START

U S OFFICIAL GAZETTE UNITED STATES PATENT OFFICE

VOL. 964

NOVEMBER 1977

OFFICIAL GAZETTE of the
UNITED STATES PATENT and TRADEMARK OFFICE

November 1, 1977 | Volume 964 | Number 1

CONTENTS

The following are mailed under direction of the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, to whom all subscriptions should be made payable and all communications addressed:

THE OFFICIAL GAZETTE (PATENTS SECTION), issued weekly, subscription $342.20 per annum for first class mailing, also available as fourth-class mail at $250.00; foreign mailing $85.55 additional; single copies $6.60 each.

THE OFFICIAL GAZETTE (TRADEMARK SECTION), issued weekly, subscription $88.40 per annum, foreign mailing $22.10 additional; single copies $1.70 each.

CIRCULARS OF GENERAL INFORMATION concerning PATENTS, price 60 cents each.

CIRCULARS OF GENERAL INFORMATION concerning TRADEMARKS, price 50 cents each.

PRINTED COPIES OF PATENTS are furnished by the Patent and Trademark Office at 50 cents each; PLANT PATENTS in color, $1.00 each; copies of TRADEMARKS AND DESIGN PATENTS at 20 cents each. Address orders to the Commissioner of Patents and Trademarks, Washington, D.C., 20231.

Printing authorized by Section 11(a)3 of Title 35, U.S. Code P.T.O.

PATENT AND TRADEMARK OFFICE NOTICES

Availability of 1977 Edition of Title 37 Code of Federal Regulations

The July 1977 edition of Title 37 Code of Federal Regulations, entitled "Patents, Trademarks, and Copyrights," is now for sale by the Superintendent of Documents for $3.00 per copy. The format of this booklet has been structured to allow parts pertaining to patent regulations and trademark regulations to be grouped separately. This booklet is published by the Office of the Federal Register and contains all patent rules and forms, trademark rules and forms as well as the copyright rules. The stock number is 022–003–93389–1.

Orders for this booklet should be addressed to the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

RENE D. TEGTMEYER,
Assistant Commissioner for Patents.

Oct. 11, 1977.

Board of Appeals Decisions Rendered in the Month of September 1977

Affirmed	208
Affirmed in Part	21
Reversed	67
Total	296

Set IV of Addenda to the Classification Definitions

The definitions of the classes listed below were modified by addenda as part of Classification Orders 582 to 593 issued between April 1, 1977 and June 30, 1977. All of these addenda have been consolidated into Set IV of "Addenda to the Classification Definitions."

Class	*Class*	*Class*	*Class*	*Class*
2	72	156	245	324
3	73	164	249	328
5	74	169	250	329
6	75	173	252	330
8	76	174	254	331
13	83	175	256	332
15	84	176	260	333
19	85	178	264	335
24	87	179	266	336
26	93	180	267	337
28	100	188	273	338
29	101	191	277	340
30	102	192	280	343
32	106	200	283	350
34	109	204	285	357
38	112	206	289	360
43	113	210	291	361
44	114	214	292	363
51	118	215	295	364
52	122	219	301	365
53	123	220	302	403
55	125	221	307	416
57	126	222	308	417
59	128	223	310	418
61	132	226	312	423
62	136	228	313	425
63	137	235	314	427
64	138	238	315	428
65	139	239	318	429
66	140	241	320	444
68	141	242	321	
69	148	243	322	
70	149	244	323	

ALFRED C. MARMOR,
Administrator for Documentation.

Oct. 6, 1977.

Patent Suits

Notices under 35 U.S.C. 290; Patent Act of 1952

2,938,676, G. H. Magrath, TOP DRIVE SPINNING SPINDLE, **filed** June 10, 1977, United States Court of Claims (District of Columbia), Doc. 13–77, *George H. Magrath v. The United States.* Order, the motion to dismiss is granted and the petition is dismissed, July 8, 1977.

3,275,487, J. H. Lemelson, METHOD AND AUTOMATIC APPARATUS FOR PRODUCING PILE SURFACED PLASTIC SHEETING; **3,414,928**, same, COMBINATION SPONGE AND SCOURER, **filed** July 7, 1977, D.C., N.D. Ill. (Chicago), Doc. 77c2442, *Jerome H. Lemelson v. Minnesota Mining and Manufacturing Company.*

3,315,278, Schatzki, Schleeweiss and Richardson, SWIMMING POOL STRUCTURE, **filed** July 6, 1977, D.C., E.D.N.Y., (Brooklyn), Doc. 77–C–1382, *Swim 'n Play, Inc. v. Polytech Pool Manufacturing, Inc.*

3,414,928. (See 3,275,487.)

3,515,792, R. Deutsch, DIGITAL ORGAN; **3,610,799**, G. A. Watson, MULTIPLEXING SYSTEM FOR SELECTION OF NOTES AND VOICES IN AN ELECTRONIC MUSICAL INSTRUMENT; **3,610,805**, Watson and Deutsch, ATTACK AND DECAY SYSTEM FOR A DIGITAL ELECTRONIC ORGAN; **3,610,806**, R. Deutsch, ADAPTIVE SUSTAIN SYSTEM FOR DIGITAL ELECTRONIC ORGAN; **3,639,913**, G. A. Watson, METHOD AND APPARATUS FOR ADDRESSING A MEMORY AT SELECTIVELY CONTROLLED RATES; **3,743,755**, same, **filed** June 2, 1977, D.C., C.D. Calif. (Los Angeles), Doc. CV77–2002–FW, *Nippon Gakki Seizo Kabushiki Kaisha v. Allen Organ Company.*

3,544,267, G. R. Dychdala, CALCIUM HYPOCHLORITE PRODUCT AND PROCESS FOR PRODUCING SAME, **filed** June 29 1977, D.C., N.D. Ohio (Akron), Doc. C77–240–A, *Pennwalt Corporation v. PPG Industries, Inc.*

3,610,799. (See 3,515,792.)

3,610,805. (See 3,515,792.)

3,610,806. (See 3,515,792.)

3,639,913. (See 3,515,792.)

3,743,755. (See 3,515,792.)

3,751,649, T. W. Hart, Jr., MEMORY SYSTEM EXERCISER, **filed** Mar. 16, 1974, D.C., C.D. Calif. (Los Angeles), Doc. CV74–2016–DWW, *Macrodata Corporation v. Xincom Corp. and Tektronix, Inc.* It is hereby stipulated that the complaint and counterclaim be dismissed, Jan. 12, 1976.

3,785,050, Witledge and Kavick, COUPLING ATTACHMENT DEVICE; **3,858,298**, same, SWAGING APPARATUS, **filed** Apr. 14, 1977, D.C., N.D. Ga. (Atlanta), Doc. C77–584A, *Parker-Hannifin Corporation v. Samuel Moore & Company.*

3,792,133, R. R. Goughnour, METHOD FOR SLIP-FORMING WALLS OF ASYMMETRICAL TRANSVERSE CROSS SECTION; **3,957,405**, same, SLIP FORM HAVING HINGED GATE MEANS; **4,014,633**, same, ADJUSTABLE SLIP FORM, **filed** June 6, 1977, D.C., N.D. Iowa (Sioux City), Doc. C–77–4038, *Gomaco Corporation v. A. C. Aukerman Co.*

3,809,264, G. K. Mayers, METHOD OF LOADING CARGO CONTAINERS, **filed** Apr. 4, 1977, D.C. Oreg. (Portland), Doc. 77–279, *Gerald Mayers et al v. Port of Portland et al.*

3,810,631, J. M. Braly, GOLF CLUB HEAD OF THE IRON TYPE HAVING A CONCAVE SOLE, **filed** Nov. 12, 1976, D.C. Del. (Wilmington), Doc. 76–395, *Con-Sole Golf Corporation v. Wilson Sporting Goods Company.* The above case is dismissed with prejudice, Apr. 11, 1977.

3,823.522, Jureit and Jardins,, HINGED CONNECTOR PLATE, **filed** June 7, 1977, D.C., M.D. Pa. (Scranton), Doc. 77–485, *Automated Building Components, Inc. v. Thomas Fahringer, doing business as Fahringer Distributors.* **Same, filed** June 29, 1977, D.C., S.D. Fla. (Miami), Doc. 77–6291–C–JLK, *Alpine Engineering Products, Inc. et al v. Automated Building Components, Inc.*

3,858,298. (See 3,785,050.)

3,858,623, L. R. Lefkowitz, PAPERMAKERS FABRICS, **filed** Dec. 23, 1976, D.C., W.D. La. (Shreveport), Doc. 76–1359, *Huyck Corporation v. Scapa Group, Limited and Unaform, Inc.* **Same, filed** Dec. 23, 1976, D.C. S.C. (Greenville), Doc. 76–2456, *Huyck Corporation v. Asten-Hill Mfg. Co. and Wisconsin Wire, Inc.* **Same, filed** Feb. 17, 1977, D.C.S.C. (Greenville), Doc. C.A. 77–326, *Unaform Inc. v. Huyck Corporation.* **Same, filed** July 1, 1975, D.C., M.D. Ala. (Montgomery), Doc. 75–225–N, *Huyck Corporation v. Albany International Corporation.* Judgment, defendant is hereby restrained and enjoined from directly or indirectly infringing any claim of said patent. Judgment is hereby entered against defendant, Feb. 3, 1977.

3,868,883, J. M. Tucker, GUIDANCE SYSTEM, **filed** May 20, 1977. United States Court of Claims (District of Columbia), Doc. 278–77, *McDonnell Douglas Corporation v. The United States of America.*

3,895,380, Nishina and Suzuki, DIGIT DISPLAY APPARATUS, **filed** Apr. 26, 1977, D.C., S.D. Fla. (Miami), Doc. 77–1399–C–JLK, *Tamura Electric Works, Ltd. v. Kendale Technology Corporation.*

3,905,398, Johansen, Phillipp and Green, COMPOSITE REINFORCED HOSE WHEREIN THE REINFORCING MATERIAL IS BRAIDED AROMATIC POLYAMIDE FILAMENTS, **filed** Oct. 20, 1975, D.C., W.D. Okla. (Oklahoma City), Doc. 75–0889–C, *Samuel Moore and Company v. American Hose & Reel Co., Inc.* Complaint dismissed on motion of plaintiff, Oct. 20, 1975.

3,911,521, C. Parise, STEAM CLEANER DUMP BUCKET, **filed** Oct. 14, 1975, D.C. Colo. (Denver), Doc. 75–1073, *Parise & Sons, Inc. v. Magi-Clean, Inc.* Upon stipulation of counsel, order of dismissal without prejudice entered Dec. 15, 1976.

3,917,890, S. Levy, COMPOSITE TAPE AND METHOD OF FORMING THE SAME, **filed** Sept. 20, 1976, D.C., S.D. Tex. (Houston), Doc. CA76–H–1540, *The Leal Corp. v. Cooper Industries, inc.*

3,929,020, R. W. Honkanen, LEAK-RESISTENT GAUGE, **filed** July 19, 1976, D.C., C.D. Calif. (Los Angeles), Doc. CV76–2294–LEW, *Reino Honkanen v. Sportsways & Pittman Rubber Company.*

3,954,273, Shaper and Litcher, PHONOGRAPH PICKUP CARTRIDGE, **filed** July 5, 1977, D.C., N.D. Ill. (Chicago), Doc. 77c2391, *Empire Scientific Corporation v. Shure Brothers. Inc.*

3,957,176, L. Marston, DISPOSABLE PUTTY DISPENSER, **filed** Nov. 4, 1976, D.C.N.J. (Trenton), Doc. 76–2117, *Dynatron/Bondo Corporation v. The Clausen Company.* Plaintiff voluntarily dismissed action, June 27, 1977.

3,957,405. (See 3,792,133.)

3.957,557, R. Fraige, WATER MATTRESS AND METHOD OF MANUFACTURE, **filed** Sept. 14, 1976, D.C., N.D. Calif. (San Francisco), Doc. C–76–1966–WAI, *Vinyl Products Mfg. Inc. and Richard Fraige v. Calco-Hawaiian Import & Export Co., doing business as Calco-Hawaiian, Inc., Paul D. Callenace and Ronald D. Beal.*

4,014,633. (See 3,792,133.)

D. 226,375, Wells and Krusinski, AUTOMOBILE FLOOR MAT, **filed** Nov. 19, 1973, D.C., N.D. Ill. (Chicago), Doc. 73c2941, *Pretty Products Incorporated v. American Biltrite Incorporated.* Case dismissed, June 30, 1975.

D. 227,498, McCanse and Gecan, ROTARY MOWER, **filed** Dec. 3, 1973, D.C. Kans. (Kansas City), Doc. KC–3869, *Hesston Corporation v. The Sun Master Corporation, Inc.* Defendant has infringed said design patent, June 17, 1976.

D. 236,535, Larsen and Oehring, VEHICLE LIGHT, **filed** Mar. 9, 1977, D.C., C.D. Calif. (Los Angeles), Doc. CV–77–861–F, *Bates Industries, Inc. v. K–D Lamp Co. et al.*

D. 239,301, R. Clarke, SEATED BENCH EXERCISING MACHINE; **D. 239,302**, same, TRICEP EXERCISING MACHINE; **D. 239,303**, same, VERTICAL BUTTERFLY EXERCISING MACHINE; **D. 239,306**, same, LEG CURL EXERCISING MACHINE; **D. 239,398**, same, ARM CURL EXERCISING MACHINE; **D. 239,399**, same, PULLOVER EXERCISING MACHINE; **D. 239,641**, same, LOWER BUTTOCKS AND HAMSTRING EXERCISING MACHINE; **D. 239,643**, same, HIP AND BUTTOCKS EXERCISING MACHINE, **filed** Dec. 1, 1976, D.C., C.D. Calif. (Los Angeles), Doc. CV–75–3709–RMT, *Paramount Health Equipment Corp. v. United Physical Fitness Products et al.*

D. 239,302. (See D. 239,301.)

D. 239,303. (See D. 239,301.)

D. 239,306. (See D. 239,301.)

D. 239,398. (See D. 239,301.)

D. 239,399. (See D. 239,301.)

D. 239,611. (See D. 239,301.)

D. 239,643. (See D. 239,301.)

D. 240,993, M. L. Levin, ELECTRIC FOOD COOKER, **filed** Aug. 18, 1976, D.C., C.D. Calif. (Los Angeles), Doc. CV76–2636–LEW, *Scovill Manufacturing Company v. Winnie Mae Manufacturing Co., Inc., doing business as American Electric.*

D. 244,647, G. Offredi, ARMCHAIR, **filed** June 29, 1977, D.C., S.D.N.Y., Doc. 77–C–3170, *Fratelli Saporiti Industria Arredamenti Di Saporti, Sergio E. Giorgio S.N.S.C. v. Designers Furniture Center Int'l.*

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b)).

3,516,149, Re. S.N. 822,973, Filed Sept. 19, 1977, Cl. 29/568, MACHINING APPARATUS WITH AUTOMATIC TOOL CHANGING MEANS, George Mickas, Owner of Record: *Ex-Cell-O Corporation, Detroit, Mich.*, Attorney or Agent: James H. Bower, Ex. Gp.: 342

3,579,311, Re. S.N. 828,972, Filed Aug. 29, 1977, Cl. 423/261, PROCESS AND APPARATUS FOR PRODUCING UO_2 POWDER, John J. McCoy, Owner of Record: *General Electric Co., New York, N.Y.*, Attorney or Agent: Ivor J. James, Jr., et al., Ex. Gp.: 223

3,756,212, Re. S.N. 822,691, Filed Aug. 8, 1977, Cl. 123/148 E, ARRANGEMENTS FOR ELECTRONICALLY DETERMINING AND ADJUSTING THE IGNITION TIME OF AN INTERNAL COMBUSTION ENGINE, Gunter Schirmer, et al., Owner of Record: *Robert Bosch G.m.b.H., Stuttgart, Germany,* Attorney or Agent: Michael J. Striker, Ex. Gp.: 342

3,876,498, Re. S.N. 830,915, Filed Sept. 6, 1977, Cl. 162/199, CONTROLLED FORMING WIRE SEPARATION ON IMPERVIOUS ROLL OF TWIN-WIRE PAPER-MAKING MACHINE, Edgar J. Justus, Owner of Record: *Beloit Corporation, Beloit, Wis.*, Attorney or Agent: Benjamin H. Sherman, et al., Ex. Gp.: 173

3,904,084, Re. S.N. 830,900, Filed Sept. 6, 1977, Cl. 222/105, PLASTIC BAG AND A PROTECTIVE CONTAINER THEREFOR AND A FIXTURE FOR SECURING THE BAG IN THE CONTAINER, Luigi Ukmar, et al., Owner of Record: *Montecatini Edison S.p.A., Milan, Italy,* Attorney or Agent: Davidson C. Miller, et al., Ex. Gp.: 311

3,960,332, Re. S.N. 828,269, Filed Aug. 29, 1977, Cl. 241/46.06, DEFIBERING APPARATUS FOR PAPERMAKING STOCK, Peter Seifert, Owner of Record: *The Black Clawson Company, Middletown, Ohio,* Attorney or Agent: Lawrence B. Biebel, et al., Ex. Gp.: 325

3,981,523, Re. S.N. 829,826, Filed Sept. 1, 1977, Cl. 282/27.5, CARBONLESS MANIFOLD BUSINESS FORMS, George E. Maalouf, Owner of Record: *Moore Business Forms, Inc., Niagara Falls, N.Y.*, Attorney or Agent: James H. Marsh, Jr., Ex. Gp.: 165

4,030,791, Re. S.N. 830,228, Filed Sept. 2, 1977, Cl. 339/5 M, ELECTRICAL CONTACT SYSTEM, Wilmer Lee Sheesley, Owner of Record: *AMP Incorporated, Harrisburg, Pa.*, Attorney or Agent: William J. Keating, et al.; Ex. Gp.: 325

4,032,209, Re. S.N. 831,355, Filed Sept. 7, 1977, Cl. 339/91 R, MULTIPLE SOCKET ASSEMBLY FOR ELECTRICAL COMPONENTS, John L. Rutkowski, Owner of Record: *Appleton Electric Company, Chicago, Ill.*, Attorney or Agent: Howard H. Darbo, et al., Ex. Gp.: 325

4,036,511, Re. S.N. 829,825, Filed Sept. 1, 1977, Cl. 282/27.5, CARBONLESS MANIFOLD BUSINESS FORMS, George E. Maalouf, Owner of Record: *Moore Business Forms, Inc., Niagara Falls, N.Y.*, Attorney or Agent: James H. Marsh, Jr., Ex. Gp.: 165

PATENT NOTICES

Certificates of Correction for the Week of Nov. 1, 1977

Re. 29,226	4,014,755	4,029,776	4,037,843
Re. 29,320	4,014,877	4,029,971	4,037,990
D. 242,570	4,014,919	4,030,167	4,038,056
D. 243,505	4,014,973	4,030,425	4,038,146
3,437,494	4,016,465	4,030,777	4,038,166
3,594,526	4,017,548	4,030,966	4,038,175
3,739,364	4,018,780	4,031,017	4,038,206
3,848,392	4,019,100	4,031,106	4,038,232
3,864,768	4,019,817	4,031,133	4,038,373
3,873,571	4,019,875	4,031,188	4,038,408
3,891,619	4,019,895	4,031,284	4,038,463
3,907,811	4,020,045	4,031,312	4,038,549
3,909,654	4,020,715	4,031,371	4,038,593
3,931,492	4,021,021	4,031,669	4,038,701
3,951,906	4,021,286	4,031,974	4,038,713
3,956,069	4,021,426	4,032,423	4,038,722
3,957,818	4,021,535	4,032,525	4,038,816
3,962,637	4,022,704	4,032,622	4,038,917
3,963,765	4,022,781	4,032,711	4,038,943
3,967,031	4,022,790	4,032,773	4,039,093
3,971,088	4,022,974	4,033,189	4,039,309
3,971,968	4,023,476	4,033,243	4,039,367
3,972,407	4,024,149	4,033,301	4,039,523
3,973,122	4,024,238	4,033,466	4,039,584
3,974,186	4,024,519	4,033,482	4,039,592
3,975,224	4,024,637	4,033,515	4,039,648
3,975,564	4,024,925	4,033,672	4,039,663
3,978,141	4,025,191	4,033,686	4,039,693
3,979,000	4,025,496	4,033,775	4,039,789
3,979,298	4,025,667	4,033,892	4,039,837
3,982,966	4,025,916	4,034,249	4,039,907
3,985,604	4,026,380	4,034,939	4,040,130
3,986,171	4,026,691	4,035,049	4,040,207
3,994,909	4,026,726	4,035,116	4,040,421
3,996,376	4,026,944	4,035,162	4,040,470
3,999,641	4,027,035	4,035,903	4,040,562
4,001,025	4,027,145	4,035,970	4,040,581
4,001,208	4,027,287	4,036,068	4,040,595
4,003,906	4,027,479	4,036,262	4,040,923
4,004,529	4,027,585	4,036,275	4,040,983
4,006,215	4,027,718	4,036,283	4,041,008
4,006,741	4,027,827	4,036,302	4,041,132
4,008,249	4,028,092	4,036,349	4,041,347
4,008,545	4,028,394	4,036,802	4,041,363
4,009,165	4,028,458	4,037,018	4,041,374
4,011,390	4,028,716	4,037,206	4,041,471
4,012,679	4,028,806	4,037,448	4,042,584
4,013,011	4,029,106	4,037,475	4,042,592
4,013,322	4,029,289	4,037,641	4,043,572
4,014,343	4,029,335	4,037,764	4,043,879
4,014,460	4,029,501	4,037,768	4,043,957
4,014,592	4,029,671	4,037,786	4,044,366

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF AUGUST 27, 1977

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	8-30-76
GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	9-17-76
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	6-1-76
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials: Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	10-21-76
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	10-6-76
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales.	7-26-76
SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	6-7-76
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	8-17-76
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating.	3-8-77
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave-Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	6-25-76
DESIGNS, GROUP 290—C. D. QUARFORTH, Director Industrial Arts; Household, Personal and Fine Arts.	1-15-76
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—D. J. STOCKING, Director Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	10-5-76
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director Manufacturing Processes, Assembling, Combined Machines. Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus: Plastics Working Apparatus; Plastic Block and Earthenware Apparatus: Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks.	11-24-76
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—G. M. FORLENZA, Director Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	9-3-76
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GAY, Director Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication.	9-16-76
GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director Joints; Fasteners; Rod, Pipe and Electrical Connectors; Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines.	1-3-77

Expiration of patents: The patents within the range of numbers indicated below expire during August 1977, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents........ Numbers 2,947,001 to 2,951,248, inclusive
Plant Patents........ Numbers 1,963 to 1,969, inclusive

DEFENSIVE PUBLICATIONS

PUBLISHED NOVEMBER 1, 1977

Published at the request of the applicant or owner in accordance with the Notice of Dec. 16, 1969, 869 O.G. 687. The abstracts of Defensive Publication applications are identified by distinctly numbered series and are arranged chronologically. The heading of each abstract indicates the number of pages of specification, including claims and sheets of drawings contained in the application as originally filed. The files of these applications are available to the public for inspection and reproduction may be purchased for 30 cents a sheet.

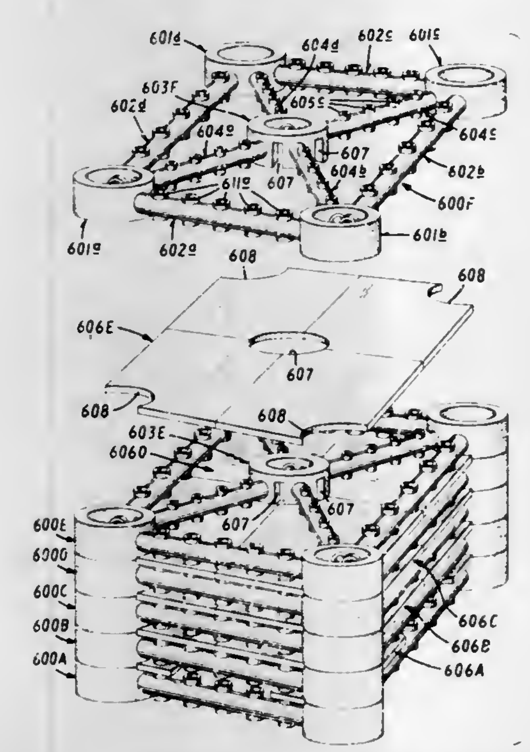
Defensive Publication applications have not been examined as to the merits of alleged invention. The Patent and Trademark Office makes no assertion as to the novelty of the disclosed subject matter.

T964,001

STRUCTURAL INTEGRATED ASSEMBLY OF RELATIVELY RIGID TUBULAR MEMBERS INCLUDING AT LEAST ONE SMALLER SUCH MEMBER EXTENDING THROUGH AND ANCHORED TO SUCH LARGER MEMBER

Thomas Norvin Ferwerda, 94 Brambach Road, Scarsdale, N.Y. 10583

Filed Jan. 28, 1977, Ser. No. 763,703
Int. Cl.[2] E04B *1/348*
U.S. Cl. 52—637
6 Sheets Drawing. 15 Pages Specification



Structural integrated assembly of relatively rigid tubular members that are formed of compositions selected from a group of metallic and plastic materials that are of the desired rigidity. The assembly includes at least a section of such relatively rigid tubular composition which is of relatively large internal cross-sectional dimensions, and at least one other relatively rigid tubular section which is in the form of a transversely smaller bridging member that extends transversely through openings in opposite sides of the relatively large tubular member there to provide two separate and spaced junctions. Suitable means integratively connect all circumambient points of the exterior surface of the smaller bridging member in each junction to all of the immediately adjacent points of the circumscribing edge of the opening in the larger tubular member thereat. The edges of the openings in the larger rigid tubular member that meet with the adjacent external surfaces of the smaller rigid member which extend therethrough are continuously anchored to the latter by joint weldings.

T964,002

METHOD TO PURIFY MAGNESIUM CHLORIDE TO PRODUCE A FLUX FOR MOLTEN MAGNESIUM

Henry A. Kuchek, 4842 S. Garfield Road, Auburn, Mich. 48611

Filed Nov. 3, 1976, Ser. No. 738,192
Int. Cl.[2] C22B *45/00*
U.S. Cl. 75—67 A
No Drawing. 7 Pages Specification

A method to remove organic impurities, such as Grignard reagents, from an impure magnesium chloride by heating the magnesium chloride in a vacuum at a temperature of up to about 500° C, and preferably from about 300° to about 500° C, and recovering a purified magnesium chloride product. The purified product is preferably added to a molten bath including potassium chloride and commercially pure magnesium chloride at a temperature of at least about 426° C and preferably from about 450° to about 760° C. The bath is thereafter solidified into a desired size and used as a flux for molten magnesium. Upon solidification, the magnesium treated with flux including the purified magnesium chloride has a finer grain size than magnesium treated with a similar flux containing commercially pure magnesium chloride.

T964,003

HARDENABLE MARTENSITIC STAINLESS STEEL

Wilson P. Rehrer, R.D. No. 2, Box 496, Reading, Pa. 19605

Filed Oct. 6, 1976, Ser. No. 730,003
Int. Cl.[2] C22C *38/44, 38/46, 38/48*
U.S. Cl. 75—128 G
1 Sheets Drawing. 14 Pages Specification

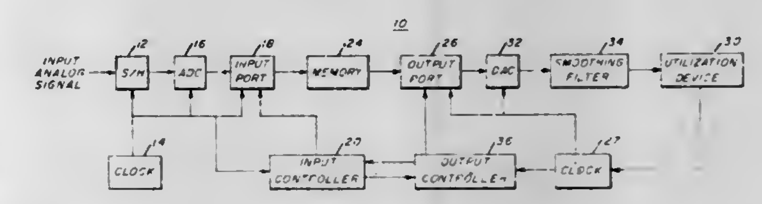
A corrosion resistant hardenable martensitic chromium stainless steel containing about 0.10–0.2% carbon, up to about 0.90% manganese, up to about 0.35% silicon, up to about 0.025% phosphorus, up to about 0.025% sulfur, about 11.00–12.50% chromium, about 2.00–3.00% nickel, about 1.50–2.00% molybdenum, about 0.25–0.40% vanadium, up to about 0.05% nitrogen, about 0.10–0.25% columbium, and the balance iron plus impurities. When austenitized at a temperature above about 1900° F, the steel has a grain size no coarser than about ASTM-7.

T964,004

TIME-BASE INSTABILITY COMPENSATION APPARATUS FOR USE IN COPY/DUPLICATION

L. Nevil Davy, 343 State St., Rochester, N.Y. 14650

Filed Oct. 26, 1976, Ser. No. 735,645
Int. Cl.[2] H04B *1/66*
U.S. Cl. 179—15.55 T
1 Sheets Drawing. 8 Pages Specification

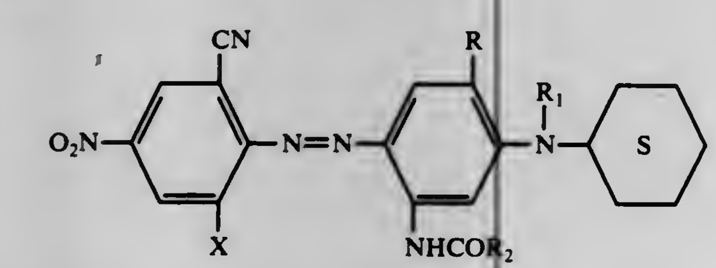


Apparatus is disclosed which compensates for time-base instabilities in analog signals representative of a document image and includes an analog-to-digital converter for digitizing such analog signals, a digital storage device, such as a read/write memory, for storing such digitized signals, and a digital-to-analog converter which is adapted to be sequentially connected to selected locations of the memory to reconstruct the input analog signals for use by a printer. The read/write memory is of a wraparound variety. Further, input and output controllers are provided, having address pointers for the memory. The input pointer causes digitized analog signals to be stored in sequence at consecutive storage locations of the memory. The output pointer removes such stored digital sig-

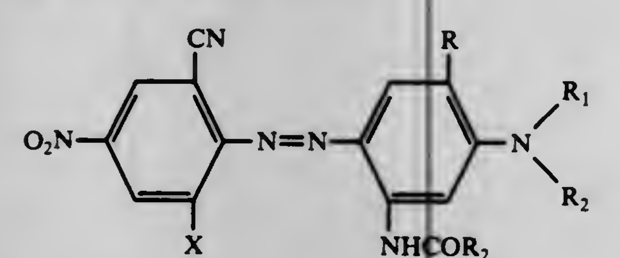
nals from consecutive storage locations of memory and applies them to the digital-to-analog converter. These pointers are independently incremented under the control of input (document scanner) or output operations (printer), respectively, to remove surges in data flow thereby compensating for timebase instabilities.

T964,005
MONOAZO DYE MIXTURES
Clarence A. Coates, Jr., Rte. 8, and Gary T. Clark, 513 Montezuma Road, both of Kingsport, Tenn. 37664
Filed Mar. 10, 1977, Ser. No. 776,457
Int. Cl.² C09B *29/26;* **D06P** *3/36, 3/52*
U.S. Cl. 8—26
No Drawing. 10 Pages Specification

Mixtures of monoazo dyes having at least one dye of the formula



and at least one dye of the formula



wherein X is chlorine, bromine, alkylsulfonyl of 1 to 6 carbon atoms, CN, CF_3 or NO_2; R is hydrogen or alkyl or alkoxy of 1 to 6 carbon atoms; R_1 is hydrogen, alkyl or alkoxy of 1 to 6 carbon atoms or alkyl of 1 to 6 carbon atoms substituted with phenyl, hydroxy or alkanoyloxy of 1 to 6 carbon atoms; R_2 is hydrogen, cyclohexyl, phenyl, alkoxy or alkyl of 1 to 6 carbon atoms or alkyl of 1 to 6 carbon atoms substituted with phenyl, chloro, phenoxy or alkoxy of 1 to 6 carbon atoms; and R_3 has the same meaning as R_1 excluding hydrogen. These mixtures produce bright, fast blue shades on polyester fibers having excellent fastness to light, wash, crock, gas, acid or base perspiration and sublimation. These mixtures have excellent pH stability over a range of 4–8 when applied to polyester above the boil, typically 220° to 275° F. These mixtures have superior build-up characteristics, color yield, exhaustion on to the fiber, leveling, barre coverage and rate of dyeing and have excellent shade reproducibility. The excellent saturation values and faster rates of dyeing are economically advantageous to the dyer.

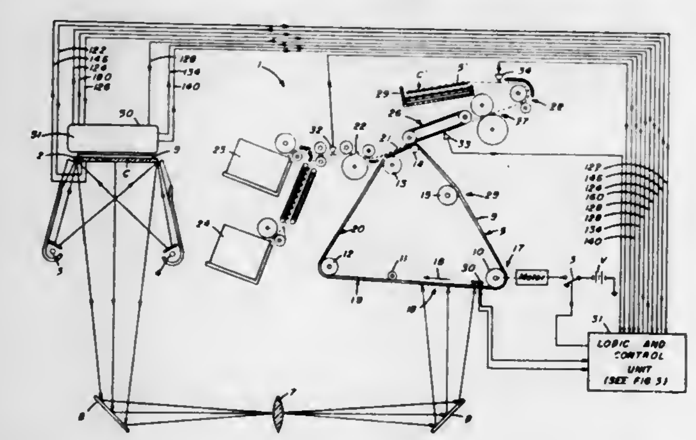
T964,006
ANTIMICROBIAL FATTY ESTER-AMIDES
August V. Bailey, 4470 San Marco Road, New Orleans, La. 70129; Gordon J. Boudreaux, 6625 Dorian St., New Orleans, La. 70126; Gene Sumrell, 1540 Aviators St., New Orleans, La. 70122, and Arthur F. Novak, 656 College Hill Drive, Baton Rouge, La. 70808
Division of Ser. No. 667,063, March 15, 1976, Pat. No. 4,017,522. This application Feb. 15, 1977, Ser. No. 768,808
Int. Cl.² C09F *5/00*
U.S. Cl. 260—404
No Drawing. 15 Pages Specification

New ester-amides containing one or more long chain fatty acyl groupings are described which have antimicrobial activity against several pathogenic microorganisms, and have properties making them useful as antimicrobial agents.

T964,007
ANTIMICROBIAL ESTERS OF ALIPHATIC DIOLS
August V. Bailey, 4470 San Marco Road, New Orleans, La. 70129; Gordon J. Boudreaux, 6625 Dorian St., New Orleans, La. 70126; Gene Sumrell, 1540 Aviators St., New Orleans, La. 70122, and Arthur F. Novak, 656 College Hill Drive, Baton Rouge, La. 70808
Division of Ser. No. 667,055, March 15, 1976, Pat. No. 4,024,164. This application Feb. 15, 1977, Ser. No. 768,807
Int. Cl.² C09F *5/08, 7/10*
U.S. Cl. 260—410.5
No Drawing. 12 Pages Specification

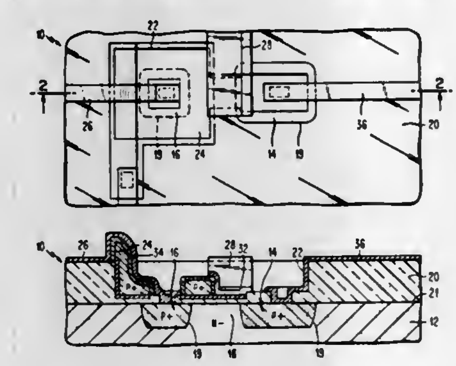
New mixed esters of diols having one hydroxyl group esterified with benzoic acid and the other esterified with various saturated or unsaturated aliphatic acids or aromatic acids other than benzoic are found to have antimicrobial activity against several pathogenic microorganisms, and to have properties making them useful as antimicrobial agents.

T964,008
SEPARATION MEMBER RETURN MEANS FOR USE IN RECIRCULATING FEEDERS
William Edward Hunt, 901 Elmgrove Road, Rochester, N.Y. 14650
Filed Mar. 28, 1977, Ser. No. 781,812
Int. Cl.² G03B *27/48, 27/50*
U.S. Cl. 355—50
3 Sheets Drawing. 19 Pages Specification



A recirculating feeder adapted to be coupled to a copier is set forth which employs a separator member that initially engages the top document sheet of a multi-sheet document in a tray and incrementally moves downwardly under the influence of gravity as individual document sheets are fed from the bottom of the multi-sheet document to the copier exposure platen and returned to the top of the multi-sheet document in the tray. After the sheet initially engaged by the separator member is fed, the separator member moves downwardly to be spaced from the tray and a motor control circuit is activated which energizes a motor. The energized motor drives the separator member towards return engagement with the top document sheet of the multi-sheet document in the tray. Prior to the separator member returning to such engagement, the control circuit de-energizes the motor and connects it to a dynamic brake circuit which retards the rotation of the motor and movement of the separator member to the extent that the separator member gently re-engages the top document sheet, and does not damage it.

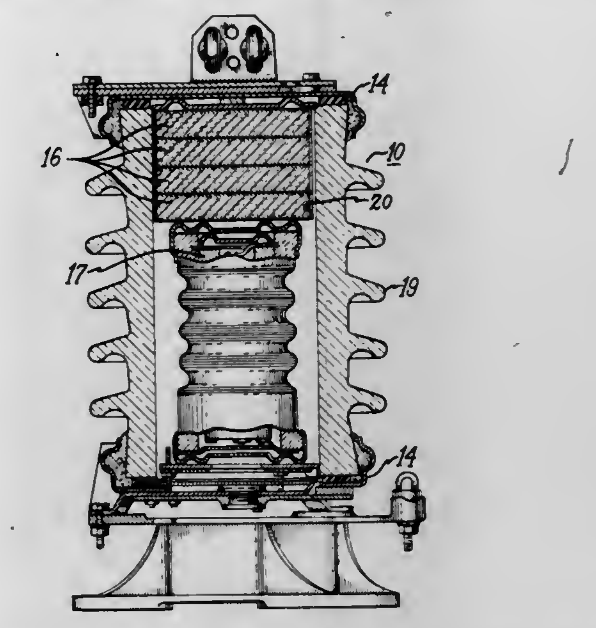
T964,009
HIGH VOLTAGE SEMICONDUCTOR STRUCTURE
Te-Long Chiu, 25 Hilltop Drive, Wappingers Falls, N.Y. 12950, and Madhukar B. Vora, Taconic Drive, Hopewell Junction, N.Y. 12533
Continuation of Ser. No. 547,912, Feb. 6, 1975, abandoned, which is a continuation of Ser. No. 361,101, May 17, 1973, abandoned. This application Apr. 5, 1976, Ser. No. 673,510
Int. Cl.² H01L *29/78*
U.S. Cl. 357—23
1 Sheets Drawing. 9 Pages Specification



In a field effect transistor having a semiconductor body, spaced source and drain regions, an insulating layer on the surface of the body, and an electrode to the source region, the improvement being a field shield electrode on the insulating layer overlying at least the PN junction of the drain region that terminates at the interface of the surface of the body and the insulating layer, and a gate electrode on the insulating layer over at least a portion of the channel region, the gate electrode and the field shield electrode in combination overlying all of the channel region. Another feature of the invention is a high voltage line for use on a semiconductor device consisting of a diffused region of opposite conductivity in the semiconductor body, an overlying insulating layer having an opening therein, and an overlying field shield conductive stripe that overlies the PN junction of the diffused region that terminates at the surface of the body.

T964,010
NON-LINEAR RESISTANCE OVERVOLTAGE SURGE ARRESTER DISC WITH CERAMIC COLLAR AND METHOD FOR APPLYING
John J. Pitha, 165 Walker St., Lenox, Mass. 01240, and Howard F. Ellis, Stephentown, N.Y. 12168
Continuation of Ser. No. 735,072, Oct. 22, 1976, which is a division of Ser. No. 576,324, May 12, 1975, abandoned. This application May 2, 1977, Ser. No. 792,586
Int. Cl.² B05D *3/02, 5/12;* **H01C** *7/12*
U.S. Cl. 428—210
1 Sheets Drawing. 11 Pages Specification

A zinc oxide compound nonlinear resistance overvoltage surge arrester disc is provided with a low temperature-curing ceramic antiflashover collar having relatively low coefficient of thermal expansion of about 4.5×10^{-6}. The cured ceramic comprises the reaction product of a dry mixture of 80% by weight of mullite refractory filler and 20% kaolin suspending clay, together with 5% to 15% of the weight of the dry mixture of a binder consisting of equal weights of monoaluminum phosphate and concentrated phosphoric acid.



Also disclosed is a method of application comprising the steps of applying the slurry to the perimeter of the disc and baking at a temperature below about 600° Celsius.

T964,011
ADHESIVE COMPOSITIONS HAVING A CARBON BLACK COMPONENT
Thomas C. Blanken, 3 Badhuisweg, Amsterdam, Netherlands
Filed Feb. 28, 1977, Ser. No. 772,810
Claims priority, application United Kingdom, Mar. 30, 1976, 12744/76
Int. Cl.² C08L *95/00, 53/02;* **B32B** *11/04, 27/00*
U.S. Cl. 428—489
No Drawing. 10 Pages Specification

Article provided with a pressure-sensitive adhesive layer composition, which composition is characterized by improved flow resistance at high temperatures (e.g. at 90° C), and which comprises 50–97 parts by weight of a bituminous component dispersed in an extender oil, 3 to 50 parts by weight of at least one thermoplastic polymer, which is preferably a block polymer having the general structure:

A—B—(B-A)n

where A is a monoalkenyl arene block, B is a conjugated diene block, and n is an integer from 1–15, and 5 to 50% by weight (based on the combined weight of the bituminous component and the thermoplastic polymer) of a carbon black having an oil absorptivity of above 80 milliliters per 100 grams. Such articles usually possesses good low temperature flexibility, tack and adhesive strength.

REISSUES

NOVEMBER 1, 1977

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 29,462

LUMINOUS OUTDOOR SIGN BOARD RESISTANT TO INCLEMENT WEATHER

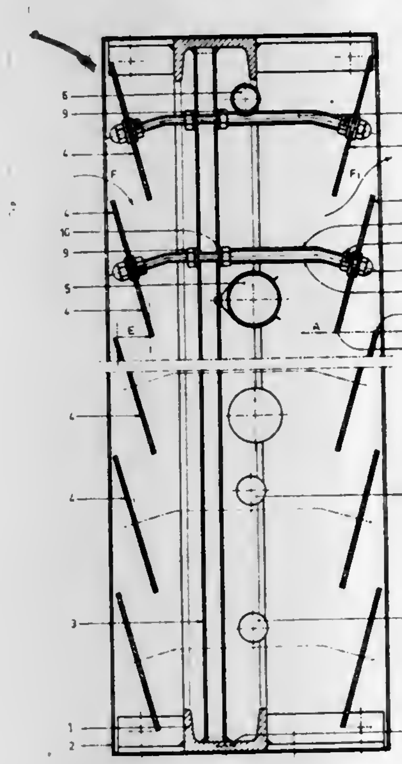
Rene Verazin Tchakgarian, 19, Avenue Charles de Gaulle, Autun (Saone et Loire), France

Original No. 3,837,105, dated Sept. 24, 1974, Ser. No. 331,334, Feb. 9, 1973. Application for reissue July 26, 1976, Ser. No. 708,593

Claims priority, application France, Nov. 2, 1972, 72.38851

Int. Cl.^{2} G09F ***13/04***

U.S. Cl. 40—130 R **6 Claims**



1. A luminous outdoor sign board adapted to resist inclement weather comprising:
- a framework in the form of a case defining a pair of opposed open sides,
- support means within the case including a plurality of rods extending toward said opposed open sides of the case,
- a plurality of parallel translucent slats,
- each slat being supported by attachment to a plurality of said rods, the attachment between each slat and its support rods being located at spaced points along the centerline axis of the slat for allowing free expansion of the edges of the slats,
- said parallel translucent slats being positioned in the open sides of said case with the edges of said slats when seen in the vertical plane being continuous, so that when standing back the viewer obtains the impression that he is facing a plane surface,
- said slats being inclined in the same direction to form between them lateral interstices extending over their entire length for allowing the wind and rain water to pass freely through the sign board both horizontally and vertically for making the sign board aerated and self-washing,
- letters forming a message being fixed on the slats, and
- lighting means located in the case illuminating from the inside said translucent slats and said letters on the slats.

Re. 29,463

TANKER FOR LIQUIFIED AND/OR COMPRESSED GAS

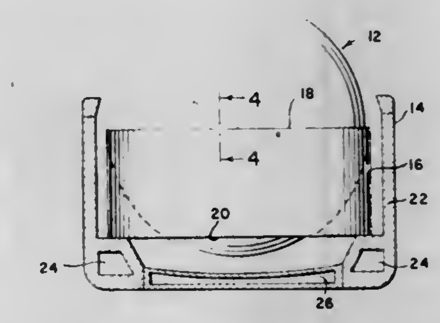
Ragnar Bognaes, Jeloy, and Olav Solberg, Oslo, both of Norway, assignors to Kvaerner Brug A/S, Olso, Norway

Original No. 3,680,323, dated Aug. 1, 1972, Ser. No. 81,101, Oct. 15, 1970. Application for reissue Dec. 21, 1976, Ser. No. 752,897

Claims priority, application Norway, Oct. 10, 1969, 694145

Int. Cl.^{2} F17C ***13/08***

U.S. Cl. 62—55 **31 Claims**



1. Apparatus for storing liquified gas in combination with a cargo tank on board a marine vessel having a hull structure, said tank being generally curvilinear in cross section, and said apparatus comprising skirt means operably interconnecting said tank and said hull structure for supporting said tank on said structure, said skirt extending tangentially to said tank and having one end thereof integrally connected to said hull structure and the other end thereof integrally connected to said tank along a peripheral portion thereof, and separate means for maintaining a low temperature condition within said tank to maintain said gas in its liquid phase.

Re. 29,464

MANUFACTURE OF GLASS

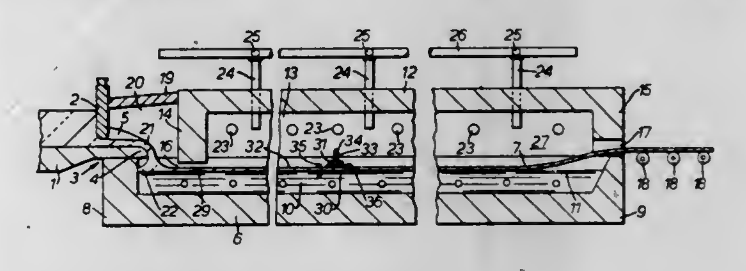
David Gordon Loukes, Prescot; William Ramsey Maltman, and Colin Robert Howard, both of St. Helens, all of England, assignors to Pilkington Brothers Limited, St. Helens, England

Original No. 3,958,969, dated May 25, 1976, Ser. No. 525,279, Nov. 19, 1974. Application for reissue Mar. 10, 1977, Ser. No. 776,471

Claims priority, application United Kingdom, Nov. 23, 1973, 54497/73

Int. Cl.^{2} C03B ***18/02***

U.S. Cl. 65—30 E **29 Claims**



1. In a method of modifying a glass surface *to produce patterned glass* in which glass is contacted with a molten metal body while the glass is at a temperature at which it is susceptible to surface modification, relative movement is effected between the molten metal body and the glass, and migration of cations from the molten metal body into the glass surface is electrically induced *by subjecting the glass to anodic treatment,* the improvement comprising periodically during said migration connecting said molten metal body as a cathode with respect to the glass for a preset time by the transmission of cathodic pulses of preset duration to the molten metal body,

and regulating the quantity of electricity passing in each cathodic pulse *and a preset time interval between the end of each cathodic pulse and the beginning of the next anodic treatment* to [a value] *values* sufficient at least partially to de-oxidise the molten metal body.

20. Apparatus for manufacturing *patterned* glass with a modified surface comprising an electrically conductive contact for one surface of the glass, electrode means for maintaining a body of molten metal in contact with the other surface of the glass, an electrical supply source connected to said contact and to said electrode means through a switchable supply circuit, and a control waveform generator connected to said switchable supply circuit and including settable means operable to cause the generator to produce a control waveform consisting of a sequence of switching pulses for application to the switching circuit to control the switching of a sequence of anodic and cathodic current pulses to the electrode means to effect the required modification of the glass surface.

Re. 29,465
PSORIASIS TREATMENT WITH MYCOPHENOLIC ACID

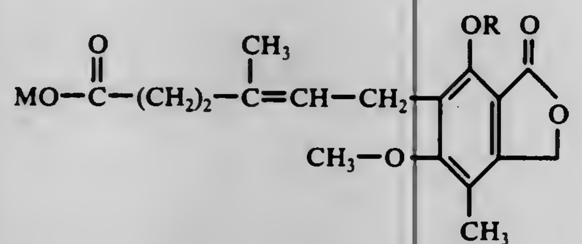
Irving S. Johnson, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Original No. 3,777,020, dated Dec. 4, 1973, Ser. No. 280,626, Aug. 14, 1972. Continuation-in-part of Ser. No. 191,824, Oct. 22, 1971, abandoned, which is a continuation-in-part of Ser. No. 93,432, Nov. 27, 1970, abandoned. Application for reissue Nov. 24, 1976, Ser. No. 744,553

Int. Cl.^{2} A61K *31/70, 31/335*

U.S. Cl. 424—180 **2 Claims**

1. A method of treating psoriasis comprising the *oral* administration to a human suffering from psoriasis [either orally or topically] of an effective amount for treating psoriasis of a compound of the formula:



wherein M is hydrogen, sodium, potassium or ammonium and R is hydrogen or β-D-glucuronidyl.

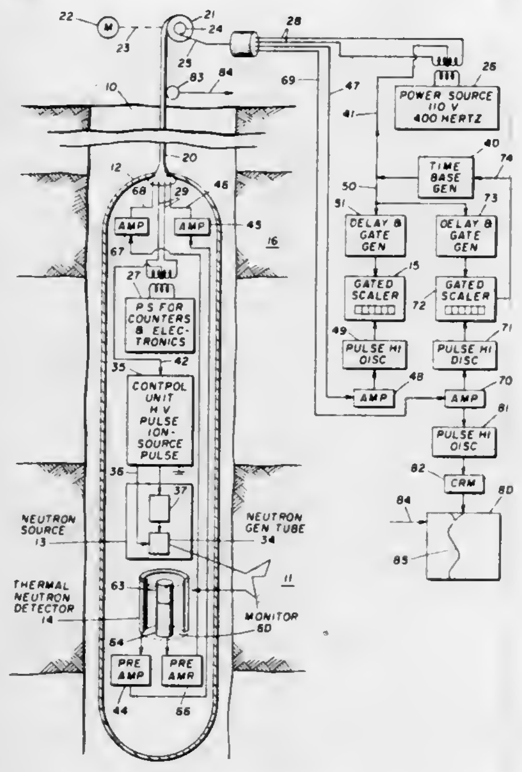
Re. 29,466
IN-SITU ASSAYING FOR URANIUM IN ROCK FORMATIONS

Wyatt W. Givens; Richard L. Caldwell, and William R. Mills, Jr., all of Dallas, Tex., assignors to Mobil Oil Corporation, New York, N.Y.

Original No. 3,686,503, dated Aug. 22, 1972, Ser. No. 38,244, May 18, 1970. Application for reissue May 7, 1976, Ser. No. 684,133

Int. Cl.^{2} G01V *5/00*

U.S. Cl. 250—269 **11 Claims**



1. A method of assaying for uranium in the formation traversed by a borehole and to obtain information indicative of the interfering effect of oxygen in said formations, comprising the steps of:

locating a pulsed neutron source and a thermal neutron detector at the level of a nonuranium-bearing formation, said source being productive of fast neutrons having energies of about 14 Mev,

Operating said source to periodically irradiate said nonuranium-bearing formation with bursts of fast neutrons spaced in time,

detecting neutrons resulting from the irradiation of said nonuranium-bearing formation and indicative of delayed neutrons emitted by oxygen as a result of irradiation by neutrons,

locating said source and detector at the level of a formation of interest suspected of containing uranium,

operating said source to periodically irradiate said formation of interest with bursts of fast neutrons spaced in time, and

detecting neutrons resulting from the irradiation of said formation of interest to detect for delayed neutrons emitted as a result of neutron fission of uranium.

PLANT PATENTS

GRANTED NOVEMBER 1, 1977

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

4,138
ROSE PLANT

J. Benjamin Williams, 2800 Elnora St., Silver Spring, Md. 20902
Filed Oct. 21, 1976, Ser. No. 734,453
Int. Cl.^{2} A01H *5/00*

U.S. Cl. Plt.—17 **1 Claim**

1. A new and distinct variety of rose plant of the grandiflora class, substantially as shown and described, characterized particularly by recurrent flowers borne singly and in sprays of 3 to 5 blooms having brilliant orange-red cast at the inner petals with iridescent quality on an upright compact plant of above average winter hardiness and disease resistance.

4,139
ROSE PLANT

William A. Warriner, Tustin, Calif., assignor to Jackson & Perkins Co., Medford, Oreg.
Filed Nov. 17, 1976, Ser. No. 742,466
Int. Cl.^{2} A01H *5/00*

U.S. Cl. Plt.—28 **1 Claim**

1. A new and distinct cultivar of rose plant of the hybrid tea class, substantially as herein shown and described, characterized particularly as to novelty by the unique combination of its very vigorous, heavily branched, upright plant; bud and flower color of dark red; little or no fragrance; average number of downward hooked prickles; and a goodly degree of mildew resistance.

4,140
PLUM TREE

Dennis Surabian, P.O. Box 206, Reedley, Calif. 93654
Filed Dec. 29, 1976, Ser. No. 755,354
Int. Cl.^{2} A01H *5/03*

U.S. Cl. Plt.—38 **1 Claim**

1. A new and distinct variety of plum tree, substantially as illustrated and described, characterized by its vigorous growth and regular bearing of large, yellow fleshed when ripe, freestone fruit whose flesh becomes brilliantly red in storage; and by its general resemblance to the Laroda (unpatented) plum tree from which it is distinguished by its earlier appearing final skin coloration and from which it is further distinguished by such coloration being much darker, almost black.

4,141
NECTARINE TREE

Dennis Surabian, P.O. Box 206, Reedley, Calif. 93654
Filed Dec. 29, 1976, Ser. No. 755,228
Int. Cl.^{2} A01H *5/03*

U.S. Cl. Plt.—41 **1 Claim**

1. A new and distinct variety of nectarine tree, substantially as illustrated and described, characterized by its vigorous growth; its bearing of large, freestone, yellow fleshed fruit; and by its general resemblance to the Fantasia (unpatented) Nectarine Tree, but from which it is distinguished by its fruit ripening from 14 to 19 days earlier.

4,142
ESCALLONIA (COMPAKTA) PLANT

Louis E. Gavello, 3436 Maricopa Ave., Richmond, Calif. 94804
Filed Oct. 19, 1976, Ser. No. 734,371
Int. Cl.^{2} A01H *5/00*

U.S. Cl. Plt.—54 **1 Claim**

1. A new and distinct variety of Escallonia plant, substantially as illustrated and described and characterized as to novelty by:

a. the very compact mounding form of the plant having a low height and spread greater than its height;
b. the distinct pink color of the flowers;
c. the long blooming period;
d. its resistance to weather and disease;
e. its slow growth and controlled habit, making it a very suitable plant for restricted areas.

PATENTS

GRANTED NOVEMBER 1, 1977

ERRATA

For CLASS	See PATENT NO.
053–247	4,055,943
187–052 R	4,056,162
141–392	4,056,234
366–160	4,056,258
366–015	4,056,259
366–144	4,056,260
296–137 G	4,056,274
536–004	4,056,322
428–565	4,056,365
428–653	4,056,366
360–106	4,056,518
544–146	4,056,526
544–194	4,056,527
548–360	4,056,533
460–126	4,056,551
560–128	4,056,552
560–043	4,056,553
560–060	4,056,554
560–053	4,056,555
560–053	4,056,556
560–060	4,056,557
560–151	4,056,558
526–212	4,056,559
560–231	4,056,562
560–245	4,056,563
426–577	4,056,566
235–030 R	4,056,709
235–437	4,056,710
364–200	4,056,711
365–205	4,056,810
365–189	4,056,811
365–015	4,056,812
365–012	4,056,813
365–008	4,056,814

PATENTS

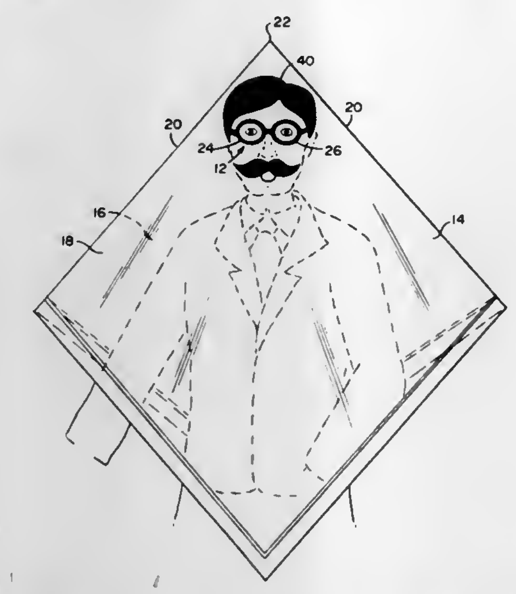
GRANTED NOVEMBER 1, 1977

NOTE—A cross reference listing of applications published under the second Trial Voluntary Protest Program is located in the back of this Issue. These entries will be in numerical order by document publication number.

GENERAL AND MECHANICAL

4,055,852
DISPOSABLE RAIN PROTECTOR
William E. Wallace, 1851 Arlington St., Sarasota, Fla. 33579
Filed Dec. 10, 1975, Ser. No. 639,452
Int. Cl.² A41D *9/00*

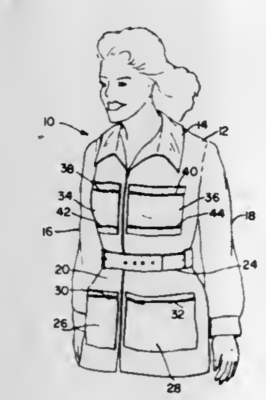
U.S. Cl. 2—84 **6 Claims**



1. A disposable rain protector comprising: canopy means formed from a flexible sheet material and defining a predetermined configuration; and cohesion inhibitor means comprising a positive electrostatic charge disposed on opposite surface portions of said flexible sheet material and coextensive with said surface portions, whereby adherence of said flexible sheet material to itself and to the user thereof is substantially reduced.

4,055,853
CONVERTIBLE COAT AND TOTE BAG
Gloria Argento, 14718 Cranbrook, Hawthorne, Calif. 90250, and Margaret Strandt, 14835 Dublin Ave., Gardena, Calif. 90249
Filed Jan. 24, 1977, Ser. No. 762,114
Int. Cl.² A41D *3/02*

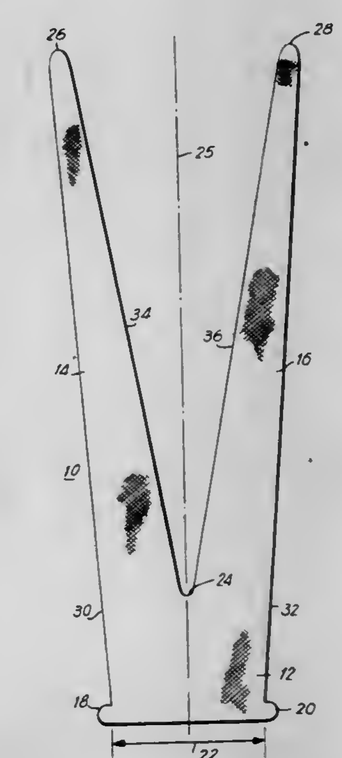
U.S. Cl. 2—93 **8 Claims**



1. A garment convertible from an outer coat to a tote bag comprising:
an outer garment having at least a front portion, a collar portion and a back portion,
a belt completely encircling said front portion and said back portion thereby defining an upper portion and a lower portion,
a first pair of deep pockets having access ports on the uppermost portion and located on the front lower portion of the jacket,
a second pair of deep pockets having access ports on both the uppermost portion and the lowermost portion and located on the front upper portion of said garment,
locking snaps located on said collar portion and the central portion of said back portion for holding said collar portion close to the back portion when folded, and
hooks located on the longitudinal outside edges of said first pair of pockets and said second pair of pockets and adapted to be interconnected when said upper portion and said lower portion are folded about said belt thereby forming a tote bag with the belt as the handle or strap and said first pair of pockets located on one side of the strap and said second pair of pockets located on the other side of said strap.

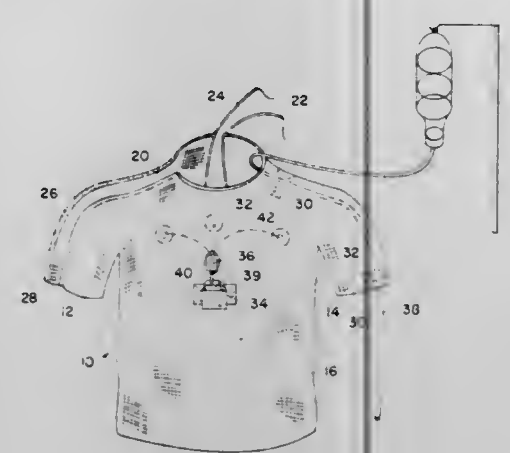
4,055,854
VERSATILE STRETCH KNIT GARMENT
Nathaniel P. Jones, Stuhr Garden Apartments, Apartment 7B, Frost Lane, Peekskill, N.Y. 10566
Filed Jan. 24, 1977, Ser. No. 761,620
Int. Cl.² A41D *1/22*

U.S. Cl. 2—105 **10 Claims**



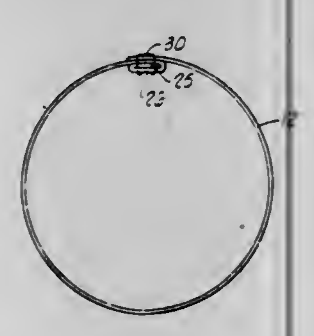
1. A versatile garment which is especially adapted to be worn as an item of brief female outerwear and which can be worn in many different ways to provide many different appearances comprising a structure which is substantially symmetrical about a center-line including a substantially flat double stretch knit body including a base portion and two separate upstanding portions formed integrally with said base portion,
said upstanding portions being substantially straight and equal in vertical length and diverging away from the center-line at the upper ends thereof,
said upstanding portions each being uniformly tapered to substantially a point at the upper end thereof,
the unstretched length of said upstanding portions measured from the bottom of said base portion being more than fifty percent greater than the chest measurement of the intended wearer,
the unstretched basic width of said base portion being about equal to four tenths of said chest measurement,
the separation between said upstanding portions beginning at a vertical dimension measured from the bottom of said base portion which is about equal to one third of said chest measurement when said garment is in the unstretched condition.

4,055,855
HOSPITAL GOWN
Alexander C. Ragone, 38 Celestial Lane, Levittown, N.Y. 11756, and Inez Ragone, 1885 Leonard Lane, Merrick, N.Y. 11566
Filed July 19, 1976, Ser. No. 706,302
Int. Cl.² A41B *9/00*
U.S. Cl. 2—114 **8 Claims**



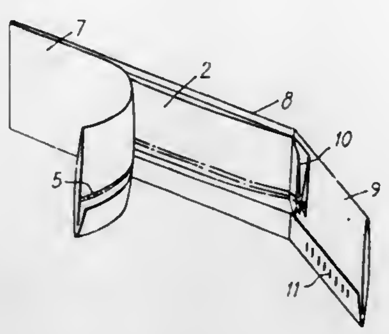
1. A hospital gown comprising:
at least two panels used to cover the front and back of the upper torso and arms of a patient,
means for removably securing said panels together about the upper torso and arms of a patient to form a garment having a pair of sleeves and an upper torso enveloping portion,
a pocket on a front surface of the upper torso enveloping portion of said garment for holding a medical diagnostic instrument, and
an opening through the upper torso enveloping portion of said garment for attaching said medical instrument to the patient.

4,055,856
CHILD'S TOY HALO
Walter M. Dirham, Norman, Okla., assignor to Osber M. Bachrach, Norman, Okla.
Filed Nov. 3, 1975, Ser. No. 627,831
Int. Cl.² A42C *1/00*
U.S. Cl. 2—192 **1 Claim**



1. A method for making a halo device comprising:
bifurcating an elongated flat blank of flexible material of substantially rectangular shape by removing a strip from a central portion thereof to form a pair of elongated, spaced legs joined at one end by a web portion;
folding said web portion upon itself to form a multi-layered supporting column extending between said spaced legs; and
bending the spaced legs into two spaced bands and securing the free ends of the legs to said multi-layered supporting column formed from said folded web portion.

4,055,857
DISPOSABLE CAPS
Richard Louis Brucciani, Leicester, England, assignor to The Paper Lynen Co. Ltd., England
Filed Sept. 29, 1975, Ser. No. 617,658
Claims priority, application United Kingdom, Oct. 16, 1974, 44916/74
Int. Cl.² A42B *1/22*
U.S. Cl. 2—197 **1 Claim**

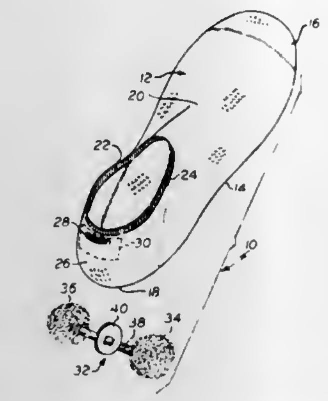


1. An improved disposable cap comprising a headband consisting of a flattened open-ended tube of paper or like sheet material formed by folding inwardly a strip of said paper or the like along two intermediate longitudinal creases so that one marginal longitudinal panel so formed overlaps the opposite marginal longitudinal panel and so as to form an outer panel and an uppermost marginal panel and a lowermost marginal panel, said overlapping marginal panels being secured by an adhesive, and said lowermost panel lying inwardly of said outer panel and said uppermost panel to form a headband, the uppermost panel being substantially wider than the lowermost panel and overlapped by said lowermost panel by a substantial amount so that a triple thickness of said panels is provided in the area of said headband, said tube being provided intermediate its length with transverse creases dividing the tube into three sections and enabling the tube to be folded into a closed annulus with one end of the flattened open-ended tube inserted within the outer end of said tube, and a crown composed of an accordion-pleated sheet of paper or like sheet material which is secured by an adhesive at the lateral edges thereof to and between two opposed overlapped uppermost outer marginal longitudinal panels of the folded headband tube, leaving a third section of said tube free and in overlapping relationship to the sections to which the crown is connected, whereby the annulus is maintained in shape solely by the force of friction between the layers of material from which the annulus is made, the second section of the headband, to which the third section is attached, being of greater length than the first section, and the pleated crown being of greater length than the second headband section and the surplus length of this crown being secured by an adhesive to the third headband section to provide crown material for expansion of the crown when the headband is expanded.

4,055,858
WITHIN-THE-SHOE SOCK HAVING REMOVABLE RETAINING DEVICE
William J. Traenkle, 61 Old Ox Road, Manhasset, N.Y. 11030
Filed June 23, 1975, Ser. No. 589,444
Int. Cl.² A41B *11/00;* A43B *19/00*
U.S. Cl. 2—240 **18 Claims**

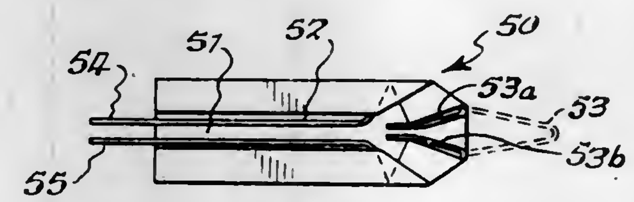
1. A within-the-shoe sock construction comprising a sock having a foot opening adapted to receive a foot therethrough, the height of said sock being substantially coextensive with the height of a shoe to be worn with said sock whereby the upper rear edge of the sock is substantially coterminus with the upper rear edge of the shoe; retaining means detachably secured to said sock and engageable with the rear edge of a shoe for retaining said sock in position on the foot of the wearer, said retaining means comprising an enlarged member, and a relatively narrow support member connected to said enlarged member; an opening in the rear of said sock receiving said narrow support member therethrough; and securing means engaging the portion of said support member extended through said opening to prevent withdrawal of said portion from said opening.

18. Detachable retaining means for retaining in position on the foot of the wearer a within-the-shoe sock of the type having a foot opening adapted to receive a foot therethrough, the height of the sock being substantially coextensive with the height of a shoe to be worn with the sock whereby the upper rear edge of the sock is substantially coterminous with the upper rear edge of the shoe; said retaining means comprising an



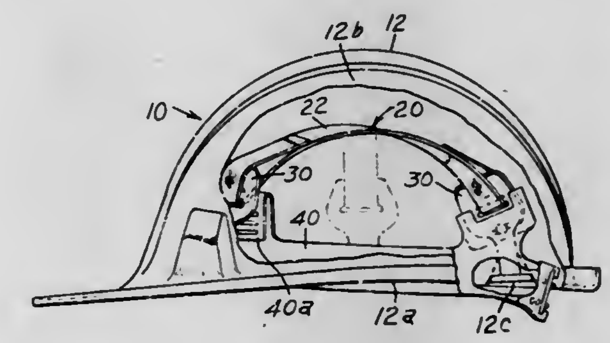
enlarged member adapted to be disposed outside of the shoe and in engagement therewith to prevent downward movement of said sock, and a narrow support member connected to said enlarged member and having a section adapted to extend through the rear of the sock to be detachably secured thereto, said enlarged member comprising a pair of pompons, said narrow supporting member comprising a ribbon extending between said pair of pompons and having one end connected to one of said pompons and the other end connected to the other of said pair of pompons, and a relatively thin button secured to said ribbon intermediate said pompons and adapted to be received in a button hole at the rear of the sock.

4,055,859
METHOD AND MACHINE FOR MAKING A GARMENT
Charles B. Green, Lewisburg, and Joseph R. Sholter, Weikert, both of Pa., assignors to International Paper Company, New York, N.Y.
Filed Feb. 20, 1975, Ser. No. 551,378
Int. Cl.² A41D *13/04;* A41H *43/00*
U.S. Cl. 2—243 R **4 Claims**



1. In a method for making a garment from a continuous web of material, during movement of the web along a feed path, which comprises the steps of: directing the web along the feed path; dividing the web into successive sheets; successively directing the cut sheets along the feed path; positioning a narrow strip of material across the sheet, so that the strip extends in a direction perpendicular to the sheet's direction of movement along the feed path, with the end portions of the strip protruding from the opposite sides of the sheet; moving the center portion of the strip with a depending member in the sheet's direction of movement along the feed path and through two spaced guides located along the feed path between the opposite sides of the sheet, so that: the strip has a generally V-configuration, its center portion protruding from the sheet, its end portions protruding from opposite sides of the sheet and its leg portions, between the center portion and the end portions thereof, being positioned adjacent opposed corner portions of the sheet; folding the opposed corner portions of the sheet over the adjacent leg portions of the strip and into contact with the body of the sheet on the otherside of the leg portions of the strip; securing the corner portions to the contacted body portions of the sheet to maintain the strip in fixed relationship with the sheet; moving the center portion of the strip with the depending member opposite to the sheet's direction of movement along the feed path and through the two spaced guides located along the feed path to invert the strip so that it has a generally W-configuration, its center portion forming generally a V-configuration above the sheet, and its leg portions maintained in fixed relationship with the sheet through the folded opposed corner portions of the sheet and forming the outer legs of the W; and severing the strip at the apex of the center portion, the improvement in inverting and severing the center portion which comprises
maintaining contact between the depending member and the center portion of the inverted strip at about the apex of its V-configuration subsequent to its positioning above the sheet; and
moving the depending member in a direction opposite the sheet's direction of movement along the feed path to sever the center portion of the strip at about the apex of its V-configuration.

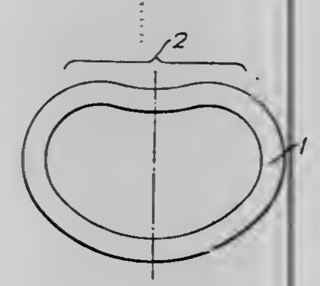
4,055,860
SAFETY CAP WITH ENERGY ABSORBING SUSPENSION
John H. King, Lilburn, Ga., assignor to Norton Company, Worcester, Mass.
Continuation-in-part of Ser. No. 716,829, Aug. 23, 1976, abandoned. This application Feb. 28, 1977, Ser. No. 772,742
Int. Cl.² A42B *3/02*
U.S. Cl. 2—416 **19 Claims**



1. A safety cap with energy absorbing suspension comprising:
a relatively rigid shell having
a generally convex exterior wall portion and adjoining concave internal cavity extending from a lower edge and adapted to extend around and receive an upper portion of a wearer's head,
anchor means angularly spaced around adjacent the lower edge of the convex wall portion for attaching the suspension to the shell;
an energy absorbing suspension attached to the anchor means and having
crown straps spaced from the shell and situated within the internal concave cavity between the anchor means for supporting engagement with the wearer's head,
connecting means attached to and connecting the crown straps to the shell and each of the connecting means having
an end portion attached to one of the anchor means,
an elastically and plastically deformable energy absorbing portion attached to an end portion of a crown strap, and
control means adjacent to and engageable by the energy absorbing portion for first allowing elastic deformation of, then controlling and limiting plastic deformation of the energy absorbing portion;

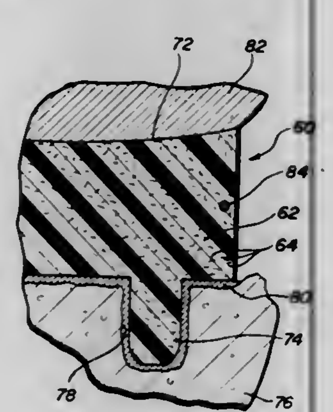
whereby energy of an impact against and displacing the shell is absorbed by first placing the crown straps engaging and resisted by the wearer's head in tension and pulled tightly against the energy absorbing portions to firmly seat the end portions of the connecting means against the anchor means after which the crown straps elastically and then plastically deform the energy absorbing portions into engagement with the adjacent control means.

4,055,861
SUPPORT FOR A NATURAL HUMAN HEART VALVE
Alain Carpentier, Paris; Xavier Leclercq, Orgeval, and Jean Paris, Saint-Denis, all of France, assignors to Rhone-Poulenc Industries, Paris, France
Filed Apr. 9, 1976, Ser. No. 675,592
Claims priority, application France, Apr. 11, 1975, 75.11361
Int. Cl.² A61F *1/22, 1/24*
U.S. Cl. 3—1.5 **9 Claims**



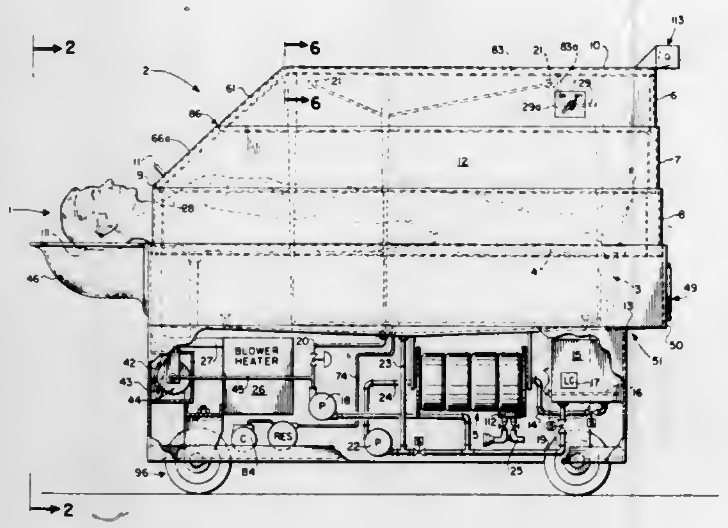
9. A support for a natural human valve, said support consisting of an elongated flexurally deformable frame having a longitudinal axis curved along its length to define a generally ring-shaped frame having the shape of at least a substantial portion of the periphery of a natural heart valve at the base of its cusps, said frame being substantially enclosed in a textile sheath, said frame and sheath being formed of biocompatible material and being flexurally deformable in all directions about said longitudinal axis.

4,055,862
HUMAN BODY IMPLANT OF GRAPHITIC CARBON FIBER REINFORCED ULTRA-HIGH MOLECULAR WEIGHT POLYETHYLENE
Gene M. Farling, Warsaw, Ind., assignor to Zimmer USA, Inc., Warsaw, Ind.
Filed Jan. 23, 1976, Ser. No. 651,706
Int. Cl.² A61F *1/24*
U.S. Cl. 3—1.91 **6 Claims**



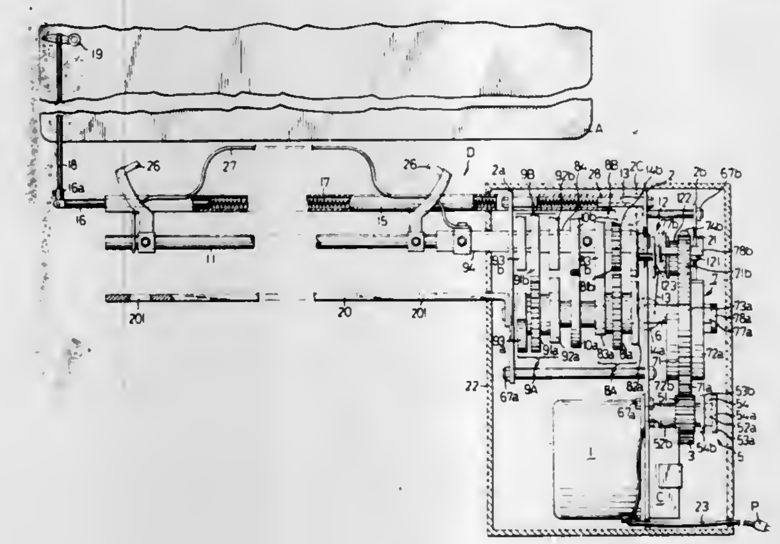
1. A medical implant element which is to be subjected to rolling or sliding pressure or a combination of such pressures in the human body, comprising: a plurality of microparticles of ultra-high molecular weight polyethylene resin fused together into a matrix; and a quantity of graphitic carbon, consisting essentially of a substantially unoriented array of short, random length fibers, disposed in interstices of said matrix, said graphitic carbon fiber-containing matrix being a wear-resistant, substantially isotropic member.

4,055,863
APPARATUS FOR BATHING PERSONS
Lawrence Edward Duval, 219 Chestnut St., Denham Springs, La. 70726
Filed Dec. 22, 1975, Ser. No. 642,723
Int. Cl.² A47K *3/06;* **A61H** *33/00*
U.S. Cl. 4—173 R **7 Claims**



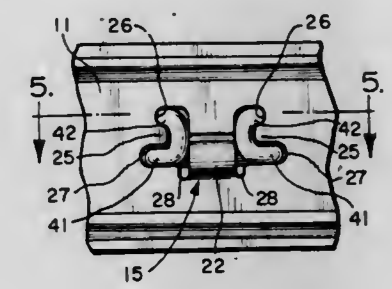
1. An apparatus for bathing a person which comprises:
a. compressed air producing means;
b. a drainable frame structure;
c. a bedding frame assembly attached to said frame structure and capable of supporting said person in and about horizontal position;
c. a canopy assembly attached to said frame structure to form a water-tight chamber about said persons body, said canopy assembly comprising:
i. a lower side panel and an upper side panel telescopically received in said lower said panel wherein said lower side panel comprises; two parallel spaced apart side walls, a bottom wall attached to said parallel side walls at their lower end and provided with locking means to limit the heighth to which said lower side panel may rise, and a top wall attached to said parallel side walls at the upper end and provided with a second locking means to contact and limit the height to which said upper side panel may rise, and wherein said upper side panel comprises: two parallel side walls spaced apart a distance to fit between said lower side panel's spaced apart side walls, a upper side panel bottom wall attached to the lower end of said upper side panel walls and provided with a first upper side panel locking means which mates with said second lower side panel locking means,
ii. a retractable top shade including means attachable to said upper side panel to form a water-tight seal above said body, and;
iii. a front neck panel plate attachable to said lower side panel to form a water tight seal about said persons neck, and;
iv. means for introducing said compressed air to said upper and lower side panels for raising said upper side panel to a position whereby said upper side panel locking means contacts and second lower side panel locking means;
e. Spray nozzles attached to said frame structure including said upper side panels and positioned about said bedding frame structure to spray water to all areas of said person's body lying on said
bedding frame assembly;
f. means for providing said water to said spray nozzles, said means connected to said spray nozzles;
g. Air ducts attached to said frame structure and having duct openings positioned about said bedding frame assembly and directed to force air from said compressed air means to all areas of said person's body lying in said bedding frame assembly; and.

4,055,864
AUTOMATIC LID-LIFTING AND FLUSHING DEVICE FOR WATER CLOSET
Yu-Hsing Liu, No.7-3, Alley 15, Lane 667, Chung Shan Road, Sec. 2, Chung Ho, Taipei Hsien, and Fon-Wen Chiu, 11th Floor, No. 220, Sung Chiang Road, Taipei, both of China /Taiwan
Filed June 14, 1976, Ser. No. 695,786
Int. Cl.² A47K *13/00*
U.S. Cl. 4—253 **11 Claims**



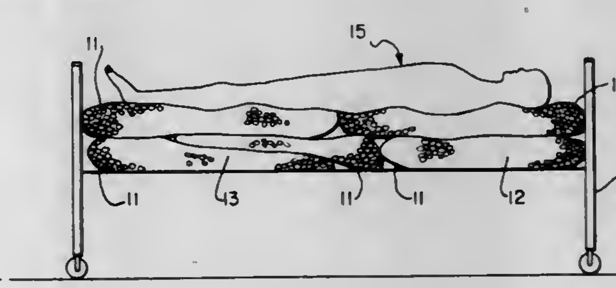
1. A control mechanism in combination with a water closet having a bowl, a flush tank, a raisable and closable lid, a raisable and closable seat and a flushing mechanism, said control mechanism being operable to automatically control the raising and lowering movements of said lid and seat as well as the actuation of said flushing mechanism, said control mechanism comprising:
a casing;
a low speed motor mounted in said casing;
motor actuated means operably connected to be driven by said motor;
lid operating means interconnecting said motor-actuated means and said lid for raising and lowering said lid;
seat operating means interconnecting said motor-actuated means and said seat for raising and lowering said seat;
electric control means electrically connected to said motor, said electric control means comprising:
a first manually operable switch for actuating said motor and said motor-actuated means through a lid-raising sequence in which said lid operating means raises said lid;
a second manually operable switch for actuating said motor and said motor-actuated means through a seat-raising sequence in which said seat operating means raises the seat; and
a third manually operable switch for actuating said motor and said motor-actuated means in reverse for closing said seat if the latter is raised and for closing said lid; and
flush operating means interconnecting said flushing mechanism and said motor-actuated means and being driven by the latter only during said reverse actuation thereof in response to operation of said third switch, to flush said bowl.

4,055,865
SPRING ATTACHMENT ASSEMBLIES
Lawton H. Crosby, Lake Bluff, Ill., and Thomas H. Keane, Morristown, Tenn., assignors to Morley Furniture Spring Corporation, Chicago, Ill.
Continuation-in-part of Ser. No. 501,155, Aug. 28, 1974, Pat. No. 3,971,082. This application June 16, 1976, Ser. No. 696,544
Int. Cl.² A61J *19/00;* **F16F** *1/46*
U.S. Cl. 5—259 R **4 Claims**



1. A rail attachment assembly for attaching an end of a sinuous spring band to a vertical flange of a steel frame rail, comprising:
a. a pair of apertures formed through said flange in spaced relationship longitudinally of said flange,
b. a portion of the segment of said flange between said apertures being deformed inwardly of said flange,
c. said deformed portion defining at least two co-extensive concave surfaces extending longitudinally of said flange between said apertures,
d. said two co-extensive concave surfaces comprising a first surface having a greater radius of curvature and a second surface having a lesser radius of curvature,
e. said second surface being formed horizontally inwardly of said vertical flange from said first surface, and
f. a wire-like element on the end of said band seated on one of said concave surfaces to attach said band to said rail with said band extending generally horizontally away from said vertical flange.

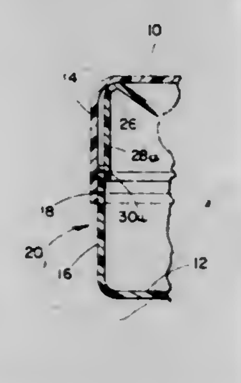
4,055,866
POLYMORPHIC SUPPORT SYSTEMS
Franklin Temple Evans, Homewood Road, Ferry Farms, Annapolis, Md. 21402
Filed Jan. 19, 1976, Ser. No. 650,353
Int. Cl.² A47C *3/00, 27/08*
U.S. Cl. 5—367 **10 Claims**



1. A polymorphic body support system comprising a base structure including a generally planar supporting surface dimensioned to receive a person thereon, a plurality of unattached, individual closed flexible bags contiguously arranged on said base structure, said contiguous arrangement including at least a single layer of said bags, said contiguous arrangement between said unattached, individual bags and the quantity of said bags being infinitely variable, at the discretion of the user prior to or during use, each of said bags containing a plurality of beads, said beads being characterized as non-absorbent, non-compressible and capable of free flow with respect to each other within said bag when subjected to the weight of a body member so that the upper surface of the bag conforms to the

body member supported thereon, each of said contiguous flexible bags being independently responsive to the compressive force component resulting from the presence of the body member and jointly responsive to the lateral force components to provide a comfortable contour support for the person.

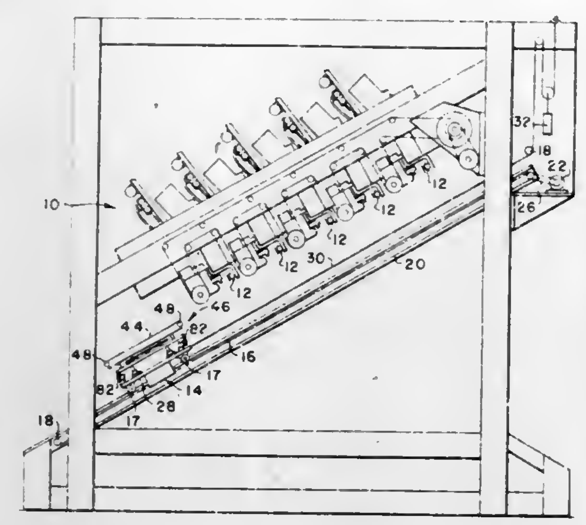
4,055,867
MATTRESS HAVING AN INTERNAL FLUID CONTAINING CHAMBER
Raymond M. Phillips, 305 Poquito Lane, Topanga, Calif. 90290
Continuation-in-part of Ser. No. 581,262, May 27, 1975, Pat. No. 4,006,501. This application Oct. 17, 1975, Ser. No. 623,445
Int. Cl.² A47C *27/08*
U.S. Cl. 5—371 **34 Claims**



1. A liquid containing mattress for supporting an individual in an inclined position comprising:
a. an upper sheet having a peripheral end margin,
b. a lower sheet having a peripheral end margin and being in spaced apart relationship to said upper sheet,
c. a first peripheral inner wall extending between and secured in operative relationship to said upper and lower sheets and forming a liquid chamber between said inner wall and upper and lower sheets,
d. said inner wall being tapered so that it extends in proximate relationship to the peripheral end margin of said upper sheet to form said liquid chamber substantially continuous with the surface of said upper sheet, said inner wall extending inwardly from the peripheral end margin of said lower sheet and being secured to said lower sheet inwardly of its peripheral end margin,
e. and a second peripheral outer wall extending between said upper and lower sheets forming a material containing chamber bounded by said outer and said inner wall and said lower sheet, and
f. said inner wall having a section slightly disposed inwardly from said outer wall to form a relatively thin liquid space therebetween and said section being secured relative to said outer wall and said lower wall so that said liquid chamber is in fluid communication with and includes said relatively thin liquid space.

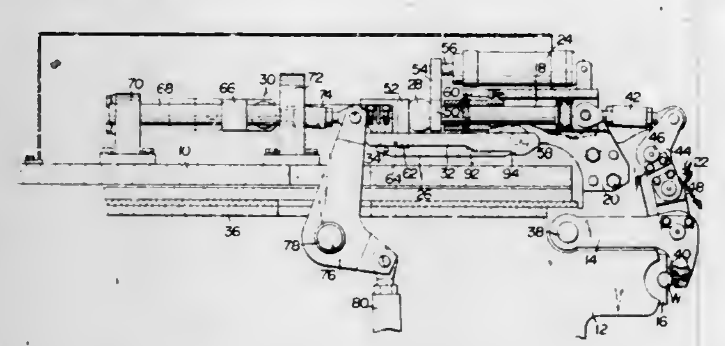
4,055,868
DYEING METHOD
John H. O'Neill, Jr., Spartanburg, S.C., assignor to Milliken Research Corporation, Spartanburg, S.C.
Filed Nov. 29, 1976, Ser. No. 745,658
Int. Cl.² D06B *1/02, 11/00*
U.S. Cl. 8—150 **1 Claim**

1. A method to dye a textile product comprising the steps: passing the textile product under a dye jet gun bar having a plurality of dye emitting orifices and a horizontal axis, applying a narrow pattern of dye on the textile product from the dye emitting orifices, indexing the textile product in a direction parallel to the horizontal axis of the gun bar, passing the textile product again under the dye emitting orifices to apply a second narrow pattern of dye on the textile product adjacent the first



applied pattern of dye and removing the textile product from under the dye jet gun bar.

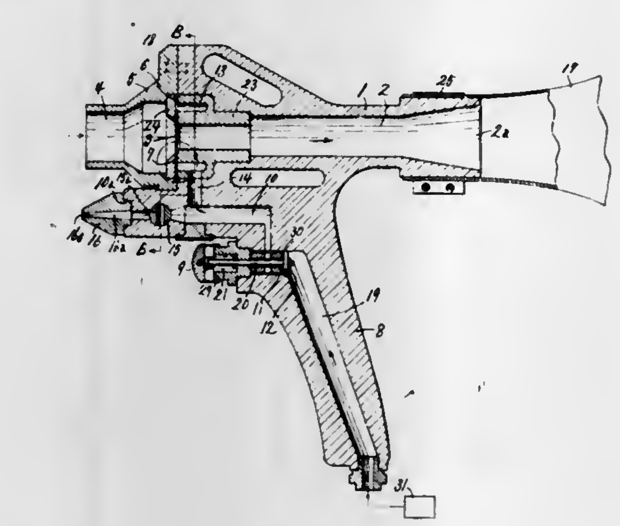
4,055,869
CLAMPING AND CUTTING APPARATUS
Takashi Furuto, Komatsu, Japan, assignor to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan
Filed Dec. 17, 1976, Ser. No. 751,728
Claims priority, application Japan, Dec. 17, 1975, 50-169277[U]; Dec. 17, 1975, 50-169278[U]
Int. Cl.² B21D *43/10;* **B21K** *1/46*
U.S. Cl. 10—25 **7 Claims**



1. In clamping and cutting apparatus of the type incorporated with a header or the like, the combination of:
frame means;
a carriage having cutter means thereon and movable between a cutting position and a transfer position relative to said frame means;
a clamp lever pivotally mounted on said carriage for clamping work against said cutter means;
support means on said carriage;
a slider supported by said support means and operatively connected to said clamp lever, said slider being slidable relative to said support means between a clamping position for causing said clamp lever to clamp the work against said cutter means and an unclamping position for causing said clamp lever to release the work;
actuator means on said support means tending to move said slider from said clamping to said unclamping position;
a locking member mounted on said support means for pivotal movement between a locking position for locking said slider in said clamping position and an unlocking position for permitting said slider to be moved from said clamping to said unclamping position by said actuator means;
spring means yieldably urging said locking member from said unlocking to said locking position;
resilient means adapted to be compressed when said slider is locked in said clamping position by said locking member for exerting a reactive force on said slider, whereby said

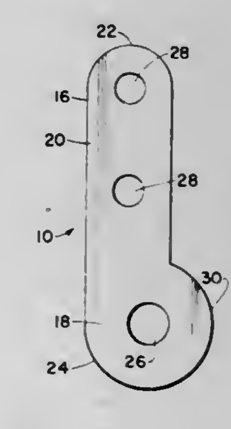
slider is urged to move further in such a direction that said clamp lever clamps the work more positively;
reciprocating means mounted on said frame means for movement toward and away from said support means, whereby upon movement of said reciprocating means toward said support means while said carriage is in said cutting position said slider is moved to and locked in said clamping position against the forces of said actuator means and said resilient means;
cam follower means on said locking member; and
cam means carried by said reciprocating means and adapted to move said locking member from said locking to said unlocking position via said cam follower means against the force of said spring means upon movement of said reciprocating means away from said support means while said carriage is in said transfer position.

4,055,870
HAND-OPERATED APPARATUS FOR PNEUMATICALLY REMOVING DUST
Yasuzi Furutsutsumi, 1-19, 2-chome, Midoridi, Kawanishi, Hyougo, Japan
Continuation of Ser. No. 535,554, Dec. 23, 1974, abandoned. This application June 21, 1976, Ser. No. 698,148
Int. Cl.² A47L *5/16*
U.S. Cl. 15—409 **2 Claims**



1. A hand operated apparatus connected to an air source for pneumatically removing dust, said apparatus comprising:
handle means for holding said apparatus, said handle means having a first air passage therethrough connected to said air source;
cylindrical main body means having a second air passage longitudinally therethrough with an inlet and a discharge end for receiving and discharging dust particles therethrough, said main body means comprised of:
a cylindrical main body portion having said second air passage longitudinally therethrough, and
an intake portion removably secured to the inlet end of said main body portion;
annular member means fitted within said cylindrical body means in said second air passage and connected to said first air passage for ejecting the air flowing from said air source through said first passage into said secondary passage toward the discharge end thereof, said annular member means comprised of:
an annular member positioned within said second air passage between said intake portion and said main body portion, said annular member having a first central opening therethrough aligned with said second air passage, the forward end of said first central opening having an inwardly tapered surface, and said annulr member further having an annular chamber spaced from and surrounding said first central opening, said annular chamber being open at the front portion thereof toward the front of said annular member and connected to said first air passage,
a ring plate adjacent said annular member between the outer circumference of said annular member and said annular chamber,
a ring holder next to said ring plate on the side thereof opposite said annular member having a second central opening therethrough aligned with said first central opening through said annular member and having a slanted surface extending circumferentially inwardly toward said central openings, whereby an annular slit is formed between said ring holder and said annular member due to the presence of said ring plate thereinbetween, and whereby air in said annular chamber is forced outwardly through said annular slit and flows rearward along the tapered surface of said annulr member through said first central opening toward the discharge end of said main body portion;
manually operable first control valve means in said first air passage for regulating the flow of air through said first air passage from said air source;
nozzle means connected to said handle means and operatively connected to said first air passage for ejecting the air coming from said air source through said first air passage outward therethrough; and
second air valve means between said first control valve means and said nozzle means for controlling the flow of air from said first air passage to said nozzle means.

4,055,871
SILENCER DEVICE
John T. Morton, 15-2nd St., c/o P.O. Box 231, Scotstown, Quebec, Canada (J0B 3B0)
Filed Sept. 8, 1976, Ser. No. 721,392
Int. Cl.² E05D *13/00, 15/00*
U.S. Cl. 16—86 A **4 Claims**

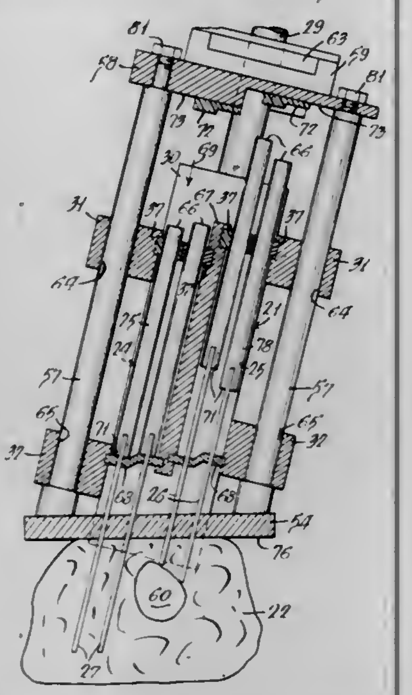


1. A silencer device for prevention of slamming of a door, which comprises a P-shaped element having a head portion and a tail portion, a bottom end of said tail portion being curved, said tail portion having a plurality of longitudinally aligned apertures therethrough; a upper left hand corner of said P-shaped element being curved, said tail portion of said P-shaped element adapted to be removabably mounted on a vertical door jamb of a door frame by screw means extending through said aperture into said door jamb, said head portion of said P-shaped element extending forwardly of a forward edge of said door jamb and adapted to receive said door thereupon.

4,055,872
APPARATUS FOR TENDERIZING MEAT
Richard C. Wagner, Frankfort, Ill., assignor to Hollymatic Corporation, Park Forest, Ill.
Filed July 6, 1976, Ser. No. 702,932
Int. Cl.² A22C *9/00*
U.S. Cl. 17—25 **19 Claims**

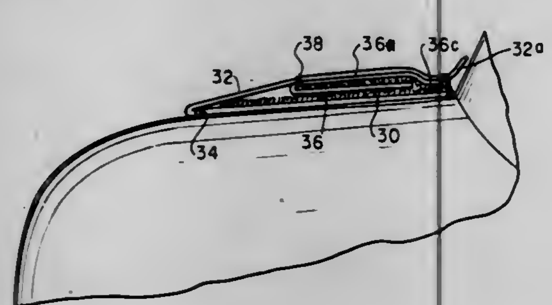
1. Apparatus for tenderizing meat, comprising: a conveyor for conveying meat in a longitudinal direction through said apparatus; a mounting member above and transverse to said

conveyor; a plurality of knives comprising elongated blades on said mounting member having sharp meat penetrating and severing blade ends adjacent to said conveyor, each said blade end being transversely planar and arranged at an angle other than 0° to said direction of movement of said conveyor; means for arranging said blades in a plurality of spaced first rows extending longitudinally of said direction of movement and a



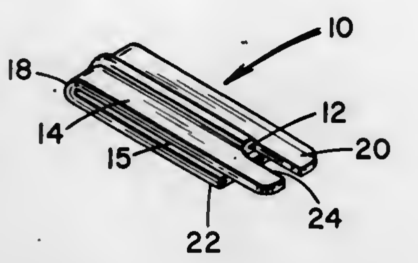
plurality of spaced second rows extending transversely to said direction of movement, the collective said blades in said plurality of second rows include some blade ends in some combinations of said second rows parallel to each other and other blade ends in other combinations of said second rows at an acute angle to each other; and means for reciprocating said mounting member toward and away from said meat and thereby said knives into and from meat penetration.

4,055,873
ACCESSORY HOLDER FOR USE ON ARTICLE OF CLOTHING
Robert A. Kallman, Brooklyn, N.Y., assignor to Kallman Research Corporation, Weatogue, Conn.
Continuation-in-part of Ser. No. 690,262, May 26, 1976. This application Nov. 17, 1976, Ser. No. 742,617
Int. Cl.² A44B ***21/00***
U.S. Cl. 24—3 C **4 Claims**



1. An accessory holder for an article of clothing comprising a flap member for covering a part of the clothing article, means for fixedly securing one end of said flap member at a first point on said article, a first elongated piece of fabric fastening material with fastening means thereon secured to the clothing article in at least a part of the area to be covered by the free part of the flap, a second piece of fabric fastening material with fastening means thereon on the underside of the flap having a first part secured to the underside of the flap and a second part hanging free, fastening means of both parts of said second piece of fabric fastening material facing the clothing article and engaging the fastening means on the first piece of fabric fastening material when the flap is laid down on the clothing article with the accessory being held located between the underside of the flap and second part of the second piece of fabric fastening material.

4,055,874
COMBINATION PLASTIC AND METAL PAPER CLIP
Dwight C. Brown, 1516 N. Nicholas St., Arlington, Va. 22205
Filed Mar. 24, 1976, Ser. No. 670,065
Int. Cl.² B42F ***1/00;*** **A44B** ***21/00***
U.S. Cl. 24—67.3 **12 Claims**

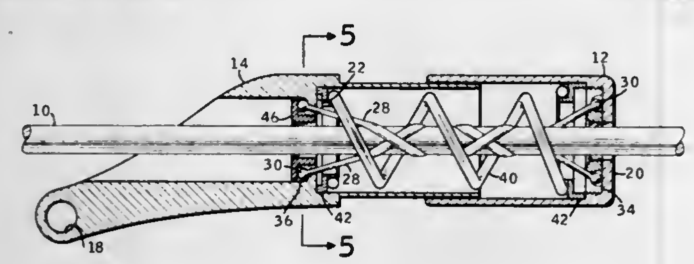


1. A paper clip for clampingly engaging at least two sheets of paper, said paper clip comprising:

a body member, substantially U-shaped in longitudinal cross-section, of semi-rigid, generally flexible plastic sheet material, said body member having a pair of legs presenting two substantially planar interior surfaces between which at least two sheets of paper may be clamped, one of said legs being longer than the other; and

a longitudinally extending substantially rigid, but slightly flexible rigidifying metal member, of substantially smaller transverse cross-section than that of the body member, fixedly secured to said legs away from the interior surfaces thereof so as to present only the planar interior surfaces of the body member to paper sheets clamped therebetween, said metal member being not coextensive with the part of the longer leg which extends beyond the other leg whereby that part of the longer leg is more flexible than any part secured to the metal member.

4,055,875
CABLE GRIPPING DEVICE
Frederick W. Strickland, Titusville, Fla., assignor to General Dynamics Corporation, San Diego, Calif.
Filed May 24, 1976, Ser. No. 689,715
Int. Cl.² F16G ***11/01***
U.S. Cl. 24—115 R **3 Claims**



1. A fail-safe cable gripping device comprising:

a first cup-shaped housing having a generally cylindrical wall and a transverse base, said base having a central aperture adapted to having a cable extend therethrough along the axis of said first housing;

a second cup-shaped housing having a generally cylindrical wall and a transverse base, said base having a central aperture adapted to having a cable extend therethrough along the axis of said second housing;

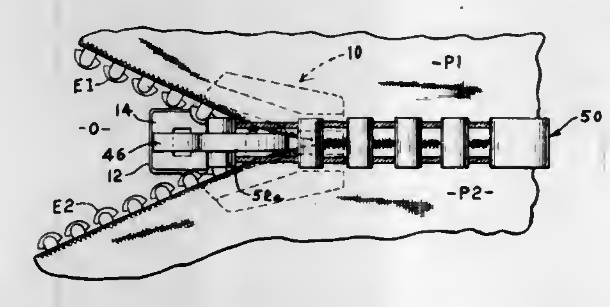
the open end of said second housing extending in a telescoping relationship into the open end of said first housing;

a gripper member comprising at least one strand secured to the inside of the bases of said first and second housings and adapted to coil around a cable extending through said housings;

a compression spring within said housing bearing against the inside of the bases of said housings to bias the housings apart and tighten said gripper against a cable extending through said housings;

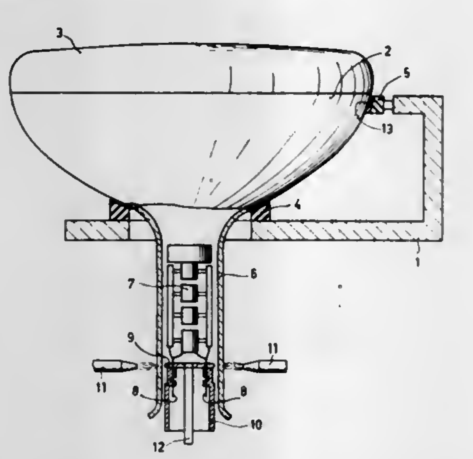
said first and second housings being adapted to straight-line manual movement toward each other whereby said gripper is released and said device may be moved along a cable extending therethrough, and adapted immediately and automatically to return to the gripping position in response to said spring when said housings are released.

4,055,876
SLIDER FOR INVISIBLE-TYPE SLIDE FASTENER
Walter Thomas Ackermann, Watertown, and Jeremias Anthony Martins, Wolcott, both of Conn., assignors to Scovill Manufacturing Company, Waterbury, Conn.
Filed June 7, 1976, Ser. No. 693,422
Int. Cl.² A44B ***19/30***
U.S. Cl. 24—205.14 R **13 Claims**



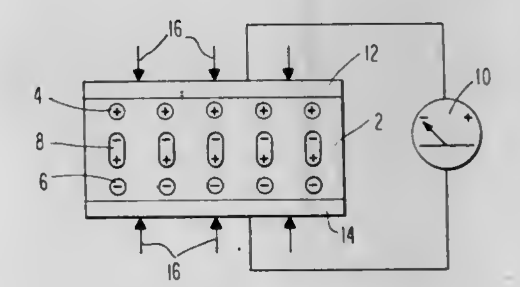
1. A slide fastener slider for invisible-type slide fasteners, the slider having a body comprising a back plate of flaring shape and with side arms, and a diamond, the diamond at least being formed of resilient plastic material, the lower end of the diamond being disposed against the central portion of the floor of the back plate, the lower surface of the diamond being formed with a socket element and the upper surface of the plate being formed with an integrally formed head element, the two elements being interengaged to hold the diamond on the back plate, the undersurface of the plate presenting a smooth projection-free surface, the diamond being formed with an integral locking arm extending up and out from the upper surface thereof and arching down toward the narrow end of the back plate and terminating in a locking tip adapted to engage fastener elements.

4,055,877
METHOD OF MANUFACTURING A CATHODE RAY TUBE
Peter Hermans, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.
Filed Mar. 11, 1976, Ser. No. 665,958
Claims priority, application Netherlands, Mar. 18, 1975, 7503177
Int. Cl.² H01J ***9/18***
U.S. Cl. 29—25.16 **2 Claims**



1. A method of manufacturing a cathode ray tube having a tubular neck of a lead-containing glass, including the steps of closing said tube by a glass base plate having sealed therein a number of contact pins which are arranged in a circle and on which base plate an electrode system for generating at least two electron beams is mounted, and sealing the periphery of said base plate to the wall of said neck by heating while supporting said base plate in a position accurately referred to a predetermined reference system of axes by a supporting member, said supporting member having guide holes and reference holes positioned with respect to said contact pins to determine the rotational position of the electrode system about its longitudinal axis with respect to the reference system of axes, the improvement comprising the step of sealing the edge of said base plate to said wall of said tube neck with said reference holes spaced from said base plate, thereby inhibiting deposition of lead released from said lead containing glass onto the walls of said reference holes.

4,055,878
STABILIZATION OF PIEZOELECTRIC RESIN ELEMENTS
Peter Francis Radice, King of Prussia, Pa., assignor to Pennwalt Corporation, Philadelphia, Pa.
Filed Sept. 24, 1976, Ser. No. 726,381
Int. Cl.² H01L ***41/22***
U.S. Cl. 29—25.35 **16 Claims**



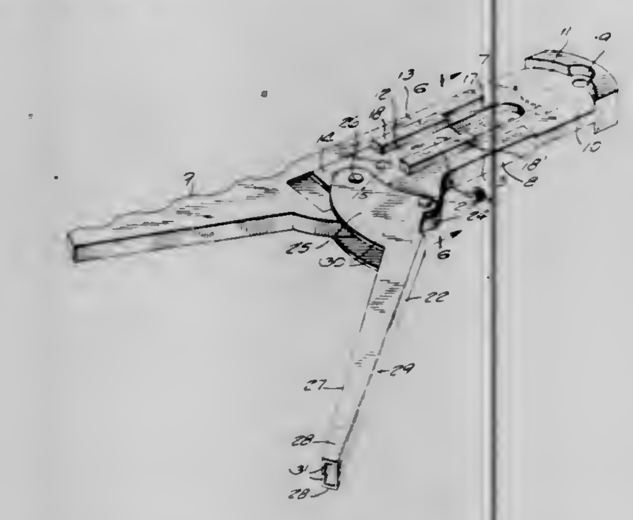
1. A method of stabilizing a poled piezoelectric resin element comprising applying pressure in excess of 20 p.s.i. to said element while its surfaces are electrically short circuited, said pressure being applied in an amount and for a time sufficient to provide a stabilized piezoelectric element.

4,055,879
ROLLER
Siegfried Schneider, Durrnhaar; Kurt Thate, Munich; Erwin Geyken, Munich; Horst Kempe, Munich, and Stephan Macher, Munich, all of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany
Division of Ser. No. 446,923, Feb. 28, 1974, Pat. No. 3,919,754, which is a division of Ser. No. 375,850, July 2, 1973, Pat. No. 3,823,456. This application May 25, 1976, Ser. No. 689,856
Claims priority, application Germany, July 1, 1972, 2232424
Int. Cl.² B21B ***31/08***
U.S. Cl. 29—123 **8 Claims**

1. A roller, particularly for use in apparatus for wet treatment of strip or sheet material with aggressive fluids, comprising an elongated metallic core having two spaced end portions and an outer surface; a cylindrical coat of chemically resistant thermoplastic material immediately adjacent to said outer surface and having end openings adjacent said end portions of said core; and two side elements of synthetic plastic material fully overlapping said end openings of said coat and having portions received in said end portions of said core, said side

elements having coupling means coaxial with said core and being sealingly bonded with said coat so that said side elements and said coat together form a closed fluid tight and corrosion-resistant envelope of synthetic plastic material around said metallic core to protect the same from attack by said aggressive fluids.

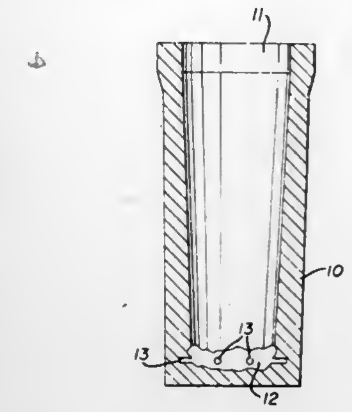
4,055,880
KEY ASSEMBLY TOOL
Frank G. Moessner, Pointe Claire, Canada, assignor to Unican Security Systems, Ltd., Montreal, Canada
Filed Sept. 27, 1976, Ser. No. 726,998
Int. Cl.² B23P *19/04*
U.S. Cl. 29—267 **14 Claims**



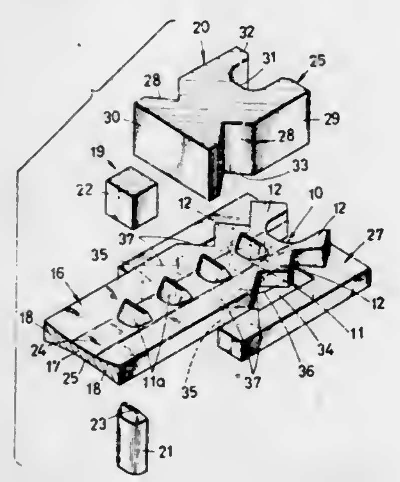
1. A tool for attaching a slotted head to or detaching it from the head end portion of the shank of a key, comprising:
A. a body having an upwardly facing head-supporting surface with an abutment rising therefrom to receive and support a head with its slot parallel to said supporting surface and perpendicular to said abutment;
B. a carriage slidably mounted on the body, said carriage having a longitudinal axis, an upwardly facing key shank supporting surface and a front end facing said abutment;
C. means constraining the carriage to linear advance along a path parallel to its longitudinal axis towards and retraction from said abutment;
D. key shank engaging means on said carriage by which the shank of a key laid on its upwardly facing surface is held and positioned on the carriage with its head end portion protruding beyond the front end of the carriage in line with the slot of a head in position on the upwardly facing head-supporting surface of the body in front of said abutment, so that as the key shank is advanced by the carriage its protruding head end portion is driven into the slotted head; and
E. manually operable motion-producing means reacting between the body and the carriage for advancing and retracting the carriage.

4,055,881
METHOD OF REBUILDING AN INGOT MOLD
Micheal Donald La Bate, 115 Hazen Ave., Ellwood City, Pa. 16117
Filed Dec. 22, 1976, Ser. No. 753,314
Int. Cl.² B23K *23/00;* **B22D** *19/10*
U.S. Cl. 29—401 A **7 Claims**

1. The method of rebuilding an ingot mold having an eroded area in the cavity thereof, said cavity having a known original configuration and comprising the steps of cleaning said eroded area, placing a metal producing exothermic compound in said eroded area and igniting said compound so as to produce a molten mass in said eroded area and containing said molten mass in said eroded area so as to reshape said cavity in said mold in accordance with its known original configuration, said metal producing exothermic compound comprising metallic aluminum, wollastonite, ferro silicon, manganese dioxide, fine iron scale and graphite, the fine iron scale an metallic aluminum being present in quantites sufficient to form thermite capable of melting the compound.

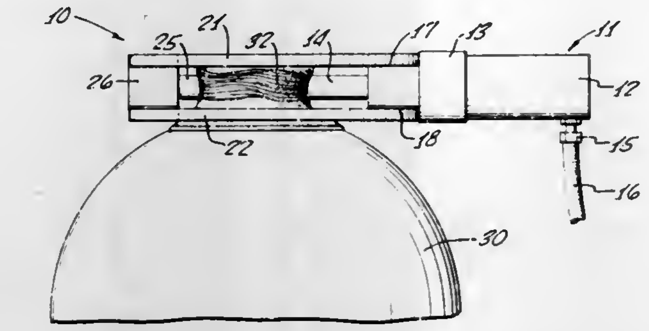


4,055,882
METHOD OF MAKING A COUPLING ELEMENT FOR A SLIDE FASTENER
Hiroshi Yoshida, Uozu, Japan, assignor to Yoshida Kogyo Kabushiki Kaisha, Japan
Division of Ser. No. 660,915, Feb. 24, 1976, Pat. No. 4,010,520. This application Oct. 8, 1976, Ser. No. 730,865
Claims priority, application Japan, Feb. 27, 1975, 50-27315; Mar. 6, 1975, 50-27764
Int. Cl.² B21D *53/52*
U.S. Cl. 29—410 **1 Claim**



1. A method of making a coupling element for a slide fastener having a pair of element-carrying tapes, the coupling element being mounted on either one of the pair of tapes, comprising the steps of: providing a blank metal web having a central portion extending longitudinally thereof and a pair of marginal portions integral one with each side of said central portion, each of said marginal portions being transversely tapered toward said central portion; drawing a limited area portion of said central portion out of the plane thereof away from its one surface to form a projection for intercoupling engagement with a coupling element on the other tape; and stamping out said metal web to form a coupling element having a head portion including said projection and formed of said central portion and a pair of tape edge clamping legs each integral with said head portion and formed of one of said pair of marginal portion.

4,055,883
METHOD AND APPARATUS FOR REMOVING COLLARS FROM COMPRESSED GAS CYLINDERS
Carl A. Grenci, 4791 Lesa Place, Yorba Linda, Calif. 92686
Filed July 26, 1976, Ser. No. 708,998
Int. Cl.² B23P *19/02*
U.S. Cl. 29—427 **6 Claims**

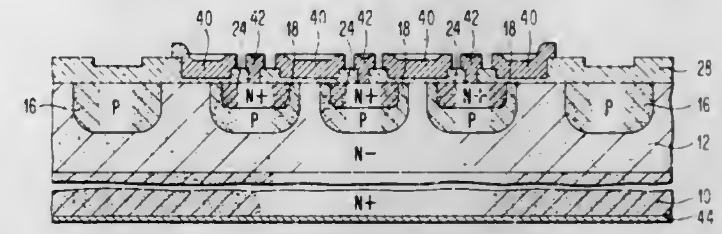


1. A method for removing a cylinder collar from the top of a compressed gas cylinder comprising the steps of:
applying a lateral force an first opposite sides of said collar of a magnitude sufficient to collapse the side walls of said collar in the direction of said applied force and over an area sufficient to elongate said side walls of said collar in a direction perpendicular to said direction of said applied force;
repeating the above-mentioned step on second opposite sides of said collar displaced by approximately 90° from said first sides, said second step freeing said collar from said cylinder neck; and
removing said collar from said cylinder neck.

4. Apparatus for removing a cylinder collar from the top of a compressed gas cylinder consisting of:
a housing and a first driven ram extendable axially from one end of said housing;
ring-shaped support means connectable to said one end of said housing; and
a second ram fixedly connected to said support means in facing, spaced, coaxial relationship to said first ram, said first ram being capable of being driven towards said second ram with a force sufficient to collapse said collar in the direction of the applied force, the areas of the facing ends of said rams being great enough to prevent penetration of said rams into said collar, the shapes of said rams being such as to elongate said collar in a direction perpendicular to said direction of said applied force, said apparatus including only said first and second rams, there being no additional rams connected to said support means to prevent elongation of said collar in said direction perpendicular to said direction of said applied force.

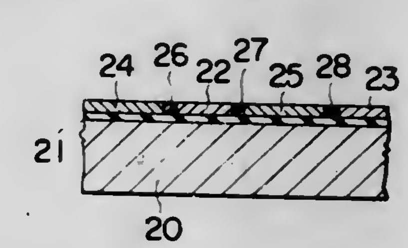
4,055,884
FABRICATION OF POWER FIELD EFFECT TRANSISTORS AND THE RESULTING STRUCTURES
Chakrapani Gajanan Jambotkar, Hopewell Junction, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.
Filed Dec. 13, 1976, Ser. No. 750,053
Int. Cl.² B01J *17/00*
U.S. Cl. 29—571 **11 Claims**

1. Method for fabrication of MOSFET devices having high current and high voltage characteristics comprising:
providing an N substrate;
forming a plurality of P regions in said substrate;
forming N regions in said P regions;
forming precise and desired gate insulator regions above peripheries of inner said P regions while allowing outermost annular P regions to remain under a blanket fieled insulator;
forming source contacts to the N regions within said inner P regions, forming gates over the said gate insulator regions, and forming the common drain region contact on the backside of the N+ substrate; and



allowing the said outermost annular P regions to remain unbiased to thereby improve the drain-to-substrate reverse breakdown voltage.

4,055,885
CHARGE TRANSFER SEMICONDUCTOR DEVICE WITH ELECTRODES SEPARATED BY OXIDE REGION THEREBETWEEN AND METHOD FOR FABRICATING THE SAME
Iwao Takemoto, Kodaira, Japan, assignor to Hitachi, Ltd., Japan
Division of Ser. No. 446,805, Feb. 28, 1974, abandoned. This application Sept. 10, 1976, Ser. No. 722,111
Claims priority, application Japan, Feb. 28, 1973, 48-23161; June 27, 1973, 48-71713
Int. Cl.² B01J *17/00;* **H01L** *29/58*
U.S. Cl. 29—578 **19 Claims**

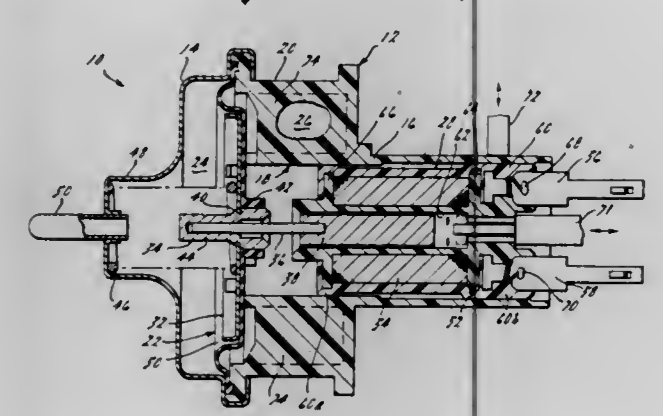


1. A method of manufacturing a charge transfer semiconductor device comprising the steps of:
a. forming a first insulating layer on a first surface of a semiconductor body;
b. forming a first conductive layer on said first insulating layer;
c. forming a masking layer on said first conductive layer;
d. selectively removing portions of said first conductive layer and said masking layer, to expose a plurality of surface portions of said first insulating layer and side surfaces of said first conductive layer;
e. replacing selected portions of said first conductive layer disposed beneath peripheral portions of said masking layer with a second insulating layer; and
f. selectively forming a second conductive layer on said plurality of exposed surface portions of said first insulating layer.

4,055,886
VARIABLE INDUCTANCE TRANSDUCER COMBINED ASSEMBLY AND CALIBRATION METHOD
Lawrence William Tomczak, Sterling Heights; Frederick William Crall, Farmington; La Verne Andrew Caron, Sterling Heights, and Walter Joseph Campau, Grosse Pointe Woods, all of Mich., assignors to Chrysler Corporation, Highland Park, Mich.
Division of Ser. No. 628,289, Nov. 3, 1975, Pat. No. 4,024,484. This application Dec. 13, 1976, Ser. No. 749,944
Int. Cl.² H01F *41/00*
U.S. Cl. 29—593 **2 Claims**

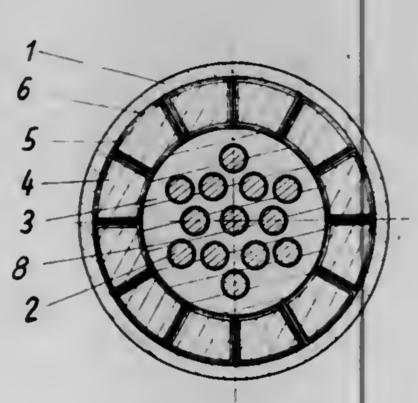
1. The method of making a variable inductance vacuum transducer for accurate combined assembly and calibration to obtain a desired inductance vs. vacuum characteristic thereof, said method comprising:
providing a housing containing an axial throughbore, a

vacuum servo actuator at one axial end of said throughbore, and a core disposed within said throughbore and connected with said servo actuator for positioning thereby axially within said throughbore in accordance with a vacuum signal applied to the servo actuator, said servo actuator including a diaphragm which is displaceable in accordance with said vacuum signal and connected with said core for similarly displacing the latter, said servo actuator also including a biasing spring for biasing said diaphragm and hence said core, said biasing spring being increasingly compressed as the intensity of said vacuum signal increases;



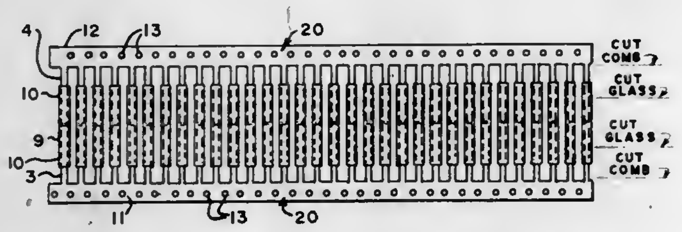
providing an inductance coil unit capable of being disposed within said throughbore and having an axial bore passing through the coil thereof large enough to permit said core to move therein;
applying a given vacuum signal to said vacuum servo actuator to displace said diaphragm and core and also compress said biasing spring;
disposing said coil unit within said throughbore by first axially inserting the coil unit into said other axial end thereof and then more fully inserting the coil unit into said throughbore so that said core passes into said bore to a position which produces a desired inductance of said coil unit for the given vacuum signal applied to the servo actuator.

4,055,887
METHOD FOR PRODUCING A STABILIZED ELECTRICAL SUPERCONDUCTOR
Gundolf Meyer, Birmenstorf, Switzerland, assignor to BBC Brown Boveri & Company Limited, Baden, Switzerland
Filed Feb. 18, 1976, Ser. No. 654,897
Claims priority, application Switzerland, Mar. 26, 1975, 3865/75
Int. Cl.^{2} H01V *11/00*
U.S. Cl. 29—599 **8 Claims**



1. A method for producing a stabilized super-conductor containing a plurality of thin filaments of super-conductive material, in which a composite parent slug is mechanically worked to achieve metallurgical bonding between all of the individual components of the slug followed by annealing to effect formation of super-conductive filaments by diffusion of at least one diffusible material component contained in a matrix material included in the slug into a second material component disposed in filament form in the interior of the conductor, characterized in that a middle region of the cross-section of the slug is constituted by a plurality of rods or wires consisting of the material component which forms the second, super-conductive material and a surrounding material containing the diffusible material component, and said middle region is surrounded by a contiguous ring of rods or wires of a material having a good electrical conductivity and each of which is individually surrounded by contiguous material which forms a barrier to the diffusible material component and also provides high electrical resistance therebetween.

4,055,888
PROCESS FOR MAKING REED SWITCHES
Vaughan Morrill, Jr., 26 S. Spoede Road, and Stanley F. Jackes, 12 Muirfield Lane, both of St. Louis, Mo. 63141, assignors to Morex, Inc., St. Louis, Mo.
Filed Oct. 4, 1976, Ser. No. 729,005
Int. Cl.^{2} H01H *11/00*
U.S. Cl. 29—622 **9 Claims**

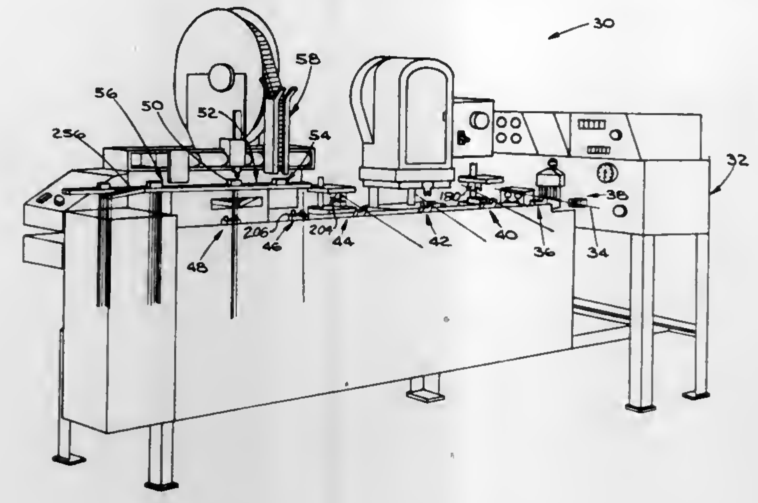


1. The process of making reed switches comprising forming combs each including a header web and, integral with said web and projecting therefrom, a plurality of reed elements, said reed elements being parallel with one another and spaced from one another along said web; forming a plurality of elongated glass envelope tubes, each with two, opposite, open ends; mounting said plurality of glass tubes parallel with one another and spaced the same centerline-to-centerline distance as said reed elements, in a fixture; inserting reed elements of a first comb into one end of said tubes and inserting reed elements of a second comb into the other end of said tubes, until the inner ends of said opposite reeds are in the desired lengthwise positions with respect to one another and forcing the reed elements of said first comb at their free inner end against the inner wall of said tubes in one direction, so that each said reed element exerts a positive pressure against said tube wall and forcing the reed elements of said second comb at their free inner end against the inner wall of the tubes in the opposite direction from the said reed elements of said first comb, so that each said reed element exerts a positive pressure against said tube wall; while maintaining said relative positions and positive pressures, heating selected sealing areas of said tubes and fusing said reed elements into said tubes, to form sealed envelopes, in an area outboard of said inner end of said reed elements, and cooling the sealing areas of said envelopes, freezing said reed elements in said relative positions and with said positive pressures, and thereafter separating said reed elements from said webs.

4,055,889
CONNECTOR HARNESS ASSEMBLY MACHINE
Vito A. Fusco, Palos Hills; Joseph C. Bennett, Lisle; Jack F. Funcik, Downers Grove; Kenneth L. Kufner, Hickory Hills, and Thomas E. Schneider, Burbank, all of Ill., assignors to Molex Incorporated, Lisle, Ill.
Filed Feb. 18, 1976, Ser. No. 659,004
Int. Cl.^{2} H01R *43/00*
U.S. Cl. 29—710 **10 Claims**

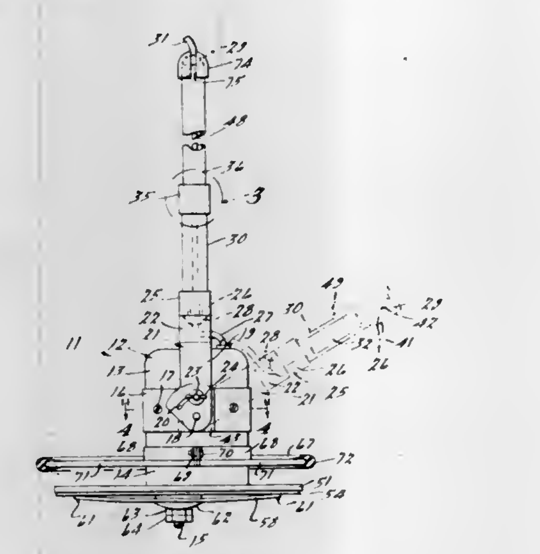
1. In a connector harness assembly machine including a harness fabrication assembly with an insertion station for automatically inserting a plurality of terminated wire leads, one at a time, into a plurality of corresponding terminal receiving

cavities formed in a connector housing held at said insertion station, the improvement comprising:
probe means associated with the harness fabrication assembly and movable into engagement with a terminal in a terminal cavity at the insertion station for sensing whether



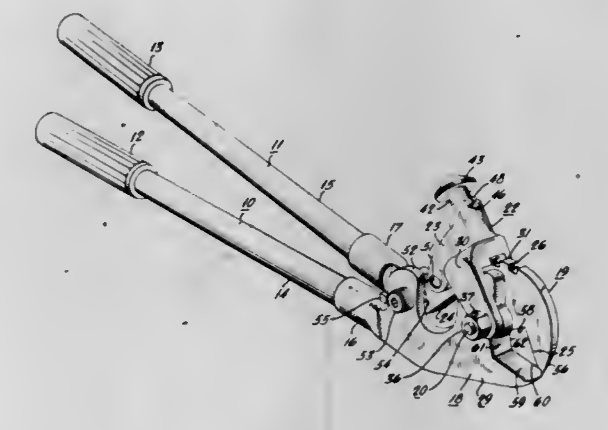
a terminated lead has been fully inserted into the corresponding terminal receiving cavity, each terminal receiving cavity including two openings, said probe means including two electrical elements each adapted to be inserted into one of the cavity openings for engagement with the terminal.

4,055,890
GRASS TRIMMING DEVICE
Paul F. Seibold, 1760 N. Woodward, Bloomfield Hills, Mich. 48013
Filed June 17, 1976, Ser. No. 697,048
The portion of the term of this patent subsequent to July 26, 1994, has been disclaimed.
Int. Cl.^{2} B26B *15/00;* **A01D** *55/18*
U.S. Cl. 30—240 **15 Claims**



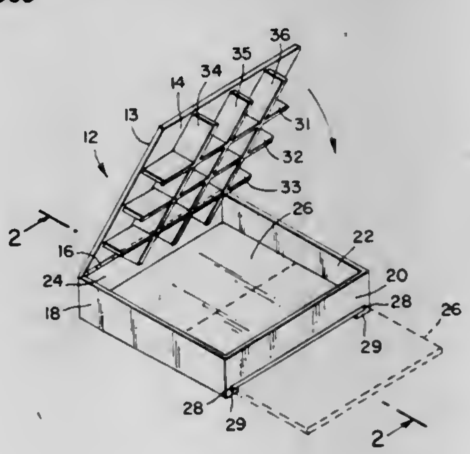
1. In a grass trimming device, a shaft, a motor for driving said shaft, a circular plate having a central opening and radially disposed cutting teeth throughout the outer circumferential edge with a notch provided ahead of each tooth, said plate being disposed in fixed relation relative to said motor with said shaft extending through said opening, a cutting blade of narrow width having a length substantially equal to the diameter of said plate, said blade having a central aperture through which said shaft extends and secured in driving relation therewith with the cutting edges offset but in parallel relation with the centerline of the blade which is aligned with the center of the shaft, said blade cutting edges being in scissors relation with said radially disposed cutting edges, and a handle attached to said assembly and extending outwardly substantially normal to said plate to permit the motor and plate to be moved by said handle in any direction with no more than half of said teeth engaging the grass to be cut at any one time as one end of the cutting blade advances to cut the grass in a notch at one tooth only at any one time with a scissors cutting action to thereby substantially reduce the power required to operate the blade of the trimming device.

4,055,891
RATCHET-OPERATED CABLE CUTTER
John R. Wick, 1040 Old Welsh Road, Huntingdon Valley, Pa. 19006
Filed May 24, 1976, Ser. No. 689,196
Int. Cl.^{2} B26B *13/26*
U.S. Cl. 30—250 **9 Claims**



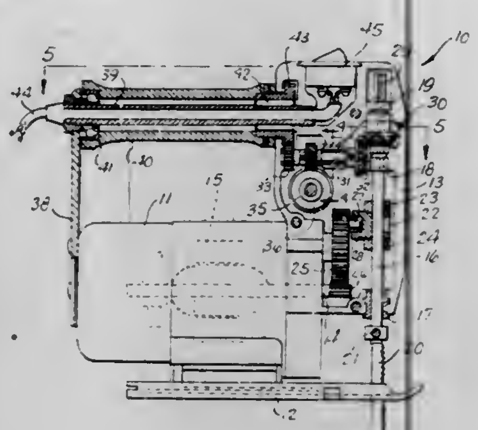
1. A two-handle-actuated cutting tool of the shear type having two oppositely-beveled cutting jaw members journaled on a common main pivot, and adapted to be opened and closed in shearing relationship, one of said jaw members being provided with a wheel segment having an arcuate ratchet portion circumferentially aligned with the axis of the main pivot; a bracket member comprising a saddle part and a pair of legs extending therefrom, said legs straddling both of said jaw members and being journaled on the main pivot and said saddle part housing a single, reversible driving pawl which operates said ratchet selectively to open or to close said jaws.

4,055,892
FOOD DICER
Joseph Del Vecchio, 3206 Middletown Road, Bronx, N.Y. 10465
Filed Mar. 10, 1976, Ser. No. 665,693
Int. Cl.^{2} B26B *3/00*
U.S. Cl. 30—303 **4 Claims**



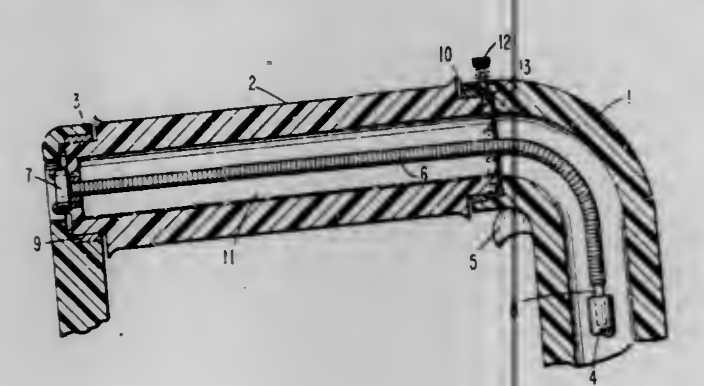
1. A food dicer which may be used for jello and the like comprising a body to which is hingedly attached a cover provided with a plurality of cutting blades suitably arranged in the desired cutting pattern, the body comprised of several joined side walls to which is slidably fitted a removable bottom; so that when the item to be cut is placed on the bottom within the body and the cover is swung towards the bottom — the item becomes cut; and so that the cut small items can be released as the bottom is slidably removed.

4,055,893
SABER SAW CONTROL HANDLE
Leo C. Saxe, 10907 Annapolis Rd., Bowie, Md. 20716
Filed Apr. 16, 1976, Ser. No. 677,533
Int. Cl.² B27B *11/00, 19/09*
U.S. Cl. 30—392 **2 Claims**



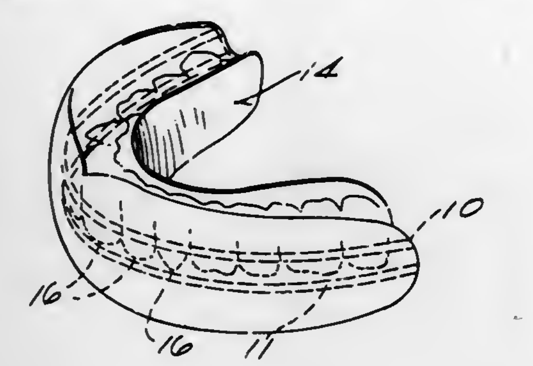
1. A saber saw including a motor housing, a drive housing, a motor in the motor housing, a saber saw blade shaft mounted for reciprocation in the drive housing, means on the lower end of the saw shaft for securing a saber saw blade thereto, means extending from the motor housing to the drive housing for vertically reciprocating the saw shaft and saber saw blade secured thereto, said last mentioned means comprising a spur gear rotated by the gear on the end of the shaft of the motor, the spur gear causing a single eccentric drive pin mated therewith to impart vertical reciprocal motion to the saw shaft through a bushing and a coupling, a handle having its axis substantially parallel to the work surface and substantially perpendicular to the axis of reciprocation of the saw shaft, a transverse shaft extending through said drive housing, and means in the drive housing for linking both said handle and said transverse shaft to the reciprocating saber saw shaft to rotate the saw shaft upon rotation of said handle or said transverse shaft or both.

4,055,894
SABER AND RECIPROCATING SAW BLADE TURNING CONTROL ARRANGEMENT
Leo C. Saxe, 10907 Annapolis Road, Bowie, Md. 20716
Filed Nov. 18, 1976, Ser. No. 742,748
Int. Cl.² B27B *19/09*
U.S. Cl. 30—394 **7 Claims**



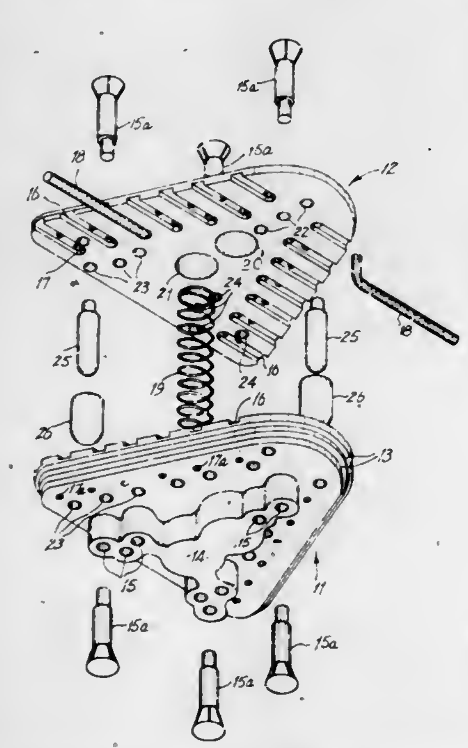
1. In portable power tools of the type having a reciprocating shaft mounted within a housing to which a saw blade etc., is attached, means to rotate the said reciprocating shaft about its axis of reciprocation by means of a full-hand grip rotatable manipulating handle for the tool and rotatable flexible cable means connected between said shaft and said handle for rotating said shaft.

4,055,895
INTRA-ORAL TOOTH POSITIONER AND PROCESS FOR PRODUCTION THEREOF
Gerald W. Huge, Racine, Wis., assignor to Professional Positioners, Inc., Racine, Wis.
Filed Mar. 29, 1976, Ser. No. 671,876
Int. Cl.² A61C *7/00*
U.S. Cl. 32—14 B **12 Claims**



1. Tooth positioner means comprising an unstressed arch-shaped body of resilient material formed to fit within a patient's mouth between the upper and lower arches, such means having a generally concave surface bearing on the buccal and labial surfaces of the teeth of at least one arch and having a convex surface adjacent to the lingual surface of the teeth of said arch, and such means having at least one prestressed elastic band which exerts lingual force on the buccal and labial surfaces of the teeth of at least one arch when the tooth positioner is worn.

4,055,896
OCCLUSAL PROGRAMMING UNIT
Andrew Neville Corbett, 345 Stirling Highway, Claremont, Australia (6010)
Filed Apr. 6, 1976, Ser. No. 674,092
Int. Cl.² A61C *9/00*
U.S. Cl. 32—19 **5 Claims**



1. An occlusal programming unit for the intraoral recording of jaw movements comprising:

a. a pair of generally triangular plates of rigid synthetic resin adapted to be positioned adjacent the upper and lower jaws of a patient's mouth during intraoral recording of the patient's jaw movements, each of said plates having a periphery of sufficient dimensions to permit peripheral trimming thereof to the shape of and dimensions of the patient's dental arches, and each of said plates having a first surface adapted to face towards the other plate intraorally and a second surface adapted to face away from

the other plate intraorally, each of said first surfaces being provided with a series of grooves extending inwardly from the periphery of the respective plate for receiving locating rods, a series of holes for receiving scribing pins, and a pair of sockets for receiving an end of a spring, and each of said second surfaces being provided with a series of openings for receiving model reference pins;

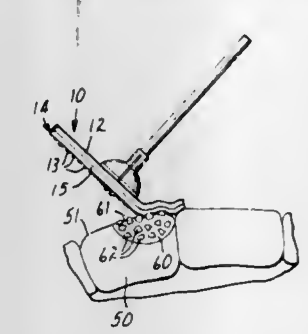
b. model reference pins for locating said plates on models of the patient's jaws, said model reference pins being removably receivable in said openings, to permit said plates to be withdrawn from the models and placed in the patient's mouth;

c. locating rods for identifying the positions of reference teeth when said plates are on the model of the patient's jaws, to thereby aid in positioning said plates in the patient's mouth, said locating rods being receivable in said grooves and being adapted to be fixed in the latter so as to permit identification of the positions of the reference teeth intraorally;

d. scribing pins for tracing the movements of the patient's jaws intraorally, said scribing pins being receivable in said holes and being dimensioned so as to project outwardly of said holes in said plates towards the respective other plate; and

e. a spring for holding said plates apart intraorally, said spring having a pair of spaced ends each of which is received in a socket of a different one of said plates intraorally.

4,055,897
DENTAL ABRADING DEVICE AND METHOD
Charles J. Brix, Maplewood, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.
Filed Mar. 11, 1976, Ser. No. 665,921
Int. Cl.² A61G *3/06;* **B24B** *1/00;* **B24D** *9/08*
U.S. Cl. 32—59 **13 Claims**



1. An abrading device comprising:

a conformable elastomeric disc-shaped body having a thickness in the range of from about 0.15 to 0.4 millimeters and a Shore A hardness in the range of from about 50 to 75; wherein said body is adapted to be connected to a driving means; and

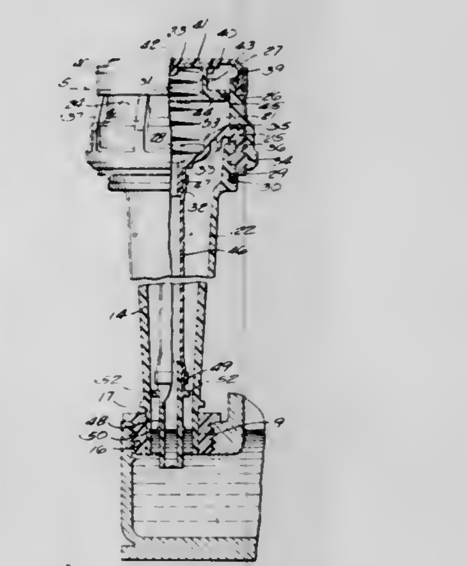
an exposed abrasive layer supported on said elastomeric body; wherein said abrasive layer has a thickness less than about 0.3 millimeters and wherein the diameter of said abrasive layer is from about 1 to 1.1 times the diameter of said elastomeric disc-shaped body.

4,055,898
MEANS FOR FACILITATING CHECKING AND REPLENISHMENT OF CRANKCASE OIL IN A SMALL ENGINE
Daniel E. Braun, Brookfield, and Patrick J. Bruener, West Allis, both of Wis., assignors to Briggs & Stratton Corporation, Wauwatosa, Wis.
Filed May 13, 1976, Ser. No. 686,146
Int. Cl.² G01F *23/04*
U.S. Cl. 33—126.4 R **11 Claims**

1. A device for indicating whether oil in the crankcase of an engine is above or below a predetermined level, said device being of the type that comprises a tube having a lower end normally in the crankcase at said level and having an upper end communicated with a suction chamber that provides for withdrawal of a small quantity of oil out of the crankcase (if oil therein is above said level) and to a location at which the withdrawn oil is visible, said device being characterized by:

A. said suction chamber being defined by means comprising
1. a bottom wall to which the upper end portion of said tube is attached and through which the interior of the tube is communicated with the interior of the suction chamber,
2. a substantially annular side wall having a bottom portion sealingly connected with said bottom wall, and
3. a flatwise upwardly and downwardly displaceable top wall which is sealingly connected with an upper portion of said side wall;

B. said side wall



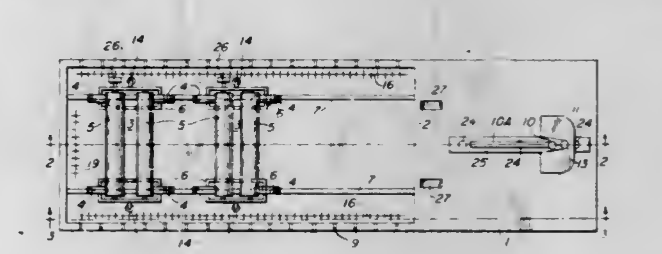
1. being at least in part transparent between its connections with said bottom wall and said top wall, and
2. having a cylindrical interior surface portion between said connections;

C. said top wall being yieldingly biased upwardly to a normal position from which it can be manually displaced downwardly;

D. a resilient circular wiper having an axially slidable wiping fit with said interior surface portion of the side wall; and

E. means providing a connection between said wiper and said top wall whereby said wiper is constrained to move up and down with said top wall so that manual downward displacement of the top wall causes the wiper to remove residual oil from said cylindrical interior surface portion.

4,055,899
AXLE ALIGNMENT MACHINE
Floyd E. Dean, Box 124, Morning Sun, Iowa 52640
Filed Mar. 30, 1976, Ser. No. 672,006
Int. Cl.² G01B *3/14, 5/25*
U.S. Cl. 33—193 **2 Claims**



1. An axle alignment machine comprised of a base having a forward portion and a rearward portion, a stand supporting a fifth wheel located on the forward portion of the base, a pit located in the rearward portion of the base, removable supports extending across the pit, tracks located in the pit, a plurality of carriages, each carriage having a frame, a plurality of track rollers and a plurality of wheel rollers turnably mounted on each frame, the track rollers being in movable engagement

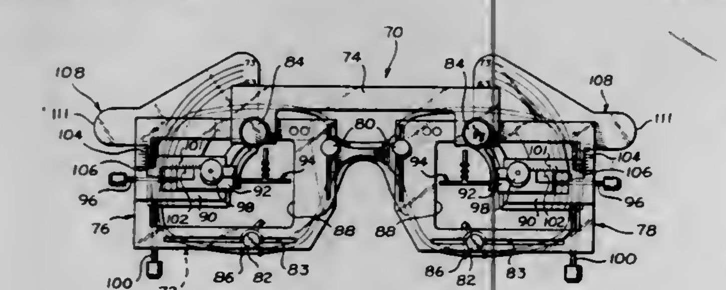
with the tracks, the wheel rollers being mounted on the carriages in fixed relation to the track rollers, markings in the pit along the tracks, plumb bobs attached to the carriages to read over the markings along the tracks, the wheel rollers being mounted in fixed relation to each other and the track rollers to support the wheels of a trailer fastened to the fifth wheel, additional markings across the rear of the pit, a rear plumb bob attached to the rear of the trailer to read over the additional markings across the rear of the pit, motors attached to the wheel rollers to turn the wheel rollers.

4,055,900
DEVICE FOR MAKING OPTHALMIC MEASUREMENTS AND METHOD

Bernard Grolman, Worcester, and William Richards, Medway, both of Mass., assignors to American Optical Corporation, Southbridge, Mass.

Filed Oct. 2, 1975, Ser. No. 619,083
Int. Cl.[2] A61B *3/10*

U.S. Cl. 33—200 **6 Claims**



1. Apparatus for applying ophthalmic measurements directly to a spectacle frame comprising:

a main supporting section including a pair of depending measuring plates;

means for detachably connecting said main supporting section and measuring plates to said spectacle frame with said plates disposed forwardly of lens rims of the frame;

a one-piece reticle having vertical and horizontal legs carried by each of said depending plates within the area circumscribed by right and left rims respectively of said spectacle frame and each disposed generally forwardly of one of right and left eyes of a patient wearing said frame and measuring apparatus, means for adjusting each one-piece reticle as a unit in directions horizontally and vertically relative to a selected point on a respectively adjacent eye and wherewith a point on at least one leg of said reticle may be centered with said eye; and

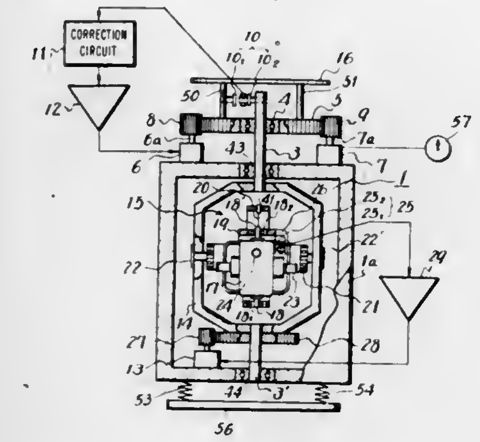
dual scale means on each of said plates, one of said scale means being so disposed and calibrated as to indicate to a user of the apparatus when read, a measurement of the distance in one direction from said point on said reticle to the extreme lateral extension of the adjacent lens rim of said spectacle frame and the other scale means being so disposed and calibrated as to similarly indicate a measurement of the distance from said point on said same reticle to the extreme inferior extension of said lens rim, said dual scale means being so constructed and arranged as to provide both of said measurements simultaneously and with a single setting of adjustment of said unitary reticle in each case of each right and left eye of said patient, visual perception of said scales being required to effect said readings.

4,055,901
GYROCOMPASS

Susumu Ishii, Tokyo, Japan, assignor to Kabushiki Kaisha Tokyo Keiki, Tokyo, Japan

Continuation-in-part of Ser. No. 474,252, May 29, 1974, abandoned. This application Jan. 19, 1976, Ser. No. 649,996
Claims priority, application Japan, May 31, 1973, 48-61477
Int. Cl.[2] G01C *19/38*

U.S. Cl. 33—324 **4 Claims**



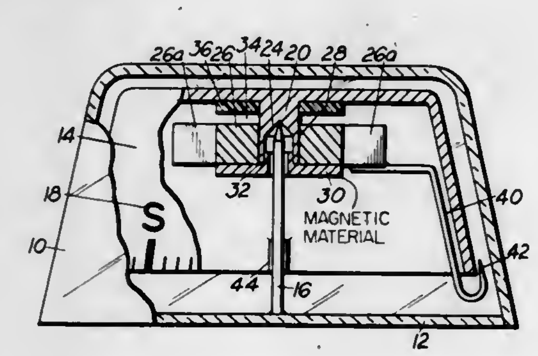
4. In a gyrocompass comprising a housing, a gyro case, a gimbal supporting the gyro case, a follow-up shaft, a follow-up ring rotatably supported by said housing to rotate about a vertical axis on said follow-up shaft, and said gimbal is mounted within the follow-up ring, a first follow-up system including detecting means mounted on the gimbal support and the gyro case to detect a relative movement therebetween about the vertical axis, the improvement comprising a second follow-up detecting means mounted to said housing and said follow-up shaft, wherein said second follow-up detecting means includes a first gear rotatably mounted on said follow-up shaft, a signal generator mounted on said housing and having a rotary shaft, an indicator connected to said signal generator, a second gear in mesh with said first gear, and said rotary shaft of said signal generator fixed to said second gear, a pick-up mounted for detecting a displacement between said follow-up shaft and said first gear, a third gear in mesh with said first gear, a servo motor mounted on said housing and its rotary shaft fixed to said third gear and supplied the output from said pick-up and driving said first gear and a compass card attached to said first gear.

4,055,902
COMPASS WITH MEANS FOR CORRECTING ANGLE OF MAGNETIC VARIATION

William S. Jolley, 7934 NE. Alberta St., Portland, Oreg. 97218, and William R. Cranford, 521 Gorgonia, Newport Beach, Calif. 92660

Filed Feb. 6, 1976, Ser. No. 655,845
Int. Cl.[2] G01C *17/38*

U.S. Cl. 33—356 **4 Claims**



1. A magnetic compass comprising
a. a housing,
b. a rotatable compass card having a top wall,

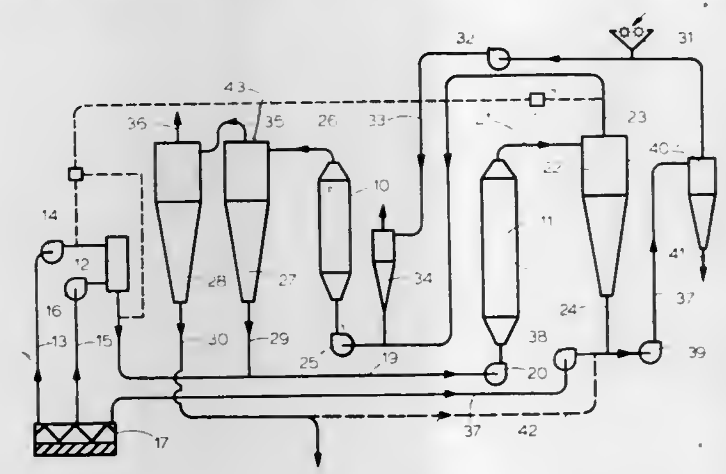
c. means in said housing rotatably supporting said compass card therein on substantially a vertical axis,
d. a projecting hub integral with said compass card,
e. a flange integral with said hub and spaced from said top wall,
f. said flange being formed of magnetically permeable material,
g. and a compass magnet rotatably mounted on said hub between said flange and said top wall of said compass card and being magnetically attracted to said flange for connecting said magnet to said compass card for unitary rotation,
h. said hub being longer than the thickness of said magnet whereby the latter can be moved out of engagement with said flange into engagement with said top wall and also rotatably adjusted relative to said compass card by an exterior magnet of sufficient magnetic power, whereby to correct the angle of magnetic variation by rotating said compass magnet by the exterior magnet and then removing the exterior magnet to permit said compass magnet to re-engage with said flange in the adjusted position,
i. the space between said flange and said top wall being pre-selected relative to the thickness of said magnet such that said flange when said magnet is moved into engagement with said top wall by the exterior magnet still is within the influence of said compass magnet.

4,055,903
METHOD AND APPARATUS FOR DRYING DISINTEGRATED FIBER MASS

Karl Erik Hansen, Kokkedal; Svend Hovmand, Horsholm; Mogens Lindskov Pedersen, Kokkedal; Christian Schwartzbach, Glostrup, all of Denmark; Myat Htun, Vallingby, Sweden; Alf de Ruvo, Stockholm, Sweden, and Sören Cavlin, Saffle, Sweden, assignors to Aktieselskabet Niro Atomizer, Soborg, Denmark

Filed Mar. 25, 1976, Ser. No. 670,265
Claims priority, application Sweden, Mar. 25, 1975, 7503484
Int. Cl.[2] F26B *7/00*

U.S. Cl. 34—12 **24 Claims**



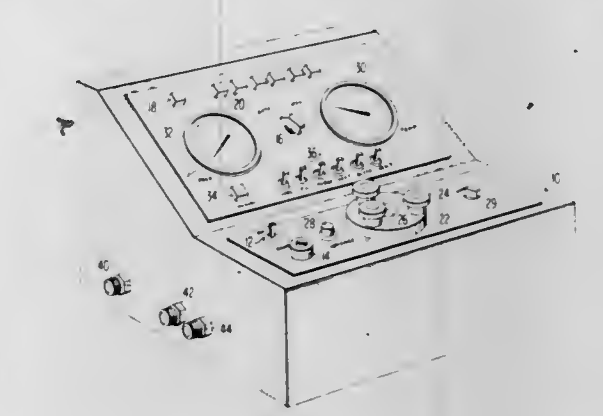
1. In a method of flash drying a fiber mass generally requiring subsequent grinding in an aqueous slurry in the manufacture of paper products wherein the fiber mass to be dried is disintegrated to comprise a disintegrated fiber mass which comprises substantially free single fibers, of which at least a part of the free single fibers are cellulose fibers, and wads or lumps of fibers and then the disintegrated fiber mass is subjected to a drying gas the improvement comprising exposing the said disintegrated fiber mass to flash drying by utilization of a drying gas at a temperature of at least 180° C, to at least partially dry the free fibers and then separating a substantial part of the free fibers from the wads and lumps of the disintegrated fiber mass whereby the grindability of the free fibers is not substantially reduced.

4,055,904
AUTOMATIC CRITICAL POINT DRYING APPARATUS

John E. Horne, Hyattsville, Md., assignor to Tousimis Research Corporation, Rockville, Md.

Filed Apr. 2, 1976, Ser. No. 672,923
Int. Cl.[2] F26B *19/00*

U.S. Cl. 34—45 **19 Claims**



1. In a critical point dryer for specimen preparation in electron microscopy, said specimen being dehydrated in a dehydrating fluid, said dryer including a specimen chamber in which said dehydrating fluid containing specimen is inserted, cooling means for cooling said chamber, filling means for filling said chamber with a transitional fluid having a critical temperature and critical pressure, purging means for purging said chamber of said dehydrating fluid, heating and pressurizing means for heating said transitional fluid above said critical temperature and pressurizing said transitional fluid above said critical pressure, bleeding means for controllably equalizing said chamber to atmospheric pressure, venting means for venting said chamber directly into the atmosphere, the improvement comprising:

automatic means for automatically and sequentially controlling said cooling means, said filling means, said purging means, said heating and pressurizing means, said bleeding means and said venting means.

4,055,905
TEACHING TYPEWRITER

Charles R. Budrose, Melrose, Mass., assignor to Upaya, Inc., Saugus, Mass.

Filed June 21, 1976, Ser. No. 698,411
Int. Cl.[2] G09B *13/00*

U.S. Cl. 35—5 **11 Claims**

1. A system for use with a typewriter including a keyboard having keys, said system comprising;

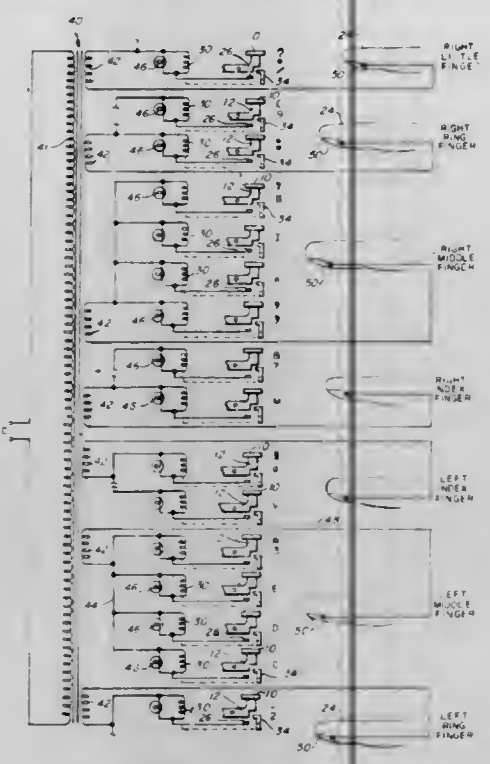
a plurality of blocking means associated, respectively, with each key capable of assuming two different positions, one for permitting key depression and one for preventing key depression,

each said blocking means being operable independent of the other blocking means,

glove means worn by the operator having a plurality of conductive patches, one at the tip of each finger of the glove means,

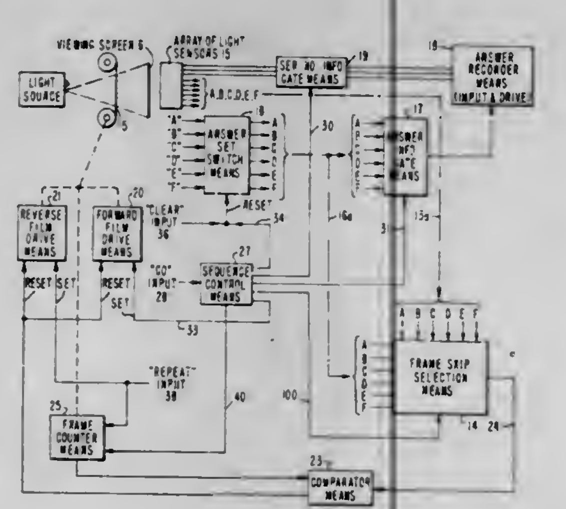
and means defining a plurality of separate circuit paths each including first conductor means extending from the conductive patch, means defining a potential difference source coupled to the first conductor means, electromechanical means coupled to the potential difference source for operating said blocking means and second conductor means associated with the key and coupling to the electromechanical means whereby an electrical path is com-

pleted between the potential difference source and the electromechanical means when the proper key is de-



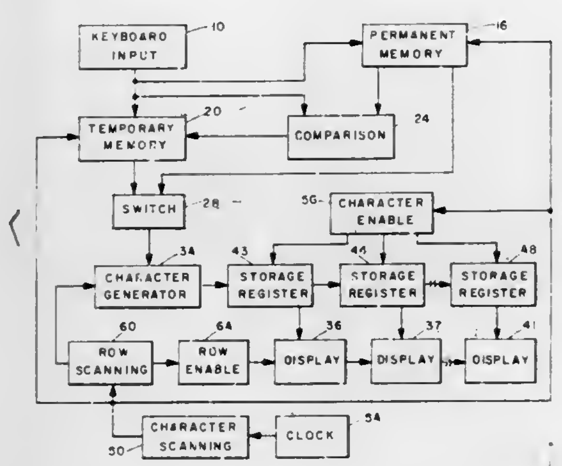
pressed to operate the blocking means to its key depression permitted position.

4,055,906
AUTOMATED INTERROGATING APPARATUS
Francis T. Thompson, Murrysville, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.
Filed Apr. 12, 1976, Ser. No. 676,180
Int. Cl.^{2} G09B *7/08*
U.S. Cl. 35—9 A **3 Claims**



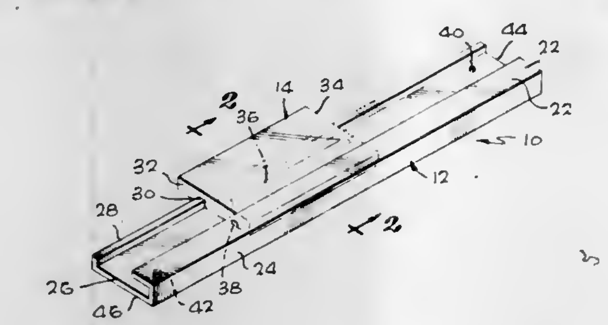
1. An automatic self-administered interrogating apparatus comprising,
   film strip means for visually presenting a series of image frames at a viewing station, at least many of said image frames containing multiple answers viewable simultaneously at such station, and each such frame having an identification code affiliated with it, together with frame-count-advance codes respective to said answers,
   answer selection means operable to indicate choice of any one, several, or all of the aforesaid answers,
   recording means for storing said identification code and answer-choice information from said answer selection means,
   frame-count-advance selection means essentially comprising a bit-polarity-dominant logic circuitry for selecting frame-count-movement information from among the codes of the chosen answers, and
   means for effecting advancing movement of said film strip means according to such frame-count-movement information selection.

4,055,907
CHARACTER SCANNED TEACHING MACHINE
Eugene Murl Henson, 14256 Caminata Soleado, San Diego, Calif. 92129
Filed June 9, 1976, Ser. No. 694,232
Int. Cl.^{2} G09B *7/02*
U.S. Cl. 35—9 R **9 Claims**



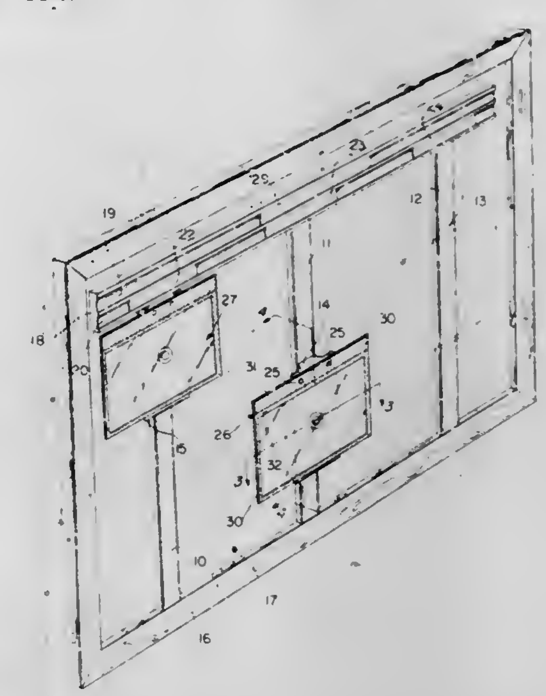
1. A teaching machine wherein an answer provided by a student in the form of a sequence of characters is displayed as each character is correctly indicated in said sequence by the student as determined by a character by character comparison of input character indications made by the student with a correct character indication sequence stored in the machine, comprising,
   input means for providing an input character indication,
   permanent memory means for storing a correct character indication sequence,
   comparison means for comparing said input character indication with a stored character indication in a corresponding position in said stored correct character indication sequence, and for providing an enabling signal when said input character indication matches said stored correct character indication,
   temporary memory means for storing correct input character indications in response to said enabling signal, in the sequence that said characters are correctly indicated at the input means,
   a sequence of display devices for displaying characters represented by said input character indications stored in the temporary memory means, wherein each character is displayed in a matrix format consisting of rows and columns,
   a sequence of storage registers corresponding to the sequence of display devices, each storage register for holding and providing signals to its corresponding display device for forming a character represented by an input character indication in the corresponding character sequence position in the temporary memory means,
   character generating means for providing said character forming signals to the storage registers in response to input character indications received from the temporary memory means, wherein each character forming signal represents a single row of a character matrix,
   character scanning means for sequentially addressing each character indication position in the temporary memory means to provide said character indication in said addressed position to the character generating means,
   character enabling means for enabling the storage registers to provide character forming signals to the corresponding display devices in the sequence and at the rate that the corresponding character positions in the temporary memory means are addressed,
   row scanning means for row by row scanning of the character generating means to provide character forming signals representing a single row of said indicated character matricies to the storage registers,
   row enabling means for enabling all of the display devices to display corresponding single rows of said character matricies at the same rate that the character generating means is scanned by the row scanning means and at such a rate that signals are received by all of the storage registers from the character generating means during the scanning of each row, and
   means for enabling the storage registers to receive character forming signals from the character generating means during the first half of the interval during which each row is scanned and for enabling the display devices to display said corresponding single rows of said character matricies during the second half of said interval.

4,055,908
READING DEVICE
Daniel H. Greene, 15910 Ventura Blvd., Encino, Calif. 91324, and Lawrence J. Greene, 1031 Foster City Blvd., Foster City, Calif. 94404
Filed Apr. 15, 1976, Ser. No. 677,322
Int. Cl.^{2} G09B *17/02*
U.S. Cl. 35—35 R **9 Claims**



1. A device for training people to improve reading skills, comprising:
   means for isolating a single line of reading material to be read from a page containing a plurality of lines of readable material including a frame having an open left end, and open right end and having at least one elongated member defining a trough between said open ends, one of said members having an edge underlying said single line of reading material, and said frame including a first stop pin mounted on the left end of the frame and a second stop pin mounted on the right end of the frame; and
   shutter means slidingly mounted in the trough of said isolating means for sequentially uncovering portions of said single line of reading material, whereby a reader may attack selected portions of said single line of material as said shutter means is moved from left to right on said isolation means, said shutter having a left edge and a right edge, each of said edges being capable of movement out of said open ends so that the opposite edge is positioned near the edge of the printed margin of the page, said left edge of said shutter being adapted to uncover portions of said line sequentially as said shutter is slid laterally along in said trough, said shutter being provided with an upper dead end groove and a lower dead end groove, said upper dead end groove being open adjacent one ege of the shutter in alignment with one of said pins and being closed between said edges in a location permitting movement of the opposite edge of the shutter past one margin of the page, said lower dead end groove being open adjacent the other edge of the shutter in aligment with the other pin and being closed between said edges in a location permitting movement of the opposite edge of the shutter past the other margin of the page.

4,055,909
DISPLAY AND SCHEDULING PANELS WITH DOCUMENT HOLDING ENVELOPE
Loren Dale Perry, 414 Parliament Road, Martinez, Ga. 30907
Filed May 21, 1976, Ser. No. 688,563
Int. Cl.^{2} G09F *1/10*
U.S. Cl. 40—124.2 **7 Claims**

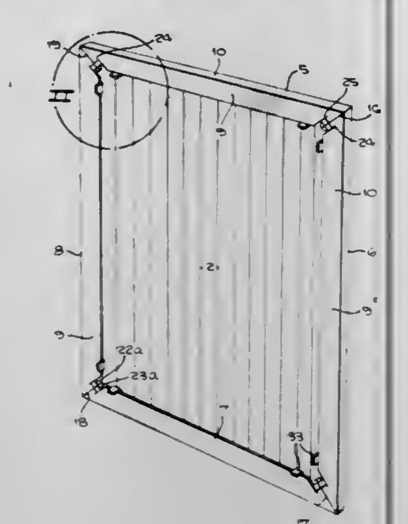


1. Display means for holding a plurality of documents of variable size fully visible in ordered sequence, comprising in combination,
   a set of longitudinally disposed guide members arranged on a panel for retaining said documents in said ordered sequence,
   a plurality of riders adapted for retention on and movement along said guide members each for displaying one of said documents,
   friction means holding said riders frictionally in position on said guide members and permitting sliding movement therealong when the friction is manually overcome,
   transparent envelope means affixed to said riders for visibly retaining removably inserted indicia documents of different dimensions,
   and wherein said guide members comprise a set of parallel linear members disposed upon a panel whereby documents prepared in the normal course of business such as work orders, sales slips and invoices are held in said ordered sequence subject to removal and reordering of both the riders and the documents along said guide members.

4,055,910
PICTURE FRAME
Hans H. Schmidt, 1905 Pontius Ave., Los Angeles, Calif. 90025
Filed July 1, 1976, Ser. No. 701,431
Int. Cl.^{2} G09F *1/12*
U.S. Cl. 40—155 **24 Claims**

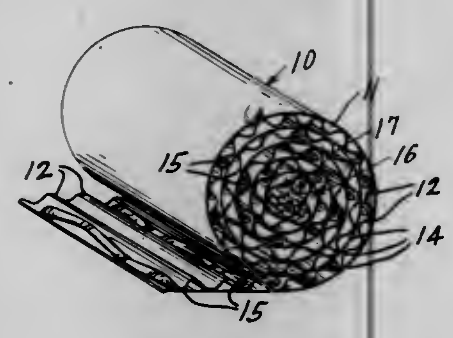
1. In a frame having channel members extending along each edge of framed material, each channel member abutting another channel member at the corner of the framed material, the improvement comprising:
   locking means slidable between the framed material and a pair of abutting channel members at each corner of the framed material and means on the channel members for

receiving and holding the locking means whereby the locking means performs the dual function of holding the



channel members together in abutting relationship and of holding the channel members on the framed material.

4,055,911
WORM PACKAGE AND METHOD OF PACKAGING WORMS
Elmo E. Aylor, 18650 Willow Lane, Hesperia, Calif. 92345
Filed June 7, 1976, Ser. No. 693,498
Int. Cl.^{2} A01K *97/04*
U.S. Cl. 43—55 **17 Claims**

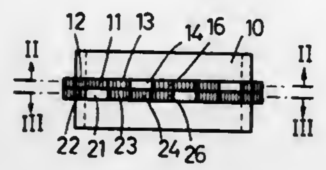


1. A worm package containing a plurality of worms comprising at least one section of water absorbent sheet material supported in overlying spaced relation over another section of sheet material to form worm compartments between the layers of said sheet material, and

spacer means disposed between said layers of sheet material dimensioned to provide a space between said layers to permit a worm to crawl therebetween for snug-fit residence therebetween, said package having an entrance opening to said space for entry of worms therein.

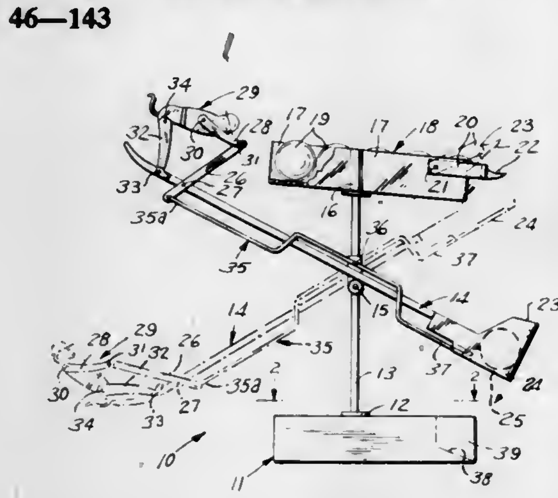
4,055,912
TOY CONSTRUCTION MEMBERS
Hans-Josef Anschutz, Berlin, Germany, assignor to Anschutz Handels-und Verwaltungs- GmbH, Berlin, Germany
Continuation of Ser. No. 408,916, Oct. 23, 1973, abandoned, which is a continuation of Ser. No. 121,268, March 5, 1971, abandoned. This application Feb. 4, 1976, Ser. No. 655,225
Claims priority, application Germany, Mar. 7, 1970, 2010896
Int. Cl.^{2} A63H *33/08*
U.S. Cl. 46—25 **6 Claims**

1. A toy construction set comprising a plurality of members, each of said members comprising a unitary frame of open polygonal shape having outer peripheral planar edge surfaces and a planar cover member for sheathing the open side of said frame, said frame having two parallel rows of continuously alternating tabs and recesses located substantially along the center line of at least one of said edge surfaces, each of said rows comprising a plurality of adjacent alternating tabs raised perpendicularly from the plane of said edge surface and recesses conformed in depth to said tabs, said tabs and recesses being respectively below and over the plane defining said edge surface and being mutually conformed trapezoids of the same height and width with the tabs tapering inwardly in the outward direction at an angle of 45°, the tabs of one row being offset relative to the tabs of the other row by a distance equal



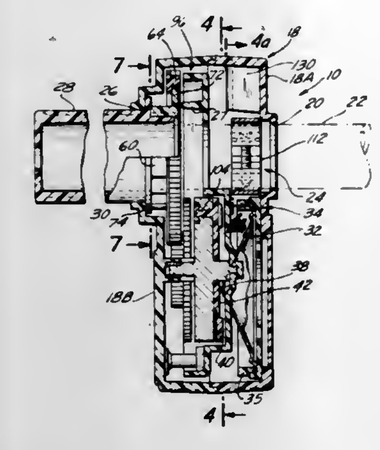
to one of said tabs or recesses whereby two or more of said frames may be interconnected with the tabs and recesses of one interengaging with the conforming recesses and tabs of the other and the planar surfaces of the corresponding peripheral edges in abutment, said cover member being provided with tabs are recesses on its surface which are adapted to interconnect with the tabs and recesses of said frames.

4,055,913
MECHANICAL TOY
John B. Sindelar, Box 30, Loyalton, S. Dak. 57459
Filed Aug. 5, 1976, Ser. No. 694,547
Int. Cl.^{2} A63H *29/08*
U.S. Cl. 46—143 **2 Claims**



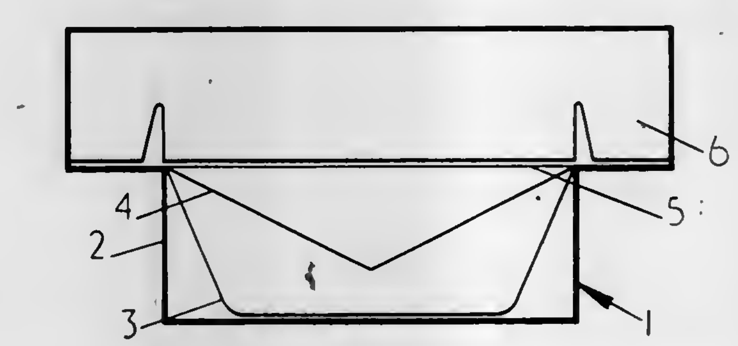
1. A mechanical toy, comprising a base for support on a stationary surface, a pair of vertically upright posts supported on said base, a horizontally inclined container upon an upper end of said posts, said container holding a plurality of balls, an opening in a downwardly inclined end of said container for rolling of said balls out of said container, a U-shaped retainer pivoted around said end opening, normally preventing said balls to roll outward; a rod pivoted at its intermediate portion over a roller pivoted on a pivot pin between an intermediate portion of said posts, one end of said rod having a cup, an upper edge of said cup pivoting said U-shaped retainer upwardly when said rod end is upwardly pivoted, so to release one said ball from said container into said cup, said cup containing said ball being heavier than an opposite end of said rod, so to cause said cup to downwardly pivot about said roller, an underside of said cup abutting with a sloping chute of said base, when said rod cup is downwardly pivoted, and means for transferring said ball from said cup to said chute, when said cup abuts said chute.

4,055,914
SOUND PRODUCING DEVICE
Michael Ieda, Fort Solanga, and Walter Friedman, Centereach, both of N.Y., assignors to Ideal Toy Corporation, Hollis, N.Y.
Filed Mar. 31, 1976, Ser. No. 672,230
Int. Cl.^{2} A63H *5/00*
U.S. Cl. 46—192 **26 Claims**



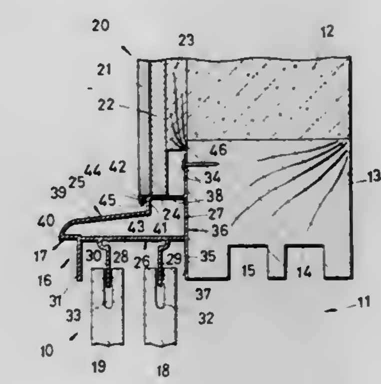
1. A device for producing sound comprising a housing, an elongated handle rotatably mounted in said housing for rotation in opposite directions about the handle's longitudinal axis, resonator means mounted in said housing for producing noise when struck, striker means in said housing for striking said resonator in response to rotation of said handle, and transmission means for transmitting rotational movement from said handle to said striker including clutch means for transmitting rotary movement between the handle and the striker means only when the handle is rotated in a first direction about its longitudinal axis; said clutch means including a first clutch plate mounted on said handle for rotation therewith and a second clutch plate rotatably mounted with respect to said first clutch plate; said first and second clutch plates including cooperating means for transmitting rotation from said first clutch plate to said second clutch plate only when the handle is rotated in said first direction.

4,055,915
METHOD OF AND APPARATUS FOR TREATING PLANT ORGANISMS
Zeera Polyandre Charnoe, Alvah, (near Banff), Scotland, assignor to Devatron Limited, Insch, Scotland
Filed Sept. 29, 1975, Ser. No. 617,505
Claims priority, application United Kingdom, Sept. 28, 1974, 42255/74
Int. Cl.^{2} A01C *1/00*
U.S. Cl. 47—58 **13 Claims**



1. A method of inducing acceleration of the metabolisms of plant organisms such as seeds and plants comprising the steps of testing a plant organism by subjecting it to sound at a plurality of frequencies in turn and, while each frequency is being applied, detecting at least one substantially immediate response characteristic of at least part of the plant organism to determine a frequency favored by the plant organism and thereafter applying sound at said favored frequency to the plant organism while the latter is subjected to the conditions of heat, light and moisture normally provided.

4,055,916
EXTERIOR WINDOW UNIT HAVING FRAME HEADER
Yukio Yamamoto, and Mitsuo Nagase, both of Kurobe, Japan, assignors to Yoshida Kogyo Kabushiki Kaisha, Tokyo, Japan
Filed Dec. 24, 1975, Ser. No. 644,155
Claims priority, application Japan, Dec. 26, 1974, 50-3881[U]
Int. Cl.^{2} E06B *3/26*
U.S. Cl. 49—404 **6 Claims**



1. An exterior window unit for being mounted on the outside of an opening in a building wall, such wall having exterior siding and a wall header extending along the opening, said exterior window unit comprising:

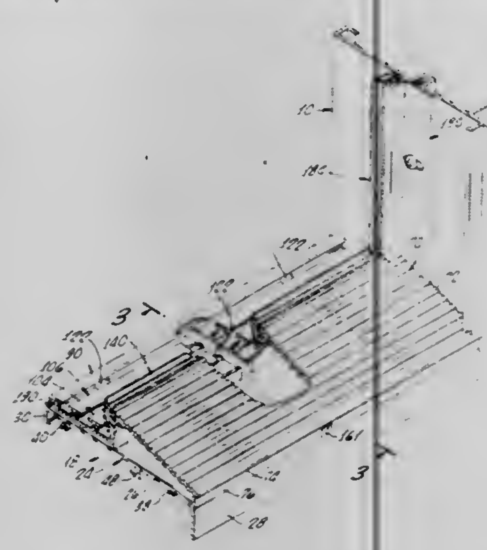
a. a frame;
b. a pair of horizontally movable sashes mounted within said frame in parallel closely spaced planes; and
c. said frame including a frame header comprising
   1. a vertical mounting plate adapted to be attached to the outside of said wall header,
   2. a first plate directly joined to and projecting horizontally outwardly from said mounting plate,
   3. a pair of horizontally elongated flanges projecting downwardly from said first horizontal plate into slots in the upper ends of said sashes, respectively, and along which flanges said sashes are individually guided during horizontal movement,
   4. a second plate joined to and projecting horizontally outwardly from said mounting plate for a distance overlying only the inner one of said sashes and spaced upwardly from said first plate, said second plate being adapted to engage the horizontal bottom edge of said exterior siding and
   5. a third plate extending outwardly and downwardly from said second horizontal plate to said first horizontal plate in overlying relation to at least the outer one of said sashes.

4,055,917
DOOR AND THRESHHOLD ASSEMBLY
John Coller, Redondo Beach, Calif., assignor to Elixir Industries, Gardena, Calif.
Filed Oct. 14, 1975, Ser. No. 621,830
Int. Cl.^{2} E06B *1/70*
U.S. Cl. 49—469 **18 Claims**

1. For use with a door hinged in a doorway, a threshhold assembly comprising

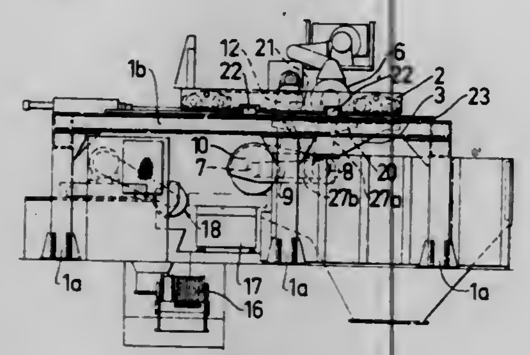
an elongated subpan adapted to be mounted in said doorway and to extend across the doorway, said subpan including means for effecting drainage therefrom, an elongated threshhold member mounted to said subpan and positioned above a forward portion thereof, an elongated upper pan mounted to said subpan and spaced above said subpan, said upper pan extending along the length of said subpan and across the width of said subpan from a rear edge thereof to a rear edge of said threshhold member,

said upper pan having a width substantially equal to the thickness of said door,
drainage means interconnecting said subpan and upper pan,
a door jamb upstanding at a side of said doorway,
a first flexible elongated sealing strip fixed to and extending along said jamb,
a second flexible elongated sealing strip fixed to and extending along the rear edge of said threshhold member,



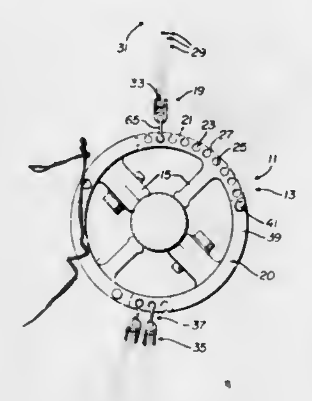
said second sealing strip having an elongated upstanding fin that overlaps said first sealing strip at adjacent ends of said strips, one of said sealing strips adapted to be engaged by said door to thereby be pressed against the other of said sealing strips at said jamb and provide a tightly sealed corner at the bottom of said jamb.

4,055,918
GRINDING MACHINE
Börje Brålander, Svanesund; Åke Claesson, Floda; Lars-Erik Henningsson, Goteborg, and Johan Scheel, Partille, all of Sweden, assignors to Centro-Maskin Goteborg AG, Goteborg, Sweden
Filed June 8, 1976, Ser. No. 693,741
Claims priority, application Sweden, June 10, 1975, 7506620
Int. Cl.² B24B *7/02*
U.S. Cl. 51—47 **5 Claims**



1. A grinding machine which comprises:
a rigid frame structure,
a cross travel carriage movably supported on said rigid frame structure,
a grinding wheel,
a grinding pendulum, and
a drive motor, wherein said grinding stand is rotatably supported by said cross travel carriage in the horizontal plane about a pin located straight above center of said grinding wheel by a pivot fixed between said cross travel carriage and said grinding stand and by wheels on said grinding stand which cooperate with rails on said cross travel carriage, and
wherein said grinding wheel is supported by a grinding pendulum carried by said grinding stand via an intermediate shaft fastened on said grinding stand, and
wherein said drive motor for driving the grinding wheel is rigidly secured on said rotatable grinding stand.

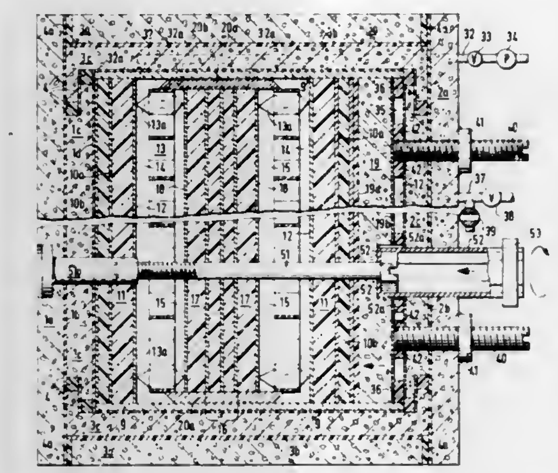
4,055,919
PACK UNIT AND MOUNTING MEANS THEREFOR
James A. Belanger, Northville, Mich., assignor to Belanger, Inc., Northville, Mich.
Filed May 10, 1976, Ser. No. 685,015
Int. Cl.² B24D *13/06*
U.S. Cl. 51—334 **25 Claims**



1. A pack unit adapted to be mounted on the hub structure of a rotary finishing wheel, said hub structure including a plurality of circumferentially spaced, elongated, quasi-cylindrical, key-hole-type slots about the periphery thereof, each of said slots having an inner portion and a restricted neck passage opening outwardly therefrom, each of the said slots further including a longitudinal slot axis substantially parallel to the rotational axis of said finishing wheel, said pack unit comprising at least one flap-like member of finishing material having a radially outer portion adapted for engaging the workpiece and a radially inner portion adapted to be clampably secured; a unitary, integrally-formed, elongated clip member including a clip body, a pair of radially outwardly extending clamping arms adapted for clampably receiving the radially inner portion of said flap-like member therebetween, the radially inner portion of said clip body being provided with an elongated, radially inwardly disposed, quasi-cylindrical, key-hole-type slot having an inner portion and a restricted neck passage opening outwardly therefrom; and a unitary link member having a dumb-bell-shaped configuration and having a first slot-engaging solid head portion of generally quasi-cylindrical configuration telescopically received within the elongated slot of said clip member, a second slot-engaging solid head portion of generally quasi-cylindrical configuration adapted to be telescopically received within an elongated slot of the hub structure, and an intermediate link portion integrally interconnecting said solid head portions, the end segment of said intermediate link portion adjacent said first head portion being telescopically received within the restricted neck passage of said slot in said clip body and the end segment of said intermediate link portion adjacent said second portion being adapted to be telescopically received within the restricted neck passage of the selected slot in the hub structure, such that said link member telescopically mounts said clip member carrying said flap-like member to the hub structure.

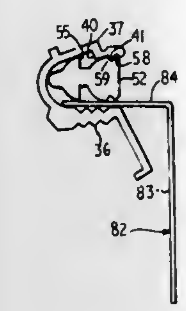
4,055,920
LOAD BEARING CONSTRUCTION UNIT
Otto Alfred Becker, Robert Koch Strasse 59, 66 Saarbrucken 6, Germany
Filed Dec. 31, 1975, Ser. No. 645,651
Claims priority, application Germany, Dec. 31, 1974, 2461940
Int. Cl.² E04C *3/26*
U.S. Cl. 52—2 **17 Claims**

1. A load-bearing construction unit comprising
a. outer composite shell assemblies of high flexural strength forming the sides of said unit, border assemblies comprising the top and bottom of said unit, said shell and border assemblies defining a cavity therewithin,
b. composite supporting plates positioned within said outer shell assemblies,
c. an intermediate load-bearing composite group disposed in said cavity between and spaced from said outer shell assemblies,
d. cellular web assemblies disposed between said intermediate composite group and said composite supporting plates,



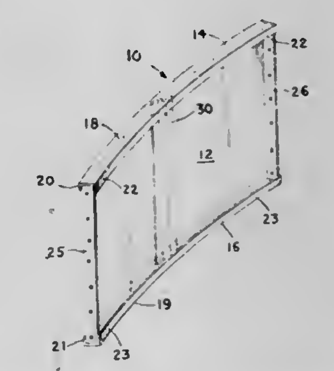
the lateral edges of said web assemblies being tightly and compressively engaged by said intermediate composite group and said composite supporting plates thereby to seal off the individual cells in said web assemblies, whereby the desired pressure conditions can be maintained in said web assemblies,
e. first screw means extending through said unit for stressing said outer shell assemblies, and
f. second screw means applying compressive pressure to the remaining elements within said cavity.

4,055,921
REGLETS AND ASSOCIATED COMPONENTS
Arnold Edward Francis de Carteret, 16/21 Harrison Stret, Neutral Bay, New South Wales, Australia (2089)
Filed Oct. 30, 1975, Ser. No. 627,352
Claims priority, application Australia, Nov. 19, 1974, 9672/74
Int. Cl.² E04D *13/14;* **E04B** *1/54*
U.S. Cl. 52—61 **6 Claims**



6. A weatherproofing system for a building, comprising a reglet adapted to be embedded in a cast concrete wall relative an area to be protected from the weather,
a flashing member adapted to be received in said reglet and including a portion for covering the building area to be protected,
a wedge receivable in said reglet to retain said flashing member therein; said reglet comprising first and second elongate wall members arranged in substantially parallel transversely spaced relationship,
an elongate substantially transversely curved member connecting adjacent longitudinal edges of said wall members to define an elongate channel like structure,
a rib extending along the external surface of said channel in the region of the connection between one said wall member and said curved member to provide an embedment key; said one wall member comprising a substantially planar portion having a wall element extending along the other longitudinal edge thereof and projecting substantially normally from said planar portion towards the other one of said wall members to provide an inner abutment face,
a second wall element connected to the inner longitudinal edge of the first said wall element and projecting outwardly of said channel, said second wall element having a substantially flat surface facing said other wall member and extending therealong between said abutment surface and the free longitudinal edge of said second wall element, said second wall element being angled relative to said other wall member to define a channel opening transversely narrower than the distance between said planar portion and said other wall member,
a plurality of ratchet like elements along said second wall element between the free longitudinal edge thereof and said substantially flat surface thereof and having a depth less than the depth of said abutment face; said flashing member comprising a substantially L-shaped elongate member, one leg of said L-shaped member having a return bent portion receivable in said channel with the longitudinal edge thereof engaged with said abutment surface, the other leg of said flashing member extending in a direction away from said return bent portion to cover said area to be protected;
said wedge comprising an elongate member having a front portion adapted to engage the bent portion of said flashing member and urge it against the curved member of said reglet, a central portion receivable between opposite legs of the return bent portion of said flashing member to urge said legs into engagement with the wall members of said reglet and retain said longitudinal edge of said flashing behind said abutment face, a rear portion having a plurality of ratchet like elements extending therealong and adapted to engage the ratchet like elements of said second wall element to retain said wedge in said reglet and a rear face portion for closing off the channel opening of said reglet.

4,055,922
FRAME STRUCTURE FOR SWIMMING POOL
Harold John Ellington, Basking Ridge, and Roy C. McNeil, Paterson, both of N.J., assignors to Heldor Associates, Inc., Clifton, N.J.
Filed Sept. 24, 1976, Ser. No. 726,127
Int. Cl.² E04H *3/18;* **E04B** *1/32*
U.S. Cl. 52—169.7 **19 Claims**

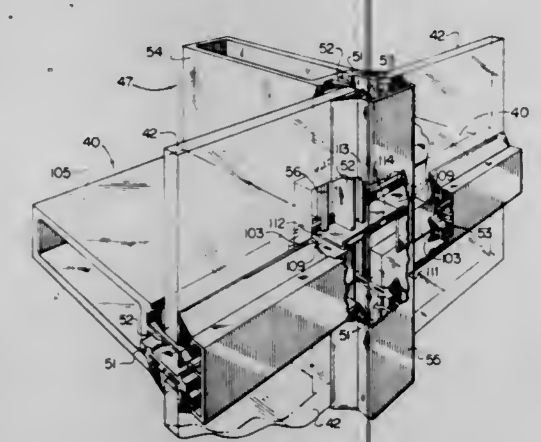


1. A pool frame structure for forming freeform pools, said pool frame structure including a plurality of panel segments secured in abutting end to end relationship to define a closed geometric figure, wherein each of said panel segments comprises:
a first generally U-shaped channel, said first generally U-shaped channel being curved to define a radius;
a second generally U-shaped channel, said second generally U-shaped channel being curved to define a radius equal to the radius defined by said first U-shaped channel; and
a wall plate having an upper edge and a lower edge, said wall plate being rigidly secured to said first and second U-shaped channels at its upper and lower edges respec-

tively and said wall plate further having end flanges extending between said upper edge and said lower edge, said end flanges for being in abutting surface-to-surface contact with the end flanges of next adjacent panel segments upon assembly of said panel segments to form said freeform pool.

4,055,923
WALL FRAMING SYSTEM AND COMPONENTS THEREOF

Lawrence F. Biebuyck, Dallas, Tex., assignor to Howmet Corporation, New York, N.Y.
Continuation-in-part of Ser. No. 560,820, March 21, 1975, Pat. No. 4,008,552, which is a continuation of Ser. No. 378,321, July 11, 1973, abandoned. This application Nov. 3, 1975, Ser. No. 628,158
Int. Cl.² E04B *2/88*
U.S. Cl. 52—235 **13 Claims**



1. In a wall structure having hollow horizontal and vertical panel gripping mullions and having a mullion crossing at which said horizontal and vertical mullions cross, said crossing being of the type in which the vertical mullions pass through the crossing and the horizontal mullions abut the vertical mullions at the crossing, said mullions comprising interior and exterior pieces attached together internally at spaced intervals, the improvements comprising:

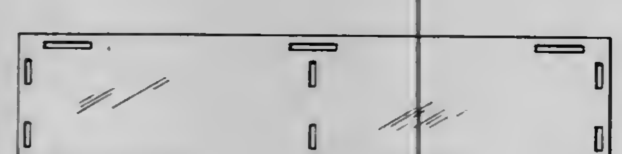
water diverters mounted internally in each of the horizontal mullions, said diverters each extending from a point in the mullion interiorly of and above the lower edge of an upper panel gripped by the horizontal mullion to a point in the mullion exteriorly of and below the upper edge of a lower panel gripped by the horizontal mullion;

means in said horizontal mullions adjacent the exterior-most portions of said water diverters for permitting egress of water from the interior of said mullions;

and a water diverter bridge piece extending horizontally through a portion of said vertical mullions at the crossing between points of attachment of interior and exterior pieces thereof from the water diverter in one horizontal mullion of said crossing to the water diverter in the other horizontal mullion of said crossing.

4,055,924
INEXPENSIVE AND DISASSEMBLABLE STRUCTURAL UNITS

Emil R. Beaver, Jr., 4148 S. Crane Road, Tipp City, Ohio 45371
Filed Mar. 10, 1976, Ser. No. 665,712
Int. Cl.² E04B *1/00*
U.S. Cl. 52—262 **3 Claims**



1. A class of non-permanent structures characterized by locking and interlocking panels of uniform thickness which may be assembled in a variety of modes to provide a plurality of different structures, said panels including:

a. a first plurality of rectangular panels, each such first panel having:
   1. a first plurality of slots of a first predetermined length, said first slots extending longitudinally along a first long edge of said first panel in a uniformly spaced array, with each of said first slots having a width equal to said uniform thickness; and
   2. a second plurality of slots of a second predetermined length, said second slots extending perpendicularly to said first long edge of said first panel and being spaced at intervals along said first long edge thereof, said second slots also having a width equal to said uniform thickness; and

b. a second plurality of longitudinal vertical panels, each such panel having:
   1. a first plurality of tabs of said first predetermined length, said first tabs extending along a first long edge of said second panel in a uniformly spaced array corresponding to the spaced array of said first slots of said first panel so as to be engageable therewith;
   2. a second plurality of tabs of one-half said first predetermined length, said second tabs extending along a second long edge of said second panel in a uniformly spaced array and positioned thereon so as to be engageable, in a first relative orientation of said first and second panels, and engageable in a second relative orientation of said first and second panels, within the other half of the first slots of said first panels; and
   3. a third plurality of slots of said second predetermined length, said third slots extending perpendicularly to the long edges of said second panel and being spaced therealong in manner identical to the spacing of said second slots of said first panel; and

c. a third plurality of transverse vertical panels, each such third panel having:
   1. a third plurality of tabs of said second predetermined length positioned along a first edge of said third panel, said third tabs being engageable with second slots of said first panel;
   2. a fourth plurality of tabs, each comprising one-half of said third tab and half of said second predetermined length, positioned along a second edge of said third panel, said second edge of said third panel being disposed on opposite side of said third panel from first edge, said half tabs positioned thereon so as to be engageable with the fourth half-tabs of another said third panel within the second slots of said first panel; and
   3. a fifth plurality of tabs of said second predetermined length positioned along a third edge of said third panel and intermediate to said first and second edges thereof, so as to be engageable with said third slots of said second panel when said first, second, and third panels are joined at right angles to each other.

4,055,925
EXPANSION JOINT AND FLASHING CONSTRUCTION

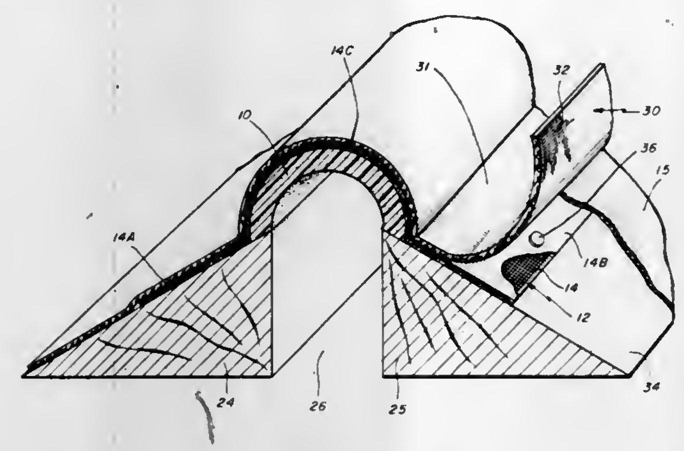
Max Wasserman, Chestnut Hill, and Martin E. Gorman, Jr., Belmont, both of Mass., assignors to Sandell Mfg. Co., Inc., Cambridge, Mass.
Filed July 1, 1976, Ser. No. 701,555
Int. Cl.² E04D *3/38;* **E04B** *1/68*
U.S. Cl. 52—403 **7 Claims**

1. Expansion joint construction for bridging and insulating a gap between two structural members comprising;

an insulating strip means,

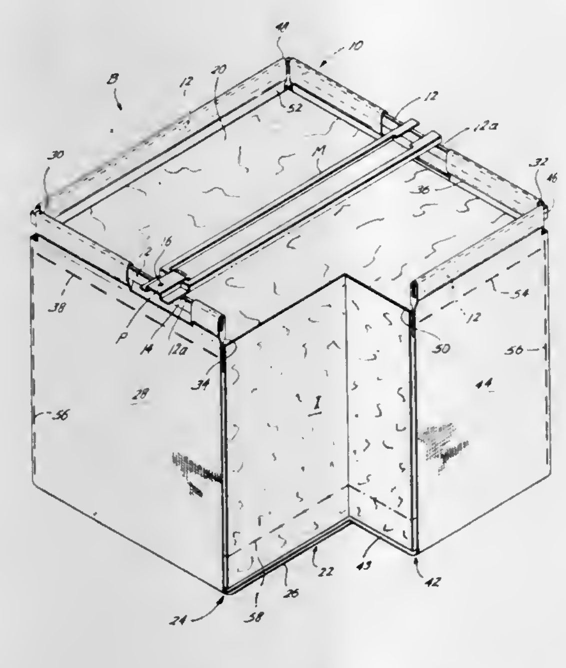
a bituminous coated woven wire cloth means affixed on one side to and having flexible marginal portions extending beyond edges of said insulating strip means,

and a cover means having a width greater than the width of said bituminous coated woven wire cloth means and having a center area affixed on the other side of said woven wire cloth means with marginal portions of said cover means extending beyond and free of said marginal portions of said wire cloth means, said cover means comprising a rubbery layer having a durable exposed outer surface and an integral fabric backing having an exposed inner surface along said marginal portions, and adhesive means affixing the other side of said bituminous coated woven wire cloth means to said fabric backing.



4,055,926
REFRACTORY FIBER BLANKET MODULE

Carlisle O. Byrd, Jr., Houston, Tex., assignor to Johns-Manville Corporation, Denver, Colo.
Continuation-in-part of Ser. No. 603,391, Aug. 11, 1975, Pat. No. 4,002,996, which is a continuation-in-part of Ser. No. 475,439, June 3, 1974, Pat. No. 3,952,470. This application Jan. 7, 1977, Ser. No. 757,748
Int. Cl.² E04B *1/80*
U.S. Cl. 52—475 **9 Claims**

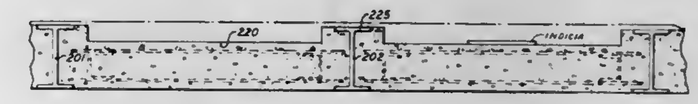


1. A module for refractory fiber insulation of a wall of a furnace or like equipment, comprising:

a. a supporting frame member having at least two opposite sides;
b. a band of metal oxide cloth suspended between said opposite sides of said frame member to form a pocket;
c. insulating means mounted in said pocket to insulate the wall of the furnace; and
d. means for attaching said supporting frame member to the wall of the furnace.

4,055,927
CONCRETE WALLS AND REINFORCEMENT CAGE THEREFOR

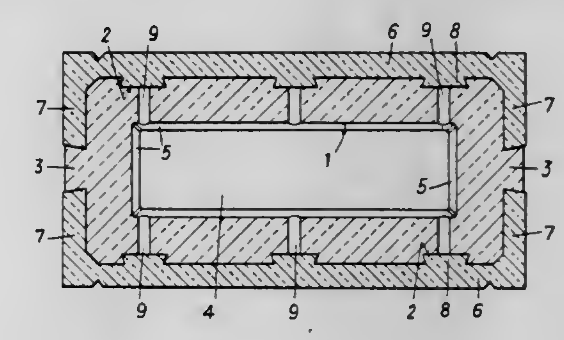
George John Tamaro, Leonia, N.J., assignor to Icos Corporation of America, New York, N.Y.
Division of Ser. No. 603,982, Aug. 12, 1975, Pat. No. 4,005,582. This application July 2, 1976, Ser. No. 701,777
Int. Cl.² E04G *21/12*
U.S. Cl. 52—577 **3 Claims**



1. For use in constructing a vertical concrete underground panel wall section by the slurry trench excavation method, a reinforcement cage assembly, a pair of spaced flanged steel beams, each beam having a length at least equal to the depth of said panel wall section and a web portion substantially equal to the width of an elongated excavation for said panel wall section, the web portions of each said flanged beam being substantially parallel, means securing said cage in interfitting relation to said flange surfaces, respectively, the improvement comprising block out means removably secured in spaced relation to said steel reinforcing cage, said block out means having a flat surface which is coplanar with flanges on both said pair of beams and said block out is constructed to have low bouyancy such that when immersed in slurry and/or concrete said block out means does not affect the positioning or alignment of said flanged beams and reinforcement cage.

4,055,928
CASING BRICK, AND A METHOD AND APPARATUS FOR MAKING THE SAME

Otto Magerle, Hausergasse 11, Klagenfurt (Kaernten), Austria
Filed Apr. 14, 1976, Ser. No. 676,642
Claims priority, application Austria, Apr. 18, 1975, 3011/75; May 21, 1975, 3862/75
Int. Cl.² E04B *5/04*
U.S. Cl. 52—612 **8 Claims**



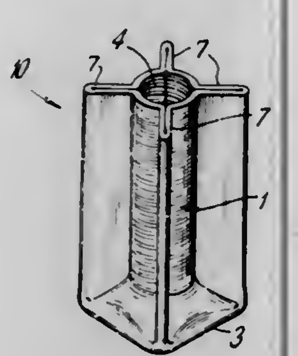
1. A casing brick, comprising:

a hollow and unitary insulating insert;

a concrete shell consisting of two separate parts having a spacing therebetween and substantially enclosing said insert, said two separate parts being free of contact over the entire periphery thereof, said insert having two projections thereon received in the spacing between said two parts of said shell; and

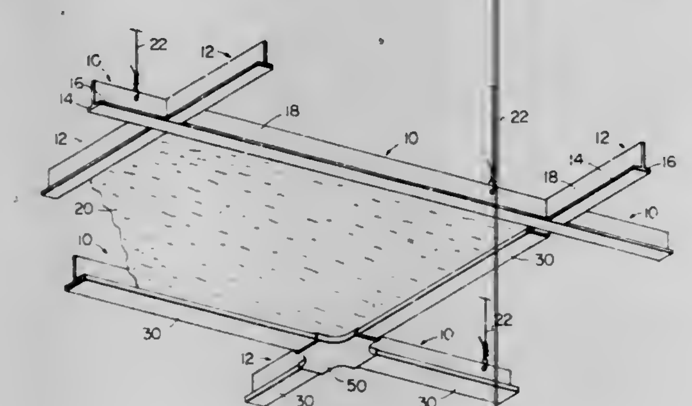
interlocking means for connecting each shell part to said insert.

4,055,929
THREADED ANCHOR
Nicholas F. Stancati, Basking Ridge, and Peter Garner, Chatham, both of N.J., assignors to Acta Limited, Manville, N.J.
Filed Oct. 8, 1976, Ser. No. 730,817
Int. Cl.² E04B *1/41*
U.S. Cl. 52—705 **1 Claim**



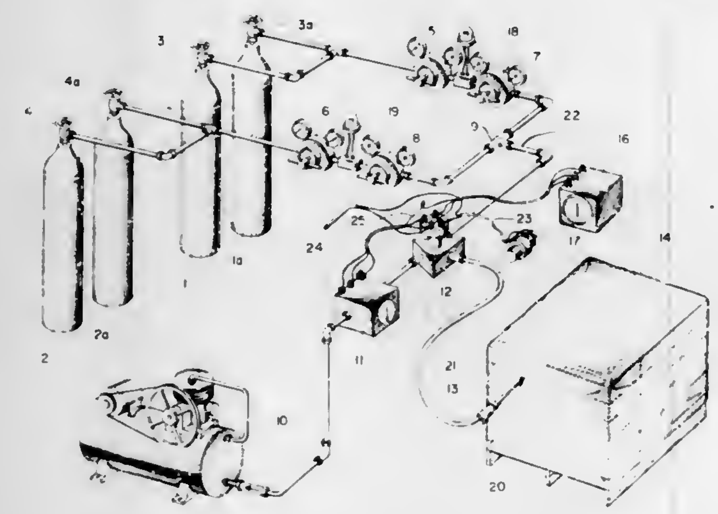
1. A heavy duty threaded anchor for embedding in a cementious material, constructed from a single square sheet of metal comprising a unitary elongated member of generally cylindrical configuration, said cylindrical member being open at one end and interiorly threaded along its length, the other end of said cylindrical member being closed by a pyramid shaped base member having a substantially square portion which is greater in size than the diameter of the cylindrical member and four inclined surfaces extending from said square portion to the cylindrical member, said base member being perpendicular to the longitudinal axis of the cylindrical member and unitary with said cylindrical member; and four radial, substantially rectangular flange members, said flange members being unitary with said cylindrical member and extending along the entire length of the outer surface of the cylindrical member, said flange members being unitary with the base member and disposed at right angles to each other.

4,055,930
GRID CEILING TRIM
Roger Neil Weinar, and John Anthony Eder, both of Tonawanda, N.Y., assignors to Ceiling Resurfacing Systems, Inc., Eggertsville, N.Y.
Filed May 27, 1976, Ser. No. 690,609
Int. Cl.² E04C *2/38;* E04B *1/00*
U.S. Cl. 52—717 **8 Claims**



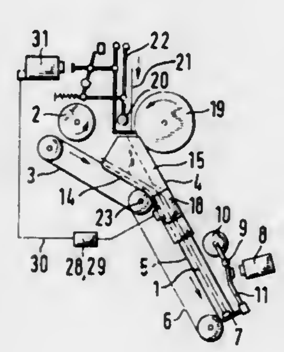
1. A resilient decorative trim strip for covering normally exposed lower surfaces of horizontal flanges of beams for supporting ceiling panels which comprises a horizontal lower flange, a substantially horizontal upper flange slightly less than half the width of the lower flange and a short vertical web connecting the horizontal flanges and forming a J-member with them, with the leg of the J being horizontal, with the end of the substantially horizontal upper flange away from the vertical web being angled upwardly therefrom to facilitate placement of the strip over a horizontal flange of the ceiling panel supporting beam and with the opening between the flanges of the strip being such size that the flanges of the strip contact the flange of the beam.

4,055,931
METHOD AND APPARATUS FOR PROVIDING A CONTROLLED ATMOSPHERE AROUND PERISHABLE PRODUCTS
Albert H. Myers, Los Gatos, Calif., assignor to Furukawa International U.S.A., Inc., San Francisco, Calif.
Filed July 28, 1976, Ser. No. 708,853
Int. Cl.² B65B *31/08*
U.S. Cl. 53—22 B **14 Claims**



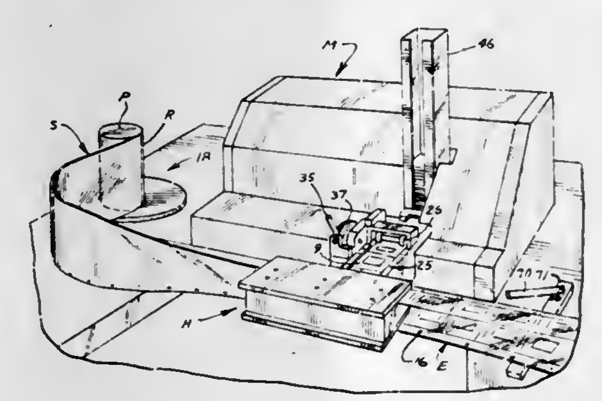
1. A method for protecting perishable products comprising the steps of:
sealing the product within an air-tight flexible bag;
inserting into said bag a probe connected to a multi-position valve;
moving said valve to a first position which connects said probe to a vacuum pump;
evacuating air from said bag to a predetermined pressure below atmospheric pressure;
moving said valve to a second position which connects said probe to a source of said gas;
introducing a predetermined volume of gas into said bag by flowing a gas at a predetermined pressure into said bag for a predetermined time;
moving said valve to a third position which closes the source of gas and vacuum to said probe; and
withdrawing said probe from said bag.

4,055,932
ENVELOPE-STUFFING MACHINE
Rudolf Wanner, Aystetten, Germany, assignor to Böwe Böhler & Weber KG Maschinenfabrik, Augsburg, Germany
Filed Dec. 20, 1976, Ser. No. 752,170
Claims priority, application Germany, Dec. 20, 1975, 2557670
Int. Cl.² B65B *57/06, 43/30*
U.S. Cl. 53—63 **10 Claims**



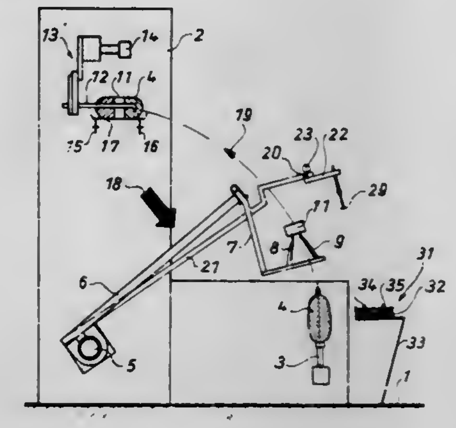
1. A machine for introducing an insert between spreadable sides of a cover forming a mouth to receive said insert upon the spreading of said sides, said machine comprising:
means for displacing said cover into an insertion station;
a suction head at said station having a pair of perforated suction surfaces juxtaposed with the respective sides of a cover disposed at said station, a suction chamber cmmunicating with the perforations of said surfaces, and means for evacuating said chamber whereby the suction generated at said surface spreads said sides and undergoes an increase in suction level upon contact of said sides with said surfaces;
a transport mechanism for feeding said insert into the mouth of said cover formed upon spreading of said sides;
a threshold-value sensor responsive to the suction level in said chamber; and
circuit means connecting said sensor to said mechanism for activating same to introduce said insert into said cover upon the development of a predetermined vacuum level in said chamber.

4,055,933
APPARATUS FOR PACKAGING PHOTOGRAPHIC SLIDES IN ENVELOPES
Edward W. Getsch, Minneapolis, Minn., assignor to Pako Corporation, Minneapolis, Minn.
Filed Aug. 29, 1975, Ser. No. 608,836
Int. Cl.² B65B *5/04, 43/12, 43/26*
U.S. Cl. 53—187 **5 Claims**



1. For use with a photographic slide mounting machine of the type having means for mounting slide transparencies in a supporting frame and means to eject the mounted slides from said machine; apparatus for packaging in a single multi-pocket envelope a plurality of such mounted slides, said apparatus comprising:
means supplying a continuous flexible strip of envelope material formed to define a pair of spaced apart parallel rows of connected pockets, each row including a plurality of pockets arranged in opposed spaced apart relation to the pockets of the other row to form opposed pairs of pockets having inwardly facing slide-receiving mouth openings,
a positioning head defining a packaging station and having said flexible strip slidably mounted thereon with means for holding said strip in doubled-back substantially U-shaped position to simultaneously expose the opposed mouth openings of a selected pair of pockets positioned at said packaging station,
a shiftable guide track for transporting mounted slides from the ejecting means of the slide mounting machine to the packaging station and including means for selectively aligning said track with the mouth opening of one of said pockets to permit insertion of the slides successively into said respective pockets of said envelope from the slide ejecting means, and
means for presenting successive pairs of pockets at said packaging station.

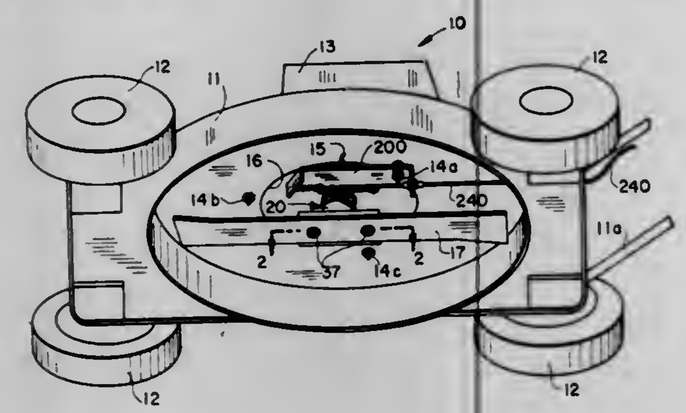
4,055,934
BAND APPLYING DEVICE FOR A SKEIN WINDING MACHINE
Roland Leveugle, Peruwelz, Belgium, assignor to Croon & Lucke Maschinenfabrik GmbH & Co. KG, Mengen, Germany
Filed July 14, 1976, Ser. No. 705,261
Claims priority, application Germany, July 19, 1975, 2532432
Int. Cl.² B65B *13/00*
U.S. Cl. 53—198 B **8 Claims**



1. A band applying device for use with a skein winding machine, the device applying a band to a completely wound skein mounted on a winding mandrel of the winding machine, the device, after applying the band to the skein, removing the skein from the mandrel and transferring the skein to a deposit location, said device comprising:
a magazine for accommodating a stack of collapsed bands;
a first pivot arm pivotally connected to the skein winding machine for movement in a first plane, said first pivot arm supporting two banding flaps, the inner surfaces of said flaps being provided with barbs for carrying the skein, said flaps being adapted to receive a band when said first pivot arm is in an initial setting;
a drive mechanism for pivoting said first pivot arm in a first direction from said initial setting towards the mandrel thereby pushing a band carried by said flaps over the skein, said drive mechanism being adapted for pivoting said first pivot arm in a direction opposite said first direction for removing the skein from the mandrel and for transferring the skein to the deposit location, said drive mechanism being further adapted for pivoting said first pivot arm in said first direction for removing said flaps from said skein and for returning said first pivot arm to said initial setting;
retention means operatively associated with the deposit location for retaining the banded skein in the deposit location while said flaps are being removed;
a second pivot arm having one end pivotably connected to the skein winding machine for pivotal movement in a second plane substantially parallel to said first plane;
driving means for pivoting said second pivot arm between a first position wherein a band is withdrawn from said magazine and a second position wherein the band is positioned over said banding flaps;
a rotary arm articulatedly fastened to the other end of said second pivot arm for rotation in a plane substantially perpendicular to said first and second planes;
band holding means attached to said rotary arm for securing, holding, positioning, and placing the band over said holding flaps;
driving means for rotating said rotary arm between a first position associated with said magazine wherein said band holding means withdraws a band from said magazine, the band being opened as it is withdrawn from said magazine, and a second position associated with said banding flaps wherein said band holding means positions and places the band over said banding flaps, said banding flaps in said initial setting of said first pivot arm being disposed in the

path of rotation of said band holding means from said first position to said second position.

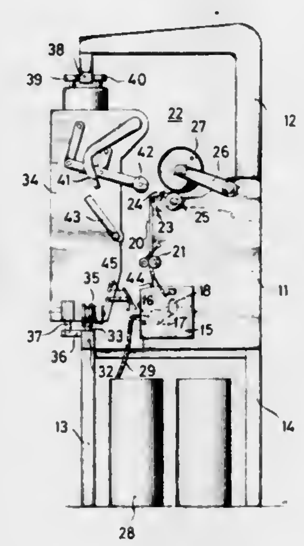
4,055,935
CLUTCH BRAKE MECHANISM FOR LAWNMOWERS
William R. Malion, 7591 Pinehurst Road, Mentor on the Lake, Ohio 44060, and John E. Watkins, 9674 Fairmont Road, Novelty, Ohio 44072
Continuation of Ser. No. 459,540, April 10, 1974, abandoned. This application Feb. 6, 1976, Ser. No. 655,866
Int. Cl.² A01D *75/18, 69/10;* **H02G** *11/00*
U.S. Cl. 56—10.3 **12 Claims**



3. In a lawnmower of the type including a drive shaft adapted for connection to a source of rotary motion, a rotatably mounted blade, and drive system for selectively drivingly connecting the drive shaft and the blade, the improvement wherein the drive system includes a combination clutch-brake device, comprising:

a. an input member coupled to the drive shaft and having a drive portion formed thereon including peripheral wall portions concentric about an axis;
b. an output member coupled to the blade and positioned near said input member;
c. said members being relatively rotatable about said axis;
d. spring means supported on said output member for rotation therewith and extending around and in engagement with said input member to normally establish a driving connection therebetween which is operable, when said input member is rotated in a selected direction, to drive said output member;
e. braking means for interrupting said driving connection and for braking the rotation of said output member, including:
 i. sleeve means positioned around portions of said spring means and connected to said spring means for rotation therewith;
 ii. restraining means including a spring steel brake band having a coiled central region extending around said sleeve means and also having opposite end regions extending away from said coil and intersecting substantially at right angles;
 iii. biasing means normally biasing said central region into braking engagement with said sleeve means to restrain the movement thereof to release the grip of said spring means on said input member thereby interrupting said driving connection, and to restrain the rotation of said output member;
 iv. operating means connected to said restraining means and for selectively releasing the braking engagement between said central region and said sleeve means to permit rotation of said output member;
 v. bracket means, including a bracket movably carried near one side of said sleeve means, connecting with one of said end regions for restraining the brake band against rotation with said sleeve means, said end regions extending to positions overlying said bracket, said bracket being formed from a strip of metal with opposite end portions bent away from the plane of the strip to define first and second end flanges, said bracket including a mounting hole formed therethrough near said first end flange, the connection between said one end and said mounting bracket being located along a line which is tangent to said central coiled region and extending through said mounting hole;
 vi. said operating means including a control cable connected to the other of said end regions for moving said other end region to selectively release and establish braking engagement between said coiled central region and said sleeve means, said control cable being provided with a shield secured to said first end flange; and
 vii. said biasing means connecting with said other end region and with said bracket to bias said other end region in a direction which will tighten the grip of said coiled central region around said sleeve means, said biasing means including a tension coil spring connected at one end to said other end region and at the other end to said second end flange.

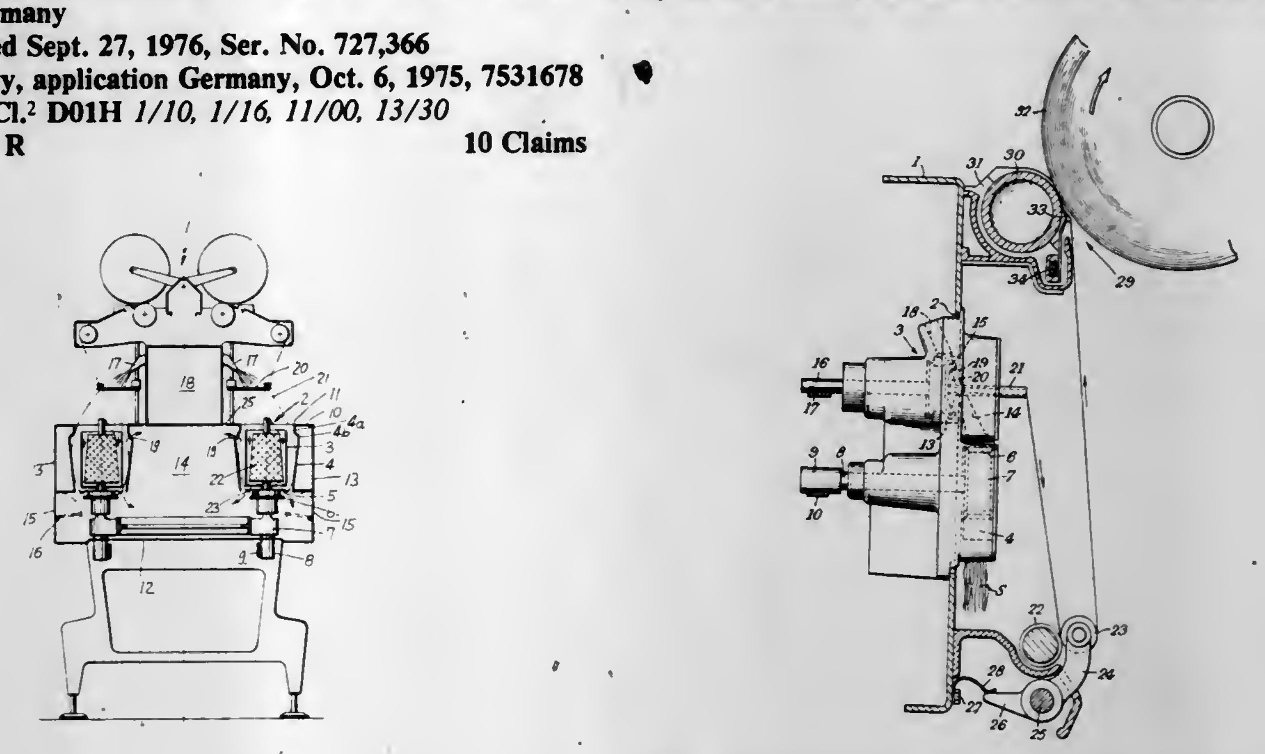
4,055,936
METHOD FOR TERMINATING A SPINNING OPERATION
Hans Raasch, Monchen-Gladbach, Germany, assignor to W. Schlafhorst & Co., Monchen-Gladbach, Germany
Filed May 14, 1976, Ser. No. 686,465
Claims priority, application Germany, May 16, 1975, 2521850
Int. Cl.² D01H *9/16*
U.S. Cl. 57—34 R **4 Claims**



1. In a method for terminating the spinning operation in a spinning machine having a loosening-up and a feeding device for slivers, the steps of running a sliver having a substantially full cross section with a substantially uniform count over the entire length thereof through the sliver feeding device and the fiber loosening-up device and cleanly cutting the sliver transversely immediately upstream of the feeding device in direction of feed of the sliver to provide a sliver end which retains said substantially full cross section and substantially uniform count.

2. In apparatus for carrying out a method of terminating the spinning operation in a spinning machine having a loosening-up and a feeding device for slivers, comprising means located immediately upstream of the feeding device for transversely severing said sliver with a clean cut without altering the cross section of said sliver.

4,055,937
DOUBLE TWIST THREAD TWISTING FRAME
Hans Latus; Zdenek Hemala, both of Kempten; Heinz Bleeck, Probstried, and Rolf Dieter Weber, Kempten, all of Germany, assignors to Saurer-Allma GmbH Allgaeuer Maschinenbau, Kempten, Germany
Filed Sept. 27, 1976, Ser. No. 727,366
Claims priority, application Germany, Oct. 6, 1975, 7531678
Int. Cl.² D01H *1/10, 1/16, 11/00, 13/30*
U.S. Cl. 57—34 R **10 Claims**

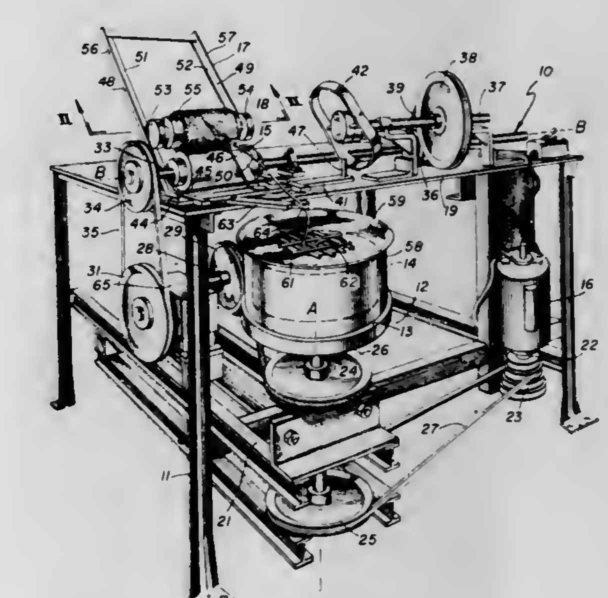


1. In a double twist thread twisting frame having a plurality of double twist spindles each of which is surrounded by a balloon limiter having an upper rim thereon and has at its lower part a storage disc and a whorl driven by a belt spaced below said storage disc, upper and lower closure wall means above and below, respectively, said balloon limiter and extending over the whole width and length of said frame, and on both sides of said frame, side wall means are arranged outside said balloon limiter and connected to said upper and lower closure wall means, channel means defined by said upper, lower and side wall means being in communication with said double twist spindles and the interior of said balloon limiters and having a suction device connected thereto, the improvement comprising wherein said upper closure wall means is arranged generally at the level of said upper rim of said balloon limiter and has in the region of each balloon limiter a coaxial circular opening therein, the diameter of said circular opening being somewhat smaller than the part of the balloon limiter located therebeneath, and wherein there is provided on said balloon limiter in the region below said upper closure wall means a suction opening communicating with said channel means, and wherein above each balloon limiter there is provided blower nozzle means connected to a tube that extends in the longitudinal direction of the frame for supplying conditioned air to said circular opening in said balloon limiter.

4,055,938
OPEN-END SPINNING
James William Barnes Clayton, Accrington, England, assignor to Platt Saco Lowell Limited, Rossendale, England
Filed Nov. 8, 1976, Ser. No. 739,807
Claims priority, application United Kingdom, Nov. 13, 1975, 46840/75
Int. Cl.² D01H *1/12*
U.S. Cl. 57—58.89 **17 Claims**

1. Apparatus for open-end spinning textile yarns, comprising a longitudinally extending machine frame, a plurality of spinning units mounted at spaced intervals along said machine frame, each said spinning unit including fibre feed means and spinning means for receiving fibres from the fibre feed means and spinning them into a tail end of yarn for continuously withdrawal of yarn from the spinning means, yarn withdrawal means for withdrawing the yarn along a yarn withdrawal axis to a yarn delivery aperture of the spinning means and forming the yarn into a package, said yarn withdrawal means comprising a package forming assembly for forming a package of the yarn and having yarn distributing means for distributing the yarn on the package and yarn engaging means to engage the yarn in its passage between the yarn delivering aperture and the yarn distributing means, wherein the yarn engaging means and the yarn distributing guide means are arranged on opposite sides of the spinning unit and wherein the distance travelled by the yarn from the yarn engaging means to the yarn distributing means is greater than the distance from the yarn delivery aperture to the yarn distributing guide means.

4,055,939
SPINNING MACHINE
Lawrence S. Bussiere, 49 Hagop Road, Salem, N.H. 03079
Filed Aug. 5, 1976, Ser. No. 712,036
Int. Cl.² D01H *11/00, 1/28*
U.S. Cl. 57—62 **11 Claims**



1. A spinning machine, comprising
a. a supporting structure,
b. a platform having a horizontal upper surface for receiving a roving cheese and supported on the structure for rotation about a vertical axis,
c. a drive roll mounted on the structure for rotation about a horizontal axis that is substantially spaced from the said vertical axis,
d. means driving the platform and the drive roll at selected relative speeds,
e. a rack element mounted on the structure and defining a plane, the plane lying parallel to and spaced from the said

horizontal axis, the plane lying at an acute angle to the said vertical axis, and

f. a receiving spool on which the yarn is coiled, the spool being carried on the rack for rotation about a horizontal axis parallel to and spaced from the said horizontal axis, the spool being free to move under the influence of gravity toward contact with the drive roll.

4,055,940

INTERNAL FRICTION TWIST DEVICE

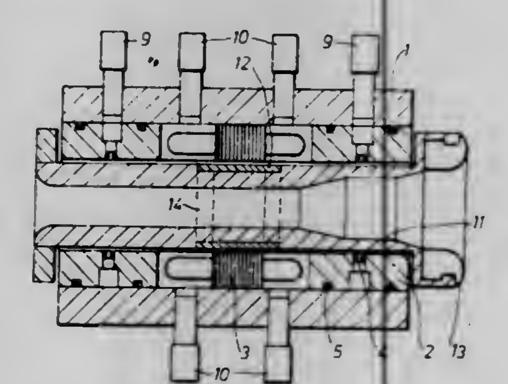
Edgar Muschelknautz, Leverkusen, and Franz Nemecek, Duesseldorf, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed June 15, 1976, Ser. No. 696,300

Claims priority, application Germany, June 18, 1975, 2527004

Int. Cl.² D01H *7/92*

U.S. Cl. 57—77.4 **12 Claims**



1. An internal friction twist device for texturing fine threads, comprising an air-supported twist device in the form of a component of the rotor of an electric motor.

4,055,941

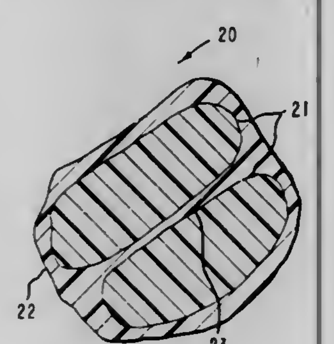
INTEGRATED STRING

Joseph Tracy Rivers, Jr., West Chester, Pa., and Joe Dennis Zaharko, Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Dec. 9, 1976, Ser. No. 748,883

Int. Cl.² D02G *3/34, 3/38, 3/40*

U.S. Cl. 57—149 **10 Claims**



1. An integrated string comprised of from 2 to 4 monofilaments of an oriented, synthetic, thermoplastic polymer, with each monofilament having a denier of 2,000 to 8,000 and having at least two opposite flattened sides throughout its length, said monofilaments having substantially no individual twist and being ply-twisted and bonded together throughout the length of the string with each said monofilament being bonded along a flattened side to at least one other of said monofilaments.

4,055,942

METHOD FOR PIECING A THREAD ON OPEN-END SPINNING UNITS

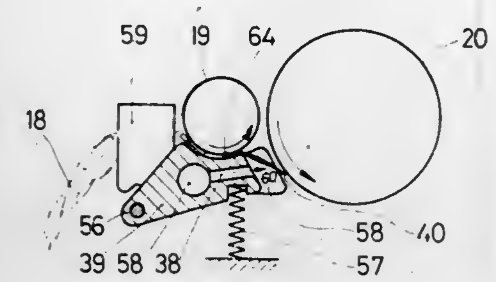
Fritz Stahlecker, Bad Uberkingen, Germany, assignor to Fritz Stahlecker and Hans Stahlecker, Germany

Filed Feb. 6, 1976, Ser. No. 655,853

Claims priority, application Germany, Feb. 19, 1975, 2507153

Int. Cl.² D01H *15/00*

U.S. Cl. 57—156 **18 Claims**



2. A method for piecing a thread on an open-end spinning unit of the type having a spinning rotor, comprising:

preparing shortened fibres,

supplying said shortened fibres to said spinning rotor to form a ring of shortened fibres,

returning a thread end to said ring of shortened fibres while rotating said spinning rotor to piece said thread end with said ring of shortened fibres,

drawing off said thread,

and supplying normal length fibres to said spinning rotor to form more thread following the piecing connection formed with said shortened ring of fibres,

wherein said preparing and supplying of said shortened fibres are performed in a predetermined manner to form a predetermined configuration of said ring of shortened fibres, whereby uniform repetitive piecing operations are accommodated.

4,055,943

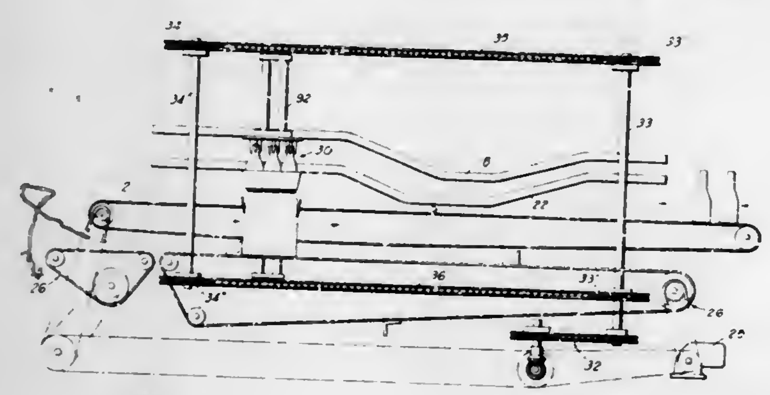
BOTTLE LOADING MACHINE

Donald G. Reichert, Tarpon Springs, Fla., assignor to ABC Packaging Machine Corporation, Tarpon Springs, Fla.

Filed June 9, 1976, Ser. No. 694,205

Int. Cl.² B65B *21/18*

U.S. Cl. 53—247 **20 Claims**



1. A machine for loading bottles into cases comprising, in combination, bottle conveyor means for continuously conveying upstanding bottles through a bottom retrieving station; grouping means for grouping together into a preselected arrangement a plurality of upstanding bottles on said bottle conveyor means; case conveyor means for continually conveying open cases through a case loading station; and gripper means for gripping and carrying a grouped plurality of upstanding bottles as they move through the botle retrieving station off of said bottle conveyor means and for subsequently depositing the gripped group of bottles into an open case as it passes through the case loading station upon said case conveyor means, said grouping means comprises a bottle retainer bar overlying said bottle conveyor means, and means for reciprocally moving said retainer bar over said bottle conveyor means.

4,055,944

SECURING DEVICE FOR THE OUTER END OF THE HAIR-SPRING OF A TIMEPIECE

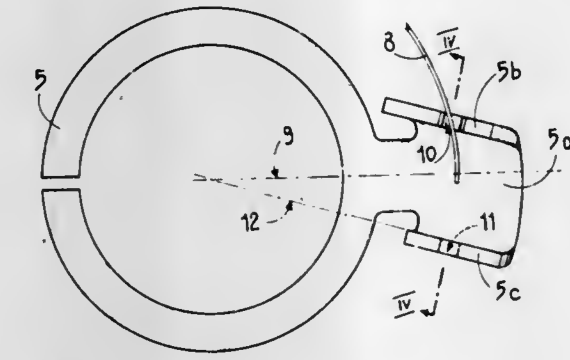
Rene Widmer, Fontainemelon, Switzerland, assignor to Fabrique d'Horlogerie de Fontainemelon S.A., Fontainemelon, Switzerland

Filed May 24, 1976, Ser. No. 689,089

Claims priority, application Switzerland, June 18, 1975, 7900/75

Int. Cl.² G04B *17/32*

U.S. Cl. 58—115 **2 Claims**



1. In a timepiece having a balance wheel, a hair-spring and a support therefor, a securing device for the outer end of said hair-spring comprising

a U-shaped arm extending radially of the axis of said balance wheel and having a pair of thin-walled ears disposed parallel to each other and to said axis, said ears being disposed at a predetermined angle to the radial plane through the middle of said arm,

one of said ears being provided with a first opening for receiving and fixing the outer end of said hair-spring by gluing it therein,

the other of said ears being provided with a second opening for receiving the end of said hair-spring and having a securing pin for fixing it is said second opening when it is not glued in said first opening,

said other ear being disposed on a radial plane through the axis of said balance wheel such that the plane of said second opening is perpendicular to the tangent to said hair-spring at the point where it is fixed by said pin.

4,055,945

FREQUENCY ADJUSTMENT MEANS FOR AN ELECTRONIC TIMEPIECE

Jack Schwarzschild, and John R. Lowdenslager, both of Stamford, Conn., assignors to Timex Corporation, Waterbury, Conn.

Filed Dec. 15, 1975, Ser. No. 640,665

Int. Cl.² G04B *27/08*

U.S. Cl. 58—85.5 **1 Claim**

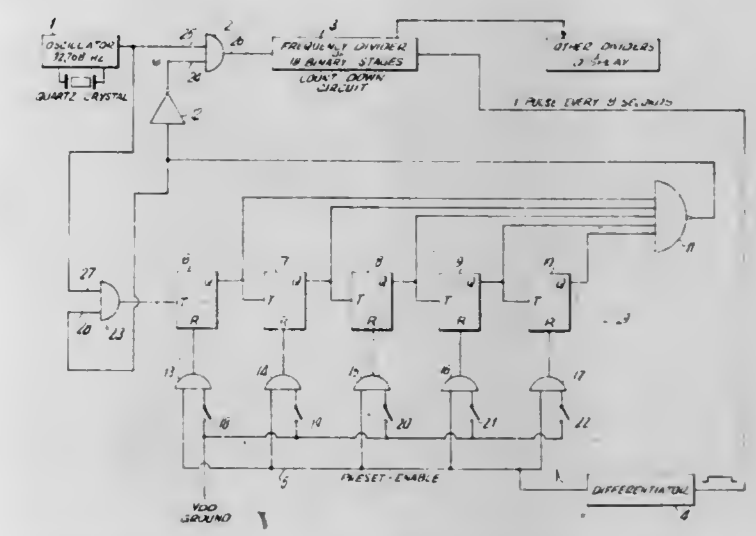
1. A horological instrument comprising:

a piezoelectric crystal oscillator;

a countdown circuit coupled to the oscillator to receive pulse signals from said oscillator and frequency divide said pulse signal down to a lower frequency output pulse signal;

means for periodically inhibiting at the countdown circuit at least a first or second predetermined number of pulse signals or the sum of the first and second predetermined number of pulse signals to further lower the frequency of the output pulse signal at said countdown circuit;

means including at least a first and second manually activatable switch each having an elongated shaft actuator having contoured portions to establish a first and second detented longitudinal tactile positions, a switch contact mounted for selective engagement with the shaft actuator, and single spring means common to said first and second manually activatable switches and having spring fingers in an arm of an energy cell spring in electrical contact with the shaft of each of said first and second manually activatable switches and engaging each shaft for providing detented longitudinal movement of each shaft to selectively enable a fixed engagement in the first detented longitudinal tactile position with the switch contact wherein electrical connection is maintained between the spring means and the shafts and the switch contact and a fixed disengagement with the switch contact in the second detented longitudinal tactile position, said first switch being activated to control said means for periodically inhibiting



pulse signals to inhibit the first predetermined number of pulse signals and deactivated to cease inhibiting the first predetermined number of pulse signals, said second switch being activated to control said means for periodically inhibiting pulse signals to inhibit the second predetermined number of pulse signals and deactivated to cease inhibiting the second predetermined number of pulse signals, and first and second switches both being activated to control said means for periodically inhibiting pulse signals to periodically inhibit the sum of the first and second predetermined number of pulse signals and;

time indicating means coupled to the countdown circuit to be activated thereby.

4,055,946

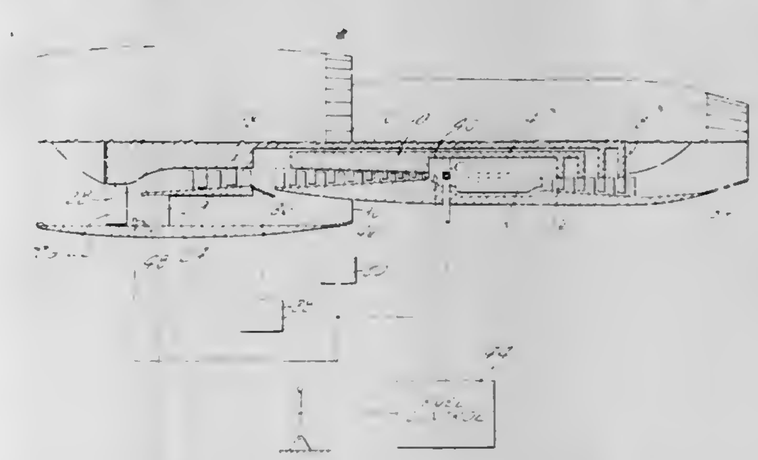
TWIN-SPOOL GAS TURBINE POWER PLANT WITH MEANS TO SPILL COMPRESSOR INTERSTAGE AIRFLOW

William H. Sens, West Hartford, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Mar. 29, 1976, Ser. No. 671,517

Int. Cl.² F02K *3/06;* **F02C** *3/06, 9/04, 9/14*

U.S. Cl. 60—204 **5 Claims**



1. An aircraft twin spool gas turbine power plant having a high and low compressor,

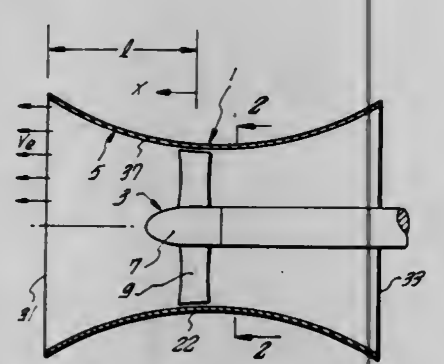
and high and low turbine for driving said high and low compressors, respectively,

a combustor disposed between said compressors and said turbines for generating hot gases for driving said turbines,

fuel control means for regulating the flow of fuel to said combustor so as to operate said high compressor said high compressor at a predetermined speed and compression ratio,

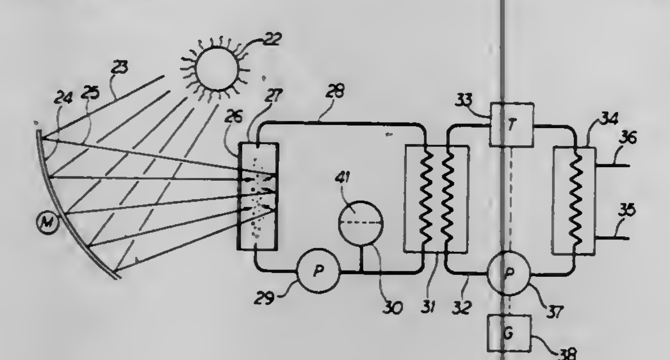
means for controlling the high compressor inlet pressure by spilling air exhausting from said low compressor such that at all aircraft altitudes, when the compressor operates at said predetermined rotational speed and compression ratio, the compressor discharge pressure and temperature are substantially the same for all conditions of said power plant over the flight envelope of the aircraft.

4,055,947
HYDRAULIC THRUSTER
Calvin A. Gongwer, 19017 E. Leadora Ave., Glendora, Calif. 91740
Filed Feb. 3, 1976, Ser. No. 654,925
Int. Cl.² B63H *11/00, 11/02*
U.S. Cl. 60—221 **26 Claims**



1. A thruster comprising an impeller positioned with a diffuser throat, said impeller having at least one blade mounted about a central rotatable hub wherein the chord of said blade root and tip sections is greater than the chord of said blade midsection, and said impeller blade is further defined as having a greater pitch at said tip section than at said blade midsection.

4,055,948
SOLAR THERMAL-RADIATION, ABSORPTION AND CONVERSION SYSTEM
Robert A. Kraus, and Edmund J. Kraus, both of 14160 Redhill, Tustin, Calif. 92680
Filed Dec. 8, 1975, Ser. No. 638,927
Int. Cl.² F03G *7/02;* **F24J** *3/02*
U.S. Cl. 60—641 **5 Claims**



1. A highly light-transparent radiant heat-receiving fluid containment constructed of a hard and high-temperature-resisting glass-like material having at least one first highly light-transparent wall and one second highly light-reflecting wall, being spaced substantially apart from each other to form a fluid passage between them

and being exposed substantially perpendicular to direct or indirect and focused thermal radiant emission from the sun,

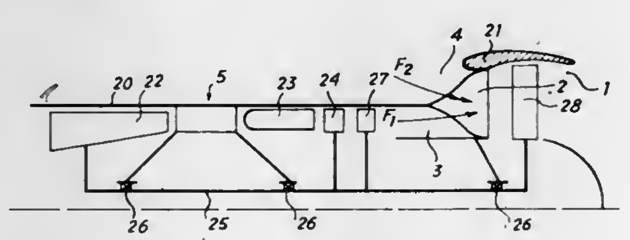
comprising a temperature-inert, thermal radiation-absorbing fluidic heat-transfer compound of a certain desired optical density, having a high boiling point and comprising a quantitative magnitude of solid, dull-black, non-light-reflecting particles of colloidal size, per unit area, times a certain unit fluid depth to compliment said fluidic compound's desired optical density and being homogeneously suspended within said heat-transfer fluid, circulating through said transparent radiation receiver containment

to be heated directly from within through the basic heat-transfer process of radiation,

wherein the thermal radiation emitted from the sun penetrates through said transparent radiation receiver containment to strike those particles of colloidal size suspended homogeneously within said circulating, radiant heat-absorbing, heat-transfer fluid, partially direct and partially by means of reflection from said second light-reflecting wall

for the purpose of heating that radiant heat-absorbing fluid and to evacuate said absorbed and stored radiant heat within said fluidic compound for further conversion into either mechanical or electrical power, or for the purpose of general heating, domestic and industrial.

4,055,949
MULTIFLOW GAS TURBINE POWER PLANT
Serge Boudigues, Bagneux, France, assignor to Societe Nationale d'Etude et de Construction de Moteurs d'Aviation, Paris, France
Division of Ser. No. 467,793, May 7, 1974, Pat. No. 3,968,647. This application May 3, 1976, Ser. No. 682,523
Claims priority, application France, May 8, 1973, 73.16471
Int. Cl.² F02C *3/06;* **F02K** *3/04*
U.S. Cl. 60—269 **6 Claims**



1. A dual-flow gas-turbine jet propulsion engine of the kind subdivided into a primary duct and a secondary duct traversed in operation respectively by a primary gas flow and by a secondary air flow, comprising in combination:

a. a gas generator of the internal-combustion gas-turbine type including compressor means, combustion means and turbine means mounted in series flow arrangement in said primary duct, said gas generator being designed to deliver a gas flow at a first pressure which is higher than the pressure of said secondary air flow through said secondary duct,

b. a super-expansion turbine separate and distinct from said turbine means and located in said primary duct downstream of said turbine means to receive the primary gas flow from said gas generator and super-expand the same from its initial pressure down to a lower pressure substantially equal to that of said secondary air flow,

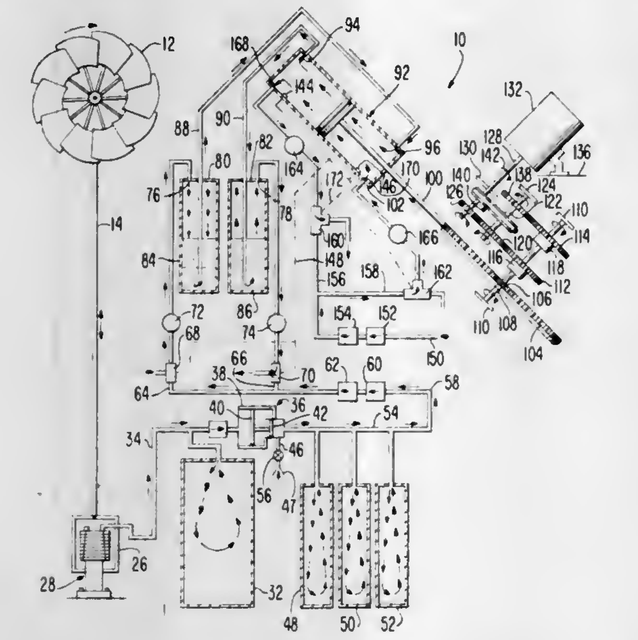
c. flow-mixer means communicating both with said primary duct downstream of said super-expansion turbine and with said secondary duct, for intermingling said super-extended gas flow with said secondary air flow at their substantially equal pressure, to deliver a gaseous mixture of said gas and said air,

d. a recompressor arranged downstream of said flow-mixer means to be supplied in operation with said gaseous mixture and raise the same to a higher pressure,

e. drive means interconnecting said recompressor and said super-expansion turbine for driving said recompressor from said super-expansion turbine, and

f. a jet propulsion nozzle extending downstream of said recompressor to be supplied with said recompressed gaseous mixture issuing therefrom, and discharge a thrust-producing jet.

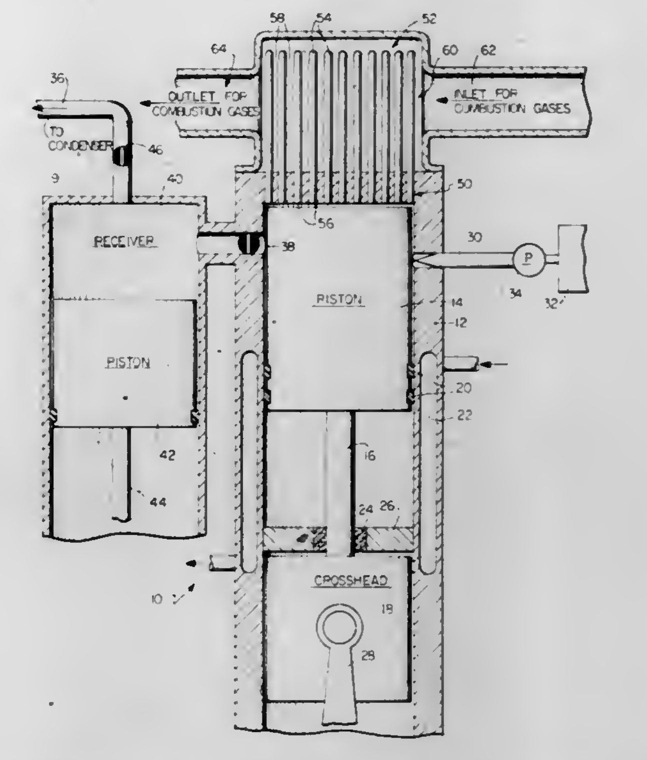
4,055,950
ENERGY CONVERSION SYSTEM USING WINDMILL
William C. Grossman, 4274 Briarwood Way, Palo Alto, Calif. 94303
Filed Dec. 29, 1975, Ser. No. 644,495
Int. Cl.² F16D *31/02*
U.S. Cl. 60—398 **2 Claims**



1. An energy transfer system comprising: a rotatable windmill responsive to atmospheric wind; an air compressor coupled to the windmill for compressing air as a function of the rotation thereof under the influence of atmospheric wind; means coupled with the compressor for storing air compressed thereby; a prime mover including a piston and cylinder assembly, said piston of the assembly having a control rod responsive to a fluid under pressure, there being a rack on the control rod, and structure coupled to the rack for connecting the same to a workproducing apparatus; a hydraulic motor having a pair of tanks containing a liquid, said tanks being coupled to said prime mover for supplying liquid thereto to thereby actuate said control rod and to maintain it in operation in response to a change in the level of the liquid in said tanks to thereby permit said prime mover to operate said work-producing apparatus, said storing means being in fluid communication with said tanks to supply compressed air thereto for changing said liquid level therein; and a valve responsive to the operation of the prime mover for controlling the flow of compressed air from said storing means into and out of each tank, respectively.

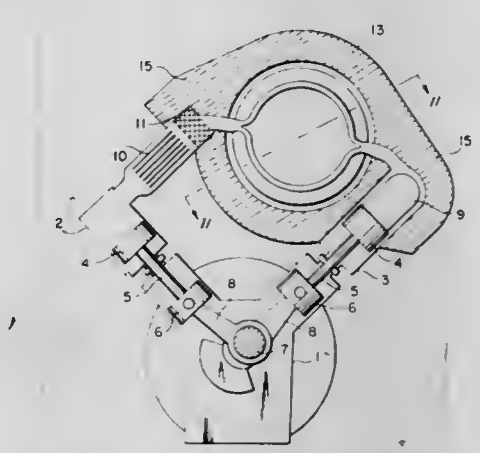
4,055,951
CONDENSING VAPOR HEAT ENGINE WITH TWO-PHASE COMPRESSION AND CONSTANT VOLUME SUPERHEATING
John Gordon Davoud, and Jerry Allen Burke, Jr., both of Richmond, Va., assignors to D-Cycle Associates, Richmond, Va.
Filed Aug. 16, 1976, Ser. No. 714,513
Int. Cl.² F01K *21/02*
U.S. Cl. 60—514 **9 Claims**

1. A heat engine power producing cycle using a condensable vapor as the working fluid characterized in that the heat input is indirectly into the working fluid of the engine in a zone comprising the clearance volume of the cylinder and wherein



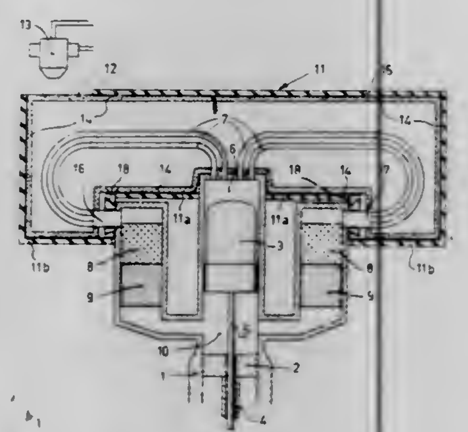
the working fluid is introduced into the swept volume of the cylinder of the engine as a fine spray of liquid.

4,055,952
HEATING DEVICE FOR AN EXTERNAL COMBUSTION ENGINE
Lennart Nils Johansson, Eskilstuna, and Claes-Goran O. Svensson, Borensberg, both of Sweden, assignors to Forenade Fabriksverken, Eskilstuna, Sweden
Filed Nov. 11, 1975, Ser. No. 631,121
Int. Cl.² F02G *1/04*
U.S. Cl. 60—517 **2 Claims**



1. An external combustion two cylinder engine arrangement comprising in combustion, a separate low temperature and high temperature cylinder with a cylindrical heater head of arcuately shaped pipes arranged therebetween, and a cylindrical combustion chamber surrounded by a recuperative heat exchanger comprises a single unit mounted abutting one end of said cylindrical heater head to permit removal as a unit.

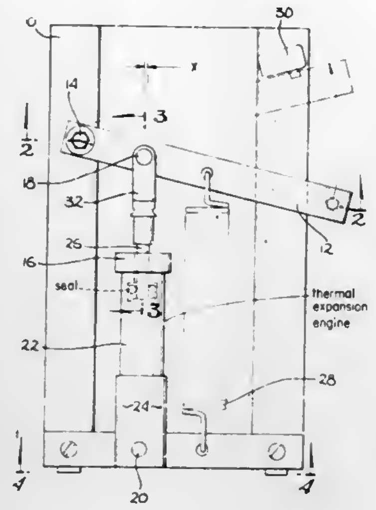
4,055,953
HOT-GAS RECIPROCATING ENGINE
Anton Marie Nederlof, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.
Continuation of Ser. No. 596,186, July 15, 1975, abandoned, which is a continuation of Ser. No. 513,241, Oct. 9, 1974, abandoned. This application June 29, 1976, Ser. No. 700,750
Claims priority, application Netherlands, Oct. 31, 1973, 7314928
Int. Cl.² F02G *1/04*
U.S. Cl. 60—526 10 Claims



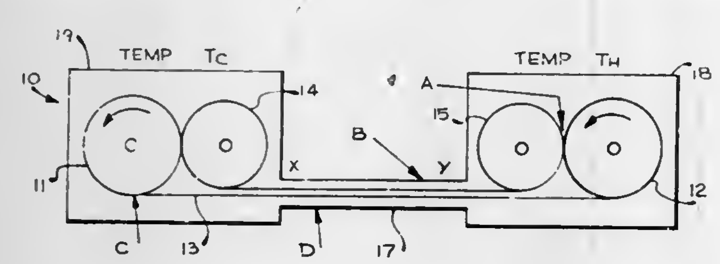
2. In a hot gas engine including a housing, a regenerator, a cylinder and displacer defining together a variable-volume expansion space, a heater comprising a heater duct having first and second ends communicating with said expansion space and said regenerator respectively, and a heat pipe generally surrounding said heater duct for supplying thermal energy thereto, the improvement in combination therewith, wherein said cylinder and displacer component has a central axis along which the displacer is reciprocated, and said regenerator component has a central axis corresponding to the flow direction of fluid therethrough, and said improvement comprises a tubular connection member oriented transverse of the central axis of at least one of said components and engaging and interconnecting said component and one of said heater duct ends, said member traversing said heat pipe wall with a clearance space defined therebetween, said improvement further comprising flexible seal means sealing said clearance space, whereby, a continuous fluid path is provided between said expansion space and said regenerator through said heater duct and connection member.

4,055,954
DAMPER ACTUATOR FOR A VENTILATION SYSTEM
Ronald Aaron Marks, Canoga Park; George Levenback, Studio City, and Albert Sweet, Northridge, all of Calif., assignors to Elster's Inc., Hollywood, Calif.
Filed May 30, 1975, Ser. No. 582,090
Int. Cl.² F03G *7/06*
U.S. Cl. 60—527 10 Claims

1. In a ventilation system, an actuator to control the flow of fluid in said ventilation system comprising:
a frame assembly;
an engine means having a first and second end, and having a piston and a body member, said piston being movable within said body member and having a seal between said body member and piston, said first end being rotatably coupled to said frame assembly, said second end being movable with respect to said frame assembly, said engine means for applying a force by displacing said second end with respect to said first end in response to a signal activating said engine means; and
a lever means being rotatably coupled to said frame assembly, said second end of said engine means being rotatably coupled to said lever means, for delivering said force from said engine means to control flow of fluid within said ventilation system, said rotatable couplings of said first and second ends of said engine means substantially reducing stresses on said seal in a direction perpendicular to an axis extending through said first and second ends of said engine means.



4,055,955
MEMORY ALLOY HEAT ENGINE AND METHOD OF OPERATION
Alfred Davis Johnson, 2108 41st Ave., Oakland, Calif. 94601
Filed Aug. 16, 1976, Ser. No. 714,344
Int. Cl.² F03G *7/06*
U.S. Cl. 60—527 25 Claims

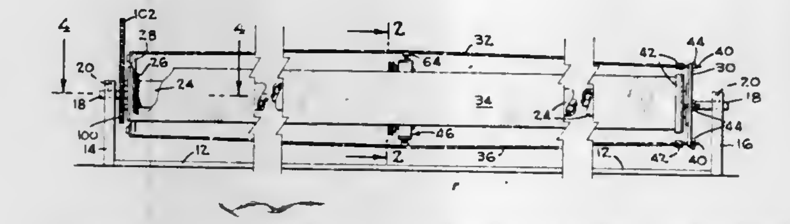


1. A method of converting thermal energy into mechanical work by means of a heat source, a heat sink, and a memory alloy which is characterized in having a transition temperature at which crystal phase transformation occurs, including the steps of cooling a portion of the alloy in the heat sink below said transition temperature whereby the cooled portion assumes a first configuration, moving the cooled portion along a first path from the heat sink to the heat source, heating a portion of the alloy in the heat source above said transition temperature whereby the heated portion assumes another configuration, causing the heated alloy portion to apply a force through a distance as it changes from the first to the second configuration to perform said mechanical work, and moving the heated portion of the alloy along another path in heat exchange relationship with the alloy portion in the first path whereby thermal energy from the heated portion is transferred to the cooled portion for maximizing the efficiency of conversion of thermal energy in the heat source into said mechanical work.

8. A method for starting operation of a heat engine employing a shape memory alloy formed in an endless loop one end of which is reeved in non-slip engagement about a first pulley and the second end of which is reeved in non-slip engagement about a second pulley having a diameter greater than the diameter of the first pulley, the method of starting operation comprising the steps of applying heat to a portion of the wire reeved about the first pulley, extracting heat from a portion of the wire reeved about the second pulley, applying a torque to the pulleys so that they conjointly turn at equal angular rates and in the same rotational direction for moving the loop through at least one complete cycle around the pulleys, progressively applying tension in the loop as the loop continues to

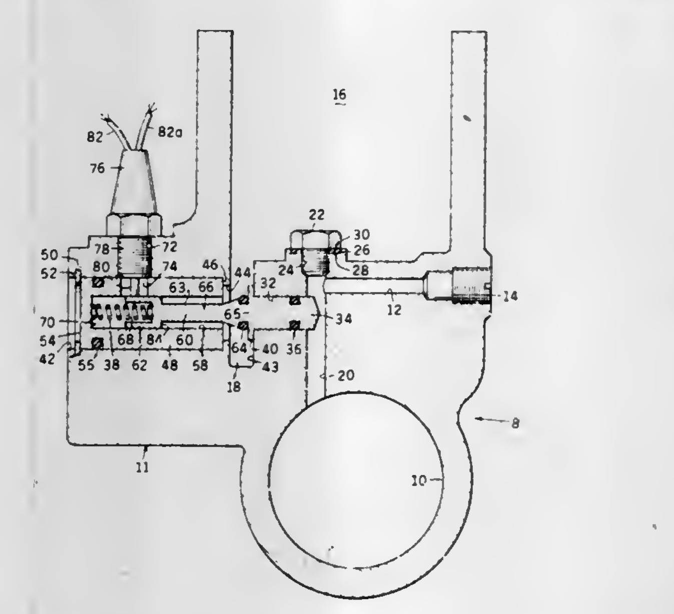
cycle about the pulleys, and removing the applied torque when the torque generated by the engine is sufficient to rotate the pulleys.

4,055,956
HIGH TORQUE SOLAR MOTOR
Mitchel J. Matovich, Jr., 19354 Zinfandel Court, Saratoga, Calif. 95070
Continuation-in-part of Ser. No. 639,845, Dec. 11, 1975, abandoned. This application Nov. 8, 1976, Ser. No. 739,687
Int. Cl.² F03G *7/02*
U.S. Cl. 60—527 10 Claims



1. A motor for converting to mechanical energy heat energy which radiates from a source and travels along a path, said motor comprising a base, a non-rotatable shaft secured to said base for defining an axis of rotation oriented transversely of said path, a rigid frame and means for supporting said frame for rotation on said shaft, first and second thin elongate vanes having ends rigidly fixed to said frame, said vanes being supported at circumferentially spaced points on said frame, each said vane having a heat energy absorbtive surface and an oppositely disposed heat energy reflective surface so that in response to rotation of said frame on said shaft the respective said surfaces of each said vane alternately and sequentially move through an exposed position at which the vane surfaces are exposed to said source, said vanes being formed of material having a thermal coefficient of expansion and contraction so that upon movement of the absorbtive surfaces of respective said vanes to a position nonexposed to said source said vanes contract to produce a tensile force, means interlinking said vanes at a site substantially medially of said ends and said shaft for converting said tensile force to a rotational force on said frame, and output means connected to said frame.

4,055,957
AUTOMOTIVE BRAKE FLUID LOW-LEVEL WARNING SENSOR
Edward J. Falk, St. Louis County, Mo., assignor to Wagner Electric Corporation, Parsippany, N.J.
Filed Feb. 17, 1976, Ser. No. 658,771
Int. Cl.² F15B *7/00*
U.S. Cl. 60—535 12 Claims

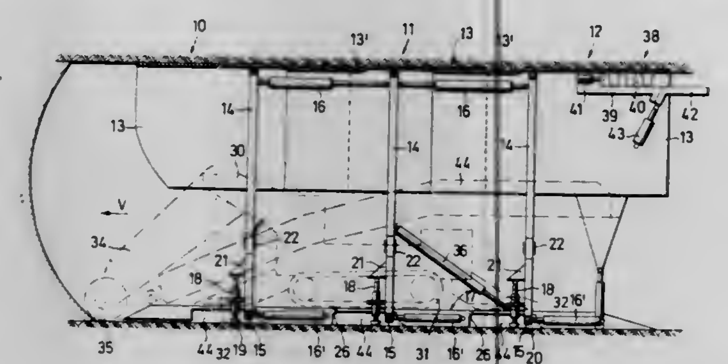


9. A warning sensor for a hydraulic brake system including a housing having a master brake cylinder with brake fluid therein and a reservoir containing a supply of brake fluid comprising:
a. a first piston having one end thereof in communication with the brake fluid of said master cylinder to apply a force against said one end of the first piston causing translation of said first piston when the master cylinder is actuated;
b. a second piston having one end thereof connected to the second end of said first piston;
c. the housing including a blind bore formed therein coaxially aligned with the second end of said second piston;
d. said second piston being located outside said blind bore and being translated toward and at least partly into said blind bore by translation of said first piston;
e. means for supplying brake fluid from said reservoir to said blind bore to oppose movement of the second end of said second piston into said blind bore upon actuation of the master cylinder; and
f. means for generating an electrical signal when said second piston enters said blind bore.

4,055,958
SLIPFORMING METHOD AND APPARATUS FOR IN SITU LINING OF AN UPWARDLY OPEN SHAFT WITH MONOLITHIC CONCRETE
Raymond A. Hanson, P.O. Box 7400, Spokane, Wash. 99207
Filed Sept. 20, 1976, Ser. No. 724,655
Int. Cl.² E21B *33/13*
U.S. Cl. 61—41 R 13 Claims

1. In a slipform assembly for lining in situ an upright upwardly open vertical walled shaft with monolithic concrete, a combination comprising:
a conical outer form member having an open lower end;
an upwardly closed inner core member mounted to the outer form member;
said inner core member having an upright wall spaced inwardly from the open lower end of the outer form member;
sectioned tremmie tube means openly connected at a lower end to the outer core member for supporting the outer form and inner core members within the shaft and for receiving concrete at an upper end and directing the concrete downwardly between the outer form and inner core members;
guide means on the tremmie tube for centering the outer form and inner core members in a shaft; and
concrete supply means removably connected to the tremmie tube at its upper end for supplying fluid concrete to the tremmie tube.

4,055,959
APPARATUS FOR USE IN MINING OR TUNNELLING INSTALLATIONS
Giselher Fritz, Werne, Germany, assignor to Gewerkschaft Eisenhutte Westfalia, Lunen, Germany
Filed Nov. 29, 1976, Ser. No. 745,748
Claims priority, application Germany, Dec. 2, 1975, 2554107
Int. Cl.^{2} E01G *3/02*
U.S. Cl. 61—85 **24 Claims**

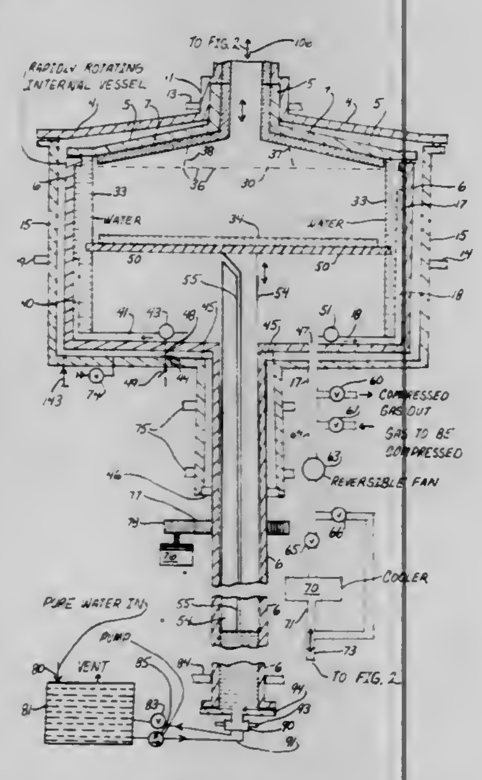


1. Apparatus for supporting and shielding excavation machinery for use in mining or tunnelling operations, said apparatus comprising:

a. a floor sill for supporting said machinery;
b. a shield for shielding said machinery, said shield being constituted by a plurality of generally cylindrical shield sections;
c. means for advancing said shield whilst said floor sill remains stationary; and
d. means for advancing said floor sill whilst said shield remains stationary;

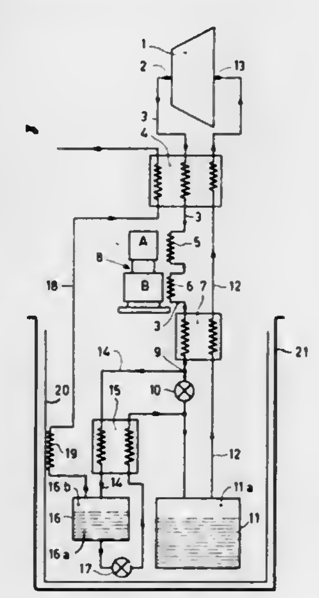
whereby, during operation, said shield is advanced relative to said floor sill and then subsequently, said floor sill is drawn up to follow the advancement of said shield.

4,055,960
STIRLING CYCLE ENGINE
John Craig St. Clair, P.O. Box 3345, University Station, Columbus, Ohio 43210
Filed July 6, 1976, Ser. No. 702,417
Int. Cl.^{2} F25B *9/00*
U.S. Cl. 62—6 **11 Claims**



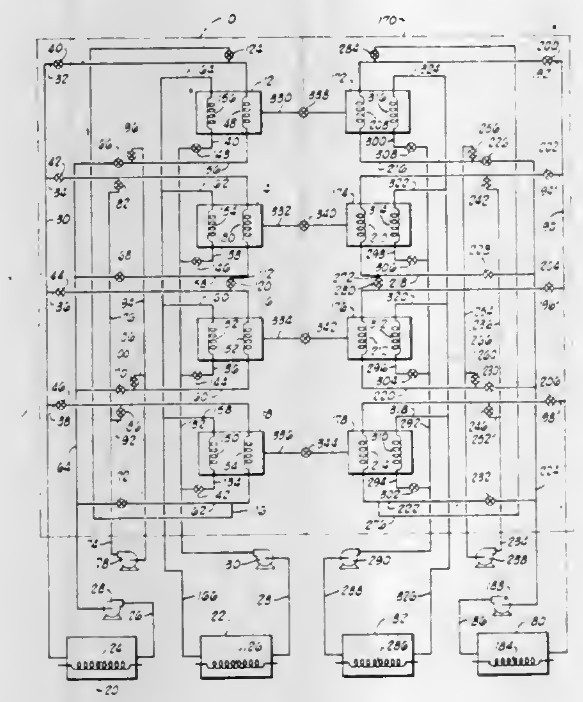
1. A process for compressing a gas with a lower molecular weight than water by means of Stirling Cycle which comprises: storing a hot gas and a cold gas of the same composition but in separate compartments with both under approximately the same pressure in a cylinder with the cold and hot gases being separated by a moveable piston, removing cold gas from the cylinder and heating it and introducing the heated cold gas into the end of the cylinder with the hot gas, thus moving the piston and thus increasing the pressure of the hot and cold gas stored, removing gas at increased pressure from the system as a product, reversing the above process with hot gas being removed from the hot gas storage in the cylinder and cooling it and introducing it into the end of the cylinder with the cold gas, thus moving the piston in the opposite direction to that previously obtained and thus decreasing the pressure of the cold and hot gas stored, and introducing gas to be compressed into the system, the novelty comprising revolving the cylinder that stores the hot and cold gases around its longitudinal axis, maintaining a layer of water around the inner surface of the revolving cylinder by centrifugal force, using this layer of water to act as a seal for the edge of the piston as it moves back and forth, and using as the gas mentioned a gas whose density is less than that of pure steam at the same temperature and pressure.

4,055,961
DEVICE FOR LIQUEFYING GASES
Petrus Simon Admiraal, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.
Continuation of Ser. No. 494,393, Aug. 5, 1974, abandoned. This application Oct. 30, 1975, Ser. No. 627,106
Claims priority, application Netherlands, Aug. 21, 1973, 7311471
Int. Cl.^{2} F17C *13/00*
U.S. Cl. 62—54 **3 Claims**



1. Apparatus for selectively liquifying one component contained in a gaseous body comprising no more than two components which comprises means for compressing a portion of said gaseous body, means for feeding said pressurized portion to a refrigeration stage for cooling to a temperature below the inversion temperature of said one component at the pressure to which said portion is so compressed, a collecting container having liquid and vapor spaces, a first duct connecting said refrigeration stage to said collecting container, a first Joule-Thompson valve in said first duct for selectively reducing the pressure of said cooled pressurized portion when said gaseous body comprises only one component, a separation container having liquid and vapor spaces, a second duct connecting a point of said first duct, between said refrigeration stage and said first Joule-Thompson valve, to said separation container, a third duct connecting the liquid space of said separation container to said first duct at a point between said first Joule-Thompson valve and said collecting container, a second Joule-Thompson valve in said third duct functioning to selectively reduce the pressure of the liquid part of said cooled pressurized portion when said gaseous body comprises two components, means to exchange heat in counterflow relationship between said second duct and a section of said third duct between said second Joule-Thompson valve and said first duct, and a fourth duct connecting the vapor space of the collecting container to said compressing means, for feeding vapor from said vapor space to said compressing means.

4,055,962
HYDROGEN-HYDRIDE ABSORPTION SYSTEMS AND METHODS FOR REFRIGERATION AND HEAT PUMP CYCLES
Lynn E. Terry, 22 Suncrest Ave., Bridgeton, N.J. 08302
Filed Aug. 18, 1976, Ser. No. 715,231
Int. Cl.^{2} F25B *15/00;* **F01K** *25/10*
U.S. Cl. 62—102 **17 Claims**

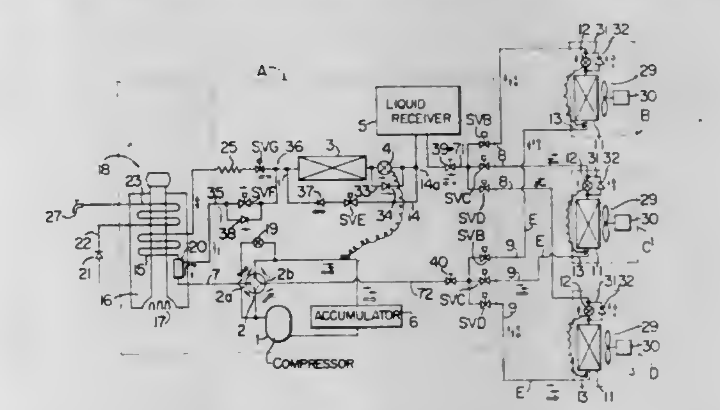


1. An absorption system comprising:

a first hydride-dehydride subsystem including first reactor means;
a first hydridable material in said first reactor means for forming a first hydride by reaction with hydrogen gas;
a second hydride-dehydride subsystem including second reactor means;
a second hydridable material in said second reactor means for forming a second hydride by reaction with hydrogen gas;
means for periodically transferring hydrogen gas between said first and second reactor means;
means for supplying heat to said first reactor means and said second reactor means in alternating sequence for effecting chemical compression and dehydriding of the hydrides of said first and second hydridable materials;
means for recovering a part of the thermal energy from said first and second reactor means in each of said subsystems; and
means for removing heat from the reactor means in each of said subsystems.

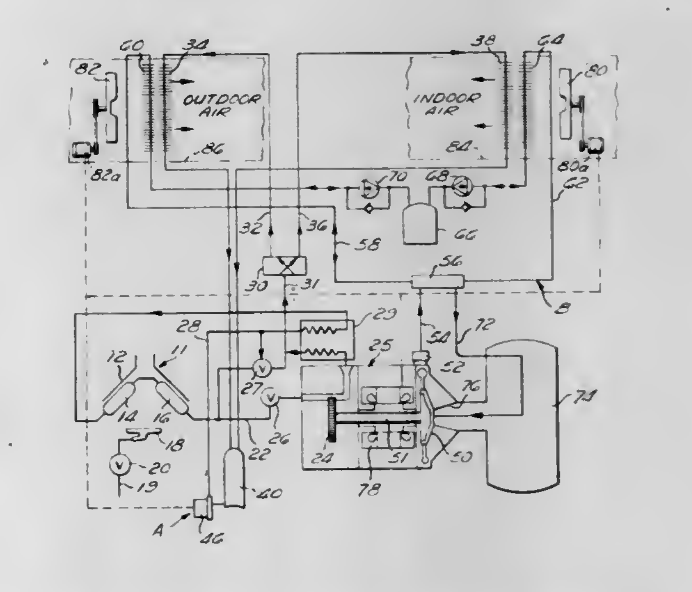
4,055,963
HEATING SYSTEM
Kunihiro Shoji; Akihiro Yokota, and Kenzo Watanabe, all of Kusatsu, Japan, assignors to Daikin Kogyo Co., Ltd., Japan
Filed June 25, 1975, Ser. No. 590,203
Int. Cl.^{2} F25B *13/00*
U.S. Cl. 62—238 **12 Claims**

1. An air conditioning system comprising compressor means (1) having suction side and delivery side; four-way valve means (2) having a first port connected to the suction side, a second port connected to the delivery side, a third port and a fourth port, heat exchanger means (15) for heating refrigerant passing therethrough by a heat source which is higher in temperature than outdoor air, connected to said third port of said four-way valve means (2); outdoor coil means (3) connected to said heat exchanger means (15), check valve means (34) connected to said outdoor coil means (3) permitting the refrigerant to flow from said outdoor coil means (3), expansion means (12) for cooling operation connected to said check valve mean (34), indoor coil means (11) connected to said expansion (12) and said fourth port of said four-way valve means (2), first bypass circuit means (31) bypassing said expansion means (12) and having check valve means (37) permitting the refrigerant to flow from said indoor coil means (11), second bypass circuit means (14) bypassing said outdoor coil means (3) and said check valve means (34) and having check valve means (37) permitting the refrigerant to flow from said indoor coil means (11) to said heat exchange means (15), fourth bypass circuit means (35) bypassing said heat exchanger means (15) and having



ing check valve means (38) permitting the refrigerant to flow from said four-way valve means to said outdoor coil means (3), whereby by operating said four-way valve means (2) said system can selectively make a cooling circuit for cooling operation wherein refrigerant flows from said compressor means (1) through said four-way valve means (2), fourth bypass circuit means (35), outdoor coil means (3), check valve means (34), expansion means (12), said indoor coil means (11), and four-way valve means (2) in the indicated order, to said compressor means (1), or a heating circuit for heating operation wherein said refrigerant flows from said compressor means (1) through said four-way valve means (2), indoor coil means (11), first bypass circuit means (31), second bypass circuit (14), heat exchanger means (15) and four-way valve means (2), in the indicated order, to said compressor means (1).

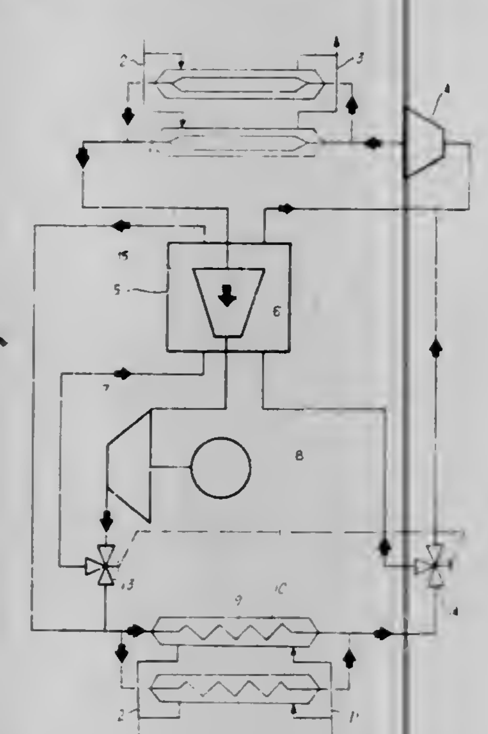
4,055,964
HEAT PUMP SYSTEM
Paul F. Swenson, Cleveland, Ohio, and Paul B. Moore, Fedhaven, Fla., assignors to Consolidated Natural Gas Service Company, Cleveland, Ohio
Filed Nov. 1, 1976, Ser. No. 737,776
Int. Cl.^{2} F25B *27/02, 13/00, 1/00*
U.S. Cl. 62—238 **15 Claims**



1. A fluid heating and cooling system comprising:

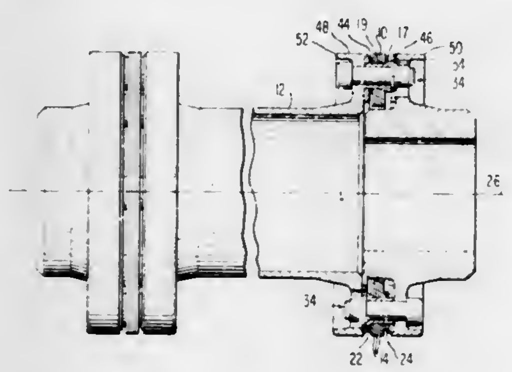
a refrigeration circuit having a compressor with an inlet and an outlet, an indoor refrigeration circuit heat exchanger, and an outdoor refrigeration circuit heat exchanger,
a vapor power circuit having a vapor generator with an inlet and an outlet, a prime mover expander having an inlet and an outlet, means connecting said vapor generator outlet with said prime mover expander inlet, an indoor vapor power circuit heat exchanger, an outdoor vapor power circuit heat exchanger,
first fluid moving means for conducting a first fluid in series across both of said indoor heat exchangers,
second fluid moving means for conducting a second fluid in series across both of said outdoor heat exchangers,
means for drivingly interconnecting said prime mover expander with said compressor,
first valve means movable to a cooling position for discontinuing flow of vapor from said prime mover expander outlet to said vapor power circuit indoor heat exchanger when said prime mover expander is drivingly connected to said compressor,
second valve means movable to a heating position for discontinuing flow of vapor from said prime mover expander outlet to said vapor power circuit outdoor heat exchanger when said prime mover expander is drivingly connected to said compressor,
third valve means movable to a cooling position for connecting said compressor outlet to said refrigeration circuit outdoor heat exchanger when said first valve means is in said cooling position,
fourth valve means movable to a heating position for connecting said compressor outlet to said refrigeration circuit indoor heat exchanger when said second valve means is in said heating position.

4,055,965
HEAT PUMP INSTALLATION
Edmond Girard, Boulogne, France, assignor to Society Messier, Paris, France
Filed Sept. 8, 1976, Ser. No. 721,588
Int. Cl.² F25B *13/00, 1/10*
U.S. Cl. 62—324 **10 Claims**



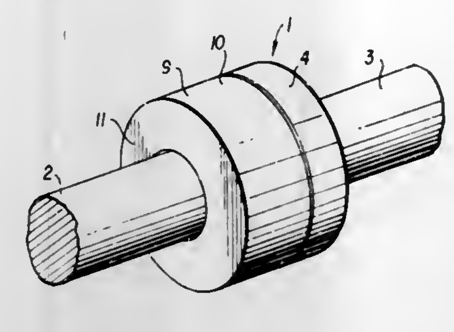
1. A heat pump installation comprising: at least one first heat exchanger in which a heat-exchange fluid of the installation absorbs heat from a heat-carrying fluid; a stato-thermic compressor comprising static mechanical means for effecting pre-compression and temperature elevation of the heat-exchange fluid, connected to the heat-exchange fluid outlet of the first heat exchanger; a compressor means connected to the outlet of the stato-thermic compressor, for compression of the heat-exchange fluid issuing therefrom; a second heat exchanger in which the heat-exchange fluid transfers heat to a working circuit which, in use, is connected to the installation; an expansion means connected to the heat-exchange fluid outlet on the second heat exchanger, for return of the fluid to the first heat exchanger; a first three-way valve in the connection between the outlet of the compressor means and the second heat exchanger, for diverting heat-exchange fluid from the compressor means to the second heat exchanger indirectly through the stato-thermic compressor; and a second three-way valve in the connection between the heat-exchange fluid outlet of the second heat exchanger and the expansion means, for diverting the heat-exchange fluid from the second heat exchanger to the expansion means indirectly through the stato-thermic compressor whereby the stato-thermic compressor effects pre-compression of the heat-exchange fluid before said fluid enters the compressor means and at the same time an increase in the temperature of said fluid by the absorption of heat from the heat-exchange fluid issuing alternatively from the compressor means on route to the second heat exchanger and from the second heat exchanger on route to the expansion means.

4,055,966
TORQUE TRANSMISSION COUPLING
Walter A. Fredericks, Warren, Pa., assignor to Rexnord, Inc., Milwaukee, Wis.
Filed Oct. 10, 1975, Ser. No. 621,450
Int. Cl.² F16D *3/78*
U.S. Cl. 64—13 **46 Claims**



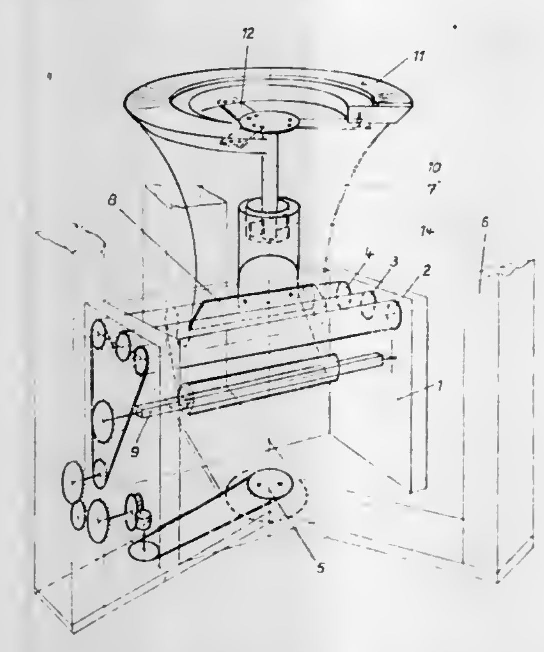
1. A coupling for transmitting rotary power, said coupling comprising:
a. a plurality of flexible laminar elements;
b. first means for holding said laminar elements in facing relationship, thereby creating a coupling flexing element having a coupling axis and two axial faces;
c. a first pilot ring alignment means having at least one precision-finished readially symmetric surface for aligning said coupling flexing element with a first hub;
d. second means for affixing said first pilot ring to a first axial face of said coupling flexing element such that the axis of the precision-finished radially symmetric surface is coincident with the coupling axis;
e. said first hub being integral with or adapted to be connected to a shaft for the transmission of rotary power and having at least one precision-finished radially symmetric surface that axis of which is at least approximately coincident with the coupling axis and which is dimensioned to complement precision-finished radially symmetric surface on said first pilot ring; and
f. third means for mounting said coupling flexing element on said first hub.

4,055,967
AXIAL MOVEMENT LIMITING COUPLING ASSEMBLY
Carmen S. Terranova, and Rustam B. Chinoy, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.
Filed Sept. 18, 1975, Ser. No. 614,522
Int. Cl.² F16D *9/00*
U.S. Cl. 64—28 R **2 Claims**



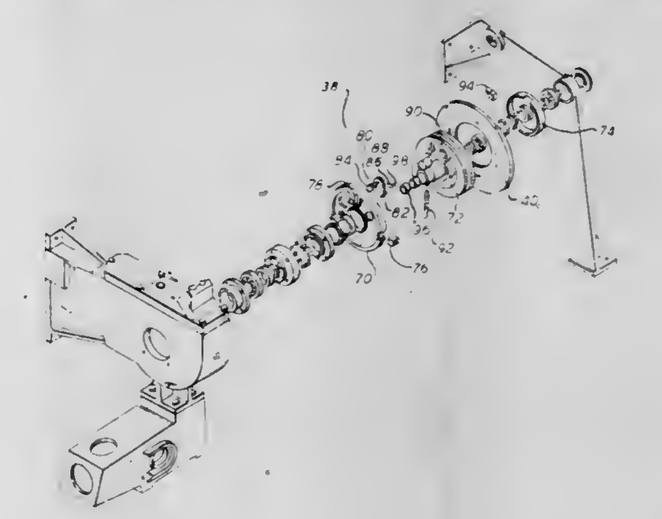
1. A coupling assembly for aligned first and second shafts comprising:
a. flanged portions on each of said shafts, said flanged portions having openings therein;
b. a plurality of shear bolts receivable in said openings for joining the flanged portions of the shafts together;
c. a casing having an axially extending portion abutting the flanged portion of said first shaft and a radially extending portion surrounding said second shaft;
d. a plurality of assembly bolts engaging said axially extending portion of said casing for assembling said casing to the flanged portion of said first shaft; and
e. means for retaining lubricating fluid within said coupling assembly, said means comprising a chamber formed between said casing and the flanged portion of said first shaft, a gasket disposed between said axially extending portion of said casing and the flanged portion of said first shaft, and a seal disposed between said radially extending portion of said casing and said second shaft.

4,055,968
DRIVE ARRANGEMENT FOR WIND-UP APPARATUS IN A CIRCULAR KNITTING MACHINE
Norbert Paul Bourgeois, Troyes, France, assignor to A.S.A. S.A., Roanne, France
Filed Sept. 27, 1976, Ser. No. 726,954
Claims priority, application France, Oct. 1, 1975, 75.30070
Int. Cl.² D04B *15/88*
U.S. Cl. 66—151 **5 Claims**



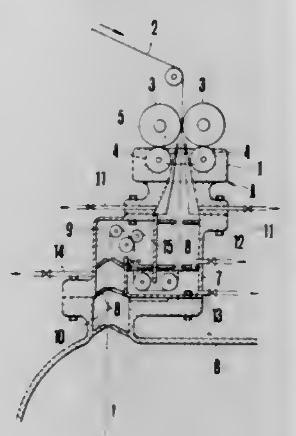
1. A circular knitting machine comprising needle beds adapted to produce a knitted tube, a cloth expander located, in use of the machine, within the knitted tube and a rotary wind up apparatus, such apparatus comprising at least two rollers mounted in a rotatable frame, said machine including means to rotate said rotary wind up apparatus, such means being adapted to act on said two rollers and being located, in use of the machine, within the knitted tube and being supported beneath the expander, said expander being supported by a shaft attached to one needle bed of the machine, and a shock absorber located between said shaft and said expander.

4,055,969
METHOD AND APPARATUS FOR PRODUCING TERRY CLOTH TOWELING ON A WARP KNITTING MACHINE
Christian Wilkens, Offenbach, Germany, assignor to Karl Mayer Textilmaschinenfabrik GmbH, Germany
Filed Sept. 27, 1976, Ser. No. 727,073
Claims priority, application Germany, Oct. 1, 1975, 2543714
Int. Cl.² D04B *23/00, 27/00*
U.S. Cl. 66—204 **31 Claims**



1. An apparatus for producing terry cloth toweling on a warp knitting machine comprising:
a plurality of needles;
a first and a second rotatable pattern chain means;
a guide bar means including a plurality of guide bars for knitting on said needles, said guide bar means being responsive to the motion of said first pattern chain means;
a transfer means for transferring some of the rotational motion of said first pattern chain means to said second pattern chain means, said transfer means comprising a speed varying transmission means, said speed varying transmission means including:
a shaft on which said first pattern chain means is mounted;
a first gear means coaxially mounted on said shaft;
a second gear means also coaxially mounted on said shaft; and,
an idler gear means attached to said first pattern chain means and adapted to engage with the teeth of said first and second gear means;
an actuating means responsive to said second pattern chain means;
a clutch means responsive to said actuating means;
a cam means operatively connected to said clutch means; and,
a guide bar moving means responsive to said cam means for moving one of said guide bars in response to the movement of said cam means.

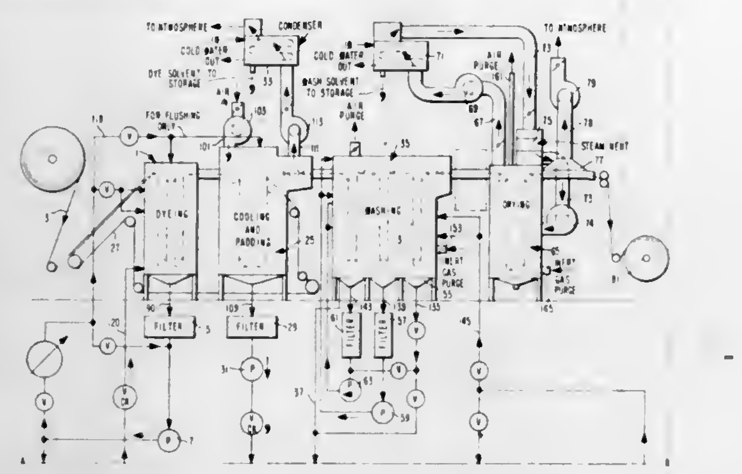
4,055,970
HIGH TEMPERATURE AND HIGH PRESSURE STEAMER
Yoshikazu Sando, and Hiroshi Ishidoshiro, both of Wakayama, Japan, assignors to Sando Iron Works Co., Ltd., Wakayama, Japan
Filed Apr. 13, 1976, Ser. No. 676,401
Claims priority, application Japan, Apr. 22, 1975, 50-48771
Int. Cl.² D06B *23/18*
U.S. Cl. 68—5 E **1 Claim**



1. A high temperature and high pressure steamer for liquid processing cloth comprising a high temperature and high pressure steamer vessel body having a cloth inlet and a cloth outlet, said cloth inlet comprising a seal block having a seal roll group through which the cloth passes as it enters said steamer vessel and said seal roll group forming a block between the exterior and the interior of said steamer vessel for the cloth entering therein, a reduced pressure vessel chamber located within said steamer vessel arranged between said seal block and the interior of said steamer vessel so that the cloth passes from said seal block through said reduced pressure vessel chamber before entering into the interior of said steamer vessel, said reduced pressure vessel chamber being reduced in pressure relative to the interior of said steamer vessel, said reduced pressure vessel chamber having a valve seat within the interior thereof, and a liquid seal tank arranged to contain a body of liquid therein and located between said seal block and said reduced pressure vessel chamber so that the cloth entering through said seal block passes first through said liquid seal tank traversing the body of liquid therein and then enters said reduced pressure vessel chamber before entering the interior of said vessel, and said liquid seal tank having a liquid supply tube and liquid exhaust tube for introducing liquid into and removing liquid from said tank.

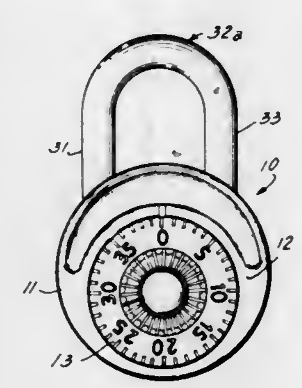
4,055,971
CLOSED CYCLE APPARATUS FOR THE RAPID, CONTINUOUS AND WATERLESS DYEING OF TEXTILE AND PLASTIC MATERIALS
Julius Hermes, Martinsville, Va., assignor to Martin Processing, Inc., Martinsville, Va.
Filed Aug. 10, 1976, Ser. No. 713,259
Int. Cl.² D06B *9/06*
U.S. Cl. 68—9 **38 Claims**

1. A closed cycle apparatus for the rapid, continuous and waterless dyeing of a generally continuous textile or plastic material with a dye comprising dyestuff dissolved or suspended or dispersed in a high boiling organic liquid which is free or substantially free of water and at a relatively high temperature comprising:
a dyeing apparatus for dyeing the textile or plastic material and recycling the used dye to the dyeing apparatus;
means for cooling and padding the dyed textile or plastic material and condensing vapors from the hot residual high boiling organic liquid and returning the vapors to said dyeing apparatus and returning the residual used dye to said dyeing apparatus;
means for washing the dyed textile or plastic material with a low boiling organic liquid which is free or substantially free of water and separating the used wash liquor from the residual high boiling organic liquid and residual dyestuff and returning said used wash liquor to the washing means and residual high boiling liquid and residual dyestuff to said dyeing apparatus, respectively;
means for drying the dyed and washed textile or plastic material and condensing vapors from the used residual low boiling organic liquid and returning said vapors to said washing means;



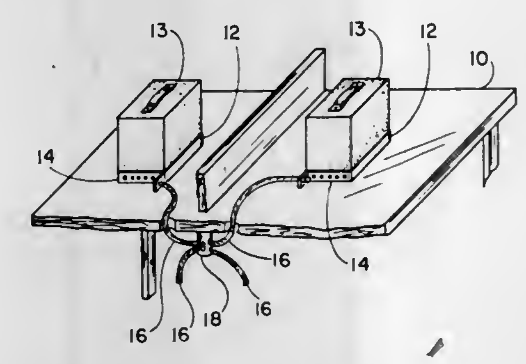
said dyeing apparatus, said means for cooling and padding, said means for washing, and said means for drying being arranged in series;
means for conveying the textile or plastic material successively through said dyeing apparatus, said means for cooling and padding, said means for washing, and said means for drying; and
means for taking-up the dyed, washed and dried textile or plastic material.

4,055,972
COMBINATION-CONTROLLED AND KEY-OPERATED SECURITY PADLOCK
Everett L. Calegan, Homewood, Ill., assignor to Junkunc Bros. American Lock Company, Crete, Ill.
Filed June 1, 1976, Ser. No. 691,864
Int. Cl.² E05B *37/06*
U.S. Cl. 70—21 **11 Claims**



1. In a permutation and key-operated padlock,
an outer casing having an outer wall having a pair of parallel spaced openings therein,
a U-shaped shackle slidably carried in said openings and having a shorter leg having a latch bolt receiving notch therein,
a rocker assembly mounted within said casing between the legs of said shackle,
a pivot pin forming a pivotal mounting for said rocker assembly,
a latch bolt slidably carried in said rocker assembly,
a spring seated in said rocker assembly and biasing said latch bolt to engage said latch bolt receiving notch,
permutation-controlled release means for said latch bolt to accommodate release of said latch bolt from said shackle upon outward pulling movement on said shackle,
spring means biasing said rocker to position said latch bolt into a latching position upon release of said shackle and key-operated means engageable with said latch bolt to release said latch bolt from said shackle independently of said permutation-controlled release means,
a two-part inner back plate closing said casing, one part forming a mounting for one end of said pivot shaft for said rocker and the other part forming a mounting for said key cylinder and transmission plate, and bodily mounting said key cylinder and transmission plate in said casing.

4,055,973
EQUIPMENT LOCK
Walter E. Best, c/o Best Lock Corporation, P.O. Box 103, Indianapolis, Ind. 46206
Filed Mar. 11, 1976, Ser. No. 666,048
Int. Cl.² E05B *73/00*
U.S. Cl. 70—58 **17 Claims**

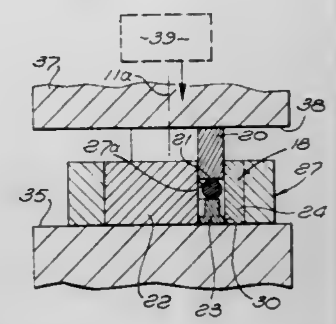


1. An equipment lock, comprising
a plurality of cables adapted to be secured respectively against separation from a plurality of items of equipment and each having a cable end member shaped for engagement in a locking device,
a lock body having a plurality of spaced receptacles for said cable end members, and having a mounting chamber within the body for the reception of keeper means,
and keeper means having a keeping position mounted in said chamber in which it interengages the cable end members received in said receptacles to secure the same against removal from the lock body, said keeper means being movable from said keeping position to release the cable end members for such removal,
and key-operated locking means which in the keeping position of the keeper means is contained within the body and locks said keeper means in said keeping position and which is operable to release the keeper means for movement to release the cable end members.

4,055,974
DISINTEGRATABLE FERTILIZER TABLET
Laban P. Jackson, Jr., Lexington, Ky., assignor to International Spike, Inc., Lexington, Ky.
Filed Mar. 5, 1976, Ser. No. 664,284
Int. Cl.² C05F *11/00;* **C05C** *9/02*
U.S. Cl. 71—11 **17 Claims**

1. A hygroscopic plant fertilizer tablet comprising particles of plant fertilizer source materials said source materials comprising nitrogen, phosphorus or potassium or mixtures thereof mixed with particles of a water swellable, water insoluble hydrophilic polymeric gel compressed into a hard, dense tablet.

4,055,975
PRECISION FORGING OF TITANIUM
Tibor Serfozo, Monterey Park, and Rod F. Simenz, Studio City, both of Calif., assignors to Lockheed Aircraft Corporation, Burbank, Calif.
Filed Apr. 1, 1977, Ser. No. 783,607
Int. Cl.² B21J *3/00*
U.S. Cl. 72—42 **18 Claims**

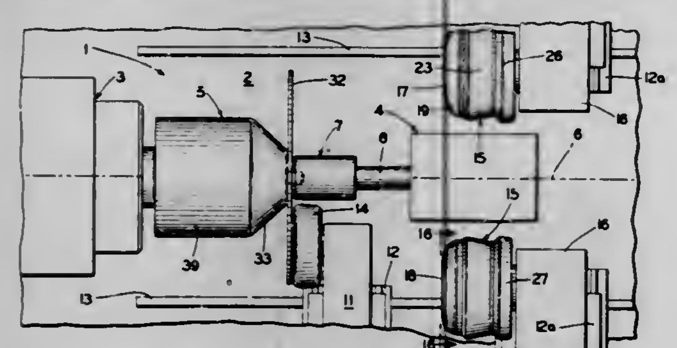


1. The titanium forging process that comprises:
preparing a quantity of titanium or titanium alloy stock shaped to fit within a cavity in a segmented zero draft die and having a volume approximately equal to that of a forged part to be manufactured in the die;
applying a protective coating to said stock;
heating said coated stock and said segmented zero draft die while separted to approximately a predetermined optimum forging temperature for said stock at least as high as about 1200° F;
coating all segments of said die with a lubricant before positioning the stock therein;
positioning the heated stock in the heated die;
heating the die and contained stock further after assembly together and as necessary to give the combination said forging temperature;
applying forging force to said heated segmented die to deform the heated stock partially, but not completely, toward the shape of said cavity;
separating the sections of said segmented die and removing the partially forged stock therefrom;
applying a protective coating again to said partially forged stock;
reheating said partially forged stock and said segmented die while separated to said forging temperature;
coating said die segments again with a lubricant before placing the stock therein for a second time;
repositioning said heated partially forged stock in the segmented die;
reheating the die and stock together;
applying forging force again to the heated die to further deform the heated partially forged stock toward the shape of said cavity; and
separating the die sections and removing the forged stock therefrom.

4,055,976
METHOD OF ROLLER SPINNING CUP-SHAPED METAL BLANKS AND ROLLER CONSTRUCTION THEREFOR
Derald H. Kraft, Canton, Ohio, assignor to Aspro, Inc., Canton, Ohio
Filed Mar. 29, 1976, Ser. No. 671,132
Int. Cl.² B21D *22/14*
U.S. Cl. 72—83 **5 Claims**

1. In a method of making a cup-shaped sheet metal blank of the type having a circular bottom hub flange wall and an outwardly extending conical wall terminating in an integrally connected outer cylindrical side wall having an open end from a flat sheet metal disc blank with pressure roller forming means for use as a stage blank for forming a V-grooved pulley, including the steps of:

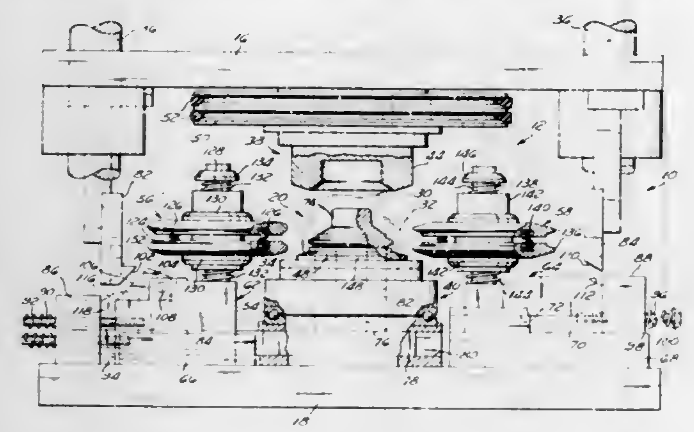
a. providing a flat sheet metal disc blank having a central hole formed therein;
b. clamping a central portion of the disc around the hole between opposed relatively axially movable complementary clamping faces of rotatable first headstock die means wherein the first headstock die means also has conical flange forming means extending outwardly of the clamping face and terminating in cylindrical flange forming means;
c. rotating the first die means and clamped disc;
d. forming the outwardly extending conical stage blank wall by pressure rolling, forming and ironing an intermediate annular portion of the rotating disc surrounding the central portion by first roller means reacting against the headstock die means conical flange forming means, while leaving unworked an annular disc portion extending outwardly from the formed conical wall;
e. laying the outer unworked annular portion of the blank disc along the cylindrical flange forming means of the headstock die means by pressure rolling with second



roller means said outer annular portion against said cylindrical flange forming means to rough form a cylindrical side wall of a cup-shaped blank, while maintaining the annular portion metal thickness as said outer annular portion metal is being laid to re shaped cylindrical form;
f. thinning and elongating the metal of the rough formed cylindrical side wall progressively simultaneously immediately after the rough forming of said side wall by pressure rolling flow forming the metal with said second roller meams rearwardly along the cylindrical flange florming means of the headstock die means;
g. permitting the thinned and elongated flow formed metal to expand outwardly an amount less than the amount of thinning immediately after being thinned and elongated; and
h. further thinning and elongating the expanded metal pogressively simultaneously immediately after the expansion of the initial thinning and elongating of the metal by pressure rolling flow forming the metal with said second roller means further along the headstock die means.

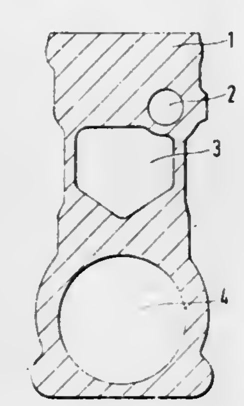
4,055,977
METHOD AND APPARATUS FOR MAKING DOUBLE GROOVE PULLEYS
John W. Haswell, 44429 Harmony Lane, Belleville, Mich. 48111
Filed Feb. 7, 1977, Ser. No. 765,974
Int. Cl.^{2} B21H *1/00*
U.S. Cl. 72—84 **8 Claims**

1. A machine for forming a pulley having a plurality of pulley grooves of given cross section from a pulley blank in the form of a cup, each groove being defined by pulley wall means connected through the root of the groove and each groove being separated from an adjacent groove by a land, comprising axially movable members for engaging said blank adjacent opposed axial ends thereof, means to axially advance at least one of said axially movable members toward the other to a final apposition at which they define a die cavity, first and second rotatably mounted roll die means, said first roll die means including a first forming roll translatable toward the longitudinal axis and the outer sidewall of the cup along a path defined by a first imaginary line connecting a center of rotation of said forming roll and said longitudinal axis and having a periphery adapted to roll form the periphery of the blank to a desired configuration, said second roll die means having a second forming roll positioned between said axially movable members, being translatable away from the longitudinal axis and toward the inner sidewall of the cup along a path defined by a second imaginary line connecting the center of rotation of said second roll die means and said longitudinal axis, and having a periphery adapted to complement the periphery of said first roll die means and to roll form the periphery of the blank to said desired configuration, said first and second imaginary



lines being at an angle of greater than 0° with respect to each other, means to establish relative rotation between said pulley blank and said forming rolls, first roll die moving means to advance said first roll die means from a retracted position toward said longitudinal axis to its forming position at which it defines a die cavity corresponding to further portions of a desired configuration, second roll die moving means to advance said second roll die means away from said longitudinal axis toward the inner sidewall of the cup and to said forming position at which it and said first roll die means together define said further portions of said desired configuration.

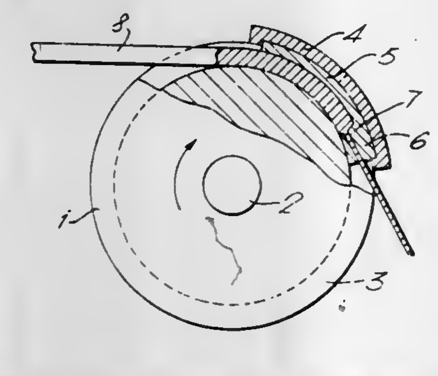
4,055,978
PROCEDURE FOR MANUFACTURING HYDRAULIC PLUNGER-TYPE PUMP BODIES
Jose Esteban Torralba, Zaragoza, Spain, assignor to Talleres Diesel, S.A., Zaragoza, Spain
Filed Mar. 29, 1976, Ser. No. 671,476
Claims priority, application Spain, Apr. 10, 1975, 436492
Int. Cl.^{2} B21K *1/26*
U.S. Cl. 72—254 **2 Claims**



1. A method of forming a reciprocating pump body having a fuel inlet feed duct, a cavity and a cam shaft housing comprising the steps of:
a. continuously drawing a member having an outside configuration which is the outside configuration of the finished pump body;
b. said member having three longitudinal cavities therein, a first of said cavities being adapted to serve as a fuel inlet feed duct, the second of said cavities being adapted to serve as a cavity, and the third of said cavities being adapted to serve as a cam shaft housing;

c. said first, second and third cavities extending longitudinally completely through said body; and
d. cutting said body to the length required to form a pump body, said cutting being performed normal to the axis of said three longitudinal cavities.

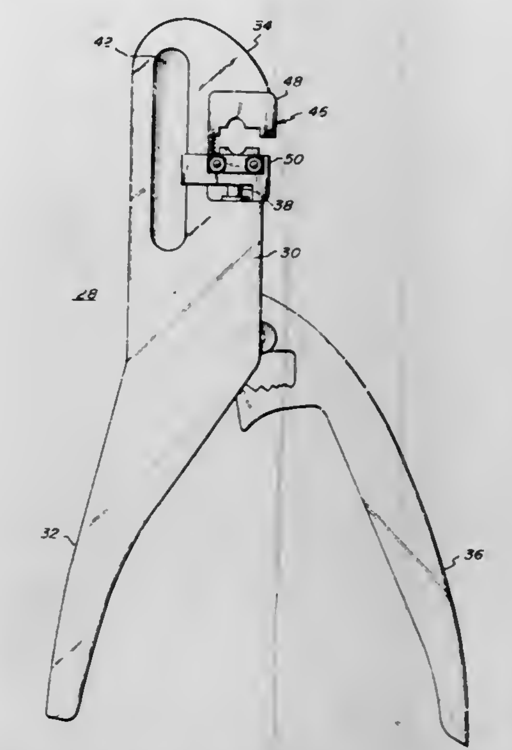
4,055,979
FORMING OF MATERIALS BY EXTRUSION
Eric Hunter, Leyland, England, and Derek Green, deceased, late of Langrigg, England (by Muriel Irene Green, executrix), assignors to United Kingdom Atomic Energy Authority, London, England
Filed June 7, 1976, Ser. No. 693,174
Claims priority, application United Kingdom, July 11, 1975, 29316/75
Int. Cl.^{2} B21C *23/08*
U.S. Cl. 72—262 **4 Claims**



1. Apparatus for the forming of materials by extrusion, such apparatus comprising a wheel member with an endless groove in its periphery, a second member fixed relative to said wheel member and cooperating with the wheel member to define an elongate passageway therebetween for receiving at its inlet end material to be extruded at its extrusion end, means for rotating the wheel member in the direction of the passageway from inlet end to extrusion end, an abutment member fixed relative to the wheel member and projecting into the passageway at the extrusion end for blocking it, means defining at least one die orifice in the extrusion end of the passageway and leading therefrom, the material to be extruded being moved towards the die orifice means by frictional engagement with the walls of the endless groove constituting the major part of the passageway, characterised by the provision of means for prestressing the material constituting at least the walls of the endless groove of said wheel member, such means comprising means for preloading the wheel member via cooperating taper surfaces, of which said wheel member includes at least two, for superimposing a circumferential compression in the wheel member.

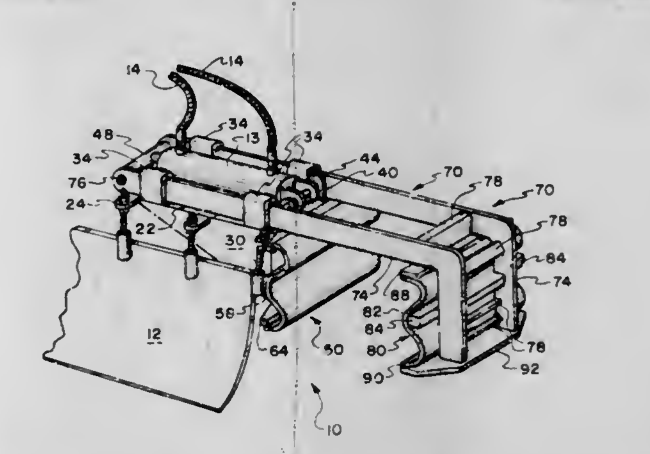
4,055,980
DIE SET
John J. Churla, Belle Mead, N.J., assignor to Thomas & Betts Corporation, Elizabeth, N.J.
Filed Oct. 18, 1976, Ser. No. 733,188
Int. Cl.^{2} B21J *9/08*
U.S. Cl. 72—410 **22 Claims**

1. A die set comprising: a first die member fabricated of a semi-rigid, flexible material and having first and second spaced apart, generally parallel faces; a first recess in said first face to receive a portion of the periphery of a deformable fastener; first and second ridges on said first face, one to either side of said first recess and spaced apart by a first predetermined distance; and a second die member fabricated of a semi-rigid, flexible material and having third and fourth spaced apart, generally parallel faces; a second recess in said third face to receive a portion of the periphery of a deformable fastenera; third and fourth ridges on said third face, one to either side of said second recess and spaced apart by a second predetermined distance less than said first predetermined distance; the engagement of said third and fourth ridges with said first and second ridges when said first and second die members are brought together, align said second recess with said first recess to substantially, completely envelope a deformable fastener



placed in said die set first and second recesses when said first face of said first die member is in contact with said third face of said second die member.

4,055,981
PORTABLE GUARDRAIL STRAIGHTENER FOR FIELD USE
Barry W. Olson, 1361 E. Parkway Ave., Salt Lake City, Utah 84106
Filed Jan. 19, 1977, Ser. No. 760,491
Int. Cl.^{2} B21D *13/02, 37/14*
U.S. Cl. 72—415 **8 Claims**

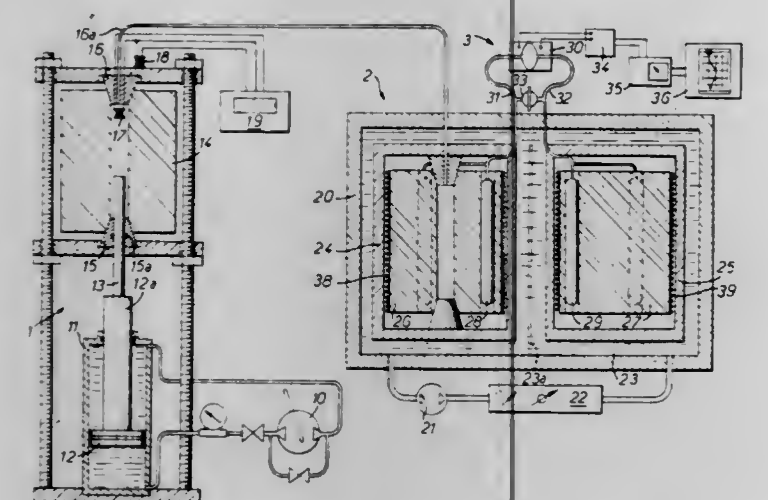


1. A portable guardrail straightener for field use in highway maintenance comprising:
vehicle means
a pressure-applying mechanism;
means mounting the pressure-applying mechanism to the vehicle means;
the pressure-applying mechanism comprising:
first frame means;
first die means comprising top and bottom edges and opposed ends, the cross sections configuration of the first die means substantially matching the original configuration of a damaged guardrail to be straightened the first die means being mounted adjacent one edge thereof to the first frame means for being positioned adjacent one side of said damaged guardrail in the field;
second frame means;
second die means comprising top and bottom edges and opposed ends, the cross sectional configuration of the second die means substantially matching the configuration of both the damaged guardrail and the first die means, the

second die means being mounted adjacent one edge thereof to the second frame means for being positioned adjacent the other side of damaged guardrail the edges of said first and second die means remote from the edges adjacent the frame means opening for lateral damaged guardrail access;

pressure-applying power means relatively reciprocating the first and second die means between an open condition and a closed condition contiguous with the damaged guardrail thereby cold deforming the damaged guardrail substantially into its original cross sectional and longitudinal configuration.

4,055,982
CALORIMETERS FOR MAKING MEASUREMENTS AT PRESSURES ABOVE 1000 BARS
Léon Ter-Minassian, Fresnes; Philippe Pruzan, L'Hay-les-Roses; Pierre Figuière, Bourg-la-Reine, and Henri Szwarc, Saint-Germain-en-Laye, all of France, assignors to ANVAR-Agence Nationale de Valorisation de la Recherche, France
Filed July 27, 1976, Ser. No. 709,242
Claims priority, application France, July 31, 1975, 75.23884
Int. Cl.² G01K *17/00;* G01N *25/20*
U.S. Cl. 73—15 B 10 Claims



1. A calorimeter suitable for measuring the latent energy of a sample at a pressure of at least 1,000 bars, especially the latent energy of change of state, comprising:

a thick walled test chamber able to withstand very high pressure,

means for changing the state of a sample in said test chamber essentially comprising means for pressurizing said test chamber including pressure measuring means,

a connecting means having a small flow section disposed between said test chamber and said pressurizing means,

a reference body thermally equivalent to said test chamber,

respective thermally insulating jackets surrounding said test chamber and said pressurizing means,

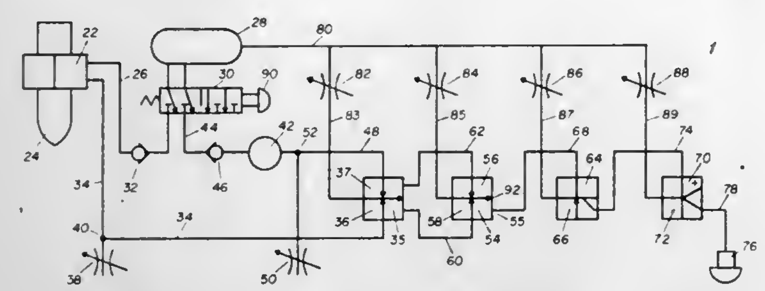
an isothermal enclosure in which said test chamber and said reference body are symetrically arranged,

means for holding said isothermal enclosure at a set temperature,

a differential gas thermometer comprising respective bulbs in thermal contact with said reference body and thick walls of said chamber externally to this latter, and

a two inputs differential pressure measuring unit, each input respectively connected to said thermometer bulbs by capillary connections, where the sensitivity of said differential pressure unit is such that temperature differences lesser than 10⁻⁵° C, may be detected within the range −30° to + 150° C.

4,055,983
FLUIDIC GAP GAUGE
Michael J. Goes, Dover, and John R. Masly, Landing, both of N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.
Filed Dec. 28, 1976, Ser. No. 754,936
Int. Cl.² G01B *13/12*
U.S. Cl. 73—37.5 4 Claims



1. A fluidic gap gauging system for checking a shell body-base plate gap of a projectile which comprises:

split-ring hermetically sealed pressure enclosure means for circumferentially enclosing said shell body-base plate gap and creating a gap volume therein;

a reference volume;

pneumatic supply source means for generating a pressure within said split-ring enclosure means gap volume and said reference volume and supplying pneumatic power to said gauging system;

valve means for simultaneously pneumatically pressurizing said split-ring enclosure means gap volume and said reference volume;

fluidic proportional amplifier means for generating a pneumatic output signal in response to a differential pressure input signal;

fluidic Schmitt Trigger means, having a control port pneumatically connected to the output of said fluidic proportional amplifier means switching from an off position to an on position and for generating a pneumatic signal in response to said output signal of said fluidic proportional amplifier means;

a geometrically biased fluidic bi-stable gate having a control input port pneumatically connected to the output of said Schmitt-Trigger, said bi-stable gate being normally biased in a given "off" state;

a pneumatic indicator pneumatically connected to the output of said geometrically biased fluidic bi-stable gate, said indicator giving a visual indication of a "bad" assembly when said split-ring enclosure means gap volume is greater than said reference volume, and giving a visual indication of a "good" assembly when said split-ring enclosure means gap volume is equal to or less than said reference volume; and

fluidic restriction means for adjusting the supply pressure to said gauging system.

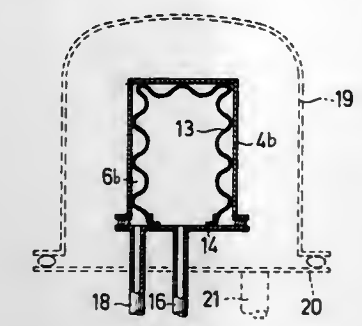
4,055,984
DEVICE FOR DETECTING LEAKS IN FLEXIBLE ARTICLES
Joachim Marx, Wesseling, Germany, assignor to Leybold-Heraeus GmbH & Co. KG, Cologne, Germany
Filed July 14, 1976, Ser. No. 705,005
Claims priority, application Germany, July 29, 1975, 2533830
Int. Cl.² G01M *3/20*
U.S. Cl. 73—40.7 19 Claims

1. A device for detecting leaks in an article which includes a readily deformable wall having opposite inner and outer sides; the improvement comprising:

a. a flexible backup wall having opposite inner and outer sides and being arranged for positioning inside an article;

b. closure means secured to said backup wall for defining, together with said outer side of said backup wall and the inner side of an article wall, a coherent space;

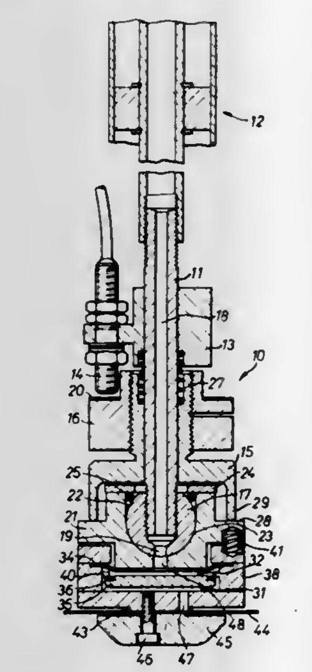
c. means for generating a pressure difference between the pressures in said coherent space and at said inner side of said backup wall for causing said backup wall to deform and to engage, with its outer side, the inner side of the article wall for supporting the article wall while maintaining the coherence of said space;



d. means for generating a pressure difference between the pressures in said coherent space and at the outer side of the article wall for causing test gas to penetrate into said coherent space through any leak in the article wall; and

e. detector means communicating with said coherent space for sensing test gas therein.

4,055,985
APPARATUS FOR TESTING THE SURFACE QUALITY OF A VESSEL MOUTH
Werner Munz, Obfelden, Switzerland, assignor to Emhart Zurich S. A., Zurich, Switzerland
Filed Dec. 9, 1976, Ser. No. 748,994
Claims priority, application Switzerland, Dec. 24, 1975, 16773/75
Int. Cl.² G01M *3/32*
U.S. Cl. 73—49.2 10 Claims

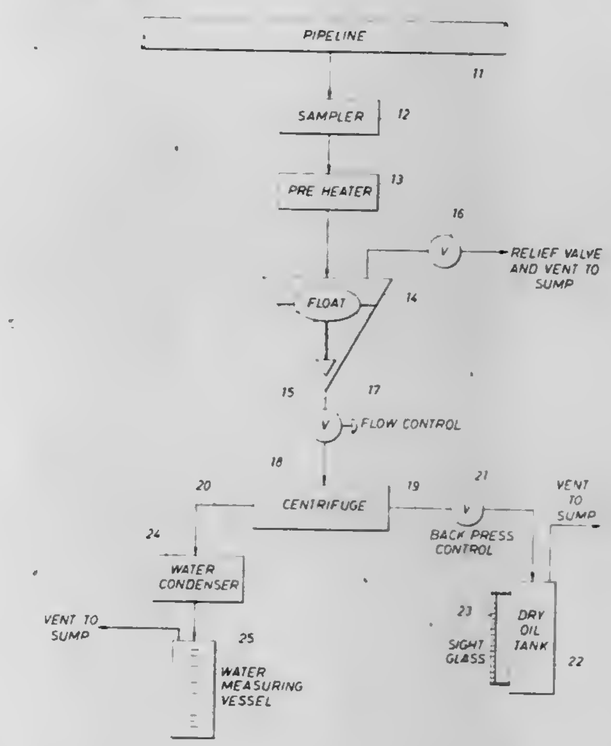


1. In an apparatus for testing the surface quality of a vessel mouth, said apparatus including a test head adapted to be placed temporarily over the vessel mouth, means connecting the test head to a source of test gas, passage means through said test head for introducing gas into said vessel, and a pressure measuring instrument connected to said means connecting the test head to a source of test gas, said pressure measuring instrument adapted to generate an electrical signal when a pressure change of a predetermined tolerance value occurs, the improvement comprising:

a. a sealing washer of spring stiffness mounted on said test head and having a first surface for bearing against the vessel mouth, said test head having a bearing surface against which the other surface of said washer bears, and

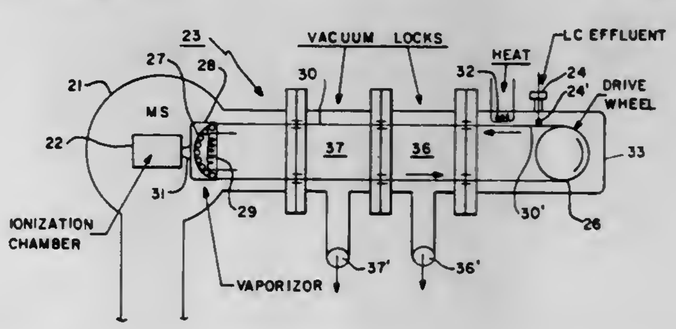
b. valve means in said test head for opening the passage means when the washer is pressed against a vessel mouth and closing said passage means when the test head is removed from the vessel.

4,055,986
BASIC SEDIMENT AND WATER MEASUREMENT
Thomas L. Stewart, and Edward R. Cadena, both of Houston, Tex., assignors to Shell Oil Company, Houston, Tex.
Filed Dec. 20, 1976, Ser. No. 752,342
Int. Cl.² G01N *15/04*
U.S. Cl. 73—61 R 7 Claims



1. A process for measuring the water and sediment content of crude oil flowing through a pipeline comprising removing a representative sample of the crude oil from the pipeline, heating the sample, centrifuging the sample to separate the water and sediment from the oil, controlling the vapor pressure in the centrifuge to prevent the escape of any water which has been vaporized by the heating step, passing the water fraction to a condenser to condense whatever water was vaporized during the heating, measuring the water, passing the oil to a tank and measuring the oil.

4,055,987
LIQUID CHROMATOGRAPH/MASS SPECTROMETER INTERFACE
William H. McFadden, San Jose, Calif., assignor to Finnigan Corporation, Sunnyvale, Calif.
Filed Mar. 4, 1976, Ser. No. 664,058
Int. Cl.² G01N *31/08*
U.S. Cl. 73—61.1 C 6 Claims



1. An interface for permitting efficient continuous introduction of any dilute solution into the ionization chamber, having an entrance port, of a mass spectrometer comprising: a thin ribbon in the form of a loop; driving means for continuous moving of said ribbon; means for receiving said solution and depositing it on said moving ribbon; a vaporization chamber including a turn-around for said loop in close proximity to said

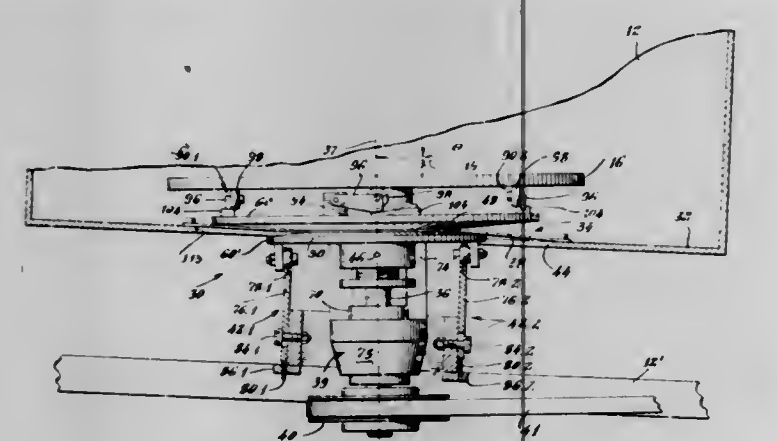
entrance port of said ionization chamber of said mass spectrometer and heating means for vaporizing said deposited solution for introduction into said ionization chamber.

4,055,988
ALIGNMENT CONTROL APPARATUS FOR A TURNTABLE USED IN AN ULTRASONIC TESTING SYSTEM

Arthur L. Dutton, Jr., Westport, Conn., assignor to J. B. Engineering and Sales Company, Inc., Greenwich, Conn.

Filed Dec. 9, 1976, Ser. No. 748,960
Int. Cl.^{2} G01N *29/04*

U.S. Cl. 73—620 **10 Claims**



1. An apparatus for adjusting the orientation of a rotational turntable relative to a wall of a tank inside of which the turntable is located to support and move a workpiece relative to an ultrasonic testing system movably mounted to the tank for movement in a scanning plane to ultrasonically probe the workpiece when a liquid is in the tank, comprising

a diaphragm mounted in a plane to said tank wall over an adjustment opening thereof, said diaphragm having an access opening and being effectively mounted in liquid sealing relationship with the tank wall, said diaphragm further being formed of a material selected to permit limited flexure of the mounted diaphragm relative to its mounting plane;

support means mounted to the diaphragm to firmly clamp the diaphragm around its access opening, said support means having sufficient rigidity to support the platform and workpiece, said support means further being provided with a drive shaft opening in alignment with the access opening in the diaphragm;

a drive shaft mounted to the turntable and extending through the openings in the support means and the diaphragm in operative and effective liquid sealing relationship with the support means;

bearing means operatively coupled between the support means and the drive shaft to permit rotation of the latter about an axis of rotation while enabling the support means to support the turntable and workpiece; and

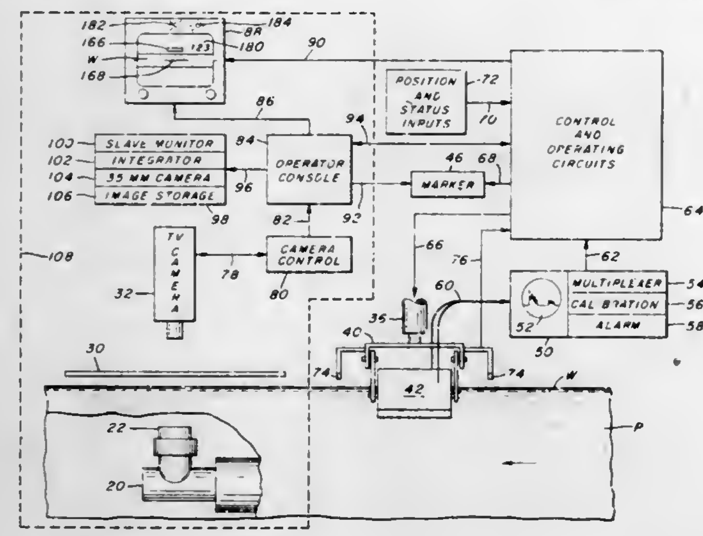
pivot control means operatively connected between the support means and an external segment of said tank to adjust the orientation of the support means whereby said turntable orientation may be adjusted relative to the scanning plane of the ultrasonic testing system from outside of said tank.

4,055,989
WELD INSPECTION SYSTEM WITH DUAL FLAW DETECTION

Edwin Blair Henry, Jr., Mount Lebanon Township, Allegheny County; John A. Patsey, Penn Hills Township, Allegheny County; Ralph G. Rudolph, Edgewood Borough, and Donald G. Schindler, Whitehall Borough, all of Pa., assignors to United States Steel Corporation, Pittsburgh, Pa.

Filed Mar. 17, 1976, Ser. No. 667,763
Int. Cl.^{2} G01N *29/04*

U.S. Cl. 73—588 **10 Claims**



1. A method for inspecting the longitudinal weld in a pipe comprising the steps of

traversing the weld along a path past a pair of adjacent flaw detection systems operating at the same time and located along a path parallel to the longitudinal axis of the pipe, the first system being a fluoroscopic system particularly sensitive to volumetric type flaws and the second system being an ultrasonic system particularly sensitive to planar type flaws,

maintaining the position of the weld with respect to the path along which the systems are located,

placing a mark on the pipe wall location wherever the first system detects a flaw,

placing a mark on the pipe wall location wherever the second system detects a flaw, and

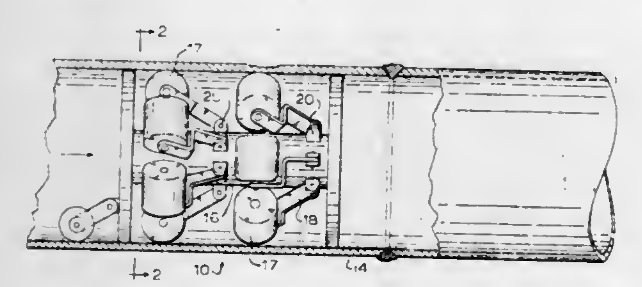
recording the location, as a distance from the end of the length of pipe, of a flaw detected by the first system on one record and a flaw detected by the second system on a second record.

4,055,990
PIPELINE INSPECTION APPARATUS

Frederick Victor Topping, 3 Kirkton Road, Toronto, Canada

Filed July 19, 1976, Ser. No. 706,505
Claims priority, application United Kingdom, July 28, 1975, 31440/75
Int. Cl.^{2} G01N *29/00*

U.S. Cl. 73—623 **14 Claims**



9. Means for measuring the thickness of walls of a liquid bearing pipeline comprising:

means for supporting, in spaced relation to the inner surface of the wall of a pipeline, a transmitter of and a receiver of ultra-sonic waves,

said supporting means being designed to be moved along said pipeline by the liquid therein,

means, when supersonic radiation is transmitted from said transmitter, for detecting at said receiver, the reception of that reflection, of such radiation reflected at the inner surface of the pipe, and for detecting at said receiver the reception of that reflection of said transmitted radiation, reflected at the outer surface of the pipe,

and means for recording the time interval between reception of the reflections from the outer and inner surfaces,

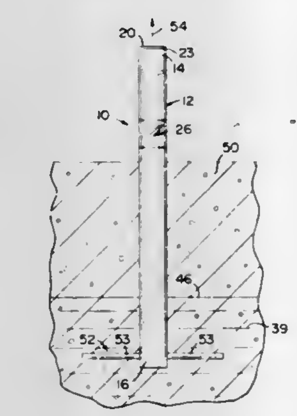
including means for measuring the travel of said supporting means along said pipeline and for correlating said reflection deflections.

4,055,991
LIQUID GAUGE ASSEMBLY

Willie Earl Bridwell, Tampa, Fla., assignor to Kapsura, Inc., Tampa, Fla.

Filed July 12, 1976, Ser. No. 704,487
Int. Cl.^{2} G01F *23/06*

U.S. Cl. 73—73 **7 Claims**



1. A liquid gauge means of the type primarily designed to determine liquid levels in plant containers having liquid and supporting soil material maintained therein, said liquid gauge comprising: a casing including a substantially elongated configuration and a hollow interior, vent means formed in said casing, inlet means formed in said casing in spaced relation to said vent means, both said vent means and said inlet means each comprising at least one aperture disposed in interconnecting relation between the interior and exterior of said casing, whereby air escapes from said vent means as liquid enters said inlet means; indicator means movably mounted on the interior of said casing and comprising a substantially elongated configuration having a longitudinal dimension less than that of said casing, said indicator means structured to be floatable within said casing, whereby the level of liquid within said container is indicated by the relative disposition of said indicator means to predetermined portions of said casing; anchor means connected to said casing and extending outwardly therefrom in substantially transverse relation to the longitudinal axis of said casing and into supported engagement with the supporting soil material, whereby said casing is maintained in substantially upright position due to engagement between the supporting soil material and said anchor means.

4,055,992
BEAM LEAD TESTING APPARATUS

Frank A. Pizzarello, Santa Ana, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed June 16, 1976, Ser. No. 696,676
Int. Cl.^{2} G01N *19/04*

U.S. Cl. 73—88 B **8 Claims**

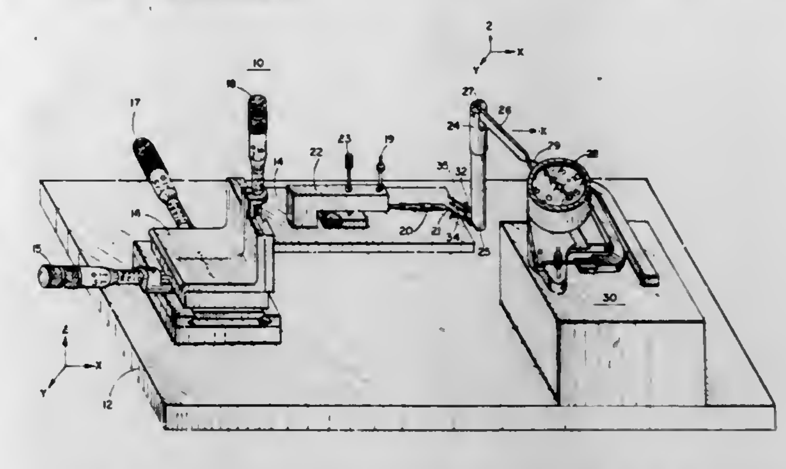
1. An apparatus for testing the strength of beam leads bonded to a device comprising:

table means;

clamp means for holding beam leads to said table means;

a mounting bar adjacent said table means and having means for mounting said device;

said table means and said mounting bar being movable relative to each other;



means for rotating said mounting bar such that the beam leads held to said table means are broken from said device; and

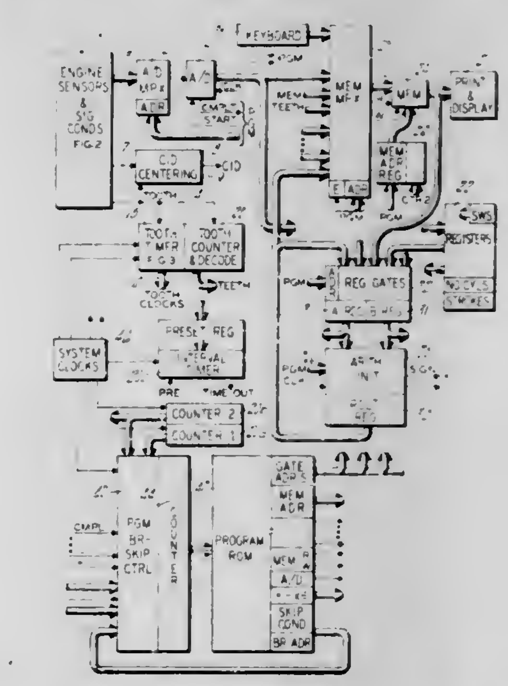
means for measuring the force applied by said means for rotating to cause said beam leads to be broken from said device.

4,055,993
SUB-CYCLIC MEASUREMENT OF SPEED OF AN INTERNAL COMBUSTION ENGINE

Richard J. Rackliffe, Agawam, Mass., and Lee R. Armstrong, Enfield, Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed May 7, 1976, Ser. No. 684,220
Int. Cl.^{2} G01P *3/48;* G01M *15/00*

U.S. Cl. 73—116 **5 Claims**



1. Apparatus for sub-cyclic determination of speed of a rotating internal combustion engine, comprising:

means adapted to be disposed on the engine for sensing the passage of teeth on the flywheel of said engine, said teeth delineating successive, substantially equal small angles, each of which is a small fraction of a full revolution of the engine, and providing a sense signal in response to an integral number of the teeth;

timing means responsive to said sensing means for providing a time increment data manifestation of the elapsed time between occurrences of said sense signals from said sensing means;

means presenting a manifestation of the number of teeth on said flywheel; and

processing means reponsive to said angle data manifestation and to said time increment manifestation for generating a manifestation of the speed of the engine.

4,055,994

METHOD AND A DEVICE FOR DETECTING THE STALL CONDITION OF AN AXIAL FLOW FAN OR COMPRESSOR

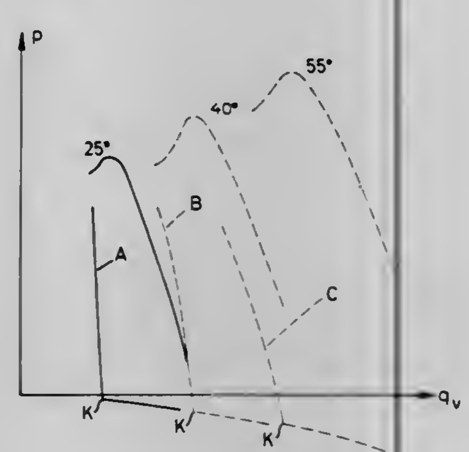
Ole Roslyng, and Niels Erik Friis Dam, both of Naestved, Denmark, assignors to Nordisk Ventilator Co., A/S, Naestved, Denmark

Filed Aug. 12, 1976, Ser. No. 713,958

Claims priority, application Denmark, Aug. 12, 1975, 3656/75; Feb. 10, 1976, 531/76

Int. Cl.^{2} G01M *15/00*

U.S. Cl. 73—116 **10 Claims**



1. A method of detecting the stall condition of an axial flow fan or compressor arranged in an air duct, comprising the step of measuring the pressure difference between the total air pressure acting in a direction opposite to the direction of revolution of the fan wheel and a reference pressure corresponding substantially to the static pressure at the wall of the duct in substantially the same radial measuring plane.

4,055,995

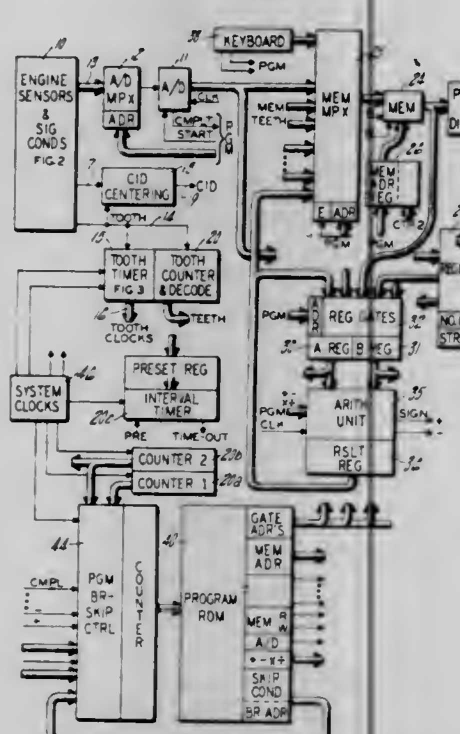
ENGINE AIR-IN-FUEL DIAGNOSTICS

Lee R. Armstrong, and Henry J. Mercik, Jr., both of Enfield, Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Dec. 6, 1976, Ser. No. 747,759

Int. Cl.^{2} G01M *15/00*

U.S. Cl. 73—116 **6 Claims**



4. In the method of determining the presence of air accumulation in the fuel intake of an internal combustion engine, the steps of:

measuring an indication of horsepower in each of a plurality of successive acceleration bursts from a low engine speed to a high engine speed; and

comparing the measured indication of horsepower for a first one of said acceleration bursts to the indications of horsepower for at least one successive one of said acceleration bursts.

4,055,996

AUTOMOTIVE VEHICLE PERFORMANCE TEST STAND SYSTEM AND PERFORMANCE MEASURING METHOD

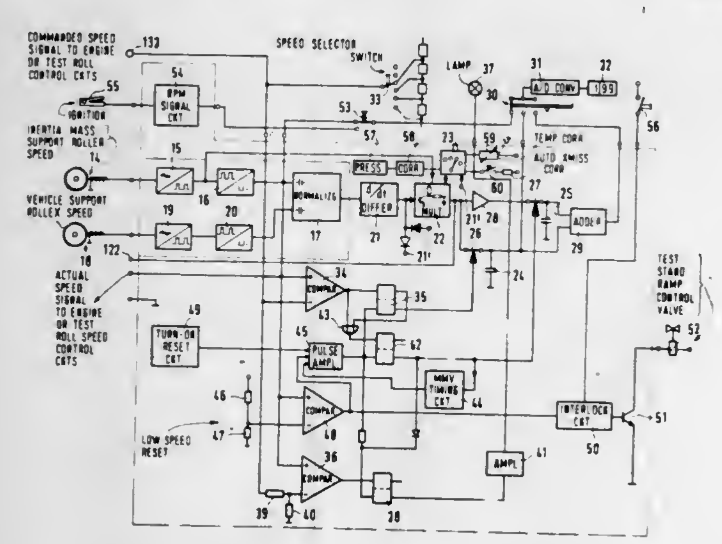
Walter Dinkelacker, Stuttgart; Rudolf Blum, Wendlingen; Klaus Abele, Uhingen; Jurgen Knodler, Remshalden-Grunbach, and Peter Ebinger, Owen (Teck), all of Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany

Filed Sept. 13, 1976, Ser. No. 722,775

Claims priority, application Germany, Sept. 11, 1975, 2540514; Apr. 8, 1976, 2615193

Int. Cl.^{2} G01L *5/13*

U.S. Cl. 73—117 **22 Claims**



17. Method of dynamically testing the performance of automotive vehicles and of the engines thereof

using a test stand system

having rollers with which the driven wheels of the vehicle are in engagement; inertia flywheel means connected to at least one of the rollers for acceleration by the engine of the vehicle via the wheels of the vehicle through the drive train of the vehicle, and for subsequent deceleration upon interruption of driving connection between the engine and the vehicle wheels;

means (**14, 15, 16; 18, 19, 20; 17**) sensing an operating parameter related to speed and change thereof and providing a measured speed-related signal;

means (**17; 21**) sensing traction effort supplied by the wheels upon acceleration, and traction losses upon deceleration and providing a measured torque-related signal;

and combining means responsive to the measured speed-related signal and to the measured torque-related signal and deriving a combined output signal representative of engine performance,

and including the steps of: connecting the drive train of the engine and accelerating the engine while sensing and measuring the speed-related signal and the traction-related signal;

storing a combined first output signal derived during acceleration from said measured signals at a first predetermined engine speed;

then disconnecting the engine to provide for deceleration and driving of the wheels of the vehicle by the inertia flywheel while sensing and measuring the speed-related signal and the torque-related signal;

storing a combined second output signal derived during deceleration from said measured signals at said first predetermined engine speed;

summing the combined first and second output signals to determine performance and power output of the engine by generating a signal representative of losses dependent upon at least one of: traction losses; speed-related losses; constant losses.

4,055,997

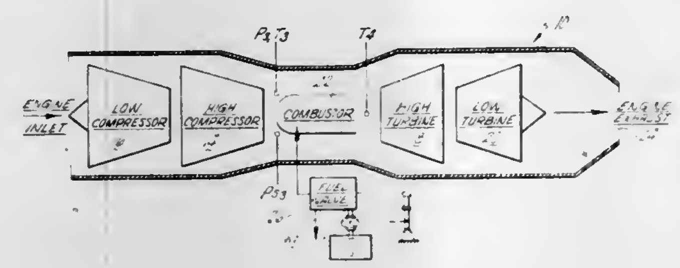
MEANS FOR CALCULATING TURBINE INLET TEMPERATURE OF A GAS TURBINE ENGINE

John Kniat, Glastonbury, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Sept. 15, 1976, Ser. No. 723,364

Int. Cl.^{2} G01M *15/00*

U.S. Cl. 73—117.3 **4 Claims**



1. Means for ascertaining the turbine inlet temperature of a gas turbine engine including computing means responsive to compressor discharge total and static pressure for producing a first signal indicative of the ratio thereof, function generator means responsive to said first signal for producing a second signal indicative of corrected air flow at the burner of said engine, computer means responsive to said second signal and compressor discharge total pressure and total temperature for producing a third signal indicative of air flow at the burner, means responsive to said third signal and fuel flow to said burner for producing a fourth signal indicative of the fuel-air ratio at the burner and means responsive to said fourth signal and compressor discharge total temperature for producing an output signal indicative of turbine inlet temperature.

4,055,998

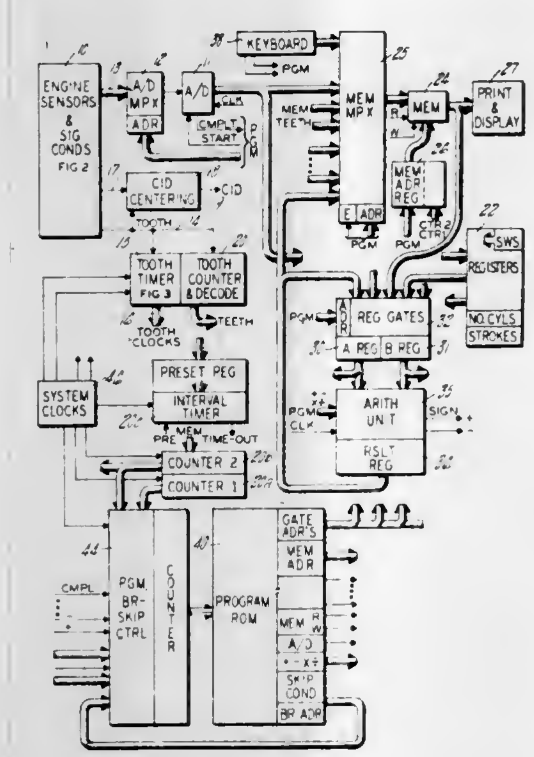
WAVEFORM COUNT OF TEETH ON AN INTERNAL COMBUSTION ENGINE FLYWHEEL

James R. Pettingell, Granby, and Lee R. Armstrong, Enfield, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Dec. 6, 1976, Ser. No. 747,755

Int. Cl.^{2} G01M *15/00*

U.S. Cl. 73—119 R **9 Claims**



7. In the method of determining the number of teeth on the flywheel of a slowly rotating internal combustion engine, the steps of:

electronically measuring the time intervals between the passage of corresponding successive ones of a large number of teeth of the flywheel past a fixed point;

maintaining a running count of teeth respectively corresponding to each of said time intervals;

from the magnitude of said time intervals, dividing said running count of teeth into cylinder-related subcycles of an engine revolution;

determining the number of teeth related to each of said subcycles; and

relating the number of teeth in each subcycle to a number of teeth corresponding to a full revolution of the engine to provide a measured number of teeth on the flywheel thereof.

4,055,999

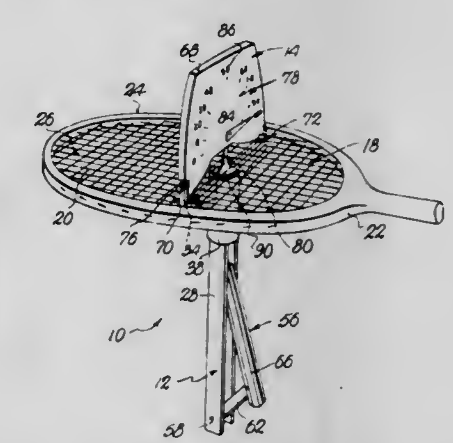
TENSION TESTER FOR TENNIS RACKET STRINGS

James R. Cope, 10500 Cherokee Lane, Leawood, Kans. 66108

Filed Dec. 23, 1976, Ser. No. 753,643

Int. Cl.^{2} G01L *5/06*

U.S. Cl. 73—145 **10 Claims**



1. A device for measuring tension in the strings of the netting in a tennis racket or the like, said netting presenting a pair of opposed faces, said device including:

a base adapted to be positioned against one of said faces;

clamping structure adapted for emplacement against the other of said faces;

securement means for releasably coupling said structure to said base when the structure and base are positioned against their respective said faces;

a plunger shiftably mounted on said base for movement toward and away from a fixed position wherein said plunger projects outwardly from said base in a direction toward said structure;

mechanism on said base for forcibly shifting said plunger to said fixed position when said base is coupled with said structure whereby said plunger is pushed against said one face and said strings are deflected toward said structure;

said plunger including an elastic section adapted to yield proportionately to resistance against movement of the plunger such that said deflection of the strings is inversely related to the tension in said strings; and

a tension gauge on said clamping structure for sensing the deflection of said strings and translating said deflection into a string tension measurement.

4,056,000

ALTITUDE RELEASE MECHANISM

Frank C. Kulhanek, Hinsdale, Ill., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

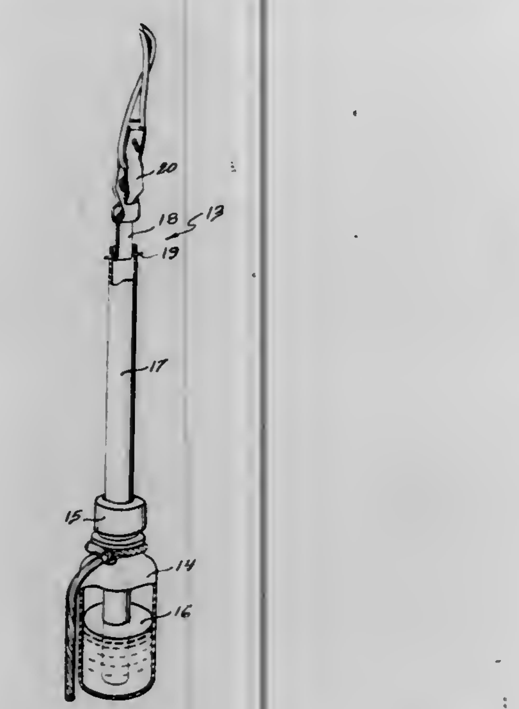
Filed Mar. 16, 1977, Ser. No. 778,188

Int. Cl.^{2} G01W *1/08*

U.S. Cl. 73—170 R **2 Claims**

1. An altitude release mechanism for releasing an instrument

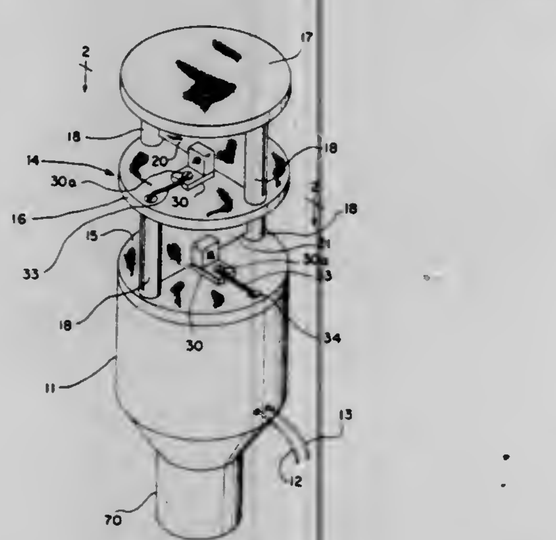
from a balloon at a predetermined altitude whereupon the instrument is lowered to the ground by parachute comprising a plastic bottle provided with a cap, said bottle being partially filled with water, a plastic tube sealed in the cap with one end submerged in the water and the other end extending above the top of the cap, said instrument and parachute being connected to the bottle and means for connecting the balloon to the bottle



including a strip of water-disintegrable paper held within the open free end of the plastic tube whereby expanding air in the bottle due to decreased atmospheric air pressure as the balloon rises forces the water up the tube to reach and dissolve the water-disintegrable paper, thereby severing the link between the plastic bottle and balloon, permitting the instrument to fall to earth,

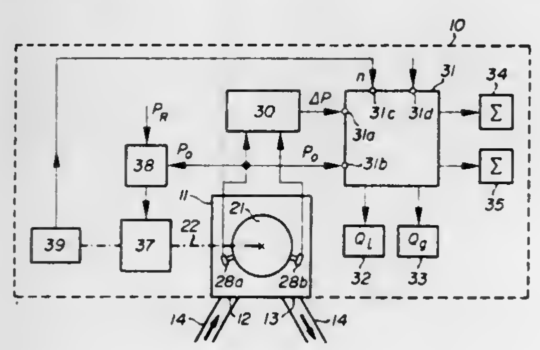
---

4,056,001
AIR FLOW MEASUREMENT
Jack Arakelian, 2130 MacLarie Lane, Broomall, Pa. 19008
Filed Jan. 10, 1977, Ser. No. 757,893
Int. Cl.^{2} G01W *1/02*
U.S. Cl. 73—189 **30 Claims**



1. In a system for detecting and measuring the direction, or velocity, or both of gaseous currents subject to unpredictable variations, comprising:
a sensing head to be subjected to the currents, the sensing head including a pair of substantially planar surfaces positioned at an angle to one another, and adapted to be impinged by the currents,
each surface being of magnetic material, and each surface being subject to transverse displacement in response to impingement by the currents,
a pair of magnetic circuit means respectively in circuit with the different surfaces, each circuit having a reluctance which varies as a function of the transverse displacement of its associated surface,
means for electrically exciting each magnetic circuit means,
means for deriving from each magnetic circuit-means an electric signal corresponding to the excitation as modified by the variations in reluctance, and
means for processing the derived signals to produce an indication of the gaseous currents.

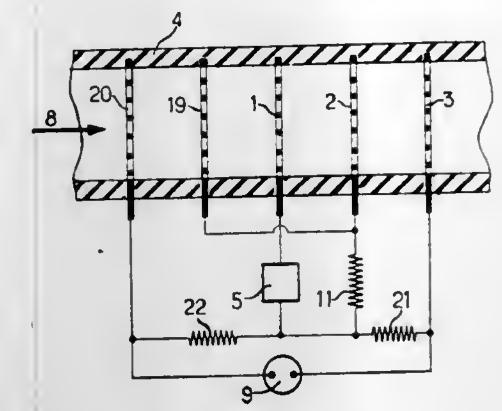
4,056,002
COMPONENT FLOW RATE MEASUREMENT IN TWO-PHASE SYSTEMS
Simon Arieh, Geneva, and Jean-Pierre Budliger, Onex, Geneva, both of Switzerland, assignors to Battelle Development Corporation, Columbus, Ohio
Filed Sept. 15, 1976, Ser. No. 723,494
Claims priority, application Switzerland, Sept. 19, 1975, 12225/75
Int. Cl.^{2} G01F *1/06, 5/00*
U.S. Cl. 73—194 R **8 Claims**



1. A method for continuously measuring the rate of flow of each phase of a concentrated gas-liquid mixture in which the phases move at fluctuating flow velocities relative to one another wherein the method comprises,
a. dividing said mixture into fixed, separate, successive fractions of a first predetermined volume,
b. measuring an initial pressure of said mixture in said successive fractions at the first predetermined volume.
c. varying the volume of said mixture in said successive fractions to a second predetermined volume,
d. measuring a final pressure of said mixture in said successive fractions at the second predetermined volume,
e. measuring the flow rate of said mixture,
f. determining the proportion of each phase in said mixture in said successive fractions from a comparison of the difference in the first and second predetermined volumes and the difference in initial and final pressures of said mixture in said successive fractions, and
g. determining the rate of flow of each phase in said mixture from the flow rate of said mixture and the proportion of each phase in said mixture in successive fractions.

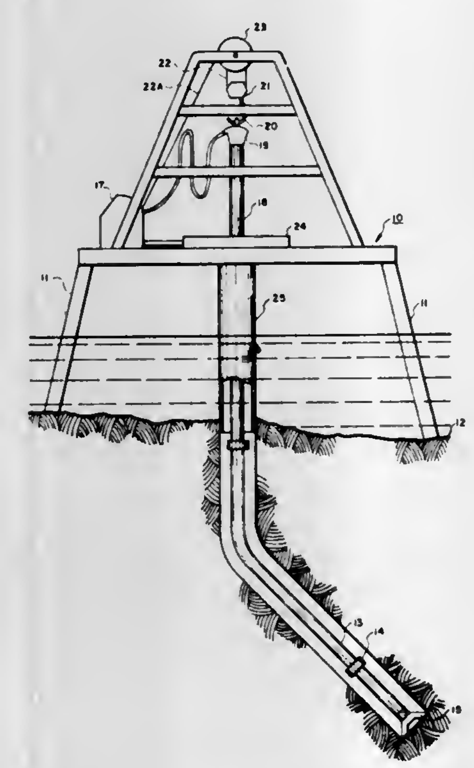
4,056,003
DEVICE FOR MEASURING THE MASS FLOW OR FLOW RATE OF A GAS
Jean Louis Zizine, L'Hay-Les-Roses, France, assignor to S.C.I. Le Brin, Champigny sur Marne, France
Filed Nov. 24, 1975, Ser. No. 634,631
Int. Cl.^{2} G01F *1/56*
U.S. Cl. 73—194 F **6 Claims**

1. A device for measuring the mass flow or rate flow of a gas, comprising:
first, second and third electrodes positioned in the path of the gas flow, the first, second and third electrodes being electrically isolated from each other, the second electrode being spaced from the first electrode in the flow direction, the third electrode being spaced from the second electrode in the flow direction;
a voltage source coupled between the first electrode and the second and third electrodes for producing a corona discharge localized about the first electrode and for creating



an electric field such that the ions produced by the first electrode move toward the second electrode, in the direction of the gas flow.

4,056,004
MULTIPLE ARM PAD INSTRUMENT FOR LOGGING HIGHLY DEVIATED BOREHOLES
Raymond Earl Roesner, Houston, Tex., assignor to Dresser Industries, Inc., Dallas, Tex.
Filed Sept. 2, 1976, Ser. No. 719,759
Int. Cl.^{2} E21B *49/00*
U.S. Cl. 73—151 **4 Claims**



1. An apparatus for investigating the formations surrounding an earth borehole, comprising:
an elongated instrument adapted to traverse an earth borehole;
a plurality of arm pad members carried by said instrument, at least one of said pad members having an earth formation investigative device adapted to contact the walls of the borehole, said arm pad members also each comprising: a bow spring having two ends, one of said ends being anchored to said instrument;
a plurality of sliding members slidably mounted on said instrument, each of said bow springs having their second ends connected to different ones of said sliding members; and
means for causing said sliding members to slide in a direction away from the anchored ends of said bow springs, thereby facilitating the movement of said instrument through a borehole.

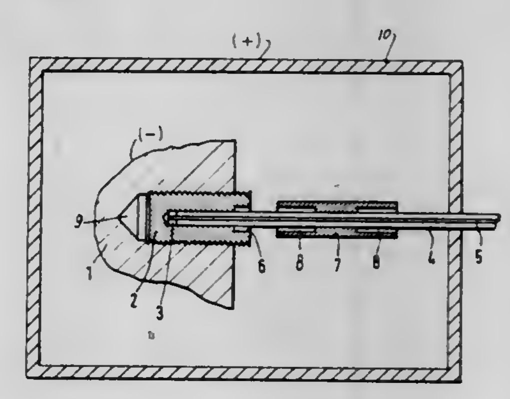
4,056,005
BLOCKED ISOCYANATE COMPOSITION FOR FORMING THERMOPARTICULATING COATING
James D. B. Smith, Turtle Creek; Joseph F. Meier, Export, and David C. Phillips, Pittsburgh, all of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.
Filed Apr. 15, 1975, Ser. No. 568,222
Int. Cl.^{2} G01K *11/02;* C09K *3/00*
U.S. Cl. 73—339 R **53 Claims**

1. A composition comprising at least one blocked isocyanate solution of a resinous carrier curable and stable at 60°C, and unreactive with said blocked isocyanate.

4,056,006
METAL DITHIOCARBAMATE COMPOSITION FOR FORMING THERMOPARTICULATING COATING
James D. B. Smith, Turtle Creek; Joseph F. Meier, Export, and David C. Phillips, Pittsburgh, all of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.
Filed Nov. 21, 1975, Ser. No. 634,217
Int. Cl.^{2} G01K *11/02;* C09K *3/00*
U.S. Cl. 73—339 R **20 Claims**

7. A composition comprising at least one metal dithiocarbamate and a solution of a resinous carrier curable and stable at 60°C, and unreactive with said metal dithiocarbamate.

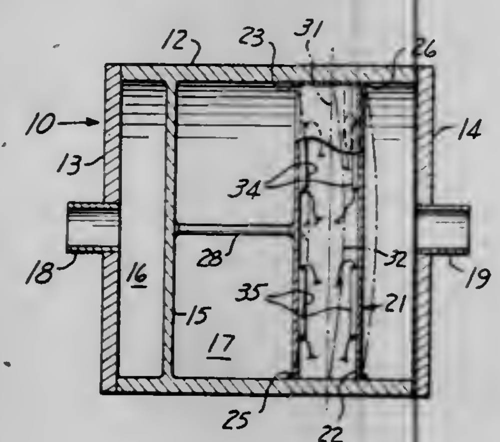
4,056,007
ARRANGEMENT FOR TREATING WORKPIECES BY CORONA DISCHARGE WITH SHORT-CIRCUIT PREVENTION FEATURE
Johannes Luckan, Cologne, Germany, assignor to Ionit Anstalt Bernhard Berghaus, Vaduz, Liechtenstein
Filed Feb. 14, 1977, Ser. No. 768,354
Claims priority, application Germany, Feb. 18, 1976, 2606454
Int. Cl.^{2} G01K *1/08;* B01K *1/00*
U.S. Cl. 73—343 R **9 Claims**



1. In an arrangement for measuring the temperatures of workpieces to be treated in a corona discharge field, particularly of workpieces to be nitrided in the presence of a nitrogeneous medium, a combination comprising a container for receiving a workpiece to be treated; means for establishing an electrical potential gradient between said container and the workpiece to thereby produce between the container and the

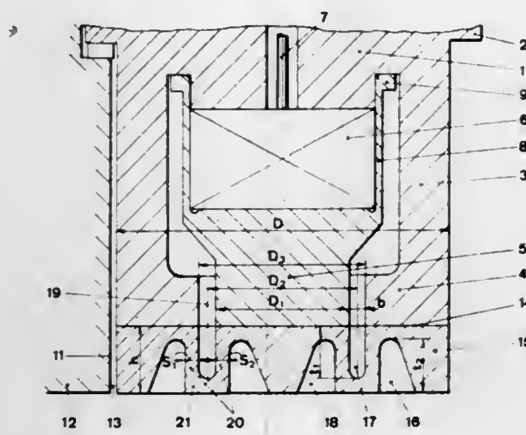
workpiece a corona discharge field of ionized particles and concomitantly heat the latter; means for measuring the temperature of the workpiece, including heat sensing means mounted in the workpiece and extending along a path from the workpiece through said field of particles in said circumambient region and thereupon to the exterior of said container, said heat sensing means tending to be covered by metal particles along said path; and means for preventing deposition of said particles at selected portions of said path so that formation of a continuous electrically-conductive path comprised of particles deposited on said heat sensing means is avoided, whereby discontinuance of the electrical potential gradient due to short-circuiting between said container and the workpiece is prevented.

4,056,008
TRANSDUCING METHODS AND TRANSDUCERS
Winfield Sample, Sierra Madre, Calif., assignor to Bell & Howell Company, Chicago, Ill.
Continuation-in-part of Ser. No. 593,395, July 7, 1975, Pat. No. 3,981,198. This application June 28, 1976, Ser. No. 700,671
Int. Cl.² G01L *9/02, 7/08*
U.S. Cl. 73—398 AR **4 Claims**



1. A fluid pressure transducer, comprising in combination:
a housing;
means including a diaphragm for defining a fluid chamber in said housing;
means connected to said housing for admitting a fluid to said fluid chamber;
strain gage transducer signal generating means in said fluid chamber;
means for protecting said transducer signal generating means from effects of said fluid, including a laterally flexible tubular enclosure having an inner wall surface and two opposite ends;
means connected to said tubular enclosure for mounting said tubular enclosure in said fluid chamber and for maintaining both of said opposite ends relatively stationary;
means connected to said diaphragm and to a portion of said tubular enclosure between said opposite ends for laterally flexing said tubular enclosure with a fluid pressure force picked up by said diaphragm; and
means for bonding said strain gage transducer signal generating means to said inner wall surface of the tubular enclosure for measurement of the strain of a wall portion of said tubular enclosure at said wall surface during said flexing of the tubular enclosure.

4,056,009
DIAPHRAGM ARRANGEMENT FOR PRESSURE TRANSDUCERS
Hans Conrad Sonderegger, Neftenbach, and Hans Ulrich Baumgartner, Winterthur, both of Switzerland, assignors to Kistler Instrumente AG, Switzerland
Filed Nov. 7, 1975, Ser. No. 629,987
Claims priority, application Switzerland, Nov. 8, 1974, 014968/74
Int. Cl.² G01L *7/08, 9/04*
U.S. Cl. 73—406 **28 Claims**

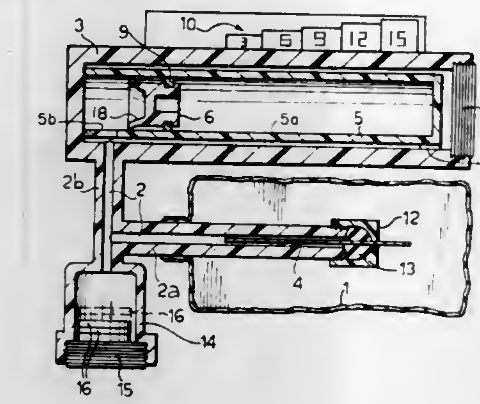


8. In a pressure transducer system comprising a housing having walls, a transducing element mounted within said housing, a force transmission member mounted within said housing at an annular separation from said walls for transmitting forces to said transducing element, and a diaphragm mounted on an end of said housing in contact with said force transmission member for imparting pressure values of a pressure medium to said force transmission member, the improvement comprising said diaphragm including
a diaphragm plate having first and second parallel major surfaces, said first major surface facing said pressure medium and said second major surface contacting surfaces of said housing walls and said force transmission member respectively,
a plurality of annular concentric first grooves formed within said diaphragm plate in said first major surface to a depth less than the thickness of the plate,
at least one second annular groove formed within said diaphragm plate in said second major surface to a depth less than the thickness of said plate, said second annular groove being formed concentrically with at least two of said first grooves in said first surface with two concentric annular elastic walls being formed between said first and second grooves, and
an annular rim connecting said two annular elastic walls, said annular rim having an end surface which is coplanar with said first major surface.

4,056,010
INSTRUMENT FOR INDICATING THE DEPTHS AND DURATIONS OF DECOMPRESSION STOPS REQUIRED DURING UNDERWATER SUBMERSIONS
Carlo Alinari, Corso Vittorio Emanuele, 200 - Turin, Italy
Filed Jan. 2, 1976, Ser. No. 646,105
Claims priority, application Italy, Jan. 17, 1975, 67101/75
Int. Cl.² G06G *5/00;* **G01F** *23/14*
U.S. Cl. 73—432 R **5 Claims**

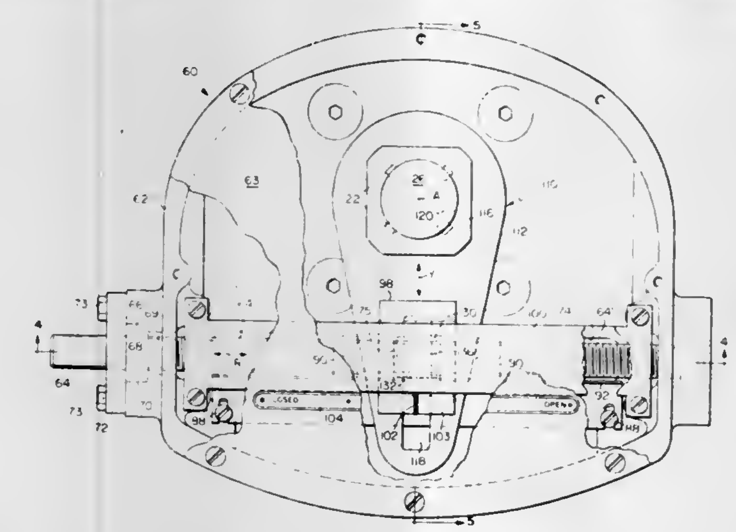
1. In an instrument for determining the depths and durations of decompression stops required to be made by a diver when ascending after a submarine dive, of the type including:
a first chamber having a resilient wall,
a second chamber having rigid walls,
means interconnecting said first and second chambers, said interconnecting means including a restrictor throttle for delaying the transfer of gas from one chamber to the other upon the occurrence of changes in the pressure to which they are both subject;

the improvement wherein said second chamber is formed as a cylindrical chamber of a transparent material,
an inner cylinder is housed coaxially within the cylinder comprising said second chamber, said inner cylinder being at least semi-transparent and communicating with said second chamber through an opening at one end of said inner cylinder, the other end of said inner cylinder being closed,



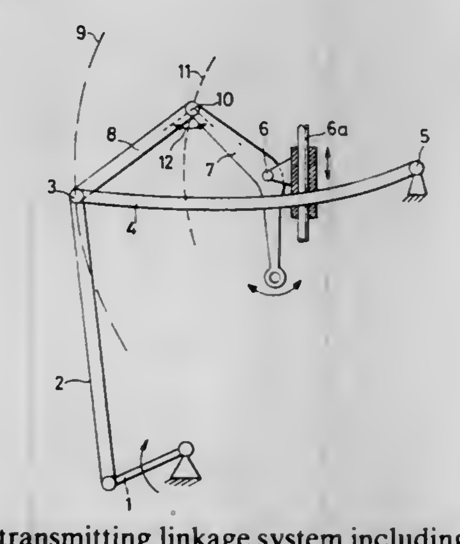
a piston slidingly and sealingly housed in said inner cylinder, the position of said piston being observable from outside said second chamber and representing the pressure obtaining at any time within said second chamber, and
a fixed scale on said rigid chamber against which the position of said piston can be compared to determine the depth and duration of decompression stops required.

4,056,011
SCOTCH YOKE
William L. Carlson, Jr., St. Cloud, Minn., assignor to General Signal Corporation, Rochester, N.Y.
Continuation of Ser. No. 530,639, Dec. 9, 1974, which is a division of Ser. No. 385,379, Aug. 3, 1973, abandoned. This application June 14, 1976, Ser. No. 695,891
Int. Cl.² F16H *21/15*
U.S. Cl. 74—50 **5 Claims**



1. In a scotch yoke comprising a housing with a hole therethrough, a threaded rod extending along an axis through said hole in a first direction, means for preventing said rod from moving in said first direction, a yoke arm in said housing pivotable about an axis and extending in a second direction that intersects said first direction, slot means in said yoke arm, the improvement comprising:
a member on said rod and threadingly engaged therewith, said member having projection means extending through said slot means, and a means cooperating with said projection means for absorbing thrust in a sideward direction on said yoke arm and in a sideward direction on said rod, said means for absorbing thrust being positioned in a plane which includes said axis of said rod and is perpendicular to said sideward direction of said rod to thereby minimize bowing and twisting in said yoke arm and said rod, said means for absorbing sideward thrust to minimize bowing and twisting comprises a guide strap fixed to said housing and a saddle slidably mounted on said guide strap, said guide strap extending in said first direction, said projection means fitting into a hole in said saddle to link said saddle member to said yoke arm, whereby rotation of said rod slides said member in said first direction and pivots said yoke arm about said axis.

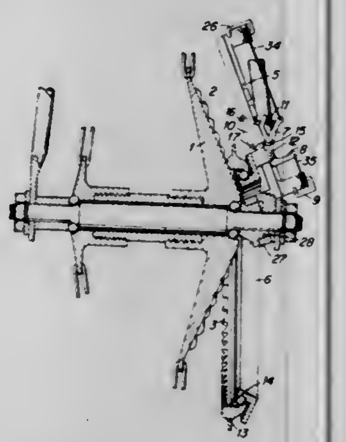
4,056,012
LINKAGE SYSTEM FOR WARP KNITTING MACHINE
Karl Kohl, 10 Chlorodont Strasse, Obertshausen, Germany (6053)
Filed Nov. 1, 1974, Ser. No. 520,174
Claims priority, application Germany, Nov. 2, 1973, 2354824; Nov. 5, 1973, 2355235
Int. Cl.² F16H *21/40*
U.S. Cl. 74—81 **2 Claims**



1. A motion transmitting linkage system including a plurality of linkage means, each having at least a first and a second end, said system comprising:
a first linkage means for driving said system, said first linkage means being adapted to rotate about the first end thereof;
a second linkage means having the first end thereof rotatably connected to the second end of said first linkage means;
a third linkage means having the first end thereof rotatably connected to the second end of said second linkage means and having the second end thereof rotatably attached to a first relatively fixed reference point, said first end of said third linkage means being adapted to describe a first arc about said first relatively fixed reference point;
a fourth linkage means having a first end thereof rotatably connected to the second end of said second linkage means;
a fifth linkage means having the first end thereof rotatably attached to the second end of said fourth linkage means and the second end thereof adapted for connection to an output mechanism, said fifth linkage means including a pivot section located intermediate said first and said second ends thereof, said pivot section being adapted for rotatable attachment about a second relatively fixed reference point, said second relatively fixed reference point being located substantially within the ambit of said third linkage means when it describes said first arc, said first end of said fifth linkage means being adapted to describe a second arc about said second fixed reference point; and,
an adjustment means for moving said second relatively fixed reference point in a direction approximately perpendicular to the effective length of the third linkage means when the angle between said fourth and fifth linkage means is approximately 90° with respect to one another at the common point thereof,
wherein the effective length of the third linkage means measured from its first end to its second end is greater than the distance between said first relatively fixed reference point and said second relatively fixed reference point and further, wherein said effective length of said third linkage

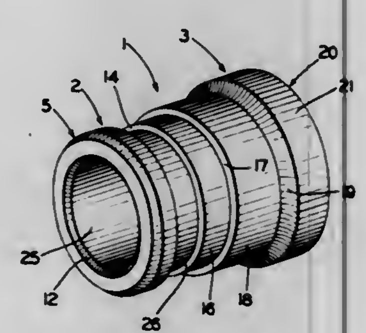
means is greater than the distance from the first end of said fifth linkage means to the pivot section of said fifth linkage means so that the radius of curvature of said first arc is greater than the radius of curvature of said second arc.

4,056,013
BICYCLE TRANSMISSIONS
W. Henry Snyder, 4272 McKay St., Salt Lake City, Utah 84107, assignor to W. Henry Snyder, Salt Lake City, Utah
Filed Feb. 11, 1976, Ser. No. 657,158
Int. Cl.^{2} F16H *7/22, 9/08, 9/24*
U.S. Cl. 74—217 B **3 Claims**



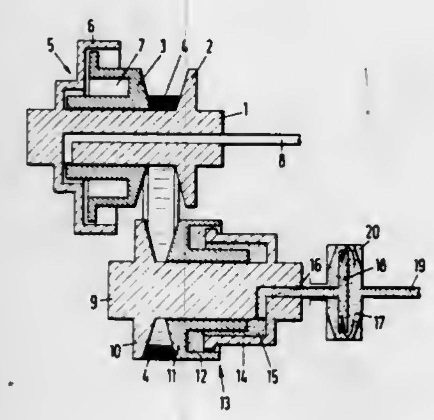
1. A transmission for a vehicle of the type having a wheel to which power is to be applied to rotate it, drive means to provide wheel-turning power, and shifting means, said transmission including a cone-shaped member adapted for mounting on a wheel of a vehicle of the said type, concentrically about the axis thereof; concentric, ring-like sets of teeth formed on the cone-shaped member's tapered surface; a sprocket ring encircling the axis of said cone-shaped member and adapted to be rotatably mounted on the shifting means of the vehicle; the sprocket ring being adapted to be driven by the drive means of the vehicle and always lying and being shifted in a plane perpendicular to the axis of said wheel of the vehicle; engagement means on one side of said sprocket ring and adapted to cooperate with the ring-like sets of teeth on said cone-shaped member, said sprocket ring being shiftable both toward the cone-shaped member and radially toward or away from the axis of said cone-shaped member, so as to permit the engagement means to cooperate with a different set of ring teeth for purposes of ratio change.

4,056,014
SINTERED PULLEY HUB CONSTRUCTION AND METHOD OF MAKING SAME
Derald H. Kraft, Canton, Ohio, assignor to Aspro, Inc., Canton, Ohio
Filed Apr. 26, 1976, Ser. No. 680,427
Int. Cl.^{2} F16H *55/36, 55/44*
U.S. Cl. 74—230.4 **13 Claims**



1. A pulley hub construction including:
a. first and second tubular members;
b. the first tubular member having a main cylindrical body terminating at one end in a radially outwardly extending annular flange;
c. the second tubular member having an interior annular cavity formed in one end thereof and a radially outwardly extending annular flange formed on the other end thereof;
d. the outer surface of the cylindrical body of the first tubular member having a diameter generally equal to the diameter of the interior annular cavity of the second tubular member; and
e. the cylindrical body portion of the first tubular member being telescopically received within the annular cavity of the second tubular member and secured therein with the annular flange of the first tubular member forming a hub pulling flange and the annular flange of the second tubular member forming a seat for mounting a pulley cup thereon.

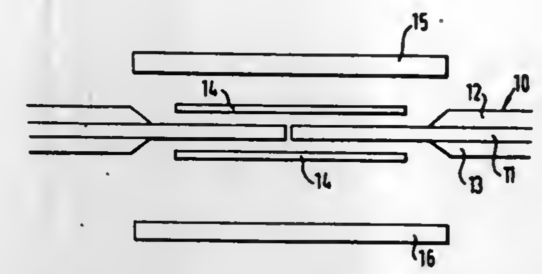
4,056,015
STEPLESS VARIABLE TRANSMISSION
Hemmo Hermannes Johannes Ludoph, Heeze, and Petrus Henricus van Deursen, Deurne, both of Netherlands, assignors to van Doorne's Transmissie B.V., Tilburg, Netherlands
Filed May 11, 1976, Ser. No. 685,419
Int. Cl.^{2} F16H *55/52*
U.S. Cl. 74—230.17 F **3 Claims**



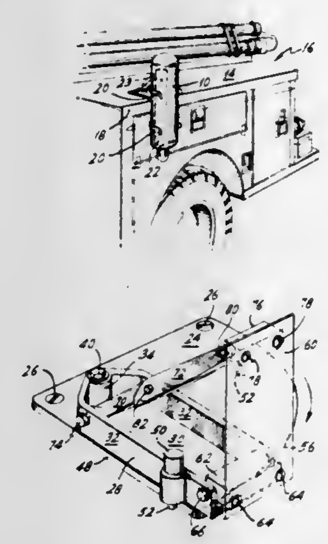
1. In a stepless, variable transmission comprising an endless transmission member and at least one cone pulley having at least one conical disc axially movable by means of an hydraulic piston-and-cylinder unit rotating along with said disc, and a fluid conduit connected at one end to said piston-and-cylinder unit, said piston-and-cylinder unit including a rotatable shaft with said fluid conduit being located in said rotatable shaft, the improvement comprising said fluid conduit having at its other end a radially outwardly directed portion with respect to said shaft, said portion being located within a stationary chamber with the outlet of said portion in said stationary chamber being spaced a greater distance from said rotary shaft than the outlet of said one end of said fluid conduit in said shaft, said radially outwardly directed portion being rotatable along with said piston-and-cylinder unit in said stationary chamber through which chamber fluid is supplied to, and discharged from, said piston-and-cylinder unit.

4,056,016
BELTING
Peter Lothar Ernst Möring, Sutton Coldfield, England, assignor to Dunlop Limited, London, England
Filed Sept. 27, 1976, Ser. No. 726,781
Claims priority, application United Kingdom, Oct. 3, 1975, 40499/75
Int. Cl.^{2} F16G *1/00*
U.S. Cl. 74—231 J **19 Claims**

9. Belting having a layer of cover material and an embedded longitudinal reinforcement structure which is longitudinally compressible, and a joint region in which ends of the embedded reinforcement structure are in end-to-end relationship and covered by an overlying layer of substantially weftless fabric having a compression absorbing warp with warp members of the fabric positioned parallel to the length of the belting.



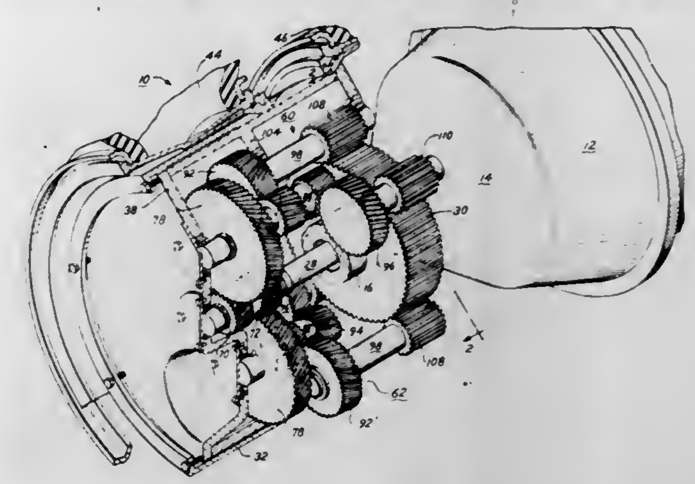
4,056,017
OXYGEN BOTTLE CARRIER AND LINKAGE
Clyde A. Cobb, Feasterville, Pa., assignor to Ziamatic Corporation, Yardley, Pa.
Filed Mar. 22, 1976, Ser. No. 668,934
Int. Cl.^{2} A62C *27/00;* **A47G** *29/00;* **B66C** *23/00;* **F16M** *11/12*
U.S. Cl. 74—522 **5 Claims**



4. A device for supporting an oxygen bottle or the like on a shelf of a fire engine or other mounting means comprising a platform adapted to be fixedly secured in a horizontal position on such a shelf, a base member having one end thereof pivotally connected to said platform for movement over said platform in a plane parallel thereto from a first position in which the base member and an oxygen bottle thereon extend parallel to said shelf to a second position in which the opposite end of the base member projects beyond an edge of said shelf, a support member pivotally mounted adjacent said opposite end of said base member for movement at right angles to said platform into and out of a vertical position adjacent said shelf when said platform is moved to said second position, and folding linkage members connected to said base member and support member for holding said support member and an oxygen bottle secured thereto in said vertical position.

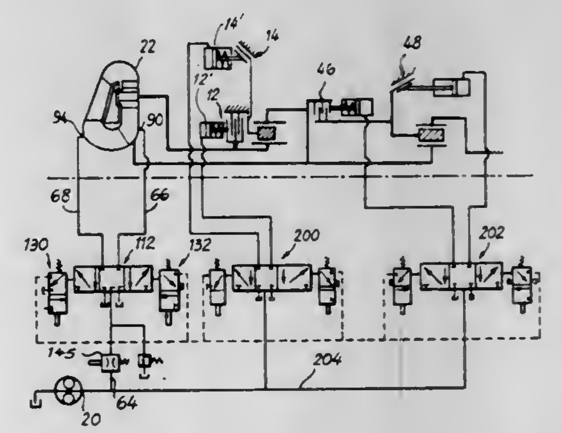
4,056,018
MULTIPLE POWER PATH CONCENTRIC SPEED REDUCER
Jackson Chung, Mishawaka, Ind., assignor to Reliance Electric Company, Mishawaka, Ind.
Filed Sept. 10, 1976, Ser. No. 722,026
Int. Cl.^{2} F16H *37/06, 35/00, 57/00*
U.S. Cl. 74—665 P **29 Claims**

1. A multiple power path, concentric speed reducer comprising center shaft means, axle means disposed coaxially around said shaft means, a first pinion having two sets of gear teeth thereon mounted on said shaft means for rotation therewith, an externally toothed gear mounted on said axle means, and two gear trains operatively interconnecting said pinion with said gear mounted on said axle means for distributing the load transmitted between said shaft means and said axle means and producing relative rotation between said shaft means and axle means, each gear train having a first gear engaging one of



the sets of gear teeth on said pinion, a shaft for said first gear, a second pinion mounted on the shaft for said first gear and having two sets of gear teeth thereon, a pair of second gears engaging the two sets of teeth on said second pinion, shafts for said pair of gears, and gears on the shafts for said pair of gears meshing with said externally toothed gear on said axle means.

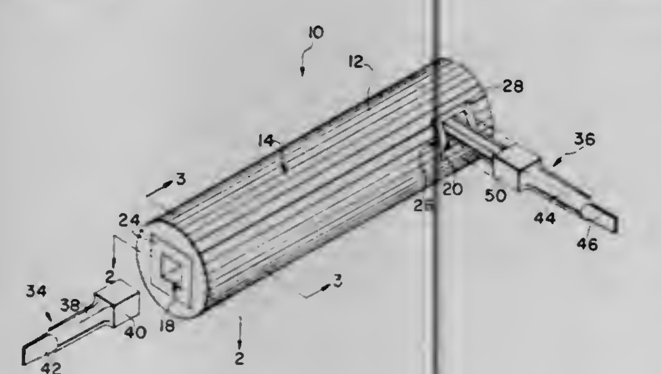
4,056,019
TORQUE CONVERTER TRANSMISSION AND VALVE ARRANGEMENT THEREFOR
Karl Gustav Ahlen, Stockholm, Sweden, assignor to S.R.M. Hydromekanik Aktiebolag, Stockholm-Vallingby, Sweden
Continuation-in-part of Ser. No. 695,043, June 11, 1976, abandoned, which is a continuation of Ser. No. 549,448, Feb. 12, 1975, abandoned. This application Oct. 4, 1976, Ser. No. 729,421
Claims priority, application United Kingdom, Feb. 14, 1974, 6856/74; Dec. 18, 1974, 54770/74
Int. Cl.^{2} F16H *47/04*
U.S. Cl. 74—677 **46 Claims**



1. A torque converter having a working chamber with at least a pump part and a turbine part, said pump part having at least one ring of pump blades and said turbine part having at least one ring of turbine blades,
a fluid communication system within the torque converter for controlling its mode of operation,
a valve device for controlling the flow of fluid in said fluid communication system,
said valve device comprising,
an elongated bore,
at least five ports opening into said bore including a high pressure port, a pair of control ports in communication with the fluid communication system of the torque converter and located, longitudinally, one on each side of said high pressure port, and a pair of low pressure ports located, longitudinally, one beyond each control port on the side thereof opposite from said high pressure port,
a first pair of abutment means located, longitudinally, one

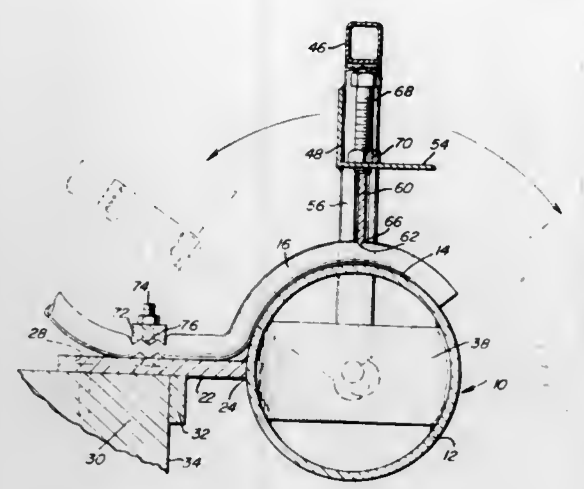
between the high pressure port and each of the control ports, and a second pair of abutment means located, longitudinally, one between each control port and its adjacent low pressure port, each of the abutment means including surfaces located in a radial plane constituting means for defining a valve seat for a disc valve element adapted to move axially thereagainst,
elongated means located within the bore and movable axially therein,
a first pair of valve discs mounted on said elongated means, one between the high pressure port and each of said control ports and arranged to cooperate with the valve seat of the corresponding one of the first pair of abutment means and openable away from its valve seat towards the high pressure port,
a second pair of valve discs mounted on the elongated means, one between each control port and its adjacent low pressure port and arranged to cooperate with the valve seat of the corresponding one of the second pair of abutment means in a direction from its respective low pressure port towards its respective control port such that it is openable towards its respective low pressure port,
and means operatively associated with the elongated means for selectively opening said valve discs upon axial movement of the elongated means.

4,056,020
HAND-GRIPPABLE DRIVER-FASTENER TOOL
Joseph Coviello, 163-09 99th St., Howard Beach, N.Y. 11414
Filed Aug. 24, 1976, Ser. No. 716,995
Int. Cl.² B25B *15/00*
U.S. Cl. 81—177 A **6 Claims**



1. A hand-held fastening tool comprising in combination:
an axially elongated handle;
a first socket formed in an end of said handle adapted to receive and non-rotatably retain a first fastener therein;
a second socket formed in a side wall of the handle adjacent the other end thereof and extending transversely thereinto adapted to receive and non-rotatably retain a second fastener therein;
an aperture of lesser lateral dimension than said second socket formed in said handle adjacent said other end extending transversely thereinto and openly communicating with said second socket;
a first driver-fastener comprising an axially extending shank having a tang at one end thereof dimensioned to fit non-rotatably and be releasably retained within said first socket and a fastening element at the other end thereof;
and a second driver-fastener comprising an axially extending shank having first and second blade-type fastening elements at the opposed ends thereof and a tang formed at an intermediate location, said tang being dimensioned to fit non-rotatably and be releasably retained within said second socket, the portion of said shank extending from said tang to one of said first and second fastening elements being dimensioned in length and in width to extend through said transverse aperture in said handle such that said one fastening element projects outwardly of said aperture for operative use.

4,056,021
IRRIGATION HOSE AND BELT SPLICE PREPARING TOOL
Edward H. Lacey, P.O. Box 796, Trent, S. Dak. 57065
Filed Feb. 9, 1976, Ser. No. 656,699
Int. Cl.² B26D *3/06, 7/02*
U.S. Cl. 83—4 **10 Claims**

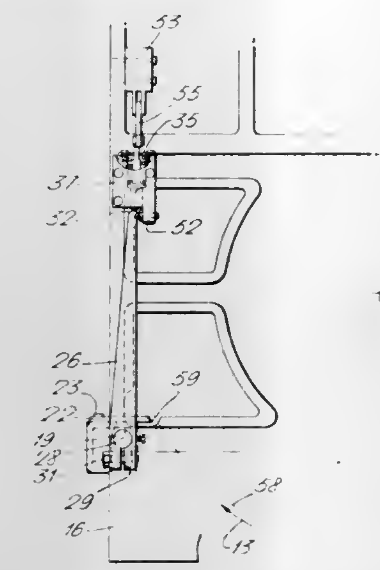


1. A tool for preparing an elastomeric item having longitudinal, flexible reinforcing elements embedded therein for splicing by stripping the elastomeric material from the reinforcing elements and exposing them for connection with identical exposed reinforcing elements when forming a splice between adjacent ends of items to be spliced, said tool comprising a supporting surface on which an elastomeric item may be placed, a knife having a straight edge extending transversely of and generally parallel to the supporting surface and elastomeric item for engaging the elastomeric item, and means supporting the knife for adjustment toward the elastomeric item and for movement longitudinally of the elastomeric item while engaged with the elastomeric material for stripping the elastomeric material from the longitudinal reinforcing elements, said supporting surface being arcuately curved with the axis of curvature paralleling the knife edge, said means supporting the knife including a support arm pivoted to move about an axis coincident with the center of curvature of the arcuate supporting surface whereby the knife moves in an arcuate path concentric with the arcuate supporting surface.

4,056,022
KNIFE GROWTH DETECTOR
Eric Thomas Ray, Andover, England, assignor to AMF Incorporated, White Plains, N.Y.
Filed Jan. 13, 1977, Ser. No. 759,316
Claims priority, application United Kingdom, Feb. 19, 1976, 6589/76
Int. Cl.² A24C *5/28;* **B26D** *7/24, 7/12*
U.S. Cl. 83—62 **8 Claims**

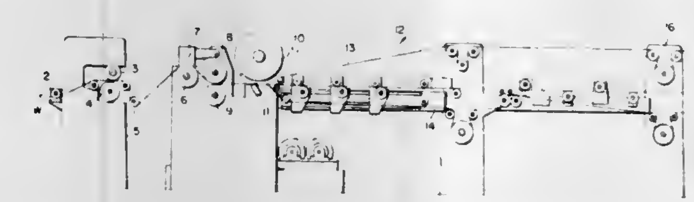
1. In a cutting machine having a housing, a cutter drum mounted in the housing, a plurality of knives carried on said drum, means for rotating the cutter drum about its axis, means for feeding material to be cut to the cutter drum, means for grinding the knives to maintain a sharp knife edge, means for advancing the knives as they are worn away by the grinding means, a drum diameter being defined by the path of the knife edges as the cutter drum rotates, the provision of a detecting device to detect when a knife has been advanced beyond the cutter drum diameter, said device comprising:
a movable support carried on said housing and movable into and out of a working position;
a detector blade mounted on the movable support and having an edge positioned in proximity to the cutter drum diameter when the movable support is in its working position;
a trip lever connected to the movable support;

a latch mechanism mounted on the housing to retain the trip lever when the movable support is in its working position;
a switch operated by the latch mechanism when the latch mechanism is disengaged by said trip lever; and
circuit means for stopping rotation of the cutter drum when said switch means is operated,



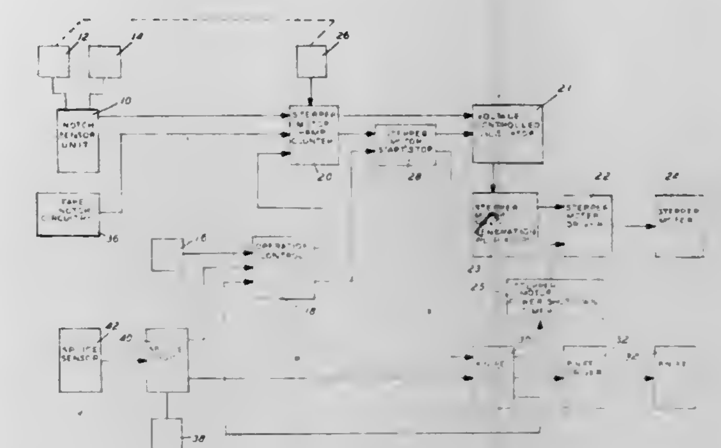
the arrangement being such that, in use, a knife which has been advanced beyond the cutter drum diameter strikes th detector blade thereby causing the movable support to move out of the working position and the latch mechanism to be disengaged by said trip lever.

4,056,023
SINGLE WEB SHEET CUTTER AND STACKER
Robert O. Wilt, Cumberland, Md., assignor to Westvaco Corporation, New York, N.Y.
Filed Dec. 30, 1976, Ser. No. 755,971
Int. Cl.² B26H *29/12*
U.S. Cl. 83—155 **11 Claims**



1. A sheet cutting, conveying and stacking machine comprising in combination, means for advancing a web of material to a sheet cutting device where the web is cut into sheets, a sheet receiving and conveying means for conveying the cut sheets from the cutting device to a sheet collecting station and a sheet slow down means for delivering the cut sheets to a stacking station, the improvement comprising means associated with the sheet receiving and conveying means for receiving and conveying cut sheets of different lengths said means comprising:
a. a roller assembly comprising at least one pair of nip rolls mounted on the machine for fore and aft movement in the direction of web travel;
b. means for selectively opening and closing the nip between said nip rolls; and,
c. means for moving the nip rolls linearly toward and away from said cutting device in response to the sheet length cut.

4,056,024
WEB ADVANCEMENT AND CUTTING MECHANISM AND METHOD
Victor R. Baert, Anoka, and Ronald B. Harvey, Minneapolis, both of Minn., assignors to Pako Corporation, Minneapolis, Minn.
Filed Oct. 31, 1975, Ser. No. 627,526
Int. Cl.² B26D *5/32, 5/34*
U.S. Cl. 83—210 **12 Claims**



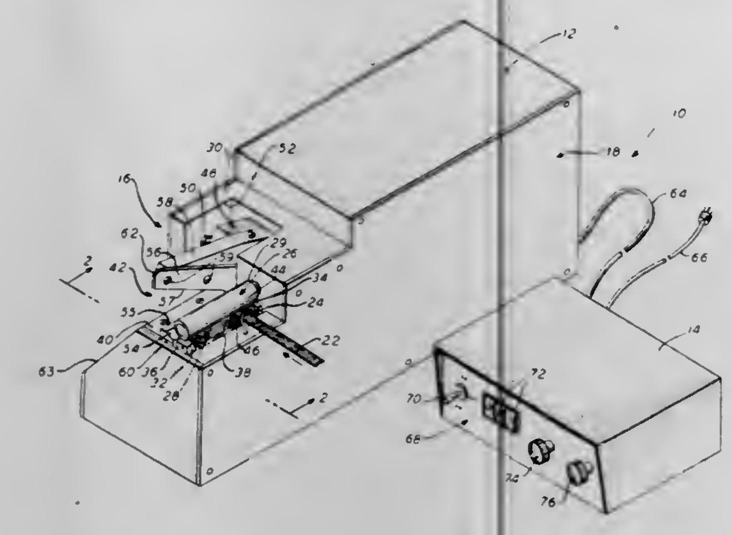
1. A film advancement mechanism for film in a film processor comprising:
initiate means connected to the film processor for initiating a cycle of film advancement by the mechanism,
digital stepper motor means for advancing film in the processor,
drive means for said stepper motor, responsive to said initiate means, for gradually increasing the drive frequency of said stepper motor at the beginning of a cycle of film advancement, driving said stepper motor through a cycle of film advancement and then gradually slowing the drive frequency of said stepper motor at the end of a cycle of film advancement,
indicia sensing means for sensing indicia positioned in fixed relation to individual frames of film as the film advances in said mechanism,
first counter means, responsive to said initiate means, for counting the steps that said stepper motor advances said film in a cycle of film advancement until a predetermined number is reached and then activating said indicia sensor,
second counter means, responsive to said indicia sensor, for controlling said drive means for said stepper motor to cause said motor to be advanced a predetermined number of steps after an indicium is sensed, gradually slowed down and then stopped,
wherein said drive means includes voltage controlled oscillator means for producing a variable frequency signal in response to signals from said first and second counter means and said initiate means, and stepper motor drive means for controlling said digital stepper motor means in response to the variable frequency signal, and
fake indicia counter means to count steps of said stepper motor after said indicia sensor has been activated for causing said stepper motor to be stopped if an indicium has not been sensed after a predetermined number of advancement steps have occurred.

4,056,025
STRIP CUTTING APPARATUS
Laurence P. Rubel, 34 Clark Drive, Howell, N.J. 07731
Filed Apr. 2, 1976, Ser. No. 673,101
Int. Cl.² B26D *5/20*
U.S. Cl. 83—261 **17 Claims**

1. A strip cutting apparatus comprising:
a. housing having a longitudinal and transverse axis and

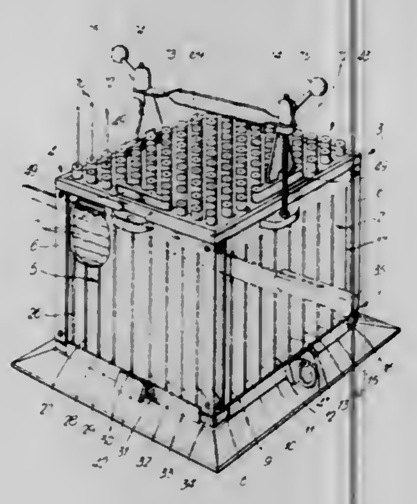
including an enclosed portion and an open work receiving portion;

b. means for feeding strip material along the transverse axis of said open portion, the driven portion of said feeding means engaging the upper surface of said strip material; and



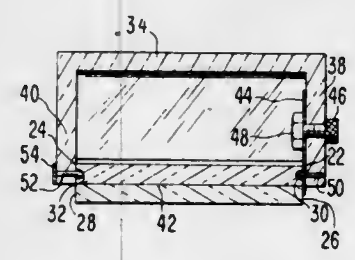
c. scissor-like means transversely disposed within said work receiving portion for shearing said strip material, said scissor-like means being activated simultaneously with the inactivation of said feeding means.

4,056,026
APPARATUS FOR CUTTING MEAT
Dimitrios P. Panaritis, and Spyros A. Iacovidis, both of Thessaloniki, Greece, assignors to George P. Panaritis and Panayotis P. Panaritis, both of North Bay, Canada
Filed Sept. 28, 1976, Ser. No. 727,537
Claims priority, application Greece, Oct. 1, 1975, 53287
Int. Cl.² B26D *3/24*
U.S. Cl. 83—454 **7 Claims**



1. In a device for guiding a knife to facilitate uniform cutting of a stack including meat slices into a plurality of stacks including meat chunks of generally uniform size, the device comprising a generally rectangular container structure including a bottom and four generally upright walls for receiving said stack; a plurality of vertical slots in each of said walls, said slots being equidistantly spaced from each other whereby said slots form a plurality of pairs of slots, each pair of slots being located in a generally vertical plane disposed at a right angle with respect to the walls in which the slots of said pair are disposed, each of said slots extending over a substantial portion of the height of the respective wall; whereby the blade of a knife can be inserted to pass through both slots of each of said pairs and to be guided by same along the respective generally vertical plane as it cuts through said stack; the improvement comprising a rectangular guide plate whose perimeter generally corresponds to but is slightly less than the plan of the inside of said container; said guide plate having a bottom face provided with a plurality of straight, transversely and longitudinally disposed guide grooves equidistantly spaced from each other at a spacing corresponding to the spacing of said slots to render each of said grooves generally coincident with the respective generally vertical plane when said plate is inserted into the container.

4,056,027
CUTTING DEVICE
Tom A. Northrop, 280 Alicia Way, Los Altos, Calif. 94022
Filed June 7, 1976, Ser. No. 693,194
Int. Cl.² B26D *7/02*
U.S. Cl. 83—455 **4 Claims**

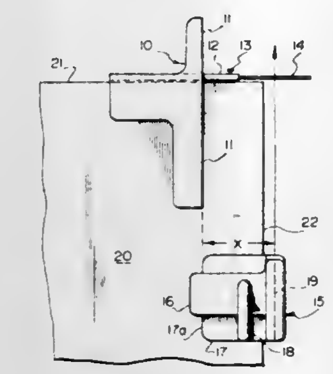


1. A device for cutting sheet material, comprising

means for holding the sheet material to be cut, said holding means comprising a pair of generally flat, elongated members of substantially rigid transparent material hingedly connected together at one end thereof, one said member above the other and with the longitudinally extending edges of said members being parallel, with a pin at the other end of one said member projecting outwardly of the surface of said one member facing the other said member and being receivable into a mating hole in the facing surface of said other member, whereby reception of the pin into its mating hole may effect mutual centering of the two members when the mutually facing surfaces of the members are brought together; and

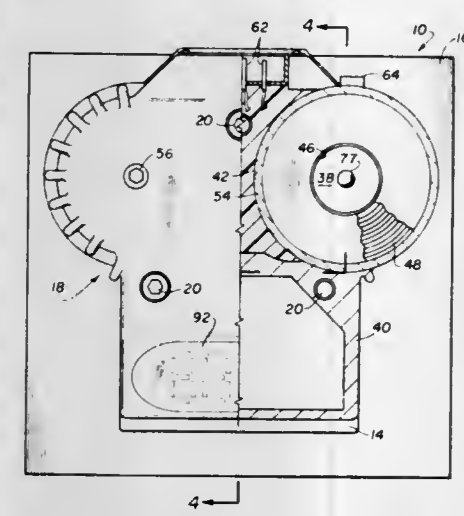
a cutting block supported for sliding movement upon the upwardly facing surface of the upper said holding member, said block having an upper portion comprising a member of transparent material extending across said upper holding member upwardly facing surface and having side portions extending downwardly of said holding member surface and adjacent and parallel said holding member longitudinally extending edges to generally adjacent the downwardly facing surface of said upper holding member for guiding movement of said block longitudinally of said holding member, said cutting block further including a cutting blade affixed to a first said side portion parallel to and between said first side portion and the adjacent said holding member edge, said cutting blade projecting below the downwardly facing surface of said upper holding member, whereby sheet material to be cut may be held between the facing surfaces of the holding members and aligned with the edge thereof by visual inspection through the transparent material and then may be cut or scored by moving the cutting block along the upper holding member with the blade contacting the sheet material while being guided by the holding member edge thus to provide a straight line cut or score in the sheet material, with the transparent cutting block upper portion providing for continuous observation of the alignment of that material during such cutting.

4,056,028
APPARATUS FOR GUIDING A PORTABLE POWER-SAW
G. Keith Patterson, 322 Boler Road, London, Ontario, Canada (N6K 2K2)
Filed May 12, 1976, Ser. No. 685,893
Claims priority, application Canada, June 4, 1975, 228471
Int. Cl.² B27B *9/04*
U.S. Cl. 83—745 **14 Claims**



1. Apparatus for guiding a portable power-saw during sawing of a workpiece, said apparatus comprising a guide member having at least one flat surface and a straight saw-guiding edge adapted for placement upon said workpiece and a rod-holding member located on said flat surface of said guide member, said rod-holding member provided with releasable clamping means for securely supporting and holding a rod to extend from said saw-guiding edge of said guide member at a selected angle thereto, said rod formed from a material which is capable of being severed by a portable power-saw and said holder being structured to permit said rod to be placed closely adjacent and parallel with or flush against an edge of said workpiece to be sawn with the saw-guiding edge of said guide member overlying said workpiece member.

4,056,029
ELECTRICALLY ACTUATED POWER PRESS
Norman R. Doherty, 870 Main St., Farmingdale, N.Y. 11735, and Richard F. Doherty, 61 Lion Lane, Westbury, N.Y. 11590
Filed Apr. 29, 1976, Ser. No. 681,693
Int. Cl.² B26D *5/08*
U.S. Cl. 83—575 **31 Claims**



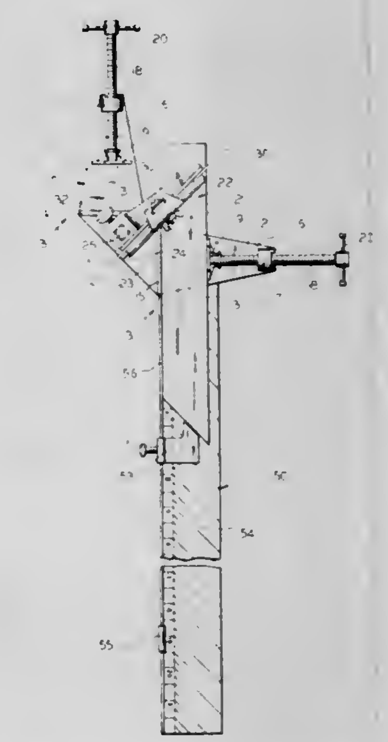
1. A power pack for use with a die set having a first nonmovable die set portion and a second die set portion that is movable relative to the first portion as well as to at least one elongated, magnetizable leader pin, said power pack comprising the combination of:

a. a housing adapted to be secured to said second die set portion, said housing being arranged to move together therewith;

b. annular coil means having a bore therein, said coil means being mounted in said housing with at least a portion of the leader pin being located in said bore of said coil means when said housing is secured to the second portion of the die set; and

c. means for connecting said coil means to a source of electrical energy.

4,056,030
COMBINED MITER BOX, CORNER CLAMP AND MEASURING GAUGE
Roy C. Hahn, Bensenville, Ill., assignor to Hahn Manufacturing Co., Franklin Park, Ill.
Filed Oct. 26, 1976, Ser. No. 735,427
Int. Cl.² B27B *21/08*
U.S. Cl. 83—762 **6 Claims**



1. A combined miter box, corner clamp and measuring gauge device for producing rectangular frames from trim strips, comprising

a. an integral support having two outwardly extending arms diverging perpendicularly from each other and an integral supporting ledge extending therebetween,

b. straight vertically upstanding shoulders at the junctions of the inner ends of said arms and ledge, said shoulders extending in planes perpendicular to each other with a gap at their adjacent ends for accommodating a cutting saw blade therebetween,

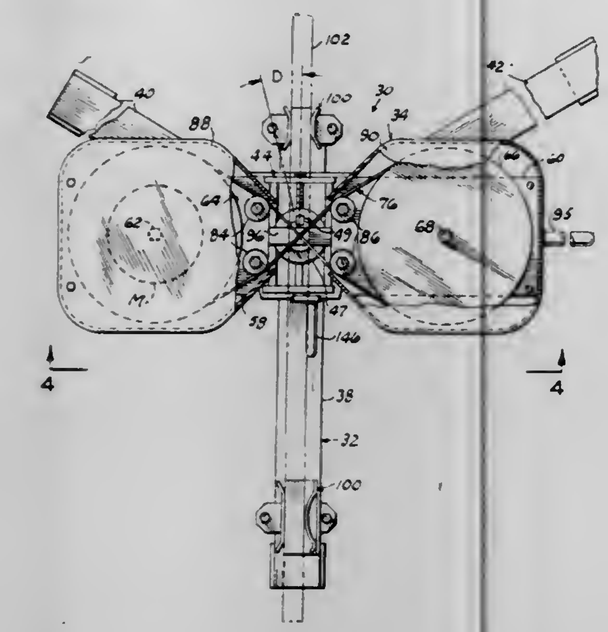
c. internally threaded lugs at the outer ends of said arms, each provided with a threaded adjusting screw with operating means therefor at the outer end and a clamping jaw at the inner end for cooperative action with a respective shoulder to clamp a trim strip therebetween,

d. said integral ledge having a channel in the top thereof along a line bisecting the right angle between the longitudinal axes of said arms and below said gap for allowing movement of said cutting saw blade below the upper surfaces of said arms incidental to the angular cutting of the trim strips adapted to rest on said arms,

e. a unitary saw guide assembly and support means therefor on said ledge at one side of said channel for detachably setting the cutting saw blade in overlying relation to said channel and gap, and

f. a rectilinear measuring gauge detachably connected to an outer edge of one of said arms for measuring the length of the trim strip from the vertical plane containing said bisecting line.

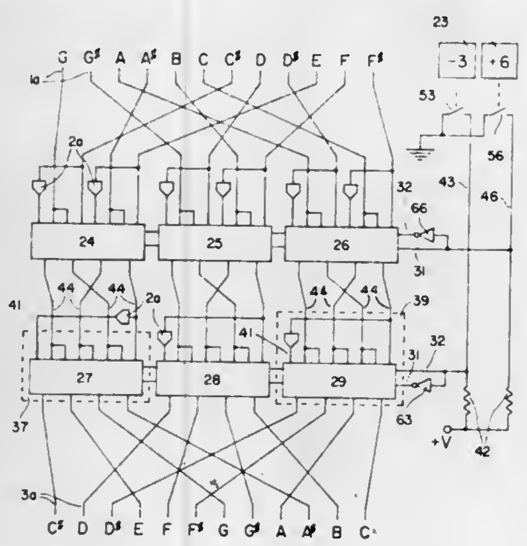
4,056,031
TRUSS WEB CUTTER
Jack L. Thornton, P.O. Box 213, Pacific Grove, Calif. 93950
Filed Oct. 12, 1976, Ser. No. 731,602
Int. Cl.^{2} B27B *13/00*; B27M *3/04*
U.S. Cl. 83—794 **7 Claims**



1. An apparatus for forming miter cuts on the ends of truss webs, comprising:
support base means for supporting an elongated plank-like workpiece in a horizontal path;
column means including a column normally supported vertically by said support base means,
the upper end of said column terminating below the horizontal workpiece path; and,
cutter head means slidably supported by said column for acting on a workpiece when said cutter head means is moved vertically across the workpiece path,
said cutter head means including,
a frame including a pair of horizontal frame base members,
sleeve means including a sleeve interposed between and connected with said frame base members and surrounding the upper end portion of said column,
a spring retainer overlying and secured to the upper end of said column,
spring reel means including an elongated spring band secured to said frame base members adjacent said column,
said spring reel means including an elongated band having one end secured to said spring retainer for normally maintaining the upper end of said sleeve adjacent said spring retainer,
said base frame members having frame uprights mounted thereon and terminating at their upper ends in a horizontal plane spaced above the workpiece path,
a pair of pulleys journalled by said frame uprights in a generaly horizontal plane,
an endless band saw blade substantially describing a figure eight and entrained around said pulleys with the point of intersection of the crossed portions of the blade coaxially aligned with the vertical axis of said column, and,
a motor drivably connected with one said pulley.

4,056,032
MUSICAL APPARATUS
Donald K. Coles, 2505 Capital Ave., Fort Wayne, Ind. 46806
Filed Apr. 23, 1976, Ser. No. 679,814
Int. Cl.^{2} G10H *1/00*
U.S. Cl. 84—1.01 **6 Claims**

1. In a muscial instrument, improved apparatus for changing absolute pitch of the musical output, the apparatus having:
at least thirteen circuits generating individual electrical tone signals fluctuating at audio frequencies, said tone generator circuits arranged in a single sequence proceeding from low frequency to high frequency with intertone musical intervals of a single semitone between consecutive members of the sequence; and
first switching means having a first set of at least thirteen input leads and a first set of at least twelve output leads, the individual input leads receiving fluctuating electrical signals from said individual tone generator circuits, the number of switch input leads being greater than the number of switch output leads,
said first switching means having at least first and second switch states corresponding to different absolute pitches at the output leads, the absolute pitches of all tone signals at the first set of output leads being uniformly T semitones higher in the second switch state than in the first switch state, where T is an integer;
the improvement comprising;

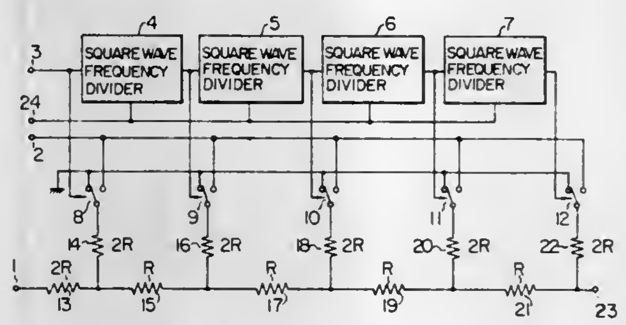


second switching means having a second set of at least twelve input leads and a second set of at least eight output leads, the number of switch input leads being greater than the number of switch output leads, individual members of the second set of input leads receiving individual fluctuating electrical signals from individual members of the first set of output leads,
said second switching means having at least first and second switch states corresponding to different absolute pitches at the second set of output leads, the absolute pitches of all tone signals at the second set of output lead being uniformly V semitones higher in the second switch state than in the first switch state, where V is an integer;
the absolute pitches of all tone signals at the second set of output leads being uniformly T + V semitones higher when said first and second switching means are both in their second switch states than when said first and second switching means are both in their first switch states.

4,056,033
TONE GENERATOR SYSTEM FOR AN ELECTRONIC ORGAN
Michihiro Inoue; Takeji Kimura, both of Hirakata; Masaharu Sato, Moriguchi, and Masahiko Tsunoo, Suita, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan
Filed Oct. 14, 1975, Ser. No. 622,383
Claims priority, application Japan, Oct. 18, 1974, 49-120763; Oct. 18, 1974, 49-120806; Oct. 23, 1974, 49-122663; Nov. 18, 1974, 49-132981; Nov. 19, 1974, 49-133991; Apr. 18, 1975, 50-47740
Int. Cl.^{2} G10H *1/02*
U.S. Cl. 84—1.24 **12 Claims**

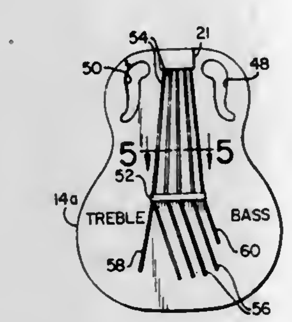
1. A frequency dividing circuit for a saw-tooth wave and a staircase wave for use in a tone generator system of an electronic organ wherein said tone generator system includes an original source for providing a square wave signal and a saw-

tooth or a staircase wave signal, said frequency dividing circuit comprising:
square wave frequency divided means having an input terminal to recieve the square wave signal from said original signal source and generating frequency divided square wave signals respectively having repetition periods which are even multiples of the repetition period of the input square wave signal, said input square wave signal having a repetition period of two times that of said original saw-tooth signal;
means for supplying a constant voltage;
electronic switching means connected to said square wave frequency divider means and said constant voltage supplying means, said switching means including a plurality of electronic switches which respectively, in response to said frequency divided square wave signals, intermittently pass said constant voltage for providing square wave signals having a constant amplitude; and



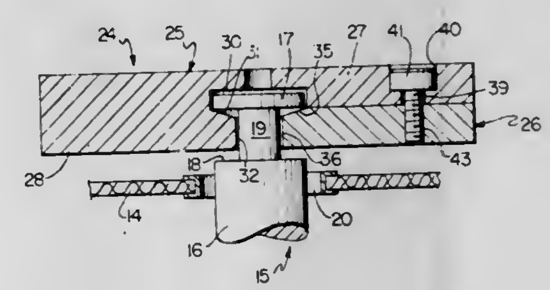
combining means connected to said switching means comprising an R-**2R** ladder network including a series of R resistors having **2R** resistor branches connected thereto, said R-**2R** ladder network having one end supplies with said original saw-tooth wave signal or staircase wave signal through a **2R** resistor, a free end of a **2R** resistor branch at the lowest order position being supplied through said switching means with a square wave signal having a repetition period two times as large as that of said original saw-tooth wave signal, the free ends of other **2R** resistor branches at sequentially higher order positions respectively being supplied through said switching means with the square wave signals having repetition periods respectively four, eight, . . . times as large as that of the original saw-tooth wave signal,
whereby the original saw-tooth wave signal is combined with the square wave signals each having a period which is an even multiple of that of said original saw-tooth wave signal at the combination ratios of **1, 2, 4,** . . . . of the square wave signals with respect to the saw-tooth wave signal.

4,056,034
GUITAR CONSTRUCTION
Charles H. Kaman, Prattling Pond Road, Farmington, Conn. 06032
Continuation-in-part of Ser. No. 515,364, Oct. 16, 1974, abandoned. This application Apr. 21, 1976, Ser. No. 679,039
Int. Cl.^{2} G10D *1/08*
U.S. Cl. 84—267 **12 Claims**



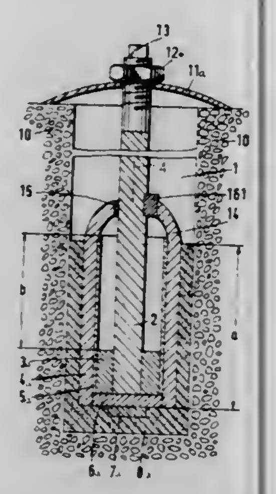
1. A guitar having a hollow body portion and a neck portion the lower end of which is attached to and extends upwardly from said body portion so that the upper end of said neck is adapted to support the upper ends of the guitar strings, said body portion including a sound board with interior and exterior surfaces, a bridge mounted to said sound board for supporting the lower ends of the guitar strings so that the string vibrations are transmitted to the sound board, said sound board having a longitudinal axis coincident with said neck portion, said sound board having a bass and a treble side located on either side of said longitudinal axis, said sound board also including upper and lower bouts defining a waist therebetween, and said bridge located below said waist in said lower bout, a bass and treble sound opening in said upper bout, said openings located in laterally spaced relationship with respect to the longitudinal axis of said sound board, said sound board comprising bracing secured to its interior surface, said bracing including a plurality of longitudinally extending stringers arranged generally symmetrically and between said sound board openings and a cross brace located behind said bridge, said stringers extending upwardly from said cross brace to the lower end of said guitar neck, and at least one sound board stiffener extending obliquely from said cross brace into the bass side of the lower bout of said sound board.

4,056,035
STUD LOCK
Benny Centera, 1325 Wilder Ave., Honolulu, Hawaii 96822
Filed Aug. 23, 1976, Ser. No. 716,726
Int. Cl.^{2} F16B *21/16*
U.S. Cl. 85—8.9 **1 Claim**



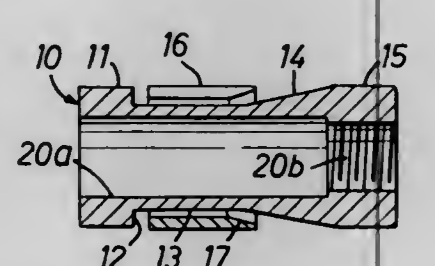
1. A stud lock for retaining a hanging article on a stud having a generally flat disk shaped head and a stem having a reduced diameter, comprising, first and second body members which may be selectively connected together, said first body member including a generally cylindrical outer portion and an integral generally semicylindrical inner portion, said inner portion having a diametrically disposed shoulder, said outer portion including a cylindrical recess having a diameter greater than the diameter of the head of said stud and having a depth greater than the thickness of the head of said stud, said semicylindrical inner portion having a substantially semi-frusto-conical shoulder for guiding the head of said stud into said recess, said semicylindrical inner portion having an axially disposed semicylindrical groove extending from said semi-frusto-conical shoulder to the exterior surface of said inner portion, said second body member having a flat semicylindrical configuration with a diametrically disposed shoulder for complementary abutting relationship with the shoulder of said first body member, said second body member having an axially disposed semicylindrical groove, said semicylindrical grooves of said first and second members cooperating with each other to define a bore of a size to freely rotatably receive the stem of said stud, screw means for securing said first and second body members in assembled relationship with each other, and said first body member having a radially disposed opening for receiving a tool to prevent rotation of said first body member when said screw means is being applied or removed.

4,056,036
BOREHOLE ANCHOR
Günther Kamann; Jürgen Krahe; Ulf Zischinsky, and Wilhelm Götze, all of Essen, Germany, assignors to Bergwerksverband GmbH, Essen, Germany
Filed Mar. 17, 1976, Ser. No. 666,633
Int. Cl.² F16B *13/04, 31/02*
U.S. Cl. 85—63 **22 Claims**



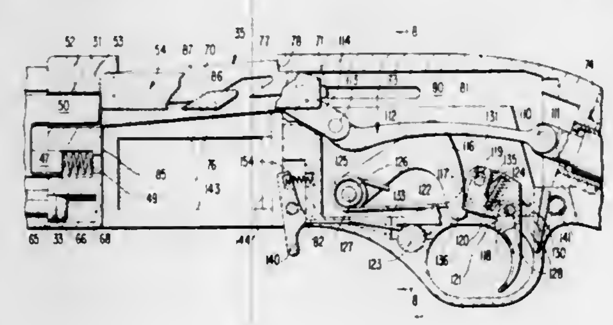
1. An anchor assembly for mounting in a borehole in a rock, said assembly comprising:
- an outer element defining an axis;
- means for securing said outer element proximal to the mouth of said borehole;
- an inner element limitedly axially displaceable relatively to said outer element through a predetermined axial distance;
- means for securing said inner element in said borehole distal from the mouth of said borehole;
- a friction surface on one of said elements having a predetermined axial length equal at least to said axial distance;
- a friction surface on the other of said elements transversely engageable with said surface of said one element and displaceable axially therealong through said distance; and
- means pressing said surface of said other element transversely against said surface of said one element with a predetermined constant force for interconnecting said inner and outer elements and allowing limited mutual axial shifting thereof through said distance without disconnection only on axial stressing of said elements relative to each other beyond a predetermined limit.

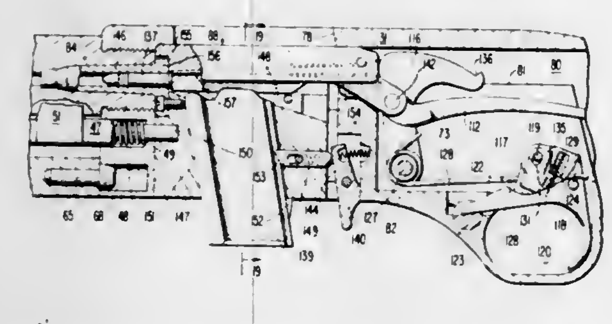
4,056,037
EXPANDING BOLT-LIKE FASTENING MEANS
Douglas Owen McIntyre, Royston, England, assignor to Dom Holdings Limited, Royston, England
Filed Feb. 17, 1976, Ser. No. 658,684
Claims priority, application United Kingdom, Feb. 14, 1975, 6362/75
Int. Cl.² F16B *13/04*
U.S. Cl. 85—74 **4 Claims**



1. Bolt fastener means for locking engagement in a socket comprising an elongated cylinder-like member with a bore and a collar element loosely fitted on said member; said member comprising an inner end portion and an outer end portion of equal diameter and a waisted portion formed between said inner end portion and said outer end portion, the waisted portion further comprising a cylindrical portion of lesser diameter than said end portions and an abutting, axially-extending conical portion, the cylindrical portion extending from a radially directed shoulder formed on said outer end portion, the conical portion being convergent in a direction away from said inner end portion and leading to the cylindrical portion; said collar element being of one piece and retained loosely on said waisted portion of the fastener between said shoulder and said inner end portion of the fastener and adapted for radial expansion into engagement with the socket by having at least one slit therein which extends axially from that end of the collar which is adjacent to the said conical portion, the collar further having an inner diameter which, before the radial expansion, is less than the greatest diameter of the conical portion; said bore being of stepped diameter and extending axially throughout the length of the fastener, said stepped bore consisting of a plain bore and of a screw threaded bore of less root diameter than the diameter of the plain bore, the screw threaded bore extending through the inner end portion of the fastener and the plain bore extending through the outer end portion and the waisted portion of the fastener to the region where the conical portion meets the inner end portion.

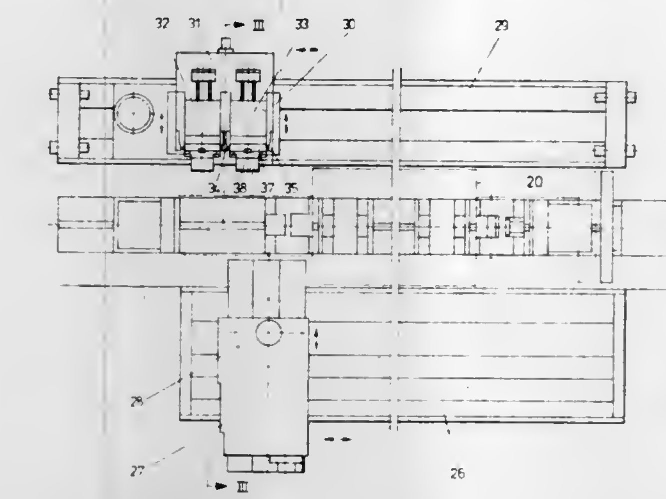
4,056,038
DUAL PURPOSE SEMI-AUTOMATIC CONVERTIBLE RIFLE
Hans M. Rath, 116 Sproul Lane, Staunton, Va. 24401
Filed May 12, 1976, Ser. No. 685,651
Int. Cl.² F41C *21/10*
U.S. Cl. 89—128 **8 Claims**





1. A dual purpose convertible rifle comprising a receiver adapted selectively to hold a locking bolt assembly and a magazine for high powered center fire cartridges and a non-locking blow-back bolt for low powered rimfire cartridges and an adapter for the rimfire cartridges, said adapte being unitary and comprising a holder body for a rimfire cartridge magazine including a latching means for such magazine and a forward chamber extension for rimfire cartridges insertable into an existing chamber of the rifle for said high powered center fire cartridges, a firing mechanism common to said high powered and low powered cartridges including a housing mountable in said magazine and including a magazine latch engaging and releasably securing said magazine for high powered cartridges within the receiver and also engageable with said latching means for said rimfire cartridge magazine to activate the latter, a gas operated actuator means on the rifle ahead of the receiver including a rearwardly driven element adapted to strike said locking bolt assembly through an open forward passage of the receiver, and a member on said adapter for rimfire cartridges in the path of movement of said rearwardly driven element to disable said gas operated actuator means when said adapter for rimfire cartridges is in the receiver.

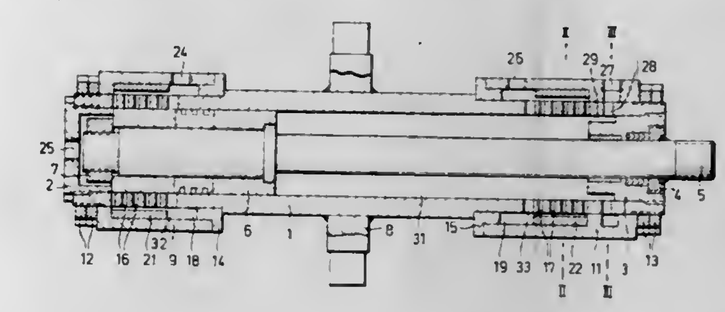
4,056,039
DEVICE FOR MACHINING WINDING SLOTS OF GENERATOR ROTORS
Kurt Bäuml, Nurtingen; Otto Ch. Gunsser, Zizishausen, and Rudolf K. Lohse, Nurtingen, all of Germany, assignors to Gebruder Heller Maschinenfabrik GmbH, Nurtingen, Germany
Filed Mar. 19, 1975, Ser. No. 560,177
Claims priority, application Germany, Oct. 19, 1974, 2449772
Int. Cl.² B23D *37/06;* **H02K** *15/02*
U.S. Cl. 90—92 **8 Claims**



1. Apparatus for finish machining winding slots cut in a generator rotor workpiece comprising, in combination, clamping means for clamping the workpiece in a number of index positions corresponding to the number of winding slots, a tool, including a plate-shaped support having a longitudinal rim, first and second rows of cutting edges mounted on the longitudinal rim of the plate, the cutting edges of each row being disposed linearly one behind the other and displaced with respect to each other by one depth of cut in a direction normal to the cutting direction, the first row of cutting edges protruding in one direction from the plate and the cutting edges of the first row being directed in one direction, the second row of cutting edges protruding in the opposite direction from the plate, and the cutting edges of the second row being directed in the opposite direction to the cutting edges of the first row, at least one tool slide, means for guiding the tool slide in a select rotor slot in the longitudinal direction with respect to the workpiece, the tool slide having means for holding the tool during cutting, and copying means including at least one template for controlling the depth the tool extends into the select rotor slot and the depth the tool penetrates vertically to at least one wall of the select rotor slot, the tool slide further including a first operating element, the tool slide guiding means further including a second operating element at each end, the first and second operating elements cooperating together at a first end of the guiding means to bring the first row of cutting edges into engagement with the workpiece, and at a second end of the guiding means to bring the second row of cutting edges into engagement with the workpiece and to cause the copying device to change the depth of penetration of the tool into the workpiece.

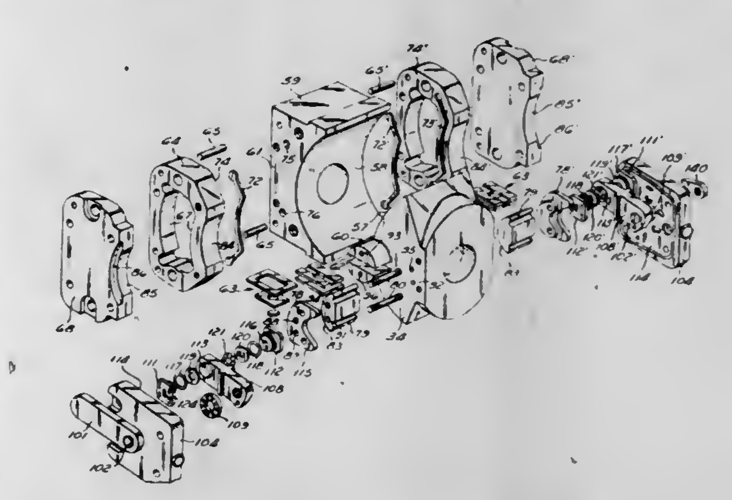
4,056,040
SHOCK ABSORBER
Hubert Fussangel, Am Hoverkamp 52, Kaarst, Germany
Filed Apr. 16, 1975, Ser. No. 568,390
Claims priority, application Germany, Apr. 20, 1974, 2419118; Feb. 15, 1975, 2506451
Int. Cl.² F15B *15/22*
U.S. Cl. 91—25 **8 Claims**

1. A shock absorber assembly having variable damping characteristics comprising: main cylinder means defined by peripheral wall means; piston means axially slidably mounted within said main cylinder means and movable relative thereto under the influence of pressure fluid within said main cylinder means; flow means for effecting pressure fluid flow to and from said main cylinder means to control relative movement between said piston means and said main cylinder means; said flow means including means defining openings in said peripheral wall in flow communication with said main cylinder means, said openings being axially spaced apart from each other along said peripheral wall in positions in which said openings are successively passed over to be closed and opened by said piston means during movement thereof relative to said main cylinder means; and adjustment means for varying fluid flow thrugh said openings to provide adjustment of said damp-



ing characteristics of said shock absorber assembly, said adjustment means comprising outer cylindrical means rotatably mounted relative to said main cylinder means and spaced radially therefrom, and arcuate adjustment elements comprising substantially crescent-shaped sections mounted upon said outer cylinder means for rotation therewith relative to said main cylinder means, said crescent-shaped sections having surface means extending eccentrically relative to said main cylinder means and over said openings to adjustably vary the flow path through said openings upon rotation of said outer cylindrical means relative to said main cylinder means.

4,056,041
CONTROL SYSTEM FOR AXIAL PISTON FLUID ENERGY TRANSLATING DEVICE
Ellis H. Born; William H. Meisel, and Alan H. Viles, all of Columbus, Ohio, assignors to ABEX Corporation, New York, N.Y.
Division of Ser. No. 494,677, Aug. 2, 1974, Pat. No. 3,967,541. This application Mar. 1, 1976, Ser. No. 662,300
Int. Cl.² F15B *9/10;* **F16K** *1/6, 51/00*
U.S. Cl. 91—375 R **10 Claims**



1. A control device for a fluid motor having a movable fluid motor member, comprising an input member for setting the desired position of said fluid motor, a valve shoe having a pressure fluid supply port and carried by said input member, a flat valve plate having a pair of fluid receiving ports, passage means for connecting both of said fluid receiving ports to said fluid motor, said input member being alternatively movable between a first position in which said fluid supply port is aligned with one of said fluid receiving ports to thereby move said movable fluid motor member in one direction, a second position in which said fluid supply port is aligned with the other of said fluid receiving ports to thereby move said mov-

able fluid motor member in another direction and a null position in which said fluid supply port is misaligned with both of said fluid receiving ports and said fluid motor is inoperative, said valve plate being movable in direct response to movement of said movable fluid motor member to misalign said fluid receiving ports and said fluid supply port when said fluid motor reaches the position set by said input member, and differential area means on said valve shoe responsive to fluid pressure to move said shoe away from said valve plate a predetermined distance to permit limited fluid flow therebetween and thus create a hydrostatic bearing.

4,056,042

ROTARY HYDROSTATIC PISTON MACHINE WITH ECCENTRICALLY MOVABLE GUIDE MEANS

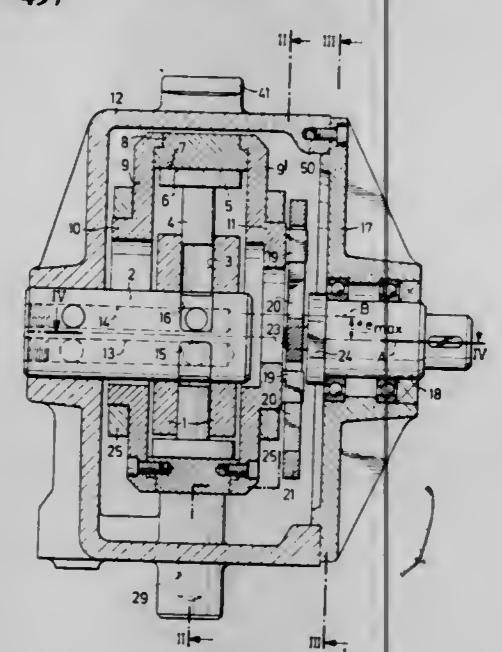
Peter Rutz, Winterthur, and Anton Steiger, Illnau, both of Switzerland, assignors to Sulzer Brothers Limited, Winterthur, Switzerland

Filed Mar. 22, 1976, Ser. No. 668,970

Claims priority, application Switzerland, Apr. 2, 1975, 4143/75

Int. Cl.[2] **F01B** *1/06, 13/06*

U.S. Cl. 91—497 **7 Claims**



1. A hydrostatic piston machine comprising
a housing;
a pintle fixedly secured within said housing about a longitudinal axis;
a cylinder block rotatably mounted on said pintle within said housing and about said longitudinal axis;
a plurality of pistons movably mounted in said cylinder block and peripherally disposed about said cylinder block, each said piston having a support surface at an outer end;
a guide member mounted about said cylinder block about a second longtudinal axis, said guide member having a plurality of plane guide surfaces disposed tangentially to a circular cylindrical surface normally eccentric to said axis of said cylinder block, each said guide surface having a support of a respective one of said pistons guided thereon;
a movable guide means within said housing mounting said guide member therein for varying the eccentricity of said guide member axis to said pintle axis; and
means on said guide member for supplying and/or taking-off the torque of the machine.

4,056,043

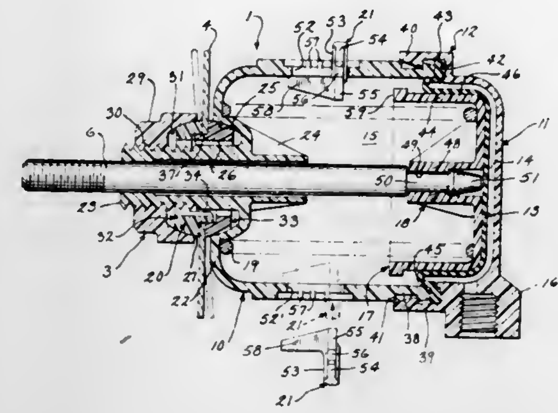
FLUID POWER PISTON ACTUATORS

Durvasula V. Sriramamurty, Milwaukee, and Donald E. Brzezinski, Brookfield, both of Wis., assignors to Johnson Controls, Inc., Milwaukee, Wis.

Filed Oct. 28, 1975, Ser. No. 625,823

Int. Cl.[2] **F15B** *15/24*

U.S. Cl. 92—13.2 **18 Claims**



1. In a fluid power actuator, an outer body portion having a mounting wall with an opening, an operator projecting through said mounting wall opening, a fluid driven member in said body portion and connected to said operator, said mounting wall further including an annular recess encircling said opening, said recess defining a spherical chordal section having a spherically shaped sidewall with an outer circular opening to the recess of a diameter less than the diameter of a sphere generated by the full development of the spherically shaped sidewall, an annular mounting means clamped within said recess and having a central opening for the operator and an outer periphery defining a central sector of said sphere, said central opening having a diameter greater than the operator and being spaced from said operator and permitting movement of the mounting means independently of the body portion and the operator, a clamping means secured to said body portion in spaced relation to said mounting wall, said clamping means having a spherical chordal sector generally corresponding to and coaxially aligned with said spherical chordal sector defined by said recess and operable to firmly clamp the mounting means in position for supporting of the actuator, wherein said annular mounting means is a two-piece member having a pair of similar ring members with internal slot and projections defining a snap-joint connection of the ring members.

4,056,044

OIL COOLED PISTON

Kenneth R. Kamman, Edelstein, and Wayne D. Jacobson, Peoria, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

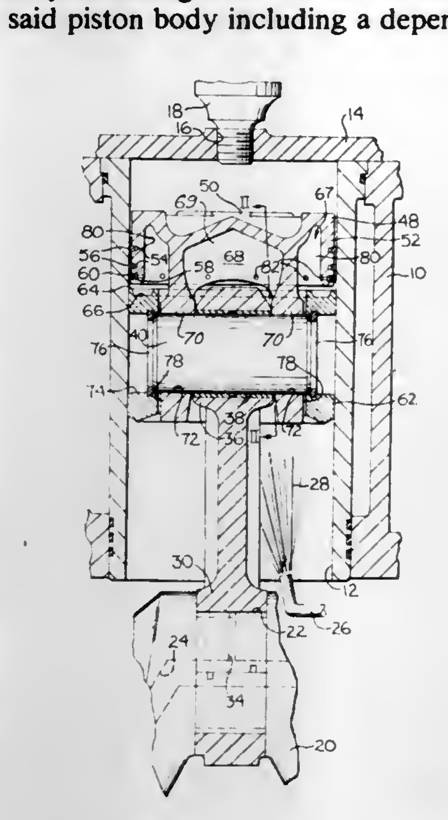
Filed Nov. 12, 1975, Ser. No. 631,247

Int. Cl.[2] **F01B** *31/10*

U.S. Cl. 92—159 **6 Claims**

1. A piston assembly comprising:
a generally cylindrical piston body having a crown, a depending, relatively short ring land and a central cavity;
seal receiving groove means in said ring land adapted to receive sealing rings;
a generally cylindrical skirt body having an end in proximity to said ring land and aligned with said piston body; and
an annular, imperforate groove in said end opening into said central cavity for receiving a lubricant draining from said central cavity and for splashing the lubricant, during reciprocation of said piston, against the interior of said ring land to cool the same in the vicinity of said groove means;

said skirt body including a cross bore for receiving a wrist pin and said piston body including a depending rib and a



pair of bosses each having a wrist pin receiving aperture aligned with said cross bore.

4,056,045

PRODUCTION OF BAGS FROM A PANEL OF SHEET MATERIAL

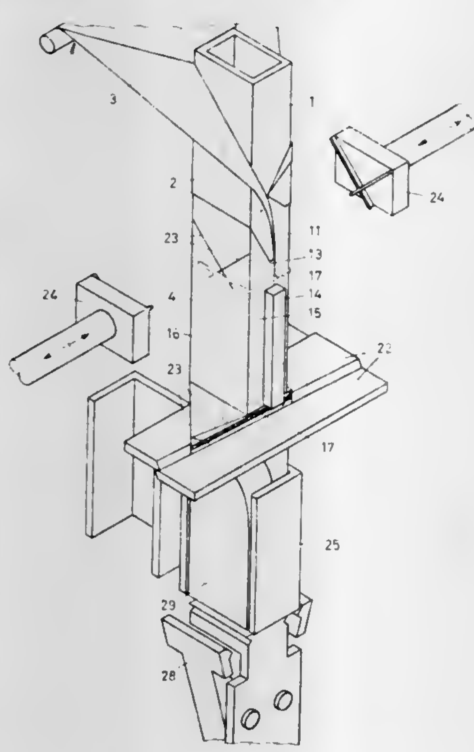
Hans Heinzer, Beringen, and Werner Müller, Neuhausen am Rheinfall, both of Switzerland, assignors to S I G Schweizerische Industrie-Gesellschaft, Neuhausen am Rheinfall, Switzerland

Filed Aug. 30, 1976, Ser. No. 719,057

Claims priority, application Switzerland, Aug. 28, 1975, 11183/75

Int. Cl.[2] **B31B** *1/86*

U.S. Cl. 93—35 SB **13 Claims**



1. In a method for producing bags in succession from an elongate panel of flexible sheet material having parallel longitudinal edges, which method includes: advancing the panel in the direction of its length between a shaping tube having a rectangular cross section and extending in the direction of panel advance and a folding box surrounding a portion of the length of the shaping tube, to fold the panel into a tubular structure of rectangular cross section with the longitudinal edges of the panel overlapping; joining the longitudinal edges of the panel together to form a longitudinal seam of the tubular structure; forming a closed bottom at the leading end of the tubular structure, which is the leading end with respect to the direction of advance of the panel; and severing a portion of the tubular structure having such closed bottom to provide a bag which is open at its top and to establish a new leading end of the tubular structure at the plane of severance, the improvement wherein:
said step of joining the longitudinal edges of the panel together comprises applying a longitudinal bead of adhesive material along one of the longitudinal edges and then pressing the other longitudinal edge against that bead to form the longitudinal seam; and
said step of forming a closed bottom comprises: applying adhesive to the outer surface of one narrow side and both wide sides of the tubular structure, while the structure is stationary, to form a transverse adhesive bead having a U-shaped configuration in a plane perpendicular to the length of the tubular structure and located in a region of the tubular structure at which a closed bottom is to be formed; and, in sequence, folding a portion of the one narrow side at the leading end of the tubular structure inwardly to lie in a plane perpendicular to the length of the tubular structure, folding a corresponding portion of the other narrow end inwardly to lie in the same plane as the folded portion of the one narrow side, to cause the other narrow side to contact the base of the U-shape defined by the transverse adhesive bead and to be attached thereby to the one narrow side, said steps of folding the narrow sides imparting to the corresponding portions of the wide sides of the tubular structure the form of ears each composed of two layers of sheet material, the layers of each ear being fastened together by a portion of a respective arm of the U-shape defined by the transverse adhesive bead, and folding the ears in succession against the folded narrow side portions in a manner to cause the ears to be fastened together and to the folded narrow side portions by the end portions of the arms of the U-shape defined by the transverse adhesion bead.

4,056,046

APPARATUS FOR FOLDING AND GLUING CARTON BLANKS

Charles C. Hughes, Ludlow, Ky., assignor to R. A. Jones & Co. Inc., Covington, Ky.

Filed May 27, 1976, Ser. No. 690,644

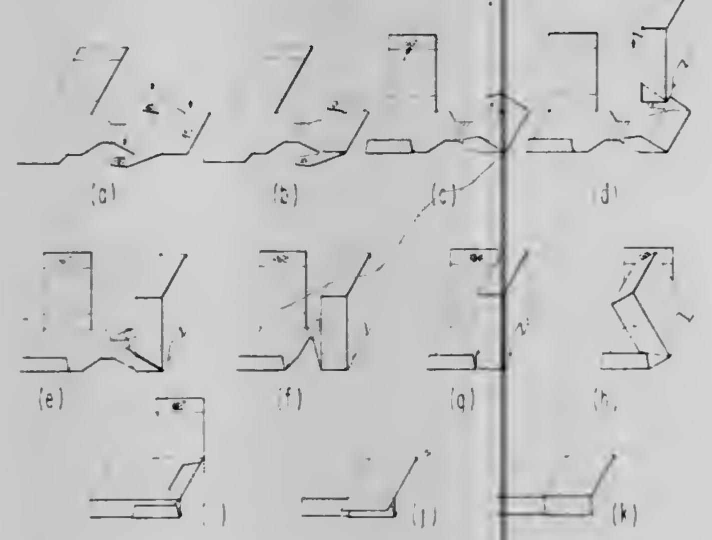
Int. Cl.[2] **B31B** *1/56*

U.S. Cl. 93—49 R **8 Claims**

1. Apparatus for folding and gluing a blank into a carton having two outboard panels, two inboard panels and a glue flap at the edge of one outboard panel adhesively secured to the edge of the opposite outboard panel, said panels and glue flap being defined by fold lines, said apparatus comprising,

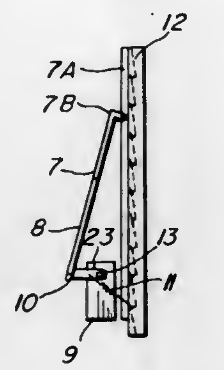
a conveyor for feeding carton blanks in a direction parallel to their folded lines,
a first rotatable plow on one side of said conveyor for folding said glue flap and outboard panel over upon said one outboard panel,
conveyor means on the other side of said conveyor opposite said first rotatable plow for tightly gripping the upper and lower sides of said one outboard panel to convey said blank past said first rotatable plow while holding said blank securely in longitudinal alignment,
means downstream of said rotatable plow for applying glue to said glue flap,
a second rotatable plow located downstream of said glue-applying means and on the opposite side of said conveyor from said first rotatable plow for folding said opposite outboard panel on the other side of said blank over upon said blank with an edge portion overlying the glue flap of the first panel,
conveyor means securely gripping the upper and lower surfaces of said folded blank and located on the side of said conveyor opposite to said second rotatable plow to securely grip said blank and maintain it in longitudinal alignment, .
and means downstream of said rotatable plow for pressing said edge portion and glue flap together.

4,056,047
METHOD AND APPARATUS FOR ASSEMBLING A PACKAGE
Wolfgang H. Grimm, Richmond, Va., assignor to Brown & Williamson Tobacco Corporation, Louisville, Ky.
Filed May 14, 1976, Ser. No. 686,578.
Int. Cl.² B31B *13/00*
U.S. Cl. 93—49 M **44 Claims**



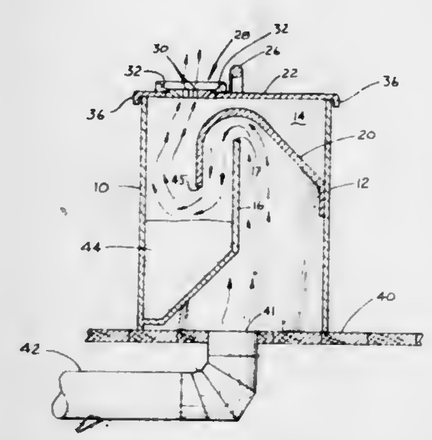
1. A method of assembling a package comprised of an open-topped receptacle and a slide-actuated closure member, said closure member being formed from a blank, said closure member having a closure portion disposed to fit over the open portion of said receptacle, a slide portion for surrounding said receptacle and a rolling hinge portion connecting said slide portion and said closure portion, the steps comprising:
a. moving said blank along a path;
b. placing the open end of said receptacle into contacting relation with said closure portion with said receptacle extending generally normally from said path;
c. affixing portions of said blank to said receptacle;
d. moving said hinge portion out of the plane of said path;
e. rotating said receptacle into a contacting relation with said rolling hinge portion and said slide portion;
f. wrapping said slide portion around said receptacle; and
g. affixing said slide portion around said receptacle to allow reciprocating movement of the slide portion toward and away from said open portion of said receptacle.

4,056,048
EMERGENCY VENTILATION MEANS FOR CONFINED LIVESTOCK AREAS
Robert W. Milroy, R. R. 1, Box 168, Manchester, Iowa 52057
Filed July 19, 1976, Ser. No. 706,844
Int. Cl.² F24F *11/02*
U.S. Cl. 98—41 R **2 Claims**



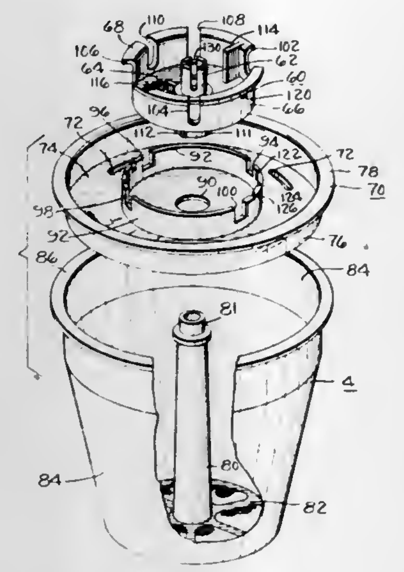
1. An emergency ventilation means for confined livestock areas comprised of a set of louvers fastened together in moving relation to each other, an electrical motor having a high gearing ratio, an arm connected to the louvers, a strip connecting the arm to the electrical motor, a spring loading between the strip and a frame for the louvers to immediately open the louvers when electrical power is lost, the electrical motor having a stop thereon to prevent the electrical motor from distorting the louvers as the louvers reach a normally closed position.

4,056,049
SPACE HUMIDIFIER
Milton C. Stuckey, Rte. No. 6, Box 241A, Macon, Ga. 31201
Filed July 1, 1976, Ser. No. 701,904
Int. Cl.² F24F *13/06*
U.S. Cl. 98—105 **6 Claims**



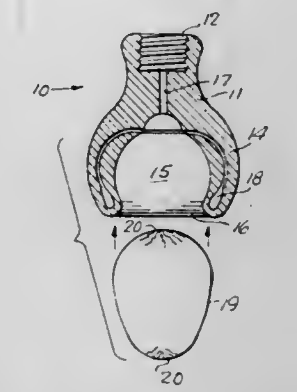
1. A space humidifier for humidifying air being forced into a room through a floor vent and with the space humidifier comprising a casing having a front, a back and two sides extending upwardly about an open casing bottom sized to be seated upon the room floor over and about the floor vent; a lid having a vent mounted atop said casing; a partition extending upwardly within said casing between said two casing sides; a reservoir within said casing to one side of said partition below said lid vent; an air shaft within said casing to the oter side of said partition opposite said one side; and baffle means for deflecting air rising from said air shaft downwardly into said reservoir and then upwardly out of said casing through said lid vent including a baffle mounted within said casing extending between the top of said partition and said lid.

4,056,050
COFFEEMAKER WITH BREW STRENGTH CONTROL
Richard N. Brown, Macungie, Pa., assignor to General Electric Company, Bridgeport, Conn.
Filed Dec. 22, 1976, Ser. No. 753,557
Int. Cl.² A47J *31/44*
U.S. Cl. 99—305 **9 Claims**



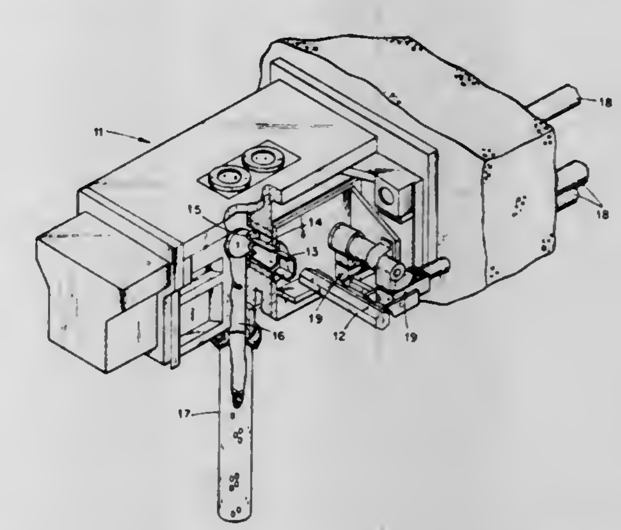
1. In an electric coffeemaker wherein a ground coffee basket having side wall means, bottom wall means and brewed coffee aperture means in said bottom wall means is positioned above a brewed coffee container and a heated water outlet is positioned above the ground coffee basket for providing heated brewing water to the ground coffee basket the improvement comprising:
a. by-pass passage means extending upwardly from the bottom wall means of said coffee basket for by-passing heated brewing water to said brewed coffee container;
b. a heated water spreader positioned generally above said ground coffee basket for receiving heated brewing water and for distributing heated water into the ground coffee basket;
c. said spreader including a bottom wall, an upwardly extending side wall, an aperture for said by-pass passage means, an upwardly extending heated water control wall positioned between the aperture for said by-pass passage means and the side wall of the spreader, and a plurality of heated water openings extending through the bottom wall of said spreader between the heated water control wall and the side wall of the spreader for distributing heated water into the ground coffee basket;
d. a plurality of spaced openings formed in said heated water control wall for permitting heated brewing water to flow to the heated water openings in the bottom wall of the spreader;
e. a movable slide wall in slidable engagement with said control wall positioned between said control wall and the aperture for receiving said by-pass passage means; and
f. a plurality of spaced openings formed in said slide wall positioned for selective registry with one, or more of the spaced openings formed in said control wall so that movement of said slide wall with respect to said control wall will uncover one, or more of the openings in said control wall to permit more or less heated water to flow through said control wall and through the heated water openings in the bottom wall of the spreader to control the relative amount of water which is permitted to flow through the coffee basket and the by-pass passage means to thereby control the strength of the liquid brewed coffee in the coffee container.

4,056,051
HARD BOILED EGG EXTRACTOR
Ernest A. Brown, 410 W. Clark St., Springfield, Ohio 45506
Filed Aug. 25, 1976, Ser. No. 717,613
Int. Cl.² A23B *4/08, 4/12;* **A23N** *5/00;* **A47J** *17/00*
U.S. Cl. 99—516 **2 Claims**



1. A hard boiled egg extractor comprising a semi-sperical holder composed of an elastic material, curved sides and an open end on said holder to receive a hard boiled egg having holes in each end of its shell, means for attaching said holder to a source of pressure, means for conducting the pressure to the center of the holder including a pressure passage in the curved walls of the holder whereby said pressure flexes said walls and thereby holds the egg shell as the pressure expels the egg from the shell.

4,056,052
METHOD FOR SHEARING SPENT NUCLEAR FUEL ASSEMBLIES
Bradley S. Weil, Oak Ridge, and Clyde D. Watson, Knoxville, both of Tenn., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.
Filed Apr. 29, 1976, Ser. No. 681,648
Int. Cl.² B30B *13/00*
U.S. Cl. 100—39 **5 Claims**

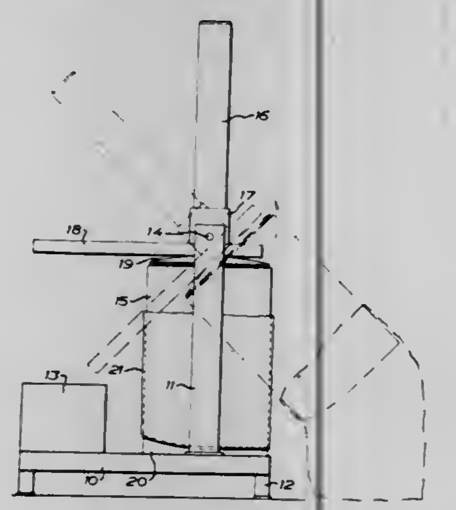


1. A method for shearing elongated spent nuclear fuel assemblies of the shrouded tube-bundle type into short segments for subsequent dissolution of contained fuel values comprising:
a. reducing the cross section of the fuel assembly by progressively pressing it between opposed movable and stationary gags defining a compression zone which progressively changes in cross section from that of the uncompressed fuel assembly to a cross section having a substantially reduced area relative to the cross section of the uncompressed fuel assembly which defines a non-planar contour for engagement by a shearing blade; said fuel assembly being advanced in a stepwise manner through said compression zone with said movable gag being periodically disengaged to permit such advancement and then engaged with said assembly in a compression stroke to compress

said fuel assembly upon completion of said advancement; and

b. shearing segments from the compressed end of said assembly by driving a shearing blade against said compressed end at a point immediately adjacent said compression zone while said movable gag is engaged with said assembly following completion of a compression stroke, said shearing blade having a non-planar shearing face contoured to match that portion of the contour of the compressed end of said fuel assembly which it engages.

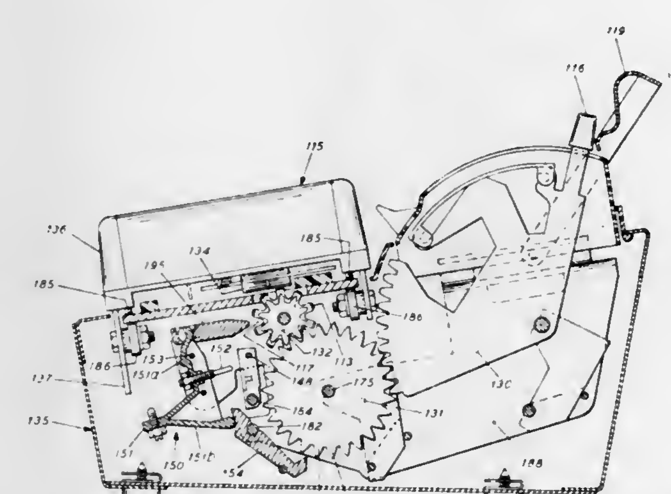
4,056,053
COMPACTORS, PARTICULARLY FOR GARBAGE
Olof Robert Wilhelm Åkerberg, Vetlanda, Sweden, assignor to Aktiebolaget Electrolux, Stockholm, Sweden
Continuation-in-part of Ser. No. 558,369, March 14, 1975, abandoned, which is a continuation of Ser. No. 353,085, April 20, 1973, abandoned. This application Oct. 14, 1975, Ser. No. 622,071
Claims priority, application Sweden, Apr. 24, 1972, 5343/72
Int. Cl.² B30B *15/32*
U.S. Cl. 100—218 **2 Claims**



1. A compactor, particularly for garbage, comprising a support, a tubular element mounted on said support, pressing means including a pressure plate reciprocatable into said tubular element, for compacting garbage therein, a bottom plate beneath said tubular element against which the pressure plate acts for compacting purposes, means for moving said pressure plate to occupy a position close to the upper end of said tubular element, to cover said element, and for moving said pressure plate from the last-mentioned position horizontally with respect to said element to uncover the upper end thereof, horizontal pivot means arranged near the upper end of said tubular element, for pivoting said tubular element about said pivot between a first position in which the lower end of said tubular element is above said bottom plate and a second position in which the lower end of said element is swung-out laterally thereof to clear said bottom plate, whereby compacted matter accumulated in said tubular element can be pressed out of said element by said pressure plate, into a bag-like means disposed over the lower end of said tubular element.

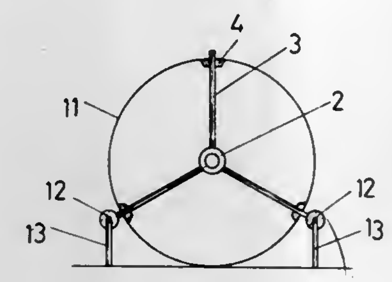
4,056,054
CREDIT CARD IMPRINTER
Richard B. Feldman, San Mateo, Calif., assignor to Chevron Research Company, San Francisco, Calif.
Filed Aug. 19, 1976, Ser. No. 715,808
Int. Cl.² B41F *3/04*
U.S. Cl. 101—45 **4 Claims**

1. A credit imprinter adapted to prevent errors due to failure to reset said imprinter after a prior transaction, comprising:
a base including a first area for printing a transaction form and a second area having at least one row of data values printed thereon;
a platen, movable in a path across said base from an initial position to an extreme position and back to said initial position to form a printing cycle;
a platen roller rotatably supported by said platen;
a plurality of settable print wheels pivotally supported by said base and located in said printing area;
blocking means movable into the path of said platen so as to prevent movement of said platen to said extreme position;
stopping means controllably associated with said blocking means, said stopping means being movable to a first position to effect positioning of said blocking means in the path of said platen and to a second position to effect positioning of said blocking means out of the path of said platen;
means responsive to the motion of said platen through a printing cycle for moving said stopping means to said first position;
positioning means for setting each print wheel to a desired setting including a gear train having a set of gears which are pivotally connected to said base; and a first shaft which axially extends through each of said gears so as to pivotally support said gears to said base;
a second shaft movable to a stop position between adjacent teeth of each of said gears of said gear train while said



stopping means remains in said first position and said platen remains in a locked position after said platen moved from initial position, across said printing area and returns to the initial position;
a pair of toggle arms having an interconnecting toggle joint wherein a first one of said toggle arms is pivotally connected to said first shaft for keeping said gears in axial alignment;
a second one of said toggle arms having a slot wherein said second shaft has one end slidably located therein;
a rod connected to one end to said pair of toggle arms so that substantially all of an actuating force which causes said rod to move is transferable to said pair of toggle arms which in turn moves said second shaft allowing said stopping means to move in said second position so as to permit said platen to be movable over said printing area;
a reset handle for introducing said actuating force, said handle rotatably connected to said rod and to said base, said handle for resetting all of said print wheels at once to a reference datum while said rod transfers a force through said toggle arm so as to relocate said second shaft from its stop position, permitting said platen to be relocated over said plurality of number wheels to record the data on said number wheels on another transaction form.

4,056,055
ROTARY SCREEN SUPPORTING AND TENSIONING MEANS
Johannes Zimmer, Ebentalerstrasse 133, A-9020 Klagenfurt, Austria
Filed Dec. 29, 1975, Ser. No. 645,230
Claims priority, application Austria, Dec. 30, 1974, 10368/74; Oct. 2, 1975, 7555/75
Int. Cl.² B41F *15/38*
U.S. Cl. 101—128.1 **10 Claims**

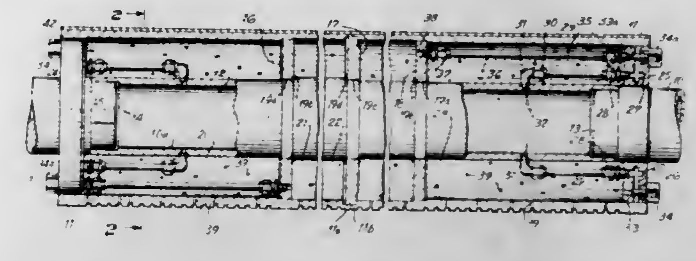


1. A rotary printing machine, comprising a cylindrical stencil; an end ring connected at each end to said cylindrical stencil, a supporting frame; a supporting body carried by said frame at each end of said stencil and each supporting body comprising rollers engaging a respective said end ring to guide and tension the stencil; each said supporting body further comprising a center element and radially diverging arms extending from said center element, the rollers of each supporting body being mounted at the extremities of said arms, at least one of said rollers of each supporting body being movable from its operating position for releasing said end rings.

4,056,056
ROTARY PRINTING PRESS
Gualtiero Giori, Lonay, Switzerland, assignor to De La Rue Giori S.A., Switzerland
Continuation-in-part of Ser. No. 452,385, March 18, 1974, abandoned. This application Dec. 19, 1975, Ser. No. 643,532
Claims priority, application Switzerland, Mar. 21, 1973, 4082/73
Int. Cl.² B41F *9/02, 11/00*
U.S. Cl. 101—152 **8 Claims**

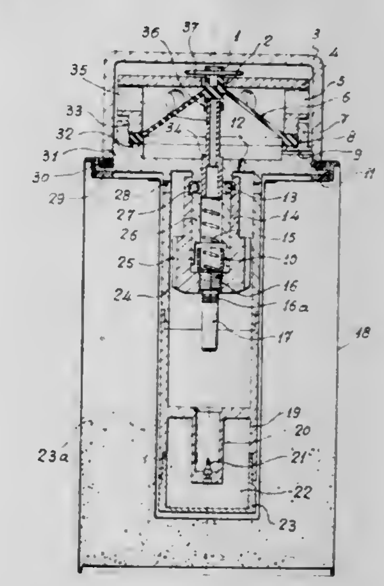
1. A combined rotary printing press for printing on sheet material, said press comprising an offset printer and a direct plate printer arranged in tandem,
said offset printer comprising a blanket cylinder, a plate cylinder cooperating with said blanket cylinder to apply an image thereto and a first impression cylinder comprising a steel cylinder for pressing said sheet material against said blanket cylinder to transfer said image to said sheet material,
said direct plate printer comprising a plate cylinder, inking means for applying ink to a plate on said plate cylinder and a second impression cylinder for pressing said sheet material against a plate cylinder to print said sheet material,
said first and second impression cylinders being independently adjustable to provide optimum contact pressure,
feed means comprising a first conveyor drum for feeding said sheet material to said blanket cylinder of said offset printer at a position in advance of and spaced from said first impression cylinder in proper registration with said image on said blanket cylinder, and transfer means comprising a second conveyor drum for transferring said sheet material from said offset printer to said direct plate printer,
said first and second conveyor drums being spaced from and independent of said first impression cylinder,
whereby said first impression cylinder is adjustable to obtain optimum contact pressure without disturbing registration of said sheet material with said image on said blanket cylinder.

4,056,057
VACUUM PRINTING CYLINDER CONSTRUCTION
Earl R. Smith, Ashway, R.I., assignor to Livermore and Knight Co., Inc., Palm Beach, Fla.
Filed Feb. 27, 1976, Ser. No. 661,841
Int. Cl.² B41F *27/12;* **B25B** *11/00*
U.S. Cl. 101—382 MV **12 Claims**



1. A vacuum-operated printing cylinder, which comprises
a. a shaft,
b. a cylinder sleeve surrounding and supported on said shaft to form a cylindrical structure wherein the annular region between said shaft and said cylinder sleeve forms a vacuum chamber,
c. a pre-evacuation chamber internal of said cylindrical structure,
d. first air passage means connected to said pre-evacuation chamber for application of vacuum thereto,
e. valved air passage means interconnecting said vacuum chamber and said internal pre-evacuation chamber,
f. a valve operator located externally of said printing cylinder and associated with said valved air passage means for selectively controlling the valved air passage means, whereby said vacuum chamber is isolated from said internal pre-evacuation chamber and the vacuum effect of the pre-evacuation chamber may be immediately applied to said vacuum chamber by the selective operation of said valved air passage means, and
g. second air passage means providing vacuum communication between said vacuum chamber and the exterior of said cylinder sleeve.

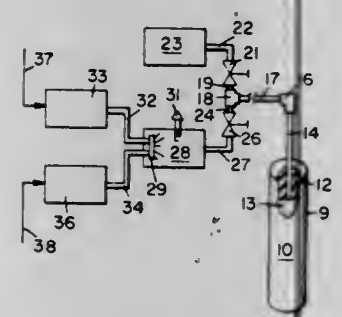
4,056,058
SAFETY FUSE FOR UNDERWATER ARTEFACTS
Fernando Almarza Laguna de Rins, Parlo Marina Moreno 8, Zaragoza, Spain
Filed Apr. 21, 1976, Ser. No. 679,050
Claims priority, application Spain, Apr. 24, 1975, 436905
Int. Cl.² F42B *22/36*
U.S. Cl. 102—16 **14 Claims**



1. Safety fuse for underwater artefacts, comprising:
a body having an open end; a valve head closing said body open end; said valve head being secured to said body;
a diaphragm located in and sealingly dividing said body into a primary and a secondary chamber; said diaphragm being

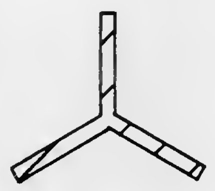
deformable to change the relative sizes of said primary and secondary chambers; said diaphragm having an annular peripheral flange which is secured inside said valve head; said diaphragm having a generally conical shape with a central portion projecting further into said valve head than said diaphragm peripheral flange;
passages into said valve head from the exterior of said body and communicating into said primary chamber, thereby to communicate the ambient pressure around said safety fuse into said primary chamber;
a first piston attached to said diaphragm to shift therewith and being mounted and oriented to be movable axially through said body as said diaphragm deforms; said first piston being of lightweight construction and being tubular with an axial bore therethrough;
a second piston axially spaced from said first piston and also being positioned and oriented to be axially movable through said body; a compressible spring between said first and said second pistons, which is compressed as said first piston is moved toward said second piston by said diaphragm;
restraining means for restraining motion of said second piston under the influence of said spring; release means connectable with said first piston and located for releasing said restraining means once said first piston has moved a predetermined distance toward said second piston;
a detonator connectable with said second piston to be moved by said second piston; impact means in said body to be impacted upon by said detonator and spaced from said detonator as said second piston is restrained by said restraining means, such that release of said restraining means and of said detonator enables said detonator to impact against the cooperating said impact means to initiate detonation of a charge.

4,056,059
CLOSED INITIATOR SYSTEM INCLUDING EXPLOSIVE ENERGY-INITIATABLE BLASTING CAPS, AND METHOD
David T. Zebree, Kingston, N.Y., assignor to Hercules Incorporated, Wilmington, Del.
Filed July 30, 1976, Ser. No. 710,058
Int. Cl.² F42B *3/10;* F42D *1/04*
U.S. Cl. 102—22 R **20 Claims**



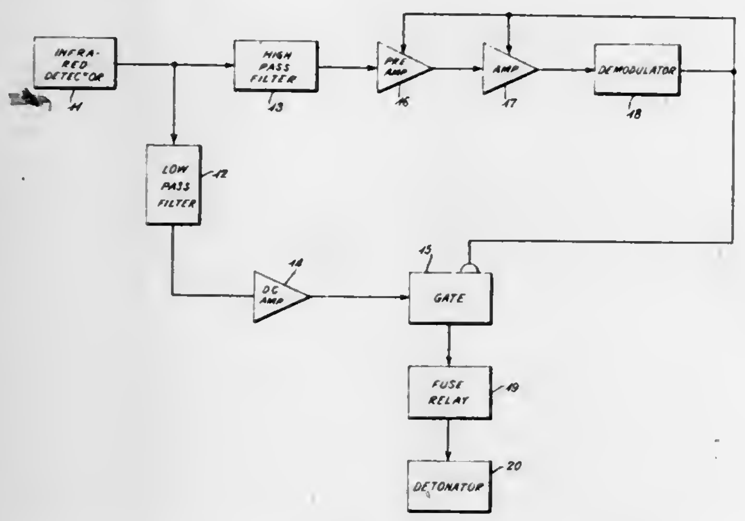
1. A closed initiator system including at least one non-electrically initiatable blasting cap, which comprises:
as said blasting cap(s), (1) a closed shell, (2) an ignition charge in said shell ignitable in response to action of explosive energy of an explosive gas mixture, and (3) conduit means communicating the interior of said shell with the exterior thereof and opening in said shell in operative relationship with said ignition charge therein to convey resident non-explosive gas being removed from said shell and convey an explosive gas mixture as a confined stream from outside said shell into position therein for explosion and responsive ignition of said ignition charge;
separate means outside said shell connecting through said conduit means for (1) removal of at least a portion of resident non-explosive gas from said shell, (2) subsequent emplacement of said explosive gas mixture in said position for explosion of same, and (3) for then igniting said explosive gas mixture when so emplaced; and
said conduit means and said shell of said blasting cap(s) disposed in gas-tight relationship with the other and with said means for removal of said non-explosive gas and subsequent emplacement of said explosive gas mixture and said means for igniting said mixture.

4,056,060
ARMOR PLATE PENETRATOR
Patrick J. Devine, Cinnaminson, N.J., assignor to The Government of the United States, as represented by the Secretary of the Army, Washington, D.C.
Division of Ser. No. 660,526, Feb. 23, 1976, abandoned. This application Mar. 10, 1977, Ser. No. 776,342
Int. Cl.² F42B *13/06*
U.S. Cl. 102—52 **5 Claims**



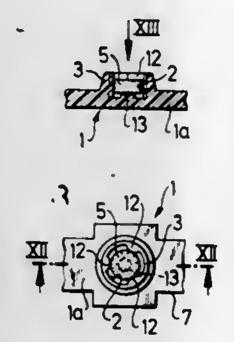
1. In an armor piercing round having a case wall including propellant therewithin and a projectile disposed at a forward portion of said case wall, said projectile including a penetrator or core therewithin, said projectile being carried by a nondiscarding sabot, said sabot having a windshield associated therewith, and means for igniting said propellant within said case for propelling said projectile forwardly with said sabot and windshield form said case at a high rotational speed, in combination therewith, the improvement comprising said penetrator having a non-circular transverse cross-section throughout its length and a predetermined center of gravity and weight, said nondiscarding sabot having an internal configuration mating generally with the exterior configuration of said non-circular transverse cross-section penetrator, and said non-circular transverse cross-section penetrator having an axis and comprising a plurality of plates, each of said plates extending from said axis and being equal to each other and spaced from each other by an equal number of degrees.

4,056,061
PROXIMITY FUSE
Orville A. Becklund, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.
Filed Jan. 20, 1959, Ser. No. 788,019
Int. Cl.² F42C *13/02*
U.S. Cl. 102—70.2 P **3 Claims**



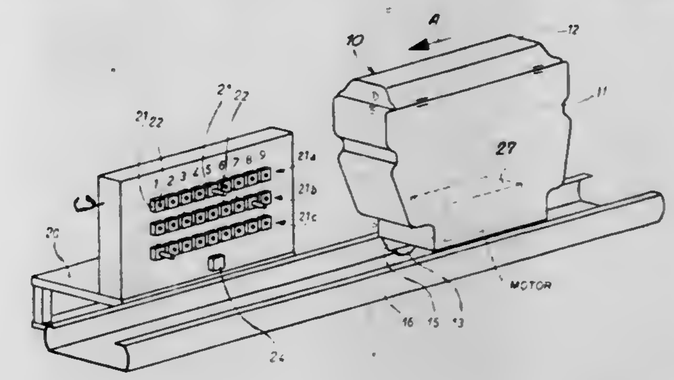
1. An infrared proximity fuse comprising means to transduce infrared radiation intensity into the amplitude of an electrical signal, first circuit means including a low pass filter connected to a filter substantially all frequencies except DC from said electrical signal, thus generating a DC output signal, second circuit means including a high pass filter connected to filter substantially all low frequencies from said electrical signal, thus generating an AC output signal, a demodulator having as its input said AC output signal from said second circuit means to produce a DC signal corresponding to the amplitude of said AC output signal, a gate circuit means having as inputs said DC output signal from said first circuit means and said DC signal corresponding to the amplitude of said AC output signal, said gate circuit means having means to generate an output signal solely during an interval when said DC output signal is above a maximum preset level and said DC signal corresponding to the amplitude of said AC output signal is below a minimum preset level, a detonator, and means responsive to production of the output signal of said gate circuit means to energize said detonator.

4,056,062
MAGAZINE FOR CASELESS CHARGES
Karl Walser, Nendeln, Liechtenstein; Kurt Schmid, Altenstadt, Austria, and Ralph Scotoni, Triesen, Liechtenstein, assignors to Hilti Aktiengesellschaft, Schaan, Liechtenstein
Continuation of Ser. No. 438,677, Feb. 1, 1974, abandoned. This application July 26, 1976, Ser. No. 708,303
Claims priority, application Germany, Feb. 2, 1973, 2305219
Int. Cl.² F42B *39/08*
U.S. Cl. 102—86.5 **8 Claims**



1. A magazine for use in an explosive powder driven bolt setting gun comprising a substantially flat band-shaped magazine body having a first substantially flat face surface and a second substantially flat face surface oppositely directed from said first face surface, a cartridge recess formed in said magazine body extending inwardly from said first face surface, a torus-shaped wall mounted on and extending outwardly from the first face surface of said magazine body and encircling the recess and forming in combination therewith a cartridge holding space, wherein the improvement comprises a caseless charge held in the cartridge holding space defined by said cartridge recess and torus-shaped wall with said caseless charge disposed in surface contact with the annular surface within said cartridge recess and the inner surface of said torus-shaped wall which extends transversely of said first and second face surfaces, said caseless charge being capable of generating explosive gases when ignited for driving a bolt from a setting gun into a receiving material, said cartridge recess being closed by the second face surface of said magazine body and the base of said recess closed by said magazine body being a planar surface and having a projection extending outwardly therefrom in said cartridge holding space with said projection being spaced inwardly from the annular surface within said cartridge holding space which extends transversely of said first and second face surfaces and with which said caseless charge is in surface contact, said projection having a free end surface spaced from the base of said recess and located inwardly from the outer end of said cartridge holding space defined by said torus-shaped wall.

4,056,063
DISPATCHER FOR CONVEYOR SYSTEM
Bruno Ritter, Malente Gremsmuhlen, Germany, assignor to Buro Patent AG, Glarus, Switzerland
Continuation of Ser. No. 599,053, July 25, 1975, abandoned. This application Jan. 4, 1977, Ser. No. 756,611
Claims priority, application Germany, July 27, 1974, 2436376
Int. Cl.² B61J *3/00*
U.S. Cl. 104—88 **10 Claims**



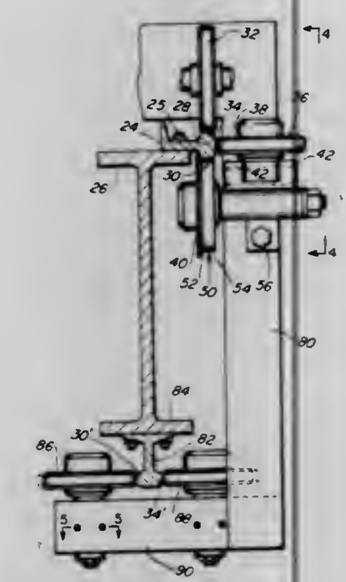
1. A dispatching apparatus for a conveyor system having a plurality of cars displaceable along a track and each having a side provided with a plurality of parallel guides each in turn receiving a respective code marker slidable along the respective guide and arrestable therein at any of a plurality of predetermined index positions, whereby the pattern defined by said markers in said positions determines the path of travel of the respective car on said track, said apparatus comprising:
a support fixed adjacent said track;
a plurality of rows of encoders on said support, each row being alignable with a respective guide on a one of said cars and each encoder being alignable with a respective position on the respective guide, each encoder having a remotely operable abutment member projectable from said support into the respective guide, whereby displacement of a car past a support having one such member of each such row projecting from said support automatically displaces the respective markers along the respective guides; and
means for displacing said abutment members and said side apart to disengage same when the guides of the car align with the rows of the support.

4,056,064
TRANSVERSELY REMOVABLE GANTRY LOADER
Herbert Geoffrey Bottomley, Skipton, England, assignor to Landis Lund, Limited, Keighley, England
Continuation of Ser. No. 555,318, March 4, 1975, abandoned. This application Nov. 8, 1976, Ser. No. 739,668
Claims priority, application United Kingdom, Mar. 9, 1974, 10646/74
Int. Cl.² E01B *25/22*
U.S. Cl. 104—93 **5 Claims**

1. A gantry loader comprising
a horizontally disposed support beam,
a railway rail secured to said support beam, said rail including a straight portion terminating in a head having an end face extending substantially perpendicularly to said straight portion and opposing portions projecting in a direction parallel to said end face outwardly beyond said straight portion, and having substantially flat surfaces parallel to said straight portion,
a loader assembly including a carriage selectively displaceable along said beam, said carriage having
a first wheel mounted for rotation about an axis parallel to said straight portion and having a substantially flat surface for rollingly engaging the flat surface of one projecting portion of said head,
a second wheel mounted for rotation about an axis perpen-

dicular to said straight portion for rollingly engaging the face of said rail head,

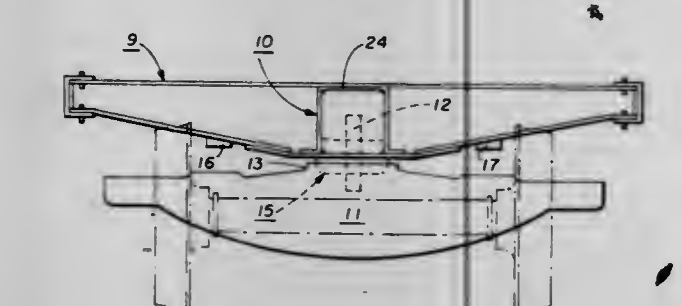
a third wheel mounted for rotation about an axis parallel to said straight portion for rollingly engaging the flat surface of the other projecting portion of said head, said third wheel including a peripheral step having a base portion selectively facing the flat surface of said other projecting portion and having a side wall surface for rollingly engaging the side of said head opposite from said end face,



said third wheel being selectively displaceable in a plane perpendicular to its axis from a retracted position remote from said rail whereat said loader assembly can be transversely displaced away from said rail to an advanced position whereat the base and side wall surface of said step engage said other projecting portion to prevent the disassociation of said loader assembly from said rail, and

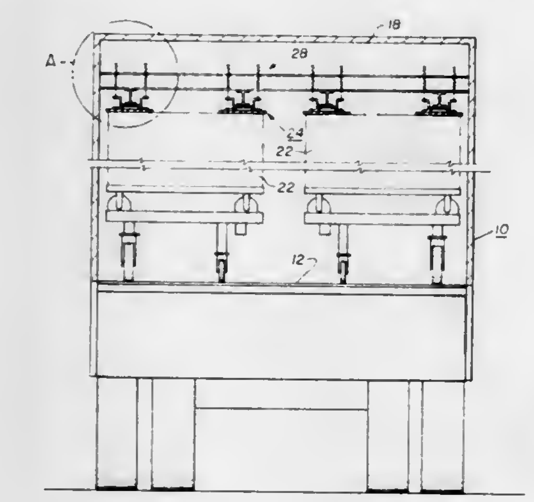
means for selectively maintaining said third wheel at said advanced position.

4,056,065
REJECTION FEATURE FOR CENTER PLATE
David Elmer Fiegl, Williamsville; Vaughn Terrey Hawthorne, East Amherst, and Albert Edward Martin, Lancaster, all of N.Y., assignors to Dresser Industries, Inc., Dallas, Tex.
Filed Oct. 19, 1976, Ser. No. 733,971
Int. Cl.^{2} B61C *9/48*
U.S. Cl. 105—199 C **9 Claims**



1. In a body bolster center plate assembly for a railway car comprising in combination a center sill having walls contiguously arranged generally U-shaped in cross section and forming a centrally open interior; body bolster of longitudinal extent having a centrally defined laterally extending opening receiving said center sill intersecting therewith; shear plates longitudinally spaced apart secured within said sill interior to the walls thereof, at least one of said plates being located on each side of the center of intersection between said bolster and sill; said shear plates and portion of said sidewalls included therebetween defining a generally rectangular bottom-open pocket in which to receive a center plate; a center plate having a first portion of exterior dimension greater than said pocket for extending outward of the underside thereof and connecting with a second portion of reduced exterior dimension received within said pocket; and means securing the center plate to the underedge of said pocket walls forming a fixed rigid structure thereat, said center plate being detachable upon removal of said means; the improvement comprising said centerplate and said shear plate containing means for polarizing said center plate within the bottom-open pocket. Wherein the polarizing means on said shear plates is at least one stop lug disposed on the interior surface thereof for permitting the center plate to be installed in only two proper positions within the bottom-open pocket.

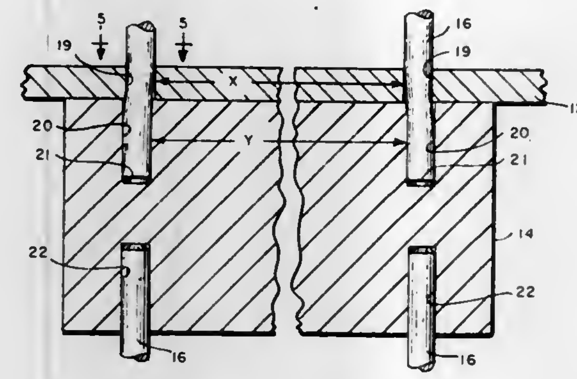
4,056,066
DISPLACEABLE CEILING MOUNTED CARGO RESTRAINT SYSTEM
George Homanick, Lathrup Village, Mich., assignor to PepsiCo Inc., Purchase, N.Y.
Filed Mar. 15, 1976, Ser. No. 667,155
Int. Cl.^{2} B61D *45/00*
U.S. Cl. 105—493 **14 Claims**



1. In a cargo restraint arrangement for an enclosed truck body having a cargo-supporting floor structure and a roof structure, said floor structure being adapted to have bulk cargo conveyed and stored thereon, the improvement comprising: generally horizontally extending vertically displaceable rigid planar means being disposed below said roof structure, said planar means extending along a longitudinal length of said truck body and positioned at predetermined locations above said bulk cargo; means connecting said planar means to said roof structure for vertical movement relative thereto; said connecting means including resiliently yieldable means for normally biasing said planar means upwardly towards said roof structure; expandable means being interposed between said roof structure and the upper surface of said planar means, said expandable means being normally compressed intermediate said roof structure and the upper surface of said planar means responsive to the upward biasing force of said resiliently yieldable means; and actuating means for pressurizing and expanding said expandable means during predetermined time periods for forceably moving said planar means downwardly towards said bulk cargo into resilient pressure engagement therewith so as to restrain the latter from movement within said truck body.

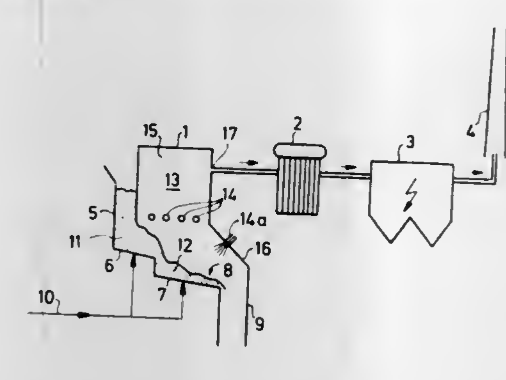
14. In a method for the transport of goods racked or stacked in tall upright wheeled carriers supported upon a platform forming a cargo-supporting floor of an enclosed truck body having a roof structure, the improvement which comprises resiliently engaging the uppermost portions of said carriers with normally upwardly biased rigid planar contact means suspended from said roof structure for vertical displacement relative thereto, and applying downwardly directed pressure through the interposition of expandable means between said roof structure and said planar contact means sufficient to engage and lockingly urge said carriers into a fixed and stable position against and upon said platform for transport, releasing the pressure engagement of said contact means for allowing movement of the said carriers on said truck platform and reengaging said contact means in the same manner for continued transport of the truck while the carriers are maintained in a fixed position on the truck platform.

4,056,067
JOINT FOR MODULAR FURNITURE
Thomas C. Steger, Goose Hill Road, Chester, Conn. 06412
Filed June 7, 1976, Ser. No. 693,474
Int. Cl.^{2} A47B *57/00, 87/00*
U.S. Cl. 108—101 **3 Claims**



1. A multishelf structure comprising shelves containing at their opposite ends spaced vertically disposed holes, and means for supporting the shelves in spaced parallel relation, one above another, said means comprising spaced parallel columns at the opposite ends of the shelves, said columns extending continuously from the underside of one shelf upwardly through the holes in the one shelf to the underside of the shelf above, but not into the holes therein, and locking means comprising a block at each end of each shelf having contact with the lower side of the shelf, said blocks containing at their upper and lower sides spaced holes offset outwardly with respect to the holes in the shelves, the holes in the top side receiving the portions of the columns extending downwardly through a given shelf and the holes in the lower side receiving the portions of the columns extending upwardly from said shelf into the holes at the lower side of the blocks at the underside of the shelf above such that the shelf at the upper side of a block bends the columns inwardly and the block at the underside of the shelf above bends the columns outwardly.

4,056,068
PROCESS FOR CONDITIONING FLUE GASES IN WASTE MATERIAL INCINERATION PLANTS WITH HEAT UTILIZATION
Robert Hafeli, Zurich, Switzerland, assignor to Von Roll AG, Gerlafingen, Switzerland
Filed May 7, 1976, Ser. No. 684,557
Claims priority, application Switzerland, July 4, 1975, 8787/75
Int. Cl.^{2} F23G *5/00;* **F23L** *9/04;* **F23J** *5/00*
U.S. Cl. 110—8 A **12 Claims**



1. A process for conditioning flue gases in waste material incineration plants with heat utilization having a combustion chamber with a combustion grate, sidewalls and a reflection wall, a flue gas cooler serving as the heat utilizer and a gas cleaner connected in series with said combustion chamber, said process comprising the steps of:

introducing secondary air into said combustion chamber above the combustion grate and before said flue gas cooler at a plurality of injection points located at the same height through at least one of the two furnace sidewalls and through said reflection wall; and

spraying water into said flue gases to moisten them before they enter said flue gas cooler at said plurality of injection points;

said water and secondary air being regulatably introduced together into the reduction-oxidation zone of the combustion chamber thereby creating an oxygen excess sufficient for the subsequent burning of unburned combustible volatile material in said flue gases, the CO-oxidation of the unburned material is catalytically accelerated by a homogeneous water gas reaction and simultaneously the laminar flow of the combustible gases is converted into a turbulent flow to facilitate mixing the gases in the combustion chamber, and whereby a predetermined maximum gas temperature is maintained, and a flue gas water content of at least 10 Vol. % is maintained prior to its discharge from the combustion chamber.

9. Apparatus for conditioning flue gases in waste material incineration plants with heat utilization having a combustion chamber with a combustion grate, sidewalls and a reflection wall, a flue gas cooler serving as the heat utilizer connected at the gas discharge of the combustion chamber, and a gas cleaner connected in series with saio combustion chamber and said gas cooler, said apparatus comprising:

a conduit adapted for connection to a source of secondary air;

a conduit adapted for connection to a source of water;

at least one first mixing nozzle opening into said combustion chamber from at least one of said side walls;

at least one second mixing nozzle opening into said combustion chamber from said reflection wall, said reflection wall overlying the final combustion zone of said combustion grate; and

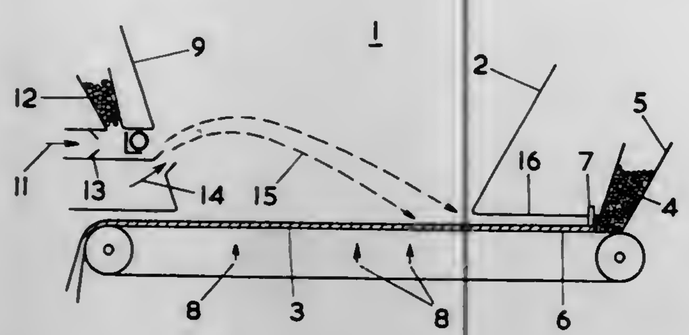
means for connecting both said water and secondary air conduits to said first and second mixing nozzles for injection thereof into said combustion chamber;

whereby an oxygen excess sufficient for the subsequent burning of unburned combustible volatile material in said flue gases is provided, the CO-oxidation of the unburned material is catalytically accelerated by a homogeneous water gas reaction, the laminar flow of the combustible gases is converted into a turbulent flow to facilitate mixing the gases in the combustion chamber, a predetermined maximum gas temperature is maintained, and a flue gas water content of at least 10 Vol. % is maintained prior to its discharge from the combustion chamber.

4,056,069
METHOD OF BURNING REFUSE
John Edward Marshall, Aldridge, England, assignor to Imperial Metal Industries (Kynoch) Limited, England
Filed Mar. 23, 1976, Ser. No. 669,497
Claims priority, application United Kingdom, Apr. 7, 1975, 14144/75
Int. Cl.^{2} F23G *5/08;* **F23B** *1/22*
U.S. Cl. 110—7 R **14 Claims**

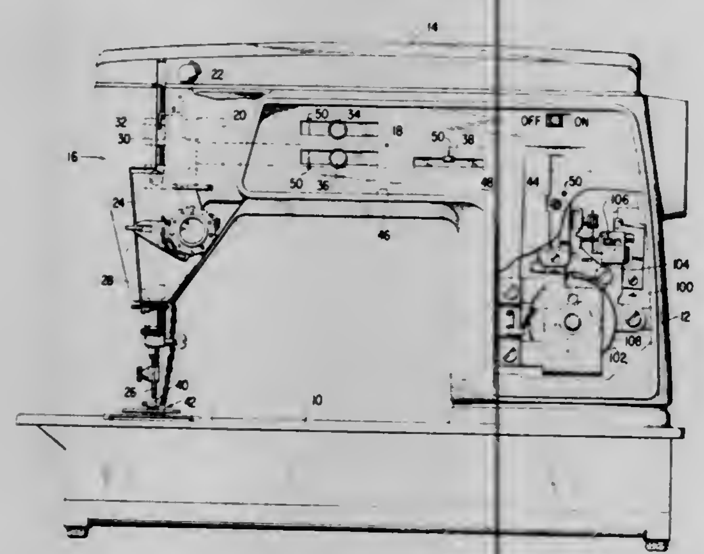
1. A method of burning refuse including the steps of establishing a substantially uniform bed of burning coal on a moving grate floor, the bed of burning coal being located at the lower end of a combustion chamber, and entraining refuse in particulate form in a gas jet directed into the combustion chamber through the back wall of the combustion chamber in the opposite direction to the direction of movement of the grate, the velocity of the gas jet being such that the heavier particles are

projected towards the front of the bed of coal, to fall onto the moving bed of coal and to be burned with the coal, while the



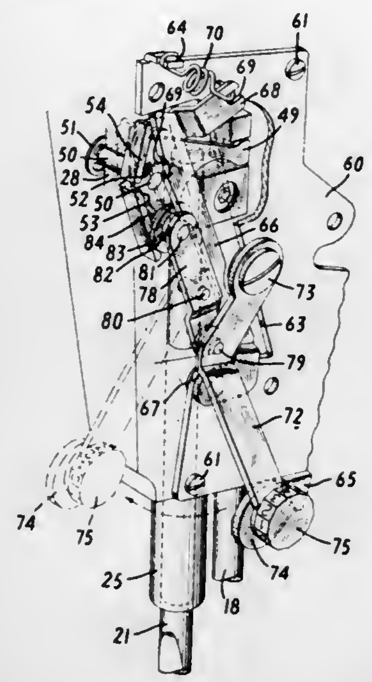
lighter particles of the refuse are burned in suspension above the moving bed of coal.

4,056,070
AUTOMATIC ONE-STEP BUTTONHOLING DEVICE
Robert Conrad Hauf, Upper Montclair, N.J., assignor to The Singer Company, New York, N.Y.
Filed Oct. 15, 1976, Ser. No. 732,683
Int. Cl.² D05B *3/02*
U.S. Cl. 112—158 B **3 Claims**



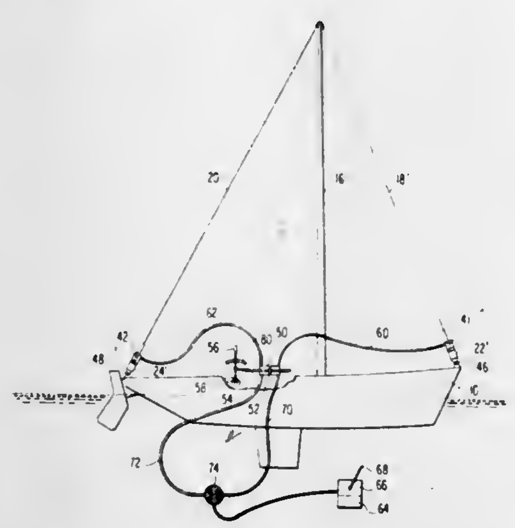
1. In a sewing machine for producing zig-zag stitching in a work piece and having a needle reciprocable in an endwise path, a mechanism for jogging said needle laterally to produce zig-zag stitches including at least one member for regulating the needle jogging motion, a work feeding mechanism including a feed regulating member having a range of position corresponding to forward and reverse direction of work feed, an actuating mechanism in said sewing machine operatively connected to impart endwise reciprocatory and lateral vibratory movements to said needle and movement to said work feeding mechanism in timed relation thereto, a presser device arranged to bear against the work piece adjacent to the path of reciprocation of said needle, a buttonholing assembly having a repetitive sequence of modes and effective in each one of said modes to influence the settings of said needle jogging and feed regulating members appropriately for the formation of a different segment of a stitched buttonhole, an indexing mechanism effective on each activation to advance said buttonholing assembly one mode in said repetitive sequence, an electrical control arrangement for said indexing mechanism comprising a circuit including an activation stage for said indexing mechanism, and gate means carried by said sewing machine presser device closely adjacent to one side of said path of needle reciprocation and effective on each closure to energize said activation stage, in combination with a pair of gate closing elements each including fastening means for temporary attachment to a work piece each to one side of the opposite extremity of the location of a buttonhole desired to be formed in said work piece.

4,056,071
COMBINATION PRESSER BAR LIFTERS AND PRESSURE CONTROLS
Kenneth Douglas Adams, Madison, N.J., assignor to The Singer Company, New York, N.Y.
Filed Oct. 26, 1976, Ser. No. 735,304
Int. Cl.² D05B *29/02*
U.S. Cl. 112—237 **8 Claims**



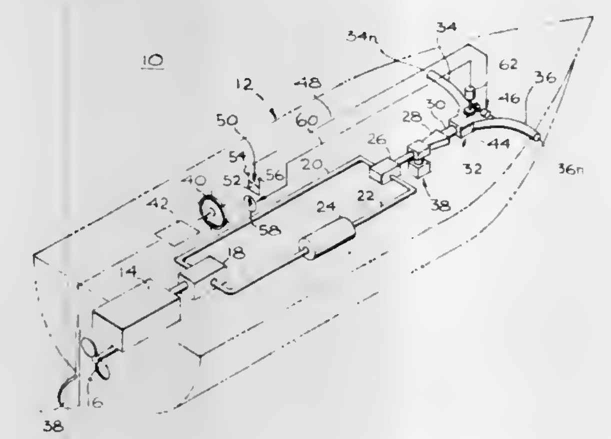
1. A presser device for a sewing machine having a frame, said presser device comprising: a presser bar supported by said frame for endwise movement; rockable means operatively connected to said presser bar for transfering selectively variable and reversible force thereto; means for creating a force for transfer to said presser bar; and, means for adjustably connecting said force creating means to said rockable means in order to obtain said variable and reversible force on said presser bar.

4,056,072
SYSTEM FOR TRIMMING THE MAST OF A SAILING YACHT
Lars Rune Bergström, Lands End, Longboat Key, Fla. 33548
Filed Aug. 30, 1976, Ser. No. 718,777
Int. Cl.² B63B *15/02*
U.S. Cl. 114—109 **5 Claims**



1. In a sailboat having a hull, a mast projecting upwardly from the hull, a forestay fixed to the top of the mast, an aftstay fixed to the top of the mast, a first hydraulic cylinder connected to the hull at a forward location thereof and including a piston connected to the forestay, a second hydraulic cylinder connected to an aft portion of the hull and including a piston connected to the aftstay, the improvement comprising control means simultaneously supplying one of said hydraulic cylinders with fluid while exhausting the other hydraulic cylinder of fluid for moving the fore and aft stays simultaneously to trim the mast in either the fore or aft direction as desired, and wherein said control means includes a hydraulic control cylinder and first and second hydraulic fluid lines respectively interconnecting the opposite ends of the hydraulic control cylinder and said first and second hydraulic cylinders, and wherein said control cylinder includes a control piston, and wherein there is further included drive means for moving the control piston in the control cylinder for supplying and exhausting hydraulic fluid from said first and second hydraulic cylinders simultaneously, and wherein there is further included a hydraulic fluid reservoir, third and fourth hydraulic lines communicating with the control cylinder on opposite sides of said control piston and means for selectively communicating said third and fourth hydraulic fluid lines with the reservoir.

4,056,073
BOAT THRUSTER
Stanley A. Dashew, Santa Monica, and Charles D. Sutton, Woodland Hills, both of Calif., assignors to Omnithruster Inc., Compton, Calif.
Continuation-in-part of Ser. No. 491,797, July 25, 1974, abandoned. This application Mar. 8, 1976, Ser. No. 664,871
Int. Cl.² B63H *25/46*
U.S. Cl. 114—151 **5 Claims**



2. In combination with a boat having a hull with bow and stern portions, the improvement comprising:

pump means mounted in said hull for pumping water; and

thruster means having a common passage coupled to said pump means, for receiving the water pumped thereby, said common passage connecting to two thruster outlet means opening to the sea at either side of the bow of the hull for discharging water into the sea thereat;

said boat hull having a recess on either side of said bow, said recess having a deep forward portion and being tapered in depth to have a progressively smaller recess depth at progressively more rearward locations;

said outlet means includes a sidewardly opening outlet at said forward portion of said recess, and said diverter means including a movable member lying in said recess, and

each of said thruster outlet means including diverter means selectively operable to assume different desired positions to direct water being discharged in different directions for position holding steering or propelling said boat.

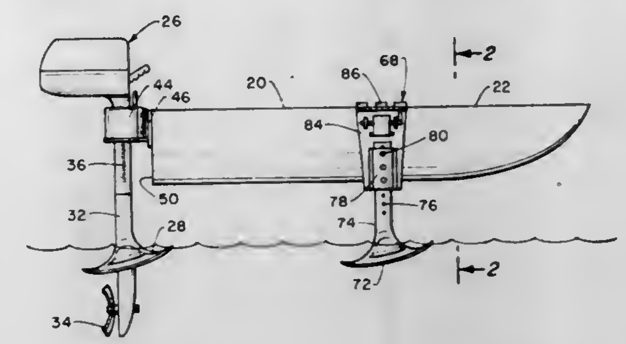
4,056,074
HYDROFOIL KIT
Elmer B. Sachs, 3371 Rexford, Ventura, Calif. 93003
Filed Apr. 23, 1976, Ser. No. 679,772
Int. Cl.² B63B *1/26*
U.S. Cl. 114—280 **3 Claims**

1. In combination with a boat hull, a hydrofoil kit connectable with said hull, said hydrofoil kit comprising:

a first hydrofil unit connectable by first connecting means to starboard side of said hull;

a second hydrofil unit connectable by second connecting means to the port side of said hull, each said hydrofil unit including a hydrofoil member spaced below the bottom of said hull;

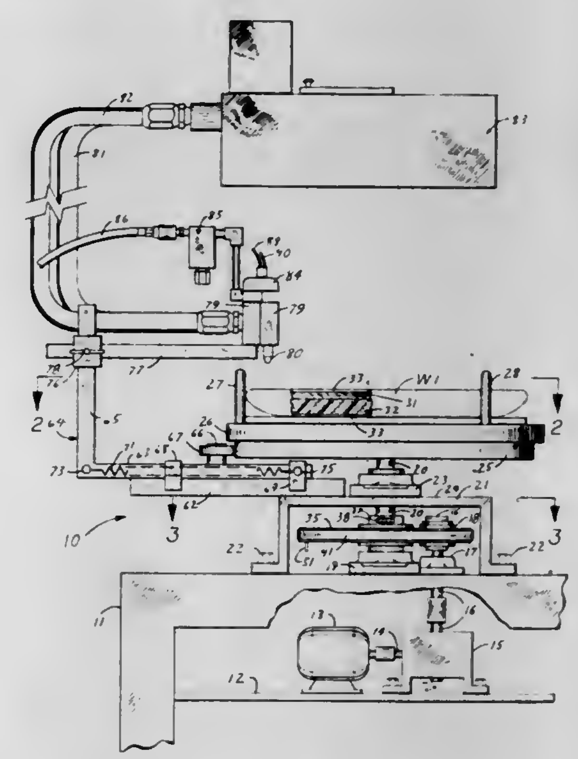
interconnecting means connecting said first hydrofoil unit and said second hydrofoil unit, said interconnecting means



securely binding together said hydrofoil units to said hull; and

said interconnecting means including a flexible band assembly extending across the bottom of said hull, tightening means connected with said flexible band to make said flexible band taut.

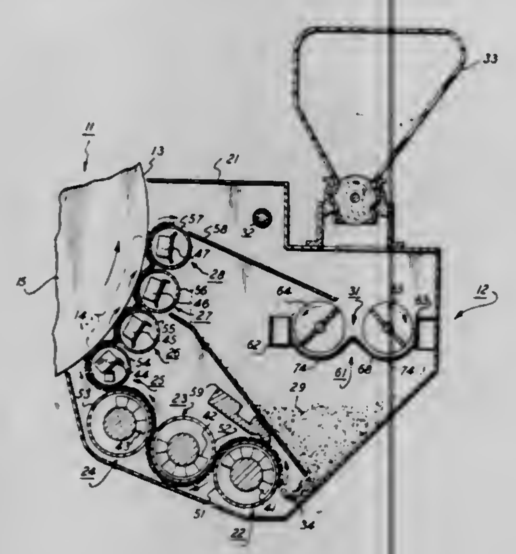
4,056,075
AUTOMATIC HOT MELT ADHESIVE DEPOSITING MACHINE
Abe Seiderman, 7365 SW. 132 St., Miami, Fla. 33156
Filed Jan. 12, 1976, Ser. No. 648,141
Int. Cl.² B05C *5/00*
U.S. Cl. 118—7 **9 Claims**



1. Apparatus for automatically controlling the gravitational deposition of hot glue or the like dispensed from the nozzle of a dispensing machine and along a circuitous path upon the upper surface of a flat work-piece having an irregular curvilinear peripheral contour preparatory to its gluing assembly to a complemental member, the dispensing machine included electrical means for starting and stopping the dispensing flow of hot glue, comprising, in combination, a work table having a substantially horizontal support surface for seating the work-piece, means for positionally locating a work-piece upon said support surface, means for rotating said work table about a vertical axis, mechanism for supporting the nozzle of a hot glue dispensing machine vertically above a work-piece located on said support table, a cam fixed with respect to said work table and rotatable in unison therewith, a cam follower cooperative with said cam, said nozzle support mechanism comprising means slidably supporting said cam follower for rectilinear

movement upon rotation of said cam, means for simultaneously initiating a rotative cycle of said work table and starting the flow of hot glue dispensd from the nozzle of the hot glue dispensing machine, and means controlled by the completion of a rotative cycle of operation of said work table for automatically stopping both the rotation of said work table and the flow of hot glue from said hot glue dispensing nozzle, said cam having the same peripheral contour as that of the work-piece upon which glue is to be deposited, and said work-piece locating means being operative to positionally constrain the work-piece so that its peripheral contour is in rotative registration with respect to the peripheral contour of said cam.

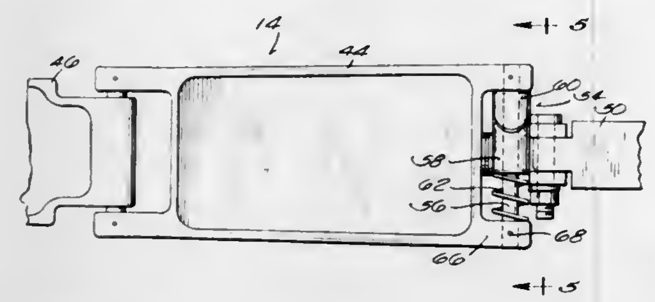
4,056,076
DEVELOPER MIXING SYSTEM
Richard E. Smith, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.
Filed Apr. 24, 1975, Ser. No. 571,134
Int. Cl.^{2} G03G *15/09*
U.S. Cl. 118—653 **19 Claims**



1. In a development system for developing latent electrostatic images carried by an imaging surface of an electrostatographic processor; said development system including a housing having a sump for storing a supply of multi-component developer, and means within said housing for circulating developer along a path running from said sump, through a development zone, and then back into said sump; the improvement comprising series hybrid crossmixing means disposed in said path between said sump and said development zone, said crossmixing means including an active section in series with at least one passive section for sequentially blending and mixing developer circulating along said path, said crossmixing means including a pair of parallel passive sections in series with said active section, said passive sections having separate sets of spaced apart, internal deflector vanes which are downwardly inclined to deflect developer toward opposite sides of said housing,

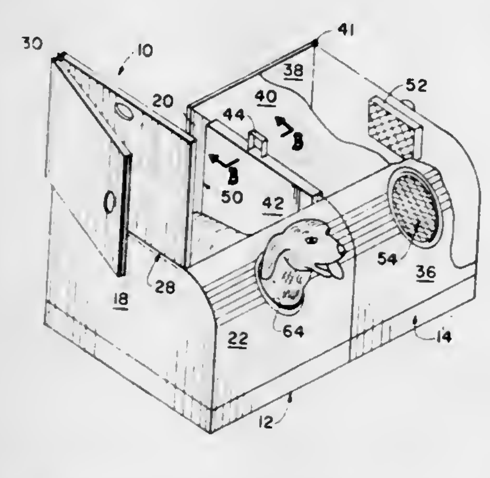
4,056,077
MILKING UNIT DETACHER MECHANISM
Gary W. Schluckbier, Madison, Wis., assignor to DEC International, Inc., Madison, Wis.
Filed July 29, 1976, Ser. No. 709,650
Int. Cl.^{2} A01J *7/00*
U.S. Cl. 119—14.08 **4 Claims**

1. A milking unit detacher mechanism comprising:
a main support column;
a vertically movable milker support column movably mounted on said main support column;
a horizontally extending retractable milking unit support assembly mounted on said milker support column, said retractable milker unit support assembly adapted to support a milker unit thereon when the milker unit is connected to a cow for milking, said milker unit support assembly further adapted to be retracted from its extended position underneath the cow to a retracted position adjacent the cow, said support assembly comprising a plurality of link members pivotally connected to each other with the end link member pivotally connected to said vertically movable milker support column by a pivotal connection, said pivotal connection including a pivot pin operatively connected to said end link member;
a biasing means operatively connected to said pivotal connection between said end link member and said milker support column, said biasing means functioning to create a rotating biasing force on said end link member in a direction towards its extended milking position, said biasing means including a first cam sleeve rotatably mounted on said pivot pin and fastened to said vertically movable



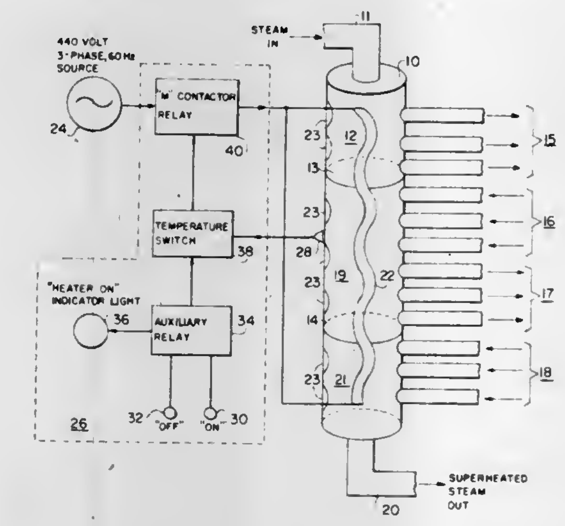
support column, and a second cam sleeve fixedly mounted on said pivot pin adjacent said first cam sleeve, said first and second cam sleeves having cooperating cam surfaces on the adjacent ends thereof which operate when the sleeves are rotated with respect to each other to create a biasing force on said end link member tending to rotate it toward its extended position, said biasing means further including a compression spring mounted on said pivot pin and adapted to exert an axial biasing force on said first sleeve member in a direction towards said second sleeve member;
a flexible retract member fastened at one end to said retractable milking support assembly; and
retract means for pulling on said flexible retract member to cause said milker unit support assembly to be moved from its extended position to its retracted position.

4,056,078
AUTOMATIC DOG WASHER
Clem Blafford, and Antoinette Blafford, both of 106 Bay 38th St., Brooklyn, N.Y. 11214
Filed Aug. 3, 1976, Ser. No. 711,308
Int. Cl.^{2} A01K *29/00;* A61D *11/00*
U.S. Cl. 119—158 **7 Claims**



1. Dog cleaning apparatus comprising in combination:
a. a first showering enclosure including a floor, opposed side walls, a front wall, and pivotably connected top and rear walls;
b. a second drying enclosure including a floor, opposed side walls, one of said side walls being a common side wall of said first enclosure, and front, top and rear walls;
c. water spray means mounted in said showering enclosure adapted to direct at least one stream of water onto an animal stationed therein;
d. blower means mounted in said drying enclosure adapted to direct at least one stream of heated air onto an animal stationed therein; and
e. a gate movably mounted in said common side wall manually operable from a location externally of the showering and drying enclosures for selectively providing communication between said showering and drying enclosures, the top wall of said showering enclosure being pivotably connected to the side wall thereof remote from said common side wall and the rear wall of said showering enclosure being pivotably connected to the said top wall.

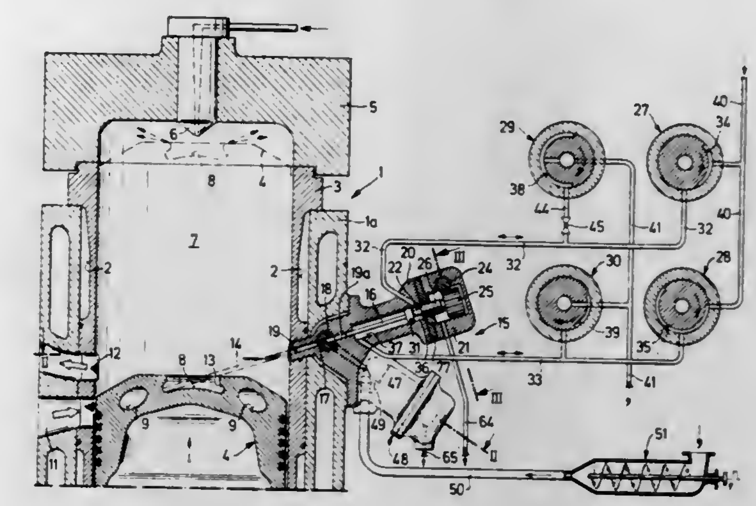
4,056,079
APPARATUS AND PROCESS FOR PREHEATING MAIN BOILER SUPERHEATER HEADERS
Alan Reid, Columbia, and Wendell C. Phillips, Jr., Harwood, both of Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.
Filed June 30, 1976, Ser. No. 701,486
Int. Cl.^{2} F22G *3/00;* F22B *37/42*
U.S. Cl. 122—476 **12 Claims**



1. A superheater header connected to the outlet of a boiler comprising:
at least one inlet for steam to enter said header;
at least one outlet for steam to exit from said header; and
means for preheating said header to a desired temperature prior to both boiler light-off and the introduction of steam into said header to prevent thermal shock to said header.

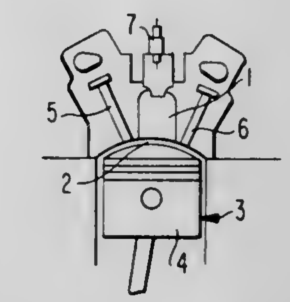
4,056,080
RECIPROCATING INTERNAL COMBUSTION ENGINE
Peter Rutz, Winterthur, and Anton Steiger, Illnau, both of Switzerland, assignors to Sulzer Brothers Limited, Winterthur, Switzerland
Filed Aug. 26, 1976, Ser. No. 718,086
Claims priority, application Switzerland, Mar. 5, 1976, 2753/76
Int. Cl.^{2} F02B *45/02, 19/04;* F02F *3/28*
U.S. Cl. 123—23 **14 Claims**

1. In a reciprocating internal combustion engine the combination comprising
at least one cylinder having a wall defining a combustion chamber;
a piston slidably mounted in said cylinder to move into said combustion chamber during a compression stroke, said piston having a centrally disposed pocket in a surface thereof facing said combustion chamber, said pocket having an undercut portion in a peripheral surface thereof; and
a mechanical fuel dosing and ejecting means mounted on said cylinder wall for ejecting powdered fuel cyclically and tangentially into said pocket for initial collection under said undercut during a first half of said compression stroke and for release into said combustion chamber dur-



ing a second half of said compression stroke under the influence of decreasing centrifugal force and increasing axial deceleration of said piston.

4,056,081
INTERNAL COMBUSTION ENGINE
Konstantin Pattas, Thessaloniki, Greece, assignor to Daimler-Benz Aktiengesellschaft, Germany
Filed May 19, 1975, Ser. No. 578,768
Claims priority, application Germany, May 22, 1974, 2424799
Int. Cl.^{2} F02B *19/08*
U.S. Cl. 123—75 B **30 Claims**

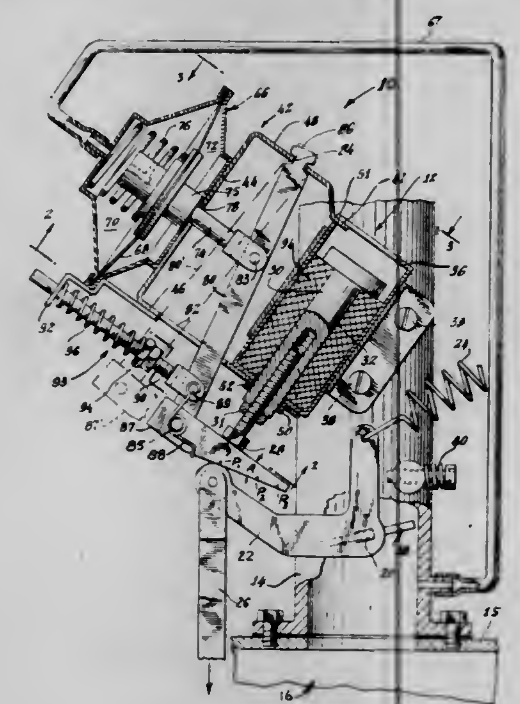


1. An internal combustion engine which includes a main combustion space means, ignition chamber means terminating in said main combustion space means, and mixture supply means for supplying a fuel-air mixture to the main combustion space means, characterized in that a further mixture supply means is provided for independently supplying a different fuel-air mixture to the ignition chamber means, and in that the fuel-air ratio of the combustion is controlled by control means in dependence on the load of the engine at least over a portion of the rotational speed range in such a manner that the fuel-air ratio is reduced with an increasing load starting from the upper boundary of a lower load range, in which an approximately constant large fuel-air ratio exists.

4,056,082
FUEL SAVING VARIABLE CLOSED POSITION FUEL AND AIR FLOW CONTROL FOR VEHICLES WITH AUTOMATIC TRANSMISSION
Douglas G. Noiles, 114 Elm Place, New Canaan, Conn. 06840
Continuation-in-part of Ser. No. 423,091, Dec. 7, 1973, abandoned. This application Jan. 20, 1975, Ser. No. 542,586
Int. Cl.^{2} F02D *11/08*
U.S. Cl. 123—103 R **23 Claims**

1. Apparatus for use in a vehicular engine drive system including an automatic transmission wherein air-fuel flow control means associated with an induction passage leading to the engine are provided for controlling engine power and speed with a movable control member for operating said air-fuel flow control means, said apparatus comprising a solenoid for allowing said control member to move to an engine shut

down position; positioning means for moving said control member for providing varying air-fuel flow; pressure-responsive means connected to said induction passage for controlling said positioning means during idling when the operator's foot is removed from the accelerator pedal for moving said positioning means to move said control member to variably increase air-fuel flow at idling when the pressure in said induction passage increases due to the tendency for the engine to slow down when one or more power-operated accessories are put in use and for moving said positioning means to move said control member to variably decrease air-fuel flow at idling when the pressure in said induction passage decreases due to the tendency for the engine to speed up when use of one or more power-operated accessories is discontinued; and said solenoid moving said positioning means for holding said posi-



tioning means in an operating position during engine operation and for moving said positioning means and said control member to an engine shut down position; said pressure-responsive means also controlling said positioning means during deceleration and downhill travel when the operator's foot is removed from the accelerator pedal for moving said positioning means to move said control member to decrease further the air-fuel flow when the vehicle momentum is driving the engine; whereby the position of said control member results from the sum of the control action of said pressure-responsive means plus the control action of said solenoid, thereby reducing fuel consumption by automatically controlling engine speed during idling and air-fuel flow during deceleration and downhill travel when the operator's foot is removed from the accelerator pedal and vehicle momentum is driving the engine.

4,056,083

EXHAUST GAS RECIRCULATOR FOR PURIFICATION OF EMISSION FROM AN INTERNAL COMBUSTION ENGINE

Nobuaki Wakita, Susono, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Japan

Filed Apr. 29, 1976, Ser. No. 681,699

Claims priority, application Japan, Dec. 19, 1975, 50-172053[U]

Int. Cl.² F02M *25/06*

U.S. Cl. 123—119 A **4 Claims**

1. An exhaust gas recirculator for purification of emission from an internal combustion engine, comprising:

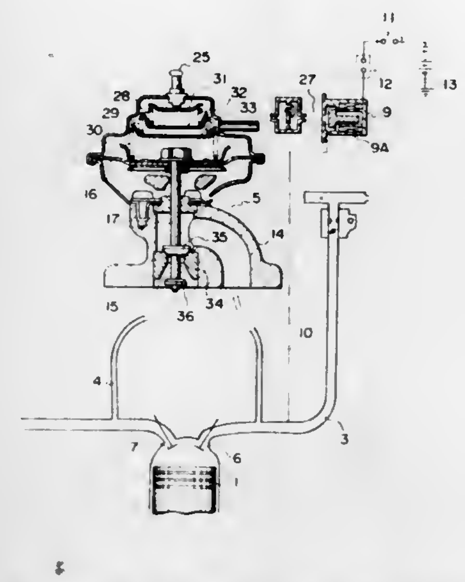
a cylinder;

an intake manifold connected to said cylinder;

an exhaust pipe;

an exhaust gas recirculation pipe connected between said intake manifold and said exhaust pipe;

a recirculation control valve inserted midway in said exhaust gas recirculation pipe, which has a diaphragm, a diaphragm chamber provided at one side of said diaphragm and connecting to said intake manifold, a valve body configured substantially as a truncated cone and connected to said diaphragm, and a plurality of springs provided in series in said diaphragm chamber and working such reaction force on said diaphragm as varies phasedly in accordance with the displacement of said valve body; and



a plurality of orifices opened in the valve chamber of said recirculation control valve, and arranged in combination around said valve body, said orifices being constituted such that they can change the flow area in the valve-opening direction of the valve body, which is controlled by the negative pressure of said intake manifold, whereby the flow rate of exhaust gas recirculated to the intake manifold can be continuously controlled by the displacement of the valve body caused by the negative pressure of the intake manifold.

4,056,084

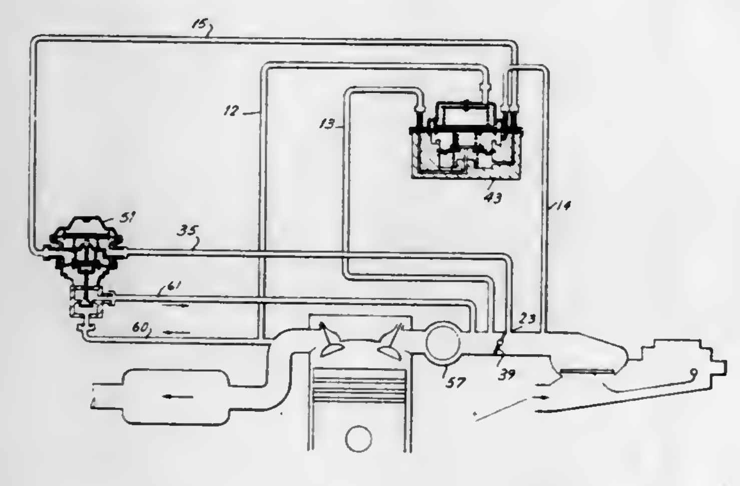
APPARATUS FOR RECYCLING EXHAUST

Hans Baumgartner, Viersen, Germany, assignor to A. Pierburg Autogeratebau KG, Neuss, Germany

Filed June 24, 1976, Ser. No. 699,635

Int. Cl.² F02M *25/06*

U.S. Cl. 123—119 A **11 Claims**



1. Apparatus for recycling exhaust gas for an internal combustion engine having inlet and outlet manifold, said apparatus comprising an EGR-valve including a plurality of diaphragms defining first and second chambers separated by one diaphragm, the second chamber being a working chamber, means for subjecting said first chamber to suction pressure prevailing in the inlet manifold of the engine, a pressure converter having a first inlet connected to the inlet manifold for being subjected to the suction pressure therein, a second inlet connected to the inlet manifold for being subjected to a control suction pressure, an outlet connected to said working chamber of the EGR-valve and valve means for selectively connecting the outlet to said second inlet in accordance with the suction pressure prevailing at said first inlet, said EGR-valve further comprising recycle means coupled to said inlet and outlet manifolds for recycling engine exhaust gases, and coupling means between said diaphragms and said recycle means for controlling the operation of said recycle means in accordance with the pressures in said chambers such that at low engine loads the amount of recycled gas is proportionately reduced in relation to engine air-fuel mixture rate to provide a lower ratio of recycled fuel to mixture rate at low loads as compared to the ratio at high loads.

4,056,085

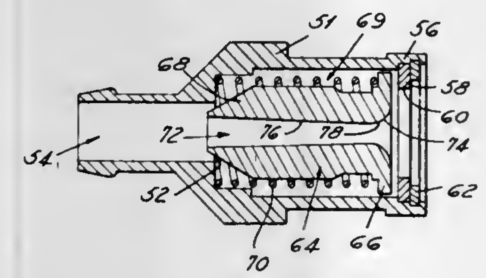
ENGINE POSITIVE CRANKCASE VENTILATION VALVE ASSEMBLY

Alvin P. Nowroski, Livonia, and Lyman V. Root, Dearborn, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed June 18, 1976, Ser. No. 697,497

Int. Cl.² F02M *25/06;* **F02F** *9/00*

U.S. Cl. 123—119 B **6 Claims**



1. An engine positive crankcase ventilation valve assembly for use in a line connecting the engine crankcase to the engine intake manifold, comprising, a sleeve type valve body having a valve seat formed on its internal diameter and slidably receiving a regulating valve of lesser diameter therein to define a flow annulus therebetween, the valve being axially movable against and away from the valve seat in response to manifold vacuum acting thereon to control variably the flow of crankcase vapors and gases to the intake manifold through the annulus, spring means biasing the valve towards a fully open position away from the valve seat in opposition to manifold vacuum acting on the valve to close the valve, and sonic flow control means extending through the valve to permit at least a minimum flow at a constant rate through the valve during all partial load conditions to always maintain a predetermined constant rate of flow of vapors and gases to the intake manifold.

4,056,086

METHOD OF ACCELERATING EVAPORATION OF FUEL IN INTERNAL COMBUSTION ENGINE INTAKE SYSTEM BY HEAT EVOLVED BY DECOMPOSITION OF H_2O_2 AND APPARATUS FOR SAME

Zene Ueno, Fuchu; Katuaki Kosaka, Hidaka, and Fumio Wagatsuma, Tokyo, all of Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan

Filed Aug. 20, 1975, Ser. No. 606,214

Claims priority, application Japan, Aug. 21, 1974, 49-95816

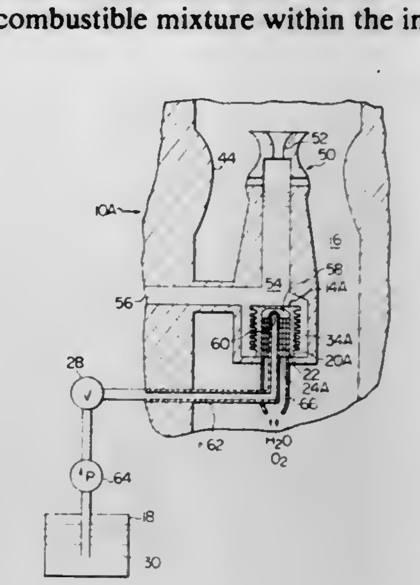
Int. Cl.² F02M *31/00*

U.S. Cl. 123—122 R **23 Claims**

1. A method of accelerating evaporation of a liquid fuel in an intake system of an internal combustion engine said intake system having fuel introduced into a flow of air to prepare a combustible mixture, comprising the steps of:

subjecting hydrogen peroxide to catalytic decomposition in a reaction vessel thereby to produce oxygen and water with evolution of heat; and

transferring the heat of decomposition to at least one component of said combustible mixture within the intake system



before said combustible mixture is admitted into the combustion chambers of the engine.

4,056,087

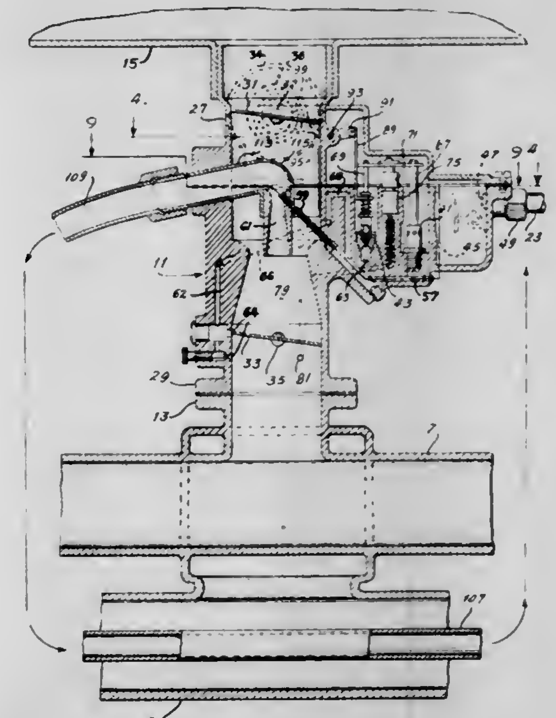
TWO-FUEL CARBURETOR

Leonard D. Boyce, Kirkwood, Mo., assignor to F. Travers Burgess, Kirkwood, Mo.

Filed Mar. 26, 1976, Ser. No. 670,718

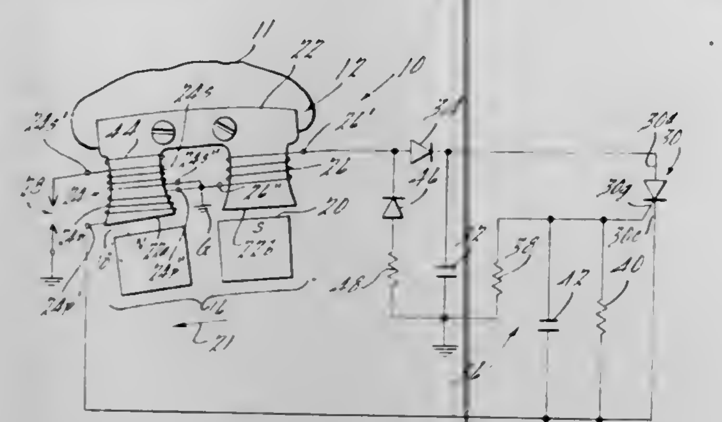
Int. Cl.² F02M *13/04, 31/00*

U.S. Cl. 123—127 **10 Claims**



1. In a carburetor for an internal combustion engine, an intake conduit, a pair of separate liquid chambers each having an outlet below the normal liquid level therein, separate normally open metering valves respectively controlling said outlets responsive to fuel requirements of the engine, a shut-off valve separate from said metering valves controlling one of said outlets independently of the respective metering valve, means controlling said shut-off valve responsive to engine temperature to maintain said shut-off valve closed during cold starting of the engine when the engine temperature is below a predetermined value and to open said shut-off valve during normal operation of the engine when the engine temperature equals or exceeds such predetermined value, and separate passage means connecting said outlets to the intake conduit and having discharge means thereinto at a level above the liquid level in said chambers.

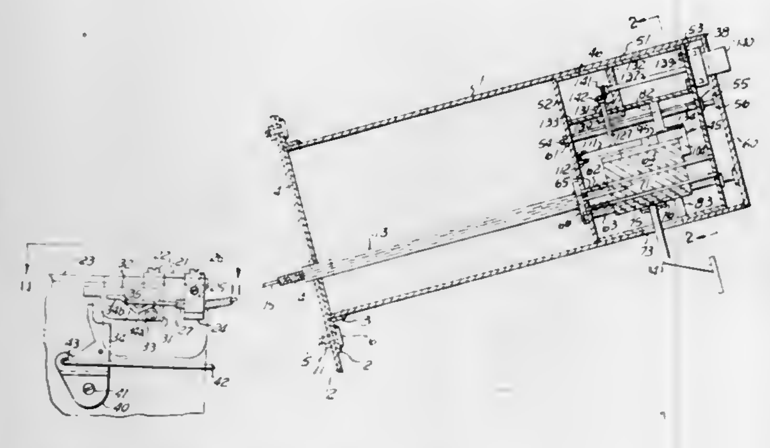
4,056,088
IGNITION SYSTEM
Thomas F. Carmichael, Drayton Plains, Mich., assignor to Syncro Corporation, Oxford, Mich.
Filed Apr. 12, 1974, Ser. No. 460,271
Int. Cl.² F02P *3/08*
U.S. Cl. 123—148 E **2 Claims**



1. A capacitor discharge ignition system for delivering a secondary potential to a spark plug and incorporating circuit components with limited peak potential rating comprising:
an ignition coil having a primary and a secondary winding coil for connection to a spark plug,
a stator core on which said primary and secondary windings are disposed,
a shorted winding on said stator core for reducing the maximum peak potential delivered to said ignition system circuit components with limited peak potential rating without detrimentally reducing said secondary potential delivered to said spark plug at low rotor speeds relative to the same ignition system without said shorted winding,
a magnetic structure including a north magnetic pole and a south magnetic pole for energizing said primary winding through said stator core with a time-varying magnetic flux such that said primary winding generates an output waveform which includes repetitive pulses of one polarity,
a spark plug,
a main capacitor,
a charge coil also disposed on said stator core being energized by said time-varying magnetic flux provided by said north and south magnetic poles for energizing said main capacitor,
diode means connected in parallel with said charging coil for reducing the maximum peak potential delivered to said ignition system circuit components with limited peak potential rating without detrimentally reducing said secondary potential delivered to said spark plug at low rotor speeds relative to the same ignition system without said diode means,
a solid state switch means connecting said capacitor to said primary winding, said solid state switch means being arranged to conduct current from said capacitor to said primary winding in response to a trigger signal, and
triggering circuit means coupling said primary coil and said solid state switch means such that said solid state switch means is rendered conductive in response to a trigger signal derived from said pulses generated by said primary winding upon energization thereof by said time-varying magnetic flux provided by said north and south magnetic poles, which trigger signal occurs after said capacitor has been energized.

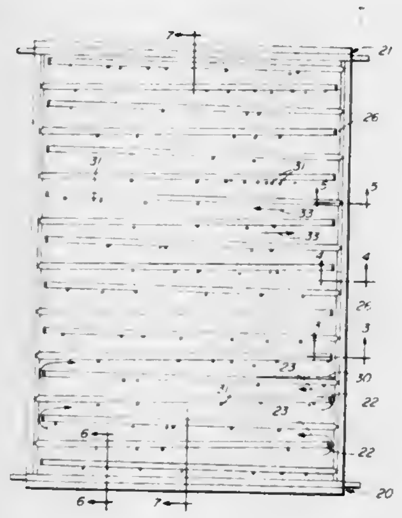
4,056,089
THROTTLE VALVE LOCK FOR AUTOMOBILE
David P. Ratliff, 4578 Post, Troy, Mich. 48084
Filed Aug. 9, 1976, Ser. No. 712,924
Int. Cl.² F02B *77/00*
U.S. Cl. 123—198 B **8 Claims**

1. In combination, a throttle valve lock, a motor vehicle having an internal combustion engine, a carburetor mounted upon said engine, a passenger compartment, and a fire wall separating the passenger compartment from the engine, wherein the improvement comprises,
a lock member, having reciprocable travel between a throttle valve lock position to resist functioning of said throttle valve, and a throttle valve release position to afford such functioning,
means mounting said lock member relative to and exteriorly of said carburetor for such travel,
an actuator, mounted in the passenger compartment of such vehicle for operation by a driver,
drive means interconnecting said lock member and said actuator to transmit a reversible drive from said actuator to said lock member,



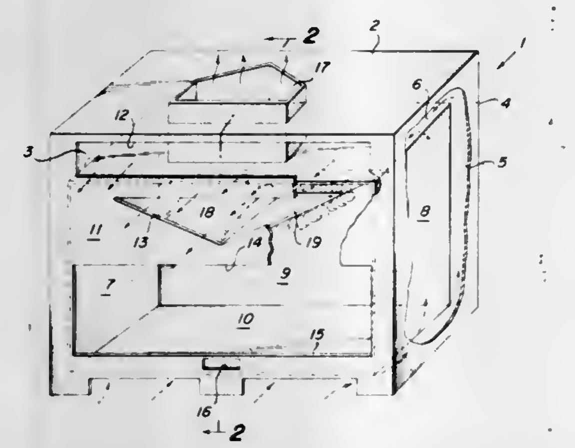
actuator support means supporting said actuator for reversible travel to operate said drive means,
at least one restraint element releasably engageable with said actuator to resist said reversible travel and immobilize said lock member in said lock position,
a restraint support to support said restraint element for said releasable engagement,
a first spring means urging said restraint element to engage said actuator,
a trigger to disengage said restraint element from said actuator, and
a second spring means urging said actuator to operate said drive means to establish said lock member in its throttle valve release position.

4,056,090
SOLAR HEAT COLLECTOR
Frederick C. Henriques, Simsbury; Joseph P. Pandolfo, Kensington, and Peter Lunde, West Simsbury, all of Conn., assignors to The Center for the Environment & Man, Hartford, Conn.
Filed Feb. 23, 1976, Ser. No. 660,617
Int. Cl.² F24J *3/02*
U.S. Cl. 126—271 **12 Claims**



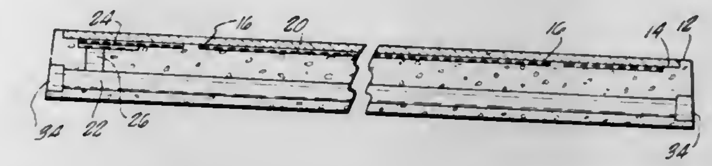
1. A solar heating panel comprising means in the form of a first sheet of substantially flat solid material to convert visible radiation into heat, a second sheet of substantially-flat solid material which is at least partially transparent to visible radiation and which is substantially opaque to infrared radiation through which to transfer visible radiation energy to said first sheet, means holding said sheets in confronting spaced-relation, means giving access to the space between said sheets for filling said space with a heat transfer liquid, means to guide said heat transfer liquid in a substantially laminar flow mode between said sheets, such that when said space is filled with a liquid having an index of refraction approximating the index of refraction of said second sheet substantially all visible radiation that is incident upon said panel will be transmitted therethrough to said first sheet for conversion into heat, and said liquid flowing in said laminar flow mode will thermally insulate said sheets one from the other.

4,056,091
VORTICAL FLOW AEROTHERMODYNAMIC FIREPLACE UNIT
Alexander John Moncrieff-Yeates, 8609 Hillside Place, Fairfax, Va. 22030
Filed Apr. 23, 1975, Ser. No. 570,798
Int. Cl.² F24B *7/00*
U.S. Cl. 126—121 **21 Claims**



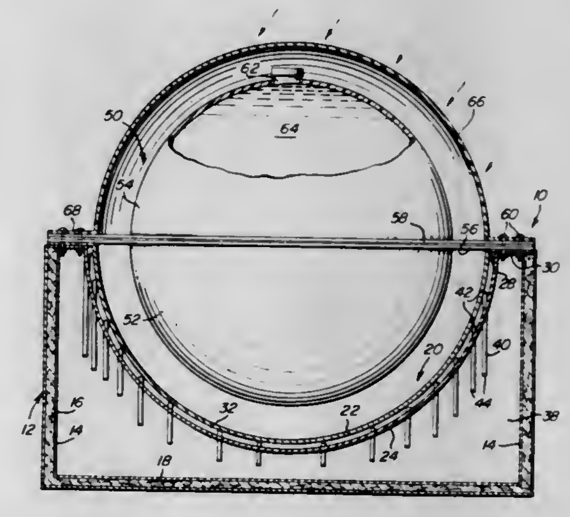
1. A heat exchange structure for use in a fireplace of the type including
an enclosure for a fire producing a hot thermally donative gas, said enclosure comprising side walls, a back wall, and a top wall,
a flue opening in said top wall for exhausting said donative gas,
an outer enclosure comprising walls spaced outwardly from said fire enclosure walls and defining therebetween passages for a thermally recipient air,
a front wall extending downwardly from a front portion of said top wall and including a fire enclosure opening therein,
means communicating air from said thermally recipient air passages through said front wall, said means comprising a duct extending between junctures with said back and front walls through a central portion of said fire enclosure,
said structure further characterized in that
said duct has a bottom surface comprising a flame plate for exposure to said donative gas in said enclosure, said flame plate being slanted upwardly toward one of said junctures to define throughout the extent of said one juncture a laterally extensive thermally donative air vorticity area throughout which the donative air is induced to whirl in a stable vortex proximate to and in heat exchange relationship to said flame plate and said wall structure.

4,056,092
FLAT PLATE SOLAR ENERGY COLLECTOR
Harold K. Meier, and John Michael Popovich, both of 9620 Royalton Drive, Beverly Hills, Calif. 90210
Filed July 26, 1974, Ser. No. 492,342
Int. Cl.² F24J *3/02*
U.S. Cl. 126—271 **9 Claims**



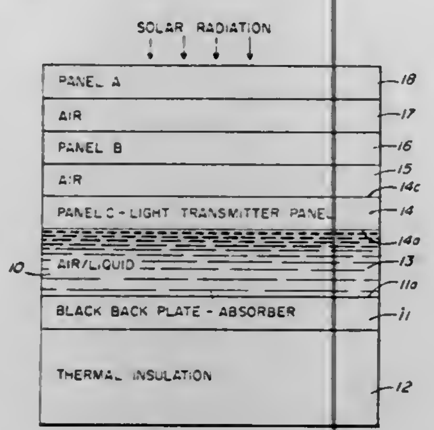
1. A solar energy collector comprising:
a first member defining a first planar surface, said planar surface being spectrally transparent to solar radiation;
a second member defining a second planar surface parallel to and spaced from said first planar surface, said second planar surface being spectrally absorptive to solar radiation;
means adhering said first and second members together in a fluid-tight relationship defining a cavity between said first and second planar surfaces, said cavity having a cross-sectional dimension of about ⅛ to ¼ inch; and
means for continuously circulating fluid through said cavity to define a radiation interference filter spectrally transparent to solar radiation and spectrally opaque to heat radiation.

4,056,093
SOLAR HEATER
Harold E. Barger, Paxton, Nebr. 69155
Filed Dec. 5, 1975, Ser. No. 638,096
Int. Cl.² F24J *3/02*
U.S. Cl. 126—271 **4 Claims**



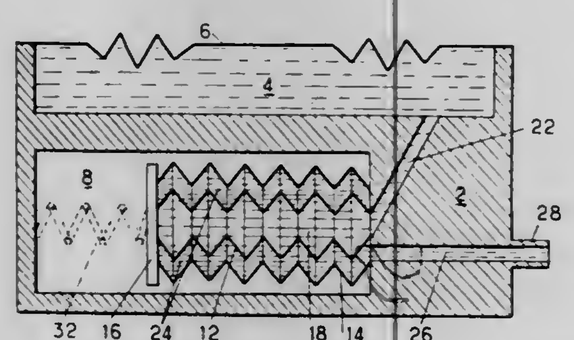
1. In combination, an upwardly opening generally hemispherical double wall boiler including closely radially spaced inner and outer hemispherical walls defining a closed chamber therebetween in which to receive a liquid to be heated, a hollow transparent spherical lens body of smaller outside diameter than the inside diameter of said boiler, supported concentrically from the upper peripheral portion of said boiler and closing the latter from above and filled with a transparent liquid, a downwardly opening hemispherical and transparent hollow cover secured over said transparent spherical lens in spaced relation thereto and with the centers of curvature of said spherical lens, inner and outer hemispherical walls and said cover substantially coinciding.

4,056,094
SOLAR HEAT COLLECTOR
Paul Rosenberg, Larchmont, N.Y., assignor to The Center for the Environment & Man, Hartford, Conn.
Filed Feb. 23, 1976, Ser. No. 660,437
Int. Cl.² F24J *3/02*
U.S. Cl. 126—271 **13 Claims**



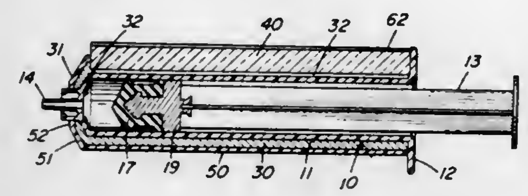
1. In a solar heating panel having an absorber panel for converting radiant energy into heat, a sheet of solid material substantially transparent to visible light for transferring such energy to said absorber panel, said absorber panel and said sheet of solid material defining a space for a heat transfer liquid, the improvement comprising:
internally-reflecting prism means on the surface of said sheet of solid material facing towards said space for heat transfer liquid, for substantially entirely reflecting visible light that is incident upon said panel when said heat transfer liquid is not present.

4,056,095
CONTROL DEVICE FOR MEDICAL AND SURGICAL USES
Pierre Theodore Joseph Rey, Thorigny; Jacqueline Agathe Marie Leandri, Paris, and Clement Claude Abbou, Fontenay S/Bois, all of France, assignors to Agence Nationale de Valorisation de la Recherche (ANVAR), France
Filed Apr. 1, 1976, Ser. No. 672,680
Claims priority, application France, Apr. 4, 1975, 75.10534
Int. Cl.² A61F *1/00;* **A61B** *17/00*
U.S. Cl. 128—1 R **22 Claims**



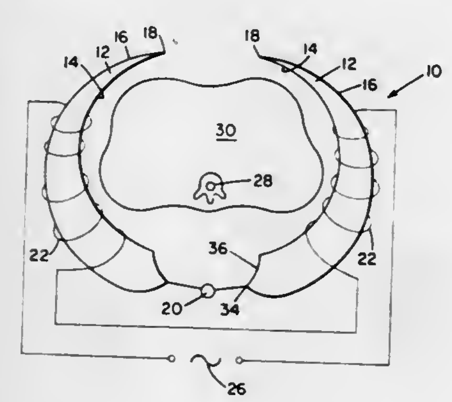
1. An externally actuated control device for operating a means for controlling a body duct or cavity in medical and surgical uses, implantable in sub-cutaneous position and actuatable by pressing on a sub-cutaneous membrane, said device comprising, in a casing, a first chamber, closed by said membrane which is positioned on one face of the casing and containing an incompressible fluid, and a second chamber, containing a gas and housing two coaxial bellows joined together at their free ends, one of the two bellows being an actuating bellows and communicating with said first chamber containing said incompressable fluid, and the second bellows with a flexible control duct going to said body duct or cavity to be controlled.

4,056,096
SHIELDED SYRINGE
Carl Collica, New Rochelle; Leonard Epifano, Rye, and Ralph Farella, Scarsdale, all of N.Y., assignors to Medi-Ray, Inc., Tuckahoe, N.Y.
Filed Mar. 19, 1976, Ser. No. 668,531
Int. Cl.² A61B *6/00*
U.S. Cl. 128—1.1 **27 Claims**



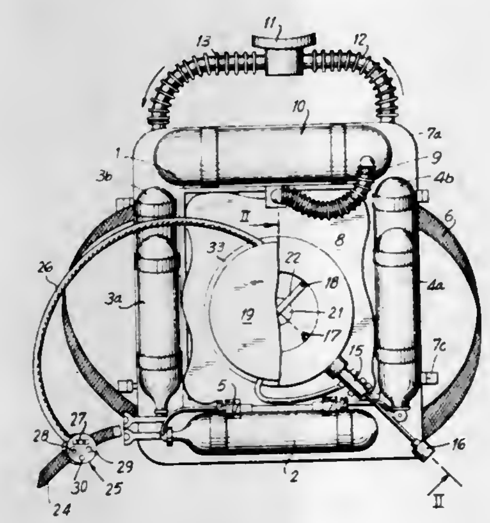
1. A shielded syringe, comprising:
a syringe having a barrel, a tip on the front of said barrel, and a plunger slideable in said barrel and extending from the rear of said barrel for manual actuation, said syringe having volumetric indicia disposed along its barrel;
a body of radiation-shielding material substantially covering the barrel of said syringe, said body having a slot therein which is in registration with at least some of said indicia;
a shell substantially covering said radiation-shielding body, said shell having a slot therein which is in registration with the slot in said radiation-shielding body;
an optically transparent radiation-shielding member proportioned to generally conform in size to the slot in said body and removably insertible therein; and
manually actuable means adapted for engaging said shell and said transparent radiation-shielding member so as to removably retain said member in said body.

4,056,097
CONTACTLESS STIMULUS TRANSDUCER
Joachim Adolf Maass, 179 East Maxwell St., Lexington, Ky. 40508
Filed Mar. 15, 1976, Ser. No. 666,646
Int. Cl.² A61N *1/42*
U.S. Cl. 128—1.5 **8 Claims**



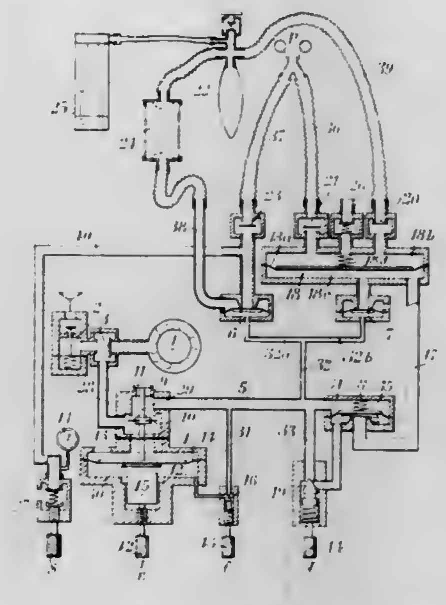
1. Apparatus for stimulating a biological specimen, comprising at least two ferro-magnetic pole pieces, means for positioning said pole pieces in operative relation to said biological specimen, each of said pole pieces having an outer boundary surface of predetermined curvature and an inner curved surface intersecting the outer surface at opposite ends of the pole piece, said inner curved surfaces of the pole pieces confronting each other in at least partially encircling relation to the biological specimen to define a stimulus zone, a field winding mounted on each of said pole pieces intermediate the opposite ends thereof, a source of energizing current, and means connecting said source to the field windings for generating opposing magnetic fields extending from the inner surfaces of the pole pieces into the stimulus zone.

4,056,098
RESPIRATORY APPARATUS FOR FREE UNDERWATER DIVER
Alain Marie Michel, Toulon, and Jean Edmond Parc, Toulon Naval, both of France, assignors to Etat Francais, Paris, France
Filed Jan. 7, 1976, Ser. No. 647,168
Claims priority, application France, Jan. 17, 1975, 75.01381
Int. Cl.² A62B *7/00*
U.S. Cl. 128—142 R **8 Claims**



1. Respiratory apparatus for an underwater free diver comprising a sealed and deformable respiratory bag in pressure equilibrium with the exterior, diver connection means connected to said bag for permitting a diver to breath into and from said bag, absorbant means for CO_2 connected to said bag and to said diver connection means for passage of exhaled gas therethrough, an oxygen container connected to said bag, a container of compressed neutral gas connected to said bag, a valve controlling the connection of the neutral gas container with said bag, actuator means coupled to said valve and operated by said bag upon reduction of the volume thereof for opening said valve to admit neutral gas into said bag, sensor means for sensing the actual partial pressure of oxygen in said bag, said sensor means producing a voltage proportional to said actual partial pressure, an electrovalve controlling the connection of the oxygen container to said bag, electronic regulation means connected to said sensor means and to said electrovalve for automatically controlling said electrovalve to maintain the partial pressure of oxygen in said respiratory bag substantially equal to an assigned adjustable value, and a sealed casing containing said electrovalve and said electronic circuit means, said electronic regulation means comprising a subtractor for producing a signal equal to the difference between an adjustable reference voltage corresponding to the assigned value of the partial pressure of oxygen and the voltage furnished by the sensor means for automatically controlling the closure of the said electrovalve when the difference is less than a first threshold zero level, and a comparator means coupled to said subtractor for comparing the difference between the assigned value and the actual value of the partial pressure of oxygen to a second positive threshold value equal to a fraction of the reference voltage for effecting successive and discontinuous opening of the electrovalve when this difference is positive and less than the second threshold valve and for effecting continuous opening of the electrovalve when said difference is greater than the second threshold value.

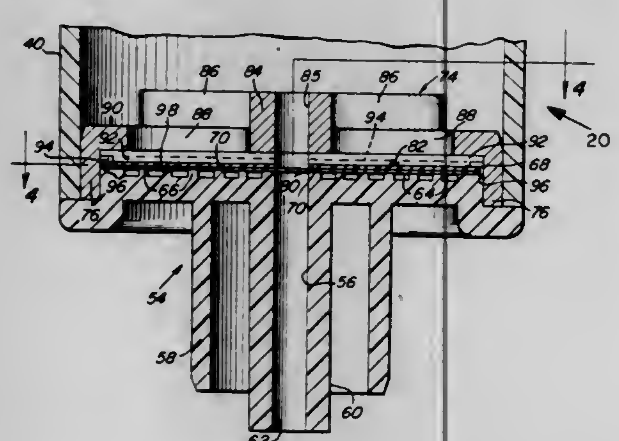
4,056,099
VOLUMETRIC RESPIRATION EQUIPMENT
Robert Metivier, 49 rue du Docteur Blanche, 75016 Paris, France
Filed Jan. 20, 1976, Ser. No. 650,610
Claims priority, application France, Jan. 20, 1975, 75.01615
Int. Cl.² A61M *16/00*
U.S. Cl. 128—145.6 **4 Claims**



1. Volumetric respirator for reanimating a patient, comprising, in combination:
a source of gases necessary for the patient's respiration;
control means for inhalating said gases into the patient's lungs and subsequently permitting the patient's exhalation with an adjustable inhalation time to exhalation time ratio, said control means including a housing having first and second chambers separated by diaphragm means, an inlet valve connected to said first chamber, a first conduit connecting said source with said inlet valve, inhalation valve means connected to said first chamber adapted to open for allowing the flow of said gases into the patient's lungs, and exhalation valve means adapted to open for subsequently allowing the flow of the gas breathed out by said patient, patient connection means, a first controlled membrane-type valve member closed during the inhalation time and open during the exhalation time, said first controlled membrane-type valve member having an inlet port communicating with said second chamber, a control port and a vent port;
an inhalation gas conduit connecting said inhalation valve means with said patient connection means;
an exhalation gas conduit connecting said patient connection means with said exhalation valve means, a second controlled membrane-type valve member having an inlet port communicating with said exhalation valve means, a control port and a vent port, a second conduit connecting said vent port of said second controlled membrane-type valve member with said source, said second conduit including means permitting the regeneration of the gas breathed out by the patient;
means for preserving the safety of operation of said respirator, consisting of a safety valve communicating with said exhalation gas conduit;
means controlling said control means for inhalating said gases from said source into the patient's lungs and subsequently causing the patient to exhale comprising:
a source of control fluid under pressure;
a main circuit for directing said control fluid under pressure towards said second chamber;
a circuit branched off said main control fluid circuit, which comprises in turn two branch lines leading to the control ports of said first and second membrane-type valve members, respectively;
means permitting the delivery of said control fluid to said

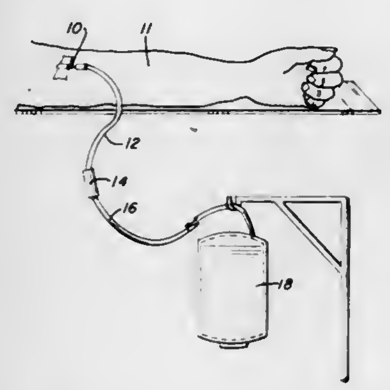
main circuit under a low pressure higher however than the pressure that the patient's lungs can withstand;
said means controlling said control means including a housing having first and second chambers, said first chamber including an inlet port communicating with said source of control fluid, an outlet port communicating with said second chamber and an exhaust port communicating with atmosphere, and valve means for closing said inlet port and opening said exhaust port simultaneously, and opening said exhaust port and closing said inlet port simultaneously, said second chamber including movable means operatively associated with said valve means, filling means communicating between said main circuit and said second chamber of said controlling means for filling said second chamber with control fluid during a time period corresponding to the inhalation period and to be emptied during another time period corresponding to the exhalation time, and means associated with said filling means for adjusting as required the inhalation time to exhalation time ratio;
said filling means including a needle valve for adjusting the frequency of the filling and emptying phases of said chamber in said control assembly;
means between said means controlling said control means and said second chamber capable of providing a constant control fluid output, whereby the patient's compliance is compensated, said means providing a constant control fluid output including means for adjusting the value of said output.

4,056,100
VOLUME LIMITING CHAMBER
Douglas G. Noiles, New Canaan, Conn., assignor to United States Surgical Corporation, New York, N.Y.
Continuation-in-part of Ser. No. 504,733, Sept. 10, 1974, Pat. No. 3,967,620. This application July 1, 1976, Ser. No. 701,886
Int. Cl.² A61M *5/14*
U.S. Cl. 128—214 C **23 Claims**



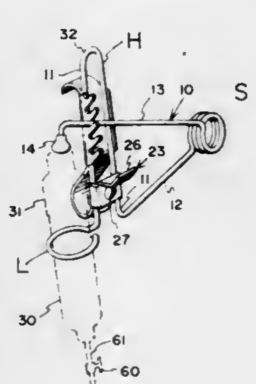
1. A volume limiting chamber for use in an intravenous set comprising a chamber having a top and a bottom and side walls connecting said top and bottom, an inlet passageway in said top for placing said chamber in fluid communication with a source of parenteral solution, an outlet passageway in said bottom for placing said chamber in fluid communication with an intravenous needle, indicia on said chamber for indicating the amount of parenteral solution in said chamber, a membrane valve positioned in said chamber and cooperating with said outlet fluid passageway so that all parenteral solution in said chamber flows through said membrane valve, said membrane valve comprising a material which when wet will pass parenteral fluid but will not pass air at normal intravenous administration pressures, and means for bypassing said membrane valve and allowing air to enter said chamber through said bottom from underneath said membrane valve when said membrane valve is wet, said bypass means comprising means for mounting said membrane valve in said bottom so that air can enter said volume limiting chamber around the periphery of said membrane valve, said mounting means comprising a surface against which said membrane valve is adapted to seat, said surface having a plurality of air passages formed therein in communication with said outlet passageway such that air forced through said outlet passageway and said air passages will act to unseat said membrane valve, said mounting means further comprising a bypass member spaced from said surface to define a membrane valve chamber therebetween, said membrane valve being mounted in said membrane valve chamber adjacent said surface, said bypass means further comprising a pressure pad mounted in said membrane valve chamber between said membrane valve and said bypass member whereby said membrane valve is resiliently urged into contact with said surface by said pressure pad.

4,056,101
MEANS FOR REDUCING TISSUE THROMBOPLASTIN IN COLLECTED BLOOD
Ulrich C. Geissler, Cary, and William J. Stith, Mundelein, both of Ill., assignors to Baxter Travenol Laboratories, Inc., Deerfield, Ill.
Filed Sept. 1, 1976, Ser. No. 719,556
Int. Cl.² A61M *5/00*
U.S. Cl. 128—214 D **4 Claims**



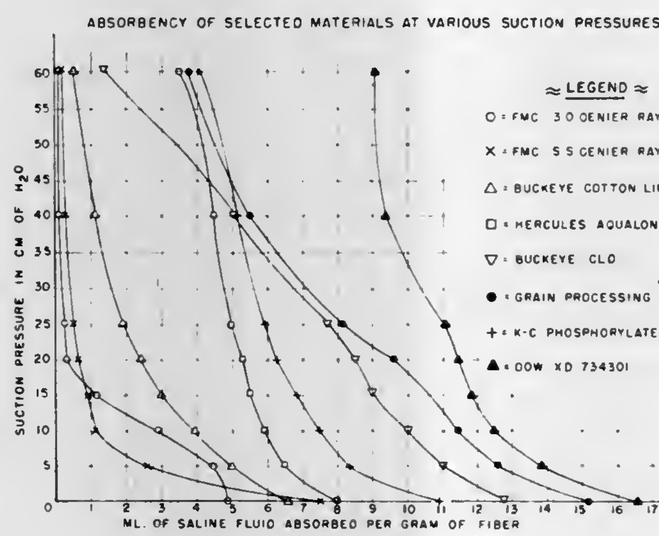
1. In a blood collection system including a phlebotomy needle, a main blood container and tubing for coupling the needle to the main container, the improvement comprising: a secondary blood container for collecting an initial volume of blood prior to collection of the blood in the main blood container, said secondary blood container comprising a blood receptacle concentrically positioned about said tubing, said tubing being open within said receptacle during flow of said initial volume whereby said initial volume will flow to said receptacle; and means for collecting said initial volume in said secondary container and thereafter channeling flow of the blood into said main blood container.

4,056,102
SPRING ACTUATED MEDICAL INJECTOR
Melvin Levinson, 7330 SW. 62nd Place, Miami, Fla. 33143, and Goodwin Salkoff, 450 Tivoli, Coral Gables, Fla. 33134
Filed Aug. 24, 1976, Ser. No. 717,355
Int. Cl.² A61M *5/00*
U.S. Cl. 128—218 F **6 Claims**



1. A spring actuated medical injector comprising a substantially elongated wire body portion, syringe holding means mounted on one end of said elongated wire body portion and extending in one direction therefrom, spring holding means formed of wire mounted on said one end of said elongated body portion and extending in a substantially opposite direction, spring means mounted on said last named means, an actuating wire arm extending from said spring means in the direction of said elongated body portion, detent means mounted on said elongated wire body portion for engaging said actuating arm and preventing the swinging movement of said actuating arm and means releasing said actuating wire arm from said detent.

4,056,103
WRAPPER STRUCTURE FOR TAMPONS CONTAINING SUPERABSORBENT MATERIAL
Leonard M. Kaczmarzyk; James J. Hlaban, both of Neenah, and Patricia J. McKelvey, Appleton, all of Wis., assignors to Kimberly-Clark Corporation, Neenah, Wis.
Filed Mar. 11, 1977, Ser. No. 776,635
Int. Cl.² A61F *13/20*
U.S. Cl. 128—285 **7 Claims**



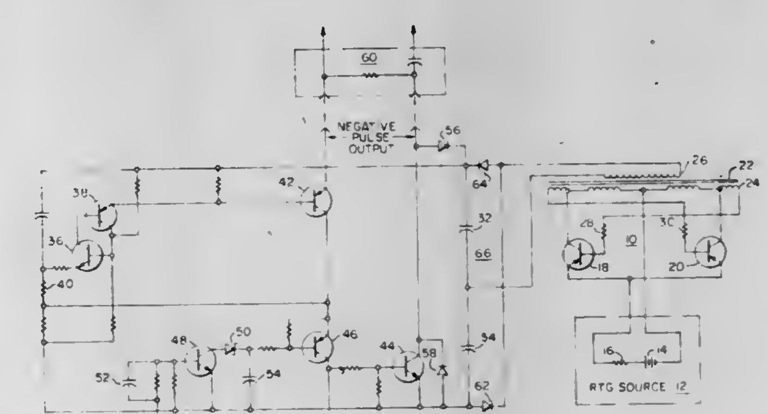
1. In a tampon comprised of an absorbent core containing superabsorbent materials and a fluid-permeable wrapper enclosing said core and in which said superabsorbent material has a suction pressure in the range of 25 cm. of H_2O or more when 5 ml. of physiological saline fluid are absorbed per gram of fiber, means for providing ease of withdrawal of the tampon comprising a body fluid lubricable wrapper material having a fluid retention capacity of 30% or more, said fluid retention capacity being the percent saline solution retained in the wrapper material at equilibrium conditions when said wrapper is in simulated contact with a superabsorbent material containing 100% saline solution by weight.

4,056,104
ENDOTRACHEAL TUBE
Burton Jaffe, 22 Burnham Road, West Newton, Mass. 02165
Filed Jan. 15, 1976, Ser. No. 649,329
Int. Cl.² A61M *25/00*
U.S. Cl. 128—351 **11 Claims**

1. An endotracheal tube comprising a pliable hollow plastic tube of a length many times its width having open distal and proximate ends defining a fluid passageway, a section of the tube spaced from either end having a triangular cross-section extending along at least a portion of the tube that would normally contact the larynx and conforming to the shape of the larynx when the tube is in position with the distal end of the tube in the trachea and the proximate end extending from the mouth, a cuff coaxial with and secured to the tube between the distal end and said section, and a cuff inflation lumen extending longitudinally from said cuff lengthwise of the wall of said section toward said proximate end, said section having a substantially uniform wall thickness along its length extending along the tube a distance less than the entire length of the tube

with the passageway through said section also having a triangular shape to optimize fluid passage through the tube.

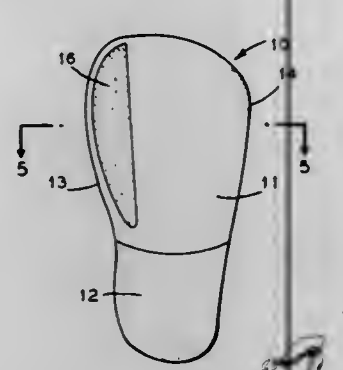
4,056,105
PULSE GENERATOR
Richard J. Ravas, Monroeville, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.
Filed Nov. 19, 1974, Ser. No. 525,123
Int. Cl.² A61N *1/36*
U.S. Cl. 128—419 PG **5 Claims**



1. A radioisotope thermoelectric heart pacemaker comprising:
a radioisotope thermoelectric DC source;
a substantially constant input current inverter electrically connected to be driven by the source and having a square wave output;
a transformer having a primary winding connected to the square wave output and a secondary winding output;
a voltage multiplier rectifier having an input from the transformer secondary winding and an output;
a capacitive reactance, having an output which is adapted to be connected to the heart, comprising a plurality of series coupled capacitors respectively connected in parallel across the secondary winding through the rectifier in a manner that will provide a voltage across the reactance equal to the secondary winding output multiplied by the number of capacitors;
means for monitoring the voltage level across the capacitive reactance and comparing the monitored voltage with a preselected fixed reference level; and
means connected between the capacitive reactance and the output to the heart for cyclically discharging the capacitive reactance through the heart at a substantially constant rate, said discharge means being responsive to said monitoring means to disconnect the capacitive reactance from the heart during the discharge portion of each cycle prior to substantial discharge of the reactance when the voltage

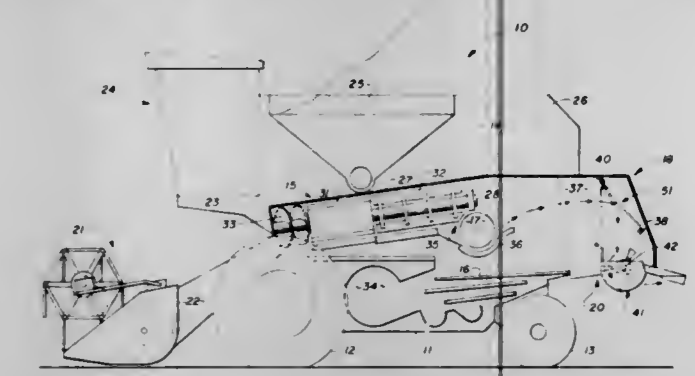
across the reactance drops below the preselected reference level.

4,056,106
ORTHOPEDIC SHOE CONSTRUCTION
Joseph E. Salvatore, 200 Engle St., Englewood, N.J. 07631
Filed Aug. 2, 1976, Ser. No. 710,912
Int. Cl.[2] A43B *7/24*
U.S. Cl. 128—583 **12 Claims**



1. A shoe having an upper and a sole and heel portion,
an orthopedic friction corrective member attached to said sole portion,
said sole portion having generally a flat outer surface,
said friction member positioned at the great toe side of said sole portion to retard the movement of said shoe when said shoe engages the ground under the weight of the wearer of said shoe creating a friction surface at the point of application of said friction member whereby internal rotation is caused at said great toe side of said sole portion of said shoe turning said shoe inwardly in the direction of the position of said friction member when said friction member engages the ground.

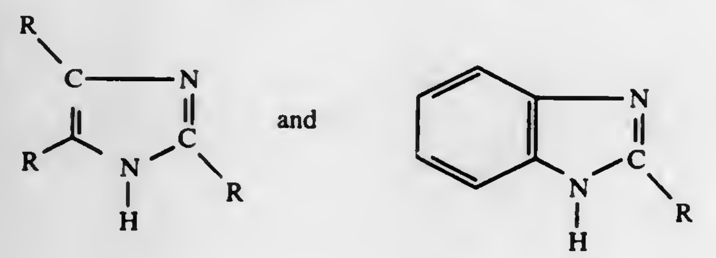
4,056,107
CROP RESIDUE DEFLECTOR MEANS
Robert R. Todd, Leola, and Edward W. Rowland-Hill, Lancaster, both of Pa., assignors to Sperry Rand Corporation, New Holland, Pa.
Filed Apr. 26, 1976, Ser. No. 679,956
Int. Cl.[2] A01F *7/06*
U.S. Cl. 130—27 R **8 Claims**



1. In a combine having a hollow residue receiving discharge hood provided with a downwardly facing residue outlet for receiving residue material emanating from said combine and a residue treating means, such as a straw chopper or the like, mounted in the vicinity of said outlet for treating said residue material and discharging the same onto the ground, the improvement comprising:
a deflector mounted within said hood above said treating means and adapted to be disposed between a first position wherein said emanating residue material is deflected into said treating means and a second position wherein said emanating residue material is deflected through said residue outlet to thereby bypass said treating means; and
means for mounting said deflector for movement between said first and second positions.

4,056,108
TOBACCO PRODUCT
Joseph N. Schumacher; Freddie W. Best, and Charles R. Green, all of Winston-Salem, N.C., assignors to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.
Continuation-in-part of Ser. No. 578,806, May 19, 1975. This application Apr. 21, 1976, Ser. No. 679,009
Int. Cl.[2] A24B *3/12*
U.S. Cl. 131—17 R **7 Claims**

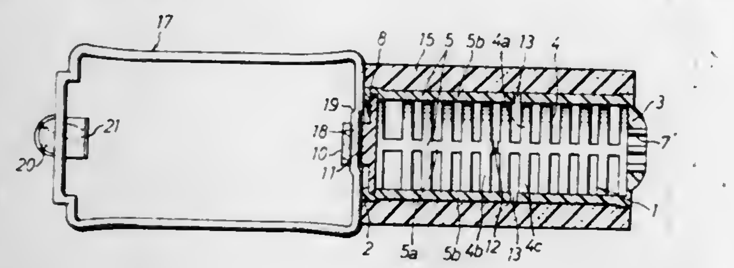
1. A tobacco product or foodstuff having added thereto a small amount sufficient to alter the flavor or aroma of the tobacco product or foodstuff of a compound selected from the group of compounds having the following formulae:



I II

where R = hydrogen, alkyl containing up to 6 carbon atoms, alkenyl containing up to 6 carbon atoms, or acyl containing up to 6 carbon atoms.

4,056,109
HAIR-CURLER
Hisao Takai, Katano, Japan, assignor to Lucky Hair Products Co., Ltd., Yao, Japan
Filed June 16, 1976, Ser. No. 696,710
Int. Cl.[2] A45D *2/00*
U.S. Cl. 132—40 **8 Claims**

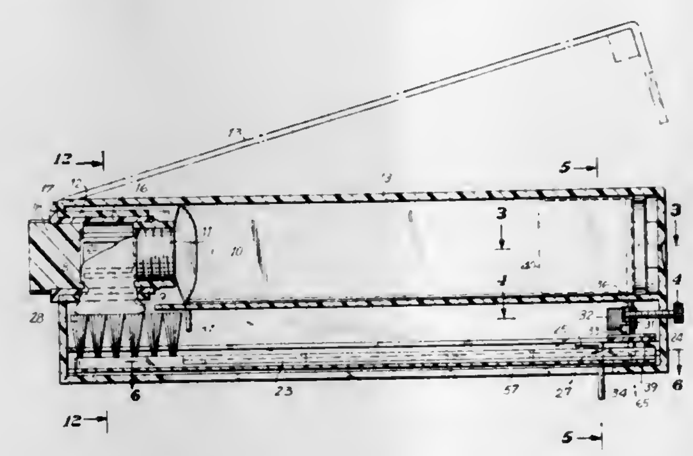


1. A hair-curler comprising a cage-like tubular core, a hollow cylindrical cover of cellular synthetic resin covering the tubular core, and a rectangular holding frame pivotally connected to one end of the tubular core and provided with an engaging projection detachably engageable in the other end of the tubular core; the tubular core: (1) being formed at its one end with at least two slots intersecting each other at the center of the end for engaging the engaging projection of the holding frame, the slots being formed in an outwardly bulged center portion of the end which provides a guide surface for the engaging projection of the holding frame; (2) having at its longitudinal midportion a flexible portion bendable with the cover when the tubular core is subjected to an external force at its opposite ends; and (3) having a frame support fittingly retained on the inner peripheral wall of the other end of the tubular core against displacement longitudinally of the tubular core but rotatable circumferentially of the tubular core; and the rectangular holding frame being integral in its entirety and surrounding the cover.

4,056,110
COMBINATION BRUSH AND PASTE DISPENSER
Emanuel Landsman, 245 N. Broadway, Yonkers, N.Y. 10701
Filed Oct. 19, 1976, Ser. No. 733,824
Int. Cl.[2] A45D *44/18*
U.S. Cl. 132—84 R **12 Claims**

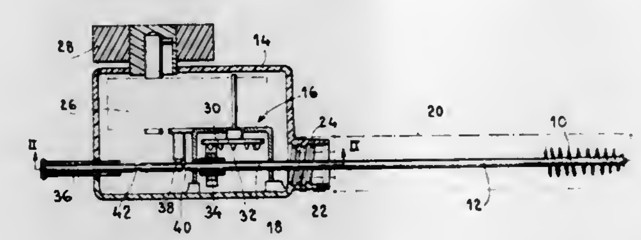
1. A combination of brush and paste dispenser for dispensing

a measured amount of paste from a tube onto a brush comprising:
a hollow elongated housing having a hinged outlet cover mounted on one end and a top cover providing access to the top of said housing;
a first compartment in said housing for receiving and securing the tube of paste;
paste applying means for coupling to the outlet of the paste tube and disposed above said hinged outlet cover;
a carriage slidably disposed in said housing and including a compression paddle for engaging the side walls of the paste tube;



a brush and handle combination slidably disposed in said housing with the brush being adjacent to said hinged outlet cover, said brush and handle combination having a pin connected to the handle and disposed through an elongated slot in said housing, and said brush portion being disposed adjacent to said brush applying means; and
connection means coupling said handle to said carriage and for advancing said carriage and compression paddle with respect to said paste tube so that when the handle pin is pushed in the direction of said hinged outlet cover, said compression paddle will advance along the side of said paste tube causing paste to be dispensed from the tube outlet through said paste applying means onto said brush as the brush is advanced out of said hinged outlet cover.

4,056,111
COSMETIC APPLICATOR
Jean Mantelet, 46-48, Avenue Montaigne, 75008 Paris, France
Filed June 2, 1976, Ser. No. 692,185
Claims priority, application France, Mar. 30, 1976, 76.09133
Int. Cl.[2] A45D *40/26, 24/00*
U.S. Cl. 132—88.7 **9 Claims**



1. An applicator for a cosmetic product, particularly for eyelashes, comprising a painting tool, such as a cylindrical or conical brush having radially extending bristles, which tool is adapted to receive the said product and is carried by a rod, the axis of which is an extension of the axis of the tool, said rod being mounted for rotation in a casing adapted to be held by hand, and a drive device contained in said casing and comprising a rotary output shaft coupled to the rod, wherein the drive device comprises a spiral spring motor adapted to be wound by means of a button mounted for movement on and relative to the casing, and a speed step-up mechanism disposed between the motor and the output shaft.

4,056,112
CONTAINMENT AND REMOVAL OF RADIOACTIVE SPILLS BY DEPOSITING A CROSSLINKED ION EXCHANGE COMPOSITION IN A DRY FORM OVER REGION OF SPILL
Calvin Calmon, Arneys Mount Road, Birmingham, N.J. 08011
Filed May 2, 1974, Ser. No. 466,232
Int. Cl.[2] B08B *7/00*
U.S. Cl. 134—6 **18 Claims**

1. A method of containing and removing spills of liquid radioactive material comprising the steps of
depositing an ion exchange composition in a dry form over the region where a spill of liquid radioactive material has occurred and over the regions surrounding said spill region, the amount of cross-linking agent in said ion exchange composition being selected so that the radioactive ions of said radioactive material are exchanged with ions of said ion exchange composition, said radioactive ions being held in said ion exchange composition, and said liquid is simultaneously absorbed by said ion exchange composition and substantially confined to said spill region;
removing said ion exchange composition from said spill region and from said surrounding regions after said ion exchange and said absorption operations have occurred.

4,056,113
LIQUID DETERGENT COMPOSITIONS FOR REMOVAL OF COOKED-ON FOOD SOILS
Eric M. Johnson, Blyth; Graeme D. Murray, and Frederick E. Hardy, both of Newcastle-on-Tyne, all of England, assignors to The Procter & Gamble Company, Cincinnati, Ohio
Continuation of Ser. No. 503,123, Sept. 4, 1974, abandoned. This application Aug. 31, 1976, Ser. No. 719,312
Claims priority, application United Kingdom, Sept. 4, 1973, 41496/73; Mar. 15, 1974, 11628/74
Int. Cl.[2] C11D *3/065, 3/43, 17/08;* **C23G** *5/00*
U.S. Cl. 134—40 **16 Claims**

1. A clear single-phase liquid detergent composition comprising from 26 to about 50% by weight of the composition of anionic detergent selected from the group consisting of linear alkyl benzene sulfonates having from 8–18 carbon atoms in the alkyl radical, alkyl sulfates having from 10–20 carbon atoms, paraffin sulfonates having from 10–20 carbon atoms, alkyl polyglycol ether sulfates having from 10–20 carbon atoms in the alkyl group and from 1–6 ethoxy groups in the molecule, and mixtures thereof; from about 0.5 to about 15% by weight of the composition of the anion of a condensed phosphoric acid; from 0 to 10% by weight of the composition of mono- or di-lower alkyl benzene sulfonate having a total of 1 to 3 carbon atoms in the alkyl group; wherein the cations of the detergent, the phosphoric acid salts and the mono- or di-lower alkyl benzene sulfonate are solely monoethanolammonium and wherein the composition is solubilized in water with a lower alcohol having from 1 to 3 carbon atoms.

8. A process for the removal of cooked-on food soils from cookware and tableware, comprising the steps of:
a. soaking said cookware and tableware in an aqueous solution comprising from about 0.5 to about 2%, by weight, of a clear single-phase liquid detergent composition comprising from 26 to about 50% by weight of the composition of anionic detergent selected from the group consisting of linear alkyl benzene sulfonates having from 8–18 carbon atoms in the alkyl radical, alkyl sulfates having from 10–20 carbon atoms, paraffin sulfonates having from 10–20 carbon atoms, alkyl polyglycol ether sulfates having from 10–20 carbon atoms in the alkyl group and from 1–6 ethoxy groups in the molecule, and mixtures thereof; from about 0.5 to about 15% by weight of the composition of the anion of a condensed phosphoric acid; from 0 to 10% by weight of the composition of mono- or di-lower alkyl benzene sulfonate having a total of 1 to 3 carbon atoms in the alkyl group; wherein the cations of the detergent, the phosphoric acid salts and the mono- or di-lower alkylben-

zene sulfonate are mixtures of monoethanolammonium and at least one cation selected from the group consisting of ammonium, sodium, potassium, calcium, and magnesium, wherein said monoethanolammonium cation is present in an amount equal to at least 20 mole percent of the cation mixture; and wherein the composition is solubilized in water with from about 3 to about 15% of a lower alcohol having from 1 to 3 carbon atoms; and

b. washing said cookware and tableware in an aqueous solution comprising from about 0.05 to about 2%, by weight, of said detergent composition.

4,056,114

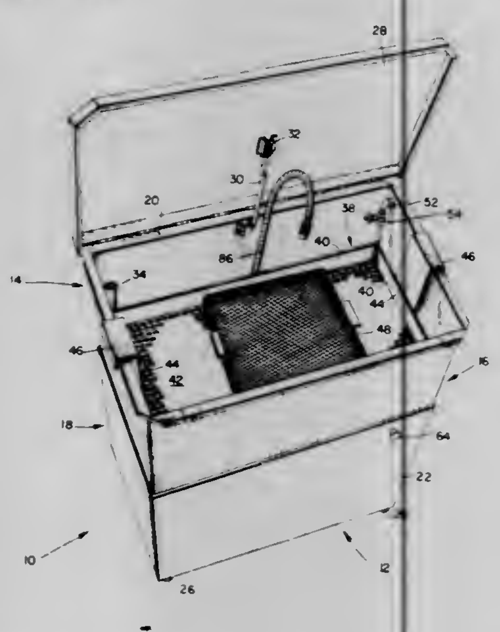
PARTS WASHER AND FILTER ASSEMBLY THEREFOR

Arthur A. Boutillette, 22 Old Dudley Road, Oxford, Mass. 01540

Filed June 3, 1975, Ser. No. 583,452

Int. Cl.^{2} B08B *3/02*

U.S. Cl. 134—104 **23 Claims**



1. A cleaning fluid recirculating and filtering parts washer comprising: a generally rectangular cabinet structure including front, rear and side walls and a bottom; a sink for washing parts forming an upper portion of said cabinet, a controllable drain in said sink located adjacent one of said cabinet walls; a tank forming a lower portion of said cabinet and communicating with said drain; pump means for circulating cleaning fluid to said sink located in said tank adjacent another of said cabinet walls opposite the disposition of said sink drain and said one cabinet wall; and cleaning fluid filtration means surrounding said pump means and extending from said cabinet bottom to a level above a predetermined level of cleaning fluid therein; whereby cleaning fluid contaminated by a parts washing operation in said sink and entering said sink drain must travel substantially across said tank from said drain to said pump means, thus allowing a substantial portion of waste particles and other contaminants to settle by gravity to the bottom of said tank prior to passing through said filtration means and pump for circulation back to said sink.

4,056,115

ADAPTER FOR MANIPULATING A SPRING LOADED PUSHBUTTON

Morton I. Thomas, 101 Gedney St., Nyack, N.Y. 10960

Filed May 6, 1976, Ser. No. 683,978

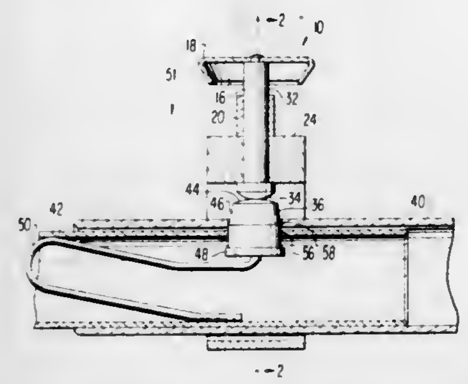
Int. Cl.^{2} A45B *1/00*

U.S. Cl. 135—67 **8 Claims**

1. An adapter apparatus for manipulating a spring-loaded pushbutton located between two overlapping members, said overlapping members comprising an inner tubular member which telescopes into an outer tubular member, both of said tubular members including a hole therethrough through which said spring-loaded pushbutton is biased when said holes are aligned one opposite the other, said apparatus comprising:

a support means adapted for rigid connection to one of said overlapping members, said support means comprising a collar which is adapted to fit around said outer tubular member, said collar including an interior opening and an exterior side and a hole communicating said interior opening with said exterior side;

a substantially flat pressure plate;



a plunger slidably engaged by said support means and adapted to make contact with said spring-loaded pushbutton, said plunger including a shaft attached at one end to said pressure plate and at the other end to a domed head which is adapted to make contact with said pushbutton, said shaft of said plunger passing through said collar hole with said pressure plate being located on the exterior side of said collar and said domed head being located within said interior opening; and,

a sleeve surrounding said plunger shaft and located between said pressure plate and said collar.

4,056,116

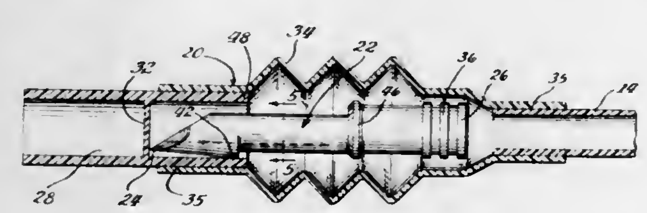
VALVE FOR INTERCONNECTING STERILE CONTAINERS AND THE LIKE

Garry L. Carter, Palatine, and Daniel B. Granzow, Arlington Heights, both of Ill., assignors to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Filed Sept. 8, 1976, Ser. No. 721,622

Int. Cl.^{2} A61M *5/14*

U.S. Cl. 137—68 R **7 Claims**



1. In a sealed, tubular fluid conduit having a diaphragm positioned to block fluid flow through said conduit, said fluid conduit carrying a spike having front and rear ends positioned in said fluid conduit and adapted for movement to rupture said diaphragm with said front end, and a transversely-enlarged, flexible, axially-collapsible portion of said conduit positioned adjacent said spike and adapted to permit manual movement of said spike from outside of said conduit to rupture said diaphragm, the improvement comprising, in combination:

a longitudinal groove defined in said spike extending from said front end and terminating at a point between said front and rear ends, said spike also defining an annular, enlarged sealing portion of a transverse dimension which is proportioned to sealingly occlude a portion of said conduit adjacent to said transversely-enlarged, collapsible portion, said sealing portion being positioned between said terminating point of the groove and the rear end of the spike, said spike being positioned so that said enlarged sealing portion normally resides within said transversely-enlarged collapsible portion, said spike and conduit being dimensioned such that upon rupture of the diaphragm a flow path is defined through said groove and about said enlarged seal portion, whereby, for resealing said conduit after rupture of the diaphragm, the spike may be moved to bring said enlarged sealing portion into flow-blocking relation with said conduit immediately adjacent to said transversely-enlarged portion.

4,056,117

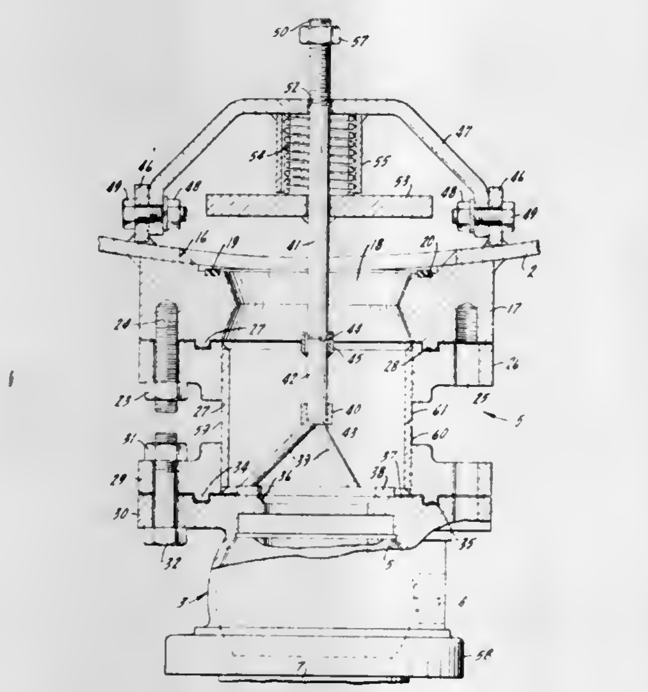
BOTTOM OUTLET SAFETY CLOSURE

Ronald George Deeks, Oakville, Canada, assignor to Procor Limited, Oakville, Canada

Filed Nov. 4, 1976, Ser. No. 738,937

Int. Cl.^{2} F16K *17/40*

U.S. Cl. 137—68 R **10 Claims**



1. A safety device for preventing escape of a fluid from the outlet opening of a tank when a valve that normally regulates flow through said outlet opening is damaged, comprising: a saddle having a hole therethrough and being attached to the outside of said tank and surrounding said outlet opening, a gasketed surface on said saddle around said hole, a hollow tube connected to said saddle and aligned with said hole, said valve being connected to and aligned with said tube, a shoulder on said valve around the inlet port of said valve facing the inside of said tube, a perforated disc resting on and being restrained from movement by said shoulder and surrounding said inlet port, a rod connected to said disc and passing through said tube and said saddle and said outlet opening into said tank, a bracket attached to the inside of said tank and spanning said outlet opening, a safety closure plate for seating against said gasket attached to said rod between said bracket and said outlet opening, spring means between said plate and bracket for forcing said plate against said gasket, said rod normally maintaining said closure plate in an open position against the bias of said spring means, a fracture groove around said tube between said saddle and said shoulder for causing a portion of said tube connected to said valve and said valve to break away from said tank on impact capable of causing leakage from said tank by damaging said valve, the breaking away of said valve removing the restraining effect of said shoulder and enabling said perforated disc and rod to move under the force of said spring means so as to cause said closure plate to seat against said gasket and prevent escape of fluid from said tank.

4,056,118

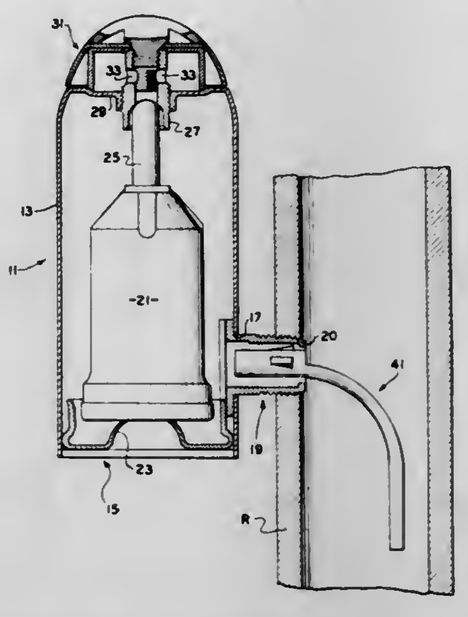
SYPHON TUBE AND VENT VALVE ASSEMBLY

Jay H. Bradford, Elgin, and Norman T. Terp, St. Charles, both of Ill., assignors to Eaton Corporation, Cleveland, Ohio

Filed Sept. 17, 1975, Ser. No. 613,385

Int. Cl.^{2} F16T *1/20*

U.S. Cl. 137—201 **6 Claims**



1. A radiator vent valve including a valve body and a threaded valve nipple adapted to engage a wall of a radiator and define a passage communicating between the interior of the radiator and the interior of said valve body, said vent valve including a syphon tube for draining condensate from the interior of said valve body into the interior of said radiator, said syphon tube comprising:

a. a tubular first portion adapted to be inserted into said passage defined by said valve nipple, said tubular first portion including resilient tab means formed of resiliently deformable material disposed in circumferentially spaced arrangement about the outer surface of said tubular first portion, said resilient tab means deforming to permit insertion of said tubular first portion into said passage and after said insertion, resiliently recovering from said deformation and engaging an inner surface of said valve nipple for resisting removal therefrom;

b. a generally trough-shaped second portion providing a continuous flow path with said tubular first portion and oriented generally coplanar therewith; and

c. a generally trough-shaped third portion providing a continuous flow path with said trough-shaped second portion, said third portion being oriented relative to said second portion to direct the flow of condensate downwardly when said tubular first portion is oriented generally horizontally.

4,056,119

SOLENOID VALVE

Walter E. Allen, Prospect, Conn., assignor to Peter Paul Electronics Co., Inc., New Britain, Conn.

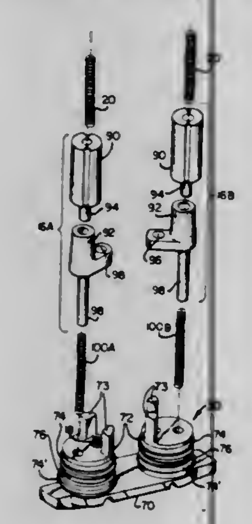
Division of Ser. No. 498,089, Aug. 16, 1974, Pat. No. 3,965,923. This application June 22, 1976, Ser. No. 698,746

Int. Cl.^{2} F16K *31/02*

U.S. Cl. 137—315 **11 Claims**

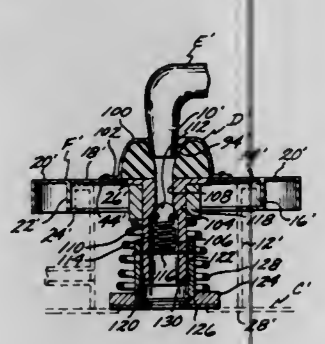
1. A solenoid actuated control valve comprising a body assembly including a body member having fluid inlet and outlet ports opening exteriorly thereof for connection with fluid conduits and first and second chamber bores opening outwardly therethrough and respectively partially defining first and second valve chambers, said body assembly including a pair of axially elongated tubular plunger sleeves attached to said body member and defining first and second plunger bores respectively communicating with said first and second chambers and having mounting means for securing said body member in fixed position on an associated supporting means, said

body assembly including a cartridge member having connected first and second portions respectively received in said first and second chamber bores providing closures therefore and respectively further defining said first and second valve chambers and means for releasably retaining said cartridge member in assembly with said body member, a pair of valve seats in each of said chambers, means defining fluid passageways through said body assembly and communicating with said valve seats and said fluid inlet and outlet ports for defining fluid flow paths through said valve, a pair of solenoids each respectively mounted on an associated one of said sleeves, a pair of axially elongated plunger assemblies, each plunger assembly having a part thereof supported in an associated one of said plunger bores for axial shifting movement therein between one and another position, each of said plunger assemblies having a pair of seating surfaces thereon disposed in an



associated one of said valve chambers, one of said seating surfaces engaging and closing one of said valve seats in said associated chamber when said plunger assembly is in one of its positions, the other of said seating surfaces engaging and closing the other of said valve seats when said plunger assembly is in the other of its positions, and means for biasing each of said plunger assemblies to and normally retaining it in one of its positions and yieldably resisting shifting thereof on energization of an associated one of said solenoids to the other of its positions to open said one of said valve seats and close said other of said valve seats, said cartridge member, said plunger assemblies and said biasing means comprising a cartridge subassembly which may be removed as a unit from said body assembly when said body assembly is mounted in fixed position on the supporting means by said mounting means and said inlet and outlet ports are connected to associated fluid conduit means.

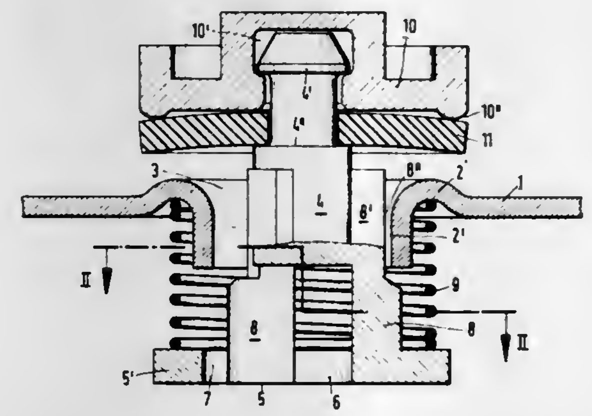
4,056,120
VALVED AUTOMOTIVE RADIATOR CAP
George C. MacNeilage, 16302 Sierra Trail Court, Hacienda Heights, Calif. 91745
Filed May 27, 1976, Ser. No. 690,635
Int. Cl.^{2} F16K *45/00, 15/00*
U.S. Cl. 137—493.9 **1 Claim**



1. A valved radiator cap assembly capable of being removably mounted on a filling tube of an automotive radiator of the type that includes a cylindrical shell having first and second ends, a flat circular flange extending outwardly from said first end, a pair of oppositely disposed first tabs depending from said flange, and a ring-shaped lip projecting inwardly from said second end of said shell, said shell having an opening therein between said first and second ends that is in communication with an overflow line, said assembly permitting water under pressure to be discharged into said radiator from a nozzle having a tapered end without removing said assembly from said filling tube, said assembly permitting water and steam to escape from said radiator through said opening to said overflow line when the pressure in said radiator rises above a predetermined level, said assembly permitting a negative pressure in said radiator to be partially relieved by flow of air thereinto from the ambient atmosphere as said radiator cools, said assembly including:

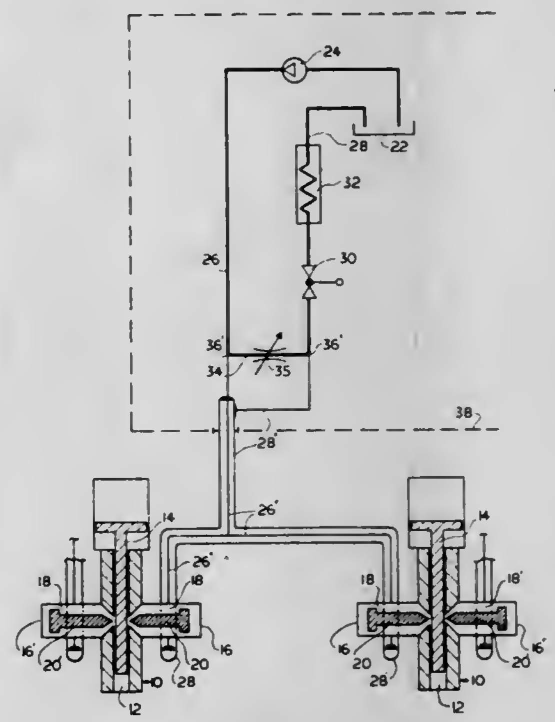
a. a cover removably mounted on said first end of said shell, said cover including a pair of oppositely disposed second tabs that engage said first pair of tabs to maintain said cover on said filling tube, said cover having a central opening therein;
b. an exteriorly disposed tubular resilient body that projects outwardly from said cover, is permanently secured to said cover, and is in communication with said central opening, with said resilient body capable of being sealingly engaged by said nozzle when the latter is in pressure contact with said body;
c. an elongate valve body that depends from said cover, said valve body having a bore and a counterbore therein, said counterbore in communication with said central opening, and said bore and counterbore at their junction defining and inward and upwardly tapering valve seat;
d. a rigid ball longitudinally movable in said bore and capable of sealingly engaging said valve seat, said ball of less diameter than that of said bore;
e. a transverse pin supported by said valve body below said ball, said pin having outwardly projecting end portions;
f. a first compressed helical spring disposed in said bore with one end thereof in abutting contact with said ball and the other end in contact with said pin, said first spring having a compression ratio sufficient to maintain said ball in sealing contact with said seat with a first force to permit water to flow from said nozzle through said bore when the pressure on said water is sufficiently great as to exert a second force on said ball greater than said first force;
g. a tubular member slidably and sealingly movable in a longitudinal direction on the exterior surface of said valve body, said member having a pair of oppositely disposed, elongate, longitudinal slots therein that are slidably engaged by said end portions to limit the range of movement of said tubular member relative to said valve body and to prevent inadvertent separation of said tubular member and valve body;
h. an outwardly projecting ring-shaped valve member secured to the end portion of said tubular member most remote from said first spring, said valve member having first and second oppositely disposed sides;
i. abutment defining means on said tubular member adjacent said cover;
j. a resilient sheet of material bonded to said first side of said valve member;
k. a second compressed helical spring that encircles said tubular member, said second spring having one end in contact with said abutment means and the other end in contact with said second side of said valve member, said second spring at all times tending to maintain said resilient sheet in pressure sealing contact with said ring-shaped lip with a third force, with a portion of said resilient sheet at all times in communication with the interior of said radiator, and when pressure of fluid in said radiator exerts a fourth force on said resilient sheet greater than said third force said tubular member, valve member and resilient sheet will move towards said cover to allow fluid to flow to said overflow line from said radiator until said third force is greater than said fourth force, said ball when there is a negative pressure in said radiator of sufficient magnitude will move out of sealing contact with said valve seat against the first force of said first spring to allow air from the ambient atmosphere to flow into said radiator until said first force returns said ball to sealing engagement with said valve seat.

4,056,121
PRESSURE COMPENSATION VALVE ARRANGEMENT
Theodor Gerdes, 24, Lortzingweg, D 4018 Langenfeld, Rheinland, Germany, assignor to Blau KG Fabrik fur Kraftfahrzeugteile, Langenfeld, Germany
Filed June 1, 1976, Ser. No. 691,407
Claims priority, application Germany, June 10, 1975, 2525708
Int. Cl.^{2} F16K *15/06*
U.S. Cl. 137—541 **7 Claims**



1. In an arrangement for preventing fluid pressure from exceeding a predetermined value, a combination comprising a valve support having a raised annular valve seat which bounds a passageway for a pressurized fluid, said passageway extending between a fluid inlet at one side of said support and a fluid outlet at the other side of said support; a valve stem extending through and mounted for movement along said passageway, said stem having an exposed end at said one side of said support which faces and is acted upon by the pressurized fluid to thereby move said stem when the pressure of the fluid exceeds the predetermined value, and another opposite end at said other side of said support; a valve head mounted at said other end for movement with said stem, said head having a raised annular collar which extends circumferentially about said annular seat; a dish-shaped resilient element mounted on said stem for movement therewith, said resilient element engaging said annular collar and overlying said annular seat; a flange at said exposed end and overlying said one side of said support; biasing means surrounding said stem intermediate said flange and said one side of said support, said biasing means being operative for moving said stem and urging said collar and said resilient element into sealing engagement with said seat when the pressurized fluid acting on said exposed end is below the predetermined value; and means for establishing fluid communication between said exposed end and said passageway, including a plurality of ribs equidistantly spaced circumferentially of said stem, each rib having an upper rib portion extending lengthwise of said stem and a lower rib portion extending from said upper rib portion to said flange, each lower rib portion having a larger cross-sectional dimension than said upper rib portion for strengthening said flange, each two circumferentially adjacent ribs bounding a channel and all of said lower rib portions bounding a cavity at said exposed end, each channel communicating with said cavity and with said passageway when the pressure of the fluid in said cavity exceeds the predetermined value and moves each channel into communication with said passageway.

4,056,122
FLUID COMPONENT RECYCLING SYSTEM IN A PLURAL COMPONENT PLASTICS MOLDING MACHINE
Alfred Schlieckmann, Lindau, and Kurt Moser, Kirchheim, both of Germany, assignors to The Upjohn Company, Kalamazoo, Mich.
Filed Feb. 9, 1976, Ser. No. 656,164
Claims priority, application Germany, Feb. 21, 1975, 2507580
Int. Cl.^{2} B29B *5/04*
U.S. Cl. 137—563 **6 Claims**



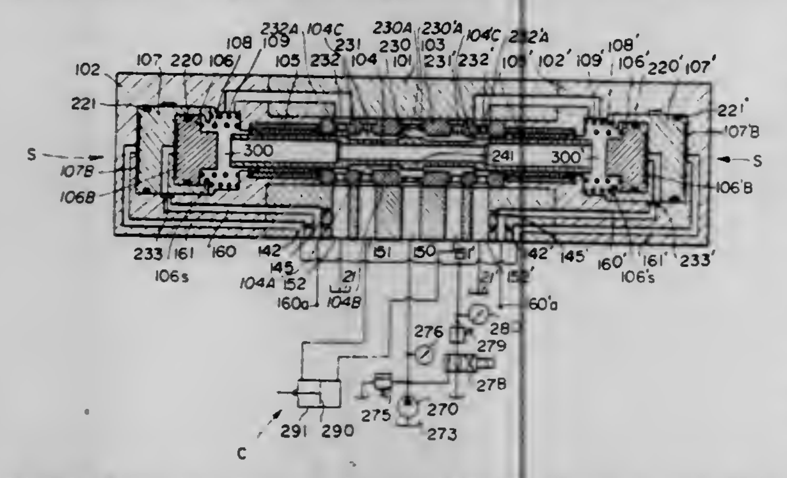
1. In a system for supplying one of a plurality of fluids under pressure to a mixing head having a mixing chamber into which the fluids are injected to produce mixing thereof, a valve chamber associated with said head and an inlet valve in said valve chamber controlling admission of said one fluid from said valve chamber to said mixing chamber, a fluid reservoir for said one fluid, a supply line connecting said valve chamber to said reservoir, and pump means in said supply lines to deliver said fluid under pressure from said reservoir to said valve chamber, a return line connecting said valve chamber to said reservoir, and a stop cock in said return line, whereby fluid can be circulated by said pump from said reservoir through said supply line to said valve chamber and back through said return line to said reservoir when said stop cock is open; the improvement which comprises

a by-pass line between said supply line and said return line in shunt connection with said inlet valve chamber, said by-pass line being located upstream of said stop cock;
said by-pass line affording resistance to flow therethrough and thereby causing division of fluid flow between said by-pass line and said valve chamber.

4,056,123
HYDRAULIC OSCILLATOR
Tsuneo Kimura, Kusatsu, and Shiro Takeshika, Ikeda, both of Japan, assignors to Nihon Spindle Seizo Kabushiki Kaisha, Japan
Filed Sept. 25, 1974, Ser. No. 509,184
Claims priority, application Japan, Sept. 26, 1973, 48-108194; Nov. 12, 1973, 48-127082
Int. Cl.^{2} F01L *31/00, 25/04*
U.S. Cl. 137—624.14 **5 Claims**

1. A hydraulic oscillator, said oscillator being self-excited, comprising a main body, said main body being equipped with an oil inflow port having inwardly divergent walls, a first pair of flow ports for alternately receiving and transmitting pressurized oil therethrough, an oil pressure chamber having a wall in said main body, a vibratory member in said oil pressure chamber, said vibratory member being positioned for bringing

them into self-excited oscillation by flow of pressurized oil through said oil inflow port and said flow ports, and a pair of resiliently disposed stopper means positioned for regulating the excursion of said vibrating member in each of opposed directions by impact of said vibrating member against said stopper means, both of said stopper means including first and second stoppers adapted to be positionally displaced with respect to each other, and first and second resilient biasing means for respectively resiliently positioning said first and second stopper with respect to said oil pressure chamber, said oil pressure chamber having two opposed ends and having axially aligned bearings proximate both of said ends, said vibratory member being a spool supported slidably inside said oil pressure chamber by said bearings, and being maintained at a predetermined



spacing from said wall of said oil pressure chamber, said spool having a first land at a position opposed to said inflow port and being in minus-lap relationship thereto, said first land dividing said chamber into two pockets, said main body having a pair of second ports positioned for connection with each of said pockets, said spool having a pair of second lands for closing and opening each of said pair of second ports alternately during oscillation of said spool, the relation of said first land to said inflow port being such that pressurized oil flows alternately into each of said pockets during oscillation of said vibratory member and out through the corresponding port of said first pair of ports, while oil in the pocket other than that containing pressurized oil can flow out of same through the other corresponding port of said pair of second ports said first land and said pair of second lands being of the same diameter.

4,056,124

FLUID MIXING VALVE FOR SUPPLYING CONTROLLABLE PROPORTIONS OF TWO INLET FLUIDS FROM A SINGLE OUTLET

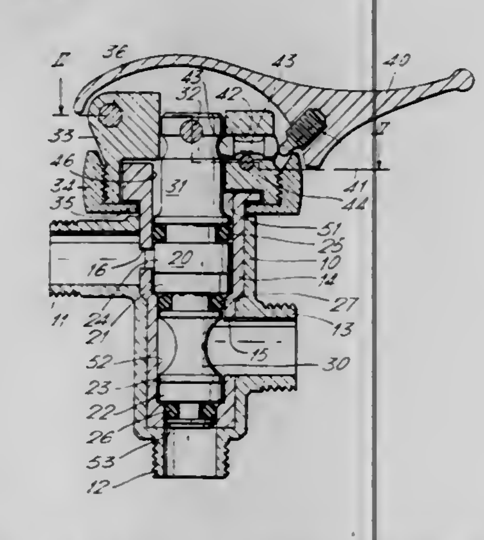
Derek John Goldsmith, 6, Downe Avenue, Cudham, Sevenoaks, Kent, England

Filed Feb. 20, 1976, Ser. No. 659,917

Claims priority, application United Kingdom, Feb. 22, 1975, 7567/75; Mar. 14, 1975, 10697/75

Int. Cl.² F16K *11/07*

U.S. Cl. 137—625.17 **11 Claims**



1. A fluid mixing valve comprising a housing having a bore therein and provided with two spaced fluid inlet ports communicating with the bore at spaced locations therealong for the admission of fluid to the bore and an outlet port for discharging fluid from the bore, said outlet port communicating with the bore at a location intermediate the said spaced locations, and a valve member within the bore in the housing axially movable in the bore for controlling fluid flow from the respective inlet ports through the bore to the outlet port and rotatable in the bore for controlling the relative volume rates of flow through the two inlet ports, said valve member being provided with two arcuate control surfaces eccentric in relation to the axis of rotation of the valve member and each control surface cooperable with separate ones of the ports for inversely controlling, responsive to rotation of the valve member, the relative rates of fluid flow through the individual inlet ports, said control surfaces comprising cut-away portions of the valve member axially spaced along the length of the valve member, one of the control surfaces co-operating with one of the inlet ports and the other co-operating with the outlet port for controlling relative fluid flow through the two inlet ports, that one inlet port which is co-operable with one of said control surfaces having two spaced end boundaries with at least that one end boundary that is nearer the outlet port extending along part of the circumference of the bore in the housing and two lateral boundaries extending parallel with the axis of said bore and intersecting said one end boundary substantially at right angles thereto, and the outlet port having two spaced end boundaries with at least that one end boundary which is nearer the other inlet port extending along part of the circumference of the bore in the housing and lateral axially extending boundaries intersecting said one end boundary of the outlet port substantially at right angles thereto, whereby flow of fluid from the two inlet ports is controlled by co-operation of the one control surface with the one end boundary of said one inlet port and co-operation of the other control surface with the one end boundary of said outlet port.

4,056,125

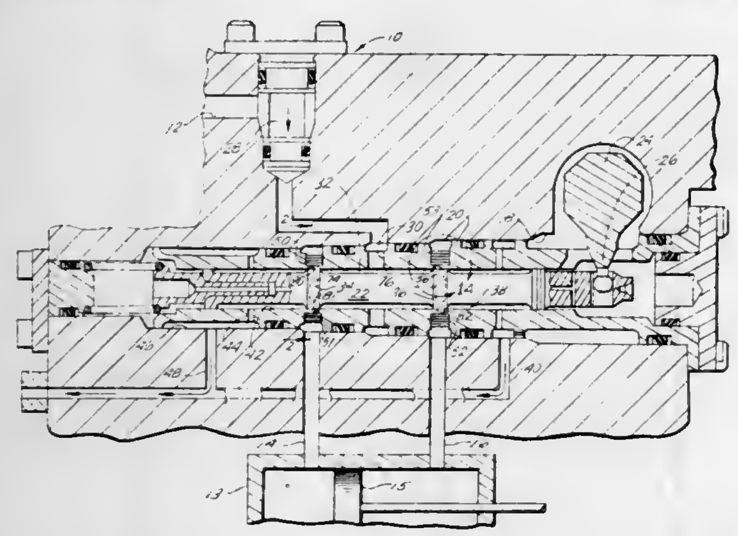
EXTENDED LIFE STRUCTURE FOR SPOOL VALVE

Vernon L. McNabb, Van Nuys, Calif., assignor to The Bendix Corporation, North Hollywood, Calif.

Filed Oct. 2, 1975, Ser. No. 618,976

Int. Cl.² F16K *47/08;* **F16B** *13/04*

U.S. Cl. 137—625.3 **3 Claims**



1. In a flow control valve wherein a spool valve member having a plurality of lands is moveable within a sleeve to cause said lands to open and close radially directed fluid passageways through the sidewalls of said sleeve,

at least some of said passageways including cylindrical chambers and fine radial passageways communicating said chambers with the inside of said sleeve, and

a stack of laminar disk members positioned in said cylindrical chambers, said stack including disks of a first group including a central opening of large area and disks of a second group including an orifice of limited area each of which introduces a substantial pressure drop thereacross, said stack comprising alternate disks of said first group and said second group with a disk of said first group positioned at the bottom of said cylindrical chamber such that its opening communicates with one of said fine passageways, said sleeve also including large openings axially displaced from said fine passageways such that as said spool valve member moves past said fine passageways it begins to uncover said large openings.

4,056,126

SPOOL VALVE ARRANGEMENT

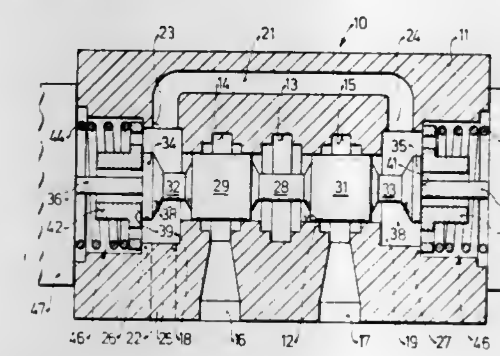
Manfred Hauser, Schwieberdingen, and Werner Schumacher, Asperg, both of Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany

Filed Feb. 25, 1976, Ser. No. 661,164

Claims priority, application Germany, Mar. 19, 1975, 2511991

Int. Cl.² F15B *13/044*

U.S. Cl. 137—625.65 **12 Claims**



1. In a valve, a combination comprising a housing having a flow-through passage formed with a fluid-admitting inlet and a pair of fluid-discharging outlets; a pair of pressure-relief chambers each associated with a respective outlet for relieving pressure thereat; a spool slide having respective ends each facing into one of said pressure-relief chambers and also having a pair of lands, said spool slide being mounted in said passage for movement from a neutral position in which said lands prevent communication between said inlet and said outlets and in which communication is also prevented between the latter and their associated chambers, towards operative positions; means for alternatively moving said spool slide from said neutral position towards one of said operative positions so as to permit pressure relief at a respective one of said outlets so that pressurized fluid escaping in a path from said one outlet towards its associated pressure-relief chamber acts on the respective end of said slide which faces the respective chamber and tends to accelerate the movement of said spool slide in a predetermined direction towards said one operative position; and means for counteracting the acceleration of said spool slide, comprising attenuating elements each formed with a deflecting surface extending transversely of said path so as to be directly impinged by the pressurized fluid escaping into the respective pressure-relief chamber in direction opposite to said predetermined direction, to thereby slow the movement of said spool slide towards its respective operative positions.

4,056,127

ACCUMULATOR WITH OPEN ENDED SHELL

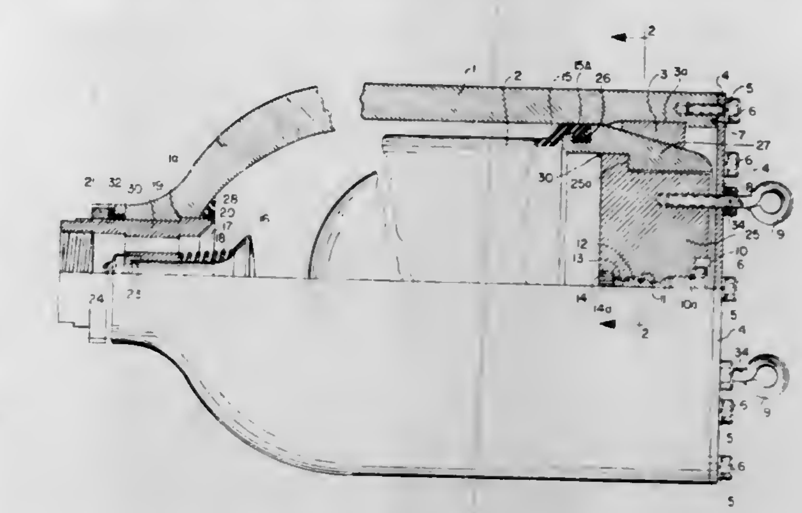
Edward M. Greer, Beverly Hills, Calif., assignor to EMG Hydraulics, Inc., Santa Monica, Calif.

Filed Apr. 30, 1976, Ser. No. 681,788

Int. Cl.² F16L *55/04*

U.S. Cl. 138—30 **8 Claims**

1. In a pressure accumulator which includes an elongated rigid shell open at one end and having a port formed in the other end thereof; cap means mounted in and enclosing the open end of the shell; a segmented tapered ring fitted into an internal groove at the open end of the shell and engaging the peripheral surface of the cap means for retaining the cap means in the shell; a thimble-shaped flexible bladder positioned in the shell and having a mouth and a rim surrounding said mouth, said mouth being sealed to the inner surface of the shell by the inner peripheral edge of the cap means; and a gas pre-charge valve mounted in said cap means to introduce gas into the interior of said bladder a poppet valve mounted in the port in the other end of the shell, and wherein the cap means comprises a cap having a peripheral shoulder, and a concentric



annular member surrounding the cap, said annular member also having a peripheral shoulder engaging the peripheral shoulder on said cap, and said annular member having a longitudinally inclined peripheral surface engaging the adjacent surface of the tapered ring.

4,056,128

APPARATUS FOR PRODUCING A CONNECTION BETWEEN TWO OVERLAPPING BAND SECTIONS OF A PACKAGE STRIP AND IMPROVED CLOSURE SEAL FOR USE THEREWITH

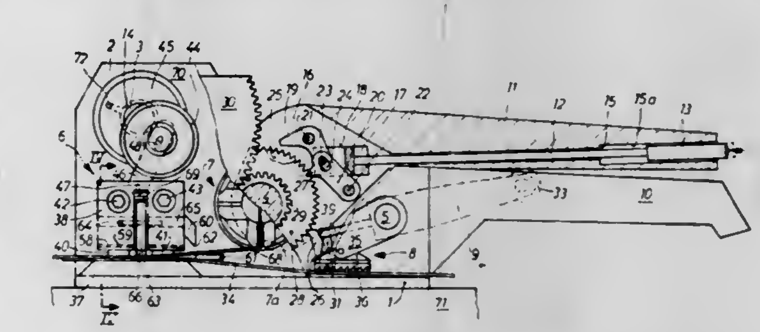
Albert Konrad, Rigistrasse 516, Merenschwand, Switzerland (5634)

Filed Apr. 13, 1976, Ser. No. 676,497

Claims priority, application Switzerland, Apr. 30, 1975, 5556/75

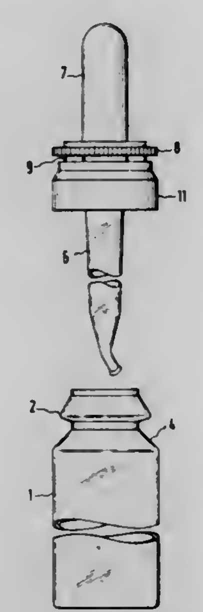
Int. Cl.² B21F *15/06, 9/02*

U.S. Cl. 140—93.4 **8 Claims**



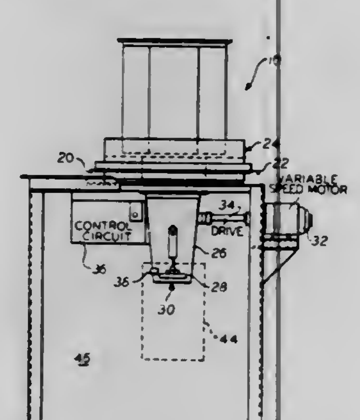
1. An apparatus for producing a connection between two overlapping band sections of a strap placed about a package or the like by means of a closure seal, comprising a band tensioning roll, a closure mechanism for closing the closure seal about the overlapping band ends, an actuation mechanism, said closure mechanism including a punch for closing the closure seal, said punch having a work surface embodying a substantially flat press surface intended to act upon a flap of the closure seal and a curved flanging surface intended to act upon a flange edge of the closure seal, said apparatus further including a housing, a first shaft mounted in said housing, the actuation mechanism comprising an actuation lever pivotable about said shaft, two ratchet wheels mounted on said first shaft within the housing, a first one of the ratchet wheels being rigidly connected with said shaft, a gear rotatably mounted upon said shaft, the second ratchet wheel being connected with the rotatably mounted gear, a toothed segment meshing with the rotatably mounted gear, a second shaft, the toothed segment being secured to the second shaft, said second shaft having a front end carrying a control disk, and a roll eccentrically mounted upon the control disk for acting upon the punch.

4,056,129
CLOSABLE STERILE CONTAINER
Herbert Weiler; Hans Schneider, both of Marburg an der Lahn, and Ludwin Weyrich, Buchenau, all of Germany, assignors to Behringwerke Aktiengesellschaft, Marburg an der Lahn, Germany
Filed Dec. 16, 1976, Ser. No. 751,162
Claims priority, application Germany, Dec. 20, 1975, 7540657[U]
Int. Cl.² B65B *3/04*
U.S. Cl. 141—24 **2 Claims**



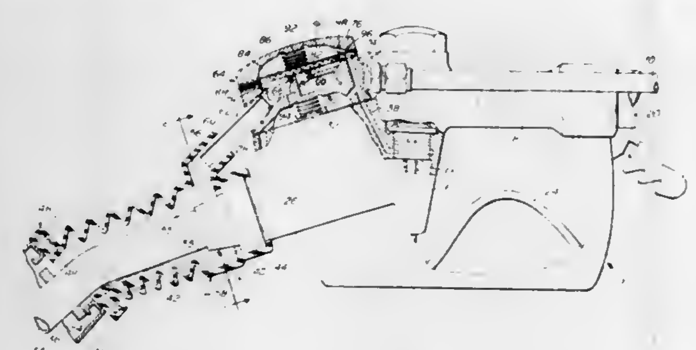
1. Closable sterile container with associated closure cap, characterised in that the closure cap consists of a head plate **8** with pipette **6** and pipette suction means **7**, wherein the pipette wall is designed as a sealing face, and of a connected hollow-cylindrical ring **11**, the perpendicular wall of which has on the inside a surrounding groove **10** and extends from the latter conically outwards, and that both parts of the closure cap are joined together by tear-off bars **9**.

4,056,130
VOLUMETRIC BAGGING APPARATUS
Robert Likens, Los Angeles, and William S. Boehm, Downey, both of Calif., assignors to Likens Manufacturing Co., Huntington Park, Calif.
Filed Mar. 4, 1976, Ser. No. 663,808
Int. Cl.² B65B *1/04*
U.S. Cl. 141—67 **10 Claims**



1. In a volumetric bagging apparatus for dispensing a predetermined volume of particulate material into a bag positioned on said apparatus for receipt thereof having filler spout means for providing said particulate material therethrough to said bag, clamp means for releasably retainably positioning said bag at an exit end of said filler spout means for receiving said particulate material therethrough, rotating drum means rotatably positionable adjacent an entrance end of said filler spout means for selectively providing said particulate material to said filler spout during rotation of said drum, brake means for holding said drum against said rotation, and drive means for selectively rotatably driving said drum means; the improvement comprising magnetic control means for indexing said rotatable drum for positioning said drum and releasing said releasably retained bag when said predetermined volume has been dispensed thereto, said magnetic control means comprising a first magnetic cam mounted on said drum means for rotation therewith and a first magnetic proximity switch means mounted adjacent said rotatable drum for actuation by said first magnetic cam means when said first magnetic cam means is in magnetic proximity therewith; said clamp means comprising means responsive to the mounting of an empty bag in said clamp means for providing an actuation signal to said control means; said control means further comprising means responsive to said actuation signal for releasing said drum brake means, activating said drum drive means for initiating said drum rotation and locking said clamp means said first magnetic cam means being mounted on said drum means with respect to said mounted first magnetic proximity switch means for enabling said predetermined volume to be subsequently dispensed into said bag during said drum rotation; said control means responsive means further comprising means responsive to said first magnetic proximity switch means actuation during said drum rotation for unlocking said clamp means and releasing said filled bag.

4,056,131
VAPOR CONTROL IN A FUEL DISPENSING NOZZLE
James W. Healy, 54 Plymouth Road, Wakefield, Mass. 01880
Continuation-in-part of Ser. No. 553,529, Feb. 27, 1975. This application Feb. 9, 1976, Ser. No. 656,124
Int. Cl.² B65B *3/04*
U.S. Cl. 141—206 **36 Claims**



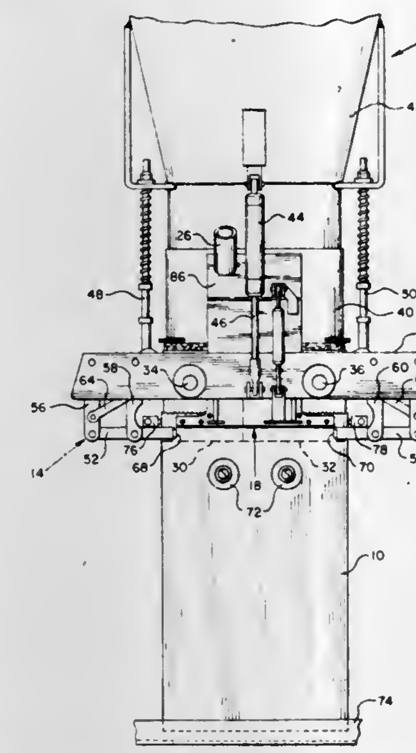
1. In a fuel dispensing nozzle comprising a body having a fuel conduit leading to a spout insertable into a fuel tank, a manually operable fuel valve in said fuel conduit, a vapor conduit for transporting vapor displaced from said tank to a remote vapor handling system, and a vapor shut-off valve in said vapor conduit, the improvement wherein said vapor shut-off valve comprises

a first diaphragm having a first surface facing said vapor conduit and a second surface facing a chamber within the nozzle, said first diaphragm causing said vapor conduit to be blocked in a first position of said first diaphragm and not to be blocked in a second position of said first diaphragm, and

biasing means urging said first diaphragm to said first position;

said nozzle further including valve opening means for urging said first diaphragm toward said second position only when fuel is flowing past said fuel valve.

4,056,132
BAG FILLING APPARATUS WITH AIR CONTAMINATE PREVENTION
Charles E. Decrane, West Monroe, La., assignor to Olinkraft, Inc., West Monroe, La.
Filed Apr. 5, 1976, Ser. No. 673,849
Int. Cl.² B65B *3/18*
U.S. Cl. 141—285 **10 Claims**



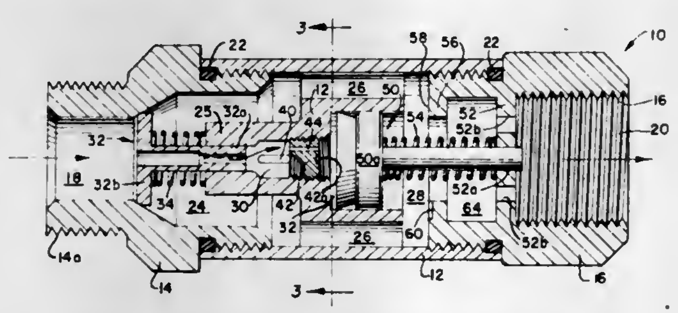
1. An apparatus for filling a bag having an open top, comprising in combination:

filling spout means adapted to be received in the open top of the bag,

clamping means for tightly engaging a portion of the top of the bag against the filling spout means,

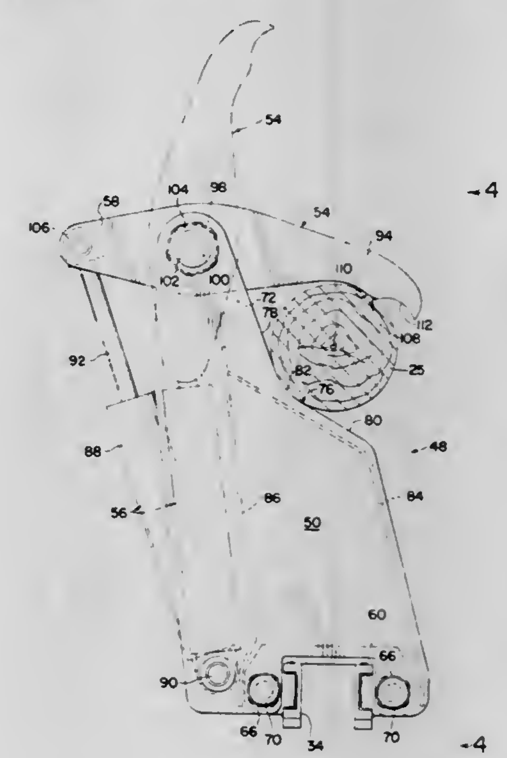
sealing means for sealingly engaging the remaining portion of the top of the bag, said sealing means defining a portion of an enclosed chamber means disposed for sealingly containing the spout means externally above the remaining portion of the top of the bag to prevent escape of contaminates.

4,056,133
FLUID FLOW CONTROL APPARATUS AND A GASOLINE DISPENSING AND VAPOR RECOVERY SYSTEM UTILIZING SAID APPARATUS
Elmer M. Deters, Muscatine, Iowa, assignor to Weil-McLain Company, Inc., Dallas, Tex.
Filed Apr. 19, 1976, Ser. No. 677,983
Int. Cl.² B65B *3/04*
U.S. Cl. 141—301 **8 Claims**



1. A control apparatus for controlling the flow of fluid comprising a housing adapted to receive fluid, passage means in said housing for permitting the flow of fluid through said housing, a control member disposed in said housing and movable relative to said housing in response to variations in the flow rate of said fluid through said passage means, means for defining a chamber in said housing, a valve member movable in said chamber between a position in which it prevents fluid flow through said passage means and a position in which it permits fluid flow through said passage means, means urging said valve member to its fluid flow permitting position, and means cooperating with said control member for selectively permitting a portion of said fluid to flow into said chamber in response to said control member attaining a predetermined position in said housing thus forcing said valve member to its fluid flow preventing position.

4,056,134
CLAMP ASSEMBLY
Thomas G. Bakowski, West Seneca, N.Y., assignor to Eaton Yale Ltd., Canada
Filed Sept. 7, 1976, Ser. No. 721,015
Int. Cl.² A01G *23/08*
U.S. Cl. 144—2 Z **7 Claims**



1. In apparatus for processing trees including a substantially horizontal processing boom, means for depositing a cut tree on said processing boom, and delimber means engageable with said cut tree and movable along said processing boom to delimb said tree;

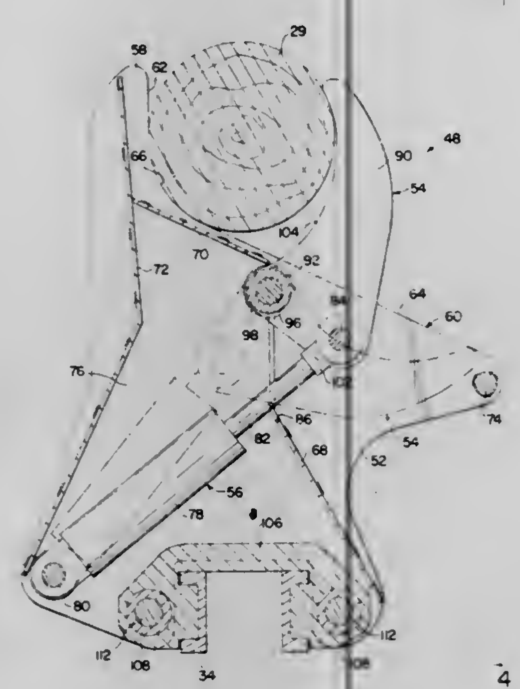
a clamp assembly mounted on said processing boom in position to receive a tree deposited on said processing boom, said clamp assembly comprising a frame fixed to said boom; a first tree engaging surface formed on said frame and disposed at an angle extending downwardly from the horizontal; a clamp arm pivotally mounted to said frame and having a second tree engaging surface formed thereon; and means for moving said arm from a first position out of the way of a tree being deposited on said boom and a second position putting said second tree engaging surface in clamping engagement with a tree on said first tree engaging surface, said second tree engaging surface comprising a first convex surface element engageable with a tree placed on a first area of said first tree engaging surface and a second concave surface element engageable with a tree placed on a second area of said first tree engaging surface.

4,056,135
CLAMP ASSEMBLY
Paul H. Whitcomb, Attica, N.Y., assignor to Eaton Yale Ltd., Canada
Filed Sept. 17, 1976, Ser. No. 724,143
Int. Cl.² A01G *23/08*
U.S. Cl. 144—2 Z **11 Claims**

1. In apparatus for processing trees including a substantially horizontal processing boom, means for depositing a cut tree on

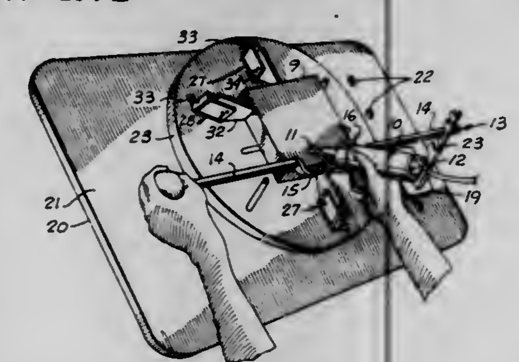
said processing boom, and delimber means engageable with said cut tree and movable along said processing boom to delimb said tree:

a clamp assembly mounted on said processing boom in position to receive a tree deposited on said processing boom, said clamp assembly comprising a frame fixed to said boom; a first tree engaging surface formed on said frame at least a portion of which is disposed at an angle extending downwardly from the horizontal; a clamp arm pivotally mounted to said frame and having a second tree engaging surface formed thereon; and means for moving said clamp



arm from a first position wherein said first and second tree engaging surfaces are spaced apart for deposit of a tree between them to a second position wherein said second tree engaging surface is in clamping engagement with a tree on said first tree engaging surface; the improvement wherein said clamp arm is located beneath said first tree engaging surface when said clamp arm is in its first position, to place said second tree engaging surface beneath said first tree engaging surface, whereby no portion of said clamp arm is in position to interfere with a tree being deposited on said processing boom.

4,056,136
PORTABLE TOOL GUIDE
Donald M. Miller, 1005 North Ave., Sunnyside, Wash. 98944
Filed July 12, 1976, Ser. No. 704,469
Int. Cl.² B27C *5/02*
U.S. Cl. 144—134 D **10 Claims**

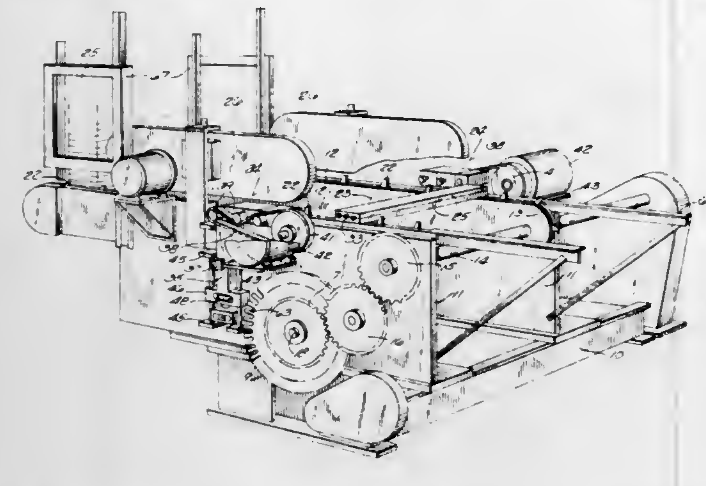


1. A guide for a portable tool having a workpiece-engaging element aligned along a movable axis for surfacing operations, comprising:

a rigid elongated maulstick comprising a shaft having two side sections extending outward from each side of an integral offset yoke at its center;

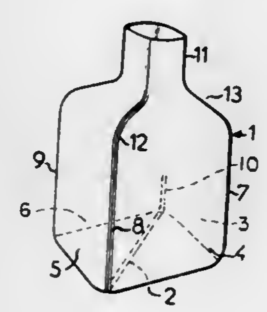
and means for mounting a portable tool to the yoke of the maulstick for pivotal motion of the portable tool relative to the maulstick about an axis perpendicular to the movable axis of its workpiece-engaging element.

4,056,137
METHOD AND APPARATUS FOR CUTTING TENONS
Ronald J. Morasch, and Robert J. Webb, both of Oshkosh, Wis., assignors to Medalist Industries, Inc., Milwaukee, Wis.
Filed June 25, 1975, Ser. No. 590,241
Int. Cl.² B27F *1/08*
U.S. Cl. 144—323 **19 Claims**



1. A method of cutting tenons in the ends of workpieces and comprising the steps of advancing the workpiece on a substantially rectilinear path, reciprocating a cutting tool on a transverse, substantially rectilinear path which intersects the workpiece for a distance inwardly of its edge equal to the length of a tenon and concurrently varying the speed of advance of the workpiece and the speed of reciprocation of the cutting tool so that the cutting tool has an effective undulating cutting path with respect to the workpiece which is a composite of the variation in workpiece speed and cutting tool speed, thus forming a series of spaced tenons thereon.

4,056,138
FLEXIBLE PLASTIC CONTAINER
Gaston Fagniart, Valenciennes, France, assignor to Societe Anonyme dite: BORACIER, Switzerland
Filed Mar. 24, 1976, Ser. No. 669,975
Claims priority, application France, Apr. 3, 1975, 75.11149
Int. Cl.² B65D *1/00*
U.S. Cl. 150—.5 **3 Claims**



1. A foldable container, comprising:

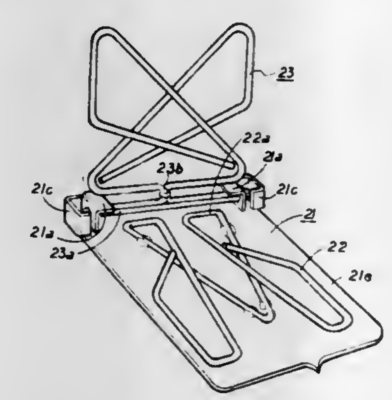
walls of plastic material defining a homogeneous container of high mechanical strength generally shaped as a polyhedron, each wall defining a face of the polyhedron, the body having a mouth at one end of the walls and a base at another end thereof and having a plane of general symmetry extending between such walls diagonally of the polyhedron; and

preliminary folds integral with such walls and with portions of the base, extending in the immediate vicinity of and along the plane of general symmetry, to interconnect such walls and base portions and to permit the container body to be folded about the preliminary folds, said folds having a general cross-sectional shape of a W extending into the interior of said container body, the W being offset relative

to said body to a slight extent such that one pair of the walls, when the body is folded, practically adjoins another pair of the walls of the polyhedron,

whereby said container body is slightly asymmetrical relative to said plane of general symmetry, and storage of the folded container body, as well as the folding thereof, is thus facilitated.

4,056,139
HOLDER FOR MONEY, CARDS AND THE LIKE
Edward M. Murt, 831 Medway Road, Philadelphia, Pa. 19115
Filed Mar. 3, 1976, Ser. No. 663,298
Int. Cl.² A45C *11/18;* B42F *1/00*
U.S. Cl. 150—39 **13 Claims**



1. A holder for money, cards, or the like comprising:

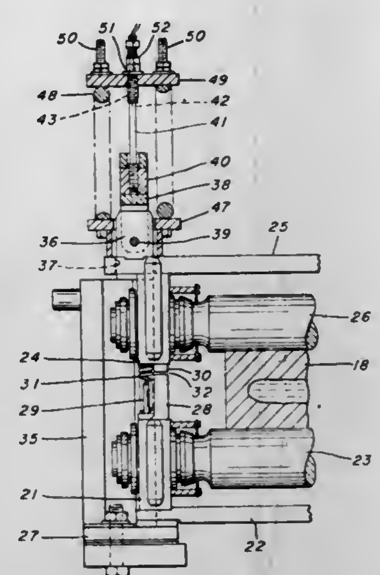
a. a side cover,

b. a first clip substantially immovably secured directly to the inside surface of said side cover, said clip having two portions normally urged resiliently into contact with one another and lying in generally parallel adjacent planes, said two portions clasping said money or the like between them, and

c. a second clip having two generally parallel portions normally urging resiliently toward one another to clasp money or the like between them, said second clip being spaced from said first clip and disposed for pivotal movement and to lie over said first clip in a genrally parallel relation thereto in a mounting which is connected to said side cover and spaced from said first clip.

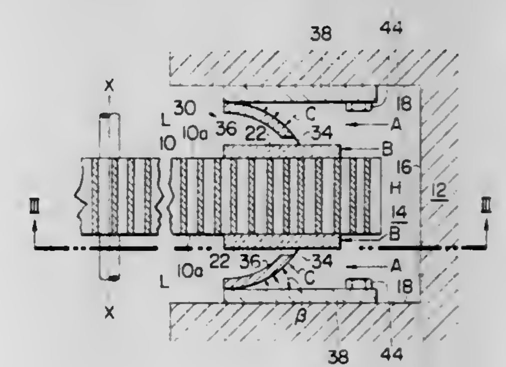
4,056,140
METHOD AND MECHANISM FOR CONTROLLING FORCES IN A CONTINUOUS-CASTING MACHINE
Kenneth D. Ives, Franklin Township, Westmoreland County; Ronald S. Vranka, Monroeville, and George J. Wagner, Jr., North Fayette Township, Allegheny County, all of Pa., assignors to United States Steel Corporation, Pittsburgh, Pa.
Filed Oct. 20, 1976, Ser. No. 734,066
Int. Cl.² B21B *37/08;* B22D *11/12*
U.S. Cl. 164—4 **16 Claims**

1. In a continuous-casting operation in which a partially solidified casting having a liquid core travels between a series of opposed roll-pairs which guide the casting and confine it against bulging, the rolls of each pair being journaled for rotation on relatively fixed but adjustable axes and having a gap of predetermined dimension therebetween and in which the force exerted between the roll-pairs and casting is measured at each roll-pair, an improved method of controlling forces exerted between the rolls and casting to prevent the casting from bulging if the gap is too large and to prevent improper stresses in the casting and rolls or the gap is too small, said method comprising utilizing deviations in the force measurement from the norm to locate improperly gapped roll-pairs and correcting



the dimension of the gap with adjustment means operatively connected to each roll pair.

4,056,141
SEAL ASSEMBLY IN ROTARY REGENERATIVE HEAT EXCHANGER
Yoshihiro Sakaki, Suwa, Japan, assignor to Nissan Motor Company, Limited, Yokohama, Japan
Filed Mar. 3, 1976, Ser. No. 663,231
Claims priority, application Japan, Mar. 25, 1975, 50-34943
Int. Cl.² F28D *21/00*
U.S. Cl. 165—9 **7 Claims**



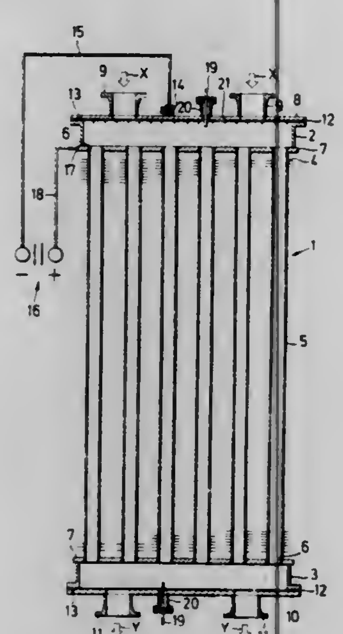
1. In a rotary regenerative heat exchanger including a stationary housing member and a heat-transferring member which is cylindrical and rotatable on the longitudinal axis thereof for heat exchange between a first fluid stream of a relatively high pressure and a second fluid stream of a relatively low pressure, the housing member having a surface opposite to and spaced from a portion of an end face of the heat-transferring member, and a seal assembly for preventing leakage of the first fluid into the second fluid along said end face of the heat-transferring member, said seal assembly comprising:

a seal member placed on said end face of the heat-transferring member and loosely joined with said surface of the housing member such that said seal member is movable vertically to said end face;

a support plate fixedly placed on said surface; and

a shield plate of a resilient material fixed at one end to said support plate to extend from said support plate obliquely towards said end face of the heat-transferring member such that an acute angle is formed between said surface and one side of said shield plate to be exposed to the first fluid, the extended end of said shield plate being in sliding contact with said seal member at a surface opposite to said surface of the housing member.

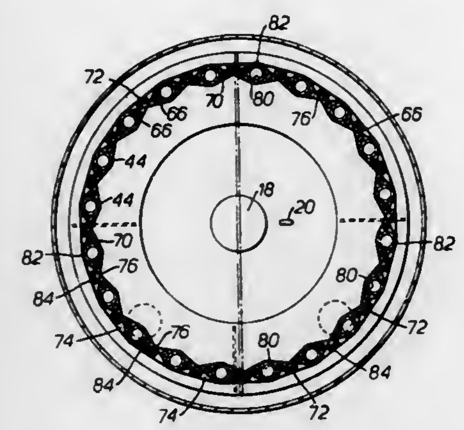
4,056,142
HEAT EXCHANGE ARRANGEMENT
Hans Baumann, Essen; Manfred Halfmann, Ravolzhausen, and Rudolf Janke, Hagen-Halden, all of Germany, assignors to GEA Luftkuhlergesellschaft Happel GmbH & Co. KG, Bochum, Germany
Continuation of Ser. No. 448,379, March 5, 1974, Pat. No. 3,951,207, which is a continuation-in-part of Ser. No. 396,118, Sept. 10, 1973, abandoned. This application Dec. 22, 1975, Ser. No. 643,509
Claims priority, application Germany, Sept. 9, 1972, 2244331
The portion of the term of this patent subsequent to Apr. 20, 1993, has been disclaimed.
Int. Cl.^{2} F28F *19/02;* **C23F** *13/00*
U.S. Cl. 165—133 **8 Claims**



1. A heat exchanger comprising a plurality of fluid conduits adapted for receiving a hot corrosive fluid medium to be cooled; end plates connecting the said conduits; openings formed in said end plates for said conduits; walls forming an inlet chamber provided at one end of said conduits; a cover for said inlet chamber, the said conduits, end plates and walls forming the main body of the heat exchanger and the said main body and the said cover being formed of a conductive metal, the said cover being insulated from said main body of the heat exchanger, and terminals to permit connection with opposite poles of a source of direct current, one for said cover and the other for said main body, to cause flow of a current when an electrolytically active fluid is passed through said heat exchanger whereby a protective coating against corrosion is caused to form throughout the fluid-wetted surface of said cover and main body.

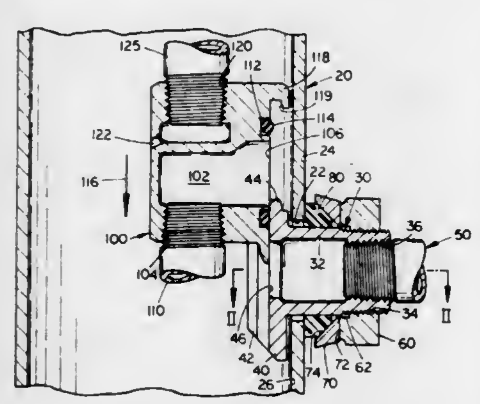
4,056,143
HEAT EXCHANGE APPARATUS
Barrie James Martin, Shenfield, England, assignor to The Plessey Company Limited, Ilford, England
Continuation-in-part of Ser. No. 411,135, Oct. 30, 1973, abandoned. This application Apr. 8, 1976, Ser. No. 675,201
Claims priority, application United Kingdom, Nov. 8, 1972, 51451/72
Int. Cl.^{2} F24B *5/02;* **F28F** *1/32, 9/02*
U.S. Cl. 165—176 **6 Claims**

1. A heat exchange unit for use in a central heating system, which heat exchange unit comprises in combination:
1. a housing;
2. a liquid conducting array of parallel pipes so arranged as to enclose an area, said pipes being spaced inwardly of said housing to define a gas chamber between said pipes and said housing;
3. a gas outlet in said gas chamber;
4. upper and lower liquid chambers communicating with said pipes whereby liquid can be passed through said pipes;
5. heat conducting material woven around said pipes with said heat conducting material extending substantially transverse to said pipes and being in contact with said pipes and with itself;
6. a metallic coating on said heat conducting material and said pipes adhering said heat conducting material to said pipes and to itself to form said heating conducting material and said pipes into a solid body having spaces between said heat conducting material and said pipes through



which hot gas can pass, whereby in use of said heat exchange unit said hot gas can pass from the center of said liquid conducting array through said spaces and into said gas chamber and out through said gas outlet and heat conducting material passing around said pipes to cross over itself between said pipes, and wherein more heat conducting material is wound around the outside of said pipes, and metal rods are positioned in gaps formed between said pipes and said crossover points, said rods being adhered to said pipes and to said conducting material by said metallic coating.

4,056,144
POSITIVE SEAL PITLESS WELL ADAPTER
William Wellstein, P.O. Box 430, Fostoria, Ohio 44830
Continuation-in-part of Ser. No. 660,396, Feb. 23, 1976. This application Dec. 6, 1976, Ser. No. 747,902
Int. Cl.^{2} E21B *33/03*
U.S. Cl. 166—85 **64 Claims**

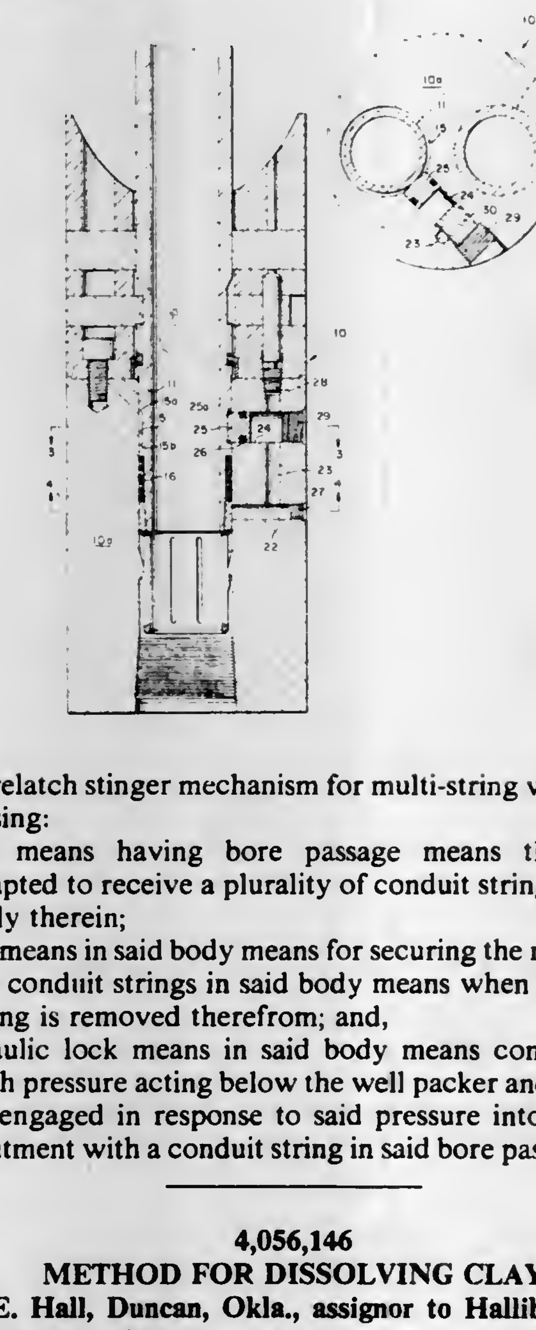


1. In an adapter for a side duct to a main duct having an outer cylindrical convex surface and having a radial hole through said surface, said adapter comprising:
A. a nipple having an outer cylindrical surface and having its axis extending radially outwardly from its inner end held in said hole, said side duct being connected to the outer end of said nipple,
B. sleeve means around said nipple comprising a nut means threaded on said nipple at the outer end of said nipple,
C. a gasket between said sleeve means and said main duct for engagement with both the outside cylindrical surfaces of said main duct and of said nipple,

the improvement comprising:

D. a frusto-conical seat on said sleeve means for said gasket, and
F. a saddle-shaped surface on one of said gasket and said seat contoured to substantially conform with the junction intersection between said main duct and said side duct, whereby axial thrust by said nut means against said gasket in said seat compressingly seals said gasket both against the outer cylindrical convex surface of said main duct and the outer cylindrical surface of said nipple.

4,056,145
HYDRAULIC HOLDDOWN FOR WELL PACKER STINGER
Marion Barney Jett, and Dennis Mitchel Spriggs, both of Dallas, Tex., assignors to Dresser Industries, Inc., Dallas, Tex.
Filed Oct. 28, 1975, Ser. No. 626,415
Int. Cl.^{2} E21B *23/00, 33/122*
U.S. Cl. 166—212 **5 Claims**



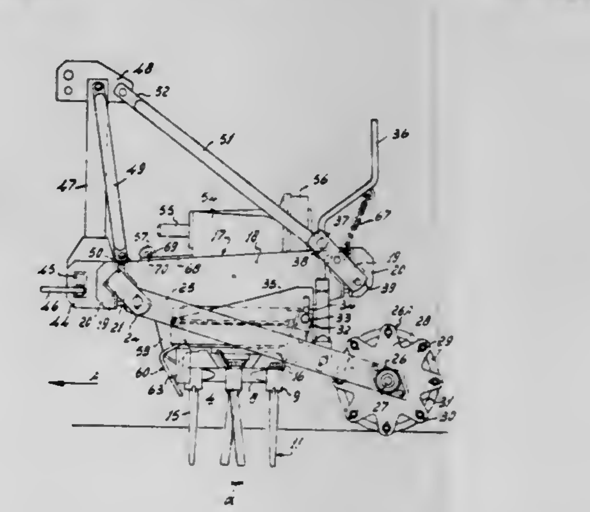
1. A relatch stinger mechanism for multi-string well packers, comprising:
body means having bore passage means therethrough adapted to receive a plurality of conduit strings telescopically therein;
latch means in said body means for securing the remainder of the conduit strings in said body means when one conduit string is removed therefrom; and,
hydraulic lock means in said body means communicating with pressure acting below the well packer and adapted to be engaged in response to said pressure into restraining abutment with a conduit string in said bore passage means.

4,056,146
METHOD FOR DISSOLVING CLAY
Bobby E. Hall, Duncan, Okla., assignor to Halliburton Company, Duncan, Okla.
Filed July 6, 1976, Ser. No. 702,813
Int. Cl.^{2} E21B *43/27*
U.S. Cl. 166—300 **15 Claims**

1. A method of dissolving clay comprising treating said clay with at least a one-stage treatment of at least two different chemicals, in alternate slugs, said one stage being comprised of
contacting said clay with a slug of a first chemical and thereafter
contacting said clay with a slug of a second chemical different from said first chemical to thereby form hydrofluoric acid on the surface of said clay,
wherein said first chemical supplies one of hydrogen ions or fluoride ions and said second chemical supplies fluoride ions, if hydrogen ions are supplied by said first chemical, or hydrogen ions if fluoride ions are supplied by said first chemical wherein said chemical supplying said fluoride ions is an aqueous solution of a fluoride-containing chemical selected from the group consisting of ammonium bifluoride, ammonium fluoride, and mixtures thereof.

12. A method of acid treating a subterranean sandstone formation comprising contacting said formation with an aqueous hydrochloric acid solution containing about 5 percent hydrochloric acid by weight of solution, contacting said formation with an aqueous solution containing about 3 percent hydrofluoric acid and about 12 percent hydrochloric acid by weight of solution, contacting said formation with at least one stage of a clay dissolving system wherein said stage consists of an aqueous solution containing about 3 percent ammonium fluoride by weight of solution, followed by an aqueous solution containing about 5 percent hydrochloric acid by weight of solution and thereafter contacting said formation with a 5 percent by weight solution of hydrochloric acid or a 3 percent by weight solution of ammonium chloride.

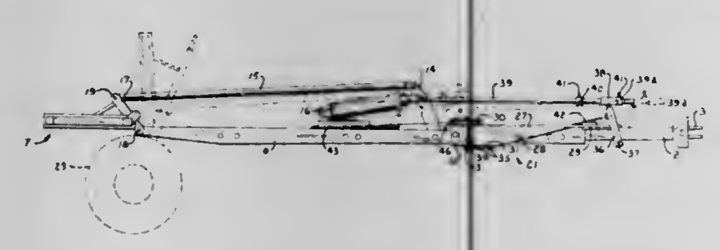
4,056,147
ROTARY HARROWS
Ary van der Lely, Maasland, and Cornelis Johannes Gerardus Bom, Rozenburg, both of Netherlands, assignors to C. van der Lely N. V., Maasland, Netherlands
Continuation of Ser. No. 436,956, Jan. 28, 1974, abandoned, which is a continuation of Ser. No. 283,337, Aug. 24, 1972, abandoned. This application Aug. 13, 1975, Ser. No. 604,243
Claims priority, application Netherlands, Aug. 31, 1971, 7111947
The portion of the term of this patent subsequent to Aug. 12, 1992, has been disclaimed.
Int. Cl.^{2} A01B *33/06, 33/16*
U.S. Cl. 172—68 **10 Claims**



10. A harrow comprising a frame having coupling means connectable to the lift of a tractor and a plurality of rotatable soil-working members mounted on said frame in a row extending transverse to the direction of travel, said soil-working members comprising tines mounted for rotation about upwardly extending axes that are supported on an elongated frame part of said frame, an elongated roller coextending with said row and said roller being connected to said frame and positioned at the rear thereof to trail behind said soil-working members, said frame part depending from an elongated supporting structure and the latter comprising a front beam and a rear beam that coextend with said frame part, forwarding extending arms said roller being connected to said arms, said arms being connected to said rear beam by adjustment means for varying the position of said arms up and down relative to said supporting structure connected to said arms intermediate the ends thereof, locking means positioned adjacent the lateral ends of said frame part for locking said arms against movement relative to said supporting structure, and said locking means being connected to said arms being pivotally connected to the front part of said supporting structure and intermediate the ends thereof, said arms being fixable in chosen angular settings about their pivot connections to said frame by said locking

means, said roller including a central tube-like support and a plurality of rod-like elements being spaced from said support, said rod-like elements extending generally transverse to the direction of travel and being helically positioned with respect to the center line of the said tube-like support, holes on said roller for supporting said rod-like elements and, means for detachably mounting said rod-like elements in said holes.

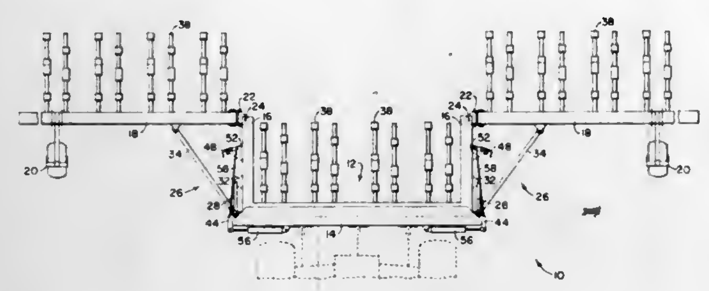
4,056,148
MULTIPLE SECTION FARM IMPLEMENT WITH ADJUSTABLE LATCH ARRANGEMENT
Calvin B. Blair, P.O. Box 97, Barnard, Kans. 67418
Filed Aug. 27, 1975, Ser. No. 608,090
Int. Cl.² A01B *73/00*
U.S. Cl. 172—311 **10 Claims**



1. In a multiple section farm implement having a main frame and a wing frame which is rearwardly foldable from an operating configuration to a transporting configuration, and vice versa said wing frame being adapted for mounting of soil conditioning members thereon and having elongated, flexible reinforcing members attached thereto which extend to said main frame, the improvement comprising:

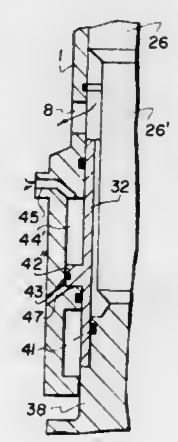
a. swinging arm members which are pivotally attached near their inner ends to the main frame and are pivotable forwards and backwards with respect thereto when said wig frame is folded, respectively, to an operating and a transporting configuration, one end of each of said reinforcing members being attached near the outer ends of one of said arm members,
b. latching means associated with said main frame whereby said arm members are latched with said reinforcing member one ends adjacent said main frame when said wing frame is in an operating configuration and whereby the arm members are unlatched for pivoting said reinforcing member one ends outwardly of said main frame during the folding of said wing frame to transporting configuration.
c. a lifting tower on said main frame for pivoting the wing frame, said lifting tower including a lever pivotally attached at one end to the main frame, an interconnecting link which is pivotally attached to said lever toward the other end thereof, said link extending rearwardly from said lever and being pivotally attached at its rear end of the wing frame,
d. an actuator rod pivotally attached at one end to said lever and in operational engagement with said latching means at the other end, the latching means being pivotal back and forth by said rod for unlatching said arm members upon pivoting the wing frame from an operating configuration to an intermediate configuration, and for latching said arm members when said wing frame is folded to an operating configuration, and
e. said latching means having means forming a sleeve passageway through which said rod extends and with respect to which said rod is longitudinally reciprocable, at least one engagement member mounted on said rod and selectively spaced from and engageable with said passageway forming means during movement of said rod with respect to said pasageway and being adjustable in position along said rod, whereby latching of said swinging arm members may be adjustably synchronized with the folding of said wing frame.

4,056,149
REARWARDLY FOLDING IMPLEMENT
Darrel Lee Honnold, Winterset, Iowa, assignor to Deere & Company, Moline, Ill.
Filed Mar. 8, 1976, Ser. No. 665,067
Int. Cl.² A01B *23/04, 73/00, 61/00*
U.S. Cl. 172—311 **12 Claims**



1. A mobile foldable sectional agricultural implement adapted to be pulled by a traction vehicle, comprising: a transverse center section with a forwardly projecting hitch means adapted for connection to a traction vehicle and having rearwardly extending leg members; transversely aligned side sections universally connected to the rearward portions of the leg members to swing between transversely extending and fore and aft extending positions with respect to the leg members; a first rigid link pivotally connected with each leg member forwardly of the aforesaid rearward portion for rotation about a vertical axis between a forwardly directed position and a rearwardly extending position in which the respective side section extends fore and aft; a second rigid link universally connecting each side section with the first link of its respective leg member; and a releasable locking means on the respective leg member for each first rigid link that engages and secures the latter after it has moved to its forwardly and rearwardly extending position.

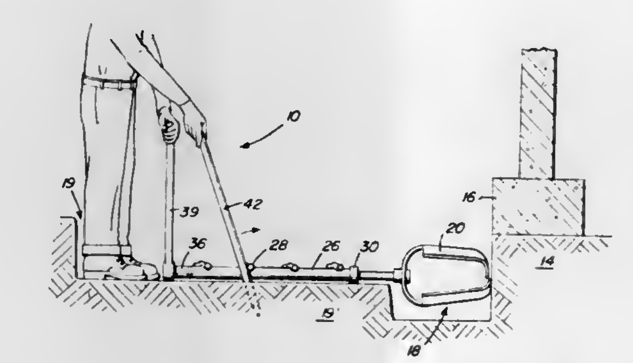
4,056,150
RAM DEVICE
Johann Daniël Meijer, Appingedam, Netherlands, assignor to N.V. Appingedammer Bronsmotorenfabriek, Netherlands
Continuation of Ser. No. 252,317, May 11, 1972, abandoned, and a continuation of Ser. No. 495,202, Aug. 6, 1974, abandoned.
This application Jan. 9, 1976, Ser. No. 647,818
Int. Cl.² E02D *7/08, 7/10*
U.S. Cl. 173—127 **7 Claims**



1. A pile driving drop hammer comprising, in combination, a vertically oriented cylinder adapted to be mounted above a pile and having a bore and a cylinder wall; a piston movable in said bore; a drop weight connected to said piston and operable, when dropped, to ram ;he pile into the ground; a sleeve valve movable inside said cylinder and operable to cover and to block ports formed in said cylinder wall, said ports including a first set of ports communicating with a supply of pressurized air and a second set of ports communicating directly with the ambient external atmosphere, the ports of at least said second set being distributed around said cylinder wall and having a flow cross-section sufficiently large to offer only a minimal

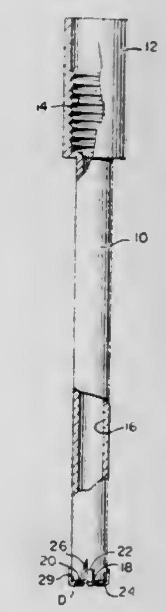
resistance to flow of air therethrough; said sets of ports being spaced apart from each other axially of said cylinder wall; piston means on said sleeve valve movable in a separate part of said cylinder sealingly separated from said bore in which said drop weight connected piston is movable; and control means selectively operable to connect said separate cylinder part to a source of pressurized air to subject said piston means to pressurized air to move said sleeve valve axially of said cylinder; the sleeve part of said sleeve valve having an axial length sufficiently greater than the axial spacing of said sets of ports that, upon axial movement of said sleeve valve, said sleeve part blocks communication between one set of ports and the interior of said cylinder bore beneath said drop weight connected piston before establishing communication between the other set of ports and the interior of said piston bore beneath said drop weight connected piston; said sleeve valve and said sets of ports being relatively arranged in a manner such that, upon establishing of communication between said first set of ports and the interior of said cylinder bore beneath said drop weight connected piston, following blocking of communication between said second set of ports and the interior of said cylinder bore beneath said drop weight connected piston, pressurized air is admitted through said sleeve valve to said cylinder bore beneath said drop weight connected piston to lift said drop weight connected piston and, upon establishment of communication between said second set of ports and the interior of said cylinder bore beneath said drop weight connected piston, following blocking of communication between said first set of ports and the interior of said cylinder bore beneath said drop weight connected piston, the pressurized air escapes directly to the ambient external atmosphere through said second set of ports with a minimum resistance to air flow, until said drop weight connected piston has dropped to its lowermost position to impact said drop weight against the pile to ram the pile into the ground.

4,056,151
EXCAVATING TOOL
Dennis J. Sullivan, 305 S. Idaho Ave., Grangeville, Idaho 83530
Filed Mar. 29, 1976, Ser. No. 671,362
Int. Cl.² B23Q *5/00*
U.S. Cl. 173—141 **9 Claims**



1. An excavating tool comprising: means of simple construction, very durable and maintenance free, and easy to operate by the ordinary unskilled laborer including; and easily replaceable auger head for excavating earth and the like, drive means attached to said auger head for rotating same for excavating purposes, second means associated with the drive means for applying pressure to the auger head in a substantially longitudihal direction to force the auger head to bite into the earth, the drive means attached to said auger head being a substantially long rod member, third means being secured to the other end of said rod member from the auger head for attachment to a ratchet actuating mechanism, the second means associated with the drive means for applying pressure to the auger head including a longitudinally extending tube member covering and enclosing a substantial intermediate portion of sid rod member between the auger head and the ratchet mechanism, and the second means including at least one perpendicular cross member attached to the outer side of said tube member and engaged by external ground engaging means for applying lateral pressure thereto.

4,056,152
DRILL BIT FOR REINFORCED CONCRETE
Patrick J. Lacey, 247 Hollywood Ave., Crestwood, N.Y. 10707
Filed Oct. 14, 1976, Ser. No. 732,268
Int. Cl.² E21B *9/36*
U.S. Cl. 175—330 **3 Claims**



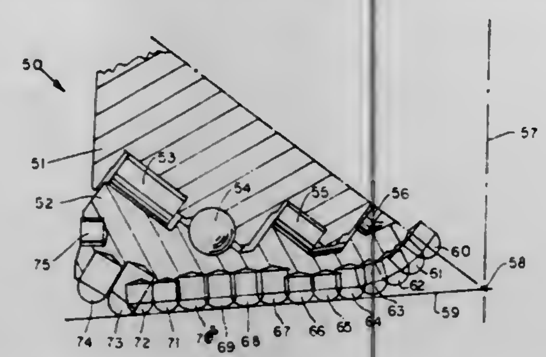
1. A bit to be driven by a rotary machine for drilling concrete containing metal reinforcements, said bit comprising:

a. a body having a coupling at its inner end for connection to said machine and having a hollow-stem extending outwardly from said coupling and terminating in an annular cutting face at its outer end;
b. The cutting face comprising a saw-tooth shape having multiple abrupt leading step portions facing in the direction of rotation of the bit, and having multiple trailing portions sloping circumferentially at a substantially constant angle away from the apex of each step portion to the root of the next succeeding step portion;
c. a hardened cutter insert secured against the leading edge of each step portion and having a cutting edge extending outwardly of the drill beyond the apex of the step, and having an inner end recessed in a slot in the hollow stem adjacent to the root of the step, each cutter insert being raked away from the direction of rotation of the bit;
d. the trailing portions of the annular saw-tooth face having surfaces sloping radially outwardly away from the center of the stem and axially away from its outer end so that cuttings are displaced away from the center of the bit toward the periphery of the hole being drilled;
e. the surfaces of said trailing portions of the saw-tooth face having diamond chips bonded thereto, the chips being recessed below the cutting edges of the hardened inserts; and
f. the outer surface of the stem being longitudinally recessed to provide an escape channel for cuttings which extends axially along the stem from a location immediately in front of each insert toward the inner end of the stem and past the slot which supports the adjacent insert.

4,056,153
ROTARY ROCK BIT WITH MULTIPLE ROW COVERAGE FOR VERY HARD FORMATIONS
Raul A. Miglierini, Dallas, Tex., assignor to Dresser Industries, Inc., Dallas, Tex.
Continuation of Ser. No. 581,998, May 29, 1975, abandoned.
This application July 16, 1976, Ser. No. 705,963
Int. Cl.² E21B *9/08*
U.S. Cl. 175—376 **5 Claims**

1. A three cone rotary bit for drilling by disintegrating the

formations at the bottom of a borehole, comprising: a head; three bearing pins extending from said head; and three rolling cutters of generally conical configuration, each cutter rotatably mounted upon a respective bearing pin, each of said cutters having a nose and a base and each of said cutters having intermediate circumferential rows of individual mounted in sockets in said cutters with said intermediate rows being



spaced between said nose and base so that in a majority of instances the track of an intermediagte row of one cutter on the bottom of the borehole at least partially overlaps the track of an intermediate row of one of the other cutters on the bottom of the borehole, said intermediate circumferential rows of inserts being completely out of intermesh and a composite of the inserts of said intermediate rows of all three cutters having the tips of the inserts forming substantially a straight line.

4,056,154

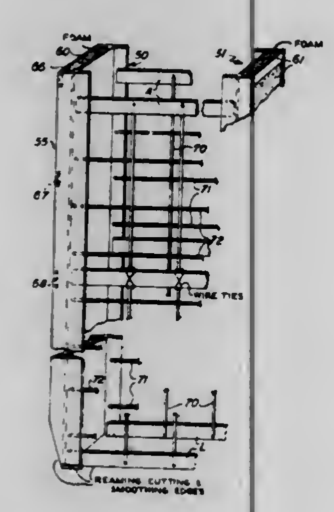
SQUARING OFF AND REAMING TOOL FOR DEEP ELONGATED TRENCH EXCAVATIONS

George John Tamaro, Leonia, N.J., assignor to Icos Corporation of America, New York, N.Y.

Division of Ser. No. 603,982, Aug. 12, 1975, Pat. No. 4,005,582. This application July 2, 1976, Ser. No. 701,761

Int. Cl.² E02D *17/148*

U.S. Cl. 175—416 **1 Claim**



1. A tool for squaring off and evening out the walls of an elongated trench excavation comprising a parallel pair of spaced steel beams, a plurality connecting steel lattice bars maintaining said beams in spaced parallel relation, and means forming reaming, cutting and smoothing edges on the lower edges of said beams and the lower steel connecting lattices for the walls of said elongated excavation to square off and smooth same and means for lifting and dropping said tool in said elongated trench excavation.

4,056,155

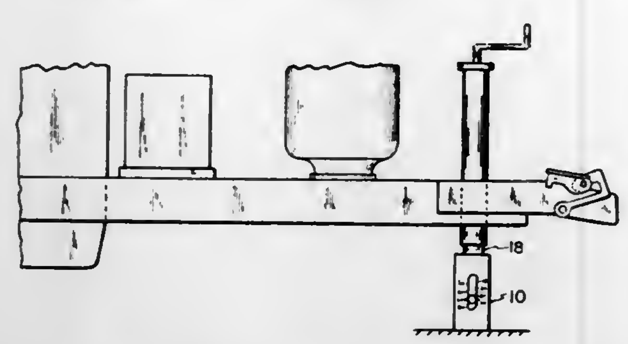
PORTABLE TRAILER TONGUE WEIGHT SCALE

Martin H. Wahl, R.D. 2, Box 53, Evans City, Pa. 16033

Filed Mar. 1, 1976, Ser. No. 662,712

Int. Cl.² G01G *3/02*

U.S. Cl. 177—145 **7 Claims**



1. A portable scale for receiving the jack tube of a trailer tongue to provide trailer tongue load weight comprising:

a cylindrical tubular housing having a closed end and an open end which receives the jack tube of a trailer tongue;

a weight sensitive device disposed within said tubular housing and being recessed from the open end of said tubular housing;

a sleeve secured to the inner diameter of said housing and extending between the open end of said housing and said weight sensitive device;

a weight scale disposed on the outside circumference of said tubular housing; and,

indicator means connected to said weight sensitive device for movement relative to said weight scale whereby the applied load weight is indicated.

4,056,156

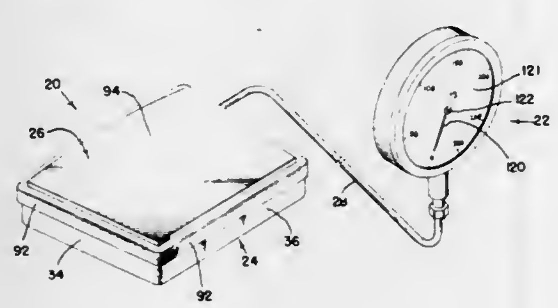
WEIGHING DEVICE

Arnold J. Dayton, 12718-37th Ave. NE., Seattle, Wash. 98125

Filed Aug. 12, 1976, Ser. No. 713,850

Int. Cl.² G01G *5/04*

U.S. Cl. 177—209 **17 Claims**



1. A combination hydraulic-pneumatic weighing device comprising:

a. a base member including a bottom wall and upstanding side walls defining an upwardly open scale housing,

b. a plurality of hydraulic fluid-containing, load-receiving members supported in said base member, said load receiving members having a manifold housing including an upwardly open manifold cavity and a downwardly movable member disposed above said manifold cavity for limited vertical movement and also including a metallic bellows member sealingly secured to both said movable member and manifold housing and together with said manifold cavity defining a load cell cavity, said manifold housing including at least one fluid opening connected to said manifold cavity to be interconnected by fluid passage means with another load receiving member, said plurality of load-receiving members being filled with hydraulic liquid and interconnected for movement of said hydraulic liquid,

c. a platform section mounted on said base member in such a way as to apply a weight thereon generally equally to said plurality of load-receiving members,

d. conduit means interconnecting at least one of said load-receiving members and a weighing scale device and also being substantially completely filled with hydraulic liquid, said conduit and said plurality of load-receiving members being interconnected so as to cumulatively displace a predetermined amount of hydraulic liquid in response to a predetermined amount of weight being applied to said load receiving member, and,

e. said weighing scale device including a weight indicator which is actuated by a column of air compressed by said displaced hydraulic liquid.

4,056,157

ELECTRONIC SPEED CONTROL SYSTEM FOR AUTOMOTIVE VEHICLES

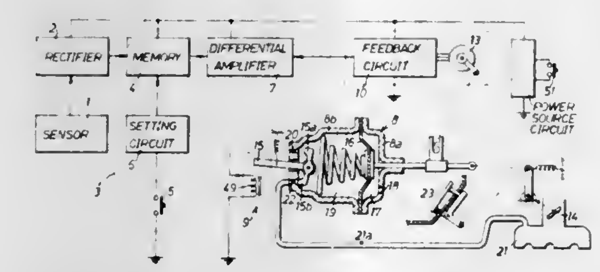
Shoji Kawata, Okazaki, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Aug. 5, 1976, Ser. No. 711,807

Claims priority, application Japan, Aug. 8, 1975, 50-96857

Int. Cl.² B60K *31/00*

U.S. Cl. 180—105 E **9 Claims**



1. In an electronic control system for use in automatically controlling the speed of a vehicle having an actuator for a throttle valve of the vehicle, comprising:

means for generating a speed signal voltage proportional to the actual speed of the vehicle;

a memory circuit including a memory capacitor and a first high input impendance amplifier, said capacitor connected at one end thereof to an output terminal of said speed signal voltage generating means and at the other end thereof to a control electrode of said first high input impedance amplifier;

setting means for momentarily connecting a constant voltage circuit to a common junction between said control electrode of said first high input impedance amplifier and said memory capacitor to store a command speed voltage in said memory capacitor in response to said speed signal voltage generated by said speed signal voltage generating means; and

a comparison circuit connected to said memory circuit for operating said throttle valve actuator by comparing the output voltage of said first high input impedance amplifier with a reference voltage;

wherein said setting means comprises a second high input impendance amplifier having an input terminal connected to said constant voltage circuit and having an output terminal connected to said common junction between said memory capacitor and said first high input impedance amplifier, and manual control means connected to the control electrode of said second high input impedance amplifier to normally deenergize said second high input impedance amplifier and to momentarily energize said second high input impedance amplifier upon actuation of said manual control means.

4,056,158

ROUGH TERRAIN VEHICLES

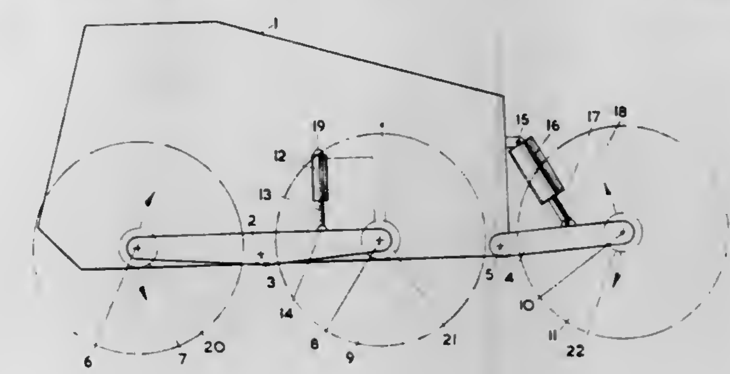
Roderick Buchan Ross, Bordon, England, assignor to Minister of Agriculture, Fisheries & Food, in Her Britanic Majesty's Government of the U.K. of Great Britain & N. Ireland, London, England

Filed Apr. 15, 1976, Ser. No. 677,442

Claims priority, application United Kingdom, Apr. 16, 1975, 15739/75

Int. Cl.² B62D *11/02*

U.S. Cl. 180—6.48 **8 Claims**



1. A vehicle comprising a rigid frame supported upon a plurality of wheels and skid-steerable by rotation upon a transverse pair of said wheels, each wheel of said transverse pair being called herein a pivot wheel, an operator-commandable transmission control system, hydraulic drive motors under the control of fluid transmission lines from said control system for independently driving at least the two pivot wheels, and hydraulic loading means downwardly operative upon each pivot wheel, each of said hydraulic loading means being in fluid connection with the fluid transmission line of one of said hydraulic drive motors and so constructed and arranged that fluid pressure developed within said one hydraulic drive motor by rotational resistance at its driven wheel acts via the hydraulic, loading means to increase ground pressure at the said pivot wheel.

4,056,159

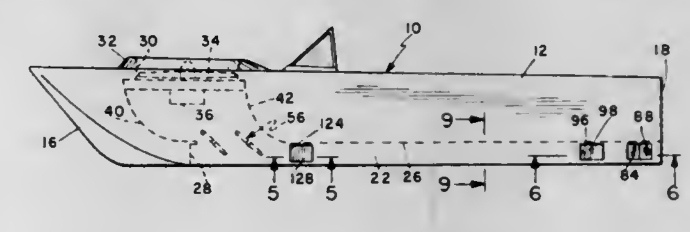
AIR CUSHION VEHICLE

Carmi Goodrich Evans, Hoddview Mobile Estates, Rte. 1, Space 12, Hubbard, Oreg. 97032

Filed July 12, 1976, Ser. No. 704,232

Int. Cl.² B60V *1/08*

U.S. Cl. 180—120 **4 Claims**



1. An air cushion vehicle, comprising:

an elongated body having a forward bow portion, a stern, and a lower portion with a floor and side walls defining a longitudinal, rearwardly opening air channel in the underside thereof;

a duct in said bow portion having a driven impeller therein;

a plenum chamber extending from and having an outlet communicating with said air channel;

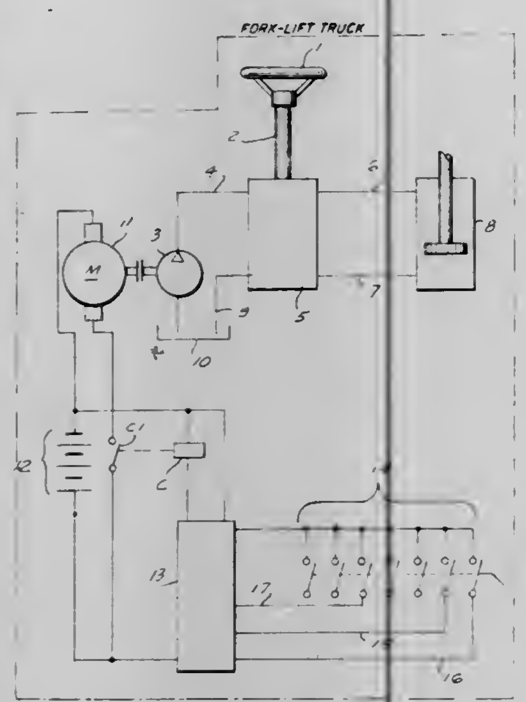
valve means in said outlet for directing air flow from the plenum chamber selectively downwardly, rearwardly and forwardly;

trim rudder means mounted in the rear portion of said air channel for selectively obstructing portions of the air channel;

and steering means for diverting air flow from said air channel through portions of said side walls, said steering means including rearwardly opening tunnels in the rear portions

of said side walls, said tunnels having inlets from said air channel forwardly of said trim rudder means, and directional control rudders pivotally mounted in said tunnels adjacent the rear openings thereof.

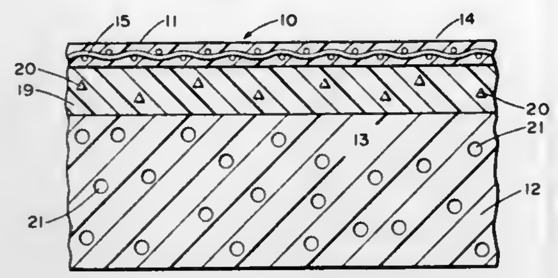
4,056,160
ELECTRICALLY POWERED VEHICLE WITH POWER STEERING
Theodor Abels, and Siegfried Puschel, both of Aschaffenburg, Germany, assignors to Linde Aktiengesellschaft, Wiesbaden, Germany
Filed Feb. 27, 1976, Ser. No. 662,165
Claims priority, application Germany, Jan. 3, 1975, 2508938
Int. Cl.² B62D *5/06*
U.S. Cl. 180—143 **11 Claims**



1. A vehicle comprising a battery;
an electrically-operated propulsion system;
switch means for connecting said battery to said propulsion system and having a range of speeds including relatively low speeds and at least one relatively high speed and, corresponding thereto, a high speed position and at least one lower speed position;
a hydraulically operable power steering mechanism for steering said vehicle, said mechanism including a hydraulic pump and an electric motor operatively connected to said pump for driving same upon energization of said motor; and
circuit means connected between said switch means and said motor for connecting said motor to said battery for operation of said mechanism in a lower speed position of said switch means and decoupling same from said battery in said high speed position of said switch means, said circuit means including a time-delay network delaying the energization of said motor by said circuit means for a predetermined time period subsequent to the operation of said switch means at said high speed position.

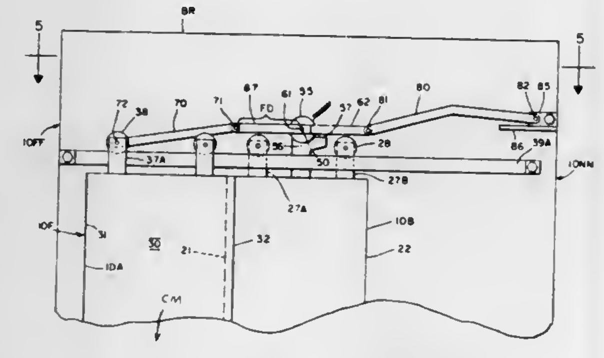
4,056,161
SOUND ATTENUATION MATERIAL
Ralph W. Allen, Jr., Melrose, Mass., assignor to Tillotson Corporation, Needham, Mass.
Filed Oct. 30, 1975, Ser. No. 627,278
Int. Cl.² G10K *11/04*
U.S. Cl. 181—290 **3 Claims**

1. A sound attenuating material comprising a polyvinyl chloride wear resistant outer layer containing embedded fiber reinforcement, a sound absorption layer comprising a foam material, and a sound barrier layer interposed between said outer and sound absorption layers, said barrier layers comprising a polyvinyl chloride layer containing a particulate, high density filler in major proportion by weight based upon the weight of the polyvinyl chloride, said sound barrier layer also serving as a bonding layer laminating said outer and said sound



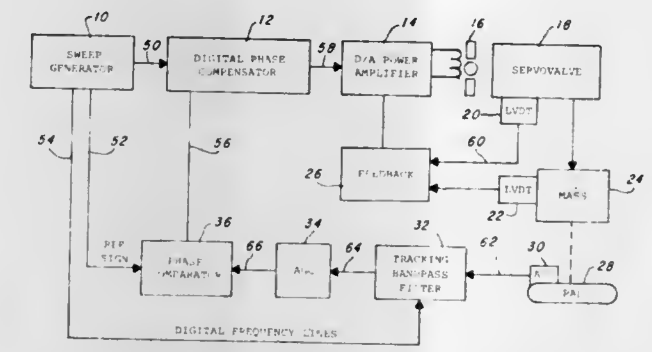
absorption layers together, said sound attenuating material being operable to absorb vibration and to inhibit transmission thereof.

4,056,162
OPERATING MECHANISM FOR OVERLAPPING PANELS TYPE DOORWAY CLOSURES
Richard L. Brown, Bellevue, Nebr., assignor to Lo-Rise Elevator Company, Plattsmouth, Nebr.
Filed Feb. 7, 1977, Ser. No. 766,266
Int. Cl.² B66B *13/08*
U.S. Cl. 187—52 R **9 Claims**



1. Operating mechanism for doorway closures of the rollably suspended overlapping parallel panels type, said doorway opening framework stationarily comprising an upright near-jamb at a finite lateral-extent from an upright far-jamb and a horizontal floor and header, there being a pair of horizontal overhead parallel rails attached to the framework nearer said header than to the floor and laterally extending in excess said lateral-extent including a front-rail forwardly offset a transverse-gap of a rear-rail, the doorway closure panels above mid-height being rollably suspended from the respective rails, said closure panels including a faster moving far-panel having a finite lateral-width representing a ratio compared to doorway lateral-extent within the range of one-third to two-thirds, said operating mechanism ensuring that the closure panels move appropriately interdependently between fully-open and fully-closed positions relative the doorway opening and comprising:
A. A transversely extending shaft turnable in both angular directions about its transverse-axis, said shaft being associated with the near-panel at a fixed elevation located above mid-height and hence also laterally co-movable with said near-panel;
B. A dual-arms lever including a first-arm and a secondarm at a fixed obtuse angular relationship and merging together at a turning-point, said lever arms being co-turnably attached to the transverse shaft, said dual-arms lever and shaft being sufficiently remote of the far-panel as to not abut thereagainst during far-panel lateral movement;
C. Dual-directional powering means for turning the shaft in both angular directions about its transverse-axis;
D. A far-link having its far-end pivotably attached to the far-panel at fixed elevation located above the far-panel mid-height, said far-link near-end being pivotably attached to the lever second-arm a finite-distance from the shaft transverse-axis;
E. A near-link having its far-end pivotably attached to the first-arm and having its near-end pivotably attached at an immovable-location which is nearwardly laterally offset the doorway near-edge; and
F. Stop means to limit turning of the shaft in both angular directions as the interdependently laterally movable panels approach fully-open and fully-closed positions at said framework jambs.

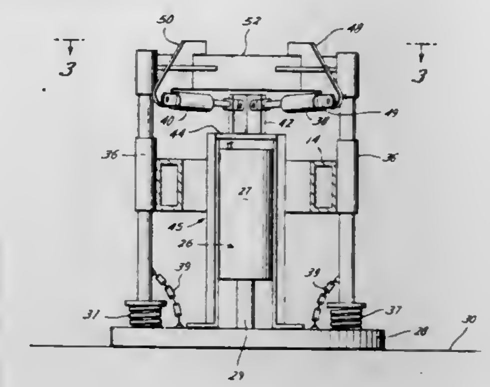
4,056,163
TRACKING BANDPASS FILTER FOR CONDITIONING VIBRATOR ACCELEROMETER WAVEFORM
George William Wood, Dallas, and John James Sallas, Richardson, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.
Filed May 1, 1975, Ser. No. 573,498
Int. Cl.² G01V *1/02*
U.S. Cl. 181—113 **18 Claims**



1. A control system for a vibratory seismic source comprising:
a. means for generating a first variable frequency electrical signal representative of the desired motion of said seismic source,
b. means for generating a second electrical signal representative of the actual motion of said seismic source,
c. tracking bandpass filter means responsive to said second electrical signal, the frequency response of said tracking bandpass filter means being variable to maintain a local amplitude response peak at the instantaneous frequency of said first electrical signal; and
d. phase comparator means responsive to said first electrical signal and to the signal produced by said tracking bandpass filter means to generate an error signal for controlling said seismic source.

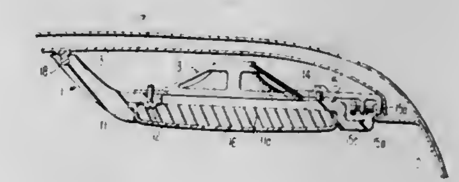
4,056,164
STABILIZED PORTABLE SEISMIC SIGNAL TRANSDUCER
Otis A. Johnston, League City, Tex., assignor to Western Geophysical Co., Houston, Tex.
Filed July 21, 1976, Ser. No. 707,178
Int. Cl.² G01V *1/04, 1/14*
U.S. Cl. 181—114 **17 Claims**

5. A portable seismic signal source apparatus, comprising:
a seismic energy source;
a base plate;
said source being coupled to said base plate and adapted to impart seismic energy to the ground through said base plate;
a vehicle having a frame;
means supported on said frame for raising and lowering said base plate and for exerting a substantial portion of the weight of said vehicle on said base plate while said base plate is imparting seismic energy from said source to the ground;
at least one hydraulic damper connected between said frame and said source; and



means for releasably biasing said damper to resist a lateral rotational motion of the vertical axis of said source without restricting the axial movement therealong.

4,056,165
SOUND REPRODUCING APPARATUS IN THE INSIDE OF A CAR
Kintaro Okamoto, Hachioji; Hirokatu Kudo, Wako; Soichi Ishijimi, Tokyo; Etsuro Kadoiri, Tokyo; Hiroshi Soma, Tokyo, and Hiroyuki Suzuki, Tokyo, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha and Pioneer Electronic Corporation, both of Tokyo, Japan
Filed Oct. 28, 1975, Ser. No. 626,005
Claims priority, application Japan, Oct. 28, 1974, 49-124055; Oct. 28, 1974, 49-130149; Oct. 28, 1974, 49-103150
Int. Cl.² H05K *10/00*
U.S. Cl. 181—141 **4 Claims**

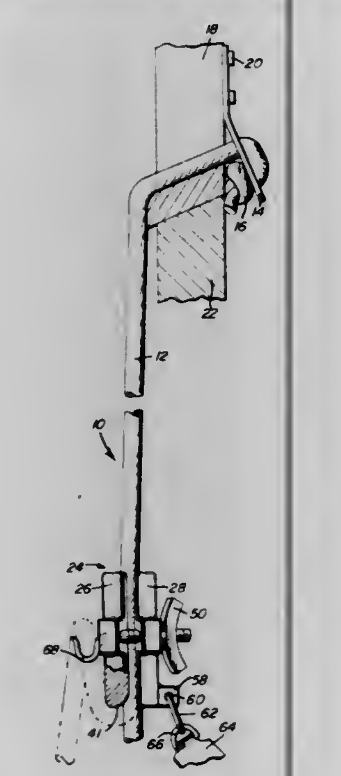


1. A sound reproducing apparatus in the inside of a car comprising speaker assemblies located in boundary portions between inside panels forming a part of the side wall of the inside of the car and ceiling material extending to the upper end of said inside panels, each of said speaker assemblies comprising a speaker unit fixed to a baffle plate, and a fixture attaching said speaker unit and said baffle plate to the upper end of said inside panel so as to form back chambers of predetermined capacity between said baffle and the ceiling of said car, said fixture having a first bent portion that rests on the back of the upper end of said inside panel and a second bent portion, and a bolt fastening the upper end of said inside panel between said first and second bent portions.

4,056,166
DETACHABLE FIRE ESCAPE DEVICE
Nicholas A. Rabelos, 7 Armour Lane, Riverdale, Ga. 30296, assignor to Thomas G. Clark; Kenneth B. Clary; J. Melvin England; Charles O'Brien, Jr. and Nicholas A. Rabelos, all of Atlanta, Ga.
Filed July 28, 1976, Ser. No. 709,296
Int. Cl.² A62B *1/14*
U.S. Cl. 182—5 **3 Claims**

1. A fire escape device comprising an elongated flexible member having an upper end capable of being anchored with respect to a building structure and having a length to depend to adjacent ground level or other safe level, a slide and sling assembly detachably mounted on the flexible member for longitudinal movement therealong, said slide and sling assem-

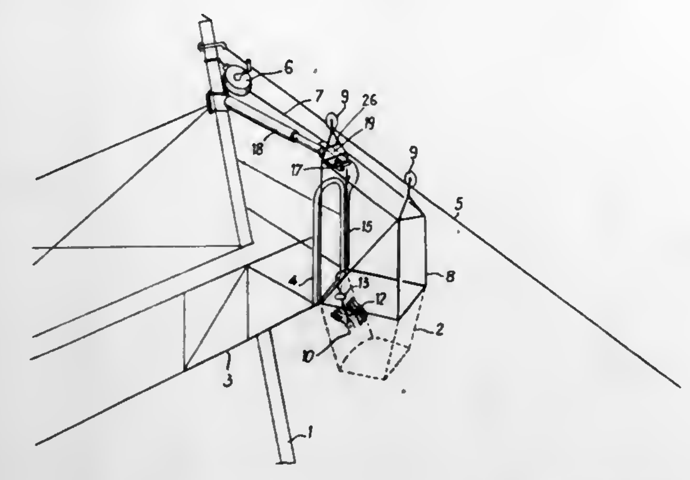
bly including a slide in the form of a pair of hingedly connected plates provided with facing grooves receiving the flexible member, manually operated screw-threaded means interconnecting said plates for pivoting them towards and away from each other to selectively frictionally grip the flexible member for controlling the rate of descent of the slide along the flexible member, said slide and sling assembly including a projecting mounting block on the lower outer portion of the outer plate below said screw-threaded means, said slide and sling assembly including a sling connected to said block thereby enabling a person supported by the sling to manually manipulate the means for pivoting the plates in relation to each other, each of



said plates being substantially cruciform in configuration, hinge means interconnecting the outer ends of one pair of horizontal arms, said means for pivoting said plates in relation to each other interconnecting the outer ends of the opposite pair of horizontal arms, said means for pivoting the plates in relation to each other including a threaded rod hingedly attached to a horizontal arm on one of said plates and a wing nut threaded onto said threaded rod and engaged with the arm on the other of said plates, said wing nut being disposed outwardly of the plate having the mounting block thereon whereby a person supported from the sling connected to the mounting block will have access to the wing nut.

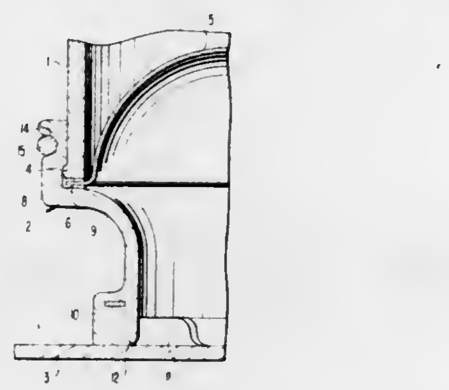
4,056,167
EMERGENCY ELEVATOR
Raymond Bonafos, Ris Orangis, France, assignor to Societe Nationale Elf Aquitaine (Production), Courbevoie, France
Filed July 20, 1976, Ser. No. 707,053
Claims priority, application France, July 23, 1975, 75.23001
Int. Cl.² A62B *1/02*
U.S. Cl. 182—10 **4 Claims**

1. Apparatus for automatically escaping from a tall structure, said apparatus comprising a chamber formed by a light metal frame and a flame-resistant cloth pocket suspended from said frame, said chamber being mounted to travel on a cable attached at one end to said structure, and an automatically releasable latching system attached to said cloth pocket and adapted to connect said chamber to said structure when the chamber is empty but initiate the release and descent of the



chamber upon the application of tension to said cloth when a person jumps into the chamber.

4,056,168
ARRANGEMENT OF THE SUCTION FUNNEL OF AN OIL PUMP IN THE SUMP OF AN INTERNAL COMBUSTION ENGINE
Alfred Bajohr, Stuttgart, Germany, assignor to Daimler-Benz Aktiengesellschaft, Germany
Filed Dec. 3, 1975, Ser. No. 637,187
Claims priority, application Germany, Dec. 5, 1974, 2457508
Int. Cl.² F01M *1/10, 11/06*
U.S. Cl. 184—6.24 **14 Claims**



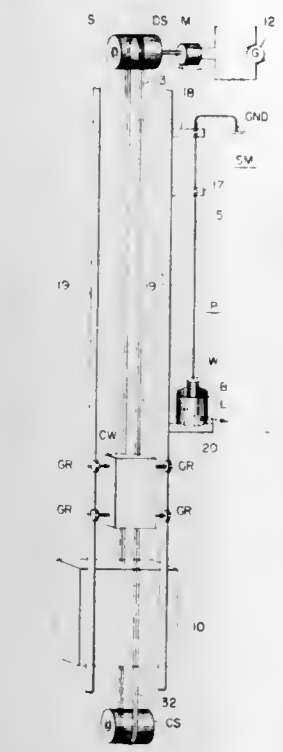
1. An arrangement of a suction funnel of a lubricating oil pump in an oil pan of an internal combustion engine, in which the suction funnel is supported at the bottom of the oil pan by means of an elastic hollow spacer means and the interior space of the suction funnel is sealingly connected with the interior space of the hollow spacer means, the spacer means resting with its lower end on the bottom of the oil pan by way of a support rim means provided with at least one opening determining the air-free suctioning-off, characterized in that the spacer means directly surrounds the inlet end of the suction funnel by a portion of the spacer means located in the upper half thereof, said portion having a larger diameter than a lower half portion, and a screen filter being arranged in the suction funnel and being force-lockingly and form-lockingly clamped in by a retaining rim clamped between the suction funnel and the portion of the spacer means surrounding said suction funnel.

4,056,169
ELEVATOR CONTROL SYSTEM
John Melville Showalter, Clark, N.J., assignor to United Technologies Corporation, Hartford, Conn.
Filed June 28, 1976, Ser. No. 700,630
Int. Cl.² B66B *5/02*
U.S. Cl. 187—29 R **18 Claims**

1. An elevator control system for use in a building which

occasionally experiences vibratory motion caused by wind, said elevator control system including a drive motor for moving an elevator through a hostway in said building to any one of a plurality of landings at which it can be stopped and further comprising:

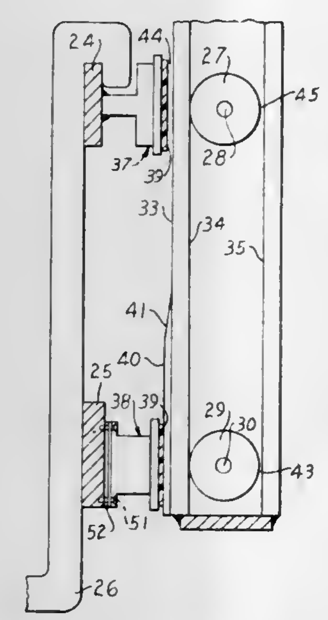
speed control means controlling said motor so that said car can move at a maximum velocity having a first predetermined magnitude;



vibration sensing means responsive to said vibratory motion and producing a vibration signal in response to said vibratory motion of a predetermined magnitude being sustained for a predetermined time interval; and

limit means operating in response to said vibration signal and controlling said speed control means to limit the maximum velocity at which said motor can move said car to a second predetermined magnitude which is less than said first predetermined magnitude.

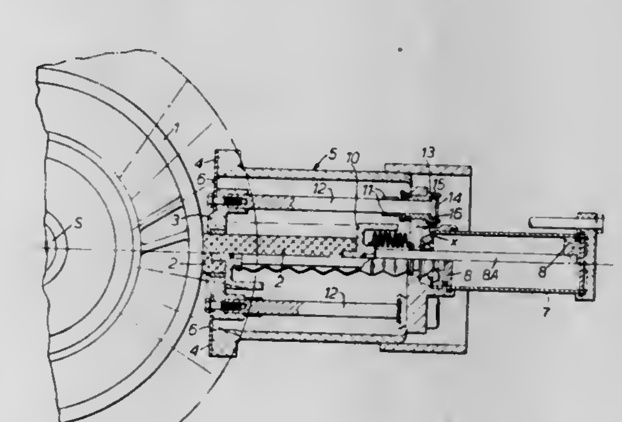
4,056,170
LOAD FORCE BYPASSING APPARATUS FOR LIFT TRUCK MASTS
Charles R. Chelin, Peoria, Ill., assignor to Towmotor Corporation, Mentor, Ohio
Filed Oct. 18, 1976, Ser. No. 733,645
Int. Cl.² B66B *7/02;* **B66F** *9/12*
U.S. Cl. 187—95 **8 Claims**



1. In a mast arrangement including a generally upright support, a work engaging assembly, a plurality of rollers movably mounting the assembly on said generally upright support, said rollers normally being subjected to load forces imparted against said assembly during normal load crowding operations, the improvement comprising;

load force bypassing means for maintaining said rollers substantially free of loading due to said load forces, said bypassing means being positioned between said assembly and said support in direct force transmitting relation therebetween to thereby directly pass said load forces from said assembly to said support only when said assembly is below a preselected height of said support.

4,056,171
LOW FRICTION SUPPORT FOR DISC BRAKE PAD
Colin John Frederick Tickle, Birmingham, England, assignor to Girling Limited, Birmingham, England
Filed June 8, 1976, Ser. No. 693,910
Claims priority, application United Kingdom, June 9, 1975, 24698/75
Int. Cl.² B60T *1/06*
U.S. Cl. 188—18 A **1 Claim**



1. A brake for braking a rotor having a braking surface, comprising an elongate body of friction material for braking engagement with said rotor surface; a support close to said rotor surface supporting said body of friction material; a fixed structure; connecting means connecting said support to said fixed structure; and means for urging said body of friction material into engagement with said rotor surface, wherein said connecting means comprises at least one flexible member which is relatively rigid in a first plane perpendicular to the direction of movement of said body of friction material and which is flexible in a plane perpendicular to said first plane, said flexible member comprising a plate including means defining an elongate slot which permits said flexing, said member being connected between said support and said fixed structure.

4,056,172
DISK BRAKE
Tullio Campagnolo, P.O. Box 822, Vicenza, Italy
Filed Aug. 13, 1976, Ser. No. 714,284
Claims priority, application Italy, Aug. 14, 1975, 26358/75
Int. Cl.² F16D *55/02*
U.S. Cl. 188—26 **2 Claims**

1. Disk brake for wheels of ground or air vehicles and especially motorcycles, comprising:

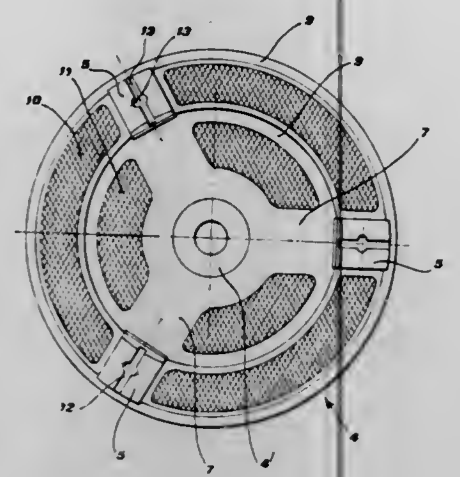
at least one brake disk connecting the actual hub of the wheel with the spokes-carrying flange of the wheel itself;

at least one non-rotating plate, provided with friction pads and slidable along the wheel axis in order to establish or remove the braking engagement between said friction pads and said disk, under the opposing action of fluid pressure control means and of spring return means;

the surface of the brake disk being a conical surface, with its axis coinciding with the wheel axis, and the friction pads being carried by the non-rotating plate in such a way as to lie on a conical surface mating with the conical surface of the disk, with which they are engageable;

wide slottings in the non-rotating plate, thereby to provide a

unit comprising a hub, three spokes and two peripheral crowns, and having the friction pads applied to said spokes between one crown and the other;
said unit being a metal casting;



said friction pads being crossed through by at least one radial notching; and
said slottings being screened by a protective wire netting.

4,056,173

AUTOMATIC SLACK ADJUSTER FOR VEHICLE BRAKES COMBINED WITH A HYDRAULIC ACTUATOR AND AUXILIARY MECHANICAL ACTUATOR ASSEMBLY

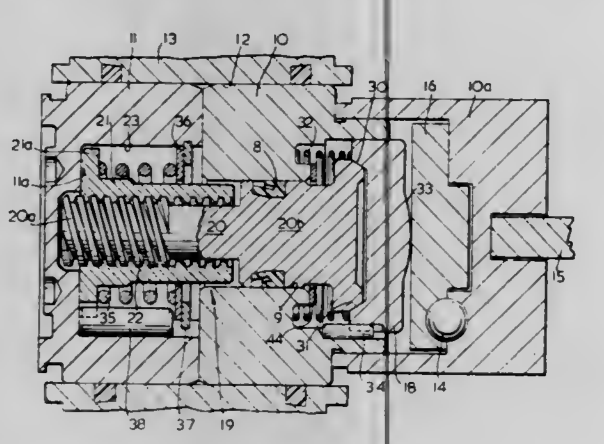
Glyn Phillip Reginald Farr, Leek Wootton, England, assignor to Girling Limited, Birmingham, England

Filed Apr. 5, 1976, Ser. No. 673,858

Claims priority, application United Kingdom, Apr. 8, 1975, 14269/75

Int. Cl.² F16D *65/56*

U.S. Cl. 188—71.9 **30 Claims**



1. In combination with a hydraulic actuator for a vehicle brake comprising opposed first and second non-rotatable but relatively axially displaceable components which are movable apart by the application of hydraulic pressure therebetween; an auxiliary mechanical actuator fitted to said first component; an automatic slack adjuster operative between said auxiliary mechanical actuator and said second component for taking up increased slack due to lining wear, said slack adjuster including rotatable and non-rotatable adjuster elements of which the rotatable element has a screw-threaded portion and a further portion non-rotatable relatively thereto and a screw-thread connection between said screw-threaded portion and said non-rotatable adjuster element; means slidably sealing said further portion to said first hydraulic actuator component, such that the hydraulic pressure acts on said further portion of said rotatable adjuster element in the same direction as it acts on said first hydraulic actuator component, said auxiliary mechanical actuator acting on said second hydraulic actuator component via said rotatable adjuster element, said screw-threaded engagement and said non-rotatable adjuster element in that order; and spring means arranged to bias said further portion of said rotatable adjuster element in a direction opposite to the direction in which the applied hydraulic pressure acts thereon for producing at least part of an adjustment cycle when lining wear has taken place and when the applied hydraulic pressure is below a predetermined relatively low value, said adjustment cycle at least in part consisting of rotation of said rotatable adjuster element in a direction to take up increased slack due to the lining wear, said spring means being overcome by the applied hydraulic pressure acting on said further portion of said rotatable adjuster element to inhibit any part of an adjustment cycle whenever the applied hydraulic pressure is above said predetermined relatively low value.

4,056,174

FRICTION PAD ASSEMBLIES FOR SLIDING CALIPER DISC BRAKES

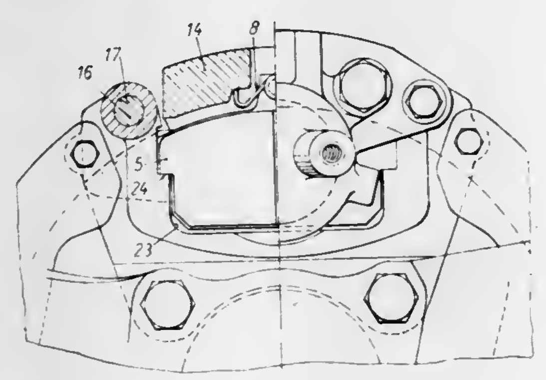
Hans-Jürgen Wienand, Steimel, and Horst Willi Klassen, St. Sebastian, both of Germany, assignors to Girling Limited, Birmingham, England

Filed Dec. 23, 1975, Ser. No. 643,827

Claims priority, application United Kingdom, Dec. 24, 1974, 55727/74

Int. Cl.² F16D *65/00*

U.S. Cl. 188—73.5 **9 Claims**



1. A friction pad assembly in combination with a sliding caliper disc brake, the brake comprising a torque member and a caliper member, at least one hydraulic actuator being incorporated in the caliper member, the caliper member being attached to the torque member for sliding movement relative thereto and arranged to act on the friction pad assembly which is located in a recess in the torque member, wherein the friction pad assembly comprises a backing plate, a pad of friction material secured to the backing plate, and a wire spring, a tab of the backing plate being free of friction material and a pin being permanently attached to said tab, the wire spring having a coiled region, the end regions of the spring protruding in two directions from said coiled region, the coiled region being fitted over a shank portion of the pin and a headed portion of the pin retaining the spring on the pin, the whole of the spring and pin being confined to an area that is not swept by the disc of the disc brake under all conditions of pad wear, the end regions of the spring engaging the undersurface of a portion of the caliper member, and the friction pad assembly engaging guides in the torque member so that the spring acts to urge the pad assembly against the guides, and to urge the caliper member away from the pad assembly.

4,056,175

SLACK ADJUSTERS FOR THE SHOES OF VEHICLE SHOE DRUM BRAKES OF THE DUO SERVO TYPE

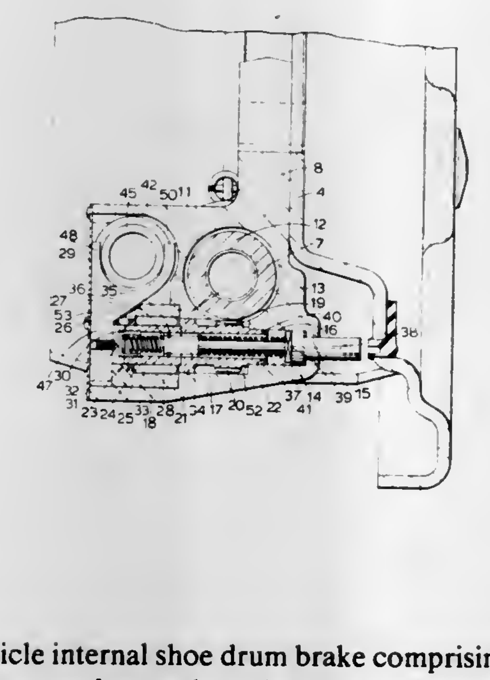
Charles Newstead, Walsall; Andrew Charles Assinder, Redditch, and Geoffrey Harvey, Birmingham, all of England, assignors to Girling Limited, Birmingham, England

Filed Sept. 15, 1976, Ser. No. 723,657

Claims priority, application United Kingdom, Sept. 30, 1975, 39903/75

Int. Cl.² F16D *65/56*

U.S. Cl. 188—196 BA **9 Claims**



1. A vehicle internal shoe drum brake comprising a rotatable drum, primary and secondary shoes located within said drum, said primary shoe being carried around with said drum with a servo-action when the brake is applied, and automatic slack adjustment means being located between adjacent ends of said shoes, wherein said automatic slack adjusting means comprises a housing, a thrust member slidably guided in said housing and having an adjustable effective length, two tappets slidable in said housing and protruding from opposite ends thereof for engagement by ends of said shoes so that the thrust on said primary shoe when the brake is applied is transmitted to said secondary shoe to augment the brake applying force applied to said secondary shoe, said thrust member having threaded engagements of opposite hands at its opposite ends with said tappets, sensing means for sensing movement of said shoes when the brake is applied, and adjuster means incorporated in said housing for automatically increasing the effective length of said thrust member to compensate for wear of friction linings carried by said shoes when the said movement exceeds a predetermined amount, said sensing means comprising a helically toothed pinion forming a part of said adjuster means, said thrust member comprising a body provided with helical gear teeth meshing with said teeth on said toothed pinion such that said pinion moves in response to sliding movement of said thrust member, at least beyond a given amount, during application of the brake, and energy-storing clutch means controlled by said sensing means located within said housing and connected to said adjuster means to operate said adjuster means to increase the effective length of said thrust member when the torque generated on said thrust member by stored energy force exceeds the torque generated by the force applied to said thrust member from said shoe ends, said energy-storing clutch means acting on said pinion so as to effect adjustment of the length of said thrust member, said energy-storing clutch means comprising energy-storing means, a one-way clutch connected to said energy-storing means, said one-way clutch being connected to said pinion, and lost motion being incorporated in the connection from said clutch through said pinion to said thrust member.

4,056,176

DRIVE ARRANGEMENT FOR MOTOR VEHICLES, ESPECIALLY FOR PASSENGER MOTOR VEHICLES, WITH AN AUTOMATIC CHANGE-SPEED TRANSMISSION

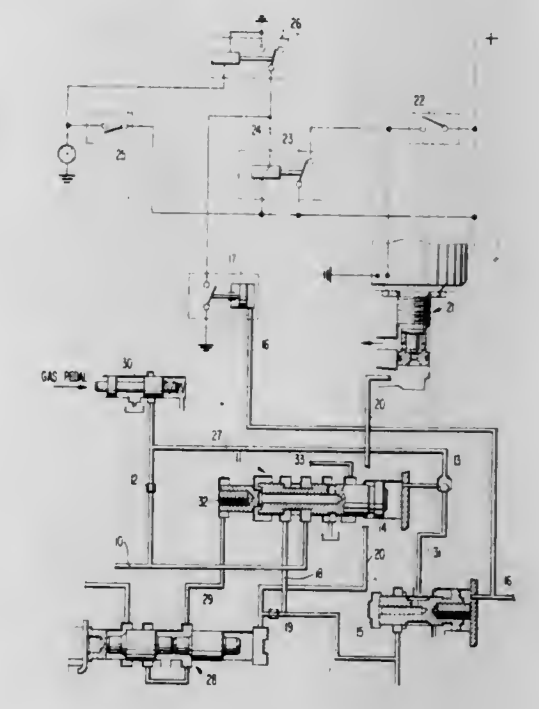
Hans-Joachim M. Förster, and Hermann Gaus, both of Stuttgart, Germany, assignors to Daimler-Benz Aktiengesellschaft, Japan

Filed May 3, 1976, Ser. No. 682,213

Claims priority, application Germany, May 3, 1975, 2519903

Int. Cl.² B60K *41/26*

U.S. Cl. 192—4 A **8 Claims**



8. A drive arrangement for motor vehicles, including an automatically shifting transmission means, a warm-up control means for raising an idling rotational speed of the driving engine during a warm-up phase, and brake means for braking the vehicle, characterized by means for shifting the transmission means from first to second speed upon an actuation of the brake means during the warm-up phase of the engine while the idling rotational speed is artificially raised by said control means.

4,056,177

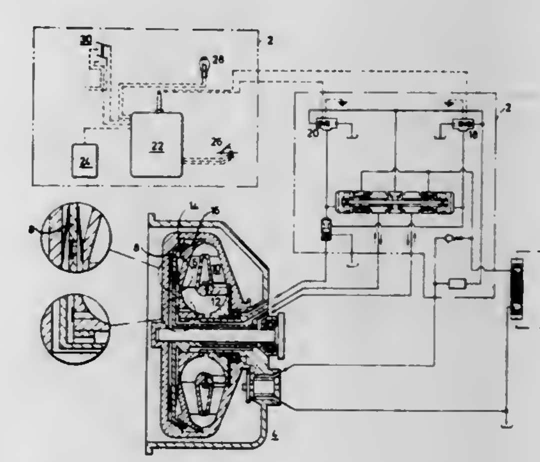
SIMPLIFIED ELECTRONIC PILOT AND REMOTE CONTROL SYSTEM FOR 1½ STAGE TRANSMISSION

Karl Gustav Ahlen, and Gunnar Wahlsten, both of Stockholm, Sweden, assignors to S.R.M. Hydromekanik Aktiebolag, Sweden

Filed May 7, 1976, Ser. No. 684,318

Int. Cl.² F16D *47/06*

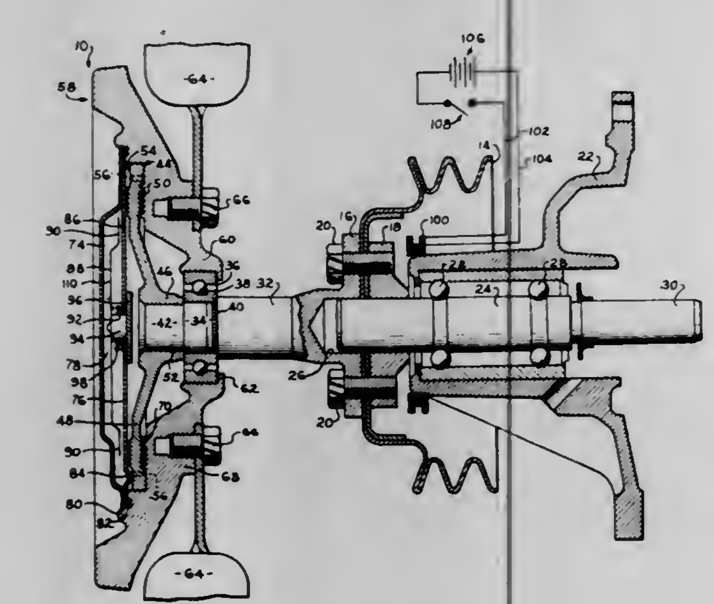
U.S. Cl. 192—.032 **7 Claims**



1. A control system for connecting and disconnecting the lock-up clutch in a hydrodynamic torque converter for a prime

mover, comprising first means for deriving a signal representative of the input speed of the prime mover, second means for deriving a signal representative of the torque setting of the prime mover, and means for comparing the signals and for controlling the setting of the clutch in accordance with that comparison.

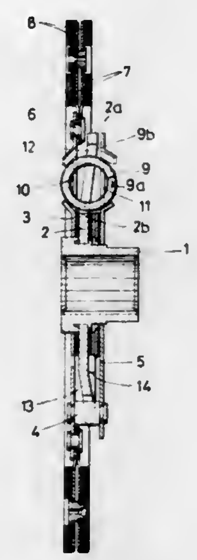
4,056,178
MAGNETICALLY ACTUATED VISCOUS FLUID COUPLING
Rodney H. Detty, Marshall, Mich., assignor to Eaton Corporation, Cleveland, Ohio
Filed Apr. 28, 1976, Ser. No. 681,106
Int. Cl.² F16D *35/00, 43/25*
U.S. Cl. 192—58 B **18 Claims**



1. A viscous fluid clutch comprising
a shaft made of magnetic material;
a first member secured to said shaft;
a second member rotatably disposed on said shaft relative to said first member;
shear surfaces disposed on said first and second members and forming an operating chamber therebetween;
a fluid storage chamber adjacent said operating chamber;
means for selectively inducing a magnetic field in said shaft;
valve means effecting selective communication between said storage chamber and said operating chamber and including a valve member, including an armature made of a magnetic material and located adjacent said shaft, movable in response to the induction of said magnetic field in said shaft from a first position to a second position, one of said positions providing communication between said storage chamber and said operating chamber and the other of said positions blocking such communication;
fluid means disposed within said storage chamber and being selectively displaced into said operating chamber when said valve member is in said one position to provide in said operating chamber a medium to transmit rotational movement from one of said members to the other of said members; and
pump means in said operating chamber to displace said fluid means from said operating chamber to said storage chamber.

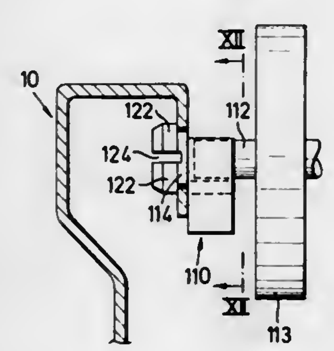
4,056,179
CLUTCH DISK
Lothar Huber, Buhl-Altschweier, Germany, assignor to LuK Lamellen und Kupplungsbau GmbH, Buhl, Germany
Filed Feb. 23, 1976, Ser. No. 660,155
Claims priority, application Germany, Feb. 22, 1975, 2507725
Int. Cl.² F16D *3/66*
U.S. Cl. 192—106.2 **1 Claim**

1. Clutch disk assembly, comprising a hub member, a flange carried by said hub member, respective disks mounted on said hub member at opposite sides of said flange, force storage means engageable with said flange and said disks so as to afford rotational play of said disks relative to said flange in a direction opposite the biasing action direction of said force storage means, and at least one friction device disposed between and effective upon said relatively rotatable flange and disks, said flange being dish-shaped and having a substantially conical



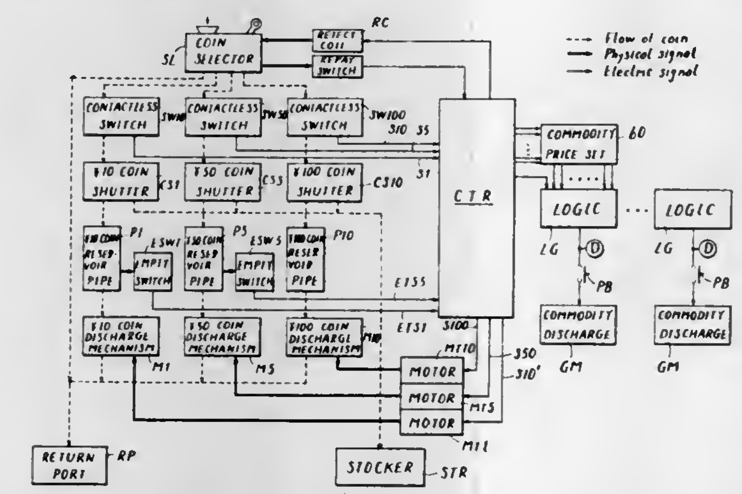
portion in a radial region thereof disposed between the outer periphery thereof and the location of said friction devices, said dish-shaped flange, in said substantially conical portion thereof, being formed with at least one cut-out wherein said force storage means are received, said force storage means being engageable with abutment contours defining said cutout, said abutment contours extending substantially centrally through the axis of said force storage means.

4,056,180
SET OF COMPONENTS FOR PRODUCING VARIABLE LOAD-BEARING SCAFFOLDS
Rolf Gunti, Laufen, Switzerland, assignor to Masyc AG, Laufen, Switzerland
Filed Aug. 27, 1975, Ser. No. 608,399
Claims priority, application Switzerland, Aug. 27, 1974, 11677/74
Int. Cl.² B65G *39/02*
U.S. Cl. 193—35 J **2 Claims**



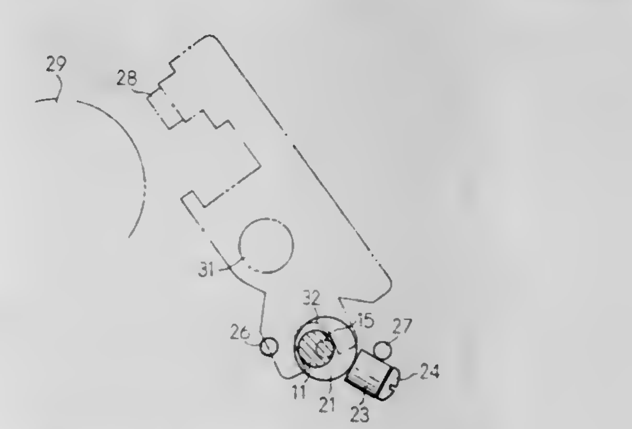
1. A set of components for producing load-bearing scaffolds comprising profile bars each of which has an approximately Σ-shaped cross-section with a flat centre web section and two equally dimensioned flanges arranged in mirror image relationship, each of said centre web section and an inwardly angled free arm of each flange, which arm extends parallel to the centre web section, being provided with perforations; connecting bars each of which has cross-section which is geometrically approximately similar to that of the profile bars with a centre web section and two equally dimensioned flanges arranged in mirror image relationship and has such dimensions that a one of said connecting bars is slidably insertible into a one of said profile bars with engaging and fitting flanges and mutually superposed centre web sections, the centre web section of each of the connecting bars being provided with perforations, said profile and connecting bars being mutually detachably connectable by connecting means located through mutually superposed perforations; and reducing elements which are provided for supporting the axles of small rollers or light support rollers, the reducing elements being each located in a perforation of the profile bars and each having a fixing stud insertible releasably and engageably into a perforation of a one of the profile bars and each having a bearing ring for receiving an end of one of said axles, each said reducing element having a bearing plate which is H-shaped in plan and has two triquadrant-shaped bearing section rings and wherein the fixing stud is arranged laterally staggered above a one of the two bearing section rings and has an external circumference insertible as a snug fit into a polygonal perforation in a one of said profile bars.

4,056,181
SYSTEM AND METHOD FOR DETERMINING VENDIBILITY IN AUTOMATIC VENDING MACHINE
Shigehiko Ikeguchi; Norio Yamashita, both of Oora, and Eiji Matsuda, Oota, all of Japan, assignors to Sanyo Electric Co., Ltd.; Tokyo Sanyo Electric Co., Ltd. and Sanyo Vending Machine Co., Ltd., all of, Japan
Filed Mar. 16, 1976, Ser. No. 667,543
Claims priority, application Japan, Mar. 17, 1975, 50-32579
Int. Cl.² G07F *9/04*
U.S. Cl. 194—10 **15 Claims**



1. A system for determining vendibility in an automatic vending machine, comprising:
means for receiving a plurality of kinds of coins, said plurality of kinds of received coins comprising at least three kinds of coins of large, medium and small values, said large and medium values being as large as integral times said small value,
means coupled to said coin receiving means for sorting said received coins depending on said kinds of coins,
means coupled to said coin sorting means for detecting each of said received and sorted coins separately for each kind of coins, and for generating a small, medium and large value coin detecting signal upon detection of said coins of small, medium and large value, respectively,
means coupled to said coin sorting means for reserving received and sorted coins separately for each kind of coins,
means coupled to said coin reserving means for detecting when said reserved coins are fewer than a predetermined number of coins separately for each kind of coins,
means coupled to said coin reserving means for discharging said reserved coins as change from said coin reserving means,
means coupled to said detecting means and responsive to said medium value coin detecting signal for storing information indicating the number of received coins of said medium value,
means coupled to said detecting means and responsive to said small value coin detecting signal for storing information indicating the number of received coins of said small value,
means coupled to said detecting means and responsive to said small, medium and large value coin detecting signals for generating information indicating the total amount of received coins,
means operatively associated with said small value coin information storing means for generating unit information proportional to said small value coin information,
subtraction means responsive to said total amount information generating means and said small value unit information generating means for effecting sequential subtraction of said small value unit information from said total amount information,
determining means connected to said detecting means and responsive to said coin detecting signals of said medium and small values and connected to said medium and small value coin information storing means and responsive to said information indicating the number of received coins of said medium and small values for determining availability as change of said received coins for each stage of said sequential subtraction by said subtraction means, and having an output for designating vendibility at each stage of said sequential subtraction,
means for setting a plurality of prices of commodities being vended by said machines, and
display means connected to said determining means and responsive to said vendibility designating output from said determining means and operatively associated with said price setting means for displaying ones among said preset prices of commodities in said price setting means that are vendible.

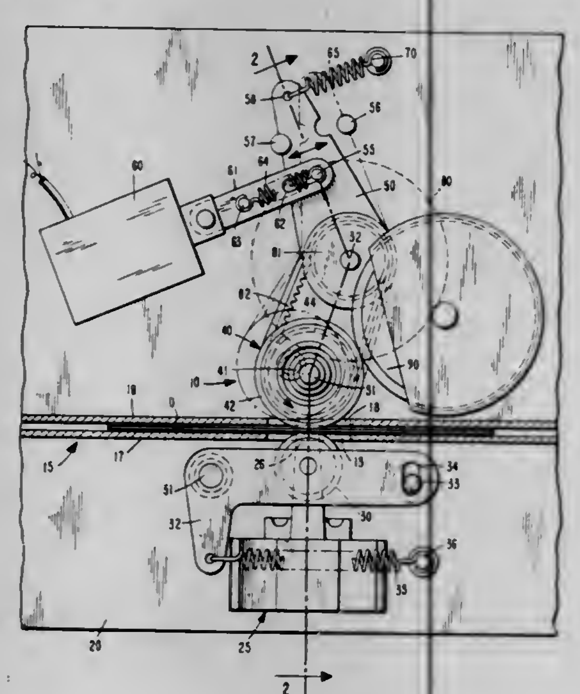
4,056,182
STYLUS ACTUATOR
Ronald Kent Thuet, Salt Lake City, Utah, assignor to Sperry Rand Corporation, New York, N.Y.
Filed Apr. 21, 1976, Ser. No. 678,850
Int. Cl.² B41J *25/00*
U.S. Cl. 197—1 R **6 Claims**



1. A stylus actuator comprising in combination:
a stylus carriage having a print head at one end, said stylus carriage adapted to rotate between print and non-print positions;
a slot disposed in the other end of said stylus carriage;
shaft means disposed within said slot, said shaft means comprising a shaft having a first longitudinal axis, first and second extensions integrally formed at opposite ends of said shaft means and having a diameter smaller than that of said shaft means, said first and second extensions having a common longitudinal axis displaced from said first longitudinal axis of said shaft means, such that when said shaft means is rotated the axis of rotation is said common longitudinal axis of said first and second extensions, such that rotation of said shaft means in a first direction causes said stylus carriage to rotate to said print position and rotation of said shaft means in a second direction causes said stylus carriage to rotate to said non-print position;

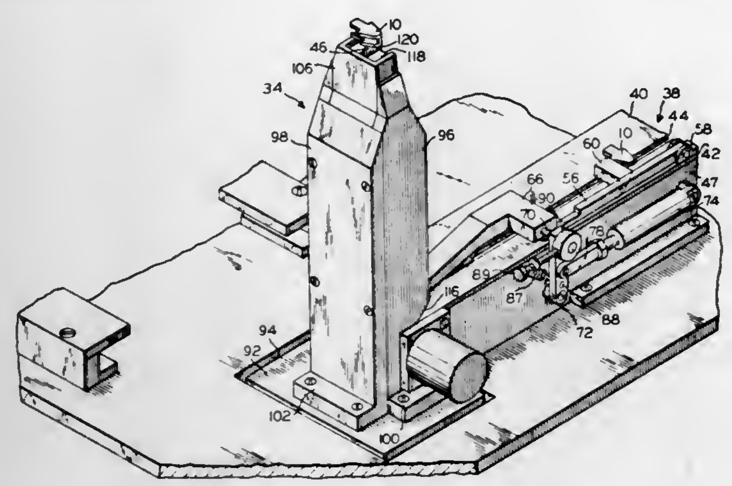
bearing means for rotationally supporting said first extension;
motor means having a drive shaft connected to said second extension for rotating said shaft means;
spring means disposed on said shaft means normally biasing said shaft means to said non-print position whereby when said motor means is de-energized said shaft means is rotated to the non-print position;
a coupling disposed on said shaft means;
an extension extending radially outward from said coupling;
first stop means disposed in the path of said extension for limiting movement of said stylus carriage in said first direction and into said print position; and
second stop means disposed in the path of said extension for limiting movement of said stylus carriage in said second direction and into said non-print position.

4,056,183
RIBBONLESS ENDORSER HAVING A SHIFTABLE INKED PLATEN AND FEED ROLLER
Jack Beery, Farmington, Mich., assignor to Burroughs Corporation, Detroit, Mich.
Filed May 7, 1976, Ser. No. 684,449
Int. Cl.² B41J *7/10*
U.S. Cl. 197—1 R **16 Claims**



1. Apparatus for selectively printing information onto documents moving past a print location comprising:
a. selectively actuable impact producing means;
b. rotatable impact receiving means shiftable between a retracted position and an advanced print position;
c. means for shiftably supporting said impact receiving means;
d. means for controlling the speed of said documents moved past the print location including (1) feed roller means supported by said shiftable supporting means, and (2) pressure roller means cooperable with said feed roller means to pinch the documents therebetween when said impact receiving means is in the advanced print position, said feed roller means and said impact receiving means being mounted for conjoint rotation on said shiftable supporting means; and
e. means for shifting said shiftable supporting means, to shift said impact receiving means and said feed roller means between said retracted position and said advanced print position.

4,056,184
APPARATUS AND METHOD OF POSITIONING SLIDERS
Richard R. Silvis, Meadville, and John A. Ettinger, Conneaut Lake, both of Pa., assignors to Textron Inc., Providence, R.I.
Division of Ser. No. 484,906, July 1, 1974, Pat. No. 3,964,615. This application Feb. 23, 1976, Ser. No. 660,610
Int. Cl.² B65G *37/00*
U.S. Cl. 198—471 **6 Claims**

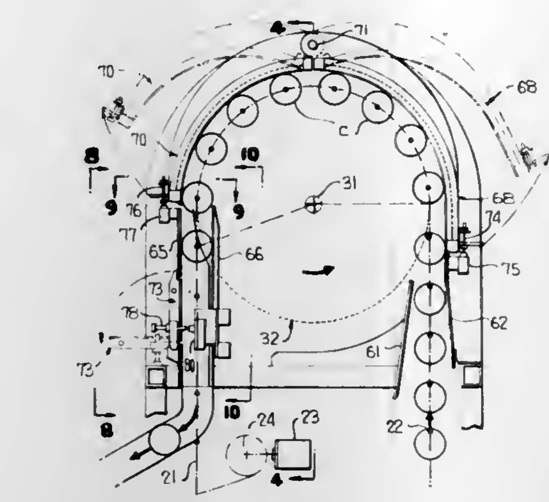


1. An apparatus for positioning a slider in a slider assembly station, comprising
support means defining a work area,
a conveyor track having entrance means and a terminal point and forming a path for guiding sliders single file from the entrance means to the terminal point of the conveyor track,
friction driven moving means having spaced means for engaging sliders to simultaneously move a series containing a plurality of the sliders in spaced relationship along the conveyor track from the entrance means toward the terminal point,
raising means adjacent the terminal point for raising a slider from a lowered position to a raised position above the terminal point,
means including a projection extending into the path of the sliders for engaging a second of the series of sliders on the conveyor track at a position spaced from the terminal point to stop the moving means to prevent pile-up at the terminal point,
transfer means for transferring the first slider from the terminal point of the conveyor track to the raising means in a lowered position, and
means responsive to operation of the transfer means for releasing the projection to allow the series of sliders to advance along the conveyor track.

4,056,185
CONVEYOR UNLOADER
William J. Cartwright, Palos Park, Ill., assignor to The Continental Group, Inc., New York, N.Y.
Filed Aug. 21, 1973, Ser. No. 390,241
Int. Cl.² B65G *47/00*
U.S. Cl. 198—484 **13 Claims**

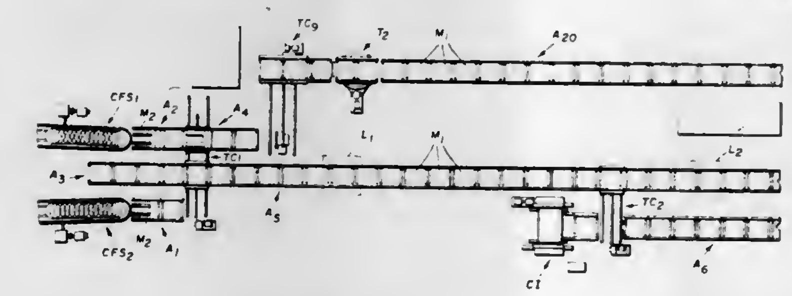
1. An apparatus for unloading cans and like tubular members from travelling supports carried by an endless conveyor, said apparatus comprising a turret mounted for rotation about an axis, a plurality of carriers having means defining pockets, means mounting said carriers in uniformly circumferentially spaced relation about said axis for rotation in unison about said axis and independent reciprocation parallel to said axis, the spacing of said carriers corresponding to the spacing of travelling supports from which cans and like tubular members are to be unloaded, means for rotating said turret with said carriers moving at the same rate as the supports, said carriers defining radially outwardly opening pockets, outer guide means disposed generally radially outwardly of said carriers and cooperable with said carriers to retain cans and like tubular members

within said pockets, and each carrier including a stripper member for engaging a can or like tubular member at one end thereof to move the same axially with said carrier, said turret being encased within an enclosure including swingably mounted doors, said outer guide means being at least in part



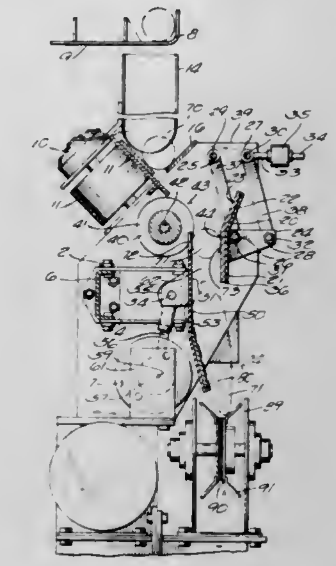
carried by said doors, and door support means for adjustably positioning said doors relative to said axis to selectively vary the spacing between said outer guide means and said carrier pockets for receiving cans and like tubular members of selected different diameters.

4,056,186
COIL HANDLING APPARATUS AND SYSTEM
William J. Hill, Holden, Mass., assignor to Morgan Construction Company, Worcester, Mass.
Continuation of Ser. No. 570,236, April 21, 1975, abandoned. This application Feb. 22, 1977, Ser. No. 771,058
Int. Cl.² B23Q *5/22*
U.S. Cl. 198—339 **10 Claims**



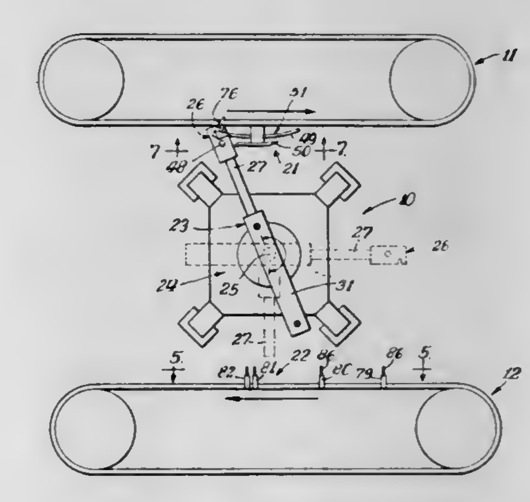
1. An apparatus for transporting upstanding cylindrical product coils between stations employing coil transfer mandrels, said apparatus comprising: a plurality of separately driven roller table modules aligned to form longitudinally extending roller conveyor avenues, the roller table modules adjacent to said stations having laterally arranged rollers defining first open ended spaced therebetween; pallets having base sections with laterally spaced leg members defining second open ended spaces therebetween, said second open ended spaced being arranged for vertical alignment with said first open ended spaces to accept the coil transfer mandrels when said pallets are located adjacent to said stations, support members extending upwardly from said leg members to provide lateral support for coils deposited thereon, said base sections being adapted for movement on said roller table modules along said roller conveyor avenues; and, transfer means for laterally shifting certain of said roller table modules from one to another of said roller conveyor avenues.

4,056,187
CORN ORIENTING MACHINERY
Fortunato S. Ajero, South Milwaukee, Wis., assignor to Carlo S. Ajero, South Milwaukee, Wis.
Filed Sept. 30, 1976, Ser. No. 728,351
Int. Cl.² B65G *47/24*
U.S. Cl. 198—394 **17 Claims**



15. A tapered object orienting machine adapted to orient tapered objects with their smaller ends foremost, of the type having first and second inwardly opposed orienting surfaces biased toward each other, between which surfaces a tapered object is engaged on opposite edges of its largest diametral plane in an orienting operation, wherein the improvement comprises an orienting lane of fixed length bounded by said opposed orienting surfaces, having a first fixed point where an object to be oriented is engaged at the edges of its largest diametral plane and a second fixed point where such engagement is released at the end of the orienting operation, said first and second fixed points being constant when tapered objects having different largest diameters are oriented in said machine, and means to intermittently apply an upward force to objects in said lane whereby to orient said objects without overcorrection.

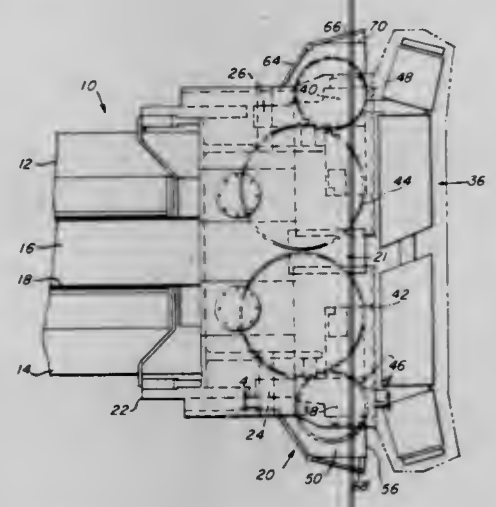
4,056,188
CONVEYOR TRANSFER APPARATUS PICKUP MEANS REACH-RETRACT CONTROL
Thomas R. MacFarlane, and Frank R. Skinner, II, both of St. Joseph, Mich., assignors to Whirlpool Corporation, Benton Harbor, Mich.
Filed Oct. 24, 1975, Ser. No. 625,520
Int. Cl.² B65G *47/00*
U.S. Cl. 198—465 **11 Claims**



1. Apparatus for transferring an article from a conveyor wherein the article is moved along a preselected path, said apparatus comprising: means for sensing the presence of an article carried by the first conveyor at a pickup position; a carrier; a pickup device mounted on the carrier; means for

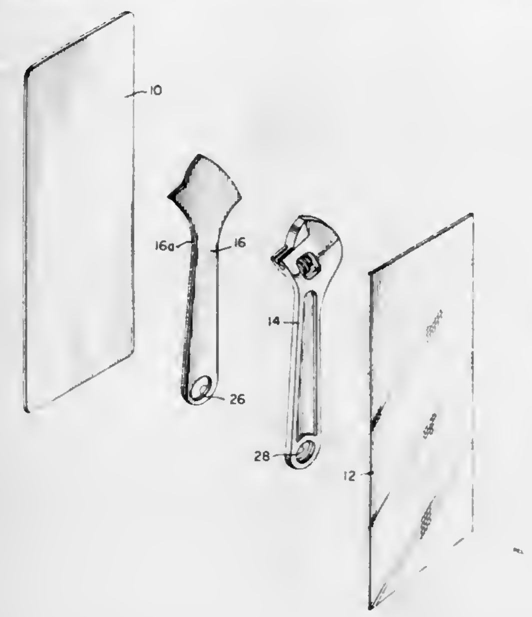
translating the carrier to move the pickup device to said pickup position for picking up the article thereat, and subsequently from said pickup position to a delivery position; and means for incrementally adjusting the position of the pickup device on the carrier while the carrier is being translated at said pickup position to cause the pickup device to move seriatim inwardly and outwardly transversely to said path to substantially follow said path at said pickup position and thereby be effectively disposed to pick up the article at said pickup position.

4,056,189
MATERIAL GATHERING DEVICE FOR A MINING MACHINE
Donald L. Freed, Jr., Belleville, Ill., assignor to National Mine Service Company, Pittsburgh, Pa.
Filed Dec. 23, 1975, Ser. No. 643,856
Int. Cl.² B65G *65/06*
U.S. Cl. 198—514 **9 Claims**



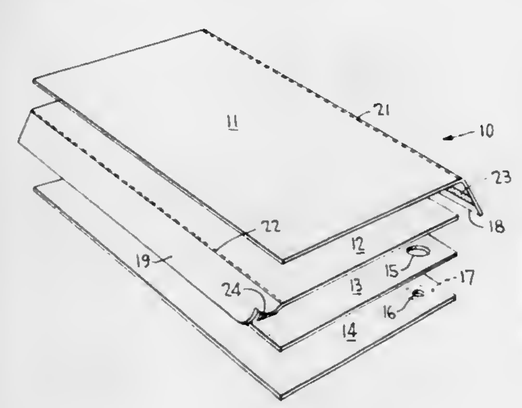
1. A material gathering device for a mining machine comprising,
a gathering platform extending forwardly from the mining machine,
said gathering platform having a transverse forward edge portion and side portions extending rearwardly therefrom,
a longitudinal conveyor extending rearwardly from said gathering platform,
said conveyor being operable to convey dislodged material rearwardly from said gathering platform on the mining machine,
a first set of gathering disc members rotatably positioned in side by side relation on one side of said longitudinal conveyor adjacent said forward edge portion of said gathering platform,
a second set of gathering disc members rotatably positioned in side by side relation on the opposite side of said longitudinal conveyor adjacent said forward edge portion of said gathering platform,
said first set and said second set of gathering disc members each including a first gathering disc positioned oppositely of said longitudinal conveyor and a second gathering disc positioned adjacent said side portion of said gathering platform,
said first and second gathering discs having peripheral edge portions positioned tangentially to one another,
drive means positioned on said gathering platform for rotating said first and second sets of gathering disc members,
gear means for drivingly connecting said drive means with said first and second sets of gathering disc members and transmitting rotation from said first gathering disc to said second gathering disc,
said gear means secured to said peripheral edge portions of said first and second gathering discs so that said gear means of said gathering discs are maintained in meshing relation and said gathering disc members of each of said sets rotate in opposite directions to convey dislodged material laterally from said gathering platform onto said longitudinal conveyor.

4,056,190
PACKAGING ARTICLES AND IDENTIFYING TEMPLATES
Walter James Dix, 919 Avondale Ave., Asheboro, N.C. 27203
Filed May 13, 1976, Ser. No. 685,992
Int. Cl.² B65D *75/36, 75/54;* **A45C** *11/26*
U.S. Cl. 206—349 **2 Claims**



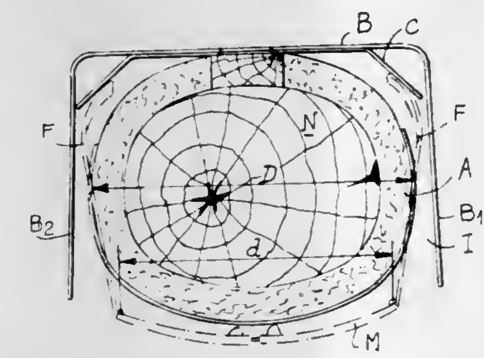
1. A package for an article comprising a backing member having a mounting surface and an encasing element, said encasing element when received on and adhered to said backing member conforming substantially to the outline of said article thereby to support said article adjacent said backing member, and wherein the improvement comprises a template, said template formed by a sheet material body having a silhouette forming a representation of the outline of said article, said template body including means by which it may be supportingly received on a display surface to identify the placement of said article, and said template body being received in said package juxtaposed said mounting surface of said backing member and below said article and encasing element.

4,056,191
STUBLESS MULTI-PART ASSEMBLY
John A. Weisenfluh, North Tonawanda, N.Y., assignor to Moore Business Forms, Inc., Niagara Falls, N.Y.
Filed Sept. 15, 1976, Ser. No. 723,247
Int. Cl.² B65D *27/14, 27/34*
U.S. Cl. 206—629 **5 Claims**



1. A multi-part mailer construction, comprising superimposed first, second, third and fourth parts, said third part having at least one first hole therein of a predetermined first size along one of its margins, a quantity of detachable adhesive extending between said second and fourth parts and through said hole of said third part for securing said second and fourth parts together, said adhesive extending through said first hole having a cross-sectional size which is less than said predetermined size of said first hole so as to be spaced inwardly of the marginal edge of said first hole for retaining said third part in place, said first part having a first glue flap thereon underlying said fourth part and being secured thereto, said first flap being removably secured to said first part along a line of weakening located at one marginal edge thereof, and said second part having a second glue flap thereon underlying said fourth part and being secured thereto, said second flap being removably secured to said second part along a line of weakening located at a marginal edge opposite said one edge whereby said second and fourth parts are connected together and said third part is immobilized to form a mailer construction having open sides at other than said marginal edges with said first part detachably connected thereto along said first flap line of weakening, said one flap having said detachable adhesive thereon, and said parts each being devoid of any tear lines which may form a stub, whereby removal of said first part leaves said second, third and fourth parts intact, or separation of said second and fourth parts effects a break in said adhesive and frees said third part from the remaining of said parts while leaving said first and fourth parts interconnected, or removal of said first part together with separation of said second and fourth parts separates each of said parts from one another.

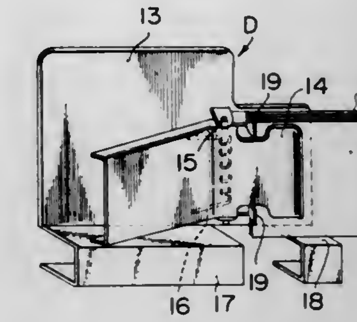
4,056,192
DISPLAY DEVICE FOR SPECTACLES
Marcelle Barrois, Garches, France, assignor to Techniform, Nanterre, France
Filed July 15, 1976, Ser. No. 705,551
Int. Cl.² A47F *7/02*
U.S. Cl. 211—13 **5 Claims**



1. A display device for spectacles, comprising a core member to be straddled by the frames of spectacles to be displayed, said core member having, normally convex, opposed side surfaces and including a layer of inwardly deformable material disposed thereon for contact with the respective side-pieces of said spectacles, the normal width of said core member being at least equal to the centre-to-centre distance between hinges of the frames, whereby said side-pieces form furrows in said layer when mounted on said core member, and forcing means situated for engagement with the free ends of the side-pieces to urge said free ends toward each other when the spectacles are so mounted.

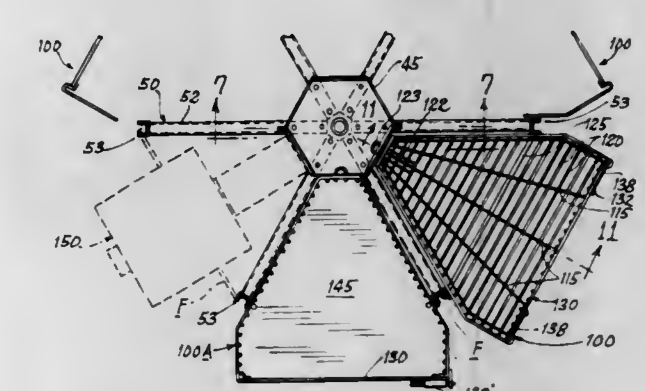
4,056,193
SHEET HOLDER ATTACHMENT ADAPTED TO BE USED WITH SHEET HOLDER FOR SHEET COUNTER
Minoru Yoshida, Tokyo, Japan, assignor to Laurel Bank Machine Co., Ltd., Tokyo, Japan
Filed Mar. 26, 1976, Ser. No. 670,843
Claims priority, application Japan, Mar. 28, 1975, 50-41722
Int. Cl.² B65H *5/08*
U.S. Cl. 211—51 **1 Claim**

1. In combination with a sheet holder for a sheet counter for counting sheets by suction attracting them one by one, a small sheet holder attachment, said sheet holder including a sheet receiving plate, a sheet holding plate attached thereto, a counted sheet keeper rod, means pivotally mounting the sheet holding plate and the sheet receiving plate for movement toward the sheet keeper rod to a sheet counting position, said small sheet holder attachment characterized by: a base member, means mounting said base member to the sheet holding plate of the sheet holder for movement with the sheet holding plate toward the keeper rod, a keep member pivotably



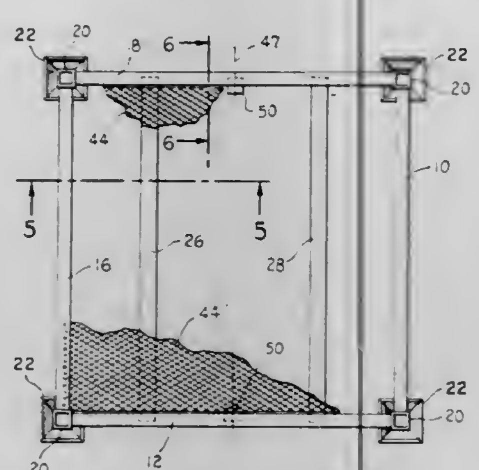
mounted on said base member and spring means for urging said keep member toward said base member to clamp a stack of small sheets to be counted between said base member and said keep member, said base member having a stand portion for supporting the lower end of the sheet stack, and abutment members adapted to engage the rear end of the sheet stack.

4,056,194
COMBINATION SERVICE TRUCK AND DISPENSING EQUIPMENT
John R. Radek, Hinsdale, Ill., assignor to Ready Metal Manufacturing Company, Chicago, Ill.
Division of Ser. No. 418,835, Nov. 26, 1973, Pat. No. 3,957,159, which is a division of Ser. No. 240,163, March 31, 1972, Pat. No. 3,807,788. This application Nov. 17, 1975, Ser. No. 632,625
Int. Cl.² A47F *3/14, 5/14*
U.S. Cl. 211—131 **4 Claims**



1. A reticulated wire basket-like container designed to hold a plurality of loose articles, comprising
a. a bottom portion of crossed wires with an element extending rearwardly beyond the periphery of said bottom portion to provide, when engaged with support means outside the basket, partial support for the latter,
b. an elongated member extending transversely across said bottom portion with terminal elements beyond the periphery of both sides thereof to provide, when engaged with support means outside the basket, lateral support for the latter, whereby the basket is provided with three-point support,
c. an upper rim portion of relatively heavy wire,
d. side and back wire portions secured to said rim and bottom portions,
e. a pivoted front portion providing access to the interior of the basket, and
f. detachable means latching the front portion.

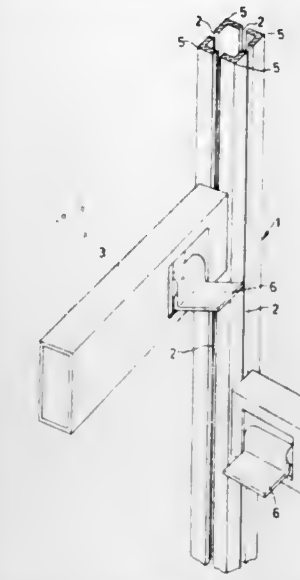
4,056,195
SUPPORTING BASE FOR RACK
William Johnson Keith, Greenville, S.C., assignor to Metal Products Corporation, Greenville, S.C.
Continuation of Ser. No. 482,858, June 25, 1974, abandoned. This application Apr. 12, 1976, Ser. No. 675,818
Int. Cl.² A47F *5/01*
U.S. Cl. 211—153 **1 Claim**



1. A supporting base for a rack comprising:
a. four "*c*" channel members joined end to end defining a rectangular frame;
b. said "*c*" channel members having an opened side facing the center of said frame and include a top and bottom flange joined by a vertical flange,
c. a rectangular shaped expanded metal member corresponding in size to said frame for spanning said rectangular frame;
d. free edges of said expanded metal member extending in two of said "*c*" channel members and being secured thereto so as not to have an exposed edge, said two channel members being in opposing relationship,
e. cross braces carried below said expanded metal member with ends thereof engaging said channel members;
f. an abutment member carried by each of said "*c*" channel members other than said two opposing "*c*" channel members, said abutment members extending below said top flanges of said other two "*c*" channel members; and
g. said expanded metal member sloping downwardly to said abutment members and being supported thereon providing an inclined base surface for stacking articles:
whereby stacked articles on said supporting base slope inwards reducing the tendency of said articles to fall from said rack.

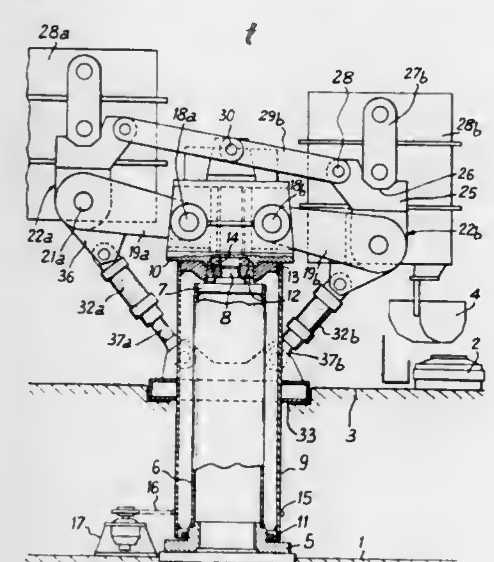
4,056,196
SUPPORTING FRAMEWORK FOR SHELVES
Egon Brauning, Weil am Rhein, Germany, assignor to Fehlbaum, Switzerland
Filed June 8, 1976, Ser. No. 694,110
Claims priority, application Switzerland, June 16, 1975, 7789/75
Int. Cl.² A47F *5/10;* A47B *57/26*
U.S. Cl. 211—207 **2 Claims**

1. In a shelf supporting framework having hollow crosspieces guided at right angles to the hollow uprights of the framework in longitudinal slots in said uprights, each of said crosspieces connecting two adjacent uprights and having at both ends a locking bolt aligned along the longitudinal axis of the crosspieces and mounted in a bearing element for rotation about and sliding motion along said longitudinal axis, one end of said locking bolt having a head which can be inserted through said slot into the cavity within the upright and which locks the upright and crosspiece together when rotated about 90°, said locking bolt further carrying a blocking element connected to the bolt shaft and accessible via an aperture in the crosspiece wall, said blocking element in the locked position abutting said bearing element and thus urging the bearing element into frictional engagement with the outside surface of the upright, the improvement comprising said blocking element being a collar to which a tab projecting out laterally from the collar through said aperture is attached, said bearing element being made of a resilient elastic material and projecting in



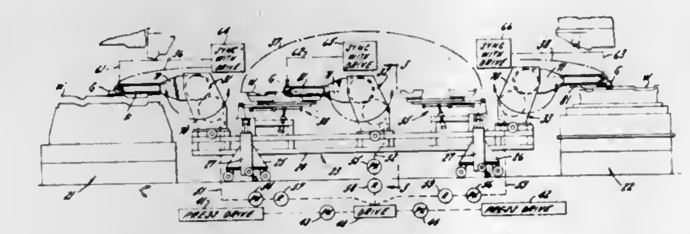
its unstressed state a short distance beyond the end of the crosspiece so that when the bolt is in the locked position the bearing element presses tightly against the outside surface of the upright, and centering means being provided at each end of the crosspiece which engage in said slot.

4,056,197
TURNING MECHANISM FOR THE MOVEMENT OF LADLES IN STEEL MILLS
Pierre Peytavin, Neuilly-sur-Seine, France, assignor to Vallourec (Usines a Tubes de Lorraine-Escaut et Vallourec Reunies), Paris, France
Division of Ser. No. 482,638, June 24, 1974, Pat. No. 3,942,650. This application Dec. 23, 1975, Ser. No. 643,754
Claims priority, application France, June 26, 1973, 7323253; June 11, 1974, 7420103
Int. Cl.² B66C *1/44*
U.S. Cl. 214—1 BC **5 Claims**



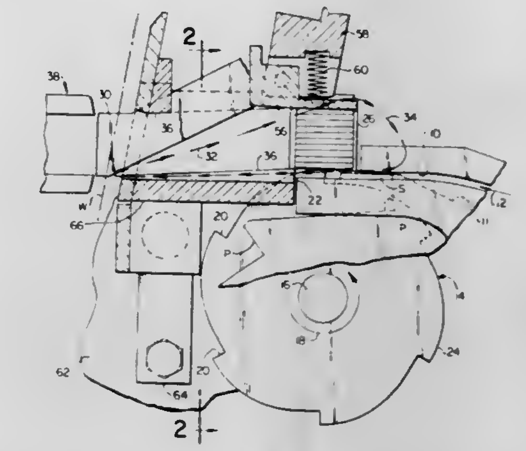
1. A turning mechanism for the movement of heavy ladles in steel mills comprising
a rigid vertical shaft fixed by its lower extremity on a structure and having an upper extremity,
a turning assembly mounted for turning around the rigid vertical shaft, and comprising:
a tubular vertical element surrounding the rigid vertical shaft and mounted for turning around the shaft,
a first bearing for supporting the turning assembly and disposed appreciably at the lower extremity of and positioned between the tubular vertical element and the rigid vertical shaft,
a second bearing at the upper extremity of the rigid vertical shaft, and forming a support bearing supporting the weight of the turning member,
a head on top of and connected to the tubular vertical element, the head supporting by pivots, two arms in the form of diametrically opposed forks mounted in a pivoting fashion for receiving a casting ladle,
means for pivoting said arms and including jacks supported by the tubular vertical element and extending obliquely between the arms and the tubular vertical element,
drive means for rotating the tubular vertical element and disposed near the lower extremity of the tubular vertical element.

4,056,198
TRANSFER AND TURNOVER MECHANISM FOR USE WITH POWER PRESS OR THE LIKE
Hans C. Boserup, Elmwood Park, Ill., assignor to Danly Machine Corporation, Chicago, Ill.
Filed Mar. 29, 1976, Ser. No. 671,106
Int. Cl.² B65G *47/90*
U.S. Cl. 214—1 BC **27 Claims**



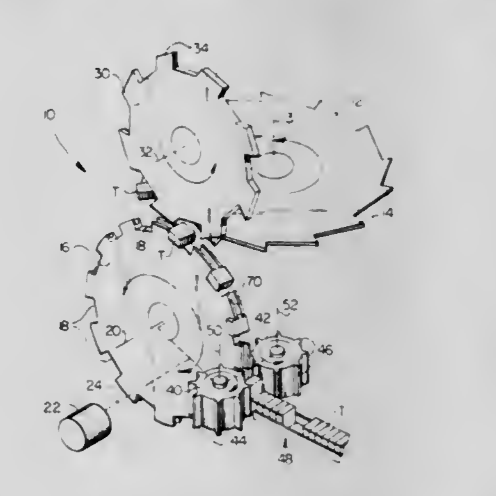
1. For use with a power press or the like, a transfer mechanism for transferring a large generally flat workpiece from a first horizontal open-topped receptacle to a second open-topped receptacle which is horizontally spaced therefrom, the combination comprising a pair of stands having transverse axes and coaxially spaced from one another, transfer driving means, a pair of gear boxes of equal length pivotally mounted in opposition closely adjacent the respective stands and having a reversible connection with the driving means for oscillating the gear boxes in unison parallel to one another through an angle of substantially 180° from a first horizontal position downwardly and then upwardly so that the gear boxes extend in the opposite direction in a second horizontal position, the gear boxes having first alined shaft means at the ends thereof, the gear boxes further having arms of equal length respectively connected to the first shaft means with the arms being spaced parallel to one another to provide a clearance space for passage of the workpiece between them, second alined shaft means at the respective ends of the arms, the second shaft means having gripper means for gripping the workpiece, at least one of the gear boxes having an output gear connected to the associated first shaft means, means for driving the output gear synchronized with the oscillation of the associated gear box so that the arm swings on the gear box in a direction of swing opposite to that of the gear box and relatively thereto at twice the angular rate with the result that as the gear boxes are swung from their first position to their second position by the transfer driving means the ends of the arms are swung from a first horizontal position above the first receptacle to a second horizontal position extending in the opposite direction and above the second receptacle, means for operating the gripper means cyclically so that the workpiece is removed from the first receptacle and deposited in the second, the arms being longer than the gear boxes so that the gripper means follows an arcuate path with the result that the workpiece is removed from the first receptacle with an upward component of motion and deposited in the second receptacle with a downward component of motion.

4,056,199
STACKER FOR GUM WRAPPING MACHINE
Lawrence W. Schoppee, Springfield, Mass., assignor to Package Machinery Company, East Longmeadow, Mass.
Filed June 1, 1976, Ser. No. 691,837
Int. Cl.² B65G *57/30*
U.S. Cl. 214—6 BA **7 Claims**



1. In an apparatus for receiving sticks of product fed individually to a stacking station and for moving the stack of sticks in a downstream direction out of the stacking station for further handling, the improvement comprising
a. means for elevating each stick fed to the stacking station to allow the next stick to be fed into the bottom of a stack of sticks,
b. side guides at the stacking station for guiding the sticks so elevated,
c. mounting means for supporting said side guides for limited movement toward and away from the sides of the stack, and
d. biasing means for urging the side guides inwardly toward one another to keep the stack oriented in centered vertical relationship therebetween,
e. said side guides including abutments on their respective downstream edges for supporting and guiding the stack as succeeding sticks are fed into the bottom of the stack at the stacking station.

4,056,200
HIGH SPEED STACKER
Richard H. Provost, Brimfield, Mass., assignor to Package Machinery Company, East Longmeadow, Mass.
Filed June 24, 1976, Ser. No. 699,512
Int. Cl.² B65G *57/00*
U.S. Cl. 214—7 **10 Claims**



1. A high speed stacker for assembling a group of individual products in series comprising:
input feeding means for feeding the individual products sequentially along a product feed path;
a tumble wheel mounted for continuous rotation about an axis along the product feed path of the input feeding means with the wheel generally tangent to the path at a

receiving point, the wheel containing a plurality of product-receiving pockets on the periphery of the wheel, each pocket having a peripheral opening facing radially outwardly for individually receiving a product transmitted along the feed path to the receiving point of the wheel and carrying the individual product about the wheel to a discharge point arcuately displaced from the receiving point;

guide means circumscribing the periphery of the tumble wheel between the receiving point and the discharge point for holding the products in the individual pockets of the wheel during arcuate displacement in the continuously rotated tumble wheel;

a stacking tray projecting away from the tumble wheel at the discharge point on the periphery of the tumble wheel, the tray defining a support surface for holding the products discharged from the tumble wheel in a stack; and

two stacking wheels positioned in spaced relationship and at opposite sides of the tumble wheel at the discharge point, the wheels being rotatably driven in opposite directions about parallel axes lying in a plane generally parallel to the axis of rotation of the tumble wheel at the discharge point, and being positioned to engage an individual product in a pocket and pull the product through the peripheral opening of a pocket toward the stacking tray.

4,056,201

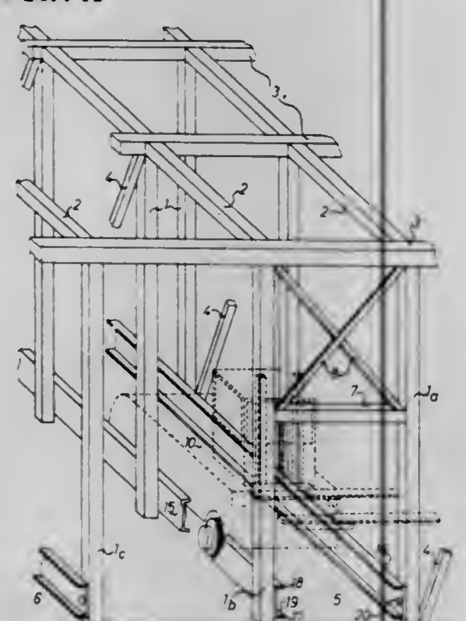
HANDLING INSTALLATION FOR SUPPORTING DISPLACING AND STACKING LOADS IN PREDETERMINED POSITIONS

Marcel A. P. Giros, Route de Saint Dizier, Ancerville, France (55170)

Filed Feb. 23, 1976, Ser. No. 660,449

Int. Cl.² B65G *1/06*

U.S. Cl. 214—16.4 A **9 Claims**



1. An installation comprising, in combination,

a load-storage zone having at least one gangway extending therein, each gangway being provided on either side with fixed members, each including a track, and

a vehicle for loading and unloading said load storage zone having support wheels for carrying the vehicle on the floor external to each gangway, the support wheels including driving wheels and steerable wheels and the vehicle being further provided with rollers for supporting the vehicle on the tracks during movement of the vehicle along a chosen gangway,

the rollers including means for guiding the vehicle on the tracks,

the tracks being disposed at a sufficient height above the floor in the load-storage zone to maintain the support wheels off the floor when the vehicle is in the gangway,

an entrance to the gangway having a surface means for the support wheels,

the surface means bearing the support wheels to maintain the rollers above the level of the tracks until the vehicle is within the tracks, the surface means then having a declining portion down which the support wheels go until the rollers ride on the tracks and the support wheels clear the floor within the gangway, wherein

the rollers comprise at least one driving roller and one idle roller and wherein the driving roller and the idle roller are on different axles and the diameter of the driving roller is smaller than that of the idle roller.

4,056,202

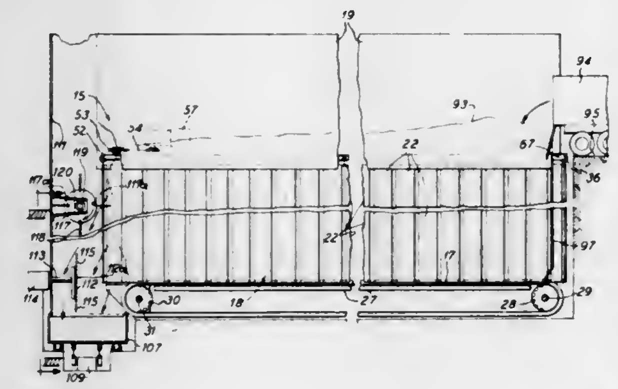
BULK DISCRETE FIBROUS MATERIAL STORAGE AND FEEDING APPARATUS

Harold B. Mackenzie, Wheaton, Ill., and Ingvar G. Anderson, Dunedin, Fla., assignors to New Life Foundation, Wheaton, Ill.

Filed Oct. 28, 1975, Ser. No. 626,104

Int. Cl.² B65G *65/24*

U.S. Cl. 214—17 C **35 Claims**



1. In apparatus for bulk discrete fibrous material storage and feeding, including a bin receptive of a large volume load of the bulk material and having a bottom wall and upwardly extending side walls along the opposite sides of said bottom wall; movable conveyor means along said bottom wall and movable conveyor means along said side walls, said conveyor means cooperating to effect movement of material in the bin toward, and to discharge from, a discharge end of the bin; and means for driving said bottom wall and side wall conveyor means to run concurrently toward said discharge end to move the load of material progressively to discharge from said discharge end, the improvement comprising:

said side walls having frame structure;

suspension track means carried by said frame structure;

and suspension devices on the upper portions of said side wall conveyor means and running along said track means.

4,056,203

PLATFORM LIFT

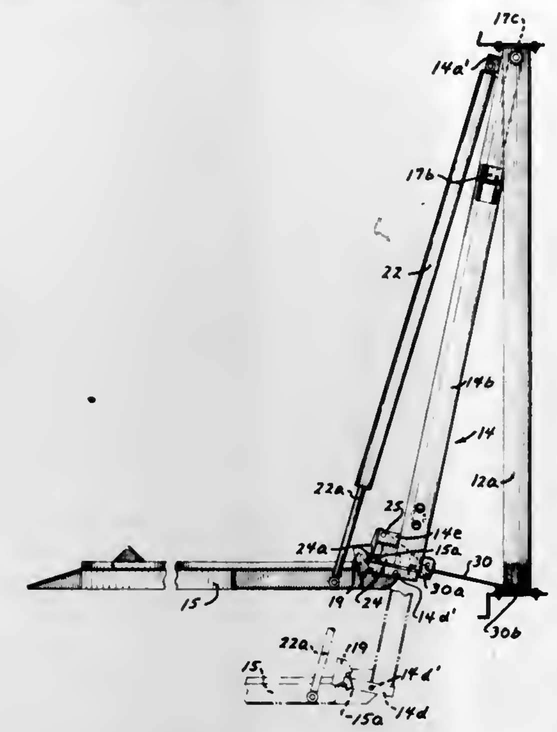
Robert D. Meldahl, Granville, and Raymond L. Smalley, Carey, both of Ohio, assignors to Reb Manufacturing Inc., Carey, Ohio

Filed Oct. 15, 1976, Ser. No. 732,605

Int. Cl.² B60P *1/44*

U.S. Cl. 214—75 T **9 Claims**

1. A vehicle having a platform lift comprising a framework mounted within the vehicle doorway, a slide frame mounted at its top end on said framework for pivotal movement in a vertical plane between a stored position and an operative position in which the slide frame is pivoted slightly outwardly from said framework, a platform mounted for elevational movement along said slide frame, said platform being pivotal from a substantially vertical stored position to a substantially horizontal operative position, a ramp pivotally connected to the lower horizontal part of said framework and having a width substantially the same width as said platform whereby the ramp forms a continuous support between said platform and said framework, said ramp being pivotal about its pivotal connection from a substantially vertical stored position to a substantially horizontal operative position, a hydraulic cylinder for moving said platform and said ramp to and from said stored and said operative positions and selectively lowering and raising said platform through a range of positions below and to a position disposed adjacent said lower horizontal part, said hydraulic cylinder being connected to said platform at a point spaced



outwardly from the pivot point of the platform to said slide frame, locking means on said frame for selectively locking said platform in its horizontal position, and manually operable means for selectively raising and lowering said platform independently of said hydraulic cylinder, whereby upon failure of said hydraulic cylinder the manually operable means may be used to operate said platform.

4,056,204

BALE LOADING ASSEMBLY

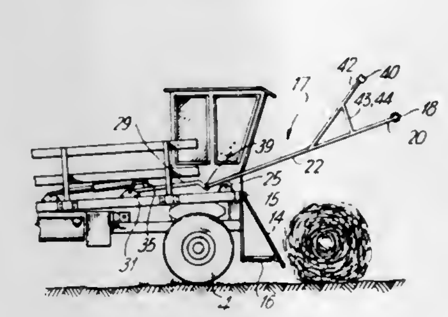
Paul Spasuik, Box 146, Unity, Saskatchewan, Canada

Filed Apr. 6, 1976, Ser. No. 674,725

Claims priority, application Canada, Feb. 2, 1976, 244776

Int. Cl.² B60D *1/00*

U.S. Cl. 214—83.3 **7 Claims**



1. Bale loading assembly for use with a bale loader for handling bales of hay or the like, said bale loader being of the type of a mobile platform of an elongated, generally rectangular shape including two sides and a loading front end, said bale loading assembly comprising:

a. ramp means pivotally secured to said loading front end for pivotal movement about a first lateral axis generally coincident with said front end, said ramp means normally being inclined downwardly and forwardly of said front end of the platform;

b. a first drive means operatively connected to said ramp means for selectively adjusting the inclination of said ramp means;

c. bale pulling means including bale engagement means secured to one end of said bale pulling means and having an extended position forwardly and in a surrounding posture of said bale, a ground engaging position and a retracted position, said bale engagement means including a pair of arms for simultaneous generally pivotal movement operatively about a second lateral axis generally parallel with said first lateral axis in planes generally coincident with planes perpendicular to said platform and located adjacent to said sides of the platform, said pair of arms having free ends, and said bale engagement means further including ground engagement means mounted on free ends of said pair of arms;

d. second drive means operatively connected to said bale pulling means for selectively displacing said bale engagement means from said extended position wherein said bale engagement means is located ahead of said front end in a generally co-planar relationship with said mobile platform, to said ground engaging portion, wherein said bale engagement means is located ahead of said front end at the ground level, and to said retracted position wherein said bale engagement means is generally co-planar with said platform and located on said platform adjacent said front end thereof, said second drive means further including a pair of levers, each of said pair of levers being secured with its one end, to one side of the platform for pivotal movement about said second lateral axis and in a plane generally perpendicular to said platform and located at the respective side thereof, the opposite end of each of said levers being pivotally secured by a pivot joint to the respective ends of said arms remote from said free ends thereof; and

e. guide means operatively connected to said bale pulling means to guide movement of said bale engagement means from said ground engaging position to said retracted position along a locus generally parallel with the inclination of said ramp means.

4,056,205

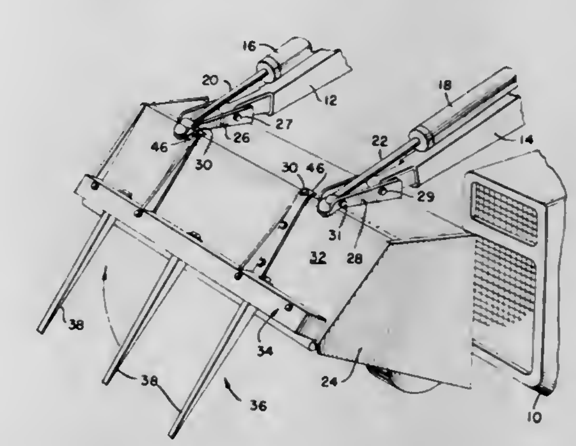
LOADER ATTACHMENT

John Lewis Etzler, IV, Rte. 2, Box 367, Troutville, Va. 24175

Filed Oct. 22, 1975, Ser. No. 624,641

Int. Cl.² G02F *3/81*

U.S. Cl. 214—145 R **3 Claims**



1. An implement receiving hitch for use with a front loader having a pair of vertically adjustable lift arms and a load bucket having a top surface and a front opening defined by a rim, said hitch comprising:

an elongated hollow four-sided box-shaped member having a length substantially equal to the length of said load bucket,

a plurality of apertures formed in first and second sides of said box-shaped member,

sleeve means for lining said apertures and for receiving said implement,

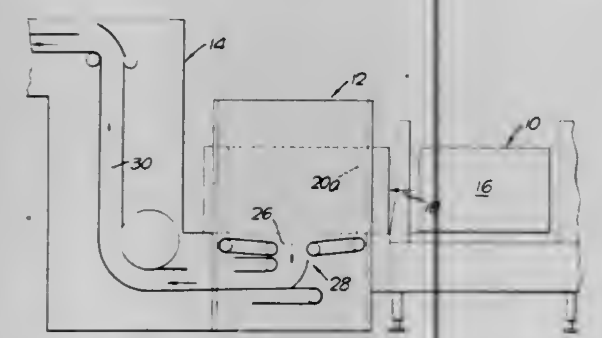
bracket means for attaching said box-shaped member to said load bucket,

backing straps located within said load bucket,

first threaded fastening means for attaching said hitch to said load bucket, said first fastening means passing through third and fourth sides of said elongated box-shaped mem-

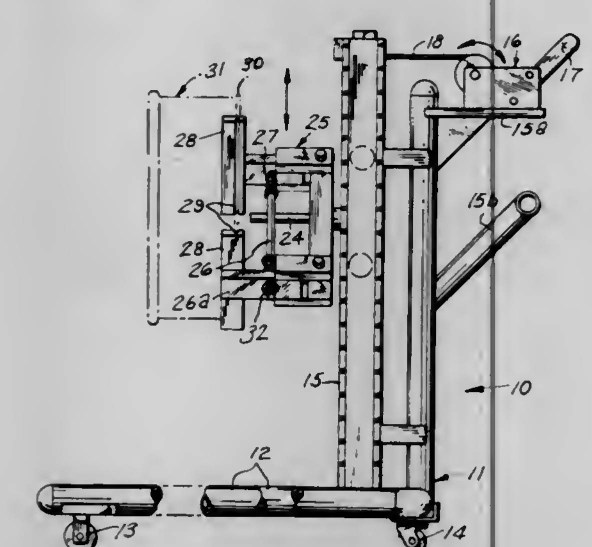
ber, the top surface of said load bucket, and said backing straps, and
second fastening means for attaching said bracket means to said load bucket.

4,056,206
APPARATUS FOR UNLOADING ROD-LIKE ARTICLES FROM CONTAINERS
George Robert Bennett, London, England, assignor to Molins Limited, United Kingdom
Filed Apr. 28, 1976, Ser. No. 681,191
Claims priority, application United Kingdom, May 2, 1975, 18395/75
Int. Cl.² B65G *65/04*
U.S. Cl. 214—302 **16 Claims**



1. Apparatus for unloading rod-like articles from a tray, comprising a rotatable frame member having at least two tray carriers, the frame member being rotatable about a transverse axis through said frame member to effect interchange of said tray carriers between a first position in which a full tray may be received by a carrier and a second position in which said full tray in said carrier is positioned to discharge its contents into a hopper or the like, and means for lifting said axis around which the frame member is rotatable during movement of the frame member between said first and second positions including guide means for constraining both lifting and rotation of the frame member as it is moved between said positions, said guide means preventing rotation about said axis until said lifting has started.

4,056,207
DIE CHANGER
James W. Spilker, R.R. 2, Box 195, New Palestine, Ind. 46163
Filed July 15, 1976, Ser. No. 705,666
Int. Cl.² B66F *9/18*
U.S. Cl. 214—652 **3 Claims**



1. A die changing device, comprising, in combination, a frame, a pair of posts secured to said frame for supporting a pair of guide channels, a winch secured to said frame for raising and lowering support clamp plate, a die lifting fixture freely received upon shaft means extending from said support clamp plate, and die clamp finger means secured to said lifting fixture; said posts being parallel spaced apart and fixedly secured to parallel spaced apart and horizontal leg members of said frame, and said guide channels being parallel spaced apart and fixedly secured, one each in said posts, said guide channels freely receiving a pair of rollers secured to shaft means extending from the side edges of said support clamp plate, and said support clamp plate having a wire rope secured to it at its upper center, said wire rope extending from said winch and being carried upon upper pulley means secured within an upper portion of said posts, said winch being fixedly secured to said frame at its upper extremity.

4,056,208
CAUSTIC-RESISTANT POLYMER COATINGS FOR GLASS
George Wyatt Prejean, 5807 Lodge Creek, Houston, Tex. 77069
Continuation-in-part of Ser. No. 603,661, Aug. 11, 1976, abandoned. This application Aug. 9, 1976, Ser. No. 712,700
Int. Cl.² B65D *11/16;* B32B *27/38, 17/06, 9/04*
U.S. Cl. 215—12 R **20 Claims**

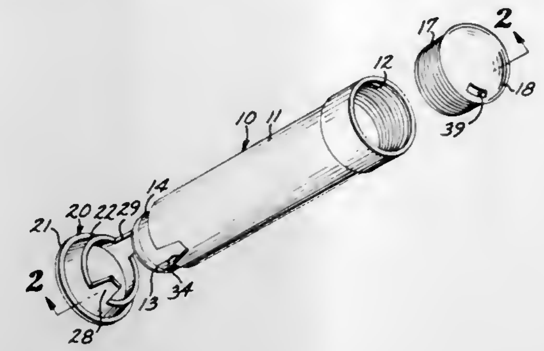
1. Returnable glass bottles for carbonated beverages, said bottles being coated on the outer surfaces with a clear, cross-linked resin providing abrasion resistance and protection from flying glass in care of fracture, said coating being caustic-resistant, exhibiting strong adherence to glass even after repeated treatments with 5% aqueous NaOH at 80° C, said clear, abrasion- and causticresistant coating being at least 8 mils thick and comprising:
1. a cured primer layer on the glass, and
2. an outer layer of a copolymer of ethylene,
said primer layer (1) consisting essentially of
A from 0.5 to 5% by weight of an organofunctional silane of the formula $(RO-)_3Si(CH_2-)_xR^1$, where
RO— is a hydrolyzable alkoxy group in which R is an alkyl radical of 1 to 4 carbon atoms,
R^1 is a functional group selected from $-NH_2$,

$$-O-CH_2-\overset{O}{\overbrace{CH-CH_2}}\text{, and}$$

$$\overset{HCl}{-NH}-CH_2-CH_2-NH-CH-CH_2-C_6H_4-CH=CH_2,$$

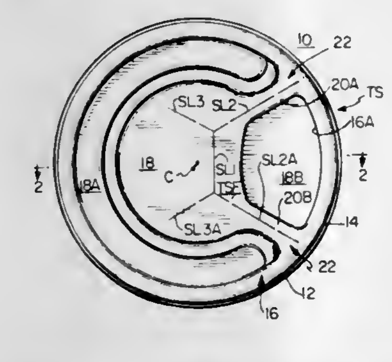
and
x is an integer from 1 to 4, inclusive,
B. an epoxy resin,
C. a curing agent selected from the group consisting of amines and reactive polyamides containing excess amine groups,
and optionally at least one member of the group consisting of
D. a water-soluble metal salt, and
E. diethylene glycol monoethyl ether,
and the copolymer of said outer layer (2) consisting essentially of a random copolymer of ethylene in which the alpha, beta-unsaturated carboxylic acid is selected from the group consisting of acrylic acid and methacrylic acid having from 10% to 100% of the carboxyl groups ionized by metal ions having an ionized valence from one to three, inclusive, and in which the ethylene content of the copolymer is at least 70 mol %, based on the copolymer, the alpha, beta-unsaturated carboxylic acid content of said copolymer is from 0.2 to 5 mol %, inclusive, based on said copolymer, and any third monomer component optionally copolymerized in said copolymer is a monoethylenically unsaturated monomer.

4,056,209
MEDICATION BOTTLE HAVING A SAFETY CAP
Robert J. Winkler, Santa Ana, and Clarence R. Possell, San Diego, both of Calif., assignors to W.P. Energy Technology Systems, Santa Ana, Calif.
Filed Mar. 23, 1977, Ser. No. 780,511
Int. Cl.² B65D *55/02, 85/56;* A61J *1/00*
U.S. Cl. 215—215 **5 Claims**



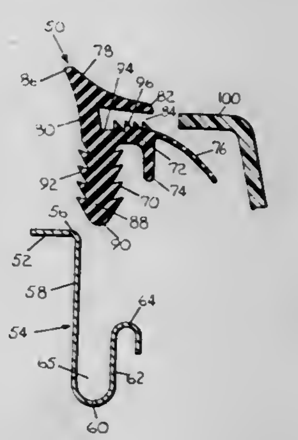
1. A container adapted to store medicine or similar substances, comprising:
a substantially cylindrical enclosure including a first and second end, said first end including an end surface formed thereacross said end surface being conformed in the manner of a first hemispherical structure on the exterior thereof;
an internally threaded segment formed on the interior surface of said second end;
a cap assembly including an exteriorly threaded segment conformed for threaded engagement in said internally threaded segment and a second hemispherical structure of a radius greater than the radius of said exteriorly threaded segment extending therefrom;
a first and second diametrically opposed key slots formed in said second hemispherical structure; and
a key assembly including a cylindrical frustum conformed to receive said first hemispherical structure on the interior thereof, a disc attached to one end of said frustum and extending transversely thereacross, and a first and second key member formed on the other end of said frustum and dimensioned for corresponding receipt in said first and second key slot.

4,056,210
SPLASH PROOF DRINK THROUGH BEVERAGE CONTAINER LID
Patrick T. Boyle, Baltimore, Md., assignor to Maryland Cup Corporation, Owings Mills, Md.
Continuation-in-part of Ser. No. 678,751, April 21, 1976, abandoned. This application Sept. 13, 1976, Ser. No. 722,402
Int. Cl.² A47G *19/22;* B65D *41/32, 83/00*
U.S. Cl. 220—90.4 **20 Claims**



1. A flexible plastic lid for open mouthed containers having an annular bead or rim defining the open mouth thereof, comprising:
a rim receiving annular bead cavity formed in the outer periphery of said lid and having an upper surface for overlying a container rim and a dependent annular skirt outboard of said upper surface;
a central web portion bounded by said bead cavity having a raised central area defined therein connected to and at substantially the same level as said upper surface by a pair of divergent arms formed in said central web and including a respective pair of raised elongated surface areas merging with said upper surface and said raised central area; and
finite score line means formed in said raised central area substantially transversely oriented with respect to said divergent arms and a pair of tear line means defined one in each of said upper surfaces of said divergent arms, said tear line means extending from respectively opposite ends of said score line means to a point substantially inboard of the said upper surface of said bead cavity;
said score and tear line means defining tear tab means in said raised central area and a wedge shaped tear-away segment in said lid.

4,056,211
SUPPORT AND RETENTION LINER GASKET
Homer Zumwalt, Galesburg, Ill., assignor to Rockwell International Corporation, Pittsburgh, Pa.
Filed Aug. 30, 1976, Ser. No. 719,045
Int. Cl.² B65D *25/18*
U.S. Cl. 220—9 G **3 Claims**



1. A refrigerated cabinet construction comprising: a food liner formed of a thin plastic sheet having side walls and an end wall defining an open ended storage space, said food liner side walls being capable of limited flexure whereby exceeding the limit would subject said side walls to cracking, said side walls terminating at the open end of the storage space with an outwardly turned peripheral flange; an enclosure having outside walls terminating with an inwardly turned peripheral rim having an inner edge circumscribing an area larger than combined area including said open end and said flange; a channel formed integrally with the inner edge of the rim to extend inwardly thereof having spaced surfaces defining a frontally opening groove of a predetermined width, said groove being generally parallel with said outside wall; a liner support gasket formed of an elastomeric material for mounting the food liner on the enclosure without flexure of said food liner, said gasket including a base portion having a free width greater than the width of the groove so as to be resiliently compressively insertable therewithin, said gasket having a slot in an intermediate portion thereof which said slot includes opposed surfaces which are generally perpendicular to said base portion for receiving the flange of the food liner; an outwardly projecting portion of said gasket being resiliently deflected by one of said spaced surfaces upon insertion of said base portion into the channel to narrow the width of the slot such that the opposed surfaces thereof compressively grip the flange without imparting flexure to the side wall.

4,056,212

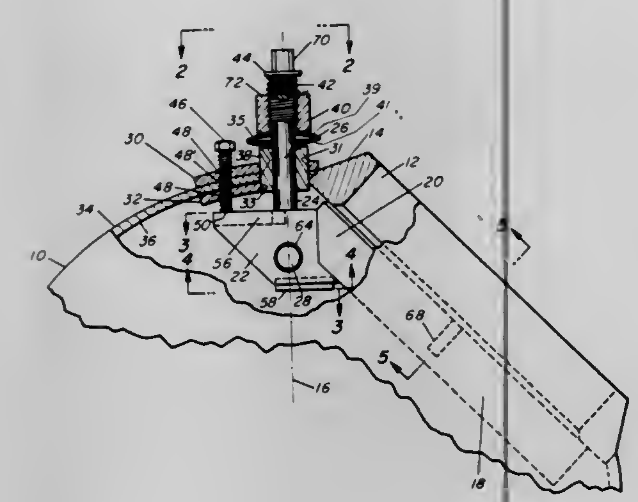
PORTABLE PRESSURE VESSEL AND CLOSURE

Jon Petty, Newton, N.J.; Beverly D. Trott, and Joseph E. Backofen, both of Columbus, Ohio, assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Mar. 11, 1977, Ser. No. 776,692

Int. Cl.² B65D *45/00*

U.S. Cl. 220—244 **3 Claims**



1. A closure for a pressure vessel for safely storing and transporting an improvised explosive device therein which comprises:

a spherically shaped body member having a vertical axis, a body bushing bore being disposed therethrough concentric with said vertical axis, an access port disposed in an upper hemispherical side of said body member, and two vessel threaded bores transversely passing therethrough and being proximate to said vertical axis;

a reinforcing ring member circumferentially welded to the peripheral edge of said access port, said reinforcing ring member being inclined at approximately 45° with respect to said vertical axis of said body member;

internal door means pivotally held in juxtaposition to said reinforcing ring member for providing rapid unobstructed access through said access port and for rapidly closing said access port of said body member to completely seal said improvised explosive device therein; and

a door stop fixedly welded to said reinforcing lug for stopping said internal door means when it reaches a closed position;

a pair of reinforcing plates fixedly welded to said body member, said pair of reinforcing plates having plate bushing bores therein axially aligned with said body bushing bore, plate threaded bores passing transversely therethrough and being concentrically aligned with said vessel threaded bores;

a tubular bushing fixedly positioned in said plate and vessel bushing bores;

a pair of door closing adjusting bolts threadedly positioned in said plate threaded bores and said vessel threaded bore, said pair of bolts having ends protruding into the interior of said body member;

a single pivot "T" bar means pivotally positioned in said bushing and rotatably connected to said internal door means for rapidly opening and closing said internal door means.

4,056,213

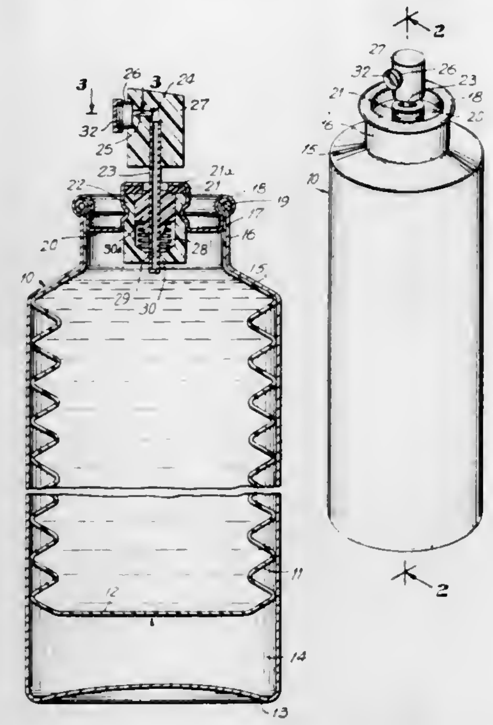
PRESSURIZED DISPENSER FOR AQUEOUS EMULSION PAINTS

David Stern, Roslyn, N.Y., assignor to Martin Paint and Chemical Corporation, Jamaica, N.Y.

Continuation-in-part of Ser. No. 168,916, Aug. 4, 1971, abandoned. This application Jan. 14, 1975, Ser. No. 540,812

Int. Cl.² B65D *35/28*

U.S. Cl. 222—95 **12 Claims**



1. A pressurized dispenser for aqueous latex paint wherein the binder is an acrylic polymer or a vinyl acetate-lower alkyl acrylic ester copolymer, comprising a container having therein a collapsible piston adapted to contain a latex paint with a propellant under pressure in the space between the piston and the wall of the container, a valve controlling the discharge of paint from within the piston, a nozzle into which the paint is conducted for discharge in the form of a spray or mist, and a cap for closing the nozzle orifice and providing at most a free evaporation space about the nozzle orifice which is less in volume than is required for the evaporation, to a substantially solid residue, of any paint clinging to the wall of the nozzle orifice at the termination of a fractional discharge of the contents of the container.

4,056,214

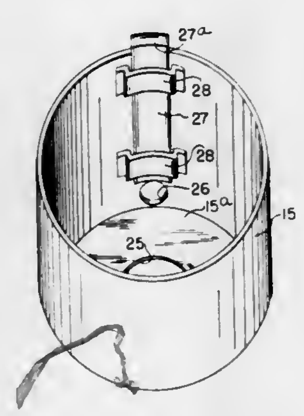
EASY EMPTY SEED HOPPER

Leon E. Day, West Memphis, Ark., assignor to George G. Watts and Jeff D. Pratt, both of Memphis, Tenn.

Filed Apr. 7, 1976, Ser. No. 674,386

Int. Cl.² A01C *15/00*

U.S. Cl. 222—608 **4 Claims**



3. An elongated seed hopper, said hopper being cylindrical and having a removable and closable top and a bottom closed except for a seed-exit opening, said hopper being otherwise imperforate, there being a small seed-clean-out opening through the cylindrical wall of said hopper next to said bottom, a closure member for said clean-out opening having an outer surface complementary to the inner face of said hopper cylinder and having opposite parallel edges, bracket means fixed in said hopper holding said closure member close to said hopper cylindrical wall while permitting sliding movement of said closure member along said hopper and axially thereof, said closure member being of a length to engage said bottom and to close said seed-clean-out opening only when its upper end opposite said clean-out opening is substantially touching said closed top, whereby said top must be closed to indicate said clean-out opening is closed and said closure member may be easily reciprocated away from said clean-out opening to remove seed from said hopper when the latter is in a vertical position.

4,056,215

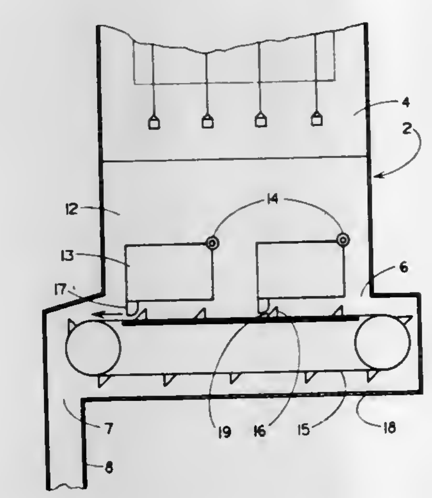
ANTI-BRIDGING DEVICE

Ernst Zwahlen, Uster, Switzerland, assignor to Elex A.G., Zurich, Switzerland

Filed Apr. 26, 1976, Ser. No. 679,883

Int. Cl.² B65G *3/12*

U.S. Cl. 222—231 **6 Claims**



6. In combination with an electrostatic precipitator, a device for preventing bridging in a hopper, the hopper including an upper inlet portion in communication with a bottom opening of an electrostatic precipitator and a lower outlet position with inclined sidewalls disposed therebetween, the device comprising: at least one scraper disposed along at least one of said sidewalls with at least one upper corner pivotally attached at said one upper corner to said one sidewall of said hopper; and, means to contact and raise said scraper whereby said scraper is moved upwardly by said means during contact therewith and downwardly after said contact therewith; thereby preventing bridging of material at said lower outlet portion.

4,056,216

LIQUID DISPENSING PUMP AUTOMATICALLY SEALABLE AGAINST LEAKAGE

Paul M. Kotuby, Naugatuck, Conn., assignor to The Risdon Manufacturing Company, Naugatuck, Conn.

Filed Apr. 13, 1976, Ser. No. 676,415

Int. Cl.² G01F *11/04*

U.S. Cl. 222—385 **10 Claims**

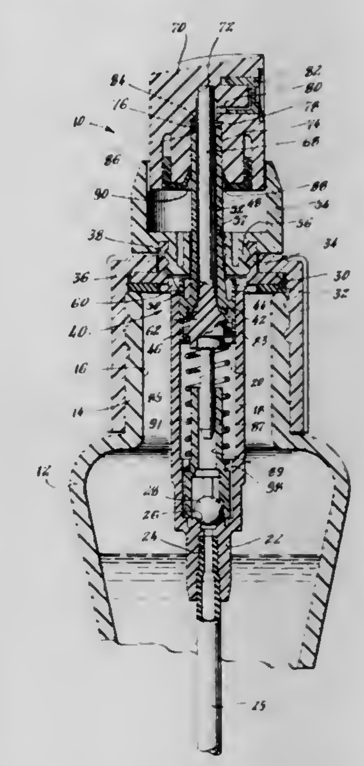
1. In a finger-operable pump, adapted to be mounted on a container to dispense the contents thereof, including a housing defining a pumping chamber; a plunger having a stem projecting outwardly at one end of the housing and defining a discharge passage therethrough, the plunger being telescopically received in the pumping chamber for reciprocal movement away from and back to a home position and making a sliding piston fit with the housing; and check valve means for preventing return flow of liquid through the pumping chamber; an automatically operable seal arrangement for preventing leakage through the pump, said seal arrangement comprising:

A. a valve seat formed about the plunger discharge passage,

B. stopper means positioned for cooperative sealing engagement with said valve seat,

C. an actuator button formed with a socket, having a base, that receives the projecting end of the plunger stem in axially reciprocally movable relation, said actuator button being movable toward and away from a plunger-operation position with said socket base at least partially abutting the projecting end of the plunger stem to then move the plunger away from its home position,

D. link means disposed in the discharge passage, interconnecting said actuator button and stopper means, to disengage said stopper means when said actuator button is in the plunger-operating position,



E. seal means for sealing the projecting end of the plunger stem and said base when said actuator button is in the plunger-operating position, said seal means comprising

1. a ring shaped protuberance formed on one of the projecting ends of the plunger stem and said base; and
2. a ring shaped depression, formed on the other of the projecting ends of the plunger stem and said base interfittable with said protuberance, and

F. means for urging said stopper means into sealing engagement with said valve seat and said actuator button away from the plunger-operating position and, then, for urging the plunger toward its home position.

4,056,217

SLIDING GATE VALVE FOR MOLTEN METAL WITH ADJUSTABLE PLATES

Giovanni Aliprandi, Genoa, and Roberto Ricci, Genoa-Pegli, both of Italy, assignors to SNAC S.p.A. Refrattari Argille e Caolini, Italy

Filed Dec. 5, 1975, Ser. No. 637,964

Claims priority, application Italy, Apr. 24, 1975, 12585/75

Int. Cl.² B22D *37/00*

U.S. Cl. 222—600 **7 Claims**

1. A device for discharging smelted metal from a container, comprising;

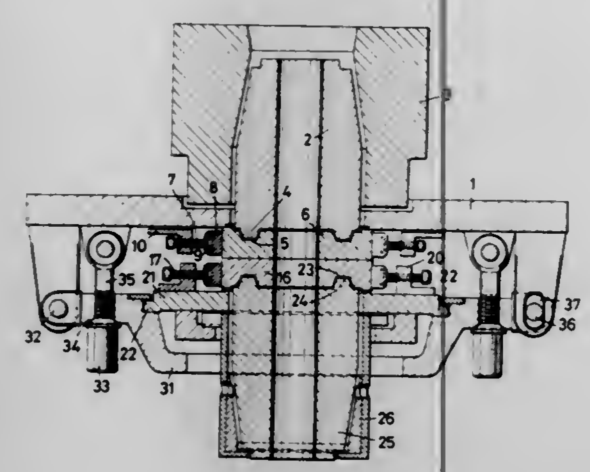
a first discharger plate unit, secured in use to a container comprising a first and stationary metal frame and a first and stationary refractory plate normally supported thereby and having a discharge hole;

first mounting means for tiltably mounting the first plate unit on the container;

a second discharger plate unit comprising a second metal frame and a second refractory plate normally supported thereby and having a discharge hole;

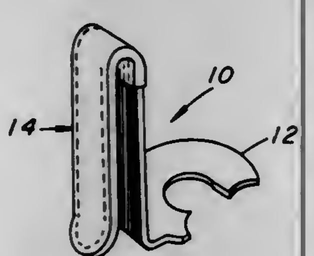
second mounting means for mounting the second unit for sliding movement of the second plate along and in contact

with the first and stationary plate to mutually align the holes in an opening step of the sliding movement and to place the holes out of mutual alignment in a closing step thereof, the mounting means comprising a third, normally stationary metal frame secured to the container and having elongate mutually parallel guides, the second frame having edges slidable along the parallel guides, the second mounting means also comprising means for tiltably mounting the third frame and thereby the guides and the second frame on the container; and



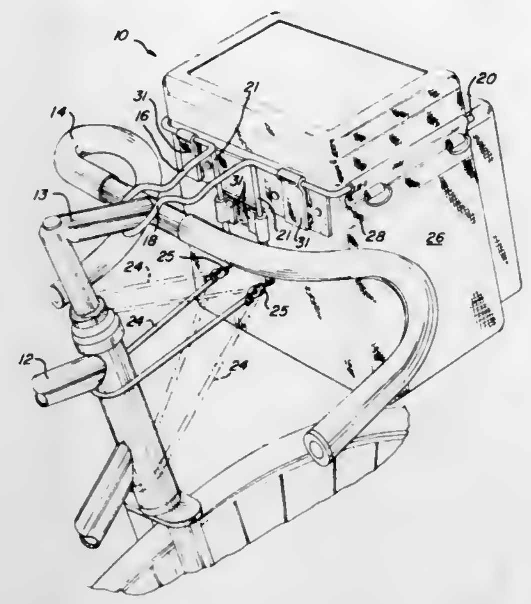
first and second plate mounting means, each comprising a plurality of set screws threaded into a respective frame, engageable and disengageable with the respective refractory plate, sides of the respective frame sliding integrally with the respective refractory plate and having leaf springs and positioning listels co-operating with said screws to press them against edges of the respective refractory plate.

4,056,218
DEVICE FOR CARRYING A HANDGUN
Alex J. Barna, 1216 Crawford St., Duquesne, Pa. 15110
Filed May 11, 1976, Ser. No. 685,272
Int. Cl.² F41B *33/00*
U.S. Cl. 224—2 C **7 Claims**



1. A device for releasably securing a handgun to body wearing apparel comprising,
a shaped member having a pair of leg portions adapted for releasable engagement to body wearing apparel,
attachment means formed integral with and extending laterally from the end of one of said leg portions for releasably engaging the handgun,
said attachment means including a single "C" shaped portion having an opening transverse to the longitudinal axis of said leg portions, said "C" shaped portion arranged to receive the body of the handgun to facilitate installation of said shaped member while the handgun is in operation, and
stabilizing means covering a portion of one of said leg portions for frictionally engaging the body of the handgun for maintaining said shaped member in position on the handgun.

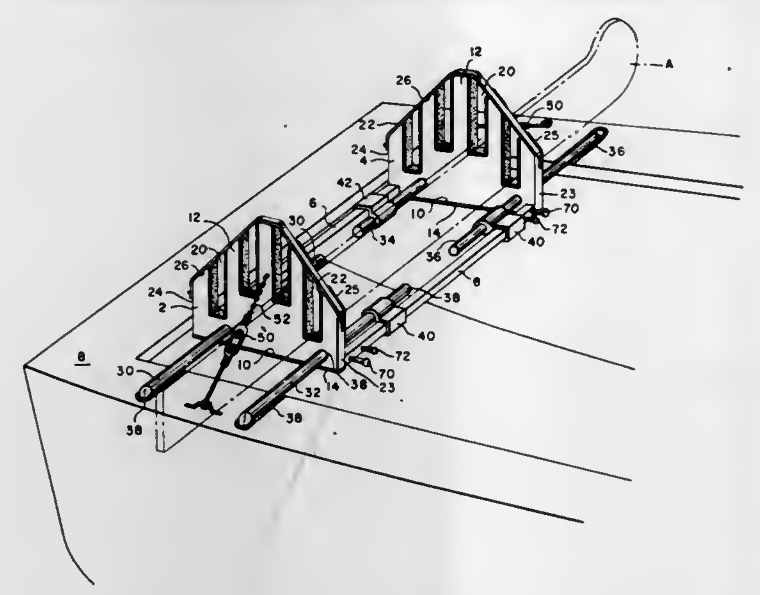
4,056,219
BICYCLE HANDLEBAR PACK AND SUPPORT THEREFOR
Edward K. Hine, Jr., Louisville, Colo., assignor to Hine-Snowbridge, Inc., Boulder, Colo.
Filed Apr. 9, 1976, Ser. No. 675,430
Int. Cl.² B62J *7/06*
U.S. Cl. 224—36 **8 Claims**



1. A handlebar pack and support therefor comprising:
a support housing:
means for engaging the joinder of a bicycle gooseneck and handlebar and projecting in a first direction in a cantilevered manner;
forked members projecting substantially in the first direction from the engaging means in a parallel, spaced apart relationship; and
at least one depending member extending from the support in a second direction substantially perpendicular to the plane of the forked members at a position between the forked members and the engaging means;
a pack comprising:
a substantially rectilinear enclosure having a top portion, a bottom portion, two side portions, a front portion, and a back portion;
parallel pockets defined one each in each side portion of the enclosure and adapted to receive the forked members of the support; and
securing means disposed upon the back portion of the enclosure to releasably engage the portion of the support including a depending member adjacent the back portion of the enclosure; and
a resilient member attached to the support and adapted to engage an adjacent portion of a bicycle when the support and pack are attached to a bicycle;
whereby, the engaging means and the resilient member are adapted to stably and securely attach the support to a bicycle in a prestressed manner, the forked members and depending member are adapted to engage the pack with the securing means holding the pack to the support in a substantially inflexible manner.

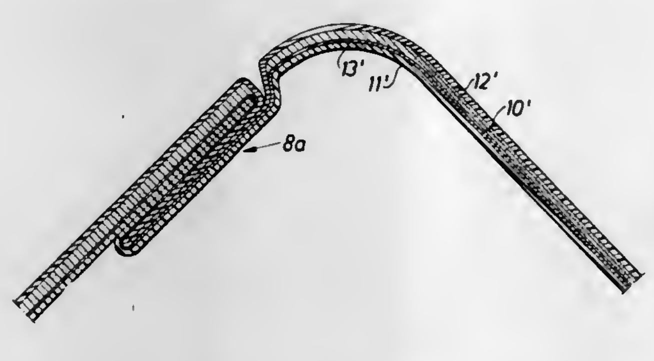
4,056,220
PORTABLE BOAT-CARRIED RACK FOR WATER SKIS AND TOW ROPES
Steven M. Trimble, 1302 Banbury Road, Apt. H, Kalamazoo, Mich. 49001
Filed July 30, 1975, Ser. No. 600,383
Int. Cl.² B60R *9/08*
U.S. Cl. 224—42.45 R **1 Claim**

1. A rack for water skis adapted to be mounted on a boat so that it extends athwart the boat, the rack comprising two transversely spaced, paralleled planar end members having substantially the same size and shape, elongated members connecting the end members to form a unitary structure of fixed length, each end member having a horizontal bottom surface, substantially vertically extending front and rear lower surfaces and inclined front and rear upper surfaces which converge upwardly to an apex substantially at the center of the end member, a plurality of open ended vertical slots formed in each end member and extending downwardly from both of the front and rear inclined upper surfaces thereof, the slots being substantially the same vertical dimension, each slot in one of said end members being transversely aligned with a corresponding slot in the other end member whereby a ski placed on its side edge in any pair of aligned slots will be in relatively, vertically stepped position and relation with respect to skis



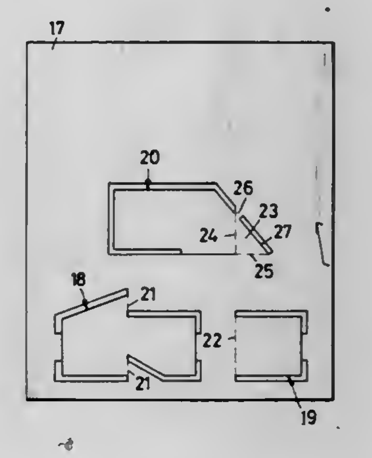
placed in any other pair of aligned slots in the same front or rear inclined upper surface of the rack, all of the slots being of such a size and configuration that each pair of aligned slots will receive and retain at least one ski positioned on its side edge, each end member having at least two openings extending therethrough adjacent a lower part thereof in a direction normal to the plane of the end member, and an elongated rod-like supporting member positioned in each opening for sliding movement through the opening whereby the end portions of the supporting members, not positioned within the rack between the end members, provide means external to each end member for supporting the rack on corresponding boat parts of various transverse spacings.

4,056,221
LAMINATED PACKAGE
Lars-Erik Piltz, Dalby, and Claes Tvingstedt, Malmo, both of Sweden, assignors to AB Akerlund & Rausing, Lund, Sweden
Filed Dec. 8, 1975, Ser. No. 638,367
Claims priority, application Sweden, Dec. 12, 1974, 7415580
Int. Cl.² B65D *5/40, 5/62*
U.S. Cl. 229—14 BL **21 Claims**



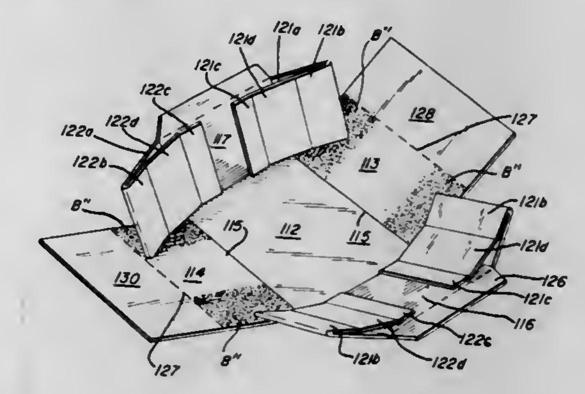
1. A blank for making a container comprising a first member of a first thickness including a bottom field and a plurality of side fields, said side fields including side edges defining cut-out portions between adjacent side edges, and second member means of a second thickness less than said first thickness arranged in overlying relation to said first member and extending beyond said side edges of said side fields so as to completely fill said cut-out portions, said second member means comprising two sheets of flexible material adhered to and completely enclosing said first member, said two sheets of flexible material extending beyond said side fields and said cut-out portions to define collar means, said container when erected from said blank having the adjacent side edges of each cut-out portion in abutting relationship with each other so that there is no overlap of said first member upon itself.

4,056,222
COMPARTMENTALIZED STRUCTURE WITH PIVOTABLE SEPARATING WEBS
Heinz Focke, Verden, Germany, assignor to Focke & Pfuhl, Verden, Germany
Filed Aug. 25, 1976, Ser. No. 717,798
Claims priority, application Germany, Aug. 26, 1975, 2537811
Int. Cl.² B65D *3/24, 5/48*
U.S. Cl. 229—15 **12 Claims**



1. In a compartmentalized structure for insertion in packages for separating articles such as bottles or the like, by means of longitudinal and cross webs, said structure comprising a flat blank serving as the longitudinal web, said flat blank being provided with percut lugs adapted to be pivoted to form cross webs, the improvement comprising:
at least one lug being formed in the blank outside of the separating region determined by the cross webs and being extended into the separating region at right angles to the longitudinal web by folding it about at least two fold lines.

4,056,223
FOLDABLE CONTAINER AND BLANK THEREFOR
Michael M. Williams, Arlington, Tex., assignor to Packaging Corporation of America, Evanston, Ill.
Filed Aug. 11, 1976, Ser. No. 713,540
Int. Cl.² B65D *5/22*
U.S. Cl. 229—32 **6 Claims**



1. A foldable container formed from a single blank of sheet material and having at least one reinforced corner, said container comprising a bottom section; end and side panels foldably connected respectively to first and second peripheral segments of said bottom section and extending upright therefrom and delimiting an open top, said upright end and side

panels forming at least one corner therebetween; a top closure flap foldably connected to at least one of said side panels; and a corner-reinforcing member foldably connected to an edge of the end panel adjacent said corner, said corner-reinforcing member including a first section foldably connected to the end panel edge and having a surface thereof secured to an interior surface of the adjacent side panel, a second section having a first portion foldably connected to said first section and secured to the opposite surface thereof in foldback relation and a second portion foldably connected to said first portion and extending angularly therefrom and disposed in inwardly spaced relation with respect to said end panel edge, and a third section foldably connected to said second portion and secured to the interior surface of said end panel.

4,056,224

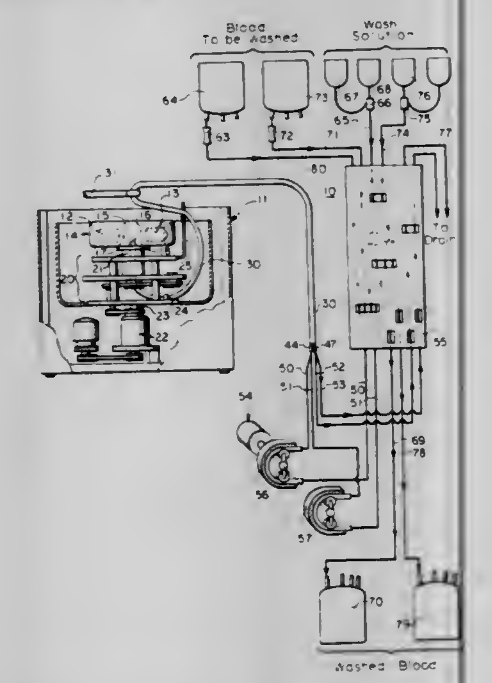
FLOW SYSTEM FOR CENTRIFUGAL LIQUID PROCESSING APPARATUS

Houshang Lolachi, Rockville, Md., assignor to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Continuation-in-part of Ser. No. 562,749, March 27, 1975, abandoned. This application Feb. 11, 1976, Ser. No. 657,186

Int. Cl.² B04B *5/02, 7/00,* *15/12*

U.S. Cl. 233—14 R **9 Claims**



1. A leader assembly for installing a flow system of the type having at least one flexible-walled liquid processing chamber and a connecting flexible conduit segment in a centrifugal processing apparatus having guide means through which the processing chamber and conduit segment are threaded, comprising, in combination:

retaining means including an opening for receiving the processing chamber; and

a flexible guide cable attached to said retaining means for pulling said retaining means through the guide means.

4,056,225

CENTRIFUGE ROTOR FOR SEPARATING PHASES OF A LIQUID

George Norton Hein, Jr., 331 Chesham Ave., San Carlos, Calif. 94070

Filed Apr. 29, 1976, Ser. No. 681,312

Int. Cl.² B04B *7/02, 9/06*

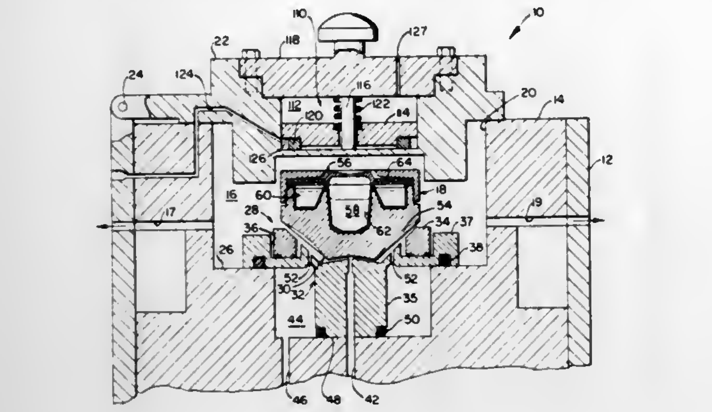
U.S. Cl. 233—20 R **6 Claims**

1. A rotor for use with a centrifuge, said rotor comprising:

a container having a lower section with at least two chambers positioned within said rotor for receipt of a fluid mixture;

a movable top section portion attached over said lower section of said container, said top section in an unrestrained orientation allowing fluid communication between said chambers; and

sealing means mounted adjacent said top section within said rotor for biasing said top section in a juxtaposed position over one of said chambers to seal said one chamber from



the other of said chambers to prevent fluid communication between said chambers, said fluid mixture in said one of said chambers exerting a centrifugally induced force on said top section when said rotor is rotating to move said top section against the bias of said sealing member to allow fluid communication between said chambers.

4,056,226

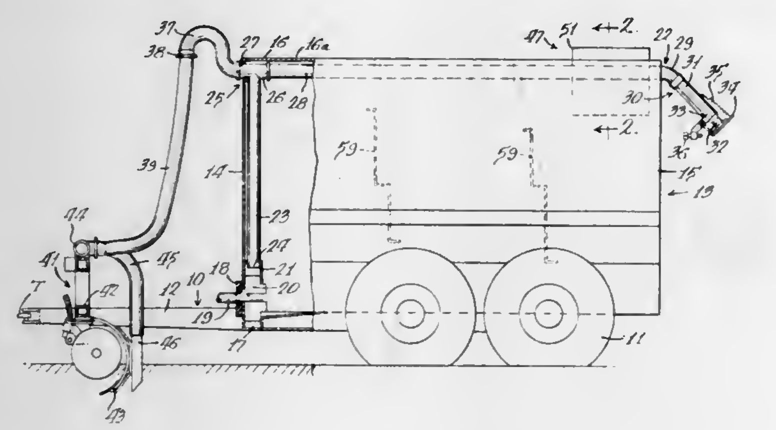
LIQUID MANURE SPREADER

James H. Hodgson, Vinton, Iowa, assignor to Chromalloy American Corporation, New York, N.Y.

Filed July 29, 1976, Ser. No. 709,662

Int. Cl.² A01G *25/09*

U.S. Cl. 239—172 **4 Claims**



1. In a liquid manure spreader which has a wheeled chassis with an enclosed tank mounted thereon, and a power driven pump for discharging liquid manure from the tank through spray nozzle means at the rear of the tank, the improvement comprising:

a pump casing within the tank at the front lower extremity thereof, the rear of said casing being open to the tank;

a centrifugal pump in said casing which is on a longitudinal axis and has a drive shaft extending through the front wall of the tank for connection to a power source;

and a discharge pipe which has a vertical run extending from the top of the pump casing within the front of the tank, and a horizontal run which extends from the top of said vertical run inside the top of the tank, and through the rear of the tank, the spray nozzle means being on said horizontal run of the discharge pipe outside the rear of the tank.

4,056,227

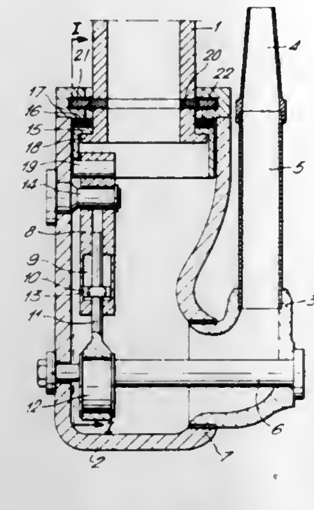
APPARATUS FOR CLEANING TANKS AND THE LIKE

Olav Hakon Fismen, Kjaernes, 1400 Ski, Norway

Filed Dec. 18, 1975, Ser. No. 641,747

Int. Cl.² B08B *3/02;* **B05B** *3/14*

U.S. Cl. 239—227 **7 Claims**



1. An apparatus for cleaning the interior surfaces of a tank and the like, which comprises

a. a supply tube having an outlet end for introducing a supply of a cleaning fluid under pressure into the tank,

b. a flushing head mounted on the outlet end of the supply tube for receiving the cleaning fluid therefrom and for rotation about the axis of the tube,

c. a nozzle unit mounted in the flushing head for rotation about an axis substantially perpendicular to the tube axis, the nozzle unit including

1. a shaft mounting the nozzle unit rotatably in the flushing head for rotation about the shaft and

2. a nozzle in communication with the flushing head for receiving the cleaning fluid therefrom, the nozzle having a jet outlet direction offset from the axis of rotation of the nozzle unit whereby the nozzle unit is rotated as a result of reaction pressure from a jet of cleaning fluid delivered through the nozzle,

d. a hydraulic braking device coupled to the nozzle unit for variably controlling the rotational speed of the nozzle unit in dependence on the rotational position of the nozzle unit, the braking device comprising

1. two members reciprocable relative to each other and

2. means for varying the braking force of the device in dependence on the relative position of the two members whereby the rotational speed of the nozzle unit is variably controlled,

e. a crank coupling one of the members of the braking device to the shaft of the nozzle unit for oscillating the braking device about an axis parallel to the axis of the shaft, and

f. a mechanism coupling the other braking device member to the flushing head for rotating the flushing head about the axis of the supply tube upon oscillation of the braking device.

4,056,228

AROMA SYSTEM

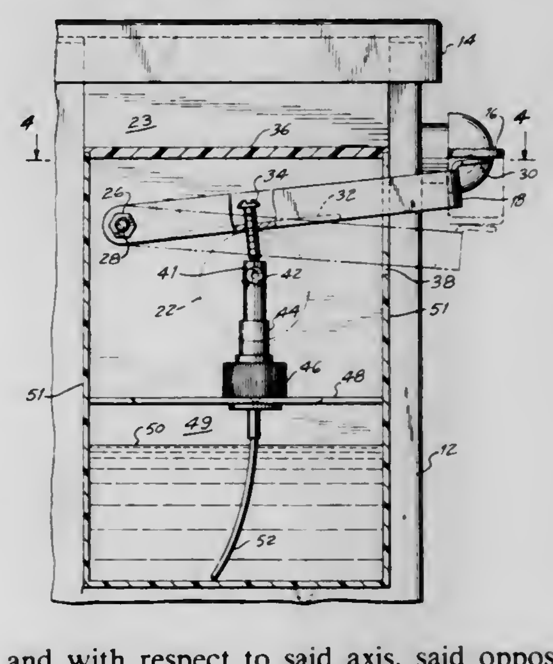
Evelyn S. Rosenkrantz, and Edward Rosenkrantz, both of 4915 Tyrone Ave., Sherman Oaks, Calif. 91403

Filed May 14, 1976, Ser. No. 686,466

Int. Cl.² B05B *15/00*

U.S. Cl. 239—274 **1 Claim**

1. An aroma emitting device for cooperative use with a toilet handle, or the like, comprising in combination: a housing, a refillable fluid reservoir carried by the housing, pump means communicating with said reservoir for generating a fluid mist, actuating means disposed in the path of a movable member for controllably and variably actuating said pump means so as to cause said mist to be generated proximate the movable member, said housing including an integral support wall extending at an elevation above that of the level of said fluid reservoir, said support wall comprising a shelf member extending substantially perpendicularly from and with respect to a substantially vertical wall making up said housing, said vertical housing wall extending upwardly to a downwardly facing U-shaped channel portion supported by upper edges of a wall of a toilet bowl holding water, said housing further including a removable and replaceable lid for enabling access to interior portions of said housing, said pump assembly including an outer housing supported integrally with said support wall shelf within the housing, a reciprocable plunger head carrying a spray nozzle, and a hollow dip tube communicating with said spray nozzle and extending below the level of said fluid, said actuating means comprising a bar member extending along an axis and pivotably supported by said support wall at an elevation above that of said plunger head, said bar member having substantially horizontal surfaces intermediate the junction of the bar member and said housing and its opposite end, said opposite end including an actuating portion extending at an



angle from and with respect to said axis, said opposite end comprising adjustable alignment means for positioning said actuating portion in the path of more than one type and shape of conventional toilet handle, said adjustable alignment means including male and female threaded members and locking means for securing said male and female threaded members integrally together in one of several possible relative positions, threaded fastening means for pivotally securing said bar member to said support wall, and adjustable biasing means carried by said bar member for engaging said plunger head during use, said biasing means comprising a threaded member capable of being adjustably manipulated upon removal of said lid such that a lower end thereof may be positioned at varying elevations, said adjustability of the threaded member providing means for variable controlling the stroke of said pump plunger head and thus the characteristics of fluid spray mist from said spray nozzle and the quantities of fluid discharged as a result of depression of said toilet handle.

4,056,229

CAR WASH SPRAYER

Genevieve M. Jones, 10840 SE. 85th Ave., Portland, Oreg. 97266

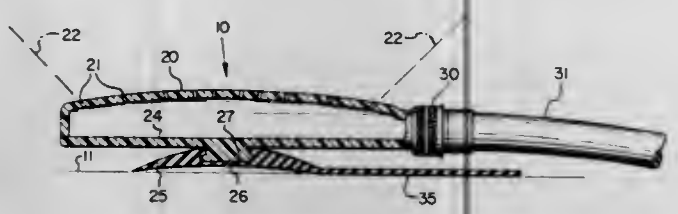
Filed Apr. 27, 1976, Ser. No. 680,767

Int. Cl.² B05B *1/14*

U.S. Cl. 239—288 **1 Claim**

1. A car wash sprayer comprising a sprinkler head having a hollow body with a top side and a bottom side, a downwardly protruding button formed integral with said bottom side in one-piece construction, perforations in said top side arranged to discharge a water spray upwardly and outwardly in all directions from said body, a water supply hose connection having a rotatable connector fitting extending laterally from said body, a suction cup having a socket recess receiving said button, and a flat flap formed integral with said suction cup in

one-piece construction and extending from one side of said suction cup to lie flat on a surface supporting said suction cup



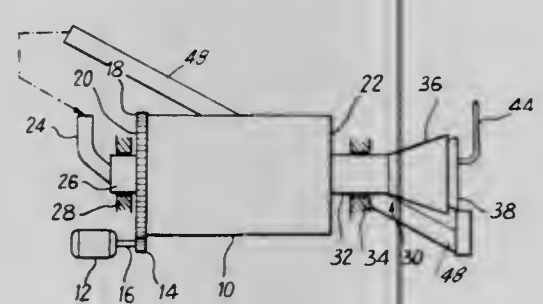
and shield said surface from contact with said hose connection without interfering with the manipulation of said connector fitting.

4,056,230
METHOD OF CRUSHING PARTICLES OF MATERIAL IN A BALL MILL

Jacques L. E. Decobert, Les Candeaux Eysus, France, assignor to Alcan Research and Development Limited, Montreal, Canada

Filed Nov. 19, 1975, Ser. No. 633,409
Claims priority, application France, Nov. 20, 1974, 74.38134
Int. Cl.^{2} B02C *23/18*

U.S. Cl. 241—15 **5 Claims**



1. A continuous method of crushing metal particles in a ball-mill to produce metallic pigment, in which method: a mixture composed of balls and of a charge consisting of the metal particles to be crushed, a solvent and a lubricant is continuously introduced into a ball mill initially containing a quantity of balls; a mixture consisting of balls, crushed metal particles, solvent and lubricant being continuously recovered at the outlet from the mill; and the balls being separated from the recovered mixture by washing with solvent and reintroduced into the mill with a fresh charge, while the crushed metal particles with solvent are delivered separately from the balls; the content of non-volatile substances in the charge being between 20% and 80% by weight.

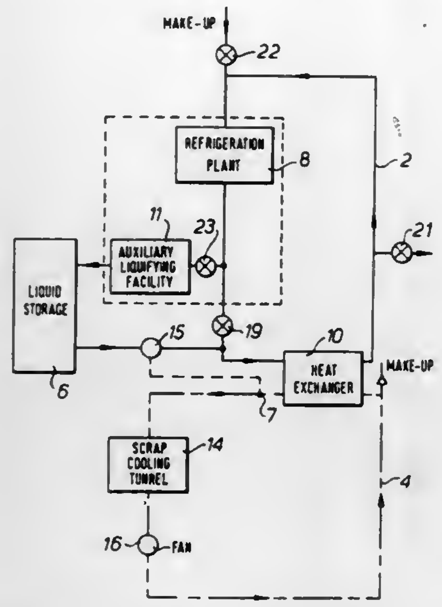
4,056,231
SCRAP TREATMENT

Nicholas A. Townsend, Bexley, England, assignor to British Steel Corporation, London, England

Filed Aug. 2, 1976, Ser. No. 711,076
Claims priority, application United Kingdom, Aug. 7, 1975, 33079/75
Int. Cl.^{2} B02C *23/06*

U.S. Cl. 241—23 **14 Claims**

1. A process for fragmenting metal scrap includes cooling the scrap until it is brittle by contacting it with a first cooling agent which is gaseous and then fragmenting the scrap in its brittle state, said first cooling agent being cooled by being passed through a heat exchanger to which a second cooling agent is fed partly in the liquid phase and partly in the gaseous phase and from which the second cooling agent emerges in the gaseous phase, in which the improvement resides in said cooling agent being supplied to the heat exchanger partly from a liquid storage facility and partly directly from a refrigeration plant, the refrigeration plant being used in conjunction with a liquifier to supply the storage facility with liquid second cooling agent, and in which the gaseous second cooling agent is supplied to the refrigeration plant following its emergence from the heat exchanger said refrigeration plant, during periods in which the cooling of the scrap is interrupted, drawing



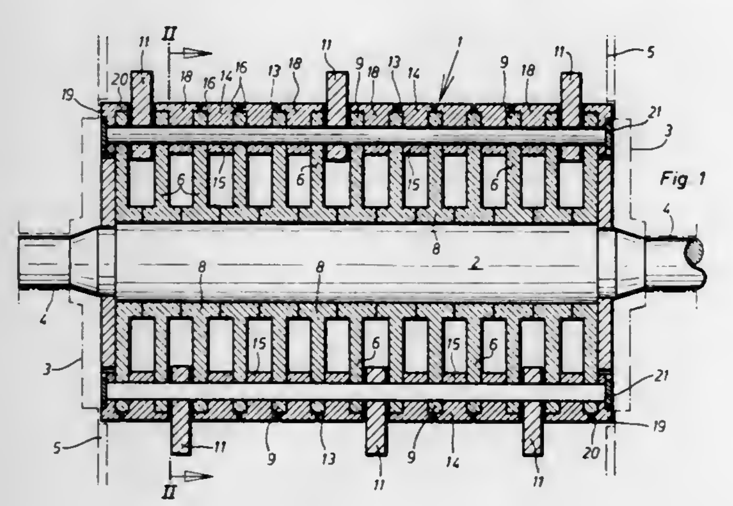
warm gas from an external source and, in conjunction with the liquifying plant, replenishing the liquid store in readiness for the next scrap cooling cycle.

4,056,232
PROTECTIVE DEVICE FOR ROTARY HAMMER BREAKER

Wilhelm Linnerz, Buttgen near Neuss, and Josef Tillmanns, Dusseldorf, both of Germany, assignors to Lindemann Maschinenfabrik GmbH, Dusseldorf, Germany

Filed Mar. 15, 1976, Ser. No. 666,910
Claims priority, application United Kingdom, Mar. 17, 1975, 11052/75
Int. Cl.^{2} B02C *13/04*

U.S. Cl. 241—194 **10 Claims**



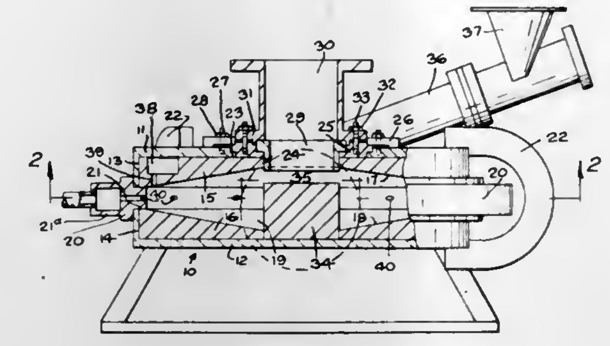
1. A protective device for a rotary hammerbreaker including a plurality of discs secured upon a rotor shaft, a plurality of rods extending through said discs and hammers pivotably mounted upon said rods between said discs, said protective device comprising a plurality of shields each including a hub mounted upon one of said rods between adjacent discs, and a circumferential segmental flange fixed to said hub extending over at least a part of the periphery of at least one of the adjacent discs between which said hub is mounted to protect said part of said periphery, each of said segmental flanges being configured to extend over a portion of the circumference of said hammerbreaker with said plurality of shields being fitted to said rotary hammerbreaker such that said segmental flanges are juxtaposed relative to each other to provide substantially continuous protection over the periphery of said discs.

4,056,233
APPARATUS FOR PULVERIZING SOLID MATERIALS

Edwin F. Fay, West Centennial Drive, Marlton, N.J. 08053

Filed Oct. 1, 1976, Ser. No. 728,749
Int. Cl.^{2} B02C *19/06*

U.S. Cl. 241—39 **7 Claims**



1. Apparatus for the pulverization of solid material into finely divided form comprising a generally circular grinding chamber for the particles to be pulverized formed between a pair of top and bottom heads, means for injecting a pressurized gaseous fluid into said chamber to establish therein a high velocity inwardly spiralling vortex of the gaseous fluid, means for injecting the material to be pulverized into said grinding chamber for entrainment of said particles of material into the outer reaches of said vortex for movement inwardly thereof toward a discharge outlet coaxial with the center of the vortex, and baffle means including a fixed member disposed centrally within the grinding chamber in axial alinement with said discharge outlet and extending vertically from the floor of said grinding chamber substantially beyond the horizontal median plane of said chamber to a level short of and in relatively closely spaced relation to the top head of said chamber, said baffle member having an external surface defining the inner wall of an annular zone within said grinding chamber which is closed at its bottom end and open at its top end, the top end of said baffle member having an outline defining a cross-sectional area which is at least substantially as great as that of the bottom end of said member and said inner wall of said annular zone being radially unobstructed across the top thereof and of a cross-sectional area at least equal to that of the inlet end of said discharge outlet to provide an unobstructed free space of vertically limited depth located between said topmost end of said baffle member and the top head of said grinding chamber, said space extending across said topmost end of said annular zone inner wall for unrestricted direct communication with said zone about the full peripheral extent of said wall, whereby those heavier and coarser particles of material which have traversed said vortex and are gravitationally held in said zone are centrifugally thrown back into said vortex and subjected thereby to its grinding energy until the same have been reduced in size by attrition in said zone and so are sufficiently lightened in weight to be lifted out of said zone against the force of gravity for discharge solely from the upper region of the grinding chamber together with the exhausting stream of said gaseous vortex radially inward across the top end of said baffle member into said discharge outlet.

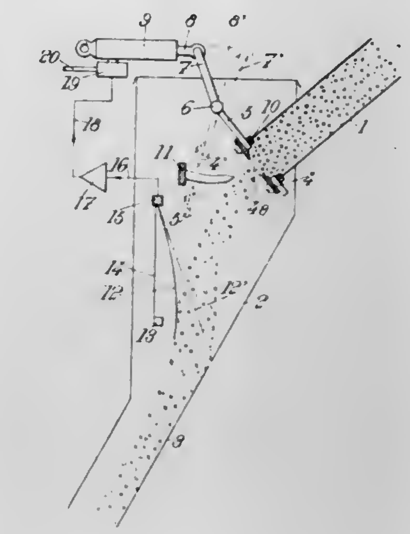
4,056,234
METERING DEVICE FOR A POWDERY MATERIAL

Christian Carré, Houilles, France, and Claude Rouault, Vlissingen, Netherlands, assignors to Air-Industrie, Courbevoie, France

Filed Nov. 7, 1975, Ser. No. 629,929
Claims priority, application France, Nov. 14, 1974, 74.37566
Int. Cl.^{2} B65B *1/06*

U.S. Cl. 141—392 **5 Claims**

1. Declogging device for a duct in which normally flows a powdery material, said duct being provided at its outlet with a removable diaphragm comprising an orifice determining a normal flow rate of the material, said declogging device comprising: a flow detector for sensing the flow rate of the material and supplying at its output a signal when the rate of flow of said material is under or reaches a predetermined threshold lower than said normal flow rate, consequent upon partial or total obstruction of said orifice; a clearing pin; and actuating



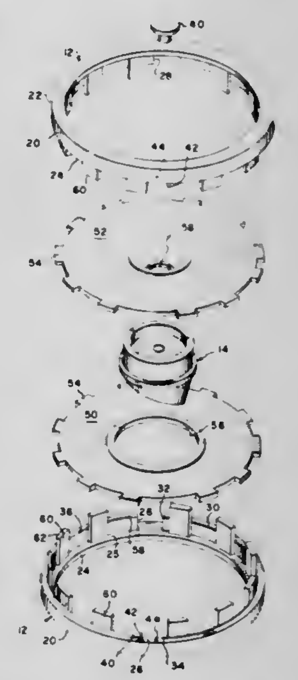
means connected to said output of the flow detector for causing said clearing pin to be engaged in said orifice of the diaphragm and to clear the latter when receiving said signal.

4,056,235
BEZEL CASE

Alfred W. Roe, Bellport, N.Y.; John Ogden, Rayleigh, England, and Robert Carter, Shoreham, N.Y., assignors to Roe International, Inc., Patchogue, N.Y.

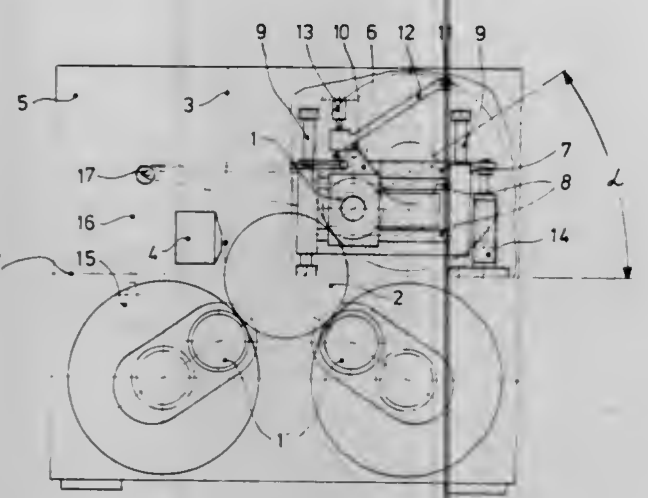
Filed Nov. 19, 1976, Ser. No. 743,524
Int. Cl.^{2} B65D *11/10;* **G01B** *3/08*

U.S. Cl. 220—4 E **18 Claims**



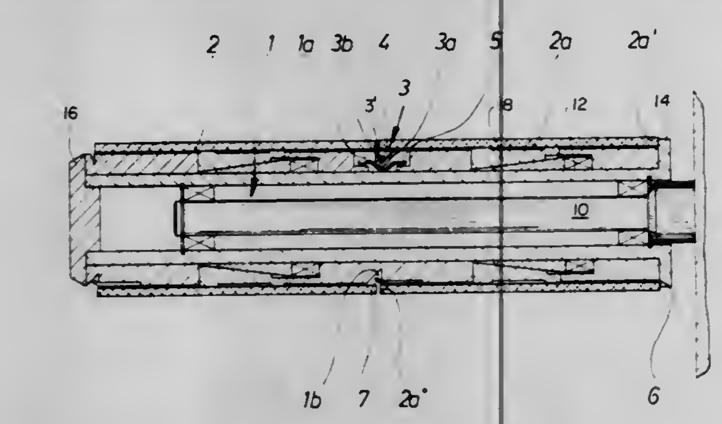
12. A tape reel case comprising a pair of substantially identical case elements each of which comprises a peripheral wall having first and second edge portions and an inwardly extending wall portion integral with said second edge portion; said first edge portion of said peripheral wall having a tape discharge slot formed therein extending from the first edge portion toward the second edge portion thereof and having a predetermined length; said case elements each including a plurality of identically located peripherally spaced fingers extending from said inwardly extending wall portion parallel to said peripheral wall portion to free ends located above said first edge portion of the wall whereby said fingers on said case elements interdigitate when the elements are superimposed with said first edge portions in engagement.

4,056,236
MACHINE FOR WINDING TEXTILE THREADS
Günter Jährig, Leopoldshafen, Germany, assignor to Industrie-Werke Karlsruhe Augsburg Aktiengesellschaft, Germany
Filed Nov. 1, 1976, Ser. No. 737,340
Claims priority, application Germany, Nov. 4, 1975, 2549254
Int. Cl.² B65H *54/20, 17/08*
U.S. Cl. 242—18 DD **5 Claims**



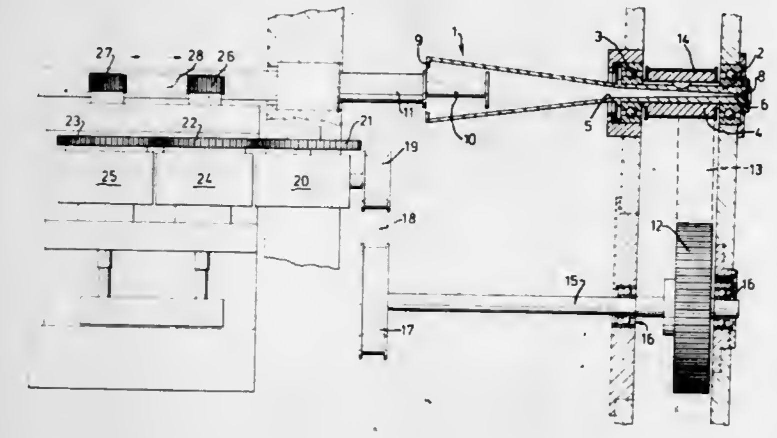
1. A machine for winding textile threads into a ball, comprising a drive cylinder, means for supporting at least one bobbin holder on the circumference of said drive cylinder comprising a receiver having means for rotatably supporting a bobbin holder thereon, a horizontal guide along which said receiver is movable, biasing means biasing said receiver in a direction to urge the bobbin holder which receives the ball against the drive cylinder for rotation thereby, said receiver being continuously displaceable along said guide with increased ball volume, a swivel guide bar pivotally mounted adjacent said guide and being inclined relative to the horizontal for pivotal movement in one direction and performing a slight pivotal movement in the horizontal displacement of said receiver, said receiver having a first feeler in operative connection with said swivel guide bar, a second stationary feeler located adjacent said guide bar and being actuatable by pivotal movement of said guide bar, and drive means connected to said receiver for effecting the vertical displacement thereof and connected to said second feeler for actuation thereof upon actuation of said second feeler.

4,056,237
SPACER FOR SPOOL TUBES
Harry B. Miller, Charlotte, N.C., and Günter Jährig, Eggenstein-Leopoldshafen, Germany, assignors to Industrie-Werke Karlsruhe Augsburg Aktiengesellschaft, Germany
Filed Oct. 5, 1976, Ser. No. 729,817
Claims priority, application Germany, Oct. 8, 1975, 7531948
Int. Cl.² B65H *54/00*
U.S. Cl. 242—18 PW **6 Claims**



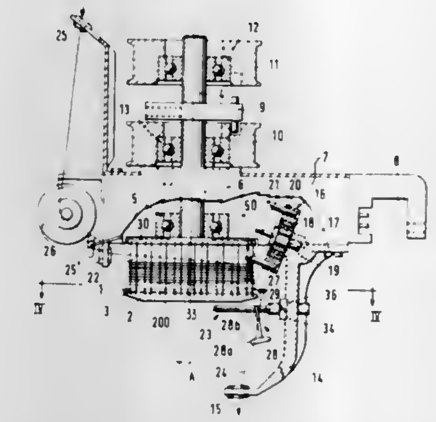
1. A device for the axial spacing of spool tubes along a common spool carrier, comprising a rotatable cylindrical spool carrier having a periphery with a recess therein intermediate the length of said spool and having an unobstructed end and an opposite end with a projecting stop, first and second spool tubes of substantially the same length and internal diameter being engageable onto the unobstructed end and over the periphery of said spool carrier with the first spool abutting against said stop and with the two tubes being arrangeable in end-to-end relationship on said spool carrier, spool tube spacing means located in the recess on the periphery of said spool carrier and being movable by engagement of said first spool as it is moved over the periphery of said spool carrier to abut against said top to prevent movement of said second spool into abutting engagement with said first spool and effectively spacing said second tube axially away from said first tube, and thread-catching means on said spool located between said spool tubes for catching the thread to be spooled, said spool tube spacing means comprising an angle lever pivotally mounted in said recess for movement in an axial direction, said angle lever being of a V-shape configuration and including first and second interconnected leg portions which are flattened at their connections.

4,056,238
APPARATUS AND A METHOD OF WINDING FILAMENTARY MATERIAL
Alexander J. Ciniglio, Brentwood, and Richard M. Hadfield, London, both of England, assignors to Rotawinder Limited, Ilford, England
Filed Dec. 23, 1975, Ser. No. 643,799
Claims priority, application United Kingdom, Jan. 30, 1975, 4186/75; July 24, 1975, 31074/75
Int. Cl.² B65H *54/02*
U.S. Cl. 242—25 R **9 Claims**



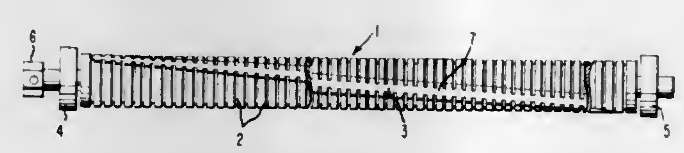
1. For winding a filament about a bobbin or like former, a fly winder having a rotatable axially stationary hollow flier and a rotationally stationary bobbin support concentric with the hollow flier and axially reciprocable towards and away therefrom, wherein the hollow interior of the flier is a surface of rotation symmetrical about the axis of rotation of the flier forming a filament guide surface adapted to restrain outward radial movement of the filament, said surface of rotation increasing in diameter substantially smoothly along its length from an axially directed filament inlet guide closely circumscribing said axis at substantially the apex of said surface of rotation, the greater diameter end of the hollow interior being disposed adjacent to the bobbin support and being of diameter such that a bobbin or like former mounted on the support can be received therein, filament guide means being disposed at or adjacent to the greater diameter end and through which the filament is to be constrained to pass before being wound on the bobbin or like former with the filament having freedom of circumferential movement intermediate the filament inlet and the filament guide means.

4,056,239
YARN SUPPLY APPARATUS FOR POSITIVE THREAD SUPPLY
Josef Fecker, Steinbofen-Bisingen, and Gustav Memminger, Freudenstadt, both of Germany, assignors to Firma Gustav Memminger Verfahrenstechnik fur die Maschenindustrie, Freudenstadt, Germany
Filed Dec. 19, 1975, Ser. No. 642,605
Claims priority, application Germany, Oct. 4, 1975, 2544495
Int. Cl.² B65H *51/20*
U.S. Cl. 242—47.01 **11 Claims**



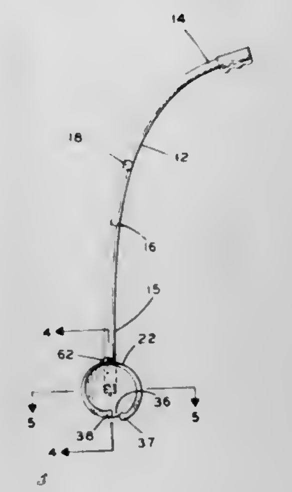
1. Thread supply apparatus for positive thread supply, for use with textile machines, comprising
- a support frame **(8, 14)**;
- a rotatable yarn supply storage drum **(1)** journalled in the support frame for rotation in a clockwise or counterclockwise direction.
- means supplying yarn to said drum **(1)** to form a stack of supply windings **(27)** thereon, the yarn being drawn off over the end of the drum from a pull-off position;
- a thread break sensor **(28)** in the path of the yarn and engaged thereby;
- a depending arm **(14)** extending from said frame and adjacent said drum and stationary thread guide means **(15)** at the end thereof beneath the drum and offset from the axis of the drum;
- and a thread guide element **(23)** including a pin-like finger **(33)** which is located below the drum **(1)** in the path of the thread adjacent the pull-off position, and upwardly of the thread guide means **(15)** and extends in a direction substantially parallel and laterally offset, with respect to a plane containing the axis of rotation of the drum and said guide means **(15)**.

4,056,240
YARN GUIDE
John Battista Gallini; Gerald Dean Hauxwell, and Christopher Roger Whitfield, all of Richmond, Va., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.
Filed Feb. 18, 1977, Ser. No. 770,060
Int. Cl.² B65H *57/16, 57/04;* **D01H** *13/04*
U.S. Cl. 242—47.09 **4 Claims**



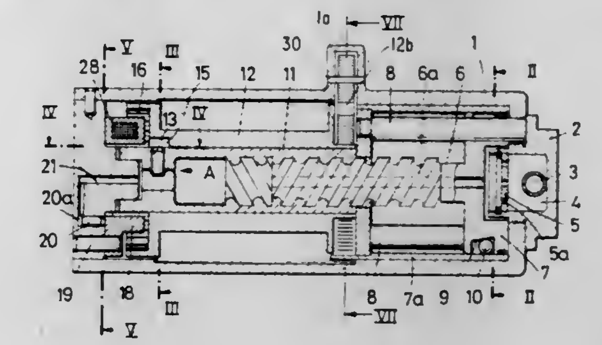
1. A yarn guide comprising a rotatably mounted circumferentially grooved cylindrical bar having as part of the bar surface a smoothly recessed, relatively flat area advancing helically less than a complete turn along the length of the bar, the relatively flat area being uniformly recessed to a depth such that at least part of the recessed area is devoid of grooves.

4,056,241
HOSE ROLLING DEVICE
Patrick D. Yates, 23668 Ave. 17, Madera, Calif. 93637
Filed Apr. 14, 1976, Ser. No. 676,735
Int. Cl.² B65H *75/40*
U.S. Cl. 242—86.4 **7 Claims**



1. A hose rolling device comprising:
- an elongated rigid handle disposable in a generally vertical position;
- hand grip means at the upper end of said handle;
- a drum rotatably mounted at the lower end of said handle, said drum having means for releasably anchoring one end of a linearly disposed section of hose for rotation with said drum with the surface of said drum aligned to rotatably pass over the balance of said hose, and being rotatably movable by said handle to roll along the balance of said hose and coil the same about said surface.

4,056,242
REEL FOR WINDING UP SAFETY BELTS
Güenter Herrmann, Munich, Germany, assignor to Bayern-Chemie Gesellschaft for flugchemische Antrieve mit beschrankter Aschau, Germany
Filed Sept. 3, 1975, Ser. No. 609,933
Claims priority, application Germany, Sept. 6, 1974, 2442744
Int. Cl.² A62B *35/00;* **B65H** *75/48*
U.S. Cl. 242—107.4 R **11 Claims**



1. In a reel for winding up safety belts in vehicles having a housing with a chamber therein, a threaded spindle axially slideably supported in said housing and having piston-shaped head means thereon slideably engaging the walls of said chamber in said housing, a threaded nut member rotatably supported in said housing and threadedly engaging said thread on said spindle, an axial movement of said spindle effecting a rotation of said nut member, a winch mounted for rotation in said housing and relative to said nut member, said belt being wound onto said winch, a return spring connected between said housing and said winch to resiliently urge said winch in a first direction to wind up said belt thereon, pyrotechnically produced gas generating means in said chamber and on one side of said piston-shaped head means for effecting, upon a firing thereof in response to an impact of said vehicle with another object, a driving of said spindle in a first axial direction to rotate said nut member and inertia block means for locking said

winch against rotation in response to a braking of said vehicle at a rate in excess of a predefined normal braking rate, the improvement comprising at least one pin for connecting said nut member to said winch in response to the generation of gas caused by a firing of said pyrotechnically produced gas generating means, said pin being mounted in a hole in said nut member and said hole communicates with said chamber in which said pyrotechnically produced gas generating means is located through an axially extending hole in said spindle.

4,056,243

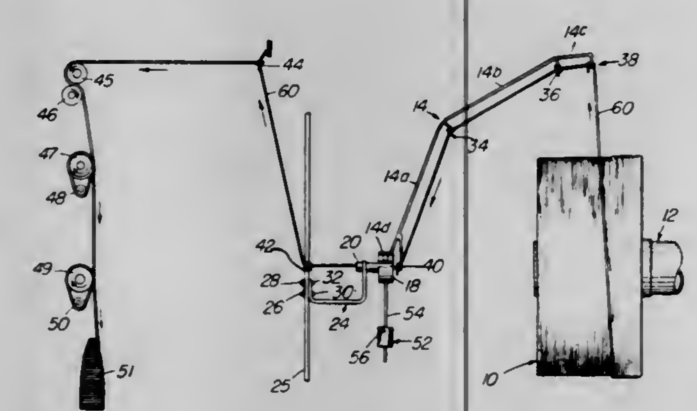
APPARATUS FOR UNIFORMLY UNWINDING A YARN PACKAGE

Luc Andre Bilodeau, St. Jean, Canada, assignor to Celanese Canada Limited, Montreal, Canada

Filed Apr. 2, 1976, Ser. No. 673,189

Int. Cl.[2] B65H *49/00*

U.S. Cl. 242—128 **7 Claims**



1. An apparatus for smoothly and regularly unwinding a yarn wrapped around the exterior face of a bobbin, said apparatus comprising:

a. a frame for supporting bobbins of yarn

b. a bobbin of yarn rigidly and substantially horizontally mounted on said frame, said bobbin containing yarn wrapped around its exterior surface, so as to be unwound from the outside of the bobbin,

c. a yarn take-up device for pulling the yarn from said bobbin, and

d. therebetween said take-up device and said bobbin, a tubular member secured on said frame and coaxial with said bobbin,

e. a semi-arcuate arm being rotatably mounted, near its first end on said tubular member, and said end provided with a counter-balanced weight, the other end terminating at a distance short of the yarn wrapped around the bobbin and ending substantially half-way along the length of the bobbin, said arm being substantially frictionless upon rotation for its easy spinning and being provided with a yarn passage from near said other end to near said first end, said yarn passage co-operating with said tubular member defining a second yarn passage, with said yarn take-up device and with said bobbin to simultaneously radially support and displace the yarn from outside of the bobbin and to convey said yarn to said yarn take-up device via said yarn passages, while simultaneously converting the motion of the yarn from rotational into translational, and by the free rotation of the arm dampening of abrupt motions of the yarn leaving the bobbin, thereby reducing yarn breakage, the rotation of said arm being solely obtained by the force exerted on the yarn by said take-up device.

4,056,244

TAPE CLAMPING DEVICE FOR TAPE-CONTAINING CASSETTES

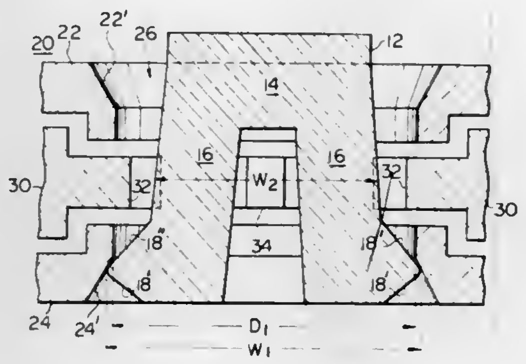
Nobuaki Matsutsuka, Yokohama, Japan, assignor to Victor Company of Japan, Limited, Yokohama, Japan

Filed Apr. 13, 1976, Ser. No. 676,491

Claims priority, application Japan, Apr. 16, 1975, 50-50533[U]

Int. Cl.[2] G03B *1/04;* **G11B** *15/32, 23/04;* **B65D** *85/672*

U.S. Cl. 242—197 **8 Claims**



1. A tape clamping device for a tape-containing cassette having a cassette housing with a pair of identical openings extending through the housing, a pair of reel hubs each having an aperture rotatably mounted within the housing coaxial with each of said openings and having a plurality of teeth extending inwardly from the inner wall of the aperture and adapted to mesh in use with a driving means provided in a tape recording and reproducing apparatus, the device comprising a plate-like member and a pair of laterally spaced limbs connected at one end to said plate-like member and extending substantially at right angles to the plane of said plate-like member and insertable through a space between adjacent ones of said teeth of one of said hubs and into one of said openings and removable therefrom, the longitudinal dimension of said limbs being substantially equal to the axial dimension of said one opening of the cassette housing, and the transverse dimensions of said limbs at the forward end thereof being slightly greater than the cross-sectional dimension of said one opening and at a portion intermediate their ends being slightly greater than a cross-sectional dimension defined by a locus of the inner end of said teeth by rotation of the hub and smaller than the cross-sectional dimension of said aperture of the hub, said limbs being capable of bending slightly toward each other upon insertion into said one opening and restoring to the original condition upon removal therefrom, whereby the intermediate portion of the limbs is disposed between adjacent ones of said teeth while the forward ends of the limbs engage the rear end portion of said one opening when the limbs are fully inserted thereinto.

4,056,245

MAGNETIC TAPE CARTRIDGE

Klaus Schoettle, Heidelberg; Heinrich Wittkamp, Mannheim, and Lothar Gliniorz, Frankenthal, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Filed Dec. 4, 1975, Ser. No. 637,780

Claims priority, application Germany, Dec. 7, 1974; Mar. 21, 1975, 2512455

Int. Cl.[2] G11B *23/02*

U.S. Cl. 242—197 **4 Claims**

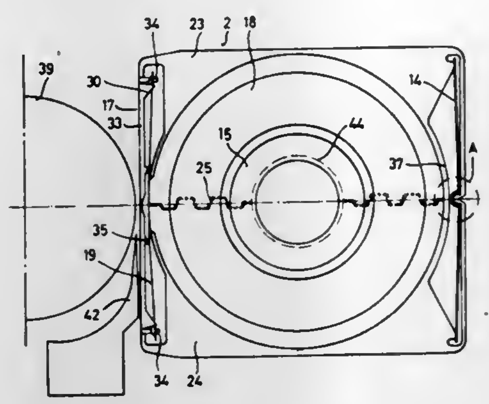
1. A cartridge assembly for storing a roll of magnetic recording tape, said assembly comprising:

an enclosure housing consisting of a pair of pivotal hollow boxes having corresponding open sides;

a pair of inward projections formed on the rear wall of said hollow boxes about which said hollow boxes pivot;

a spring means for hinging said hollow boxes together along their corresponding open sides and for urging said hollow boxes together in a normally closed position;

said spring means comprising a two-armed closing spring, a portion of one of said arms engaging one of said hollow boxes and a portion of the other of said arms engaging the other of said hollow boxes;



said spring means further having a central portion which embraces said projections formed on the rear wall of said hollow boxes thereby keeping them bearing against each other as said hollow boxes are pivoted open.

4,056,246

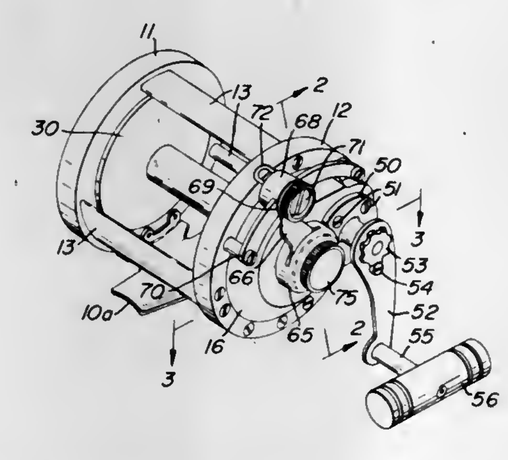
FISHING REEL WITH FRICTION DRAG

William Purcell, Philadelphia, Pa., assignor to Penn Fishing Tackle Mfg. Co., Philadelphia, Pa.

Filed Dec. 13, 1976, Ser. No. 750,242

Int. Cl.[2] A01K *89/00*

U.S. Cl. 242—219 **9 Claims**



1. A fishing reel having spaced side housing members,

a spool interposed between said housing members,

a spool shaft journaled at one end in one of said housing members and to which said spool is secured,

said spool at its other end being journaled in said other housing member,

means for rotating said spool in one direction comprising

an exteriorly accessible manually operable crank member,

a gear movable along said spool shaft and driven by said crank member,

interengageable friction members one of which is on said spool and the other of which is movable with said gear, and

means for controlling free spool operation of said spool,

said last mentioned means comprising

spring means for urging said interengageable members to out of engagement position,

a brake control lever exteriorly disposed on said other housing member for manual manipulation,

mounting members for said lever one of which is in threaded engagement with the other for applying a force in opposition to said spring force.

4,056,247

AIRCRAFT ARRESTING GEAR NET RAISING DEVICE

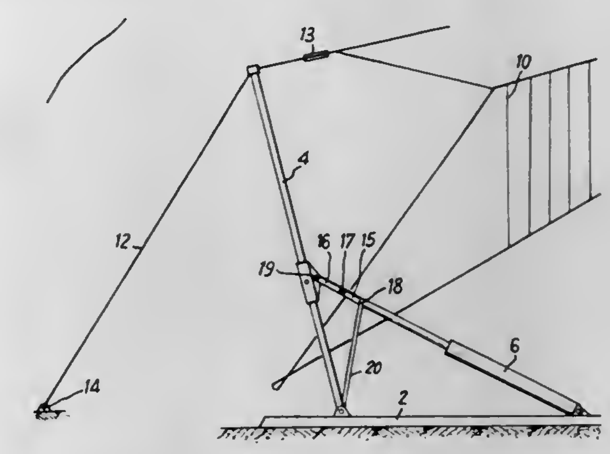
Jean Paul Bernard, Paris, and Paul A. Meningand, Clamart, both of France, assignors to Aerazur Constructions Aeronautiques, France

Filed Aug. 4, 1976, Ser. No. 711,661

Claims priority, application France, Aug. 5, 1975, 75.24372

Int. Cl.[2] B64F *1/02*

U.S. Cl. 244—110 C **3 Claims**



1. An aircraft arresting gear, for disposal across a runway having a center line, comprising:

i. a pair of frame structures having a first end and a second end, said frame structures being intended for anchoring to the ground one at each side of the runway and obliquely to the center line of the runway

ii. a pair of posts associated one with each of said frame structures, said posts each having a top end and a bottom end, each post being pivoted at its bottom end to its associated frame structure at the first end thereof

iii. a rope connected to the top end of each post and disposed across the runway

iv. a net disposed across the runway and connected along said rope

v. a pair of pneumatically-operable piston-and-cylinder rams associated one with each of said frame structures, said ram being pivotably connected to the frame structure at the second end of the frame structure

vi. a pair of connecting means each connecting a respective ram to a respective post, each connecting means having:

a. a lever pivoted to the frame structure and the ram

b. a pair of links pivotally connected end-to-end, one end of said pair of links being pivotally connected to the point of connection of the ram and lever, the other end of said pair of links being pivotally connected to said post intermediate its top and bottom ends.

4,056,248

TWO-PURPOSE HOOK FOR AIRCRAFT LOAD CARRIERS

Jean H. Hasquenoph, Lagny-sur-Marne, and Pierre Fernand Coutin, Paris, both of France, assignors to R. Alkan & Cie, France

Filed July 1, 1976, Ser. No. 701,708

Claims priority, application France, July 1, 1975, 75.20577

Int. Cl.[2] B64D *1/02*

U.S. Cl. 244—137 R **3 Claims**

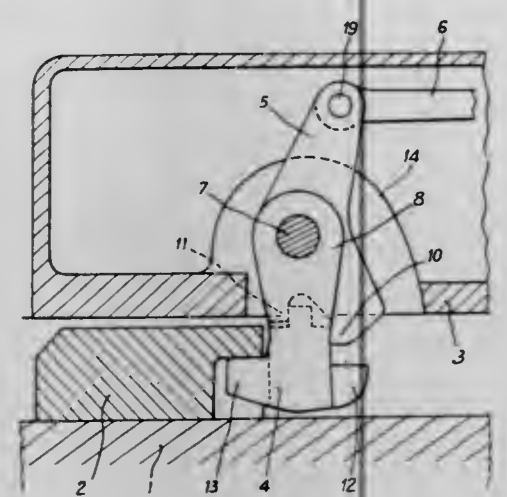
1. In a system for securing, under an aircraft, a jettisonable load having selectively a suspension ring and a suspension bridge with laterally spaced recesses, in combination:

i. a carrier structure, for mounting on the aircraft, including a horizontal transverse pivot pin releasably engaged therein,

ii. a shank having a first end and a second end, said first end being freely rotatably journalled on said carrier structure, said second end being adapted for connection to means for moving the shank angularly into a holding position and into a releasing position,

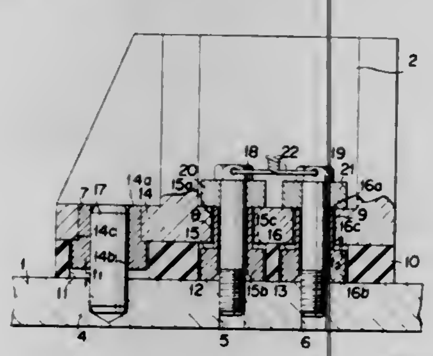
iii. a hook member having a first end and a second end, said

first end being freely rotatably journalled on said pivot pin, said second end having thereon a single element projecting in a radial plane from one side of the hook member and adapted for engagement in a suspension ring, said second end having thereon a pair of axially spaced



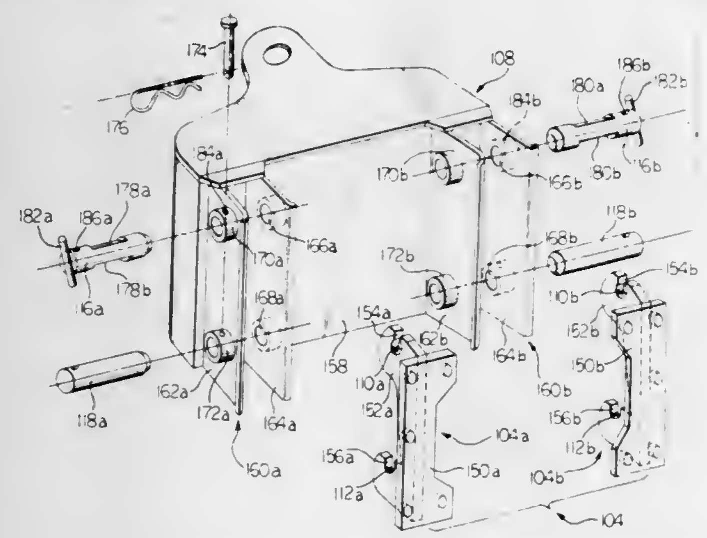
abutments projecting in a radial plane from the opposite side of the hook member and adapted for engagement in the laterally spaced recesses of a suspension bridge,
said shank and said hook member having portions abutting such that said shank and said hook member are coupled for angular movement about the axis of the pivot pin.

4,056,249
ENGINE MOUNTING APPARATUS
Masaharu Hashimoto, Hirakata, Japan, assignor to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan
Filed June 24, 1976, Ser. No. 699,580
Claims priority, application Japan, June 25, 1975, 50-87285[U]
Int. Cl.² F16F *15/00*
U.S. Cl. 248—9 **4 Claims**



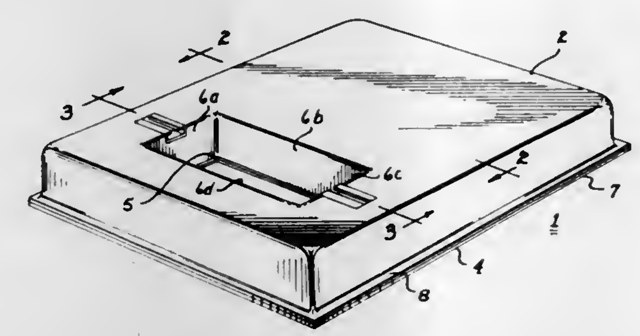
1. An engine mounting apparatus comprising a base frame having first, second and third holes formed therein;
a bracket for the engine mounted on said base frame, said bracket having first, second and third holes formed therein corresponding to said holes in said base frame;
a cushion rubber disposed between said base frame and said bracket said cushion rubber having first, second and third holes formed therein corresponding to said holes in said base frame, diameters of said holes in said cushion rubber being larger than those of the corresponding holes in said bracket;
a first bush having small and large diameter portions disposed in said first holes formed in said bracket and said cushion rubber; second and third bushes having small and large diameter portions with a shoulder formed therebetween, said second and third bushes disposed in said second and third holes formed in said bracket and said cushion rubber respectively wherein a first gap is provided between said base frame and said first bush and a second gap is provided between said bracket and shoulder portion of said second and third bush respectively;
a pin adapted to be set in said first hole formed in said base frame through said first bush; and
bolt means disposed in said second and third holes formed in said base frame through said second and third bushes thereby fastening said bracket to said base frame.

4,056,250
COUPLING DEVICE FOR MOUNTING A MATERIAL HANDLING MACHINE ON A CIVIL ENGINEERING VEHICLE
Kanji Uchiyama, Sagamihara, Japan, assignor to Caterpillar Mitsubishi Ltd., Tokyo, Japan
Filed Sept. 7, 1976, Ser. No. 720,861
Claims priority, application Japan, Nov. 18, 1975, 50-137755
Int. Cl.² F16M *11/04*
U.S. Cl. 248—14 **2 Claims**



1. A coupling device for mounting a material handling machine on a civil engineering vehicle comprising:
a first bracket assembly secured to said vehicle and including a pair of brackets, each having a base plate member and a coupling plate member which protrudes at a right angle to said base plate member, each of said coupling plate members having an upper pin-receiving concave seat with an upwardly opening locking first slot of a first predetermined width continuous therewith, and a lower pin-receiving concave seat with an upwardly opening second slot of a second predetermined width continuous therewith, said second width being relatively greater than said first width, and said coupling plate members being spaced apart in a horizontal direction;
a second bracket assembly secured to said material handling machine, said bracket assembly including a base plate member and pair of coupling means which protrude at a right angle from the base plate member, said coupling means each being bifurcated into two parts of coupling plate members which are disposed in horizontally spaced relation to each other, said coupling plate members each having upper and lower pin-attaching holes positioned in corresponding relation to said upper and lower pin-receiving concave seats, respectively, of said first bracket assembly;
a pair of upper pins having recessed surface means formed thereon, thereby providing the pins with middle portions having reduced widths which are slightly smaller than the predetermined width of said locking slots, said upper pins being formed with handles and being adapted to be inserted through said upper pin-attaching holes in said coupling plate members of said second bracket assembly; and
lower pins having circular cross sections throughout the entire lengths thereof and adapted to be inserted into said lower pin-attaching holes in said coupling plate members of said second bracket assembly.

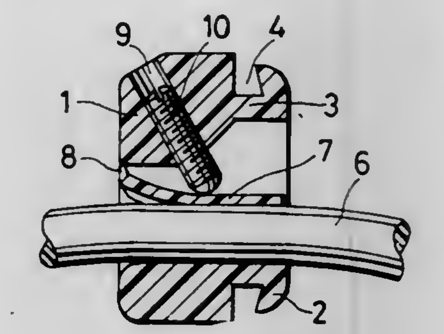
4,056,251
LIGHTWEIGHT PAD FOR SEMI-RIGIDLY SUPPORTING ELECTRICAL TRANSFORMERS
Jimmie D. Dixon, 7146 W. Bluefield, Peoria, Ariz. 85345, and Ralph C. McCannon, 3841 W. Vista Ave., Phoenix, Ariz. 85021
Continuation of Ser. No. 203,519, Dec. 1, 1971, abandoned, which is a continuation-in-part of Ser. No. 158,383, June 30, 1971, abandoned. This application May 6, 1976, Ser. No. 683,720
Int. Cl.² H02B *5/00;* **B65D** *19/24*
U.S. Cl. 248—19 **5 Claims**



1. A lightweight pad providing a semi-rigid vibration dampening support for maintaining an electrical transformer in spaced relation to a generally horizontal plane, said pad comprising in combination:
a. an integral, monolithic superstructure of synthetic, polymeric members, comprising:
i. a platform member for contactingly receiving said transformer;
ii. a base member parallel to said platform member, said base member having a plurality of spaced apertures therein;
iii. lateral wall members extending peripherally of said pad and enclosing the volume between said platform and said base member;
iv. a network of hollow, frusto-conical shaped members located between said lateral wall members and extending between said platform member and said base member, said frusto-conical shaped members tapering inwardly from said base member to said platform member and providing frusto-conical-shaped cells having open bases defined by the apertures in said base member and tops defined by, and integral with, said platform member; all of said members cooperating to define an internally disposed volume; said network of frusto-conical shaped members being substantially regular in pattern;
v. a transversely extending channel having opposing endwise openings through said base and said platform members to provide physical access between said transformer and said horizontal plane;
b. low density filler material substantially filling said internally disposed volume; and,
c. means for connectively receiving said electrical transformer in secured relation to said pad.

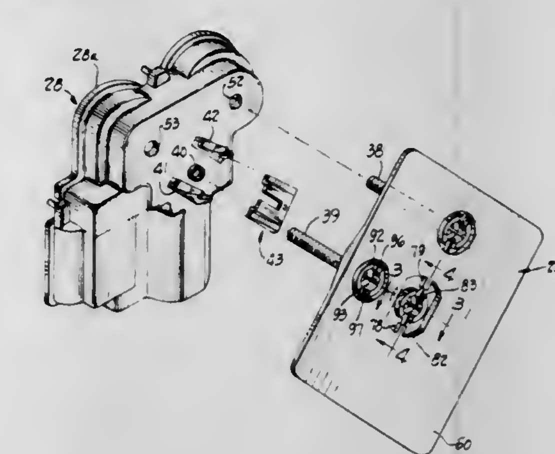
4,056,252
STRAIN-RELIEF BUSHING FOR CABLES AND THE LIKE
Hans Simon, Bruchausener Strasse 11, D-5463 Unkel (Rhine), Germany
Filed Apr. 10, 1975, Ser. No. 567,114
Claims priority, application Germany, Jan. 20, 1975, 2502050
Int. Cl.² F16L *5/00*
U.S. Cl. 248—56 **5 Claims**

1. A strain-relief bushing for a cable or the like extending through an opening in a wall of a casing and being subjected to a longitudinal tension force, said bushing comprising a circumferentially complete body of an uninterrupted cross-section having an internal axial passage therethrough, through which a cable is adapted to extend and having an internal wall extending through said passage substantially parallel to the axis thereof and being connected only at one end to the remainder of said body, said internal wall being of one piece with said body and being movable only in a direction transverse to said axis, said body having a pair of opposite circular groove portions on the outer surface thereof located in a substantially common plane in which parts of said casing wall about said opening are engaged, said body having a threaded bore extending therethrough and so arranged that its axis encloses an acute angle with said axis of said axial passage and intersects said common plane of said groove portions; and a threaded pres-



sure-exerting element extending through said bore and exerting pressure against said internal wall at said acute angle relative to the same and in a direction against said tension force to thereby press said internal wall against the cable and to press thereby one of said groove portions into a corresponding portion of said casing wall about said opening, creating thereby a reaction force which presses the opposite groove portion likewise into a corresponding portion of said casing wall to thereby clamp the cable in said axial passage and said bushing in said opening in said casing wall.

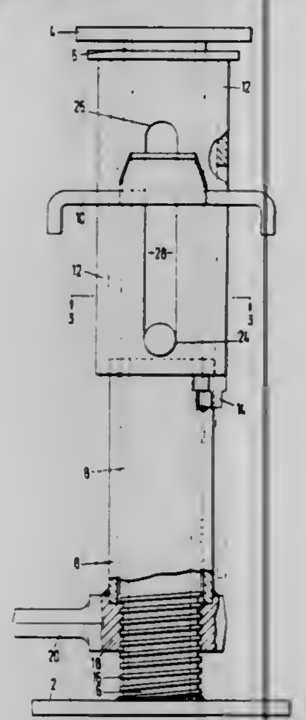
4,056,253
ADJUSTABLE MIRROR SUPPORT
Laszlo N. Repay, Chagrin Falls, and Thomas A. Young, Burton, both of Ohio, assignors to Tenna Corporation, Warrensville Heights, Ohio
Continuation-in-part of Ser. No. 470,569, May 16, 1974, Pat. No. 3,972,597. This application July 27, 1976, Ser. No. 709,161
Int. Cl.² A47G *1/24*
U.S. Cl. 248—479 **14 Claims**



1. A one piece back for supporting a mirror for pivotable adjustment relative to a support, said back having a plate portion and as an integral part thereof a central mounting stud, two screws, and means integral with the plate portion connecting each said stud and screws at one end thereof to the plate portion for universal pivoting, each said connecting means comprising (a) a first portion substantially rigid, received within an aperture of the plate portion and spaced from the periphery of the aperture, (b) first and second web portions on diametrically opposite sides of said first portion, between the first portion and the plate portion, rigid in the direction of plate thickness but each flexible about a common axis in the plane of said portion, and (c) a third web portion rigid in the direction of plate thickness and flexible about an axis parallel to the plane

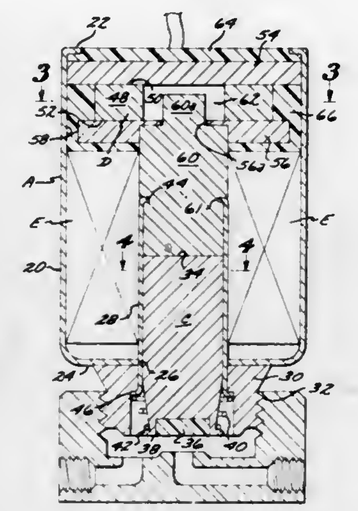
of said plate portion and perpendicular to said common axis, extending transversely of and located between said first and second web portions, at least partially surrounded by and integral with said first portion, and supporting the end of said respective stud or screw.

4,056,254
SUPPORTS OR CONCRETE FORMWORK
Jack Raymond Tooley, New Malden, England, assignor to Acrow (Engineers) Limited, London, England
Filed Jan. 19, 1976, Ser. No. 650,449
Claims priority, application United Kingdom, Jan. 20, 1975, 2418/75
The portion of the term of this patent subsequent to Oct. 28, 1992, has been disclaimed.
Int. Cl.^{2} E04G *17/14, 25/06*
U.S. Cl. 249—210 **5 Claims**



1. A fitment for a prop, said fitment being adapted to support at least one shuttering element of the type used with concrete formwork, said fitment being adjustable between a full support position, and preliminary and full strip positions, said fitment comprising
a shank connectable at one end to a prop,
a shuttering tube longitudinally slidable in coaxial relation with said shank, said shuttering tube mounting at least one shuttering support member thereon,
a support tube rotatably disposed in coaxial relation with said shank,
locater means carried partially on said support tube and partially on said shuttering tube, said locater means being operative in a first rotational position of said support tube to maintain said shuttering tube in said full support position and said locater means being inoperative to maintain said shuttering tube in said full support position when in a second rotational position of said support tube, said locater means permitting said shuttering tube to drop into said full strip position when in said second rotational position, and
screw threads on said shank and said support tube and connecting said shank and said support tube together in threaded relation, rotation of said support tube relative to said shank while said locater means is in said first rotational position causing said shuttering tube to move between said full support position and said preliminary strip position in response to said threaded relation between said shank and said support tube, and rotation of said support tube relative to said shank which causes said locater means to move into said second rotational position also permitting said shuttering tube to drop into said full strip position in response to the inoperativeness of said locater means at said second rotational position.

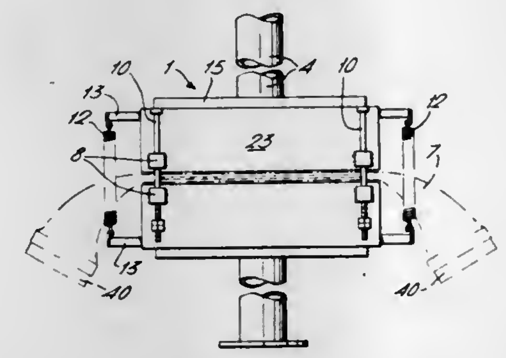
4,056,255
VALVE ACTUATOR
Donald A. Lace, 5041 Galway Circle, Huntington Beach, Calif. 92649
Filed May 8, 1975, Ser. No. 575,484
Int. Cl.^{2} F16K *31/08*
U.S. Cl. 251—129 **8 Claims**



1. In combination with a valve body having an intermediate passage that has a valve seat therein, said valve body having a fluid inlet and fluid outlet that are at all times in communication with said intermediate passage and said valve seat respectively, a device operable from a source of electric power for controlling the flow of fluid through said valve body, which device includes:
a. a housing assembly that includes a cylindrical shell formed of a material having substantial magnetic permeability, said shell having a first open end and a second closed end that has an opening formed therein, a tubular guide having first and second ends, which guide is longitudinally aligned relative to said shell and extends through said opening, and first means for securing said housing assembly to said valve body with said guide being axially aligned with said valve seat;
b. an elongate armature having first and second ends, with said armature being slidably mounted in said guide, and said armature being formed from a ferro-magnetic material having substantial permeability and low retentivity;
c. a resilient valve member on said second end of said armature that sealingly engages said valve seat when in a first position and in pressure contact therewith;
d. second means that at all times exert a first force on said armature in a direction that tends to move said armature to said first position;
e. a solenoid in said housing that extends around at least a portion of said guide, with said solenoid being capable of energization from said source of electric power;
f. permanent magnet means of fixed polarity in said housing, said permanent magnet means adjacent said first end of said shell, said fixed polarity being such that the direction of the major portion of the magnetic flux from said permanent magnet means is through said shell and armature to tend to hold said armature in a second position where said valve member is spaced from said valve seat and fluid may flow from said inlet to said outlet, with said magnetic flux being of sufficient strength to overcome said first force exerted by said second means when said armature is in said second position but now when said armature is in said first position; said permanent magnet means including:
1. a permanent transversely magnetized ring having first and second side surfaces;
2. first and second plates of a material having substantial magnetic permeability that are in abutting contact with said first and second side surfaces of said ring, said first plate in abutting contact with the interior of said shell, said second plate defining an air gap with the interior surface of said shell; and

3. a core of material having substantial magnetic permeability that projects from said second plate into the interior of said solenoid;
g. third means for momentarily nullifying the flow of said magnetic flux through said shell and armature to permit said second means to move said armature to said first position; and
h. fourth means for electrically energizing said solenoid when said third means is not operating that said magnetic flux from said permanent magnet means and the magnetic flux from said solenoid concurrently flow through said armature in the same direction and exert a second force on said armature that is greater than said first force to move said armature from said first to said second position.

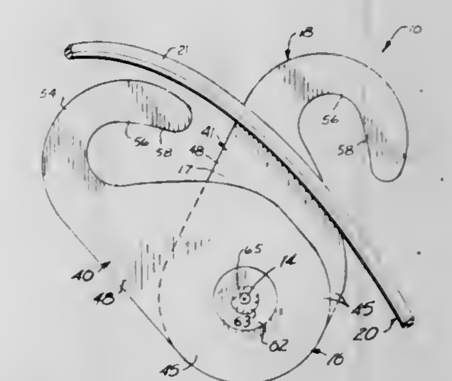
4,056,256
JACKING ASSEMBLY
Jack Banks Caisley, Corner Pine & Newport Sts., Ballina, N.S.W. 2478, Australia
Filed May 4, 1976, Ser. No. 683,142
Claims priority, application Australia, May 5, 1975, 1474/75; May 5, 1975, 1477/75; May 5, 1975, 1475/75; Feb. 27, 1976, 5029/76
Int. Cl.^{2} B66F *1/00*
U.S. Cl. 254—106 **17 Claims**



1. A fluid operated jacking assembly suitable for moving a load, in steps, axially of an elongated member the assembly comprising:-
two gripping parts adapted to be mounted at axially spaced positions on the member;
gripping devices mounted on each part and which grip the member in a way which allows relative axial movement in one direction only between the member and the parts;
fluid-pressure operated thrusting equipment for forcibly separating the two parts in response to the admission of a fluid under pressure to the equipment during a working stroke; and,
recovery means for forcing the two parts towards one another to execute a recovery stroke which follows the working stroke;
in which assembly said equipment comprises a flexible, inflatable, but non-elastic bag means shaped whereby, as it dilates, it progressively reduces its area of contact with the two parts in a way which causes the ratio of the jacking thrust to fluid pressure to diminish progressively as the two parts of the assembly move apart.

4,056,257
HOISTING TACKLE BLOCK ASSEMBLY
Howard E. Kaiser, P.O. Box 85, Kettle Falls, Wash. 99141
Filed Dec. 6, 1976, Ser. No. 747,720
Int. Cl.^{2} B66D *1/36*
U.S. Cl. 254—194 **4 Claims**

1. A hoisting tackle block assembly, comprising:
a sheave shaft;
a sheave mounted on the shaft for rotation about the shaft axis;
a first housing member supporting one end of the shaft and extending upward along one side of the sheave and over the sheave and terminating in an upper end;
a second housing member supporting the other end of the shaft and extending upward along the other side of the sheave and over the sheave and terminating in an upper end;
said upper ends of the housing members having complementary, angularly alignable connecting means for enabling the assembly to be connected to a supporting structure;
wherein the upper ends of the first and second housing members have hook shaped segments; each segment having hook openings facing in the same rotational directions; and

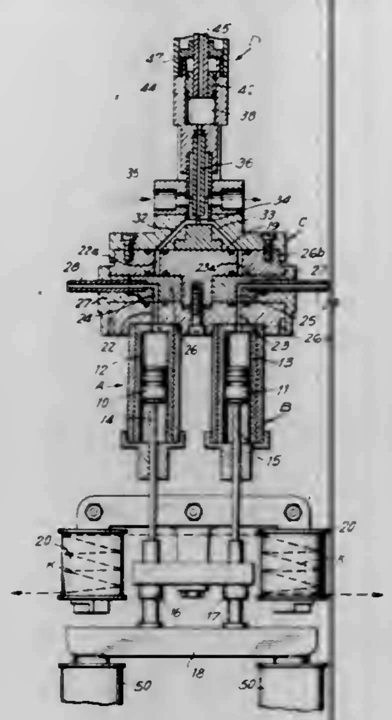


said first and second housing members being rotatable about the shaft axis with respect to each other for movement between (1) an operating position in which the first and second housing members are angularly aligned with each other forming a rope enclosing housing transversely over the sheave with the complementary connecting means being angularly aligned for use in connection with a supporting structure, and (2) a rope loading and unloading position in which the first and second housing members are angularly displaced with respect to each other enabling a looped section of a rope to be easily mounted over or removed from the sheave.

4,056,258
ACTUATING DEVICE WITH ELECTRONIC CONTROL FOR INJECTORS OF LIQUID MIXERS
Paolo Papoff; Basilio Morelli, and Dante Guidarini, all of Bari, Italy, assignors to Centro Nazionale Delle Richerche, Rome, Italy
Continuation-in-part of Ser. No. 541,321, Jan. 15, 1975, abandoned. This application Dec. 8, 1976, Ser. No. 749,391
Int. Cl.^{2} B01F *15/00*
U.S. Cl. 366—160 **12 Claims**

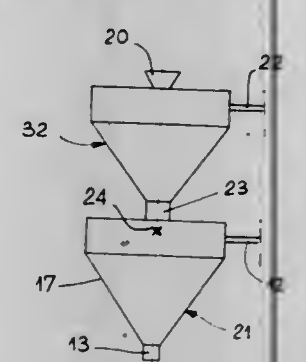
1. A device for actuating injectors of liquid mixers of the type used in chemical/physical analysis, in particular according to the so-called stopped-flow method, for treating small amounts of the liquids in the range of a few cubic centimeters, comprising, in combination: dual injector devices having pistons that are operatively connected, by the intermediary of connecting means, the latter including a keeper of at least one electromagnet for simultaneous operation, while chambers of corresponding cylinders are selectively connectable, through a commutable intercepting member, with feeding conduits for

the liquids to be mixed, and with at least one mixing chamber; and electronic control means for feeding an electric supply



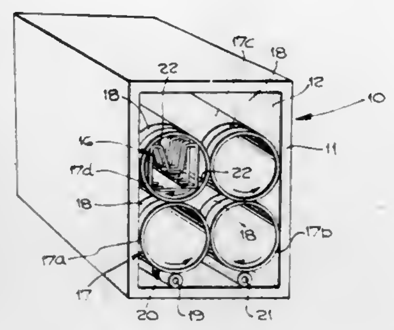
voltage to said at least one electromagnet, which voltage has a stepwise controllable value and duration.

4,056,259
PROCESS AND APPARATUS FOR THE CONTINUOUS PREPARATION OF A MIXTURE FOR FOUNDRY MOLDS OR THE LIKE, WITH FORMATION OF A PREMIX
Gerard Y. Richard, Precy sur Oise, France, assignor to Societe d'Applications de Procedes Industriels et Chimiques S.A.P.I.C., France
Filed Mar. 1, 1976, Ser. No. 662,806
Claims priority, application France, Mar. 3, 1975, 75.06564
Int. Cl.^{2} B01F *7/16, 15/00, 15/02*
U.S. Cl. 366—15 **12 Claims**



1. Apparatus useful for the malaxation of a charge and one constituent of the two constituents of a binder-hardener system to form a pre-mix followed by admixture of said pre-mix with the other constituent of said two constituents of said binder-hardener system, which apparatus comprises first malaxation means for forming a homogeneous pre-mix of said charge and said one constituent, second malaxation means embodying agitator means operable to obtain intimate and homogeneous admixture of said pre-mix and said other constituent within a few seconds followed by immediate evacuation of the resultant mixture from said second means, at least said second means being characterized by a mixing vessel having a cylindrical or conically tapered inner wall, a drive shaft extending coaxially in said vessel, a plurality of arms extending radially from said shaft, and a hammer on the radially outer end of each arm, said hammers respectively having a clearance with said inner wall, as they orbit upon rotation of said shaft, of only a few millimeters to provide thin film malaxation of the constituents of said resultant mixture.

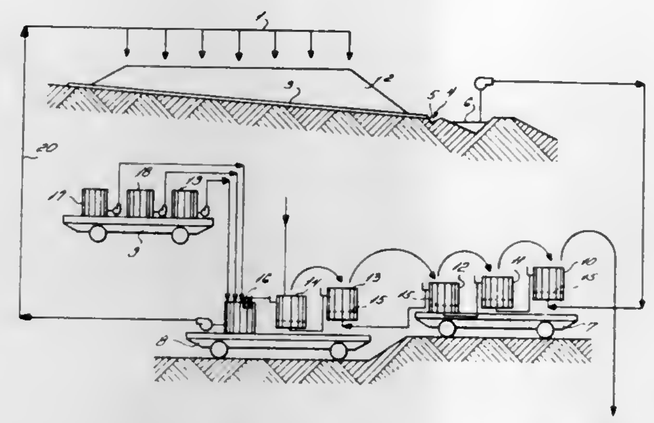
4,056,260
ENVIRONMENTAL PLATELET AGITATOR
Melvin J. David, 16221 Quemada Road, Encino, Calif. 91314
Filed Oct. 4, 1976, Ser. No. 729,372
Int. Cl.^{2} B01F *9/04*
U.S. Cl. 366—144 **10 Claims**



10. An environmental platelet solution agitator for use with platelet solution packets comprising:
a. an insulated enclosure having an interior compartment;
b. cooling means for maintaining the interior compartment of said enclosure at a predetermined temperature coupled to said enclosure;
c. cylindrical members having a cylindrical inner cavity and an outer cylindrical surface being disposed within the interior compartment of said housing, the longitudinal axis of said cylindrical member being in a horizontal plane;
d. frictional transfer belts secured about the outer surface of each of said cylindrical members, each of said cylindrical members being aligned within said enclosure in abuttment with adjacent cylindrical members, the frictional transfer belt secured about adjacent cylindrical members being in frictional contact with one another;
e. rotating power means for providing a source of rotary power disposed within the interior compartment of said enclosure and being coupled to said frictional transfer means;
f. platelet packet containers comprising a plurality of separator elements, each of said separator elements being substantially the same shape as said platelet packet, each of said separator elements being coupled in parallel spaced relation to each other, each pair of adjacent separator elements defining a cell therebetween for receiving a platelet packet, said coupling of said separator elements leaving an opening to each cell sufficient for insertion of a platelet packet, and further including cover means for closing the opening to the cell coupled to a terminating separator element of said container, each of said separator elements being disposed at a uniform oblique angle with respect to an axis directed along said coupled separator element, said platelet packet container being securely disposed within the interior cavity of respective ones of said cylindrical members; and
g. rotary power means for providing a source of rotary power disposed within the interior compartment of said interior enclosure and being coupled to said frictional transfer belts whereby said cylindrical members and said platelet packet containers are rotated at an angular velocity synchronious to said rotary power means.

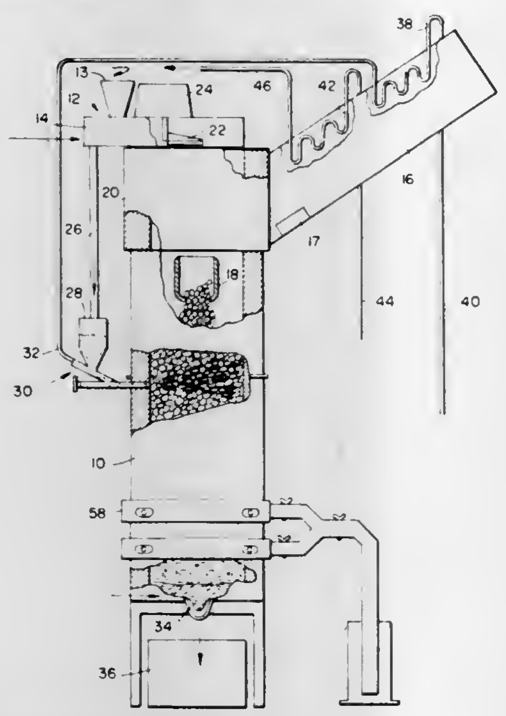
4,056,261
RECOVERY OF GOLD AND SILVER FROM MINE-RUN DUMPS OR CRUSHED ORES USING A PORTABLE ION-EXCHANGE CARBON PLANT
Robert M. Darrah, P.O. Box "5", Cool, Calif. 95614
Filed Feb. 17, 1976, Ser. No. 658,551
Int. Cl.^{2} C22B *3/02*
U.S. Cl. 266—101 **4 Claims**

1. System for recovering at least one of gold and silver from mine run dumps or crushed ores containing at least one of gold and silver, comprising an inclined surface for supporting a heap of the mine-run dumps or crushed ores, means for distributing an alkali and cyanide containing aqueous solution onto the heap, a storage zone for the resulting pregnant solution arranged to collect the run-off of the solution from the inclined surface, a plurality of activated carbon loaded ion exchange vessels mounted on mobile support means, the activated carbon being supported on a punchplate distributor in each of the



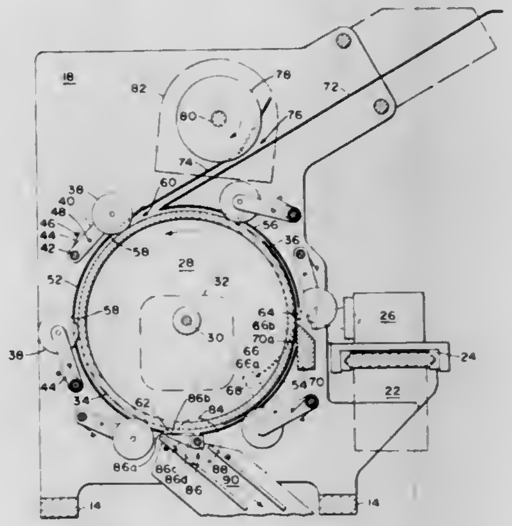
vessels, conduit means for feeding the pregnant solution upwardly through the punchplate distributor supporting the activated carbon, the upward velocity of the solution maintaining the carbon in a teetered state and serially feeding the pregnant solution through the vessels thereby to strip the gold and silver values from the solution, and conduit means for recycling resulting barren solution for distribution onto the heap.

4,056,262
CUPOLA FURNACE TO ENABLE CONTINUOUS SMELTING AND REFINING OF CEMENT COPPER AND METHOD THEREFOR
Douglas Pollock; Omar Sobarzo; Rolando Urquizar; Carlos Vilches, and Jaime Bolanos, all of Santiago, Chile, assignors to Compania de Acero del Pacifico S.A., Santiago, Chile
Filed June 28, 1976, Ser. No. 700,217
Int. Cl.^{2} C22B *15/02*
U.S. Cl. 266—138 **8 Claims**



1. A shaft kiln comprising:
an upper gas chamber;
an intermediate stack zone including coke-charging means;
a lower hearth zone including air-injecting tuyeres;
charge preheating means utilizing sensible heat from said upper gas chamber;
pneumatic charge injecting means adapted to inject said preheated charge into said intermediate zone;
gas off-take means in communication with said gas chamber; and
heat exchange means within said off-take means.

4,056,263
DRUMLESS PAPER TRANSPORTER
Eric L. LaWhite, South Royalton, Vt.; Ernest G. Henrichon, Jr., Wellesley Hills, and Harvey J. Bloom, Bellingham, both of Mass., assignors to Xicon Data Entry Corporation, Newton Upper Falls, Mass.
Continuation-in-part of Ser. No. 477,809, June 10, 1974, Pat. No. 3,941,375. This application Dec. 11, 1975, Ser. No. 639,802
Int. Cl.^{2} B65H *9/16*
U.S. Cl. 271—3 **5 Claims**



1. A transporter of a sheet of paper for use in conjunction with an optical character reader having a pick-up head that translates along a first direction, comprising in combination,
a hub rotatable about its central longitudinal axis and extending along said axis for a distance substantially less than the length of the sheet, said axis being aligned in said first direction,
a reference edge located proximate one end of said hub lying in a plane substantially transverse to said axis,
means for rotating said hub,
a plurality of rollers that engage the periphery of said hub and hold the sheet on said periphery, said rollers being canted towards said reference edge in the direction of said rotation to dynamically adjust the sheet, said hub, rollers and reference edge cooperating to hold the sheet in a spaced relationship with said pick-up head as it rotates, supported on said hub, along a generally cylindrical path,
a plurality of guards spaced closely from the periphery of said hub and substantially encircling the sheet at least in the region about said hub to maintain the sheet in said generally cylindrical path as it rotates on the hub, said guards being spaced from one another to form input and output slots and a viewing slot that each extend in said first direction, and
a flexible brush located interior to said cylindrical path having a free edge extending in said first direction and proximate said viewing slot, said free edge engaging the surface of said sheet opposite said pick-up head to control said spacing between said pick-up head and said sheet along the length of said paper in said first direction.

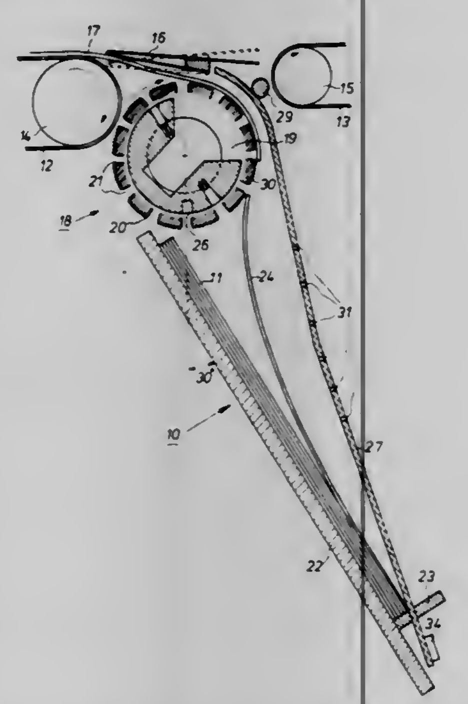
4,056,264
STACK FORMING DEVICE
Alfons Leon Dhooge, Zwijndrecht, and Joseph Marie Cappuyns, Berchem, both of Belgium, assignors to AGFA-GEVAERT N.V., Mortsel, Belgium
Filed Apr. 26, 1976, Ser. No. 680,370
Claims priority, application United Kingdom, Apr. 28, 1975, 17566/75
Int. Cl.^{2} B65H *29/22, 29/24*
U.S. Cl. 271—177 **6 Claims**

1. A sheet stacking device for stacking a plurality of sheets delivered in sequence, comprising
a stack supporting platform,
a driven substantially continuous traction surface having an

arcuate peripheral region disposed above one end of said platform with the lower side thereof proximate to said platform, said traction surface being aligned to engagingly contact the under face of a sheet to be stacked and by its movement to positively propel the sheet forward in a delivery direction,

delivery means for delivering a sheet to be stacked to a point on a portion of said arcuate peripheral region of said traction surface generally opposite said platform end,

stop means at the other end of said stack supporting platform for arresting and aligning the delivered sheets into a stack, said stop means and said rotary traction peripheral surface region being spaced apart at their closest points a distance less than the sheet length whereby the trailing sheet edge remains in engagement with said traction surface after the leading edge thereof has been arrested by said stop means and until said trailing edge has been displaced past said traction surface region by the continued movement of said



traction surface to thereby positively propel said trailing sheet edge against said stack,

guide means defining a delivery passageway with said generally opposite portion of said traction surface peripheral region and extending in spaced relation to said platform to a point at least adjacent said stack stop means, said guide means comprising an array of discrete elongated hollow members each extending with its length generally parallel to the sheet delivery direction, the individual members being spaced apart at plural points transverse of the sheet delivery direction, said hollow members having holes facing toward said stack for transmitting air under pressure toward said platform to bias a sheet being propelled by said traction surface toward said platform, and

means adjacent the lower side of said traction surface peripheral region proximate said platform end for directing a flow of air generally in the direction of the surface of said sheet stack to cushion the delivery of an on-coming sheet onto said stack.

4,056,265
MACHINE FOR INDOOR RUNNING

Azuma Ide, 5-213 go, 33-ban, 2-chome, Takashimadaira, Itabashi, Tokyo, Japan
Filed Oct. 12, 1976, Ser. No. 731,219
Claims priority, application Japan, July 14, 1976, 51-83870
Int. Cl.^{2} A63B *23/04*
U.S. Cl. 272—70 **1 Claim**

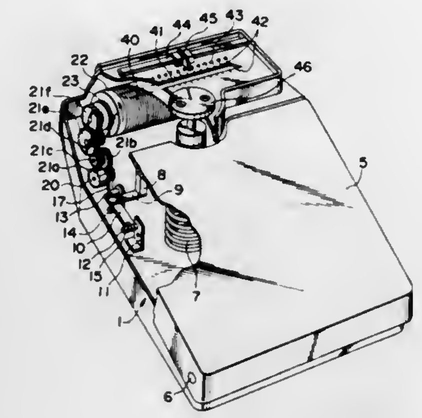
1. An indoor running machine comprising:

a machine body having a drum accommodating section formed at its front edge;

a vertically movable footboard provided on top of the body on the rear end side of said drum accommodating section and spring biased in the upward direction;

a ratchet gear provided within the body and means associated with said movable footboard and body adapted to rotate said ratchet gear pitch by pitch with the vertical movement of said footboard; and

a rotary drum provided within the drum accommodating section of the body and adapted to be coupled to the rotation of the ratchet wheel by means of a series of large and small transmitting gears,

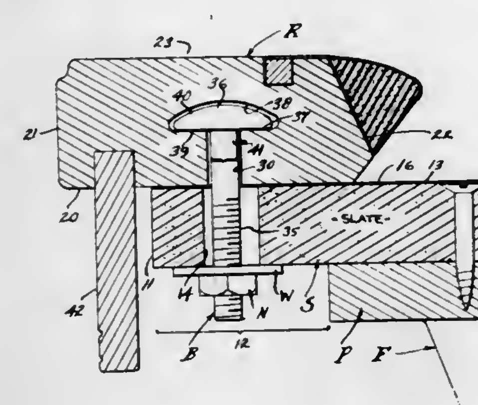


the outer periphery of said rotary drum being provided with a colored indicating surface of increasing width from one end to the other end in the direction of the axis opposite to the direction of rotation,

the top of said drum accommodating section positioned directly above said rotary drum being provided with an display window of a slit-like form along the axial direction of the rotary drum, said display window being provided with running distance indicating graduations permitting the rate of increase of the colored indicating surface appearing on the display window with the rotation of said rotary drum to be read out in terms of the rnning distance.

4,056,266
ADJUSTABLE BILLIARD TABLE RAIL CONSTRUCTION

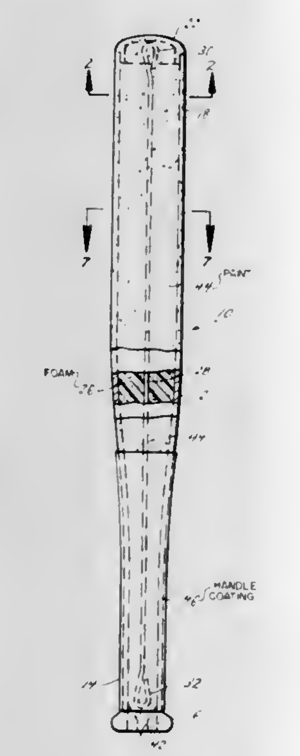
Torben W. Gramstrup, 1946 W. 130th St., Gardena, Calif. 90249
Filed Dec. 24, 1975, Ser. No. 644,301
Int. Cl.^{2} A63D *15/00*
U.S. Cl. 273—9 **7 Claims**



1. A hidden hold-down and replaceable adjustable rail construction for billiard tables and the like, and including; a platform with an overlying surface member having a marginal portion with openings therethrough, at least one replaceable rail shiftably engageable over said marginal portion and comprising an elongated member having an imperforate top and a flat bottom seated upon the surface member and with a channel longitudinally coextensive with and entering the bottom and having a lateral enlargement defining an upwardly faced seat longitudinally coextensive therewith, and hold-down bolts and each with a first member slideable into the channel to engage downwardly upon said seat and one bolt for positioned alignment within each of said openings in the surface member to extend through and project downwardly from the surface member, said bolts having shanks substantially smaller in diameter than the size of any of said openings through said surface member for selective placement of the rail, there being a second member operable by each of the bolts to engage upwardly beneath said surface member to hold said placement of the rail.

4,056,267
DIE CAST BAT WITH ROD

George H. Krieger, St. Louis, Mo., assignor to St. Louis Diecasting Corporation, Bridgeton, Mo.
Continuation-in-part of Ser. No. 468,815, May 10, 1974, abandoned, which is a continuation-in-part of Ser. No. 549,701, Feb. 13, 1975, abandoned. This application May 11, 1976, Ser. No. 685,168
Int. Cl.^{2} A63B *59/06*
U.S. Cl. 273—72 A **9 Claims**



1. A die cast porous metal bat having a unitary skin and a foam center, the major portion of the bat being an elongated die cast porous metal blank having a handle and a barrel, the remaining portion being a die cast porous metal cap, the cap and blank being joined at the barrel end of the blank and fixed together by a substantially non-porous weld seam, the cap portion having a sleeve which projects into the interior of the blank beyond the weld seam and lies closely adjacent to the interior of the blank and reinforces the barrel end of the blank, the handle end of the bat having walls defining an opening into the interior of the bat, and the interior of the bat being filled with a resilient foam material.

4,056,268
APPARATUS FOR MOTORCYCLE POLO GAME

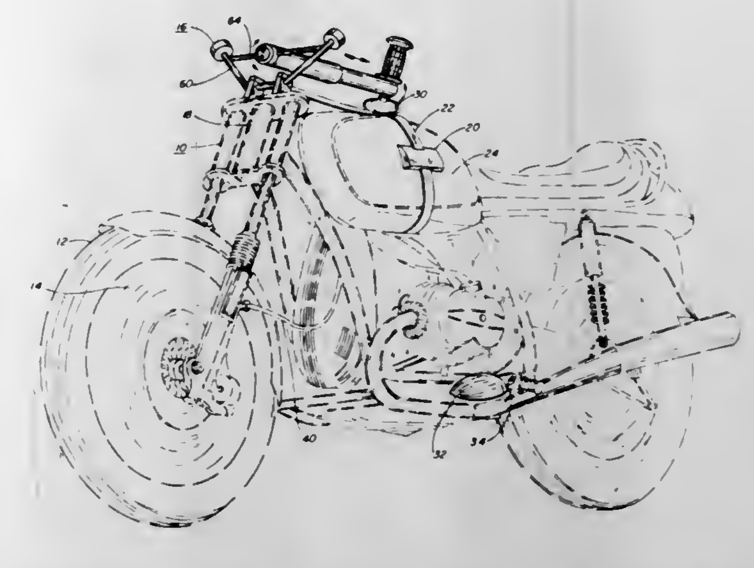
Thomas R. Connor, and Shirley A. Connor, both of 5626 Putnam Drive, W. Bloomfield, Mich. 48033
Continuation-in-part of Ser. No. 577,305, June 9, 1975, abandoned. This application Apr. 16, 1976, Ser. No. 677,578
Int. Cl.^{2} A63B *71/02;* **A63C** *19/12;* **B60K** *41/20;* **B62D** *61/02*
U.S. Cl. 273—118 R **5 Claims**

1. Apparatus for motorcycle polo game comprising in combination:

a. center lever steering means mounted on a motorcycle's steering post for steering with one hand;

b. player stabilizer means fixed between a motorcycle's saddle and steering post for stabilizing player as he strikes at a ball;

c. feet operated control means operably connected to a motorcycle's motor and brakes for controlling said motorcycle's motion other than steering; and



d. cooperating traction means mounted on a motorcycle and a playing field for increasing the traction therebetween without destroying the playing field surface.

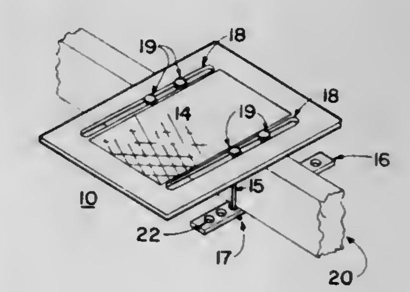
4,056,269
HOMOGENEOUS MOLDED GOLF BALL

Duncan H. Pollitt, Titusville, and Murray H. Reich, Princeton, both of N.J., assignors to Princeton Chemical Research, Inc., Princeton, N.J.
Filed May 4, 1972, Ser. No. 250,147
Int. Cl.^{2} A63B *37/06;* **C08F** *279/02;* **C08K** *3/10, 5/09*
U.S. Cl. 273—218 **12 Claims**

1. In a homogeneous molded golf ball having the density and click and rebound required in a golf ball and comprising filled cis-polybutadiene elastomer highly cross-linked into a three dimensional network with long, flexible cross-links formed of a polymerized cross-linking monomer, the improvement wherein said cross-linking monomer comprises a polyvalent metal salt of an unsaturated acid and is present in about 0.046 to 0.41 equivalents per mole of elastomer base whereby said comonomer simultaneously functions as said filler at least in part, said ball in addition to said filler-functioning cross-linking monomer containing up to about 30 parts of a further filler per 100 parts by weight of said elastomer, the amount of said further filler being sufficient to impart to said golf ball a weight of about 1.500 to 1.620 ounces.

4,056,270
DEMOUNTABLE BOAT TRAILER STEP

Kenneth Greenfield, 2723 Hillcrest Lane, Caldwell, Idaho 83605
Filed July 2, 1976, Ser. No. 702,182
Int. Cl.^{2} B60R *3/00*
U.S. Cl. 280—166 **3 Claims**



1. A demountable boat trailer step, which comprises:

a substantially rectangular foot plate having oppositely disposed planar surfaces, the bottom surface of said plate engaging the top surface of a boat trailer frame member, said plate having a pair of parallel slots extending substantially the full width of said plate and adapted to receive

bolts for allowing horizontally transverse movement of said plate relative to the frame member;

a plurality of bolts extending through the slots and having head portions contacting the top surface of said foot plate;

a pair of clamp bars, each having a plurality of holes, equally spaced, through which said bolts extend, said clamp bars adapted to engage the underside of a trailer frame member; and

means engaging the ends of said bolts for securing said clamp bars to said bolts.

4,056,271

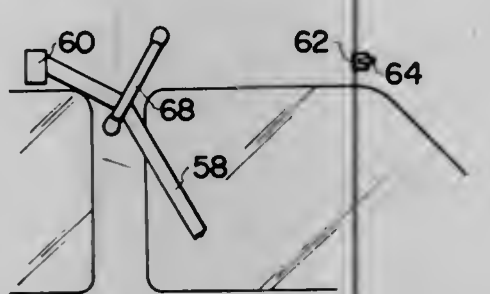
VEHICLE OCCUPANT RESTRAINING BELT WITH DEVICE TO PROVIDE AN ARRANGEMENT IN WHICH SHOULDER BELT IS PREVENTED FROM TOUCHING SEATED OCCUPANT'S NECK

Yoshihisa Imabuchi; Kenshi Kurami; Yoshinori Akiyama, and Katsunobu Sobajima, all of Yokohama, Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan

Division of Ser. No. 613,419, Sept. 15, 1975. This application Oct. 22, 1976, Ser. No. 734,886

Int. Cl.² B60R *21/02*

U.S. Cl. 280—745 **1 Claim**



1. In a vehicle having a vehicle body including a floor and a roof defining an occupant compartment in which is mounted a vehicle seat accessible through a vehicle door opening selectively opened and closed by a vehicle body door whose front edge is pivotally secured to the vehicle body;

an occupant restraining belt arrangement comprising:

a lap belt having one end fixed adjacent a lower inboard portion of the door;

a first inertia retractor mounted adjacent a lower inboard portion of the seat and receiving the other end of said lap belt;

a shoulder belt having one end secured to an intermediate portion of said lap belt between said one end and the other end thereof;

a second inertia retractor mounted on the roof within the occupant compartment adjacent an outboard upper rear portion of the seat;

a belt hanger fixedly mounted on the vehicle body within the occupant compartment forward and above the seat and having a hook, said hook having an operative position in which when said shoulder belt is manually hanged on said hook, said hook receives said shoulder belt;

drive means for moving said hook from the operative position to an inoperative position in which said hook will release said shoulder belt therefrom;

control means for actuating said drive means to move said hook from the operative position to the inoperative position upon closure of the door with the seat occupied; and

a channel member mounted to the roof within the occupant compartment, said channel member slidably receiving an intermediate portion of said shoulder belt, to provide an arrangement in which said shoulder belt extends diagonally across the chest of a seated occupant without touching the neck thereof when said shoulder belt is in its occupant restraining position.

4,056,272

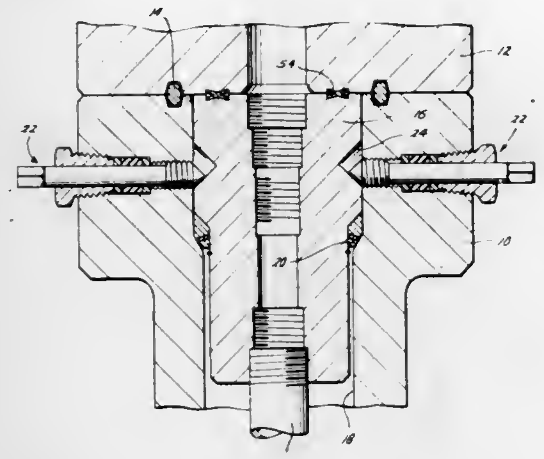
SEAL

Charles Donovan Morrill, 5003 Holly, Bellaire, Tex. 77401

Continuation-in-part of Ser. No. 447,141, March 1, 1974, abandoned. This application Sept. 10, 1975, Ser. No. 611,860

Int. Cl.² F16L *21/00*

U.S. Cl. 285—140 **15 Claims**



1. Well pipe suspension apparatus comprising:

a wellhead,

a well pipe,

pipe hanger means carried within said wellhead for supporting said well pipe,

opposing tapered annular support shoulders on said pipe hanger means and said wellhead supporting said pipe hanger means in said wellhead,

said support shoulders being separated forming an annular space,

an annular metal gasket in said annular space between said support shoulders,

said gasket having inner and outer circumferential edges,

one edge of said gasket sealingly engaging one of said tapered support shoulders of said pipe hanger means and said wellhead, and

the other edge sealingly engaging the other of said pipe hanger means and said wellhead.

4,056,273

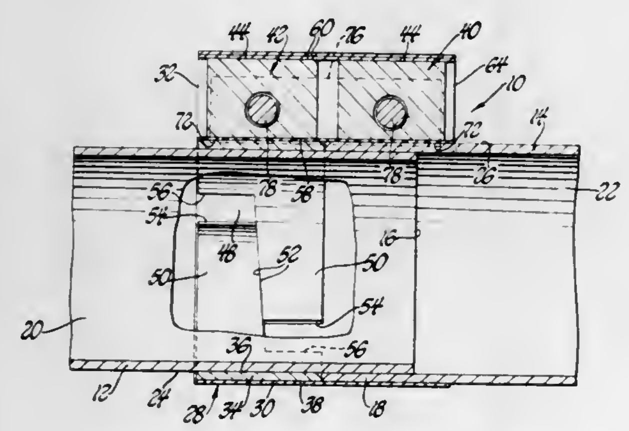
COUPLING FOR PIPE LAP JOINTS

Thomas R. Cassel, 226 Shirley, Birmingham, Mich. 48009

Filed Dec. 8, 1976, Ser. No. 748,423

Int. Cl.² F16L *21/06*

U.S. Cl. 285—337 **10 Claims**



1. A coupling for connecting and sealing inner and outer pipes having respective inner and outer surfaces and ends that lap each other at a joint where the inner pipe is received within the outer pipe in a telescoped relationship, the coupling comprising: a coupling band having a roundish sleeve portion extending about the pipe ends and a radially projecting channel portion connected to the sleeve portion and cooperating therewith in encircling the pipe ends while extending axially from the outer pipe end over the inner pipe; a seal ring received within the sleeve portion of the band so as to be adaptable to butt against the outer pipe end and having inner and outer surfaces for forming an axial continuation of the inner and outer surfaces on the outer pipe; first and second axially spaced reaction members received within the channel portion of the band in respective axial alignment with the outer pipe end and the seal ring; said reaction members having outer surfaces that respectively form circumferential continuations of the outer surfaces on the outer pipe end and the seal ring in a spaced relationship to the band channel portion; said band having an inner surface whose combined circumferential length about the sleeve and channel portions thereof is less than the combined circumferential length of the outer surface on the outer pipe end and the outer surface on the first reaction member; the combined circumferential length of the inner surface of the band about the sleeve and channel portions thereof also being less than the combined circumferential length of the ring outer surface and the outer surface on the second reaction member when the ring has the inner surface thereof engaged with the outer surface on the inner pipe; and force applying means for engaging the inner surface of the band at the channel portion thereof with the outer surface of the reaction members to stretch the band sleeve portion over the seal ring and the end of the outer pipe and provide a clamped relationship thereof that connects and seals the pipes.

4,056,274

VEHICLE SLIDING ROOF CONSTRUCTION

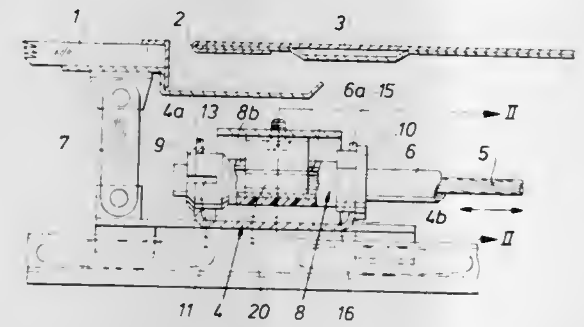
Hans Jardin, Krailling, Germany, and Jack Auzannet, Conflans Ste., Honorine, France, assignors to Webasto-Werk W. Baier KG, Germany

Filed Dec. 16, 1975, Ser. No. 641,283

Claims priority, application Germany, Dec. 21, 1974, 2461018

Int. Cl.² B60J *7/10*

U.S. Cl. 296—137 G **13 Claims**



1. A vehicle sliding roof construction with a rigid sliding roof articulated to transport bridge, the bridge being U-shaped in cross-section, a driving cable rigid under compression slidably received or guided in a longitudinally slotted pipe mounted on the fixed roof portion, the pipe slidably receivable in the tubular body fixed to the transport bridge at least when the roof is in the open position, the tubular body comprising a longitudinally slotted plastic member which passes through the arms of the transport bridge, the tubular body having means securing the body to the said transport bridge so that the tubular body cannot rotate and become axially displaced, means fixing the driving cable to the transport bridge within the same comprising a clamping collar fixed on the cable and having cross bars projecting through and beyond the longitudinal slots of the pipe and of the tubular body.

4,056,275

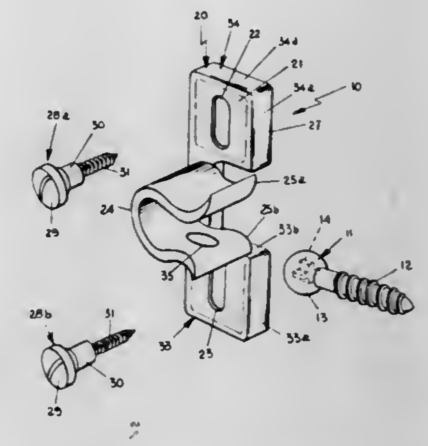
CLOSURE CATCH ASSEMBLY

Miner S. Keeler, II, Grand Rapids, Mich., assignor to Keeler Brass Company, Grand Rapids, Mich.

Filed Aug. 30, 1976, Ser. No. 718,677

Int. Cl.² E05C *19/02*

U.S. Cl. 292—17 **6 Claims**



1. A fastener for a cabinet or the like, comprising:

an elongated strike component including a head portion and a threaded screw portion for mounting and adjusting the position of said head portion;

a catch component including a substantially flat, elongated base member having an elongated, longitudinal screw receiving slot extending through said base member, said base member having a flexible, screw engaging means surrounding the perimeter of said slot for providing a biasing force restraining longitudinal movement of said base member, and an integral catch member projecting substantially perpendicularly from said base member;

said catch member having a pair of opposing flanges extending forwardly from a connecting rearward portion thereby defining an interior cavity, intermediate said flanges and said rearward portion, opening through both sides of said catch member, for receiving said head portion of said elongated strike component; and

a mounting screw for passing through said screw receiving slot, said mounting screw having stop means for limiting travel of said mounting screw into the cabinet and slot engaging means for engaging said screw engaging means and thereby deforming the perimeter of said slot.

4,056,276

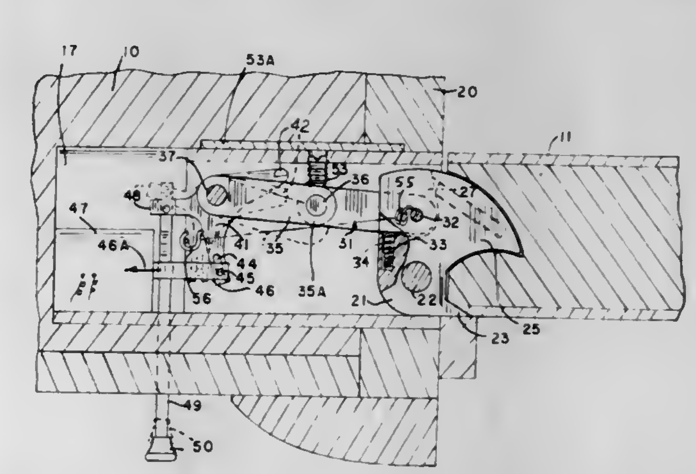
DOOR LOCK

Kenneth W. Jarvis, 5900 Columbus Ave. South, Minneapolis, Minn. 55417

Filed Apr. 5, 1976, Ser. No. 673,403

Int. Cl.² E05C *3/16*

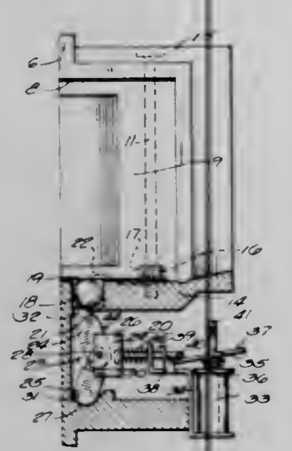
U.S. Cl. 292—201 **14 Claims**



1. A door lock device for use with a door frame member and movable door member comprising a housing mountable in one of said members, the other of said members having a receptacle in an edge adjacent said lock device, a latch bolt pivotally

mounted to said housing about a generally upright axis when installed, said latch bolt being pivotally movable from a retracted position to a locked position, means associated with said latch bolt operable to cause pivoting of said latch bolt as a door to be latched is moved toward a closed position whereby portions of said latch bolt protrude from said housing and into the receptacle in said other member, an elongated tension coil spring means having one end connected to said housing and the other end connected to said latch bolt and urging said latch bolt to retracted position, toggle linkage means mounted inside said housing including a first link pivotally mounted to said latch bolt at a position spaced from the pivot between said latch bolt and said housing and a second link, pivot means pivotally mounting said second link to said first link at an opposite end of said first link from the pivot mounting to said latch bolt, and said second link also being pivotally mounted to said housing at an opposite end thereof from its pivotal mounting to said first link, said toggle linkage means being in a folded position when said latch bolt is in an unlatched position, and moving to a locked position wherein the pivot axis formed by the pivot means between the first and second links is generally adjacent to a plane defined by the pivots between the first link and the latch bolt and the second link and the housing to resist pivoting of said latch bolt from its latched to its unlatched position from loads on the latch bolt, and actuator means including an actuator member movable from a first position to a second position, and to exert a mechanical force on said toggle linkage means at a location between the pivot of the second link to the housing and the pivot of the first link to the latch bolt when the linkage is in locked position and to mechanically move said toggle linkage means toward folded position and permit the latch bolt to move to unlatched position.

4,056,277
ELECTRIC STRIKE
Abraham Gamus, Chomeday, and Zoran Knecevic, Montreal, both of Canada, assignors to Unican Security Systems, Ltd., Montreal, Canada
Filed Oct. 5, 1976, Ser. No. 729,647
Int. Cl.² E05C ***19/16***
U.S. Cl. 292—341.16 **15 Claims**



1. In a door lock of the character described wherein a remotely controlled strike tongue in an edge portion of the door frame has a part thereof providing a keeper for an outwardly biased bolt projecting from an edge of the door, wherein said strike tongue is a rigid member located in a cavity in a housing that is secured in said portion of the door frame and is mounted therein for rotation about an axis parallel to said portion of the door frame to and from an operative position to which it is yieldingly biased and in which the part thereof that forms the keeper is engaged with the bolt to hold the door closed, said rigid member and a wall of said housing cavity in which it is located having contiguous surfaces transverse to said axis, that slide across one another during rotation of the rigid member, so that projection across the interface between said contiguous surfaces of a stop member mounted in the housing, into a socket in the rigid member that opens to its respective one of said contiguous surfaces while the rigid member is in its operative position, locks a closed door against unauthorized opening, the improvement which comprises:

A. the housing having
  1. a passage leading from its said cavity to a mouth that opens to the interface between said contiguous surfaces at a point in line with said socket in the strike tongue when the latter is in its operative position, and
  2. means providing a fulcrum substantially in line with and remote from said passage;

B. a toggle linkage having inner and outer legs pivotally connected by a knee joint, said toggle linkage being located in said cavity of the housing with the extremity of its inner leg supportingly engaged with said fulcrum and the extremity of its outer leg adjacent to said passage and movable towards and from the mouth thereof as the toggle linkage is respectively straightened and collapsed;

C. mean at the extremity of the outer leg of the toggle linkage providing said stop member and projecting across the interface between said contiguous surfaces into the socket in said rigid member when the toggle linkage is in a substantially straightened extended condition;

D. biasing means yieldingly urging the toggle linkage towards its straightened condition and in one direction beyond its dead center condition;

E. the interengaging surfaces of said socket and said means at the extremity of the outer leg of the toggle linkage being shaped to provide a wedging action that translates torque applied to said rigid member by opening force exerted upon the closed door into toggle collapsing force;

F. means defining a stop to support said toggle linkage in said slightly beyond dead center condition and thereby resist any collapsing force applied to the toggle linkage by the aforesaid wedging action; and

G. remotely actuatable means operatively connected with the knee joint of the toggle linkage for moving the same across dead center in the direction opposite to that in which said biasing means urges the same to thereby initiate collapse of the toggle linkage.

4,056,278
SCOOP DEVICE
Marcel Bau, 89 Van Ness Court; Larry D. Hinkes, 45 Van Ness Court, both of Maplewood, N.J. 07040, and James Cosgrave, 57 Norwood St., Newark, N.J. 07106
Continuation-in-part of Ser. No. 634,821, Nov. 24, 1975. This application July 1, 1976, Ser. No. 701,615
Int. Cl.² A47F ***13/06***
U.S. Cl. 294—19 R **5 Claims**

1. An apparatus for retrieving waste material comprising:

a. an outer tubular shaft having at one end thereof a U-shaped handle end and at the opposite end thereof a distal end;

b. an inner tubular shaft telescopically associated within said outer shaft at said distal end thereof;

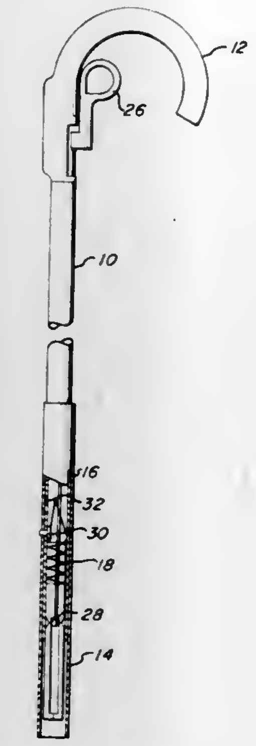
c. a hinged grasping member comprising a unitary base secured at one end thereof within the distal end of said inner shaft and at the other end thereof defining finger elements extending in their natural state in opposite directions to each other, said grasping member prepared from a resilient, flexible material, said finger elements adapted to flex toward each other to grasp and secure an open disposable litter receptacle during the placement of litter therein and to subsequently effect the closing of said receptacle;

d. a trigger element rotatably secured to said handle end;

e. a connecting wire attached to said trigger and passing axially through the length of said outer shaft and said inner shaft, respectively, said connecting wire passing through an opening provided in said base and terminating between said fingers, said wire having its degree of tension controlled by the movement of said trigger element;

f. a ball element attached to said wire at its point of termination and emergence from said base, said ball element serving to pass through a corresponding opening in said litter receptacle to secure said receptacle in position between said fingers during the placement of said litter therewithin; and

g. a biasing element disposed about said wire and abuttingly disposed to said base, said biasing element serving to



accomplish a fine control of the closing of said fingers by said trigger,

whereby longitudinal movement of said outer shaft toward said handle end will cause the release of said fingers into a naturally open opposed disposition for cooperation with said ball element to associate with an open, unused waste receptacle.

4,056,279
AIR DEFLECTOR FOR TRACTOR-TRAILER VEHICLE
Robert Eugene Dorsch, South Bend, Ind., assignor to Uniroyal, Inc., New York, N.Y.
Filed Nov. 24, 1975, Ser. No. 634,553
Int. Cl.² B62D ***35/00***
U.S. Cl. 296—1 S **15 Claims**

9. An air deflector suitable for mounting on the roof of a cab of a tractor of a tractor-trailer vehicle and providing a forwardly facing air-deflecting surface for reducing air resistance to forward movement of the tractor-trailer vehicle, wherein the improvement comprises:

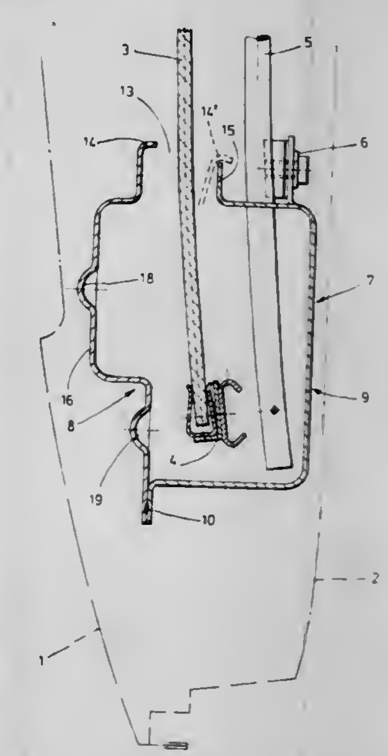
A. said air-deflecting surface is (1) symmetrical about a vertical center plane and has a central portion and a pair of lateral wing portions symmetrically located on opposite sides of said central portion, (2) is totally curved and forwardly convex in all its horizontal and vertical cross-sectional planes, and (3) in said central portion has a uniform radius of curvature in all horizontal and vertical cross-sectional planes;

B. said deflector has a top edge and a base edge;

C. the center of curvature of said central portion of said air-deflecting surface is located on a plane that is parallel to the plane of said base edge of said deflector and below the same, the perpendicular distance between said planes being the product of (a) the radius of curvature extending from said center of curvature to said base edge and (b) the sine of an angle of about 12° to 16° included between that radius and the lower one of said planes; and

D. the radii of curvature of said wing portions of said air-deflecting surface are smaller at said base edge than said radius of curvature of said central portion and gradually increase until at said top edge the radii of curvature of said wing portions are merged into and become equal to the radius of curvature of said central portion.

4,056,280
DOOR FOR VEHICLES, IN PARTICULAR MOTOR VEHICLES
Andreas Bauer, Fallersleben, and Wolfgang Lange, Nordsteimke, both of Germany, assignors to Volkswagenwerk Aktiengesellschaft, Wolfsburg, Germany
Filed Mar. 31, 1975, Ser. No. 563,509
Claims priority, application Germany, Apr. 9, 1974, 2417192
Int. Cl.² B60J ***5/04***
U.S. Cl. 296—146 **6 Claims**



1. A door for vehicles, particularly motor vehicles, having a shaft for a drop window located between an inner and an outer wall of the door, characterized in that at least the lower end of the shaft is surrounded by a hollow-section longitudinal supporting member located between the inner and outer walls of the door and having an opening in its upper region to permit entry of the window, the edges of the supporting member at the opening being formed as flange regions that overlap and interlock with each other so as to close the opening in the support member during a side impact on the outer wall of the door.

4,056,281
DISPOSABLE BACK SEAT HEADREST COVER
Leo A. Byrnes, Bloomfield Hills, Mich., assignor to Acme Mills Company, Detroit, Mich.
Filed Dec. 1, 1976, Ser. No. 746,530
Int. Cl.² A47C ***7/62, 31/10***
U.S. Cl. 297—220 **6 Claims**

1. In a disposable back seat headrest cover for removable

attachment to and engagement with a strip of material having a plurality of male hook elements or barbs projecting outwardly from a base layer fixedly secured to and mounted upon the headrest portion of a seat back, the improvement comprising

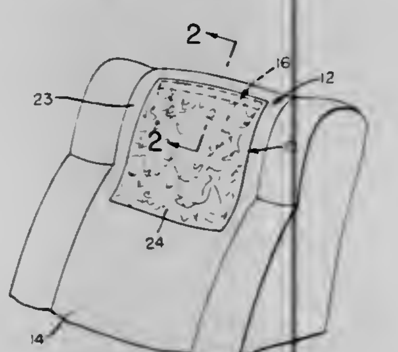
a substantially flat thin headrest cover sheet,

a substantially flat thin narrow strip of a non-woven olefin, fibrous, firm yet flexible, single layer of material, which is substantially impregnable and impervious to said hook elements, fixedly secured to said cover sheet along and adjacent one edge thereof,

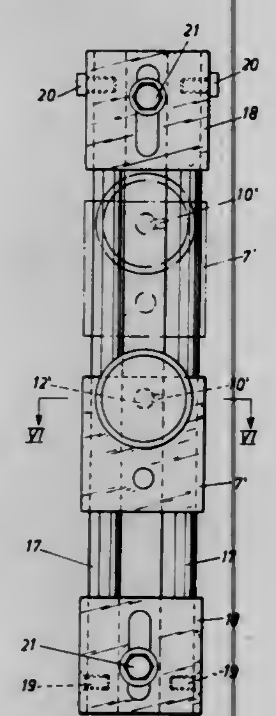
said flat narrow strip of non-woven olefin material comprising a mass in a single layer of needled and garnetted polypropylene fibers, bonded together by the application of heat to one side of said mass to form a single sheet or layer of non-woven, flexible, felt-like material of moderate tensile strength sufficient to removably secure said cover sheet by moderate manual pressure to said strip of material upon said male hook elements or barbs projecting outwardly from said base layer,

said strip of fibers being bonded together on one side thereof into a substantially impregnable and impervious surface, and being arranged on its opposite facing surface with a mass of substantially disordered, disoriented, randomly and freely extending fibers,

said fibers on the exposed side of said cover sheet strip making substantial and removable engagement with said hook elements to secure said headrest cover to the headrest portion of said seat back.

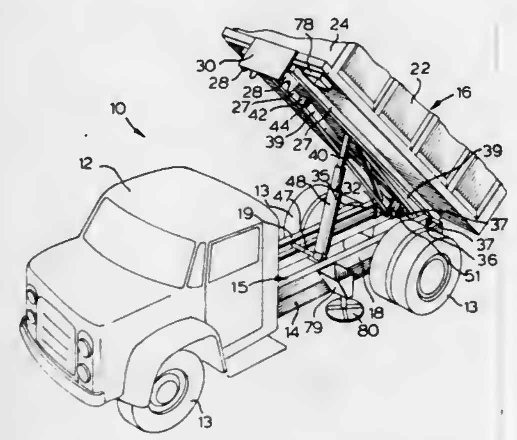


4,056,282
SAFETY HARNESS FOR MOTOR VEHICLES
Rolf Göran Nordh, Storfors, Sweden, assignor to Hakanssons Manufaktur AB, Amal, Sweden
Filed May 19, 1976, Ser. No. 687,880
Int. Cl.² A62B *35/00*
U.S. Cl. 297—389 **3 Claims**



1. An improved device in safety harnesses for motor vehicles, said device comprising a first fastening device for securement, of the harness at its lower end inwardly of a vehicle seat and a second fastening device for securement of the harness at the upper end outwardly of the vehicle seat, a slide provided on at least one of said fastening devices, said slide having one end of said harness attached thereto and arranged to be set in various positions of adjustment, the improvement comprising a guide member along which said slide is arranged to run, said guide including a pair of parallel rods, brackets affixed to both ends of the rod pair to retain same in fixed relative position, means on said brackets for attaching said guide to the desired vehicle portion, said slide comprising a body portion having parallel openings therein sized to slidably fit on the aforesaid parallel rods, said slide body having a bore made therein and provided with at least one locking means, said locking means moving freely in said bore in said slide body in a direction towards and away from one of the guide rods, the inner end of said locking means having a conical configuration, said slide body also provided with a clamp bolt formed with a conical portion and disposed in a position wherein it is at an angle to said bore containing said locking means, said clamp bolt arranged, upon its displacement in the axial direction, to urge its conical portion against the conical end of said locking element so as to press said locking means into abutment against one of the guide rods.

4,056,283
TRUCK CONSTRUCTION
Robert Marvin Pow, Woodstock, Canada, assignor to King Seagrave Limited, Woodstock, Canada
Filed Jan. 25, 1977, Ser. No. 762,258
Int. Cl.² B60P *1/04*
U.S. Cl. 298—17.6 **7 Claims**



1. In a load-carrying vehicle, a construction which comprises:

a load-supporting frame having a front and a rear,

a dumping box above the frame also having a front and a rear,

a fixed pivot at the rear of the frame, and first engagement means on the rear of the box for engaging the fixed pivot,

first locking means for selectively engaging or releasing said first engagement means with respect to the fixed pivot,

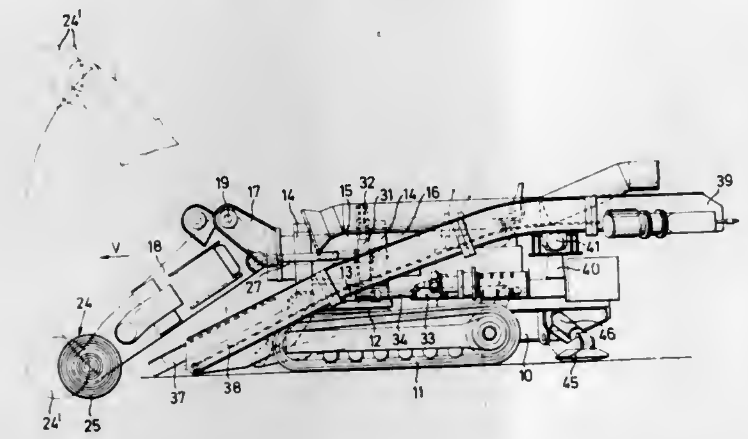
connecting link means having one end pivoted at said fixed pivot and the other end pivoted to the dumping box at an intermediate location therealong,

a displaceable pivot at the front of the frame, and second engagement means on the front of the box for engaging the displaceable pivot,

second locking means for selectively engaging or releasing said second engagement means with respect to the displaceable pivot,

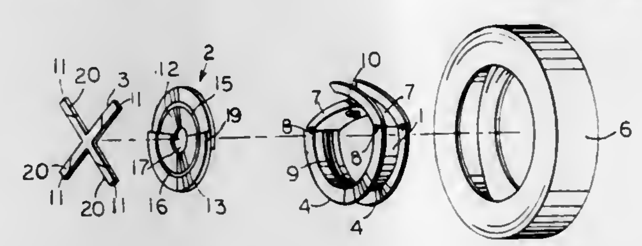
and a power means connected between a first location on the frame which lies between said pivots, and a second location on the box which lies between said first and second engagement means, the power means being capable of extending or contracting the distance between its connection locations.

4,056,284
MACHINES FOR USE IN MINING OR TUNNELLING WORK
Wilhelm Stoltefuss, Kamen; Herbert Haller, Gelsenkirchen-Buer, and Ottocar Hunscher, Altlunen, all of Germany, assignors to Gewerkschaft Eisenhutte Westfalia, Westfalia, Germany
Filed Aug. 4, 1975, Ser. No. 602,166
Claims priority, application Germany, Aug. 5, 1974, 2437683
Int. Cl.² E21C *25/08, 25/68*
U.S. Cl. 299—64 **8 Claims**



1. A machine for use in tunnelling or mining; said machine comprising a main chassis, an arm, support means for the arm, means connecting the arm to the support means for pivoting up and down in a generally vertical sense, rotary cutting means provided at a free end of the arm, the axis of rotation of the cutting means extending transversely of the arm and generally parallel to the axis of pivoting of the arm and means connecting the support means to the chassis for pivoting in a generally horizontal sense about a vertical axis; said support means being composed of a hollow body, bearing means mounting the hollow body on the connecting means for rendering the support means pivotable about an axis which extends parallel to the arm when horizontal and in the direction of advancement of the tunnelling or mining operation performed by the machine, a support member carrying the arm and extending within the hollow body and key means formed between the body and the support member for rendering the support member non-rotatable in relation to the hollow body while allowing displacement of the support member to extend and retract in relation to the hollow body whereby during operation the arm can be swung up and down and the support member displaced in relation to the hollow body to cause the rotary cutting means to move along a path which is approximately vertical.

4,056,285
COLLAPSIBLE TIRE WHEEL
Thomas Wright, 1783 A. Pacific St., Brooklyn, N.Y. 11213
Filed Mar. 11, 1977, Ser. No. 776,530
Int. Cl.² B60B *3/12, 25/02*
U.S. Cl. 301—8 **3 Claims**

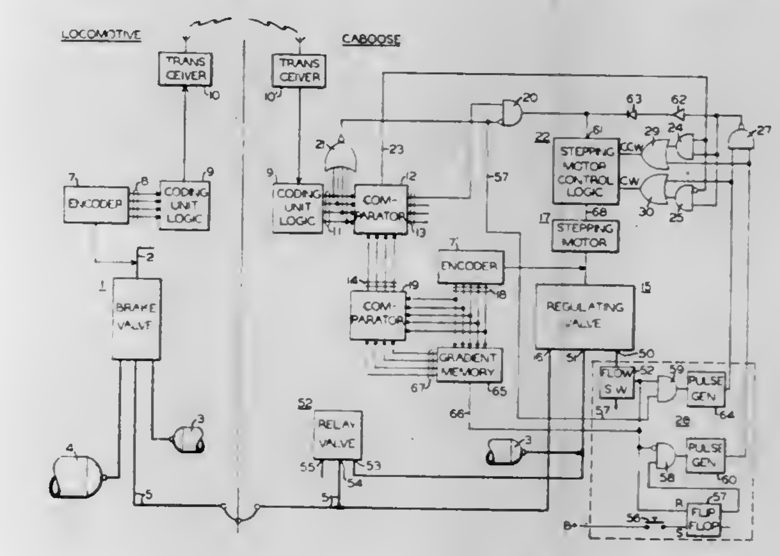


1. A tire supporting rim comprising:

a. a wheel rim having a track on its internal surface and at least one pivotable section, said wheel rim adapted to fit within a tire when said pivotable section is fully extended, and

b. a sectioned disc formed from mutually slidable plates adapted to fit within said track to support said wheel rim when said sections are slidably extended, said plate sections including extensions of reentrant configuration to retain said sections together in slidable relationship.

4,056,286
REMOTE CONTROL BRAKE SYSTEM FOR A RAILWAY TRAIN
Richard O. Burkett, Apollo, Pa., assignor to Westinghouse Air Brake Company, Wilmerding, Pa.
Filed June 8, 1976, Ser. No. 693,776
Int. Cl.² B60T *13/68*
U.S. Cl. 303—20 **20 Claims**



1. A remote control system for varying fluid pressure carried in a brake pipe extending continuously through a railway train having a locomotive at which one end of said brake pipe is terminated and a caboose at which the other end of said brake pipe is terminated to thereby obtain faster, more accurate synchronized control of the brakes of said train, said system comprising:

a. a main reservoir charged with fluid under pressure;

b. a first equalizing reservoir;

c. a first pressure regulating valve device to which said first equalizing reservoir and said main reservoir are connected, and having a cam member in response to rotation of which said first regulating valve device is operable to supply fluid pressure from said main reservoir to said equalizing reservoir and to release fluid pressure therefrom;

d. a first relay valve device to which said one end of said brake pipe, said main reservoir and said first equalizing reservoir are connected, said first relay valve device being operative responsively to the variation of pressure in said first equalizing reservoir to supply fluid pressure from said main reservoir to said brake pipe at said one end and to release fluid pressure therefrom;

e. first encoder means for providing a brake control signal according to the position in which said cam member of said first regulating valve device is rotated;

f. means for transmitting said brake control signal;

g. means for receiving said transmitted brake control signal at said caboose;

h. a second equalizing reservoir;

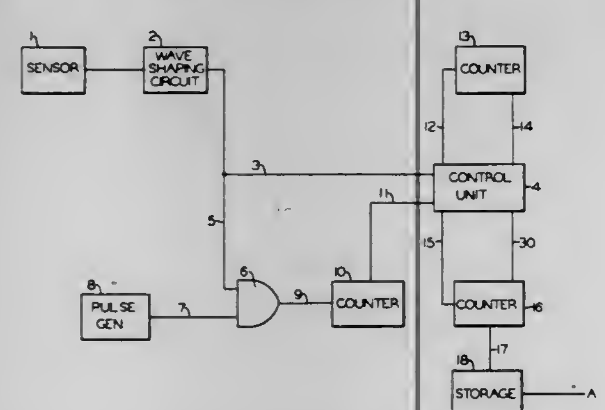
i. a second pressure regulating valve device to which said other end of said brake pipe and said second equalizing reservoir are connected and having a cam member in response to rotation of which said second regulating valve device is operable to supply fluid pressure from said other end of said brake pipe to said second equalizing reservoir and to release fluid pressure therefrom;

j. motor means for effecting rotation of said cam member of said second regulating valve device;

k. second encoder means for providing a feedback signal corresponding to the position in which said cam member of said second regulating valve device is rotated;

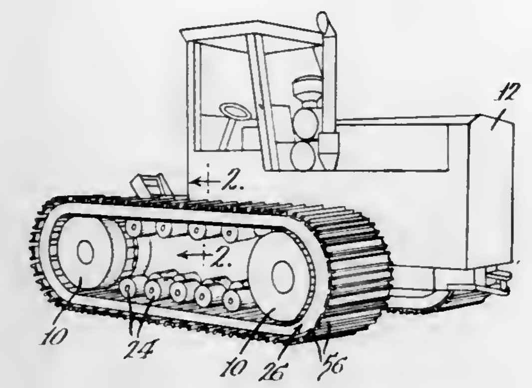
l. first comparator means for effecting operation of said motor means when a difference exists between said brake control signal and said feedback signal; and
m. a second relay valve device to which said other end of said brake pipe and said second equalizing reservoir are connected, said second relay valve device being operative responsive to variation of pressure in said second equalizing reservoir to effect release of fluid pressure from said other end of said brake pipe accordingly.

4,056,287
CIRCUIT ARRANGEMENT FOR PRODUCING A DIGITAL SPEED SIGNAL CORRESPONDING TO THE ANGULAR VELOCITY OF A WHEEL FROM THE HALF CYCLE DURATION OF THE SINUSOIDAL WAVEFORM GENERATED BY THE WHEEL
Wolfgang Gudat, Hannover, Germany, assignor to WABCO Westinghouse GmbH, Hannover, Germany
Filed Dec. 9, 1976, Ser. No. 748,745
Claims priority, application Germany, Jan. 20, 1976, 2601800
Int. Cl.² B60T *8/02*
U.S. Cl. 303—91 **5 Claims**



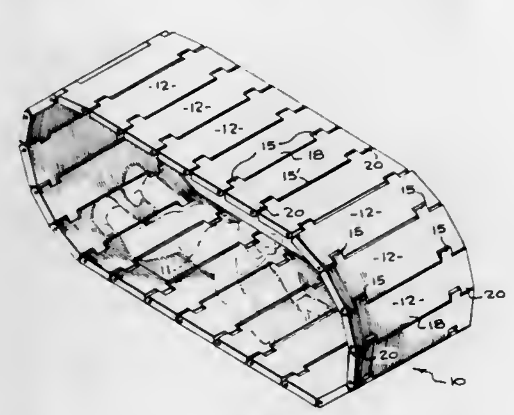
1. A circuit for providing a digital wheel speed signal comprising:
a. wheel sensor means for generating a sinusoidal waveform having a frequency directly proportional to the angular velocity of a vehicle wheel;
b. a gating circuit connected with said wheel sensor means so as to be enabled during a first half cycle duration of said sinusoidal waveform;
c. first pulse generator means for emitting pulses at a constant frequency;
d. a first multi-stage digital counter to which said impulses are connected via said gating circuit only so long as said gating circuit is enabled, said first counter providing an output signal that varies inversely with the angular wheel velocity; and
e. control means for modifying the output signal of said first counter so as to vary in direct proportion to the angular wheel velocity comprising:
i. a second multi-stage digital counter;
ii. first means for supplying impulses to said second counter at a frequency that changes exponentially;
iii. a third multi-stage digital counter;
iv. second means for supplying impulses to said third counter at a frequency that changes exponentially;
v. comparator means for activating said second means only when the output signals of said first and second counters are equal; and
vi. means for recognizing the final stage of said second counter to deactivate said second means, whereby the output of said third counter corresponds to the difference between the final stage output of said second counter and the output of said first counter following expiration of said first half cycle duration of said sinusoidal waveform.

4,056,288
ENDLESS TRACK FOR CRAWLER VEHICLES
Robert N. Stedman, Chillicothe, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.
Filed Mar. 1, 1976, Ser. No. 662,200
Int. Cl.² B62D *55/24*
U.S. Cl. 305—34 **9 Claims**



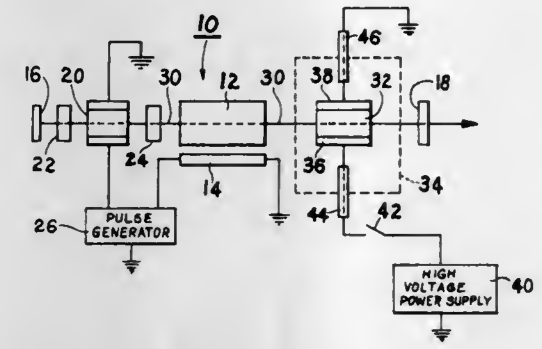
1. An endless track for a track laying vehicle such as a crawler vehicle or the like, comprising:
a first endless, flexible belt having metal grousers secured about the periphery thereof and directed outwardly from the exterior surface thereof;
an endless, flexible, collapsible carcass including a fluid receiving chamber having an exterior surface removably secured to the interior surface of said first endless belt; and
a second endless, flexible belt having an exterior surface removably secured to the interior surface of said carcass and a plurality of sprocket engaging lugs directed inwardly from the interior surface thereof;
said belts and said carcass being constructed and arranged to permit disassembly when said carcass is collapsed and to preclude disassembly when installed on a crawler vehicle or the like and when said carcass is filled with fluid.

4,056,289
OCCUPANT PROPELLED TREAD VEHICLE
George E. Gilliland, 6001 Topke, Albuquerque, N. Mex. 87101
Filed Oct. 14, 1975, Ser. No. 622,040
Int. Cl.² B62D *55/22*
U.S. Cl. 305—47 **16 Claims**



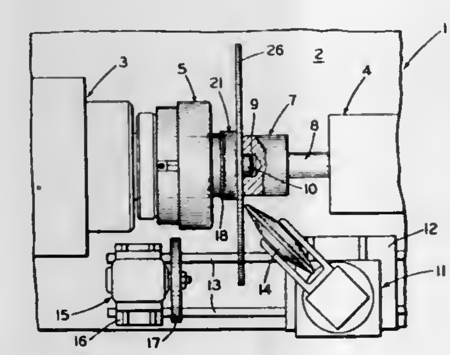
1. An amusement device in the nature of a self-complete, user powered vehicle comprising a plurality of parallel slats arranged in spaced edge-to-edge relation in a closed flat loop configuration, said slats having inner faces forming the internal surface of said loop and outer faces forming the outer surface of said loop, and hinge means provided between facing edges of said slats for permitting relative pivotal movement of adjacent slats inwardly with respect to said loop but preventing substantial relative pivotal movement of said slats in a reverse direction outwardly of said loop beyond a position in which said slats are in substantial coplanar orientation, said slats being of sufficient number and size to form a loop of adequate size to permit a user to assume a position of use fully within the confines of said internal surface of said loop or to be supported on the upper external surface of said loop.

4,056,290
METHOD OF CHANGING THE FREQUENCY OF A LASER BEAM
Lloyd C. Bobb, Willow Grove, and Kimball Kramer, Philadelphia, both of Pa., assignors to The Government of the United States as represented by the Secretary of the Army, Washington, D.C.
Filed Mar. 18, 1976, Ser. No. 667,911
Int. Cl.² H02M *5/04*
U.S. Cl. 307—88.3 **7 Claims**



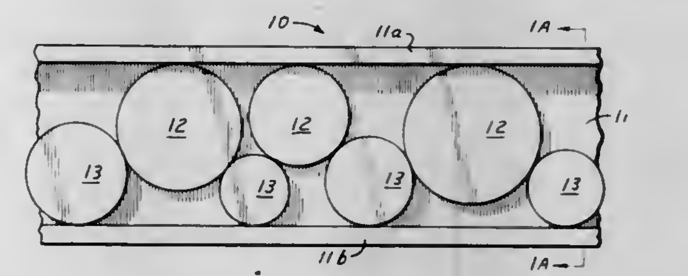
1. In a laser system of the type wherein an active laser element is energized to produce a laser beam of substantially one frequency, ω_1, the improvement in the method of changing the frequency of said laser beam by a frequency ω_2, comprising
disposing a crystal of a single crystal structure, having paraelectric and ferroelectric states above and below a Curie point, respectively, in the path of said laser beam,
maintaining said crystal in its paraelectric state at substantially constant temperature just above its Curie point, when the laser beam emerging from said crystal is to remain substantially unchanged in frequency, and
applying a voltage of sufficient value across said crystal to drive it into its ferroelectric state and generate radiations of frequency ω_2, when the laser beam emerging from said crystal is to have frequencies of $\omega_1 \pm \omega_2$.

4,056,291
CLUTCH HOUSING AND BEARING ASSEMBLY AND METHOD OF MAKING THE SAME
Derald H. Kraft, Canton, and Richard C. St. John, North Canton, both of Ohio, assignors to Aspro, Inc., Canton, Ohio
Division of Ser. No. 601,346, Aug. 4, 1975. This application Oct. 26, 1976, Ser. No. 735,509
Int. Cl.² F16C *33/08*
U.S. Cl. 308—189 R **7 Claims**



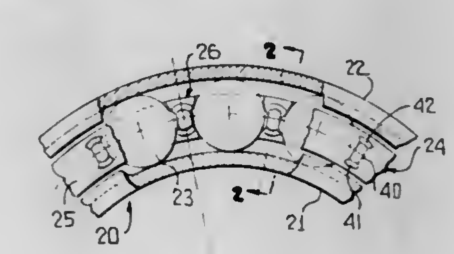
1. A clutch housing and bearing assembly including;
a. a cup-shaped bearing housing having a circumferential flange with an inturned web wall at one flange end and an annular retaining shoulder at the other flange end;
b. bearing means telescopically mounted within the circumferential flange and clamped axially between the web wall and retaining shoulder;
c. a larger cup-shaped clutch housing having an annular cup wall extending in a radial direction with respect to the bearing housing and terminating in an annular flange; said annular flange extending axially from the clutch housing cup wall in a direction opposite to the bearing housing; and
d. the clutch housing cup wall being integrally connected with the bearing housing at the retaining shoulder.

4,056,292
LINEAR ROLLING CONTACT DEVICES
Earl W. Traut, 8040 Palm Lake Drive, Orlando, Fla. 32811
Filed Aug. 2, 1976, Ser. No. 710,797
Int. Cl.² F16C *23/08*
U.S. Cl. 308—206 **12 Claims**



1. A linear rolling contact device comprising:
at least one linear surface,
rotating means,
said rotating means including at least two major rotating elements in rolling contact with said linear surface,
retaining means,
said retaining means being in rolling contact with said rotating elements and acting to prevent same from moving away from each other,
separating means,
said separating means including at least one roller,
said separating means being in rolling contact with said rotating elements and acting to prevent same from moving towards each other,
said retaining means and said separating means not being fastened to said linear surface.

4,056,293
SEGMENTED RETAINERS
John Hillman Lobeck, and Raymond Harold Lindgren, both of South Bend, Ind., assignors to The Torrington Company, Torrington, Conn.
Filed Apr. 20, 1976, Ser. No. 678,675
Int. Cl.² F16C *33/46*
U.S. Cl. 308—217 **20 Claims**



1. A segmented retainer for a roller bearing, said retainer comprising a pair of end rings, a plurality of separator bars extending between said end rings, and means securing said bars to said end rings, each bar having at opposite sides thereof a set of inner and outer bearing surfaces for engagement by rollers, bearing surfaces of each set being spaced from each other to define a lubricant pocket therebetween, and each of said bearing surfaces being convex for cooperation with an associated roller for assuring a supply of lubricant between the roller and said surfaces.

4,056,294

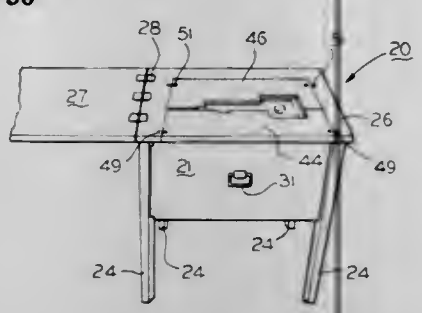
OPEN ARM SEWING MACHINE CABINET

Walter A. Godlewski, Maywood; Bernard S. Roser, Arlington Heights, and John B. Lyons, Chicago, all of Ill., assignors to Montgomery Ward & Co., Incorporated, Chicago, Ill.

Filed Sept. 22, 1976, Ser. No. 725,401

Int. Cl.² D05B *75/00;* **A47B** *57/20*

U.S. Cl. 312—30 **8 Claims**



1. In a cabinet for a sewing machine capable of open arm or flat bed sewing operations:

a. walls defining an enclosure for storage of a sewing machine;

b. first and second pairs of panels wholly pivotal within opposed walls of said enclosure and movable to positions selectively to provide work surfaces for open arm and flat bed sewing;

c. said first pair of panels supporting said machine for both flat bed and open arm sewing;

d. said second pair of panels overlying said first pair of panels and being movable into position over said first pair of panels into planar relationship to define a work surface for flat bed sewing;

e. one of said first pair of panels having said machine secured thereto and being hinged to the walls of said enclosure internally thereof for storage of said machine beneath the plane of said second pair of panels;

f. the second of said first pair of panels being hinged to walls of said enclosure in opposed relationship to said one panel of said first pair, and being swingable out of position by movement of the said one of said first pair of panels to the working position of said machine for both open arm and flat bed sewing;

g. meas biasing the said second of said first pair of panels to a position to support said machine after reverse swinging movement of the said one of said first panels.

4,056,295

MULTIPLE CONTAINER AND RACK SYSTEM

Benjamin A. Downing, Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Mar. 1, 1976, Ser. No. 662,798

Int. Cl.² A47B *87/00*

U.S. Cl. 312—107 **8 Claims**

1. A multiple container and rack system for use both as a transport and storage medium, the system comprising:

a frame assembly, said assembly including

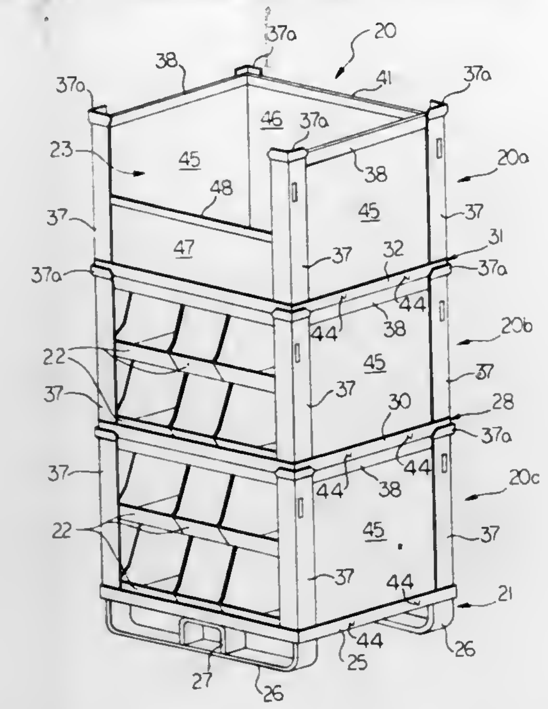
a pair of end members, each of said end members including first and second angle corner posts, a rail member fixedly secured at the upper end of each post to maintain said posts from each other the distance of said rail member, and

at least one side member, said side member including first and second angle leg members and a rail member fixedly secured to the upper end of said leg members;

means for detachably securing each of said side member angle legs nestably within a respective receiving angle corner post;

base means includes a flange member for receiving said frame assembly therein and thereby defining a modular unit for receipt of articles to be carried thereby;

receiving means on each corner post to permit nestably receipt of one additional modular unit in a stacking manner; restraining means includes at least one inwardly projecting element at each of said flange member upward portions wherein said projecting elements engage the lower angle member of said end member thereby preventing relative vertical displacement thereof; and



said restraining means cooperating between said base means and said frame assembly to prevent vertical displacement of said frame assembly from said base means.

4,056,296

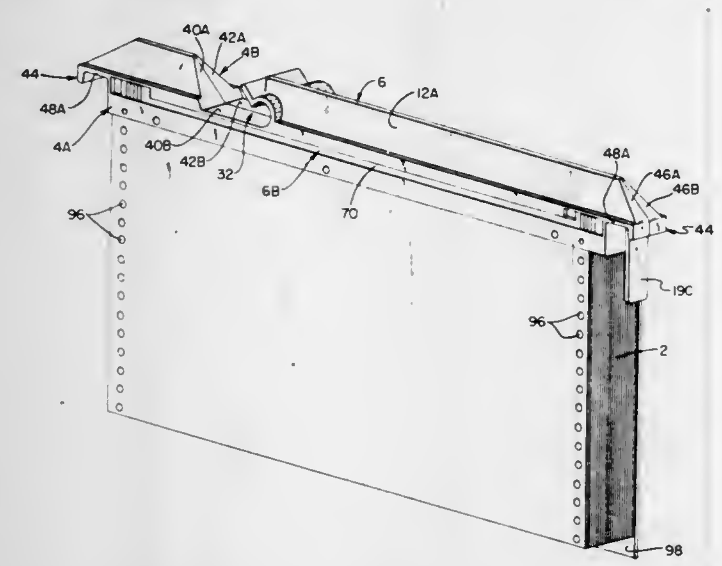
DOCUMENT HOLDER

Norman A. Hedstrom, Worcester; David M. Wright, and Jerome O'Toole, both of Shrewsbury, all of Mass., assignors to Wright Line Inc., Worcester, Mass.

Filed Mar. 17, 1976, Ser. No. 667,613

Int. Cl.² A47B *63/00;* **B42F** *15/00*

U.S. Cl. 312—184 **32 Claims**



1. A document holder comprising a one-piece body molded of plastic and having first and second side sections, a single integral hinge section connecting said side sections, and a pair of holes in said first side section, said one-piece unit being molded with said hinge section unfolded and said side sections being separated from one another and said hinge section being foldable so as to bring said side sections into confronting relation with one another, a pair of document mounting posts attached to the second side section, said posts being located so that the free end of each is received by one of said holes when said side sections are in confronting relation with one another, said side sections being formed so that when they confront one another they form a channel for receiving margin portions of documents to be mounted on said posts, and lock means separate from said posts for locking said side sections together in mutually confronting relation, said lock means comprising at least one movable latch attached to one of said side sections and a catch disposed on the other of said side sections in position to engage and positively hold said at least one latch when said side sections are removed into said mutually confronting relation.

4,056,297

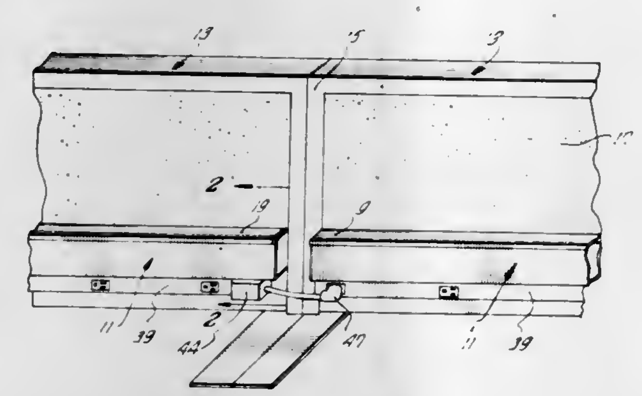
REMOVABLE ELECTRICAL FIXTURES FOR MODULAR WALL PANELS

Clifford W. Gartung, Santa Ana, Calif.

Filed Nov. 15, 1976, Ser. No. 741,797

Int. Cl.² H02G *3/26*

U.S. Cl. 339—23 **8 Claims**



4. In a reconfigurable modular sound absorbing office screen system having a plurality of hollow rigid square frame members with vertical side support members and interconnecting horizontal support members and a central sound absorbing panel of resilient fiberglass material mounted in and supported on all four peripheral sides of the rigid frame member, the frame member capable of being interconnected to other frame members to form a predetermined wall partition configuration independent of the structural support walls of an office building, the improvement consisting of;

a hollow molding member;

mounting means on the hollow molding member for insertion between the elongated channel housing member and the resilient sound absorbing panel, and

mounting tab means attached to the respective ends of the molding member, the combined length of the mounting tab means and the molding member being greater than the horizontal interior distance between the side support members but less than the diagonal distance across the sound absorbing panel, the mounting tab means being removably inserted between the sound absorbing panel and the frame side support members by diagonally positioning the molding member relative to the frame member and depressing the resilent panel while sliding the upper end downward to operatively position the molding member parallel to and above the elongated channel housing member.

4,056,298

ELECTRICAL CONNECTOR WITH COUPLING ASSEMBLY BREECH RETAINING MEANS

Earl A. Cooper, Los Angeles, and Michael J. Howett, Fountain Valley, both of Calif., assignors to Automation Industries, Inc., Los Angeles, Calif.

Filed Oct. 7, 1976, Ser. No. 730,449

Int. Cl.² H01R *13/54*

U.S. Cl. 339—90 R **7 Claims**

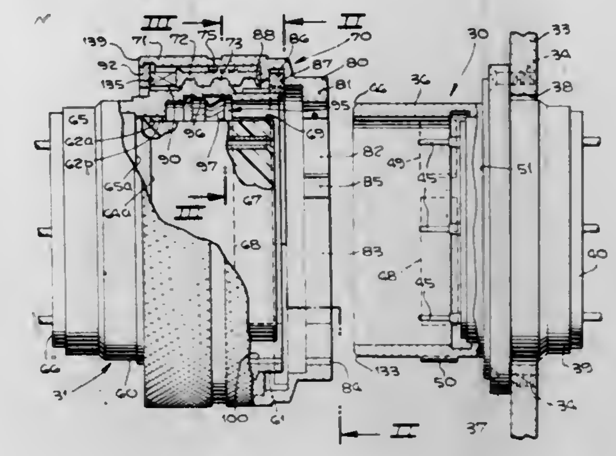
1. A retaining means for use on an electrical connector having inner and outer coaxial cylindrical members, one of said members being rotatable to transmit forces to the other member to cause relative axial movement of said members, comprising in combination:

one of said members having an end portion provided with angularly spaced internal axially extending grooves on the internal surface thereof;

recess means in said internal surface on said end portion between said grooves and in communication therewith;

an annular retainer member having a circumference provided with angularly spaced locking lugs corresponding to said grooves and receivable within said end portion;

said recess means being provided with end walls;



said annular retainer member being axially movable relative to said one member to pass said locking lugs through said grooves, and said retainer member being rotatable to align said locking lugs with said recesses,

and spring means for biasing said retainer member in a direction to cause said locking lugs to be positioned in said recesses.

4,056,299

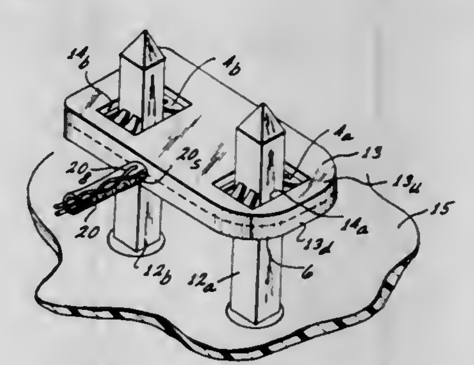
ELECTRICAL CONNECTOR

Walter Griffin Paige, Pasadena, Calif., assignor to Burroughs Corporation, Detroit, Mich.

Filed May 3, 1976, Ser. No. 682,770

Int. Cl.² H01R *13/38*

U.S. Cl. 339—95 D **2 Claims**



1. An electrical connector for connecting a pair of wires, each wire carrying a different voltage level, to adjacent terminal pins on a backplane, comprising:

a. a pair of conductive flags, spaced a predetermined distance apart;

b. an opening centrally located in each flag of said pair of conductive flags;

c. a pair of bifurcated strips within each of said central openings to provide teeth for biting into the surface of a terminal pin inserted through said opening;

d. an insulating cover which integrally provides a hermetic seal to said pair of conductive flags and said pair of wires while rigidly maintaining said flags a predetermined distance apart, said insulating cover having openings oriented to expose the central opening of each flag and the ends of the teeth within the opening of each of said flags;

e. said insulating cover having one end provided with a shape distinguished from the shape of the other end to readily identify one wire of the twisted pair from the other wire in order to distinguish the level of each wire in the pair of wires, thus to reliably insure the proper voltage

orientation and proper connection of the wires when connected on the terminal pins of said backplane;

f. each of said openings in said hermetically insulating cover providing sufficient exposed area about the central openings of the flag and about the teeth therein to permit bending of said teeth into contact against said backplane pins.

4,056,300

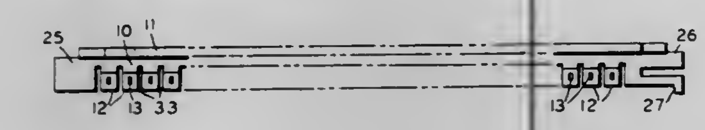
TERMINAL CONNECTOR WITH STRESS RELIEF

Donald Alfred Schumacher, Lockport, N.Y., assignor to GTE Sylvania Incorporated, Stamford, Conn.

Continuation of Ser. No. 333,886, Feb. 20, 1973, abandoned. This application Apr. 15, 1976, Ser. No. 677,431

Int. Cl.² H01R *13/58*

U.S. Cl. 339—103 R **4 Claims**



1. A connector for pluggable engagement between terminals carried by said connector and terminals carried by a panel comprising:

a strip member of elastic insulating material having a plurality of lands arrayed longitudinally on one edge on said member, said lands formed by a plurality of slots extending through said strip member transversely to the longitudinal dimension thereof, each of said lands having a single opening located substantially within said lands and extending through said lands, terminals pressure fitted through more than one of said openings with sufficient force to cause said elastic insulating material to be displaced, said terminals extending on both sides of said strip member for mating electrical connections thereto.

4,056,301

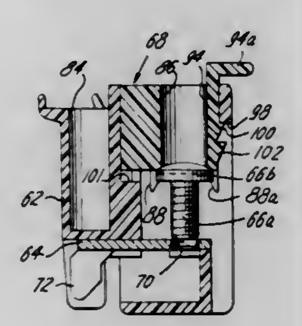
RETAINED SCREW ASSEMBLY

Alexander R. Norden, 350 Central Park West, New York, N.Y. 10025

Filed Mar. 11, 1976, Ser. No. 665,925

Int. Cl.² H01R *9/10*

U.S. Cl. 339—263 R **18 Claims**



1. An electrical connector including a stationary unit having a body of electrical insulation and a metal member assembled to said body and having a threaded hole therein, a screw for securing a retained wiring element to said metal member, said screw having a head and a threaded body extending from the underside of the head for driving entry into the threaded hole, and a screw retainer movably connected to said stationary unit and having resilient nest means for releasably retaining said screw head, said stationary unit and said screw retainer having cooperating portions for locating the screw, when the head thereof is in said nest means, in a position ready for insertion into the threaded hole with said threaded body aligned with the threaded hole, said screw retainer being movable relative to said stationary unit for carrying the screw when in the nest means away from said ready-for-insertion position to a removed position with the free end of the screw displaced from the metal member to free the space adjacent the threaded hole for admission and removal of a wiring element.

4,056,302

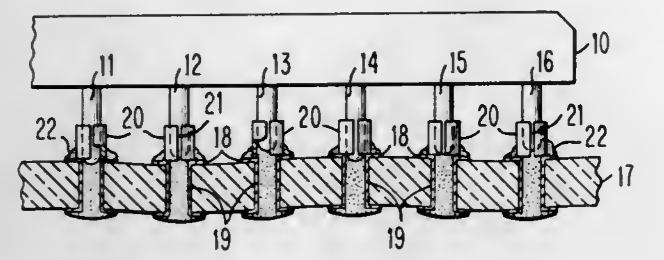
ELECTRICAL CONNECTION STRUCTURE AND METHOD

Roland Joseph Braun, Vestal, and William Ditlef von Voss, Endicott, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed June 4, 1976, Ser. No. 693,051

Int. Cl.² H01R *5/04*

U.S. Cl. 339—275 B **8 Claims**



1. In a circuit assembly, having a component with a plurality of interconnection pins adapted to be solder-connected to respective lands on a printed circuit card surface, the improvement comprising:

a plurality of electrically conductive sleeve connectors, one for each pin of said component and adapted to be variably slideably mounted thereon according to the distance between said pin and said respective land with at least one of said pins being in direct contact with its said land, to thereby assure electrical contact between each of said pins and the respective land on the surface of said printed circuit card to which the pin is to be connected, said connectors being exclusively on the surface of said card.

4,056,303

OPTICAL INSTRUMENT IN WHICH EYEPIECE TUBE AND OBJECTIVE TUBE ARE SURROUNDED IN CAST RESIN TO MAKE A RIGID CORE ENCLOSED IN FOAMED SYNTHETIC RESIN

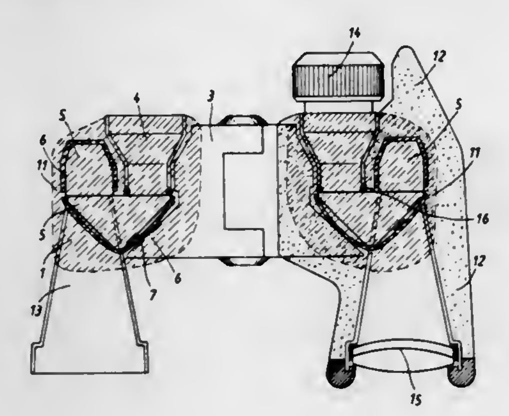
David Swarovski, Wattens, and Kurt Schwab, Innsbruck, both of Austria, assignors to D. Swarovski & Co., Glasschleiferei, Wattens, Austria

Filed May 18, 1976, Ser. No. 687,457

Claims priority, application Germany, May 22, 1975, 2522738; Apr. 27, 1976, 2618497

Int. Cl.² G02B *23/18*

U.S. Cl. 350—36 **13 Claims**



1. An optical instrument comprising:

an image-erecting system;

an eyepiece tube;

an objective tube;

said image-erecting system, said eyepiece tube and said objective tube being at least partially enclosed in cast resin and thereby positioned and forming a rigid core; and

a foamed synthetic resin covering extending around the periphery of said rigid core and fixedly secured thereto to form the housing of the instrument.

4,056,304

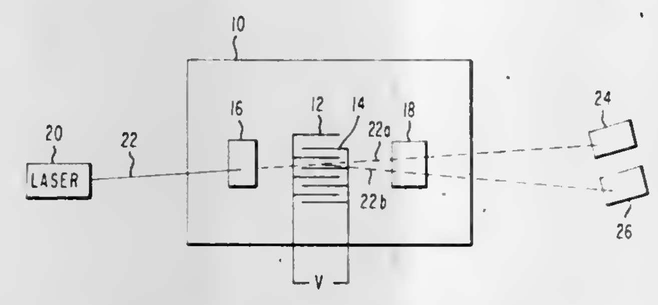
LIGHT MODULATION EMPLOYING SINGLE CRYSTAL OPTICAL WAVEGUIDES OF NIOBIUM-DOPED LITHIUM TANTALATE

William Phillips, Princeton, N.J., assignor to RCA Corporation, New York, N.Y.

Division of Ser. No. 555,725, March 6, 1975, which is a continuation-in-part of Ser. No. 442,844, Feb. 15, 1974, abandoned, which is a continuation-in-part of Ser. No. 434,408, Jan. 18, 1974, abandoned. This application Nov. 22, 1976, Ser. No. 744,126

Int. Cl.² G02B *5/23;* **B05D** *5/06*

U.S. Cl. 350—96 WG **10 Claims**



1. In a light modulator comprising a source of coherent light, an optical waveguide, a plurality of electrodes disposed in said waveguide, optical input means disposed on one side of said electrodes and optical output means disposed on the other side of said electrodes, the improvement which comprises employing as said optical waveguide a crystal prepared by depositing a film of niobium oxide on one surface of a polished single crystal of lithium tantalate, annealing the single cyrstal of lithium tantalate so as to allow the niobium to diffuse into the crystal and cooling the crystal.

4,056,305

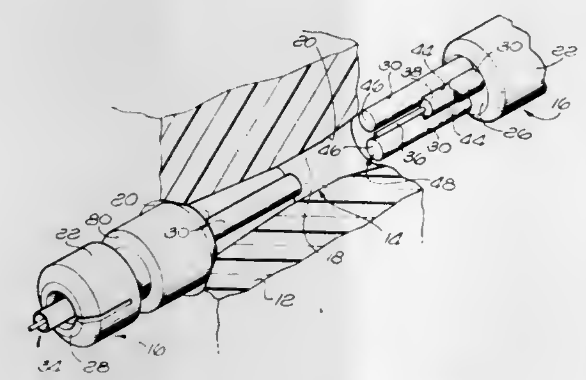
SINGLE OPTICAL FIBER CONNECTOR UTILIZING ELASTOMERIC ALIGNMENT DEVICE

Ronald L. McCartney, Orange; Bruce K. Arnold, El Toro, and Vaughn C. Hogan, Sun Valley, all of Calif., assignors to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Apr. 26, 1976, Ser. No. 680,170

Int. Cl.² G02B *5/16*

U.S. Cl. 350—96 C **20 Claims**



1. A fiber optic connector comprising:

a deformable elastomeric alignment element having a bore therethrough;

a pair of fiber optic contacts mounted in opposite ends of said bore, each said contact comprising three equal diameter, generally parallel, flexible cylindrical rods having an optical fiber positioned therebetween, the rods and fiber of each said contact terminating in a common planar mating end face; and

said rods of each contact having an interference fit in said bore causing said rods to be resiliently compressed inwardly to engage each other and said fiber therebetween, whereby said fibers will become precisely laterally aligned.

4,056,306

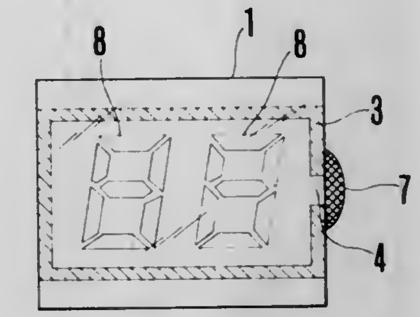
LIQUID CRYSTAL DISPLAY DEVICE AND METHOD OF MANUFACTURING THE SAME

Masayoshi Misono, Chosei; Masaharu Koayama, and Tutomu Asida, both of Mobara, all of, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Sept. 13, 1976, Ser. No. 722,437

Int. Cl.² G02F *1/13*

U.S. Cl. 350—160 LC **5 Claims**



1. A liquid crystal display device comprising a pair of parallel insulating substrates spaced a predetermined spacing, at least one of the substrates being transparent, opposed electrodes formed on the opposing surfaces of said substrates, a peripheral sealing member for sealing the peripheries of said substrates for defining a space for accommodating a liquid crystal, means for defining a filling port at a portion of said sealing member for filling the liquid crystal into said space, a metal layer formed across the full width of the side surfaces of said substrates sandwiching said peripheral sealing member surrounding said filling port, and a solder layer applied onto said metal layer for sealing said filling port, said solder layer having an amount of 0.1 to 1.2mg/mm².

4,056,307

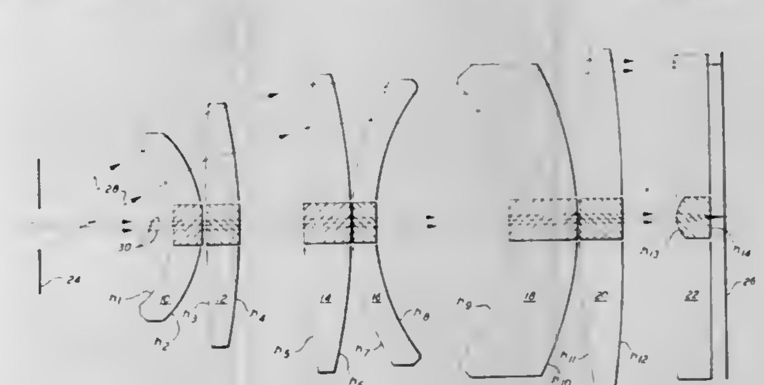
ANAMORPHIC SCANNER LENS SYSTEM

Juan L. Rayces, Santa Ana, Calif., assignor to The Perkin-Elmer Corporation, Norwalk, Conn.

Filed Oct. 29, 1976, Ser. No. 737,140

Int. Cl.² G02B *13/08, 3/06*

U.S. Cl. 350—181 **8 Claims**



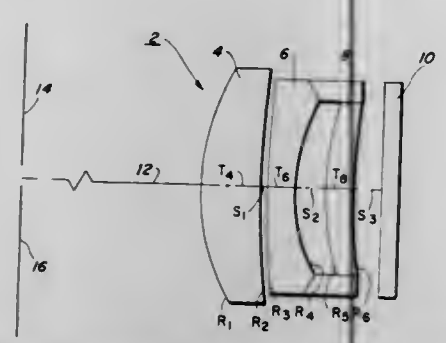
1. An anamorphic scanner lens system comprising in axial alignment:

a plurality of pairs of cylindrical lens elements, the cylinder axes of the surfaces thereof being at right angles to the direction of the scan line, each pair consisting of a biconvex positive lens and a negative meniscus lens, the concave side of the menisci alternate pointing toward the direction of the light and in the direction of the light;

aperture stop means disposed in front of said plurality of pairs of lens elements; and

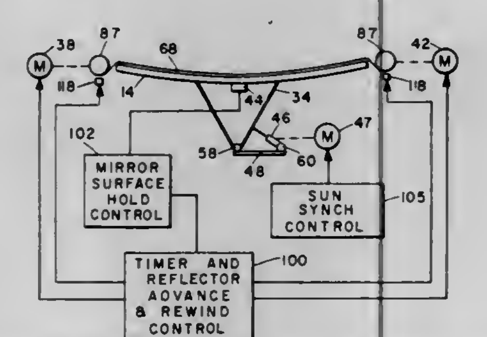
a cylindrical lens element disposed behind said plurality of pairs of lens elements having a front surface having an axis parallel to the scan line and having a substantially flat rear surface.

4,056,308
VARIABLE FOCAL LENGTH REFLECTOR LENS SYSTEM
George Louis McCrobie, Upland, Calif., assignor to Xerox Corporation, Stamford, Conn.
Filed Mar. 3, 1976, Ser. No. 663,394
Int. Cl.² G02B *15/14, 17/00*
U.S. Cl. 350—184 **3 Claims**



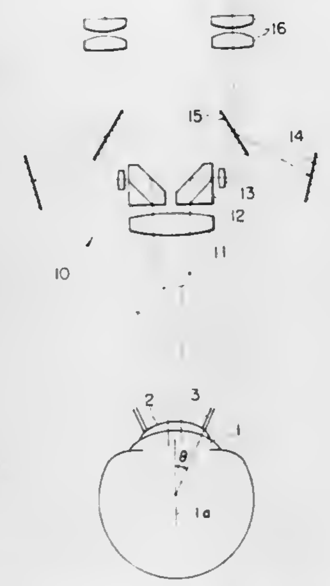
1. A variable magnification reflector lens including the following elements in alignment along an optical axis:
a positive crown element,
a negative flint element spaced from said crown element,
a meniscus element spaced from said flint element,
a reflector spaced from said meniscus element,
said corwn element and said reflector being fixed relative to each other,
said flint and meniscus elements being movable in the same direction along said optical axis relative to said crown element and said reflector to vary the focal length of said lens.

4,056,309
RENEWABLE SURFACE HELIOSTAT TYPE SOLAR MIRROR
Robert Campbell Harbison; Gerald Arthur Bradley, and Paul Arthur Lux, all of San Diego, Calif., assignors to General Dynamics Corporation, San Diego, Calif.
Filed May 4, 1976, Ser. No. 682,911
Int. Cl.² G02B *5/10*
U.S. Cl. 350—310 **22 Claims**



1. A renewable surface heliostat type solar mirror comprising:
a sheet of flexible mirror material having at least one mirror surface for reflecting solar light,
a support means comprising a housing having a substantially planar surface for supporting at least a portion of said sheet material with said mirror surface on the outside,
sheet holding means for selectively adhering said sheet material against the surface of said support means,
said support means having a surface shape and curvature whereby said mirror surface directs solar light toward a receiver,
sheet moving means positioned in said housing for selectively moving and changing the flexible mirror material on said support member, whereby new mirror material selectively replaces used mirror material,
control means for de-energizing said sheet holding means and energizing said sheet moving means for changing the flexible mirror material and then re-energizing said sheet holding means,
and said housing having surface edges with a lip extension enclosing the ends and sides of said sheet mirror material for reducing wind lifting of the sheet material from the support surface.

4,056,310
METHOD AND DEVICE FOR OPHTHALMOSCOPY
Hiroyuki Shimizu, Utsunomiya; Kouji Inaba, Tokyo, and Ken-Ichi Nakahashi, Hachiouji, all of Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan
Filed Feb. 13, 1976, Ser. No. 658,053
Claims priority, application Japan, Feb. 14, 1975, 50-19729[U]; June 20, 1975, 50-83571[U]; June 20, 1975, 50-74358; Sept. 12, 1975, 50-110603; Sept. 12, 1975, 50-110604
Int. Cl.² A61B *3/10;* **G02B** *5/16*
U.S. Cl. 351—6 **8 Claims**



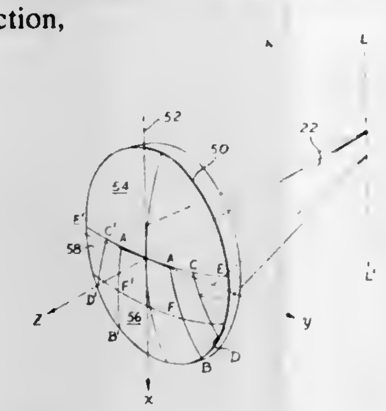
1. A method for ophthalmoscopy comprising the steps of arranging a contact lens in contact with an eyeball to be observed in order to observe the eyeball by eliminating refraction of light by the surface of the cornea of the eyeball, illuminating the fundus of the eyeball by transmitting illuminating light through a plurality of optical fiber bundles having exit ends arranged along the circumference of the contact lens and entrance ends arranged opposite to a light source, and observing a magnified erect image by means of a head-band scope comprising a binocular telescopic optical system arranged opposite to and distant from the contact lens.

4. (amended) A device for ophthalmoscopy comprising a contact lens, a plurality of optical fiber bundles having exit ends fixed along the circumference of said contact lens by inclining said exit end by 10° through 20° with respect to the optical axis of the contact lens, a tubular holder carrying said contact lens at one end thereof and carrying said optical fiber bundles arranged in substantially longitudinal direction of the holder, and a selector shutter arranged adjacent to entrance ends of said optical fiber bundles for the purpose of selectively transmitting the illuminating light by means of said optical fiber bundles, said device for ophthalmoscopy being arranged to selectively transmit illuminating light by means of at least one of said optical fiber bundles by operating said selector shutter for the purpose of illuminating the fundus of the eyeball to be observed and arranged to observe through said holder from a position corresponding to the exit end of the selected optical fiber bundle.

4,056,311
PROGRESSIVE POWER OPHTHALMIC LENS HAVING A PLURALITY OF VIEWING ZONES WITH NON-DISCONTINUOUS VARIATIONS THEREBETWEEN
John Talley Winthrop, Wellesley, Mass., assignor to American Optical Corporation, Southbridge, Mass.
Continuation-in-part of Ser. No. 389,042, Aug. 16, 1973, abandoned. This application Oct. 1, 1975, Ser. No. 619,143
Int. Cl.² G02C *7/06*
U.S. Cl. 351—169 **19 Claims**

1. An ophthalmic lens comprising a lens body having a first refractive surface viewing zone thereon characterized by

a smooth, unbroken principal meridional curve having continuously varying slope lying along the refractive surface viewing zone in a generally vertical direction and dividing the refractive surface viewing zone into two similar lateral portions, the curvature of the principal meridional curve varying progressively from point to point therealong to provide a predetermined dioptric focal power at each such point according to a predetermined law, the dioptric focal power increasing generally from top to bottom of the viewing zone along the principal meridional curve, and being characterized further by having cross curves defined on the refractive surface viewing zone by planes perpendicular to the principal meridional curve, the curvatures of the cross curves at their points of intersection with the principal meridional curve being respectively equal to the curvature of the meridional curve at the point of intersection,



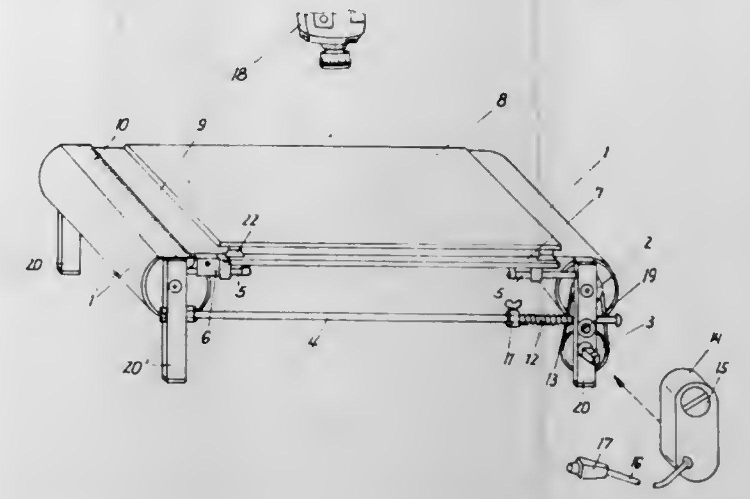
the first refractive surface viewing zone defined by a power range varying from a first dioptric focal power at the top of the viewing zone to a second, higher dioptric focal power at the bottom of the viewing zone, the viewing zone being divided into at least three laterally disposed areas,
a first one of the three areas being centrally disposed in the viewing zone, extending vertically therethrough, and having the principal meridional curve passing through the center thereof, and
the two outermost of the three areas being disposed at the lateral peripheries of the viewing zone and each having a surface so curved that the condition

$$\frac{\partial^2 f}{\partial x \partial y} = 0$$

is fulfilled when y and x are the coordinates in the horizontal and vertical directions respectively of said outermost areas and f is the distance of the refractive surfaces from the x-y plane whereby skew distortion is so optically compensated that at all points on said outermost areas the principal axes of astigmatism lie in vertical and horizontal planes which are parallel to the x and y axes respectively to permit a wearer of the lens to perceive horizontal and vertical lines in the visual environment as being horizontal and vertical.

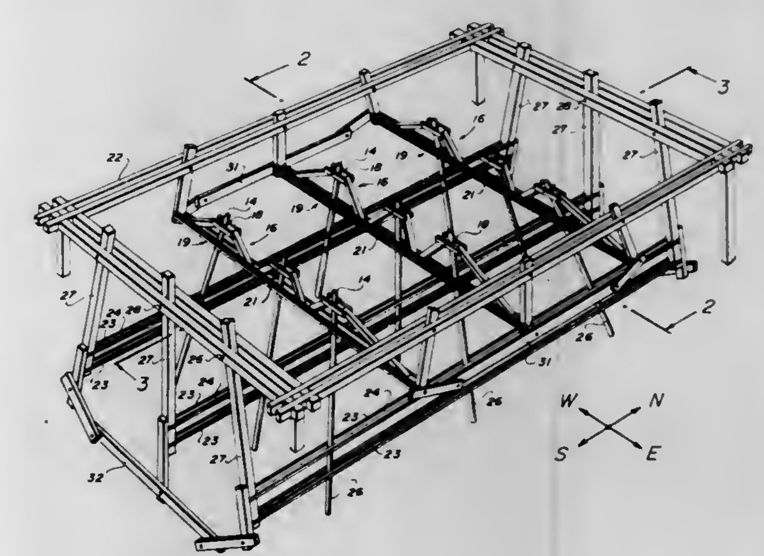
4,056,312
FILM TITLE MACHINE FOR AMATEUR FILMMAKERS
Werner Uhlig, Junkeracker 31, D-7540 Neuenburg, Germany
Filed Apr. 7, 1976, Ser. No. 674,396
Claims priority, application Germany, Apr. 12, 1975, 2516080
Int. Cl.² G03B *21/32*
U.S. Cl. 352—90 **8 Claims**

1. A film titling machine, for use by amateur film makers, which comprises:
a pair of parallel shaft rollers;
a continuous belt driven and supported by said shaft rollers;
two pairs of support legs for supporting said shaft rollers;
longitudinally adjustable rods for holding apart said support legs;
support pads attached to said support legs, parallel to said rods;
a motive plate resting on said support pads, said motive plate protruding beyond the sides of said continuous belt;
distance pieces attached to the sides of said motive plate; and
an object plate, which is transparent and reflection free, resting on said distance pieces parallel to said motive



plate, the upper part of said continuous belt moving between said motive plate and said object plate.

4,056,313
MULTIPLE MIRRORED APPARATUS UTILIZING SOLAR ENERGY
Porter R. Arbogast, 281 W. Langhorne Ave., Bethlehem, Pa. 18017
Filed June 15, 1976, Ser. No. 696,176
Int. Cl.² G03B *21/00;* **F24J** *3/02;* **G02B** *5/08*
U.S. Cl. 353—3 **2 Claims**



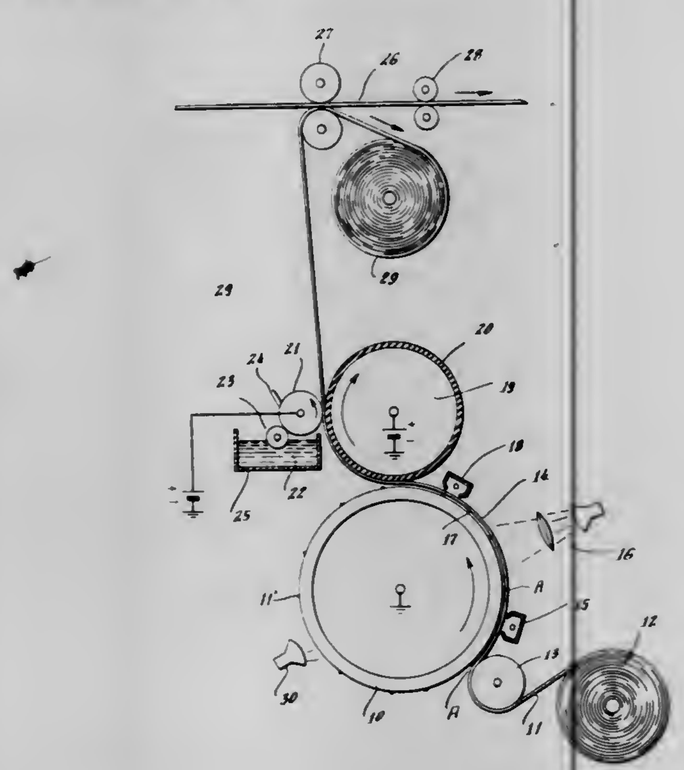
1. A heliostat comprising
a plurality of mirrors arranged in an array of m rows and n columns, each mirror having a reflective surface and a rear surface and a central axis through each surface;
a like plurality of elongated rods, each rod coupled at one end thereof to the rear surface of a corresponding mirror and oriented along the central axis thereof;
n support structures;
pivotal support means for pivotably supporting each rod, near said one end, with respect to said support structures;
n pairs of first guide rails coupled to said support structures, each pair being spaced apart to form a track therebetween for receiving depending portions of said rod to enable said rods to traverse pivotable paths within said tracks within planes each perpendicular to first common fixed plane;
a frame for supporting said support structures;
m pairs of second guide rails, each pair being spaced apart to form a track therebetween for receiving depending portions of said rods near their opposite ends to enable said rods to traverse pivotal paths within said tracks within planes each perpendicular to a second common fixed plane, said second common fixed plane being perpendicular to said first fixed plane;
a plurality of arms coupling said second guide rails to said

frame so that said arms are pivotable with respect to said frame;

first means for pivoting all of said first guide rails along loci parallel to said first fixed plane; and

second means for pivoting all of said second guide rails along loci parallel to said second fixed plane.

4,056,314
LIQUID INK IMAGING SYSTEM
Morton Silverberg, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.
Filed June 4, 1976, Ser. No. 692,704
Int. Cl.² G03G *15/10*
U.S. Cl. 355—10 **4 Claims**



1. An electrostatic imaging apparatus comprising: a photoconductor assembly; means for positioning the inner surface of a dielectric web against said photoconductor whereby an air gap is formed between said photoconductor and said web; first charging means for applying a charge to the outer surface of said web; means for exposing a light pattern through said web, whereby the air gap is ionized and forms a latent image on the inner surface of the web; second charging means for applying a charge to the outer surface of said web sufficient to neutralize said first charge; means for guiding the latent image bearing web away from the photoconductor, including, a conductive roller, having an insulating coating thereon, said roller being biased at a potential sufficient to prevent charge transfer from said assembly to said web; a liquid developing system for developing the latent image on said web; and means for transferring said developed image from said web to an image copy member.

4,056,315
SQUEEZE ROLLER RETRACTION ASSEMBLY
Kenzo Ariyama; Sakae Ota, both of Tokyo; Sunao Ikeda, and Toyoo Okamoto, both of Yokohama, all of Japan, assignors to Ricoh Company, Ltd., Japan
Filed Jan. 9, 1976, Ser. No. 647,816
Claims priority, application Japan, Jan. 14, 1975, 50-6714
Int. Cl.² G03G *15/10, 21/00*
U.S. Cl. 355—10 **8 Claims**

1. An electrophotographic copying machine comprising, in combination, a phtosensitive drum; a pair of sidewalls for rotatably mounting said drum therebetween; one of said sidewalls having an opening to permit a passage of said drum therethrough; a cover plate detachably mounted on said one sidewall to cover the opening and rotatably mounting a corresponding end of said drum; a squeeze member, normally maintained close to the peripheral surface of said drum, mounted on said sidewalls, for removing an excess amount of a developing solution from the drum surface; and a squeeze member retraction assembly comprising:

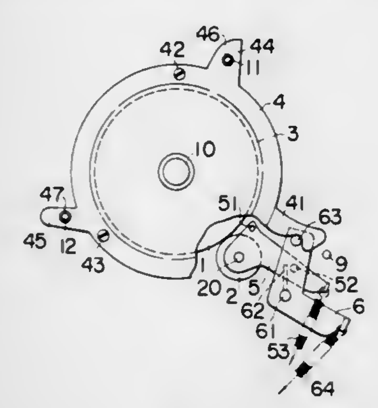
a. first lever means swingable about a stationary axis parrallel to the axis of said drum and supporting said squeeze member,

b. first spring means connected to said first lever means for urging the squeeze member to be maintained close to said drum surface,

c. second lever means having a detent member attached thereto and mounted for movement of said detent member in a plane perpendicular to the drum axis along a predetermined path,

d. second spring means connected to said second lever means,

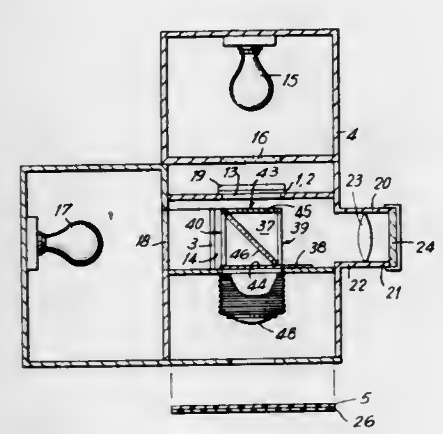
e. detent plate means, including a detent portion releasably



engageable with said detent member against the bias of said second spring means, mounted on said cover plate and extending over and in the detent member path when the cover plate is mounted on said one side wall, and said detent portion releasing said detent member in response to dismounting of said cover plate from said one side wall, and

f. means operable to interconnect said first and second lever means when said detent member is released from said detent portion, whereupon said second spring means overcomes the bias of said first spring means to move said squeeze member away from the drum surface, said detent portion reengaging said detent member in response to remounting of said cover plate on said one sidewall to disconnect said second lever means from said first lever means for movement of said squeeze member close to the drum surface by the bias of said first spring means.

4,056,316
METHOD AND APPARATUS FOR MAKING A PRINT OF AN OBJECT
Howard C. Zutrauen, 119-05 103rd Ave., Richmond Hill, N.Y. 11419
Filed Apr. 9, 1976, Ser. No. 675,306
Int. Cl.² G03B *27/32, 35/14*
U.S. Cl. 355—22 **9 Claims**



1. A method of making a print of an object, photographed by

a stereo camera to provide first and second stereo transparencies thereof, which print appears to the human eye to be three-dimensional, said method comprising the steps of

copying one of the first and second transparencies to prepare a third transparency;

optically superimposing the first transparency provided by the stereo camera and the third transparency on each other to provide a first combination of light;

preparing a line screen negative having a plurality of black lines of equal thickness in parallel relation equidistantly spaced from each other by clear lines equal in thickness to the black lines;

exposing photosensitive material to the first combination of light via the line screen negative to provide a first exposure;

optically superimposing the second transparency provided by the stereo camera and the third transparency on each other to provide a second combination of light;

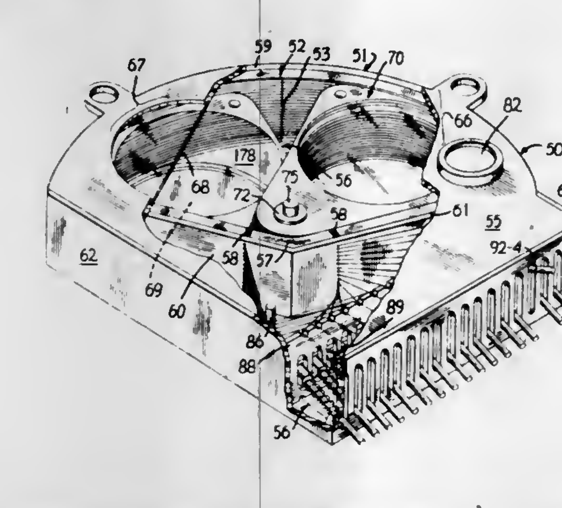
shifting the line screen negative in position by the thickness of a black line thereof on the first exposure;

re-exposing the photosensitive material to the second combination of light via the shifted line screen negative to expose the line of the first exposure covered by the black lines of the negative in providing the first exposure to provide a complete exposure;

printing the complete exposure as a single print; and

lenticulating the print whereby it appears to be three-dimensional to a human eye.

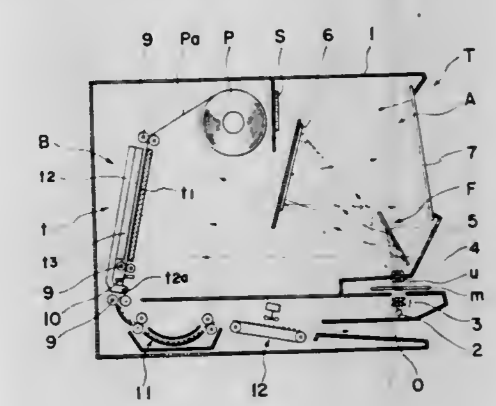
4,056,317
APPARATUS FOR SELECTIVELY MODULATING THE COLOR OF LIGHT BEAM PATHS OF PHOTOGRAPHIC COLOR RECORDERS
John Hopkins Lewis, 32 Franklin Road, Teaneck, N.J. 07666
Filed Feb. 11, 1976, Ser. No. 657,254
Int. Cl.² G03B *27/32*
U.S. Cl. 355—32 **11 Claims**



1. Apparatus for selectively inserting into and withdrawing color absorption filters from the light beam paths of photographic color recorders; comprising

1. a housing defining a plural-section chamber and having opposed and spaced sidewalls with the latter in an operational section of the chamber provided with opposite windows closed by suitable optical transparencies through which the light beam path of a photographic color recorder may extend upon suitable beam-intercepting support of said housing in a certain orientation dictated by the predetermined path of such beam;
2. a stack of planar color absorption filters, having substantially uniform indices of refraction and arranged in groups within a storage section of the chamber located offset from the windowed operational section with those in one group being of the color cyan, those in a second group being of the color magenta and those in the third group being of the color yellow;
3. manipulative means capable of moving individually and selectively each such filer from the stack in the storage section to positions of stacking between said windows substantially normal to the light beam path extending therethrough and back again into the storage section;
4. means sealing in a liquid-tight manner at least the sides and bottoms of the entire chamber including its storage and operational section; and
5. a body of transparent colorless liquid having an index of refraction substantially equal to that of the filters and located in the chamber and its sections in a quantity to maintain immersion therein of said filters in their positions of storage and operation and movements therebetween.

4,056,318
OPTICAL SYSTEM FOR USE IN MICROFILM READING AND PRINTING APPARATUS
Yutaka Watanabe, Tokyo, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan
Filed Apr. 14, 1976, Ser. No. 676,887
Claims priority, application Japan, Apr. 22, 1975, 50-55644[U]
Int. Cl.² G03B *27/32, 21/28*
U.S. Cl. 355—45 **6 Claims**

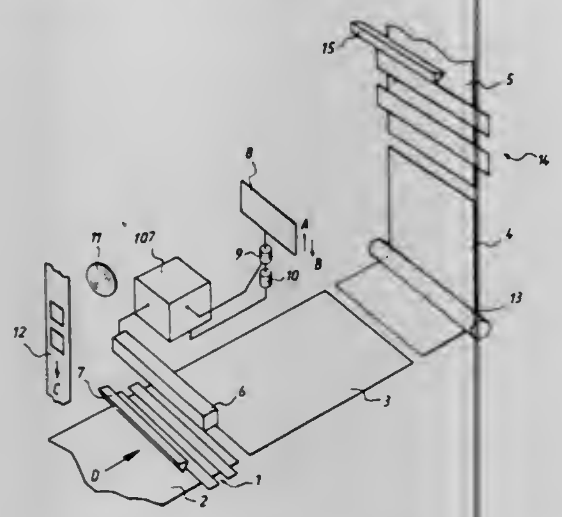


1. An optical system for use in a microfilm reading and printing apparatus which comprises a lens assembly for selectively projecting, on an enlarged scale, image light of information on a microfilm illuminated by a light source onto an exposure station of a printing section and onto an observation screen of the microfilm reading and printing apparatus, a first reflecting mirror, a second reflecting mirror, said first reflecting mirror being displaceable between a first position thereof for projecting said image light through said lens assembly onto said exposure station and a second position thereof for projecting said image light onto said second reflecting mirror, said second reflecting mirror being displaceable between a first position thereof for projecting said image light from said first mirror at said second position onto said observation screen and a second position thereof spaced away from a path of said image light between said first reflecting mirror at said first position and said exposure station, said first and second reflecting mirrors being disposed for intercepting outside light entering from said observation screen when the former is at said first position and the latter is at said second position, and driving means for positioning said first reflecting mirror to said second position and said second reflecting mirror to said first position during reading, and also for positioning said first reflecting mirror to said first position and said second reflecting mirror to said second position during printing.

4,056,319
MICROFILM RECORDING APPARATUS
Klaus Mischo, Munich, Germany, assignor to AGFA-Gevaert, A.G., Leverkusen, Germany
Filed Sept. 29, 1975, Ser. No. 617,446
Claims priority, application Germany, Sept. 27, 1974, 2446240
Int. Cl.² G03B *27/74, 27/78*
U.S. Cl. 355—68 **16 Claims**

1. Arrangement for making copies on microfilm of a sequence of originals having lengths varying between a maximum and a minimum length comprising, in combination, first

transport means transporting said sequence of originals along a predetermined path in the direction of said length, past a measuring station and a filming station provided with exposure control means spaced from said measuring station by a predetermined distance along said path corresponding to said maximum length; scanning means for illuminating said original, scanning said original along successive scan lines extending transverse to the transport direction of said original and effecting the scanning along each such scan line progressively along the length of the scan line, and furnishing scanning signals

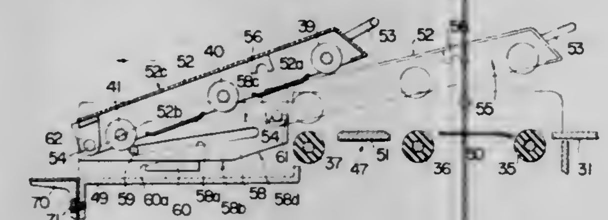


corresponding to the quantity of light reflected by the scanned original; storage means connected to said scanning means, for furnishing a stored scanning signal having a predetermined relationship to said scanning signals; exposure control means at said filming station for addressing said storage means just prior to the time said original reaches said filming station and atjusting said exposure control means in dependence upon said stored scanning signal; and reset means for resetting said storage means after said original has passed through said filming station.

4,056,320
COPYING MACHINE

Hideaki Mochimaru, Yokohama, and Yugoro Kobayashi, Suginami, both of Japan, assignors to Ricoh Company, Ltd., Japan

Filed May 6, 1976, Ser. No. 683,762
Claims priority, application Japan, May 10, 1975, 50-55591
Int. Cl.^{2} G03B *27/62*
U.S. Cl. 355—75 **7 Claims**



1. A copying machine, which permits a selective use of either a single sheet original or a file original comprising:

a. main body

b. a plurality of drive rollers disposed on the underside of a path of movement of an image bearing surface of an original to be copied with their axes extending transversely of said path, and mounted on said body for rotation,

c. marginal driven rollers each mounted on said body on the other side of said path for cooperation with end portions of a respective drive rollers,

d. a transparent sheet member arranged to be fed between said drive rollers and said marginal driven rollers from an inlet of said path, thereby to be moved along said path while receiving a file original thereon,

e. intermediate driven rollers, each engageable with the remaining intermediate portions of said drive rollers on the other side of said path, to form nips therebetween for moving a single sheet original fed from said path inlet,

f. frame means, mounting said intermediate driven rollers thereon, movable between a first position, in which said intermediate driven rollers engage with respective drive rollers, and a second position, in which it is closely juxtaposed to the region in which said drive rollers are disposed along a direction parallel to said path while its top extremity is below an extension of said path,

g. guide means guiding the movement of said frame means between said first and second positions without substantial change in the orientation of said frame means,

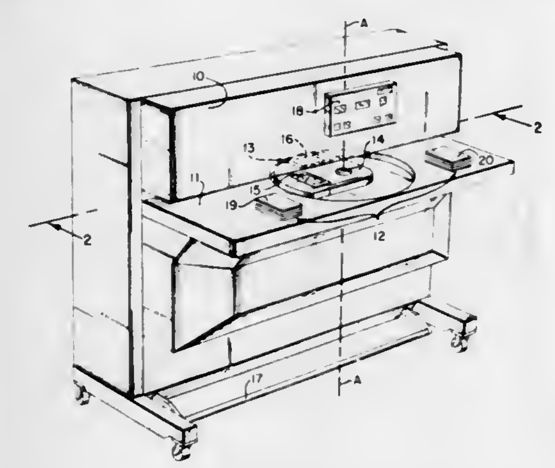
h. handle means provided at a front end of said frame means corresponding to said path inlet to be gripped by an operator to manually move said frame means between said first and second positions, and

i. means for scanning an image of an original during its movement along said path.

4,056,321
MICROFICHE DUPLICATING APPARATUS

Karl H. Gensike, Northridge; Robert C. Marsh, El Monte, and John D. Reinhard, Los Angeles, all of Calif., assignors to Dymat Photomatrix Corporation, Santa Monica, Calif.

Filed June 25, 1976, Ser. No. 700,046
Int. Cl.^{2} G03B *29/00, 27/04*
U.S. Cl. 355—99 **5 Claims**



1. A microfiche duplicating apparatus including, in combination:

a. a housing supporting a table defining a work loading station exterior of the housing and a light exposure station within said housing;

b. a platen carrier set in said table and mounted for movement between first and second positions, said carrier having first and second platens in spaced relationship such that when said carrier is in said first position, the first platen is exterior of said housing adjacent to said work loading station and the second platen is positioned within said housing at said light exposure station, and when said carrier is in said second position, said first platen is positioned within said housing at said light exposure station and said second platen is exterior of said housing adjacent to said work loading station;

c. a contacting platen positioned in said housing and movable into opposed engaging relationship with that one of the first and second platens positioned at said light exposure station;

d. a reel of microfiche film mounted in said housing;

e. a driving capstan means in said housing receiving the microfiche film from said reel for moving successive given lengths of said film to said light exposure station between said contacting platen and that one of said first and second platens positioned at said light exposure station;

f. roller means in said housing between said reel and driving capstan means for guiding movement of said microfiche film from said reel to said light exposure station, said roller means including a lever having a pair of rollers mounted

on opposite ends and being centrally pivoted to said housing, said microfiche film from said reel passing between said pair of rollers; and biasing means biasing said lever to a first position such that pulling of the film over the pair of rollers by said driving capstan means swings said lever to a second position against the bias of said biasing means, said biasing means thereafter returning said lever to said first position, a given length of microfiche film corresponding to each of said given lengths being drawn from said reel by said pair of rollers upon return of the lever to its first position so that the driving capstan means in moving said microfiche film through said successive lengths always pulls against the same resistance forces exerted by said biasing means independently of the amount of film on said reel;

g. a light source in said housing for exposing the given length of said microfiche film positioned at said light exposure station;

h. cutting means in said housing for cutting said successive given lengths of said film after the same have been moved from said light exposure station to provide exposed microfiche;

i. film developing chamber means in said housing for successively receiving the cut lengths of microfiche and developing the same; and

j. motor means for moving said platen carrier and driving said driving capstan means whereby a first master microfiche of which a duplicate is to be made may be positioned at said work loading station on said first platen and moved into said housing to effect a contact print with one of said given lengths of microfiche film at said light exposure station when said light source is energized, and whereby a second master microfiche may be positioned on said second platen during the time of exposure to said light source of said first master microfiche and moved into said housing for exposure with a next successive length of microfiche film during which time said first platen is available at said work loading station for removal of said first master microfiche and insertion of a third master microfiche, successive copies of successive master microfiches being made in a similar manner such that the time involved in duplicating a large number of microfiche masters is reduced as compared to the time required if only a single platen for receiving a microfiche master were available.

4,056,322
PREPARATION OF ETHERS OF MONOSACCHARIDES

Paul Gordon; Bruce Ronsen, both of Chicago, and Shrikant V. Kulkarni, Lombard, all of Ill., assignors to Strategic Medical Research Corporation, Murray, Utah

Continuation-in-part of Ser. No. 424,786, Dec. 14, 1973, Pat. No. 3,939,146, which is a continuation-in-part of Ser. No. 337,134, March 1, 1973, Pat. No. 3,939,145. This application Mar. 28, 1975, Ser. No. 563,080
Int. Cl.^{2} C07H *15/04, 5/06*
U.S. Cl. 536—4 **20 Claims**

1. In a method of preparing an ethereally substituted monosaccharide comprising the step of reacting

1. a monosaccharide derivative having the general formula A-O-H, wherein O is oxygen, H is hydrogen and A is the residue of a monosaccharide selected from the group consisting of pentoses, hexoses and heptoses which has been derivatized with at least one substance selected from the group consisting of (1-a) at least one alcohol containing 1–18 carbon atoms to produce an acetal group at the site of at least one available hydroxyl residue. (1-b) at least one aldehyde containing 1–18 carbon atoms to produce at least one acetal group at the site of at least one available hydroxyl residue, (1-c) at least one ketone containing 1–18 carbon atoms to produce at least one ketal group at the site of at least one available hydroxyl residue, and (1-d) at least one organic acid residue containing 1–18 carbon atoms to produce an ester group at the site of at least one available hydroxyl residue, the said hydrolyzable acetal groups (1-a) and (1-b), ketal group (1-c) and ester group (1-d) being removable from said A by hydrolysis in an acidic aqueous medium having a pH value less than 7,

2. an organic halide having the general formula Y-X, wherein X is selected from the group consisting of chlorine, bromine and iodine and Y is selected from the group consisting of (2-a) cyclic monovalent nitrogen containing organic radicals and residua free of carbonyl oxygen and (2-b) monovalent organic radicals and residua having the general formula $-R_1-B$, wherein B is selected from the group consisting of

$$\begin{array}{c}-N-R_2,\\ |\\ R_3\end{array}$$

$-O-R_4$ and $-S-R_4$, R_1 is a divalent organic radical having a linear carbon chain length of about 1–7 carbon atoms, R_2 and R_3 are selected from the group consisting of —H, —OH, —SH, halogen and monovalent organic radicals and residua having a linear carbon chain length of about 1–7 carbon atoms, R_4 is selected from the group consisting of —H and monovalent organic radicals and residua having a linear carbon chain length of about 1–7 carbon atoms, N is nitrogen, O is oxygen, S is sulphur and H is hydrogen,

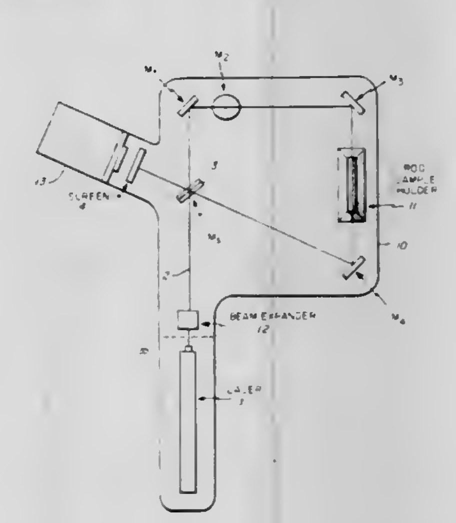
the said hydrogen atom H of the monosaccharide derivative A-O-H and the said halogen atom X of the organic halide being reactive whereby the said H is replaced by Y to produce an ethereally substituted monosaccharide derivative having the general formula A-O-Y wherein A and Y are as above defined,

the improvement which comprises reacting said monosaccharide derivative (1) and the said organic halide (2) at an elevated reaction temperature below the thermal decomposition temperature thereof while dissolved in an anhydrous organic solvent in the present of a solid anhydrous strong inorganic base of a metal selected from the group consisting of the alkali metals and the alkaline earth metals and in the presence of a dehydrating agent which is a scavenger for water whereby anhydrous reaction conditions are maintained throughout the reaction.

4,056,323
INTERFEROMETER OPTICAL SYSTEM

Jacques E. Ludman, 98 Old Lowell Road, Westford, Mass. 01886

Filed Apr. 2, 1975, Ser. No. 564,498
Int. Cl.^{2} G01B *9/02*
U.S. Cl. 356—106 R **8 Claims**



1. An interferometer optical system for measuring the positions of first and second space subject mirrors comprising,

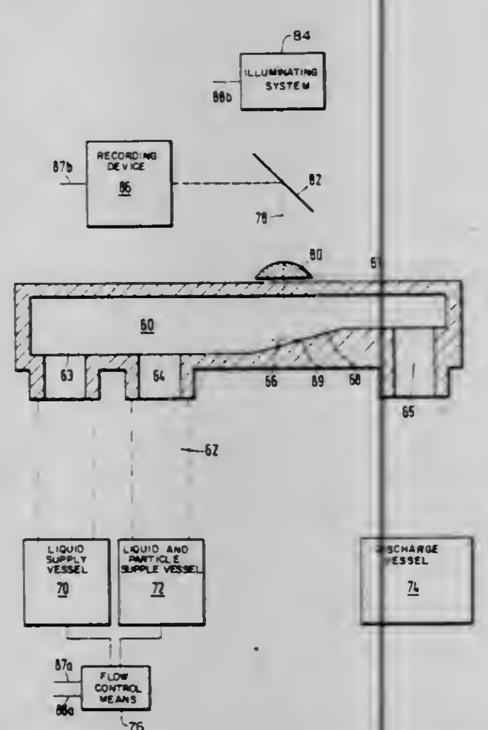
a source of coherent radiation directed along an initial path,

a target for the radiation,

means in said path for splitting said radiation into two substantially equal beams, a first beam and a second beam,

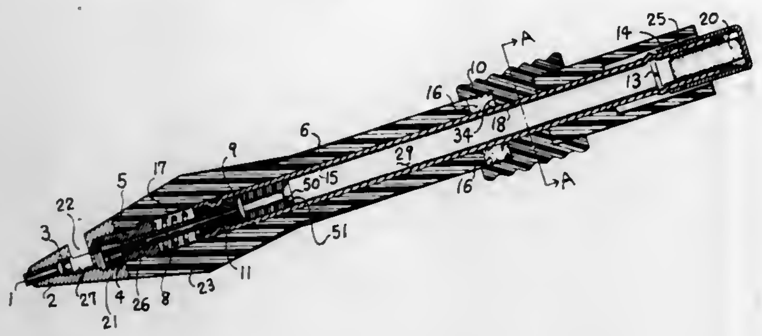
first optical means including first, second and third mutually perpendicular mirrors for directing the first beam normal to the first spaced mirror,
second optical means for directing the second beam normal to the second spaced mirror,
the first optical means serving to direct the first beam which reflects from the first spaced mirror back to the beam splitting means,
the second optical means serving to direct the second beam which reflects from the second spaced mirror back to the beam splitting means, and
at said beam splitting means, at least a portion of said reflected first and second beams are superimposed and directed to said target,
whereby light patterns appearing on the target are indicative of the positions of the first and second subject mirrors.

4,056,324
APPARATUS FOR COUNTING AND/OR MEASURING PARTICLES SUSPENDED IN A FLUID MEDIUM
Hildegard Göhde, von-Stauffenberg-Str. 40, 4400 Munster, Germany
Filed May 5, 1976, Ser. No. 683,340
Claims priority, application Germany, May 10, 1975, 2521236
Int. Cl.² G01N *21/00*
U.S. Cl. 356—246 **8 Claims**



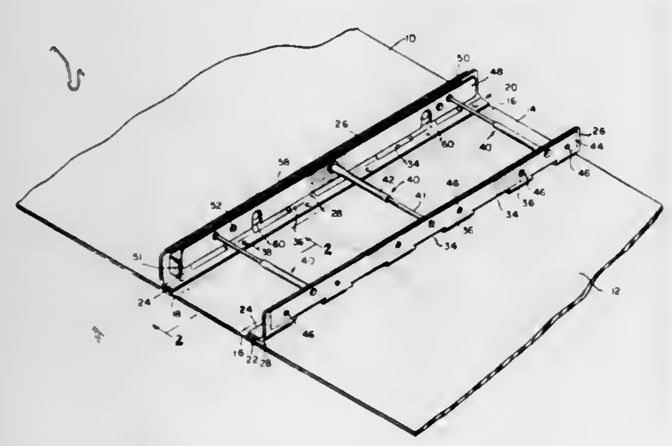
1. In an apparatus for counting and/or measuring particles suspended in a fluid medium,
a flow cell having spaced apart cover wall means and bottom wall means for defining a flow channel therebetween,
a first inlet to said channel and an outlet from said channel at opposite ends thereof for establishing a general direction of flow in said channel going from said first inlet to said outlet,
a second inlet to said channel in said bottom means between and spaced from said first inlet and said outlet,
means in said cover wall means bordering a section of said channel between said second inlet and said outlet defining a window extending substantially parallel with said general direction of flow within said section,
said bottom wall means including a substantially plane surface opposite said window and inclined relative to said general direction of flow so that the cross-sectional area of said channel is reduced in said general direction, and
observation means having an axis of observation passing through said window for defining an observation area between said window and adjacent said inclined plane surface, said observation area being a plane extending from said inclined plane surface into said channel parallel to said window.

4,056,325
MECHANICAL PENCIL
Tadaaki Maruyama, 1089-130 Nedo, Abiko, Chiba, Japan (270-11)
Filed Apr. 5, 1976, Ser. No. 673,884
Claims priority, application Japan, Apr. 7, 1975, 50-41191
Int. Cl.² B43K *21/16, 21/00*
U.S. Cl. 401—65 **5 Claims**



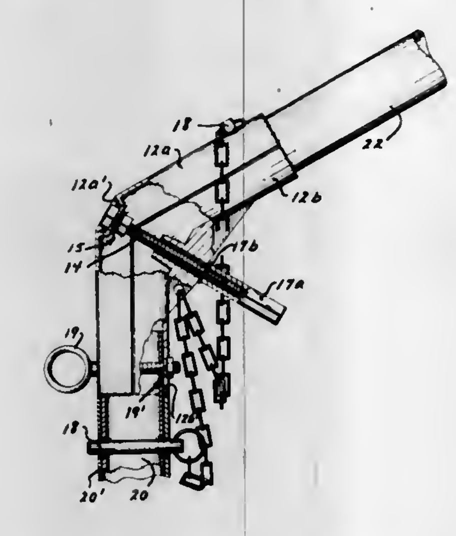
1. A push-out type mechanical lead pencil comprising:
an outer tube means for forming a pencil body;
a bulb at the lower end of said outer tube means where a writer's fingers are positioned while writing;
a hollow tip mount at the forward end of said outer tube means and extending therefrom, the forward portion extending from said outer tube means being threaded;
a hollow tip member threaded onto the forward end of said tip mount;
a collet chuck means expandable within and extending rearward from said hollow tip for holding lead therein;
an inner tube means longitudinally moveable coaxially within said outer tube means for holding lead therein and for forcing against said collet chuck;
push button means at the end of said inner tube means extending outside said outer tube means for moving said inner tube means;
said outer tube means further having at least one longitudinal slot therein parallel to the axis of said tube at the portion of said outer tube means where the web of the writer's thumb and index finger contact said outer tube means; and
a slider at least partially circumferentially surrounding and slidable along said outer tube member, said slider being fitted through said slot in said outer tube means and contacting said inner tube means.

4,056,326
LOOSE LEAF BINDER
Kenneth Z. Crawford, Crawfordsville, Ind., assignor to Crawford Industries, Inc., Crawfordsville, Ind.
Filed Aug. 6, 1975, Ser. No. 602,229
Int. Cl.² B42F *13/30*
U.S. Cl. 402—30 **8 Claims**



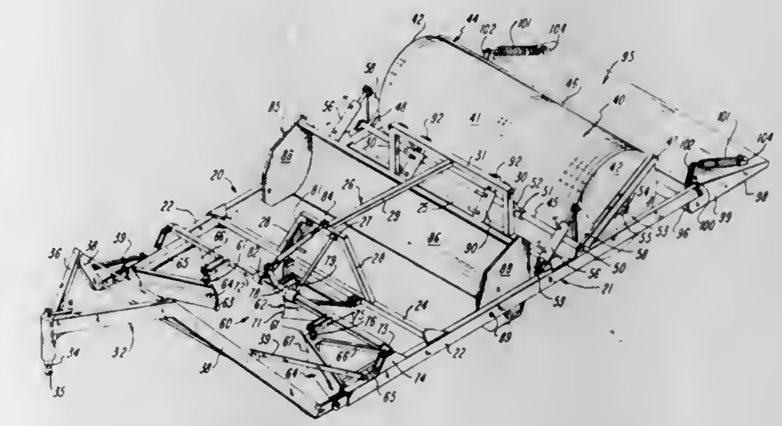
4. A loose leaf binder, comprising
stiff front and rear covers and a stiff backbone of fixed width to which the covers are hinged on hinge lines at their inner edges for movement between a closed position in which the covers lie in spaced face-to-face relation and an open position in which the covers are substantially coplanar with the backbone,
a post-mounting unit fixed to the inner face of each cover adjacent its hinged edge, each such unit being an elongated member of stiff plastic material having an elongated base strip along one edge thereof and fixed to the cover with a free edge adjacent the cover hinge line and extending outwardly of said hinge line to an outer edge spaced from the cover hinge line, a post-supporting strip along the opposite edge thereof, and a web extending from the outer edge of the base strip to the post-supporting strip and containing at least two spaced flex lines about which the edge strips may swing relative to each other,
post mechanism including a plurality of extensible posts having mounting means at their ends secured to said post-supporting strips in a manner so as to hold such strips in substantially parallel spaced planes perpendicular to said posts, said mounting means including post-supporting bars lying flat against the outer faces of said post-supporting strips,
the arrangement being such that in the closed position of the covers, the post-supporting bars lie substantially flat against the inner faces of the covers, the post-supporting strips lie substantially flat against such bars, outwardly from and in offset parallel relation with the edge strips to which they are connected by the webs, so that there is a leaf-receiving space between the post-supporting strips, and the posts are in shortened state and generally perpendicular to the covers, and as the covers are swung outward toward their open position, the webs of the post-mounting units are flexed on each of their spaced flex lines, and the post-supporting strips are held in substantially parallel spaced relation but are carried outward with the outward-swinging outer edges of the base strips so as to extend and lift the posts and widen the leaf-receiving space between the post-supporting strips and said web portions swing upward from the covers to inclined positions between the base and post-mounting strips.

4,056,327
CORNER CONNECTOR
John J. Daus, Jr.; Henry E. James, and Thomas L. Reinhart, all of Evansville, Ind., assignors to Anchor Industries, Inc., Evansville, Ind.
Filed Feb. 19, 1976, Ser. No. 659,410
Int. Cl.² F16L *41/00*
U.S. Cl. 403—172 **1 Claim**



1. A two-part corner member defined as an outer member and an inner member, said outer member and said inner member each arranged to include four corresponding and converging arm sections which fit together to encircle and receive tubular frame members, two of said arm sections being at a right angle to each other and in the same horizontal plane, another of said arm sections being vertically disposed, and the other of said arm sections angling upwardly and inwardly with respect to said two of said arm sections, and independent bolt and nut fastening means extending through said outer member and said inner member at the area of convergence of said arm sections selectively securing said outer member and said inner member in an assembled relationship.

4,056,328
SNOW GROOMER FOR SNOWMOBILE TRAILS
Loren R. Maxey, 615 S. Loomis, Fort Collins, Colo. 80521
Filed Feb. 17, 1977, Ser. No. 769,733
Int. Cl.² E01C *19/41*
U.S. Cl. 404—96 **5 Claims**

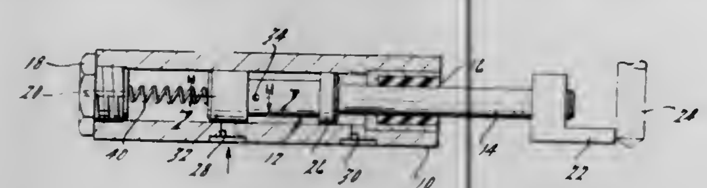


1. Apparatus adapted to be towed by a dirigible tracked vehicle for grooming snow on snowmobile trails, said apparatus comprising, in combination:
a generally horizontal main frame;
a hitch supporting the forward end of said frame adapted for towing engagement with the tracked vehicle;
means on said hitch for raising and lowering the same relative to the vehicle thereby to raise or lower the forward end of said main frame relative to the snow surface being groomed;
a packing roller mounted transversely within and supporting the rear end of said frame and for compacting the snow surface being groomed;
means for adjusting the position of said main frame relative to the packing roller, thereby to raise and lower the rear end of said main frame relative to the snow surface being groomed;
a moldboard scraper mounted transversely within said main frame in front of said packing roller for scraping and leveling the snow surface being groomed;
means adjustably mounting said moldboard scraper on said frame for raising and lowering said moldboard relative to the snow surface being groomed;
cutting blades mounted within the forward end of said frame for cutting and moving snow toward the longitudinal center axially of said frame;
means adjustably mounting said cutting blades on said main frame for varying the position and cutting depth of said blades reltive to said main frame;
and a floating pan secured to the rear of said main frame for smoothing the snow surface which has been cut by said cutting blades, leveled by said molboard and compacted by said packing roller thereby to provide a smoothed and leveled snow trail for snowmobiles.

4,056,329
DETECTION SYSTEM FOR MACHINE TOOLS
Louis James Perry, Oak Park, Mich., assignor to Invo Spline, Inc., Warren, Mich.
Filed Mar. 8, 1976, Ser. No. 664,681
Int. Cl.² B23B *49/00*
U.S. Cl. 408—6 **8 Claims**

1. In a detecting device for use with a machine operable through a cycle of operation upon energization of a pressure responsive switch, the improvement comprising a pneumatically operable detecting device including a movable detecting

member, means biasing said detecting member to an extended position into engagement with a target such as a tool bit or workpiece the presence of which is necessary to proper operation of the machine, said detecting device including a pressure port and a sensing port, and a control system including a source of air under pressure, means operable upon energization of said control system for supplying air under pressure to said pressure port to hold said detecting member in retracted posi-



tion, means operable to block the flow of air to said pressure port and simultaneously to supply air under pressure to said sensing port, means venting said sensing port except when said detector member is moved by its biasing means to a position blocking said sensing port and engaging said target, and means responsive to the build-up of pressure at said sensing port due to said blockage to supply air under pressure to said pressure responsive switch.

4,056,330

METHOD FOR ADJUSTING THE OUTPUT OF A PUMP PROVIDED WITH AN ADJUSTABLE SPRAY CONE WITH MOVABLE BLADES

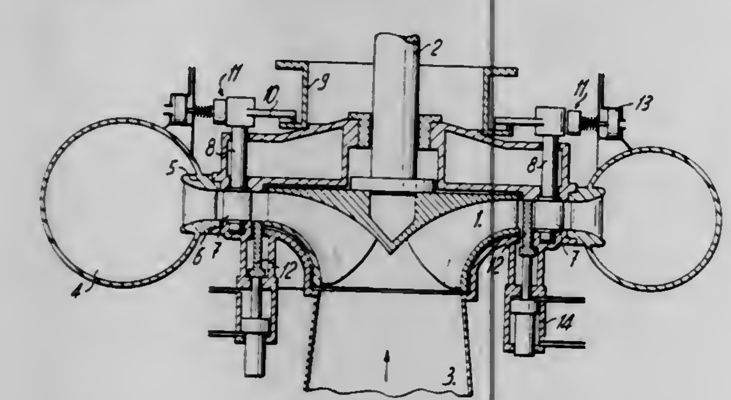
Jean Lieber, Geneva, Switzerland, assignor to Ateliers des Charmilles S.A., Geneva, Switzerland

Filed Sept. 29, 1975, Ser. No. 617,798

Claims priority, application Switzerland, Oct. 3, 1974, 13293/74

Int. Cl.² F01D *21/00*

U.S. Cl. 415—1 **1 Claim**



1. A method for adjusting the output of a machine having a rotor which is operable both as a pump or turbine, said machine including a diffuser provided with normally locked movable directing blades and a sleeve valve, said method consisting of unlocking, adjusting and re-locking the angular setting of said blades to change the amount of power produced without shutting off the intake of water to said rotor when the machine is used as a turbine, and when said machine is used as a pump, said method consisting of driving said rotor, continuing the driving of said rotor preparatory to adjusting the output of said pump, closing fully said sleeve valve to put the pump under still water conditions, unlocking said movable directing blades without stopping the rotor, adjusting said blades to adjust the subsequent throughput of the pump, re-locking said blades and then opening said sleeve valve to initiate the operation of an adjusted throughput of the pump.

4,056,331

TURBINE CONTROL SYSTEM

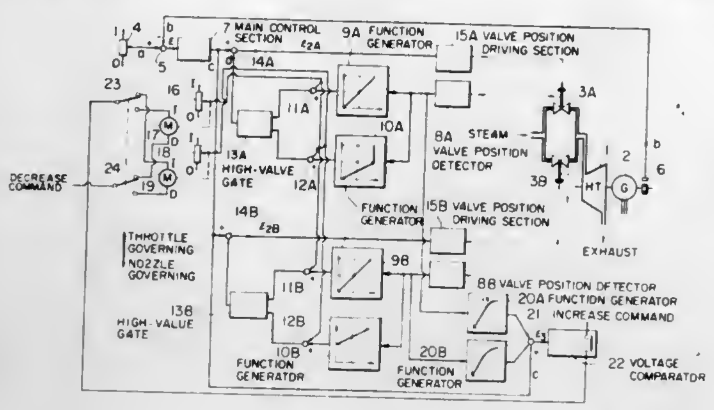
Seiko Sato, Tokyo, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Japan

Filed Jan. 27, 1976, Ser. No. 652,849

Claims priority, application Japan, Jan. 31, 1975, 50-12361

Int. Cl.² F01B *25/04*

U.S. Cl. 415—15 **9 Claims**



1. A turbine control system for changing two speed governing operations of a steam turbine from a throttle governing operation to a nozzle governing operation and vice versa by controlling a plurality of steam control valves on the basis of a main control flow-rate request signal, which system comprises:

a. first group of function generators for the throttle governing operation operatively coupled to said steam control valves for producing function outputs, as throttle governing feedback signals, in response to the opening degrees of said steam control valves, respectively;

b. a second group of function generators for the nozzle governing operation operatively coupled to said steam control valves for producing function outputs, as nozzles governing feedback signals, in response to the opening degrees of said steam control valves, respectively;

c. bias subtracting means connected to said function generators of the first and second groups for subtracting two bias signals from said feedback signals produced by said function generators of the first group and said feedback signals produced by said function generator of the second group to produce output signals, respectively;

d. a high-value gate circuit provided for each steam control valve for passing the higher of said output signal applied thereto by said bias subtracting means;

e. first means operatively connected to said steam control valves for producing a difference signal between said main control flow-rate request signal and the sum of signals representative of actual flow-rates of said steam control valves; and

f. second means connected between said first means and said bias subtracting means for increasing, according to said difference signal, one of said two bias signal which is subtracted from said feedback signals produced for one of said two speed governing operations which is not one intended to effect, and for decreasing the other bias signal which is subtracted from the feedback signals produced for the other governing operation intended to effect,

whereby during a period of changing said two governing operation, an output of said turbine is kept unchanged and no thermal shock is caused to said turbine.

4,056,332

COOLED TURBINE BLADE

Beat Meloni, Zurich, Switzerland, assignor to BBC Brown Boveri & Company Limited, Baden, Switzerland

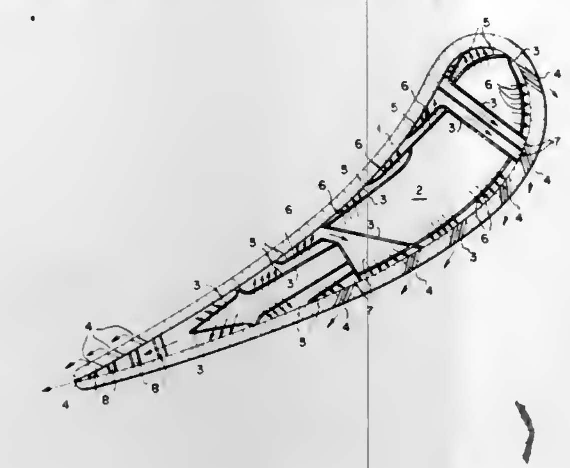
Filed May 5, 1976, Ser. No. 683,488

Claims priority, application Switzerland, May 16, 1975, 6370/75

Int. Cl.² F01D *5/18*

U.S. Cl. 416—97 A **3 Claims**

1. A turbine blade including a cavity extending generally longitudinally therein and into which air for cooling the interior wall of the blade is admitted, a plurality of inserts disposed in the cavity adjacent the interior wall of the blade and arranged in a row between the leading and trailing edges thereof, each said insert being constituted by a plurality of stepped overlapping walls with air passages therethrough and which



establish therebetween corresponding adjacent air turbulence and cooling spaces interconnected by said passages and bounded respectively at one side by the interior blade wall, the cooling air passing from said cavity into and through the cooling spaces of each said insert in succession for impingement upon the blade wall and being discharged to the exterior of the blade through an outlet port formed in the blade wall.

4,056,333

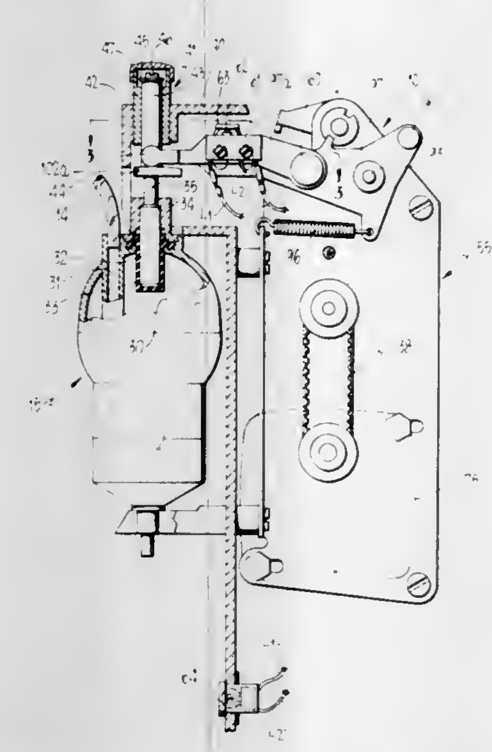
INTRAVENOUS FEEDING PUMP FAILURE ALARM SYSTEM

Ingemar H. Lundquist, Oakland, Calif., assignor to Valleylab, Boulder, Colo.

Continuation of Ser. No. 488,581, July 15, 1974, abandoned. This application Nov. 26, 1975, Ser. No. 635,656

Int. Cl.² F04B *21/00;* **A61M** *5/16;* **F04B** *49/10*

U.S. Cl. 417—44 **14 Claims**



1. In combination with an intravenous feeding pump having:

a. pumping chamber having an inlet and an outlet,

b. inlet valve means disposed in the inlet and outlet valve means disposed in the outlet,

c. a plunger serving as a pumping member projecting through the wall of said chamber and having an outer end portion always extending out of said chamber whereby the plunger can be reciprocated between first and second positions in said chamber,

d. resilient biasing means for returning said plunger to the first position,

e. a pump actuator having means adapted to urge the outer end of said plunger to the second position against the force of the resilient biasing means and;

an alarm system comprising:

1. means for sensing failure of said plunger to return to its inoperative position, and
2. signal means operated by said sensing means.

4,056,334

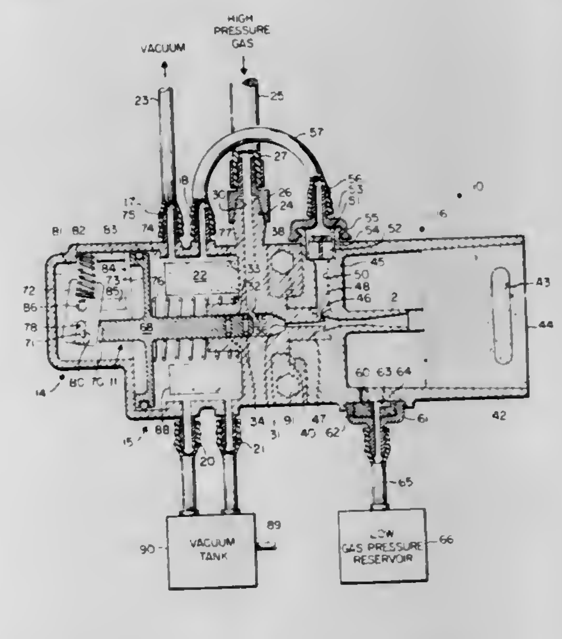
VACUUM SYSTEM

William S. Fortune, 14250 Dearborn St., Panorama City, Calif. 91402

Filed May 12, 1975, Ser. No. 576,612

Int. Cl.² F04F *5/52*

U.S. Cl. 417—189 **16 Claims**



1. A demand operated vacuum pump comprising:

a. a venturi tube;

b. means including a passageway for supplying compressed gas to said venturi tube;

c. means for forming a vacuum chamber;

d. conduit means for exhausting the air from said vacuum chamber and connected to the throat of said venturi tube;

e. unitary piston means disposed in said vacuum chamber and capable of moving from one end position to the other, said piston means having a valving portion capable by said moving of opening and closing said passageway to permit or prevent the compressed gas from entering said venturi tube;

f. spring means associated with said piston means and disposed in said housing for urging said piston into one end position, while an existing vacuum tends to urge said piston in the other end position, thereby to close off the supply of compressed gas; and

g. means coupled to said piston means for causing said piston means to rapidly snap from one end position to the other.

4,056,335

SUBSURFACE PUMPING INSTALLATION FOR HANDLING VISCOUS OR SAND-LADEN FLUIDS

Walter S. Secrist, Dallas, Tex., assignor to United States Steel Corporation, Pittsburgh, Pa.

Filed Jan. 29, 1976, Ser. No. 653,425

Int. Cl.² F04B *39/00*

U.S. Cl. 417—431 **16 Claims**

1. In a subsurface pumping installation which includes:

parallel power and production tubing strings;

a pump barrel at the lower end of said power tubing string;

sucker rods extending down said power tubing string;

a plunger movable up and down within said barrel;

means connecting said plunger with said sucker rods;

a crossover affording communication between said pump barrel and said production tubing string;

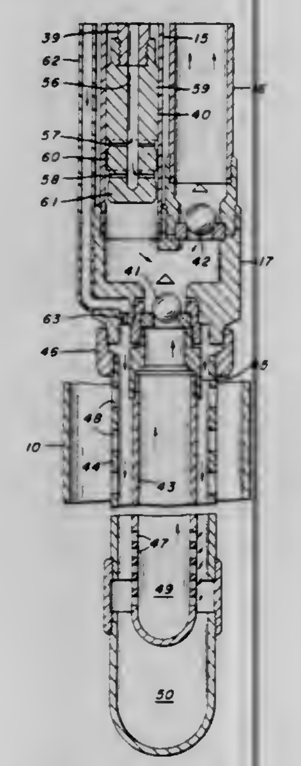
said power tubing string being adapted to carry diluent from the surface into a well;

means for transmitting at least a portion of the diluent to said barrel beneath said plunger and thence to said crossover; and

valves for admitting well fluid to said crossover and discharging it therefrom on opposite movements of said plunger;

said production tubing string being adapted to carry a mixture of well fluid and diluent to the surface;

the improvement comprising:



a landing shoe attached to one of said tubing strings at the lower end thereof;

means carried by the other of said tubing strings at the lower end thereof stabbed and locked in said landing shoe;

said landing shoe having upper edges which slope downwardly toward the central axis of said other tubing string to guide said last-named means into the landing shoe as said other tubing string is lowered; and

tubular means connecting said crossover and said landing shoe.

4,056,336

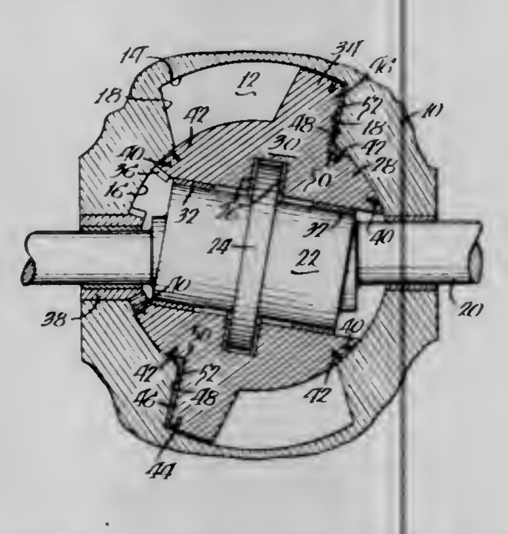
APEX SEALS FOR SLANT AXIS ROTARY MECHANISMS

James A. Ritchie, Hampton-in-Arden, England, assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed July 2, 1976, Ser. No. 702,168

Int. Cl.² F01C *1/02, 19/00;* **F04C** *27/00*

U.S. Cl. 418—51 **6 Claims**



1. In a slant axis rotary mechanism including a housing defining a chamber having radially inner and outer spherical walls interconnected by opposed, generally radially extending side walls, a shaft journalled in said housing and having an angularly offset portion within said chamber, a rotor within said chamber journalled on the angularly offset portion and having a spherical hub and a peripheral, radially outwardly extending flange having plural apexes on each side thereof, an apex seal receiving groove at each apex extending radially the length of the flange and into the hub, and an apex seal loosely received in and extending along the length of each groove and further extending therefrom to sealingly engage a corresponding one of said side walls, the improvement wherein each said seal is tapered only toward its surface sealingly engaging the corresponding side wall whereby when the seals tip within their grooves when a pressure differential exists, a side thereof may contact a side of the groove along the length of the seal to minimize gas leakage.

4,056,337

EXTERNAL GEAR TYPE FLUID DISPLACING MACHINE WITH BEARING GAP

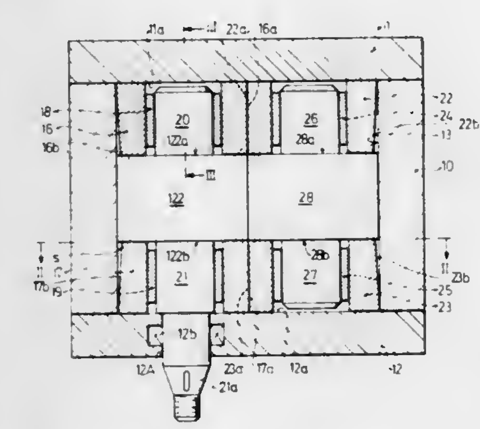
Jürgen Zorn, Korntal; Jan Vlemmings, Hemmingen; Karl-Heinz Müller, Gerlingen; Siegfried Mayer, Vaihingen, Enz; Wilhelm Dworak, Stuttgart; Eugen Hartmann, Hausen; Martin Fader, Bieselsberg; Wolfgang Talmon, Otisheim; Claus Jöns, Munchingen; Ivan Sauer, Schwieberdingen, and Paul Bosch, Ludwigsburg, all of Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany

Filed July 17, 1975, Ser. No. 596,738

Claims priority, application Germany, Aug. 10, 1974, 2438512

Int. Cl.² F01C *19/08;* **F03C** *3/00;* **F04C** *15/00*

U.S. Cl. 418—131 **13 Claims**



1. In an external gear type fluid displacing machine, a combination comprising a housing having a chamber; a pair of mating gears in said chamber, each of said gears having at least one trunnion and a first end face adjacent to said trunnion; and annular bearing members surrounding said trunnions and each having a second end face opposite one of said first end faces extending in the radial direction at least over a substantial portion of the radial extent of said first end face and also having an outer peripheral surface, said housing having internal surfaces adjacent to and defining with the outer peripheral surfaces of the bearing members, when the machine is not in operation, arcuate gaps extending at least over a major portion of the length of said bearing members and having cross-sectional areas gradually increasing toward the end faces of the respective gears, said bearing members being in operation subject to tilting with resulting radial upsetting and axial elongation of the bearing members, said tilting causing formation of axial clearances between said first and second end faces which compensate for said axial elongation and at least reduce frictional wear between said first and second end faces.

4,056,338

ROTARY PISTON ENGINE

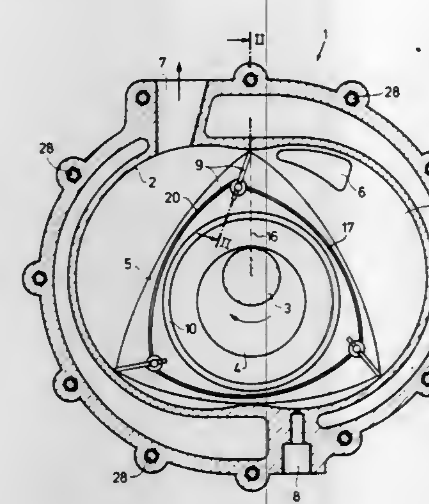
Dankwart Eiermann, Lindau, Germany, assignor to Wankel GmbH, Lindau, Germany

Continuation of Ser. No. 374,045, June 27, 1973, abandoned. This application Aug. 19, 1976, Ser. No. 715,662

Claims priority, application Germany, July 5, 1972, 2232997

Int. Cl.² F04C *27/00*

U.S. Cl. 418—119 **13 Claims**



1. A rotary piston machine for operation by introduction of air into a compression chamber, said machine comprising a housing having a multi-arc peripheral inner surface of epitrochoidal cross section and end walls in planes perpendicular to said peripheral wall, and a multi-corner piston rotatable in said housing with its corners in sealing contact with said peripheral surface to form a plurality of working chambers, said piston having radial planes extending through the axis of said piston and said corners, one of said end walls of said housing having an inlet opening adjacent the peripheral wall to admit air under pressure into a working chamber, said rotary piston having a plurality of seal strips on each end wall to engage said end walls of the housing, said seal strips extending substantially circumferentially and disposed radially inwardly of the radial inner limit of said inlet opening to seal the working chambers outwardly of said seal strips, sealing bolts radially inwardly of the radial inner limit of said inlet opening and positioned rearwardly in rotational direction of said piston relative to the radial planes through the corners of said piston, the path of said sealing bolts lying inwardly of said inlet opening, the ends of said seal strips intersecting said bolts, a corner seal on each corner of said piston, said corner seal having a strip across the corner of said piston engaging said peripheral inner surface and legs extending inwardly and rearwardly from the radial plane through the corner relative to rotation of said piston, said legs intersecting said sealing bolts, so that the seal strip and corner seal leg on the corner of the piston leaves a large free area on the end of said piston forward of said corner seal leg and provides maximum admission of air through said inlet opening in the compression chamber.

4,056,339

ROTARY PISTON TYPE INTERNAL COMBUSTION ENGINES

Kunio Doi, Hiroshima; Kozo Koike, Kure, and Toshiro Sasaki, Hiroshima, all of Japan, assignors to Toyo Kogyo Co., Ltd., Japan

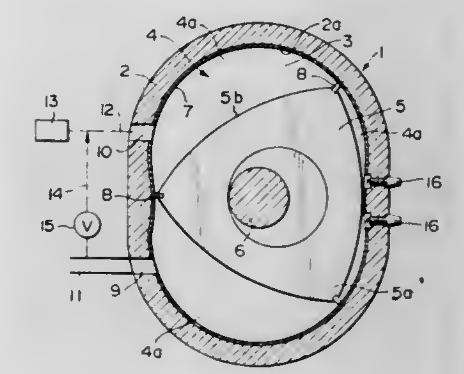
Filed Oct. 15, 1976, Ser. No. 732,851

Claims priority, application Japan, Oct. 16, 1975, 50-125007

Int. Cl.² F01C *21/00*

U.S. Cl. 418—178 **5 Claims**

1. Rotary piston engine comprising a casing which comprises a rotor housing having an inner wall of trochoidal configuration and a pair of side housings gas-tightly secured to the opposite sides of the rotor housing to define a trochoidal cavity therein, a substantially polygonal rotor disposed in the cavity for rotation with apex portions in sliding contact with the inner wall of the rotor housing so that working chambers of variable volume are defined in said cavity between said inner wall of the rotor housing and flanks of the rotor, intake means for introducing intake gas into one of said working chambers which is in intake stroke, exhaust means for exhausting gas from another working chamber which is in exhaust stroke, said rotor housing being applied on the inner wall thereof with pin-point type porous chromium plating mainly including



discontinuous pores and having a porosity of 10 to 60 percent and a hardness of 930 to 1200 in Vicker's scale, said rotor being provided on each of the apex portions with an apex seal having a sliding surface adapted to be brought into sliding contact with the chromium plating on the inner wall of the rotor housing, said apex seal being constituted by cast-iron based material with 50 to 70 volume percent of carbides in at least in the sliding surface and having a hardness of 700 to 900 in Vicker's scale at the sliding surface.

4,056,340

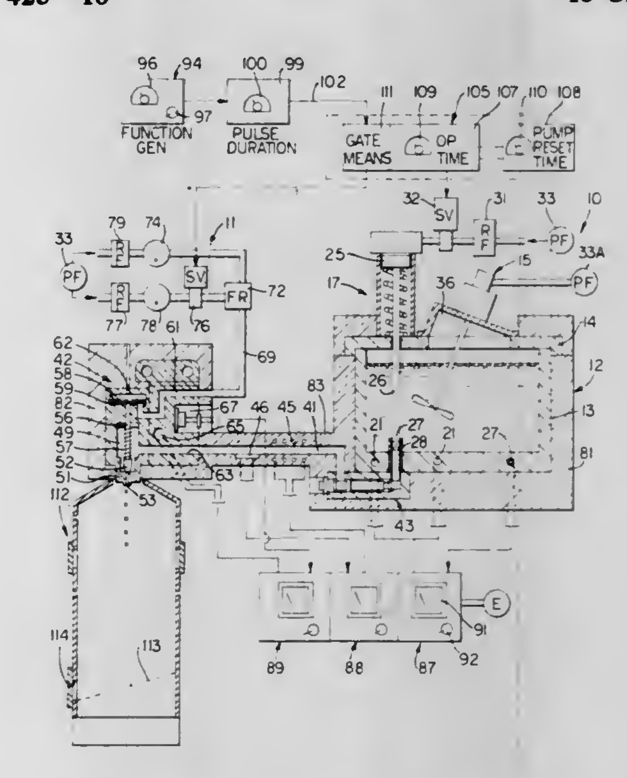
PRILLING APPARATUS

Samuel H. Yalkowsky, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Filed July 1, 1976, Ser. No. 701,892

Int. Cl.² B22D *23/08*

U.S. Cl. 425—10 **13 Claims**



1. A prilling apparatus for prilling pharmaceuticals and the like, comprising:

means for supplying a melted mixture of a pharmaceutical and a vehicle at a preselected pressure and at a temperature less than the decomposition temperature of the pharmaceutical and wherein the vehicle is a solid at normal room temperature;

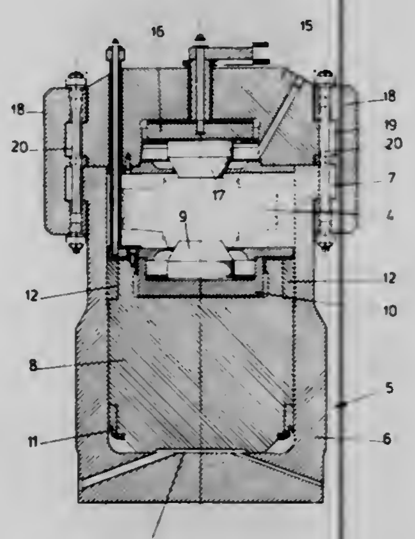
gun means including

a. a melt chamber connected to said supply means for receiving said melt mixture,

b. a substantially downwardly directed nozzle communication with said chamber,
c. a valve member and biasing means normally urging said valve member to a closed condition blocking said communication between said chamber and nozzle to prevent melt material flow out of said nozzle,
d. shift means actuable for shifting said valve member to an open condition permitting said pressurized melt mixture to escape the gun through said nozzle;

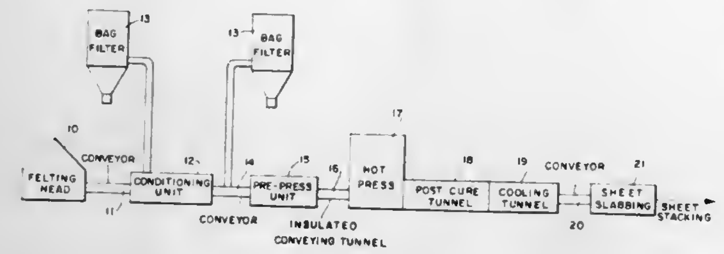
means for generating a train of electrical pulses of preselected frequency and width;
transducer means responsive to said pulse train and coupled to said shift means for periodically opening said valve means at said frequency with a preselected duration controlled by said pulse width and therewith ejecting from said nozzle a series of spaced droplets of melt mixture at said frequency and of size controlled by said pulse width;
container means extending downward below said nozzle and surrounding a gravity drop path for the droplets; and
fluid means in said container for congealing said droplets as they fall along said path to form same into substantially spherical prills.

4,056,341
PRESSES
Anthony John Moore, Farms Splitrock, Ezulweni, Swaziland, South Africa
Filed Aug. 30, 1976, Ser. No. 718,471
Claims priority, application South Africa, Sept. 5, 1975, 75/5683
Int. Cl.² B29C *3/00;* **B30B** *11/32*
U.S. Cl. 425—77 **5 Claims**



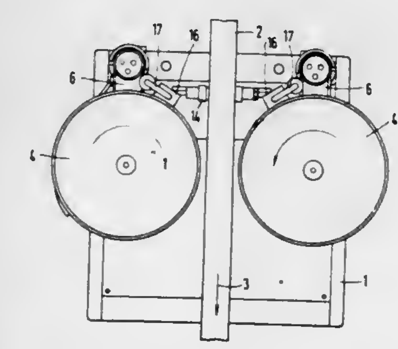
1. A press comprising:
a cylinder closed at one end,
a piston adapted to move in the cylinder towards and out of the other end of the cylinder and having a length less than that of the cylinder,
a platten carried by the cylinder,
a circumferential flange around the other end of the cylinder and integral with the cylinder,
a lid adapted to rest on the other end of the cylinder to close it off,
a platten carried by the lid and facing the platten on the cylinder,
a circumferential flange on the lid, integral with the lid and registering with the cylinder flange when the lid is closed, and clamping segments movable to sandwich the flanges between them to form a continuous ring around the flanges.

4,056,342
FIBERBOARD MANUFACTURE
Henry A. Fremont, Wyoming, and Walter Phalti Lawrence, Hamilton, both of Ohio, assignors to Champion International Corporation, Stamford, Conn.
Division of Ser. No. 380,334, July 18, 1973, Pat. No. 3,969,459. This application Apr. 14, 1976, Ser. No. 676,715
Int. Cl.² B29J *5/00*
U.S. Cl. 425—80 **1 Claim**



1. Apparatus system for the manufacture of fiberboard products having a final thickness of no more than about 0.16 inches on a continuous basis comprising, in combination:
a. felting means for continuously forming a binder-impregnated wood fiber mat;
b. conditioning means for adjusting the temperature of the mat to about the glass transition temperature of the ligneous hemicellulosic matrix material of wood at a moisture content of the mat from about 6% to 12%;
c. prepress means for pressing the mat as conditioned to reduce permanently the thickness of the mat and substantially eliminate entrained air therefrom;
d. hot press means for reducing further the thickness of the mat to the final thickness desired and partially curing the binder;
e. heated tunnel means within which complete cure of the binder is effected; and
f. conveying means for conveying the mat as it is continuously formed away from said felting means whereby said mat from its leading end is sequentially treated thereby to form said fiberboard products.

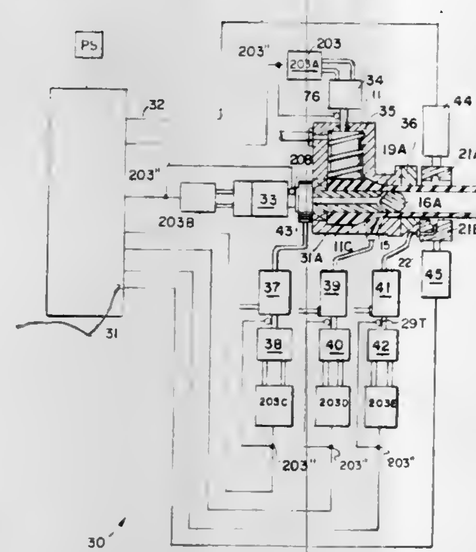
4,056,343
APPARATUS FOR CONTINUOUSLY PRODUCING RAISED MARKS ON PLASTIC CABLE JACKETS
Hans Kaiser, Ditzingen; Ernst Konnerth, and Gert Kramer, both of Stuttgart, all of Germany, assignors to International Standard Electric Corporation, New York, N.Y.
Filed Feb. 23, 1976, Ser. No. 660,299
Claims priority, application Germany, Mar. 1, 1975, 2509027
Int. Cl.² B29C *25/00*
U.S. Cl. 425—112 **5 Claims**



1. Improvements of an apparatus in tandem with an extruder comprising apparatus for continuously producing raised marks on plastic cable jackets disposed in the immediate vicinity of said extruder producing the cable jacket having in combination:
at least one rotatable drum disposed on one side of the cable emerging from the extruder with its circumferential surface coming into contact with the cable surface, said drum having marks or depressions on its circumferential surface corresponding to the outlines of the marks,

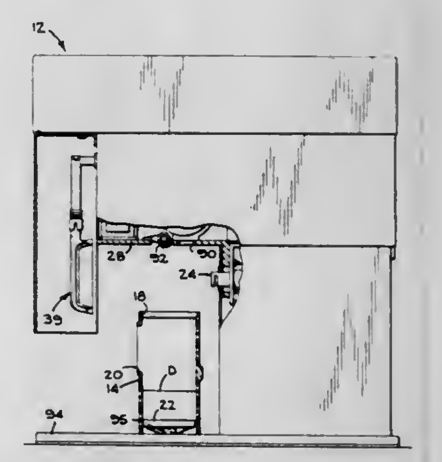
an automatic advancing counting mechanism associated with said drum for forming length markings on said drum's circumferential surface with a powder container associated with the circumferential surface of said drum and having an outlet bearing on the surface of the drum in the area of the marks characterized by the combination of:
means operatively associated with said at least one drum for driving said at least one of said drums including a stepper motor controlled synchronously with the cable take-off speed;
means mounting said at least one drum so as to be vertically adjustable on swivel arms, said swivel arms being mounted on a movable carriage having means for locking the elements associated with and allowing said carriage to be movable;
said carriage including a supply of plastic powder and pipe means interconnecting said powder supply to said container; and
said container being pivotably mounted and positioned in the area of the marks on the surface of said drum and having biasing means operatively associated with said container for causing said outlet to bear against said drum's surface with a preselected pressure.

4,056,344
APPARATUS FOR PRODUCING COMPOSITE EXTRUSIONS
Jerome H. Lemelson, 85 Rector St., Metuchen, N.J. 08840
Continuation-in-part of Ser. No. 68,724, Sept. 1, 1970, Pat. No. 3,708,253, which is a continuation-in-part of Ser. No. 736,081, June 11, 1968, Pat. No. 3,526,020, which is a division of Ser. No. 142,405, Oct. 2, 1961, Pat. No. 3,422,648. This application Dec. 29, 1972, Ser. No. 319,194
Int. Cl.² B29D *23/04*
U.S. Cl. 425—132 **9 Claims**



1. An apparatus for forming an integrally molded article of at least two different thermoplastic materials comprising:
a die to define a predetermined shaped article,
a first variably controllable means operatively associated with said die for introducing a first melt material into said die,
a second variably controllable means operatively associated with said die for introducing a second melt material into said die whereby said first and second materials occupy selected portions of said shaped article defined by said die to form a composite molded article of said materials,
and a control means operatively associated with first and second variably control means for variably controlling said first and second variably controllable means for predeterminately activating said first and second means so as to variably control the introduction of said first and second melt materials into said die during a forming operation whereby the formed thermoplastic article will embody the attributes and characteristics of the respective first and second materials.

4,056,345
DOUGH FORMING APPARATUS
Mounir A. Shatila; William H. VonDer Lieth, both of Blackfoot; John L. Veeneman, and Marion E. Thomas, both of Idaho Falls, all of Idaho, assignors to AMPCO Foods Inc., San Francisco, Calif.
Division of Ser. No. 507,602, Sept. 19, 1974, abandoned. This application Nov. 24, 1976, Ser. No. 744,530
Int. Cl.² A21C *11/18, 3/04*
U.S. Cl. 425—186 **13 Claims**



1. In apparatus for reconstituting dehydrated potato agglomerates by adding water to the agglomerates to form dough and for shaping the dough into shaped potato pieces, said apparatus being of the type having an impervious wall defining an elongate chamber of uniform cross-sectional shape, means mounting said chamber on a generally horizontal axis, said chamber being open ended to define a discharge opening at one end thereof and a rear opening opposite the discharge opening, a piston movable in said chamber, means extending through said rear opening and operative to move said piston toward and away from said discharge opening to effect discharge of dough through said discharge opening, dough shaping means supported adjacent said discharge opening shaping dough discharged from said chamber by movement of said piston toward said discharge opening, a first latch element on said piston moving means and a second latch element on said piston that is removably interengageable with said first latch element to effect removable attachment of said piston to said piston moving means, said chamber wall having an upward open side opening adjacent said rear opening, and means operative to introduce into said chamber through said side opening preselected amounts of potato agglomerates and water, the improvement for forming an impervious dough barrier spanning said discharge opening comprising supporting means interengageable with said second latch element supporting said piston in a substantially horizontal plane, means mounting said supporting means in vertical alignment below said introducing means, and means positioning said chamber upon the piston when the piston is engaged on said supporting means in substantially vertical disposition, said positioning means being disposed to position said chamber so that said piston is within said chamber adjacent said discharge opening thereby to form an impervious receptacle thereabove for receiving agglomerates and water from said introducing means.

4,056,346

APPARATUS FOR PROCESSING DOUGH

Torahiko Hayashi, Post Office Box 50, 2-3 Nozawa, Utsunomiya 320, Japan

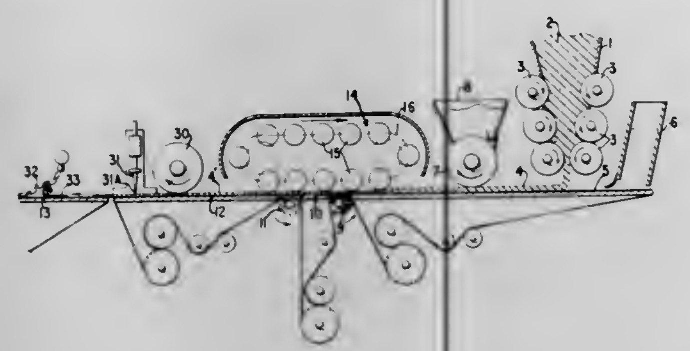
Filed Feb. 25, 1975, Ser. No. 552,760

Claims priority, application Japan, Feb. 25, 1974, 49-22041

The portion of the term of this patent subsequent to Aug. 10, 1993, has been disclaimed.

Int. Cl.² A21C *3/02*

U.S. Cl. 425—373 **3 Claims**



1. Apparatus for the cutting and shaping of dough, comprising

a. means for supplying dough,

b. at least three conveyors for conveyance of said dough in a given direction,

c. a plurality of rollers rotatably mounted on shafts with at least one roller positioned above each conveyor spaced apart therefrom at distances progressively closer in the direction of said conveyor and suitable for stretching said dough, means to move said rollers along an elliptical path in the direction of the travel of said conveyors at the portion of the path facing said conveyors,

d. means operable to control the travelling speed of each of said at least three conveyors at a speed greater than that of the next upstream conveyor and operable to control the speed of the progress of said rollers at a speed greater than that of any of said conveyors,

e. whereby the dough is stretched by the coaction of said rollers and said conveyors to a thickness of between 1 and 4 mm.

4,056,347

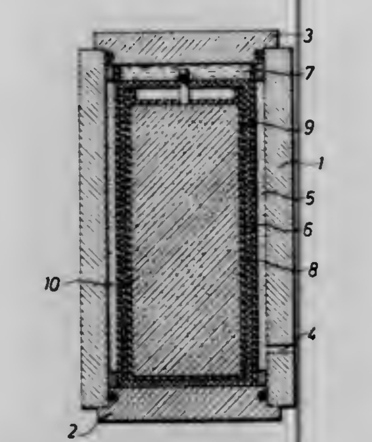
ISOSTATIC COMPACTOR OF PULVERULENT MATERIALS AND THE LIKE

Sten Trolle, Ystad, Sweden, assignor to AB Carbox, Ystad, Sweden

Filed Dec. 27, 1976, Ser. No. 754,420

Int. Cl.² B30B *5/02, 11/00*

U.S. Cl. 425—405 H **6 Claims**



1. Apparatus for isostatic compaction of a pulverulent material, comprising:

a pressure vessel (1,2,3) containing first and second liquids (5,7) separated from each other;

container means (9) housing the pulverulent material during the compaction thereof and being insertable in said pressure vessel;

deformable supporting means (8) surrounding and supporting said container means (9) during its insertion into and removal out from said pressure vessel, said deformable supporting means (8) being in contact with said first liquid (5) surrounding said deformable supporting means (8) when it is in said pressure vessel; and

flexible partition means (6) in said pressure vessel for separating said first and second liquids (5,7) from each other and providing pressure equalization between said liquids, said flexible partition (6) means contacting said deformable supporting means (8) upon pressurization of said liquids for compacting the pulverulent material in said container and deforming said supporting means (8) towards said container means (9) when contacted by said flexible partition means (6).

4,056,348

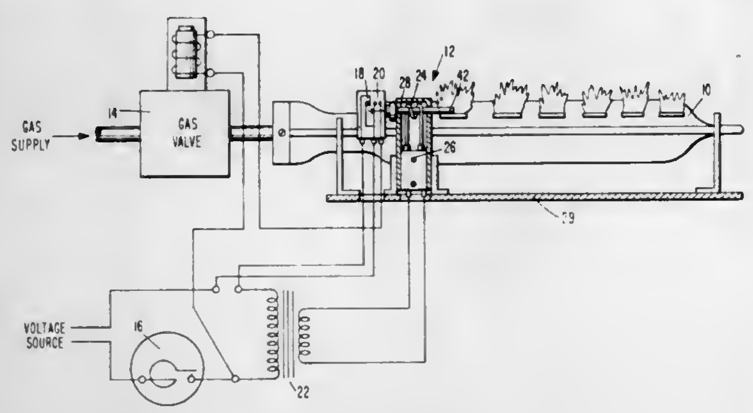
GLOW COIL IGNITION SYSTEM WITH FLAME SENSING

Denis G. Wolfe, Santa Ana, Calif., assignor to Robertshaw Controls Company, Richmond, Va.

Filed Jan. 23, 1976, Ser. No. 651,873

Int. Cl.² F23N *5/02*

U.S. Cl. 431—66 **9 Claims**



1. A burner ignition system comprising

fuel flow control means,

an electrical resistance igniter,

first means operated by heat from the igniter for opening the fuel flow control means when the igniter is at fuel ignition temperature,

second means operated by heat from the igniter overriding the operating first igniter temperature operated means for closing the fuel flow control means after a duration of operation of the first igniter temperature responsive means, and

burner flame sensing means for overriding the operating second igniter heat operated means during the presence of a flame.

4,056,349

DEVICE FOR MEASURING SLOPE PARAMETERS FOR A MATERIAL CONTAINED INSIDE A CYLINDER ROTATED ABOUT THE AXIS THEREOF

Jean Parisis, Haccourt; Roger Rossion, Richelle, and Jacques Depoitier, Wanfercee Baulet, all of Belgium, assignors to Cimenteries C.B.R. Cementbedrijven, Watermael-Boisfort, Belgium

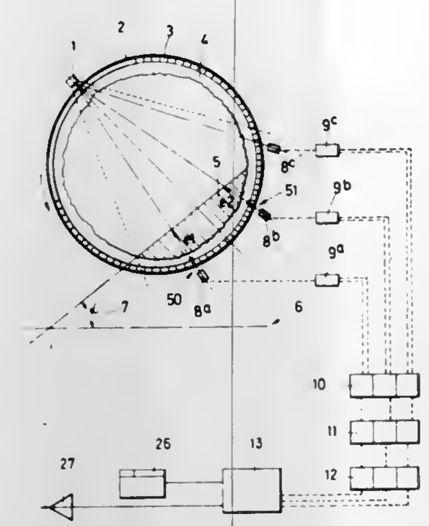
Filed June 30, 1975, Ser. No. 592,053

Claims priority, application Belgium, July 1, 1974, 0146110

Int. Cl.² F27B *9/40*

U.S. Cl. 432—36 **11 Claims**

1. A device for measuring slope parameters for a loose material contained inside a hollow cylindrical wall which rotated about its axis so that when viewed in transverse cross section the material forms a slope segment in engagement with the inner surface of said wall, said apparatus comprising a radioactive source generating a stream of penetrating radiation; means supporting said radiation generating means adjacent the exterior of said cylindrical wall at a location opposite the slope segment in a position in which the stream of radiation passes through said wall and through at least two circumferentially



spaced-apart portions of the slope segment of material; separate means for sensing the radiation passing through each of the two portions and generating signals in accordance with the sensed radiation; and means for analyzing the signals from said sensing and signal generating means.

4,056,350

SUPPORT RAIL ARRANGEMENT

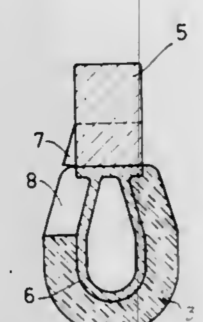
Rüdiger Knaak, Neuss, Germany, assignor to Koppers-Wistra-Ofenbau GmbH, Dusseldorf, Germany

Filed Feb. 11, 1976, Ser. No. 657,107

Claims priority, application Germany, Feb. 26, 1975, 2508206

Int. Cl.² F27D *3/02*

U.S. Cl. 432—234 **8 Claims**



1. In a furnace for heat treating workpieces, a combination comprising an elongated, internally cooled supporting member for supporting workpieces which are to be advanced through and heat treated in the furnace; a workpiece-engaging member mounted on said supporting member and having an upper portion adapted to support a workpiece from below; insulating means partially surrounding said supporting member for insulating the latter from heat; and protecting means provided on at least one of said members for protecting said insulating means from damage by a workpiece in the event that a workpiece slides off said upper portion of said workpiece-engaging member, said protecting means comprising an element having an outer portion which extends outwardly of said supporting member in direction transversely of the elongation thereof, said insulating means having at least one side portion subject to damage by a workpiece in the event that the latter slides off said workpiece-engaging member, and wherein said outer portion overlies said one side portion of said insulating means.

4,056,351

WORKPIECE-ENGAGING ELEMENT FOR FURNACES

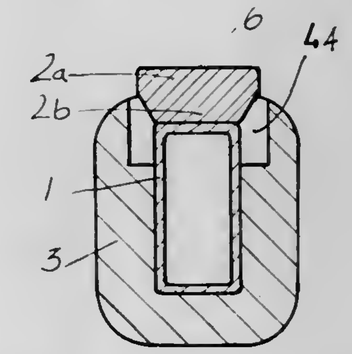
Rüdiger Knaak, Neuss, Germany, assignor to Koppers-Wistra-Ofenbau GmbH, Dusseldorf, Germany

Filed Feb. 3, 1976, Ser. No. 654,917

Claims priority, application Germany, Feb. 7, 1975, 2505179

Int. Cl.² F27B *9/14*

U.S. Cl. 432—234 **12 Claims**



1. In a furnace for heat treating workpieces, a combination comprising an elongated internally-cooled supporting member for supporting workpieces which are to be advanced through the furnace; and a plurality of workpiece-engaging elements of one-piece constructions each having a lower portion mounted on said supporting member and an upper portion having an upwardly-directed planar surface which is adapted to support the workpieces from below, said lower portion having a smaller cross-section than said upper portion, wherein said supporting member has a side facing said lower portions of said elements, and wherein each of said lower portions has a mounting face in surface engagement with said side of said supporting member wherein said lower portion has a pair of spaced sidewalls which diverge away from each other in direction from said lower portion towards said upwardly-directed planar surface of said upper portion.

4,056,352

DRY TRANSFER OF ORGANIC COMPOUNDS TO WEBS

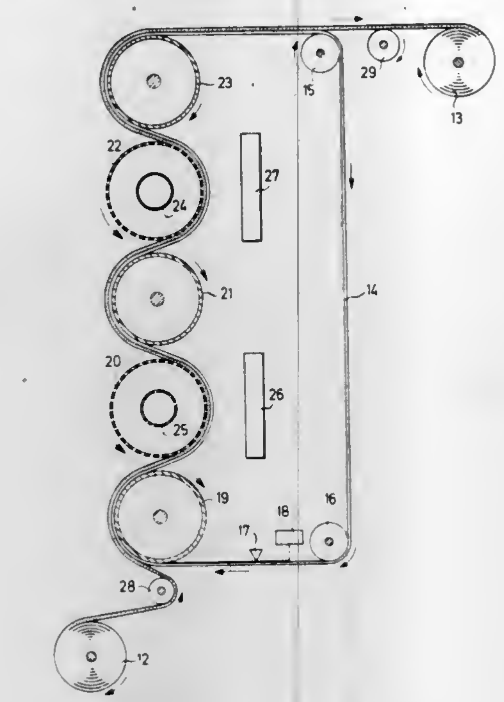
Fritz Mayer, Haltingen, Germany, assignor to Ciba-Geigy AG, Haltingen, Germany

Continuation of Ser. No. 497,599, Aug. 15, 1974, abandoned. This application July 13, 1976, Ser. No. 704,898

Claims priority, application Switzerland, Aug. 22, 1973, 12062/73

Int. Cl.[2] **D06P** *1/00*

U.S. Cl. 8—2.5 A **16 Claims**



1. A process for the continuous, dry transfer of an organic compound to a web of air-permeable organic textile material, comprising, the steps of

1. applying to a carrier a preparation which contains at least one organic compound that is converted into the vapour state at atmospheric pressure and at a temperature above 80° C,
2. bringing said carrier into contact with a side of the air-permeable web of organic textile material to be treated, in such a manner that web and carrier advance together synchronously, the one superimposed on the other,
3. subjecting carrier and web under atmospheric pressure to a heat treatment in a heating zone of at least 80° C sufficient to raise the temperature of the web to the temperature at which the organic compound is converted to the vapour state, said heat treatment being applied from the carrier side,
4. advancing said carrier and web from the heating zone and subsequently into a suction zone and subjecting said carrier and web to a suction treatment applied from the web side until the organic compound has been transferred from the carrier to the textile web, and
5. separating the treated web from the carrier.

4,056,353

TEXTILE FINISHING

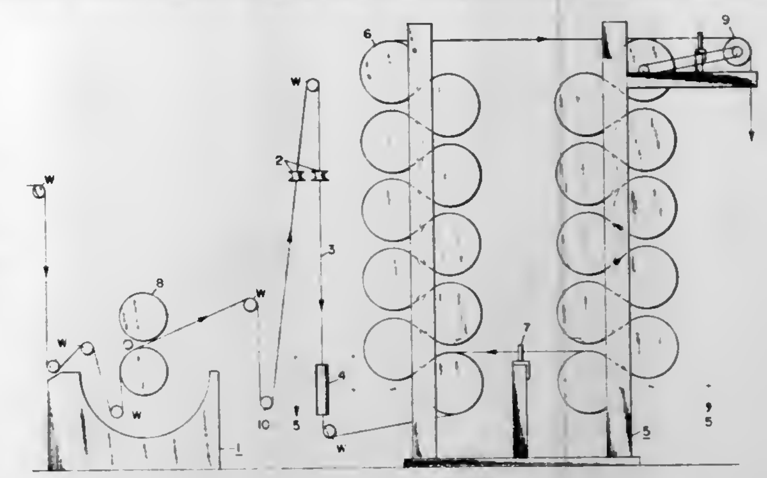
Alfred H. Bent, 2400 Kingman Drive; George J. Booth, 1102 Piper Road, Graylyn Crest, both of Wilmington, Del. 19803, and Anthony Perregrino, 207 Taylor Road, Wilmington, Del. 19804

Filed Mar. 26, 1976, Ser. No. 670,941

Int. Cl.[2] **D06P** *7/00*

U.S. Cl. 8—14 **9 Claims**

1. An apparatus for migration-dyeing of fabrics which comprises a means for applying dye on an open sheet of fabric so that the fabric can attain a pick-up of from about 55 weight percent up to about 75 weight percent; a means for converting the sheet into a tight fabric rope wherein an integral part of said means is a tube-eye; placing tension on the tight fabric rope; a contact drying means for the tight fabric rope to pass over so that the rope intimately contacts the hot surface of the dryer under such tension that the tight rope fabric is flattened



against the drying surface, forcing all layers into intimate contact.

4,056,354

PROCESS FOR RAPID DYEING OF TEXTILES

Allen G. Pittman, El Cerrito; William L. Wasley, Pacific Grove, both of Calif., and Nelson F. Getchell, Great Falls, Va., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Feb. 10, 1976, Ser. No. 657,011

Int. Cl.[2] **C09B** *67/00;* **D06M** *3/02, 5/14, 1/00*

U.S. Cl. 8—54 **17 Claims**

1. A process of modifying proteinaceous fibers, which comprises contacting the fibers with a solution of a dyeing or finishing agent in ethylene glycol in the absence of water and in the presence of 0.6% of an acid, based on the weight of acid to the volume of ethylene glycol, at a temperature of about from 110° to 165° C.

4,056,355

DETERGENT FORMULATIONS AND THEIR USE

Jack H. Kolaian, Wappingers Falls; Frederic C. McCoy, Beacon, and John A. Patterson, Fishkill, all of N.Y., assignors to Texaco Inc., New York, N.Y.

Filed Dec. 23, 1974, Ser. No. 535,758

Int. Cl.[2] **C11D** *3/08*

U.S. Cl. 8—137 **4 Claims**

1. A process for removing the soil from soiled cotton fabric in an aqueous environment consisting essentially of:

A. contacting the soiled cotton fabric to be cleaned with a free-flowing detergent formulation of:
   a. from about 5 to 45 parts by weight of at least one fatty alcohol surfactant containing 6 to 18 carbon atoms, said alcohol or alcohols being the sole surfactant present,
   b. from about 5 to 95 parts by weight of builder,
   c. from about 1 to 10 parts by weight of detergent additives, and
   d. from about 5 to 45 parts by weight of finely divided, water-insoluble, chemically non-reactive, inorganic absorbent passing through a 325 mesh sieve and having surface area of at least 30 M^2/g, said parts by weight of the free-flowing detergent formulation of (a), (b), (c) and (d) being based upon the final weight of the aqueous laundering environment;

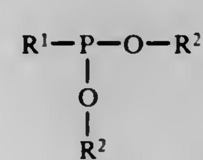
B. continuing said contact of the soiled cotton with the aqueous laundering environment until substantially all of the soil has been removed from the soiled cotton.

4,056,356
POLYESTER FIBER

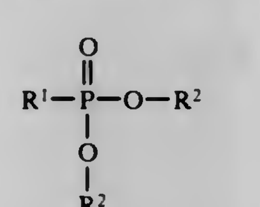
Russell Gilkey, Kingsport; Samuel D. Hilbert, Jonesboro; Bobby J. Sublett, and Thomas H. Wicker, Jr., both of Kingsport, all of Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 577,361, May 14, 1975, abandoned, which is a continuation-in-part of Ser. No. 468,309, May 9, 1974, abandoned, which is a continuation-in-part of Ser. No. 468,310, May 9, 1974, abandoned, which is a continuation-in-part of Ser. No. 468,311, May 9, 1974, abandoned, which is a continuation-in-part of Ser. No. 468,312, May 9, 1974, abandoned. This application Mar. 8, 1976, Ser. No. 664,841
Int. Cl.[2] D01F *6/62, 9/08*
U.S. Cl. 8—168 C **3 Claims**

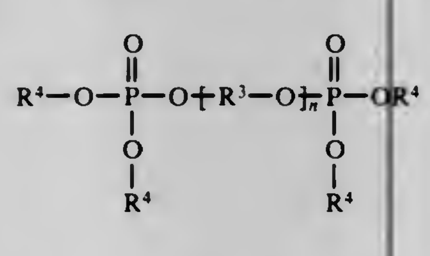
1. A textile fiber comprised of
A. a polyetherester of
1. terephthalic acid, and
2. a diol component comprised of
a. 1,4-cyclohexanedimethanol, and
b. from 3 to 12 weight percent, based on the weight of the polyetherester, of poly(oxyethylene)glycol having a molecular weight in the range of 300–800,
B. based on the weight of the polyetherester, from 0–150 weight parts per million of manganous ion,
C. based on the weight of the polyetherester, from 20–500 weight parts per million phosphorus derived from
1. phosphorus acid,
2. phosphoric acid,
3. pyrophosphoric acid,
4. polyphosphoric acid, or a compound corresponding to the formula


(5)

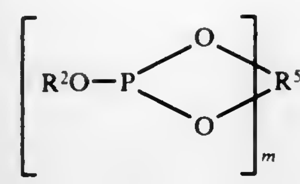
where
R^1 is —H, a monovalent alkyl radical having 1–18 carbon atoms, a monovalent aryl or substituted aryl radical having 6–15 carbon atoms, or -O-R where R is —H, a monovalent alkyl radical having 1–18 carbon atoms or a monovalent aryl or substituted aryl radical having 6–15 carbon atoms,
R^2 is —H, monovalent alkyl radical having 1–18 carbon atoms, or a monovalent aryl or substituted aryl radical having 6–15 carbon atoms, provided that when R^2 is alkyl, at least one of R^2 has a chain of at least two unsubstituted methylene groups attached to the oxygen atom attached to phosphorus,


(6)

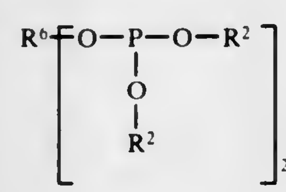
where R^1 and R^2 are the same as above,


(7)

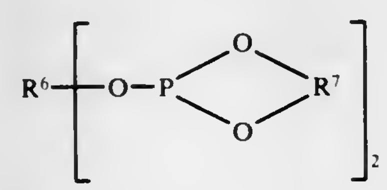
where
R^4 is —H, a monovalent alkyl radical having 1–18 carbon atoms, or a monovalent aryl or substituted aryl radical having 6–15 carbon atoms,
n = 1–6,
$R^3 = (CH_2)_x$ where x = 2–6,


(8)

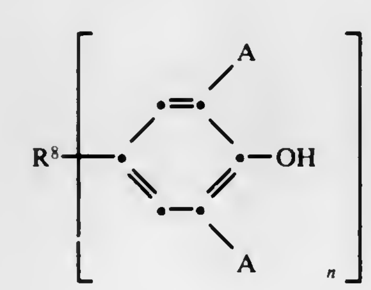
where
R^2 is the same as above,
R^5 is a divalent or tetravalent alkyl radical having 2–5 carbon atoms,
m = 1 or 2,


(9)

where
R^2 is the same as above,
R^6 is a divalent alkyl radical having 2–12 carbon atoms or a divalent aryl or substituted aryl radical having 6–15 carbon atoms,


(10)

where
R^6 is the same as above,
R^7 is a divalent alkyl radical having 2–5 carbon atoms,
D. based on the weight of the polyetherester, from 1000 to 5000 weight parts per million of a stabilizer effective to reduce oxidative degradation of the polyetherester corresponding to the structure



where
n is from 1 to 4,
R^8 is a radical selected from the group consisting of
1. neopentanetetrayltetrakis,
2. phosphinylidynetrioxy,
3. 2,4,6-trimethyl-1,3,5-benzenetriyltrimethylene,
4. alkylene having 1 to 5 carbon atoms,
5. alkyl having 1 to 12 carbon atoms,
6. 2,4,6-trioxo-1,2,3,4,5,6-hexahydro-S-triazine1,3,5-triyl)tris(3-oxotrimethylene),
7. [3-octadecyloxy)-3-oxopropyl],

A is a monovalent radical selected from the group consisting of
1. tertiary alkyl having 4 to 8 carbon atoms,
2. alkyl having 8 to 22 carbon atoms, and
3. secondary alkyl having 12 to 24 carbon atoms,

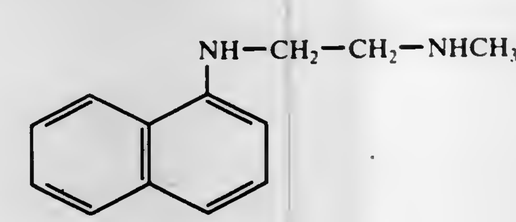
E. based on the weight of the polyetherester, from 25–200 weight parts per million titanium derived from a soluble tetravalent organic titanium compound.

4,056,357
DIRECT BILIRUBIN ASSAY

Lloyd R. Snyder, Yorktown Heights, and Jana Furda, Pleasantville, both of N.Y., assignors to Technicon Instruments Corporation, Tarrytown, N.Y.

Filed June 30, 1976, Ser. No. 701,186
Int. Cl.[2] G01N *33/16*
U.S. Cl. 23—230 B **2 Claims**

1. In a method for assaying direct bilirubin in a multi-assay system, the improvement which comprises using, as a calibration standard, the compound

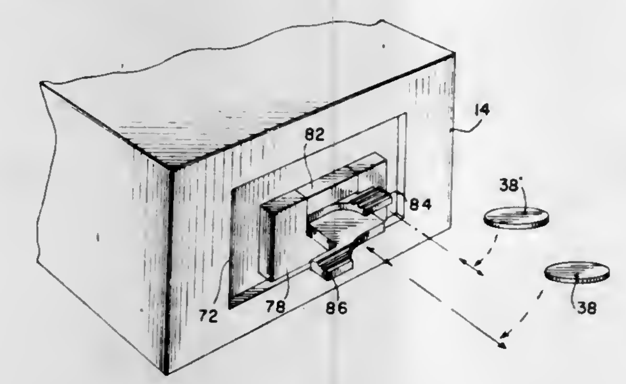


or addition salts thereof.

4,056,358
APPARATUS FOR DERIVING BLOOD OXYGEN ASSOCIATION CURVE INFORMATION

Paolo Priarone, West Hyattsville, and Eugene K. Achter, Gaithersburg, both of Md., assignors to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Filed Nov. 22, 1976, Ser. No. 743,570
Int. Cl.[2] G01N *33/16, 21/24*
U.S. Cl. 23—253 R **6 Claims**

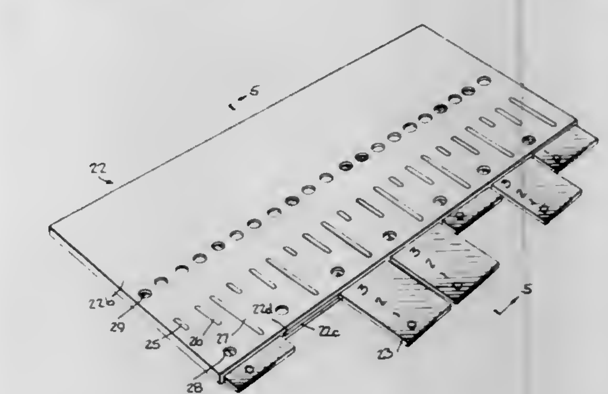


1. An apparatus for incubating and analyzing blood samples, said apparatus comprising, in combination, means defining a sample treating chamber, means for controlling the atmosphere within said chamber, a slide assembly including a slide holder and first and second slide units each including a portion thereof adapted to receive and hold a blood sample to be analyzed, said slide units being mounted for movement with respect to said slide holder along a predetermined path between a loading and unloading position, an incubating position, and an analysis position, and cooperating means on said slide units and said slide holder for guiding said slide units along said path during movement thereof into and out of said chamber and for sensibly indicating when each of said slides is located at any one of said positions.

4,056,359
PROFILE RECOGNITION APPARATUS FOR IDENTIFYING BACTERIA

Pierre R. Janin, New York, N.Y., assignor to American Home Products Corporation, New York, N.Y.

Division of Ser. No. 453,434, March 21, 1974, Pat. No. 3,936,356, which is a continuation-in-part of Ser. No. 349,698, April 10, 1973, abandoned. This application Aug. 14, 1975, Ser. No. 604,875
Int. Cl.[2] C12K *1/04*
U.S. Cl. 23—259 **14 Claims**



1. Apparatus for the identification of an unknown substance, a specimen of the substance having been prepared to be analyzed, portions of the prepared specimen being caused to undergo a plurality of different tests, and a determination made as to whether the specimen has reacted with each of the tests, the determinations being arranged into at least one group which includes a plurality of determinations, the identification being accomplished by transforming the determination into a score value, the score value for each determination being different dependent upon whether the specimen has or has not reacted, the score value weighted differently among determinations in a group for one of the conditions of whether the specimen has or has not reacted and combining the score values of each group to form an intermediate value which is a function of all of the score values of the group, the apparatus comprising:
a. structure forming a supporting frame;
b. at least one strip slidably mounted for movement along the length of the supporting frame, each strip corresponding to a different group of determinations;
c. means for shifting said strip in increments in the direction of the length of said strip, the magnitude of each increment being a function of the score value of a different determination in a group corresponding to said strip and thereby transforming each determination into a score value, the sequential movements of said strip providing a total movement representative of the combining of the score values of the group and thereby the intermediate value thereof;
A. said means for moving said strip including a cover portion having a plurality of elongated slots for each group, the number of slots for each group corresponding to the number of determinations for the group, each slot having its length extending substantially parallel to the length of the slide and spaced apart from one another and a function of the maximum weighted score value corresponding to each determination;
B. said strip having elements disposed in rows thereon, each row extending in alignment with a different slot of said slots associated with said strip, the elements of each row being spaced apart from one another at intervals corresponding to a function of the movement of said strip to a score value in the range between the minimum and maximum score values for the determination; and
d. indicia associated with said strip for presenting the intermediate value in response to the total movement of said strip and including indicia disposed along a line parallel to the length of said strip.

4,056,360

APPARATUS FOR DILUTION OF LIQUID SPECIMENS

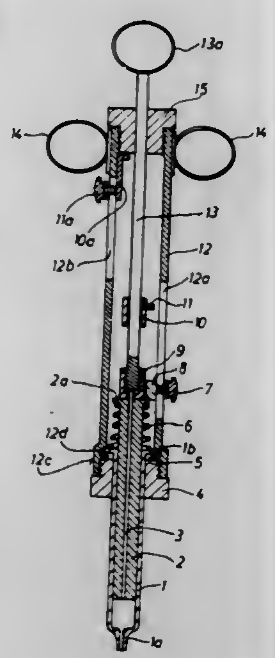
Gerhard M. Risch, Schaan, Liechtenstein

Filed Feb. 17, 1976, Ser. No. 658,748

Claims priority, application Germany, Feb. 18, 1975, 2506844

Int. Cl.² B01L *3/02;* **G01N** *1/14, 1/18*

U.S. Cl. 23—259 **6 Claims**



1. An apparatus for dilution of liquid specimens which comprises in combination, a tubular chamber having cap members disposed at opposite ends thereof, a cylindrical member projecting from one of said cap members, said cylindrical member having a restricted opening at one end for receiving fluids, a spring biased piston slidably disposed within the cylindrical member, means for limiting the movement of said spring biased piston out of the cylindrical member, a second piston axially disposed through a bore within the spring biased piston, said second piston having substantially the same length as the spring biased piston, a piston rod projecting through the opposite cap member and engaging the second piston by means of a head portion, said piston rod having externally disposed means for movement of the spring biased piston and the second piston respectively whereby controlled amounts of a liquid specimen may be introduced into the cylindrical member upon retraction of the spring biased piston, and further controlled amounts of a liquid specimen may be introduced into the cylindrical member upon retraction of the second piston.

4,056,361

VIAL OR OTHER CONTAINER, AND CARRIER THEREFOR

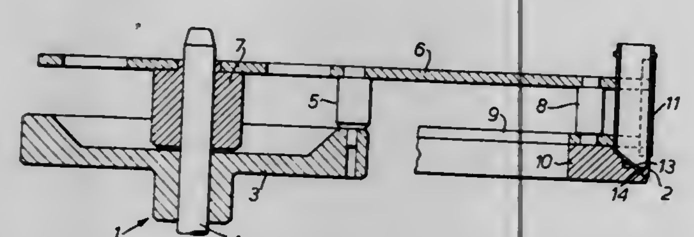
Ann Margaret Peters; Geoffrey Stuart Greaves; Ian Robert Clark; Roger Leonard Holder, and Roger Abraham Bunce, all of Birmingham, England, assignors to The Secretary of State for Social Services in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England

Filed June 11, 1976, Ser. No. 694,971

Claims priority, application United Kingdom, June 11, 1975, 25114/75

Int. Cl.² B01L *3/14, 9/06;* **G01F** *19/00;* **G01N** *31/00*

U.S. Cl. 23—259 **9 Claims**



1. A combination comprising a carrier and self-locating container, said carrier including at least one container receiving pocket, said pocket having an inlet with a cross-section to receive a container in any angular displacement about the pocket axis and an internal, plane cam surface located opposite to said opening, said cam surface being inclined at an acute angle to the pocket axis for angular aligning during positioning within said pocket a container having a complementary cam surface, and a container having a cam surface complementary to the cam surface of said pocket, whereby said container is aligned in a predetermined angular displacement by and with respect to the cam surface of the pocket during positioning within said carrier pocket.

4,056,362

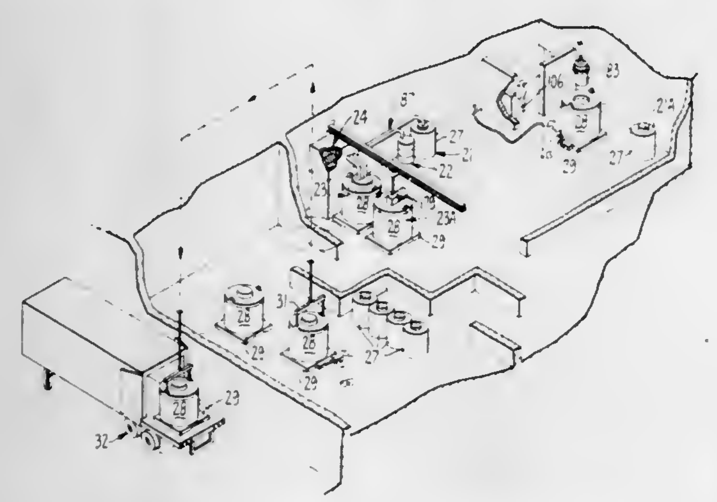
SYSTEM FOR DISPOSING OF RADIOACTIVE WASTE

Kenneth A. Gablin, Burton, and Larry J. Hansen, Tacoma, both of Wash., assignors to Nuclear Engineering Co., Inc., Louisville, Ky.

Division of Ser. No. 220,214, Jan. 24, 1972, abandoned. This application June 27, 1974, Ser. No. 483,785

Int. Cl.² B01J *1/00;* **G21F** *9/00*

U.S. Cl. 23—260 **36 Claims**



1. A system for solidifying a slurry of radioactive waste material into a solid plastic matrix of cured polymer having radioactive waste particles distributed throughout, comprising

a supply tank adapted to contain a polymerizable setting agent in liquid form,

a catalyst tank adapted to contain a curing agent for said setting agent in liquid form,

a receiving tank adapted to contain solidified radioactive waste material and formed with an inlet thereto,

manifold means connected to said supply and catalyst and receiving tanks,

slurry pump means interposed in said manifold means and adapted for connection to a source of liquid slurry containing radioactive waste material,

catalyst pump means in said manifold connected to pump said curing agent from said catalyst tank,

setting agent pump means in said manifold connected to pump setting agent from said supply tank,

said pump means being formed to pump proportioned amounts of said setting agent and said curing agent and said radioactive slurry into said receiving tank for regulating the specific activity radiation characteristics per unit of volume of the materials in said tank,

radioactivity control means connected to said pump means and responsive to specific activity levels in said system to regulate pump speed thereby to maintain the specific radioactivity level of the material in said receiving tank at no more than a predetermined Low Specific Activity rating,

a first mixing means connected to said pumping means and formed for intermixing said setting agent and said radioactive slurry before delivery to said receiving tank,

and a second mixing means positioned at the inlet to said receiving tank and formed for intermixing said curing agent with the intermixed setting agent and slurry from said first mixing means as they enter said receiving tank.

4,056,363

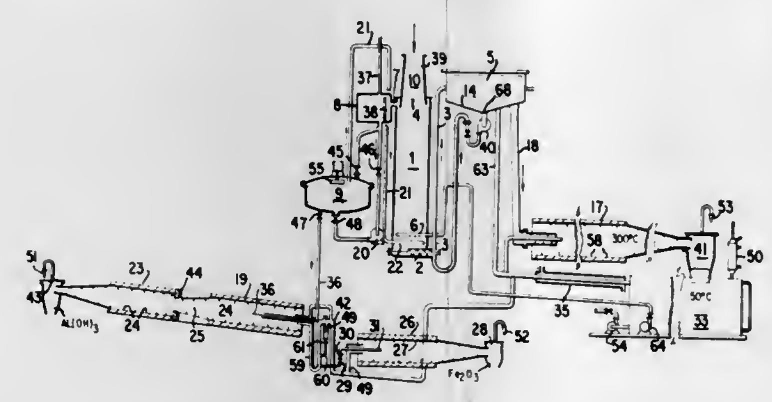
APPARATUS FOR THE FABRICATION OF PURE ALUMINA FROM AL_2O_3 AND SILICA CONTAINING RAW MATERIALS BY LEACHING WITH HYDROCHLORIC ACID

Georg Messner, Latemar-Strasse 7, 8000 Munich 90, Germany

Division of Ser. No. 453,265, March 21, 1974, Pat. No. 3,959,438. This application Feb. 27, 1976, Ser. No. 661,982

Int. Cl.² B01D *9/02, 11/02;* **C01F** *7/22, 7/04*

U.S. Cl. 23—270 R **13 Claims**



1. Apparatus for the production of pure alumina from silicate containing raw materials comprising means for feeding said raw material into an acid resistant leaching tower from the top portion thereof; means for feeding a leaching liquor containing hydrochloric acid into the bottom portion of said leaching tower, so as to continuously flow said leaching liquor upward countercurrently through said raw material flowing downward in order to leach out the alumina as a solution enriched in aluminum chloride, leaving a raw material solid residue; means for withdrawing said solution enriched in aluminum chloride from the top portion of said tower; means for withdrawing said raw material solid residue from the bottom portion of said tower; means for providing a flowing carrier liquid for conveying said solid residue away from said leaching zone and into a separator means and separator means for removing said solid residue from said carrier liquid; means to convey said solution enriched in aluminum chloride at about 120° C. from said leaching tower into and through a balancing container means and into a backwashable sand filter; means for conveying said solution enriched in aluminum chloride from said backwashable sand filter into the cold crystallizer section of a crystallizer-thermal-decomposer combination, comprising a rotating, inclined tube made of acid and heat resistant material and containing a mother liquor, causing said aluminum chloride to precipitate in said crystallizer as $AlCl_3 \cdot 6\ H_2O$ crystals; screw conveyor flights within said tube for transporting said precipitated crystals through an intermediate washing means into a hot thermal decomposer to convert said $AlCl_3 \cdot 6\ H_2O$ crystals into $al(OH)_3$ and into vapors of HCl and water; means for conveying said vapors countercurrent to said crystals from said thermal decomposer through said intermediate washing means and into said crystallizer; means to recover said $Al(OH)_3$; means providing a fluid-tight feeding shaft inside the upper end portion of said leaching tower; and means for adding amounts of new raw material into said feeding shaft to a sufficient height to absorb rising HCl vapors and to prevent escape of said vapors into the atmosphere.

4,056,364

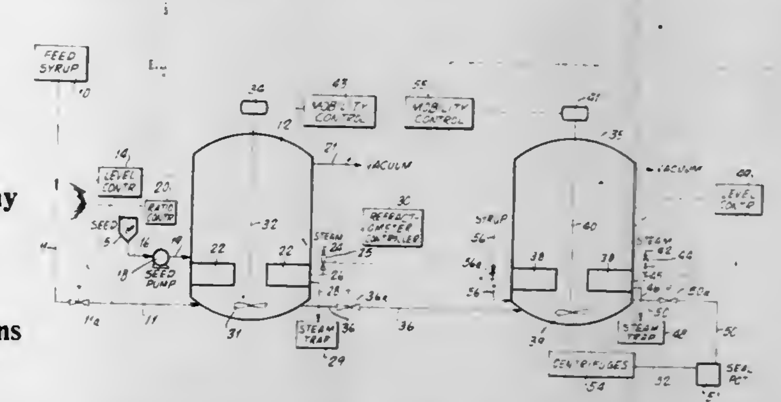
TWO STAGE CONTINUOUS CRYSTALLIZATION APPARATUS WITH CONTROLS

Morris Dmitrovsky, Roslyn Heights, N.Y., and Antoine H. Kokke, Rosemont, Pa., assignors to Amstar Corporation, New York, N.Y.

Division of Ser. No. 501,862, Aug. 30, 1974, Pat. No. 3,981,739. This application Jan. 19, 1976, Ser. No. 650,300

Int. Cl.² B01D *9/02*

U.S. Cl. 23—273 R **9 Claims**



1. An apparatus for the continuous crystallization of a crystallizable solute from a feed solution thereof comprising in combination a first stage crystallization zone, a second stage crystallization zone, said first stage crystallization zone and said second stage crystallization zone each being provided with fluid agitating means, first feed solution conduit means for supplying said feed solution to said first stage crystallization zone, first transfer conduit means for the transfer of fluid from said first stage crystallization zone to said second stage crystallization zone, first flow control means associated with said first transfer conduit means for controlling the flow of fluid therein from said first crystallization zone to said second crystallization zone, said first flow control means being controlled by means for measuring the total solute concentration of the fluid contents undergoing processing within said second stage crystallization zone, means for introduction of solute seed crystals to said first crystallization zone, second flow control means associated with said means for introduction of said solute seed crystals for controlling the introduction of solute seed crystals to said first crystallization zone, said second flow control means being responsive to the feed solution introduced to said first crystallization zone, said second flow control means comprising a ratio controller controlling the proportion of solute seed crystals introduced into said first stage crystallization zone relative to the feed solution supplied to said first crystallization zone means for heating the fluid contents of said first stage and said second stage crystallization zones, said means for heating being provided within said first stage and said second stage crystallization zones, respectively, said means for heating of the contents of said first stage crystallization zone being controlled by means measuring the concentration of dissolved solids in the fluid within said first stage crystallization zone, said means for heating of the contents of said second stage crystallization being controlled by means measuring the total solute concentration of the fluid contents within said second stage crystallization zone, third transfer conduit means for the withdrawal of fluid from said second stage crystallization zone, third flow control means associated with said third transfer conduit means for control of fluid withdrawn from said second stage crystallization zone, said third flow control means being responsive to the fluid level within the second stage crystallization zone means for producing a reduced pressure within said first stage and within said second stage crystallization zones, second feed solution conduit means for supplying additional feed solution to said second stage crystallization zone, fourth flow control means responsive to the total solute concentration of the fluid contents undergoing processing within said second stage crystallization zone for controlling the flow of feed solution to said second crystallization zone.

4,056,365
SILVER ELECTRICAL CONTACT MATERIALS AND METHOD OF MAKING

Richard C. Bevington, Delmont, and David J. Snee, Murrysville, both of Pa., assignors to Gibson Electric, Inc., Delmont, Pa.

Filed Nov. 10, 1975, Ser. No. 630,349
Int. Cl.[2] B22F *3/00*
U.S. Cl. 428—565 **20 Claims**

1. A method for preparing silver material comprising
forming a compact of a mixture of particles of silver or particles of silver and a thermally decomposable compound of silver together with an additive selected from the group consisting of lithium nitrate, strontium nitrate, and cesium nitrate;
heating said compact to a temperature below the final sintering temperature for a period of time sufficient to decompose said additive; and
sintering said heated compact.

7. A method for preparing silver material comprising
forming a compact comprising a mixture of finely-divided particles of silver or finely-divided particles of silver and a thermally decomposable compound of silver together with lithium nitrate so that lithium constitutes 0.01 to 0.05 percent by weight of the mixture;
heating said compact at about 600° to 700° C for about20 minutes to 1 hour to decompose said lithium nitrate and to drive off entrapped gases and volatile impurities; and
heating said compact at about 850° to 950° C for about $\frac{1}{2}$ to $2\frac{1}{2}$ hours to form a sintered silver compact.

4,056,366
ZINC-ALUMINUM ALLOY COATING AND METHOD OF HOT-DIP COATING

Harvie Ho Lee, Glenwood, Ill.; David W. Gomersall, Valparaiso, and Harry P. Leckie, Schererville, both of Ind., assignors to Inland Steel Company, Chicago, Ill.

Filed Dec. 24, 1975, Ser. No. 644,109
Int. Cl.[2] C23C *1/02*
U.S. Cl. 29—653 **14 Claims**

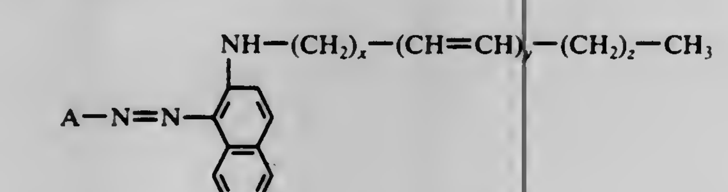
1. A ferrous metal sheet having on a surface thereof a zinc-aluminum alloy continuous hot-dip coating consisting essentially of between about 0.2 wt. % and about 17 wt. % aluminum, between about 0.02 wt. % and about 0.15 wt. % antimony and a maximum of about 0.02 wt. % lead with the balance essentially zinc, and said alloy coating characterized by having a smooth bright ripple-free surface which is resistant to intergranular corrosion and blistering along grain boundaries when exposed for prolonged periods to a high humidity atmosphere, and said coating being formable without having the coating separate from the sheet both before and after prolonged exposure to said high humidity atmosphere.

4,056,367
LIQUID MONOAZO-NAPHTHALENE DYESTUFFS, AND THEIR USE

Aime Joseph Arsac, Condrieu, and Pierre Frank, Saint Clair du Rhone, both of France, assignors to Produits Chimiques Ugine Kuhlmann, Paris, France

Filed June 10, 1975, Ser. No. 585,546
Claims priority, application France, June 28, 1974, 74.22597
Int. Cl.[2] C10L *1/10;* **C09B** *29/06;* **C07C** *107/04, 107/08*
U.S. Cl. 44—59 **8 Claims**

1. Liquid dyestuff of the formula:

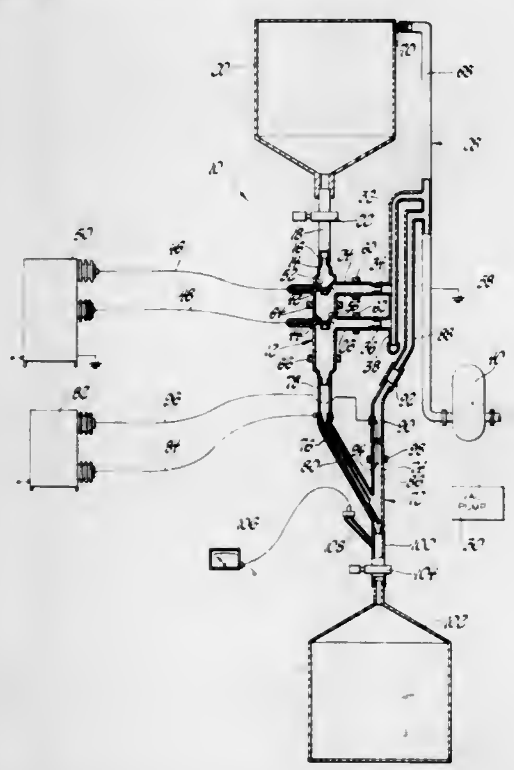


in which A represents phenyl or naphthyl, which is unsubstituted or substituted by at least one alkyl or alkoxy group containing 1 to 2 carbon atoms, y represents 0 or 1, x and z each represent a whole number such that the sum $x + y + z$ is a whole number from 5 to 17.

4,056,368
METHOD AND APPARATUS FOR DEGASSING GAS CONTAMINATED PARTICULATE MATERIAL

Walter J. Rozmus, Birmingham, Mich., assignor to Kelsey-Hayes Company, Romulus, Mich.

Filed Feb. 4, 1976, Ser. No. 655,088
Int. Cl.[2] B03C *9/00*
U.S. Cl. 55—2 **38 Claims**



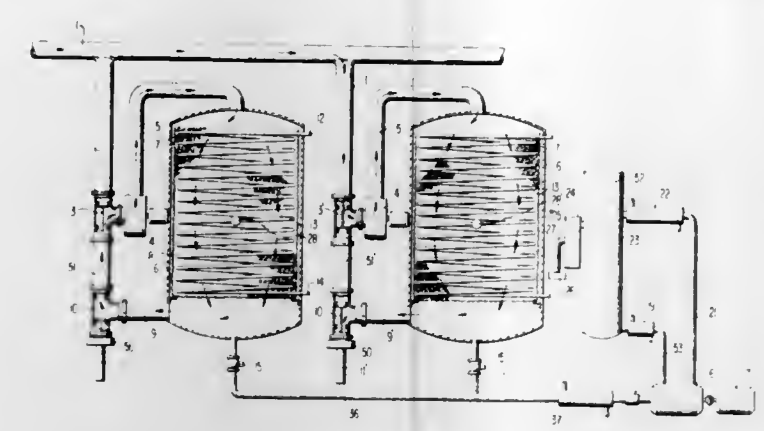
1. An apparatus for cleaning contaminated particulate material which is at least in part contaminated by gaseous contaminants, said apparatus comprising: a vacuum chamber, vacuum pump means for evacuating said vacuum chamber, means for generating an electric field within said vacuum chamber, gas outlet means connected to said vacuum pump means through which gaseous contaminants can be removed from said vacuum chamber, inlet means for introducing gas contaminated particulate material into said vacuum chamber and for subjecting said particulate material to said electric field whereby said gaseous contaminants are electrically charged to cause separation of said gaseous contaminants from said particulate material and said gaseous contaminants are excited by said electric field to facilitate removal of said gaseous contaminants from said vacuum chamber through said gas outlet means, particulate material outlet means for conducting particulate material out of said chamber and means for receiving and collecting decontaminated particulate material through said particulate material outlet means and for maintaining said particulate material in a substantially decontaminated state.

36. A method of cleaning and degassing contaminated powder metal consisting of the steps of:
a. introducing contaminated powder metal into a vacuum chamber,
b. subjecting the powder metal to an electric field to charge the powder and contaminants to separate the contaminants therefrom and
c. simultaneously evacuating the vacuum chamber by means of a suitable vacuum pump to remove separated contaminants.

4,056,369
METHOD OF AND APPARATUS FOR THE RECOVERY OF A DESIRED MATERIAL FROM A CARRIER STREAM

Henry Quackenbush, 200 Ridgewood Place, Mobile, Ala. 36608

Filed Nov. 25, 1975, Ser. No. 635,107
Int. Cl.[2] B01D *51/06*
U.S. Cl. 55—58 **23 Claims**

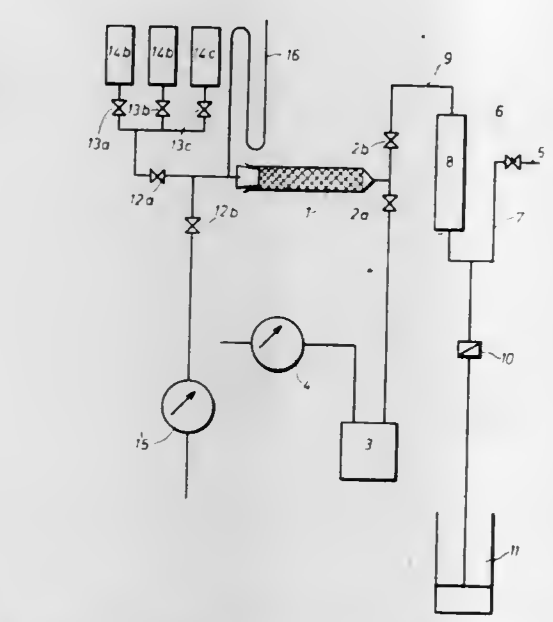


9. A process for the recovery of gasoline or halogenated hydrocarbons of the type having a boiling point that varies in direct proportion to pressure comprising:
adsorbing said gasoline or halogenated hydrocarbon on a bed of adsorbent material from a stream of air laden with said gasoline or chlorinated hydrocarbon, the bed further containing an inert, high heat capacity material intimately mixed with said adsorbent material;
providing an enclosure for said bed;
heating the interior of said enclosure at substantially atmospheric pressure;
reducing the pressure in said enclosure while maintaining the temperature in the enclosure above the vaporization temperature at the reduced pressure;
withdrawing air laden with gasoline or halogenated hydrocarbon vapor from the enclosure while maintaining the temperature in the enclosure; and
subsequently separating the gasoline or halogenated hydrocarbon from the air withdrawn from the enclosure.

4,056,370
ZEOLITE A WITH IMPROVED PROPERTIES

Gerhard Heinze, Schildgen; Manfred Mengel, Cologne, and Gerhard Reiss, Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Division of Ser. No. 472,387, May 22, 1974, abandoned. This application Oct. 7, 1975, Ser. No. 620,723
Claims priority, application Germany, June 7, 1973, 2329210
Int. Cl.[2] B01D *53/04*
U.S. Cl. 55—68 **4 Claims**



1. A process for separating a mixture of substances, comprising treating a type Na-A zeolite with a solution of a calcium salt to replace sodium and introduce x moles of calcium, the zeolite then having the formula

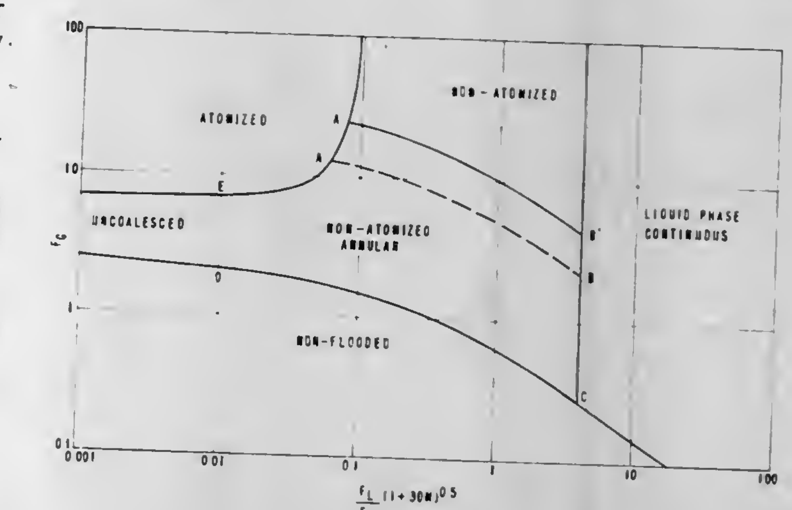
$$x\mathrm{CaO}\,.\,n\mathrm{Na_2O}\,.\,\mathrm{Al_2O_3}\,.\,(1.85 \pm 0.5)\,\mathrm{SiO_2}$$

in which
x has a value of at least 0.80; and
n has a value of $(1.0 \pm 0.2) - x$,
and contacting the modified zeolite with the mixture of substances selectively to adsorb on the zeolite predetermined ones of said substances, desorbing said substances, regenerating the zeolite in the presence of water vapor, the adsorptive capacity following regeneration remaining substantially as high as at the outset, and repeating the adsorption, desorption and regeneration.

4,056,371
METHOD FOR SEPARATING IMMISCIBLE FLUIDS OF DIFFERENT DENSITY

R. Bertrum Diemer, Jr., 4942 Wilderness Road, Wilmington, N.C. 28401, and James B. Dunson, Jr., 202 Winslow Road, Newark, Del. 19711

Filed Feb. 23, 1976, Ser. No. 660,181
Int. Cl.[2] B01D *47/00*
U.S. Cl. 55—90 **15 Claims**



1. A method for separating a flowing mixture of immiscible fluids of different density in which a higher density fluid phase is dispersed within a lower density fluid phase comprising passing the mixture through an inertial separator having an N_D value of 50 or below under conditions of non-atomizing flow such that the coordinates of the gas phase Froude coefficient and $(1 + 30M)^{0.5}$ times the ratio of the liquid phase Froude coefficient to the gas phase Froude coefficient of the fluid mixture at the separator inlet lie within the enclosed area defined by points A, B, C, D and E in FIG. 1 hereto.

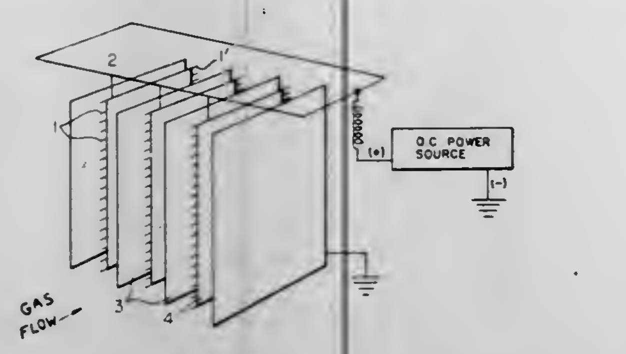
4,056,372
ELECTROSTATIC PRECIPITATOR

Tsutomu Hayashi, Yokohama, Japan, assignor to Nafco Giken, Ltd., Tokyo, Japan

Division of Ser. No. 406,159, Oct. 15, 1973, Pat. No. 3,958,962. This application Apr. 15, 1976, Ser. No. 677,417
Claims priority, application Japan, Dec. 30, 1972, 47-1359
Int. Cl.[2] B03C *3/24*
U.S. Cl. 55—152 **5 Claims**

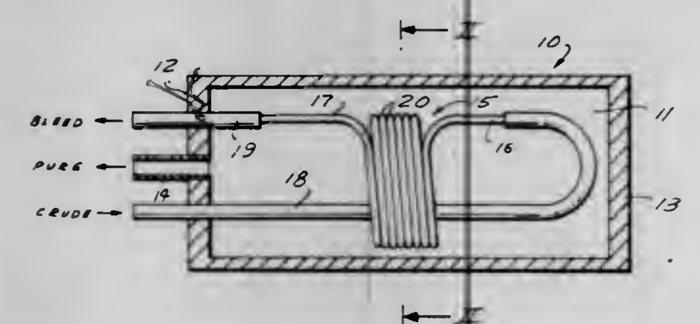
1. A discharge electrode for use in an electrostatic precipitator comprising: a planar platelike member having a substantially straight edge along one side thereof, an elongated bracket means having an outwardly facing surface disposed longitudinally thereof, said bracket means comprising an elongated U-shaped channel member defining an open portion in said channel member opposite said outwardly facing surface, said open portion of said channel member being adapted to receive the straight edge of said platelike member, plural nee-

dle-like elements fastened at one axial end on the longitudinal surface of said bracket means in spaced-apart longitudinal alignment therealong, the other free end of said needles projecting perpendicular to said surface, and means connecting



said bracket means on said edges of the platelike member in such a manner that the free ends of the needles are disposed to lie along said edge in a substantially straight line in the plane of said member.

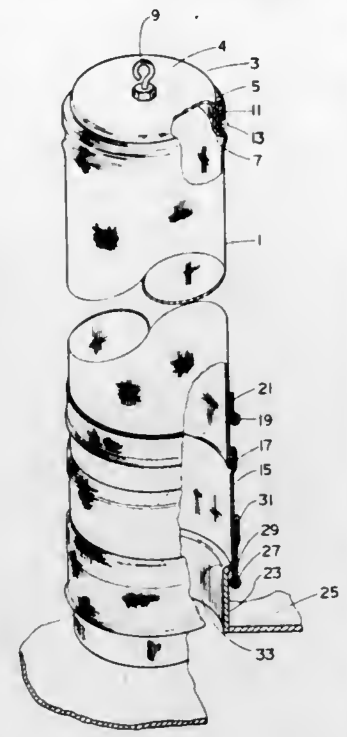
4,056,373
HYDROGEN-PURIFICATION APPARATUS WITH PALLADIUM-ALLOY FILTER COIL
Leonard Roy Rubin, Short Hills, N.J., assignor to Resource Systems, Inc., East Hanover, N.J.
Filed May 12, 1976, Ser. No. 686,238
Int. Cl.^{2} B01D *13/00*
U.S. Cl. 55—158 **2 Claims**



1. An apparatus for gas purification which comprises:
a closed chamber;
an inlet opening into said chamber;
a bleed opening from said chamber;
a helical, tubular, palladium-alloy permeation filter coil within said chamber and connected at one end to said inlet opening and at the other end to said bleed opening, said coil having a multiplicity of turns between its ends, at least some of said turns of said helical coil consisting of respective arcuate segments and respective straight segments interconnecting the arcuate segments of adjacent turns; and
an outlet opening from said chamber.

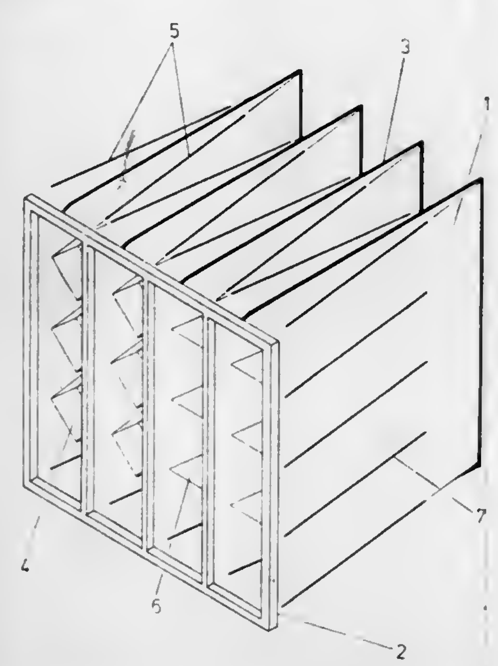
4,056,374
TUBULAR GAS FILTER
Dennis L. Hixenbaugh, Louisville, Ky., assignor to American Air Filter Company, Inc., Louisville, Ky.
Filed Feb. 19, 1976, Ser. No. 659,290
Int. Cl.^{2} B01D *46/02*
U.S. Cl. 55—377 **9 Claims**

1. A filter bag for removing particles from a dirty gas stream comprising: a first tubular flexible gas filter member having at least one opening in one end thereof, and an opposed end having means for attaching to a bag support means; a second tubular flexible dust impervious fabric member having a cross-sectional area substantially the same as said first tubular member and having an opening in each end thereof, said second tubular member having a flexible and abrasive resistant coating thereon, one end being connected to said one end of said first tubular member, and, the other end including means for attaching to a flow inlet means; and, one motion restricting ring member attached to one of said tubular members remote from said flow inlet means disposed adjacent to the connection



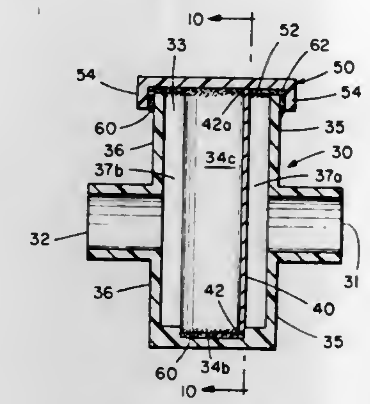
between said first tubular member and said second tubular member maintaining said connection in a substantially non-flexing position.

4,056,375
GAS FILTER ELEMENT
Wolfgang Ringel, Morlenbach; Peter Rutsch, Absteinach; Rolf Schneider, Weinheim, and Edgar Kohl, Abtsteinach, all of Germany, assignors to Firma Carl Freudenberg, Weinheim an der Bergstrasse, Germany
Filed Sept. 3, 1976, Ser. No. 720,327
Claims priority, application Germany, Sept. 17, 1975, 2541331
Int. Cl.^{2} B01D *46/02*
U.S. Cl. 55—381 **9 Claims**



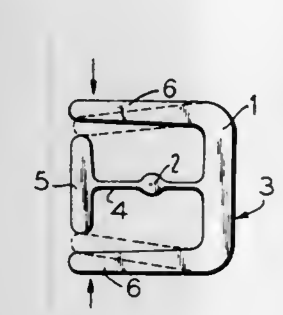
1. A gas filter element comprising a holding frame and at least one self-supporting wedge-shaped filter pocket each having its wide end open and secured to said frame, each filter pocket comprising a pair of substantially symmetrical pocket halves formed of fusible fibers and welded to one another along the wedge edge and centrally along the opposite wedge end faces and at least one laminar spacing element disposed within the pocket and extending from adjacent the open end toward the wedge edge, the spacing element being welded to the opposite inclined wedge faces, the filter pocket being rendered self-supporting by the welding of the pocket halves to one another and the welding of the spacing element to the pocket.

4,056,376
AIR FILTER
Raymond E. Schuldenfrei, Los Angeles, Calif., assignor to Brunswick Corporation, Skokie, Ill.
Filed Nov. 14, 1975, Ser. No. 631,816
Int. Cl.^{2} B01D *39/08*
U.S. Cl. 55—497 **4 Claims**



1. A fluid filtering device comprising:
A. a unitary container having an integral port and defining a cubic volume with at least one open surface;
B. a continuous three section trough integral within the container and adapted to receive and position three side edges of a pleated filter media element;
C. an adhesive substantially simultaneously deposited in the three sections of the trough in its gooey, uncured state;
D. a three dimensional pleated filter element having two flat planar side edges and an upper zigzag side edge and a lower zigzag side edge, three of the filter element's side edges being inserted in the goo containing trough so as to simultaneously seal three edges of the filter element to three corresponding sides of the trough, the seal becoming permanent when the goo has been allowed to cure;
E. a cover secured to the open surface of the container, the cover having an integral port and a channel mateable with the container's trough for receiving and positioning the remaining unsealed side edge of the filter element; and
F. sealing means within the channel for providing a fluid type seal between the cover and (1) the container and (2) the remaining unsealed side edge of the filter element.

4,056,377
METHOD FOR THE PRODUCTION OF ONE-MATERIAL OPTICAL FIBERS
Franz Auracher, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany
Filed Apr. 12, 1976, Ser. No. 676,351
Claims priority, application Germany, Apr. 15, 1975, 2516375
Int. Cl.^{2} C03C *23/20;* **C03B** *11/08*
U.S. Cl. 65—4 A **9 Claims**

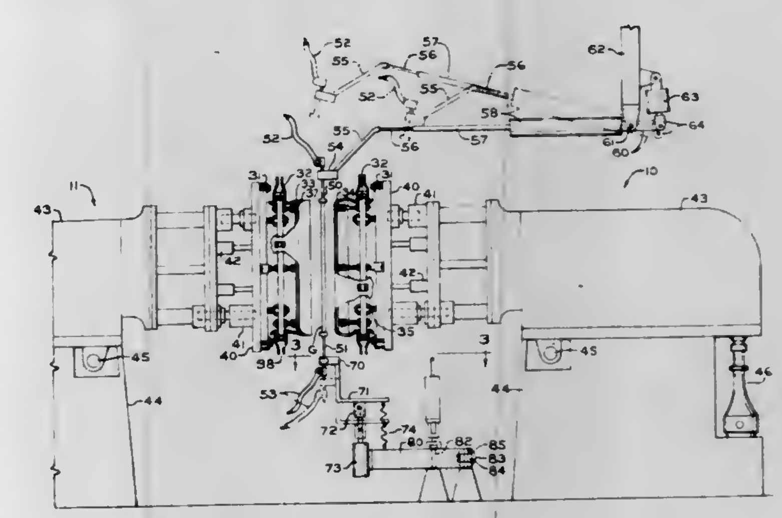


1. A method for the production of one-material optical fibers having at least one light conducting core component supported by a support component in a surrounding protective casing, said method comprising the steps of forming a one-piece blank having at least one light conducting core component integrally formed with a thin supporting component that extends between a pair of casing components whose side edges are spaced apart to provide an open cross section for the blank, working the blank to force the side edges of at least one of the casing components into engagement with the side edges of the other casing component to close the cross section and to form a blank with a closed cross section, heating the blank with the closed cross section to a suitable temperature for drawing, and drawing the blank with the closed cross section into said one-material optical fiber.

4,056,378
METHOD FOR PREPARATION OF VO$_2$ CURRENT INRUSH LIMITERS FOR INCANDESCENT LAMPS
James P. McHugh, Pittsburgh; Philip J. Nalepa, Greensburg; Robert C. Miller, Pittsburgh, all of Pa., and Chester W. Dawson, Basking Ridge, N.J., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.
Filed Sept. 15, 1976, Ser. No. 723,387
Int. Cl.^{2} C03B *32/00, 35/00;* **H01B** *1/06*
U.S. Cl. 65—18 **15 Claims**

1. The method of making a current inrush limiter for incandescent lamps substantially comprising vanadium dioxide particles maintained in a chemically stable and mechanically strong mass of predetermined dimensions by a glassy matrix binder, which method comprises:
a. mixing together finely divided vanadium sesquioxide and vanadium pentoxide wherein the molar ratio of said finely divided vanadium sesquioxide to said finely divided vanadium pentoxide is from 1:1 to 2:1 together with finely divided glass-forming constituents which include at least one of vanadium oxide and metallic vanadate, with the weight ratio of said total finely divided vanadium sesquioxide plus vanadium pentoxide to said total glass-forming constituents being from 98:2 to 70:30;
b. compacting said mixture into the shape desired for said limiter;
c. sintering said compact in a substantially inert atmosphere at a temperature of from about 800° C to about 1100° C for a sufficient period of time to react and convert the mixed vanadium sesquioxide and vanadium pentoxide particles to vanadium oxide and to form said glass-forming constituents into said glassy matrix binder.

4,056,379
FORMING V BENDS IN GLASS SHEETS BY PRESS BENDING
Joseph B. Kelly, and Kenneth A. Gibson, both of Crestline, Ohio, assignors to PPG Industries, Inc., Pittsburgh, Pa.
Filed Jan. 3, 1977, Ser. No. 756,209
Int. Cl.^{2} C03B *23/02*
U.S. Cl. 65—106 **12 Claims**



1. A method of bending a glass sheet into a shape which

includes a line of sharp bending about which the radius of curvature is less than 8 inches, comprising the steps of:

applying an electroconductive stripe onto a surface of a sheet of glass along a line of intended sharp bending;

heating the sheet of glass in a heated enclosure to an overall temperature suitable for bending;

removing the sheet of glass from said heated enclosure and passing electric current through the stripe so as to heat the line of intended sharp bending to a temperature higher than said overall temperature of the glass sheet; and

bending the sheet of glass to the desired curvature, including said sharp bend of less than 8 inches radius, by pressing it between two shaping members having shaping surfaces of complementary curvature.

9. An apparatus for bending a sheet of glass comprising:

a heated enclosure, including means to heat a sheet of glass to a softened condition suitable for bending;

a pair of opposed shaping members located outside said furnace and having complementary shaping surfaces conforming to the desired shape for the glass, including a line of sharp bending about which the radius of curvature is less than 8 inches;

means to bring the shaping members into pressing contact against opposite surfaces of a glass sheet supported therebetween;

means to convey a glass sheet into and out of said heated enclosure and into and out of pressing position between said shaping members;

a pair of electrodes located on opposite sides of the pressing position, said electrodes having means associated therewith for moving the electrodes into and out of contact with opposite edges of a glass sheet when the sheet is located between said pressing members; and

means for supplying electric current to the electrodes so that electric current may be passed along the line of sharp bending in the glass sheet while the glass sheet is positioned between the shaping members.

4,056,380
METHOD OF PRODUCING AN ORGANIC SOIL ADDITIVE AND THE PRODUCT THEREOF

E. Brandt Thiac, Lafayette, La., assignor to The Hydro-Terre Corporation, Lafayette, La.

Filed June 25, 1976, Ser. No. 696,790

Int. Cl.² C05F *11/08*

U.S. Cl. 71—9 **12 Claims**

1. The method of producing an organic soil additive for improving structural properties of soils comprising:

a. harvesting water hyacinths,

b. mixing secondary sewage sludge, animal or poultry manure and/or any combination of the three with water hyacinths in spaced apart heaps,

c. injecting air into the heaps to cut composting time, and

d. steam treating the composted mass to sterilize it.

4,056,381
FERTILIZER SOLUTIONS CONTAINING STABILIZED IRON

Joseph R. Kenton, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

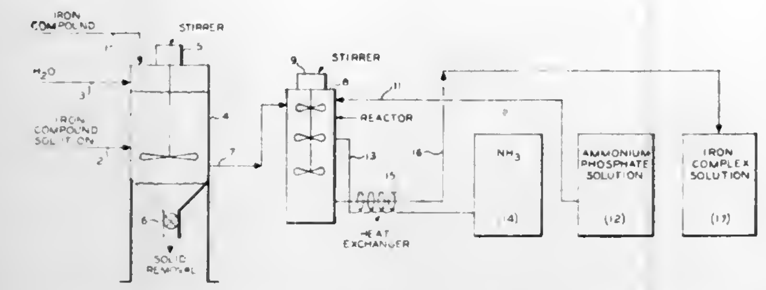
Filed Sept. 14, 1976, Ser. No. 723,259

Int. Cl.² C05B *7/00*

U.S. Cl. 71—36 **15 Claims**

1. Substantially stable iron complexes comprising nitrogen, phosphorus, and iron, prepared by a process which comprises the step of:

a. contacting a water-soluble iron salt with an ammonium polyphosphate and water in a ratio sufficient to provide at least about 1:1 phosphorus atoms:iron atoms, thereby preparing an iron polyphosphate slurry, wherein said ammonium polyphosphate contains at least about 20 weight percent of the phosphorus atoms thereof in the poly form, and



b. thereafter reacting said iron polyphosphate slurry from said step (a) with ammonia in amount sufficient to provide a substantially stable iron complex solution.

4,056,382
METHOD OF CONTROLLING AQUATIC WEEDS

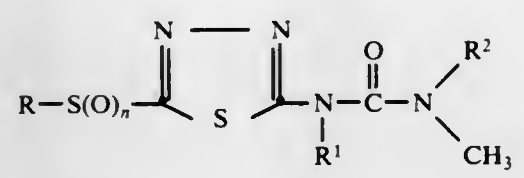
Quentin Francis Soper, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Continuation-in-part of Ser. No. 531,582, Dec. 11, 1974, abandoned. This application June 9, 1976, Ser. No. 687,120

Int. Cl.² A01N *9/12*

U.S. Cl. 71—66 **8 Claims**

1. A method of destroying aquatic weeds in water which comprises contacting the weeds with an herbicidally-effective amount of a compound of the formula



wherein

R is C_1–C_8 alkyl, C_3–C_7 cycloalkyl, benzyl or phenethyl

R^1 is methyl or ethyl;

R^2 is hydrogen, methyl or ethyl; and

n is 0, 1 or 2.

4,056,383
THIAOIAZOLYLTETRAHYDROPYRIMIDINONE HERBICIDES

John Krenzer, Oak Park, Ill., assignor to Velsicol Chemical Corporation, Chicago, Ill.

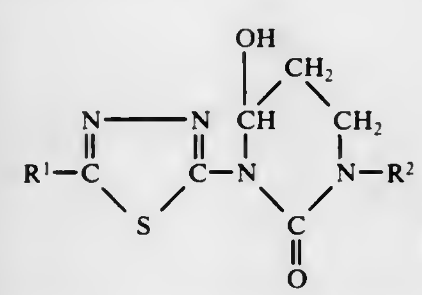
Division of Ser. No. 505,118, Sept. 11, 1974, Pat. No. 3,979,388. This application June 14, 1976, Ser. No. 695,342

The portion of the term of this patent subsequent to June 22, 1993, has been disclaimed.

Int. Cl.² A01N *9/14*

U.S. Cl. 71—90 **9 Claims**

1. A herbicidal composition comprising an inert carrier and, as an essential active ingredient, in a quantity toxic to weeds, a compound of the formula



wherein R^1 is selected from the group consisting of alkyl of up to 4 carbon atoms, lower alkenyl, lower chloroalkyl, trifluoromethyl, lower alkoxy, lower alkylthio, lower alkylsulfonyl and lower alkylsulfinyl; and R^2 is selected from the group consisting of lower alkyl, lower alkenyl, lower chloroalkyl, lower bromoalkyl and

wherein R^3 and R^4 are each selected from the group consisting of hydrogen and alkyl of up to 3 carbon atoms.

4,056,384
PESTICIDAL DIHYDROTETRAZOLO[1,5-a] QUINAZOLINES AND PESTICIDAL USES THEREOF

Raymond Alexander Bowie, Macclesfield; John Michael Cox; Gordon Michael Farrell, both of Wokingham, and Margaret Claire Shephard, Maidenhead, all of England, assignors to Imperial Chemical Industries Limited, London, England

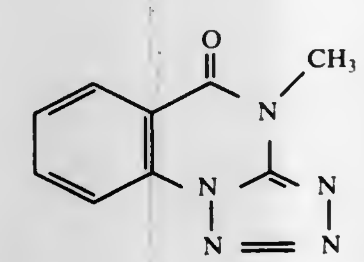
Filed Aug. 25, 1975, Ser. No. 607,543

Claims priority, application United Kingdom, Sept. 5, 1974, 38796/74

Int. Cl.² A01N *21/02;* **C07D** *487/04*

U.S. Cl. 71—92 **2 Claims**

1. A process for combating the disease Piricularia oryzae, rice blast, which comprises applying to rice seeds, rice plants, the roots of rice plants, or to their locus within or remote from a germination or growing environment, an effective amount of a dihydrotetrazolo[1,5-a]quinazoline having the structural formula:



and chemical name: 4 methyl-4,5-dihydro tetrazol[1,5-a]quinazolin-5-one.

4,056,385
ALANINE DERIVATIVES AS SUGAR CANE RIPENERS

Ronald W. A. Leach, Sittingbourne, England, assignor to Shell Oil Company, Houston, Tex.

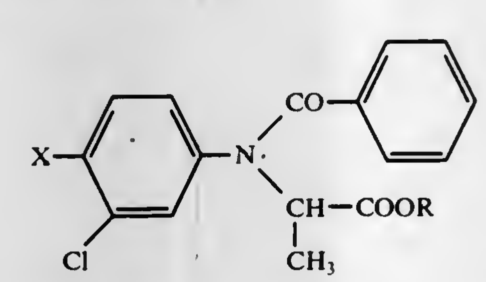
Filed Nov. 16, 1976, Ser. No. 742,320

Claims priority, application United Kingdom, Nov. 27, 1975, 48796/75

Int. Cl.² A01N *9/20*

U.S. Cl. 71—111 **1 Claim**

1. A method for effecting ripening of sugar cane which comprises applying to the growing plant an effective amount of a compound of the formula:



wherein X is chlorine or fluorine and R is hydrogen, an alkyl group containing 1 to 6 carbon atoms, or an alkali metal, alkaline earth metal, ammoniuum or alkyl-substituted ammonium ion.

4,056,386
METHOD FOR DECOMPOSING IRON PENTACARBONYL

William S. McEwan, Ridgecrest, Calif., and Hans B. Jonassen, New Orleans, La., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 19, 1977, Ser. No. 788,726

Int. Cl.² C21B *15/04*

U.S. Cl. 75—0.5 BA **4 Claims**

1. In a method for producing iron comprising the steps of providing iron pentacarbonyl and subjecting the iron pentacarbonyl to an elevated temperature to cause it to decompose into iron and carbon monoxide the improvement residing in utilizing as a catalyst to speed the rate of decomposition, a gas selected from the group consisting of H_2, NO, PF_3, PH_3, NH_3 and I_2.

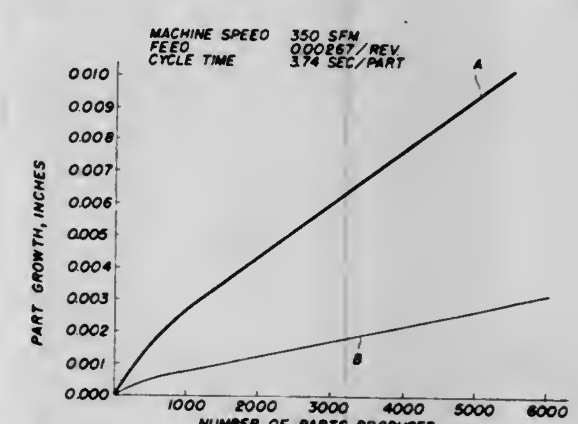
4,056,387
LEADED STEEL BAR FREE OF LEAD MACROINCLUSIONS

Gregorio Asua Cantera; Jose M. Palacios Reparaz, both of Bilbao, Spain, and Louis Molnar, Hammond, Ill., assignors to Inland Steel Company, Chicago, Ill. and S.A. Echevarria, Bilbao, Spain

Continuation of Ser. No. 497,258, Aug. 14, 1974, abandoned, which is a continuation-in-part of Ser. No. 403,065, Oct. 3, 1973, Pat. No. 3,876,422, which is a continuation-in-part of Ser. No. 256,806, May 25, 1972, abandoned. This application Dec. 8, 1975, Ser. No. 638,675

Int. Cl.² C22C *37/00*

U.S. Cl. 75—123 F **5 Claims**



1. An as-rolled, free machining steel bar having ingredients consisting essentially of, in wt. %:

carbon	.03 – 1.03
manganese	.25 – 1.65
sulfur	.01 – .50
phosphorus	.005 – .20
silicon	.01 – .05
nitrogen	.03 max.
lead	.40 – .50
iron	essentially the balance;

the entire lead content of said bar being uniformly dispersed throughout said bar, with substantially all of said dispersed lead being contained in microinclusions;

said bar being substantially free of lead macroinclusions;

said steel bar having an immediate sub-surface region which comprises about 5–15% of the depth from the surface to the center of said bar;

said immediate sub-surface region being substantially free of complex macroinclusions comprising oxides of manganese, silicon and iron with metallic lead interspersed therein;

the form-tool machinability of said immediate sub-surface region, expressed in terms of cubic inches of metal re-

moved until tool failure, being greater than 50% of the form-tool machinability of the bar's interior.

4,056,388

PROCESS FOR UTILIZING FERROPHOSPHORUS

Jurgen Stenzel, Erftstadt-Liblar, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed May 27, 1976, Ser. No. 690,678

Claims priority, application Germany, May 31, 1975, 2524259

Int. Cl.² C22C *28/00;* **C01B** *25/01*

U.S. Cl. 75—129 **2 Claims**

1. A process for utilizing ferrophosphorus for the production of calcium phosphide, which comprises reacting ferrophosphorus with calcium silicide in proportions necessary to obtain a reaction mixture containing calcium and phosphorus in at least the stoichiometric quantities necessary for the formation of calcium phosphide Ca_3P_2 at temperatures of 1250° C up to 1500° C, allowing the resulting melt to gradually cool with the resultant formation of two separate phases consisting of ferrosilicon and calcium phosphide, respectively, and separating the said phases from one another.

4,056,389

NICKEL-CHROMIUM HIGH STRENGTH CASTING

Stuart Walter Ker Sutton Shaw, Coldfield, England, assignor to The International Nickel Company, Inc., New York, N.Y.

Filed May 18, 1972, Ser. No. 254,728

Claims priority, application United Kingdom, May 20, 1971, 16046/71

Int. Cl.² C22C *19/05*

U.S. Cl. 75—171 **3 Claims**

1. A cast nickel-chromium alloy characterized by a good combination of stress-rupture strength at temperatures of 850° C. or higher together with marked resistance to embrittlement upon prolonged exposure to such temperature, and also good weldability, said alloy consisting of from 27 to 31% chromium, 10 to 25% cobalt, up to 1.9% niobium, titanium and aluminum in a total amount of 3.5 to 5.5%, the ratio of titanium to aluminum being from 1:1 to 4:1 and with the niobium, titanium, aluminum and chromium being correlated such that the "Correlated Factor" of 5 (% Nb) + 6 (% Ti + Al) + 2/3 (% Cr) is more than 49 and up to 54, 0.02 to 0.2% carbon, up to 0.025% zirconium, up to 1.2% hafnium with the %Zr + 1/2 (% Hf) not exceeding 0.6%, up to 0.002% boron, up to 0.2% of yttrium and/or lanthanum, the balance being essentially nickel.--

4,056,390

PROCESS FOR TRANSFERRING ELECTROSTATIC LATENT IMAGES

Isao Iizaka, and Toshio Yamamoto, both of Toyokawa, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Continuation-in-part of Ser. No. 452,861, March 20, 1974, abandoned, which is a division of Ser. No. 330,722, Feb. 8, 1973, Pat. No. 3,824,012. This application Sept. 18, 1975, Ser. No. 614,387

Claims priority, application Japan, Feb. 17, 1972, 47-16816; Feb. 21, 1972, 47-21364

Int. Cl.² G03G *13/22*

U.S. Cl. 96—1 TE **10 Claims**

1. A process of transferring an electrostatic latent image for electrophotography comprising the steps of:

a. forming the electrostatic latent image on a dielectric layer on the front face of a photoconductive plate having on its rear face an electrically conductive layer substantially grounded while the photoconductive plate is being driven by a drive member;

b. bringing copy paper onto the latent image bearing surface of the photoconductive plate by a first member to advance the copy paper with a small air gap maintained between the paper and the plate, the copy paper having on its rear face an electrically conductive lining layer having a high electric resistance of 10^5 to 10^{10} ohms and on its front face a dielectric layer, the first member serving substantially as a high resistance element having a higher electric resistance than the conductive lining layer, the transfer of the high potential portion of the latent image to the copy paper being initiated as the copy paper advances between the plate and the first member and being limited by the resistance of the first member;

c. injecting a transfer charge into the copy paper travelling along the photoconductive plate with a small air gap maintained therebetween by a second member grounded and having a lower electric resistance than the conductive lining layer of the copy paper, the low potential portion of the latent image being transferred to the copy paper as it traverses the second member whereas the copy paper is spaced from the latent image surface by the small air gap of at least 10 microns; and

d. separating the copy paper from the photoconductive plate after the paper has passed over the second member.

4,056,391

METHOD FOR ENHANCING SOLID SOLUTION STABILITY OF ELECTRON ACCEPTOR MOLECULES AND ELECTROPHOTOGRAPHIC COMPOSITIONS

Sam R. Turner, and John M. Pochan, both of Webster, N.Y., assignors to Xerox Corporation, Stamford, Conn.

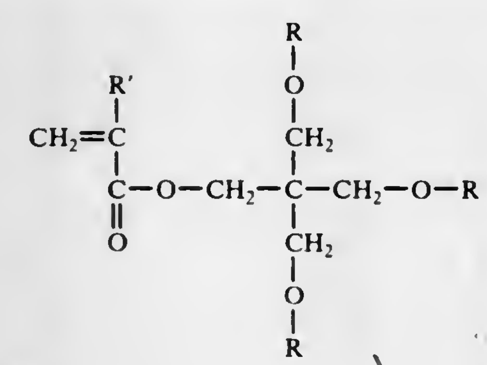
Filed Sept. 22, 1975, Ser. No. 615,665

Int. Cl.² G03G *5/06, 5/08*

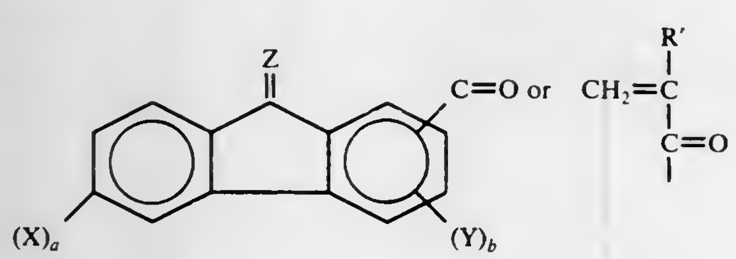
U.S. Cl. 96—1 PC **11 Claims**

9. In an electrophotographic imaging process comprising the steps of providing an electrophotographic imaging member having a photoconductive insulating layer and forming a latent image on the surface of said photoconductive insulating layer, the improvement comprising;

an electrophotographic imaging member comprising a photoconductive insulating layer which comprises a solid solution of a polymeric resin and at least 25 weight percent of at least one compound of the formula



wherein R is



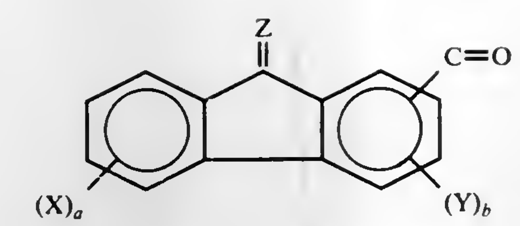
R′ is hydrogen or methyl;

X and Y are independently selected from the group consisting of $—NO_2$, halogen, cyano and $—CF_3$;

Z is oxygen or dicyanomethylene; and

a and *b* can range from 0 to 3;

with the proviso that at least one of R is



said electron acceptor compound having been exposed to a sufficient thermal energy, electromagnetic radiation and/or electron beam bombardment to effect polymerization of said compounds within the solid solution.

4,056,392

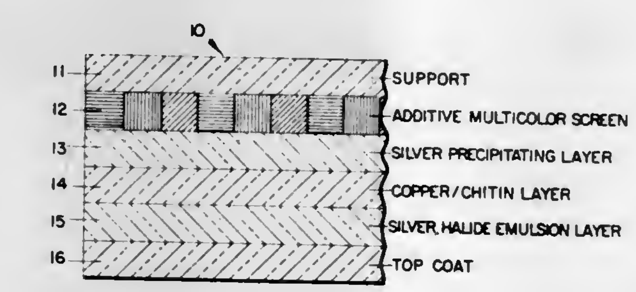
ADDITIVE COLOR SILVER SALT TRANSFER FILM UNIT WITH LAYER OF CHITIN AND CUPRIC SALT

Kenneth G. Scott, Natick, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed June 17, 1976, Ser. No. 697,104

Int. Cl.² G03C *7/00, 5/54, 1/48, 1/84*

U.S. Cl. 96—3 **23 Claims**



15. A photographic process which comprises the steps of:

a. exposing a film unit which comprises, in order, a transparent support, an additive color screen, a layer comprising silver precipitating nuclei, a layer comprising a water soluble cupric salt and a compound selected from the group consisting of deacetylated chitin and 2-amino-2-deoxyglucose, and a photosensitive silver halide emulsion layer; and

b. contacting said exposed film unit with a processing composition containing a silver halide developing agent and a silver halide solvent adapted to provide a positive silver image in said layer comprising silver precipitating nuclei.

4,056,393

METHOD OF RECORDING INFORMATION USING A COPOLYMER OF GLYCIDYL METHACRYLATE AND ALLYL GLYCIDYL ETHER

Sheldon I. Schlesinger, East Windsor Township, Mercer County, N.J., and Veronica Cochran, Armonk, N.Y., assignors to American Can Company, Greenwich, Conn.

Continuation-in-part of Ser. No. 509,679, Sept. 26, 1974, abandoned, which is a division of Ser. No. 297,829, Oct. 16, 1972, abandoned. This application June 17, 1976, Ser. No. 696,980

Int. Cl.² G03C *5/04, 1/78, 5/00*

U.S. Cl. 96—27 H **9 Claims**

1. A method for recording and storing information from a laser source comprising the steps of admixing (a) a copolymer of glycidyl methacrylate and allyl glycidyl ether having an inherent viscosity of at least about 0.25 and an epoxide equivalent of at least about 0.65 epoxide equivalent per 100 grams of polymer, derived from reaction of a mixture consisting essentially of the monomers containing from about a 4 to 5 molar excess of glycidyl methacrylate in the presence of a free-radical polymerization catalyst and a solvent at a temperature below about 100° C, and (b) as a latent curing catalyst, an aromatic diazonium salt of a complex halogenide which decomposes upon exposure to irradiation to release a Lewis Acid effective to initiate polymerization, said catalyst being present in an amount sufficient to effect polymerization of said copolymer and being selected from compounds having the general formula $(ArN_2)_m(MX_{n+m})^{-m}$ wherein Ar is an aryl or substituted aryl group, X is chlorine or fluorine, M is phosphorous, *n* is the oxidation state of M and *m* is the number of diazonium groups in the diazonium salt as determined by the net charge on the anion $(MX_{n+m})^{-m}$,

applying said mixture to a substrate, subjecting the surface of the coated substrate to a beam of coherent radiation emerging from a laser having an intensity at least sufficient to effect polymerization of said copolymer in said surface and applying a suitable solvent to remove unpolymerized portions from said surface.

4,056,394

TIMING LAYER FOR COLOR TRANSFER FILM UNITS COMPRISING COPOLYMER WITH ACTIVATION ENERGY TO PENETRATION GREATER THAN 18 KCAL/MOLE

David Eugene Hannie, Pittsford, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Apr. 14, 1976, Ser. No. 676,945

Int. Cl.² G03C *7/00, 5/54, 1/40, 1/76*

U.S. Cl. 96—29 D **22 Claims**

20. In a process of producing a photographic transfer image in color comprising:

a. imagewise exposing a photographic element comprising a support having thereon at least one photosensitive silver halide emulsion layer having associated therewith a dye image-providing material, a receiving layer and a barrier layer associated with a neutralizing layer being permeable by said alkaline processing composition and which is located between said photosensitive silver halide emulsion layer and said neutralizing layer to light;

b. treating said element with an alkaline processing composition in the presence of a silver halide developing agent to effect development of each of said exposed silver halide emulsion layers;

i. an imagewise distribution of dye image-producing material being so formed as a function of development and

ii. at least a portion of said imagewise distribution of dye image-providing material diffusing to said dye image-receiving layer; and

c. neutralizing said alkaline processing composition by means of said neutralizing layer associated with said photographic element;

said film unit containing a silver halide developing agent, the improvement wherein said barrier layer comprises a polymeric latex having an activation energy to penetration from aqueous alkaline solution of greater than 18 kcal/mole, said polymeric latex comprising a polymer comprising from about 5 to about 35 percent by weight of polymerized ethylenically unsaturated monomer, from about 2 to about 10 percent by weight of polymerized ethylenically unsaturated carboxylic acid, and from about 55 to about 85 percent by weight of polymerized vinylidene chloride.

4,056,395

METHOD FOR PRODUCING A RELIEF PATTERN BY ION-ETCHING A PHOTOGRAPHIC SUPPORT

Masamichi Sato; Keishiro Kido, and Noboru Arai, all of Asaka, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Nov. 19, 1975, Ser. No. 633,199

Claims priority, application Japan, Nov. 19, 1974, 49-132897

Int. Cl.² G03C *5/00*

U.S. Cl. 96—36 **12 Claims**

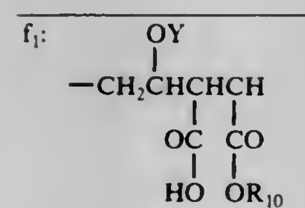
1. A method for producing a relief pattern comprising in sequence forming one of (i) a silver image, (ii) a silver halide image, and (iii) an image obtained by toning and/or intensifying said silver image in the emulsion layer of a photographic light-sensitive material which comprises a support having

thereon at least one silver halide emulsion layer either directly or on at least one subbing layer on the support by image-wise exposure to light and developing; heating said photographic material at a temperature greater than 150° C to thermally decompose the binder of said emulsion layer; and then ion-etching the photographic material to form a relief pattern in the support corresponding to said image.

4,056,396
LAYERS USED TO PREVENT RETICULATION IN PHOTOGRAPHIC ELEMENTS
Ikutaro Horie; Takushi Miyazako; Shinji Sakaguchi; Nobuo Tsuji, and Nagao Kameji, all of Ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan
Continuation-in-part of Ser. No. 441,791, Feb. 12, 1974, abandoned. This application May 16, 1975, Ser. No. 578,069
Claims priority, application Japan, Feb. 12, 1973, 48-17273
Int. Cl.^{2} G03C *1/76, 3/00*
U.S. Cl. 96—67 **10 Claims**

1. A photographic silver halide light-sensitive element including a support a light sensitive silver halide layer and, a non-light sensitive uppermost layer said uppermost layer not containing gelatin, not delaminating from said light-sensitive material when subjected to a processing solution selected from the group consisting of a developing solution, water, a fix-bleaching solution, a stopping solution, a fixing solution and a stabilizing solution and comprising polymer (F) comprising repeating unit f_1

f_1:



wherein Y represents $—CH_3$ or $—COCH_3$, R_{10} represents —H or $—C_nH_{2n+1}$, n being an integer of 1 to 12, and at least one unexposed silver halide light-sensitive layer between said support and said uppermost layer, said polymer (F) being insoluble in any of said processing solutions used during processing, and the thickness of said layer being sufficient to prevent reticulation.

4,056,397
DYE DIFFUSION TRANSFER MATERIAL WITH GRAFT POLYMER BINDING LAYER
Werner Krafft; Erich Wolff, and Wulf von Bonin, all of Leverkusen, Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany
Filed Nov. 5, 1975, Ser. No. 629,104
Claims priority, application Germany, Nov. 9, 1974, 2453208
Int. Cl.^{2} G03C *1/40, 1/48, 1/90*
U.S. Cl. 96—77 **3 Claims**

1. Photographic monosheet material for the dye diffusion transfer process, containing the following layers in the given sequence between a first and a second dimensionally stable support layer, of which at least the first is transparent:
a. an image receiving layer,
b. a light reflecting pigment layer or means for producing such a light reflecting pigment layer and
c. a light-sensitive layer unit containing at least one light-sensitive silver halide emulsion layer with which a colour producing compound is associated,

and a destructible container containing processing liquid arranged at the side, which container releases its contents between a first and second binder layer of the monosheet material when subjected to mechanical force, a bond existing between the said first and said second binder layer of the monosheet material before and after processing, which bond is temporarily eliminated under the action of the processing liquid, wherein the improvement comprises between said first layer and said second layer there is arranged another layer which consists substantially of a graft polymer obtained by grafting a monomer containing a double bond which is capable of radical polymerisation on a hydrophilic linear basic polymer consisting substantially of one or more of the following recurrent units:

$$(—R_1—O—),\ (—R_2—O—)\ \text{and}\ (—R_3—O—CO—)$$

in which R_1, R_2 and R_3 each represents an alkylene group containing 1 to 8 carbon atoms, and having a molecular weight of between 2000 and 10,000.

4,056,398
PLASTIC REFRACTORY COMPOSITION SUITABLE FOR PLACEMENT BY VIBRATING AND THE USE THEREOF
Harold L. Rechter, Chicago, and James R. Haligarda, Oak Forest, both of Ill., assignors to Chicago Fire Brick Company, Chicago, Ill.
Filed Mar. 31, 1977, Ser. No. 783,271
Int. Cl.^{2} C04B *35/10*
U.S. Cl. 106—65 **9 Claims**

1. A plastic refractory composition suitable for placement by mechanical vibration comprising in percent by weight on a dry basis:

	%
-325 mesh alumina or aluminum silicate	20–45
Phosphoric acid or water soluble phosphate to give a P_2O_5 content equal to 75% phosphoric acid	3–12
Bentonite	1.2–3
Kaolin clay	0–1
Tetrasodium pyrophosphate	0.2–1.5
Alumina or aluminum silicate aggregates, ¼ inch maximum size	balance.

4,056,399
ACID AND HEAT RESISTANT MORTARS FOR CELLULAR GLASS BODIES
John Kirkpatrick, Trafford, and John Kijowski, Bradford, both of Pa., assignors to Pittsburgh Corning Corporation, Pittsburgh, Pa.
Filed May 6, 1976, Ser. No. 683,754
Int. Cl.^{2} C04B *35/14*
U.S. Cl. 106—69 **13 Claims**

1. An acid-resistant mortar composition for bonding cellular glass bodies consisting essentially of a mixture expressed by percentage weight of finely powdered reactive glass in the range between about 26 and 48 percent, said powdered reactive glass having substantially the same composition as said cellular glass bodies, inert aggregate filler in the range between about 26 and 61 percent, and a silica sol binder in the range between about 13 and 26 percent.

4,056,400
OXIDATION PRODUCTS OF CELLULOSE, HEMICELLULOSE AND LIGNIN
Michael Diamantoglou, Erlenbach; Helmut Magerlein, Obernburg; Rainer Zielke, Erlenbach, all of Germany, and Emery George Philomena Cornelissens, Nootdorp, Netherlands, assignors to Michael Diamantoglou, Erlenbach; Helmut Mägerlein, Obernburg and Rainer Zielke, Erlenbach, all of, Germany
Filed July 28, 1975, Ser. No. 599,364
Claims priority, application Germany, July 31, 1974, 2436843
Int. Cl.^{2} C08L *1/00*
U.S. Cl. 106—162 **13 Claims**

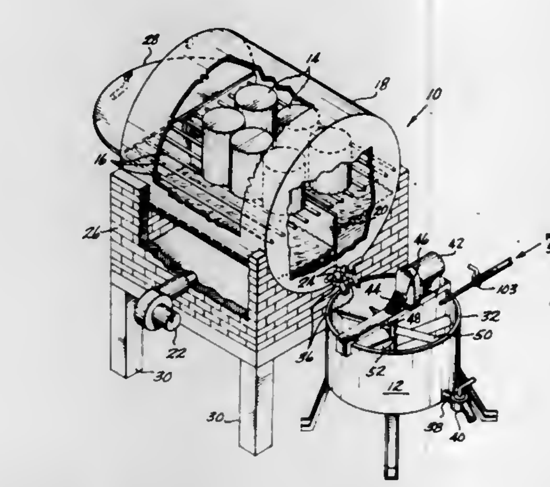
1. A process for the production of a mixture consisting primarily of oligomeric and polymeric oxidation products of cellulose, hemicellulose and lignin containing carboxy, ether and hydroxy groups which comprises:

oxidizing a woody plant material in aqueous suspension in a single stage with alkali hypohalite as the essential oxidizing agent or in two stages with nitrogen dioxide, alkali periodate or lead tetraacetate as the essential oxidizing agent of the first stage and with alkali chlorite or alkali hypochlorite as the essential oxidizing agent in the second stage, the total amount of oxidizing agent being at least two parts by weight for each part by weight of said woody plant material;

separating undissolved components; and

precipitating the oxidation products from the aqueous medium by means of a water-miscible organic precipitating agent.

4,056,401
ASPHALT EMULSION AND MANUFACTURE THEREOF
Bjorn N. DeBough, 8011 1st NE., Seattle, Wash. 98115
Continuation-in-part of Ser. No. 376,727, July 5, 1973, abandoned. This application May 23, 1975, Ser. No. 580,366
Int. Cl.^{2} C08L *95/00*
U.S. Cl. 106—277 **2 Claims**



1. A method for preparing an asphaltic emulsion consisting of clay, asphalt and water which comprises: preparing a slurry, at ambient temperature, consisting of water of a hydrophilic clay having a particle size not exceeding about 0.002 inches and capable of absorbing from up to about ten times its weight of water to about its own weight of water; preheating an asphalt having a range of 40 to 300 penetration to a temperature within the range from about 375° F. to about 400° F.; and, admixing said slurry with said asphalt while agitating at a mixing speed of between 50 and 90 r.p.m. to emulsify the slurry and asphalt into a lather having an increase in volume of about 18 percent.

4,056,402
DRY WATER-DISPERSIBLE PIGMENT COMPOSITIONS
John Guzi, Jr., Argyle, N.Y., assignor to Hercules Incorporated, Wilmington, Del.
Filed Aug. 24, 1976, Ser. No. 717,415
Int. Cl.^{2} C08L *1/26;* **C09C** *3/08*
U.S. Cl. 106—308 Q **10 Claims**

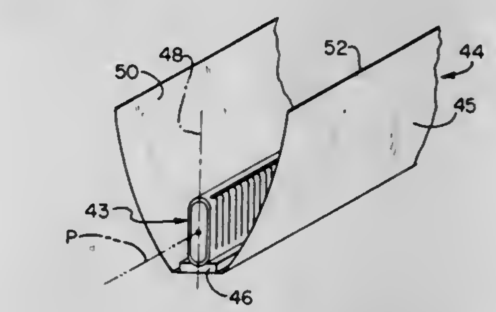
1. A dry, non-dusting, water-dispersible pigment composition developing upon stirring in water-borne industrial finish systems good strength and color values, said composition consisting essentially of from 55 to 80% of pigment and, based on the pigment weight, from 15 to 45% of a nonionic dispersing agent of the polyether alcohol type, alkylene oxide-alkylene diamine block polymer type or polyoxyethylene glycol or glycerol ester type and from 10 to 67% of at least one water-soluble, nonionic cellulose ether having a viscosity of less than 1000 cps. as measured on a 2% aqueous solution at 25° C.

4,056,403
SOLVENT COMPOSITION USED TO CLEAN POLYURETHANE FOAM GENERATING EQUIPMENT
Robert J. Cramer, West Haven, and Maurice A. Raymond, Northford, both of Conn., assignors to Olin Corporation, New Haven, Conn.
Filed May 27, 1976, Ser. No. 690,448
Int. Cl.^{2} C23G *3/04;* **B08B** *3/04*
U.S. Cl. 134—22 R **13 Claims**

1. In a method for cleaning polyurethane foam generating equipment which comprises purging or rinsing said equipment or a portion thereof with a solvent, the improvement of using as said solvent a composition which is comprised of
a. a halogentated aliphatic hydrocarbon having 1–12 carbon atoms and containing only carbon, hydrogen, and halogen atoms in the molecule and
b. an aliphatic monohydric alcohol having 1–20 carbon atoms and containing only carbon, oxygen, hydrogen and optionally halogen atoms in the molecule,

the weight ratio of (a):(b) ranging from about 1:1 to about 12:1.

4,056,404
FLAT TUBULAR SOLAR CELLS AND METHOD OF PRODUCING SAME
Lynne C. Garone, Cambridge, and Kramadhati Venkata Ravi, Sudbury, both of Mass., assignors to Mobil Tyco Solar Energy Corporation, Waltham, Mass.
Filed Mar. 29, 1976, Ser. No. 671,610
Int. Cl.^{2} H01L *31/06*
U.S. Cl. 136—89 PC **10 Claims**



1. A solar cell unit comprising in combination:
a substantially monocrystalline semi-conductor body in the form of a substantially flat oval tube having first and second opposed and mutually spaced flat side wall sections connected together by a pair of opposed edge sections, said side wall sections being substantially larger than said edge sections;

said tube having a radiation-receiving outer surface and a photo-voltaic junction which is close to said outer surface and is capable of responding to radiant energy passing through said surface, said outer surface being substantially flat along the length and breadth of said side wall sections; and

at least first, second and third electrodes for coupling said unit to an external circuit;

said first and third electrodes (1) being carried on said first and second flat side wall sections, respectively, of said radiation receiving outer surface, and (2) each comprising a plurality of spaced conductors, and said second electrode being carried by an inner surface of said body.

7. A method of producing a solar cell unit comprising the steps of:
a. providing a substantially monocrystalline body of a semi-conductor material in the form of a flat oval tube having a pair of opposed mutually spaced flat side wall sections connected together by a pair of opposed edge sections, said side wall sections being substantially larger than said edge sections;
b. forming a photo-voltaic junction near the outer surface of said tube along said side wall sections and said edge sections; and

c. forming electrodes on the outer and inner surfaces of said side wall sections, with separate electrodes being formed on the outer surfaces of each of said flat side wall sections.

4,056,405

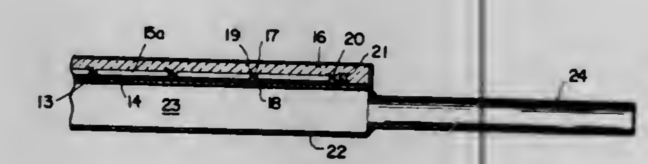
PANEL FOR SOLAR ENERGY CELLS

Peter F. Varadi, Rockville, Md., assignor to Solarex Corporation, Rockville, Md.

Filed May 10, 1976, Ser. No. 684,848

Int. Cl.[2] H01L *31/04*

U.S. Cl. 136—89 PC **10 Claims**



1. A panel for mounting solar energy cells for exposure to light in a terrestrial environment while mitigating impairment of cell efficiency due to excessive heat generated by the light, comprising

a. a housing for retaining the cells, said housing comprising side and end walls and a wall intersecting said side and end walls and forming an upwardly open recessed top to said housing, said intersecting wall being formed from a good conductor of heat,

b. a sheet of resilient resinous cushion material that is thermally conductive but has electrically insulating properties, said sheet overlaying said intersecting wall and being in heat-transfer position therewith, and having an outwardly facing surface, and

c. a plurality of solar energy cells, each of which has a top surface adapted to absorb light impinging thereon and a bottom surface, said cells being secured to said outwardly facing surface of said cushion at their bottom surfaces and, as so secured, being in a position whereby light impinging on the junctions of said cells will generate a flow of electricity that will not be dissipated by said cushion, but heat generated by said light will be carried by said cushion from the immediate vicinity of said cells and transferred to said heat-conductive intersecting wall.

4,056,406

TUBULAR THERMOELECTRIC MODULE

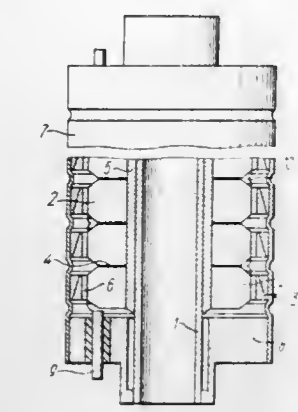
Mikhail Abramovich Markman, ulitsa Shirokaya, 1, korpus 2, kv. 264; Leonid Mikhailovich Simanovsky, ulitsa 3 Mytishchinskaya, 14, kv. 18; Igor Rostislavovich Jurkevich, Michurinsky prospekt, 74, kv. 116; Nikolai Vasilievich Kolomoets, Kastanaevskaya ulitsa, 61, korpus 1, kv. 22, all of Moscow; Vyacheslav Tikhonovich Kamensky, Sovetsky prospekt, 26, kv. 112, Ivanteevka Moskovskoi oblasti; Igor Mikhailovich Matskov, ulitsa Festivalnaya, 22, korpus 3, kv. 263, and Sergei Ilich Maximov, ulitsa Shirokaya, 24, kv. 26, both of Moscow, all of U.S.S.R.

Filed Jan. 15, 1975, Ser. No. 541,322

Int. Cl.[2] H01L *35/02*

U.S. Cl. 136—208 **7 Claims**

1. A tubular thermoelectric module comprising an inner thermal conductor; circular thermopiles embracing said inner thermal conductor; connecting strips interconnecting said thermopiles; an outer thermal conductor in the form of a number of taper clamps, each of said taper clamps including an unbroken outer ring and a split inner ring, each embracing a respective one of said thermopiles; and electric insulation units



serving to insulate one thermopile from another and from said inner and outer thermal conductors.

4,056,407

THERMOCOUPLE

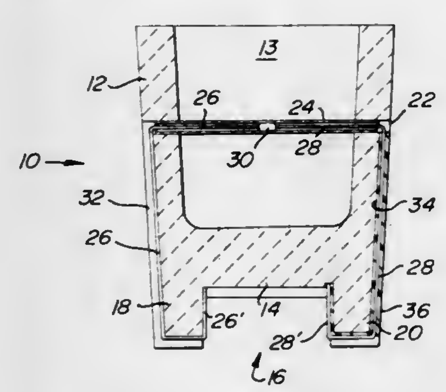
Omer P. Cure, Diepenbeek, Belgium, assignor to Electro-Nite Co., Philadelphia, Pa.

Filed Mar. 31, 1976, Ser. No. 672,100

Claims priority, application Belgium, Nov. 18, 1975, 54658

Int. Cl.[2] H01V *1/04*

U.S. Cl. 136—232 **6 Claims**



1. A thermocouple assembly comprising a cup of refractory material having oppositely disposed walls, a quartz tube extending across the interior of said cup, opposite ends of said tube passing through and being supported by said oppositely disposed walls, dissimilar metal thermocouple wires having an OD less than the ID of said tube welded together at a hot junction within said quartz tube, only said hot junction weld being in contact with substantially 360° of the inner circumference of said tube adjacent said weld, each thermocouple wire extending from a discrete opposite end of said tube, an exterior surface of said cup supporting the free ends of said thermocouple wires as exposed contacts, and means for electrically insulating at least one of said thermocouple wires from said cup.

4,056,408

REDUCING THE SWITCHING TIME OF SEMICONDUCTOR DEVICES BY NUCLEAR IRRADIATION

John Bartko, Monroeville, and Kuan H. Sun, Pittsburgh, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Mar. 17, 1976, Ser. No. 667,791

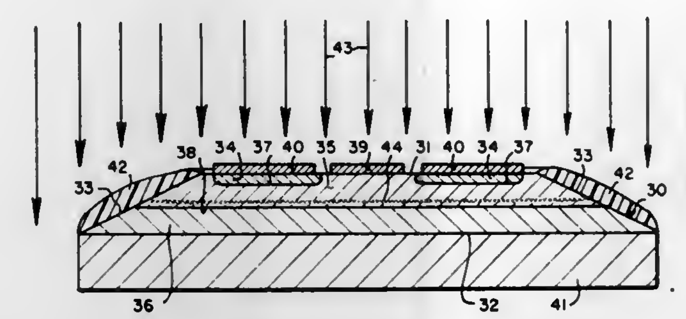
Int. Cl.[2] H01L *21/26*

U.S. Cl. 148—1.5 **28 Claims**

1. A method of reducing the switching time of certain semiconductor devices comprising the steps of:

A. determining the depth of maximum defect generation in a given type of semiconductor device having a blocking PN junction on irradiation with a given radiation source radiating particles with molecular weight of at least one;

B. adjusting the energy level of said radiation source to provide the depth of maximum defect generation adjacent a blocking PN junction of said type of semiconductor device;



C. positioning at least one semiconductor device of said given type with a major surface thereof to be exposed to said adjusted radiation source; and

D. thereafter irradiating said semiconductor device with said adjusted radiation source to a given dosage level reducing the switching time of said semiconductor device.

4,056,409

INCREASING TOPCOAT ADHESION FOR SOLVENT PHOSPHATIZED SURFACES

Edward A. Rowe, Jr., Mentor, and William H. Cawley, Painesville, both of Ohio, assignors to Diamond Shamrock Corporation, Cleveland, Ohio

Filed July 28, 1976, Ser. No. 709,263

Int. Cl.[2] C23F *7/10*

U.S. Cl. 148—6.15 R **16 Claims**

1. In the process of forming a phosphatized coating on a metal substrate, wherein coating formation proceeds through contact of the surface of said metal substrate with a methylene chloride and water-containing liquid phosphatizing composition having a continuous and homogeneous liquid phase containing water in minor amount, with the composition being capable of forming a phosphatized coating of substantial water insolubility on said surface, the improvement for forming on said surface a phosphate coating having enhanced topcoat adhesion, which improvement comprises adjusting the specific gravity of said liquid phosphatizing composition to between about 1.12 and about 1.14, as determined at a temperature within the range of from about 95° to about 105° F, by blending with said composition a constituent selected from the group consisting of water, aprotic polar organic compound, solubilizing solvent capable of solubilizing phosphoric acid in methylene chloride, and mixtures thereof, whereby the blending provides the resulting phosphatizing composition with water in an amount above about 4 weight percent, basis total weight of the composition, and then contacting the surface to be coated with the resulting phosphatizing composition.

4,056,410

PROCESS FOR PREPARING ACICULAR IRON POWDERS CONTAINING TITANIUM AND TIN, AND THE RESULTING POWDERS WHEN SO PREPARED

Ariello Rolando Corradi, Romentino Novara, and Giuliano Fagherazzi, Novara, both of Italy, assignors to Montedison, S.p.A., Milan, Italy

Filed Nov. 28, 1975, Ser. No. 635,985

Claims priority, application Italy, Nov. 29, 1974, 30014/74

Int. Cl.[2] H01F *1/02*

U.S. Cl. 148—105 **9 Claims**

1. A process for preparing metallic powders based on iron and suitable for magnetic recording, starting from acicular particles of an iron compound selected from the class consisting of α-Fe_2O_3, α-FeOOOH, and Fe_3O_4, comprising the sequential steps of (a) adding to the said acicular particles of the iron compound titanium, in the form of $TiO(OH)_2$ or TiO_2, and tin, in the form of $Sn(OH)_2$ or $SnO(OH)_2$; (b) thereafter subjecting same to at least one treatment in air at 400°–550° C.; and finally (c) subjecting the mixture to reductionat 340°–420° C with a gas containing more than 50% by volume of hydrogen; the titanium being introduced into the particles of the iron compound in an amount of 0.5 – 1% by weight, calculated as TiO_2, and the tin being introduced in an amount of 3 – 6% by weight, these percentages being referred to pure iron.

4,056,411

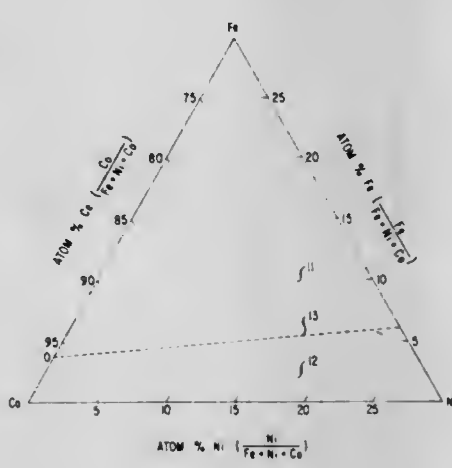
METHOD OF MAKING MAGNETIC DEVICES INCLUDING AMORPHOUS ALLOYS

Ho Sou Chen, 3 Arrighi Drive, Warren, N.J. 07060; Ernst Michael Gyorgy, 6 Woodcliff Drive, Madison, N.J. 07940; Harry John Leamy, 480 Charnwood Road, and Richard Curry Sherwood, 8 Vista Lane, both of, New Providence, N.J. 07974

Filed May 14, 1976, Ser. No. 686,456

Int. Cl.[2] H01F *1/00;* C22B *43/00*

U.S. Cl. 148—121 **2 Claims**



1. Method for the production of a device comprising

a. forming a filament consisting essentially of an amorphous low magnetostrictive metallic alloy of the composition $(Co_aFe_bT_c)_iX_j$ wherein

i. T is at least one first species selected from the group consisting of Ni, Cr, Mn, V, Ti, Mo, W, Nb, Zr, Pd, Pt, Cu, Ag, Au;

ii. X is at least one second species selected from the group consisting of a first subgroup, consisting of P, Si, B, C, As and Ge and a second subgroup consisting of Al, Ga, In, Sb, Bi and Sn;

iii. i is from 0.7 to 0.9;

iv. $i + j = 1$;

v. a is from 0.7 to 0.97; and

vi. b is from 0.03 to 0.25 with $a + b + c = 1$,

b. winding the filament to produce a magnetic body,

c. heat treating the magnetic body at a heat treatment temperature above its Curie temperature and below its glass transition temperature for at least one minute, which heat treatment temperature is selected to yield a body of improved magnetic permeability,

d. immediately immersing the body in a liquid, and

e. incorporating the body in the device by a method including magnetically coupling the body to an electrically conductive path.

4,056,412

METHOD FOR HARDENING STEEL PIPES

Yoshihisa Fujii, and Akio Fujiwara, both of Wakayama, Japan, assignors to Sumitomo Metal Industries Limited, Osaka City, Japan

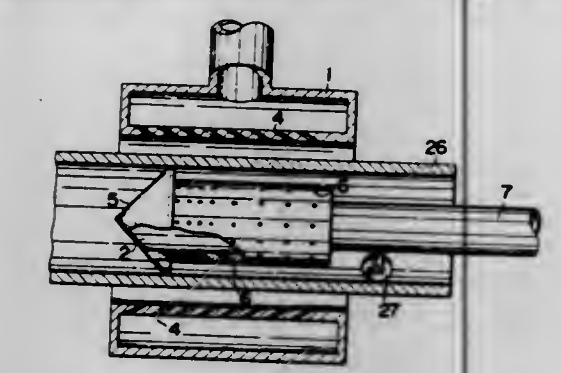
Division of Ser. No. 471,543, May 20, 1974, Pat. No. 3,937,448. This application Sept. 12, 1975, Ser. No. 612,927

Int. Cl.[2] C21D *9/08*

U.S. Cl. 148—153 **3 Claims**

1. A method of hardening steel pipes by quenching the inside

surface and the outside surface of a steel pipe by jetting quenching water from the outside and inside of the pipe comprising, a first quenching step of jetting quenching water to the outside surface of the steel pipe at an angle of 30°±10° in the pipe advancing direction of the pipe axis, said first step commencing when the steel pipe has a heating temperature above the A_3 transformation point, and a second quenching step of



jetting quenching water to the inside surface of the steel pipe at an angle of 30°±10° in the pipe advancing direction of the pipe axis, said second quenching step commencing when said inside surface of the steel pipe is just below the A_1 transformation point and the quenching water being jetted during said second quenching step first at a predetermined density and thereafter at a density lower than said predetermined density.

4,056,413

ETCHING METHOD FOR FLATTENING A SILICON SUBSTRATE UTILIZING AN ANISOTROPIC ALKALI ETCHANT

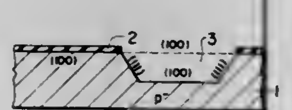
Masayoshi Yoshimura, Hamura, Japan, assignor to Hitachi, Ltd., Japan

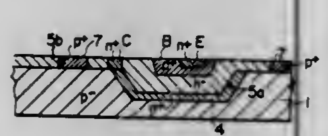
Filed Oct. 5, 1976, Ser. No. 729,710

Claims priority, application Japan, Oct. 6, 1975, 50-119768

Int. Cl.² H01L *21/302, 21/20, 21/76*

U.S. Cl. 148—175 **10 Claims**





1. An etching method for flattening a silicon substrate wherein an epitaxial silicon layer is grown on the (100) crystal face of the silicon single-crystal substrate, the silicon single-crystal substrate having a depressed portion in its principal face, and etching for flattening the epitaxial silicon layer is carried out; said method comprising the steps of forming said epitaxial silicon layer to such a sufficient thickness that a position at which side surfaces of a new depressed portion to be formed in a surface of said epitaxial silicon layer, said side surface having a crystal face (111), intersect becomes at least a final surface of the etching, and subjecting said epitaxial silicon layer to anisotripic etching with an alkali etchant down to said final surface.

4,056,414

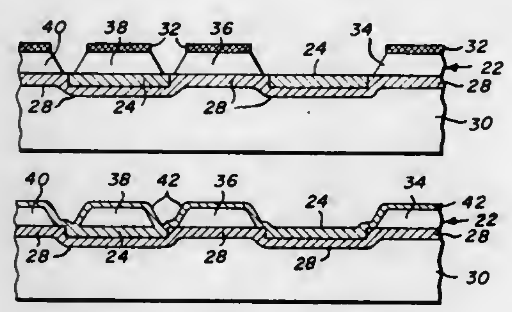
PROCESS FOR PRODUCING AN IMPROVED DIELECTRICALLY-ISOLATED SILICON CRYSTAL UTILIZING ADJACENT AREAS OF DIFFERENT INSULATORS

Robert J. Kopp, Los Altos, Calif., assignor to Fairchild Camera and Instrument Corporation, Mountain View, Calif.

Filed Nov. 1, 1976, Ser. No. 737,749

Int. Cl.² H01L *21/20, 21/76*

U.S. Cl. 148—175 **9 Claims**



1. A method for fabricating single-crystal silicon films dielectrically isolated from each other and from a common substrate by silicon dioxide and silicon nitride insulating films, said method comprising the steps of:
- epitaxially growing a silicon film to a thickness of approximately four micrometers on the surface of a heavily-doped n-type single-crystal silicon wafer;
- coating the surface of said silicon film with a first dielectric material to a thickness of approximately 0.2 micrometers;
- masking all portions of the surface of said first dielectric material that are to be retained for dielectric isolation and removing all portions of said first dielectric material that are not masked and are to be isolated by a second dielectric material;
- coating the areas on the surface of said silicon film that have been exposed by the removal of portions of said first dielectric material with a second dielectric material;
- depositing on the exposed surfaces of said first and second dielectric materials a relatively thick supporting layer of polycrystalline silicon;
- removing said heavily-doped n-type silicon wafer by electrochemically etching it from said epitaxially-grown silicon film;
- vapor thinning said silicon film to a desired thickness; and
- selectively etching through said silicon film to form individual single-crystal device islands on said first and second dielectric materials.

4,056,415

METHOD FOR PROVIDING ELECTRICAL ISOLATING MATERIAL IN SELECTED REGIONS OF A SEMICONDUCTIVE MATERIAL

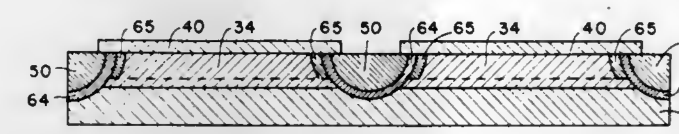
Charles R. Cook, Jr., North Palm Beach; Aung San U, and Raymond E. Scherrer, both of West Palm Beach, all of Fla., assignors to International Telephone and Telegraph Corporation, Nutley, N.J.

Division of Ser. No. 601,855, Aug. 4, 1975, abandoned. This application July 15, 1976, Ser. No. 705,632

Int. Cl.² H01L *21/20*

U.S. Cl. 148—187 **39 Claims**

1. A method for providing electrical isolation regions in a semiconductive material, comprising the steps of:
- forming a protective layer on a surface of the semiconductive material;
- removing the protective layer in said regions to expose the semiconductive material; and
- forming a porous dielectric material from at least a portion of the semiconductive material in the regions by submerging the semiconductive material into an anodizing solution and applying and anodizing potential to the semiconductive material so that the exposed semiconductive material in the regions becomes an anode and is at least partially



anodized to form the porous dielectric insulating material in the regions, the porosity of said dielectric material being sufficient to allow the anodizing solution to penetrate the dielectric and react with the unanodized semiconductive material in said regions, whereby the isolation regions may be formed to a desired thickness.

4,056,416

RADIATION POLYMERIZED PRIMING COMPOSITIONS

Gerald B. Franklin, Philadelphia, Pa., and Clyde F. Parrish, Terre Haute, Ind., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Dec. 1, 1975, Ser. No. 636,387

Int. Cl.² C06B *45/10*

U.S. Cl. 149—19.91 **10 Claims**

8. An irradiation polymerized priming composition of admirable percussion sensitivity and low dusting properties comprising by weight about 32–42% normal lead styphnate, about 14–16% antimony sulfide, about 30–33% barium nitrate, about 3.9–4.1% tetracene, about 6–8% aluminum powder, and about 4½–8% binder comprising methyl methacrylate and trimethylolpropanetrimethacrylate.

4,056,417

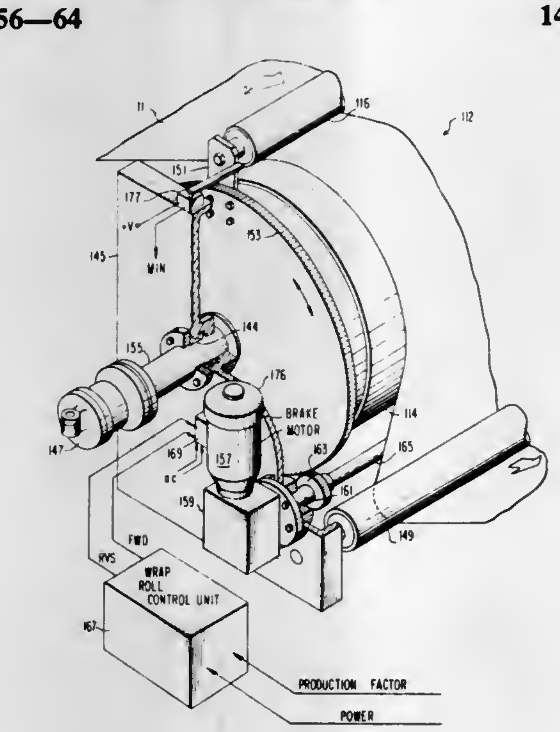
OPEN LOOP HEATING CONTROLLER AND METHOD FOR CORRUGATORS

John S. League, IV, Baltimore, Md., assignor to Koppers Company, Inc., Pittsburgh, Pa.

Filed Aug. 29, 1975, Ser. No. 608,980

Int. Cl.² B32B *31/00*

U.S. Cl. 156—64 **14 Claims**



1. In a corrugating machine for the production of double-face corrugated paperboard by joining a flat paper web to one side of a corrugated medium to form a single-face web and joining a second flat paper web to the opposite side of the corrugated medium to form the double-face corrugated paperboard, apparatus for heating the webs as a function of only one production factor of the corrugator machine and without a feedback signal comprising:
- at least one rotatably journaled heating roll for receiving a web in contact with a circumferential area of the roll;
- means positionable relative to the heating roll for varying the circumferential area of contact between the web and the roll; and,
- control circuit means for positioning the positionable means relative to the heating roll in response to only one production factor of the corrugating machine, said control circuit means comprising:
  - means for sensing said one production factor of the machine and for generating a signal related to said sensed production factor;
  - means for periodically sampling said generated production factor related signal;
  - means for storing the sampled production factor related signal at a first time;
  - means for comparing said stored production factor related signal with said production factor related signal sampled at a time subsequent to said first time;
  - means responsive to said comparing means for generating a drive signal related in value to a difference between the compared signals; and,
  - drive means for driving the positionable means in response to said generated drive signal.

4,056,418

PROCESS FOR MAKING HOLLOW FIBERS

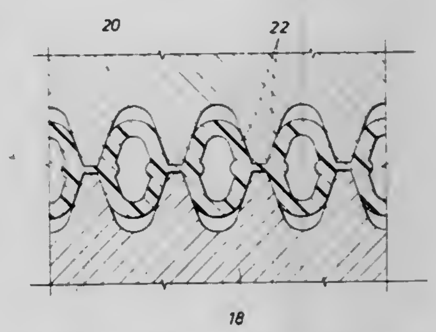
Frank M. Aspin, Knutsford, England, assignor to Shell Oil Company, Houston, Tex.

Filed May 6, 1975, Ser. No. 574,652

Claims priority, application United Kingdom, May 8, 1974, 20198/74

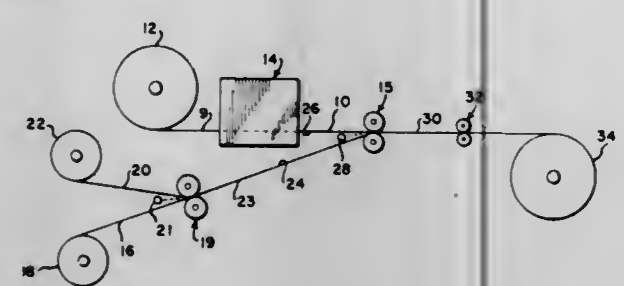
Int. Cl.² B32B *31/08, 31/18;* **B29D** *7/24;* **D01D** *5/24*

U.S. Cl. 156—145 **6 Claims**



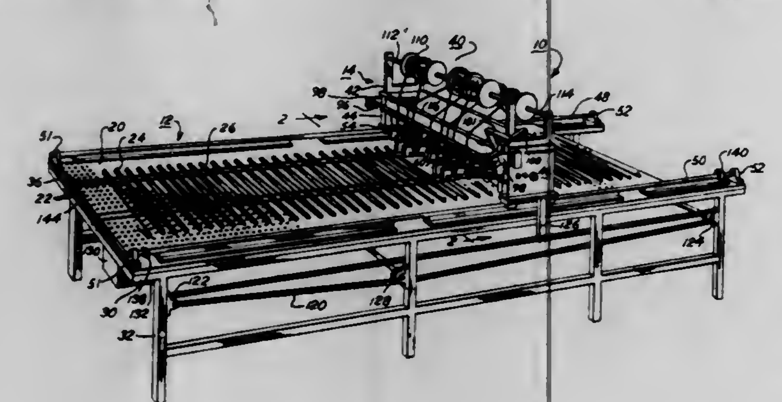
1. A process for making hollow fibers which comprises (a) simultaneously passing at least two molecularly orientable plastic films through a pressure nip between two rollers, said plastic films being at or above their fusion temperature at least at the point where the films come in contact with said rollers, said rollers having from 15 to 60 peripheral annular grooves per inch with lands of no more than about 0.0015 inch width therebetween, the grooves in the respective rollers being accurately aligned so that the lands of each roller are in the same planes cutting the circumference of the roller, so that the films are fused together at the point they contact the lands and are kept apart by air trapped between the films in the non-fused area, (b) cooling the fused films below the fusion temperature of the molecularly orientable plastic, (c) stretching the fused films and treating the stretched film so as to cause the fused films to fibrillate.

4,056,419
METHOD AND BELT OF ORIENTED NYLON WITH RUBBER SHEET ADHERED THERETO
Ellis H. Paine, Woodstock, Conn., assignor to Moldex, Inc., Wauregan, Conn.
Filed Dec. 1, 1975, Ser. No. 636,730
Int. Cl.² B32B *31/08;* C09J *5/02*
U.S. Cl. 156—164 **1 Claim**



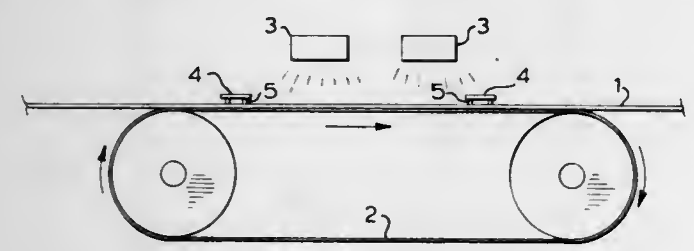
1. The method of producing a high tensile strength laminated belt which is adapted to contact a driving pulley comprising, the steps of, heat-bonding a surface layer of nylon to a sheet of rubber to form a laminate thereof having at least the length and width desired in the completed belt, forming a sheet of high tensile strength oriented nylon of at least the length and width desired in the completed belt, passing said sheets longitudinally along paths toward each other in substantially transverse alignment to a mating position wherein one surface of said sheet of oriented nylon moves into contact with the exposed surface layer of nylon which has been heat-bonded to said sheet of rubber, depositing a liquid which activates nylon onto said exposed surface of said surface layer and said one surface of said sheet of oriented nylon to thereby activate the respective surfaces which are moved together, and exerting pressure and heat progressively against the exposed surfaces of said sheets of nylon and rubber at the zone where they move together at a temperature which is sufficient to insure the bonding of said surface layer to said sheet of oriented nylon and which is below the critical temperature at which the orientation of said sheet of oriented nylon would be impaired substantially.

4,056,420
HEATING STRUCTURE FABRICATING MACHINE AND METHOD
Gerald E. Adams, Mishawaka, Ind., assignor to Bristol Products, Inc., Bristol, Ind.
Division of Ser. No. 503,924, Sept. 6, 1974, Pat. No. 3,964,959. This application Jan. 19, 1976, Ser. No. 650,050
Int. Cl.² H05B *3/00*
U.S. Cl. 156—181 **7 Claims**



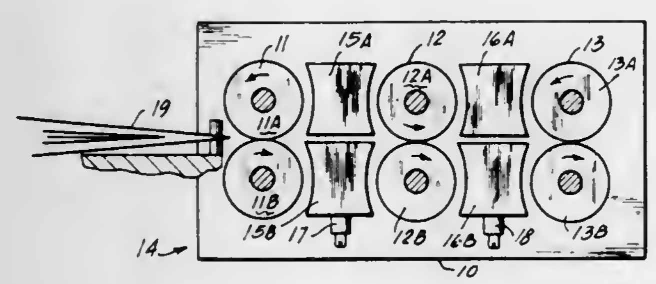
1. A method of fabricating a heating structure using a heating element, the steps comprising arranging a heating wire with a thermoplastic outer layer in a predetermined pattern with transverse spaced sections, feeding a strand having a thermoplastic outer layer progressively to said sections in an angular, crosswise relationship while said strands and sections are below the temperature at which the surface thereof fuses, heating by direct contact with said heating element only the areas of said wire sections which are to be joined to the strand, to the fusion point before said strands and sections contact one another simultaneously heating said strands with said heating element to provide a fused area in the proximity of each of said heating wire sections, and pressing said fused areas of the strand and respective section together to form a bond between said wire and strand.

4,056,421
METHOD OF FABRICATING CROSSLINKED THERMOPLASTICS ARTICLES
Harold F. Jarvis, Moffat, Canada, assignor to Shaw Pipe Industries Ltd., Toronto, Canada
Filed Jan. 10, 1977, Ser. No. 758,161
Int. Cl.² B29C *19/02;* C09J *5/00*
U.S. Cl. 156—272 **7 Claims**



1. A method of fabricating crosslinked synthetic plastics articles comprising providing crosslinkable synthetic thermoplastics material in sheet form, crosslinking areas of the sheets to a controlled degree of crosslinking by exposing them to crosslink-inducing radiant energy while providing relatively uncrosslinked portions thereon by masking selected areas of the sheets with masking material relatively opaque to the radiant energy, shaping the crosslinked sheets into a more complex configuration and bringing relatively uncrosslinked portions of the sheets into contact, fusing the contacted portions together under heat and pressure, and locally applying crosslink-inducing energy to the fused portions.

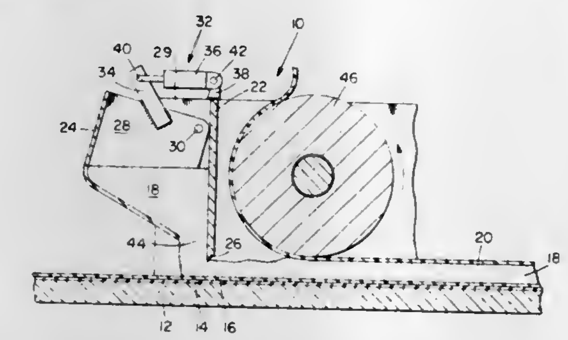
4,056,422
TWO STAGE OVEN LAMINATOR METHOD
Henry N. Staats, Deerfield, Ill., assignor to General Binding Corporation, Northbrook, Ill.
Filed June 6, 1975, Ser. No. 584,374
Int. Cl.² C09J *5/00*
U.S. Cl. 156—309 **5 Claims**



1. The method of laminating a polyester-heat sealable adhesive film material to paper or card stock to form a laminated product comprising:

inserting the product to be laminated into a carrier,
passing the carrier and its contents through a first heating zone having a temperature range sufficiently high to melt the adhesive to provide a preliminary superficial tack without distorting the polyester.
passing the heated carrier and product through a pair of pressure laminating rolls,
then passing the carrier and its contents through a second heating zone having a temperaure range higher than the temperature range in said first heating zone to further melt the adhesive and then passing the carrier and product through a second pair of laminating rolls to effect lamination of the adhesive to the card stock without polyester distortion

4,056,423
PLATEMAKING APPARATUS
Norman Edward Hughes, Landenberg, Pa., assignor to Hercules Incorporated, Wilmington, Del.
Continuation-in-part of Ser. No. 571,030, April 23, 1975, abandoned. This application May 20, 1976, Ser. No. 688,451
Int. Cl.² B05C *9/12, 11/04*
U.S. Cl. 156—356 **3 Claims**

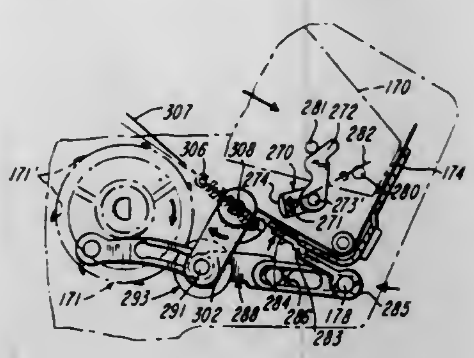


1. In combination with photopolymer platemaking apparatus wherein a horizontal flat plate, a photo transparency on said flat plate, a cover film on said photo transparency, and a movable carriage to traverse said flat plate, said carriage having photopolymer supply means, a press roll and backing sheet supply means all mounted on said carriage, are provided for making a photorelief printing plate, wherein the improvement comprises:

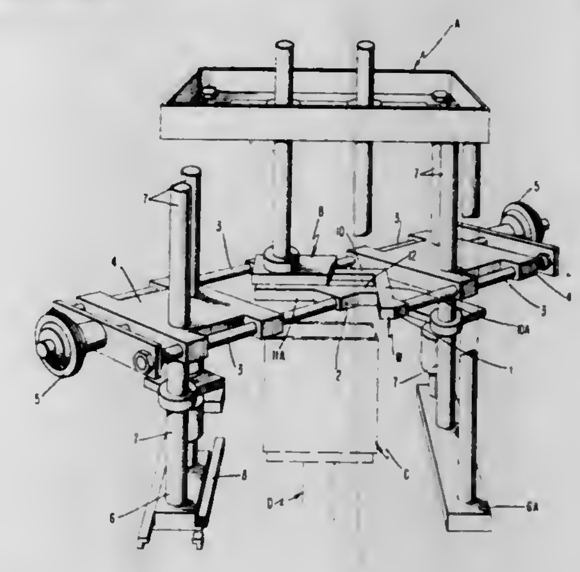
a substantially vertical plate connected to said carriage, said vertical plate acting as a back wall and as a doctor blade;
scoop means abutting said vertical plate and being movable with respect to said vertical plate, movement of said scoop means with respect to said vertical plate defining a bottom opening between said scoop means and said vertical plate to control the flow of photopolymer therethrough;
actuator means interconnecting said scoop means and said vertical plate to control the speed and amount of movement of said scoop means with respect to the vertical plate and the resulting opening between said scoop means and said vertical plate, whereby said opening provides uniform flow of a photopolymer onto the surface of the cover film and said vertical plate doctors said photopolymer to uniform thickness before the application of a backing sheet onto the surface thereof;
a shim means connected to said flat plate, said press roll riding on said shim, the height of said press roll from said flat plate being determined by the thickness of said shim means; and
gear means connected to said press roll and said flat plate, said gear means pivotally mounted to said carriage and being thereby vertically adjustable to compensate for the height of said press roll from said flat plate, said gear means driving said carriage.

4,056,424
APPARATUS FOR PRINTING AND APPLYING PRESSURE SENSITIVE LABELS
Paul H. Hamisch, Jr., Franklin, Ohio, assignor to Monarch Marking Systems, Inc., Dayton, Ohio
Division of Ser. No. 476,744, June 5, 1974, Pat. No. 3,957,562, which is a continuation-in-part of Ser. No. 380,445, July 18, 1973, abandoned, which is a continuation-in-part of Ser. No. 312,454, Dec. 6, 1972, Pat. No. 3,968,245, which is a continuation-in-part of Ser. No. 208,035, Dec. 8, 1971, abandoned. This application Feb. 17, 1976, Ser. No. 658,432
Int. Cl.² B32B *31/00*
U.S. Cl. 156—384 **9 Claims**

1. Apparatus for applying labels releasably adhered by pressure sensitive adhesive to a web of supporting material, comprising: a frame, means for supporting a roll of pressure sensitive material, a delaminator mounted by the frame, an applicator for applying the delaminated labels, means in contact with the web downstream of the delaminator for feeding the web to the delaminator, brake means including movable means for applying a braking force to the web upstream of the delaminator, means for actuating the movable means, means for driving the web feeding means, the actuating means comprising a pair of spaced-apart abutments, and one of the abutments being effective to move the movable means to the effective braking position and the other of the abutments being effective to move the movable means to the ineffective position.

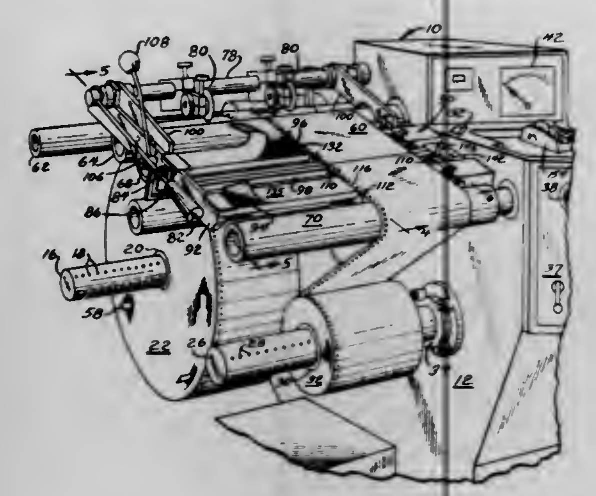


4,056,425
APPARATUS FOR WELDING TOGETHER A COVER AND A VESSEL OF THERMOPLASTIC MATERIAL
Chester Groby, Nol, Sweden, assignor to Aktiebolaget Tudor, Sundbyberg, Sweden
Filed Aug. 12, 1976, Ser. No. 713,899
Claims priority, application Sweden, Aug. 15, 1975, 75/09150
Int. Cl.² B32B *31/04*
U.S. Cl. 156—499 **5 Claims**



1. Apparatus for welding together a cover and a vessel of thermoplastic material, said apparatus comprising a pair of heating cheeks adapted to be disposed between the cover and the vessel to heat edges thereof to be joined, said heating cheeks being mounted for movement in separate directions from between the cover and the vessel without passing across the opening of the vessel, each heating cheek comprising a pair of arms disposed in mutually angled relationship; the end of an arm of one heating cheek being applied against the inner side of an arm of the other heating cheek.

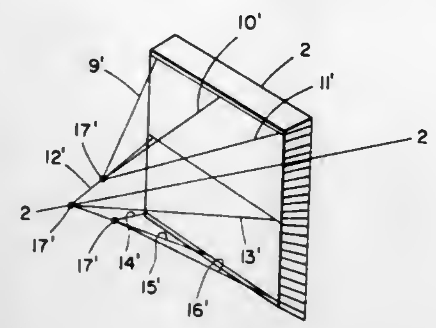
4,056,426
PAPER SALVAGING MACHINE WITH IMPROVED SPLICING BOARD
Richard F. Sipin, Naperville, Ill., assignor to American Tara Corporation, Chicago, Ill.
Filed Apr. 4, 1977, Ser. No. 784,421
Int. Cl.^{2} B31F *5/00*
U.S. Cl. 156—505 11 Claims



1. A machine for salvaging the usable portions of a roll of paper which has edge positioned pin-feed registration holes from a continuous supply roll of said paper containing both usable and unusable portions, said machine comprising a frame; first support shaft means mounted for rotation in said frame for supporting the core of said supply roll; second support shaft means mounted for rotation in said frame for supporting a take-up core about which the usable portions of said supply roll are to be wound; a pair of paper engaging guide rollers mounted in said frame with their axes spaced apart sufficiently so as to provide an extended straight line path for paper passing over their surfaces which is being unwound from one of said cores onto the other; splicing board means mounted on said frame and extending outwardly from said frame and normally just under said straight line path; said splicing board means including a pair of elongated spaced apart flat vacuum table portions which are positioned intermediate said pair of guide rollers; a source of vacuum; said table portions being selectively connected to said source of vacuum and having perforated top surfaces for permitting suction to be applied to spaced portions of said paper to selectively firmly affix said spaced portions to said perforated top surfaces; at least a pair of spaced register pins for longitudinally registering the registration holes on one edge of each of said spaced portions of paper, said register pins being mounted on a pin bar which is movable longitudinally relative to each of said table portions to adjust for different paper widths; splicing bar means including a splicing groove positioned between said table portions, said groove being adapted to receive a cutter for cutting said paper; and retractable support means for said pin bar and guide pins for selectively moving said guide pins upwardly through said straight line path when the paper in said path is to be cut or spliced.

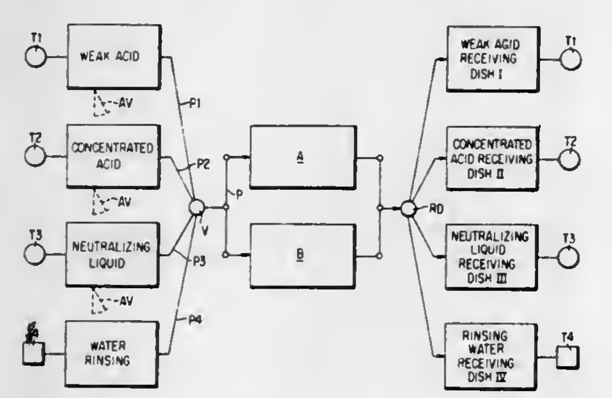
4,056,427
FOCUS COLLIMATOR PRESS FOR A COLLIMATOR FOR GAMMA RAY CAMERAS
Richard N. York, and David L. York, both of Lockport, Ill., assignors to Precise Corporation, Lockport, Ill.
Division of Ser. No. 608,071, Aug. 27, 1975, abandoned. This application July 14, 1976, Ser. No. 705,046
Int. Cl.^{2} B23K *27/00*
U.S. Cl. 156—580 2 Claims

1. A focus collimator press, including a work table surface lying in a first plane to receive strips thereon for stacking to form a collimator, a press member spaced from said work table surface movable between an engaged pressing position and a retracted position, said press member including face means for engaging and bearing against each last strip added to said collimator stack, angular directing means to angularly direct said face means in a plane which intersects said first plane a constant fixed distance from said face means when said face



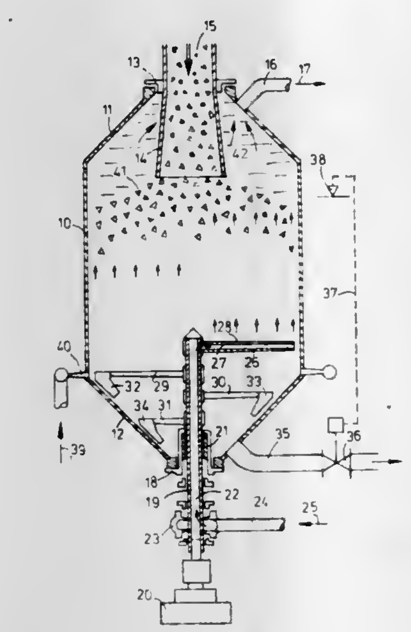
means is in bearing engagement against any one of said last strips added to said stack, said constant fixed distance being substantially equal to the distance of the focal point of the row of apertures formed by each strip added to said stack from the midpoint of such strip.

4,056,428
PROCESS FOR ETCHING INNER SURFACE OF PIPE OR TUBE
Nobuhiko Harada; Minetaka Tanaka; Masanao Shimano; Kyozo Fujinaga; Kunito Nunomura; Masamitu Tamura; Shigeharu Nakamura, and Kazuo Akagi, all of Shimonoseki, Japan, assignors to Kobe Steel, Ltd., Kobe, Japan
Filed Oct. 6, 1975, Ser. No. 620,230
Claims priority, application Japan, Oct. 5, 1974, 49-114874
Int. Cl.^{2} C23F *1/00*
U.S. Cl. 156—642 6 Claims



1. A process for etching the inner surface of a pipe or tube by using a plurality of treating solutions, comprising the steps of:
connecting one end of said pipe or tube to an outlet of a treating solution supply means, in a solution-tight sealing manner, having switching means therein for switching and providing a respective treating solution;
supplying and switching said respective treating solutions including a weak acid solution and a concentrated acid solution in turn so as to conduct each treating solution through the pipe or tube for a predetermined period of time;
independently receiving said respective treating solutions flowing out of the other end of the pipe or tube; and
supplying air into said pipe or tube, upon completion of the respective supply of said treating solutions, for discharging residual portions of said treating solutions disposed within said pipe or tube.

4,056,429
METHOD FOR COUNTER-CURRENT TREATMENT OF CELLULOSE FIBER MATERIAL
Johan C. F. C. Richter, St. Jean Cap Ferrat, France; Per Tyke Christenson, and Ole Johan Richter, both of Karlstad, Sweden, assignors to Kamyr Aktiebolag, Karlstad, Sweden
Continuation of Ser. No. 423,812, Dec. 11, 1973, abandoned. This application July 20, 1976, Ser. No. 707,070
Claims priority, application Sweden, Dec. 11, 1972, 16090/72
Int. Cl.^{2} D21C *3/24*
U.S. Cl. 162—17 4 Claims



1. A method of counter-current treatment of cellulosic fiber material in a vessel substantially filled with liquid, said vessel having lower and upper ends, comprising the steps of:
a. introducing fiber material in a substantially continuous flow into the liquid in said vessel through an inlet having an open lower end, said inlet being located centrally in said vessel at the upper end thereof and vertically extending downwardly into said vessel,
b. establishing a fiber material column upper level at a point below the position of said inlet lower end;
c. discharging fiber material through an outlet in the lower end of the vessel at a given rate so that the level of said material column is maintained substantially constant, individual fiber material particles gradually sinking downwardly from the top of said column to said outlet;
d. introducing treatment liquid into said vessel with an upwardly directed velocity component so that said treatment liquid flows upwardly through said material column toward the upper end of said vessel;
e. the velocity of the upflowing treatment liquid being correlated with the dimensions of the inlet relative to the vessel dimensions so that fiber material in said column will not flow upwardly with said upflowing liquid to said liquid outlet; and
f. discharging treatment liquid, as well as displaced liquid introduced with said fiber material entrained by the upwardly flowing treatment liquid, through an unscreened outlet at the upper end of said vessel at a point above the lower end of said inlet;
g. whereby separation of treatment liquid and material takes place without the use of strainers.

4,056,430
PROCESS OF PREVENTING FORMATION OF RESINOUS DEPOSITS IN THE MANUFACTURE OF PAPER AND THE LIKE, AND COMPOSITIONS
Ernst Hoeger, Neuhofen, and Franz Baskovic, Goennheim, both of Germany, assignors to Benckiser-Knapsack GmbH, Ladenburg am Neckar, Germany
Filed Feb. 21, 1975, Ser. No. 551,685
Claims priority, application Germany, Feb. 22, 1974, 2408523
Int. Cl.^{2} D21C *9/00;* D21H *3/08, 3/68*
U.S. Cl. 162—76 22 Claims

1. In a process of preventing formation of resinous deposits and overcoming pitch trouble from a resin-containing cellulosic starting material in the manufacture of paper, cardboard, boxboard and the like, said process comprising adding to the resin-containing cellulosic starting material during processing a water-soluble additive consisting essentially of a phosphonic acid compound selected from an alkylene amino phosphonic acid or an alkali metal or ammonium salt thereof in an amount between about 0.02 and about 1.0%, calculated for dry cellulosic material.

4,056,431
RESIN-CONTAINING CELLULOSIC OVERLAYS
John F. Miller, Tacoma, and Rodney R. Conner, Bellevue, both of Wash., assignors to Pacific Resins & Chemicals, Inc., Tacoma, Wash.
Filed June 7, 1976, Ser. No. 693,559
Int. Cl.^{2} D21D *3/00*
U.S. Cl. 162—165 19 Claims

1. In a process for producing a resin-containing cellulosic overlay useful for overlaying woody substrates comprising admixing an aqueous slurry of cellulosic fibers and an alkaline, water-solubilized resin, precipitating the resin onto said fibers by acidification of said slurry and forming a dry sheet from the acidified slurry, the improvement wherein said resin is a resole resin produced by reacting bisphenol A, from 0.35 to 1.35 moles per mole of bisphenol A of a para-substituted phenol selected from p-tertiarybutylphenol, p-tertiaryamylphenol and p-phenylphenol and an amount of formaldehyde satisfying the equations $F \geqq 0.3(4X + 2Y)$ and $F \leqq 4X + 2Y$ wherein F is the number of moles of formaldehyde, X is the number of moles of bisphenol A and Y is the number of moles of para-substituted phenol.

4,056,432
PROCESS FOR MAKING PAPER PRODUCTS OF IMPROVED DRY STRENGTH
Robert Clayton Slagel, Pittsburgh, and Gloria DiMarco Sinkovitz, Bridgeville, both of Pa., assignors to Calgon Corporation, Pittsburgh, Pa.
Filed July 6, 1971, Ser. No. 160,097
The portion of the term of this patent subsequent to Jan. 9, 1990, has been disclaimed.
Int. Cl.^{2} D21D *3/00*
U.S. Cl. 162—168 NA 1 Claim

1. An improved process for making paper having dry strength comprising forming an aqueous suspension of paper-making cellulosic fibers, adding to said suspension a dry strength additive, sheeting the fibers to form a web and heating the web until dry to form the paper, wherein the improvement comprises using as the dry strength additive, a graft copolymer comprising from 5 to 99.5 percent by weight of a chitosan substrate and the remainder derived from acrylamide monomer.

4,056,433

ASCENDING TWIN-WIRE PAPER MACHINE WITHOUT WEB PICK-UP

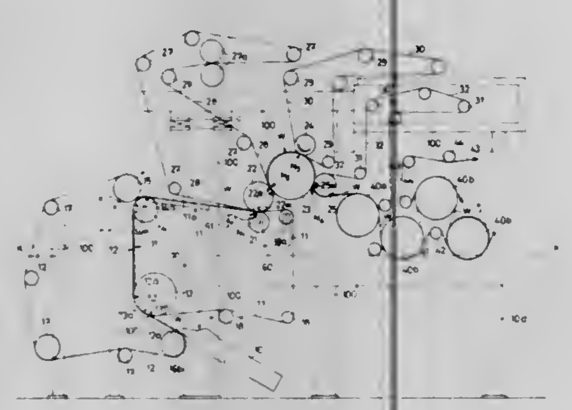
Martti Koponen, and Pertti Soikkanen, both of Jyvaskyla, Finland, assignors to Valmet Oy, Finland

Filed Sept. 15, 1976, Ser. No. 723,224

Claims priority, application Finland, Sept. 16, 1975, 752585

Int. Cl.² D21F *9/00*

U.S. Cl. 162—290 **11 Claims**



1. In a paper machine, a pair of endless fabric means and forming roll means cooperating therewith for providing with said pair of endless fabric means an ascending twin-wire former and in advance of said twin-wire former a single-wire former, one of said endless fabric means having an upper run extending laterally from said twin-wire former and carrying the web formed at said twin-wire former beyond the latter on an upper surface of said upper run of said one fabric means, a pair of press rolls including a lower press roll and an upper press roll for defining between themselves a first press nip, said upper run of said one fabric means passing between said press rolls and an endless felt also passing between said press rolls and being lapped around said upper press roll so that said endless felt and said one fabric means are sandwiched between said press rolls and the web travelling beyond said first nip together with said endless felt around part of said upper press roll, and a rotary cylinder defining with said upper press roll at least a second press nip where said endless felt travels together with the web between said upper press roll and said rotary cylinder, whereby the web is fully supported along a closed conduction path from said twin-wire former through said first and second press nips, the latter forming part of a press section to which the web is delivered without requiring a pick-up roll or felt, said forming roll means including an upper couch roll lapped in part by said one endless fabric means and from which said upper run of said one endless fabric means extends laterally from said twin-wire former, said couch roll including a suction means for detaching the web from the other of said pair of endless fabric means and causing the web to travel with said one endless fabric means beyond said twin-wire former at the upper surface of said upper run of said one endless fabric means, and said forming roll means also including a lower forming roll, said pair of endless fabric means travelling together from said lower forming roll to said upper couch roll while pressing against the web situated between said pair of endless fabric means while they travel upwardly from said lower forming roll to said upper couch roll, so as to form said ascending twin-wire former.

4,056,434

LIQUID METAL COOLED NUCLEAR REACTOR SCANNING APPARATUS

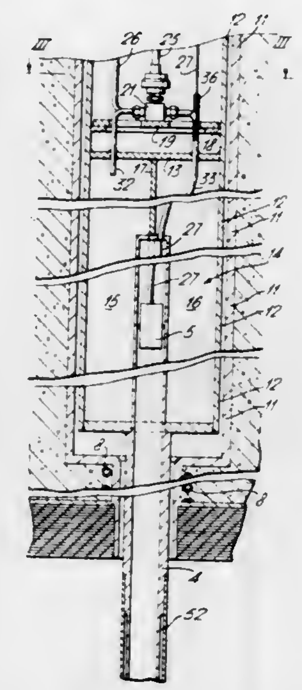
Sidney Barnes, Warrington, and John Roderick Fothergill, Lymm, both of England, assignors to United Kingdom Atomic Energy Authority, United Kingdom

Filed Nov. 13, 1975, Ser. No. 631,650

Claims priority, application United Kingdom, Dec. 12, 1974, 53863/74

Int. Cl.² G21C *17/02*

U.S. Cl. 176—19 R **5 Claims**



1. A liquid metal cooled nuclear reactor construction comprising: a vault containing a pool of liquid metal coolant; a vertical dip tube extending into the pool of coolant; a transducer unit for generating ultra-sound signals housed within the dip tube and disposed above the pool of coolant; a vacuum source connectable to an upper closed end of the dip tube for drawing a column of liquid metal from the pool into the dip tube; first and second vacuum reservoirs connected in series between the dip tube and the vacuum source; fluid flow isolating valves disposed one each between the dip tube and the first vacuum reservoir, between the first and second vacuum reservoirs and between the second vacuum reservoir and the vacuum source; and means for cooling the upper region of the column of liquid metal between two lifting stages and before submersion of the transducer in liquid metal.

4,056,435

LOADING AND UNLOADING OF A NUCLEAR REACTOR CORE

Jacques Carlier, Aix-en-Provence, and Bernard Risbourg, St. Paul-lez-Durance, both of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed July 7, 1975, Ser. No. 593,443

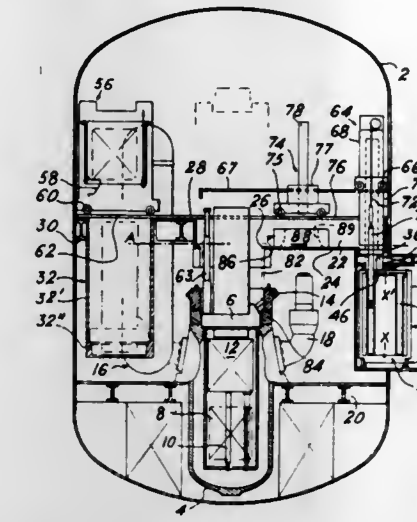
Claims priority, application France, July 11, 1974, 74.24158

Int. Cl.² G21C *19/06, 19/10*

U.S. Cl. 176—30 **6 Claims**

1. A nuclear reactor of the water-cooled type, comprising an outer containment vessel, a pressure vessel in the lower portion of said outer vessel, a top flange and a top closure cap for said pressure vessel and containing a reactor core, a plurality of vertical fuel assemblies for said core, upper internal structures above said core and said pressure vessel, a structure having a horizontal bottom wall serving as a pool, a first orifice in said bottom wall located above said pressure vessel and having a diameter slightly larger than that of said closure cap, a second orifice in said bottom wall in communication between said structure and a leak-tight storage compartment partially within said outer containment vessel and partially exterior to said outer containment vessel and at a lower level than said structure, closure means for said second orifice, said compartment

receiving containers for the storage of fuel assemblies, means for moving said containers from a position beneath said second orifice to a position beneath a third orifice in said storage compartment opening to the exterior of said outer containment vessel, said third orifice providing for discharge of containers through it, a storage zone for said pressure vessel closure cap, first means for lifting said pressure vessel closure cap and for



transferring said cap to said storage zone, second means for lifting the fuel assemblies and transferring said assemblies directly from said reactor core to said storage compartment and a removable shell providing a leak-tight connection between said bottom wall of said structure at the level of said first orifice and said top flange of said pressure vessel said first means for lifting including means for storing said removable shell.

4,056,436

SYSTEM FOR MITIGATING THE EFFECTS OF AN ACCIDENT AT A NUCLEAR POWER PLANT

Anatoly Matveevich Bukrinsky, prospekt Vernadskogo, 119, kv. 19; Genrikh Vladimirovich Matskevich, Sevanskaya ulitsa, 7, kv. 66; Julian Vulfovich Rzheznikov, Michurinsky prospekt, 16, kv. 35; Andrei Borisovich Sukhov, ulitsa Krupskoi, 15, kv. 75; Viktor Petrovich Tatarnikov, ulitsa Chusovskaya, 11, korpus 8, kv. 24; Viktor Mozesovich Berkovich, Sakhalinskaya ulitsa, 6, korpus 1, kv. 156, all of Moscow; Jury Nikolaevich Remzhin, ulitsa Vasi Alexeeva, 24, kv. 20, Leningrad; Lev Nikolaevich Slepnev, Novocherkassky prospekt, 18, kv. 221, Leningrad; Alexandr Anatolievich Sverdlov, ulitsa Zhelyabova, 1, kv. 69, Leningrad; Vladimir Geselevich Karan, ulitsa Uralskaya, 46, kv. 97, Sverdlovsk; Jury Petrovich Kaloshin, Verkhne-Pervomaiskaya ulitsa, 14, kv. 17, Moscow; Anatoly Nikolaevich Krasikov, Inzhenernaya ulitsa, 32, kv. 42; Evgeny Akimovich Babenko, Inzhenernaya ulitsa, 32, kv. 12, both of Sverdlovsk; Vladimir Konstantinovich Bronnikov, ulitsa Pobedy, 102, kv. 2, Gorlovka Donetskoi oblasti; Jury Vasilievich Shvyryaev, Dnepropetrovskaya ulitsa, 23, korpus 3, kv. 117, Moscow, and Boris Semenovich Shiryaev, Inzhenernaya ulitsa, 34, kv. 3, Sverdlovsk, all of U.S.S.R.

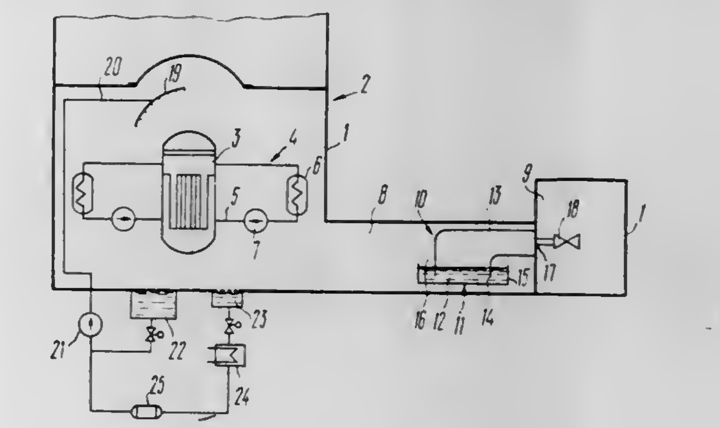
Filed June 4, 1975, Ser. No. 584,011

Claims priority, application U.S.S.R., June 5, 1974, 2026554

Int. Cl.² G21C *9/00*

U.S. Cl. 176—38 **5 Claims**

1. A system for mitigating the effects of an accident at a nuclear power plant, comprising: a first container accommodating a nuclear reactor and its primary cooling system, wherein an unusually high pressure rise can occur as a result of vaporization caused by ebullition of the leaking coolant, the resulting vapor mingling with air to form a vapor-air mixture; a second container arranged separately from said first container and communicating therewith to receive and contain air partially forced out from said first container as the pressure therein rises and the vapor-air mixture is formed; a conduit between the first and second containers, through which the interiors of said containers communicate and said vapor-air mixture passes from said first container into the second container as a result of said pressure rise; a passive vapor condenser placed in said conduit across the flow of said vapor-air mixture, said condenser being substantially a bubbling device comprising a trough filled with a coolant and a housing arranged above said trough with an inlet portion of said housing being lowered into said trough so that formed between the walls of said trough and the inlet portion of said housing are passages wherethrough said vapor-air mixture is introduced into the trough under the pressure rise in the first container, the vapor being condensed in the trough as said mixture passes through said coolant, the air filling the inner space of said housing in which a pressure rise occurs, the housing having an outlet portion connected to the inlet of said second container; a non-return valve mounted at the inlet to said second container and controlling air flow from said housing to said second



container, whereby the latter can be cut off from said first container and the air is prevented from returning thereto, said valve being opened when the pressure of the air accumulated in said housing rises and exceeds the pressure in said second container for passing the air into said second container, while closure of the valve takes place when the pressures in said housing and second container become equal; and a supplementary condenser of the sprinkler type, disposed in said first container and actuated upon leakage of said coolant, said condenser condensing the vapor filling said first container after air has been forced out therefrom into said second container, whereafter a negative pressure develops in said first container, precluding release of radioactive products to the environment, the operation of said condenser of the sprinkler type being completed when all of the vapor resulting from the accident has been condensed.

4,056,437

FAST REACTOR CORE

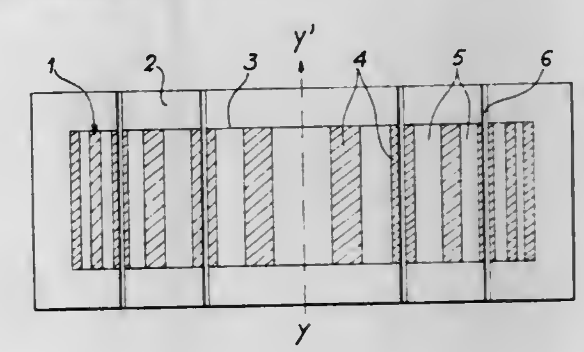
Christian Giacometti; Jean-Claude Mougniot, both of Manosque, and Jean Ravier, Venelles, all of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed Sept. 24, 1975, Ser. No. 616,132

Claims priority, application France, Sept. 30, 1974, 74.32882

Int. Cl.² G21C *1/02*

U.S. Cl. 176—40 **1 Claim**



1. A fast reactor core comprising:

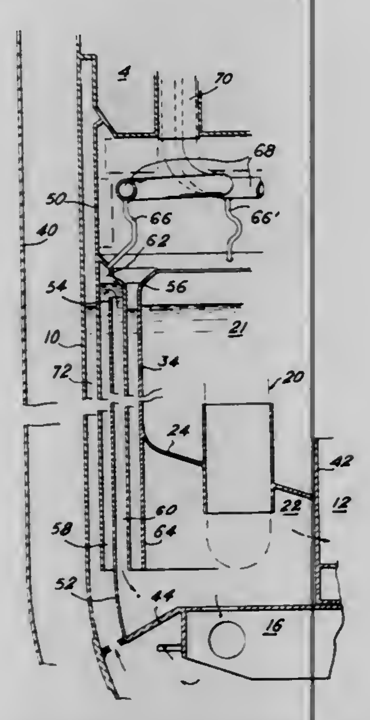
an inner zone of a single enrichment having a heterogeneous structure with a vertical axis about which is arranged a

distribution of fissile material and fertile material alternating in a radial direction from said vertical axis, said distribution and enrichment providing an internal breeding gain within said inner zone that at most results in a total reactivity change that is slightly positive; and

an outer zone of fertile material surrounding said inner zone, said core having the following characteristics:

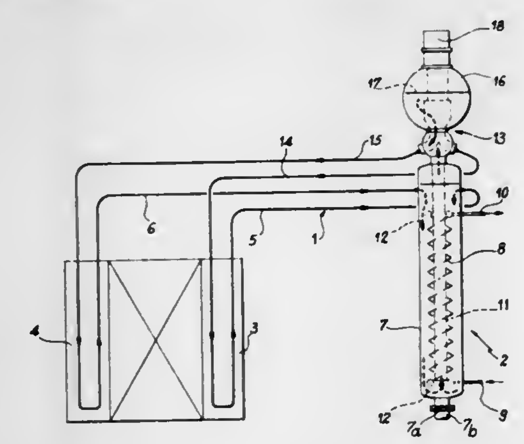
Volumetric percentage - fuel (fissile material) :	
steel (cladding and structure)	22.3 %
sodium (coolant)	40.6 %
fuel (UO_2 + PuO_2)	32.9 %
Volumetric percentage (fertile material) :	
steel	19.2 %
sodium	27.8 %
fertile material	50.5 %
Height of fuel	100 cm
Linear power in fuel	500 W/cm
Maximum burn-up	115,000 MWd/T
Thickness of axial and radial blankets in the outer zone	50 cm
Diameter of fuel pellets in fuel pins	5.5 mm
Concentration of enrichment $\left(\frac{PuO_2}{PuO_2 + UO_2}\right)$	33.5 %
Number of control rods	12
Variation in reactivity after 308 days of irradiation	+ 250 pcm
Total breeding gain (TBG)	0.47
Internal breeding gain (IGB)g	0.031
Compound doubling time	12 years
Core sodium voiding effect	+ 700 pcm
Total flattening factor	1.42
Integrated dose in displacements per atom (DPA)	70

4,056,438
LIQUID SODIUM COOLED FAST REACTOR
Jean-Michel Gama, Ormesson; Jean Lallement, Verrieres-le-Buisson, and Lucien Pugnet, Boulogne, all of France, assignors to Commissariat a l'Energie Atomique, Paris, France
Continuation of Ser. No. 513,817, Oct. 10, 1974, abandoned. This application July 15, 1976, Ser. No. 705,693
Claims priority, application France, Oct. 18, 1973, 73.37232
Int. Cl.² G21C *15/12*
U.S. Cl. 176—50 **7 Claims**



1. A reactor comprising a cylindrical main vessel having an upper edge and having a blanket of inert gas at the top, an end-wall for said main vessel secured to said upper edge and forming a sealed enclosure, a primary vessel within each said main vessel, a reactor core within said primary vessel, fuel assemblies is said core, a support structure for said fuel assemblies, a liquid sodium coolant for said core which flows upwards through said fuel assemblies of said reactor core and exiting said core as hot metal coolant, primary heat exchangers in said primary vessel receiving said hot coolant from said core, cold liquid sodium exiting from said heat exchangers into a bottom zone of said main reactor vessel or intervessel zone, a primary vessel separating said zone from the remainder of said vessel, pumps within said primary vessel for withdrawing said cold sodium from said zone and for reinjecting said cold sodium under pressure into the lower portion of said reactor core fuel assemblies, and at least one assembly of cylindrical shells having the same axis as said main vessel and surrounding said primary vessel, a two-branch siphon formed by said shells interposed between the hot sodium and the main vessel wall in at least the upper portion of said vessel preventing stagnation of the sodium, said two branches of said siphon being connected at their upper ends above the level of separation of the sodium and the inert gas and opening towards the bottom of the reactor, the branch of said siphon nearest said main vessel wall being supplied at low pressure with part of the cold sodium only injected into the bottom of said reactor core and the second branch of said siphon opening into said intervessel zone.

4,056,439
SECONDARY HEAT TRANSFER CIRCUITS FOR NUCLEAR REACTOR PLANT
Marcel Robin, Sevres, France, assignor to Commissariat a l'Energie Atomique, Paris, France
Filed Aug. 16, 1976, Ser. No. 714,374
Claims priority, application France, Aug. 22, 1975, 75.26039
Int. Cl.² G21C *15/02*
U.S. Cl. 176—65 **7 Claims**



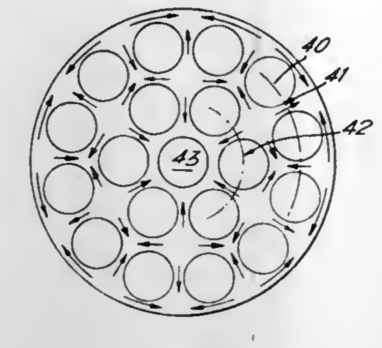
1. In a secondary heat transfer circuit of a nuclear reactor, which circuit comprises at least one steam generator module, at least one intermediate heat exchanger, pipe means interconnecting the steam generator module and the heat exchanger for circulation of a heat transfer liquid between the heat exchanger and the steam generator module, and pump means for effecting said circulation:

the improvement wherein the steam generator module includes a central return duct central to the pump means mounted on the steam generator module for cold heat transfer liquid from the generator and the pump means includes an intake directly connected to said central duct, the steam generator module including at its lower end a rapid drainage pipe system obturated from the steam generator module by a safety membrane.

4,056,440
HEAT TRANSFER CHANNELS
Robert Victor Macbeth, Bournemouth, England, assignor to United Kingdom Atomic Energy Authority, London, England
Filed May 28, 1975, Ser. No. 581,431
Claims priority, application United Kingdom, June 3, 1974, 24424/74
Int. Cl.² G21C *3/30*
U.S. Cl. 176—78 **9 Claims**

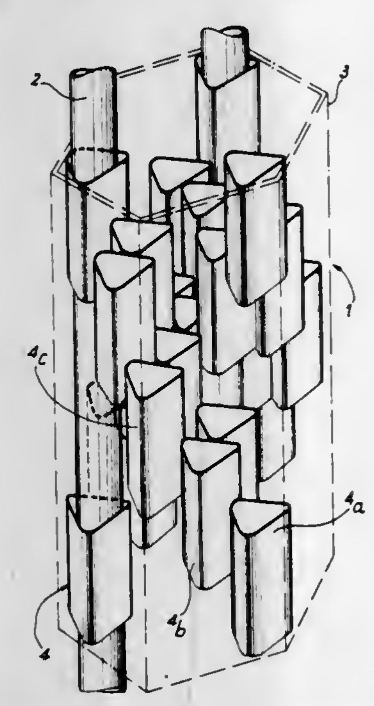
1. A heat transfer channel comprising a channel wall, an inlet for a heat receiving liquid coolant at one end, an outlet for

a two phase liquid/vapour mixture at the other, a plurality of elongated, heat emitting members supported in the channel by axially spaced grids in at least two annular concentric rows between the inlet and the outlet in spaced apart relation to one another and to the channel wall and extending parallel to one



another and to the channel axis, the heat emitting members between the grids defining unobstructed passageways for coolant axially and radially, the members being held in position such that there is an odd number of members occupying the outermost row adjacent the channel wall.

4,056,441
BRACING DEVICE FOR A BUNDLE OF PARALLEL PINS IN A NUCLEAR REACTOR ASSEMBLY
Pierre Marmonier, Aix-en-Provence, France; Bernard Mesnage, Madras, India; Jean Skok, Aix-en-Provence, France, and Jean Vayra, Meyreuil, France, assignors to Commissariat a l'Energie Atomique, Paris, France
Filed Jan. 19, 1976, Ser. No. 650,031
Claims priority, application France, Jan. 20, 1975, 75.01655
Int. Cl.² G21C *3/34*
U.S. Cl. 176—78 **9 Claims**



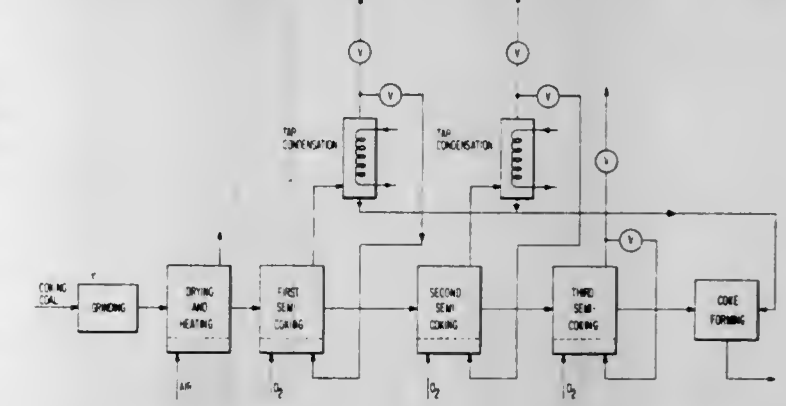
1. A bracing device for a bundle of parallel pins in nuclear reactor assembly, comprising at least one compartment grid formed by multisided cylinder elements of small height placed in juxtaposed relation and each traversed axially by one pin of the bundle, said elements being rigidly fixed to each other at successive points in the grid, wherein said elements are displaced along the height of said pins so as to be distributed in at least one helix.

4,056,442
LIPASE COMPOSITION FOR GLYCEROL ESTER DETERMINATION
Charles Y. Huang, S. Pasadena, Calif., and Alejo V. Roy, Carmel, Ind., assignors to The Dow Chemical Company, Midland, Mich.
Filed June 1, 1976, Ser. No. 691,932
Int. Cl.² C07G *7/02;* **G01N** *31/14*
U.S. Cl. 195—62 **13 Claims**

1. A composition useful for the hydrolysis of a glycerol ester in an aqueous medium comprising a mixture of from 15 to 95 units of *Rhizopus arrhizus* lipase and from 5 to 85 units of *Candida cylindracea* lipase per 100 units of total lipase present.

8. A method for hydrolyzing a glycerol ester and for determining the amount of glycerol ester present in an aqueous medium which comprises incubating the glycerol ester at a pH of 5.5-9.0 with a lipase mixture having the proportions of 15 to 95 units of a lipase from *Rhizopus arrhizus* and 5 to 85 units of a lipase from *Candida cylindracea* per 100 units of total lipase present for a time sufficient to hydrolyze the glycerol ester and determining the amount of glycerol or fatty acids released by the hydrolysis.

4,056,443
COKE PRODUCTION
Angelo Colletta, and Luigi Palumbo, both of Rome, Italy, assignors to Centro Sperimentale Metallurgico S.p.A., Rome, Italy
Filed Feb. 19, 1976, Ser. No. 659,580
Claims priority, application Italy, Feb. 19, 1975, 48246/75
Int. Cl.² C10B *47/24, 49/10, 53/04, 57/04*
U.S. Cl. 201—5 **2 Claims**



1. A method of producing coke of low sulfur content, comprising grinding coking coal, drying and heating the ground coal at a temperature of 200° to 300° C. for 15 to 120 minutes by fluidizing the ground coal with gas thereby to produce a dried and heated material; passing said material to a first semicoking stage, heating said material by fluidization in said first semicoking stage at 300° to 470° C. for 10 to 20 minutes while supplying to said first semicoking stage a make-up fluidizing gas containing oxygen in a quantity of 10 to 30 normal liters per kilogram of dry coal, thereby to produce semicoke and first offgases; cooling said first offgases to produce condensed tar and first residual gases; recycling to said first semicoking stage as fluidizing gas 60 to 80% by volume of said first residual gases; passing the semicoke from said first semicoking stage to a second semicoking stage, heating the semicoke in said second semicoking stage at 400° to 600° C. for 10 to 20 minutes while supplying to said second semicoking stage a make-up fluidizing gas containing oxygen in a quantity of 5 to 20 normal liters per kilogram of dry coal, thereby to produce semicoke and second offgases; cooling said second offgases to produce condensed tar and second residual gases; recycling to said second semicoking stage as fluidizing gas 60 to 80% by volume of said second residual gases; passing the semicoke from said second semicoking stage to a third semicoking stage, heating the semicoke by fluidization in said third semicoking stage at 800° to 1100° C. for 10 to 20 minutes with the production of third offgases while supplying to said third semicoking stage a make-

up fluidizing gas containing oxygen in a quantity of 40 to 100 normal liters per kilogram of dry coal; recycling to said third semicoking stage as fluidizing gas 10 to 20% by volume of said third offgases; and briquetting the semicoke from said third semicoking stage into formed coke.

4,056,444

VACUUM SEPARATION OF MIXTURES WITH SIMILAR BOILING POINTS

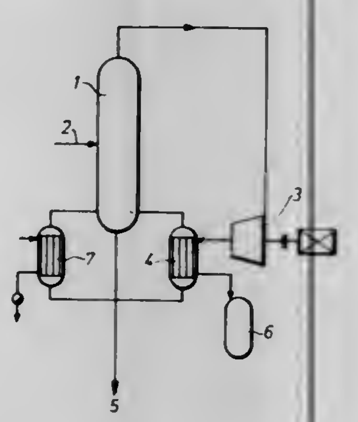
Bodo Weicht, and Karl Kleinbenz, both of Leverkusen, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Apr. 2, 1975, Ser. No. 564,395

Claims priority, application Germany, Apr. 24, 1974, 2419723

Int. Cl.^{2} B01D *3/10*

U.S. Cl. 203—26 **9 Claims**



1. A process for separating mixtures of components which differ in boiling points by up to about 10° C, comprising distilling the mixture in a distillation column at a reduced pressure of above 10 Torr, supplying heat to the column in an amount of 5–15% of the heat required for heating the column by indirect heat exchange in a first reboiler, collecting the vapors at the top of the column, compressing said vapors and supplying the balance of the heat required for the distillation by indirect heat exchange by condensing the compressed vapors in a second reboiler evaporator.

4,056,445

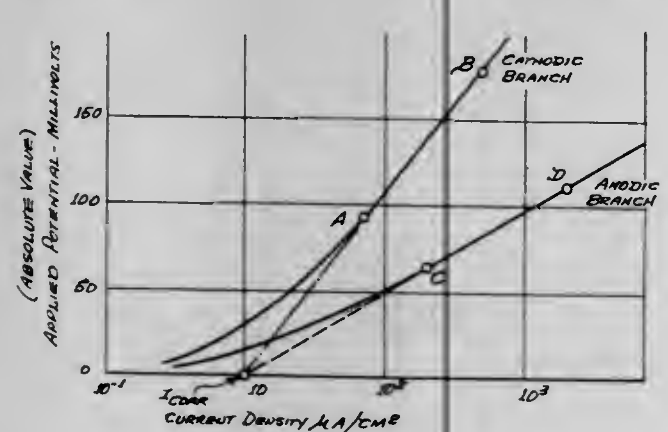
DETERMINATION OF CORROSION RATES BY AN ELECTROCHEMICAL METHOD

Wayne M. Gauntt, 1825 Wheaton Ave., Claremont, Calif. 91711, and Earl L. Pye, 2910 Santez Drive, Pomona, Calif. 91768

Continuation-in-part of Ser. No. 621,550, Oct. 10, 1975, abandoned, and a continuation-in-part of Ser. No. 538,763, Jan. 6, 1975, abandoned. This application Nov. 26, 1976, Ser. No. 744,972

Int. Cl.^{2} G01N *27/46, 27/30*

U.S. Cl. 204—1 T **20 Claims**



1. A method for determining the freely corroding current density of a metallic substance immersed in an electrolyte, comprising the steps of:

providing a working electrode formed of said substance,
providing a counter electrode formed of a conductive material,
providing a reference electrode formed of a conductive substance,
immersing said three electrodes in said electrolyte,
establishing by external means a first potential difference, not less than 50 millivolts in magnitude, across said working and reference electrodes,
measuring the current flow induced by said first potential difference through said counter electrode after the elapse of a predetermined first time period, said first time period being substantially shorter than the time required to establish equilibrium current flow upon the imposition of said first potential difference,
measuring said first potential between said working and reference electrodes,
recording said current and said potential difference,
establishing by said external means a second potential difference, substantially higher in magnitude than said first potential difference, between said working and reference electrodes,
recording said second potential difference and the current resulting therefrom after the elapse of a second pre-determined time period, said second time period being substantially shorter than the time required to establish equilibrium current flow upon the imposition of said second potential difference,
converting said current measurements into current density measurements,
deriving the linear equation passing through the pair of coordinate points represented by the measured first and second potential differences and by the logarithms of the corresponding measured current densities, and
determining, by means of said equation, the freely corroding current density at zero applied potential difference.

2. The method of claim 1 wherein said first potential difference is selected in the range between 50 and 200 millivolts and said second potential difference is selected in the range between 100 and 400 millivolts.

4,056,446

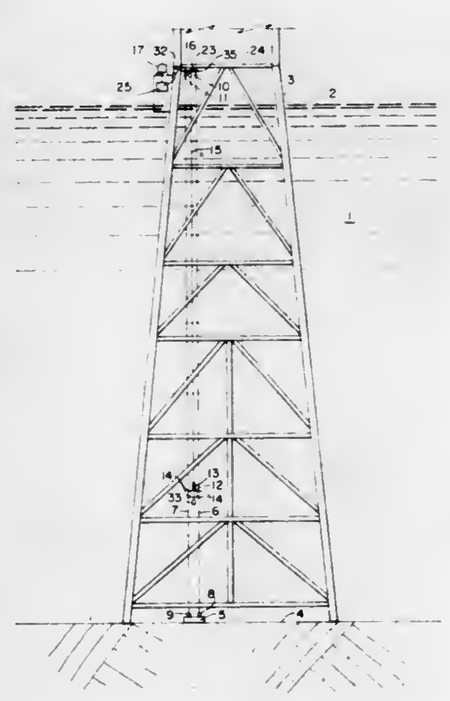
DIVERLESS CATHODIC PROTECTION DATA ACQUISITION

Richard M. Vennett, Ponca City, Okla., assignor to Continental Oil Company, Ponca City, Okla.

Filed Jan. 3, 1977, Ser. No. 756,571

Int. Cl.^{2} G01N *27/30;* **C23F** *13/00*

U.S. Cl. 204—1 T **12 Claims**



1. In a process for diverless acquisition of data useful for determining cathodic protection of a portion of a structure immersed in salt-containing water and subject to corrosion wherein the structure extends from contact with the bottom of the body of water to above the surface of the body of water and wherein the process comprises:

a. passing a reference electrode along a guide line to a definite point along the length of the guideline wherein the guideline is fastened on one end to the structure above the surface and on the other end to an anchoring means near the bottom such that the guideline passes in proximity to the portion of the structure to be sensed for protection, wherein the electrode is slideably mounted on the guideline, and
b. recovering electrode potential data from the electrode at the definite point on the guideline; the improvement comprising:
c. maintaining the guideline taut and maintaining the electrode at a fixed distance from the guideline and in a fixed radial direction from the guideline.

9. An apparatus for diverless acquisition of data useful for determining cathodic protection of a portion of a structure immersed in salt-containing water and subject to corrosion wherein the structure extends from contact with the bottom of the body of water to above the surface of the body of water comprising in combination with said partially immersed structure:

(a). an anchoring means near the bottom,
(b). a first taut guideline contacting the anchoring means on one end and the other end contacting the member of the structure above a surface of the water,
(c). a second taut guideline contacting the anchoring means and contacting the member of the structure above the surface such that the second taut guideline is parallel to the first taut guideline and such that both guidelines pass within proximity of the portion of the structure subject to corrosion,
(d). a saddle slideably attached to the first guideline and the second guideline,
(e). a reference electrode mounted in association with the saddle such that its radial direction and distance from the first guideline remains constant,
(f). a readout attached in electrical communication to the electrode,
(g). a line for raising and lowering the electrode and the saddle assembly on the guidelines attached on one end to the electrode and saddle assembly, and
(h). means for determining the depth to which the line is played out and consequently the position of the electrode and saddle assembly.

4,056,447

ELECTROLYZING ALKALI METAL CHLORIDES USING RESIN BONDED ASBESTOS DIAPHRAGM

Luigi Giuffre, Milan, Italy; Vittorio De Nora, Nassau, Bahamas, and Placido Spaziante, Milan, Italy, assignors to Oronzio de Nora Impianti Elettrochimici S.p.A., Milan, Italy

Division of Ser. No. 575,415, May 7, 1975, Pat. No. 4,020,235. This application Dec. 6, 1976, Ser. No. 747,708

Claims priority, application Italy, Mar. 6, 1975, 20989

Int. Cl.^{2} C25B *1/16, 1/26, 13/06, 13/00*

U.S. Cl. 204—98 **17 Claims**

1. In a method of electrolyzing alkali metal chlorides in an electrodic gap between an anode and a cathode provided with a diaphragm, the improvement comprising the diaphragm being made of a composition comprising an inert fibrous material impregnated with a copolymer of styrene and divinyl benzene copolymerized directly on the material in the absence of a solvent and there sulfonated and halogenated.

4,056,448

PROCESS FOR BRINE MEMBRANE CELL OPERATION WITH EXTERNAL CAUSTIC AND NaCl CONCENTRATION CONTROL

Andrew D. Babinsky, Chagrin Falls, Ohio, and Ronald L. Dotson, Cleveland, Tenn., assignors to Diamond Shamrock Corporation, Cleveland, Ohio

Filed Dec. 17, 1976, Ser. No. 751,644

Int. Cl.^{2} C25B *1/16, 1/00*

U.S. Cl. 204—98 **3 Claims**

1. In a process for the electrolysis of an aqueous sodium chloride solution in an electrolytic cell the anolyte and catholyte compartments of which are separated by an electrolytically-conductive, hydraulically impervious, cation permselective membrane, having an equivalent weight of approximately 1200, the improvement which consists essentially of establishing and maintaining the sodium hydroxide concentration in the catholyte within the range of about 540–580 grams per liter by the addition of water from outside the cell and simultaneously establishing and maintaining the sodium chloride concentration in the anolyte within the range of about 170 to 210 grams per liter while maintaining the current density in the range 0.75 to 1.25 amperes per square inch.

4,056,449

ELECTROWINNING METHOD

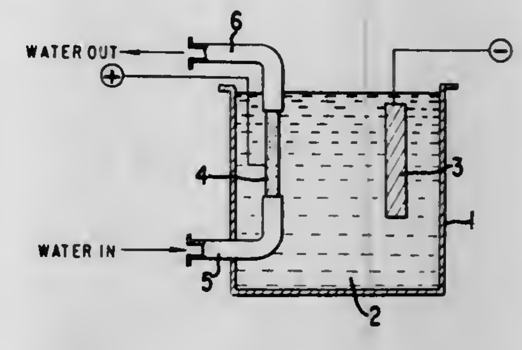
Vittorio de Nora, Nassau, Bahamas; Antonio Nidola, and Giuseppe Bianchi, both of Milan, Italy, assignors to Diamond Shamrock Technologies S.A., Geneva, Switzerland

Filed Sept. 23, 1975, Ser. No. 616,044

Claims priority, application Italy, Oct. 31, 1974, 29067/74

Int. Cl. C25b *1/04;* **C25C** *1/06, 1/12, 1/16*

U.S. Cl. 204—106 **14 Claims**



1. In a method of evolving oxygen by electrolysis of aqueous solutions by passing an electric current through the solution with oxygen being evolved at the anode, the improvement comprising operating the electrolysis so that the surface temperature of the anode is not greater than 40° C to prevent deposition of an impurity on the anode which increases oxygen overvoltage and causes passivation.

4,056,450

CONTINUOUS DETINNING SYSTEM

George L. McCauslan, Jamesburg, and Donald B. Read, Colts Neck, both of N.J., assignors to M & T Chemicals Inc., Greenwich, Conn.

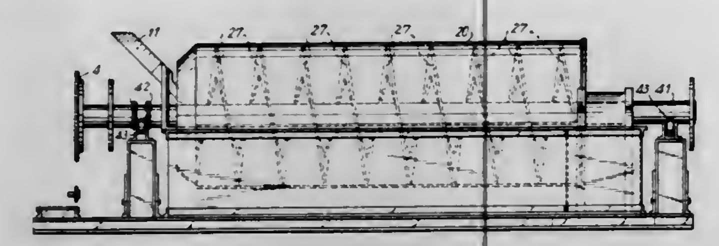
Division of Ser. No. 591,891, June 30, 1975. This application June 16, 1976, Ser. No. 696,642

Int. Cl.^{2} C25F *7/00, 5/00*

U.S. Cl. 204—201 **15 Claims**

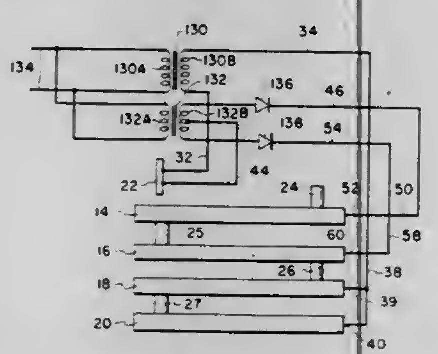
14. In a plant for the continuous recovery of tin as tin metal from tin plate scrap comprising in a sequence of treatment stages means for storing tin plate scrap, means for conveying said tin plate scrap, chute means for said tin scrap, to a revolving anodic perforated drum having an opening at one end for receiving material, contact means for rendering said drum anodic, a central cylinder inside said drum, drive means for revolving said drum, helical means interposed between said drum and said cylinder, said means dividing the annular zone

between said drum and said cylinder into a plurality of flights, each accommodating a quantity of scrap, said helical means being arranged to advance said scrap from the intake end of said drum to the discharge end thereof, a tank for bath solution



in which said drum is partially submerged, a plurality of cathode plates obversely and externally to said electrically anodic rotating drum arranged in a longitudinal row on the inside wall of said tank containing said bath solution, conveying means for detinned scrap and storage means for said detinned scrap.

4,056,451
DUAL FIELD ELECTRIC TREATER
Robert A. Hodgson, Tulsa, Okla., assignor to Maloney-Crawford Tank Corporation, Tulsa, Okla.
Filed Mar. 29, 1976, Ser. No. 671,090
Int. Cl.^{2} C10G *33/02*
U.S. Cl. 204—305 **7 Claims**



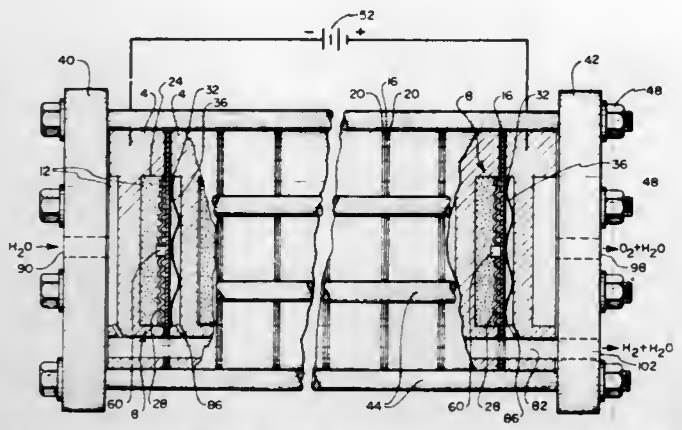
1. In an oil field electrical emulsion treater having a plurality of trays through which the emulsion is passed sequentially, the improvement comprising:

a. at least one first tray means comprising at least one insulatively mounted electrode therein, and means to apply an AC potential between said electrode and the walls of said first tray;

b. at least one additional pair of trays, each pair comprising a second tray and a third tray, at least one insulatively mounted electrode in each of said second and third trays, and means to apply unidirectional pulsed half wave rectified potential between said electrodes in said second and third trays and the walls of each respective tray, the half waves in said second tray being out of phase by 180° with the half waves in said third tray.

4,056,452
ELECTROLYSIS APPARATUS
Barrie C. Campbell, Provo, Utah, assignor to Billings Energy Research Corporation, Provo, Utah
Filed Feb. 26, 1976, Ser. No. 661,788
Int. Cl.^{2} C25B *1/02, 11/02*
U.S. Cl. 204—258 **21 Claims**

1. An electrode structure for electrolysis apparatus having a solid polymer electrolyte membrane and a pair of electrodes disposed on either side of and in contact with the membrane, at least one of said electrodes including a corrugated surface portion which presents alternating ridges and grooves, with the ridges being maintained in contact with the membrane so that the portions of the membrane in contact with the ridges are deformed to conform in shape to the tops of the ridges and the grooved bottoms being spaced from the membrane to enable the flow of fluid through the grooves, said corrugated



surface portion extending over a generally circular area and in a substantially flat plane.

4,056,453
UV-CURING PRINTING INKS
Helmut Barzynski, Bad Durkheim; Güenter Heil, Ludwigshafen; Karl Klemm, Stuttgart, and Helfrid Sander, Beibingen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany
Continuation of Ser. No. 527,269, Nov. 26, 1974, abandoned. This application July 29, 1976, Ser. No. 709,802
Claims priority, application Germany, Nov. 27, 1973, 2358948
Int. Cl.^{2} C08F *8/00;* **C08G** *18/00*
U.S. Cl. 204—159.23 **9 Claims**

1. A printing ink curable by UV radiation and comprising

A. from 0 to 50 percent by weight of a pigment conventionally used in printing inks;

B. from 0.5 to 15 percent by weight of a mixture of benzophenone and Michler's ketone;

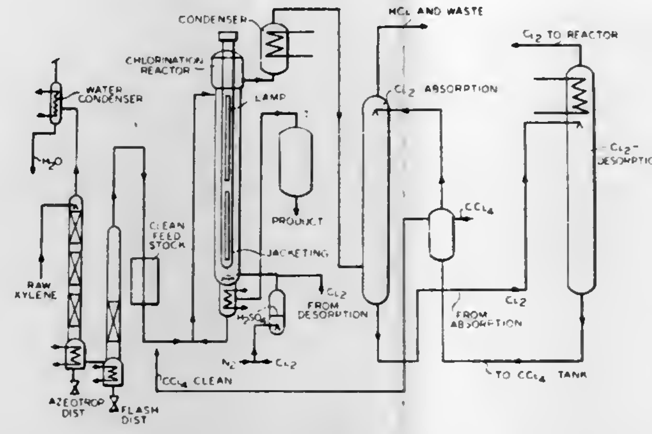
C. from 40 to 85 percent by weight of at least one polymerizable olefinically unsaturated compound which has an average molecular weight of from 250 to 4000 and which contains at least one group of the formula:

$$CH_2{=}CR{-}\underset{\underset{\textstyle O}{\|}}{C}{-}$$

wherein R is a hydrogen atoms or a methyl group and at least one urethane group, which has been manufactured from aliphatic or cycloaliphatic diisocyanates or polyisocyanates and at least one hydroxyl-containing acrylic or methacrylic compound selected from the group consisting of ethylene glycol monoacrylate or monomethacrylate, 1,2- or 1,3-propanediol monoacrylate or monomethacrylate, 1,4-butanediol monoacrylate or monomethacrylate and 1,6-hexanediol monoacrylate or monomethacrylate and

D. From 10 to 25 percent by weight of at least one compound which is liquid at 50° C and which is obtained by reacting a diglycidyl ether of an aliphatic diol, triol or tetrol, containing from 2 to 8 carbon atoms with acrylic acid or methacrylic acid used in an amount of at least one mole per epoxide group in the diglycidyl ether and optionally thereafter esterifying or etherifying the reaction product at the free hydroxyl group or groups thereof; the polymerizable olefinically unsaturated compound (s) (C) and the compound (s) (B) which is liquid at 50° C being such that when in admixture they form a mixture having a vapor pressure of less than 1 mm Hg at 100° C and a viscosity greater than 1 poise at 30° C and containing substantially no fatty oils of fatty acids having more than 6 carbon atoms.

4,056,454
PROCESS FOR THE PREPARATION OF α,α,αα',α'-PENTACHLORO-O-XYLENE
Paul Riegger, Troisdorf; Hermann Richtzenhain, Much-Scwellenbach, and Gunter Zoche, Bonn, all of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Cologne, Germany
Filed Aug. 2, 1976, Ser. No. 710,834
Claims priority, application Germany, Aug. 9, 1975, 2535696
Int. Cl.^{2} B01J *1/10*
U.S. Cl. 204—163 R **7 Claims**



1. Process for the preparation of α,α,α,α',α'-pentachloro-o-xylene consisting essentially of reacting o-xylene with chlorine in the presence of carbon tetrachloride as solvent under actinic light radiation, at temperatures above 75° up to 140° C, the temperature being increased from about above 75° - 90° C at the beginning to about 110 - 140 at the end of the reaction, carbon tetrachloride vapor being evolved during the reaction and the vapor being condensed and recirculated to the reaction, the actinic light radiation source being a high-pressure mercury immersion lamp which is surrounded by a jacket filled with organic liquid which partially absorbs the radiation, the reaction being carried out in the absence of additive which binds traces of metal.

4,056,455
PROCESS FOR THE CONTINUOUS PREPARATION OF MONO- OR DI-(TRICHLOROMETHYL)-BENZENES
Rudolf Lademann, Kelheim, Taunus; Franz Landauer, Frankfurt am Main; Heinrich Lenzmann, Kelheim, Taunus; Klaus Schmiedel, Konigstein, Taunus, and Wolfram Schwiersch, Frankfurt am Main, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany
Filed July 1, 1976, Ser. No. 701,819
Claims priority, application Germany, July 5, 1975, 2530094
Int. Cl.^{2} B01J *1/10*
U.S. Cl. 204—163 R **9 Claims**

1. In a process for the continuous preparation of a mono- or di-(trichloromethyl)-benzene, or a mono- or di-(trichloromethyl)-benzene halo-substituted in the benzene ring, from the corresponding unsubstituted or halo-substituted mono- or dimethylbenzene, or said unsubstituted or halo-substituted mono- or dimethylbenzene which is mono- or dihalo-substituted in one or both methyl groups, and chlorine in several steps by irradiating with actinic light, the improvement which comprises reacting said unsubstituted or halo-substituted mono- or dimethylbenzene, or said unsubstituted or halo-substituted mono- or dimethylbenzene which is mono- or dihalo-substituted in one or both methyl groups, in four to 14 steps with chlorine, by introducing chlorine to the second step and the following steps, or to the second and following steps excluding the last step when the quantity of chlorine dissolved in the reaction product amounts to a multiple of the expected conversion, introducing the resulting waste gas to step 1 and reacting the chlorine contained in the waste gas there with fresh said corresponding unsubstituted or halo-substituted mono- or dimethyl benzene, or said unsubstituted or halo-substituted mono- or dimethylbenzene which is mono- or dihalo-substituted in one or both methyl groups.

4,056,456
PROCESS FOR PREPARING NOVEL THIN FILMS
Takezo Sano, Takatsuki, and Masao Sasaki, Ibaragi, both of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan
Filed Nov. 22, 1974, Ser. No. 526,253
Claims priority, application Japan, Nov. 22, 1973, 48-131989
Int. Cl.^{2} B01K *1/00;* **B01J** *1/00*
U.S. Cl. 204—165 **14 Claims**

1. A process for preparing a novel thin film which comprises crosslinking the surface of a layer of a surfactant selected from the group consisting of fatty acid salts, sulfuric acid esters of higher alcohols, alkylbenzenesulfonates, alkylnaphthalenesulfonates, naphthalenesulfonic acid-formalin condensates, dialkyl sulfosuccinates, alkyl phosphates, polyoxyethylene sulfates, alkylamine salts, quaternary ammonium salts, polyoxyethylene alkylamines, polyoxyethylene alkyl ethers, polyoxyethylene alkylphenol ethers, sorbitan fatty acid esters, polyoxyethylene fatty acid esters, hydroxyethylene sorbitan fatty acid esters, hydroxyethylenehydroxypropylene block polymers, fatty acid monoglycerides, and alkyl betaines, by irradiation with plasma, and then washing away the uncrosslinked portion of said surfactant with water or the like solvent to obtain an extremely thin film.

4,056,457
METHOD OF DEPOSITING LOW STRESS HAFNIUM THIN FILMS
John Louis Vossen, Jr., Bridgewater, N.J., assignor to RCA Corporation, New York, N.Y.
Filed Sept. 20, 1976, Ser. No. 724,550
Int. Cl.^{2} C23C *15/00;* **B32B** *9/00*
U.S. Cl. 204—192 SP **7 Claims**

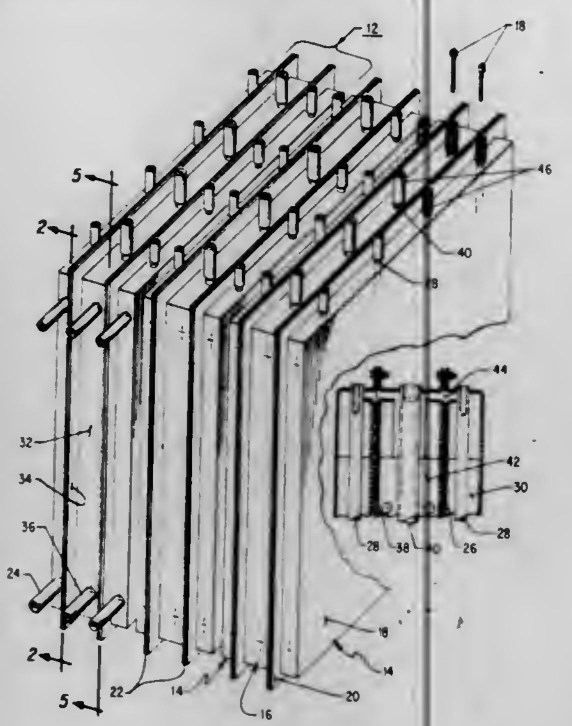
1. A method for depositing adherent films of hafnium metal on an alumina or sapphire substrate which comprises radio frequency vacuum sputtering a hafnium target in an inert gaseous plasma atmosphere at deposition rates of over 175 Angstroms per minute onto said substrate, said substrate being maintained at minimum bias with respect to said plasma atmosphere.

5. A composite comprising a layer of hafnium adhered to a sapphire substrate and deposited by the method of claim 1.

4,056,458
MONOPOLAR MEMBRANE ELECTROLYTIC CELL
Gerald R. Pohto, Mentor; Michael J. Kubrin, Chardon, and Robert C. Sutter, Painesville, all of Ohio, assignors to Diamond Shamrock Corporation, Cleveland, Ohio
Filed Aug. 26, 1976, Ser. No. 718,060
Int. Cl.^{2} C25B *9/00, 15/08, 11/02*
U.S. Cl. 204—263 **29 Claims**

1. A monopolar membrane electrolytic cell comprising: two end electrode pans of identical configuration having a peripheral flange therearound; end electrode elements connected to the interior depression of each of said end electrode pans; a central electrode frame having peripheral flanges on each side thereof to match the corresponding flanges of said end electrode pans for sealing engagement when connected to form the monopolar membrane electrolytic cell; a bifurcated central electrode element such that each presents a substantially planar surface to said corresponding end electrode element connected to the interior of said central electrode frame; a membrane separating said end electrode elements from said central electrode element when the cell is assembled; current distributors

to supply electrical energy of opposite polarity to said central electrode elements and said end electrode elements; and at least



one access port in each compartment for adding materials or removing products.

4,056,459

ANODE ASSEMBLY FOR AN ELECTROLYTIC CELL

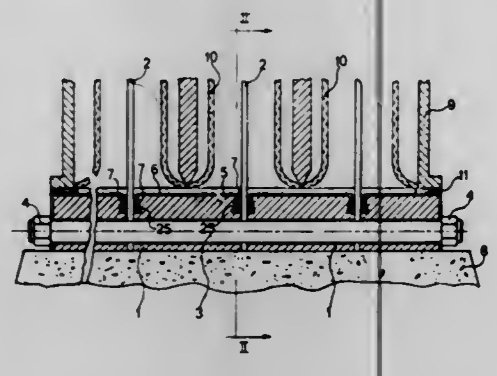
Stelio Ritti, Rome, and Silvio Policardi, Ferrare, both of Italy, assignors to Solvay & Cie, Brussels, Belgium

Filed Apr. 9, 1976, Ser. No. 675,492

Claims priority, application France, Apr. 25, 1975, 75.13313

Int. Cl.[2] C25B *1/26, 9/02*

U.S. Cl. 204—286 16 Claims



1. An anode assembly for an electrolytic cell comprising, a plurality of upstanding parallel anode plates spaced from each other, support means for supporting the anode plates and for providing electrical current thereto comprising metallic beams between the anode plates, fluid-tight caps over the beams having bent marginal edge portions bent downwardly along the sides opposed to the anode plates, each beam having on opposite longitudinal sides thereof grooves open to the top of the beams and to the sides thereof, said bent marginal edge portions of each cap being bent into the longitudinal side grooves of the corresponding beam covered by the respective cap, a sealing material along the bent marginal edge portions on a side thereof toward the individual anode plates defining sealing joints.

4,056,460

PROCESS FOR LIQUEFYING CARBONACEOUS MATERIALS OF HIGH MOLECULAR WEIGHT AND FOR SEPARATING LIQUEFACTION PRODUCTS

John M. Malek, P.O. Box 71, Lomita, Calif. 90717

Filed Dec. 1, 1975, Ser. No. 636,450

Int. Cl.[2] C10G *1/06*

U.S. Cl. 208—8 15 Claims

5. In a process for hydrogenating and liquefying coal, wherein coal is subjected in a coal liquefaction medium to the chemical action of hydrogen under elevated temperature and pressure, in which process gasiform products are separated from hydrogenated slurryform products comprising liquid and solid products including materials with structures composed of acidic phenolic components and basic amino-components, the improvement for increasing coal conversion rates, being characterized by agitating the slurryform products in the presence of an alkaline hydroxide in the presence of water, for binding acidic phenolic components in said products to form phenolic salts and lower the viscosity of the slurryform, separating the slurryform which was agitated into a solid residue rich portion, a liquid product portion rich in phenolic compounds, and a liquid portion comprising amines, and recycling and admixing at least a part of the liquid portion comprising amines to said liquefaction medium.

8. In a process for hydrogenating and liquefying coal, wherein coal is subjected in a coal liquefaction medium to the chemical action of hydrogen under elevated temperature and pressure, in which process gasiform products are separated from hydrogenated slurryform products comprising liquid and solid products including materials with structures composed of acidic phenolic components and basic amino-components, the improvement for increasing coal conversion rates being characterized by agitating the slurryform products in the presence of an inorganic acid in the presence of water, for binding basic components in the slurryform and lower the viscosity thereof, while forming salts and adducts of amines with said inorganic acid, separating the slurryform which was agitated into a solid residue portion, a liquid product portion rich in said salts and adducts, and a liquid portion comprising phenols, and recycling and admixing a part of the liquid portion comprising phenols to said coal liquefaction medium.

4,056,461

RETORTING PROCESS UTILIZING A FLEXIBLE, HELICAL SHAPED CONVEYOR

Jack W. Unverferth, Walnut Creek, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed June 25, 1976, Ser. No. 700,378

Int. Cl.[2] C10G *1/02;* C10B *49/16*

U.S. Cl. 208—11 R 10 Claims

1. A continuous process for retorting hydrocarbon-containing solids which comprises:

a. introducing a solid heat-transfer material at an elevated temperature and hydrocarbon-containing solids into a first section of a stationary, elongated vessel;

b. conveying said heat-transfer material and said hydrocarbon-containing solids through said vessel by means of a flexible generally helical shaped, elongated, hollow longitudinal core, rotating conveyor disposed in said vessel throughout a substantial portion thereof, whereby said hydrocarbon-containing solids and said heat-transfer material are intermixed and sufficient heat is transferred from said solid heat-transfer material to said hydrocarbon-containing solid to raise the temperature of said hydrocarbon-containing solids to an elevated retorting temperature in said first section of said vessel;

c. introducing a stripping gas at an elevated temperature into a third end section of said vessel downstream from the location where said hydrocarbon-containing solids are introduced, and passing said stripping gas through said third section of said vessel in countercurrent flow relative to the flow of said hydrocarbon-containing solids;

d. withdrawing at an elevated temperature an effluent stream from a second middle section of said vessel, said effluent stream comprising said stripping gas, entrained liquid and gaseous hydrocarbons and finely-divided solids;

e. withdrawing at an elevated temperature retorted solids and said heat-transfer material from said third section of said vessel;

f. separating the condensable hydrocarbons from said effluent stream.

4,056,462

SEPARATING HYDROCARBON MIXTURES BY EMULSIFICATION

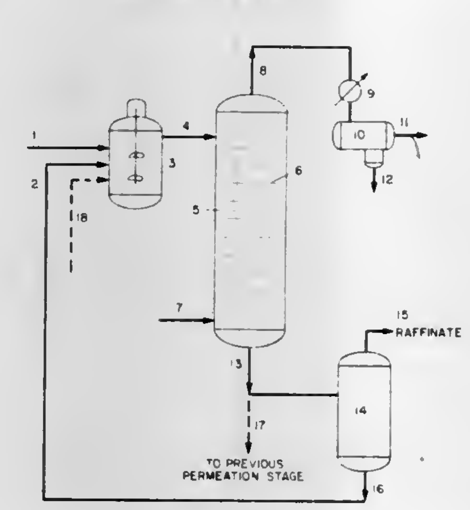
Norman N. Li, Edison, and Robert P. Cahn, Millburn, both of N.J., assignors to Exxon Research and Engineering Company, Linden, N.J.

Filed July 25, 1973, Ser. No. 382,468

Int. Cl.[2] B01J *17/34;* C10G *31/00*

U.S. Cl. 208—308 15 Claims

SINGLE STAGE OF SEPARATION PROCESS



1. A process for separating components from a hydrocarbon containing liquid mixture which comprises emulsifying said liquid mixture in an immiscible liquid, thereby forming a discontinuous phase of said hydrocarbon containing liquid mixture in a continuous phase of said immiscible liquid, said immiscible liquid being characterized as a solvent for said components, and contacting said emulsion with an inert gas at conditions whereby said liquid mixture is restrained from boiling and said components pass into said immiscible liquid and are removed therefrom by said inert gas.

4,056,463

TOBACCO/PAPER SORTER METHOD AND APPARATUS

Charles D. Hansen, Jr., Richmond, Va., assignor to AMF Incorporated, White Plains, N.Y.

Filed Aug. 19, 1976, Ser. No. 715,779

Int. Cl.[2] B07C *5/344*

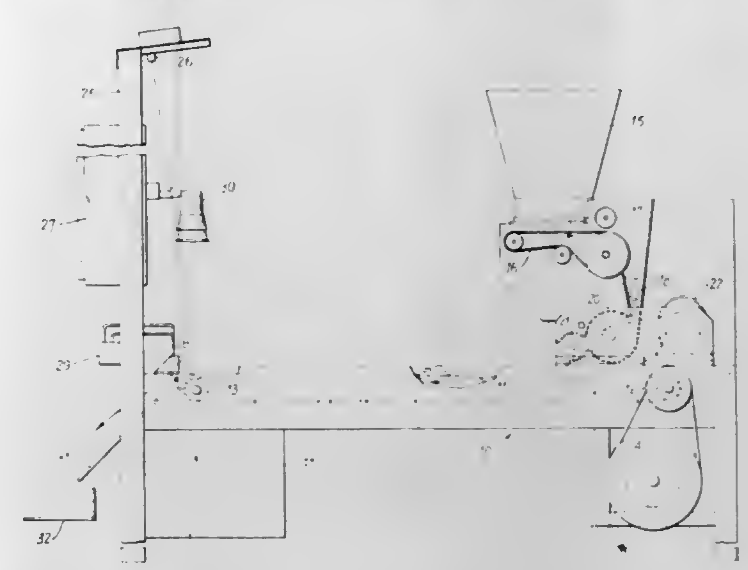
U.S. Cl. 209—111.7 R 9 Claims

1. The method of removing paper particles randomly mixed in reclaimed shredded tobacco from defective cigarettes, comprising the steps of

creating a shower of the shredded tobacco with paper particles to form a blanket of shredded tobacco with paper particles exposed on top of the formed blanket,

electro-optically scanning the blanket of shredded tobacco to detect exposed paper particles;

propelling the scanned blanket of shredded tobacco along a path of flight; and



pneumatically diverting detected paper particles from the path of flight.

4,056,464

MINERAL JIGS

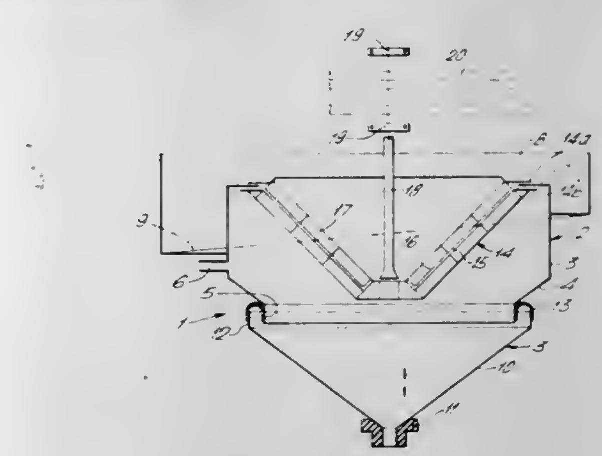
Donald James Cross, 3 Grange Road, Bearsden, Glasgow G61 3PL, Scotland

Filed May 17, 1976, Ser. No. 686,897

Claims priority, application United Kingdom, May 23, 1975, 22505/75

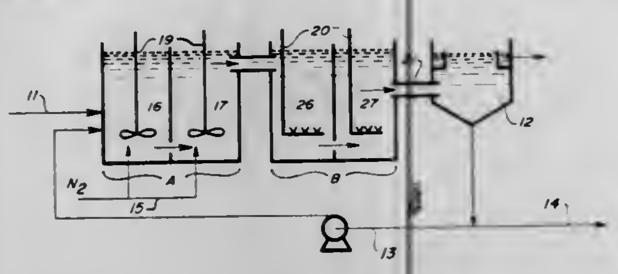
Int. Cl.[2] B03B *5/16*

U.S. Cl. 209—425 14 Claims



1. A mineral jig comprising a container for water, pulsating means to cause said water to pulsate in the container, an inlet to the container for water, a rotor mounted for rotation about a vertical axis and including a rotary frusto-conical bed in the container; said bed having a permeable frusto-conical wall; an inlet discharging into the bed for slurry; an outlet from the container for concentrated slurry; said rotor being connectible to a drive and the frusto-conical bed being arranged such that a slurry vortex is formed thereon on rotation of the bed whereby material separation is achieved by heavier materials of the slurry passing through the permeable frusto-conical wall of the bed while lighter materials move up the frusto-conical wall for discharge from an upper end of the bed; and receiving means at the upper end of the bed for lighter materials discharged from the bed.

4,056,465
PRODUCTION OF NON-BULKING ACTIVATED SLUDGE
Marshall L. Spector, Allentown, Pa., assignor to Air Products and Chemicals, Inc., Allentown, Pa.
Filed Apr. 12, 1976, Ser. No. 676,266
Int. Cl.[2] C02C *1/06*
U.S. Cl. 210—7 **19 Claims**



1. In the operation of an activated sludge system the method of inhibiting proliferation of filamentous biomass consisting essentially of:

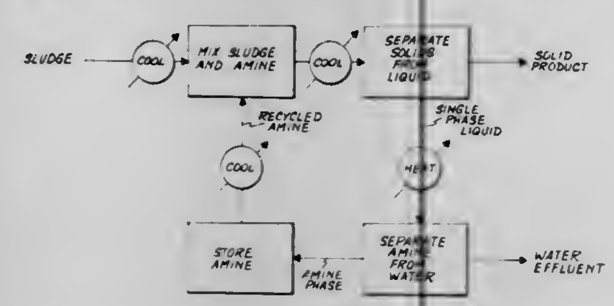
producing a mixed liquor by mixing in an initial contact zone recycled activated sludge with BOD-containing wastewater influent; said initial contact zone being maintained under anaerobic conditions such as to be substantially free of NO_x^- and to contain a concentration of less than 0.7 ppm dissolved oxygen; thereby effecting selective production of nonfilamentous microorganisms capable of sorbing BOD;

oxidizing BOD in the mixed liquor in a subsequent oxygenated zone to cause removal of BOD by contact with oxygen-containing gas admitted to said oxygenated zone, said oxygenated zone having maintained therein a dissolved oxygen content of at least 1 ppm;

transferring the oxidized mixed liquor from said oxygenated zone to a settling zone wherein purified supernatant liquid is separated from settled sludge;

and returning a portion of said settled sludge to said initial contact zone to provide the activated sludge admixed therein with the wastewater influent.

4,056,466
METHOD OF DEWATERING MATERIAL CONTAINING SOLID MATTER AND BOUND AND UNBOUND WATER
Hans H. Peters, Federal Way, Wash., assignor to Resources Conservation Co., Renton, Wash.
Filed Aug. 3, 1973, Ser. No. 385,488
Int. Cl.[2] B01D *11/00*
U.S. Cl. 210—10 **7 Claims**



1. In the process for dewatering a sludge containing solid matter and water including the steps of

admixing said sludge with an amine to form a mixture, said amine having the formula

$$\begin{array}{c} R_1 \\ | \\ N-R_2 \\ | \\ R_3 \end{array}$$

wherein:

R_1 is hydrogen or alkyl,

R_2 and R_3 are alkyl radicals having from one to six carbon atoms or alkenyl radicals having from two to six carbon atoms, and

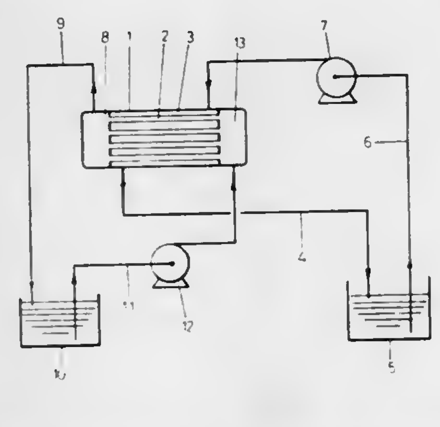
the total number of carbon atoms in the molecule being in the range of from three to seven, inclusive, said amine having an inverse critical solution temperature in a two phase system with water,

adjusting the temperature of said mixture below said inverse critical solution temperature to form a single phase liquid and a solid phase containing at least a portion of said solid matter which is insoluble in said single phase liquid, and

separating said solid phase from said single phase liquid, the improvement comprising:

maintaining the temperature of said mixture below said inverse critical solution temperature while admixing said amine and said sludge and until said solid phase is separated from said single phase liquid.

4,056,467
HOLLOW FIBRES
Gilbert Christen, Lyon; Bernard Favre, Ecully; Xavier Marze, Lyon; Michel Salmon, Mions, and Rene Thuillier, Morance, all of France, assignors to Rhone-Poulenc S.A., Paris, France
Division of Ser. No. 395,155, Sept. 7, 1973, Pat. No. 3,930,105. This application June 3, 1975, Ser. No. 583,168
Claims priority, application France, Sept. 12, 1972, 72.32285
Int. Cl.[2] B01D *13/00*
U.S. Cl. 210—23 F **8 Claims**



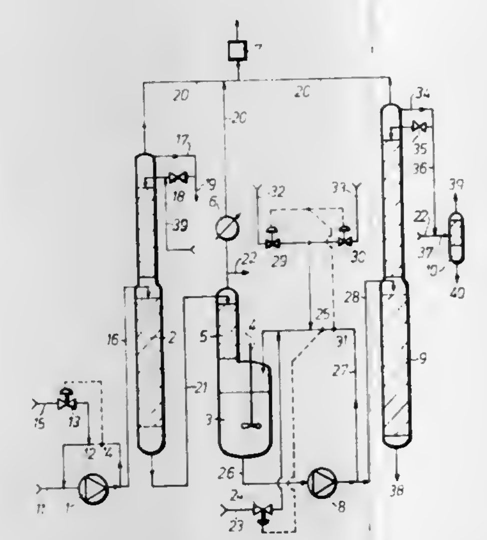
1. In a method of ultrafiltration or dialysis using a membrane, the improvement which comprises

using as the membrane a skinless hollow fiber possessing a continuous longitudinally extending channel from macromolecular material, said fiber consisting essentially of a copolymer of acrylonitrile and an olefinically unsaturated comonomer containing an optionally salified sulfonic acid group, the proportion of optionally salified sulfonic acid groups in said copolymer being between 1 and 50% (by number) of the monomer units and possessing micropores of average diameter less than about 100 A, between 40 and 80% of walls of the fiber being empty space, said fiber possessing zero salt rejection, measured under a pressure of 2 bars for an aqueous solution containing 10 g/l of sodium chloride.

4,056,468
ISOLATION OF COMPONENT MATERIALS OF AQUEOUS SOLUTIONS SOLUBLE IN LIPOPHILIC SOLVENTS
Joachim Breiter, and Roland Helger, both of Darmstadt, Germany, assignors to Merck Patent Gesellschaft mit beschrankter Haftung, Darmstadt, Germany
Filed Feb. 25, 1975, Ser. No. 553,023
Claims priority, application Germany, Mar. 2, 1974, 2410033
Int. Cl.[2] B01D *15/00*
U.S. Cl. 210—31 R **11 Claims**

1. In a process for the isolation of lipophilic solvent-soluble components from an aqueous solution containing lipophilic components comprising contacting the aqueous solution with one or both of a silica gel-based or kieselguhr-based concentration agent to absorb said aqueous solution therein and subsequently extracting substantially only the lipophilic solvent-soluble components from the aqueous solution absorbed in the concentration agent with a lipophilic solvent, the improvement which comprises employing as the concentration agent a flowable silica gel of kieselguhr or a mixture thereof, having an average particle size of 0.05 to 1.0 mm., an average pore volume of 0.2 to 3 ml./g. and a specific surface to 0.2 to 50 m^2/g., and said extracting is conducted without substantial simultaneous desorption of the water of said absorbed aqueous solution, said lipophilic solvent-soluble components being at least one analgesic, sedative, hypnotic, anti-epileptic, psychopharmaceutical, sympathicomimetic, anti-histamine, narcotic, alkaloid, antibiotic, lipid, triglyceride, fatty acid, steroid or porphyrin.

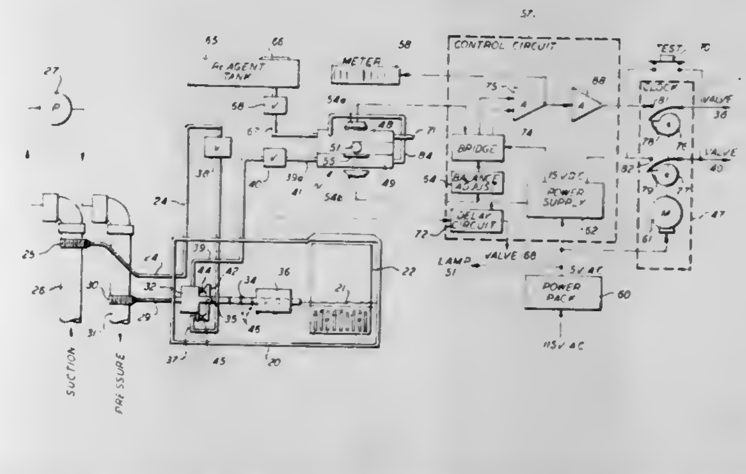
4,056,469
PURIFICATION OF WASTE WATER FROM HYDRAZINE PRODUCTION
Kurt-Wilhelm Eichenhofer, Leverkusen, and Reinhard Schliebs, Cologne, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany
Filed June 15, 1976, Ser. No. 696,253
Claims priority, application Germany, July 3, 1975, 2529647
Int. Cl.[2] C02C *5/04*
U.S. Cl. 210—62 **9 Claims**



1. A process for the purification of waste water produced in hydrazine production by the oxidation of ammonia or amine with an oxidizing agent in the presence of an aldehyde or ketone, such waste water containing small amounts of hydrazine and organic hydrazine derivatives, comprising intensively mixing the waste water with chlorine or a hypochlorite at a temperature of about 10° C to 110° C and a pH of about 5 to 10 until the treated waste water reaches a redox potential to platinum, relative to Ag/AgCl, of about −400 mV to +800 mV.

4,056,470
AUTOMATIC CHLORINATOR
Anthony P. Carpenter, Sauquoit, N.Y., assignor to Mohawk Video Systems Corporation, Utica, N.Y.
Filed Aug. 23, 1976, Ser. No. 716,465
Int. Cl.[2] E04H *3/16;* **B01D** *11/02*
U.S. Cl. 210—94 **5 Claims**

1. An automatic chlorinator for a swimming pool having a water circulating system including a pump comprising, in combination, a reservoir for storing a chlorine saturated water solution, a dual chambered sample vial having a light source therein, conduit means operably connecting the high pressure side of the pump with the sample vial for introducing pool water into both chambers thereof, means for introducing a metered amount of reagent into one only of the chambers for mixing with the pool water therein, said means for introducing a metered amount of reagent including a reservoir for the reagent, conduit means connecting said reservoir with said one sample vial chamber, and a solenoid valve is said conduit means, a spectral filter for the other of said chambers, a photocell for each chamber, the light source operating to direct light rays onto the photocell for each chamber after passing through its contents and said filter, a clock assembly, normally closed valve means in the conduit means connecting the pump with the sample vial, the clock assembly being operable at regular intervals to open the valve means whereby pool water is introduced into the sample vial chambers, means controlled by the valve means for actuating the reagent introducing means, said means for actuating the reagent introducing means including a delay circuit forming a part of the control circuit, said delay circuit operating to energize the solenoid valve that forms a

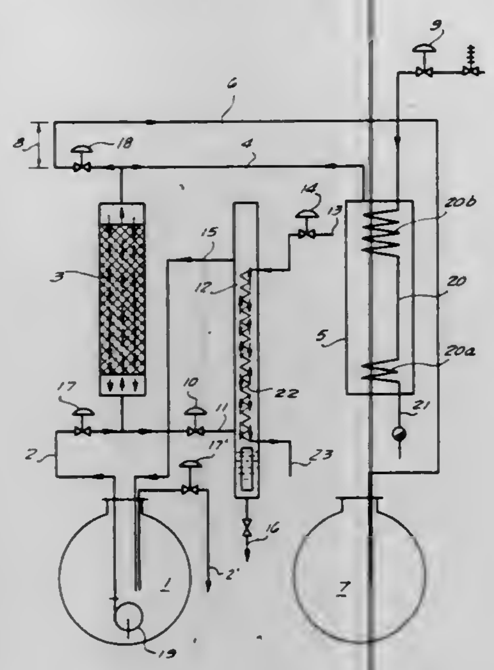


part of the reagent introducing means when the valve means tha permits pool water to be introduced into the sample vial chambers de-energizes, the delay circuit including a series connected capacitor and resistor for controlling the time interval that the reagent solenoid valve remains energized, a control circuit for comparing the output signals of the photocells to determine whether the residual chlorine in the pool water is or is not below a predetermined desired level, the control circuit including means for providing an output signal if the residual chlorine is below the predetermined desired level, conduit means operably connecting the reservoir to the low pressure side of the pump, and normally closed valve means in the last-named conduit means openable by said last-named output signal to permit chlorine saturated solution to flow from the reservoir to the pool.

4,056,471
ADSORPTION ARRANGEMENT
Paul Fischer, Regensdorf, and Edward Wisz, Kaiseraugst, both of Switzerland, assignors to Chemische Fabrik Uetikon, Uetikon, Switzerland
Filed Oct. 9, 1973, Ser. No. 404,603
Claims priority, application Switzerland, Oct. 13, 1972, 14984/72
Int. Cl.[2] B01D *35/18*
U.S. Cl. 210—186 **1 Claim**

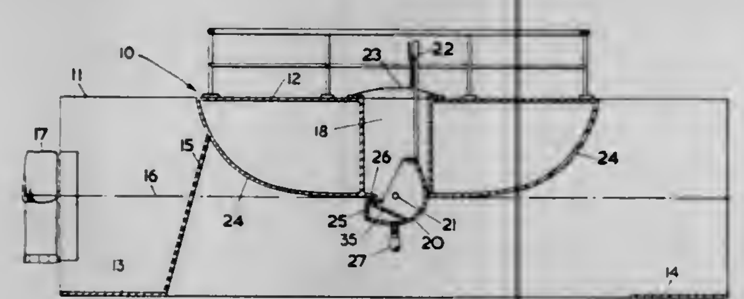
1. An arrangement for the adsorptive purification of fluids and for the regeneration of the adsorption medium, comprising an adsorption agent; means for contacting a fluid which is convertible between a liquid and a gaseous state with said adsorption agent while said fluid is in one of said states so as to permit impurities from said fluid to be adsorbed and retained by said adsorption agent; and means for converting a portion of the purified fluid from said one state to the other of said states, said converting means and said adsorption agent being in communication during adsorption and conversion thereby permitting said portion of said purified fluid to flow from said adsorption agent to said converting means during the adsorption of impurities from said fluid for conversion of said portion of said purified fluid, and permitting said portion of said purified fluid to flow from said converting means to said adsorption agent

subsequent to said conversion for the removal of adsorbed impurities from and regeneration of said adsorption agent by



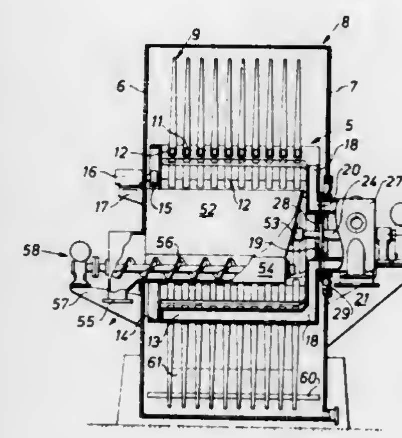
said portion of said purified fluid, wherein said adsorption agent is accommodated in said converting means.

4,056,472
OIL RECOVERY APPARATUS
Raymond Geoffrey Teasdale, Waterlooville, England, assignor to National Research Development Corporation, London, England
Filed Mar. 12, 1976, Ser. No. 666,321
Claims priority, application United Kingdom, Mar. 13, 1975, 10602/75; June 18, 1975, 26022/75
Int. Cl.² E02B *15/04*
U.S. Cl. 210—242 S **12 Claims**



1. Oil recovery apparatus for collecting oil floating on the surface of a body of water, said apparatus comprising a vessel having spaced apart longitudinally extending hulls connected by a bridge structure located between the hulls and having a lower surface inclined downwardly from the front of the vessel toward its rear, the rear edge of said surface being located approximately at the mid-point of the vessel and on its load water line, oil collection means comprising a receptacle having a front wall forming a weir plate member over which oil may enter the receptacle, side walls and a closed bottom, said receptacle being mounted between said hulls in the region of the center of buoyancy of the vessel and being so constructed and arranged that the front wall thereof is located adjacent the rear edge of said bridge structure, means for removing oil from said receptacle, said means comprising an oil suction evacuation conduit, a baffle plate arranged substantially horizontally within said receptacle, spaced above the bottom thereof and having flow equalising slots therein, an open end of said conduit being located adjacent the mid-point of said baffle plate on one side thereof in fluid communication with the space within the receptacle on the other side of said baffle plate via said flow equalising slots, said slots being located in said baffle plate on opposite sides of said conduit, increasing in width toward the opposite ends of said plate and having a total open area substantially equal to that of said conduit open end, the pump means for applying suction to the opposite end of said conduit for removing liquid from said receptacle.

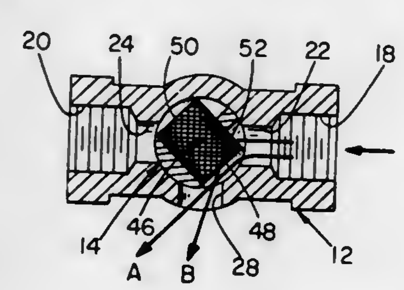
4,056,473
ROTARY FILTER FOR CONCENTRATING FIBER SUSPENSIONS
Bjarne Ivar Nilsson, Takan P1 2372 B, 460 64 Frandefors, Sweden
Filed May 25, 1976, Ser. No. 690,045
Int. Cl.² B01D *33/28*
U.S. Cl. 210—331 **6 Claims**



1. In a rotary filter for concentrating fibre suspension and of the type comprising a plurality of annular disks each composed of sector-shaped filter boxes and mounted parallel to each other and in spaced relationship on a common shaft which is journalled in a vessel for containing the liquid to be filtered, means for rotating the shaft, each of said filter boxes having at least two opposite walls made of filter cloth, and an outlet opening for filtrate at the inner end of each filter box, said outlet opening communicating with a longitudinal outlet tube in the shaft, the improvement wherein:

said shaft comprises a drum having a lattice-shaped cylindrical wall, said longitudinal outlet tubes being peripherally spaced about and partially forming said cylindrical wall, and further comprising a collecting hopper positioned within said drum, said hopper extending through an open end of said drum and being supported by a stationary support outside said drum, said hopper having an inlet opening facing upwardly and positioned within the uppermost portion of the interior of said drum, said inlet opening extending along all filter disks carried by said drum to receive concentrated pulp falling down through the lattice-shaped drum wall from those filter surfaces which are at their uppermost positions above the liquid level within said vessel during the rotation of said drum.

4,056,474
STRAINING VALVES
William N. Snouffer, 111 Buena Vista Way, Chapel Hill, N.C. 27514
Filed Apr. 19, 1976, Ser. No. 678,170
Int. Cl.² B01D *35/02*
U.S. Cl. 210—390 **7 Claims**



1. A straining valve comprising:

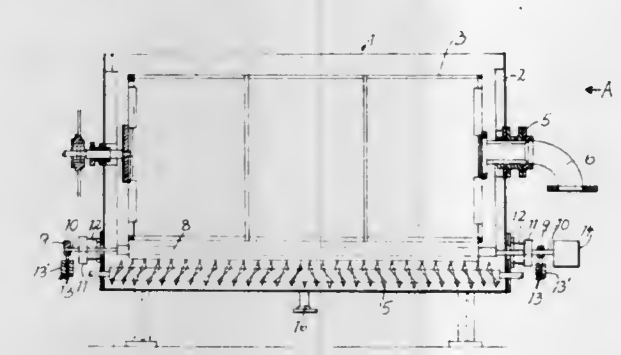
a body having an inlet, an outlet, a chamber for accommodating a valve plug, said chamber being between and communicating with said inlet and outlet, and a flush port between said inlet and outlet and communicating with said chamber,

a valve plug seated in said chamber and having an axis of rotation, said plug having a plug flow passage therethrough directed transverse of said axis, said plug flow passage having first and second openings at the ends of said passage, said openings respectively aligning with said inlet and outlet for permitting fluid to flow from inlet to outlet when said plug is rotated to a first, valve-open position, and said plug passage having a third opening therefrom through the wall of said plug between said first and second openings, said first opening being large enough to communicate with both said inlet and said flush port when said plug is rotated to a second self-cleaning position, in which position said third opening communicates with said inlet, and

a first filter area positioned in said first opening, and a second filter area positioned in said third opening,

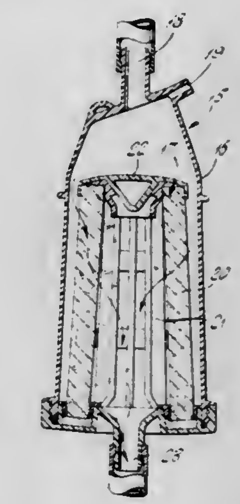
wherein said first filter area filters fluid passing from inlet to outlet in said first, valve-open position, and in said second position part of the fluid from said inlet flows across said first filter area and then out said flush port, to clean said first filter area, and part of the fluid from said inlet passes through said second filter area and is filtered as it passes therethrough, then passes into said plug flow passage, and finally passes out through said first filter area and flush port, to backflush and thereby to further clean the first filter area.

4,056,475
PULP CATCHER
Hanslothar Sander; Siegfried Matusch, and Uwe Hemminghaus, all of Braunschweig, Germany, assignors to Braunschweigische Maschinenbauanstalt, Braunschweig, Germany
Filed July 21, 1972, Ser. No. 273,855
Claims priority, application Germany, July 23, 1971, 2136850
Int. Cl.² B01D *33/06*
U.S. Cl. 210—402 **6 Claims**



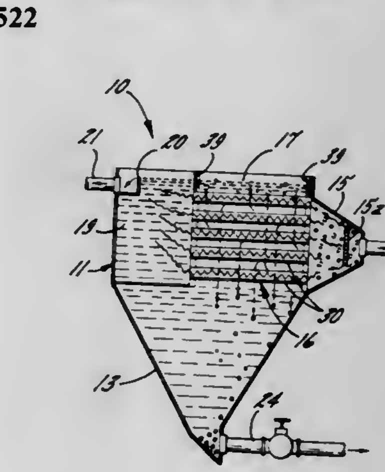
1. A strainer apparatus comprising a housing, straining drum means having a rotational axis, means rotatably supporting said straining drum means in said housing, means connected to said housing to supply material to be strained into said housing, further means also connected to said housing to remove separated material and liquid from said housing, said further means being arranged to maintain a liquid level in said housing, rotatable brush roller means including shaft means located in said housing below said liquid level, sealing means in said housing below said liquid level, said shaft means having ends extending through said sealing means out of said housing, bearing means movably supported outside said housing for rotatably supporting said shaft ends, biasing means operatively connected to said bearing means to urge said bearing means radially toward said rotational axis, and compensating means operatively interconnecting said sealing means and said housing.

4,056,476
BLOOD FILTER MEDIA
Herman Charles Mouwen, Ventura, Calif.; William Lauer, Madison, and Steven Louis Weinberg, East Brunswick, both of N.J., assignors to Johnson & Johnson, New Brunswick, N.J. and Purolator, Inc., Del.
Continuation-in-part of Ser. No. 553,703, Feb. 27, 1975, abandoned. This application Sept. 2, 1976, Ser. No. 696,256
Int. Cl.² B01D *25/06*
U.S. Cl. 210—446 **2 Claims**



1. In a unit for filtering blood, the improvement comprising an uncalendered, unbonded, woven fabric filter media having a nominal pore size rating of 20 microns, a pore size distribution range of from 17 microns to 23 microns, and woven with monofilament yarns having a yarn diameter of from 30 microns to 36 microns, said media being woven in a two-up and two-down twill weave, whereby the media is stable and retains its nominal pore size rating and pore size distribution range during use.

4,056,477
SEPARATING APPARATUS FOR CLARIFYING LIQUID
Richard B. Ravitts, Rockford, Ill., assignor to Riga, Inc., Rockford, Ill.
Filed June 21, 1976, Ser. No. 697,929
Int. Cl.² B01D *43/00*
U.S. Cl. 210—522 **5 Claims**



1. Apparatus for separating suspended settleable and flotable substance from liquid, said apparatus comprising a vessel having an upstream inlet for receiving a substantially horizontal flow of said liquid and having a downstream outlet for discharging said liquid, a separator located in said vessel between said inlet and outlet, said separator having an upstream portion defined by a series of at least first, second and third substantially vertical upstream baffles spaced substantially horizontally from one another across the path of the incoming liquid, said separator having a downstream portion defined by a series of at least first, second and third substantially vertical downstream baffles spaced substantially horizontally from one another and alined with said first, second and third upstream baffles, respectively, the space alined with and located be-

tween said first baffles defining a first channel, the space alined with and located between said second baffles defining a second channel, and the space alined with and located between said third baffles defining a third channel, each of said channels having the same width as its respective baffles and being open across its entire width and along its entire height, said upstream baffles deflecting the incoming flow of liquid into the space between said first and second upstream baffles and into the space between said second and third upstream baffles and preventing any substantial downstream flow into said channels whereby the liquid in said channels is substantially still, said separator further including a first row of vertically spaced and parallel vanes having upstream end portions extending between said first and second upstream baffles and secured to one of the latter baffles, the vanes of said first row having downstream end portions extending between said first and second downstream baffles and secured to one of the latter baffles, said separator further including a second row of vertically spaced and parallel vanes having upstream end portions extending between said second and third upstream baffles and secured to one of the latter baffles, the vanes of said second row having downstream end portions extending between said second and third downstream baffles and secured to one of the latter baffles, the vanes of each of said rows sloping downwardly upon progressing away from said second baffles whereby suspended flotable substance in the liquid flowing horizontally downstream within the spaces between said vanes rise into contact with the undersides of said vanes and are directed upwardly and laterally into said second still channel while the suspended settleable substance in such liquid sink into contact with the upper sides of said vanes and are directed downwardly and laterally by the vanes of said first row into said first still channel and by the vanes of said second row into said third still channel, the vanes of said first row all having lower edges disposed in a common vertical plane coinciding with one side of said first still channel and all having upper edges disposed in a common vertical plane coinciding with the adjacent side of said second still channel, and the vanes of said second row all having upper edges disposed in a common vertical plane coinciding with the other side of said second still channel and all having lower edges disposed in a common vertical plane coinciding with one side of said third still channel.

4,056,478
BEARING MATERIAL EMPLOYING FRANGIBLE MICROCAPSULES CONTAINING LUBRICANT
Alfred J. Capelli, Palos Verdes Peninsula, Calif., assignor to Sargent Industries, Inc., Los Angeles, Calif.
Division of Ser. No. 403,453, Oct. 4, 1973, Pat. No. 3,950,047. This application Jan. 15, 1976, Ser. No. 649,528
Int. Cl.² C10M *5/00, 7/00;* **F16C** *27/00*
U.S. Cl. 252—12.4 **13 Claims**

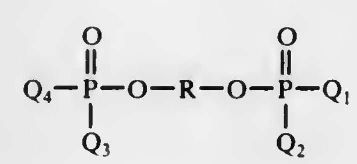
1. A bearing material engagable with a member comprising:
a plurality of frangible microcapsules;
a lubricant in said microcapsules and having properties of being released from the microcapsules upon the breaking of the capsules;
a porous body;
said microcapsules being substantially uniformly distributed through at least a portion of said body and being mechanically bonded in the pores of the porous body;
at least said portion of said body at least partially defining a wear surface engagable with the member;
the frangible capsules adjacent said wear surface being breakable upon forcible engagement of the wear surface and the member whereby the lubricant in such broken capsules is released to lubricate said wear surface;
said body including a binder forming a matrix, said matrix defining at least a portion of said wear surface, said capsules being substantially uniformly distributed throughout said matrix; and
said body including a fabric backing member defining the pores for mechanically bonding the microcapsules relative to the body.

4,056,479
MAGNESIUM CARBOXYLATE-SULFONATE COMPLEXES
Derek Redmore, Ballwin, and Frederick T. Welge, Webster Groves, both of Mo., assignors to Petrolite Corporation, St. Louis, Mo.
Filed May 17, 1976, Ser. No. 686,707
Int. Cl.² C10M *3/18, 5/14, 7/20;* **C10L** *1/32*
U.S. Cl. 252—18 **2 Claims**

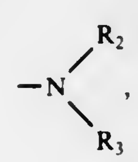
1. A process of preparing a stable dispersion of a basic, magnesium-containing, inorganic compound having a magnesium content of about 12.5% to about 14.6% which comprises (a) admixing (1) a glycol ether solution of an oil-soluble magnesium alkoxide-carbonate complex, said complex having been prepared from a glycol ether having not more than 8 carbon atoms, (2) an oil-soluble sulfonate, (3) a carboxylate- and/or phenate dispersing agent, (4) a volatile carrier and (5) water in excess of the stoichometric requirement for hydrolysis of said magnesium-alkoxide-carbonate complex,
b. hydrolyzing the magnesium-alkoxide-carbonate complex to an oil-soluble magnesium-containing inorganic compound, at reflux temperature for a period of about 1 to 2 hours, and then
c. removing the volatile carrier to the desired viscosity,
d. said process being characterized further in that the magnesium-alkoxide-carbonate complex of step (a) is prepared by a process comprising
1. reacting magnesium with a glycol ether having not more than 8 carbon atoms to form the magnesium alkoxide; and
2. reacting the magnesium alkoxide with from 0.5 to about 1.5 mols of carbon dioxide per mole of said magnesium alkoxide to form a magnesium-alkoxide-carbonate complex.
2. The product obtained by the process of claim 1.

4,056,480
HYDRAULIC FLUIDS
John F. Herber, St. Louis, Mo., assignor to Monsanto Company, St. Louis, Mo.
Filed June 10, 1975, Ser. No. 585,636
Int. Cl.² C10M *3/40, 3/38*
U.S. Cl. 252—78.5 **4 Claims**

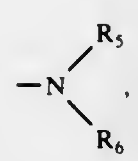
1. A method of transmitting force from one point to another utilizing a hydraulic fluid as the force transmitting medium, the improvement which comprises utilizing as said force transmitting medium at least one compound represented by the structure



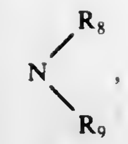
where Q_1 is —O—R_1 or



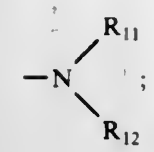
Q_2 is —O—R_4 or



Q_3 is —O—R_7 or



Q_4 is —O—R_{10} or



R is nonphenolic alkylaryl, R containing from 1 to 16 carbon atoms; provided that the —O—R—O—portion of the structure is non-phenolic; R_1, R_2, R_3, R_4, R_5, R_6, R_7, R_8, R_9, R_{10}, R_{11} and R_{12} each contain from 1-12 carbons and are individually selected from the group consisting of linear alkyl, branched alkyl, cyclic alkyl, nonphenolic alkylaryl, or substituted cyclic alkyl and can be the same or different in any combination.

4,056,481
DETERGENT COMPOSITION
John Robert Tate, Whitley Bay, England, assignor to The Procter & Gamble Company, Cincinnati, Ohio
Filed Jan. 9, 1975, Ser. No. 539,756
Claims priority, application United Kingdom, Jan. 11, 1974, 1370/74
Int. Cl.² B02D *19/04;* **C11D** *3/16, 3/18*
U.S. Cl. 252—140 **11 Claims**

1. A granular built detergent composition which comprises:
a. from about 2% to about 40% by weight of an organic synthetic detergent selected from the group consisting of nonionic, zwitterionic, and anionic detergents and mixtures thereof;
b. from about 0.02% to about 5% by weight of a substantially water-insoluble microcrystalline wax having a melting point in the range from 35° C to 115° C and saponification value less than 100 or mixtures thereof; and
c. from about 10% to about 90% by weight of detergency building salt or mixtures thereof; said wax in intimate admixture with the said organic detergent.

4,056,482
METHOD FOR PREPARING AQUEOUS, RADIOACTIVE WASTE SOLUTIONS FROM NUCLEAR PLANTS FOR SOLIDIFICATION
Helmut Schmieder, Karlsruhe, and Reinhard Kroebel, Leopoldshafen, both of Germany, assignors to Gesellschaft fur Kernforschung m.b.H., Karlsruhe, Germany
Filed Oct. 20, 1975, Ser. No. 624,108
Claims priority, application Germany, Oct. 18, 1974, 2449588
Int. Cl.² G21F *9/04*
U.S. Cl. 252—301.1 W **8 Claims**

5. A method for preparing aqueous, radioactive waste solutions, from reprocessing plants for spent nuclear fuel and/or breeder materials and other nuclear plants, for non-contaminating solidification and/or removal of such solutions, in which the total quantity of the various inorganic and organic substances is reduced by the destruction of nitric acid, nitrates and nitrites and formation of a waste gas mixture which is practically free of higher nitrous oxides, said solution containing at least one substance selected from the group consisting of nitric acid, nitrate, and nitrite, and at least one substance selected from the group consisting of hydrazine, hydroxylamine, oxalic acid, oxalates, tartaric acid and tartrates comprising subjecting the radioactive waste solution to an electrolysis current in an electrolysis cell that does not contain a diaphragm at such current densities at the anode and at the cathode that, in one process step, those substances selected from the group consisting of hydrazine, hydroxylamine, oxalic acid, oxalates, tartaric acid and tartrates that are present are oxidized at the anode and those substances selected from the group consisting of nitric acid, nitrates and nitrites that are present are reduced at the cathode.

4,056,483
PROCESS FOR PRODUCING SYNTHESIS GASES
Gerhard Baron, Hofheim; Herbert Bierbach; Carl Hafke, both of Frankfurt am Main, and Günter Pockrandt, Bad Homburg, all of Germany, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main and Ruhrgas Aktiengesellschaft, Essen, both of, Germany
Filed July 12, 1976, Ser. No. 704,258
Claims priority, application Germany, July 18, 1975, 2532197
Int. Cl.² C01B *2/02;* **C10J** *3/00*
U.S. Cl. 252—373 **13 Claims**

1. The production of a synthesis gas comprising carbon monoxide and hydrogen, by a process comprising gasifying coal in a first reaction zone under a pressure of about 5-150 bars in counterflow to oxygen and water vapor to produce a water vapor-containing raw gas having a temperature of about 350° - 700° C, feeding said raw gas without cooling same, into a second reaction zone and reacting it non-catalytically with oxygen under a pressure of about 5-150 bars, said second reaction zone containing a bed of heat-resisting inert granular material having a particle size of about 3-80 mm, withdrawing from said second reaction zone an intermediate product gas having a temperature between about 800° C and 1400° C, cooling the intermediate product gas and freeing it from sulfur compounds.

4,056,484
STABLE BLOOD PLASMA, PROCESS FOR PREPARING IT AND ITS USE AS COMPARATIVE PLASMA IN COAGULATION TESTS
Norbert Heimburger; Axel Sieber, both of Marburg, Lahn, and Horst Schwinn, Marburg-Michelbach, all of Germany, assignors to Behringwerke Aktiengesellschaft, Marburg, Lahn, Germany
Filed Dec. 29, 1975, Ser. No. 644,519
Claims priority, application Germany, Dec. 31, 1974, 2461969
Int. Cl.² G01N *33/16*
U.S. Cl. 252—408 **4 Claims**

1. Lyophilized blood plasma containing an anti-coagulating agent and present in a sealed container under a protective gas containing at least 5 percent of carbon dioxide.

4,056,485
STABLE COLORED REFERENCE STANDARD FOR ENZYMATIC DETERMINATIONS
Paul K. Adolf, Easton, Pa., and James J. Carroll, East Hanover, N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.
Continuation-in-part of Ser. No. 512,261, Oct. 4, 1974, abandoned. This application Feb. 4, 1976, Ser. No. 655,180
Int. Cl.² C09K *3/00;* **G01N** *31/06, 31/22, 31/14*
U.S. Cl. 252—408 **15 Claims**

1. A colored reference standard for use in diagnostic determinations involving enzymatic reactions in which 1-(p-iodophenyl)-5-(p-nitrophenyl)-3-phenylformazan is produced, which comprises an aqueous solution of:
A. From about 0.001% to about 0.020% by weight, based on the weight of the total solution, of 1-(p-iodophenyl)-5-(p-nitrophenyl)-3-phenylformazan;
B. From about 0.01% to about 0.10% by weight of serum albumin;
C. From about 1.76% to about 10% by weight of solvent selected from the group consisting of N,N'-dimethylformamide and dimethylsulfoxide; and
D. From about 1.45% to about 10% by weight of isopropyl alcohol;

said aqueous color standard solution having an absorbence maximum at 500 nanometers.

7. A lyophilized colored reference standard for use in diagnostic determinations involving enzymatic reactions in which 1-(p-iodophenyl)-5-(p-nitrophenyl)-3-phenylformazan is produced, obtained by a process which comprises:

A. Completely dissolving from about 0.001% to about 0.020% by weight of 1-(p-iodophenyl)-5-(p-nitrophenyl)-3-phenylformazan, in about 1.76% to 10% by weight of solvent selected from the group consisting of N,N'-dimethylformamide and dimethylsulfoxide;

B. Adding from about 1.45% to about 10% by weight of isopropyl alcohol to (A) slowly, and mixing thoroughly;

C. Dissolving from about 0.01% to about 0.1.0% by weight of serum albumin and from about 5% to about 20% by weight of inert bulking agent in water;

D. Adding solution (B) to solution (C) slowly, with stirring; and

E. Lyophilizing the solution of (D);

said percentages by weight being based on the weight of the total solution, prior to lyophilization.

4,056,486

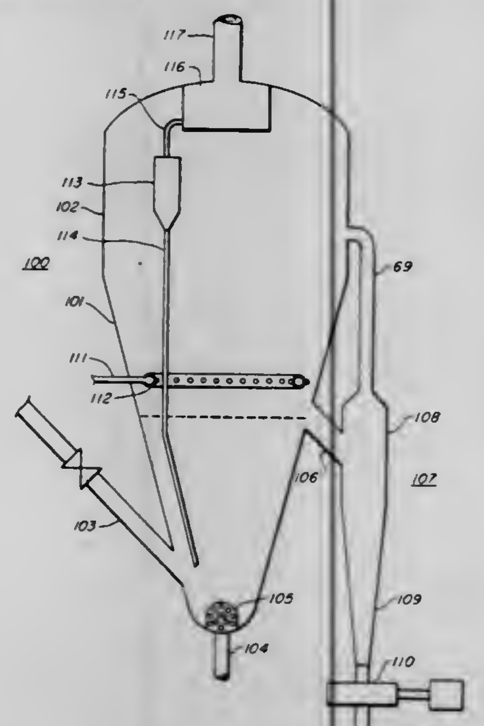
FLUIDIZED CATALYTIC CRACKING REGENERATION PROCESS

Dorrance P. Bunn, Jr.; John C. Strickland, and Douglas H. May, Jr., all of Houston, Tex., assignors to Texaco Inc., New York, N.Y.

Filed May 7, 1976, Ser. No. 684,439

Int. Cl.² B01J *29/38, 21/20;* **C10G** *11/18*

U.S. Cl. 252—417 **8 Claims**



1. In a fluidized cracking catalyst regeneration process wherein a spent, coke-contaminated cracking catalyst is contacted with a molecular oxygen containing regeneration gas, in a single regeneration vessel, at catalyst regeneration conditions, for burning substantially all the coke from said spent catalyst, producing a spent regeneration gas comprising carbon dioxide and carbon monoxide and substantially depleted in oxygen, and a hot regenerated catalyst substantially reduced in residual carbon suitable for cracking a hydrocarbon charge; the improvement which comprises:

a. contacting, in the bottom of a frustoconical first regeneration zone, having a closed bottom and an open top spent catalyst with an amount of molecular oxygen containing primary regeneration gas sufficient to provide about the stoichometric amount of oxygen for complete combustion of coke under turbulent flow conditions for forming an intimate mixture of spent catalyst and primary regeneration gas;

b. flowing said mixture of spent catalyst and primary regeneration gas upward, at catalyst regeneration conditions, at superficial vapor velocities of about 5–8 ft/sec near the bottom decreasing to about 2.5–4.5 ft/sec at the top of said first regeneration zone, for forming a fluidized dense phase bed of catalyst having an upper surface within said first regeneration zone;

c. withdrawing hot, regenerated catalyst from the upper portion of said fluidized dense phase catalyst bed for use in cracking hydrocarbon charge stock;

d. disengaging spent regeneration gas containing entrained catalyst from the upper surface of said fluidized dense phase catalyst bed;

e. flowing said spent regeneration gas and entrained catalyst from the open top of said first regeneration zone into the bottom of a frusto-conical second regeneration zone, having an open top and open bottom in open communication with the top of said first regeneration zone, at a superficial vapor velocity in the range of about 2.5–4.5 ft/sec at the bottom decreasing to about 1.0–2.2 ft/sec at the top of said second regeneration zone such that a major portion of the entrained catalyst returns under the influence of gravity to the upper surface of said fluidized dense phase catalyst bed, and a dilute phase of catalyst suspended in spent regeneration gas exits the top of said second regeneration zone;

f. radially distributing a molecular oxygen containing secondary regeneration gas into said second regeneration zone in an amount to provide the equivalent of about 1–10 percent of the oxygen in said primary regeneration gas for combusting substantially all the carbon monoxide in said spent regeneration gas to carbon dioxide;

g. separating, in a separation zone, said dilute phase into a hot catalyst fraction and a flue gas fraction essentially free of entrained catalyst;

h. venting said flue gas fraction from the regeneration process;

i. flowing said hot, separated catalyst fraction from the separation zone to the bottom of the first regeneration zone for contact with additional spent catalyst and primary regeneration gas.

4,056,487

VANADIUM PHOSPHORUS OXYGEN OXIDATION CATALYSTS USEFUL FOR PREPARING ANHYDRIDES FROM ALKANES

Ralph O. Kerr, Houston, Tex., assignor to Petro-Tex Chemical Corporation, Houston, Tex.

Filed Oct. 2, 1975, Ser. No. 618,959

Int. Cl.² B01J *27/14*

U.S. Cl. 252—435 **12 Claims**

1. A catalyst composition for use in the partial oxidation to C_4 to C_{10} alkane hydrocarbons to anhydrides consisting of vanadium, phosphorus, oxygen and a modifying component consisting of the elements Nb, Cu, Mo, Ni, Co and Cr or the elements Nb, Cu, Mo, Ni, Co and Cr and one or more of the elements selected from the group of Ce, Nd, Ba, Hf, U, Ru, Re, Li, or Mg, wherein the atomic ratio of vanadium:phosphorus:-modifying component is 1:0.90 to 1.3:0.005 to 0.4, respectively.

4,056,488

SYNTHETIC AMORPHOUS SILICAS OF PREDETERMINED PORE DISTRIBUTION, METHOD OF PRODUCING SAME

Thomas O. Mitchell, Trenton, and Darrell D. Whitehurst, Titusville, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

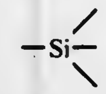
Division of Ser. No. 450,967, March 14, 1974, Pat. No. 3,983,055. This application Dec. 8, 1975, Ser. No. 638,866

Int. Cl.² B01J *21/08, 29/00*

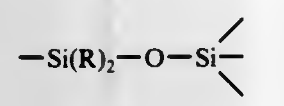
U.S. Cl. 252—449 **15 Claims**

1. A synthetic amorphous solid having shape selective properties prepared by the steps of hydrolyzing and polymerizing

in the presence of water a silane having the formula $R(Si)X_3$ wherein R is a nonhydrolyzable organic group, X is a hydrolyzable group and (Si) is selected from the group consisting of



and



and calcining the polymerzied product.

13. The solid of claim 3 wherein X is alkoxy of from 1 to 10 carbon atoms.

4,056,489

HIGH TEMPERATURE STABLE CATALYST COMPOSITION AND METHOD FOR ITS PREPARATION

Saul G. Hindin, Mendham, and George R. Pond, Elizabeth, both of N.J., assignors to Engelhard Minerals & Chemicals Corporation, Iselin, N.J.

Division of Ser. No. 423,093, Dec. 10, 1973, Pat. No. 3,966,391. This application Apr. 5, 1976, Ser. No. 673,683

Int. Cl.² B01J *21/04, 23/10, 23/64*

U.S. Cl. 252—462 **21 Claims**

1. A catalyst composition consisting essentially of (a) a catalytically-active calcined composite of alumina, a rare earth metal oxide and a mixture of two metal oxide components wherein the first metal oxide component is selected from the group consisting of an oxide of chromium, tungsten and mixtures thereof and the second oxide component is selected from the group consisting of an oxide of calcium, strontium, barium, silicon, tin and mixtures thereof, said composite having been formed by calcination at a temperature of at least 500° C. and being characterized by a surface area of at least 20 m²/g when heated for 2 hours at 1200° C.; and (b) a catalytically-effective amount of a platinum group metal incorporated in said calcined composite after calcination of said composite at a temperature of at least 500° C.

4,056,490

DEHYDROGENATION PROCESS AND CATALYST

Harold E. Manning, Houston, Tex., assignor to Petro-Tex Chemical Corporation, Houston, Tex.

Continuation of Ser. No. 477,401, June 7, 1974, abandoned. This application Nov. 21, 1975, Ser. No. 634,207

Int. Cl.² B01J *23/00, 27/06;* **C01G** *37/14*

U.S. Cl. 252—468 **17 Claims**

1. In a process for the preparation of magnesium chromite for use in cyclic dehydrogenation comprising the steps of intimately mixing precursors of magnesium chromite and heating said precursors to a temperature in the range of 550° to 900° C said precursors being nitrates, hydroxides, hydrates, oxalates, carbonates, acetates, formates, halides or oxides, wherein the improvement comprises forming said chromite in an essentially inert atmosphere of nitrogen, helium, neon, argon, krypton, xenon, radon or mixtures thereof, which may contain up to about 3 mole percent of a reactive gas as determined in a static atmosphere.

4,056,491

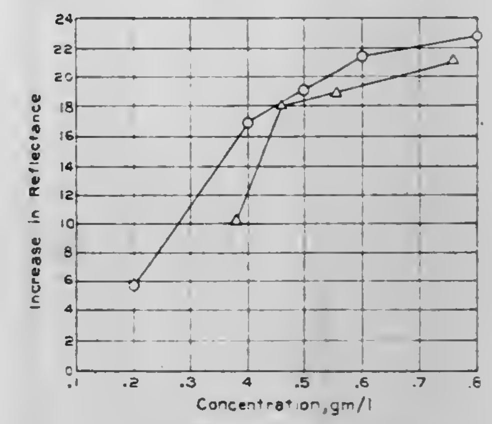
DETERGENT COMPOSITIONS OF TRISULFOSUCCINIC ACID

Donald R. Nielsen, Corpus Christi, Tex., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Division of Ser. No. 494,669, Aug. 5, 1974, Pat. No. 3,991,104. This application July 30, 1976, Ser. No. 710,056

Int. Cl.² C11D *1/22, 3/34*

U.S. Cl. 252—557 **9 Claims**

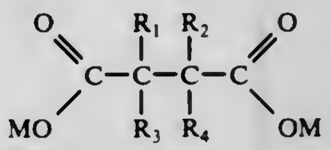


O = STPP
Δ = PENTASODIUM TRISULFOSUCCINATE

1. A detergent composition consisting essentially of:

a. 100 parts by weight of a surfactant selected from the group consisting of anionic, cationic, and non-ionic synthetic surfactants; and

b. 10 to 1,000 parts by weight of trisulfosuccinic acid or its salts described by the formula:



where one of R_1, R_2, R_3 or R_4 is a hydrogen ion and the remainder are SO_3M; and where M may be the same or different cation selected from hydrogen or an alkali metal.

4,056,492

PROCESS FOR THE PRODUCTION OF A BODIED SILICONE RESIN WITHOUT THE USE OF A CATALYST

Duane F. Merrill, Ballston Spa, N.Y., assignor to General Electric Company, Waterford, N.Y.

Filed June 24, 1976, Ser. No. 699,735

Int. Cl.² C08L *91/00*

U.S. Cl. 260—18 S **13 Claims**

12. An encapsulating film composed of a silicone resin having a viscosity in the range of 40,000 to 100,000 centipoise which is produced by a process comprising (a) adding an organohalosilane to a homogeneous hydrolysis mixture where there is present per part of organohalosilane from at least 1.7 to 10 parts of water and from at least 0.2 to 5 parts of acetone and from 0 to about 1 mole of an aliphatic monohydric alcohol having from 1 to 8 carbon atoms per mole of halogen attached to the silicone of the organohalosilane to produce a silicone resin hydrolyzate; (b) separating the acid/water layer from the silicone resin hydrolyzate; (c) adding to the silicone resin hydrolyzate at least 5% by weight of water based on the silicone resin hydrolyzate; (d) heating the silicone resin hydrolyzate gradually for a period of time of 1 to 8 hours to at least 130° C; and (e) removing the water and acetone from the silicone resin hydrolyzate to leave the silicone resin wherein organohalosilane is selected from the group consisting of (1) organotrihalosilane; (2) a mixture of organotrihalosilane and diorganodihalosilane; (3) a reaction product of an aliphatic monohydric alcohol having from 1 to 8 carbon atoms and a member selected from the class consisting of organotrihalosilane, and a mixture of organotrihalosilane and diorganodihalosilane, which reaction product can have substituted

an average of up to one alkoxy radical per halogen radical; (4) a mixture of the reaction product of (3) and a member selected from organotrihalosilane and diorganodihalosilane, and wherein the organo groups of said organohalosilane and the silicone resin are selected from the class consisting of monovalent hydrocarbon radicals, and halogenated monovalent hydrocarbon radicals.

13. The encapsulating film of claim 12 which is cured by the addition of 0.05% to 1% by weight based on the silicone resin of metal salt of a carboxylic acid, the metal being selected from the class consisting of lead to manganese in the periodic table, and heating the film above 200° C.

4,056,493

TRIMELLITIC ANHYDRIDE MODIFIED URETHANE ELECTROCOATING RESINS

Ivan H. Tsou, Bloomfield Hills, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Continuation-in-part of Ser. No. 316,320, Dec. 29, 1972, abandoned, which is a division of Ser. No. 75,748, Sept. 25, 1970, Pat. No. 3,709,846, which is a continuation-in-part of Ser. No. 733,187, April 24, 1968, abandoned, which is a continuation-in-part of Ser. No. 363,814, April 30, 1965, abandoned, and Ser. No. 734,825, April 24, 1968, abandoned. This application Mar. 4, 1974, Ser. No. 448,161

Int. Cl.[2] C08G *18/12*

U.S. Cl. 260—22 TN **1 Claim**

1. In a bath composition for electrodepositing paint on an anode and comprising on a pigment and particulate fillerfree basis an aqueous dispersion of a film-forming, polycarboxylic acid paint binder resin at least partially neutralized with water-soluble base, the improvement wherein said polycarboxylic acid paint binder resin is formedby:

a. reacting 1 molar part of glycerine with 1 molar part of an acyclic, olefinically unsaturated monocarboxylic fatty acid of about 18 carbon atoms at a temperature of about 230° C.
b. reacting the product of (a) with 2 molar parts of toluene diisocyanate at a temperature of about 75° C.,
c. reacting the product of (b) with 2 molar parts of diethylene glycol at a temperature of about 75° C., and
d. reacting the product of (c) with about 0.5 to about 2 molar parts of trimellitic anhydride at a temperature of about 165° C.

4,056,494

JOINT SUSPENSIONS OF MIXED PIGMENTATIONS ACHIEVED BY ACTIVE EFFECTS OF PLANT PHOSPHATIDES

Max Kronstein, Bronx, N.Y., and Joseph Eichberg, Atlanta, Ga., assignors to American Lecithin Company, Atlanta, Ga.

Filed Mar. 7, 1975, Ser. No. 556,309

Int. Cl.[2] C09D *3/54, 3/64, 5/02*

U.S. Cl. 260—22 A **17 Claims**

1. The process of overcoming in a coating composition that includes a fluid vehicle which is compounded with a mixture of powdered or granular solid pigment components, said solid pigment components having different specific gravities, the tendency of said solid pigment components, upon storage, to separate from each other in accordance to their specific gravity, which comprises incorporating lecithin or a modification thereof, said modification having been obtained by hydroxylating or bleaching lecithin, into said coating composition containing said solid pigment components in an amount effective to significantly improve the storage stability of said solid pigment components in said coating composition, said effective amount of said lecithin, of said modification thereof, being 5.5 percent by weight, or more, based on the weight of said solid pigment components, said effective amount being more than the amount of said lecithin, or said modification thereof, required for the optimum wetting and dispersion of said solid components in said coating composition and said coating composition returns to the original color and state said coating composition originally had upon mixing or shaking of said coating composition after a storage period.

4,056,495

HIGH SOLID ALKYD RESIN COATING COMPOSITION CURABLE AT AMBIENT TEMPERATURE

Masahumi Kawamura; Wataru Takahashi, and Tadashi Watanabe, all of Hiratsuka, Japan, assignors to Kansai Paint Co., Ltd., Japan

Filed July 8, 1975, Ser. No. 593,955

Claims priority, application Japan, July 10, 1974, 49-78831; July 10, 1974, 49-78832

Int. Cl.[2] C09D *3/64, 3/66*

U.S. Cl. 260—22 CA **12 Claims**

1. A high solid coating composition curable at ambient temperatures and characterized by a solid content of at least 80% at 70 KU viscosity which comprises the mixture of:

I. 100 parts by weight of alkyd resin having an oil length of not less than 65%, resin acid value of not more than 7, Gardner-Holdt viscosity (25° C) of not more than Z and solid content of not less than 90% which is prepared by the reaction among (a) saturated aliphatic or aromatic polybasic acids or their acid anhydrides, (b) polyhydric alcohols, and (c) unsaturated vegetable oils or unsaturated vegetable oil fatty acids, and
II. 1 to 10 parts by weight of at least one aluminum alcoholate or chelate thereof.

4,056,496

HYDROGELS AND ARTICLES MADE THEREFROM

William L. Mancini, Framingham; Donald R. Korb, Boston, and Miguel F. Refojo, Lexington, all of Mass., assignors to Corneal Sciences, Inc., Burlington, Mass.

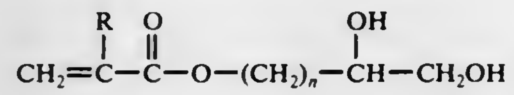
Continuation-in-part of Ser. No. 451,906, March 18, 1974, Pat. No. 3,957,362, which is a continuation-in-part of Ser. No. 294,019, Oct. 2, 1972, abandoned. This application May 13, 1976, Ser. No. 685,996

The portion of the term of this patent subsequent to May 18, 1993, has been disclaimed.

Int. Cl.[2] C08F *220/14;* **G02C** *7/04*

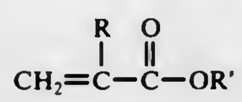
U.S. Cl. 260—29.6 TA **29 Claims**

1. A polymer formed by a free radical, bulk polymerization of a first hydrophilic monomer conforming to the formula:



where R is hydrogen or methyl or methyl and n is a whole integer having a value of from 0 to 4,

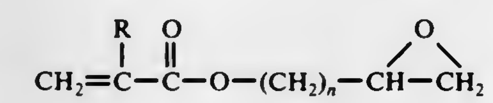
a second substantially water insoluble monomer conforming to the formula:



where R is as above described and R' is alkyl having from 1 to 6 carbon atoms,

the mole ratio of said first monomer to said second monomer varying between 1:3 and 20:1, and

a third substantially water insoluble monomer conforming to the formula



where R and n are as above defined,

the concentration of said third monomer varying between 0 and 30% by weight of the first monomer,

said polymer being insoluble in a member selected from the group of acetone, dioxane and mixtures thereof.

4,056,497

ACRYLIC ESTER COPOLYMERS CAPABLE OF BEING CROSS-LINKED

Rolf Reinecke, Wiesbaden; Karl Josef Rauterkus; Werner Schmieder, both of Kelkheim, Taunus, and Eleonore Lutz, Frankfurt am Main, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Continuation of Ser. No. 358,605, May 9, 1973, abandoned. This application Mar. 4, 1975, Ser. No. 555,137

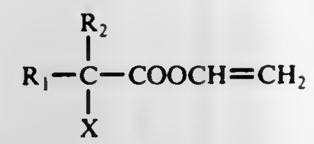
Claims priority, application Germany, May 15, 1972, 2223630

Int. Cl.[2] C08L *33/00, 31/00*

U.S. Cl. 260—29.6 TA **4 Claims**

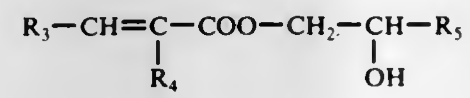
1. An aqueous dispersion of a cross-linkable acrylic ester copolymer, said copolymer consisting essentially of

a. 50 to 95% by weight of monomeric units derived from at least one acrylic acid ester and/or methacrylic acid ester of a saturated aliphatic alcohol having from 1 to 20 carbon atoms,
b. 0.5 to 25% by weight of monomeric units derived from at least one monomer selected from styrene, methyl methacrylate, acrylonitrile, methacrylonitrile, vinyl acetate, vinyl propionate, acrylic amide and methacrylic amide, said (b) monomer being different from said (a) monomer,
c. 0.5 to 8% by weight of monomeric units derived from an α-haloalkanecarboxylic acid vinyl ester of the formula



wherein R_1 and R_2 each is hydrogen or an alkyl radical having from 1 to 5 carbon atoms and X is fluorine, chlorine, bromine or iodine,

d. 0.5 to 5% by weight of monomeric units derived from at least one α, β-ethylenically unsaturated carboxylic acid having from 3 to 8 carbon atoms or a partial ester thereof with a saturated aliphatic alcohol having from 1 to 20 carbon atoms, and
e. 0.1 to 5% by weight of monomeric units derived from at least one monomer of the formula



wherein R_3 is hydrogen, a methyl group or the group —$COOR_6$, R_4 and R_5 each is hydrogen or a methyl group and R_6 is hydrogen or an alkyl group having from 1 to 12 carbon atoms.

4,056,498

PRODUCTION OF NOVEL RESINS AND THEIR USES IN PRINTING INK COMPOSITIONS

James J. Laurito, Coraopolis, Pa., assignor to Neville Chemical Company, Pittsburgh, Pa.

Filed Jan. 17, 1974, Ser. No. 434,270

Int. Cl.[2] C09F *1/04*

U.S. Cl. 260—23.7 C **15 Claims**

1. A dibasic acid-modified hydrocarbon/tall oil resin suitable for use in heat-set and gravure printing ink compositions which resin consists essentially of the reaction product of at least one ethylenically unsaturated lower aliphatic dicarboxylic acid or anhydride with a base resin consisting essentially of a polymerized mixture of: (a) a predominant amount of dicyclopentadiene; and lesser amounts of (b) a mixture consisting essentially of dimerized aliphatic cyclic and non-cyclic dienes of five carbons, and (c) tall oil; the dibasic acid-modified resin having Gardner-Holdt solution viscosities at about 25° C (bubble seconds) of from about 1.65 to about 9.0 (60% in 45 Kauri butanol gravure ink solvent) and from about 10 to about 1000 (50% in 31 Kauri butanol heat set ink solvent).

4,056,499

DEGRADABLE POLYMERIC COMPOSITION

Lynn J. Taylor, Haslett, Mich., assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed Dec. 8, 1971, Ser. No. 206,133

The portion of the term of this patent subsequent to Mar. 16, 1993, has been disclaimed.

Int. Cl.[2] C08J *3/20*

U.S. Cl. 260—23 H **18 Claims**

1. A process for degrading a polymeric composition, which process comprises reacting the polymeric material in the presence of a source of free radicals with a non-polymeric organic reagent R-X, wherein R is at least one aliphatic hydrocarbon group containing at least six carbon atoms and X is at least one polymeric material-degradation-sensitizing group, to produce said degradable polymeric composition, and subsequently exposing said composition to at least one natural environmental condition sufficient to degrade said composition.

4,056,500

AEROSOL-DISPENSED LATEX PAINT COMPOSITIONS

David Stern, Roslyn, N.Y., assignor to Martin Paint and Chemical Corporation, Jamaica, N.Y.

Continuation-in-part of Ser. No. 278,212, Aug. 7, 1972, abandoned, which is a continuation-in-part of Ser. No. 168,916, Aug. 4, 1971, abandoned. This application Jan. 20, 1975, Ser. No. 542,220

Int. Cl.[2] C08L *33/08, 31/04;* **B65D** *35/38*

U.S. Cl. 260—29.6 MN **9 Claims**

1. In a pressurized dispenser having a spray discharge nozzle controlled by a discharge valve and connected to a dip tube, the combination of an aqueous vinyl acetate-lower alkyl acrylate copolymer emulsion paint composition free of cellulosic bodying agents and having a pigment suspended therein, the composition having a viscosity of between 10 and 60 seconds measured on the No. 4 Ford cup (20 to 209 cps) at room temperature, and a solids content of 25 to 40% by weight, said dispenser having a relatively waterinsoluble propellant therein occupying the space above the paint composition and characterized by the capacity for discharging such composition in a spray without being materially dissolved in the composition whereby the discharged spray is substantially devoid of foaming, said propellant comprised predominantly of gaseous nitrogen under pressure.

4,056,501

CATIONIC STRUCTURED-PARTICLE LATEXES

Dale S. Gibbs, Midland, Mich.; Earl H. Wagener, Concord, Calif., and Ritchie A. Wessling, Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Apr. 21, 1975, Ser. No. 569,723

Int. Cl.[2] C08L *9/08*

U.S. Cl. 260—29.6 SQ **19 Claims**

1. A method for preparing a cationic structured-particle latex comprising the steps of reacting at a temperature from about 0° to about 80° C a water-stable, nonionic nucleophile which is capable of diffusing through aqueous media with a latex of copolymer particles having activated halogens bound to a thin layer of the copolymer at or near the particle surface; said nucleophile having a hetero atom as a center of nucleophilicity wherein each covalent bond of said hetero atom is to a carbon atom; said activated-halogens being present in an amount from about 0.01 to about 3.0 milliequivalents per gram of copolymer in the latex, with the proviso that the amount of activated-halogen bound to the thin layer at or near the particle surface is in the range of from about 0.4 to about 3.0 milliequivalents for each gram of polymer in the thin layer, whereby

pH independent cationic groups are chemically bound to the particles at or near the particle surface.

4,056,502

ABSORBENT ARTICLES MADE FROM CARBOXYLIC POLYELECTROLYTE SOLUTIONS CONTAINING BIS-OXAZOLINE CROSSLINKER AND METHODS FOR THEIR PREPARATION

James R. Gross, Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Filed Aug. 5, 1974, Ser. No. 494,440

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 17, 1976

Int. Cl.² C08F *20/06*

U.S. Cl. 260—29.6 N **13 Claims**

1. A solution useful to form water swellable articles of a carboxylic synthetic polyelectrolyte which comprises

1. a solvent consisting of water, or a mixture thereof with lower alcohols,
2. about 5 to about 60% by weight based on the amount of solvent of a carboxylic polyelectrolyte or mixtures thereof having free carboxylic acid groups, and
3. 0.05 to 5.0% by weight based on the polyelectrolyte of a bis-oxazoline or bis-imino-oxazolidino crosslinking agent reactive with carboxylic acid groups.

4,056,503

INCORPORATION OF MULTIFUNCTIONAL MONOMERS (PETA, TMPTA, AND HDODA) IN VINYL-ACRYLIC EMULSION POLYMERS

Thomas M. Powanda, Middlesex; Ralph F. Patella, South Plainfield; Joseph A. Vona, Westfield, and Charles A. DeFazio, Berkeley Heights, all of N.J., assignors to Celanese Corporation, New York, N.Y.

Filed Oct. 18, 1976, Ser. No. 733,632.

Int. Cl.² C08L *31/04*

U.S. Cl. 260—29.6 T **9 Claims**

1. A latex composition comprised of an emulsion polymer of vinyl acetate with from about 5% to about 50% by weight of alkyl acrylate or methacrylate based on the total weight of vinyl acetate and alkyl acrylate or methacrylate and from about 2% to about 10% by weight, based on the total weight of said polymer, of an acrylic or methacrylic acid ester of a polyol in which at least two hydroxyl groups are esterified.

4,056,504

POLYCARBONATE MOLDING COMPOSITIONS

Manfred Grundmeier; Rudolf Binsack, and Hugo Vernaleken, all of Krefeld, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Continuation-in-part of Ser. No. 599,259, July 25, 1975, abandoned. This application Jan. 7, 1976, Ser. No. 647,228

Claims priority, application Germany, Aug. 16, 1974, 2439342; July 19, 1975, 2532386

Int. Cl.² C08L *67/02, 69/00*

U.S. Cl. 260—37 PC **29 Claims**

1. Thermoplastic molding compositions comprising

a. high molecular aromatic polycarbonates based on diphenols,
b. about 10% by weight to 40% by weight based on the polycarbonate + glass fibers, of glass fibers, and
c. about 4% by weight to 0.5% by weight, based on the total mixture, of a polyalkylene glycol terephthalate,

or

a. high molecular aromatic polycarbonates based on diphenols
b. about 10% by weight to 40% by weight, based on the total mixture, of glass fibers and
c. about 10% by weight to 0.5% by weight, based on the total mixture of a polyalkylene glycol isophthalate.

4,056,505

GLASS-REINFORCED THERMOPLASTIC MOULDING COMPOSITIONS

Kenneth John Taylor, and Allan Lord, both of Rochdale, England, assignors to IBA Industrial Products Ltd., England

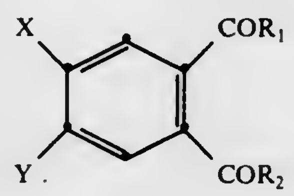
Filed June 2, 1976, Ser. No. 692,143

Claims priority, application United Kingdom, June 7, 1975, 24531/75

Int. Cl.² C08K *7/14*

U.S. Cl. 260—42.18 **12 Claims**

1. A mouldable thermoplastic material comprising from 20% to 90% by weight polypropylene, polyethylene or polyamide as thermoplastic matrix, from 80 to 10% by weight of glass fibre and from 0.05 to 15% by weight based on the total weight of the glass fibre and thermoplastic matrix of an additive capable of coupling with the glass at a temperature within the range from 180° C to 300° C and incapable of forming a homopolymer at said temperature, said additive being selected from the groups consisting of oxalic acid and organic compounds containing the grouping



in which X may be a hydrogen atom, an alkyl group, a carboxyl group, or a group of the formula —-CO-R_3, R_3 being selected from alkyl groups, and aromatic groups with or without carbonyl containing substitutents, Y may be a hydrogen atom, an alkyl or a carboxyl group or a group of the formula —-COR_4, R_4 being selected from alkyl groups and aromatic groups with or without carbonyl containing substituents, or

X and Y may together constitute an anhydride grouping thus forming a cyclic anhydride,

R_1 and R_2 may be selected from hydroxyl groups, aromatic groups or —COR_1 and —COR_2 may together constitute an anhydride group thus forming a cyclic anhydride.

4,056,506

HOMOGENEOUS POLYEPOXIDE-POLYANHYDRIDE COMPOSITIONS

William J. Heilman, Allison Park, Pa.; Frank C. Peterson, Orange; Mical C. Renz, and Leslie P. Theard, both of Houston, all of Tex., assignors to Gulf Oil Corporation, Pittsburgh, Pa.

Division of Ser. No. 590,460, June 26, 1975, which is a continuation-in-part of Ser. No. 501,634, Aug. 29, 1974, abandoned. This application Dec. 8, 1976, Ser. No. 748,597

The portion of the term of this patent subsequent to Apr. 12, 1994, has been disclaimed.

Int. Cl.² C08K *7/14;* **C08L** *63/00, 63/02*

U.S. Cl. 260—42.18 **12 Claims**

1. A handleable, thermosettable composition which comprises a homogeneous resin mixture of polyanhydride molecules, polyepoxide molecules of an epoxy resin having a 1,2-epoxy equivalent value greater than 1, a saturated monoanhydride, a monoepoxy compound, and from about 0.01 to about 10 weight percent of an anhydride accelerator,

said polyanhydride comprising the addition copolymer of (1) styrene and (2) maleic anhydride in a molar ratio of styrene (1) to maleic anhydride (2) of about 0.5:1 to about 8:1 and (3) a styrene-maleic anhydride copolymer having between two and about 500 repeating units and a styrene to maleic anhydride ratio between about 1:1 and about 10:1;

said saturated monoanhydride selected from phthalic anhydride, hexahydrophthalic anhydride, methyltetrahydrophthalic anhydride, dodecenylsuccinic anhydride, chlorendic anhydride and a mixture of methyl bicyclo(2.2.1)heptane-2,3-dicarboxylic anhydride isomers;

the ratio of anhydride equivalents derived from said maleic anhydride (2) to the total sum of the anhydride equivalents in said homogeneous resin mixture being between about 0.2:1 and about 1:1 and the ratio of anhydride equivalents in said saturated monoanhydride to the anhydride equivalents derived from said styrene-maleic anhydride copolymer (3) being between zero and about 1:1;

the A/E ratio of total anhydride equivalents to total epoxy equivalents in said composition being between about 0.1:1 to about 2.5:1 and the ratio of epoxy equivalents in the epoxy resin to the epoxy equivalents in the monoepoxy compound being at least about 1:1; and

said handleable, thermosettable composition being substantially free of any volatile component.

4,056,507

HINDERED PIPERIDINE CARBOXYLIC ACIDS, METAL SALTS THEREOF AND STABILIZED COMPOSITIONS

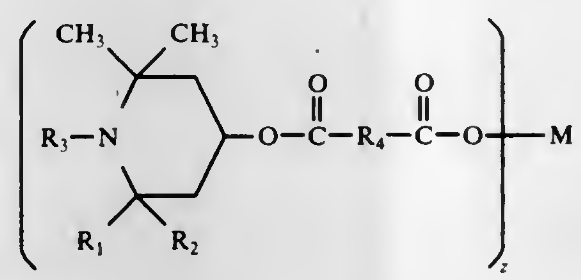
Chester E. Ramey, Spring Valley, and John J. Luzzi, Carmel, both of N.Y., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 429,232, Dec. 28, 1973, Pat. No. 3,920,661. This application Nov. 19, 1975, Ser. No. 633,201

Int. Cl.² C08K *5/34;* **C08D** *211/18;* **C07D** *401/00*

U.S. Cl. 260—45.8 N **26 Claims**

1. A composition of matter comprising a synthetic organic polymer normally subject to ultraviolet deterioration stabilized with 0.005 to 5% of a stabilizer having the formula



wherein

R_1 and R_2 independently of each other are straight- or branched-chain alkyl having from 1 to 6 carbon atoms, or together with the carbon to which they are bound form a cyclopentyl or cyclohexyl ring, which is unsubstituted or substituted with a methyl group,

R_3 is hydrogen, alkyl having 1 to 12 carbon atoms, β-methoxyethyl, alkenyl having 3 to 4 carbon atoms, propargyl, benzyl, or alkyl substituted benzyl,

R_4 is straight- or branched-chain alkylene having 5 to 8 carbon atoms, or the group $(CH_2)_mY(CH_2)_n$ wherein Y is oxygen or sulfur and *m* and *n* independently of each other are an integer of from 1 to 3,

M is hydrogen or a metal selected from the group consisting of barium, nickel, manganese, calcium, zinc, iron, sodium, cobalt, tin and dialkyl tin, and

z has a value of from 1 to 4, the value of *z* being the same as the available valence of M

said stabilizer bing incorporated into the synthetic organic polymer after polymerization.

4,056,508

DIFFICULTLY INFLAMMABLE POLYESTER MOLDING COMPOSITIONS

Werner Schmidt, St. Augustin; Egon Norbert Petersen, Neunkirchen, and Hermann Richtzenhain, Much-Schwellenbach, all of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Troisdorf, Germany

Continuation of Ser. No. 516,944, Oct. 22, 1974, abandoned. This application Oct. 6, 1975, Ser. No. 620,071

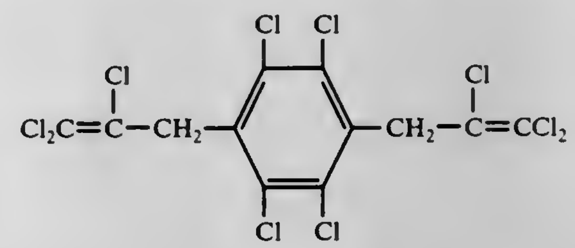
Claims priority, application Germany, Oct. 27, 1973, 2354001

Int. Cl.² C08K *3/22, 3/38, 5/03*

U.S. Cl. 260—45.75 B **10 Claims**

1. A flame stabilized molding composition comprising:

1. A polyester which is the condensation product of an aromatic dicarboxylic acid, acid-halide or ester and an aliphatic diol having more than 2 carbon atoms in the chain; and
2. 1,4-bis-(β,γ,γ-trichloroallyl)-2,3,5,6-tetrachlorobenzene, as flameproofing agent, which has the formula:



said 1,4-bis-(β,γ,γ-trichloroallyl)-2,3,5,6-tetrachlorobenzene being present in said composition in an amount of 5–30 weight percent based upon the weight of said polyester.

4,056,509

PREPARATION OF BENZYL CYANIDES

Pieter A. Verbrugge, and Elisabeth W. Uurbanus, both of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.

Filed June 24, 1976, Ser. No. 699,815

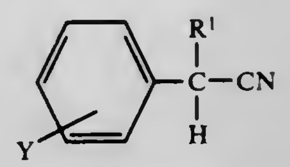
Claims priority, application United Kingdom, July 9, 1975, 28869/75; July 9, 1975, 28900/75

Int. Cl.² C07C *120/04, 121/66*

U.S. Cl. 260—465 G **15 Claims**

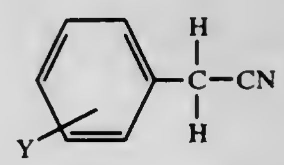
1. A process for the preparation of compounds of the formula

(III)



wherein R^1 represents a secondary alkyl group having from 3 to 6 carbon atoms; and Y represents a hydrogen atom or a halogen atom of atomic number from 9–35, inclusive, which process comprises contacting an organic phase containing a compound of the formula

(II)



and a sec-alkyl halide of the formula

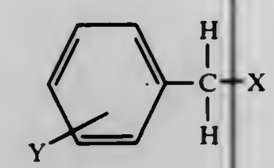
$$\text{Hal} - R^1 \qquad \text{IV}$$

in which formulas II and IV R^1 and Y have the meanings stated above and Hal represents a halogen atom having an atomic number from 17 to 53, inclusive, with an aqueous phase con-

taining an alkali metal hydroxide or with a solid alkali metal hydroxide in the presence of a tetrahydrocarbylammonium halide, using a molar ratio of sec-alkyl halide of formula IV to compound of formula II of at least 3.

14. A process for the preparation of substituted benzyl nitrile derviatives which comprises (a) reacting a benzyl halide of the formula

(I)



wherein Y represents a hydrogen atom or a halogen atom of atomic number from 9 to 35, inclusive, and X represents a halogen atom of atomic number 17 to 53, inclusive, with sodium cyanide, which reaction is performed in the presence of a liquid organic phase containing the benzyl halide, sodium cyanide and a tetrahydrocarbylammonium halide, either in the absence of water or using a volume ratio of water to benzyl halide of below 0.1 and (b) reacting the resulting organic phase containing a benzyl nitrile with a sec-alkyl halide of the formula Hal—R[1] wherein R[1] represents a secondary alkyl group having from 3 to 6 carbon atoms and Hal represents a halogen atom having an atomic number of from 17 to 53, inclusive, with an aqueous phase containing an alkali metal hydroxide or with a solid alkali metal hydroxide also in the presence of the tetrahydrocarbylammonium halide and using a molar ratio of sec-alkyl halide reactant to benzyl nitrile reactant of at least 3.

4,056,510

AMINE-MODIFIED POLYETHERS

Richard H. Symm, and Byford D. Sheffield, both of Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed Jan. 23, 1975, Ser. No. 543,219

Int. Cl.^{2} C08G *65/24, 65/26, 65/32*

U.S. Cl. 260—47 EP **12 Claims**

1. A water-soluble amine-modified polyether made by reacting an excess of an alkylene polyamine with a halogen-containing polyether prepared by

reacting with 0.1 to 10 mole percent of a poly-1,2-epoxide:

a. a halogen-containing alkylene oxide monomer, or

b. a mixture thereof with a non-halogen-containing alkylene oxide monomer, wherein said mixture contains at least about 50 mole percent of said halogen-containing monomer.

4,056,511

PROCESS FOR PREPARING AROMATIC POLYETHERS

Philip Anthony Staniland, Tewin Wood, England, assignor to Imperial Chemical Industries Limited, London, England

Filed Mar. 25, 1976, Ser. No. 670,156

Claims priority, application United Kingdom, Mar. 25, 1975, 12416/75; Feb. 10, 1976, 5169/76

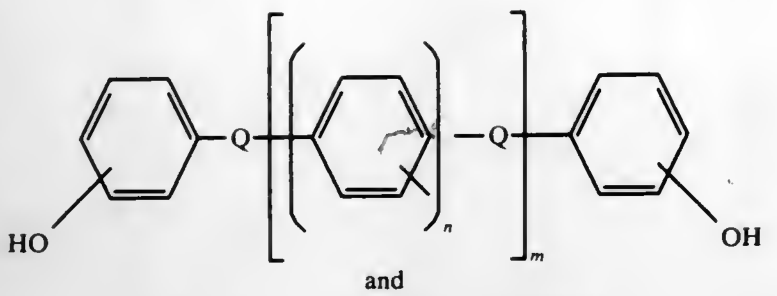
Int. Cl.^{2} C08G *65/40*

U.S. Cl. 260—49 **10 Claims**

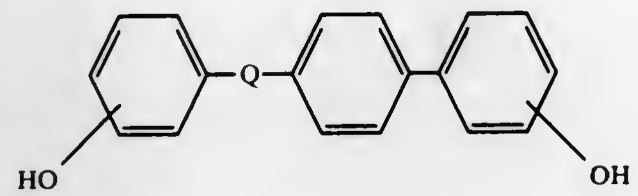
1. A process for the manufacture of aromatic polyethers whose molecular chains contain phenylene groups, oxygen atoms and ketone and/or sulphone groups comprising

i. heating a monomer mixture consisting essentially of

1. 30 to 49.99% molar of at least one di(alkali metal) salt of a bisphenol selected from the group consisting of

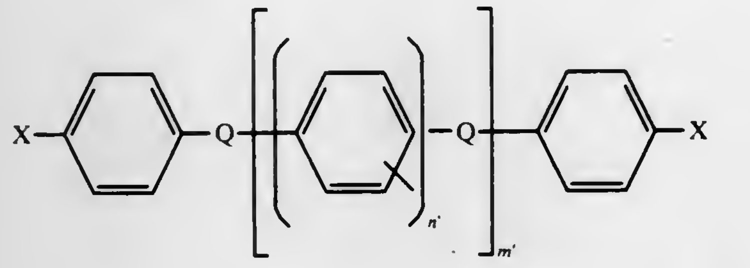


and

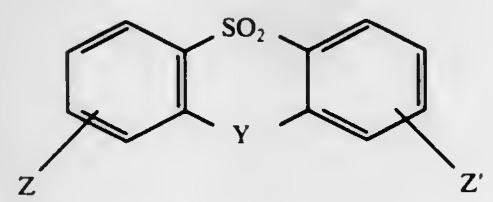


at least 95% of the phenolic OH groups being in the para position, *Q* is —SO_2— or —CO—, *m* is 0, 1, 2 or 3 and *n* is 1, 2 or 3, and

2. correspondingly 70 to 50.01% molar of at least one dihalo compound of the formula



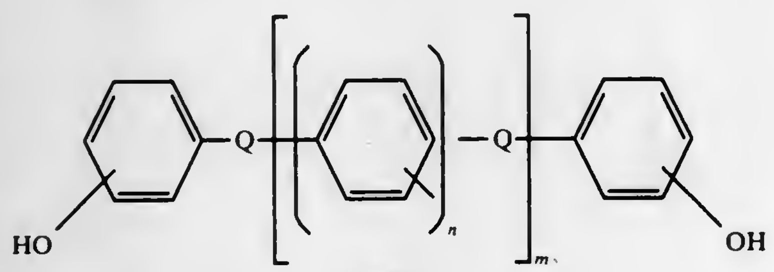
in which *X* is F, Cl or Br, *Q* is —SO_2— or —CO—, *m'* is 0, 1, 2 or 3, and *n'* is 1, 2 or 3, at a temperature in the range 200° to 250° C in the presence of an aromatic sulphone having the formula



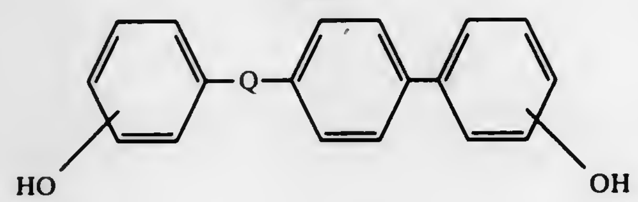
in which Y is a direct link, an oxygen atom or two hydrogen atoms (one attached to each benzene ring) and Z and Z' are selected from hydrogen atoms and phenyl groups and may be the same or different,

ii. increasing the temperature to a temperature in the range 260 to 400° C and heating the mixture at that temperature,

iii. after increasing the temperature to said temperature in the range 260 to 400° C, adding in finely divided form, at least 0.01 mole, per 100 moles of said monomer mixture, of at least one di(alkali metal) salt of a bisphenol selected from the group consisting of



and



at least 95% of the phenolic OH groups being in the para position, *Q* is —SO_2— or —CO—, *m* is 0, 1, 2 or 3 and *n* is 1, 2 or 3 so as to bring the overall molar ratio of dihalo compound to bisphenate to within the range 51:49 to 50:50 and then

iv. continuing said polymerisation by said heating at the temperature within the range 260° to 400° C.

4,056,512

COMPOSITION COMPRISING PHENOLIC RESINS AND CURING AMOUNTS TRIAZA PHOSPHAADAMANTANE COMPOUNDS

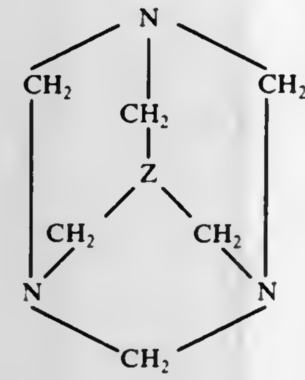
Richard D. Carlson, Grand Island, and Akio Takahashi, Amherst, both of N.Y., assignors to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.

Filed Feb. 27, 1976, Ser. No. 661,894

Int. Cl.^{2} C08G *8/28*

U.S. Cl. 260—59 R **11 Claims**

1. A curable phenolic molding compound comprising an uncured phenolictype novolak resin and curing amount of a triaza phosphaadamantane compound having the formula:



wherein Z is selected from

$-\overset{|}{\underset{|}{P}}-$, $-\overset{|}{\underset{|}{P}}{=}O$, and $-\overset{|}{\underset{|}{P}}{=}S$.

4,056,513

PROCESS FOR THE PREPARATION OF TERPENE-PHENOL RESINS BY THREE-STAGE REACTION OF PHENOL WITH CARENE USING FRIEDEL-CRAFTS OR LEWIS ACID CATALYST

Bernard Lahourcade, and Gustave Bonneau, both of Vielle-St Girons, France, assignors to Les Derives Resiniques et Terpeniques, Dax, France

Filed Feb. 20, 1976, Ser. No. 660,024

Claims priority, application France, Mar. 11, 1975, 75.07480

Int. Cl.^{2} C08L *65/00*

U.S. Cl. 260—62 **8 Claims**

1. Process for the preparation of terpene-phenol resins by reaction of a carene with a phenol in the presence of an acidic condensation catalyst, comprising:

a. reacting at a temperature of 80°–120° C one molar proportion of a phenol having at least two reactive sites with 0.4–0.6 molar proportion of a carene, in the presence of an acidic condensation catalyst selected from a Lewis acid type catalyst and a Friedel-Crafts type catalyst:

b. reacting at a temperature of 80°–120° C the reaction product from step (a) with 0.4–0.6 molar proportion of said carene, in the presence of said catalyst, said carene being added in steps (a) and (b) at a temperature of 20°–100° C; and

c. subsequently reacting at a temperature of 80°–120° C the product from step (b) with a reactive terpene, the molar ratio of reactive terpene to amount of carene added in step (b) being comprised within the range from 0.5 to 5; steps (a)–(c) being carried out under an inert gaseous atmosphere and in the presence of an aromatic hydrocarbon solvent; thereby obtaining a terpene-phenol resin of clear stable color having a Ring and Ball melting point range of 95°–98° C.

4,056,514

CONTINUOUS MANUFACTURE OF POLYBUTYLENE TEREPHTHALATES

Hugo Strehler, Frankenthal; Ludwig Beer, Ludwigshafen; Eduard Heil, Limburgerhof; Friedrich Urbanek, Schifferstadt, and Hermann Fischer, Limburgerhof, all of Germany, assignors to BASF Aktiengesellschaft, Rheinland/Pfalz, Germany

Filed Mar. 18, 1976, Ser. No. 668,284

Int. Cl.^{2} C08G *63/16*

U.S. Cl. 260—75 R **9 Claims**

1. A process for the continuous manufacture of linear, high molecular weight polybutylene terephthalates, wherein

a. dimethyl terephthalate is reacted with 1,4-butanediol, if desired in the presence of up to 40 mole% of further starting materials which form linear polyesters, in the molar ratio of from 1:1.2 to 1:1.5 in a plurality of successive stages at temperatures rising from 160° to 230° C in the presence of trans-esterification catalysts, and methanol is distilled off continuously.

b. the resulting mixture of dihydroxybutyl terephthalate and its oligomers is subsequently passed, at from 230° to 270° C and from 20 to 2 mm Hg, upward through a bundle of stationary heated tubes, and the resulting mixture of vapor and liquid is passed through a hold tank located immediately above the tube ends, the volume of the hold tank being at least ¼ and at most 2.5 times the volume of the tube bundle and the mean residence time in the tube bundle and hold tank together being from 10 to 60 minutes, most of the amount of heat required to heat the reaction mixture and vaporize the volatile constituents of the reaction mixture being supplied to the reaction mixture in the tubes, and the mixing of the reaction mixture being effected predominantly by the vapor bubbles rising from the tubes, and

c. the precondensate thus obtained is polycondensed at from 240° to 260° C and from 0.1 to 2 mm Hg, with continuous formation of thin films.

4,056,515

CONTINUOUS REACTION FOR PREPARATION OF ARYLENE SULFIDE POLYMER

Fernando C. Vidaurri, Jr., Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Mar. 30, 1976, Ser. No. 671,774

Int. Cl.^{2} C08G *75/14, 75/16*

U.S. Cl. 260—79.1 **4 Claims**

1. A continuous process using a plurality of agitated reaction vessels connected in series for producing arylene sulfide polymer by contacting, in an organic amide, a dihalo aromatic compound with a suitable sulfur source to produce a particulate, polymeric product, said method comprising:

a. introducing the reactants into a first reaction zone maintained at substantially liquid-full conditions at a temperature in the range of about 260° C to about 310° C suitable to initiate a polymerization reaction thereby providing a polymerization reaction pressure sufficient to drive the reaction mass through a series of reaction zones;

b. passing reactants and polymerization product from said first reaction zone into a second, substantially liquid-full reaction zone maintained at a polymerization temperature said temperature in the range of about 5° C to about 25° C lower than the temperature of said first zone and a pressure in the range of about 0.5 Kg/cm^2 to about 2 Kg/cm^2 lower than the pressure in said first zone;

c. passing partially polymerized reactants and polymerization product from said second reaction zone into a third reaction zone maintained at a polymerization temperature

in the range of about 5° C to about 25° C lower than said second reaction zone and a pressure in the range of about 0.5 Kg/cm² to about 2 Kg/cm² lower than the pressure in said second zone;

d. passing the effluent from said third reaction zone into a fourth zone having a vapor space above a controlled liquid level wherein the pressure is in the range of about 0.5 Kg/cm² to about 2 Kg/cm² lower than in the third zone and wherein the temperature is increased to exceed the temperature of said second reaction zone sufficiently to evaporate a portion of the water and organic amide content of the effluent; and

e. subjecting the reaction mixture from the fourth reaction zone to reduced pressure thereby flash evaporating the liquid portion to recover a polymeric, particulate product and a vapor.

4,056,516

MODACRYL FILAMENTS AND FIBERS AND PROCESS FOR THEIR MANUFACTURE

Ernst-August Albers, Bad Soden, Taunus; Walter Fester, Konigstein, Taunus, and Bernd Sassenrath, Niedernhausen, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Continuation of Ser. No. 318,268, Dec. 26, 1972, abandoned. This application Feb. 25, 1976, Ser. No. 661,116

Claims priority, application Germany, Dec. 28, 1971, 2164917

Int. Cl.² C08F *28/00*

U.S. Cl. 260—79.3 M **5 Claims**

1. A process for the manufacture of modacryl filaments and fibers from an acetone-insoluble copolymer of acrylonitrile, 20 to 45 weight percent of vinylidene chloride and up to 11.5 weight percent of further copolymerizable compounds, said copolymer having a K value of from about 60 to about 90, which comprises dissolving the copolymer in a mixture of a solvent for the polymer and a non-solvent for the polymer to form a spinning solution, the amount of non-solvent being from about 30 to 80% of the amount of non-solvent which would cause gelation of the spinning solution at the spinning temperature, forcing the spinning solution so obtained through nozzles into the first of at least three series-connected coagulation baths containing mixtures of said polymer solvent and said polymer non-solvent, the polymer solvent concentration in the first coagulation bath being from 30 to 70% by weight of said bath and being gradually reduced in successive coagulation baths, the polymer solvent concentration in the first coagulation bath being about 1.2 to 2.0 times that of the second coagulation bath, the polymer solvent concentration in each coagulation bath subsequent to the second bath being reduced by a factor of about 1.2 to 3 in each such subsequent bath, the temperatures of the first and second coagulation baths being from 0° to 70° C. and those of the third and the following baths from 20° to 90° C., drawing the spinning tows obtained to a multiple of their length in at least one of these baths, and, after removal of the solvent as completely as possible, subjecting said drawn tows to at least one further drawing.

4,056,517

MODACRYL FILAMENTS AND FIBERS AND PROCESS FOR THEIR MANUFACTURE

Ernst-August Albers, Bad Soden, Taunus, and Bernd Sassenrath, Niedernhausen, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Continuation of Ser. No. 318,269, Dec. 26, 1972, abandoned. This application Feb. 25, 1976, Ser. No. 661,117

Claims priority, application Germany, Dec. 28, 1971, 2164918

Int. Cl.² C08F *28/00*

U.S. Cl. 260—79.3 M **5 Claims**

1. A process for the manufacture of modacryl filaments and fibers from an acetone-insoluble copolymer of acrylonitrile, 20 to 45 weight percent of vinylidene chloride and up to 11.5 weight percent of at least one other compound copolymerizable therewith, said copolymer having a K value of about 95 to 120, which comprises dissolving said copolymer in a solvent to form a spinning solution, forcing the spinning solution so obtained through nozzles into the first of at least three series-connected coagulation baths containing mixtures of the polymer solvent and at least one non-solvent for the polymer, the polymer solvent concentration in the first coagulation bath being from 30% to 70% by weight of said bath and being gradually reduced in successive coagulation baths, the polymer solvent concentration in the first coagulation bath being about 1.2 to 2.0 times that of the second coagulation bath, the polymer solvent concentration in each coagulation bath subsequent to the second bath being reduced by a factor of 1.2 to 3 in each such subsequent bath, the temperatures of the first and second coagulation baths being from 0° to 70° C., those of the third and the following baths being from 20° to 90° C., drawing the spinning tows obtained to a multiple of their length in at least one of these baths and, after removal of the solvent as completely as possible, subjecting said drawn tows to at least one further drawing.

4,056,518

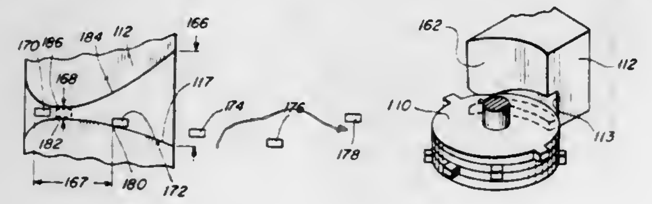
RATCHET HEAD TAPE MOVER

Sidney Milovac, 4215 W. 45th St., Chicago, Ill. 60632

Continuation-in-part of Ser. No. 372,871, June 22, 1973, abandoned. This application July 22, 1975, Ser. No. 598,503

Int. Cl.² G11B *21/12*

U.S. Cl. 360—106 **3 Claims**



1. In a magnetic tape system including a magnetic tape head with tape gaps for accessing a magnetic tape having a plurality of tape tracks, a movable tape head support member mounted for movement to be aligned in relation to each of said plurality of tape tracks, plurality of tape tracks, a tape head elevation adjustment arrangement comprising:

wheel means, said wheel means supported for rotation adjacent said tape head support member; said wheel means having a plurality of radially projecting extensions, said radially projecting extensions separated consecutively by an integral multiple of the distance between adjacent tape tracks;

slot means, said slot means rigidly connected to said tape head support member, said slot means defining a slot for receiving said radially projecting extensions of said wheel means and assuming an elevation corresponding to the elevation of the radially projecting extension received.

4,056,519

SUBSTRATE FOR ASSAY OF PLASMIN

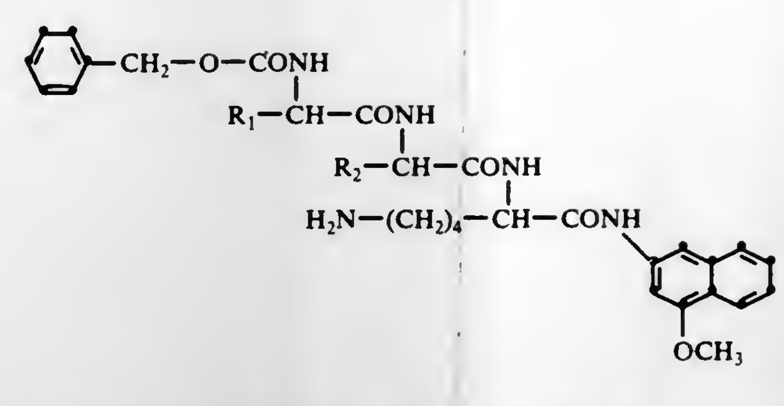
Jesse L. Bobbitt, and Edward L. Smithwick, Jr., both of Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Filed May 10, 1976, Ser. No. 685,193

Int. Cl.² C07C *103/52*

U.S. Cl. 260—112.5 R **5 Claims**

1. A tripeptidyl-4-methoxy-2-naphthylamide having the formula,



in which R_1 and R_2 independently are hydrogen, alkyl, hydroxyalkyl, mercaptoalkyl, methylthioalkyl, benzyl, or hydroxybenzyl, with the proviso that at least one of R_1 and R_2 must be other than benzyl or hydroxybenzyl; and the acid addition salts thereof in which the acid is inorganic or C_1–C_2 carboxylic.

4,056,520

CLINICALLY ACTIVE BOVINE GROWTH HORMONE FRACTION

Martin Sonenberg, New York, N.Y., and Nobuyuki Yamasaki, Matsuyama, Japan, assignors to Research Corporation, New York, N.Y.

Division of Ser. No. 240,301, March 31, 1972, Pat. No. 3,904,753, which is a division of Ser. No. 13,162, Feb. 20, 1970, Pat. No. 3,664,925. This application May 2, 1975, Ser. No. 573,902

Int. Cl.² C07C *103/52;* A61K *37/00*

U.S. Cl. 260—112.5 R **1 Claim**

1. A polypeptide derivable from and being a fraction or moiety of bovine growth hormone and useful for the treatment of pituitary dwarfism, said polypeptide having a molecular weight of about 5000, an amino acid content or chain length of about 38 amino acids, said polypeptide recoverable by gel filtration in the present of 50% having valine as the amino terminal amino acid and arginine as the carboxyl terminal amino acid and having the amino acid analysis:

lysine	2.0
arginine	2.8
asparatic acid and asparagine	3.8
threonine	2.6
serine	1.9
glutamic acid and/or glutamine	4.9
proline	0.9
glycine	2.9
alanine	1.0
valine	3.0
methionine	1.0
isoleucine	0.9
leucine	5.1
tyrosine	1.0
phenylalanine	1.8

4,056,521

PENAM AND CEPHAM DERIVATIVES AND PREPARATION THEREOF

Takashi Kamiya, Suita; Tsutomu Teraji; Masashi Hashimoto, both of Toyonaka; Osamu Nakaguti, Osaka, and Teruo Oku, Kyoto, all of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan

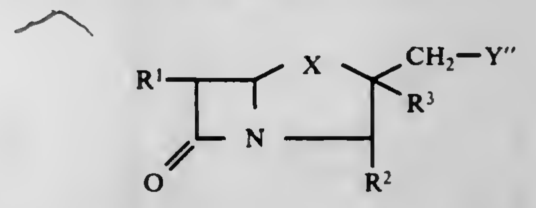
Division of Ser. No. 407,962, Oct. 19, 1973, Pat. No. 3,954,732. This application Dec. 1, 1976, Ser. No. 648,492

Claims priority, application Japan, Dec. 20, 1972, 48-128658; Dec. 20, 1972, 48-128659; Dec. 20, 1972, 48-128660; Dec. 21, 1972, 48-128902; Dec. 22, 1972, 48-2270; Dec. 23, 1972, 48-1198; Dec. 23, 1972, 48-1201; Aug. 1, 1973, 47-87108

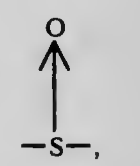
Int. Cl.² C07D *499/44*

U.S. Cl. 260—239.1 **6 Claims**

1. A compound of the general formula:



wherein R¹ is a conventional, pharmaceutically acceptable acylamino, R² is carboxy or a conventionally protected carboxy, X is —S— or



R³ is lower alkyl and Y'' is arylamino.

4,056,522

AZO COMPOUNDS DERIVING FROM 3-AMINO-4-LOWER CARBOALKOXY-BENZOIC ACID-4'-PHENOXY ANILIDES AND 2-HYDROXY-3-NAPHTHOIC ACID-4'-BENZOYLAMINO ANILIDES

Klaus Hunger, Kelkheim, Taunus, and Friedrich Wilhelm Weingarten, Liederbach, Taunus, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

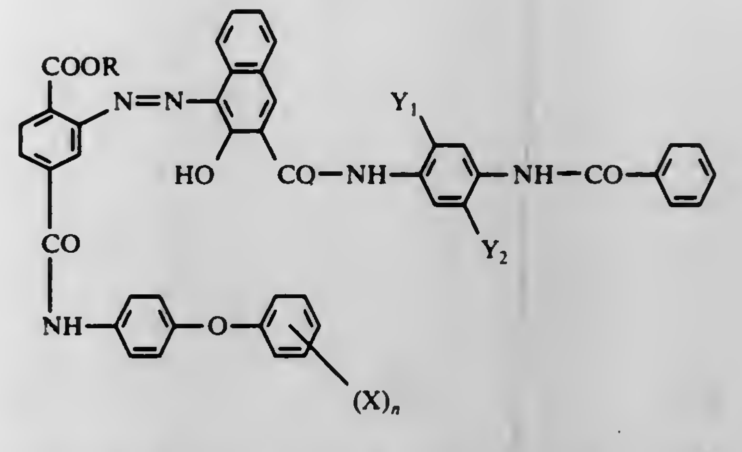
Filed May 13, 1976, Ser. No. 686,031

Claims priority, application Germany, May 15, 1975, 2521655

Int. Cl.² C09B *29/20*

U.S. Cl. 260—203 **10 Claims**

1. A compound of the formula



in which R is methyl or ethyl, X stands for equal or different halogen atoms, Y_1 and Y_2, which are equal or different, are hydrogen, chlorine, bromine, methyl, ethyl, methoxy or ethoxy and *n* is zero or an integer from 1 to 4.

4,056,523

WATER-INSOLUBLE AZO DYESTUFFS

Peter Mischke, Neuenhain, Taunus, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

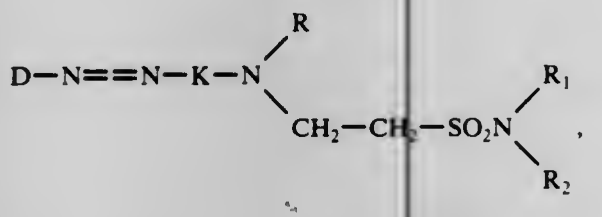
Filed Dec. 8, 1975, Ser. No. 638,909

Claims priority, application Germany, Dec. 9, 1974, 2458195

Int. Cl.^{2} C09B *46/00, 29/00*

U.S. Cl. 260—205 **9 Claims**

1. Novel azo dyestuffs-being water-soluble only in traces - of the formula



in which

D as the radical of a diazo component represents nitrophenylene, carbo-lower alkoxy-phenylene, dinitrophenylene, nitro-cyano-phenylene, nitro-chloro-phenylene, nitro-bromo-phenylene, nitro-lower alkylsulfonyl-phenylene, nitro-carbo-lower alkoxy-phenylene, di(cyano)phenylene, trifluoro- lower alkylsulfonyl-phenylene, dichlorophenylene, chloro- lower alkoxy-phenylene,

chloro- lower alkylsulfonyl-phenylene, di(nitro)-bromophenylene, trichlorophenylene, dichloro-nitro-phenylene, dinitro-chloro-phenylene, phenylazo-phenylene, di(carbo-lower alkoxy)phenylene,

nitro- lower alkyl-phenylene, nitro-trifluoromethyl-phenylene or nitro-bromo-cyano-phenylene,

K represents phenylene, lower alkylphenylene, lower alkoxyphenylene, chlorophenylene acetylamino-phenylene, benzoylamino-phenylene, lower alkylsulfonylamino-phenylene, formylamino-phenylene, chloroacetylamino-phenylene, carbo-lower alkoxyamino-phenylene, lower alkyl-lower alkoxyphenylene, lower alkyl-acetylamino-phenylene, di(lower alkyl)phenylene, dichlorophenylene, lower alkoxy-lower alkylene-CO-NH-phenylene, lower alkoxy-acetylamino-phenylene or hydroxynaphthylene,

R represents hydrogen, lower alkyl, lower alkylene-O-CO-lower alkyl, lower alkylene-COO-lower alkyl, cyano-lower alkyl, chloro-lower alkyl, benzyl or cyclohexyl,

R_1, represents hydrogen, alkyl of from 3 to about 14 carbon atoms, cyanoethyl, hydroxyethyl, acetoxyethyl or benzyl, and R_2 represents alkyl of from 4 to about 14 carbon atoms, benzyl, phenylethyl, cyclohexyl, phenyl, methylphenyl, ethylphenyl, methoxyphenyl, ethoxyphenyl, nitrophenyl, chlorophenyl or bromophenyl.

4,056,524

BIS-SUBSTITUTED SUCCINAMIDES AND THEIR UTILITY AS HERBICIDES

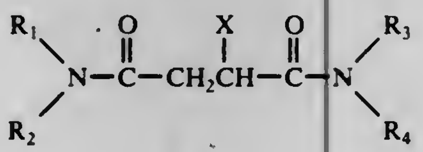
Francis H. Walker, Mill Valley, Calif., assignor to Stauffer Chemical Company, Westport, Conn.

Continuation-in-part of Ser. No. 459,438, April 9, 1974, abandoned, which is a continuation-in-part of Ser. No. 410,641, Nov. 12, 1973, abandoned. This application Feb. 3, 1975, Ser. No. 546,234

Int. Cl.^{2} C07D *295/06, 203/12, 205/04, 207/06*

U.S. Cl. 260—239 BF **9 Claims**

1. A compound in which the formula is



in which X is chlorine or bromine; R_1 and R_2 taken together are alkylene having from 2 to 8 carbon atoms, inclusive; R_3 and R_4 taken together are alkylene having from 2 to 8 carbon atoms, inclusive.

4,056,525

2,3-DIALKOXY-3H-1,4-BENZODIAZEPINES

John H. Sellstedt, Pottstown, and Daniel M. Teller, Devon, both of Pa., assignors to American Home Products Corporation, New York, N.Y.

Filed June 2, 1975, Ser. No. 583,307

Int. Cl.^{2} C07D *243/24*

U.S. Cl. 260—239 BD **1 Claim**

1. 7-chloro-5-(o-chlorophenyl)-2-ethoxy-3-methoxy-3H-1,4-benzodiazepine.

4,056,526

BENZO(b)THIOPHENE DERIVATIVES

Peter Johannes Stoss, Wildtal; Manfred Franz Reinhold Herrmann, Gundelfingen, and Gerhard Satzinger, Denzlingen, all of Germany, assignors to Warner-Lambert Company, Morris Plains, N.J.

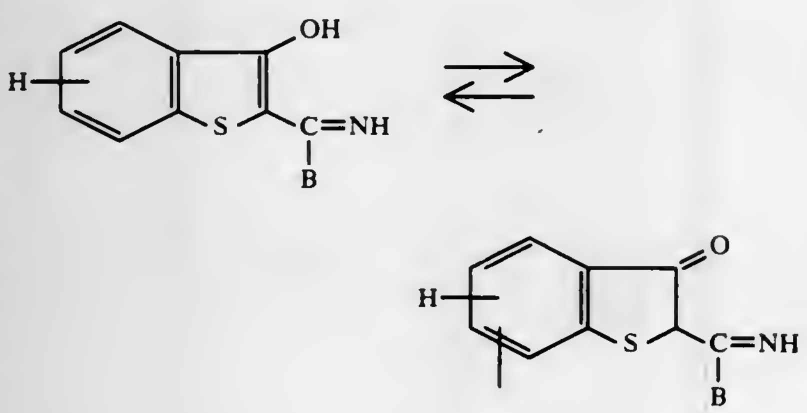
Division of Ser. No. 566,469, April 9, 1975, Pat. No. 3,971,814, which is a division of Ser. No. 419,305, Nov. 27, 1973, Pat. No. 3,907,826. This application May 28, 1976, Ser. No. 691,109

Claims priority, application Germany, Nov. 27, 1972, 2225803

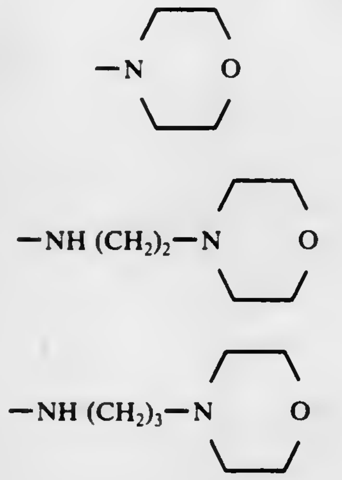
Int. Cl.^{2} C07D *413/02*

U.S. Cl. 544—146 **4 Claims**

1. Benzo(b)thiophene compounds of the formula:



wherein B is selected from the group consisting of:



4,056,527

TETRAHYDRO-1,3,5-TRIAZINE-2,6-DIONES

Hans Georg Schlee, Cologne; Klaus Sasse, Schildgen, and Ludwig Eue, Cologne, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

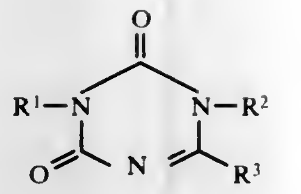
Filed Oct. 18, 1973, Ser. No. 407,693

Claims priority, application Germany, Nov. 6, 1972, 2254200

Int. Cl.^{2} C07D *251/16, 251/42;* **A01N** *9/22*

U.S. Cl. 544—194 **19 Claims**

1. 1 (3-times amended) Tetrahydro-1,3,5-triazine-2,6-dione compound of the formula



(I)

wherein

R^1 is alkyl of from 1 to 12 carbon atoms, haloalkyl of from 1 to 12 carbon atoms, cycloalkyl of from 5 to 7 ring carbon atoms, carbocyclic aralkyl of up to 12 carbon atoms or carbocyclic aryl of up to 10 carbon atoms, which cycloalkyl, carbocyclic aralkyl or carbocyclic aryl may be substituted with at least one of halogen, alkyl of up to 4 carbon atoms, alkoxy of up to 4 carbon atoms and trifluoromethyl,

R^2 is alkoxy or alkanoyloxy of from 1 to 4 carbon atoms, cycloalkyl of from 5 to 7 ring carbon atoms, carbocyclic aralkyl of up to 12 carbon atoms or carbocyclic aryl of up to 10 carbon atoms; or

R^2 is —NR^4R^5 wherein R^4 and R^5 individually represent hydrogen, alkyl of up to 4 carbon atoms or alkanoyl of up to 4 carbon atoms; or

R^2 is —NR^4R^5 wherein R^4 and R^5 together represent alkylidene, of up to 3 carbon atoms, optionally substituted with at least one of carbocyclic aryl, haloaryl, alkoxyaryl and nitroaryl of up to 10 carbon atoms;

R^3 is hydrogen, halogen, alkyl of up to 10 carbon atoms, haloalkyl of up to 10 carbon atoms or carbocyclic aryloxy of up to 10 carbon atoms; or

R^3 is —N—R^6R^7 wherein R^6 and R^7 individually are hydrogen, alkyl of up to 4 carbon atoms, carbocyclic aralkyl of up to 7 carbon atoms, hydroxyl, amino, or methoxy; or

R^3 is alkoxy or alkylthio of up to 4 carbon atoms.

4,056,528

DISPERSE DYES

Hansrudolf Schwander, Riehen; Kurt Burdeska, Basel, and Christian Zickendraht, Binningen, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

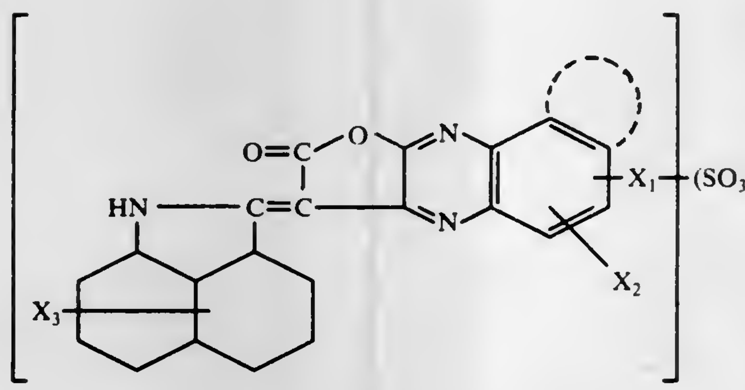
Filed Feb. 13, 1976, Ser. No. 657,771

Claims priority, application Switzerland, Feb. 21, 1975, 2239/75

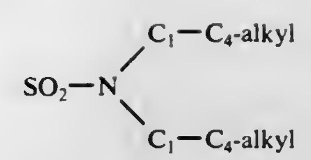
Int. Cl.^{2} C07D *491/04*

U.S. Cl. 260—250 Q **8 Claims**

1. A dyestuff of the formula

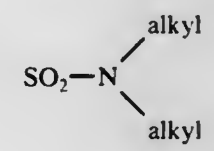


wherein X_1 represents fluorine, bromine, chlorine or hydrogen, C_1–C_4-alkyl, C_1–C_4-alkoxy, phenyl, phenoxy, thiophenoxy or C_1–C_4-alkyl sulphonyl, C_1–C_4-alkylthio, each of which is unsubstituted or substituted by C_1–C_4-alkoxy, hydroxy, cyano, bromine, chloride, carbo-C_1–C_4-alkoxy, C_1–C_4-alkoxy-C_1–C_4-alkoxy, C_1–C_4-alkylcarbonyloxy, chloro-C_1–C_4-alkylcarbonyloxy or C_1–C_4-alkoxy-carbonyloxy, fluorine, bromine, chlorine, COOR, in which R represents C_1–C_4-alkyl or C_1C_4-alkyl substituted by C_1–C_4-alkoxy, hydroxy, cyano, C_1C_4-alkylcarbonyloxy, chlorine or bromine,—SO_2NH-C_1–C_4-alkyl and



(wherein the C_1–C_4-alkyl is unsubstituted or substituted by hydroxy, chlorine, bromine, C_1–C_4-alkoxy or phenyl). —SO_2C_1–C_4-alkyl or CN;

X_2 represents methoxy, ethoxy, methyl or hydrogen. X_3 represents hydrogen, alkyl containing up to 4 carbon atoms, chlorine, bromine,



wherein alkyl is substituted or unsubstituted), nitro, or SO_2—R, wherein R represents alkyl or substituted or unsubstituted phenyl, *n* is 0, 1 or 2,

and the dotted ring can represent a fused benzene ring.

4,056,529

DIBENZOPYRIMIDOAZEPINES

Robin Michael Black, Porton, England, assignor to John Wyeth & Brother Limited, Maidenhead, England

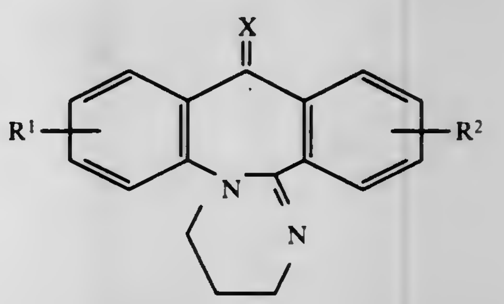
Filed Jan. 8, 1976, Ser. No. 647,376

Claims priority, application United Kingdom, Jan. 16, 1975, 1937/75

Int. Cl.^{2} C07D *487/04, 223/20;* **A61K** *31/55*

U.S. Cl. 260—251 A **6 Claims**

1. A dibenzopyrimidoazepine selected from the group consisting of compounds having the formula (I):



and the pharmaceutically acceptable acid addition and quaternary ammonium salts thereof, wherein R^1 and R_2 each represent hydrogen, lower alkyl, lower alkoxy, halogen or trifluoromethyl and X represents two hydrogen atoms, an oxo group, an ethylene ketal group, a di-(lower alkyl) ketal group, or an oximino group.

4,056,530

PROCESS OF SEMICONTINUOUSLY PRODUCING ANILINE CONDENSED DYES

Yoshihiro Maekawa, Nara, Japan, assignor to Orient Chemical Industries, Ltd., Osaka, Japan

Filed June 7, 1976, Ser. No. 693,619

Int. Cl.^{2} C09B *57/00, 59/00*

U.S. Cl. 260—267 **16 Claims**

1. In a process for the production of aniline condensed dyes comprising the reacting, by heating, of the raw materials aniline and at least one of nitrobenzene, an alkylaniline, an alkylnitrobenzene or diazoaminobenzene in the presence of a catalyst wherein the heating is in a reaction system comprising reaction vessels susceptible to heat shock, the improvement which comprises:

i. dividing said reaction system into at least two reaction sections, each section comprising one or more reaction vessels, the second section being maintained at a higher temperature than the first section; and

ii. reacting said raw materials by successively and semicontinuously introducing batches of raw materials into said first reaction section and introducing the product therefrom into the second reaction section without down times in the reaction vessels prior to said introductions.

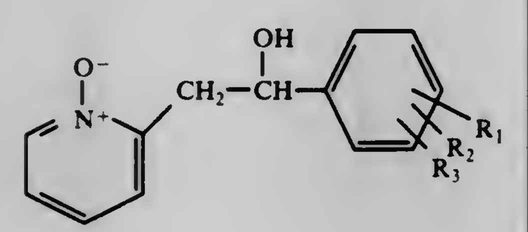
4,056,531
POLYMONOOLEFIN QUATERNARY AMMONIUM SALTS OF TRIETHYLENEDIAMINE
Robert E. Malec, Birmingham, Mich., assignor to Ethyl Corporation, Richmond, Va.
Division of Ser. No. 395,221, Sept. 7, 1973, abandoned, which is a division of Ser. No. 255,223, May 19, 1972, Pat. No. 3,778,371, which is a continuation-in-part of Ser. No. 138,758, April 29, 1971, abandoned. This application Sept. 15, 1975, Ser. No. 613,369
Int. Cl.² C07D *295/00, 295/22*
U.S. Cl. 260—268 PL **9 Claims**

1. A high molecular weight quaternary ammonium salt of triethylenediamine having one or two polymonoolefin groups having an average molecular weight of from about 350 to about 3000 bonded only to a quaternary ammonium nitrogen atom of said triethylenediamine.

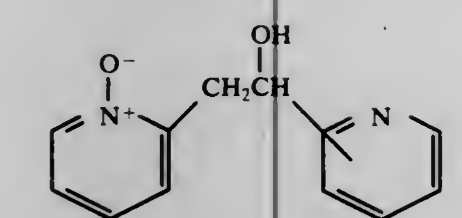
4,056,532
ALPHA-ARYL-2-PYRIDINEETHANOL 1-OXIDES AND ALPHA-PYRIDINYL-2-PYRIDINEETHANOL 1-OXIDES
David T. Connor, Parsippany; Patricia A. Young, Madison, and Maximillian von Strandtmann, Rockaway, all of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.
Filed June 24, 1976, Ser. No. 699,278
Int. Cl.² C07D *213/89*
U.S. Cl. 260—296 R **10 Claims**

1. A compound of the formula I or II:

I



II

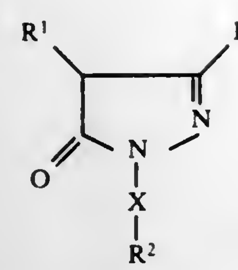


wherein R_1 is hydrogen, halogen, hydroxy, lower alkyl, lower alkoxy, benzyloxy, lower alkanoyloxy, ortho-amino or ortho-lower alkylamino; R_2 and R_3 are each hydrogen, halogen, hydroxy, lower alkyl, lower alkoxy, benzyloxy or lower alkanoyloxy, and the pharmaceutically acceptable acid addition salts thereof.

4,056,533
PYRAZOL-5-ONES
Eike Möller; Karl Meng, both of Wuppertal; Egbert Wehinger, Neviges, and Harald Horstmann, Wuppertal, all of Germany, assignors to Bayer Aktiengesellschaft, Germany
Division of Ser. No. 461,285, April 15, 1974, Pat. No. 3,952,008. This application Nov. 14, 1975, Ser. No. 631,946
Claims priority, application Germany, Apr. 17, 1973, 2319279; Dec. 19, 1973, 2363138
Int. Cl.² C07D *231/52;* **A61K** *31/415*
U.S. Cl. 548—360 **13 Claims**

1. A compound of the formula

I



or a pharmaceutically acceptable, nontoxic salt thereof, wherein

R is amino;

R^1 is hydrogen, lower alkyl or lower alkenyl ;

X is

a. ethylene, ethylene wherein 1 hydrogen atom on 1 of the carbon atoms is substituted by alkyl of 1 to 4 carbon atoms or ethylene wherein 1 hydrogen atom on each of the two carbon atoms is substututed by alkyl of 1 to 4 carbon atoms; or

b. propenyl, propenyl wherein 1 hydrogen atom on one, two or three of the carbon atoms is substituted by alkyl of 1 to 4 carbon atoms, said propenyl being linked to the N^1 atom of the pyrazole ring via its methylene moiety;

R^2 is aryl of 6 to 10 carbon atoms unsubstituted or substituted by:

a. 1 or 2 of the same or different substituents selected from the group consisting of halogen, trifluoromethyl, alkyl of 1 to 8 carbon atoms, alkenyl of 2 to 8 carbon atoms and lower alkoxy;

b. cycloalkyl of 5, 6 or 7 carbon atoms or cycloalkenyl of 5, 6 or 7 carbon atoms;

c. nitro; or

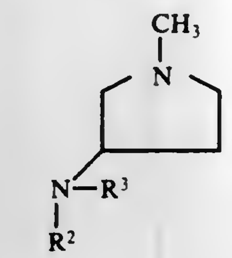
d. nitro, and 1 or 2 of the same or different substituents selected from the group consisting of lower alkyl, lower alkenyl, lower alkoxy, halogen and trifluoromethyl.

4,056,534
PROCESS FOR PREPARING COPPER PHTHALOCYANINE PIGMENTS OF THE α-MODIFICATION
Siegfried Schiessler, Frankfurt am Main; Ernst Spietschka, Oberauroff, Taunus, and Hans-Gerd Elinkmann, Frankfurt am Main, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany
Filed May 5, 1975, Ser. No. 574,759
Claims priority, application Germany, May 6, 1974, 2421804
Int. Cl.² C09B *47/04*
U.S. Cl. 260—314.5 **3 Claims**

1. A process for the preparation of highly pure, unsubstituted α-copperphthalocyanine which comprises: forming an aqueous suspension of α-copperphthalocyanine by regenerating α-copperphthalocyanine from its sulfate; finely distributing said α-copperphthalocyanine in said aqueous suspension; adding to said aqueous suspension a polar compound having up to 8 carbon atoms which is water-soluble or liquid under the aftertreating conditions recited below, said polar compound being an alcohol, a ketone, an ether, a carboxylic acid or a functional derivative of a carboxylic acid selected from the group consisting of esters, nitriles, amides, lactones and lactams and further being aliphatic, cycloaliphatic or saturated heterocyclic compound containing one or two identical or different hetero atoms selected from oxygen, sulfur and nitrogen; finely distributing said α-copperphthalocyanine in said aqueous medium containing said polar compound at a temperature of 15° to 80° C and continuing said fine distribution until the difference in the intensity between the maxima at 12.1 and 13 A and the minimum at 12.6 A in the Xray diagram of the product is from 1:10 to 10:4.

4,056,535
N-SUBSTITUTED 3-AMINOPYRROLIDINES
David W. Henry, Menlo Park, and Priscilla A. Sturm, Mountain View, both of Calif., assignors to Stanford Research Institute, Menlo Park, Calif.
Continuation-in-part of Ser. No. 594,511, July 9, 1975, abandoned. This application Apr. 23, 1976, Ser. No. 679,718
Int. Cl.² C07D *207/14*
U.S. Cl. 260—326.2 **3 Claims**

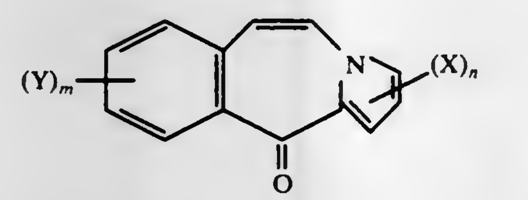
1. The compounds having the structure



wherein R^2 may be $—CON(C_2H_5)_2$ and R^3 be —H, or R^2 may be $—CO_2C_2H_5$ and R^3 be $—CH_3$, and the pharmaceutically acceptable acid addition salts thereof.

4,056,536
PYRROLO[2,1-b][3]BENZAZEPINES
Joseph G. Atkinson, Montreal; Patrice C. Belanger, Dollard des Ormeaux; Clarence S. Rooney, Beaconsfield, all of Canada, and Susan F. Britcher, Norristown, Pa., assignors to Merck & Co., Inc., Rahway, N.J.
Filed June 29, 1976, Ser. No. 700,921
Int. Cl.² C07D *487/04*
U.S. Cl. 260—326.5 B **7 Claims**

1. A compound of structural formula:



wherein

n is [3,2,] 1, or 0 (X is hydrogen);

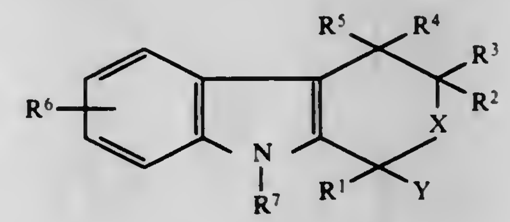
m is [4, 3, 2,] 1 or 0 (Y is hydrogen); and

X and Y are independently selected from

(1) hydrogen,
(2) halo,
(3) formyl,
(4) lower alkanoyl,
(5) lower alkyl,
(6) lower alkoxycarbonyl,
(7) hydroxy-lower alkyl,
(8) perhalo-lower alkyl,
(9) lower alkoxy,
(10) cyano,
(11) perhalo-lower alkylthio,
(12) lower alkylthio,
(13) lower alkylsulfonyl,
(14) perhalo-lower alkylsulfonyl,
(15) lower alkylsulfinyl,
(16) perhalo-alkylsulfinyl,
(17) amino,
(18) lower alkanoylamino,
(19) lower alkylamino,
(20) di(lower alkyl)amino,
(21) hydroxy,
(22) N-lower alkylcarbamoyl,
(23) N,N-di(lower alkyl)carbamoyl,
(24) nitro,
(25) di(lower alkyl)sulfamoyl,
(26) lower alkoxycarbonylamino,
(27) N-loweralkyl-carbamoyloxy,
(28) carboxy, and
(29) carbamoyl.

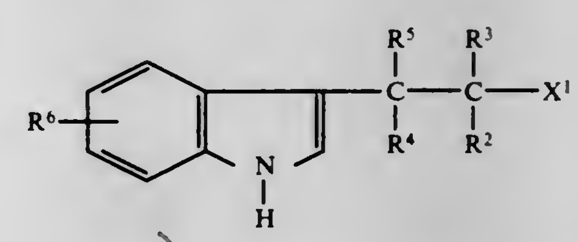
4,056,537
PROCESS FOR MAKING PYRANO- AND THIOPYRANOINDOLE DERIVATIVES
Christopher A. Demerson, St. Laurent; Leslie G. Humber, Dollard des Ormeaux; Andre A. Asselin, Lemoyne; Ivo Jirkovsky, Montreal, and Thomas A. Dobson, Dollard des Ormeaux, all of Canada, assignors to Ayerst McKenna and Harrison Ltd., Montreal, Canada
Division of Ser. No. 507,085, Sept. 18, 1974, abandoned, which is a division of Ser. No. 217,627, Jan. 13, 1972, Pat. No. 3,852,285. This application Oct. 18, 1976, Ser. No. 733,829
Int. Cl.² C07D *491/04*
U.S. Cl. 260—326.5 B **5 Claims**

1. A process for preparing a compound of formula



in which R^1 is lower alkyl or lower cycloalkyl; R^2, R^3, R^4 and R^5 are the same or different selected from the group consisting of hydrogen and lower alkyl; R^6 is hydrogen, lower alkyl, hydroxy, lower alkoxy, lower alkanoyloxy, nitro or halo; R^7 is lower alkyl, lower alkenyl, propargyl, phenyl (lower) alkyl or an amino (lower)alkyl radical or formula $—Alk—NR^8R^9$ wherein Alk is an alkylene selected from the group consisting of $CR^{10}R^{11}CR^{12}R^{13}$, $CR^{10}R^{11}CR^{12}R^{13}CR^{14}R^{15}$ and $CR^{10}R^{11}CR^{12}R^{13}CR^{14}R^{15}CR^{16}R^{17}$ wherein R^{10}, R^{11}, R^{12}, R^{13}, R^{14}, R^{15}, R^{16} and R^{17} are hydrogen or lower alkyl and R^8 and R^9 are either the same or different selected from the group consisting of hydrogen and lower alkyl, or R^8 and R^9 together with the nitrogen atom to which they are joined from a heterocyclic amine radical selected from the group consisting of 1-pyrrolidinyl piperidino, morpholino, piperazino, 4-(lower)alkyl)-1-piperazinyl and 4-[hydroxy(lower)alkyl]-1-piperazinyl; X is oxy or thio; and Y is an amino(lower)alkyl of formula $Alk—NR^8R^9$ in which Alk is CH_2 or $Alk^1—CH_2$ wherein Alk^1 is an alkylene selected from the group consisting of $CR^{10}R^{11}$, $CR^{10}R^{11}CR^{12}R^{13}$ and $CR^{10}R^{11}CR^{12}R^{13}CR^{14}R^{15}$ wherein R^8, R^9, R^{10}, R^{11}, R^{12}, R^{13}, R^{14}, and R^{15} are as defined herein, which comprises:

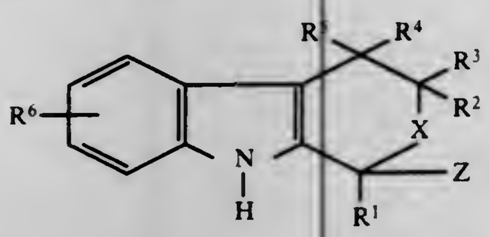
a. reacting in the presence of an inert organic solvent and an acid catalyst selected from the class consisting of p-toluenesulfonic acid, aluminum chloride, phosphorus pentoxide, boron trifluoride, zinc chloride, hydrochloric acid, perchloric acid, trifluoroacetic acid and sulfuric acid from 10 minutes to 60 hours at a temperature within the range from 20° C to the boiling point of the reaction mixture substantially equal molar equivalents of a compound of the formula:



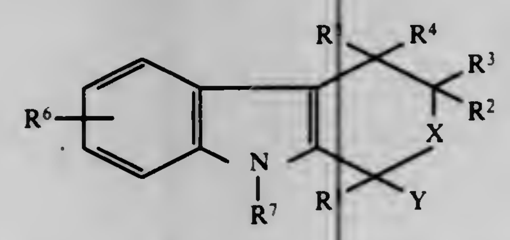
in which R^2, R^3, R^4, R^5 and R^6 are as defined herein and X^1 is hydroxy or mercapto, with the compound of formula

$$R^1—\overset{\overset{\large O}{\|}}{C}—Z$$

in which R^1 is lower alkyl or cycloalkyl and z is selected from the group consisting of CH_2OCOR^{20} and Alk^1-CH_2OCOR^{20} in which R^{20} is hydrogen or lower alkyl and Alk^1 is an alkylene selected from the group consisting of $CR^{10}R^{11}$, $CR^{10}R^{11}CR^{12}R^{13}$ and $CR^{10}R^{11}CR^{12}R^{13}CR^{14}R^{15}$ wherein R^{10}, R^{11}, R^{12}, R^{13}, R^{14} and R^{15} are hydrogen or lower alkyl; to provide a tricyclic compound of formula



in which R^1, R^2, R^3, R^4, R^5, R^6, X and Z are as defined herein;
b. subjecting the tricyclic compound to hydrolysis to obtain the corresponding primary alcohol;
c. reacting the primary alcohol with a halogenating, mesylating or tosylating agent and reacting the intermediate obtained thereby with a two molar excess of an amine of formula HNR^8R^9 in which R^8 and R^9 are as defined herein to give the corresponding amine;
d. subjecting the amine product to N-alkylation with an appropriate organic halide to introduce the R^7 substituent; to give the corresponding compound of formula



in which R^1, R^2, R^3, R^4, R^5, R^6, R^7, X and Y are as defined herein; and, if desired, forming the acid addition salt thereof with a pharmaceutically acceptable acid.

4,056,538
PROCESS FOR PREPARING PYRANO- AND THIOPYRANOINDOLE DERIVATIVES

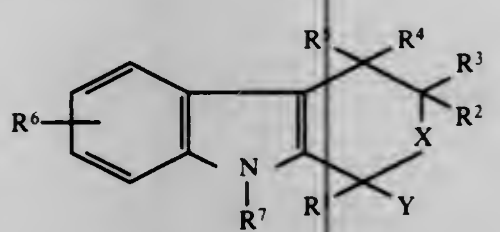
Christopher A. Demerson; Leslie G. Humber, both of Montreal; André A. Asselin, Lemoyne; Ivo Jirkovsky, and Thomas A. Dobson, both of Montreal, all of Canada, assignors to Ayerst, McKenna & Harrison Limited, Montreal, Canada

Division of Ser. No. 507,085, Sept. 18, 1974, abandoned, which is a division of Ser. No. 217,627, Jan. 13, 1972, Pat. No. 3,852,285. This application Oct. 18, 1976, Ser. No. 733,834

Int. Cl.^{2} C07D *491/04*

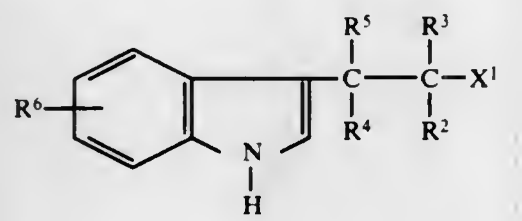
U.S. Cl. 260—326.5 B **10 Claims**

1. A process for preparing a compound of formula



in which R^1 is lower alkyl or lower cycloalkyl; R^2, R^3, R^4 and R^5 are the same or different selected from the group consisting of hydrogen and lower alkyl; R^6 is hydrogen, lower alkyl, hydroxy, lower alkoxy, lower alkanoyloxy, nitro or halo; R^7 is lower alkyl, lower alkenyl, propargyl, phenyl(lower)alkyl or an amino(lower)alkyl radical of formula —Alk—NR^8R^9 wherein Alk is an alkylene selected from the group consisting of $CR^{10}R^{11}CR^{12}R^{13}$, $CR^{10}R^{11}CR^{12}R^{13}CR^{14}R^{15}$ and $CR^{10}R^{11}CR^{12}R^{13}CR^{14}R^{15}CR^{16}R^{17}$ wherein R^{10}, R^{11}, R^{12}, R^{13}, R^{14}, R^{15}, R^{16} and R^{17} are hydrogen or lower alkyl and R^8 and R^9 are either the same or different selected from the group consisting of hydrogen and lower alkyl, or R^8 and R^9 together with the nitrogen atom to which they are joined form a heterocyclic amine radical selected from the group consisting of 1-pyrrolidinyl, piperidino, morpholino, piperazino, 4-(lower)alkyl)-1-piperazinyl and 4-[hydroxy(lower)alkyl]-1-piperazinyl; X is oxy or thio; and Y is an amino(lower)alkyl of formula Alk-NR^8R^9 in which Alk is an alkylene selected from the group consisting of $CR^{10}R^{11}$, $CR^{10}R^{11}CR^{12}R^{13}$, $CR^{10}R^{11}CR^{12}R^{13}CR^{14}R^{15}$ and $CR^{10}R^{11}CR^{12}R^{13}CR^{14}R^{15}CR^{16}R^{17}$ wherein R^8, R^9, R^{10}, R^{11}, R^{12}, R^{13}, R^{14}, R^{15}, R^{16} and R^{17} are as defined herein, and R^8 is hydrogen or lower alkyl and R^8 is lower alkyl, which comprises:

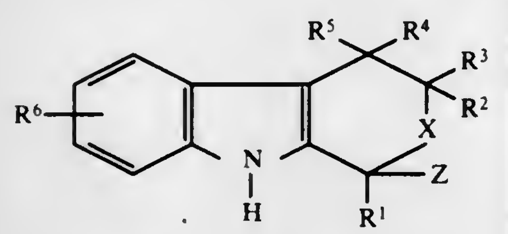
a. reacting in the presence of an inert organic solvent and an acid catalyst selected from the class consisting of p-toluenesulfonic acid, aluminum chloride, phosphorus pentoxide, boron trifluoride, zinc chloride, hydrochloric acid, perchloric acid, trifluoroacetic acid and sulfuric acid from 10 minutes to 60 hours at a temperature within the range from 20° C to the boiling point of the reaction mixture substantially equal molar equivalents of a compound of the formula:



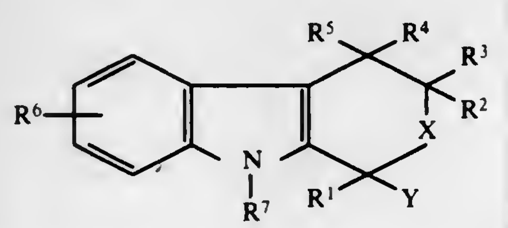
in which R^2, R^3, R^4, R^5 and R^6 are as defined herein and X^1 is hydroxy or mercapto, with the compound of formula

$$R^1-\overset{\overset{\Large O}{\|}}{C}-Z$$

in which R^1 is lower alkyl or lower cycloalkyl and Z is Alk-NR^8-COR^{21} in which Alk is an alkylene selected from the group consisting of $CR^{10}R^{11}$, $CR^{10}R^{11}CR^{12}R^{13}$, $CR^{10}R^{11}CR^{12}R^{13}CR^{14}R^{15}$ and $CR^{10}R^{11}CR^{12}R^{13}CR^{14}R^{15}CR^{16}R^{17}$ in which R^{10}, R^{11}, R^{12}, R^{13}, R^{14}, R^{15}, R^{16} and R^{17} are as defined herein, R^8 is hydrogen or lower alkyl and R^{21} is hydrogen or lower alkyl containing one to five carbon atoms, to provide a tricyclic compound of the formula



in which R^1, R^2, R^3, R^4, R^5, R^6, X and Z are as defined herein;
b. reducing the tricyclic compound with a suitable complex metal hydride to give the corresponding amine;
c. subjecting said amine to N-alkylation with an appropriate organic halide to introduce the R^7 substituent to give the corresponding compound of the formula



in which R^1, R^2, R^3, R^4, R^5, R^6, R^7 and X are as defined herein, Y is Alk $NR^8CH_2R^{21}$ wherein Alk, R^8 and R^{21} are as defined herein; and, if desired, forming the acid addition salt thereof with a pharmaceutically acceptable acid.

4,056,539
NAPHTHALIDE INDICATOR DYES

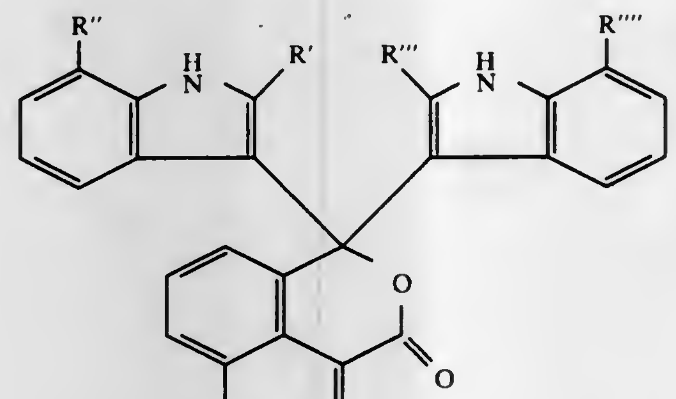
Richard B. Greenwald, Lexington, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Continuation-in-part of Ser. No. 520,248, Nov. 4, 1974, abandoned, which is a continuation-in-part of Ser. No. 204,350, Dec. 2, 1971, Pat. No. 3,862,128. This application Mar. 22, 1976, Ser. No. 669,190

Int. Cl.^{2} C07D *209/18*

U.S. Cl. 260—326.14 R **6 Claims**

1. An indicator dye having the formula



wherein R′ and R″ each are selected from hydrogen, carboxy, hydroxy, o-hydroxyphenyl, —NH—SO_2—R wherein R is alkyl containing 1 to 20 carbon atoms, aryl selected from phenyl and naphthyl, alkyl-substituted phenyl containing up to 18 carbon atoms or phenyl-substituted alkyl containing up to 18 carbon atoms, —SO_2—NH—R° wherein R° has the same meaning as R, and the group

$$-(CH_2)_n-\overset{\overset{R^1}{|}}{\underset{\underset{R^3}{|}}{C}}-R^2$$

wherein R^1 is —OH, R^2 is hydrogen, alkyl having 1 to 20 carbon atoms, aryl selected from phenyl and naphthyl, alkyl-substituted phenyl having up to 20 carbon atoms or perhalomethyl, R^1 and R^2 when taken together represent =O, R^3 is perhalomethyl, and *n* is an integer O or l, at least one of R′ and R″ being hydrogen and one of R‴ and R⁗ being said group

$$-(CH_2)_n-\overset{\overset{R^1}{|}}{\underset{\underset{R^3}{|}}{C}}-R^2$$

and the other being hydrogen.

4,056,540
4-PHENYL-1,3-BENZODIOXANS

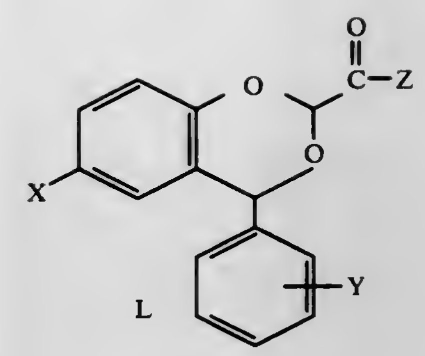
Ronald Leslie Buchanan, Fayetteville; Richard Anthony Partyka, Liverpool, and Robert Ted Standridge, Cazenovia, all of N.Y., assignors to Bristol-Myers Company, New York, N.Y.

Continuation-in-part of Ser. No. 434,463, Jan. 1, 1974, abandoned. This application Aug. 15, 1975, Ser. No. 604,979

Int. Cl.^{2} C07D *319/08, 405/06, 405/12*

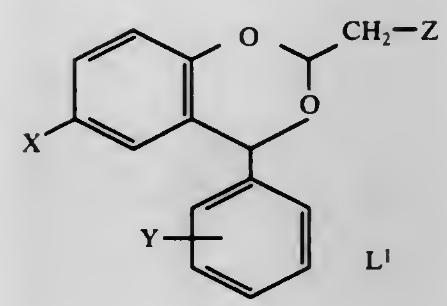
U.S. Cl. 260—340.3 **20 Claims**

1. The compound having the formula



L

or



L^1

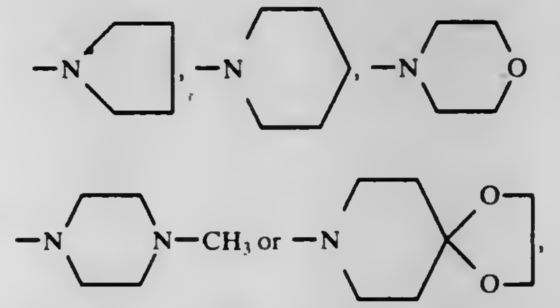
in which X and Y are alike or different and are H, F, Cl, Br, CF_3 or Nitro, Z is a radical having the formula

$$-\overset{\overset{R^6}{|}}{N}-(C_nH_{2n})-N\begin{matrix}R^1\\ \\R^2\end{matrix}$$

or

$$-N\begin{matrix}R^1\\ \\R^2\end{matrix}$$

in which R^6 is H, (lower) alkyl or phenyl, R^1 and R^2 are alike or different and each is H, lower alkyl, cycloloweralkyl or when taken together with the nitrogen a heterocyclic ring having the formula



and *n* is an integer of 1 to 4 inclusive;
or a pharmaceutically acceptable acid addition salt thereof.

4,056,541
KETOLACTONES

Werner Hoffman, Neuhofen; Norbert Mueller, Mutterstadt, and Karl von Fraunberg, Bobenheim, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

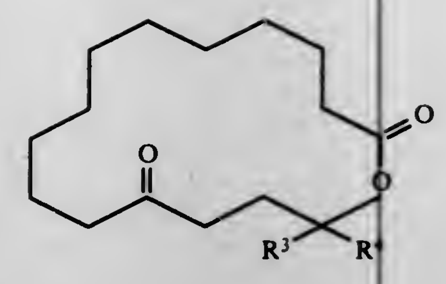
Filed Mar. 1, 1976, Ser. No. 662,579

Claims priority, application Germany, Mar. 15, 1975, 2511410

Int. Cl.^{2} C07D *313/00*

U.S. Cl. 260—343 **3 Claims**

1. The ketolactones of the general formula I



(I)

where R^3 and R^4 are $—CH_3$, $—C_2H_5$ or $—CH=CH_2$.

4,056,542
PYROLYSIS OF N-SUBSTITUTED-1-CYCLOHEXENE-1,2-DICARBOXIMIDES

Raymond L. Cobb, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.
Division of Ser. No. 360,962, May 16, 1973, Pat. No. 3,932,457. This application Aug. 8, 1975, Ser. No. 603,221
Int. Cl.[2] C07D *307/89*
U.S. Cl. 260—346.3 **7 Claims**

1. A process of preparing pyromellitic anhydride which comprises the steps of:

reacting under pyrolysis conditions at elevated temperatures in the range of about 500° to 1000° C. at reduced pressure and short contact time N-alkyl-1-cyclohexene-1,2-dicarboximide and N-alkylmaleimide in substantially equimolar relationship thereby producing N,N'-dialkyl-3,4,5,6-tetrahydropyromellitdiimide,

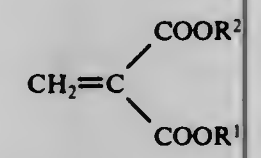
dehydrogenating said N,N'-dialkyl-3,4,5,6-tetrahydropyromellitdiimide by heating with sulfur, or with a palladium, platinum, or ruthenium dehydrogenation catalyst to N,N'-dialkylpyromellitdiimide, and

hydrolyzing said N,N'-dialkylpyromellitdiimide, thereby preparing said pyromellitic anhydride.

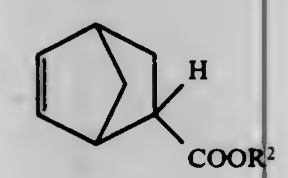
4,056,543
PROCESS OF PREPARING SUBSTITUTED ACRYLATES

Ignazio Salvatore Ponticello, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.
Filed Sept. 7, 1976, Ser. No. 721,149
Int. Cl.[2] C07D *303/16;* **C07C** *69/52*
U.S. Cl. 260—348.59 **7 Claims**

1. A process for preparing methylenemalonates having the formula



wherein R^2 is selected from the group consisting of alkyl or R^1; R^1 is selected from the group consisting of alkyl, allyl R^5—$O(CH_2)_n$, glycidyl, haloalkyl, vinyl, propargyl, and cycloalkyl; R^5 is alkyl and n is an integer of from 1 to 10, comprising (1) reacting a compound having the formula

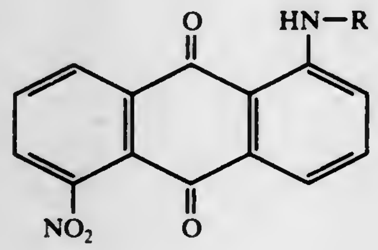


wherein R^2 is as described above with an electrophilic material having the formula $XCOOR^1$ wherein R^1 is as described above and X is halogen in the presence of an alkyl-substituted lithium amide complex at a temperature range of −78° C to −40° C and (2) pyrolyzing the resulting norbornene at a temperature of 400° C to 800° C at 1mm to 760mm Hg pressure in an inert atmosphere.

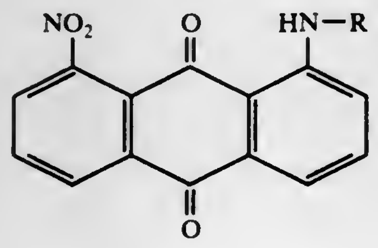
4,056,544
ANTHRAQUINONE COMPOUNDS

Walter Hohmann, Leverkusen; Helmut Herzog, Bergisch-Neukirchen, and Hans-Samuel Bien, Burscheid, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany
Filed Feb. 15, 1974, Ser. No. 443,119
Claims priority, application Germany, Feb. 16, 1973, 2307591
Int. Cl.[2] C09B *1/16*
U.S. Cl. 260—378 **5 Claims**

1. Compound of the formula

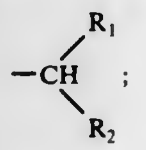


or



in which

R is cycloalkyl or



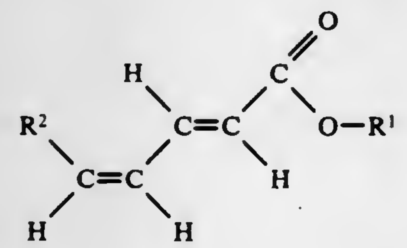
and R_1 and R_2 are alkyl.

4,056,545
MANUFACTURE OF OLEFINICALLY UNSATURATED ESTERS

Werner Hoffmann, Neuhofen, and Manfred Baumann, Mannheim, both of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany
Filed July 14, 1976, Ser. No. 705,280
Claims priority, application Germany, Aug. 5, 1975, 2534859
Int. Cl.[2] C09F *5/08, 7/10;* **C11C** *3/00*
U.S. Cl. 260—410 **8 Claims**

1. A process for the manufacture of Δ,β, γ,δ-unsaturated esters containing a high proportion of the 2(E), 4(Z)-isomer of the formula:

(I)

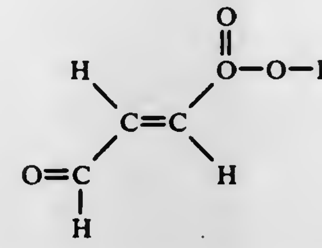


wherein R^1 is a saturated hydrocarbon radical of 1 to 4 carbon atoms and R^2 is a linear or branched hydrocarbon radical of 1 to 10 carbon atoms, which process comprises slowly introducing an ether solvent solution of a phosphorane of the formula:

$$R^2—CH=P(R^3)_3 \qquad (II)$$

wherein R^2 is as defined above and R^3 is phenyl or tolyl, at from 60° to 150° C, into an ether solvent solution of a fumaraldehyde-acid ester of the formula:

(III)

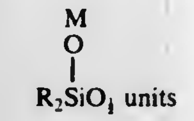


wherein R^1 is as defined above.

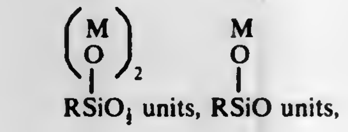
4,056,546
HYDROCARBONOXY-CONTAINING SILICONE FLUIDS USEFUL AS HYDRAULIC FLUIDS

Edgar D. Brown, Jr., Schenectady, N.Y., assignor to General Electric Company, Waterford, N.Y.
Continuation of Ser. No. 429,386, Dec. 28, 1973, Pat. No. 3,984,449, which is a division of Ser. No. 256,483, May 24, 1972, Pat. No. 3,821,114. This application July 30, 1976, Ser. No. 710,090
The portion of the term of this patent subsequent to Oct. 5, 1993, has been disclaimed.
Int. Cl.[2] C10M *3/46, 3/44*
U.S. Cl. 260—448.8 R **5 Claims**

1. A silicone fluid useful as a hydraulic fluid consisting essentially of a polymer having 75 to 95 mole percent by weight of polymeric units selected from the class consisting of from



and R_2SiO units and mixtures thereof, 5 to 25 mole percent of polymeric units selected from the class consisting of



and $RSiO_{3/2}$ units and mixtures thereof with trace amounts of other units selected from the class consisting of $(MO)_3SiO_{1/2}$ units, $(MO)_2SiO$ units, $MOSiO_{3/2}$ units, SiO_2 units and $R_3SiO_{3/2}$ units and substantially free of disiloxanes, wherein the molar amount of MO groups present based on the total moles of R and MO groups present may vary from 5 to 95 mole percent, wherein the viscosity of the polymer may vary from 2 to 400 centistokes at 25° C, R is a lower alkyl radical, M is selected from the class consisting of ROR'—, ROR'OR'—, and $R(OC_xH_{2x})_n$— such that R is as previously defined, R' is selected from the class consisting of alkylene and arylene radicals of 1 to 10 carbon atoms, x varies from 2 to 4 and n varies from 4 to 100.

4,056,547
PROCESS FOR THE PREPARATION OF ORGANIC ISOCYANATE COMPOUNDS

Yoshiaki Tanaka, Osaka; Susumu Handa, Wakayama; Atsushi Nishibata, Wakayama; Sadashi Ueda, Wakayama; Yoshiaki Inamoto, Wakayama; Masahiro Saito, Wakayama; Fumio Tanimoto, Kyoto, and Hisao Kitano, Osaka, all of Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan
Filed Sept. 24, 1976, Ser. No. 726,205
Claims priority, application Japan, Oct. 7, 1975, 50-121047
Int. Cl.[2] C07C *118/00*
U.S. Cl. 260—453 P **4 Claims**

1. A process for preparing organic isocyanates which comprises reacting at a temperature of from 150° to 250° C, for from 0.1 to 10 hours, an alkali metal or ammonium cyanate, or mixture thereof, with a compound having the formula

$$(X)_nRCH_2Cl$$

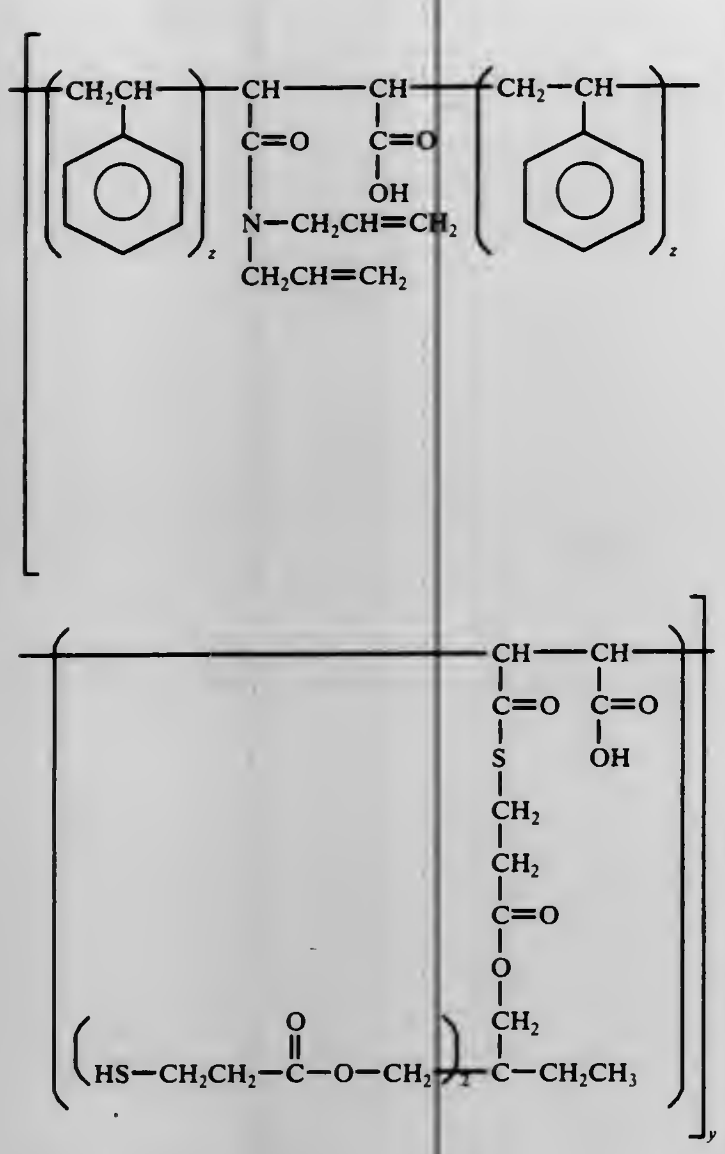
wherein X is chlorine, alkyl, cycloalkyl, alkenyl, phenyl, chloromethylphenyl or chloromethyl, n is zero or an integer of from 1 to 3 and R is an aromatic hydrocarbon radical, and X can be the same or different when n is more than 1,

in the presence of a catalyst composition consisting essentially of (a) from 0.1 to 20 weight percent, based on the weight of said compound, of a cuprous salt selected from the group consisting of cuprous chloride, cuprous bromide, cuprous thiocyanate, cuprous cyanate and mixtures thereof, and (b) a nitrogen compound selected from the group consisting of triethylene diamine, pyridine, ethylpyridine, lutidine, collidine, trimethylamine, triethylamine, tripropylamine, tributylamine, triamylamine, trihexylamine, tri-higher-alkylamines, dimethylbenzylamine, methyldibenzylamine, tribenzylamine, dimethylnaphthylamine, N-methylpiperidine, N-methylmorpholine, N-butylmorpholine, N,N'-dimethylpiperazine, tetramethylammonium chloride, tetraethylammonium chloride, trimethylbenzylammonium chloride, dimethylbenzyl-higher-alkylammonium chloride, tetramethylammonium bromide, tetraethylammonium bromide, trimethylbenzylammonium bromide, 1,8-diazabicyclo[5.4.0]-7-undecene and mixtures thereof, in an amount of said nitrogen compound equivalent to from 0.05 to 1.25 gram atoms of nitrogen per gram mole of said cuprous salt, and in a solvent, or mixture of solvents, having a dielectric constant (ϵ) of $\leqq 20$, which are free of active hydrogen atoms and which have a boiling point of from 150° to 400° C.

4,056,548
CURABLE POLYENE-POLYTHIOL COMPOUNDS AND METHODS FOR PREPARATION AND CURING

Donald W. Larsen, Marriottsville, Md., assignor to W. R. Grace & Co., New York, N.Y.
Division of Ser. No. 677,649, April 16, 1976, Pat. No. 3,996,257, which is a division of Ser. No. 504,410, Sept. 9, 1974, Pat. No. 3,966,794, which is a continuation of Ser. No. 259,148, June 2, 1972, abandoned. This application Sept. 17, 1976, Ser. No. 723,851
Int. Cl.[2] C07C *153/11*
U.S. Cl. 260—455 R **1 Claim**

1. A polymer comprising recurring structural units of the formula:



wherein z is from 1 to about 3 and y is from 1 to about 10.

4,056,549

S-3-METHOXYPHENYL N-ALKYLTHIOLCARBAMATES AND S-3-METHYLTHIOPHENYL N-ALKYLTHIOLCARBAMATES

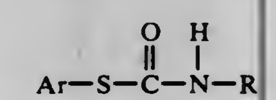
Jay Kent Rinehart, Akron, Ohio, assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed June 7, 1976, Ser. No. 693,666

Int. Cl.² C07C *155/00;* A01N *9/12*

U.S. Cl. 260—455 A **4 Claims**

1. A S-substituted phenyl N-alkylthiolcarbamate represented by the general formula:



wherein:

Ar is selected from the group consisting of 3-methoxyphenyl and 3-methylthiophenyl; and

R is an alkyl of from one to four carbon atoms.

4,056,550

ALPHA-CYANOETHYLPHTHALATE AND PREPARATION THEREOF

Francois A. Lavallee, Willoughby Hills, Ohio, assignor to General Electric Company, Schenectady, N.Y.

Continuation-in-part of Ser. No. 468,405, May 9, 1974, abandoned. This application Apr. 26, 1976, Ser. No. 680,454

Int. Cl.² C07C *121/66*

U.S. Cl. 260—465 D **15 Claims**

1. A solid stereo isomer mixture having meso and dl-isomers of crystalline alpha-cyanoethylphthalate with a refractive index of about $1.5349n_D^{21°}$ and a melting point in the range from about 62° C to about 66° C wherein said mixture contains about 80% by weight of the predominant meso isomer and about 20% by weight of the dl-isomers.

6. A method for preparing a solid stereo isomer mixture having meso and dl-isomers of crystalline alpha-cyanoethylphthalate which comprises:

a. dissolving lactonitrile and an amine in a liquid organic solvent to form a first solution,
b. dissolving a stoichiometric quantity of a phthalic acid halide compound in the same solvent to form a second solution,
c. mixing the solutions at ambient conditions to form alpha-cyanoethylphthalate dissolved in the reaction mixture,
d. precipitating the alpha-cyanoethylphthalate as a stereo isomer mixture by adding an organic precipitant liquid to the reaction mixture at a temperature whereby said mixture contains about 80% by weight of the predominant meso isomer and about 20% by weight of the dl-isomers, and

separating the precipitated stereoisomer mixture from the reaction mixture.

4,056,551

PREPARATION OF SUCCINYLSUCCINIC ACID DIESTERS

Mitsuhiro Goi, and Masahiko Miyashita, both of Hirakata, Japan, assignors to Nippon Gohsei Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Nov. 5, 1976, Ser. No. 739,284

Claims priority, application Japan, Nov. 17, 1975, 50-138432; Nov. 27, 1975, 50-143094

Int. Cl.² C07C *67/30, 69/95*

U.S. Cl. 560—126 **8 Claims**

1. In the process for preparing a succinylsuccinic acid diester by subjecting a γ-haloacetoacetic acid ester to dimerization in the presence of a base in a reaction medium, the improvement which comprises carrying out the dimerization in a mixed medium of an alcohol having at least 2 carbon atoms and water containing a water-immiscible organic compound selected from the group consisting of halogenated aliphatic hydrocarbons and aromatic hydrocarbons in an amount of 0.5 to 40% by volume based on the total volume of an alcohol and water.

4,056,552

ETHYL 3,7-CYCLODECADIENE-1-CARBOXYLATE

Günther Wilke, and Paul Heimbach, both of Mulheim (Ruhr), Germany, assignors to Studiengesellschaft Kohle m.b.H., Mulheim (Ruhr), Germany

Division of Ser. No. 463,089, April 22, 1974, Pat. No. 3,920,762, which is a division of Ser. No. 109,949, Jan. 26, 1971, Pat. No. 3,849,506, which is a division of Ser. No. 845,904, July 29, 1969, abandoned, Ser. No. 845,901, July 29, 1969, Pat. No. 3,629,347, and Ser. No. 843,220, July 18, 1969, Pat. No. 3,586,727, each is a continuation-in-part of Ser. No. 582,775, Sept. 27, 1966, abandoned. This application Apr. 4, 1975, Ser. No. 565,282

Claims priority, application Germany, Sept. 29, 1965, 24439

Int. Cl.² C07C *69/74*

U.S. Cl. 560—128 **1 Claim**

1. Ethyl-3,7-cyclodecadiene-1-carboxylate.

4,056,553

3-AMINO-4-CARBOALKOXY-BENZOIC ACID 4'-PHENOXY-ANILIDES

Friedrich Wilhelm Weingarten, Liederbach, Taunus, and Klaus Hunger, Kelkheim, Taunus, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

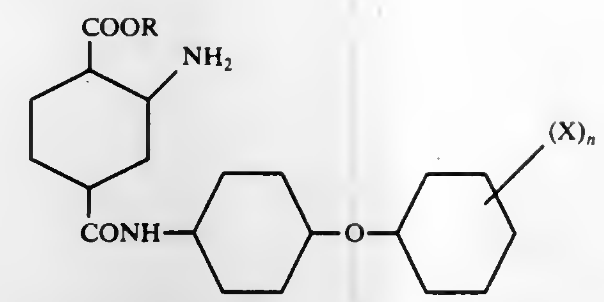
Filed May 13, 1976, Ser. No. 686,008

Claims priority, application Germany, May 15, 1975, 2521649

Int. Cl.² C07C *103/78*

U.S. Cl. 560—43 **8 Claims**

1. A compound of the formula



wherein R is methyl or ethyl, X stands for equal or different halogen atoms and n is an integer of 1 to 4 or zero.

4,056,554

2,2-DIFLUORO-16-PHENOXY-13,14-DIHYDRO-PGF₁ ANALOGS

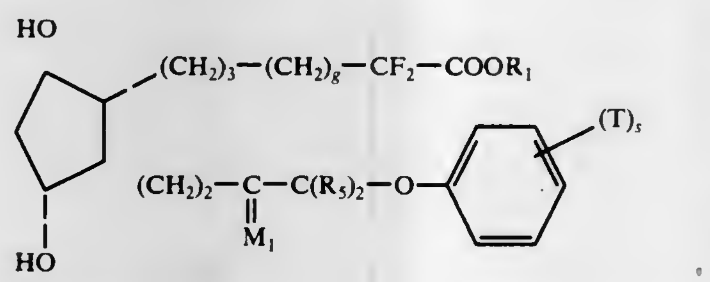
Udo F. Axen, Plainwell, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 552,708, Feb. 25, 1975, Pat. No. 4,001,300. This application Sept. 17, 1976, Ser. No. 724,238

Int. Cl.² C07C *65/22*

U.S. Cl. 560—60 **58 Claims**

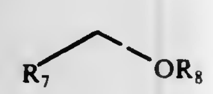
1. A compound of the formula



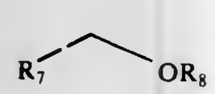
or a mixture comprising that compound and the enantiomer thereof,

wherein g is 2 to 4, inclusive;

wherein M_1 is



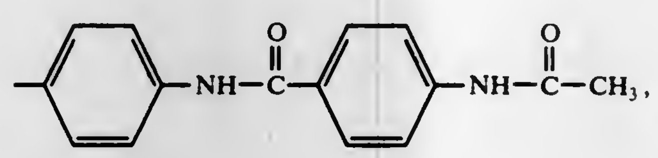
or



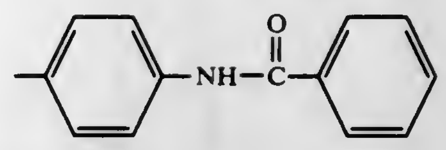
wherein R_7 and R_8 are hydrogen or methyl, with the proviso that one of R_7 or R_8 is methyl only when the other is hydrogen;

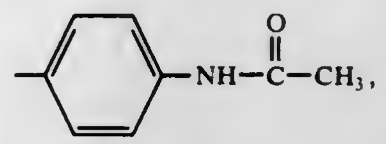
wherein T is alkyl of one to 3 carbon atoms, inclusive, fluoro, chloro, trifluoromethyl, or $-OR_4$ wherein R_4 is alkyl of one to 3 carbon atoms, inclusive, and wherein s is zero, one, 2, or 3, with the proviso that not more than two T's are other than alkyl;

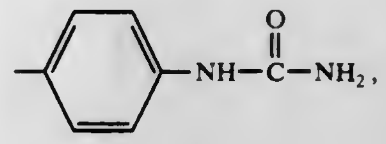
wherein R_1 is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with 1, 2, or 3 chloro, alkyl of 1 to 4 carbon atoms, inclusive, or a pharmacologically acceptable cation,

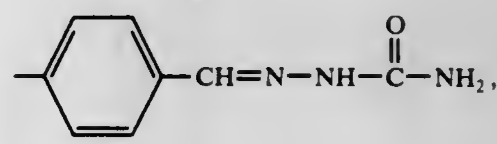


-continued

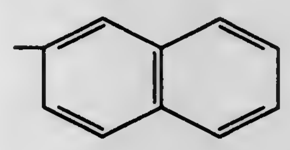








or



; and

wherein R_5 is hydrogen or methyl, with the proviso that R_5 is methyl only when R_7 and R_8 are both hydrogen.

4,056,555

2,2-DIFLUORO-16-PHENOXY-PGA₂ ANALOGS

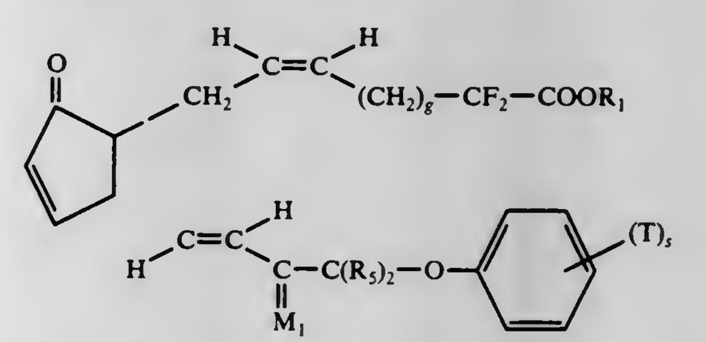
Udo F. Axen, Plainwell, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 552,708, Feb. 24, 1975, Pat. No. 4,001,300. This application Sept. 17, 1976, Ser. No. 724,152

Int. Cl.² C07C *65/22*

U.S. Cl. 560—53 **58 Claims**

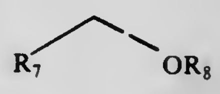
1. A compound of the formula



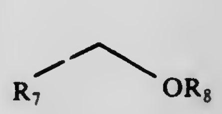
or a mixture comprising that compound and the enantiomer thereof,

wherein g is 2 to 4, inclusive;

wherein M_1 is



or

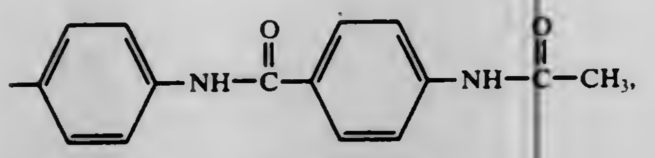


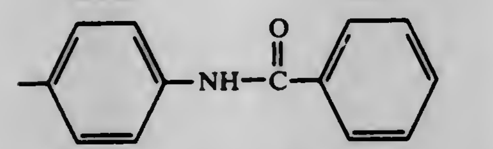
wherein R_7 and R_8 are hydrogen or methyl, with the proviso that one of R_7 or R_8 is methyl only when the other is hydrogen;

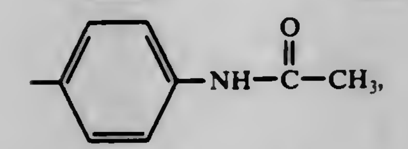
wherein T is alkyl of one to 3 carbon atoms, inclusive, fluoro, chloro, trifluoromethyl, or $-OR_4$ wherein R_4 is alkyl of one to 3 carbon atoms, inclusive, and wherein s is

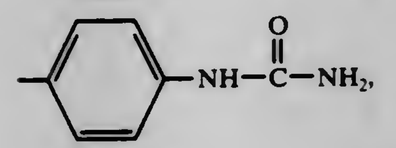
zero, one, 2, or 3, with the proviso that not more than two T's are other than alkyl;

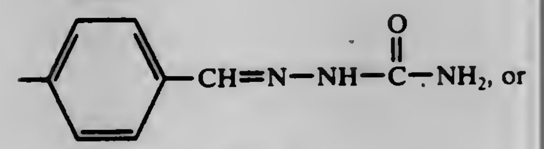
wherein R_1 is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, 2, or 3 chloro, alkyl of one to 4 carbon atoms, inclusive, or a pharmacologically acceptable cation,

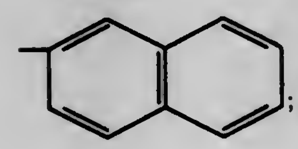












; and

wherein R_5 is hydrogen or methyl, with the proviso that R_5 is methyl only when R_7 and R_8 are both hydrogen.

4,056,556

2,2-DIFLUORO-16-PHENOXY-PGE$_2$ ANALOGS

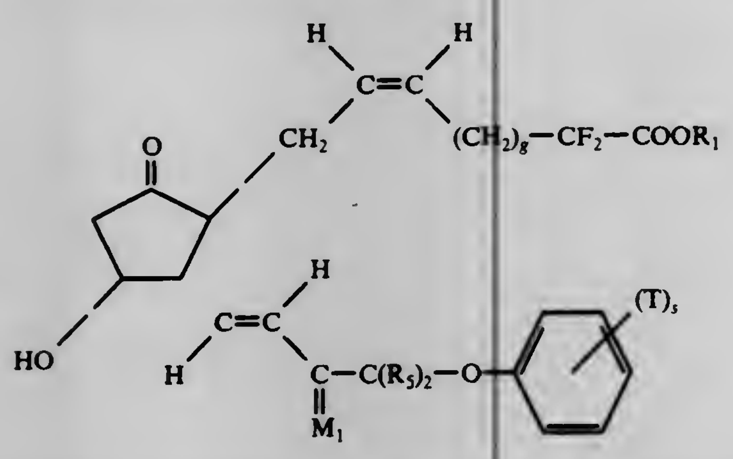
Udo F. Axen, Plainwell, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 552,708, Feb. 25, 1975, Pat. No. 4,001,300. This application Sept. 17, 1976, Ser. No. 724,153

Int. Cl.^{2} C07C *65/22*

U.S. Cl. 560—53 **58 Claims**

1. A compound of the formula



or a mixture comprising that compound and the enantiomer thereof,

wherein g is 2 to 4, inclusive;

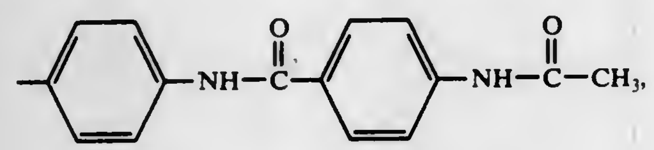
wherein M_1 is

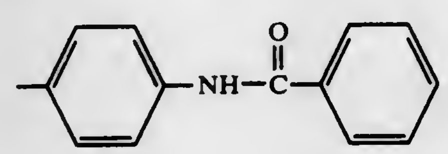
-continued

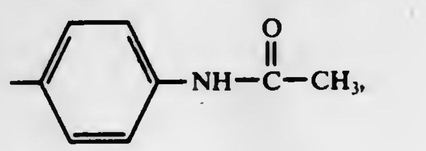
wherein R_7 and R_8 are hydrogen or methyl, with the proviso that one of R_7 or R_8 is methyl only when the other is hydrogen;

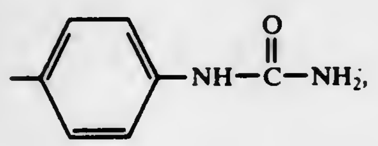
wherein T is alkyl of one to 3 carbon atoms, inclusive, fluoro, chloro, trifluoromethyl, or —OR_4 wherein R_4 is alkyl of one to 3 carbon atoms, inclusive, and wherein s is zero, one, 2, or 3, with the proviso that not more than two T's are other than alkyl;

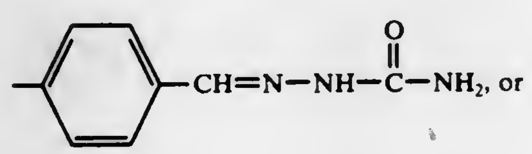
wherein R_1 is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, 2, or 3 chloro, alkyl of one to 4 carbon atoms, inclusive, or a pharmacologically acceptable cation,

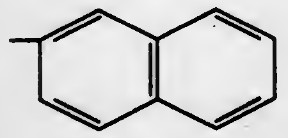












; and

wherein R_5 is hydrogen or methyl, with the proviso that R_5 is methyl only when R_7 and R_8 are both hydrogen.

4,056,557

2,2-DIFLUORO-16-PHENOXY-PGF$_1$ ANALOGS

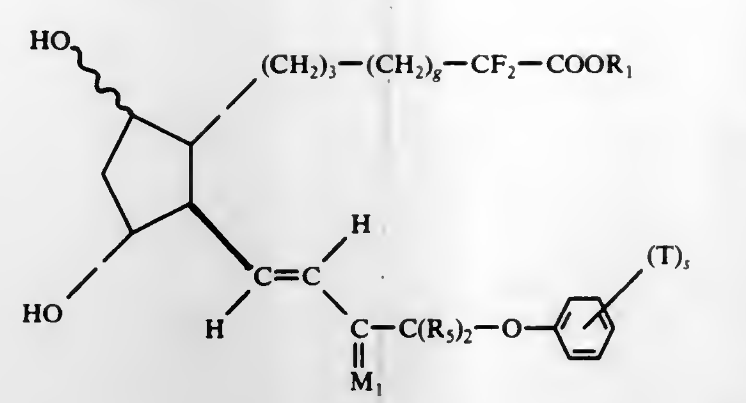
Udo F. Axen, Plainwell, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 552,708, Feb. 25, 1975, Pat. No. 4,001,300. This application Sept. 17, 1976, Ser. No. 724,151

Int. Cl.^{2} C07L *65/21*

U.S. Cl. 560—60 **58 Claims**

1. A compound of the formula



or a mixture comprising that compound and the enantiomer thereof,

wherein g is 2 to 4, inclusive;

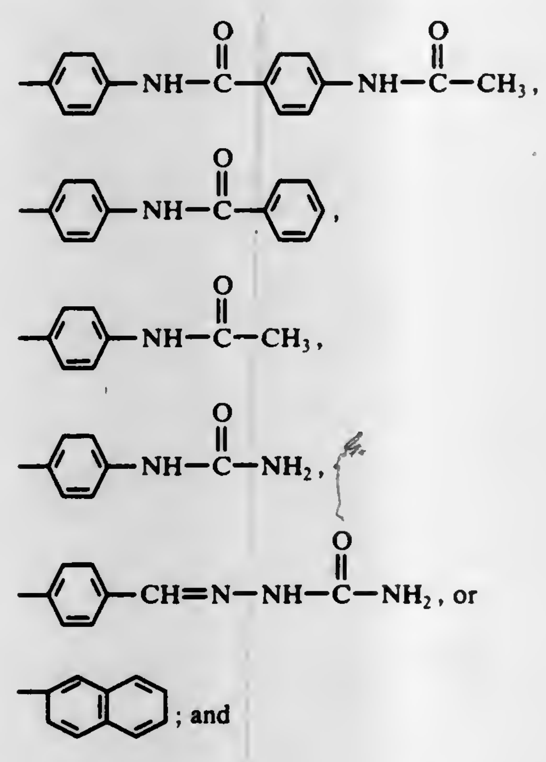
wherein M_1 is

or

wherein R_7 and R_8 are hydrogen or methyl, with the proviso that one of R_7 or R_8 is methyl only when the other is hydrogen;

wherein T is alkyl of one to 3 carbon atoms, inclusive, fluoro, chloro, trifluoromethyl, or —OR_4 wherein R_4 is alkyl of one to 3 carbon atoms, inclusive, and wherein *s* is zero, one, 2 or 3, with the proviso that not more than two T's are other than alkyl;

wherein R_1 is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, 2, or 3 chloro, alkyl of one to 4 carbon atoms, inclusive, or a pharmacologically acceptable cation,



; and

wherein R_5 is hydrogen or methyl, with the proviso that R_5 is methyl only when R_7 and R_8 are both hydrogen.

4,056,558

SULFOSUCCINATES OF POLYHYDROXY TERTIARY AMINES AS NEW DETERGENT-SOFTENER COMPOUNDS

Bjorn Sundby, Halifax, Canada, assignor to Colgate-Palmolive Company, New York, N.Y.

Continuation-in-part of Ser. No. 205,395, Dec. 6, 1971, Pat. No. 3,928,422. This application Dec. 12, 1973, Ser. No. 424,250

The portion of the term of this patent subsequent to Dec. 23, 1992, has been disclaimed.

Int. Cl.^{2} C07C *143/15*

U.S. Cl. 560—151 **12 Claims**

1. Sulfosuccinate esters of the formula:

$$R_1-\underset{\displaystyle |}{\overset{A}{CH}}-CH_2-\overset{R_2}{\underset{}{N}}-R_3$$

wherein

R_1 is C_{8-24} alkyl;

A is OH or

$$-OOC-\underset{\displaystyle SO_3X}{R_5}-COOX;$$

R_2 is C_{1-6} alkyl or hydroxyalkyl or

$$-R_4-OOC-\underset{\displaystyle SO_3X}{R_5}-COOX;$$

R_3 is C_{1-6} hydroxyalkyl or

$$-R_4-OOC-\underset{\displaystyle SO_3X}{R_5}-COOX;$$

R_4 is C_{1-6} alkylene;

R_5 is ethylene or C_{1-6} alkyl-substituted ethylene;

X is H or a salt-forming member of the group consisting of alkali metal, ammonium, mono, di-and tri-C_{1-4} alkylamine, and mono-, di- and tri-C_{1-4} alkanolamine;

and at least one of R_2 and R_3 is

$$-R_4-OOC-\underset{\displaystyle SO_3X}{R_5}-COOX;$$

or mixtures of mono-, di- and tri-esters having said formula.

4,056,559

NOVEL POLYMERS OF ALKYL METHACRYLATES

Sheldon N. Lewis, Willow Grove, and Richard A. Haggard, Fort Washington, both of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Continuation-in-part of Ser. No. 371,921, June 20, 1973, abandoned, which is a continuation-in-part of Ser. No. 137,057, April 23, 1971, abandoned. This application Oct. 23, 1974, Ser. No. 517,336

Int. Cl.^{2} C07C *9/54*

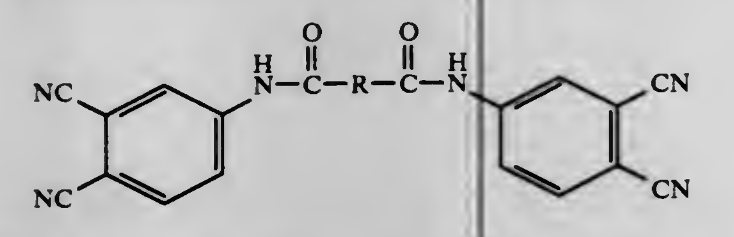
U.S. Cl. 526—212 **18 Claims**

1. An anionically-polymerized addition homopolymer or copolymer of at least one ester of methacrylic acid selected from the group consisting of (C_1-C_{24}) alkyl esters of methacrylic acid, di(C_1-C_4) alkylamino (C_2-C_4) alkyl esters of methacrylic acid, (C_2-C_{12}) alkoxyalkyl esters of methacrylic acid, (C_7-C_{12}) aryloxyalkyl esters of methacrylic acid, (C_7-C_{12}) aralkoxyalkyl esters of methacrylic acid, and (C_7-C_{10}) aralkyl esters of methacrylic acid, and, in a copolymer, other anioni-

cally copolymerizable monomers, wherein *n*, the average chain length of the homopolymer or copolymer, is about 6to 50 mers; the polymerization being carried out, in the presence of an alcohol and a catalytic amount of an alkoxide, using controlled rates of addition of at least one of the ester, the alcohol and the alkoxide.

4,056,560
N,N'-BIS(3,4-DICYANOPHENYL) ALKANEDIAMIDES
James R. Griffith, Riverdale Heights, and Jacques G. O'Rear, Temple Hills, both of Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.
Continuation-in-part of Ser. No. 500,209, Aug. 23, 1974, Pat. No. 3,993,631. This application July 23, 1976, Ser. No. 707,979
Int. Cl.^{2} C07C *121/78*
U.S. Cl. 260—465 D **6 Claims**

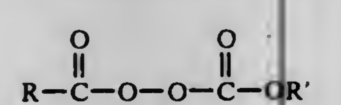
1. A composition of matter having the formula:



wherein R = $(CH_2)_{n-2}$ and $(CH_2)_xCHCH_3(CH_2)_y$; n = 3 to 20; x = 1 to 8; y = 1 to 8.

4,056,561
THERMALLY STABLE HIGH MOLECULAR WEIGHT ACYL PEROXYCARBONIC ESTERS IN VULCANIZATION OF SILICONE RUBBER
Roger N. Lewis, Martinez; Ronald L. Pastorino, Larkspur, and James F. Wilts, Richmond, all of Calif., assignors to Argus Chemical Corporation, Brooklyn, N.Y.
Division of Ser. No. 696,463, June 16, 1976. This application Mar. 7, 1977, Ser. No. 774,832
Int. Cl.^{2} C08G *77/04*; C08F *2/00*
U.S. Cl. 260—46.5 G **8 Claims**

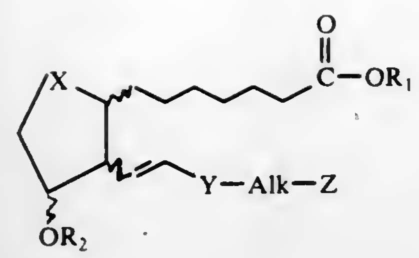
1. A process for the vulcanization of silicone rubber comprising: subjecting ethylenically unsaturated silicone rubber to vulcanization conditions in the presence of a vulcanizing amount of an acyl peroxycarbonic ester of the formula:



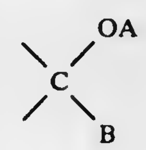
where R is selected from methyl and ethyl; and R' is an alkyl group which together with R contains a total of 17 to about 25 carbon atoms.

4,056,562
3,5-BISOXYGENATED 2-(ω-HALO-3-OXYGENATED-1-ALKENYL)-CYCLOPENTANE-1-HEPTANOIC ACIDS AND DERIVATIVES THEREOF
Richard A. Mueller, Northbrook, Ill., assignor to G. D. Searle & Co., Chicago, Ill.
Division of Ser. No. 577,675, May 15, 1975, Pat. No. 3,997,588. This application July 19, 1976, Ser. No. 706,364
Int. Cl.^{2} C07C *177/00*
U.S. Cl. 560—231 **12 Claims**

1. A compound of the formula



wherein R_1 is hydrogen or an alkyl radical containing 1-12 carbon atoms; R_2 is hydrogen, a tetrahydropyran-2-yl or trialkylsilyl radical, or alkanoyl radical containing 1-12 carbon atoms; X is a carbonyl radical; Y is a radical of the formula



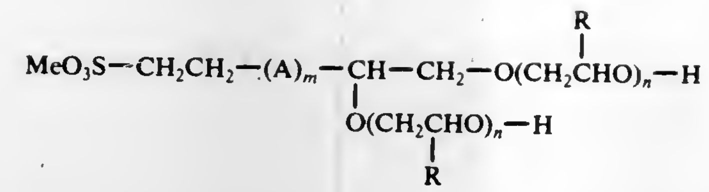
A being hydrogen or an alkanoyl radical containing 1-12 carbon atoms and B being hydrogen or an alkyl radical containing 1-12 carbon atoms; Z is a chloro, bromo, or iodo radical; Alk is an alkylene radical containing 3-8 carbon atoms; and the wavy lines represent the alternative α and β stereochemical configuration.

4,056,563
METHOD OF PRODUCING ALLYLACETATE
Varazdat Karapetovich Boyadzhian, ulitsa Grachia Nersesiana, 10, kv. 1; Saribek Saakovich Khachatrian, ulitsa Agaiana, 10, kv. 1-a; Genrikh Gevorkovich Stepanian, ulitsa Olega Koshevogo, 5, kv. 75; Volodya Karapetovich Eritsian, Achapniak, 11, kvartal 6, kv. 35; Edik Stepanovich Agavelian, ulitsa Grachia Kochara, 12, kv. 6, all of Erevan; Oleg Matveevich Nefedov, ulitsa Shukhova, 5/7, kv. 15, Moscow; Igor Evgenievich Dolgy, ulitsa Vernadskogo, 95, korpus 2, kv. 262, Moscow; Mikhail Fedorovich Sisin, ulitsa Schepkina, 30, kv. 12, Moscow; Alexei Yakovlevich Kolbasin, Salavat, bulvar Matrosova, 8/12, kv. 17, and Ivan Konstantinovich Anikeev, Salavat, ulitsa Kalinina, 38, kv. 70, both of Bashkirskaya ASSR, all of U.S.S.R.
Filed Jan. 28, 1976, Ser. No. 653,375
Claims priority, application U.S.S.R., Jan. 31, 1975, 2101054
Int. Cl.^{2} C07C *67/05*
U.S. Cl. 560—245 **2 Claims**

1. A method of producing allylacetate by oxyacetylation of propylene residing in that propylene is reacted with acetic acid and oxygen in a gaseous phase at a temperature of 150°-250° C under a pressure of 1-10 atg in the presence of the catalyst tetraammonium palladium acetate of the formula $(CH_3COO)_2$ containing sodium acetate, zinc acetate and copper acetylacetonate or copper acetateon an alumina support.

4,056,564
DIHYDROXY SULPHONATES CONTAINING ETHER STRUCTURES
Gerhard Dieter Wolf, Dormagen; Francis Bentz, Cologne, and Günther Nischk, Dormagen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany
Filed July 22, 1975, Ser. No. 598,104
Claims priority, application Germany, Aug. 2, 1974, 2437218
Int. Cl.^{2} C07C *143/42, 143/11*; C08G *63/12*; C08C *69/44*
U.S. Cl. 260—512 C **2 Claims**

1. Dihydroxy sulphonates containing ether groups and corresponding to the following general formula:



(I)

wherein

A represents a straight- or branched-chain alkylene radical having from 1 to 6 carbon atoms;

R represents hydrogen, a C_1–C_4 alkyl radical or phenyl;

Me represents NH_4 or an alkali metal;

m is 0 or 1; and

n is a number of from 1 to 30.

4,056,565
PROCESS FOR THE PRODUCTION OF ACRYLAMIDE AND METHACRYLAMIDE
Fujio Matsuda, Fujisawa, Japan, assignor to Mitsui Toatsu Chemicals, Incorporated, Tokyo, Japan
Filed July 21, 1970, Ser. No. 56,967
Claims priority, application Japan, July 24, 1969, 44-58021; Oct. 9, 1969, 44-80309; Nov. 4, 1969, 44-87593; Nov. 25, 1969, 44-93945
Int. Cl.^{2} C07C *103/133*
U.S. Cl. 260—561 N **5 Claims**

1. A process for the production of an amide, which comprises reacting a nitrile selected from the group consisting of acrylonitrile and methacrylonitrile with water in the presence of a catalyst consisting essentially of Raney copper.

4,056,566
ACIDIC EDIBLE PECTIN HYDROGEL CONTAINING COLLOIDALLY DISPERSED PROTEIN AND METAPHOSPHATE IONS FOR PREVENTING COAGULATION OF THE PROTEIN
Sakuichi Sakakibara, Kobe; Ko Sugisawa, and Yukio Kitamura, both of Nara, all of Japan, assignors to House Food Industrial Company Limited, Osaka, Japan
Filed Apr. 26, 1977, Ser. No. 791,015
Int. Cl.^{2} A23L *1/04*
U.S. Cl. 426—577 **10 Claims**

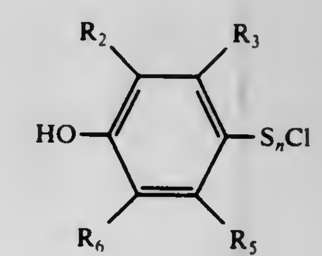
1. An edible gel consisting essentially, in parts by weight, of 0.4 to 2.0 parts pectin, an amount of calcium or magnesium sufficient to cause gelling of said pectin, 0.1 to 30 parts of an edible acid, 0.1 to 1.5 parts metaphosphate ions, calculated as sodium metaphosphate, 20 to 98 parts water, and 2 to 70 parts of an edible protein, not more than 40% of the carboxyl groups in said pectin being esterified with methyl, the amount of said acid being sufficient to impart a pH of not more than 6.15 to said gel, and said protein being colloidally dispersed in said gel.

4,056,567
CHEMICAL PROCESSES FOR PREPARING CITRIC ACID
Vincent Lamberti, Upper Saddle River, and Eddie N. Gutierrez, Fort Lee, both of N.J., assignors to Lever Brothers Company, New York, N.Y.
Filed Mar. 8, 1976, Ser. No. 664,449
Int. Cl.^{2} C07C *59/16*
U.S. Cl. 260—535 P **17 Claims**

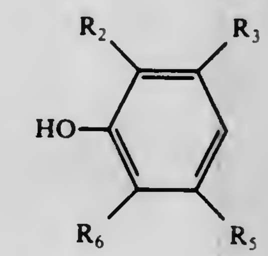
1. A process for preparing calcium, magnesium and strontium salts of citric acid and mixtures thereof comprising the corresponding salt or mixture of salts of a tricarboxylic acid selected from the group consisting of cis-aconitic acid, trans-aconitic acid, isocitric acid, alloiso-citric acid and mixtures thereof, in an aqueous medium at a temperature of at least about 160° C and in the presence of an alkali metal hydroxide or an alkaline earth metal hydroxide selected from the group consisting of calcium hydroxide, magnesium hydroxide, strontium hydroxide and mixtures thereof.

4,056,568
2,6-DIALKYL-4-HYDROXYSULFENYL CHLORIDES
Merle Edward Cisney, Camas, Wash., assignor to Crown Zellerbach Corporation, San Francisco, Calif.
Continuation-in-part of Ser. No. 561,391, March 24, 1975, abandoned. This application Mar. 1, 1976, Ser. No. 662,292
Int. Cl.^{2} C07C *145/00*
U.S. Cl. 260—543 H **13 Claims**

1. A method of preparing a sulfenyl chloride having the formula



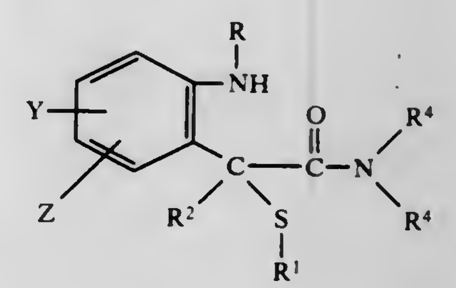
wherein R_3 and R_5 are lower alkyl groups, R_2 and R_6 are hydrogen or lower alkyl groups, and n is 1 or 2, which method comprises reacting S_nCl_2 with only an equimolar amount of a 3,5-dialkyl phenol having the formula



in an inert solvent.

4,056,569
ORTHO-[(ALKYLTHIO)(AMINOCARBONYL)METHYL]-ANILINES
Paul G. Gassman, Columbus, Ohio, assignor to The Ohio State University Research Foundation, Columbus, Ohio
Division of Ser. No. 563,783, March 31, 1975, Pat. No. 3,996,264, which is a division of Ser. No. 355,207, April 27, 1973, Pat. No. 3,897,451. This application June 17, 1976, Ser. No. 696,942
Int. Cl.^{2} C07C *103/28*
U.S. Cl. 260—558 S **3 Claims**

1. A compound having a formula



wherein R is hydrogen, a hydrocarbon radical free from aliphatic unsaturation and containing from 1 to 8 carbon atoms, or a lower alkanoyl;

R^1 is lower alkyl, phenyl or benzyl;

R^2 is hydrogen, lower alkyl, phenyl or benzyl;

each R^4 is hydrogen or a lower alkyl;

each of Y and Z is hydrogen or a substituent selected from the group consisting of halogen, nitro, cyano, lower alkyl and lower alkyloxy.

4,056,570

ACYLFORMANIDINE INSECTICIDAL AND MITICIDAL COMPOUNDS

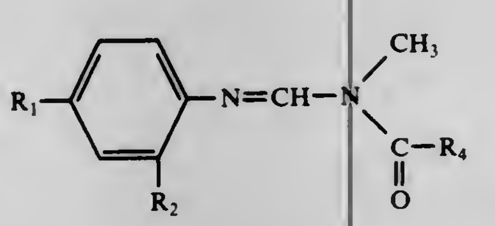
Ferenc M. Pallos, Walnut Creek, Calif., assignor to Stauffer Chemical Company, Westport, Conn.

Division of Ser. No. 575,313, May 7, 1975, Pat. No. 3,962,305, which is a division of Ser. No. 439,507, Feb. 4, 1974, abandoned. This application Mar. 12, 1976, Ser. No. 666,520

Int. Cl.² C07C *123/127*

U.S. Cl. 260—562 B **6 Claims**

1. The compound having the formula



wherein R_1 and R_2 are independently methyl or halogen and R_4 is either haloalkyl or ketoalkyl.

4,056,571

PROCESS FOR THE PREPARATION OF TERTIARY PHOSPHINE OXIDES

Hans-Jerg Kleiner, Bad Soden, Taunus, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

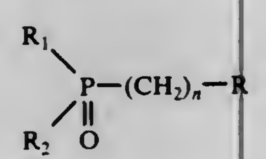
Continuation of Ser. No. 407,580, Oct. 18, 1973, abandoned, which is a division of Ser. No. 171,305, Aug. 12, 1971, Pat. No. 3,790,638. This application June 21, 1976, Ser. No. 698,002

Claims priority, application Germany, Aug. 13, 1970, 2040208

Int. Cl.² C07F *9/28, 9/30, 9/50*

U.S. Cl. 260—583 E **6 Claims**

1. A compound of the formula



in which R_1 and R_2 are alkyl of 1 to 12 carbon atoms, n is 3, and R is

$—NR_4R_5$

in which R_4 is hydrogen, and R_5 is hydrogen.

4,056,572

METHOD FOR THE MANUFACTURE OF PHENOLS

Andrei Nikolaevich Bashkirov, Novopeschanaya ulitsa, 21, korpus 1, kv. 13; Mark Markovich Grozhan, prospekt Kalinina, 31, kv. 49; Vladimir Vasilievich Kamzolkin, ulitsa Vavilova, 55/5, kv. 25; Jury Anatolievich Lapitsky, Leninsky prospekt, 83, korpus 2, kv. 226, and Irina Vladimirovna Vygodskaya, ulitsa Novatorov, 36, korpus 9, kv. 38, all of Moscow, U.S.S.R.

Continuation of Ser. No. 887,339, Dec. 22, 1969, abandoned. This application Feb. 22, 1974, Ser. No. 444,984

Int. Cl.² C07C *39/06, 39/08, 67/05*

U.S. Cl. 260—624 R **14 Claims**

1. A method for the production of a monohydric phenol comprising subjecting an alkyl benzene wherein the alkyl moiety consists of at least one alkyl group selected from the group consisting of methyl and ethyl groups to liquid-phase oxidation with oxygen at a temperature of 180°–250° and under a pressure of 15–30 atm in the presence of

a. 0.0006 to 10 mole percent of a strongly acidic catalyst and
b. an esterifying agent selected from the group consisting of lower alkanoic carboxylic acid anhydrides and acid chlorides, followed by saponification or hydrolysis of the resulting monohydric phenolic ester to form the monhydric phenol.

4,056,573

SYNTHESIS OF ACYCLIC, TERPENE ALCOHOLS

Ralph E. Close, and John M. Derfer, both of Jacksonville, Fla., assignors to SCM Corporation, New York, N.Y.

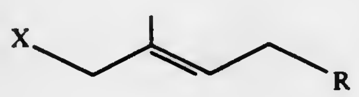
Continuation-in-part of Ser. No. 571,375, April 24, 1975, abandoned. This application July 1, 1976, Ser. No. 701,699

Int. Cl.² C07C *29/00, 41/00*

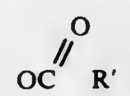
U.S. Cl. 260—631.5 **8 Claims**

1. A process for the preparation of 3,7-dimethyloctan-1-ol and derivatives thereof substituted at the 7-position with an hydroxy or ether group, comprising the steps of

a. coupling 3-methylbut-1-yn or the 3-hydroxy or ether substituted derivative thereof with a C_5 coupling reagent having the configuration



X being a leaving group selected from the group consisting of chloride, bromide, iodide, tosylate and mesylate, R being



or OR', R' being a lower alkyl up to 5 carbon atoms, phenyl, substituted phenyl up to 10 carbon atoms, aralkyl up to 10 carbon atoms or cycloalkyl up to 10 carbon atoms;

b. said coupling being carried out in the presence of a cuprous salt and an acid scavenger;
c. subjecting the reaction product of step a,b) to hydrogenation and saponification or ether cleavage to convert the ester or ether group in the 1-position to an hydroxyl group.

4,056,574

OXIDATIVE COUPLING PROCESS

David Holland; David John Milner, both of Runcorn, and Hugh Wilma Boulton Reed, Middlesborough, all of England, assignors to Imperial Chemical Industries Limited, London, England

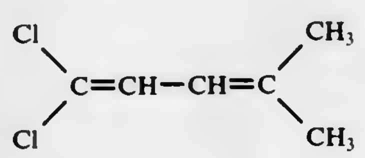
Filed Apr. 26, 1976, Ser. No. 680,124

Claims priority, application United Kingdom, Apr. 28, 1975, 17511/75

Int. Cl.² C07C *21/00*

U.S. Cl. 260—654 R **6 Claims**

1. A process for the preparation of 1,1-dichloro-4-methyl penta-1,3-diene of formula



which comprises oxidatively coupling isobutene with vinylidene chloride by heating them together in homogeneous liquid medium in the presence of a catalytic amount of palladium acetate at a temperature in the range 50° to 150° C, the ratio of isobutene to vinylidene chloride being in the range 2 to 1 to 15 to 1.

4,056,575

CHEMICAL PROCESS MAKING AROMATIC HYDROCARBONS OVER GALLIUM CATALYST

Reginald Gregory, Camberley, and Alexander John Kolombos, Sutton, both of England, assignors to The British Petroleum Company Limited, London, England

Filed July 12, 1976, Ser. No. 704,166

Claims priority, application United Kingdom, July 17, 1975, 30012/75; Nov. 20, 1975, 47829/75; June 11, 1976, 24297/75

Int. Cl.² C07C *3/04*

U.S. Cl. 260—673.5 **23 Claims**

1. A process for the production of aromatic hydrocarbons comprising subjecting an unsaturated hydrocarbon containing at least six carbon atoms to aromatisation in the presence of a catalyst consisting essentially of elemental gallium or a compound of gallium deposited on a support.

4,056,576

CHEMICAL PROCESS OVER GALLIUM CATALYST CONVERTING SATURATED HYDROCARBONS TO OLEFINS

Reginald Gregory, Camberley, and Alexander John Kolombos, Sutton, both of England, assignors to The British Petroleum Company Limited, London, England

Filed July 12, 1976, Ser. No. 704,167

Claims priority, application United Kingdom, July 17, 1975, 30012/75; Nov. 20, 1975, 47829/75; June 11, 1976, 24296/76

Int. Cl.² C07C *3/28*

U.S. Cl. 260—683.3 **12 Claims**

1. A process for producing olefinic hydrocarbons from the corresponding C_3–C_8 saturated hydrocarbon feedstock comprising subjecting the feedstock to dehydrogenation conditions in the presence of a catalyst composition consisting essentially of elemental gallium or a compound of gallium deposited on a support.

4,056,577

SEPARATION OF ACID-HYDROCARBON EMULSIONS AND ALKYLATION PROCESS UTILIZING SAID SEPARATION

Thomas Hutson, Jr., and Donald J. Makovec, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Nov. 11, 1976, Ser. No. 741,315

Int. Cl.² C07C *3/54;* **B01D** *17/04*

U.S. Cl. 260—683.48 **9 Claims**

1. A process for achieving rapid separation of HF acid-hydrocarbon emulsions into separate HF acid and hydrocarbon phases which comprises adding to said emulsion a finite amount of up to about 700 ppm of a tetraalkylammonium iodide coalescing promoter, based on HF acid present in said emulsion, and allowing said emulsion containing said coalescing promoter to separate into an HF acid phase and a hydrocarbon phase.

4,056,578

ISOPARAFFIN-OLEFIN ALKYLATION PROCESS USING A SUPPORTED PERFLUORINATED POLYMER CATALYST

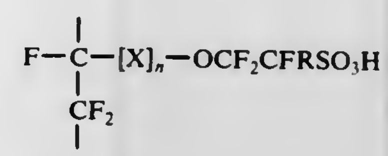
James D. McClure, and Stanley G. Brandenberger, both of Houston, Tex., assignors to Shell Oil Company, Houston, Tex.

Division of Ser. No. 663,956, March 4, 1976, Pat. No. 4,038,213. This application Apr. 1, 1977, Ser. No. 783,522

Int. Cl.² C07C *3/54*

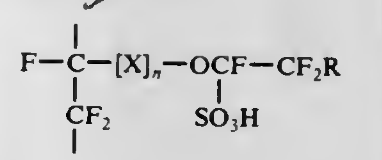
U.S. Cl. 260—683.47 **8 Claims**

1. A liquid phase alkylation process which comprises contacting a C_4 to C_6 isoparaffin or mixtures thereof with an olefin selected from the group consisting of C_2 to C_5 monoolefins or mixtures thereof at a reaction temperature of between about 80° C and about 225° C and with a catalyst composition comprising a solid perfluorinated polymer catalyst supported on an inert porous carrier having an average pore diameter of between about 50 A and about 600 A in a weight ratio of catalyst to support of between about 0.5:100 and about 20:100 wherein said catalyst contains a repeating structure selected from the group of:



a)

or



b)

where n is 0, 1 or 2; **R is a radical selected from the group consisting of fluorine and perfluoroalkyl radicals having from** 1 to 10 carbon atoms; and X is selected from the group consisting of:

$[O(CF_2)_m]$, $[OCF_2CFY]$ or $[OCFYCF_2]$

where m is an integer from 2 to 10 and Y is a radical selected from the class consisting of fluorine and the trifluoromethyl radical.

4,056,579

NOVEL THERMOSETTING RESIN COMPOSITION AND CURED PRODUCT THEREFROM

Akio Nishikawa, Hitachi; Hitoshi Yokono, Katsuta; Shun-ichi Numata, and Junji Mukai, both of Hitachi, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Sept. 15, 1975, Ser. No. 613,543

Claims priority, application Japan, Sept. 30, 1974, 49-111543

Int. Cl.² C08L *63/00*

U.S. Cl. 260—830 P **8 Claims**

1. A thermosetting resin composition consisting essentially of (a) an isocyanate group-terminated condensate obtained by reacting a polycarboxylic acid compound having at least one acid anhydride ring with a stoichiometric excess of a polyfunctional isocyanate compound or said condensate containing the unreacted isocyanate compound, (b) a polyfunctional epoxy compound, the isocyanate group-terminated condensate or said condensate containing the unreacted isocyanate compound being present in an equivalent ratio of isocyanate compound to the polyfunctional epoxy compound of 0.2 : 1 to 4 : 1, and (c) a catalyst which forms mainly isocyanurate rings and oxazolidone rings selected from the group consisting of tertiary amine tetraphenylborates, N-substituted morpholine tetraphenylborates, imidazole tetraphenylborates and onium salt tetraphenylborates, the amount of said catalyst being from about 0.01 to 10% by weight based on the weight of the condensate and the polyfunctional epoxy compound.

4,056,580

METHOD FOR PREPARATION OF METHACRYLATE AND ACRYLATE POLYMERS AND COPOLYMERS BY ANIONIC POLYMERIZATION

Lubomir Lochmann, and Jiri Trekoval, both of Prague, Czechoslovakia, assignors to Ceskoslovenska akademie ved, Prague, Czechoslovakia

Filed Nov. 21, 1974, Ser. No. 525,854

Claims priority, application Czechoslovakia, Nov. 26, 1973, 8136/73; May 24, 1974, 3734/74; July 3, 1974, 4690/74

Int. Cl.² C08F *2/00, 4/46, 20/10, 293/00*

U.S. Cl. 260—881 **12 Claims**

1. A method for the preparation of acrylate and methacrylate polymers and copolymers by anionic polymerization com-

prising the step of polymerizing at least an acrylate or methacrylate monomer in the presence of an initiating system selected from the group consisting of an alpha-lithium carboxylic acid ester and an alkoxide of a heavier alkali metal selected from the group consisting of sodium, potassium, rubidium and cesium, a carboxylic acid ester substituted in the alpha-position with an alkali metal selected from the group consisting of sodium, potassium, rubidium and cesium and a carboxylic acid ester substituted in the alpha-position with an alkali metal selected from the group consisting of sodium, potassium, rubidium, and cesium and an alkoxide of an alkali metal selected from the group consisting of lithium, sodium, potassium, rubidium and cesium, said carboxylic acid ester containing 3 to 30 carbon atoms in the straight or branched chain and 1 to 6 ester groups bonded to different carbon atoms and said alkoxide containing 3 to 16 carbon atoms in the straight or branched chain.

4,056,581

PROCESS FOR THE PREPARATION OF PHOSPHORODICHLORIDOTHIOLATES

Horst O. Bayer, Levittown, and William S. Hurt, Collegeville, both of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Filed Aug. 22, 1975, Ser. No. 607,078

Int. Cl.^{2} C07F *9/20*

U.S. Cl. 260—972 **28 Claims**

1. A process for preparing a phosphorodichloridothiolate of the formula

$$RS-\overset{\overset{\displaystyle O}{\|}}{\underset{\underset{\displaystyle Cl}{|}}{P}}-Cl$$

wherein R is

a. a (C_1-C_{10}) alkyl group, optionally substituted with a (C_1-C_4) alkoxy group, a (C_1-C_4) alkylthio group or a halogen atom;

b. a (C_3-C_6)cycloalkyl group;

c. a (C_7-C_{10}) aralkyl group, optionally substituted with up to three (C_1-C_5) alkyl groups, (C_1-C_5) alkoxy groups, halogen atoms, or nitro groups; or

d. a (C_6-C_{10}) aryl group, optionally substituted with up to three (C_1-C_5) alkyl groups, (C_1-C_5) alkoxy groups, halogen atoms or nitro groups;

which comprises reacting at a temperature of about −20° C. to about 50° C., a sulfenyl chloride of the formula

$$R-S-Cl$$

wherein R is as defined above,

with phosphorus trichloride, and water or a carboxylic acid.

4,056,582

HUMIDIFIER ASSEMBLY

Ho Chow, River Edge, N.J., assignor to Beatrice Foods Co., Chicago, Ill.

Continuation of Ser. No. 537,250, Dec. 30, 1974, abandoned. This application June 7, 1976, Ser. No. 693,377

Int. Cl.^{2} B01F *3/04*

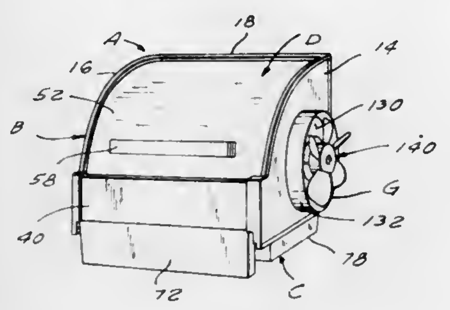
U.S. Cl. 261—30 **29 Claims**

1. A humidifier assembly comprising:

A. a housing defining at least a pair of operative apertures and comprising a rear wall adapted to be secured to an associated hot gas heating system, a stationary front section, a movable top cover section, and end walls, said front section having an opening therein remote from said top section, said rear wall and said heating system each having a port therein, said ports being in gaseous communication with each other, said rear wall port comprising one of said operative apertures;

B. an open-topped reservoir means slidably received in said housing through said opening and accessible at the front of said housing for removal and replacement;

C. a rotatable fluid carrier subassembly rotatably received in given position in said housing between said end walls with a portion thereof adapted to contact fluid within said reservoir means via the open top thereof, said reservoir means and said fluid carrier subassembly each being removable from said housing separately from each other;



D. means for rotating said fluid carrier subassembly through at least 360°; and

E. means for operatively connecting said rotating means with said fluid carrier subassembly;

whereby gas to be humidified enters said housing through one of said apertures, passes through said fluid carrier subassembly to absorb moisture therefrom, and exits said housing through another of said apertures.

4,056,583

VARIABLE VENTURI CARBURETOR

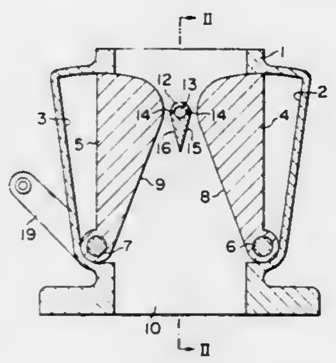
Kazuo Shinoda, and Akira Ii, both of Toyota, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed July 17, 1975, Ser. No. 596,726

Claims priority, application Japan, Feb. 7, 1975, 50-15923

Int. Cl.^{2} F02M *9/06*

U.S. Cl. 261—36 A **4 Claims**



1. A variable Venturi carburetor for gasoline engines which comprises:

a body member which defines therein a passage including a pair of sectorially concaved portions;

a pair of opposing sectorial elements received by said concaved portions and defining a Venturi passage therebetween;

a fuel nozzle means disposed to traverse a throat portion of said Venturi passage;

means for moving said pair of sectorial elements to vary the flow area of said throat portion;

a fuel supply passage connected with said fuel nozzle means for supplying fuel thereto;

said fuel supply passage including a variable orifice means which is controlled in relation to the movement of said sectorial elements so that the flow area of said orifice means is proportional to that of said throat portion;

a fuel pressure control valve which includes a biasing element actuated by the intake manifold vacuum of the engine;

said valve delivering fuel at a constant pressure when said vacuum is greater than a predetermined value which generates an acoustic air flow through said throat opening, and at a pressure proportional to said vacuum when it is smaller than said predetermined value;

said fuel pressure regulating valve including a first diaphragm valve which comprises a relief valve structure operated by a diaphragm;

said diaphragm being controlled by a spring force and a second diaphragm which is actuated by the intake manifold vacuum;

said first diaphragm supports a valve member which cooperates with an end portion of a tube which is branched from the fuel supply passage;

said valve structure controlling the flow of fuel to be branched from said fuel supply passage and returned to a fuel tank;

said first diaphragm being urged towards said inner end of said tube by a compression coil spring which is supported at an opposite end by said second diaphragm; and

said second diaphragm being driven by the intake manifold vacuum so that it supports said opposite end of said compression coil spring at a predetermined limit position when the intake manifold vacuum is equal or greater than said predetermined value and is shifted rearward to loosen said compression coil spring when the intake mainfold vacuum is smaller than said predetermined value.

4,056,584

METHOD OF MAKING A GRAPHITE FUEL ELEMENT HAVING CARBONACEOUS FUEL BODIES

Gary N. Miertschin, and David F. Leary, both of San Diego, Calif., assignors to General Atomic Company, San Diego, Calif.

Filed Sept. 30, 1974, Ser. No. 510,282

Int. Cl.^{2} G21C *21/02*

U.S. Cl. 264—.5 **10 Claims**

1. A method of making a nuclear fuel element comprising the steps of providing a porous rigid fuel element block of graphite having a cavity of precise dimension formed therein, combining particulate nuclear fuel material having fission-product retentive coatings, particulate carbon, pitch, and a carbonizable coke-reducing additive which is effective to reduce the coke yield upon carbonization, said additive being selected from the group consisting of (1) polystyrene and styrene-butadiene copolymers having a molecular weight between about 500 and 1,000,000, (2) aromatic hydrocarbons having a molecular weight between about 75 and 300, and (3) saturated hydrocarbon polymers having a molecular weight between about 5,000 and 1,000,000, said pitch and said additive being heated to a temperature of at least 100° C., molding a green fuel body from said combination of materials under pressure, inserting said molded green fuel body into said cavity within said fuel element block and heating said molded green body in situ in said fuel element cavity to decompose the pitch and said additive leaving a relatively close-fitting fuel body in said cavity, which fuel body comprises coated nuclear fuel particles plus particulate carbon in a coke matrix formed from said carbonized pitch and additive, wherein said coke constitutes an amount not more than 25 weight percent of the original weight of pitch plus said additive.

4,056,585

TOOTH DIE AND METHOD AND APPARATUS FOR MAKING THE SAME

Robert W. Waltke, 39-32 215th Place, Bayside, N.Y. 11361

Filed May 20, 1976, Ser. No. 688,179

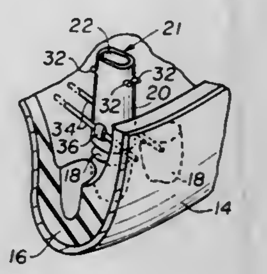
Int. Cl.^{2} A61C *13/08*

U.S. Cl. 264—19 **15 Claims**

15. A method for forming a unitary tooth die and stem integral with and removable from a dental stone model comprising

positioning a casting member having a hollow interior over and in alignment with and spaced from a negative impression of a denture having a cavity of a selected tooth to be reproduced,

pouring a dental molding material into the negative impression and into the hollow of the casting member and cavity to form the stem of a tooth die that is integral with the tooth die reproduction formed by the material in the cavity of the selected tooth,



allowing the molding material to harden into a dental stone model,

relieving the dental stone model to provide access to a part of the die stem,

and applying a force to the accessible part of the die stem to cleave and separate the unitary tooth die and stem from the casting member and dental stone model.

4,056,586

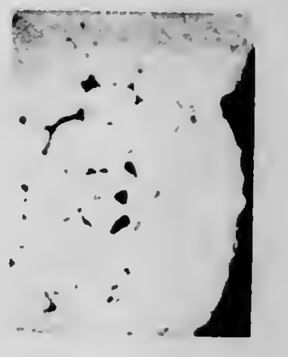
METHOD OF PREPARING MOLTEN METAL FILTER

Michael J. Pryor, Woodbridge, Conn., and Thomas J. Gray, Halifax, Canada, assignors to Swiss Aluminium Limited, Chippis, Switzerland

Division of Ser. No. 430,229, Jan. 2, 1974, Pat. No. 3,893,917. This application Dec. 4, 1974, Ser. No. 529,452

Int. Cl.^{2} C04B *33/32*

U.S. Cl. 264—44 **8 Claims**



1. A method of preparing a disposable filter for filtering molten metal which comprises:

A. providing an open cell flexible organic foam material having a thickness of from ¼ inch to 4 inches and having a plurality of interconnected voids surrounded by a web of said material, wherein said foam contains from 5 to 100 pores per inch;

B. providing an aqueous ceramic slurry containing from about 10 to 40% water, wherein said ceramic is selected from the group consisting of alumina, chromia, zirconia, magnesia, titanium dioxide, silica and mixtures thereof, and impregnating said material therewith by immersing said material in said aqueous ceramic slurry so that the web is coated therewith and the voids are filled therewith;

C. compressing the impregnated material and releasing the compression by passing said impregnated material through preset rollers to expel from 25 to 75% of said slurry therefrom while leaving the web coated therewith;

D. forming said slurry coated flexible foam into a desired curved configuration, drying said material while in said configuration and retaining said material in said configuration throughout the drying step; and

E. heating the dried material to burn off the web of flexible foam and to sinter the ceramic coating while avoiding collapse thereof, wherein the dried impregnated material

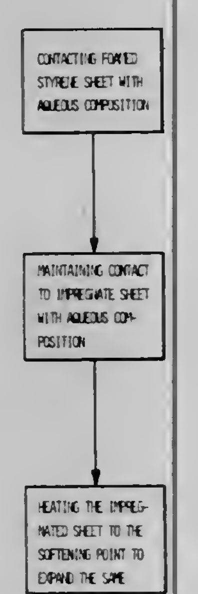
is heated in two stages, with the first stage being to slowly heat at a rate less than 10° C per minute to a temperature of from 350° to 700° C and hold within said temperature range for from 15 minutes to 6 hours to burn off the web of flexible foam, and with the second stage being to heat at a rate less than 100° C per minute to a temperature of from 1200° to 1600° C and hold within said temperature range for from 15 minutes to 10 hours to sinter the ceramic and wherein said dried material is retained in said configuration throughout said heating step,

thereby providing a fused ceramic foam having a desired curved configuration and having a plurality of interconnected voids surrounded by a web of fused ceramic in the configuration of said flexible foam, wherein the resultant fused ceramic foam has a density of less than 30% of the theoretical density for a ceramic material of the same size.

4,056,587

PROCESS FOR EXPANDING

Arvid Honkanen, Spartanburg, and Paul Joonase, Taylors, both of S.C., assignors to W. R. Grace & Co., Duncan, S.C.
Filed Oct. 20, 1975, Ser. No. 624,152
Int. Cl.² B29D *27/00*
U.S. Cl. 264—53 **27 Claims**



1. A process for further expanding a previously expanded styrene polymer foam sheet comprising the steps of:

impregnating the previously expanded styrene polymer foam sheet with an aqueous composition to the extent of at least 0.3 parts of aqueous composition per 100 parts of styrene polymer; and

heating the thus impregnated sheet to at least the softening point of said styrene polymer to soften said polymer and to volatilize said aqueous composition within the porosity of said foam sheet to thus expand said foam sheet by the action of said volatilized aqueous composition to a greater extent than any expansion which would be produced in the absence of said aqueous composition.

4,056,588

BONDED PARTICULATE CERAMIC MATERIALS AND THEIR MANUFACTURE

Avraham Matitiahu Baniel, Haifa; Abraham Mitzmager, Kiriat Bialik; Jeanna Segall, Haifa; Shlomo Star, Haifa, and Leonard Marshall Shorr, Haifa, all of Israel, assignors to IMI (TAMI) Institute for Research and Development, Haifa, Israel
Continuation-in-part of Ser. No. 230,998, March 1, 1972, abandoned, which is a continuation-in-part of Ser. No. 814,432, April 8, 1969, abandoned, which is a continuation-in-part of Ser. No. 518,792, Jan. 5, 1966, abandoned. This application Mar. 13, 1974, Ser. No. 450,558
Int. Cl.² C04B *35/64*
U.S. Cl. 264—63 **5 Claims**

1. A method for the manufacture of self-bonded bodies from particulate materials selected from the group consisting of oxides of magnesium, silicon, aluminum, zirconium, beryllium, thorium, cerium, titanium, chromium, iron; metal aluminates, titanates, ferrites, and silicates; and carbides of silicon, tungsten, titanium, boron and tantalum characterized in that a shaped mixture containing the particulate material, from 0 to 6% of its weight of water, and from 1 to 10% of its weight of a heat-decomposable additive is subjected to initial green-strength providing conditions in which the additive is substantially not reactive towards any of the other ingredients of the mixture, then heated to a temperature within the range from about 200° C to about 600° C, at which the additive is thermally decomposed and bonding of said particulate material is effected, to form low strength bonded bodies, and then further heated to a higher temperature at which the particles of the particulate material become self-bonding, said additive being characterized by not boiling below 350° C at 760 mm/Hg, and being thermally decomposed at said temperature range from about 200° C to about 600° C to produce a non-volatile inorganic residue amounting to at least 5% of the original weight of the additive, said additive being an organo-phosphorus compound having a non-polymeric inorganic moiety and corresponding to the formula

$$M(A_x \text{ or } {}_{x+1}Q_{x'})\,(A'R)_y(R')_z$$

wherein,

M is an element selected from the group consisting of metals and silicon;

A and A′ are each O, S or N;

Q is P, P=O or P=S;

R and R′ are each H, or a hydrocarbon, substituted hydrocarbon, organo-metallyl or-metalloxy radical, and R′ may also be halogen; x and z are each an integer from zero to 5; x' is an integer from 1 to 5, and y is an integer from zero to 8, provided that y and z may not both be zero, and A′R and/or R′ can be bonded either to M or Q and there may be more than one type of A′R and/or R′ groups in the molecule.

4,056,589

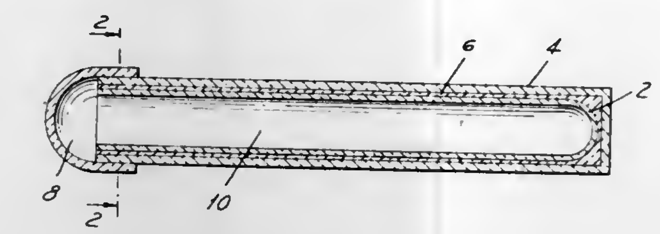
METHOD FOR SINTERING CERAMICS

James N. Lingscheit, Dearborn, Mich., assignor to Ford Motor Company, Dearborn, Mich.
Filed Feb. 18, 1976, Ser. No. 658,982
Int. Cl.² C04B *35/10*
U.S. Cl. 264—65 **12 Claims**

1. A method for sintering a green ceramic body comprised of polycrystalline bi- or multi-metal oxides comprising:

A. encapsulating said body in a chamber having inner and outer wall portions, said inner wall portion being
   i. adjacent to said body being sintered and
   ii. comprised of a sintered polycrystalline bi- or multi-metal oxide composition of the same type as said body being sintered such that upon heating during the sintering process volatile metal oxide constituents of said composition create an atmosphere of said constituents which surrounds said body being sintered, and

said outer wall portion being
   i. adjacent to, contiguous with and integrally bonded to the entire outer surface of said inner wall portion and



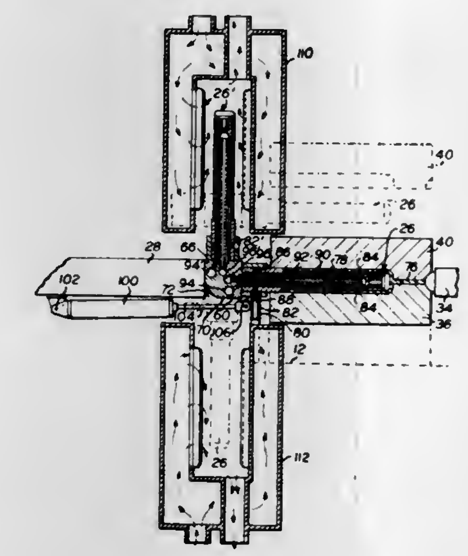
   ii. comprised of a substantially impervious sintered ceramic which is essentially nonreactive with said polycrystalline bi- or multi-metal oxides; and

B. heating said chamber with said body encapsulated therein to a temperature and for a time necessary to sinter said body to the desired density.

4,056,590

BLOW MOLDING METHOD WITH DOUBLE CYCLE FOR CORE RODS

John J. Farrell, Green Brook, N.J., assignor to Farrell Patent Company, Greenbrook, N.J.
Division of Ser. No. 476,092, June 3, 1974, Pat. No. 3,923,441. This application Nov. 5, 1975, Ser. No. 628,881
Int. Cl.² B29C *17/07*
U.S. Cl. 264—89 **13 Claims**

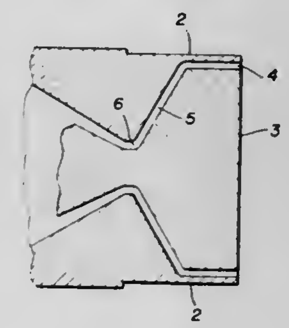


1. The method of making blow molded articles by injection molding a parison on a core rod, blow molding the parison to form a hollow article, and stripping the article from the core rod comprising, moving successive parison covered cored rods in a temperature conditioning cycle along a course past an injection molding station, a blowing station and a stripping station, said stations being in a common plane and said temperature conditioning cycle being in a plane other than said common plane, each core rod after injection molding being moved along the course past the blowing and stripping stations and past the station at which the parison was injection molded without interaction with any of these stations, and, then with other core rods indexed for operation at said stations, shifting the position of the temperature conditioned parison covered core rod to said common plane and then moving the temperature conditioned parison covered core rod in another cycle into active cooperation with the blowing station to form said article and stripping station to remove said article from the core rod.

4,056,591

PROCESS FOR CONTROLLING ORIENTATION OF DISCONTINUOUS FIBER IN A FIBER-REINFORCED PRODUCT FORMED BY EXTRUSION

Lloyd A. Goettler, and James Lambright, both of Akron, Ohio, assignors to Monsanto Company, St. Louis, Mo.
Continuation of Ser. No. 428,219, Dec. 26, 1973, abandoned. This application Feb. 2, 1976, Ser. No. 654,547
Int. Cl.² B29D *3/02*
U.S. Cl. 264—108 **27 Claims**

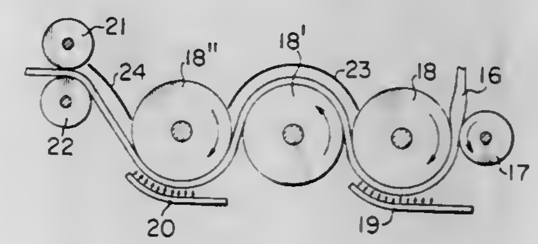


1. In the process for the off-axis orientation of fiber in a matrix by dividing a mixture of organic polymer and discontinuous fiber and extruding it through a die channel having inner and outer surfaces and intervening space substantially filled by the mixture, the improvement which comprises effecting off-axis orientation primarily by having said inner and outer surfaces diverge from the axis of the die such that the distance of each surface from said axis is greater at the channel outlet than at the channel inlet and (A_o/A_i) is 2 or more where A_o is the channel outlet area and A_i is the channel inlet area, said inner and outer surfaces being substantially stationary.

4,056,592

PROCESS FOR PREPARATION OF THERMOSETTING RESIN POWDER PAINTS

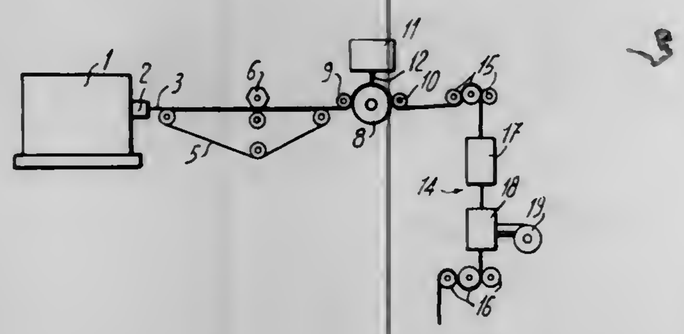
Ryoji Izumi, Neyagawa; Shoji Kobayashi, Akashi; Toshiharu Ono, Suita; Toru Shirato, Hiroshima; Akiyoshi Fujii, Hiroshima, and Tadashi Okihara, Hiroshima, all of Japan, assignors to Dai Nippon Toryo Co., Ltd. and The Japan Steel Works Ltd., both of, Japan
Filed July 7, 1975, Ser. No. 593,875
Claims priority, application Japan, July 11, 1974, 49-79548
Int. Cl.² B29B *1/02*
U.S. Cl. 264—141 **4 Claims**



1. A process for the production of thermosetting resin powder paints which consists of the steps (1) melting and kneading a thermosetting resinous composition which contains curing agents at a temperature higher than the softening point but lower than the curing point of the resinous composition, extruding said thermosetting resinous composition for a powder paint in the molten state from an extruder die, at temperature between 90° C and 140° C, at a rate between 100 and 600 kg/hr. (2) continuously cooling the extruded composition and forming it into a sheet under conditions to avoid curing of the resin by means of a plurality of rolls including press rolls for rolling the composition into a sheet, cooling feed rolls and withdrawal take-up rolls disposed in this order, applying air from air blasting nozzles, which nozzles are opened to face the entire surfaces of the cooling feed rolls, at a distance from the cooling feed rolls of between 20 and 150mm, at an air rate of at least 30m/sec, at a pressure of between 1.5 and4kg/cm² while con-

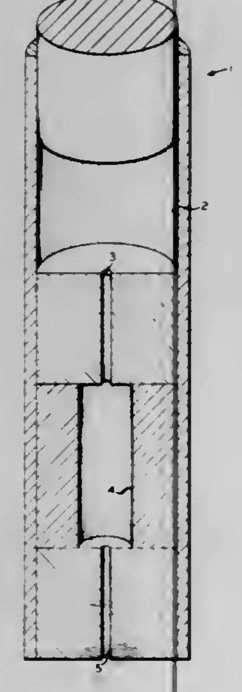
trolling the sheet temperature at the terminal portion of the withdrawal take-up rolls between room temperature and 50° C, and (3) pulverizing the so formed sheet.

4,056,593
METHOD OF MAKING A FASTENER
José Luis de Navas Albareda, Barcelone, Spain, assignor to Repla International S.A.H., Luxembourg
Continuation of Ser. No. 235,315, March 16, 1972, abandoned. This application June 21, 1974, Ser. No. 481,741
Claims priority, application Spain, Mar. 26, 1971, 389609
Int. Cl.² B29D *5/00;* B29C *17/08;* B29F *3/00*
U.S. Cl. 264—145 **4 Claims**



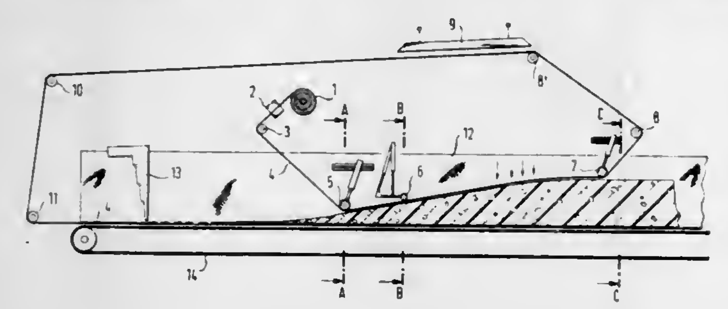
1. A method of manufacturing a strip including fastener projections to form in combination with a similar strip a closure member, the steps consisting of extruding a strip of synthetic resin having longitudinal ribs on at least one of its faces, passing said strip beneath a forming member to deform the ribs on said upper face and thereby vary the height and width of the ribs throughout the length of said strip, passing the strip partially around a roller disposed beneath a cutting member, actuating said cutting member to cut transverse spaces in said ribs, passing the strip through a heating zone and cooling the thus formed strip.

4,056,594
METHOD OF PRODUCING A FLEXIBLE EXTRUDATE OF A MIXTURE OF POLY(PHENYLENE SULFIDE) AND FILLER
Guy E. Carrow, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.
Filed Dec. 15, 1975, Ser. No. 640,984
Int. Cl.² C08G *75/14*
U.S. Cl. 264—176 R **4 Claims**



1. A method for producing an extrudate of a poly(phenylene sulfide) mixture having a stiffness of less than 10,000 psi as measured by ASTM D 747-70, said method comprising:
a. precuring a mixture of poly(phenylene sulfide and at least one filler, at least one of said fillers is polytetrafluoroethylene in an amount of at least about 20 percent by weight of the total mixture weight and said poly(phenylene sulfide) is in an amount of at least about 30 percent by weight of the total mixture weight, said mixture being precured an amount sufficient to produce a flexible extrudate upon extrusion;
b. applying pressure to said mixture, said mixture being at a temperature sufficient to soften the mixture to a flowable state under a predetermined pressure;
c. flowing said mixture through a first orifice;
d. flowing said mixture from said first orifice through an expansion chamber which is in downstream communication with said first orifice; and
e. flowing said mixture from the expansion chamber through a second orifice which is in downstream communication with said expansion chamber, said expansion chamber having a cross-sectional area about 10 times larger in area than the first and second orifices.

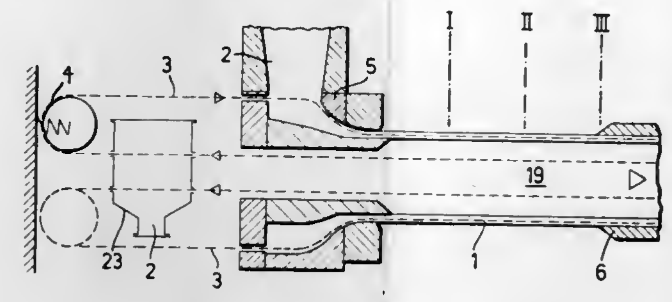
4,056,595
PROCESS FOR PRODUCING FOAM SLABS OF RECTANGULAR CROSS-SECTION
Horst Bokelmann, Bad Wildungen, Germany, assignor to Metzeler Schaum GmbH, Memmingen, Germany
Filed Apr. 13, 1976, Ser. No. 676,603
Claims priority, application Germany, Apr. 22, 1975, 2517664
Int. Cl.² B29D *27/04*
U.S. Cl. 264—46.3 **8 Claims**



1. In the continuous production of rectangular foam slabs wherein a foamable reaction mixture is foamed on a forwardly moving floor web and lateral confining webs, and in which a cover web is applied during the foaming process to the surface of the rising foam, the improvement which comprises supplying said cover web from a supply upon the still liquid foam surface, subjecting the cover web to an adjustable tensile stress, thereby exercising a pressure of about 1 to 6 Kg/m² on the surface of the rising foam, removing the cover web from the foam surface beyond the point at which the rising mixture has substantially reached its maximum height, and passing the web rearwardly and then forwardly to serve as the floor web for receiving further foamable mixture.

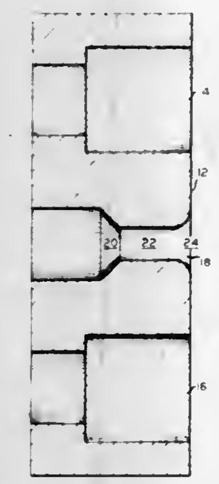
4,056,596
CONTINUOUS METHOD FOR MAKING HOSE WITH DESTRUCTION OF MANDREL
Karl-Heinz Pahl, Dusseldorf-Lohausen, Germany, assignor to Pahl'Sche Gummi-und Asbest-Gesellschaft "Paguag", Dusseldorf, Germany
Filed May 7, 1976, Ser. No. 684,347
Claims priority, application Germany, May 10, 1975, 2520853
Int. Cl.² B29C *1/06, 1/08;* B29D *23/00;* B29H *7/14*
U.S. Cl. 264—166 **9 Claims**

1. In a method in which a hose of vulcanizable material is continuously formed on a hollow, destructible mandrel, the improvement comprising:
continuously forming and advancing said mandrel and continuously vulcanizing said hose while advancing said hose in an axial direction with said mandrel; after a portion of said hose has been vulcanized on a portion of said mandrel, continuously destroying said portion of said mandrel within said hose and removing remnants of said mandrel



from said hose, the destroying and removing steps including longitudinally severing said mandrel into a plurality of strips, flexing said strips and carrying said strips back within the hollow mandrel, breaking down said strips into their components and recycling the components of the mandrel strips to the mandrel forming stage.

4,056,597
PROCESS AND DIE FOR EXTRUSION OF A RESINOUS MATERIAL
Earl D. Cooper, Borger, Tex., assignor to Phillips Petroleum Company, Bartlesville, Okla.
Filed Apr. 3, 1975, Ser. No. 564,685
Int. Cl.² D01D *1/10;* B28B *21/54*
U.S. Cl. 264—169 **7 Claims**

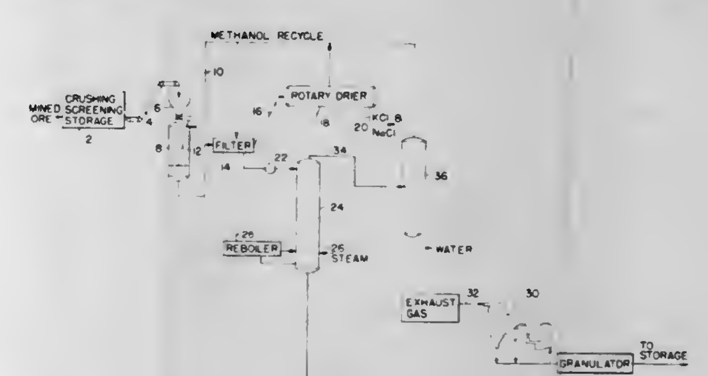


1. A process comprising:
extruding a resinous material selected from the group consisting of polyethylene, polypropylene, polystyrene and styrene-butadiene copolymers through an orifice in a die to produce a strand, said orifice comprising an inlet zone, a cylindrical zone and an outlet zone, in that order;
said inlet zone converging in the direction of flow of said resinous material and attached to one end of said cylindrical zone; and
said outlet zone having a shape resembling a portion of the area circumscribed by a torus wherein the radius of curvature is in the range of from about ½ to 2 times the radius of the strand produced, diverging in the direction of flow of said resinous material and attached to the other end of said cylindrical zone.

4,056,598
PROCESS FOR FORMING FILAMENTS FROM POLYAMIC ACID
Francis S. Galasso, Manchester; Romeo G. Bourdeau, South Windsor, and Roscoe A. Pike, Simsbury, all of Conn., assignors to United Technologies Corporation, Hartford, Conn.
Filed Dec. 11, 1974, Ser. No. 531,633
Int. Cl.² D01F *7/00*
U.S. Cl. 264—184 **4 Claims**

1. A process for producing continuous by filaments of uniform diameter from polyamic acid suitable for conversion to polyimide filaments a condensation reaction mechanism comprising:
providing a fiber-forming solution consisting essentially of essentially equimolar amounts of P,P-diaminophenyl ether and bis-(3,4-dicarboxyphenyl) sulfone dianhydride, and an amount of a solvent selected from the group consisting of dimethyformamide, n-methyl pyrrolidone and mixtures thereof sufficient to cause said solution to have a viscosity of 500 to 5,000 centipoises; and
forming filaments by extruding said starting solution in a coagulating liquid consisting essentially of a liquid selected from the group consisting of propanol, methyl alcohol, ethyl alcohol, butyl alcohol, a mixture of ethyl alcohol and propanol and a mixture of methyl alcohol and acetone.

4,056,599
PROCESS FOR THE RECOVERY OF MAGNESIUM CHLORIDE HYDRATE AND POTASSIUM CHLORIDE FROM CARNALLITE AND BISCHOFITE
Joseph M. Fox, III, Lafayette; Bruce D. Degen, Bolinas, and Irving Leibson, Alamo, all of Calif., assignors to Bechtel International Corporation, San Francisco, Calif.
Filed Oct. 20, 1975, Ser. No. 624,028
Int. Cl.² C01F *5/30*
U.S. Cl. 423—178 **23 Claims**



8. A process for recovering magnesium chloride hydrate from carnallite comprising the steps of dissolving the magnesium chloride hydrate in a lower saturated monohydric aliphatic alcohol having from one to four carbon atoms by contacting the carnallite with the alcohol, injecting water into the solution, and evaporating the alcohol from the solution, the step of injecting the water being performed before a major portion of the alcohol has been evaporated.

17. A process for the recovery of magnesium chloride hydrate from carnallite comprising the steps of contacting the carnallite with a lower saturated monohydric aliphatic alcohol having from one to four carbon atoms to thereby dissolve the magnesium chloride hydrate in the alcohol, and removing from the solution substantially all of the alcohol and substituting therefor a sufficient amount of water to form an aqueous magnesium chloride hydrate brine.

4,056,600

METHOD OF SELECTIVE CATALYTIC PURIFICATION OF WASTE GASES FROM NITROGEN OXIDES

Gennady Alexeevich Skvertsov, ulitsa Kima, 32, kv. 50; Nellya Nikitichna Nizeeva, ulitsa Lermontova, 17, kv. 4; Avrum Iosifovich Podzharsky, ulitsa Juzhnaya, 12, kv. 10, and Irma Viktorovna Dobrovolskaya, ulitsa Prokhodnoi tupik, 3, kv. 2-a, all of Dneprodzerzhinsk Dnepropetrovskoi oblasti, U.S.S.R.

Continuation of Ser. No. 476,045, June 3, 1974, abandoned. This application Feb. 16, 1977, Ser. No. 769,214

Int. Cl.[2] B01D *53/00*

U.S. Cl. 423—239 **5 Claims**

1. Method of selectively removing nitrogen oxides from waste gases by reducing said nitrogen oxides with ammonia, which comprises a waste gas containing nitrogen oxides in admixture with a substantially stoichiometric amount of gaseous ammonia through a catalyst at a temperature of 100° - 500° C, at a volumetric velocity of passage of 5000 - 100,000 hour and a volumetric ratio of the gaseous ammonia to nitrogen oxides of 0.7 - 1.5, said catalyst consisting essentially of a mixture of oxides of vanadium and manganese applied to an inert carrier said oxides being taken in a weight ratio of V_2O_5/Mn_2O_3 of 0.1 - 30, the total content of said oxides of vanadium and manganese being 5-40 percent of the total weight of the catalyst, whereby substantially all of the nitrogen oxides are reduced to nitrogen and the waste gas is thus purified of nitrogen oxides.

4,056,601

PROCESS FOR THE PRODUCTION OF YELLOW PHOSPHORUS

Semen Issakovich Volfkovich, Vystavochny pereulok, 3, kv. 12, Moscow; Vladimir Nikolaevich Belov, Bolsheokhtinsky prospekt, 3, kv. 305; Vadim Andreevich Ershov, prospekt Veteranov, 105, kv. 29, both of Leningrad; Evgeny Khaskelevich Rozenberg, Novokhoroshevskoe shosse, 31, korpus 2, kv. 36; Emmanuil Ivanovich Shipov, Izumrudnaya ulitsa, 50, kv. 134, both of Moscow, and Ljudmila Vladimirovna Jumanova, Otdelny pereulok, 5a, kv. 13, Sverdlovsk, all of U.S.S.R.

Filed Aug. 4, 1975, Ser. No. 601,468

Int. Cl.[2] C01B *25/01, 25/02, 25/04*

U.S. Cl. 423—322 **14 Claims**

1. A process for the production of yellow phosphorus from a charge consisting essentially of natural phosphates and mineral quartzite in an installation comprising an apparatus for the preliminary melting of said charge into a melt collector and which apparatus communicates, through said melt collector, with an electrothermal furnace containing a plurality of electrodes in contact with said melt, comprising:

a. comminuting lumps of natural phosphates having a grading not exceeding 10 mm. and quartzite into a finely divided state and mixing together said comminuted phosphates and quartzite to obtain a two-component phosphate-quartzite charge;

b. melting said two-component phosphate-quartzite charge using fuel combustion products in said apparatus for preliminary melting of the charge;

c. treating the resulting phosphate-quartzite melt, while flowing down the apparatus walls in a thin layer, with overheated steam obtained from moisture contained in said fuel combustion products to form fluorine compounds;

d. removing the fluorine compounds and the fuel combustion products from the installation;

e. continuously feeding the remaining defluorinated melt through said melt collector into said electrothermal furnace;

f. concurrently with the above steps, feeding to the surface of the melt in the electrothermal furnace a three-component charge preliminarily obtained by mixing heat-treated lump phosphate and quartzite having a grading of about from 10-50 mm., together with a reducing agent having a grading of about from 5-25 mm., while, also concurrently, feeding a comminuted reducing agent into the melt layer under pressure, whereby the phosphates in the melt are reduced to yellow phosphorous in gaseous form, together with the formation of furnace gases containing carbon oxide, slag, and ferrophosphorus;

g. removing the formed slag and ferrophosphorus from the installation; and

h. removing the gaseous mixture of furnace gases and yellow phosphorus from the furnace and condensing the mixture to recover the yellow phosphorus thereform.

4,056,602

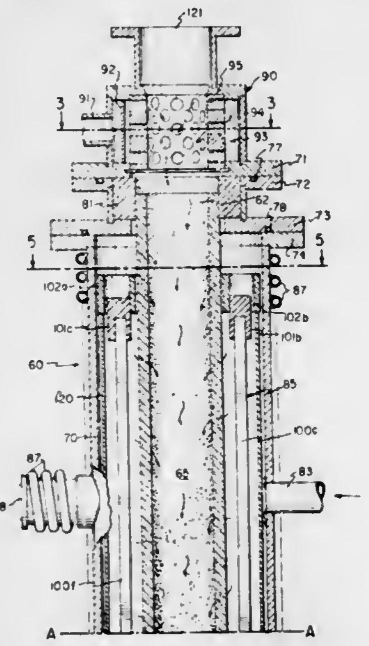
HIGH TEMPERATURE CHEMICAL REACTION PROCESSES UTILIZING FLUID-WALL REACTORS

Edwin Matovich, Brea, Calif., assignor to Thagard Technology Company, Irvine, Calif.

Continuation-in-part of Ser. No. 606,222, Aug. 20, 1975, Ser. No. 591,949, June 30, 1975, and Ser. No. 271,560, July 13, 1972, Pat. No. 3,933,434. This application Sept. 24, 1975, Ser. No. 616,393

Int. Cl.[2] C01B *31/36;* **C10G** *9/42*

U.S. Cl. 423—345 **21 Claims**



1. A high temperature chemical reaction process which comprises:

a. generating an annular envelope of an inert fluid which is substantially transparent to radiation within a shell of a refractory material which reflects radiation, the volume enclosed by the shell constituting a black body cavity, the envelope having substantial axial length and the interior of the envelope defining a reaction chamber;

b. passing at least one reactant into the black body cavity and through the reaction chamber along a predetermined path substantially coincident with the longitudinal axis of the envelope, the reactants being confined within the reaction chamber, at least one of the reactants being a carbonaceous material; and

c. directing high intensity radiant energy into the reaction chamber to coincide with at least a portion of the predetermined path of the reactants, sufficient radiant energy being absorbed within the reaction chamber to raise the temperature of the reactants to a level required to initiate and sustain the desired chemical reaction.

4,056,603

PROCESS FOR INCREASING AMMONIA PRODUCTION

Sidney A. Bresler, New York, N.Y., assignor to Bresler and Associates, Inc., New York, N.Y.

Filed June 14, 1976, Ser. No. 695,457

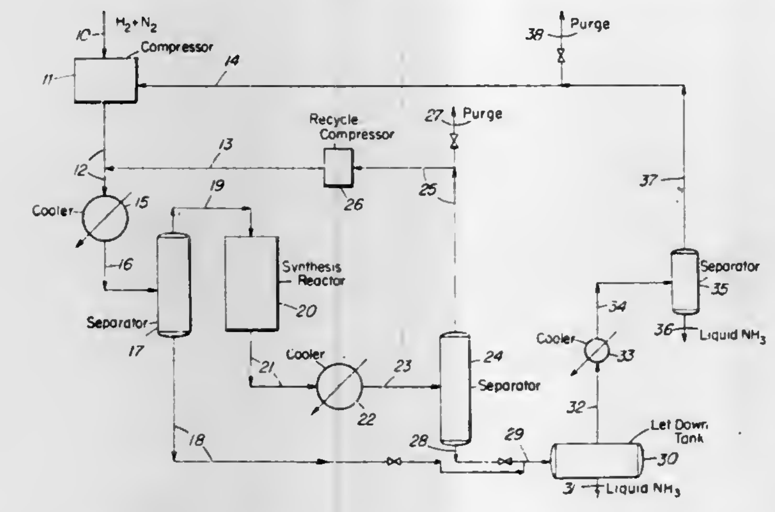
Int. Cl.[2] C01C *1/04*

U.S. Cl. 423—359 **6 Claims**

1. A process for the synthesis of ammonia from hydrogen and nitrogen, at least one of which is contaminated with at least one inert gas selected from the group consisting of argon and methane, which consists essentially of the following sequence:

contacting said hydrogen and nitrogen, together with recycled mixtures (C) and (E), described below, in a converter with an ammonia synthesis catalyst at elevated temperature and elevated pressure to form a gaseous reaction mixture (A) containing ammonia, unreacted hydrogen, unreacted nitrogen and inert gas contaminant,

cooling said gaseous reaction mixture (A) and separating therefrom a liquid ammonia product (B) containing a



portion of the unreacted hydrogen, unreacted nitrogen and inert gas contaminant therein,

recycling the gaseous remainder (C) of said gaseous reaction mixture (A) to said converter, reducing the pressure of said liquid ammonia product (B) and separating therefrom liquid ammonia (D) and a gaseous mixture (E) containing unreacted hydrogen, unreacted nitrogen, ammonia and inert gas contaminant, and

recycling a substantial portion of said gaseous mixture (E) without removing therefrom said inert gas contaminant to said converter.

4,056,604

PRODUCTION OF HYDROGEN FLUORIDE

William Henry Thompson, 22 Crannagh Park, Dublin 14; Ralph Eric Worthington, 16 Woodbine Road, Blackrock Co. Dublin, and David John Stamper, 15 Bayside Walk, Sutton Co. Dublin, all of Ireland

Filed Aug. 20, 1973, Ser. No. 389,572

Claims priority, application United Kingdom, Aug. 24, 1972, 39400/72; Jan. 29, 1973, 4373/73; Apr. 24, 1973, 19378/73; May 21, 1973, 24149/73

Int. Cl.[2] C01B *7/22;* **C01D** *3/02*

U.S. Cl. 423—483 **12 Claims**

1. A process for the preparation of hydrogen fluoride, the process comprising heating ammonium fluoride in an aqueous solution, in the presence of an amount of a soluble alkali metal fluoride in excess of the stoichiometric amount for reacting to form an aqueous solution of the bifluoride of the alkali metal, such that the weight ratio of fluoride ions to ammonium ions in solution is at least 3 : 1, whereby the rate of reaction to form the bifluoride is increased, and recovering a solid product from the solution comprising alkali metal bifluoride, substantially free from ammonia, and decomposing the alkali metal bifluoride by heating the solid product to release hydrogen fluoride and to form metal fluoride.

4,056,605

METHOD FOR PURIFICATION OF HYDROFLUORIC ACID

Alexandr Ilich Vulikh, ulitsa Khalturina, 5[a], kv. 93; Maina Konstantinovna Zagorskaya, ulitsa Khalturina, 5[a], kv. 93, both of Ryazan; Izrail Zalmanovich Kofman, ulitsa Bazhova, 8, kv. 5, Sverdlovskaya oblast, Polevskoi; Inna Vasilievna Pavlovich, ulitsa Kultury, 12, kv. 7, Sverdlovskaya oblast, Polevskoi; Boris Veniaminovich Levitan, ulitsa Kultury, 10, kv. 14, Sverdlovskaya oblast, Polevskoi; Nikolai Vasilievich Troyan, ulitsa Kultury, 10, kv. 10, Sverdlovskaya oblast, Polevskoi, and Sergei Viktorovich Dubyaga, ulitsa Karla Marxa, 7, kv. 7, Sverdlovskaya oblast, Polevskoi, all of U.S.S.R.

Filed Nov. 23, 1976, Ser. No. 744,296

Int. Cl.[2] C01B *7/22;* **C01C** *1/24;* **C01B** *33/00*

U.S. Cl. 423—484 **7 Claims**

1. A method for purification of hydrofluoric acid from acids selected from the group consisting of silicofluoric and sulphuric acids which comprises contacting a mixture of said acids with an anion-exchange resin in the fluoride form thereof to obtain a purified hydrofluoric acid; treating the exhausted anion-exchange resin with a regenerating solution comprising an aqueous solution of ammonium fluoride having a concentration ranging from 2 to 10% by weight and a pH value ranging from 6 to 9.

4,056,606

DESULFURIZATION OF WASTE GASES CONTAINING HYDROGEN SULFIDE

Rolf Germerdonk, Schildgen; Adam Jonas, Leichlingen; Dieter Hüllstrung, and Bernhard Scherhag, both of Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed May 25, 1976, Ser. No. 689,876

Claims priority, application Germany, May 30, 1975, 2524124; Apr. 21, 1976, 2617311

Int. Cl.[2] C01B *17/04*

U.S. Cl. 423—575 **10 Claims**

1. A process for removing hydrogen sulfide from a gas containing it comprising treating the gas with an aqueous solution of at least one organic polybasic acid selected from the group consisting of oxalic acid, malonic acid, glutaric acid, adipic acid, maleic acid, fumaric acid, citraconic acid and phthalic acid and buffered by a base,

a. the gas having a molar ratio of hydrogen sulfide to sulfur dioxide of at least about 2:1 and being brought into contact in finely divided form in a first absorption and reaction zone at a temperature of about 10 to 100° C with the aqueous absorption solution buffered by the base to a pH of about 2 to 6, thereby to produce solid sulfur;

b. the sulfur accumulating in solid form from the solution being removed from at least a component stream of the solution;

c. the gas leaving stage (a) being heated to a temperature of about 700° to 1000° C, thereby converting the sulfur compounds present in the gas into sulfur dioxide and oxidizing any organic compounds present into carbon dioxide and water;

d. SO_2-containing smoke gas from stage (c) being recycled to stage (a);

e. the balance of the smoke gas component stream from (c) being treated in a second absorption stage (e) with the solution leaving stage (b) for the substantially quantitative absorption of SO_2, and

f. the SO_2-containing solution from stage (e) being recycled to stage (a).

4,056,607

THERMOCHEMICAL PROCESS FOR THE PRODUCTION OF HYDROGEN AND OXYGEN FROM WATER

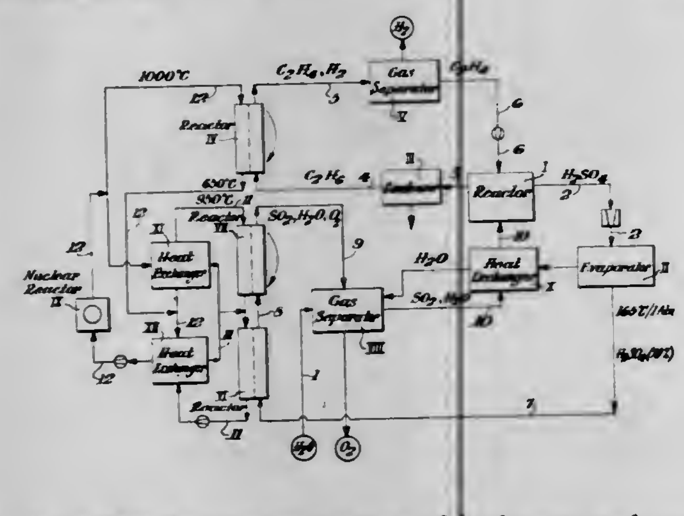
Friedrich F. Behr, Gross-Denkte, Germany, assignor to Rheinische Braunkohlenwerke AG, Cologne, Germany

Filed Jan. 4, 1977, Ser. No. 756,728

Claims priority, application Germany, Jan. 9, 1976, 2600666

Int. Cl.² C01B *1/16, 1/28, 13/00*

U.S. Cl. 423—579 **5 Claims**



1. A process for the production of hydrogen and oxygen from water in a thermochemical, closed circulation process comprising:

a. reacting sulfur dioxide, water and an olefin in the presence of catalytically active quantities of iodine in an exothermic reaction at temperatures of about 200°–350° C and pressures of about 20–300 atmospheres to produce sulfuric acid and a paraffin hydrocarbon corresponding to said olefin;
b. decomposing the sulfuric acid at temperatures of about 600°–950° C into sulfur dioxide, water and oxygen;
c. decomposing said paraffin hydrocarbon into hydrogen and the corresponding olefin at temperatures of about 500°–750° C;
d. recycling into the exothermic reaction of step (a) the sulfur dioxide and water formed in step (b) and the olefin formed in step (c); and
e. collecting and removing hydrogen and oxygen formed in steps (c) and (b), respectively.

4,056,608

CARDIAC GLYCOSIDE OR AGLYCONE ASSAYS

Edwin F. Ullman, Atherton; Joyce Y. Chang, Sunnyvale, and Kenneth G. McNeil, Santa Clara, all of Calif., assignors to Syva Company, Palo Alto, Calif.

Filed Apr. 8, 1976, Ser. No. 674,782

Int. Cl.² G01N *33/00;* **G21H** *5/02*

U.S. Cl. 424—1 **9 Claims**

1. In an immunoassay for the determination of cardiac glycosides or aglycones employing a serium sample, wherein antibody for cardiac glycosides or aglycones is employed which binds to cardiac glycosides or aglycones in competition with the indicator used for detection, the improvement which comprises:

pre-treating said serum sample with an alkaline solution under mild conditions at a pH of at least about 10.5.

4,056,609

ARTICLE FOR DIAGNOSIS OF ACHLORHYDRIA

Michael A. Kirchubel, San Francisco, Calif., assignor to Gunn, Kirchubel & Miller, San Francisco, Calif.

Filed Jan. 28, 1976, Ser. No. 653,000

Int. Cl.² A61K *43/00, 29/00;* **G01N** *31/00, 33/00*

U.S. Cl. 424—1 **22 Claims**

1. An article useful to detect stomach acid comprising a detection agent enclosed in a fluid-impervious entrapping medium with said entrapping medium including a degradable element that is degradable at pH lower than 6, with said degradable element sealing said entrapping medium whereby when said degradable element is degraded, said detection agent is released from said entrapping medium.

21. The article of claim 1 wherein said detection agent is a radioactive material.

4,056,610

MICROCAPSULE INSECTICIDE COMPOSITION

Loren L. Barber, Jr., Woodbury; Anthony J. Lucas, Oakdale, and Richard Y. Wen, New Brighton, all of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation of Ser. No. 566,287, April 9, 1975, abandoned. This application Aug. 24, 1976, Ser. No. 717,170

Int. Cl.² A01N *17/08*

U.S. Cl. 424—32 **18 Claims**

1. The method of controlling insect pest activity comprising contacting said insects, in an environment having ultra violet light activity degrading to pyrethroid, with a microcapsule insecticide composition comprising microcapsules each having (i) a permeable polyurea shell including as an integral part of said shell a shell stabilizer comprising a photostable ultraviolet light absorbent compound having a log molor extinction coefficient of from about 2 to 5 with respect to radiation having wavelengths in the range of from about 270 to 350 nanometers, and (ii) a liquid fill comprising a pyrethroid, a water-immiscible organic solvent, an antioxidant, a biological synergist for said pyrethroid and a fill stabilizer comprising a photostable ultraviolet light absorbent compound having a log molar extinction coefficient of from about 2 to 5 with respect to radiation having wavelengths in the range of from about 270 to 350 nanometers; wherein said liquid fill permeates said porous polyurea shell over a sustained period of time and maintains an insecticidally effective level of pyrethroid upon the outer surface of the shell wall for an extended period of time.

4,056,611

THERAPEUTIC COMPOSITION

Henry Y. Young, Delmar, N.Y., assignor to Stiefel Laboratories, Inc., Oak Hill, N.Y.

Filed Apr. 16, 1973, Ser. No. 351,773

Int. Cl.² A61K *7/135*

U.S. Cl. 424—62 **9 Claims**

1. A therapeutic composition for the treatment of acne consisting of a stable dispersion of finely divided particles of benzoyl peroxide in an aqueous alcohol vehicle, said aqueous alcohol vehicle being a single non-lipid phase consisting essentially of a solution of water and an alkyl alcohol having from 1 to 3 carbon atoms and in which solution is dissolved a nonionic surface active agent, the hydrophilic portion of which is a polyoxyalkylene moiety wherein each oxyalkylene group contains from 2 to 3 carbon atoms, said surface active agent being soluble in said solution, said composition containing from about 1 to 30 percent by weight benzoyl peroxide having a particle size of less than 100 microns, from about 1 to 30 percent by weight of a surface active agent, from about 10 to 80 percent by weight of said alkyl alcohol, and from about 10 to 80 percent by weight of water.

4,056,612

AIR FRESHENER GELS

Chii-Fa Lin, Tarrytown, N.Y., assignor to Stauffer Chemical Company, Westport, Conn.

Continuation of Ser. No. 453,442, March 21, 1974, abandoned. This application Nov. 26, 1975, Ser. No. 635,553

Int. Cl.² A61L *13/00*

U.S. Cl. 424—76 **16 Claims**

1. In an air freshener gel consisting essentially of about 1.5 to 4% of a gelling agent, and about 98.5 to 96% of an aqueous medium containing a volatile air freshener component; the improvement which comprises a gelling agent comprising:

a. from about 0.6 to about 2% of a carrageenan of which at least 40% by weight is the kappa fraction,
b. from about 0.2 to about 1.0% of locust bean gum; and
c. from about 0.05 to about 1.0% of a water soluble ammonium salt having a pH greater than about 5.0 selected from the group consisting of ammonium chloride, ammonium sulfate, ammonium acetate, ammonium phosphate (dibasic) and mixtures thereof,

wherein said percent is percent by weight of said air freshener gel.

4,056,613

METHOD OF REDUCING THE CARDIOTOXIC SIDE EFFECTS OF GLYCOSIDIC ANTHRACYCLINONES

Cesare Bertazzoli; Luisa Sala, and Mario Ghione, all of Milan, Italy, assignors to Societa Farmaceutici Italia S.p.A., Milan, Italy

Filed July 12, 1976, Ser. No. 704,508

Claims priority, application United Kingdom, July 21, 1975, 32152/75

Int. Cl.² A61K *37/48, 31/70*

U.S. Cl. 424—94 **1 Claim**

1. A method for reducing the cardiotoxic effects of adriamycin which comprising administering to an animal in need thereof an effective amount of CoQ_{10} to inhibit the cardiotoxic effects of adriamycin.

4,056,614

IMMUNITY DEPRESSANT MEDICINE

Marc Bonneau, 18, rue de Tourville, 69005 Lyon, and Mireille Latour, 23, Les Sabines, 69130 Ecully, both of France

Continuation-in-part of Ser. No. 399,496, Sept. 21, 1973, abandoned. This application Dec. 1, 1975, Ser. No. 636,611

Claims priority, application France, Sept. 22, 1972, 72.33703

Int. Cl.² A61K *35/50, 39/00*

U.S. Cl. 424—105 **16 Claims**

1. A process for extracting immuno-depressive gamma-globulins from human placental tissue which has been ground or powdered comprising the following steps:

a. Washing the ground placental tissue to remove serous substances therefrom;
b. Eluting the placental tissues, freed of serous substances, with a buffer solution to form an eluate; and freeing the eluate of any tissue material and precipitates wherein the elution of the placental tissue is undertaken at a pH of about between 2 and 3.5 with said buffer solution and at a temperature ranging between about 10° to 38° C;
c. Adding ethanol to said eluate to precipitate the immuno-depressive gamma-globulins; and
d. Dialyzing the immuno-depressive gamma-globulins with water.

4,056,615

LUCKNOMYCIN AND PROCESS FOR PRODUCING SAME

Vinay Chhotalal Vora, Lucknow, and Amrut Vithaldas Mody, Bombay, both of India, assignors to U C B Societe Anonyme, Brussels, Belgium

Filed May 24, 1976, Ser. No. 689,145

Claims priority, application United Kingdom, May 28, 1975, 23342/75

Int. Cl.² A61K *35/00*

U.S. Cl. 424—120 **7 Claims**

1. Lucknomycin, an antifungal and antiprotozoal antibiotic, which:

a. is an orange yellow powder;
b. starts to decompose at about 150° C. but, even at 300° C., does not melt;
c. has a molecular weight of about 1240;
d. has the following elemental analysis: C, 58.92, H, 7.58; N, 2.29;
e. is soluble in pyridine, dimethylformamide and dimethylacetamide, less soluble in 60% methanol, concentrated ethanol and isopropanol and is insoluble in benzene, acetone, water, chloroform, absolute ethanol, cyclohexane, ethyl acetate and diethyl ether;
f. gives an intense blue coloration in sulfuric acid;
g. has the following infrared absorption spectrum in a KBr pellet (in cm^{-1}):

3400 (S)	1465 (W)	1075 (S)
3100 (W)	1390 (W)	1045 (W)
2930 (S)	1350 (W)	1010 (S)
2860 (M)	1325 (W)	995 (W)
1715 (M)	1295 (W)	940 (W)
1650 (M)	1250 (W)	890 (W)
1600 (S)	1185 (S)	850 (M)
1575 (W)	1140 (W)	835 (W)
1545 (W)	1110 (M)	800 (W)

wherein S means strong absorption, M medium absorption and W weak absorption;

h. has the following ultraviolet absorption spectrum taken at a concentration of 1 mg. per 100 ml. of dimethylformamide;

344 mμ ($\epsilon = 3.5 \times 10^4$)

364 mμ ($\epsilon = 5.52 \times 10^4$)

384 mμ ($\epsilon = 8.04 \times 10^4$)

408 mμ ($\epsilon = 6.6 \times 10^4$)

i. has an optical rotation $[\alpha]_D^{25^\circ C.} = 187°$ to 194° (C = 0.3% in dimethylformamide at 25° C); and
j. is an aromatic heptaene giving by retroaldolization reaction p-N-methylamino-acetophenone and which contains mycosamine as a substituent and which has no titratable carboxyl group.

4. A process for making the antifungal and antiprotozoal antibiotic defined in claim 1, which comprises cultivating *Streptomyces diastatochromogenes* var. Krains CBS 101.74, in an aqueous nutrient medium under submerged aerobic conditions until substantial antifungal and antiprotozoal antibiotic activity is imparted to said medium by the production of lucknomycin.

4,056,616

ROSAMICIN DERIVATIVES AND METHOD OF USING SAME

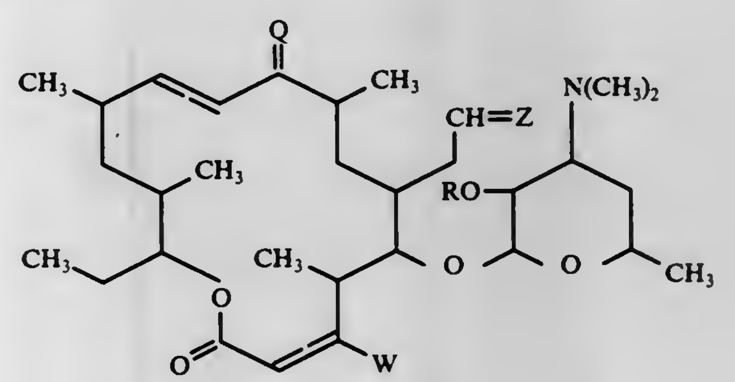
Hans Reimann, Wayne; Robert S. Jaret, Livingston, and Mohammad Mehdi Nafissi-Varchei, North Caldwell, all of N.J., assignors to Schering Corporation, Kenilworth, N.J.

Filed Mar. 5, 1976, Ser. No. 664,204

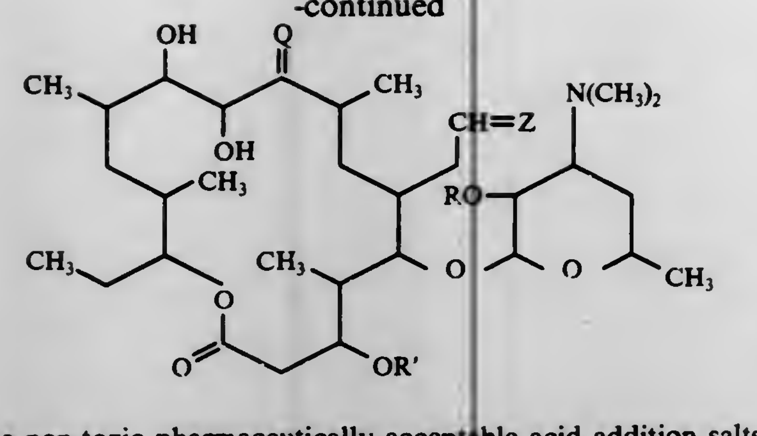
Int. Cl.² A61K *31/71;* **C07H** *17/08*

U.S. Cl. 424—180 **51 Claims**

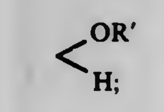
47. A method of eliciting an antibacterial response which comprises administering to a warm-blooded animal having a bacterial infection a therapeutically effective quantity of a compound of the formulae:



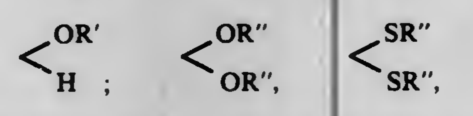
-continued



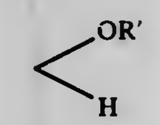
the non-toxic pharmaceutically acceptable acid addition salts thereof wherein the dotted lines represent facultative double bonds; Q is a member selected from the group consisting of O, and



Z is a member selected from the group consisting of O,



NOR′ and NOR″; R and R′ are members selected from the group consisting of hydrogen and hydrocarbon carbonyl having 2 to 18 carbon atoms; R″ is hydrogen or alkyl having 1 to 5 carbon atoms; B together wtih the carbon atoms of positions 12 and 13 to which it is attached represents a single bond or a double bond or, when Q or Z is other than O, or when the macrolide ring is saturated between positions 10 and 11 or unsaturated between positions 2 and 3, B may also be an oxirane ring; and W is a member selected from the group consisting of OR′ and hydrogen, R′ being as previously defined with the proviso that when W is hydrogen, positions 2 and 3 are connected by a double bond, and the further proviso that in formula II, when B, together with the carbon atoms which it is attached represents a double bond, W is OR′, Q is O, and positions 10 and 11 are connected by a double bond, Z is other than



4,056,617
ORGANIC PYRIDAZYL PHOSPHOROTHIOATES AND THEIR USE AS INSECTICIDES
Teruomi Jojima; Hideakira Tsuji, both of Tokyo; Shinjiro Yamamoto, and Teiji Omino, both of Shiga, all of Japan, assignors to Sankyo Company Limited, Tokyo, Japan
Continuation of Ser. No. 540,234, Jan. 10, 1975, abandoned, Division of Ser. No. 67,292, Aug. 26, 1970, abandoned. This application Oct. 6, 1975, Ser. No. 620,227
Claims priority, application Japan, Sept. 17, 1969, 44-73788; Sept. 1, 1969, 44-69218
Int. Cl.² A01N *9/36*
U.S. Cl. 424—200 **48 Claims**

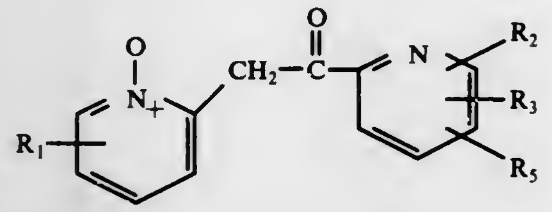
1. An insecticidal composition which comprises a carrier and as an active ingredient an effective amount of O,O-diethyl O-(6-n-propoxy-3-pyridazyl)phosphorothioate.

4,056,618
NOVEL DIURETIC AND ANTIHYPERTENSIVE COMPOSITION
Olivier Mantel, Montmorency, France, assignor to Roussel-Uclaf, Paris, France
Filed Apr. 8, 1976, Ser. No. 674,755
Claims priority, application France, Apr. 11, 1975, 75.11377
Int. Cl.² A61K *31/535, 31/505*
U.S. Cl. 424—246 **7 Claims**

1. A diuretic and antihypertensive composition comprising an antihypertensively and diuretically effective amount of triamterene and cyclothiazide in a weight ratio of 10 to 200 parts of triamterene to one part of cyclothiazide with the optional presence of an inert pharmaceutical carrier.

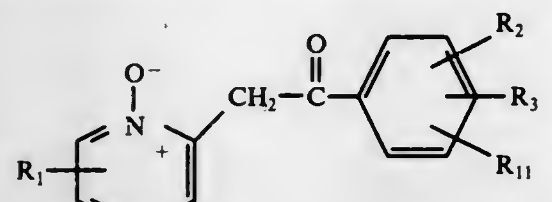
4,056,619
1-SUBSTITUTED-2-(2-PYRIDINYL)ETHANONE N-OXIDES
David T. Connor, Parsippany; Patricia A. Young, Madison, and Maximilian von Strandtmann, Rockaway Township, all of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.
Filed Sept. 8, 1975, Ser. No. 611,282
Int. Cl.² C07D *213/89;* **A61K** *31/44*
U.S. Cl. 424—263 **24 Claims**

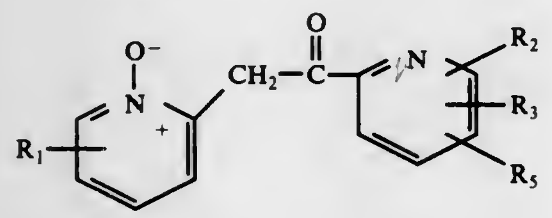
1. A compound of the formula II:


II

wherein R_1 is hydrogen or lower alkyl; R_2 and R_3 are each hydrogen, halogen, hydroxy, lower alkyl, lower alkoxy or benzyloxy; and R_5 is hydrogen, halogen, hydroxy, lower alkyl, lower alkoxy or benzyloxy; and the pharmaceutically acceptable acid addition salts thereof.

22. A method for treating hyperacidity in mammals in need of such treatment which comprises the administration of an effective amount of the compound of the formula I or II:

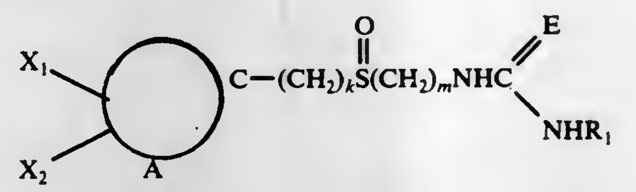

I


II

wherein R_1 is hydrogen or lower alkyl; R_2 and R_3 are each hydrogen, halogen, hydroxy, lower alkyl, lower alkoxy or benzyloxy; R_{11} is hydrogen, halogen, hydroxy, lower alkyl, lower alkoxy, benzyloxy, ortho-amino, ortho-lower alkylamino, ortho-alkanoylamino or ortho-benzoylamino; and R_5 is hydrogen, halogen, hydroxy, lower alkyl, lower alkoxy, benzyloxy, and the pharmaceutically acceptable acid addition salts thereof.

4,056,620
SULPHOXIDES
George Raymond White, Harpenden, England, assignor to Smith Kline & French Laboratories Limited, Welwyn Garden City, England
Division of Ser. No. 627,418, Oct. 30, 1975, Pat. No. 3,979,398, which is a division of Ser. No. 436,285, Jan. 24, 1974, Pat. No. 3,932,443. This application May 24, 1976, Ser. No. 689,013
Int. Cl.² C07D *277/26, 263/32;* **A61K** *31/42, 31/425*
U.S. Cl. 424—270 **10 Claims**

1. A compound of the formula:

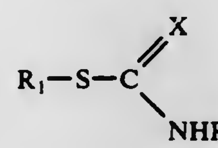


wherein A is such that the heterocyclic nucleus formed is a thiazole or oxazole ring; X_1 and X_2, which may be the same or different are hydrogen, lower alkyl, trifluoromethyl, halogen or amino *k* is 0 to 2 and *m* is 2 or 3 provided that the sum of *k* and *m* is 3 or 4; E is oxygen, sulphur or NH_2; R_1 is hydrogen, lower alkyl, benzoyl or dimethylaminoethyl; and R_2 is hydrogen, nitro, cyano, alkanesulphonyl having 1 to 3 carbon atoms, benzenesulphonyl, halobenzenesulphonyl or toluenesulphonyl.

10. A pharmaceutical composition to inhibit histamine H-2 receptors comprising in an amount effective to inhibit said receptors a compound of claim 1 together with a pharmaceutically acceptable diluent or carrier.

4,056,621
IMIDAZOLYLMETHYLTHIOETHYL DITHIOCARBAMATE COMPOUNDS
Thomas Henry Brown; Graham John Durant; Charon Robin Ganellin, all of Welwyn Garden City, and Robert John Ife, Stevenage, all of England, assignors to Smith Kline & French Laboratories Limited, Welwyn Garden City, England
Filed Jan. 27, 1976, Ser. No. 652,925
Claims priority, application United Kingdom, Feb. 3, 1975, 4538/75
Int. Cl.² A61K *31/415;* **C07D** *233/64*
U.S. Cl. 424—273 R **7 Claims**

1. A compound of the formula:



wherein R_1 represents a grouping of the structure

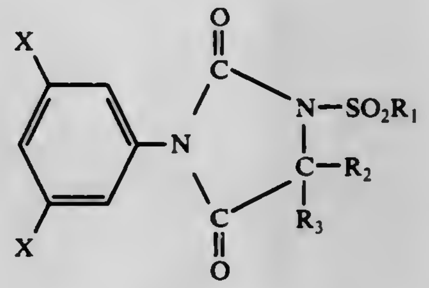
Het — $CH_2S(CH_2)_2$—

wherein Het is an imidazole, ring, which ring is optionally substituted by lower alkoxy or halogen R_2 is hydrogen, lower alkyl or the same as R_1; X is sulphur or a hydrate or pharmaceutically acceptable acid addition salt or hydrated salt thereof.

7. A method of blocking histamine H_2-receptors which comprises administering to an animal in an effective amount to block said receptors a compound of claim 1.

4,056,622
N-SULFONYL-N-DIHALOPHENYLIMIDAZOLIDINEDIONES
Chiyozo Takayama, Osaka; Yoshio Hisada, Kawanishi; Toshiro Kato, Osaka, and Akira Fujinami, Hyogo, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan
Filed Apr. 15, 1976, Ser. No. 677,440
Claims priority, application Japan, Apr. 22, 1975, 50-49250
Int. Cl.² C07D *233/86;* **A61K** *31/415*
U.S. Cl. 424—273 R **16 Claims**

1. A compound of the formula:



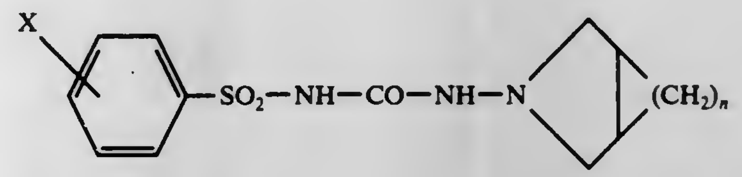
wherein X is a halogen atom, R_1 is a C_1–C_{12} alkyl group, a C_2–C_4 alkenyl group or a halogenated C_1–C_4 alkyl group having 1 to 3 halogen atoms, and R_2 and R_3 are individually a hydrogen atom or a methyl group.

15. A method for controlling fungi which comprises applying a fungicidally effective amount of a compound according to claim 1 to the fungi.

4,056,623
METHODS OF TREATING ANIMALS SUFFERING FROM HYPERLIPIDEMIA USING CERTAIN N-PHENYL SULPHONYL-N′-(3-AZABICYCLOALKYL) UREAS
Jacques Duhault, Chatou, France, assignor to Science Union et Cie, Societe Francaise de Recherche Medicale, Suresnes, France
Continuation-in-part of Ser. No. 555,427, March 5, 1975, abandoned. This application June 3, 1976, Ser. No. 692,387
Int. Cl.² A61K *31/40, 31/445*
U.S. Cl. 424—274 **5 Claims**

1. A method of treating a warm-blooded animal suffering from hyperlipidemia to effect improvement in such condition and thereby reduce the risk of arteriosclerosis, which consists of administering to such animal an effective anti-lipid infiltration and deposition amount of a compound selected from the group consisting of:

A. an N-benzenesulphonyl-N′-(3-azabicycloalkyl) urea of the formula:



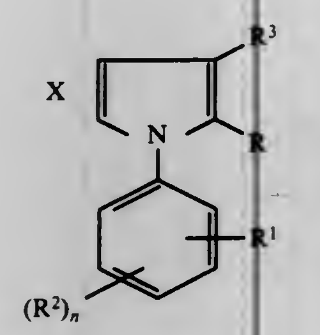
wherein: X is a substituent selected from the group consisting of chloro. bromo, fluoro, and a lower-alkyl radical of 1 to 5 carbon atoms, inclusive; and *n* is 1 to 3, inclusive; and

B. a physiologically tolerable addition salt thereof.

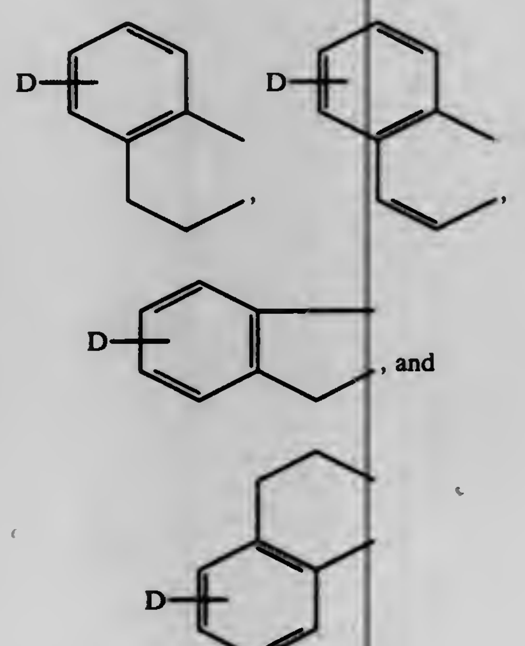
4,056,624
METHOD OF TREATING DERMAL INFLAMMATION
Howard B. Lassman, Flemington, and William J. Novick, Jr., Lebanon, both of N.J., assignors to American Hoechst Corporation, Bridgewater, N.J.
Filed May 14, 1976, Ser. No. 686,525
Int. Cl.² A61K *31/40, 31/66*
U.S. Cl. 424—274 **14 Claims**

1. A method of treating inflammation in the dermal layers of

mammals which comprises topically administering to the inflamed area of a patient an effective amount of a pyrrole of the formula



wherein R is alkyl of from 1 to 6 carbon atoms, thienyl, phenyl, diphenyl or phenyl substituted by halogen, trifluoromethyl, alkyl of from 1 to 6 carbon atoms, alkoxy of 1 to 6 carbon atoms, nitro, cyano or hydroxy; R^1 is carboxy, alkoxycarbonyl of from 2 to 7 carbon atoms, carbamoyl, N-alkylcarbamoyl of from 2 to 7 carbon atoms, N,N-dialkylcarbamoyl of from 3 to 7 carbon atoms, hydroxycarbamoyl or dialkylphosphinylalkoxycarbonyl of from 4 to 10 carbon atoms; R^2 is hydrogen, hydroxyl, mercapto, halogen, trifluoromethyl, alkoxy of from 1 to 6 carbon atoms, alkanoyloxy of from 1 to 6 carbon atoms, amino, alkanoylamino of from 1 to 6 carbon atoms, dialkylthiocarbamoyloxy of from 3 to 7 carbon atoms or dialkylcarbamoylthio of 3 to 7 carbon atoms; R^3 is hydrogen, alkanoyl of from 1 to 6 carbon atoms or phenyl; X is alkylene of from 3 to 5 carbon atoms, alkylene of from 3 to 5 carbon atoms substituted by alkyl or alkoxy of from 1 to 6 carbon atoms, divinylene, divinylene substituted by alkyl of from 1 to 6 carbon atoms or



wherein D is hydrogen, alkoxy of from 1 to 6 carbon atoms or halogen; and *n* is the integer 1 or 2.

4,056,625

PESTICIDAL COMPOSITIONS CONTAINING BENZODIOXOLE DERIVATIVES AND METHODS OF COMBATING PESTS

Peter Stuart Gates, Cambridge, and John Gillon, Linton, both of England, assignors to Fisons Limited, London, England

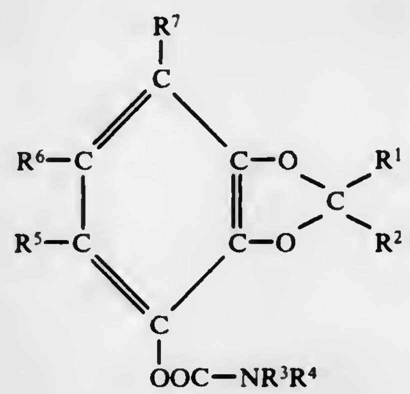
Division of Ser. No. 389,202, Aug. 17, 1973, Pat. No. 3,948,952, which is a continuation-in-part of Ser. No. 347,462, Jan. 29, 1973, abandoned, which is a continuation-in-part of Ser. No. 130,487, April 1, 1971, Pat. No. 3,736,338, which is a continuation-in-part of Ser. No. 706,628, Feb. 19, 1968, abandoned. This application Dec. 18, 1975, Ser. No. 641,925

Claims priority, application United Kingdom, Aug. 22, 1972, 39001/72; Dec. 6, 1972, 56170/72

Int. Cl.² A01N *9/28;* C07D *317/46*

U.S. Cl. 424—282 33 Claims

1. A pesticidal composition for combating insects and acarids comprising a pesticidal amount of a compound of the formula



wherein

R^1 and R^2 are selected from the group consisting of hydrogen and alkyl of 1 to 6 carbon atoms and a group where R^1 and R^2 together with the linking carbon atom form a cycloaliphatic ring selected from the group consisting of cycloalkane and cycloalkene rings of 5 to 7 carbon atoms;

R^3 is selected from the group consisting of hydrogen, alkyl of 1 to 4 carbon atoms and lower alkanoyl;

R^4 is selected from the group consisting of alkyl of 1 to 4 carbon atoms, alkenyl of up to 4 carbon atoms and alkynyl of up to 4 carbon atoms; and

one of R^5, R^6 and R^7 are selected from the group consisting of hydrogen, halogen and alkyl of 1 to 4 carbon atoms, and wherein the remaining members of R^5, R^6 and R^7 each represent hydrogen in combination with at least one material selected from the group consisting of carriers, wetting agents, and mixtures thereof.

4,056,626

PHARMACEUTICAL COMPOSITION CONTAINING BENZOFURAN DERIVATIVE

Kiyoshi Ito, Otsu; Masahiko Ikemoto, Shiga; Kazuhiko Kimura, Otsu, and Teruo Nakanishi, Kyoto, all of Japan, assignors to Kakenyaku Kako Co., Ltd., Tokyo, Japan

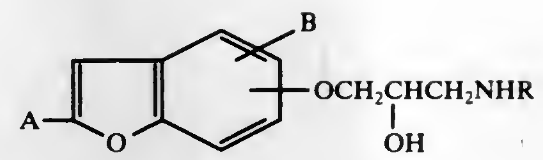
Continuation-in-part of Ser. No. 588,195, June 19, 1975, abandoned, which is a division of Ser. No. 447,060, Feb. 28, 1974, abandoned, which is a division of Ser. No. 251,454, May 8, 1972, Pat. No. 3,853,923. This application Feb. 27, 1976, Ser. No. 662,099

Claims priority, application Japan, May 13, 1971, 46-32145; July 14, 1971, 46-52333; Oct. 28, 1971, 46-86109; Jan. 6, 1972, 47-4395

Int. Cl.² A61K *31/34*

U.S. Cl. 424—285 23 Claims

1. A pharmaceutical composition possessing a β-adrenergic blocking activity and local anesthetic activiy which comprises as the essential active ingredient an effective amount a benzofuran derivative of the formula:



(I)

wherein A is —COR',

$-\overset{R'}{\overset{|}{C}}=NR$

or ethyl group; B is hydrogen atom when A is —COR' or

$-\overset{R'}{\overset{|}{C}}=NR,$

or —COR'' substituted at the 3 or 4 position of the benzofuran nucleus when A is ethyl; R is an alkyl group having 1 to 5 carbon atoms; R' is an alkyl group having 1 to 4 carbon atoms, an alkoxy group having 1 to 3 carbon atoms or phenyl group; R'' is an alkyl group having 1 to 4 carbon atoms, phenyl or phenylalkyl group wherein the alkyl moiety has 1 to 2 carbon atoms; and the substituted propoxy group is at the 3, 4, 5, 6 or 7 position of the benzofuran nucleus; or a pharmacetuically acceptable acid addition salt thereof in admixture with a pharmaceutically acceptable carrier.

4,056,627

BIS-CYCLOALKYLTHIOCARBAMATES AS INSECT CONTROL AGENTS

Ferenc M. Pallos, Walnut Creek, Calif., assignor to Stauffer Chemical Company, Westport, Conn.

Division of Ser. No. 574,472, May 5, 1975, Pat. No. 3,960,917. This application Mar. 10, 1976, Ser. No. 666,296

Int. Cl.² A01N *9/12, 9/20*

U.S. Cl. 424—300 6 Claims

1. A method for selectively impeding the metamorphosis of insects comprising applying to the insect at its larval stage, a metamorphosis-inhibiting effective amount of a compound having the formula

$$R-S-\underset{\underset{O}{\|}}{C}-NH-CH_2-CH_2-\overset{R_1}{\overset{|}{N}}-\underset{\underset{O}{\|}}{C}-S-R$$

wherein R is cycloalkyl having from 3 to 7 carbon atoms, and R_1 is lower alkyl.

4,056,628

INSECTICIDAL ESTERS OF ALPHA-PHENOXY ALKANOIC ACIDS WITH SUBSTITUTED BENZYL ALCOHOLS

Pavol Winternitz, Greifensee, Switzerland, assignor to Hoffmann-La Roche Inc., Nutley, N.J.

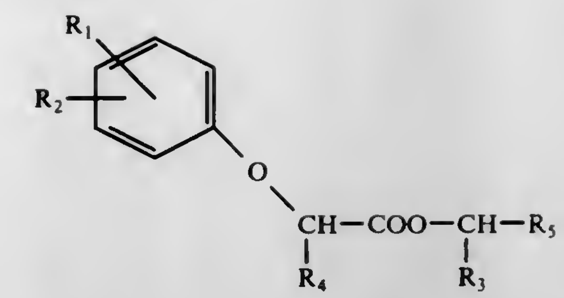
Filed Aug. 3, 1976, Ser. No. 711,330

Claims priority, application Switzerland, Aug. 8, 1975, 10380/75; June 28, 1976, 8230/76

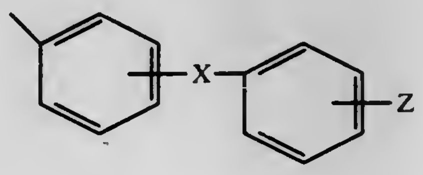
Int. Cl.² A01N *9/24;* C07C *69/76*

U.S. Cl. 424—308 13 Claims

1. A substituted α-aryloxycarboxylic acid ester of the formula

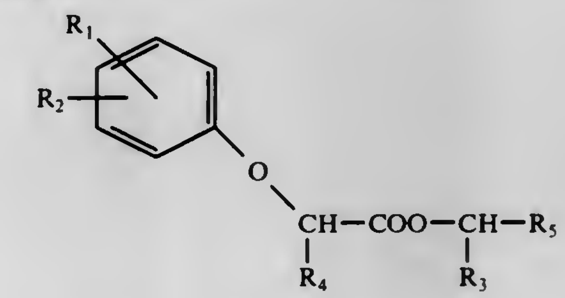


wherein R_1 and R_2 are hydrogen, halogen, alkyl containing from 1 to 3 carbon atoms, lower alkoxy, lower alkylthio, cyano or nitro; or R_2 and R_1 together are methylenedioxy; R_3 is hydrogen atom or cyano, lower alkenyl, lower alkynyl or lower alkyl; R_4 is lower alkyl group and R_5 is

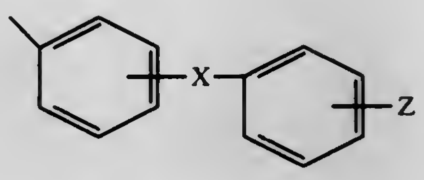


in which X is oxygen or sulphur or methylene and Z is hydrogen or fluorine.

11. An insecticidal composition comprising as an essential ingredient an insecticidally effective amount of a compound of the formula



wherein R_1 and R_2 are hydrogen, halogen, alkyl containing from 1 to 3 carbon atoms, lower alkoxy, lower alkylthio, cyano or nitro; or R_1 and R_2 together are methylenedioxy; R_3 is hydrogen atom or cyano, lower alkenyl, lower alkynyl or lower alkyl; R_4 is lower alkyl group and R_5 is



in which X is oxygen or sulphur or methylene and Z is hydrogen or fluorine and an inert carrier.

4,056,629

PHARMACOLOGICALLY ACTIVE O-ACYL-2,3-DIARYL-3-HALOGENO-ACRYL-ALDOXIMES

Wilhelm Bartmann, Neuenhain, Taunus; Gerhard Beck, Frankfurt am Main; Ernold Granzer, Kelkheim, Taunus; Josef Musil, Konigstein, Taunus, and Hermann Teufel, Kelkheim, Taunus, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

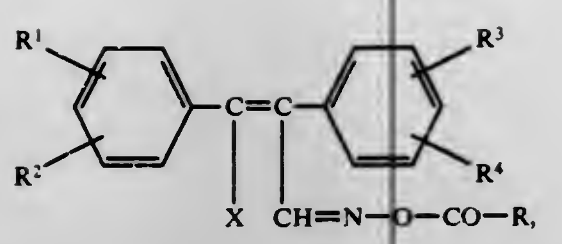
Filed Aug. 20, 1976, Ser. No. 716,277

Claims priority, application Germany, Aug. 22, 1975, 2537372

Int. Cl.² A61K *31/15*

U.S. Cl. 424—327 1 Claim

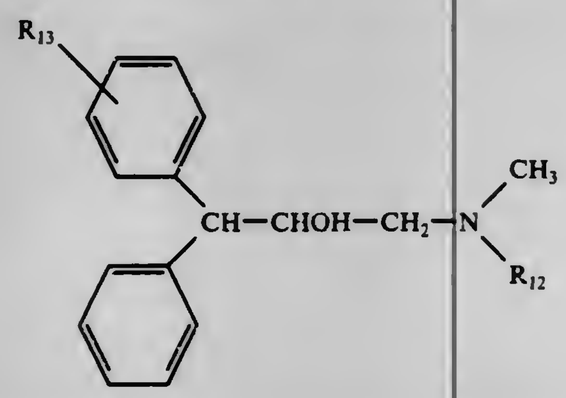
1. A method for treating hyperurecemia which comprises orally administering to a patient suffering therefrom a therapeutically effective amount of a compound of the formula



wherein X is chlorine or bromine; R is alkyl, alkenyl, alkoxy, alkenoxy, or alkylamino each having from 1 to 12 carbon atoms, or R is a member selected from the group consisting of phenyl, phenyloxy, phenylalkyl, phenylalkoxy, phenylamino, phenylalkylamino, naphthyl, naphthyloxy, naphthylalkyl, naphthylalkoxy, naphthylamino, and naphthylalkylamino, or R is such a member mono-substituted or di-substituted by alkyl having 1 to 6 carbon atoms; and R^1, R^2, R^3, and R^4 are the same or different and are hydrogen, halogen, or alkyl or alkoxy each having from 1 to 6 carbon atoms.

4,056,630
DIPHENYLPROPYLAMINES FOR TREATING DEPRESSION
Judith Ann Clark, Barrington, England, assignor to Beecham Group Limited, England
Division of Ser. No. 443,021, Feb. 15, 1974, Pat. No. 4,028,415. This application Aug. 30, 1976, Ser. No. 718,411
Claims priority, application United Kingdom, Feb. 24, 1973, 9183/73; Oct. 13, 1973, 47928/73
Int. Cl.² A61K *31/135*
U.S. Cl. 424—330 **26 Claims**

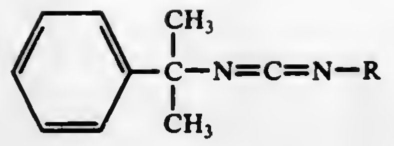
1. A pharmaceutical composition useful for treating depression in humans which comprises antidepressantly effective amount of a compound of the formula (IV):



or a pharmaceutically acceptable acid addition salt thereof wherein R_{12} is hydrogen or methyl; and R_{11} is hydrogen, fluorine, chlorine, bromine or trifluoromethyl, in combination with a pharmaceutically acceptable carrier.

4,056,631
METHOD OF COMBATTING TICKS
Shigeo Kitaoka, Musashino; Katsuhiro Johkoh, Yokohama; Hisashi Ebisawa; Tadashi Sato, both of Tokyo; Hiroshi Kubo; Sosuke Takahashi, both of Yokohama, and Yoshinobu Kawase, Tokyo, all of Japan, assignors to Showa Denko K.K., Tokyo, Japan
Continuation-in-part of Ser. No. 515,929, Oct. 18, 1974, Pat. No. 3,995,053. This application June 8, 1976, Ser. No. 693,833
Claims priority, application Japan, Oct. 23, 1973, 48-118458
Int. Cl.² A01N *9/06, 9/20, 9/24*
U.S. Cl. 424—330 **17 Claims**

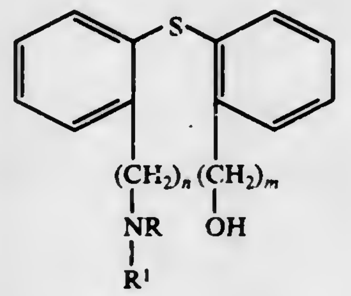
1. A method of combatting ticks which comprises applying to the surface of the body of domestic animals infested with ticks a pesticidally effective amount of a carbodiimide of the formula



wherein R is a moiety selected from the group consisting of (1) aryclic alkyl containing 2–18 carbon atoms; (2) cyclohexyl;; (3) cyclohexyl substituted by 1–3 methyl groups (4) phenyl; (5) phenyl substituted by at least one moiety selected from the group consisting of alkyl having 1–4 carbon atoms, alkoxy having 1–4 carbon atoms and chlorine; (6) benzyl; (7) p-chlorobenzyl; and (8) phenylethyl.

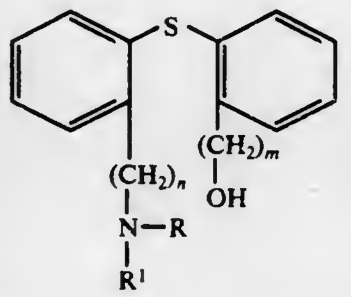
4,056,632
2-HYDROXYMETHYL-2'-AMINOMETHYL-DIPHENYL-SULFIDES AND METHOD OF USE
Nariman Bomanshaw Mehta, and Lawrence Edward Brieaddy, both of Raleigh, N.C., assignors to Burroughs Wellcome Co., Research Triangle Park, N.C.
Division of Ser. No. 597,697, July 21, 1975, Pat. No. 3,997,540. This application Aug. 20, 1976, Ser. No. 716,163
Int. Cl.² A01N *9/20, 9/24*
U.S. Cl. 424—330 **61 Claims**

1. A compound of the formula



or an acid addition salt thereof where R and R^1 are the same or different and are each hydrogen or lower alkyl, in the above lower alkyl has 1 to 4 carbon atoms and *n* and *m* are each 1.

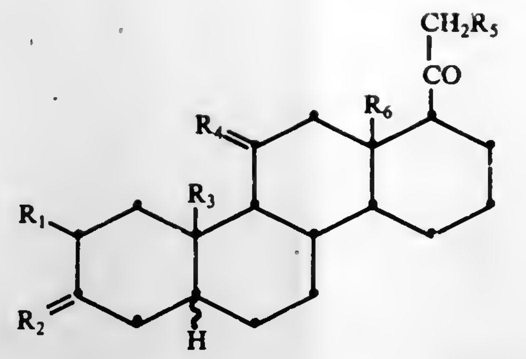
31. The method of treating depression in a mammal which comprises administering to a depressed mammal an effective antidepressant amount of a compound of the formula



or a pharmaceutically acid addition salt thereof where R and R^1 are the same or different and are each hydrogen or lower alkyl, in the above lower alkyl has 1 to 4 carbon atoms and n and m are each 1.

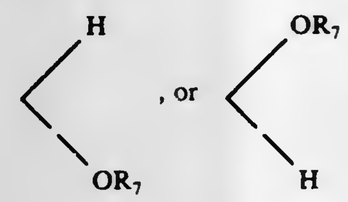
4,056,633
D-HOMO-20-KETOPREGNANES AND METHOD FOR INDUCING ANESTHESIA OR NARCOSIS
Ulrich Kerb; Rudolf Wiechert; Helmut Wachtel; Otto Engelfried, and Klaus Kieslich, all of Berlin, Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Germany
Filed Dec. 17, 1975, Ser. No. 641,602
Claims priority, application Germany, Dec. 23, 1974, 2461312; Feb. 14, 1975, 2506688
Int. Cl.² C01B *33/24;* **C07J** *63/00*
U.S. Cl. 424—331 **37 Claims**

1. A D-homo-20-ketopregnane of the formula



wherein R_1 is hydrogen, fluorine, chlorine, bromine, alkyl of 1–15 carbon atoms, alkoxy of 1–15 carbon atoms, or azido;

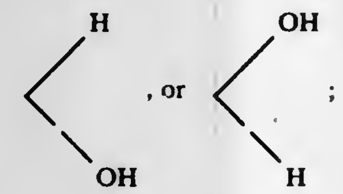
R_2 is oxygen



and R_7 is hydrogen, alkyl of 1–8 carbon atoms or alkanoyl of up to 5 carbon atoms;

R_3 is hydrogen or methyl;

R_4 is oxygen, two hydrogens,



R_5 is hydrogen, hydroxy, alkoxy of 1–15 carbon atoms or mercapto,

R_6 is methyl or ethyl;

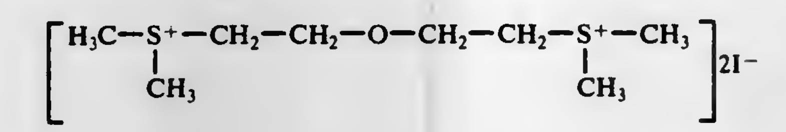
the hydrogen atom in the 5-position is in the α-or β-configuration; and

pharmaceutically acceptable acid addition salts thereof.

36. A method for inducing anesthesia or narcosis in human and veterinary medicine comprising administering to a patient a narcotic-anesthetic unit dosage of a compound of claim 1, in admixture with a pharmaceutically acceptable carrier.

4,056,634
DIMERCAPTOETHYL ETHER SULFONIUM COMPOUNDS AND USE AS ANTIINFLAMMATORY AND ANTIRHEUMATIC AGENTS
Davide Della-Bella, Milan, and Dario Chiarino, Monza, Milan, both of Italy, assignors to Whitefin Holding S.A., Lugano, Switzerland
Filed Feb. 17, 1976, Ser. No. 658,756
Claims priority, application Italy, Feb. 19, 1975, 20419/75
Int. Cl.² C01B *33/12;* **C07C** *149/46*
U.S. Cl. 424—335 **1 Claim**

1. Pharmaceutical compositions having antiinflammatory and antirheumatic activity, containing a therapeutically effective amount of the compound of formula



in admixture with suitable binding agents, excipients, diluents as well as carriers therapeutically acceptable for human and veterinary use.

4,056,635
2,6-DIISOPROPYLPHENOL AS AN ANAESTHETIC AGENT
John Baird Glen, and Roger James, both of Macclesfield, England, assignors to Imperial Chemical Industries Limited, London, England
Filed Mar. 19, 1975, Ser. No. 559,880
Claims priority, application United Kingdom, Mar. 28, 1974, 13739/74
Int. Cl.² A61K *31/05*
U.S. Cl. 424—346 **2 Claims**

1. A method for producing anaesthesia in a warm-blooded animal which comprises administering parenterally to said animal an anaesthetically effective amount of 2,6-diisopropylphenol.

4,056,636
PROCESS FOR THE CONVERSION OF STARCH AND PROTEIN-CONTAINING CELLULOSIC WASTE PRODUCTS INTO NUTRIENTS RICHER IN PROTEINS
Hans Müller, Im Almendli, Erlenbach, Zurich, Switzerland
Filed Apr. 22, 1975, Ser. No. 570,456
Int. Cl.² C13K *1/06*
U.S. Cl. 426—48 **3 Claims**

1. A process for the recovery of high-protein materials from starch and protein-containing pieces and crumbs of broken baked goods from bakeries which process comprises

dispersing said baked goods in comminuted form in water;

subjecting said dispersion to an acid-, enzyme-, or microorganism-induced hydrolysis under suitable conditions sufficient to convert the starch in said dispersion to a fermentable sugar;

thereafter separating and recovering protein containing solids from the hydrolyzed dispersion by means of ultrafiltration, and

aerobically cultivating in the remaining sugar-containing liquid a yeast that is capable of fermenting the sugar-containing liquid and utilizing the sugar therein for growth, and

finally recovering from the fermented liquid a high protein yeast formed by said fermentation whereby said protein containing solids and said high protein yeast are suitable for use in human and animal food products.

4,056,637
PROCESS FOR PREPARING FOOD PRODUCTS CONTAINING A LACTIC ACID BACTERIA-FERMENTED PRODUCT OF A CEREAL GERM
Yoshihide Hagiwara, Takarazuka; Miyauchi Tetsuji, Itami, and Yuki Morimasa, Kawanishi, all of Japan, assignors to Japan Natural Food Co. Ltd., Osaka, Japan
Filed June 8, 1976, Ser. No. 693,761
Int. Cl.² A23L *1/172, 1/28*
U.S. Cl. 426—52 **12 Claims**

1. A process for preparing a lactic acid bacteria-fermented food product from a cereal germ, which comprises inoculating a culture medium containing a water extract of a cereal germ as a main ingredient with lactic acid bacteria, and then cultivating the lactic acid bacteria therein to produce the lactic acid bacteria-fermented product.

4,056,638
DIELECTRIC DRYING OF FUNGAL MATERIAL AND RESULTANT TEXTURED PRODUCT
Hua-Feng Huang, Mendenhall, Pa., and Richard Alan Yates, Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.
Continuation-in-part of Ser. No. 587,149, June 16, 1975, abandoned. This application May 6, 1976, Ser. No. 683,926
Int. Cl.² A23J *3/00, 1/18*
U.S. Cl. 426—244 **30 Claims**

1. A process comprising dewatering a fermenter effluent to

form a mycelial fungal mass which contains from 15 to 40 weight percent solids, dielectrically heating said mass for from 5 to 180 seconds during which period the solids content thereof is increased by from about 8 to about 40 weight percent as based on total dewatered composition whereby a product containing from 30 to 70 weight percent solids is produced.

4,056,639
PRESERVING RED COLOR IN FRESH RED MEATS
Eckhard C. A. Schwarz, Neenah, Wis., assignor to Presto Products Incorporated, Appleton, Wis.
Filed July 9, 1976, Ser. No. 703,723
Int. Cl.² A23B *4/14;* A23L *1/272*
U.S. Cl. 426—264 **17 Claims**

1. A process for treating fresh red meat to preserve the red color of the meat comprising the step of introducing into the meat a meat color preservative selected from the group consisting of sodium cyanate, acetylurea, sodium-5-acetylhydantoate, urethylane sodium carboxylate, and mixtures thereof, in an amount sufficient to stabilize the red color of the meat.

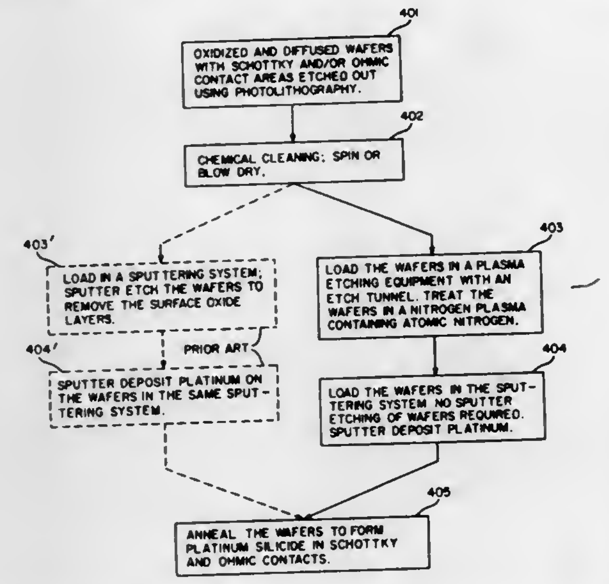
4,056,640
METHOD AND APPARATUS FOR MAKING CONFECTIONERIES
Friedrich Otto, Hameln, Weser, Germany, assignor to A. Stephan U. Sohne GmbH & Co., Hameln, Weser, Germany
Filed Jan. 19, 1976, Ser. No. 650,235
Claims priority, application Germany, Jan. 18, 1975, 2501933
Int. Cl.² A23G *3/00*
U.S. Cl. 426—573 **11 Claims**

1. A method of making low boiled confectioneries comprising combining a plurality of first confectionery ingredients, heating said ingredients to an initial temperature of 60° C by directly admitting steam therein, subsequently adding a plurality of additional confectionery ingredients including milk to form a confectionery mass while continuously heating said mass to approximately 80° C by directly admitting steam, maintaining said mass at approximately 80° C for a maximum of about 45 seconds and subsequently heating said mass to a temperature of approximately 125° C by directly admitting steam to complete cooking of said mass, said confectionery being continuously mixed and emulsified by at least one rotary member at speeds between about 1500–3000 rpm throughout heating.

4,056,641
PROCESS AND APPARATUS FOR COATING FUEL FERTILE OR ABSORBER MATERIAL CONTAINING PARTICLES FOR HIGH TEMPERATURE FUEL ELEMENTS
Hans Huschka, and Wolfgang Warzawa, both of Grossauheim, Germany, assignors to HOBEG Hochtemperaturreaktor-Brennelement G.m.b.H., Grossauheim, Germany
Filed Aug. 23, 1974, Ser. No. 500,017
Claims priority, application Germany, Aug. 27, 1973, 2343123
Int. Cl.² G21C *3/06;* B05D *7/00*
U.S. Cl. 427—6 **9 Claims**

1. A process for coating particles of a member of the group consisting of uranium oxide, uranium carbide, thorium oxide, thorium carbide, plutonium oxide, plutonium carbide, boron carbide, boronated graphite, hafnium carbide, gadolinium oxide, samarium oxide and europium oxide particles for use in a high-temperature fuel element of a nuclear reactor in a fluidized bed comprising heating the particles and fluidizing the particles with preheated inert carrier gas blown upwardly through the particles and injecting coating gas at a higher velocity than the carrier gas above the fluidized bed and passing the coating gas downwardly in counter flow to the carrier gas through the fluidized-particle bed to deposit said coating gas by pyrolytic decomposition.

4,056,642
METHOD OF FABRICATING METAL-SEMICONDUCTOR INTERFACES
Arjun N. Saxena, Palo Alto, and Courtney Hart, San Jose, both of Calif., assignors to Data General Corporation, Westboro, Mass.
Filed May 14, 1976, Ser. No. 684,207
Int. Cl.² H01L *21/302*
U.S. Cl. 427—84 **4 Claims**



1. A process for fabricating metal-semiconductor interface comprising the steps of:

a. producing an oxidized semiconductor wafer with photo-resisted areas;
b. subjecting the surface of said semiconductor wafer to a neutral, atomic, nitrogen plasma to break nascent oxide from said surface and to passivate said surface to make said surface resistant to nascent oxide buildup; and
c. depositing said metal on said semiconductur wafer to obtain said metal-semiconductor interface.

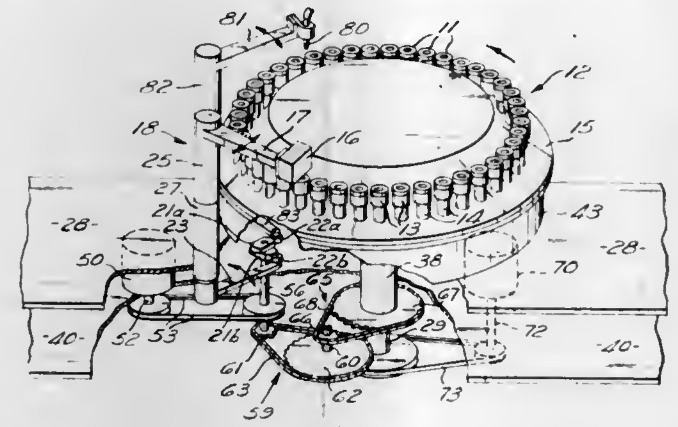
4,056,643
METHOD FOR DECORATIVE COLORING OF GLASS
Makoto Kume, Ashiya, Japan, assignor to Nippon Sheet Glass Co., Ltd., Japan
Continuation of Ser. No. 529,104, Dec. 3, 1974, abandoned. This application May 17, 1976, Ser. No. 687,375
Claims priority, application Japan, Dec. 8, 1973, 48-139845; Feb. 20, 1974, 49-20848
Int. Cl.² B05D *3/02*
U.S. Cl. 427—226 **7 Claims**

1. A method for decorative coloring of glass having a granite-like decorative design, which comprises coating the surface of a glass article containing alkali metal oxides and sulfide sulfur with a composition comprising a copper compound and a vanadium compound capable of forming vanadium pentoxide by subsequent heat-treatment, the amount of said vanadium compound being such that vanadium pentoxide resulting from the heat-treatment of the vanadium compound forms a melt together with the copper compound on the surface of the glass article and the melt forms an assembly of droplets having irregular sizes, the weight ratio of the copper compound coated to vanadium compound coated being 0.3 to 1.5, and then heat-treating the coated article at a temperature of from about 580° C to about 1000° C and for a period of time sufficient to obtain the desired degree of coloration.

4,056,644
METHOD OF COATING ANNULAR SURFACES
Alfred S. Howard, and William Selesnick, both of P.O. Box 22226, Cleveland, Ohio 44122
Filed Oct. 9, 1975, Ser. No. 621,006
Int. Cl.² B05B *13/04*
U.S. Cl. 427—284 **15 Claims**

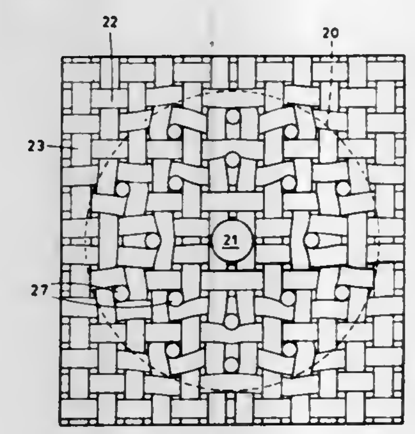
1. A method of coating annular surfaces on a plurality of workpieces each having an annular surface, which comprises:

a. producing a relative translational component of motion between an array of workpieces and a spray of a coating material by which each workpiece passes individually within the spray with the annular surface to be sprayed facing the point of origin of the spray;
b. simultaneously relatively moving the point of the spray and the workpieces back-and-forth in a plane generally



parallel to the plane of motion of step (a) and in synchronization with the motion of step (a) so that the path of the spray follows a portion of the curvature of each of the annular surfaces as the surface passes within the spray;
c. rotating the workpieces through at least one revolution while each workpiece is within the spray; and
d. spraying each workpiece with the coating material.

4,056,645
APERTURE REINFORCING MEANS FOR APERTURES IN REINFORCED FLEXIBLE MATERIALS
John Henry, Cowes, England, assignor to British Hovercraft Corporation Ltd., Yeovil, England
Filed July 12, 1976, Ser. No. 704,634
Claims priority, application United Kingdom, July 14, 1975, 29509/75
Int. Cl.² B32G *3/02, 3/10;* B60V *1/16*
U.S. Cl. 428—65 **8 Claims**

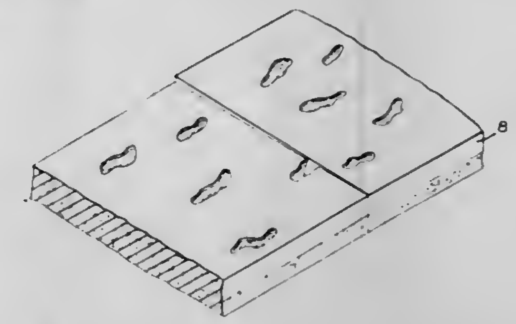


1. In a component manufactured from at least one layer of a reinforcing fabric material embedded within an elastomeric material and having at least one aperture extending through the elastomeric and reinforcing materials, aperture reinforcing means embedded within the elastomeric material at the location of the or each aperture, said means comprising a pegged washer plate including an apertured body portion having two opposed substantially parallel surfaces and a plurality of pegs spaced around the aperture in the body portion so as to extend outwardly from at least one of the opposed parallel surfaces to mesh with the reinforcing material.

4,056,646
FLOCKED FOAMED LATEX SHEET
Paul Marlin Westfall, St. Albans, and Howard Mayfield, South Charleston, both of W. Va., assignors to Union Carbide Corporation, New York, N.Y.
Filed May 16, 1975, Ser. No. 578,092
Int. Cl.² B32B *33/00*
U.S. Cl. 428—90 **4 Claims**

1. A soft, pliable, fiber reinforced, surface flocked, foamed latex sheet, said foamed latex sheet comprising a fibrous sheet or scrim base material weighing from 0.15 to 5 ounces per square yard, on at least one side of said base material a foamed latex, and on the exterior surface of said foamed latex a flock; wherein the foamed latex comprises from about 0.5 to about 8 ounces per square yard and the flock comprises from about 0.25 to 4 ounces per square yard.

4,056,647
POWDER EDGE COATING FOR CEILING TILE
John R. Garrick, and Ray C. Kendig, both of Lancaster, Pa., assignors to Armstrong Cork Company, Lancaster, Pa.
Filed Dec. 29, 1975, Ser. No. 644,646
Int. Cl.² B32B *3/10, 3/02;* B05D *1/12*
U.S. Cl. 428—134 **4 Claims**

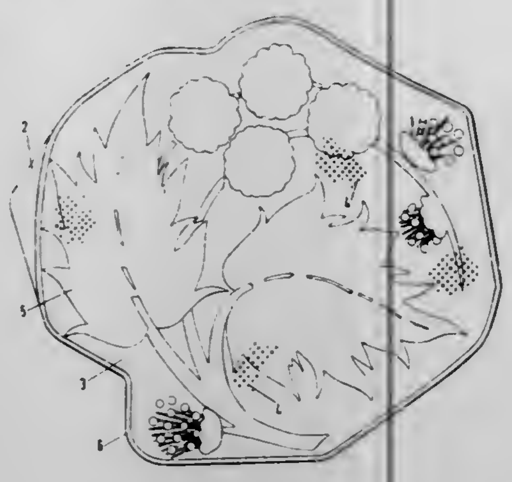


1. In a method of producing a ceiling board product comprising a body formed of a fibrous mass bound together by appropriate binder means, the front surface of the board having applied to it a decorative coating of a given color and the edge surfaces of said ceiling board having an open porous surface, the improvement consisting of applying to a portion of said edge surface of the ceiling board a coating consisting of a dry powder, said powder being applied in a quantity and color so as to render said edges basically the same color as the decorative color of the front face surface, said powder being adhered to the edges of the ceiling board only by mechanical entrapment of the powder in the pores of the edges of the ceiling board.

4,056,648
TRANSFERS
Anthony George Richardson, Belper, England, assignor to Denbyware Limited, England
Filed May 19, 1976, Ser. No. 688,089
Claims priority, application United Kingdom, June 16, 1975, 25651/75; July 15, 1975, 29674/75
Int. Cl.² B05D *3/02;* B32B *3/10, 7/06, 17/08*
U.S. Cl. 428—138 **1 Claim**

1. In a transfer of the type to be applied to a substrate and subsequently fired to obtain permanent marking of the substrate, and comprising a base having a surface of soluble adhesive onto an area of which is printed a pattern of one or more glazes, colours or pigments, and consumable cover coat covering the pattern area, said transfer being removed from said base by use of a solvent to free it from said soluble adhesive, the improvement comprising: said cover coat is provided with a configuration of small aperatures over substantially the whole of the pattern area, the size of said apertures varying according to a half toning technique wherein smaller apertures are uti-

lized for fine pattern detail and vice versa, the cover coat being thus rendered porous but retaining its coherence to permit



escape of solvent from behind the transfer without the necessity for squeegeeing.

4,056,649

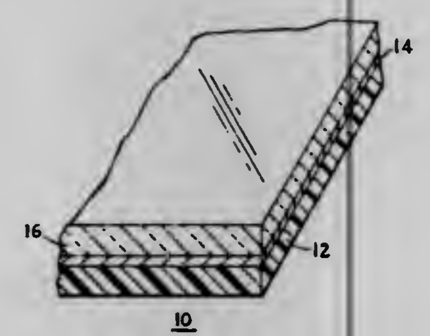
ABRASION RESISTANT OPTICAL MATERIALS AND PROCESS FOR MAKING SAME

John J. Walls, Jr., Huntingdon Valley, Pa., and Richard A. McKyton, Delran, N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Sept. 24, 1976, Ser. No. 726,714

Int. Cl.² B05D *5/06*

U.S. Cl. 428—215 **4 Claims**



1. Optical composite comprising an allyl diglycol carbonate substrate, a chromium interlayer of about 50–200A in thickness bonded on said substrate, and a glass layer of about 3.25 μm to 4.5 μm in thickness, comprising substantially SiO_2, bonded on said chromium interlayer.

4,056,650

PROCESS FOR MAKING ALUMINUM-COATED GLASS-CERAMIC COOKING VESSEL AND ARTICLE PRODUCED THEREBY

Harold F. Dates, Corning; Joseph J. Domicone, Horseheads, and Joseph E. Nitsche, Corning, all of N.Y., assignors to Corning Glass Works, Corning, N.Y.

Continuation of Ser. No. 524,521, Nov. 18, 1974, abandoned. This application Aug. 9, 1976, Ser. No. 712,479

Int. Cl.² B32B *15/04*

U.S. Cl. 428—332 **2 Claims**

1. A process for producing an aluminum-coated glass-ceramic cooking vessel exhibiting improved thermal durability which comprises the steps of:

a. selecting a glass-ceramic vessel composed of a lithium aluminosilicate glass-ceramic material comprising a principal crystal phase consisting of beta-spodumene solid solution;
b. preheating at least a selected surface portion of the glass-ceramic vessel to a temperature in the range of about 120°-600° C;
c. applying to the preheated selected surface portion a molten aluminum metal spray, said spray being produced by melting an aluminum metal powder and being applied in a quantity sufficient to provide an aluminum metal coating on the vessel having a thickness in the range of about 18–28 mils;
d. providing the aluminum coating with a film of phosphoric acid; and
e. heating said aluminum coating and film to a temperature at least sufficient to decompose the phosphoric acid.

4,056,651

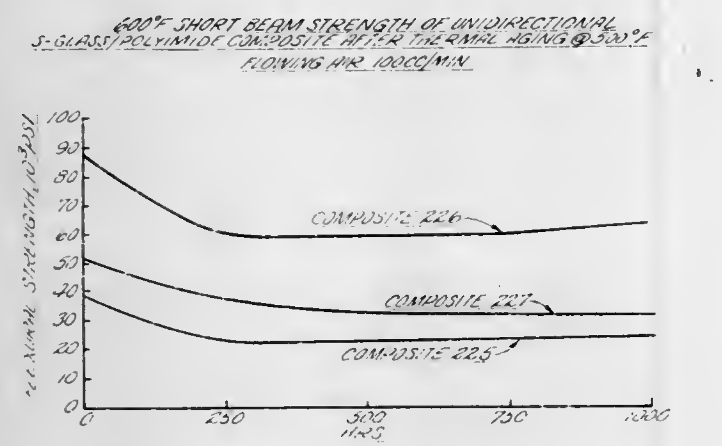
MOISTURE AND HEAT RESISTANT COATING FOR GLASS FIBERS

Daniel A. Scola, Glastonbury, Conn., assignor to United Technologies Corporation, Hartford, Conn.

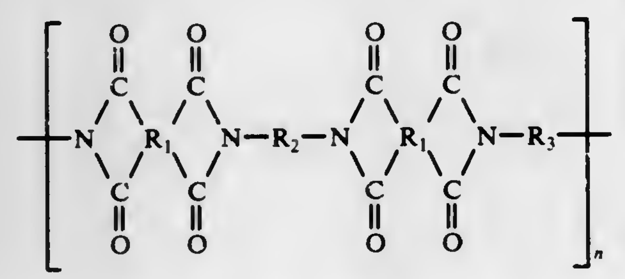
Continuation-in-part of Ser. No. 559,480, March 18, 1975, abandoned. This application July 16, 1976, Ser. No. 706,025

Int. Cl.² B32B *17/04, 27/26, 17/10*

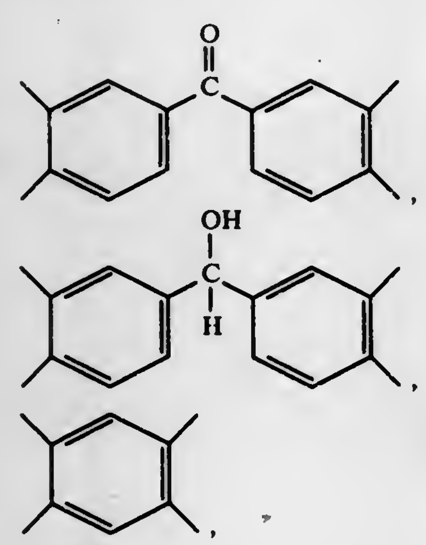
U.S. Cl. 428—336 **6 Claims**



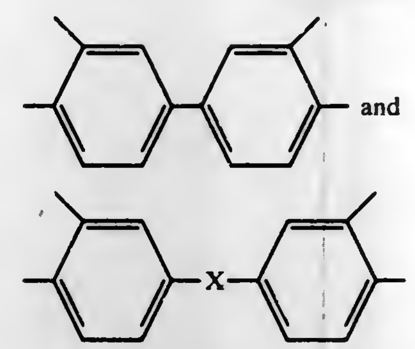
1. A moisture and heat resistant finish coating on materials having a hydroxylated surface consisting essentially of approximately, by weight, 40–98 percent of a polyimide film former selected from the group consisting of (1) a fully imidized and polymerized polyimide containing the repeating unit



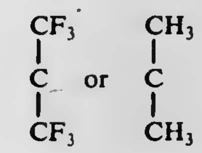
wherein R_1 is a tetravalent radical selected from the group consisting of



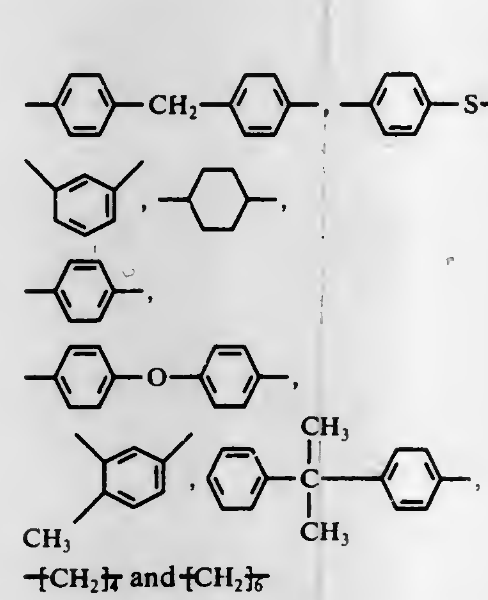
-continued



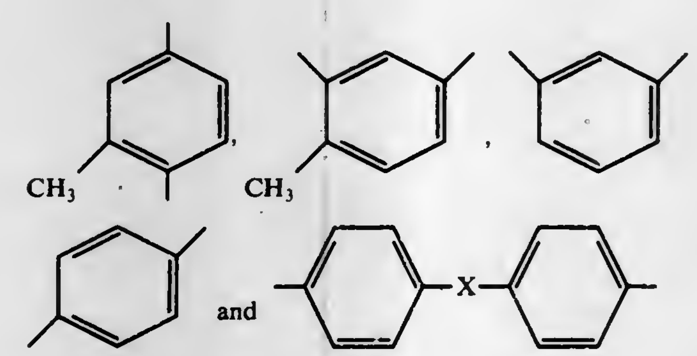
wherein X = O, S, SO_2, CH_2,



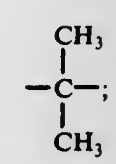
and R_2 is a divalent aromatic or aliphatic radical selected from the group consisting of



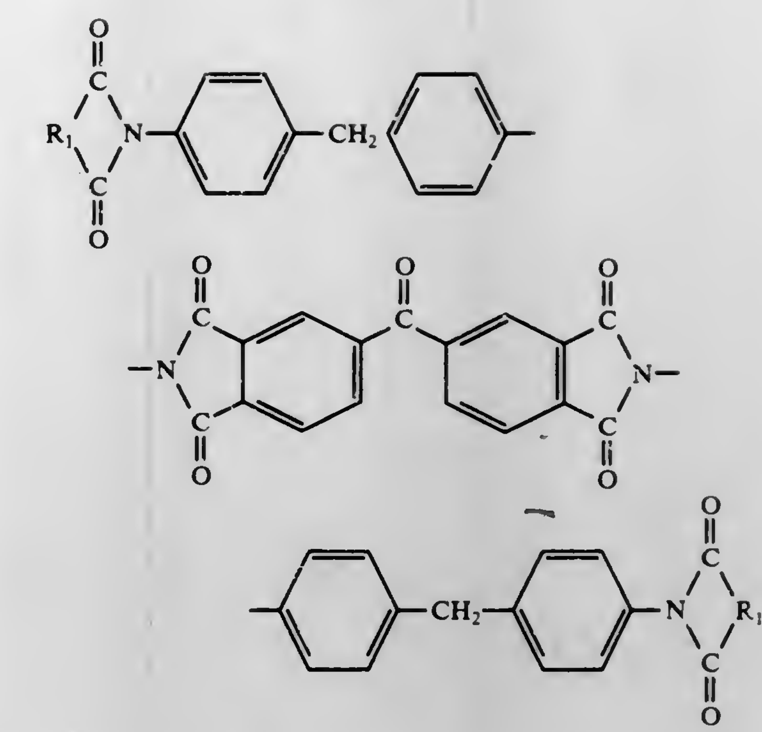
and R_3 is an aromatic divalent radical selected from the group consisting of



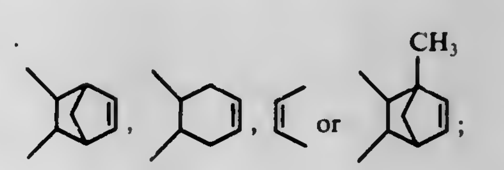
where X = CH_2, O, S or



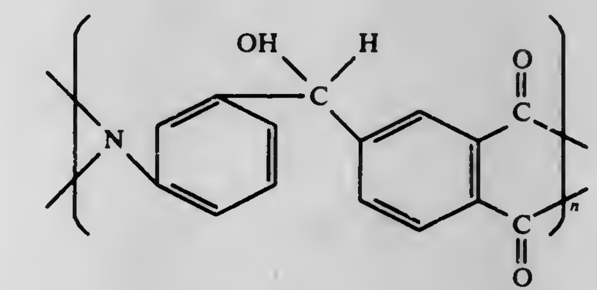
(2) an addition type resin intermediate derived from the low molecular weight polyimide monomer



wherein R_1 is an unsaturated divalent system such as



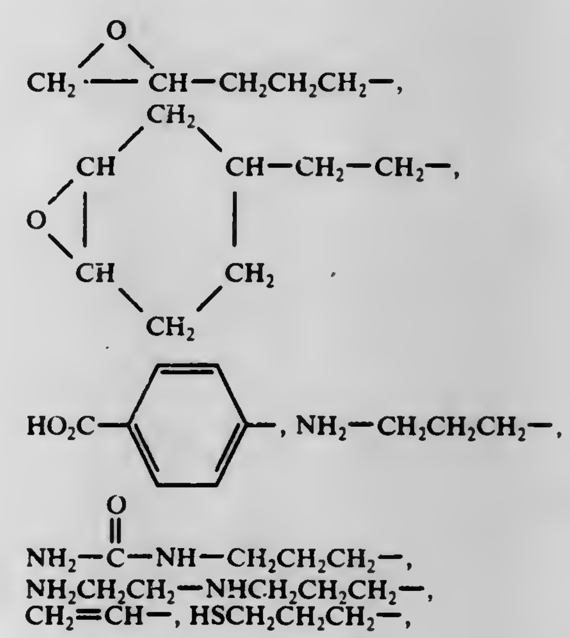
and (3) an hydroxylated aromatic polyimide in the amic acid stage having the repeating unit



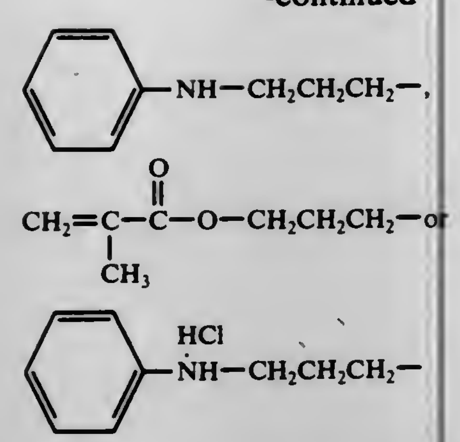
wherein *n* is an integer of sufficient magnitude, e.g., at least approximately 5, 2–60percent of a silane coupling agent characterized by the formula

$$R - Si - X_3$$

wherein R is an organic group containing amino, epoxy, aminehydrochloride or carboxy functionality such as



-continued



and X is an organic group which contains ether or ester functionality such as $—OCH_3$, $—OCH_2CH_3$,

$$-O\overset{\overset{O}{\|}}{C}-CH_3$$

or $—OCH_2CH_2OCH_3$ and up to 30 percent of a wetting and lubricating agent, said finish coating having a thickness of approximately 0.02–25 microns.

4,056,652
MONOFILAMENT OF POLYHEXAMETHYLENE ADIPAMIDE HAVING A SURFACE LAYER OF REDUCED ORIENTATION RELATIVE TO THE ORIENTATION OF THE CORE

Sibbley Paul Gauntt, Bon Air, Va., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.
Division of Ser. No. 641,135, Dec. 15, 1975, Pat. No. 4,009,511, which is a continuation of Ser. No. 480,759, June 19, 1974, abandoned. This application Sept. 13, 1976, Ser. No. 722,512
Int. Cl.² D02G *3/00*
U.S. Cl. 428—400 **3 Claims**

1. A filament of polyhexamethylene adipamide having a denier greater than 1000 and characterized by a polymer surface layer at least 3 and less than about 15 microns thick, said layer having an intermediate orientation relative to the orientation of the core and a refractive index, $n\|$, for the polymer in said surface layer of greater than 1.547 and less than 1.567 and the core polymer has a refractive index, $n\|$, of greater than 1.57.

4,056,653
SPHERICAL-SHAPED PARTICLES FROM IONOMER RESINS AND ETHYLENE/CARBOXYLIC ACID COPOLYMER RESINS

John Charles Gebhard, Jr., West Chester, Pa.; Marion Glen Waggoner, Hockessin, Del., and James Lang Webster, Parkersburg, W. Va., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.
Division of Ser. No. 419,894, Nov. 28, 1973, Pat. No. 3,933,954. This application Sept. 24, 1975, Ser. No. 616,443
Int. Cl.² B32B *9/00*
U.S. Cl. 428—402 **8 Claims**

1. Spherical-shaped particles having an average diameter of 10 to 100 microns, of a copolymer of (a) alpha-olefins of the formula $R—CH{=}CH_2$, where R is a radical selected from the class consisting of hydrogen and alkyl radicals having from 1 to 8 carbon atoms, and (b) an alpha, beta-ethylenically unsaturated carboxylic acids having from 3 to 8 carbon atoms, said copolymer having from 0 to 90% of the carboxylic acid groups ionized by neutralization with metal ions, said metal ions having an ionized valence of from 1 to 3 inclusive when the unsaturated acid is a monocarboxylic acid and an ionized valence of one when the unsaturated acid is a dicarboxylic acid and said metal ions being selected from the group consisting of uncomplexed and complexed metal ions, said copolymer being a direct copolymer of the alpha-olefins and the unsaturated carboxylic acid in which the carboxylic acid groups are randomly distributed over all molecules and in which

1 the alpha-olefin content of the copolymer is at least 50 mol percent, based on the alpha-olefinacid copolymer,
2. the unsaturated carboxylic acid content of the copolymer is from 0.2 to 25 mol percent, based on the alpha-olefin-acid copolymer, and
3. any other monomer component optionally copolymerized in said copolymer is monothylenically unsaturated,

characterized in that the surfaces of the polymer particles are rough and convered with hemispherical-shaped bumps about 0.1 micron in diameter.

4,056,654
COATING COMPOSITIONS, PROCESSES FOR DEPOSITING THE SAME, AND ARTICLES RESULTING THEREFROM

Harry Wilfred Kompanek, Santa Barbara, Calif., assignor to KKF Corporation, Santa Barbara, Calif.
Filed July 24, 1975, Ser. No. 598,892
Int. Cl.² B32B *00/00*
U.S. Cl. 428—409 **37 Claims**

1. A method for preparing a composite of a substrate with a dielectric ceramic coating composition adhered thereto comprising forming an acidic aqueous slurry at a pH of less than about 1 by admixing a finely divided dielectric ceramic material, a phosphate additive and water, depositing said slurry as a coating composition on the substrate and drying said composition at a temperature sufficient to adhere said composition to said substrate.

15. A coating composition comprising a ferroelectric or piezoelectric ceramic material which is selected from the group consisting of barium titanate materials, lead zirconate-titanate materials, and lead metaniobate materials, and a phosphate additive admixed therewith in an amount of from about 0.5 weight percent to about 60 weight percent wherein the composition is an acidic aqueous slurry at a pH of less than about 1.

26. A composite article comprising a substrate and a dried coating composition adhered thereon prepared from an acidic aqueous slurry comprising a ferroelectric or piezoelectric ceramic powder material and a phosphate additive in an amount of from about 0.5 weight percent to about 60 weight percent of said material.

4,056,655
PROCESS FOR TREATING POROUS MATERIALS AND PRODUCTS OBTAINED

Marc Della Faille, Floree; Pierre Delvaux; Pierre Godard, both of Brussels, and Jean Pierre Mercier, Kessel-Lo, all of Belgium, assignors to S. A. Eternit, Kapelle op den Bos, Belgium
Continuation of Ser. No. 429,661, Dec. 28, 1973, abandoned. This application Feb. 3, 1976, Ser. No. 654,974
Claims priority, application France, Jan. 2, 1973, 73.00003
Int. Cl.² B32B *19/02;* **B05D** *3/02*
U.S. Cl. 428—443 **16 Claims**

1. A method for processing porous materials comprising in successive order the steps of: impregnating, with at least one water-insoluble polymerizable compound, a porous material consisting essentially of a hydraulic binder and a filler selected from the group consisting of granular and fibrous fillers; fully covering the thus impregnated material with an aqueous solution of a salt which does not substantially modify the inherent viscosity of water and heating said impregnated material to a polymerization temperature for said compound and maintaining said temperature to polymerize said compound in said material while covered with said solution, wherein said solution is a solution of a salt which precipitates when contacted with said hydraulic binder in said material, said solution having a concentration of at least 10% of the saturation concentration at the polymerization temperature.

4,056,656
FLAME-RESISTANT LAMINATES

Arnold Franz, Troisdorf-Spich, and Werner Stein, Troisdorf-Kriegsdorf, both of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Troisdorf, Germany
Division of Ser. No. 283,247, Aug. 23, 1972, Pat. No. 3,922,459. This application Apr. 28, 1975, Ser. No. 572,243
Claims priority, application Germany, Aug. 27, 1971, 2141890; May 26, 1972, 2225587
Int. Cl.² B32B *15/08, 27/42*
U.S. Cl. 428—460 **13 Claims**

1. A flame-retardant laminated comprising a first layer, which first layer comprises between 35 and 65% by weight continuous layer of paper, the balance comprising a mixture of a synthetic resin of cresol or phenol, a plasticizer and pentabromodiphenyl ether alone or in a admixture with another brominated diphenyl ether, the amount of brominated diphenyl ether being between 5 and 15% based upon the weight of the moisture-free synthetic resin, the total percentage of brominated diphenyl ether amounting to between 5 and 15% by weight based upon the weight of moisture-free synthetic resin and plasticizer, and a second layer laminated to said first layer.

4,056,657
ZINC-ALUMINUM EUTECTIC ALLOY COATED FERROUS STRIP

Harry P. Leckie, Schererville; William C. Sievert, Chesterton, both of Ind., and Robert A. Legault, Homewood, Ill., assignors to Inland Steel Company, Chicago, Ill.
Continuation-in-part of Ser. No. 596,427, July 16, 1975, abandoned. This application June 10, 1976, Ser. No. 694,773
Int. Cl.² B32B *15/18*
U.S. Cl. 428—659 **4 Claims**

1. A corrosion resistant continuous hot-dip coated ferrous metal strip having applied directly on a surface thereof a hot-dip coating consisting essentially of:

1. zinc-aluminum eutectic alloy which contains 5.0 ± 0.5 wt. % aluminum, and
2. at least one metallic additive effective for lowering the surface tension of the coating selected from the group of metals consisting of lead, antimony, and tin with the total amount of said mtallic additives present in said coating being a maximum of about 0.1 wt. %, with the balance essentially zinc;

and said coating being characterized by a bright, smooth surface which is free of both ripples and spangles which interfere with the paintability and weldability of the strip and said coated strip being formable and resistant to corrosion due to exposure to a marine-type environment.

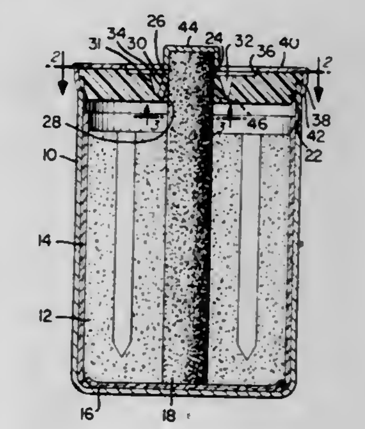
4,056,658
FOOD AND FODDER ADDITIVE

Heidrun Bertram, Grossauheim; Rudolf Fahnestich, Mombris, and Joachim Hesse, Grossauheim, all of Germany, assignors to Deutsche Gold- und Silber-Scheideanstalt Vormals Roessler, Frankfurt, Germany
Filed Oct. 19, 1973, Ser. No. 408,051
Claims priority, application Germany, Oct. 23, 1972, 2251877; Dec. 18, 1972, 2261926
Int. Cl.² A23J *3/00;* **A23K** *1/00*
U.S. Cl. 426—2 **11 Claims**

1. A protein containing feed deficient in methionine containing DL-methionyl-DL-methionine in an amount sufficient to eliminate the deficiency.

4,056,659
PRIMARY DRY CELL HAVING A NOVEL VENTING CLOSURE

Frank George Spanur, Parma Heights, and Vicente Santo Domingo Alberto, Parma, both of Ohio, assignors to Union Carbide Corporation, New York, N.Y.
Filed Feb. 11, 1976, Ser. No. 657,210
Int. Cl.² H01M *2/12*
U.S. Cl. 429—54 **9 Claims**



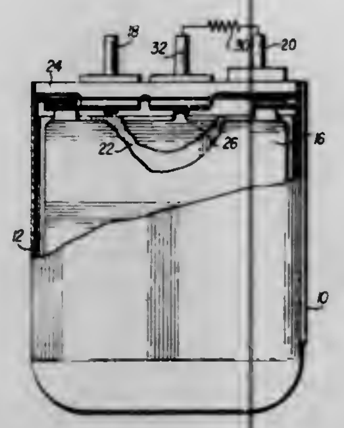
1. A magnesium dry cell comprising a metal anode cup having an open end and having a cathode mix therein, a central cathode rod protruding through said open end of said anode cup, and a closure for said open end, said closure including a central bore having at least three protrusions in contact with said cathode rod and adapted to be in interference fitting relationship when positioned on said central cathode rod, said central bore including a first section having a uniform and smooth surface which is slightly smaller in diameter than the diameter of said cathode rod and a second section extending downwardly from said first section and tapering outwardly away from said cathode rod and a venting sleeve defined by an annular groove in said closure and being disposed proximate said central bore, said venting sleeve being adapted to be urged outwardly away from said central cathode rod upon the development of a predetermined gas pressure within said cell thereby permitting venting of gas from the interior of said cell.

4,056,660
RECHARGEABLE CELL WITH OXYGEN SENSING ELECTRODE

Guy G. Rampel, Gainesville, and Jon R. Young, High Springs, both of Fla., assignors to General Electric Company, Columbus, Ohio
Continuation of Ser. No. 709,355, July 28, 1976, abandoned. This application Mar. 18, 1977, Ser. No. 778,898
Int. Cl.² H01M *10/34*
U.S. Cl. 429—59 **11 Claims**

1. A rechargeable cell comprising:
a. a sealed casing;
b. a positive electrode within said casing;
c. a negative electrode within said casing and spaced from said positive electrode;

d. an alkaline aqueous electrolyte within said casing;
e. an oxygen sensing electrode within said casing; and
f. separators between adjacent electrodes;



g. said sensing electrode comprising a substrate having cadmium thereon, and silver dispersed in intimate contact with said cadmium.

4,056,661

ROLLED ADHESIVE SHEET HAVING PRINTABLE AND STRIPPABLE PROPERTIES AND PROCESS FOR PRODUCING THE SAME

Yo Sato, and Keisuke Enomoto, both of Tokyo, Japan, assignors to Kabushiki Kaisha Sato, Japan

Continuation of Ser. No. 528,565, Nov. 29, 1974, abandoned. This application July 15, 1976, Ser. No. 705,661

Int. Cl.² B05D *1/36, 5/02;* **B32B** *3/10, 5/16;* **C09J** *7/04*

U.S. Cl. 428—144 **10 Claims**

1. In an adhesive sheet having printability and strippability characteristics comprising a paper base sheet layer, a pigment layer provided on one surface of the base sheet layer comprising a pigment and a binder therefor, a silicone resin layer provided on the pigment layer, and a tacky adhesive layer provided on the other opposite surface of the base sheet layer, the improvement consisting in that the silicone resin layer exists in a fine discontinuous state with finely dispersed parts substantially without a silicone resin film whereby strippability thereof from the tacky adhesive layer after adhesively contacting the same is assured, and said parts substantially without a silicone resin film assure acceptance of printing inks by the sheet and printability thereof.

3. An adhesive sheet having printability and strippability characteristics comprising a paper base sheet layer, a pigment layer of a coarse surface texture provided on one surface of the base sheet layer comprising a pigment selected from the group consisting of cellulose powder, starch particles, phthalocyanine pigment, synthetic resin powders, clay, talc, titanium dioxide, terra alba, bentonite, calcium carbonate, barium sulfate, zinc oxide, silica, alumina, and mixtures thereof and a binder therefor selected from the group consisting of milk casein, oxidized starch, polyvinyl alcohol, polystyrene butadiene, polyacrylic esters, and ethylene-vinyl acetate copolymers employed in a quantity of from 5 to 25 percent by weight relative to the pigment; a silicone resin layer provided on the pigment layer, and a tacky adhesive layer provided on the other, opposite surface of the base sheet layer, said silicone resin layer existing in a fine discontinuous state with finely dispersed parts, said fine discontinuous state having been generated by coating silicone resin on the coarse surface of the pigment layer in a solution concentration of 1 to 25 percent by weight thereby enabling strippability to the sheet from the tacky adhesive layer after adhesively contacting the same, substantially without the presence of a silicone resin film to assure the printability of the sheet and acceptance thereof of printing inks.

6. In a process for producing an adhesive sheet having printability and strippability characteristics which comprises coating one surface of a paper base sheet layer with a pigment together with a binder thereby to form a pigment layer, coating the pigment layer with a silicone resin thereby to form a layer thereof, and coating the other opposite surface of the base sheet layer with a tacky adhesive thereby to form a layer thereof, the improvement consisting in that the silicone resin layer is formed in a fine discontinuous state with finely dispersed parts substantially without a silicone resin film whereby the strippability thereof from the tacky adhesive layer after adhesively contacting the same is assured, and said parts substantially without a silicone resin film assure acceptance of printing inks by the sheet and printability thereof.

4,056,662

THERMAL CELLS AND ELECTROLYTE COMPOSITION THEREFOR

Glenn F. Zellhoefer, Normal, Ill., assignor to National Union Electric Corporation, Stamford, Conn.

Filed Jan. 27, 1954, Ser. No. 406,542

Int. Cl.² H01M *6/36*

U.S. Cl. 429—112 **6 Claims**

PERCENTAGE COMPOSITION BY WEIGHT

POINT NO.	$CdCl_2$	NaCl	KCl
1	63.0	5.0	32.0
2	66.6	26.6	6.8
3	48.9	31.2	19.9
4	45.8	5.8	48.4
5	52.9	11.2	35.9
6	54.2	20.1	25.7
7	48.1	24.5	27.4
8	46.9	15.0	38.1

1. A fused electrolyte cell embodying an electrolyte consisting essentially of a mixture of 25 to 40 mole percent $CdCl_2$; 10 to 50 mole percent NaCl; and 10 to 65 mole percent KCl, containing proportions of each component substantially as detemined by a three system diagram thereof; and a depolarizing agent.

4,056,663

PERFORMANCE IN AN ORGANIC ELECTROLYTE

Carl Roger Schlaikjer, Arlington, Mass., assignor to P. R. Mallory & Co. Inc., Indianapolis, Ind.

Filed Nov. 3, 1975, Ser. No. 628,036

Int. Cl.² H01M *6/16*

U.S. Cl. 429—197 **7 Claims**

1. An electrochemical cell comprising an active metal anode, said active metal being above hydrogen in the EMF series; a salt of an active metal as electrolyte; an oxidizing cathode selected from the group consisting of V_2O_5, MoO_3, the chromates and dichromates of silver, mercury, copper, lead, iron, cobalt, nickel, thallium, bismuth and mixtures thereof; and an ether free electrolyte solvent system comprising a mixture of a polar material selected from the group consisting of propylene carbonate, ethylene carbonate and mixtures thereof with an adjuvant material selected from the group consisting of methyl acetate, ethyl acetate, propyl acetate, butyl acetate and mixtures thereof.

4,056,664

ELECTROCHEMICAL CELL HAVING AN AGO ELECTRODE DISCHARGING AT AN AG_2O VOLTAGE LEVEL

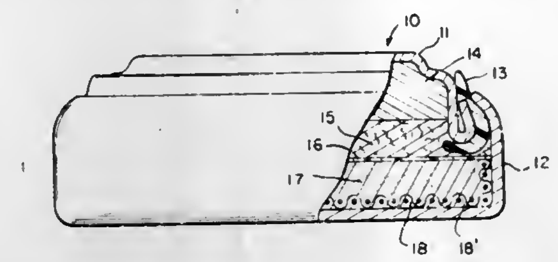
Sol Samson Jaffe, West Orange, N.J., assignor to P. R. Mallory & Co. Inc., Indianapolis, Ind.

Filed Jan. 28, 1977, Ser. No. 763,375

Int. Cl.² H01M *10/34*

U.S. Cl. 429—217 **10 Claims**

1. An electrochemical cell comprising an anode, a cathode, a cathode current collector, and an electrolyte wherein said cathode comprises divalent silver oxide, a portion of said divalent silver oxide is attenuated in a direction parallel to the adjacent surfaces of said cathode and said cathode current collector, and the portion of said divalent silver oxide which is attenuated is positioned adjacent the surface of said cathode current collector whereby an increase in internal cell resistance is introduced, and wherein the amount of divalent silver



oxide in the attenuated layer is 20 to 50 percent by volume and the balance is a non-conductive, non-reactive material.

4,056,665

COMPOSITION AND PROCESS

Lynn J. Taylor, Toledo, and John W. Tobias, Perrysburg, both of Ohio, assignors to Owens-Illinois, Inc., Toledo, Ohio

Continuation-in-part of Ser. No. 301,199, Oct. 26, 1972, which is a continuation-in-part of Ser. No. 206.144, Dec. 8, 1971, Pat. No. 3,797,690. This application May 24, 1974, Ser. No. 472,947

Int. Cl.² C08J *3/20*

U.S. Cl. 526—1 **10 Claims**

1. As a composition of matter, a photodegradable polymeric composition comprising at least one thermoplastic organic polymer and at least two aromatic carbonyl photosensitizers present in amounts sufficient to accelerate the photodegradation of the resulting polymeric composition, at least one aromatic carbonyl photosensitizer having an ultraviolet absorption maximum in the range of 280 to 330 millimicrons and at least one other aromatic carbonyl photosensitizer having an ultraviolet absorption maximum in the range of 330 to 400 millimicrons, each of said aromatic carbonyl photosensitizers being present at a level of about 0.01 to 2.0 percent by weight.

4,056,666

PROCESS FOR PRODUCING POLYION COMPLEX HAVING NUCLEIC ACID BASES

Toru Seita; Akihiko Shimizu, and Yujiro Kosaka, all of Shinnanyo, Japan, assignors to Toyo Soda Manufacturing Co., Ltd., Japan

Filed May 24, 1976, Ser. No. 689,062

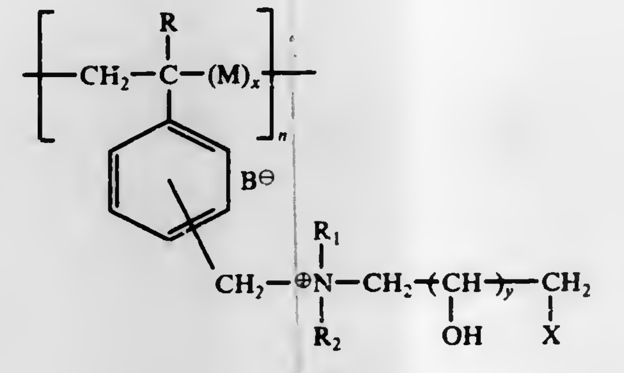
Claims priority, application Japan, June 2, 1975, 50-65426

Int. Cl.² C08F *8/42, 8/44*

U.S. Cl. 526—29 **5 Claims**

1. A process for preparing a polyion complex which comprises reacting an alkali metal silicate with a nucleic acid base-containing polycation polymer having the unit formula:

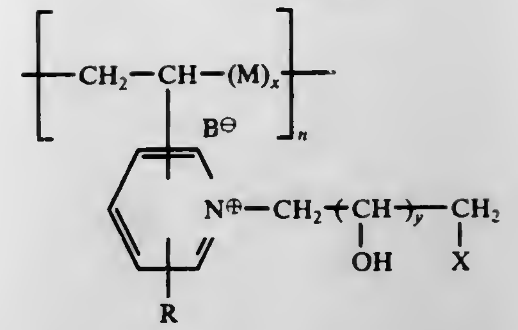
(I)



OR

-continued

(II)



wherein X represents adenine, thymine, cytosine, uracil or a derivative thereof, in which the purine nucleus is bonded at 9-position and the pyrimidine nucleus is bonded at 1-position; M represents a vinyl monomer; x is 0 or a positive integer; B represents a halogen atom or hydroxyl group; Y is 0 or 1; R represents a hydrogen atom or a C_{1-4} alkyl group; R_1 and R_2 respectively represent a C_{1-10} hydrocarbon group and n is an integer greater than 10.

4,056,667

PROCESS PERMITTING A POLYMERIZATION BATCH TO BE ADDITIONALLY COOLED

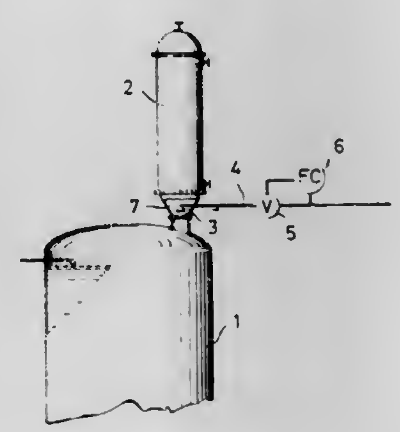
Helmut Sonnenberg, Erftstadt-Lechenich, and Bruno Krämer, Hurth, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Dec. 2, 1975, Ser. No. 636,934

Claims priority, application Germany, Dec. 7, 1974, 2458024

Int. Cl.² C08F *2/18, 14/06*

U.S. Cl. 526—74 **4 Claims**



1. In a process permitting a vinyl chloride batch which is to undergo polymerization in suspension, with the use of an overall quantity of water necessary for effecting the polymerization to be additionally cooled, wherein gaseous matter formed in the gas chamber of a polmerization vessel is delivered through a pipe connection communicating with the gas chamber and a reflux condenser, to the reflux condenser and condensed therein, and the resulting condensate is returned to the polymerization vessel, the improvement which comprises spraying by means of at least one nozzle structure, a liquid consisting essentially of fully desalted water into the pipe connection substantially across its entire cross section and over the entire polymerization period, the water sprayed into the pipe connection having an approximate temperature of from 5° to 45° C and being used in a proportion ranging from about 10 to 15% by volume, based on overall quantity of water necessary for effecting the polymerization whereby the formation of undesirable polymer deposits in the condenser is prevented.

4,056,668

PROCESS FOR THE POLYMERIZATION AND COPOLYMERIZATION OF OLEFINS WITH A SOLID SUPPORT CATALYST

Eugene Berger; Pol Gerard; Andre Delbouille, all of Brussels, and Jean-Louis Deroitte, Barvaux-sur-Ourthe, all of Belgium, assignors to Solvay & Cie, Brussels, Belgium

Continuation of Ser. No. 676,738, Oct. 20, 1967, abandoned, and Ser. No. 118,998, Feb. 25, 1971, abandoned. This application Apr. 29, 1976, Ser. No. 681,577

Claims priority, application France, Oct. 21, 1966, 66.81066; Sept. 1, 1967, 67.119682

Int. Cl.² C08F *4/02, 10/02*

U.S. Cl. 526—124 **14 Claims**

1. A process for the polymerization and copolymerization of α-olefins which comprises conducting polymerization or copolymerization in the presence of a catalyst composition comprising

A. the solid reaction product of (1) a substantially anhydrous, solid, oxygenated magnesium compound containing less than 0.1 hydroxyl group per molecule, and (2) a liquid, halogen-containing transition metal compound selected from the group consisting of the chloride, bromide, and oxyhalide salt of titanium and vanadium, the solid reaction product having a halogen-to-transition metal atomic ratio higher than 3 and the reaction having been carried out so as to prevent the elimination of hydrogen halide from the reaction; and

B. an organometallic compound selected from the organic derivatives of the metals of Groups I, II, III, and IV of the Periodic Table and being present in a molar concentration greater than that of said transition metal.

4,056,669

POLYMERIZATION PROCESS

Denis George Harold Ballard; Eric Jones; John Christopher Padget; Alexander Joseph Peter Pioli; Peter Anthony Robinson; John Walker, and Ronald John Wyatt, all of Runcorn, England, assignors to Imperial Chemical Industries Limited, London, England

Filed July 9, 1973, Ser. No. 377,197

Claims priority, application United Kingdom, July 13, 1972, 32811/72

Int. Cl.² C08F *4/02, 10/02*

U.S. Cl. 526—154 **5 Claims**

1. A process for the polymerisation of ethylene in which the ethylene is contacted with a catalyst comprising a transition metal composition which is the product of reacting a transition metal complex of general formula MR_m, where M is a metal of Group IVa, chromium or vanadium, R is selected from the group consisting of alkyl, alkenyl, and substituents of the formula —CH_2Y, where Y is selected from the group consisting of aromatic groups, polyaromatic groups and groups of formula $Z(R^1)_3$, where Z is silicon, germanium, tin or lead and each R^1 is hydrocarbon or hydrogen and m is an integer having a value equal to the valency of metal M, with particulate alumina which is free from adsorbed water, and which consists essentially of generally spherical particles, devoid of sharp edges, and has substantially no particles with diameters less than 20 μ.

4,056,670

ANAEROBIC ADHESIVE AND SEALANT COMPOSITIONS EMPLOYING AS A CATALYST α-AMINO SULFONE COMPOUND

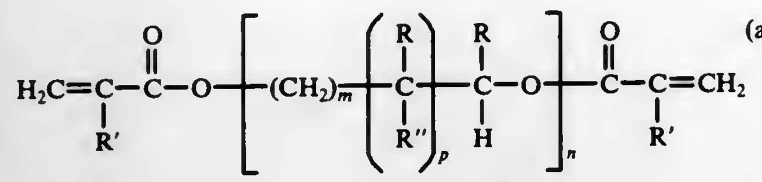
Martin M. Skoultchi, Somerset, N.J., assignor to National Starch and Chemical Corporation, Bridgewater, N.J.

Filed Nov. 3, 1975, Ser. No. 627,900

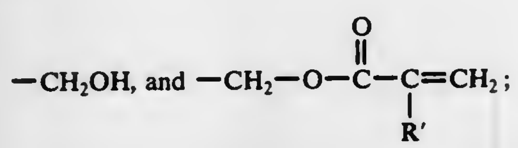
Int. Cl.² C08F *18/00, 4/04, 4/00*

U.S. Cl. 526—320 **9 Claims**

1. An anaerobic curing composition stable when exposed to air consisting essentially of a mixture of a polymerizable acrylic or substituted acrylic monomer selected from the group consisting of

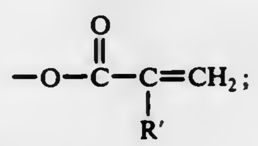

(a)

wherein R is selected from the group consisting of hydrogen, methyl, ethyl,

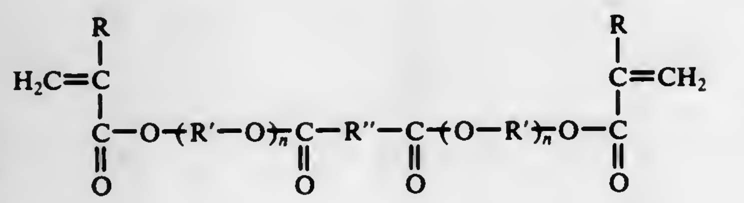


R' is selected from the group consisting of hydrogen chlorine, methyl and ethyl;

R'' is selected from the group consisting of hydrogen, hydroxy, and



m is an integer from 1 to 8; and n is an integer from 1 to 20; and p is 0 or 1;

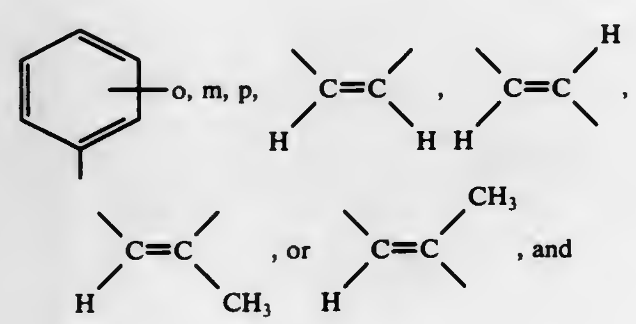

(b)

wherein

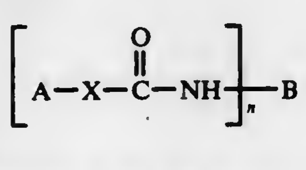
R represents hydrogen, chlorine, methyl or ethyl,

R' represents alkylene with 2-6 carbon atoms,

R'' represents $(CH_2)_m$ in which m is an integer of from 0 to 8,

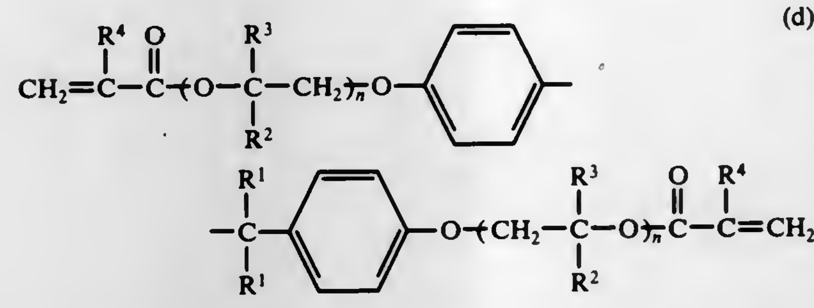


n represents an integer of from 1 to 4;


(c)

wherein X is selected from the group consisting of —O— and

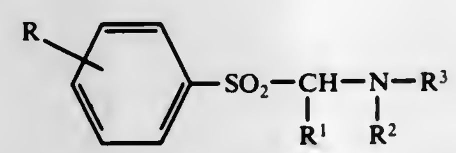
and R is a member selected from the group consisting of hydrogen and lower alkyl of 1 to 7 carbon atoms, A represents the organic residue of an active hydrogen containing acrylic ester wherein the active hydrogen has been removed, said ester being hydroxy or amino substituted on the alkyl portion thereof, and the methyl, ethyl and chlorine homologs thereof, n is an integer from 1 to 6, and B is a mono- or polyvalent organic radical selected from the group consisting of alkyl, alkylene, alkenyl, cycloalkyl, cycloalkylene, aryl, aralkyl, alkaryl, poly(oxyalkylene) poly(carboalkoxyalkylene), and heterocyclic radicals both substituted and unsubstituted


(d)

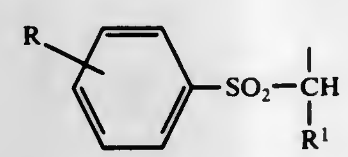
wherein R^1 is selected from the group consisting of methyl, ethyl, carboxyl and hydrogen, R^2 is selected from the group consisting of hydrogen, methyl and ethyl; R^3 is selected from the group consisting of hydrogen, methyl and hydroxyl; R^4 is selected from the group consisting of hydrogen, chlorine, methyl and ethyl and n represents an integer of from 0 to 8; and

e. monofunctional acrylate and methacrylate esters and the hydroxy, amide, cyano, chloro, and silane substituted derivatives thereof;

and from 0.05 to 5.0%, by weight of monomer, of an alpha-amino sulfone corresponding to the formula



where R is hydrogen or methyl; R^1, R^2 and R^3 are independently chosen from the group consisting of hydrogen; hydroxy; C_1–C_{20} alkyl; C_1–C_{20} alkyl substituted with chlorine, bromine, fluorine, dialkyl(C_1–C_6)amino, carboalkoxy (C_1–C_4) or alkoxy (C_1–C_4); C_6–C_{10} aryl; C_6–C_{10} aryl substituted with alkyl (C_1–C_8), chlorine, bromine, fluorine, dialkyl(C_1–C_6)amino, carboalkoxy (C_1–C_4) or alkoxy (C_1–C_4); dialkyl(C_1–C_6)amino, or either R_2 or R^3 may be



and wherein the alpha-amino sulfone is present in amount sufficient to initiate polymerization of said acrylic monomer at room temperature in the absence of air or oxygen.

4,056,671

STYRENE ACRYLONITRILE COPOLYMERS WITH HIGH DIMENSIONAL STABILITY UNDER HEAT

Heinrich Alberts, Cologne; Herbert Bartl, Odenthal-Hahnenberg, and Richard Prinz, Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

Continuation-in-part of Ser. No. 530,169, Dec. 6, 1974, abandoned. This application May 6, 1975, Ser. No. 574,950

Claims priority, application Germany, Dec. 12, 1973, 2361743

Int. Cl.² C08F *210/00, 212/00*

U.S. Cl. 526—342 **3 Claims**

1. A copolymer of improved dimensional stability consisting essentially of

a. 5 to 85% by weight of acrylonitrile or methacrylonitrile,

b. 14.99 to 94.5% by weight of styrene and

c. 0.01 to 0.5% by weight of an aliphatic monoolefin having 2 to 18 carbon atoms.

4,056,672

POLYMER PREPARED BY CYANHYDRIN METHOD

Alf-Göran Dahlberg, Nykvarn; Karl Gustav Högberg, Sodertalje; Sven Lindvall, Sodertalje, and Thore Oskar Verner Rydh, Sodertalje, all of Sweden, assignors to Astra Lakemedel Aktiebolag, Sodertalje, Sweden

Division of Ser. No. 343,690, March 22, 1973, Pat. No. 3,928,581. This application May 9, 1975, Ser. No. 576,152

Int. Cl.² A61K *31/70;* **C07H** *15/08*

U.S. Cl. 536—1 **26 Claims**

2. A polymer suitable for being administered parenterally which has been prepared by

A. reacting in an aqueous solution at a temperature between about 20° C and the boiling point of the reaction mixture

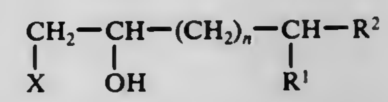
1. about 0.1 to 1.0 moles of a saccharide (per mole of component (3) below) which is selected from the group consisting of

a. sucrose,

b. trehalose, and

c. raffinose;

2. about 0.05 to 5 moles of a polymerization agent (per mole of component (3) below) of the formula



wherein n is an integer selected from the group consisting of 0, 1, 2, 3 and 4; X is selected from the group consisting of Cl, Br and I; R^1 is selected from the group consisting of OH, Cl, Br and I; and R^2 is selected from the group consisting of H and CH_2X with the proviso that R^2 is CH_2X only when R^1 is OH, wherein X has the meaning specified above; the epoxides or the diepoxides derivable therefrom; and

3. a hexitol selected from the group consisting of sorbitol, hydroxypropyl sorbitol, mannitol, talitol, iditol, galactitol, and allitol to from a first intermediate of the formula

$$(\text{polymer}) > C{=}O \qquad (I);$$

B. reacting said first intermediate product with a cyanide selected from the group consisting of KCN, NaCN, $Ca(CN)_2$, HCN, and NH_4CN in an amount at least equimolar with the amount of carbonyl groups on the first intermediate product to form a second intermediate product of the formula

$$(\text{polymer}) > C{-}CN \quad \backslash O^{\ominus} \qquad (II);$$

C. acidifying said second intermediate product to from a third intermediate product of the formula

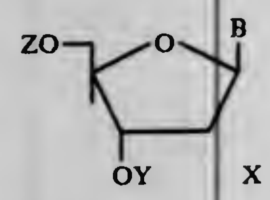
$$(\text{polymer}) > C{-}CN \quad \backslash OH \qquad (III);$$

D. hydrolyzing said thrid intermediate product to form a water swellable polymer of the formula

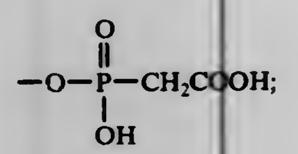
$$(\text{polymer}) > C{-}COOH \quad \backslash OH \qquad (IV).$$

4,056,673
PHOSPHONOACETIC ACID DERIVATIVES OF NUCLEOSIDES
Edgar Philip Heimer, Cedar Grove, and Alexander Leopold Nussbaum, Upper Montclair, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.
Filed July 16, 1976, Ser. No. 706,041
Int. Cl.² C07H *19/10, 19/20*
U.S. Cl. 536—27 **13 Claims**

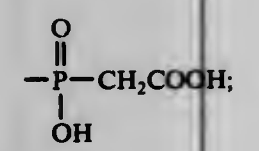
1. A compound of the formula



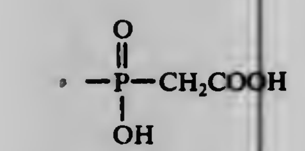
wherein B is selected from (a) the group of nucleobases consisting of adenine, guanine, cytidine, thymidine and uracil or (b) a 5-halopyrimidine; X is hydrogen, hydroxy, or



Y is hydrogen or



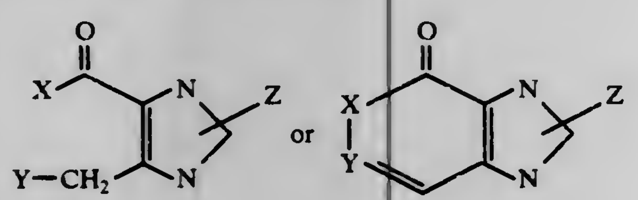
and Z is



or, when either of X and Y is other than hydrogen or hydroxy, is hydrogen: and pharmaceutically acceptable base salts thereof.

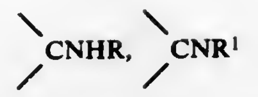
4,056,674
DERIVATIVES OF 3-DEAZAGUANINE
Roland K. Robins, Santa Ana; Robert J. Rousseau, Laguna Niguel, and Abdul M. Mian, Los Angeles, all of Calif., assignors to ICN Pharmaceuticals, Inc., Irvine, Calif.
Continuation-in-part of Ser. No. 377,078, July 6, 1973, Pat. No. 3,896,135, and a continuation-in-part of Ser. No. 377,079, July 6, 1973, Pat. No. 3,919,193. This application June 5, 1975, Ser. No. 584,215
Int. Cl.² C07H *19/06, 19/10, 19/16, 19/20*
U.S. Cl. 536—28 **14 Claims**

1. A compound of the structure

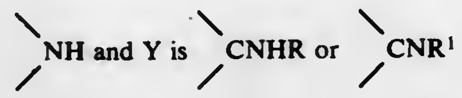


wherein X is

—NH_2 or —OCH_3; Y is



or —C≡N where R is H or acyl and R¹ is =Ch—$N(CH_3)_2$; Z is β-D-ribofuranosyl, 5-deoxy-β-D-ribofuranosyl, β-D-ribofuranosyl-5-phosphate, β-D-ribofuranosyl-3,5-cyclic phosphate, C_1-C_{18} acyl and isopropylidene β-D-ribofuranosyl, C_1-C_{18} acyl and isopropylidene 5-deoxy-β-D-ribofuranoxyl, C_1-C_{18} acyl and isopropylidene β-D-ribofuranosyl-5-phosphate or C_1-C_{18}β-D-ribofuranosyl-3,5-cyclic phosphate; and the physiologically acceptable salts thereof; with the proviso that X is



only when X and Y are joined together; and X is —NH_2 or —OCH_3 and Y is —C≡N only when X and Y are not joined together; and Z is not β-D-ribofuranosyl or C_1-C_{18} acyl β-D-ribofuranosyl when Y is

where R is H.

4,056,675
PROCESS FOR PRODUCING REGENERATED CELLULOSIC FIBERS
Albin Frank Turbak, Convent Station, and Richard Benjamin Hammer, Morris Plains, both of N.J., assignors to International Telephone and Telegraph Corporation, New York, N.Y.
Filed Feb. 27, 1976, Ser. No. 662,132
Int. Cl.² C08B *16/00*
U.S. Cl. 536—57 **6 Claims**

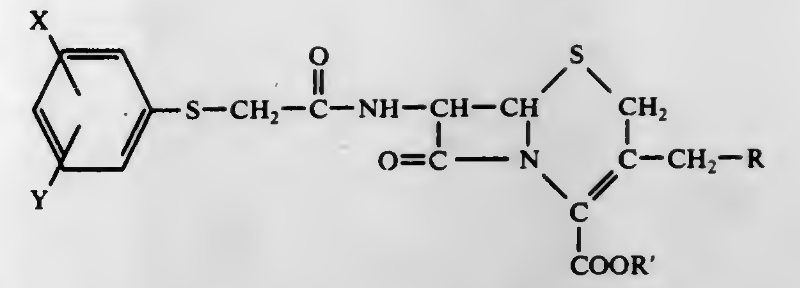
1. A process for producing a regenerated cellulosic fiber of improved alkaline resistance comprising

nitrosating cellulose with a nitrosating agent selected from the group consisting of an oxide of nitrogen and nitrosyl chloride and dissolving from 5 to 14% by weight of the cellulose in a dialkylacylamide solvent to form a solution of cellulose nitrite ester while said solution is maintained at a temperature no greater than 20° C. and

regenerating said cellulose by contacting the cellulose ester solution with a regenerant therefor containing a protonic group, the time at temperature of said cellulose ester solution from completion of dissolution to regeneration ranging from a maximum of 2 hours at a temperature not exceeding 20° C. to a maximum of 60 hours at a temperature below 0° C., said regeneration occurring before significant oxidation of said cellulose takes place.

4,056,676
HALOGENATED PHENYLTHIOACETAMIDO CEPHALOSPORINS
George W. Huffman, Carmel, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.
Division of Ser. No. 341,210, March 14, 1973, Pat. No. 3,907,784, which is a continuation-in-part of Ser. No. 288,227, Sept. 11, 1972, abandoned, which is a continuation-in-part of Ser. No. 212,739, Dec. 27, 1971, abandoned. This application June 9, 1975, Ser. No. 584,998
Int. Cl.² C07D *501/28, 501/40;* **A61K** *31/545*
U.S. Cl. 544—29 **5 Claims**

1. A cephalosporin antibiotic compound of the formula



in which

R' is hydrogen, dicyclohexylamine, or a pharmaceutically acceptable cation;

R is selected from the group consisting of hydrogen, C_1 to C_4-alkanoyloxy, and N-pyridino;

and X and Y are chlorine and are in the 3,4-, the 3,5-, or the 2,5-positons.

4,056,677

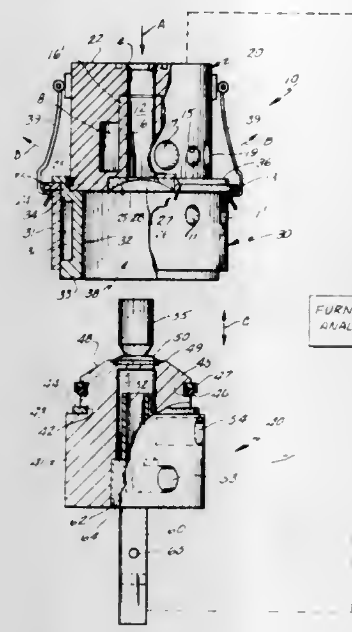
ELECTRODE SYSTEM FOR RESISTANCE FURNACE

Charles W. Berk, St. Joseph, and Charles B. Vallance, Berrien Springs, both of Mich., assignors to Leco Corporation, St. Joseph, Mich.

Filed Apr. 19, 1976, Ser. No. 677,930

Int. Cl.² H05B *3/08;* **F27D** *11/02*

U.S. Cl. 13—23 **15 Claims**



1. An electrode system for use in a resistance furnace employing a resistive crucible for combusting a specimen positioned in the crucible, said system comprising:
  - a pair of opposed electrodes of electrically conductive material, one of said electrodes being movable for selectively holding a crucible between said pair of electrodes; and
  - an intermediate electrode section including a central cavity for receiving a crucible, said intermediate electrode section demountably coupled to one electrode of said pair of electrodes to facilitate cleaning of said electrode system when said intermediate electrode section is removed.

4,056,678

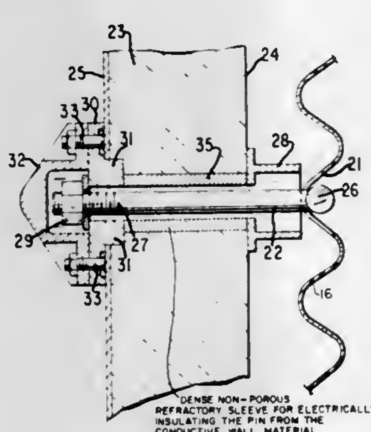
ELECTRIC HEATING FURNACE

Benjamin S. Beall, III, Lake Forest, and Russell F. Novy, Northbrook, both of Ill., assignors to Sola Basic Industries, Inc., Milwaukee, Wis.

Filed Feb. 20, 1976, Ser. No. 659,676

Int. Cl.² H05B *3/06*

U.S. Cl. 13—25 **5 Claims**



1. In an electric heating furnace for heat treatment having a body with side walls of porous insulating material defining a chamber therein to receive material for heat treatment, the improvement comprising a conductive electric heating resistance strip within said chamber adjacent to the inner hot face of a side wall of porous insulating material for electrically heating said chamber, a plurality of pins each extending through said side wall and being connected to said resistance strip, said porous insulating material of said side wall being subject to the build up of an electrically conductive layer of carbon within the interior thereof spaced inwardly from said hot face if insufficient "burnout" is used, and a plurality of sleeves of dense non-porous refractory material, said sleeves being located in said side wall and surrounding the portions of the respective pins within said porous insulating material of said side wall for electrically insulating each pin from such electrically conductive layer of carbon for preventing the rapid deterioration of the pins which would otherwise be caused by electricity passing through said conductive layer of carbon forming an electrically conductive path.

4,056,679

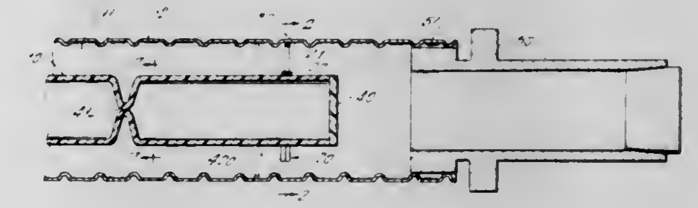
SODIUM FILLED FLEXIBLE TRANSMISSION CABLE

Thomas F. Brandt, Swarthmore; Philip C. Netzel, Milmont Park, both of Pa., and Lennard Wharton, Winnetka, Ill., assignors to I-T-E Imperial Corporation, Spring House, Pa.

Filed Sept. 27, 1976, Ser. No. 726,847

Int. Cl.² H01B *5/00, 9/00;* **H02G** *15/02*

U.S. Cl. 174—13 **11 Claims**



1. A conductor having an outer longitudinal relatively thin electrically conductive casing and an interior electrically conductive metal in said casing in electrically conductive contact therewith;
  - the said interior electrically conductive metal having a different coefficient of thermal expansion than the outer relatively thin conductive casing;
  - a core member substantially axially positioned along the interior of said outer casing;
  - said interior electrically conductive metal filling the space between said outer electrically conductive casing and said core member;
  - said core member being radially flexible and resilient;
  - said core member being resiliently compressed when said interior metal expands;
  - said core member expanding when said interior metal contracts; said core member remaining in contact with said interior metal, preventing the occurrence of voids in said interior metal between said interior metal and said core member and between said interior metal and said casing while absorbing pressures that may be generated by the difference in coefficient of expansion of the interior metal and said casing.

4,056,680

TERMINATION OF D.C. HIGH TENSION ELECTRIC CABLES AND METHOD OF MANUFACTURING SAME

Mitsugu Aihara, Yokohama; Yutaka Kogane, Kawasaki; Yasumitsu Ebinuma, Tokyo, and Masaki Minami, Yokohama, all of Japan, assignors to Showa Electric Wire & Cable Co., Ltd., Kawasaki, Japan

Filed Apr. 6, 1976, Ser. No. 674,163

Claims priority, application Japan, Apr. 11, 1975, 50-43941

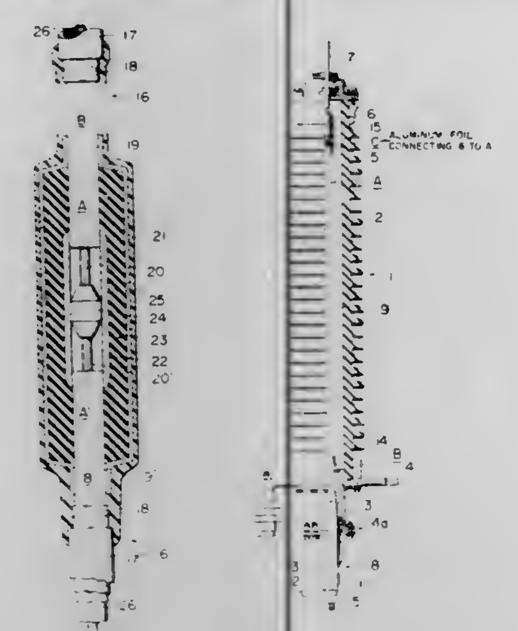
Int. Cl.² H02G *15/22, 1/14, 15/24;* **G01R** *31/20*

U.S. Cl. 174—19 **15 Claims**

1. A d.c. high tension cable termination comprising an electric conductor, an electrically insulating layer concentrically applied over the electric conductor, and a semi-conductive layer concentrically applied over the insulating layer in close contact therewith, the semi-conductive layer including an area adjacent to an end of the insulating layer which is impregnated with an electrically insulating liquid so as to present an electrical resistivity which is higher than that of the remainder of the semi-conductive layer which is not impregnated with the

liquid and which is lower than that of the insulating layer, the electric conductor being electrically connected with that end of the impregnated area of the semi-conductive layer which is located nearer the conductor.

9. A method of forming a termination for a d.c. high tension cable which includes an electric conductor successively covered in concentric manner with an electrically insulating layer,

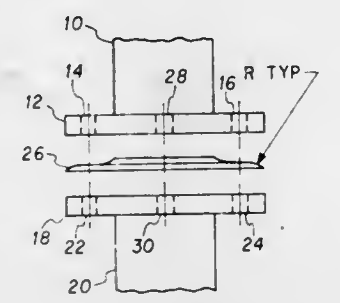


a semi-conductive layer, and at least one additional layer, the method comprising the steps of stripping the additional layer or layers from an end of the cable to expose the semi-conductive layer, applying an electrically insulating liquid to an exposed area of the semi-conductive layer which is located adjacent to a cable end to impregnate the semi-conductive layer with the liquid, and electrically connecting the impregnated semi-conductive layer with the conductor.

4,056,681
SELF-ALIGNING PACKAGE FOR INTEGRATED CIRCUITS
Charles R. Cook, Jr., North Palm Beach, Fla., assignor to International Telephone and Telegraph Corporation, Nutley, N.J.
Filed Aug. 4, 1975, Ser. No. 601,854
Int. Cl.^{2} H05K *5/00*
U.S. Cl. 174—52 FP **69 Claims**

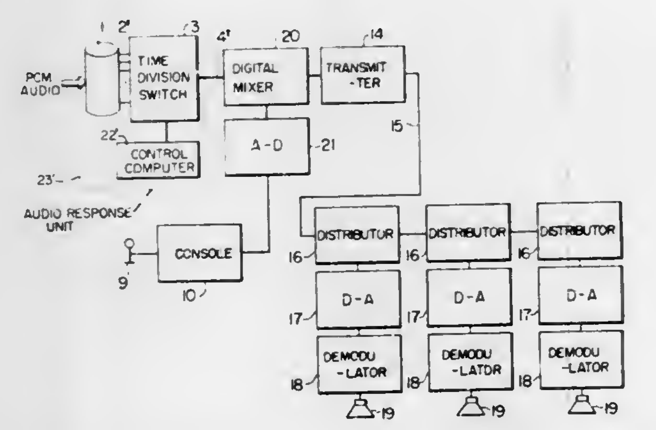
1. An interconnecting die for use in integrated circuit packaging for connecting contact means of an integrated circuit die with contact means of an integrated circuit package, said interconnecting die comprising:
- a substrate of anodizable electrically conductive material including unanodized conducting regions and anodized non-conducting regions;
- first contact means associated with said substrate to contact the contact means of the integrated circuit die when placed in juxtapostion and properly aligned with the integrated circuit die; and
- second contact means associated with said substrate to contact the contact means of the integrated circuit package when placed in juxtaposition and properly aligned therewith, said conducting regions of the substrate being formed and arranged for electrically connecting said first and second contact means of the interconnecting die, whereby the contact means of the integrated circuit die and the contact means of the package may be connected using a single element with a minumum of bonding steps.

4,056,682
GASKET APPARATUS
Charlie C. Havens, Garland, and James A. Rutelonis, Plano, both of Tex., assignors to Rockwell International Corporation, El Segundo, Calif.
Filed Feb. 18, 1976, Ser. No. 658,954
Int. Cl.^{2} H05K *9/00*
U.S. Cl. 174—35 GC **1 Claim**



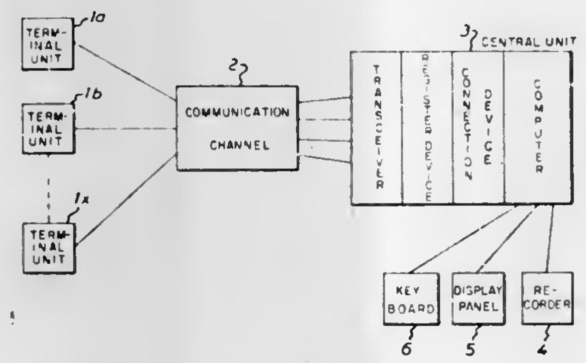
1. RF sealing apparatus for sealing a connection upon compression between a first RF conduit flange and a second RF conduit flange comprising:
- a thin flexible electrically conducting substantially planar structure having a central opening therein alignable with a hole in said conduit and having a plurality of fastener passageways;
- an inside edge, defining said opening, angularly disposed from said planar structure to provide high pressure contact with said first flange;
- an inside curved contact area adjacent said inside edge to engage said second flange, for providing, under deformation, a high pressure contact therewith, the inside curved contact completely circumscribing said opening between said inside edge and said plurality of fastener passageways;
- an outside edge circumscribing said plurality of fastener passageways angularly disposed from said planar structure to produce high pressure contact with second flange; and
- an outside curved contact area adjacent said outside edge to engage said first flange, to provide, under deformation, a high pressure contact therewith.

4,056,683
AUDIO TRANSMITTING AND RECEIVING SYSTEM
Akio Suehiro, Yokohama, Japan, assignor to Hitachi, Ltd., Japan
Filed Sept. 29, 1975, Ser. No. 617,639
Claims priority, application Japan, Oct. 2, 1974, 49-112756
Int. Cl.^{2} H04Q *3/00*
U.S. Cl. 179—1 AT **2 Claims**



1. An audio transmitting and receiving system comprising an audio response unit for reading out prerecorded audio information and editing it to required information, transmission means for transmitting the edited information, and conversion means at a receiving side for converting the transmitted information into an analog audio signal, the improvement in that the audio response unit includes means for editing the audio information in digital signal form to produce a digital signal; further comprising conversion means for converting audio information for interruption into a digital signal, and digital mixer means for mixing the digital signal from the conversion means with the digital signal of the audio response unit.

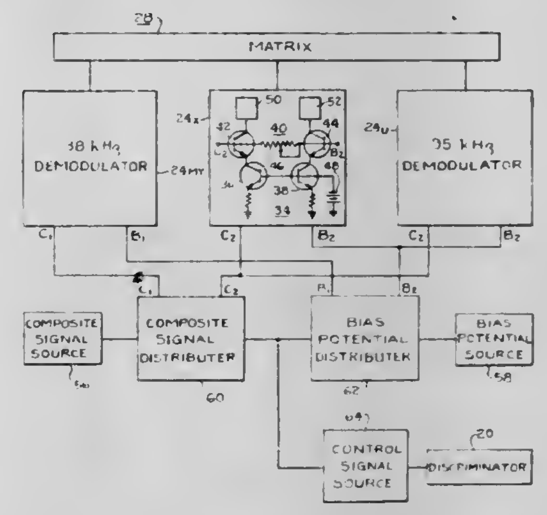
4,056,684
SURVEILLANCE SYSTEM
Arne David Lindstrom, Jonkoping, Sweden, assignor to Saab-Scania AB, Jonkoping, Sweden
Filed Nov. 25, 1975, Ser. No. 635,228
Claims priority, application Sweden, Nov. 26, 1974, 7414814
Int. Cl.^{2} H04M *11/04*
U.S. Cl. 179—5 R **15 Claims**



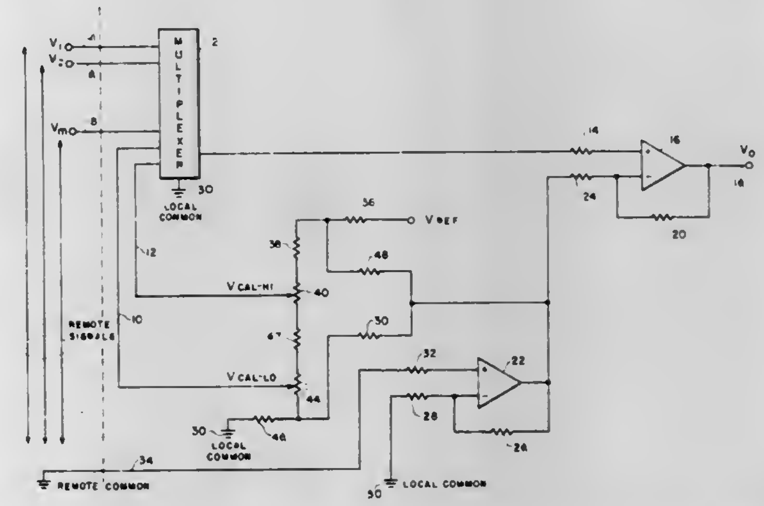
1. In a surveillance system which comprises a central unit connected, by the intermediary of a communication channel to a plurality of local terminal units in order to receive information from these units concerning changes of status in sensors connected to said terminal units, the improvement wherein said terminal unit comprises:
- a. a transfer blocking register with a memory cell for each sensor in at least one group of the sensors connected to said terminal unit, said memory cells having two states and being switchable between these states by control information transferred from said central unit; and
- a sensing device for achieving, on a change of status in any one of the sensors of the group, transfer of information on such change to the central unit only when the corresponding memory cell in the transfer blocking register is in one of its two states.

4,056,685
SIGNAL DISTRIBUTING AND MUTING SYSTEM FOR MULTIPLE CHANNEL FM STEREO SYSTEM
Lajos Burgyan, Chicago, Ill., assignor to Zenith Radio Corporation, Glenview, Ill.
Filed Dec. 29, 1976, Ser. No. 755,367
Int. Cl.^{2} H04H *5/00*
U.S. Cl. 179—15 BT **5 Claims**

1. A signal distributing and muting system for a multiple-channel stereo receiver comprising:
- a source of composite baseband signal;
- a source of bias potential;
- a plurality of demodulators responsive to said composite baseband signal and to said source of bias potential for developing a like plurality of audio difference components, each of said demodulators comprising a differential amplifier;
- a composite signal distributor having an input terminal coupled to said source of composite baseband signal,
  - a first output terminal for applying said composite signal to one of said demodulators, and
  - a second output terminal for applying said composite signal to the other ones of said demodulators;
- a bias potential distributor connected to said source of bias potential and having a first output terminal for applying operating bias potential to said one demodulator and
  - a second output terminal for applying operating bias potential to said other ones of said demodulators;
- a source of control signal, said control signal having a predetermined first amplitude indicative of detection by said receiver of a multiple-channel related pilot signal and having a predetermined different amplitude indicative of failure to detect such pilot signal; and
- switch means coupled to said second output terminals of said composite signal distributor and said bias potential distributor and responsive to a control signal of said predetermined first amplitude to maintain a coupling between said second output terminals and said other demodulators to render said other demodulators operative
- and responsive to a control signal of said predetermined different amplitude to render said other demodulators quiescent by effectively decoupling said composite signal from said other demodulators while simultaneously controlling the bias potentials applied concurrently to each of said other demodulator differential amplifiers so that the power consumed by said other demodulator differential amplifiers during said quiescent condition remains substantially the same as the power consumed by them during their operative condition.



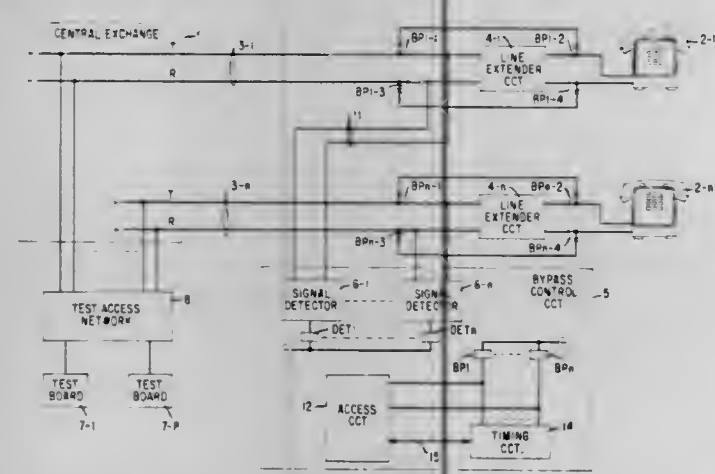
4,056,686
MULTIPLEXED SIGNAL REFERENCE LEVEL EQUALIZER
Martin Zielinski, Roslyn, Pa., assignor to Honeywell Inc., Minneapolis, Minn.
Filed Oct. 12, 1976, Ser. No. 731,507
Int. Cl.^{2} H04J *3/04*
U.S. Cl. 179—15 BL **6 Claims**



6. A method for multiplexing remote and local signals comprising the steps of selecting ones of remote and local input

signals, generating a common mode signal representing the difference between a common signal level of the remote input signals and a common signal level of the local input signals, adding the common mode signal to the local input signals and subtracting the common mode signal from the selected ones of the remote and local input signals.

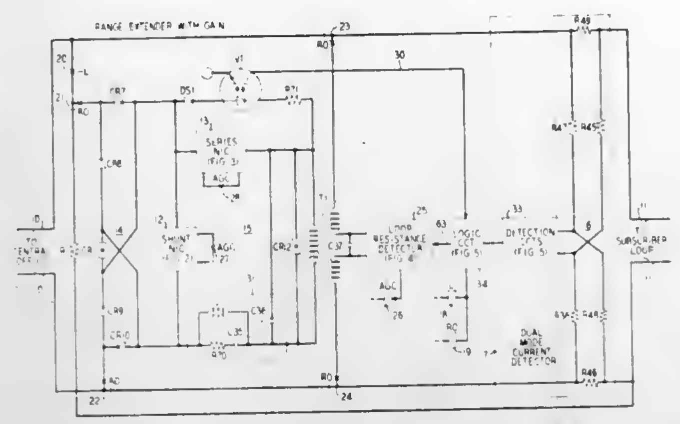
4,056,687
DECOUPLING CONTROL ARRANGEMENT FOR AUXILIARY CIRCUITS COUPLED TO TELEPHONE LINES
Robert Dennis Sims, Addison, Ill., assignor to Western Electric Company, New York, N.Y.
Filed Aug. 16, 1976, Ser. No. 714,592
Int. Cl.² H04M *3/22;* H04B *3/46*
U.S. Cl. 179—16 F **32 Claims**



1. For use in a system including a plurality of telephone lines coupled to a different auxiliary circuit and means for decoupling each auxiliary circuit from its respective line, a circuit for controlling each of said decoupling means, said controlling circuit comprising
means for operating individual ones of said decoupling means upon receipt of request signals individually associated therewith,
means responsive to a first said request signal for holding operated an associated one of the decoupling means for at least a prescribed time interval, and
means responsive to a subsequent said request signal received during said prescribed time interval for controlling said holding means to hold operated each operated said decoupling means for at least another said prescribed time interval.

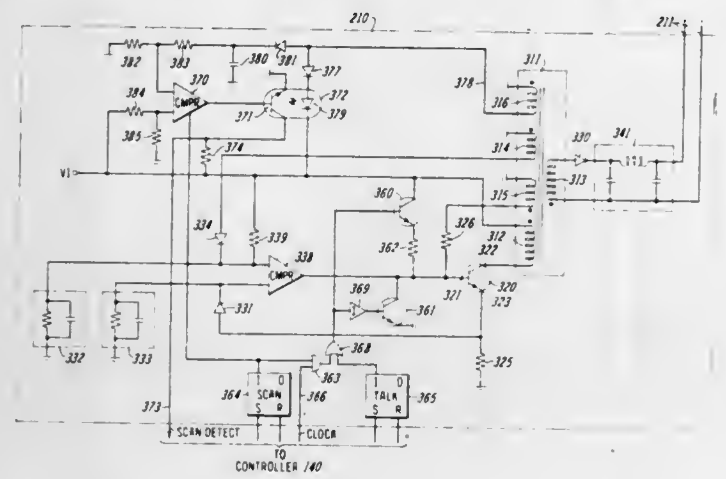
4,056,688
TELEPHONE RANGE EXTENDER WITH GAIN
Kenneth Erwin Stiefel, Randolph Township, Morris County, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.
Filed Nov. 11, 1976, Ser. No. 740,854
Int. Cl.² H04M *1/76;* H04B *3/16*
U.S. Cl. 179—16 F **11 Claims**

6. A bilateral amplifier in the form of a π network comprising
a shunt negative impedance converter;
a series negative impedance converter;
a shunt impedance transformer; and



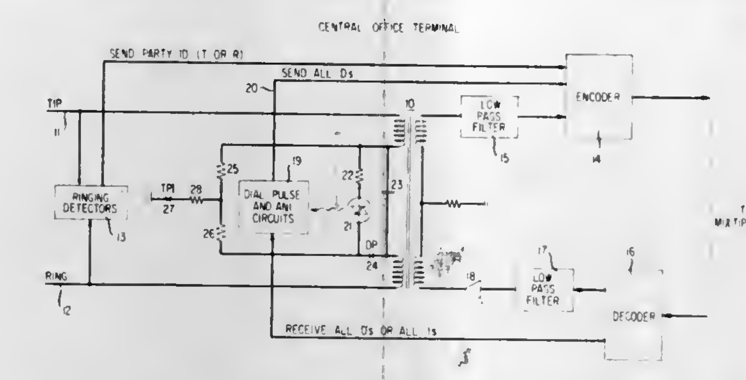
a fixed impedance matching network connected between said shunt negative impedance converter and said shunt impedance transformer.

4,056,689
TELEPHONE SUBSCRIBER LINE CIRCUIT
Laimons Freimanis, Chicago, Ill., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.
Filed Jan. 5, 1977, Ser. No. 757,005
Int. Cl.² H04Q *1/30*
U.S. Cl. 179—16 F **8 Claims**



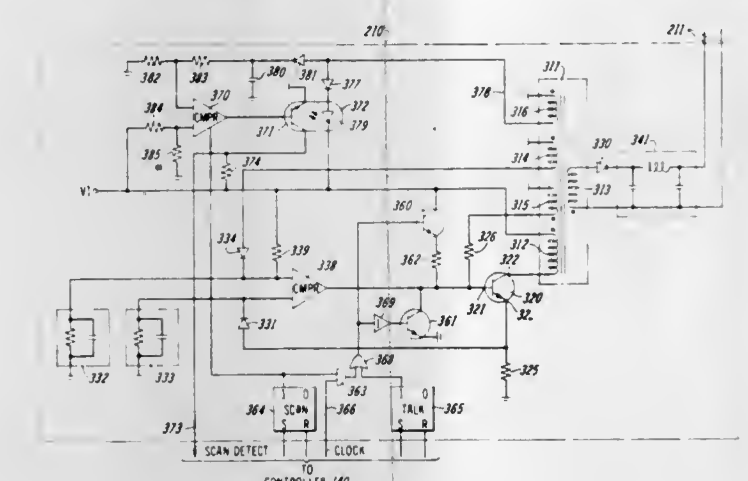
1. A current supply circuit comprising:
a transformer having a primary winding connectable to an electrical power source and a secondary winding connectable to an electrical load;
a switching device connected to said primary winding for controlling current flow in said primary winding;
a first sense winding magnetically coupled to said primary and secondary windings and connected to said switching device for controlling said switching device to allow current flow in said primary winding;
a second sense winding magnetically coupled to at least said secondary winding for generating output signals representative of current flow in said secondary winding;
sensing means for sensing current flow in said primary winding and for generating output signals representing current flow in said primary winding; and
a comparator circuit having a first input terminal connected to said second sense winding, a second input terminal connected to said sensing means, and an output terminal connected to said switching device and responsive to said signals from said second sense winding and said sensing means for turning off said switching device.

4,056,690
AUTOMATIC NUMBER IDENTIFICATION IN SUBSCRIBER LOOP CARRIER SYSTEMS
Stephen Joseph Brolin, Livingston, and Samuel Colodner, Succasunna, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.
Filed Oct. 14, 1976, Ser. No. 732,343
Int. Cl.² H04M *15/36*
U.S. Cl. 179—17 A **10 Claims**



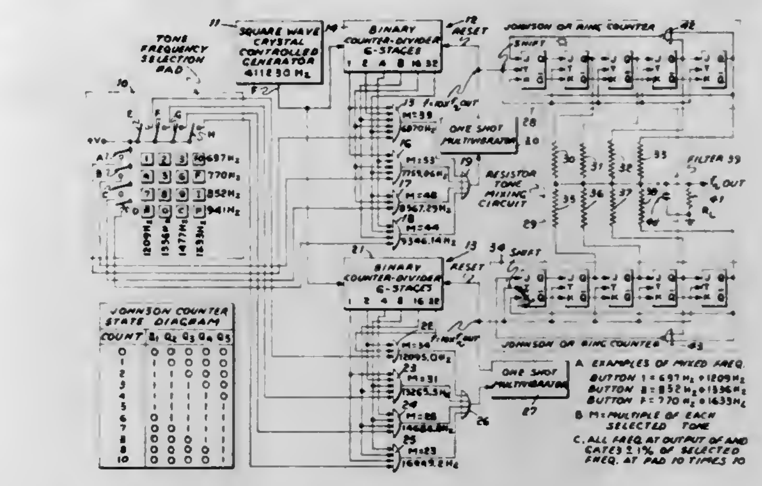
6. An automatic number identification circuit comprising
a timing circuit at a central office location with a timed output for enabling an automatic number identification test signal generation; and
a storage circuit at said central office location for storing an automatic number identification response signal between successive generations of said test signal.

4,056,691
TELEPHONE SUBSCRIBER LINE CIRCUIT
Laimons Freimanis, Chicago; Harry Edward Mussman, Glen Ellyn, and DeWitt Paul Smith, Naperville, all of Ill., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.
Filed Jan. 5, 1977, Ser. No. 757,006
Int. Cl.² H04Q *1/28*
U.S. Cl. 179—18 FA **12 Claims**



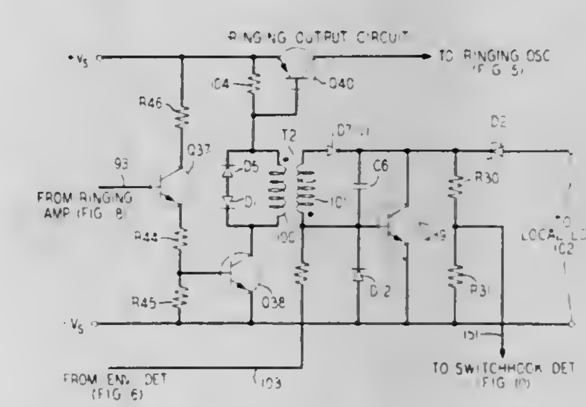
1. A line interface circuit for detecting both off-hook and dial pulse signaling on a line comprising:
a constant current power supply having an output transformer;
a sense winding magnetically coupled to said transformer;
a source of reference potential;
a comparator circuit having one input connected to said sense winding and another input connected to said source of reference potential;
circuit means connected between said sense winding and said source of reference potential and responsive to the potential induced in said sense winding; and
signal generating means alternatively responsive to said comparator circuit and said circuit means to generate an output signal.

4,056,692
DIGITAL TONE GENERATOR
Harry Place, Ridgewood, N.J., assignor to International Telephone and Telegraph Corporation, Nutley, N.J.
Filed Aug. 2, 1976, Ser. No. 710,513
Int. Cl.² H04M *1/50*
U.S. Cl. 179—84 VF **41 Claims**



1. A digital tone generator comprising:
first means to generate a reference square wave signal having a stable given frequency;
second means coupled to said first means to provide a plurality of square wave signals each having a different predetermined frequency, each of said predetermined frequencies having a different predetermined relationship to said given frequency;
third means coupled to said second means to select at least one of said plurality of square wave signals; and
fourth means coupled to said second means responsive only to said selected one of said plurality of square wave signals to provide as an output signal of said generator one sine wave tone having a frequency equal to said predetermined frequency divided by a given factor greater than two of said selected one of said plurality of square wave signals.

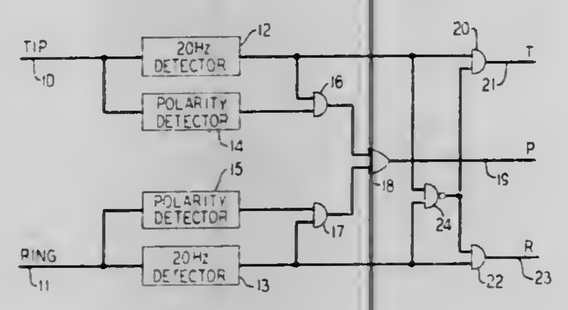
4,056,693
VOLTAGE AND CURRENT CONTROLLED CONVERTER FOR TELEPHONE RINGING
Barry Sheldon Bosik, Parsippany, and Dale Eugene Stone, Cedar Knolls, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.
Division of Ser. No. 638,163, Dec. 5, 1975, Pat. No. 4,002,838. This application Aug. 26, 1976, Ser. No. 718,081
Int. Cl.² H04M *1/26;* H02H *7/10*
U.S. Cl. 179—84 R **4 Claims**



1. A direct current to direct current converter comprising an oscillator,
a voltage transformer connected to said oscillator,
a rectifier connected to said transformer,
a voltage sensing circuit connected to said rectifier and responsive to voltages exceeding a preselected threshold to disable said oscillator output, and
a current sensing circuit connected to said transformer and responsive to currents exceeding a preselected threshold

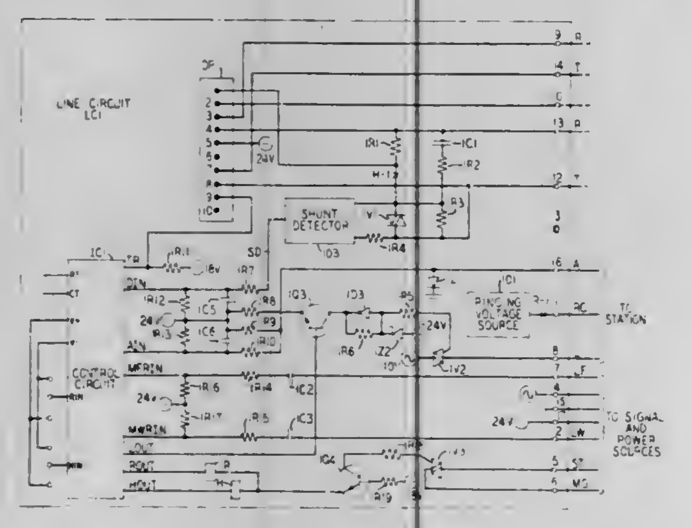
to disable said oscillator for the balance of the half-cycle of said oscillator.

4,056,694
TELEPHONE RINGING DETECTORS
Stephen Joseph Brolin, Livingston, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.
Filed Sept. 17, 1976, Ser. No. 724,381
Int. Cl.^{2} H04M *1/26*
U.S. Cl. 179—84 R **10 Claims**



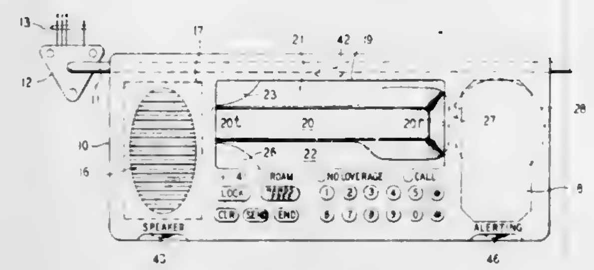
1. A detector for alternating current signals superimposed on a preselected polarity of direct current voltage comprising
an alternating current detector;
a direct current polarity detector; and
means for enabling the operation of said direct current detector only in the presence of an output from said alternating current detector.

4,056,695
KEY TELEPHONE LINE CIRCUIT TONE-ON-HOLD ARRANGEMENT
Ronald Joseph Angner, Freehold, and James Volney Lacy, Red Bank, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.
Filed July 28, 1976, Ser. No. 708,858
Int. Cl.^{2} H04M *1/72*
U.S. Cl. 179—99 **11 Claims**



1. A line circuit for use in controlling communication services between a telephone switching machine and a telephone station, said line circuit adapted for connection in parallel across the communication conduction pair between said switching machine and said telephone station and adapted for A-lead control from said station, said line circuit including
hold and ringing control means,
a source of clock signals,
means controlled by said clock signals for detecting both A-lead signal changes, and communication lead signal changes and
for comparing detected A-lead signals with detected communication lead signals, and
for enabling selected ones of said hold or ringing control means,
audio coupler means,
means for generating from said clock signals a signal having a duty cycle, such that when said generated signal is applied to said audio coupler means a distinctive audio tone results, and
means for optionally coupling said generated audio signal to said communication leads through said audio coupler when said hold means is enabled.

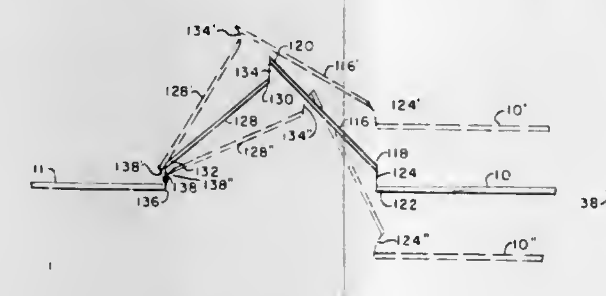
4,056,696
FLAT PANEL TELEPHONE STATION SET
John Alfons Meyerle, Manasquan, and Rembert Ryan Stokes, Middletown, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.
Filed Sept. 15, 1976, Ser. No. 723,230
Int. Cl.^{2} H04M *1/02*
U.S. Cl. 179—100 R **15 Claims**

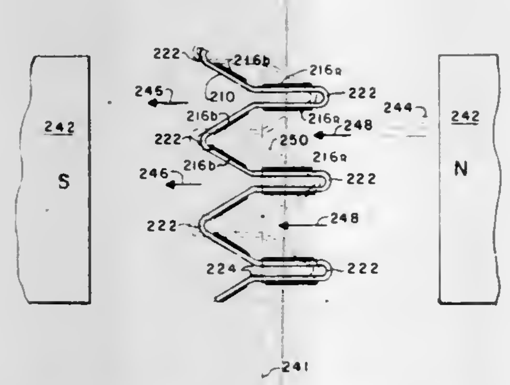


1. A telephone station set adapted to be operated by a user in at least one predetermined position, said set comprising
a rotatable panel member having first and second oppositely disposed faces and mounted for rotation between a first position wherein the first face is substantially concealed from view from said user position and a second position wherein the first face is in full view from said user position, said panel member having a recess in said first face for receiving a handset,
a handset having transmitter and receiver portions shaped to fit in said recess substantially entirely within the thickness of said panel member between said first and second faces, said handset comprising
a bridge portion mechanically connecting said transmitter and receiver portions, and
said bridge portion includes first and second longitudinal sections, one telescopically engaging the other, and means for resiliently urging said sections apart from a telescopically closed position toward a telescopically extended position,
said recess is of a length to accommodate said handset in said closed position,
means for retaining said handset in said recess in the absence of a removing force substantially in excess of the weight of said handset, and
means, mounted on said panel, for performing pushbutton dialing operations.

4,056,697
MOVABLE DIAPHRAGM CONNECTOR METHOD FLEXIBLE HINGE DIAPHRAGM SURROUND AND ELECTRO-ACOUSTIC TRANSDUCER WITH FOLDED DIAPHRAGM WITH INTERMEDIATE FLEXIBLE PORTIONS
Oskar Heil, 1775 Parrott Drive, San Mateo, Calif. 94402
Filed Sept. 3, 1976, Ser. No. 720,279
Int. Cl.^{2} H04R *7/12, 7/18, 9/02*
U.S. Cl. 179—115.5 PV **3 Claims**

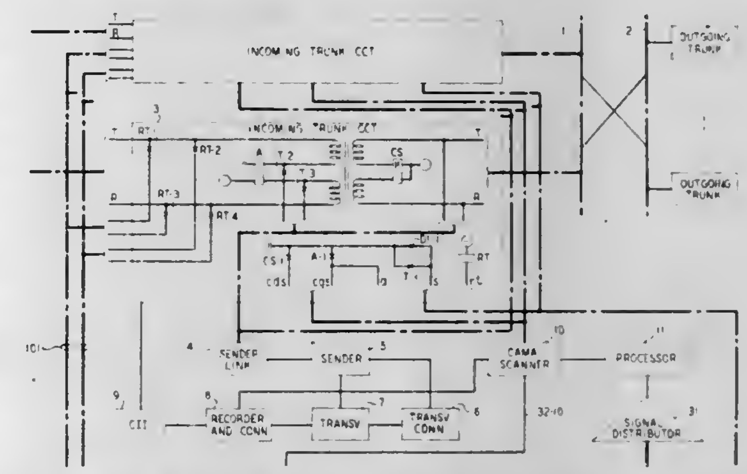
1. A connector for a movable diaphragm comprising
a fixed member,
a movable diaphragm member having a planar axis and adapted to move in a direction perpendicular to said planar axis relative to said fixed member,
a first rigid, generally elongated member having elongated parallel edges, said member being disposed at an angle to said planar axis about the periphery of said movable diaphragm,
a first hinge member hingedly connecting one elongated edge of said first rigid elongated member to said movable diaphragm comprising
a first generally planar, elongated flexible member having elongated parallel edges, said member disposed with its planar axis parallel to the direction of motion of said movable diaphragm and having one edge fixedly attached to said movable diaphragm and the other parallel edge fixedly attached to one elongated edge of said first rigid member,
a second rigid, generally elongated member having elongated parallel edges, said member being disposed at an angle to said planar axis opposite the angle of said first rigid member,
a second hinge member hingedly connecting the other parallel elongated edge of said first rigid member to one elongated edge of said second rigid member comprising
a second generally planar, elongated flexible member having elongated parallel edges disposed with its planar axis parallel to the direction of motion of said movable diaphragm and having one edge fixedly attached to the other parallel edge of said first rigid member and the other parallel edge of said second flexible member fixedly attached to one edge of said second movable member, and
a third hinge member hingedly connecting the other parallel elongated edge of said second rigid member to said fixed member comprising
a third generally planar, elongated flexible member having elongated parallel edges disposed with its planar axis parallel to the direction of motion of said movable diaphragm and having one edge fixedly attached to the other parallel edge of said second rigid member, and the other parallel edge of said third flexible member fixedly attached to said fixed member.





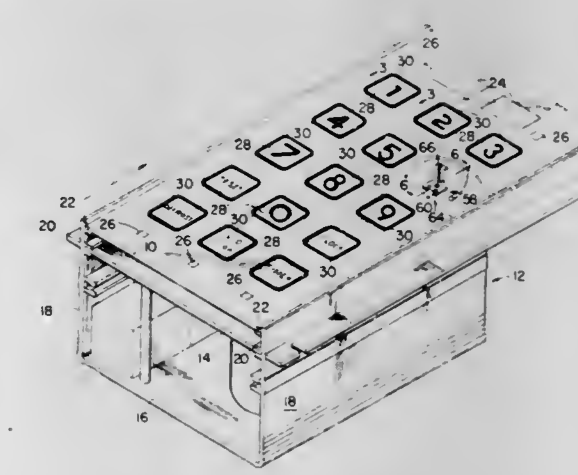
2. An electro-acoustic transducer comprising
a plurality of parallel arranged, elongated, narrow, generally planar pairs of first and second rigid members,
a first hinge member hingedly connecting said pair of first and second rigid members to each other,
a second hinge member hingedly connecting said pairs of rigid members to adjacent pairs of rigid members,
said pairs of rigid members alternately folded at said second hinge member to define a plurality of angular corrugations having adjacent narrow open air spaces facing in opposite directions, and
means for moving alternate adjacent first hinge members toward and away from each other.

4,056,698
SPECIAL AUTOMATIC TRUNK TESTING ARRANGEMENT
Francis Stanislaus Dworak, Oceanport, N.J., and Renald Anthony Ratti, Westerville, Ohio, assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.
Filed Apr. 20, 1976, Ser. No. 678,689
Int. Cl.^{2} H04M *3/22*
U.S. Cl. 179—175.2 C **11 Claims**



1. In an automatic trunk testing system having means for registering the identity of a trunk to be seized for transmission path testing and means responsive to said registering means for verifying that said trunk is idle before said trunk is so seized, the improvement comprising
means responsive to a special test control signal for locking the identity of a seized trunk in said registering means;
means for releasing said so-seized trunk;
means for by-passing said idle verifying means; and
means for thereafter seizing a trunk identified by said special test control signal to perform transmission path testing thereon irrespective of the busy or idle state thereof.

4,056,699
TOUCH PLATE ASSEMBLY
Leslie S. Jordan, Logansport, Ind., assignor to Essex International, Inc., Fort Wayne, Ind.
Filed Nov. 13, 1975, Ser. No. 631,596
Int. Cl.^{2} H01H *9/26*
U.S. Cl. 200—5 A **7 Claims**



5. A touch plate assembly for entering information into a digital control circuit, comprising:
a flat dielectric plate having front and back faces;
a plurality of touch switches on said dielectric plate;
contact areas on said back face, said contact areas being electrically connected to said touch switches;
a printed circuit board containing circuitry for detecting the activation of said touch switches;
a plurality of bifurcated contacts extending from said printed circuit board toward said dielectric plate, said bifurcated contacts being electrically connected to said circuitry and

abutting against said contact areas to electrically connect said circuitry and said touch switches;

housing means for holding said dielectric plate and said printed circuit board substantially parallel to one another, said housing means including first means for engaging a first edge of said flat dielectric plate and a first edge of said printed circuit board, and second means for engaging the opposite edge of said flat dielectric plate and the opposite edge of said printed circuit board.

4,056,700

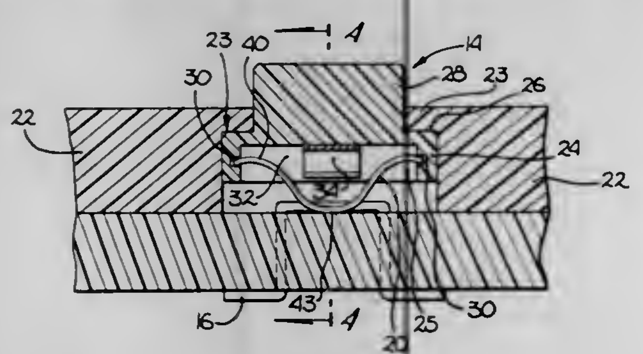
KEYBOARD ASSEMBLY MOMENTARY CONTACT PUSH BUTTON SWITCH WITH TACTILE ACTION

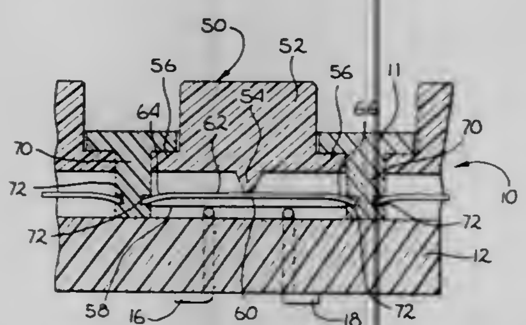
Karl Heinz Stannek, Santa Ana, Calif., assignor to Western Digital Corporation, Newport Beach, Calif.

Filed Jan. 19, 1976, Ser. No. 650,419

Int. Cl.² H01H *13/52*

U.S. Cl. 200—159 R **38 Claims**





18. A spring-actuated push button switch keyboard adapted for use in a keyboard assembly which assembly includes a plurality of electrical staple elements comprising:

a button member and an associated spring, said button member having means for retaining said spring therein; and

a contact bridge disposed in said button member adjacent the bottom thereof, said contact bridge having arm members adapted to electrically engage said keyboard;

wherein said spring is so disposed in said button member such that when said button is depressed, said arm members of said contact bridge come into electrical contact with said staple elements disposed in said keyboard.

31. A momentary contact push button switch disposed in an associated keyboard assembly which keyboard assembly includes a plurality of electrical staple elements comprising:

a button member having an outwardly extending ledge member at the bottom thereof terminating in a downwardly extending rim;

a contact bridge disposed in said button member, said contact bridge having downwardly extending arm members for making an electrical contact with said staple elements; l

a sinusoidal-shaped spring having two arcuous branch sections forming a central, downward extending trough section, said branch sections coupled to said rim on the inside surface thereof such that when said button member is depressed, said arm members on said contact bridge come into electrical contact with said staple elements; and

wherein said keyboard assembly is comprised of a top framework having a plurality of openings for said button members, and a bottom circuit board coupled to said top framework, said top framework having outwardly extending arm member for engaging and retaining said button member therein, and said bottom circuit board containing said stape elements.

4,056,701

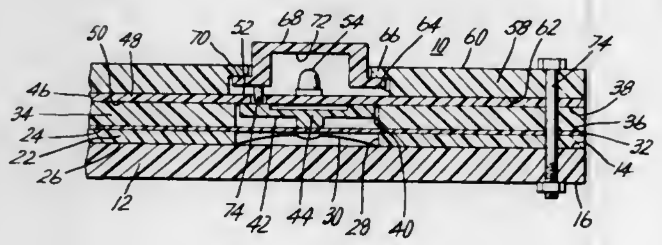
LOW PROFILE LIGHTED PUSH BUTTON SWITCH

John E. Weber, Fort Wayne, Ind., assignor to Bowmar Instrument Corporation, Fort Wayne, Ind.

Filed July 8, 1976, Ser. No. 703,526

Int. Cl.² H01H *3/12*

U.S. Cl. 200—314 **13 Claims**



1. In a low profile, lighted push button-type switch assembly: first rigid insulative means for supporting a switch and having flat opposite surfaces with a first opening formed in one surface thereof; a switch including a resilient element in said first opening, said element being actuable between first and second positions in response to force exerted thereon; a relatively thin sheet of flexible insulating material engaging said one surface of said first means covering said first opening and switch element; second rigid insulative means for supporting push button means and having flat opposite surfaces with one surface engaging said sheet, said sheet being sandwiched between said first and second insulative means, said second insulative means having at least a second opening therethrough communicating with said sheet and in alignment with a part of said first opening; light source means on the other surface of said second insulative means for providing illumination in response to electrical energization; and push button means for actuating said switch including a first element formed of light-transmissive material, said first element being disposed adjacent said other surface of said second insulative means in light-receiving relation with said light source means, said push button means including a second element extending through said second opening for movement therein, said push button means also including a third element aligned with said first opening for engaging said sheet in response to depression of said push button means thereby to apply force on said switch element for actuating the same between said positions thereof.

4,056,702

ELECTRICAL DISCHARGE MACHINING POWER CIRCUIT

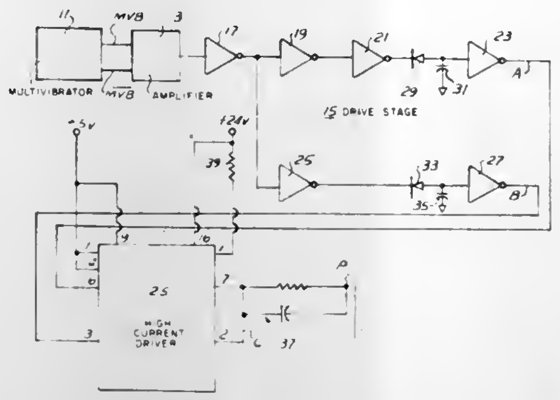
Oliver A. Bell, Jr., Mooresville; Randall C. Gilleland, Troutman, and Davey J. Chance, Concord, all of N.C., assignors to Colt Industries Operating Corporation, New York, N.Y.

Filed Dec. 29, 1975, Ser. No. 644,447

Int. Cl.² B23P *1/08*

U.S. Cl. 219—69 C **6 Claims**

5. In an electrical discharge machining apparatus for machining a conductive workpiece by means of electrical discharges between an electrode and a workpiece across a dielectric filled gap, a source of voltage, a transistor connected in series with said source and said gap, a pulse generator, and a drive stage connected intermediate said pulse generator and said transistor, said drive stage further including a pair of parallel branches each branch having a different set of series inverters for providing square wave out-of-phase signals from the pulse generator output, and a high current push-pull driver device having a pair of input terminals connected intermediate



said branches and its output coupled to said transistor for providing turn-on and turn-off of said transistor.

4,056,703

PROCESS AND APPARATUS FOR RESISTANCE HEATING OF ELECTRICALLY CONDUCTIVE WORKPIECES

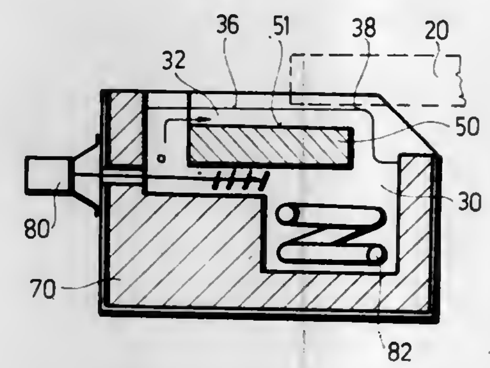
Andor Mándoki, Budapest, Hungary, assignor to "Licencia" Talalmanyokat Ertekesito Vallalat, Budapest, Hungary

Filed Oct. 28, 1975, Ser. No. 626,131

Claims priority, application Hungary, Oct. 30, 1974, MA 2611

Int. Cl.² H05B *3/00*

U.S. Cl. 219—71 **9 Claims**



1. A process for the resistance heating of electrically conductive workpieces, comprising establishing a solid support surface for a liquid, flowing a molten electrically-conductive material over said support surface with linear flow, maintaining a said workpiece in an undeformed condition in contact with said molten material flowing over said support surface with linear flow, and passing an electric current through said workpiece between said molten material and another electrical contact.

4,056,704

PROCESS AND APPARATUS FOR HEATING GASES

Anthony John Beach, New Waltham; Geoffrey Frank Eveson, Tetney, and Reginald Keith Leedham, Grimsby, all of England, assignors to Laporte Industries Limited, England

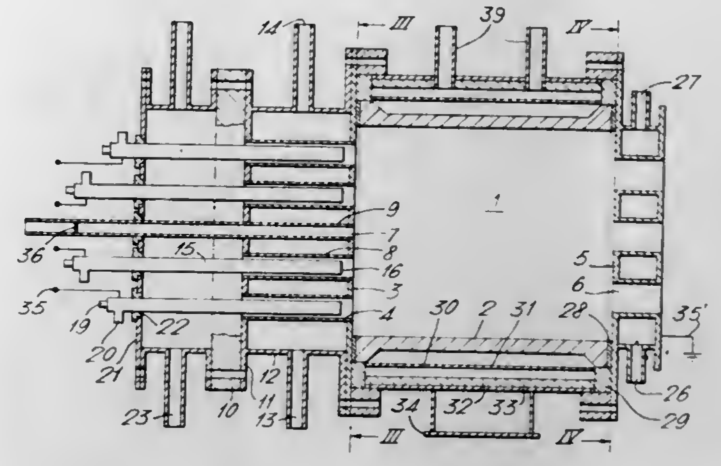
Filed May 21, 1975, Ser. No. 579,635

Claims priority, application United Kingdom, June 4, 1974, 26413/74

Int. Cl.² B23K *9/00*

U.S. Cl. 219—121 P **22 Claims**

1. Apparatus for heating gas comprising means defining a heating zone; gas supply means for applying gas to said heating zone to be heated therein; gas removal means for removing heated gas from said heating zone; upstream and downstream electrode means adapted to establish a distributed electrical discharge in said heating zone; and means for establishing a difference in electrical potential between said upstream and downstream electrical means, said gas supply means comprising a plurality of adjacently positioned conduits arranged to constrain the gas supplied to said heating zone at its point of entry thereto into a plurality of substantially parallel streams; and the upstream electrode means comprising a plurality of



electrode members positioned respectively in said plurality of gas streams.

4,056,705

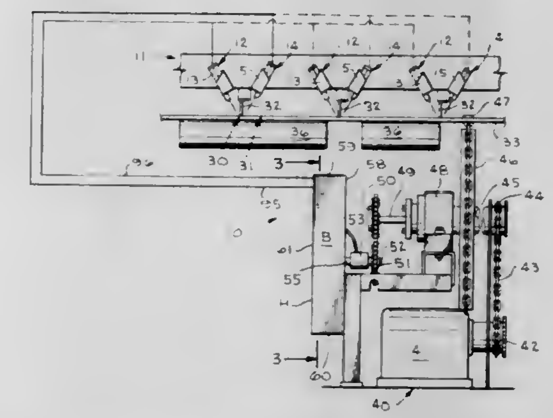
APPARATUS FOR CONTROLLING THE WELDING PATTERN BETWEEN WELDMENT COMPONENTS

Richard L. Linam, League City, Tex., and Leonard J. Lucas, Richmond, Calif., assignors to Kelso, Inc., Galveston, Tex.

Filed Mar. 15, 1976, Ser. No. 666,932

Int. Cl.² B23K *9/00*

U.S. Cl. 219—125 R **3 Claims**



1. An arrangement for selectively actuating longitudinally spaced rows of welding guns to weld weldment components in a predetermined welding pattern, the weldment components being movable relative to the rows of welding guns comprising:

a. disc means supported on a shaft and rotatable from an initial predetermined position in synchronism at a predetermined reduced speed in relation to the speed of the movable weldment components;

b. circumferential surface indicating means on said disc means corresponding with the weld pattern to be formed on the weldment components;

c. optical scanner means electrically connected to each row of the welding guns and responsive to said surface indicating means to sequentially activate and deactivate the rows of welding guns to form the weld pattern on the weldment components;

d. said scanner means being longitudinally spaced from each other by the following formula:

$$\frac{\text{speed of weldment components}}{\text{peripheral surface speed of disc means}} = \frac{\text{length of space between rows of welding guns}}{\text{length of space between scanner means}}$$

e. air clutch means operable when activated to engage said disc means for rotation in synchronism relative to the

movement of the weldment components and operable when deactivated to disengage said disc means from rotation in synchronism relative to the movement of the weldment components;

f. solenoid actuated control valve means actuatable for controlling the flow of air to said air clutch means to activate and deactive it, said control valve means being closed to deactivate said clutch means;

g. means electrically connected to said control valve means to actuate it when movement of said weldment components relative to the rows of welding guns is initiated to activate said clutch means and initiate synchronous rotation of said disc means;

h. switch means electrically connected with said solenoid actuated control valve means;

i. means on said rotatable disc means engagable with said switch means upon rotation of said disc means as the weldment components complete their movement relative to the rows of welding guns to actuate said control valve means and thereby deactivate said clutch means; and

j. means to rotatably return said disc means to its initial predetermined position.

4,056,706

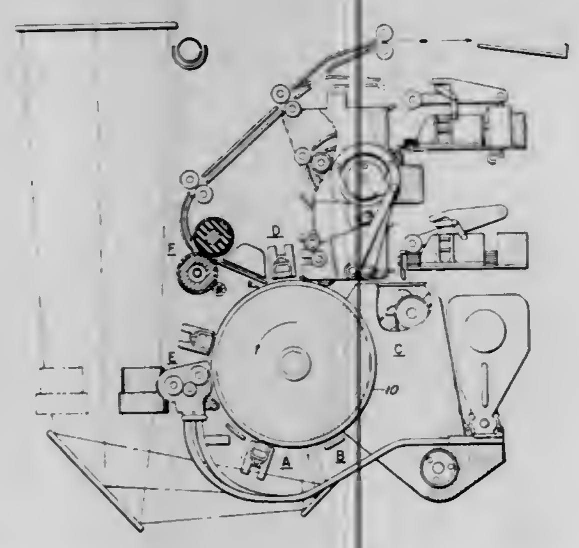
APPARATUS AND METHOD FOR EXTENDING FUSER RELEASE LIFE

Stephen Strella, Pittsford, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Apr. 21, 1975, Ser. No. 569,735

Int. Cl.² H05B *1/00;* G03G *15/00*

U.S. Cl. 219--216 12 Claims



1. A fusing assembly for use in a xerographic reproducing apparatus for fixing a powder image onto a support surface comprising,

a frame;

a first and second member journaled in parallel relation to a third member in said frame, the third member being a fuser member comprising an elastomer impregnated with an offset prevention fluid, the first member being a pressure member to cause the support surface to advance between the fuser member and the pressure member, and the second member being an offset prevention liquid supply member comprising an elastomer material capable of degrading to a fluid having offset prevention properties and providing upon its surface an offset prevention fluid for transfer to the fuser member for restoration of depleted offset prevention fluid in the fuser member; and

means to heat at least the surface of the fuser member;

the fuser member being heated sufficiently and contacting the support surface carrying the powder image with sufficient pressure whereby the powder image is fused to the support surface as the support surface advances between the pressure member and the fuser member, the second member contacting the fuser member with sufficient pressure whereby the offset prevention fluid therein transfers from the elastomer material of the second member to the elastomer material of the fuser member and thereby replenishes release material depleted from the fuser member.

4,056,707

ELECTRICAL HEATING DEVICE FOR USE WITH AEROSOL CONTAINERS

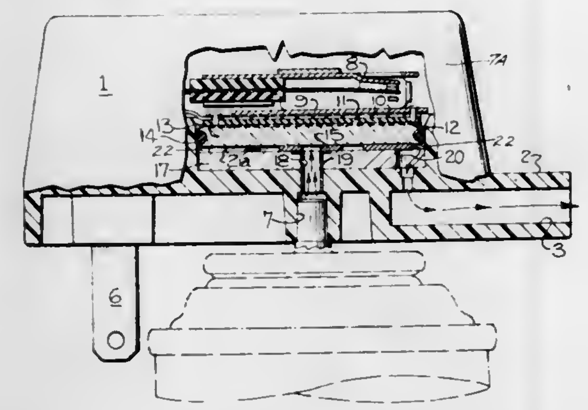
Franklin C. Farnam, 19 Glenview Road, Asheville, N.C. 28804

Filed Oct. 6, 1975, Ser. No. 619,599

The portion of the term of this patent subsequent to Aug. 31, 1990, has been disclaimed.

Int. Cl.² H05B *1/02;* B67D *5/62;* F24H *1/12*

U.S. Cl. 219—302 6 Claims



1. Apparatus for heating fluid dispensed from a container and comprising:

housing means for passing fluid being dispensed and having an entrance orifice adapted to receive an outlet nozzle of a container, an exit orifice for delivering heated fluid and conduit means establishing operative

fluid heating means in said housing means for heating fluid passing therethrough and having heat sink means for storing heat and disposed in heat transfer relation to said conduit means for heating lather therein and electrical heating means for heating said heat sink means, and

electrical connector means on said housing and electrically connected to said electrical heating means for conducting electrical current thereto,

said connector means and said entrance orifice being so disposed one relative to the other that connection of said connector means with a source of electrical current prevents said entrance orifice from receiving an outlet nozzle of a container and receipt of an outlet nozzle of a container by said entrance orifice prevents said connector means from connecting with a source of electrical current,

said heat sink means having a thermal capacity capable of storing during conductance of electrical current through said electrical heating means thermal energy sufficient to heat a charge of fluid to a desired temperature after conductance of electrical current has been interrupted by disconnecting of said connector means.

4,056,708

DIGITAL TEMPERATURE CONTROLLER

Charles Soodak, Silver Spring, and Alexander Gelbman, Gaithersburg, both of Md., assignors to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

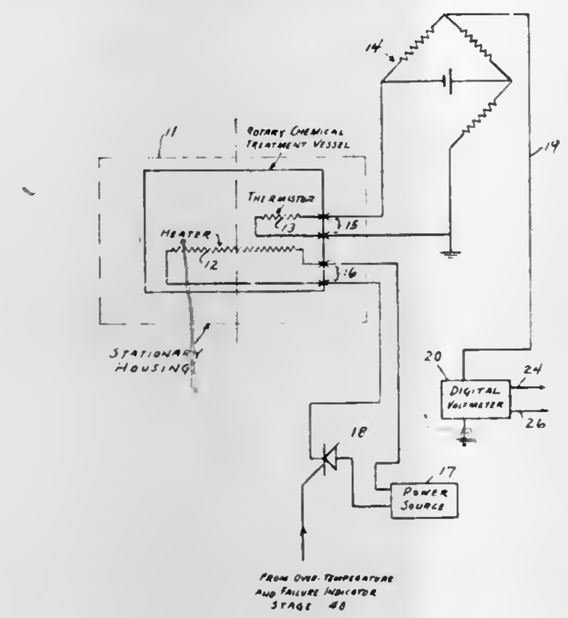
Filed July 22, 1975, Ser. No. 598,037

Int. Cl.² H05B *1/02*

U.S. Cl. 219—499 6 Claims

1. A chemical treatment apparatus including temperature control means comprising heater means, an electrical power source, circuit means including a relay device connecting said power source to said heater means, temperature sensing means including a temperature sensor in the apparatus generating a signal corresponding to actual temperature, temperature command means furnishing a command signal corresponding to a desired temperature, programmable computer means con-

nected between the sensing means and the command means generating a control signal which is a programmed function of the difference between the desired temperature and the actual temperature, means operating said relay device in accordance with said control signal to control the supply of power to said heater means and modulate the supply in accordance with said programmed function, temperature indicating means connected to said sensing means, said indicating means having means to provide an output signal corresponding to said actual temperature, wherein said computer means is connected be-



tween the output of said indicating means and said command means, wherein said temperature indicating means comprises a digital voltmeter and said output signal is in binary form, the command signal being likewise in binary form, and wherein said digital voltmeter includes terminal means to supply the binary actual temperature output signals and means to supply additional signals representing abnormal system conditions, and means to inhibit operation of said relay device responsive to the presence of any of said additional signals or to the absence of actual temperature output signals.

4,056,709

TAXIMETER INDICATOR ARRANGEMENT

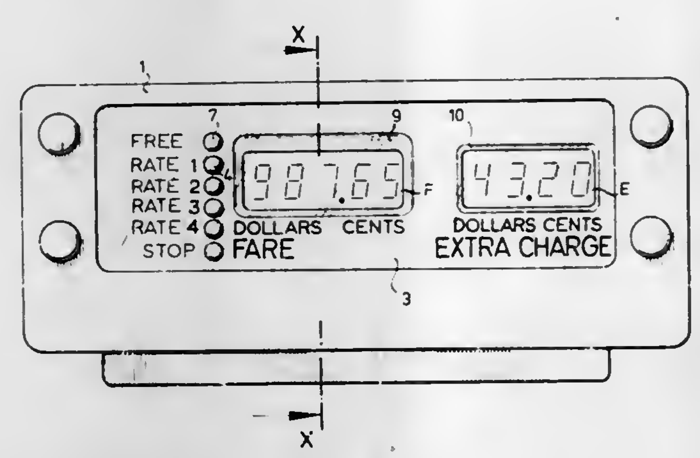
Hans-Peter Scholl, Villingen-Schwenningen; Alfons Heimburger, Niedereschach; Ulrich Warkentin, Tannheim, and Manfred Säufferer, Villingen, all of Germany, assignors to Kienzle Apparate GmbH, Villingen-Schwenningen, Germany

Filed June 13, 1975, Ser. No. 587,235

Claims priority, application Germany, June 14, 1974, 2428887

Int. Cl.² G07B *13/00*

U.S. Cl. 235—30 R 9 Claims



1. In a digital taximeter of the type operative for providing a visual read out of at least a first and a second multi-digit number, in combination,

a single multi-digit illuminated-digit display unit having a row of equal-size digit zones and including a first group of digit zones and a second group of digit zones respectively adapted for the display of the first and second multi-digit numbers;

blocking means for blocking from view at least one of the middle digit zones of said single multidigit illuminated-digit display unit to thereby form said first and second groups of digit zones located to either side of the digit zones which are blocked from view,

said blocking means including first and second viewing frame means respectively framing said first and second groups of digit zones,

said first viewing frame means being configured and dimensioned differently from said second viewing frame means for making the digit zones of said first group appear larger than the digit zones of said second group.

4,056,710

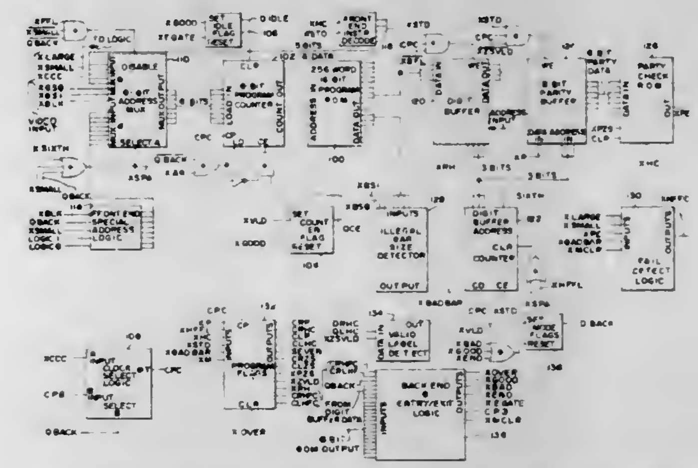
SYSTEM FOR DECODING BAR CODE

Robert C. Shepardson, Cupertino, and Michael E. Watts, Woodside, both of Calif., assignors to Coherent Radiation, Palo Alto, Calif.

Filed Apr. 16, 1976, Ser. No. 677,715

Int. Cl.² G06K *7/08;* G06F *15/34*

U.S. Cl. 235—437 3 Claims



1. A reader-scanner system for detecting and decoding coded character information where each encoded character comprises a plurality of bars of alternating light reflective characteristics of one or more widths comprising:

a. a light source for projecting a beam of light;

b. a scan target area through which pass encoded objects to be scanned;

c. a light-sensitive detector for detecting changes in the level of light reflected from objects at said scan target area which are scanned by said beam of light;

d. means responsive to said detector for determining possible bar width and bar characteristic information of the object being scanned;

f. means responsive to said bar width information to determine in real time valid sequences of said information comprising;

multiple level decision making means which includes means for comparing incoming bar width and characteristic information with allowable bar width and characteristic values for the bar and characteristic information sequence developed to that point,

means for failing any information sequence which is not allowable, and means for moving to the next and subsequent levels of the decision-making sequence so long as the information sequence is an allowable one, until the completion of the multi-level sequence at which time an individual character is uniquely defined.

4,056,711

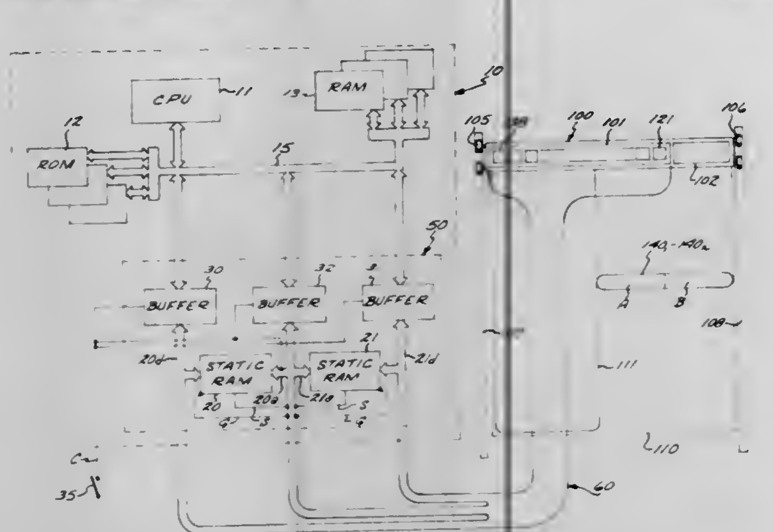
METHOD AND APPARATUS FOR PROGRAMMING MICROPROCESSORS

William Paul Lamar, 1024 17th St., Hermosa Beach, Calif. 90254

Filed Oct. 24, 1975, Ser. No. 625,673

Int. Cl.² G06K *7/10, 19/06*

U.S. Cl. 364—200 **7 Claims**



1. Apparatus for loading a sequence of instructions into a memory section of a data processing device comprising:

a frame;

address means selectively securable to said frame for providing a plurality of address signals indicative of the selected individual segments of said memory section;

data means individually and selectively securable to said frame for providing a plurality of data signals in predetermined geometric relationship with selected ones of said address signals, and for providing a visual display indicative of said data signals; and

reading means adapted for translation along said frame for responding to said address and data signal and providing coding signals indicative thereof to said memory section.

4,056,712

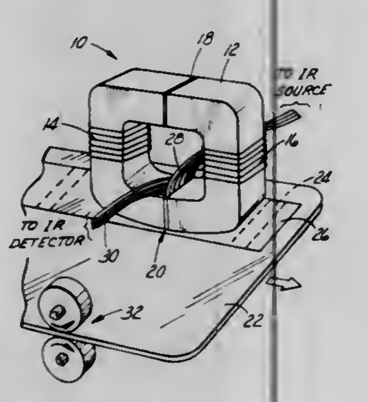
WEAR COMPENSATING OPTICAL/MAGNETIC TRANSDUCER

Robert H. Trenkamp, Cleveland Heights, and Gerald A. Dissauer, South Euclid, both of Ohio, assignors to Addressograph Multigraph Corporation, Cleveland, Ohio

Filed June 9, 1976, Ser. No. 694,384

Int. Cl.² G11B *5/25;* **G06K** *7/01*

U.S. Cl. 235—440 **10 Claims**



1. A transducer for reading optical and magnetic data from a document in operative sliding engagement therewith, said transducer comprising:

a magnetic read head comprising a core of magnetic material having a contact surface adapted to slidably engage documents during reading and a magnetic reluctance aperture disposed in the area of said contact surface, and

optical means for delivering and receiving radiant energy to and from documents as they are read, said optical means comprising a plurality of optical fibers each with an end portion of uniform cross-sectional area extending through said reluctance aperture to an end, the ends of said optical fibers providing an optical sensing surface defining a reading aperture of predetermined size substantially coplanar with said contact surface and adapted to engage documents during reading whereby said reading aperture remains substantially coplanar with said contact surface and the size of said aperture remains substantially constant with wear.

4,056,713

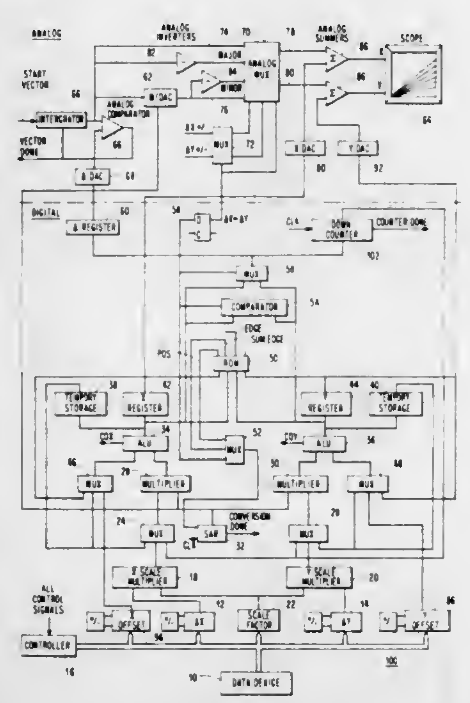
DISPLAY PROCESSING UNIT FOR DRAWING VECTORS

Robert J. Quinn, Millis, Mass., assignor to Digital Equipment Corporation, Maynard, Mass.

Filed Oct. 1, 1976, Ser. No. 728,801

Int. Cl.² G06F *15/20;* **H01J** *29/70*

U.S. Cl. 364—521 **16 Claims**



7. The process of displaying a vector on a display device, said process comprising the steps of:

A. identifying the location of said vector with respect to the display area;

B. determining the rectangular coordinates of said vector which are within said display area;

C. comparing said rectangular coordinates of said vector to determine which is larger;

D. determining the tangent of said vector; and

E. generating an analog voltage to said display device, said analog voltages being responsive to said vector within said display area.

4,056,714

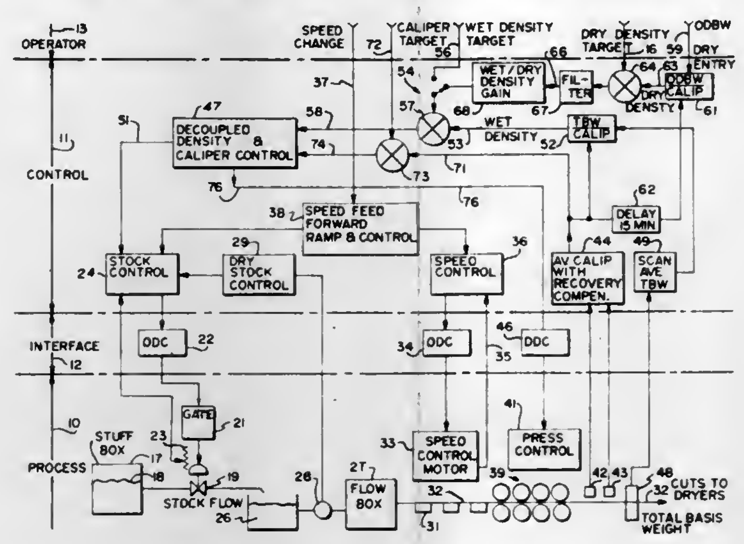
METHOD FOR CONTROL OF CEILING TILE PROCESS

Al Al-Shaikh, Sunnyvale, and Erik B. Dahlin, Saratoga, both of Calif., assignors to Measurex Corporation, Cupertino, Calif. Continuation of Ser. No. 495,565, Aug. 8, 1974, abandoned. This application Jan. 13, 1976, Ser. No. 648,656

Int. Cl.² D21F *11/00*

U.S. Cl. 364—111 **2 Claims**

1. A method for the control of oven dry density of a moving sheet material where the on-line measurement of moisture before said sheet material is dried is not feasible due to the type of sheet material being manufactured said method comprising the following steps: measuring the total basis weight of said material; measuring the thickness of said material, the ratio of basis weight and thickness providing the wet density of said material; utilizing said wet density in a feedback control loop to control such density to a target; obtaining a sample of wet material; drying such sample in a manner equivalent to the oven drying of said sheet material, obtaining the oven dry density of said material by division with a thickness measurement taken substantially at the time said sample was obtained; compared said oven dry density of said sample with a predetermined dry density target to produce an error signal; and utilizing said error signal to update said wet density in a manner to achieve said dry density target.



4,056,715

DEVICE FOR FORMING CHANNELS USING DETECTORS SPACED OUT ON A CIRCULAR BASE

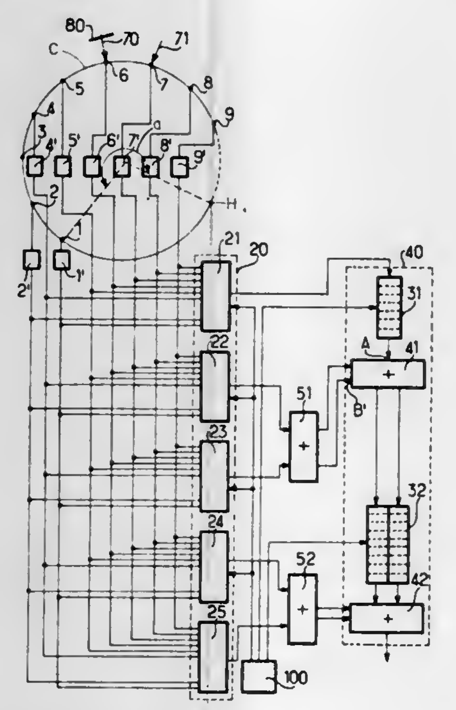
Guy Parent, Le Plessis Robinson, France, assignor to Compagnie Industrielle des Telecommunications Cit-Alcatel, Paris, France

Filed Dec. 2, 1975, Ser. No. 636,888

Claims priority, application France, Dec. 10, 1974, 74.40458

Int. Cl.² G01S *3/00*

U.S. Cl. 364—514 **18 Claims**



1. Device for forming channels comprising H detectors evenly spaced along an arc of a circular base:

H coders, each coder being connected to the output of a detector for transcoding the analog output signal of the detector into a signal having s bits ($s \geqq 1$),

Means **(200)** for sampling and memorizing the signals coming from the H coders,

A bus bar system **(300)** on which the signals memorized as a whole pass,

Means **(400)** for sampling at the frequency F_H the signals on the bus bar system **(300),**

Control means **(500)** for the sampling means **(400),**

$(N-1)$ secondary adders (51, 52), the inputs of which are fed by the sampling means **(400),**

A chain **(40)** constituted by an alternate sequence of $(N-1)$ delay devices **(31, 32)** and of $(N-1)$ main adders **(41, 42),** where $(2N-1 < H)$, each main adder **(41, 42)** comprising an input (A) connected to the output of a delay device **(31, 32)** and a lateral input (B) connected to the output of a secondary adder **(51, 52),** each delay device **(31, 32)** comprising at least an elementary cell, the chain input being fed by said sampling means **(400),** and

A clock **(100)** delivering a frequency F_H to the control means and to the chain **(40)** for controlling the transfer of the signals along the chain **(40)** so that the signals stay only during a period $1/F_H$ in an elementary cell.

4,056,716

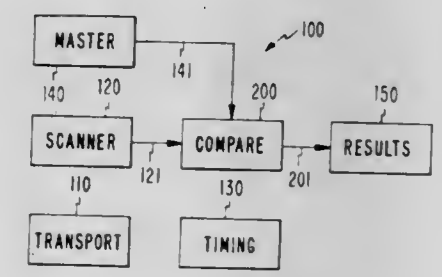
DEFECT INSPECTION OF OBJECTS SUCH AS ELECTRONIC CIRCUITS

Duane Willard Baxter, Rochester, Minn., and Richard Edward Shipway, Endwell, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed June 30, 1976, Ser. No. 701,337

Int. Cl.² H04N *1/38*

U.S. Cl. 364—515 **8 Claims**



1. A method of inspecting an object for defects, comprising the steps of:

a. producing a high-resolution electronic representation of an object, said representation having a plurality of cells each corresponding to a first amount of area on said object;

b. storing a low-resolution master pattern having a plurality of cells each representing a second, substantially larger amount of area on said object;

c. detecting a first of a predetermined set of features in a first window comprising a plurality of said cells of said high-resolution representation;

d. detecting a second feature of said set in a second window comprising a plurality of said cells of said low-resolution master pattern, said second window representing a substantially larger total area on said object than the area represented by said first window;

e. comparing said first feature with said second feature; and

f. repeating steps (c), (d) and (e) for different ones of said windows, representing further areas on said object.

4,056,717

TEMPERATURE CORRECTION SYSTEMS FOR A FLUID FLOW METER

Malcolm W. Cornforth, Edgewater Park, N.J., assignor to The Singer Company, New York, N.Y.

Filed Oct. 27, 1976, Ser. No. 735,861

Int. Cl.² G01F *1/08, 15/02*

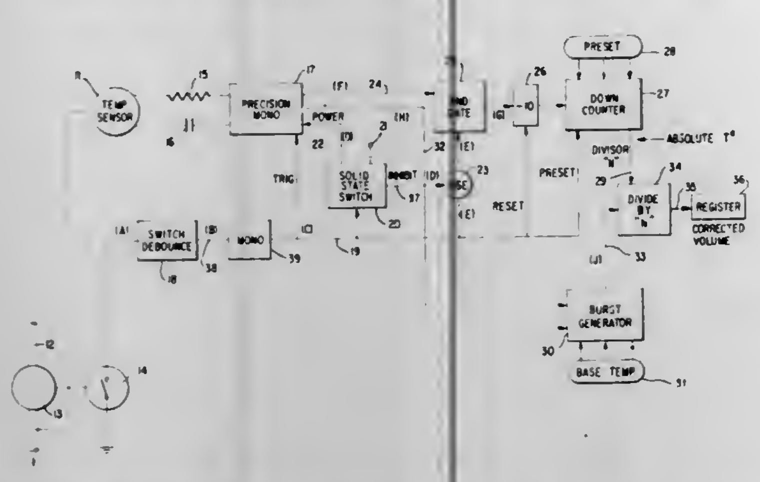
U.S. Cl. 364—510 **10 Claims**

1. In a system for correcting the measurement of the volume flow of a fluid to a standard volume flow in response to a variable physical condition of said fluid, the combination comprising:

means providing a single pulse signal for each uncorrected unit volume flow,

power demanding means initiated by said pulse signal and

responsive to said variable condition for calculating the volume flow corrected to a standard volume flow, and



means for substantially reducing the power demand of said system by controlling the duty cycle of the supply of power to at least part of said calculating means.

4,056,718

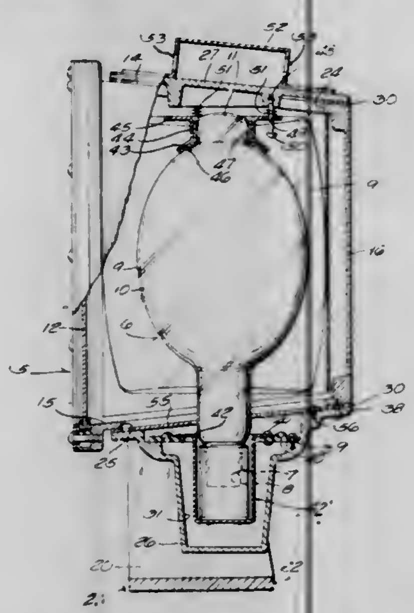
HEAVY DUTY FLOODLIGHT FIXTURE

Kenneth R. Faux, Sr., Mequon, and William A. Wenman, both of Milwaukee, Wis., assignors to Phoenix Products Company, Inc., Milwaukee, Wis.

Filed Mar. 8, 1976, Ser. No. 664,914

Int. Cl.² F21M *3/00*

U.S. Cl. 362—306 **1 Claim**



1. A floodlight fixture of the type having a housing with a transparent front wall, rigid top and bottom walls which have aligned holes through either of which access may be had to the interior of the housing, and a reflector facing the transparent wall, a closure member detachably secured to each of said rigid top and bottom walls over the hole therein, and a lamp socket on one of said closure members to receive the base of a lamp, said fixture being characterized by an improved shock resistant mounting for its lamp comprising the combination of:

A. means on said one of the closure members forming a socket-receiving cavity which opens to the interior of the housing and has a ledge at the mouth thereof;

B. an annular diaphragm of resiliently yieldable material having its peripheral portion seated on and secured to said ledge;

C. a substantially rigid carrier embracing the lamp socket, said carrier having a closed end to which the socket is attached and an open end provided with mounting flange means;

D. means securing said mounting flange means to the inner edge portion of the annular diaphragm, with the carrier and the socket attached thereto located in said cavity and spaced from the walls thereof so as to be free to move to the extent the resiliency of the diaphragm permits such motion;

E. a ring of a size to embrace the end portion of a lamp opposite its base, said ring having

1. a cylindrical portion to encircle the protuberance at the outer end of a lamp bulb of the type having an enlarged medial portion and a protuberance projecting therefrom,
2. a first outwardly projecting flange on and encircling one end of the ring, to engage the adjacent surface of the enlarged medial portion of the lamp bulb, and
3. a second outwardly projecting flange on and encircling the other end of the ring;

F. a plurality of circumferentially spaced studs projecting inwardly from the other one of said closure members and passing loosely through holes in the second outwardly projecting flange on said ring;

G. springs encircling said studs and confined between said second outwardly projecting flange on the ring and said other closure member yieldingly urging the ring towards said annular diaphragm, so that said springs and the resilient yieldability of the diaphragm coact to floatingly hold the lamp and isolate the same from shocks to which the fixture may be subjected; and

H. abutments on the studs to limit spring produced movement of the ring when such movement is not limited by the presence of a lamp.

4,056,719

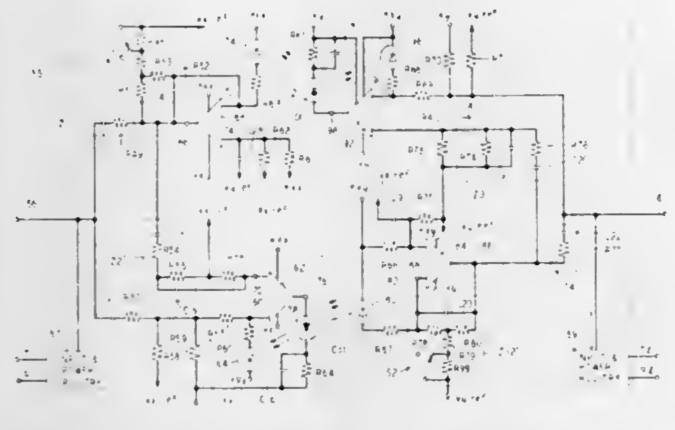
TWO-WAY TELEPHONE TRANSMISSION SYSTEM UTILIZING OPTO-COUPLERS

Sigurd Gunther Waaben, Princeton, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Continuation-in-part of Ser. No. 548,404, Feb. 10, 1975, abandoned. This application Aug. 2, 1976, Ser. No. 710,562

Int. Cl.² G01J *1/32;* **H03F** *17/00;* **H04B** *9/00*

U.S. Cl. 250—199 **11 Claims**



7. An opto-coupler comprising:

a first amplifier having an output terminal, at least one input terminal, and a reference terminal;

a light emitting means coupled to the output terminal of the amplifier;

first and second light detecting means, the first and second light detecting means being positioned so as to receive light from the light emitting means;

the first and second light detecting means being characterized in that thhe current induced therethrough is proportional to the light incident thereon;

the first light detecting means being coupled to the input terminal of the first amplifier;

a second amplifier having at least two input terminals and one output terminal and being characterized in that when signals of equal magnitude and the same polarity appear at the two input terminals they cancel each other and there is essentially no output signal;

the signal light detecting means being coupled to the first of the two input terminals of the second amplifier; and

capacitive coupling means having a first terminal coupled to the second input terminal of the second amplifier and having a second terminal coupled to the reference terminal of the first amplifier.

4,056,720

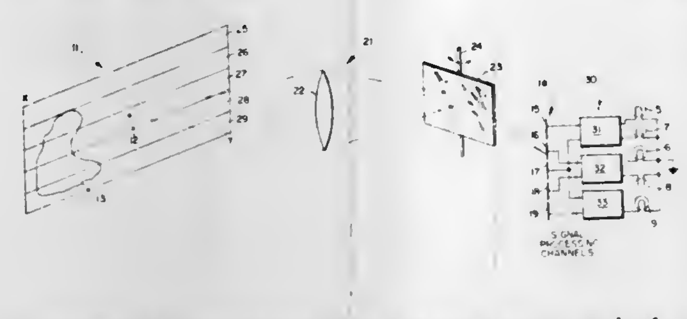
SCANNING POINT SOURCE OPTICAL ENERGY DETECTOR

Louis A. Williams, Jr., Cincinnati, Ohio, and Joseph D. Miller, N. Lauderdale, Fla., assignors to Cincinnati Electronics Corporation, Cincinnati, Ohio

Filed Mar. 8, 1976, Ser. No. 665,156

Int. Cl.² G01J *1/20*

U.S. Cl. 250—203 R **15 Claims**



1. Apparatus for indicating that a point source optical radiation emitter exists in a relatively large field of view, said indication being substantially independent of large, non-point source targets in the field of view, comprising first and second point source detectors for generating output currents in response to said radiation irradiating them, means for scanning the fields of view of the detectors so that the field of view of each detector traces a substantially straight line path across the large field of view, said detectors having slightly displaced fields of view in a direction at right angles to the direction of scan, the spacing of the detectors and the paths traced by the detectors being substantially parallel and close enough to each other to enable the images of large targets to be indicated as undulations having approximately the same wave shape at substantially the same time positions at outputs of the detectors while images of point sources are indicated as undulations having different wave shapes at substantially the same time positions at outputs of the detectors, a differential amplifier having complementary input terminals and at least one output terminal, said first and second detectors being respectively connected to said complementary input terminals, D.C. negative feedback paths between the input and output terminals, whereby in response to a point source target irradiating one of said detectors there is derived at one of said output terminals a signal including a pulse having a polarity indicative of which of the detectors is irradiated by the point source target, said signal being substantially independent of large targets, and means responsive to the signal for indicating that the pulse is derived from a point source.

4,056,721

AUTOMATIC RETICLE BRIGHTNESS CONTROL CIRCUIT MEANS IN NIGHT VISION IMAGE INTENSIFIERS

Sen-te Chow, Alexandria, and Earl M. Thomas, Arlington, both of Va., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Sept. 9, 1976, Ser. No. 721,750

Int. Cl.² H01J *31/50;* **G01J** *1/32*

U.S. Cl. 250—213 VT **4 Claims**

1. An automatic reticle brightness control circuit means for maintaining the brightness of a reticle commensurate with the brightness of an object image incident upon the cathode of an image intensifier tube under varying input light conditions, the means comprising:

a screen power supply oscillator and voltage multiplier for providing a direct current bias voltage on the screen of said image intensifier tube;

a screen current sensing circuit having on one side thereof a common node connected to the secondary winding of said screen power supply oscillator and having another side connected to a ground potential;

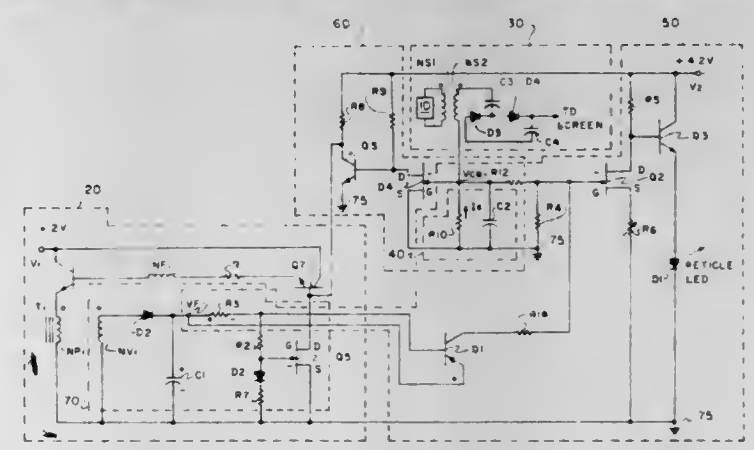
an automatic brightness control circuit having an input connected to said common node and an output therefrom;

an n-p-n transistor base controlled MCP OSC circuit for providing a variable feedback direct current voltage at a feedback terminal in response to a signal from the output of said automatic brightness control circuit applied to the base of said n-p-n transistor;

a feedback circuit having an input connected to said variable feedback direct current voltage at said feedback terminal and an output therefrom providing a voltage in direct relation to the value of said variable feedback direct current voltage;

a reticle LED direct current voltage source for providing bias voltage to a reticle LED; and

a reticle brightness control circuit, said reticle brightness control circuit having two common inputs and an output therefrom for controlling the bias voltage to said reticle LED wherein a first of said common inputs is connected



to said common node of said screen current sensing circuit and a second of said common inputs is connected to the output of said feedback circuit whereby as screen current varies proportionally to the object image input light and said screen current flows through said current sensing circuit the voltage at said common node decreases as screen current increases and causes the first of said common inputs to said reticle brightness control circuit to vary the bias voltage across said reticle LED directly with the increase in screen current and whereby as the screen current further increases past an automatic brightness control level said automatic brightness control circuit base controls said n-p-n transistor base controlled MCP OSC circuit to change said variable feedback direct current voltage inversely with increasing screen current in which said variable feedback direct current voltage source controls said second of said common inputs to said reticle brightness control circuit for additionally increasing current flow through said reticle LED directly with increasing screen current to keep the reticle visible to an observer under varying light conditions of said object image.

4,056,722

SHAFT POSITION SENSOR

Earnest Joseph Ray, Mountain View, Calif., assignor to Dictaphone Corporation, Rye, N.Y.

Filed Sept. 29, 1976, Ser. No. 727,870

Int. Cl.² G01D *5/34*

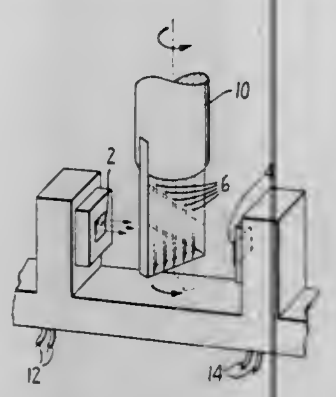
U.S. Cl. 250—231 SE **8 Claims**

1. Shaft position sensing apparatus comprising

a group of generally parallel vanes with each said vane extending in a direction generally longitudinally of said shaft axis and said group arranged in a pattern extending transversely of said shaft axis;

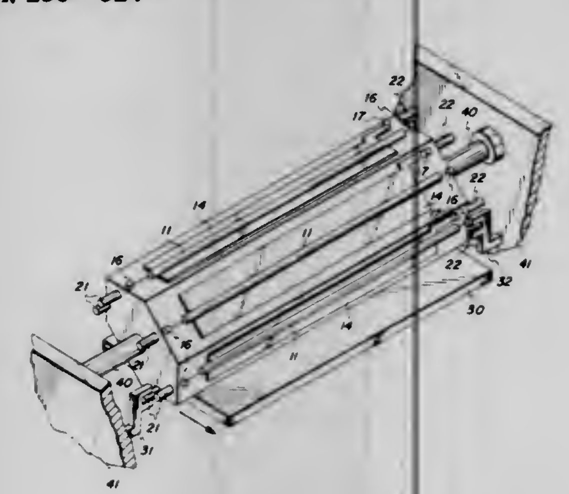
vane mounting means for maintaining said group of vanes in said relationships with one another and with said shaft, said vane mounting means being attached to said shaft for rotation with said shaft;

a light surce positioned on one side of said shaft and having a beam of light directed transversely of said shaft axis against said vanes at a point adjacent said shaft axis; and
a light sensor aligned with said light beam and positioned on the opposite side of said shaft axis from said light source for receiving light from said light beam, whereby light



received by the sensor is passed between the vanes such that the amount of light received by the sensor varies with the angle between the light beam and the vanes such that the angular position of the shaft may be determined by the relative amount of light received by the sensor and indicated by the sensor output.

4,056,723
ROTATABLE CORONA DEVICE
Brian E. Springett, and Dror Sarid, both of Rochester, N.Y., assignors to Xerox Corporation, Stamford, Conn.
Filed Jan. 23, 1976, Ser. No. 651,768
Int. Cl.² H01T *19/00*
U.S. Cl. 250—324 **5 Claims**



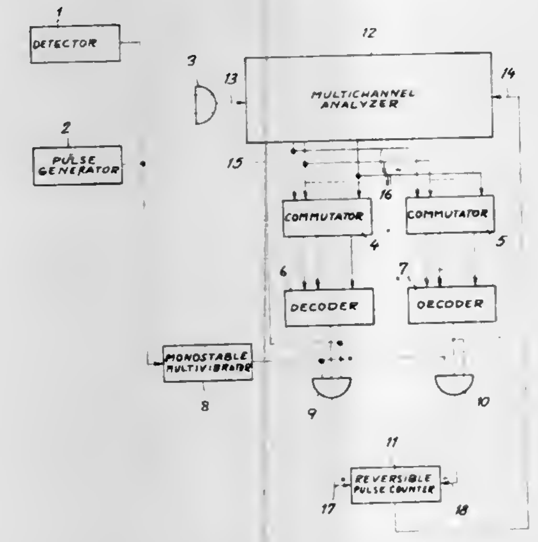
1. A corona charging arrangement for depositing charge on an imaging surface comprising:
a plurality of corona discharge devices carried by a common member, each device comprising a corona electrode including a wire coated with a thick dielectric material sufficient to prevent the flow of conduction current therethrough, conductive biasing member carried by said common member, said electrode supported in contact with said biasing member, means for applying corona causing potentials to one of said devices, and
means for moving said member to orient one of said plurality of devices for depositing charge on said surface.

4,056,724
FLUOROMETRIC SYSTEM, METHOD AND TEST ARTICLE
Richard A. Harte, Redwood City, Calif., assignor to International Diagnostic Technology, Santa Clara, Calif.
Continuation-in-part of Ser. No. 447,574, March 4, 1974, abandoned, and a continuation-in-part of Ser. No. 553,582, Feb. 27, 1975, Pat. No. 3,992,631. This application July 8, 1976, Ser. No. 703,579
Int. Cl.² G01T *1/00;* **G01N** *31/00*
U.S. Cl. 250—328 **10 Claims**

1. In apparatus for analyzing a sample by fluorometric techniques, a carrier member having a surface portion adapted for receiving said sample and including means for supporting said sample thereon as an exposed layer presenting a surface for analysis,
test stage means for supporting said member at an analysis location in said apparatus, said carrier member and said stage means being constructed and arranged so that said member is removably insertable into said stage means,
illumination means including a source of excitation radiation and means forming a first optical system intersecting said analysis location for delivering said radiation to the surface thereat,
optical fluorescence collection means including a photodetector and means forming a second optical system intersecting said analysis location for receiving the fluorescence emitted from the exposed layer thereat,
emission filter means associated with said fluorescence collection means for restricting the sensitivity thereof to a frequency band overlapping the emission spectra of said fluorometrically active substance and being substantially non-responsive to the band of excitation radiation,
means juxtaposed with said excitation filter means for forming a beam splitter for removing a portion of the light therefrom for developing a reference channel in parallel with the illumination means,
means for alternating said illumination means and said reference means during mutually exclusive periods of time,
sensing means for developing a signal indicative of sample illumination on-times when said photodetector is activated by sample fluorescence and for developing a second signal indicative of the period when said reference means is detected,
a demultiplexer response to said signal for alternately delivering outputs indicative of said sample signal or said reference signal,
a sample signal processor for receiving said sample signal,
a reference signal processor for receiving said reference signal,
said processors serving to develop signal outputs, the strength of which is proportional to the amount of light signal received at said photodetector during said sample and reference periods, respectively,

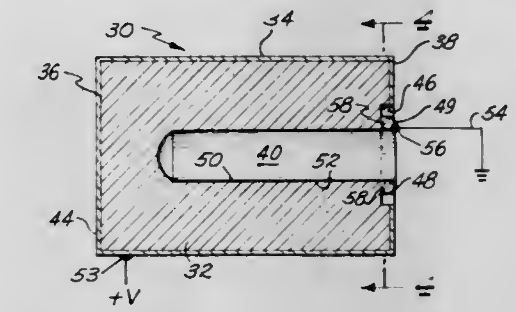
a ratio circuit for obtaining the ratio S/R where S equals sample signal and R equals said reference signal, and
display means responsive to said ratio circuit for displaying the value of said ratio.

4,056,725
METHOD OF AND SYSTEM FOR COMPENSATING THE DISTORTION OF AMPLITUDE SPECTRA OF MULTICHANNEL ANALYZERS IN SPECTROMETRY
Hristo Kirilov Kamburov; Ivan Danailov Vankov, and Ivan Yordanov Donev, all of Sofia, Bulgaria, assignors to Institute za Yadreni Izsledvania I Yadrena Energetika pri Ban, Sofia, Bulgaria
Filed Dec. 16, 1975, Ser. No. 641,179
Int. Cl.² G01T *1/00, 3/00*
U.S. Cl. 250—336 **10 Claims**



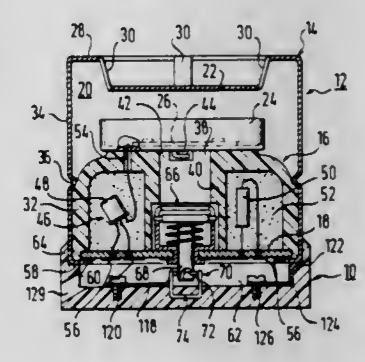
6. A system for compensating pulse-amplitude distortion in a spectrometric operation in which a pulse due to particle emission from a sample is converted into a digital signal identifying one of a multiplicity of channels corresponding to a respective pulse amplitude, comprising:
detector means for generating measuring pulses in response to the flow of particles from a sample to be measured;
a generator of reference pulses of predetermined frequency and amplitude;
a multichannel analyzer converting the amplitudes of incoming pulses into digital codes identifying a multiplicity of channels, said analyzer having a pulse-receiving input and a set of stage outputs carrying said digital codes, said detector means and said generator having outputs connected to said pulse-receiving input;
a first decoder connected to certain of said stage outputs for emitting a first counting pulse in response to a pulse amplitude in said pulse-receiving input falling within a predetermined first group of said channels encompassing the amplitude of said reference pulses;
a second decoder connected to other of said stage outputs for emitting a second counting pulse in response to a pulse amplitude in said pulse-receiving input falling within a predetermined second group of said channels adjoining said first group;
a reversible pulse counter having a forward-stepping input connected to said first decoder and a backward-stepping input connected to said second decoder for respectively receiving said first and second counting pulses therefrom; and
gating means controlled by said generator and interposed between said decoders and said pulse counter for allowing the transmission of a counting pulse only within a limited period following the generation of any reference pulse.

4,056,726
COAXIAL GAMMA RAY DETECTOR AND METHOD THEREFOR
Micha Harchol, Kendall Park, N.J., assignor to Princeton Gamma-Tech, Inc., Princeton, N.J.
Filed Oct. 1, 1975, Ser. No. 618,357
Int. Cl.² G01T *1/24;* **H01L** *29/06*
U.S. Cl. 250—370 **43 Claims**



1. A coaxial radiation detector comprising:
a. a body of semiconductor material,
b. a diffused region of electrical impurity material within said semiconductor material, said region extending to a surface of said semiconductor material,
c. first means for making electrical contact with said diffused region,
d. a metallic layer in contact with said semiconductor body,
e. electrical conductor means connected to said metallic layer at a contact region thereof,
f. said first means and said electrical conductor means adapted for connection to a source of electrical potential for forming a depletion zone within said semiconductor material, and
g. means for isolating said contact region from said depletion zone.

4,056,727
ATTACHMENT MEANS OF AN OBJECT TO A SUPPORT
Hartwig Beyersdorf, Scharbeutz, Germany, assignor to GEBA, Gesellschaft fuer Brandmeldeanlagen mbH & Co., Neuss, Germany
Filed Sept. 3, 1976, Ser. No. 720,421
Claims priority, application Germany, Sept. 5, 1975, 2539655; Sept. 5, 1975, 281764
Int. Cl.² G01T *1/18*
U.S. Cl. 250—385 **43 Claims**



1. A shock-, vibrations-, and tampering-proof attachment means of an object, such as a signal producing insert of an ionization alarm system coaxially along a common central axis to a fixed support face of a support, such as of land-, marine- and air-vehicles,
A. said object comprising:
A **1.** an elongated protrusion mounted non-rotatably and coaxially in the bottom of said object and protruding through its bottom downwardly facing said support face;
A **2.** a spring assembly mounted coaxially within the bottom of said object;
A **3.** a helical crescent shaped channel with openings

within the protruding bottom of said protrusion said channel continuing with a vertex directed upwardly and from there to its end;

B. said support provided with a connector means for a rod, said connector means fixed non-rotatably coaxially with said protrusion; said connector means protruding upwardly from said support

A 4. said protrusion mounted with said spring assembly under upward axial tension away from the said connector means;

C. a rod mounted between the said connector means and reaching into said protrusion to engage said channel in a direction substantially radial to the common axis to permit assembly of said object with said support by rotation of the former relative to the latter, to prevent their separation by accident or design.

4,056,728

MAGNETIC DEFLECTING AND FOCUSING DEVICE FOR A CHARGED PARTICLE BEAM

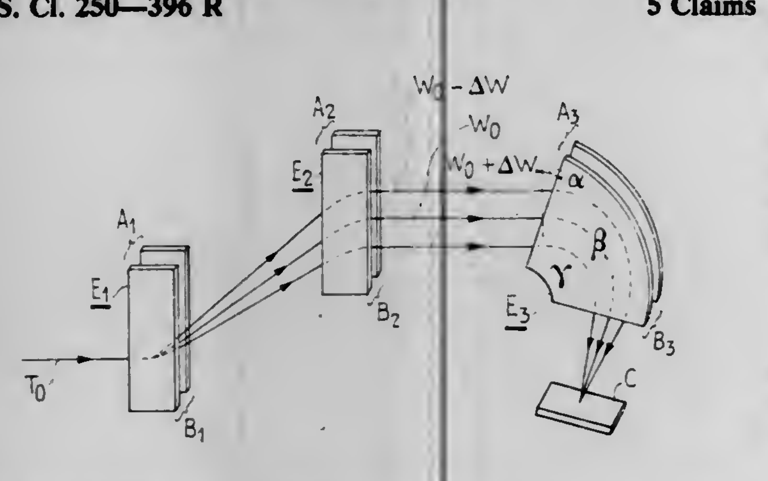
Hubert LeBoutet, Paris, France, assignor to C.G.R.-Mev., France

Continuation of Ser. No. 326,957, Jan. 26, 1974, abandoned. This application June 19, 1974, Ser. No. 481,117

Claims priority, application France, Jan. 31, 1972, 72.03136

Int. Cl.² H01J *3/14*

U.S. Cl. 250—396 R **5 Claims**



1. A magnetic deflecting and focusing device for a beam of accelerated charged particles having an incident mean path T_o, comprising, in combination, magnetic means for translating said beam in a direction perpendicular to said incident mean path T_o to obtain a translated beam parallel to said incident mean path T_o, the particle paths of said translated beam being dependent upon the momentum of said particles, and magnetic means for deflecting and focusing said translated beam upon a target having a predetermined position, said magnetic means for translating and said magnetic means for deflecting and focusing said beam being positioned and configured so as to achieve convergence of said particle beam on said target in two mutually perpendicular planes whose intersection is coincidental with the mean path of said beam emerging from said device, the positioning and configuration of said magnetic means further being such that momentum convergence of said particle beam is simultaneously achieved on said target substantially located on the axis corresponding to the mean path T_o of the incident beam; said magnetic means for translating said beam comprising a first and a second electromagnet having respectively an entry face and an exit face parallel to one another; the entry face A_1 of said first electromagnet being perpendicular to said incident mean path T_o and the exit face B_2 of said second electromagnet being perpendicular to said particle beam emerging from said second electromagnet; the entry face A_2 of said second electromagnet being parallel to the exit face B_1 of said first electromagnet and said faces A_2 and B_1 being spaced of an interval of:

$$d = 2r/tg\,\theta$$

the normal to said beam at the exit face B_1 and at the entry face A_2 being respectively at an angle θ with said entry face A_1 and said exit face B_2 and r being the radius of curvature of said particle beam within said first and second electromagnet.

4,056,729

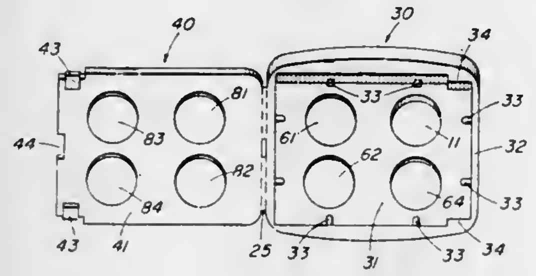
APPARATUS FOR HOUSING RADIATION MEASURING MATERIAL HOUSED IN A PLASTIC INSERT

Carl Collica, New Rochelle; Leonard Epifano, Rye, and Ralph Farella, Scarsdale, all of N.Y., assignors to Medi-Ray, Inc., Tuckahoe, N.Y.

Filed Jan. 23, 1975, Ser. No. 543,337

Int. Cl.² G01T *1/04*

U.S. Cl. 250—472 **9 Claims**



1. Apparatus for housing radiation measuring material, comprising, in combination, first and second members joinable in spaced relationship and having generally flat and parallel opposing surfaces; said surface of said first member having a plurality of recessed areas; and a generally flat insert member proportioned to removably fit between said surfaces said insert member having a plurality of receiving chambers positionally aligned with said recessed areas, said chambers being adapted to removably receive radiation measuring material.

4,056,730

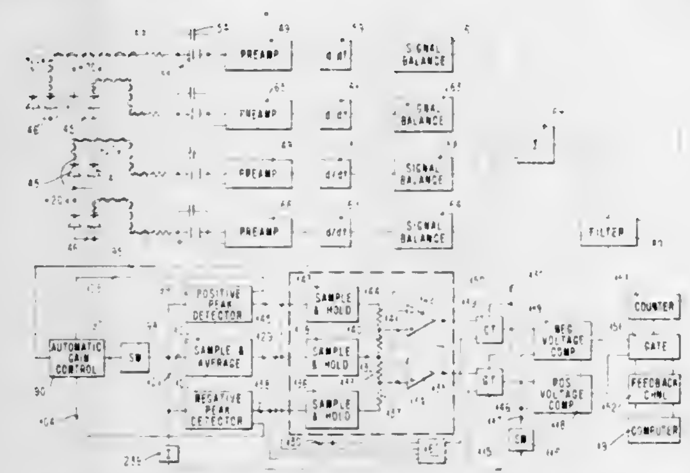
APPARATUS FOR DETECTING REGISTRATION MARKS ON A TARGET SUCH AS A SEMICONDUCTOR WAFER

Donald E. Davis, Wappingers Falls, N.Y.; Millard A. Habegger, Boulder, Colo., and Hannon S. Yourke, Poughkeepsie, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation-in-part of Ser. No. 704,605, July 12, 1976, abandoned. This application Oct. 12, 1976, Ser. No. 731,270

Int. Cl.² H01J *37/00*

U.S. Cl. 250—492 R **7 Claims**



7. In apparatus for detecting the location of an electron beam with respect to registration marks on a wafer, said apparatus including: means for causing an electron beam to scan said registration marks, detecting means for detecting electrons scattered by said registration marks and for producing a first signal related to the time varying density of scattered electrons impinging on the detecting means, and analyzing means for analyzing data to provide an indication of said location; the improvement comprising:

differentiating means having an output and being responsive to said detecting means for producing a second signal at said output representing the time derivative of said first signal;

said output being connected to said analyzing means to provide said second signal as data to said analyzing means.

4,056,731

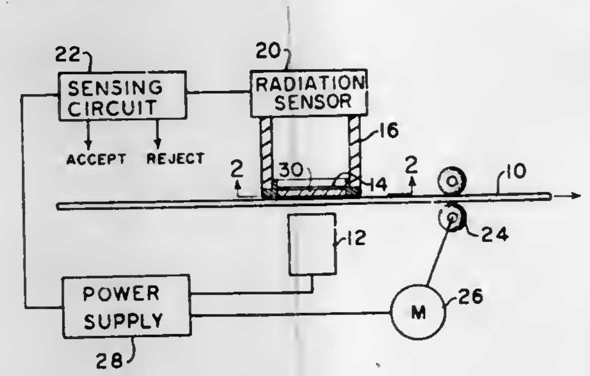
RETICLE PROTECTIVE STRUCTURE AND RADIATION SENSITIVE VALIDATION APPARATUS

Jack E. Bayha, Adrian, Mich., assignor to ARDAC/USA, Chesterland, Ohio

Continuation of Ser. No. 413,428, Nov. 7, 1973, which is a continuation of Ser. No. 159,917, July 6, 1971, abandoned. This application Dec. 1, 1975, Ser. No. 636,719

Int. Cl.² G06K *5/00, 11/00*

U.S. Cl. 250—556 **4 Claims**



1. A paper document validating device comprising,

a. a radiation source for projecting a beam of radiation onto a surface of the document,

b. a radiation detector spaced from the document and disposed so as to receive the portion of the radiation coming from the document,

c. a very thin reticle having a plurality of precisely spaced markings on one surface thereof,

d. an elongated tubular member associated with the radiation detector,

e. said reticle located between and apart from said radiation source and in association with the detector and the tubular member,

f. said reticle markings being toward the surface of the document and obstructing the flow of radiation through the reticle,

g. a protective cover of a thickness of approximately 0.003 inches positioned in contact with the document surface and in supportive contact with said reticle over the full surface thereof so that said reticle markings over the full surface thereof are positioned in parallel relation to the document surface and approximately 0.003 inches from the document,

h. a separate frame mounting the reticle and protective cover in supportive juxtaposition and operatively connected to the end of the tubular member,

i. said protective cover being of a material highly transparent to said radiation and highly resistant to abrasion,

j. a detecting circuit for determining when the radiation passing to the detector corresponds to that passing through a valid piece of currency, and

k. means for selectively effecting relative movement between said reticle and the document with the document in contact with the protective covering, and with the protective covering maintaining the parallel relation of the reticle to the document during such relative movement.

4,056,732

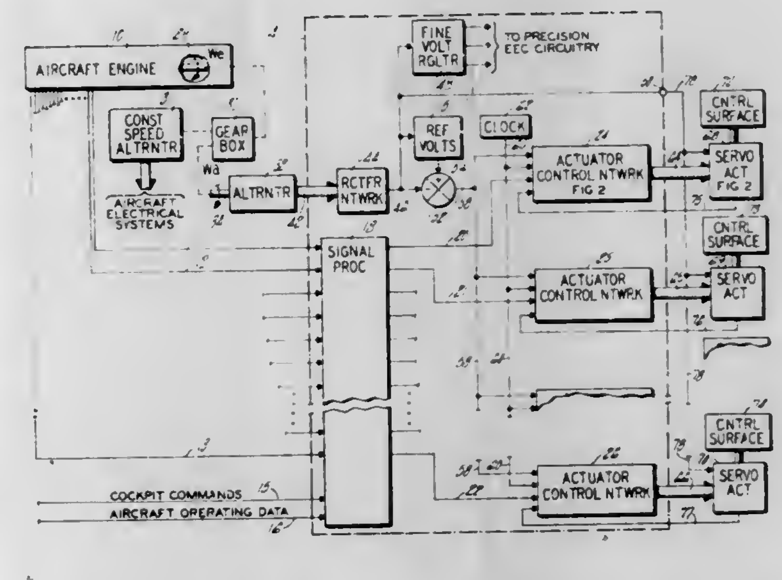
VOLTAGE REGULATION IN AN ELECTRONIC ENGINE CONTROL SYSTEM HAVING DIGITAL EFFECTOR ACTUATORS

Anthony Newman Martin, Simsbury, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Aug. 24, 1976, Ser. No. 717,433

Int. Cl.² H02J *3/14*

U.S. Cl. 307—33 **7 Claims**



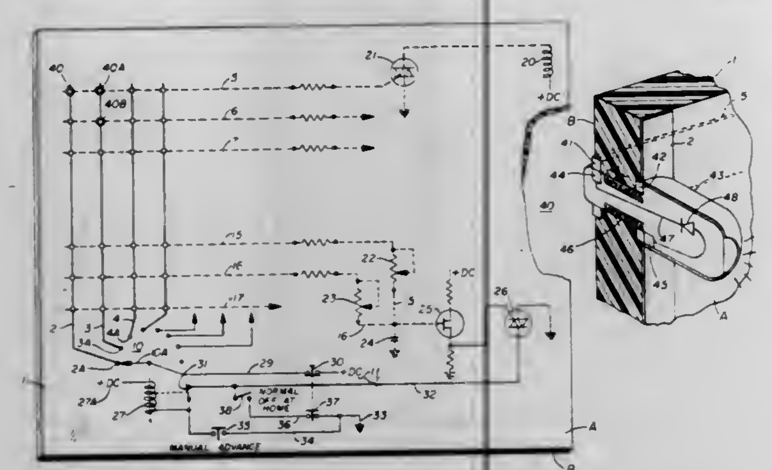
1. In a system for controlling the position of a controlled surface with a servo actuator of the type having a mechanical assembly for providing displacement of the controlled surface in each of two directions in response to a magnetic field provided by a respective one of two oppositely polarized solenoids disposed within the actuator, the system receiving electrical power from an unregulated voltage source and each solenoid providing a corresponding polarity magnetic field in response to an unregulated voltage signal from the voltage source presented through a corresponding one of a pair of solenoid gated switches in response to the ON portion of a gating signal presented to a gate input thereof, the system including a control unit for providing position change gate signals in response to a displacement signal presented thereto, each position change gate signal having an ON portion and an OFF portion with the time duration of the ON portion being proportional to the magnitude of the displacement signal, the control unit presenting the position change gate signals to the gate signal input of a respective one of the gated switches through a corresponding one of a pair of output lines in dependence on the polarity of the displacement signal, circuitry for providing voltage regulation of the unregulated voltage source, comprising:

signal means for providing a reference voltage signal;

summing means, responsive to the unregulated voltage signal and to the reference voltage signal, for providing a voltage error signal in response to an unregulated voltage signal having an absolute value amplitude greater than that of the reference voltage signal, the error signal having a magnitude proportional to the difference therebetween; and

regulation means, responsive to the voltage error signal and to the position change gate signals, for presenting the voltage regulation gate signals to the gate input of both gated switches simultaneously, in response to the presence of a voltage error signal in the absence of a position change gate signal ON portion, to provide concurrent energizing of both solenoids for a time duration proportional to magnitude of the voltage error signal, said regulation means not presenting the regulation gate signals to the gated switches in the presence of a position change gate signal ON portion.

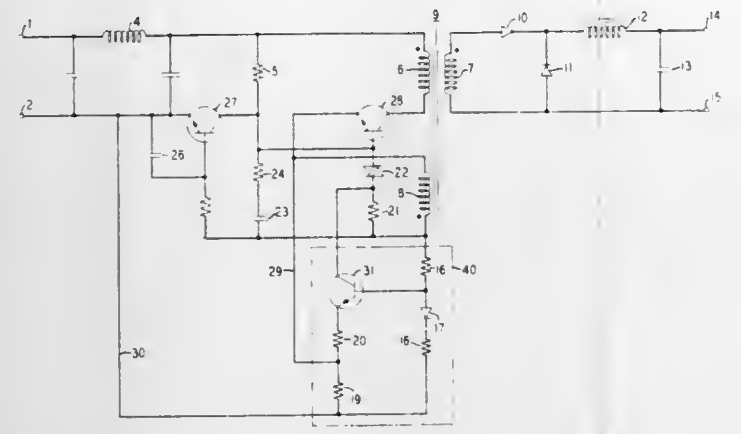
4,056,733
PANEL BOARD
Floyd L. Prestridge, Tulsa, Okla., assignor to Combustion Engineering, Inc., Windsor, Conn.
Filed Jan. 2, 1976, Ser. No. 646,220
Int. Cl.^{2} H01H *47/04*
U.S. Cl. 307—115 **6 Claims**



1. A control system, including,
a plurality of first conductors mounted on a support with each conductor having a section extended parallel to the sections of the remaining conductors,
a plurality of second conductors mounted on the support with each conductor having a section extended parallel to the sections of the remaining conductors and a constant distance from all sections of the first conductors,
a plurality of third conductors mounted on the support with each conductor having a section extended parallel to the sections of the remaining conductors and a constant distance from all sections of the first conductors,
a multiple-position switch mounted on the support with each of its contactors electrically connected to one of the first conductors,
an advance mechanism including a switch arm element for cycling the switch to each of its contactors,
a source of electrical power connected to the switch arm element,
a first work circuit connected to each of the second conductors,
a second work circuit connected between each of the third conductors and the advance mechanism of the multiple-position switch and including a manually adjustable time delay system which determines time dwell of the switch at that one of the first conductors connected to one of the third conductors,
a first conductive element which is manually positioned through the support to electrically connect one of the first conductor sections with one of the second conductor sections,
and a second conductive element which is manually positioned through the support to electrically connected one of the first conductor sections with one of the third conductor sections.

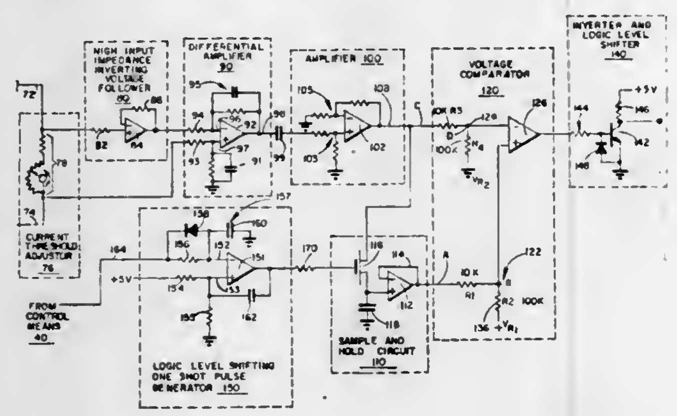
4,056,734
COMPENSATED BASE DRIVE CIRCUIT TO REGULATE SATURATED TRANSISTOR CURRENT GAIN
William Anders Peterson, Lake Parsippany, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.
Filed July 2, 1976, Ser. No. 702,038
Int. Cl.^{2} H03K *17/60*
U.S. Cl. 307—254 **4 Claims**

1. In combination,
a power transistor operating in a saturated mode,
means for supplying a base drive current to said power transistor,
means for diverting base drive current from a base of said power transistor, comprising
a current drain transistor connected to the base of said power transistor,
means for establishing a control bias coupled to a control electrode of said current drain transistor, and
means for sensing the current magnitude of current in a main conduction path of said power transistor, said means for sensing operative to generate a signal proportional to said



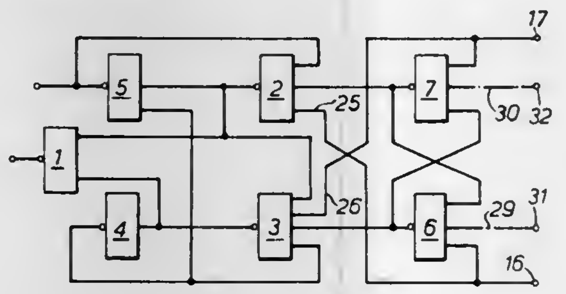
current magnitude and connected to an output electrode of said current drain transistor, said means for sensing further coupled to said means for establishing a control bias in order to control a magnitude of a control bias established therein, whereby a magnitude of current diverted from said base of said power transistor is controlled by said signal proportional to said current magnitude.

4,056,735
ONE SHOT PULSE GENERATOR AND LOGIC LEVEL CONVERTER CIRCUIT
Robert L. Caswell, Placentia, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.
Division of Ser. No. 461,177, April 15, 1974. This application June 1, 1976, Ser. No. 691,755
Int. Cl.^{2} H03K *17/00*
U.S. Cl. 307—273 **4 Claims**



1. A one shot pulse generating and logic level converting system having an input terminal and an output terminal and comprising in combination:
amplifier means having a first, non-inverting, input terminal and a second, inverting, input terminal and an output terminal;
capacitor means connected between said output terminal of said amplifier means and said first input terminal of said amplifier means for providing positive feedback;
said output terminal of said amplifier means comprising said output terminal of said generating and converting system;
circuit means connecting said input terminal of said generating and converting system to said second input terminal of said amplifier means;
voltage divider means connected between a first reference potential and a second reference potential different from said first reference potential, said voltage divider means having a tap thereof connected to said first input terminal of said amplifier means for establishing a quiescent voltage at said first input terminal of said amplifier means, whereby when the voltage applied to second input terminal of said amplifier means is more negative than said quiescent voltage, then the output voltage from said generating and converting system is at its most positive value and when the voltage applied to said second input terminal of said amplifier means is more positive than said quiescent voltage, then the output voltage from said generating and converting system is at its most negative value.

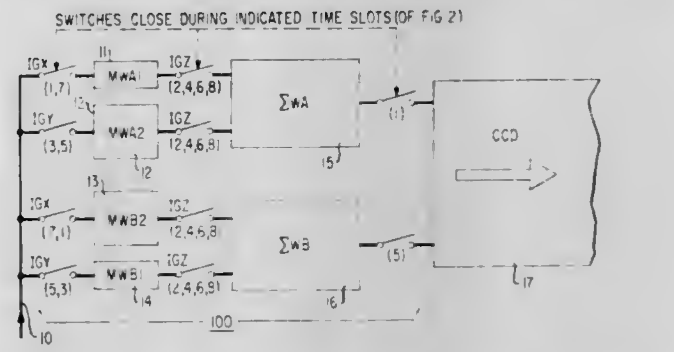
4,056,736
INJECTION LOGIC ARRANGEMENTS
Victor Blatt, Northampton, England, assignor to Plessey Handel und Investments A.G., Zug, Switzerland
Filed Feb. 27, 1976, Ser. No. 662,273
Claims priority, application United Kingdom, Mar. 11, 1975, 09964/75
Int. Cl.^{2} H03K *3/286, 19/08, 19/20*
U.S. Cl. 307—289 **8 Claims**



1. An integrated injection logic flip flop arrangement comprising
a. first and second input gates each having first and second independent outputs;
b. first and second cross-coupled gates each having first and second independent outputs;
c. means for cross-coupling said first and second cross-coupled gates wherein an input of said first cross-coupled gate is coupled to said first independent output of said second cross-coupled gate, and an input of said second cross-coupled gate is coupled to said first independent output of said first cross-coupled gate;
d. means for connecting said first independent output of said first input gate to said input of said first cross-coupled gate;
e. means for connecting said first independent output of said second input gate to said input of said second cross-coupled gate;
f. first combining means for combining said second independent output of said first input gate with said second independent output of said second cross-coupled gate; and
g. second combining means for combining said second independent output of said second input gate with said second independent output of said first cross-coupled gate, thus providing two alternative outputs for the flip flop.

4,056,737
ANTI-ALIASING PRE-FILTER CIRCUIT FOR SEMICONDUCTOR CHARGE TRANSFER DEVICE
Carlo Heinrich Sequin, New Providence, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.
Filed Sept. 7, 1976, Ser. No. 720,885
Int. Cl.^{2} H03K *3/353;* **H03H** *7/10;* **H01L** *29/78*
U.S. Cl. 307—304 **11 Claims**

1. Semiconductor apparatus comprising:
a. time determining means for producing first and second activating signals at predetermined at least first and second difference times;
b. input means, responsive to an electrical input signal, for generating charges in a semiconductor body in accordance with said input signal;
c. switching means, responsive to said activating signals, for enabling the flow of first and second amounts of said charges, respectively, developed in said input means in accordance with first and second signal samples taken of the said electrical signal at said first and second times, respectively;
d. first semiconductor potential well means including a first region in the semiconductor body, responsive to said input means, for receiving said first amount of charges from said input means and for producing a first charge packet of charge content in a first proportion to the said first signal sample;
e. second semiconductor potential well means including a second region in said semiconductor body, responsive to



said input means, for receiving said second amount of charges from the input means and for producing a second charge packet of charge content in a second, different proportion to the said second signal sample;
f. third semiconductor potential well means including a third region in said semiconductor body, responsive to said first and second means, for receiving said first and second charge packets at third and fourth times and for summing together said first and second charge packets, to form a third charge packet of charge content equal at least to the sum of the charge contents of said first and second charge packets; and
g. fourth means for delivering said third packet to a fourth region in said body at a fifth time; said first, second, third, and fourth regions being integrated in a single semiconductor substrate.

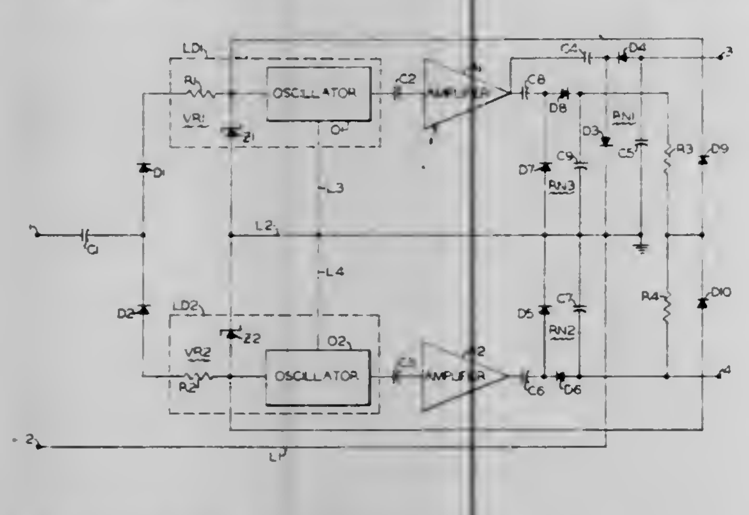
4,056,738
THRESHOLD CIRCUIT
Kjell Arne Håkan Gustafson, Karlskoga, Sweden, assignor to AB Bofors, Bofors, Sweden
Filed Jan. 29, 1976, Ser. No. 653,324
Int. Cl.^{2} H03K *5/20, 5/18*
U.S. Cl. 307—359 **6 Claims**

1. A threshold circuit for signal receiving equipment particularly suited for use in signalling to or from a rapidly flying object such as a missile or rocket having means for establishing a threshold with an input for receiving signal pulses and noise

pulses and an output for emitting pulses corresponding to those pulses at said input which pass the threshold circuit, wherein the improvement comprises:

first and second control means, responsive to said input pulses and noise pulses for generating a first or second threshold within first or second predetermined threshold ranges, said first control means producing a first threshold in response to a condition when said input signal pulses and noise pulses exceed a predetermined reference level for a predetermined period of time with a predetermined number of pulses per unit time, for limiting the number of noise pulses per unit time passing to said output, said second control means producing a second threshold in the absence of said condition, wherein said second threshold is lower than said first threshold.

4,056,739
FAIL-SAFE ELECTRONIC POLARIZED RELAY
John O. G. Darrow, Murrysville, Pa., assignor to Westinghouse Air Brake Company, Swissvale, Pa.
Filed Aug. 2, 1976, Ser. No. 710,554
Int. Cl.² H03K *5/18*
U.S. Cl. 307—360 **10 Claims**



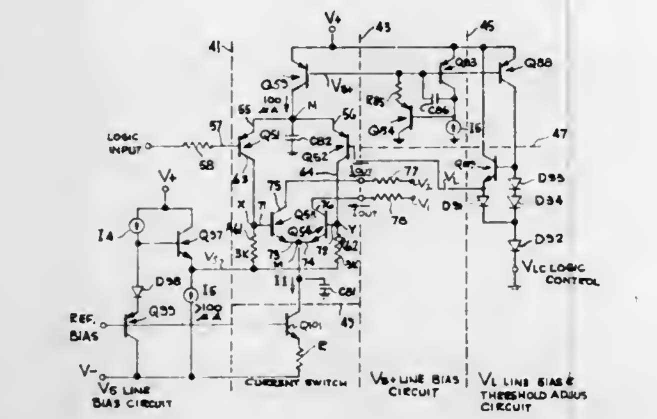
1. A fail-safe electronic polarized relay circuit comprising, a positive level detector and a negative level detector said positive and said negative level detectors each includes a regulating and an oscillating circuit, said regulating circuit of said first and said second level detectors coupled to a source of periodic input signals, a first amplifier coupled to the output of said oscillating circuit of said positive level detector, a second amplifier coupled to the output of said oscillating circuit of said negative level detector, a first rectifier network coupled to the output of said first amplifier for producing a signal on a first output terminal when the periodic input signal exceeds a predetermined positive value, and a second rectifier network coupled to the output of said second amplifier for producing a signal on a second output terminal when the periodic input signal exceeds a predetermined negative value.

4,056,740
DIFFERENTIAL INPUT-DIFFERENTIAL OUTPUT TRANSISTOR SWITCHING CELL
John A. Schoeff, Los Gatos, Calif., assignor to Precision Monolithics, Inc., Santa Clara, Calif.
Filed Jan. 6, 1976, Ser. No. 646,902
Int. Cl.² H03K *5/20, 17/60*
U.S. Cl. 307—362 **7 Claims**

1. A differential input, differential output current switch comprising,

a balanced two branch transistor input means for (a) receiving switch current, said two branch transistor input means comprising a left branch and a right branch, each branch having an input transistor with a control electrode, an output electrode and a common electrode, each branch having a first node in common to which said common electrode is connected and said switch current is supplied, one of said branches receiving a digital logic signal at the control electrode thereof and the other of said branches receiving a threshold adjustment voltage at the control electrode thereof, and for (b) switching switch current alternately between one of said two branches and the other, in response to said digital logic signal,

a balanced two branch transistor output means for (a) receiving a controlled amount of steering current supplied from a connected source, said two branch transistor output means comprising a left branch and a right branch, each branch having an output transistor with an output electrode for connection to a terminal of a load, having a common electrode connected to a second common node to which said steering current is supplied, and having a

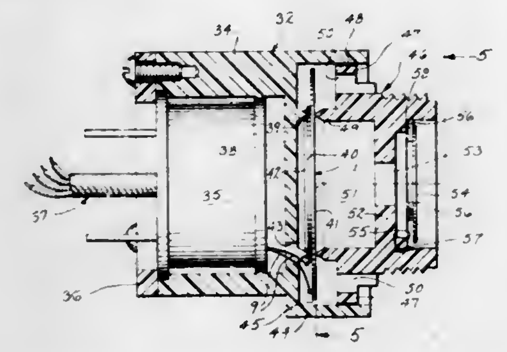


control electrode connected to an output electrode of an input transistor of a corresponding branch of said balanced transistor input means, and for (b) communicating steering current to said load associated with each branch of the output means depending upon the existence of switch current in the corresponding branch of the input means,

a switch current bias circuit means connected to said first node for supplying said switch current in regulated amounts to said first node and,

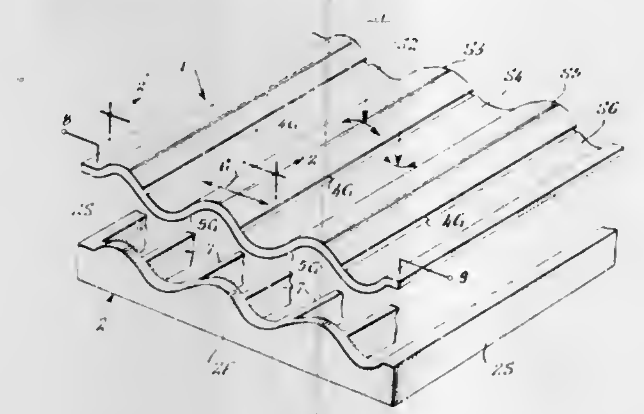
a bias circuit means communicating with the output electrode of each of said input transistors for compensating transients upon switching current between circuit branches.

4,056,741
AUDIBLE SIGNAL GENERATING APPARATUS HAVING SELECTIVELY CONTROLLED AUDIBLE OUTPUT
Richard D. Hoerz, and Donald J. Propp, both of Madison, Wis., assignors to Airco, Inc., Montvale, N.J.
Continuation of Ser. No. 534,050, Dec. 18, 1974, abandoned, which is a division of Ser. No. 352,145, April 18, 1973, Pat. No. 3,872,470. This application Apr. 19, 1976, Ser. No. 677,954
Int. Cl.² H01L *41/04*
U.S. Cl. 310—322 **1 Claim**



1. A crystal sound generating apparatus comprising a housing including a base member from which a substantially circumferential mounting ridge extends for defining a first line contact surface; a plate like crystal unit for generating an audible sound in response to electrical energization thereof, said crystal being affixed to said first line contract surface; a lens unit secured to said housing and having (1) an annular wall provided with a central opening and spaced from said crystal unit such that said annular wall and crystal unit substantially define a cavity within said lens unit, (2) a circumferential clamping projection extending from said lens unit and aligned with said mounting ridge such that said clamping projection defines a second line contact surface engaging said crystal unit, and (3) a flange portion which together with said housing, said mounting ridge and said clamping projection define an annular chamber into which the crystal unit extends, said flange portion having a plurality of ports formed therein such that said annular chamber is coupled to the ambient; and a reflector disc secured to said lens unit exteriorly of said cavity in a spaced overlying relationship to said central opening such that audible sound generated by electrical energization of said crystal unit is transmitted through said ports and central opening.

4,056,742
TRANSDUCER HAVING PIEZOELECTRIC FILM ARRANGED WITH ALTERNATING CURVATURES
George C. Tibbetts, Camden, Maine, assignor to Tibbetts Industries, Inc., Camden, Maine
Filed Apr. 30, 1976, Ser. No. 682,130
Int. Cl.² H01L *41/04*
U.S. Cl. 310—357 **22 Claims**



1. A transducer of the type converting between electrical and mechanical energy by means of the piezoelectric effect in a supported sheet of uniaxially oriented, electrically polarized high polymer film having surface electrodes thereon for connection to an electrical circuit, characterized in that:

the piezoelectric film is arranged with a series of curved substantially cylindrical segments of alternating sign of curvature,

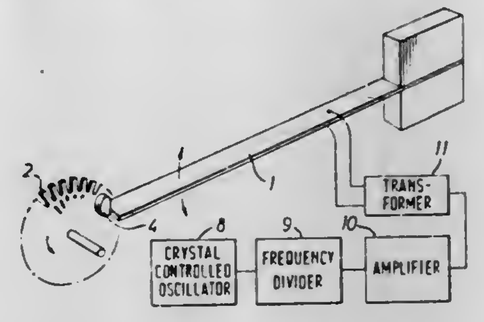
the film being fixedly supported in locations between adjacent segments and being freestanding between said locations, whereby each curved segment functions as a distinct electromechanical transducer, and

the surface electrodes on the film are divided in selected locations between adjacent segments,

whereby the series of individually supported curved segments imparts useful elastic stability to the piezoelectric film, and the individual transducers formed by the supported curved segments and divided surface electrodes may be interconnected electrically to obtain desired transfer and impedance characteristics in the transducer.

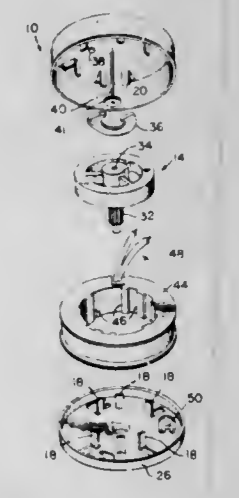
4,056,743
OSCILLATING REED ELECTRIC MOTORS
Cecil Frank Clifford, and Laurence Harry Finlayson, both of Bath, England, assignors to Horstmann Clifford Magnetics Ltd., Somerset, England
Continuation-in-part of Ser. No. 492,176, July 26, 1974, abandoned. This application Nov. 6, 1975, Ser. No. 629,611
Claims priority, application United Kingdom, July 30, 1973, 36232/73; Aug. 31, 1973, 41131/73
Int. Cl.² H02K *33/00*
U.S. Cl. 310—21 **13 Claims**

1. An electric motor comprising a mechanically oscillatory element, a magnetic coupling cooperating with the oscillatory element, a rotor cooperating with the magnetic coupling, a permanent magnet carried by the oscillatory element, a driving coil interacting with said permanent magnet, and means for supplying to the driving coil signals to effect oscillation of the



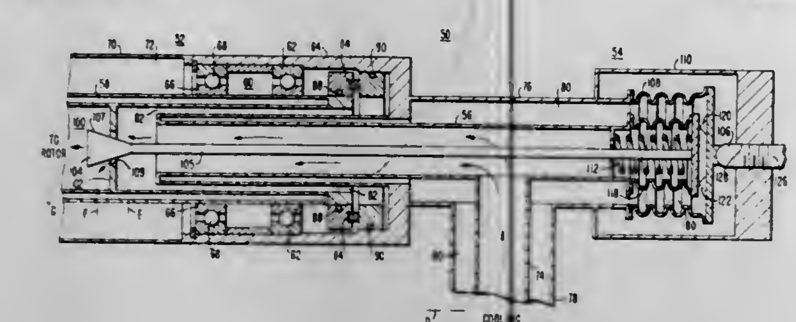
oscillatory element and thereby impart continuous rotation to the rotor through said magnetic coupling, said permanent magnet having a cross sectional area exceeding the square of its length.

4,056,744
NOISE DAMPENING MEANS FOR A PERMANENT MAGNET SYNCHRONOUS MOTOR
James S. Blanchard, and Charles E. Kapper, both of Indianapolis, Ind., assignors to P. R. Mallory & Co. Inc., Indianapolis, Ind.
Continuation of Ser. No. 479,800, June 17, 1974, abandoned. This application Aug. 7, 1975, Ser. No. 602,661
Int. Cl.² H02K *5/24*
U.S. Cl. 310—51 **5 Claims**



1. In a permanent magnet synchronous motor that includes a housing comprising a field plate secured to a stator cup, a permanent magnet rotor journaled for rotation in said housing, a stator winding carried by said housing, a first set of stator poles extending from a face of said field plate and disposed in an annular configuration around a periphery of said permanent magnet rotor, the improvement which comprises a second set of stator poles projecting from a face of said stator cup in an annular configuration and interleaved with said first set of stator poles around said periphery of said permanent magnet rotor, wherein said second set of stator poles are shorter in a direction taken substantially parallel to the rotational axis of said permanent magnet rotor than said first set of stator poles, whereby, upon energizing of said stator winding, an axially imbalanced magnetic field in created in said first and second sets of stator poles around said permanent magnet rotor, thereby urging said permanent magnet rotor axially against a face of said stator cup to dampen noise caused by axial oscillations of said permanent magnet rotor against said face of said stator cup.

4,056,745
CRYOGEN TRANSFER COUPLING WITH ADJUSTABLE THROTTLE VALVE FOR ROTATING MACHINERY
Phillip W. Eckels, Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.
Filed Jan. 8, 1976, Ser. No. 647,462
Int. Cl.² H02K *9/00*
U.S. Cl. 310—52 **2 Claims**

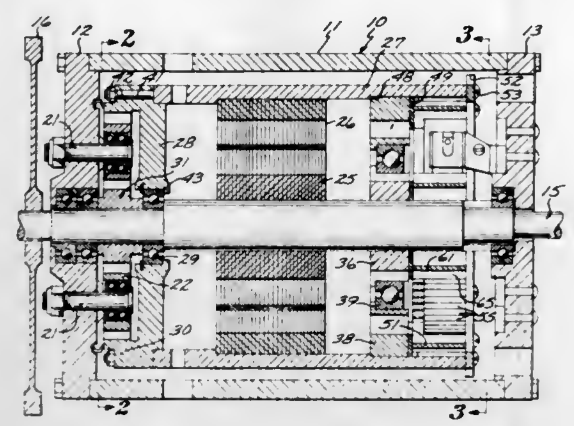


1. In a dynamoelectric machine having a rotor member disposed upon a shaft for rotation within an annular stator member, said shaft having a passage for permitting the flow of a cooling fluid therethrough to said rotor member, coupling means secured to said shaft for transferring said cooling fluid from a reservoir to said shaft passage, said coupling means having a first conduit portion connected to the reservoir defining an inlet flow path and a second conduit portion connected to said shaft defining a discharge flow path for said cooling fluid, the inlet flow path being in fluid communication with the reservoir and the discharge flow path being in fluid communication with said shaft passage, said first and second conduit portions being interconnected in an overlapping, radially spaced apart relation by rotatable interconnecting means to define a relative motion gap between the overlapping conduit portions and to permit rotational movement of said second conduit portion relative to said first conduit portion, the combination with said coupling means of an adjustable throttle valve for regulating the flow of cooling fluid passing therethrough, said throttle valve comprising a valve seat disposed within the discharge flow path of said second conduit portion and providing a fluid passageway therethrough, a valve plug disposed within said discharge flow path of said second conduit portion having seating surfaces which cooperate with said valve seat to throttle the flow of cooling fluid therethrough, said valve plug having a stem portion disposed within and extending axially through said first conduit portion for supporting said valve plug, means connected to said stem for axially displacing said stem and valve plug relative to said valve seat, and means for fluidly sealing said relative motion gap from the atmosphere.

4,056,746
COUNTERROTATION ELECTRIC MOTOR
Wilson A. Burtis, 5011 Harvard Ave., Westminster, Calif. 92683
Continuation-in-part of Ser. No. 534,854, Dec. 20, 1974, abandoned, which is a division of Ser. No. 293,652, Sept. 29, 1972, abandoned. This application Oct. 20, 1975, Ser. No. 623,717
Int. Cl.² H02K *23/60*
U.S. Cl. 310—115 **8 Claims**

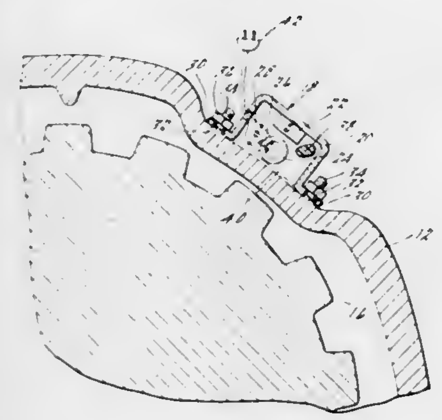
1. In an electric motor having a field and rotor that each has windings thereof, the improvement comprising:

a. counter-rotating means disposed between said rotor and field for rendering said field rotatable in a direction opposite to the rotation of said rotor;
b. commutation means on said field and rotor, said commutation means including a field commutation ring selectively connecting predetermined ones of said windings for excitation and a rotor commutation ring for exciting predetermined other ones of said windings;
c. a casing supporting in rotation with said field and rotor; and
d. brush means disposed in said casing for providing electrical connection to said commutation means, said brush means including two adjustable rings mounted for rotation on said motor, each ring including a corresponding set of



brushes for controlling the relative phase angle between the excitation of said one winding and said other winding according to the relative angular alignment thereof.

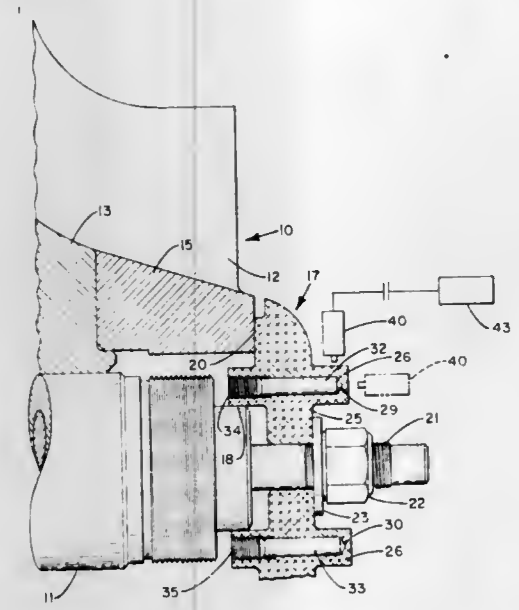
4,056,747
SPEED SENSOR
Stephen Jay Orris, Allen Park, and Frederick Otto Richard Miesterfeld, Troy, both of Mich., assignors to Chrysler Corporation, Highland Park, Mich.
Filed Jan. 22, 1976, Ser. No. 651,385
Int. Cl.² H02K *21/38*
U.S. Cl. 310—155 **20 Claims**



1. In a system for providing a speed signal the combination comprising:

a toothed ferromagnetic reluctor member contained interiorly of a casing, said casing having an imperforate non-ferromagnetic wall portion and said ferromagnetic reluctor member being disposed such that teeth thereof confront said imperforate non-ferromagnetic wall portion;
an electromagnetic speed pick-up device disposed exteriorly of said casing and confronting said imperforate non-ferromagnetic wall portion, said device including a magnetic flux source creating a magnetic circuit which exits said device and enters said casing via said imperforate non-ferromagnetic wall portion, passes through said toothed ferromagnetic member, and exits said casing and re-enters said device via said imperforate non-ferromagnetic wall portion, said device comprising an inductance coil electromagnetically coupled with said magnetic circuit;
and means for moving said toothed ferromagnetic reluctor member relative to said casing such that teeth of said member move past said imperforate non-ferromagnetic wall portion and cause a speed siganl representative of the speed of movement of said member to be provided by said coil.

4,056,748
MAGNETIC SPEED PICKUP
Robert L. Cross, Jr., West Newton; M. Raymond Hill, North Huntingdon Township, Westmoreland County, and Fred Tucker, Jeannette, all of Pa., assignors to Carrier Corporation, Syracuse, N.Y.
Filed Oct. 6, 1975, Ser. No. 619,745
Int. Cl.² H02K *19/20*
U.S. Cl. 310—168 **9 Claims**



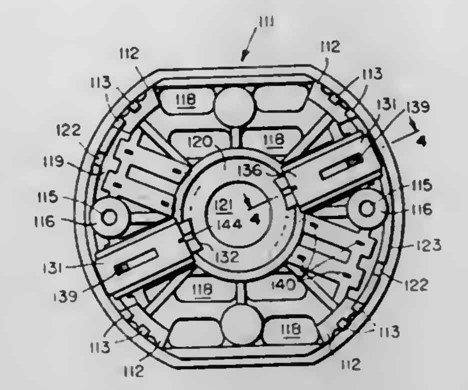
1. A magnetic pickup for sensing the speed of a wheel mounted upon a rotor shaft including

a generally annular nosepiece having two radially opposed surfaces comprising a working surface on the backside thereof and an outer surface, the nosepiece being slidably mounted upon the rotor shaft with the working surface positioned against the end face of the wheel,
an embossed section axially extended from the opposed surface of the nosepiece,
at least one magnet mounted within an axially aligned blind opening passing from the backside of the nosepiece into the embossed section,
a plug secured within the opening for positioning the magnet within the embossed section and preventing the magnet from escaping from the opening,
means operatively associated with the shaft for securing the working surface of the nosepiece against the wheel whereby the nosepiece moves with the wheel, and
stationary detecting means positioned adjacent the embossed section for sensing the passage of the magnet therebeneath.

4,056,749
MODULAR MOTOR
Christian R. Carlson, Jr., and Michael J. Hillyer, both of Mechanicsburg, Pa., assignors to General Signal Corporation, Rochester, N.Y.
Filed Jan. 19, 1976, Ser. No. 650,383
Int. Cl.² H02K *13/00*
U.S. Cl. 310—239 **15 Claims**

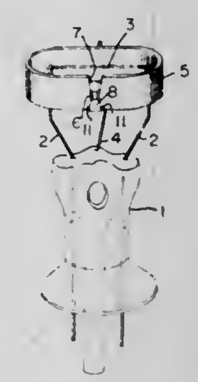
1. A modular motor assembly comprising in combination:

a. an armature assembly including a commutator;
b. a structure for providing a magnetic field for said armature assembly;
c. a modular terminal assembly for mounting in a fixed physical relationship with respect to said structure and having a plurality of terminals formed thereon with at least some having electrical connection to said structure;
d. a bracket assembly for mounting in a predetermined physical relationship with respect to said terminal assembly;
e. a brush holder supported on said bracket assembly for retaining a brush in alignment to make contact with said commutator; and
f. said brush holder including an integral preformed projection for engagement with a predetermined one of said plurality of terminals to complete an electrical connection from said brush holder to said predetermined one of said



plurality of terminals in response to said bracket assembly being mounted in its predetermined physical relationship with respect to said terminal assembly.

4,056,750
MERCURY DISPENSER FOR DISCHARGE LAMPS
Frank M. Latassa, Magnolia, Mass., assignor to GTE Sylvania Incorporated, Danvers, Mass.
Filed Dec. 17, 1976, Ser. No. 751,835
Int. Cl.² H01J *61/28*
U.S. Cl. 313—177 **2 Claims**

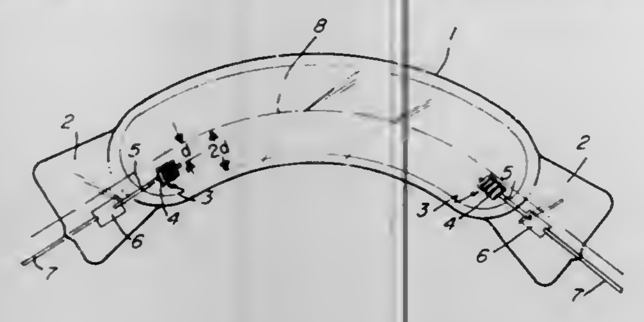


1. In an arc discharge lamp having a glass mount at one end with a cathode supported on the mount, the improvement comprising a disintegration shield encircling the cathode except for a narrow gap between the ends of the shield, a mercury containing metal capsule disposed in the gap and electrically connected to the ends of the shield, the portion of the capsule that is connected to the ends of the shield being the lower portion thereof which is more proximate the mount so that when an RF current is induced in the shield the current flow through the capsule primarily occurs through said lower portion.

4,056,751
METAL HALIDE DISCHARGE LAMP HAVING OPTIMUM ELECTRODE LOCATION
W. Calvin Gungle, Danvers, Mass.; Federic Koury, Alexandria, N.H., and William M. Keeffe, Rockport, Mass., assignors to GTE Sylvania Incorporated, Danvers, Mass.
Filed Mar. 22, 1976, Ser. No. 669,055
Int. Cl.² H01J *61/20*
U.S. Cl. 313—217 **1 Claim**

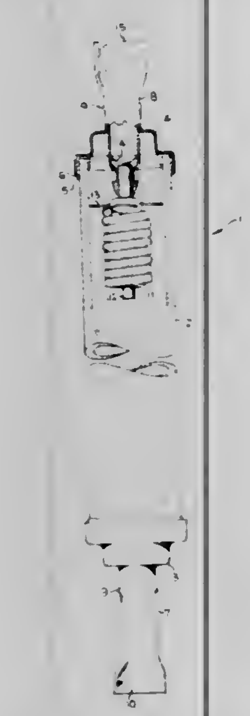
1. In a metal halide arc discharge lamp having an arched arc tube containing a fill of mercury, metal halide and inert gas and having electrodes sealed in each end of the arc tube and

wherein the arc tube is normally operated in a horizontal position with the arch uppermost, the improvement which



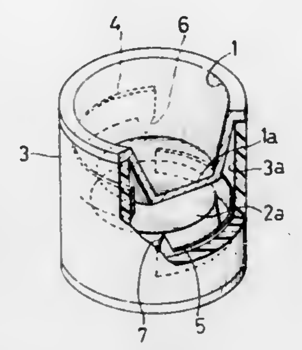
comprises the electrodes being located about midway between the arc tube axis and the lower wall of the arc tube.

4,056,752
CERAMIC LAMP HAVING TUBULAR INLEAD CONTAINING YTTRIUM-ZIRCONIUM MIXTURE
Stanley F. Bubar, Chagrin Falls, Ohio, assignor to General Electric Company, Schenectady, N.Y.
Filed July 1, 1976, Ser. No. 701,553
Int. Cl.² H01J *61/06, 61/36*
U.S. Cl. 313—217 **5 Claims**



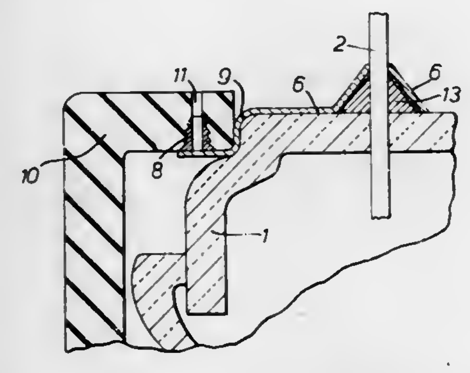
1. An electric lamp arc tube comprising:
a light-transmitting ceramic envelope having end closures sealing its ends and containing a discharge-sustaining filling including a vaporizable metal,
electrodes supported from said closures at opposite ends of said envelope,
one of said closures including a tubular niobium or tantalum inlead having a portion extending into the interior of said envelope,
the electrode supported by said one closure comprising an emitting portion mounted on a tungsten shank,
said tungsten shank extending from the interiorly extending portion of said inlead and being quasi-hermetically fastened thereto,
and a mixture of yttrium and zirconium within said inlead at the joint with said tungsten shank, said mixture having been melted in place to form a braze penetrating any pores at the joint in order to assure a hermetic seal between said tungsten shank and said niobium inlead.

4,056,753
OVERVOLTAGE PROTECTING ELEMENT
Tsukioka Keikichi, and Takayanagi Yukio, both of Sagamihara, Japan, assignors to Kabushiki Kaisha Sankosha, Tokyo, Japan
Filed Feb. 13, 1976, Ser. No. 657,858
Int. Cl.² H01J *17/00, 21/00*
U.S. Cl. 313—325 **5 Claims**



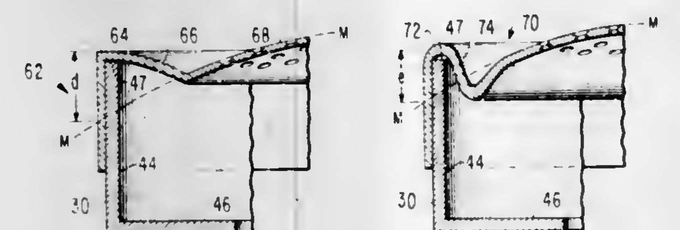
1. An overvoltage protecting element comprising:
a hollow cylinder formed of an insulating material;
a pair of main electrodes sealed to the opposite ends of the cylinder so as to close openings at the opposite ends thereof, said main electrodes being frusto-conical in configuration and having a flat bottom, the bottom of one of the electrodes being disposed in opposing relationship with, and spaced a given distance from, the bottom of the other electrode; and
a pair of conductive layers disposed on the inner wall of the cylinder in opposed and spaced relationship with a different one of the main electrodes, said conductive layers being separated from each other by a space and being electrically insulated the main electrodes, each of said conductive layers having at least one projection which extends toward the other main electrode, said conductive layers extending around the inner wall of the cylinder over an angle not greater than 360° and being spaced from each other in the axial and circumferential directions of the cylinder.

4,056,754
VIDICON HAVING SWITCHABLE ELECTRODE CONNECTIONS
Philip Charles Bailey, Writtle, and Hans Scholz, Maldon, both of England, assignors to Electric Valve Company Limited, England
Filed Feb. 25, 1976, Ser. No. 661,131
Claims priority, application United Kingdom, Mar. 1, 1975, 8656/75
Int. Cl.² H01J *31/38, 29/46*
U.S. Cl. 313—390 **2 Claims**



1. A vidicon tube including within an envelope, a target, a target electrode in electrical contact with the target, an anode of which the portion nearest the target cylindrical, a field mesh electrically isolated from and positioned closely adjacent the target electrode between the target electrode and the cylindrical postion of the anode, terminal means passing through the envelope, and electrical connection means electrically connecting the terminal means to the field mesh; wherein, the electrical connection means includes a conductive cylindrical member coaxial with and surrounding the anode and extending at least approximately to the end of the cylindrical portion of the anode, the opposite end portions of the cylindrical member being electrically connected, respectively, to the perimeter of the field mesh and to a plurality of electrical conductors which are disposed symmetrically about the axis of the tube and extend to the terminal means, and wherein means are provided, outside of the tube envelope, for making and breaking an electrical connection between the terminal to which said mesh is connected and a terminal to which said anode is connected whereby said tube is operative as an integral mesh or a separate mesh tube, said means for making and breaking comprising removable link means between two conductive members connected one to one of said terminals and the other to the other of said terminals, and said link means comprising a short circuiting bridge which is pluggable into sockets provided in said conductive members and, said terminals being adjacent ones of a ring of terminals extending through the base of the tube, each of said conductive members comprising a tag extending substantially radially outwardly from the terminal to which it is attached and bearing its socket outwardly of the periphery of the base of the tube and in a position covered by the normally provided base cap of the tube, access to said sockets for said pluggable bridge member being provided for by holes provided in said cap.

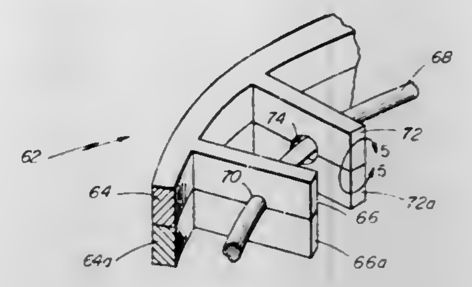
4,056,755
COLOR PICTURE TUBE HAVING MASK-FRAME ASSEMBLY WITH REDUCED THICKNESS
Frank Myung-Hi Sohn, Leola, Pa., assignor to RCA Corporation, New York, N.Y.
Filed Dec. 22, 1975, Ser. No. 642,733
Int. Cl.² H01J *29/80*
U.S. Cl. 313—402 **3 Claims**



1. In an apertured mask type color picture tube having a mask attached to a peripheral frame which is suspended within said tube adjacent a screen of said tube, said frame including a flange substantially parallel to the longitudinal axis of said tube, said mask including a domed central apertured portion, a border portion surrounding said apertured portion and a skirt portion surrounding said border portion, the improvement comprising,
said mask being telescoped within said frame and at least a part of said skirt portion being parallel with said flange and extending toward said screen.

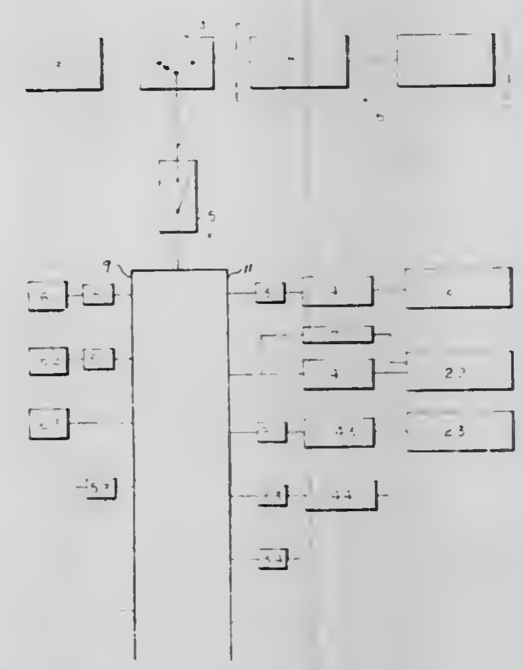
4,056,756
ANODE ASSEMBLY FOR ELECTRON DISCHARGE DEVICES
Palmer P. Derby, Weston, Mass., assignor to Raytheon Company, Lexington, Mass.
Continuation of Ser. No. 571,891, April 25, 1975, abandoned. This application Sept. 20, 1976, Ser. No. 724,813
Int. Cl.² H01J *23/22*
U.S. Cl. 315—39.69 **19 Claims**

1. An anode for a magnetron comprising:
a plurality of substantially conductive members each having a cylindrical boundary wall portion formed integrally with a plurality of vane sections which extend from said wall portions inwardly to a central bore;
at least one annular conductive strap member contacting alternate vane sections of each conductive member adjacent said bore; and



said members being bonded into a rigid unit by nonthermal metallurgical techniques.

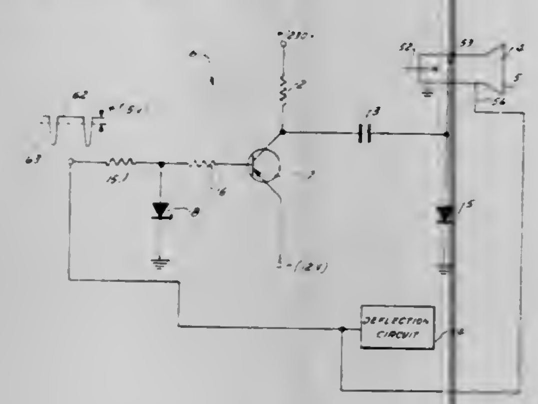
4,056,757
EMERGENCY LIGHTING SYSTEM
Robert E. Mauch, and Robert I. Sarbacher, both of Santa Monica, Calif., assignors to John C. Bogue, Santa Monica, Calif.
Filed Mar. 2, 1972, Ser. No. 231,220
Int. Cl.² H05B *37/00*
U.S. Cl. 315—86 **10 Claims**



1. In combination with a lighting system comprising an alternating current utility power source, an "on-off" switch and a plurality of fluorescent lights coupled to said utility power source through said "on-off" switch, each one of said plurality of fluorescent lights being provided with a ballast, an emergency system comprising:
an emergency power supply having a frequency higher than the frequency of said utility power source;
a transfer switch having a first contact directly connected to said utility power source, a second contact connected to said emergency power supply and a switch arm connected to said "on-off" switch, said transfer switch being so arranged that said switch arm is closed on said first contact when power is available from said utility power source and is automatically transferred from said first contact to said second contact when power is not available from said utility power source whereby power for illuminating said plurality of fluorescent lights is provided by said emergency power supply through said "on-off" switch when power is not available from said utility power source; and
means for illuminating one or more but not all of said plurality of fluorescent lights when power for illuminating said plurality of fluorescent lights is provided by said emergency power supply, said ballast provided with each one of said plurality of fluorescent lights presenting such a

high impedance to said higher frequency power from said emergency power supply that each one of said plurality of fluorescent lights cannot be effectively illuminated from said higher frequency emergency power supply through its respective said ballast.

4,056,758
LIGHT SPOT SUPPRESSION CIRCUIT FOR A CATHODE RAY TUBE
Gerhard Schaas, Near 27, 8633 Steinrod, Germany
Filed Dec. 17, 1975, Ser. No. 641,819
Claims priority, application Germany, Dec. 21, 1974, 2460940
Int. Cl.² H01J *29/52*
U.S. Cl. 315—381 **10 Claims**

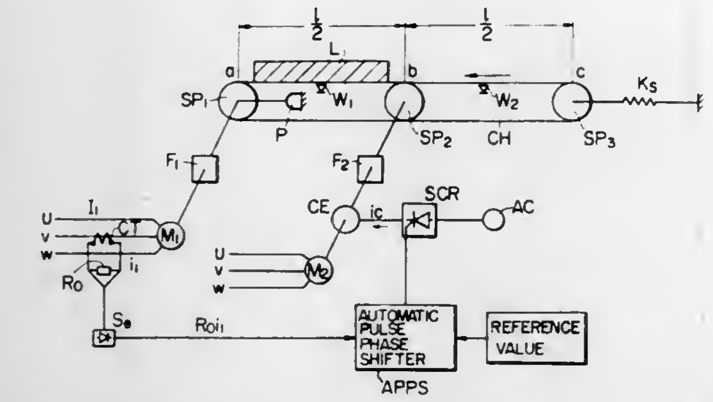


1. In a cathode ray tube operable with a deflection voltage having a first forward sweep portion and a second flyback portion, a circuit for selectively inhibiting beam current in the tube when the first sweep portion is absent, the inhibiting means comprising, in combination, a first transistor connectable to a positive voltage source, a first serial path comprising a capacitor and a diode coupled to the first transistor, and means connecting the first serial path to the brightness control grid of the tube, the improvement in which the first transistor is normally maintained in a conductive state in the absence of the forward sweep portion of the deflection voltage; in which the first serial path is connected across the first transistor with the diode poled in the low impedance direction relative to the positive voltage of the source for normally establishing a high negative voltage at the first junction of the capacitor and the diode while the first transistor remains in its conductive condition; in which the connecting means comprises means for applying the voltage at the first junction to the brightness control grid of the tube whereby the high negative voltage normally at the first junction will inhibit beam current in the tube while the first transistor remains conductive; and in which the circuit further comprises means coupled to the base of the first transistor and responsive to the first sweep portion of the deflection voltage for positively switching the first transistor into a non-conductive state during the first sweep portion to impart to the first junction, and thereby to the brightness control grid of the tube, a positive step in voltage sufficient to permit the flow of beam current in the tube.

4,056,759
DRIVING SYSTEM FOR MOVING PATHS OR ESCALATORS
Nobuo Mitsui; Akinori Watanabe; Takeshi Oohira; Kazuhiko Kawauchi, all of Katsuta; Shoichi Nakao, Mito, and Katsuya Teranishi, Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan
Filed June 3, 1974, Ser. No. 475,801
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 30, 1976
Claims priority, application Japan, June 4, 1973, 48-61894
Int. Cl.² H02P *7/00*
U.S. Cl. 318—98 **10 Claims**

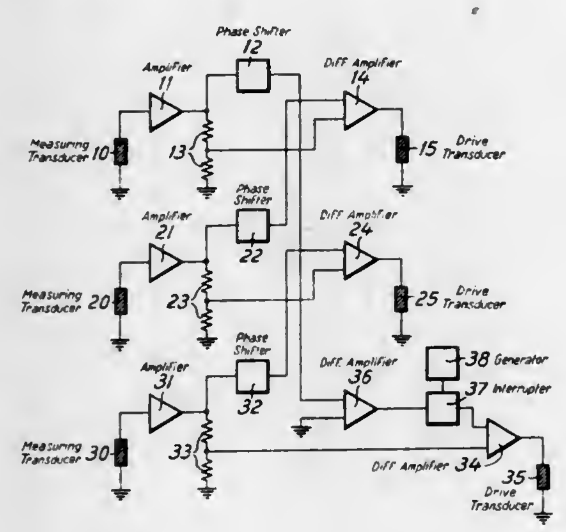
1. A driving system for moving paths or escalators which use an endless chain adapted to be circulated between a path for transporting passengers, comprising:

a first and a second sprocket disposed at one end portion and substantially middle portion of said path, respectively;
a first motor for driving said first sprocket;
a second motor for driving said second sprocket;
means for detecting a quantity corresponding to a loaded weight acting upon said endless chain;



means for setting a reference value; and
means for controlling a torque to be applied upon said second sprocket in response to an output from said detecting means, said torque controlling means including means for increasing the torque to be applied upon said second sprocket in response to an excess developed when the output of said detecting means exceeds said reference value.

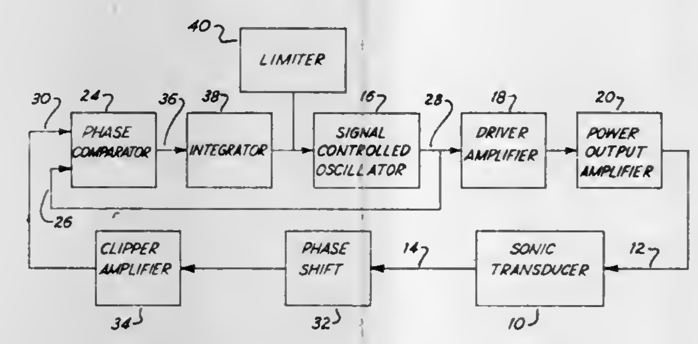
4,056,760
METHOD OF DRIVING A TWO COORDINATE OSCILLATOR AND CIRCUIT ARRANGEMENT THEREFOR
Helmuth Frenk, Wetzlar, Germany, assignor to Ernst Leitz G.m.b.H., Wetzlar, Germany
Continuation-in-part of Ser. No. 443,241, Feb. 19, 1974, abandoned. This application July 1, 1976, Ser. No. 701,700
Claims priority, application Germany, Feb. 19, 1973, 2308024
Int. Cl.² H02H *7/00*
U.S. Cl. 318—115 **7 Claims**



1. A method of driving a two coordinate mechanical oscillator with the aid of a deformed rotating field of forces defined by a plurality of exciting and pick-up components, the method comprising the steps of:

a. deriving a plurality of first electrical signals each corresponding to the mechanical motion of the oscillator in a respective one of the component directions;
b. imparting to each first signal a phase shift equal to the geometrical angle between cyclically preceding ones of the pick-up components;
c. comparing in the cyclical sequence given by each undisplaced first signal the deformed rotating field of forces adjacent to the exciting and pick-up components corresponding to the respective first signal with the phase displaced signal corresponding to the preceding pick-up component next adjacent;
d. deriving a respective difference signal from each comparison; and
e. applying each difference signal to respective exciting means of the mechanical oscillator associated with the component corresponding to the respective first undisplaced signal.

4,056,761
SONIC TRANSDUCER AND DRIVE CIRCUIT
Benjamin Franklin Jacoby, Columbus, and Marvin E. Monroe, Sunbury, both of Ohio, assignors to Quintron, Inc., Columbus, Ohio
Filed Sept. 11, 1975, Ser. No. 612,358
Int. Cl.² H01L *41/10*
U.S. Cl. 318—116 **13 Claims**



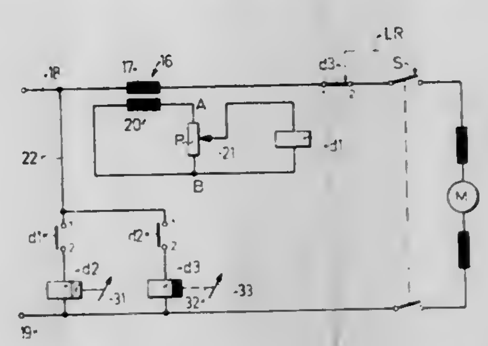
1. A sonic tool comprising:

a. a sonic transducer including electromechanical transducing means for the application of a periodic electronic drive signal thereto to produce a mechanical stress for driving said transducer and for generating an electronic pickup signal which is proportional to mechanical strain;
b. a phase comparator having an output signal proportional to the phase difference of a pair of periodic signals at a pair of inputs, one input connected to receive the electronic drive signal applied to said transducing means and the other input connected to receive the electronic pickup signal from said transducing means;
c. integrator circuit means having its input connected to the output of said phase comparator;
d. an electronic signal controlled oscillator having its input control terminal connected for control by the output of said integrator circuit means and its output connected for exciting said transducing means with said drive signal;
e. limiter circuit means connected to the input control terminal of said oscillator for limiting the escursions of the control signal to confine it within a selected range; and
f. an adjustable phase shift network means and amplitude limiting circuit means electrically interposed in cascade between said transducing means and said phase comparator for introducing a selected phase shift in said pickup signal and for making the input pickup signal applied to said phase detector independent of the amplitude of the pickup signal from said transducing means.

4,056,762
STROKE ENERGY LIMITED MOTOR-DRIVEN SCREWDRIVER
Fritz Schädlich, Stetten, Germany, assignor to Robert Bosch GmbH, Stuttgart, Germany
Filed Feb. 27, 1976, Ser. No. 661,949
Claims priority, application Germany, Apr. 17, 1975, 2516951
Int. Cl.² H02H *7/085*
U.S. Cl. 318—484 **11 Claims**

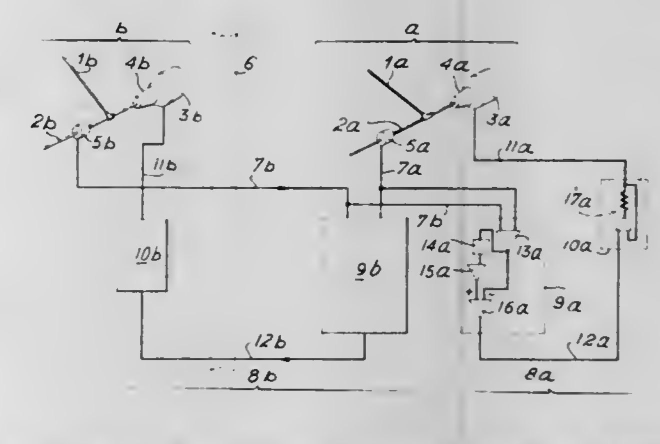
1. A motor-driven screwdriver having a drive motor capable of a.c. operation and having means for automatically controlling the duration of continuous motor operation, comprising, in combination:

means for shutting off the motor in response to an electric signal;
means for initiating an energy measurement operation in response to the peak portion of the pulse in the amplitude of the drive current in said motor produced by the starting up of said motor;
energy measurement means arranged to be activated by said initiating means for measuring the electric energy supplied



to the drive motor after the starting up thereof and for providing an electric signal to said means for shutting off said motor when the measured energy reaches a predetermined value, said energy measurement means being arranged also to be de-activated when said motor is shut off, and
means responsive to the lapse of a predetermined time following deactivation of said measurement means for resetting said measurement means before said motor is restarted.

4,056,763
DEVICE FOR CONTROLLING A MECHANICAL ELEMENT WITH EFFORT RETURN
Guy Debrie, Massy; Claude Grenier, Orsay; Michel Petit, La Celle St-Cloud; Henri Rigaut, Limours, and Jean Vertut, Issy-les-Moulineaux, all of France, assignors to Commissariat a l'Energie Atomique, Paris, France
Filed June 12, 1975, Ser. No. 586,229
Claims priority, application France, June 19, 1974, 74.21355
Int. Cl.² G05B *11/14*
U.S. Cl. 318—675 **12 Claims**



1. A device which serves to control a mechanical assembly of the so-called "slave" type in displacements and in efforts and is actuated by a motor element, wherein said mechanical assembly is reversible and comprises a position detector for delivering a signal which is proportional to the displacements of said assembly and wherein said device comprises an assembly for controlling said motor element and delivering a signal constituting orders relating to the positions of said motor element, means for producing an error signal ϵ which is proportional to the difference between the signal delivered by the detector and the signal delivered by said control assembly, a generator for delivering a physical signal which produces action directly on the torque of the motor element, the amplitude of said signal being proportional to the signal ϵ, the relation between the error signal and the torque being thus in

one-to-one correspondence, the error signal being also fed back into said control assembly, said control assembly being constituted by a second mechanical assembly actuated by a second motor element comprising a second position detector, and wherein each motor element is controlled independently by a control loop circuit, each loop circuit being provided with means for generating an error signal ϵ which is proportional to the difference between the signals emitted by said detectors, means for providing a derivative of said error signal ϵ so as to give a signal ϵ' which is proportional to said derivative, means for determining the difference between the signals ϵ and ϵ' so as to give the signal E, and a second correspondence control stage constituted by a generator for delivering a physical signal which produces action directly on the torque of the motor element, the amplitude of said signal being proportional to the signal E, the relation between the error signal and the torque being thus in one-to-one correspondence.

4,056,764

POWER SUPPLY SYSTEM HAVING TWO DIFFERENT TYPES OF BATTERIES AND CURRENT-LIMITING CIRCUIT FOR LOWER OUTPUT BATTERY

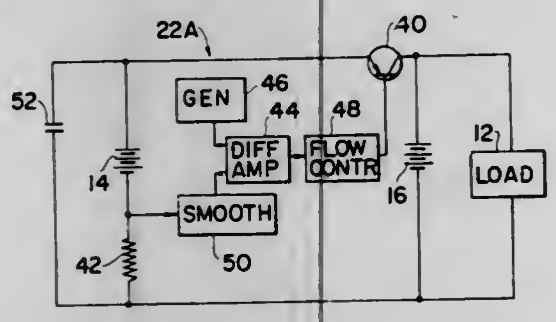
Takuya Endo, and Toshio Hirota, both of Yokohama, Japan, assignors to Nissan Motor Company, Limited, Japan

Filed May 30, 1975, Ser. No. 582,387

Claims priority, application Japan, June 3, 1974, 49-61833; June 3, 1974 Japan 49-61834

Int. Cl.² H02J *7/00*

U.S. Cl. 320—3 **4 Claims**



1. In a power supply system of the type having a first battery and a second battery with a lower open-circuit voltage, higher maximum output current and lower total energy capacity than the first battery, and means connecting said first battery and said second battery to provide a power supply output current consisting of the total discharge currents from said first battery and said second battery; the improvement comprising: said means connecting said first battery and said second battery including discharge current distribution means for discharging substantially only said first battery to develop the output current when the magnitude of the total discharge current is less than a certain predetermined value and for discharging both said first battery and said second battery when the total discharge current is greater than the certain predetermined value with said second battery supplying a current equal to the difference between the magnitude of the discharge current of said first battery and the total output current to maintain the magnitude of the discharge current of said first battery less than the certain predetermined value, wherein the certain predetermined value is selected below a critical current value at which a terminal voltage of said first battery equals an open-circuit voltage of said second battery; said discharge current distribution means comprising current measuring means for measuring the magnitude of the discharge current from said first battery, signal generating means for generating a current signal of said certain predetermined value, comparison means for comparing the magnitude of the discharge current measured by said current measuring means with said current signal to develop a control signal representative of the difference between the measured current and the predetermined current value, and current limiting means responsive to the control signal developed by said comparison means for limiting the maximum magnitude of the discharge current from said first battery to the certain predetermined value.

4,056,765

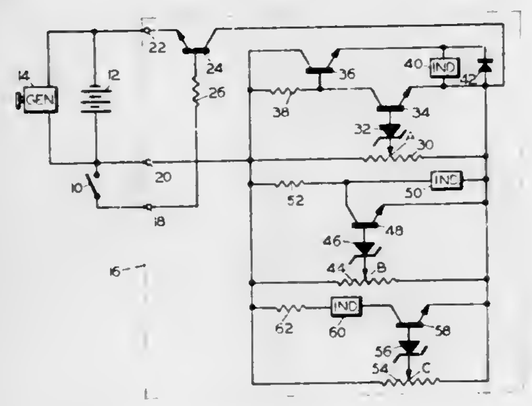
BATTERY-GENERATOR OUTPUT MONITOR

Ralph E. Scheidler, Milwaukie, and Howard H. Morse, Portland, both of Oreg., assignors to Howard H. Morse, Portland, Oreg.

Filed Oct. 20, 1975, Ser. No. 623,723

Int. Cl.² H02J *7/14*

U.S. Cl. 320—48 **7 Claims**



1. For use with the battery-generator system of an engine having an electric cranking starter, a battery-generator output monitor, comprising:

a. a first electric circuit including first indicator means for indicating low battery voltage during cranking, and first indicator actuator means having an electric circuit arranged for connection at a first end directly to one of the battery terminals of the battery-generator system and operable when the output voltage drops below a predetermined value during cranking to activate the first indicator means and give indication that the battery voltage drops too low during cranking,

b. a second electric circuit including second indicator means for indicating low generator charging voltage, and second indicator actuator means having an electric circuit arranged for connection at a first end directly to said one battery terminal and operable when the output voltage drops below a predetermined value higher than the first named predetermined value to activate said second indicator means and give indication that the generator is providing insufficient voltage to charge the battery,

c. a third electric circuit including third indicator means for indicating high generator charging voltage, and third indicator actuator means having an electric circuit arranged for connection at a first end directly to said one battery terminal and operable when the output voltage exceeds a predetermined maximum to activate said third indicator means and give indication that the generator is producing excessively high charging voltage,

d. electric control switch means connected at one end to the second end of the electric circuits of the first, second and third indicator actuator means and arranged for connection of its opposite end directly to the other of said battery terminals, and

e. electric switch actuator means associated with the control switch means and operable upon connection to a source of electric potential to close said control switch means and connect said first, second and third indicator actuator circuits across said battery terminals.

4,056,766

COMMUTATION CIRCUIT FOR A CYCLOCONVERTER WITH INTERMEDIATE D.C. LINK

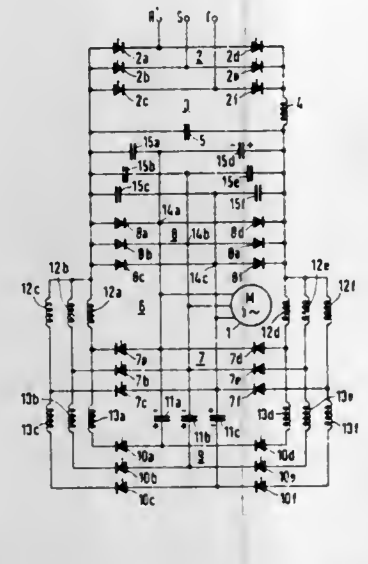
Hans-Hermann Zander, Erlangen, Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Germany

Filed Feb. 26, 1976, Ser. No. 661,426

Claims priority, application Germany, Mar. 10, 1975, 2510357

Int. Cl.² H02M *5/257*

U.S. Cl. 363—37 **10 Claims**



1. In a cycloconverter having an intermediate d-c link, a controlled rectifier and an inverter with main thyristors in a bridge circuit, to which bypass diodes in a bridge circuit are connected with opposite polarity with a quenching circuit including a quenching thyristor and a commutating capacitor connected in parallel to each bridge arm, one commutating capacitor being provided for each two bridge arms which have a common main terminal lead, and commutating chokes arranged in the commutating circuits, the improvement comprising at least one damping capacitor coupled in parallel to a bridge arm for each two bridge arms with a common terminal lead.

4,056,767

COOLING ARRANGEMENT FOR SEMICONDUCTOR CONVERTER DEVICE

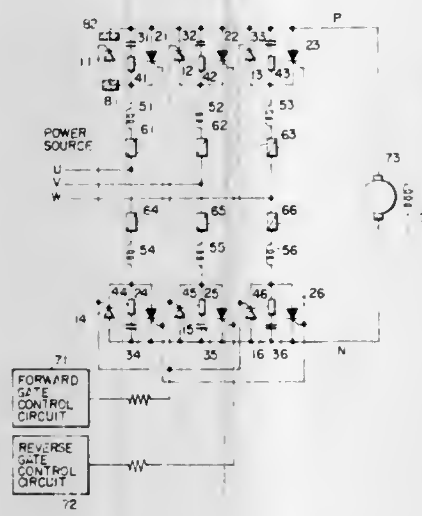
Masahiro Tobise; Hiromasa Kogure; Tadahiko Kanbara, and Hiroshi Koseki, all of Ibaraki, Japan, assignors to Hitachi, Ltd., Japan

Filed Aug. 24, 1976, Ser. No. 717,387

Claims priority, application Japan, Aug. 25, 1975, 50-102153

Int. Cl.² H02M *7/00*

U.S. Cl. 363—141 **4 Claims**



1. In a converter circuit having two sets of converters, each including planar-type semiconductor controlled rectifier elements, connected in a bridge configuration, said converters being connected in parallel, with opposite polarities, to a load, an improved cooling arrangement for said converters wherein said rectifier elements are aligned in sequence along an axis so that the adjacent electrodes of adjacent rectifier elements which belong to respectively different converters are of opposite polarities with respect to each other; and cooling elements are interposed between each pair of adjacent rectifier elements wherein cooling elements are interposed between each adjacent rectifier element in said sequence.

4,056,768

STATIC CONVERTOR PLANT

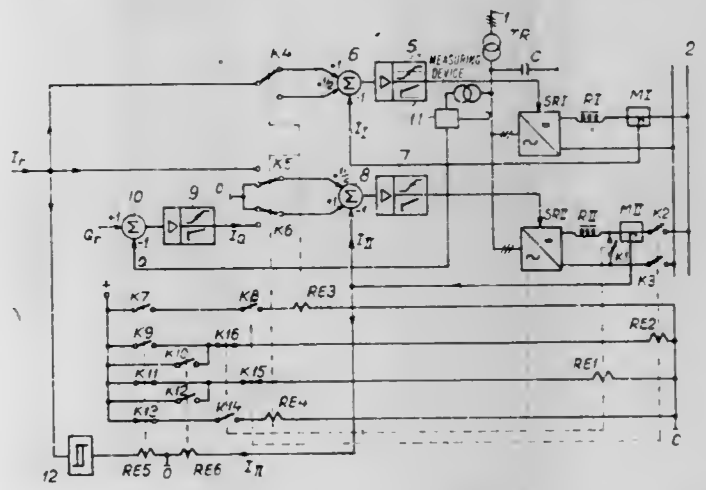
Sven Ivner, Vasteras, Sweden, assignor to ASEA Aktiebolag, Vasteras, Sweden

Filed Jan. 19, 1976, Ser. No. 650,376

Claims priority, application Sweden, Jan. 20, 1975, 7500544

Int. Cl.² H02P *13/24*

U.S. Cl. 363—79 **4 Claims**



1. Convertor plant for connection between a DC network and an AC network and comprising at least one convertor group, each said convertor group comprising at least two convertors with AC terminals for connection to the AC network and with DC terminals for connection to the DC network, at least one of said convertors in said at least one convertor group including a reactor connected on its DC side and with switching means for alternatively connecting the DC terminals of said at least one convertor to the DC network in parallel with the other convertors or connecting said reactor between the DC terminals of said at least one convertor, control means for controlling said switching means in dependence on the load current of said convertors.

4,056,769

DIRECT CURRENT PROXIMITY DETECTOR HAVING SWITCHING MEANS WHICH PROVIDE ON TWO DISTINCT OUTPUTS, SIGNALS WHEN THE TARGET IS LOCATED BEYOND OR WITHIN A PREDETERMINED RANGE

Marcel Lefebvre, and Alain Rouquet, both of Angouleme, France, assignors to La Telemecanique Electrique, France

Filed Feb. 25, 1976, Ser. No. 661,078

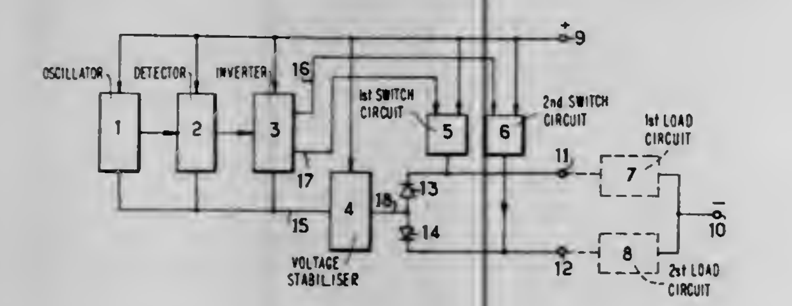
Claims priority, application France, Feb. 27, 1975, 75.06091

Int. Cl.² G01R *33/12*

U.S. Cl. 324—236 **4 Claims**

1. A proximity detector comprising: a source of direct current supply having first and second terminal; first and second load circuits; first and second diodes having a common point, the first diode and the first load circuit being serially connected between the common point and the second terminal and the second diode and the second load circuit being serially connected between the common point and the second terminal; a voltage stabilising transistor having a current input, a current output and a control input, the said current output being connected to the said common point; a first Zener diode connect-

ing the first terminal of the source to the said control input; an oscillator power supplied between the first terminal of the source and the current input of the voltage stabilising transistor and having a high frequency output; a detector power supplied between the first terminal of the source and the current input of the voltage stabilising transistor and having an input connected to the high frequency output of the oscillator and an output on which a control signal is generated when the oscillator is in an oscillating state; inverter means power supplied between the first terminal of the source and the current input of the voltage stabilising transistor and having an input connected to the output of the detector and first and second control outputs, said inverter means providing a signal on the first output thereof when the said control signal is present and a signal on the second output thereof when the said control



signal is absent; first and second switching transistors each having a current input, a current output and a control input; a second Zener diode connecting the first terminal of the source to the current inputs of the first and second switching transistors, the current output of the first switching transistor being connected to the junction point between the serially connected first diode and first load circuit and the current output of the second switching transistor being connected to the junction point between the serially connected second diode and second load circuit, means connecting the control inputs of the first and second switching transistors respectively to the first and second control outputs of the inverter means; and first and second resistors respectively connecting the control input of the voltage stabilising transistor to the respective junction points between the serially connected first and second diodes and first and second load circuits.

4,056,770

DYNAMO ELECTRIC MACHINE PERMANENT MAGNET FLUX TEST APPARATUS WHICH SIMULATES ACTUAL FLUX CONDITIONS OF THE MOTOR

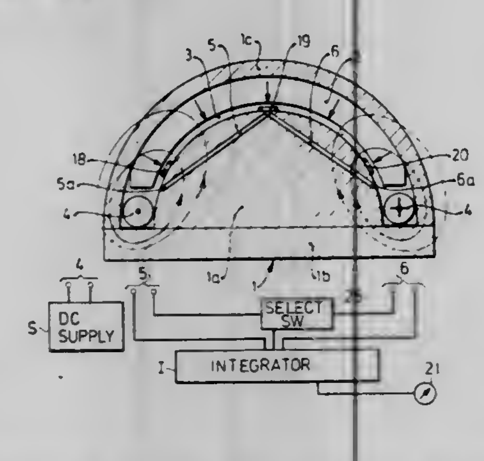
Adolf Mohr, Buhlertal; Wolfgang Sohn, Buhl-Vimbuch, and Georg Strobl, Buhl, all of Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany

Filed Sept. 27, 1976, Ser. No. 726,874

Claims priority, application Germany, Sept. 25, 1975, 2542774

Int. Cl.² G01R 33/12

U.S. Cl. 324—205 **14 Claims**



1. Dynamo electric machine permanent magnet test apparatus to test the magnetic flux emanating from part circular permanent magnet segment of arcuate cross section comprising

a gauage (1, 9) which is at least partly cylindrical and of material having soft iron characteristics, including a smaller part cylindrical segmental portion (1*a*, 12*a*) adapted for placement within the arcuate magnet segment, and a larger arcuate part cylindrical portion (1*c*, 12*b*) adapted for placement outside of the arcuate magnet segment (2), means (1*b*, 13, 14, 15) magnetically connecting said smaller, inner portion and said larger outer portion to form a magnetic circuit structure having soft iron characteristics, and an opening coaxial with said portions, separating said portions and shaped to receive the magnet segment (2);

a layer (3, 10) of nonmagnetic material having a thickness simulating the air gap of the dynamo electric machine located adjacent one of said portions and facing said opening;

cross field simulating winding means (4; 7*a*, 7*b*, 7*c*; 8*a*, 8*b*, 8*c*) located on one of said portions of the gauge adjacent the ends, in circumferential direction, of the magnet segment (2);

means (S) energizing said cross field simulating winding means to establish a magnetic field simulating the cross field arising in operation of a dynamo electric machine;

a chorded measuring coil (5, 6, 11) located on the gauge to sense magnetic flux passing through the non-magnetic material simulating the air gap, the coil being positioned to conform at least approximately to the pitch angle of the armature of the dynamo electric machine in which the segmental permanent magnet (2) is to be used;

and measuring means including an integrator (I) and a volt meter (21) connected to the output of the integrator, the integrator being connected to the measuring coil (5, 6; 11) whereby the volt meter will read the time integral of voltage induced in the measuring coil upon change of flux linkages between the measuring coil and the magnet segment (2).

4,056,771

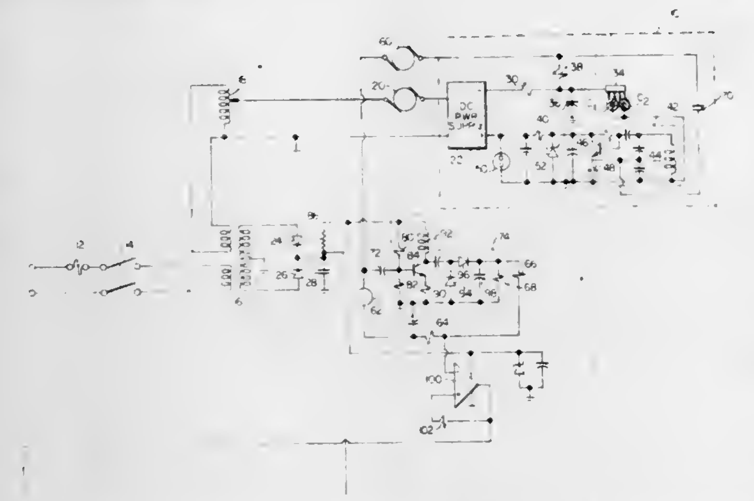
REMOTELY CONTROLLED HIGH POTENTIAL INSULATION TESTER

Henry H. Clinton, Ivoryton, and David A. Zeichner, Madison, both of Conn., assignors to Clinton Instrument Company, Clinton, Conn.

Filed July 22, 1976, Ser. No. 707,892

Int. Cl.² G01R 31/14

U.S. Cl. 324—54 **11 Claims**



1. A high potential d.c. insulation tester for testing insulation on a conductor at a first station within a rotating environment for detection at a second remote station in a non-rotating environment comprising:

a high potential d.c. power supply at the first station having first and second output terminals between which a high potential is produced;

a testing electrode connected to the first output terminal for applying a high potential from the power supply to the insulation under test;

current sensitive means also at the first station connected with an output terminal of the power supply and having a low voltage output producing a signal indicative of current flowing between the output terminals of the power supply;

detection means at the second station responsive to the signal from the current sensitive means for detecting current from the d.c. power supply; and

rotatable electrical coupling means connected between the current sensitive means and the detecting means for receiving the low voltage output signal at the first station within the rotating environment and transmitting the signal to the second station in the non-rotating environment.

4,056,772

ION DETECTOR

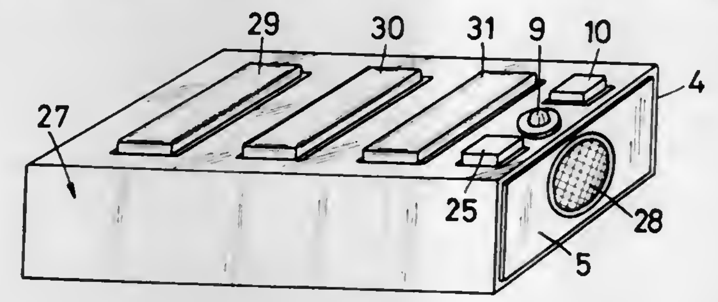
Constantin Graf von Berckheim, Friedrichstrasse 9, Weinheim, Germany (6940)

Filed Feb. 24, 1976, Ser. No. 660,956

Claims priority, application Germany, Mar. 6, 1975, 2509766

Int. Cl.² G01R 31/02

U.S. Cl. 324—72 **11 Claims**



1. Remote control ion detector and controller for a remotely spaced controllable ion generator comprising a space charge detector having a sensing electrode which detects the presence of a space charge by the charging of the sensing electrode, an evaluating circuit contained in a housing consisting essentially of insulating material and bearing the said sensing electrode externally, wherein the sensing electrode is in the form of a surface electrode extending along a wall of said housing, indicator means for indicating the presence or absence of ions and an ultrasonic remote control device for controlling the ion generator as a result of the indication by the indicator means.

4,056,773

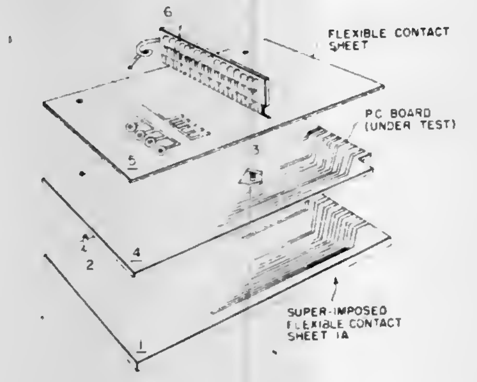
PRINTED CIRCUIT BOARD OPEN CIRCUIT TESTER

Donald F. Sullivan, 115 Cambridge Road, King of Prussia, Pa. 19406

Filed Aug. 25, 1976, Ser. No. 717,512

Int. Cl.² G01R 31/02

U.S. Cl. 324—73 PC **17 Claims**



1. The method of testing printed circuit assemblies before mounting of components comprising the steps of,

1. providing two access terminals for at least one conductor on the assembly to be tested at two spaced positions appearing on the assembly, preferably the extremity positions of all conductors,
2. registering by means of a printed circuit overlay respective electrical test circuit contactors on at least one side of said assembly with respective ones of said access terminals, and
3. testing the continuity of the conductor through the two test circuit contactors with a movable probe incorporating a conductive circuit completing a continuity testing circuit path between the two said contactors on said overlay.

4,056,774

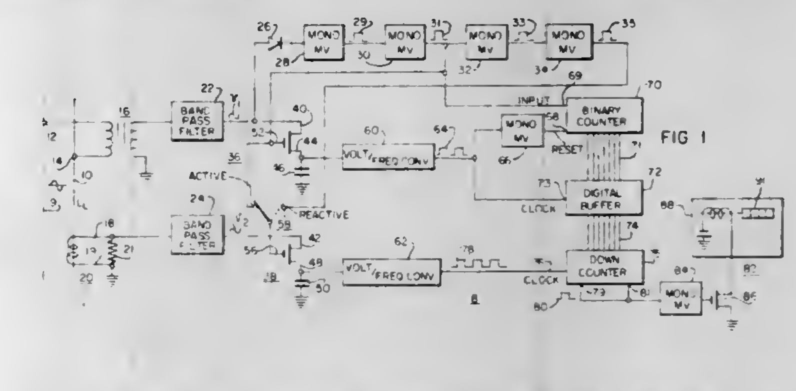
ELECTRONIC WATTHOUR METER CIRCUIT

Lanson Y. Shum, Delmont, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Oct. 29, 1976, Ser. No. 736,797

Int. Cl.² G01R 21/06

U.S. Cl. 324—142 **10 Claims**



1. An electronic watthour meter circuit responsive to the voltage and current components of an AC electrical energy quantity to be measured, said circuit comprising:

means producing a first sinusoidal voltage signal in response to said voltage conponent;

means producing a second sinusoidal voltage signal in response to said current component;

means producing a sampling pulse in response to each cycle of said first voltage signal;

sampling means controlled by said sampling pulse for sampling said first and said second voltage signals during each cycle thereof;

voltage-to-frequency converter means producing first and second pulse trains each having a frequency responsive to the sampled values of said first and said second voltage signals, respectively;

binary counter means having a counter input, a reset input, and binary outputs, said counter input receiving said sampling pulse and said reset input receiving said first pulse train such that said output produces a binary output inversely proportional to the sampled value of said first voltage signal during each cycle of said first voltage signal; and

down binary counter means having data inputs, a clock input and a borrow output, said data inputs receiving said binary counter outputs, said clock input receiving said second pulse train such that said borrow output produces pulses responsive to the sampled values of said second voltage signal divided by the inverse values of the sampled values of said first voltage signal, whereby said borrow output pulses are representative of the electrical energy quantity to be measured.

4,056,775

ELECTRONIC KWH METER HAVING INTERNAL POWER SUPPLY AND ERROR CORRECTION SYSTEM

Miran Milkovic, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Jan. 7, 1977, Ser. No. 757,800

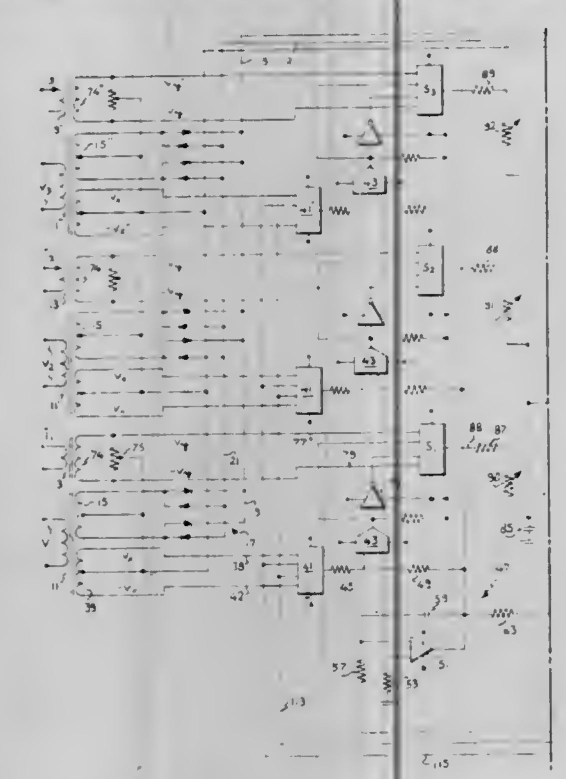
Int. Cl.² G01R 11/32

U.S. Cl. 324—142 **10 Claims**

1. An electronic kWh meter for metering electrical energy in a system comprising

means for generating at least a first analog signal representa-

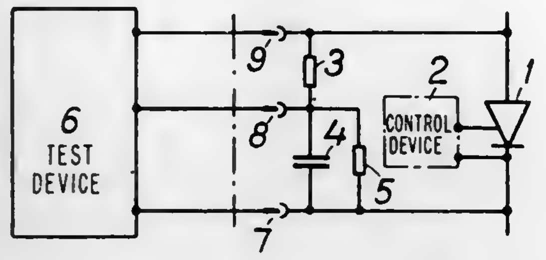
tive of a voltage in said system and at least a second analog signal representative of a current in said system;
at least one multiplier for producing an output signal representative of the product of said first and second analog signals, said multiplier comprising means for generating a cyclicly varying reference signal;
comparator means for linearly superimposing said reference signal and said first analog signal to form a pulse train which is width modulated in accordance with the comparison of said reference signal with said first analog signal, a switching means responsive to said pulse train for coupling said second analog signal to the output of said multiplier to form an output pulse train representative of the instantaneous power which is width modulated in accordance with the first analog signal and amplitude modulated in accordance with the second analog signal;
integrating means to which the output of said at least one



multiplier is connected for forming an output representative of the average total system energy consumed;
means for converting said average total system power output signal of said integrating means into a series of output pulse signals wherein each pulse is representative of a quantized amount of electrical energy;
means for accumulating said pulses representative of quantized amounts of electrical energy;
means for generating a display proportional to the accumulated quantized amounts of the electrical energy;
power conversion means responsive to said voltage of said system for generating at least one D.C. power supply signal, said power supply signal driving the active circuit components of said meter; and
error correction means responsive to the output pulses of said converter for reversing the phase of said first analog signal connected to said comparator to thereby correct integration errors in said meter.

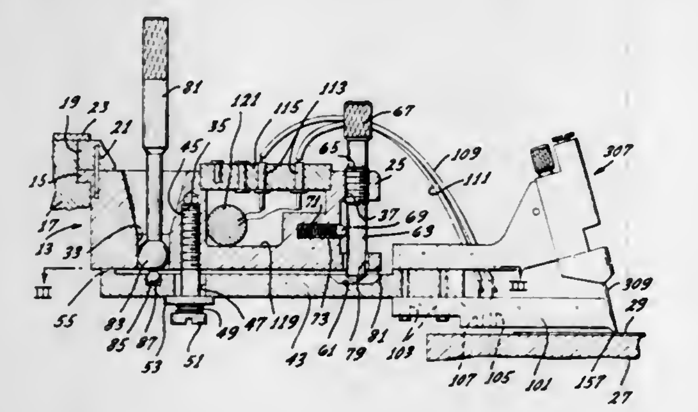
4,056,776
COMBINATION OF A THYRISTOR CONNECTION AND A TEST DEVICE
Karl Erik Olsson, and Bengt Sehman, both of Ludvika, Sweden, assignors to ASEA Aktiebolag, Vasteras, Sweden
Filed Dec. 11, 1975, Ser. No. 639,805
Claims priority, application Sweden, Dec. 12, 1974, 7415574
Int. Cl.² G01R *31/22, 31/02*
U.S. Cl. 324—158 SC **8 Claims**

1. A combination comprising:
a plurality of serially connected thyristor devices, each said thyristor device including a voltage divider and each voltage divider being parallelly connected to an associated thyristor in each of said thyristor devices;
a test device for testing the individual thyristors in place in the serially connected thyristor devices and including a voltage source and means for measuring the leakage current in an individual thyristor; and



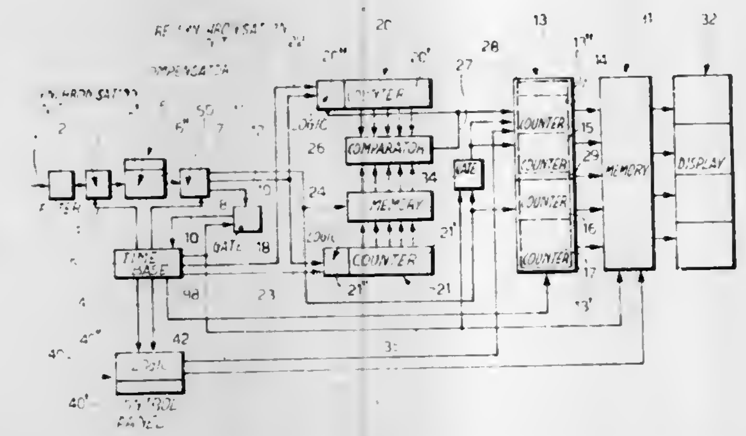
said voltage divider of each thyristor device including first connection means for removable connection of said voltage source across at least a part of said voltage divider, a measuring section connected in series with said at least part of said voltage divider and second connection means for removable connection of said measuring section to said means for measuring.

4,056,777
MICROCIRCUIT TEST DEVICE WITH MULTI-AXES PROBE CONTROL
Jacques Leon Roch, San Jose, Calif., assignor to Electroglas, Inc., Santa Clara, Calif.
Continuation of Ser. No. 497,471, Aug. 14, 1974, which is a division of Ser. No. 366,421, June 4, 1973, Pat. No. 3,851,249. This application June 16, 1976, Ser. No. 696,512
Int. Cl.² G01R *31/02, 1/06*
U.S. Cl. 324—158 P **22 Claims**



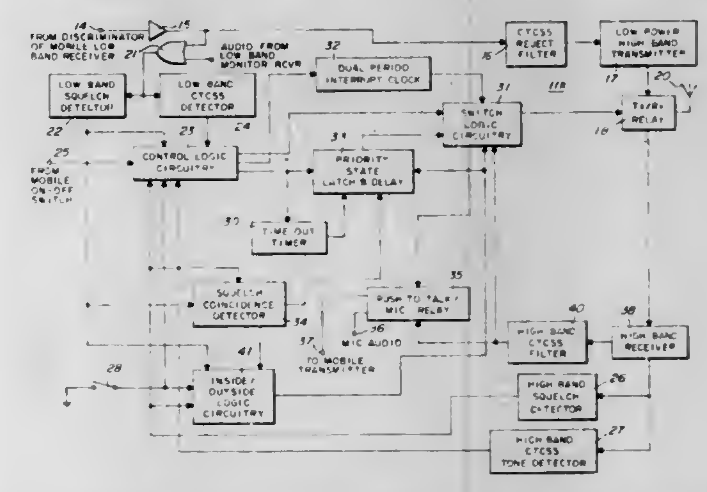
1. A device for testing printed circuitry comprising
support means,
electrical connection means mounted on said support means,
a probe arm supported by said support means for movement in a particular plane relative to said support means,
at least one test probe mounted on said probe arm having means thereon for contacting the printed circuitry for transmitting a current therethrough and
conductor means interconnecting said electrical connection means and said circuitry contact means, and
apparatus for selectively positioning said probe relative to said supporting means including
first means for selectively moving said probe arm in substantially a single line of motion along a first axis transverse to the printed circuitry being tested and
second means for selectively moving said probe arm substantially universally in the particular plane substantially parallel to said printed circuitry,
the first means including third means on the probe arm near one end of the probe arm and extending through the support means and engaging the probe arm for providing a fulcrum for rotary movement of the probe arm relative to the support means in the particular plane and for providing an adjustment of the probe arm relative to the support means along the first axis and the second means including fourth means extending through the support means to the probe arm and operable to provide a movement of the probe arm in the particular plane relative to the support means in accordance with such operation and the first means further including fifth means operatively coupled to the support means and the probe arm at a position between the third means and the fourth means to bias the probe arm toward the support means and to control the disposition of the third means relative to the probe arm along the first axis.

4,056,778
DIGITAL TACHOMETER
Gaspare Randazzo, Turin, Italy, assignor to Societa di Elettronica per l'Automazione - SEPA S.p.A., Turin, Italy
Filed Sept. 13, 1976, Ser. No. 722,462
Claims priority, application Italy, Sept. 23, 1975, 69357/75
Int. Cl.² G01P *3/48*
U.S. Cl. 324—166 **8 Claims**



1. A digital tachometer for determining and displaying the speed of rotation of a rotating device by counting pulses derived from an electrical sensor signal produced by a sensor sensitive to the speed of rotation of the device, the frequency of said sensor signal being a function of the speed of rotation of the device, comprisings:
means for deriving from said sensor signal a first electrical signal in the form of a train of pulses the pulse repetition frequency of which is variable and directly related by a predetermined scale factor to the instantaneous frequency of said sensor signal,
main counting means,
means feeding said processing means with said first signal,
processing means,
means feeling said processing means with said first signal, said processing means operating to produce a second signal in the form of a train of pulses the frequency of which is related to said first signal is such a way that in any interval between two successive pulses of said first signal the frequency of said second signal is that frequency at which a predetermined given number of pulses equal to said scale factor would occur in the immediately preceding interval between two successive pulses of said first signal,
interpolation means,
means feeding said interpolation means with said second signal, said interpolation means operating to count the pulses of said second signal,
a time base circuit which generates a signal controlling the operation of said main counting means whereby to define successive counting intervals during which said main counting means count the pulses of said first signal,
memory means,
means feeding said memory means with a signal representing the content of said main counting means accumulated during the last complete counting interval together with the content of said interpolation means accumulated between the last pulse of said first signal and the end of said counting interval, and
display means operating to display the content of said memory means,
said processing means comprising:
first and second counters,
means feeding said first and second counters with respective counting signal, the frequency of the signal fed to said first counter being greater than the frequency of the signal fed to said second counter by a factor equal to the said scale factor,
a memory device,
means feeding the output of said second counter to said memory device under the control of said first signal whereby the count accumulated in said second counter between two successive pulses of said first signal is stored in said memory device until the occurrence of the next pulse of said first signal, and
comparator means operating to compare the contents of said memory device with the contents accumulated at any time in said first counter and to produce at the output thereof a pulse of said second signal each time the count of said first counter is the same as the count stored in said memory device.

4,056,779
VEHICULAR REPEATER
Robert Lee Toler, Plantation, Fla., assignor to Motorola, Inc., Schaumburg, Ill.
Filed Apr. 5, 1976, Ser. No. 673,841
Int. Cl.² H04B *7/20*
U.S. Cl. 325—4 **23 Claims**



1. In a two-way communication system having a base station operating on a first frequency, and a plurality of vehicular installations each comprised of a mobile station operating on the first frequency, a detachable portable unit operable on a second frequency and a repeater unit for repeating out on one of said frequencies information received on the other of said frequencies, apparatus for prioritizing the repeater operation, including in combination:
first detect means for detecting received transmissions on the first frequency;
second detect means for detecting received transmissions on the second frequency;
switching means for activating one of the receive and transmit functions at the second frequency;
means coupled to the switching means for providing momentary interrupt periods in the repeater function when repeating out on the second frequency;
latching means coupled to the switching means for enabling the repeater function;
first circuit means coupled to the first and second detect means to the latching means for delatching the latching means when substantially simultaneous transmissions are received on the first and second frequencies during at least one of said interrupt periods;
delay means for relatching the latching means a predeter-

mined period of time after the detection of received transmission;

second circuit means for disenabling repeating out on the second frequency when transmission is received on the second frequency during at least one of said interrupt periods.

4,056,780

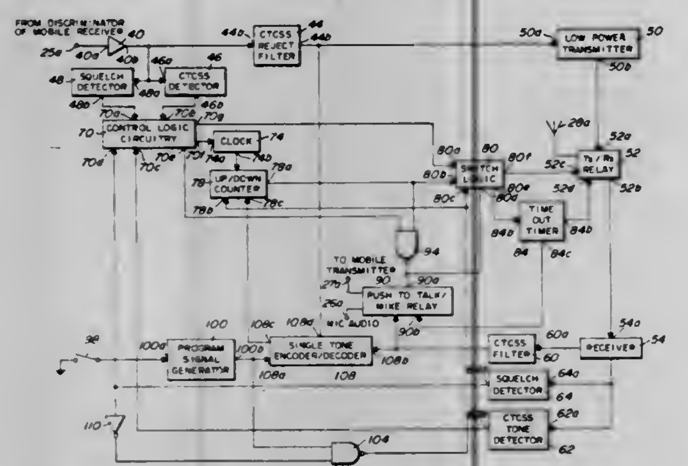
VEHICLE REPEATER PRIORITIZATION SYSTEM

Thomas Edward Faulkner, Margate, Fla., assignor to Motorola, Inc., Schaumburg, Ill.

Filed June 25, 1975, Ser. No. 590,006

Int. Cl.² H04B *1/40, 7/14*

U.S. Cl. 325—5 **33 Claims**



1. In a two way communication network, an improved vehicular repeater adapted to operate in the vicinity of other repeaters and arranged to cooperatively assign repeating priorities thereamong, and having a receiver for receiving a broadcast signal and a transmitter for rebroadcasting said signal, the repeater comprising:

delay means for delaying rebroadcast for a predetermined programmed time period,

detecting means detecting a signal broadcast by a potentially interferring station during the delay interval,

means inhibiting transmitter rebroadcast in response to said detected signal, and

logic means predeterminedly responsive to signals received by said receiver for producing program signals and applying said signals to the delay means for programming the time delay.

4,056,781

DEVICE FOR CALLING A GROUND STATION BY AN AIRCRAFT

Albert Hetebrij, and Cornelis Adrianus Geertrudis Kloeck, both of Bussum, Netherlands, assignors to De Staat der Nederlanden, te Dezen Vertegenwoordigd Door de Directeur-Generaal der Posterijen, Telegrafie en Telefonie, The Hague, Netherlands

Continuation-in-part of Ser. No. 502,170, Aug. 30, 1974, abandoned. This application Sept. 20, 1976, Ser. No. 724,922

Int. Cl.² H04B *1/00, 3/60*

U.S. Cl. 325—55 **13 Claims**

1. A ground station system for automatically monitoring radio communication calls from aircraft which transmit and receive traffic over one of a predetermined number of high frequency carriers, comprising:

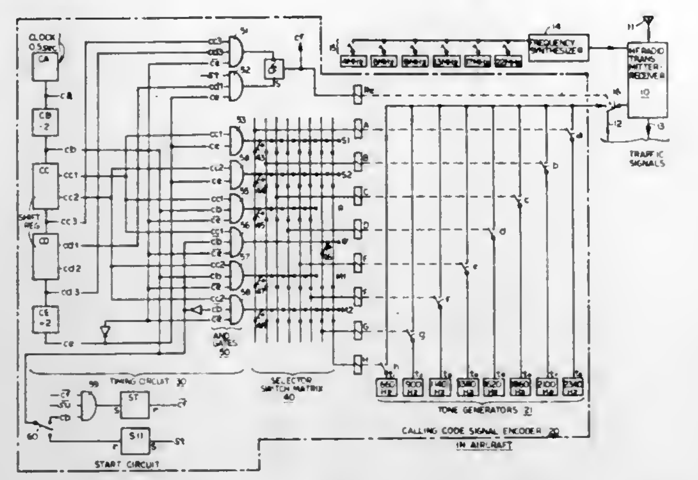
I. in said aircraft:

A. means for transmitting from said aircraft a calling code signal of tone frequencies of given spacing and duration indicating in its code the ground station to be called, and

II. at said ground station:

A. separate receivers tuned to all of said high frequency carriers,

b. decoding means connected to all of said receivers for completely and correctly receiving the calling code signal for said ground station over any one of said carriers, and



C. means for transmitting traffic signals over said one high frequency carrier upon which said calling code signal was detected by said decoding means.

4,056,782

WIRE TRANSMISSION NOISE SUPPRESSOR FOR A VEHICLE

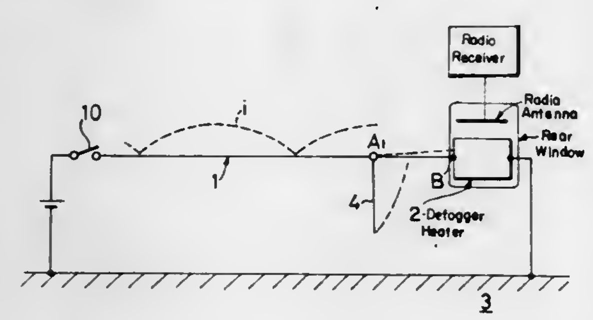
Takayuki Makino, Okazaki; Teruo Yamanaka, Toyota; Yoshitaka Kuroyanagi, Toyota, and Tatsuo Teratani, Toyota, all of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Nov. 6, 1975, Ser. No. 629,363

Claims priority, application Japan, July 31, 1975, 50-29180

Int. Cl.² H04B *1/18*

U.S. Cl. 325—313 **7 Claims**



1. A wire transmission noise suppressor for a vehicle including an electrical circuit wherein a standing wave of current is formed, comprising a branch circuit of low impedance connected to said electrical circuit at a position corresponding to a node of a standing wave, said branch circuit being a noise trap wire having an open circuit end and a length of about

$\lambda/4 + \lambda 2 \times n, (n = 0, 1, 2 \ldots),$

wherein the current is a high frequency signal and λ is the wavelength of the signal, said noise trap wire being arranged along said electrical circuit toward the side from which the high frequency current is generated.

4,056,783

LINEAR SOUND AMPLIFIER CIRCUIT

Stanley Norman Harrison, Dupont, Colo., assignor to AudioKinetics Corporation, Denver, Colo.

Continuation of Ser. No. 640,329, Dec. 12, 1975, abandoned. This application Feb. 3, 1977, Ser. No. 765,117

Int. Cl.² H03F *3/18*

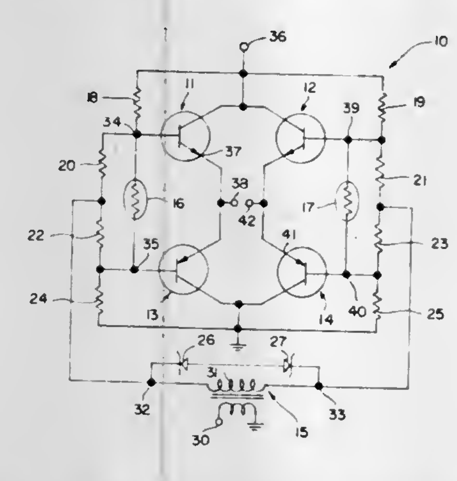
U.S. Cl. 330—268 **3 Claims**

1. A linear sound amplifier circuit for increasing fidelity and boosting power output from a sound source in the form of a stereophonic tape or record player and the like, the circuitry comprising in combination:

a balanced bridge network including a series of NPN transistors and PNP transistors, the collectors of each PNP transistor connected to ground, and the emitter of a first NPN transistor connected directly to the emitter of a first PNP transistor to form one segment of said balanced bridge network and the emitter of a second NPN transistor directly connected to the emitter of the second PNP transistor to form the second segment of said balanced bridge network;

a resistive divider network at the power input of each segment of said balanced bridge network, the base of each said NPN transistor connected to the base of each said transistor in each segment by means of said resistor divider network;

a transformer having a primary winding connected to the input signal from said sound source, a secondary winding having opposite terminals with each terminal connected



to the center of each resistive divider network connecting the bases of said transistors in each segment of said balanced bridge network, the secondary winding of said transformer including limiting means for limiting the input signals applied by said terminals to the center of each resistive divider network to a predetermined breakdown voltage value;

a DC voltage supply terminal adapted for connection to a DC voltage supply means with the collectors of each NPN transistor connected to said terminal; and

a common output including a first output terminal connected to the emitters of said first NPN and PNP transistors and a second output terminal connected to said emitters of said second NPN and PNP transistors, said first and second output terminals providing the signal output for transmission thereof to a resistive load.

4,056,784

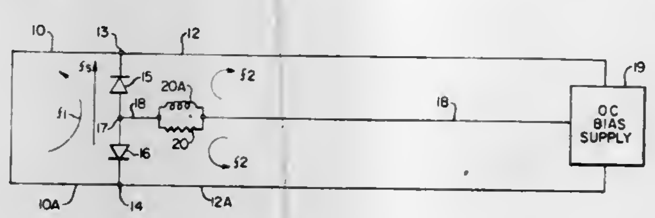
SUPPRESSION OF PARAMETRIC OSCILLATIONS IN IMPATT AMPLIFIERS AND OSCILLATORS

Marvin Cohn, Baltimore, Md., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Nov. 4, 1976, Ser. No. 738,811

Int. Cl.² H03F *3/10*

U.S. Cl. 330—287 **12 Claims**



1. A balanced circuit for suppressing parametric oscillations in IMPATT apparatus that includes avalanche devices, comprising:

a balanced transmission line for propagating a broadband of frequencies including odd harmonics of a large-signal input frequency and a parametrically-generated idler signal having odd symmetry,

an unbalanced transmission line for propagating a broadband of frequencies including even harmonics of a large-signal input and a parametrically-generated idler signal having even symmetry,

at least one pair of avalanche devices in an anti-series arrangement electrically connected at the junction of the balanced and the unbalanced transmission lines,

said unbalanced transmission line having a central branch connected to the anti-series arrangement at its common terminal,

a constant current d-c power supply in the unbalanced transmission line for biasing the avalanche devices to operate in the avalanche condition,

a frequency-independent resistive loading in the unbalanced transmission line to overcome negative resistance parametrically generated in the avalanche devices when a large-signal input is impressed across the devices operating in the avalanche condition, to suppress the parametrically-generated idler signal of even symmetry in the unbalanced transmission line and to simultaneously suppress the parametrically-generated idler signal of odd symmetry in the balanced transmission line, and

an inductance, connected across the resistive loading, having a impedance greater than that of the resistive loading at the lowest anticipated frequency and providing minimum shunting resistance to the d-c bias current.

4,056,785

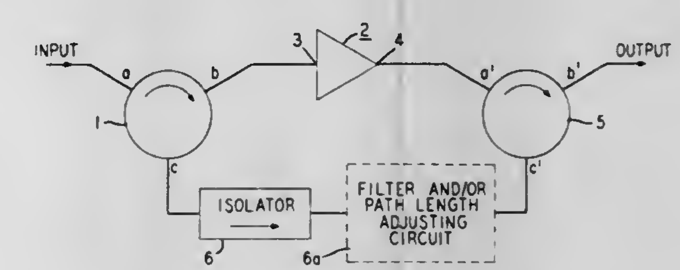
LOW-NOISE MICROWAVE AMPLIFIER

Clarence Burke Swan, Allentown, Pa., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Dec. 6, 1976, Ser. No. 747,899

Int. Cl.² H03F *3/60*

U.S. Cl. 330—53 **7 Claims**



1. A microwave amplifier comprising:

an input microwave circulator having in the direction of circulation a first, second and third port;

an output microwave coupling device having at least a first, second and third port;

means for coupling an input signal to the first port of said input circulator;

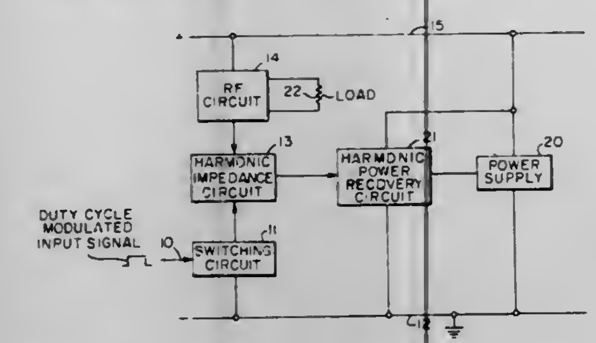
means for deriving an output signal from the second port of said output device;

an amplifying stage having an input terminal and an output terminal;

means for coupling said amplifying stage between the second port of said input circulator and the first port of said output device; and

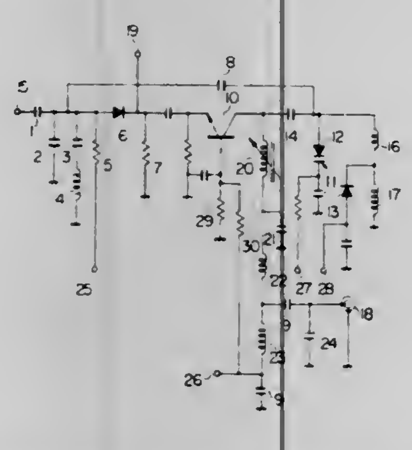
a passive signal by-pass arrangement coupled between the third ports of said input circulator and output device such that only under unpowered or otherwise failed condition of said amplifying stage said input signal is reflected at said input terminal and coupled to said output terminal via said input circulator, said passive by-pass arrangement and said output coupling device thereby reducing transmission loss of the amplifier.

4,056,786
SINGLE ENDED CLASS D AMPLIFIER
Heber J. Morrison, Ellicott City, and Rockney W. Howland, Glen Burnie, both of Md., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.
Continuation of Ser. No. 502,316, Sept. 3, 1974, abandoned. This application Aug. 16, 1976, Ser. No. 714,923
Int. Cl.^{2} H03F *3/04*
U.S. Cl. 330—207 A **3 Claims**



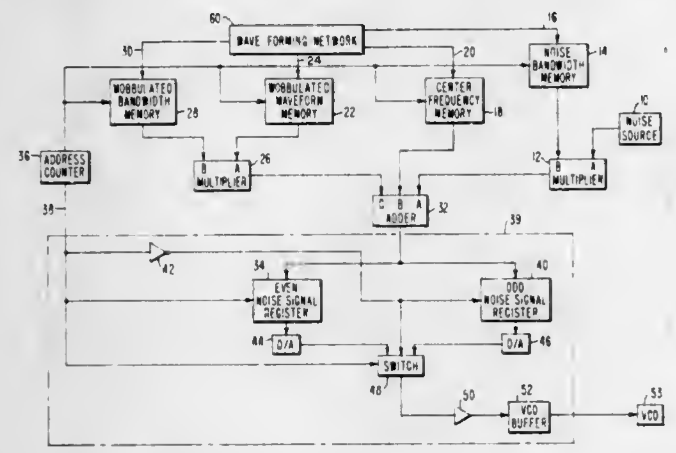
1. A class D amplifier circuit for amplifying an RF input signal, comprising in combination:
a. an on-off switching circuit responsive to said RF input such that said switching circuit alternatively switches to produce high and low conductivity states between two terminals of said switching circuit;
b. a harmonic circuit; and
c. an RF circuit, wherein:
d. said switching circuit, harmonic circuit and RF circuit are series coupled to the positive and negative terminals of a DC power supply to form a Class D amplifier for producing an output signal having a frequency equal to the fundamental frequency of said input signal and an amplitude substantially proportional to the duty cycle of said input signal, said harmonic circuit storing energy when said switching circuit is in the high conductivity state and returning said stored energy to said power supply during the low conductivity state of said switching circuit.

4,056,787
SELF-OSCILLATING MIXER CIRCUIT
Takeshi Saitoh; Eisaku Akutsu, and Mitsuhisa Shinagawa, all of Yokohama, Japan, assignors to Hitachi, Ltd., Japan
Filed May 28, 1976, Ser. No. 691,086
Claims priority, application Japan, May 30, 1975, 50-64266; May 30, 1975, 50-64267
Int. Cl.^{2} H04B *1/06*
U.S. Cl. 331—59 **4 Claims**



1. A self-oscillating mixer circuit comprising:
a first input terminal;
a first switching diode connected to said first input terminal at one end thereof;
a self-oscillating mixing transistor connected at its emitter to the other end of said first switching diode and grounded at its base;
a feedback circuit for oscillation connected between the collector of said transistor and said one end of the first switching diode;
an intermediate frequency damping circuit connected between said input terminal and ground;
a second input terminal connected to said other end of the first switching diode;
a first bias voltage source connected to said one end of the first switching diode, for rendering said first switching diode conductive and nonconductive;
means for rendering said first switching diode conductive by applying a voltage of said first bias voltage source to said first switching diode so as to allow said transistor to effect a self-oscillating mixing operation; and
means for rendering said first switching diode nonconductive by changing the voltage of said first bias voltage source applied to said first switching diode, and disconnecting said oscillation feedback circuit and said intermediate frequency damping circuit from the emitter of said transistor so as to allow said transistor to effect an intermediate frequency amplifier operation.

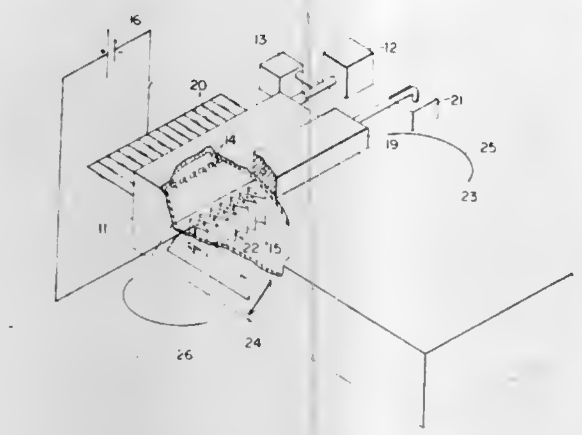
4,056,788
DIGITAL-TO-ANALOG NOISE GENERATOR
Joel E. Brown, Baltimore, and Kelly C. Overman, Pikesville, both of Md., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.
Filed Nov. 1, 1976, Ser. No. 737,820
Int. Cl.^{2} H03B *29/00*
U.S. Cl. 331—78 **23 Claims**



1. A digital noise signal generator comprising:
first means for generating a noise product signal in response to a noise bandwidth input signal and a random noise signal;
second means for generating a wobbulated waveform product signal in response to a wobbulated bandwidth input signal, and a wobbulated waveform input signal;
means for combining the noise product signal and the wobbulated waveform product signal in response to the output of said first and second generating means; and
third means for generating an analog noise signal in response to the digital output of said combining means.

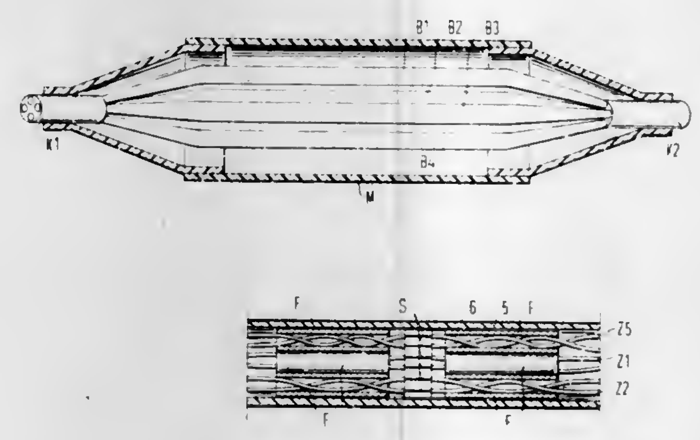
4,056,789
ELECTRIC DISCHARGE GAS DYNAMIC LASER
Joseph A. Stregack, Silver Spring, Md., and Bernard L. Wexler, Arlington, Va., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.
Filed July 2, 1976, Ser. No. 693,592
Int. Cl.^{2} H01S *3/00*
U.S. Cl. 331—94.5 G **18 Claims**

1. A CW laser system which comprises:
a housing,
said housing including a plenum section, a nozzle array section, and a constant area supersonic flow region,
said plenum section including gas inlet for introducing an intermediate gas, and a plurality of conductive pins, said conductive pins extending axially toward said array and connected electrically to a dc power supply,
said nozzle array section including a plurality of side-by-side noncontoured wedge shaped nozzles positioned to form a nozzle throat therebetween and connected electrically to ground,
said nozzles including a plurality of gas outlet openings along their height downstream from the throat through which a lasing gas flows, and an inlet through which said lasing gas enters said nozzles;
a plenum chamber to which each of said nozzle inlets are connected for supplying said lasing gas to said nozzles;



a pump for pumping gases along the length of said housing from said plenum section and said nozzles;
oppositely disposed windows in said housing extending downstream from the plane of said nozzle throat and positioned at Brewster's angle along the supersonic flow region; and
a fully reflective spherical mirror opposite one window and a partially reflective mirror opposite the other window, whereby an optical cavity whose axis is transverse to the gas flow is formed between said mirrors and said mirrors are axially movable along the length of said windows.

4,056,790
TRANSMISSION SYSTEM FOR PULSE SIGNALS
Reginhard Pospischil, Lochbam, and Josef Dömer, Hohenschaftlarn, both of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany
Continuation of Ser. No. 425,162, Dec. 17, 1973, abandoned. This application July 24, 1975, Ser. No. 598,724
Claims priority, application Germany, Dec. 18, 1972, 2261840
Int. Cl.^{2} H04B *3/30*
U.S. Cl. 333—5 **7 Claims**

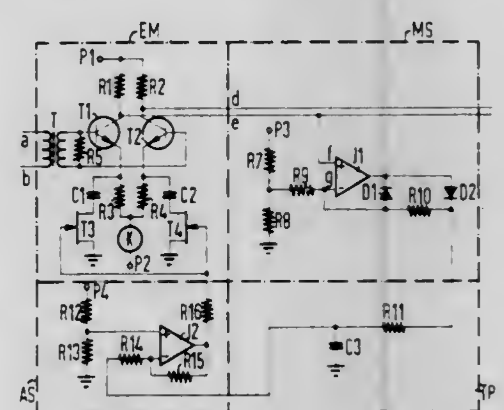


1. A transmission system for pulse modulation signals such as pulse code modulation signals comprising a plurality of cables that are spliced together end to end and wherein each cable contains a plurality of group conductors and each group conductor contains a plurality of pairs of conductors and wherein different group conductors are utilized for forward and reverse transmission, wherein a plurality of inductances comprising ferrite tubes have openings through which individual ones of said pairs of conductors extend, each of said group conductors surrounded by a shielding cover, and each of said ferrite tubes spaced on said pair of conductors and having a length and cross section which depends on the properties of the ferrite material and have an inductance value L with respect to unsymmetrical conductor currents which approximately are defined by the following equuation:

$$L = \frac{Z}{m \cdot \pi \cdot F_2 \cdot (1 + \frac{1}{N})} \left[4 \left(\frac{f_2}{f_1} \right)^2 \cdot \frac{l_2}{l_1} \cdot 10^{\frac{a_{f_1} - a_1 - 2(n + a_{s_1} - a_{u_1}) - (a_{u_2} - a_2)}{10}} - 1 \right]^1$$

where:
Z = Wave resistance for the unsymmetric wave type
m = Number of places of insertion of tubular bi-filar inductances in a continuous conductor path of length l_2
l_1 = Reference lengths
f_1 = Reference frequency
f_2 = Highest frequency to be transmitted, whereby the cross-talk demands must be considered
N = Number of pairs of a group
n = 10 lg N
a_{f_1} = direct cross-talk at the frequency f_1 via the conductor length l_1
a_1 = Operational damping of the symmetrically operated pair at the frequency f_1 via the conductor length l_1
a_{s_1} = Damping of the interference from the ground-symmetric into the ground unsymmetric wave type at the frequency f_1 of a pair via the conductor length l_1
a_{u_1} Operative attenuation for ground-unsymmetric transmission through a pair over the section length l at the frequency f_1
a_{u_2} = Operative attenuation for ground-unsymmetric transmission through a pair over the section length l_2 at the frequency f_2
a_2 = Operative attenuation through a pair over the section length l_2 at the frequency f_2.

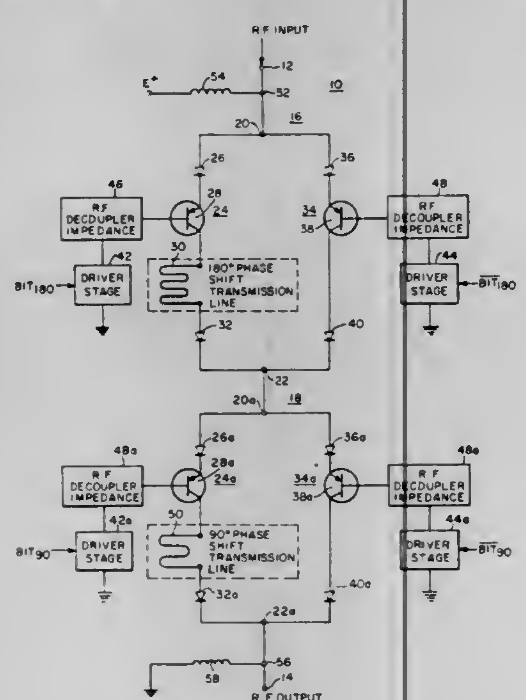
4,056,791
APPARATUS FOR CORRECTING DISTORTION IN LOW FREQUENCY CABLE
Reiner Lohmann, Munich, and Volker Ludwig, Gelting, both of Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany
Filed Oct. 30, 1975, Ser. No. 627,264
Claims priority, application Germany, Oct. 31, 1974, 2451912
Int. Cl.^{2} H04B *3/04*
U.S. Cl. 333—18 **4 Claims**



1. Apparatus for equalizing the attenuation characteristic in audio frequency cable connected for carrying a base band signal from a transmitter to a receiver comprising:
measuring circuit means for producing a measuring signal

having a value which is dependent on the peak value of said base band signal in the region of said receiver and differential amplifier means in said receiver comprising first and second amplifier elements, the conductive paths of which are, respectively, connected in series with a gain control means comprising a capacitance connected in series with the drain-source path of a field effect transistor, said gain control means being responsive to said measuring signal such that said audio frequency cable and said differential amplifier means together exhibit a substantially constant attenuation characteristic within a predetermined low frequency range.

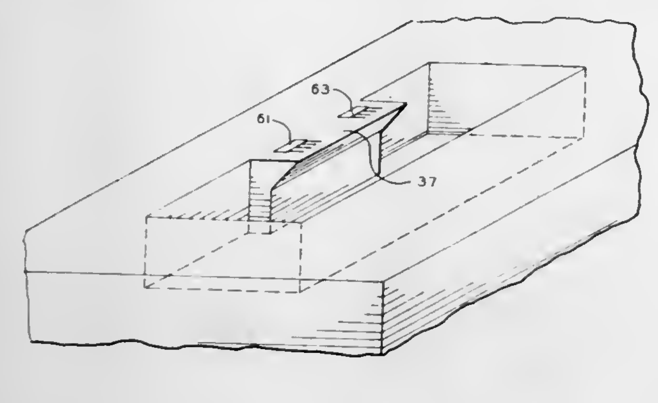
4,056,792
WIDEBAND DIODE SWITCHED MICROWAVE PHASE SHIFTER NETWORK
Stuart S. Horwitz, Baltimore, Md., and Walter R. Jost, Richfield, Minn., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.
Filed Nov. 11, 1975, Ser. No. 630,872
Int. Cl.² H01P *1/18, 1/15, 5/12;* **H03K** *17/74*
U.S. Cl. 333—31 R **18 Claims**



1. A diode switched variable R.F. phase shift network of the type in which shift increment stages may be controllably inserted in series circuits in the network in response to normal and complemented forms of binary digit signals, said phase shift network comprising:

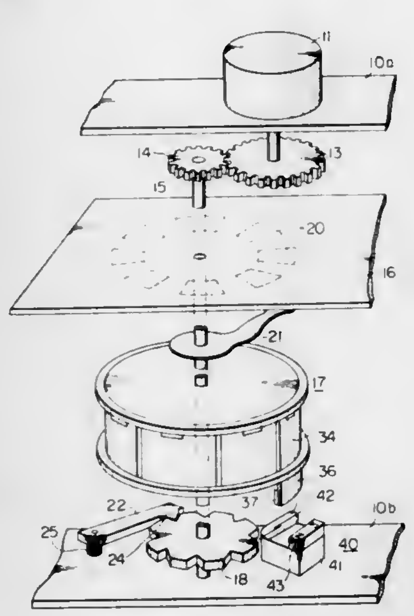
a. at least first and second phase shift stages, all serially connected between first and second network ends,
b. each phase shift stage comprising a zero-shift path and a phase shift path in parallel circuit relationship with one another, the zero-shift path and the phase shift path each having an associated transistor,
c. the zero-shift path of each phase shift stage including one and another diodes and the collector-emitter path of the associated transistor therebetween, all connected in series circuit, d. The phase shift path of phase shift stage including one and another diodes and a sub-network of two series connected circuit elements therebetween, all connected in series circuit, said sub-network including one and another of the collector-emitter path of the associated transistor and an R.F. delay line element,
e. the diodes in the paths of the phase shift stages having a common polarity of forward conduction relative to the first and second network ends, and means for applying a bias potential between said first and second network ends, said bias potential being poled in the direction of forward conduction of the diodes,
f. means for applying the normal and complemented forms, respectively, of each binary digit signal to the bases of the transistors associated with one and the other paths of the corresponding phase shift stage.

4,056,793
ACOUSTIC WAVEGUIDE RESONATOR
Robert S. Wagers, Richardson, and Clinton S. Hartmann, Dallas, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.
Division of Ser. No. 451,718, March 15, 1974, Pat. No. 3,974,464. This application May 12, 1976, Ser. No. 685,551
Int. Cl.² H03H *9/04, 9/26, 9/30;* **H01L** *41/18*
U.S. Cl. 333—72 **9 Claims**



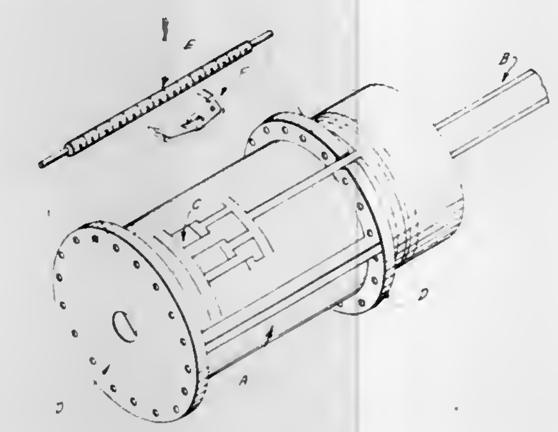
1. An acoustic waveguide resonator comprising:
a substrate made of a material taken from the group consisting of single crystal silicon and single crystal piezoelectric material;
a horizontal ledge extending out from said substrate with the top of the ledge being coplanar with the top surface of said substrate, said substrate and said ledge defining an acoustic waveguide and being shaped so as to be a resonant structure; and
at least one transducer on said waveguide for exciting acoustic waves therein, having a transducer pad with a plurality of electrode fingers extending laterally therefrom toward the edge of said ledge.

4,056,794
CHANNEL SELECTION MECHANISM FOR AN ELECTRONIC TUNER
Tugio Ohigashi, and Junichi Ariga, both of Osaka, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan
Filed June 24, 1976, Ser. No. 699,594
Claims priority, application Japan, June 25, 1975, 50-79603
Int. Cl.² H03J *3/18, 1/02*
U.S. Cl. 334—15 **5 Claims**



1. A channel selection mechanism for an electronic tuner having a varactor, comprising, a motor-driven shaft, a plurality of contact elements connected to sources of different potentials, a wiper mounted on the shaft to slidably make contact with each contact element to selectively connect said different potentials to the varactor of the electronic tuner, a channel number indicating drum having a plurality of slots in pairs on the periphery thereof and film strips equal in number to said pairs inserted into said slots, and electromagnetic sensing and switch means mounted stationary relative to the periphery of said drum to detect the proximity thereto of a particular one of said film strips to permit said electronic tuner to switch between the VHF and UHF bands.

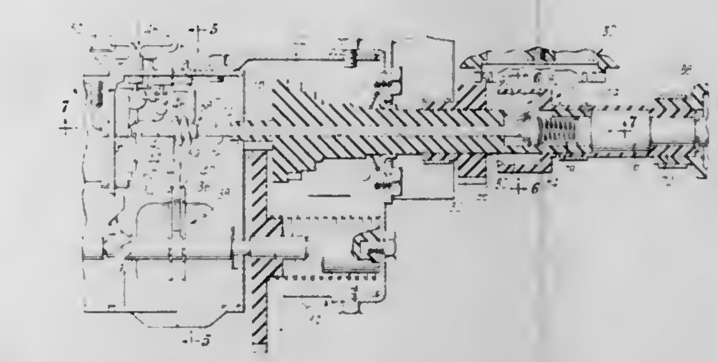
4,056,795
WIPER CONTACT FOR TURRET-TYPE VARACTOR CONTROLLER
Robert D. Whelan, West Springfield, Mass., assignor to General Instrument Corporation, Clifton, N.J.
Filed June 29, 1976, Ser. No. 700,959
Int. Cl.² H03J *3/18;* **H01C** *10/42*
U.S. Cl. 334—15 **13 Claims**



1. A contact for use on a turret-type varactor controller of the type having a resistive strip mounted on the surface of said turret, a screw rotatably mounted on said turret at a location spaced from said strip, said contact being deformable to be inserted between said screw and said strip to assure electrical contact therebetween, said contact comprising thread engaging means and means for inhibiting movement of said thread engaging means relative to said turret surface in a direction tangential to said surface but permitting movement thereof relative to said surface in a direction radial to said surface, said inhibiting means comprising an aperture defined within said contact by said thread engaging means, side portions extending therefrom and a portion connecting said side portions, within which said screw is adapted to be received, said aperture having a tangential dimension substantially equal to the diameter of said screw and said connecting portion being normally spaced from said screw to form an aperture with a radial dimension substantially greater than the diameter of said screw, such that radial movement of said screw engaging means is permitted but tangential movement of said thread engaging means is inhibited, without cooperation with any external part of said turret other than said strip and said screw.

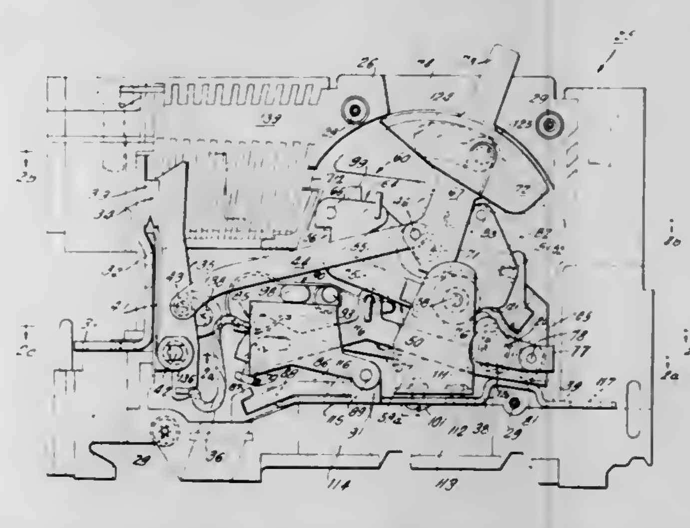
4,056,796
DETENTED UHF TELEVISION TUNER WITH INDEPENDENT INDUCTIVE FINE TUNING
Alarico A. Valdettaro, Bloomington, Ind., assignor to Sarkes Tarzian, Inc., Bloomington, Ind.
Filed Oct. 20, 1976, Ser. No. 734,327
Int. Cl.² H03J *1/14, 5/06*
U.S. Cl. 334—55 **22 Claims**

1. A UHF television tuning system comprising:
a UHF tuner having a housing, a continuously variable main tuning shaft rotation of which is effective to cause said tuner selectively to select signals on all channels in the UHF television band, a channel selector shaft, means interconnecting said channel selector shaft and said main tuning shaft, a fine tuning shaft associated with said channel selector shaft, detent means for said selector shaft for establishing a stop position of said main tuning shaft for each of the television channels in the UHF band, a mechanically variable capacitor mechanically coupled to said main tuning shaft, a variable frequency oscillator electrically coupled to said mechanically variable capacitor and having a frequency of oscillation that is adjustable upon rotation of said main tuning shaft over a range of frequencies predeterminedly related to the range of frequencies of the entire UHF television band for determin-



ing the frequency of the signal received by said UHF tuner, said variable frequency oscillator having a mechanically variable inductor electrically connected thereto; and
means mechanically coupling said variable inductor to said fine tuning shaft for controlling the frequency of said oscillator to tune said tuner independently of the operation of said main tuning shaft over a range of frequencies corresponding to substantially less than the frequency range provided by said mechanically variable capacitor for fine tuning said UHF tuner.

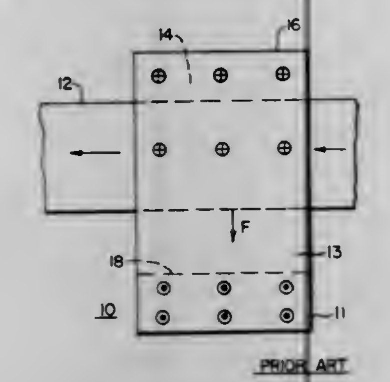
4,056,797
CRADLE FOR CONTACT OPERATING MEANS
Tadeusz J. Rys, Bellefontaine, Ohio, assignor to I-T-E Imperial Corporation, Spring House, Pa.
Filed July 6, 1976, Ser. No. 702,891
Int. Cl.² H01H *75/00, 77/00*
U.S. Cl. 335—6 **10 Claims**



1. A circuit breaker pole unit including a narrow insulating housing, cooperating movable and stationary contact means disposed within said housing, a manually operable spring powered operating mechanism for opening and closing said contact means; said mechanism including a releaseable cradle, a collapsible toggle interposed between said cradle and said movable contact means, and latch means for maintaining said cradle latched in an operating position wherein said operating mechanism is operable to close said contact means; automatic means for tripping said latch means responsive to predetermined abnormal current conditions thereby releasing said cradle whereby said contact means are opened by said mechanism; a metal frame within said housing; pin means pivotally mounting said cradle on said frame; said cradle including first and second spaced parallel walls, one of which has an exten-

sion engageable by said latch means; said walls on their confronting surfaces having integral bearing formations which pivotally support said toggle.

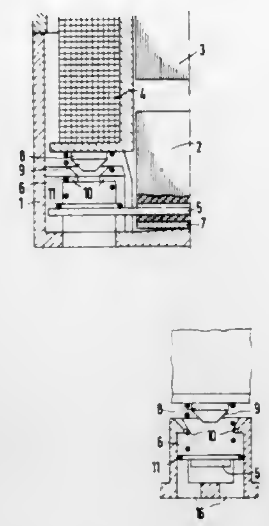
4,056,798
CURRENT LIMITING CIRCUIT BREAKER
Franklin S. Malick, Monroeville, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.
Filed Sept. 23, 1975, Ser. No. 615,858
Int. Cl.² H01H *77/10*
U.S. Cl. 335—16 **12 Claims**



1. A circuit interrupter, comprising:
a pair of separable contacts;
means supporting said separable contacts and operable to actuate said contacts between open and closed positions to interrupt current flow therebetween; and
a magnetic drive structure comprising a magnetic device comprising a plurality of slotted plates of magnetic material forming an elongated slot having a top and a bottom, said slotted plates being electrically insulated from each other and being spaced apart at unequal intervals to form a plurality of insulating gaps;
said supporting means comprising a contact arm carrying one of said contacts and extending into said slot when said contacts are in a closed circuit position;
the current through said circuit interrupter when in a closed circuit position passing through said contact arm and including a component of current flow in a vertical direction with respect to said slot;
an overcurrent condition through said circuit interrupter above a predetermined value generating magnetic flux in said magnetic device to produce a force acting on said contact arm to separate said contacts.

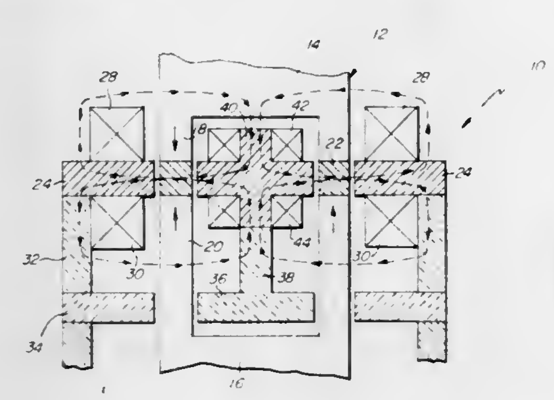
4,056,799
HOUSING FOR SECURING A DAMPING COMPRESSION SPRING IN AN ELECTROMAGNETIC SWITCHING APPARATUS
Johann Bauer, Amberg, Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Germany
Filed Dec. 3, 1975, Ser. No. 637,403
Claims priority, application Germany, Dec. 5, 1974, 2457608
Int. Cl.² H01F *7/08*
U.S. Cl. 335—277 **8 Claims**

1. In an electromagnetic switching apparatus including a housing, a magnet coil and switching and non-switching magnet parts disposed within said housing, and at least one damping compression coil spring for biasig said non-switching magnet part in one direction in said housing, said spring having a plurality of turns of the same diameter, and an end turn having a diameter which is greater than that of said plurality of turns for securing said spring within said housing, the improvement comprising said housing including hook-shaped projection members disposed about the periphery of said spring, said projection members being spaced apart from each other along a diameter of said spring by a distance which is greater than the diameter of said plurality of turns but less than the diameter of said end turn so that said plurality of turns are movable axially



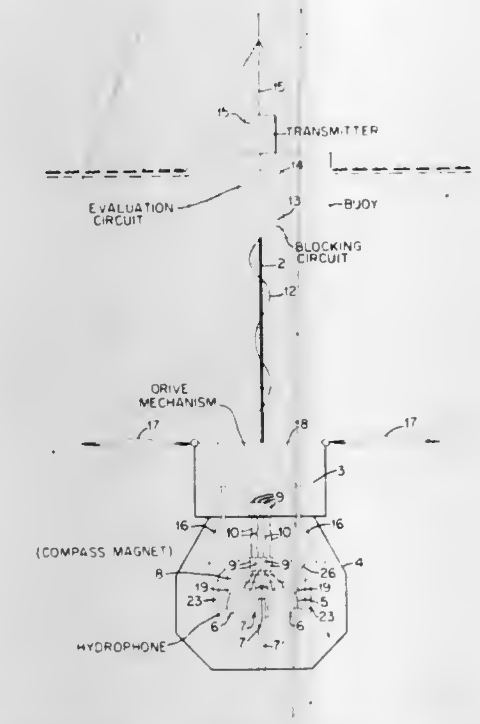
between said members and said end turn engages said members for movably securing said spring in said housing.

4,056,800
MAGNETIC FIELD ALIGNING MEANS
Norman J. Dionne, Arlington Heights, and Ernest C. Wettstein, Acton, both of Mass., assignors to Raytheon Company, Lexington, Mass.
Filed Dec. 11, 1975, Ser. No. 639,745
Int. Cl.² H01F *3/08*
U.S. Cl. 335—296 **10 Claims**



1. Magnetic field producing apparatus including:
a first pair of electromagnetic coils aligned with one another and axially spaced apart;
a ring of saturable magnetic material axially disposed between the electromagnetic coils of the first pair;
a cylinder of saturable magnetic material axially disposed within the ring and spaced therefrom by an annular gap;
first electrical means connected to the first pair of electromagnetic coils for producing respective magnetic fields having flux lines directed radially in the gap; and
unidirectional flux modifying means including electromagnetic coil means axially disposed within the ring and annularly spaced therefrom for altering the magnetic field in the gap.

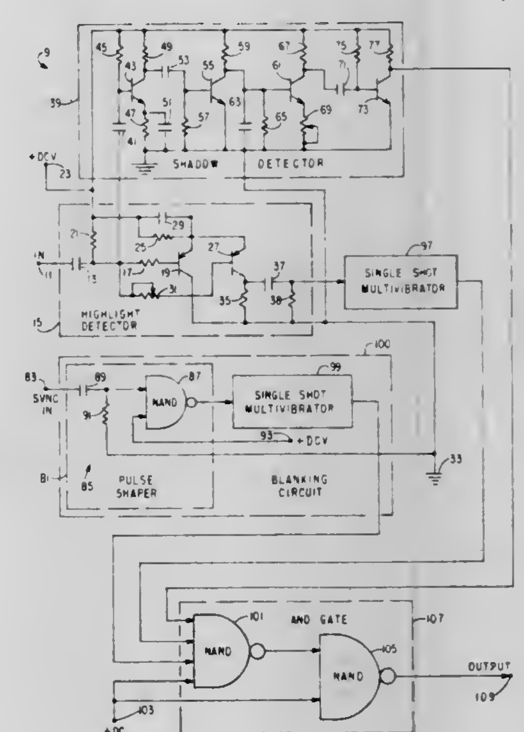
4,056,801
APPARATUS FOR LOCATING SOURCES OF SOUND IN WATER
Reinhard Leisterer, Bremen; Manfred Oelfke, Achim; Hans Woiczik, Oyten; Hans-Joachim Meyer, and Rolf Ostermeier, both of Bremen, all of Germany, assignors to Fried. Krupp Gesellschaft mit beschrankter Haftung, Essen, Germany
Continuation-in-part of Ser. No. 503,945, Sept. 6, 1974, abandoned. This application Sept. 2, 1975, Ser. No. 609,405
Claims priority, application Germany, Sept. 8, 1973, 2345381
Int. Cl.² G01S *3/80*
U.S. Cl. 340—2 **22 Claims**

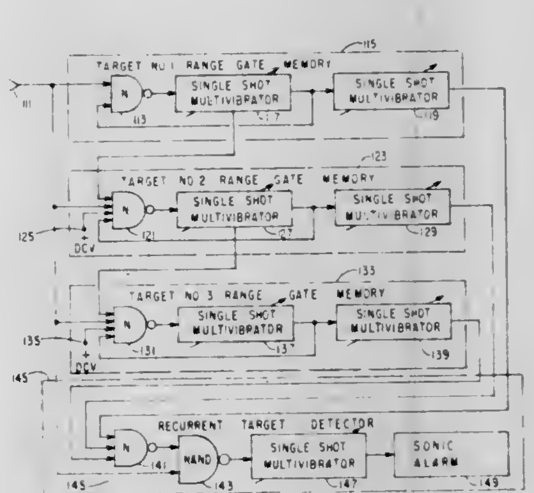


1. In an apparatus for locating sources of sound in water, including a hydrophone system which is mechanically coupled with a compass magnet (north reference) so that one given reference axis of the hydrophone system is automatically aligned with the magnetic field of the earth, a buoy, and means for suspending the hydrophone system from said buoy, after being dropped into the water; the improvement wherein said means for suspending comprises, in combination:
a control box;
a plurality of thin transmission wires, each of which is insulated with an elastic plastic coating and passes freely through the water, electrically connecting the hydrophones of the hydrophone system to said control box;
an elastic suspending cable and electrical connecting cable extending between said control box and said buoy; and,
means for mechanically connecting said hydrophone system to said control box so that seaid hydrophone system is suspended below said control box and, when operable, is rotatable in a recoilless manner about an axis which is perpendicular to the surface of the earth.

4,056,802
SONAR ALARM SYSTEM
James L. Rabon, Panama City, Fla., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.
Filed Mar. 10, 1976, Ser. No. 665,653
Int. Cl.² G01S *9/66*
U.S. Cl. 340—3 R **3 Claims**

1. In combination with a reflective object detecting sonar system including transmitter means for projecting pulses of sonic energy at predetermined sweep intervals and receiver means for providing first electrical signals representative of reflected sonic energy, a target alarm system comprising:
highlight detector means, responsive to said first electrical signals, for providing a second electrical signal corresponding to each highlight reflection of at least a predetermined strength;
shadow detector means, responsive to said first electrical signals, for providing a third electrical signal corresponding to each substantial absence of reflected energy for a predetermined time period;
single shot means, responsive to said second electrical signals, for providing a fourth electrical signal for a predetermined time period after initiation;
coincidence gate means, responsive to coincidence of said second and said fourth electrical signals, for providing fifth electrical signals each representative of a detected highlight reflection followed by a detected shadow, said fifth electrical signals occurring at times in a given sweep





interval corresponding to the ranges of reflective objects giving rise to detected highlights and associated shadows;
range memory means, responsive to occurrences of said fifth electrical signals in a given sweep interval, for initiating sixth electrical signals at times in the following sweep interval corresponding to said ranges; and
target alarm means, responsive to coincidence of at least one of said fifth signals and a corresponding one of said sixth signals, for providing a perceptible output signal corresponding to detection of a highlight and associated shadow at substantially the same range on at least two successive sweeps.

4,056,803

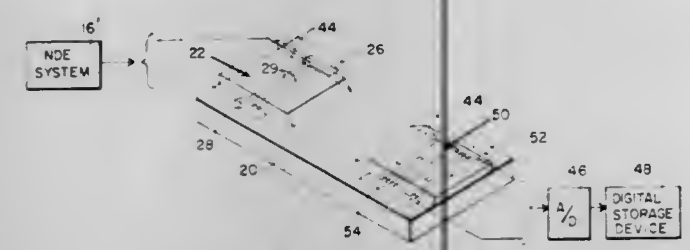
METHOD AND APPARATUS FOR EXTRACTING DERIVATIVES FROM SURFACE ACOUSTIC WAVES

Richard Manning White, Berkeley, and Tzu-Hwa Hsu, San Jose, both of Calif., assignors to The Regents of the University of California, Berkeley, Calif.

Filed Nov. 14, 1975, Ser. No. 632,134

Int. Cl.² H04B *11/00*

U.S. Cl. 340—15 **8 Claims**



1. An apparatus for extracting the second derivative from an acoustic wave, comprising:

a first bus bar;

a second bus bar spaced apart from said first bus bar;

three pairs of parallel fingers coupled to a piezoelectric material and oriented transversely to the direction of travel of the acoustic waves, and wherein the first, fourth, and fifth fingers are coupled to said first bus bar and the second, third, and sixth fingers are coupled to said second bus bar, the center-to-center spacing of the fingers in each pair is equal to one-half the acoustic wavelength, and the end portions of the outer pairs each overlap by an equal amount, and the end portions of the inner pair overlap by an amount equal to two times said equal amount of overlap of said outer pairs, whereby the amplitude contribution of each pair is weighted by an amount equal to the amount of overlap of said fingers in each pair and the difference in amplitude contribution between said outer pairs and said inner pairs is obtained so that the second derivative is extracted from the acoustic wave according to the finite difference approximation of the pulse amplitudes, as follows:

$$\Delta^2 Y_k = Y_k - 2Y_{K-1} + Y_{k-2},$$

wherein Y_k equals the amplitude of the acoustic wave passing a reference point at time k.

4,056,804

OPTICAL CHARACTER RECOGNITION SYSTEMS

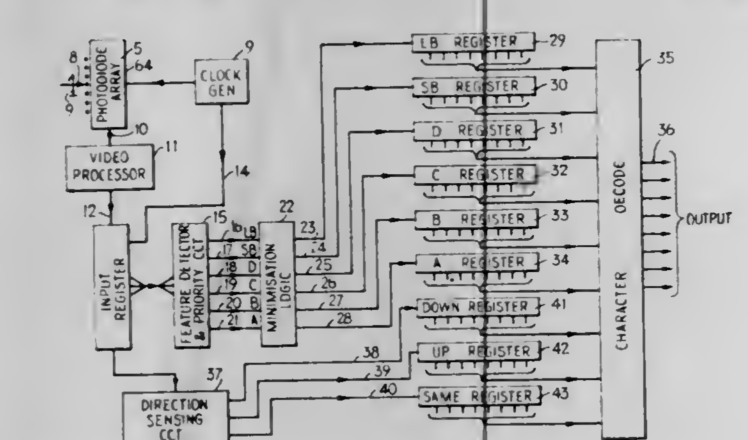
John Alan Whitfield, Wimborne, and Eric William Burdis, Poole, both of England, assignors to Piessey Handel und Investments A.G., Zug, Switzerland

Filed Sept. 10, 1976, Ser. No. 722,132

Claims priority, application United Kingdom, Sept. 11, 1975, 37346/75

Int. Cl.² G06K *9/00*

U.S. Cl. 340—146.3 J **10 Claims**



1. An optical character recognition system comprising a reader head which includes a single line array of photo sensitive elements, a clock pulse generator under control of which the elements of the array are sequentially sampled to produce video output pulses one from each element, the level of each pulse being dependent upon the light incident upon the element from which it originated, all elements being sampled in one scan and the elements being scanned repeatedly, data storage means into which the output pulses derived from the array are clocked under control of the clock pulse generator, a feature detector comprising gating circuits responsive to predetermined signals obtaining contemporaneously in two or more predetermined locations within the store for providing a signal indicating that a feature has been detected, a plurality of different features being detectable, each being regarded as having a certain priority relative to the others, priority selection gating means operative for selecting the feature having the highest priority detected in each scan, minimisation logic circuitry responsive to signals fed from the priority selection gating means and having a plurality of output lines one for each feature on an appropriate one of which a signal is produced each time the highest priority feature selected in the given scan differs from the feature having the highest priority selected in the previous scan, a plurality of feature storage locations one for each detected feature which are individually fed on an appropriate line from the minimisation logic circuitry and clocked synchronously by incoming signals fed on the said appropriate line so as to advance in synchronism data clocked into the feature stores, and a character recognition logic circuit responsive to the signals in the feature stores for providing an output signal indicating that a character has been recognised when predetermined features occur in a predetermined sequence within the feature stores.

4,056,805

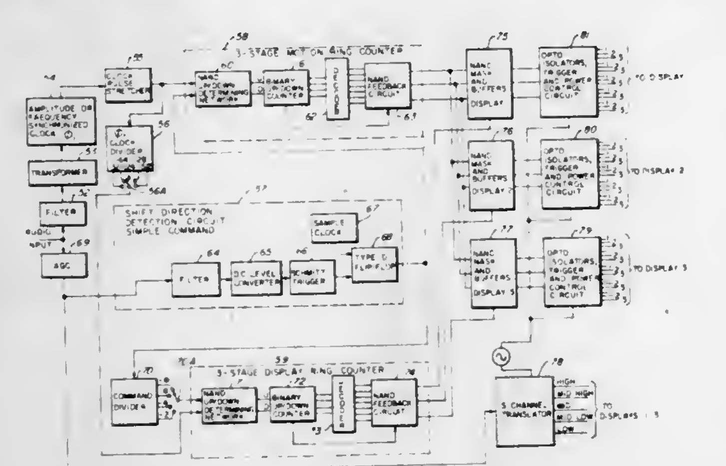
PROGRAMMABLE ELECTRONIC VISUAL DISPLAY SYSTEMS

William M. Brady, P.O. Box 24C14, Los Angeles, Calif. 90024

Filed Dec. 17, 1976, Ser. No. 751,275

Int. Cl.² G08B *5/36*

U.S. Cl. 340—148 **20 Claims**



1. A programmable visual display system for use in presenting visual displays of intelligence carried by an input signal as a function of the intelligence content of the signal and simultaneously as a function of predetermined conditions, comprising:

means for inputting a signal having amplitude, tempo and frequency content information associated therewith;

means for generating timing pulses whose rate is functionally related to and synchronized to an amplitude component of the intelligence carried by said input signal;

means for counting said timing pulses and for generating a count signal representative of the total number of such pulses as a function of time;

memory means, responsive to said count signal, for providing a predetermined first memory output signal comprising a bit pattern which is representative of a predetermined light display pattern; and

display means, responsive to said first memory output signal, for visually displaying a light pattern in response to said bit pattern as a function of time.

4,056,806

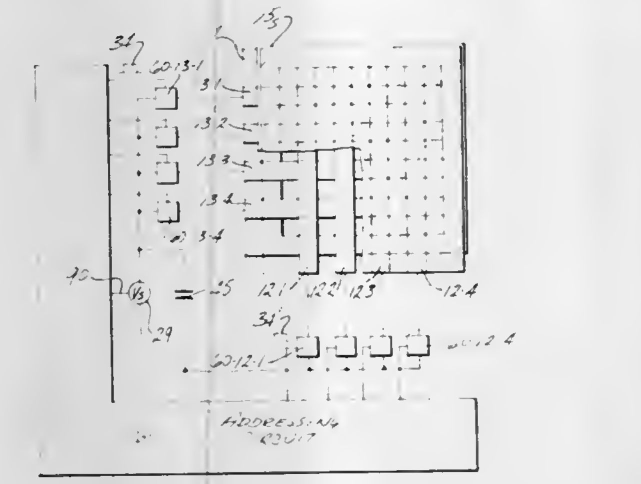
INTERFACING CIRCUITRY AND METHOD FOR MULTIPLE DISCHARGE GASEOUS DISPLAY AND/OR MEMORY PANELS

Larry J. Schmersal, Toledo, Ohio, and William E. Johnson, Temperance, Mich., assignors to Owens-Illinois, Inc., Toledo, Ohio

Continuation-in-part of Ser. No. 161,853, July 12, 1971, which is a continuation-in-part of Ser. No. 699,170, Jan. 19, 1968, Pat. No. 3,618,071. This application Mar. 13, 1973, Ser. No. 340,783

Int. Cl.² G08B *5/36;* **H01J** *17/48*

U.S. Cl. 340—166 EL **2 Claims**



1. A display device arrangement comprising first and second pluralities of conductors arranged so as to define a matrix of crosspoint display cells, and first and second layers of dielectric material disposed between said first and second pluralities of conductors, characterized by a substantially uniform continuous layer of gaseous display material disposed between said first and second layers of dielectric material,

means for selectively addressing individual ones of said display cells to initiate a discharge breakdown threat, and sustaining means connected to each of said display cells and operative upon the initial discharge breakdown of individual ones of said cells for thereafter periodically breaking down said individual ones of said cells; and

said addressing means comprising respective pulse transformers having secondary windings connected to individual ones of said first and second pluralities of conductors, each said transformer having a primary winding connected to a respective address signal input lead, and wherein said sustaining means comprises an alternating signal source connected to the secondary windings of each of said pulse transformers.

4,056,807

ELECTRONICALLY ALTERABLE DIODE LOGIC CIRCUIT

Karvel Kuhn Thornber, Berkeley Heights, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Aug. 16, 1976, Ser. No. 714,650

Int. Cl.² G11C *11/40*

U.S. Cl. 340—166 R **27 Claims**

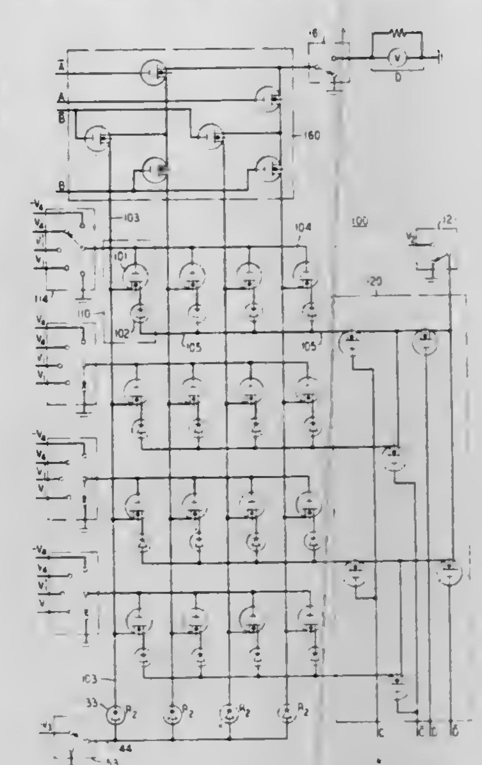
1. A logic circuit which comprises

a. a row column array, MxN in number, of three-terminal electrically unidirectional and reprogrammable logic cells, each cell having a first and a second high current carrying terminal and a third low current carrying gate terminal,

b. a plurality of M first electrically conductive row line means for connecting together the third terminals of all cells in each row to a different gate write-in row terminal,

c. a plurality of M second electrically conductive row line means for connecting together the first terminals of all cells in each row to a different row line signal terminal,

d. a plurality of N third electrically conductive column line means for connecting together the second terminals of all cells in each column to a different one of said column



lines, each column line connected at one terminal thereof to a different two-terminal column electrical load element for inhibiting current in the opposite sense of direction from said unidirectional cell and each column line having a column signal terminal.

4,056,808

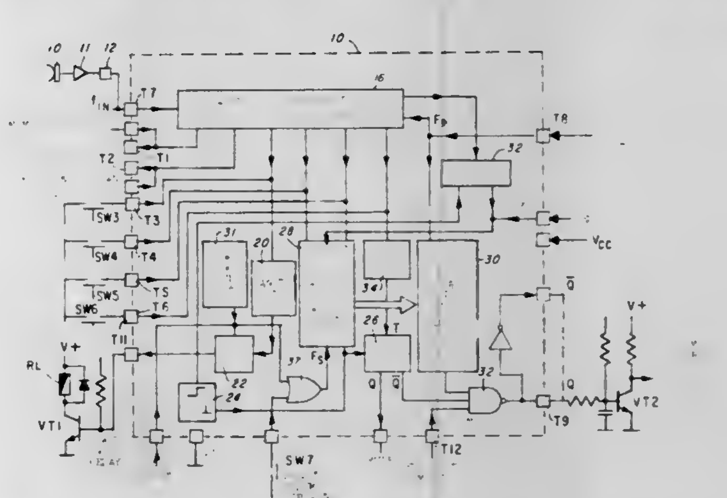
ULTRASONIC REMOTE CONTROL RECEIVER SUITABLE FOR TV RECEIVER

Jean Pierre Benhamou, Houston, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Apr. 30, 1976, Ser. No. 681,928

Int. Cl.² H04B *1/06*

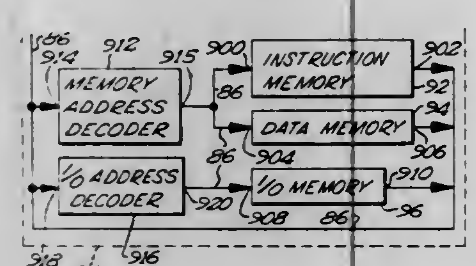
U.S. Cl. 340—171 PF **16 Claims**



1. Remote control receiver for receiving continuous wave command signal pulses of different operating frequencies in individual signal channels within a selected frequency range; said receiver having an individual output for each signal channel; means for dividing the frequency of received command signal pulses by a predetermined factor to produce sequence control pulses; sequence generator means responsive to each sequence control pulse resulting from reception of a command signal within the selected frequency range to initiate a new counting cycle; reference frequency counter means for counting in each of said counting cycles reference frequency pulses having a frequency significantly higher than command signals in said selected frequency range; said command signal pulses in

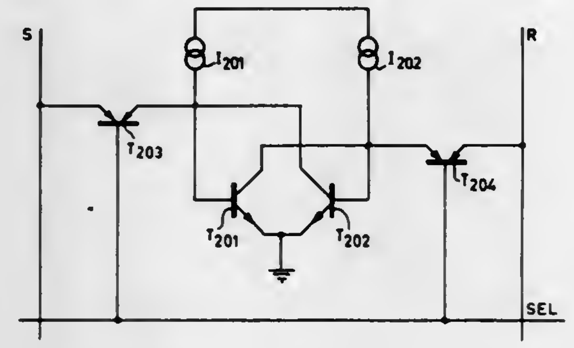
each channel giving rise to a different predetermined count of said reference frequency counter means during a counting cycle; storage means for storing the count of the reference frequency counter reached during a counting cycle; comparator circuit means for comparing at the end of each said counting cycle the count of said reference frequency counter means with the existing count stored by said storage means and for producing a first signal indicating identity between such counts and a second signal indicating non-identity between said counts; second and third counter means; means for applying said first signals as count inputs to said second counter means and as clear inputs to said third counter means; means for applying said second signals as count inputs to said third counter means and as clear inputs to said second counter means; decoder circuit means connected for receiving the count stored by said storage means to generage an output signal at an output of said receiver determined by said count; validation means selectively actuable to transfer the count of said storage means to said decoder circuit means; means responsive to a predetermined count of said second counter means to activate said validation means and means responsive only to a different predetermined count of said third counter means to inactivate said validation means.

4,056,809
FAST TABLE LOOKUP APPARATUS FOR READING MEMORY
John S. Hoerning; Richard P. Halverson, both of Minneapolis, and Darrell E. Nelson, Bloomington, all of Minn., assignors to Data Flo Corporation, Minneapolis, Minn.
Filed Apr. 30, 1975, Ser. No. 573,303
Int. Cl.² G06F *5/02, 9/06*
U.S. Cl. 364—200 **1 Claim**



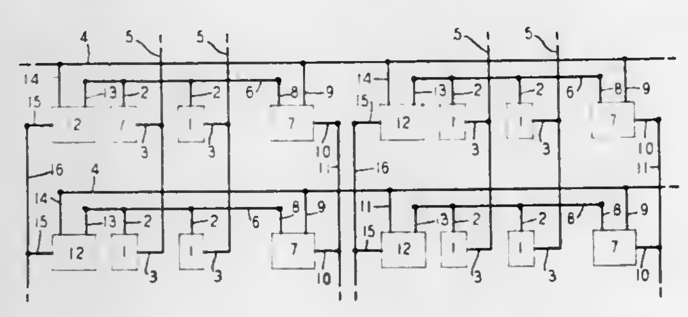
1. Fast table lookup apparatus for reading memory, comprising in combination: a logic bus; a memory device; a microprocessor of the type which provides an output logic signal to the bus comprising the contents of an internal register and which includes means for immediately reading logic signals on the bus into the internal register of the microprocessor; logic means, external to the microprocessor, for recognizing when the microprocessor provides the logic signal output comprising the contents of the internal register and for using the register contents available to address a location within the memory device and for substituting the contents of the memory location within the memory device, conforming to the microprocessor internal register contents, for the microprocessor internal register contents on the bus in time for the memory location contents to be read into the microprocessor as a part of the next input to the microprocessor; means for providing an electrical connection between the logic bus and the memory device; means for providing an electrical connection between the logic bus and the external logic; means for providing an electrical connection between the external logic and the memory device; means for providing an electrical connection between the logic bus and the microprocessor.

4,056,810
INTEGRATED INJECTION LOGIC MEMORY CIRCUIT
Cornelis Maria Hart, and Arie Slob, both of Eindhoven, Netherlands, assignors to U.S. Phillips Corporation, New York, N.Y.
Division of Ser. No. 505,663, Sept. 13, 1974, which is a continuation of Ser. No. 253,348, May 15, 1972, abandoned. This application Jan. 28, 1976, Ser. No. 653,131
Claims priority, application Netherlands, May 22, 1971, 7107040
Int. Cl.² G11C *11/40, 13/00*
U.S. Cl. 365—205 **8 Claims**



1. An integrated semiconductor memory comprising a plurality of groups of first, second, and third transistors each having emitter, base and collector, first and second transistors in each group being connected to form a plurality of cross-coupled trigger flip-flop circuits, said plurality of trigger circuits being arranged in rows and columns, the third transistors being complementary to the first and second transistors, a first read-write line commonly coupled to a column of trigger circuits, means connecting the first read-write line through the emitter-collector path of the third transistor to the base of the first transistor in that group, means for providing a circuit path from the emitters of the first and second transistors to a point of reference potential, a current injector coupled to the base zones of the first and second transistors and capable when forward biased of injecting carriers from a region outside of the first and second transistors and causing collection of the same or corresponding carriers by said base zones biasing the first and second transistors into operative condition, and a voltage supply line connected to the current injector.

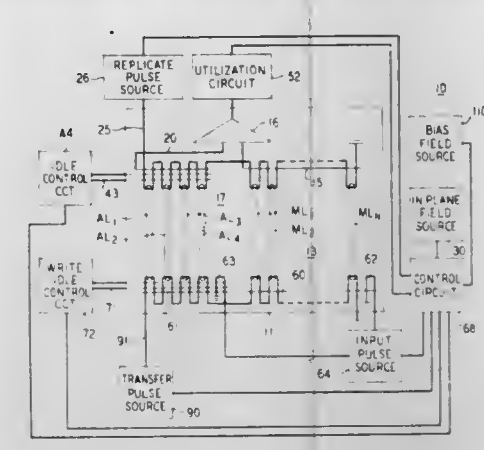
4,056,811
CIRCUIT FOR THE IMPROVEMENT OF SEMICONDUCTOR MEMORIES
Roger T. Baker, P.O. Box 240, Mount Tabor, N.J. 07878
Filed Feb. 13, 1976, Ser. No. 657,769
Int. Cl.² G11C *11/40*
U.S. Cl. 365—189 **6 Claims**



1. In a random access memory of the class wherein
a plurality of memory cells,
a plurality of row conductors, and
a plurality of column conductors are disposed such that each of the said memory cells and a specific plurality of said row conductors are mutually associated with each other, and such that each of said memory cells and a specific plurality of said column conductors are mutually associated with each other,
such that, any particular one of said memory cells may be uniquely selected by selecting both the said specific plurality of column conductors associated with that particular one of the said memory cells, and the said specific plurality of row conductors associated with that particular one of said memory cells, and furthermore,
such that the datum stored in any particular one of said memory cells may be determined by monitoring the electrical characteristics of the said specific plurality of row conductors associated with that particular one of the said memory cells, and appropriately activating the said specific plurality of column conductors associated with that particular one of the said memory cells.
a circuit to improve the output signal from the said memory cell comprised of,
a plurality of subrow conductors, each of said subrow conductors being associated with one of the said row conductors.
means for electrically connecting said memory cells to said subrow conductors such that for each particular row conductor of the said specific plurality of row conductors associated with any particular one of the said memory cells, the said particular memory cell is electrically connected to one of the said subrow conductors which is associated with said particular row conductor,
a plurality of first transistors, each of said first transistors having a control terminal, an input terminal, and an output terminal,
means for electrically connecting the said control terminal of each of the said first transistors to said subrow conductors such that each of said first transistors is electrically connected to one of said subrow conductors, and each of said subrow conductors is electrically connected to one of the said plurality of first transistors,
means for electrically connecting the said input terminal of each of the said first transistors to the said row conductors such that each particular one of the said first transistors is electrically connected to that particular one of the said row conductors with which the particular said subrow conductor which is connected to the said particular first transistor, is associated,
a plurality of second transistors, each of said second transistors having a control terminal, an input terminal, and an output terminal,
means for electrically connecting the said output terminal of each of the said second transistors to the said subrow conductors such that each one of the said subrow conductors is electrically connected to one of the said second transistors,
means for electrically connecting the said input terminal of each of said second transistors to the said row conductors such that each particular one of the said second transistors is electrically connected to that particular one of the said row conductors with which the particular said subrow conductor which is connected to the said particular second transistor, is associated.

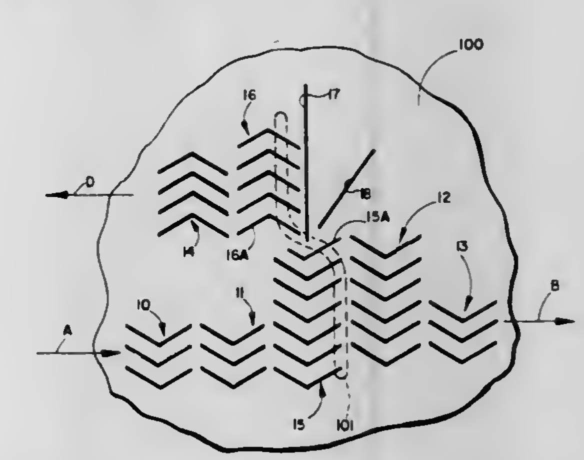
4,056,812
FAULT TOLERANT MAGNETIC BUBBLE MEMORY
Andrew Henry Bobeck, Chatham, and Robert Frederick Fischer, Livingston, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.
Filed May 6, 1976, Ser. No. 683,736
Int. Cl.² G11C *19/08*
U.S. Cl. 365—17 **16 Claims**

1. A magnetic memory comprising a layer of material in which single wall domains can be moved, a plurality of elements coupled to said layer for defining therein a plurality of closed-loop paths in which domain patterns are recirculated synchronously through first positions responsive to a cyclically varying magnetic field, said elements also defining a sequential accessing means and means for selectively moving domain patterns from said first positions to said sequential accessing means, said accessing means including a domain detector, said plurality of paths being organized into a main set and an auxiliary set, said memory also including means for controllably changing the positions in said sequential accessing



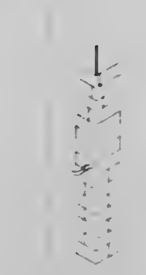
means of the domain pattern from said auxiliary set with respect to that of said main set.

4,056,813
PASSIVE CHEVRON REPLICATOR
Thomas R. Oeffinger, Placentia, and Leonard R. Tocci, Laguna Niguel, both of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.
Filed Oct. 20, 1975, Ser. No. 623,681
Int. Cl.² G11C *11/02*
U.S. Cl. 365—12 **12 Claims**



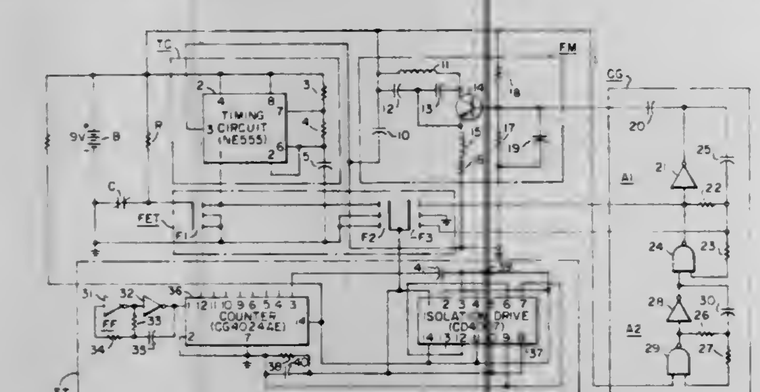
10. A passive replicator for magnetic bubble domains comprising,
a first column of magnetizable chevron elements associated with a first propagation path,
a second column of magnetizable chevron elements associated with a second propagation path,
said first and second columns of magnetizable chevron elements arranged in an overlapping array such that the ends of the chevrons in said first column are aligned approximately with the apices of the chevrons in said second columns, and
an elongated magnetizable bar element arranged to be substantially parallel to said first column of magnetizable chevron elements and aligned with the apices of the chevrons in said second column so as to selectively provide an attracting pole and repelling pole at the end thereof to split a magnetic bubble domain stretched between said first and second columns of magnetizable chevron elements.

4,056,814
MAGNETORESISTIVE ELEMENT FOR DETECTING MAGNETIC BUBBLES
Andrew Henry Bobeck, Chatham, and Henry Evelyn Derrick Scovil, Gladstone, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.
Filed Mar. 10, 1976, Ser. No. 665,421
Int. Cl.² G11C *19/08*
U.S. Cl. 365—8 TF **2 Claims**



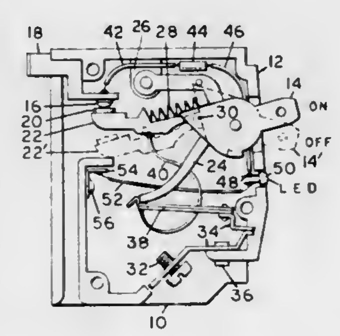
1. A magnetic bubble memory comprising a layer of material in which magnetic bubbles can be moved, a magnetoresistive detector and means for moving said bubbles to said detector, said detector comprising a plurality of chevron elements, said elements being aligned along an axis transverse to the path of bubble movement, said chevron elements being interconnected by interlinking elements into a single magnetoresistive element, said interlinking elements being arranged in at least first, second, and third groups to link together pairs of adjacent elements in at least three different sets of corresponding positions.

4,056,815
BATTERY OPERATED TRANSMITTER CIRCUIT
Arthur Ernest Anderson, Franklin, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.
Filed Feb. 3, 1976, Ser. No. 655,036
Int. Cl.² G08B *21/00, 29/00, 1/00*
U.S. Cl. 340—224 **4 Claims**



1. A battery operated RF transmitter circuit, comprising:
a battery,
an ON-OFF condition responsive device for connecting said battery through a high impedance means when said ON-OFF condition responsive device is in an OFF state to provide minimum current drain from said battery,
transmitter circuit means including:
a cycle timer means,
first switch means responsive to the ON state of said ON-OFF condition responsive device for activating said cycle timer means to connect said battery to said transmitter circuit means,
RF oscillator means connected to said cycle timer means, said cycle timer means periodically activating said RF oscillator means to produce an RF output waveform,
tone code generator means connected to said RF oscillator means and responsive to the ON state of said ON-OFF condition responses means to frequency modulate said RF output to transmit a first predetermined tone indicative of the ON state of said ON-OFF condition responsive device,
self-test circuit means,
second switch means connected between said self-test circuit means and said cycle timer means to periodically activate said cycle timer means in response to said self-test circuit means to connect said battery to said transmitter circuit means and activate said RF oscillator means to produce an RF output signal, the activation of said cycle timer means by said second switch means further activating said tone code generator means to frequency modulate said RF output at a frequency to transmit a second predetermined tone distinct from said first predetermined tone and indicative of a circuit test signal, said cycle timer means determining the duration and repetition rate of said first and second predetermined tones.

4,056,816
LIGHT EMITTING DIODE BLOWN CIRCUIT BREAKER INDICATOR
Raul Guim, 834 Venetia, Coral Gables, Fla. 33135
Filed Oct. 5, 1976, Ser. No. 729,664
Int. Cl.² G08B *21/00*
U.S. Cl. 340—253 A **6 Claims**

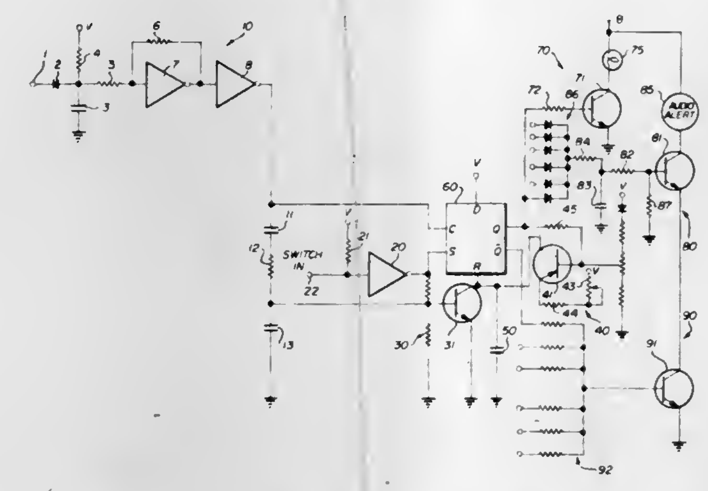


1. In a conventional circuit breaker (10) having a stationary contact (16) on a line terminal clip (18), a movable contact (20), a contact carrier (22) having the movable contact (20) mounted thereon, an operating mechanism including a handle (14) for manually moving the movable contact carrier (22) to selectively open and close the line circuit contact (16 and 20), a load terminal (32) from which the load circuit extends through the line contacts (16 and 20), a tripping mechanism including an overload circuit responsive member (38) in the load circuit between the movable contact (20) and the load terminal contact (32) for moving the contact carrier (22) to open the contacts and interrupt the load circuit in response to an overload condition through the overload responsive member (38); the improvement comprising a blown circuit indicator circuit (42-56 and 24', 22, 40) in parallel with the load circuit, said blown load circuit indicator parallel circuit being connected to the line circuit and load circuit terminals (18 and 32) and through and including a resistor (44) in series with a light emitting diode (50), a fixed contact (56), and a movable parallel circuit contact (24') held in parallel circuit interrupting position by said overload responsive member (38) until said overload responsive member is actuated to load circuit interrupting position to thus actuate said parallel circuit contact (24') to parallel circuit completing position (24') to light up said light emitting diode (50) to remain lit up to indicate that the load circuit breaker has blown.

4,056,817
SYSTEM FOR MONITORING A PERIODIC FUNCTION
Wesley J. Bachman, Auburn, Ill., assignor to Dickey-john Corporation, Auburn, Ill.
Filed Nov. 22, 1976, Ser. No. 744,174
Int. Cl.² G08B *21/00*
U.S. Cl. 340—253 Y **13 Claims**

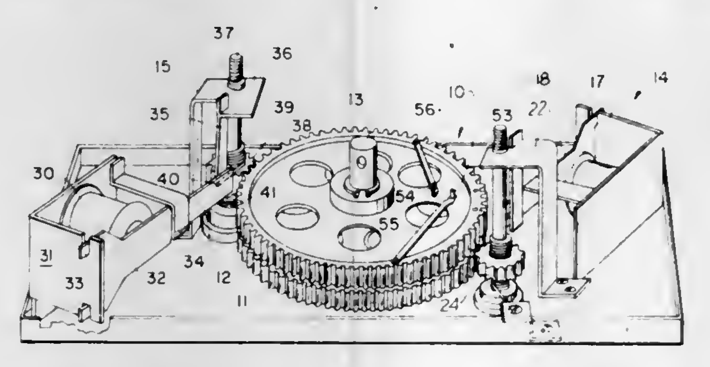
1. A system for monitoring the frequency of a periodic function and indicating whether or not said function frequency

differs from a predetermined frequency, said function frequency being represented by an electrical signal having a parameter which varies systematically in accordance with the period of said function, said system comprising:
means for generating a control signal having a characteristic which starts at a reference level and attains a predetermined level after the passage of a preselected period of time;
first switching means coupled to said control signal generating means and having two switching states, said first switching means being normally biased to one of said switching states but responsive to said control signal characteristic attaining said predetermined level for switching to the other of said switching states;



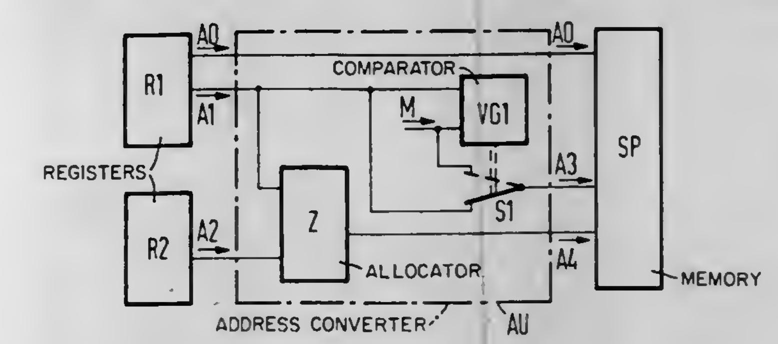
indicating means coupled to said first switching means for indicating which state said switching means is in; and
second switching means coupled to said control signal generating means and responsive to said systematic variation of said parameter for periodically resetting said characteristic of said control signal to said reference level, whereby the first switching means is in one of its two switching states when the function period is less than the preselected period of time and is in the other switching state when the function period is greater than the preselected period of time, and the system thus indicates whether or not the function is occurring at the predetermined frequency.

4,056,818
AUTOMATIC SURVEILLANCE SYSTEM FOR TIME SEQUENCE OPERATIONS
Robert Oddsen, 136 W. Waterview, Northport, N.Y. 11768
Filed Dec. 29, 1975, Ser. No. 644,697
Int. Cl.² G08B *21/00*
U.S. Cl. 340—309.4 **33 Claims**



1. Automatic surveillance system for time sequence operations which comprises:
first and second rotary members mounted in operative facing relation for rotation about a common axis,
first and second pulse energized rotation imparting means operatively arranged to move independently said first and second rotary members respectively in selective amplitude rotational increments in accordance with the timing of the corresponding pulses of said first and second rotation imparting means,
sensing means moving with said first member and selectively rotationally spaced contact means for said second member in operative relation to said sensing means for ascertaining a difference in relative rotational movement between said first and second members, and
means for energizing one of said rotation imparting means at a predetermined time pulse and means for energizing the other of said rotation imparting means at a random time pulse in dependence upon the time sequence operation under surveillance.

4,056,819
ADDRESS CONVERTER
Eberhard Lukas, Wolfratshausen, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany
Filed Feb. 4, 1976, Ser. No. 655,145
Claims priority, application Germany, Feb. 26, 1975, 2508373
Int. Cl.² G11C *8/02;* G06F *5/00*
U.S. Cl. 340—347 DD **7 Claims**



1. An address converter for converting first addresses into second addresses which are fed to a memory of a data processing device, wherein the first addresses contain first and second address words and the second addresses contain third and fourth address words, said address converter comprising:
a comparator for receiving a first address word and a predetermined binary number and responsive thereto to provide a first binary value when the first address word is less than the predetermined binary number and a second binary value when the first address word is not less than the predetermined binary number;
transfer switch means for receiving the first address word and the predetermined binary number, said transfer switch means connected to the memory and connected to and operated by said comparator to selectively feed the first address word and the predetermined binary number to the memory as a third address word in response to the first and second binary values, respectively; and
an allocator for receiving the first and second address words, said allocator connected to the memory and responsive to the first and second address words to feed a fourth address word to the memory.

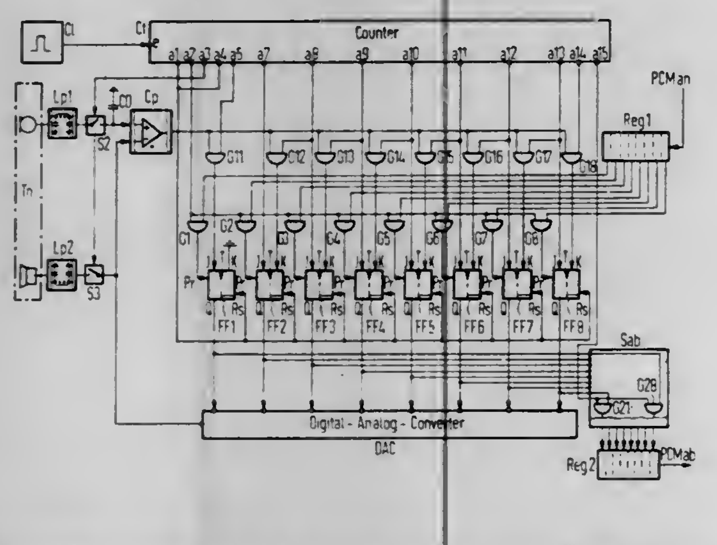
4,056,820
REVERSIBLE ANALOG TO DIGITAL CONVERTER
Ernst Hofer, Munich, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany
Filed July 27, 1976, Ser. No. 709,125
Claims priority, application Germany, July 30, 1975, 2534109
Int. Cl.² H03K *13/02*
U.S. Cl. 340—347 C **5 Claims**

1. Apparatus for converting analog signals from a source thereof into digital signals for transmission and transmitted digital signals into analog signals for an analog receiver, comprising:
digital to analog converter means,
comparator means having a first input connected to an output of said digital to analog converter means and a second input connected to receive said analog signals from said source,
a multistage binary counter,

intermediate register means having a plurality of bistable stages,

first logic means coupled to receive an output from said comparator means and to enable communication of outputs from predetermined ones of said stages of said counter to respective ones of said stages of said intermediate register,

means coupled to a first predetermined stage of said binary counter and responsive to an output signal therefrom for enabling the communication of a digital signal to be converted to said digital to analog converter during a first interval when a digital to analog conversion is to take place



gate means coupled to a second predetermined stage of said binary counter and responsive to an output signal therefrom for rendering said digital to analog converter operative during an interval when an analog to digital conversion is to take place,

output register means having inputs connected, respectively, to outputs of said intermediate register for producing output digital signals, and

input register means having an input for receiving digital signals to be converted and outputs connected, respectively, to set inputs of said bistable stages of said intermediate register means.

4,056,821

TEXTUAL PROCESSING SYSTEM UTILIZING DISPLAY AIDED ASSOCIATIVE SEARCHING FEATURE

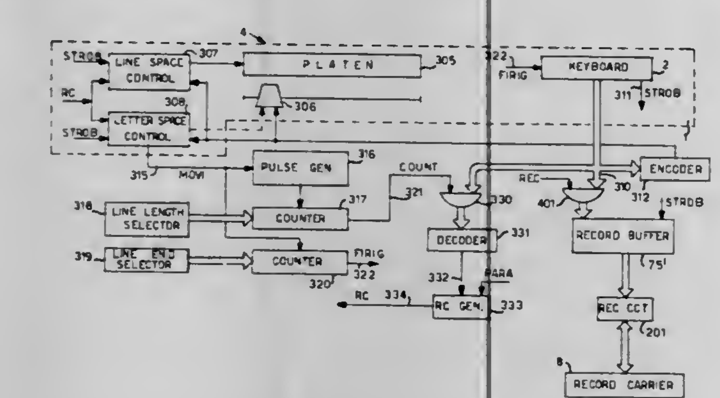
Vittore Vittorelli, Ivrea (Turin), Italy, assignor to Ing. C. Olivetti & C., S.p.A., Ivrea (Turin), Italy

Filed Apr. 9, 1976, Ser. No. 675,399

Claims priority, application Italy, Apr. 29, 1975, 68086/75; Apr. 18, 1975, 67984/75

Int. Cl.² G06F *3/12, 3/14, 7/28;* **G11B** *27/02*

U.S. Cl. 364—900 **7 Claims**



1. A textual processing system comprising:

a keyboard having a plurality of symbol printing keys providing alphanumeric printing signals;

a record mode signal means for conditioning the system into a record mode of operation;

a search mode signal means for conditioning the system into a search mode of operation;

a start search signal means for providing a start search signal which commences the search mode of operation;

a control unit connected to said keyboard and including; temporary storage means having a plurality of storage locations, each location having a capacity of storing the alphanumeric printing signals corresponding to alphanumeric print symbols;

a record unit connected to said control unit including: means for recording the alphanumeric printing signals on a recording medium from said temporary storage means, means for reading said signals from the recording medium into said temporary storage means, and drive means for moving the recording medium;

type means operable in response to said alphanumeric printing signals to print corresponding alphanumeric symbols in a line;

a display unit connected to said control unit and receptive of the alphanumeric printing signals from said temporary storage means for displaying corresponding alphanumeric symbols, said display unit having the capacity of displaying a maximum predetermined number of alphanumeric symbols; and

said control unit further including: first operating means enabled in said record mode to operate said recording means and said drive means to sequentially record onto the recording medium the alphanumeric printing signals as sequentially entered from said keyboard,

storing means enabled in said search mode for storing a group of alphanumeric printing signals entered from said keyboard and not exceeding in number said maximum predetermined number, into a first section of said temporary storage means,

second operating means enabled in said search mode for operating said display unit to display the symbols corresponding to the signals stored in said first section of said temporary storage means,

first means responsive to said start search signal for operating said reading means and said drive means for sequentially shifting the signals read from the recording medium into a second section of said temporary storage means, each location of said first section being in correspondence with a location of said second section,

comparing means enable in said search mode upon reception of said start search signal for continuously comparing, during the operation of said reading means, the alphanumeric printing signals stored in the location of said first section of the temporary storage means with the signals stored in the corresponding locations of said second section of the temporary storage means, and for generating a match signal when a match occurs,

second means responsive to said match signal for terminating the operation of said reading means and said drive means, and

third means responsive to said match signal for operating said display unit to display the entire content of said second section of said temporary storage means.

4,056,822

LOW PROFILE SINGLE CHANNEL THERMAL ANALOG RECORDER

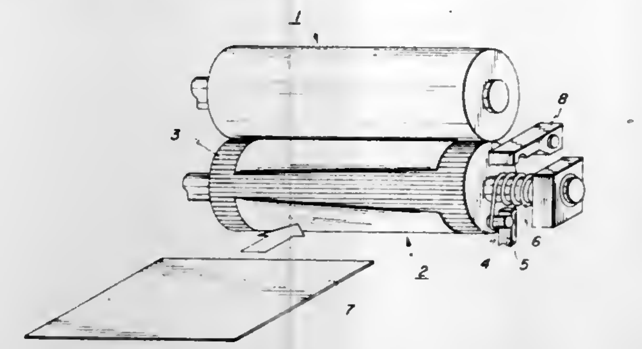
David D. Thornburg, Los Altos, and Geoffrey O. Thompson, Palo Alto, both of Calif., assignors to Xerox Corporation, Stamford, Conn.

Filed Dec. 3, 1976, Ser. No. 747,164

Int. Cl.² G01D *15/10, 15/24;* **H05B** *3/20*

U.S. Cl. 346—76 R **10 Claims**

1. A thermal analog recorder comprising an upper thermally conductive roller and an electrically insulating lower roller which is engageably positioned with respect to said upper roller to provide a nip therebetween through which recording paper may pass, said lower roller having disposed on at least part of the surface thereof a tapered resistor heating element said tapered resistor element comprising a tapered electrically resistive element which develops a non-uniform temperature profile upon electrical energization from the output of a test



source, a pin carried by the lower roller, a pin stop against which said pin is loaded in the rest position by a coil spring, and a latch which is positioned to terminate the travel of the pin upon insertion of the heat sensitive recording paper.

4,056,823

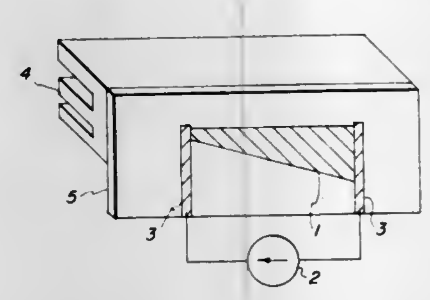
ANALOG CHART RECORDER EMPLOYING THERMAL PRINTING MEANS

David D. Thornburg, Los Altos, Calif., assignor to Xerox Corporation, Stamford, Conn.

Filed Dec. 3, 1976, Ser. No. 747,165

Int. Cl.² G01D *15/10;* **H05B** *3/20;* **H01C** *3/08*

U.S. Cl. 346—76 R **6 Claims**



1. An analog chart recorder comprising a heater assembly said assembly comprising a tapered electrically resistive element which develops a non-uniform temperature profile on electrical energization along its length, a substrate which underlies said resistive film which is in thermal contact with said resistive film, a heat sink in thermal contact with said substrate which provides that the temperature distribution will achieve steady state, and means for advancing a heat sensitive media past and in contact with the heater assembly.

4,056,824

DEVELOPING APPARATUS FOR DIAZO COPYING MACHINE

Kiyotaka Iiyama; Takeshi Matsui, both of Yokohama; Shigeru Kusakata, Kawasaki, and Michihisa Takahashi, Tachikawa, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Sept. 1, 1976, Ser. No. 719,864

Claims priority, application Japan, Sept. 3, 1975, 50-106799; Sept. 4, 1975, 50-107402

Int. Cl.² G03D *7/00*

U.S. Cl. 354—300 **15 Claims**

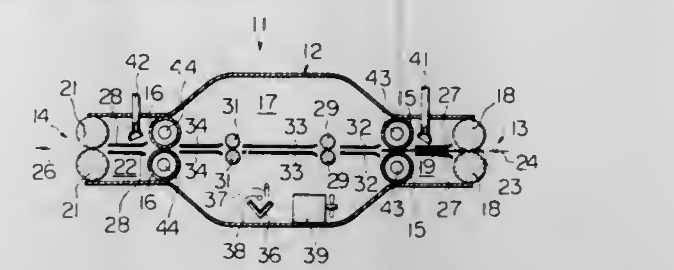
1. In a diazo copying machine, a developing apparatus comprising:

a housing formed with an inlet opening and an outlet opening;

a pair of inner inlet feed rollers and a pair of inner outlet feed rollers operatively disposed in the housing in substantially sealing cooperation to define therebetween a developing chamber within the housing;

a pair of outer inlet feed rollers provided within the housing adjacent to the inlet opening in substantially sealing cooperation to define with the inner inlet feed rollers an inlet chamber therebetween;

a pair of outer outlet feed rollers provided within the housing adjacent to the outlet opening in substantially sealing cooperation to define with the inner outlet feed rollers an outlet chamber therebetween;



means for introducing a vaporized developing fluid into the developing chamber; and

heating means provided in the housing to maintain the developing chamber and inlet and outlet chamber at temperature high enough to prevent condensation of the developing fluid and water vapor therein.

4,056,825

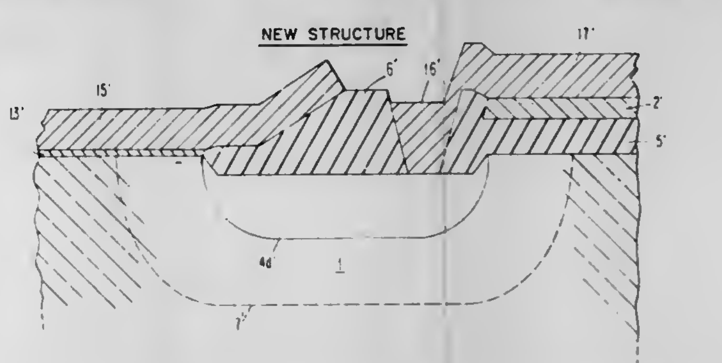
FET DEVICE WITH REDUCED GATE OVERLAP CAPACITANCE OF SOURCE/DRAIN AND METHOD OF MANUFACTURE

Ronald Philip Esch, Manassas, Va., assignor to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 591,995, June 30, 1975, abandoned. This application Feb. 17, 1977, Ser. No. 769,801

Int. Cl.² H01L *29/78, 29/34, 29/04*

U.S. Cl. 357—23 **11 Claims**



1. A semiconductor device having reduced parasitic capacitance comprising

a. a semiconductor substrate of a first conductivity type,

b. a first insulating layer including an opening disposed on the substrate,

c. at least one diffused region of a second conductivity type disposed in the substrate and beneath the opening in the layer,

d. a second insulating layer disposed on the first insulating layer and in the opening, the second layer in the opening having a thicker dimension than the first insulating layer,

e. a third insulating layer disposed on the substrate adjacent to but not extending over the diffused region, and

f. a conductor overlying the third insulating layer and at least a portion of the second layer, the parasitic capacitance related to the conductor overlap of the second and third layers being less than 0.039 picofarads per mil along one side of the conductor dimension over the diffused region.

4,056,826

SUBCARRIER REGENERATION CIRCUIT FOR COLOR TELEVISION RECEIVERS

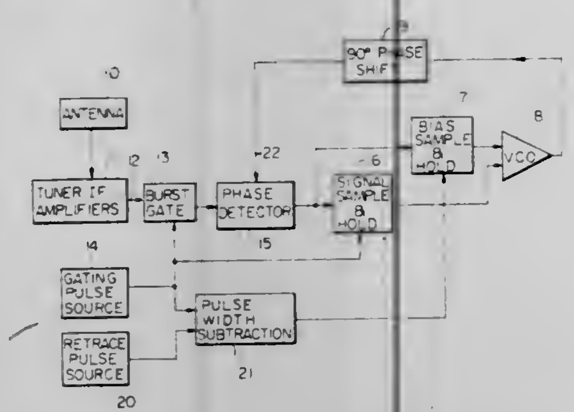
Yasuaki Watanabe; Yukio Okabe, and Mitsuru Hayakawa, all of Yokohama, Japan, assignors to Victor Company of Japan, Limited, Japan

Filed Oct. 15, 1976, Ser. No. 732,598

Claims priority, application Japan, Oct. 16, 1975, 50-140053[U]

Int. Cl.² H04N *9/46*

U.S. Cl. 358—19 **6 Claims**



1. A subcarrier regeneration circuit for a color television receiver adapted to receive a composite color television signal including a color burst contained in a flyback interval and a chroma signal between successive ones of the flyback intervals, the subcarrier regeneration circuit comprises:

a phase detector for generating an output representative of the difference in phase between the color burst and a reference subcarrier;

a first sample-and-hold circuit operable to sample the output from the phase detector during the interval of the color burst and storing the sampled signal into a first capacitor;

means for generating a sampling pulse with a duration equal to the flyback interval minus the interval of the color burst;

a second sample-and-hold circuit operable to sample the output from the phase detector during the interval of said sampling pulse and storing the sampled signal into a second capacitor; and

a voltage controlled oscillator receptive of the voltage difference between the first and second capacitors to generate a signal at said reference subcarrier and operable to control the frequency and phase of said subcarrier in accordance with said voltage difference.

4,056,827

OPTICAL SYSTEMS FOR THE DISPLAY OF VISUAL IMAGES

Archer Michael Spooner, South Nutfield, and Paul Michael Murray, Tunbridge Wells, both of England, assignors to Redifon Limited, London, England

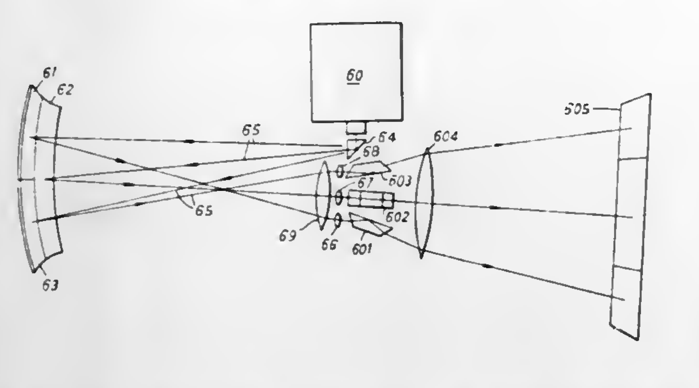
Filed Oct. 28, 1975, Ser. No. 626,546

Claims priority, application United Kingdom, Oct. 30, 1974, 46942/74

Int. Cl.² H04N *7/18*

U.S. Cl. 358—87 **8 Claims**

1. An optical display system, for the display of visual images, comprising a first optical system for viewing an object and providing a first image having a first format, a second optical system for dissecting said first image and providing a second image having a second format different from said first format, an electro optic system for viewing the said second image and providing a third image, substantially reproducing said second image parts and having substantially the same (second) format, and a third optical system for viewing the said third image and providing a fourth image substantially reproducing the said fourth image parts and having substantially the same (first) format in which the said first image format and said format (final) image format are both wide-angle image formats, having at least three times as great width as height, and said first image is dissected into and said fourth (final) image is reproduced from at least three image parts separated at boundaries all of



which are off-centre with respect to the said first and said fourth (final) images.

4,056,828

RUN LENGTH ENCODING AND DECODING METHODS AND MEANS

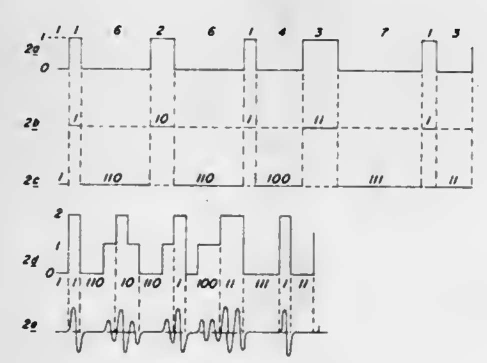
Eiichiro Furuta, Ebina, Japan, assignor to Xerox Corporation, Stamford, Conn.

Filed Sept. 27, 1976, Ser. No. 726,865

Claims priority, application Japan, Sept. 29, 1975, 50-117394

Int. Cl.² H04N *7/12*

U.S. Cl. 358—133 **7 Claims**



1. A data compressor for compressing a binary video signal having a raster scan format, said video signal having one logic level for background representing picture elements and an opposite logic level for image representing picture elements; said compressor comprising the combination of

white run length encoding means for converting runs of said video signal at said one logic level into binary white run length message codes,

black run length encoding means for converting runs of said video signal at said opposite logic level into binary black run length message codes, and

ternary encoding means for alternatively responding to the binary white and black message codes from each scan line of said video signal and for selectively level shifting bits of said message codes to provide a series of ternary black and white run length message codes having intra-scan line code boundaries marked by distinctive amplitude transitions.

4,056,829

DEVICE FOR DETACHABLY MOUNTING A MANUSCRIPT ON A ROTARY CYLINDRICAL DRUM FOR CYLINDER SCANNING TYPE FACSIMILES

Masachika Ikeda, Tokyo, Japan, assignor to Olympus Optical Co. Ltd., Tokyo, Japan

Filed June 7, 1976, Ser. No. 693,927

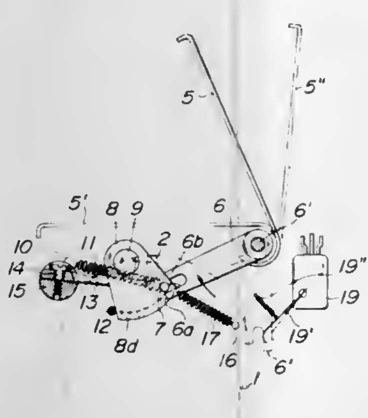
Claims priority, application Japan, June 11, 1975, 50-70301

Int. Cl.² H04N *1/03*

U.S. Cl. 358—256 **1 Claim**

1. An apparatus for detachably mounting a manuscript on a

cylindrical drum for cylinder scanning type facsimiles, employing a rotary cylindrical drum (1) around which is wound a manuscript (20), a clamping bar (2) arranged in parallel with an axis of the rotary cylindrical drum (1) being resiliently urged against the drum (1) so as to detachably move one end of the manuscript (20) on the drum (1), said apparatus including a drum cover (5) having one end rotatably mounted on a shaft (6′) for supporting frame (1′) and being disposed to open and close an opening provided for casing means enclosing the drum (1) therein, a cam operated lever (6) being integral and rotatable with drum cover (5) at one end, a segmental cam (8) rotatably mounted on a pivot (9) secured to the supporting frame (1′), said cam (8) having stepped cam surface portions at its peripheral edge formed of a lower portion (8*a*), a higher portion (8*b*) and a tapered portion (8*c*) extending between the lower and higher portions (8*a*), (8*b*), the higher portion being terminated at a projection (8*d*), said cam (8) being further



defined by a pin (7) which is connected through a spring 11 passing over the center axis of said pivot (9) of the segmental cam (8) in response to movement of cover (5) from closed to fully open positions, respectively, an arm (13) cooperating with said clamping bar (2) and having one end rotatably supported by a pin (14) threadedly engaged to shaft (15) disposed perpendicular to said pin (14) and rotatable about its axis, the free end of said arm (13) being resiliently urged against said stepped cam surface portion of said segmental cam (8); block piece (18) associated with arm (13) being adapted to selectively operate said clamping bar (2), and microswitch 19 having normally open contacts which close responsive to the operation of said cam operating lever (6) when said drum cover (5) arrives at its fully closed position (5′) to thereby energize a driving motor of said drum (1), and the contacts of microswitch (19) being open responsive to opening of said drum cover (5) for deenergization of said driving motor of said drum (1).

4,056,830

UTILIZING DATA FOR TRANSDUCER POSITIONING

Douglas A. Smith, Blairadam by Kelty, Scotland, assignor to Burroughs Corporation, Detroit, Mich.

Division of Ser. No. 527,896, Nov. 27, 1974. This application Feb. 17, 1977, Ser. No. 769,614

Claims priority, application United Kingdom, Mar. 15, 1974, 11610/74

Int. Cl.² G11B *5/09, 5/43*

U.S. Cl. 360—51 **9 Claims**

1. A method of recording data at different clock frequencies on a plural-track record disk comprising the steps of:

detecting addresses of a plurality of tracks;

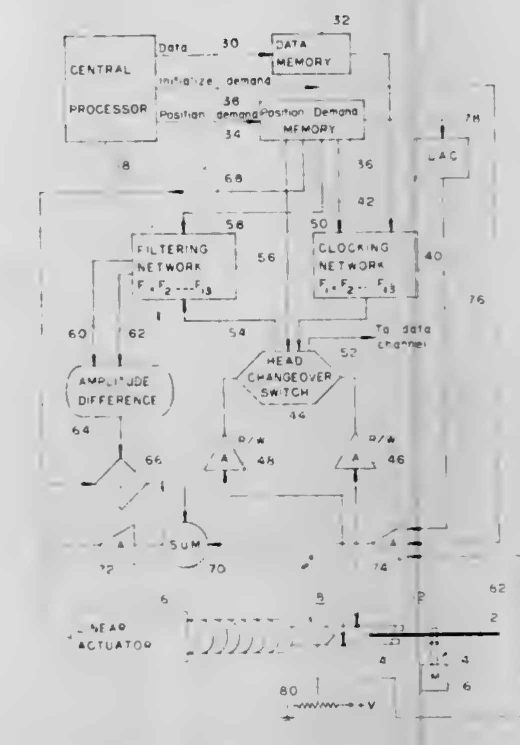
generating a nominal clock frequency;

varying said nominal clock frequency by a predetermined amount, said amount dependent on said detected addresses;

generating a plurality of differing clock frequencies from said varying nominal clock frequency, said plurality of clock frequencies corresponding to said plurality of detected track addresses;

sorting said differing clock frequencies into a plurality of frequency groups;

dividing each of said frequency groups into two subgroups wherein said differing clock frequencies increase with respect to said nominal clock frequency in one of said subgroups and decrease with respect to said nominal clock frequency in said other subgroup; and



recording said data at said plurality of clock frequencies on said plural-track record disk, each of said differing clock frequencies being interlaced between adjacent tracks such that each odd track has a relatively large clock frequency difference with respect to an adjacent even track but a relatively small clock frequency difference with respect to a next closest odd track, said clock frequency at which said data is recorded being the same at corresponding tracks among said plurality of groups.

4,056,831

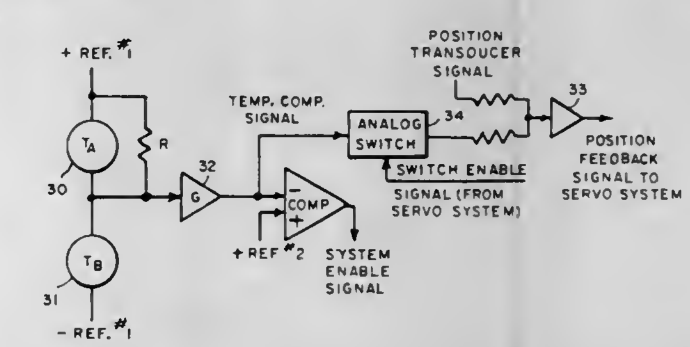
THERMAL COMPENSATION FOR DISK PACK SYSTEMS

Joseph C. Godbout, Acton, and Michael A. Feldstein, Sudbury, both of Mass., assignors to Data General Corporation, Southboro, Mass.

Filed Sept. 1, 1976, Ser. No. 719,819

Int. Cl.² G11B *21/08, 21/10*

U.S. Cl. 360—77 **5 Claims**



1. Temperature compensation means for disk storage systems which include a base member, means for mounting one or more disks having a plurality of data information tracks, one or more record/read heads capable of being movably positioned with respect to said tracks for recording data information on or reading data information from said tracks, and position servo loop means for controlling the movement of said one or more heads to a commanded position in response to a position command signal, said loop means including means for providing a position feedback signal representing the position of said one

or more heads with respect to said tracks, said temperature compensation means comprising

temperature error sensing means for providing a temperature compensation error signal;

means for combining said temperature compensation error signal with said position feedback signal to provide a combined feedback signal and for supplying said combined feedback signal to said position servo loop, and

means responsive to said temperature compensation error signal for producing a disk storage system enable signal when said temperature compensation error signal is below a selected amplitude level.

4,056,832

SERVO SYSTEM FOR CONTROLLING THE POSITION OF A READING HEAD

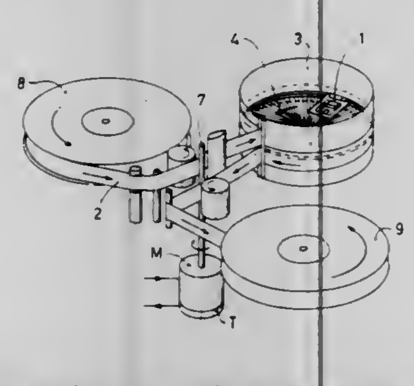
Jacob de Boer, and Anthonie Walraven, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 590,138, June 25, 1975, abandoned. This application Mar. 4, 1977, Ser. No. 774,523

Claims priority, application Netherlands, July 15, 1974, 7409513; Jan. 14, 1975, 7500395

Int. Cl.² G11B *21/04, 21/10*

U.S. Cl. 360—77 **12 Claims**



1. A servo system for controlling the position of a magnetic reading head relative to the center of a selected data track in a magnetizable layer of a recording medium that is relatively movable with respect to the reading head and is provided with a plurality of spaced tracks extending parallel to each other, said system comprising means for receiving short wave information signals and at least two ordered long-wave positioning signals, each of said long-wave positioning signals having a different frequency, means for recording said information signals in successive tracks and for successively superimposing each ordered position signal in separate ones of said data tracks in longitudinal alignment with said short-wave information signals in the magnetizable layer in which the data tracks are recorded, said positioning signals having a wavelength of a magnitude sufficient to produce crosstalk in a reading head placed over said selected data track, the wavelength of said short-wave information signals being of a magnitude insufficient to produce a crosstalk signal in said reading head placed over said selected data track, the spacing between tracks in which adjacent longwave positioning signals are recorded being at most equal to twice the spacing between the tracks in which the short-wave information signals are recorded, the adjacent recorded long-wave positioning signals having different frequencies, a magnetic reading head having a gap width substantially equal to the width of each track so as to scan the full width of a selected track and to simultaneously read all signals in said selected track and only the long-wave positioning signals in the tracks on either side thereof, said reading head producing during reading a composite signal, frequency sensitive electronic means for separating the two positioning signals read from the tracks on either side of the selected tracks from the composite signal, means for effecting a frequency comparison between the positioning signals and producing a servo signal which is a function of the deviation of the reading head from the center of the selected track and means responsive to the servo signal for adjusting the relative position between said reading head and said magnetic medium to align said reading head with said selected data track.

4,056,833

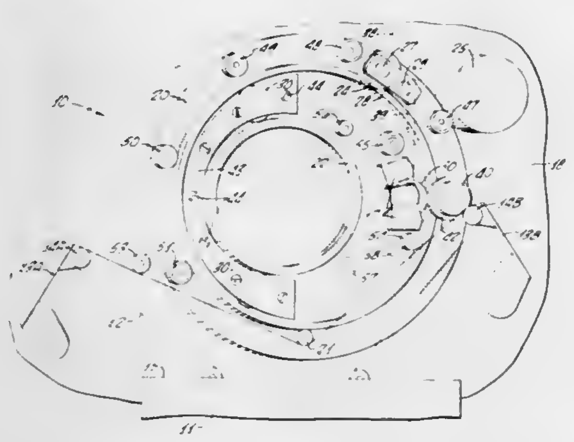
TURNTABLE ASSEMBLY FOR VIDEO CASSETTE RECORDER/REPRODUCER

Gordon Schulz, Villa Park, Calif., assignor to Odetics, Inc., Anaheim, Calif.

Filed Mar. 10, 1976, Ser. No. 665,689

Int. Cl.² G11B *15/66*

U.S. Cl. 360—85 **16 Claims**



1. A turntable assembly for helically threading tape which has been withdrawn from a video cassette around a video scanner and across a plurality of longitudinal magnetic recording/reproducing heads, the rotational axis of said video scanner being tilted relative to said cassette, comprising:

an annular turntable ring surrounding said video scanner and said heads and having a rotational axis which is tilted relative to said rotational axis of said scanner and said video cassette, said magnetic heads being positioned in parallel, spaced relationship, coplanar to said turntable ring;

means for rotating said turntable ring between first and second positions; and

a lead guide post fixedly mounted on said turntable ring and extending perpendicular thereto, said lead guide post being positioned, in said first position of said turntable ring, out of the plane of said cassette, said lead guide post, upon rotation of said turntable ring from said first to said second position, intersecting the plane of said video cassette so as to engage said tape withdrawn therefrom and wrap said tape around said scanner, said lead guide post threading said tape across all of said longitudinal magnetic heads as said turntable ring rotates from said first to said second position, said turntable ring rotating through an angle greater than 360° in threading said tape around said scanner and across said magnetic heads.

4,056,834

MAGNETIC VIDEO RECORDER AND CASSETTE PROVIDING TAPE LOADING

Mamoru Hiroyasu, Saijo, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed May 20, 1976, Ser. No. 688,288

Claims priority, application Japan, May 26, 1975, 50-63186

Int. Cl.² G11B *15/66, 23/04*

U.S. Cl. 360—85 **7 Claims**

1. In combination, a magnetic tape cassette and a magnetic video recording and reproducing apparatus for use with a magnetic tape,

said magnetic tape cassette comprising,

a cassette casing,

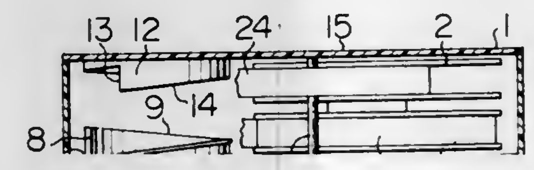
supply and take-up reels mounted rotatably within said cassette casing, said magnetic tape being supplied by said supply reel and taken up by said take-up reel,

a hollow cylindrical member having a longitudinal axis defining an axial direction, said magnetic tape being wound spirally around said hollow cylindrical member,

supporting means for supporting said hollow cylindrical member within said cassette casing so that said hollow cylindrical member is translated in the axial direction when said hollow cylindrical member is rotated about said longitudinal axis, and

said magnetic video recording and reproducing apparatus comprising,

a magnetic head drum having a rotatable magnetic head, said magnetic head drum being received in the hollow interior of said hollow cylindrical member when said magnetic tape cassette is mounted on said magnetic video recording and reproducing apparatus, and



driving means mounted within said magnetic video recording and reproducing apparatus for engaging said hollow cylindrical member and rotating it selectively in either direction, said magnetic tape wound around said hollow cylindrical member being thereby transferred onto said magnetic head drum when said hollow cylindrical member is withdrawn from said cassette case by rotating it in one direction by said driving means, said magnetic tape wound around said magnetic head drum being transferred onto said hollow cylindrical member when said hollow cylindrical member is moved into said cassette casing by rotation thereof in the opposite direction by said driving means.

4,056,835

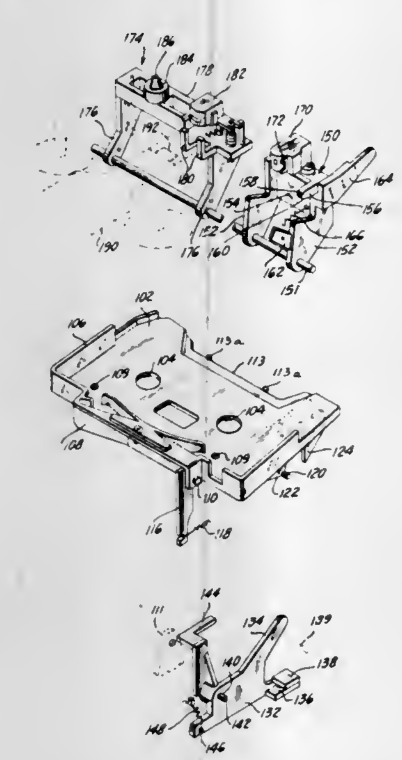
HEAD SUPPORT AND EJECT MECHANISM FOR RECORDING AND/OR PLAYBACK APPARATUS

James C. Whitney, Fairfield, and Anthony Ciaraldi, Stamford, both of Conn., assignors to Dictaphone Corporation, Rye, N.Y.

Filed Apr. 20, 1976, Ser. No. 678,596

Int. Cl.² G11B *21/22, 15/04, 5/12*

U.S. Cl. 360—105 **18 Claims**



1. In a recording and/or playback apparatus of the type wherein information is recorded on and/or played back from magnetic tape driven past a record and/or playback head, support apparatus for said head, comprising a first pivotable support member upon which said head is mounted; means extending from said first support member for pivotally coupling said first support member to a pivot axis such that said first support member and said head are pivotable through an arc which lies in a plane substantially normal to the movement of said tape; means for controlling the pivotal movement of said first support member to selectively place said head in contact with said tape; a second pivotable support member disposed adjacent said first support member; an erase head mounted on said second support member to selectively contact said tape; means extending from said second support member to said pivot axis such that said second support member is pivotable through an arc which lies in a plane substantially normal to said movement of tape; and means for pivotally moving said second support member.

4,056,836

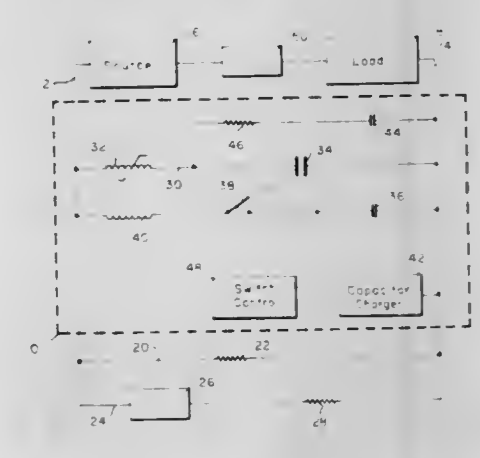
METHOD AND APPARATUS FOR INTERRUPTING LARGE CURRENT

Wolfgang Knauer, Malibu, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed Mar. 23, 1976, Ser. No. 669,553

Int. Cl.² H02H *7/22*

U.S. Cl. 361—4 **12 Claims**



1. Switching apparatus for interrupting large current comprising:

a main branch comprising a saturable reactor, main switch contacts serially connected therewith, said main switch contacts having means connected thereto for rapidly opening said main switch contacts;

a commutation branch connected in parallel to said main branch, said commutation branch comprising the serial connection of a commutation capacitor, an inductor and a commutation switch; and

means connected to control both said main switch contacts and said commutation switch for discharging commutation current through said main switch contacts to reduce current therethrough to zero and for opening said main switch contacts when the current therethrough is substantially zero.

4,056,837

GROUND FAULT CIRCUIT INTERRUPTER WITH TRIP LEVEL ADJUSTMENT

John J. Misencik, Shelton, and Gary S. Zakrzewski, Bridgeport, both of Conn., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Oct. 24, 1975, Ser. No. 625,615

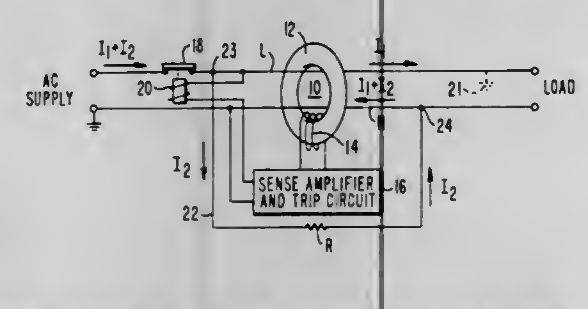
Int. Cl.² H02H *3/28*

U.S. Cl. 361—45 **4 Claims**

1. A ground fault circuit interrupter comprising:

a differential current transformer including a core, primary windings on said core that comprise a hot line conductor and a neutral conductor, a secondary winding on said core

for sensing a differential current between said primary winding; a sensing amplifier responsive to said differential current to produce a signal for operating circuit interruption means upon a differential current being of predetermined magnitude, said sensing amplifier being characterized by responding only to a given polarity of current differential between said primary windings, sensitivity adjustment means for causing an effective change in the sensitivity of said sensing amplifier comprising a continually closed circuit branch connected between a first point on said hot line conductor on a first side of said core and a second point on said neutral conductor on a second side of said core, said circuit branch containing a resistance for



causing additional current flow vectorially added to differential current otherwise occurring between said primary windings;

said sensing amplifier being responsive only to positive differential currents through said hot line conductor from the supply side of said core to the load side of said core; and

said first and second points of connection of said circuit branch being respectively on the supply side and the load side of said windings in relation to said core and said additional current flow being in opposition to said normal differential current and effectively causing said sensing amplifier to be less sensitive.

4,056,838

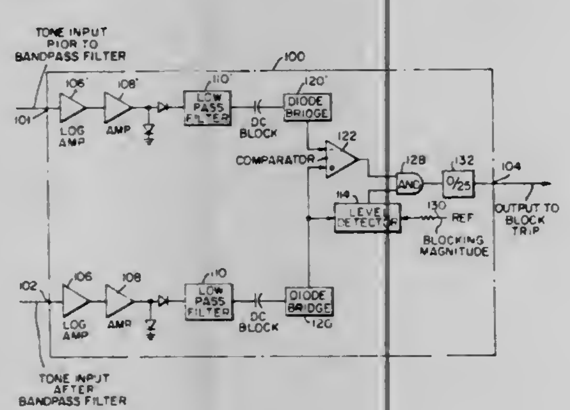
IN-BAND SIGNAL-TO-NOISE RATIO MONITOR FOR AN FSK RELAYING SYSTEM

Michael J. Leib, Flanders, N.J., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Sept. 20, 1976, Ser. No. 725,067

Int. Cl.² H02H *3/26*

U.S. Cl. 361—68 **8 Claims**



1. In a relaying network having guard and trip signal input means, a trip relay and control circuit means cooperatively coupling said guard and trip signal input means and said trip relay, monitoring apparatus for blocking actuation of said trip relay whenever the signal-to-noise ratio of a transmitted signal exceeds a predetermined value, said apparatus comprising:

a. a bandpass filter having an input terminal adapted to receive a transmitted signal and an output terminal adapted to forward a filtered signal therefrom to said guard and trip signal input means;

b. first signal-to-noise detecting circuit means connected to said bandpass filter input for generating a first output signal which is a function of the signal-to-noise ratio of the transmitted signal;

c. second signal-to-noise detecting circuit means connected to said bandpass filter output for generating a second output signal which is a function of the signal-to-noise ratio of the filtered transmitted signal;

d. means for generating a reference voltage signal proportional to a predetermined acceptable value of a signal-to-noise ratio in the transmitted signal;

e. level detection means adapted to receive said second output signal and said reference voltage signal for comparing said signals and for generating a third output signal whenever said second output quantity exceeds said reference signal; and

f. comparator means, adapted to receive said first, second and third output signals and having an output connected to said control circuit means, for generating a blocking signal usable to block coupling of said trip input means and said trip relay whenever said first, second and third output signals reach a predetermined relationship.

4,056,839

PROTECTIVE RELAY DEVICES

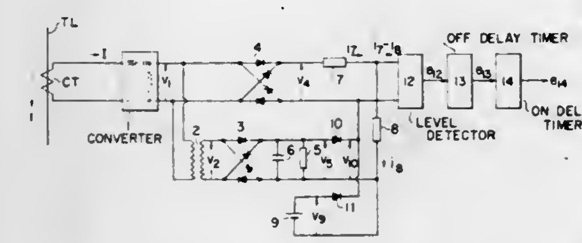
Fumio Andow, Hachioji, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Japan

Filed Jan. 19, 1976, Ser. No. 650,159

Claims priority, application Japan, Jan. 20, 1975, 50-7894

Int. Cl.² H02H *3/28*

U.S. Cl. 361—68 **11 Claims**



1. A ratio differential relay comprising first and second voltages respectively proportional to the currents at the opposite ends of a section of an electricl power system, each of said converters including a time delay element,

first rectifier means for producing a third voltage proportional to said first voltage,

second rectifier means for producing a fourth voltage proportional to said second voltage,

third rectifier means for producing a fifth voltage proportional to the difference between said first and second voltages,

fourth rectifier means for producing a sixth voltage which is smaller than said fifth voltage and proportional to the difference between said first and second voltages,

a source of constant direct current voltage, means for producing a seventh voltage which is equal to the largest one of the sum of said third and fourth voltages, said sixth voltage and said constant direct current voltage,

a level detector responsive to the difference in the levels of the currents created by said fifth voltage and said seventh voltage,

an OFF delay timer responsive to the output of said level detector,

and an ON delay timer responsive to the output from said OFF delay timer for producing an output for operating said ratio differential relay.

4,056,840

LINE PROTECTOR FOR COMMUNICATIONS CIRCUIT

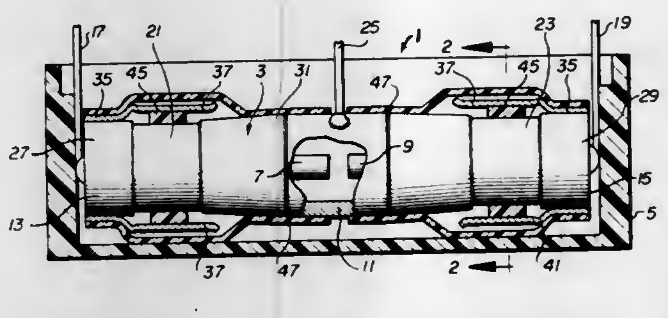
Paul S. Lundsgaard, and William S. Sedlacek, both of Chicago, Ill., assignors to Reliable Electric Company, Franklin Park, Ill.

Filed May 12, 1976, Ser. No. 685,724

Int. Cl.² H02H *3/22*

U.S. Cl. 361—124 **8 Claims**

1. A line protector comprising a gas-filled tube therein, at least one pair of electrodes separated by insulation and defining an arc gap, connectors electrically insulated from each other and being in respective electrical contact with the electrodes, each connector having an electrically conductive surface external of the gas tube and surrounding the electrodes, a resilient conductive member outside of said tube and having a first part in proximity with a first of said external surfaces and also having a second part in proximity with a second of said external surfaces, the resiliency of said conductive member biasing said conductive member in a direction to effect electrically conductive connection of said external surfaces, said first and



second parts respectively being in substantial surrounding relationship with said first and second surfaces, and a meltable dielectric substance interposed between said conductive member and said tube, said dielectric substance being meltable upon heating due to an overcurrent condition in the tube, said substance being normally engaged by said conductive member to prevent electrically conductive connection of said surfaces except upon melting of said substance so that upon said melting a direct short circuit is provided between said external surfaces over substantial areas of engagement with said member that surrounds said surfaces.

4,056,841

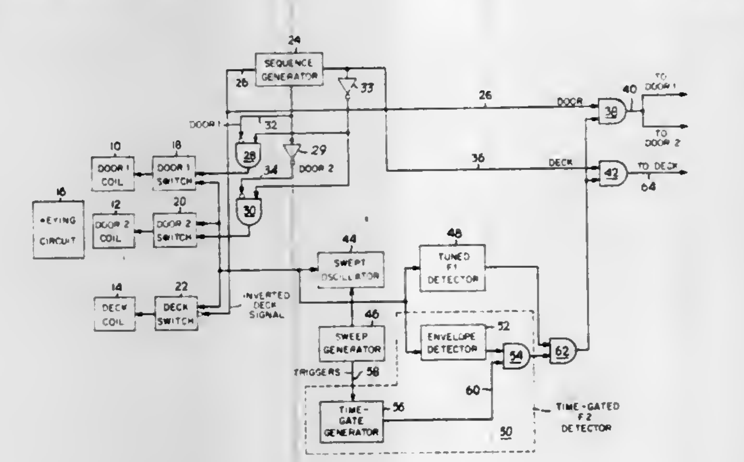
INDUCTIVELY COUPLED KEYABLE CONTROL CIRCUIT AND KEYING CIRCUIT THEREFORE USING HYBRID DETECTION MEANS

Carl E. Atkins, Montclair, and Francis A. McGuirk, Jr., Chatham, both of N.J., assignors to Wagner Electric Corporation, Parsippany, N.J.

Filed Feb. 13, 1976, Ser. No. 657,752

Int. Cl.² H01H *47/20;* E05B *47/00*

U.S. Cl. 361—203 **8 Claims**



1. In an inductively coupled keying circuit for actuating at least one load of the type which includes a swept rf oscillator and an external keying circuit containing at least one resonant circuit having a resonant frequency within the rf swept range of said swept rf oscillator, the invention which comprises:

a. a plurality of sensing coils;

b. switch means for switching the rf energy in sequence to each one of said sensing coils, and for switching off all of the other sensing coils whenever any one coil is switched on;

c. first means for generating a first signal in response to rf absorption in said at least one resonant circuit;

d. second means for generating a second signal in response to rf absorption in said at least one resonant circuit; and

e. means, operative in response to the simultaneous presence of said first and second signals for enabling a control output signal for actuating at least one load.

4,056,842

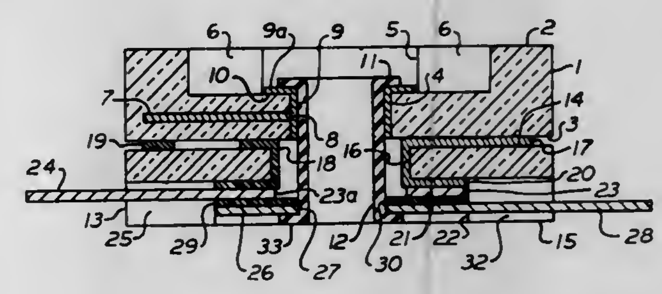
CERAMIC TRIMMER CAPACITOR

John W. Sienicki, and Clarence A. Haycox, both of Erie, Pa., assignors to Erie Technological Products, Inc., Erie, Pa.

Filed July 8, 1976, Ser. No. 703,668

Int. Cl.² H01G *5/06*

U.S. Cl. 361—293 **7 Claims**



4. In a disc trimmer capacitor of the type having a rotor and a stator each with an electrode, the improvement which comprises a socket in the stator, rotor and stator terminals having apertured heads received in said socket in superposed relation, and means interposed between said heads for insulating the terminals from each other.

4,056,843

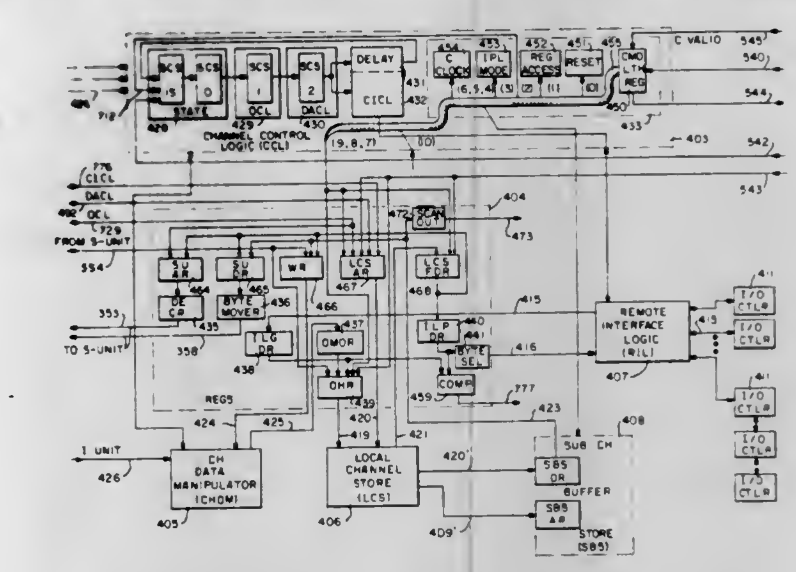
DATA PROCESSING SYSTEM HAVING A PLURALITY OF CHANNEL PROCESSORS

Richard L. Bishop, and Steven P. Tulloh, both of Sunnyvale, Calif., assignors to Amdahl Corporation, Sunnyvale, Calif.

Filed June 7, 1976, Ser. No. 693,553

Int. Cl.² G06F *15/20, 13/00, 3/00*

U.S. Cl. 364—200 **14 Claims**



1. A data processing system including system storage and channel unit apparatus for transferring data between input-/output devices and said system storage over a plurality of channels, each channel connected to one or more input/output devices, said channel unit apparatus comprising,

channel store means for storing information including said data to be transferred over said channels,

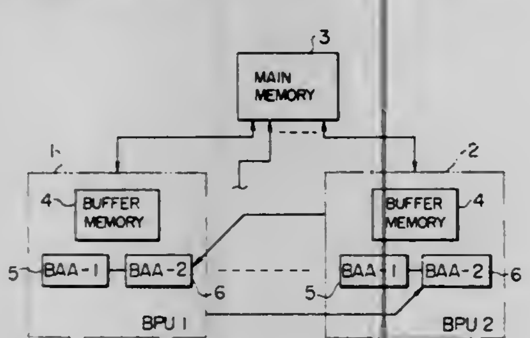
channel state memory means, storing information for all of said channels, having a plurality of groups of locations, one group for each of said channels where each group stores information for a different associated channel; said state memory means including, for each group, first locations for storing a count to designate a remaining transfer length where the remaining transfer length specifies a number of bytes of said data remaining to be transferred

over the associated channel, second locations for storing a pointer for defining a location in said channel store means, and third locations for storing an availability number specifying the remaining locations in said channel store means,

a first processor means operative for each of said channels to control the transfer of said data between said channel store means and said system storage in response to information in said state memory means for an associated channel, said first processor means including means connected to said state memory means for accessing said first, second and third locations for each channel, including means for transferring said data between said channel store means and said system storage by a first transfer amount for each channel, said first processor means including means for changing said availability number of a different associated group for each channel in one direction by the amount equal to said first transfer amount,

second processor means operative for each of said channels to control the transfer of said data between said channel store means and said input/output devices in response to information in said state memory means for an associated channel, said second processor means including means connected to said state memory means for accessing said first, second and third locations for each channel, including means for transferring said data between said channel store means and said input/output devices by a second transfer amount for each channel, said second processor means including means for changing said availability number of a different associated group for each channel in a direction opposite said one direction by the amount equal to said second transfer amount.

4,056,844
MEMORY CONTROL SYSTEM USING PLURAL BUFFER ADDRESS ARRAYS
Chikahiko Izumi, Hatano, Japan, assignor to Hitachi, Ltd., Japan
Filed Oct. 8, 1975, Ser. No. 620,757
Claims priority, application Japan, Feb. 26, 1974, 49-22473
Int. Cl.² G06F *13/00*
U.S. Cl. 364—200 **7 Claims**



1. In a memory control system for a data processing system, which memory control system includes a main memory, a basic processing unit which carries out processing operations with respect to information read-out from and written into said main memory, at least one additional processing unit which also carries out processing operations with respect to information read-out from and written into said main memory, said main memory being adapted to be accessed by said processing units, the improvement wherein at least said basic processing unit comprises

a buffer memory for reading-out and writing-in a predetermined amount of information stored in said main memory;

first register means, coupled to said main memory, for storing the address of said main memory which corresponds to information stored in said buffer memory;

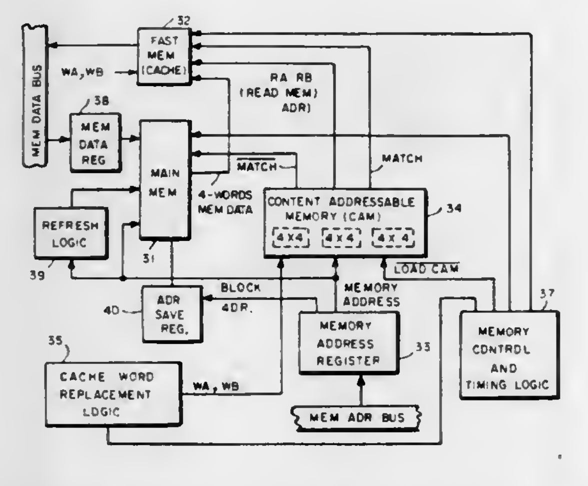
first detector means, coupled to said first register means, for detecting whether or not there is stored in said first register means an address corresponding to an address signal produced within said basic processing unit representative of an address location in said main memory;

second register means, coupled to said main memory, for storing a copy of the contents of said first register means;

second detector means, coupled to said second register means, for detecting the storage address in said main memory into which storage address information is to be written by an additional processing unit; and

means, coupled to said first and second detector means, and responsive to the writing of information into said storage address of said main memory by said additional processing unit, so that information stored in said buffer memory may differ from that stored in said main memory and may, therefore, no longer be valid information, for invalidating a predetermined amount of information which is contained within the information stored in said buffer memory, said predetermined amount of information including that information which is written into said main memory by said additional processing unit.

4,056,845
MEMORY ACCESS TECHNIQUE
William P. Churchill, Jr., Carlisle, Mass., assignor to Data General Corporation, Southboro, Mass.
Filed Apr. 25, 1975, Ser. No. 571,573
Int. Cl.² G06F *13/00*
U.S. Cl. 364—200 **10 Claims**



1. A memory module for use in a data processing system having a plurality of memory modules and a memory address bus for transferring addresses in said system, each said memory module comprising

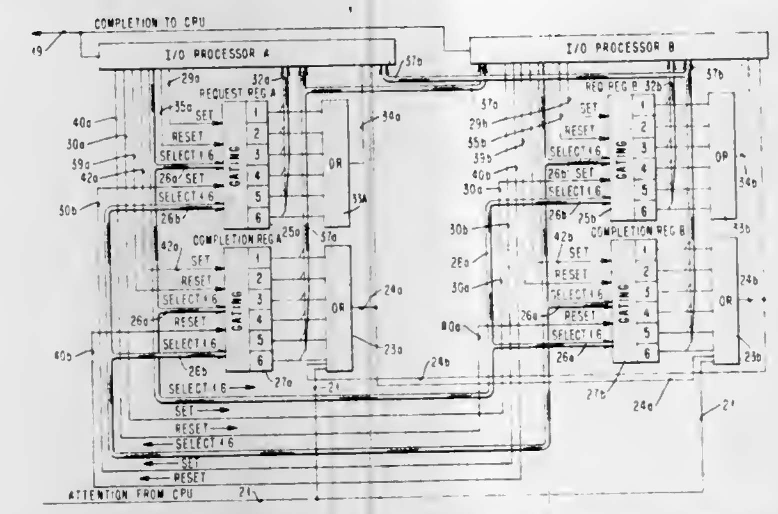
a main memory means operable at a first speed;

an auxiliary memory means operable at a second speed higher than said first speed for temporarily storing selected portions of the data stored in said main memory means;

associative memory means for temporarily storing selected main memory addresses and comparing the stored addresses with an address supplied from said memory address bus to said associative memory means during a read or write operation to generate comparison data for indicating whether data requested by said supplied address is stored in said auxiliary memory means; and

means for storing said selected data portions in said auxiliary memory means so that the data stored in the auxiliary memory means of all of said plurality of memory modules are arranged in an interleaved manner such that data which are expected to be referenced sequentially during the operation of said data processing system are sequentially stored in the auxiliary memory means of different ones of said memory modules.

4,056,846
DATA PROCESSING SYSTEM WITH APPARATUS FOR SHARING CHANNEL BACKGROUND PROCESSING
Robert William Callahan; Paul Eugene Kauffman, both of Endwell; Lawrence Joseph Kobesky, Endicott, and Howard Loomis Page, Apalachin, all of N.Y., assignors to IBM Corporation, Armonk, N.Y.
Filed June 30, 1976, Ser. No. 701,373
Int. Cl.² G06F *3/04*
U.S. Cl. 364—200 **4 Claims**



1. In a data processing system having a plurality of I/O processors each having a time slice operation with a plurality of time slices for executing portions of channel programs oriented to a particular I/O device for each time slice and one time slice for executing background portions of all channel programs, the improvement comprising,

means connecting each of said I/O processors to receive an attention signal from a central processor for beginning processing by the background time slice of any I/O device,

each of said I/O processors having a first register having a bit position for each device oriented time slice of the associated I/O processor,

means connecting the input of said first register to each of said I/O processors to be set by a background time slice in a bit position identifying one of the device oriented time slices for which background processing has been completed by any background time slice,

means connecting the output of said first register to the associated I/O processor to identify the device oriented time slice for which the background processing has been completed,

means connecting the input of said first register to the associated I/O processor to be reset when a device oriented resource has responded to the output of said first register,

a second register for each I/O processor having a bit position for each device oriented time slice of the associated I/O processor,

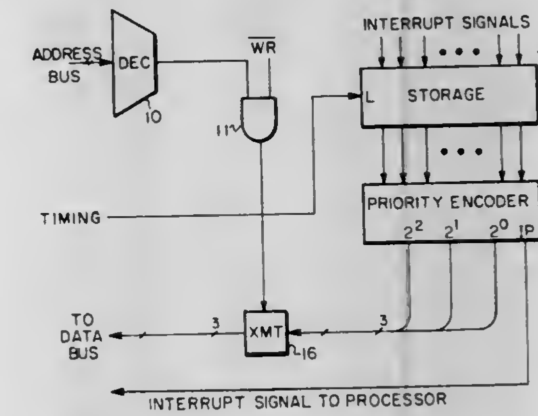
means connecting said second register to be set by a device oriented time slice of the associated I/O processor when device oriented processing has been completed,

means connecting the output of said second register to each I/O processor to signal any background time slice that background processing is required by a particular device oriented time slice of the I/O processor and,

means connecting the input of said second register to be reset by any background time slice.

4,056,847
PRIORITY VECTOR INTERRUPT SYSTEM
Angelo Robert Marcantonio, Princeton, N.J., assignor to RCA Corporation, New York, N.Y.
Filed Aug. 4, 1976, Ser. No. 771,450
Int. Cl.² G06F *9/18*
U.S. Cl. 364—200 **1 Claim**

1. In a data processing system capable of handling priority vectored interrupts, said system including means for generating address signals, including address bus means for conducting said address signals, data bus means for conducting data signals, timing signal means for supplying periodic signals, read signal means for supplying signals indicative of system read operations, write signal means for supplying signals representative of system write operations, a plurality of interrupt request signal means for supplying interrupt request signals representative of particular interrupts, each interrupt request signal having an assigned priority, decoder means responsive to said address signals when representative of a particular location for producing a control signal, storage means responsive to said timing signal means for storing the state of each of said plurality of interrupt request signals, priority encoder means responsive to the storage means for producing encoded signals representative of the active interrupt request signal having the highest assigned priority, first gating means responsive to said control signal and said read signal means for coupling said encoded signals to said data bus, the improvement comprising:



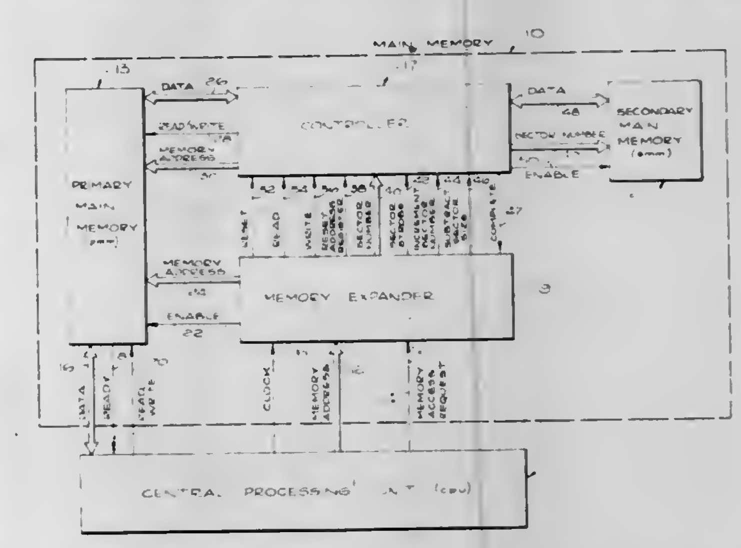
second gating means responsive to said control signal and said write signal means for producing a latch signal;

latching means for latching data bus signals in response to said latch signal;

a plurality of third gating means, each responsive to a different one of the latched data bus signals and a different one of said plurality of interrupt request signals, for selectively coupling said interrupt request signals

to said storage means.

4,056,848
MEMORY UTILIZATION SYSTEM
George C. Gilley, 21730 Redbeam Ave., Torrance, Calif. 90503
Filed July 27, 1976, Ser. No. 709,139
Int. Cl.² G11C *9/06, 7/00*
U.S. Cl. 364—200 **19 Claims**



1. A memory utilization apparatus for transferring data sectors between a first data storage device directly accessable to a processing unit of a computing device and a second data storage device accessable to the said processing unit through the first data storage device, comprising:

a first data storage device from which data contained within a data sector is directly accessable by said processing unit;

a second data storage device be transferred to the first data storage device for access by said processing unit;

control means for receiving a request from said processing unit for data and for transferring the data sector containing the requested data from the second data storage device to the first data storage device, said control means further comprising means for automatically transferring a first sequence of data from the second data storage device to the first data storage device, in the same order in which the data appears in the second data storage device, said first sequence beginning with the data sector containing the requested data and ending with a data sector having an address determined so that said sequence of data will be contained in the first data storage device, the address of said beginning data sector and the address of said ending data sector forming a first set of limits;

means for storing said first set of limits;

means for monitoring the process of the data transfer by continuously updating and storing the address of the last data sector transferred to the first data storage device from the second data storage device throughout the transfer of the first sequence of data;

means for providing the processing unit with access to requested data within the first data storage device as soon as the data sector containing the requested data is transferred to the first data storage device;

means for determining whether a data sector containing further requested data by the said processing unit resides within the first data storage device at the time the request is made;

means for providing said processing unit with access to the first data storage device if the data sector containing the further requested data resides within the first data storage device;

means for determining whether the further requested data is within said first set of limits and within a predetermined number of data sector addresses beyond the address of the last data sector transferred in the transfer operation;

means for accessing the further requested data by said processing unit after the data sector containing the further requested data is transferred to the first data storage device if the data sector containing the further requested data is within said first set of limits and within said predetermined number of data sector addresses beyond the address of the last data sector transferred in the transfer operation;

means for refilling the first data storage device with a second sequence of data from the second data storage device if the further requested data is not contained within said first set of limits and said predetermined number of data sector addresses beyond the address of the last data sector transferred in the transfer operation, said second sequence beginning with the data sector containing the further requested data, said second sequence being transferred in the same order in which the data appears in the second data storage device, said second sequence of data ending with a data sector having an address determined so that said second sequence of data will be contained in the first data storage device, said refill beginning data sector address and said refill ending data sector address forming a second set of limits;

means for storing said second set of limits; and,

means for monitoring the progress of the data transfer by continuously updating and storing the address of the last data sector transferred to the first data storage device throughout the transfer of the second sequence of data.

4,056,849

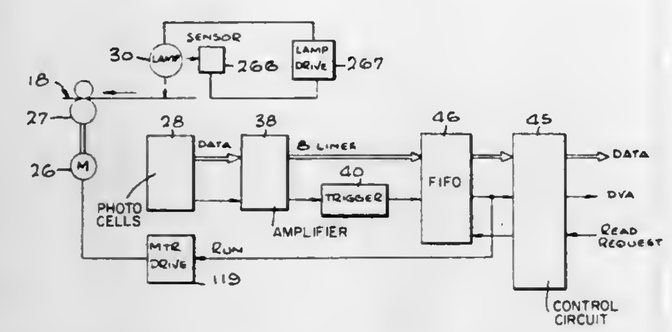
HIGH SPEED BUFFERED TAPE READER WITH LOW TAPE STRESS

Jeffrey M. Bevis, Long Beach, Calif., assignor to Chalco Engineering Co., Gardena, Calif.

Filed Sept. 25, 1975, Ser. No. 616,548

Int. Cl.² G06F *13/00;* G06K *7/01, 7/10;* G11B *15/48*

U.S. Cl. 364—900 27 Claims



1. An apparatus of the class described comprising a support, a tape transfer mechanism mounted on the support, a tape path on the support, a tape read head mounted on the support and associated with said tape path for reading characters on the tape that move by the read head, said tape transfer mechanism having a tape starting means and a braking means of the kind which operates to gradually stop the tape transfer mechanism and the tape without destructive stresses on the tape whereby when the braking means operates a number of characters on the tape move by the tape read head and are read by it, character storing means operatively associated with said tape read head for storing in sequence any characters on the tape that move by the tape read head when the braking means is gradually bringing the tape transfer mechanism and the tape to a stop, and means connected to the character storing means for recovering the stored characters in the character storing means when operation of the tape transfer mechanism is resumed.

4,056,850

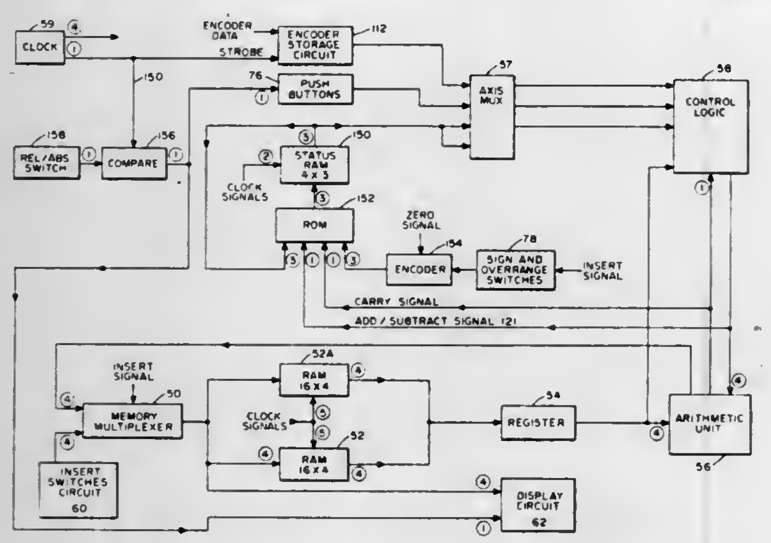
ABSOLUTE RELATIVE POSITION ENCODER PROCESSOR AND DISPLAY

John B. Brown, Lincoln, Mass., assignor to Dynamics Research Corporation, Wilmington, Mass.

Filed Jan. 19, 1976, Ser. No. 650,540

Int. Cl.² G05B *19/18;* G06F *15/46*

U.S. Cl. 364—900 12 Claims



1. In a system for processing signals from one or more positional encoders, indicating the movement or non-movement thereof, to provide first signals representative of the positions of each of the encoders relative to a first reference point, of the type having:

storage means for storing data representative of each digit of a plurality of multi-digit values, each value being representative of a first position relative to the first reference point of a respective encoder;

means for sequentially retrieving from the storage means the data representative of each of the stored digits;

means responsive to the retrieved data and further responsive to the signals from the encoders for sequentially processing the retrieved data representative of eacn digit to produce data representative of a plurality of multi-digit values representing a subsequent position relative to the first reference point of each of the encoders; and

means for storing in the storage means the data representative of each of the digits of the multi-digit values representing the subsequent position of each of the encoders;

the improvement comprising means for providing second signals representative of the positions of the encoders relative to a second reference point independent of the first reference point;

second storage means for storing data representative of each digit of a plurality of second multi-digit values, each value being representative of the first position relative to the second reference point of a respective encoder;

said means for retrieving further including means for sequentially retrieving from the second storage means the data representative of each of the stored digits of the second multi-digit values;

said processing means being operative to sequentially process the retrieved data representative of each of the stored digits of the second multi-digit values to produce data representative of a plurality of multi-digit values representing the subsequent position relative to the respective second reference points of each of the encoders and

said means for storing in the storage means further including means for storing in the second storage means the data representative of each of the digits of the multi-digit values representing the subsequent position relative to the respective second reference points of each of the encoders.

4,056,851

ELASTIC BUFFER FOR SERIAL DATA

Norman Hovagimyan, Cherry Hill, and John Michael Link, Westmont, both of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Sept. 20, 1976, Ser. No. 724,915

Int. Cl.² G06F *5/06*

U.S. Cl. 364—900 6 Claims

1. An elastic buffer for receiving information bits at a rate determined by a receiving clock, and transmitting the information bits at a rate determined by an output clock, where the clocks are not exactly synchronous, comprising

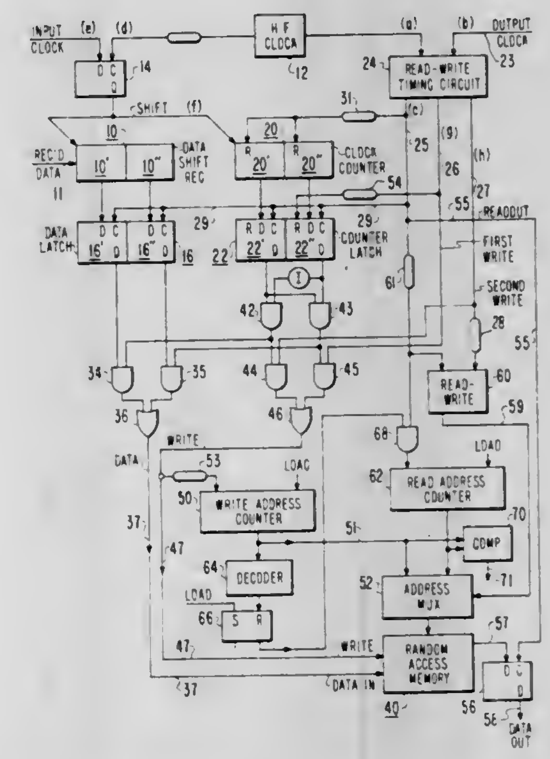
a two-bit data input buffer,

a random access memory,

a read-write memory timing circuit synchronized by said output clock and repeatedly producing a read pulse followed by first and a second spaced write pulses,

a read address counter and a write address counter,

means responsive to said read pulse to read out a bit from said memory at an address determined by the contents of said read address counter, and then increment said counter,



means responsive to said first write pulse and the presence of a first received bit in said two-bit buffer to write said bit into said memory at an address determined by the contents of said write address counter, and then increment said counter, and

means responsive to said second write pulse and the presence of a second received bit in said two-bit buffer to write said bit into said memory at an address determined by the contents of said write address counter, and then increment said counter.

DESIGN PATENTS

GRANTED NOVEMBER 1, 1977

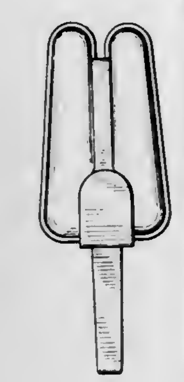
ERRATA

For CLASS	See PATENT NO.
014-036	246,259

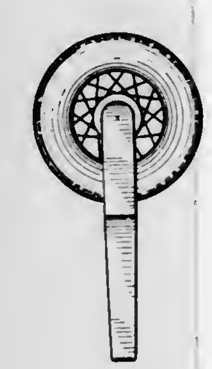
DESIGNS

NOVEMBER 1, 1977

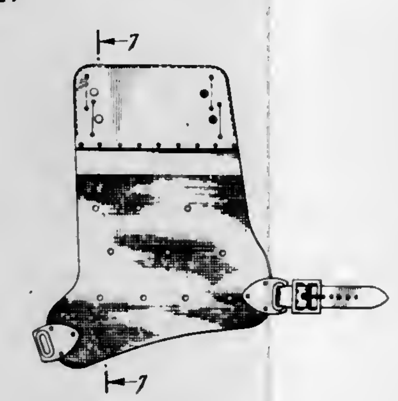
246,206
COMBINED CONFECTION AND HOLDER
Edward Dee, 45 Georgian Court, Elizabeth, N.J. 07200
Filed June 24, 1976, Ser. No. 699,361
Term of patent 14 years
Int. Cl. D1—*1*
U.S. Cl. D1—22



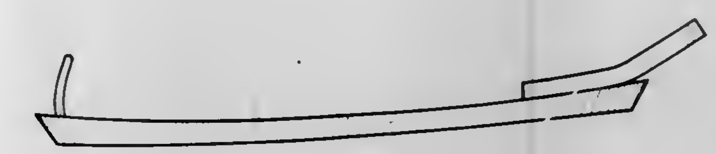
246,207
COMBINED ROTATABLE CONFECTION AND HANDLE
Edward Dee, 45 Georgian Court, Elizabeth, N.J. 07200
Filed Aug. 24, 1976, Ser. No. 717,081
Term of patent 14 years
Int. Cl. D1—*01*
U.S. Cl. D1—22



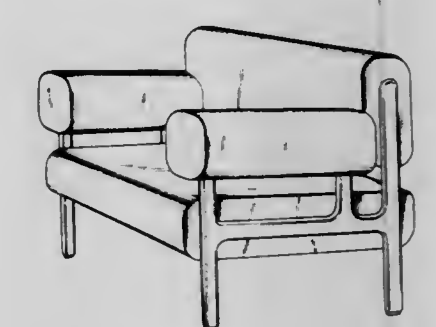
246,208
ROOFER'S PAD
Moises O. Ruiz, and George Hillinger, both of Los Angeles, Calif., assignors to Action Leathercraft, Inc., Commerce, Calif.
Filed Aug. 14, 1975, Ser. No. 604,701
Term of patent 14 years
Int. Cl. D2—*02*
U.S. Cl. D2—27



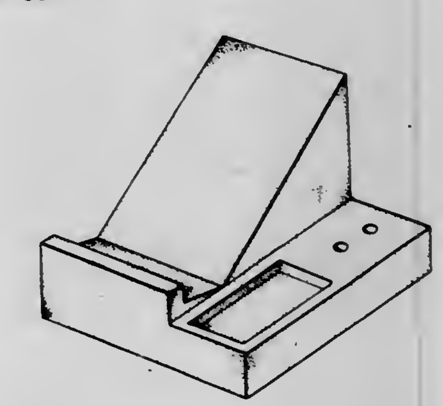
246,209
BELT BUCKLE
Glen D. Burgell, 5132 Washington, St. Joseph, Mich. 49085
Filed Sept. 15, 1975, Ser. No. 613,486
Term of patent 14 years
Int. Cl. D2—*07*
U.S. Cl. D2—427



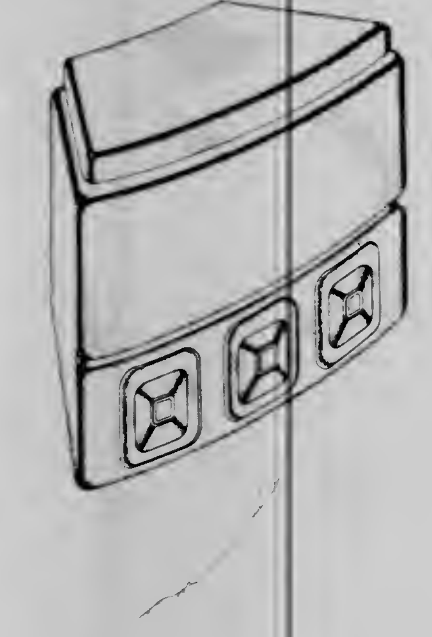
246,210
SEAT
Aubrey Amey, deceased, late of New York, N.Y., by Greta A. Beckner, administratrix, 2703 Case Road, Columbus, Ohio 43220
Filed May 2, 1975, Ser. No. 574,109
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—63



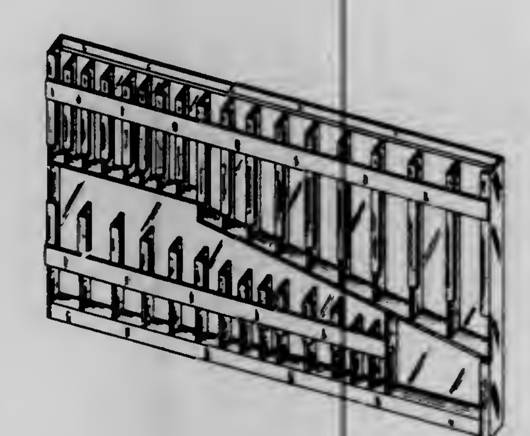
246,211
CALCULATOR SUPPORT STAND
Charles Wayne Sullivan, 3849 Dieckman Lane, Cincinnati, Ohio 45245
Division of Ser. No. 589,869, June 24, 1975. This application Oct. 15, 1976, Ser. No. 732,700
Term of patent 14 years
Int. Cl. D6—*99*
U.S. Cl. D6—85



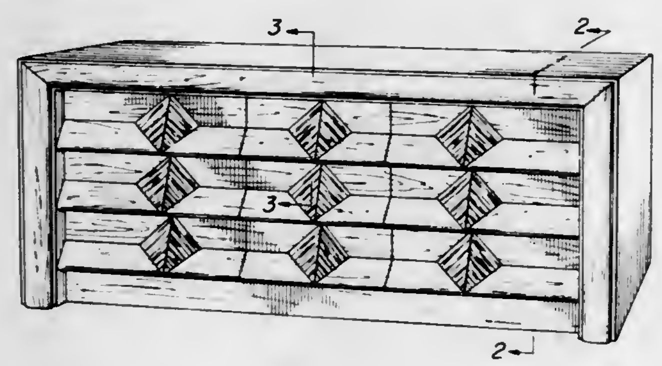
246,212
HOUSING FOR A DISPENSER FOR LIQUID SOAP OR THE LIKE
Henry C. Keck, Pasadena; Masao Morisaku, Monterey Park; Irvin O. Anderson, Jr., South Pasadena, all of Calif., and William Roland White, Houston, Tex., assignors to Evolution Health Care Company, Pico Rivera, Calif.
Filed Aug. 5, 1975, Ser. No. 602,145
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D6—95



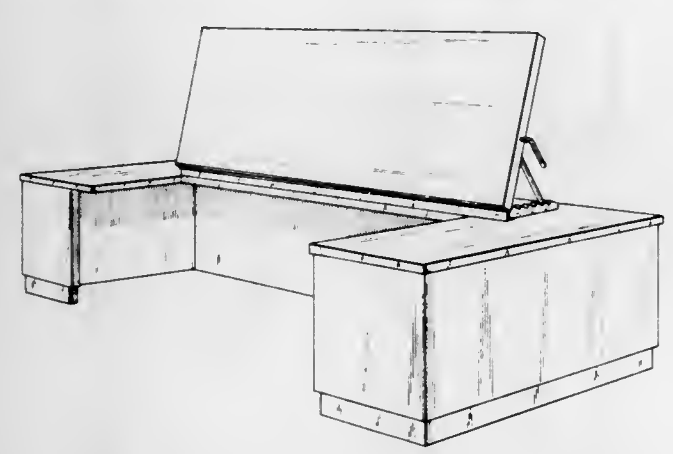
246,213
DOUBLE DECKER DISPENSER
Ralph S. Ruggiero, Hamden, Conn., assignor to Litton Industrial Products, Inc.
Filed Apr. 5, 1976, Ser. No. 673,821
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—130



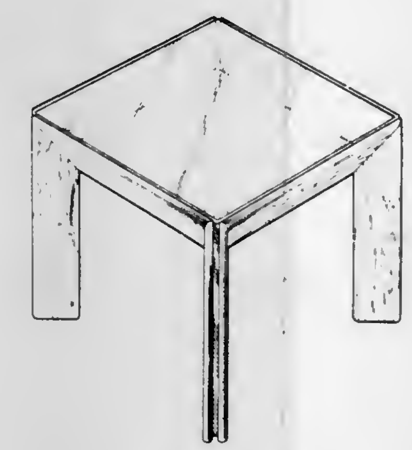
246,214
DRESSER
Max C. Brubaker, Fancy Gap, Va., assignor to Vaughn Bassett Furniture Company, Galax, Va.
Filed Dec. 22, 1975, Ser. No. 643,129
Term of patent 3½ years
Int. Cl. D6—*04*
U.S. Cl. D6—154



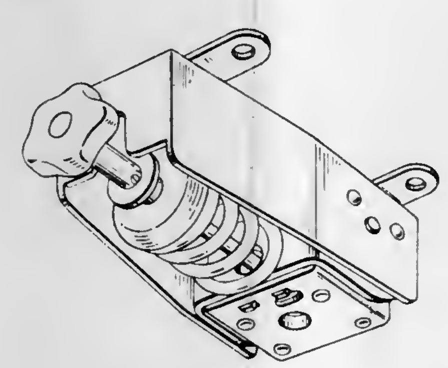
246,215
DRAFTING TABLE
Harry E. Riley, 14 Fennell St., and David O. Chase, E. Lake Road, both of Skaneateles, N.Y. 13152
Filed July 18, 1975, Ser. No. 597,107
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—156



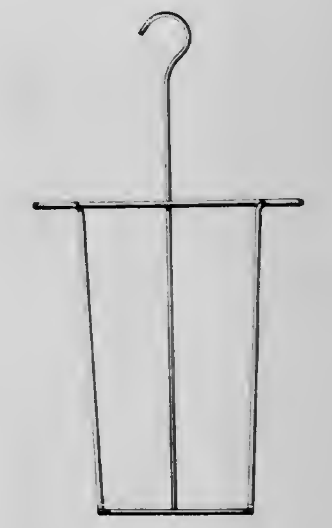
246,216
TABLE
Jules M. Heumann, South San Francisco, Calif., assignor to Metropolitan Furniture Manufacturing Company, South San Francisco, Calif.
Division of Ser. No. 595,564, July 14, 1975. This application Sept. 22, 1976, Ser. No. 725,562
Term of patent 14 years
Int. Cl. D6—*03*
U.S. Cl. D6—175



246,217
CHAIR CONTROL UNIT
Frank Doerner, 138 Aberdeen Road, Kitchener, Ontario, Canada
Filed Feb. 5, 1976, Ser. No. 655,409
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—191

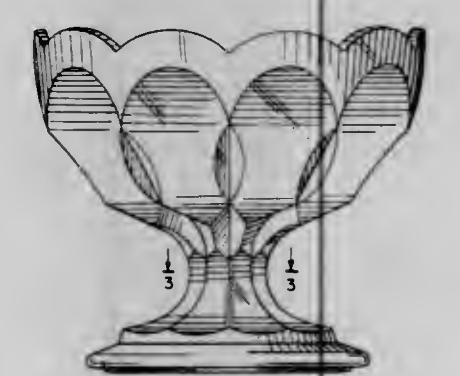


246,218
SHIRT HANGER OR SIMILAR ARTICLE
Arnold Z. Goodman, 360 E. 72nd St., New York, N.Y. 10021
Filed Aug. 25, 1976, Ser. No. 717,562
Term of patent 14 years
Int. Cl. D6—*08*
U.S. Cl. D6—247

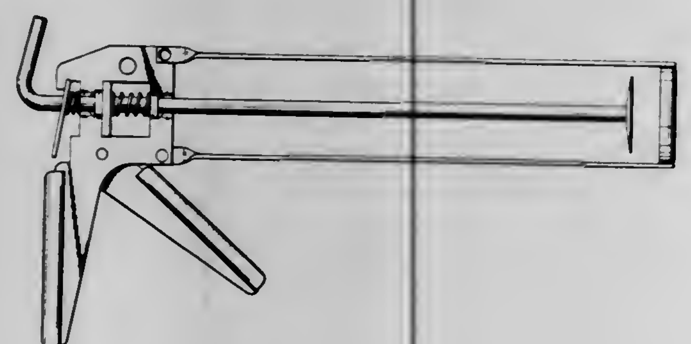


246,219
BEVERAGE GLASS OR SIMILAR ARTICLE
Theodore H. Harbaugh, and Robert C. Malone, both of Toledo, Ohio, assignors to Owens-Illinois, Inc., Toledo, Ohio
Filed Dec. 29, 1975, Ser. No. 644,790
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—13

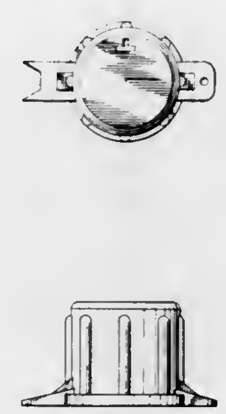
246,220
COMPOTE DISH OR SIMILAR ARTICLE
Frank J. Benes, Lancaster, Ohio, assignor to Anchor Hocking Corporation, Lancaster, Ohio
Division of Ser. No. 544,913, Jan. 29, 1975, Pat. No. Des. 243,431, which is a division of Ser. No. 397,069, Sept. 13, 1973, Pat. No. Des. 238,541. This application June 17, 1976, Ser. No. 697,105
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—22



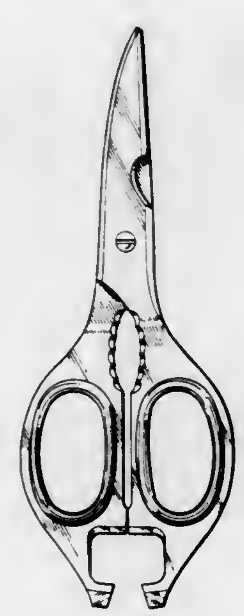
246,221
MASTIC DISPENSING GUN
John Patrick Anthony Cox, Hungerford, England, assignor to P. C. Cox (Mastic Appliances) Limited
Filed Apr. 21, 1976, Ser. No. 678,756
Claims priority, application United Kingdom, Oct. 22, 1975, 972968/75
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D8—14.1



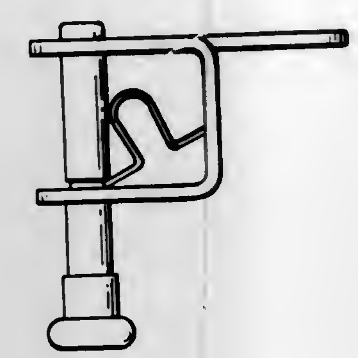
246,222
SPOUT OPENING TOOL
Michael W. Brandt, 1111 W. Mockingbird Lane, Suite 565, Dallas, Tex. 75247
Filed Feb. 2, 1976, Ser. No. 654,353
Term of patent 14 years
Int. Cl. D7—*99*
U.S. Cl. D8—40



246,223
KITCHEN SCISSORS
Toru Hayashi, Seki, Japan, assignor to Hayashi Cutlery Co., Ltd., Osaka, Japan
Division of Ser. No. 553,319, Feb. 26, 1976, Pat. No. Des. 243,650. This application July 21, 1976, Ser. No. 707,693
Term of patent 14 years
Int. Cl. D8—*03*
U.S. Cl. D8—55



246,224
VENT LOCK
Donald B. Hawkins, P.O. Box 1203, Tracy, Calif. 95376
Filed June 23, 1976, Ser. No. 698,829
Term of patent 14 years
Int. Cl. D8—*07*
U.S. Cl. D8—341

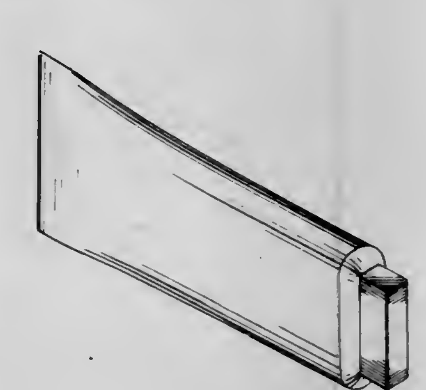


246,225
NUT
Toru Ono, Izumi, Japan, assignor to Kabushiki Kaisha Izumi Seisakusho, Osaka, Japan
Division of Ser. No. 620,340, Oct. 7, 1975, Pat. No. DES. 242,220. This application Sept. 3, 1976, Ser. No. 720,454
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—397

246,226
TONER CONTAINER OR THE LIKE
Donald R. Avolio, Fairport, N.Y., assignor to Xerox Corporation, Stamford, Conn.
Filed June 18, 1976, Ser. No. 697,583
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—67

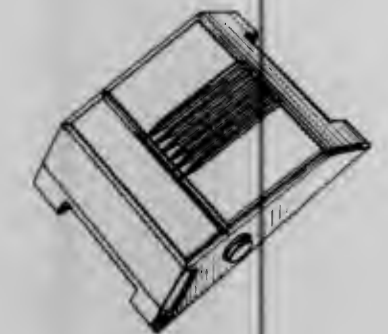
246,227
SHIPPING DRUM OR THE LIKE
Thomas E. Douglas, Statesville, N.C., assignor to Rubbermaid Industrial Products Corporation, Statesville, N.C.
Filed Aug. 29, 1975, Ser. No. 608,824
Term of patent 3½ years
Int. Cl. D9—*02*
U.S. Cl. D9—170

246,228
COMBINED COLLAPSIBLE TUBE AND CAP ASSEMBLY
David E. Hoy, 2100 Jefferson St., Paducah, Ky. 42001
Filed Dec. 1, 1975, Ser. No. 636,459
Term of patent 14 years
Int. Cl. D9—*99*
U.S. Cl. D9—194



246,229
SEAM-FREE CAN BODY
William T. Saunders, Weirton, W. Va., assignor to National Steel Corporation, Pittsburgh, Pa.
Filed Apr. 4, 1975, Ser. No. 565,093
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—218

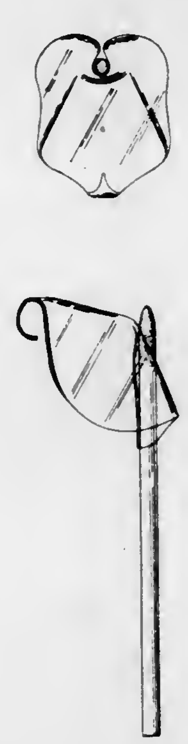
246,230
ELECTRONIC DIGITAL WRISTWATCH CASE
Robert F. Sagarino, Wheatley Heights, N.Y., assignor to Bulova Watch Company, Inc., Flushing, N.Y.
Filed Dec. 3, 1975, Ser. No. 637,115
Term of patent 14 years
Int. Cl. D10—*02*
U.S. Cl. D10—38



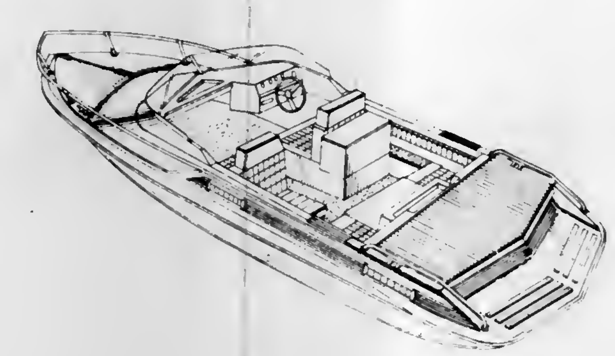
246,231
JEWELRY FINDING
Herman Cernevski, R.R. No. 1 Box 127, Valparaiso, Ind. 46383
Filed Apr. 5, 1976, Ser. No. 673,911
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D11—1

246,232
ARTIFICIAL FLOWER
Susan Kaye Hetherington, 4018 Northridge, Norman, Okla. 73069
Filed Oct. 7, 1976, Ser. No. 730,595
Term of patent 14 years
Int. Cl. D11—*04*
U.S. Cl. D11—117

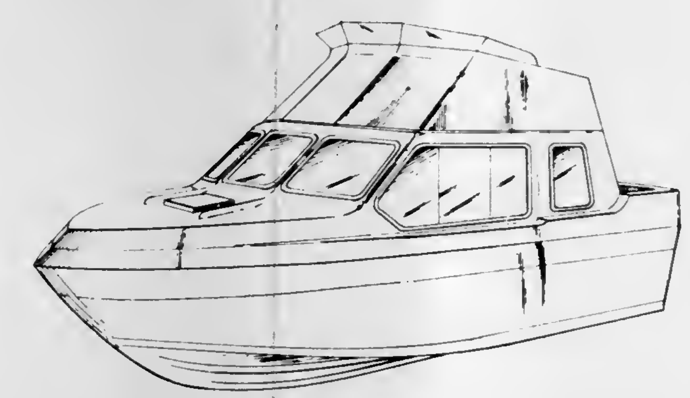
246,233
ARTIFICIAL FLOWER
Susan Kaye Hetherington, 4018 Northridge, Norman, Okla. 73069
Filed Oct. 7, 1976, Ser. No. 730,480
Term of patent 14 years
Int. Cl. D11—*04*
U.S. Cl. D11—117



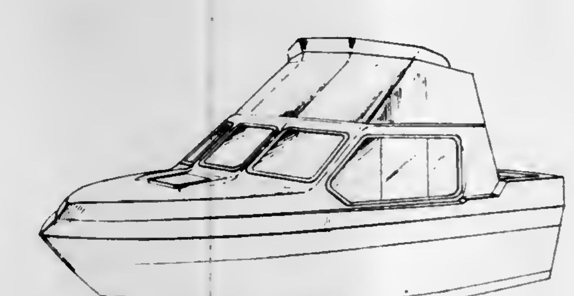
246,234
BOATS
Warwick M. Whitley, Austin, Tex., and Arthur E. Carlson, Garden Grove, Calif., assignors to Conroy, Inc., San Antonio, Tex.
Filed Apr. 20, 1976, Ser. No. 678,645
Term of patent 14 years
Int. Cl. D12—*06*
U.S. Cl. D12—62



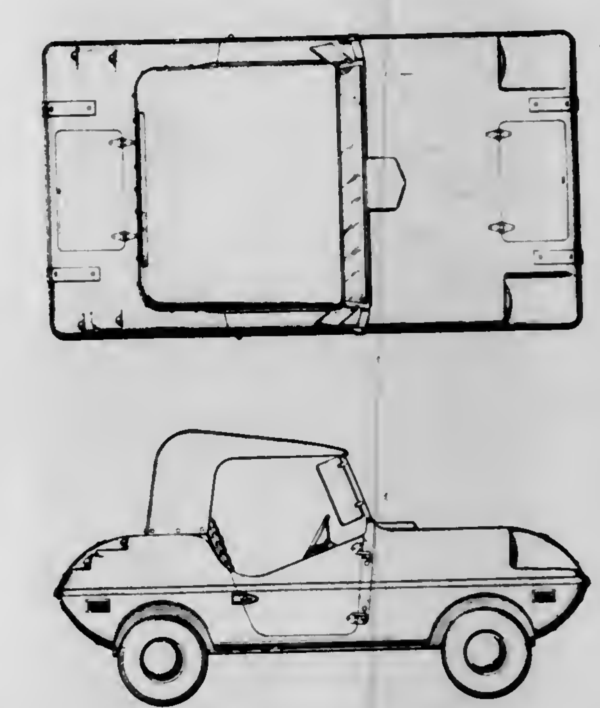
246,235
MOTOR BOAT
David T. Livingston, Seattle, Wash., assignor to Reinell Boats, Inc., Marysville, Wash.
Filed July 15, 1976, Ser. No. 705,452
Term of patent 14 years
Int. Cl. D12—*06*
U.S. Cl. D12—66



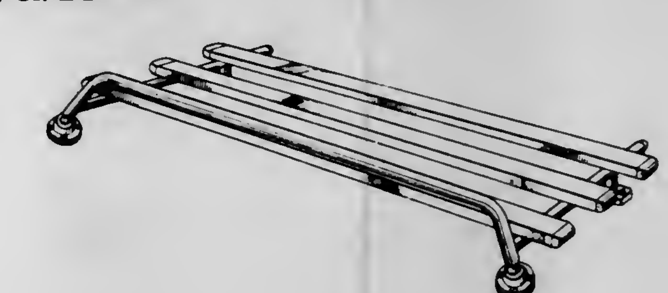
246,236
MOTOR BOAT
David T. Livingston, Seattle, Wash., assignor to Reinell Boats, Inc., Marysville, Wash.
Filed July 16, 1976, Ser. No. 705,833
Term of patent 14 years
Int. Cl. D12—*06*
U.S. Cl. D12—66



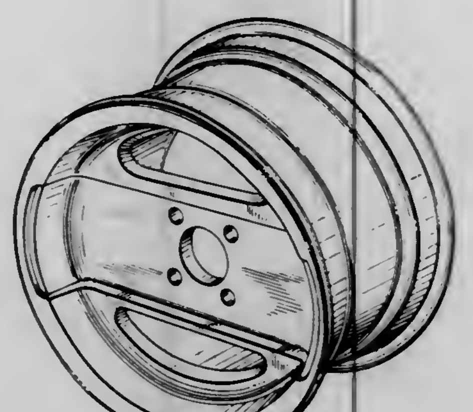
246,237
ELECTRIC CAR
Jack C. Murrill, 5901 Meghan Way, Sacramento, Calif. 95842
Filed Nov. 3, 1976, Ser. No. 738,343
Term of patent 14 years
Int. Cl. D12—*08*
U.S. Cl. D12—92



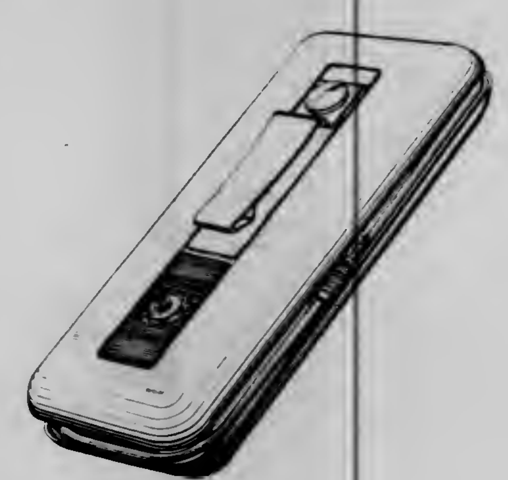
246,238
AUTOMOBILE LUGGAGE RACK
Donald P. Boas, Orange Park, Fla., assignor to Florida Cycle Supply Company
Filed June 3, 1976, Ser. No. 692,613
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—157



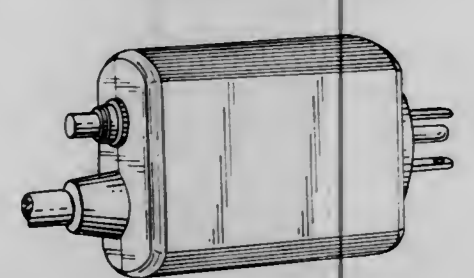
246,239
WHEEL
Edward A. Kozloski, Babylon, N.Y., assignor to Fiat Motors of North America, Montvale, N.J.
Filed Sept. 2, 1976, Ser. No. 719,721
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—209



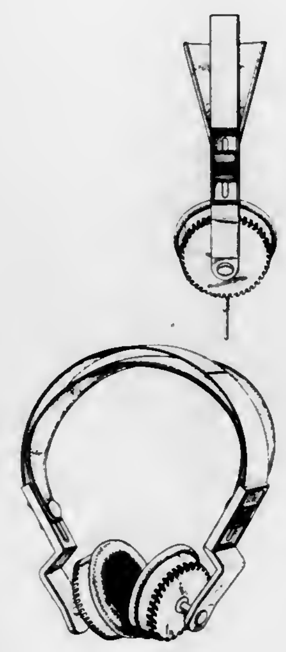
246,240
RECHARGEABLE POWER PACK
David E. Hansen, Fairport, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.
Filed Oct. 1, 1975, Ser. No. 619,142
Term of patent 14 years
Int. Cl. D16—*05*; D13—*02*
U.S. Cl. D13—8



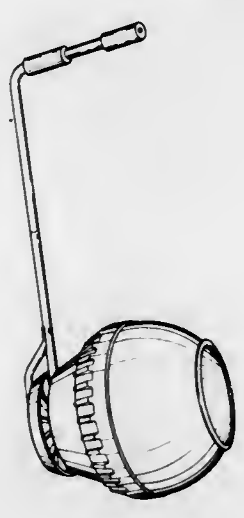
246,241
COMBINATION PLUG AND POWER CUT-OFF UNIT
David A. Jacobs, Brighton, Mich., assignor to JDS Products, Inc., Pontiac, Mich.
Filed Apr. 5, 1976, Ser. No. 673,394
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D13—28



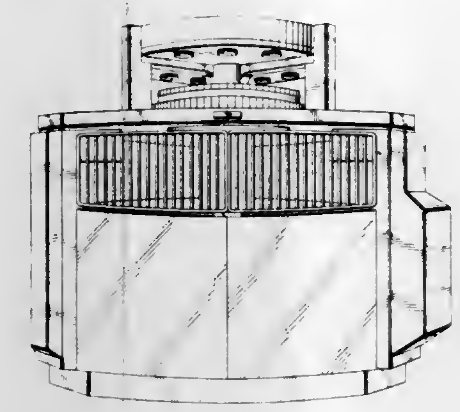
246,242
HEADPHONE
Mario Bellini, Lugano, Switzerland, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Japan
Filed Oct. 15, 1975, Ser. No. 622,467
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—36



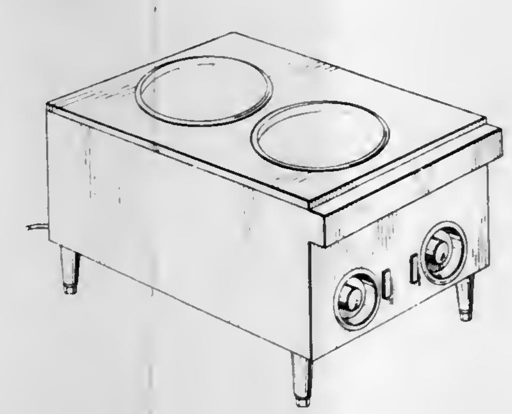
246,243
PORTABLE CEMENT MIXER
Jon A. Violet, and Hans Hauser, both of Fredericktown, Ohio, assignors to The J. B. Foote Foundry Co., Fredericktown, Ohio
Filed June 28, 1976, Ser. No. 700,514
Term of patent 14 years
Int. Cl. D15—*04*
U.S. Cl. D15—19



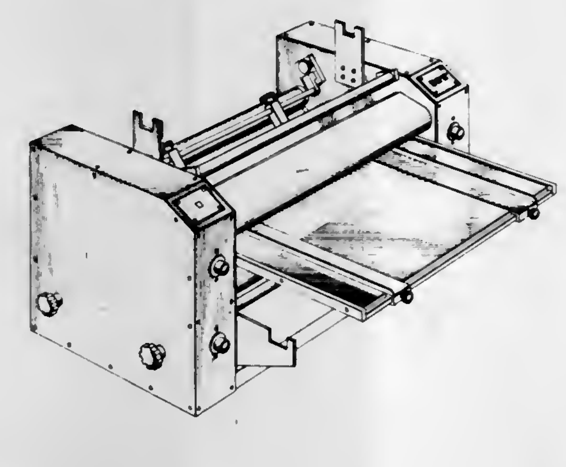
246,244
CIRCULAR KNITTING MACHINE
Wayne Allen Current, Cranford, and Michael Ballone, New Providence, both of N.J., assignors to The Singer Company
Filed Nov. 7, 1975, Ser. No. 629,822
Term of patent 14 years
Int. Cl. D15—*06*
U.S. Cl. D15—66



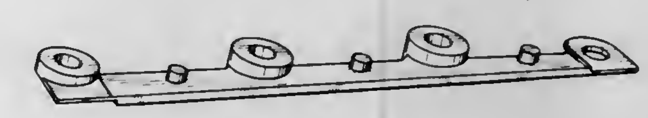
246,245
COMMERCIAL FOOD COOKING DEVICE
Harnek S. Gill, 637 Webster St., Algonquin, Ill. 60102, and Johannes W. Kaebitzsch, 430 Sunset Drive, Crystal Lake, Ill. 60014
Filed Apr. 12, 1976, Ser. No. 675,984
Term of patent 14 years
Int. Cl. D15—*08*
U.S. Cl. D15—104



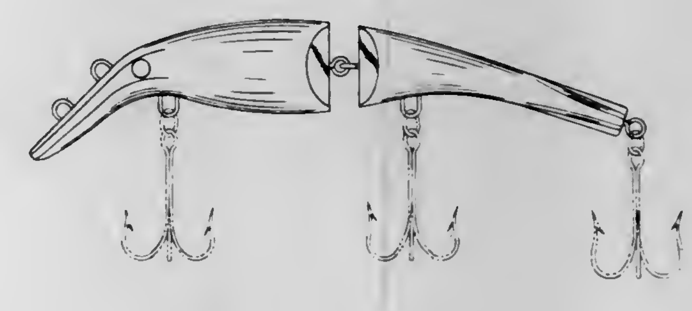
246,246
LAMINATING APPARATUS
Myron W. Shaffer, Irving, Tex., assignor to Thermo Seal, Inc., Fort Worth, Tex.
Filed June 28, 1976, Ser. No. 700,603
Term of patent 14 years
Int. Cl. D15—*99*
U.S. Cl. D15—146



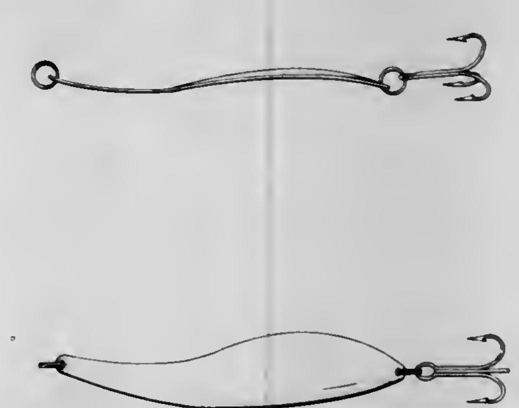
246,247
LATHLIKE ELEMENT FOR SIEVES
Sven Erik Dyrup, Oxie, Sweden, assignor to Trelleborgs Gummifabriks Aktiebolag, Trelleborg, Sweden
Filed Oct. 28, 1975, Ser. No. 626,509
Claims priority, application Sweden, Apr. 29, 1975, 75914
Term of patent 14 years
Int. Cl. D15—*99*
U.S. Cl. D15—147



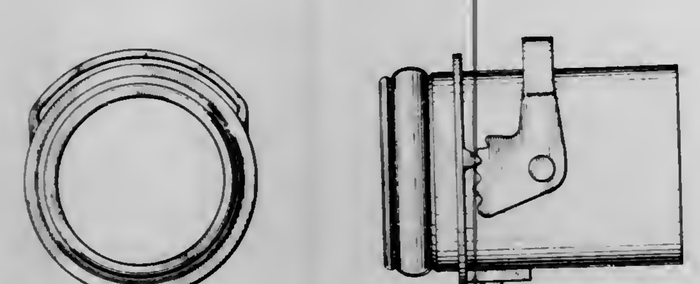
246,248
FISHING LURE
Carl Nothdurft, 22412 Lavon, St. Clair Shores, Mich. 48081
Filed Sept. 27, 1976, Ser. No. 727,211
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—27



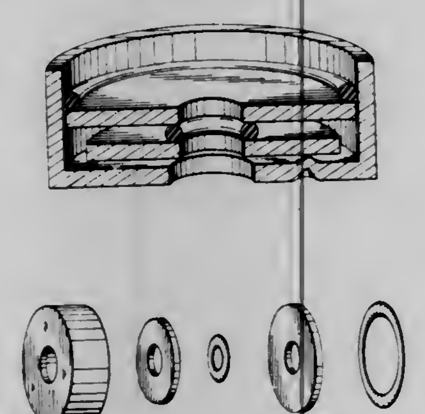
246,249
FISHING LURE
Illmari Pyorret, Karlskoga, Sweden, assignor to ABU Aktiebolag, Sweden
Filed June 4, 1976, Ser. No. 692,907
Claims priority, application Sweden, Dec. 4, 1975, 752413
Term of patent 7 years
Int. Cl. D22—*05*
U.S. Cl. D22—29



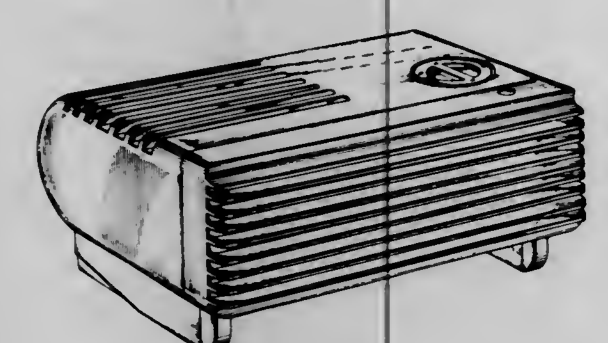
246,250
RECREATIONAL VEHICLE SEWER COUPLING
Robley H. Baldwin, P.O. Box 13286, South Lake Tahoe, Calif. 95702
Filed Sept. 10, 1975, Ser. No. 612,178
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—43



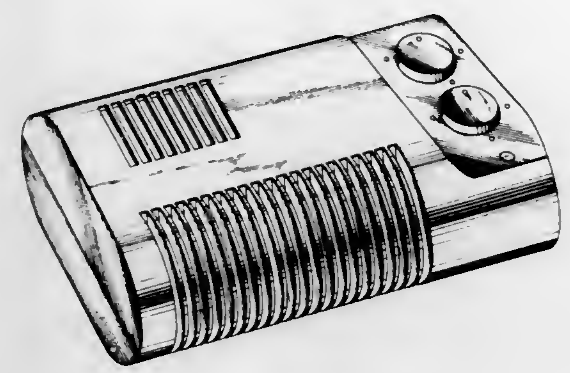
246,251
VACUUM BREAKER FOR VALVE STEM PACKING
Elder F. Hirsch, 520 - 21st St., and Ronald F. Hirsch, 707 E. 20th St., both of Greeley, Colo. 80631
Filed Oct. 14, 1975, Ser. No. 621,689
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—47



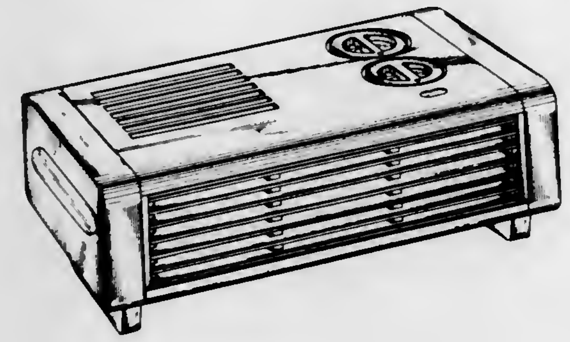
246,252
HEATER
Hans-Ulrich Schade, Pfuhl, Germany, assignor to Firma Elektro-Warme Technik, Nurnberg, Germany
Filed Aug. 8, 1975, Ser. No. 603,179
Claims priority, application Germany, Feb. 13, 1975, 1147
Term of patent 14 years
Int. Cl. D23—*03*
U.S. Cl. D23—122



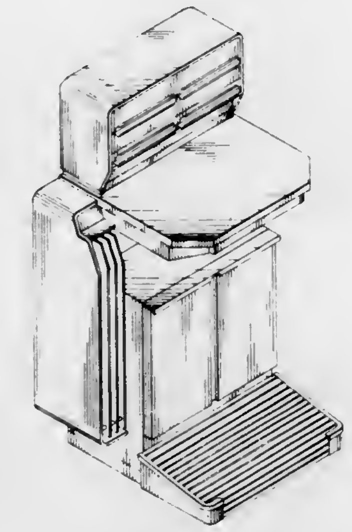
246,253
HEATER
Hans-Ulrich Schade, Pfuhl, Germany, assignor to Firma Elektro-Warme Technik, Nurnberg, Germany
Filed Aug. 8, 1975, Ser. No. 604,612
Term of patent 14 years
Int. Cl. D23—*03*
U.S. Cl. D23—122



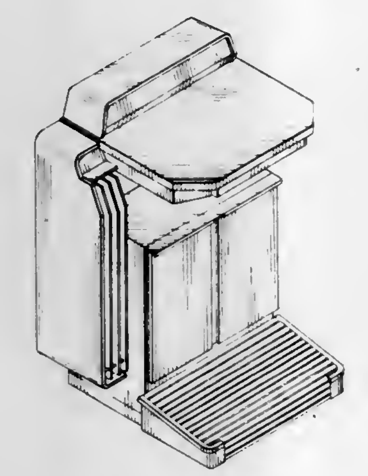
246,254
HEATER
Hans-Ulrich Schade, Pfuhl, Germany, assignor to Firma Elektro-Warme Technik, Nurnberg, Germany
Filed Aug. 8, 1975, Ser. No. 603,180
Term of patent 14 years
Int. Cl. D23—*03*
U.S. Cl. D23—122



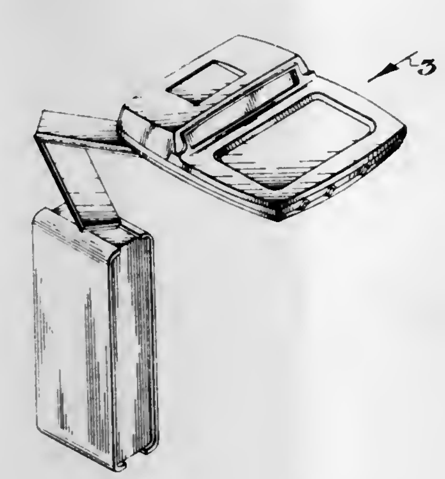
246,255
DENTAL CONSOLE
Danny Michael Truette, Pineville, N.C., assignor to Pelton & Crane Company, Charlotte, N.C.
Filed Nov. 12, 1976, Ser. No. 741,361
Term of patent 14 years
Int. Cl. D24—*01*
U.S. Cl. D24—4



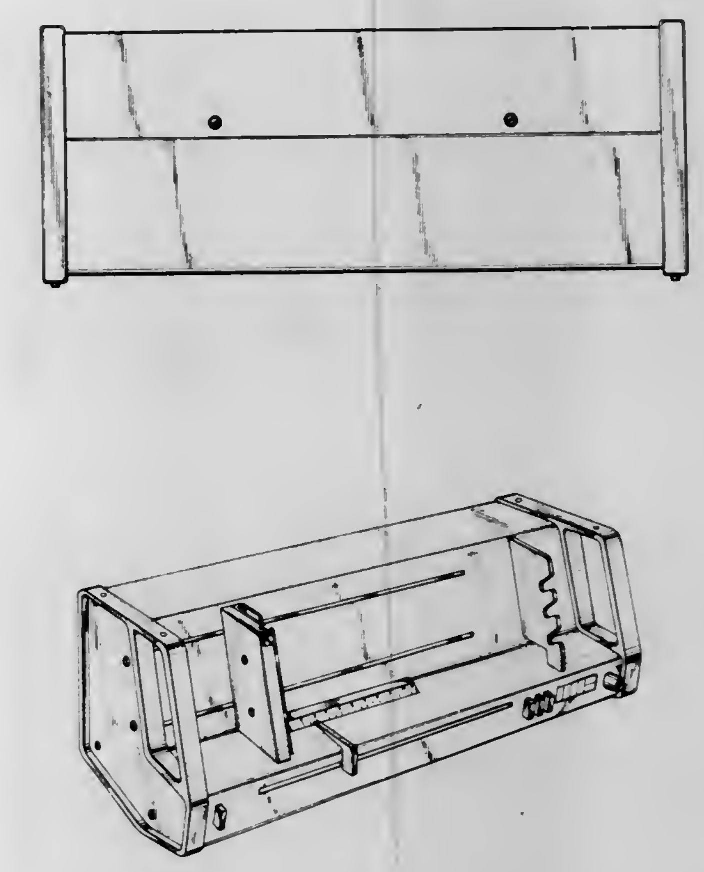
246,256
DENTAL CONSOLE
Danny Michael Truette, Pineville, N.C., assignor to Pelton & Crane Company, Charlotte, N.C.
Filed Nov. 12, 1976, Ser. No. 741,364
Term of patent 14 years
Int. Cl. D24—*01*
U.S. Cl. D24—4



246,257
DENTAL CONSOLE
Danny Michael Truette, Pineville, N.C., assignor to Pelton & Crane Company, Charlotte, N.C.
Filed Nov. 12, 1976, Ser. No. 741,516
Term of patent 14 years
Int. Cl. D24—*01*
U.S. Cl. D24—4



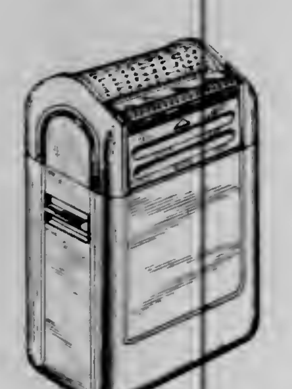
246,258
INFUSION PUMP
Roland Ekert, Burghaldenstrasse 52, 7032 Sindelfingen, Germany
Filed Dec. 31, 1975, Ser. No. 645,883
Claims priority, application Germany, July 4, 1975, 601
Term of patent 14 years
Int. Cl. D24—*01*; D15—*02*
U.S. Cl. D24—8



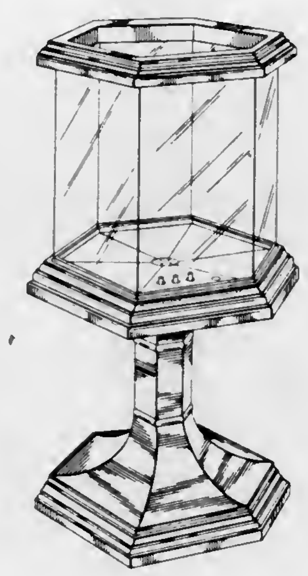
246,259
HEAD PHONE
Yasutake Nishimura, Hirakata, and Mitsuhiro Hasagawa, Osaka, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan
Filed Dec. 10, 1975, Ser. No. 639,511
Claims priority, application Japan, June 20, 1975, 50-25251
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—36

246,260
HAIR COLOR APPLICATOR
Lynne Forrester, 736 Guthrie Ave., Des Moines, Iowa 50316
Filed Feb. 9, 1976, Ser. No. 656,210
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D28—7

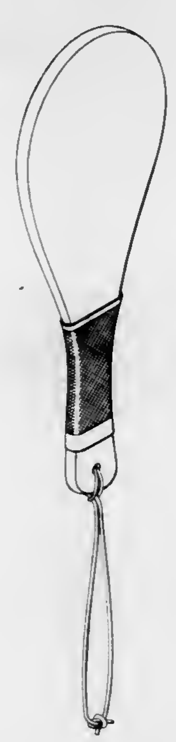
246,261
ELECTRIC DRY SHAVER
Jacob Anthony Krapowicz, Fairfield, Conn., assignor to Sperry Rand Corporation, Bridgeport, Conn.
Filed Jan. 12, 1976, Ser. No. 648,186
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D28—49



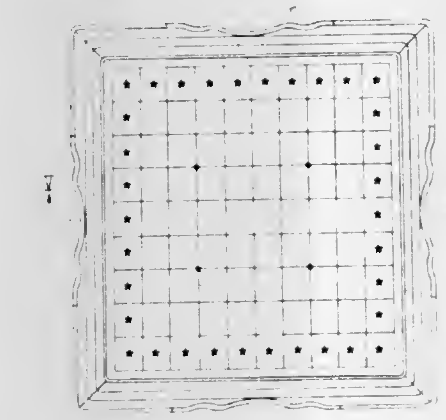
246,262
COMBINED AQUARIUM AND STAND
Ralph A. Zupo, 1818 Coronado Ave., Youngstown, Ohio 44504
Filed Oct. 22, 1976, Ser. No. 735,109
Term of patent 14 years
Int. Cl. D30—*02*
U.S. Cl. D30—8



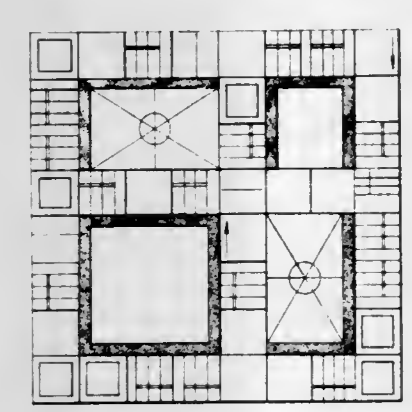
246,263
GAME PADDLE
Lindsey G. Spivey, II, Dallas, Tex., assignor to Jokari/US, Inc., Dallas, Tex.
Filed May 6, 1976, Ser. No. 683,717
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 SP



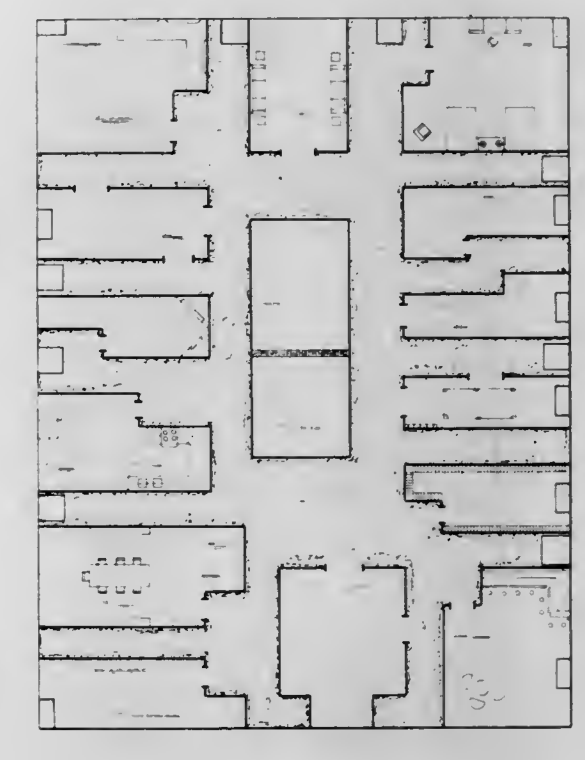
246,264
GAME BOARD
Satashi Hasegawa, and Mitsuo Tsukuda, both of 6-506 Keyaki-dai-danchi, 1-13-2 Wakaba-cho, Tachikawa, Tokyo, Japan
Filed Jan. 26, 1976, Ser. No. 652,084
Claims priority, application Japan, July 24, 1975, 5030522
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 SS



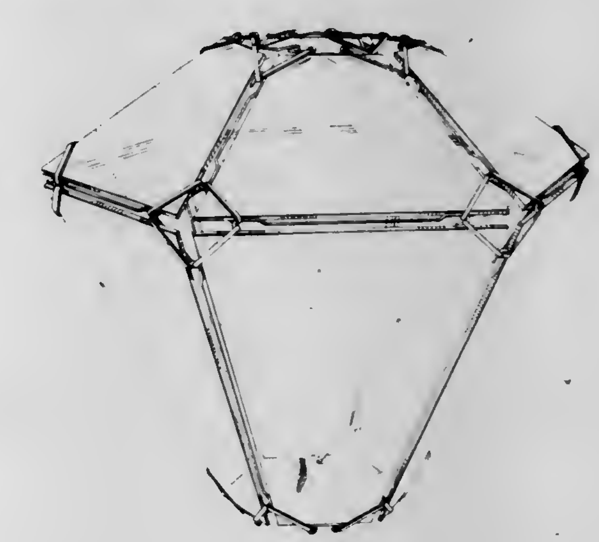
246,265
GAME BOARD
Jack Warren Wood, 238 22nd St., Costa Mesa, Calif. 92627
Filed Feb. 2, 1976, Ser. No. 654,401
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 SS



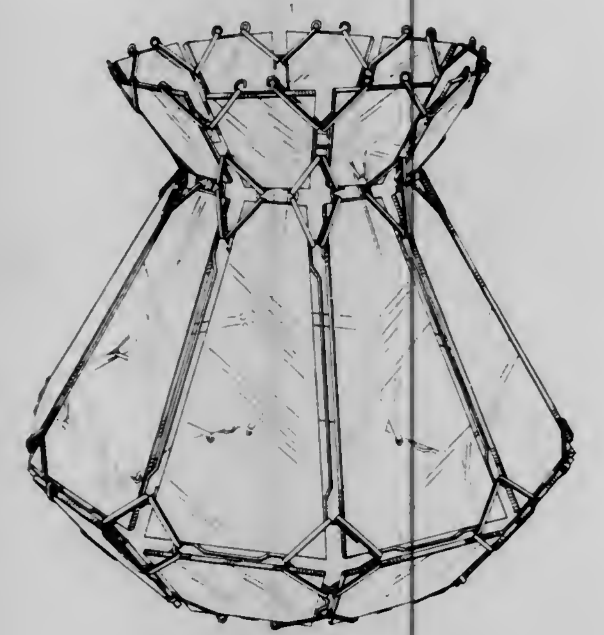
246,266
GAMEBOARD
Dian McIntosh, 28835 Pierce Ave., Barston, Calif. 93702
Filed Feb. 13, 1976, Ser. No. 657,743
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 SS



246,267
LAMP SHADE
John Geoffrey Baker, Willowdale, Canada, assignor to Baker-Martin Enterprises Limited
Filed Jan. 21, 1977, Ser. No. 761,360
Term of patent 14 years
Int. Cl. D26—*05*
U.S. Cl. D48—16 R

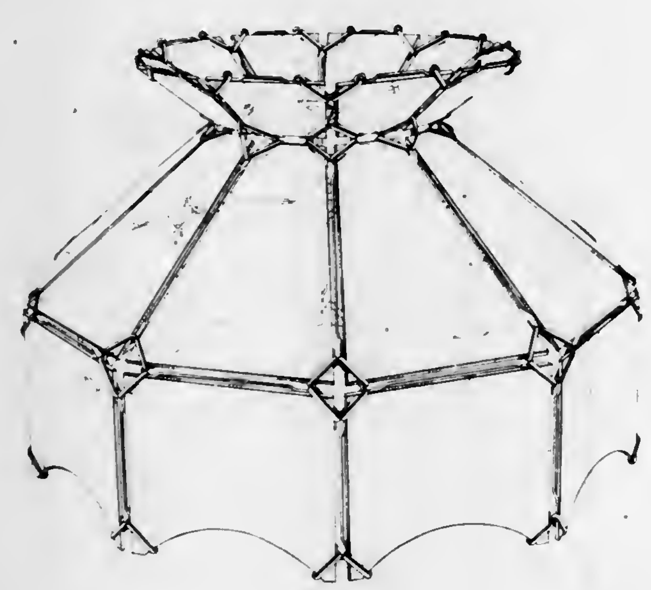


246,268
LAMP SHADE
John Geoffrey Baker, Willowdale, Canada, assignor to Baker-Martin Enterprises Limited
Filed Jan. 21, 1977, Ser. No. 761,384
Term of patent 14 years
Int. Cl. D26—*05*
U.S. Cl. D48—16 R



246,269
LAMP SHADE
John Geoffrey Baker, Willowdale, Canada, assignor to Baker-Martin Enterprises Limited
Filed Jan. 21, 1977, Ser. No. 761,385
Term of patent 14 years
Int. Cl. D26—*05*
U.S. Cl. D48—16 R

246,270
LAMP SHADE
John Geoffrey Baker, Willowdale, Canada, assignor to Baker-Martin Enterprises Limited
Filed Jan. 21, 1977, Ser. No. 761,386
Term of patent 14 years
Int. Cl. D26—*05*
U.S. Cl. D48—16 R



LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 1ST DAY OF NOVEMBER, 1977

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. Pierburg Autogeratebau KG: *See—*
Baumgartner, Hans, 4,056,084, Cl. 123-119.00A.
A.S.A. S.A.: *See—*
Bourgeois, Norbert Paul, 4,055,968, Cl. 66-151.000.
A. Stephan U. Sohne GmbH & Co.: *See—*
Otto, Friedrich, 4,056,640, Cl. 426-573.000.
AB Akerlund & Rausing: *See—*
Piltz, Lars-Erik; and Tvingstedt, Claes, 4,056,221, Cl. 229-14.0BL.
AB Bofors: *See—*
Gustafson, Kjell Arne Hakan, 4,056,738, Cl. 307-359.000.
AB Carbox: *See—*
Trolle, Sten, 4,056,347, Cl. 425-405.00H.
Abbou, Clement Claude: *See—*
Rey, Pierre Theodore Joseph; Leandri, Jacqueline Agathe Marie; and Abbou, Clement Claude, 4,056,095, Cl. 128-1.00R.
ABC Packaging Machine Corporation: *See—*
Reichert, Donald G., 4,055,943, Cl. 53-247.000.
Abele, Klaus: *See—*
Dinkelacker, Walter; Blum, Rudolf; Abele, Klaus; Knodler, Jurgen; and Ebinger, Peter, 4,055,996, Cl. 73-117.000.
Abels, Theodor; and Puschel, Siegfried, to Linde Aktiengesellschaft. Electrically powered vehicle with power steering. 4,056,160, Cl. 180-143.000.
ABEX Corporation: *See—*
Born, Ellis H.; Meisel, William H.; and Viles, Alan H., 4,056,041, Cl. 91-375.00R.
Achter, Eugene K.: *See—*
Priarone, Paolo; and Achter, Eugene K., 4,056,358, Cl. 23-253.00R.
Ackermann, Walter Thomas; and Martins, Jeremias Anthony, to Scovill Manufacturing Company. Slider for invisible-type slide fastener. 4,055,876, Cl. 24-205.14R.
Acme Mills Company: *See—*
Byrnes, Leo A., 4,056,281, Cl. 297-220.000.
Acrow (Engineers) Limited: *See—*
Tooley, Jack Raymond, 4,056,254, Cl. 249-210.000.
Acta Limited: *See—*
Stancati, Nicholas F.; and Garner, Peter, 4,055,929, Cl. 52-705.000.
Adams, Gerald E., to Bristol Products, Inc. Heating structure fabricating machine and method. 4,056,420, Cl. 156-181.000.
Adams, Kenneth Douglas, to Singer Company, The. Combination presser bar lifters and pressure controls. 4,056,071, Cl. 112-237.000.
Addressograph Multigraph Corporation: *See—*
Trenkamp, Robert H.; and Dissauer, Gerald A., 4,056,712, Cl. 235-440.000.
Admiraal, Petrus Simon, to U.S. Philips Corporation. Device for liquefying gases. 4,055,961, Cl. 62-54.000.
Adolf, Paul K.; and Carroll, James J., to Warner-Lambert Company. Stable colored reference standard for enzymatic determinations. 4,056,485, Cl. 252-408.000.
Aerazur Constructions Aeronautiques: *See—*
Bernard, Jean Paul; and Meningand, Paul A., 4,056,247, Cl. 244-110.00C.
Agavelian, Edik Stepanovich: *See—*
Boyadzhian, Varazdat Karapetovich; Khachatrian, Saribek Saakovich; Stepanian, Genrikh Gevorkovich; Eritsian, Volodya Karapetovich; Agavelian, Edik Stepanovich; Nefedov, Oleg Matveevich; Dolgy, Igor Evgenievich; Sisin, Mikhail Fedorovich; Kolbasin, Alexei Yakovlevich; and Anikeev, Ivan Konstantinovich, 4,056,563, Cl. 560-245.000.
Agence Nationale de Valorisation de la Recherche (ANVAR): *See—*
Rey, Pierre Theodore Joseph; Leandri, Jacqueline Agathe Marie; and Abbou, Clement Claude, 4,056,095, Cl. 128-1.00R.
AGFA-Gevaert, A.G.: *See—*
Krafft, Werner; Wolff, Erich; and von Bonin, Wulf, 4,056,397, Cl. 96-77.000.
Mischo, Klaus, 4,056,319, Cl. 355-68.000.
Schneider, Siegfried; Thate, Kurt; Geyken, Erwin; Kempe, Horst; and Macher, Stephan, 4,055,879, Cl. 29-123.000.
AGFA-GEVAERT N.V.: *See—*
Dhooge, Alfons Leon; and Cappuyns, Joseph Marie, 4,056,264, Cl. 271-177.000.
Ahlen, Karl Gustav, to S.R.M. Hydromekanik Aktiebolag. Torque converter transmission and valve arrangement therefor. 4,056,019, Cl. 74-677.000.
Ahlen, Karl Gustav; and Wahlsten, Gunnar, to S.R.M. Hydromekanik Aktiebolag. Simplified electronic pilot and remote control system for 1½ stage transmission. 4,056,177, Cl. 192-.032.
Aihara, Mitsugu; Kogane, Yutaka; Ebinuma, Yasumitsu; and Minami, Masaki, to Showa Electric Wire & Cable Co., Ltd. Termination of d.c. high tension electric cables and method of manufacturing same. 4,056,680, Cl. 174-19.000.
Air-Industrie: *See—*
Carre, Christian; and Rouault, Claude, 4,056,234, Cl. 141-392.000.
Air Products and Chemicals, Inc.: *See—*
Spector, Marshall L., 4,056,465, Cl. 210-7.000.
Airco, Inc.: *See—*
Hoerz, Richard D.; and Propp, Donald J., 4,056,741, Cl. 310-322.000.
Aisin Seiki Kabushiki Kaisha: *See—*
Kawata, Shoji, 4,056,157, Cl. 180-105.00E.
Ajero, Carlo S.: *See—*
Ajero, Fortunato S., 4,056,187, Cl. 198-394.000.
Ajero, Fortunato S., to Ajero, Carlo S. Corn orienting machinery. 4,056,187, Cl. 198-394.000.
Akagi, Kazuo: *See—*
Harada, Nobuhiko; Tanaka, Minetaka; Shimano, Masanao; Fujinaga, Kyozo; Nunomura, Kunito; Tamura, Masamitu; Nakamura, Shigeharu; and Akagi, Kazuo, 4,056,428, Cl. 156-642.000.
Akerberg, Olof Robert Wilhelm, to Aktiebolaget Electrolux. Compactors, particularly for garbage. 4,056,053, Cl. 100-218.000.
Akiyama, Yoshinori: *See—*
Imabuchi, Yoshihisa; Kurami, Kenshi; Akiyama, Yoshinori; and Sobajima, Katsunobu, 4,056,271, Cl. 280-745.000.
Aktiebolaget Electrolux: *See—*
Akerberg, Olof Robert Wilhelm, 4,056,053, Cl. 100-218.000.
Aktiebolaget Tudor: *See—*
Groby, Chester, 4,056,425, Cl. 156-499.000.
Aktieselskabet Niro Atomizer: *See—*
Hansen, Karl Erik; Hovmand, Svend; Pedersen, Mogens Lindskov; Schwartzbach, Christian; Htun, Myat; de Ruvo, Alf; and Cavlin, Soren, 4,055,903, Cl. 34-12.000.
Akutsu, Eisaku: *See—*
Saitoh, Takeshi; Akutsu, Eisaku; and Shinagawa, Mitsuhisa, 4,056,787, Cl. 331-59.000.
Al-Shaikh, Al; and Dahlin, Erik B., to Measurex Corporation. Method for control of ceiling tile process. 4,056,714, Cl. 364-111.000.
Albers, Ernst-August; Fester, Walter; and Sassenrath, Bernd, to Hoechst Aktiengesellschaft. Modacryl filaments and fibers and process for their manufacture. 4,056,516, Cl. 260-79.30M.
Albers, Ernst-August; and Sassenrath, Bernd, to Hoechst Aktiengesellschaft. Modacryl filaments and fibers and process for their manufacture. 4,056,517, Cl. 260-79.30M.
Alberto, Vicente Santo Domingo: *See—*
Spanur, Frank George; and Alberto, Vicente Santo Domingo, 4,056,659, Cl. 429-54.000.
Alberts, Heinrich; Bartl, Herbert; and Prinz, Richard, to Bayer Aktiengesellschaft. Styrene acrylonitrile copolymers with high dimensional stability under heat. 4,056,671, Cl. 526-342.000.
Alcan Research and Development Limited: *See—*
Decobert, Jacques L. E., 4,056,230, Cl. 241-15.000.
Alinari, Carlo. Instrument for indicating the depths and durations of decompression stops required during underwater submersions. 4,056,010, Cl. 73-432.00R.
Aliprandi, Giovanni; and Ricci, Roberto, to SNAC S.p.A. Refrattari Argille e Caolini. Sliding gate valve for molten metal with adjustable plates. 4,056,217, Cl. 222-600.000.
Allen, Ralph W., Jr., to Tillotson Corporation. Sound attenuation material. 4,056,161, Cl. 181-290.000.
Allen, Walter E., to Peter Paul Electronics Co., Inc. Solenoid valve. 4,056,119, Cl. 137-315.000.
Amdahl Corporation: *See—*
Bishop, Richard L.; and Tulloh, Steven P., 4,056,843, Cl. 364-200.000.
American Air Filter Company, Inc.: *See—*
Hixenbaugh, Dennis L., 4,056,374, Cl. 55-377.000.
American Can Company: *See—*
Schlesinger, Sheldon I.; and Cochran, Veronica, 4,056,393, Cl. 96-27.00H.
American Hoechst Corporation: *See—*
Lassman, Howard B.; and Novick, William J., Jr., 4,056,624, Cl. 424-274.000.
American Home Products Corporation: *See—*
Janin, Pierre R., 4,056,359, Cl. 23-259.000.
Sellstedt, John H.; and Teller, Daniel M., 4,056,525, Cl. 260-239.0BD.
American Lecithin Company: *See—*
Kronstein, Max; and Eichberg, Joseph, 4,056,494, Cl. 260-22.00A.
American Optical Corporation: *See—*
Grolman, Bernard; and Richards, William, 4,055,900, Cl. 33-200.000.
Winthrop, John Talley, 4,056,311, Cl. 351-169.000.

American Tara Corporation: *See—*
Sipin, Richard F., 4,056,426, Cl. 156-505.000.
AMF Incorporated: *See—*
Hansen, Charles D., Jr., 4,056,463, Cl. 209-111.70R.
Ray, Eric Thomas, 4,056,022, Cl. 83-62.000.
AMPCO Foods Inc.: *See—*
Shatila, Mounir A.; VonDer Leith, William H.; Veeneman, John L.; and Thomas, Marion E., 4,056,345, Cl. 425-186.000.
Amstar Corporation: *See—*
Dmitrovsky, Morris; and Kokke, Antoine H., 4,056,364, Cl. 23-273.00R.
Anchor Industries, Inc.: *See—*
Daus, John J., Jr.; James, Henry E.; and Reinhart, Thomas L., 4,056,327, Cl. 403-172.000.
Anderson, Arthur Ernest, to Westinghouse Electric Corporation. Battery operated transmitter circuit. 4,056,815, Cl. 340-224.000.
Anderson, Ingvar G.: *See—*
Mackenzie, Harold B.; and Anderson, Ingvar G., 4,056,202, Cl. 214-17.00C.
Andow, Fumio, to Tokyo Shibaura Denki Kabushiki Kaisha. Protective relay devices. 4,056,839, Cl. 361-68.000.
Angner, Ronald Joseph; and Lacy, James Volney, to Bell Telephone Laboratories, Incorporated. Key telephone line circuit tone-on-hold arrangement. 4,056,695, Cl. 179-99.000.
Anikeev, Ivan Konstantinovich: *See—*
Boyadzhian, Varazdat Karapetovich; Khachatrian, Saribek Saakovich; Stepanian, Genrikh Gevorkovich; Eritsian, Volodya Karapetovich; Agavelian, Edik Stepanovich; Nefedov, Oleg Matveevich; Dolgy, Igor Evgenievich; Sisin, Mikhail Fedorovich; Kolbasin, Alexei Yakovlevich; and Anikeev, Ivan Konstantinovich, 4,056,563, Cl. 560-245.000.
Anschutz Handels-und Verwaltungs- GmbH: *See—*
Anschutz, Hans-Josef, 4,055,912, Cl. 46-25.000.
Anschutz, Hans-Josef, to Anschutz Handels-und Verwaltungs- GmbH. Toy construction members. 4,055,912, Cl. 46-25.000.
ANVAR-Agence Nationale de Valorisation de la Recherche: *See—*
Ter-Minassian, Leon; Pruzan, Philippe; Figuiere, Pierre; and Szwarc, Henri, 4,055,982, Cl. 73-15.00B.
Arai, Noboru: *See—*
Sato, Masamichi; Kido, Keishiro; and Arai, Noboru, 4,056,395, Cl. 96-36.000.
Arakelian, Jack. Air flow measurement. 4,056,001, Cl. 73-189.000.
Arbogast, Porter R. Multiple mirrored apparatus utilizing solar energy. 4,056,313, Cl. 353-3.000.
ARDAC/USA: *See—*
Bayha, Jack E., 4,056,731, Cl. 250-556.000.
Argento, Gloria; and Strandt, Margaret. Convertible coat and tote bag. 4,055,853, Cl. 2-93.000.
Argus Chemical Corporation: *See—*
Lewis, Roger N.; Pastorino, Ronald L.; and Wilts, James F., 4,056,561, Cl. 260-46.50G.
Arieh, Simon; and Budliger, Jean-Pierre, to Battelle Development Corporation. Component flow rate measurement in two-phase systems. 4,056,002, Cl. 73-194.00R.
Ariga, Junichi: *See—*
Ohigashi, Tugio; and Ariga, Junichi, 4,056,794, Cl. 334-15.000.
Ariyama, Kenzo; Ota, Sakae; Ikeda, Sunao; and Okamoto, Toyoo, to Ricoh Company, Ltd. Squeeze roller retraction assembly. 4,056,315, Cl. 355-10.000.
Armstrong Cork Company: *See—*
Garrick, John R.; and Kendig, Ray C., 4,056,647, Cl. 428-134.000.
Armstrong, Lee R.; and Mercik, Henry J., Jr., to United Technologies Corporation. Engine air-in-fuel diagnostics. 4,055,995, Cl. 73-116.000.
Armstrong, Lee R.: *See—*
Pettingell, James R.; and Armstrong, Lee R., 4,055,998, Cl. 73-119.00R.
Rackliffe, Richard J.; and Armstrong, Lee R., 4,055,993, Cl. 73-116.000.
Arnold, Bruce K.: *See—*
McCartney, Ronald L.; Arnold, Bruce K.; and Hogan, Vaughn C., 4,056,305, Cl. 350-96.00C.
Arsac, Aime Joseph; and Frank, Pierre, to Produits Chimiques Ugine Kuhlmann. Liquid monoazo-naphthalene dyestuffs, and their use. 4,056,367, Cl. 44-59.000.
ASEA Aktiebolag: *See—*
Ivner, Sven, 4,056,768, Cl. 363-79.000.
Olsson, Karl Erik; and Sehman, Bengt, 4,056,776, Cl. 324-158.0SC.
Asida, Tutomu: *See—*
Misono, Masayoshi; Koayama, Masaharu; and Asida, Tutomu, 4,056,306, Cl. 350-160.0LC.
Aspin, Frank M., to Shell Oil Company. Process for making hollow fibers. 4,056,418, Cl. 156-145.000.
Aspro, Inc.: *See—*
Kraft, Derald H., 4,055,976, Cl. 72-83.000.
Kraft, Derald H., 4,056,014, Cl. 74-230.400.
Kraft, Derald H.; and St. John, Richard C., 4,056,291, Cl. 308-189.00R.
Asselin, Andre A.: *See—*
Demerson, Christopher A.; Humber, Leslie G.; Asselin, Andre A.; Jirkovsky, Ivo; and Dobson, Thomas A., 4,056,537, Cl. 260-326.50B.
Demerson, Christopher A.; Humber, Leslie G.; Asselin, Andre A.; Jirkovsky, Ivo; and Dobson, Thomas A., 4,056,538, Cl. 260-326.50B.
Assinder, Andrew Charles: *See—*
Newstead, Charles; Assinder, Andrew Charles; and Harvey, Geoffrey, 4,056,175, Cl. 188-196.0BA.
Astra Lakemedel Aktiebolag: *See—*
Dahlberg, Alf-Goran; Hogberg, Karl Gustav; Lindvall, Sven; and Rydh, Thore Oskar Verner, 4,056,672, Cl. 536-1.000.
Ateliers des Charmilles S.A.: *See—*
Lieber, Jean, 4,056,330, Cl. 415-1.000.
Atkins, Carl E.; and McGuirk, Francis A., Jr., to Wagner Electric Corporation. Inductively coupled keyable control circuit and keying circuit therefore using hybrid detection means. 4,056,841, Cl. 361-203.000.
Atkinson, Joseph G.; Belanger, Patrice C.; Rooney, Clarence S.; and Britcher, Susan F., to Merck & Co., Inc. Pyrrolo[2,1-b][3]benzazepines. 4,056,536, Cl. 260-326.50B.
AudioKinetics Corporation: *See—*
Harrison, Stanley Norman, 4,056,783, Cl. 330-268.000.
Auracher, Franz, to Siemens Aktiengesellschaft. Method for the production of one-material optical fibers. 4,056,377, Cl. 65-4.00A.
Automation Industries, Inc.: *See—*
Cooper, Earl A.; and Howett, Michael J., 4,056,298, Cl. 339-90.00R.
Auzannet, Jack: *See—*
Jardin, Hans; and Auzannet, Jack, 4,056,274, Cl. 296-137.00G.
Axen, Udo F., to Upjohn Company, The. 2,2-Difluoro-16-phenoxy-13,14-dihydro-PGF$_1$, analogs. 4,056,554, Cl. 560-60.000.
Axen, Udo F., to Upjohn Company, The. 2,2-Difluoro-16-phenoxy-PGA$_2$ analogs. 4,056,555, Cl. 560-53.000.
Axen, Udo F., to Upjohn Company, The. 2,2-Difluoro-16-phenoxy-PGE$_2$ analogs. 4,056,556, Cl. 560-53.000.
Axen, Udo F., to Upjohn Company, The. 2,2-Difluoro-16-phenoxy-PGF$_1$ analogs. 4,056,557, Cl. 560-60.000.
Ayerst McKenna and Harrison Ltd.: *See—*
Demerson, Christopher A.; Humber, Leslie G.; Asselin, Andre A.; Jirkovsky, Ivo; and Dobson, Thomas A., 4,056,537, Cl. 260-326.50B.
Demerson, Christopher A.; Humber, Leslie G.; Asselin, Andre A.; Jirkovsky, Ivo; and Dobson, Thomas A., 4,056,538, Cl. 260-326.50B.
Aylor, Elmo E. Worm package and method of packaging worms. 4,055,911, Cl. 43-55.000.
Babenko, Evgeny Akimovich: *See—*
Bukrinsky, Anatoly Matveevich; Matskevich, Genrikh Vladimirovich; Rzheznikov, Julian Vulfovich; Sukhov, Andrei Borisovich; Tatarnikov, Viktor Petrovich; Berkovich, Viktor Mozesovich; Remzhin, Jury Nikolaevich; Slepnev, Lev Nikolaevich; Sverdlov, Alexandr Anatolievich; Karan, Vladimir Geselevich; Kaloshin, Jury Petrovich; Krasikov, Anatoly Nikolaevich; Babenko, Evgeny Akimovich; Bronnikov, Vladimir Konstantinovich; Shvyryaev, Jury Vasilievich; and Shiryaev, Boris Semenovich, 4,056,436, Cl. 176-38.000.
Babinsky, Andrew D.; and Dotson, Ronald L., to Diamond Shamrock Corporation. Process for brine membrane cell operation with external caustic and NaCl concentration control. 4,056,448, Cl. 204-98.000.
Bachman, Wesley J., to Dickey-john Corporation. System for monitoring a periodic function. 4,056,817, Cl. 340-253.00Y.
Bachrach, Osher M.: *See—*
Dirham, Walter M., 4,055,856, Cl. 2-192.000.
Backofen, Joseph E.: *See—*
Petty, Jon; Trott, Beverly D.; and Backofen, Joseph E., 4,056,212, Cl. 220-244.000.
Baert, Victor R.; and Harvey, Ronald B., to Pako Corporation. Web advancement and cutting mechanism and method. 4,056,024, Cl. 83-210.000.
Bailey, Philip Charles; and Scholz, Hans, to Electric Valve Company Limited. Vidicon having switchable electrode connections. 4,056,754, Cl. 313-390.000.
Bajohr, Alfred, to Daimler-Benz Aktiengesellschaft. Arrangement of the suction funnel of an oil pump in the sump of an internal combustion engine. 4,056,168, Cl. 184-6.240.
Baker, Roger T. Circuit for the improvement of semiconductor memories. 4,056,811, Cl. 365-189.000.
Bakowski, Thomas G., to Eaton Yale Ltd. Clamp assembly. 4,056,134, Cl. 144-2.00Z.
Ballard, Denis George Harold; Jones, Eric; Padget, John Christopher; Pioli, Alexander Joseph Peter; Robinson, Peter Anthony; Walker, John; and Wyatt, Ronald John, to Imperial Chemical Industries Limited. Polymerization process. 4,056,669, Cl. 526-154.000.
Baniel, Avraham Matitiahu; Mitzmager, Abraham; Segall, Jeanna; Star, Shlomo; and Shorr, Leonard Marshall, to IMI (TAMI) Institute for Research and Development. Bonded particulate ceramic materials and their manufacture. 4,056,588, Cl. 264-63.000.
Barber, Loren L., Jr.; Lucas, Anthony J.; and Wen, Richard Y., to Minnesota Mining and Manufacturing Company. Microcapsule insecticide composition. 4,056,610, Cl. 424-32.000.
Barger, Harold E. Solar heater. 4,056,093, Cl. 126-271.000.
Barna, Alex J. Device for carrying a handgun. 4,056,218, Cl. 224-2.00C.
Barnes, Sidney; and Fothergill, John Roderick, to United Kingdom Atomic Energy Authority. Liquid metal cooled nuclear reactor scanning apparatus. 4,056,434, Cl. 176-19.00R.
Baron, Gerhard; Bierbach, Herbert; Hafke, Carl; and Pockrandt, Gunter, to Metallgesellschaft Aktiengesellschaft; and Ruhrgas Aktiengesellschaft. Process for producing synthesis gases. 4,056,483, Cl. 252-373.000.
Barrois, Marcelle, to Techniform. Display device for spectacles. 4,056,192, Cl. 211-13.000.

Bartko, John; and Sun, Kuan H., to Westinghouse Electric Corporation. Reducing the switching time of semiconductor devices by nuclear irradiation. 4,056,408, Cl. 148-1.500.
Bartl, Herbert: *See—*
Alberts, Heinrich; Bartl, Herbert; and Prinz, Richard, 4,056,671, Cl. 526-342.000.
Bartmann, Wilhelm; Beck, Gerhard; Granzer, Ernold; Musil, Josef; and Teufel, Hermann, to Hoechst Aktiengesellschaft. Pharmacologically active O-acyl-2,3-diaryl-3-halogeno-acryl-aldoximes. 4,056,629, Cl. 424-327.000.
Barzynski, Helmut; Heil, Guenter; Klemm, Karl; and Sander, Helfrid, to BASF Aktiengesellschaft. UV-curing printing inks. 4,056,453, Cl. 204-159.230.
BASF Aktiengesellschaft: *See—*
Barzynski, Helmut; Heil, Guenter; Klemm, Karl; and Sander, Helfrid, 4,056,453, Cl. 204-159.230.
Hoffman, Werner; Mueller, Norbert; and von Fraunberg, Karl, 4,056,541, Cl. 260-343.000.
Hoffmann, Werner; and Baumann, Manfred, 4,056,545, Cl. 260-410.000.
Schoettle, Klaus; Wittkamp, Heinrich; and Gliniorz, Lothar, 4,056,245, Cl. 242-197.000.
Strehler, Hugo; Beer, Ludwig; Heil, Eduard; Urbanek, Friedrich; and Fischer, Hermann, 4,056,514, Cl. 260-75.00R.
Bashkirov, Andrei Nikolaèvich; Grozhan, Mark Markovich; Kamzolkin, Vladimir Vasilievich; Lapitsky, Jury Anatolievich; and Vygodskaya, Irina Vladimirovna. Method for the manufacture of phenols. 4,056,572, Cl. 260-624.00R.
Baskovic, Franz: *See—*
Hoeger, Ernst; and Baskovic, Franz, 4,056,430, Cl. 162-76.000.
Battelle Development Corporation: *See—*
Arieh, Simon; and Budliger, Jean-Pierre, 4,056,002, Cl. 73-194.00R.
Bau, Marcel; Hinkes, Larry D.; and Cosgrave, James. Scoop device. 4,056,278, Cl. 294-19.00R.
Bauer, Andreas; and Lange, Wolfgang, to Volkswagenwerk Aktiengesellschaft. Door for vehicles, in particular motor vehicles. 4,056,280, Cl. 296-146.000.
Bauer, Johann, to Siemens Aktiengesellschaft. Housing for securing a damping compression spring in an electromagnetic switching apparatus. 4,056,799, Cl. 335-277.000.
Baumann, Hans; Halfmann, Manfred; and Janke, Rudolf, to GEA Luftkuhlergesellschaft Happel GmbH & Co. KG. Heat exchange arrangement. 4,056,142, Cl. 165-133.000.
Baumann, Manfred: *See—*
Hoffmann, Werner; and Baumann, Manfred, 4,056,545, Cl. 260-410.000.
Baumgartner, Hans, to A. Pierburg Autogeratebau KG. Method and apparatus for recycling exhaust. 4,056,084, Cl. 123-119.00A.
Baumgartner, Hans Ulrich: *See—*
Sonderegger, Hans Conrad; and Baumgartner, Hans Ulrich, 4,056,009, Cl. 73-406.000.
Bauml, Kurt; Gunsser, Otto Ch.; and Lohse, Rudolf K., to Gebruder Heller Maschinenfabrik GmbH. Device for machining winding slots of generator rotors. 4,056,039, Cl. 90-92.000.
Baxter, Duane Willard; and Shipway, Richard Edward, to International Business Machines Corporation. Defect inspection of objects such as electronic circuits. 4,056,716, Cl. 364-515.000.
Baxter Travenol Laboratories, Inc.: *See—*
Carter, Garry L.; and Granzow, Daniel B., 4,056,116, Cl. 137-68.00R.
Geissler, Ulrich C.; and Stith, William J., 4,056,101, Cl. 128-214.00D.
Lolachi, Houshang, 4,056,224, Cl. 233-14.00R.
Priarone, Paolo; and Achter, Eugene K., 4,056,358, Cl. 23-253.00R.
Soodak, Charles; and Gelbman, Alexander, 4,056,708, Cl. 219-499.000.
Bayer Aktiengesellschaft: *See—*
Alberts, Heinrich; Bartl, Herbert; and Prinz, Richard, 4,056,671, Cl. 526-342.000.
Eichenhofer, Kurt-Wilhelm; and Schliebs, Reinhard, 4,056,469, Cl. 210-62.000.
Germerdonk, Rolf; Jonas, Adam; Hullstrung, Dieter; and Scherhag, Bernhard, 4,056,606, Cl. 423-575.000.
Grundmeier, Manfred; Binsack, Rudolf; and Vernaleken, Hugo, 4,056,504, Cl. 260-37.0PC.
Heinze, Gerhard; Mengel, Manfred; and Reiss, Gerhard, 4,056,370, Cl. 55-68.000.
Hohmann, Walter; Herzog, Helmut; and Bien, Hans-Samuel, 4,056,544, Cl. 260-378.000.
Moller, Eike; Meng, Karl; Wehinger, Egbert; and Horstmann, Harald, 4,056,533, Cl. 548-360.000.
Muschelknautz, Edgar; and Nemecek, Franz, 4,055,940, Cl. 57-77.400.
Schlee, Hans Georg; Sasse, Klaus; and Eue, Ludwig, 4,056,527, Cl. 544-194.000.
Weicht, Bodo; and Kleinhenz, Karl, 4,056,444, Cl. 203-26.000.
Wolf, Gerhard Dieter; Bentz, Francis; and Nischk, Gunther, 4,056,564, Cl. 260-512.00C.
Bayer, Horst O.; and Hurt, William S., to Rohm and Haas Company. Process for the preparation of phosphorodichloridothiolates. 4,056,581, Cl. 260-972.000.
Bayern-Chemie Gesellschaft fur flugchemische Antriebe mit beschrankter Haftung: *See—*
Herrmann, Guenter, 4,056,242, Cl. 242-107.40R.
Bayha, Jack E., to ARDAC/USA. Reticle protective structure and radiation sensitive validation apparatus. 4,056,731, Cl. 250-556.000.
BBC Brown Boveri & Company Limited: *See—*
Meloni, Beat, 4,056,332, Cl. 416-97.00A.
Meyer, Gundolf, 4,055,887, Cl. 29-599.000.
Beach, Anthony John; Eveson, Geoffrey Frank; and Leedham, Reginald Keith, to Laporte Industries Limited. Process and apparatus for heating gases. 4,056,704, Cl. 219-121.00P.
Beall, Benjamin S., III; and Novy, Russell F., to Sola Basic Industries, Inc. Electric heating furnace. 4,056,678, Cl. 13-25.000.
Beatrice Foods Co.: *See—*
Chow, Ho, 4,056,582, Cl. 261-30.000.
Beaver, Emil R., Jr. Inexpensive and disassemblable structural units. 4,055,924, Cl. 52-262.000.
Bechtel International Corporation: *See—*
Fox, Joseph M., III; Degen, Bruce D.; and Leibson, Irving, 4,056,599, Cl. 423-178.000.
Beck, Gerhard: *See—*
Bartmann, Wilhelm; Beck, Gerhard; Granzer, Ernold; Musil, Josef; and Teufel, Hermann, 4,056,629, Cl. 424-327.000.
Becker, Otto Alfred. Load bearing construction unit. 4,055,920, Cl. 52-2.000.
Becklund, Orville A., to Texas Instruments Incorporated. Proximity fuse. 4,056,061, Cl. 102-70.20P.
Beecham Group Limited: *See—*
Clark, Judith Ann, 4,056,630, Cl. 424-330.000.
Beer, Ludwig: *See—*
Strehler, Hugo; Beer, Ludwig; Heil, Eduard; Urbanek, Friedrich; and Fischer, Hermann, 4,056,514, Cl. 260-75.00R.
Beery, Jack, to Burroughs Corporation. Ribbonless endorser having a shiftable inked platen and feed roller. 4,056,183, Cl. 197-1.00R.
Behr, Friedrich F., to Rheinische Braunkohlenwerke AG. Thermochemical process for the production of hydrogen and oxygen from water. 4,056,607, Cl. 423-579.000.
Behringwerke Aktiengesellschaft: *See—*
Heimburger, Norbert; Sieber, Axel; and Schwinn, Horst, 4,056,484, Cl. 252-408.000.
Weiler, Herbert; Schneider, Hans; and Weyrich, Ludwin, 4,056,129, Cl. 141-24.000.
Belanger, Inc.: *See—*
Belanger, James A., 4,055,919, Cl. 51-334.000.
Belanger, James A., to Belanger, Inc. Pack unit and mounting means therefor. 4,055,919, Cl. 51-334.000.
Belanger, Patrice C.: *See—*
Atkinson, Joseph G.; Belanger, Patrice C.; Rooney, Clarence S.; and Britcher, Susan F., 4,056,536, Cl. 260-326.50B.
Bell & Howell Company: *See—*
Sample, Winfield, 4,056,008, Cl. 73-398.0AR.
Bell, Oliver A., Jr.; Gilleland, Randall C.; and Chance, Davey J., to Colt Industries Operating Corporation. Electrical discharge machining power circuit. 4,056,702, Cl. 219-69.00C.
Bell Telephone Laboratories, Incorporated: *See—*
Angner, Ronald Joseph; and Lacy, James Volney, 4,056,695, Cl. 179-99.000.
Bobeck, Andrew Henry; and Fischer, Robert Frederick, 4,056,812, Cl. 365-17.000.
Bobeck, Andrew Henry; and Scovil, Henry Evelyn Derrick, 4,056,814, Cl. 365-8.0TF.
Bosik, Barry Sheldon; and Stone, Dale Eugene, 4,056,693, Cl. 179-84.00R.
Brolin, Stephen Joseph; and Colodner, Samuel, 4,056,690, Cl. 179-17.00A.
Brolin, Stephen Joseph, 4,056,694, Cl. 179-84.00R.
Dworak, Francis Stanislaus; and Ratti, Renald Anthony, 4,056,698, Cl. 179-175.20C.
Freimanis, Laimons, 4,056,689, Cl. 179-16.00F.
Freimanis, Laimons; Mussman, Harry Edward; and Smith, DeWitt Paul, 4,056,691, Cl. 179-18.0FA.
Meyerle, John Alfons; and Stokes, Rembert Ryan, 4,056,696, Cl. 179-100.00R.
Peterson, William Anders, 4,056,734, Cl. 307-254.000.
Sequin, Carlo Heinrich, 4,056,737, Cl. 307-304.000.
Stiefel, Kenneth Erwin, 4,056,688, Cl. 179-16.00F.
Swan, Clarence Burke, 4,056,785, Cl. 330-53.000.
Thornber, Karvel Kuhn, 4,056,807, Cl. 340-166.00R.
Waaben, Sigurd Gunther, 4,056,719, Cl. 250-199.000.
Belov, Vladimir Nikolaevich: *See—*
Volfkovich, Semen Issakovich; Belov, Vladimir Nikolaevich; Ershov, Vadim Andreevich; Rozenberg, Evgeny Khaskelevich; Shipov, Emmanuil Ivanovich; and Jumanova, Ljudmila Vladimirovna, 4,056,601, Cl. 423-322.000.
Benckiser-Knapsack GmbH: *See—*
Hoeger, Ernst; and Baskovic, Franz, 4,056,430, Cl. 162-76.000.
Bendix Corporation, The: *See—*
McNabb, Vernon L., 4,056,125, Cl. 137-625.300.
Benhamou, Jean Pierre, to Texas Instruments Incorporated. Ultrasonic remote control receiver suitable for TV receiver. 4,056,808, Cl. 340-171.0PF.
Bennett, George Robert, to Molins Limited. Apparatus for unloading rod-like articles from containers. 4,056,206, Cl. 214-302.000.
Bennett, Joseph C.: *See—*
Fusco, Vito A.; Bennett, Joseph C.; Funcik, Jack F.; Kufner, Kenneth L.; and Schneider, Thomas E., 4,055,889, Cl. 29-710.000.
Bent, Alfred H.; Booth, George J.; and Perregrino, Anthony. Textile finishing. 4,056,353, Cl. 8-14.000.

5

Bentz, Francis: *See—*

Wolf, Gerhard Dieter; Bentz, Francis; and Nischk, Gunther, 4,056,564, Cl. 260-512.00C.

Berger, Eugene; Gerard, Pol; Delbouille, Andre; and Deroitte, Jean-Louis, to Solvay & Cie. Process for the polymerization and copolymerization of olefins with a solid support catalyst. 4,056,668, Cl. 526-124.000.

Bergstrom, Lars Rune. System for trimming the mast of a sailing yacht. 4,056,072, Cl. 114-109.000.

Bergwerksverband GmbH: *See—*

Kamann, Gunther; Krahe, Jurgen; Zischinsky, Ulf; and Gotze, Wilhelm, 4,056,036, Cl. 85-63.000.

Berk, Charles W.; and Vallance, Charles B., to Leco Corporation. Electrode system for resistance furnace. 4,056,677, Cl. 13-23.000.

Berkovich, Viktor Mozesovich: *See—*

Bukrinsky, Anatoly Matveevich; Matskevich, Genrikh Vladimirovich; Rzheznikov, Julian Vulfovich; Sukhov, Andrei Borisovich; Tatarnikov, Viktor Petrovich; Berkovich, Viktor Mozesovich; Remzhin, Jury Nikolaevich; Slepnev, Lev Nikolaevich; Sverdlov, Alexandr Anatolievich; Karan, Vladimir Geselevich; Kaloshin, Jury Petrovich; Krasikov, Anatoly Nikolaevich; Babenko, Evgeny Akimovich; Bronnikov, Vladimir Konstantinovich; Shvyryaev, Jury Vasilievich; and Shiryaev, Boris Semenovich, 4,056,436, Cl. 176-38.000.

Bernard, Jean Paul; and Meningand, Paul A., to Aerazur Constructions Aeronautiques. Aircraft arresting gear net raising device. 4,056,247, Cl. 244-110.00C.

Bertazzoli, Cesare; Sala, Luisa; and Ghione, Mario, to Societa Farmaceutici Italia S.p.A. Method of reducing the cardiotoxic side effects of glycosidic anthracyclinones. 4,056,613, Cl. 424-94.000.

Bertram, Heidrun; Fahnestich, Rudolf; and Hesse, Joachim, to Deutsche Gold- und Silber-Scheideanstalt Vormals Roessler. Food and fodder additive. 4,056,658, Cl. 426-2.000.

Best, Freddie W.: *See—*

Schumacher, Joseph N.; Best, Freddie W.; and Green, Charles R., 4,056,108, Cl. 131-17.00R.

Best, Walter E. Equipment lock. 4,055,973, Cl. 70-58.000.

Bevington, Richard C.; and Snee, David J., to Gibson Electric, Inc. Silver electrical contact materials and method of making. 4,056,365, Cl. 428-565.000.

Bevis, Jeffrey M., to Chalco Engineering Co. High speed buffered tape reader with low tape stress. 4,056,849, Cl. 364-900.000.

Beyersdorf, Hartwig, to GEBA, Gesellschaft fuer Brandmeldeanlagen mbH & Co. Attachment means of an object to a support. 4,056,727, Cl. 250-385.000.

Bianchi, Giuseppe: *See—*

de Nora, Vittorio; Nidola, Antonio; and Bianchi, Giuseppe, 4,056,449, Cl. 204-106.000.

Biebuyck, Lawrence F., to Howmet Corporation. Wall framing system and components thereof. 4,055,923, Cl. 52-235.000.

Bien, Hans-Samuel: *See—*

Hohmann, Walter; Herzog, Helmut; and Bien, Hans-Samuel, 4,056,544, Cl. 260-378.000.

Bierbach, Herbert: *See—*

Baron, Gerhard; Bierbach, Herbert; Hafke, Carl; and Pockrandt, Gunter, 4,056,483, Cl. 252-373.000.

Billings Energy Research Corporation: *See—*

Campbell, Barrie C., 4,056,452, Cl. 204-258.000.

Bilodeau, Luc Andre, to Celanese Canada Limited. Apparatus for uniformly unwinding a yarn package. 4,056,243, Cl. 242-128.000.

Binsack, Rudolf: *See—*

Grundmeier, Manfred; Binsack, Rudolf; and Vernaleken, Hugo, 4,056,504, Cl. 260-37.0PC.

Bishop, Richard L.; and Tulloh, Steven P., to Amdahl Corporation. Data processing system having a plurality of channel processors. 4,056,843, Cl. 364-200.000.

Black, Robin Michael, to John Wyeth & Brother Limited. Dibenzopyrimidoazepines. 4,056,529, Cl. 260-251.00A.

Blafford, Antoinette: *See—*

Blafford, Clem; and Blafford, Antoinette, 4,056,078, Cl. 119-158.000.

Blafford, Clem; and Blafford, Antoinette. Automatic dog washer. 4,056,078, Cl. 119-158.000.

Blair, Calvin B. Multiple section farm implement with adjustable latch arrangement. 4,056,148, Cl. 172-311.000.

Blanchard, James S.; and Kapper, Charles E., to P. R. Mallory & Co. Inc. Noise dampening means for a permanent magnet synchronous motor. 4,056,744, Cl. 310-51.000.

Blatt, Victor, to Plessey Handel und Investments A.G. Injection logic arrangements. 4,056,736, Cl. 307-289.000.

Blau KG Fabrik fur Kraftfahrzeugteile: *See—*

Gerdes, Theodor, 4,056,121, Cl. 137-541.000.

Bleeck, Heinz: *See—*

Latus, Hans; Hemala, Zdenek; Bleeck, Heinz; and Weber, Rolf Dieter, 4,055,937, Cl. 57-34.00R.

Bloom, Harvey J.: *See—*

LaWhite, Eric L.; Henrichon, Ernest G., Jr.; and Bloom, Harvey J., 4,056,263, Cl. 271-3.000.

Blum, Rudolf: *See—*

Dinkelacker, Walter; Blum, Rudolf; Abele, Klaus; Knodler, Jurgen; and Ebinger, Peter, 4,055,996, Cl. 73-117.000.

Bobb, Lloyd C.; and Kramer, Kimball, to United States of America, Army. Method of changing the frequency of a laser beam. 4,056,290, Cl. 307-88.300.

Bobbitt, Jesse L.; and Smithwick, Edward L., Jr., to Eli Lilly and Company. Substrate for assay of plasmin. 4,056,519, Cl. 260-112.50R.

Bobeck, Andrew Henry; and Fischer, Robert Frederick, to Bell Telephone Laboratories, Incorporated. Fault tolerant magnetic bubble memory. 4,056,812, Cl. 365-17.000.

Bobeck, Andrew Henry; and Scovil, Henry Evelyn Derrick, to Bell Telephone Laboratories, Incorporated. Magnetoresistive element for detecting magnetic bubbles. 4,056,814, Cl. 365-8.0TF.

Boehm, William S.: *See—*

Likens, Robert; and Boehm, William S., 4,056,130, Cl. 141-67.000.

Bokelmann, Horst, to Metzeler Schaum GmbH. Process for producing foam slabs of rectangular cross-section. 4,056,595, Cl. 264-46.300.

Bolanos, Jaime: *See—*

Pollock, Douglas; Sobarzo, Omar; Urquizar, Rolando; Vilches, Carlos; and Bolanos, Jaime, 4,056,262, Cl. 266-138.000.

Bom, Cornelis Johannes Gerardus: *See—*

van der Lely, Ary; and Bom, Cornelis Johannes Gerardus, 4,056,147, Cl. 172-68.000.

Bonafos, Raymond, to Societe Nationale Elf Aquitaine (Production). Emergency elevator. 4,056,167, Cl. 182-10.000.

Bonneau, Gustave: *See—*

Lahourcade, Bernard; and Bonneau, Gustave, 4,056,513, Cl. 260-62.000.

Bonneau, Marc; and Latour, Mirelle. Immunity depressant medicine. 4,056,614, Cl. 424-105.000.

Booth, George J.: *See—*

Bent, Alfred H.; Booth, George J.; and Perregrino, Anthony, 4,056,353, Cl. 8-14.000.

Born, Ellis H.; Meisel, William H.; and Viles, Alan H., to ABEX Corporation. Control system for axial piston fluid energy translating device. 4,056,041, Cl. 91-375.00R.

Bosch, Paul: *See—*

Zorn, Jurgen; Vlemmings, Jan; Muller, Karl-Heinz; Mayer, Siegfried; Dworak, Wilhelm; Hartmann, Eugen; Fader, Martin; Talmon, Wolfgang; Jons, Claus; Sauer, Ivan; and Bosch, Paul, 4,056,337, Cl. 418-131.000.

Boserup, Hans C., to Danly Machine Corporation. Transfer and turnover mechanism for use with power press or the like. 4,056,198, Cl. 214-1.0BC.

Bosik, Barry Sheldon; and Stone, Dale Eugene, to Bell Telephone Laboratories, Incorporated. Voltage and current controlled converter for telephone ringing. 4,056,693, Cl. 179-84.00R.

Bottomley, Herbert Geoffrey, to Landis Lund, Limited. Transversely removable gantry loader. 4,056,064, Cl. 104-93.000.

Boudigues, Serge, to Societe Nationale d'Etude et de Construction de Moteurs d'Aviation. Multiflow gas turbine power plant. 4,055,949, Cl. 60-269.000.

Bourdeau, Romeo G.: *See—*

Galasso, Francis S.; Bourdeau, Romeo G.; and Pike, Roscoe A., 4,056,598, Cl. 264-184.000.

Bourgeois, Norbert Paul, to A.S.A. S.A. Drive arrangement for windup apparatus in a circular knitting machine. 4,055,968, Cl. 66-151.000.

Boutillette, Arthur A. Parts washer and filter assembly therefor. 4,056,114, Cl. 134-104.000.

Bowe Bohler & Weber KG Maschinenfabrik: *See—*

Wanner, Rudolf, 4,055,932, Cl. 53-63.000.

Bowie, Raymond Alexander; Cox, John Michael; Farrell, Gordon Michael; and Shephard, Margaret Claire, to Imperial Chemical Industries Limited. Pesticidal dihydrotetrazolo [1,5-a] quinazolines and pesticidal uses thereof. 4,056,384, Cl. 71-92.000.

Bowmar Instrument Corporation: *See—*

Weber, John E., 4,056,701, Cl. 200-314.000.

Boyadzhian, Varazdat Karapetovich; Khachatrian, Saribek Saakovich; Stepanian, Genrikh Gevorkovich; Eritsian, Volodya Karapetovich; Agavelian, Edik Stepanovich; Nefedov, Oleg Matveevich; Dolgy, Igor Evgenievich; Sisin, Mikhail Fedorovich; Kolbasin, Alexei Yakovlevich; and Anikeev, Ivan Konstantinovich. Method of producing allylacetate. 4,056,563, Cl. 560-245.000.

Boyce, Leonard D., to Burgess, F. Travers. Two-fuel carburetor. 4,056,087, Cl. 123-127.000.

Boyle, Patrick T., to Maryland Cup Corporation. Splash proof drink through beverage container lid. 4,056,210, Cl. 220-90.400.

Bradford, Jay H.; and Terp, Norman T., to Eaton Corporation. Syphon tube and vent valve assembly. 4,056,118, Cl. 137-201.000.

Bradley, Gerald Arthur: *See—*

Harbison, Robert Campbell; Bradley, Gerald Arthur; and Lux, Paul Arthur, 4,056,309, Cl. 350-310.000.

Brady, William M. Programmable electronic visual display systems. 4,056,805, Cl. 340-148.000.

Bralander, Borje; Claesson, Ake; Henningsson, Lars-Erik; and Scheel, Johan, to Centro-Maskin Goteborg AG. Grinding machine. 4,055,918, Cl. 51-47.000.

Brandenberger, Stanley G.: *See—*

McClure, James D.; and Brandenberger, Stanley G., 4,056,578, Cl. 260-683.470.

Brandt, Thomas F.; Netzel, Philip C.; and Wharton, Lennard, to I-T-E Imperial Corporation. Sodium filled flexible transmission cable. 4,056,679, Cl. 174-13.000.

Braun, Daniel E.; and Bruener, Patrick J., to Briggs & Stratton Corporation. Means for facilitating checking and replenishment of crankcase oil in a small engine. 4,055,898, Cl. 33-126.40R.

Braun, Roland Joseph; and von Voss, William Ditlef, to International Business Machines Corporation. Electrical connection structure and method. 4,056,302, Cl. 339-275.00B.

Brauning, Egon, to Fehlbaum. Supporting framework for shelves. 4,056,196, Cl. 211-207.000.

Braunschweigische Maschinenbauanstalt: *See—*

Sander, Hanslothar; Matusch, Siegfried; and Hemminghaus, Uwe, 4,056,475, Cl. 210-402.000.

Breiter, Joachim; and Helger, Roland, to Merck Patent Gesellschaft mit beschrankter Haftung. Isolation of component materials of aqueous solutions soluble in lipophilic solvents. 4,056,468, Cl. 210-31.00R.

Bresler and Associates, Inc.: *See—*

Bresler, Sidney A., 4,056,603, Cl. 423-359.000.

Bresler, Sidney A., to Bresler and Associates, Inc. Process for increasing ammonia production. 4,056,603, Cl. 423-359.000.

Bridwell, Willie Earl, to Kapsura, Inc. Liquid gauge assembly. 4,055,991, Cl. 73-73.000.

Brieaddy, Lawrence Edward: *See—*

Mehta, Nariman Bomanshaw; and Brieaddy, Lawrence Edward, 4,056,632, Cl. 424-330.000.

Briggs & Stratton Corporation: *See—*

Braun, Daniel E.; and Bruener, Patrick J., 4,055,898, Ci. 33-126.40R.

Bristol-Myers Company: *See—*

Buchanan, Ronald Leslie; Partyka, Richard Anthony; and Standridge, Robert Ted, 4,056,540, Cl. 260-340.300.

Bristol Products, Inc.: *See—*

Adams, Gerald E., 4,056,420, Cl. 156-181.000.

Britcher, Susan F.: *See—*

Atkinson, Joseph G.; Belanger, Patrice C.; Rooney, Clarence S.; and Britcher, Susan F., 4,056,536, Cl. 260-326.50B.

British Hovercraft Corporation Ltd.: *See—*

Henry, John, 4,056,645, Cl. 428-65.000.

British Petroleum Company Limited, The: *See—*

Gregory, Reginald; and Kolombos, Alexander John, 4,056,575, Cl. 260-673.500.

Gregory, Reginald; and Kolombos, Alexander John, 4,056,576, Cl. 260-683.300.

British Steel Corporation: *See—*

Townsend, Nicholas A., 4,056,231, Cl. 241-23.000.

Brix, Charles J., to Minnesota Mining and Manufacturing Company. Dental abrading device and method. 4,055,897, Cl. 32-59.000.

Brolin, Stephen Joseph; and Colodner, Samuel, to Bell Telephone Laboratories, Incorporated. Automatic number identification in subscriber loop carrier systems. 4,056,690, Cl. 179-17.00A.

Brolin, Stephen Joseph, to Bell Telephone Laboratories, Incorporated. Telephone ringing detectors. 4,056,694, Cl. 179-84.00R.

Bronnikov, Vladimir Konstantinovich: *See—*

Bukrinsky, Anatoly Matveevich; Matskevich, Genrikh Vladimirovich; Rzheznikov, Julian Vulfovich; Sukhov, Andrei Borisovich; Tatarnikov, Viktor Petrovich; Berkovich, Viktor Mozesovich; Remzhin, Jury Nikolaevich; Slepnev, Lev Nikolaevich; Sverdlov, Alexandr Anatolievich; Karan, Vladimir Geselevich; Kaloshin, Jury Petrovich; Krasikov, Anatoly Nikolaevich; Babenko, Evgeny Akimovich; Bronnikov, Vladimir Konstantinovich; Shvyryaev, Jury Vasilievich; and Shiryaev, Boris Semenovich, 4,056,436, Cl. 176-38.000.

Brown, Dwight C. Combination plastic and metal paper clip. 4,055,874, Cl. 24-67.300.

Brown, Edgar D., Jr., to General Electric Company. Hydrocarbonoxy-containing silicone fluids useful as hydraulic fluids. 4,056,546, Cl. 260-448.80R.

Brown, Ernest A. Hard boiled egg extractor. 4,056,051, Cl. 99-516.000.

Brown, Joel E.; and Overman, Kelly C., to Westinghouse Electric Corporation. Digital-to-analog noise generator. 4,056,788, Cl. 331-78.000.

Brown, John B. Absolute relative position encoder processor and display. 4,056,850, Cl. 364-900.000.

Brown, Richard L., to Lo-Rise Elevator Company. Operating mechanism for overlapping panels type doorway closures. 4,056,162, Cl. 187-52.00R.

Brown, Richard N., to General Electric Company. Coffeemaker with brew strength control. 4,056,050, Cl. 99-305.000.

Brown, Thomas Henry; Durant, Graham John; Ganellin, Charon Robin; and Ife, Robert John, to Smith Kline & French Laboratories Limited. Imidazolylmethylthioethyl dithiocarbamate compounds. 4,056,621, Cl. 424-273.00R.

Brown & Williamson Tobacco Corporation: *See—*

Grimm, Wolfgang H., 4,056,047, Cl. 93-49.00M.

Brucciani, Richard Louis, to Paper Lynen Co. Ltd., The. Disposable caps. 4,055,857, Cl. 2-197.000.

Bruener, Patrick J.: *See—*

Braun, Daniel E.; and Bruener, Patrick J., 4,055,898, Cl. 33-126.40R.

Brunswick Corporation: *See—*

Schuldenfrei, Raymond E., 4,056,376, Cl. 55-497.000.

Brzezinski, Donald E.: *See—*

Sriramamurty, Durvasula V.; and Brzezinski, Donald E., 4,056,043, Cl. 92-13.200.

Bubar, Stanley F., to General Electric Company. Ceramic lamp having tubular inlead containing yttrium-zirconium mixture. 4,056,752, Cl. 313-217.000.

Buchanan, Ronald Leslie; Partyka, Richard Anthony; and Standridge, Robert Ted, to Bristol-Myers Company. 4-Phenyl-1,3-benzodioxans. 4,056,540, Cl. 260-340.300.

Budliger, Jean-Pierre: *See—*

Arieh, Simon; and Budliger, Jean-Pierre, 4,056,002, Cl. 73-194.00R.

Budrose, Charles R., to Upaya, Inc. Teaching typewriter. 4,055,905, Cl. 35-5.000.

Bukrinsky, Anatoly Matveevich; Matskevich, Genrikh Vladimirovich; Rzheznikov, Julian Vulfovich; Sukhov, Andrei Borisovich; Tatarnikov, Viktor Petrovich; Berkovich, Viktor Mozesovich; Remzhin, Jury Nikolaevich; Slepnev, Lev Nikolaevich; Sverdlov, Alexandr Anatolievich; Karan, Vladimir Geselevich; Kaloshin, Jury Petrovich; Krasikov, Anatoly Nikolaevich; Babenko, Evgeny Akimovich; Bronnikov, Vladimir Konstantinovich; Shvyryaev, Jury Vasilievich; and Shiryaev, Boris Semenovich. System for mitigating the effects of an accident at a nuclear power plant. 4,056,436, Cl. 176-38.000.

Bunce, Roger Abraham: *See—*

Peters, Ann Margaret; Greaves, Geoffrey Stuart; Clark, Ian Robert; Holder, Roger Leonard; and Bunce, Roger Abraham, 4,056,361, Cl. 23-259.000.

Bunn, Dorrance P., Jr.; Strickland, John C.; and May, Douglas H., Jr., to Texaco Inc. Fluidized catalytic cracking regeneration process. 4,056,486, Cl. 252-417.000.

Burdeska, Kurt: *See—*

Schwander, Hansrudolf; Burdeska, Kurt; and Zickendraht, Christian, 4,056,528, Cl. 260-250.00Q.

Burdis, Eric William: *See—*

Whitfield, John Alan; and Burdis, Eric William, 4,056,804, Cl. 340-146.30J.

Burgess, F. Travers: *See—*

Boyce, Leonard D., 4,056,087, Cl. 123-127.000.

Burgyan, Lajos, to Zenith Radio Corporation. Signal distributing and muting system for multiple channel FM stereo system. 4,056,685, Cl. 179-15.0BT.

Burke, Jerry Allen, Jr.: *See—*

Davoud, John Gordon; and Burke, Jerry Allen, Jr., 4,055,951, Cl. 60-514.000.

Burkett, Richard O., to Westinghouse Air Brake Company. Remote control brake system for a railway train. 4,056,286, Cl. 303-20.000.

Buro Patent AG: *See—*

Ritter, Bruno, 4,056,063, Cl. 104-88.000.

Burroughs Corporation: *See—*

Beery, Jack, 4,056,183, Cl. 197-1.00R.

Paige, Walter Griffin, 4,056,299, Cl. 339-95.00D.

Smith, Douglas A., 4,056,830, Cl. 360-51.000.

Burroughs Wellcome Co.: *See—*

Mehta, Nariman Bomanshaw; and Brieaddy, Lawrence Edward, 4,056,632, Cl. 424-330.000.

Burtis, Wilson A. Counterrotation electric motor. 4,056,746, Cl. 310-115.000.

Bussiere, Lawrence S. Spinning machine. 4,055,939, Cl. 57-62.000.

Byrd, Carlisle O., Jr., to Johns-Manville Corporation. Refractory fiber blanket module. 4,055,926, Cl. 52-475.000.

Byrnes, Leo A., to Acme Mills Company. Disposable back seat headrest cover. 4,056,281, Cl. 297-220.000.

C.G.R.-Mev.: *See—*

LeBoutet, Hubert, 4,056,728, Cl. 250-396.00R.

C. van der Lely N. V.: *See—*

van der Lely, Ary; and Bom, Cornelis Johannes Gerardus, 4,056,147, Cl. 172-68.000.

Cadena, Edward R.: *See—*

Stewart, Thomas L.; and Cadena, Edward R., 4,055,986, Cl. 73-61.00R.

Cahn, Robert P.: *See—*

Li, Norman N.; and Cahn, Robert P., 4,056,462, Cl. 208-308.000.

Caisley, Jack Banks. Jacking assembly. 4,056,256, Cl. 254-106.000.

Calegan, Everett L., to Junkunc Bros. American Lock Company. Combination-controlled and key-operated security padlock. 4,055,972, Cl. 70-21.000.

Calgon Corporation: *See—*

Slagel, Robert Clayton; and Sinkovitz, Gloria DiMarco, 4,056,432, Cl. 162-168.0NA.

Callahan, Robert William; Kauffman, Paul Eugene; Kobesky, Lawrence Joseph; and Page, Howard Loomis, to International Business Machines Corporation. Data processing system with apparatus for sharing channel background processing. 4,056,846, Cl. 364-200.000.

Calmon, Calvin. Containment and removal of radioactive spills by depositing a crosslinked ion exchange composition in a dry form over region of spill. 4,056,112, Cl. 134-6.000.

Campagnolo, Tullio. Disk brake. 4,056,172, Cl. 188-26.000.

Campau, Walter Joseph: *See—*

Tomczak, Lawrence William; Crall, Frederick William; Caron, La Verne Andrew; and Campau, Walter Joseph, 4,055,886, Cl. 29-593.000.

Campbell, Barrie C., to Billings Energy Research Corporation. Electrolysis apparatus. 4,056,452, Cl. 204-258.000.

Cantera, Gregorio Asua; Reparaz, Jose M. Palacios; and Molnar, Louis, to Inland Steel Company; and S.A. Echevarria. Leaded steel bar free of lead macroinclusions. 4,056,387, Cl. 75-123.00F.

Capelli, Alfred J., to Sargent Industries, Inc. Bearing material employing frangible microcapsules containing lubricant. 4,056,478, Cl. 252-12.400.

Cappuyns, Joseph Marie: *See—*

Dhooge, Alfons Leon; and Cappuyns, Joseph Marie, 4,056,264, Cl. 271-177.000.

Carl Freudenberg, Firma: *See—*

Ringel, Wolfgang; Rutsch, Peter; Schneider, Rolf; and Kohl, Edgar, 4,056,375, Cl. 55-381.000.

Carlier, Jacques; and Risbourg, Bernard, to Commissariat a l'Energie Atomique. Loading and unloading of a nuclear reactor core. 4,056,435, Cl. 176-30.000.

Carlson, Christian, Jr.; and Hillyer, Michael J., to General Signal Corporation. Modular motor. 4,056,749, Cl. 310-239.000.

Carlson, Richard D.; and Takahashi, Akio, to Hooker Chemicals & Plastics Corporation. Composition comprising phenolic resins and curing amounts triaza phosphaadamantane compounds. 4,056,512, Cl. 260-59.00R.

Carlson, William L., Jr., to General Signal Corporation. Scotch yoke. 4,056,011, Cl. 74-50.000.

Carmichael, Thomas F., to Syncro Corporation. Ignition system. 4,056,088, Cl. 123-148.00E.
Caron, La Verne Andrew: *See—*
Tomczak, Lawrence William; Crall, Frederick William; Caron, La Verne Andrew; and Campau, Walter Joseph, 4,055,886, Cl. 29-593.000.
Carpenter, Anthony P., to Mohawk Video Systems Corporation. Automatic chlorinator. 4,056,470, Cl. 210-94.000.
Carpentier, Alain; Leclercq, Xavier; and Paris, Jean, to Rhone-Poulenc Industries. Support for a natural human heart valve. 4,055,861, Cl. 3-1.500.
Carre, Christian; and Rouault, Claude, to Air-Industrie. Metering device for a powdery material. 4,056,234, Cl. 141-392.000.
Carrier Corporation: *See—*
Cross, Robert L., Jr.; Hill, M. Raymond; and Tucker, Fred, 4,056,748, Cl. 310-168.000.
Carroll, James J.: *See—*
Adolf, Paul K.; and Carroll, James J., 4,056,485, Cl. 252-408.000.
Carrow, Guy E., to Phillips Petroleum Company. Method of producing a flexible extrudate of a mixture of poly(phenylene sulfide) and filler. 4,056,594, Cl. 264-176.00R.
Carter, Garry L.; and Granzow, Daniel B., to Baxter Travenol Laboratories, Inc. Valve for interconnecting sterile containers and the like. 4,056,116, Cl. 137-68.00R.
Carter, Robert: *See—*
Roe, Alfred W.; Ogden, John; and Carter, Robert, 4,056,235, Cl. 220-4.00E.
Cartwright, William J., to Continental Group, Inc., The. Conveyor unloader. 4,056,185, Cl. 198-484.000.
Cassel, Thomas R. Coupling for pipe lap joints. 4,056,273, Cl. 285-337.000.
Caswell, Robert L., to Rockwell International Corporation. One shot pulse generator and logic level converter circuit. 4,056,735, Cl. 307-273.000.
Caterpillar Mitsubishi Ltd.: *See—*
Uchiyama, Kanji, 4,056,250, Cl. 248-14.000.
Caterpillar Tractor Co.: *See—*
Downing, Benjamin A., 4,056,295, Cl. 312-107.000.
Kamman, Kenneth R.; and Jacobson, Wayne D., 4,056,044, Cl. 92-159.000.
Ritchie, James A., 4,056,336, Cl. 418-51.000.
Stedman, Robert N., 4,056,288, Cl. 305-34.000.
Cavlin, Soren: *See—*
Hansen, Karl Erik; Hovmand, Svend; Pedersen, Mogens Lindskov; Schwartzbach, Christian; Htun, Myat; de Ruvo, Alf; and Cavlin, Soren, 4,055,903, Cl. 34-12.000.
Cawley, William H.: *See—*
Rowe, Edward A., Jr.; and Cawley, William H., 4,056,409, Cl. 148-6.15R.
Ceiling Resurfacing Systems, Inc.: *See—*
Weinar, Roger Neil; and Eder, John Anthony, 4,055,930, Cl. 52-717.000.
Celanese Canada Limited: *See—*
Bilodeau, Luc Andre, 4,056,243, Cl. 242-128.000.
Celanese Corporation: *See—*
Powanda, Thomas M.; Patella, Ralph F.; Vona, Joseph A.; and DeFazio, Charles A., 4,056,503, Cl. 260-29.60T.
Center for the Environment & Man, The: *See—*
Henriques, Frederick C.; Pandolfo, Joseph P.; and Lunde, Peter, 4,056,090, Cl. 126-271.000.
Rosenberg, Paul, 4,056,094, Cl. 126-271.000.
Centera, Benny. Stud lock. 4,056,035, Cl. 85-8.900.
Centro-Maskin Goteborg AG: *See—*
Bralander, Borje; Claesson, Ake; Henningsson, Lars-Erik; and Scheel, Johan, 4,055,918, Cl. 51-47.000.
Centro Nazionale Delle Richerche: *See—*
Papoff, Paolo; Morelli, Basilio; and Guidarini, Dante, 4,056,258, Cl. 366-160.000.
Centro Sperimentale Metallurgico S.p.A.: *See—*
Colletta, Angelo; and Palumbo, Luigi, 4,056,443, Cl. 201-5.000.
Ceskoslovenska akademie ved: *See—*
Lochmann, Lubomir; and Trekoval, Jiri, 4,056,580, Cl. 260-881.000.
Chalco Engineering Co.: *See—*
Bevis, Jeffrey M., 4,056,849, Cl. 364-900.000.
Champion International Corporation: *See—*
Fremont, Henry A.; and Lawrence, Walter Phalti, 4,056,342, Cl. 425-80.000.
Chance, Davey J.: *See—*
Bell, Oliver A., Jr.; Gilleland, Randall C.; and Chance, Davey J., 4,056,702, Cl. 219-69.00C.
Chang, Joyce Y.: *See—*
Ullman, Edwin F.; Chang, Joyce Y.; and McNeil, Kenneth G., 4,056,608, Cl. 424-1.000.
Charnoe, Zeera Polyandre, to Devatron Limited. Method of and apparatus for treating plant organisms. 4,055,915, Cl. 47-58.000.
Chelin, Charles R., to Towmotor Corporation. Load force bypassing apparatus for lift truck masts. 4,056,170, Cl. 187-95.000.
Chemische Fabrik Uetikon: *See—*
Fischer, Paul; and Wisz, Edward, 4,056,471, Cl. 210-186.000.
Chen, Ho Sou; Gyorgy, Ernst Michael; Leamy, Harry John; and Sherwood, Richard Curry. Method of making magnetic devices including amorphous alloys. 4,056,411, Cl. 148-121.000.
Chevron Research Company: *See—*
Feldman, Richard B., 4,056,054, Cl. 101-45.000.
Unverferth, Jack W., 4,056,461, Cl. 208-11.00R.
Chiarino, Dario: *See—*
Della-Bella, Davide; and Chiarino, Dario, 4,056,634, Cl. 424-335.000.
Chicago Fire Brick Company: *See—*
Rechter, Harold L.; and Haligarda, James R., 4,056,398, Cl. 106-65.000.
Chinoy, Rustam B.: *See—*
Terranova, Carmen S.; and Chinoy, Rustam B., 4,055,967, Cl. 64-28.00R.
Chiu, Fon-Wen: *See—*
Liu, Yu-Hsing; and Chiu, Fon-Wen, 4,055,864, Cl. 4-253.000.
Chow, Ho, to Beatrice Foods Co. Humidifier assembly. 4,056,582, Cl. 261-30.000.
Chow, Sen-te; and Thomas, Earl M., to United States of America, Army. Automatic reticle brightness control circuit means in night vision image intensifiers. 4,056,721, Cl. 250-213.0VT.
Christen, Gilbert; Favre, Bernard; Marze, Xavier; Salmon, Michel; and Thuillier, Rene, to Rhone-Poulenc S.A. Hollow fibres. 4,056,467, Cl. 210-23.00F.
Christenson, Per Tyke: *See—*
Richter, Johan C. F. C.; Christenson, Per Tyke; and Richter, Ole Johan, 4,056,429, Cl. 162-17.000.
Chromalloy American Corporation: *See—*
Hodgson, James H., 4,056,226, Cl. 239-172.000.
Chrysler Corporation: *See—*
Orris, Stephen Jay; and Miesterfeld, Frederick Otto Richard, 4,056,747, Cl. 310-155.000.
Tomczak, Lawrence William; Crall, Frederick William; Caron, La Verne Andrew; and Campau, Walter Joseph, 4,055,886, Cl. 29-593.000.
Chung, Jackson, to Reliance Electric Company. Multiple power path concentric speed reducer. 4,056,018, Cl. 74-665.00P.
Churchill, William P., Jr., to Data General Corporation. Memory access technique. 4,056,845, Cl. 364-200.000.
Churla, John J., to Thomas & Betts Corporation. Die set. 4,055,980, Cl. 72-410.000.
Ciaraldi, Anthony: *See—*
Whitney, James C.; and Ciaraldi, Anthony, 4,056,835, Cl. 360-105.000.
Ciba-Geigy AG: *See—*
Mayer, Fritz, 4,056,352, Cl. 8-2.50A.
Ciba-Geigy Corporation: *See—*
Ramey, Chester E.; and Luzzi, John J., 4,056,507, Cl. 260-45.80N.
Schwander, Hansrudolf; Burdeska, Kurt; and Zickendraht, Christian, 4,056,528, Cl. 260-250.00Q.
Cimenteries C.B.R. Cementbedrijven: *See—*
Parisis, Jean; Rossion, Roger; and Depoitier, Jacques, 4,056,349, Cl. 432-36.000.
Cincinnati Electronics Corporation: *See—*
Williams, Louis A., Jr.; and Miller, Joseph D., 4,056,720, Cl. 250-203.00R.
Ciniglio, Alexander J.; and Hadfield, Richard M., to Rotawinder Limited. Apparatus and a method of winding filamentary material. 4,056,238, Cl. 242-25.00R.
Cisney, Merle Edward, to Crown Zellerbach Corporation. 2,6-Dialkyl-4-hydroxysulfenyl chlorides. 4,056,568, Cl. 260-543.00H.
Claesson, Ake: *See—*
Bralander, Borje; Claesson, Ake; Henningsson, Lars-Erik; and Scheel, Johan, 4,055,918, Cl. 51-47.000.
Clark, Ian Robert: *See—*
Peters, Ann Margaret; Greaves, Geoffrey Stuart; Clark, Ian Robert; Holder, Roger Leonard; and Bunce, Roger Abraham, 4,056,361, Cl. 23-259.000.
Clark, Judith Ann, to Beecham Group Limited. Diphenylpropylamines for treating depression. 4,056,630, Cl. 424-330.000.
Clark, Thomas G.: *See—*
Rabelos, Nicholas A., 4,056,166, Cl. 182-5.000.
Clary, Kenneth B.: *See—*
Rabelos, Nicholas A., 4,056,166, Cl. 182-5.000.
Clayton, James William Barnes, to Platt Saco Lowell Limited. Open-end spinning. 4,055,938, Cl. 57-58.890.
Clifford, Cecil Frank; and Finlayson, Laurence Harry, to Horstmann Clifford Magnetics Ltd. Oscillating reed electric motors. 4,056,743, Cl. 310-21.000.
Clinton, Henry H.; and Zeichner, David A., to Clinton Instrument Company. Remotely controlled high potential insulation tester. 4,056,771, Cl. 324-54.000.
Clinton Instrument Company: *See—*
Clinton, Henry H.; and Zeichner, David A., 4,056,771, Cl. 324-54.000.
Close, Ralph E.; and Derfer, John M., to SCM Corporation. Synthesis of acyclic, terpene alcohols. 4,056,573, Cl. 260-631.500.
Cobb, Clyde A., to Ziamatic Corporation. Oxygen bottle carrier and linkage. 4,056,017, Cl. 74-522.000.
Cobb, Raymond L., to Phillips Petroleum Company. Pyrolysis of N-substituted-1-cyclohexene-1,2-dicarboximides. 4,056,542, Cl. 260-346.300.
Cochran, Veronica: *See—*
Schlesinger, Sheldon I.; and Cochran, Veronica, 4,056,393, Cl. 96-27.00H.
Coherent Radiation: *See—*
Shepardson, Robert C.; and Watts, Michael E., 4,056,710, Cl. 235-437.000.
Cohn, Marvin, to Westinghouse Electric Corporation. Suppression of parametric oscillations in IMPATT amplifiers and oscillators. 4,056,784, Cl. 330-287.000.

Coles, Donald K. Musical apparatus. 4,056,032, Cl. 84-1.010.
Colgate-Palmolive Company: *See—*
Sundby, Bjorn, 4,056,558, Cl. 560-151.000.
Coller, John, to Elixir Industries. Door and threshhold assembly. 4,055,917, Cl. 49-469.000.
Colletta, Angelo; and Palumbo, Luigi, to Centro Sperimentale Metallurgico S.p.A. Coke production. 4,056,443, Cl. 201-5.000.
Collica, Carl; Epifano, Leonard; and Farella, Ralph, to Medi-Ray, Inc. Shielded syringe. 4,056,096, Cl. 128-1.100.
Collica, Carl; Epifano, Leonard; and Farella, Ralph, to Medi-Ray, Inc. Apparatus for housing radiation measuring material housed in a plastic insert. 4,056,729, Cl. 250-472.000.
Colodner, Samuel: *See—*
Brolin, Stephen Joseph; and Colodner, Samuel, 4,056,690, Cl. 179-17.00A.
Colt Industries Operating Corporation: *See—*
Bell, Oliver A., Jr.; Gilleland, Randall C.; and Chance, Davey J., 4,056,702, Cl. 219-69.00C.
Combustion Engineering, Inc.: *See—*
Prestridge, Floyd L., 4,056,733, Cl. 307-115.000.
Commissariat a l'Energie Atomique: *See—*
Carlier, Jacques; and Risbourg, Bernard, 4,056,435, Cl. 176-30.000.
Debrie, Guy; Grenier, Claude; Petit, Michel; Rigaut, Henri; and Vertut, Jean, 4,056,763, Cl. 318-675.000.
Gama, Jean-Michel; Lallement, Jean; and Pugnet, Lucien, 4,056,438, Cl. 176-50.000.
Giacometti, Christian; Mougniot, Jean-Claude; and Ravier, Jean, 4,056,437, Cl. 176-40.000.
Marmonier, Pierre; Mesnage, Bernard; Skok, Jean; and Vayra, Jean, 4,056,441, Cl. 176-78.000.
Robin, Marcel, 4,056,439, Cl. 176-65.000.
Compagnie Industrielle des Telecommunications Cit-Alcatel: *See—*
Parent, Guy, 4,056,715, Cl. 364-514.000.
Compania de Acero del Pacifico S.A.: *See—*
Pollock, Douglas; Sobarzo, Omar; Urquizar, Rolando; Vilches, Carlos; and Bolanos, Jaime, 4,056,262, Cl. 266-138.000.
Conner, Rodney R.: *See—*
Miller, John F.; and Conner, Rodney R., 4,056,431, Cl. 162-165.000.
Connor, David T.; Young, Patricia A.; and von Strandtmann, Maximillian, to Warner-Lambert Company. Alpha-aryl-2-pyridineethanol 1-oxides and alpha-pyridinyl-2-pyridineethanol 1-oxides. 4,056,532, Cl. 260-296.00R.
Connor, David T.; Young, Patricia A.; and von Strandtmann, Maximilian, to Warner-Lambert Company. 1-Substituted-2-(2-pyridinyl)ethanone N-oxides. 4,056,619, Cl. 424-263.000.
Connor, Shirley A.: *See—*
Connor, Thomas R.; and Connor, Shirley A., 4,056,268, Cl. 273-118.00R.
Connor, Thomas R.; and Connor, Shirley A. Apparatus for motorcycle polo game. 4,056,268, Cl. 273-118.00R.
Consolidated Natural Gas Service Company: *See—*
Swenson, Paul F.; and Moore, Paul B., 4,055,964, Cl. 62-238.000.
Continental Group, Inc., The: *See—*
Cartwright, William J., 4,056,185, Cl. 198-484.000.
Continental Oil Company: *See—*
Vennett, Richard M., 4,056,446, Cl. 204-1.00T.
Cook, Charles R., Jr.; U, Aung San; and Scherrer, Raymond E., to International Telephone and Telegraph Corporation. Method for providing electrical isolating material in selected regions of a semiconductive material. 4,056,415, Cl. 148-187.000.
Cook, Charles R., Jr., to International Telephone and Telegraph Corporation. Self-aligning package for integrated circuits. 4,056,681, Cl. 174-52.0FP.
Cooper, Earl A.; and Howett, Michael J., to Automation Industries, Inc. Electrical connector with coupling assembly breech retaining means. 4,056,298, Cl. 339-90.00R.
Cooper, Earl D., to Phillips Petroleum Company. Process and die for extrusion of a resinous material. 4,056,597, Cl. 264-169.000.
Cope, James R. Tension tester for tennis racket strings. 4,055,999, Cl. 73-145.000.
Corbett, Andrew Neville. Occlusal programming unit. 4,055,896, Cl. 32-19.000.
Corneal Sciences, Inc.: *See—*
Mancini, William L.; Korb, Donald R.; and Refojo, Miguel F., 4,056,496, Cl. 260-29.6TA.
Cornelissens, Emery George Philomena: *See—*
Diamantoglou, Michael; Magerlein, Helmut; Zielke, Rainer; and Cornelissens, Emery George Philomena, 4,056,400, Cl. 106-162.000.
Cornforth, Malcolm W., to Singer Company, The. Temperature correction systems for a fluid flow meter. 4,056,717, Cl. 364-510.000.
Corning Glass Works: *See—*
Dates, Harold F.; Domicone, Joseph J.; and Nitsche, Joseph E., 4,056,650, Cl. 428-332.000.
Corradi, Ariello Rolando; and Fagherazzi, Giuliano, to Montedison, S.p.A. Process for preparing acicular iron powders containing titanium and tin, and the resulting powders when so prepared. 4,056,410, Cl. 148-105.000.
Cosgrave, James: *See—*
Bau, Marcel; Hinkes, Larry D.; and Cosgrave, James, 4,056,278, Cl. 294-19.00R.
Coutin, Pierre Fernand: *See—*
Hasquenoph, Jean H.; and Coutin, Pierre Fernand, 4,056,248, Cl. 244-137.00R.
Coviello, Joseph. Hand-grippable driver-fastener tool. 4,056,020, Cl. 81-177.00A.
Cox, John Michael: *See—*
Bowie, Raymond Alexander; Cox, John Michael; Farrell, Gordon Michael; and Shephard, Margaret Claire, 4,056,384, Cl. 71-92.000.
Crall, Frederick William: *See—*
Tomczak, Lawrence William; Crall, Frederick William; Caron, La Verne Andrew; and Campau, Walter Joseph, 4,055,886, Cl. 29-593.000.
Cramer, Robert J.; and Raymond, Maurice A., to Olin Corporation. Solvent composition used to clean polyurethane foam generating equipment. 4,056,403, Cl. 134-22.00R.
Cranford, William R.: *See—*
Jolley, William S.; and Cranford, William R., 4,055,902, Cl. 33-356.000.
Crawford Industries, Inc.: *See—*
Crawford, Kenneth Z., 4,056,326, Cl. 402-30.000.
Crawford, Kenneth Z., to Crawford Industries, Inc. Loose leaf binder. 4,056,326, Cl. 402-30.000.
Croon & Lucke Maschinenfabrik GmbH & Co. KG: *See—*
Leveugle, Roland, 4,055,934, Cl. 53-198.00B.
Crosby, Lawton H.; and Keane, Thomas H., to Morley Furniture Spring Corporation. Spring attachment assemblies. 4,055,865, Cl. 5-259.00R.
Cross, Donald James. Mineral jigs. 4,056,464, Cl. 209-425.000.
Cross, Robert L., Jr.; Hill, M. Raymond; and Tucker, Fred, to Carrier Corporation. Magnetic speed pickup. 4,056,748, Cl. 310-168.000.
Crown Zellerbach Corporation: *See—*
Cisney, Merle Edward, 4,056,568, Cl. 260-543.00H.
Cure, Omer P., to Electro-Nite Co. Thermocouple. 4,056,407, Cl. 136-232.000.
D-Cycle Associates: *See—*
Davoud, John Gordon; and Burke, Jerry Allen, Jr., 4,055,951, Cl. 60-514.000.
D. Swarovski & Co., Glasschleiferei: *See—*
Swarobski, Daniel; and Schwab, Kurt, 4,056,303, Cl. 350-36.000.
Dahlberg, Alf-Goran; Hogberg, Karl Gustav; Lindvall, Sven; and Rydh, Thore Oskar Verner, to Astra Lakemedel Aktiebolag. Polymer prepared by cyanhydrin method. 4,056,672, Cl. 536-1.000.
Dahlin, Erik B.: *See—*
Al-Shaikh, Al; and Dahlin, Erik B., 4,056,714, Cl. 364-111.000.
Dai Nippon Toryo Co., Ltd.: *See—*
Izumi, Ryoji; Kobayashi, Shoji; Ono, Toshiharu; Shirato, Toru; Fujii, Akiyoshi; and Okihara, Tadashi, 4,056,592, Cl. 264-141.000.
Daikin Kogyo Co., Ltd.: *See—*
Shoji, Kunihiro; Yokota, Akihiro; and Watanabe, Kenzo, 4,055,963, Cl. 62-238.000.
Daimler-Benz Aktiengesellschaft: *See—*
Bajohr, Alfred, 4,056,168, Cl. 184-6.240.
Forster, Hans-Joachim M.; and Gaus, Hermann, 4,056,176, Cl. 192-4.00A.
Pattas, Konstantin, 4,056,081, Cl. 123-75.00B.
Dam, Niels Erik Friis: *See—*
Roslyng, Ole; and Dam, Niels Erik Friis, 4,055,994, Cl. 73-116.000.
Danly Machine Corporation: *See—*
Boserup, Hans C., 4,056,198, Cl. 214-1.0BC.
Darrah, Robert M. Recovery of gold and silver from mine-run dumps or crushed ores using a portable ion-exchange carbon plant. 4,056,261, Cl. 266-101.000.
Darrow, John O. G., to Westinghouse Air Brake Company. Fail-safe electronic polarized relay. 4,056,739, Cl. 307-360.000.
Dashew, Stanley A.; and Sutton, Charles D., to Omnithruster Inc. Boat thruster. 4,056,073, Cl. 114-151.000.
Data Flo Corporation: *See—*
Hoerning, John S.; Halverson, Richard P.; and Nelson, Darrell E., 4,056,809, Cl. 364-200.000.
Data General Corporation: *See—*
Churchill, William P., Jr., 4,056,845, Cl. 364-200.000.
Godbout, Joseph C.; and Feldstein, Michael A., 4,056,831, Cl. 360-77.000.
Saxena, Arjun N.; and Hart, Courtney, 4,056,642, Cl. 427-84.000.
Dates, Harold F.; Domicone, Joseph J.; and Nitsche, Joseph E., to Corning Glass Works. Process for making aluminum-coated glass-ceramic cooking vessel and article produced thereby. 4,056,650, Cl. 428-332.000.
Daus, John J., Jr.; James, Henry E.; and Reinhart, Thomas L., to Anchor Industries, Inc. Corner connector. 4,056,327, Cl. 403-172.000.
David, Melvin J. Environmental platelet agitator. 4,056,260, Cl. 366-144.000.
Davis, Donald E.; Habegger, Millard A.; and Yourke, Hannon S., to International Business Machines Corporation. Apparatus for detecting registration marks on a target such as a semiconductor wafer. 4,056,730, Cl. 250-492.00R.
Davoud, John Gordon; and Burke, Jerry Allen, Jr., to D-Cycle Associates. Condensing vapor heat engine with two-phase compression and constant volume superheating. 4,055,951, Cl. 60-514.000.
Dawson, Chester W.: *See—*
McHugh, James P.; Nalepa, Philip J.; Miller, Robert C.; and Dawson, Chester W., 4,056,378, Cl. 65-18.000.
Day, Leon E., to Watts, George G.; and Pratt, Jeff D. Easy empty seed hopper. 4,056,214, Cl. 222-608.000.
Dayton, Arnold J. Weighing device. 4,056,156, Cl. 177-209.000.
De La Rue Giori S.A.: *See—*
Giori, Gualtiero, 4,056,056, Cl. 101-152.000.

De Staat der Nederlanden, te Dezen Vertegenwoordigd Door de Directeur-Generaal der Posterijen, Telegrafie en Telefonie: *See—*
  Hetebrij, Albert; and Kloeck, Cornelis Adrianus Geertrudis, 4,056,781, Cl. 325-55.000.
Dean, Floyd E. Axle alignment machine. 4,055,899, Cl. 33-193.000.
de Boer, Jacob; and Walraven, Anthonie, to U.S. Philips Corporation. Servo system for controlling the position of a reading head. 4,056,832, Cl. 360-77.000.
DeBough, Bjorn N. Asphalt emulsion and manufacture thereof. 4,056,401, Cl. 106-277.000.
Debrie, Guy; Grenier, Claude; Petit, Michel; Rigaut, Henri; and Vertut, Jean, to Commissariat a l'Energie Atomique. Device for controlling a mechanical element with effort return. 4,056,763, Cl. 318-675.000.
DEC International, Inc.: *See—*
  Schluckbier, Gary W., 4,056,077, Cl. 119-14.080.
de Carteret, Arnold Edward Francis. Reglets and associated components. 4,055,921, Cl. 52-61.000.
Decobert, Jacques L. E., to Alcan Research and Development Limited. Method of crushing particles of material in a ball mill. 4,056,230, Cl. 241-15.000.
Decrane, Charles E., to Olinkraft, Inc. Bag filling apparatus with air contaminate prevention. 4,056,132, Cl. 141-285.000.
Deeks, Ronald George, to Procor Limited. Bottom outlet safety closure. 4,056,117, Cl. 137-68.00R.
Deere & Company: *See—*
  Honnold, Darrel Lee, 4,056,149, Cl. 172-311.000.
DeFazio, Charles A.: *See—*
  Powanda, Thomas M.; Patella, Ralph F.; Vona, Joseph A.; and DeFazio, Charles A., 4,056,503, Cl. 260-29.60T.
Degen, Bruce D.: *See—*
  Fox, Joseph M., III; Degen, Bruce D.; and Leibson, Irving, 4,056,599, Cl. 423-178.000.
Delbouille, Andre: *See—*
  Berger, Eugene; Gerard, Pol; Delbouille, Andre; and Deroitte, Jean-Louis, 4,056,668, Cl. 526-124.000.
Della-Bella, Davide; and Chiarino, Dario, to Whitefin Holding S.A. Dimercaptoethyl ether sulfonium compounds and use as antiinflammatory and antirheumatic agents. 4,056,634, Cl. 424-335.000.
Delvaux, Pierre: *See—*
  Faille, Marc Della; Delvaux, Pierre; Godard, Pierre; and Mercier, Jean Pierre, 4,056,655, Cl. 428-443.000.
Del Vecchio, Joseph. Food dicer. 4,055,892, Cl. 30-303.000.
Demerson, Christopher A.; Humber, Leslie G.; Asselin, Andre A.; Jirkovsky, Ivo; and Dobson, Thomas A., to Ayerst McKenna and Harrison Ltd. Process for making pyrano- and thiopyranoindole derivatives. 4,056,537, Cl. 260-326.50B.
Demerson, Christopher A.; Humber, Leslie G.; Asselin, Andre A.; Jirkovsky, Ivo; and Dobson, Thomas A., to Ayerst, McKenna & Harrison Limited. Process for preparing pyrano- and thiopyranoindole derivatives. 4,056,538, Cl. 260-326.50B.
de Navas Albareda, Jose Luis, to Repla International S.A.H. Method of making a fastener. 4,056,593, Cl. 264-145.000.
Denbyware Limited: *See—*
  Richardson, Anthony George, 4,056,648, Cl. 428-138.000.
de Nora, Vittorio; Nidola, Antonio; and Bianchi, Giuseppe, to Diamond Shamrock Technologies S.A. Electrowinning method. 4,056,449, Cl. 204-106.000.
De Nora, Vittorio: *See—*
  Giuffre, Luigi; De Nora, Vittorio; and Spaziante, Placido, 4,056,447, Cl. 204-98.000.
Depoitier, Jacques: *See—*
  Parisis, Jean; Rossion, Roger; and Depoitier, Jacques, 4,056,349, Cl. 432-36.000.
Derby, Palmer P., to Raytheon Company. Anode assembly for electron discharge devices. 4,056,756, Cl. 315-39.690.
Derfer, John M.: *See—*
  Close, Ralph E.; and Derfer, John M., 4,056,573, Cl. 260-631.500.
Deroitte, Jean-Louis: *See—*
  Berger, Eugene; Gerard, Pol; Delbouille, Andre; and Deroitte, Jean-Louis, 4,056,668, Cl. 526-124.000.
de Ruvo, Alf: *See—*
  Hansen, Karl Erik; Hovmand, Svend; Pedersen, Mogens Lindskov; Schwartzbach, Christian; Htun, Myat; de Ruvo, Alf; and Cavlin, Soren, 4,055,903, Cl. 34-12.000.
Deters, Elmer M., to Weil-McLain Company, Inc. Fluid flow control apparatus and a gasoline dispensing and vapor recovery system utilizing said apparatus. 4,056,133, Cl. 141-301.000.
Detty, Rodney H., to Eaton Corporation. Magnetically actuated viscous fluid coupling. 4,056,178, Cl. 192-58.00B.
Deutsche Gold- und Silber-Scheideanstalt Vormals Roessler: *See—*
  Bertram, Heidrun; Fahnestich, Rudolf; and Hesse, Joachim, 4,056,658, Cl. 426-2.000.
Devatron Limited: *See—*
  Charnoe, Zeera Polyandre, 4,055,915, Cl. 47-58.000.
Devine, Patrick J., to United States of America, Army. Armor plate penetrator. 4,056,060, Cl. 102-52.000.
Dhooge, Alfons Leon; and Cappuyns, Joseph Marie, to AGFA-GEVAERT N.V. Stack forming device. 4,056,264, Cl. 271-177.000.
Diamantoglou, Michael; Magerlein, Helmut; Zielke, Rainer; and Cornelissens, Emery George Philomena, to Diamantoglou, Michael; Magerlein, Helmut; and Zielke, Rainer. Oxidation products of cellulose, hemicellulose and lignin. 4,056,400, Cl. 106-162.000.
Diamond Shamrock Corporation: *See—*
  Babinsky, Andrew D.; and Dotson, Ronald L., 4,056,448, Cl. 204-98.000.
  Pohto, Gerald R.; Kubrin, Michael J.; and Sutter, Robert C., 4,056,458, Cl. 204-263.000.
  Rowe, Edward A., Jr.; and Cawley, William H., 4,056,409, Cl. 148-6.15R.
Diamond Shamrock Technologies S.A.: *See—*
  de Nora, Vittorio; Nidola, Antonio; and Bianchi, Giuseppe, 4,056,449, Cl. 204-106.000.
Dickey-john Corporation: *See—*
  Bachman, Wesley J., 4,056,817, Cl. 340-253.00Y.
Dictaphone Corporation: *See—*
  Ray, Earnest Joseph, 4,056,722, Cl. 250-231.0SE.
  Whitney, James C.; and Ciaraldi, Anthony, 4,056,835, Cl. 360-105.000.
Diemer, R. Bertrum, Jr.; and Dunson, James B., Jr. Method for separating immiscible fluids of different density. 4,056,371, Cl. 55-90.000.
Digital Equipment Corporation: *See—*
  Quinn, Robert J., 4,056,713, Cl. 364-521.000.
Dinkelacker, Walter; Blum, Rudolf; Abele, Klaus; Knodler, Jurgen; and Ebinger, Peter, to Robert Bosch GmbH. Automotive vehicle performance test stand system and performance measuring method. 4,055,996, Cl. 73-117.000.
Dionne, Norman J.; and Wettstein, Ernest C., to Raytheon Company. Magnetic field aligning means. 4,056,800, Cl. 335-296.000.
Dirham, Walter M., to Bachrach, Osher M. Child's toy halo. 4,055,856, Cl. 2-192.000.
Dissauer, Gerald A.: *See—*
  Trenkamp, Robert H.; and Dissauer, Gerald A., 4,056,712, Cl. 235-440.000.
Dix, Walter James. Packaging articles and identifying templates. 4,056,190, Cl. 206-349.000.
Dixon, Jimmie D.; and McCannon, Ralph C. Lightweight pad for semi-rigidly supporting electrical transformers. 4,056,251, Cl. 248-19.000.
Dmitrovsky, Morris; and Kokke, Antoine H., to Amstar Corporation. Two stage continuous crystallization apparatus with controls. 4,056,364, Cl. 23-273.00R.
Dobrovolskaya, Irma Viktorovna: *See—*
  Skvortsov, Gennady Alexeevich; Nizeeva, Nellya Nikitichna; Podzharsky, Avrum Iosifovich; and Dobrovolskaya, Irma Viktorovna, 4,056,600, Cl. 423-239.000.
Dobson, Thomas A.: *See—*
  Demerson, Christopher A.; Humber, Leslie G.; Asselin, Andre A.; Jirkovsky, Ivo; and Dobson, Thomas A., 4,056,537, Cl. 260-326.50B.
  Demerson, Christopher A.; Humber, Leslie G.; Asselin, Andre A.; Jirkovsky, Ivo; and Dobson, Thomas A., 4,056,538, Cl. 260-326.50B.
Doherty, Norman R.; and Doherty, Richard F. Electrically actuated power press. 4,056,029, Cl. 83-575.000.
Doherty, Richard F.: *See—*
  Doherty, Norman R.; and Doherty, Richard F., 4,056,029, Cl. 83-575.000.
Doi, Kunio; Koike, Kozo; and Sasaki, Toshiro, to Toyo Kogyo Co., Ltd. Rotary piston type internal combustion engines. 4,056,339, Cl. 418-178.000.
Dolgy, Igor Evgenievich: *See—*
  Boyadzhian, Varazdat Karapetovich; Khachatrian, Saribek Saakovich; Stepanian, Genrikh Gevorkovich; Eritsian, Volodya Karapetovich; Agavelian, Edik Stepanovich; Nefedov, Oleg Matveevich; Dolgy, Igor Evgenievich; Sisin, Mikhail Fedorovich; Kolbasin, Alexei Yakovlevich; and Anikeev, Ivan Konstantinovich, 4,056,563, Cl. 560-245.000.
Dom Holdings Limited: *See—*
  McIntyre, Douglas Owen, 4,056,037, Cl. 85-74.000.
Domer, Josef: *See—*
  Pospischil, Reginhard; and Domer, Josef, 4,056,790, Cl. 333-5.000.
Domicone, Joseph J.: *See—*
  Dates, Harold F.; Domicone, Joseph J.; and Nitsche, Joseph E., 4,056,650, Cl. 428-332.000.
Donev, Ivan Yordanov: *See—*
  Kamburov, Hristo Kirilov; Vankov, Ivan Danailov; and Donev, Ivan Yordanov, 4,056,725, Cl. 250-336.000.
Dorsch, Robert Eugene, to Uniroyal, Inc. Air deflector for tractor-trailer vehicle. 4,056,279, Cl. 296-1.00S.
Dotson, Ronald L.: *See—*
  Babinsky, Andrew D.; and Dotson, Ronald L., 4,056,448, Cl. 204-98.000.
Dow Chemical Company, The: *See—*
  Gibbs, Dale S.; Wagener, Earl H.; and Wessling, Ritchie A., 4,056,501, Cl. 260-29.6SQ.
  Gross, James R., 4,056,502, Cl. 260-29.60N.
  Huang, Charles Y.; and Roy, Alejo V., 4,056,442, Cl. 195-62.000.
  Symm, Richard H.; and Sheffield, Byford D., 4,056,510, Cl. 260-47.0EP.
Downing, Benjamin A., to Caterpillar Tractor Co. Multiple container and rack system. 4,056,295, Cl. 312-107.000.
Dresser Industries, Inc.: *See—*
  Fiegl, David Elmer; Hawthorne, Vaughn Terrey; and Martin, Albert Edward, 4,056,065, Cl. 105-199.00C.
  Jett, Marion Barney; and Spriggs, Dennis Mitchel, 4,056,145, Cl. 166-212.000.
  Miglierini, Raul A., 4,056,153, Cl. 175-376.000.
  Roesner, Raymond Earl, 4,056,004, Cl. 73-151.000.
Dubyaga, Sergei Viktorovich: *See—*
  Vulikh, Alexandr Ilich; Zagorskaya, Maina Konstantinovna; Kofman, Izrail Zalmanovich; Pavlovich, Inna Vasilievna; Levitan,

  Boris Veniaminovich; Troyan, Nikolai Vasilievich; and Dubyaga, Sergei Viktorovich, 4,056,605, Cl. 423-484.000.
Duhault, Jacques, to Science Union et Cie, Societe Francaise de Recherche Medicale. Methods of treating animals suffering from hyperlipidemia using certain N-phenyl sulphonyl-N'-(3-azabicycloalkyl) ureas. 4,056,623, Cl. 424-274.000.
Dunlop Limited: *See—*
  Moring, Peter Lothar Ernst, 4,056,016, Cl. 74-231.00J.
Dunson, James B., Jr.: *See—*
  Diemer, R. Bertrum, Jr.; and Dunson, James B., Jr., 4,056,371, Cl. 55-90.000.
Du Pont de Nemours, E. I., and Company: *See—*
  Gallini, John Battista; Hauxwell, Gerald Dean; and Whitfield, Christopher Roger, 4,056,240, Cl. 242-47.090.
  Gauntt, Sibbley Paul, 4,056,652, Cl. 428-400.000.
  Gebhard, John Charles, Jr.; Waggoner, Marion Glen; and Webster, James Lang, 4,056,653, Cl. 428-402.000.
  Huang, Hua-Feng; and Yates, Richard Alan, 4,056,638, Cl. 426-244.000.
  Rivers, Joseph Tracy, Jr.; and Zaharko, Joe Dennis, 4,055,941, Cl. 57-149.000.
Durant, Graham John: *See—*
  Brown, Thomas Henry; Durant, Graham John; Ganellin, Charon Robin; and Ife, Robert John, 4,056,621, Cl. 424-273.00R.
Dutton, Arthur L., Jr., to J. B. Engineering and Sales Company, Inc. Alignment control apparatus for a turntable used in an ultrasonic testing system. 4,055,988, Cl. 73-620.000.
Duval, Lawrence E. Apparatus for bathing persons. 4,055,863, Cl. 4-173.00R.
Dworak, Francis Stanislaus; and Ratti, Renald Anthony, to Bell Telephone Laboratories, Incorporated. Special automatic trunk testing arrangement. 4,056,698, Cl. 179-175.20C.
Dworak, Wilhelm: *See—*
  Zorn, Jurgen; Vlemmings, Jan; Muller, Karl-Heinz; Mayer, Siegfried; Dworak, Wilhelm; Hartmann, Eugen; Fader, Martin; Talmon, Wolfgang; Jons, Claus; Sauer, Ivan; and Bosch, Paul, 4,056,337, Cl. 418-131.000.
Dymat Photomatrix Corporation: *See—*
  Gensike, Karl H.; Marsh, Robert C.; and Reinhard, John D., 4,056,321, Cl. 355-99.000.
Dynamit Nobel Aktiengesellschaft: *See—*
  Franz, Arnold; and Stein, Werner, 4,056,656, Cl. 428-460.000.
  Riegger, Paul; Richtzenhain, Hermann; and Zoche, Gunter, 4,056,454, Cl. 204-163.00R.
  Schmidt, Werner; Petersen, Egon Norbert; and Richtzenhain, Hermann, 4,056,508, Cl. 260-45.75B.
Eastman Kodak Company: *See—*
  Gilkey, Russell; Hilbert, Samuel D.; Sublett, Bobby J.; and Wicker, Thomas H., Jr., 4,056,356, Cl. 8-168.00C.
  Hannie, David Eugene, 4,056,394, Cl. 96-29.00D.
  Ponticello, Ignazio Salvatore, 4,056,543, Cl. 260-348.590.
Eaton Corporation: *See—*
  Bradford, Jay H.; and Terp, Norman T., 4,056,118, Cl. 137-201.000.
  Detty, Rodney H., 4,056,178, Cl. 192-58.00B.
Eaton Yale Ltd.: *See—*
  Bakowski, Thomas G., 4,056,134, Cl. 144-2.00Z.
  Whitcomb, Paul H., 4,056,135, Cl. 144-2.00Z.
Ebinger, Peter: *See—*
  Dinkelacker, Walter; Blum, Rudolf; Abele, Klaus; Knodler, Jurgen; and Ebinger, Peter, 4,055,996, Cl. 73-117.000.
Ebinuma, Yasumitsu: *See—*
  Aihara, Mitsugu; Kogane, Yutaka; Ebinuma, Yasumitsu; and Minami, Masaki, 4,056,680, Cl. 174-19.000.
Ebisawa, Hisashi: *See—*
  Kitaoka, Shigeo; Johkoh, Katsuhiro; Ebisawa, Hisashi; Sato, Tadashi; Kubo, Hiroshi; Takahashi, Sosuke; and Kawase, Yoshinobu, 4,056,631, Cl. 424-330.000.
Eckels, Phillip W., to Westinghouse Electric Corporation. Cryogen transfer coupling with adjustable throttle valve for rotating machinery. 4,056,745, Cl. 310-52.000.
Eder, John Anthony: *See—*
  Weinar, Roger Neil; and Eder, John Anthony, 4,055,930, Cl. 52-717.000.
Eichberg, Joseph: *See—*
  Kronstein, Max; and Eichberg, Joseph, 4,056,494, Cl. 260-22.00A.
Eichenhofer, Kurt-Wilhelm; and Schliebs, Reinhard, to Bayer Aktiengesellschaft. Purification of waste water from hydrazine production. 4,056,469, Cl. 210-62.000.
Eiermann, Dankwart, to Wankel GmbH. Rotary piston engine. 4,056,338, Cl. 418-119.000.
Electric Valve Company Limited: *See—*
  Bailey, Philip Charles; and Scholz, Hans, 4,056,754, Cl. 313-390.000.
Electro-Nite Co.: *See—*
  Cure, Omer P., 4,056,407, Cl. 136-232.000.
Electroglas, Inc.: *See—*
  Roch, Jacques Leon, 4,056,777, Cl. 324-158.00P.
Elex A.G.: *See—*
  Zwahlen, Ernst, 4,056,215, Cl. 222-231.000.
Eli Lilly and Company: *See—*
  Bobbitt, Jesse L.; and Smithwick, Edward L., Jr., 4,056,519, Cl. 260-112.50R.
  Huffman, George W., 4,056,676, Cl. 544-29.000.
  Soper, Quentin Francis, 4,056,382, Cl. 71-66.000.
Elinkmann, Hans-Gerd: *See—*
  Schiessler, Siegfried; Spietschka, Ernst; and Elinkmann, Hans-Gerd, 4,056,534, Cl. 260-314.500.
Elixir Industries: *See—*
  Coller, John, 4,055,917, Cl. 49-469.000.
Ellington, Harold John; and McNeil, Roy C., to Heldor Associates, Inc. Frame structure for swimming pool. 4,055,922, Cl. 52-169.700.
Elster's Inc.: *See—*
  Marks, Ronald Aaron; Levenback, George; and Sweet, Albert, 4,055,954, Cl. 60-527.000.
EMG Hydraulics, Inc.: *See—*
  Greer, Edward M., 4,056,127, Cl. 138-30.000.
Emhart Zurich S. A.: *See—*
  Munz, Werner, 4,055,985, Cl. 73-49.200.
Endo, Takuya; and Hirota, Toshio, to Nissan Motor Company, Limited. Power supply system having two different types of batteries and current-limiting circuit for lower output battery. 4,056,764, Cl. 320-3.000.
Engelfried, Otto: *See—*
  Kerb, Ulrich; Wiechert, Rudolf; Wachtel, Helmut; Engelfried, Otto; and Kieslich, Klaus, 4,056,633, Cl. 424-331.000.
Engelhard Minerals & Chemicals Corporation: *See—*
  Hindin, Saul G.; and Pond, George R., 4,056,489, Cl. 252-462.000.
England, J. Melvin: *See—*
  Rabelos, Nicholas A., 4,056,166, Cl. 182-5.000.
Enomoto, Keisuke: *See—*
  Sato, Yo; and Enomoto, Keisuke, 4,056,661, Cl. 428-144.000.
Epifano, Leonard: *See—*
  Collica, Carl; Epifano, Leonard; and Farella, Ralph, 4,056,096, Cl. 128-1.100.
  Collica, Carl; Epifano, Leonard; and Farella, Ralph, 4,056,729, Cl. 250-472.000.
Erie Technological Products, Inc.: *See—*
  Sienicki, John W.; and Haycox, Clarence A., 4,056,842, Cl. 361-293.000.
Eritsian, Volodya Karapetovich: *See—*
  Boyadzhian, Varazdat Karapetovich; Khachatrian, Saribek Saakovich; Stepanian, Genrikh Gevorkovich; Eritsian, Volodya Karapetovich; Agavelian, Edik Stepanovich; Nefedov, Oleg Matveevich; Dolgy, Igor Evgenievich; Sisin, Mikhail Fedorovich; Kolbasin, Alexei Yakovlevich; and Anikeev, Ivan Konstantinovich, 4,056,563, Cl. 560-245.000.
Ernst Leitz G.m.b.H.: *See—*
  Frenk, Helmuth, 4,056,760, Cl. 318-115.000.
Ershov, Vadim Andreevich: *See—*
  Volfkovich, Semen Issakovich; Belov, Vladimir Nikolaevich; Ershov, Vadim Andreevich; Rozenberg, Evgeny Khaskelevich; Shipov, Emmanuil Ivanovich; and Jumanova, Ljudmila Vladimirovna, 4,056,601, Cl. 423-322.000.
Esch, Ronald Philip, to International Business Machines Corporation. FET device with reduced gate overlap capacitance of source/drain and method of manufacture. 4,056,825, Cl. 357-23.000.
Essex International, Inc.: *See—*
  Jordan, Leslie S., 4,056,699, Cl. 200-5.00A.
Etat Francais: *See—*
  Michel, Alain Marie; and Parc, Jean Edmond, 4,056,098, Cl. 128-142.00R.
Ethyl Corporation: *See—*
  Malec, Robert E., 4,056,531, Cl. 260-268.0PL.
Ettinger, John A.: *See—*
  Silvis, Richard R.; and Ettinger, John A., 4,056,184, Cl. 198-471.000.
Etzler, John Lewis, IV. Loader attachment. 4,056,205, Cl. 214-145.00R.
Eue, Ludwig: *See—*
  Schlee, Hans Georg; Sasse, Klaus; and Eue, Ludwig, 4,056,527, Cl. 544-194.000.
Evans, Carmi Goodrich. Air cushion vehicle. 4,056,159, Cl. 180-120.000.
Evans, Franklin Temple. Polymorphic support systems. 4,055,866, Cl. 5-367.000.
Eveson, Geoffrey Frank: *See—*
  Beach, Anthony John; Eveson, Geoffrey Frank; and Leedham, Reginald Keith, 4,056,704, Cl. 219-121.00P.
Exxon Research and Engineering Company: *See—*
  Li, Norman N.; and Cahn, Robert P., 4,056,462, Cl. 208-308.000.
Fabrique d'Horlogerie de Fontainemelon S.A.: *See—*
  Widmer, Rene, 4,055,944, Cl. 58-115.000.
Fader, Martin: *See—*
  Zorn, Jurgen; Vlemmings, Jan; Muller, Karl-Heinz; Mayer, Siegfried; Dworak, Wilhelm; Hartmann, Eugen; Fader, Martin; Talmon, Wolfgang; Jons, Claus; Sauer, Ivan; and Bosch, Paul, 4,056,337, Cl. 418-131.000.
Fagherazzi, Giuliano: *See—*
  Corradi, Ariello Rolando; and Fagherazzi, Giuliano, 4,056,410, Cl. 148-105.000.
Fagniart, Gaston, to Societe Anonyme dite: BORACIER. Flexible plastic container. 4,056,138, Cl. 150-.500.
Fahnestich, Rudolf: *See—*
  Bertram, Heidrun; Fahnestich, Rudolf; and Hesse, Joachim, 4,056,658, Cl. 426-2.000.
Faille, Marc Della; Delvaux, Pierre; Godard, Pierre; and Mercier, Jean Pierre, to S. A. Eternit. Process for treating porous materials and products obtained. 4,056,655, Cl. 428-443.000.
Fairchild Camera and Instrument Corporation: *See—*
  Kopp, Robert J., 4,056,414, Cl. 148-175.000.

Falk, Edward J., to Wagner Electric Corporation. Automotive brake fluid low-level warning sensor. 4,055,957, Cl. 60-535.000.

Farella, Ralph: *See—*
  Collica, Carl; Epifano, Leonard; and Farella, Ralph, 4,056,096, Cl. 128-1.100.
  Collica, Carl; Epifano, Leonard; and Farella, Ralph, 4,056,729, Cl. 250-472.000.

Farling, Gene M., to Zimmer USA, Inc. Human body implant of graphitic carbon fiber reinforced ultra-high molecular weight polyethylene. 4,055,862, Cl. 3-1.910.

Farnam, Franklin C. Electrical heating device for use with aerosol containers. 4,056,707, Cl. 219-302.000.

Farr, Glyn Phillip Reginald, to Girling Limited. Automatic slack adjuster for vehicle brakes combined with a hydraulic actuator and auxiliary mechanical actuator assembly. 4,056,173, Cl. 188-71.900.

Farrell, Gordon Michael: *See—*
  Bowie, Raymond Alexander; Cox, John Michael; Farrell, Gordon Michael; and Shephard, Margaret Claire, 4,056,384, Cl. 71-92.000.

Farrell, John J., to Farrell Patent Company. Blow molding method with double cycle for core rods. 4,056,590, Cl. 264-89.000.

Farrell Patent Company: *See—*
  Farrell, John J., 4,056,590, Cl. 264-89.000.

Faulkner, Thomas Edward, to Motorola, Inc. Vehicle repeater prioritization system. 4,056,780, Cl. 325-5.000.

Faux, Kenneth R., Sr.; and Wenman, William A., to Phoenix Products Company, Inc. Heavy duty floodlight fixture. 4,056,718, Cl. 362-306.000.

Favre, Bernard: *See—*
  Christen, Gilbert; Favre, Bernard; Marze, Xavier; Salmon, Michel; and Thuillier, Rene, 4,056,467, Cl. 210-23.00F.

Fay, Edwin F. Apparatus for pulverizing solid materials. 4,056,233, Cl. 241-39.000.

Fecker, Josef; and Memminger, Gustav, to Gustav Memminger Verfahrenstechnik fur die Maschenindustrie, Firma. Yarn supply apparatus for positive thread supply. 4,056,239, Cl. 242-47.010.

Fehlbaum: *See—*
  Brauning, Egon, 4,056,196, Cl. 211-207.000.

Feldman, Richard B., to Chevron Research Company. Credit card imprinter. 4,056,054, Cl. 101-45.000.

Feldstein, Michael A.: *See—*
  Godbout, Joseph C.; and Feldstein, Michael A., 4,056,831, Cl. 360-77.000.

Fester, Walter: *See—*
  Albers, Ernst-August; Fester, Walter; and Sassenrath, Bernd, 4,056,516, Cl. 260-79.30M.

Fiegl, David Elmer; Hawthorne, Vaughn Terrey; and Martin, Albert Edward, to Dresser Industries, Inc. Rejection feature for center plate. 4,056,065, Cl. 105-199.00C.

Figuiere, Pierre: *See—*
  Ter-Minassian, Leon; Pruzan, Philippe; Figuiere, Pierre; and Szwarc, Henri, 4,055,982, Cl. 73-15.00B.

Finlayson, Laurence Harry: *See—*
  Clifford, Cecil Frank; and Finlayson, Laurence Harry, 4,056,743, Cl. 310-21.000.

Finnigan Corporation: *See—*
  McFadden, William H., 4,055,987, Cl. 73-61.10C.

Fischer, Hermann: *See—*
  Strehler, Hugo; Beer, Ludwig; Heil, Eduard; Urbanek, Friedrich; and Fischer, Hermann, 4,056,514, Cl. 260-75.00R.

Fischer, Paul; and Wisz, Edward, to Chemische Fabrik Uetikon. Adsorption arrangement. 4,056,471, Cl. 210-186.000.

Fischer, Robert Frederick: *See—*
  Bobeck, Andrew Henry; and Fischer, Robert Frederick, 4,056,812, Cl. 365-17.000.

Fismen, Olav Hakon. Apparatus for cleaning tanks and the like. 4,056,227, Cl. 239-227.000.

Fisons Limited: *See—*
  Gates, Peter Stuart; and Gillon, John, 4,056,625, Cl. 424-282.000.

Focke, Heinz, to Focke & Pfuhl. Compartmentalized structure with pivotable separating webs. 4,056,222, Cl. 229-15.000.

Focke & Pfuhl: *See—*
  Focke, Heinz, 4,056,222, Cl. 229-15.000.

Ford Motor Company: *See—*
  Lingscheit, James N., 4,056,589, Cl. 264-65.000.
  Nowroski, Alvin P.; and Root, Lyman V., 4,056,085, Cl. 123-119.00B.
  Tsou, Ivan H., 4,056,493, Cl. 260-22.0TN.

Forenade Fabriksverken: *See—*
  Johansson, Lennart Nils; and Svensson, Claes-Goran O., 4,055,952, Cl. 60-517.000.

Forster, Hans-Joachim M.; and Gaus, Hermann, to Daimler-Benz Aktiengesellschaft. Drive arrangement for motor vehicles, especially for passenger motor vehicles, with an automatic change-speed transmission. 4,056,176, Cl. 192-4.00A.

Fortune, William S. Vacuum system. 4,056,334, Cl. 417-189.000.

Fothergill, John Roderick: *See—*

Army. Radiation polymerized priming compositions. 4,056,416, Cl. 149-19.910.

Franz, Arnold; and Stein, Werner, to Dynamit Nobel Aktiengesellschaft. Flame-resistant laminates. 4,056,656, Cl. 428-460.000.

Fredericks, Walter A., to Rexnord, Inc. Torque transmission coupling. 4,055,966, Cl. 64-13.000.

Freed, Donald L., Jr., to National Mine Service Company. Material gathering device for a mining machine. 4,056,189, Cl. 198-514.000.

Freimanis, Laimons, to Bell Telephone Laboratories, Incorporated. Telephone subscriber line circuit. 4,056,689, Cl. 179-16.00F.

Freimanis, Laimons; Mussman, Harry Edward; and Smith, DeWitt Paul, to Bell Telephone Laboratories, Incorporated. Telephone subscriber line circuit. 4,056,691, Cl. 179-18.0FA.

Fremont, Henry A.; and Lawrence, Walter Phalti, to Champion International Corporation. Fiberboard manufacture. 4,056,342, Cl. 425-80.000.

Frenk, Helmuth, to Ernst Leitz G.m.b.H. Method of driving a two coordinate oscillator and circuit arrangement therefor. 4,056,760, Cl. 318-115.000.

Fried. Krupp Gesellschaft mit beschrankter Haftung: *See—*
  Leisterer, Reinhard; Oelfke, Manfred; Woiczik, Hans; Meyer, Hans-Joachim; and Ostermeier, Rolf, 4,056,801, Cl. 340-2.000.

Friedman, Walter: *See—*
  Ieda, Michael; and Friedman, Walter, 4,055,914, Cl. 46-192.000.

Fritz, Giselher, to Gewerkschaft Eisenhutte Westfalia. Apparatus for use in mining or tunnelling installations. 4,055,959, Cl. 61-85.000.

Fuji Photo Film Co., Ltd.: *See—*
  Horie, Ikutaro; Miyazako, Takushi; Sakaguchi, Shinji; Tsuji, Nobuo; and Kameji, Nagao, 4,056,396, Cl. 96-67.000.
  Sato, Masamichi; Kido, Keishiro; and Arai, Noboru, 4,056,395, Cl. 96-36.000.

Fujii, Akiyoshi: *See—*
  Izumi, Ryoji; Kobayashi, Shoji; Ono, Toshiharu; Shirato, Toru; Fujii, Akiyoshi; and Okihara, Tadashi, 4,056,592, Cl. 264-141.000.

Fujii, Yoshihisa; and Fujiwara, Akio, to Sumitomo Metal Industries Limited. Method for hardening steel pipes. 4,056,412, Cl. 148-153.000.

Fujinaga, Kyozo: *See—*
  Harada, Nobuhiko; Tanaka, Minetaka; Shimano, Masanao; Fujinaga, Kyozo; Nunomura, Kunito; Tamura, Masamitu; Nakamura, Shigeharu; and Akagi, Kazuo, 4,056,428, Cl. 156-642.000.

Fujinami, Akira: *See—*
  Takayama, Chiyozo; Hisada, Yoshio; Kato, Toshiro; and Fujinami, Akira, 4,056,622, Cl. 424-273.00R.

Fujisawa Pharmaceutical Co., Ltd.: *See—*
  Kamiya, Takashi; Teraji, Tsutomu; Hashimoto, Masashi; Nakaguti, Osamu; and Oku, Teruo, 4,056,521, Cl. 260-239.100.

Fujiwara, Akio: *See—*
  Fujii, Yoshihisa; and Fujiwara, Akio, 4,056,412, Cl. 148-153.000.

Funcik, Jack F.: *See—*
  Fusco, Vito A.; Bennett, Joseph C.; Funcik, Jack F.; Kufner, Kenneth L.; and Schneider, Thomas E., 4,055,889, Cl. 29-710.000.

Furda, Jana: *See—*
  Snyder, Lloyd L.; and Furda, Jana, 4,056,357, Cl. 23-230.00B.

Furukawa International U.S.A., Inc.: *See—*
  Myers, Albert H., 4,055,931, Cl. 53-22.00B.

Furuta, Eiichiro, to Xerox Corporation. Run length encoding and decoding methods and means. 4,056,828, Cl. 358-133.000.

Furuto, Takashi, to Kabushiki Kaisha Komatsu Seisakusho. Clamping and cutting apparatus. 4,055,869, Cl. 10-25.000.

Furutsutsumi, Yasuzi. Hand-operated apparatus for pneumatically removing dust. 4,055,870, Cl. 15-409.000.

Fusco, Vito A.; Bennett, Joseph C.; Funcik, Jack F.; Kufner, Kenneth L.; and Schneider, Thomas E., to Molex Incorporated. Connector harness assembly machine. 4,055,889, Cl. 29-710.000.

Fussangel, Hubert. Shock absorber. 4,056,040, Cl. 91-25.000.

G. D. Searle & Co.: *See—*
  Mueller, Richard A., 4,056,562, Cl. 560-231.000.

Gablin, Kenneth A.; and Hansen, Larry J., to Nuclear Engineering Co., Inc. System for disposing of radioactive waste. 4,056,362, Cl. 23-260.000.

Galasso, Francis S.; Bourdeau, Romeo G.; and Pike, Roscoe A., to United Technologies Corporation. Process for forming filaments from polyamic acid. 4,056,598, Cl. 264-184.000.

Gallini, John Battista; Hauxwell, Gerald Dean; and Whitfield, Christopher Roger, to Du Pont de Nemours, E. I., and Company. Yarn guide. 4,056,240, Cl. 242-47.090.

Gama, Jean-Michel; Lallement, Jean; and Pugnet, Lucien, to Commissariat a l'Energie Atomique. Liquid sodium cooled fast reactor. 4,056,438, Cl. 176-50.000.

Gamus, Abraham; and Knecevic, Zoran, to Unican Security Systems, Ltd. Electric strike. 4,056,277, Cl. 292-341.160.

Ganellin, Charon Robin: *See—*
  Brown, Thomas Henry; Durant, Graham John; Ganellin, Charon Robin; and Ife, Robert John, 4,056,621, Cl. 424-273.00R.

Gassman, Paul G., to Ohio State University Research Foundation, The. Ortho-[(alkylthio)(aminocarbonyl)methyl]anilines. 4,056,569, Cl. 260-558.00S.

Gates, Peter Stuart; and Gillon, John, to Fisons Limited. Pesticidal compositions containing benzodioxole derivatives and methods of combating pests. 4,056,625, Cl. 424-282.000.

Gauntt, Sibbley Paul, to Du Pont de Nemours, E. I., and Company. Monofilament of polyhexamethylene adipamide having a surface layer of reduced orientation relative to the orientation of the core. 4,056,652, Cl. 428-400.000.

Gauntt, Wayne M.; and Pye, Earl L. Determination of corrosion rates by an electrochemical method. 4,056,445, Cl. 204-1.00T.

Gaus, Hermann: *See—*
  Forster, Hans-Joachim M.; and Gaus, Hermann, 4,056,176, Cl. 192-4.00A.

GEA Luftkuhlergesellschaft Happel GmbH & Co. KG: *See—*
  Baumann, Hans; Halfmann, Manfred; and Janke, Rudolf, 4,056,142, Cl. 165-133.000.

GEBA, Gesellschaft fuer Brandmeldeanlagen mbH & Co.: *See—*
  Beyersdorf, Hartwig, 4,056,727, Cl. 250-385.000.

Gebhard, John Charles, Jr.; Waggoner, Marion Glen; and Webster, James Lang, to Du Pont de Nemours, E. I., and Company. Spherical-shaped particles from ionomer resins and ethylene/carboxylic acid copolymer resins. 4,056,653, Cl. 428-402.000.

Gebruder Heller Maschinenfabrik GmbH: *See—*
  Bauml, Kurt; Gunsser, Otto Ch.; and Lohse, Rudolf K., 4,056,039, Cl. 90-92.000.

Geissler, Ulrich C.; and Stith, William J., to Baxter Travenol Laboratories, Inc. Means for reducing tissue thromboplastin in collected blood. 4,056,101, Cl. 128-214.00D.

Gelbman, Alexander: *See—*
  Soodak, Charles; and Gelbman, Alexander, 4,056,708, Cl. 219-499.000.

General Atomic Company: *See—*
  Miertschin, Gary N.; and Leary, David F., 4,056,584, Cl. 264-.500.

General Binding Corporation: *See—*
  Staats, Henry N., 4,056,422, Cl. 156-309.000.

General Dynamics Corporation: *See—*
  Harbison, Robert Campbell; Bradley, Gerald Arthur; and Lux, Paul Arthur, 4,056,309, Cl. 350-310.000.
  Strickland, Frederick W., 4,055,875, Cl. 24-115.00R.

General Electric Company: *See—*
  Brown, Edgar D., Jr., 4,056,546, Cl. 260-448.80R.
  Brown, Richard N., 4,056,050, Cl. 99-305.000.
  Bubar, Stanley F., 4,056,752, Cl. 313-217.000.
  Lavallee, Francois A., 4,056,550, Cl. 260-465.00D.
  Merrill, Duane F., 4,056,492, Cl. 260-18.00S.
  Milkovic, Miran, 4,056,775, Cl. 324-142.000.
  Rampel, Guy G.; and Young, Jon R., 4,056,660, Cl. 429-59.000.
  Terranova, Carmen S.; and Chinoy, Rustam B., 4,055,967, Cl. 64-28.00R.

General Instrument Corporation: *See—*
  Whelan, Robert D., 4,056,795, Cl. 334-15.000.

General Signal Corporation: *See—*
  Carlson, Christian, Jr.; and Hillyer, Michael J., 4,056,749, Cl. 310-239.000.
  Carlson, William L., Jr., 4,056,011, Cl. 74-50.000.

Gensike, Karl H.; Marsh, Robert C.; and Reinhard, John D., to Dymat Photomatrix Corporation. Microfiche duplicating apparatus. 4,056,321, Cl. 355-99.000.

Gerard, Pol: *See—*
  Berger, Eugene; Gerard, Pol; Delbouille, Andre; and Deroitte, Jean-Louis, 4,056,668, Cl. 526-124.000.

Gerdes, Theodor, to Blau KG Fabrik fur Kraftfahrzeugteile. Pressure compensation valve arrangement. 4,056,121, Cl. 137-541.000.

Germerdonk, Rolf; Jonas, Adam; Hullstrung, Dieter; and Scherhag, Bernhard, to Bayer Aktiengesellschaft. Desulfurization of waste gases containing hydrogen sulfide. 4,056,606, Cl. 423-575.000.

Gesellschaft fur Kernforschung m.b.H.: *See—*
  Schmieder, Helmut; and Kroebel, Reinhard, 4,056,482, Cl. 252-301.10W.

Getchell, Nelson F.: *See—*
  Pittman, Allen G.; Wasley, William L.; and Getchell, Nelson F., 4,056,354, Cl. 8-54.000.

Getsch, Edward W., to Pako Corporation. Apparatus for packaging photographic slides in envelopes. 4,055,933, Cl. 53-187.000.

Gewerkschaft Eisenhutte Westfalia: *See—*
  Fritz, Giselher, 4,055,959, Cl. 61-85.000.
  Stoltefuss, Wilhelm; Haller, Herbert; and Hunscher, Ottocar, 4,056,284, Cl. 299-64.000.

Geyken, Erwin: *See—*
  Schneider, Siegfried; Thate, Kurt; Geyken, Erwin; Kempe, Horst; and Macher, Stephan, 4,055,879, Cl. 29-123.000.

Ghione, Mario: *See—*
  Bertazzoli, Cesare; Sala, Luisa; and Ghione, Mario, 4,056,613, Cl. 424-94.000.

Giacometti, Christian; Mougniot, Jean-Claude; and Bavier, Jean, to

Gibson, Kenneth A.: *See—*
  Kelly, Joseph B.; and Gibson, Kenneth A., 4,056,379, Cl. 65-106.000.

Gilkey, Russell; Hilbert, Samuel D.; Sublett, Bobby J.; and Wicker, Thomas H., Jr., to Eastman Kodak Company. Polyester fiber. 4,056,356, Cl. 8-168.00C.

Gilleland, Randall C.: *See—*
  Bell, Oliver A., Jr.; Gilleland, Randall C.; and Chance, Davey J., 4,056,702, Cl. 219-69.00C.

Gilley, George C. Memory utilization system. 4,056,848, Cl. 364-200.000.

Gilliland, George E. Occupant propelled tread vehicle. 4,056,289, Cl. 305-47.000.

Gillon, John: *See—*
  Gates, Peter Stuart; and Gillon, John, 4,056,625, Cl. 424-282.000.

Giori, Gualtiero, to De La Rue Giori S.A. Rotary printing press. 4,056,056, Cl. 101-152.000.

Girard, Edmond, to Society Messier. Heat pump installation. 4,055,965, Cl. 62-324.000.

Girling Limited: *See—*
  Farr, Glyn Phillip Reginald, 4,056,173, Cl. 188-71.900.
  Newstead, Charles; Assinder, Andrew Charles; and Harvey, Geoffrey, 4,056,175, Cl. 188-196.0BA.
  Tickle, Colin John Frederick, 4,056,171, Cl. 188-18.00A.
  Wienand, Hans-Jurgen; and Klassen, Horst Willi, 4,056,174, Cl. 188-73.500.

Giros, Marcel A. P. Handling installation for supporting displacing and stacking loads in predetermined positions. 4,056,201, Cl. 214-16.40A.

Giuffre, Luigi; De Nora, Vittorio; and Spaziante, Placido, to Oronzio de Nora Impianti Elettrochimici S.p.A. Electrolyzing alkali metal chlorides using resin bonded asbestos diaphragm. 4,056,447, Cl. 204-98.000.

Glen, John Baird; and James, Roger, to Imperial Chemical Industries Limited. 2,6-Diisopropylphenol as an anaesthetic agent. 4,056,635, Cl. 424-346.000.

Gliniorz, Lothar: *See—*
  Schoettle, Klaus; Wittkamp, Heinrich; and Gliniorz, Lothar, 4,056,245, Cl. 242-197.000.

Godard, Pierre: *See—*
  Faille, Marc Della; Delvaux, Pierre; Godard, Pierre; and Mercier, Jean Pierre, 4,056,655, Cl. 428-443.000.

Godbout, Joseph C.; and Feldstein, Michael A., to Data General Corporation. Thermal compensation for disk pack systems. 4,056,831, Cl. 360-77.000.

Godlewski, Walter A.; Roser, Bernard S.; and Lyons, John B., to Montgomery Ward & Co., Incorporated. Open arm sewing machine cabinet. 4,056,294, Cl. 312-30.000.

Goes, Michael J.; and Masly, John R., to United States of America, Army. Fluidic gap gauge. 4,055,983, Cl. 73-37.500.

Goettler, Lloyd A.; and Lambright, A. James, to Monsanto Company. Process for controlling orientation of discontinuous fiber in a fiber-reinforced product formed by extrusion. 4,056,591, Cl. 264-108.000.

Gohde, Hildegard. Apparatus for counting and/or measuring particles suspended in a fluid medium. 4,056,324, Cl. 356-246.000.

Goi, Mitsuhiro; and Miyashita, Masahiko, to Nippon Gohsei Kagaku Kogyo Kabushiki Kaisha. Preparation of succinylsuccinic acid diesters. 4,056,551, Cl. 560-126.000.

Goldsmith, Derek John. Fluid mixing valve for supplying controllable proportions of two inlet fluids from a single outlet. 4,056,124, Cl. 137-625.170.

Gomersall, David W.: *See—*
  Lee, Harvie Ho; Gomersall, David W.; and Leckie, Harry P., 4,056,366, Cl. 29-653.000.

Gongwer, Calvin A. Hydraulic thruster. 4,055,947, Cl. 60-221.000.

Gordon, Paul; Ronsen, Bruce; and Kulkarni, Shrikant V., to Strategic Medical Research Corporation. Preparation of ethers of monosaccharides. 4,056,322, Cl. 536-4.000.

Gorman, Martin E., Jr.: *See—*
  Wasserman, Max; and Gorman, Martin E., Jr., 4,055,925, Cl. 52-403.000.

Gotze, Wilhelm: *See—*
  Kamann, Gunther; Krahe, Jurgen; Zischinsky, Ulf; and Gotze, Wilhelm, 4,056,036, Cl. 85-63.000.

Graf von Berckheim, Constantin. Ion detector. 4,056,772, Cl. 324-72.000.

Gramstrup, Torben W. Adjustable billiard table rail construction. 4,056,266, Cl. 273-9.000.

Granzer, Ernold: *See—*
  Bartmann, Wilhelm; Beck, Gerhard; Granzer, Ernold; Musil, Josef; and Teufel, Hermann, 4,056,629, Cl. 424-327.000.

Granzow, Daniel B.: *See—*
  Carter, Garry L.; and Granzow, Daniel B., 4,056,116, Cl. 137-68.00R.

Gray, Thomas J.: *See—*
  Pryor, Michael J.; and Gray, Thomas J., 4,056,586, Cl. 264-44.000.

Greaves, Geoffrey Stuart: *See—*
  Peters, Ann Margaret; Greaves, Geoffrey Stuart; Clark, Ian Rob-

Falk, Edward J., to Wagner Electric Corporation. Automotive brake fluid low-level warning sensor. 4,055,957, Cl. 60-535.000.
Farella, Ralph: *See—*
Collica, Carl; Epifano, Leonard; and Farella, Ralph, 4,056,096, Cl. 128-1.100.
Collica, Carl; Epifano, Leonard; and Farella, Ralph, 4,056,729, Cl. 250-472.000.
Farling, Gene M., to Zimmer USA, Inc. Human body implant of graphitic carbon fiber reinforced ultra-high molecular weight polyethylene. 4,055,862, Cl. 3-1.910.
Farnam, Franklin C. Electrical heating device for use with aerosol containers. 4,056,707, Cl. 219-302.000.
Farr, Glyn Phillip Reginald, to Girling Limited. Automatic slack adjuster for vehicle brakes combined with a hydraulic actuator and auxiliary mechanical actuator assembly. 4,056,173, Cl. 188-71.900.
Farrell, Gordon Michael: *See—*
Bowie, Raymond Alexander; Cox, John Michael; Farrell, Gordon Michael; and Shephard, Margaret Claire, 4,056,384, Cl. 71-92.000.
Farrell, John J., to Farrell Patent Company. Blow molding method with double cycle for core rods. 4,056,590, Cl. 264-89.000.
Farrell Patent Company: *See—*
Farrell, John J., 4,056,590, Cl. 264-89.000.
Faulkner, Thomas Edward, to Motorola, Inc. Vehicle repeater prioritization system. 4,056,780, Cl. 325-5.000.
Faux, Kenneth R., Sr.; and Wenman, William A., to Phoenix Products Company, Inc. Heavy duty floodlight fixture. 4,056,718, Cl. 362-306.000.
Favre, Bernard: *See—*
Christen, Gilbert; Favre, Bernard; Marze, Xavier; Salmon, Michel; and Thuillier, Rene, 4,056,467, Cl. 210-23.00F.
Fay, Edwin F. Apparatus for pulverizing solid materials. 4,056,233, Cl. 241-39.000.
Fecker, Josef; and Memminger, Gustav, to Gustav Memminger Verfahrenstechnik fur die Maschenindustrie, Firma. Yarn supply apparatus for positive thread supply. 4,056,239, Cl. 242-47.010.
Fehlbaum: *See—*
Brauning, Egon, 4,056,196, Cl. 211-207.000.
Feldman, Richard B., to Chevron Research Company. Credit card imprinter. 4,056,054, Cl. 101-45.000.
Feldstein, Michael A.: *See—*
Godbout, Joseph C.; and Feldstein, Michael A., 4,056,831, Cl. 360-77.000.
Fester, Walter: *See—*
Albers, Ernst-August; Fester, Walter; and Sassenrath, Bernd, 4,056,516, Cl. 260-79.30M.
Fiegl, David Elmer; Hawthorne, Vaughn Terrey; and Martin, Albert Edward, to Dresser Industries, Inc. Rejection feature for center plate. 4,056,065, Cl. 105-199.00C.
Figuiere, Pierre: *See—*
Ter-Minassian, Leon; Pruzan, Philippe; Figuiere, Pierre; and Szwarc, Henri, 4,055,982, Cl. 73-15.00B.
Finlayson, Laurence Harry: *See—*
Clifford, Cecil Frank; and Finlayson, Laurence Harry, 4,056,743, Cl. 310-21.000.
Finnigan Corporation: *See—*
McFadden, William H., 4,055,987, Cl. 73-61.10C.
Fischer, Hermann: *See—*
Strehler, Hugo; Beer, Ludwig; Heil, Eduard; Urbanek, Friedrich; and Fischer, Hermann, 4,056,514, Cl. 260-75.00R.
Fischer, Paul; and Wisz, Edward, to Chemische Fabrik Uetikon. Adsorption arrangement. 4,056,471, Cl. 210-186.000.
Fischer, Robert Frederick: *See—*
Bobeck, Andrew Henry; and Fischer, Robert Frederick, 4,056,812, Cl. 365-17.000.
Fismen, Olav Hakon. Apparatus for cleaning tanks and the like. 4,056,227, Cl. 239-227.000.
Fisons Limited: *See—*
Gates, Peter Stuart; and Gillon, John, 4,056,625, Cl. 424-282.000.
Focke, Heinz, to Focke & Pfuhl. Compartmentalized structure with pivotable separating webs. 4,056,222, Cl. 229-15.000.
Focke & Pfuhl: *See—*
Focke, Heinz, 4,056,222, Cl. 229-15.000.
Ford Motor Company: *See—*
Lingscheit, James N., 4,056,589, Cl. 264-65.000.
Nowroski, Alvin P.; and Root, Lyman V., 4,056,085, Cl. 123-119.00B.
Tsou, Ivan H., 4,056,493, Cl. 260-22.0TN.
Forenade Fabriksverken: *See—*
Johansson, Lennart Nils; and Svensson, Claes-Goran O., 4,055,952, Cl. 60-517.000.
Forster, Hans-Joachim M.; and Gaus, Hermann, to Daimler-Benz Aktiengesellschaft. Drive arrangement for motor vehicles, especially for passenger motor vehicles, with an automatic change-speed transmission. 4,056,176, Cl. 192-4.00A.
Fortune, William S. Vacuum system. 4,056,334, Cl. 417-189.000.
Fothergill, John Roderick: *See—*
Barnes, Sidney; and Fothergill, John Roderick, 4,056,434, Cl. 176-19.00R.
Fox, Joseph M., III; Degen, Bruce D.; and Leibson, Irving, to Bechtel International Corporation. Process for the recovery of magnesium chloride hydrate and potassium chloride from carnallite and bischofite. 4,056,599, Cl. 423-178.000.
Frank, Pierre: *See—*
Arsac, Aime Joseph; and Frank, Pierre, 4,056,367, Cl. 44-59.000.
Franklin, Gerald B.; and Parrish, Clyde F., to United States of America, Army. Radiation polymerized priming compositions. 4,056,416, Cl. 149-19.910.
Franz, Arnold; and Stein, Werner, to Dynamit Nobel Aktiengesellschaft. Flame-resistant laminates. 4,056,656, Cl. 428-460.000.
Fredericks, Walter A., to Rexnord, Inc. Torque transmission coupling. 4,055,966, Cl. 64-13.000.
Freed, Donald L., Jr., to National Mine Service Company. Material gathering device for a mining machine. 4,056,189, Cl. 198-514.000.
Freimanis, Laimons, to Bell Telephone Laboratories, Incorporated. Telephone subscriber line circuit. 4,056,689, Cl. 179-16.00F.
Freimanis, Laimons; Mussman, Harry Edward; and Smith, DeWitt Paul, to Bell Telephone Laboratories, Incorporated. Telephone subscriber line circuit. 4,056,691, Cl. 179-18.0FA.
Fremont, Henry A.; and Lawrence, Walter Phalti, to Champion International Corporation. Fiberboard manufacture. 4,056,342, Cl. 425-80.000.
Frenk, Helmuth, to Ernst Leitz G.m.b.H. Method of driving a two coordinate oscillator and circuit arrangement therefor. 4,056,760, Cl. 318-115.000.
Fried. Krupp Gesellschaft mit beschrankter Haftung: *See—*
Leisterer, Reinhard; Oelfke, Manfred; Woiczik, Hans; Meyer, Hans-Joachim; and Ostermeier, Rolf, 4,056,801, Cl. 340-2.000.
Friedman, Walter: *See—*
Ieda, Michael; and Friedman, Walter, 4,055,914, Cl. 46-192.000.
Fritz, Giselher, to Gewerkschaft Eisenhutte Westfalia. Apparatus for use in mining or tunnelling installations. 4,055,959, Cl. 61-85.000.
Fuji Photo Film Co., Ltd.: *See—*
Horie, Ikutaro; Miyazako, Takushi; Sakaguchi, Shinji; Tsuji, Nobuo; and Kameji, Nagao, 4,056,396, Cl. 96-67.000.
Sato, Masamichi; Kido, Keishiro; and Arai, Noboru, 4,056,395, Cl. 96-36.000.
Fujii, Akiyoshi: *See—*
Izumi, Ryoji; Kobayashi, Shoji; Ono, Toshiharu; Shirato, Toru; Fujii, Akiyoshi; and Okihara, Tadashi, 4,056,592, Cl. 264-141.000.
Fujii, Yoshihisa; and Fujiwara, Akio, to Sumitomo Metal Industries Limited. Method for hardening steel pipes. 4,056,412, Cl. 148-153.000.
Fujinaga, Kyozo: *See—*
Harada, Nobuhiko; Tanaka, Minetaka; Shimano, Masanao; Fujinaga, Kyozo; Nunomura, Kunito; Tamura, Masamitu; Nakamura, Shigeharu; and Akagi, Kazuo, 4,056,428, Cl. 156-642.000.
Fujinami, Akira: *See—*
Takayama, Chiyozo; Hisada, Yoshio; Kato, Toshiro; and Fujinami, Akira, 4,056,622, Cl. 424-273.00R.
Fujisawa Pharmaceutical Co., Ltd.: *See—*
Kamiya, Takashi; Teraji, Tsutomu; Hashimoto, Masashi; Nakaguti, Osamu; and Oku, Teruo, 4,056,521, Cl. 260-239.100.
Fujiwara, Akio: *See—*
Fujii, Yoshihisa; and Fujiwara, Akio, 4,056,412, Cl. 148-153.000.
Funcik, Jack F.: *See—*
Fusco, Vito A.; Bennett, Joseph C.; Funcik, Jack F.; Kufner, Kenneth L.; and Schneider, Thomas E., 4,055,889, Cl. 29-710.000.
Furda, Jana: *See—*
Snyder, Lloyd L.; and Furda, Jana, 4,056,357, Cl. 23-230.00B.
Furukawa International U.S.A., Inc.: *See—*
Myers, Albert H., 4,055,931, Cl. 53-22.00B.
Furuta, Eiichiro, to Xerox Corporation. Run length encoding and decoding methods and means. 4,056,828, Cl. 358-133.000.
Furuto, Takashi, to Kabushiki Kaisha Komatsu Seisakusho. Clamping and cutting apparatus. 4,055,869, Cl. 10-25.000.
Furutsutsumi, Yasuzi. Hand-operated apparatus for pneumatically removing dust. 4,055,870, Cl. 15-409.000.
Fusco, Vito A.; Bennett, Joseph C.; Funcik, Jack F.; Kufner, Kenneth L.; and Schneider, Thomas E., to Molex Incorporated. Connector harness assembly machine. 4,055,889, Cl. 29-710.000.
Fussangel, Hubert. Shock absorber. 4,056,040, Cl. 91-25.000.
G. D. Searle & Co.: *See—*
Mueller, Richard A., 4,056,562, Cl. 560-231.000.
Gablin, Kenneth A.; and Hansen, Larry J., to Nuclear Engineering Co., Inc. System for disposing of radioactive waste. 4,056,362, Cl. 23-260.000.
Galasso, Francis S.; Bourdeau, Romeo G.; and Pike, Roscoe A., to United Technologies Corporation. Process for forming filaments from polyamic acid. 4,056,598, Cl. 264-184.000.
Gallini, John Battista; Hauxwell, Gerald Dean; and Whitfield, Christopher Roger, to Du Pont de Nemours, E. I., and Company. Yarn guide. 4,056,240, Cl. 242-47.090.
Gama, Jean-Michel; Lallement, Jean; and Pugnet, Lucien, to Commissariat a l'Energie Atomique. Liquid sodium cooled fast reactor. 4,056,438, Cl. 176-50.000.
Gamus, Abraham; and Knecevic, Zoran, to Unican Security Systems, Ltd. Electric strike. 4,056,277, Cl. 292-341.160.
Ganellin, Charon Robin: *See—*
Brown, Thomas Henry; Durant, Graham John; Ganellin, Charon Robin; and Ife, Robert John, 4,056,621, Cl. 424-273.00R.
Garner, Peter: *See—*
Stancati, Nicholas F.; and Garner, Peter, 4,055,929, Cl. 52-705.000.
Garone, Lynne C.; and Ravi, Kramadhati Venkata, to Mobil Tyco Solar Energy Corporation. Flat tubular solar cells and method of producing same. 4,056,404, Cl. 136-89.0PC.
Garrick, John R.; and Kendig, Ray C., to Armstrong Cork Company. Powder edge coating for ceiling tile. 4,056,647, Cl. 428-134.000.
Gartung, Clifford W. Removable electrical fixtures for modular wall panels. 4,056,297, Cl. 339-23.000.

Gassman, Paul G., to Ohio State University Research Foundation, The. Ortho-[(alkylthio)(aminocarbonyl)methyl]anilines. 4,056,569, Cl. 260-558.00S.
Gates, Peter Stuart; and Gillon, John, to Fisons Limited. Pesticidal compositions containing benzodioxole derivatives and methods of combating pests. 4,056,625, Cl. 424-282.000.
Gauntt, Sibbley Paul, to Du Pont de Nemours, E. I., and Company. Monofilament of polyhexamethylene adipamide having a surface layer of reduced orientation relative to the orientation of the core. 4,056,652, Cl. 428-400.000.
Gauntt, Wayne M.; and Pye, Earl L. Determination of corrosion rates by an electrochemical method. 4,056,445, Cl. 204-1.00T.
Gaus, Hermann: *See—*
Forster, Hans-Joachim M.; and Gaus, Hermann, 4,056,176, Cl. 192-4.00A.
GEA Luftkuhlergesellschaft Happel GmbH & Co. KG: *See—*
Baumann, Hans; Halfmann, Manfred; and Janke, Rudolf, 4,056,142, Cl. 165-133.000.
GEBA, Gesellschaft fuer Brandmeldeanlagen mbH & Co.: *See—*
Beyersdorf, Hartwig, 4,056,727, Cl. 250-385.000.
Gebhard, John Charles, Jr.; Waggoner, Marion Glen; and Webster, James Lang, to Du Pont de Nemours, E. I., and Company. Spherical-shaped particles from ionomer resins and ethylene/carboxylic acid copolymer resins. 4,056,653, Cl. 428-402.000.
Gebruder Heller Maschinenfabrik GmbH: *See—*
Bauml, Kurt; Gunsser, Otto Ch.; and Lohse, Rudolf K., 4,056,039, Cl. 90-92.000.
Geissler, Ulrich C.; and Stith, William J., to Baxter Travenol Laboratories, Inc. Means for reducing tissue thromboplastin in collected blood. 4,056,101, Cl. 128-214.00D.
Gelbman, Alexander: *See—*
Soodak, Charles; and Gelbman, Alexander, 4,056,708, Cl. 219-499.000.
General Atomic Company: *See—*
Miertschin, Gary N.; and Leary, David F., 4,056,584, Cl. 264-.500.
General Binding Corporation: *See—*
Staats, Henry N., 4,056,422, Cl. 156-309.000.
General Dynamics Corporation: *See—*
Harbison, Robert Campbell; Bradley, Gerald Arthur; and Lux, Paul Arthur, 4,056,309, Cl. 350-310.000.
Strickland, Frederick W., 4,055,875, Cl. 24-115.00R.
General Electric Company: *See—*
Brown, Edgar D., Jr., 4,056,546, Cl. 260-448.80R.
Brown, Richard N., 4,056,050, Cl. 99-305.000.
Bubar, Stanley F., 4,056,752, Cl. 313-217.000.
Lavallee, Francois A., 4,056,550, Cl. 260-465.00D.
Merrill, Duane F., 4,056,492, Cl. 260-18.00S.
Milkovic, Miran, 4,056,775, Cl. 324-142.000.
Rampel, Guy G.; and Young, Jon R., 4,056,660, Cl. 429-59.000.
Terranova, Carmen S.; and Chinoy, Rustam B., 4,055,967, Cl. 64-28.00R.
General Instrument Corporation: *See—*
Whelan, Robert D., 4,056,795, Cl. 334-15.000.
General Signal Corporation: *See—*
Carlson, Christian, Jr.; and Hillyer, Michael J., 4,056,749, Cl. 310-239.000.
Carlson, William L., Jr., 4,056,011, Cl. 74-50.000.
Gensike, Karl H.; Marsh, Robert C.; and Reinhard, John D., to Dymat Photomatrix Corporation. Microfiche duplicating apparatus. 4,056,321, Cl. 355-99.000.
Gerard, Pol: *See—*
Berger, Eugene; Gerard, Pol; Delbouille, Andre; and Deroitte, Jean-Louis, 4,056,668, Cl. 526-124.000.
Gerdes, Theodor, to Blau KG Fabrik fur Kraftfahrzeugteile. Pressure compensation valve arrangement. 4,056,121, Cl. 137-541.000.
Germerdonk, Rolf; Jonas, Adam; Hullstrung, Dieter; and Scherhag, Bernhard, to Bayer Aktiengesellschaft. Desulfurization of waste gases containing hydrogen sulfide. 4,056,606, Cl. 423-575.000.
Gesellschaft fur Kernforschung m.b.H.: *See—*
Schmieder, Helmut; and Kroebel, Reinhard, 4,056,482, Cl. 252-301.10W.
Getchell, Nelson F.: *See—*
Pittman, Allen G.; Wasley, William L.; and Getchell, Nelson F., 4,056,354, Cl. 8-54.000.
Getsch, Edward W., to Pako Corporation. Apparatus for packaging photographic slides in envelopes. 4,055,933, Cl. 53-187.000.
Gewerkschaft Eisenhutte Westfalia: *See—*
Fritz, Giselher, 4,055,959, Cl. 61-85.000.
Stoltefuss, Wilhelm; Haller, Herbert; and Hunscher, Ottocar, 4,056,284, Cl. 299-64.000.
Geyken, Erwin: *See—*
Schneider, Siegfried; Thate, Kurt; Geyken, Erwin; Kempe, Horst; and Macher, Stephan, 4,055,879, Cl. 29-123.000.
Ghione, Mario: *See—*
Bertazzoli, Cesare; Sala, Luisa; and Ghione, Mario, 4,056,613, Cl. 424-94.000.
Giacometti, Christian; Mougniot, Jean-Claude; and Ravier, Jean, to Commissariat a l'Energie Atomique. Fast reactor core. 4,056,437, Cl. 176-40.000.
Gibbs, Dale S.; Wagener, Earl H.; and Wessling, Ritchie A., to Dow Chemical Company, The. Cationic structured-particle latexes. 4,056,501, Cl. 260-29.6SQ.
Gibson Electric, Inc.: *See—*
Bevington, Richard C.; and Snee, David J., 4,056,365, Cl. 428-565.000.
Gibson, Kenneth A.: *See—*
Kelly, Joseph B.; and Gibson, Kenneth A., 4,056,379, Cl. 65-106.000.
Gilkey, Russell; Hilbert, Samuel D.; Sublett, Bobby J.; and Wicker, Thomas H., Jr., to Eastman Kodak Company. Polyester fiber. 4,056,356, Cl. 8-168.00C.
Gilleland, Randall C.: *See—*
Bell, Oliver A., Jr.; Gilleland, Randall C.; and Chance, Davey J., 4,056,702, Cl. 219-69.00C.
Gilley, George C. Memory utilization system. 4,056,848, Cl. 364-200.000.
Gilliland, George E. Occupant propelled tread vehicle. 4,056,289, Cl. 305-47.000.
Gillon, John: *See—*
Gates, Peter Stuart; and Gillon, John, 4,056,625, Cl. 424-282.000.
Giori, Gualtiero, to De La Rue Giori S.A. Rotary printing press. 4,056,056, Cl. 101-152.000.
Girard, Edmond, to Society Messier. Heat pump installation. 4,055,965, Cl. 62-324.000.
Girling Limited: *See—*
Farr, Glyn Phillip Reginald, 4,056,173, Cl. 188-71.900.
Newstead, Charles; Assinder, Andrew Charles; and Harvey, Geoffrey, 4,056,175, Cl. 188-196.0BA.
Tickle, Colin John Frederick, 4,056,171, Cl. 188-18.00A.
Wienand, Hans-Jurgen; and Klassen, Horst Willi, 4,056,174, Cl. 188-73.500.
Giros, Marcel A. P. Handling installation for supporting displacing and stacking loads in predetermined positions. 4,056,201, Cl. 214-16.40A.
Giuffre, Luigi; De Nora, Vittorio; and Spaziante, Placido, to Oronzio de Nora Impianti Elettrochimici S.p.A. Electrolyzing alkali metal chlorides using resin bonded asbestos diaphragm. 4,056,447, Cl. 204-98.000.
Glen, John Baird; and James, Roger, to Imperial Chemical Industries Limited. 2,6-Diisopropylphenol as an anaesthetic agent. 4,056,635, Cl. 424-346.000.
Gliniorz, Lothar: *See—*
Schoettle, Klaus; Wittkamp, Heinrich; and Gliniorz, Lothar, 4,056,245, Cl. 242-197.000.
Godard, Pierre: *See—*
Faille, Marc Della; Delvaux, Pierre; Godard, Pierre; and Mercier, Jean Pierre, 4,056,655, Cl. 428-443.000.
Godbout, Joseph C.; and Feldstein, Michael A., to Data General Corporation. Thermal compensation for disk pack systems. 4,056,831, Cl. 360-77.000.
Godlewski, Walter A.; Roser, Bernard S.; and Lyons, John B., to Montgomery Ward & Co., Incorporated. Open arm sewing machine cabinet. 4,056,294, Cl. 312-30.000.
Goes, Michael J.; and Masly, John R., to United States of America, Army. Fluidic gap gauge. 4,055,983, Cl. 73-37.500.
Goettler, Lloyd A.; and Lambright, A. James, to Monsanto Company. Process for controlling orientation of discontinuous fiber in a fiber-reinforced product formed by extrusion. 4,056,591, Cl. 264-108.000.
Gohde, Hildegard. Apparatus for counting and/or measuring particles suspended in a fluid medium. 4,056,324, Cl. 356-246.000.
Goi, Mitsuhiro; and Miyashita, Masahiko, to Nippon Gohsei Kagaku Kogyo Kabushiki Kaisha. Preparation of succinylsuccinic acid diesters. 4,056,551, Cl. 560-126.000.
Goldsmith, Derek John. Fluid mixing valve for supplying controllable proportions of two inlet fluids from a single outlet. 4,056,124, Cl. 137-625.170.
Gomersall, David W.: *See—*
Lee, Harvie Ho; Gomersall, David W.; and Leckie, Harry P., 4,056,366, Cl. 29-653.000.
Gongwer, Calvin A. Hydraulic thruster. 4,055,947, Cl. 60-221.000.
Gordon, Paul; Ronsen, Bruce; and Kulkarni, Shrikant V., to Strategic Medical Research Corporation. Preparation of ethers of monosaccharides. 4,056,322, Cl. 536-4.000.
Gorman, Martin E., Jr.: *See—*
Wasserman, Max; and Gorman, Martin E., Jr., 4,055,925, Cl. 52-403.000.
Gotze, Wilhelm: *See—*
Kamann, Gunther; Krahe, Jurgen; Zischinsky, Ulf; and Gotze, Wilhelm, 4,056,036, Cl. 85-63.000.
Graf von Berckheim, Constantin. Ion detector. 4,056,772, Cl. 324-72.000.
Gramstrup, Torben W. Adjustable billiard table rail construction. 4,056,266, Cl. 273-9.000.
Granzer, Ernold: *See—*
Bartmann, Wilhelm; Beck, Gerhard; Granzer, Ernold; Musil, Josef; and Teufel, Hermann, 4,056,629, Cl. 424-327.000.
Granzow, Daniel B.: *See—*
Carter, Garry L.; and Granzow, Daniel B., 4,056,116, Cl. 137-68.00R.
Gray, Thomas J.: *See—*
Pryor, Michael J.; and Gray, Thomas J., 4,056,586, Cl. 264-44.000.
Greaves, Geoffrey Stuart: *See—*
Peters, Ann Margaret; Greaves, Geoffrey Stuart; Clark, Ian Robert; Holder, Roger Leonard; and Bunce, Roger Abraham, 4,056,361, Cl. 23-259.000.
Green, Charles B.; and Sholter, Joseph R., to International Paper Company. Method and machine for making a garment. 4,055,859, Cl. 2-243.00R.
Green, Charles R.: *See—*
Schumacher, Joseph N.; Best, Freddie W.; and Green, Charles R., 4,056,108, Cl. 131-17.00R.

Green, Derek, deceased: *See—*
  Hunter, Eric; and Green, Derek, deceased, 4,055,979, Cl. 72-262.000.
Green, Muriel Irene, executrix: *See—*
  Hunter, Eric; and Green, Derek, deceased, 4,055,979, Cl. 72-262.000.
Greene, Daniel H.; and Greene, Lawrence J. Reading device. 4,055,908, Cl. 35-35.00R.
Greene, Lawrence J.: *See—*
  Greene, Daniel H.; and Greene, Lawrence J., 4,055,908, Cl. 35-35.00R.
Greenfield, Kenneth. Demountable boat trailer step. 4,056,270, Cl. 280-166.000.
Greenwald, Richard B., to Polaroid Corporation. Naphthalide indicator dyes. 4,056,539, Cl. 260-326.14R.
Greer, Edward M., to EMG Hydraulics, Inc. Accumulator with open ended shell. 4,056,127, Cl. 138-30.000.
Gregory, Reginald; and Kolombos, Alexander John, to British Petroleum Company Limited, The. Chemical process making aromatic hydrocarbons over gallium catalyst. 4,056,575, Cl. 260-673.500.
Gregory, Reginald; and Kolombos, Alexander John, to British Petroleum Company Limited, The. Chemical process over gallium catalyst converting saturated hydrocarbons to olefins. 4,056,576, Cl. 260-683.300.
Grenci, Carl A. Method and apparatus for removing collars from compressed gas cylinders. 4,055,883, Cl. 29-427.000.
Grenier, Claude: *See—*
  Debrie, Guy; Grenier, Claude; Petit, Michel; Rigaut, Henri; and Vertut, Jean, 4,056,763, Cl. 318-675.000.
Griffith, James R.; and O'Rear, Jacques G., to United States of America, Navy. N,N'-bis(3,4-dicyanophenyl) alkanediamides. 4,056,560, Cl. 260-465.00D.
Grimm, Wolfgang H., to Brown & Williamson Tobacco Corporation. Method and apparatus for assembling a package. 4,056,047, Cl. 93-49.00M.
Groby, Chester, to Aktiebolaget Tudor. Apparatus for welding together a cover and a vessel of thermoplastic material. 4,056,425, Cl. 156-499.000.
Grolman, Bernard; and Richards, William, to American Optical Corporation. Device for making opthalmic measurements and method. 4,055,900, Cl. 33-200.000.
Gross, James R., to Dow Chemical Company, The. Absorbent articles made from carboxylic polyelectrolyte solutions containing bis-oxazoline crosslinker and methods for their preparation. 4,056,502, Cl. 260-29.60N.
Grossman, William C. Energy conversion system using windmill. 4,055,950, Cl. 60-398.000.
Grozhan, Mark Markovich: *See—*
  Bashkirov, Andrei Nikolaevich; Grozhan, Mark Markovich; Kamzolkin, Vladimir Vasilievich; Lapitsky, Jury Anatolievich; and Vygodskaya, Irina Vladimirovna, 4,056,572, Cl. 260-624.00R.
Grundmeier, Manfred; Binsack, Rudolf; and Vernaleken, Hugo, to Bayer Aktiengesellschaft. Polycarbonate molding compositions. 4,056,504, Cl. 260-37.0PC.
GTE Sylvania Incorporated: *See—*
  Gungle, W. Calvin; Koury, Federic; and Keeffe, William M., 4,056,751, Cl. 313-217.000.
  Latassa, Frank M., 4,056,750, Cl. 313-177.000.
  Schumacher, Donald Alfred, 4,056,300, Cl. 339-103.00R.
Gudat, Wolfgang, to WABCO Westinghouse GmbH. Circuit arrangement for producing a digital speed signal corresponding to the angular velocity of a wheel from the half cycle duration of the sinusoidal waveform generated by the wheel. 4,056,287, Cl. 303-91.000.
Guidarini, Dante: *See—*
  Papoff, Paolo; Morelli, Basilio; and Guidarini, Dante, 4,056,258, Cl. 366-160.000.
Guim, Raul. Light emitting diode blown circuit breaker indicator. 4,056,816, Cl. 340-253.00A.
Gulf Oil Corporation: *See—*
  Heilman, William J.; Peterson, Frank C.; Renz, Mical C.; and Theard, Leslie P., 4,056,506, Cl. 260-42.180.
Gungle, W. Calvin; Koury, Federic; and Keeffe, William M., to GTE Sylvania Incorporated. Metal halide discharge lamp having optimum electrode location. 4,056,751, Cl. 313-217.000.
Gunn, Kirchubel & Miller: *See—*
  Kirchubel, Michael A., 4,056,609, Cl. 424-1.000.
Gunsser, Otto Ch.: *See—*
  Bauml, Kurt; Gunsser, Otto Ch.; and Lohse, Rudolf K., 4,056,039, Cl. 90-92.000.
Gunti, Rolf, to Masyc AG. Set of components for producing variable load-bearing scaffolds. 4,056,180, Cl. 193-35.00J.
Gustafson, Kjell Arne Hakan, to AB Bofors. Threshold circuit. 4,056,738, Cl. 307-359.000.
Gustav Memminger Verfahrenstechnik fur die Maschenindustrie, Firma: *See—*
  Fecker, Josef; and Memminger, Gustav, 4,056,239, Cl. 242-47.010.
Gutierrez, Eddie N.: *See—*
  Lamberti, Vincent; and Gutierrez, Eddie N., 4,056,567, Cl. 260-535.00P.
Guzi, John, Jr., to Hercules Incorporated. Dry water-dispersible pigment compositions. 4,056,402, Cl. 106-308.00Q.
Gyorgy, Ernst Michael: *See—*
  Chen, Ho Sou; Gyorgy, Ernst Michael; Leamy, Harry John; and Sherwood, Richard Curry, 4,056,411, Cl. 148-121.000.
Habegger, Millard A.: *See—*
  Davis, Donald E.; Habegger, Millard A.; and Yourke, Hannon S., 4,056,730, Cl. 250-492.00R.
Hadfield, Richard M.: *See—*
  Ciniglio, Alexander J.; and Hadfield, Richard M., 4,056,238, Cl. 242-25.00R.
Hafeli, Robert, to Von Roll AG. Process for conditioning flue gases in waste material incineration plants with heat utilization. 4,056,068, Cl. 110-8.00A.
Hafke, Carl: *See—*
  Baron, Gerhard; Bierbach, Herbert; Hafke, Carl; and Pockrandt, Gunter, 4,056,483, Cl. 252-373.000.
Haggard, Richard A.: *See—*
  Lewis, Sheldon N.; and Haggard, Richard A., 4,056,559, Cl. 526-212.000.
Hagiwara, Yoshihide; Tetsuji, Miyauchi; and Morimasa, Yuki, to Japan Natural Food Co. Ltd. Process for preparing food products containing a lactic acid bacteria-fermented product of a cereal germ. 4,056,637, Cl. 426-52.000.
Hahn Manufacturing Co.: *See—*
  Hahn, Roy C., 4,056,030, Cl. 83-762.000.
Hahn, Roy C., to Hahn Manufacturing Co. Combined miter box, corner clamp and measuring gauge. 4,056,030, Cl. 83-762.000.
Hakanssons Manufaktur AB: *See—*
  Nordh, Rolf Goran, 4,056,282, Cl. 297-389.000.
Halfmann, Manfred: *See—*
  Baumann, Hans; Halfmann, Manfred; and Janke, Rudolf, 4,056,142, Cl. 165-133.000.
Haligarda, James R.: *See—*
  Rechter, Harold L.; and Haligarda, James R., 4,056,398, Cl. 106-65.000.
Hall, Bobby E., to Halliburton Company. Method for dissolving clay. 4,056,146, Cl. 166-300.000.
Haller, Herbert: *See—*
  Stoltefuss, Wilhelm; Haller, Herbert; and Hunscher, Ottocar, 4,056,284, Cl. 299-64.000.
Halliburton Company: *See—*
  Hall, Bobby E., 4,056,146, Cl. 166-300.000.
Halverson, Richard P.: *See—*
  Hoerning, John S.; Halverson, Richard P.; and Nelson, Darrell E., 4,056,809, Cl. 364-200.000.
Hamisch, Paul H., Jr., to Monarch Marking Systems, Inc. Apparatus for printing and applying pressure sensitive labels. 4,056,424, Cl. 156-384.000.
Hammer, Richard Benjamin: *See—*
  Turbak, Albin Frank; and Hammer, Richard Benjamin, 4,056,675, Cl. 536-57.000.
Handa, Susumu: *See—*
  Tanaka, Yoshiaki; Handa, Susumu; Nishibata, Atsushi; Ueda, Sadashi; Inamoto, Yoshiaki; Saito, Masahiro; Tanimoto, Fumio; and Kitano, Hisao, 4,056,547, Cl. 260-453.00P.
Hannie, David Eugene, to Eastman Kodak Company. Timing layer for color transfer film units comprising copolymer with activation energy to penetration greater than 18 kcal/mole. 4,056,394, Cl. 96-29.00D.
Hansen, Charles D., Jr., to AMF Incorporated. Tobacco/paper sorter method and apparatus. 4,056,463, Cl. 209-111.70R.
Hansen, Karl Erik; Hovmand, Svend; Pedersen, Mogens Lindskov; Schwartzbach, Christian; Htun, Myat; de Ruvo, Alf; and Cavlin, Soren, to Aktieselskabet Niro Atomizer. Method and apparatus for drying disintegrated fiber mass. 4,055,903, Cl. 34-12.000.
Hansen, Larry J.: *See—*
  Gablin, Kenneth A.; and Hansen, Larry J., 4,056,362, Cl. 23-260.000.
Hanson, Raymond A. Slipforming method and apparatus for in situ lining of an upwardly open shaft with monolithic concrete. 4,055,958, Cl. 61-41.00R.
Harada, Nobuhiko; Tanaka, Minetaka; Shimano, Masanao; Fujinaga, Kyozo; Nunomura, Kunito; Tamura, Masamitu; Nakamura, Shigeharu; and Akagi, Kazuo, to Kobe Steel, Ltd. Process for etching inner surface of pipe or tube. 4,056,428, Cl. 156-642.000.
Harbison, Robert Campbell; Bradley, Gerald Arthur; and Lux, Paul Arthur, to General Dynamics Corporation. Renewable surface heliostat type solar mirror. 4,056,309, Cl. 350-310.000.
Harchol, Micha, to Princeton Gamma-Tech, Inc. Coaxial gamma ray detector and method therefor. 4,056,726, Cl. 250-370.000.
Hardy, Frederick E.: *See—*
  Johnson, Eric M.; Murray, Graeme D.; and Hardy, Frederick E., 4,056,113, Cl. 134-40.000.
Harrison, Stanley Norman, to AudioKinetics Corporation. Linear sound amplifier circuit. 4,056,783, Cl. 330-268.000.
Hart, Cornelis Maria; and Slob, Arie, to U.S. Phillips Corporation. Integrated injection logic memory circuit. 4,056,810, Cl. 365-205.000.
Hart, Courtney: *See—*
  Saxena, Arjun N.; and Hart, Courtney, 4,056,642, Cl. 427-84.000.
Harte, Richard A., to International Diagnostic Technology. Fluorometric system, method and test article. 4,056,724, Cl. 250-328.000.
Hartmann, Clinton S.: *See—*
  Wagers, Robert S.; and Hartmann, Clinton S., 4,056,793, Cl. 333-72.000.
Hartmann, Eugen: *See—*
  Zorn, Jurgen; Vlemmings, Jan; Muller, Karl-Heinz; Mayer, Siegfried; Dworak, Wilhelm; Hartmann, Eugen; Fader, Martin; Talmon, Wolfgang; Jons, Claus; Sauer, Ivan; and Bosch, Paul, 4,056,337, Cl. 418-131.000.

Harvey, Geoffrey: *See—*
  Newstead, Charles; Assinder, Andrew Charles; and Harvey, Geoffrey, 4,056,175, Cl. 188-196.0BA.
Harvey, Ronald B.: *See—*
  Baert, Victor R.; and Harvey, Ronald B., 4,056,024, Cl. 83-210.000.
Hashimoto, Masaharu, to Kabushiki Kaisha Komatsu Seisakusho. Engine mounting apparatus. 4,056,249, Cl. 248-9.000.
Hashimoto, Masashi: *See—*
  Kamiya, Takashi; Teraji, Tsutomu; Hashimoto, Masashi; Nakaguti, Osamu; and Oku, Teruo, 4,056,521, Cl. 260-239.100.
Hasquenoph, Jean H.; and Coutin, Pierre Fernand, to R. Alkan & Cie. Two-purpose hook for aircraft load carriers. 4,056,248, Cl. 244-137.00R.
Haswell, John W. Method and apparatus for making double groove pulleys. 4,055,977, Cl. 72-84.000.
Hauf, Robert Conrad, to Singer Company, The. Automatic one-step buttonholing device. 4,056,070, Cl. 112-158.00B.
Hauser, Manfred; and Schumacher, Werner, to Robert Bosch GmbH. Spool valve arrangement. 4,056,126, Cl. 137-625.650.
Hauxwell, Gerald Dean: *See—*
  Gallini, John Battista; Hauxwell, Gerald Dean; and Whitfield, Christopher Roger, 4,056,240, Cl. 242-47.090.
Havens, Charlie C.; and Rutelonis, James A., to Rockwell International Corporation. Gasket apparatus. 4,056,682, Cl. 174-35.0GC.
Hawthorne, Vaughn Terrey: *See—*
  Fiegl, David Elmer; Hawthorne, Vaughn Terrey; and Martin, Albert Edward, 4,056,065, Cl. 105-199.00C.
Hayakawa, Mitsuru: *See—*
  Watanabe, Yasuaki; Okabe, Yukio; and Hayakawa, Mitsuru, 4,056,826, Cl. 358-19.000.
Hayashi, Torahiko. Apparatus for processing dough. 4,056,346, Cl. 425-373.000.
Hayashi, Tsutomu, to Nafco Giken, Ltd. Electrostatic precipitator. 4,056,372, Cl. 55-152.000.
Haycox, Clarence A.: *See—*
  Sienicki, John W.; and Haycox, Clarence A., 4,056,842, Cl. 361-293.000.
Healy, James W. Vapor control in a fuel dispensing nozzle. 4,056,131, Cl. 141-206.000.
Hedstrom, Norman; Wright, David; and O'Toole, Jerome, to Wright Line Inc. Document holder. 4,056,296, Cl. 312-184.000.
Heil, Eduard: *See—*
  Strehler, Hugo; Beer, Ludwig; Heil, Eduard; Urbanek, Friedrich; and Fischer, Hermann, 4,056,514, Cl. 260-75.00R.
Heil, Guenter: *See—*
  Barzynski, Helmut; Heil, Guenter; Klemm, Karl; and Sander, Helfrid, 4,056,453, Cl. 204-159.230.
Heil, Oskar. Movable diaphragm connector method flexible hinge diaphragm surround and electro-acoustic transducer with folded diaphragm with intermediate flexible portions. 4,056,697, Cl. 179-115.5PV.
Heilman, William J.; Peterson, Frank C.; Renz, Mical C.; and Theard, Leslie P., to Gulf Oil Corporation. Homogeneous polyepoxide-polyanhydride compositions. 4,056,506, Cl. 260-42.180.
Heimburger, Alfons: *See—*
  Scholl, Hans-Peter; Heimburger, Alfons; Warkentin, Ulrich; and Saufferer, Manfred, 4,056,709, Cl. 235-30.00R.
Heimburger, Norbert; Sieber, Axel; and Schwinn, Horst, to Behringwerke Aktiengesellschaft. Stable blood plasma, process for preparing it and its use as comparative plasma in coagulation tests. 4,056,484, Cl. 252-408.000.
Heimer, Edgar Philip; and Nussbaum, Alexander Leopold, to Hoffmann-La Roche Inc. Phosphonoacetic acid derivatives of nucleosides. 4,056,673, Cl. 536-27.000.
Hein, George Norton, Jr. Centrifuge rotor for separating phases of a liquid. 4,056,225, Cl. 233-20.00R.
Heinze, Gerhard; Mengel, Manfred; and Reiss, Gerhard, to Bayer Aktiengesellschaft. Zeolite A with improved properties. 4,056,370, Cl. 55-68.000.
Heinzer, Hans; and Muller, Werner, to S I G Schweizerische Industrie-Gesellschaft. Production of bags from a panel of sheet material. 4,056,045, Cl. 93-35.0SB.
Heldor Associates, Inc.: *See—*
  Ellington, Harold John; and McNeil, Roy C., 4,055,922, Cl. 52-169.700.
Helger, Roland: *See—*
  Breiter, Joachim; and Helger, Roland, 4,056,468, Cl. 210-31.00R.
Hemala, Zdenek: *See—*
  Latus, Hans; Hemala, Zdenek; Bleeck, Heinz; and Weber, Rolf Dieter, 4,055,937, Cl. 57-34.00R.
Hemminghaus, Uwe: *See—*
  Sander, Hanslothar; Matusch, Siegfried; and Hemminghaus, Uwe, 4,056,475, Cl. 210-402.000.
Henningsson, Lars-Erik: *See—*
  Bralander, Borje; Claesson, Ake; Henningsson, Lars-Erik; and Scheel, Johan, 4,055,918, Cl. 51-47.000.
Henrichon, Ernest G., Jr.: *See—*
  LaWhite, Eric L.; Henrichon, Ernest G., Jr.; and Bloom, Harvey J., 4,056,263, Cl. 271-3.000.
Henriques, Frederick C.; Pandolfo, Joseph P.; and Lunde, Peter, to Center for the Environment & Man, The. Solar heat collector. 4,056,090, Cl. 126-271.000.
Henry, David W.; and Sturm, Priscilla A., to Stanford Research Institute. N-substituted 3-aminopyrrolidines. 4,056,535, Cl. 260-326.200.
Henry, Edwin Blair, Jr.; Patsey, John A.; Rudolph, Ralph G.; and Schindler, Donald G., to United States Steel Corporation. Weld inspection system with dual flaw detection. 4,055,989, Cl. 73-588.000.
Henry, John, to British Hovercraft Corporation Ltd. Aperture reinforcing means for apertures in reinforced flexible materials. 4,056,645, Cl. 428-65.000.
Henson, Eugene Murl. Character scanned teaching machine. 4,055,907, Cl. 35-9.00R.
Herber, John F., to Monsanto Company. Hydraulic fluids. 4,056,480, Cl. 252-78.500.
Hercules Incorporated: *See—*
  Guzi, John, Jr., 4,056,402, Cl. 106-308.00Q.
  Hughes, Norman Edward, 4,056,423, Cl. 156-356.000.
  Zebree, David T., 4,056,059, Cl. 102-22.00R.
Hermans, Peter, to U.S. Philips Corporation. Method of manufacturing a cathode ray tube. 4,055,877, Cl. 29-25.160.
Hermes, Julius, to Martin Processing, Inc. Closed cycle apparatus for the rapid, continuous and waterless dyeing of textile and plastic materials. 4,055,971, Cl. 68-9.000.
Herrmann, Guenter, to Bayern-Chemie Gesellschaft fur flugchemische Antriebe mit beschrankter Haftung. Reel for winding up safety belts. 4,056,242, Cl. 242-107.40R.
Herrmann, Manfred Franz Reinhold: *See—*
  Stoss, Peter Johannes; Herrmann, Manfred Franz Reinhold; and Satzinger, Gerhard, 4,056,526, Cl. 544-146.000.
Herzog, Helmut: *See—*
  Hohmann, Walter; Herzog, Helmut; and Bien, Hans-Samuel, 4,056,544, Cl. 260-378.000.
Hesse, Joachim: *See—*
  Bertram, Heidrun; Fahnestich, Rudolf; and Hesse, Joachim, 4,056,658, Cl. 426-2.000.
Hetebrij, Albert; and Kloeck, Cornelis Adrianus Geertrudis, to De Staat der Nederlanden, te Dezen Vertegenwoordigd Door de Directeur-Generaal der Posterijen, Telegrafie en Telefonie. Device for calling a ground station by an aircraft. 4,056,781, Cl. 325-55.000.
Hilbert, Samuel D.: *See—*
  Gilkey, Russell; Hilbert, Samuel D.; Sublett, Bobby J.; and Wicker, Thomas H., Jr., 4,056,356, Cl. 8-168.00C.
Hill, M. Raymond: *See—*
  Cross, Robert L., Jr.; Hill, M. Raymond; and Tucker, Fred, 4,056,748, Cl. 310-168.000.
Hill, William J., to Morgan Construction Company. Coil handling apparatus and system. 4,056,186, Cl. 198-339.000.
Hillyer, Michael J.: *See—*
  Carlson, Christian, Jr.; and Hillyer, Michael J., 4,056,749, Cl. 310-239.000.
Hilti Aktiengesellschaft: *See—*
  Walser, Karl; Schmid, Kurt; and Scotoni, Ralph, 4,056,062, Cl. 102-86.500.
Hindin, Saul G.; and Pond, George R., to Engelhard Minerals & Chemicals Corporation. High temperature stable catalyst composition and method for its preparation. 4,056,489, Cl. 252-462.000.
Hine, Edward K., Jr., to Hine-Snowbridge, Inc. Bicycle handlebar pack and support therefor. 4,056,219, Cl. 224-36.000.
Hine-Snowbridge, Inc.: *See—*
  Hine, Edward K., Jr., 4,056,219, Cl. 224-36.000.
Hinkes, Larry D.: *See—*
  Bau, Marcel; Hinkes, Larry D.; and Cosgrave, James, 4,056,278, Cl. 294-19.00R.
Hirota, Toshio: *See—*
  Endo, Takuya; and Hirota, Toshio, 4,056,764, Cl. 320-3.000.
Hiroyasu, Mamoru, to Matsushita Electric Industrial Co., Ltd. Magnetic video recorder and cassette providing tape loading. 4,056,834, Cl. 360-85.000.
Hisada, Yoshio: *See—*
  Takayama, Chiyozo; Hisada, Yoshio; Kato, Toshiro; and Fujinami, Akira, 4,056,622, Cl. 424-273.00R.
Hitachi, Ltd.: *See—*
  Izumi, Chikahiko, 4,056,844, Cl. 364-200.000.
  Misono, Masayoshi; Koayama, Masaharu; and Asida, Tutomu, 4,056,306, Cl. 350-160.0LC.
  Mitsui, Nobuo; Watanabe, Akinori; Oohira, Takeshi; Kawauchi, Kazuhiko; Nakao, Shoichi; and Teranishi, Katsuya, 4,056,759, Cl. 318-98.000.
  Nishikawa, Akio; Yokono, Hitoshi; Numata, Shun-ichi; and Mukai, Junji, 4,056,579, Cl. 260-830.00P.
  Saitoh, Takeshi; Akutsu, Eisaku; and Shinagawa, Mitsuhisa, 4,056,787, Cl. 331-59.000.
  Suehiro, Akio, 4,056,683, Cl. 179-1.0AT.
  Takemoto, Iwao, 4,055,885, Cl. 29-578.000.
  Tobise, Masahiro; Kogure, Hiromasa; Kanbara, Tadahiko; and Koseki, Hiroshi, 4,056,767, Cl. 363-141.000.
  Yoshimura, Masayoshi, 4,056,413, Cl. 148-175.000.
Hixenbaugh, Dennis L., to American Air Filter Company, Inc. Tubular gas filter. 4,056,374, Cl. 55-377.000.
Hlaban, James J.: *See—*
  Kaczmarzyk, Leonard M.; Hlaban, James J.; and McKelvey, Patricia J., 4,056,103, Cl. 128-285.000.
HOBEG Hochtemperaturreaktor-Brennelement G.m.b.H.: *See—*
  Huschka, Hans; and Warzawa, Wolfgang, 4,056,641, Cl. 427-6.000.
Hodgson, James H., to Chromalloy American Corporation. Liquid manure spreader. 4,056,226, Cl. 239-172.000.
Hodgson, Robert A., to Maloney-Crawford Tank Corporation. Dual field electric treater. 4,056,451, Cl. 204-305.000.
Hoechst Aktiengesellschaft: *See—*
  Albers, Ernst-August; Fester, Walter; and Sassenrath, Bernd, 4,056,516, Cl. 260-79.30M.

Albers, Ernst-August; and Sassenrath, Bernd, 4,056,517, Cl. 260-79.30M.
Bartmann, Wilhelm; Beck, Gerhard; Granzer, Ernold; Musil, Josef; and Teufel, Hermann, 4,056,629, Cl. 424-327.000.
Hunger, Klaus; and Weingarten, Friedrich Wilhelm, 4,056,522, Cl. 260-203.000.
Kleiner, Hans-Jerg, 4,056,571, Cl. 260-583.00E.
Lademann, Rudolf; Landauer, Franz; Lenzmann, Heinrich; Schmiedel, Klaus; and Schwiersch, Wolfram, 4,056,455, Cl. 204-163.00R.
Mischke, Peter, 4,056,523, Cl. 260-205.000.
Reinecke, Rolf; Rauterkus, Karl Josef; Schmieder, Werner; and Lutz, Eleonore, 4,056,497, Cl. 260-29.6TA.
Schiessler, Siegfried; Spietschka, Ernst; and Elinkmann, Hans-Gerd, 4,056,534, Cl. 260-314.500.
Sonnenberg, Helmut; and Kramer, Bruno, 4,056,667, Cl. 526-74.000.
Stenzel, Jurgen, 4,056,388, Cl. 75-129.000.
Weingarten, Friedrich Wilhelm; and Hunger, Klaus, 4,056,553, Cl. 560-43.000.

Hoeger, Ernst; and Baskovic, Franz, to Benckiser-Knapsack GmbH. Process of preventing formation of resinous deposits in the manufacture of paper and the like, and compositions. 4,056,430, Cl. 162-76.000.
Hoerning, John S.; Halverson, Richard P.; and Nelson, Darrell E., to Data Flo Corporation. Fast table lookup apparatus for reading memory. 4,056,809, Cl. 364-200.000.
Hoerz, Richard D.; and Propp, Donald J., to Airco, Inc. Audible signal generating apparatus having selectively controlled audible output. 4,056,741, Cl. 310-322.000.
Hofer, Ernst, to Siemens Aktiengesellschaft. Reversible analog to digital converter. 4,056,820, Cl. 340-347.00C.
Hoffman, Werner; Mueller, Norbert; and von Fraunberg, Karl, to BASF Aktiengesellschaft. Ketolactones. 4,056,541, Cl. 260-343.000.
Hoffmann-La Roche Inc.: *See—*
Heimer, Edgar Philip; and Nussbaum, Alexander Leopold, 4,056,673, Cl. 536-27.000.
Winternitz, Pavol, 4,056,628, Cl. 424-308.000.
Hoffmann, Werner; and Baumann, Manfred, to BASF Aktiengesellschaft. Manufacture of olefinically unsaturated esters. 4,056,545, Cl. 260-410.000.
Hogan, Vaughn C.: *See—*
McCartney, Ronald L.; Arnold, Bruce K.; and Hogan, Vaughn C., 4,056,305, Cl. 350-96.00C.
Hogberg, Karl Gustav: *See—*
Dahlberg, Alf-Goran; Hogberg, Karl Gustav; Lindvall, Sven; and Rydh, Thore Oskar Verner, 4,056,672, Cl. 536-1.000.
Hohmann, Walter; Herzog, Helmut; and Bien, Hans-Samuel, to Bayer Aktiengesellschaft. Anthraquinone compounds. 4,056,544, Cl. 260-378.000.
Holder, Roger Leonard: *See—*
Peters, Ann Margaret; Greaves, Geoffrey Stuart; Clark, Ian Robert; Holder, Roger Leonard; and Bunce, Roger Abraham, 4,056,361, Cl. 23-259.000.
Holland, David; Milner, David John; and Reed, Hugh Wilma Boulton, to Imperial Chemical Industries Limited. Oxidative coupling process. 4,056,574, Cl. 260-654.00R.
Hollymatic Corporation: *See—*
Wagner, Richard C., 4,055,872, Cl. 17-25.000.
Homanick, George, to PepsiCo Inc. Displaceable ceiling mounted cargo restraint system. 4,056,066, Cl. 105-493.000.
Honda Giken Kogyo Kabushiki Kaisha: *See—*
Okamoto, Kintaro; Kudo, Hirokatu; Ishijimi, Soichi; Kadoiri, Etsuro; Soma, Hiroshi; and Suzuki, Hiroyuki, 4,056,165, Cl. 181-141.000.
Honkanen, Arvid; and Joonase, Paul, to W. R. Grace & Co. Process for expanding. 4,056,587, Cl. 264-53.000.
Honnold, Darrel Lee, to Deere & Company. Rearwardly folding implement. 4,056,149, Cl. 172-311.000.
Hooker Chemicals & Plastics Corporation: *See—*
Carlson, Richard D.; and Takahashi, Akio, 4,056,512, Cl. 260-59.00R.
Horie, Ikutaro; Miyazako, Takushi; Sakaguchi, Shinji; Tsuji, Nobuo; and Kameji, Nagao, to Fuji Photo Film Co., Ltd. Layers used to prevent reticulation in photographic elements. 4,056,396, Cl. 96-67.000.
Horne, John E., to Tousimis Research Corporation. Automatic critical point drying apparatus. 4,055,904, Cl. 34-45.000.
Horstmann Clifford Magnetics Ltd.: *See—*
Clifford, Cecil Frank; and Finlayson, Laurence Harry, 4,056,743, Cl. 310-21.000.
Horstmann, Harald: *See—*
Moller, Eike; Meng, Karl; Wehinger, Egbert; and Horstmann, Harald, 4,056,533, Cl. 548-360.000.
Horwitz, Stuart S.; and Jost, Walter R., to Westinghouse Electric Corporation. Wideband diode switched microwave phase shifter network. 4,056,792, Cl. 333-31.00R.
House Food Industrial Company Limited: *See—*
Sakakibara, Sakuichi; Sugisawa, Ko; and Kitamura, Yukio, 4,056,566, Cl. 426-577.000.
Hovagimyan, Norman; and Link, John Michael, to RCA Corporation. Elastic buffer for serial data. 4,056,851, Cl. 364-900.000.
Hovmand, Svend: *See—*
Hansen, Karl Erik; Hovmand, Svend; Pedersen, Mogens Lindskov; Schwartzbach, Christian; Htun, Myat; de Ruvo, Alf; and Cavlin, Soren, 4,055,903, Cl. 34-12.000.
Howard, Alfred S.; and Selesnick, William. Method of coating annular surfaces. 4,056,644, Cl. 427-284.000.
Howett, Michael J.: *See—*
Cooper, Earl A.; and Howett, Michael J., 4,056,298, Cl. 339-90.00R.
Howland, Rockney W.: *See—*
Morrison, Heber J.; and Howland, Rockney W., 4,056,786, Cl. 330-207.00A.
Howmet Corporation: *See—*
Biebuyck, Lawrence F., 4,055,923, Cl. 52-235.000.
Hsu, Tzu-Hwa: *See—*
White, Richard Manning; and Hsu, Tzu-Hwa, 4,056,803, Cl. 340-15.000.
Htun, Myat: *See—*
Hansen, Karl Erik; Hovmand, Svend; Pedersen, Mogens Lindskov; Schwartzbach, Christian; Htun, Myat; de Ruvo, Alf; and Cavlin, Soren, 4,055,903, Cl. 34-12.000.
Huang, Charles Y.; and Roy, Alejo V., to Dow Chemical Company, The. Lipase composition for glycerol ester determination. 4,056,442, Cl. 195-62.000.
Huang, Hua-Feng; and Yates, Richard Alan, to Du Pont de Nemours, E. I., and Company. Dielectric drying of fungal material and resultant textured product. 4,056,638, Cl. 426-244.000.
Huber, Lothar, to LuK Lamellen und Kupplungsbau GmbH. Clutch disk. 4,056,179, Cl. 192-106.200.
Huffman, George W., to Eli Lilly and Company. Halogenated phenylthioacetamido cephalosporins. 4,056,676, Cl. 544-29.000.
Huge, Gerald W., to Professional Positioners, Inc. Intra-oral tooth positioner and process for production thereof. 4,055,895, Cl. 32-14.00B.
Hughes Aircraft Company: *See—*
Knauer, Wolfgang, 4,056,836, Cl. 361-4.000.
Hughes, Charles C., to R. A. Jones & Co. Inc. Apparatus for folding and gluing carton blanks. 4,056,046, Cl. 93-49.00R.
Hughes, Norman Edward, to Hercules Incorporated. Platemaking apparatus. 4,056,423, Cl. 156-356.000.
Hullstrung, Dieter: *See—*
Germerdonk, Rolf; Jonas, Adam; Hullstrung, Dieter; and Scherhag, Bernhard, 4,056,606, Cl. 423-575.000.
Humber, Leslie G.: *See—*
Demerson, Christopher A.; Humber, Leslie G.; Asselin, Andre A.; Jirkovsky, Ivo; and Dobson, Thomas A., 4,056,537, Cl. 260-326.50B.
Demerson, Christopher A.; Humber, Leslie G.; Asselin, Andre A.; Jirkovsky, Ivo; and Dobson, Thomas A., 4,056,538, Cl. 260-326.50B.
Hunger, Klaus; and Weingarten, Friedrich Wilhelm, to Hoechst Aktiengesellschaft. Azo compounds deriving from 3-amino-4-lower carboalkoxy-benzoic acid-4'-phenoxy anilides and 2-hydroxy-3-naphthoic acid-4'-benzoylamino anilides. 4,056,522, Cl. 260-203.000.
Hunger, Klaus: *See—*
Weingarten, Friedrich Wilhelm; and Hunger, Klaus, 4,056,553, Cl. 560-43.000.
Hunscher, Ottocar: *See—*
Stoltefuss, Wilhelm; Haller, Herbert; and Hunscher, Ottocar, 4,056,284, Cl. 299-64.000.
Hunter, Eric; and Green, Derek, deceased (by Green, Muriel Irene, executrix), to United Kingdom Atomic Energy Authority. Forming of materials by extrusion. 4,055,979, Cl. 72-262.000.
Hurt, William S.: *See—*
Bayer, Horst O.; and Hurt, William S., 4,056,581, Cl. 260-972.000.
Huschka, Hans; and Warzawa, Wolfgang, to HOBEG Hochtemperaturreaktor-Brennelement G.m.b.H. Process and apparatus for coating fuel fertile or absorber material containing particles for high temperature fuel elements. 4,056,641, Cl. 427-6.000.
Hutson, Thomas, Jr.; and Makovec, Donald J., to Phillips Petroleum Company. Separation of acid-hydrocarbon emulsions and alkylation process utilizing said separation. 4,056,577, Cl. 260-683.480.
Hydro-Terre Corporation, The: *See—*
Thiac, E. Brandt, 4,056,380, Cl. 71-9.000.
I-T-E Imperial Corporation: *See—*
Brandt, Thomas F.; Netzel, Philip C.; and Wharton, Lennard, 4,056,679, Cl. 174-13.000.
Rys, Tadeusz J., 4,056,797, Cl. 335-6.000.
Iacovidis, Spyros A.: *See—*
Panaritis, Dimitrios P.; and Iacovidis, Spyros A., 4,056,026, Cl. 83-454.000.
IBA Industrial Products Ltd.: *See—*
Taylor, Kenneth John; and Lord, Allan, 4,056,505, Cl. 260-42.180.
ICN Pharmaceuticals, Inc.: *See—*
Robins, Roland K.; Rousseau, Robert J.; and Mian, Abdul M., 4,056,674, Cl. 536-28.000.
Icos Corporation of America: *See—*
Tamaro, George John, 4,055,927, Cl. 52-577.000.
Tamaro, George John, 4,056,154, Cl. 175-416.000.
Ide, Azuma. Machine for indoor running. 4,056,265, Cl. 272-70.000.
Ideal Toy Corporation: *See—*
Ieda, Michael; and Friedman, Walter, 4,055,914, Cl. 46-192.000.
Ieda, Michael; and Friedman, Walter, to Ideal Toy Corporation. Sound producing device. 4,055,914, Cl. 46-192.000.
Ife, Robert John: *See—*
Brown, Thomas Henry; Durant, Graham John; Ganellin, Charon Robin; and Ife, Robert John, 4,056,621, Cl. 424-273.00R.
Ii, Akira: *See—*
Shinoda, Kazuo; and Ii, Akira, 4,056,583, Cl. 261-36.00A.
Iiyama, Kiyotaka; Matsui, Takeshi; Kusakata, Shigeru; and Takahashi,

Michihisa, to Ricoh Company, Ltd. Developing apparatus for diazo copying machine. 4,056,824, Cl. 354-300.000.
Iizaka, Isao; and Yamamoto, Toshio, to Minolta Camera Kabushiki Kaisha. Process for transferring electrostatic latent images. 4,056,390, Cl. 96-1.0TE.
Ikeda, Masachika, to Olympus Optical Co. Ltd. Device for detachably mounting a manuscript on a rotary cylindrical drum for cylinder scanning type facsimiles. 4,056,829, Cl. 358-256.000.
Ikeda, Sunao: *See—*
Ariyama, Kenzo; Ota, Sakae; Ikeda, Sunao; and Okamoto, Toyoo, 4,056,315, Cl. 355-10.000.
Ikeguchi, Shigehiko; Yamashita, Norio; and Matsuda, Eiji, to Sanyo Electric Co., Ltd.; Tokyo Sanyo Electric Co., Ltd.; and Sanyo Vending Machine Co., Ltd. System and method for determining vendibility in automatic vending machine. 4,056,181, Cl. 194-10.000.
Ikemoto, Masahiko: *See—*
Ito, Kiyoshi; Ikemoto, Masahiko; Kimura, Kazuhiko; and Nakanishi, Teruo, 4,056,626, Cl. 424-285.000.
Imabuchi, Yoshihisa; Kurami, Kenshi; Akiyama, Yoshinori; and Sobajima, Katsunobu, to Nissan Motor Company, Limited. Vehicle occupant restraining belt with device to provide an arrangement in which shoulder belt is prevented from touching seated occupant's neck. 4,056,271, Cl. 280-745.000.
IMI (TAMI) Institute for Research and Development: *See—*
Baniel, Avraham Matitiahu; Mitzmager, Abraham; Segall, Jeanna; Star, Shlomo; and Shorr, Leonard Marshall, 4,056,588, Cl. 264-63.000.
Imperial Chemical Industries Limited: *See—*
Ballard, Denis George Harold; Jones, Eric; Padget, John Christopher; Pioli, Alexander Joseph Peter; Robinson, Peter Anthony; Walker, John; and Wyatt, Ronald John, 4,056,669, Cl. 526-154.000.
Bowie, Raymond Alexander; Cox, John Michael; Farrell, Gordon Michael; and Shephard, Margaret Claire, 4,056,384, Cl. 71-92.000.
Glen, John Baird; and James, Roger, 4,056,635, Cl. 424-346.000.
Holland, David; Milner, David John; and Reed, Hugh Wilma Boulton, 4,056,574, Cl. 260-654.00R.
Staniland, Philip Anthony, 4,056,511, Cl. 260-49.000.
Imperial Metal Industries (Kynoch) Limited: *See—*
Marshall, John Edward, 4,056,069, Cl. 110-7.00R.
Inaba, Kouji: *See—*
Shimizu, Hiroyuki; Inaba, Kouji; and Nakahashi, Ken-Ichi, 4,056,310, Cl. 351-6.000.
Inamoto, Yoshiaki: *See—*
Tanaka, Yoshiaki; Handa, Susumu; Nishibata, Atsushi; Ueda, Sadashi; Inamoto, Yoshiaki; Saito, Masahiro; Tanimoto, Fumio; and Kitano, Hisao, 4,056,547, Cl. 260-453.00P.
Industrie-Werke Karlsruhe Augsburg Aktiengesellschaft: *See—*
Jahrig, Gunter, 4,056,236, Cl. 242-18.0DD.
Miller, Harry B.; and Jahrig, Gunter, 4,056,237, Cl. 242-18.0PW.
Ing. C. Olivetti & C., S.p.A.: *See—*
Vittorelli, Vittore, 4,056,821, Cl. 364-900.000.
Inland Steel Company: *See—*
Cantera, Gregorio Asua; Reparaz, Jose M. Palacios; and Molnar, Louis, 4,056,387, Cl. 75-123.00F.
Leckie, Harry P.; Sievert, William C.; and Legault, Robert A., 4,056,657, Cl. 428-659.000.
Lee, Harvie Ho; Gomersall, David W.; and Leckie, Harry P., 4,056,366, Cl. 29-653.000.
Inoue, Michihiro; Kimura, Takeji; Sato, Masaharu; and Tsunoo, Masahiko, to Matsushita Electric Industrial Co., Ltd. Tone generator system for an electronic organ. 4,056,033, Cl. 84-1.240.
Institute za Yadreni Izsledvania I Yadrena Energetika pri Ban: *See—*
Kamburov, Hristo Kirilov; Vankov, Ivan Danailov; and Donev, Ivan Yordanov, 4,056,725, Cl. 250-336.000.
International Business Machines Corporation: *See—*
Baxter, Duane Willard; and Shipway, Richard Edward, 4,056,716, Cl. 364-515.000.
Braun, Roland Joseph; and von Voss, William Ditlef, 4,056,302, Cl. 339-275.00B.
Callahan, Robert William; Kauffman, Paul Eugene; Kobesky, Lawrence Joseph; and Page, Howard Loomis, 4,056,846, Cl. 364-200.000.
Davis, Donald E.; Habegger, Millard A.; and Yourke, Hannon S., 4,056,730, Cl. 250-492.00R.
Esch, Ronald Philip, 4,056,825, Cl. 357-23.000.
Jambotkar, Chakrapani Gajanan, 4,055,884, Cl. 29-571.000.
International Diagnostic Technology: *See—*
Harte, Richard A., 4,056,724, Cl. 250-328.000.
International Nickel Company, Inc., The: *See—*
Shaw, Stuart Walter Ker Sutton, 4,056,389, Cl. 75-171.000.
International Paper Company: *See—*
Green, Charles B.; and Sholter, Joseph R., 4,055,859, Cl. 2-243.00R.
International Spike, Inc.: *See—*
Jackson, Laban P., Jr., 4,055,974, Cl. 71-11.000.
International Standard Electric Corporation: *See—*
Kaiser, Hans; Konnerth, Ernst; and Kramer, Gert, 4,056,343, Cl. 425-112.000.
International Telephone and Telegraph Corporation: *See—*
Cook, Charles R., Jr.; U, Aung San; and Scherrer, Raymond E., 4,056,415, Cl. 148-187.000.
Cook, Charles R., Jr., 4,056,681, Cl. 174-52.0FP.
McCartney, Ronald L.; Arnold, Bruce K.; and Hogan, Vaughn C., 4,056,305, Cl. 350-96.00C.
Place, Harry, 4,056,692, Cl. 179-84.0VF.
Turbak, Albin Frank; and Hammer, Richard Benjamin, 4,056,675, Cl. 536-57.000.
Invo Spline, Inc.: *See—*
Perry, Louis James, 4,056,329, Cl. 408-6.000.
Ionit Anstalt Bernhard Berghaus: *See—*
Luckan, Johannes, 4,056,007, Cl. 73-343.00R.
Ishidoshiro, Hiroshi: *See—*
Sando, Yoshikazu; and Ishidoshiro, Hiroshi, 4,055,970, Cl. 68-5.00E.
Ishii, Susumu, to Kabushiki Kaisha Tokyo Keiki. Gyrocompass. 4,055,901, Cl. 33-324.000.
Ishijimi, Soichi: *See—*
Okamoto, Kintaro; Kudo, Hirokatu; Ishijimi, Soichi; Kadoiri, Etsuro; Soma, Hiroshi; and Suzuki, Hiroyuki, 4,056,165, Cl. 181-141.000.
Ito, Kiyoshi; Ikemoto, Masahiko; Kimura, Kazuhiko; and Nakanishi, Teruo, to Kakenyaku Kako Co., Ltd. Pharmaceutical composition containing benzofuran derivative. 4,056,626, Cl. 424-285.000.
Ives, Kenneth D.; Vranka, Ronald S.; and Wagner, George J., Jr., to United States Steel Corporation. Method and mechanism for controlling forces in a continuous-casting machine. 4,056,140, Cl. 164-4.000.
Ivner, Sven, to ASEA Aktiebolag. Static convertor plant. 4,056,768, Cl. 363-79.000.
Izumi, Chikahiko, to Hitachi, Ltd. Memory control system using plural buffer address arrays. 4,056,844, Cl. 364-200.000.
Izumi, Ryoji; Kobayashi, Shoji; Ono, Toshiharu; Shirato, Toru; Fujii, Akiyoshi; and Okihara, Tadashi, to Dai Nippon Toryo Co., Ltd.; and Japan Steel Works Ltd., The. Process for preparation of thermosetting resin powder paints. 4,056,592, Cl. 264-141.000.
J. B. Engineering and Sales Company, Inc.: *See—*
Dutton, Arthur L., Jr., 4,055,988, Cl. 73-620.000.
Jackes, Stanley F.: *See—*
Morrill, Vaughan, Jr.; and Jackes, Stanley F., 4,055,888, Cl. 29-622.000.
Jackson, Laban P., Jr., to International Spike, Inc. Disintegratable fertilizer tablet. 4,055,974, Cl. 71-11.000.
Jacobson, Wayne D.: *See—*
Kamman, Kenneth R.; and Jacobson, Wayne D., 4,056,044, Cl. 92-159.000.
Jacoby, Benjamin Franklin; and Monroe, Marvin E., to Quintron, Inc. Sonic transducer and drive circuit. 4,056,761, Cl. 318-116.000.
Jaffe, Burton. Endotracheal tube. 4,056,104, Cl. 128-351.000.
Jaffe, Sol Samson, to P. R. Mallory & Co. Inc. Electrochemical cell having an AgO electrode discharging at an Ag_2O voltage level. 4,056,664, Cl. 429-217.000.
Jahrig, Gunter, to Industrie-Werke Karlsruhe Augsburg Aktiengesellschaft. Machine for winding textile threads. 4,056,236, Cl. 242-18.0DD.
Jahrig, Gunter: *See—*
Miller, Harry B.; and Jahrig, Gunter, 4,056,237, Cl. 242-18.0PW.
Jambotkar, Chakrapani Gajanan, to International Business Machines Corporation. Fabrication of power field effect transistors and the resulting structures. 4,055,884, Cl. 29-571.000.
James, Henry E.: *See—*
Daus, John J., Jr.; James, Henry E.; and Reinhart, Thomas L., 4,056,327, Cl. 403-172.000.
James, Roger: *See—*
Glen, John Baird; and James, Roger, 4,056,635, Cl. 424-346.000.
Janin, Pierre R., to American Home Products Corporation. Profile recognition apparatus for identifying bacteria. 4,056,359, Cl. 23-259.000.
Janke, Rudolf: *See—*
Baumann, Hans; Halfmann, Manfred; and Janke, Rudolf, 4,056,142, Cl. 165-133.000.
Japan Natural Food Co. Ltd.: *See—*
Hagiwara, Yoshihide; Tetsuji, Miyauchi; and Morimasa, Yuki, 4,056,637, Cl. 426-52.000.
Japan Steel Works Ltd., The: *See—*
Izumi, Ryoji; Kobayashi, Shoji; Ono, Toshiharu; Shirato, Toru; Fujii, Akiyoshi; and Okihara, Tadashi, 4,056,592, Cl. 264-141.000.
Jardin, Hans; and Auzannet, Jack, to Webasto-Werk W. Baier KG. Vehicle sliding roof construction. 4,056,274, Cl. 296-137.00G.
Jaret, Robert S.: *See—*
Reimann, Hans; Jaret, Robert S.; and Nafissi-Varchei, Mohammad Mehdi, 4,056,616, Cl. 424-180.000.
Jarvis, Harold F., to Shaw Pipe Industries Ltd. Method of fabricating crosslinked thermoplastics articles. 4,056,421, Cl. 156-272.000.
Jarvis, Kenneth W. Door lock. 4,056,276, Cl. 292-201.000.
Jett, Marion Barney; and Spriggs, Dennis Mitchel, to Dresser Industries, Inc. Hydraulic holddown for well packer stinger. 4,056,145, Cl. 166-212.000.
Jirkovsky, Ivo: *See—*
Demerson, Christopher A.; Humber, Leslie G.; Asselin, Andre A.; Jirkovsky, Ivo; and Dobson, Thomas A., 4,056,537, Cl. 260-326.50B.
Demerson, Christopher A.; Humber, Leslie G.; Asselin, Andre A.; Jirkovsky, Ivo; and Dobson, Thomas A., 4,056,538, Cl. 260-326.50B.
Johansson, Lennart Nils; and Svensson, Claes-Goran O., to Forenade Fabriksverken. Heating device for an external combustion engine. 4,055,952, Cl. 60-517.000.
Johkoh, Katsuhiro: *See—*
Kitaoka, Shigeo; Johkoh, Katsuhiro; Ebisawa, Hisashi; Sato, Tadashi; Kubo, Hiroshi; Takahashi, Sosuke; and Kawase, Yoshinobu, 4,056,631, Cl. 424-330.000.

John C. Bogue: *See—*
Mauch, Robert E.; and Sarbacher, Robert I., 4,056,757, Cl. 315-86.000.
John Wyeth & Brother Limited: *See—*
Black, Robin Michael, 4,056,529, Cl. 260-251.00A.
Johns-Manville Corporation: *See—*
Byrd, Carlisle O., Jr., 4,055,926, Cl. 52-475.000.
Johnson, Alfred Davis. Memory alloy heat engine and method of operation. 4,055,955, Cl. 60-527.000.
Johnson Controls, Inc.: *See—*
Sriramamurty, Durvasula V.; and Brzezinski, Donald E., 4,056,043, Cl. 92-13.200.
Johnson, Eric M.; Murray, Graeme D.; and Hardy, Frederick E., to Procter & Gamble Company, The. Liquid detergent compositions for removal of cooked-on food soils. 4,056,113, Cl. 134-40.000.
Johnson & Johnson: *See—*
Mouwen, Herman Charles; Lauer, William; and Weinberg, Steven Louis, 4,056,476, Cl. 210-446.000.
Johnson, William E.: *See—*
Schmersal, Larry J.; and Johnson, William E., 4,056,806, Cl. 340-166.0EL.
Johnston, Otis A., to Western Geophysical Co. Stabilized portable seismic signal transducer. 4,056,164, Cl. 181-114.000.
Jojima, Teruomi; Tsuji, Hideakira; Yamamoto, Shinjiro; and Omino, Teiji, to Sankyo Company Limited. Organic pyridazyl phosphorothioates and their use as insecticides. 4,056,617, Cl. 424-200.000.
Jolley, William S.; and Cranford, William R. Compass with means for correcting angle of magnetic variation. 4,055,902, Cl. 33-356.000.
Jonas, Adam: *See—*
Germerdonk, Rolf; Jonas, Adam; Hullstrung, Dieter; and Scherhag, Bernhard, 4,056,606, Cl. 423-575.000.
Jonassen, Hans B.: *See—*
McEwan, William S.; and Jonassen, Hans B., 4,056,386, Cl. 75-0.5BA.
Jones, Eric: *See—*
Ballard, Denis George Harold; Jones, Eric; Padget, John Christopher; Pioli, Alexander Joseph Peter; Robinson, Peter Anthony; Walker, John; and Wyatt, Ronald John, 4,056,669, Cl. 526-154.000.
Jones, Genevieve M. Car wash sprayer. 4,056,229, Cl. 239-288.000.
Jones, Nathaniel P. Versatile stretch knit garment. 4,055,854, Cl. 2-105.000.
Jons, Claus: *See—*
Zorn, Jurgen; Vlemmings, Jan; Muller, Karl-Heinz; Mayer, Siegfried; Dworak, Wilhelm; Hartmann, Eugen; Fader, Martin; Talmon, Wolfgang; Jons, Claus; Sauer, Ivan; and Bosch, Paul, 4,056,337, Cl. 418-131.000.
Joonase, Paul: *See—*
Honkanen, Arvid; and Joonase, Paul, 4,056,587, Cl. 264-53.000.
Jordan, Leslie S., to Essex International, Inc. Touch plate assembly. 4,056,699, Cl. 200-5.00A.
Jost, Walter R.: *See—*
Horwitz, Stuart S.; and Jost, Walter R., 4,056,792, Cl. 333-31.00R.
Jumanova, Ljudmila Vladimirovna: *See—*
Volfkovich, Semen Issakovich; Belov, Vladimir Nikolaevich; Ershov, Vadim Andreevich; Rozenberg, Evgeny Khaskelevich; Shipov, Emmanuil Ivanovich; and Jumanova, Ljudmila Vladimirovna, 4,056,601, Cl. 423-322.000.
Junkunc Bros. American Lock Company: *See—*
Calegan, Everett L., 4,055,972, Cl. 70-21.000.
Jurkevich, Igor Rostislavovich: *See—*
Markman, Mikhail Abramovich; Simanovsky, Leonid Mikhailovich; Jurkevich, Igor Rostislavovich; Kolomoets, Nikolai Vasilievich; Kamensky, Vyacheslav Tikhonovich; Matskov, Igor Mikhailovich; and Maximov, Sergei Ilich, 4,056,406, Cl. 136-208.000.
Kabushiki Kaisha Komatsu Seisakusho: *See—*
Furuto, Takashi, 4,055,869, Cl. 10-25.000.
Hashimoto, Masaharu, 4,056,249, Cl. 248-9.000.
Kabushiki Kaisha Sankosha: *See—*
Keikichi, Tsukioka; and Yukio, Takayanagi, 4,056,753, Cl. 313-325.000.
Kabushiki Kaisha Sato: *See—*
Sato, Yo; and Enomoto, Keisuke, 4,056,661, Cl. 428-144.000.
Kabushiki Kaisha Tokyo Keiki: *See—*
Ishii, Susumu, 4,055,901, Cl. 33-324.000.
Kaczmarzyk, Leonard M.; Hlaban, James J.; and McKelvey, Patricia J., to Kimberly-Clark Corporation. Wrapper structure for tampons containing superabsorbent material. 4,056,103, Cl. 128-285.000.
Kadoiri, Etsuro: *See—*
Okamoto, Kintaro; Kudo, Hirokatu; Ishijimi, Soichi; Kadoiri, Etsuro; Soma, Hiroshi; and Suzuki, Hiroyuki, 4,056,165, Cl. 181-141.000.
Kaiser, Hans; Konnerth, Ernst; and Kramer, Gert, to International Standard Electric Corporation. Apparatus for continuously producing raised marks on plastic cable jackets. 4,056,343, Cl. 425-112.000.
Kaiser, Howard E. Hoisting tackle block assembly. 4,056,257, Cl. 254-194.000.
Kakenyaku Kako Co., Ltd.: *See—*
Ito, Kiyoshi; Ikemoto, Masahiko; Kimura, Kazuhiko; and Nakanishi, Teruo, 4,056,626, Cl. 424-285.000.
Kallman Research Corporation: *See—*
Kallman, Robert A., 4,055,873, Cl. 24-3.00C.
Kallman, Robert A., to Kallman Research Corporation. Accessory holder for use on article of clothing. 4,055,873, Cl. 24-3.00C.
Kaloshin, Jury Petrovich: *See—*
Bukrinsky, Anatoly Matveevich; Matskevich, Genrikh Vladimirovich; Rzheznikov, Julian Vulfovich; Sukhov, Andrei Borisovich; Tatarnikov, Viktor Petrovich; Berkovich, Viktor Mozesovich; Remzhin, Jury Nikolaevich; Slepnev, Lev Nikolaevich; Sverdlov, Alexandr Anatolievich; Karan, Vladimir Geselevich; Kaloshin, Jury Petrovich; Krasikov, Anatoly Nikolaevich; Babenko, Evgeny Akimovich; Bronnikov, Vladimir Konstantinovich; Shvyryaev, Jury Vasilievich; and Shiryaev, Boris Semenovich, 4,056,436, Cl. 176-38.000.
Kaman, Charles H. Guitar construction. 4,056,034, Cl. 84-267.000.
Kamann, Gunther; Krahe, Jurgen; Zischinsky, Ulf; and Gotze, Wilhelm, to Bergwerksverband GmbH. Borehole anchor. 4,056,036, Cl. 85-63.000.
Kamburov, Hristo Kirilov; Vankov, Ivan Danailov; and Donev, Ivan Yordanov, to Institute za Yadreni Izsledvania I Yadrena Energetika pri Ban. Method of and system for compensating the distortion of amplitude spectra of multichannel analyzers in spectrometry. 4,056,725, Cl. 250-336.000.
Kameji, Nagao: *See—*
Horie, Ikutaro; Miyazako, Takushi; Sakaguchi, Shinji; Tsuji, Nobuo; and Kameji, Nagao, 4,056,396, Cl. 96-67.000.
Kamensky, Vyacheslav Tikhonovich: *See—*
Markman, Mikhail Abramovich; Simanovsky, Leonid Mikhailovich; Jurkevich, Igor Rostislavovich; Kolomoets, Nikolai Vasilievich; Kamensky, Vyacheslav Tikhonovich; Matskov, Igor Mikhailovich; and Maximov, Sergei Ilich, 4,056,406, Cl. 136-208.000.
Kamiya, Takashi; Teraji, Tsutomu; Hashimoto, Masashi; Nakaguti, Osamu; and Oku, Teruo, to Fujisawa Pharmaceutical Co., Ltd. Penam and cepham derivatives and preparation thereof. 4,056,521, Cl. 260-239.100.
Kamman, Kenneth R.; and Jacobson, Wayne D., to Caterpillar Tractor Co. Oil cooled piston. 4,056,044, Cl. 92-159.000.
Kamyr Aktiebolag: *See—*
Richter, Johan C. F. C.; Christenson, Per Tyke; and Richter, Ole Johan, 4,056,429, Cl. 162-17.000.
Kamzolkin, Vladimir Vasilievich: *See—*
Bashkirov, Andrei Nikolaevich; Grozhan, Mark Markovich; Kamzolkin, Vladimir Vasilievich; Lapitsky, Jury Anatolievich; and Vygodskaya, Irina Vladimirovna, 4,056,572, Cl. 260-624.00R.
Kanbara, Tadahiko: *See—*
Tobise, Masahiro; Kogure, Hiromasa; Kanbara, Tadahiko; and Koseki, Hiroshi, 4,056,767, Cl. 363-141.000.
Kansai Paint Co., Ltd.: *See—*
Kawamura, Masahumi; Takahashi, Wataru; and Watanabe, Tadashi, 4,056,495, Cl. 260-22.0CA.
Kao Soap Co., Ltd.: *See—*
Tanaka, Yoshiaki; Handa, Susumu; Nishibata, Atsushi; Ueda, Sadashi; Inamoto, Yoshiaki; Saito, Masahiro; Tanimoto, Fumio; and Kitano, Hisao, 4,056,547, Cl. 260-453.00P.
Kapper, Charles E.: *See—*
Blanchard, James S.; and Kapper, Charles E., 4,056,744, Cl. 310-51.000.
Kapsura, Inc.: *See—*
Bridwell, Willie Earl, 4,055,991, Cl. 73-73.000.
Karan, Vladimir Geselevich: *See—*
Bukrinsky, Anatoly Matveevich; Matskevich, Genrikh Vladimirovich; Rzheznikov, Julian Vulfovich; Sukhov, Andrei Borisovich; Tatarnikov, Viktor Petrovich; Berkovich, Viktor Mozesovich; Remzhin, Jury Nikolaevich; Slepnev, Lev Nikolaevich; Sverdlov, Alexandr Anatolievich; Karan, Vladimir Geselevich; Kaloshin, Jury Petrovich; Krasikov, Anatoly Nikolaevich; Babenko, Evgeny Akimovich; Bronnikov, Vladimir Konstantinovich; Shvyryaev, Jury Vasilievich; and Shiryaev, Boris Semenovich, 4,056,436, Cl. 176-38.000.
Karl Mayer Textilmaschinenfabrik GmbH: *See—*
Wilkens, Christian, 4,055,969, Cl. 66-204.000.
Kato, Toshiro: *See—*
Takayama, Chiyozo; Hisada, Yoshio; Kato, Toshiro; and Fujinami, Akira, 4,056,622, Cl. 424-273.00R.
Kauffman, Paul Eugene: *See—*
Callahan, Robert William; Kauffman, Paul Eugene; Kobesky, Lawrence Joseph; and Page, Howard Loomis, 4,056,846, Cl. 364-200.000.
Kawamura, Masahumi; Takahashi, Wataru; and Watanabe, Tadashi, to Kansai Paint Co., Ltd. High solid alkyd resin coating composition curable at ambient temperature. 4,056,495, Cl. 260-22.0CA.
Kawase, Yoshinobu: *See—*
Kitaoka, Shigeo; Johkoh, Katsuhiro; Ebisawa, Hisashi; Sato, Tadashi; Kubo, Hiroshi; Takahashi, Sosuke; and Kawase, Yoshinobu, 4,056,631, Cl. 424-330.000.
Kawata, Shoji, to Aisin Seiki Kabushiki Kaisha. Electronic speed control system for automotive vehicles. 4,056,157, Cl. 180-105.00E.
Kawauchi, Kazuhiko: *See—*
Mitsui, Nobuo; Watanabe, Akinori; Oohira, Takeshi; Kawauchi, Kazuhiko; Nakao, Shoichi; and Teranishi, Katsuya, 4,056,759, Cl. 318-98.000.
Keane, Thomas H.: *See—*
Crosby, Lawton H.; and Keane, Thomas H., 4,055,865, Cl. 5-259.00R.
Keeffe, William M.: *See—*
Gungle, W. Calvin; Koury, Federic; and Keeffe, William M., 4,056,751, Cl. 313-217.000.
Keeler Brass Company: *See—*
Keeler, Miner S., II, 4,056,275, Cl. 292-17.000.

Keeler, Miner S., II, to Keeler Brass Company. Closure catch assembly. 4,056,275, Cl. 292-17.000.
Keikichi, Tsukioka; and Yukio, Takayanagi, to Kabushiki Kaisha Sankosha. Overvoltage protecting element. 4,056,753, Cl. 313-325.000.
Keith, William Johnson, to Metal Products Corporation. Supporting base for rack. 4,056,195, Cl. 211-153.000.
Kelly, Joseph B.; and Gibson, Kenneth A., to PPG Industries, Inc. Forming V bends in glass sheets by press bending. 4,056,379, Cl. 65-106.000.
Kelsey-Hayes Company: *See—*
Rozmus, Walter J., 4,056,368, Cl. 55-2.000.
Kelso, Inc.: *See—*
Linam, Richard L.; and Lucas, Leonard J., 4,056,705, Cl. 219-125.00R.
Kempe, Horst: *See—*
Schneider, Siegfried; Thate, Kurt; Geyken, Erwin; Kempe, Horst; and Macher, Stephan, 4,055,879, Cl. 29-123.000.
Kendig, Ray C.: *See—*
Garrick, John R.; and Kendig, Ray C., 4,056,647, Cl. 428-134.000.
Kenton, Joseph R., to Phillips Petroleum Company. Fertilizer solutions containing stabilized iron. 4,056,381, Cl. 71-36.000.
Kerb, Ulrich; Wiechert, Rudolf; Wachtel, Helmut; Engelfried, Otto; and Kieslich, Klaus, to Schering Aktiengesellschaft. D-homo-20-ketopregnanes and method for inducing anesthesia or narcosis. 4,056,633, Cl. 424-331.000.
Kerr, Ralph O., to Petro-Tex Chemical Corporation. Vanadium phosphorus oxygen oxidation catalysts useful for preparing anhydrides from alkanes. 4,056,487, Cl. 252-435.000.
Khachatrian, Saribek Saakovich: *See—*
Boyadzhian, Varazdat Karapetovich; Khachatrian, Saribek Saakovich; Stepanian, Genrikh Gevorkovich; Eritsian, Volodya Karapetovich; Agavelian, Edik Stepanovich; Nefedov, Oleg Matveevich; Dolgy, Igor Evgenievich; Sisin, Mikhail Fedorovich; Kolbasin, Alexei Yakovlevich; and Anikeev, Ivan Konstantinovich, 4,056,563, Cl. 560-245.000.
Kido, Keishiro: *See—*
Sato, Masamichi; Kido, Keishiro; and Arai, Noboru, 4,056,395, Cl. 96-36.000.
Kienzle Apparate GmbH: *See—*
Scholl, Hans-Peter; Heimburger, Alfons; Warkentin, Ulrich; and Saufferer, Manfred, 4,056,709, Cl. 235-30.00R.
Kieslich, Klaus: *See—*
Kerb, Ulrich; Wiechert, Rudolf; Wachtel, Helmut; Engelfried, Otto; and Kieslich, Klaus, 4,056,633, Cl. 424-331.000.
Kijowski, John: *See—*
Kirkpatrick, John; and Kijowski, John, 4,056,399, Cl. 106-69.000.
Kimberly-Clark Corporation: *See—*
Kaczmarzyk, Leonard M.; Hlaban, James J.; and McKelvey, Patricia J., 4,056,103, Cl. 128-285.000.
Kimura, Kazuhiko: *See—*
Ito, Kiyoshi; Ikemoto, Masahiko; Kimura, Kazuhiko; and Nakanishi, Teruo, 4,056,626, Cl. 424-285.000.
Kimura, Takeji: *See—*
Inoue, Michihiro; Kimura, Takeji; Sato, Masaharu; and Tsunoo, Masahiko, 4,056,033, Cl. 84-1.240.
Kimura, Tsuneo; and Takeshika, Shiro, to Nihon Spindle Seizo Kabushiki Kaisha. Hydraulic oscillator. 4,056,123, Cl. 137-624.140.
King, John H., to Norton Company. Safety cap with energy absorbing suspension. 4,055,860, Cl. 2-416.000.
King Seagrave Limited: *See—*
Pow, Robert Marvin, 4,056,283, Cl. 298-17.600.
Kirchubel, Michael A., to Gunn, Kirchubel & Miller. Article for diagnosis of achlorhydria. 4,056,609, Cl. 424-1.000.
Kirkpatrick, John; and Kijowski, John, to Pittsburgh Corning Corporation. Acid and heat resistant mortars for cellular glass bodies. 4,056,399, Cl. 106-69.000.
Kistler Instrumente AG: *See—*
Sonderegger, Hans Conrad; and Baumgartner, Hans Ulrich, 4,056,009, Cl. 73-406.000.
Kitamura, Yukio: *See—*
Sakakibara, Sakuichi; Sugisawa, Ko; and Kitamura, Yukio, 4,056,566, Cl. 426-577.000.
Kitano, Hisao: *See—*
Tanaka, Yoshiaki; Handa, Susumu; Nishibata, Atsushi; Ueda, Sadashi; Inamoto, Yoshiaki; Saito, Masahiro; Tanimoto, Fumio; and Kitano, Hisao, 4,056,547. Cl. 260-453.00P.
Kitaoka, Shigeo; Johkoh, Katsuhiro; Ebisawa, Hisashi; Sato, Tadashi; Kubo, Hiroshi; Takahashi, Sosuke; and Kawase, Yoshinobu, to Showa Denko K.K. Method of combatting ticks. 4,056,631, Cl. 424-330.000.
KKF Corporation: *See—*
Kompanek, Harry Wilfred, 4,056,654, Cl. 428-409.000.
Klassen, Horst Willi: *See—*
Wienand, Hans-Jurgen; and Klassen, Horst Willi, 4,056,174, Cl. 188-73.500.
Kleiner, Hans-Jerg, to Hoechst Aktiengesellschaft. Process for the preparation of tertiary phosphine oxides. 4,056,571, Cl. 260-583.00E.
Kleinhenz, Karl: *See—*
Weicht, Bodo; and Kleinhenz, Karl, 4,056,444, Cl. 203-26.000.
Klemm, Karl: *See—*
Barzynski, Helmut; Heil, Guenter; Klemm, Karl; and Sander, Helfrid, 4,056,453, Cl. 204-159.230.
Kloeck, Cornelis Adrianus Geertrudis: *See—*
Hetebrij, Albert; and Kloeck, Cornelis Adrianus Geertrudis, 4,056,781, Cl. 325-55.000.
Knaak, Rudiger, to Koppers-Wistra-Ofenbau GmbH. Support rail arrangement. 4,056,350, Cl. 432-234.000.
Knaak, Rudiger, to Koppers-Wistra-Ofenbau GmbH. Workpiece-engaging element for furnaces. 4,056,351, Cl. 432-234.000.
Knauer, Wolfgang, to Hughes Aircraft Company. Method and apparatus for interrupting large current. 4,056,836, Cl. 361-4.000.
Knecevic, Zoran: *See—*
Gamus, Abraham; and Knecevic, Zoran, 4,056,277, Cl. 292-341.160.
Kniat, John, to United Technologies Corporation. Means for calculating turbine inlet temperature of a gas turbine engine. 4,055,997, Cl. 73-117.300.
Knodler, Jurgen: *See—*
Dinkelacker, Walter; Blum, Rudolf; Abele, Klaus; Knodler, Jurgen; and Ebinger, Peter, 4,055,996, Cl. 73-117.000.
Koayama, Masaharu: *See—*
Misono, Masayoshi; Koayama, Masaharu; and Asida, Tutomu, 4,056,306, Cl. 350-160.0LC.
Kobayashi, Shoji: *See—*
Izumi, Ryoji; Kobayashi, Shoji; Ono, Toshiharu; Shirato, Toru; Fujii, Akiyoshi; and Okihara, Tadashi, 4,056,592, Cl. 264-141.000.
Kobayashi, Yugoro: *See—*
Mochimaru, Hideaki; and Kobayashi, Yugoro, 4,056,320, Cl. 355-75.000.
Kobe Steel, Ltd.: *See—*
Harada, Nobuhiko; Tanaka, Minetaka; Shimano, Masanao; Fujinaga, Kyozo; Nunomura, Kunito; Tamura, Masamitu; Nakamura, Shigeharu; and Akagi, Kazuo, 4,056,428, Cl. 156-642.000.
Kobesky, Lawrence Joseph: *See—*
Callahan, Robert William; Kauffman, Paul Eugene; Kobesky, Lawrence Joseph; and Page, Howard Loomis, 4,056,846, Cl. 364-200.000.
Kofman, Izrail Zalmanovich: *See—*
Vulikh, Alexandr Ilich; Zagorskaya, Maina Konstantinovna; Kofman, Izrail Zalmanovich; Pavlovich, Inna Vasilievna; Levitan, Boris Veniaminovich; Troyan, Nikolai Vasilievich; and Dubyaga, Sergei Viktorovich, 4,056,605, Cl. 423-484.000.
Kogane, Yutaka: *See—*
Aihara, Mitsugu; Kogane, Yutaka; Ebinuma, Yasumitsu; and Minami, Masaki, 4,056,680, Cl. 174-19.000.
Kogure, Hiromasa: *See—*
Tobise, Masahiro; Kogure, Hiromasa; Kanbara, Tadahiko; and Koseki, Hiroshi, 4,056,767, Cl. 363-141.000.
Kohl, Edgar: *See—*
Ringel, Wolfgang; Rutsch, Peter; Schneider, Rolf; and Kohl, Edgar, 4,056,375, Cl. 55-381.000.
Kohl, Karl. Linkage system for warp knitting machine. 4,056,012, Cl. 74-81.000.
Koike, Kozo: *See—*
Doi, Kunio; Koike, Kozo; and Sasaki, Toshiro, 4,056,339, Cl. 418-178.000.
Kokke, Antoine H.: *See—*
Dmitrovsky, Morris; and Kokke, Antoine H., 4,056,364, Cl. 23-273.00R.
Kolaian, Jack H.; McCoy, Frederic C.; and Patterson, John A., to Texaco Inc. Detergent formulations and their use. 4,056,355, Cl. 8-137.000.
Kolbasin, Alexei Yakovlevich: *See—*
Boyadzhian, Varazdat Karapetovich; Khachatrian, Saribek Saakovich; Stepanian, Genrikh Gevorkovich; Eritsian, Volodya Karapetovich; Agavelian, Edik Stepanovich; Nefedov, Oleg Matveevich; Dolgy, Igor Evgenievich; Sisin, Mikhail Fedorovich; Kolbasin, Alexei Yakovlevich; and Anikeev, Ivan Konstantinovich, 4,056,563, Cl. 560-245.000.
Kolombos, Alexander John: *See—*
Gregory, Reginald; and Kolombos, Alexander John, 4,056,575, Cl. 260-673.500.
Gregory, Reginald; and Kolombos, Alexander John, 4,056,576, Cl. 260-683.300.
Kolomoets, Nikolai Vasilievich: *See—*
Markman, Mikhail Abramovich; Simanovsky, Leonid Mikhailovich; Jurkevich, Igor Rostislavovich; Kolomoets, Nikolai Vasilievich; Kamensky, Vyacheslav Tikhonovich; Matskov, Igor Mikhailovich; and Maximov, Sergei Ilich, 4,056,406, Cl. 136-208.000.
Kompanek, Harry Wilfred, to KKF Corporation. Coating compositions, processes for depositing the same, and articles resulting therefrom. 4,056,654, Cl. 428-409.000.
Konnerth, Ernst: *See—*
Kaiser, Hans; Konnerth, Ernst; and Kramer, Gert, 4,056,343, Cl. 425-112.000.
Konrad, Albert. Apparatus for producing a connection between two overlapping band sections of a package strip and improved closure seal for use therewith. 4,056,128, Cl. 140-93.400.
Koponen, Martti; and Soikkanen, Pertti, to Valmet Oy. Ascending twin-wire paper machine without web pick-up. 4,056,433, Cl. 162-290.000.
Kopp, Robert J., to Fairchild Camera and Instrument Corporation. Process for producing an improved dielectrically-isolated silicon crystal utilizing adjacent areas of different insulators. 4,056,414, Cl. 148-175.000.
Koppers Company, Inc.: *See—*
League, John S., IV, 4,056,417, Cl. 156-64.000.
Koppers-Wistra-Ofenbau GmbH: *See—*
Knaak, Rudiger, 4,056,350, Cl. 432-234.000.

Knaak, Rudiger, 4,056,351, Cl. 432-234.000.

Korb, Donald R.: *See—*

Mancini, William L.; Korb, Donald R.; and Refojo, Miguel F., 4,056,496, Cl. 260-29.6TA.

Kosaka, Katuaki: *See—*

Ueno, Zene; Kosaka, Katuaki; and Wagatsuma, Fumio, 4,056,086, Cl. 123-122.00R.

Kosaka, Yujiro: *See—*

Seita, Toru; Shimizu, Akihiko; and Kosaka, Yujiro, 4,056,666, Cl. 526-29.000.

Koseki, Hiroshi: *See—*

Tobise, Masahiro; Kogure, Hiromasa; Kanbara, Tadahiko; and Koseki, Hiroshi, 4,056,767, Cl. 363-141.000.

Kotuby, Paul M., to Risdon Manufacturing Company, The. Liquid dispensing pump automatically sealable against leakage. 4,056,216, Cl. 222-385.000.

Koury, Federic: *See—*

Gungle, W. Calvin; Koury, Federic; and Keeffe, William M., 4,056,751, Cl. 313-217.000.

Krafft, Werner; Wolff, Erich; and von Bonin, Wulf, to AGFA-Gevaert, A.G. Dye diffusion transfer material with graft polymer binding layer. 4,056,397, Cl. 96-77.000.

Kraft, Derald H., to Aspro, Inc. Method of roller spinning cup-shaped metal blanks and roller construction therefor. 4,055,976, Cl. 72-83.000.

Kraft, Derald H., to Aspro, Inc. Sintered pulley hub construction and method of making same. 4,056,014, Cl. 74-230.400.

Kraft, Derald H.; and St. John, Richard C., to Aspro, Inc. Clutch housing and bearing assembly and method of making the same. 4,056,291, Cl. 308-189.00R.

Krahe, Jurgen: *See—*

Kamann, Gunther; Krahe, Jurgen; Zischinsky, Ulf; and Gotze, Wilhelm, 4,056,036, Cl. 85-63.000.

Kramer, Bruno: *See—*

Sonnenberg, Helmut; and Kramer, Bruno, 4,056,667, Cl. 526-74.000.

Kramer, Gert: *See—*

Kaiser, Hans; Konnerth, Ernst; and Kramer, Gert, 4,056,343, Cl. 425-112.000.

Kramer, Kimball: *See—*

Bobb, Lloyd C.; and Kramer, Kimball, 4,056,290, Cl. 307-88.300.

Krasikov, Anatoly Nikolaevich: *See—*

Bukrinsky, Anatoly Matveevich; Matskevich, Genrikh Vladimirovich; Rzheznikov, Julian Vulfovich; Sukhov, Andrei Borisovich; Tatarnikov, Viktor Petrovich; Berkovich, Viktor Mozesovich; Remzhin, Jury Nikolaevich; Slepnev, Lev Nikolaevich; Sverdlov, Alexandr Anatolievich; Karan, Vladimir Geselevich; Kaloshin, Jury Petrovich; Krasikov, Anatoly Nikolaevich; Babenko, Evgeny Akimovich; Bronnikov, Vladimir Konstantinovich; Shvyryaev, Jury Vasilievich; and Shiryaev, Boris Semenovich, 4,056,436, Cl. 176-38.000.

Kraus, Edmund J.: *See—*

Kraus, Robert A.; and Kraus, Edmund J., 4,055,948, Cl. 60-641.000.

Kraus, Robert A.; and Kraus, Edmund J. Solar thermal-radiation, absorption and conversion system. 4,055,948, Cl. 60-641.000.

Krenzer, John, to Velsicol Chemical Corporation. Thiaoiazolyltetrahydropyrimidinone herbicides. 4,056,383, Cl. 71-90.000.

Krieger, George H., to St. Louis Diecasting Corporation. Die cast bat with rod. 4,056,267, Cl. 273-72.00A.

Kroebel, Reinhard: *See—*

Schmieder, Helmut; and Kroebel, Reinhard, 4,056,482, Cl. 252-301.10W.

Kronstein, Max; and Eichberg, Joseph, to American Lecithin Company. Joint suspensions of mixed pigmentations achieved by active effects of plant phosphatides. 4,056,494, Cl. 260-22.00A.

Kubo, Hiroshi: *See—*

Kitaoka, Shigeo; Johkoh, Katsuhiro; Ebisawa, Hisashi; Sato, Tadashi; Kubo, Hiroshi; Takahashi, Sosuke; and Kawase, Yoshinobu, 4,056,631, Cl. 424-330.000.

Kubrin, Michael J.: *See—*

Pohto, Gerald R.; Kubrin, Michael J.; and Sutter, Robert C., 4,056,458, Cl. 204-263.000.

Kudo, Hirokatu: *See—*

Okamoto, Kintaro; Kudo, Hirokatu; Ishijimi, Soichi; Kadoiri, Etsuro; Soma, Hiroshi; and Suzuki, Hiroyuki, 4,056,165, Cl. 181-141.000.

Kufner, Kenneth L.: *See—*

Fusco, Vito A.; Bennett, Joseph C.; Funcik, Jack F.; Kufner, Kenneth L.; and Schneider, Thomas E., 4,055,889, Cl. 29-710.000.

Kulhanek, Frank C., to United States of America, Energy Research and Development Administration. Altitude release mechanism. 4,056,000, Cl. 73-170.00R.

Kulkarni, Shrikant V.: *See—*

Gordon, Paul; Ronsen, Bruce; and Kulkarni, Shrikant V., 4,056,322, Cl. 536-4.000.

Kume, Makoto, to Nippon Sheet Glass Co., Ltd. Method for decorative coloring of glass. 4,056,643, Cl. 427-226.000.

Kurami, Kenshi: *See—*

Imabuchi, Yoshihisa; Kurami, Kenshi; Akiyama, Yoshinori; and Sobajima, Katsunobu, 4,056,271, Cl. 280-745.000.

Kuroyanagi, Yoshitaka: *See—*

Makino, Takayuki; Yamanaka, Teruo; Kuroyanagi, Yoshitaka; and Teratani, Tatsuo, 4,056,782, Cl. 325-313.000.

Kusakata, Shigeru: *See—*

Iiyama, Kiyotaka; Matsui, Takeshi; Kusakata, Shigeru; and Takahashi, Michihisa, 4,056,824, Cl. 354-300.000.

La Telemecanique Electrique: *See—*

Lefebvre, Marcel; and Rouquet, Alain, 4,056,769, Cl. 324-236.000.

La Bate, Micheal Donald. Method of rebuilding an ingot mold. 4,055,881, Cl. 29-401.00A.

Lace, Donald A. Valve actuator. 4,056,255, Cl. 251-129.000.

Lacey, Edward H. Irrigation hose and belt splice preparing tool. 4,056,021, Cl. 83-4.000.

Lacey, Patrick J. Drill bit for reinforced concrete. 4,056,152, Cl. 175-330.000.

Lacy, James Volney: *See—*

Angner, Ronald Joseph; and Lacy, James Volney, 4,056,695, Cl. 179-99.000.

Lademann, Rudolf; Landauer, Franz; Lenzmann, Heinrich; Schmiedel, Klaus; and Schwiersch, Wolfram, to Hoechst Aktiengesellschaft. Process for the continuous preparation of mono- or di-(trichloromethyl)-benzenes. 4,056,455, Cl. 204-163.00R.

Laguna de Rins, Fernando Almarza. Safety fuse for underwater artefacts. 4,056,058, Cl. 102-16.000.

Lahourcade, Bernard; and Bonneau, Gustave, to Les Derives Resiniques et Terpeniques. Process for the preparation of terpene-phenol resins by three-stage reaction of phenol with carene using Friedel-Crafts or Lewis acid catalyst. 4,056,513, Cl. 260-62.000.

Lallement, Jean: *See—*

Gama, Jean-Michel; Lallement, Jean; and Pugnet, Lucien, 4,056,438, Cl. 176-50.000.

Lamar, William Paul. Method and apparatus for programming microprocessors. 4,056,711, Cl. 364-200.000.

Lamberti, Vincent; and Gutierrez, Eddie N., to Lever Brothers Company. Chemical processes for preparing citric acid. 4,056,567, Cl. 260-535.00P.

Lambright, A. James: *See—*

Goettler, Lloyd A.; and Lambright, A. James, 4,056,591, Cl. 264-108.000.

Landauer, Franz: *See—*

Lademann, Rudolf; Landauer, Franz; Lenzmann, Heinrich; Schmiedel, Klaus; and Schwiersch, Wolfram, 4,056,455, Cl. 204-163.00R.

Landis Lund, Limited: *See—*

Bottomley, Herbert Geoffrey, 4,056,064, Cl. 104-93.000.

Landsman, Emanuel. Combination brush and paste dispenser. 4,056,110, Cl. 132-84.00R.

Lange, Wolfgang: *See—*

Bauer, Andreas; and Lange, Wolfgang, 4,056,280, Cl. 296-146.000.

Lapitsky, Jury Anatolievich: *See—*

Bashkirov, Andrei Nikolaevich; Grozhan, Mark Markovich; Kamzolkin, Vladimir Vasilievich; Lapitsky, Jury Anatolievich; and Vygodskaya, Irina Vladimirovna, 4,056,572, Cl. 260-624.00R.

Laporte Industries Limited: *See—*

Beach, Anthony John; Eveson, Geoffrey Frank; and Leedham, Reginald Keith, 4,056,704, Cl. 219-121.00P.

Larsen, Donald W., to W. R. Grace & Co. Curable polyene-polythiol compounds and methods for preparation and curing. 4,056,548, Cl. 260-455.00R.

Lassman, Howard B.; and Novick, William J., Jr., to American Hoechst Corporation. Method of treating dermal inflammation. 4,056,624, Cl. 424-274.000.

Latassa, Frank M., to GTE Sylvania Incorporated. Mercury dispenser for discharge lamps. 4,056,750, Cl. 313-177.000.

Latour, Mirelle: *See—*

Bonneau, Marc; and Latour, Mirelle, 4,056,614, Cl. 424-105.000.

Latus, Hans; Hemala, Zdenek; Bleeck, Heinz; and Weber, Rolf Dieter, to Saurer-Allma GmbH Allgaeuer Maschinenbau. Double twist thread twisting frame. 4,055,937, Cl. 57-34.00R.

Lauer, William: *See—*

Mouwen, Herman Charles; Lauer, William; and Weinberg, Steven Louis, 4,056,476, Cl. 210-446.000.

Laurel Bank Machine Co., Ltd.: *See—*

Yoshida, Minoru, 4,056,193, Cl. 211-51.000.

Laurito, James J., to Neville Chemical Company. Production of novel resins and their uses in printing ink compositions. 4,056,498, Cl. 260-23.70C.

Lavallee, Francois A., to General Electric Company. Alpha-cyanoethylphthalate and preparation thereof. 4,056,550, Cl. 260-465.00D.

LaWhite, Eric L.; Henrichon, Ernest G., Jr.; and Bloom, Harvey J., to Xicon Data Entry Corporation. Drumless paper transporter. 4,056,263, Cl. 271-3.000.

Lawrence, Walter Phalti: *See—*

Fremont, Henry A.; and Lawrence, Walter Phalti, 4,056,342, Cl. 425-80.000.

Leach, Ronald W. A., to Shell Oil Company. Alanine derivatives as sugar cane ripeners. 4,056,385, Cl. 71-111.000.

League, John S., IV, to Koppers Company, Inc. Open loop heating controller and method for corrugators. 4,056,417, Cl. 156-64.000.

Leamy, Harry John: *See—*

Chen, Ho Sou; Gyorgy, Ernst Michael; Leamy, Harry John; and Sherwood, Richard Curry, 4,056,411, Cl. 148-121.000.

Leandri, Jacqueline Agathe Marie: *See—*

Rey, Pierre Theodore Joseph; Leandri, Jacqueline Agathe Marie; and Abbou, Clement Claude, 4,056,095, Cl. 128-1.00R.

Leary, David F.: *See—*

Miertschin, Gary N.; and Leary, David F., 4,056,584, Cl. 264-.500.

LeBoutet, Hubert, to C.G.R.-Mev. Magnetic deflecting and focusing device for a charged particle beam. 4,056,728, Cl. 250-396.00R.

Leckie, Harry P.; Sievert, William C.; and Legault, Robert A., to Inland Steel Company. Zinc-aluminum eutectic alloy coated ferrous strip. 4,056,657, Cl. 428-659.000.

Leckie, Harry P.: *See—*

Lee, Harvie Ho; Gomersall, David W.; and Leckie, Harry P., 4,056,366, Cl. 29-653.000.

Leclercq, Xavier: *See—*

Carpentier, Alain; Leclercq, Xavier; and Paris, Jean, 4,055,861, Cl. 3-1.500.

Leco Corporation: *See—*

Berk, Charles W.; and Vallance, Charles B., 4,056,677, Cl. 13-23.000.

Lee, Harvie Ho; Gomersall, David W.; and Leckie, Harry P., to Inland Steel Company. Zinc-aluminum alloy coating and method of hot-dip coating. 4,056,366, Cl. 29-653.000.

Leedham, Reginald Keith: *See—*

Beach, Anthony John; Eveson, Geoffrey Frank; and Leedham, Reginald Keith, 4,056,704, Cl. 219-121.00P.

Lefebvre, Marcel; and Rouquet, Alain, to La Telemecanique Electrique. Direct current proximity detector having switching means which provide on two distinct outputs, signals when the target is located beyond or within a predetermined range. 4,056,769, Cl. 324-236.000.

Legault, Robert A.: *See—*

Leckie, Harry P.; Sievert, William C.; and Legault, Robert A., 4,056,657, Cl. 428-659.000.

Leib, Michael J., to Westinghouse Electric Corporation. In-band signal-to-noise ratio monitor for an FSK relaying system. 4,056,838, Cl. 361-68.000.

Leibson, Irving: *See—*

Fox, Joseph M., III; Degen, Bruce D.; and Leibson, Irving, 4,056,599, Cl. 423-178.000.

Leisterer, Reinhard; Oelfke, Manfred; Woiczik, Hans; Meyer, Hans-Joachim; and Ostermeier, Rolf, to Fried. Krupp Gesellschaft mit beschrankter Haftung. Apparatus for locating sources of sound in water. 4,056,801, Cl. 340-2.000.

Lemelson, Jerome H. Apparatus for producing composite extrusions. 4,056,344, Cl. 425-132.000.

Lenzmann, Heinrich: *See—*

Lademann, Rudolf; Landauer, Franz; Lenzmann, Heinrich; Schmiedel, Klaus; and Schwiersch, Wolfram, 4,056,455, Cl. 204-163.00R.

Les Derives Resiniques et Terpeniques: *See—*

Lahourcade, Bernard; and Bonneau, Gustave, 4,056,513, Cl. 260-62.000.

Levenback, George: *See—*

Marks, Ronald Aaron; Levenback, George; and Sweet, Albert, 4,055,954, Cl. 60-527.000.

Lever Brothers Company: *See—*

Lamberti, Vincent; and Gutierrez, Eddie N., 4,056,567, Cl. 260-535.00P.

Leveugle, Roland, to Croon & Lucke Maschinenfabrik GmbH & Co. KG. Band applying device for a skein winding machine. 4,055,934, Cl. 53-198.00B.

Levinson, Melvin; and Salkoff, Goodwin. Spring actuated medical injector. 4,056,102, Cl. 128-218.00F.

Levitan, Boris Veniaminovich: *See—*

Vulikh, Alexandr Ilich; Zagorskaya, Maina Konstantinovna; Kofman, Izrail Zalmanovich; Pavlovich, Inna Vasilievna; Levitan, Boris Veniaminovich; Troyan, Nikolai Vasilievich; and Dubyaga, Sergei Viktorovich, 4,056,605, Cl. 423-484.000.

Lewis, John Hopkins. Apparatus for selectively modulating the color of light beam paths of photographic color recorders. 4,056,317, Cl. 355-32.000.

Lewis, Roger N.; Pastorino, Ronald L.; and Wilts, James F., to Argus Chemical Corporation. Thermally stable high molecular weight acyl peroxycarbonic esters in vulcanization of silicone rubber. 4,056,561, Cl. 260-46.50G.

Lewis, Sheldon N.; and Haggard, Richard A., to Rohm and Haas Company. Novel polymers of alkyl methacrylates. 4,056,559, Cl. 526-212.000.

Leybold-Heraeus GmbH & Co. KG: *See—*

Marx, Joachim, 4,055,984, Cl. 73-40.700.

Li, Norman N.; and Cahn, Robert P., to Exxon Research and Engineering Company. Separating hydrocarbon mixtures by emulsification. 4,056,462, Cl. 208-308.000.

"Licencia" Talalmanyokat Ertekesito Vallalat: *See—*

Mandoki, Andor, 4,056,703, Cl. 219-71.000.

Lieber, Jean, to Ateliers des Charmilles S.A. Method for adjusting the output of a pump provided with an adjustable spray cone with movable blades. 4,056,330, Cl. 415-1.000.

Likens Manufacturing Co.: *See—*

Likens, Robert; and Boehm, William S., 4,056,130, Cl. 141-67.000.

Likens, Robert; and Boehm, William S., to Likens Manufacturing Co. Volumetric bagging apparatus. 4,056,130, Cl. 141-67.000.

Lin, Chii-Fa, to Stauffer Chemical Company. Air freshener gels. 4,056,612, Cl. 424-76.000.

Linam, Richard L.; and Lucas, Leonard J., to Kelso, Inc. Apparatus for controlling the welding pattern between weldment components. 4,056,705, Cl. 219-125.00R.

Linde Aktiengesellschaft: *See—*

Abels, Theodor; and Puschel, Siegfried, 4,056,160, Cl. 180-143.000.

Lindemann Maschinenfabrik GmbH: *See—*

Linnerz, Wilhelm; and Tillmanns, Josef, 4,056,232, Cl. 241-194.000.

Lindgren, Raymond Harold: *See—*

Lobeck, John Hillman; and Lindgren, Raymond Harold, 4,056,293, Cl. 308-217.000.

Lindstrom, Arne David, to Saab-Scania AB. Surveillance system. 4,056,684, Cl. 179-5.00R.

Lindvall, Sven: *See—*

Dahlberg, Alf-Goran; Hogberg, Karl Gustav; Lindvall, Sven; and Rydh, Thore Oskar Verner, 4,056,672, Cl. 536-1.000.

Lingscheit, James N., to Ford Motor Company. Method for sintering ceramics. 4,056,589, Cl. 264-65.000.

Link, John Michael: *See—*

Hovagimyan, Norman; and Link, John Michael, 4,056,851, Cl. 364-900.000.

Linnerz, Wilhelm; and Tillmanns, Josef, to Lindemann Maschinenfabrik GmbH. Protective device for rotary hammer breaker. 4,056,232, Cl. 241-194.000.

Liu, Yu-Hsing; and Chiu, Fon-Wen. Automatic lid-lifting and flashing device for water closet. 4,055,864, Cl. 4-253.000.

Livermore and Knight Co., Inc.: *See—*

Smith, Earl R., 4,056,057, Cl. 101-382.0MV.

Lo-Rise Elevator Company: *See—*

Brown, Richard L., 4,056,162, Cl. 187-52.00R.

Lobeck, John Hillman; and Lindgren, Raymond Harold, to Torrington Company, The. Segmented retainers. 4,056,293, Cl. 308-217.000.

Lochmann, Lubomir; and Trekoval, Jiri, to Ceskoslovenska akademie ved. Method for preparation of methacrylate and acrylate polymers and copolymers by anionic polymerization. 4,056,580, Cl. 260-881.000.

Lockheed Aircraft Corporation: *See—*

Serfozo, Tibor; and Simenz, Rod F., 4,055,975, Cl. 72-42.000.

Lohmann, Reiner; and Ludwig, Volker, to Siemens Aktiengesellschaft. Apparatus for correcting distortion in low frequency cable. 4,056,791, Cl. 333-18.000.

Lohse, Rudolf K.: *See—*

Bauml, Kurt; Gunsser, Otto Ch.; and Lohse, Rudolf K., 4,056,039, Cl. 90-92.000.

Lolachi, Houshang, to Baxter Travenol Laboratories, Inc. Flow system for centrifugal liquid processing apparatus. 4,056,224, Cl. 233-14.00R.

Lord, Allan: *See—*

Taylor, Kenneth John; and Lord, Allan, 4,056,505, Cl. 260-42.180.

Lowdenslager, John R.: *See—*

Schwarzschild, Jack; and Lowdenslager, John R., 4,055,945, Cl. 58-85.500.

Lucas, Anthony J.: *See—*

Barber, Loren L., Jr.; Lucas, Anthony J.; and Wen, Richard Y., 4,056,610, Cl. 424-32.000.

Lucas, Leonard J.: *See—*

Linam, Richard L.; and Lucas, Leonard J., 4,056,705, Cl. 219-125.00R.

Luckan, Johannes, to Ionit Anstalt Bernhard Berghaus. Arrangement for treating workpieces by corona discharge with short-circuit prevention feature. 4,056,007, Cl. 73-343.00R.

Lucky Hair Products Co., Ltd.: *See—*

Takai, Hisao, 4,056,109, Cl. 132-40.000.

Ludman, Jacques E. Interferometer optical system. 4,056,323, Cl. 356-106.00R.

Ludoph, Hemmo Hermannes Johannes; and van Deursen, Petrus Henricus, to van Doorne's Transmissie B.V. Stepless variable transmission. 4,056,015, Cl. 74-230.17F.

Ludwig, Volker: *See—*

Lohmann, Reiner; and Ludwig, Volker, 4,056,791, Cl. 333-18.000.

LuK Lamellen und Kupplungsbau GmbH: *See—*

Huber, Lothar, 4,056,179, Cl. 192-106.200.

Lukas, Eberhard, to Siemens Aktiengesellschaft. Address converter. 4,056,819, Cl. 340-347.0DD.

Lunde, Peter: *See—*

Henriques, Frederick C.; Pandolfo, Joseph P.; and Lunde, Peter, 4,056,090, Cl. 126-271.000.

Lundquist, Ingemar H., to Valleylab. Intravenous feeding pump failure alarm system. 4,056,333, Cl. 417-44.000.

Lundsgaard, Paul S.; and Sedlacek, William S., to Reliable Electric Company. Line protector for communications circuit. 4,056,840, Cl. 361-124.000.

Lutz, Eleonore: *See—*

Reinecke, Rolf; Rauterkus, Karl Josef; Schmieder, Werner; and Lutz, Eleonore, 4,056,497, Cl. 260-29.6TA.

Lux, Paul Arthur: *See—*

Harbison, Robert Campbell; Bradley, Gerald Arthur; and Lux, Paul Arthur, 4,056,309, Cl. 350-310.000.

Luzzi, John J.: *See—*

Ramey, Chester E.; and Luzzi, John J., 4,056,507, Cl. 260-45.80N.

Lyons, John B.: *See—*

Godlewski, Walter A.; Roser, Bernard S.; and Lyons, John B., 4,056,294, Cl. 312-30.000.

M & T Chemicals Inc.: *See—*

McCauslan, George L.; and Read, Donald B., 4,056,450, Cl. 204-201.000.

Maass, Joachim Adolf. Contactless stimulus transducer. 4,056,097, Cl. 128-1.500.

Macbeth, Robert Victor, to United Kingdom Atomic Energy Authority. Heat transfer channels. 4,056,440, Cl. 176-78.000.

MacFarlane, Thomas R.; and Skinner, Frank R., II, to Whirlpool Corporation. Conveyor transfer apparatus pickup means reach-retract control. 4,056,188, Cl. 198-465.000.

Macher, Stephan: *See—*
Schneider, Siegfried; Thate, Kurt; Geyken, Erwin; Kempe, Horst; and Macher, Stephan, 4,055,879, Cl. 29-123.000.
Mackenzie, Harold B.; and Anderson, Ingvar G., to New Life Foundation. Bulk discrete fibrous material storage and feeding apparatus. 4,056,202, Cl. 214-17.00C.
MacNeilage, George C. Valved automotive radiator cap. 4,056,120, Cl. 137-493.900.
Maekawa, Yoshihiro, to Orient Chemical Industries, Ltd. Process of semicontinuously producing aniline condensed dyes. 4,056,530, Cl. 260-267.000.
Magerle, Otto. Casing brick, and a method and apparatus for making the same. 4,055,928, Cl. 52-612.000.
Magerlein, Helmut: *See—*
Diamantoglou, Michael; Magerlein, Helmut; Zielke, Rainer; and Cornelissens, Emery George Philomena, 4,056,400, Cl. 106-162.000.
Makino, Takayuki; Yamanaka, Teruo; Kuroyanagi, Yoshitaka; and Teratani, Tatsuo, to Toyota Jidosha Kogyo Kabushiki Kaisha. Wire transmission noise suppressor for a vehicle. 4,056,782, Cl. 325-313.000.
Makovec, Donald J.: *See—*
Hutson, Thomas, Jr.; and Makovec, Donald J., 4,056,577, Cl. 260-683.480.
Malec, Robert E., to Ethyl Corporation. Polymonoolefin quaternary ammonium salts of triethylenediamine. 4,056,531, Cl. 260-268.0PL.
Malek, John M. Process for liquefying carbonaceous materials of high molecular weight and for separating liquefaction products. 4,056,460, Cl. 208-8.000.
Malick, Franklin S., to Westinghouse Electric Corporation. Current limiting circuit breaker. 4,056,798, Cl. 335-16.000.
Malion, William R.; and Watkins, John E. Clutch brake mechanism for lawnmowers. 4,055,935, Cl. 56-10.300.
Maloney-Crawford Tank Corporation: *See—*
Hodgson, Robert A., 4,056,451, Cl. 204-305.000.
Mancini, William L.; Korb, Donald R.; and Refojo, Miguel F., to Corneal Sciences, Inc. Hydrogels and articles made therefrom. 4,056,496, Cl. 260-29.6TA.
Mandoki, Andor, to "Licencia" Talalmanyokat Ertekesito Vallalat. Process and apparatus for resistance heating of electrically conductive workpieces. 4,056,703, Cl. 219-71.000.
Manning, Harold E., to Petro-Tex Chemical Corporation. Dehydrogenation process and catalyst. 4,056,490, Cl. 252-468.000.
Mantel, Olivier, to Roussel-Uclaf. Novel diuretic and antihypertensive composition. 4,056,618, Cl. 424-246.000.
Mantelet, Jean. Cosmetic applicator. 4,056,111, Cl. 132-88.700.
Marcantonio, Angelo Robert, to RCA Corporation. Priority vector interrupt system. 4,056,847, Cl. 364-200.000.
Markman, Mikhail Abramovich; Simanovsky, Leonid Mikhailovich; Jurkevich, Igor Rostislavovich; Kolomoets, Nikolai Vasilievich; Kamensky, Vyacheslav Tikhonovich; Matskov, Igor Mikhailovich; and Maximov, Sergei Ilich. Tubular thermoelectric module. 4,056,406, Cl. 136-208.000.
Marks, Ronald Aaron; Levenback, George; and Sweet, Albert, to Elster's Inc. Damper actuator for a ventilation system. 4,055,954, Cl. 60-527.000.
Marmonier, Pierre; Mesnage, Bernard; Skok, Jean; and Vayra, Jean, to Commissariat a l'Energie Atomique. Bracing device for a bundle of parallel pins in a nuclear reactor assembly. 4,056,441, Cl. 176-78.000.
Marsh, Robert C.: *See—*
Gensike, Karl H.; Marsh, Robert C.; and Reinhard, John D., 4,056,321, Cl. 355-99.000.
Marshall, John Edward, to Imperial Metal Industries (Kynoch) Limited. Method of burning refuse. 4,056,069, Cl. 110-7.00R.
Martin, Albert Edward: *See—*
Fiegl, David Elmer; Hawthorne, Vaughn Terrey; and Martin, Albert Edward, 4,056,065, Cl. 105-199.00C.
Martin, Anthony Newman, to United Technologies Corporation. Voltage regulation in an electronic engine control system having digital effector actuators. 4,056,732, Cl. 307-33.000.
Martin, Barrie James, to Plessey Company Limited, The. Heat exchange apparatus. 4,056,143, Cl. 165-176.000.
Martin Paint and Chemical Corporation: *See—*
Stern, David, 4,056,213, Cl. 222-95.000.
Stern, David, 4,056,500, Cl. 260-29.6MN.
Martin Processing, Inc.: *See—*
Hermes, Julius, 4,055,971, Cl. 68-9.000.
Martins, Jeremias Anthony: *See—*
Ackermann, Walter Thomas; and Martins, Jeremias Anthony, 4,055,876, Cl. 24-205.14R.
Maruyama, Tadaaki. Mechanical pencil. 4,056,325, Cl. 401-65.000.
Marx, Joachim, to Leybold-Heraeus GmbH & Co. KG. Device for detecting leaks in flexible articles. 4,055,984, Cl. 73-40.700.
Maryland Cup Corporation: *See—*
Boyle, Patrick T., 4,056,210, Cl. 220-90.400.
Marze, Xavier: *See—*
Christen, Gilbert; Favre, Bernard; Marze, Xavier; Salmon, Michel; and Thuillier, Rene, 4,056,467, Cl. 210-23.00F.
Masly, John R.: *See—*
Goes, Michael J.; and Masly, John R., 4,055,983, Cl. 73-37.500.
Masyc AG: *See—*
Gunti, Rolf, 4,056,180, Cl. 193-35.00J.
Matovich, Edwin, to Thagard Technology Company. High temperature chemical reaction processes utilizing fluid-wall reactors. 4,056,602, Cl. 423-345.000.
Matovich, Mitchel J., Jr. High torque solar motor. 4,055,956, Cl. 60-527.000.
Matskevich, Genrikh Vladimirovich: *See—*
Bukrinsky, Anatoly Matveevich; Matskevich, Genrikh Vladimirovich; Rzheznikov, Julian Vulfovich; Sukhov, Andrei Borisovich; Tatarnikov, Viktor Petrovich; Berkovich, Viktor Mozesovich; Remzhin, Jury Nikolaevich; Slepnev, Lev Nikolaevich; Sverdlov, Alexandr Anatolievich; Karan, Vladimir Geselevich; Kaloshin, Jury Petrovich; Krasikov, Anatoly Nikolaevich; Babenko, Evgeny Akimovich; Bronnikov, Vladimir Konstantinovich; Shvyryaev, Jury Vasilievich; and Shiryaev, Boris Semenovich, 4,056,436, Cl. 176-38.000.
Matskov, Igor Mikhailovich: *See—*
Markman, Mikhail Abramovich; Simanovsky, Leonid Mikhailovich; Jurkevich, Igor Rostislavovich; Kolomoets, Nikolai Vasilievich; Kamensky, Vyacheslav Tikhonovich; Matskov, Igor Mikhailovich; and Maximov, Sergei Ilich, 4,056,406, Cl. 136-208.000.
Matsuda, Eiji: *See—*
Ikeguchi, Shigehiko; Yamashita, Norio; and Matsuda, Eiji, 4,056,181, Cl. 194-10.000.
Matsuda, Fujio, to Mitsui Toatsu Chemicals, Incorporated. Process for the production of acrylamide and methacrylamide. 4,056,565, Cl. 260-561.00N.
Matsui, Takeshi: *See—*
Iiyama, Kiyotaka; Matsui, Takeshi; Kusakata, Shigeru; and Takahashi, Michihisa, 4,056,824, Cl. 354-300.000.
Matsushita Electric Industrial Co., Ltd.: *See—*
Hiroyasu, Mamoru, 4,056,834, Cl. 360-85.000.
Inoue, Michihiro; Kimura, Takeji; Sato, Masaharu; and Tsunoo, Masahiko, 4,056,033, Cl. 84-1.240.
Ohigashi, Tugio; and Ariga, Junichi, 4,056,794, Cl. 334-15.000.
Matsutsuka, Nobuaki, to Victor Company of Japan, Limited. Tape clamping device for tape-containing cassettes. 4,056,244, Cl. 242-197.000.
Matusch, Siegfried: *See—*
Sander, Hanslothar; Matusch, Siegfried; and Hemminghaus, Uwe, 4,056,475, Cl. 210-402.000.
Mauch, Robert E.; and Sarbacher, Robert I., to John C. Bogue. Emergency lighting system. 4,056,757, Cl. 315-86.000.
Maxey, Loren R. Snow groomer for snowmobile trails. 4,056,328, Cl. 404-96.000.
Maximov, Sergei Ilich: *See—*
Markman, Mikhail Abramovich; Simanovsky, Leonid Mikhailovich; Jurkevich, Igor Rostislavovich; Kolomoets, Nikolai Vasilievich; Kamensky, Vyacheslav Tikhonovich; Matskov, Igor Mikhailovich; and Maximov, Sergei Ilich, 4,056,406, Cl. 136-208.000.
May, Douglas H., Jr.: *See—*
Bunn, Dorrance P., Jr.; Strickland, John C.; and May, Douglas H., Jr., 4,056,486, Cl. 252-417.000.
Mayer, Fritz, to Ciba-Geigy AG. Dry transfer of organic compounds to webs. 4,056,352, Cl. 8-2.50A.
Mayer, Siegfried: *See—*
Zorn, Jurgen; Vlemmings, Jan; Muller, Karl-Heinz; Mayer, Siegfried; Dworak, Wilhelm; Hartmann, Eugen; Fader, Martin; Talmon, Wolfgang; Jons, Claus; Sauer, Ivan; and Bosch, Paul, 4,056,337, Cl. 418-131.000.
Mayfield, Howard: *See—*
Westfall, Paul Marlin; and Mayfield, Howard, 4,056,646, Cl. 428-90.000.
McCannon, Ralph C.: *See—*
Dixon, Jimmie D.; and McCannon, Ralph C., 4,056,251, Cl. 248-19.000.
McCartney, Ronald L.; Arnold, Bruce K.; and Hogan, Vaughn C., to International Telephone and Telegraph Corporation. Single optical fiber connector utilizing elastomeric alignment device. 4,056,305, Cl. 350-96.00C.
McCauslan, George L.; and Read, Donald B., to M & T Chemicals Inc. Continuous detinning system. 4,056,450, Cl. 204-201.000.
McClure, James D.; and Brandenberger, Stanley G., to Shell Oil Company. Isoparaffin-olefin alkylation process using a supported perfluorinated polymer catalyst. 4,056,578, Cl. 260-683.470.
McCoy, Frederic C.: *See—*
Kolaian, Jack H.; McCoy, Frederic C.; and Patterson, John A., 4,056,355, Cl. 8-137.000.
McCrobie, George Louis, to Xerox Corporation. Variable focal length reflector lens system. 4,056,308, Cl. 350-184.000.
McEwan, William S.; and Jonassen, Hans B., to United States of America, Navy. Method for decomposing iron pentacarbonyl. 4,056,386, Cl. 75-0.5BA.
McFadden, William H., to Finnigan Corporation. Liquid chromatograph/mass spectrometer interface. 4,055,987, Cl. 73-61.10C.
McGuirk, Francis A., Jr.: *See—*
Atkins, Carl E.; and McGuirk, Francis A., Jr., 4,056,841, Cl. 361-203.000.
McHugh, James P.; Nalepa, Philip J.; Miller, Robert C.; and Dawson, Chester W., to Westinghouse Electric Corporation. Method for preparation of VO_2current inrush limiters for incandescent lamps. 4,056,378, Cl. 65-18.000.
McIntyre, Douglas Owen, to Dom Holdings Limited. Expanding bolt-like fastening means. 4,056,037, Cl. 85-74.000.
McKelvey, Patricia J.: *See—*
Kaczmarzyk, Leonard M.; Hlaban, James J.; and McKelvey, Patricia J., 4,056,103, Cl. 128-285.000.

McKyton, Richard A.: *See—*
Walls, John J., Jr.; and McKyton, Richard A., 4,056,649, Cl. 428-215.000.
McNabb, Vernon L., to Bendix Corporation, The. Extended life structure for spool valve. 4,056,125, Cl. 137-625.300.
McNeil, Kenneth G.: *See—*
Ullman, Edwin F.; Chang, Joyce Y.; and McNeil, Kenneth G., 4,056,608, Cl. 424-1.000.
McNeil, Roy C.: *See—*
Ellington, Harold John; and McNeil, Roy C., 4,055,922, Cl. 52-169.700.
Measurex Corporation: *See—*
Al-Shaikh, Al; and Dahlin, Erik B., 4,056,714, Cl. 364-111.000.
Medalist Industries, Inc.: *See—*
Morasch, Ronald J.; and Webb, Robert J., 4,056,137, Cl. 144-323.000.
Medi-Ray, Inc.: *See—*
Collica, Carl; Epifano, Leonard; and Farella, Ralph, 4,056,096, Cl. 128-1.100.
Collica, Carl; Epifano, Leonard; and Farella, Ralph, 4,056,729, Cl. 250-472.000.
Mehta, Nariman Bomanshaw; and Brieaddy, Lawrence Edward, to Burroughs Wellcome Co. 2-Hydroxymethyl-2'-aminomethyl-diphenylsulfides and method of use. 4,056,632, Cl. 424-330.000.
Meier, Harold K.; and Popovich, John Michael. Flat plate solar energy collector. 4,056,092, Cl. 126-271.000.
Meier, Joseph F.: *See—*
Smith, James D. B.; Meier, Joseph F.; and Phillips, David C., 4,056,005, Cl. 73-339.00R.
Smith, James D. B.; Meier, Joseph F.; and Phillips, David C., 4,056,006, Cl. 73-339.00R.
Meijer, Johann Daniel, to N.V. Appingedammer Bronsmotorenfabriek. Ram device. 4,056,150, Cl. 173-127.000.
Meisel, William H.: *See—*
Born, Ellis H.; Meisel, William H.; and Viles, Alan H., 4,056,041; Cl. 91-375.00R.
Meldahl, Robert D.; and Smalley, Raymond L., to Reb Manufacturing Inc. Platform lift. 4,056,203, Cl. 214-75.00T.
Meloni, Beat, to BBC Brown Boveri & Company Limited. Cooled turbine blade. 4,056,332, Cl. 416-97.00A.
Memminger, Gustav: *See—*
Fecker, Josef; and Memminger, Gustav, 4,056,239, Cl. 242-47.010.
Meng, Karl: *See—*
Moller, Eike; Meng, Karl; Wehinger, Egbert; and Horstmann, Harald, 4,056,533, Cl. 548-360.000.
Mengel, Manfred: *See—*
Heinze, Gerhard; Mengel, Manfred; and Reiss, Gerhard, 4,056,370, Cl. 55-68.000.
Meningand, Paul A.: *See—*
Bernard, Jean Paul; and Meningand, Paul A., 4,056,247, Cl. 244-110.00C.
Mercier, Jean Pierre: *See—*
Faille, Marc Della; Delvaux, Pierre; Godard, Pierre; and Mercier, Jean Pierre, 4,056,655, Cl. 428-443.000.
Mercik, Henry J., Jr.: *See—*
Armstrong, Lee R.; and Mercik, Henry J., Jr., 4,055,995, Cl. 73-116.000.
Merck & Co., Inc.: *See—*
Atkinson, Joseph G.; Belanger, Patrice C.; Rooney, Clarence S.; and Britcher, Susan F., 4,056,536, Cl. 260-326.50B.
Merck Patent Gesellschaft mit beschrankter Haftung: *See—*
Breiter, Joachim; and Helger, Roland, 4,056,468, Cl. 210-31.00R.
Merrill, Duane F., to General Electric Company. Process for the production of a bodied silicone resin without the use of a catalyst. 4,056,492, Cl. 260-18.00S.
Mesnage, Bernard: *See—*
Marmonier, Pierre; Mesnage, Bernard; Skok, Jean; and Vayra, Jean, 4,056,441, Cl. 176-78.000.
Messner, Georg. Apparatus for the fabrication of pure alumina from Al_2O_3 and silica containing raw materials by leaching with hydrochloric acid. 4,056,363, Cl. 23-270.00R.
Metal Products Corporation: *See—*
Keith, William Johnson, 4,056,195, Cl. 211-153.000.
Metallgesellschaft Aktiengesellschaft: *See—*
Baron, Gerhard; Bierbach, Herbert; Hafke, Carl; and Pockrandt, Gunter, 4,056,483, Cl. 252-373.000.
Metivier, Robert. Volumetric respiration equipment. 4,056,099, Cl. 128-145.600.
Metzeler Schaum GmbH: *See—*
Bokelmann, Horst, 4,056,595, Cl. 264-46.300.
Meyer, Gundolf, to BBC Brown Boveri & Company Limited. Method for producing a stabilized electrical superconductor. 4,055,887, Cl. 29-599.000.
Meyer, Hans-Joachim: *See—*
Leisterer, Reinhard; Oelfke, Manfred; Woiczik, Hans; Meyer, Hans-Joachim; and Ostermeier, Rolf, 4,056,801, Cl. 340-2.000.
Meyerle, John Alfons; and Stokes, Rembert Ryan, to Bell Telephone Laboratories, Incorporated. Flat panel telephone station set. 4,056,696, Cl. 179-100.00R.
Mian, Abdul M.: *See—*
Robins, Roland K.; Rousseau, Robert J.; and Mian, Abdul M., 4,056,674, Cl. 536-28.000.
Michel, Alain Marie; and Parc, Jean Edmond, to Etat Francais. Respiratory apparatus for free underwater diver. 4,056,098, Cl. 128-142.00R.
Miertschin, Gary N.; and Leary, David F., to General Atomic Company. Method of making a graphite fuel element having carbonaceous fuel bodies. 4,056,584, Cl. 264-.500.
Miesterfeld, Frederick Otto Richard: *See—*
Orris, Stephen Jay; and Miesterfeld, Frederick Otto Richard, 4,056,747, Cl. 310-155.000.
Miglierini, Raul A., to Dresser Industries, Inc. Rotary rock bit with multiple row coverage for very hard formations. 4,056,153, Cl. 175-376.000.
Milkovic, Miran, to General Electric Company. Electronic kWh meter having internal power supply and error correction system. 4,056,775, Cl. 324-142.000.
Miller, Donald M. Portable tool guide. 4,056,136, Cl. 144-134.00D.
Miller, Harry B.; and Jahrig, Gunter, to Industrie-Werke Karlsruhe Augsburg Aktiengesellschaft. Spacer for spool tubes. 4,056,237, Cl. 242-18.0PW.
Miller, John F.; and Conner, Rodney R., to Pacific Resins & Chemicals, Inc. Resin-containing cellulosic overlays. 4,056,431, Cl. 162-165.000.
Miller, Joseph D.: *See—*
Williams, Louis A., Jr.; and Miller, Joseph D., 4,056,720, Cl. 250-203.00R.
Miller, Robert C.: *See—*
McHugh, James P.; Nalepa, Philip J.; Miller, Robert C.; and Dawson, Chester W., 4,056,378, Cl. 65-18.000.
Milliken Research Corporation: *See—*
O'Neill, John H., Jr., 4,055,868, Cl. 8-150.000.
Milner, David John: *See—*
Holland, David; Milner, David John; and Reed, Hugh Wilma Boulton, 4,056,574, Cl. 260-654.00R.
Milovac, Sidney. Ratchet head tape mover. 4,056,518, Cl. 360-106.000.
Milroy, Robert W. Emergency ventilation means for confined livestock areas. 4,056,048, Cl. 98-41.00R.
Minami, Masaki: *See—*
Aihara, Mitsugu; Kogane, Yutaka; Ebinuma, Yasumitsu; and Minami, Masaki, 4,056,680, Cl. 174-19.000.
Minister of Agriculture, Fisheries & Food, in Her Britanic Majesty's Government of the U.K. of Great Britain & N. Ireland: *See—*
Ross, Roderick Buchan, 4,056,158, Cl. 180-6.480.
Minnesota Mining and Manufacturing Company: *See—*
Barber, Loren L., Jr.; Lucas, Anthony J.; and Wen, Richard Y., 4,056,610, Cl. 424-32.000.
Brix, Charles J., 4,055,897, Cl. 32-59.000.
Minolta Camera Kabushiki Kaisha: *See—*
Iizaka, Isao; and Yamamoto, Toshio, 4,056,390, Cl. 96-1.0TE.
Watanabe, Yutaka, 4,056,318, Cl. 355-45.000.
Mischke, Peter, to Hoechst Aktiengesellschaft. Water-insoluble azo dyestuffs. 4,056,523, Cl. 260-205.000.
Mischo, Klaus, to AGFA-Gevaert, A.G. Microfilm recording apparatus. 4,056,319, Cl. 355-68.000.
Misencik, John J.; and Zakrzewski, Gary S., to Westinghouse Electric Corporation. Ground fault circuit interrupter with trip level adjustment. 4,056,837, Cl. 361-45.000.
Misono, Masayoshi; Koayama, Masaharu; and Asida, Tutomu, to Hitachi, Ltd. Liquid crystal display device and method of manufacturing the same. 4,056,306, Cl. 350-160.0LC.
Mitchell, Thomas O.; and Whitehurst, Darrell D., to Mobil Oil Corporation. Synthetic amorphous silicas of predetermined pore distribution, method of producing same. 4,056,488, Cl. 252-449.000.
Mitsui, Nobuo; Watanabe, Akinori; Oohira, Takeshi; Kawauchi, Kazuhiko; Nakao, Shoichi; and Teranishi, Katsuya, to Hitachi, Ltd. Driving system for moving paths or escalators. 4,056,759, Cl. 318-98.000.
Mitsui Toatsu Chemicals, Incorporated: *See—*
Matsuda, Fujio, 4,056,565, Cl. 260-561.00N.
Mitzmager, Abraham: *See—*
Baniel, Avraham Matitiahu; Mitzmager, Abraham; Segall, Jeanna; Star, Shlomo; and Shorr, Leonard Marshall, 4,056,588, Cl. 264-63.000.
Miyashita, Masahiko: *See—*
Goi, Mitsuhiro; and Miyashita, Masahiko, 4,056,551, Cl. 560-126.000.
Miyazako, Takushi: *See—*
Horie, Ikutaro; Miyazako, Takushi; Sakaguchi, Shinji; Tsuji, Nobuo; and Kameji, Nagao, 4,056,396, Cl. 96-67.000.
Mobil Oil Corporation: *See—*
Mitchell, Thomas O.; and Whitehurst, Darrell D., 4,056,488, Cl. 252-449.000.
Mobil Tyco Solar Energy Corporation: *See—*
Garone, Lynne C.; and Ravi, Kramadhati Venkata, 4,056,404, Cl. 136-89.0PC.
Mochimaru, Hideaki; and Kobayashi, Yugoro, to Ricoh Company, Ltd. Copying machine. 4,056,320, Cl. 355-75.000.
Mody, Amrut Vithaldas: *See—*
Vora, Vinay Chhotalal; and Mody, Amrut Vithaldas, 4,056,615, Cl. 424-120.000.
Moessner, Frank G., to Unican Security Systems, Ltd. Key assembly tool. 4,055,880, Cl. 29-267.000.
Mohawk Video Systems Corporation: *See—*
Carpenter, Anthony P., 4,056,470, Cl. 210-94.000.
Mohr, Adolf; Sohn, Wolfgang; and Strobl, Georg, to Robert Bosch GmbH. Dynamo electric machine permanent magnet flux test apparatus which simulates actual flux conditions of the motor. 4,056,770, Cl. 324-205.000.
Moldex, Inc.: *See—*
Paine, Ellis H., 4,056,419, Cl. 156-164.000.

Molex Incorporated: *See—*
Fusco, Vito A.; Bennett, Joseph C.; Funcik, Jack F.; Kufner, Kenneth L.; and Schneider, Thomas E., 4,055,889, Cl. 29-710.000.
Molins Limited: *See—*
Bennett, George Robert, 4,056,206, Cl. 214-302.000.
Moller, Eike; Meng, Karl; Wehinger, Egbert; and Horstmann, Harald, to Bayer Aktiengesellschaft. Pyrazol-5-ones. 4,056,533, Cl. 548-360.000.
Molnar, Louis: *See—*
Cantera, Gregorio Asua; Reparaz, Jose M. Palacios; and Molnar, Louis, 4,056,387, Cl. 75-123.00F.
Monarch Marking Systems, Inc.: *See—*
Hamisch, Paul H., Jr., 4,056,424, Cl. 156-384.000.
Moncrieff-Yeates, Alexander John. Vortical flow aerothermodynamic fireplace unit. 4,056,091, Cl. 126-121.000.
Monroe, Marvin E.: *See—*
Jacoby, Benjamin Franklin; and Monroe, Marvin E., 4,056,761, Cl. 318-116.000.
Monsanto Company: *See—*
Goettler, Lloyd A.; and Lambright, A. James, 4,056,591, Cl. 264-108.000.
Herber, John F., 4,056,480, Cl. 252-78.500.
Montedison, S.p.A.: *See—*
Corradi, Ariello Rolando; and Fagherazzi, Giuliano, 4,056,410, Cl. 148-105.000.
Montgomery Ward & Co., Incorporated: *See—*
Godlewski, Walter A.; Roser, Bernard S.; and Lyons, John B., 4,056,294, Cl. 312-30.000.
Moore, Anthony John. Presses. 4,056,341, Cl. 425-77.000.
Moore Business Forms, Inc.: *See—*
Weisenfluh, John A., 4,056,191, Cl. 206-629.000.
Moore, Paul B.: *See—*
Swenson, Paul F.; and Moore, Paul B., 4,055,964, Cl. 62-238.000.
Morasch, Ronald J.; and Webb, Robert J., to Medalist Industries, Inc. Method and apparatus for cutting tenons. 4,056,137, Cl. 144-323.000.
Morelli, Basilio: *See—*
Papoff, Paolo; Morelli, Basilio; and Guidarini, Dante, 4,056,258, Cl. 366-160.000.
Morex, Inc.: *See—*
Morrill, Vaughan, Jr.; and Jackes, Stanley F., 4,055,888, Cl. 29-622.000.
Morgan Construction Company: *See—*
Hill, William J., 4,056,186, Cl. 198-339.000.
Morimasa, Yuki: *See—*
Hagiwara, Yoshihide; Tetsuji, Miyauchi; and Morimasa, Yuki, 4,056,637, Cl. 426-52.000.
Moring, Peter Lothar Ernst, to Dunlop Limited. Belting. 4,056,016, Cl. 74-231.00J.
Morley Furniture Spring Corporation: *See—*
Crosby, Lawton H.; and Keane, Thomas H., 4,055,865, Cl. 5-259.00R.
Morrill, Charles Donovan. Seal. 4,056,272, Cl. 285-140.000.
Morrill, Vaughan, Jr.; and Jackes, Stanley F., to Morex, Inc. Process for making reed switches. 4,055,888, Cl. 29-622.000.
Morrison, Heber J.; and Howland, Rockney W., to Westinghouse Electric Corporation. Single ended class d amplifier. 4,056,786, Cl. 330-207.00A.
Morse, Howard H.: *See—*
Scheidler, Ralph E.; and Morse, Howard H., 4,056,765, Cl. 320-48.000.
Morton, John T. Silencer device. 4,055,871, Cl. 16-86.00A.
Moser, Kurt: *See—*
Schlieckmann, Alfred; and Moser, Kurt, 4,056,122, Cl. 137-563.000.
Motorola, Inc.: *See—*
Faulkner, Thomas Edward, 4,056,780, Cl. 325-5.000.
Toler, Robert Lee, 4,056,779, Cl. 325-4.000.
Mougniot, Jean-Claude: *See—*
Giacometti, Christian; Mougniot, Jean-Claude; and Ravier, Jean, 4,056,437, Cl. 176-40.000.
Mouwen, Herman Charles; Lauer, William; and Weinberg, Steven Louis, to Johnson & Johnson; and Purolator, Inc. Blood filter media. 4,056,476, Cl. 210-446.000.
Mueller, Norbert: *See—*
Hoffman, Werner; Mueller, Norbert; and von Fraunberg, Karl, 4,056,541, Cl. 260-343.000.
Mueller, Richard A., to G. D. Searle & Co. 3,5-Bisoxygenated 2-(ω-halo-3-oxygenated-1-alkenyl)-cyclopentane-1-heptanoic acids and derivatives thereof. 4,056,562, Cl. 560-231.000.
Mukai, Junji: *See—*
Nishikawa, Akio; Yokono, Hitoshi; Numata, Shun-ichi; and Mukai, Junji, 4,056,579, Cl. 260-830.00P.
Muller, Hans. Process for the conversion of starch and protein-containing cellulosic waste products into nutrients richer in proteins. 4,056,636, Cl. 426-48.000.
Muller, Karl-Heinz: *See—*
Zorn, Jurgen; Vlemmings, Jan; Muller, Karl-Heinz; Mayer, Siegfried; Dworak, Wilhelm; Hartmann, Eugen; Fader, Martin; Talmon, Wolfgang; Jons, Claus; Sauer, Ivan; and Bosch, Paul, 4,056,337, Cl. 418-131.000.
Muller, Werner: *See—*
Heinzer, Hans; and Muller, Werner, 4,056,045, Cl. 93-35.0SB.
Munz, Werner, to Emhart Zurich S. A. Apparatus for testing the surface quality of a vessel mouth. 4,055,985, Cl. 73-49.200.
Murray, Graeme D.: *See—*
Johnson, Eric M.; Murray, Graeme D.; and Hardy, Frederick E., 4,056,113, Cl. 134-40.000.
Murray, Paul Michael: *See—*
Spooner, Archer Michael; and Murray, Paul Michael, 4,056,827, Cl. 358-87.000.
Murt, Edward M. Holder for money, cards and the like. 4,056,139, Cl. 150-39.000.
Muschelknautz, Edgar; and Nemecek, Franz, to Bayer Aktiengesellschaft. Internal friction twist device. 4,055,940, Cl. 57-77.400.
Musil, Josef: *See—*
Bartmann, Wilhelm; Beck, Gerhard; Granzer, Ernold; Musil, Josef; and Teufel, Hermann, 4,056,629, Cl. 424-327.000.
Mussman, Harry Edward: *See—*
Freimanis, Laimons; Mussman, Harry Edward; and Smith, DeWitt Paul, 4,056,691, Cl. 179-18.0FA.
Myers, Albert H., to Furukawa International U.S.A., Inc. Method and apparatus for providing a controlled atmosphere around perishable products. 4,055,931, Cl. 53-22.00B.
Nafco Giken, Ltd.: *See—*
Hayashi, Tsutomu, 4,056,372, Cl. 55-152.000.
Nafissi-Varchei, Mohammad Mehdi: *See—*
Reimann, Hans; Jaret, Robert S.; and Nafissi-Varchei, Mohammad Mehdi, 4,056,616, Cl. 424-180.000.
Nagase, Mitsuo: *See—*
Yamamoto, Yukio; and Nagase, Mitsuo, 4,055,916, Cl. 49-404.000.
Nakaguti, Osamu: *See—*
Kamiya, Takashi; Teraji, Tsutomu; Hashimoto, Masashi; Nakaguti, Osamu; and Oku, Teruo, 4,056,521, Cl. 260-239.100.
Nakahashi, Ken-Ichi: *See—*
Shimizu, Hiroyuki; Inaba, Kouji; and Nakahashi, Ken-Ichi, 4,056,310, Cl. 351-6.000.
Nakamura, Shigeharu: *See—*
Harada, Nobuhiko; Tanaka, Minetaka; Shimano, Masanao; Fujinaga, Kyozo; Nunomura, Kunito; Tamura, Masamitu; Nakamura, Shigeharu; and Akagi, Kazuo, 4,056,428, Cl. 156-642.000.
Nakanishi, Teruo: *See—*
Ito, Kiyoshi; Ikemoto, Masahiko; Kimura, Kazuhiko; and Nakanishi, Teruo, 4,056,626, Cl. 424-285.000.
Nakao, Shoichi: *See—*
Mitsui, Nobuo; Watanabe, Akinori; Oohira, Takeshi; Kawauchi, Kazuhiko; Nakao, Shoichi; and Teranishi, Katsuya, 4,056,759, Cl. 318-98.000.
Nalepa, Philip J.: *See—*
McHugh, James P.; Nalepa, Philip J.; Miller, Robert C.; and Dawson, Chester W., 4,056,378, Cl. 65-18.000.
National Mine Service Company: *See—*
Freed, Donald L., Jr., 4,056,189, Cl. 198-514.000.
National Research Development Corporation: *See—*
Teasdale, Raymond Geoffrey, 4,056,472, Cl. 210-242.00S.
National Starch and Chemical Corporation: *See—*
Skoultchi, Martin M., 4,056,670, Cl. 526-320.000.
National Union Electric Corporation: *See—*
Zellhoefer, Glenn F., 4,056,662, Cl. 429-112.000.
Nederlof, Anton Marie, to U.S. Philips Corporation. Hot-gas reciprocating engine. 4,055,953, Cl. 60-526.000.
Nefedov, Oleg Matveevich: *See—*
Boyadzhian, Varazdat Karapetovich; Khachatrian, Saribek Saakovich; Stepanian, Genrikh Gevorkovich; Eritsian, Volodya Karapetovich; Agavelian, Edik Stepanovich; Nefedov, Oleg Matveevich; Dolgy, Igor Evgenievich; Sisin, Mikhail Fedorovich; Kolbasin, Alexei Yakovlevich; and Anikeev, Ivan Konstantinovich, 4,056,563, Cl. 560-245.000.
Nelson, Darrell E.: *See—*
Hoerning, John S.; Halverson, Richard P.; and Nelson, Darrell E., 4,056,809, Cl. 364-200.000.
Nemecek, Franz: *See—*
Muschelknautz, Edgar; and Nemecek, Franz, 4,055,940, Cl. 57-77.400.
Netzel, Philip C.: *See—*
Brandt, Thomas F.; Netzel, Philip C.; and Wharton, Lennard, 4,056,679, Cl. 174-13.000.
Neville Chemical Company: *See—*
Laurito, James J., 4,056,498, Cl. 260-23.70C.
New Life Foundation: *See—*
Mackenzie, Harold B.; and Anderson, Ingvar G., 4,056,202, Cl. 214-17.00C.
Newstead, Charles; Assinder, Andrew Charles; and Harvey, Geoffrey, to Girling Limited. Slack adjusters for the shoes of vehicle shoe drum brakes of the duo servo type. 4,056,175, Cl. 188-196.0BA.
Nidola, Antonio: *See—*
de Nora, Vittorio; Nidola, Antonio; and Bianchi, Giuseppe, 4,056,449, Cl. 204-106.000.
Nielsen, Donald R., to PPG Industries, Inc. Detergent compositions of trisulfosuccinic acid. 4,056,491, Cl. 252-557.000.
Nihon Spindle Seizo Kabushiki Kaisha: *See—*
Kimura, Tsuneo; and Takeshika, Shiro, 4,056,123, Cl. 137-624.140.
Nilsson, Bjarne Ivar. Rotary filter for concentrating fiber suspensions. 4,056,473, Cl. 210-331.000.
Nippon Gohsei Kagaku Kogyo Kabushiki Kaisha: *See—*
Goi, Mitsuhiro; and Miyashita, Masahiko, 4,056,551, Cl. 560-126.000.
Nippon Sheet Glass Co., Ltd.: *See—*
Kume, Makoto, 4,056,643, Cl. 427-226.000.

Nischk, Gunther: *See—*
Wolf, Gerhard Dieter; Bentz, Francis; and Nischk, Gunther, 4,056,564, Cl. 260-512.00C.
Nishibata, Atsushi: *See—*
Tanaka, Yoshiaki; Handa, Susumu; Nishibata, Atsushi; Ueda, Sadashi; Inamoto, Yoshiaki; Saito, Masahiro; Tanimoto, Fumio; and Kitano, Hisao, 4,056,547, Cl. 260-453.00P.
Nishikawa, Akio; Yokono, Hitoshi; Numata, Shun-ichi; and Mukai, Junji, to Hitachi, Ltd. Novel thermosetting resin composition and cured product therefrom. 4,056,579, Cl. 260-830.00P.
Nissan Motor Company, Limited: *See—*
Endo, Takuya; and Hirota, Toshio, 4,056,764, Cl. 320-3.000.
Imabuchi, Yoshihisa; Kurami, Kenshi; Akiyama, Yoshinori; and Sobajima, Katsunobu, 4,056,271, Cl. 280-745.000.
Sakaki, Yoshihiro, 4,056,141, Cl. 165-9.000.
Ueno, Zene; Kosaka, Katuaki; and Wagatsuma, Fumio, 4,056,086, Cl. 123-122.00R.
Nitsche, Joseph E.: *See—*
Dates, Harold F.; Domicone, Joseph J.; and Nitsche, Joseph E., 4,056,650, Cl. 428-332.000.
Nizeeva, Nellya Nikitichna: *See—*
Skvortsov, Gennady Alexeevich; Nizeeva, Nellya Nikitichna; Podzharsky, Avrum Iosifovich; and Dobrovolskaya, Irma Viktorovna, 4,056,600, Cl. 423-239.000.
Noiles, Douglas G. Fuel saving variable closed position fuel and air flow control for vehicles with automatic transmission. 4,056,082, Cl. 123-103.00R.
Noiles, Douglas G., to United States Surgical Corporation. Volume limiting chamber. 4,056,100, Cl. 128-214.00C.
Norden, Alexander R. Retained screw assembly. 4,056,301, Cl. 339-263.00R.
Nordh, Rolf Goran, to Hakanssons Manufaktur AB. Safety harness for motor vehicles. 4,056,282, Cl. 297-389.000.
Nordisk Ventilator Co., A/S: *See—*
Roslyng, Ole; and Dam, Niels Erik Friis, 4,055,994, Cl. 73-116.000.
Northrop, Tom A. Cutting device. 4,056,027, Cl. 83-455.000.
Norton Company: *See—*
King, John H., 4,055,860, Cl. 2-416.000.
Novick, William J., Jr.: *See—*
Lassman, Howard B.; and Novick, William J., Jr., 4,056,624, Cl. 424-274.000.
Novy, Russell F.: *See—*
Beall, Benjamin S., III; and Novy, Russell F., 4,056,678, Cl. 13-25.000.
Nowroski, Alvin P.; and Root, Lyman V., to Ford Motor Company. Engine positive crankcase ventilation valve assembly. 4,056,085, Cl. 123-119.00B.
Nuclear Engineering Co., Inc.: *See—*
Gablin, Kenneth A.; and Hansen, Larry J., 4,056,362, Cl. 23-260.000.
Numata, Shun-ichi: *See—*
Nishikawa, Akio; Yokono, Hitoshi; Numata, Shun-ichi; and Mukai, Junji, 4,056,579, Cl. 260-830.00P.
Nunomura, Kunito: *See—*
Harada, Nobuhiko; Tanaka, Minetaka; Shimano, Masanao; Fujinaga, Kyozo; Nunomura, Kunito; Tamura, Masamitu; Nakamura, Shigeharu; and Akagi, Kazuo, 4,056,428, Cl. 156-642.000.
Nussbaum, Alexander Leopold: *See—*
Heimer, Edgar Philip; and Nussbaum, Alexander Leopold, 4,056,673, Cl. 536-27.000.
N.V. Appingedammer Bronsmotorenfabriek: *See—*
Meijer, Johann Daniel, 4,056,150, Cl. 173-127.000.
O'Brien, Charles, Jr.: *See—*
Rabelos, Nicholas A., 4,056,166, Cl. 182-5.000.
Oddsen, Robert. Automatic surveillance system for time sequence operations. 4,056,818, Cl. 340-309.400.
Odetics, Inc.: *See—*
Schulz, Gordon, 4,056,833, Cl. 360-85.000.
Oeffinger, Thomas R.; and Tocci, Leonard R., to Rockwell International Corporation. Passive chevron replicator. 4,056,813, Cl. 365-12.000.
Oelfke, Manfred: *See—*
Leisterer, Reinhard; Oelfke, Manfred; Woiczik, Hans; Meyer, Hans-Joachim; and Ostermeier, Rolf, 4,056,801, Cl. 340-2.000.
Ogden, John: *See—*
Roe, Alfred W.; Ogden, John; and Carter, Robert, 4,056,235, Cl. 220-4.00E.
Ohigashi, Tugio; and Ariga, Junichi, to Matsushita Electric Industrial Co., Ltd. Channel selection mechanism for an electronic tuner. 4,056,794, Cl. 334-15.000.
Ohio State University Research Foundation, The: *See—*
Gassman, Paul G., 4,056,569, Cl. 260-558.00S.
Okabe, Yukio: *See—*
Watanabe, Yasuaki; Okabe, Yukio; and Hayakawa, Mitsuru, 4,056,826, Cl. 358-19.000.
Okamoto, Kintaro; Kudo, Hirokatu; Ishijimi, Soichi; Kadoiri, Etsuro; Soma, Hiroshi; and Suzuki, Hiroyuki, to Honda Giken Kogyo Kabushiki Kaisha; and Pioneer Electronic Corporation. Sound reproducing apparatus in the inside of a car. 4,056,165, Cl. 181-141.000.
Okamoto, Toyoo: *See—*
Ariyama, Kenzo; Ota, Sakae; Ikeda, Sunao; and Okamoto, Toyoo, 4,056,315, Cl. 355-10.000.
Okihara, Tadashi: *See—*
Izumi, Ryoji; Kobayashi, Shoji; Ono, Toshiharu; Shirato, Toru; Fujii, Akiyoshi; and Okihara, Tadashi, 4,056,592, Cl. 264-141.000.
Oku, Teruo: *See—*
Kamiya, Takashi; Teraji, Tsutomu; Hashimoto, Masashi; Nakaguti, Osamu; and Oku, Teruo, 4,056,521, Cl. 260-239.100.
Olin Corporation: *See—*
Cramer, Robert J.; and Raymond, Maurice A., 4,056,403, Cl. 134-22.00R.
Olinkraft, Inc.: *See—*
Decrane, Charles E., 4,056,132, Cl. 141-285.000.
Olson, Barry W. Portable guardrail straightener for field use. 4,055,981, Cl. 72-415.000.
Olsson, Karl Erik; and Sehman, Bengt, to ASEA Aktiebolag. Combination of a thyristor connection and a test device. 4,056,776, Cl. 324-158.0SC.
Olympus Optical Co. Ltd.: *See—*
Ikeda, Masachika, 4,056,829, Cl. 358-256.000.
Shimizu, Hiroyuki; Inaba, Kouji; and Nakahashi, Ken-Ichi, 4,056,310, Cl. 351-6.000.
Omino, Teiji: *See—*
Jojima, Teruomi; Tsuji, Hideakira; Yamamoto, Shinjiro; and Omino, Teiji, 4,056,617, Cl. 424-200.000.
Omnithruster Inc.: *See—*
Dashew, Stanley A.; and Sutton, Charles D., 4,056,073, Cl. 114-151.000.
O'Neill, John H., Jr., to Milliken Research Corporation. Dyeing method. 4,055,868, Cl. 8-150.000.
Ono, Toshiharu: *See—*
Izumi, Ryoji; Kobayashi, Shoji; Ono, Toshiharu; Shirato, Toru; Fujii, Akiyoshi; and Okihara, Tadashi, 4,056,592, Cl. 264-141.000.
Oohira, Takeshi: *See—*
Mitsui, Nobuo; Watanabe, Akinori; Oohira, Takeshi; Kawauchi, Kazuhiko; Nakao, Shoichi; and Teranishi, Katsuya, 4,056,759, Cl. 318-98.000.
O'Rear, Jacques G.: *See—*
Griffith, James R.; and O'Rear, Jacques G., 4,056,560, Cl. 260-465.00D.
Orient Chemical Industries, Ltd.: *See—*
Maekawa, Yoshihiro, 4,056,530, Cl. 260-267.000.
Oronzio de Nora Impianti Elettrochimici S.p.A.: *See—*
Giuffre, Luigi; De Nora, Vittorio; and Spaziante, Placido, 4,056,447, Cl. 204-98.000.
Orris, Stephen Jay; and Miesterfeld, Frederick Otto Richard, to Chrysler Corporation. Speed sensor. 4,056,747, Cl. 310-155.000.
Ostermeier, Rolf: *See—*
Leisterer, Reinhard; Oelfke, Manfred; Woiczik, Hans; Meyer, Hans-Joachim; and Ostermeier, Rolf, 4,056,801, Cl. 340-2.000.
Ota, Sakae: *See—*
Ariyama, Kenzo; Ota, Sakae; Ikeda, Sunao; and Okamoto, Toyoo, 4,056,315, Cl. 355-10.000.
O'Toole, Jerome: *See—*
Hedstrom, Norman; Wright, David; and O'Toole, Jerome, 4,056,296, Cl. 312-184.000.
Otto, Friedrich, to A. Stephan U. Sohne GmbH & Co. Method and apparatus for making confectioneries. 4,056,640, Cl. 426-573.000.
Overman, Kelly C.: *See—*
Brown, Joel E.; and Overman, Kelly C., 4,056,788, Cl. 331-78.000.
Owens-Illinois, Inc.: *See—*
Schmersal, Larry J.; and Johnson, William E., 4,056,806, Cl. 340-166.0EL.
Taylor, Lynn J., 4,056,499, Cl. 260-23.00H.
Taylor, Lynn J.; and Tobias, John W., 4,056,665, Cl. 526-1.000.
P. R. Mallory & Co. Inc.: *See—*
Blanchard, James S.; and Kapper, Charles E., 4,056,744, Cl. 310-51.000.
Jaffe, Sol Samson, 4,056,664, Cl. 429-217.000.
Schlaikjer, Carl Roger, 4,056,663, Cl. 429-197.000.
Pacific Resins & Chemicals, Inc.: *See—*
Miller, John F.; and Conner, Rodney R., 4,056,431, Cl. 162-165.000.
Package Machinery Company: *See—*
Provost, Richard H., 4,056,200, Cl. 214-7.000.
Schoppee, Lawrence W., 4,056,199, Cl. 214-6.0BA.
Packaging Corporation of America: *See—*
Williams, Michael M., 4,056,223, Cl. 229-32.000.
Padget, John Christopher: *See—*
Ballard, Denis George Harold; Jones, Eric; Padget, John Christopher; Pioli, Alexander Joseph Peter; Robinson, Peter Anthony; Walker, John; and Wyatt, Ronald John, 4,056,669, Cl. 526-154.000.
Page, Howard Loomis: *See—*
Callahan, Robert William; Kauffman, Paul Eugene; Kobesky, Lawrence Joseph; and Page, Howard Loomis, 4,056,846, Cl. 364-200.000.
Pahl, Karl-Heinz, to Pahl'Sche Gummi-und Asbest-Gesellschaft "Paguag". Continuous method for making hose with destruction of mandrel. 4,056,596, Cl. 264-166.000.
Pahl'Sche Gummi-und Asbest-Gesellschaft "Paguag": *See—*
Pahl, Karl-Heinz, 4,056,596, Cl. 264-166.000.
Paige, Walter Griffin, to Burroughs Corporation. Electrical connector. 4,056,299, Cl. 339-95.00D.
Paine, Ellis H., to Moldex, Inc. Method and belt of oriented nylon with rubber sheet adhered thereto. 4,056,419, Cl. 156-164.000.
Pako Corporation: *See—*
Baert, Victor R.; and Harvey, Ronald B., 4,056,024, Cl. 83-210.000.
Getsch, Edward W., 4,055,933, Cl. 53-187.000.
Pallos, Ferenc M., to Stauffer Chemical Company. Acylformanidine insecticidal and miticidal compounds. 4,056,570, Cl. 260-562.00B.

Pallos, Ferenc M., to Stauffer Chemical Company. Bis-cycloalkylthiocarbamates as insect control agents. 4,056,627, Cl. 424-300.000.
Palumbo, Luigi: *See—*
Colletta, Angelo; and Palumbo, Luigi, 4,056,443, Cl. 201-5.000.
Panaritis, Dimitrios P.; and Iacovidis, Spyros A., to Panaritis, Georges P.; and Panaritis, Panayotis P. Apparatus for cutting meat. 4,056,026, Cl. 83-454.000.
Panaritis, Georges P.: *See—*
Panaritis, Dimitrios P.; and Iacovidis, Spyros A., 4,056,026, Cl. 83-454.000.
Panaritis, Panayotis P.: *See—*
Panaritis, Dimitrios P.; and Iacovidis, Spyros A., 4,056,026, Cl. 83-454.000.
Pandolfo, Joseph P.: *See—*
Henriques, Frederick C.; Pandolfo, Joseph P.; and Lunde, Peter, 4,056,090, Cl. 126-271.000.
Paper Lynen Co. Ltd., The: *See—*
Brucciani, Richard Louis, 4,055,857, Cl. 2-197.000.
Papoff, Paolo; Morelli, Basilio; and Guidarini, Dante, to Centro Nazionale Delle Richerche. Actuating device with electronic control for injectors of liquid mixers. 4,056,258, Cl. 366-160.000.
Parc, Jean Edmond: *See—*
Michel, Alain Marie; and Parc, Jean Edmond, 4,056,098, Cl. 128-142.00R.
Parent, Guy, to Compagnie Industrielle des Telecommunications Cit-Alcatel. Device for forming channels using detectors spaced out on a circular base. 4,056,715, Cl. 364-514.000.
Paris, Jean: *See—*
Carpentier, Alain; Leclercq, Xavier; and Paris, Jean, 4,055,861, Cl. 3-1.500.
Parisis, Jean; Rossion, Roger; and Depoitier, Jacques, to Cimenteries C.B.R. Cementbedrijven. Device for measuring slope parameters for a material contained inside a cylinder rotated about the axis thereof. 4,056,349, Cl. 432-36.000.
Parrish, Clyde F.: *See—*
Franklin, Gerald B.; and Parrish, Clyde F., 4,056,416, Cl. 149-19.910.
Partyka, Richard Anthony: *See—*
Buchanan, Ronald Leslie; Partyka, Richard Anthony; and Standridge, Robert Ted, 4,056,540, Cl. 260-340.300.
Pastorino, Ronald L.: *See—*
Lewis, Roger N.; Pastorino, Ronald L.; and Wilts, James F., 4,056,561, Cl. 260-46.50G.
Patella, Ralph F.: *See—*
Powanda, Thomas M.; Patella, Ralph F.; Vona, Joseph A.; and DeFazio, Charles A., 4,056,503, Cl. 260-29.60T.
Patsey, John A.: *See—*
Henry, Edwin Blair, Jr.; Patsey, John A.; Rudolph, Ralph G.; and Schindler, Donald G., 4,055,989, Cl. 73-588.000.
Pattas, Konstantin, to Daimler-Benz Aktiengesellschaft. Internal combustion engine. 4,056,081, Cl. 123-75.00B.
Patterson, G. Keith. Apparatus for guiding a portable power-saw. 4,056,028, Cl. 83-745.000.
Patterson, John A.: *See—*
Kolaian, Jack H.; McCoy, Frederic C.; and Patterson, John A., 4,056,355, Cl. 8-137.000.
Pavlovich, Inna Vasilievna: *See—*
Vulikh, Alexandr Ilich; Zagorskaya, Maina Konstantinovna; Kofman, Izrail Zalmanovich; Pavlovich, Inna Vasilievna; Levitan, Boris Veniaminovich; Troyan, Nikolai Vasilievich; and Dubyaga, Sergei Viktorovich, 4,056,605, Cl. 423-484.000.
Pedersen, Mogens Lindskov: *See—*
Hansen, Karl Erik; Hovmand, Svend; Pedersen, Mogens Lindskov; Schwartzbach, Christian; Htun, Myat; de Ruvo, Alf; and Cavlin, Soren, 4,055,903, Cl. 34-12.000.
Penn Fishing Tackle Mfg. Co.: *See—*
Purcell, William, 4,056,246, Cl. 242-219.000.
Pennwalt Corporation: *See—*
Radice, Peter Francis, 4,055,878, Cl. 29-25.350.
PepsiCo Inc.: *See—*
Homanick, George, 4,056,066, Cl. 105-493.000.
Perkin-Elmer Corporation, The: *See—*
Rayces, Juan L., 4,056,307, Cl. 350-181.000.
Perregrino, Anthony: *See—*
Bent, Alfred H.; Booth, George J.; and Perregrino, Anthony, 4,056,353, Cl. 8-14.000.
Perry, Loren Dale. Display and scheduling panels with document holding envelope. 4,055,909, Cl. 40-124.200.
Perry, Louis James, to Invo Spline, Inc. Detection system for machine tools. 4,056,329, Cl. 408-6.000.
Peter Paul Electronics Co., Inc.: *See—*
Allen, Walter E., 4,056,119, Cl. 137-315.000.
Peters, Ann Margaret; Greaves, Geoffrey Stuart; Clark, Ian Robert; Holder, Roger Leonard; and Bunce, Roger Abraham, to United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Social Services in Her Britannic Majesty's Government of the. Vial or other container, and carrier therefor. 4,056,361, Cl. 23-259.000.
Peters, Hans H., to Resources Conservation Co. Method of dewatering material containing solid matter and bound and unbound water. 4,056,466, Cl. 210-10.000.
Petersen, Egon Norbert: *See—*
Schmidt, Werner; Petersen, Egon Norbert; and Richtzenhain, Hermann, 4,056,508, Cl. 260-45.75B.
Peterson, Frank C.: *See—*
Heilman, William J.; Peterson, Frank C.; Renz, Mical C.; and Theard, Leslie P., 4,056,506, Cl. 260-42.180.
Peterson, William Anders, to Bell Telephone Laboratories, Incorporated. Compensated base drive circuit to regulate saturated transistor current gain. 4,056,734, Cl. 307-254.000.
Petit, Michel: *See—*
Debrie, Guy; Grenier, Claude; Petit, Michel; Rigaut, Henri; and Vertut, Jean, 4,056,763, Cl. 318-675.000.
Petro-Tex Chemical Corporation: *See—*
Kerr, Ralph O., 4,056,487, Cl. 252-435.000.
Manning, Harold E., 4,056,490, Cl. 252-468.000.
Petrolite Corporation: *See—*
Redmore, Derek; and Welge, Frederick T., 4,056,479, Cl. 252-18.000.
Pettingell, James R.; and Armstrong, Lee R., to United Technologies Corporation. Waveform count of teeth on an internal combustion engine flywheel. 4,055,998, Cl. 73-119.00R.
Petty, Jon; Trott, Beverly D.; and Backofen, Joseph E., to United States of America, Army. Portable pressure vessel and closure. 4,056,212, Cl. 220-244.000.
Peytavin, Pierre, to Vallourec (Usines a Tubes de Lorraine-Escaut et Vallourec Reunies). Turning mechanism for the movement of ladles in steel mills. 4,056,197, Cl. 214-1.0BC.
Phillips, David C.: *See—*
Smith, James D. B.; Meier, Joseph F.; and Phillips, David C., 4,056,005, Cl. 73-339.00R.
Smith, James D. B.; Meier, Joseph F.; and Phillips, David C., 4,056,006, Cl. 73-339.00R.
Phillips Petroleum Company: *See—*
Carrow, Guy E., 4,056,594, Cl. 264-176.00R.
Cobb, Raymond L., 4,056,542, Cl. 260-346.300.
Cooper, Earl D., 4,056,597, Cl. 264-169.000.
Hutson, Thomas, Jr.; and Makovec, Donald J., 4,056,577, Cl. 260-683.480.
Kenton, Joseph R., 4,056,381, Cl. 71-36.000.
Vidaurri, Fernando C., Jr., 4,056,515, Cl. 260-79.100.
Phillips, Raymond M. Mattress having an internal fluid containing chamber. 4,055,867, Cl. 5-371.000.
Phillips, Wendell C., Jr.: *See—*
Reid, Alan; and Phillips, Wendell C., Jr., 4,056,079, Cl. 122-476.000.
Phillips, William, to RCA Corporation. Light modulation employing single crystal optical waveguides of niobium-doped lithium tantalate. 4,056,304, Cl. 350-96.0WG.
Phoenix Products Company, Inc.: *See—*
Faux, Kenneth R., Sr.; and Wenman, William A., 4,056,718, Cl. 362-306.000.
Piessey Handel und Investments A.G.: *See—*
Whitfield, John Alan; and Burdis, Eric William, 4,056,804, Cl. 340-146.30J.
Pike, Roscoe A.: *See—*
Galasso, Francis S.; Bourdeau, Roméo G.; and Pike, Roscoe A., 4,056,598, Cl. 264-184.000.
Piltz, Lars-Erik; and Tvingstedt, Claes, to AB Akerlund & Rausing. Laminated package. 4,056,221, Cl. 229-14.0BL.
Pioli, Alexander Joseph Peter: *See—*
Ballard, Denis George Harold; Jones, Eric; Padget, John Christopher; Pioli, Alexander Joseph Peter; Robinson, Peter Anthony; Walker, John; and Wyatt, Ronald John, 4,056,669, Cl. 526-154.000.
Pioneer Electronic Corporation: *See—*
Okamoto, Kintaro; Kudo, Hirokatu; Ishijimi, Soichi; Kadoiri, Etsuro; Soma, Hiroshi; and Suzuki, Hiroyuki, 4,056,165, Cl. 181-141.000.
Pittman, Allen G.; Wasley, William L.; and Getchell, Nelson F., to United States of America, Agriculture. Process for rapid dyeing of textiles. 4,056,354, Cl. 8-54.000.
Pittsburgh Corning Corporation: *See—*
Kirkpatrick, John; and Kijowski, John, 4,056,399, Cl. 106-69.000.
Pizzarello, Frank A., to Rockwell International Corporation. Beam lead testing apparatus. 4,055,992, Cl. 73-88.00B.
Place, Harry, to International Telephone and Telegraph Corporation. Digital tone generator. 4,056,692, Cl. 179-84.0VF.
Platt Saco Lowell Limited: *See—*
Clayton, James William Barnes, 4,055,938, Cl. 57-58.890.
Plessey Company Limited, The: *See—*
Martin, Barrie James, 4,056,143, Cl. 165-176.000.
Plessey Handel und Investments A.G.: *See—*
Blatt, Victor, 4,056,736, Cl. 307-289.000.
Pochan, John M.: *See—*
Turner, Sam R.; and Pochan, John M., 4,056,391, Cl. 96-1.0PC.
Pockrandt, Gunter: *See—*
Baron, Gerhard; Bierbach, Herbert; Hafke, Carl; and Pockrandt, Gunter, 4,056,483, Cl. 252-373.000.
Podzharsky, Avrum Iosifovich: *See—*
Skvortsov, Gennady Alexeevich; Nizeeva, Nellya Nikitichna; Podzharsky, Avrum Iosifovich; and Dobrovolskaya, Irma Viktorovna, 4,056,600, Cl. 423-239.000.
Pohto, Gerald R.; Kubrin, Michael J.; and Sutter, Robert C., to Diamond Shamrock Corporation. Monopolar membrane electrolytic cell. 4,056,458, Cl. 204-263.000.
Polaroid Corporation: *See—*
Greenwald, Richard B., 4,056,539, Cl. 260-326.14R.
Scott, Kenneth G., 4,056,392, Cl. 96-3.000.
Policardi, Silvio: *See—*
Ritti, Stelio; and Policardi, Silvio, 4,056,459, Cl. 204-286.000.

Pollitt, Duncan H.; and Reich, Murray H., to Princeton Chemical Research, Inc. Homogeneous molded golf ball. 4,056,269, Cl. 273-218.000.
Pollock, Douglas; Sobarzo, Omar; Urquizar, Rolando; Vilches, Carlos; and Bolanos, Jaime, to Compania de Acero del Pacifico S.A. Cupola furnace to enable continuous smelting and refining of cement copper and method therefor. 4,056,262, Cl. 266-138.000.
Pond, George R.: *See—*
Hindin, Saul G.; and Pond, George R., 4,056,489, Cl. 252-462.000.
Ponticello, Ignazio Salvatore, to Eastman Kodak Company. Process of preparing substituted acrylates. 4,056,543, Cl. 260-348.590.
Popovich, John Michael: *See—*
Meier, Harold K.; and Popovich, John Michael, 4,056,092, Cl. 126-271.000.
Pospischil, Reginhard; and Domer, Josef, to Siemens Aktiengesellschaft. Transmission system for pulse signals. 4,056,790, Cl. 333-5.000.
Possell, Clarence R.: *See—*
Winkler, Robert J.; and Possell, Clarence R., 4,056,209, Cl. 215-215.000.
Pow, Robert Marvin, to King Seagrave Limited. Truck construction. 4,056,283, Cl. 298-17.600.
Powanda, Thomas M.; Patella, Ralph F.; Vona, Joseph A.; and DeFazio, Charles A., to Celanese Corporation. Incorporation of multifunctional monomers (PETA, TMPTA, and HDODA) in vinyl-acrylic emulsion polymers. 4,056,503, Cl. 260-29.60T.
PPG Industries, Inc.: *See—*
Kelly, Joseph B.; and Gibson, Kenneth A., 4,056,379, Cl. 65-106.000.
Nielsen, Donald R., 4,056,491, Cl. 252-557.000.
Rinehart, Jay Kent, 4,056,549, Cl. 260-455.00A.
Pratt, Jeff D.: *See—*
Day, Leon E., 4,056,214, Cl. 222-608.000.
Precise Corporation: *See—*
York, Richard N.; and York, David L., 4,056,427, Cl. 156-580.000.
Precision Monolithics, Inc.: *See—*
Schoeff, John A., 4,056,740, Cl. 307-362.000.
Prejean, George Wyatt. Caustic-resistant polymer coatings for glass. 4,056,208, Cl. 215-12.00R.
Presto Products Incorporated: *See—*
Schwarz, Eckhard C. A., 4,056,639, Cl. 426-264.000.
Prestridge, Floyd L., to Combustion Engineering, Inc. Panel board. 4,056,733, Cl. 307-115.000.
Priarone, Paolo; and Achter, Eugene K., to Baxter Travenol Laboratories, Inc. Apparatus for deriving blood oxygen association curve information. 4,056,358, Cl. 23-253.00R.
Princeton Chemical Research, Inc.: *See—*
Pollitt, Duncan H.; and Reich, Murray H., 4,056,269, Cl. 273-218.000.
Princeton Gamma-Tech, Inc.: *See—*
Harchol, Micha, 4,056,726, Cl. 250-370.000.
Prinz, Richard: *See—*
Alberts, Heinrich; Bartl, Herbert; and Prinz, Richard, 4,056,671, Cl. 526-342.000.
Procor Limited: *See—*
Deeks, Ronald George, 4,056,117, Cl. 137-68.00R.
Procter & Gamble Company, The: *See—*
Johnson, Eric M.; Murray, Graeme D.; and Hardy, Frederick E., 4,056,113, Cl. 134-40.000.
Tate, John Robert, 4,056,481, Cl. 252-140.000.
Produits Chimiques Ugine Kuhlmann: *See—*
Arsac, Aime Joseph; and Frank, Pierre, 4,056,367, Cl. 44-59.000.
Professional Positioners, Inc.: *See—*
Huge, Gerald W., 4,055,895, Cl. 32-14.00B.
Propp, Donald J.: *See—*
Hoerz, Richard D.; and Propp, Donald J., 4,056,741, Cl. 310-322.000.
Provost, Richard H., to Package Machinery Company. High speed stacker. 4,056,200, Cl. 214-7.000.
Pruzan, Philippe: *See—*
Ter-Minassian, Leon; Pruzan, Philippe; Figuiere, Pierre; and Szwarc, Henri, 4,055,982, Cl. 73-15.00B.
Pryor, Michael J.; and Gray, Thomas J., to Swiss Aluminium Limited. Method of preparing molten metal filter. 4,056,586, Cl. 264-44.000.
Pugnet, Lucien: *See—*
Gama, Jean-Michel; Lallement, Jean; and Pugnet, Lucien, 4,056,438, Cl. 176-50.000.
Purcell, William, to Penn Fishing Tackle Mfg. Co. Fishing reel with friction drag. 4,056,246, Cl. 242-219.000.
Purolator, Inc.: *See—*
Mouwen, Herman Charles; Lauer, William; and Weinberg, Steven Louis, 4,056,476, Cl. 210-446.000.
Puschel, Siegfried: *See—*
Abels, Theodor; and Puschel, Siegfried, 4,056,160, Cl. 180-143.000.
Pye, Earl L.: *See—*
Gauntt, Wayne M.; and Pye, Earl L., 4,056,445, Cl. 204-1.00T.
Quackenbush, Henry. Method of and apparatus for the recovery of a desired material from a carrier stream. 4,056,369, Cl. 55-58.000.
Quinn, Robert J., to Digital Equipment Corporation. Display processing unit for drawing vectors. 4,056,713, Cl. 364-521.000.
Quintron, Inc.: *See—*
Jacoby, Benjamin Franklin; and Monroe, Marvin E., 4,056,761, Cl. 318-116.000.
R. A. Jones & Co. Inc.: *See—*
Hughes, Charles C., 4,056,046, Cl. 93-49.00R.
R. Alkan & Cie: *See—*
Hasquenoph, Jean H.; and Coutin, Pierre Fernand, 4,056,248, Cl. 244-137.00R.
R. J. Reynolds Tobacco Company: *See—*
Schumacher, Joseph N.; Best, Freddie W.; and Green, Charles R., 4,056,108, Cl. 131-17.00R.
Raasch, Hans, to W. Schlafhorst & Co. Method for terminating a spinning operation. 4,055,936, Cl. 57-34.00R.
Rabelos, Nicholas A., to Clark, Thomas G.; Clary, Kenneth B.; England, J. Melvin; O'Brien, Charles, Jr.; and Rabelos, Nicholas A. Detachable fire escape device. 4,056,166, Cl. 182-5.000.
Rabon, James L., to United States of America, Navy. Sonar alarm system. 4,056,802, Cl. 340-3.00R.
Rackliffe, Richard J.; and Armstrong, Lee R., to United Technologies Corporation. Sub-cyclic measurement of speed of an internal combustion engine. 4,055,993, Cl. 73-116.000.
Radek, John R., to Ready Metal Manufacturing Company. Combination service truck and dispensing equipment. 4,056,194, Cl. 211-131.000.
Radice, Peter Francis, to Pennwalt Corporation. Stabilization of piezoelectric resin elements. 4,055,878, Cl. 29-25.350.
Ragone, Alexander C.; and Ragone, Inez. Hospital gown. 4,055,855, Cl. 2-114.000.
Ragone, Inez: *See—*
Ragone, Alexander C.; and Ragone, Inez, 4,055,855, Cl. 2-114.000.
Ramey, Chester E.; and Luzzi, John J., to Ciba-Geigy Corporation. Hindered piperidine carboxylic acids, metal salts thereof and stabilized compositions. 4,056,507, Cl. 260-45.80N.
Rampel, Guy G.; and Young, Jon R., to General Electric Company. Rechargeable cell with oxygen sensing electrode. 4,056,660, Cl. 429-59.000.
Randazzo, Gaspare, to Societa di Elettronica per l'Automazione - SEPA S.p.A. Digital tachometer. 4,056,778, Cl. 324-166.000.
Rath, Hans M. Dual purpose semi-automatic convertible rifle. 4,056,038, Cl. 89-128.000.
Ratliff, David P. Throttle valve lock for automobile. 4,056,089, Cl. 123-198.00B.
Ratti, Renald Anthony: *See—*
Dworak, Francis Stanislaus; and Ratti, Renald Anthony, 4,056,698, Cl. 179-175.20C.
Rauterkus, Karl Josef: *See—*
Reinecke, Rolf; Rauterkus, Karl Josef; Schmieder, Werner; and Lutz, Eleonore, 4,056,497, Cl. 260-29.6TA.
Ravas, Richard J., to Westinghouse Electric Corporation. Pulse generator. 4,056,105, Cl. 128-419.0PG.
Ravi, Kramadhati Venkata: *See—*
Garone, Lynne C.; and Ravi, Kramadhati Venkata, 4,056,404, Cl. 136-89.0PC.
Ravier, Jean: *See—*
Giacometti, Christian; Mougniot, Jean-Claude; and Ravier, Jean, 4,056,437, Cl. 176-40.000.
Ravitts, Richard B., to Riga, Inc. Separating apparatus for clarifying liquid. 4,056,477, Cl. 210-522.000.
Ray, Earnest Joseph, to Dictaphone Corporation. Shaft position sensor. 4,056,722, Cl. 250-231.0SE.
Ray, Eric Thomas, to AMF Incorporated. Knife growth detector. 4,056,022, Cl. 83-62.000.
Rayces, Juan L., to Perkin-Elmer Corporation, The. Anamorphic scanner lens system. 4,056,307, Cl. 350-181.000.
Raymond, Maurice A.: *See—*
Cramer, Robert J.; and Raymond, Maurice A., 4,056,403, Cl. 134-22.00R.
Raytheon Company: *See—*
Derby, Palmer P., 4,056,756, Cl. 315-39.690.
Dionne, Norman J.; and Wettstein, Ernest C., 4,056,800, Cl. 335-296.000.
RCA Corporation: *See—*
Hovagimyan, Norman; and Link, John Michael, 4,056,851, Cl. 364-900.000.
Marcantonio, Angelo Robert, 4,056,847, Cl. 364-200.000.
Phillips, William, 4,056,304, Cl. 350-96.0WG.
Sohn, Frank Myung-Hi, 4,056,755, Cl. 313-402.000.
Vossen, John Louis, Jr., 4,056,457, Cl. 204-192.0SP.
Read, Donald B.: *See—*
McCauslan, George L.; and Read, Donald B., 4,056,450, Cl. 204-201.000.
Ready Metal Manufacturing Company: *See—*
Radek, John R., 4,056,194, Cl. 211-131.000.
Reb Manufacturing Inc.: *See—*
Meldahl, Robert D.; and Smalley, Raymond L., 4,056,203, Cl. 214-75.00T.
Rechter, Harold L.; and Haligarda, James R., to Chicago Fire Brick Company. Plastic refractory composition suitable for placement by vibrating and the use thereof. 4,056,398, Cl. 106-65.000.
Redifon Limited: *See—*
Spooner, Archer Michael; and Murray, Paul Michael, 4,056,827, Cl. 358-87.000.
Redmore, Derek; and Welge, Frederick T., to Petrolite Corporation. Magnesium carboxylate-sulfonate complexes. 4,056,479, Cl. 252-18.000.
Reed, Hugh Wilma Boulton: *See—*
Holland, David; Milner, David John; and Reed, Hugh Wilma Boulton, 4,056,574, Cl. 260-654.00R.
Refojo, Miguel F.: *See—*
Mancini, William L.; Korb, Donald R.; and Refojo, Miguel F., 4,056,496, Cl. 260-29.6TA.

Reich, Murray H.: *See—*
Pollitt, Duncan H.; and Reich, Murray H., 4,056,269, Cl. 273-218.000.
Reichert, Donald G., to ABC Packaging Machine Corporation. Bottle loading machine. 4,055,943, Cl. 53-247.000.
Reid, Alan; and Phillips, Wendell C., Jr., to United States of America, Navy. Apparatus and process for preheating main boiler superheater headers. 4,056,079, Cl. 122-476.000.
Reimann, Hans; Jaret, Robert S.; and Nafissi-Varchei, Mohammad Mehdi, to Schering Corporation. Rosamicin derivatives and method of using same. 4,056,616, Cl. 424-180.000.
Reinecke, Rolf; Rauterkus, Karl Josef; Schmieder, Werner; and Lutz, Eleonore, to Hoechst Aktiengesellschaft. Acrylic ester copolymers capable of being cross-linked. 4,056,497, Cl. 260-29.6TA.
Reinhard, John D.: *See—*
Gensike, Karl H.; Marsh, Robert C.; and Reinhard, John D., 4,056,321, Cl. 355-99.000.
Reinhart, Thomas L.: *See—*
Daus, John J., Jr.; James, Henry E.; and Reinhart, Thomas L., 4,056,327, Cl. 403-172.000.
Reiss, Gerhard: *See—*
Heinze, Gerhard; Mengel, Manfred; and Reiss, Gerhard, 4,056,370, Cl. 55-68.000.
Reliable Electric Company: *See—*
Lundsgaard, Paul S.; and Sedlacek, William S., 4,056,840, Cl. 361-124.000.
Reliance Electric Company: *See—*
Chung, Jackson, 4,056,018, Cl. 74-665.00P.
Remzhin, Jury Nikolaevich: *See—*
Bukrinsky, Anatoly Matveevich; Matskevich, Genrikh Vladimirovich; Rzheznikov, Julian Vulfovich; Sukhov, Andrei Borisovich; Tatarnikov, Viktor Petrovich; Berkovich, Viktor Mozesovich; Remzhin, Jury Nikolaevich; Slepnev, Lev Nikolaevich; Sverdlov, Alexandr Anatolievich; Karan, Vladimir Geselevich; Kaloshin, Jury Petrovich; Krasikov, Anatoly Nikolaevich; Babenko, Evgeny Akimovich; Bronnikov, Vladimir Konstantinovich; Shvyryaev, Jury Vasilievich; and Shiryaev, Boris Semenovich, 4,056,436, Cl. 176-38.000.
Renz, Mical C.: *See—*
Heilman, William J.; Peterson, Frank C.; Renz, Mical C.; and Theard, Leslie P., 4,056,506, Cl. 260-42.180.
Reparaz, Jose M. Palacios: *See—*
Cantera, Gregorio Asua; Reparaz, Jose M. Palacios; and Molnar, Louis, 4,056,387, Cl. 75-123.00F.
Repay, Laszlo N.; and Young, Thomas A., to Tenna Corporation. Adjustable mirror support. 4,056,253, Cl. 248-479.000.
Repla International S.A.H.: *See—*
de Navas Albareda, Jose Luis, 4,056,593, Cl. 264-145.000.
Research Corporation: *See—*
Sonenberg, Martin; and Yamasaki, Nobuyuki, 4,056,520, Cl. 260-112.50R.
Resource Systems, Inc.: *See—*
Rubin, Leonard Roy, 4,056,373, Cl. 55-158.000.
Resources Conservation Co.: *See—*
Peters, Hans H., 4,056,466, Cl. 210-10.000.
Rexnord, Inc.: *See—*
Fredericks, Walter A., 4,055,966, Cl. 64-13.000.
Rey, Pierre Theodore Joseph; Leandri, Jacqueline Agathe Marie; and Abbou, Clement Claude, to Agence Nationale de Valorisation de la Recherche (ANVAR). Control device for medical and surgical uses. 4,056,095, Cl. 128-1.00R.
Rheinische Braunkohlenwerke AG: *See—*
Behr, Friedrich F., 4,056,607, Cl. 423-579.000.
Rhone-Poulenc Industries: *See—*
Carpentier, Alain; Leclercq, Xavier; and Paris, Jean, 4,055,861, Cl. 3-1.500.
Rhone-Poulenc S.A.: *See—*
Christen, Gilbert; Favre, Bernard; Marze, Xavier; Salmon, Michel; and Thuillier, Rene, 4,056,467, Cl. 210-23.00F.
Ricci, Roberto: *See—*
Aliprandi, Giovanni; and Ricci, Roberto, 4,056,217, Cl. 222-600.000.
Richard, Gerard Y., to Societe d'Applications de Procedes Industriels et Chimiques S.A.P.I.C. Process and apparatus for the continuous preparation of a mixture for foundry molds or the like, with formation of a premix. 4,056,259, Cl. 366-15.000.
Richards, William: *See—*
Grolman, Bernard; and Richards, William, 4,055,900, Cl. 33-200.000.
Richardson, Anthony George, to Denbyware Limited. Transfers. 4,056,648, Cl. 428-138.000.
Richter, Johan C. F. C.; Christenson, Per Tyke; and Richter, Ole Johan, to Kamyr Aktiebolag. Method for counter-current treatment of cellulose fiber material. 4,056,429, Cl. 162-17.000.
Richter, Ole Johan: *See—*
Richter, Johan C. F. C.; Christenson, Per Tyke; and Richter, Ole Johan, 4,056,429, Cl. 162-17.000.
Richtzenhain, Hermann: *See—*
Riegger, Paul; Richtzenhain, Hermann; and Zoche, Gunter, 4,056,454, Cl. 204-163.00R.
Schmidt, Werner; Petersen, Egon Norbert; and Richtzenhain, Hermann, 4,056,508, Cl. 260-45.75B.
Ricoh Company, Ltd.: *See—*
Ariyama, Kenzo; Ota, Sakae; Ikeda, Sunao; and Okamoto, Toyoo, 4,056,315, Cl. 355-10.000.
Iiyama, Kiyotaka; Matsui, Takeshi; Kusakata, Shigeru; and Takahashi, Michihisa, 4,056,824, Cl. 354-300.000.
Mochimaru, Hideaki; and Kobayashi, Yugoro, 4,056,320, Cl. 355-75.000.
Riegger, Paul; Richtzenhain, Hermann; and Zoche, Gunter, to Dynamit Nobel Aktiengesellschaft. Process for the preparation of $\alpha,\alpha,\alpha\alpha',\alpha'$-pentachloro-o-xylene. 4,056,454, Cl. 204-163.00R.
Riga, Inc.: *See—*
Ravitts, Richard B., 4,056,477, Cl. 210-522.000.
Rigaut, Henri: *See—*
Debrie, Guy; Grenier, Claude; Petit, Michel; Rigaut, Henri; and Vertut, Jean, 4,056,763, Cl. 318-675.000.
Rinehart, Jay Kent, to PPG Industries, Inc. S-3-Methoxyphenyl N-alkylthiolcarbamates and S-3-methylthiophenyl N-alkylthiolcarbamates. 4,056,549, Cl. 260-455.00A.
Ringel, Wolfgang; Rutsch, Peter; Schneider, Rolf; and Kohl, Edgar, to Carl Freudenberg, Firma. Gas filter element. 4,056,375, Cl. 55-381.000.
Risbourg, Bernard: *See—*
Carlier, Jacques; and Risbourg, Bernard, 4,056,435, Cl. 176-30.000.
Risch, Gerhard M. Apparatus for dilution of liquid specimens. 4,056,360, Cl. 23-259.000.
Risdon Manufacturing Company, The: *See—*
Kotuby, Paul M., 4,056,216, Cl. 222-385.000.
Ritchie, James A., to Caterpillar Tractor Co. Apex seals for slant axis rotary mechanisms. 4,056,336, Cl. 418-51.000.
Ritter, Bruno, to Buro Patent AG. Dispatcher for conveyor system. 4,056,063, Cl. 104-88.000.
Ritti, Stelio; and Policardi, Silvio, to Solvay & Cie. Anode assembly for an electrolytic cell. 4,056,459, Cl. 204-286.000.
Rivers, Joseph Tracy, Jr.; and Zaharko, Joe Dennis, to Du Pont de Nemours, E. I., and Company. Integrated string. 4,055,941, Cl. 57-149.000.
Robert Bosch GmbH: *See—*
Dinkelacker, Walter; Blum, Rudolf; Abele, Klaus; Knodler, Jurgen; and Ebinger, Peter, 4,055,996, Cl. 73-117.000.
Hauser, Manfred; and Schumacher, Werner, 4,056,126, Cl. 137-625.650.
Mohr, Adolf; Sohn, Wolfgang; and Strobl, Georg, 4,056,770, Cl. 324-205.000.
Schadlich, Fritz, 4,056,762, Cl. 318-484.000.
Zorn, Jurgen; Vlemmings, Jan; Muller, Karl-Heinz; Mayer, Siegfried; Dworak, Wilhelm; Hartmann, Eugen; Fader, Martin; Talmon, Wolfgang; Jons, Claus; Sauer, Ivan; and Bosch, Paul, 4,056,337, Cl. 418-131.000.
Robertshaw Controls Company: *See—*
Wolfe, Denis G., 4,056,348, Cl. 431-66.000.
Robin, Marcel, to Commissariat a l'Energie Atomique. Secondary heat transfer circuits for nuclear reactor plant. 4,056,439, Cl. 176-65.000.
Robins, Roland K.; Rousseau, Robert J.; and Mian, Abdul M., to ICN Pharmaceuticals, Inc. Derivatives of 3-deazaguanine. 4,056,674, Cl. 536-28.000.
Robinson, Peter Anthony: *See—*
Ballard, Denis George Harold; Jones, Eric; Padget, John Christopher; Pioli, Alexander Joseph Peter; Robinson, Peter Anthony; Walker, John; and Wyatt, Ronald John, 4,056,669, Cl. 526-154.000.
Roch, Jacques Leon, to Electroglas, Inc. Microcircuit test device with multi-axes probe control. 4,056,777, Cl. 324-158.00P.
Rockwell International Corporation: *See—*
Caswell, Robert L., 4,056,735, Cl. 307-273.000.
Havens, Charlie C.; and Rutelonis, James A., 4,056,682, Cl. 174-35.0GC.
Oeffinger, Thomas R.; and Tocci, Leonard R., 4,056,813, Cl. 365-12.000.
Pizzarello, Frank A., 4,055,992, Cl. 73-88.00B.
Zumwalt, Homer, 4,056,211, Cl. 220-9.00G.
Roe, Alfred W.; Ogden, John; and Carter, Robert, to Roe International, Inc. Bezel case. 4,056,235, Cl. 220-4.00E.
Roe International, Inc.: *See—*
Roe, Alfred W.; Ogden, John; and Carter, Robert, 4,056,235, Cl. 220-4.00E.
Roesner, Raymond Earl, to Dresser Industries, Inc. Multiple arm pad instrument for logging highly deviated boreholes. 4,056,004, Cl. 73-151.000.
Rohm and Haas Company: *See—*
Bayer, Horst O.; and Hurt, William S., 4,056,581, Cl. 260-972.000.
Lewis, Sheldon N.; and Haggard, Richard A., 4,056,559, Cl. 526-212.000.
Ronsen, Bruce: *See—*
Gordon, Paul; Ronsen, Bruce; and Kulkarni, Shrikant V., 4,056,322, Cl. 536-4.000.
Rooney, Clarence S.: *See—*
Atkinson, Joseph G.; Belanger, Patrice C.; Rooney, Clarence S.; and Britcher, Susan F., 4,056,536, Cl. 260-326.50B.
Root, Lyman V.: *See—*
Nowroski, Alvin P.; and Root, Lyman V., 4,056,085, Cl. 123-119.00B.
Rosenberg, Paul, to Center for the Environment & Man, The. Solar heat collector. 4,056,094, Cl. 126-271.000.
Rosenkrantz, Edward: *See—*
Rosenkrantz, Evelyn S.; and Rosenkrantz, Edward, 4,056,228, Cl. 239-274.000.
Rosenkrantz, Evelyn S.; and Rosenkrantz, Edward. Aroma system. 4,056,228, Cl. 239-274.000.

Roser, Bernard S.: *See—*
Godlewski, Walter A.; Roser, Bernard S.; and Lyons, John B., 4,056,294, Cl. 312-30.000.
Roslyng, Ole; and Dam, Niels Erik Friis, to Nordisk Ventilator Co., A/S. Method and a device for detecting the stall condition of an axial flow fan or compressor. 4,055,994, Cl. 73-116.000.
Ross, Roderick Buchan, to Minister of Agriculture, Fisheries & Food, in Her Britanic Majesty's Government of the U.K. of Great Britain & N. Ireland. Rough terrain vehicles. 4,056,158, Cl. 180-6.480.
Rossion, Roger: *See—*
Parisis, Jean; Rossion, Roger; and Depoitier, Jacques, 4,056,349, Cl. 432-36.000.
Rotawinder Limited: *See—*
Ciniglio, Alexander J.; and Hadfield, Richard M., 4,056,238, Cl. 242-25.00R.
Rouault, Claude: *See—*
Carre, Christian; and Rouault, Claude, 4,056,234, Cl. 141-392.000.
Rouquet, Alain: *See—*
Lefebvre, Marcel; and Rouquet, Alain, 4,056,769, Cl. 324-236.000.
Rousseau, Robert J.: *See—*
Robins, Roland K.; Rousseau, Robert J.; and Mian, Abdul M., 4,056,674, Cl. 536-28.000.
Roussel-Uclaf: *See—*
Mantel, Olivier, 4,056,618, Cl. 424-246.000.
Rowe, Edward A., Jr.; and Cawley, William H., to Diamond Shamrock Corporation. Increasing topcoat adhesion for solvent phosphatized surfaces. 4,056,409, Cl. 148-6.15R.
Rowland-Hill, Edward W.: *See—*
Todd, Robert R.; and Rowland-Hill, Edward W., 4,056,107, Cl. 130-27.00R.
Roy, Alejo V.: *See—*
Huang, Charles Y.; and Roy, Alejo V., 4,056,442, Cl. 195-62.000.
Rozenberg, Evgeny Khaskelevich: *See—*
Volfkovich, Semen Issakovich; Belov, Vladimir Nikolaevich; Ershov, Vadim Andreevich; Rozenberg, Evgeny Khaskelevich; Shipov, Emmanuil Ivanovich; and Jumanova, Ljudmila Vladimirovna, 4,056,601, Cl. 423-322.000.
Rozmus, Walter J., to Kelsey-Hayes Company. Method and apparatus for degassing gas contaminated particulate material. 4,056,368, Cl. 55-2.000.
Rubel, Laurence P. Strip cutting apparatus. 4,056,025, Cl. 83-261.000.
Rubin, Leonard Roy, to Resource Systems, Inc. Hydrogen-purification apparatus with palladium-alloy filter coil. 4,056,373, Cl. 55-158.000.
Rudolph, Ralph G.: *See—*
Henry, Edwin Blair, Jr.; Patsey, John A.; Rudolph, Ralph G.; and Schindler, Donald G., 4,055,989, Cl. 73-588.000.
Ruhrgas Aktiengesellschaft: *See—*
Baron, Gerhard; Bierbach, Herbert; Hafke, Carl; and Pockrandt, Gunter, 4,056,483, Cl. 252-373.000.
Rutelonis, James A.: *See—*
Havens, Charlie C.; and Rutelonis, James A., 4,056,682, Cl. 174-35.0GC.
Rutsch, Peter: *See—*
Ringel, Wolfgang; Rutsch, Peter; Schneider, Rolf; and Kohl, Edgar, 4,056,375, Cl. 55-381.000.
Rutz, Peter; and Steiger, Anton, to Sulzer Brothers Limited. Rotary hydrostatic piston machine with eccentrically movable guide means. 4,056,042, Cl. 91-497.000.
Rutz, Peter; and Steiger, Anton, to Sulzer Brothers Limited. Reciprocating internal combustion engine. 4,056,080, Cl. 123-23.000.
Rydh, Thore Oskar Verner: *See—*
Dahlberg, Alf-Goran; Hogberg, Karl Gustav; Lindvall, Sven; and Rydh, Thore Oskar Verner, 4,056,672, Cl. 536-1.000.
Rys, Tadeusz J., to I-T-E Imperial Corporation. Cradle for contact operating means. 4,056,797, Cl. 335-6.000.
Rzheznikov, Julian Vulfovich: *See—*
Bukrinsky, Anatoly Matveevich; Matskevich, Genrikh Vladimirovich; Rzheznikov, Julian Vulfovich; Sukhov, Andrei Borisovich; Tatarnikov, Viktor Petrovich; Berkovich, Viktor Mozesovich; Remzhin, Jury Nikolaevich; Slepnev, Lev Nikolaevich; Sverdlov, Alexandr Anatolievich; Karan, Vladimir Geselevich; Kaloshin, Jury Petrovich; Krasikov, Anatoly Nikolaevich; Babenko, Evgeny Akimovich; Bronnikov, Vladimir Konstantinovich; Shvyryaev, Jury Vasilievich; and Shiryaev, Boris Semenovich, 4,056,436, Cl. 176-38.000.
S. A. Eternit: *See—*
Faille, Marc Della; Delvaux, Pierre; Godard, Pierre; and Mercier, Jean Pierre, 4,056,655, Cl. 428-443.000.
S.C.I. Le Brin: *See—*
Zizine, Jean Louis, 4,056,003, Cl. 73-194.00F.
S I G Schweizerische Industrie-Gesellschaft: *See—*
Heinzer, Hans; and Muller, Werner, 4,056,045, Cl. 93-35.0SB.
S.R.M. Hydromekanik Aktiebolag: *See—*
Ahlen, Karl Gustav, 4,056,019, Cl. 74-677.000.
Ahlen, Karl Gustav; and Wahlsten, Gunnar, 4,056,177, Cl. 192-.032.
Saab-Scania AB: *See—*
Lindstrom, Arne David, 4,056,684, Cl. 179-5.00R.
Sachs, Elmer B. Hydrofoil kit. 4,056,074, Cl. 114-280.000.
St. Clair, John Craig. Stirling cycle engine. 4,055,960, Cl. 62-6.000.
St. John, Richard C.: *See—*
Kraft, Derald H.; and St. John, Richard C., 4,056,291, Cl. 308-189.00R.
St. Louis Diecasting Corporation: *See—*
Krieger, George H., 4,056,267, Cl. 273-72.00A.
Saito, Masahiro: *See—*
Tanaka, Yoshiaki; Handa, Susumu; Nishibata, Atsushi; Ueda, Sadashi; Inamoto, Yoshiaki; Saito, Masahiro; Tanimoto, Fumio; and Kitano, Hisao, 4,056,547, Cl. 260-453.00P.
Saitoh, Takeshi; Akutsu, Eisaku; and Shinagawa, Mitsuhisa, to Hitachi, Ltd. Self-oscillating mixer circuit. 4,056,787, Cl. 331-59.000.
Sakaguchi, Shinji: *See—*
Horie, Ikutaro; Miyazako, Takushi; Sakaguchi, Shinji; Tsuji, Nobuo; and Kameji, Nagao, 4,056,396, Cl. 96-67.000.
Sakaki, Yoshihiro, to Nissan Motor Company, Limited. Seal assembly in rotary regenerative heat exchanger. 4,056,141, Cl. 165-9.000.
Sakakibara, Sakuichi; Sugisawa, Ko; and Kitamura, Yukio, to House Food Industrial Company Limited. Acidic edible pectin hydrogel containing colloidally dispersed protein and metaphosphate ions for preventing coagulation of the protein. 4,056,566, Cl. 426-577.000.
Sala, Luisa: *See—*
Bertazzoli, Cesare; Sala, Luisa; and Ghione, Mario, 4,056,613, Cl. 424-94.000.
Salkoff, Goodwin: *See—*
Levinson, Melvin; and Salkoff, Goodwin, 4,056,102, Cl. 128-218.00F.
Sallas, John James: *See—*
Wood, George William; and Sallas, John James, 4,056,163, Cl. 181-113.000.
Salmon, Michel: *See—*
Christen, Gilbert; Favre, Bernard; Marze, Xavier; Salmon, Michel; and Thuillier, Rene, 4,056,467, Cl. 210-23.00F.
Salvatore, Joseph E. Orthopedic shoe construction. 4,056,106, Cl. 128-583.000.
Sample, Winfield, to Bell & Howell Company. Transducing methods and transducers. 4,056,008, Cl. 73-398.0AR.
Sandell Mfg. Co., Inc.: *See—*
Wasserman, Max; and Gorman, Martin E., Jr., 4,055,925, Cl. 52-403.000.
Sander, Hanslothar; Matusch, Siegfried; and Hemminghaus, Uwe, to Braunschweigische Maschinenbauanstalt. Pulp catcher. 4,056,475, Cl. 210-402.000.
Sander, Helfrid: *See—*
Barzynski, Helmut; Heil, Guenter; Klemm, Karl; and Sander, Helfrid, 4,056,453, Cl. 204-159.230.
Sando Iron Works Co., Ltd.: *See—*
Sando, Yoshikazu; and Ishidoshiro, Hiroshi, 4,055,970, Cl. 68-5.00E.
Sando, Yoshikazu; and Ishidoshiro, Hiroshi, to Sando Iron Works Co., Ltd. High temperature and high pressure steamer. 4,055,970, Cl. 68-5.00E.
Sankyo Company Limited: *See—*
Jojima, Teruomi; Tsuji, Hideakira; Yamamoto, Shinjiro; and Omino, Teiji, 4,056,617, Cl. 424-200.000.
Sano, Takezo; and Sasaki, Masao, to Sumitomo Chemical Company, Limited. Process for preparing novel thin films. 4,056,456, Cl. 204-165.000.
Sanyo Electric Co., Ltd.: *See—*
Ikeguchi, Shigehiko; Yamashita, Norio; and Matsuda, Eiji, 4,056,181, Cl. 194-10.000.
Sanyo Vending Machine Co., Ltd.: *See—*
Ikeguchi, Shigehiko; Yamashita, Norio; and Matsuda, Eiji, 4,056,181, Cl. 194-10.000.
Sarbacher, Robert I.: *See—*
Mauch, Robert E.; and Sarbacher, Robert I., 4,056,757, Cl. 315-36.000.
Sargent Industries, Inc.: *See—*
Capelli, Alfred J., 4,056,478, Cl. 252-12.400.
Sarid, Dror: *See—*
Springett, Brian E.; and Sarid, Dror, 4,056,723, Cl. 250-324.000.
Sarkes Tarzian, Inc.: *See—*
Valdettaro, Alarico A., 4,056,796, Cl. 334-55.000.
Sasaki, Masao: *See—*
Sano, Takezo; and Sasaki, Masao, 4,056,456, Cl. 204-165.000.
Sasaki, Toshiro: *See—*
Doi, Kunio; Koike. Kozo; and Sasaki, Toshiro, 4,056,339, Cl. 418-178.000.
Sasse, Klaus: *See—*
Schlee, Hans Georg; Sasse, Klaus; and Eue, Ludwig, 4,056,527, Cl. 544-194.000.
Sassenrath, Bernd: *See—*
Albers, Ernst-August; Fester, Walter; and Sassenrath, Bernd, 4,056,516, Cl. 260-79.30M.
Albers, Ernst-August; and Sassenrath, Bernd, 4,056,517, Cl. 260-79.30M.
Sato, Masaharu: *See—*
Inoue, Michihiro; Kimura, Takeji; Sato, Masaharu; and Tsunoo, Masahiko, 4,056,033, Cl. 84-1.240.
Sato, Masamichi; Kido, Keishiro; and Arai, Noboru, to Fuji Photo Film Co., Ltd. Method for producing a relief pattern by ion-etching a photographic support. 4,056,395, Cl. 96-36.000.
Sato, Seiko, to Tokyo Shibaura Denki Kabushiki Kaisha. Turbine control system. 4,056,331, Cl. 415-15.000.
Sato, Tadashi: *See—*
Kitaoka, Shigeo; Johkoh, Katsuhiro; Ebisawa, Hisashi; Sato, Tadashi; Kubo, Hiroshi; Takahashi, Sosuke; and Kawase, Yoshinobu, 4,056,631, Cl. 424-330.000.
Sato, Yo; and Enomoto, Keisuke, to Kabushiki Kaisha Sato. Rolled adhesive sheet having printable and strippable properties and process for producing the same. 4,056,661, Cl. 428-144.000.

Satzinger, Gerhard: *See—*

Stoss, Peter Johannes; Herrmann, Manfred Franz Reinhold; and Satzinger, Gerhard, 4,056,526, Cl. 544-146.000.

Sauer, Ivan: *See—*

Zorn, Jurgen; Vlemmings, Jan; Muller, Karl-Heinz; Mayer, Siegfried; Dworak, Wilhelm; Hartmann, Eugen; Fader, Martin; Talmon, Wolfgang; Jons, Claus; Sauer, Ivan; and Bosch, Paul, 4,056,337, Cl. 418-131.000.

Saufferer, Manfred: *See—*

Scholl, Hans-Peter; Heimburger, Alfons; Warkentin, Ulrich; and Saufferer, Manfred, 4,056,709, Cl. 235-30.00R.

Saurer-Allma GmbH Allgaeuer Maschinenbau: *See—*

Latus, Hans; Hemala, Zdenek; Bleeck, Heinz; and Weber, Rolf Dieter, 4,055,937, Cl. 57-34.00R.

Saxe, Leo C. Saber saw control handle. 4,055,893, Cl. 30-392.000.

Saxe, Leo C. Saber and reciprocating saw blade turning control arrangement. 4,055,894, Cl. 30-394.000.

Saxena, Arjun N.; and Hart, Courtney, to Data General Corporation. Method of fabricating metal-semiconductor interfaces. 4,056,642, Cl. 427-84.000.

Schaas, Gerhard. Light spot suppression circuit for a cathode ray tube. 4,056,758, Cl. 315-381.000.

Schadlich, Fritz, to Robert Bosch GmbH. Stroke energy limited motor-driven screwdriver. 4,056,762, Cl. 318-484.000.

Scheel, Johan: *See—*

Bralander, Borje; Claesson, Ake; Henningsson, Lars-Erik; and Scheel, Johan, 4,055,918, Cl. 51-47.000.

Scheidler, Ralph E.; and Morse, Howard H., to Morse, Howard H. Battery-generator output monitor. 4,056,765, Cl. 320-48.000.

Scherhag, Bernhard: *See—*

Germerdonk, Rolf; Jonas, Adam; Hullstrung, Dieter; and Scherhag, Bernhard, 4,056,606, Cl. 423-575.000.

Schering Aktiengesellschaft: *See—*

Kerb, Ulrich; Wiechert, Rudolf; Wachtel, Helmut; Engelfried, Otto; and Kieslich, Klaus, 4,056,633, Cl. 424-331.000.

Schering Corporation: *See—*

Reimann, Hans; Jaret, Robert S.; and Nafissi-Varchei, Mohammad Mehdi, 4,056,616, Cl. 424-180.000.

Scherrer, Raymond E.: *See—*

Cook, Charles R., Jr.; U, Aung San; and Scherrer, Raymond E., 4,056,415, Cl. 148-187.000.

Schiessler, Siegfried; Spietschka, Ernst; and Elinkmann, Hans-Gerd, to Hoechst Aktiengesellschaft. Process for preparing copper phthalocyanine pigments of the α-modification. 4,056,534, Cl. 260-314.500.

Schindler, Donald G.: *See—*

Henry, Edwin Blair, Jr.; Patsey, John A.; Rudolph, Ralph G.; and Schindler, Donald G., 4,055,989, Cl. 73-588.000.

Schlaikjer, Carl Roger, to P. R. Mallory & Co. Inc. Performance in an organic electrolyte. 4,056,663, Cl. 429-197.000.

Schlee, Hans Georg; Sasse, Klaus; and Eue, Ludwig, to Bayer Aktiengesellschaft. Tetrahydro-1,3,5-triazine-2,6-diones. 4,056,527, Cl. 544-194.000.

Schlesinger, Sheldon I.; and Cochran, Veronica, to American Can Company. Method of recording information using a copolymer of glycidyl methacrylate and allyl glycidyl ether. 4,056,393, Cl. 96-27.00H.

Schliebs, Reinhard: *See—*

Eichenhofer, Kurt-Wilhelm; and Schliebs, Reinhard, 4,056,469, Cl. 210-62.000.

Schlieckmann, Alfred; and Moser, Kurt, to Upjohn Company, The. Fluid component recycling system in a plural component piastics molding machine. 4,056,122, Cl. 137-563.000.

Schluckbier, Gary W., to DEC International, Inc. Milking unit detacher mechanism. 4,056,077, Cl. 119-14.080.

Schmersal, Larry J.; and Johnson, William E., to Owens-Illinois, Inc. Interfacing circuitry and method for multiple discharge gaseous display and/or memory panels. 4,056,806, Cl. 340-166.0EL.

Schmid, Kurt: *See—*

Walser, Karl; Schmid, Kurt; and Scotoni, Ralph, 4,056,062, Cl. 102-86.500.

Schmidt, Hans H. Picture frame. 4,055,910, Cl. 40-155.000.

Schmidt, Werner; Petersen, Egon Norbert; and Richtzenhain, Hermann, to Dynamit Nobel Aktiengesellschaft. Difficultly inflammable polyester molding compositions. 4,056,508, Cl. 260-45.75B.

Schmiedel, Klaus: *See—*

Lademann, Rudolf; Landauer, Franz; Lenzmann, Heinrich; Schmiedel, Klaus; and Schwiersch, Wolfram, 4,056,455, Cl. 204-163.00R.

Schmieder, Helmut; and Kroebel, Reinhard, to Gesellschaft fur Kernforschung m.b.H. Method for preparing aqueous, radioactive waste solutions from nuclear plants for solidification. 4,056,482, Cl. 252-301.10W.

Schmieder, Werner: *See—*

Reinecke, Rolf; Rauterkus, Karl Josef; Schmieder, Werner; and Lutz, Eleonore, 4,056,497, Cl. 260-29.6TA.

Schneider, Hans: *See—*

Weiler, Herbert; Schneider, Hans; and Weyrich, Ludwin, 4,056,129, Cl. 141-24.000.

Schneider, Rolf: *See—*

Ringel, Wolfgang; Rutsch, Peter; Schneider, Rolf; and Kohl, Edgar, 4,056,375, Cl. 55-381.000.

Schneider, Siegfried; Thate, Kurt; Geyken, Erwin; Kempe, Horst; and Macher, Stephan, to AGFA-Gevaert, A.G. Roller. 4,055,879, Cl. 29-123.000.

Schneider, Thomas E.: *See—*

Fusco, Vito A.; Bennett, Joseph C.; Funcik, Jack F.; Kufner, Kenneth L.; and Schneider, Thomas E., 4,055,889, Cl. 29-710.000.

Schoeff, John A., to Precision Monolithics, Inc. Differential input-differential output transistor switching cell. 4,056,740, Cl. 307-362.000.

Schoettle, Klaus; Wittkamp, Heinrich; and Gliniorz, Lothar, to BASF Aktiengesellschaft. Magnetic tape cartridge. 4,056,245, Cl. 242-197.000.

Scholl, Hans-Peter; Heimburger, Alfons; Warkentin, Ulrich; and Saufferer, Manfred, to Kienzle Apparate GmbH. Taximeter indicator arrangement. 4,056,709, Cl. 235-30.00R.

Scholz, Hans: *See—*

Bailey, Philip Charles; and Scholz, Hans, 4,056,754, Cl. 313-390.000.

Schoppee, Lawrence W., to Package Machinery Company. Stacker for gum wrapping machine. 4,056,199, Cl. 214-6.0BA.

Schuldenfrei, Raymond E., to Brunswick Corporation. Air filter. 4,056,376, Cl. 55-497.000.

Schulz, Gordon, to Odetics, Inc. Turntable assembly for video cassette recorder/reproducer. 4,056,833, Cl. 360-85.000.

Schumacher, Donald Alfred, to GTE Sylvania Incorporated. Terminal connector with stress relief. 4,056,300, Cl. 339-103.00R.

Schumacher, Joseph N.; Best, Freddie W.; and Green, Charles R., to R. J. Reynolds Tobacco Company. Tobacco product. 4,056,108, Cl. 131-17.00R.

Schumacher, Werner: *See—*

Hauser, Manfred; and Schumacher, Werner, 4,056,126, Cl. 137-625.650.

Schwab, Kurt: *See—*

Swarobski, Daniel; and Schwab, Kurt, 4,056,303, Cl. 350-36.000.

Schwander, Hansrudolf; Burdeska, Kurt; and Zickendraht, Christian, to Ciba-Geigy Corporation. Disperse dyes. 4,056,528, Cl. 260-250.00Q.

Schwartzbach, Christian: *See—*

Hansen, Karl Erik; Hovmand, Svend; Pedersen, Mogens Lindskov; Schwartzbach, Christian; Htun, Myat; de Ruvo, Alf; and Cavlin, Soren, 4,055,903, Cl. 34-12.000.

Schwarz, Eckhard C. A., to Presto Products Incorporated. Preserving red color in fresh red meats. 4,056,639, Cl. 426-264.000.

Schwarzschild, Jack; and Lowdenslager, John R., to Timex Corporation. Frequency adjustment means for an electronic timepiece. 4,055,945, Cl. 58-85.500.

Schwiersch, Wolfram: *See—*

Lademann, Rudolf; Landauer, Franz; Lenzmann, Heinrich; Schmiedel, Klaus; and Schwiersch, Wolfram, 4,056,455, Cl. 204-163.00R.

Schwinn, Horst: *See—*

Heimburger, Norbert; Sieber, Axel; and Schwinn, Horst, 4,056,484, Cl. 252-408.000.

Science Union et Cie, Societe Francaise de Recherche Medicale: *See—*

Duhault, Jacques, 4,056,623, Cl. 424-274.000.

SCM Corporation: *See—*

Close, Ralph E.; and Derfer, John M., 4,056,573, Cl. 260-631.500.

Scola, Daniel A., to United Technologies Corporation. Moisture and heat resistant coating for glass fibers. 4,056,651, Cl. 428-336.000.

Scotoni, Ralph: *See—*

Walser, Karl; Schmid, Kurt; and Scotoni, Ralph, 4,056,062, Cl. 102-86.500.

Scott, Kenneth G., to Polaroid Corporation. Additive color silver salt transfer film unit with layer of chitin and cupric salt. 4,056,392, Cl. 96-3.000.

Scovil, Henry Evelyn Derrick: *See—*

Bobeck, Andrew Henry; and Scovil, Henry Evelyn Derrick, 4,056,814, Cl. 365-8.0TF.

Scovill Manufacturing Company: *See—*

Ackermann, Walter Thomas; and Martins, Jeremias Anthony, 4,055,876, Cl. 24-205.14R.

Secrist, Walter S., to United States Steel Corporation. Subsurface pumping installation for handling viscous or sand laden fluids. 4,056,335, Cl. 417-431.000.

Sedlacek, William S.: *See—*

Lundsgaard, Paul S.; and Sedlacek, William S., 4,056,840, Cl. 361-124.000.

Segall, Jeanna: *See—*

Baniel, Avraham Matitiahu; Mitzmager, Abraham; Segall, Jeanna; Star, Shlomo; and Shorr, Leonard Marshall, 4,056,588, Cl. 264-63.000.

Sehman, Bengt: *See—*

Olsson, Karl Erik; and Sehman, Bengt, 4,056,776, Cl. 324-158.0SC.

Seibold, Paul F. Grass trimming device. 4,055,890, Cl. 30-240.000.

Seiderman, Abe. Automatic hot melt adhesive depositing machine. 4,056,075, Cl. 118-7.000.

Seita, Toru; Shimizu, Akihiko; and Kosaka, Yujiro, to Toyo Soda Manufacturing Co., Ltd. Process for producing polyion complex having nucleic acid bases. 4,056,666, Cl. 526-29.000.

Selesnick, William: *See—*

Howard, Alfred S.; and Selesnick, William, 4,056,644, Cl. 427-284.000.

Sellstedt, John H.; and Teller, Daniel M., to American Home Products Corporation. 2,3-Dialkoxy-3H-1,4-benzodiazepines. 4,056,525, Cl. 260-239.0BD.

Sens, William H., to United Technologies Corporation. Twin-spool gas turbine power plant with means to spill compressor interstage airflow. 4,055,946, Cl. 60-204.000.

Sequin, Carlo Heinrich, to Bell Telephone Laboratories, Incorporated.

Anti-aliasing pre-filter circuit for semiconductor charge transfer device. 4,056,737, Cl. 307-304.000.

Serfozo, Tibor; and Simenz, Rod F., to Lockheed Aircraft Corporation. Precision forging of titanium. 4,055,975, Cl. 72-42.000.

Shatila, Mounir A.; VonDer Leith, William H.; Veeneman, John L.; and Thomas, Marion E., to AMPCO Foods Inc. Dough forming apparatus. 4,056,345, Cl. 425-186.000.

Shaw Pipe Industries Ltd.: *See—*

Jarvis, Harold F., 4,056,421, Cl. 156-272.000.

Shaw, Stuart Walter Ker Sutton, to International Nickel Company, Inc., The. Nickel-chromium high strength casting. 4,056,389, Cl. 75-171.000.

Sheffield, Byford D.: *See—*

Symm, Richard H.; and Sheffield, Byford D., 4,056,510, Cl. 260-47.0EP.

Shell Oil Company: *See—*

Aspin, Frank M., 4,056,418, Cl. 156-145.000.

Leach, Ronald W. A., 4,056,385, Cl. 71-111.000.

McClure, James D.; and Brandenberger, Stanley G., 4,056,578, Cl. 260-683.470.

Stewart, Thomas L.; and Cadena, Edward R., 4,055,986, Cl. 73-61.00R.

Verbrugge, Pieter A.; and Uurbanus, Elisabeth W., 4,056,509, Cl. 260-465.00G.

Shepardson, Robert C.; and Watts, Michael E., to Coherent Radiation. System for decoding bar code. 4,056,710, Cl. 235-437.000.

Shephard, Margaret Claire: *See—*

Bowie, Raymond Alexander; Cox, John Michael; Farrell, Gordon Michael; and Shephard, Margaret Claire, 4,056,384, Cl. 71-92.000.

Sherwood, Richard Curry: *See—*

Chen, Ho Sou; Gyorgy, Ernst Michael; Leamy, Harry John; and Sherwood, Richard Curry, 4,056,411, Cl. 148-121.000.

Shimano, Masanao: *See—*

Harada, Nobuhiko; Tanaka, Minetaka; Shimano, Masanao; Fujinaga, Kyozo; Nunomura, Kunito; Tamura, Masamitu; Nakamura, Shigeharu; and Akagi, Kazuo, 4,056,428, Cl. 156-642.000.

Shimizu, Akihiko: *See—*

Seita, Toru; Shimizu, Akihiko; and Kosaka, Yujiro, 4,056,666, Cl. 526-29.000.

Shimizu, Hiroyuki; Inaba, Kouji; and Nakahashi, Ken-Ichi, to Olympus Optical Co., Ltd. Method and device for ophthalmoscopy. 4,056,310, Cl. 351-6.000.

Shinagawa, Mitsuhisa: *See—*

Saitoh, Takeshi; Akutsu, Eisaku; and Shinagawa, Mitsuhisa, 4,056,787, Cl. 331-59.000.

Shinoda, Kazuo; and Ii, Akira, to Toyota Jidosha Kogyo Kabushiki Kaisha. Variable venturi carburetor. 4,056,583, Cl. 261-36.00A.

Shipov, Emmanuil Ivanovich: *See—*

Volfkovich, Semen Issakovich; Belov, Vladimir Nikolaevich; Ershov, Vadim Andreevich; Rozenberg, Evgeny Khaskelevich; Shipov, Emmanuil Ivanovich; and Jumanova, Ljudmila Vladimirovna, 4,056,601, Cl. 423-322.000.

Shipway, Richard Edward: *See—*

Baxter, Duane Willard; and Shipway, Richard Edward, 4,056,716, Cl. 364-515.000.

Shirato, Toru: *See—*

Izumi, Ryoji; Kobayashi, Shoji; Ono, Toshiharu; Shirato, Toru; Fujii, Akiyoshi; and Okihara, Tadashi, 4,056,592, Cl. 264-141.000.

Shiryaev, Boris Semenovich: *See—*

Bukrinsky, Anatoly Matveevich; Matskevich, Genrikh Vladimirovich; Rzheznikov, Julian Vulfovich; Sukhov, Andrei Borisovich; Tatarnikov, Viktor Petrovich; Berkovich, Viktor Mozesovich; Remzhin, Jury Nikolaevich; Slepnev, Lev Nikolaevich; Sverdlov, Alexandr Anatolievich; Karan, Vladimir Geselevich; Kaloshin, Jury Petrovich; Krasikov, Anatoly Nikolaevich; Babenko, Evgeny Akimovich; Bronnikov, Vladimir Konstantinovich; Shvyryaev, Jury Vasilievich; and Shiryaev, Boris Semenovich, 4,056,436, Cl. 176-38.000.

Shoji, Kunihiro; Yokota, Akihiro; and Watanabe, Kenzo, to Daikin Kogyo Co., Ltd. Heating system. 4,055,963, Cl. 62-238.000.

Shoiter, Joseph R.: *See—*

Green, Charles B.; and Sholter, Joseph R., 4,055,859, Cl. 2-243.00R.

Shorr, Leonard Marshall: *See—*

Baniel, Avraham Matitiahu; Mitzmager, Abraham; Segall, Jeanna; Star, Shlomo; and Shorr, Leonard Marshall, 4,056,588, Cl. 264-63.000.

Showa Denko K.K.: *See—*

Kitaoka, Shigeo; Johkoh, Katsuhiro; Ebisawa, Hisashi; Sato, Tadashi; Kubo, Hiroshi; Takahashi, Sosuke; and Kawase, Yoshinobu, 4,056,631, Cl. 424-330.000.

Showa Electric Wire & Cable Co., Ltd.: *See—*

Aihara, Mitsugu; Kogane, Yutaka; Ebinuma, Yasumitsu; and Minami, Masaki, 4,056,680, Cl. 174-19.000.

Showalter, John Melville, to United Technologies Corporation. Elevator control system. 4,056,169, Cl. 187-29.00R.

Shum, Lanson Y., to Westinghouse Electric Corporation. Electronic watthour meter circuit. 4,056,774, Cl. 324-142.000.

Shvyryaev, Jury Vasilievich: *See—*

Bukrinsky, Anatoly Matveevich; Matskevich, Genrikh Vladimirovich; Rzheznikov, Julian Vulfovich; Sukhov, Andrei Borisovich; Tatarnikov, Viktor Petrovich; Berkovich, Viktor Mozesovich; Remzhin, Jury Nikolaevich; Slepnev, Lev Nikolaevich; Sverdlov, Alexandr Anatolievich; Karan, Vladimir Geselevich; Kaloshin, Jury Petrovich; Krasikov, Anatoly Nikolaevich; Babenko, Evgeny Akimovich; Bronnikov, Vladimir Konstantinovich; Shvyryaev, Jury Vasilievich; and Shiryaev, Boris Semenovich, 4,056,436, Cl. 176-38.000.

Sieber, Axel: *See—*

Heimburger, Norbert; Sieber, Axel; and Schwinn, Horst, 4,056,484, Cl. 252-408.000.

Siemens Aktiengesellschaft: *See—*

Auracher, Franz, 4,056,377, Cl. 65-4.00A.

Bauer, Johann, 4,056,799, Cl. 335-277.000.

Hofer, Ernst, 4,056,820, Cl. 340-347.00C.

Lohmann, Reiner; and Ludwig, Volker, 4,056,791, Cl. 333-18.000.

Lukas, Eberhard, 4,056,819, Cl. 340-347.0DD.

Pospischil, Reginhard; and Domer, Josef, 4,056,790, Cl. 333-5.000.

Zander, Hans-Hermann, 4,056,766, Cl. 63-37.000.

Sienicki, John W.; and Haycox, Clarence A., to Erie Technological Products, Inc. Ceramic trimmer capacitor. 4,056,842, Cl. 361-293.000.

Sievert, William C.: *See—*

Leckie, Harry P.; Sievert, William C.; and Legault, Robert A., 4,056,657, Cl. 428-659.000.

Silverberg, Morton, to Xerox Corporation. Liquid ink imaging system. 4,056,314, Cl. 355-10.000.

Silvis, Richard R.; and Ettinger, John A., to Textron Inc. Apparatus and method of positioning sliders. 4,056,184, Cl. 198-471.000.

Simanovsky, Leonid Mikhailovich: *See—*

Markman, Mikhail Abramovich; Simanovsky, Leonid Mikhailovich; Jurkevich, Igor Rostislavovich; Kolomoets, Nikolai Vasilievich; Kamensky, Vyacheslav Tikhonovich; Matskov, Igor Mikhailovich; and Maximov, Sergei Ilich, 4,056,406, Cl. 136-208.000.

Simenz, Rod F.: *See—*

Serfozo, Tibor; and Simenz, Rod F., 4,055,975, Cl. 72-42.000.

Simon, Hans. Strain-relief bushing for cables and the like. 4,056,252, Cl. 248-56.000.

Sims, Robert Dennis, to Western Electric Company. Decoupling control arrangement for auxiliary circuits coupled to telephone lines. 4,056,687, Cl. 179-16.00F.

Sindelar, John B. Mechanical toy. 4,055,913, Cl. 46-143.000.

Singer Company, The: *See—*

Adams, Kenneth Douglas, 4,056,071, Cl. 112-237.000.

Cornforth, Malcolm W., 4,056,717, Cl. 364-510.000.

Hauf, Robert Conrad, 4,056,070, Cl. 112-158.00B.

Sinkovitz, Gloria DiMarco: *See—*

Slagel, Robert Clayton; and Sinkovitz, Gloria DiMarco, 4,056,432, Cl. 162-168.0NA.

Sipin, Richard F., to American Tara Corporation. Paper salvaging machine with improved splicing board. 4,056,426, Cl. 156-505.000.

Sisin, Mikhail Fedorovich: *See—*

Boyadzhian, Varazdat Karapetovich; Khachatrian, Saribek Saakovich; Stepanian, Genrikh Gevorkovich; Eritsian, Volodya Karapetovich; Agavelian, Edik Stepanovich; Nefedov, Oleg Matveevich; Dolgy, Igor Evgenievich; Sisin, Mikhail Fedorovich; Kolbasin, Alexei Yakovlevich; and Anikeev, Ivan Konstantinovich, 4,056,563, Cl. 560-245.000.

Skinner, Frank R., II: *See—*

MacFarlane, Thomas R.; and Skinner, Frank R., II, 4,056,188, Cl. 198-465.000.

Skok, Jean: *See—*

Marmonier, Pierre; Mesnage, Bernard; Skok, Jean; and Vayra, Jean, 4,056,441, Cl. 176-78.000.

Skoultchi, Martin M., to National Starch and Chemical Corporation. Anaerobic adhesive and sealant compositions employing as a catalyst α-amino sulfone compound. 4,056,670, Cl. 526-320.000.

Skvortsov, Gennady Alexeevich; Nizeeva, Nellya Nikitichna; Podzharsky, Avrum Iosifovich; and Dobrovolskaya, Irma Viktorovna. Method of selective catalytic purification of waste gases from nitrogen oxides. 4,056,600, Cl. 423-239.000.

Slagel, Robert Clayton; and Sinkovitz, Gloria DiMarco, to Calgon Corporation. Process for making paper products of improved dry strength. 4,056,432, Cl. 162-168.0NA.

Slepnev, Lev Nikolaevich: *See—*

Bukrinsky, Anatoly Matveevich; Matskevich, Genrikh Vladimirovich; Rzheznikov, Julian Vulfovich; Sukhov, Andrei Borisovich; Tatarnikov, Viktor Petrovich; Berkovich, Viktor Mozesovich; Remzhin, Jury Nikolaevich; Slepnev, Lev Nikolaevich; Sverdlov, Alexandr Anatolievich; Karan, Vladimir Geselevich; Kaloshin, Jury Petrovich; Krasikov, Anatoly Nikolaevich; Babenko, Evgeny Akimovich; Bronnikov, Vladimir Konstantinovich; Shvyryaev, Jury Vasilievich; and Shiryaev, Boris Semenovich, 4,056,436, Cl. 176-38.000.

Slob, Arie: *See—*

Hart, Cornelis Maria; and Slob, Arie, 4,056,810, Cl. 365-205.000.

Smalley, Raymond L.: *See—*

Meldahl, Robert D.; and Smalley, Raymond L., 4,056,203, Cl. 214-75.00T.

Smith, DeWitt Paul: *See—*

Freimanis, Laimons; Mussman, Harry Edward; and Smith, DeWitt Paul, 4,056,691, Cl. 179-18.0FA.

Smith, Douglas A., to Burroughs Corporation. Utilizing data for transducer positioning. 4,056,830, Cl. 360-51.000.

Smith, Earl R., to Livermore and Knight Co., Inc. Vacuum printing cylinder construction. 4,056,057, Cl. 101-382.0MV.

Smith, James D. B.; Meier, Joseph F.; and Phillips, David C., to Westinghouse Electric Corporation. Blocked isocyanate composition for forming T hermoparticulating coating. 4,056,005, Cl. 73-339.00R.

Smith, James D. B.; Meier, Joseph F.; and Phillips, David C., to Westinghouse Electric Corporation. Metal dithiocarbamate composition for forming thermoparticulating coating. 4,056,006, Cl. 73-339.00R.

Smith Kline & French Laboratories Limited: *See—*

Brown, Thomas Henry; Durant, Graham John; Ganellin, Charon Robin; and Ife, Robert John, 4,056,621, Cl. 424-273.00R.

White, George Raymond, 4,056,620, Cl. 424-270.000.

Smith, Richard E., to Xerox Corporation. Developer mixing system. 4,056,076, Cl. 118-653.000.

Smithwick, Edward L., Jr.: *See—*

Bobbitt, Jesse L.; and Smithwick, Edward L., Jr., 4,056,519, Cl. 260-112.50R.

SNAC S.p.A. Refrattari Argille e Caolini: *See—*

Aliprandi, Giovanni; and Ricci, Roberto, 4,056,217, Cl. 222-600.000.

Snee, David J.: *See—*

Bevington, Richard C.; and Snee, David J., 4,056,365, Cl. 428-565.000.

Snouffer, William N. Straining valves. 4,056,474, Cl. 210-390.000.

Snyder, Lloyd L.; and Furda, Jana, to Technicon Instruments Corporation. Direct bilirubin assay. 4,056,357, Cl. 23-230.00B.

Snyder, W. Henry, to Snyder, W. Henry. Bicycle transmissions. 4,056,013, Cl. 74-217.00B.

Sobajima, Katsunobu: *See—*

Imabuchi, Yoshihisa; Kurami, Kenshi; Akiyama, Yoshinori; and Sobajima, Katsunobu, 4,056,271, Cl. 280-745.000.

Sobarzo, Omar: *See—*

Pollock, Douglas; Sobarzo, Omar; Urquizar, Rolando; Vilches, Carlos; and Bolanos, Jaime, 4,056,262, Cl. 266-138.000.

Societa di Elettronica per l'Automazione - SEPA S.p.A.: *See—*

Randazzo, Gaspare, 4,056,778, Cl. 324-166.000.

Societa Farmaceutici Italia S.p.A.: *See—*

Bertazzoli, Cesare; Sala, Luisa; and Ghione, Mario, 4,056,613, Cl. 424-94.000.

Societe Anonyme dite: BORACIER: *See—*

Fagniart, Gaston, 4,056,138, Cl. 150-.500.

S.A. Echevarria: *See—*

Cantera, Gregorio Asua; Reparaz, Jose M. Palacios; and Molnar, Louis, 4,056,387, Cl. 75-123.00F.

Societe d'Applications de Procedes Industriels et Chimiques S.A.P.I.C.: *See—*

Richard, Gerard Y., 4,056,259, Cl. 366-15.000.

Societe Nationale d'Etude et de Construction de Moteurs d'Aviation: *See—*

Boudigues, Serge, 4,055,949, Cl. 60-269.000.

Societe Nationale Elf Aquitaine (Production): *See—*

Bonafos, Raymond, 4,056,167, Cl. 182-10.000.

Society Messier: *See—*

Girard, Edmond, 4,055,965, Cl. 62-324.000.

Sohn, Frank Myung-Hi, to RCA Corporation. Color picture tube having mask-frame assembly with reduced thickness. 4,056,755, Cl. 313-402.000.

Sohn, Wolfgang: *See—*

Mohr, Adolf; Sohn, Wolfgang; and Strobl, Georg, 4,056,770, Cl. 324-205.000.

Soikkanen, Pertti: *See—*

Koponen, Martti; and Soikkanen, Pertti, 4,056,433, Cl. 162-290.000.

Sola Basic Industries, Inc.: *See—*

Beall, Benjamin S., III; and Novy, Russell F., 4,056,678, Cl. 13-25.000.

Solarex Corporation: *See—*

Varadi, Peter F., 4,056,405, Cl. 136-89.0PC.

Solvay & Cie: *See—*

Berger, Eugene; Gerard, Pol; Delbouille, Andre; and Deroitte, Jean-Louis, 4,056,668, Cl. 526-124.000.

Ritti, Stelio; and Policardi, Silvio, 4,056,459, Cl. 204-286.000.

Soma, Hiroshi: *See—*

Okamoto, Kintaro; Kudo, Hirokatu; Ishijimi, Soichi; Kadoiri, Etsuro; Soma, Hiroshi; and Suzuki, Hiroyuki, 4,056,165, Cl. 181-141.000.

Sonderegger, Hans Conrad; and Baumgartner, Hans Ulrich, to Kistler Instrumente AG. Diaphragm arrangement for pressure transducers. 4,056,009, Cl 73-406.000.

Sonenberg, Martin; and Yamasaki, Nobuyuki, to Research Corporation. Clinically active bovine growth hormone fraction. 4,056,520, Cl. 260-112.50R.

Sonnenberg, Helmut; and Kramer, Bruno, to Hoechst Aktiengesellschaft. Process permitting a polymerization batch to be additionally cooled. 4,056,667, Cl. 526-74.000.

Soodak, Charles; and Gelbman, Alexander, to Baxter Travenol Laboratories, Inc. Digital temperature controller. 4,056,708, Cl. 219-499.000.

Soper, Quentin Francis, to Eli Lilly and Company. Method of controlling aquatic weeds. 4,056,382, Cl. 71-66.000.

Spanur, Frank George; and Alberto, Vicente Santo Domingo, to Union Carbide Corporation. Primary dry cell having a novel venting closure. 4,056,659, Cl. 429-54.000.

Spasuik, Paul. Bale loading assembly. 4,056,204, Cl. 214-83.300.

Spaziante, Placido: *See—*

Giuffre, Luigi; De Nora, Vittorio; and Spaziante, Placido, 4,056,447, Cl. 204-98.000.

Spector, Marshall L., to Air Products and Chemicals, Inc. Production of non-bulking activated sludge. 4,056,465, Cl. 210-7.000.

Sperry Rand Corporation: *See—*

Thuet, Ronald Kent, 4,056,182, Cl. 197-1.00R.

Todd, Robert R.; and Rowland-Hill, Edward W., 4,056,107, Cl. 130-27.00R.

Spietschka, Ernst: *See—*

Schiessler, Siegfried; Spietschka, Ernst; and Elinkmann, Hans-Gerd, 4,056,534, Cl. 260-314.500.

Spilker, James W. Die changer. 4,056,207, Cl. 214-652.000.

Spooner, Archer Michael; and Murray, Paul Michael, to Redifon Limited. Optical systems for the display of visual images. 4,056,827, Cl. 358-87.000.

Spriggs, Dennis Mitchel: *See—*

Jett, Marion Barney; and Spriggs, Dennis Mitchel, 4,056,145, Cl. 166-212.000.

Springett, Brian E.; and Sarid, Dror, to Xerox Corporation. Rotatable corona device. 4,056,723, Cl. 250-324.000.

Sriramamurty, Durvasula V.; and Brzezinski, Donald E., to Johnson Controls, Inc. Fluid power piston actuators. 4,056,043, Cl. 92-13.200.

Staats, Henry N., to General Binding Corporation. Two stage oven laminator method. 4,056,422, Cl. 156-309.000.

Stahlecker, Fritz, to Stahlecker, Fritz; and Stahlecker, Hans. Method for piecing a thread on open-end spinning units. 4,055,942, Cl. 57-156.000.

Stahlecker, Hans: *See—*

Stahlecker, Fritz, 4,055,942, Cl. 57-156.000.

Stamper, David John: *See—*

Thompson, William Henry; Worthington, Ralph Eric; and Stamper, David John, 4,056,604, Cl. 423-483.000.

Stancati, Nicholas F.; and Garner, Peter, to Acta Limited. Threaded anchor. 4,055,929, Cl. 52-705.000.

Standridge, Robert Ted: *See—*

Buchanan, Ronald Leslie; Partyka, Richard Anthony; and Standridge, Robert Ted, 4,056,540, Cl. 260-340.300.

Stanford Research Institute: *See—*

Henry, David W.; and Sturm, Priscilla A., 4,056,535, Cl. 260-326.200.

Staniland, Philip Anthony, to Imperial Chemical Industries Limited. Process for preparing aromatic polyethers. 4,056,511, Cl. 260-49.000.

Stannek, Karl Heinz, to Western Digital Corporation. Keyboard assembly momentary contact push button switch with tactile action. 4,056,700, Cl. 200-159.00R.

Star, Shlomo: *See—*

Baniel, Avraham Matitiahu; Mitzmager, Abraham; Segall, Jeanna; Star, Shlomo; and Shorr, Leonard Marshall, 4,056,588, Cl. 264-63.000.

Stauffer Chemical Company: *See—*

Lin, Chii-Fa, 4,056,612, Cl. 424-76.000.

Pallos, Ferenc M., 4,056,570, Cl. 260-562.00B.

Pallos, Ferenc M., 4,056,627, Cl. 424-300.000.

Walker, Francis H., 4,056,524, Cl. 260-239.0BF.

Stedman, Robert N., to Caterpillar Tractor Co. Endless track for crawler vehicles. 4,056,288, Cl. 305-34.000.

Steger, Thomas C. Joint for modular furniture. 4,056,067, Cl. 108-101.000.

Steiger, Anton: *See—*

Rutz, Peter; and Steiger, Anton, 4,056,042, Cl. 91-497.000.

Rutz, Peter; and Steiger, Anton, 4,056,080, Cl. 123-23.000.

Stein, Werner: *See—*

Franz, Arnold; and Stein, Werner, 4,056,656, Cl. 428-460.000.

Stenzel, Jurgen, to Hoechst Aktiengesellschaft. Process for utilizing ferrophosphorus. 4,056,388, Cl. 75-129.000.

Stepanian, Genrikh Gevorkovich: *See—*

Boyadzhian, Varazdat Karapetovich; Khachatrian, Saribek Saakovich; Stepanian, Genrikh Gevorkovich; Eritsian, Volodya Karapetovich; Agavelian, Edik Stepanovich; Nefedov, Oleg Matveevich; Dolgy, Igor Evgenievich; Sisin, Mikhail Fedorovich; Kolbasin, Alexei Yakovlevich; and Anikeev, Ivan Konstantinovich, 4,056,563, Cl. 560-245.000.

Stern, David, to Martin Paint and Chemical Corporation. Pressurized dispenser for aqueous emulsion paints. 4,056,213, Cl. 222-95.000.

Stern, David, to Martin Paint and Chemical Corporation. Aerosol-dispensed latex paint compositions. 4,056,500, Cl. 260-29.6MN.

Stewart, Thomas L.; and Cadena, Edward R., to Shell Oil Company. Basic sediment and water measurement. 4,055,986, Cl. 73-61.00R.

Stiefel, Kenneth Erwin, to Bell Telephone Laboratories, Incorporated. Telephone range extender with gain. 4,056,688, Cl. 179-16.00F.

Stiefel Laboratories, Inc.: *See—*

Young, Henry Y., 4,056,611, Cl. 424-62.000.

Stith, William J.: *See—*

Geissler, Ulrich C.; and Stith, William J., 4,056,101, Cl. 128-214.00D.

Stokes, Rembert Ryan: *See—*

Meyerle, John Alfons; and Stokes, Rembert Ryan, 4,056,696, Cl. 179-100.00R.

Stoltefuss, Wilhelm; Haller, Herbert; and Hunscher, Ottocar, to Gewerkschaft Eisenhutte Westfalia. Machines for use in mining or tunnelling work. 4,056,284, Cl. 299-64.000.

Stone, Dale Eugene: *See—*

Bosik, Barry Sheldon; and Stone, Dale Eugene, 4,056,693, Cl. 179-84.00R.

Stoss, Peter Johannes; Herrmann, Manfred Franz Reinhold; and Satzinger, Gerhard, to Warner-Lambert Company. Benzo(b)thiophene derivatives. 4,056,526, Cl. 544-146.000.

Strandt, Margaret: *See—*

Argento, Gloria; and Strandt, Margaret, 4,055,853, Cl. 2-93.000.

Strategic Medical Research Corporation: *See—*

Gordon, Paul; Ronsen, Bruce; and Kulkarni, Shrikant V., 4,056,322, Cl. 536-4.000.

Sregack, Joseph A.; and Wexler, Bernard L., to United States of America, Navy. Electric discharge gas dynamic laser. 4,056,789, Cl. 331-94.50G.

Strehler, Hugo; Beer, Ludwig; Heil, Eduard; Urbanek, Friedrich; and

Fischer, Hermann, to BASF Aktiengesellschaft. Continuous manufacture of polybutylene terephthalates. 4,056,514, Cl. 260-75.00R.

Strella, Stephen, to Xerox Corporation. Apparatus and method for extending fuser release life. 4,056,706, Cl. 219-216.000.

Strickland, Frederick W., to General Dynamics Corporation. Cable gripping device. 4,055,875, Cl. 24-115.00R.

Strickland, John C.: *See—*

Bunn, Dorrance P., Jr.; Strickland, John C.; and May, Douglas H., Jr., 4,056,486, Cl. 252-417.000.

Strobl, Georg: *See—*

Mohr, Adolf; Sohn, Wolfgang; and Strobl, Georg, 4,056,770, Cl. 324-205.000.

Stuckey, Milton C. Space humidifier. 4,056,049, Cl. 98-105.000.

Studiengesellschaft Kohle m.b.H.: *See—*

Wilke, Gunther; and Wilhelm, Kaiser, 4,056,552, Cl. 560-128.000.

Sturm, Priscilla A.: *See—*

Henry, David W.; and Sturm, Priscilla A., 4,056,535, Cl. 260-326.200.

Sublett, Bobby J.: *See—*

Gilkey, Russell; Hilbert, Samuel D.; Sublett, Bobby J.; and Wicker, Thomas H., Jr., 4,056,356, Cl. 8-168.00C.

Suehiro, Akio, to Hitachi, Ltd. Audio transmitting and receiving system. 4,056,683, Cl. 179-1.0AT.

Sugisawa, Ko: *See—*

Sakakibara, Sakuichi; Sugisawa, Ko; and Kitamura, Yukio, 4,056,566, Cl. 426-577.000.

Sukhov, Andrei Borisovich: *See—*

Bukrinsky, Anatoly Matveevich; Matskevich, Genrikh Vladimirovich; Rzheznikov, Julian Vulfovich; Sukhov, Andrei Borisovich; Tatarnikov, Viktor Petrovich; Berkovich, Viktor Mozesovich; Remzhin, Jury Nikolaevich; Slepnev, Lev Nikolaevich; Sverdlov, Alexandr Anatolievich; Karan, Vladimir Geselevich; Kaloshin, Jury Petrovich; Krasikov, Anatoly Nikolaevich; Babenko, Evgeny Akimovich; Bronnikov, Vladimir Konstantinovich; Shvyryaev, Jury Vasilievich; and Shiryaev, Boris Semenovich, 4,056,436, Cl. 176-38.000.

Sullivan, Dennis J. Excavating tool. 4,056,151, Cl. 173-141.000.

Sullivan, Donald F. Printed circuit board open circuit tester. 4,056,773, Cl. 324-73.0PC.

Sulzer Brothers Limited: *See—*

Rutz, Peter; and Steiger, Anton, 4,056,042, Cl. 91-497.000.

Rutz, Peter; and Steiger, Anton, 4,056,080, Cl. 123-23.000.

Sumitomo Chemical Company, Limited: *See—*

Sano, Takezo; and Sasaki, Masao, 4,056,456, Cl. 204-165.000.

Takayama, Chiyozo; Hisada, Yoshio; Kato, Toshiro; and Fujinami, Akira, 4,056,622, Cl. 424-273.00R.

Sumitomo Metal Industries Limited: *See—*

Fujii, Yoshihisa; and Fujiwara, Akio, 4,056,412, Cl. 148-153.000.

Sun, Kuan H.: *See—*

Bartko, John; and Sun, Kuan H., 4,056,408, Cl. 148-1.500.

Sundby, Bjorn, to Colgate-Palmolive Company. Sulfosuccinates of polyhydroxy tertiary amines as new detergent-softener compounds. 4,056,558, Cl. 560-151.000.

Sutter, Robert C.: *See—*

Pohto, Gerald R.; Kubrin, Michael J.; and Sutter, Robert C., 4,056,458, Cl. 204-263.000.

Sutton, Charles D.: *See—*

Dashew, Stanley A.; and Sutton, Charles D., 4,056,073, Cl. 114-151.000.

Suzuki, Hiroyuki: *See—*

Okamoto, Kintaro; Kudo, Hirokatu; Ishijimi, Soichi; Kadoiri, Etsuro; Soma, Hiroshi; and Suzuki, Hiroyuki, 4,056,165, Cl. 181-141.000.

Svensson, Claes-Goran O.: *See—*

Johansson, Lennart Nils; and Svensson, Claes-Goran O., 4,055,952, Cl. 60-517.000.

Sverdlov, Alexandr Anatolievich: *See—*

Bukrinsky, Anatoly Matveevich; Matskevich, Genrikh Vladimirovich; Rzheznikov, Julian Vulfovich; Sukhov, Andrei Borisovich; Tatarnikov, Viktor Petrovich; Berkovich, Viktor Mozesovich; Remzhin, Jury Nikolaevich; Slepnev, Lev Nikolaevich; Sverdlov, Alexandr Anatolievich; Karan, Vladimir Geselevich; Kaloshin, Jury Petrovich; Krasikov, Anatoly Nikolaevich; Babenko, Evgeny Akimovich; Bronnikov, Vladimir Konstantinovich; Shvyryaev, Jury Vasilievich; and Shiryaev, Boris Semenovich, 4,056,436, Cl. 176-38.000.

Swan, Clarence Burke, to Bell Telephone Laboratories, Incorporated. Low-noise microwave amplifier. 4,056,785, Cl. 330-53.000.

Swarobski, Daniel; and Schwab, Kurt, to D. Swarovski & Co., Glasschleiferei. Optical instrument in which eyepiece tube and objective tube are surrounded in cast resin to make a rigid core enclosed in foamed synthetic resin. 4,056,303, Cl. 350-36.000.

Sweet, Albert: *See—*

Marks, Ronald Aaron; Levenback, George; and Sweet, Albert, 4,055,954, Cl. 60-527.000.

Swenson, Paul F.; and Moore, Paul B., to Consolidated Natural Gas Service Company. Heat pump system. 4,055,964, Cl. 62-238.000.

Swiss Aluminium Limited: *See—*

Pryor, Michael J.; and Gray, Thomas J., 4,056,586, Cl. 264-44.000.

Symm, Richard H.; and Sheffield, Byford D., to Dow Chemical Company, The. Amine-modified polyethers. 4,056,510, Cl. 260-47.0EP.

Syncro Corporation: *See—*

Carmichael, Thomas F., 4.056,088, Cl. 123-148.00E.

Syva Company: *See—*

Ullman, Edwin F.; Chang, Joyce Y.; and McNeil, Kenneth G., 4,056,608, Cl. 424-1.000.

Szwarc, Henri: *See—*

Ter-Minassian, Leon; Pruzan, Philippe; Figuiere, Pierre; and Szwarc, Henri, 4,055,982, Cl. 73-15.00B.

Takahashi, Akio: *See—*

Carlson, Richard D.; and Takahashi, Akio, 4,056,512, Cl. 260-59.00R.

Takahashi, Michihisa: *See—*

Iiyama, Kiyotaka; Matsui, Takeshi; Kusakata, Shigeru; and Takahashi, Michihisa, 4,056,824, Cl. 354-300.000.

Takahashi, Sosuke: *See—*

Kitaoka, Shigeo; Johkoh, Katsuhiro; Ebisawa, Hisashi; Sato, Tadashi; Kubo, Hiroshi; Takahashi, Sosuke; and Kawase, Yoshinobu, 4,056,631, Cl. 424-330.000.

Takahashi, Wataru: *See—*

Kawamura, Masahumi; Takahashi, Wataru; and Watanabe, Tadashi, 4,056,495, Cl. 260-22.0CA.

Takai, Hisao, to Lucky Hair Products Co., Ltd. Hair-curler. 4,056,109, Cl. 132-40.000.

Takayama, Chiyozo; Hisada, Yoshio; Kato, Toshiro; and Fujinami, Akira, to Sumitomo Chemical Company, Limited. N-sulfonyl-N-dihalophenylimidazolidinediones. 4,056,622, Cl. 424-273.00R.

Takemoto, Iwao, to Hitachi, Ltd. Charge transfer semiconductor device with electrodes separated by oxide region therebetween and method for fabricating the same. 4,055,885, Cl. 29-578.000.

Takeshika, Shiro: *See—*

Kimura, Tsuneo; and Takeshika, Shiro, 4.056,123, Cl. 137-624.140.

Talleres Diesel, S.A.: *See—*

Torralba, Jose Esteban, 4,055,978, Cl. 72-254.000.

Talmon, Wolfgang: *See—*

Zorn, Jurgen; Vlemmings, Jan; Muller, Karl-Heinz; Mayer, Siegfried; Dworak, Wilhelm; Hartmann, Eugen; Fader, Martin; Talmon, Wolfgang; Jons, Claus; Sauer, Ivan; and Bosch, Paul, 4,056,337, Cl. 418-131.000.

Tamaro, George John, to Icos Corporation of America. Concrete walls and reinforcement cage therefor. 4,055,927, Cl. 52-577.000.

Tamaro, George John, to Icos Corporation of America. Squaring off and reaming tool for deep elongated trench excavations. 4,056,154, Cl. 175-416.000.

Tamura, Masamitu: *See—*

Harada, Nobuhiko; Tanaka, Minetaka; Shimano, Masanao; Fujinaga, Kyozo; Nunomura, Kunito; Tamura, Masamitu; Nakamura, Shigeharu; and Akagi, Kazuo, 4,056,428, Cl. 156-642.000.

Tanaka, Minetaka: *See—*

Harada, Nobuhiko; Tanaka, Minetaka; Shimano, Masanao; Fujinaga, Kyozo; Nunomura, Kunito; Tamura. Masamitu; Nakamura, Shigeharu; and Akagi, Kazuo, 4,056,428, Cl. 156-642.000.

Tanaka, Yoshiaki; Handa, Susumu; Nishibata, Atsushi; Ueda, Sadashi; Inamoto, Yoshiaki; Saito, Masahiro; Tanimoto, Fumio; and Kitano, Hisao, to Kao Soap Co., Ltd. Process for the preparation of organic isocyanate compounds. 4,056,547, Cl. 260-453.00P.

Tanimoto, Fumio: *See—*

Tanaka, Yoshiaki; Handa, Susumu; Nishibata, Atsushi; Ueda, Sadashi; Inamoto, Yoshiaki; Saito, Masahiro; Tanimoto, Fumio; and Kitano, Hisao, 4,056,547, Cl. 260-453.00P.

Tatarnikov, Viktor Petrovich: *See—*

Bukrinsky, Anatoly Matveevich; Matskevich, Genrikh Vladimirovich; Rzheznikov, Julian Vulfovich; Sukhov, Andrei Borisovich; Tatarnikov, Viktor Petrovich; Berkovich, Viktor Mozesovich; Remzhin, Jury Nikolaevich; Slepnev, Lev Nikolaevich; Sverdlov, Alexandr Anatolievich; Karan, Vladimir Geselevich; Kaloshin, Jury Petrovich; Krasikov, Anatoly Nikolaevich; Babenko, Evgeny Akimovich; Bronnikov, Vladimir Konstantinovich; Shvyryaev, Jury Vasilievich; and Shiryaev, Boris Semenovich, 4,056,436, Cl. 176-38.000.

Tate, John Robert, to Procter & Gamble Company, The. Detergent composition. 4,056,481, Cl. 252-140.000.

Taylor, Kenneth John; and Lord, Allan, to IBA Industrial Products Ltd. Glass-reinforced thermoplastic moulding compositions. 4,056,505, Cl. 260-42.180.

Taylor, Lynn J., to Owens-Illinois, Inc. Degradable polymeric composition. 4,056,499, Cl. 260-23.00H.

Taylor, Lynn J.; and Tobias, John W., to Owens-Illinois, Inc. Composition and process. 4,056,665, Cl. 526-1.000.

Teasdale, Raymond Geoffrey, to National Research Development Corporation. Oil recovery apparatus. 4,056,472, Cl. 210-242.00S.

Technicon Instruments Corporation: *See—*

Snyder, Lloyd L.; and Furda, Jana, 4,056,357, Cl. 23-230.00B.

Techniform: *See—*

Barrois, Marcelle, 4,056,192, Cl. 211-13.000.

Teller, Daniel M.: *See—*

Sellstedt, John H.; and Teller, Daniel M., 4,056,525, Cl. 260-239.0BD.

Tenna Corporation: *See—*

Repay, Laszlo N.; and Young, Thomas A., 4,056,253, Cl. 248-479.000.

Teraji, Tsutomu: *See—*

Kamiya, Takashi; Teraji, Tsutomu; Hashimoto, Masashi; Nakaguti, Osamu; and Oku, Teruo, 4,056,521, Cl. 260-239.100.

Teranishi, Katsuya: *See—*

Mitsui, Nobuo; Watanabe, Akinori; Oohira, Takeshi; Kawauchi, Kazuhiko; Nakao, Shoichi; and Teranishi, Katsuya, 4,056,759, Cl. 318-98.000.

- Teratani, Tatsuo: *See—*
  - Makino, Takayuki; Yamanaka, Teruo; Kuroyanagi, Yoshitaka; and Teratani, Tatsuo, 4,056,782, Cl. 325-313.000.
- Ter-Minassian, Leon; Pruzan, Philippe; Figuiere, Pierre; and Szwarc, Henri, to ANVAR-Agence Nationale de Valorisation de la Recherche. Calorimeters for making measurements at pressures above 1000 bars. 4,055,982, Cl. 73-15.00B.
- Terp, Norman T.: *See—*
  - Bradford, Jay H.; and Terp, Norman T., 4,056,118, Cl. 137-201.000.
- Terranova, Carmen S.; and Chinoy, Rustam B., to General Electric Company. Axial movement limiting coupling assembly. 4,055,967, Cl. 64-28.00R.
- Terry, Lynn E. Hydrogen-hydride absorption systems and methods for refrigeration and heat pump cycles. 4,055,962, Cl. 62-102.000.
- Tetsuji, Miyauchi: *See—*
  - Hagiwara, Yoshihide; Tetsuji, Miyauchi; and Morimasa, Yuki, 4,056,637, Cl. 426-52.000.
- Teufel, Hermann: *See—*
  - Bartmann, Wilhelm; Beck, Gerhard; Granzer, Ernold; Musil, Josef; and Teufel, Hermann, 4,056,629, Cl. 424-327.000.
- Texaco Inc.: *See—*
  - Bunn, Dorrance P., Jr.; Strickland, John C.; and May, Douglas H., Jr., 4,056,486, Cl. 252-417.000.
  - Kolaian, Jack H.; McCoy, Frederic C.; and Patterson, John A., 4,056,355, Cl. 8-137.000.
- Texas Instruments Incorporated: *See—*
  - Becklund, Orville A., 4,056,061, Cl. 102-70.20P.
  - Benhamou, Jean Pierre, 4,056,808, Cl. 340-171.0PF.
  - Wagers, Robert S.; and Hartmann, Clinton S., 4,056,793, Cl. 333-72.000.
  - Wood, George William; and Sallas, John James, 4,056,163, Cl. 181-113.000.
- Textron Inc.: *See—*
  - Silvis, Richard R.; and Ettinger, John A., 4,056,184, Cl. 198-471.000.
- Thagard Technology Company: *See—*
  - Matovich, Edwin, 4,056,602, Cl. 423-345.000.
- Thate, Kurt: *See—*
  - Schneider, Siegfried; Thate, Kurt; Geyken, Erwin; Kempe, Horst; and Macher, Stephan, 4,055,879, Cl. 29-123.000.
- Theard, Leslie P.: *See—*
  - Heilman, William J.; Peterson, Frank C.; Renz, Mical C.; and Theard, Leslie P., 4,056,506, Cl. 260-42.180.
- Thiac, E. Brandt, to Hydro-Terre Corporation, The. Method of producing an organic soil additive and the product thereof. 4,056,380, Cl. 71-9.000.
- Thomas & Betts Corporation: *See—*
  - Churla, John J., 4,055,980, Cl. 72-410.000.
- Thomas, Earl M.: *See—*
  - Chow, Sen-te; and Thomas, Earl M., 4,056,721, Cl. 250-213.0VT.
- Thomas, Marion E.: *See—*
  - Shatila, Mounir A.; VonDer Leith, William H.; Veeneman, John L.; and Thomas, Marion E., 4,056,345, Cl. 425-186.000.
- Thomas, Morton I. Adapter for manipulating a spring loaded pushbutton. 4,056,115, Cl. 135-67.000.
- Thompson, Francis T., to Westinghouse Electric Corporation. Automated interrogating apparatus. 4,055,906, Cl. 35-9.00A.
- Thompson, Geoffrey O.: *See—*
  - Thornburg, David D.; and Thompson, Geoffrey O., 4,056,822, Cl. 346-76.00R.
- Thompson, William Henry; Worthington, Ralph Eric; and Stamper, David John. Production of hydrogen fluoride. 4,056,604, Cl. 423-483.000.
- Thornber, Karvel Kuhn, to Bell Telephone Laboratories, Incorporated. Electronically alterable diode logic circuit. 4,056,807, Cl. 340-166.00R.
- Thornburg, David D.; and Thompson, Geoffrey O., to Xerox Corporation. Low profile single channel thermal analog recorder. 4,056,822, Cl. 346-76.00R.
- Thornburg, David D., to Xerox Corporation. Analog chart recorder employing thermal printing means. 4,056,823, Cl. 346-76.00R.
- Thornton, Jack L. Truss web cutter. 4,056,031, Cl. 83-794.000.
- Thuet, Ronald Kent, to Sperry Rand Corporation. Stylus actuator. 4,056,182, Cl. 197-1.00R.
- Thuillier, Rene: *See—*
  - Christen, Gilbert; Favre, Bernard; Marze, Xavier; Salmon, Michel; and Thuillier, Rene, 4,056,467, Cl. 210-23.00F.
- Tibbetts, George C., to Tibbetts Industries, Inc. Transducer having piezoelectric film arranged with alternating curvatures. 4,056,742, Cl. 310-357.000.
- Tibbetts Industries, Inc.: *See—*
  - Tibbetts, George C., 4,056,742, Cl. 310-357.000.
- Tickle, Colin John Frederick, to Girling Limited. Low friction support for disc brake pad. 4,056,171, Cl. 188-18.00A.
- Tillmanns, Josef: *See—*
  - Linnerz, Wilhelm; and Tillmanns, Josef, 4,056,232, Cl. 241-194.000.
- Tillotson Corporation: *See—*
  - Allen, Ralph W., Jr., 4,056,161, Cl. 181-290.000.
- Timex Corporation: *See—*
  - Schwarzschild, Jack; and Lowdenslager, John R., 4,055,945, Cl. 58-85.500.
- Tobias, John W.: *See—*
  - Taylor, Lynn J.; and Tobias, John W., 4,056,665, Cl. 526-1.000.
- Tobise, Masahiro; Kogure, Hiromasa; Kanbara, Tadahiko; and Koseki, Hiroshi, to Hitachi, Ltd. Cooling arrangement for semiconductor converter device. 4,056,767, Cl. 363-141.000.
- Tocci, Leonard R.: *See—*
  - Oeffinger, Thomas R.; and Tocci, Leonard R., 4,056,813, Cl. 365-12.000.
- Todd, Robert R.; and Rowland-Hill, Edward W., to Sperry Rand Corporation. Crop residue deflector means. 4,056,107, Cl. 130-27.00R.
- Tokyo Sanyo Electric Co., Ltd.: *See—*
  - Ikeguchi, Shigehiko; Yamashita, Norio; and Matsuda, Eiji, 4,056,181, Cl. 194-10.000.
- Tokyo Shibaura Denki Kabushiki Kaisha: *See—*
  - Andow, Fumio, 4,056,839, Cl. 361-68.000.
  - Sato, Seiko, 4,056,331, Cl. 415-15.000.
- Toler, Robert Lee, to Motorola, Inc. Vehicular repeater. 4,056,779, Cl. 325-4.000.
- Tomczak, Lawrence William; Crall, Frederick William; Caron, La Verne Andrew; and Campau, Walter Joseph, to Chrysler Corporation. Variable inductance transducer combined assembly and calibration method. 4,055,886, Cl. 29-593.000.
- Tooley, Jack Raymond, to Acrow (Engineers) Limited. Supports or concrete formwork. 4,056,254, Cl. 249-210.000.
- Topping, Frederick Victor. Pipeline inspection apparatus. 4,055,990, Cl. 73-623.000.
- Torralba, Jose Esteban, to Talleres Diesel, S.A. Procedure for manufacturing hydraulic plunger-type pump bodies. 4,055,978, Cl. 72-254.000.
- Torrington Company, The: *See—*
  - Lobeck, John Hillman; and Lindgren, Raymond Harold, 4,056,293, Cl. 308-217.000.
- Tousimis Research Corporation: *See—*
  - Horne, John E., 4,055,904, Cl. 34-45.000.
- Towmotor Corporation: *See—*
  - Chelin, Charles R., 4,056,170, Cl. 187-95.000.
- Townsend, Nicholas A., to British Steel Corporation. Scrap treatment. 4,056,231, Cl. 241-23.000.
- Toyo Kogyo Co., Ltd.: *See—*
  - Doi, Kunio; Koike, Kozo; and Sasaki, Toshiro, 4,056,339, Cl. 418-178.000.
- Toyo Soda Manufacturing Co., Ltd.: *See—*
  - Seita, Toru; Shimizu, Akihiko; and Kosaka, Yujiro, 4,056,666, Cl. 526-29.000.
- Toyota Jidosha Kogyo Kabushiki Kaisha: *See—*
  - Makino, Takayuki; Yamanaka, Teruo; Kuroyanagi, Yoshitaka; and Teratani, Tatsuo, 4,056,782, Cl. 325-313.000.
  - Shinoda, Kazuo; and Ii, Akira, 4,056,583, Cl. 261-36.00A.
  - Wakita, Nobuaki, 4,056,083, Cl. 123-119.00A.
- Traenkle, William J. Within-the-shoe sock having removable retaining device. 4,055,858, Cl. 2-240.000.
- Traut, Earl W. Linear rolling contact devices. 4,056,292, Cl. 308-206.000.
- Trekoval, Jiri: *See—*
  - Lochmann, Lubomir; and Trekoval, Jiri, 4,056,580, Cl. 260-881.000.
- Trenkamp, Robert H.; and Dissauer, Gerald A., to Addressograph Multigraph Corporation. Wear compensating optical/magnetic transducer. 4,056,712, Cl. 235-440.000.
- Trimble, Steven M. Portable boat-carried rack for water skis and tow ropes. 4,056,220, Cl. 224-42.45R.
- Trolle, Sten, to AB Carbox. Isostatic compactor of pulverulent materials and the like. 4,056,347, Cl. 425-405.00H.
- Trott, Beverly D.: *See—*
  - Petty, Jon; Trott, Beverly D.; and Backofen, Joseph E., 4,056,212, Cl. 220-244.000.
- Troyan, Nikolai Vasilievich: *See—*
  - Vulikh, Alexandr Ilich; Zagorskaya, Maina Konstantinovna; Kofman, Izrail Zalmanovich; Pavlovich, Inna Vasilievna; Levitan, Boris Veniaminovich; Troyan, Nikolai Vasilievich; and Dubyaga, Sergei Viktorovich, 4,056,605, Cl. 423-484.000.
- Tsou, Ivan H., to Ford Motor Company. Trimellitic anhydride modified urethane electrocoating resins. 4,056,493, Cl. 260-22.0TN.
- Tsuji, Hideakira: *See—*
  - Jojima, Teruomi; Tsuji, Hideakira; Yamamoto, Shinjiro; and Omino, Teiji, 4,056,617, Cl. 424-200.000.
- Tsuji, Nobuo: *See—*
  - Horie, Ikutaro; Miyazako, Takushi; Sakaguchi, Shinji; Tsuji, Nobuo; and Kameji, Nagao, 4,056,396, Cl. 96-67.000.
- Tsunoo, Masahiko: *See—*
  - Inoue, Michihiro; Kimura, Takeji; Sato, Masaharu; and Tsunoo, Masahiko, 4,056,033, Cl. 84-1.240.
- Tucker, Fred: *See—*
  - Cross, Robert L., Jr.; Hill, M. Raymond; and Tucker, Fred, 4,056,748, Cl. 310-168.000.
- Tulloh, Steven P.: *See—*
  - Bishop, Richard L.; and Tulloh, Steven P., 4,056,843, Cl. 364-200.000.
- Turbak, Albin Frank; and Hammer, Richard Benjamin, to International Telephone and Telegraph Corporation. Process for producing regenerated cellulosic fibers. 4,056,675, Cl. 536-57.000.
- Turner, Sam R.; and Pochan, John M., to Xerox Corporation. Method for enhancing solid solution stability of electron acceptor molecules and electrophotographic compositions. 4,056,391, Cl. 96-1.0PC.
- Tvingstedt, Claes: *See—*
  - Piltz, Lars-Erik; and Tvingstedt, Claes, 4,056,221, Cl. 229-14.0BL.
- U, Aung San: *See—*
  - Cook, Charles R., Jr.; U, Aung San; and Scherrer, Raymond E., 4,056,415, Cl. 148-187.000.
- U C B Societe Anonyme: *See—*
  - Vora, Vinay Chhotalal; and Mody, Amrut Vithaldas, 4,056,615, Cl. 424-120.000.

- Uchiyama, Kanji, to Caterpillar Mitsubishi Ltd. Coupling device for mounting a material handling machine on a civil engineering vehicle. 4,056,250, Cl. 248-14.000.
- Ueda, Sadashi: *See—*
  - Tanaka, Yoshiaki; Handa, Susumu; Nishibata, Atsushi; Ueda, Sadashi; Inamoto, Yoshiaki; Saito, Masahiro; Tanimoto, Fumio; and Kitano, Hisao, 4,056,547, Cl. 260-453.00P.
- Ueno, Zene; Kosaka, Katuaki; and Wagatsuma, Fumio, to Nissan Motor Company, Limited. Method of accelerating evaporation of fuel in internal combustion engine intake system by heat evolved by decomposition of H_2O_2. 4,056,086, Cl. 123-122.00R.
- Uhlig, Werner. Film title machine for amateur filmmakers. 4,056,312, Cl. 352-90.000.
- Ullman, Edwin F.; Chang, Joyce Y.; and McNeil, Kenneth G., to Syva Company. Cardiac glycoside or aglycone assays. 4,056,608, Cl. 424-1.000.
- Unican Security Systems, Ltd.: *See—*
  - Gamus, Abraham; and Knecevic, Zoran, 4,056,277, Cl. 292-341.160.
  - Moessner, Frank G., 4,055,880, Cl. 29-267.000.
- Union Carbide Corporation: *See—*
  - Spanur, Frank George; and Alberto, Vicente Santo Domingo, 4,056,659, Cl. 429-54.000.
  - Westfall, Paul Marlin; and Mayfield, Howard, 4,056,646, Cl. 428-90.000.
- Uniroyal, Inc.: *See—*
  - Dorsch, Robert Eugene, 4,056,279, Cl. 296-1.00S.
- United Kingdom Atomic Energy Authority: *See—*
  - Barnes, Sidney; and Fothergill, John Roderick, 4,056,434, Cl. 176-19.00R.
  - Hunter, Eric; and Green, Derek, deceased, 4,055,979, Cl. 72-262.000.
  - Macbeth, Robert Victor, 4,056,440, Cl. 176-78.000.
- United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Social Services in Her Britannic Majesty's Government of the: *See—*
  - Peters, Ann Margaret; Greaves, Geoffrey Stuart; Clark, Ian Robert; Holder, Roger Leonard; and Bunce, Roger Abraham, 4,056,361, Cl. 23-259.000.
- United States of America
  - Agriculture: *See—*
    - Pittman, Allen G.; Wasley, William L.; and Getchell, Nelson F., 4,056,354, Cl. 8-54.000.
  - Army: *See—*
    - Bobb, Lloyd C.; and Kramer, Kimball, 4,056,290, Cl. 307-88.300.
    - Chow, Sen-te; and Thomas, Earl M., 4,056,721, Cl. 250-213.0VT.
    - Devine, Patrick J., 4,056,060, Cl. 102-52.000.
    - Franklin, Gerald B.; and Parrish, Clyde F., 4,056,416, Cl. 149-19.910.
    - Goes, Michael J.; and Masly, John R., 4,055,983, Cl. 73-37.500.
    - Petty, Jon; Trott, Beverly D.; and Backofen, Joseph E., 4,056,212, Cl. 220-244.000.
    - Walls, John J., Jr.; and McKyton, Richard A., 4,056,649, Cl. 428-215.000.
  - Energy Research and Development Administration: *See—*
    - Kulhanek, Frank C., 4,056,000, Cl. 73-170.00R.
    - Weil, Bradley S.; and Watson, Clyde D., 4,056,052, Cl. 100-39.000.
  - Navy: *See—*
    - Griffith, James R.; and O'Rear, Jacques G., 4,056,560, Cl. 260-465.00D.
    - McEwan, William S.; and Jonassen, Hans B., 4,056,386, Cl. 75-0.5BA.
    - Rabon, James L., 4,056,802, Cl. 340-3.00R.
    - Reid, Alan; and Phillips, Wendell C., Jr., 4,056,079, Cl. 122-476.000.
    - Stregack, Joseph A.; and Wexler, Bernard L., 4,056,789, Cl. 331-94.50G.
- U.S. Philips Corporation: *See—*
  - Admiraal, Petrus Simon, 4,055,961, Cl. 62-54.000.
  - de Boer, Jacob; and Walraven, Anthonie, 4,056,832, Cl. 360-77.000.
  - Hermans, Peter, 4,055,877, Cl. 29-25.160.
  - Nederlof, Anton Marie, 4,055,953, Cl. 60-526.000.
- U.S. Phillips Corporation: *See—*
  - Hart, Cornelis Maria; and Slob, Arie, 4,056,810, Cl. 365-205.000.
- United States Steel Corporation: *See—*
  - Henry, Edwin Blair, Jr.; Patsey, John A.; Rudolph, Ralph G.; and Schindler, Donald G., 4,055,989, Cl. 73-588.000.
  - Ives, Kenneth D.; Vranka, Ronald S.; and Wagner, George J., Jr., 4,056,140, Cl. 164-4.000.
  - Secrist, Walter S., 4,056,335, Cl. 417-431.000.
- United States Surgical Corporation: *See—*
  - Noiles, Douglas G., 4,056,100, Cl. 128-214.00C.
- United Technologies Corporation: *See—*
  - Armstrong, Lee R.; and Mercik, Henry J., Jr., 4,055,995, Cl. 73-116.000.
  - Galasso, Francis S.; Bourdeau, Romeo G.; and Pike, Roscoe A., 4,056,598, Cl. 264-184.000.
  - Kniat, John, 4,055,997, Cl. 73-117.300.
  - Martin, Anthony Newman, 4,056,732, Cl. 307-33.000.
  - Pettingell, James R.; and Armstrong, Lee R., 4,055,998, Cl. 73-119.00R.
  - Rackliffe, Richard J.; and Armstrong, Lee R., 4,055,993, Cl. 73-116.000.
  - Scola, Daniel A., 4,056,651, Cl. 428-336.000.
  - Sens, William H., 4,055,946, Cl. 60-204.000.
  - Showalter, John Melville, 4,056,169, Cl. 187-29.00R.
- University of California, The Regents of the: *See—*
  - White, Richard Manning; and Hsu, Tzu-Hwa, 4,056,803, Cl. 340-15.000.
- Unverferth, Jack W., to Chevron Research Company. Retorting process utilizing a flexible, helical shaped conveyor. 4,056,461, Cl. 208-11.00R.
- Upaya, Inc.: *See—*
  - Budrose, Charles R., 4,055,905, Cl. 35-5.000.
- Upjohn Company, The: *See—*
  - Axen, Udo F., 4,056,554, Cl. 560-60.000.
  - Axen, Udo F., 4,056,555, Cl. 560-53.000.
  - Axen, Udo F., 4,056,556, Cl. 560-53.000.
  - Axen, Udo F., 4,056,557, Cl. 560-60.000.
  - Schlieckmann, Alfred; and Moser, Kurt, 4,056,122, Cl. 137-563.000.
  - Yalkowsky, Samuel H., 4,056,340, Cl. 425-10.000.
- Urbanek, Friedrich: *See—*
  - Strehler, Hugo; Beer, Ludwig; Heil, Eduard; Urbanek, Friedrich; and Fischer, Hermann, 4,056,514, Cl. 260-75.00R.
- Urquizar, Rolando: *See—*
  - Pollock, Douglas; Sobarzo, Omar; Urquizar, Rolando; Vilches, Carlos; and Bolanos, Jaime, 4,056,262, Cl. 266-138.000.
- Uurbanus, Elisabeth W.: *See—*
  - Verbrugge, Pieter A.; and Uurbanus, Elisabeth W., 4,056,509, Cl. 260-465.00G.
- Valdettaro, Alarico A., to Sarkes Tarzian, Inc. Detented UHF television tuner with independent inductive fine tuning. 4,056,796, Cl. 334-55.000.
- Vallance, Charles B.: *See—*
  - Berk, Charles W.; and Vallance, Charles B., 4,056,677, Cl. 13-23.000.
- Valleylab: *See—*
  - Lundquist, Ingemar H., 4,056,333, Cl. 417-44.000.
- Vallourec (Usines a Tubes de Lorraine-Escaut et Vallourec Reunies): *See—*
  - Peytavin, Pierre, 4,056,197, Cl. 214-1.0BC.
- Valmet Oy: *See—*
  - Koponen, Martti; and Soikkanen, Pertti, 4,056,433, Cl. 162-290.000.
- van Doorne's Transmissie B.V.: *See—*
  - Ludoph, Hemmo Hermannes Johannes; and van Deursen, Petrus Henricus, 4,056,015, Cl. 74-230.17F.
- van der Lely, Ary; and Bom, Cornelis Johannes Gerardus, to C. van der Lely N. V. Rotary harrows. 4,056,147, Cl. 172-68.000.
- van Deursen, Petrus Henricus: *See—*
  - Ludoph. Hemmo Hermannes Johannes; and van Deursen, Petrus Henricus, 4,056,015, Cl. 74-230.17F.
- Vankov, Ivan Danailov: *See—*
  - Kamburov, Hristo Kirilov; Vankov, Ivan Danailov; and Donev, Ivan Yordanov, 4,056,725, Cl. 250-336.000.
- Varadi, Peter F., to Solarex Corporation. Panel for solar energy cells. 4,056,405, Cl. 136-89.0PC.
- Vayra, Jean: *See—*
  - Marmonier, Pierre; Mesnage, Bernard; Skok, Jean; and Vayra, Jean, 4,056,441, Cl. 176-78.000.
- Veeneman, John L.: *See—*
  - Shatila, Mounir A.; VonDer Leith, William H.; Veeneman, John L.; and Thomas, Marion E., 4,056,345, Cl. 425-186.000.
- Velsicol Chemical Corporation: *See—*
  - Krenzer, John, 4,056,383, Cl. 71-90.000.
- Vennett, Richard M., to Continental Oil Company. Diverless cathodic protection data acquisition. 4,056,446, Cl. 204-1.00T.
- Verbrugge, Pieter A.; and Uurbanus, Elisabeth W., to Shell Oil Company. Preparation of benzyl cyanides. 4,056,509, Cl. 260-465.00G.
- Vernaleken, Hugo: *See—*
  - Grundmeier, Manfred; Binsack, Rudolf; and Vernaleken, Hugo, 4,056,504, Cl. 260-37.0PC.
- Vertut, Jean: *See—*
  - Debrie, Guy; Grenier, Claude; Petit, Michel; Rigaut, Henri; and Vertut, Jean, 4,056,763, Cl. 318-675.000.
- Victor Company of Japan, Limited: *See—*
  - Matsutsuka, Nobuaki, 4,056,244, Cl. 242-197.000.
  - Watanabe, Yasuaki; Okabe, Yukio; and Hayakawa, Mitsuru, 4,056,826, Cl. 358-19.000.
- Vidaurri, Fernando C., Jr., to Phillips Petroleum Company. Continuous reaction for preparation of arylene sulfide polymer. 4,056,515, Cl. 260-79.100.
- Vilches, Carlos: *See—*
  - Pollock, Douglas; Sobarzo, Omar; Urquizar, Rolando; Vilches, Carlos; and Bolanos, Jaime, 4,056,262, Cl. 266-138.000.
- Viles, Alan H.: *See—*
  - Born, Ellis H.; Meisel, William H.; and Viles, Alan H., 4,056,041, Cl. 91-375.00R.
- Vittorelli, Vittore, to Ing. C. Olivetti & C., S.p.A. Textual processing system utilizing display aided associative searching feature. 4,056,821, Cl. 364-900.000.
- Vlemmings, Jan: *See—*
  - Zorn, Jurgen; Vlemmings, Jan; Muller, Karl-Heinz; Mayer, Siegfried; Dworak, Wilhelm; Hartmann, Eugen; Fader, Martin; Talmon, Wolfgang; Jons, Claus; Sauer, Ivan; and Bosch, Paul, 4,056,337, Cl. 418-131.000.
- Volfkovich, Semen Issakovich; Belov, Vladimir Nikolaevich; Ershov, Vadim Andreevich; Rozenberg, Evgeny Khaskelevich; Shipov, Emmanuil Ivanovich; and Jumanova, Ljudmila Vladimirovna. Process for the production of yellow phosphorus. 4,056,601, Cl. 423-322.000.

Volkswagenwerk Aktiengesellschaft: *See—*
Bauer, Andreas; and Lange, Wolfgang, 4,056,280, Cl. 296-146.000.
Von Roll AG: *See—*
Hafeli, Robert, 4,056,068, Cl. 110-8.00A.
Vona, Joseph A.: *See—*
Powanda, Thomas M.; Patella, Ralph F.; Vona, Joseph A.; and DeFazio, Charles A., 4,056,503, Cl. 260-29.60T.
von Bonin, Wulf: *See—*
Krafft, Werner; Wolff, Erich; and von Bonin, Wulf, 4,056,397, Cl. 96-77.000.
VonDer Leith, William H.: *See—*
Shatila, Mounir A.; VonDer Leith, William H.; Veeneman, John L.; and Thomas, Marion E., 4,056,345, Cl. 425-186.000.
von Fraunberg, Karl: *See—*
Hoffman, Werner; Mueller, Norbert; and von Fraunberg, Karl, 4,056,541, Cl. 260-343.000.
von Strandtmann, Maximilian: *See—*
Connor, David T.; Young, Patricia A.; and von Strandtmann, Maximilian, 4,056,619, Cl. 424-263.000.
von Strandtmann, Maximillian: *See—*
Connor, David T.; Young, Patricia A.; and von Strandtmann, Maximillian, 4,056,532, Cl. 260-296.00R.
von Voss, William Ditlef: *See—*
Braun, Roland Joseph; and von Voss, William Ditlef, 4,056,302, Cl. 339-275.00B.
Vora, Vinay Chhotalal; and Mody, Amrut Vithaldas, to U C B Societe Ancnyme. Lucknomycin and process for producing same. 4,056,615, Cl. 424-120.000.
Vossen, John Louis, Jr., to RCA Corporation. Method of depositing low stress hafnium thin films. 4,056,457, Cl. 204-192.0SP.
Vranka, Ronald S.: *See—*
Ives, Kenneth D.; Vranka, Ronald S.; and Wagner, George J., Jr., 4,056,140, Cl. 164-4.000.
Vulikh, Alexandr Ilich; Zagorskaya, Maina Konstantinovna; Kofman, Izrail Zalmanovich; Pavlovich, Inna Vasilievna; Levitan, Boris Veniaminovich; Troyan, Nikolai Vasilievich; and Dubyaga, Sergei Viktorovich. Method for purification of hydrofluoric acid. 4,056,605, Cl. 423-484.000.
Vygodskaya, Irina Vladimirovna: *See—*
Bashkirov, Andrei Nikolaevich; Grozhan, Mark Markovich; Kamzolkin, Vladimir Vasilievich; Lapitsky, Jury Anatolievich; and Vygodskaya, Irina Vladimirovna, 4,056,572, Cl. 260-624.00R.
W.P. Energy Technology Systems: *See—*
Winkler, Robert J.; and Possell, Clarence R., 4,056,209, Cl. 215-215.000.
W. R. Grace & Co.: *See—*
Honkanen, Arvid; and Joonase, Paul, 4,056,587, Cl. 264-53.000.
Larsen, Donald W., 4,056,548, Cl. 260-455.00R.
W. Schlafhorst & Co.: *See—*
Raasch, Hans, 4,055,936, Cl. 57-34.00R.
Waaben, Sigurd Gunther, to Bell Telephone Laboratories, Incorporated. Two-way telephone transmission system utilizing opto-couplers. 4,056,719, Cl. 250-199.000.
WABCO Westinghouse GmbH: *See—*
Gudat, Wolfgang, 4,056,287, Cl. 303-91.000.
Wachtel, Heimut: *See—*
Kerb, Ulrich; Wiechert, Rudolf; Wachtel, Helmut; Engelfried, Otto; and Kieslich, Klaus, 4,056,633, Cl. 424-331.000.
Wagatsuma, Fumio: *See—*
Ueno, Zene; Kosaka, Katuaki; and Wagatsuma, Fumio, 4,056,086, Cl. 123-122.00R.
Wagener, Earl H.: *See—*
Gibbs, Dale S.; Wagener, Earl H.; and Wessling, Ritchie A., 4,056,501, Cl. 260-29.6SQ.
Wagers, Robert S.; and Hartmann, Clinton S., to Texas Instruments Incorporated. Acoustic waveguide resonator. 4,056,793, Cl. 333-72.000.
Waggoner, Marion Glen: *See—*
Gebhard, John Charles, Jr.; Waggoner, Marion Glen; and Webster, James Lang, 4,056,653, Cl. 428-402.000.
Wagner Electric Corporation: *See—*
Atkins, Carl E.; and McGuirk, Francis A., Jr., 4,056,841, Cl. 361-203.000.
Falk, Edward J., 4,055,957, Cl. 60-535.000.
Wagner, George J., Jr.: *See—*
Ives, Kenneth D.; Vranka, Ronald S.; and Wagner, George J., Jr., 4,056,140, Cl. 164-4.000.
Wagner, Richard C., to Hollymatic Corporation. Apparatus for tenderizing meat. 4,055,872, Cl. 17-25.000.
Wahl, Martin H. Portable trailer tongue weight scale. 4,056,155, Cl. 177-145.000.
Wahlsten, Gunnar: *See—*
Ahlen, Karl Gustav; and Wahlsten, Gunnar, 4,056,177, Cl. 192-.032.
Wakita, Nobuaki, to Toyota Jidosha Kogyo Kabushiki Kaisha. Exhaust gas recirculator for purification of emission from an internal combustion engine. 4,056,083, Cl. 123-119.00A.
Walker, Francis H., to Stauffer Chemical Company. Bis-substituted succinamides and their utility as herbicides. 4,056,524, Cl. 260-239.0BF.
Walker, John: *See—*
Ballard, Denis George Harold; Jones, Eric; Padget, John Christopher; Pioli, Alexander Joseph Peter; Robinson, Peter Anthony; Walker, John; and Wyatt, Ronald John, 4,056,669, Cl. 526-154.000.
Wallace, William E. Disposable rain protector. 4,055,852, Cl. 2-84.000.
Walls, John J., Jr.; and McKyton, Richard A., to United States of America, Army. Abrasion resistant optical materials and process for making same. 4,056,649, Cl. 428-215.000.
Walraven, Anthonie: *See—*
de Boer, Jacob; and Walraven, Anthonie, 4,056,832, Cl. 360-77.000.
Walser, Karl: Schmid, Kurt; and Scotoni, Ralph, to Hilti Aktiengesellschaft. Magazine for caseless charges. 4,056,062, Cl. 102-86.500.
Waltke, Robert W. Tooth die and method and apparatus for making the same. 4,056,585, Cl. 264-19.000.
Wankel GmbH: *See—*
Eiermann, Dankwart, 4,056,338, Cl. 418-119.000.
Wanner, Rudolf, to Bowe Bohler & Weber KG Maschinenfabrik. Envelope-stuffing machine. 4,055,932, Cl. 53-63.000.
Warkentin, Ulrich: *See—*
Scholl, Hans-Peter; Heimburger, Alfons; Warkentin, Ulrich; and Saufferer, Manfred, 4,056,709, Cl. 235-30.00R.
Warner-Lambert Company: *See—*
Adolf, Paul K.; and Carroll, James J., 4,056,485, Cl. 252-408.000.
Connor, David T.; Young, Patricia A.; and von Strandtmann, Maximillian, 4,056,532, Cl. 260-296.00R.
Connor, David T.; Young, Patricia A.; and von Strandtmann, Maximilian, 4,056,619, Cl. 424-263.000.
Stoss, Peter Johannes; Herrmann, Manfred Franz Reinhold; and Satzinger, Gerhard, 4,056,526, Cl. 544-146.000.
Warzawa, Wolfgang: *See—*
Huschka, Hans; and Warzawa, Wolfgang, 4,056,641, Cl. 427-6.000.
Wasley, William L.: *See—*
Pittman, Allen G.; Wasley, William L.; and Getchell, Nelson F., 4,056,354, Cl. 8-54.000.
Wasserman, Max; and Gorman, Martin E., Jr., to Sandell Mfg. Co., Inc. Expansion joint and flashing construction. 4,055,925, Cl. 52-403.000.
Watanabe, Akinori: *See—*
Mitsui, Nobuo; Watanabe, Akinori; Oohira, Takeshi; Kawauchi, Kazuhiko; Nakao, Shoichi; and Teranishi, Katsuya, 4,056,759, Cl. 318-98.000.
Watanabe, Kenzo: *See—*
Shoji, Kunihiro; Yokota, Akihiro; and Watanabe, Kenzo, 4,055,963, Cl. 62-238.000.
Watanabe, Tadashi: *See—*
Kawamura, Masahumi; Takahashi, Wataru; and Watanabe, Tadashi, 4,056,495, Cl. 260-22.0CA.
Watanabe, Yasuaki; Okabe, Yukio; and Hayakawa, Mitsuru, to Victor Company of Japan, Limited. Subcarrier regeneration circuit for color television receivers. 4,056,826, Cl. 358-19.000.
Watanabe, Yutaka, to Minolta Camera Kabushiki Kaisha. Optical system for use in microfilm reading and printing apparatus. 4,056,318, Cl. 355-45.000.
Watkins, John E.: *See—*
Malion, William R.; and Watkins, John E., 4,055,935, Cl. 56-10.300.
Watson, Clyde D.: *See—*
Weil, Bradley S.; and Watson, Clyde D., 4,056,052, Cl. 100-39.000.
Watts, George G.: *See—*
Day, Leon E., 4,056,214, Cl. 222-608.000.
Watts, Michael E.: *See—*
Shepardson, Robert C.; and Watts, Michael E., 4,056,710, Cl. 235-437.000.
Webasto-Werk W. Baier KG: *See—*
Jardin, Hans; and Auzannet, Jack, 4,056,274, Cl. 296-137.00G.
Webb, Robert J.: *See—*
Morasch, Ronald J.; and Webb, Robert J., 4,056,137, Cl. 144-323.000.
Weber, John E., to Bowmar Instrument Corporation. Low profile lighted push button switch. 4,056,701, Cl. 200-314.000.
Weber, Rolf Dieter: *See—*
Latus, Hans; Hemala, Zdenek; Bleeck, Heinz; and Weber, Rolf Dieter, 4,055,937, Cl. 57-34.00R.
Webster, James Lang: *See—*
Gebhard, John Charles, Jr.; Waggoner, Marion Glen; and Webster, James Lang, 4,056,653, Cl. 428-402.000.
Wehinger, Egbert: *See—*
Moller, Eike; Meng, Karl; Wehinger, Egbert; and Horstmann, Harald, 4,056,533, Cl. 548-360.000.
Weicht, Bodo; and Kleinhenz, Karl, to Bayer Aktiengesellschaft. Vacuum separation of mixtures with similar boiling points. 4,056,444, Cl. 203-26.000.
Weil, Bradley S.; and Watson, Clyde D., to United States of America, Energy Research and Development Administration. Method for shearing spent nuclear fuel assemblies. 4,056,052, Cl. 100-39.000.
Weil-McLain Company, Inc.: *See—*
Deters, Elmer M., 4,056,133, Cl. 141-301.000.
Weiler, Herbert; Schneider, Hans; and Weyrich, Ludwin, to Behringwerke Aktiengesellschaft. Closable sterile container. 4,056,129, Cl. 141-24.000.
Weinar, Roger Neil; and Eder, John Anthony, to Ceiling Resurfacing Systems, Inc. Grid ceiling trim. 4,055,930, Cl. 52-717.000.
Weinberg, Steven Louis: *See—*
Mouwen, Herman Charles; Lauer, William; and Weinberg, Steven Louis, 4,056,476, Cl. 210-446.000.
Weingarten, Friedrich Wilhelm; and Hunger, Klaus, to Hoechst Aktiengesellschaft. 3-Amino-4-carboalkoxy-benzoic acid 4'-phenoxyanilides. 4,056,553, Cl. 560-43.000.
Weingarten, Friedrich Wilhelm: *See—*
Hunger, Klaus; and Weingarten, Friedrich Wilhelm, 4,056,522, Cl. 260-203.000.
Weisenfluh, John A., to Moore Business Forms, Inc. Stubless multi-part assembly. 4,056,191, Cl. 206-629.000.

Welge, Frederick T.: *See—*
Redmore, Derek; and Welge, Frederick T., 4,056,479, Cl. 252-18.000.
Wellstein, William. Positive seal pitless well adapter. 4,056,144, Cl. 166-85.000.
Wen, Richard Y.: *See—*
Barber, Loren L., Jr.; Lucas, Anthony J.; and Wen, Richard Y., 4,056,610, Cl. 424-32.000.
Wenman, William A.: *See—*
Faux, Kenneth R., Sr.; and Wenman, William A., 4,056,718, Cl. 362-306.000.
Wessling, Ritchie A.: *See—*
Gibbs, Dale S.; Wagener, Earl H.; and Wessling, Ritchie A., 4,056,501, Cl. 260-29.6SQ.
Western Digital Corporation: *See—*
Stannek, Karl Heinz, 4,056,700, Cl. 200-159.00R.
Western Electric Company: *See—*
Sims, Robert Dennis, 4,056,687, Cl. 179-16.00F.
Western Geophysical Co.: *See—*
Johnston, Otis A., 4,056,164, Cl. 181-114.000.
Westfall, Paul Marlin; and Mayfield, Howard, to Union Carbide Corporation. Flocked foamed latex sheet. 4,056,646, Cl. 428-90.000.
Westinghouse Air Brake Company: *See—*
Burkett, Richard O., 4,056,286, Cl. 303-20.000.
Darrow, John O. G., 4,056,739, Cl. 307-360.000.
Westinghouse Electric Corporation: *See—*
Anderson, Arthur Ernest, 4,056,815, Cl. 340-224.000.
Bartko, John; and Sun, Kuan H., 4,056,408, Cl. 148-1.500.
Brown, Joel E.; and Overman, Kelly C., 4,056,788, Cl. 331-78.000.
Cohn, Marvin, 4,056,784, Cl. 330-287.000.
Eckels, Phillip W., 4,056,745, Cl. 310-52.000.
Horwitz, Stuart S.; and Jost, Walter R., 4,056,792, Cl. 333-31.00R.
Leib, Michael J., 4,056,838, Cl. 361-68.000.
Malick, Franklin S., 4,056,798, Cl. 335-16.000.
McHugh, James P.; Nalepa, Philip J.; Miller, Robert C.; and Dawson, Chester W., 4,056,378, Cl. 65-18.000.
Misencik, John J.; and Zakrzewski, Gary S., 4,056,837, Cl. 361-45.000.
Morrison, Heber J.; and Howland, Rockney W., 4,056,786, Cl. 330-207.00A.
Ravas, Richard J., 4,056,105, Cl. 128-419.0PG.
Shum, Lanson Y., 4,056,774, Cl. 324-142.000.
Smith, James D. B.; Meier, Joseph F.; and Phillips, David C., 4,056,005, Cl. 73-339.00R.
Smith, James D. B.; Meier, Joseph F.; and Phillips, David C., 4,056,006, Cl. 73-339.00R.
Thompson, Francis T., 4,055,906, Cl. 35-9.00A.
Westvaco Corporation: *See—*
Wilt, Robert O., 4,056,023, Cl. 83-155.000.
Wettstein, Ernest C.: *See—*
Dionne, Norman J.; and Wettstein, Ernest C., 4,056,800, Cl. 335-296.000.
Wexler, Bernard L.: *See—*
Stregack, Joseph A.; and Wexler, Bernard L., 4,056,789, Cl. 331-94.50G.
Weyrich, Ludwin: *See—*
Weiler, Herbert; Schneider, Hans; and Weyrich, Ludwin, 4,056,129, Cl. 141-24.000.
Wharton, Lennard: *See—*
Brandt, Thomas F.; Netzel, Philip C.; and Wharton, Lennard, 4,056,679, Cl. 174-13.000.
Whelan, Robert D., to General Instrument Corporation. Wiper contact for turret-type varactor controller. 4,056,795, Cl. 334-15.000.
Whirlpool Corporation: *See—*
MacFarlane, Thomas R.; and Skinner, Frank R., II, 4,056,188, Cl. 198-465.000.
Whitcomb, Paul H., to Eaton Yale Ltd. Clamp assembly. 4,056,135, Cl. 144-2.00Z.
White, George Raymond, to Smith Kline & French Laboratories Limited. Sulphoxides. 4,056,620, Cl. 424-270.000.
White, Richard Manning; and Hsu, Tzu-Hwa, to University of California, The Regents of the. Method and apparatus for extracting derivatives from surface acoustic waves. 4,056,803, Cl. 340-15.000.
Whitefin Holding S.A.: *See—*
Della-Bella, Davide; and Chiarino, Dario, 4,056,634, Cl. 424-335.000.
Whitehurst, Darrell D.: *See—*
Mitchell, Thomas O.; and Whitehurst, Darrell D., 4,056,488, Cl. 252-449.000.
Whitfield, Christopher Roger: *See—*
Gallini, John Battista; Hauxwell, Gerald Dean; and Whitfield, Christopher Roger, 4,056,240, Cl. 242-47.090.
Whitfield, John Alan; and Burdis, Eric William, to Piessey Handel und Investments A.G. Optical character recognition systems. 4,056,804, Cl. 340-146.30J.
Whitney, James C.; and Ciaraldi, Anthony, to Dictaphone Corporation. Head support and eject mechanism for recording and/or playback apparatus. 4,056,835, Cl. 360-105.000.
Wick, John R. Ratchet-operated cable cutter. 4,055,891, Cl. 30-250.000.
Wicker, Thomas H., Jr.: *See—*
Gilkey, Russell: Hilbert, Samuel D.; Sublett, Bobby J.; and Wicker, Thomas H., Jr., 4,056,356, Cl. 8-168.00C.
Widmer, Rene, to Fabrique d'Horlogerie de Fontainemelon S.A. Securing device for the outer end of the hair-spring of a timepiece. 4,055,944, Cl. 58-115.000.
Wiechert, Rudolf: *See—*
Kerb, Ulrich; Wiechert, Rudolf; Wachtel, Helmut; Engelfried, Otto; and Kieslich, Klaus, 4,056,633, Cl. 424-331.000.
Wienand, Hans-Jurgen; and Klassen, Horst Willi, to Girling Limited. Friction pad assemblies for sliding caliper disc brakes. 4,056,174, Cl. 188-73.500.
Wilhelm, Kaiser: *See—*
Wilke, Gunther; and Wilhelm, Kaiser, 4,056,552, Cl. 560-128.000.
Wilke, Gunther; and Wilhelm, Kaiser, to Studiengesellschaft Kohle m.b.H. Ethyl 3,7-cyclodecadiene-1-carboxylate. 4,056,552, Cl. 560-128.000.
Wilkens, Christian, to Karl Mayer Textilmaschinenfabrik GmbH. Method and apparatus for producing terry cloth toweling on a warp knitting machine. 4,055,969, Cl. 66-204.000.
Williams, Louis A., Jr.; and Miller, Joseph D., to Cincinnati Electronics Corporation. Scanning point source optical energy detector. 4,056,720, Cl. 250-203.00R.
Williams, Michael M., to Packaging Corporation of America. Foldable container and blank therefor. 4,056,223, Cl. 229-32.000.
Wilt, Robert O., to Westvaco Corporation. Single web sheet cutter and stacker. 4,056,023, Cl. 83-155.000.
Wilts, James F.: *See—*
Lewis, Roger N.; Pastorino, Ronald L.; and Wilts, James F., 4,056,561, Cl. 260-46.50G.
Winkler, Robert J.; and Possell, Clarence R., to W.P. Energy Technology Systems. Medication bottle having a safety cap. 4,056,209, Cl. 215-215.000.
Winternitz, Pavol, to Hoffmann-La Roche Inc. Insecticidal esters of alpha-phenoxy alkanoic acids with substituted benzyl alcohols. 4,056,628, Cl. 424-308.000.
Winthrop, John Talley, to American Optical Corporation. Progressive power ophthalmic lens having a plurality of viewing zones with non-discontinuous variations therebetween. 4,056,311, Cl. 351-169.000.
Wisz, Edward: *See—*
Fischer, Paul; and Wisz, Edward, 4,056,471, Cl. 210-186.000.
Wittkamp, Heinrich: *See—*
Schoettle, Klaus; Wittkamp, Heinrich; and Gliniorz, Lothar, 4,056,245, Cl. 242-197.000.
Woiczik, Hans: *See—*
Leisterer, Reinhard; Oelfke, Manfred; Woiczik, Hans; Meyer, Hans-Joachim; and Ostermeier, Rolf, 4,056,801, Cl. 340-2.000.
Wolf, Gerhard Dieter; Bentz, Francis; and Nischk, Gunther, to Bayer Aktiengesellschaft. Dihydroxy sulphonates containing ether structures. 4,056,564, Cl. 260-512.00C.
Wolfe, Denis G., to Robertshaw Controls Company. Glow coil ignition system with flame sensing. 4,056,348, Cl. 431-66.000.
Wolff, Erich: *See—*
Krafft, Werner; Wolff, Erich; and von Bonin, Wulf, 4,056,397, Cl. 96-77.000.
Wood, George William; and Sallas, John James, to Texas Instruments Incorporated. Tracking bandpass filter for conditioning vibrator accelerometer waveform. 4,056,163, Cl. 181-113.000.
Worthington, Ralph Eric: *See—*
Thompson, William Henry; Worthington, Ralph Eric; and Stamper, David John, 4,056,604, Cl. 423-483.000.
Wright, David: *See—*
Hedstrom, Norman; Wright, David; and O'Toole Jerome, 4,056,296, Cl. 312-184.000.
Wright Line Inc.: *See—*
Hedstrom, Norman; Wright, David; and O'Toole, Jerome, 4,056,296, Cl. 312-184.000.
Wright, Thomas. Collapsible tire wheel. 4,056,285, Cl. 301-8.000.
Wyatt, Ronald John: *See—*
Ballard, Denis George Harold; Jones, Eric; Padget, John Christopher; Pioli, Alexander Joseph Peter; Robinson, Peter Anthony; Walker, John; and Wyatt, Ronald John, 4,056,669, Cl. 526-154.000.
Xerox Corporation: *See—*
Furuta, Eiichiro, 4,056,828, Cl. 358-133.000.
McCrobie, George Louis, 4,056,308, Cl. 350-184.000.
Silverberg, Morton, 4,056,314, Cl. 355-10.000.
Smith, Richard E., 4,056,076, Cl. 118-653.000.
Springett, Brian E.; and Sarid, Dror, 4,056,723, Cl. 250-324.000.
Strella, Stephen. 4,056,706, Cl. 219-216.000.
Thornburg, David D.; and Thompson, Geoffrey O., 4,056,822, Cl. 346-76.00R.
Thornburg, David D., 4,056,823, Cl. 346-76.00R.
Turner, Sam R.; and Pochan, John M., 4,056,391, Cl. 96-1.0PC.
Xicon Data Entry Corporation: *See—*
LaWhite, Eric L.; Henrichon, Ernest G., Jr.; and Bloom, Harvey J., 4,056,263, Cl. 271-3.000.
Yalkowsky, Samuel H., to Upjohn Company, The. Prilling apparatus. 4,056,340, Cl. 425-10.000.
Yamamoto, Shinjiro: *See—*
Jojima, Teruomi; Tsuji, Hideakira; Yamamoto, Shinjiro; and Omino, Teiji, 4,056,617, Cl. 424-200.000.
Yamamoto, Toshio: *See—*
Iizaka, Isao; and Yamamoto, Toshio, 4,056,390, Cl. 96-1.0TE.
Yamamoto, Yukio; and Nagase, Mitsuo, to Yoshida Kogyo Kabushiki Kaisha. Exterior window unit having frame header. 4,055,916, Cl. 49-404.000.
Yamanaka, Teruo: *See—*
Makino, Takayuki; Yamanaka, Teruo; Kuroyanagi, Yoshitaka; and Teratani, Tatsuo, 4,056,782, Cl. 325-313.000.

Yamasaki, Nobuyuki: *See—*
Sonenberg, Martin; and Yamasaki, Nobuyuki, 4,056,520, Cl. 260-112.50R.
Yamashita, Norio: *See—*
Ikeguchi, Shigehiko; Yamashita, Norio; and Matsuda, Eiji, 4,056,181, Cl. 194-10.000.
Yates, Patrick D. Hose rolling device. 4,056,241, Cl. 242-86.400.
Yates, Richard Alan: *See—*
Huang, Hua-Feng; and Yates, Richard Alan, 4,056,638, Cl. 426-244.000.
Yokono, Hitoshi: *See—*
Nishikawa, Akio; Yokono, Hitoshi; Numata, Shun-ichi; and Mukai, Junji, 4,056,579, Cl. 260-830.00P.
Yokota, Akihiro: *See—*
Shoji, Kunihiro; Yokota, Akihiro; and Watanabe, Kenzo, 4,055,963, Cl. 62-238.000.
York, David L.: *See—*
York, Richard N.; and York, David L., 4,056,427, Cl. 156-580.000.
York, Richard N.; and York, David L., to Precise Corporation. Focus collimator press for a collimator for gamma ray cameras. 4,056,427, Cl. 156-580.000.
Yoshida, Hiroshi, to Yoshida Kogyo Kabushiki Kaisha. Method of making a coupling element for a slide fastener. 4,055,882, Cl. 29-410.000.
Yoshida Kogyo Kabushiki Kaisha: *See—*
Yamamoto, Yukio; and Nagase, Mitsuo, 4,055,916, Cl. 49-404.000.
Yoshida, Hiroshi, 4,055,882, Cl. 29-410.000.
Yoshida, Minoru, to Laurel Bank Machine Co., Ltd. Sheet holder attachment adapted to be used with sheet holder for sheet counter. 4,056,193, Cl. 211-51.000.
Yoshimura, Masayoshi, to Hitachi, Ltd. Etching method for flattening a silicon substrate utilizing an anisotropic alkali etchant. 4,056,413, Cl. 148-175.000.
Young, Henry Y., to Stiefel Laboratories, Inc. Therapeutic composition. 4,056,611, Cl. 424-62.000.
Young, Jon R.: *See—*
Rampel, Guy G.; and Young, Jon R., 4,056,660, Cl. 429-59.000.
Young, Patricia A.: *See—*
Connor, David T.; Young, Patricia A.; and von Strandtmann, Maximillian, 4,056,532, Cl. 260-296.00R.
Connor, David T.; Young, Patricia A.; and von Strandtmann, Maximilian, 4,056,619, Cl. 424-263.000.
Young, Thomas A.: *See—*
Repay, Laszlo N.; and Young, Thomas A., 4,056,253, Cl. 248-479.000.
Yourke, Hannon S.: *See—*
Davis, Donald E.; Habegger, Millard A.; and Yourke, Hannon S., 4,056,730, Cl. 250-492.00R.
Yukio, Takayanagi: *See—*
Keikichi, Tsukioka; and Yukio, Takayanagi, 4,056,753, Cl. 313-325.000.
Zagorskaya, Maina Konstantinovna: *See—*
Vulikh, Alexandr Ilich; Zagorskaya, Maina Konstantinovna; Kofman, Izrail Zalmanovich; Pavlovich, Inna Vasilievna; Levitan, Boris Veniaminovich; Troyan, Nikolai Vasilievich; and Dubyaga, Sergei Viktorovich, 4,056,605, Cl. 423-484.000.
Zaharko, Joe Dennis: *See—*
Rivers, Joseph Tracy, Jr.; and Zaharko, Joe Dennis, 4,055,941, Cl. 57-149.000.
Zakrzewski, Gary S.: *See—*
Misencik, John J.; and Zakrzewski, Gary S., 4,056,837, Cl. 361-45.000.
Zander, Hans-Hermann, to Siemens Aktiengesellschaft. Commutation circuit for a cycloconverter with intermediate D.C. link. 4,056,766, Cl. 63-37.000.
Zebree, David T., to Hercules Incorporated. Closed initiator system including explosive energy-initiatable blasting caps, and method. 4,056,059, Cl. 102-22.00R.
Zeichner, David A.: *See—*
Clinton, Henry H.; and Zeichner, David A., 4,056,771, Cl. 324-54.000.
Zellhoefer, Glenn F., to National Union Electric Corporation. Thermal cells and electrolyte composition therefor. 4,056,662, Cl. 429-112.000.
Zenith Radio Corporation: *See—*
Burgyan, Lajos, 4,056,685, Cl. 179-15.0BT.
Ziamatic Corporation: *See—*
Cobb, Clyde A., 4,056,017, Cl. 74-522.000.
Zickendraht, Christian: *See—*
Schwander, Hansrudolf; Burdeska, Kurt; and Zickendraht, Christian, 4,056,528, Cl. 260-250.00Q.
Zielinski, Martin. Multiplexed signal reference level equalizer. 4,056,686, Cl. 179-15.0BL.
Zielke, Rainer: *See—*
Diamantoglou, Michael; Magerlein, Helmut; Zielke, Rainer; and Cornelissens, Emery George Philomena, 4,056,400, Cl. 106-162.000.
Zimmer, Johannes. Rotary screen supporting and tensioning means. 4,056,055, Cl. 101-128.100.
Zimmer USA, Inc.: *See—*
Farling, Gene M., 4,055,862, Cl. 3-1.910.
Zischinsky, Ulf: *See—*
Kamann, Gunther; Krahe, Jurgen; Zischinsky, Ulf; and Gotze, Wilhelm, 4,056,036, Cl. 85-63.000.
Zizine, Jean Louis, to S.C.I. Le Brin. Device for measuring the mass flow or flow rate of a gas. 4,056,003, Cl. 73-194.00F.
Zoche, Gunter: *See—*
Riegger, Paul; Richtzenhain, Hermann; and Zoche, Gunter, 4,056,454, Cl. 204-163.00R.
Zorn, Jurgen; Vlemmings, Jan; Muller, Karl-Heinz; Mayer, Siegfried; Dworak, Wilhelm; Hartmann, Eugen; Fader, Martin; Talmon, Wolfgang; Jons, Claus; Sauer, Ivan; and Bosch, Paul, to Robert Bosch GmbH. External gear type fluid displacing machine with bearing gap. 4,056,337, Cl. 418-131.000.
Zumwalt, Homer, to Rockwell International Corporation. Support and retention liner gasket. 4,056,211, Cl. 220-9.00G.
Zutrauen, Howard C. Method and apparatus for making a print of an object. 4,056,316, Cl. 355-22.000.
Zwahlen, Ernst, to Elex A.G. Anti-bridging device. 4,056,215, Cl. 222-231.000.

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE	DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 48,560	4,002,772	Mar. 30, 1976	Jan. 11, 1977	B 371,912	3,995,738	Mar. 2, 1976	Dec. 7, 1976
B 54,859	4,000,101	Feb. 17, 1976	Dec. 28, 1976	B 372,016	3,989,685	Mar. 9, 1976	Nov. 2, 1976
B 59,512	3,999,216	Mar. 16, 1976	Dec. 21, 1976	B 372,232	4,000,967	Mar. 16, 1976	Jan. 4, 1977
B 66,272	4,014,978	Feb. 24, 1976	Mar. 29, 1977	B 372,722	3,998,925	Mar. 9, 1976	Dec. 21, 1976
B 71,613	4,008,393	Mar. 16, 1976	Feb. 15, 1977	B 373,344	4,053,067	Feb. 3, 1976	Oct. 11, 1977
B 73,017	4,001,879	Mar. 9, 1976	Jan. 4, 1977	B 373,354	3,989,870	Jan. 27, 1976	Nov. 2, 1976
B 78,315	3,982,192	Feb. 10, 1976	Sep. 21, 1976	B 374,553	4,008,394	Mar. 30, 1976	Feb. 15, 1977
B 79,099	3,982,177	Jan. 13, 1976	Sep. 21, 1976	B 374,588	3,985,899	Jan. 27, 1976	Oct. 12, 1976
B 97,259	3,999,614	Mar. 9, 1976	Dec. 28, 1976	B 376,749	4,014,856	Mar. 30, 1976	Mar. 29, 1977
B 105,006	4,007,074	Mar. 23, 1976	Feb. 8, 1977	B 378,513	3,981,750	Jan. 27, 1976	Sep. 21, 1976
B 111,130	4,001,380	Mar. 16, 1976	Jan. 4, 1977	B 378,760	4,001,477	Mar. 9, 1976	Jan. 4, 1977
B 141,968	4,013,442	Mar. 30, 1976	Mar. 22, 1977	B 379,177	3,981,976	Jan. 27, 1976	Sep. 21, 1976
B 150,142	3,981,767	Jan. 27, 1976	Sep. 21, 1976	B 380,137	4,014,802	Mar. 23, 1976	Mar. 29, 1977
B 159,570	4,036,870	Mar. 23, 1976	July 19, 1977	B 381,006	4,009,447	Apr. 6, 1976	Feb. 22, 1977
B 160,045	3,983,446	Jan. 13, 1976	Sep. 28, 1976	B 381,709	3,984,587	Jan. 13, 1976	Oct. 5, 1976
B 160,099	3,987,221	Jan. 13, 1976	Oct. 19, 1976	B 381,985	3,990,775	Feb. 3, 1976	Nov. 9, 1976
B 163,463	3,981,659	Jan. 27, 1976	Sep. 21, 1976	B 382,120	4,013,639	Mar. 23, 1976	Mar. 22, 1977
B 167,470	4,001,101	Mar. 2, 1976	Jan. 4, 1977	B 383,697	4,008,211	Feb. 17, 1976	Feb. 15, 1977
B 181,208	4,001,391	Mar. 9, 1976	Jan. 4, 1977	B 384,225	3,998,523	Mar. 16, 1976	Dec. 21, 1976
B 200,759	3,986,872	Feb. 3, 1976	Oct. 19, 1976	B 384,330	3,985,613	Jan. 27, 1976	Oct. 12, 1976
B 208,916	3,987,106	Jan. 13, 1976	Oct. 19, 1976	B 384,654	3,992,681	Feb. 24, 1976	Nov. 16, 1976
B 214,925	3,997,648	Mar. 9, 1976	Dec. 14, 1976	B 385,024	3,994,911	Feb. 10, 1976	Nov. 30, 1976
B 231,416	4,000,054	Mar. 30, 1976	Dec. 28, 1976	B 385,483	3,993,684	Feb. 17, 1976	Nov. 23, 1976
B 236,266	4,013,624	Mar. 23, 1976	Mar. 22, 1977	B 385,631	3,982,924	Jan. 27, 1976	Sep. 28, 1976
B 236,342	4,001,182	Feb. 10, 1976	Jan. 4, 1977	B 386,257	3,981,915	Feb. 3, 1976	Sep. 21, 1976
B 248,240	3,983,556	Jan. 13, 1976	Sep. 28, 1976	B 386,673	3,993,717	Feb. 3, 1976	Nov. 23, 1976
B 257,143	4,000,111	Mar. 16, 1976	Dec. 28, 1976	B 386,828	3,992,440	Feb. 3, 1976	Nov. 16, 1976
B 270,274	3,982,223	Feb. 17, 1976	Sep. 21, 1976	B 387,337	D 243,157	Mar. 16, 1976	Jan. 25, 1977
B 270,351	3,997,893	Mar. 30, 1976	Dec. 14, 1976	B 388,675	4,012,459	Mar. 30, 1976	Mar. 15, 1977
B 271,743	4,001,195	Mar. 16, 1976	Jan. 4, 1977	B 389,155	4,000,970	Mar. 30, 1976	Jan. 4, 1977
B 276,026	3,992,405	Feb. 3, 1976	Nov. 16, 1976	B 389,304	3,986,829	Jan. 27, 1976	Oct. 19, 1976
B 279,415	4,000,697	Mar. 16, 1976	Jan. 4, 1977	B 390,031	3,985,799	Jan. 13, 1976	Oct. 12, 1976
B 279,969	3,986,073	Jan. 13, 1976	Oct. 12, 1976	B 390,408	3,992,426	Feb. 3, 1976	Nov. 16, 1976
B 281,162	4,009,481	Mar. 23, 1976	Feb. 22, 1977	B 390,979	4,003,850	Mar. 23, 1976	Jan. 18, 1977
B 283,941	3,995,313	Feb. 3, 1976	Nov. 30, 1976	B 391,473	3,988,370	Mar. 2, 1976	Oct. 26, 1976
B 288,757	4,001,072	Mar. 30, 1976	Jan. 4, 1977	B 391,797	3,988,046	Mar. 9, 1976	Oct. 26, 1976
B 301,143	3,991,107	Jan. 27, 1976	Nov. 9, 1976	B 391,828	4,014,933	Apr. 6, 1976	Mar. 29, 1977
B 302,160	3,985,774	Feb. 3, 1976	Oct. 12, 1976	B 391,844	3,999,165	Mar. 16, 1976	Dec. 21, 1976
B 306,668	3,985,713	Feb. 3, 1976	Oct. 12, 1976	B 392,798	3,996,249	Mar. 30, 1976	Dec. 7, 1976
B 307,698	3,993,763	Feb. 3, 1976	Nov. 23, 1976	B 394,248	3,989,764	Jan. 27, 1976	Nov. 2, 1976
B 308,659	3,981,947	Jan. 27, 1976	Sep. 21, 1976	B 394,350	3,982,200	Jan. 13, 1976	Sep. 21, 1976
B 311,450	3,988,976	Mar. 9, 1976	Nov. 2, 1976	B 394,742	4,009,285	Apr. 13, 1976	Feb. 22, 1977
B 311,779	4,013,481	Feb. 10, 1976	Mar. 22, 1977	B 395,554	3,998,156	Mar. 9, 1976	Dec. 21, 1976
B 313,280	4,003,591	Apr. 6, 1976	Jan. 18, 1977	B 395,975	4,001,085	Mar. 2, 1976	Jan. 4, 1977
B 326,211	3,988,272	Mar. 23, 1976	Oct. 26, 1976	B 396,164	3,989,590	Feb. 3, 1976	Nov. 2, 1976
B 328,065	4,014,752	Mar. 30, 1976	Mar. 29, 1977	B 396,377	D 243,148	Apr. 6, 1976	Jan. 25, 1977
B 328,077	4,014,860	Apr. 13, 1976	Mar. 29, 1977	B 397,674	3,998,438	Mar. 16, 1976	Dec. 21, 1976
B 328,116	4,000,774	Mar. 9, 1976	Jan. 4, 1977	B 398,084	3,996,239	Feb. 3, 1976	Dec. 7, 1976
B 330,719	4,001,121	Mar. 16, 1976	Jan. 4, 1977	B 398,220	3,990,834	Feb. 3, 1976	Nov. 9, 1976
B 330,736	3,996,299	Feb. 3, 1976	Dec. 7, 1976	B 398,488	3,987,991	Feb. 24, 1976	Oct. 26, 1976
B 332,442	4,001,231	Mar. 30, 1976	Jan. 4, 1977	B 399,098	3,997,665	Feb. 24, 1976	Dec. 14, 1976
B 333,110	3,989,867	Mar. 16, 1976	Nov. 2, 1976	B 399,632	4,001,046	Mar. 9, 1976	Jan. 4, 1977
B 333,247	4,001,201	Mar. 16, 1976	Jan. 4, 1977	B 399,908	3,983,323	Jan. 13, 1976	Sep. 28, 1976
B 333,838	4,006,263	Mar. 23, 1976	Feb. 1, 1977	B 400,871	3,988,893	Feb. 17, 1976	Nov. 2, 1976
B 335,783	4,013,744	Mar. 30, 1976	Mar. 22, 1977	B 401,042	D 242,197	Mar. 16, 1976	Nov. 9, 1976
B 336,754	3,989,805	Mar. 16, 1976	Nov. 2, 1976	B 401,221	4,014,791	Apr. 6, 1976	Mar. 29, 1977
B 337,023	4,013,188	Mar. 30, 1976	Mar. 22, 1977	B 402,162	3,994,902	Mar. 2, 1976	Nov. 30, 1976
B 337,823	4,002,746	Mar. 23, 1976	Jan. 11, 1977	B 402,328	3,995,545	Apr. 6, 1976	Dec. 7, 1976
B 339,194	3,982,215	Feb. 3, 1976	Sep. 21, 1976	B 402,553	3,983,219	Feb. 17, 1976	Sep. 28, 1976
B 339,446	4,001,067	Feb. 24, 1976	Jan. 4, 1977	B 402,657	4,013,665	Apr. 6, 1976	Mar. 22, 1977
B 340,170	4,000,444	Mar. 30, 1976	Dec. 28, 1976	B 402,929	3,991,251	Feb. 3, 1976	Nov. 9, 1976
B 344,669	4,013,655	Mar. 16, 1976	Mar. 22, 1977	B 403,076	4,014,917	Apr. 20, 1976	Mar. 29, 1977
B 347,661	3,999,218	Mar. 16, 1976	Dec. 21, 1976	B 403,243	3,996,232	Mar. 30, 1976	Dec. 7, 1976
B 348,433	3,984,405	Feb. 3, 1976	Oct. 5, 1976	B 403,326	4,001,212	Mar. 23, 1976	Jan. 4, 1977
B 349,370	3,989,684	Jan. 27, 1976	Nov. 2, 1976	B 403,477	3,995,315	Feb. 3, 1976	Nov. 30, 1976
B 351,455	4,001,309	Feb. 24, 1976	Jan. 4, 1977	B 403,507	3,982,095	Feb. 10, 1976	Sep. 21, 1976
B 354,222	4,012,305	Mar. 23, 1976	Mar. 15, 1977	B 403,766	3,994,834	Feb. 10, 1976	Nov. 30, 1976
B 354,959	3,995,996	Feb. 17, 1976	Dec. 7, 1976	B 403,883	4,001,481	Mar. 23, 1976	Jan. 4, 1977
B 356,187	3,981,222	Jan. 20, 1976	Sep. 21, 1976	B 405,726	3,981,241	Jan. 13, 1976	Sep. 21, 1976
B 356,470	4,014,789	Mar. 23, 1976	Mar. 29, 1977	B 406,546	D 242,966	Mar. 16, 1976	Jan. 11, 1977
B 357,526	4,001,319	Mar. 23, 1976	Jan. 4, 1977	B 407,205	4,000,966	Mar. 16, 1976	Jan. 4, 1977
B 358,260	3,989,661	Mar. 30, 1976	Nov. 2, 1976	B 407,737	3,992,546	Feb. 3, 1976	Nov. 16, 1976
B 358,427	3,989,896	Feb. 3, 1976	Nov. 2, 1976	B 407,812	4,010,006	Mar. 23, 1976	Mar. 1, 1977
B 359,768	4,013,684	Mar. 30, 1976	Mar. 22, 1977	B 408,123	4,014,887	Apr. 13, 1976	Mar. 29, 1977
B 359,901	3,981,729	Jan. 13, 1976	Sep. 21, 1976	B 409,848	3,983,270	Jan. 27, 1976	Sep. 28, 1976
B 361,954	4,014,753	Apr. 6, 1976	Mar. 29, 1977	B 410,074	4,001,303	Feb. 24, 1976	Jan. 4, 1977
B 363,565	4,004,821	Mar. 30, 1976	Jan. 25, 1977	B 410,694	3,995,530	Mar. 23, 1976	Dec. 7, 1976
B 364,797	3,996,131	Feb. 17, 1976	Dec. 7, 1976	B 411,471	3,982,933	Feb. 17, 1976	Sep. 28, 1976
B 367,092	4,014,920	Apr. 13, 1976	Mar. 29, 1977	B 411,624	4,001,205	Mar. 16, 1976	Jan. 4, 1977
B 367,305	3,998,640	Mar. 2, 1976	Dec. 21, 1976	B 411,765	3,993,428	Feb. 24, 1976	Nov. 23, 1976
B 367,621	3,989,589	Feb. 3, 1976	Nov. 2, 1976	B 412,068	3,981,244	Jan. 13, 1976	Sep. 21, 1976
B 369,221	3,985,834	Feb. 24, 1976	Oct. 12, 1976	B 412,124	4,007,000	Mar. 23, 1976	Feb. 8, 1977
B 369,373	4,013,683	Mar. 23, 1976	Mar. 22, 1977	B 413,379	4,001,325	Mar. 9, 1976	Jan. 4, 1977
B 369,379	4,013,754	Mar. 30, 1976	Mar. 22, 1977	B 414,028	3,993,738	Feb. 17, 1976	Nov. 23, 1976
B 370,309	3,989,640	Jan. 20, 1976	Nov. 2, 1976	B 414,266	3,993,614	Feb. 10, 1976	Nov. 23, 1976
B 371,095	4,005,074	Mar. 23, 1976	Jan. 25, 1977	B 414,481	3,982,979	Jan. 20, 1976	Sep. 28, 1976
B 371,635	4,010,290	Mar. 23, 1976	Mar. 1, 1977	B 414,971	D 242,208	Feb. 10, 1976	Nov. 9, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE	DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 415,021	3,994,173	Mar. 2, 1976	Nov. 30, 1976	B 439,778	4,001,455	Feb. 3, 1976	Jan. 4, 1977
B 415,122	3,997,503	Feb. 10, 1976	Dec. 14, 1976	B 440,548	4,001,271	Mar. 16, 1976	Jan. 4, 1977
B 415,590	4,009,317	Mar. 23, 1976	Feb. 22, 1977	B 440,632	4,014,955	Apr. 13, 1976	Mar. 29, 1977
B 416,257	4,001,335	Mar. 16, 1976	Jan. 4, 1977	B 440,633	4,000,116	Feb. 10, 1976	Dec. 28, 1976
B 416,589	3,990,363	Jan. 27, 1976	Nov. 9, 1976	B 440,858	3,993,670	Feb. 3, 1976	Nov. 23, 1976
B 417,014	3,981,851	Jan. 13, 1976	Sep. 21, 1976	B 441,543	4,014,755	Mar. 23, 1976	Mar. 29, 1977
B 417,164	4,001,360	Mar. 2, 1976	Jan. 4, 1977	B 441,605	4,026,862	Feb. 3, 1976	May 31, 1977
B 417,349	3,985,076	Mar. 9, 1976	Oct. 12, 1976	B 441,723	3,988,249	Mar. 16, 1976	Oct. 26, 1976
B 417,498	4,013,471	Mar. 23, 1976	Mar. 22, 1977	B 441,789	4,001,449	Mar. 30, 1976	Jan. 4, 1977
B 418,489	3,989,592	Jan. 13, 1976	Nov. 2, 1976	B 442,163	D 242,192	Mar. 16, 1976	Nov. 9, 1976
B 419,173	3,999,728	Mar. 9, 1976	Dec. 28, 1976	B 442,295	4,000,477	Mar. 16, 1976	Dec. 28, 1976
B 419,582	3,989,681	Mar. 2, 1976	Nov. 2, 1976	B 442,431	4,011,260	Mar. 23, 1976	Mar. 8, 1977
B 420,176	4,001,017	Mar. 16, 1976	Jan. 4, 1977	B 442,810	3,997,533	Feb. 24, 1976	Dec. 14, 1976
B 420,321	3,990,645	Mar. 30, 1976	Nov. 9, 1976	B 442,866	3,982,351	Feb. 24, 1976	Sep. 28, 1976
B 420,472	3,993,934	Feb. 24, 1976	Nov. 23, 1976	B 442,953	4,002,657	Mar. 23, 1976	Jan. 11, 1977
B 421,373	4,001,326	Mar. 23, 1976	Jan. 4, 1977	B 442,970	3,989,890	Feb. 3, 1976	Nov. 2, 1976
B 421,608	4,013,806	Mar. 23, 1976	Mar. 22, 1977	B 443,163	3,981,242	Feb. 3, 1976	Sep. 21, 1976
B 421,975	3,994,693	Mar. 2, 1976	Nov. 30, 1976	B 443,446	D 242,494	Apr. 6, 1976	Nov. 23, 1976
B 422,063	3,994,835	Feb. 3, 1976	Nov. 30, 1976	B 443,563	3,996,204	Feb. 24, 1976	Dec. 7, 1976
B 422,156	4,010,401	Mar. 23, 1976	Mar. 1, 1977	B 443,647	3,990,737	Feb. 17, 1976	Nov. 9, 1976
B 423,365	3,996,186	Feb. 17, 1976	Dec. 7, 1976	B 443,712	3,982,233	Jan. 27, 1976	Sep. 21, 1976
B 423,404	3,990,958	Mar. 2, 1976	Nov. 9, 1976	B 444,078	4,014,854	Mar. 23, 1976	Mar. 29, 1977
B 423,441	3,997,137	Feb. 17, 1976	Dec. 14, 1976	B 444,294	4,013,634	Mar. 30, 1976	Mar. 22, 1977
B 423,867	3,990,844	Feb. 3, 1976	Nov. 9, 1976	B 444,437	3,995,171	Mar. 9, 1976	Nov. 30, 1976
B 423,883	3,986,871	Jan. 27, 1976	Oct. 19, 1976	B 445,166	4,001,252	Mar. 2, 1976	Jan. 4, 1977
B 424,354	D 242,416	Feb. 10, 1976	Nov. 23, 1976	B 445,459	3,988,889	Feb. 3, 1976	Nov. 2, 1976
B 424,410	4,021,196	Mar. 30, 1976	May 3, 1977	B 445,493	3,994,903	Mar. 2, 1976	Nov. 30, 1976
B 424,989	3,990,569	Feb. 3, 1976	Nov. 9, 1976	B 445,690	3,999,584	Feb. 3, 1976	Dec. 28, 1976
B 425,193	4,002,107	Mar. 23, 1976	Jan. 11, 1977	B 446,107	4,001,276	Mar. 9, 1976	Jan. 4, 1977
B 425,285	4,014,676	Apr. 13, 1976	Mar. 29, 1977	B 446,956	4,014,765	Apr. 13, 1976	Mar. 29, 1977
B 425,462	3,998,396	Mar. 9, 1976	Dec. 21, 1976	B 447,000	3,984,419	Feb. 3, 1976	Oct. 5, 1976
B 425,588	3,985,111	Jan. 13, 1976	Oct. 12, 1976	B 447,440	3,991,724	Feb. 17, 1976	Nov. 16, 1976
B 426,157	4,013,714	Mar. 23, 1976	Mar. 22, 1977	B 449,892	3,997,919	Mar. 23, 1976	Dec. 14, 1976
B 426,227	3,999,028	Mar. 2, 1976	Dec. 21, 1976	B 449,988	4,014,794	Mar. 30, 1976	Mar. 29, 1977
B 426,266	3,998,839	Mar. 2, 1976	Dec. 21, 1976	B 450,196	3,997,701	Feb. 10, 1976	Dec. 14, 1976
B 426,274	4,014,949	Jan. 20, 1976	Mar. 29, 1977	B 450,413	4,007,463	Mar. 23, 1976	Feb. 8, 1977
B 426,424	3,993,742	Feb. 3, 1976	Nov. 23, 1976	B 450,521	3,982,838	Feb. 17, 1976	Sep. 28, 1976
B 426,639	3,992,539	Feb. 3, 1976	Nov. 16, 1976	B 450,701	3,991,084	Mar. 16, 1976	Nov. 9, 1976
B 426,819	3,995,868	Feb. 17, 1976	Dec. 7, 1976	B 450,708	3,989,724	Mar. 9, 1976	Nov. 2, 1976
B 427,883	3,982,277	Jan. 20, 1976	Sep. 21, 1976	B 450,870	3,998,951	Mar. 16, 1976	Dec. 21, 1976
B 427,946	4,006,161	Mar. 23, 1976	Feb. 1, 1977	B 450,967	3,983,055	Jan. 13, 1976	Sep. 28, 1976
B 428,103	4,000,211	Feb. 10, 1976	Dec. 28, 1976	B 451,248	3,997,758	Mar. 2, 1976	Dec. 14, 1976
B 428,271	3,987,415	Mar. 23, 1976	Oct. 19, 1976	B 451,308	3,991,037	Feb. 17, 1976	Nov. 9, 1976
B 428,408	3,995,252	Mar. 2, 1976	Nov. 30, 1976	B 451,396	4,000,450	Apr. 13, 1976	Dec. 28, 1976
B 428,877	3,984,649	Jan. 27, 1976	Oct. 5, 1976	B 451,438	Re. 29,066	Mar. 2, 1976	Dec. 7, 1976
B 429,018	3,990,061	Feb. 10, 1976	Nov. 2, 1976	B 451,534	3,986,033	Jan. 13, 1976	Oct. 12, 1976
B 429,027	4,001,260	Mar. 23, 1976	Jan. 4, 1977	B 452,034	4,002,367	Mar. 23, 1976	Jan. 11, 1977
B 429,157	3,990,628	Jan. 27, 1976	Nov. 9, 1976	B 452,138	4,004,278	Mar. 23, 1976	Jan. 18, 1977
B 429,434	3,989,223	Feb. 17, 1976	Nov. 2, 1976	B 452,293	4,014,726	Mar. 30, 1976	Mar. 29, 1977
B 430,157	3,992,465	Feb. 17, 1976	Nov. 16, 1976	B 452,501	4,001,111	Mar. 16, 1976	Jan. 4, 1977
B 430,172	3,982,563	Jan. 13, 1976	Sep. 28, 1976	B 452,672	3,981,602	Jan. 13, 1976	Sep. 21, 1976
B 430,213	4,013,514	Mar. 30, 1976	Mar. 22, 1977	B 452,879	4,001,089	Mar. 16, 1976	Jan. 4, 1977
B 430,276	3,982,171	Jan. 20, 1976	Sep. 21, 1976	B 452,883	3,981,735	Jan. 27, 1976	Sep. 21, 1976
B 430,287	D 242,489	Feb. 10, 1976	Nov. 23, 1976	B 452,915	4,013,933	Mar. 30, 1976	Mar. 22, 1977
B 430,326	4,003,581	Mar. 23, 1976	Jan. 18, 1977	B 452,938	3,994,719	Feb. 17, 1976	Nov. 30, 1976
B 430,334	3,981,677	Jan. 27, 1976	Sep. 21, 1976	B 452,944	4,009,773	Mar. 30, 1976	Mar. 1, 1977
B 431,072	3,985,610	Jan. 20, 1976	Oct. 12, 1976	B 453,031	3,998,678	Mar. 16, 1976	Dec. 21, 1976
B 431,334	3,988,095	Mar. 16, 1976	Oct. 26, 1976	B 453,067	4,005,394	Mar. 23, 1976	Jan. 25, 1977
B 431,713	4,000,167	Feb. 10, 1976	Dec. 28, 1976	B 453,238	3,997,063	Mar. 2, 1976	Dec. 14, 1976
B 431,785	3,999,950	Feb. 24, 1976	Dec. 28, 1976	B 453,432	4,000,514	Mar. 16, 1976	Dec. 28, 1976
B 431,797	4,007,290	Mar. 30, 1976	Feb. 8, 1977	B 453,533	3,997,744	Feb. 17, 1976	Dec. 14, 1976
B 432,049	3,995,123	Mar. 23, 1976	Nov. 30, 1976	B 453,616	3,987,376	Jan. 27, 1976	Oct. 19, 1976
B 432,140	3,999,163	Mar. 23, 1976	Dec. 21, 1976	B 453,759	3,989,790	Jan. 27, 1976	Nov. 2, 1976
B 432,265	4,013,480	Mar. 23, 1976	Mar. 22, 1977	B 453,960	4,014,701	Apr. 13, 1976	Mar. 29, 1977
B 432,594	4,003,404	Mar. 30, 1976	Jan. 18, 1977	B 454,283	3,995,153	Feb. 3, 1976	Nov. 30, 1976
B 432,969	3,997,017	Mar. 2, 1976	Dec. 14, 1976	B 454,833	4,008,733	Mar. 30, 1976	Feb. 22, 1977
B 432,991	3,991,669	Mar. 2, 1976	Nov. 16, 1976	B 455,425	3,990,060	Feb. 3, 1976	Nov. 2, 1976
B 433,094	3,987,768	Jan. 27, 1976	Oct. 26, 1976	B 455,481	3,991,092	Feb. 24, 1976	Nov. 9, 1976
B 433,707	4,013,594	Mar. 23, 1976	Mar. 22, 1977	B 455,486	4,001,353	Mar. 16, 1976	Jan. 4, 1977
B 433,892	4,016,061	Apr. 6, 1976	Apr. 5, 1977	B 455,686	4,001,156	Mar. 2, 1976	Jan. 4, 1977
B 433,930	4,012,324	Mar. 23, 1976	Mar. 15, 1977	B 455,759	3,984,242	Feb. 24, 1976	Oct. 5, 1976
B 434,206	3,994,610	Feb. 3, 1976	Nov. 30, 1976	B 455,806	3,998,919	Mar. 23, 1976	Dec. 21, 1976
B 434,441	D 242,849	Mar. 16, 1976	Dec. 28, 1976	B 456,069	3,998,991	Mar. 9, 1976	Dec. 21, 1976
B 435,481	4,000,892	Mar. 9, 1976	Jan. 4, 1977	B 456,148	3,984,269	Jan. 13, 1976	Oct. 5, 1976
B 435,570	4,000,908	Mar. 16, 1976	Jan. 4, 1977	B 456,153	3,997,992	Mar. 9, 1976	Dec. 21, 1976
B 435,617	4,001,234	Mar. 16, 1976	Jan. 4, 1977	B 456,384	4,014,859	Apr. 6, 1976	Mar. 29, 1977
B 436,724	3,991,856	Feb. 24, 1976	Nov. 16, 1976	B 456,579	3,993,715	Feb. 10, 1976	Nov. 23, 1976
B 437,209	4,001,193	Feb. 3, 1976	Jan. 4, 1977	B 456,869	4,001,277	Mar. 9, 1976	Jan. 4, 1977
B 437,559	3,993,287	Feb. 3, 1976	Nov. 23, 1976	B 456,900	3,996,262	Feb. 3, 1976	Dec. 7, 1976
B 437,596	3,985,638	Jan. 27, 1976	Oct. 12, 1976	B 456,905	4,013,431	Mar. 23, 1976	Mar. 22, 1977
B 437,894	4,001,015	Mar. 2, 1976	Jan. 4, 1977	B 457,547	3,996,397	Feb. 17, 1976	Dec. 7, 1976
B 437,986	4,011,399	Apr. 20, 1976	Mar. 8, 1977	B 457,850	3,993,586	Feb. 10, 1976	Nov. 23, 1976
B 438,048	4,001,394	Mar. 23, 1976	Jan. 4, 1977	B 457,862	3,987,195	Jan. 27, 1976	Oct. 19, 1976
B 438,484	3,992,451	Feb. 17, 1976	Nov. 16, 1976	B 457,886	3,988,498	Jan. 13, 1976	Oct. 26, 1976
B 438,882	3,983,719	Feb. 24, 1976	Oct. 5, 1976	B 457,931	4,001,229	Mar. 16, 1976	Jan. 4, 1977
B 438,916	3,983,050	Jan. 13, 1976	Sep. 28, 1976	B 458,500	3,997,805	Feb. 24, 1976	Dec. 14, 1976
B 439,542	3,982,199	Jan. 27, 1976	Sep. 21, 1976	B 458,617	3,984,422	Feb. 3, 1976	Oct. 5, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE	DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 458,964	3,996,615	Mar. 2, 1976	Dec. 7, 1976	B 474,573	3,988,375	Jan. 20, 1976	Oct. 26, 1976
B 459,190	4,010,786	Mar. 30, 1976	Mar. 8, 1977	B 474,747	3,997,704	Feb. 24, 1976	Dec. 14, 1976
B 459,381	4,000,017	Mar. 9, 1976	Dec. 28, 1976	B 475,236	3,989,990	Feb. 3, 1976	Nov. 2, 1976
B 459,408	4,018,890	Mar. 23, 1976	Apr. 19, 1977	B 475,385	4,001,071	Mar. 9, 1976	Jan. 4, 1977
B 459,597	3,996,711	Feb. 17, 1976	Dec. 14, 1976	B 475,681	3,983,332	Jan. 20, 1976	Sep. 28, 1976
B 459,811	3,982,173	Jan. 20, 1976	Sep. 21, 1976	B 475,801	4,056,759	Mar. 30, 1976	Nov. 1, 1977
B 459,821	4,005,954	Mar. 30, 1976	Feb. 1, 1977	B 476,267	4,005,068	Apr. 6, 1976	Jan. 25, 1977
B 460,388	3,989,448	Jan. 27, 1976	Nov. 2, 1976	B 476,372	3,985,771	Feb. 24, 1976	Oct. 12, 1976
B 460,441	3,981,828	Jan. 13, 1976	Sep. 21, 1976	B 476,542	4,013,549	Mar. 30, 1976	Mar. 22, 1977
B 460,846	3,985,817	Feb. 24, 1976	Oct. 12, 1976	B 476,568	3,999,456	Mar. 16, 1976	Dec. 28, 1976
B 461,184	3,992,482	Feb. 17, 1976	Nov. 16, 1976	B 476,577	3,982,070	Jan. 20, 1976	Sep. 21, 1976
B 461,250	4,000,768	Mar. 16, 1976	Jan. 4, 1977	B 476,681	3,986,181	Jan. 13, 1976	Oct. 12, 1976
B 461,336	3,982,231	Feb. 3, 1976	Sep. 21, 1976	B 476,776	3,998,715	Mar. 23, 1976	Dec. 21, 1976
B 461,352	3,981,681	Jan. 13, 1976	Sep. 21, 1976	B 476,967	3,995,206	Mar. 9, 1976	Nov. 30, 1976
B 461,685	4,013,661	Mar. 30, 1976	Mar. 22, 1977	B 477,252	3,985,759	Jan. 13, 1976	Oct. 12, 1976
B 461,752	4,016,541	Apr. 20, 1976	Apr. 5, 1977	B 477,481	3,991,076	Feb. 3, 1976	Nov. 9, 1976
B 461,874	3,982,276	Jan. 27, 1976	Sep. 21, 1976	B 477,584	D 242,855	Apr. 6, 1976	Dec. 28, 1976
B 462,030	4,009,342	Mar. 23, 1976	Feb. 22, 1977	B 477,597	3,993,912	Feb. 17, 1976	Nov. 23, 1976
B 462,386	3,988,188	Jan. 13, 1976	Oct. 26, 1976	B 477,892	4,010,355	Mar. 30, 1976	Mar. 1, 1977
B 462,424	3,989,602	Feb. 24, 1976	Nov. 2, 1976	B 478,234	4,010,421	Mar. 30, 1976	Mar. 1, 1977
B 462,828	3,998,395	Mar. 9, 1976	Dec. 21, 1976	B 478,739	3,992,253	Feb. 17, 1976	Nov. 16, 1976
B 462,893	3,984,253	Feb. 24, 1976	Oct. 5, 1976	B 478,759	4,055,681	Mar. 16, 1976	Oct. 25, 1977
B 463,322	3,989,982	Jan. 20, 1976	Nov. 2, 1976	B 479,175	3,985,700	Feb. 17, 1976	Oct. 12, 1976
B 463,388	3,992,605	Feb. 10, 1976	Nov. 16, 1976	B 479,242	3,983,074	Feb. 17, 1976	Sep. 28, 1976
B 463,473	4,002,068	Mar. 23, 1976	Jan. 11, 1977	B 479,502	3,999,030	Mar. 16, 1976	Dec. 21, 1976
B 463,591	4,015,051	Mar. 30, 1976	Mar. 29, 1977	B 479,681	D 242,672	Mar. 16, 1976	Dec. 14, 1976
B 463,671	3,985,385	Jan. 13, 1976	Oct. 12, 1976	B 479,969	4,001,132	Mar. 9, 1976	Jan. 4, 1977
B 464,027	3,999,390	Mar. 16, 1976	Dec. 28, 1976	B 480,114	4,001,327	Mar. 2, 1976	Jan. 4, 1977
B 464,290	3,990,307	Feb. 3, 1976	Nov. 9, 1976	B 480,251	4,008,700	Mar. 23, 1976	Feb. 22, 1977
B 464,491	4,015,612	Mar. 30, 1976	Apr. 5, 1977	B 480,287	4,006,029	Mar. 30, 1976	Feb. 1, 1977
B 464,587	3,991,091	Feb. 3, 1976	Nov. 9, 1976	B 480,292	3,994,011	Mar. 16, 1976	Nov. 23, 1976
B 464,593	3,997,659	Mar. 9, 1976	Dec. 14, 1976	B 480,350	3,994,164	Feb. 10, 1976	Nov. 30, 1976
B 465,145	3,981,148	Jan. 27, 1976	Sep. 21, 1976	B 480,384	3,999,737	Mar. 23, 1976	Dec. 28, 1976
B 465,202	3,989,757	Feb. 24, 1976	Nov. 2, 1976	B 480,452	3,994,923	Feb. 10, 1976	Nov. 30, 1976
B 465,393	3,987,390	Jan. 27, 1976	Oct. 19, 1976	B 480,473	3,995,608	Mar. 2, 1976	Dec. 7, 1976
B 465,688	3,989,770	Jan. 27, 1976	Nov. 2, 1976	B 480,604	3,985,251	Jan. 13, 1976	Oct. 12, 1976
B 465,955	3,997,502	Feb. 3, 1976	Dec. 14, 1976	B 480,625	3,996,227	Feb. 24, 1976	Dec. 7, 1976
B 466,304	4,007,095	Mar. 23, 1976	Feb. 8, 1977	B 480,662	3,988,382	Mar. 2, 1976	Oct. 26, 1976
B 466,318	3,999,115	Mar. 9, 1976	Dec. 21, 1976	B 480,740	3,996,431	Mar. 2, 1976	Dec. 7, 1976
B 466,390	3,983,349	Feb. 24, 1976	Sep. 28, 1976	B 480,749	3,999,207	Mar. 9, 1976	Dec. 21, 1976
B 466,419	4,011,087	Mar. 23, 1976	Mar. 8, 1977	B 480,987	4,001,459	Mar. 30, 1976	Jan. 4, 1977
B 466,444	3,986,039	Jan. 20, 1976	Oct. 12, 1976	B 481,048	3,998,542	Mar. 16, 1976	Dec. 21, 1976
B 466,906	3,993,037	Mar. 16, 1976	Nov. 23, 1976	B 481,190	4,013,468	Mar. 30, 1976	Mar. 22, 1977
B 466,929	3,991,195	Jan. 27, 1976	Nov. 9, 1976	B 481,600	3,981,235	Jan. 27, 1976	Sep. 21, 1976
B 467,250	3,997,428	Feb. 3, 1976	Dec. 14, 1976	B 481,737	3,982,057	Jan. 13, 1976	Sep. 21, 1976
B 467,328	3,997,599	Mar. 9, 1976	Dec. 14, 1976	B 481,778	4,001,385	Mar. 30, 1976	Jan. 4, 1977
B 467,412	3,981,265	Jan. 13, 1976	Sep. 21, 1976	B 481,930	3,992,717	Feb. 24, 1976	Nov. 16, 1976
B 467,486	3,991,725	Mar. 16, 1976	Nov. 16, 1976	B 481,989	4,008,337	Mar. 23, 1976	Feb. 15, 1977
B 467,971	3,983,453	Jan. 13, 1976	Sep. 28, 1976	B 482,058	4,001,398	Mar. 2, 1976	Jan. 4, 1977
B 468,052	3,988,335	Feb. 10, 1976	Oct. 26, 1976	B 482,660	3,995,026	Feb. 10, 1976	Nov. 30, 1976
B 468,100	3,995,107	Mar. 9, 1976	Nov. 30, 1976	B 482,709	3,985,733	Feb. 24, 1976	Oct. 12, 1976
B 468,330	4,001,475	Mar. 16, 1976	Jan. 4, 1977	B 482,907	3,984,811	Jan. 20, 1976	Oct. 5, 1976
B 468,350	3,981,922	Jan. 13, 1976	Sep. 21, 1976	B 483,247	4,001,889	Apr. 13, 1976	Jan. 4, 1977
B 468,421	4,014,739	Mar. 30, 1976	Mar. 29, 1977	B 483,256	3,981,723	Feb. 10, 1976	Sep. 21, 1976
B 468,603	4,003,839	Mar. 23, 1976	Jan. 18, 1977	B 483,268	3,995,215	Mar. 9, 1976	Nov. 30, 1976
B 469,036	4,005,926	Mar. 16, 1976	Feb. 1, 1977	B 483,606	3,986,990	Jan. 27, 1976	Oct. 19, 1976
B 469,228	4,052,954	Feb. 17, 1976	Oct. 11, 1977	B 483,615	3,988,637	Jan. 27, 1976	Oct. 26, 1976
B 469,468	4,000,220	Mar. 16, 1976	Dec. 28, 1976	B 483,746	4,014,923	Mar. 23, 1976	Mar. 29, 1977
B 469,947	3,984,153	Jan. 20, 1976	Oct. 5, 1976	B 483,762	3,993,608	Feb. 10, 1976	Nov. 23, 1976
B 470,170	3,986,410	Jan. 13, 1976	Oct. 19, 1976	B 483,865	3,985,693	Jan. 13, 1976	Oct. 12, 1976
B 470,305	4,014,043	Apr. 6, 1976	Mar. 22, 1977	B 484,029	3,983,558	Feb. 10, 1976	Sep. 28, 1976
B 470,348	3,981,929	Jan. 13, 1976	Sep. 21, 1976	B 484,067	3,992,374	Feb. 17, 1976	Nov. 16, 1976
B 470,576	3,997,507	Feb. 24, 1976	Dec. 14, 1976	B 484,068	3,994,937	Mar. 2, 1976	Nov. 30, 1976
B 470,601	3,985,655	Mar. 9, 1976	Oct. 12, 1976	B 484,121	3,997,770	Mar. 16, 1976	Dec. 14, 1976
B 470,798	3,987,480	Jan. 20, 1976	Oct. 19, 1976	B 484,269	4,000,159	Feb. 10, 1976	Dec. 28, 1976
B 470,853	4,002,101	Mar. 23, 1976	Jan. 11, 1977	B 484,332	3,986,540	Mar. 2, 1976	Oct. 19, 1976
B 470,899	3,996,441	Mar. 2, 1976	Dec. 7, 1976	B 484,365	3,983,578	Jan. 27, 1976	Sep. 28, 1976
B 470,900	4,001,213	Mar. 2, 1976	Jan. 4, 1977	B 484,419	4,001,292	Mar. 9, 1976	Jan. 4, 1977
B 470,945	4,014,848	Apr. 13, 1976	Mar. 29, 1977	B 484,437	4,013,740	Mar. 30, 1976	Mar. 22, 1977
B 471,116	4,001,318	Feb. 17, 1976	Jan. 4, 1977	B 484,482	3,994,017	Mar. 23, 1976	Nov. 23, 1976
B 471,221	3,981,974	Jan. 13, 1976	Sep. 21, 1976	B 484,769	3,999,498	Mar. 16, 1976	Dec. 28, 1976
B 471,405	3,993,576	Feb. 10, 1976	Nov. 23, 1976	B 485,051	3,992,418	Feb. 17, 1976	Nov. 16, 1976
B 471,494	3,993,660	Mar. 16, 1976	Nov. 23, 1976	B 485,060	3,983,067	Feb. 17, 1976	Sep. 28, 1976
B 471,579	3,985,689	Jan. 13, 1976	Oct. 12, 1976	B 485,169	3,989,791	Mar. 16, 1976	Nov. 2, 1976
B 471,617	3,994,871	Feb. 10, 1976	Nov. 30, 1976	B 485,188	4,001,170	Mar. 16, 1976	Jan. 4, 1977
B 471,681	4,012,844	Apr. 13, 1976	Mar. 22, 1977	B 485,401	3,985,859	Jan. 27, 1976	Oct. 12, 1976
B 471,735	3,989,408	Feb. 3, 1976	Nov. 2, 1976	B 485,575	3,996,565	Feb. 24, 1976	Dec. 7, 1976
B 471,836	4,000,150	Feb. 24, 1976	Dec. 28, 1976	B 485,926	4,006,357	Mar. 23, 1976	Feb. 1, 1977
B 472,241	3,992,453	Feb. 17, 1976	Nov. 16, 1976	B 485,972	4,017,472	Mar. 23, 1976	Apr. 12, 1977
B 472,256	3,985,789	Jan. 13, 1976	Oct. 12, 1976	B 486,280	3,983,130	Feb. 3, 1976	Sep. 28, 1976
B 472,284	3,982,078	Jan. 13, 1976	Sep. 21, 1976	B 486,614	3,995,835	Feb. 17, 1976	Dec. 7, 1976
B 472,591	4,013,029	Apr. 6, 1976	Mar. 22, 1977	B 486,678	4,001,273	Mar. 2, 1976	Jan. 4, 1977
B 472,760	4,001,330	Apr. 13, 1976	Jan. 4, 1977	B 486,828	3,989,651	Mar. 2, 1976	Nov. 2, 1976
B 473,039	3,985,747	Feb. 10, 1976	Oct. 12, 1976	B 487,062	D 241,256	Feb. 10, 1976	Nov. 9, 1976
B 473,040	3,985,738	Feb. 10, 1976	Oct. 12, 1976	B 487,078	4,012,895	Mar. 30, 1976	Mar. 22, 1977
B 473,813	3,989,071	Mar. 9, 1976	Nov. 2, 1976	B 487,133	3,989,826	Jan. 27, 1976	Nov. 2, 1976
B 473,972	3,984,043	Jan. 13, 1976	Oct. 5, 1976	B 487,260	3,990,610	Jan. 27, 1976	Nov. 9, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 487,411	3,983,579	Feb. 24, 1976	Sep. 28, 1976
B 487,423	3,998,810	Mar. 2, 1976	Dec. 21, 1976
B 487,427	3,995,788	Mar. 2, 1976	Dec. 7, 1976
B 487,467	4,014,847	Apr. 13, 1976	Mar. 29, 1977
B 487,529	4,022,750	Mar. 30, 1976	May 10, 1977
B 488,111	3,985,765	Jan. 13, 1976	Oct. 12, 1976
B 488,395	3,982,245	Jan. 27, 1976	Sep. 21, 1976
B 488,634	3,982,158	Jan. 20, 1976	Sep. 21, 1976
B 488,756	3,991,810	Mar. 16, 1976	Nov. 16, 1976
B 488,836	4,013,121	Mar. 30, 1976	Mar. 22, 1977
B 489,290	3,998,081	Feb. 17, 1976	Dec. 21, 1976
B 489,328	3,990,088	Jan. 20, 1976	Nov. 2, 1976
B 489,331	3,996,175	Feb. 17, 1976	Dec. 7, 1976
B 489,485	D 243,266	Apr. 13, 1976	Feb. 1, 1977
B 489,550	4,000,710	Mar. 16, 1976	Jan. 4, 1977
B 489,685	3,984,085	Feb. 24, 1976	Oct. 5, 1976
B 490,067	3,986,600	Jan. 27, 1976	Oct. 19, 1976
B 490,547	3,999,439	Feb. 24, 1976	Dec. 28, 1976
B 490,551	D 243,168	Apr. 6, 1976	Jan. 25, 1977
B 490,589	3,990,680	Feb. 3, 1976	Nov. 9, 1976
B 490,623	3,996,964	Mar. 2, 1976	Dec. 14, 1976
B 490,647	3,985,196	Feb. 24, 1976	Oct. 12, 1976
B 490,806	3,989,486	Feb. 3, 1976	Nov. 2, 1976
B 490,812	3,998,842	Mar. 30, 1976	Dec. 21, 1976
B 490,946	3,993,652	Feb. !7, 1976	Nov. 23, 1976
B 490,995	3,995,031	Feb. 3, 1976	Nov. 30, 1976
B 491,032	3,981,892	Feb. 10, 1976	Sep. 21, 1976
B 491,052	3,985,790	Mar. 2, 1976	Oct. 12, 1976
B 491,111	3,997,916	Feb. 17, 1976	Dec. 14, 1976
B 491,455	3,991,167	Feb. 3, 1976	Nov. 9, 1976
B 491,501	3,984,914	Jan. 13, 1976	Oct. 12, 1976
B 491,618	4,007,950	Mar. 16, 1976	Feb. 15, 1977
B 491,650	3,999,044	Mar. 9, 1976	Dec. 21, 1976
B 491,673	3,994,770	Feb. 17, 1976	Nov. 30, 1976
B 491,711	4,053,467	Mar. 23, 1976	Oct. 11, 1977
B 491,776	3,986,298	Mar. 16, 1976	Oct. 19, 1976
B 491,883	3,984,412	Feb. 3, 1976	Oct. 5, 1976
B 491,906	D 242,223	Feb. 10, 1976	Nov. 9, 1976
B 492,039	3,997,541	Feb. 24, 1976	Dec. 14, 1976
B 492,093	4,003,658	Mar. 23, 1976	Jan. 18, 1977
B 492,120	3,995,692	Feb. 24, 1976	Dec. 7, 1976
B 492,301	3,981,073	Jan. 13, 1976	Sep. 21, 1976
B 492,373	4,010,908	Mar. 30, 1976	Mar. 8, 1977
B 492,688	3,983,415	Jan. 20, 1976	Sep. 28, 1976
B 492,716	3,998,739	Mar. 2, 1976	Dec. 21, 1976
B 492,774	4,001,843	Mar. 9, 1976	Jan. 4, 1977
B 492,902	3,993,859	Feb. 24, 1976	Nov. 23, 1976
B 492,946	3,991,303	Jan. 27, 1976	Nov. 9, 1976
B 493,254	D 243,267	Apr. 13, 1976	Feb. 1, 1977
B 493,370	3,984,792	Mar. 16, 1976	Oct. 5, 1976
B 493,463	4,013,510	Mar. 23, 1976	Mar. 22, 1977
B 493,474	4,013,565	Mar. 23, 1976	Mar. 22, 1977
B 493,501	3,988,061	Feb. 3, 1976	Oct. 26, 1976
B 493,686	4,008,338	Mar. 23, 1976	Feb. 15, 1977
B 493,955	3,989,830	Mar. 9, 1976	Nov. 2, 1976
B 493,981	3,990,165	Mar. 9, 1976	Nov. 9, 1976
B 494,138	4,034,002	Mar. 23, 1976	July 5, 1977
B 494,234	3,983,808	Feb. 10, 1976	Oct. 5, 1976
B 494,339	4,001,255	Mar. 16, 1976	Jan. 4, 1977
B 494,383	3,991,289	Feb. 3, 1976	Nov. 9, 1976
B 494,440	4,056,502	Feb. 17, 1976	Nov. 1, 1977
B 494,669	3,991,104	Feb. 3, 1976	Nov. 9, 1976
B 494,691	3,987,457	Mar. 16, 1976	Oct. 19, 1976
B 494,806	3,989,210	Feb. 3, 1976	Nov. 2, 1976
B 494,944	3,992,469	Feb. 17, 1976	Nov. 16, 1976
B 495,185	3,999,166	Mar. 9, 1976	Dec. 21, 1976
B 495,331	4,000,456	Mar. 16, 1976	Dec. 28, 1976
B 495,402	3,983,988	Feb. 17, 1976	Oct. 5, 1976
B 495,408	4,000,222	Feb. 3, 1976	Dec. 28, 1976
B 495,489	3,984,571	Feb. 3, 1976	Oct. 5, 1976
B 495,550	3,993,666	Feb. 3, 1976	Nov. 23, 1976
B 495,554	3,993,665	Feb. 3, 1976	Nov. 23, 1976
B 495,759	3,989,998	Feb. 3, 1976	Nov. 2, 1976
B 495,781	4,013,699	Mar. 23, 1976	Mar. 22, 1977
B 495,903	3,995,997	Feb. 17, 1976	Dec. 7, 1976
B 496,430	3,991,140	Feb. 10, 1976	Nov. 9, 1976
B 496,431	3,985,894	Jan. 13, 1976	Oct. 12, 1976
B 496,487	3,982,261	Jan. 20, 1976	Sep. 21, 1976
B 496,500	3,985,962	Feb. 3, 1976	Oct. 12, 1976
B 496,502	3,987,444	Jan. 20, 1976	Oct. 19, 1976
B 496,792	3,999,959	Feb. 17, 1976	Dec. 28, 1976
B 496,964	3,999,219	Apr. 20, 1976	Dec. 21, 1976
B 496,999	3,983,804	Jan. 27, 1976	Oct. 5, 1976
B 497,021	3,985,039	Jan. 13, 1976	Oct. 12, 1976
B 497,194	3,988,267	Feb. 3, 1976	Oct. 26, 1976
B 497,292	3,994,052	Feb. 3, 1976	Nov. 30, 1976
B 497,293	4,011,412	Mar. 30, 1976	Mar. 8, 1977
B 497,473	3,990,839	Feb. 3, 1976	Nov. 9, 1976
B 497,571	4,009,997	Mar. 23, 1976	Mar. 1, 1977
B 497,584	3,988,184	Feb. 24, 1976	Oct. 26, 1976
B 497,702	3,996,589	Mar. 2, 1976	Dec. 7, 1976
B 497,780	3,997,500	Feb. 24, 1976	Dec. 14, 1976
B 497,853	3,987,934	Feb. 17, 1976	Oct. 26, 1976
B 497,896	D 243,091	Apr. 6, 1976	Jan. 18, 1977
B 497,960	3,991,325	Jan. 20, 1976	Nov. 9, 1976
B 498,208	4,001,480	Apr. 13, 1976	Jan. 4, 1977
B 498,288	4,013,657	Mar. 23, 1976	Mar. 22, 1977
B 498,775	3,993,868	Mar. 2, 1976	Nov. 23, 1976
B 498,205	3,989,611	Feb. 10, 1976	Nov. 2, 1976
B 498,500	3,982,241	Jan. 20, 1976	Sep. 21, 1976
B 498,775	3,993,868	Mar. 2, 1976	Nov. 23, 1976
B 498,820	3,996,670	Mar. 9, 1976	Dec. 14, 1976
B 498,951	3,996,907	Mar. 2, 1976	Dec. 14, 1976
B 499,171	3,985,192	Jan. 27, 1976	Oct. 12, 1976
B 499,209	3,995,907	Feb. 24, 1976	Dec. 7, 1976
B 499,227	3,981,344	Jan. 27, 1976	Sep. 21, 1976
B 499,324	4,001,375	Mar. 16, 1976	Jan. 4, 1977
B 499,352	3,981,391	Jan. 27, 1976	Sep. 21, 1976
B 499,370	4,013,544	Mar. 30, 1976	Mar. 22, 1977
B 499,718	3,990,058	Jan. 27, 1976	Nov. 2, 1976
B 499,786	4,000,663	Mar. 16, 1976	Jan. 4, 1977
B 500,171	3,997,262	Mar. 30, 1976	Dec. 14, 1976
B 500,176	3,995,316	Feb. 3, 1976	Nov. 30, 1976
B 500,408	D 242,721	Mar. 16, 1976	Dec. 14, 1976
B 500,945	3,996,817	Feb. 24, 1976	Dec. 14, 1976
B 500,959	4,014,853	Apr. 13, 1976	Mar. 29, 1977
B 500,981	3,984,681	Jan. 27, 1976	Oct. 5, 1976
B 501,122	3,981,385	Feb. 17, 1976	Sep. 21, 1976
B 501,181	3,984,761	Feb. 10, 1976	Oct. 5, 1976
B 501,253	3,994,015	Feb. 3, 1976	Nov. 23, 1976
B 501,317	3,985,643	Jan. 13, 1976	Oct. 12, 1976
B 501,379	4,013,696	Mar. 30, 1976	Mar. 22, 1977
B 501,415	3,982,051	Jan. 13, 1976	Sep. 21, 1976
B 501,482	4,012,650	Jan. 13, 1976	Mar. 15, 1977
B 501,503	4,001,640	Mar. 2, 1976	Jan. 4, 1977
B 501,540	3,985,694	Jan. 13, 1976	Oct. 12, 1976
B 501,975	3,998,466	Mar. 2, 1976	Dec. 21, 1976
B 501,993	3,981,606	Jan. 13, 1976	Sep. 21, 1976
B 502,151	3,998,614	Mar. 23, 1976	Dec. 21, 1976
B 502,161	4,000,500	Mar. 2, 1976	Dec. 28, 1976
B 502,289	3,982,274	Jan. 13, 1976	Sep. 21, 1976
B 502,381	D 242,231	Mar. 16, 1976	Nov. 9, 1976
B 502,540	3,983,698	Jan. 13, 1976	Oct. 5, 1976
B 502,571	D 242,433	Apr. 6, 1976	Nov. 23, 1976
B 502,589	3,989,652	Jan. 27, 1976	Nov. 2, 1976
B 502,652	3,989,186	Feb. 24, 1976	Nov. 2, 1976
B 502,667	3,991,431	Feb. 24, 1976	Nov. 16, 1976
B 502,973	3,982,161	Jan. 27, 1976	Sep. 21, 1976
B 502,993	3,992,489	Feb. 17, 1976	Nov. 16, 1976
B 503,029	3,986,879	Jan. 27, 1976	Oct. 19, 1976
B 503,345	4,001,235	Feb. 24, 1976	Jan. 4, 1977
B 503,371	4,009,401	Mar. 30, 1976	Feb. 22, 1977
B 503,436	3,988,819	Feb. 24, 1976	Nov. 2, 1976
B 503,456	4,007,702	Mar. 23, 1976	Feb. 15, 1977
B 503,521	3,999,646	Mar. 16, 1976	Dec. 28, 1976
B 503,579	3,989,680	Feb. 10, 1976	Nov. 2, 1976
B 503,618	3,997,782	Mar. 9, 1976	Dec. 14, 1976
B 503,742	3,989,756	Feb. 17, 1976	Nov. 2, 1976
B 503,776	4,016,000	Mar. 23, 1976	Apr. 5, 1977
B 503,780	3,990,055	Mar. 16, 1976	Nov. 2, 1976
B 503,817	3,988,307	Jan. 13, 1976	Oct. 26, 1976
B 504,056	3,993,923	Feb. 24, 1976	Nov. 23, 1976
B 504,061	3,987,534	Mar. 16, 1976	Oct. 26, 1976
B 504,156	3,999,048	Mar. 23, 1976	Dec. 21, 1976
B 504,169	3,981,219	Jan. 13, 1976	Sep. 21, 1976
B 504,404	3,996,499	Feb. 24, 1976	Dec. 7, 1976
B 504,405	4,007,401	Apr. 13, 1976	Feb. 8, 1977
B 504,439	3,999,398	Mar. 16, 1976	Dec. 28, 1976
B 504,503	3,999,210	Mar. 9, 1976	Dec. 21, 1976
B 504,582	4,005,138	Mar. 30, 1976	Jan. 25, 1977
B 504,778	3,986,650	Feb. 24, 1976	Oct. 19, 1976
B 504,877	3,997,564	Feb. 24, 1976	Dec. 14, 1976
B 504,899	3,991,273	Mar. 9, 1976	Nov. 9, 1976
B 505,126	3,981,745	Feb. 10, 1976	Sep. 21, 1976
B 505,221	4,013,627	Mar. 30, 1976	Mar. 22, 1977
B 505,582	4,001,659	Mar. 23, 1976	Jan. 4, 1977
B 505,689	3,987,631	Mar. 2, 1976	Oct. 26, 1976
B 505,813	3,985,175	Jan. 13, 1976	Oct. 12, 1976
B 506,144	3,991,147	Feb. 10, 1976	Nov. 9, 1976
B 506,148	3,988,319	Feb. 3, 1976	Oct. 26, 1976
B 506,167	3,990,652	Feb. 10, 1976	Nov. 9, 1976
B 506,286	3,982,085	Jan. 20, 1976	Sep. 21, 1976
B 506,461	3,987,348	Jan. 20, 1976	Oct. 19, 1976
B 506,566	3,985,402	Jan. 20, 1976	Oct. 12, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 506,624	3,999,695	Mar. 9, 1976	Dec. 28, 1976
B 506,648	3,994,857	Feb. 3, 1976	Nov. 30, 1976
B 506,744	3,981,176	Jan. 13, 1976	Sep. 21, 1976
B 506,760	4,012,835	Apr. 13, 1976	Mar. 22, 1977
B 506,839	4,005,389	Mar. 23, 1976	Jan. 25, 1977
B 506,840	4,002,928	Mar. 23, 1976	Jan. 11, 1977
B 506,916	3,986,140	Feb. 3, 1976	Oct. 12, 1976
B 506,926	3,993,232	Feb. 17, 1976	Nov. 23, 1976
B 507,087	3,991,389	Feb. 17, 1976	Nov. 9, 1976
B 507,131	4,000,499	Mar. 2, 1976	Dec. 28, 1976
B 507,166	4,014,738	Apr. 13, 1976	Mar. 29, 1977
B 507,396	3,995,167	Feb. 10, 1976	Nov. 30, 1976
B 507,476	3,994,680	Feb. 10, 1976	Nov. 30, 1976
B 507,647	3,982,240	Jan. 27, 1976	Sep. 21, 1976
B 508,118	3,992,283	Feb. 17, 1976	Nov. 16, 1976
B 508,119	3,992,285	Feb. 17, 1976	Nov. 16, 1976
B 508,369	3,985,847	Jan. 13, 1976	Oct. 12, 1976
B 508,639	4,004,194	Mar. 23, 1976	Jan. 18, 1977
B 508,817	3,989,891	Feb. 3, 1976	Nov. 2, 1976
B 508,878	3,994,117	Feb. 3, 1976	Nov. 30, 1976
B 508,940	3,981,321	Feb. 17, 1976	Sep. 21, 1976
B 508,961	3,987,477	Feb. 3, 1976	Oct. 19, 1976
B 509,043	3,996,767	Feb. 24, 1976	Dec. 14, 1976
B 509,165	3,999,155	Mar. 2, 1976	Dec. 21, 1976
B 509,185	3,989,996	Feb. 3, 1976	Nov. 2, 1976
B 509,238	3,982,399	Feb. 24, 1976	Sep. 28, 1976
B 509,474	3,997,260	Feb. 17, 1976	Dec. 14, 1976
B 509,586	4,006,645	Feb. 3, 1976	Feb. 8, 1977
B 509,606	3,989,986	Feb. 3, 1976	Nov. 2, 1976
B 509,772	3,999,004	Mar. 16, 1976	Dec. 21, 1976
B 509,819	4,014,712	Apr. 13, 1976	Mar. 29, 1977
B 510,026	4,016,763	Apr. 13, 1976	Apr. 12, 1977
B 510,184	D 242,784	Apr. 6, 1976	Dec. 21, 1976
B 510,278	4,008,972	Mar. 30, 1976	Feb. 22, 1977
B 510,281	3,993,215	Mar. 9, 1976	Nov. 23, 1976
B 510,346	D 242,207	Feb. 10, 1976	Nov. 9, 1976
B 510,458	4,000,221	Feb. 10, 1976	Dec. 28, 1976
B 510,521	3,990,656	Mar. 2, 1976	Nov. 9, 1976
B 510,588	3,981,539	Jan. 27, 1976	Sep. 21, 1976
B 510,677	3,989,541	Feb. 24, 1976	Nov. 2, 1976
B 510,682	4,000,978	Mar. 30, 1976	Jan. 4, 1977
B 510,836	4,013,795	Mar. 23, 1976	Mar. 22, 1977
B 510,850	3,989,841	Feb. 3, 1976	Nov. 2, 1976
B 510,855	3,981,059	Jan. 27, 1976	Sep. 21, 1976
B 511,907	3,999,622	Mar. 30, 1976	Dec. 28, 1976
B 510,998	3,992,336	Feb. 10, 1976	Nov. 16, 1976
B 511,002	3,998,717	Mar. 2, 1976	Dec. 21, 1976
B 511,099	3,990,162	Feb. 3, 1976	Nov. 9, 1976
B 511,156	3,981,364	Jan. 27, 1976	Sep. 21, 1976
B 511,346	3,984,072	Jan. 27, 1976	Oct. 5, 1976
B 511,407	3,981,485	Feb. 10, 1976	Sep. 21, 1976
B 511,454	3,982,333	Feb. 24, 1976	Sep. 28, 1976
B 511,665	4,001,037	Mar. 2, 1976	Jan. 4, 1977
B 511,885	3,981,346	Jan. 27, 1976	Sep. 21, 1976
B 511,886	3,989,991	Feb. 3, 1976	Nov. 2, 1976
B 511,909	3,981,183	Feb. 17, 1976	Sep. 21, 1976
B 512,324	3,985,084	Feb. 17, 1976	Oct. 12, 1976
B 512,547	3,984,193	Jan. 13, 1976	Oct. 5, 1976
B 512,745	3,981,294	Jan. 13, 1976	Sep. 21, 1976
B 512,779	4,014,897	Apr. 13, 1976	Mar. 29, 1977
B 512,818	3,997,363	Apr. 6, 1976	Dec. 14, 1976
B 512,849	3,982,141	Feb. 3, 1976	Sep. 21, 1976
B 512,964	3,995,279	Feb. 10, 1976	Nov. 30, 1976
B 513,014	3,991,113	Feb. 10, 1976	Nov. 9, 1976
B 513,027	3,995,143	Feb. 17, 1976	Nov. 30, 1976
B 513,134	4,006,764	Mar. 23, 1976	Feb. 8, 1977
B 513,280	3,988,211	Jan. 20, 1976	Oct. 26, 1976
B 513,368	3,982,138	Feb. 3, 1976	Sep. 21, 1976
B 513,706	3,986,064	Jan. 13, 1976	Oct. 12, 1976
B 513,756	3,993,869	Feb. 3, 1976	Nov. 23, 1976
B 513,781	4,001,324	Feb. 24, 1976	Jan. 4, 1977
B 513,789	3,981,599	Feb. 3, 1976	Sep. 21, 1976
B 513,791	4,008,608	Mar. 30, 1976	Feb. 22, 1977
B 514,259	4,013,649	Mar. 23, 1976	Mar. 22, 1977
B 514,687	3,986,522	Jan. 27, 1976	Oct. 19, 1976
B 514,839	4,033,816	Mar. 2, 1976	July 5, 1977
B 515,135	3,990,085	Feb. 17, 1976	Nov. 2, 1976
B 515,303	3,987,939	Jan. 20, 1976	Oct. 26, 1976
B 515,368	4,014,733	Apr. 6, 1976	Mar. 29, 1977
B 515,452	3,995,243	Feb. 10, 1976	Nov. 30, 1976
B 515,455	3,982,149	Jan. 27, 1976	Sep. 21, 1976
B 515,642	4,001,258	Feb. 24, 1976	Jan. 4, 1977
B 515,908	3,984,676	Jan. 20, 1976	Oct. 5, 1976
B 516,002	3,988,638	Jan. 13, 1976	Oct. 26, 1976
B 516,032	3,986,634	Jan. 27, 1976	Oct. 19, 1976
B 516,047	3,985,741	Feb. 10, 1976	Oct. 12, 1976
B 516,060	3,983,572	Feb. 17, 1976	Sep. 28, 1976
B 516,069	3,986,208	Mar. 16, 1976	Oct. 12, 1976
B 516,296	3,984,404	Feb. 3, 1976	Oct. 5, 1976
B 516,537	3,996,784	Feb. 17, 1976	Dec. 14, 1976
B 516,564	3,993,931	Feb. 17, 1976	Nov. 23, 1976
B 516,609	3,994,486	Feb. 24, 1976	Nov. 30, 1976
B 516,625	4,013,542	Mar. 30, 1976	Mar. 22, 1977
B 516,804	3,991,209	Mar. 23, 1976	Nov. 9, 1976
B 516,825	3,988,885	Feb. 3, 1976	Nov. 2, 1976
B 517,273	D 242,798	Mar. 16, 1976	Dec. 21, 1976
B 517,504	3,999,855	Mar. 9, 1976	Dec. 28, 1976
B 517,668	4,013,423	Apr. 6, 1976	Mar. 22, 1977
B 517,762	3,986,065	Mar. 16, 1976	Oct. 12, 1976
B 517,858	4,000,999	Feb. 17, 1976	Jan. 4, 1977
B 517,956	D 243,088	Apr. 6, 1976	Jan. 18, 1977
B 517,957	D 243,089	Apr. 6, 1976	Jan. 18, 1977
B 518,076	4,014,914	Mar. 30, 1976	Mar. 29, 1977
B 518,226	3,993,509	Feb. 10, 1976	Nov. 23, 1976
B 518,326	4,008,282	Mar. 23, 1976	Feb. 15, 1977
B 518,656	3,989,732	Feb. 17, 1976	Nov. 2, 1976
B 518,859	3,989,971	Feb. 3, 1976	Nov. 2, 1976
B 518,999	3,990,323	Feb. 3, 1976	Nov. 9, 1976
B 519,095	3,993,621	Feb. 24, 1976	Nov. 23, 1976
B 519,355	4,014,829	Apr. 13, 1976	Mar. 29, 1977
B 519,377	3,987,223	Jan. 27, 1976	Oct. 19, 1976
B 519,446	3,985,815	Feb. 24, 1976	Oct. 12, 1976
B 519,485	3,991,134	Feb. 10, 1976	Nov. 9, 1976
B 519,486	3,992,481	Feb. 17, 1976	Nov. 16, 1976
B 519,487	3,992,337	Feb. 17, 1976	Nov. 16, 1976
B 519,599	3,995,350	Feb. 17, 1976	Dec. 7, 1976
B 519,623	4,012,049	Apr. 6, 1976	Mar. 15, 1977
B 519,680	4,014,660	Mar. 30, 1976	Mar. 29, 1977
B 519,932	3,988,618	Feb. 3, 1976	Oct. 26, 1976
B 519,979	3,982,067	Feb. 3, 1976	Sep. 21, 1976
B 520,063	3,989,934	Mar. 2, 1976	Nov. 2, 1976
B 520,075	3,989,935	Feb. 24, 1976	Nov. 2, 1976
B 520,076	3,989,936	Mar. 2, 1976	Nov. 2, 1976
B 520,082	3,989,937	Mar. 23, 1976	Nov. 2, 1976
B 520,115	4,003,072	Mar. 23, 1976	Jan. 11, 1977
B 520,227	4,002,823	Mar. 30, 1976	Jan. 11, 1977
B 520,256	3,985,730	Jan. 13, 1976	Oct. 12, 1976
B 520,277	3,995,635	Feb. 17, 1976	Dec. 7, 1976
B 520,341	3,992,028	Mar. 16, 1976	Nov. 16, 1976
B 520,384	3,986,592	Jan. 27, 1976	Oct. 19, 1976
B 520,514	3,988,308	Mar. 9, 1976	Oct. 26, 1976
B 520,534	3,997,119	Feb. 17, 1976	Dec. 14, 1976
B 520,543	3,986,768	Jan. 27, 1976	Oct. 19, 1976
B 520,546	4,001,133	Mar. 2, 1976	Jan. 4, 1977
B 520,613	3,991,341	Mar. 16, 1976	Nov. 9, 1976
B 520,658	3,998,778	Mar. 9, 1976	Dec. 21, 1976
B 520,878	4,014,849	Apr. 6, 1976	Mar. 29, 1977
B 520,884	4,000,433	Mar. 16, 1976	Dec. 28, 1976
B 520,924	3,982,113	Jan. 27, 1976	Sep. 21, 1976
B 520,928	3,983,617	Jan. 13, 1976	Oct. 5, 1976
B 520,952	4,000,876	Mar. 16, 1976	Jan. 4, 1977
B 520,995	4,009,996	Mar. 23, 1976	Mar. 1, 1977
B 521,025	3,998,838	Mar. 23, 1976	Dec. 21, 1976
B 521,044	3,983,435	Feb. 24, 1976	Sep. 28, 1976
B 521,045	3,983,433	Feb. 24, 1976	Sep. 28, 1976
B 521,046	3,983,434	Feb. 24, 1976	Sep. 28, 1976
B 521,125	3,994,865	Feb. 10, 1976	Nov. 30, 1976
B 521,126	3,997,510	Feb. 10, 1976	Dec. 14, 1976
B 521,127	3,996,201	Feb. 17, 1976	Dec. 7, 1976
B 521,128	3,997,511	Feb. 10, 1976	Dec. 14, 1976
B 521,324	3,983,143	Jan. 27, 1976	Sep. 28, 1976
B 521,480	3,982,665	Jan. 13, 1976	Sep. 28, 1976
B 521,600	3,981,458	Jan. 27, 1976	Sep. 21, 1976
B 521,612	4,000,251	Mar. 9, 1976	Dec. 28, 1976
B 521,620	3,983,749	Jan. 27, 1976	Oct. 5, 1976
B 521,643	3,997,567	Mar. 2, 1976	Dec. 14, 1976
B 521,711	3,989,835	Feb. 10, 1976	Nov. 2, 1976
B 521,793	3,996,981	Feb. 24, 1976	Dec. 14, 1976
B 521,984	3,983,220	Feb. 17, 1976	Sep. 28, 1976
B 521,985	4,012,404	Mar 23, 1976	Mar. 15, 1977
B 521,986	3,981,607	Feb. 3, 1976	Sep. 21, 1976
B 522,009	3,995,444	Feb. 17, 1976	Dec. 7, 1976
B 522,038	3,993,119	Feb. 3, 1976	Nov. 23, 1976
B 522,227	3,992,904	Mar 30, 1976	Nov 23, 1976
B 522,309	3,991,603	Feb. 3, 1976	Nov 16, 1976
B 522,354	3,984,959	Jan 20, 1976	Oct. 12, 1976
B 522,446	4,001,194	Mar. 30, 1976	Jan. 4, 1977
B 522,537	3,999,587	Mar. 30, 1976	Dec. 28, 1976
B 522,567	3,996,238	Feb. 17, 1976	Dec. 7, 1976
B 522,568	D 242,785	Apr. 6, 1976	Dec. 21, 1976
B 522,577	3,982,123	Jan. 27, 1976	Sep. 21, 1976
B 522,629	4,001,155	Mar. 16, 1976	Jan. 4, 1977
B 523,226	4,006,367	Mar. 23, 1976	Feb. 1, 1977
B 523,696	3,986,071	Jan. 13, 1976	Oct. 12, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 523,885	3,981,040	Feb. 17, 1976	Sep. 21, 1976
B 523,952	3,988,707	Mar. 23, 1976	Oct. 26, 1976
B 524,026	3,992,206	Feb. 10, 1976	Nov. 16, 1976
B 524,121	3,982,536	Feb. 3, 1976	Sep. 28, 1976
B 524,179	3,985,872	Jan. 13, 1976	Oct. 12, 1976
B 524,464	3,985,580	Feb. 10, 1976	Oct. 12, 1976
B 524,806	4,000,065	Mar. 2, 1976	Dec. 28, 1976
B 524,849	4,014,938	Mar. 23, 1976	Mar. 29, 1977
B 525,133	3,996,481	Mar. 23, 1976	Dec. 7, 1976
B 525,204	4,001,109	Mar. 16, 1976	Jan. 4, 1977
B 525,809	3,985,040	Feb. 24, 1976	Oct. 12, 1976
B 525,961	3,985,557	Jan. 13, 1976	Oct. 12, 1976
B 526,106	3,990,073	Jan. 27, 1976	Nov. 2, 1976
B 526,190	3,982,129	Feb. 17, 1976	Sep. 21, 1976
B 526,279	4,013,138	Apr. 13, 1976	Mar. 22, 1977
B 526,289	3,992,641	Feb. 24, 1976	Nov. 16, 1976
B 526,388	3,992,017	Feb. 3, 1976	Nov. 16, 1976
B 526,445	3,984,978	Jan. 20, 1976	Oct. 12, 1976
B 526,447	4,000,052	Feb. 24, 1976	Dec. 28, 1976
B 526,510	3,989,708	Jan. 20, 1976	Nov. 2, 1976
B 526,654	4,011,534	Mar. 23, 1976	Mar. 8, 1977
B 526,942	4,013,700	Mar. 30, 1976	Mar. 22, 1977
B 526,997	3,985,695	Jan. 13, 1976	Oct. 12, 1976
B 527,040	4,013,515	Mar. 23, 1976	Mar. 22, 1977
B 527,054	3,981,559	Feb. 17, 1976	Sep. 21, 1976
B 527,171	3,998,248	Mar. 9, 1976	Dec. 21, 1976
B 527,187	3,995,202	Feb. 17, 1976	Nov. 30, 1976
B 527,333	3,999,732	Mar. 23, 1976	Dec. 28, 1976
B 527,669	3,982,206	Jan. 13, 1976	Sep. 21, 1976
B 527.693	3,995,233	Feb. 3, 1976	Nov. 30, 1976
B 527,788	D 242,337	Feb. 10, 1976	Nov. 16, 1976
B 527,972	4,000,016	Mar. 9, 1976	Dec. 28, 1976
B 527,999	3,981,682	Feb. 3, 1976	Sep. 21, 1976
B 528,297	4,001,138	Mar. 16, 1976	Jan. 4, 1977
B 528,303	3,991,023	Feb. 10, 1976	Nov. 9, 1976
B 528,401	3,991,619	Feb. 3, 1976	Nov. 16, 1976
B 528,756	3,990,476	Feb. 3, 1976	Nov. 9, 1976
B 528,761	3,982,221	Feb. 10, 1976	Sep. 21, 1976
B 528,962	3,989,666	Feb. 24, 1976	Nov. 2, 1976
B 528,966	3,989,667	Feb. 24, 1976	Nov. 2, 1976
B 529,156	3,989,158	Jan. 13, 1976	Nov. 2, 1976
B 529,194	4,000,776	Mar. 23, 1976	Jan. 4, 1977
B 529,214	4,013,004	Apr. 20, 1976	Mar. 22, 1977
B 529,659	3,996,875	Feb. 24, 1976	Dec. 14, 1976
B 529,836	3,994,345	Feb. 3, 1976	Nov. 30, 1976
B 529,925	4,014,003	Mar. 30, 1976	Mar. 22, 1977
B 529,974	3,987,098	Feb. 17, 1976	Oct. 19, 1976
B 530,174	3,993,635	Feb. 24, 1976	Nov. 23, 1976
B 530,255	3,996,103	Mar. 2, 1976	Dec. 7, 1976
B 530,263	4,009,736	Mar. 30, 1976	Mar. 1, 1977
B 530,285	4,013,903	Apr. 6, 1976	Mar. 22, 1977
B 530,303	4,006,029	Mar. 23, 1976	Feb. 1, 1977
B 530,318	3,985,752	Jan. 13, 1976	Oct. 12, 1976
B 530,437	4,014,857	Apr. 13, 1976	Mar. 29, 1977
B 530,569	3,999,865	Mar. 16, 1976	Dec. 28, 1976
B 530,580	4,001,151	Mar. 2, 1976	Jan. 4, 1977
B 530,605	3,989,064	Feb. 3, 1976	Nov. 2, 1976
B 530,709	4,012,944	Apr. 6, 1976	Mar. 22, 1977
B 530,813	3,986,131	Feb. 17, 1976	Oct. 12, 1976
B 530,873	4,001,016	Feb. 17, 1976	Jan. 4, 1977
B 530,925	3,983,161	Feb. 24, 1976	Sep. 28, 1976
B 531,096	3,984,415	Feb. 10, 1976	Oct. 5, 1976
B 531,267	3,997,040	Feb. 24, 1976	Dec. 14, 1976
B 531,425	3,992,595	Feb. 3, 1976	Nov. 16, 1976
B 531,566	3,997,820	Mar. 16, 1976	Dec. 14, 1976
B 531,686	3,990,017	Mar. 23, 1976	Nov. 2, 1976
B 531,753	3,988,843	Mar. 2, 1976	Nov. 2, 1976
B 531,929	3,986,067	Jan. 20, 1976	Oct. 12, 1976
B 532,005	3,992,397	Feb. 24, 1976	Nov. 16, 1976
B 532,140	4,001,299	Mar. 2, 1976	Jan. 4, 1977
B 532,319	3,990,292	Feb. 3, 1976	Nov. 9, 1976
B 532,326	3,993,959	Mar. 23, 1976	Nov. 23, 1976
B 532,424	D 242,292	Feb. 10, 1976	Nov. 9, 1976
B 532,476	3,992,756	Feb. 3, 1976	Nov. 23, 1976
B 532,477	4,014,895	Apr. 13, 1976	Mar. 29, 1977
B 532,679	4,010,706	Apr. 6, 1976	Mar. 8, 1977
B 532,901	3,984,318	Jan. 13, 1976	Oct. 5, 1976
B 532,969	3,981,706	Jan. 13, 1976	Sep. 21, 1976
B 532,976	4,000,837	Mar. 23, 1976	Jan. 4, 1977
B 533,056	3,983,969	Jan. 13, 1976	Oct. 5, 1976
B 533,259	3,999,556	Feb. 24, 1976	Dec. 28, 1976
B 533,454	3,996,566	Mar. 2, 1976	Dec. 7, 1976
B 533,580	3,982,255	Feb. 3, 1976	Sep. 21, 1976
B 533,652	4,000,196	Mar. 23, 1976	Dec. 28, 1976
B 533,734	3,984,799	Jan. 27, 1976	Oct. 5, 1976
B 533,968	3,986,576	Jan. 27, 1976	Oct. 19, 1976
B 534,016	3,983,381	Feb. 3, 1976	Sep. 28, 1976
B 534,313	3,981,675	Jan. 27, 1976	Sep. 21, 1976
B 534,314	3,981,786	Feb. 10, 1976	Sep. 21, 1976
B 534,333	3,981,480	Feb. 17, 1976	Sep. 21, 1976
B 534,334	D 242,722	Mar. 16, 1976	Dec. 14, 1976
B 534,443	3,989,970	Jan. 27, 1976	Nov. 2, 1976
B 534,574	3,995,624	Feb. 24, 1976	Dec. 7, 1976
B 534,591	3,991,141	Feb. 17, 1976	Nov. 9, 1976
B 534,680	4,014,904	Apr. 20, 1976	Mar. 29, 1977
B 534,767	3,982,180	Feb. 3, 1976	Sep. 21, 1976
B 534,915	4,012,668	Mar. 23, 1976	Mar. 15, 1977
B 534,991	3,983,517	Jan. 27, 1976	Sep. 28, 1976
B 535,076	3,981,718	Jan. 20, 1976	Sep. 21, 1976
B 535,209	4,001,873	Mar. 16, 1976	Jan. 4, 1977
B 535,256	3,999,150	Mar. 23, 1976	Dec. 21, 1976
B 535,268	3,999,045	Mar. 30, 1976	Dec. 21, 1976
B 535,386	3,981,150	Jan. 13, 1976	Sep. 21, 1976
B 535,391	3,981,386	Jan. 27, 1976	Sep. 21, 1976
B 535,411	3,990,543	Feb. 24, 1976	Nov. 9, 1976
B 535,437	3,997,555	Feb. 24, 1976	Dec. 14, 1976
B 535,448	3,997,123	Mar. 16, 1976	Dec. 14, 1976
B 535,466	3,981,309	Jan. 27, 1976	Sep. 21, 1976
B 535,813	3,981,819	Jan. 27, 1976	Sep. 21, 1976
B 535,928	3,981,466	Jan. 13, 1976	Sep. 21, 1976
B 536,009	3,982,112	Jan. 27, 1976	Sep. 21, 1976
B 536,082	3,997,783	Mar. 16, 1976	Dec. 14, 1976.
B 536,322	4,001,272	Mar. 23, 1976	Jan. 4, 1977
B 536,403	3,998,341	Mar. 23, 1976	Dec. 21, 1976
B 536,511	3,995,989	Mar. 9, 1976	Dec. 7, 1976
B 536,675	3,985,773	Jan. 20, 1976	Oct. 12, 1976
B 536,923	4,007,828	Mar. 30, 1976	Feb. 15, 1977
B 536,935	3,985,729	Jan. 13, 1976	Oct. 12, 1976
B 537,058	4,000,969	Mar. 23, 1976	Jan. 4, 1977
B 537,102	3,981,829	Jan. 13, 1976	Sep. 21, 1976
B 537,709	3,981,368	Jan. 13, 1976	Sep. 21, 1976
B 537,711	3,985,748	Jan. 13, 1976	Oct. 12, 1976
B 537,722	3,985,423	Feb. 3, 1976	Oct. 12, 1976
B 537,903	3,986,492	Jan. 20, 1976	Oct. 19, 1976
B 538,472	3,992,884	Feb. 3, 1976	Nov. 23, 1976
B 538,491	3,982,928	Feb. 17, 1976	Sep. 28, 1976
B 538,686	3,982,199	Jan. 13, 1976	Sep. 21, 1976
B 538,753	3,993,642	Feb. 10, 1976	Nov. 23, 1976
B 539,374	3,996,229	Mar. 9, 1976	Dec. 7, 1976
B 539,746	3,983,423	Feb. 17, 1976	Sep. 28, 1976
B 540,078	3,984,701	Jan. 13, 1976	Oct. 5, 1976
B 540,218	3,986,108	Feb. 10, 1976	Oct. 12, 1976
B 540,632	3,981,600	Jan. 13, 1976	Sep. 21, 1976
B 540,703	4,013,206	Apr. 13, 1976	Mar. 22, 1977
B 540,767	3,986,010	Mar. 16, 1976	Oct. 12, 1976
B 540,872	3,982,135	Jan. 20, 1976	Sep. 21, 1976
B 540,888	4,005,528	Mar. 30, 1976	Feb. 1, 1977
B 541,015	3,993,208	Jan. 27, 1976	Nov. 23, 1976
B 541,376	3,981,690	Feb. 17, 1976	Sep. 21, 1976
B 541,415	3,982,080	Feb. 3, 1976	Sep. 21, 1976
B 541,464	3,995,424	Feb. 17, 1976	Dec. 7, 1976
B 541,496	3,982,232	Jan. 27, 1976	Sep. 21, 1976
B 541,501	4,005,826	Apr. 13, 1976	Feb. 1, 1977
B 541,517	3,986,156	Jan. 13, 1976	Oct. 12, 1976
B 541,710	3,994,472	Feb. 24, 1976	Nov. 30, 1976
B 542,135	3,986,939	Feb. 10, 1976	Oct. 19, 1976
B 542,158	3,981,886	Jan. 13, 1976	Sep. 21, 1976
B 542,226	3,993,748	Feb. 24, 1976	Nov. 23, 1976
B 542,258	4,013,536	Mar. 23, 1976	Mar. 22, 1977
B 543,078	3,995,687	Feb. 17, 1976	Dec. 7, 1976
B 543,941	3,985,528	Jan. 13, 1976	Oct. 12, 1976
B 544,034	3,997,175	Feb. 17, 1976	Dec. 14, 1976
B 544,476	3,993,585	Feb. 24, 1976	Nov. 23, 1976
B 544,899	3,994,962	Feb. 17, 1976	Nov. 30, 1976
B 544,961	3,983,492	Jan. 13, 1976	Sep. 28, 1976
B 545,050	3,982,073	Jan. 20, 1976	Sep. 21, 1976
B 545,265	D 243,090	Apr. 13, 1976	Jan. 18, 1977
B 545,299	4,001,259	Feb. 24, 1976	Jan. 4, 1977
B 545,344	4,012,746	Mar. 30, 1976	Mar. 15, 1977
B 545,464	3,992,387	Feb. 10, 1976	Nov. 16, 1976
B 545,630	3,981,337	Jan. 27, 1976	Sep. 21, 1976
B 545,777	4,004,906	Jan. 27, 1976	Jan. 25, 1977
B 545,856	4,006,939	Mar. 30, 1976	Feb. 8, 1977
B 545,935	3,990,337	Jan. 27, 1976	Nov. 9, 1976
B 545,945	3,995,260	Jan. 27, 1976	Nov. 30, 1976
B 546,097	3,999,309	Mar. 23, 1976	Dec. 28, 1976
B 546,295	3,987,070	Jan. 20, 1976	Oct. 19, 1976
B 546,426	3,982,063	Jan. 27, 1976	Sep. 21, 1976
B 546,631	3,983,729	Feb. 3, 1976	Oct. 5, 1976
B 546,665	3,990,062	Jan. 20, 1976	Nov. 2, 1976
B 546,677	4,015,654	Apr. 6, 1976	Apr. 5, 1977
B 546,911	3,981,058	Jan. 13, 1976	Sep. 21, 1976
B 546,922	3,987,742	Mar. 16, 1976	Oct. 26, 1976
B 547,016	3,999,741	Mar. 23, 1976	Dec. 28, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 547,208	4,001,218	Feb. 24, 1976	Jan. 4, 1977
B 547,547	3,997,670	Feb. 24, 1976	Dec. 14, 1976
B 547,994	3,990,081	Jan. 20, 1976	Nov. 2, 1976
B 548,028	3,991,517	Feb. 3, 1976	Nov. 16, 1976
B 548,058	3,983,050	Feb. 17, 1976	Sep. 28, 1976
B 548,155	3,981,477	Jan. 13, 1976	Sep. 21, 1976
B 548,440	3,993,401	Feb. 3, 1976	Nov. 23, 1976
B 548,302	3,983,414	Feb. 17, 1976	Sep. 28, 1976
B 548,440	3,993,401	Feb. 3, 1976	Nov. 23, 1976
B 548,462	D 242,283	Feb. 10, 1976	Nov. 9, 1976
B 548,688	3,995,984	Mar. 9, 1976	Dec. 7, 1976
B 548,719	3,990,553	Feb. 17, 1976	Nov. 9, 1976
B 548,978	3,998,139	Mar. 9, 1976	Dec. 21, 1976
B 549,198	3,981,975	Jan. 13, 1976	Sep. 21, 1976
B 549,244	3,981,125	Jan. 27, 1976	Sep. 21, 1976
B 549,394	3,981,611	Jan. 27, 1976	Sep. 21, 1976
B 549,931	3,986,141	Jan. 20, 1976	Oct. 12, 1976
B 549,964	3,995,899	Feb. 24, 1976	Dec. 7, 1976
B 550,693	3,982,194	Jan. 20, 1976	Sep. 21, 1976
B 550,744	3,993,550	Feb. 17, 1976	Nov. 23, 1976
B 550,810	4,000,910	Mar. 23, 1976	Jan. 4, 1977
B 551,133	3,996,740	Mar. 2, 1976	Dec. 14, 1976
B 551,463	3,996,254	Feb. 17, 1976	Dec. 7, 1976
B 551,527	3,982,599	Jan. 13, 1976	Sep. 28, 1976
B 551,809	3,996,743	Feb. 24, 1976	Dec. 14, 1976
B 551,952	Re. 29,059	Mar. 2, 1976	Dec. 7, 1976
B 552,006	3,992,129	Feb. 3, 1976	Nov. 16, 1976
B 552,489	3,994,864	Feb. 10, 1976	Nov. 30, 1976
B 552,498	3,983,139	Jan. 13, 1976	Sep. 28, 1976
B 552,508	4,001,250	Mar. 16, 1976	Jan. 4, 1977
B 552,629	3,994,773	Mar. 23, 1976	Nov. 30, 1976
B 552,709	4,001,467	Mar. 23, 1976	Jan. 4, 1977
B 552,932	3,989,292	Feb. 3, 1976	Nov. 2, 1976
B 553,421	4,001,146	Mar. 23, 1976	Jan. 4, 1977
B 553,460	3,990,019	Feb. 3, 1976	Nov. 2, 1976
B 553,584	3,992,456	Feb. 17, 1976	Nov. 16, 1976
B 553,629	3,999,242	Feb. 24, 1976	Dec. 28, 1976
B 554,039	3,999,944	Feb. 24, 1976	Dec. 28, 1976
B 554,164	4,001,465	Mar. 9, 1976	Jan. 4, 1977
B 554,283	3,981,152	Jan. 27, 1976	Sep. 21, 1976
B 554,291	4,001,209	Mar. 9, 1976	Jan. 4, 1977
B 554,380	4,001,147	Mar. 9, 1976	Jan. 4, 1977
B 554,594	3,985,960	Jan. 20, 1976	Oct. 12, 1976
B 554,655	4,015,048	Feb. 24, 1976	Mar. 29, 1977
B 554,848	4,001,265	Feb. 24, 1976	Jan. 4, 1977
B 554,939	3,994,013	Feb. 10, 1976	Nov. 23, 1976
B 555,146	4,007,636	Apr. 20, 1976	Feb. 15, 1977
B 555,437	3,991,152	Feb. 3, 1976	Nov. 9, 1976
B 555,456	3,993,423	Mar. 30, 1976	Nov. 23, 1976
B 555,772	3,982,641	Jan. 13, 1976	Sep. 28, 1976
B 556,057	3,985,349	Jan. 13, 1976	Oct. 12, 1976
B 556,496	3,990,244	Mar. 16, 1976	Nov. 9, 1976
B 556,897	3,992,972	Feb. 3, 1976	Nov. 23, 1976
B 557,153	3,991,603	Feb. 3, 1976	Nov. 16, 1976
B 557,274	4,016,375	Mar. 23, 1976	Apr. 5, 1977
B 557,299	3,990,357	Feb. 3, 1976	Nov. 9, 1976
B 557,621	3,990,800	Feb. 3, 1976	Nov. 9, 1976
B 557,721	4,013,435	Mar. 23, 1976	Mar. 22, 1977
B 557,856	3,991,019	Feb. 10, 1976	Nov. 9, 1976
B 558,220	3,990,009	Jan. 27, 1976	Nov. 2, 1976
B 558,251	3,981,289	Jan. 13, 1976	Sep. 21, 1976
B 558,813	3,989,188	Feb. 3, 1976	Nov. 2, 1976
B 558,818	3,983,762	Jan. 13, 1976	Oct. 5, 1976
B 558,819	3,990,160	Feb. 3, 1976	Nov. 9, 1976
B 558,973	3,981,126	Feb. 10, 1976	Sep. 21, 1976
B 559,111	3,984,854	Feb. 24, 1976	Oct. 5, 1976
B 559,142	4,001,124	Mar. 2, 1976	Jan. 4, 1977
B 559,394	4,016,094	Apr. 20, 1976	Apr. 5, 1977
B 559,441	4,013,609	Mar. 23, 1976	Mar. 22, 1977
B 559,631	4,011,406	Mar. 23, 1976	Mar. 8, 1977
B 559,697	3,995,770	Mar. 16, 1976	Dec. 7, 1976
B 559,700	4,001,189	Mar. 23, 1976	Jan. 4, 1977
B 559,701	4,001,190	Mar. 23, 1976	Jan. 4, 1977
B 559,737	3,984,668	Jan. 20, 1976	Oct. 5, 1976
B 559,954	3,982,673	Feb. 3, 1976	Sep. 28, 1976
B 560,261	3,987,493	Mar. 16, 1976	Oct. 19, 1976
B 560,488	3,989,940	Mar. 16, 1976	Nov. 2, 1976
B 560,717	3,982,034	Feb. 10, 1976	Sep. 21, 1976
B 560,765	3,983,389	Feb. 3, 1976	Sep. 28, 1976
B 561,062	D 242,248	Feb. 10, 1976	Nov. 9, 1976
B 561,165	4,013,002	Mar. 30, 1976	Mar. 22, 1977
B 561,166	4,011,809	Mar. 30, 1976	Mar. 15, 1977
B 561,365	4,005,078	Apr. 13, 1976	Jan. 25, 1977
B 561,387	3,985,706	Feb. 10, 1976	Oct. 12, 1976
B 561,405	4,003,770	Mar. 30, 1976	Jan. 18, 1977
B 561,712	3,992,126	Feb. 17, 1976	Nov. 16, 1976
B 561,732	3,991,460	Feb. 3, 1976	Nov. 16, 1976
B 561,764	3,984,634	Jan. 27, 1976	Oct. 5, 1976
B 561,770	4,000,366	Mar. 16, 1976	Dec. 28, 1976
B 561,784	3,984,710	Jan. 27, 1976	Oct. 5, 1976
B 562,413	4,000,930	Mar. 16, 1976	Jan. 4, 1977
B 562,462	3,985,836	Jan. 13, 1976	Oct. 12, 1976
B 562,519	4,013,125	Mar. 30, 1976	Mar. 22, 1977
B 562,601	3,998,360	Mar. 16, 1976	Dec. 21, 1976
B 562,698	3,983,972	Jan. 13, 1976	Oct. 5, 1976
B 562,813	3,985,491	Feb. 3, 1976	Oct. 12, 1976
B 563,070	3,996,230	Mar. 9, 1976	Dec. 7, 1976
B 563,165	4,000,977	Mar. 9, 1976	Jan. 4, 1977
B 563,244	3,983,562	Jan. 27, 1976	Sep. 28, 1976
B 563,301	3,995,589	Feb. 17, 1976	Dec. 7, 1976
B 563,412	3,992,127	Feb. 24, 1976	Nov. 16, 1976
B 563,419	3,999,051	Mar. 23, 1976	Dec. 21, 1976
B 563,722	3,990,925	Jan. 13, 1976	Nov. 9, 1976
B 563,780	3,987,769	Feb. 3, 1976	Oct. 26, 1976
B 563,932	4,000,638	Mar. 23, 1976	Jan. 4, 1977
B 564,252	4,001,293	Mar. 2, 1976	Jan. 4, 1977
B 564,255	4,015,996	Mar. 30, 1976	Apr. 5, 1977
B 564,314	3,984,996	Jan. 20, 1976	Oct. 12, 1976
B 564,902	4,001,351	Mar. 23, 1976	Jan. 4, 1977
B 565,180	3,981,685	Jan. 27, 1976	Sep. 21, 1976
B 565,275	3,990,299	Apr. 6, 1976	Nov. 9, 1976
B 565,717	3,999,138	Apr. 13, 1976	Dec. 21, 1976
B 565,754	4,011,626	Mar. 30, 1976	Mar. 15, 1977
B 566,464	3,996,367	Feb. 3, 1976	Dec. 7, 1976
B 566,556	3,998,511	Mar. 23, 1976	Dec. 21, 1976
B 566,572	3,988,590	Mar. 16, 1976	Oct. 26, 1976
B 566,585	4,001,083	Mar. 2, 1976	Jan. 4, 1977
B 567,058	3,985,188	Jan. 13, 1976	Oct. 12, 1976
B 567,076	4,011,187	Mar. 23, 1976	Mar. 8, 1977
B 567,158	3,988,073	Mar. 23, 1976	Oct. 26, 1976
B 567,207	3,991,689	Apr. 13, 1976	Nov. 16, 1976
B 567,435	3,995,724	Feb. 3, 1976	Dec. 7, 1976
B 567,854	3,985,038	Feb. 3, 1976	Oct. 12, 1976
B 567,892	4,000,855	Mar. 16, 1976	Jan. 4, 1977
B 568,226	3,992,698	Feb. 24, 1976	Nov. 16, 1976
B 568,770	3,982,213	Feb. 10, 1976	Sep. 21, 1976
B 569,125	3,986,980	Feb. 24, 1976	Oct. 19, 1976
B 569,293	4,004,149	Mar. 30, 1976	Jan. 18, 1977
B 569,501	3,999,250	Mar. 9, 1976	Dec. 28, 1976
B 569,519	3,993,133	Feb. 3, 1976	Nov. 23, 1976
B 569,646	3,985,222	Jan. 13, 1976	Oct. 12, 1976
B 569,859	3,994,160	Mar. 9, 1976	Nov. 30, 1976
B 570,172	3,987,763	Feb. 3, 1976	Oct. 26, 1976
B 570,615	3,998,570	Mar. 23, 1976	Dec. 21, 1976
B 570,862	3,991,639	Feb. 24, 1976	Nov. 16, 1976
B 570,925	4,040,802	Mar. 23, 1976	Aug. 9, 1977
B 571,219	3,991,388	Feb. 24, 1976	Nov. 9, 1976
B 571,638	4,001,244	Mar. 9, 1976	Jan. 4, 1977
B 571,659	3,995,186	Apr. 13, 1976	Nov. 30, 1976
B 572,642	3,990,715	Feb. 10, 1976	Nov. 9, 1976
B 572,726	4,015,020	Feb. 24, 1976	Mar. 29, 1977
B 573,033	3,995,224	Mar. 23, 1976	Nov. 30, 1976
B 573,114	4,014,843	Apr. 6, 1976	Mar. 29, 1977
B 573,991	4,013,704	Mar. 30, 1976	Mar. 22, 1977
B 573,994	4,000,641	Mar. 23, 1976	Jan. 4, 1977
B 574,128	3,982,961	Feb. 17, 1976	Sep. 28, 1976
B 574,616	4,000,424	Mar. 2, 1976	Dec. 28, 1976
B 574,996	3,989,718	Feb. 17, 1976	Nov. 2, 1976
B 575,583	4,000,928	Mar. 16, 1976	Jan. 4, 1977
B 575,757	3,981,170	Jan. 27, 1976	Sep. 21, 1976
B 575,761	4,013,123	Apr. 13, 1976	Mar. 22, 1977
B 575,776	4,013,124	Apr. 20, 1976	Mar. 22, 1977
B 575,851	3,985,826	Feb. 10, 1976	Oct. 12, 1976
B 576,385	4,009,498	Mar. 30, 1976	Mar. 1, 1977
B 576,859	3,991,526	Feb. 24, 1976	Nov. 16, 1976
B 576,903	3,995,032	Feb. 3, 1976	Nov. 30, 1976
B 578,447	3,982,658	Jan. 20, 1976	Sep. 28, 1976
B 579,104	3,982,081	Jan. 27, 1976	Sep. 21, 1976
B 579,116	3,986,227	Feb. 3, 1976	Oct. 19, 1976
B 579,153	4,013,745	Mar. 30, 1976	Mar. 22, 1977
B 579,806	3,995,318	Feb. 3, 1976	Nov. 30, 1976
B 580,379	4,000,796	Apr. 6, 1976	Jan. 4, 1977
B 580,826	3,988,391	Feb. 17, 1976	Oct. 26, 1976
B 580,921	3,984,054	Jan. 13, 1976	Oct. 5, 1976
B 581,564	4,036,653	Mar. 23, 1976	July 19, 1977
B 581,843	4,000,562	Mar. 16, 1976	Jan. 4, 1977
B 583,051	3,990,714	Feb. 3, 1976	Nov. 9, 1976
B 583,089	3,982,174	Jan. 27, 1976	Sep. 21, 1976
B 583,712	3,995,064	Feb. 10, 1976	Nov. 30, 1976
B 584,520	3,981,149	Jan. 27, 1976	Sep. 21, 1976
B 584,997	4,000,030	Mar. 9, 1976	Dec. 28, 1976
B 585,247	3,989,914	Feb. 3, 1976	Nov. 2, 1976
B 585,731	3,993,603	Feb. 3, 1976	Nov. 23, 1976
B 586,215	3,985,302	Jan. 20, 1976	Oct. 12, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE	DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 586,380	3,983,885	Mar. 2, 1976	Oct. 5, 1976	B 592,143	3,984,713	Jan. 27, 1976	Oct. 5, 1976
B 586,387	3,981,311	Feb. 3, 1976	Sep. 21, 1976	B 592,146	4,001,084	Mar. 2, 1976	Jan. 4, 1977
B 586,663	3,992,080	Feb. 3, 1976	Nov. 16, 1976	B 592,658	4,001,164	Mar. 23, 1976	Jan. 4, 1977
B 587,118	Re. 29,067	Mar. 2, 1976	Dec. 7, 1976	B 593,781	4,015,953	Mar. 16, 1976	Apr. 5, 1977
B 587,786	3,991,204	Feb. 17, 1976	Nov. 9, 1976	B 594,871	3,999,245	Mar. 16, 1976	Dec. 28, 1976
B 587,936	3,999,052	Mar. 23, 1976	Dec. 21, 1976	B 596,692	3,992,349	Feb. 17, 1976	Nov. 16, 1976
B 589,179	4,001,102	Mar. 23, 1976	Jan. 4, 1977	B 597,410	4,000,925	Mar. 30, 1976	Jan. 4, 1977
B 589,687	3,995,349	Mar. 23, 1976	Dec. 7, 1976	B 657,438	3,985,701	Jan. 20, 1976	Oct. 12, 1976
B 589,966	3,985,828	Feb. 17, 1976	Oct. 12, 1976	B 747,785	3,981,899	Feb. 10, 1976	Sep. 21, 1976
B 590,158	3,985,163	Feb. 10, 1976	Oct. 12, 1976	B 750,679	4,007,049	Mar. 23, 1976	Feb. 8, 1977
B 590,159	3,985,164	Feb. 3, 1976	Oct. 12, 1976	B 843,038	3,981,785	Feb. 3, 1976	Sep. 21, 1976
B 590,502	4,001,171	Mar. 23, 1976	Jan. 4, 1977	B 845,044	4,001,338	Mar. 30, 1976	Jan. 4, 1977
B 591,141	4,013,631	Mar. 23, 1976	Mar. 22, 1977	B 848,336	3,993,752	Mar. 30, 1976	Nov. 23, 1976

LIST OF DEFENSIVE PUBLICATIONS

APPLICANTS TO WHOM

DEFENSIVE PUBLICATIONS WERE ISSUED ON THE 1st DAY OF NOVEMBER, 1977

Published at the request of the applicant or owner in accordance with the Notice of Dec. 16, 1969, 869 O. G. 687.

Bailey, August V.; Boudreaux, Gordon J.; Sumrell, Gene; and Novak, Arthur F. Antimicrobial fatty ester-amides. T964,006, 11-1-77, Cl. 260-404.000.
Bailey, August V.; Boudreaux, Gordon J.; Sumrell, Gene; and Novak, Arthur F. Antimicrobial esters of aliphatic diols. T964,007, 11-1-77, Cl. 260-410.500.
Blanken, Thomas C. Adhesive compositions having a carbon black component. T964,011, 11-1-76, Cl. 428-489.000.
Boudreaux, Gordon J.: *See*—
  Bailey, August V.; Boudreaux, Gordon J.; Sumrell, Gene; and Novak, Arthur F., T964,006, Cl. 260-404.000.
  Bailey, August V.; Boudreaux, Gordon J.; Sumrell, Gene; and Novak, Arthur F., T964,007, Cl. 260-410.500.
Chiu, Te-Long; and Vora, Madhukar B. High voltage semiconductor structure. T964,009, 11-1-77, Cl. 357-23.000.
Clark, Gary T.: *See*—
  Coates, Clarence A., Jr.; and Clark, Gary T., T964,005, Cl. 8-26.000.
Coates, Clarence A., Jr.; and Clark, Gary T. Monoazo dye mixtures. T964,005, 11-1-77, Cl. 8-26.000.
Davy, L. Nevil. Time-base instability compensation apparatus for use in copy/duplication. T964,004, 11-1-77, Cl. 179-15.55T.
Ellis, Howard F.: *See*—
  Pitha, John J.; and Ellis, Howard F., T964,010, Cl. 428-210.000.
Ferwerda, Thomas Norvin. Structural integrated assembly of relatively rigid tubular members including at least one smaller such member extending through and anchored to such larger member. T964,001, 11-1-77, Cl. 52-637.000.
Hunt, William Edward. Separation member return means for use in recirculating feeders. T964,008, 11-1-77, Cl. 355-50.000.
Kuchek, Henry A. Method to purify magnesium chloride to produce a flux for molten magnesium. T964,002, 11-1-77, Cl. 75-67.00A.
Novak, Arthur F.: *See*—
  Bailey, August V.; Boudreaux, Gordon J.; Sumrell, Gene; and Novak, Arthur F., T964,006, Cl. 260-404.000.
  Bailey, August V.; Boudreaux, Gordon J.; Sumrell, Gene; and Novak, Arthur F., T964,007, Cl. 260-410.500.
Pitha, John J.; and Ellis, Howard F. Non-linear resistance overvoltage surge arrester disc with ceramic collar and method for applying. T964,010, 11-1-77, Cl. 428-210.000.
Rehrer, Wilson P. Hardenable martensitic stainless steel. T964,003, 11-1-77, Cl. 75-128.00G.
Sumrell, Gene: *See*—
  Bailey, August V.; Boudreaux, Gordon J.; Sumrell, Gene; and Novak, Arthur F., T964,006, Cl. 260-404.000.
  Bailey, August V.; Boudreaux, Gordon J.; Sumrell, Gene; and Novak, Arthur F., T964,007, Cl. 260-410.500.
Vora, Madhukar B.: *See*—
  Chiu, Te-Long; and Vora, Madhukar B., T964,009, Cl. 357-23.000.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 1st DAY OF NOVEMBER, 1977

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Bognaes, Ragnar; and Solberg, Olav, to Kvaerner Brug A/S. Tanker for liquified and/or compressed gas. Re. 29,463, Cl. 62-55.000.
Caldwell, Richard L.: *See*—
  Givens, Wyatt W.; Caldwell, Richard L.; and Mills, William R., Jr., Re. 29,466, Cl. 250-269.000.
Eli Lilly and Company: *See*—
  Johnson, Irving S., Re. 29,465, Cl. 424-180.000.
Givens, Wyatt W.; Caldwell, Richard L.; and Mills, William R., Jr., to Mobil Oil Corporation. In-situ assaying for uranium in rock formations. Re. 29,466, Cl. 250-269.000.
Howard, Colin Robert: *See*—
  Loukes, David Gordon; Maltman, William Ramsey; and Howard, Colin Robert, Re. 29,464, Cl. 65-30.00E.
Johnson, Irving S., to Eli Lilly and Company. Psoriasis treatment with mycophenolic acid. Re. 29,465, Cl. 424-180.000.
Kvaerner Brug A/S: *See*—
  Bognaes, Ragnar; and Solberg, Olav, Re. 29,463, Cl. 62-55.000.
Loukes, David Gordon; Maltman, William Ramsey; and Howard, Colin Robert, to Pilkington Brothers Limited. Manufacture of glass. Re. 29,464, Cl. 65-30.00E.
Maltman, William Ramsey: *See*—
  Loukes, David Gordon; Maltman, William Ramsey; and Howard, Colin Robert, Re. 29,464, Cl. 65-30.00E.
Mills, William R., Jr.: *See*—
  Givens, Wyatt W.; Caldwell, Richard L.; and Mills, William R., Jr., Re. 29,466, Cl. 250-269.000.
Mobil Oil Corporation: *See*—
  Givens, Wyatt W.; Caldwell, Richard L.; and Mills, William R., Jr., Re. 29,466, Cl. 250-269.000.
Pilkington Brothers Limited: *See*—
  Loukes, David Gordon; Maltman, William Ramsey; and Howard, Colin Robert, Re. 29,464, Cl. 65-30.00E.
Solberg, Olav: *See*—
  Bognaes, Ragnar; and Solberg, Olav, Re. 29,463, Cl. 62-55.000.
Tchakgarian, Rene Verazin. Luminous outdoor sign board resistant to inclement weather. Re. 29,462, Cl. 40-130.00R.

LIST OF PLANT PATENTEES

Gavello, Louis E. Escallonia (compakta) plant. 4,142, 11-1-77, Cl. 54.000.
Jackson & Perkins Co.: *See*—
  Warriner, William A., 4,139, Cl. 28.000.
Surabian, Dennis. Plum tree. 4,140, 11-1-77, Cl. 38.000.
Surabian, Dennis. Nectarine tree. 4,141, 11-1-77, Cl. 41.000.
Warriner, William A., to Jackson & Perkins Co. Rose plant. 4,139, 11-1-77, Cl. 28.000.
Williams, J. Benjamin. Rose plant. 4,138, 11-1-77, Cl. 17.000.

LIST OF DESIGN PATENTEES

ABU Aktiebolag: *See—*
Pyorret, Illmari, 246,249, Cl. D22-29.000.
Action Leathercraft, Inc.: *See—*
Ruiz, Moises O.; and Hillinger, George, 246,208, Cl. D2-27.000.
Amey, Aubrey, deceased; and by Beckner, Greta A., administratrix. Seat. 246,210. 11-1-77, Cl. D6-63.000.
Anchor Hocking Corporation: *See—*
Benes, Frank J., 246,220, Cl. D7-22.000.
Anderson, Irvin O., Jr.: *See—*
Keck, Henry C.; Morisaku, Masao; Anderson, Irvin O., Jr.; and White, William Roland, 246,212, Cl. D6-95.000.
Avolio, Donald R., to Xerox Corporation. Toner container or the like. 246,226, 11-1-77, Cl. D9-67.000.
Baker, John Geoffrey, to Baker-Martin Enterprises Limited. Lamp shade. 246,267, 11-1-77, Cl. D48-16.00R.
Baker, John Geoffrey, to Baker-Martin Enterprises Limited. Lamp shade. 246,268, 11-1-77, Cl. D48-16.00R.
Baker, John Geoffrey, to Baker-Martin Enterprises Limited. Lamp shade. 246,269, 11-1-77, Cl. D48-16.00R.
Baker, John Geoffrey, to Baker-Martin Enterprises Limited. Lamp shade. 246,270, 11-1-77, Cl. D48-16.00R.
Baker-Martin Enterprises Limited: *See—*
Baker, John Geoffrey, 246,267, Cl. D48-16.00R.
Baker, John Geoffrey, 246,268, Cl. D48-16.00R.
Baker, John Geoffrey, 246,269, Cl. D48-16.00R.
Baker, John Geoffrey, 246,270, Cl. D48-16.00R.
Baldwin, Robley H. Recreational vehicle sewer coupling. 246,250, 11-1-77, Cl. D23-43.000.
Ballone, Michael: *See—*
Current, Wayne Allen; and Ballone, Michael, 246,244, Cl. D15-66.000.
Beckner, Greta A., administratrix: *See—*
Amey, Aubrey, deceased; and Beckner, Greta A., administratrix, 246,210, Cl. D6-63.000.
Bellini, Mario, to Nippon Gakki Seizo Kabushiki Kaisha. Headphone. 246,242, 11-1-77, Cl. D14-36.000.
Benes, Frank J., to Anchor Hocking Corporation. Compote dish or similar article. 246,220, 11-1-77, Cl. D7-22.000.
Boas, Donald P., to Florida Cycle Supply Company. Automobile luggage rack. 246,238, 11-1-77, Cl. D12-157.000.
Brandt, Michael W. Spout opening tool. 246,222, 11-1-77, Cl. D8-40.000.
Brubaker, Max C., to Vaughn Bassett Furniture Company. Dresser. 246,214, 11-1-77, Cl. D6-154.000.
Bulova Watch Company, Inc.: *See—*
Sagarino, Robert F., 246,230, Cl. D10-38.000.
Burgell, Glen D. Belt buckle. 246,209, 11-1-77, Cl. D2-427.000.
Carlson, Arthur E.: *See—*
Whitley, Warwick M.; and Carlson, Arthur E., 246,234, Cl. D12-62.000.
Cernevski, Herman. Jewelry finding. 246,231, 11-1-77, Cl. D11-1.000.
Chase, David O.: *See—*
Riley, Harry E.; and Chase, David O., 246,215, Cl. D6-156.000.
Conroy, Inc.: *See—*
Whitley, Warwick M.; and Carlson, Arthur E., 246,234, Cl. D12-62.000.
Cox, John Patrick Anthony, to P. C Cox (Mastic Appliances) Limited. Mastic dispensing gun. 246,221, 11-1-77, Cl. D8-14.100.
Current, Wayne Allen; and Ballone, Michael, to Singer Company, The. Circular knitting machine. 246,244, 11-7-75, Cl. D15-66.000.
Dee, Edward. Combined confection and holder. 246,206, 11-1-77, Cl. D1-22.000.
Dee, Edward. Combined rotatable confection and handle. 246,207, 11-1-77, Cl. D1-22.000.
Doerner, Frank. Chair control unit. 246,217, 11-1-77, Cl. D6-191.000.
Douglas, Thomas E., to Rubbermaid Industrial Products Corporation. Shipping drum or the like. 246,227, 11-1-77, Cl. D9-170.000.
Dyrup, Sven Erik, to Trelleborgs Gummifabriks Aktiebolag. Lathlike element for sieves. 246,247, 11-1-77, Cl. D15-147.000.
Eastman Kodak Company: *See—*
Hansen, David E., 246,240, Cl. D13-8.000.
Ekert, Roland. Infusion pump. 246,258, 11-1-77, Cl. D24-8.000.
Elektro-Warme Technik, Firma: *See—*
Schade, Hans-Ulrich, 246,252, Cl. D23-122.000.
Schade, Hans-Ulrich, 246,253, Cl. D23-122.000.
Schade, Hans-Ulrich, 246,254, Cl. D23-122.000.
Evolution Health Care Company: *See—*
Keck, Henry C.; Morisaku, Masao; Anderson, Irvin O., Jr.; and White, William Roland, 246,212, Cl. D6-95.000.
Fiat Motors of North America: *See—*
Kozloski, Edward A., 246,239, Cl. D12-209.000.
Florida Cycle Supply Company: *See—*
Boas, Donald P., 246,238, Cl. D12-157.000.
Forrester, Lynne. Hair color applicator. 246,260, 11-1-77, Cl. D28-7.000.
Gill, Harnek S.; and Kaebitzsch, Johannes W. Commercial food cooking device. 246,245, 11-7-77, Cl. D15-104.000.
Goodman, Arnold Z. Shirt hanger or similar article. 246,218, 11-1-77, Cl. D6-247.000.
Hansen, David E., to Eastman Kodak Company. Rechargeable power pack. 246,240, 11-1-77, Cl. D13-8.000.
Harbaugh, Theodore H.; and Malone, Robert C., to Owens-Illinois, Inc. Beverage glass or similar article. 246,219, 11-1-77, Cl. D7-13.000.
Hasagawa, Mitsuhiro: *See—*
Nishimura, Yasutake; and Hasagawa, Mitsuhiro, 246,259, Cl. D14-36.000.
Hasegawa, Satashi; and Tsukuda, Mitsuo. Game board. 246,264, 11-1-77, Cl. D34-5.0SS.
Hauser, Hans: *See—*
Violet, Jon A.; and Hauser, Hans, 246,243, Cl. D15-19.000.
Hawkins, Donald B. Vent lock. 246,224, 11-1-77, Cl. D8-341.000.
Hayashi Cutlery Co., Ltd.: *See—*
Hayashi, Toru, 246,223, Cl. D8-55.000.
Hayashi, Toru, to Hayashi Cutlery Co., Ltd. Kitchen scissors. 246,223, 11-1-77, Cl. D8-55.000.
Hetherington, Susan Kaye. Artificial flower. 246,232, 11-1-77, Cl. D11-117.000.
Hetherington, Susan Kaye. Artificial flower. 246,233, 11-1-77, Cl. D11-117.000.
Heumann, Jules M., to Metropolitan Furniture Manufacturing Company. Table. 246,216, 11-1-77, Cl. D6-175.000.
Hillinger, George: *See—*
Ruiz, Moises O.; and Hillinger, George, 246,208, Cl. D2-27.000.
Hirsch, Elder F.; and Hirsch, Ronald F. Vacuum breaker for valve stem packing. 246,251, 11-1-77, Cl. D23-47.000.
Hirsch, Ronald F.: *See—*
Hirsch, Elder F.; and Hirsch, Ronald F., 246,251, Cl. D23-47.000.
Hoy, David E. Combined collapsible tube and cap assembly. 246,228, 11-1-77, Cl. D9-194.000.
J. B. Foote Foundry Co., The: *See—*
Violet, Jon A.; and Hauser, Hans, 246,243, Cl. D15-19.000.
Jacobs, David A., to JDS Products, Inc. Combination plug and power cut-off unit. 246,241, 11-1-77, Cl. D13-28.000.
JDS Products, Inc.: *See—*
Jacobs, David A., 246,241, Cl. D13-28.000.
Jokari/US, Inc.: *See—*
Spivey, Lindsey G., II, 246,263, Cl. D34-5.0SP.
Kabushiki Kaisha Izumi Seisakusho: *See—*
Ono, Toru, 246,225, Cl. D8-397.000.
Kaebitzsch, Johannes W.: *See—*
Gill, Harnek S.; and Kaebitzsch, Johannes W., 246,245, Cl. D15-104.000.
Keck, Henry C.; Morisaku, Masao; Anderson, Irvin O., Jr.; and White, William Roland, to Evolution Health Care Company. Housing for a dispenser for liquid soap or the like. 246,212, 11-1-77, Cl. D6-95.000.
Kozloski, Edward A., to Fiat Motors of North America. Wheel. 246,239, 11-1-77, Cl. D12-209.000.
Krapowicz, Jacob Anthony, to Sperry Rand Corporation. Electric dry shaver. 246,261, 11-1-77, Cl. D28-49.000.
Litton Industrial Products, Inc.: *See—*
Ruggiero, Ralph S., 246,213, Cl. D6-130.000.
Livingston, David T., to Reinell Boats, Inc. Motor boat. 246,235, 11-1-77, Cl. D12-66.000.
Livingston, David T., to Reinell Boats, Inc. Motor boat. 246,236, 11-1-77, Cl. D12-66.000.
Malone, Robert C.: *See—*
Harbaugh, Theodore H.; and Malone, Robert C., 246,219, Cl. D7-13.000.
Matsushita Electric Industrial Co., Ltd.: *See—*
Nishimura, Yasutake; and Hasagawa, Mitsuhiro, 246,259, Cl. D14-36.000.
McIntosh, Dian. Gameboard. 246,266, 11-1-77, Cl. D34-5.0SS.
Metropolitan Furniture Manufacturing Company: *See—*
Heumann, Jules M., 246,216, Cl. D6-175.000.
Morisaku, Masao: *See—*
Keck, Henry C.; Morisaku, Masao; Anderson, Irvin O., Jr.; and White, William Roland, 246,212, Cl. D6-95.000.
Murrill, Jack C. Electric car. 246,237, 11-1-77, Cl. D12-92.000.
National Steel Corporation: *See—*
Saunders, William T., 246,229, Cl. D9-218.000.
Nippon Gakki Seizo Kabushiki Kaisha: *See—*
Bellini, Mario, 246,242, Cl. D14-36.000.
Nishimura, Yasutake; and Hasagawa, Mitsuhiro, to Matsushita Electric Industrial Co., Ltd. Head phone. 246,259, 11-1-77, Cl. D14-36.000.
Nothdurft, Carl. Fishing lure. 246,248, 11-1-77, Cl. D22-27.000.
Ono, Toru, to Kabushiki Kaisha Izumi Seisakusho. Nut. 246,225, 11-1-77, Cl. D8-397.000.
Owens-Illincis, Inc.: *See—*
Harbaugh, Theodore H.; and Malone, Robert C., 246,219, Cl. D7-13.000.
P. C. Cox (Mastic Appliances) Limited: *See—*
Cox, John Patrick Anthony, 246,221, Cl. D8-14.100.
Pelton & Crane Company: *See—*
Truette, Danny Michael, 246,255, Cl. D24-4.000.
Truette, Danny Michael, 246,256, Cl. D24-4.000.
Truette, Danny Michael, 246,257, Cl. D24-4.000.
Pyorret, Illmari, to ABU Aktiebolag. Fishing lure. 246,249, 11-1-77, Cl. D22-29.000.
Reinell Boats, Inc.: *See—*
Livingston, David T., 246,235, Cl. D12-66.000.
Livingston, David T., 246,236, Cl. D12-66.000.
Riley, Harry E.; and Chase, David O. Drafting table. 246,215, 11-1-77, Cl. D6-156.000.

Rubbermaid Industrial Products Corporation: *See—*
Douglas, Thomas E., 246,227, Cl. D9-170.000.
Ruggiero, Ralph S., to Litton Industrial Products, Inc. Double decker dispenser. 246,213, 11-1-77, Cl. D6-130.000.
Ruiz, Moises O.; and Hillinger, George, to Action Leathercraft, Inc. Roofer's pad. 246,208, 11-1-77, Cl. D2-27.000.
Sagarino, Robert F., to Bulova Watch Company, Inc. Electronic digital wristwatch case. 246,230, 11-1-77, Cl. D10-38.000.
Saunders, William T., to National Steel Corporation. Seam-free can body. 246,229, 11-1-77, Cl. D9-218.000.
Schade, Hans-Ulrich, to Elektro-Warme Technik, Firma. Heater. 246,252, 11-1-77, Cl. D23-122.000.
Schade, Hans-Ulrich, to Elektro-Warme Technik, Firma. Heater. 246,253, 11-1-77, Cl. D23-122.000.
Schade, Hans-Ulrich, to Elektro-Warme Technik, Firma. Heater. 246,254, 11-1-77, Cl. D23-122.000.
Shaffer, Myron W., to Thermo Seal, Inc. Laminating apparatus. 246,246, 11-1-77, Cl. D15-146.000.
Singer Company, The: *See—*
Current, Wayne Allen; and Ballone, Michael, 246,244, Cl. D15-66.000.
Sperry Rand Corporation: *See—*
Krapowicz, Jacob Anthony, 246,261, Cl. D28-49.000.
Spivey, Lindsey G., II, to Jokari/US, Inc. Game paddle. 246,263, 11-1-77, Cl. D34-5.0SP.
Sullivan, Charles Wayne. Calculator support stand. 246,211, 11-1-77, Cl. D6-85.000.
Thermo Seal, Inc.: *See—*
Shaffer, Myron W., 246,246, Cl. D15-146.000.
Trelleborgs Gummifabriks Aktiebolag: *See—*
Dyrup, Sven Erik, 246,247, Cl. D15-147.000.
Truette, Danny Michael, to Pelton & Crane Company. Dental console. 246,255, 11-1-77, Cl. D24-4.000.
Truette, Danny Michael, to Pelton & Crane Company. Dental console. 246,256, 11-1-77, Cl. D24-4.000.
Truette, Danny Michael, to Pelton & Crane Company. Dental console. 246,257, 11-1-77, Cl. D24-4.000.
Tsukuda, Mitsuo: *See—*
Hasegawa, Satashi; and Tsukuda, Mitsuo, 246,264, Cl. D34-5.0SS.
Vaughn Bassett Furniture Company: *See—*
Brubaker, Max C., 246,214, Cl. D6-154.000.
Violet, Jon A.; and Hauser, Hans, to J. B. Foote Foundry Co., The. Portable cement mixer. 246,243, 11-1-77, Cl. D15-19.000.
White, William Roland: *See—*
Keck, Henry C.; Morisaku, Masao; Anderson, Irvin O., Jr.; and White, William Roland, 246,212, Cl. D6-95.000.
Whitley, Warwick M.; and Carlson, Arthur E., to Conroy, Inc. Boats. 246,234, 11-1-77, Cl. D12-62.000.
Wood, Jack Warren. Game board. 246,265, 11-1-77, Cl. D34-5.0SS.
Xerox Corporation: *See—*
Avolio, Donald R., 246,226, Cl. D9-67.000.
Zupo, Ralph A. Combined aquarium and stand. 246,262, 11-1-77, Cl. D30-8.000.

CLASSIFICATION OF PATENTS

ISSUED NOVEMBER 1, 1977

NOTE.—First number, class; second number, subclass; third number, patent number

CLASS 2

84	4,055,852
93	4,055,853
105	4,055,854
114	4,055,855
192	4,055,856
197	4,055,857
240	4,055,858
243 R	4,055,859
416	4,055,860

CLASS 3

1.5	4,055,861
1.91	4,055,862

CLASS 4

173 R	4,055,863
253	4,055,864

CLASS 5

259 R	4,055,865
367	4,055,866
371	4,055,867

CLASS 8

2.5 A	4,056,352
14	4,056,353
54	4,056,354
137	4,056,355
150	4,055,868
168 C	4,056,356

CLASS 10

25	4,055,869

CLASS 13

23	4,056,677
25	4,056,678

CLASS 15

409	4,055,870

CLASS 16

86 A	4,055,871

CLASS 17

25	4,055,872

CLASS 23

230 B	4,056,357
253 R	4,056,358
259	4,056,359
	4,056,360
	4,056,361
260	4,056,362
270 R	4,056,363
273 R	4,056,364

CLASS 24

3 C	4,055,873
67.3	4,055,874
115 R	4,055,875
205.14 R	4,055,876

CLASS 29

25.16	4,055,877
25.35	4,055,878
123	4,055,879
267	4,055,880
401 A	4,055,881
410	4,055,882
427	4,055,883
571	4,055,884
578	4,055,885
593	4,055,886
599	4,055,887
622	4,055,888
653	4,056,366
710	4,055,889

CLASS 30

240	4,055,890
250	4,055,891
303	4,055,892
392	4,055,893
394	4,055,894

CLASS 32

14 B	4,055,895
19	4,055,896
59	4,055,897

CLASS 33

126.4 R	4,055,898
193	4,055,899
200	4,055,900
324	4,055,901
356	4,055,902

CLASS 34

12	4,055,903
45	4,055,904

CLASS 35

5	4,055,905
9 A	4,055,906
9 R	4,055,907
35 R	4,055,908

CLASS 40

124.2	4,055,909
130 R	Re.29,462
155	4,055,910

CLASS 43

55	4,055,911

CLASS 44

59	4,056,367

CLASS 46

25	4,055,912
143	4,055,913
192	4,055,914

CLASS 47

58	4,055,915

CLASS 49

404	4,055,916
469	4,055,917

CLASS 51

47	4,055,918
334	4,055,919

CLASS 52

2	4,055,920
61	4,055,921
169.7	4,055,922
235	4,055,923
262	4,055,924
403	4,055,925
475	4,055,926
577	4,055,927
612	4,055,928
705	4,055,929
717	4,055,930

CLASS 53

22 B	4,055,931
63	4,055,932
187	4,055,933
198 B	4,055,934
247	4,055,943

CLASS 55

2	4,056,368
58	4,056,369
68	4,056,370
90	4,056,371
152	4,056,372
158	4,056,373
377	4,056,374
381	4,056,375
497	4,056,376

CLASS 56

10.3	4,055,935

CLASS 57

34 R	4,055,936
	4,055,937
58.89	4,055,938
62	4,055,939
77.4	4,055,940
149	4,055,941
156	4,055,942

CLASS 58

85.5	4,055,945
115	4,055,944

CLASS 60

204	4,055,946
221	4,055,947
269	4,055,949
398	4,055,950
514	4,055,951
517	4,055,952
526	4,055,953
527	4,055,954
	4,055,955
	4,055,956
535	4,055,957
641	4,055,948

CLASS 61

41 R	4,055,958
85	4,055,959

CLASS 62

6	4,055,960
54	4,055,961
55	Re.29,463
102	4,055,962
238	4,055,963
	4,055,964
324	4,055,965

CLASS 63

37	4,056,766

CLASS 64

13	4,055,966
28 R	4,055,967

CLASS 65

4 A	4,056,377
18	4,056,378
30 E	Re.29,464
106	4,056,379

CLASS 66

151	4,055,968
204	4,055,969

CLASS 68

5 E	4,055,970
9	4,055,971

CLASS 70

21	4,055,972
58	4,055,973

CLASS 71

9	4,056,380
11	4,055,974
36	4,056,381
66	4,056,382
90	4,056,383
92	4,056,384
111	4,056,385

CLASS 72

42	4,055,975
83	4,055,976
84	4,055,977
254	4,055,978
262	4,055,979
410	4,055,980
415	4,055,981

CLASS 73

15 B	4,055,982
37.5	4,055,983
40.7	4,055,984
49.2	4,055,985
61 R	4,055,986
61.1 C	4,055,987
73	4,055,991
88 B	4,055,992
116	4,055,993
	4,055,994
	4,055,995
117	4,055,996
117.3	4,055,997
119 R	4,055,998
145	4,055,999
151	4,056,004
170 R	4,056,000
189	4,056,001
194 F	4,056,003
194 R	4,056,002
339 R	4,056,005
	4,056,006
343 R	4,056,007
398 AR	4,056,008
406	4,056,009
432 R	4,056,010
588	4,055,989
620	4,055,988
623	4,055,990

CLASS 74

50	4,056,011
81	4,056,012
217 B	4,056,013
230.17 F	4,056,015
230.4	4,056,014
231 J	4,056,016
522	4,056,017
665 P	4,056,018
677	4,056,019

CLASS 75

0.5 BA	4,056,386
123 F	4,056,387
129	4,056,388
171	4,056,389

CLASS 81

177 A	4,056,020

CLASS 83

4	4,056,021
62	4,056,022
155	4,056,023
210	4,056,024
261	4,056,025
454	4,056,026
455	4,056,027
575	4,056,029
745	4,056,028
762	4,056,030
794	4,056,031

CLASS 84

1.01	4,056,032
1.24	4,056,033
267	4,056,034

CLASS 85

8.9	4,056,035
63	4,056,036
74	4,056,037

CLASS 89

128	4,056,038

CLASS 90

92	4,056,039

CLASS 91

25	4,056,040
375 R	4,056,041
497	4,056,042

CLASS 92

13.2	4,056,043
159	4,056,044

CLASS 93

35 SB	4,056,045
49 M	4,056,047
49 R	4,056,046

CLASS 96

1 PC	4,056,391
1 TE	4,056,390
3	4,056,392
27 H	4,056,393
29 D	4,056,394
36	4,056,395
67	4,056,396
77	4,056,397

CLASS 98

41 R	4,056,048
105	4,056,049

CLASS 99

305	4,056,050
516	4,056,051

CLASS 100

39	4,056,052
218	4,056,053

CLASS 101

45	4,056,054
128.1	4,056,055
152	4,056,056
382 MV	4,056,057

CLASS 102

16	4,056,058
22 R	4,056,059
52	4,056,060
70.2 P	4,056,061
86.5	4,056,062

CLASS 104

88	4,056,063
93	4,056,064

CLASS 105

199 C	4,056,065
493	4,056,066

CLASS 106

65	4,056,398
69	4,056,399
162	4,056,400
277	4,056,401
308 Q	4,056,402

CLASS 108

101	4,056,067

CLASS 110

7 R	4,056,069
8 A	4,056,068

CLASS 112

158 B	4,056,070
237	4,056,071

CLASS 114

109	4,056,072
151	4,056,073
280	4,056,074

CLASS 118

7	4,056,075
653	4,056,076

CLASS 119

14.08	4,056,077
158	4,056,078

CLASS 122

476	4,056,079

CLASS 123

23	4,056,080
75 B	4,056,081
103 R	4,056,082
119 A	4,056,083
	4,056,084
119 B	4,056,085
122 R	4,056,086
127	4,056,087
148 E	4,056,088
198 B	4,056,089

CLASS 126

121	4,056,091
271	4,056,090
	4,056,092
	4,056,093
	4,056,094

CLASS 128

1 R	4,056,095
1.1	4,056,096
1.5	4,056,097
142 R	4,056,098
145.6	4,056,099
214 C	4,056,100
214 D	4,056,101
218 F	4,056,102
285	4,056,103
351	4,056,104
419 PG	4,056,105
583	4,056,106

CLASS 130

27 R	4,056,107

CLASS 131

17 R	4,056,108

CLASS 132

40	4,056,109
84 R	4,056,110
88.7	4,056,111

CLASS 134

6	4,056,112
22 R	4,056,403
40	4,056,113
104	4,056,114

CLASS 135

67	4,056,115

CLASS 136

89 PC	4,056,404
	4,056,405
208	4,056,406
232	4,056,407

CLASS 137

68 R	4,056,116
	4,056,117
201	4,056,118
315	4,056,119
493.9	4,056,120
541	4,056,121
563	4,056,122
624.14	4,056,123
625.17	4,056,124
625.3	4,056,125
625.65	4,056,126

CLASS 138

30	4,056,127

CLASS 140

93.4	4,056,128

CLASS 141

24	4,056,129
67	4,056,130
206	4,056,131
285	4,056,132
301	4,056,133
392	4,056,234

CLASS 144

2 Z	4,056,134
	4,056,135
134 D	4,056,136
323	4,056,137

CLASS 148

1.5	4,056,408
6.15 R	4,056,409
105	4,056,410
121	4,056,411
153	4,056,412
175	4,056,413
	4,056,414
187	4,056,415

CLASS 149

19.91	4,056,416

CLASS 150

.5	4,056,138
39	4,056,139

CLASS 156

64	4,056,417
145	4,056,418
164	4,056,419
181	4,056,420
272	4,056,421
309	4,056,422
356	4,056,423
384	4,056,424
499	4,056,425
505	4,056,426
580	4,056,427
642	4,056,428

CLASS 162

17	4,056,429
76	4,056,430
165	4,056,431
168 NA	4,056,432
290	4,056,433

CLASS 164

4	4,056,140

CLASS 165

9	4,056,141
133	4,056,142
176	4,056,143

CLASS 166

85	4,056,144
212	4,056,145
300	4,056,146

Class	Subclass	Patent No.
CLASS 172	68	4,056,147
	311	4,056,148
		4,056,149
CLASS 173	127	4,056,150
	141	4,056,151
CLASS 174	13	4,056,679
	19	4,056,680
	35 GC	4,056,682
	52 FP	4,056,681
CLASS 175	330	4,056,152
	376	4,056,153
	416	4,056,154
CLASS 176	19 R	4,056,434
	30	4,056,435
	38	4,056,436
	40	4,056,437
	50	4,056,438
	65	4,056,439
	78	4,056,440
		4,056,441
CLASS 177	145	4,056,155
	209	4,056,156
CLASS 179	1 AT	4,056,683
	5 R	4,056,684
	15 BL	4,056,686
	15 BT	4,056,685
	16 F	4,056,687
		4,056,688
		4,056,689
	17 A	4,056,690
	18 FA	4,056,691
	84 R	4,056,693
		4,056,694
	84 VF	4,056,692
	99	4,056,695
	100 R	4,056,696
	115.5 PV	4,056,697
	175.2 C	4,056,698
CLASS 180	6.48	4,056,158
	105 E	4,056,157
	120	4,056,159
	143	4,056,160
CLASS 181	113	4,056,163
	114	4,056,164
	141	4,056,165
	290	4,056,161
CLASS 182	5	4,056,166
	10	4,056,167
CLASS 184	6.24	4,056,168
CLASS 187	29 R	4,056,169
	52 R	4,056,162
	95	4,056,170
CLASS 188	18 A	4,056,171
	26	4,056,172
	71.9	4,056,173
	73.5	4,056,174
	196 BA	4,056,175
CLASS 192	4 A	4,056,176
	58 B	4,056,178
	032	4,056,177
	106.2	4,056,179
CLASS 193	35 J	4,056,180
CLASS 194	10	4,056,181
CLASS 195	62	4,056,442
CLASS 197	1 R	4,056,182
		4,056,183
CLASS 198	339	4,056,186
	394	4,056,187
	465	4,056,188
	471	4,056,184
	484	4,056,185
	514	4,056,189
CLASS 200	5 A	4,056,699
	159 R	4,056,700
	314	4,056,701
CLASS 201	5	4,056,443
CLASS 203	26	4,056,444
CLASS 204	1 T	4,056,445
		4,056,446
	98	4,056,447
		4,056,448
	106	4,056,449
	159.23	4,056,453
	163 R	4,056,454
		4,056,455
	165	4,056,456
	192 SP	4,056,457
	201	4,056,450
	258	4,056,452
	263	4,056,458
	286	4,056,459
	305	4,056,451
CLASS 206	349	4,056,190
	629	4,056,191
CLASS 208	8	4,056,460
	11 R	4,056,461
	308	4,056,462
CLASS 209	111.7 R	4,056,463
	425	4,056,464
CLASS 210	7	4,056,465
	10	4,056,466
	23 F	4,056,467
	31 R	4,056,468
	62	4,056,469
	94	4,056,470
	186	4,056,471
	242 S	4,056,472
	331	4,056,473
	390	4,056,474
	402	4,056,475
	446	4,056,476
	522	4,056,477
CLASS 211	13	4,056,192
	51	4,056,193
	131	4,056,194
	153	4,056,195
	207	4,056,196
CLASS 214	1 BC	4,056,197
		4,056,198
	6 BA	4,056,199
	7	4,056,200
	16.4 A	4,056,201
	17 C	4,056,202
	75 T	4,056,203
	83.3	4,056,204
	145 R	4,056,205
	302	4,056,206
	652	4,056,207
CLASS 215	12 R	4,056,208
	215	4,056,209
CLASS 219	69 C	4,056,702
	71	4,056,703
	121 P	4,056,704
	125 R	4,056,705
	216	4,056,706
	302	4,056,707
	499	4,056,708
CLASS 220	4 E	4,056,235
	9 G	4,056,211
	90.4	4,056,210
	244	4,056,212
CLASS 222	95	4,056,213
	231	4,056,215
	385	4,056,216
	600	4,056,217
	608	4,056,214
CLASS 224	2 C	4,056,218
	36	4,056,219
	42.45 R	4,056,220
CLASS 229	14 BL	4,056,221
	15	4,056,222
	32	4,056,223
CLASS 233	14 R	4,056,224
	20 R	4,056,225
CLASS 235	30 R	4,056,709
	437	4,056,710
	440	4,056,712
CLASS 239	172	4,056,226
	227	4,056,227
	274	4,056,228
	288	4,056,229
CLASS 241	15	4,056,230
	23	4,056,231
	39	4,056,233
	194	4,056,232
CLASS 242	18 DD	4,056,236
	18 PW	4,056,237
	25 R	4,056,238
	47.01	4,056,239
	47.09	4,056,240
	86.4	4,056,241
	107.4 R	4,056,242
	128	4,056,243
	197	4,056,244
		4,056,245
	219	4,056,246
CLASS 244	110 C	4,056,247
	137 R	4,056,248
CLASS 248	9	4,056,249
	14	4,056,250
	19	4,056,251
	56	4,056,252
	479	4,056,253
CLASS 249	210	4,056,254
CLASS 250	199	4,056,719
	203 R	4,056,720
	213 VT	4,056,721
	231 SE	4,056,722
	269	Re.29,466
	324	4,056,723
	328	4,056,724
	336	4,056,725
	370	4,056,726
	385	4,056,727
	396 R	4,056,728
	472	4,056,729
	492 R	4,056,730
	556	4,056,731
CLASS 251	129	4,056,255
CLASS 252	12.4	4,056,478
	18	4,056,479
	78.5	4,056,480
	140	4,056,481
	301.1 W	4,056,482
	373	4,056,483
	408	4,056,484
		4,056,485
	417	4,056,486
	435	4,056,487
	449	4,056,488
	462	4,056,489
	468	4,056,490
	557	4,056,491
CLASS 254	106	4,056,256
	194	4,056,257
CLASS 260	18 S	4,056,492
	22 A	4,056,494
	22 CA	4,056,495
	22 TN	4,056,493
	23 H	4,056,499
	23.7 C	4,056,498
	29.6 MN	4,056,500
	29.6 N	4,056,502
	29.6 SQ	4,056,501
	29.6 T	4,056,503
	29.6 TA	4,056,496
		4,056,497
	37 PC	4,056,504
	42.18	4,056,505
		4,056,506
	45.75 B	4,056,508
	45.8 N	4,056,507
	46.5 G	4,056,561
	47 EP	4,056,510
	49	4,056,511
	59 R	4,056,512
	62	4,056,513
	75 R	4,056,514
	79.1	4,056,515
	79.3 M	4,056,516
		4,056,517
	112.5 R	4,056,519
		4,056,520
	203	4,056,522
	205	4,056,523
	239 BD	4,056,525
	239 BF	4,056,524
	239.1	4,056,521
	250 Q	4,056,528
	251 A	4,056,529
	267	4,056,530
	268 PL	4,056,531
	296 R	4,056,532
	314.5	4,056,534
	326.14 R	4,056,539
	326.2	4,056,535
	326.5 B	4,056,536
		4,056,537
		4,056,538
	340.3	4,056,540
	343	4,056,541
	346.3	4,056,542
	348.59	4,056,543
	378	4,056,544
	410	4,056,545
	448.8 R	4,056,546
	453 P	4,056,547
	455 A	4,056,549
	455 R	4,056,548
	465 D	4,056,550
		4,056,560
	465 G	4,056,509
	512 C	4,056,564
	535 P	4,056,567
	543 H	4,056,568
	558 S	4,056,569
	561 N	4,056,565
	562 B	4,056,570
	583 E	4,056,571
	624 R	4,056,572
	631.5	4,056,573
	654 R	4,056,574
	673.5	4,056,575
	683.3	4,056,576
	683.47	4,056,578
	683.48	4,056,577
	830 P	4,056,579
	881	4,056,580
	972	4,056,581
CLASS 261	30	4,056,582
	36 A	4,056,583
CLASS 264	.5	4,056,584
	19	4,056,585
	44	4,056,586
	46.3	4,056,595
	53	4,056,587
	63	4,056,588
	65	4,056,589
	89	4,056,590
	108	4,056,591
	141	4,056,592
	145	4,056,593
	166	4,056,596
	169	4,056,597
	176 R	4,056,594
	184	4,056,598
CLASS 266	101	4,056,261
	138	4,056,262
CLASS 271	3	4,056,263
	177	4,056,264
CLASS 272	70	4,056,265
CLASS 273	9	4,056,266
	72 A	4,056,267
	118 R	4,056,268
	218	4,056,269
CLASS 280	166	4,056,270
	745	4,056,271
CLASS 285	140	4,056,272
	337	4,056,273
CLASS 292	17	4,056,275
	201	4,056,276
	341.16	4,056,277
CLASS 294	19 R	4,056,278
CLASS 296	1 S	4,056,279
	137 G	4,056,274
	146	4,056,280
CLASS 297	220	4,056,281
	389	4,056,282
CLASS 298	17.6	4,056,283
CLASS 299	64	4,056,284
CLASS 301	8	4,056,285
CLASS 303	20	4,056,286
	91	4,056,287
CLASS 305	34	4,056,288
	47	4,056,289
CLASS 307	33	4,056,732
	88.3	4,056,290
	115	4,056,733
	254	4,056,734
	273	4,056,735
	289	4,056,736
	304	4,056,737
	359	4,056,738
	360	4,056,739
	362	4,056,740
CLASS 308	189 R	4,056,291
	206	4,056,292
	217	4,056,293
CLASS 310	21	4,056,743
	51	4,056,744
	52	4,056,745
	115	4,056,746
	155	4,056,747
	168	4,056,748
	239	4,056,749
	322	4,056,741
	357	4,056,742
CLASS 312	30	4,056,294
	107	4,056,295
	184	4,056,296
CLASS 313	177	4,056,750
	217	4,056,751
		4,056,752
	325	4,056,753
	390	4,056,754
	402	4,056,755
CLASS 315	39.69	4,056,756
	86	4,056,757
	381	4,056,758
CLASS 318	98	4,056,759
	115	4,056,760
	116	4,056,761
	484	4,056,762
	675	4,056,763
CLASS 320	3	4,056,764
	48	4,056,765
CLASS 324	54	4,056,771
	72	4,056,772
	73 PC	4,056,773
	142	4,056,774
		4,056,775
	158 P	4,056,777
	158 SC	4,056,776
	166	4,056,778
	205	4,056,770
	236	4,056,769
CLASS 325	4	4,056,779
	5	4,056,780
	55	4,056,781
	313	4,056,782
CLASS 330	53	4,056,785
	207 A	4,056,786
	268	4,056,783
	287	4,056,784
CLASS 331	59	4,056,787
	78	4,056,788
	94.5 G	4,056,789
CLASS 333	5	4,056,790
	18	4,056,791
	31 R	4,056,792
	72	4,056,793
CLASS 334	15	4,056,794
		4,056,795
	55	4,056,796
CLASS 335	6	4,056,797
	16	4,056,798
	277	4,056,799
	296	4,056,800
CLASS 339	23	4,056,297
	90 R	4,056,298
	95 D	4,056,299
	103 R	4,056,300
	263 R	4,056,301
	275 B	4,056,302
CLASS 340	2	4,056,801
	3 R	4,056,802
	15	4,056,803
	146.3 J	4,056,804
	148	4,056,805
	166 EL	4,056,806
	166 R	4,056,807
	171 PF	4,056,808
	224	4,056,815
	253 A	4,056,816
	253 Y	4,056,817
	309.4	4,056,818
	347 C	4,056,820
	347 DD	4,056,819
CLASS 346	76 R	4,056,822
		4,056,823
CLASS 350	36	4,056,303
	96 C	4,056,305
	96 WG	4,056,304
	160 LC	4,056,306
	181	4,056,307
	184	4,056,308
	310	4,056,309
CLASS 351	6	4,056,310
	169	4,056,311
CLASS 352	90	4,056,312
CLASS 353	3	4,056,313
CLASS 354	300	4,056,824
CLASS 355	10	4,056,314
		4,056,315
	22	4,056,316
	32	4,056,317
	45	4,056,318
	68	4,056,319
	75	4,056,320
	99	4,056,321
CLASS 356	106 R	4,056,323
	246	4,056,324
CLASS 357	23	4,056,825
CLASS 358	19	4,056,826
	87	4,056,827
	133	4,056,828
	256	4,056,829
CLASS 360	51	4,056,830
	77	4,056,831
		4,056,832
	85	4,056,833
		4,056,834
	105	4,056,835
	106	4,056,518

Class	Subclass	Patent No.
CLASS 361	4	4,056,836
	45	4,056,837
	68	4,056,838
		4,056,839
	124	4,056,840
	203	4,056,841
	293	4,056,842
CLASS 362	306	4,056,718
CLASS 363	79	4,056,768
	141	4,056,767
CLASS 364	111	4,056,714
	200	4,056,711
		4,056,809
		4,056,843
		4,056,844
		4,056,845
		4,056,846
		4,056,847
		4,056,848
	510	4,056,717
	514	4,056,715
	515	4,056,716
	521	4,056,713
	900	4,056,821
		4,056,849
		4,056,850
		4,056,851
CLASS 365	8 TF	4,056,814
	12	4,056,813
	17	4,056,812
	189	4,056,811
	205	4,056,810
CLASS 366	15	4,056,259
	144	4,056,260
	160	4,056,258
CLASS 401	65	4,056,325
CLASS 402	30	4,056,326
CLASS 403	172	4,056,327
CLASS 404	96	4,056,328
CLASS 408	6	4,056,329
CLASS 415	1	4,056,330
	15	4,056,331
CLASS 416	97 A	4,056,332
CLASS 417	44	4,056,333
	189	4,056,334
	431	4,056,335
CLASS 418	51	4,056,336
	119	4,056,338
	131	4,056,337
	178	4,056,339
CLASS 423		4,056,599
	239	4,056,600
	322	4,056,601
	345	4,056,602
	359	4,056,603
	483	4,056,604
	484	4,056,605
	575	4,056,606
	579	4,056,607
CLASS 424	1	4,056,608
		4,056,609
	32	4,056,610
	62	4,056,611
	76	4,056,612
	94	4,056,613
	105	4,056,614
	120	4,056,615
	180	Re.29,465
		4,056,616
	200	4,056,617
	246	4,056,618
	263	4,056,619
	270	4,056,620
	273 R	4,056,621
		4,056,622
	274	4,056,623
		4,056,624
	282	4,056,625
	285	4,056,626
	300	4,056,627
	308	4,056,628
	327	4,056,629
	330	4,056,630
		4,056,631
		4,056,632
	331	4,056,633
	335	4,056,634
	346	4,056,635
CLASS 425	10	4,056,340
	77	4,056,341
	80	4,056,342
	112	4,056,343
	132	4,056,344
	186	4,056,345
	373	4,056,346
	405 H	4,056,347
CLASS 426	2	4,056,658
	48	4,056,636
	52	4,056,637
	244	4,056,638
	264	4,056,639
	573	4,056,640
	577	4,056,566
CLASS 427	6	4,056,641
	84	4,056,642
	226	4,056,643
	284	4,056,644
CLASS 428	65	4,056,645
	90	4,056,646
	134	4,056,647
	138	4,056,648
	144	4,056,661
	215	4,056,649
	332	4,056,650
	336	4,056,651
	400	4,056,652
	402	4,056,653
	409	4,056,654
	443	4,056,655
	460	4,056,656
	565	4,056,365
	659	4,056,657
CLASS 429	54	4,056,659
	59	4,056,660
	112	4,056,662
	197	4,056,663
	217	4,056,664
CLASS 431	66	4,056,348
CLASS 432	36	4,056,349
	234	4,056,350
		4,056,351
CLASS 526	1	4,056,665
	29	4,056,666
	74	4,056,667
	124	4,056,668
	154	4,056,669
	212	4,056,559
	320	4,056,670
	342	4,056,671
CLASS 536	1	4,056,672
	4	4,056,322
	27	4,056,673
	28	4,056,674
	57	4,056,675
CLASS 544	29	4,056,676
	146	4,056,526
	194	4,056,527
CLASS 548	360	4,056,533
CLASS 560	43	4,056,553
	53	4,056,555
		4,056,556
	60	4,056,554
		4,056,557
	126	4,056,551
	128	4,056,552
	151	4,056,558
	231	4,056,562
	245	4,056,563

CLASSIFICATION OF DESIGNS

Class	Subclass	Design No.
D1—	22	246,206
		246,207
D2—	27	246,208
	427	246,209
D6—	63	246,210
	85	246,211
	95	246,212
	130	246,213
	154	246,214
	156	246,215
	175	246,216
	191	246,217
	247	246,218
D7—	13	246,219
	22	246,220
D8—	14.1	246,221
	40	246,222
	55	246,223
	341	246,224
	397	246,225
D9—	67	246,226
	170	246,227
	194	246,228
	218	246,229
D10—	38	246,230
D11—	1	246,231
	117	246,232
		246,233
D12—	62	246,234
	66	246,235
		246,236
	92	246,237
	157	246,238
	209	246,239
D13—	8	246,240
	28	246,241
D14—	36	246,242
		246,259
D15—	19	246,243
	66	246,244
	104	246,245
	146	246,246
	147	246,247
D22—	27	246,248
	29	246,249
D23—	43	246,250
	47	246,251
	122	246,252
		246,253
		246,254
D24—	4	246,255
		246,256
		246,257
	8	246,258
D28—	7	246,260
	49	246,261
D30—	8	246,262
D34—	5 SP	246,263
	5 SS	246,264
		246,265
		246,266
D48—	16 R	246,267
		246,268
		246,269
		246,270

CLASSIFICATION OF PLANTS

Class	Subclass	Plant No.
P.—	17	4,138
	28	4,139
	38	4,140
	41	4,141
	54	4,142

DEFENSIVE PUBLICATIONS APPLICATIONS

[Notice of Dec. 16, 1969, 869 O.G. 6877]

Class	Subclass	Publication No.
8—	26	T964,005
52—	637	T964,001
75—	67 A	T964,002
	128 G	T964,003
179—	15.55 T	T964,004
260—	404	T964,006
	410.5	T964,007
355—	50	T964,008
357—	23	T964,009
428—	210	T964,010
	489	T964,011

GEOGRAPHICAL INDEX OF RESIDENCE OF INVENTORS

(U.S. States, Territories and Armed Forces, the Commonwealth of Puerto Rico, and the Canal Zone)

Alabama	1	Kentucky	21	Oregon	41
Alaska	2	Louisiana	22	Pennsylvania	42
American Samoa	3	Maine	23	Puerto Rico	43
Arizona	4	Maryland	24	Rhode Island	44
Arkansas	5	Massachusetts	25	South Carolina	45
California	6	Michigan	26	South Dakota	46
Canal Zone	7	Minnesota	27	Tennessee	47
Colorado	8	Mississippi	28	Texas	48
Connecticut	9	Missouri	29	Utah	49
Delaware	10	Montana	30	Vermont	50
District of Columbia	11	Nebraska	31	Virginia	51
Florida	12	Nevada	32	Virgin Islands	52
Georgia	13	New Hampshire	33	Washington	53
Guam	14	New Jersey	34	West Virginia	54
Hawaii	15	New Mexico	35	Wisconsin	55
Idaho	16	New York	36	Wyoming	56
Illinois	17	North Carolina	37	U.S. Air Force	57
Indiana	18	North Dakota	38	U.S. Army	58
Iowa	19	Ohio	39	U.S. Navy	59
Kansas	20	Oklahoma	40		

(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

PATENTS

1 :	4,056,369
4 :	4,056,251
5 :	4,056,214
6 :	4,055,853
	4,055,867
	4,055,883
	4,055,907
	4,055,908
	4,055,910
	4,055,911
	4,055,917
	4,055,931
	4,055,947
	4,055,948
	4,055,950
	4,055,954
	4,055,955
	4,055,956
	4,055,975
	4,055,987
	4,055,992
	4,056,008
	4,056,027
	4,056,031
	4,056,054
	4,056,073
	4,056,074
	4,056,092
	4,056,120
	4,056,125
	4,056,127
	4,056,130
	4,056,209
	4,056,225
	4,056,228
	4,056,241
	4,056,255
	4,056,260
	4,056,261
	4,056,266
	4,056,297
	4,056,298
	4,056,299
	4,056,305
	4,056,307
	4,056,309
	4,056,321
	4,056,333
	4,056,334
	4,056,348
	4,056,354
	4,056,376
	4,056,386
	4,056,414
	4,056,442
	4,056,445
	4,056,460
	4,056,461
	4,056,476
	4,056,478
	4,056,524
	4,056,535
	4,056,542
	4,056,561
	4,056,570
	4,056,584
	4,056,599
	4,056,602
	4,056,608
	4,056,609
	4,056,627
	4,056,642
	4,056,654
	4,056,674
	4,056,697
	4,056,700
	4,056,710
	4,056,711
	4,056,714
	4,056,722
	4,056,724
	4,056,735
	4,056,740
	4,056,746
	4,056,757
	4,056,777
	4,056,803
	4,056,805
	4,056,813
	4,056,822
	4,056,823
	4,056,833
	4,056,836
	4,056,843
	4,056,848
	4,056,849
8 :	4,056,219
	4,056,328
	4,056,783
9 :	4,055,876
	4,055,945
	4,055,946
	4,055,988
	4,055,995
	4,055,997
	4,055,998
	4,056,034
	4,056,067
	4,056,082
	4,056,090
	4,056,100
	4,056,119
	4,056,216
	4,056,276
	4,056,403
	4,056,419
	4,056,586
	4,056,598
	4,056,651
	4,056,732
	4,056,771
	4,056,835
	4,056,837
	4,056,844
10 :	4,056,353
12 :	4,055,852
	4,055,875
	4,055,943
	4,055,991
	4,056,072
	4,056,075
	4,056,102
	4,056,292
	4,056,415
	4,056,573
	4,056,660
	4,056,681
	4,056,779
	4,056,780
	4,056,802
	4,056,816
13 :	4,055,860
	4,055,909
	4,056,049
	4,056,166
15 :	4,056,035
16 :	4,056,151
	4,056,270
	4,056,345
17 :	4,055,865
	4,055,872
	4,055,889
	4,055,972
	4,056,000
	4,056,030
	4,056,044
	4,056,101
	4,056,116
	4,056,118
	4,056,170
	4,056,185
	4,056,189
	4,056,194
	4,056,198
	4,056,202
	4,056,211
	4,056,288
	4,056,294
	4,056,295
	4,056,322
	4,056,366
	4,056,383
	4,056,398
	4,056,422
	4,056,426
	4,056,427
	4,056,477
	4,056,518
	4,056,562
	4,056,662
	4,056,678
	4,056,685
	4,056,687
	4,056,689
	4,056,691
	4,056,817
	4,056,840
18 :	Re.29,465
	4,055,862
	4,055,973
	4,056,018
	4,056,032
	4,056,207
	4,056,279
	4,056,293
	4,056,326
	4,056,327
	4,056,382
	4,056,420
	4,056,519
	4,056,657
	4,056,676
	4,056,699
	4,056,701
	4,056,744
	4,056,796
19 :	4,055,899
	4,056,048
	4,056,133
	4,056,149
	4,056,226
20 :	4,055,999
	4,056,148
21 :	4,055,974
	4,056,046
	4,056,097
	4,056,374
22 :	4,055,863
	4,056,132
	4,056,380
23 :	4,056,742
24 :	4,055,866
	4,055,893
	4,055,894
	4,055,904
	4,056,023
	4,056,079
	4,056,210
	4,056,224
	4,056,358
	4,056,405
	4,056,417
	4,056,548
	4,056,560
	4,056,708
	4,056,784
	4,056,786
	4,056,788
	4,056,789
	4,056,792
25 :	4,055,900
	4,055,905
	4,055,925
	4,055,993
	4,056,104
	4,056,114
	4,056,131
	4,056,161
	4,056,186
	4,056,199
	4,056,200
	4,056,296
	4,056,311
	4,056,323
	4,056,392
	4,056,404
	4,056,496
	4,056,539
	4,056,663
	4,056,713
	4,056,750
	4,056,751
	4,056,756
	4,056,795
	4,056,800
	4,056,831
	4,056,845
	4,056,850
26 :	4,055,886
	4,055,890
	4,055,919
	4,055,977
	4,056,066
	4,056,085
	4,056,088
	4,056,089
	4,056,178
	4,056,183
	4,056,188
	4,056,220
	4,056,268
	4,056,273
	4,056,275
	4,056,281
	4,056,329
	4,056,340
	4,056,368
	4,056,493
	4,056,499
	4,056,501
	4,056,531
	4,056,554
	4,056,555
	4,056,556
	4,056,557
	4,056,589
	4,056,677
	4,056,731
	4,056,747
27 :	4,055,897
	4,055,933
	4,056,011
	4,056,024
	4,056,610
	4,056,716
	4,056,809
29 :	4,055,888
	4,055,957
	4,056,087
	4,056,267
	4,056,479
	4,056,480
31 :	4,056,093
	4,056,162
33 :	4,055,939
34 :	4,055,922
	4,055,927
	4,055,929

	4,055,962
	4,055,980
	4,055,983
	4,056,025
	4,056,060
	4,056,070
	4,056,071
	4,056,106
	4,056,112
	4,056,154
	4,056,169
	4,056,212
	4,056,233
	4,056,269
	4,056,278
	4,056,304
	4,056,317
	4,056,344
	4,056,373
	4,056,393
	4,056,411
	4,056,450
	4,056,457
	4,056,462
	4,056,488
	4,056,489
	4,056,503
	4,056,532
	4,056,567
	4,056,582
	4,056,590
	4,056,616
	4,056,619
	4,056,624
	4,056,664
	4,056,670
	4,056,673
	4,056,675
	4,056,688
	4,056,690
	4,056,692
	4,056,693
	4,056,694
	4,056,695
	4,056,696
	4,056,698
	4,056,717
	4,056,719
	4,056,726
	4,056,734
	4,056,737
	4,056,807
	4,056,811
	4,056,812
	4,056,814
	4,056,838
	4,056,841
	4,056,847
	4,056,851
35 :	4,056,289
36 :	4,055,854
	4,055,855
	4,055,858
	4,055,873
	4,055,884
	4,055,892
	4,055,914
	4,055,930
	4,055,967
	4,056,020
	4,056,029
	4,056,059
	4,056,065
	4,056,076
	4,056,078
	4,056,094
	4,056,096
	4,056,110
	4,056,115
	4,056,134
	4,056,135
	4,056,152
	4,056,191
	4,056,213
	4,056,235
	4,056,285
	4,056,300
	4,056,301
	4,056,302
	4,056,308
	4,056,314
	4,056,316
	4,056,355
	4,056,357
	4,056,359
	4,056,364
	4,056,391
	4,056,394
	4,056,402
	4,056,470
	4,056,492
	4,056,494
	4,056,500
	4,056,507
	4,056,512
	4,056,520
	4,056,540
	4,056,543
	4,056,546
	4,056,585
	4,056,603
	4,056,611
	4,056,612
	4,056,650
	4,056,706
	4,056,723
	4,056,729
	4,056,730
	4,056,775
	4,056,818
	4,056,846
37 :	4,056,108
	4,056,190
	4,056,237
	4,056,371
	4,056,474
	4,056,632
	4,056,702
	4,056,707
39 :	4,055,924
	4,055,935
	4,055,960
	4,055,964
	4,055,976
	4,056,014
	4,056,041
	4,056,051
	4,056,144
	4,056,203
	4,056,253
	4,056,291
	4,056,342
	4,056,379
	4,056,409
	4,056,424
	4,056,448
	4,056,458
	4,056,549
	4,056,550
	4,056,569
	4,056,591
	4,056,644
	4,056,659
	4,056,665
	4,056,712
	4,056,720
	4,056,752
	4,056,761
	4,056,797
	4,056,806
40 :	4,055,856
	4,056,146
	4,056,381
	4,056,446
	4,056,451
	4,056,515
	4,056,577
	4,056,594
	4,056,733
41 :	4,055,902
	4,056,159
	4,056,229
	4,056,765
42 :	4,055,859
	4,055,878
	4,055,881
	4,055,891
	4,055,906
	4,055,941
	4,055,966
	4,055,989
	4,056,001
	4,056,005
	4,056,006
	4,056,017
	4,056,050
	4,056,105
	4,056,107
	4,056,139
	4,056,140
	4,056,155
	4,056,184
	4,056,218
	4,056,246
	4,056,286
	4,056,290
	4,056,313
	4,056,365
	4,056,378
	4,056,399
	4,056,408
	4,056,416
	4,056,423
	4,056,432
	4,056,465
	4,056,485
	4,056,498
	4,056,506
	4,056,525
	4,056,559
	4,056,581
	4,056,638
	4,056,647
	4,056,649
	4,056,653
	4,056,679
	4,056,686
	4,056,739
	4,056,745
	4,056,748
	4,056,749
	4,056,755
	4,056,773
	4,056,774
	4,056,785
	4,056,798
	4,056,815
	4,056,842
44 :	4,056,057
45 :	4,055,868
	4,056,195
	4,056,587
46 :	4,055,913
	4,056,021
47 :	4,056,052
	4,056,356
48 :	Re.29,466
	4,055,923
	4,055,926
	4,055,986
	4,056,004
	4,056,061
	4,056,145
	4,056,153
	4,056,163
	4,056,164
	4,056,208
	4,056,223
	4,056,272
	4,056,335
	4,056,486
	4,056,487
	4,056,490
	4,056,491
	4,056,502
	4,056,510
	4,056,578
	4,056,597
	4,056,682
	4,056,705
	4,056,793
	4,056,808
49 :	4,055,981
	4,056,013
	4,056,182
	4,056,452
50 :	4,056,263
51 :	4,055,874
	4,055,951
	4,055,971
	4,056,038
	4,056,047
	4,056,091
	4,056,205
	4,056,240
	4,056,463
	4,056,652
	4,056,721
	4,056,825
53 :	4,055,958
	4,056,136
	4,056,156
	4,056,257
	4,056,362
	4,056,401
	4,056,431
	4,056,466
	4,056,568
54 :	4,056,646
55 :	4,055,895
	4,055,898
	4,056,043
	4,056,077
	4,056,103
	4,056,137
	4,056,187
	4,056,639
	4,056,718
	4,056,741
59 :	4,056,157

DESIGN PATENTS

6 :	246,208
	246,212
	246,216
	246,224
	246,237
	246,250
	246,265
	246,266
8 :	246,251
9 :	246,213
	246,261
12 :	246,238
17 :	246,245
18 :	246,231
19 :	246,260
21 :	246,228
26 :	246,209
	246,241
	246,248
34 :	246,206
	246,207
	246,244
36 :	246,210
	246,215
	246,218
	246,226
	246,230
	246,239
	246,240
37 :	246,227
	246,255
	246,256
	246,257
39 :	246,211
	246,219
	246,220
	246,243
	246,262
40 :	246,232
	246,233
48 :	246,222
	246,234
	246,246
	246,263
51 :	246,214
53 :	246,235
	246,236
54 :	246,229

PLANT PATENTS

6 :	4,139
	4,140
	4,141
	4,142
24 :	4,138

DEFENSIVE PUBLICATIONS APPLICATIONS

[Notice of Dec. 16, 1969, 869 O.G. 6877]

22 :	T964,006
	T964,007
25 :	T964,010
26 :	T964,002
36 :	T964,001
	T964,004
	T964,008
	T964,009
42 :	T964,003
47 :	T964,005

☆ U. S. GOVERNMENT PRINTING OFFICE : O - 1977

CHANGE OF ADDRESS FORM

NAME—FIRST, LAST

COMPANY NAME OR ADDITIONAL ADDRESS LINE

STREET ADDRESS

CITY | STATE | ZIP CODE

PLEASE PRINT OR TYPE

(or) COUNTRY

Mail this form to: NEW ADDRESS

Superintendent of Documents
Government Printing Office SSOM
Washington, D.C. 20402

Attach last subscription label here.

SUBSCRIPTION ORDER FORM

SUBSCRIPTION ORDER FORM

ENTER MY SUBSCRIPTION TO:

@ $ Domestic; @ $ Foreign.

NAME—FIRST, LAST

COMPANY NAME OR ADDITIONAL ADDRESS LINE

STREET ADDRESS

CITY | STATE | ZIP CODE

PLEASE PRINT OR TYPE

(or) COUNTRY

☐ Remittance Enclosed (Make checks payable to Superintendent of Documents)

☐ Charge to my Deposit Account No. ....

MAIL ORDER FORM TO:
Superintendent of Documents
Government Printing Office
Washington, D.C. 20402

OFFICIAL GAZETTE of the UNITED STATES PATENT and TRADEMARK OFFICE

November 8, 1977 Volume 964 Number 2

CONTENTS

The following are mailed under direction of the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, to whom all subscriptions should be made payable and all communications addressed:

THE OFFICIAL GAZETTE (PATENTS SECTION), issued weekly, subscription $342.20 per annum for first class mailing, also available as fourth-class mail at $250.00; foreign mailing $85.55 additional; single copies $6.60 each.

THE OFFICIAL GAZETTE (TRADEMARK SECTION), issued weekly, subscription $88.40 per annum, foreign mailing $22.10 additional; single copies $1.70 each.

CIRCULARS OF GENERAL INFORMATION concerning PATENTS, price 60 cents each.

CIRCULARS OF GENERAL INFORMATION concerning TRADEMARKS, price 50 cents each.

PRINTED COPIES OF PATENTS are furnished by the Patent and Trademark Office at 50 cents each; PLANT PATENTS in color, $1.00 each; copies of TRADEMARKS AND DESIGN PATENTS at 20 cents each. Address orders to the Commissioner of Patents and Trademarks, Washington, D.C., 20231.

Printing authorized by Section 11(a)3 of Title 35, U.S. Code P.T.O.

PATENT AND TRADEMARK OFFICE NOTICES

Recording of "Territorial Assignments" in the Assignment Division of the Patent and Trademark Office

It has been the practice of the Assignment Division for many years to refuse to record "territorial assignments," that is, assignments purporting to transfer rights in a trademark registration (not a concurrent use registration) for less than the entire United States. Hereinafter, such documents will be recorded as long as the requirements of the Rules of Practice are met by the documents submitted.

The Office is not addressing the validity or effect of such documents by recording same, but is merely recognizing that such transfers may affect title to a registered mark and therefore ought to be recorded. At the time a Section 8 affidavit or declaration or an application for renewal is filed, the Examiner of Trademarks will consider the effect of such a document.

BERNARD A. MEANY,
Oct. 7, 1977. *Assistant Commissioner for Trademarks.*

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b)).

Re. 29,233, Re. S.N. 833,460, Filed Sept. 15, 1977, Cl. 313/102, IMAGE INTENSIFIER TUBE DEVICE, Augustinus Joannes Cuelenaere, et al., Owner of Record: *N.V. Optische Industrie "De Oude Delft," Delft, The Netherlands,* Attorney or Agent: Louis E. Marn, et al., Ex. Gp.: 252

3,263,928, Re. S.N. 832,524, Filed Sept. 12, 1977, Cl. 239/123, APPARATUS FOR EJECTING A MIXTURE OF LIQUIDS, Frederick E. Gusmer, Owner of Record: *Gusmer Corporation, Old Bridge, N.J.,* Attorney or Agent: Irvin S. Thompson, et al., Ex. Gp.: 313

3,670,142, Re. S.N. 832,847, Filed Sept. 13, 1977, Cl. 219/367, RECESS MOUNTED ELECTRIC AIR HEATER, John T. Attridge, Owner of Record: *Westinghouse Electric Corporation, Pittsburgh, Pa.,* Attorney or Agent: C. L. McHale, et al., Ex. Gp.: 213

3,783,097, Re. S.N. 833,808, Filed Sept. 16, 1977, Cl. 162/358, HYDRODYNAMICALLY LOADED WEB PRESS WITH SLIPPER BEARING SHOES, Edgar J. Justus, Owner of Record: *Beloit Corporation, Beloit, Wis.,* Attorney or Agent: Benjamin H. Sherman, et al., Ex. Gp.: 173

3,866,307, Re. S.N. 826,104, Filed Aug. 19, 1977, Cl. 228/180 R, METHOD FOR SOLDERING, FUSING OR BRAZING, Hans Hugo Ammann, et al., Owner of Record: Pfahl to *Western Electric Company, Inc., New York, N.Y.,* Ammann to *Bell Telephone Laboratories, Inc., Murray Hill, Berkeley Heights, N.J.,* Attorney or Agent: Reuben Spencer, Ex. Gp.: 323

3,900,645, Re. S.N. 834,136, Filed Sept. 19, 1977, Cl. 428/41, SCORED ADHESIVE LAMINATE, Burton D. Morgan, Owner of Record: *Morgan Adhesives Company, Stow, Ohio,* Attorney or Agent: Vern L. Oldham, et al., Ex. Gp.: 164

3,903,332, Re. S.N. 830,000, Filed Sept. 1, 1977, Cl. 427/207, ADHESION OF POLYESTER TO RUBBER USING AN ADHESIVE CONTAINING ADDED METAL COMPOUNDS, Robert J. Kelly, et al., Owner of Record: *Uniroyal, Inc., New York, N.Y.,* Attorney or Agent: Thomas A. Beck, Ex. Gp.: 162

3,903,665, Re. S.N. 830,512, Filed Sept. 6, 1977, Cl. 280/150 B, HEAT ENERGY TRANSMISSION CONTROL PANEL, David C. Harrison, Owner of Record: *Inventor,* Attorney or Agent: Stephen S. Townsend, et al., Ex. Gp.: 316

3,904,091, Re. S.N. 828,160, Filed Aug. 26, 1977, Cl. 224/2 B, SIDEARM HOLSTERS, H. Jack Jones, Owner of Record: *Wilma Catherine Jones, Orlando, Fla.,* Attorney or Agent: George H. Spencer, et al., Ex. Gp.: 314

3,905,219, Re. S.N. 833,604, Filed Sept. 15, 1977, Cl. 72/450, PINCER MECHANISM FOR PIPELINES, Edward Niederer, Jr., et al., Owner of Record: *Inventors,* Attorney or Agent: George M. Cole, et al., Ex. Gp.: 321

3,928,949, Re. S.N. 832,516, Filed Sept. 12, 1977, Cl. 51/401, HOLLOW BODY GRINDING MATERIALS, Eckhard Wagner, Owner of Record: *Norddeutsche Schleifmittel-Industrie Christiansen & Co., Hamburg, Germany,* Attorney or Agent: Leonard W. Sherman, et al., Ex. Gp.: 323

3,929,036, Re. S.N. 831,840, Filed Sept. 9, 1977, Cl. 74/711, LIMITED SLIP DIFFERENTIAL WITH NEGLIGIBLE BIAS UNDER LIGHT LOAD CONDITIONS, Noah A. Shealy, Owner of Record: *Clark Equipment Company, Buchanan, Mich.,* Attorney or Agent: Ernst H. Ruf, Ex. Gp.: 345

3,944,869, Re. S.N. 825,814, Filed Aug. 18, 1977, Cl. 313/519, DISPLAY PANEL WITH EXPANSIBLE, METALLIC CAPSULE CONTAINING MERCURY AND METHOD OF MAKING SAID CAPSULE, George J. Przybylek, Owner of Record: *Burroughs Corporation, Detroit, Mich.,* Attorney or Agent: Robert A. Green, Ex. Gp.: 252

3,949,101, Re. S.N. 824,912, Filed Aug. 15, 1977, Cl. 426/557, HIGH PROTEIN PASTA FORMULATION, Paluri Ramachandra Murthy, Owner of Record: *Peavey Company, Minneapolis, Minn.,* Attorney or Agent: Orrin M. Haugen, Ex. Gp.: 172

3,962,213, Re. S.N. 834,506, Filed Sept. 19, 1977, Cl. 427/224, METHOD OF DRYING COATED WEBS, John H. Flynn, Owner of Record: *Inventor,* Attorney or Agent: Michael Ebert, Ex. Gp.: 162

3,990,679, Re. S.N. 833,605, Filed Sept. 15, 1977, Cl. 251/214, STEM SEALING FOR HIGH PRESSURE VALVE OR THE LIKE, Boyd D. Boitnott, Owner of Record: *Gray Tool Company, Inc., Houston, Tex.,* Attorney or Agent: John W. Malley, et al., Ex. Gp.: 341

3,997,294, Re. S.N. 832,450, Filed Sept. 12, 1977, Cl. 23/277 C, DEVICE FOR TREATING GASES, Gerhard Kritzler, Owner of Record: *Apparatebau Rothemuhle Brandt & Kritzler, Rothemuhle, Germany,* Attorney or Agent: Elliot A. Lackenbach, Ex. Gp.: 171

4,015,213, Re. S.N. 782,672, Filed Mar. 30, 1977, Cl. 250/211, CONTACTLESS LSI JUNCTION LEAKAGE TESTING METHOD, Roger L. Verkuil, Owner of Record: *International Business Machines Corporation, Armonk, N.Y.,* Attorney or Agent: None, Ex. Gp.: 256

4,026,314, Re. S.N. 831,303, Filed Sept. 7, 1977, Cl. 137/116.5, HIGH PRESSURE SAFETY VALVE, Jesse H. Turner, et al., Owner of Record: *Essex Group, Inc., Fort Wayne, Ind.,* Attorney or Agent: Lawrence E. Freiburger, et al., Ex. Gp.: 341

PATENT NOTICES

Certificates of Correction for the Week of Nov. 8, 1977

Re. 28,598	4,020,751	4,032,492	4,035,568
Re. 29,194	4,021,078	4,032,596	4,035,752
Re. 29,319	4,021,281	4,032,754	4,036,004
D. 220,684	4,021,285	4,032,851	4,036,149
D. 245,293	4,022,075	4,032,897	4,036,207
3,772,195	4,023,029	4,032,975	4,036,408
3,841,466	4,023,090	4,033,110	4,036,479
3,865,840	4,024,021	4,033,154	4,036,532
3,876,417	4,024,224	4,033,165	4,036,634
3,913,852	4,024,558	4,033,188	4,036,698
3,943,981	4,024,756	4,033,232	4,036,879
3,952,039	4,025,318	4,033,335	4,037,036
3,958,064	4,025,347	4,033,486	4,037,149
3,958,297	4,025,381	4,033,497	4,037,354
3,958,905	4,025,767	4,033,536	4,037,600
3,960,923	4,025,793	4,033,622	4,037,611
3,963,464	4,026,136	4,033,715	4,037,699
3,968,111	4,026,153	4,033,787	4,037,775
3,975,532	4,027,258	4,033,828	4,037,923
3,979,346	4,027,568	4,033,861	4,037,924
3,982,743	4,027,634	4,033,863	4,037,950
3,983,243	4,027,688	4,033,876	4,038,015
3,984,884	4,028,384	4,033,921	4,038,101
3,985,509	4,028,622	4,034,062	4,038,233
3,992,198	4,028,654	4,034,125	4,038,285
3,994,351	4,028,663	4,034,209	4,038,695
3,996,269	4,028,936	4,034,323	4,038,729
3,999,633	4,029,654	4,034,326	4,038,746
4,001,772	4,029,676	4,034,472	4,038,826
4,006,289	4,029,722	4,034,480	4,038,911
4,008,316	4,029,873	4,034,584	4,038,954
4,011,431	4,030,083	4,034,633	4,038,993
4,012,742	4,030,404	4,034,665	4,039,202
4,012,997	4,030,563	4,034,785	4,039,364
4,013,783	4,030,939	4,034,794	4,040,355
4,015,711	4,031,021	4,034,868	4,040,666
4,016,163	4,031,100	4,034,909	4,040,855
4,016,467	4,031,107	4,034,912	4,040,944
4,016,574	4,031,280	4,034,918	4,040,958
4,017,048	4,031,361	4,035,029	4,041,116
4,017,099	4,031,424	4,035,236	4,041,383
4,017,318	4,031,443	4,035,273	4,041,709
4,017,774	4,031,549	4,035,274	4,042,127
4,018,673	4,031,767	4,035,286	4,042,144
4,018,973	4,031,795	4,035,342	4,042,213
4,019,025	4,031,892	4,035,374	4,042,224
4,019,293	4,032,066	4,035,425	4,042,231
4,020,002	4,032,264	4,035,500	
4,020,095	4,032,330	4,035,539	
4,020,242	4,032,344	4,035,567	

National Technical Information Service

GOVERNMENT-OWNED INVENTIONS

Notice of Availability for Licensing

The inventions listed below are owned by the U.S. Government and are available for domestic and possibly foreign licensing in accordance with the licensing policies of the agency-sponsors.

Copies of the patents cited are available from the Commissioner of Patents and Trademarks, Washington, D.C. 20231, for $.50 each. Requests for copies of patents must include the patent number.

Copies of the patent applications can be purchased from the National Technical Information Service (NTIS), Springfield, Virginia 22161 for $3.50 ($7.00 outside North American Continent). Requests for copies of patent applications must include the patent-application number. Claims are deleted from patent application copies sold to the public to avoid premature disclosure in the event of an interference before the Patent and Trademark Office. Claims and other technical data will usually be made available to serious prospective licensees by the agency which filed the case.

Requests for licensing information on a particular invention should be directed to the address cited for the agency-sponsor.

DOUGLAS J. CAMPION,
Patent Program Coordinator,
National Technical Information Service.

U.S. DEPARTMENT OF THE AIR FORCE
AF/JACP, Washington, D.C. 20314

Patent application 758,879. Fusible Heat Sink for a Cryogenic Refrigerator. Filed Jan. 12, 1977.

Patent 4,005,144. Ethynyl-Substituted Aromatic Ortho Diamines and Method of Synthesis. Filed Apr. 9, 1976. Patented Jan. 25, 1977. Not available NTIS.

Patent 4,005,327. Low Beam Velocity Retina for Schottky Infrared Vicicons. Filed Oct. 28, 1975. Patented Jan. 25, 1977. Not available NTIS.

Patent 4,005,366. System to Simulate Motion and Plasma Induced Signal Variations From Reentry Vehicles. Filed Aug. 18, 1975. Patented Jan. 25, 1977. Not available NTIS.

Patent 4,005,378. Surface Acoustic Wave Filter. Filed Nov. 25, 1975. Patented Jan. 25, 1977. Not available NTIS.

Patent 4,005,399. Impedance Sensitive Power Line Intrusion Alarm System. Filed Feb. 14, 1975. Patented Jan. 25, 1977. Not available NTIS.

U.S. ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION
Assistant General Counsel for Patents
Washington, D.C. 20545

Patent 3,957,031. Light Collectors in Cylindrical Geometry. Filed May 29, 1975. Patented May 18, 1976. Not available NTIS.

U.S. DEPARTMENT OF THE NAVY
Assistant Chief for Patents, Office of Naval Research—Code 302, Arlington, Va. 22217

Patent application 712,416. Polymer-Bound Metallocarborane Catalyst. Filed Aug. 6, 1976.

Patent application 736,902. Photometric Method and Apparatus for Measuring Packing Fraction of Terminated Fiber Optic Cables. Filed Oct. 29, 1976.

Patent application 737,807. On Line Electro-Optic Modulator. Filed Nov. 1, 1976.

Patent application 747,590. Low-Loss Single Filament Fiber Optic Connector. Filed Dec. 6, 1976.

Patent application 749,935. Densensitizer for N-Propyl Nitrate. Filed Dec. 13, 1976.

Patent application 753,646. Microstrip Hybrid Ring Coupler. Filed Dec. 20, 1976.

Patent application 756,575. Method and Means of Link Coupling With Separate Control of Link Reactance and Coupling Coefficient. Filed Jan. 3, 1977.

Patent application 757,429. Fourier Power Spectra of Optical Images Using CCD's. Filed Jan. 6, 1977.

Patent application 758,624. Complex Photodichroic Spatial Filter. Filed Jan. 12, 1977.

Patent application. 759,970. Non-Linear Analog-To-Digital Converter. Filed Jan. 17, 1977.

Patent application 761,749. A Method of Manufacturing Three Dimensional Integrated Circuits. Filed Jan. 23, 1977.

Patent 3,893,332. Leakage Test System. Filed Feb. 21, 1974. Patented July 8, 1975. Not available NTIS.

Patent 3,913,107. Noise Cancelling Magnetic Antenna for Use With Watercraft. Filed Sept. 6, 1974. Patented Oct. 14, 1975. Not available NTIS.

Patent 3,938,888. Automated Precision Flame-Emission Photometric Apparatus. Filed Feb. 3, 1975. Patented Feb. 17, 1976. Not available NTIS.

Patent 3,958,176. Method for Measuring Suitability of Aluminum for Use in Certain Propellants. Filed Feb. 24, 1975. Patented May 18, 1976. Not available NTIS.

Patent 3,961,169. Biased-Bit Generator. Filed Mar. 25, 1975. Patented June 1, 1976. Not available NTIS.

Patent 3,963,310. Liquid Crystal Waveguide. Filed Aug. 20, 1973. Patented June 15, 1976. Not available NTIS.

Patent 3,968,126. Ferrocene Derivatives and Their Preparation. Filed Mar. 22, 1974. Patented July 6, 1976. Not available NTIS.

Patent 3,976,596. Hydridometallic Carborane Catalytic Compounds. Filed Mar. 26, 1975. Patented Aug. 24, 1976. Not available NTIS.

Patent 3,983,832. Planning Ski Conversion to Stand-Off Armor. Filed July 18, 1975. Patented Oct. 5, 1976. Not available NTIS.

Patent 3,988,682. Voltage Ramp Temperature Controller. Filed June 23, 1975. Patented Oct. 26, 1976. Not available NTIS.

Patent 3,988,778. System for Random, Time Accurate Access to Recorded Material. Filed Feb. 10, 1975. Patented Oct. 26, 1976. Not available NTIS.

Patent 3,988,888. Filter/Cooler. Filed June 14, 1974. Patented Nov. 2, 1976. Not available NTIS.

Patent 3,992,683. Optically Pumped Collision Laser in Hg at 546.1 NM. Filed May 28, 1975. Patented Nov. 16, 1976. Not available NTIS.

Patent 3,994,696. Aluminum Soap Demisting Agent in Jet Fuel. Filed May 22, 1975. Patented Nov. 30, 1976. Not available NTIS.

Patent 3,995,155. Integrated Optical Data Bus Coupler. Filed June 6, 1975. Patented Nov. 30, 1976. Not available NTIS.

Patent 3,995,311. Optical Logic Elements. Filed Sept. 22, 1975. Patented Nov. 30, 1976. Not available NTIS.

Patent 3,995,957. Internally Referenced, Laser Intracavity Technique for Measuring Small Gains or Losses. Filed Oct. 16, 1975. Patented Dec. 7, 1976. Not available NTIS.

Patent 3,996,484. Interactive Negative Resistance Multiple-Stable State Device. Filed Sept. 5, 1975. Patented Dec. 7, 1976. Not available NTIS.

Patent 3,996,525. Acousto-Optically Tuned Laser. Filed May 12, 1975. Patented Dec. 7, 1976. Not available NTIS.

Patent 3,999,083. Automatic Threshold Circuit. Filed Mar. 31, 1975. Patented Dec. 21, 1976. Not available NTIS.

Patent 3,999,301. Reticle-Lens System. Filed July 24, 1975. Patented Dec. 28, 1976. Not available NTIS.

Patent 4,001.726. High Accuracy Sweep Oscillator System. Filed Jan. 23, 1976. Patented Jan. 4, 1977. Not available NTIS.

National Aeronautics and Space Administration

Assistant General Counsel for Patent Matters, NASA—
Code GP–2, Washington, D.C. 20546

Patent application 658,487. Improved Nozzle for Use With Abrasive and/or Corrosive Materials. Filed Feb. 17, 1976.

Patent application 760,771. Improved Backwall Cell. Filed Jan. 19, 1977.

Patent application 767,912. Preparation of Dielectric Coatings of Variable Dielectric Constant by Plasma Polymerization. Filed Feb. 11, 1977.

Patent application 776,869. Solar Cell Collector and Method for Producing Same. Filed Feb. 22, 1977.

Patent 3,999,886. Hingeless Helicopter Rotor With Improved Stability. Patented Dec. 28, 1976. Not available NTIS.

Patent 4,000,929. Magnetic Bearing System. Patented Jan. 4, 1977. Not available NTIS.

Patent 4,005,574. Reverse Pitch Fan With Divided Splitter. Patented Feb. 1, 1977. Not available NTIS.

U.S. Department of the Air Force

AF/JACP, Washington, D.C. 20314

Patent application 776,037. Probe Station. Filed Mar. 9, 1977.

Patent application 776,387. Plastic/Mischmetal Incendiary Projectile. Filed Mar. 10, 1977.

Patent 4,010,921. Spacecraft Closed Loop Three-Axis Momentum Unloading System. Filed Aug. 20, 1975. Patented Mar. 8, 1977. Not available NTIS.

Patent 4,011,452. Antinarcissus Reflector Assembly for Infrared Detector. Filed Nov. 6, 1975. Patented Mar. 8, 1977. Not available NTIS.

U.S. Energy Research and Development Administration

Assistant General Counsel for Patents
Washington, D.C. 20545

Patent 3,959,073. Reactor Hold-Down Arrangement. Filed June 6, 1973. Patented May 25, 1976. Not available NTIS.

Patent 3,970,936. Telecommunication Using Muon Beams. Filed May 29, 1973. Patented July 20, 1976. Not available NTIS.

Patent 3,970,956. Cylindrical Electron Beam Diode. Filed July 24, 1975. Patented July 20, 1976. Not available NTIS.

Patent 3,973,928. Apparatus for Diffusion Separation. Filed Jan. 28, 1949. Patented Aug. 10, 1976. Not available NTIS.

Patent 3,973,934. Apparatus for Diffusion Separation. Filed Feb. 23, 1949. Patented Aug. 10, 1976. Not available NTIS.

Patent 3.976,775. Method for Dissolving Plutonium Dioxide. Filed Jan. 23, 1975. Patented Aug. 24, 1976. Not available NTIS.

Patent 3.976,888. Fission Fragment Driven Neutron Source. Filed Jan. 23, 1975. Patented Aug. 24, 1976. Not available NTIS.

Patent 3.981.321. Vehicle Fuel System. Filed Sept. 24, 1974. Patented Sept. 21, 1976. Not available NTIS.

Patent 3.982.928. Separation of Uranium From (Th.,U)O Sub 2 Solid Solutions. Filed Jan. 3, 1975. Patented Sept. 28, 1976. Not available NTIS.

Patent 3,983,219. High Purity Polonium Recovery. Filed Oct. 1, 1973. Patented Sept. 28, 1976. Not available NTIS.

Patent 3,983,220. Recovery of Boric Acid From Ion Exchargers. Filed Nov. 7, 1974. Patented Sept. 28, 1976. Not available NTIS.

U.S. Department of the Navy

Assistant Chief for Patents, Office of Naval Research—
Code 302, Arlington, Va. 22217

Patent application 700,244. Parachute Deployment and Container System. Filed June 28, 1976.

Patent application 743,441. Wide Band Proportional Transducer Array. Filed Nov. 19, 1976.

Patent application 743,723. 2,3,7,8-Tetraazaspiro (4.4) Nonane, 2,3,7,8-Tetraazaspiro-(4,4) Nona-2,7-Diene and Derivatives. Filed Nov. 22, 1976.

Patent application 747,453. Particulate Sampling Probe. Filed Dec. 3, 1976.

Patent application 761,831. Improved, Chirped Acousto-Optic Q Switch. Filed Jan. 24, 1977.

Patent application 770,332. Gradient Index Miniature Coupling Lens and Method of Fabrication. Filed Feb. 22, 1977.

Patent application 771,041. Doppler Processing Method and Apparatus. Filed Feb. 22, 1977.

Patent application 771,715. Knife Edge for Direct Measurement of the Electron Beam of a Scanning Electron Microscope. Filed Feb. 24, 1977.

Patent application 772,221. Strobe Light Having Reduced Electromagnetic Radiation. Filed Feb. 25, 1977.

Patent application 774,285. Hydro-Optic Vibration Detector. Filed Mar. 4, 1977.

Patent application 774,366. Liquid Propellant Guns. Filed Mar. 30, 1977.

Patent application 778,910. Fast Two Dimensional Fourier Transform Device. Filed Mar. 30, 1977.

Patent application. 781,243. Integrated Refractive Effects Prediction System. Filed Mar. 25, 1977.

Patent application 781,278. Desensitizing Agent for Compositions Containing Crystalline High-Energy Nitrates or Nitrates. Filed Mar. 25, 1977.

Patent 3,983,470. Superconducting Apparatus for Generating High Frequency Microwaves. Filed Aug. 20, 1975. Patented Sept. 28, 1976. Not available NTIS.

Patent 4,002,353. Towing Vehicle Having a Cart-Hitching Mechanism. Filed Aug. 27, 1975. Patented Jan. 11, 1977. Not available NTIS.

Patent 4,005,927. Broad Bandwidth Optical Modulator and Switch. Filed Mar. 10, 1975. Patented Feb. 1, 1977. Not available NTIS.

Patent 4.006,597. Method for Microwave Transmission Energy With Superconducting Apparatus. Filed June 3, 1976. Patented Feb. 8, 1977.

Patent 4.007,688. Timed Missile Flight Termination System. Filed Feb. 23, 1976. Patented Feb. 15, 1977. Not available NTIS.

Patent 4,007,700. Multiple Seafloor Storage and Supply System. Filed Oct. 28, 1975. Patented Feb. 15, 1977. Not available NTIS.

National Aeronautics and Space Administration

Assistant General Counsel for Patent Matters, NASA—
Code GP–2, Washington, D.C. 20546

Patent application 692,284. Durable Antistatic Coating for Polymethylmethacrylate. Filed June 3, 1976.

Patent application 786,322. A System for Synchronizing Synthesizers of Communication Systems. Filed Apr. 11, 1977.

Patent application 788,045. Thermal Insulation Protection Means. Filed Apr. 15, 1977.

Patent application 788,704. Volumetric Direct Nuclear Pumped Laser. Filed Apr. 19, 1977.

Patent application 788,705. Nondestructive Method for Instrumenting Helicopter Rotor Blades. Filed Apr. 19, 1977.

Patent application 792,067. Composite Lamination Method. Filed Apr. 28, 1977.

Patent 3.635,573. Adjustable Chamfering Tool. Patented Jan. 18, 1972. Not available NTIS.

Patent 4,018,080. Device for Tensioning Test Specimens Within an Hermetically Sealed Chamber. Patented Apr. 19, 1977. Not available NTIS.

Patent 4,018,085. Amplifying Ribbon Extensometer. Patented Apr. 19, 1977. Not available NTIS.

Patent 4,018,533. Optical Instrument Employing Reticle Having Preselected Visual Response Pattern Formed Thereon. Patented Apr. 19, 1977. Not available NTIS.

Patent 4,019,179. Method of Locating Persons in Distress. Patented Apr. 19, 1977. Not available NTIS.

U.S. Department of the Air Force

AF/JACP, Washington, D.C. 20314

Patent application 776,039. Double Acting Dynamic Seal. Filed Mar. 9, 1977.

U.S. Department of Agriculture

Research Agreements and Patent Mgmt. Branch, General Services Division, Federal Bldg., Agricultural Research Service, Hyattsville, Md. 20782

Patent application 751,634. Bark Burning System. Filed Jan. 10, 1977.

U.S. Energy Research and Development Administration

Assistant General Counsel for Patents
Washington, D.C. 20545

Patent application 659,439. Method and Apparatus for Detecting and Measuring Trace Impurities in Flowing Gases. Filed Feb. 19, 1976.

Patent application 664,858. Isotope Separation by Photodissociation of Van Der Waal's Molecules. Filed Mar. 8, 1976.

Patent application 664,859. Solar Radiation Absorging Material. Filed Mar. 8, 1976.

Patent application 665,191. Multiple Fuel Supply System for an Internal Combustion Engine. Filed Mar. 9, 1976.

Patent application 666,533. Bearing Assembly and the Like for Use in Corrosive and Non-Corrosive Atmospheres. Filed Mar. 15, 1976.

Patent application 668,345. Solar Collector Having a Solid Transmission Medium. Filed Mar. 19, 1976.

Patent 3,969,615. Interpolator for Numerically Controlled Machine Tools. Filed Dec. 20, 1974. Patented July 13, 1976. Not available NTIS.

Patent 3,973,075. High Temperature Furnace. Filed Sept. 15, 1975. Patented Aug. 3, 1976. Not available NTIS.

Patent 3,973,152. Ultrasonic Transducer With Laminated Coupling Wedge. Filed Apr. 3, 1975. Patented Aug. 3, 1976. Not available NTIS.

Patent 3,976,569. Water Softening Process. Filed Feb. 25, 1975. Patented Aug. 24, 1976. Not available NTIS.

Patent 3,976,747. Modified Dry Limestone Process for Control of Sulfur Dioxide Emissions. Filed June 6, 1975. Patented Aug. 24, 1976. Not available NTIS.

Patent 3,979,498. Recovery of Sesium and Palladium From Nuclear Reactor Fuel Processing Waste. Filed Aug. 6, 1975. Patented Sept. 7, 1976. Not available NTIS.

Patent 3,981,321. Vehicle Fuel System. Filed Sept. 24, 1974. Patented Sept. 21, 1976. Not available NTIS.

Patent 3,982,526. Turning Collectors for Solar Radiation. Filed May 20, 1975. Patented Sept. 28, 1976. Not available NTIS.

Patent 3,982,838. Compact Fast Analyzer of Rotary Cuvette Type. Filed Mar. 12, 1974. Patented Sept. 28, 1976. Not available NTIS.

Patent 3,983,050. Method for Storage of Solid Waste. Filed Feb. 7, 1975. Patented Sept. 28, 1976, Not available NTIS.

U.S. Department of the Navy

Assistant Chief for Patents, Office of Naval Research—
Code 302, Arlington, Va. 22217

Patent application 700,675. Radial Depressor. Filed June 28, 1976.

Patent application 762,084. Radiation Seal and Method. Filed Jan. 24, 1977.

Patent application 765,170. 360 Degrees Non-Programmed Visual System. Filed Feb. 3, 1977.

Patent application 770,871. Trinary Pulse-Number Modulation Method. Filed Feb. 22, 1977.

Patent Application 774,826. An Improved Ultrasonic Focused Transducer. Filed Mar. 7, 1977.

Patent application 776,578. Oceanographic Sensor With In-Situ Cleaning and Bio-Fouling Prevention System. Filed Mar. 11. 1977.

Patent application 777,225. Zero Temperature Coefficient of Resistance Bi-Firm Resistor. Filed Mar. 14, 1977.

Patent 3,954,931. Process for Making a Molded Valve Housing for a Prosthetic Limb. Filed Apr. 12, 1974. Patented May 4, 1976. Not available NTIS.

Patent 3,983,501. Hybrid Tracking Loop for Detecting Phase Shift Keyed Signals. Filed Sept. 29, 1975. Patented Sept. 28, 1976. Not available NTIS.

Patent 4,002,834. PCM Synchronization and Multiplexing System. Filed Dec. 9, 1974. Patented Jan. 11, 1977. Not available NTIS.

Patent 4,005,282. Decometer. Filed Sept. 25, 1975. Patented Jan. 25, 1977. Not available NTIS.

Patent 4,009,231. Powder Barrier Bonding Technique. Filed Mar. 20, 1975. Patented Feb. 22, 1977. Not available NTIS.

Patent 4,017,859. Multi-Path Signal Enhancing Apparatus. Filed Dec. 22, 1975. Patented Apr. 12, 1977. Not available NTIS.

National Aeronautics and Space Administration

Assistant General Counsel for Patent Matters, NASA—
Code GP–2, Washington, D.C. 20546

Patent application 779,428. Flow Compensating Pressure Regulator. Filed Mar. 21, 1977.

Patent application 780,729. Digital Automatic Gain Amplifier. Filed Mar. 24, 1977.

Patent application 780,930. Portable Breathing System. Filed Mar. 24, 1977.

Patent application 782,480. Wide Power Range Microwave Feedback Controller. Filed Mar. 29, 1977.

Patent application 782,481. Ocean Thermal Plant. Filed Mar. 29, 1977.

Patent application 782,482. Remote Lightning Monitor System. Filed Mar. 29, 1977.

Patent application 782,693. Lightning Current Waveform Measuring System. Filed Mar. 30, 1977.

Patent application 788,044. Reduced Chromium Stainless Steel Alloys. Filed Apr. 15, 1977.

Patent 3,555,483. Cryogenic Liquid Sensor. Patented Jan. 12, 1971. Not available NTIS.

Patent 3,582,828. Charge Storage Diode Modulators and Demodulators. Patented June 1, 1971. Not available NTIS.

Patent 3,621,330. Depressurization of Arc Lamps. Patented Nov. 16, 1971. Not available NTIS.

Patent 3,697,705. Electromagnetic Transducer Recording Head Having a Laminated Core Section and Tapered Gap. Patented Oct. 10, 1972. Not available NTIS.

Patent 3,711,701. Uniform Variable Light Source. Patented Jan. 16, 1973. Not available NTIS.

Patent 3,881,132. Compact, High Intensity Arc Lamp With Internal Magnetic Field Producing Means. Patented Apr. 29, 1975. Not available NTIS.

Patent 4,018,092. Mechanical Sequencer. Patented Apr. 19, 1977. Not available NTIS.

Patent 4,018,423. Emergency Descent Device. Patented Apr. 19, 1977. Not available NTIS.

U.S. Department of the Army

Office of Judge Advocate General, Patent Division,
Room 2C–455, Pentagon, Washington, D.C. 20310

Patent application 713,312. Irreversible Warmup Indicator. Filed Aug. 10, 1976.

Patent 3,986,906. Ultrahigh Burning Rate Propellants Containing an Organic Perchlorate Oxidizer. Filed Dec. 23, 1974. Patented Oct. 19, 1976. Not available NTIS.

Patent 3,987,366. Square Root of Transient Circuit. Filed Oct. 22, 1974. Patented Oct. 19, 1976. Not available NTIS.

Patent 3,991,421. Personal Blast Protection Armor. Filed Sept. 9, 1975. Patented Nov. 16, 1976. Not available NTIS.

Patent 3,995,234. Ringing Oscillator Including a Resonant Circuit With Frequency Divider Feedback Loop. Filed Oct. 6, 1975. Patented Nov. 30, 1976. Not available NTIS.

U.S. Department of Agriculture

Research Agreements and Patent Mgmt. Branch. General Services Division, Federal Bldg., Agricultural Research Service, Hyattsville, Md. 20782

Patent application 734,937. An Improvement in the Short Milk Tube of a Milking Machine. Filed Oct. 22, 1976.

Patent application 789,376. Apparatus for Growing Mushrooms. Filed Apr. 20, 1977.

Patent application 789,377. Apparatus for Harvesting Vegetable Heads. Filed Apr. 20, 1977.

U.S. Energy Research and Development Administration

Assistant General Counsel for Patents
Washington, D.C. 20545

Patent application 663,590. Solar Concentrator With Restricted Exit Angles. Filed Mar. 3, 1976.

Patent 3,969,218. Elution Electrophoresis. Filed Feb. 11, 1975. Patented July 13, 1976. Not available NTIS.

Patent 3,972,775. Conversion of Cellulosic Materials to Sugar. Filed June 28, 1974. Patented Aug. 3, 1976. Not available NTIS.

Patent 3,981,480. Variable Gas Leak Rate Valve. Patented Sept. 21, 1976. Not available NTIS.

U.S. Department of Health, Education, and Welfare

National Institutes of Health, Chief, Patent Branch,
Westwood Bldg., Bethesda, Md. 20014

Patent application 736,451. Capillary Cell Culture Device. Filed Oct. 28, 1976.

Patent application 737,590. Direct Contact Microwave Diathermy Applicator. Filed Nov. 1, 1976.

Patent application 738,580. Prosthetic Joint Lock and Cable Mechanism. Filed Nov. 3, 1976.

Patent application 753,103. Electrophoretic Fractional Elution Apparatus Employing a Rotational Seal Fraction Collector. Filed Dec. 21, 1976.

Patent application 758,851. Real Time Two-Dimensional Mechanical Ultrasonic Sector Scanner With Electronic Control of Sector Width. Filed Jan. 12, 1977.

Patent application 767,883. Three Dimensional Laser Doppler Velocimeter. Filed Feb. 11, 1977.

Patent application 767,996. Electrode for Artificial Pacemaker. Filed Feb. 11, 1977.

Patent application 768,397. Subcutaneous Fluid and Culture Chamber and Implant Technique. Filed Feb. 14, 1977.

Patent application 778,083. Method of and Apparatus for Measurement of Blood Flow Using Coherent Light. Filed Mar. 16, 1977.

Patent application 786,486. A Magnetic Fluid Actuated Control Valve, Relief Valve and Pump. Filed Apr. 8, 1977.

Patent 3,628,813. Fluid Connecting Device. Filed June 9, 1970. Patented Dec. 21, 1971. Not available NTIS.

Patent 3,663,965. Bacteria-Resistant, Percutaneous Conduit Device. Filed June 8, 1970. Patented May 23, 1972. Not available NTIS.

Patent 3,995,031. Method of Controlling Obesity With Purified Active Principle of Fruit of "*Synsepalum dulcificum*. Filed July 23, 1974. Patented Nov. 30, 1976. Not available NTIS.

Patent 4,003,834. Density Gradient Fractionation by Piston Displacement. Filed Mar. 31, 1975. Patented Jan. 18, 1977. Not available NTIS.

Patent 4,008,713. Ultrasonic Diagnostic Technique Utilizing Switched Gain Signal Processing. Filed Sept. 18, 1975. Patented Feb. 22, 1977. Not available NTIS.

Patent 4,014,317. Multipurpose Cardiocirculatory Assist Cannula and Methods of Use Thereof. Filed Feb. 18, 1972. Patented Mar. 29, 1977. Not available NTIS.

Patent 4,014,885. Anti-Leukemic Oxygenated Benzo(c) Phenanthridine Compounds. Filed Mar. 10, 1975. Patented Mar. 29, 1977. Not available NTIS.

Patent 4,014,991. Oral Rabies Immunization of Carnivores. Filed Jan. 23, 1976. Patented Mar. 29, 1977. Not available NTIS.

Patent 4,015,130. Method and Apparatus for Monitoring Optical Radiation. Filed Oct. 7, 1975. Patented Mar. 29, 1977. Not available NTIS.

Patent 4,017,404. Apparatus for Low Temperature Ashing Using Radio Frequency Excited Gas Plasma. Filed Mar. 11, 1976. Patented Apr. 12, 1977. Not available NTIS.

U.S. Department of the Navy

Assistant Chief for Patents, Office of Naval Research—Code 302, Arlington, Va. 22217

Patent application 765,500. Exhaust Plume Reduction and Cooling System. Filed Feb. 3, 1977.

Patent application 767,728. Castable Gas Generator Propellant. Filed Mar. 30, 1977.

Patent 3,453,861. Square Wave Fluid Pressure Generator. Filed Apr. 25, 1967. Patented July 8, 1969. Not available NTIS.

Patent 3,916,305. Atmospheric Electrical Current Detector. Filed May 20, 1974. Patented Oct. 28, 1975. Not available NTIS.

Patent 3,919,636. Electrical Field Change Meter. Filed Apr. 29, 1974. Patented Nov. 11, 1975. Not available NTIS.

Patent 3,925,726. Electric Field Sensor. Filed May 8, 1974. Patented Dec. 9, 1975. Not available NTIS.

Patent 4,000,517. Remotely Controllable Recorder. Filed Nov. 10, 1975. Patented Dec. 28, 1976. Not available NTIS.

Patent 4,003,015. Multipath Sonar System. Filed July 3, 1975. Patented Jan. 11, 1977. Not available NTIS.

Patent 4,005,765. Crash Load Attenuating Troop Seat. Filed Feb. 24, 1975. Patented Feb. 1, 1977. Not available NTIS.

Patent 4,006,303. Filtering Transition Distortion Channel Quality Monitor. Filed Dec. 29, 1975. Patented Feb. 1, 1977. Not available NTIS.

Patent 4,008,476. Digital Antenna Pattern Generator for Radar Simulation. Filed Oct. 3, 1975. Patented Feb. 15, 1977. Not available NTIS.

Patent 4,011,564. Phase Modulated Monopulse System. Filed July 7, 1966. Patented Mar. 8, 1977. Not available NTIS.

National Aeronautics and Space Administration

Assistant General Counsel for Patent Matters, NASA—Code GP-2, Washington, D.C. 20546

Patent application 782,462. Direct Current Transformer. Filed Mar. 29, 1977.

Patent 4,011,756. Metallic Hot Wire Anemometer. Patented Mar. 15, 1977. Not available NTIS.

Patent 4,012,237. Zirconium Modified Nickel-Copper Alloy. Patented Mar. 15, 1977. Not available NTIS.

U.S. Department of the Army

Office of Judge Advocate General, Patent Division, Room 2C-455, Pentagon, Washington, D.C. 20310

Patent application 684,040. Benefication of Carbinolamine Compounds. Filed May 7, 1976.

Patent application 714,416. Rectifier Controlled Circuit. Filed Aug. 16, 1976.

Patent application 774,165. Improved Process for Producing 8-NHR Quinolines. Filed Mar. 3, 1977.

Patent 3,974,708. Constant Force Belt Tensioner. Filed Sept. 17, 1975. Patented Aug. 17, 1976. Not available NTIS.

Patent 3,984,577. Method of Compacting and Freeze-Drying Particulate Foods. Filed Oct. 8, 1974. Patented Oct. 5, 1976. Not available NTIS.

Patent 3,984,762. Method for Determining Battery State of Charge by Measuring A.C. Electrical Phase Angle Change. Filed Mar. 7, 1975. Patented Oct. 5, 1976. Not available NTIS.

Patent 3,984,824. Wide-Band Optical Analog Signal Link Using Fiber Optics. Filed July 25, 1975. Patented Oct. 5, 1976. Not available NTIS.

Patent 3,986,137. Method for Producing Chemical Laser Output From Radiative Decomposition of Chemicals. Filed Sept. 30, 1974. Patented Oct. 12, 1976. Not available NTIS.

Patent 3,986,527. Laminar Flow Digital Logic Elements With Feedback. Filed Nov. 6, 1975. Patented Oct. 19, 1976. Not available NTIS.

Patent 3,987,208. Method of Extending the Storage Life of Cut Lettuce. Filed Mar. 25, 1976. Patented Oct. 19, 1976. Not available NTIS.

Patent 3,987,305. Low Self-Bias Variable Gap Diode. Filed June 10, 1975. Patented Oct. 19, 1976. Not available NTIS.

Patent 3,987,372. Chemical Laser From Radiative Decomposition of Chemicals. Filed Sept. 30, 1974. Patented Oct 19, 1976. Not available NTIS.

Patent 3,987,665. Non-Destructive Test Method for Assessing Textile Material Degradation. Filed Aug. 22, 1975. Patented Oct. 25, 1976. Not available NTIS.

Patent 3,990,003. Pulsed Loop Antenna-Conduit Electromagnetic Radiator Test Technique for Electromagnetic Shielding Flaw Detection in Buried Conduits and Shielded Conductors. Filed Sept. 17, 1975. Patented Nov. 2, 1976. Not available NTIS.

Patent 3,995,263. Oscilloscope Date-Time Generator and Display. Filed Dec. 5, 1974. Patented Nov. 30, 1976. Not available NTIS.

Patent 3,995,831. Force Fedback Controlled Winch. Filed Dec. 17, 1974. Patented Dec. 7, 1976. Not available NTIS.

Patent 3,997,266. Lens Testing Using Total Internal Reflection Polography. Filed Sept. 26, 1975. Patented Dec. 14, 1976. Not available NTIS.

Patent 3,998,749. Chemical Heater Formulation and Method for Generating Heat. Filed Sept. 6, 1974. Patented Dec. 21, 1976. Not available NTIS.

Patent 4,000,505. Thin Oxide MOS Solar Cells. Filed Aug. 8, 1975. Patented Dec. 28, 1976. Not available NTIS.

U.S. Department of the Air Force

AF/JACP, Washington, D.C. 20314

Patent 4,006,480. Antenna Window Assembly for Ablative Heat Shields. Filed Feb. 3, 1976. Patented Feb. 1, 1977. Not available NTIS.

U.S. Environmental Protection Agency

Room W513, 401 M St., SW
Washington, D.C. 20460

Patent 3,923,545. Grid Structure for High Rate Lead/Acid Battery. Filed Mar. 30, 1973. Patented Dec. 2, 1975. Not available NTIS.

U.S. Department of Health, Education, and Welfare

National Institutes of Health, Chief, Patent Branch, Westwood Bldg., Bethesda, Md. 20014

Patent application 778,455. Horizontal Flow-Through Coil Planet Centrifuge Without Rotating Seals. Filed Mar. 17, 1977.

Patent application 786,414. A Pteridine Compound. Filed Apr. 11, 1977.

Patent 3,960,138. Differential Temperature Integrating Diagnostic Method and Apparatus. Filed Jan. 6, 1975. Patented June 1, 1976. Not available NTIS.

Patent 3,988,307. Solid Phase Synthesis of Peptides With Carboxyl-Terminal Amides. Filed Sept. 6, 1974. Patented Oct. 26, 1976. Not available NTIS.

Patent 4,001,087. Affinity Labelling Enzymes With Esters of Aromatic Sulfonic Acids. Filed No. 4, 1975. Patented Jan. 4, 1977. Not available NTIS.

Patent 4,006,023. Photographic Polymeric Composition Containing a Leuco Dye Cyanide. Filed Oct. 7, 1974. Patented Feb. 1, 1977. Not available NTIS.

Patent 4,016,303. Method of Flocking Blood-Contacting Surfaces on Artificial Implant Devices. Filed Aug. 6, 1975. Patented Apr. 5, 1977. Not available NTIS.

U.S. Department of the Interior

Branch of Patents, 18th and C Sts. NW
Washington, D.C. 20240

Patent application 759,202. System for the Dielectrophoretic Separation of Particulate and Granular Materials. Filed Jan. 13, 1977.

U.S. Department of the Navy

Assistant Chief for Patents, Office of Naval Research—Code 302, Arlington, Va. 22217

Patent application. 736,173. A Cylindrical Array Radiator. Filed Mar. 30, 1977.

Patent application 759,526. Autokinetic Sampling Nozzle. Filed Jan. 14, 1977.

Patent application 761,917. Apparatus and Method for Connecting Bimetallic Members by Explosive Bonding. Filed Jan. 24, 1977.

Patent application 763,265. Field-Effect Transistor With Extended Linear Logarithmic Transconductance. Filed Jan. 27, 1977.

Patent application 767,020. Translating Filter. Filed Feb. 9, 1977.

Patent application 772,395. Optical Sliprings. Filed Mar. 30, 1977.

Patent application 772,396. Optical Sliprings. Filed Mar. 30, 1977.

Patent application 772,615. Wideband Optical Isolator. Filed Mar. 30. 1977.

Patent 3,938,029. Low Noise DC Power Supply System for Electronics on a Rotating Assembly. Filed July 5, 1974. Patented Feb. 10, 1976. Not available NTIS.

Patent 3,938,148. Automatic Frequency Control System. Filed July 10, 1974. Patented Feb. 10, 1976. Not available NTIS.

Patent 3,991,475. Depth Selecting Spool Device. Filed Dec. 5, 1975. Patented Nov. 16, 1976. Not available NTIS.

Patent 3,992,352. Fire Retardant Polyester Resins. Filed Oct. 24, 1975. Patented Nov. 16, 1976. Not available NTIS.

Patent 3,996,586. Magnetic Tape Pulse Width to Digital Converter. Filed Sept. 20, 1974. Patented Dec. 7, 1976. Not available NTIS.

Patent 3,997,231. Test Connector. Filed Dec. 8, 1975. Patented Dec. 14, 1976. Not available NTIS.

Patent 4,001,373. Removal of Tetranitromethane From TNT Plant Waste. Filed Aug. 18, 1975. Patented Jan. 4, 1977. Not available NTIS.

Patent 4,002,596. Haloalkoxy Derivatives of the Cyclophosphonitrilic Chloride-Hexamethylphosphoramide Adduct. Filed Sept. 10, 1975. Patented Jan. 11, 1977. Not available NTIS.

Patent 4,003,977 Removal of Tetranitromethane From TNT Plant Waste Gases. Filed Aug. 18, 1975. Patented Jan. 18, 1977. Not available NTIS.

Patent 4,004,266. Transducer Array Having Low Cross-Coupling. Filed Dec. 5, 1975. Patented Jan. 18, 1977. Not available NTIS.

Patent 4,006,404. Pulsed Plasma Probe. Filed Jan. 30, 1976. Patented Feb. 1, 1977. Not available NTIS.

Patent 4,007,816. Portable Salvage Lift Apparatus. Filed Aug. 28, 1975. Patented Feb. 15, 1977. Not available NTIS.

Patent 4,008,139. Fluorinated Compounds. Filed Dec. 22, 1975. Patented Feb. 15, 1977. Not available NTIS.

Patent 4,008,395. Flexible Tube Section for Gimballed IR Detectors. Filed Aug. 2, 1974. Patented Feb. 15, 1977. Not available NTIS.

Patent 4,010,040. Modified Mixing Technique for Carbonaceous Stock. Filed Dec. 5, 1974. Patented Mar. 1, 1977. Not available NTIS.

Patent 4,011,518. Microwave GaAs FET Amplifier Circuit. Filed Oct. 28, 1975. Patented Mar. 8, 1977. Not available NTIS.

National Aeronautics and Space Administration

Assistant General Counsel for Patent Matters, NASA—Code GP-2, Washington, D.C. 20546

Patent application 762,362. Solar Energy Collection System. Filed Jan. 22, 1977.

Patent application 762,363. Low Cost Solar Energy Collection System. Filed Jan. 25, 1977.

Patent application 768,794. Apparatus for Automatically Spraying a Coating Material. Filed Feb. 15, 1977.

Patent application 774,553. Very Narrow Band Width Receiver. Filed Mar. 4, 1977.

Patent application 779,871. A Rotary Electric Device. Filed Mar. 21, 1977.

Patent application 779,883. Oxygen Post-Treatment of Plastic Surfaces Coated With Plasma Polymerized Silicon-Containing Monomers. Filed Mar. 21, 1977.

Patent application 780,568. Crosswind Landing Gear Position Indicator. Filed Mar. 23, 1977.

Patent application 780,873. Apparatus and Method for Determining the Position of a Radiant Energy Source. Filed Mar. 24, 1977.

Patent application 780,874. Microcomputerized Electric Field Meter Diagnostic and Calibration System. Filed Mar. 24, 1977.

Patent 4,011,719. Anode for Ion Thruster. Patented Mar. 15, 1977. Not available NTIS.

Patent 4,011,854. Mount for Continuously Orienting a Collector Dish in a System Adapted to Perform Both Diurnal and Seasonal Solar Tracking. Patented Mar. 15, 1977. Not available NTIS.

Patent 4,012,018. All Sky Pointing Attitude Control System. Patented Mar. 15, 1975. Not available NTIS.

Patent 4,012,123. Binocular Device for Displaying Numerical Information in Field of View. Patented Mar. 15, 1977. Not available NTIS.

Patent 4,012,696. Multiple Rate Digital Command Detection System With Range Clean-Up Capability. Patented Mar. 15, 1977. Not available NTIS.

U.S. Department of the Army

Office of Judge Advocate General, Patent Division, Room 2C-455, Pentagon, Washington, D.C. 20310

Patent 3,971,854. Method of Producing Freeze-Dried, Cooked Beef Steak and Resulting Product. Filed Dec. 22, 1975. Patented July 27, 1976. Not available NTIS.

Patent 3,975,698. Fiber Acoustic Waveguide and System. Filed Dec. 15, 1975. Patented Aug. 17, 1976. Not available NTIS.

Patent 3,975,756. Gadolinium Doped Germanium. Filed June 28, 1974. Patented Aug. 17, 1976. Not available NTIS.

Patent 3,979,182. Chemical Detection of Nitrogen Containing Compounds. Filed Apr. 29, 1969. Patented Sept. 7, 1976. Not available NTIS.

Patent 3,981,687. Method of Treating Quartz Crystal Resonators. Filed May 8, 1975. Patented Sept. 21, 1976. Not available NTIS.

Patent 3,982,125. Method and Apparatus for Providing Height Variation Compensation in Certain Nuclear Gauging Applications Including Nuclear Mine Detection. Filed Jan. 9, 1975. Patented Sept. 21, 1976. Not available NTIS.

U.S. Department of the Air Force

AF/JACP, Washington, D.C. 20314

Patent 4,005,852. Traction Sheave Warning for Helicopter Rescue Hoist Systems. Filed June 27, 1975. Patented Feb. 1, 1977. Not available NTIS.

Patent 4,006,363. Gaseous Infrared Waveguide Mixer. Filed Jan. 26, 1976. Patented Feb. 1, 1977. Not available NTIS.

Patent 4,006,387. Low Power Solid State Three-Phase Overcurrent/Undercurrent Protection Circuit. Filed Sept. 22, 1975. Patented Feb. 1, 1977. Not available NTIS.

Patent 4,006,446. RAPCON-Control Tower Coordination System. Filed Jan. 8, 1976. Patented Feb. 1, 1977. Not available NTIS.

Patent 4,007,049. Thermal Shock Resistant Ceramic Composite. Filed Aug. 6, 1968. Patented Feb. 8, 1977. Not available NTIS.

U.S. Department of Agriculture

Research Agreements and Patent Mgmt. Branch, General Services Division, Federal Bldg., Agriculture Research Service. Hyattsville, Md. 20782

Patent application 748,032. Highly Absorbent Polymeric Compositions From Polyhydroxy Polymer Graft Copolymers. Filed Dec. 6, 1976.

Patent application 764,113. Alkyl 9,9(10,10)-Bis(Acyloxymethyl)Octadecanoates as Primary Plasticizers for Polyvinylchloride. Filed Jan. 31, 1977.

Patent application 780,567. Physiochemically Designed Fat Compositions From Tallow and Process for Making. Filed Mar. 23, 1977.

Patent application 789,375. Nutritionally Balanced Protein Snack Food Prepared From Legume Seeds. Filed Apr. 20, 1977.

Patent 3,972,826. Fuel Moisture Analog. Filed Aug. 14, 1975. Patented Aug. 3, 1976. Not available NTIS.

Patent 4,006,032. Process for Removing Off-Flavor From Maple Syrup. Filed Jan. 30, 1976. Patented Feb. 1, 1977. Not available NTIS.

U.S. Department of Commerce

National Technical Information Service
Springfield, Va. 22161

Patent application 788,951. Use of Sulphur as an Additive to Inhibit the Smoldering Combustion of Materials. Filed Apr. 19, 1977.

U.S. Environmental Protection Agency

Room W513, 401 M St., SW
Washington, D.C. 20460

Patent 3,863,606. Vapor Generating System Utilizing Fluidized Beds. Filed July 25, 1973. Patented Feb. 4, 1975. Not available NTIS.

Patent 3,918,636. Dual Temperature Controller. Filed July 23, 1974. Patented Nov. 11, 1975. Not available NTIS.

Patent 3,941,314. Nozzle Assembly for Distributing Fluid. Filed Dec. 26, 1973. Patented Mar. 2, 1976. Not available NTIS.

U.S. Energy Research and Development Administration

Assistant General Counsel for Patents
Washington, D.C. 20545

Patent 3,952,253. Method and Means for Generating a Synchronizing Pulse From a Repetitive Wave of Varying Frequency. Filed Nov. 21, 1974. Patented Apr. 20, 1976. Not available NTIS.

Patent 3,955,085. Thin Film Tritium Dosimetry. Filed July 23, 1975. Patented May 4, 1976. Not available NTIS.

Patent 3,957,597. Process for Recovering Tritium From Molten Lithium Metal. Filed May 28, 1974. Patented May 18, 1976. Not available NTIS.

U.S. Department of Health, Education, and Welfare

National Institutes of Health, Chief, Patent Branch,
Westwood Bldg., Bethesda, Md. 20014

Patent application 711,569. Esters of Aromatic Sulfonic Acids. Filed Aug. 4, 1976.

Patent application 730,351. The Topical and Oral Use of Cannabinoid-Like Substances to Effect Reduction in Intraocular Pressure in Animals. Filed Oct. 7, 1976.

Patent application 758,446. Metal Chelate Derivatives of Anthracycline Antibiotics, and Method for Preparing Same. Filed Jan. 11, 1977.

Patent application 758,812. Aziridinyl Quinone Antitumor Agents. Filed Jan. 12, 1977.

Patent application 769,888. 1,2-Diaminocyclohexane Platinum (II) Complexes Having Antineoplastic Activity. Filed Feb. 18, 1977.

Patent 3,992,522. Temperature-Sensitive Recombinant Mutant Viruses and a Process for Producing Same. Filed June 18, 1975. Patented Nov. 16, 1976. Not available NTIS.

U.S. Department of the Navy

Assistant Chief for Patents, Office of Naval Research—
Code 302, Arlington, Va. 22217

Patent 3,922,223. Multiple Chromatographic Column System. Filed Mar. 25, 1974. Patented Nov. 25, 1975. Not available NTIS.

Patent 3,961,171. Method of Obtaining Correlation Between Certain Selected Samples of a Sequence. Filed Feb. 18, 1975. Patented June 1, 1976. Not available NTIS.

Patent 3,963,439. Multielectrode Apparatus and Techniques to Prepare Aligned Asbestos Fibers on a Thin Substrate. Filed Sept. 5, 1975. Patented June 15, 1976. Not available NTIS.

Patent 3,968,361. Laser Receiver Anti-Sun Circuit. Filed June 23, 1975. Patented July 6, 1976. Not available NTIS.

Patent 3,976,655. Method of Making 2,6-Bis(Methylamino) or 2,6-(Bis(Dimethylamino)Pyridines. Filed June 20, 1975. Patented Aug. 24, 1976. Not available NTIS.

Patent 3,976,656. 1,4 - Bis(5 - p-n-Butoxyphenyloxazol-2-yl) Benzene and the Preparation Thereof. Filed Jan. 20, 1975. Patented Aug. 24, 1976. Not available NTIS.

Patent 3,982,280. Functional Ankle for a Prosthetic Limb. Filed Oct. 6, 1975. Patented Sept. 28, 1976. Not available NTIS.

Patent 3,992,736. Expandable Element Check Valve. Filed Dec. 22, 1975. Patented Nov. 23, 1976. Not available NTIS.

Patent 3,993,577. Method for Production of Heat and Hydrogen Gas. Filed Dec. 8, 1975. Patented Nov. 23, 1976. Not available NTIS.

Patent 3,993,966. In-Line Waveguide to Coax Transition. Filed June 16, 1975. Patented Nov. 23, 1976. Not available NTIS.

Patent 3,995,480. Thermal Sensor for Measurement of Ocean Current Direction. Filed Aug. 8, 1975. Patented Dec. 7, 1976. Not available NTIS.

Patent 3,996,551. Chromium-Silicon Oxide Thin Film Resistors. Filed Oct. 20, 1975. Patented Dec. 7, 1976. Not available NTIS.

Patent 3,998,223. Syringe Apparatus. Filed Oct. 24, 1975. Patented Dec. 21, 1976. Not available NTIS.

Patent 3,999,331. Apparatus for Making High-Pressure Ports in Closed Hulls. Filed Aug. 4, 1975. Patented Dec. 28, 1976. Not available NTIS.

Patent 4,000,648. High Sensitivity Flowmeter. Filed Jan. 12, 1976. Patented Jan. 4, 1977. Not available NTIS.

Patent 4,002,824. Selective Zoom Camera and Display. Filed Jan. 28, 1976. Patented Jan. 11, 1977. Not available NTIS.

Patent 4,002,898. Single Mode Laser Multiterminal Optical Data Communication System. Filed Jan. 26, 1976. Patented Jan. 11, 1977. Not available NTIS.

Patent 4,004,000. Self-Limiting Chemical Systems for Nonpolluting Control of Noxious Pests. Filed July 8, 1975. Patented Jan. 18, 1977. Not available NTIS.

Patent 4,004,230. Critical Parameter Receiver Tester. Filed Dec. 29, 1975. Patented Jan. 18, 1977. Not available NTIS.

Patent 4,004,235. Phase-Locking Midpulse Detector. Filed Mar. 1, 1976. Patented Jan. 18, 1977. Not available NTIS.

Patent 4,004,415. Propellant for Liquid Propellant Gun. Filed Dec. 11, 1974. Patented Jan. 25, 1977. Not available NTIS.

Patent 4,004,515. Sequential Jet Shaped Charge. Filed Jan. 25, 1971. Patented Jan. 25, 1977. Not available NTIS.

Patent 4,004,516. Fuze. Filed Oct. 24, 1975. Patented Jan. 25, 1977. Not available NTIS.

Patent 4,005,632. Liquid Propellant Gun. Filed Sept. 15, 1975. Patented Feb. 1, 1977. Not available NTIS.

Patent 4,005,655. Inflatable Stabilizer/Retarder. Filed Feb. 2, 1976. Patented Feb. 1, 1977. Not available NTIS.

Patent 4,007,437. Acoustic Foghorn for Directional Signaling. Filed Aug. 20, 1975. Patented Feb. 8, 1977. Not available NTIS.

Patent 4,014,019. Real Time Analog Doppler Processor for Weather Radar. Filed Sept. 11, 1975. Patented Mar. 22, 1977. Not available NTIS.

Patent 4,015,257. Radar Detection of Turbulence in Precipitation. Filed Sept. 11, 1975. Patented Mar. 29, 1977. Not available NTIS.

National Aeronautics and Space Administration

Assistant General Counsel for Patent Matters, NASA—
Code GP–2, Washington, D.C. 20546

Patent application 643,043. Optically Selective, Acoustically Resonant Gas Detecting Transducer. Filed Dec. 22, 1975.

Patent application 687,251. Automated Clinical System for Chromosome Analysis. Filed May 16, 1976.

Patent application 704,180. Charge Transfer Reaction Laser With Preionization Means. Filed July 12, 1976.

Patent application 765,138. Dual Membrane, Hollow Fiber Fuel Cell. Filed Feb. 3, 1977.

Patent application 765,139. A Non-Tracking Solar Energy Collector System. Filed Mar. 2, 1977.

Patent application 765,165. Phase Array Antenna Control. Filed Feb. 3, 1977.

Patent application 765,167. Bit Error Rate Measurement Above and Below Bit Rate Tracking Threshold. Filed Mar. 2, 1977.

Patent application 766,999. Passive Intrusion Detection System. Filed Feb. 9, 1977.

Patent application 767,911. Multi-Purpose Wind Tunnel Reaction Control Model Block. Filed Feb. 11, 1977.

Patent application 769,149. Logarithmic Circuit With Wide Dynamic Range. Filed Feb. 16, 1977.

Patent application 772,168. Sequencing Device Utilizing Planetary Gear Set. Filed Feb. 25, 1977.

Patent application 778,195. Low Density Bismaleimide-Carbon Microballoon Composites. Filed Mar. 16, 1977.

Patent 3,988,933. Fluid Mass Sensor for a Zero Gravity Environment. Patented Nov. 2, 1976. Not available NTIS.

Patent 3,989,136. Guide for a Typewriter. Patented Nov. 2, 1976. Not available NTIS.

Patent 3,989,541. Solar Cell Assembly. Patented Nov. 2, 1976. Not available NTIS.

Patent 3,989,602. Method of Making Reinforced Composite Structure. Patented Nov. 2, 1976. Not available NTIS.

Patent 3,990,049. Selective Data Segment Monitoring System. Patented Nov. 2, 1976. Not available NTIS.

Patent 4,006,631. Magnetic Heading Reference. Patented Feb. 8, 1977. Not available NTIS.

Patent 4,006,999. Leading Edge Protection for Composite Blades. Patented Feb. 8, 1977. Not available NTIS.

Patent 4,007,430. Continuous Plasma Laser. Patented Feb. 8, 1977. Not available NTIS.

Patent 4,007,601. Tubular Sublimatory Evaporator Heat Sink. Patented Feb. 15, 1977. Not available NTIS.

Patent 4,010,455. Cyclical Bi-Directional Rotary Actuator. Patented Mar. 1, 1977. Not available NTIS.

U.S. Department of the Army

Office of Judge Advocate General, Patent Division,
Room 2C–455, Pentagon, Washington, D.C. 20310

Patent 3,943,517. Adaptive Polarization Receiving System. Filed Oct. 29, 1974. Patented Mar. 9, 1976. Not available NTIS.

Patent 3,967,444. Technique for Preventing Afterburning of the Inert Components of Solid-Propelled Rocket Motors by Using Formamidinesulfinic Acid in the Binder of the Inert Components. Filed Sept. 30, 1974. Patented July 6, 1976. Not available NTIS.

Patent 3,968,378. Electron Beam Driven Neutron Generator. Filed June 11, 1974. Patented July 6, 1976. Not available NTIS.

Patent 3,968,411. Transmitter-Receiver Protection Device. Filed Mar. 27, 1975. Patented July 6, 1976. Not available NTIS.

Patent 3,968,724. Method for Accurately Varying the Density of a Powder or Powder Charge, and Shrink Tubes for Use Therewith. Filed Oct. 3, 1974. Patented July 13, 1976. Not available NTIS.

Patent 3,969,628. Intense, Energetic Electron Beam Assisted X-Ray Generator. Filed Apr. 4, 1974. Patented July 13, 1976. Not available NTIS.

Patent 3,971 257. Laminar Jet Linear Accelerometer. Filed Aug. 14, 1975. Patented July 27, 1976. Not available NTIS.

Patent 3,971,989. Method and System for Absolute Measurement of Noise Power at All Radio Frequencies. Filed May 21, 1975. Patented July 27, 1976. Not available NTIS.

Patent 3,975,292. Method of Screening Infra-Red Radiation. Filed Oct. 1, 1963. Patented Aug. 17, 1976. Not available NTIS.

Patent 3,980,103. Fluidic Resistive Element. Filed Nov. 7, 1975. Patented Sept. 14, 1976. Not available NTIS.

Patent 3,980,880. Automatic Exposure Control Circuit for an Image Intensifier Camera. Filed Apr. 4, 1974. Patented Sept. 14, 1976. Not available NTIS.

Patent 3,982,219. Digital Pressure/Range Transducer. Filed Feb. 19, 1975. Patented Sept. 21, 1976. Not available NTIS.

Patent 3,982,244. Radar Antenna, Monopulse Comparator Network and Mixer Simulator. Filed June 30, 1975. Patented Sept. 21, 1976. Not available NTIS.

U.S. Department of the Air Force

AF/JACP, Washington, D.C. 20314

Patent 4,006,479. Method for Dispersing Metallic Particles in a Dielectric Binder. Filed Feb. 4, 1969. Patented Feb. 1, 1977. Not available NTIS.

U.S. Department of Agriculture

Research Agreements and Patent Mgmt. Branch, General Services Division, Federal Bldg., Agricultural Research Service, Hyattsville, Md. 20782

Patent 3,983,746. Road Roughness Meter. Filed Aug. 14, 1975. Patented Oct. 5, 1976. Not available NTIS.

U.S. Environmental Protection Agency

Room W513, 401 M St. SW.,
Washington, D.C. 20460

Patent 3,886,694. Ascension Pipe Cleaning Apparatus With Self-Indexing Suspension. Filed Sept. 26, 1974. Patented June 3, 1975. Not available NTIS.

Patent 3,960,732. System for Dewatering Dilute Slurries. Filed Nov. 1, 1974. Patented June 1, 1976. Not available NTIS.

Patent 3,976,457. In-Stack Filter Cell. Filed Aug. 13, 1975. Patented Aug. 24, 1976. Not available NTIS.

Patent 4,012,822. System for Sealing and Repairing Leaks in Ruptured Containers. Filed Mar. 22, 1977. Not available NTIS.

U.S. Department of Health, Education, and Welfare

National Institutes of Health, Chief, Patent Branch,
Westwood Bldg., Bethesda, Md. 20014

Patent application 753,945. Method and Apparatus for Air Caloric Testing for the Evaluation of Aural Vestibular Disorders. Filed Dec. 23, 1976.

Patent 3,993,064. One-Handed Syringe. Filed Mar. 27, 1975. Patented Nov. 23, 1976. Not available NTIS.

U.S. Department of the Interior

Branch of Patents, 18th and C Sts. NW.,
Washington, D.C. 20240

Patent application 750,745. Modified Horizontal Roof Strain Indicator. Filed Dec. 15, 1976.

Patent application 755,916. Window Method for Measuring Leakage. Filed Dec. 30, 1976.

Patent application 755,917. Borehole Aerostatic Ground Support System. Filed Dec. 30, 1976.

Patent 3,999,980. Fluxless Recovery of Metallic Aluminum From Wastes. Filed May 9, 1975. Patented Dec. 28, 1976. Not available NTIS.

Patent 4,000,621. Remote Sealing of Mine Passages Containing Flowing Water. Filed June 19, 1975. Patented Jan. 4, 1977. Not available NTIS.

U.S. Department of the Navy

Assistant Chief for Patents, Office of Naval Research—
Code 302, Arlington, Va. 22217

Patent application 699,412. Phase Detector for Optical Figure Sensing. Filed Mar. 22, 1976. Not available NTIS.

Patent 3,922,104. Tension Link Control Device. Filed Sept. 20, 1974. Patented Nov. 25, 1975. Not available NTIS.

Patent 3,983,636. Hydraulic Fluidic Level Control System. Filed June 19, 1975. Patented Oct. 5, 1976. Not available NTIS.

Patent 3,985,446. Remote Controlled, CRT Digital Display, LLLTV Camera-Sextant. Filed Aug. 27, 1974. Patented Oct. 12, 1976. Not available NTIS.

Patent 3,986,021. Passive Solar Tracking System for Steerable Fresnel Elements. Filed Oct. 24, 1975. Patented Oct. 12, 1976. Not available NTIS.

Patent 3,986,116. Transient Source and Direction of Propagation-Detector. Filed Jan. 27, 1975. Patented Oct. 12, 1976. Not available NTIS.

Patent 3,986,122. Reliable Communications System. Filed May 22, 1962. Patented Oct. 12, 1976. Not available NTIS.

Patent 3,991,383. Franz-Keldysh Effect Tuned Laser. Filed Mar. 28, 1975. Patented Nov. 9, 1976. Not available NTIS.

Patent 3,991,387. Method and Device for Synchronous Generation and Amplification of Tunable VUV Laser Radiation. Filed Nov. 19, 1975. Patented Nov. 9, 1976. Not available NTIS.

Patent 3,992,079. Frequency Tunable Acoustooptic Mode Filter. Filed Dec. 11, 1975. Patented Nov. 16, 1976. Not available NTIS.

Patent 3,992,613. TACAN Flying Target Control System. Filed Oct. 3, 1975. Patented Nov. 16, 1976. Not available NTIS.

Patent 3,992,619. Optical Scanner. Filed June 23, 1975. Patented Nov. 16, 1976. Not available NTIS.

Patent 3,992,692. Programmable Underwater Acoustic Beacon. Filed July 23, 1975. Patented Nov. 16, 1976. Not available NTIS.

Patent 3,999,879. Inflatable Roadway. Filed June 16, 1975. Patented Dec. 28, 1976. Not available NTIS.

Patent 4,000,613. Dual Mode Fluid Management System. Filed Feb. 13, 1975. Patented Jan. 4, 1977. Not available NTIS.

Patent 4,002,962. Phase Locked Servo Loop Circuit. Filed Oct. 1, 1973. Patented Jan. 11, 1977. Not available NTIS.

Patent 4,004,764. Drogue Chute Extraction. Filed May 13, 1974. Patented Jan. 25, 1977. Not available NTIS.

Patent 4,004,948. Paint-On Thermocouple. Filed May 29, 1975. Patented Jan. 25, 1977. Not available NTIS.

Patent 4,007,437. Acoustic Foghorn for Directional Signaling. Filed Aug. 20, 1975. Patented Feb. 8, 1977. Not available NTIS.

Patent 4,008,868. Aircraft Steering and Braking System. Filed Dec. 18, 1975. Patented Feb. 22, 1977. Not available NTIS.

Patent 4,009,323. Storage Battery Comprising Positive Electrode of a Graphite and Lithium Fluoride Compound. Filed May 12, 1975. Patented Feb. 22, 1977. Not available NTIS.

Patent 4,014,022. Target Detection Method and Apparatus for Reducing Range-Smearing Error Caused by Relative Target Motion. Filed June 16, 1975. Patented Mar. 22, 1977. Not available NTIS.

U.S. Department of the Army

Office of Judge Advocate General, Patent Division,
Room 2C–455, Pentagon, Washington, D.C. 20310

Patent 3,953,853. Passive Microwave Power Distribution Systems. Filed June 25, 1974. Patented Apr. 27, 1976. Not available NTIS.

Patent 3,959,794. Semiconductor Waveguide Antenna With Diode Control for Scanning. Filed Sept. 26, 1975. Patented May 25, 1976. Not available NTIS.

Patent 3,968,458. Microwave Power Reflector Using Edge-Guided Mode. Filed Sept. 26, 1975. Patented July 6, 1976. Not available NTIS.

Patent 3,971,536. Combined Helicopter Flight Controller. Filed June 10, 1975. Patented July 27, 1976. Not available NTIS.

Patent 3,971,618. Holding Device for Measuring the Capacity of Small Electrical Components. Filed Mar. 20, 1975. Patented July 27, 1976. Not available NTIS.

U.S. Department of Agriculture

Research Agreements and Patent Mgmt. Branch, General Services Division, Federal Bldg., Agricultural Research Service, Hyattsville, Md. 20782

Patent 3,981,738. Gluten Washing and Dewatering Device. Filed Feb. 18, 1976. Patented Sept. 21, 1976. Not available NTIS.

Patent 4,011,752. Adaptive Speed and Direction Analyzer. Filed Feb. 6, 1976. Patented Mar. 15, 1977. Not available NTIS.

Patent 4,018,755. Extraction of Proteins From Vegetable Seed Compositions. Filed May 12, 1975. Patented Apr. 19, 1977. Not available NTIS.

U.S. Environmental Protection Agency

Room W513, 401 M St. SW.,
Washington, D.C. 20460

Patent application 685,569. Wastewater Disposal System. Filed May 12, 1976.

U.S. Department of Health, Education, and Welfare

National Institutes of Health, Chief, Patent Branch,
Westwood Bldg., Bethesda, Md. 20014

Patent application 739,858. Enzyme-Resistant Opiate Pentapeptides. Filed Nov. 9, 1976.

U.S. Department of the Interior

Branch of Patents, 18th and C Sts. NW.,
Washington, D.C. 20240

Patent application 742,450. Improved Synthesis of Methotrexate. Filed Nov. 17, 1976.

Patent application 751,402. Clog-Free Inorganic Grout Emplacement Gun. Filed Dec. 16, 1976.

Patent 4,000,067. Method for Rapid Sedimentation of Fine Particles From Suspensions. Filed May 21, 1976. Patented Dec. 28, 1976. Not available NTIS.

Patent 4,002,563. Regular Copolyamides as Desalination Membranes. Filed May 23, 1975. Patented Jan. 11, 1977. Not available NTIS.

U.S. Department of the Navy

Assistant Chief for Patents, Office of Naval Research—Code 302, Arlington, Va. 22217

Patent 3,935,574. Signal Source Position-Determining Process. Filed Apr. 15, 1974. Patented Jan. 27, 1976. Not available NTIS.

Patent application 685,867. Magnetostrictive Transducer. Filed May 12, 1976.

Patent application 689,894. Cable Brake and Lock. Filed May 25, 1976.

Patent application 696,952. Variable Jet Nozzle With Balanced Two Dimensional Blocker Flap. Filed Apr. 14, 1976.

Patent application 720,310. Igniter. Filed Sept. 3, 1976.

Patent 3,940,607. Photo-Electric Lightning Detector Apparatus. Filed Dec. 9, 1974. Patented Feb. 24, 1976. Not available NTIS.

Patent 3,949,682. Towline Therml Protection System. Filed June 10, 1974. Patented Apr. 13, 1976. Not available NTIS.

Patent 3,990,345. Intervalometer. Filed June 24, 1974. Patented Nov. 9, 1976. Not available NTIS.

Patent 3,992,666. Technique for Detecting Energy and Determining the Frequency of Constituent Energy Components. Filed Jan. 27, 1975. Patented Nov. 16, 1976. Not available NTIS.

Patent 4,000,757. High Gain Fluid Amplifier. Filed Dec. 4. 1975. Patented Jan. 4, 1977. Not available NTIS.

Patent 4,003,458. Fail Safe Centrifugal Clutch. Filed July 31, 1975. Patented Jan. 18, 1977. Not available NTIS.

Patent 4,007,437. Acoustic Foghorn for Directional Signaling. Filed Aug. 20, 1975. Patented Feb. 8, 1977. Not available NTIS.

National Aeronautics and Space Administration

Assistant General Counsel for Patent Matters, NASA—Code GP–2, Washington, D.C. 20546

Patent application 775,239. Automatically Lockable Axially Extensible Strut. Filed Mar. 7, 1977.

Patent 4,004,292. System for Producing Chroma Signals. Patented Jan. 18, 1977. Not available NTIS.

Patent 4,007,623. Spring Operated Accelerator and Constant Force Spring Mechanism Therefor. Patented Feb. 15, 1977. Not available NTIS.

Patent 4,008,407. Nuclear Thermionic Converter. Patented Feb. 15, 1977. Not available NTIS.

U.S. Department of the Air Force

AF/JACP, Washington, D.C. 20314

Patent 4,005,363. Range Resolving Ground Line Sensor. Filed Oct. 22, 1974. Patented Jan. 25, 1977. Not available NTIS.

Patent 4,005,414. Method for Providing Means to Eliminate Ambiguous Polarization Effects on Phase and Amplitude of Radar Backscatter Due to Unknown Target Aspect Angle. Filed June 24, 1975. Patented Jan. 25, 1977. Not available NTIS.

U.S. Department of Agriculture

Research Agreements and Patent Mgmt. Branch. General Services Division. Federal Bldg., Agricultural Research Service, Hyattsville, Md. 20782

Patent 4,002,769. Insect Maturation Inhibitors. Filed Aug. 1. 1975. Patented Jan. 11, 1977. Not available NTIS.

U.S. Environmental Protection Agency

Room W513, 401 M St. SW., Washington, D.C. 20460

Patent 3,857,777. Ion Exchange Membrane for Measuring Orthophosphate. Filed Aug. 10, 1973. Patented Dec. 31, 1974. Not available NTIS.

Patent 3,944,822. Polarization Excitation Device for X-Ray Fluorescence Analysis. Filed Sept. 30, 1974. Patented Mar. 16, 1976. Not available NTIS.

Patent 3,948,769. Ligand Exchange Process for Removal of Ammonia. Filed Apr. 8, 1974. Patented Apr. 6, 1976. Not available NTIS.

Patent 3,966,431. Waste Stone Oxidation and Recarbonization. Filed Feb. 21, 1975. Patented June 29, 1976. Not available NTIS.

U.S. Department of Health, Education, and Welfare

National Institutes of Health. Chief. Patent Branch, Westwood Bldg., Bethesda, Md. 20014

Patent application 734,129. Homocysteine Thiolactone Perchlorate and a Method of Making Same. Filed Oct. 20, 1976.

U.S. Department of the Interior

Branch of Patents, 18th and C Sts. NW., Washington, D.C. 20240

Patent application 738,201. Preparation and Use of High Surface Area Transition Metal Catalysts. Filed Nov. 3, 1976.

Patent application 749,583. Beneficiation of Olivine Foundry Sand by Differential Attrition Grinding. Filed Dec. 12, 1976.

Patent application 749,586. Foam Injection Leaching Process for Fragmented Ore. Filed Dec. 10, 1976.

Patent 4,002,428. Deductive Method for Measuring Ion Concentration Electrically. Filed May 21, 1976. Patented Jan. 11, 1977. Not available NTIS.

Patent 4,002,975. Electro-Optic Measurement of Voltage on High-Voltage Power Lines. Filed Feb. 26, 1976. Patented Jan. 11, 1977. Not available NTIS.

U.S. Department of the Navy

Assistant Chief for Patents, Office of Naval Research—Code 302, Arlington, Va. 22217

Patent application 734,833. Diving Helmet Breech Ring Connection. Filed Oct. 22, 1976.

Patent application 747,461. Sealant-Primer Coating. Filed Dec. 13, 1976.

Patent application 750,087. Prosthetic Implant Suitable for the Plateau of a Joint, and Method of Making the Same. Filed Dec. 13, 1976.

Patent application 751,308. Soft Abrasive Disc. Filed Dec. 16, 1976.

Patent application 761,189. Means for Sensitizing Liquid Explosives Abstract of the Disclosure. Filed Jan. 21, 1977.

Patent 3,937,951. All-Sky Photoelectric Lightning Detector Apparatus. Filed Dec. 9, 1974. Patented Feb. 10, 1976. Not available NTIS.

Patent 3,961,964. Coating Composition for Suppressing Combustion of Titanium Metal. Filed Oct. 24, 1973. Patented June 8, 1976. Not available NTIS.

Patent 3,989,792. Method for Fabricating a Consumable Cartridge, Casing. Filed Apr. 1, 1974. Patented Nov. 2, 1976. Not available NTIS.

Patent 3,992,976. Liquid Propellant Gun. Filed Sept. 12, 1975. Patented Nov. 23, 1976. Not available NTIS.

Patent 3,992,997. Warhead Casing. Filed Mar. 31, 1975. Patented Nov. 23, 1976. Not available NTIS.

Patent 3,992,998. Warhead, Penetrating Nose Shape. Filed Feb. 10, 1975. Patented Nov. 23, 1976. Not available NTIS.

Patent 3,994,231. Guided Missile Warhead Fuze. Filed Dec. 8, 1971. Patented Nov. 30, 1976. Not available NTIS.

Patent 3,994,895. Product and Process for Protecting Split Line of a Movable Nozzle. Filed Oct. 21, 1974. Patented Nov. 30, 1976. Not available NTIS.

Patent 3,997,914. Analog Encoder Decoder Circuit. Filed Feb. 2, 1976. Patented Dec. 14, 1976. Not available NTIS.

Patent 3,998,124. Bomb Rack Arming Unit. Filed June 2, 1975. Patented Dec. 21, 1976. Not available NTIS.

Patent 3,998,408. Remote Elevated Platform. Filed Feb. 19, 1976. Patented Dec. 21, 1976. Not available NTIS.

Patent 4,004,975. Method of Isolating and Cryopreserving Human White Cells From Whole Blood. Filed Dec. 30, 1975. Patented Jan. 25, 1977. Not available NTIS.

Patent 4,005,357. Electrostatic Field Sensor. Filed Feb. 13, 1976. Patented Jan. 25, 1977. Not available NTIS.

Patent 4,005,423. Synthetic Aperture Radar Utilizing a Low-Speed Analog-to-Digital Converter. Filed July 9, 1975. Patented Jan. 25, 1977. Not available NTIS.

Tennessee Valley Authority

Division of Law
Muscle Shoals, Ala. 35660

Patent 4,017,589. Production of Ammonium Polyphosphates From Melamine Phosphates. Filed Mar. 17, 1976. Patented Apr. 12, 1977. Not available NTIS.

National Aeronautics and Space Administration

Assistant General Counsel for Patent Matters, NASA—Code GP–2, Washington, D.C. 20546

Patent application 564,622. Improvement in Combustion Engine. Filed Apr. 2, 1975.

Patent application 694,407. A Reverse Osmosis Membrane of High Urea Rejection Properties. Filed June 9. 1976.

Patent application 750,798. Process for Purification of Waste Water Produced by a Kraft Process Pulp and Paper Mill. Filed Dec. 15, 1976.

Patent application 755,310. A Method for Aerosol Analysis by Thermoluminescence. Filed Dec. 29, 1976.

Patent application 760,795. Detection of Microbial Infection in Blood and Antibiotic Determinations. Filed Jan. 19, 1977.

Patent application 763,753. In-Situ Laser Retorting of Oil Shale. Filed Jan. 28, 1977.

Patent application 769,148. Contour Detector and Data Acquisition System for the Left Ventricular Outline. Filed Feb. 18, 1977.

Patent application 772,165. Simulator for Practicing the Mating of an Observer-Controlled Object With a Target. Filed Feb. 25, 1977.

Patent application 772,167. Device for the Detection of Phenol and Related Compounds. Filed Feb. 25, 1977.

Patent application 776,029. Apparatus and Method for Reducing Thermal Stress in a Turbine Rotor. Filed Mar. 4. 1977.

Patent application 776,146. Formulated Plastic Separators for Soluble Electrode Cells. Filed Mar. 10, 1977.

Patent 4,003,257. Analysis of Volatile Organic Compounds. Patented Jan. 18, 1977. Not available NTIS.

Patent 4,007,434. Notch Filter. Patented Feb. 8, 1977. Not available NTIS.

Patent 4,007,891. Engine Air Intake System. Patented Feb. 15, 1977. Not available NTIS.

Patent 4,008,348. Particulate and Solar Radiation Stable Coating for Spacecraft. Patented Feb. 15, 1977. Not available NTIS.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF OCTOBER 8, 1977

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	6-22-76
GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	1-3-77
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	2-1-77
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	10-22-76
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	10-27-76
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales.	8-18-76
SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	6-15-76
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	1-7-77
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating.	10-12-76
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	7-9-76
DESIGNS, GROUP 290—C. D. QUARFORTH, Director Industrial Arts; Household, Personal and Fine Arts.	3-24-76
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—D. J. STOCKING, Director Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	9-1-76
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus: Plastics Working Apparatus; Plastic Block and Earthenware Apparatus: Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks.	3-17-77
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—G. M. FORLENZA, Director Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	11-1-76
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GAY, Director Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication.	11-1-76
GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director Joints; Fasteners; Rod, Pipe and Electrical Connectors: Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines.	2-3-77

Expiration of patents: The patents within the range of numbers indicated below expire during October 1977, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents .... Numbers 2,954,560 to 2,958,080, inclusive

Plant Patents .... Numbers 1,974 to 1,977, inclusive

REISSUES

NOVEMBER 8, 1977

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 29,467

BENZYLCYANO-AMIDES

Manasse Nussim, Netanya; Ezra Levy, Peta-Tikva, and Jacob Naiman, Netanya, all of Israel, assignors to Plantex, Ltd., Netanya, Israel

Original No. 3,910,984, dated Oct. 7, 1975, Ser. No. 309,758, Nov. 27, 1972. Application for reissue Sept. 13, 1976, Ser. No. 722,355

Claims priority, application Israel, Dec. 20, 1971, 38412

Int. Cl.² C07C *121/75*

U.S. Cl. 260—465 D **1 Claim**

1. α-cyano-3,4,5-trimethoxy-dihydrocinnamamide.

Re. 29,468

PROCESS FOR MAKING A C_1-C_7 ALIPHATIC HYDROCARBYL ESTER OF AN N-[2,6-DI(C_1-C_7 ALKYL)PHENYL] α-AMINOCARBOXYLIC ACID

Anthony B. Clayton, New Castle County, Del., assignor to Hercules Incorporated, Wilmington, Del.

Original No. 3,882,162, dated May 6, 1975, Ser. No. 405,610, Oct. 11, 1973. Application for reissue July 1, 1976, Ser. No. 701,723

Int. Cl.² C07C *101/447*

U.S. Cl. 560—43 **7 Claims**

1. A process for synthesizing a C_1-C_7 aliphatic hydrocarbyl ester of an N-[2,6-di(C_1-C_7 alkyl)phenyl] α-aminocarboxylic acid from the corresponding 2,6-di(C_1-C_7 alkyl)aniline and the corresponding [chlorocarboxylic] *chloroacetic* acid ester, which comprises effecting with a catalytic quantity of 2,6-*di*(C_1-C_7 alkyl)aniline hydrochloride reaction of said aniline and said ester.

Re. 29,469

HYDROXYLATED 15-DEOXY DERIVATIVES OF 9-HYDROXYL-13-TRANS-PROSTENOIC ACID

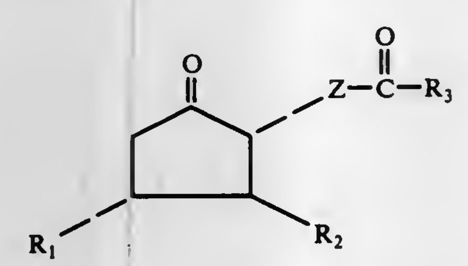
Middleton Brawner Floyd, Jr., Suffern, N.Y.; William James McGahren, Demarest, N.J.; Robert Eugene Schaub, Upper Saddle River, N.J., and Martin Joseph Weiss, Oradell, N.J., assignors to American Cyanamid Company, Stamford, Conn.

Original No. 3,950,406, dated Apr. 13, 1976, Ser. No. 480,989, June 19, 1974. Continuation-in-part of Ser. No. 274,769, July 24, 1972, abandoned. Application for reissue May 3, 1976, Ser. No. 682,691

Int. Cl.² C07C *177/00*

U.S. Cl. 560—121 **39 Claims**

1. An optically active compound of the formula:



or a racemic compound of that formula and the mirror image thereof wherein R_1 is selected from the group consisting of hydroxy, [lower alkoxy, tetrahydropyranyloxy, lower alkanoyloxy,] *methoxy, ethoxy and* ω-hydroxy substituted [lower] alkoxy [and ω-tetrahydropyranyloxy substituted lower alkoxy] *having from 2 to 4 carbon atoms;* R_2 is a moiety selected from the group consisting of those of the formulae:

$$[-CH{=}CH-\underset{}{\overset{CH_2OH}{\overset{|}{C}H}}-R' \text{ and } -CH{=}CH-CH_2-R'']$$

-continued

$$-\underset{H}{\underset{|}{C}}{=}\overset{H}{\overset{|}{C}}{=}\overset{CH_2OH}{\overset{|}{C}H}-R' \text{ and } -\underset{H}{\underset{|}{C}}{=}\overset{H}{\overset{|}{C}}-CH_2-R''$$

wherein R′ is selected from the group consisting of [a straight chain alkyl group having from 2 to 10 carbon atoms and a straight chain alkyl group having from 2 to 6 carbon atoms and having one branched alkyl group of from 1 to 3 carbon atoms] *n-propyl, n-butyl and n-pentyl,* and R″ is a *a moiety* selected from the group consisting of [a straight chain alkyl group having from 2 to 10 carbon atoms and substituted with an hydroxy group, a stright chain alkyl group having from 2 to 6 carbon atoms and having one branched alkyl group of from 1 to 3 carbon atoms and substituted with an hydroxy group, a straight chain alkenyl group having from 2 to 10 carbon atoms and substituted with an hydroxy group and a straight chain alkenyl group having from 2 to 6 carbon atoms and having one branched alkyl group of from 1 to 3 carbon atoms and substituted with an hydroxy group;] *those of the formulae:*

$$-Y-(CH_2)_m-CH_3,\ -CH_2-Y-(CH_2)_2-CH_3,$$

$$-(CH_2)_5-OH,\ -Y-\overset{trans}{\overline{CH{=}CH}}-(CH_2)_p-CH_3 \text{ and}$$

$$-Y-CH_2-\overset{cis}{CH{=}CH}-(CH_2)_q-CH_3$$

wherein m is an integer from 3 to 5, inclusive, p is an integer from 1 to 3, inclusive, q is zero, 1 or 2, and y is

$$-\underset{OH}{\underset{|}{\overset{H}{\overset{|}{C}}}}-;$$

R_3 is selected from the group consisting of hydroxy[,] *and* alkoxy having from 1 to [12] *4* carbon atoms [and tetrahydropyranyloxy]; and Z is a divalent radical selected from the group consisting of those of the formulae:

$$-(CH_2)_n-[,\ -(CH_2)_n-\underset{R_4}{\underset{|}{\overset{R_4}{\overset{|}{C}}}}-CH_2-,\ -(CH_2)_n-\overset{R_5}{\overset{|}{C}H}-,$$

$$-(CH_2)_n-O-CH_2- \text{ and } -(CH_2)_n-S-CH_2-]$$

$$\textit{and } -(CH_2)_4-O-CH_2-$$

wherein n is an integer from [3] *6* to 8, inclusive[, R_4 is an alkyl group having up to 3 carbon atoms, and R_5 is selected from the group consisting of an alkyl group having up to 3 carbon atoms, a fluorine atom and a phenyl group]; and the pharmacologically acceptable cationic salts thereof when R_3 is hydroxy.

Re. 29,470

CONTROL MECHANISMS FOR DOCUMENT-HANDLING APPARATUS

Alan P. Jones, Levittown, Pa., assignor to Brandt-Pra, Inc., Cornwells Heights, Pa.

Original No. 3,870,868, dated Mar. 11, 1975, Ser. No. 273,999, July 21, 1972. Application for reissue Mar. 29, 1976, Ser. No. 671,074

Int. Cl.² G06M *7/06*

U.S. Cl. 235—92 SB **17 Claims**

1. A sensor for detecting the presence of gaps between documents fed in a first direction at spaced intervals with said gaps occurring between the trailing edge of a document and the leading edge of the next document, said sensor comprising:

a light source positioned to one side of the path of movement of the documents;

light sensitive means positioned to receive light of maximum intensity from said light source when the trailing edge of each document passes said light sensitive means to activate said light sensitive means and to receive light of a minimum intensity when a document is positioned between said light sensitive means and said source, said light sensitive means developing a signal at its output which varies with the intensity of light;

energy storage means;

first means coupled to said light sensitive means output for rapidly charging said energy storage means when said light sensitive means is activated by light of maximum intensity;

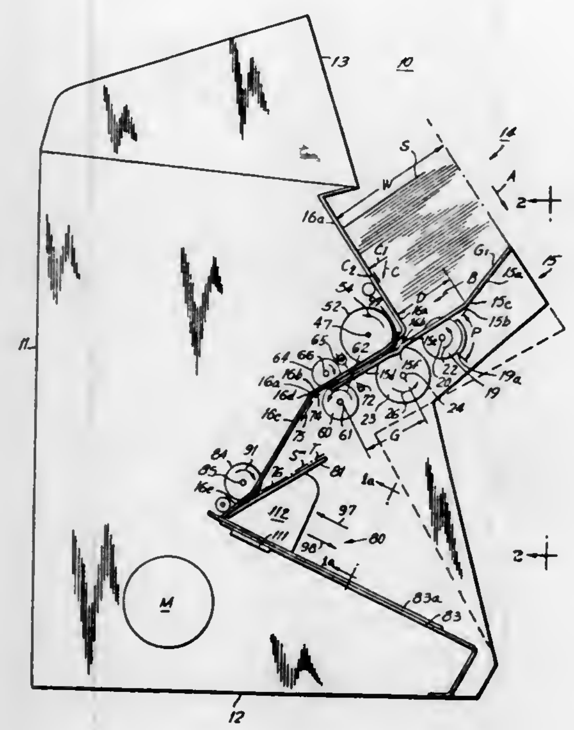
comparator means *normally maintained at a first output signal level and* having first and second inputs for generating [an] *a second* output signal *level different from said first output signal level* when the signal level at its first input exceeds the signal level at its second input;

said first input being coupled to the output of said light sensitive means;

second means coupled between said [first] *energy storage* means and said comparator means second input for coupling a portion of the signal level developed by said storage means to said second input;

said second means providing a discharge path for said energy storage means and being adapted to cause said energy storage means to discharge at a rate much slower than the charging rate to cause a substantial portion of the signal level developed by said storage means to be retained when said light sensitive means is deactivated due to the movement of the document past said light source;

storage means coupled to said comparator means and being charged to a first level when said comparator means develops said first output signal level and being discharged towards a second lower level when said comparator means develops an output which is at said second output signal level;



logical gating means responsive only to the simultaneous presence of said comparator means second output signal level and the discharge of said storage means to said second lower level to generate a count pulse representative of the passage of a document.

PLANT PATENTS

GRANTED NOVEMBER 8, 1977

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

4,143
CARNATION NAMED RENEGADE
David A. Krapes, Arvada, Colo., assignor to Denver Wholesale Florists Company, Denver, Colo.
Filed Oct. 7, 1976, Ser. No. 730,660
Int. Cl.^{2} A01H *5/00*
U.S. Cl. Plt.—73 **1 Claim**

1. A new and distinct variety of carnation plant, substantially as herein shown and described, characterized by its high production of medium sized red flowers borne on long sturdy stems, and by the very sparse occurrence of splits and bullheading.

4,144
APPLE TREE
Robert B. Gordon, 8115 Ocean View Ave., Whittier, Calif. 90602
Filed Oct. 29, 1976, Ser. No. 736,955
Int. Cl.^{2} A01H *5/03*
U.S. Cl. Plt.—34 **1 Claim**

1. A new and distinct variety of apple tree substantially as shown and described, characterized as to novelty by the abundant production of medium to large size apples having a beautiful green and red coloring suitable for growing in the mild climatic coastal regions of Southern California, by the flesh of said apples which is crisp, firm, fine textured and very juicy and has a sweet-tart flavor and a distinct aroma making the apples excellent for both eating and cooking, by its long flowering period that commences early in April and continues throughout the month of May, by the deep deep pink color of the petals at the time the flowers first open, said deep pink color of the petals becoming progressively lighter pink as the flowers approach maturity and becoming a very pale pink at full maturity, by the early maturing of the fruit and by its long bearing season that provides ripe apples commencing in mid August and continuing until mid October, and by its vigorous, dense, upright growth habit that provides an attractive tree suitable for residential planting as well as for orchard use.

4,145
MAGNOLIA TREE
Carl H. Specht, North Salem, N.Y., assignor to Brooklyn Botanic Garden Corporation, Brooklyn, N.Y.
Filed Nov. 15, 1976, Ser. No. 741,800
Int. Cl.^{2} A01H *5/00*
U.S. Cl. Plt.—51 **1 Claim**

1. A new and distinct variety of magnolia tree as herein described and illustrated, characterized by the tepals of the flower being a clear yellow with the outermost whorl slightly tinged with green.

4,146
***ILEX VERTICILLATA* BUSH NAMED WINTER RED**
Robert C. Simpson, 1504 Wheatland Road, Vincennes, Ind. 47591
Filed Dec. 1, 1976, Ser. No. 746,477
Int. Cl.^{2} A01H *5/00*
U.S. Cl. Plt.—65 **1 Claim**

1. A new and distinct variety of *Ilex verticillata* plant as herein shown and described, characterized by abundant fruit and the retention of the brilliant red fruit coloration, retaining this characteristic from October through March, its easy propagation from cuttings, and its vigorous growth habit.

4,147
AFRICAN VIOLET PLANT — PAULA
Werner Schwantje, Newark, Calif., assignor to Sunnyside Nurseries, Inc., Hayward, Calif.
Filed Jan. 3, 1977, Ser. No. 756,116
Int. Cl.^{2} A01H *5/00*
U.S. Cl. Plt.—69 **1 Claim**

1. A new and distinct variety of African Violet as described and illustrated.

PATENTS

GRANTED NOVEMBER 8, 1977

ERRATA

For CLASS	See PATENT NO.
407-114	4,056,871
407-114	4,056,872
075-00.5 R	4,056,874
043-003	4,056,890
214-777	4,057,161
366-123	4,057,222
366-172	4,057,223
366-336	4,057,224
366-157	4,057,225
366-244	4,057,226
366-002	4,057,227
366-079	4,057,228
200-016 D	4,057,520
542-428	4,057,545
544-182	4,057,546
544-184	4,057,547
424-305	4,057,556
548-305	4,057,558
560-121	4,057,571
560-053	4,057,572
560-052	4,057,573
560-053	4,057,574
560-245	4,057,575
423-127	4,057,611
235-413	4,057,708
235-145 R	4,057,710
364-600	4,057,711
364-426	4,057,712
364-476	4,057,713
364-494	4,057,714
364-494	4,057,715
364-802	4,057,717
362-249	4,057,718
365-076	4,057,786
365-104	4,057,787
365-174	4,057,788
365-189	4,057,789
560-121	4,057,851

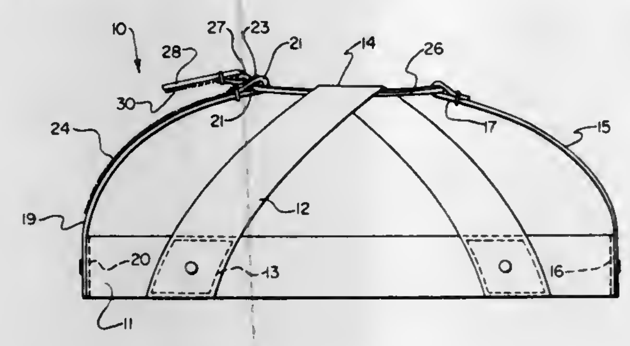
PATENTS

GRANTED NOVEMBER 8, 1977

NOTE—A cross reference listing of applications published under the second Trial Voluntary Protest Program is located in the back of this Issue. These entries will be in numerical order by document publication number.

GENERAL AND MECHANICAL

4,056,852
ADJUSTABLE HELMET SUSPENSION SYSTEM
John H. Greendale, Holliston, Mass., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.
Filed Apr. 19, 1976, Ser. No. 678,334
Int. Cl.² A42B *3/00*
U.S. Cl. 2—417 **10 Claims**



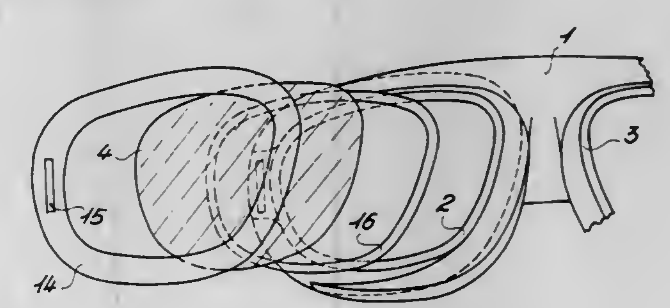
1. In an adjustable helmet suspension system for adjusting the height at which a helmet is worn on the head comprising a headband sized to fit snugly within said helmet and to be attached to the inner surface of said helmet at a plurality of points, a front suspension strap attached at one end thereof to said headband at approximately the midpoint of the front of said headband and having a loop formed at the free end thereof, and a rear suspension strap attached at one end thereof to said headband at approximately the midpoint of the rear of said headband and having a loop formed at the free end thereof, the improvement which comprises, a continuous strand of cord having two ends, said continuous strand of cord being threaded through the loops of said front and rear suspension straps in such a way as to form a doubled strand of said cord to support said front and rear suspension straps in operating position resting against the head of the wearer, said doubled strand being adjustable in circumference by having each of said two ends of said continuous strand of cord forming said doubled strand attached to a tab which comprises the hook elements of a hook and pile fastener and by having the pile element of said hook and pile fastener attached to said rear suspension strap, said pile element and said hook elements cooperating for adjustably fastening said tab at various positions along said rear suspension strap and firmly holding said tab with said doubled strand of cord adjusted to greater or smaller circumferences, said suspension straps being thereby rendered adjustable so that the ends thereof through which said continuous strand is threaded are spaced farther apart or closer together on the head of the wearer by the adjustment of the circumference of said doubled strand of cord, whereby the height at which a helmet containing said adjustable helmet suspension system is supported on the head of the wearer is adjustable.

4,056,853
SYSTEM FOR LOCKING, IN AN EASILY DISENGAGEABLE MANNER, THE LENSES TO EYEGLASSES, SPORTIVE SWIMMING GOGGLES OR DIVING MASKS AND SIMILAR GENERAL SPORTIVE ARTICLES, AND THE RESULTING ARTICLES
Franco Bottazzini, and Laura Donati, both of Genoa, Italy, assignors to K.D. Ottica s.n.c., Genoa, Italy
Filed May 25, 1976, Ser. No. 689,886
Claims priority, application Italy, May 26, 1975, 12621/75
Int. Cl.² A61F *9/02;* G02C *3/02*
U.S. Cl. 2—443 **3 Claims**

1. A readily disengageable locking assembly for the lenses of eyeglasses, swimming goggles, diving masks and the like, comprising:

a lightweight, relatively rigid, plastic body having two rearwardly-disposed, countersunk seats having planar bottoms, lying in the same plane, each of which is configured to accommodate a packing and a lens, and each of which has a forwardly-disposed, oppositely-arranged, outwardly-flaring, U-shaped rim with the ends of the rim directed toward the respective lateral ends of said body, said rims each having a groove formed therein along the inner periphery thereof, said body also having at each lateral end thereof a casing having an elongated slit extending therethrough, perpendicular to the planar bottoms of said seats;

a packing disengageably received within each of said countersunk seats;

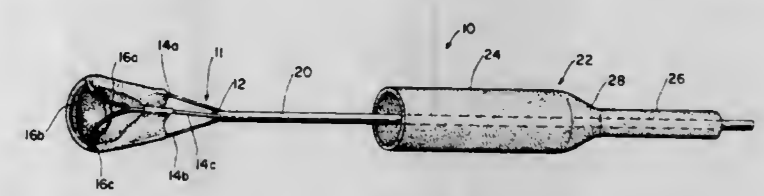


a lens disengageably received within each of said packed countersunk seats;

a frame, disengageably and slidably received within said groove of each of said rims, for maintaining said lenses and packing in a correct position with respect to said seats, said frames each having a corresponding slit formed therein which, when fully inserted in said groove of said rims, is aligned with said slit of said casings; and

a disengageable locking member insertable within said slits of said frames and casing, to effect locking of said assembly.

4,056,854
AORTIC HEART VALVE CATHETER
John W. Boretos, Rockville, Md., and Robert A. Poirier, Rochester, Minn., assignors to The United States of America as represented by the Department of Health, Education and Welfare, Washington, D.C.
Filed Sept. 28, 1976, Ser. No. 727,528
Int. Cl.² A61F *1/22*
U.S. Cl. 3—1.5 **8 Claims**



1. A prosthetic valve device for remote placement in a major blood vessel to take over the function of a malfunctioning natural valve comprising:

an expansible valve support;

means biasing said support toward an open configuration to sealingly engage the interior walls of the blood vessel in which it is to be placed;

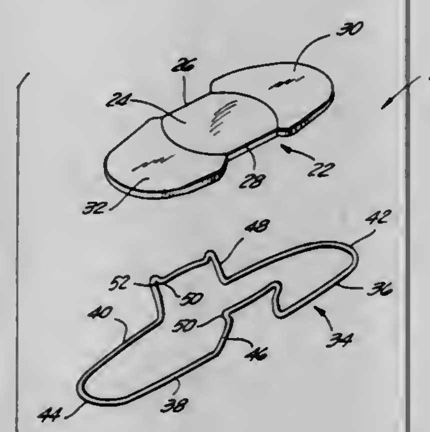
check valve means in said support to block flow through said support in one direction;

means to constrict said support in a closed configuration such that said device may be navigated through a blood vessel to a desired point of placement;

means to remotely position said device through a blood vessel to a desired point of placement; and

means to remotely remove said means to constrict from said support at a desired point of placement.

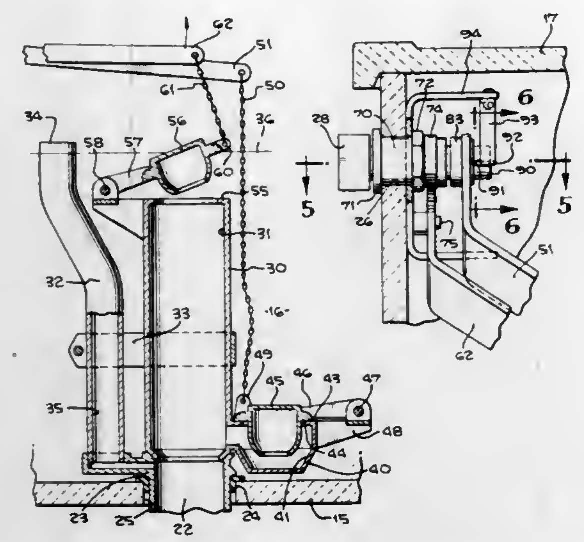
4,056,855
INTRAOCULAR LENS AND METHOD OF IMPLANTING SAME
Charles Kelman, 150 E. 58th St., New York, N.Y. 10022
Filed Apr. 7, 1976, Ser. No. 674,392
Int. Cl.² A61F *1/16, 1/24*
U.S. Cl. 3—13 **4 Claims**



3. An intraocular lens adapted to be implanted in the eye comprising; a lens member, a support wire having a predetermined configuration so as to have surfaces thereon for mounting the wire in the eye and surfaces thereon for receiving the lens member in coupled interengagement therewith after the wire is mounted in the eye, the supporting wire being resilient and including an elongated loop forming a base and having a pair of upstanding integral aligned legs extending intermediate the ends of the longer sides of the base, each leg terminating in an inwardly extending arcuate flange to form a recess therebetween, the lens being substantially elliptical in configuration and being slightly larger than the distance between the legs of the supporting wire when in relaxed position to that upon application of sufficient pressure to separate the resilient legs of the supporting wire away from one another the lens can be snapped into position in the recesses formed by the opposing flanges on the legs whereby a release of the legs and their tendency to return to the relaxed configuration will engage and hold the lens in position, the base being extendable into the posterior portion of the eye to be held in fixed position therein and in turn permitting the legs to extend into the anterior portion of the eye and hold the interengaged lens in position for use in the eye.

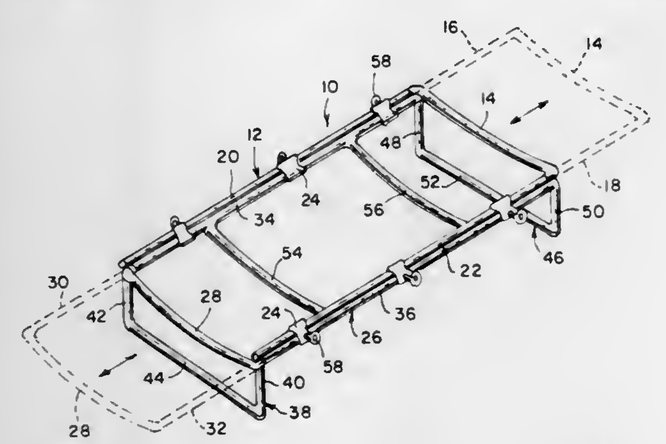
4,056,856
WATER SAVER
John Reid, 2704 Eric Court, Bakersfield, Calif. 93306, and Walter W. Stiern, 2901 Skyline Blvd., Bakersfield, Calif. 93305
Filed May 10, 1976, Ser. No. 684,485
Int. Cl.² E03D *1/22, 5/09;* G05G *1/10*
U.S. Cl. 4—67 A **8 Claims**

1. In a flush tank which has a chamber for water, a float controlled inlet valve and a flush outlet, a flush mechanism comprising a standpipe at the outlet, having a low level discharge passageway, a high level passageway, and a valve element for each passageway, a full flush lever having a captive end means mounted on the flush tank with a free end attached to the low level valve element and a partial flush lever having a captive end means pivotally mounted on the flush tank with a free end attached to the high level valve element, an operating shaft having a pivotal mounting on said flush tank and a handle, a positive drive between said shaft and said full flush lever and a free sliding engagement with said partial flush lever during rotation of said shaft in one direction, said shaft having in the opposite, rotational direction a positive drive with the partial flush lever and a free sliding engagement with the full flush lever, a radially retractable key means on the shaft, the captive end means of one of said levers having a shoulder and an adjacent space with the shoulder facing one



side of the key means, the captive end means of the other of said levers having a shoulder and adjacent space with the shoulder facing the opposite side of the key means whereby rotation of the shaft in one direction operates one only of said levers and in the other direction only the other of said levers.

4,056,857
CONVERTIBLE BACKPACK AND COT CONSTRUCTION
Reginald L. Quantz, 413 Magellan Place, Richmond, Canada
Filed July 19, 1976, Ser. No. 706,235
Int. Cl.² A45F *4/06*
U.S. Cl. 5—112 **6 Claims**



1. A convertible backpack and cot construction comprising:

a first horizontal substantially U-shaped tubular frame having an extensible bight portion and a first pair of telescoping leg assemblies connected to said bight portion said leg assemblies including relatively movable inner and outer legs, said inner legs being movable relative to said outer legs and connected to said bight portion permitting the extension of said bight portion relative to said outer legs;

a second horizontal substantially U-shaped tubular frame having an extensible bight portion and a second pair of telescoping leg assemblies connected to said bight portion said leg assemblies including relatively movable inner and outer legs, said inner legs being movable relative to said outer legs and connected to said bight portion permitting the extension of said bight portion relative to said outer legs;

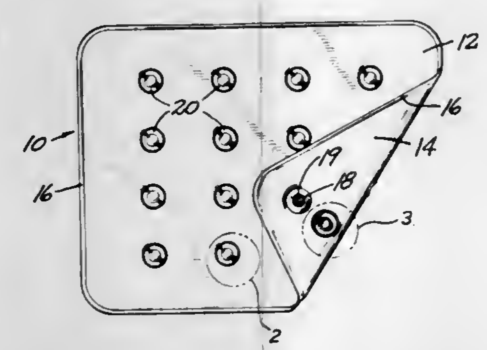
the outer legs of said first and second telescoping leg assemblies of said first and second tubular frames being in abutment;

means for retaining the outer legs of said first and second leg assemblies in abutment;

a first and second vertical substantially U-shaped frame having their legs depending from opposite ends of the second pair of telescoping leg assemblies of said second horizontal U-shaped tubular frame with the bight portions of each vertical frame being adapted to support said horizontal frames on a surface; and

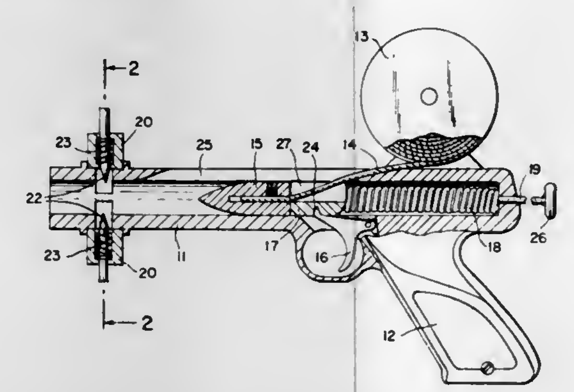
cover means for said horizontal and vertical frames.

4,056,858
INFLATABLE CUSHION AND METHOD OF MAKING THE SAME
Carl W. Weber, 201 N. Main St., Van Buren, Ohio 45889
Filed Oct. 31, 1975, Ser. No. 627,521
Int. Cl.² A47C *4/54;* B32B *31/04*
U.S. Cl. 5—365 **2 Claims**



1. In an inflatable cushion comprising two sheets of flexible thermoplastic sheet material bonded marginally and at substantially uniformly spaced intervals and having a valved inflation opening, the improvement wherein each of the spaced bonds comprises a heated bonded area of less thickness than the combined thickness of said sheets and including a plurality of closely spaced integral ribs projecting from one face, said area being surrounded by an integral reinforcing portion of greater thickness than the bonded area and greater thickness than the combined thicknesses of said sheets, and including an integral marginal rib projecting between the portions of the sheets encircled by said endless bond.

4,056,859
WIRE STRINGING DEVICE
Joseph L. Pace, Brooklyn, N.Y., assignor to Lawrence Peska Assoc., New York, N.Y.
Filed Feb. 6, 1976, Ser. No. 655,968
Int. Cl.² E21C *29/16;* F41B *7/00;* B21F *1/00*
U.S. Cl. 7—14.1 R **3 Claims**



1. An electricians wire stringing assistance device comprising:

a. A barrel carried upon a laterally outstanding gripping handle, said barrel having a cylindrical bore therein, which is closed at the rearward base end and open at the forward muzzle end and with a forward extending portion, extending forwardly of the handle, a longitudinal slot in the forward extending portion of the barrel opposite of the handle, terminating in an abutment adjacent to the muzzle end thereof;

b. means for dispensing flexible line, said means being mounted on the barrel adjacent to the base end of the slot and adapted for feeding the line into the slot;

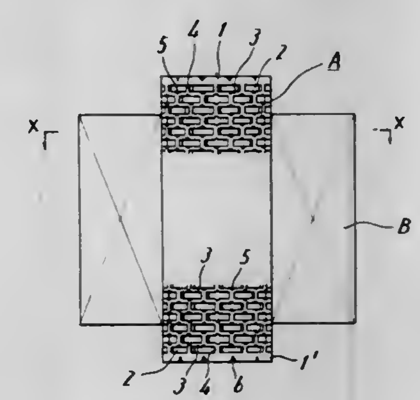
c. a spring within the bore abutting against the base end of the barrel and being adapted to drive forwardly toward the muzzle end of the barrel when released from a compressed position in the rear portion thereof;

d. a slotted piston carried within the bore against the forward end of the spring including compression means for drawing the piston rearward in order to compress the spring, the slot of said piston being adjacent to the slot of said barrel and adapted for guiding the line as the wire is fed into the slot of the barrel;

e. a trigger mounted to the handle and adapted for engaging the piston and holding the spring in a compressed position and for releasing the piston in response to finger pressure, thereby permitting a dart, set within the barrel and affixed to the line, to be projected from the device carrying the line to its destination; and

f. a cutter means situated on the barrel between the muzzle end of the barrel and the muzzle end of the barrel slot, adapted for stripping and cutting the line after the dart has been projected and the line carried to its destination which cutter means includes a rotatable housing with spring loaded blades adapted for insertion into the bore, whereby the line can be stripped and cut upon rotation of the housing.

4,056,860
METHOD OF DYEING WOUND UP YARN
Nobutaka Ono, Ashiya, Japan, assignor to Osaka Bobbin Kabushiki Kaisha, Japan
Filed Jan. 22, 1976, Ser. No. 651,333
Claims priority, application Japan, Oct. 13, 1975, 50-123708
Int. Cl.² D06B *5/18*
U.S. Cl. 8—155.1 **3 Claims**



1. A method of dyeing wound-up yarns spun by a fine spinning frame and wound into cops, comprising the steps of:

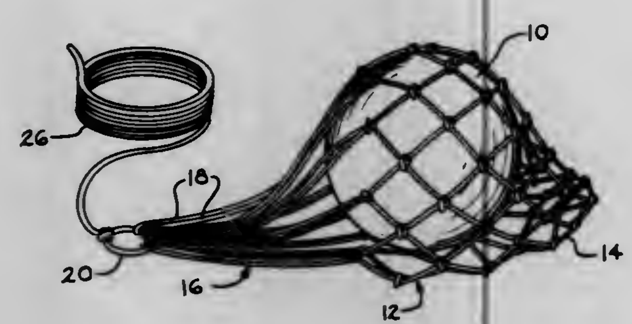
a. winding up yarns from the cops directly into cheeses on compressible bobbins which are contractable in the axial and radial directions when compressed axially and carrying out the winding under a yarn tension substantially equal to the maximum of the fluctuating yarn tensions which occur during unwinding from the cops,

b. piling at least two bobbins having cheese wound thereon one atop another in end-to-end relationship on a spindle of a carrier to form a bobbin pile,

c. axially compressing the bobbins so as to effect axial and radial contraction of the bobbins to an extent sufficient to uniformly relax the yarns due to slackening of the yarns in the direction of winding traverse on the bobbins and due to contraction of the bobbins in the radial direction, and

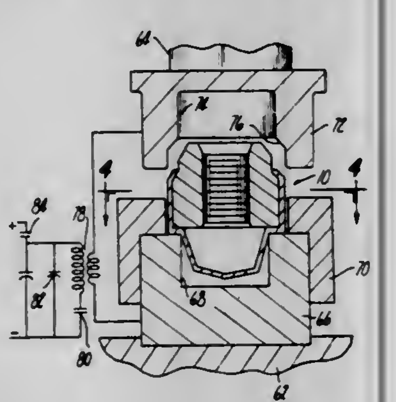
d. dyeing the cheeses while the bobbins are maintained in the compressed state with the yarns uniformly relaxed.

4,056,861
BUOYANT LIFE-SAVING DEVICE
James L. Cornforth, 728 Wayne St., Jackson, Mich. 49201
Continuation of Ser. No. 631,510, Nov. 13, 1975, abandoned. This application Dec. 3, 1976, Ser. No. 747,101
Int. Cl.² B63C *9/00*
U.S. Cl. 9—14 **6 Claims**



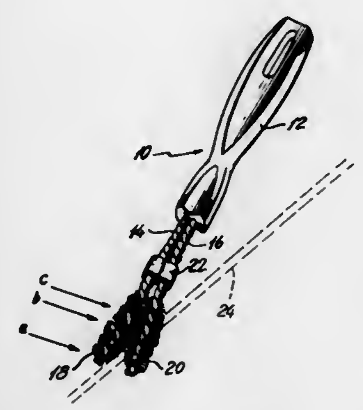
1. A life-saving device having, in combination, a sole buoyant member of sufficient weight to permit being thrown, and a flexible net-like web envelope surrounding and confining said buoyant member, said web being formed of a buoyant material and having openings of sufficient dimension to permit said web to be readily grasped through said openings, said web envelope being substantially larger than said buoyant member but small enough to effectively support a swimmer when the net is grasped whereby said web envelope is loosely disposed about said buoyant member when said member is floating permitting said web to float and spread away from said member on the surface of the water to facilitate grasping by a swimmer.

4,056,862
METHOD AND APPARATUS FOR FORMING A WHEEL NUT WITH WELDED CAP
Joseph W. Chaivre, and Albert A. Jadach, both of Royal Oak, Mich., assignors to Towne Robinson Fastener Company, Southfield, Mich.
Continuation-in-part of Ser. No. 672,746, April 1, 1976. This application July 30, 1976, Ser. No. 710,256
Int. Cl.² B21D *53/24*
U.S. Cl. 10—72 R **10 Claims**



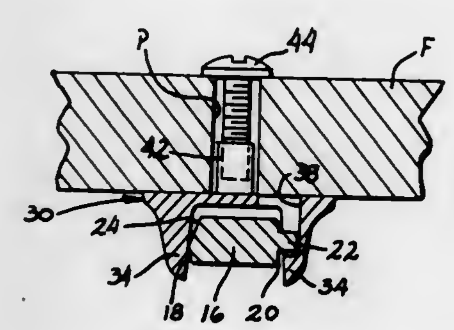
1. The method of forming a wheel nut having polygonal wrench flats, a conical wheel engaging end, and a stainless steel sheath which covers the wrench flats and the end of the nut opposite to the conical end and terminates adjacent the joinder between the wrench flats and the conical end, comprising: bringing a first electrode into pressured contact with the conical nut end; bringing a second electrode into pressured contact with a section of the sheath directly overlying the nut to exert forces between the sheath and the nut in the area adjacent to that contacted by the second electrode; and passing an electric pulse having a duration of less than 30 microseconds and a peak current in excess of 50,000 amperes, between said first and second electrodes, to form a weld between the contacting surfaces of the sheath and the nut at said areas adjacent to the section contacted by the second electrode without deleterious metallurgical changes occurring in the surface of the sheath contacted by said second electrode.

4,056,863
GRILL CLEANING BRUSH
Armen G. Gunjian, 11270 Boulevard l'Acadie, Montreal, Quebec, Canada
Filed Aug. 2, 1976, Ser. No. 710,667
Int. Cl.² A46B *3/18*
U.S. Cl. 15—160 **2 Claims**



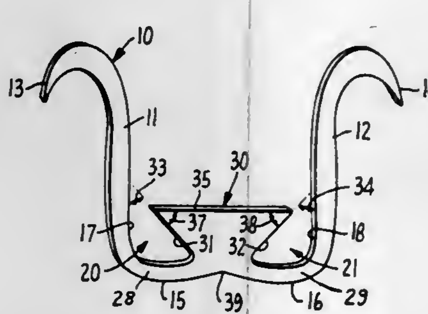
1. An improved grill cleaning brush comprising a handle, a pair of straight shanks extending from said handle in substantially parallel contiguous relation, and a cleaning element carried by each shank remote from said handle, each cleaning element being in the form of high tensile wire bristles radiating from the respective shank along an end portion thereof, said bristles being densely arranged and resisting intermeshing of said cleaning elements wherein said shanks would normally diverge from said handle, and a clip encircling said shanks adjacent said cleaning elements and spaced from said handle, said clip maintaining said shanks in said parallel relation between said handle and said clip, said clip further forcing said bristles of the two cleaning elements into meshing engagement with the resistance of said bristles to such meshing engaging effecting a diverging of said shanks beyond said clip and said cleaning elements automatically assuming a V relationship defining a V-shaped end portion on said brush for receiving a grill rib therebetween, said wire bristles being tightly engaged in overlapping relation adjacent said clip and constantly defining a positive cleaning bridge for preventing a grill rib to pass between said cleaning elements to said clip even when a high cleaning pressure is applied.

4,056,864
BACK AND BAIL ASSEMBLY
Edwin J. Driesenga, Zeeland, Mich., assignor to Keeler Corporation, Grand Rapids, Mich.
Filed Oct. 28, 1975, Ser. No. 625,830
Int. Cl.² A47B *95/02*
U.S. Cl. 16—126 **17 Claims**



1. A furniture hardware assembly comprising a handle and a pair of back members for pivotally attaching said handle on furniture; each of said back members including attachment means for attaching said back member to furniture and a pair of spaced, generally opposing wall surfaces, at least one of said wall surfaces including a recess closed at one end; said handle including a pair of legs, each leg including projection means extending from only one side thereof for insertion in said recess of one of said back members; said recess being of sufficient size to receive only said projection means but not the remainder of either side of said leg; means on the opposite side of said leg from said projection means for rotating said leg into said back member without contact between said opposite side of said leg and the other of said wall surfaces opposite said wall surface including said recess, said means including a cut-away portion on the opposite side of each of said legs from said projection means providing the clearance room for rotating each of said legs and its respective back member with respect to one another without such contact whereby said leg is positioned between said wall surfaces after said projection means is inserted in said recess; said opposite side of said leg being in adjacent and abutting relationship to said other wall surface without being pivotally joined to or received in any portion of said other wall surface; each of said legs being retained in its respective back member after insertion by engagement between said projection means on only one side of said leg and said closed end of said recess although each leg appears to be pivotally connected to each wall surface.

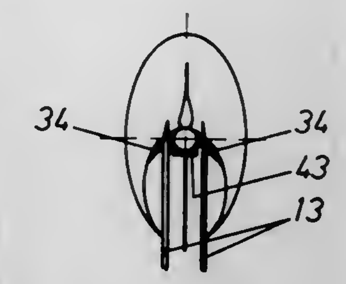
4,056,865
POULTRY TRUSSING RETAINER
John Keen Cloyd, Turlock, Calif., assignor to Volk & Son Manufacturing Co., Inc., Turlock, Calif.
Filed Dec. 10, 1976, Ser. No. 749,217
Int. Cl.² A22C *21/00*
U.S. Cl. 17—1 S **11 Claims**



1. A dressed poultry trussing retainer comprising:
a pair of arms, joined at one end by an interconnecting flap, each arm having at its other end an outwardly-extending finger for grasping the bone structure of the poultry carcass,
said flap being resilient and rotatable relative to said arms so that the tail of the poultry may be tucked between said arms,
said arms and flap defining a pair of sockets that receive and secure the exposed hocks of the poultry,
whereby said fingers grasp the bone structure of the poultry carcass while said sockets receive and retain the hocks.

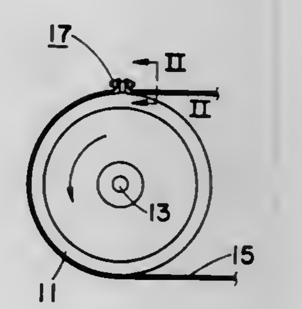
4,056,866
FISH PROCESSING MACHINES
Werner Wenzel, Lubeck, Germany, assignor to Nordischer Maschinenbau Rud. Baader, Lubeck, Germany
Filed Apr. 8, 1976, Ser. No. 675,117
Int. Cl.² A22C *25/16*
U.S. Cl. 17—57 **5 Claims**

1. A filleting machine for filleting fish wherein said fish are transported belly-side-down and head end leading along a conveying path, said machine comprising
a pair of space-apart belly filleting knives for making respective incisions in the belly of a fish transported along said conveying path, to provide separated flank fillets at opposite sides of the belly cavity,
a pair of spaced-apart bone knives located downstream of said belly filleting knives along said path and positioned to extend upwardly through the belly cavity of the fish and to cut upwardly through the vertebral appendages on either side of the fish backbone whereby to separate said vertebral appendages from said backbone without cutting the flank fillets from the fish.



a pair of rib knives located downstream of said bone knives and arranged to extend into said belly cavity for cutting the severed vertebral appendages from said flank fillets while leaving the latter intact with said backbone,
and a pair of back knives located downstream of said rib knives for cutting the flank fillets from said fish.

4,056,867
ELEVATOR BELT SPLICE
Edward Wert, and Chester Donald Fisher, both of Muncy, Pa., assignors to Koppers Company, Inc., Pittsburgh, Pa.
Filed Aug. 24, 1976, Ser. No. 717,258
Int. Cl.² F16G *3/08*
U.S. Cl. 24—37 **4 Claims**

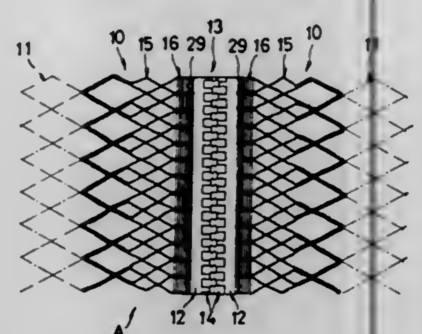


1. In a splicer for a belt comprising juxtaposed splicer elements between which is a spacer element, with belt ends disposed between the spacer element and the splicer elements, and with adjustable means for drawing the splicer elements toward each other and the spacer element thereby compressing the belt end portions, the improvement comprising:
a. the splicer elements having a plurality of belt contacting surfaces, said belt contacting surfaces disposed on the ends of the splicer elements,
b. a spacer element having a plurality of belt contacting surfaces, said belt contacting surfaces disposed on the opposing surfaces of the spacer element on the ends thereof,
c. first means projecting from said belt contacting surfaces of said splicer means, said first projecting means adapted to engage said belt ends; and
d. second means projecting from said belt contacting surfaces of said spacer means, said second projecting means adapted to engage said belt ends.

4,056,868
NET JOINTING STRUCTURE
Hiroyuki Ebata, Uozu, Japan, assignor to Yoshida Kogyo K.K., Japan
Filed Sept. 29, 1976, Ser. No. 727,797
Claims priority, application Japan, Oct. 4, 1975, 50-120061
Int. Cl.² A44B *19/00*
U.S. Cl. 24—205.16 C **3 Claims**

1. A net jointing structure for jointing together confronting ends of a primary net structure, which jointing structure comprises a pair of warp knitted net adapters; each adapter having

a net transition region disposed for connection to a respective end of the primary net structure, and a web region bearing a stringer of a sliding clasp fastener, the stringers associated with said adapters being selectively interengageable to releaseably join said adapters together along a junction line; said net transition region having a mesh structure defined by warp chains, said mesh structure including adjoining regions of different



mesh size arranged with the smallest mesh size region adjoining said web region and the largest mesh size region being that for connection to said end of the primary net structure; warp chains of said net transition region extending into said web region transversely to said junction line and forming a part of said web region; said web region further including inlaid threads connecting and fastening together the warp chains in said web region.

4,056,869

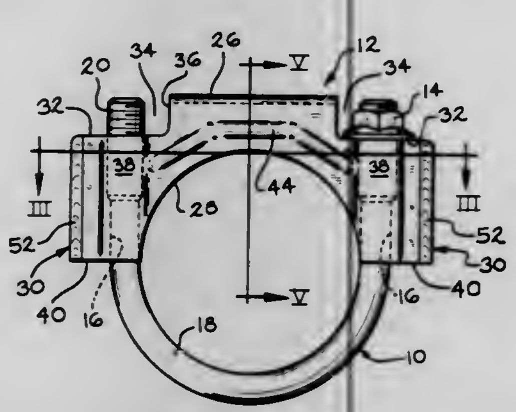
WELDED MUFFLER CLAMP

Benjamin J. Eisma, Jr., Grand Rapids, Mich., assignor to Sparton Corporation, Jackson, Mich.

Filed Jan. 19, 1977, Ser. No. 760,812

Int. Cl.² B65D *63/00*

U.S. Cl. 24—277 **9 Claims**



1. A clamp for tubular cylindrical members comprising, in combination, a U-bolt having a pair of parallel, threaded legs interconnected by a base portion of a semi-circular configuration, a sheet metal saddle bridging said legs having a pair of spaced, parallel elongated openings for receiving said legs, said saddle including an inner edge of a concave circular segment configuration in opposed relation to said base portion, spaced lateral edges and a rear edge intermediate said openings, a notch defined in said rear edge adjacent each lateral edge defining a nut engaging surface, said openings each intersecting a notch and nut engaging surface, said saddle comprising first and second portions of sheet metal folded back upon itself at said rear edge, said openings being defined by elongated semi-cylindrical recesses defined in said portions aligning to define cylindrical openings upon said portions being folded upon each other, weld means interconnecting said first and second portions at said lateral edges, and nuts threaded upon said legs engaging said nut engaging surfaces.

4,056,870

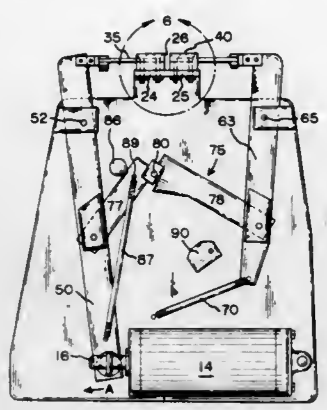
HAND HELD POWERED METAL CLINCHING TOOL

Elmer E. Biloff, 18289 Thomas Lane, Shafter, Calif. 93263

Filed Aug. 2, 1976, Ser. No. 710,547

Int. Cl.² B23P *11/00, 19/00;* **B25B** *25/00, 27/00*

U.S. Cl. 29—21.1 **7 Claims**



1. A hand held powered metal clinching device including a hand holdable base plate, a forming unit comprising axially aligned opposed punch and die members adapted to sequentially pierce, tab and swage contiguous sheets of metal disposed in a channel defined in said forming unit between said punch and said die, and a reciprocable power source for actuating and driving said punch and die members, the improvement comprising:

an integrated sequential timing and drive mechanism disposed between and interconnecting said forming unit and said power source so as to transmit power and movement from said power source to said forming unit to move said punch and said die in a predetermined sequence of integrated operations, said mechanism including,

a driver bar rotatably mounted to said plate and adapted to interconnect said punch and said power source,

a slave bar pivotally mounted to said plate in spaced relation to said drive arm and having an end thereof connected to said die, means biasing said slave arm to urge said die in a direction away from said punch, and

means interconnecting said driver bar and slave bar for transmission of timed power and motion therebetween, comprising a collapsible link, said link adapted to assume a rigid posture during the piercing, tabing and swaging motion of said forming unit, and adapted to collapse upon completion of swaging to cycle the forming unit to its starting position.

4,056,871

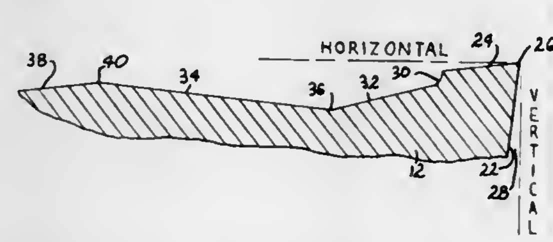
CUTTING INSERT

James S. Bator, Latrobe, Pa., assignor to Kennametal Inc., Latrobe, Pa.

Filed Oct. 21, 1976, Ser. No. 734,452

Int. Cl.² B26D *1/00*

U.S. Cl. 407—114 **17 Claims**



1. A molded indexable cutting insert formed of a hard wear resistant material and comprising a polygonal body having top and bottom faces wherein at least one of said faces comprises: at least two cutting edges defining a plane and formed by the juncture of said peripheral wall with said one of said faces; a land area extending inwardly toward the center of said polygonal body from said cutting edges; a fillet radius extending downwardly from the innermost edge of said land area; a first substantially planar wall portion extending from the bottom of said fillet and inclined downwardly from the plane of said cutting edges toward the center of said polygonal body in the range of from 5° to 15°; a second substantially planar wall portion extending from the inner edge of said first planar wall toward the center of said body and inclined upwardly toward the plane of said cutting edges in the range of from 5° to 30°, said second planar wall terminating in a central face area formed on the center portion of said polygonal body.

4,056,872

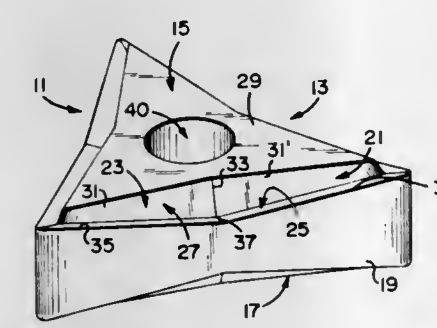
POSITIVE RAKE CUTTING INSERT FOR USE IN NEGATIVE RAKE HOLDERS

Heinz H. Seidel, Warren, Mich., assignor to GTE Sylvania Incorporated, Stamford, Conn.

Continuation of Ser. No. 619,209, Oct. 3, 1975, abandoned. This application Feb. 28, 1977, Ser. No. 772,662

Int. Cl.² B26D *1/00*

U.S. Cl. 407—114 **4 Claims**



1. In a cutting insert adapted for forming positive back and side rake angles with the surfaces of a workpiece to be cut when said insert is mounted in a negative rake holder, wherein said cutting insert includes a body portion having substantially parallel upper and lower surfaces and peripheral side substantially perpendicular to said upper and lower surfaces, at least one channel extending from the entire outer edge of at least one planar peripheral side portion to the adjacent edge of at least one surface, said channel including an inner and an outer portion, said outer portion forming an angle less than ninety degrees with said peripheral side portion, and extending inwardly therefrom to adjoin said inner portion, said inner portion extending inwardly to adjoin said one surface at an angle greater than 90°, the improvement comprising:

said inner portion and said outer portion each consisting of two substantially straight face portions intersecting at a common juncture substantially centrally located within said channel, said straight face portions of both the inner portion and the outer portion of said channel extending downwardly toward the interior of the body portion of the insert to form an angle within the range of from about 121° to about 127° between said conjunctive straight face portions of said inner and outer portions of said channel, respectively.

4,056,873

COMPOSITE GUIDE ROLLER FOR A ROLLING MILL

Jacques Cassard, Grenoble; Jean-Michel Lachenal, Vizille, and Gerard Romagnolo, Eybens, all of France, assignors to Ugine Carbone, Grenoble, France

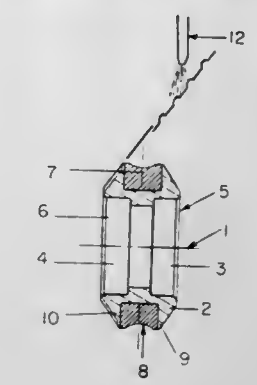
Filed Dec. 13, 1976, Ser. No. 749,835

Claims priority, application France, Dec. 19, 1975, 75.39792

Int. Cl.² B21B *31/08*

U.S. Cl. 29—132 **5 Claims**

1. A guide roller for supporting elongated products in a hot rolling mill including a hub, means defining an opening through said hub dimensioned to encircle a support shaft extending therethrough, means defining oppositely disposed recesses in said hub configured to receive supporting bearing devices therewithin, an annular ring supported on said hub and including means defining a peripheral groove to contact and guide the product, said hub being fabricated from a metallic material of lower density than steel, and said annular ring being fabricated from a hard refractory material selected from the



group consisting of metallic carbides, nitrides, carbonitrides, borides, ceramics based on metal oxides, and metal/metal oxide mixtures.

4,056,874

PROCESS FOR THE PRODUCTION OF CARBON FIBER REINFORCED MAGNESIUM COMPOSITE ARTICLES

Ilmar L. Kalnin, Millington, N.J., assignor to Celanese Corporation, New York, N.Y.

Filed May 13, 1976, Ser. No. 686,192

Int. Cl.² B32B *15/14*

U.S. Cl. 75—.5 R **12 Claims**

1. In a process for the formation of a carbon fiber reinforced composite article wherein carbon fibers are incorporated in a magnesium containing metallic matrix comprising (a) providing said carbon fibers in contact with a molten magnesium containing metal while at a temperature above the melting point of said metal, and (b) cooling the resulting magnesium containing metal having said carbon fibers incorporated therein to a temperature below the melting point of said metal; the improvement comprising providing in said molten magnesium containing metal when contacted with said carbon fibers prior to said cooling a minor quantity of dispersed solid magnesium nitride sufficient to enhance the wettability of said carbon fibers by said magnesium containing metal.

4,056,875

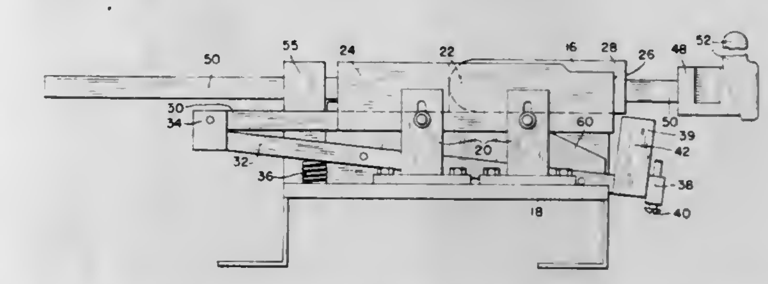
ASSEMBLING HAND GRIPS ONTO HANDLES

Edwin J. Buczak, 145 Wildwood Ave., Worcester, Mass. 01603

Filed July 2, 1976, Ser. No. 702,021

Int. Cl.² B23P *19/04*

U.S. Cl. 29—234 **5 Claims**

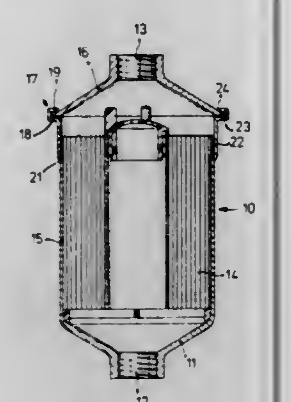


1. A machine for applying open ended grips to free ended handles comprising a base, means receiving a grip with an open end in a predetermined position, a sliding bar, means for holding an end of a handle on the sliding bar in a position to have a free end of the handle associated with the open end of the grip,

a guide aligning the free end of the handle with the open end of the grip, and means on the bar moving the guide out of the way as the bar is moved to thrust the handle into the grip,

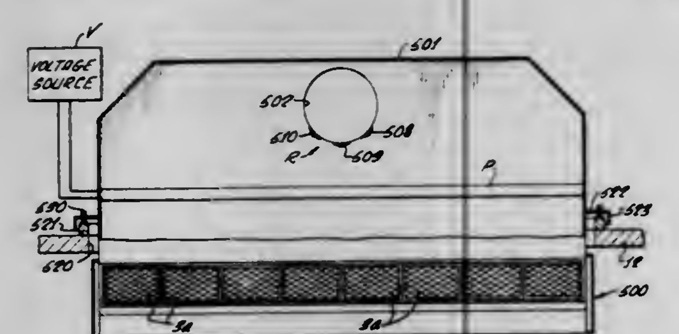
said guide also including means for engaging the sides of the grip to position the open end of the same laterally with respect to the free end of said handle.

4,056,876
METHOD OF MAKING A FILTER
Heinz Lämmermann, Nurnberg, Germany, assignor to Robert Boasch GmbH, Stuttgart, Germany
Filed Sept. 10, 1976, Ser. No. 722,214
Claims priority, application Germany, Oct. 25, 1975, 2547904
Int. Cl.² B65B *7/00*
U.S. Cl. 29—469.5 **9 Claims**



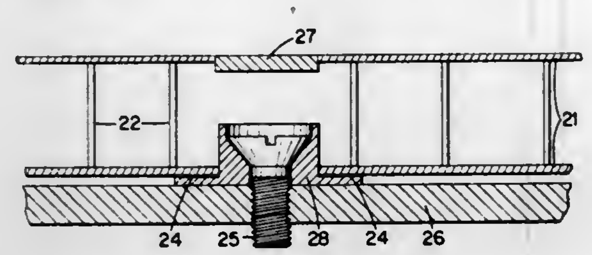
1. A method of closing a metal filter can comprising the steps of sequentially:
providing around an annular shoulder adjacent the rim of an open side of said filter can an annular line of a hot-melt adhesive in nonliquid form;
applying a metal cover over said open side with its edge in contact with said annular line of adhesive in nonliquid form;
bending over said rim around said edge and thereby pressing said edge against said line and through said line against said shoulder;
heating the bent over rim to melt said adhesive; and
curing said adhesive.

4,056,877
METHOD OF INSTALLING APPARATUS FOR EXTRACTING GREASE AND SMOKE
Irvin R. Kuechler, San Bernardino, Calif., assignor to Vent-Cair, Inc., San Bernardino, Calif.
Division of Ser. No. 509,555, Sept. 26, 1974, Pat. No. 3,952,640. This application Aug. 25, 1975, Ser. No. 607,283
Int. Cl.² B23P *21/00*
U.S. Cl. 29—469 **14 Claims**



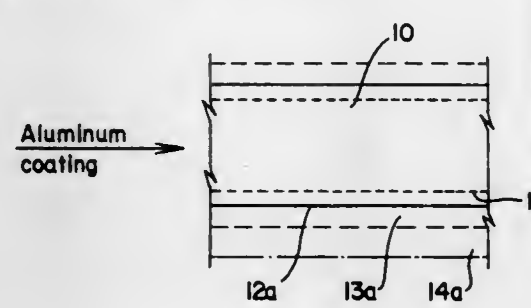
1. A method of installing a grease hood, which comprises:
a. providing a restaurant kitchen ceiling having a hole therethrough sufficiently large to receive a premanufactured grease hood,
b. dropping said premanufactured grease hood from the exterior of said kitchen at least part of the way downwardly through said hole,
c. supporting said grease hood in a desired position in spaced relationship above a cooking appliance in said kitchen, with at least part of said grease hood below the elevation of said ceiling,
d. providing exhaust means which extend upwardly through said hole from said hood, and
e. effecting closing of said hole around said exhaust means to prevent water from entering the kitchen.

4,056,878
METHOD OF FIXING A SANDWICH PANEL TO A SUPPORT
George Edward Woodley, Great Abington, England, assignor to Ciba-Geigy AG, Basel, Switzerland
Continuation of Ser. No. 611,730, Sept. 9, 1975, abandoned. This application Dec. 29, 1976, Ser. No. 755,607
Claims priority, application United Kingdom, Sept. 17, 1974, 40372/74
Int. Cl.² B23P *19/00*
U.S. Cl. 29—526 R **7 Claims**



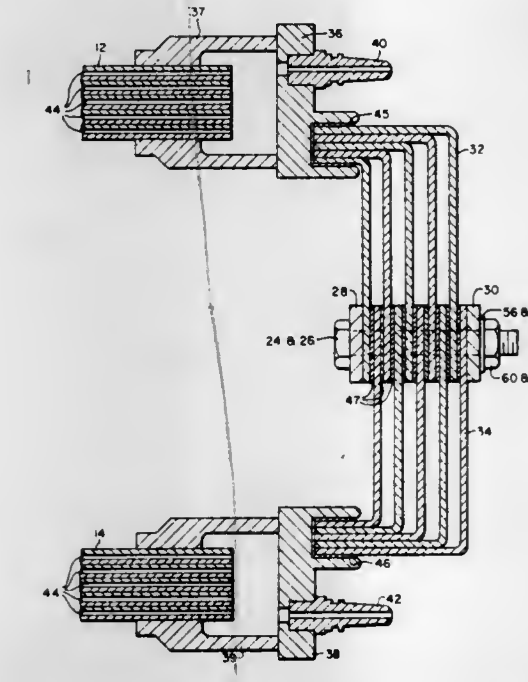
1. A method of fixing a sandwich panel having two spaced opposed skins and a core joining said skins to a support member, comprising:
inserting into a hole in one skin of said panel a cylindrical body portion of a ferrule having a hollow cylindrical body portion with an exterior flange on one end thereof and a seat within said cylindrical body portion at the same end as said exterior flange and said seat having an aperture therein of a size sufficient to pass the shank of a fastening element having a shank with a head thereon, the inserting of said ferrule being continued until said flange is against the outside of said one skin;
bonding said flange to the outside of said one skin;
placing the sandwich panel against the support member in the desired position with the skin of the panel having the flange of the ferrule bonded thereto against the support member; and
passing the shank of a headed fastening element having a shank with a head thereon through said aperture in said seat from inside said cylindrical body portion and into said support member until said head is against said seat and securing said shank to said support member;
whereby there can be used a fastening element which has a shank which is only long enough to extend through said seat and to the desired depth into said support member.

4,056,879
METHOD OF FORMING SILICON SOLAR ENERGY CELL HAVING IMPROVED BACK CONTACT
Joseph Lindmayer, Bethesda, Md., assignor to Solarex Corporation, Rockville, Md.
Division of Ser. No. 614,619, Sept. 18, 1975, Pat. No. 3,990,097. This application July 14, 1976, Ser. No. 705,063
Int. Cl.² B01J *17/00*
U.S. Cl. 29—572 **9 Claims**



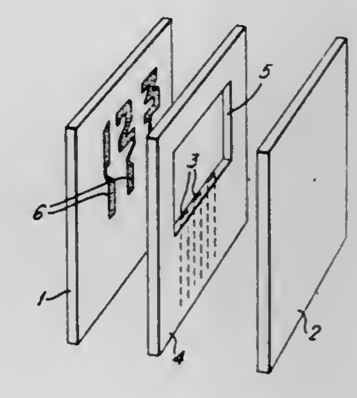
1. A method of forming a silicon solar energy cell having junctions of opposite polarities, comprising heating a crystalline silicon wafer with a diffusant to form a front junction in a zone extending inwardly from the front surface of the wafer, a back junction extending inwardly from the back surface of the wafer and films of diffusant glass on said front and back surfaces, applying a coating of aluminum to the diffusant glass on the back surface of the wafer, and heating the wafer at a sufficient temperature until the aluminum has negated the polarity of the back junction and formed an aluminum-silicon junction in its place, said aluminum-silicon junction having a polarity of opposite sign to the polarity of the front junction, and until the glass film on the back surface of the wafer has become electrically conductive.

4,056,880
METHOD FOR CONNECTING DYNAMOELECTRIC MACHINE COILS
Richard E. Stewart, Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.
Filed July 9, 1976, Ser. No. 703,738
Int. Cl.² H02K *15/00*
U.S. Cl. 29—596 **2 Claims**



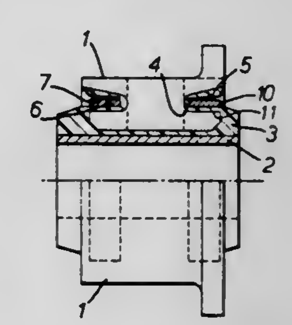
1. A method of joining the end portions of a selected pair of half coils of a dynamoelectric machine one to another thereby establishing a mechanical and electrical union between the end portions of said selected pair of coils by means of a plurality of electrical conductors, each of said conductors including first and second end portions, said method comprising:
a. connecting the first end portion of each of a plurality of electrical conductors in electrical contact with a selected one of said half coil end portions;
b. connecting the first end portion of each of a second plurality of electrical conductors in electrical contact with the remaining half coil end portion of said selected pair of coils;
c. interleaving the second electrical conductor end portions of said first and second plurality of electrical conductors in electrical contact, one with another;
d. forming a metallurgical bond between said interleaved electrical conductor end portions;
e. compressing the interleaved electrical conductor end portions sufficiently to provide electrical integrity after said conductor end portions have been metallurgically bonded; and
f. securing the interleaved electrical conductor end portions to maintain said compression.

4,056,881
METHOD OF MANUFACTURING ELECTRO-OPTICAL CELL
Ian Holt, Goodmayes, and Hugh Andrew Pincherle, New Barnet, both of England, assignors to The Rank Organisation Limited, London, England
Filed Apr. 9, 1976, Ser. No. 675,554
Claims priority, application United Kingdom, Apr. 9, 1975, 14545/75
Int. Cl.² G02F *1/13*
U.S. Cl. 29—592 R **8 Claims**



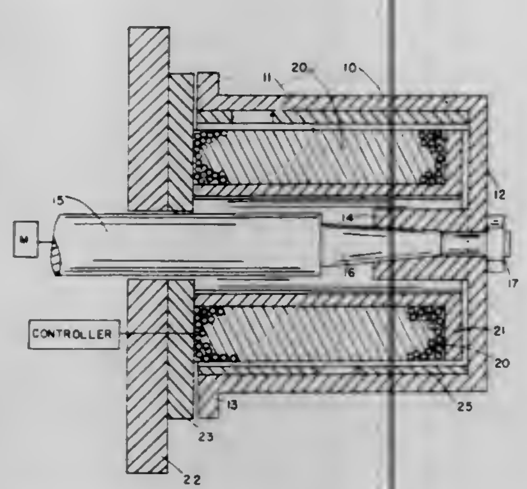
1. A method of manufacturing an electro-optical cell having parallel spaced-apart walls wherein at least one spacing element bonded to at least one insulating lamina, of an adhesive material which may readily be softened, is introduced between two cell walls and the at least one lamina is then softened to seal the cell walls and to cause the cell wall spacing to be determined substantially by the thickness of the spacer element or elements.

4,056,882
METHOD OF MAKING A DIMENSIONALLY STABLE COMMUTATOR
Robert Arthur Letts, Fleet, England, assignor to Airscrew Howden Limited, England
Continuation of Ser. No. 512,395, Oct. 4, 1974, abandoned. This application June 7, 1976, Ser. No. 693,675
Claims priority, application United Kingdom, Oct. 5, 1973, 46716/73
Int. Cl.² H01R *43/06*
U.S. Cl. 29—597 **7 Claims**



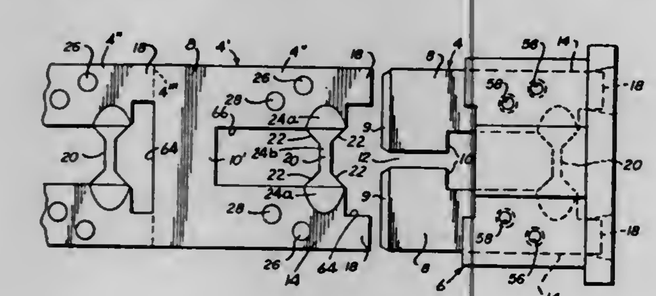
1. A method of making a high speed commutator, comprising embedding a number of conductive bars in insulating plastics material to form a moulded commutator while simultaneously providing the moulded commutator with at least one annular seat, and then subsequently placing a ring of high tensile material on the seat, stressing the ring in tension and thereby applying a radially inward load to each conductive bar which is three times greater than the centrifugal force on the bar at maximum running speed.

4,056,883
HEATED ROLL INDUCTIVE HEATER CONSTRUCTION
Kenneth H. Danner, Nashville, Tenn., assignor to Rosemount Inc., Eden Prairie, Minn.
Division of Ser. No. 475,457, June 3, 1974, Pat. No. 3,961,151. This application Feb. 2, 1976, Ser. No. 654,164
Int. Cl.[2] H05B *3/18*
U.S. Cl. 29—611 **3 Claims**



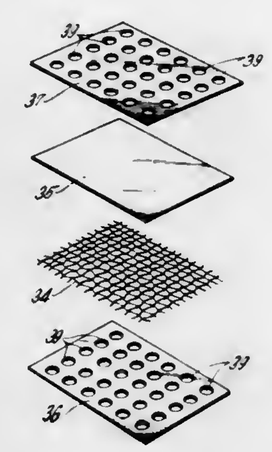
1. The method of constructing a coil for operation with heated rolls at high temperatures comprising the steps of providing a length of suitable heater wire having an inorganic insulation material surrounding said wire, helically wrapping said length of wire into loops arranged substantially in a layer about a central axis, filling the voids between each of the loops in the layer by forcing an insulating, hardening material against the loops until the voids are filled with said insulating, hardening material leaving a layer of said material over the loops in the layer, and adding additional layers of helically wound loops sequentially with each of the loops spaced from other loops and forcing said material into each layer to fill the voids between the loops of wire in each layer after each layer is wound and before another layer is wound, and to fill the voids between each of the layers with said insulating, hardening material.

4,056,884
METHOD OF MAKING A MINIATURE PLUG-IN FUSE
Harold L. Williamson, Northbrook, and Avinash P. Aryamane, Mount Prospect, both of Ill., assignors to Littelfuse, Inc., Des Plaines, Ill.
Continuation-in-part of Ser. No. 610,978, Feb. 8, 1975, Pat. No. 3,962,782, which is a division of Ser. No. 432,980, Jan. 14, 1974, Pat. No. 3,909,767. This application June 8, 1976, Ser. No. 693,937
The portion of the term of this patent subsequent to June 15, 1993, has been disclaimed.
Int. Cl.[2] H01H *69/02*
U.S. Cl. 29—623 **19 Claims**



1. A method of making a plug-in fuse element comprising a pair of juxtaposed laterally spaced generally parallel terminals to be received by pressure clip terminals or the like, the terminals having current-carrying extensions at the inner end portions thereof which are to be interconnected by a fuse link, said method comprising: providing a sheet-like body of fuse metal, and blanking said sheet-like body of fuse metal to form parallel mutually coplanar juxtaposed laterally spaced terminal forming blade portions, current-carrying extensions at the inner end portions of the terminal forming blade portions thereof and a fuse-forming link portion interconnecting said current-carrying extensions, said fuse-forming link portion being substantially smaller in cross-sectional area than the other portions of the blanked body of fuse metal.

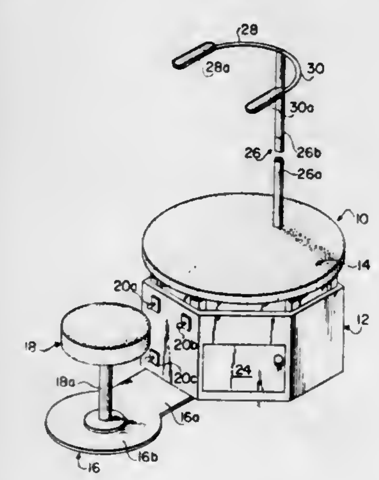
4,056,885
METHOD OF PREPARING LITHIUM-ALUMINUM ALLOY ELECTRODES
Bhaskara M. L. Rao, Fanwood, N.J., assignor to Exxon Research & Engineering Co., Linden, N.J.
Filed Dec. 15, 1976, Ser. No. 750,965
Int. Cl.[2] H01M *4/04*
U.S. Cl. 29—623.1 **13 Claims**



1. A method of making a lithium-aluminum alloy electrode comprising:

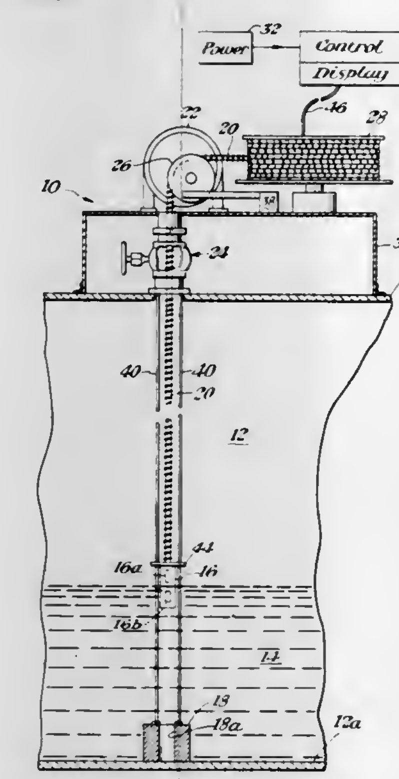
a. forming a laminate having at least one ply of aluminum sheet material and one ply of lithium sheet material;
b. contacting the laminate with a solution of a lithium salt dissolved in an organic solvent for a time sufficient for alloy formation to occur.

4,056,886
DRESSMAKER'S AID WITH ROTATING PLATFORM
Sylvia Lee Doelling, 309 N.E. 1st St., Delray Beach, Fla. 33444
Filed Mar. 24, 1976, Ser. No. 670,092
Int. Cl.[2] A41H *21/00*
U.S. Cl. 33—10 **2 Claims**



1. A dressmaker's aid comprising, in combination, an enclosed base compartment, and a circular platform having a downwardly-depending skirt portion, said base compartment and said skirt portion respectively comprising first and second relatively telescoping sections, each of said telescoping sections including a plurality of upwardly-extending sidewalls, the outer faces of the sidewalls of said second relatively telescoping section being in face to face relatively parallel disposition with the inner faces of one each of said upwardly-extending sidewalls of said first relatively telescoping sections, a stool for the dressmaker fixed with respect to and spaced laterally outwardly of said first relatively telescoping section a said circular platform rotatably mounted with respect to and above said second telescoping section means for supporting and rotating said platform with respect to said second telescoping section means for raising and lowering said second telescoping section and its associated platform with respect to said first telescoping section, said platform rotating means comprising a reversible electric motor, electric switch means supported on said first telescoping section and within reach of the dressmaker seated on said stool for controlling both the operation and direction of turning of said rotatably mounted platform, said platform raising and lowering means comprising a reversible electric motor and electric switch means supported on said first telescoping section and within reach of the dressmaker seated on said stool for selectively controlling the raising and lowering of said platform with respect to said first telescoping section, the upper surface of said circular platform being of a larger diameter than said second telescoping section such as to extend laterally over the top of said second telescoping section.

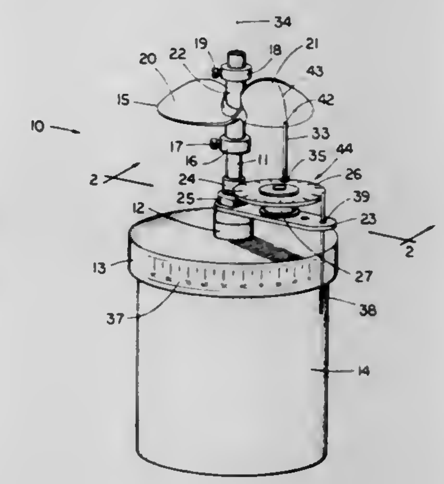
4,056,887
DEVICE FOR THE MEASUREMENT OF LIQUID LEVEL
Thomas Lee Tucker, and Gilbert Halverson, both of West Palm Beach, Fla., assignors to Scientific Instruments, Inc., Lake Worth, Fla.
Filed July 12, 1976, Ser. No. 704,684
Int. Cl.[2] G01G *23/24*
U.S. Cl. 33—126.6 **18 Claims**



1. A machine for determining the distance from the bottom of a storage tank to the liquid-vapor interface of a liquid stored therein comprising:

a movable liquid-vapor interface probe in the storage tank, said probe including at least one electrically actuated medium sensing element;
a drive means including a cable, a motor means, and a motor control means;
said cable at least partially extending into said storage tank, said cable connected to said probe;
a measurement signal means; said motor means connected to said cable for lifting and lowering said cable and said probe within said storage tank, said motor means connected to said measurement signal means to provide at least one liquid-vapor interface position signal;
said motor control means connected to said motor, means and said liquid vapor interface probe;
said measurement signal means connected to said motor control means for providing at least one liquid-vapor interface position signal;
a sensing system connected to said cable for sensing the bottom of said storage tank, said sensing system connected to said motor control means and said measurement signal means to provide liquid-vapor interface position signal from the bottom of the storage tank.

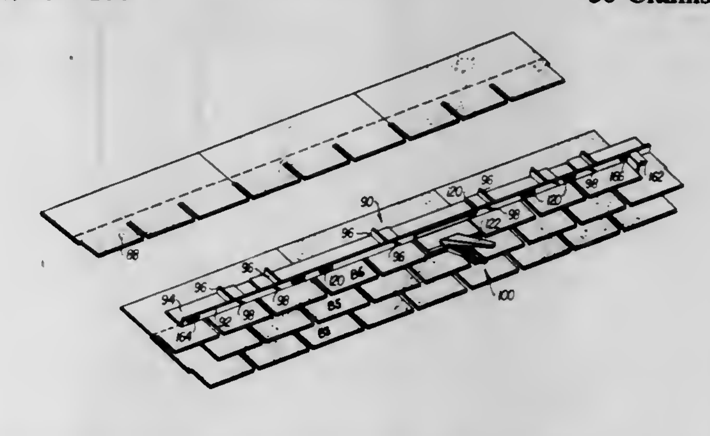
4,056,888
DEVICE FOR MEASURING THE PITCH OF PROPELLER BLADES AND THE LIKE
Edward W. Hughey, Jr., 5827 Downing Drive, Indianapolis, Ind. 46208
Filed June 22, 1976, Ser. No. 698,357
Int. Cl.[2] G01B *3/56, 5/24*
U.S. Cl. 33—174 C **12 Claims**



1. A device for measuring the pitch of propeller blades and the like which comprises:

a base;
shaft means connected to said base for mounting a propeller coaxial with a base station line;
an arm mounted upon said shaft means, said arm being rotatable in a plane essentially normal to the base station line, said arm further being movable parallel to the base station line;
pin means attached to said arm for engaging the surface of a propeller mounted upon said shaft means;
linear measurement means for measuring the movement of said arm parallel to the base station line; and
rotational measurement means for measuring the rotation of said arm in a plane essentially normal to the base station line.

4,056,889
STRIP SHINGLE ALIGNMENT FIXTURES
Larkin H. Barnett, III, Norfolk, Va., assignor to Virginia National Bank, Norfolk, Va.
Continuation-in-part of Ser. No. 610,727, Sept. 5, 1975, abandoned. This application July 29, 1976, Ser. No. 709,683
Int. Cl.[2] G01B *3/30*
U.S. Cl. 33—188 **30 Claims**



1. An improved alignment fixture for use with asphalt composition strip shingles for roofing and siding, comprising:

an elongated horizontal alignment guide for simultaneously

supporting the lower edges of a plurality of strip shingles to be laid;

a plurality of selectively, horizontally adjustable spacer means attached to said guide for spacing said strip shingles at predetermined itervals along said guide;

clamping means for attaching said guide to a previously laid row of strip shingles in parallel relation thereto; and

means joining said clamping means and said guide for permitting selectively adjustable horizontal movement of said guide relative to said clamping means while said clamping means is attached to said previously laid row, whereby said strip shingle to be laid may be properly positioned relative to said previously laid row without requiring removal of said clamping means from said previously laid row.

4,056,890

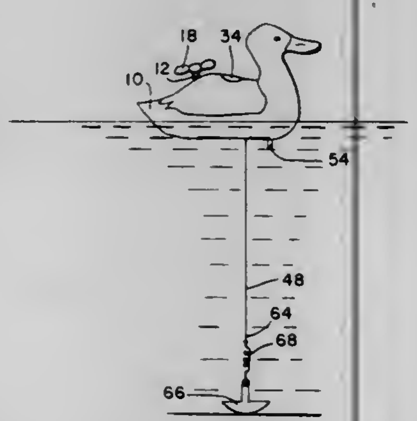
TETHERED DECOY

Gary R. Dembski, 305 Grand Blvd., Wauconda, Ill. 60084

Filed Mar. 10, 1976, Ser. No. 665,685

Int. Cl.² A01M *31/06*

U.S. Cl. 43—3 **1 Claim**



1. In a decoy with an outer shell having the general appearance of a duck, the improvement comprising:

means disposed within said shell for playing a phonograph record; and

a tether line connected to said decoy;

an anchor; and

an expandible and contractible coil spring connected between said anchor and a free end of said tether line,

said playing means comprising:

a rotatably mounted first gear having a face adapted to receive said phonograph record; and

a second gear mounted for engagement with said first gear;

a spring motor operable to cause rotation of said second gear; and

means accessible from the exterior of said shell for winding said spring motor;

a ratchet adapted to have said tether line wound thereon;

a coil spring connected to said ratchet to cause rotation thereof;

a pivotally mounted pawl;

a spring-mounted release button connected to said pawl accessible from the exterior of said shell, said button having lock and release positions which causes said pawl to pivot to respectively engage and disengage said ratchet and upon disengagement to enable said ratchet to be manually rotated to unwind said tether line or for said coil spring to rotate said ratchet to wind said tether line thereabout and

a fixedly mounted dowel in slidable engagement with said pawl for pivoting said pawl to disengage said ratchet when said release button is pushed against the bias of its spring-mounting.

4,056,891

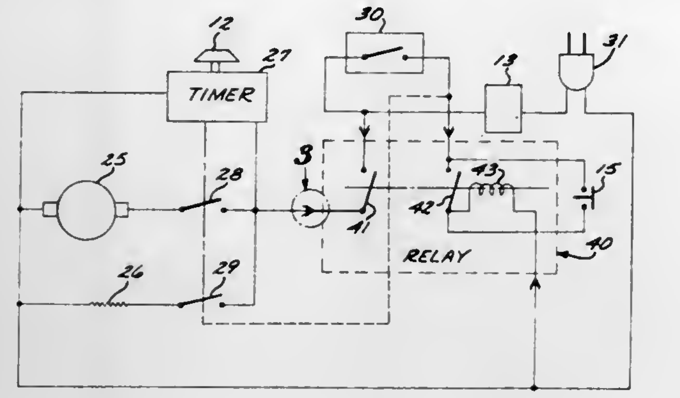
SEQUENTIAL SWITCHING DEVICE

Billy R. Rayburn, Rossmore, Calif., assignor to Billy R. Rayburn; Paul T. Mu and Alfred F. Hayes, all of Signal Hill, Calif.

Filed May 23, 1975, Ser. No. 580,229

Int. Cl.² F26B *11/04*

U.S. Cl. 34—55 **1 Claim**



1. In an automated appliance including a door for receiving articles, a source of electrical power, a door switch connected between said source of electrical power and adapted to be articulated to a closed state when said door is closed, and operating means operatively connected to said door switch, the improvement comprising:

a first normally open switch connected in circuit between said door switch and said operating means;

a second normally open switch connected in circuit with said door switch;

coil means connected in circuit with said second normally open switch for pulling in said first and second normally open switch upon receiving electrical excitation from said source of electrical power, said second normally open switch and said coil being disposed in a parallel circuit with said first normally open switch and said operating means; and

a third normally open switch formed as a push-to-close palm button adapted for manual articulation and connected in parallel with said second normally open switch for providing a parallel path between said door switch and said coil means.

4,056,892

ENGINEERING AND EDUCATIONAL TABLE AND METHOD OF USE

Jimmie P. Atencio, 18650 Rea Ave., Aromas, Calif. 95004

Filed Apr. 16, 1976, Ser. No. 677,771

Int. Cl.² G09B *25/06*

U.S. Cl. 35—10 **16 Claims**

1. A landscape instruction and design table comprising in combination;

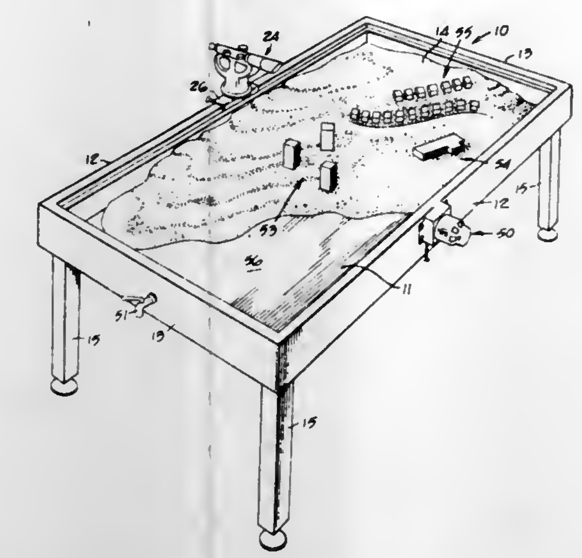
a generally rectangular box-like container having a bottom and vertically extending sides terminating at an upper edge for supporting a removable top;

a removable top plate providing a plane working surface adapted to rest on said upper edge;

a quantity of non-fluid material disposed in said container for shaping into simulated landscapes;

distance measuring means associated with said container for measuring distances of selected points within said container from each other and from a base reference point; and,

angle measuring means comprising a transit associated with said container and sealed for functioning therewith for measuring vertical and horizontal angles betwen points



within said container and between said points and a reference axis.

4,056,893

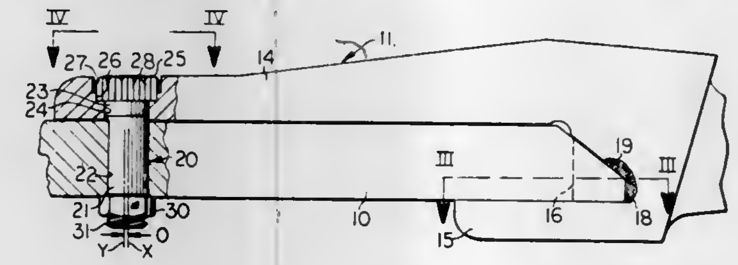
ECCENTRIC RETAINING BOLT FOR EARTHWORKING TOOLS AND METHOD

Kaarlela O. Willard, Chillicothe, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Feb. 13, 1976, Ser. No. 657,987

Int. Cl.² E02F *9/28*

U.S. Cl. 37—142 R **7 Claims**



1. A work tool for construction vehicles comprising

a support member defining a forward edge thereon,

an adapter mounted on said support member and defining a bearing surface thereon maintained in bearing contact with the forward edge of said support member,

an earthworking tip mounted on a forward end of said adapter,

means, including a bolt having eccentric cam means formed thereon, detachably mounting said adapter on said support member and for providing and maintaining the bearing surface of said adapter in bearing contact with the forward edge of said support member said cam means comprising a cylindrical cam having a longitudinal axis thereof disposed in offset relationship relative to a longitudinal axis of a shank of said bolt and disposed within a bore formed in said adapter, and anti-rotation means for preventing said bolt from rotating relative to said adapter comprising a head secured on a first end of said bolt, a plurality of teeth formed circumferentially on the periphery of said head to project radially outwardly therefrom and a plurality of notches formed circumferentially within a counterbore defined within the bore formed in said adapter, said teeth disposed within said notches for preventing said bolt from rotating relative to said adapter.

4,056,894

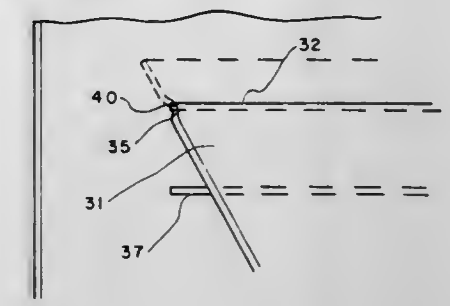
METHOD OF PRODUCING A CARD FILE

Edward K. Sundstrom, Box 338, Pennington, N.J. 08534

Filed Jan. 30, 1976, Ser. No. 653,898

Int. Cl.² B42F *15/00*

U.S. Cl. 40—104.03 **11 Claims**



1. A method of producing a card file comprising:

a. cutting parallel tandem slits in a substantially rigid sheet,

b. the slit length being slightly shorter than the width of the cards to be inserted therein,

c. providing indenting means at the ends of the slits,

d. placing cards, one or more to each slit, which will bow slightly due to their being slightly longer than the length of the slits,

e. pressing on the cards in the center and sliding the pressure out toward the edges of the cards to seat the cards in the slit and indenting them to form holding and hinge points in the cards.

4,056,895

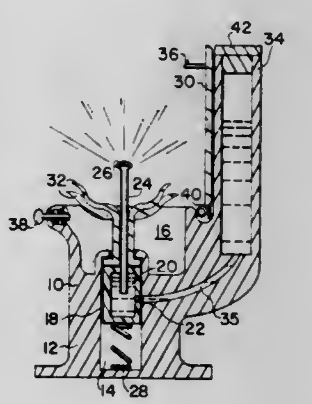
NOVELTY TOY

Antonio J. Terrulli, 4142 N. Campbell, Chicago, Ill. 60618

Filed Nov. 2, 1976, Ser. No. 738,108

Int. Cl.² A63H *33/00*

U.S. Cl. 46—1 R **6 Claims**



1. A novelty toy formed in the shape of a miniature toilet bowl comprising:

a recessed bowl having a stand attached thereto;

a longitudinal recess formed within said stand and communicating with the bowl recess;

a piston having a cavity formed therein, said piston being disposed and longitudinally movable within said longitudinal recess, and being formed with an opening;

a hollow stem protruding outwardly from said piston and inwardly into said cavity, and formed with a nozzle at the outward end thereof;

a compression spring disposed within said longitudinal recess and in contact with said piston for urging the latter to move outwardly from said bowl;

a cover hingeably attached to said bowl and normally in a closed position for covering said bowl recess and for keeping said stem within said bowl; and

means for filling said cavity with pressurized liquid through said opening upon an outward movement of said piston, whereby, upon said cover being lifted from said bowl, said stem moves in an upward direction, and said pressurized

liquid is dispensed from said nozzle upon said cavity having been filled with the liquid.

4,056,896

TOY BIRD

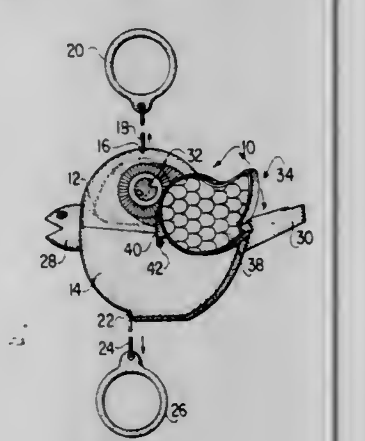
Hideyasu Karasawa, Tokyo, Japan, assignor to Tomy Kogyo Co., Inc., Tokyo, Japan

Filed Aug. 26, 1976, Ser. No. 718,095

Claims priority, application Japan, Aug. 29, 1975, 50-120269[U]

Int. Cl.² A63H *11/04*

U.S. Cl. 46—132 **6 Claims**



1. A toy bird, comprising:
a housing,
sheave means mounted for rotation within said housing and being provided with two separate posts of different dimension,
a cord having two pieces, one of said pieces wound around one of said posts while the other of said pieces is wound around the other of said posts, said cord extending outwardly of said housing such that as said cord is pulled said sheave means rotates,
wing means operably mounted for movement with respect to said housing and provided with slots,
means operatively connecting said wing means and said sheave means, including a shaft offset from the axis of rotation of said sheave means and extending through said slots of said wing means such that as said sheave means rotates said wing means moves,
noise producing means within said housing, and
means operatively connecting said noise producing means and said sheave means such that as said sheave means rotates, said noise producing means operates.

4,056,897

PLANTER DESIGN AND CONSTRUCTION

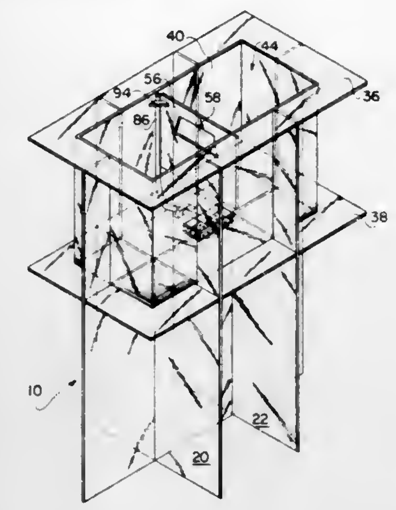
Mary Ellen Pearce, and John Scott Pearce, both of 8800 Burbank Road, Annandale, Va. 22003

Filed Dec. 22, 1975, Ser. No. 643,233

Int. Cl.² A01G *9/02*

U.S. Cl. 47—39 **15 Claims**

1. A planter comprising:
A. a plant container including interconnected sides and a bottom, all being formed of rigid transparent plastic material, said container being adapted for at least partly containing therein a plant together with plant life supporting material;
B. said container being waterproof for containment of water therein;
C. a hollow filter box with closed sides and a closed top and having perforations in the bottom thereof;
D. said filter being supported above the inner side of said container bottom and beneath plant life supporting material in said container; and



E. means placing said filter box in fluid communication with the planter exterior for controlling the amount of water within said container.

4,056,898

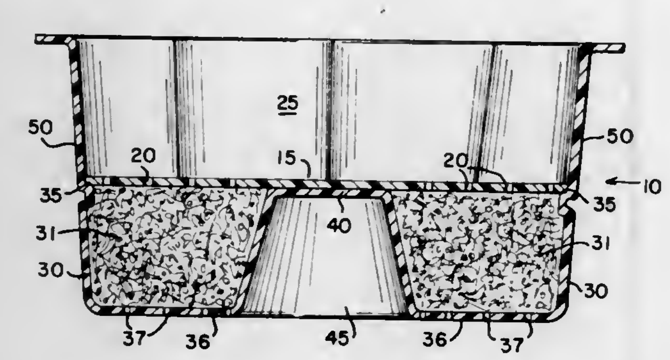
WATER ACTUATED PLANT FERTILIZING DEVICE

Jacqueline I. Brucato, and Steve J. Brucato, both of 3712 Downers Drive, Downers Grove, Ill. 60515

Filed May 10, 1976, Ser. No. 684,926

Int. Cl.² A01G *29/00*

U.S. Cl. 47—48.5 **4 Claims**



1. A fertilizer container for placement on the surface of the soil in close proximity to the root system of a plant, comprising, in combination, a cup having outer walls, a porous bottom, said outer walls tapering inwardly toward said bottom, the central portion of said porous bottom portion being a raised broad upper support surface, an interior shoulder on a midsection of said outer walls, a flat substantially uniformly perforated cover plate, said cover plate having a periphery positionable on said interior shoulder and substantially conforming to said outer wall, said raised upper support surface supporting a substantial portion of said cover plate and said shoulder supporting said periphery of said cover plate thereby providing a broad support base for said cover plate and separating said cup into a lower compartment and an upper compartment, said lower compartment being substantially donut-shaped and said upper compartment being for the reception of water, whereby the water received in said upper compartment may seep uniformly into said lower compartment, where at least a portion of said fertilizer is dissolved and passes, through said porous bottom onto the soil supporting the container at a controlled rate.

4,056,899

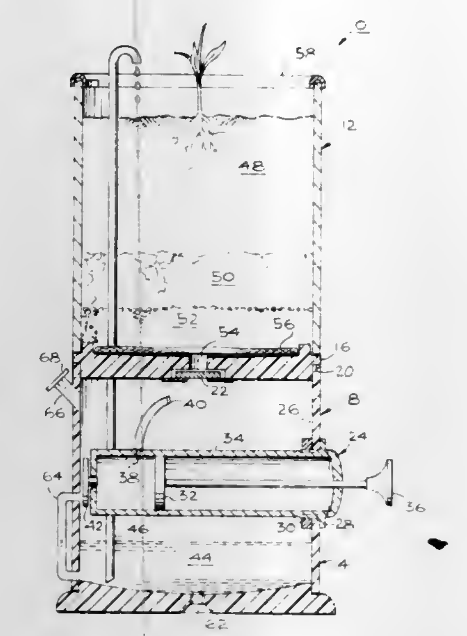
LIQUID-RECYCLING PLANTER

Dolores R. Close, 16003 Ludlow, Granada Hills, Calif. 91344

Filed Sept. 23, 1976, Ser. No. 725,978

Int. Cl.² A01G *27/00*

U.S. Cl. 47—79 **5 Claims**



4. Apparatus according to claim 1 in which said liquid delivery means includes a perforated hollow cap.

4,056,900

CAM MACHINING APPARATUS

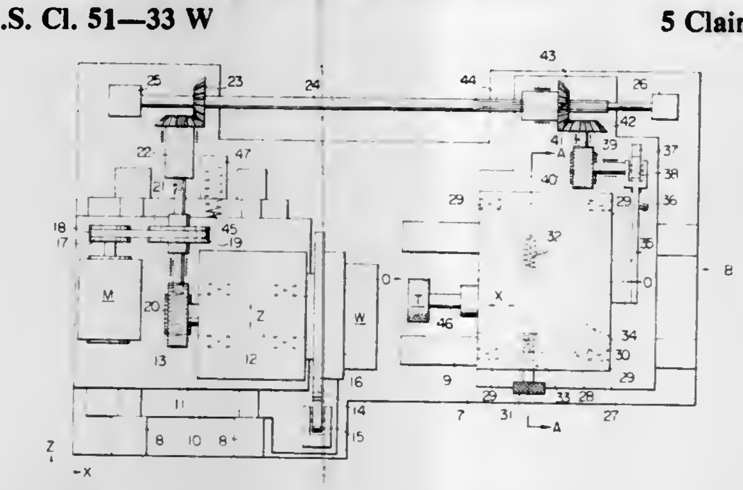
Takashi Ishida, Nagoya, Japan, assignor to Okuma Machinery Works Ltd., Nagoya, Japan

Filed Dec. 29, 1975, Ser. No. 645,221

Claims priority, application Japan, Dec. 28, 1974, 50-1413; Oct. 24, 1975, 50-128693

Int. Cl.² B24B *5/06, 17/00*

U.S. Cl. 51—33 W **5 Claims**



1. A cam machining apparatus wherein a rotating tool is used in performing work controlled by profiling of a master cam, characterized in that said apparatus comprises
a work spindle rotatably mounted on a work head and adapted to be fitted with a work piece for rotation therewith at a predetermined number of rotations;
an oscillating cam mounted on a tool holder and rotating in a certain proportion with the rotation number of said work spindle;
a swivel member swiveling with the rotation of said oscillating cam;
a tool spindle unit having a rotating tool, provided on said swivel member and being slidable perpendicularly to the swiveling axis of swivel member;
a carriage supporting one of said work head and said tool for sliding movement perpendicular to the axis of said spindle;
a master cam being rotated in a certain proportion with the rotation of said work spindle, and relatively changing the distance between the axial line of said work spindle and the axial line of said rotating tool; and
the rotating tool is constantly oscillated about the working point during work by sliding said tool spindle unit whereby the outer periphery of the rotating tool can be aligned with the center of swiveling of said swivel member;
said tool holder slidably moving perpendicularly to the axial line of the work spindle with respect to said carriage and said master cam being rotated in a certain proportion with the rotation of the work spindle is adapted to cause said tool holder to slide;
said master cam being rotated in a certain proportion with the rotation of the work spindle is mounted on said carriage and a cam follower contacting said master cam is mounted on the tool holder, thereby causing the tool holder to slidably move perpendicularly to the axial line of the work spindle with the rotation of said master cam.

4,056,901

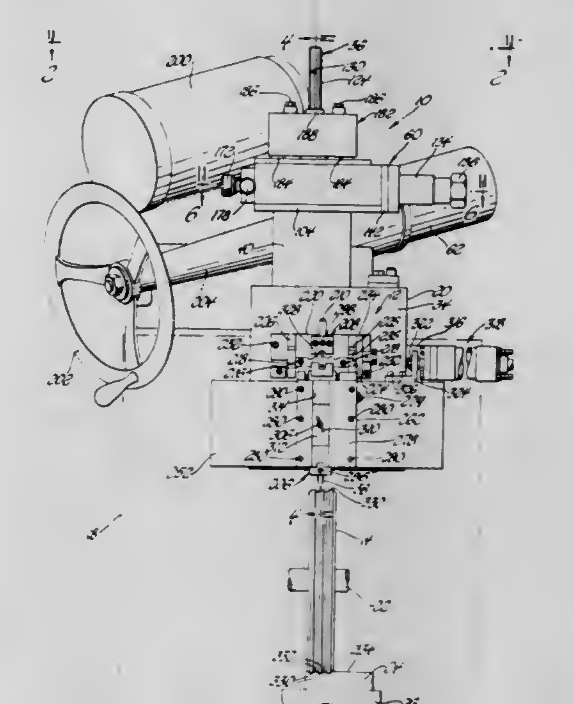
DRESSER AND GRINDING MACHINE THEREFOR

Marvin R. Anderson, Grosse Pointe Shores, and Harald N. Jungesjo, Rochester, both of Mich., assignors to Anderson-Cook, Inc., Fraser, Mich.

Division of Ser. No. 559,945, March 19, 1975, Pat. No. 4,008,702. This application Feb. 27, 1976, Ser. No. 662,076

Int. Cl.² B24B *49/18*

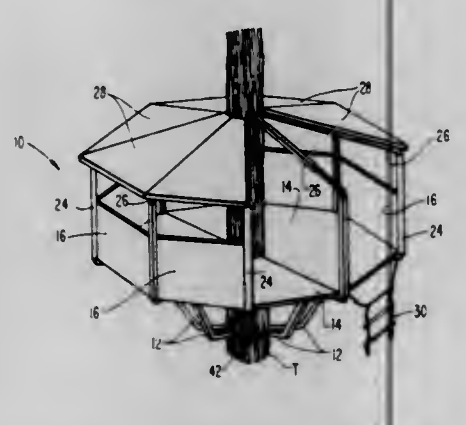
U.S. Cl. 51—165.87 **23 Claims**



1. A grinding machine and dresser therefor comprising: a base; a carriage for rotatably supporting a grinding wheel so as to grind a workpiece, the carriage being mounted on the base for rectilinear movement with respect thereto; a dresser mounted for rectilinear movement with respect to the carriage in a direction parallel to the movement of the carriage on the base, the dresser including a tool holder for a cutting tool that dresses the wheel; an elongated drive screw having coaxial right and left-hand threaded portions of the same pitch spaced axially along the length thereof, the drive screw also having an intermediate portion between the right and left-hand threaded portions thereof; a bearing coupling the intermediate portion of the drive screw with the carriage to move the carriage along the base upon axial movement of the screw; a first nut fixed to the base and threadingly receiving one threaded portion of the screw so that screw rotation moves the screw axially to drive the carriage along the base; and a second nut fixed to the dresser and threadingly received by the other threaded portion of the drive screw on the opposite side of the bearing from the first nut so that the screw rotation moves the dresser relative to the carriage the same distance the carriage moves relative to the base and in the same direction, the dresser thereby moving

twice as far as the carriage relative to the base for any given amount of screw rotation so a cutting tool held by the tooth holder of the dresser dresses the grinding wheel in a precise manner that maintains the same cutting depth of the workpiece before and after dressing.

4,056,902
TREE HOUSE KIT
William H. Ziegler, Jr., Bedford, Pa., assignor to Hedstrom Company, Bedford, Pa.
Filed Apr. 12, 1976, Ser. No. 676,338
Int. Cl.² E04B *1/34*
U.S. Cl. 52—73 **14 Claims**



1. A kit for making a tree house comprises in combination a packaging container containing

A. a set of floor frames for mounting on a tree trunk, each floor frame comprising
 1. a first elongated rigid frame section,
 2. an elongated rigid strut having two ends,
 3. means for pivotally connecting one end of the strut to the first frame section,
 4. a second elongated rigid frame section, and
 5. **means for telescopically connecting the two frame sections together beyond said connecting means,**

B. first means for pivotally securing the free end of said first floor frame section to a tree trunk,

C. second means for pivotally connecting the other end of said strut to the tree trunk, said first and second pivotal connecting means being separate and movable relative to one another,

D. a template for a floor panel shaped to rest on the set of floor frames as mounted on the tree trunk, and

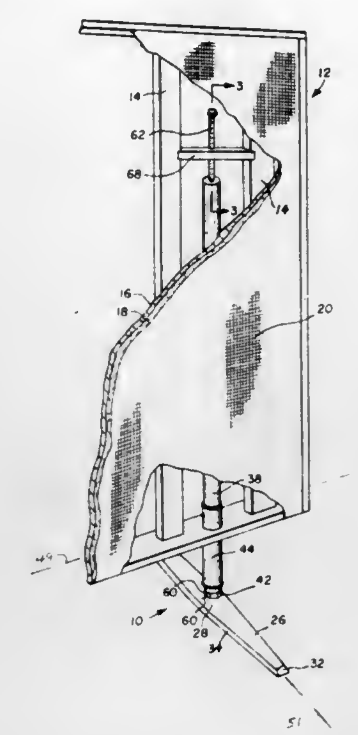
E. instructions for mounting the floor frames and panels shaped from the template to make the tree house.

4,056,903
WALL SUPPORT MECHANISM FOR ADJUSTING THE VERTICAL ORIENTATION AND HEIGHT OF A WALL MEMBER
Joseph V. Guarnere, Rochester, N.Y., assignor to TIW Industries, Inc., Rochester, N.Y.
Filed June 21, 1976, Ser. No. 698,486
Int. Cl.² E04B *2/72;* **A47G** *5/00*
U.S. Cl. 52—122 **11 Claims**

1. A support mechanism for vertically supporting a wall member such as an acoustical screen, room partition, or the like substatially perpendicular to a reference horizontal floor comprising:

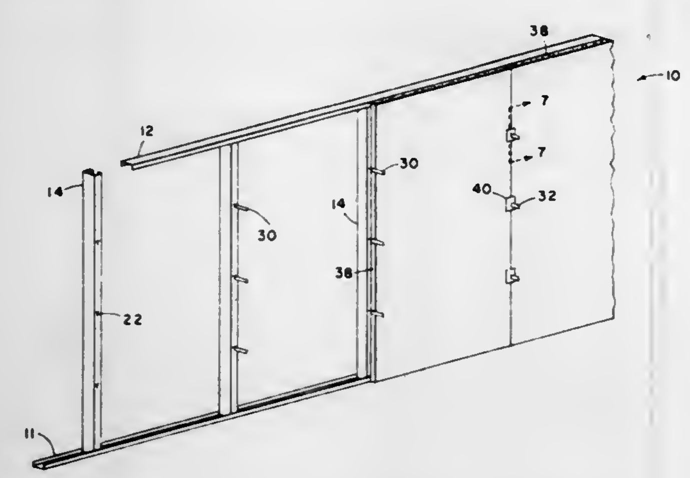
a foot member mountable on a non-horizontal floor and having a central plate portion in substantially parallel relation thereto; and

a unitary conduit coupled to the wall member and having one end of said unitary conduit rigidly secured to said unitary conduit, said one end having a surface lying in a plane inclined to the axis of said conduit, said surface of said one end abutting said central plate portion of said foot member for vertically orienting said conduit and a wall member supported thereby in a plane substantially perpendicular to said reference horizontal floor upon rotatable movement of said conduit and said one end thereof on said central plate portion of said foot member to a selected position;



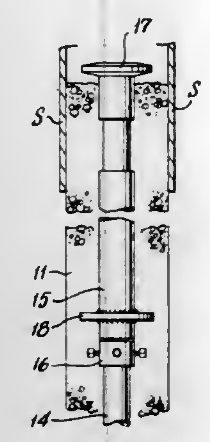
said conduit further being releasably secured to said foot member in said selected position.

4,056,904
WALLBOARD APPLICATION METHOD AND APPARATUS THEREFOR
Jack A. Dawdy, Kenmore, N.Y., assignor to National Gypsum Company, Buffalo, N.Y.
Filed June 10, 1976, Ser. No. 694,539
Int. Cl.² E02D *35/00;* **E04B** *2/00*
U.S. Cl. 52—127 **10 Claims**



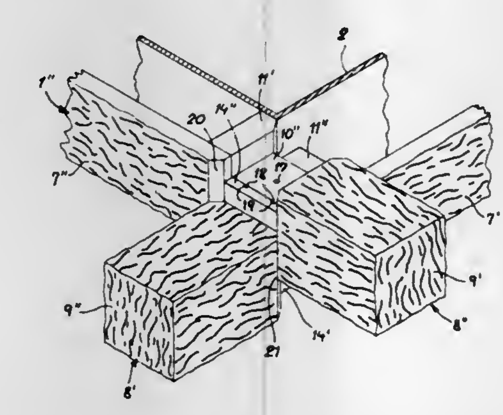
1. In combination with wallboard being adhered to wallboard supports, a temporary holder for wallboard comprising an elongate rod having one end affixed relative to one of said wallboard supports, said rod extending outward from said support between the abutting edges of two adjacent wallboards, and a retainer plate disposed firmly against the edges of said adjacent wallboards, said retainer plate being urged against said wallboard edges by means engaging said rod, said engaging means comprising at least one slit extending away from an opening, said slit having a width less than the width of the cross section of said rod and said opening being larger than said rod, said rod being grasped by said rod engaging means in a manner preventing relative movement of said rod engaging means away from said wallboard.

4,056,905
PRE-STRESSED CONCRETE STRUCTURES
Walter Thorpe, Stockport, England, assignor to Simonbuild Limited, Stockport, England
Filed Mar. 19, 1976, Ser. No. 668,426
Int. Cl.² E04C *3/10;* **E02B** *1/00*
U.S. Cl. 52—223 R **8 Claims**



6. Equipment for installing a tendon in a longitudinally extending duct in an elongated generally vertical concrete structure while said structure is being slip-formed comprising a tubular member adapted to be inserted to form the uppermost part of said duct, said member having outwardly extending abutment means at or near its lower end and being of such length that its upper end terminates at the level where the upper end of a tendon is to be anchored with said abutment means so spaced below said upper end of the tubular member that, at the time the upwardly growing concrete structure reaches a height in the vicinity of said upper end, said abutment means is located within the structure at an operative level where the concrete has sufficiently hardened and developed sufficient strength to enable forces necessary to install and support a tendon in the duct to be transmitted through the tubular member and abutment means to be distributed in the developed concrete structure at that operative level, said member having a bearing plate for a prestressing tendon at its said upper end.

4,056,906
BUILDING FRAMEWORK FOR TIMBER HOUSE OF LOG-CABIN APPEARANCE
Carry Allon Elfström, Landskrona, Sweden, assignor to Area Holding S.A., Luxembourg, Luxembourg
Filed Aug. 13, 1976, Ser. No. 714,278
Claims priority, application Sweden, Aug. 14, 1975, 75090993
Int. Cl.² E04B *1/10*
U.S. Cl. 52—233 **16 Claims**

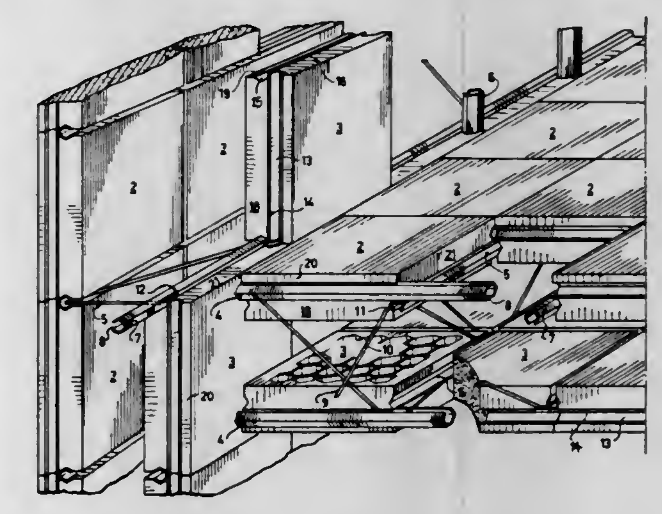


1. A building framework comprising:

two mutually orthogonal walls meeting at a corner, one of said walls comprising a set of coplanar superposed first boards forming a first outer wall surface, the other of said walls comprising a set of coplanar superposed second boards forming a second outer wall surface, all said first and second boards being of the same height, said second boards being vertically offset by half said height from said first boards; and

first and second junction blocks with projecting heads substantially as high as said boards and with reduced necks not more than half as high as said boards, said first and second junction blocks being alternately superposed by their necks at said corner on the levels of said first and second boards, respectively, said first boards having tongues disposed alongside the necks of said first junction blocks and held in position by the heads of said second junction blocks, said second boards having tongues disposed alongside the necks of said second junction blocks and held in position by the heads of said first junction blocks, said tongues being narrower than said boards and recessed from said outer wall surfaces, said heads and said boards adjoining one another along beveled flanks.

4,056,907
BUILDING BLOCKS AND SUPPORT STRUCTURE
Hans Dolder, Kloten, Switzerland, assignor to Adelheid Dolder, Kloten, Switzerland
Continuation of Ser. No. 450,162, March 11, 1974, abandoned. This application Oct. 6, 1975, Ser. No. 620,217
Int. Cl.² F04B *1/00*
U.S. Cl. 52—266 **15 Claims**



1. A structure comprising

building blocks lying together without being bound by mortar,

said building blocks having side walls with said side walls having grooves therein,

chords of supports arranged in said grooves and located between said building blocks,

said supports being truss girders including main and auxiliary supports with said auxiliary supports extending through said main supports, wherein the chords of a truss girder each comprise a hexagonal profile member, wherein the cross-section of said groove at said building block is bounded by one-half of said hexagonal profile member.

the groove in one of said side walls of a building block being offset by the height of the related chord with respect to the groove in that side wall which is located perpendicular to the first-mentioned side wall.

4,056,908
COMPOSITE CONCRETE SLAB AND STEEL JOIST CONSTRUCTION
Ira J. McManus, 39 Lincoln Ave., Florham Park, N.J. 07940
Filed Aug. 7, 1975, Ser. No. 602,711
Int. Cl.² E04B *5/16;* **E04C** *3/20*
U.S. Cl. 52—334 **5 Claims**

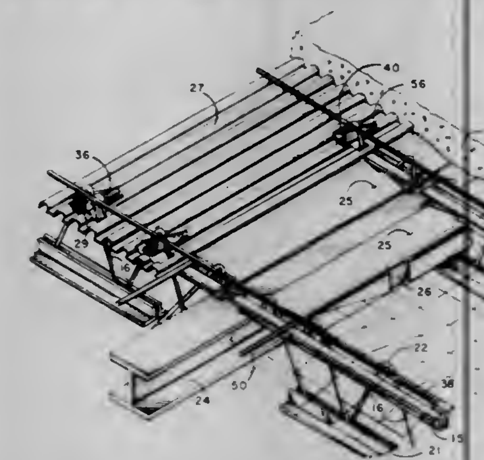
1. In a composite open-web steel joist and concrete slab construction, the combination comprising:

at least one open-web joist member having a zig-zag bent metal webbing member, and secured top and bottom chords; said zig-zag bent rod webbing member having a

substantially uniformly spaced series of upper extending apex portions with respect to the said top chord to which it is affixed forming a plurality of shear members extending upwardly from said chord at said portions; a corrugated solid sheet metal formwork member having a substantially flat top and bottom portions received in seating engagement upon said joist top chord and having a plurality of apertures therein for the through passage of said upwardly extending shear members;

said top chord being displaced somewhat downwardly from the upper ends of said apex portions of said bent rod web and being secured to said webbing members and acting in combination with said apex portions as shear members in said composite steel joist and concrete slab construction;

a rod affixed to the apices of said shear members and extending along the longitudinal axis of said joists; and



a wire mesh draped over one or more of said rods prior to pouring concrete such that said wire mesh is near the top of the concrete when poured over said joists and is near the bottom of said slab midway between any two of said joists such that said wire mesh serves to reinforce the concrete when poured; and

wedge means securing said apex portions with respect to said corrugated metal formwork member;

said wedge means comprising an angular bent piece of sheet metal including an upwardly extending leg having tapered edge portions supported by said bottom leg portion defining a substantially triangular shaped cross-section wedge means;

a poured concrete slab upon said formwork members and encasing said shear members, said rod, and said mesh.

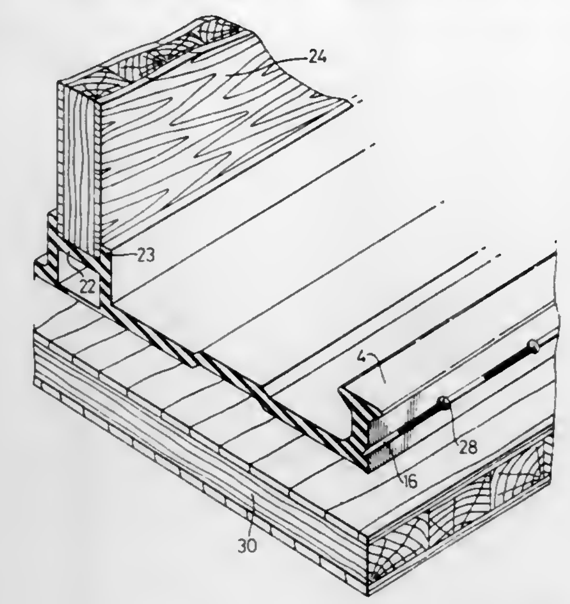
4,056,909
SURFACE WATERSTOPS
Gerald Bernardo, Henlow Village, and Richard Malcolm Clive Jackson, Cinderford, both of England, assignors to Schlegel (U.K.) Limited, Leeds, England
Continuation of Ser. No. 509,303, Sept. 25, 1974, abandoned. This application Nov. 12, 1975, Ser. No. 631,047
Int. Cl.² E04B *1/68;* B32B *3/30*
U.S. Cl. 52—396 10 Claims

1. A surface water stop for forming a waterproof joint at the face of two pours of cementitious materials and adapted to be mounted on a supporting surface by fixing pins having a head thereon or clips, said water stop comprising:

a. a longitudinally extending strip of a selected width of rubber or plastic material having a base portion with at least a planar portion thereof adapted to be mounted on said supporting surface, said base portion having a longitudinally extending lower wall surface;

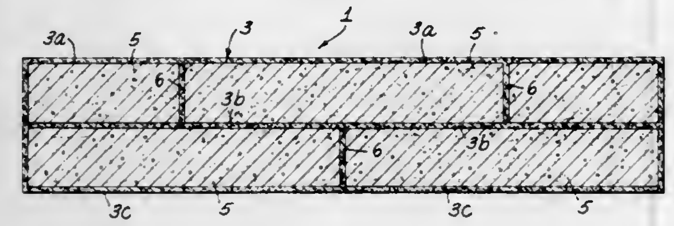
b. a longitudinally extending keying formation on each side of the center line of said base portion, each of said keying formations laterally extending from one face only of said base portion and having a side wall surface laterally extending transverse to the plane of said base portion; and

c. longitudinally extending inclined guide slot located adjacent each longitudinal edge of said base portion in one of said lower and side wall surfaces, said slot having opposed, spaced-apart surfaces spaced laterally and widthwise along one of said side and lower wall surfaces respectively and arranged at an acute angle to said plane of said base portion for receiving and guiding said fixing pins or clips at said acute angle into said supporting surface for



holding said said waterstop against said supporting surface and preventing said waterstop from moving relative to said fixing pins or clips and said supporting surface during pouring of said cementitious material.

4,056,910
STRUCTURAL BUILDING ELEMENT
Carl C. Hiatt, and Nils F. Larson, both of Winston-Salem, N.C., assignors to Hiatt-Larson Corporation, Winston-Salem, N.C.
Filed Oct. 24, 1975, Ser. No. 625,478
Int. Cl.² E04B *5/00*
U.S. Cl. 52—600 22 Claims



1. A building element having a high structural load bearing capacity and comprising:

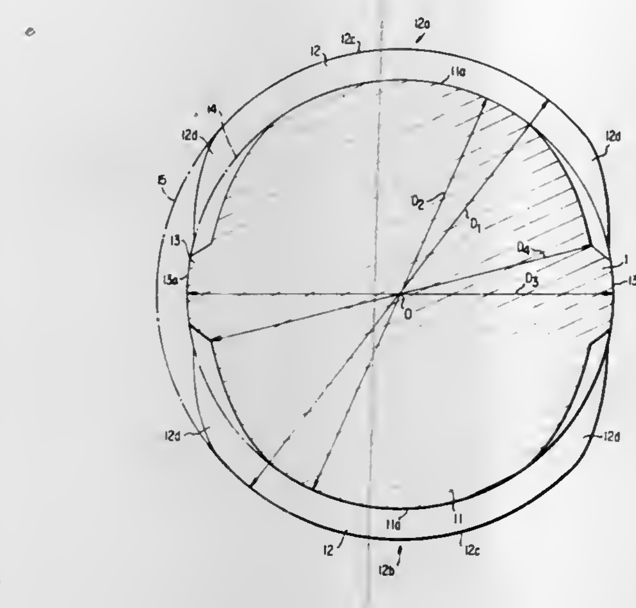
a. a continuous phase of cementitious material, wherein said continuous phase includes:

b. an interconnected matrix in the form of a cellular structure and having a first density, and

c. a plurality of zones dispersed within the matrix having a second density lower than the first density, wherein the matrix comprises a plurality of wall sections substantially completely surrounding the lower density zones with at least one portion of the matrix disposed interiorly of the element between said low density zones for interconnecting opposed wall sections of the matrix, and

d. a common cementitious bond between the wall sections of the matrix, the interiorly disposed interconnecting portion of the matrix, and the lower density zones for producing a synergistic relationship imparting increased compressive strength and minimization of fracture propagation throughout the element.

4,056,911
STEEL BAR FOR CONCRETE REINFORCEMENT HAVING A NON-CIRCULAR CROSS-SECTION
Yoshio Tani, Kobe, Japan, assignor to Kobe Steel, Ltd., Kobe, Japan
Filed June 23, 1976, Ser. No. 699,224
Claims priority, application Japan, June 23, 1975, 50-77724
Int. Cl.² E04C *5/03*
U.S. Cl. 52—738 9 Claims



1. A steel bar for concrete reinforcement, having a noncircular cross section and including a core portion, and having a longitudinally extending axis, which comprises:

two sets of transverse ribs disposed respectively upon first diametrically opposite surface portions of the core of the steel bar, each set consisting of a number of transverse ribs of a lug-forming projection type disposed at a position corresponding to every pre-selected pitch in the longitudinal direction of the steel bar and extending therefrom in planes substantially transverse to the core;

a pair of longitudinal ribs disposed on second diametrically opposite surface portions of the core at the intermediate positions between said sets of transverse ribs and extending from the core linearly in the longitudinal direction thereof;

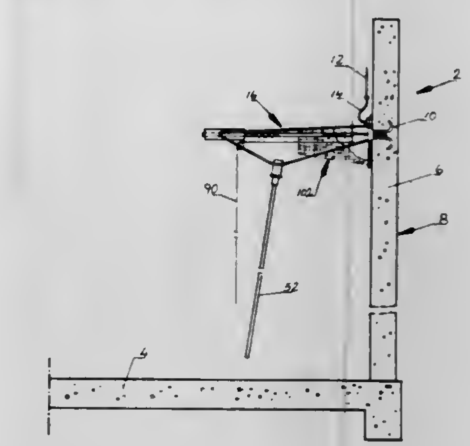
the outer portion of each of said longitudinal ribs being disposed upon a locus which is located a distance from the axis of said steel bar which lies in a range which extends between being equal to or less than the distance between said axis and the outer circumferential surface portions of said first diametrically opposite surface portions of the core located at the remotest position from said axis;

the major central portion of the outer surface of each of said transverse ribs being disposed upon a locus having a larger diameter than the locus having the axis of the steel bar as its center and a surface which tangentially contacts the outer surface of said core; and

the outer surface of the wing portion of each of said transverse ribs being disposed in such a manner that the distance from the axis is reduced progressively towards the outer portion of said longitudinal ribs;

whereby said transverse ribs can mate with a female helical thread of a corresponding pitch in a nut, coupler or anchor sleeve.

4,056,912
METHOD FOR RELEASING TILT-UP PANEL HOISTING MEMBER
James E. Case, and Richard L. Ruppert, both of Sparks, Nev., assignors to The Dayton Sure-Grip & Shore Company, Miamisburg, Ohio
Division of Ser. No. 578,552, May 19, 1975, Pat. No. 3,997,959. This application Dec. 16, 1976, Ser. No. 751,536
Int. Cl.² E04B *1/00;* E02D *35/00;* E04H *12/20*
U.S. Cl. 52—745 7 Claims



1. A method for erecting a tilt-up building panel from a generally horizontal position into a generally vertical position comprising the steps of anchoring an insert in the panel, the insert including a threaded aperture communicating with the exterior and having an axis generally perpendicular to the panel, providing a split bolt defined by a plurality of cooperating bolt segments having an exterior thread complementary to the threaded aperture, the split bolt being formed so that it can be axially inserted into the aperture when the segments are proximate to each other, inserting wedge means between the bolt segments to spread the segments and engage them with the threaded aperture, thereby locking the bolt to the insert, raising the panel by engaging the bolt and lifting it until the panel is in its upright position, fixing the panel in its upright position, and withdrawing the bolt from the ground by positioning a linearly reciprocable release member in substantial alignment with the bolt, said positioning being performed by raising the release member from about ground level to the level of the insert by mounting it to an extension and raising the extension into an upright position until the release member is aligned with the insert, engaging the wedge means with the release member and operating the release member from the ground to move it away from the panel to thereby move the wedge means out of its engagement with the bolt segments, whereby the bolt segments can be collapsed and removed from the threaded aperture without requiring the operator to climb up on the panel.

4,056,913
METHOD OF PACKAGING AND SHIPPING BULK MATERIAL USING REUSABLE OUTER SHELL
Robert A. Bamburg; Farris N. Duncan, both of West Monroe, and Roger M. Floyd, Monroe, all of La., assignors to Olinkraft, Inc., West Monroe, La.
Division of Ser. No. 557,420, March 11, 1975, Pat. No. 4,040,558. This application Oct. 29, 1976, Ser. No. 736,987
Int. Cl.² B65B *1/00*
U.S. Cl. 53—27 6 Claims

1. A method of packaging and shipping a bulk material product in a combination container comprising the steps of:

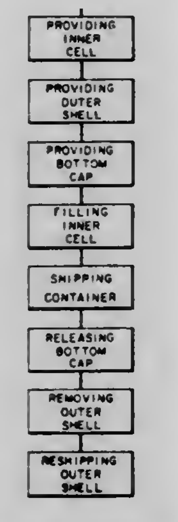
a. providing an inner paperboard container having at least one product receiving cell for the combination container;

b. providing at least one removable outer paperboard shell for the combination container designed with an open bottom to be fit over and to surround said inner container to add stability thereto;

c. filling said product receiving cell with a bulk material product at an original location, said inner container and

said outer shell being constructed so that any frictional holding forces between the walls thereof are less than the combined weight of said inner container and the products in said product receiving cell;

d. shipping said inner container with said product and with said outer shell fit over and surrounding the same to a remote location;



e. lifting said outer shell upward from said inner container and the product to remove the outer shell;

f. reshipping the removed outer shell back to its original location while allowing said inner container and the product to remain at the remote location for storage and use purposes; and g. fitting said outer shell over another inner container having at least one product receiving cell.

4,056,914

METHOD AND APPARATUS FOR REMOVING RESIDUE OF FILLING MATERIAL IN MACHINES FOR MANUFACTURING FILLED PLASTIC CONTAINERS

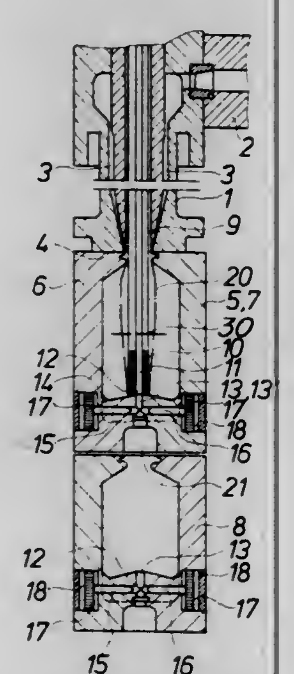
Reinhold Mnilk, Dortmund; Manfred Kurreck, Bochum-Weitmar, and Wolfgang Tiede, Dortmund, all of Germany, assignors to Holstein & Kappert Aktiengesellschaft, Dortmund, Germany

Filed Sept. 26, 1975, Ser. No. 617,180

Claims priority, application Germany, Sept. 27, 1974, 2446206

Int. Cl.² B65B *1/04*

U.S. Cl. 53—35 **5 Claims**



1. A method for removing undesired residue of a filling material from the filling mandrel in a machine for the manufacture, filling and closure of containers wherein filling material is inserted into the container by means of the filling mandrel, said machine comprising blow mold means shaped to form said container including separable mold parts, said method comprising the steps of extruding plastic material from an extrusion nozzle, clamping said mold parts about said extruded plastic material with said plastic material thereby extending within said blow mold means shaped to form the container, said blow mold means including a filling section and means defining a constriction formed in said blow mold means within a region generally above said filling section and adjacent thereto, locating within said plastic material within said blow mold means a filling mandrel having a outer diametral dimension smaller than said constriction to form therebetween an annular gap having a thickness approximately equivalent to the wall thickness of a segment of said container, forming said container in said blow mold means, filling said container with filling material through said filling mandrel with said mandrel being located below the level of the filling material during at least a substantial portion of the filling operation, moving said blow mold means relative to said filling mandrel to withdraw the filling mandrel from the blow means while said blow mold means is closed to separate the mandrel from said container while simultaneously stripping residue of the filling material adhering to the outer surface of the filling mandrel as the outer surface of the mandrel contacts a portion of the molded container in the constriction while passing the mandrel through the constriction by the relative movement of the mandrel from the blow mold means during separation of the mandrel from the container.

4,056,915

COMPENSATING STORE DEVICE IN SYSTEMS FOR DIRECTLY FEEDING CIGARETTES FROM CIGARETTE MANUFACTURING MACHINE OR MACHINES TO THE HOPPER OF THE CIGARETTE PACKETING MACHINE

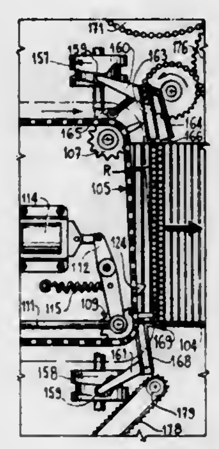
Enzo Seragnoli, Bologna, Italy, assignor to G. D. Societa per Azioni, Italy

Filed Jan. 22, 1976, Ser. No. 651,332

Claims priority, application Italy, Jan. 29, 1975, 3323/75

Int. Cl.² B65B *57/14*

U.S. Cl. 53—59 R **10 Claims**



1. Apparatus for compensating unbalances in operations of machines for producing and packeting cigarettes, comprising:

a compensating store cylinder having means for continously rotating it about a vertical axis and having vertically and radially extending cigarette-storing compartments distributed about the cylinder's circumference, each compartment having a generally open top and a generally open bottom and being dimensioned to permit horizontally disposed cigarettes in a cigarette pile one cigarette thick to be disposed in the compartment and slidingly to be moved downwardly along the same;

cigarette support means selectively actuatable for enabling such a pile to be disposed in each compartment and slidingly to be moved downwardly along the same;

a conveyor system including a cigarette-feeding conveyor, for feeding a stream of individual cigarettes to a fixed location at the top of the cylinder from a cigarette-producing machine for discharge into the top of one of the compartments during a first type of unbalance between operations of the producing machine and of a cigarette packeting machine, and a cigarette-withdrawing conveyor for withdrawing a stream of individual cigarettes from the bottom of the compartment to a fixed location at the bottom of the cylinder and further to the packeting machine during a second type of unbalance between such operations;

means for controlling the conveyor system and for actuating the cigarette support means in response to either type of unbalance; and

transfer channel means for selectively delivering cigarettes from the feeding conveyor into successive ones of the compartments and for discharging cigarettes therefrom to the withdrawing conveyor, comprising two transfer channels, each tiltably mounted at one of said fixed locations, each channel having a cigarette transfer section disposed to be moved with and relative to the cylinder during the cylinder's rotation and to provide an open path for cigarettes smoothly sliding between the section and one of the compartments, for a predetermined time, and thereafter to establish similar communication between the section and a next following one of the compartments, and means for gradually tilting the channels to effect the moving of their respective transfer sections with the cylinder, and thereby to insure the smooth sliding of the cigarettes when the cigarette support means are actuated.

4,056,916

COMPENSATING STORE DEVICE IN SYSTEMS FOR DIRECTLY FEEDING CIGARETTES FROM CIGARETTE MANUFACTURING MACHINE OR MACHINES TO THE HOPPER OF THE CIGARETTE PACKETING MACHINE

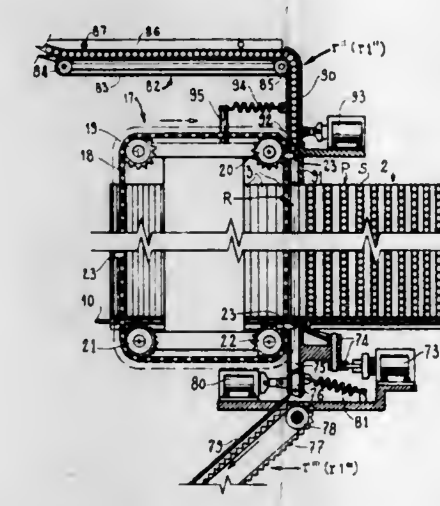
Enzo Seragnoli, Bologna, Italy, assignor to G. D. Societa per Azioni, Italy

Filed Jan. 22, 1976, Ser. No. 651,334

Claims priority, application Italy, Jan. 29, 1975, 3324/75

Int. Cl.² B65B *57/14*

U.S. Cl. 53—59 R **10 Claims**



1. Apparatus for compensating operating unbalances of machines for producing and packeting cigarettes, comprising:

a compensating storage cylinder having means for intermittently rotating it about a vertical axis to provide a regular succession of stops of the cylinder, the cylinder having vertically and radially extending cigarette-storing compartments distributed about the cylinder's circumference, each compartment having a generally open top and a generally open bottom and being dimensioned to permit horizontally disposed cigarettes in a cigarette pile one cigarette thick to perform sliding movements downwardly into, along and from the compartment;

cigarette support means for selectively enabling such movements of the cigarettes in synchronism with the stops of the cylinder;

a conveyor system, including, a cigarette-feeding conveyor movable for feeding a stream of individual cigarettes from a cigarette-producing machine to a first fixed location adjacent the top of the cylinder upon a first type of operating unbalance between the producing machine and a cigarette packeting machine, and a cigarette-withdrawing conveyor for withdrawing a stream of individual cigarettes from a second fixed location at the bottom of the cylinder and feeding it to the packeting machine on a second type of operating unbalance between the machines, the second fixed location being vertically below the first fixed location;

means for selectively actuating the conveyors while also actuating the cigarette support means in response to either type of unbalance and during the same;

a transfer system interposed between each conveyor and the cylinder and comprising a pair of transfer channel units, one at each fixed location, each transfer channel unit comprising a vertical fixed channel and a channel movable between a vertical and an inclined position, the channels of each unit being disposed in sequence, one with the other, between the respective conveyor and a point at an end of each successive cylinder compartment disposed between the fixed locations during each stop; and

transfer control means for, sequentially, holding the movable channels of both transfer channel units in their inclined position during the rotating of the cylinder to prevent said sliding movements, and holding the movable channel of one transfer unit in its vertical position during a stop of the cylinder, to insure the sliding movements of the cigarettes into the compartments during the first type of unbalance and from the compartments during the second type of unbalance.

4,056,917

SYSTEM FOR TRANSFERRING AND STORING CIGARETTES

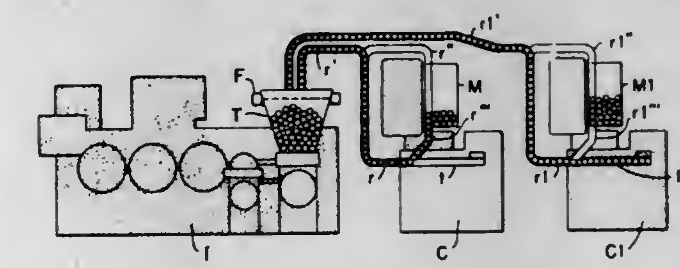
Enzo Seragnoli, Bologna, Italy, assignor to G. D. Societa per Azioni, Italy

Filed Jan. 22, 1976, Ser. No. 651,335

Claims priority, application Italy, Jan. 29, 1975, 3322/75

Int. Cl.² B65B *57/14*

U.S. Cl. 53—59 R **7 Claims**



1. A plant having at least two cigarette manufacturing machines, one packaging machine, and a storage unit for compensating operating unbalances of the manufacturing and packaging machines, the storage unit comprising;

a compensating storage cylinder having means for rotating it about a vertical axis and having vertically and radially extending cigarette-storing compartments distributed about the cylinder's circumference, each compartment having a top and a bottom and being dimensioned to permit cigarettes to be horizontally disposed in a cigarette pile one cigarette thick in the compartment between the top and the bottom;

cigarette support means capable of actuation for enabling cigarettes in such a pile to be slidingly moved downwardly along the compartment;

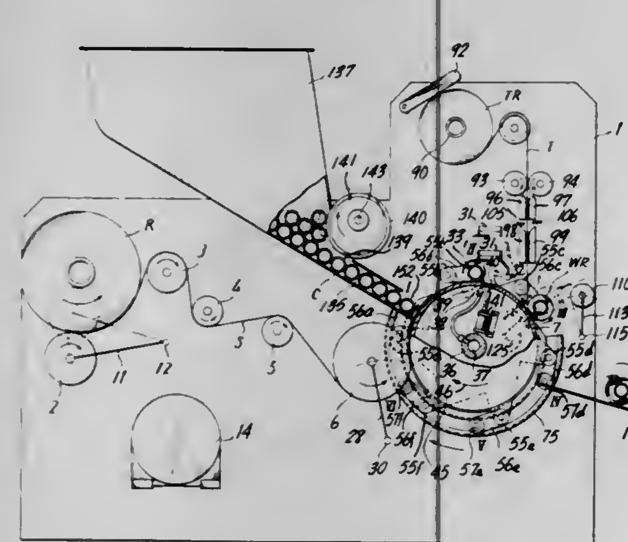
a conveyor system, including (a) a cigarette-feeding conveyor for feeding a stream of individual cigarettes from a cigarette-manufacturing machine to a fixed location at the top of the cylinder for discharge into the top of one of the compartments during a first type of operating unbalance between the manufacturing machine and a cigarette-packaging machine, and (b) a cigarette-withdrawing conveyor for withdrawing a stream of individual cigarettes from the bottom of one of the compartments to a fixed location at

the bottom of the cylinder and further to the packaging machine during a second type of operating unbalance between the machines;

means for selective actuation, in response to either type of unbalance, of the respective conveyor and of the cigarette support means; and

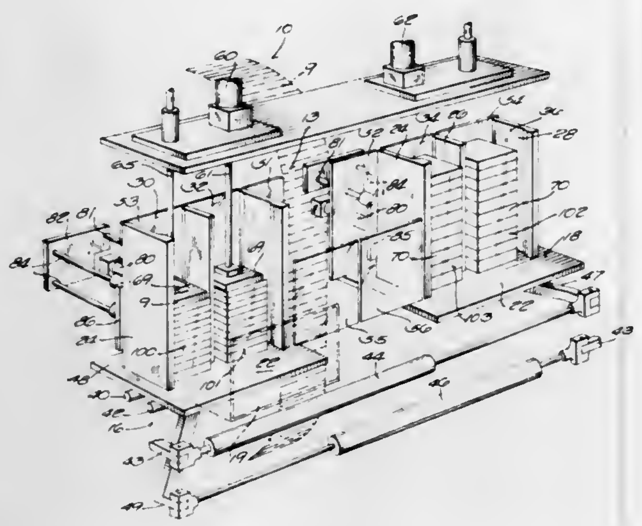
transfer channel means for, selectively, delivering cigarettes from the feeding conveyor into the top of one of the compartments, and discharging cigarettes from the bottom of one of the compartments to the withdrawing conveyor, comprising two transfer channels, each tiltably mounted at one of said fixed locations and each having means for tilting it to provide a path for cigarettes smoothly sliding between the pile and the respective one of the conveyors, and to close said path.

4,056,918
WINDING MACHINE
Yukimichi Matsumoto, Hirakata, Japan, assignor to Kabushiki Kaisha Fuji Tekkosho, Japan
Filed Oct. 8, 1976, Ser. No. 730,996
Claims priority, application Japan, Oct. 11, 1975, 50-122590
Int. Cl.² B65B *63/04*
U.S. Cl. 53—118 **7 Claims**



1. In a roll-winding apparatus for winding sheet material into a plurality of wound rolls comprising; a winding drum rotationally driven at a constant speed of rotation; feed means for advancing a travelling sheet material longitudinally in contact with a peripheral sector of said winding drum; means for automatically presenting elongated cores individually and successively to a winding station at said sector and in contact with said travelling sheet material and pressed thereagainst and against said drum in position parallel with said drum for each being rotationally driven about a corresponding longitudinal axis thereof; said means for automatically presenting elongated cores comprising means biasing the individual cores in a direction toward the periphery of said winding drum; means for winding a leading end section of said sheet material on each successive rotating core at said winding station and each with a desired length of sheet material wound thereon as a wound roll; said means for presenting said elongated cores to said winding drum comprising means to transfer successively would rolls from said winding station to a discharge station on said drum downstream of the winding station while maintaining sheet material wound on each of said wound rolls bearing against said winding drum for rotating by said drum about said corresponding longitudinal axis of each corresponding core; said means to transfer comprising means driven intermittently angularly equal increments about the longitudinal axis of said winding drum; means to automatically sever the sheet material during each transfer of a wound roll from said winding station; and said means for winding said leading section comprising means for automatically winding on each said successive core a leading end section of each next successive length of sheet material after severing of each length of sheet material from said sheet material upon winding thereof on a corresponding core.

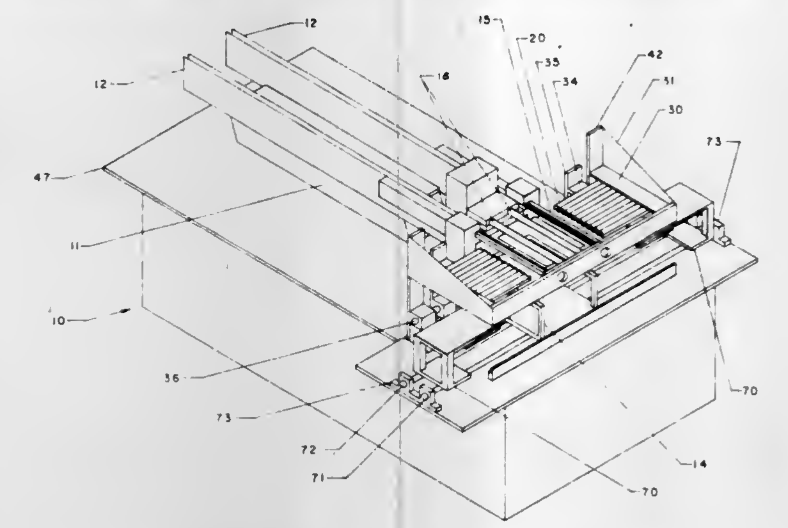
4,056,919
DIAPER PACKER
John L. Hirsch, Sheboygan Falls, Wis., assignor to Curt G. Joa, Inc., Sheboygan Falls, Wis.
Filed Oct. 27, 1976, Ser. No. 736,041
Int. Cl.² B65B *63/02*
U.S. Cl. 53—124 D **5 Claims**



1. Apparatus for packing compressible articles in cartons comprising means for forming a stack of the articles oriented along a Z axis at a stack forming station, a carriage having a stack carrying receptacle having spaced walls for confining a stack agains lateral shifting during carriage movement, means for moving the stack onto said carriage and within said receptacle, means for moving the carriage along a Y axis transverse to the Z axis and between a stack receiving position at the stack forming station and a stack unloading station, pusher means for pushing the stack from the receptacle at the unloading station along an X axis transverse to said Z and Y axes and into a shipping carton, and stack compression means for compressing and maintaining said article stack under compression along the Z axis while said articles are pushed in the direction of the X axis and wherein said receptacles are upwardly open on two sides along the X axis and said stack compressing means comprises a pressure plate, and means for reciprocating the pressure plate along the Z axis to engage and compress the article stack, and wherein said pusher means for pushing the compressed stack from the receptacles along the X axis comprises a pusher plate reciprocatable along the X axis through the open sides of the receptacle and including front and rear panels parallel to the Y axis and spaced to receive the carriages therebetween and confine the article stack during carriage movement along the Y axis.

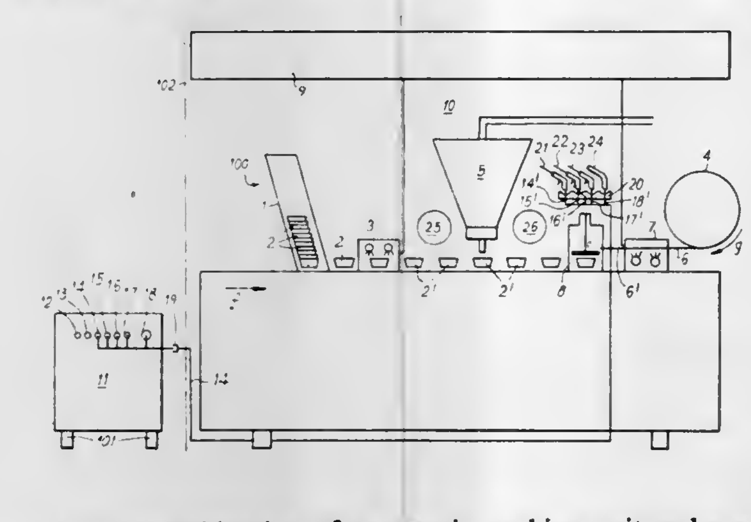
4,056,920
LOADING APPARATUS
Walter A. Shields, 181-41 Henley Road, Jamaica, N.Y. 11432
Filed Nov. 24, 1976, Ser. No. 744,479
Int. Cl.² B65B *5/08, 5/10, 35/30*
U.S. Cl. 53—142 **9 Claims**

1. Apparatus for loading a plurality of articles into a receptacle having parallel rows of openings each of which is adapted to receive a respective one of the articles, comprising a loading station including means for guiding and supporting said articles in a row parallel to and spaced above and laterally of a row of said openings to be filled with the row of articles, said guiding and supporting means including movable guide means for engaging the row of articles laterally, means for moving said movable guide means between a position in which said movable guide means laterally engages the row of articles and a position in which the movable guide means is disengaged from the row of articles, carrying means for the row of articles, means for moving the carrying means into engagement with the articles thereby to provide support for and carry the articles when the movable guide means is disengaged from the articles and for then moving the carrying means with the row of articles carried thereby laterally toward and into vertical alignment with the openings of the row of said openings to be filled with the row of articles, means for increasing the spacing between the carrying means to a spacing corresponding to the



spacing between the openings of the row to be filled as the articles are laterally carried by the carrying means into vertical alignment with the openings of the row to be filled and means for moving the carrying means vertically downwardly thereby to lower the articles partly into the openings, said means for moving the carrying means laterally including means for then moving the carrying means laterally in reverse of the former lateral movement thereby to disengage the carrying means from the articles partly received in the openings to permit the articles to descend further into the openings.

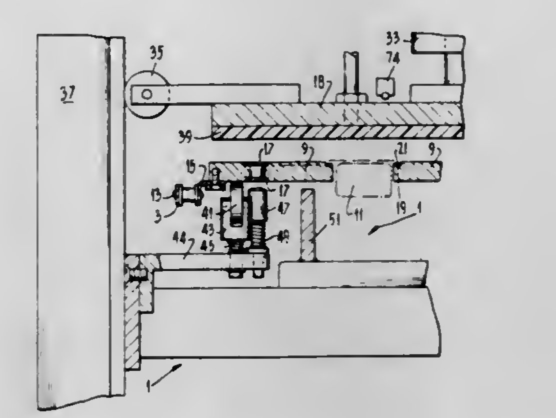
4,056,921
ASEPTIC PACKING UNIT AND A SERVICE UNIT FOR PROVIDING THE PACKING UNIT WITH STERILE UTILITIES
André Ferdinand Louis Gilliand, Rorschacherberg, and Christian Looser, Lutzenberg, both of Switzerland, assignors to Alcan Research and Development Limited, Montreal, Canada
Filed Nov. 3, 1975, Ser. No. 628,322
Claims priority, application Switzerland, Nov. 5, 1974, 014799/74
Int. Cl.² B08B *13/00;* **B65B** *17/00, 55/04, 55/12*
U.S. Cl. 53—167 **3 Claims**



1. The combination of an aseptic packing unit and a service unit;

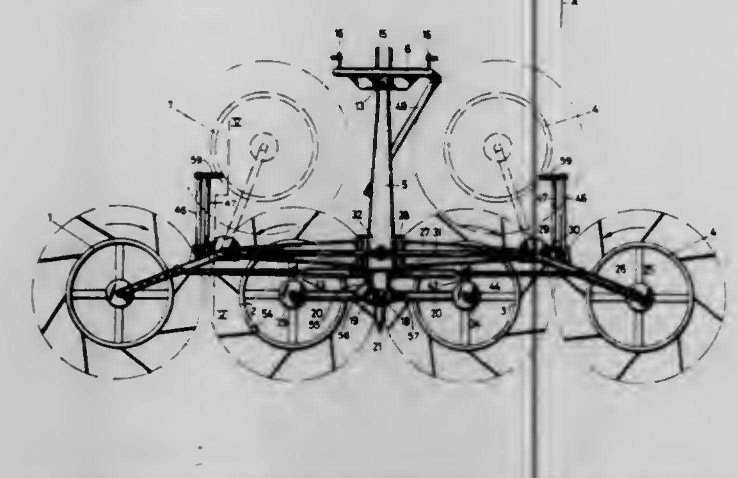
a. the aseptic packing unit comprising
   i. means for providing a sterile workspace,
   ii. sterile means within said workspace for filling previously sterilized containers with previously sterilized filling material and closing said containers, when filled, with previously sterilized lids,
   iii. means for providing a descending curtain of sterile air surrounding said sterile workspace, said curtain of air providing a barrier preventing contamination from outside said sterile workspace,
   iv. means operable within said sterile workspace for manipulation of said sterilized containers, lids for closing said containers, said sterilized filling material and said filled and closed containers,
   v. a plurality of tools comprising supply guns operable by said manipulating means to provide utilities including sterile water and sterile air within said sterile workspace without loss of sterility within said workspace,
   vi. a plurality of first detachable couplings on the exterior of said unit outside said curtain of air, and
   vii. supply lines for connecting said tools to said first detachable couplings, said supply lines including means for prevention of contamination of said tools when said first detachable couplings are detached and open to non-sterile conditions;
b. the service unit being a mobile unit exterior to and independent from said aseptic packing unit and said sterile workspace, said service unit comprising
   i. a plurality of inlets, for utilities including water and air,
   ii. means for sterilizing said utilities,
   iii. a plurality of outlets including second detachable couplings adapted to connect to corresponding ones of said first detachable couplings on said aseptic packing unit thereby supplying said tools with said utilities without loss of sterility, and
   iv. a suction pump within said service unit to exhaust a waste line from said sterile workspace;
c. said first and second detachable couplings being co-acting sets of quick-acting plug-in, non-return couplings.

4,056,922
SEALING MACHINES
Hank John Schilte, 9 Burton Court, Bayswater, Victoria, Australia
Filed Feb. 23, 1976, Ser. No. 660,674
Int. Cl.² B65B *51/14, 7/28*
U.S. Cl. 53—373 **7 Claims**



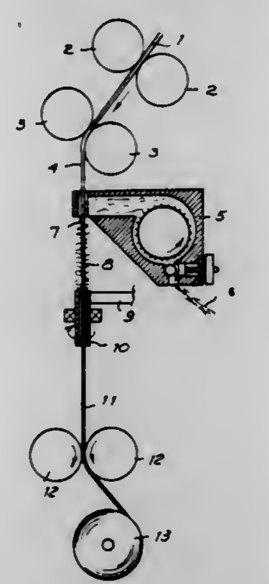
1. Plate means for use in heat sealing backings to covers to package articles therein, said plate means having at least one aperture therethrough into which a cover can be placed from a top face of said plate means, electric heating element means surrounding the periphery of said at least one aperture and electric contact means imbedded in said plate means for permitting electric heating energy to be passed to said electric heating element means, part of said electric contact means being on the bottom face of the plate means remote from the face of intended direction of insertion of a cover into said at least one aperture, locating means for locating backings over said aperture, and a single fastening means on each side of said plate means for permitting releasable attachment to a conveyor chain means.

4,056,923
AGRICULTURAL IMPLEMENT
Petrus Wilhelmus Zweegers, Nieuwendijk 46, Geldrop, Netherlands
Filed Jan. 23, 1976, Ser. No. 651,975
Claims priority, application Netherlands, Feb. 4, 1975, 7501290
Int. Cl.² A01D *79/00, 77/00*
U.S. Cl. 56—366 **24 Claims**



1. Agricultural implement having a direction of travel and comprising means defining a frame extending transversely to the direction of travel, four adjacent positively driven tine-carrying rake wheels rotatable about substantially vertical axes on said frame means and disposed to define two inner and two outer wheels, means including the two inner wheels for defining a unit so mounted on said frame means as to be reversible such that either of said two inner wheels can occupy the position occupied by the other of said two inner wheels.

4,056,924
YARN-TWISTING METHOD AND APPARATUS
John Umiastowski, 127 Sunnyside Place, Dollard des Ormeaux, Quebec, Canada
Filed Mar. 26, 1975, Ser. No. 562,113
Claims priority, application Canada, Mar. 29, 1974, 196403
Int. Cl.² D02G *3/36, 3/34, 3/40*
U.S. Cl. 57—5 **12 Claims**



1. In a yarn manufacturing method, the steps of false twisting a yarn core which has a plurality of fibers projecting laterally from the surface of said core for first introducing a twist in a given direction into the yarn core and for then releasing the yarn core so that it tends to twist upon itself in a direction opposite to said given direction, and, while said twist in said given direction is introduced into the yarn core, winding said fibers projecting laterally from said core at least partly into engagement with the surface thereof in a direction opposite to said given direction, so that the thus wound fibers form surface fibers at the surface of said core maintaining said twist in said given direction therein, tensioning said fibers while they are wound around said core, and false-twisting said core solely by the tensioning of the fibers while they are wound around said core.

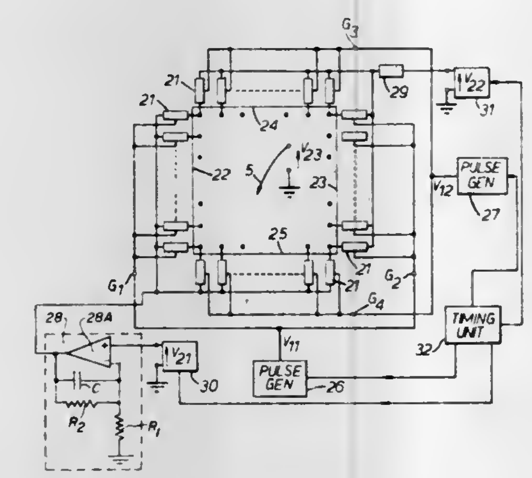
6. In a yarn-manufacturing apparatus, feed means for feeding longitudinally along a predetermined path an elongated yarn core from the exterior surface of which a plurality of fibers project laterally, rotary tubular means surrounding said path for rotating about the latter and about a yarn core fed longitudinally therealong by said feed means, said rotary means having an upstream end surface toward which the yarn core is fed by said feed means and a downstream end surface away from which the yarn core is fed by said feed means, and said rotary tubular means having a hollow unobstructed interior throughout its length and having an inner uninterrupted surface of constant diameter, the internal constant diameter of said rotary means being small enough for said inner surface of said rotary tubular means to freely surround the yarn core with at least a slight clearance while said upstream end surface thereof is of a sufficiently small diameter to frictionally engage said fibers and wind the latter helically around and into engagement with said yarn core during longitudinal feeding thereof through said rotary means, and rotating means operatively connected to said rotary means for rotating the latter around said path and said core longitudinally fed therealong at a speed sufficiently high to provide substantial slippage between said rotary means and said core, while the latter is false twisted solely as a result of the action of said rotary means on said fibers.

4,056,925
METHOD AND APPARATUS FOR THE SZ-TWISTING OF ELECTRICAL CABLES
Dieter Vogelsberg, Berlin, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany
Filed Nov. 12, 1975, Ser. No. 630,947
Claims priority, application Germany, Nov. 15, 1974, 2454777
Int. Cl.² D01H *7/90;* **H01B** *13/02*
U.S. Cl. 57—34 AT **17 Claims**

1. Apparatus for twisting elements for an electrical cable into a twisted unit having a twist direction which alternates from section to section comprising:
a. supply means for twisted elements;
b. a guide nipple through which all of said twisted elements pass and are formed into a contiguous group defining a first twisting point;
c. means defining a second twisting point, a torsioning section being defined by the two twisting points;
d. means for pulling the twisted unit off and winding it; said twisted elements passing from said supply means first through said guide nipple and from said guide nipple to said means defining a second twisting point;
e. twisting means in the form of a single twisting disk supported for rotation in either direction arranged within the torsioning section closer to said second twisting point that to said first twisting point.

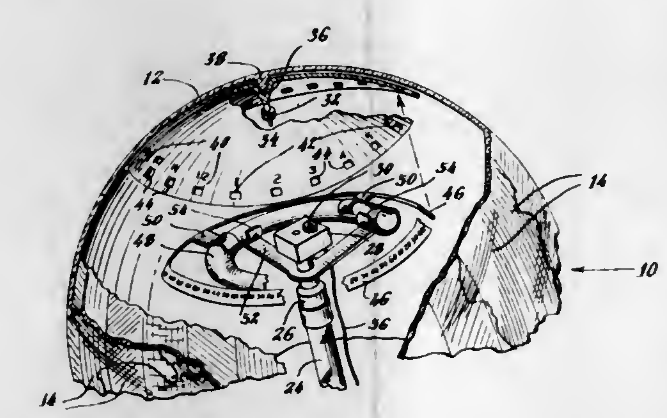
14. A method for twisting elements for electrical cables to form a twisted unit having a twist direction which alternates from section to section comprising the steps of:
a. tensioning the twisting elements between a first and second twisting point with said twisting elements contiguous to each other at both said first and second twisting points;
b. disposing a twisting device comprising a single twisting disc near said second twisting point;
c. running said twisting elements through the section defined between said first and second twisting points from said first to said second twisting point in a stretched condition;
d. rotating said twisting disc with a direction of rotation which alternates; and
e. changing the direction of rotation of said twisting disc only after at least three complete revolutions in one direction.

4,056,926
METHOD AND APPARATUS FOR DETECTING SO-CALLED MOIRE EFFECT DURING SPINNING
Wolfgang Stüber, Dettenhausen, Germany, assignor to Otto Stüber KG, Bissingen, Germany
Filed June 7, 1976, Ser. No. 693,151
Claims priority, application Germany, June 7, 1975, 2525461
Int. Cl.² D01H *13/22*
U.S. Cl. 57—81 **8 Claims**



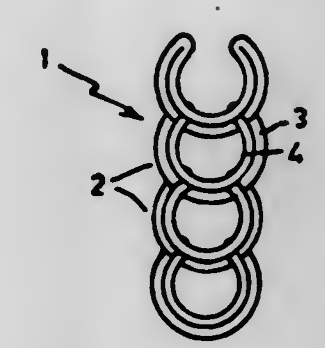
2. In a device for detecting defective portions of yarn, during spinning of yarn and the like by a spinning machine, of the type having a thread monitoring unit for detecting relatively long variations in the thickness of the yarn and including a pulser connected to a time switch, and, responsive to detection of such relatively long variations in the yarn thickness, providing an output signal for control of the spinning machine: a moire monitoring device, operable to detect the number of defective portions of the yarn, occurring at periodic spacings within a predetermined time period, connected between said pulser and said time switch and operable to activate said time switch to provide said output signal responsive to the number of detected defective portions of the yarn occurring within such predetermined time period exceeding a desired value.

4,056,927
TIME GIVING DEVICE
James R. Wilson, 2050 Kiva Road, Santa Fe, N. Mex.
Filed Apr. 7, 1977, Ser. No. 785,350
Int. Cl.² G04B *19/22*
U.S. Cl. 58—44 **4 Claims**



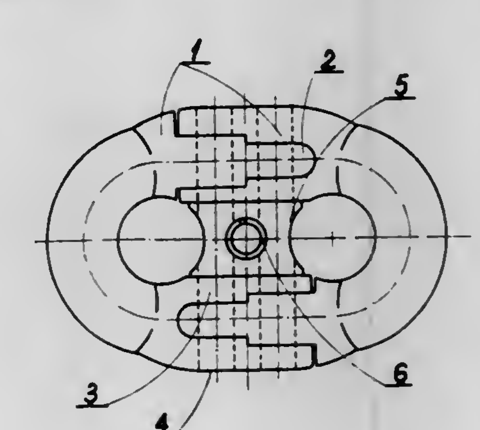
1. Apparatus for determining the time on any geographical area of the earth which comprises a transparent globe segmented into time zones, and an hour plate within said globe having numbers representing hours of the days, perforations on said plate each associated with one of said hour numbers, means within said globe positioned below said perforations for determining minute time, means for rotating said plate 360° every 24 hours and means for illuminating the interior of said globe.

4,056,928
DETACHABLE LINK-CHAIN
Robert de Vries, 2 Valeriusstraat, The Hague, Netherlands
Filed Apr. 29, 1976, Ser. No. 681,508
Claims priority, application Netherlands, Sept. 15, 1975, 7510815
Int. Cl.² F16G *15/12*
U.S. Cl. 59—83 **1 Claim**



1. A link-chain formed by assembling links in series, each of said links comprising a smaller and larger pair of connected substantially annular loops in substantially parallel superimposed relationship one to another, the outer diameter of said smaller loop being so dimensioned with respect to the inner diameter of said larger loop that the smaller loop of one link is insertable in a tight fit through the larger loop of the next adjacent link in said chain and wherein the distance apart of the two superimposed loops of each pair is sufficiently smaller than the diameter of the material of the rod forming said loop to permit the snapping of a subsequent link in or out.

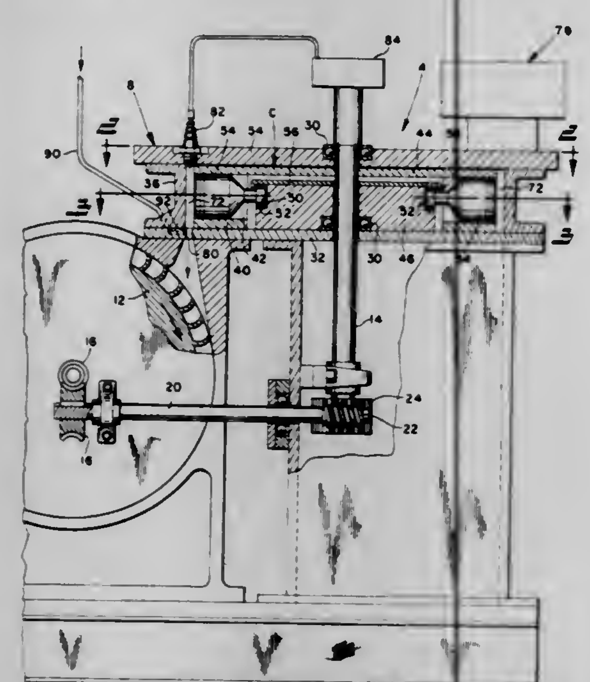
4,056,929
CHAIN QUICK-CONNECTING LINK
Eryk Chrobak, Siemianowice Slaskie; Benedykt Natkaniec, Katowice; Zenon Wasyleczko, Katowice; Antoni Stawinski, Katowice, and Andrzej Roczek, Zabrze, all of Poland, assignors to Fabryka Sprzetu i Narzedzi Gorniczych im. Gen. Karola, Katowice, Poland
Filed Mar. 4, 1976, Ser. No. 663,696
Claims priority, application Poland, May 15, 1975, 180422
Int. Cl.² F16G *15/04*
U.S. Cl. 59—85 **2 Claims**



1. A quick-coupling link for driving chains comprising: two identical half-links, each identical half-link having at its one end a forwardly extending projection having a longitudinal axis, said projection having a stepped portion along said longitudinal axis, the other end of each link having a stepped-shaped slot portion, said projection and said slot portion lying substan-

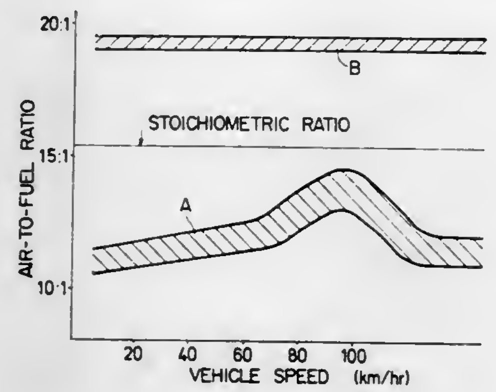
tially in the same plane as the remainder of said half-link; spacing insert means between said ends of said links; pin means passing through said projection and said slot portion for permanently interconnecting said two half-links, the two ends of each half-link having at least two cylindrical openings with axes lying substantially in said plane; an expanding sleeve in said spacing insert means for inhibiting removal of said pin means from said half-links, said pin means passing through said cylindrical openings.

4,056,930
INTERNAL COMBUSTION TURBINE
Henry B. Sherman, 935 West St., Cleveland, Ohio 44113
Filed Apr. 9, 1976, Ser. No. 675,576
Int. Cl.² F02G *3/00*
U.S. Cl. 60—39.78 **6 Claims**



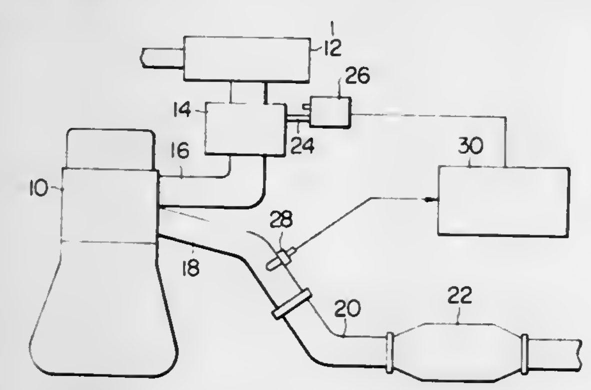
1. Apparatus comprising a cylinder block mounted for rotation about a block axis, means for rotating said cylinder block about said block axis, said cylinder block including at least one cylinder reciprocally receiving a piston and having a cylinder axis extending substantially perpendicular to said block axis so that said cylinder travels in a circular predetermined path in a predetermined direction during rotation of said block about said block axis, stationary means associated with said block and including a stationary piston-reciprocating cam means for reciprocating said piston in successive compression and expansion strokes during rotation of said block relative to said cam means, said stationary means including supply means for supplying combustible fuel to said cylinder, igniting means for igniting said fuel in said cylinder adjacent the end of one of said compression strokes at a predetermined ignition point in said path and when said piston has been moved to a predetermined position in said cylinder by said stationary cam means, said stationary cam means having a surface portion in engagement with said piston for maintaining said piston in said predetermined position during igniting of said fuel, and said stationary means including exhaust port means located closely adjacent said predetermined ignition point and spaced slightly therefrom in said predetermined direction so that a substantial volume of expanding gases in said cylinder expand outwardly therefrom through said exhaust port means rather than moving the piston toward the axis of block rotation, and a rotatable turbine wheel positioned for being rotatably driven by gases flowing through said exhaust port means.

4,056,931
MULTI-CYLINDER INTERNAL COMBUSTION ENGINE AND METHOD OF OPERATION THEREOF
Yoshitaka Hata, Fujisawa, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan
Filed May 16, 1975, Ser. No. 578,189
Claims priority, application Japan, May 21, 1974, 49-57717
Int. Cl.² F02B *75/10*
U.S. Cl. 60—274 **13 Claims**



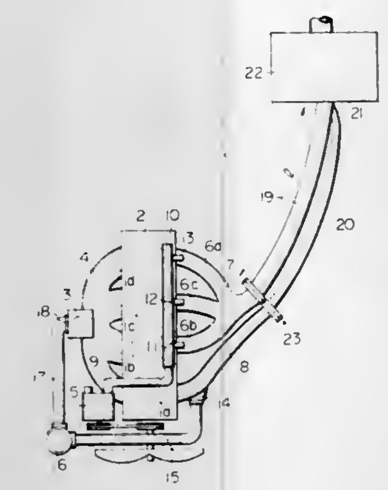
1. A method of operation of a multi-cylinder internal combustion engine having a first group of cylinders consisting of at least half the total number of cylinders and a second group of cylinders consisting of the remaining cylinders, the engine being followed by an afterburner for burning exhaust gases from all the cylinders, comprising:
- feeding said first group of cylinders with a first air-fuel mixture richer than stoichiometric;
- feeding said second group of cylinders with a second air-fuel mixture leaner than stoichiometric; and
- feeding said fist group of cylinders with an air-fuel mixture which is leaner than said first air-fuel mixture and richer than stoichiometric only when the engine is operated at medium engine speed range.

4,056,932
CONTROL SYSTEM FOR PROMOTING CATALYTIC REMOVAL OF NOXIOUS COMPONENTS FROM EXHAUST GAS OF INTERNAL COMBUSTION ENGINE
Koyo Nakamura, Yokosuka, and Hiroshi Sanbuichi, Yokohama, both of Japan, assignors to Nissan Motor Co., Ltd., Japan
Filed Oct. 30, 1975, Ser. No. 627,334
Claims priority, application Japan, Nov. 1, 1974, 49-132670[U]; Nov. 12, 1974, 49-129583
Int. Cl.² F02D *33/00, 35/00*
U.S. Cl. 60—276 **32 Claims**



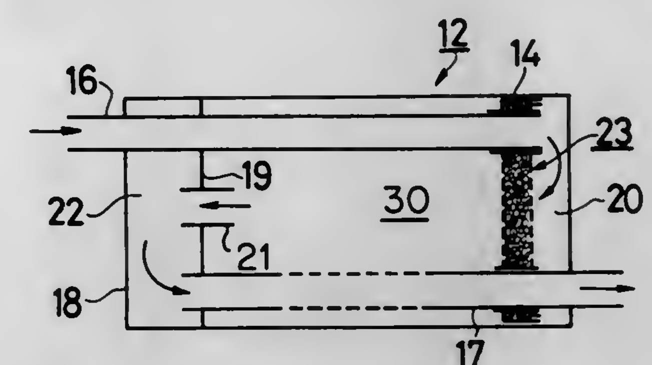
1. In an internal combustion engine provided with a carburetor having an air bleed passage opening into a fuel discharge passage and an exhaust system having a catalytic converter containing therein a catalyst which catalyzes both the reduction of oxides of nitrogen and the oxidation of carbon monoxide and hydrocarbons, a system for promoting the catalytic conversion reactions in the catalytic converter, comprising:
- means for defining an auxiliary air admitting passage connected to the fuel discharge passage of the carburetor;
- means for sensing the concentration of a particular component of the exhaust gas in the exhaust system at a section upstream of the catalytic converter and for producing an electrical signal representing the sensed concentration, said concentration being in dependence on the air/fuel ratio of an air/fuel mixture fed to the engine;
- a control circuit having means for continuously producing electrical pulses at a frequency between 5 and 100 Hz, the width of said pulses varying individually in dependence upon said air/fuel ratio such that said width increases when said air/fuel ratio indicated by said electrical signal is below a predetermined ratio which equals at least approximately to a stoichiometric air/fuel ratio and decreases when said air/fuel ratio is above said predetermined ratio; and
- an electromagnetic valve receptive of said pulses and effective to allow admission of auxiliary air to said auxiliary air admitting passage only when each of said pulses is applied thereto, so that the fuel discharge rate to the induction passage of the carburetor is varied in response to deviations of said air/fuel ratio from said predetermined ratio.

4,056,933
EXHAUST GAS PURIFIER IN AN INTERNAL COMBUSTION ENGINE
Hidetaka Nohira, and Kiyoshi Kobashi, both of Susono, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Japan
Filed May 19, 1976, Ser. No. 687,757
Claims priority, application Japan, Jan. 9, 1976, 51-1473
Int. Cl.² F02M *25/06;* **F01N** *3/10*
U.S. Cl. 60—278 **6 Claims**



1. An exhaust gas purifier in an internal combustion engine having a plurality of cylinders and an air intake system, comprising:
- a first exhaust manifold connected to at least one of said cylinders, said first exhaust manifold having an exhaust gas outlet;
- a second exhaust manifold connected to the remaining cylinders other than said at least one cylinder, said second exhaust manifold having an exhaust gas outlet;
- a first exhaust pipe fluidly connected to the exhaust gas outlet of said first exhaust manifold, said first exhaust pipe having an exhaust gas outlet;
- a second exhaust pipe fluidly connected to the exhaust gas outlet of said second exhaust manifold, the exhaust gas outlet of said first exhaust pipe being fluidly connected with said second exhaust pipe at a position remote from the exhaust gas outlet of said second exhaust manifold so that the exhaust gas in said second exhaust manifold does not enter into said first exhaust manifold;
- an exhaust gas passage between said remaining cylinders and the exhaust gas outlet of said second exhaust manifold;
- means for feeding secondary air into the exhaust gas passage between said remaining cylinders and the exhaust gas outlet of said second exhaust manifold;
- an exhaust gas passage between said one cylinder and the exhaust gas outlet of said first exhaust manifold;
- a recirculated exhaust gas inlet disposed in the exhaust gas passage between said one cylinder and the exhaust gas outlet of said first exhaust manifold;
- a recirculated exhaust gas outlet disposed in the air intake system;
- a recirculated exhaust gas conduit fluidly connecting said recirculated exhaust gas inlet with said recirculated exhaust gas outlet for delivering recirculated exhaust gas containing no secondary air therein from said recirculated exhaust gas inlet to the recirculated exhaust gas outlet; and
- means for controlling the flow rate of the recirculated exhaust gas in the recirculated exhaust gas conduit.

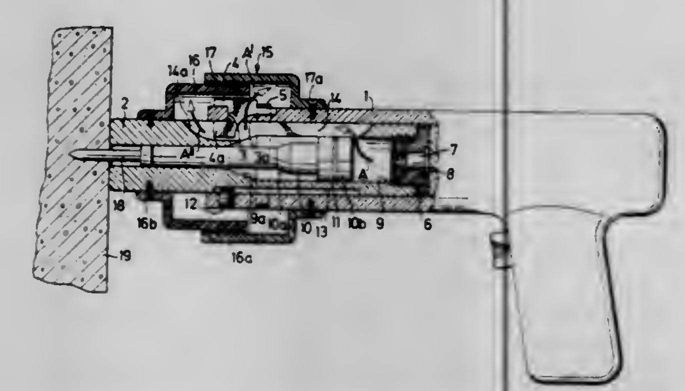
4,056,934
AFTER-BURNING PREVENTIVE AND FLAME-OUT APPARATUS
Shinichiro Mizusawa, Okazaki; Chiharu Tamura, Toyota; Norihiko Nakamura, Mishima, and Hiromichi Yanagihara, Susono, all of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan
Filed Jan. 15, 1976, Ser. No. 649,527
Claims priority, application Japan, Sept. 27, 1975, 50-116647; Oct. 15, 1975, 50-124079
Int. Cl.² F01N *3/06*
U.S. Cl. 60—311 **8 Claims**



1. In a muffler for an internal combustion engine, including an after-burning preventive and flame-out apparatus provided therein, so that flame which takes place in the course of running of a gas mixture through an exhaust system from the engine to the muffler may be extinguished by means of an improved flame-out apparatus comprising:
- a first L-shaped screen member including a longitudinally extending body portion and a transversely oriented flange portion extending inwardly from one end of said body portion, the outer face of said body portion being welded to the inner face of the outer body of the muffler;
- a second L-shaped screen member including a longitudinally extending body portion and a transversely oriented flange portion extending inwardly from one end of said body portion of said second L-shaped screen member, the outer face of said body portion of said second L-shaped member being welded to the inner face of said body portion of said first L-shaped screen member with said body portion of said first L-shaped screen member being longer than said body portion of said second L-shaped screen member in the axial direction so that said flanged portion of said first L-shaped screen member is axially spaced from said flanged portion of said second L-shaped screen member;
- a pair of transversely oriented partition plates each having a plurality of small openings, the axially outer surface of one of said partition plates being welded to the axially inner surface of said flange portion of said first L-shaped screen member while the axially outer surface of said other partition plate being welded to the axially outer surface of said flange portion of said second L-shaped screen member whereby an axially extending space is defined between said pair of partition plates; and
- flame extinguishing means filling said axially extending

space between said pair of partition plates and the inner surface of said body portion of said first L-shaped screen member for extinguishing the flame which takes place in the gas exhaust system.

4,056,935
DAMPING CHAMBER FOR AN EXPLOSIVE CHARGE-DRIVEN FASTENING ELEMENT SETTING GUN
Horst-Detlef Gassmann, Schaan, Liechtenstein, assignor to Hilti Aktiengesellschaft, Schaan, Liechtenstein
Filed Dec. 9, 1975, Ser. No. 639,048
Claims priority, application Germany, Dec. 20, 1974, 7442603[U]
Int. Cl.² F01B *29/08;* **B25C** *1/12*
U.S. Cl. 60—632 **9 Claims**



1. An explosive charge driven fastening element setting gun comprising a casing having a front end facing in the firing direction and an oppositely directed rear end, with the front end of the casing forming a bore extending in the firing direction, an axially elongated muzzle tube having a front end facing in the firing direction and oppositely directed rear end, said muzzle tube axially displaceably mounted in the bore in the front end of said casing and the front end of said muzzle tube projecting outwardly from the front end of said casing, at least one of said casing and said muzzle tube having a gas outlet orifice opening laterally therefrom, wherein the improvement comprises a damping housing mounted on said casing and on said muzzle tube and forming a closed chamber covering said gas outlet orifice for receiving explosive gases flowing therefrom and said closed chamber being openable for releasing the explosive gases collected therein.

4,056,936
BENTHIC SEMI-BARRIER TO CONTROL THE GROWTH OF WEEDS IN AQUATIC ENVIRONMENTS
J. Richard Mayer, 13 University Park, Fredonia, N.Y. 14063
Continuation-in-part of Ser. No. 518,547, Oct. 29, 1974, abandoned. This application Apr. 13, 1976, Ser. No. 676,965
Int. Cl.² E02B *3/00*
U.S. Cl. 61—1 R **2 Claims**

1. An ecologically harmless method of limiting weed growth in selected areas of the bottom of a body of water comprising the steps of:

placing a noncorrosive foraminous screen, having a plurality of generally uniform apertures, on an area to be treated upon existant plant life and in a co-planar relationship with the bottom of the body of water;

maintaining said noncorrosive foraminous screen in close proximity and co-planar relationship with the bottom of the body of water;

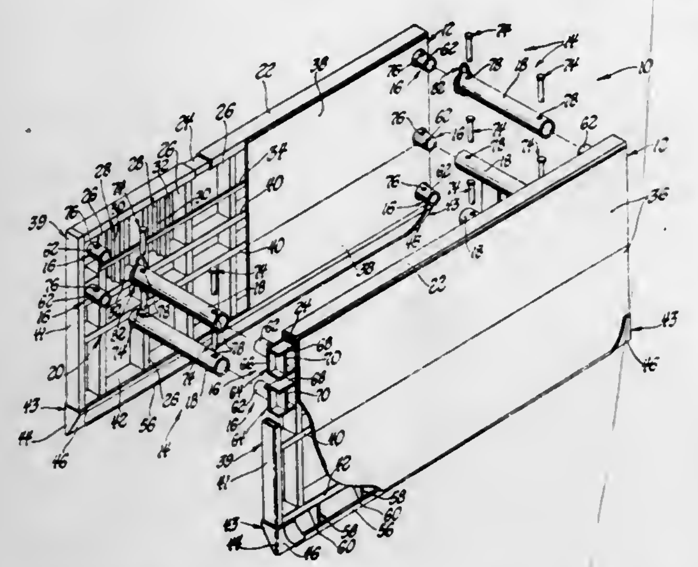
inhibiting plant growth in the area beneath said noncorrosive foraminous screen by,
shielding said area from a substantial degree of the sun's rays with said noncorrosive foraminous screen; and

limiting plant size in an area beneath and through said noncorrosive foraminous screen by,
limiting the size of plant stems which extend through the foraminous screen to the size of the apertures in said noncorrosive foraminous screen.

4,056,937
METHOD OF CONSOLIDATING SOILS
Manao Suzuki, Tokyo, Japan, assignor to Kyokado Engineering Co. Ltd., Tokyo, Japan
Filed Jan. 8, 1976, Ser. No. 647,596
Int. Cl.² E02D *3/14*
U.S. Cl. 61—36 B **14 Claims**

1. In a method of solidifying a soil or making soil water-tight by injecting a hardener thereinto, in which a mixture of water glass and acidic reacting agent is employed as said hardener, and said solution is blended so that the pH value thereof is within a range of from weak acidity of about fine to weak alkalinity of about 9, thereby to reduce the pollution of soil or subterranean water, characterized in that a liquid A which is a solution of one or two materials selected from the group consisting of a gel control agent and clay, and a liquid B which is a mixture of water glass and acidic reacting agent are employed as said hardener, and said liquids A and B are joined together and are injected into said soil, said liquid B being blended so that the pH thereof being maintained within a range of from acidity to weak alkalinity.

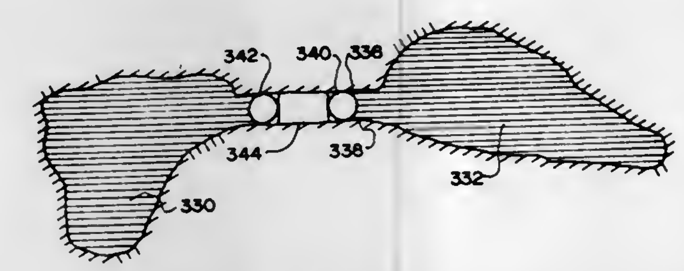
4,056,938
TRENCH SHORING ASSEMBLY WITH RIGID MAIN FRAME SUPPORT
James L. Griswold, 513 Morningside Drive, Battle Creek, Mich. 49015
Filed Feb. 9, 1976, Ser. No. 656,127
Int. Cl.² E21D *5/00;* **E04C** *2/32*
U.S. Cl. 61—41 A **8 Claims**



1. A trench shoring assembly of the type including a pair of spaced wall means interconnected by connecting means, the connecting means including spreader devices, said assembly comprising: wall means including interconnected structural members defining a main frame, plate means disposed over at least a portion of said frame and secured to at least some of said structural members, said structural members being connected together to define spaces therebetween and having a depth along each side extending outwardly of said plate means, and support means rigidly secured to at least one of said structural members of said main frame along the side and the depth thereof for connection to the spreader devices for transferring

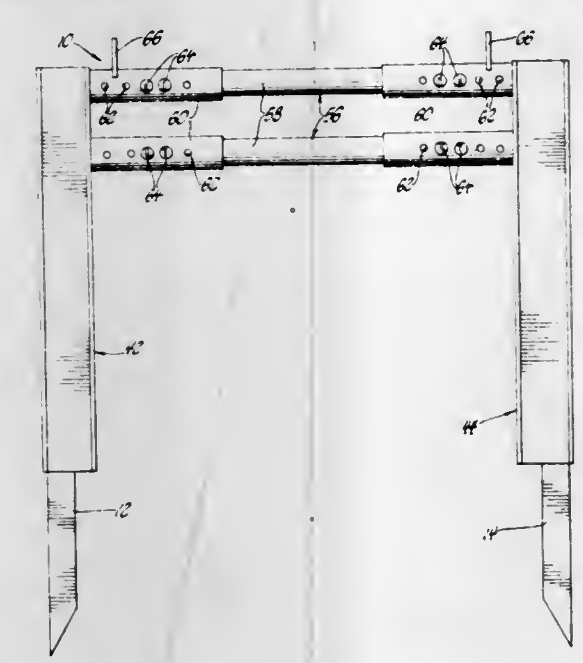
forces from the spreader devices directly to said main frame, said support means including collar means and backing plate means, said collar means adapted to be connected to the spreader devices and said backing plate means being rigidly secured along the side of said one of said structural members whereby a force applied to said collar means is transferred to said main frame.

4,056,939
INFLATABLE ENVELOPE SYSTEMS FOR USE IN EXCAVATIONS
Alberto M. Alvarez-Calderon F., 512 E. Central St., Santa Maria, Calif. 93454
Division of Ser. No. 356,591, May 2, 1973, Pat. No. 3,937,025. This application Jan. 8, 1976, Ser. No. 647,346
Int. Cl.² E21F *15/00*
U.S. Cl. 61—35 **7 Claims**



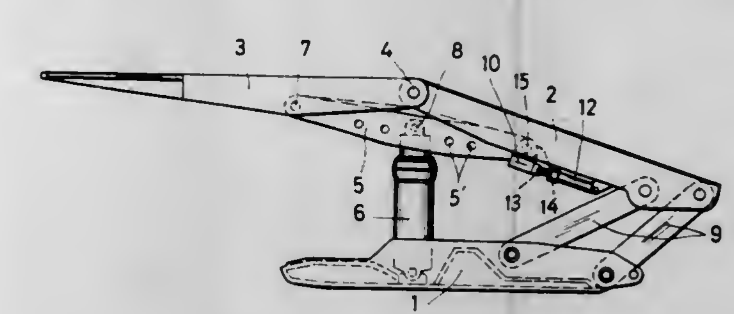
1. Apparatus for forming a channel through a solidifiable substance backfilling an excavation chamber, said chamber having opposed walls portions of which are approximately parallel and uneven, an elongate tubular envelope, elongate deformable means disposed between the envelope and the adjacent opposed walls, means for inflating said envelope to thereby partially crush said deformable means between the envelope and the wall, said deformable means conforming to the unevenness of said walls to form a seal between said envelope and at least one of said walls which opposes the flow of said solidifiable substances across said seal.

4,056,940
TRENCH BOX HEIGHT ADAPTOR
Walter A. Fisher, Coldwater, Mich., assignor to Griswold Machine & Engineering, Inc., Union City, Mich.
Filed Oct. 26, 1976, Ser. No. 735,011
Int. Cl.² E21D *5/00, 5/12*
U.S. Cl. 61—41 A **20 Claims**



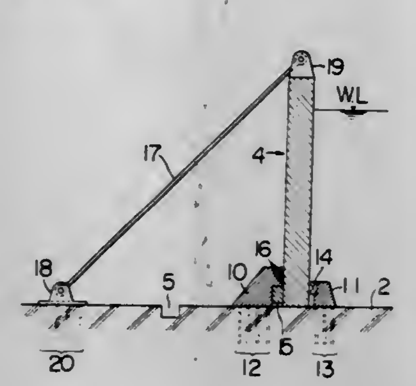
1. A trench shoring assembly comprising; first and second spaced wall means having upper surfaces, third and fourth spaced wall means stacked vertically upon said upper surfaces of said first and second wall means, said third wall means being stacked upon said first wall means to define a first substantially continuously extending vertical wall and said fourth wall means being stacked upon said second wall means to define a second substantially continuously extending vertical wall, first spreader means interconnecting first ends of said wall means, and second spreader means interconnecting all of said stacked wall means at the second ends thereof and extending across the space therebetween only above said upper surfaces for providing unobstructed space between said spaced wall means therebelow, said second spreader means including first connector means extending vertically for interconnecting said first and third wall means and second connector means extending vertically for interconnecting said second and fourth wall means, a first plurality of vertically aligned support means interconnecting said first wall means and said first connector means, a second plurality of vertically aligned support means interconnecting said third walls means and said first connector means, a third plurality of vertically aligned support means interconnecting said second wall means and said second connector means, a fourth plurality of vertically aligned support means interconnecting said fourth wall means and said second connector means, said second spreader means including tie bar means extending horizontally above said upper surfaces and interconnecting said first and second connector means.

4,056,941
MINE ROOF SUPPORT FOR AN UNDERGROUND MINE GALLERY
Willy Watermann, Dortmund-Lanstrop, Germany, assignor to Klockner-Werke AG, Duisburg, Germany
Filed Jan. 10, 1977, Ser. No. 758,303
Claims priority, application Germany, Jan. 15, 1976, 2601341
Int. Cl.² E21D *15/44*
U.S. Cl. 61—45 D **10 Claims**



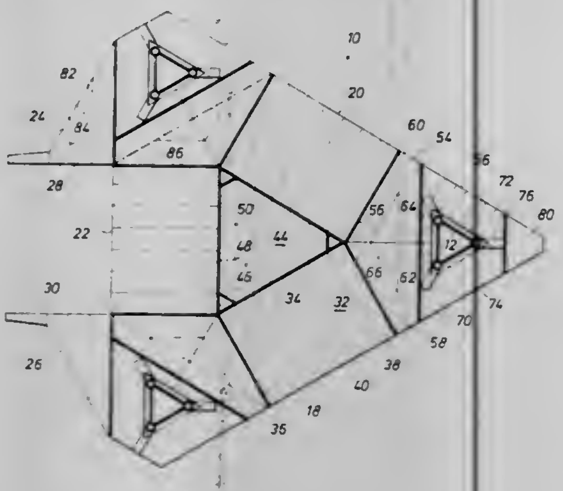
1. A mine roof support for an underground mine gallery comprising a sole plate adapted to rest on the floor of the mine gallery; a front shield adapted to engage the roof of the mine gallery and having a front end directed toward the mine face; a rear shield having a front end pivotally connected to the other end of said front shield and projecting rearwardly from the latter; a rocker arm connected at opposite ends respectively to said front and said rear shield intermediate the ends of said shields; expandable and contractable prop means supporting said rocker arm on said sole plate; and arm means pivotally connected to the other end of said rear shield and said sole plate.

4,056,942
METHOD FOR MOVING BUILT STRUCTURES BY FLOTATION
Toshio Yoshida, Kobe, Japan, assignor to Kawasaki Jukogyo Kabushiki Kaisha, Kobe, Japan
Filed May 6, 1976, Ser. No. 683,942
Claims priority, application Japan, May 13, 1975, 50-57064
Int. Cl.² E02B *1/00*
U.S. Cl. 61—65 8 Claims



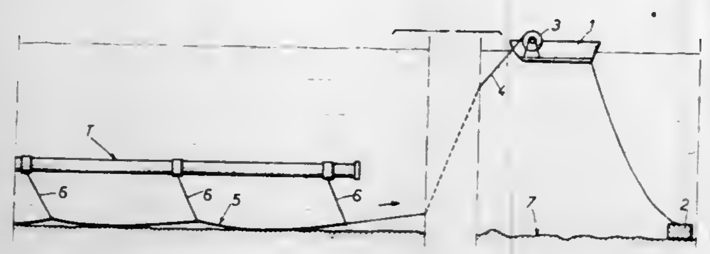
8. The method of claim 7, including packings embedded in each of the outer buttress blocks at a surface thereof facing the outer wall of the associated wall panel.

4,056,943
HULL CONSTRUCTION
D. Jarratt Tarrant, 12611 Rovensway Drive, Cypress, Tex. 77429
Filed Jan. 30, 1976, Ser. No. 653,767
Int. Cl.² E02D *21/00*
U.S. Cl. 61—96 9 Claims



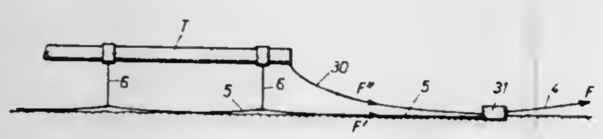
1. An improved jack up drilling rig construction which comprises
- an enclosed hull having three wells for receiving a set of supportive legs therethrough which legs support the weight of said hull when said hull is elevated on said legs above a body of water;
- said leg wells being equally spaced from one another and said Hull having first, second and third edge located sides extending between and near said leg wells;
- symetrically constructed side compartments in said hull which are arranged adjacent to the edges of said hull which side compartments define by a common side a centrally located triangular compartment;
- said side compartments having lengthwise members parallel to the edges of said hull for supporting the bending movements acting parallel to the edges of said hull; and
- three corner located compartments incorporating said leg wells therein, said corner located compartments being positioned symetrically of said hull and each supporting a leg elevating means.

4,056,944
PROCESS AND DEVICE FOR LAYING SUBMARINE PIPELINES
Jacques Edouard Lamy, Fontenay-aux-Roses, France, assignor to C. G. Doris (Compagnie Generale pour les Developpements Operationnels des Richesses Sous-marines), Paris, France
Filed May 13, 1976, Ser. No. 685,738
Claims priority, application France, Oct. 15, 1975, 75.15160
Int. Cl.² F16L *1/00*
U.S. Cl. 61—107 17 Claims



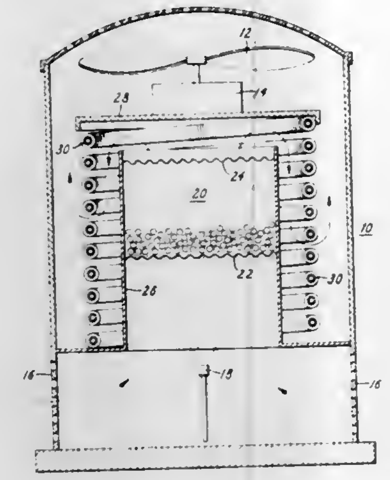
1. In a method of laying a pipeline on the bed of a body of water while forming the pipeline with a plurality of pipe sections initially stored ashore, comprising the steps of advancing a first one of said pipe sections towards the body of water, connecting a forward end of a second one of said pipe sections to a rear end of said first pipe section, further advancing said first and second pipe sections towards the water body, connecting a forward end of a third one of said pipe sections to a rear end of said second pipe sections, and so on, each advancing step comprising applying a hauling force to a pipeline portion of substantial length to haul the same towards the body of water, the improvement comprising distributing the hauling force into a plurality of traction forces, and applying the traction forces to respective points spaced along said pipeline portion.

4,056,945
PROCESS AND DEVICE FOR LAYING SUBMARINE PIPELINES
Jacques Edouard Lamy, Fontenay-aux-Roses, France, assignor to Compagnie Generale pour les Developpements Operationnels des Richesses Sous-Marines "C.G. Doris", Paris, France
Continuation-in-part of Ser. No. 685,738, May 13, 1976. This application Nov. 15, 1976, Ser. No. 741,622
Claims priority, application France, July 1, 1976, 76.20080
Int. Cl.² F16L *1/00*
U.S. Cl. 61—107 6 Claims



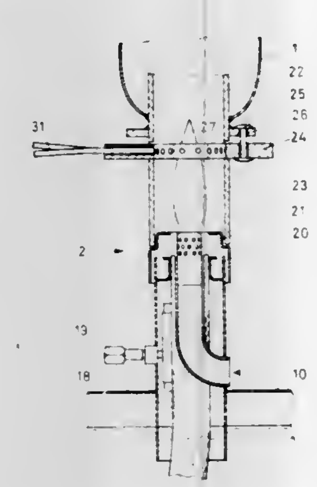
1. A method of laying a pipeline on the bed of a body of water while forming the pipeline with a plurality of pipe sections initially stored ashore, comprising the steps of advancing a first one of said pipe sections towards the body of water, connecting a forward end of a second one of said pipe sections to a rear end of said first pipe section, further advancing said first and second pipe sections towards the water body connecting a forward end of a third one of said pipe sections to a rear end of said second pipe sections, and so on, each advancing step comprising hauling a pipeline portion of substantial length towards the body of water, wherein each advancing step comprises applying a traction force to a forward end of said first pipe section, and applying a plurality of further traction forces to a plurality of points spaced along said pipeline portion.

4,056,946
LOW TEMPERATURE COOLER/CONDENSER
James A. Bond, West Chester; Spurgeon E. Eckard, and Arthur W. Schnacke, both of Cincinnati, all of Ohio, assignors to General Electric Company, Fairfield, Conn.
Filed Nov. 14, 1975, Ser. No. 632,109
Int. Cl.² F28D *5/00*
U.S. Cl. 62—121 7 Claims



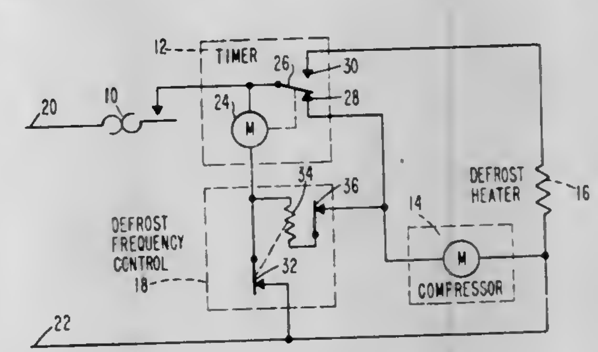
7. A method of cooling fluid contained in the tubing of a condenser comprising:
- applying water to a bed of beads;
- passing air first through said bed of beads and then over said tubing; and
- periodically terminating the application of water to said bed of beads long enough to dry said beads and fluidize said bed.

4,056,947
ABSORPTION REFRIGERATOR
Ernest W. Partsch, Dolderstrasse 63, Zurich, Switzerland (8032)
Filed Apr. 5, 1976, Ser. No. 673,744
Claims priority, application Switzerland, Apr. 15, 1975, 4806/75
Int. Cl.² F25B *15/00*; F24H *3/02*
U.S. Cl. 62—148 11 Claims



1. In an absorption refrigerator having a nonelectric boiler heating system, a box having a coolable interior and a side at which refrigerating equipment is mounted, said refrigerating equipment including a boiler and a heating burner located below said boiler for heating the same, electrically energizable blower means carried by said box, at least one centrally apertured ceramic disc formed with radial bores and disposed above said heating burner and substantially concentrically to said heating burner and said boiler so that heat originating in said burner is concentrated in the central aperture of said ceramic disc, and thermocouple means comprising a multiplicity of serially-connected thermocouple elements having respective hot junctions located within the central aperture of said ceramic disc, respective cold junctions located radially beyond the periphery of said ceramic disc and respective means extending through said radial bores for mutually connecting the respective hot and cold junctions to one another, said thermocouple means being electrically connected to said blower means for energizing the latter with electricity generated in said thermocouple means by the heat originating in said heating burner.

4,056,948
PRESETTABLE DEFROST TIMER
Carl J. Goodhouse, Litchfield, Conn., assignor to Robertshaw Controls Company, Richmond, Va.
Filed June 29, 1976, Ser. No. 700,984
Int. Cl.² F25D *21/08*
U.S. Cl. 62—155 6 Claims

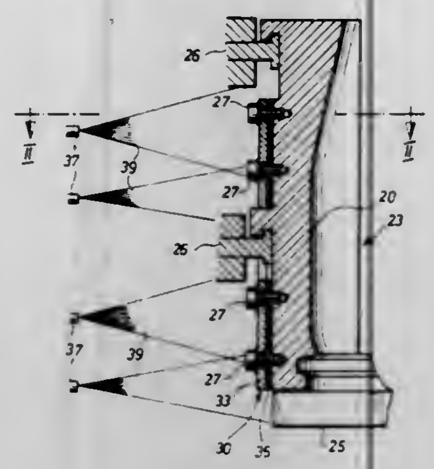


1. A defrost timing circuit comprising:
- a compressure for refrigerating enclosures;
- a defrost heater;
- thermostat means responsive to the temperature in said refrigerated enclosures;
- defrost timing means responsive to said thermostat means,
- said defrost timing means including a timing motor means, and
- a switch means operated by said timing motor means connected to said compressor and said defrost heater, said defrost timing means providing a first normal period of operation of said compressor and a second period of operation of said defrost heater after said first normal period of operation of said compressor;
- means for selectively changing said first normal period of operation of said compressor,
- said selectively changing means including a normally closed control switch in series with said timing motor means,
- said selectively changing means further including a heat motor delay means connected and parallel with said compressor for opening said normally closed control switch after the selected duration of operation for said compressor, said selected duration being substantially less in time than said first normal period of operation of said compressor.

4,056,949
APPARATUS FOR COOLING TOOLS OF GLASS-FORMING MACHINES BY EVAPORATION OF A COOLING LIQUID
Karl Friedrich Hahn, Obernkirchen, Germany, assignor to Hermann Heye, Obernkirchen, Germany
Continuation of Ser. No. 461,385, April 6, 1974, abandoned. This application Apr. 12, 1976, Ser. No. 675,806
Claims priority, application Germany, May 2, 1973, 2322091
Int. Cl.² F25D *17/02*
U.S. Cl. 62—373 18 Claims

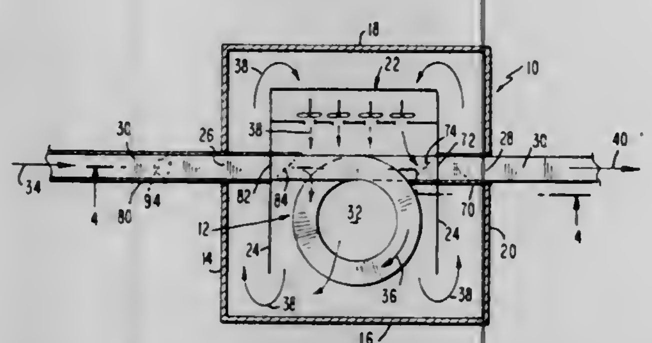
1. Apparatus for cooling tools of glass-forming machines by evaporation of a cooling liquid, comprising cover means substantially covering the tool surface to be cooled, said cover means having a surface in contact with said tool surface and being constructed and connected to said tool surface to vary the heat transfer between said surfaces to thus avoid film evap-

oration of a cooling liquid applied to that surface of said cover means which is opposite the surface in contact with said tool



surface; and means for applying cooling liquid to said opposite surface of said cover means.

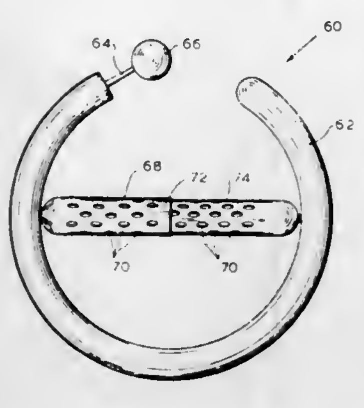
4,056,950
FOOD PROCESSOR WITH AN AIR BALANCING SYSTEM
Harold B. Kaufman, Jr., New York, N.Y., assignor to DCA Food Industries, Inc., New York, N.Y.
Filed May 25, 1976, Ser. No. 689,737
Int. Cl.² F25D *25/02*
U.S. Cl. 62—381 **14 Claims**



1. A system for blast freezing of food products comprising, a freezing chamber, food product entry and exit ports in said freezing chamber, food product conveying means extending through said entry port said freezing chamber and said exit port for conveying food products into through and out of said freezing chamber, means mounted in said freezing chamber for circulating refrigerated air over the food product as it is conveyed through said freezing chamber to freeze said food products, air balancing means coupled to at least one of said food entry or exit ports, said air balancing means including shroud means, means for coupling said shroud means to at least one of the food product entry or exit ports, said shroud means surrounding said conveyor means and extending at least partially into the flow path of said circulating refrigerated air in said freezing chamber, said shroud means positioned to intercept a determined part of the flow of refrigerated air inside the freezing chamber to produce an air flow condition in which there is a substantially reduced net flow of air into said freezing chamber and substantially reduced net flow of air into said freezing chamber and substantially reduced net flow of refrigerated air out of said freezing chamber.

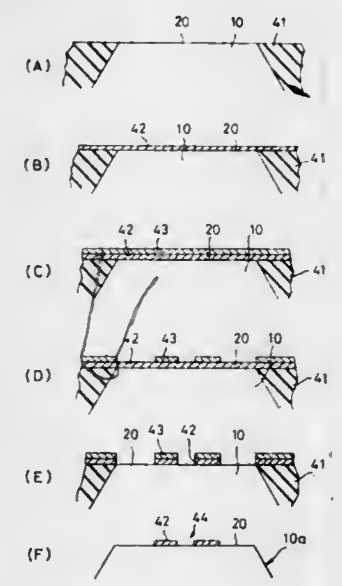
4,056,951
PIERCED EARRING HAVING PERFUMING MEANS
Edith Black, 129 E. Beacon Road, Lakeland, Fla. 33803
Filed Mar. 1, 1976, Ser. No. 662,327
Int. Cl.² A44C *7/00*
U.S. Cl. 63—13 **1 Claim**

1. An earring structure for use with pierced ears comprising:
an earring member comprising a curved hollow member forming a generally circular shape;
a post extending substantially normal from a surface of said earring member, said post adapted to extend through a pierced ear;
holding means for joining to the extremity of said post for holding said earring member in proximity to an ear;
means for removing a portion of said earring member; said



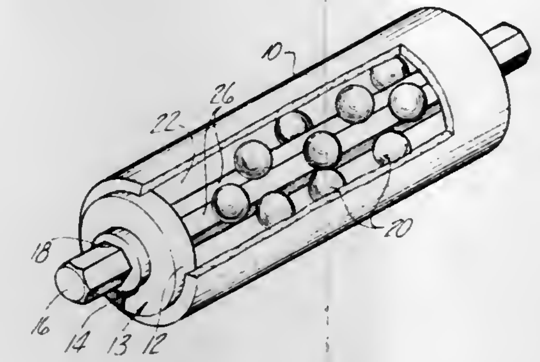
removable portion having an internal void defining a chamber adapted to hold a perfuming agent therein; and
said removable portion having apertures extending therethrough and communicating between said chamber and the ambient; wherein said removable portion comprises a generally cylindrical tube disposed between opposing sides of said curved earring member, said removing means comprising openings on the inner periphery of said opposing sides for receiving portions at the ends of said tube.

4,056,952
DIAMOND BEARING MICROSCOPIC CERTIFICATE OF APPRAISAL
Kazumi Okuda, No. 55-12-807, 2-Chome, Sangenjaya, Setagaya, Tokyo, Japan
Filed Apr. 1, 1976, Ser. No. 672,835
Claims priority, application Japan, Jan. 23, 1976, 51-5887
Int. Cl.² A44C *17/00*
U.S. Cl. 63—32 **6 Claims**



1. A diamond with an inscription, comprising a diamond gem structure having an outer surface cut and polished into a specific shape, and integrally provided means intimately and securely adhered to said gem structure for functioning as a permanent certificate of appraisal of the diamond, said means including a microscopic inscription formed at a specific position on said outer surface, said inscription having a pattern indicating the results of expert appraisal of said gem structure.

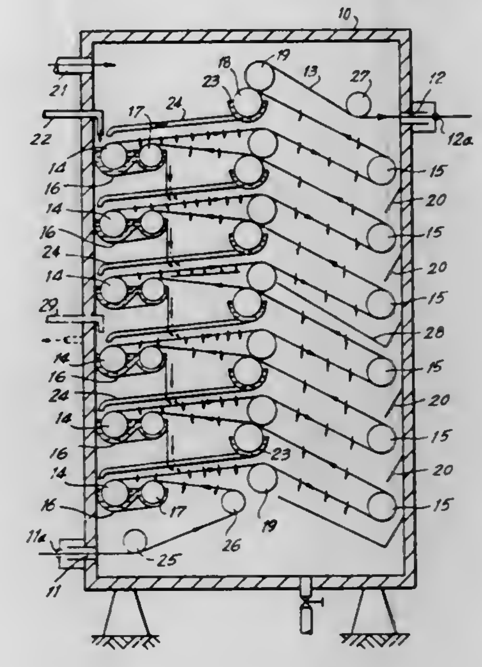
4,056,953
TORQUE LIMITING COUPLING
James L. Furlette, 984 Bal Isle, Fort Myers, Fla. 33901, and Donald A. Stadler, 310 Pirates Bight, Naples, Fla. 33940
Continuation-in-part of Ser. No. 447,471, March 4, 1974, Pat. No. 3,942,338. This application Dec. 5, 1975, Ser. No. 637,890
The portion of the term of this patent subsequent to Mar. 9, 1993, has been disclaimed.
Int. Cl.² B65G *13/02*
U.S. Cl. 64—30 D **16 Claims**



1. A torque overload coupling for transmitting torque to a tubular member from a driving shaft extending axially throughout said tubular member, said coupling comprising a pair of bearings rotatively supporting said tubular member from said shaft, each of said bearings being disposed at an end of said tubular member, an intermediate portion of said shaft between said bearings having a polygonal shape in cross-section, at least one resilient spherical member disposed in said tubular member between the peripheral surface of said shaft portion of polygonal shape and the inner bore surface of said tubular member and freely rotatable therein, said resilient member having a diameter normally larger than the distance between the peripheral surface of said shaft section of polygonal shape and the inner bore surface of said tubular member but being sufficiently resilient to permit said resilient member to roll past point where distance between the peripheral surface of said shaft section and the inner bore surface of said tubular member is the narrowest.

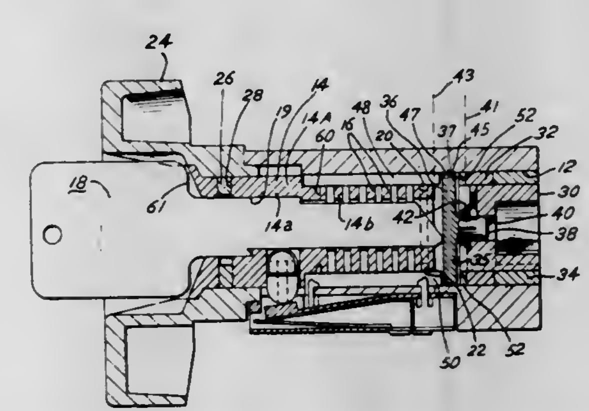
4,056,954
APPARATUS FOR WET TREATMENT OF TRAVELLING WEBS
Christian August Meier-Windhorst, 2101 Lindhorst uber, Hamburg-Harburg, Germany
Division of Ser. No. 580,453, May 23, 1975, Pat. No. 4,004,879. This application Jan. 12, 1976, Ser. No. 648,349
Claims priority, application Germany, May 25, 1974, 2425374
Int. Cl.² D06B *3/02*
U.S. Cl. 68—22 R **5 Claims**

1. An apparatus for the continuous wet treatment of elongated materials, such as travelling textile webs and the like, particularly for washing the same, comprising:
a substantially closed housing, having admission and discharge openings, for the passage of a web therethrough;
a plurality of vertically, spaced-apart and horizontally-disposed liquid treatment stages, each of said treatment stages including a first dish-shaped container located on one side of the interior of said housing, for holding a hot liquid in which the web may be immersed, at least one first guide roller disposed at least partially within said container for guiding and effecting total immersion of the web in the hot liquid contained in the container, a second guide roller disposed on the other side of the interior of said housing, which cooperates with said first guide roller for guiding the web in a generally horizontal travel path across the interior space of said housing, a pair of cooperating and coacting squeeze rollers disposed generally between said first and second guide rollers and between which the web passes prior to immersion in said container of said treatment stage, so as to remove the liquid that adheres to the web after the latter has passed through the container of a preceding treatment stage, thereby separating the preceding and following partial treatments, and a second dish-shaped container disposed beneath said squeeze rollers for collecting excess treatment liquid removed by said squeezing rollers and including means for transmitting the collected excess treatment liquid to the first dish-shaped container of the preceding treatment



stage therebelow, said rollers cooperating to successively guide the web generally upwardly through each of said treatment stages; and
means for introducing a hot liquid to the first container of the uppermost treatment stage and for successively guiding liquid overflow from a first container onto the web in the preceding treatment stage therebelow and from said web to the first container of said preceding treatment stage.

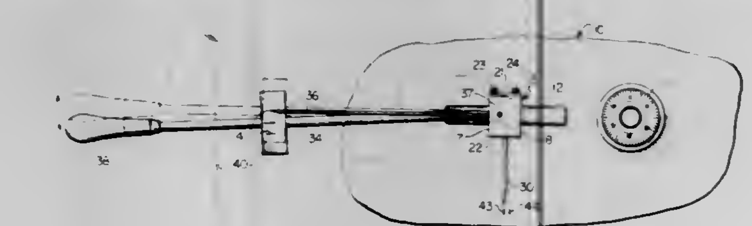
4,056,955
IGNITION LOCK
Dwight W. Glass, Rockford, Ill., assignor to Keystone Consolidated Industries, Inc., Peoria, Ill.
Filed June 11, 1976, Ser. No. 695,129
Int. Cl.² E05B *63/00*
U.S. Cl. 70—422 **2 Claims**



1. In a tumbler lock device of the type including a cylinder with a central passage, a generally cylindrical plug rotatably inserted in the passage, said plug including a key slot with a key receiving end, said plug also including a tumbler mechanism for locking the plug in fixed non-rotatable position relative to the cylinder, the tumbler mechanism being cooperative with a specific key to effect release of the tumbler mechanism and permit rotation of the plug thereby, and said plug also including driving means operated in response to rotation of the plug, the improvement of lock security means comprising torque responsive means in the plug responsive to threshold

torque force on the locked plug to separate the plug into at least two portions, said torque responsive means comprising a circumferential slot on the outside surface of the plug, said slot defining a weakened section of the plug and a line of separation of plug portions upon application of torque to the plug and in excess of the threshold torque level, said slot being a separate slot intermediate the key receiving end and the tumbler mechanism.

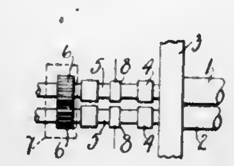
4,056,956
TOOL FOR DETERMINING SAFE LOCK COMPONENT POSITIONS
Charles David Gilliam, Long Beach, N.Y., assignor to New York School of Locksmithing, Inc., Hempstead, N.Y.
Filed July 13, 1976, Ser. No. 704,938
Int. Cl.^{2} E05B *17/0*
U.S. Cl. 70—446 **5 Claims**



1. A tool for use in determining the locations of gates in the combination lock of a safe of the type having a door with a combination lock, a combination dial for operating the lock and a rotatable handle having a tailpiece coupled thereto, the tool comprising the combination of
- a support body;
- a first pointer mounted on said body and extending therefrom in a first direction;
- a second pointer mounted on said body and extending therefrom in a second direction separated from said first direction by a predetermined angle;
- means for mounting said support body on the safe handle with said first and second pointers lying in planes which are substantially parallel with the safe door;
- an elongated resilient shaft mounted at one end on said support body, the other end of said shaft forming a tool handle,
  - said shaft extending from said body in a direction parallel with said second pointer,
  - said shaft being longer than said second pointer and being sufficiently resilient to permit manual deflection of said shaft relative to said second pointer and to return to said parallel position when released; and
- means for indicating the magnitude of deflection of said shaft relative to said second pointer.

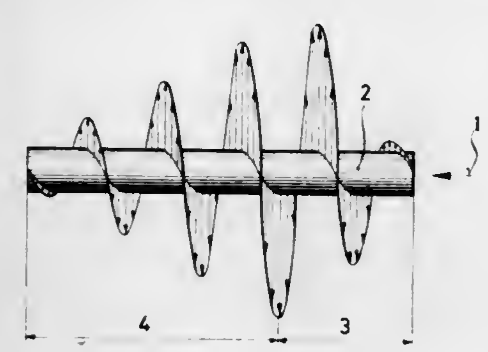
4,056,957
DRIVE ARRANGEMENT FOR THE ROLLS OF A ROLLING MILL
David Robert Howard, Sheffield, England, assignor to Davy-Loewy Limited, England
Continuation of Ser. No. 681,090, April 28, 1976, abandoned. This application May 3, 1977, Ser. No. 793,331
Int. Cl.^{2} B21B *37/00, 35/00*
U.S. Cl. 72—19 **5 Claims**

1. A rolling mill comprising: a pair of spaced apart housings each defining a window,
- a pair of dissimilar diameter work rolls each rotatably supported at its ends in bearing chock assemblies mounted in said windows,
- a driving system including drive means for the rolls including a pair of spindles connected one to each roll and gear means interconnecting the spindles having differential torques locked into the driving system caused by said dissimilar diameters of said work rolls,
- each roll having means associated therewith for producing an electrical signal representative of the torque transmitted by the roll,
- means arranged to receive and compare said signals and to produce a differential signal, and



- means responsive to said differential signal for adjusting the angular length of that part of the periphery of at least one roll where it is in contact with the workpiece being rolled in order to adjust the torque transmitted by that roll in the sense to reduce said differential signal.

4,056,958
METHOD AND APPARATUS FOR STRAIGHTENING OF ELONGATED WORKPIECES
Ralf Fangmeier, Solingen, and Lothar Bracht, Wuppertal, both of Germany, assignors to Th. Kieserling & Albrecht, Solingen, Germany
Filed Aug. 25, 1976, Ser. No. 718,659
Claims priority, application Germany, Aug. 27, 1975, 2532622
Int. Cl.^{2} B21D *3/04*
U.S. Cl. 72—98 **22 Claims**

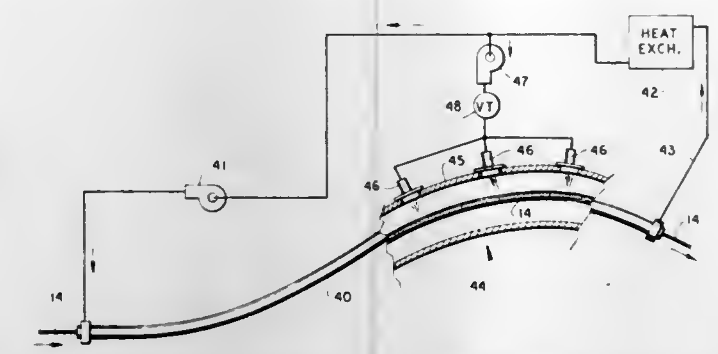


1. A method of straightening elongated workpieces of circular or other cross section and having a longitudinal axis, comprising the steps of moving a workpiece in the direction of said axis; and subjecting a portion of the workpiece during its movement in said direction to bending forces rotating about said axis such that successive curvatures produced in an upstream zone of said portion as considered in said direction, increase to thereby surpass the yield point of the material of the workpiece and in a downstream zone of said portion, as considered in said direction, gradually decrease in such a manner that the decrease of the curvatures and the corresponding decrease of the plasticity of the workpiece occurs slower than the increase thereof.

4,056,959
APPARATUS FOR CONVEYING HEATED ROD
George C. Ward, Carrollton, Ga., assignor to Southwire Company, Carrollton, Ga.
Filed Nov. 4, 1974, Ser. No. 520,268
Int. Cl.^{2} B21B *45/02;* B21F *3/00;* B65H *17/32*
U.S. Cl. 72—128 **4 Claims**

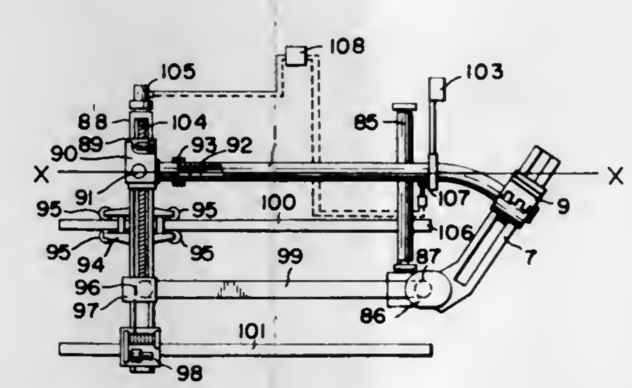
1. Apparatus for conveying heated flexible metal rod continuously emitting from a rolling mill into a coiling means, comprising an elongated guide tube having an inlet end for receiving the rod from the rolling mill, an exit end through which the

rod is delivered to the coiling means and a curved portion through which the direction of travel of the rod is changed from a substantially straight upwardly inclined path into an arcuate path prior to emitting from said exit end, a liquid recirculation system for conveying a cooling liquid through said tube in the direction of rod travel therethrough, and wherein said liquid recirculation system includes a plurality of



fluid injector means spaced over a substantial segment of said curved portion of said tube for directing jets of liquid into said tube, said injector means being positioned to direct said jets both to deflect the rod in the direction of curvature of said curved portion so as to prevent the rod from contacting any portion thereof, and to impart a viscous drag force on the rod in the direction of rod travel whereby the rod is conveyed through said guide tube with a minimum of friction.

4,056,960
MEANS AND METHOD FOR BENDING ELONGATED MATERIALS INCORPORATING TWO ARMS
Shunpei Kawanami, 45-4 Shindo, Hiratsuka, Kanagawa, Japan
Division of Ser. No. 593,961, July 8, 1975. This application July 29, 1976, Ser. No. 709,928
Claims priority, application Japan, July 23, 1974, 49-83756
Int. Cl.^{2} B21D *7/16*
U.S. Cl. 72—128 **7 Claims**

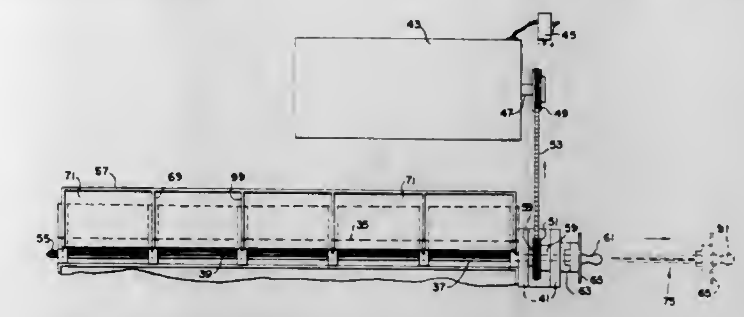


1. An apparatus for bending elongated materials, comprising:
- a. heating means for locally heating a portion of the material;
- b. an arm which is freely pivotable about an axis, the pivotable arm including means for clamping a leading portion of the material; and,
- c. means for advancing the material past said heating means, and for applying a bending moment to said material in cooperation with

said pivotable arm including:
- a second arm;
- a bearer connected to said second arm for engaging a portion

of said material not yet advanced past the heating means;
- guide means for maintaining the second arm in an orientation approximately vertical to the principal axis of the unbent portion of the material; and,
- traction means for moving the second arm toward the axis of the pivotable arm.

4,056,961
METHOD AND APPARATUS FOR FORMING CYLINDRICAL SPACERS FROM METAL BLANKS
Eugene M. Jamison, 27640 Gateway Drive, Apt. 107, Farmington Hills, Mich. 48024
Filed Nov. 8, 1976, Ser. No. 739,649
Int. Cl.^{2} B21C *47/00;* B21D *5/12*
U.S. Cl. 72—148 **1 Claim**

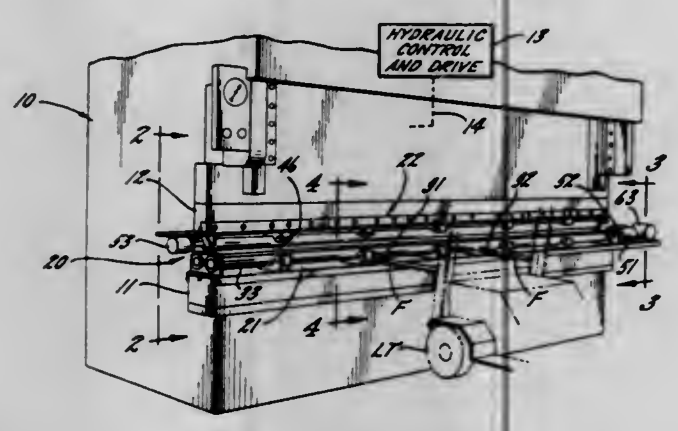


1. Apparatus for forming cylindrical spacers from metal blanks comprising
- a horizontally disposed base plate mountable upon a support;
- longitudinally spaced uprights upon said base plate;
- a die bar spaced from and parallel to said base plate spanning and secured to said supports;
- a bending roll shaft parallel to and spaced from said die bar extending through and rotatively journalled upon said uprights;
- said shaft having an elongated slot adapted to supportably and retainingly receive the edge of a blank;
- rotative drive means connected to said roll shaft;
- said blanks being guidably interposed between said roll shaft and die bar and adapted to wrap around said roll shaft during rotation thereof;
- means to strip the formed spacer from said roll shaft;
- said roll shaft adapted for rotation 360° approximately to complete said spacer;
- said die bar being a rod of circular cross section;
- and said strip means including said roll shaft adapted for longitudinal retraction relative to the formed spacer, said spacer being retained against one of said uprights, said roll shaft and die bar being spaced apart a distance approximately the thickness of said blank;
- there being a series of said uprights upon said base plate, defining a plurality of bending stations along the length of said bending roll shaft; whereby a series of blanks may be assembled onto said roll shaft and simultaneously formed into spacers; and strip means including said roll shaft adapted for longitudinal retraction relative to said uprights, said spacers bearing against an adjacent upright so that retraction of said roll shaft simultaneously strips all spacers therefrom.

4,056,962
ROLLING MACHINE ASSEMBLY
Fred Gerhardt, Fresno, Calif., assignor to Edeco-West, Inc., Fresno, Calif.
Continuation of Ser. No. 714,023, Aug. 13, 1976, abandoned. This application Mar. 10, 1977, Ser. No. 776,351
Int. Cl.^{2} B21D *5/14*
U.S. Cl. 72—170 **10 Claims**

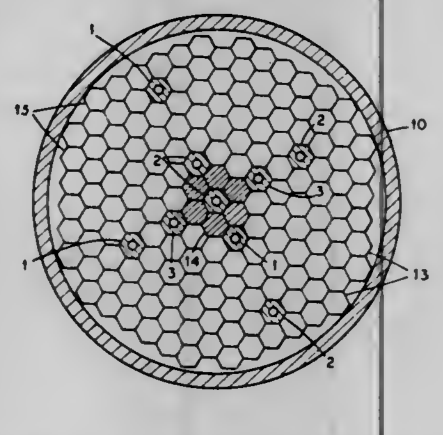
1. A rolling machine assembly for rolling a sheet of metal into curved cross section and for use in a press brake having an elongated bolster and a ram coextensive therewith with powered means for reciprocating the ram and with adjustable stop means for positioning the ram at a predetermined elevation comprising, in combination, a lower roll subassembly including a pair of lower rolls and a lower base member with upstanding bearing blocks for supporting the lower rolls in slightly upraised position and laterally spaced from one another, an upper roll subassembly including an upper roll and an upper base member having bearing blocks thereon for supporting the upper roll in a depending position from the ram and

centered between the lower rolls, means for detachably securing the lower base member to the bolster, means for detachably securing the upper base member to the ram, a lower hydraulic motor secured to the lower base member for driving the lower rolls, an upper hydraulic motor secured to the upper base member for driving the upper roll, the motors being of the positive displacement type, means for metering hydraulic fluid to the motors for rotation of the rolls at substantially the same



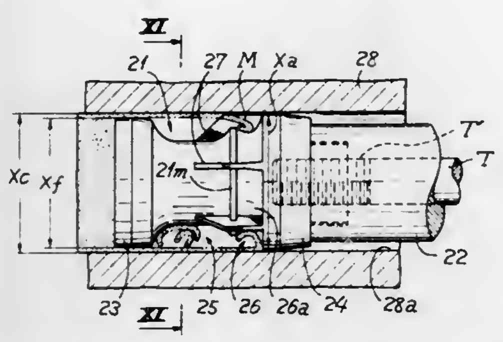
peripheral speed, the lower base member having symmetrically located sockets for reception of the tines of a forklift truck so that when the upper roll is in nested position with respect to the lower rolls, and the securing means are disengaged, the subassemblies may be lifted out of the press brake as a unit by the forklift truck to free the press brake for other usage, and with the reverse procedure being effective for re-installation of the subassemblies in the press brake.

4,056,963
MEANS OF DETERMINING EXTRUSION TEMPERATURES
Robert E. McDonald, Oliver Springs, and Domenic A. Canonico, Oak Ridge, both of Tenn., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.
Filed Dec. 21, 1976, Ser. No. 752,944
Int. Cl.[2] B23C *23/08*
U.S. Cl. 72—253 R 2 Claims



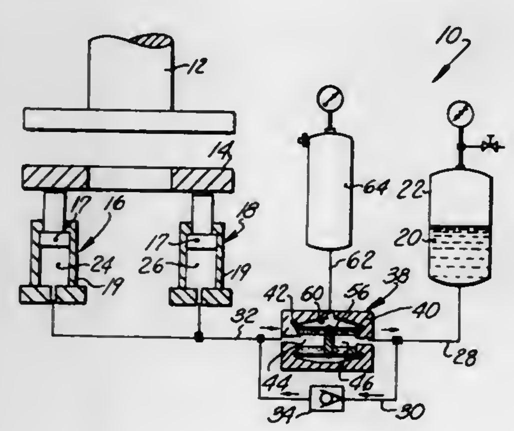
1. In an extrusion process comprising the steps of fabricating a metal billet, heating said billet for a predetermined time and at a selected temperature to increase its plasticity, and then forcing said heated billet through a small orifice of an extrusion press to produce a desired extruded product, the improvement comprising the steps of randomly inserting a plurality of small metallic thermal tabs at different cross sectional depths and axial positions in said billet as a part of said fabricating step, and examining said extruded product at each thermal tab location for determining the crystal structure of each extruded thermal tab thus revealing the maximum temperature reached in each respective tab location section of the extruded product during extrusion, whereby the thermal profile of said extruded product may be determined.

4,056,964
APPARATUS FOR METAL EXTRUSION
Tadashi Shibasaki, Nagoya, and Tsuguo Ieda, Kasugai, both of Japan, assignors to Sumitomo Light Metal Industries, Ltd., Tokyo, Japan
Filed Jan. 15, 1976, Ser. No. 640,269
Int. Cl.[2] B21C *23/04, 27/00, 33/00, 35/06*
U.S. Cl. 72—273 7 Claims



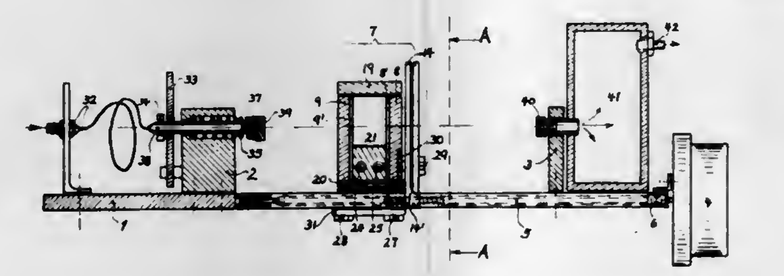
1. A disc for use in metal extrusion by pushing a billet in the bore of a main container through an extruder die, comprising:
a rear disc portion having an outer diameter slightly smaller than the inner diameter of the main container;
a front disc portion having an outer diameter slightly smaller than that of said rear disc portion;
a connecting portion between said front and rear disc portions;
rib means for splitting billet shell passing between the main container and said front disc portion into longitudinal strips, said rib means comprising a plurality of ribs, longitudinally disposed, circumferentially apart, said ribs extending forwardly from said rear disc portion between said connecting portion and said main container, and ending at a position substantially intermediate said two disc portions, rear recesses being defined between said rib means, said connecting portion and the main container; and
a front recess defined between said rear recesses, said front disc portion, said connecting portion and the main container, said front recess being substantially in front of said rib means and having a larger volume than that of said rear recesses.

4,056,965
PRESS SYSTEM OR THE LIKE
Elmer F. Heiser, 8313 Pin Oak, Parma, Ohio 44130
Filed Nov. 5, 1975, Ser. No. 628,886
Int. Cl.[2] B21D *24/02*
U.S. Cl. 72—351 30 Claims



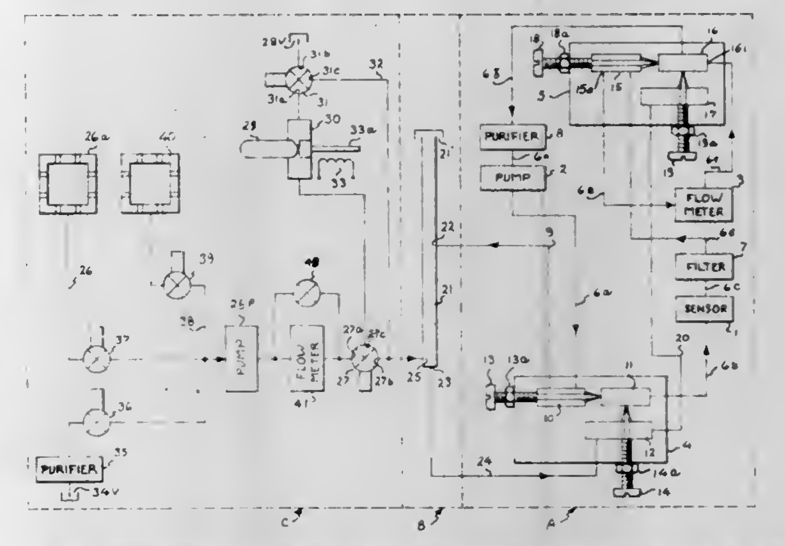
1. A press system or the like comprising hydraulic cylinder means for applying force to a member, said hydraulic cylinder means including a piston and cylinder which are relatively movable through an operating stroke to vary the volume of a variable volume cylinder chamber defined by said piston and cylinder, means for supplying hydraulic fluid under pressure to and conducting hydraulic fluid from said cylinder chamber to effect relative movement between said piston and cylinder and a variation in the volume of said variable volume cylinder chamber, valve means connected in fluid communication with said variable volume cylinder chamber for maintaining at least a first fluid pressure in said variable volume cylinder chamber during a first portion of an operating stroke and for maintaining at least a second fluid pressure in said variable volume cylinder chamber during a second portion of an operating stroke, said valve means including a housing which at least partially defines a valve chamber having a hydraulic fluid inlet connected in fluid communication with said cylinder chamber and a hydraulic fluid outlet, a valve member disposed in said housing and movable between a closed position blocking hydraulic fluid flow from said hydraulic fluid inlet to said hydraulic fluid outlet to thereby block hydraulic fluid flow from said cylinder chamber and an open position enabling hydraulic fluid to flow from said hydraulic fluid inlet to said hydraulic fluid outlet to thereby enable hydraulic fluid to flow from said cylinder chamber, pressure chamber means for holding a fluid under pressure, said valve member being urged toward the closed position under the influence of the fluid pressure in said pressure chamber means, said valve member being movable from the closed position to the open position under the influence of the pressure of hydraulic fluid in said valve chamber and against the influence of the fluid pressure in said pressure chamber means, and means for varying the fluid pressure in said pressure chamber from one fluid pressure during said first portion of an operating stroke to another fluid pressure during said second portion of an operating stroke to vary the force urging said valve member toward the closed position and the magnitude of the hydraulic fluid pressure required in said valve chamber to effect movement of said valve member from said closed position to said open position.

4,056,966
APPARATUS FOR CALIBRATION OF A MOISTURE ANALYZER
Peter H. Ketelsen, 2162 Georges Lane, Warrington, Pa. 18976
Filed Jan. 21, 1977, Ser. No. 760,968
Int. Cl.[2] G01N *31/00*
U.S. Cl. 73—1 G 1 Claim



1. A device for introducing a gaseous mixture of known moisture content into an analyzer for calibration purposes comprising a cartridge consisting of a tubular member and a wire longitudinally mounted within the tubular member, the wire being coated with a substance having chemically bonded moisture which is released when the substance is heated, means for connecting the cartridge to a source of gas at one end and to an analyzer at the other end, means mounting the cartridge and a carriage for movement along the length of the cartridge, heater means mounted on the carriage for heating a portion of the cartridge along its length and means for advancing the carriage along the length of the cartridge at a uniform speed.

4,056,967
PNEUMATIC SYSTEM FOR A GAS SENSOR
John A. Roberts, Lynnfield, Mass., assignor to General Electric Company, Schenectady, N.Y.
Filed July 16, 1976, Ser. No. 705,988
Int. Cl.[2] G01N *31/00*
U.S. Cl. 73—1 G 18 Claims

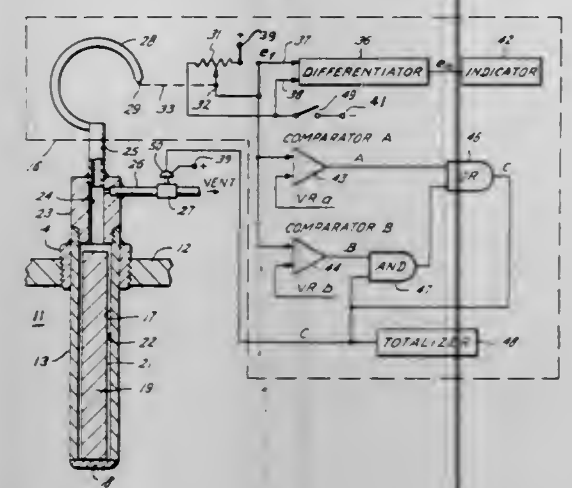


1. A pneumatic system for controlling admission of a gas sample to a gas sensor comprising:
a. a series loop cicuit including a gas sensor, a flow meter, a pump, a first manifold valve operably connected in the series circuit downstream from said pump to regulate gas flow between it and the sensor, a second manifold valve operably connected downstream from the sensor between it and the pump to regulate gas flow to said flow meter,
b. a vented gas sample input chamber including an overflow gas input orifice connected to receive gas from a point in said series loop circuit between said pump and a first flow restricting needle valve in said first manifold valve, an outlet orifice connected to deliver gas to the first manifold valve, and a sample gas inlet orifice disposed between said overflow input orifice and said outlet orifice and operable to deliver a gas sample into said input chamber, and
c. a bleeder line operably connected between the first and second manifold valves to bypass some gas received from the gas sample input chamber around said sensor, whereby said pump is effective when operated in said series loop circuit to force gas through said manifold valves, flow meter and sensor and to cause gas to flow continuously through the bleeder line and said manifold valves both during intervals when a sample gas is being introduced to the series loop and during intervals when sample gas is not being fed into the loop.

4,056,968
HYDROGEN PROBE SYSTEM
Joseph D. Winslow, Jr., Houston, Tex., assignor to Petrolite Corporation, St. Louis, Mo.
Filed Dec. 22, 1975, Ser. No. 643,284
Int. Cl.[2] G01N *7/10*
U.S. Cl. 73—19 10 Claims

1. A hydrogen probe system comprising:
a. a ferrous metal probe body adapted to be exposed to a corrodant, said body having an enclosed fluid-tight internal cavity for collecting hydrogen gas under superatmospheric pressure buildup due to the accumulated hydrogen gas produced by action of the corrodant on said body;
b. a pressure sensor carried on said body and connected by a fluid channel to said cavity, said sensor providing an output function which corresponds to the superatmospheric pressure of the hydrogen gas accumulated in said cavity;
c. valve means carried on said body for venting hydrogen gas from said cavity;
d. control means receiving the output function and with a

snap action opening and closing said valve means for venting to the atmosphere the hydrogen gas in said cavity from a certain superatmospheric pressure buildup to a certain lesser superatmospheric pressure; and



e. readout means indicating actuation of said valve means as a function of hydrogen gas accumulating in said cavity.

4,056,969

DETECTION OF CONCEALED METALLIFEROUS DEPOSITS, HYDROCARBONS AND EXPLOSIVES

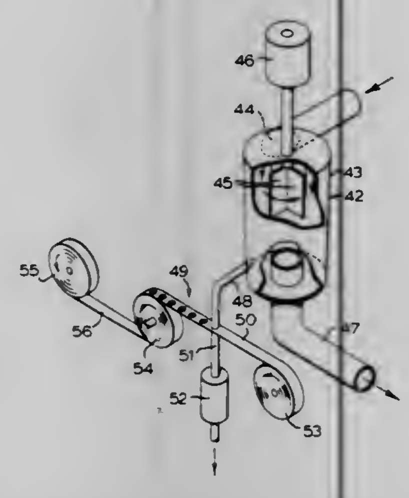
Anthony Rene Barringer, Willowdale, Canada, assignor to Barringer Research Limited, Rexdale, Canada

Filed Apr. 23, 1976, Ser. No. 679,622

Claims priority, application Canada, Apr. 28, 1975, 225851

Int. Cl.² B01D *46/00;* C12K *1/04;* G01N *33/00;* G01V *5/00*

U.S. Cl. 73—28 3 Claims



1. Geochemical prospecting apparatus comprising:
a. means for collecting a plurality of samples primarily consisting of surficial particulates selected from at least one of the following sources:
i. particulates lying on the surface of the soil,
ii. particulates lying on transpiration surfaces of vegetation, and
iii. particulates suspended in a body of water at the surface thereof,
b. said collecting means comprising an elongated flexible tube having an open end positioned in close proximity to the surficial particulates to be collected, and means for applying suction to said tube,
c. said collecting means including means for moving the collected particles in a fluid stream to a receiving station,
d. means for filtering the particles in said fluid stream so that the particles retained for analysis are primarily of diameters of below about 200 microns, and
e. means coupled to said collecting means for removing from the collected particles, particles primarily of sizes of below about 50 microns, whereby the particles retained for analysis are primarily between about 50 - 200 microns in size.

4,056,970

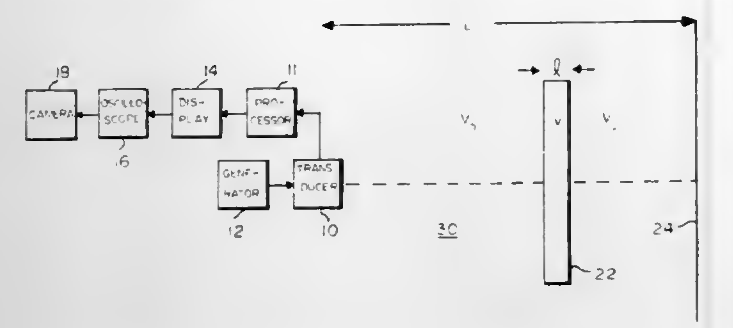
ULTRASONIC VELOCITY AND THICKNESS GAGE

Bruce D. Sollish, Rehovot, Israel, assignor to Yeda Research and Development Co., Ltd., Rehovot, Israel

Filed Oct. 30, 1975, Ser. No. 627,386

Int. Cl.² G01N *29/04*

U.S. Cl. 73—629 6 Claims



1. A method for determining the velocity of propagation of a particular material, comprising the steps of:
providing a reflecting surface in a fluid medium having a known velocity of propagation;
recording the position in time of an echo received from said reflecting surface utilizing a transducer to create at least one ultrasonic pulse which is reflected off said reflecting surface;
placing the material to be tested in said fluid between said transducer and said reflecting surface;
transmitting at least one ultrasonic pulse from the transducer and receiving echoes of said pulse reflected from said material and from said reflecting surface;
recording the position in time of the echoes corresponding to the anterior and posterior surfaces of said material and the new position in time of the echo from said reflecting surface; and
determining the velocity of propagation of said material by utilizing the positions in time of said echoes, according to the equation

$$V/V_o = 1 - \Delta T_2/\Delta T_1$$

where
V is the propagation velocity in the material to be tested,
V_o is the propagation velocity in the fluid medium,
ΔT_2 is the round trip propagation time from the transducer to the reflecting surface with the material to be tested positioned somewhere in between, minus the round trip propagation time from the transducer to the reflecting surface with said material removed, and
ΔT_1 is the round trip propagation time between the anterior and posterior surfaces of the material to be tested.

4,056,971

DISTANCE AMPLITUDE COMPENSATION SYSTEM

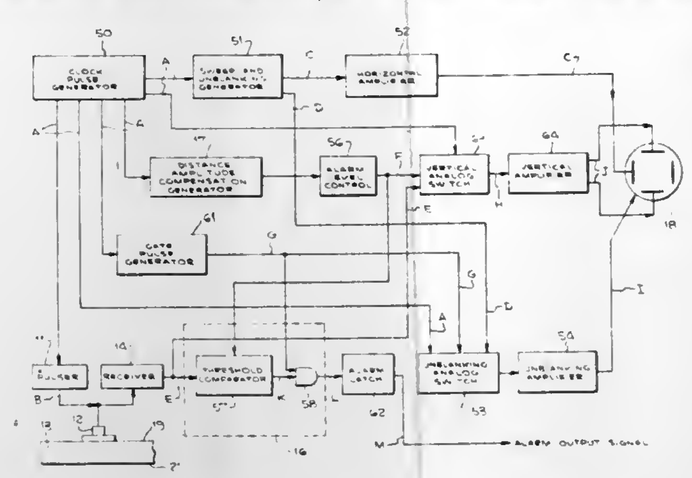
Howard E. van Valkenburg, New Fairfield, and Vincent P. McCarroll, Monroe, both of Conn., assignors to Automation Industries, Inc., Los Angeles, Calif.

Filed May 10, 1976, Ser. No. 684,679

Int. Cl.² G01N *29/04*

U.S. Cl. 73—629 17 Claims

1. A distance amplitude compensation system for comparing signals transmitted through a workpiece with a reference signal having a time varying amplitude, said system including:
receiver means for receiving said transmitted signals and converting them to video signals and having an output circuit,
distance amplitude compensation signal generator means for generating a reference signal having a time varying amplitude for compensating for the variation of said transmitted signals in the workpiece, and having an output circuit, and
comparator means having an input circuit coupled to the output circuit of said receiver means and an input circuit coupled to the output circuit of said distance amplitude



compensation generator for comparting said video signals with said reference signal.

4,056,972

TESTING OF INACCESSABLE PARTS

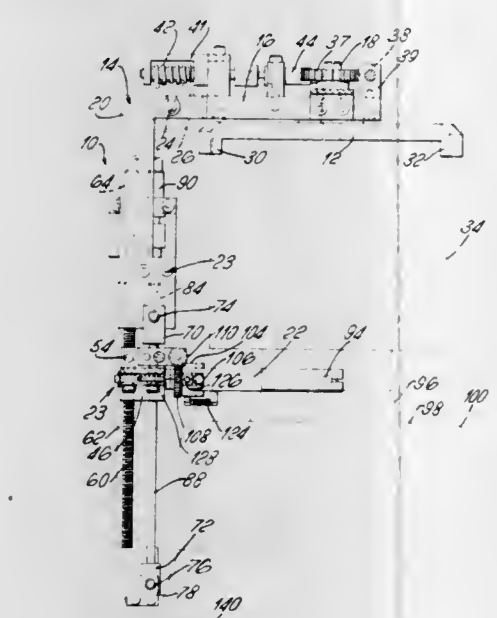
Robert Alan Charles Bromwich, Marlow, England, assignor to Foster Wheeler Energy Corporation, Livingston, N.J.

Filed June 29, 1976, Ser. No. 700,946

Claims priority, application United Kingdom, July 4, 1975, 28364/75

Int. Cl.² G01N *29/04*

U.S. Cl. 73—620 4 Claims



1. Apparatus for testing inaccessable parts comprising:
a. a clamp which can be clamped in place on the part to be tested or another part fixed in relation to that part to be tested,
b. a hingeable arm rotatably mounted on said clamp,
c. means for hingeing said arm from a substantially straight configuration for insertion through restricted regions to a bent configuration for use,
d. means for rotating said arm relative said clamp, and
e. a probe arm carried on the hingeable part of said hingeable arm and means for moving the probe arm in directions parallel to the axis of rotation and tangential to circles whose axes are coincident with the axis of rotation of said hinged arm relative said clamp once the hinged arm is in the bent configuration,

whereby during rotation of the hingeable arm a testing probe carried by said probe arm can be taken progressively over the surface of said part being tested.

4,056,973

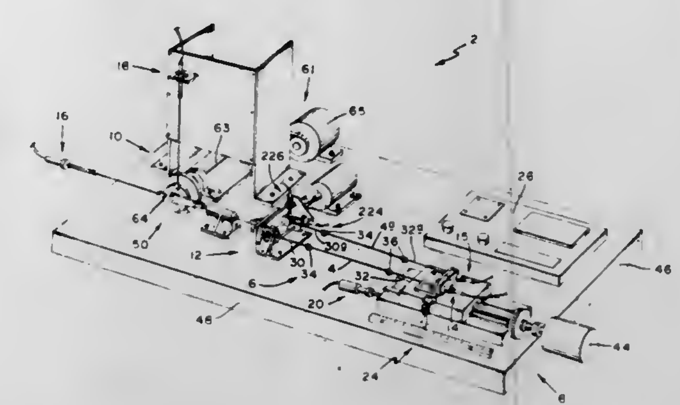
TESTING VISCOELASTIC SOLIDS

Dusan C. Prevorsek; Young D. Kwon, and Raj K. Sharma, all of Morristown, N.J., assignors to Allied Chemical Corporation, Morris Township, N.J.

Filed Dec. 13, 1976, Ser. No. 750,039

Int. Cl.² G01N *3/34*

U.S. Cl. 73—91 30 Claims



19. A method for testing viscoelastic material and measuring selected properties, comprising:
a. applying a basic first cyclic sinusoidal strain component to the material to be tested, having predetermined amplitude and frequency;
b. simultaneously applying a superimposed second sinusoidal strain component to the material to be tested, having predetermined amplitude and frequency; and
c. transforming the stress resulting in the material from the strain applied by the first and second cyclic strain component into a composite electrical stress signal.

4,056,974

METHOD AND HYDRAULIC TESTING APPARATUS FOR PERFORMING RESONANCE TESTS

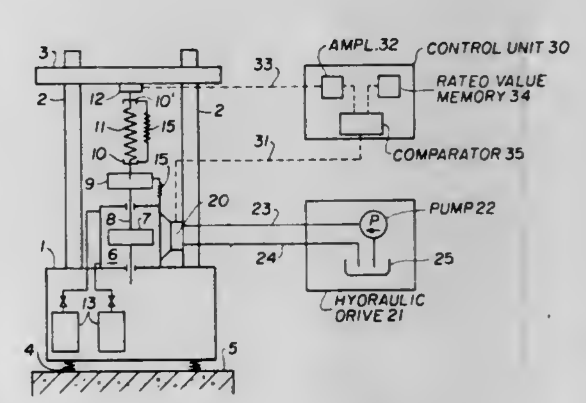
Friedrich Klinger, Garmisch-Partenkirchen; Josef Beran, Ober-Ramstadt, and Jan Brezina, Darmstadt, all of Germany, assignors to Carl Schenck AG, Darmstadt, Germany

Filed May 17, 1976, Ser. No. 686,712

Claims priority, application Germany, May 23, 1975, 2522890

Int. Cl.² G01N *3/32*

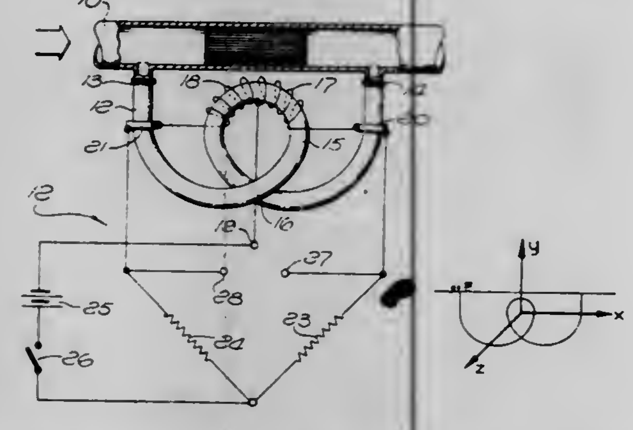
U.S. Cl. 73—92 14 Claims



1. In a method for resonance testing of materials and structural elements in which a test sample constitutes with the members of a testing apparatus a unit including a load mechanism with a single cylinder piston arrangement forming two cylindrical chambers and a pressure medium in said load mechanism, and an oscillatory system driven at resonance, the improvement comprising the steps of incorporating said pressure medium in the load mechanism as an elastic element of said oscillatory system, adjusting the spring rate of the pressure medium relative to the spring rate of the test sample or relative to the spring rate of the entire oscillatory system of the testing apparatus, further adjusting the spring rate of the pressure medium also relative to the mass of said oscillatory system, and supplying the pressure medium to said single cylinder piston

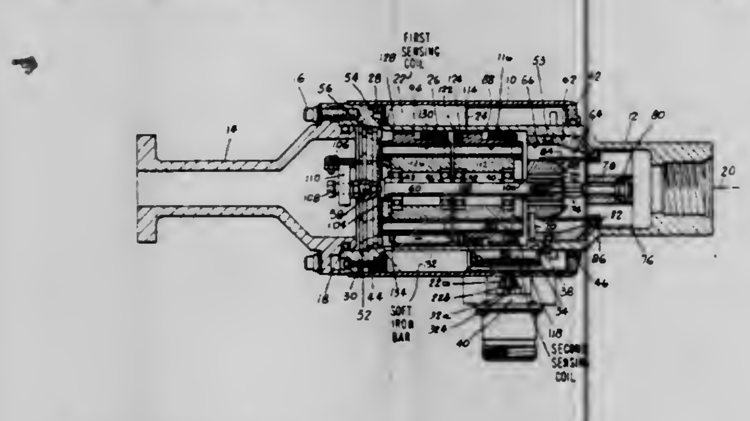
arrangement for exciting the oscillation of said oscillatory system, at high pressure in said single cylinder piston arrangement, whereby any pressure difference between supply pressure of the system and the pressure in the single cylinder piston arrangement at the time of pressure supply is minimized.

4,056,975
MASS FLOW SENSOR SYSTEM
Dan B. LeMay, Palos Verdes Estates, Calif., assignor to Tylan Corporation, Torrance, Calif.
Filed Feb. 9, 1976, Ser. No. 656,543
Int. Cl.² G01F *1/68, 5/00*
U.S. Cl. 73—202 **25 Claims**



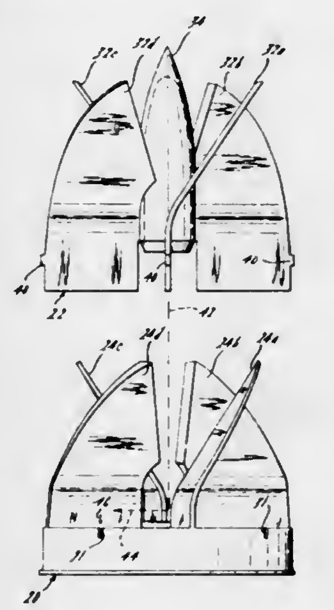
1. In apparatus for measuring the rate of mass flow of a fluid in a first conduit wherein a sensing conduit is communicatingly connected thereto by inlet means and outlet means and including self heating sensor elements on said sensing conduit intermediate said inlet means and outlet means, means for heating said sensor elements and detecting a temperature differential between said sensor elements, the improvement according to which said sensing conduit defines at least one helix loop intermediate said inlet means and outlet means and forming a continuous passageway providing reversal flow of said fluid therebetween, said loop being substantially in a plane parallel to the direction of flow of fluid in said first conduit.

4,056,976
MASS RATE OF FLOW METER
George Lee Hildebrand, West Boxford; Thomas Till Sleeper, Marblehead; William Allen Healey, Wayland; Stuart Jeffery Hall, Nahant, all of Mass., and Richard A. Pfuntner, Alfred, Maine, assignors to General Electric Company, Wilmington, Mass.
Filed Oct. 12, 1976, Ser. No. 731,405
Int. Cl.² G01F *1/82*
U.S. Cl. 73—231 M **8 Claims**



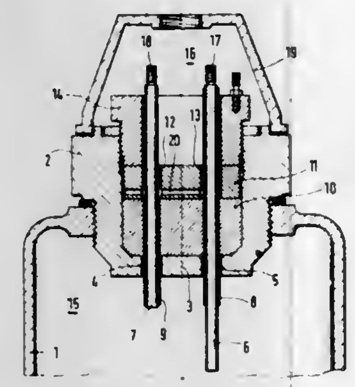
1. In a mass rate of flow meter, having:
a housing,
first means for passing a fluid stream and having a first element rotating at the average angular velocity of the fluid stream,
second means for receiving the fluid stream and for removing substantially all of the angular velocity therefrom, having a second element having a first angular orientation at a first angular momentum of the fluid stream, and for translating through an angular displacement from said first angular orientation and which displacement is a function of time rate of change of angular momentum of the fluid stream from said first angular momentum,
the improvement of:
a first source of magnetic flux fixed to said first element of said first means and rotating therewith,
a first flux change detector fixed to said housing on a first radial orientation for detecting the passage of said first source through said radial orientation and for providing a first signal in response thereto,
a second flux change detector fixed to said housing having an annular orientation to said second means for detecting a flux change and for providing a second signal in response thereto,
a second source of flux having a third element fixed to said first element of said first means and rotating therewith and a fourth element fixed to said second element of said second means and displaced therewith, and providing a source of flux change when both said third and fourth elements are in conjunction, which change is detected by said second detector,
an elapsed time meter which is turned on by said first signal and is turned off by said second signal, thereby to provide an indication of elapsed time which is a function of the time required for said first element to rotate through the displacement of said second element, which elapsed time is a function of the mass rate of flow of the stream.

4,056,977
SWIRLER FOR A FLUID FLOWMETER AND METHOD OF MAKING SAME
Leonard P. Gau, Birmingham, Mich., assignor to Chrysler Corporation, Highland Park, Mich.
Filed Apr. 29, 1976, Ser. No. 681,628
Int. Cl.² G01F *1/32*
U.S. Cl. 73—272 R **17 Claims**



1. In a fluid swirler or like device comprising a plurality of blades which are both axially and circumferentially overlapping, the combination of:
a first element containing selected ones of said blades which are circumferentially non-overlapping; and
a second element containing other selected ones of said blades which are circumferentially non-overlapping;
said two elements being assembled such that at least one blade of one of said elements circumferentially and axially overlaps a blade of the other of said elements;
said first element including a central hub joining radially inner peripheral edge portions of the blades thereof and an integral ring joining outer peripheral edge portions of the blades thereof, said second element comprising an integral central hub joining radially inner peripheral edge portions of the blades thereof, said two hubs engaging each other, and including locating slots in said ring and locating tabs on the blades of said second element disposed in said locating slots.

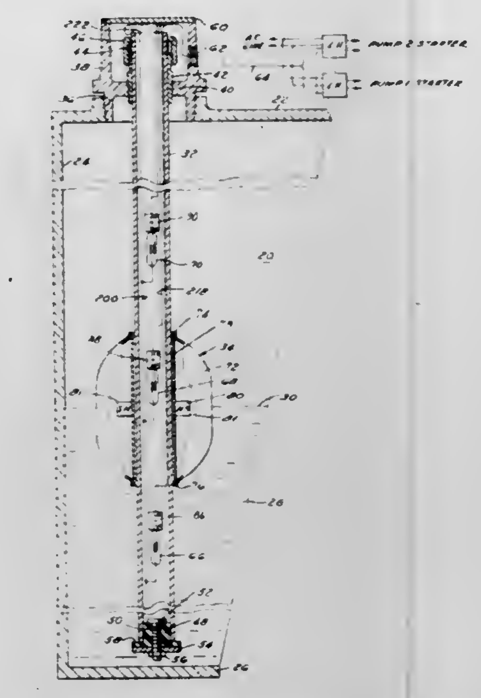
4,056,978
PROBE FOR MEASURING LIQUID LEVELS
Heino Zimmermann, Bremen, Germany, assignor to Gustav F. Gerdts KG, Bremen, Germany
Filed June 10, 1976, Ser. No. 694,736
Claims priority, application Germany, July 17, 1975, 2531915
Int. Cl.² G01F *23/24*
U.S. Cl. 73—304 R **6 Claims**



1. A probe for detecting the level of electrically conductive liquids in a walled container having an inner chamber comprising:
a probe housing having a bottom portion for insertion into the chamber of the walled container, and an inner chamber;
insulating packing means secured in said housing on said bottom portion within the inner chamber;
at least one compensating electrode having an insulating jacket and disposed through said packing means, the insulating jacked penetrating said packing means and extending into said container; and
at least one measuring electrode having an insulating jacket and disposed through said packing means, said measuring electrode being spaced apart and elongated with respect to said compensating electrode and wherein its insulating jacket penetrates said packing means and extends into said container to substantially the same extent as said jacket of said compensating electrode with said jacket of said measuring electrode extending into said container at least as far as the insulating jacket of said compensating electrode.

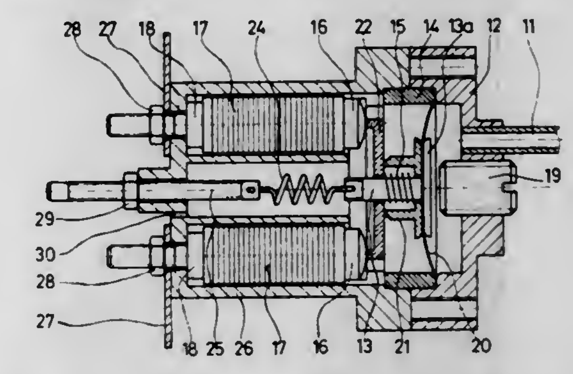
4,056,979
LIQUID LEVEL SENSOR
Edgar A. Bongort, Southfield, and William T. Cruickshank, Pontiac, both of Mich., assignors to B/W Controls Inc., Birmingham, Mich.
Filed Oct. 31, 1975, Ser. No. 627,518
Int. Cl.² G01F *23/12;* **H01H** *36/02*
U.S. Cl. 73—313 **36 Claims**

1. A liquid level sensor comprising, in combination:
a guide tube for vertical positioning in the liquid whose level is to be sensed;
a float externally surrounding the guide tube for free rotatable and longitudinal movement thereon to rise and fall with the liquid level;
a reed switch in the guide tube having its reeds extending substantially parallel to the axis of the guide tube;
means for establishing a magnetic bias field across the reeds insufficient to close them but sufficient to hold them closed;
means on the float for establishing a symmetrical toroidal magnetic field about the guide tube having leading and trailing field portions of opposite direction for sweeping the switch reeds and augmenting the bias field to close the reeds as the float passes the switch moving in one direction and sweeping and overcoming the bias field opening the switch reeds as the float passes the switch moving in



the opposite direction at substantially the same point where the reeds were closed.

4,056,980
DEPRESSION SENSOR FOR AN ELECTRONIC IGNITION ADVANCE DEVICE FOR AN INTERNAL COMBUSTION ENGINE
Louis Chateau, Rosny-sous-Bois, France, assignor to Ducellier & Cie, Creteil Cedex, France
Filed July 16, 1976, Ser. No. 705,879
Claims priority, application France, July 24, 1975, 75.23086
Int. Cl.² G01L *7/08, 9/02*
U.S. Cl. 73—398 AR **4 Claims**



1. A depression sensor for an electronic ignition advance device for an internal combustion engine, the sensor including a membrane which is deformable in response to the value of said depression, said sensor comprising resistive means of which the ohmic value varies as a function of the value of a force which is applied to them, and an electronic control circuit controlled by said resistive means, said electronic control circuit being constituted by one transistor polarized by a voltage divider and thermal stabilizing bridge connected between the positive pole and the negative pole of the sensor, and another transistor of which the collector and the emitter are in series with said resistive means and a resistance of fixed value, and of which the base is connected to another resistance which is connected by one of its ends to the collector of the first transistor and by its other end to the negative pole of the sensor, said resistive means being connected between the positive pole of the sensor and the emitter of the first transistor so as to be supplied with stabilized voltage by means of said divider and thermal stabilizing bridge, said resistance of fixed value being connected by one of its ends to the emitter of said one transistor and by its other end to the collector of said other transistor so as to cause said output voltage from the sensor to vary linearly, whereby variations in the value of said depres-

sion applied to said deformable membrane will vary said force applied to said resistive means and consequently will vary an output voltage of said electronic control circuit linearly with a determined range of depression values.

4,056,981

PROCESS AND APPARATUS FOR WITHDRAWING A SAMPLE FROM A REACTION VESSEL UNDER PRESSURE

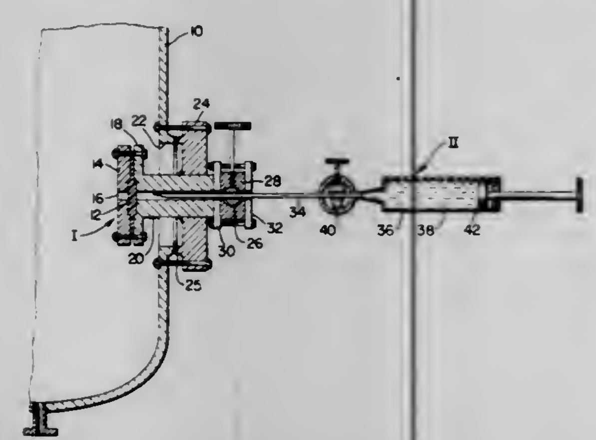
Josef Kalka, Herten; Walter Waskönig, and Karl Lueg, both of Marl, all of Germany, assignors to Chemische Werke Huls Aktiengesellschaft, Marl, Germany

Filed Feb. 10, 1977, Ser. No. 767,422

Claims priority, application Germany, Feb. 19, 1976, 2606687

Int. Cl.² G01N *1/14*

U.S. Cl. 73—421 B **10 Claims**



1. A process for the withdrawal of a sample from a reaction vessel under pressure and containing a dissolved and/or emulsified solid-liquid dispersion which comprises a liquified gas and which is sensitive to mechanical stress, which comprises the steps of providing a cannula and communicant connected pressure-proof injection syringe filled with an inert protective fluid; passing the cannula through an elastic pressure-proof self-sealing diaphragm in the wall of the reaction vessel and into the interior of the latter; ejecting the protective fluid from the syringe into the reaction vessel; gradually filling the syringe with a sample of the solid-liquid dispersion; sealing the syringe to maintain the captured sample therein when the cannula is withdrawn from the diaphragm; and thereafter withdrawing the cannula from the diaphragm.

4,056,982

APPARATUS AND METHOD FOR SAMPLING A LIQUID

Richard Warren Jones, 26 Bucknell Rd., Bicester, Oxon, England

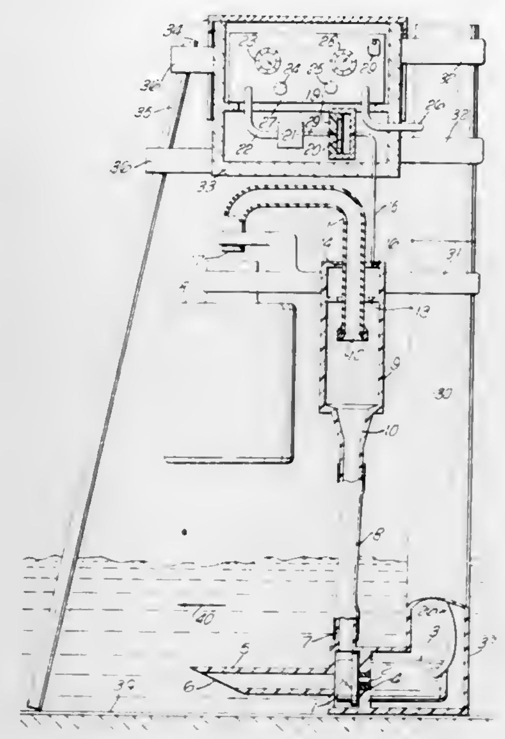
Filed Dec. 13, 1976, Ser. No. 749,990

Claims priority, application United Kingdom, Dec. 19, 1975, 52233/75

Int. Cl.² G01N *1/14*

U.S. Cl. 73—421 B **12 Claims**

1. Apparatus for sampling a liquid comprising,
i. a housing having an inlet for liquid to be sampled and an outlet for a sample;
ii. a displacer of liquid in the housing linking the inlet to an entry to a working chamber;
iii. the working chamber having plenum of a sectional area such that liquid being displaced into the working chamber through the entry is reduced in velocity and enabled to form a uniform rising surface;
iv. drive means for the displacer which, in a first state, causes the displacer to drive liquid from the inlet into the chamber by way of the entry and, in a second state causes the displacer to allow liquid in the working chamber to pass from the entry to the inlet;
v. a sample duct joining the outlet to a sample tube projecting into the plenum, the sample tube defining an opening disposed in an opposite direction to the upward direction of movement of a free surface of liquid displaced through the entry into the working chamber by the displacer with the drive means in the first state, the opening being sized such that a sensible pressure increase is created within the container when displaced liquid obturates the opening;
vi. a sensor for detecting pressure changes in the plenum; and



vii. switch means linking the sensor to the drive means so that on the sensor detecting a pressure increase in the plenum due to obturation of the sample duct by a liquid surface the drive means is subsequently caused to switch from the first state to the second.

4,056,983

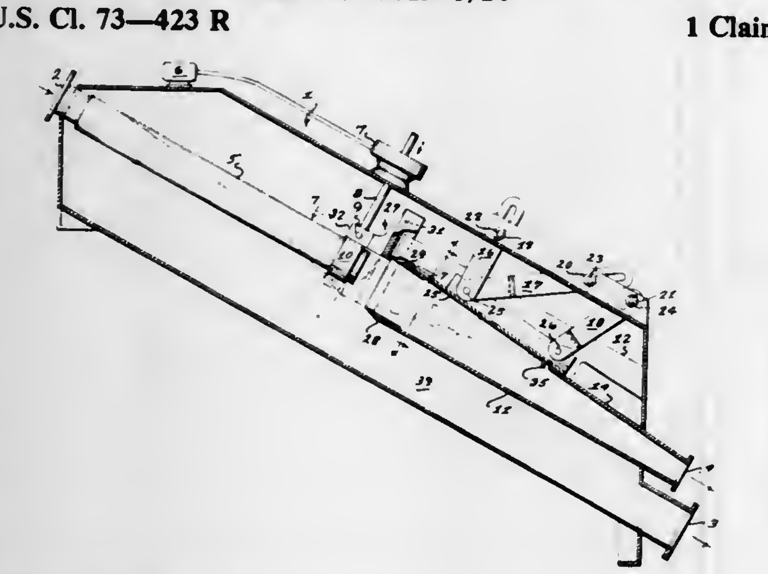
FLOW DIVERSION SAMPLER

Flavio J. Mazzetti, 6580 Arequa Ridge Lane, Colorado Springs, Colo. 80919

Filed Sept. 3, 1976, Ser. No. 720,135

Int. Cl.² G01N *1/20*

U.S. Cl. 73—423 R **1 Claim**



1. A sampling device for diverting a confined stream of fluid material from a first to a second course, comprising:
a housing disposed in series with the stream flow and having a single inlet defined by an inwardly projecting flexible conduit for directing the stream flow interiorly of the housing, said flexible conduit having a discharge mouth;
and wherein said housing includes first and second discharge ports, said second discharge port defined by a duct projecting interiorly of the housing;
drive means attached to the said flexible conduit and disposed to move the said discharge mouth into alignment with the said duct, wherein said duct includes at least one movable wall whereby the size of the duct inlet may be altered;
and including cover means operably connected to the drive means, disposed and positioned to cover the duct inlet when the flexible conduit discharge mouth and the duct inlet are misaligned.

4,056,984

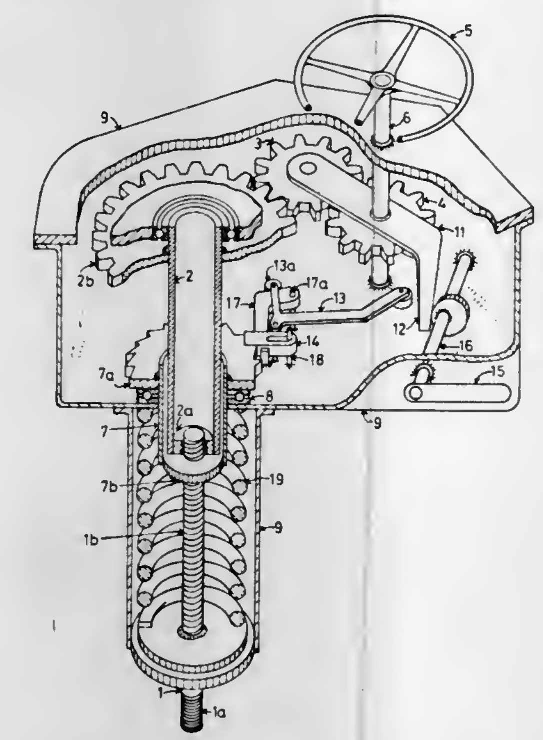
VALVE OPERATING MECHANISM

Brian Vaughan Kenealy, 2 Glamour Avenue, Blairgowrie, Randburg 2001, Transvaal, South Africa

Filed Dec. 30, 1974, Ser. No. 537,394

Int. Cl.² F16H *27/02*

U.S. Cl. 74—89.15 **7 Claims**



1. A manually energised operating mechanism for a valve including a threaded rod movable under manual control with general mechanical advantage longitudinally at low speed between a valve open position and a valve closed position as well as any intermediary position, means biasing the rod with stored mechanical energy either to the open or to the closed position, without any external power source, a control unit rotatable on the rod to urge the rod towards the desired valve position with or against the action of the bias, a rotatable axially fixed ratchet unit embracing the rod and adapted frictionally to abut the control unit to inhibit reverse movement thereof through the agency of the bias yet so proportioned as to allow a controlled slipping to occur when reverse rotation is manually applied and reduces the frictional effect between the control unit and the ratchet unit to allow the rod to move in the reverse direction, a pawl limiting rotation of the ratchet with the control unit during opening of the valve (alternatively closing of the valve), and means to release the pawl to allow the biasing means to apply the manual energy stored therein to urge the rod towards the desired position by causing rotation of the manual control in the reverse direction, the pitch of said threaded rod being such that an axial force applied thereto causes relative rotation therebetween.

4,056,985

HINGE STRUCTURES

Anthony Charles Worrallo, 15 Sprott Road, Kohlmarama, Auckland 5, New Zealand

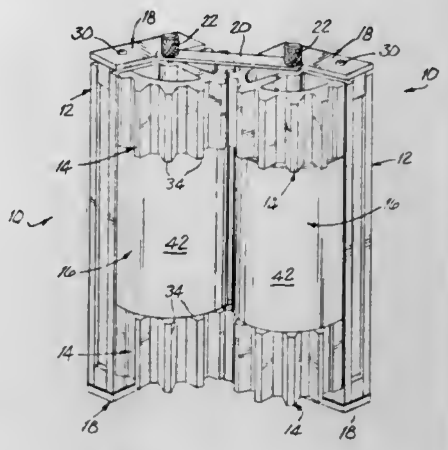
Filed Feb. 18, 1976, Ser. No. 659,124

Claims priority, application New Zealand, Feb. 21, 1975, 176729

Int. Cl.² F16H *55/04;* **E05D** *9/00*

U.S. Cl. 74—435 **9 Claims**

1. A hinge structure comprising a first base element, a first gear segment non-rotatably carried by said first base element and having an axis of rotation, a second base element, a second gear segment having an axis of rotation, said second segment being non-rotatably carried by the second base element and meshing with the first gear segment, a swinging link, axle means pivotally connecting said link to the first gear segment



for swinging motion with respect to the first base element about said axis of rotation of the first gear segment, and axle means connecting said link to the second gear segment for swinging motion with respect to said second base element about said axis of rotation of the second segment.

4,056,986

TORQUE CONVERTERS

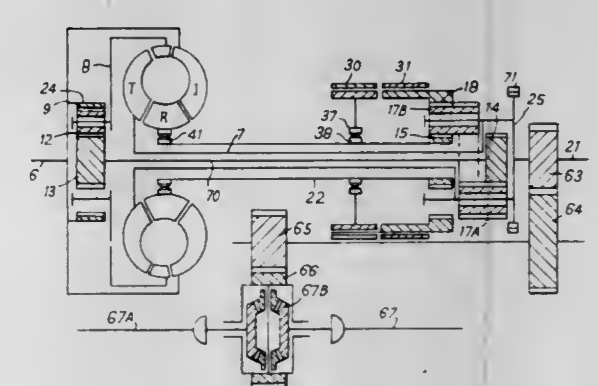
Howard Frederick Hobbs, Rugby, England, assignor to Variable Kinetic Drives, Ltd., Warwickshire, England

Filed Apr. 14, 1975, Ser. No. 567,771

Claims priority, application United Kingdom, Apr. 22, 1974, 17438/74

Int. Cl.² F16H *47/08*

U.S. Cl. 74—688 **10 Claims**



1. Power transmission apparatus comprising a torque converter having an input shaft, an impeller connected to the input shaft, an output turbine, a reactor and a circulatory turbine disposed in the flow path between the impeller and output turbine, a first gearing connecting the circulatory turbine to the input shaft so that the said circulatory turbine will always rotate with and in the same direction as the said impeller, a second gearing connecting the first gearing to the output shaft and to a stationary part, said second gearing including a part which is acted on by a friction brake so that it can be connected with or disconnected from said stationary part, said second gearing including an internally toothed ring gear acted on by said second gearing brake, a sunwheel, and pinions meshing with the ring gear and the sunwheel, the first unidirectional detent acting between a part of the second gearing and said stationary part, and the second unidirectional detent acting between the reactor and the second gearing, said sunwheel being connected to each of said detents, said detents being in series so that forwards rotation of a part of the second gearing drives the reactor in a forwards direction and negative torque on either the reactor or said part of the second gearing can act on said stationary part.

4,056,987

MECHANISM FOR PARALLEL CONNECTION OF INFINITELY-ADJUSTABLE LOOPING GEARINGS

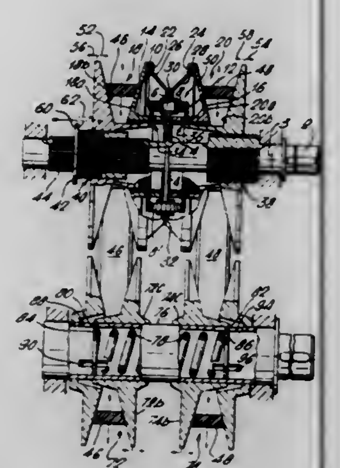
Georges Hoffmann, 35, rue des Roses, Luxembourg-Ville, Luxembourg

Filed Nov. 17, 1975, Ser. No. 632,830

Claims priority, application Luxembourg, Nov. 20, 1974, 71316; Aug. 26, 1975, 73259

Int. Cl.² F16H *37/06, 37/08*

U.S. Cl. 74—689 **11 Claims**



1. A power transmission mechanism for the parallel connection of infinitely-adjustable pulleys with at least two belt pulleys mounted axially side by side on a common shaft comprising:

at least two belt pulleys, each having at least one axially displaceable half which determines the effective pulley diameter;

an equalizing mechanism comprising differential gearing means for automatically displacing said at least one displaceable half of a pulley to nullify any asynchronism occurring in the running of said pulley relative to the other of said at least two pulleys;

said at least two belt pulleys being inter-connected via said gearing means coaxially in series with said shaft and being rotatable in relation to said shaft, and pairs of oppositely pitched screw threads operably connecting said displaceable pulley halves and said shaft for displacing said pulley halves whenever said pulleys commence to turn at different speeds.

4,056,988

DRIVING SYSTEM FOR USE IN MOTOR VEHICLE

Seitoku Kubo; Kojiro Kuramochi; Kunio Morisawa, and Kiyoshi Ohnuma, all of Toyota, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Continuation-in-part of Ser. No. 673,543, April 5, 1976. This application Aug. 6, 1976, Ser. No. 712,167

Claims priority, application Japan, Aug. 8, 1975, 50-95888; Aug. 8, 1975, 50-95889

Int. Cl.² F16H *37/08, 57/10*

U.S. Cl. 74—695 **14 Claims**

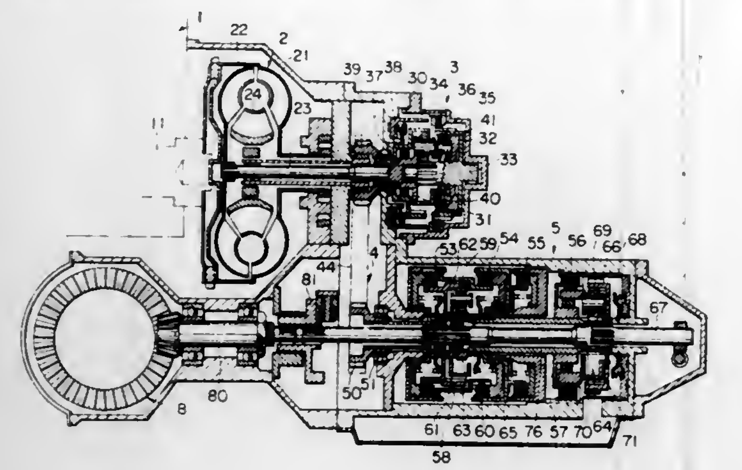
1. In a driving system acting in conjunction with a motor vehicle engine having an output shaft, the improvement comprising:

a torque convertor coaxially coupled to the output shaft of the engine and having an output shaft,

transfer means having a driving gear coaxially coupled to the output shaft of the torque convertor and a driven gear coupled to said driving gear,

overdrive means having a planetary gear mechanism also coaxially coupled to the output shaft of said torque convertor and an output shaft coaxially but removably coupled to said driving gear of said transfer means,

an automatic transmission coaxially coupled to said driven gear of said transfer means, having a planetary mechanism and friction engaging means to provide the desired mode of operation, and an output shaft on which said driven gear of said transfer means is coaxially mounted, and



a differential gear having a driving gear coupled to the output shaft of said automatic transmission for driving the motor vehicle.

4,056,989

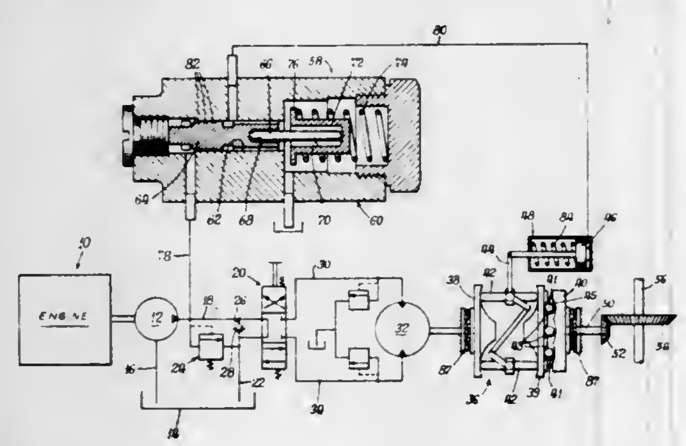
VEHICLE DRIVE

Walter M. Shaffer, Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed May 28, 1976, Ser. No. 691,053

Int. Cl.² F16H *3/02, 47/00, 15/08*

U.S. Cl. 74—745 **4 Claims**



1. A drive system for a vehicle or the like comprising:

a fluid pump;

means for driving said fluid pump;

a fluid motor;

means operatively connecting said fluid pump and fluid motor so that driving of said fluid pump drives said fluid motor; and

a variable speed transmission having an infinite number of ratios operatively coupled with said motor, wherein the variable speed transmission comprises an input disc driven by said motor, an output disc, and wheel means rollingly interconnecting the input disc and output disc, with the wheel means being variable in position relative to the input disc and output disc to vary the speed of the output disc in relation to the speed of the input disc, and means for varying the position of the wheel means relative to the input and the output discs to in turn vary the speed of the output disc in relation to the speed of the input disc, wherein the means varying the position of the wheel means comprise means operatively coupled with said wheel means and responsive to fluid pressure in said means operatively coupling said fluid pump and fluid motor.

4,056,990

AUTOMATIC MULTI-SPEED TRANSMISSION AND OVERDRIVE COMBINATION

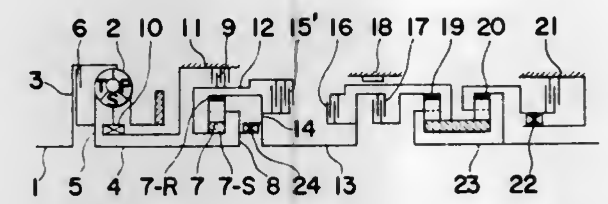
Mitsuru Hatano, Hiroshima, Japan, assignor to Toyo Kogyo Co., Ltd., Japan

Filed Jan. 19, 1976, Ser. No. 650,026

Claims priority, application Japan, Jan. 23, 1975, 50-10234

Int. Cl.² F16H *57/10*

U.S. Cl. 74—781 R **2 Claims**



1. An automatic multi-speed transmission and overdrive combination comprising:

a. engine input shaft for connection to an engine and supplying drive therefrom;

b. a fluid torque converter having a pump, a turbine, and a stator;

c. an overdrive unit having a planetary gear set with a sun gear, a ring gear, pinion gears and a carrier, said sun gear and ring gear being separated by and meshing with the pinion gears supported by the rotary carrier,

first brake means engagable with and actuable to prevent rotation of said sun gear, and

normal drive clutch means connected to said sun gear for being actuated during normal drive of said combination;

d. a multi-speed change gear unit;

e. first connection means connecting said engine input shaft with said pump of the fluid torque converter for driving said converter;

f. a turbine shaft connecting said turbine of the fluid torque converter with said carrier of said planetary gear set of said overdrive unit for driving said planetary gear set;

g. a second input shaft connecting to said multi-speed change gear unit and selectively connectable to said normal drive clutch means and to said ring gear of the overdrive unit, whereby said multi-speed change gear unit may be normally driven by said sun gear of the planetary gear set and may be driven by said ring gear of the planetary gear set during non-actuation of said normal drive clutch means;

h. an output shaft for supplying output drive from said multi-speed change gear unit to an automobile wheel unit drive means;

i. means including said first connection means, said turbine shaft, and said second input shaft for connecting said fluid torque converter, said overdrive unit, and said multi-speed change gear unit, in series;

j. normally unactuated lock up clutch means connecting said engine input shaft directly to said turbine shaft for bypassing said fluid torque converter during overdrive operation; and

k. a one-way clutch means which is provided in association with said normal drive clutch means, and which during forward normal drive transmission by said combination carries a portion of torque load imposed in transmission of drive from said turbine shaft to said second input shaft.

4,056,991

HYDRAULIC CONTROL DEVICE FOR USE WITH AUTOMATIC SPEED CHANGE GEAR DEVICE

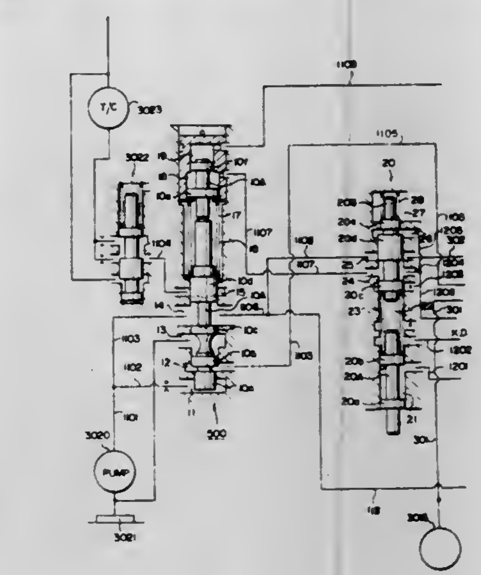
Toshimitsu Sakai; Kagenori Fukumura, and Tadashi Saito, all of Toyota, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

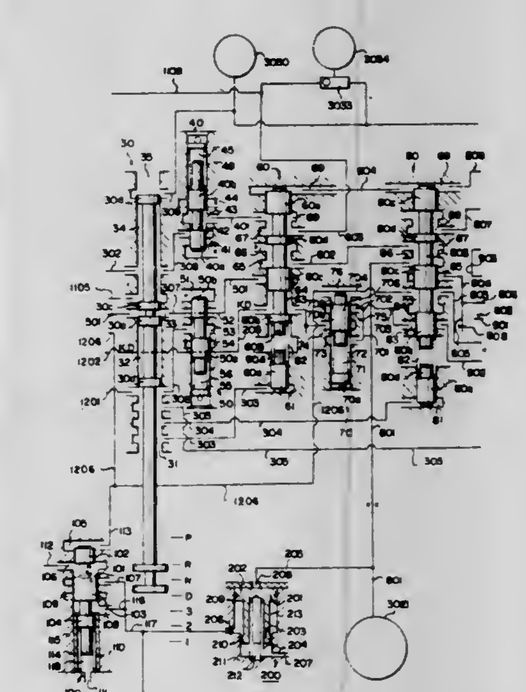
Filed June 10, 1975, Ser. No. 585,605

Claims priority, application Japan, Aug. 13, 1974, 49-92005

Int. Cl.² B60K *41/04, 41/10;* **F16D** *25/11;* **F16K** *31/363*

U.S. Cl. 74—863 **6 Claims**





1. In an automatic transmission for a throttle-controlled engine having a torque convertor, an auxiliary speed change gear device, at least one selectively-energizable friction engagement device for effecting a speed change in the gear device, and an accumulator associated with the friction engagement device for controlling the energizing of the engagement device and or preventing shocks resulting from a speed change, a hydraulic control system for regulating the pressure of fluid supplied to the accumulator comprising:

a source of pressurized fluid;

a pressure regulator in fluid communication with said source to further control the pressure of fluid from said source to a line pressure;

a throttle valve in fluid communication with said pressure regulator for developing a pressure signal indicative of the position of the throttle; and

an accumulator pressure control valve in fluid communication with said pressure regulator and said throttle valve, and responsive to the pressure signal from said throttle valve to regulate the pressure of fluid supplied to said accumulator from said regulator, said control valve having:

a housing provided with a first inlet coupled to said regula-

tor, an inlet coupled to said throttle valve, a fluid outlet coupled to said accumulator, and a fluid port in communication with said outlet and said first inlet;

a piston disposed within said housing and which requires the pressure signal from said throttle valve to move from a closed position, in which fluid communication is prevented between said first inlet and said outlet, to an open position, in which fluid communication is permitted between said first inlet and said outlet; and

a spring disposed in said housing and in engagement with said piston for biasing said piston to said closed position, whereby the movement of said piston varies the degree of fluid communication between said first inlet and said outlet, such that when the pressure signal from said throttle valve is smaller than a predetermined value, pressure less than the line pressure is supplied to said accumulator, and when the pressure signal of said throttle valve is greater than a predetermined value, pressure equal to the line pressure is supplied to said accumulator.

6. In an automatic transmission for a throttle-controlled engine having a torque converter, an auxillary speed change gear device, at least one selectively-energizable friction engagement device for effecting a speed change in the gear device, and an accumulator associated with the friction engagement device for controlling the energizing of the engagement device and for preventing shocks resulting from a speed change, a hydraulic control system for regulating the pressure of fluid supplied to the accumulator comprising:

a source of pressurized fluid;

a pressure regulator in fluid communication with said source to further control the pressure of fluid from said source to a line pressure;

a detent pressure regulator valve in fluid communication with said pressure regulator to provide an output fluid of constant pressure;

a throttle valve in fluid communication with said pressure regulator for developing a pressure signal indicative of the position of the throttle; and

an accumulator pressure control valve for receiving the constant pressure fluid from said detent pressure regulator and in fluid communication with said throttle valve, and which requires the pressure signal from said throttle valve to regulate the pressure fluid supplied to said accumulator from said detent pressure regulator, said control valve having:

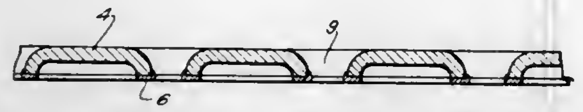
a housing provided with a first inlet coupled to said detent pressure regulator, an inlet coupled to said throttle valve a fluid outlet coupled to said accumulator, and a fluid port in communication with said outlet and said first inlet;

a piston disposed within said housing and consisting of a first and a second land of the same diameter, and a third land of a different diameter, said throttle valve inlet being open to said thir land, said first inlet being open to said first land, and the head of said first land is in communication with fluid supplied to said accumulator; and

a spring disposed within said housing between said third land and one end of said housing for biasing said piston to an open position,

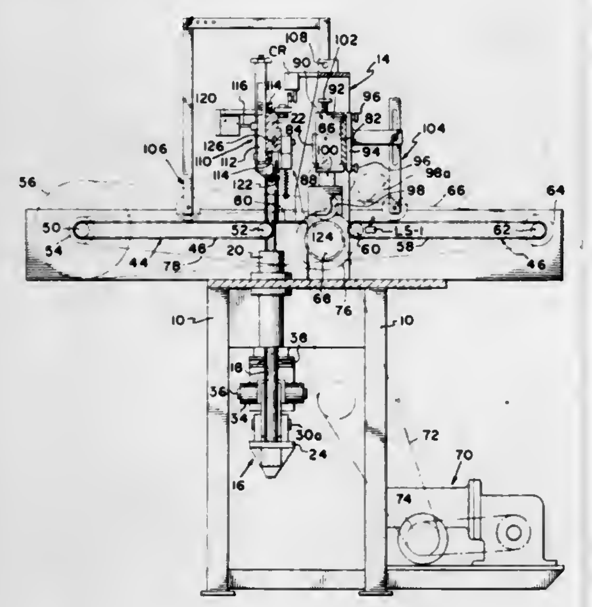
said piston requiring the pressure signal from said throttle valve to vary the degree of fluid communication between said first inlet and said outlet, such that when the pressure signal from said throttle valve is smaller than a predetermined value, pressure less than the detent pressure is supplied to said accumulator, and when the pressure signal of said throttle valve is greater than a predetermined value, pressure equal to the detent regulator pressure is supplied to said accumulator.

4,056,992
SHEAR FOIL AND METHOD OF MAKING THE SAME
Friedrich Blume, Schwalbach, Germany, assignor to Braun Aktiengesellschaft, Frankfurt am Main, Germany
Filed Aug. 31, 1976, Ser. No. 719,143
Claims priority, application Germany, Sept. 11, 1975, 2540434
Int. Cl.² B21K *11/00*; B26B *19/04*
U.S. Cl. 76—104 R 13 Claims



1. A method of making a shear foil, comprising the steps of providing a matrix element with a plurality of isles which are separated by a shallow grid-spaced recess and which have a matrix surface; overfilling said recess with a molding substance and forming a plurality of inserts each of which overlaps a narrow annular region of said matrix surface; depositing a layer of screen-forming substance over said inserts and forming a screen having a plurality of openings which extend to said matrix surface intermediate respectively adjacent inserts, said screen also having a face comprised of annular face portions each of which surrounds one of said inserts and is juxtaposed with said matrix surface; separating said matrix element and the isles from said screen and said insert and exposing said inserts and said face; depositing a layer of wear-resistant substance over said exposed face and inserts; and removing the portion of said wear-resistant layer deposited on said inserts, while leaving the remaining portion of said wear-resistant layer on said annular face portions, by separating said inserts from said screen.

4,056,993
SHEET SLITTER AND PUNCH ASSEMBLY
Henry J. Brettrager, 5450 East Street, Saginaw, Mich. 48601
Filed July 26, 1976, Ser. No. 708,835
Int. Cl.² B26D *9/00, 11/00*
U.S. Cl. 83—82 2 Claims



1. Apparatus for longitudinally and transversely slitting a sheet of paperboard or like material to form a plurality of individual rectangular cards comprising feed means for feeding an elongate sheet of material in a direction at a first speed along a first upstream section and at a second speed higher than said first speed on a second downstream section, a plurality of transversely spaced first cutter means operatively associated with said feed means at a location between said first and second sections for cutting spaced parallel longitudinal slits through said sheet as said sheet is advanced by said feed means, transversely extending support means overlying said feed means between said first and second sections and supported for vertical movement between a normally maintained upper position and an actuated lower position, second cutter means mounted on said support means for movement transversely of said feed means between a normally maintained first end limit at a side edge of a sheet on said feed means and an opposite end limit wherein said second cutter is located at the opposite side edge of a sheet in said feed means, said second cutter means being located clear of said sheet on said feed means when said support means is in said upper position and being located in cutting relationship with said sheet on said feed means when said support means is in said lower position, first reversible drive means for shifting said support means between upper and said lower position, second reversible drive means for driving said second cutter means between its first and second end limits of movement, and control means operable upon the advancement by said feed means of the leading end of the sheet to a preselected position on said feed means for sequentially:

a. stopping said feed means,

b. actuating said first drive means to drive said support means to its lower position,

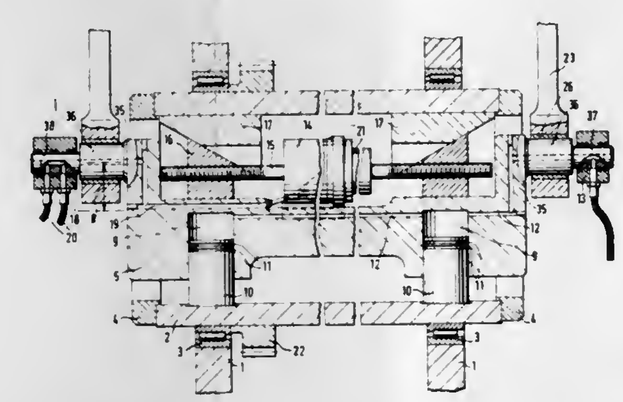
c. actuating said second drive means to drive said second cutter means from said first end limit to said second end limit to separate the leading end portion of said sheet from said sheet,

d. actuating said first drive means to raise said support means,

e. simultaneously starting said feed means to advance the separated leading end portion of said sheet along said second section away from the remainder of said sheet, and

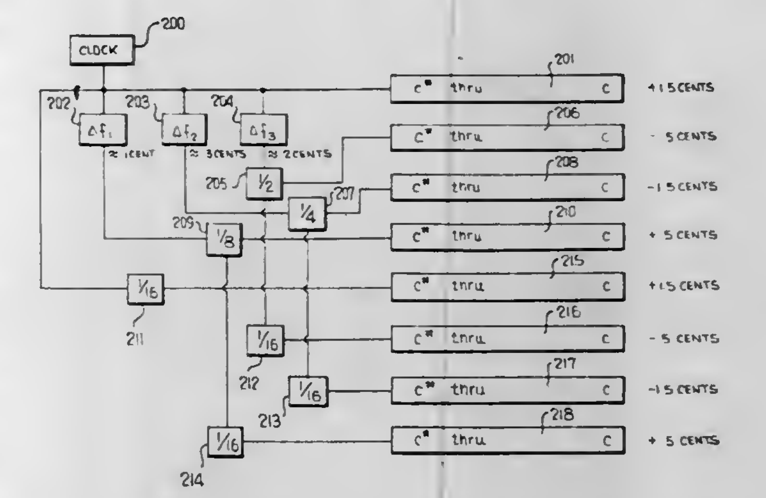
f. actuating said second drive means to return said second cutter means to its first end limit.

4,056,994
FLYING SHEAR FOR THE CROSSCUTTING OF METAL STRIPS OR BANDS
Josef Ihle, Pforzheim, Germany, assignor to Irma Ungerer geb. Dollinger, Germany
Filed Sept. 21, 1976, Ser. No. 725,109
Claims priority, application Germany, Nov. 5, 1975, 2549481
Int. Cl.² B26D *1/56*
U.S. Cl. 83—311 9 Claims



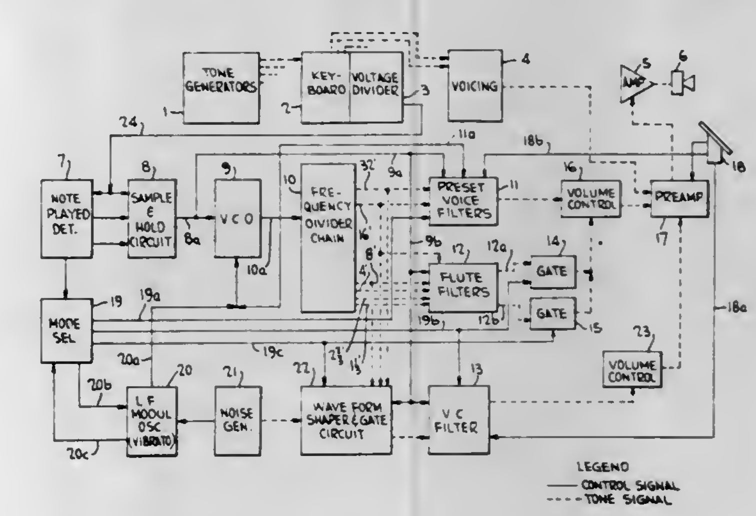
1. In a flying shear, designed as a crank rocker shear, for crosscutting metal strips continuously fed thereto, including a shear frame and a crank and a crank shaft rotatable in the shear frame and effecting entrainment of strip cutting knives in the direction of strip movement, and return of the cutting knives in the opposite direction, with the crank radius being adjustable in accordance with different cutting lengths of the strip, the improvement comprising, in combination, said crank shaft having an interior recess therein; a crank axle mounted in said recess and guided therein for adjustment rectilinearly of a diameter of said crank shaft; means connecting said crank axle to said strip cutting knives; and adjusting means operatively associated with said crank axle and operable to adjust said crank axle rectilinearly of said diameter of said crank shaft to adjust the crank radius, mounted in said interior recess and rotatable as a unit with said crank shaft.

4,056,995
SINGLE MASTER TONE GENERATOR
Dale M. Uetrecht, Cincinnati, Ohio, assignor to D. H. Baldwin Company, Cincinnati, Ohio
Division of Ser. No. 449,990, March 11, 1974, which is a division of Ser. No. 147,976, May 28, 1971, Pat. No. 3,816,635. This application Mar. 31, 1975, Ser. No. 563,431
Int. Cl.² G10H *1/00*
U.S. Cl. 84—1.01 2 Claims



1. In an electronic musical instrument, the combination comprising a pair of frequency synthesizer, a source of clock pulses connected to one of said frequency synthesizers, and frequency divider means connected with said source for dividing the pulse repetition rate of said clock pulses by a factor which differs slightly from 2, said frequency divider means being connected to another one of said frequency synthesizers.

4,056,996
ELECTRONIC MUSIC SYSTEM
David A. Bunger, Cincinnati, Ohio, assignor to D. H. Baldwin Company, Cincinnati, Ohio
Continuation of Ser. No. 452,045, March 18, 1974, abandoned, which is a division of Ser. No. 263,649, June 16, 1972, Pat. No. 3,801,721, which is a continuation-in-part of Ser. No. 213,939, Dec. 30, 1971, Pat. No. 3,789,718. This application June 23, 1975, Ser. No. 589,559
The portion of the term of this patent subsequent to Apr. 2, 1991, has been disclaimed.
Int. Cl.² G10H *1/02, 5/10*
U.S. Cl. 84—1.19 25 Claims



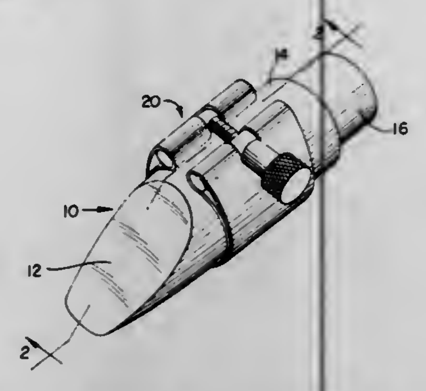
1. In an electronic organ, an improvement comprising:

means for generating a repetitive pulse tone signal;

a source of control voltage, the magnitude of said control voltage being dependent upon selected notes played on a keyboard of the organ;

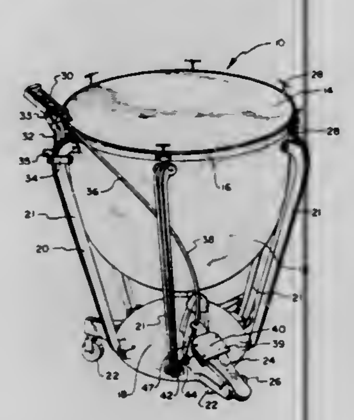
means responsive to the magnitude of said control voltage for modulating the widths of said pulses as a function of said magnitude of said control voltage.

4,056,997
REED HOLDING DEVICE FOR MUSICAL INSTRUMENTS
Philip Lee Rovner, 6 Tentmill Lane-F, Baltimore, Md. 21208
Filed Dec. 23, 1976, Ser. No. 753,893
Int. Cl.² G10D *9/02*
U.S. Cl. 84—383 R **19 Claims**



1. A reed holding device for a mouthpiece of a musical instrument, said device comprising a single unitary strip extending around the outer surfaces of portions of said reed and said mouthpiece, fastening means for securely fastening said strip in engagement with said reed and said mouthpiece to secure said reed to said mouthpiece, the thickness of said strip varying from a minimum thickness along the area of engagement with said reed, to a maximum thickness along an area of engagement with said mouthpiece to provide a graduated mechanical impedance to the energy from said reed during exitation.

4,056,998
TONAL PITCH INDICATOR FOR A KETTLEDRUM
Roger H. Rampton, 229 Mallard, Las Vegas, Nev. 89107
Filed May 24, 1976, Ser. No. 689,286
Int. Cl.² G10D *13/04*
U.S. Cl. 84—419 **12 Claims**



1. A tonal pitch indicator for a kettledrum having a foot pedal for adjusting the tonal pitch thereof, the indicator comprising:

an elongated indicator housing;

a longitudinal slot in the housing visually observable from at least one side of the housing;

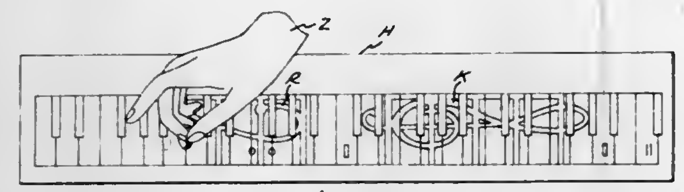
a marker longitudinally movable in the slot;

means for removably mounting the indicator housing to the kettledrum;

a hollow sheath interconnected between the indicator housing and the foot pedal means and having sufficient length to form an arcuate curvature between the indicator housing and the foot pedal means; and

a cable connected to the marker and passing through the hollow sheath to an anchoring means beyond the end of the hollow sheath, a portion of the cable adjacent the foot pedal means being encased in a stiffening tube having sufficient stiffness to accommodate movement of the foot pedal means relative to the cable to telescopically enclose the cable with the sheath thereby changing the curvature of the sheath resulting in a relative movement of the cable and sheath to cause the cable to move the marker in the slot.

4,056,999
PIANO TEACHING AID
William J. Bennett, 23403 South Berendo, Torrance, Calif. 90502
Filed Sept. 17, 1976, Ser. No. 724,301
Int. Cl.² G09B *15/02*
U.S. Cl. 84—479 **4 Claims**



1. In combination with a piano that includes a keyboard defined by a plurality of side-by-side white keys and a plurality of black keys spaced in groups of two and three and a sheet of music that has a score thereon that includes an upper spaced group of parallel lines that are identified by a treble insignia and which lines and the spaces therebetween have a plurality of longitudinally spaced notes associated therewith; a lower spaced group of parallel lines that are identified by a bass insignia and which lines and the spaces therebetween have a plurality of longitudinally spaced notes associated therewith; and a single line that corresponds to middle C disposed between said upper and lower group of lines and separated therefrom by upper and lower spaces, said single line and upper and lower spaces having a plurality of spaced notes associated therewith, a device capable of being removably secured to said white keys to visually indicate to a user the white key that corresponds to a particular note on upper group of lines and said spaces therebetween, said lower group of lines and said spaces therebetween, and said single line and spaces above and below the latter, said device including:

a. an elongate backing strip on which a replica of at least the portion of the white and black keys of said keyboard are depicted that correspond to said notes on said score of said sheet of music;

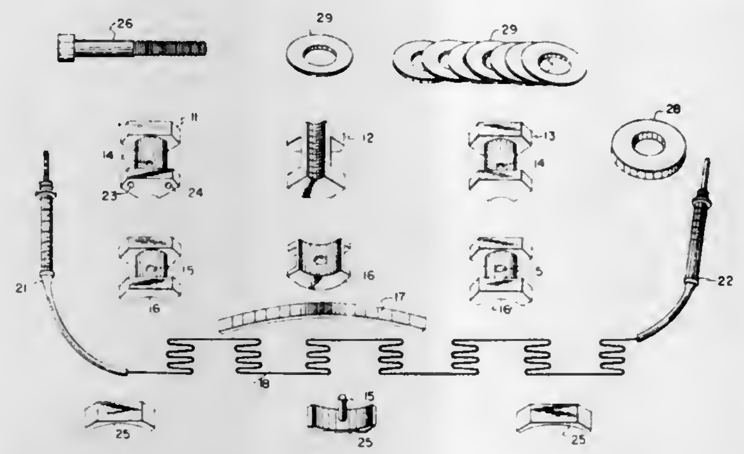
b. a plurality of first overlay segments disposed side-by-side on said white keys of said replica to define a treble signature, said first overlay segments that correspond to lines on said first group including straight tabs, said first overlay segments having first and second oppositely disposed surfaces, and said first surfaces being of a color that visually distinguishes said first overlay segments from said black and white keys;

c. first means on said second surfaces that removably secure said first overlay segments to said backing strip and to the white keys of said piano keyboard that correspond to said replicas after said first overlay segments are removed from said backing strip;

d. a plurality of second overlay segments disposed side-by-side on said white keys of said replica that are of the same structure as said first overlay segments but are different in shape in that they define a bass signature, said second overlay segments being mounted on said backing sheet and secured to the corresponding white keys of said keyboard in the same manner as said first overlay segments;

e. a third overlay segment in the form of an elongate tab that is of the same structure as one of said first overlay segments that is removably mounted on middle C key of said replica and when removed therefrom is removably secured to middle key C of said keyboard, with said first, second and third replicas when mounted on said white keys of said keyboard visually indicating to a user the key that corresponds to a note on a line of said upper and lower groups of lines and the line therebetween, and notes in spaces in said upper and lower groups of lines and above and below the middle C line in said music being identified on said piano keyboard as a white key disposed between two of said tabs.

4,057,000
MECHANISM FOR DEEP OCEAN INSTRUMENTATION REMOTE RELEASE
Geoffrey Owen Thomas, Bethesda, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.
Filed Sept. 20, 1976, Ser. No. 724,831
Int. Cl.² F16B *37/10*
U.S. Cl. 85—33 **11 Claims**



1. A simple, quiet, load-release device for use with a threaded bolt in securing a load comprising:

a threaded nut,

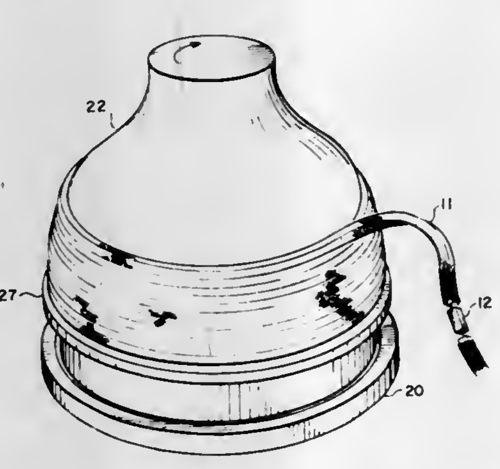
said nut machined circumferentially along a portion of its outer surface to have the shape of a bobbin and severed into three equal sections along its length;

a meltable tape for wrapping in layers around said nut sections when assembled into a whole and within the machined portion of said nut to prevent radial disassembly; and

an electrical resistance means for assembly between the layers of meltable tape,

whereby a suitable electrical current passed through said resistance means generates heat and melts said tape permitting the sections of said nut to separate and release the load.

4,057,001
ENDLESS CARRIER SLEEVE FOR DISCRETE FRAGMENTS
Jean A. Valentine, Winter Park, Fla., assignor to Martin Marietta Corporation, Orlando, Fla.
Continuation of Ser. No. 718,983, April 1, 1968. This application Oct. 31, 1969, Ser. No. 871,714
Int. Cl.² F42B *33/00*
U.S. Cl. 86—1 R **5 Claims**



1. A method of constructing a fragment shell of the type used in an explosive device, said method comprising:

a. continuously forming an elongated flexible tube;

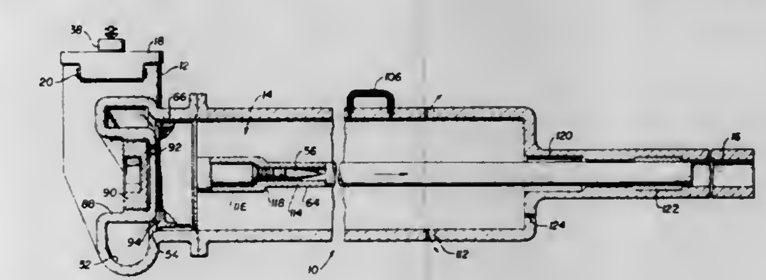
b. individually feeding a plurality of discrete fragments to said tube at a predetermined variable rate;

c. positioning said discrete fragments within said tube in a predetermined spaced relation to one another, whereby fragment density within a predetermined portion of said tube may be regulated by the rate of feed of said fragments to said tube;

d. wrapping the formed fragment containing tube about support means so as to arrange said tube into a shell configuration corresponding to the general shape of said support means; and

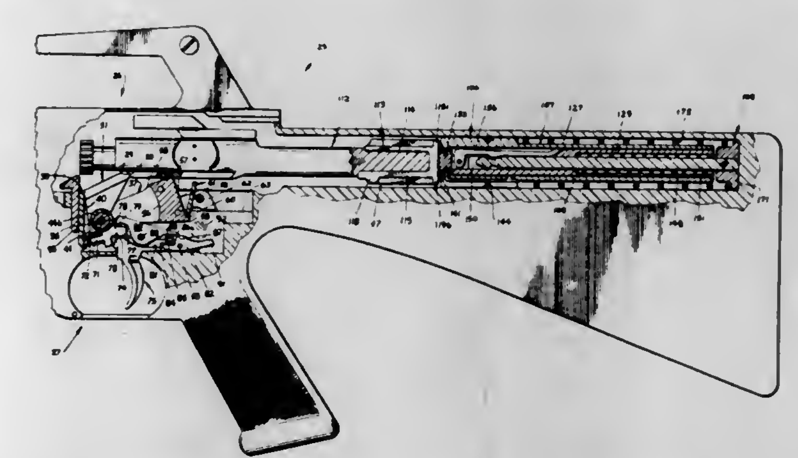
e. securing the wound tube into a substantially rigid shell having a configuration defined by said support means.

4,057,002
KINETIC BARREL GUN
William F. Donovan, Aberdeen, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.
Filed Apr. 7, 1976, Ser. No. 674,469
Int. Cl.² F41F *1/00*
U.S. Cl. 89—8 **11 Claims**



1. A gun for firing a projectile therefrom whereby the acceleration of the projectile is increased within the gun comprising: a tube having a primary combustion chamber and a piston-barrel chamber, said combustion chamber containing first charge means which includes an igniter means and a charge eccentrically mounted relative to the longitudinal axis of the tube to produce a stream of gas from said charge to said piston-barrel chamber and a gas pressure increasing means interposed between said charge and said chamber; said piston-barrel chamber having a piston therein accelerated by said gas from said charge means; said piston having means for retaining a projectile and second charge means for accelerating said projectile relative to said piston; and a firing means activated by said first charge means for igniting said second charge means.

4,057,003
OPEN BOLT CONVERSION APPARATUS
Maxwell G. Atchisson, 55 Old Yellow Springs Road, Apt. H, Fairborn, Ohio 45324
Filed Dec. 30, 1975, Ser. No. 645,362
Int. Cl.² F41D *5/04, 11/02*
U.S. Cl. 89—138 **6 Claims**



1. Open bolt firing mechanism for a firearm of the type including a receiver housing having a reciprocating bolt mech-

anism and a hammer-operated firing pin carried by said bolt mechanism; comprising:

sear means pivotally mounted within said receiver section;

said sear means having a bolt engaging surface to engage and retain said bolt mechanism in open position, and a second surface which engages said receiver housing in force transmitting alignment with said bolt engaging surface, so that forward force of said open bolt mechanism is transferred through said sear means to said receiver housing;

trigger means engagable with said sear means to pivotally move said sear means so that said bolt engaging surface is withdrawn from said bolt mechanism; and

hammer means mounted for pivotal motion concentrically with and independently of pivotal motion of said sear means;

said hammer means having a pair of legs which extend alongside of said sear means, and a bridge portion which extends between said legs outwardly beyond said sear means, so that said hammer means can pivot without interference with said sear means to bring said bridge portion into firing contact with said firing pin when said bolt assembly has moved forward.

4,057,004

FAIL-SAFE FLUID CONTROL VALVE

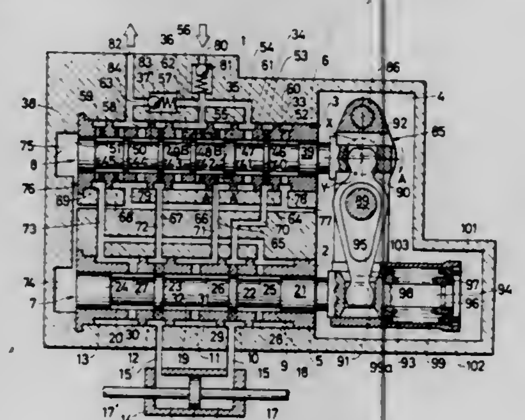
Toshio Kamimura, Gifu, Japan, assignor to Teijin Seiki Company Limited, Osaka, Japan

Filed July 22, 1976, Ser. No. 707,762

Claims priority, application Japan, July 25, 1975, 50-91320

Int. Cl.[2] F15B *13/04, 20/00*

U.S. Cl. 91—30 **3 Claims**



1. A fail-safe fluid control valve comprising:

a valve housing having first and second concave portions formed therein parallel relation with each other,

a first sleeve positioned within and fixed to said first concave portion of said valve housing, said first sleeve including first, second and third port groups located at a predetermined interval along its axial direction and each having one or more radial ports circumferentially equi-angularly formed in said first sleeve, a first orifice group located between said first and second port groups and having one or more radial orifices circumferentially equi-angularly formed in said first sleeve, a second orifice group located between said second and third port groups and having one or more radial orifices circumferentially equi-angularly formed in said first sleeve, a first annular groove formed on the outer periphery of said first sleeve in fluid communication with said ports of said first port group, a second annular groove formed on the outer periphery of said first sleeve in fluid communication with said orifices of said first orifice group, a third annular groove formed on the outer periphery of said first sleeve in fluid communication with said ports of said second port group, a fourth annular groove formed on the outer periphery of said first sleeve in fluid communication with said orifices of said second orifice group, a fifth annular groove formed on the outer periphery of said first sleeve in fluid communication with said ports of said third port group;

a first valve spool reciprocably accommodated in said first sleeve and having first, second, third and fourth large diameter portions integrally formed on the outer periphery of said first valve spool, the interval between said second and third large diameter portions being substantially equal to the interval between said first and second orifice groups, the axial length of each of said second and third large diameter portions being substantially equal to the axial length of each of said orifices of said first and second orifice groups, and said first and fourth large diameter portions being located at all times axially outwardly of said first and third port groups;

a second sleeve positioned within and fixed to said second concave portion of said valve housing, said second sleeve including fourth, fifth, sixth and seventh port groups located at a predetermined interval along its axial direction and each having one or more radial ports circumferentially equi-angularly formed in said second valve spool, a third orifice group located between said fourth and fifth port groups and having one or more radial orifices circumferentially equi-angularly formed in said second sleeve, a sixth orifice group located between said sixth and seventh port groups and having one or more radial orifices circumferentially equi-angularly formed in said second sleeve, fourth and fifth orifice groups positioned in side-by-side relation between said fifth and sixth port groups and each having one or more radial orifices circumferentially equi-angularly formed in said second sleeve, seventh and eighth orifice groups positioned in side-by-side relation axially outwardly of said seventh port group and each having one or more radial orifices circumferentially equi-angularly formed in said second sleeve, a sixth annular groove formed on the outer periphery of said second sleeve in fluidal communication with said ports of said fourth port group, a seventh annular groove formed on the outer periphery of said second sleeve in fluidal communication with said orifices of said third orifice group, and eighth annular groove formed on the outer periphery of said second sleeve in fluidal communication with said ports of said fifth port group, a ninth annular groove formed on the outer periphery of said second sleeve in fluidal communication with said orifices of said fourth orifice group, an eleventh annular groove formed on the outer periphery of said second sleeve in fluidal communication with said orifices of said sixth orifice group, a thirteenth annular groove formed on the outer periphery of said second sleeve in fluidal communication with said orifices of said eighth orifice group, a tenth annular groove formed on the outer periphery of said second sleeve in fluidal communication with said orifices of said fifth orifice group and said ports of said sixth port group, and a twelveth annular groove formed on the outer periphery of said second sleeve in fluidal communication with said ports of said seventh port group and said orifices of said seventh orifice group;

a second valve spool reciprocably accommodated in said second sleeve and having fifth, sixth, seventh, eighth, ninth, tenth and eleventh large diameter portions, the interval between said sixth and ninth large diameter being substantially equal to the interval between said third and sixth orifice groups, the axial length of each of said sixth and ninth large diameter portions being substantially equal to the axial length of each of said orifices of said third and sixth orifice groups, the end face of said eighth large diameter portion facing said seventh large diameter portion being brought into substantial alignment with the inner face of each of said orifices of said fifth orifice group adjacent to said sixth port group and the end face of said tenth large diameter portion facing said eleventh large diameter portion being brought into substantial alignment with the inner face of each of said orifices of said seventh orifice group adjacent to said seventh port group when said orifices of said third and sixth orifice groups come to be in opposing relation with and closed by said sixth and ninth large diameter portions, respectively, the end face of said seventh large diameter portion facing said eighth large diameter portion being brought into substantial alignment with the inner face of each of said orifices of said fourth orifice group adjacent to said fifth port group when said orifices of said third and sixth orifice groups come to be in opposing relation with and closed by said sixth and ninth large diameter portions, respectively, the axial length of said seventh large diameter portion being substantially equal to the axial length of each of said orifices of said fourth orifice group, the end face of said eleventh diameter portion facing said tenth large diameter portion being brought into substantial alignment with the axially outermost inner face of each of said eighth orifice group when said orifices of said third and sixth orifice groups come to be in opposing relation with and closed by said sixth and ninth large diameter portions, respectively, the axial length of said eleventh large diameter portion being larger than the axial length of each of said orifices of said eighth orifice group, and said fifth large diameter portion being at all times positioned axially outwardly of said fourth port group,

a first passage formed in said valve housing to communicate said second and seventh annular grooves;

a second passage formed in said valve housing to communicate said third and ninth annular grooves;

a third passage formed in said valve housing to communicate said fourth and eleventh annular grooves;

a fourth passage formed in said valve housing to communicate said first, fifth and thirteenth annular grooves;

a fifth passage formed in said valve housing to communicate said sixth and twelveth annular grooves;

a valve cylinder having a pair of cylinder conduits communicated with said second and fourth annular grooves, respectively;

an inlet conduit communicated with said eighth and tenth annular grooves;

an outlet conduit communicated with said twelveth annular groove; and

a reciprocating input mechanism disposed in the vicinity of and operably connected to said first and second valve spools so that only said first valve spool is reciprocated with said second valve spool held stationary to reciprocate any one of said valve housing and a piston rod of said valve cylinder in a normal condition while said second valve spool is reciprocated for imparting a reciprocating motion to any one of said valve housing and said piston rod of said valve cylinder in an abnormal condition where said first valve spool is stuck to said first sleeve to prevent said first valve spool from being reciprocated in said first sleeve.

2. A fail-safe fluid control valve comprising: a valve housing having first and second concave portions formed therein in parallel relation with each other, a first sleeve positioned within and fixed to said first concave portion of said valve housing, a second sleeve positioned within and fixed to said second concave portion of said valve housing, a first valve spool reciprocably accommodated in said first sleeve, a second valve spool reciprocably accommodated in said second sleeve, a valve cylinder operatively connected to said valve housing and having a reciprocable piston rod, whereby said first valve spool is reciprocated in said first sleeve for reciprocation motion of any one of said valve housing and said piston rod of said valve cylinder in a normal condition while said second valve spool is reciprocated in said second sleeve for reciprocation motion of any one of said valve housing and said piston rod of said valve cylinder in an abnormal condition where said first valve spool is stuck to said first sleeve and thus unable to be reciprocated in said first sleeve; the improvement comprising in combination:

a first lever provided adjacent the end portions of said first and second valve spools;

a second lever having an upper end pivotally connected to the end portion of said second valve spool and a lower end pivotally connected to the end portion of said first valve spool;

a rockable rod provided adjacent said second valve spool and securely connected to said first lever in perpendicular relation with said first lever and said second valve spool for imparting a rocking motion to said first lever;

a pivotal pin pivotally connecting the intermediate portion of said first and second levers for allowing said first and second lever to be pivotable;

a projection integrally connected to the end of said first valve spool through an annular ledge interposed therebetween and extending in axial alignment with said first valve spool;

a movable annular collar axially slidably retained on said projection;

a fixed annular collar securely retained on the free end of said projection;

a first compression coil spring positioned between said movable annular collar and said fixed annular collar to surround said projection;

a cylindrical member pivotally connected to the lower end of said first lever and retained in slidable relation with the first valve spool to surround said projection;

a fixed annular member securely retained on the inner periphery of the free end of said cylindrical member; and

a second compression coil spring positioned between said movable annular collar and said fixed annular member to surround said first compression coil spring.

4,057,005

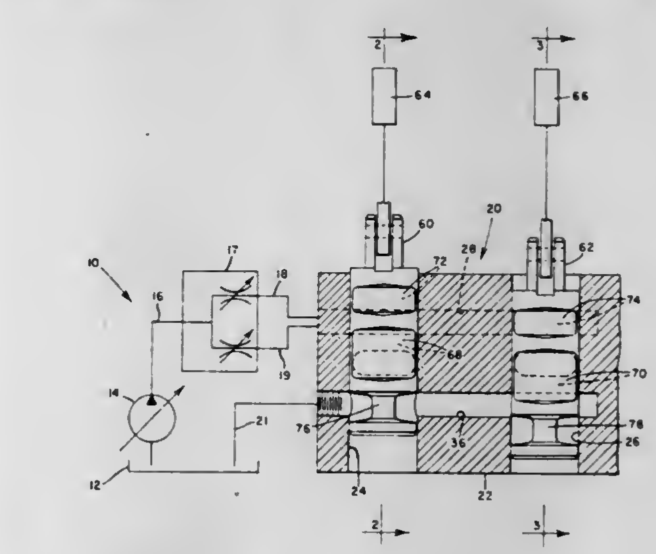
DUAL FLOW HYDRAULIC SYSTEM AND CONTROL VALVE THEREFOR

Curtis Phillip Ring, Cedar Falls, Iowa, assignor to Deere & Company, Moline, Ill.

Filed Sept. 12, 1975, Ser. No. 612,631

Int. Cl.[2] F15B *11/16*

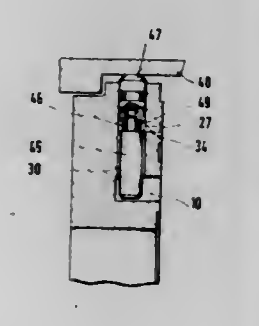
U.S. Cl. 91—413 **6 Claims**



1. A valve comprising: a valve body having a plurality of bores provided therein; parallel and coplanar first and second input passage means intersecting and straddling all of the bores; a plurality of coplanar first function passage means each intersecting one of the bores adjacent and perpendicular to the first and second input passage means; a plurality of coplanar second function passage means each intersecting one of the bores and colinear with the first function means; exhaust passage means intersecting all the bores adjacent and perpendicular to the first and second function port means; and a plurality of spool means each received within and independently axially slidable in each of the bores between a first and second position; each of said spool means containing a pair of opposed notches therein; a first and a second of said opposed notches respectively connecting the first and second input passage means to the first and second function passage means when said spool means is in the first position and respectively con-

necting the first and second function passage means to the exhaust passage means when said spool means is in the second position.

4,057,006
VALVE PLATE ARRANGEMENT FOR HYDROSTATIC PISTON MACHINES
Hans Warnke, Herne, and Werner Böer, Castrop-Rauxel, both of Germany, assignors to Klockner-Werke AG, Duisburg, Germany
Filed Mar. 29, 1976, Ser. No. 671,611
Claims priority, application Germany, May 9, 1975, 2520695
Int. Cl.² F01B *3/00, 13/04*
U.S. Cl. 91—487 7 Claims



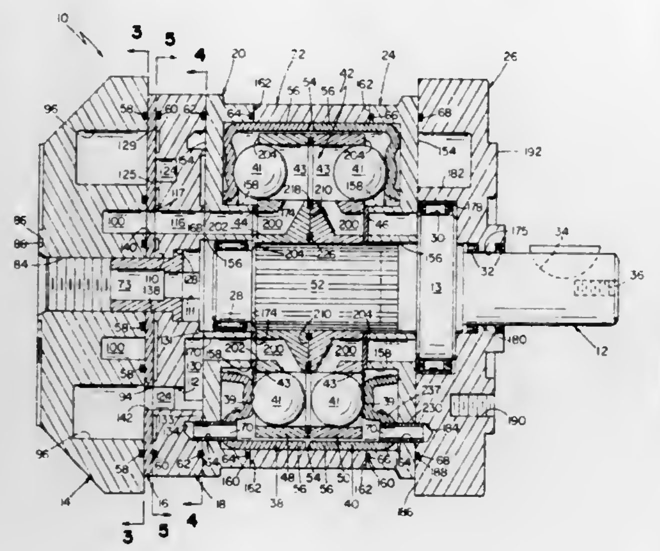
1. In an axial piston machine of the swash plate type, a combination comprising a valve plate having a front face and a rear face, a pair of control openings in said front face and each having opposite ends; a plurality of bores providing communication between said opposite ends of said control openings and said rear face of said valve plate; a plurality of shallow pockets in said front face respectively forming hydrostatic bearings; a plurality of throttle bores having outer ends at the periphery of said valve plate and each communicating at an inner end with a respective control opening; a throttle pin arranged with small clearance in each of said throttle bores for oscillating movement; biasing means for each throttle pin for biasing the same in one direction of its oscillation; a housing surrounding said peripheral surface of said valve plate; closure means for closing the outer ends of each throttle bore, each of said closure means comprising a pin in the outer end of the respective throttle bore and having an outer end abutting onto a portion of said housing; and a plurality of connecting bores through said valve plate respectively providing communication between said pockets and said throttle bores in the region of the outer ends of the latter.

4,057,007
ROTARY FLUID DEVICE HAVING TWO ROTOR SECTIONS
James M. Denker, Scituate, Mass., assignor to Nutron Corporation, Hingham, Mass.
Filed Mar. 24, 1976, Ser. No. 669,881
Int. Cl.² F01B *3/04;* F16H *53/00*
U.S. Cl. 91—501 23 Claims

1. In a rotary fluid device of the type including a shaft, a cam defining an undulating cam surface, a rotor mounted coaxially of the shaft and defining a porting surface, a plurality of pistons engaging the cam carried by the rotor for movement relative thereto, a porting member defining an annular porting surface engaging the rotor porting surface, and a plurality of bores defined by said rotor and each carrying at least one of said pistons, that improvement wherein:

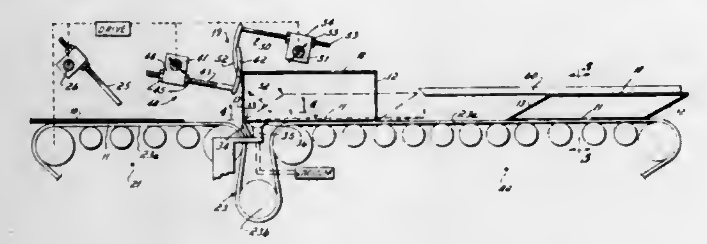
said rotor comprises two rotor sections mounted coaxially on the shaft for limited axial movement relative to each other and spaced slightly axially from each other, each of said rotor sections defining a generally axially-facing surface closely adjacent and facing towards the corresponding surface of the other of said rotor sections;

each of said bores includes a first bore portion defined by one of said rotor sections, a second bore portion defined by the other of said rotor sections, and an intermediate portion extending between said rotor sections;



an annular sealing member extends between said axially-facing surfaces of said rotor sections generally coaxially therewith and seals said axially-facing surfaces to each other, the effective sealing diameter of said sealing member being not greater than the inner diameter of said annular porting surface defined by said porting member.

4,057,008
CARTON ERECTING APPARATUS
Charles C. Hughes, Ludlow, Ky., assignor to R. A. Jones & Co. Inc., Covington, Ky.
Filed Sept. 16, 1976, Ser. No. 723,992
Int. Cl.² B31B *1/52*
U.S. Cl. 93—53 BF 9 Claims



1. Apparatus for opening tubular carton blanks passing through said apparatus for movement toward a transport conveyor, said carton having a top panel, an upwardly-facing leading side panel, a bottom panel and a downwardly-facing trailing side panel all interconnected by creases, comprising:

an endless conveyor having an upstream section and a downstream section;

a transverse breaker bar located between said two sections;

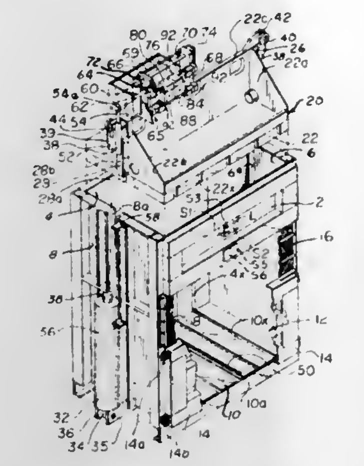
a plurality of transversely spaced suction cups located downstream of said breaker bar;

a transverse shaft overlying said upstream section adjacent said breaker bar and having a radially projecting opening element engageable with said trailing side panel;

a transverse shaft overlying said downstream section and having a radially projecting overbreak element;

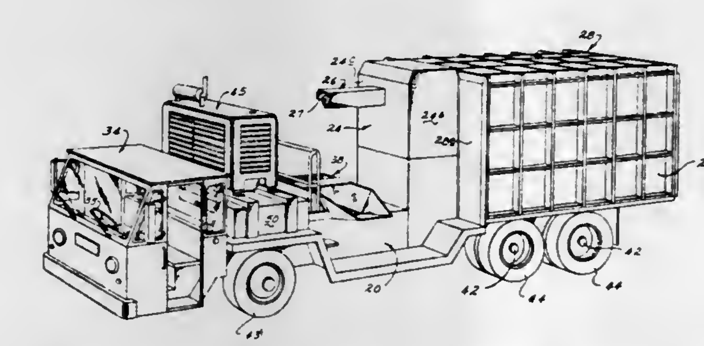
and means for rotating said shafts in timed relation to first swing a trailing side panel upwardly with said opening element and then swing said trailing side panel fowardly and downwardly with said overbreak element.

4,057,009
DOWNSTROKE BALER
Charles E. Burford, and Joe E. West, both of Dallas, Tex., assignors to Burford Corporation, Dallas, Tex.
Filed Aug. 19, 1975, Ser. No. 605,944
Int. Cl.² B30B *15/24*
U.S. Cl. 100—46 7 Claims



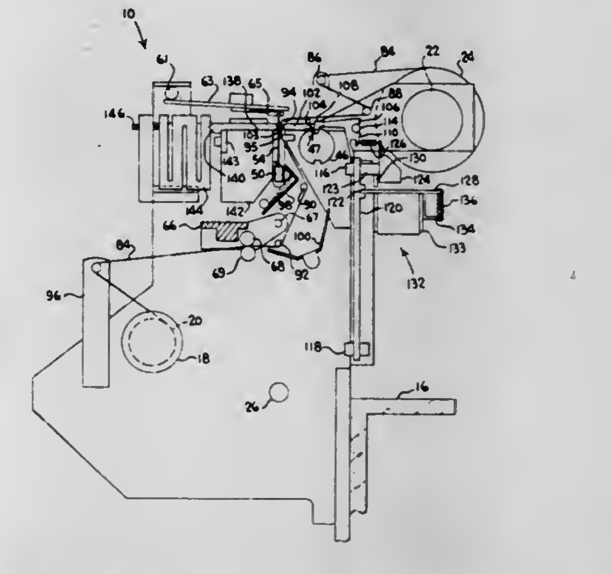
1. Bale forming apparatus comprising: a general frame; a compaction chamber in said general frame, said compaction chamber having a central axis; a platen in said compaction chamber; a pair of pressure actuated cylinders, each of said cylinders having a piston slideably disposed therein and a rod secured to the piston, said rod extending through a rod end of said cylinder, said piston being moveable between the rod end and a base end of said cylinder; means securing a base end of each of said cylinders to said frame adjacent opposite sides of said compaction chamber; means securing said rods to opposite ends of said platen; a source of pressurized fluid; first valve means between said source of pressurized fluid and a first of said cylinders; second valve means between said source of pressurized fluid and said second cylinder; an elongated sleeve; means securing said sleeve to said platen, said sleeve having a central axis which is parallel to the central axis of the chamber when said platen is in a horizontal attitude normal to the central axis of the chamber; an actuating rod extending through said sleeve; means restraining said actuating rod against movement in a direction parallel to the axis of the sleeve; and actuating means between said actuating rod and said first valve means, said actuating means being adapted to actuate said first valve means upon deviation of said platen from an attitude normal to said central axis of the compaction chamber.

4,057,010
VEHICLE MOUNTED COMPACTOR APPARATUS
Gary D. Smith, Waco, Tex., assignor to Mobile Auto Crushers Corporation of America, Dallas, Tex.
Continuation of Ser. No. 479,721, June 17, 1974, abandoned. This application Feb. 23, 1976, Ser. No. 660,525
Int. Cl.² B30B *15/16*
U.S. Cl. 100—50 14 Claims



1. Bale forming apparatus comprising: support means; a compaction chamber having an inlet passage and an outlet passage; means to secure said chamber to said support means; closure means adjacent said outlet passage; means to move said closure means between a first position across said outlet passage and a second position spaced from said outlet passage; a ram movable through said chamber between said inlet passage and said outlet passage; a plurality of cylinders, each of said cylinders having a piston movable therethrough and a rod secured to the piston, said rod extending through an end of each cylinder; a common head securing each of said cylinders to said support means; means securing each of said rods to said ram; means to selectively direct pressurized incompressible fluid to opposite ends of a first of said plurality of cylinders to move said ram toward said outlet or toward said inlet; means to direct pressurized fluid to a second to said plurality of cylinders to move said ram toward said outlet when force exceeding a predetermined magnitude restrains movement of said ram toward said outlet passage by said first cylinder; a source of incompressible liquid; and means connecting said source of incompressible liquid to opposite ends of said second plurality of cylinders such that said second plurality of cylinders remain full of incompressible liquid as said pistons move through each of said cylinders.

4,057,011
MEANS FOR PRINTING OCR AND BAR CODE ON CARDS
Herbert Tramposch, Riverside, Conn., and Michael Polad, Mendota, Minn., assignors to Malco Plastics, Garrison, Md.
Continuation of Ser. No. 520,679, Nov. 4, 1974, abandoned, which is a continuation-in-part of Ser. No. 456,643, April 1, 1974, abandoned. This application Mar. 2, 1976, Ser. No. 663,178
Int. Cl.² B41J *1/10*
U.S. Cl. 101—93.03 4 Claims



1. A printing apparatus for printing bar codes, OCR and the like on cards, the combination comprising:

A. a housing;

B. a plurality of selectively and independently operable print bars slidably supported by the housing;

C. a plurality of interposers, one of said interposers being operatively engagable with each print bar;

D. a bail shaft;

E. drive means for imparting continuous oscillating rotary motion to the bail shaft;

F. a plurality of pressure bars supported by said housing,
1. one pressure bar being spaced relative to each print bar,
2. each said pressure bar having a stop projection thereon, and
3. said pressure bars being movable in a direction substantially parallel to the sliding movement of said print bars;

G. stop means on said housing for engaging said stop projection to limit the movement of the pressure bars in the direction toward the printing bars;

H. one of the plurality of print bars and plurality of pressure bars carrying particular font characters;

I. a plurality of springs, one each of said springs independently urging each pressure bar toward its associated print

bar, and said stop projection into contact with said stop means;

J. means for individually adjusting the pressure exerted and appropriately to the respective font character by each of said springs upon said pressure bars;

K. means for positioning a printing medium between the print bars and the pressure bars;

L. means for placing the card between the printing bars and the pressure bars; and

M. means for selectively operatively engaging an interposer with the bail shaft to selectively transmit the continuous motion of the bail shaft into a motion of a print bar toward and away from its associated pressure bar for printing engagement to move the pressure bar off its stop against said appropriate spring pressure for the font character to be printed.

4,057,012

PRINTING PRESS CONVERTIBLE FROM INTAGLIO TO FLEXOGRAPHIC PRINTING AND VICE VERSA

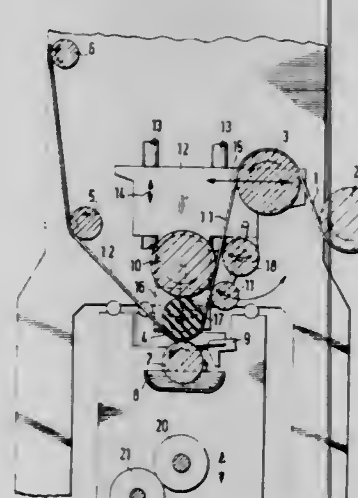
Rolf Heidemann, Ibbenburen, Germany, assignor to Windmoller & Holscher, Lengerich, Germany

Filed Mar. 9, 1977, Ser. No. 775,953

Claims priority, application Germany, Mar. 10, 1976, 2610028

Int. Cl.^{2} B41F *9/00, 11/00*

U.S. Cl. 101—153 **6 Claims**



1. A web printing press convertible from intaglio to flexographic printing and vice versa, comprising a frame; means for selectively mounting a flexographic printing cylinder and an intaglio printing cylinder within said frame; two impression cylinders; means for mounting said impression cylinders in displaceable and securable mountings on said frame; said impression cylinders including a rubber cylinder and a steel cylinder for selective cooperation with said intaglio printing cylinder and said flexographic printing cylinder, respectively; guide rollers disposed above said impression cylinders for guiding the web to be printed through upstream and downstream paths relative to the printing nip; said mounting means including means for mounting said steel cylinder in a displaceable carriage and further including means for mounting said rubber cylinder on pivotable arms for swinging said rubber cylinder about a pivotal axis from a position between said steel cylinder and said intaglio printing cylinder to a position above said steel cylinder and between said upstream and downstream web paths; means for mounting one of said web guide rollers for displacement from a vertical position above the said steel cylinder during flexographic printing to a position offset therefrom during intaglio printing.

4,057,013

ROLLING PRINTING MACHINE

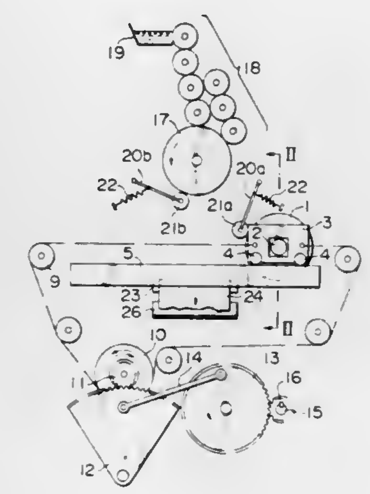
Shinzo Asano, Tokyo, Japan, assignor to Fuji Shiko Kabushiki Kaisha and Kabushiki Kaisha Asano Tekkosho, both of Tokyo, Japan

Continuation-in-part of Ser. No. 612,022, Sept. 10, 1975, abandoned. This application Jan. 13, 1977, Ser. No. 759,234

Claims priority, application Japan, May 21, 1975, 50-60441

Int. Cl.^{2} B41F *17/00*

U.S. Cl. 101—212 **1 Claim**



1. A printing press, comprising:

a plurality of ink feed rollers;

an ink reservoir disposed above said ink and in communication with feed rollers;

two inking rollers disposed below and in communication with said ink feed rollers, and arranged to rotate in opposite directions;

a plurality of ink application rollers, including at least one respective ink application roller for each of said two inking rollers, each arranged to rotate in a respective single direction then engaging the respective of said inking rollers;

a plurality of swing arms respective ones of said swing arms being connected at respective one ends thereof to said ink application rollers mounting the respective ink application rollers for displacement into communication with said ink feed rollers;

a plurality of tension springs attached to the respective opposite ends of said spring arm;

a printing roller disposed horizontally beneath said ink application rollers, and having a centre shaft;

a carrier frame;

means defining a centre notch in said carrier frame;

said printing roller centre shaft being supported by said carrier frame in said centre notch;

a horizontal rail;

a plurality of rollers supporting the carrier frame on the horizontal rail for reciprocating movement of the carrier frame backwards and forwards along said rail;

a printing block disposed on the printing roller;

a paper feeding device for feeding paper beneath said printing block periodically and in sequence with said movement of the frame;

means for rotating the printing roller at such an angular rate as will give the printing block the same peripheral speed as the speed of reciprocating movement of said frame and including drive means including a crank means coupled with a gear sector linked to said swing arms for providing said displacement of said ink application rollers.

4,057,014

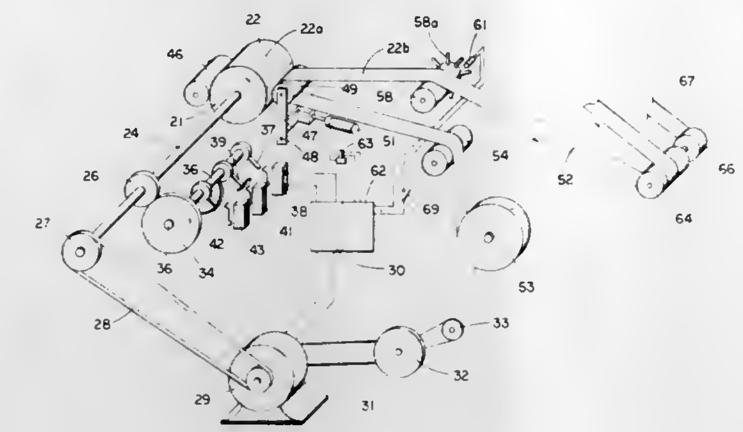
TAPE PRINTER AND STRIPPER ASSEMBLY

Charles S. Thomas, 1031 N. Brandon Ave., Marion, Ind. 46952

Filed Apr. 8, 1976, Ser. No. 674,858

Int. Cl.^{2} B41F *13/02*

U.S. Cl. 101—228 **4 Claims**



1. An assembly for placing series of imprints on a continuous web of material by passing it between a rotating printing plate cylinder and an impression cylinder, with the space between each series of imprints on the strip differing from the space between each imprint within a series, said assembly comprising said plate cylinder carrying a plurality of printing plates in spaced relation around its circumference, drive means for rotating said plate cylinder at uniform speed, control means for halting said plate cylinder for a predetermined time period each time said plate cylinder has moved through a predetermined number of complete revolutions and said impression cylinder is opposite a void between the spaced printing plates, said control means including a control shaft driven by said plate cylinder drive means at a rotational speed which is the $1/n$ fraction of the rotational speed of said plate cylinder where n is the number of printing plates carried on the circumference of said plate cylinder, an element carried by said control shaft adapted to provide an electrical signal upon each complete revolution of the control shaft, and timing means actuated by said electrical signal for halting said drive means for a predetermined time upon occurrence of said electrical signal, and means for continuously pulling the web between the plate cylinder and the impression cylinder at a speed equal to the surface speed of the rotating printing plate cylinder, whereby with the plate cylinder halted the web moves relative to the plate cylinder only when said impression roller registers with a void between said spaced printing plates, the time interval in which said relative movement occurs defining the length of the space between series of imprints, and the number of imprints in each series being the product of the number of complete revolutions of said plate cylinder between said halted intervals and the number of spaced printing plates carried on said plate cylinder.

4,057,015

BAR CODE PRINTING SYSTEM

Robert D. Kodis, Brookline, Mass., assignor to Di/An Controls, Inc., Boston, Mass.

Filed Mar. 4, 1976, Ser. No. 663,905

Int. Cl.^{2} B41J *1/60;* **B41F** *31/00*

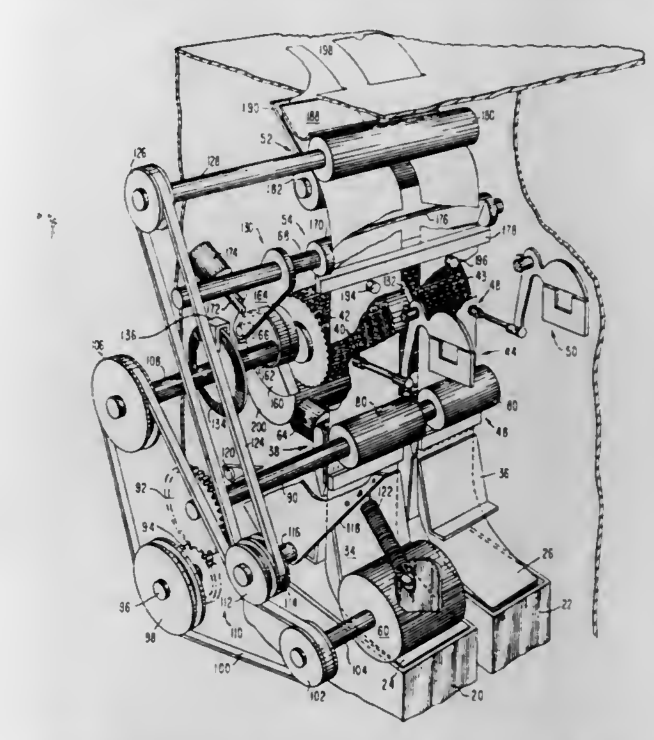
U.S. Cl. 101—93.29 **11 Claims**

1. A system for printing bars on a web in response to coded data signals representing bar code messages, said system comprising:

a. a rotatable print drum having at least one row of printing elements disposed about its periphery in an arcuate column, said column of printing elements including at least a pair of matching bar printing elements that are spaced from one another, each said printing element having a unique address defining a unique angular position on said drum;

b. an impactor assembly associated with said print drum for pressing a web passing between said drum and said impactor assembly against selected ones of said bar printing elements for printing bars on the web, one row of bars printed during one revolution of said drum; and

c. a processor for receiving a code data signal requesting the printing of one of said bars on the web, said processor converting said coded signal into command signals alter-



natively defining the address locations of said matching bar printing elements for successive rotations of said drum, said command signals actuating said impactor assembly for pressing said web against alternate ones of said pair of matching bar printing elements for successive coded signals requesting the printing of said one bar on the web for each complete revolution of said drum.

4,057,016

PROCESS FOR ELECTROSTATIC PRINTING AND APPARATUS THEREFOR

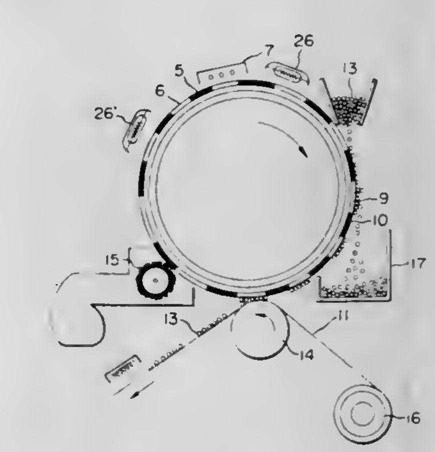
Ichiro Endo, Yokohama; Hajime Kobayashi, Mitaka, and Nobuhiro Takekawa, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed May 12, 1976, Ser. No. 685,460

Claims priority, application Japan, May 19, 1975, 50-59389

Int. Cl.^{2} G03G *5/026*

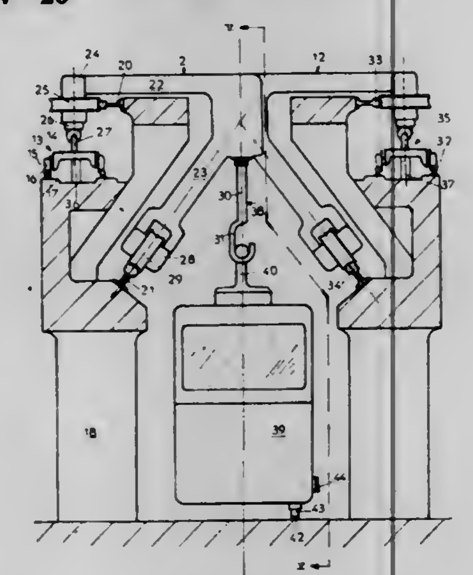
U.S. Cl. 101—465 **89 Claims**



1. In an electrostatic printing process which includes the steps of forming an electrostatic latent image on a smooth-surfaced electrostatic printing master, stable towards exposure to light or maintenance in the dark, having a layer which comprises an insulating medium having an electric resistance sufficient to retain an electrostatic charge and a conductive silver image in said insulating medium, developing said latent image to form a visible image, and transferring the developed visible image onto a support therefor, the improvement comprising

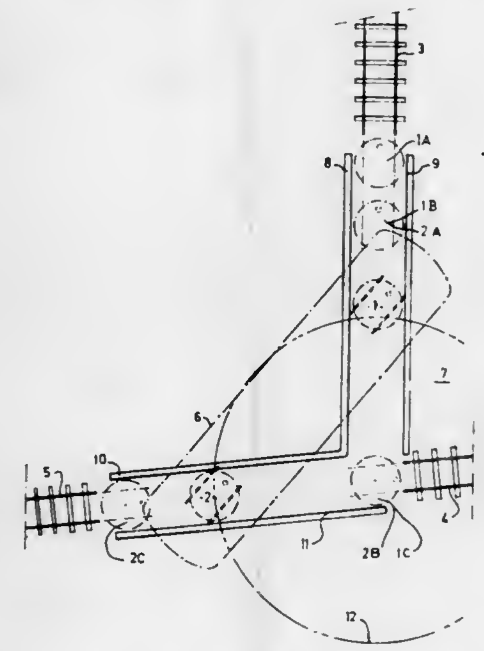
enhancing the electrical conductivity of said silver image by heating said master at least once during said printing process sufficient to reduce the tendency of said developer to adhere thereto and create undesired fog, whereby said enhanced conductivity is imparted to said silver image portion through at least about 10 cycles of printing.

4,057,017
CONTINUOUS TRANSPORT SYSTEM, IN PARTICULAR FOR PUBLIC TRANSPORT
Daniel Michalon, Saint Etienne, France, assignor to Centre Stephanois de Recherches Mecaniques Hydromecanique et Frottement, France
Filed Feb. 13, 1976, Ser. No. 658,009
Claims priority, application France, Feb. 13, 1975, 75.05206; Feb. 3, 1976, 76.03543; Feb. 3, 1976, 76.03544
Int. Cl.[2] B61K *1/00*
U.S. Cl. 104—20 **27 Claims**



1. A continuous transport system comprising:
at least one main looped track;
a plurality of vehicles, each said vehicle including a platform and a removable cabin;
said main track having a plurality of said platforms secured thereto at regular intervals and being adapted to convey said platforms at a constant speed;
at least one looped disembarkation and embarkation station track having a portion thereof substantially parallel to a section of said main track;
said station track having a plurality of said platforms secured thereto and being adapted to convey said platforms therealong at a varying speed;
wherein each said platform disposed on said portion of said station track which is substantially parallel to said section of said main track is conveyed in a side-by-side horizontal projection relationship and at an equal speed with respect to a corresponding platform disposed on said section of said main track;
each of said removable cabins being adapted to be transferred between a platform disposed on said portion of said station track and a corresponding platform disposed on said section of said main track; and
wherein said station track is adapted to never intercept in the same plane with said main track.

4,057,018
TRANSFER SYSTEM FOR LONG VEHICLES SUCH AS WAGONS
Jacky Adrien Paul Laurent, Douai, and Francis Jean-Marie Croix-Marie, Viry Chatillon, both of France, assignors to Bertin & Cie, Plaisir and Arbel Industrie, Douai, both of, France
Filed Mar. 15, 1976, Ser. No. 667,087
Claims priority, application France, Mar. 18, 1975, 75.08442
Int. Cl.[2] B61J *1/10*
U.S. Cl. 104—48 **11 Claims**

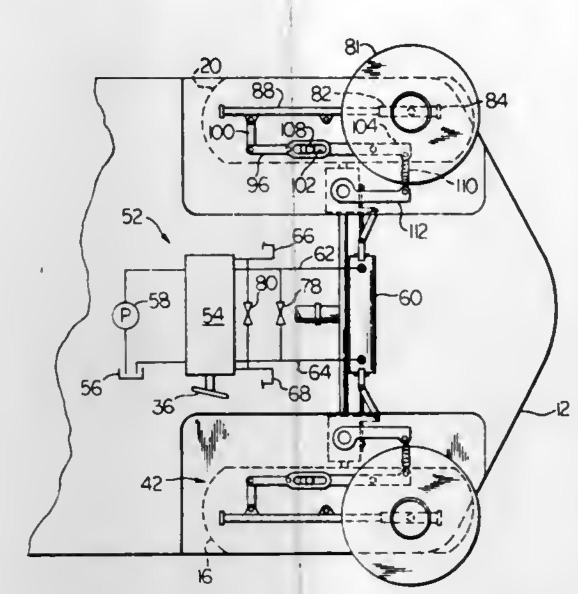


7. On the ground surface of a marshalling yard at which a number of vehicle tracks end, a vehicle handling complex designed for marshalling a relatively long wheelbase vehicle having a front wheel unit and a rear wheel unit, comprising two separate and distinct, relatively short, ground-effect platforms commensurate with but a vehicle wheel unit, each of said two ground-effect platforms comprising:
an open-ended track section having a limited length which is but a small fraction of the vehicle wheelbase and being designed to mate with any of said tracks when the respective platform is positioned adjacent the same, said limited length track section being adapted to accommodate either one of said wheel units,
alignment means for aligning said track section with the end of any of said tracks, to maintain said track section in register with said track end, and
means for securing to said platform a vehicle portion thereon.

4,057,019
SELF-CONTAINED STEERING GUIDANCE MEANS
Walter M. Shaffer, Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.
Filed Jan. 19, 1976, Ser. No. 650,085
Int. Cl.[2] B61F *9/00*
U.S. Cl. 104—247 **10 Claims**

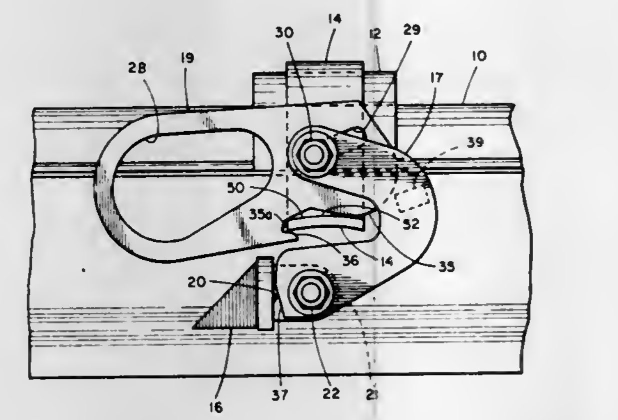
1. In a vehicle defining a longitudinal axis and a lateral direction perpendicular thereto, a steering mechanism for a pair of transversely aligned vehicle-supporting wheels turnable about substantially vertical axes linked together for movement by hydraulic power means, said mechanism including:
at least one steering guidance member positioned to contact the guide surface laterally adjacent the vehicle, said at least one steering guidance member mounted on said vehicle for movement relative thereto;
linkage means including lost-motion means, having a resilient member and including an elongated slot connecting said at least one steering guidance member with said wheels to cause said wheels to move about a generally vertical axis upon relative lateral movement between said

at least one steering guidance member and said vehicle; and



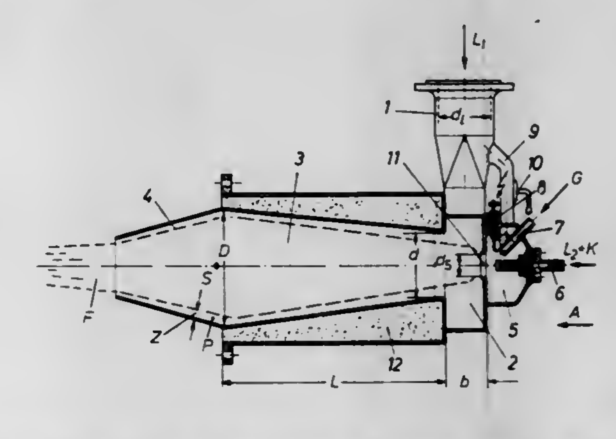
means for selectively rendering said hydraulic power means inoperative whereby turning of said wheels is accomplished by at least one steering guidance member through said linkage means.

4,057,020
CAM OPERATED HATCH COVER HOLDDOWN
William R. Halliar, Whiting, and Marvin Stark, Michigan City, both of Ind., assignors to Pullman Incorporated, Chicago, Ill.
Filed Feb. 26, 1976, Ser. No. 662,192
Int. Cl.[2] B61D *39/00;* **B65D** *45/20*
U.S. Cl. 105—377 **6 Claims**



1. For a hopper car hatch structure including a roof having a coaming defining a hatch opening, a hatch cover hingedly connected to said roof for movement between open and closed positions relative to said opening, and a hold down means supported on said roof including portions engaging said hatch cover in said closed position, said hold down means having a locking portion projecting horizontally outward relative to said coaming in the closed position of said hatch, a hatch cover latching mechanism, comprising:
an upstanding pedestal supported from the roof of the car substantially beneath the locking portion;
an upstanding linkage having upper and lower end portions, said lower end portion being pivotally coupled to said pedestal;
a rearwardly extendable vertical locking handle including a forward end portion, means coupling said handle at said forward end portion to said upper end portion of said linkage for pivotal and diagonal upward sliding movement relative to said linkage, said handle including a forward bottom portion having a downwardly convex camming surface engageable with the locking portion and a forwardly extending lip defining a horizontal notch spaced rearward and below said camming surface for receiving an edge of said locking portion;
said means coupling the handle to the upper portion of the linkage comprising,
a transverse forwardly upward elongated aperture in said forward portion of the handle;
said upper portion of the linkage having a transverse attachment aperture; and
an upper pivot pin cooperatively extending through said apertures and coupling the handle and linkage in said pivotal sliding relation.

4,057,021
COMBUSTION OF PULVERIZED COAL
Fritz Schoppe, Max-Ruttgers-Strasse 24, 8026 Ebenhausen, Isartal, Germany
Filed June 21, 1976, Ser. No. 698,301
Claims priority, application Germany, June 20, 1975, 2527618
Int. Cl.[2] F23D *11/44, 1/00;* **F23R** *1/14*
U.S. Cl. 110—28 A **36 Claims**

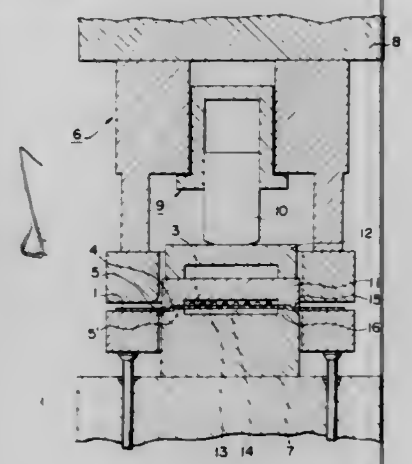


1. Method for the combustion of pulverized coal, which comprises the steps of:
a. injecting a pulverized coal into a chamber containing atmosphere having the following characteristics:
i. a static pressure of at least 20 mm WG above the static pressure in the fire tube of a boiler, based on a boiler capacity of 250,000 Kcal/h;
ii. an O_2 content of less than 10% by volume; and
iii. a temperature sufficient to heat said pulverized coal at a rate of at least 1000° C/sec;
b. heating the thus injected coal in said chamber at said heating rate to a temperature at least 100° C above the ignition temperature of said coal;
c. mixing the thus heated pulverized coal with a gaseous mixture consisting essentially of combustion air to cause combustion of said coal;
d. accelerating a burning flame jet by means of said excess pressure after combustion of at least 30% of the calorific value of said pulverized coal; and
e. injecting the thus accelerated, still burning flame jet into a gas having a temperature below the ash melting temperature of said pulverized coal.

7. A device for combusting pulverized coal which comprises a combustor having a combustion chamber therein; tangential feeding means having a combustion air flow angle α; a feeding tube for said combustion air connected to said feeding means, said combustor widening conically toward the said combustion chamber, said feeding means being positioned at the narrowest cross-section of said combustor an acceleration nozzle opening into said combustion chamber; said device having the following dimensions for a boiler capacity of 200,000 to 250,000 Kcal/h and a pressure drop of combustion air when flowing through the said combustor of 100 mm WG: a combustion air flow angle α of the tangential feeding means of approximately 7°-11°, an axial length of the tangential feeding means of approximately 85 mm, a combustor intake diameter of approximately 145 mm, a combustor outlet diameter of approximately 290 mm a combustor length of approximately 560 mm, a feeding tube for the combustion air with a diameter of approximately 300 mm; said dimensions, with the exception of the

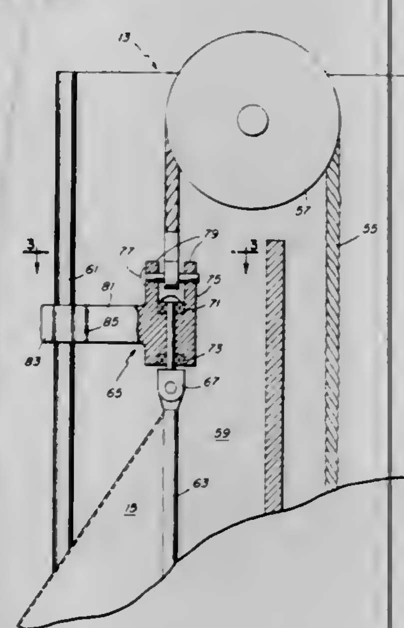
combustion air flow angle α varying with the boiler capacity proportionally with the square root of the capacity ratio.

4,057,022
VESSEL HAVING A PATTERN-MOLDED BOTTOM, A MANUFACTURING PROCESS THEREFOR
Kenji Koshino, and Masayasu Itoh, both of Toyota, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Japan
Filed June 1, 1976, Ser. No. 691,783
Int. Cl.^{2} B21D *51/00, 22/00*
U.S. Cl. 113—120 G **6 Claims**



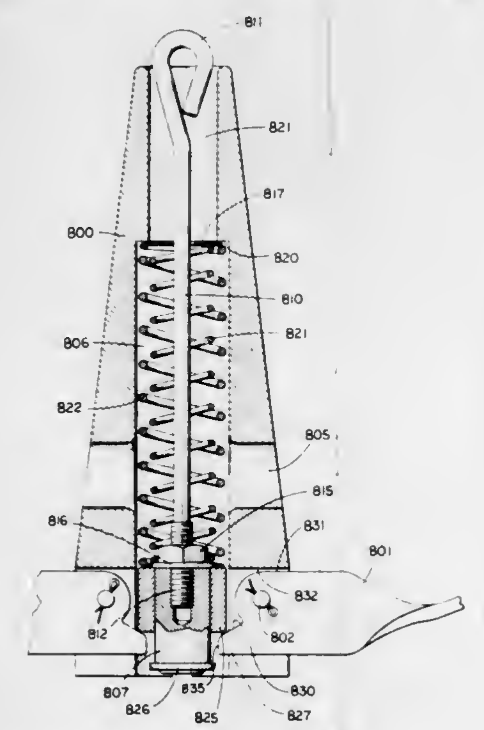
1. A process of manufacturing a vessel with a pattern-molded bottom, said process being characterized by the following steps:
molding a pattern on an adequate area of a flat blank in the part thereof to become the vessel bottom;
clamping an external part of said blank only outside of said molded pattern; and
forming the side wall of the vessel by drawing a part outside the clamped part of said blank while said clamping is maintained.

4,057,023
HALYARD RIG FOR ROLL-FURLING MAINSAIL
Frederick E. Hood; Donald K. Mitchell, and Gary S. Uhring, all of Marblehead, Mass., assignors to Hood Sailmakers, Inc., Marblehead, Mass.
Filed Aug. 30, 1976, Ser. No. 718,685
Int. Cl.^{2} B63H *9/04*
U.S. Cl. 114—107 **1 Claim**



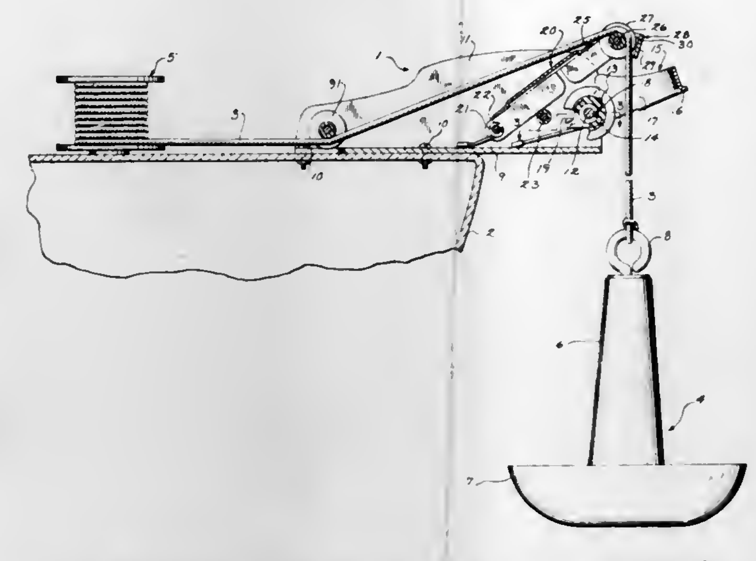
1. In a sailboat having a mainsail which roll-furls on its luff edge so as to be self-storing within a hollow mast, the mast having an aft-facing slot through which the mainsail can be drawn, a halyard system comprising:
a sheave at the top of the mast which directs a halyard centrally down into the sail-storing space; and
a swivel fitting for joining the halyard to the luff edge of the mainsail, said swivel having a lower portion which attaches to and is freely rotatable with the luff edge of the mainsail and an upper portion which attaches to the halyard and includes a laterally projecting guide which extends aft through said slot and prevents twisting of the halyard during roller furling of said mainsail, said guide including ribs which engage the edges of said slot so as to limit fore and aft movement of the swivel and thereby locate the luff edge of the mainsail essentially centrally within the mast hollow.

4,057,024
RELEASABLE ANCHOR
Truman W. Adams, Indianapolis, Ind., assignor to Indianapolis Center For Advanced Research, Indianapolis, Ind.
Continuation-in-part of Ser. No. 535,953, Dec. 23, 1974, abandoned. This application Oct. 6, 1975, Ser. No. 619,778
Int. Cl.^{2} B63B *21/44*
U.S. Cl. 114—298 **9 Claims**



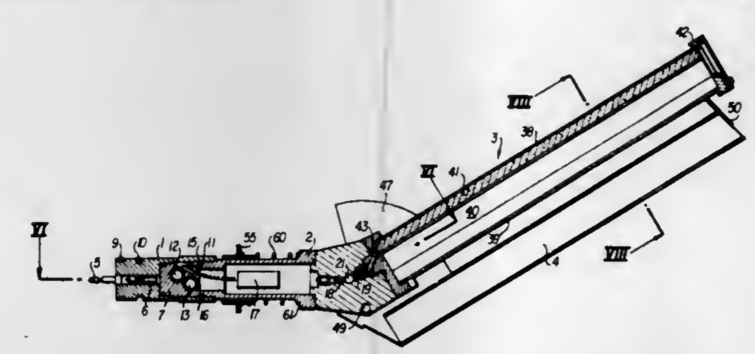
1. A releasable anchor comprising:
a body;
an arm pivotally mounted on said body, said arm including a gripping surface, said arm being pivotable between an outwardly-extending position and a retracted position;
a blocking element connected to said body, said blocking element having a blocking position and a release position, said blocking element being movable between the blocking and release positions;
said arm having a first position in which said blocking element is in the blocking position and the gripping surface of said arm frictionally engages said blocking element and prevents movement of said blocking element from the blocking position to the release position, said arm in the first position being intermediate the outwardly-extending position and the retracted position;
biasing means for biasing said arm to the outwardly-extending position;
said arm having a second position corresponding to the outwardly-extending position, said biasing means being operable to move said arm from the first position to the second position, said blocking element being movable from the blocking position to the release position when said arm is in the second position; and
release means for moving said blocking element from the blocking position to the release position, said release means including means for connecting said blocking element to an anchor line, said arm having a third position corresponding to the retracted position, said arm being movable from the second position to the third position when said blocking element is in the release position.

4,057,025
ANCHOR DAVIT
Eugene Gregory Piotrowski, Stevens Point, Wis., assignor to The Worth Company, Stevens Point, Wis.
Filed July 26, 1976, Ser. No. 708,890
Int. Cl.^{2} B63B *21/22*
U.S. Cl. 114—210 **8 Claims**



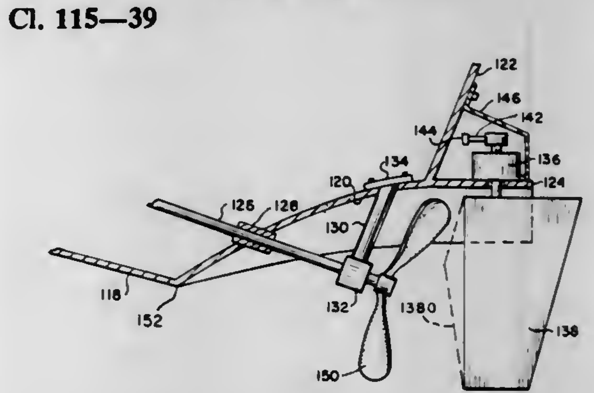
1. An anchor davit for mounting to a boat, said davit comprising:
a. a frame adapted to extend beyond the edge of a boat,
b. an anchor support member comprising a bearing for said anchor and with said bearing being disposed on the outer end portion of said frame, said bearing being disposed to be normally spaced from the anchor but selectively engageable thereby and always spaced from the anchor cable,
c. a control arm having an inner end portion pivotally mounted to said frame and with said arm normally extending upwardly and outwardly to an end portion disposed above and outwardly of said bearing,
d. a guide mounted on the outer end portion of said arm for receipt of an anchor cable thereover,
e. and means biasing said arm outwardly,
f. said biasing means being overcome upon engagement of said control arm by the end of the anchor during the stowing operation to thereby pivot said control arm rearwardly until the anchor engages and pivots about said bearing into a generally horizontal stowed position
g. said biasing means maintaining the said anchor cable under tension when the anchor is stowed, and functioning to thrust said control arm and anchor outwardly upon release of the said cable.

4,057,026
PYROTECHNIC CUTTER APPARATUS
Georges Joseph Marie Nabucet, 32 rue des 2 freres Guezenec, and Michel Andre Champ, 35 rue Erwan Marec, both of 29200 Brest, France
Filed July 16, 1976, Ser. No. 705,888
Claims priority, application France, Aug. 14, 1975, 75.25313
Int. Cl.^{2} B63B *9/00*
U.S. Cl. 114—221 A **16 Claims**



1. A pyrotechnic cutter for cutting an object such as a buoy-rope, tube, cable or the like, comprising a fixed arm containing over substantially its entire useful length an explosive charge having a dihedral covering, the plane of symmetry of the dihedral covering, which substantially corresponds to the plane of a cutting jet comprising gases resulting from explosion of said explosive charge, being directed toward a second arm of the cutter, said second arm being pivotally mounted at one end of said fixed arm, such that explosion of said explosive charge cuts an object enclosed between the two arms; said one end of said fixed arm being fastened to a body releasably connected to an ejector adapted to be engaged in a gun barrel, and an end of the second arm being pivotally connected to said body, said body also carrying control means for maintaining said arms in a separated, open position until said ejector functions, and for closing the second arm toward the first arm upon separation of said body from the ejector, and means in said body for initiating detonation of the explosive charge in the fixed arm at a delayed time after separation of said body from the ejector.

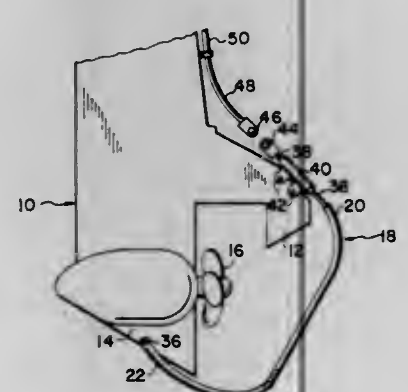
4,057,027
BOAT PROPULSION WITH SURFACE-RUNNING PROPELLER DRIVE
Daniel S. Foster, 19661 Kings Court West, Grosse Pointe Woods, Mich. 48236
Continuation-in-part of Ser. No. 495,661, Aug. 8, 1974, abandoned. This application Nov. 25, 1975, Ser. No. 635,167
Int. Cl.^{2} B63H *5/16*
U.S. Cl. 115—39 **12 Claims**



1. A boat having a transversely convex deep-vee planing type hull in which the bottom of the hull comprises generally flat surfaces which intersect to define the keel of the hull and which extend upward and outwardly from the keel at equal angles between 15° and 30° from the transverse plane through the keel,
said hull having a transom at the stern extending upwardly and preferably slightly rearwardly from the keel,
said boat having inboard engine means located aft of the longitudinal center of the boat, the weight and location of the engine means with respect to the hull characteristics being such that at rest in the water, the keel of said hull is inclined forwardly and upwardly at a small angle from the horizontal and at planing speeds the forward and upward inclination of the keel is at a substantially greater angle,
said hull having a water flow duct in its bottom located to extend forwardly and downwardly from the intersection between the bottom of the hull and the transom, said duct being open downwardly through the bottom of the hull and open rearwardly through the transom,
a propeller located in alignment with the duct and adjacent the plane occupied by the transom,
said duct comprising a downwardly and rearwardly open transversely curved channel intersecting the transom to define therewith an opening having an approximate radius slightly greater than the radius of the propeller, and including a top wall which is forwardly and downwardly curved to intersect the bottom of the hull in sharp cornered intersections a short distance forward of the transom, the sharp cornered intersections between the top front wall of said duct and the bottom of said hull being effective at planing speed to cause water flowing rearwardly along the bottom of the hull to break away from

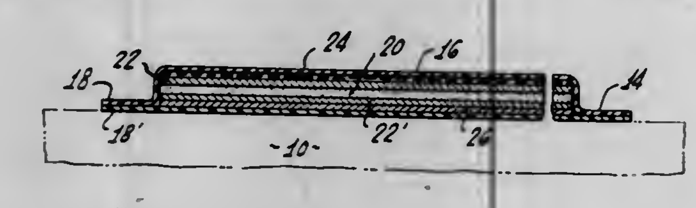
the bottom surface of the hull and to prevent this water from flowing along the duct surface into said duct,
said propeller having a propeller shaft connected to the engine means extending into the interior of the hull and inclined slightly forwardly and upwardly to position the center of rotation of the propeller generally directly astern of and closely adjacent to the horizontal plane which extends rearwardly from the sharp cornered intersections when said boat is at planing inclination to provide for running of said propeller in half-submerged condition,
a splash guard extending rearwardly of said transom from said duct in general alignment therewith and positioned to intercept the spray produced by said surface running propeller and
a rudder directly astern of said propeller to receive water projected rearwardly thereby.

4,057,028
OUTBOARD MOTOR PROPELLER GUARD
Mike F. Palka, 7651 S. Wolf Road, LaGrange, Ill. 60525
Filed Nov. 2, 1976, Ser. No. 738,316
Int. Cl.^{2} B63H *5/16*
U.S. Cl. 115—42 **2 Claims**



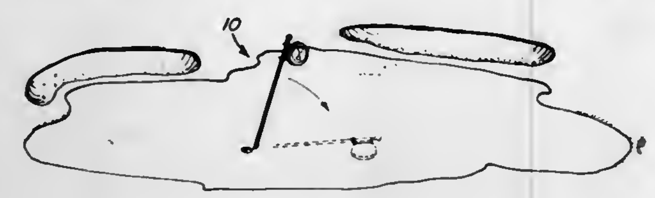
1. A guard for outboard motors having propellers, propeller housings and a trailing skeg conprising:
a. "C" shaped resilient propeller guard bar having a first and a second end;
b. means for pivotally attaching said second end of the guard bar to the propeller housing at a point below said propeller;
c. an upwardly extending semi-rigid cable slidably contained within a semi-rigid sheath affixed to said skeg, one end of said cable in communication with the transmission control for said outboard motor;
d. means for connecting the second end of said semi-rigid cable to the first end of said guard bar such that pivotal movement of the guard bar induces translational movement of said cable within said sheath providing control of said motor transmission thereby.

4,057,029
TIME-TEMPERATURE INDICATOR
Charles Seiter, Los Angeles, Calif., assignor to Infratab Corporation, Santa Monica, Calif.
Filed Mar. 8, 1976, Ser. No. 664,998
Int. Cl.^{2} G01K *3/04, 11/12*
U.S. Cl. 116—114 V **21 Claims**



10. A time-temperature indicating device for indicating deterioration of perishable goods and the like, said device comprising:
a time-temperature sensitive component including a reactant material and an indicator responsive to contact by said reactant to produce a visible reaction, said reactant and indicator being normally separated by a diffusion layer having an impermeable, pseudo-crystalline state and a reactant permeable, liquidcrystalline state, said diffusion layer effecting the transition between said impermeable and permeable states at a clearly defined transition temperature; and
container means for enclosing said time-temperature sensitive component, said container means including a transparent face for viewing said time-temperature component.

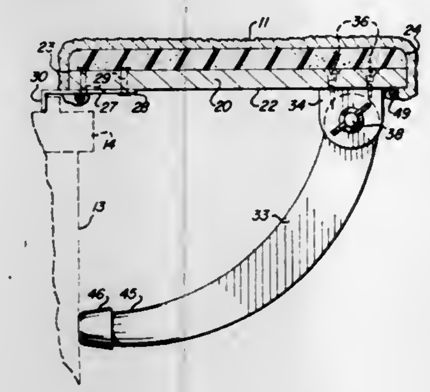
4,057,030
RIGID GOLF FLAG WITH RESILIENT PERIPHERAL EDGE
Eugene S. Womack, P.O. Box 791, Mexia, Tex. 76667
Filed July 29, 1976, Ser. No. 709,728
Int. Cl.^{2} G09F *17/00*
U.S. Cl. 116—175 **4 Claims**



1. A golf hole flag assembly, said assembly including an upright staff adapted to be supported upright from a hole cup, the upper end portion of said staff including vertically spaced upper and lower horizontally enlarged and outwardly projecting flanges extending thereabout and including upper bearing surfaces, a flag support including an upstanding rod provided with vertically spaced and aligned horizontally outstanding upper and lower support rings on its upper and lower end rotatably mounted on said staff with the upper and lower rings disposed above and rotatably engaged with said bearing surfaces and said rod spaced outwardly from said staff and flanges, an upstanding flag member including an upstanding rigid panel member constructed of weather resistant material, said panel member being generally circular in shape, but including one straight upstanding side marginal edge portion at one side edge thereof provided with vertically spaced and aligned horizontal transverse apertures formed therethrough, said straight upstanding marginal edge portion being defined by an integral horizontally outwardly projecting and elongated upstanding tab portion of said panel member, the peripheral edge portion of said panel member extending thereabout from the upper end of said tab portion to the lower end of said tab portion being substantially continuously arcuate and having a resilient covering secured thereover to protect the greens grass from damage if dropped thereupon, said rod intermediate the upper and lower ends thereof, including means defining vertically spaced loops supported therefrom, said apertures being horizontally registered with said loops, and attaching links loosely passed through corresponding pairs of apertures and loops supporting said panel member from said rod for angular displacement relative thereto about an axis paralleling said staff and thus the axis of angular displacement of said flag support about said staff.

4,057,031
WINDOW PERCH FOR PET ANIMALS
Charles H. Williams, and Charles E. Williams, both of 5958 N. 83rd St., Scottsdale, Ariz. 85252
Filed Oct. 1, 1975, Ser. No. 618,441
Int. Cl.^{2} A01K *29/00*
U.S. Cl. 119—1 **2 Claims**

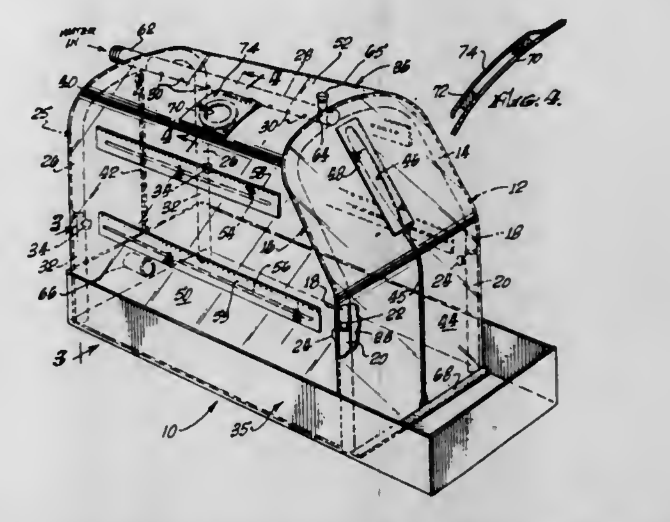
1. A perch for use in combination with a wall having a window therein for providing a seating place for a small pet animal and for holding and displaying plants and other objects, said perch comprising:
a. a substantially horizontal rigid plate have top and under surfaces and having an inboard edge adjacent said window and an outboard edge opposite said inboard edge;
b. window engaging means extending from said inboard edge of said plate and including a downwardly extending portion detachably enagageable with the sill of said window;
c. a bracket depending from the under surface of said plate proximate the outboard edge thereof;
d. a leg pivotally connected at one end thereof to said bracket and extending from said one end arcuately downwardly inward therefrom to a free end for substantially perpendicular contact with said wall at a position spaced below said window;



e. locking means for selectively positionally retaining said leg relative said bracket, said locking means comprising a high friction material grommet and means to selectively increase or decrease the axial compression on said grommet, whereby the leg is frictionally retained in a selected position, before further increase of said compression locks said leg in a selected position;
f. a friction member having a high coefficient of friction in the form of a cup, the sides of said cup extending over said free end and thereby mounting said friction member on said free end, whereby the bottom of said cup abuts against said wall;
g. whereby the thrust of said leg, through said friction member, perpendicularly against and downwardly along said wall, does not result in skidding of said friction member downwardly along said wall, with consequent collapse of said perch.

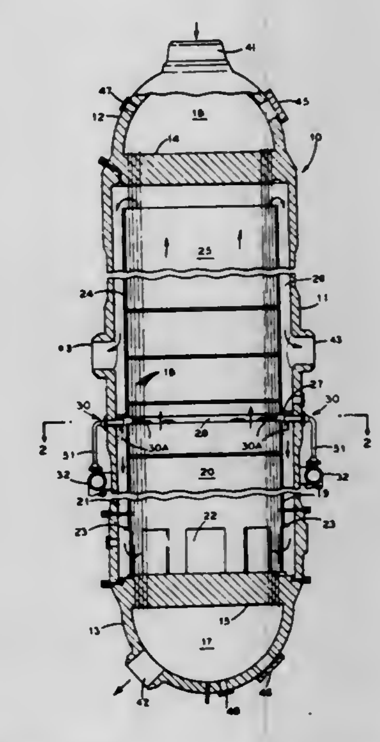
4,057,032
ANIMAL BATHING APPARATUS
James Christ Dimitriadis, 25261 Earhart Road, Laguna Hills, Calif. 92653
Filed Aug. 9, 1976, Ser. No. 712,649
Int. Cl.^{2} A61D *11/00*
U.S. Cl. 119—1 **8 Claims**

1. An animal-bathing apparatus comprising:
an adjustable, tubular, frame structure having front and rear support strut members;
a liquid-impervious housing cover of a flexible material defining a bathing compartment having access openings therein, and a rear entrance and a forward exit opening;
means for sealing said openings, said entrance, and said exit openings when not in use, said means being affixed to said housing cover;
water spray means disposed within said strut compartment and located between said strut members therein; and
drainage means formed to receive said frame structure and said housing therein, whereby said water is drained from said compartment of said housing cover; and
wherein said front-support strut comprises:
an upper tubular portion having a substantially inverted U-shaped configuration with depending arm members, said upper portion being bent rearwardly therefrom;
a pair of forward leg members arranged to slidably receive said arm members of the front support strut; and
locking means mounted to said leg member, whereby said upper portion is locked in a predetermined height; and
wherein said rear-support strut comprises:
an upper tubular portion having a substantially inverted U-shaped configuration with depending arm members;



a pair of rearward leg members arranged to slidably receive said depending arm members; and
locking means mounted to said leg members, whereby said upper portion thereof is locked in a predetermined height.

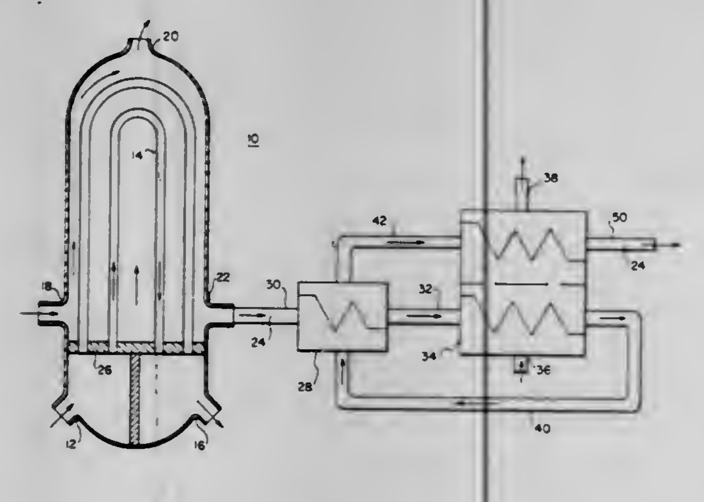
4,057,033
INDUSTRIAL TECHNIQUE
John Schlichting, Lynchburg, Va., and Robert Norman Tornow, Clinton, Ohio, assignors to The Babcock & Wilcox Company, New York, N.Y.
Filed Aug. 8, 1975, Ser. No. 602,941
Int. Cl.^{2} F22B *1/06;* F22D *1/00*
U.S. Cl. 122—32 **4 Claims**



1. A heat exchanger comprising an upright pressure vessel, a plurality of tubes extending through the vessel, shroud means surrounding the tubes to form a vapor generating and superheating passage and cooperating with the vessel to form inlet and outlet passages communicating with the vapor generating and superheating passage, means for directing a heating fluid through the tubes, means for introducing and serially directing a feedfluid in through the inlet passage, through the vapor generating and superheating passage in indirect heat exchange relation with the heating fluid, and out through the outlet passage, means for withdrawing a portion of the vaporized

feedfluid from the vapor generating and superheating passage for mixing with the feedfluid entering the inlet passage, and wherein the means for introducing feedfluid into the inlet passage includes a plurality of spaced coplanar nozzles discharging into the inlet passage, each of the nozzles comprising horizontally disposed inner and outer tubular members having closed adjacent end faces and cooperating with one another to form an enclosed chamber therebetween, the inner tubular member having outlet means extending along the top thereof for discharging feedfluid into the chamber, and the outer tubular member having outlet means extending along the bottom thereof for discharging feedfluid from the chamber to said inlet passage.

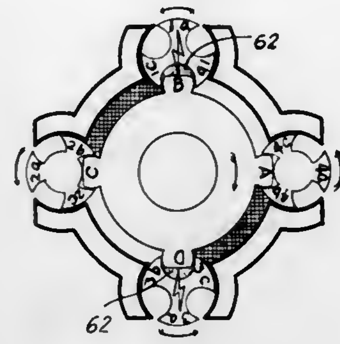
4,057,034
PROCESS FLUID COOLING SYSTEM
Norman G. Farquhar, Clairton, and John A. Schwab, Scottdale, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.
Filed May 15, 1975, Ser. No. 577,955
Int. Cl.² F22B *37/54*
U.S. Cl. 122—382 **5 Claims**



1. In a steam generator blowdown processing system of a nuclear plant utilizing plant cooling water, means for cooling blowdown fluid comprising:

a. a regenerative heat exchanger, said heat exchanger having a primary flow path and a secondary flow path,
b. a triple flow heat exchanger, said triple flow heat exchanger having a first flow path, a second flow path, and a third flow path, said first flow path and said second flow path being in fluid communication with said primary flow path and said secondary flow path of said regenerative heat exchanger, and
c. means providing fluid communication between said regenerative heat exchanger and said triple flow heat exchanger so that said blowdown fluid initially passes through one of said flow paths of said regenerative heat exchanger and is cooled, then through one of said first flow path and said second flow path of said triple flow heat exchanger to further cool said blowdown fluid, then through the other of said primary flow path and said secondary flow path of said regenerative heat exchanger to reheat said previously cooled fluid, and then through the other of said first flow path and said second flow path of said triple flow heat exchanger to recool said previously cooled and reheated fluid, said plant cooling water being passed through said third flow path in heat transfer relation with said first flow path and said second flow path to cool said fluid in said first flow path and said second flow path.

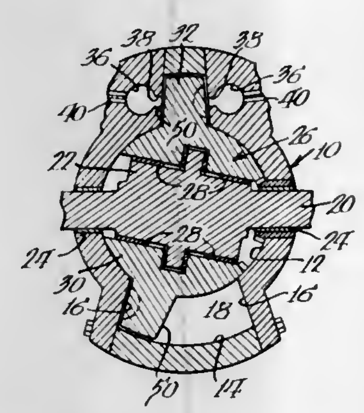
4,057,035
INTERNAL COMBUSTION ENGINES
Cherng Yi Su, Rua Topazio 380, Aclimacao, Sao Paulo, S.P., Brazil
Filed Mar. 11, 1976, Ser. No. 666,142
Int. Cl.² F02B *53/00, 55/14;* **F01C** *1/08*
U.S. Cl. 123—8.27 **7 Claims**



1. In an internal combustion engine, rotor means having a central axis of rotation, an outer periphery extending along a circle whose center is in said axis, and at least one pair of diametrically opposed projections projecting radially from said periphery, housing means housing said rotor means and having an inner periphery extending along a circle whose center is in said axis and being in the same plane as and of a diameter larger than the circle along which said outer periphery of said rotor means extends so that said peripheries define between themselves an annular channel, said projections having outer ends slidably and fluid-tightly engaging the inner periphery of said housing means for dividing said channel into a plurality of channel portions, fluid-control means operatively connected with said housing means and communicating with said channel for controlling flow of combustible fluid into said channel and flow of exhaust gases out of said channel, and combustion-chamber means connected with said housing means and communicating with said channel for receiving combustible fluid from said channel and for releasing the fluid after combustion thereof into said channel for expansion therein while engaging first one and then the other of said projections for driving said rotor means in rotation with respect to said housing means, whereby the combustible fluid, the exhaust gases, and the expanding gases of combustion are all compelled to flow circumferentially along said channel in said channel portions thereof defined between said projections, said fluid-control means and said combustion-chamber means are each in the form of a rotary sealing means capable of rotating with respect to said housing means while having a sealed, fluid-tight engagement therewith, each rotary seal means including a rotary member extending into said channel and having a fluid-tight engagement with said outer periphery of said rotor means between said projections thereof, each rotary member being formed with at least one pocket for receiving each projection as it turns past each rotary member, and drive means extending between and operatively connected with said rotor means, on the one hand, and the rotary members, on the other hand, for rotating the latter in timed relation with respect to said rotor means for situating said pocket of each rotary member at an angular position for receiving each projection as it travels past each rotary member and wherein said rotor means rotates at a substantially constant speed while said drive means drives said rotary members at a variable speed which is at a maximum when each projection is in the vicinity of and travels past a rotary member and which becomes gradually smaller and then increases as each projection travels away from one rotary member and approaches the next rotary member, respectively, and wherein an output shaft is fixed to said rotor means for rotation therewith and extends therefrom outwardly beyond said housing means, said output shaft forming part of said drive means, and said drive means further including a lobed gear fixed to said output shaft and having at least one lobe, an eccentric gear meshing with said lobed gear to be driven thereby, an eccentric shaft fixed eccentrically to

said eccentric gear and extending therefrom, a further gear fixed to said eccentric shaft for rotation therewith, an ring gear surrounding said output shaft and meshing with said further gear, and a pair of gears fixed coaxially to said rotary members and meshing with said ring gear, so that through said gears of said drive means said rotary members are rotated in timed relation with said rotor means while said lobed gear provides the variable speed of rotation for said rotary members.

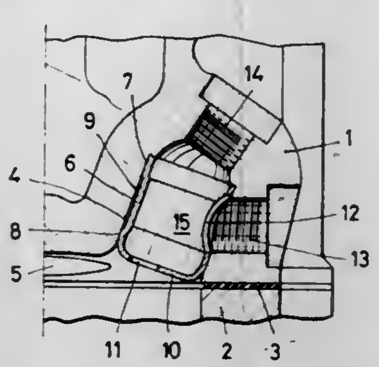
4,057,036
ROTARY ENGINE WITH VARIABLE ORIFICE PRECHAMBER
Myron R. Gibson, Edelstein, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.
Filed Mar. 1, 1976, Ser. No. 662,500
Int. Cl.² F02B *53/10*
U.S. Cl. 123—8.09 **2 Claims**



1. In a rotary engine, the combination comprising:
a housing having walls defining an operating chamber;
a prechamber associated with said housing;
an opening in one of said walls establishing fluid communication between said chamber and said prechamber;
means for introducing fuel into said prechamber;
a shaft journalled in said housing and extending through said chamber;
a rotor journalled on said shaft within said chamber and having a surface cyclically brought into proximity with said one wall and said opening for cyclically compressing an oxygen containing medium within said prechamber;
a control recess in said surface located to pass said opening during engine operation at about or subsequent to maximum compression of said medium and having a configuration such that the flow of combustion gases from said prechamber into said operating chamber is controlled by the shape of said surface about said recess and the proximity of said surface and said recess to said opening at a predetermined, desired rate; and
an additional recess in said surface separate from said control recess, and located to permit free entry of said medium into said opening prior to maximum compression of said medium.

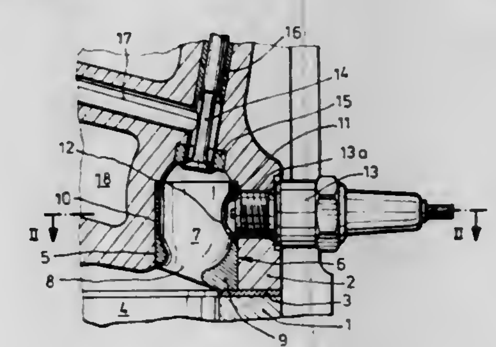
4,057,037
SPARK-IGNITED INTERNAL COMBUSTION ENGINE OPERATED WITH CHARGE STRATIFICATION
Kurt Reichel, Wolfsburg; Gerd Decker, Vorsfelde; Alfred Kuck, Isenbuttel, and Erwin Schulz, Gifhorn, all of Germany, assignors to Volkswagenwerk Aktiengesellschaft, Germany
Filed Nov. 17, 1975, Ser. No. 632,699
Claims priority, application Germany, Nov. 21, 1974, 2455070
Int. Cl.² F02B *19/10*
U.S. Cl. 123—32 SP **10 Claims**

1. In a spark ignited internal combustion engine operated with charge stratification and including a cylinder head having a main combustion chamber, a cavity defined by surrounding walls of the cylinder head, and an auxiliary combustion chamber formed within a cup-shaped insert positioned in the cavity, the cup-shaped insert being thin-walled and having an opening providing a passage connecting the main combustion chamber and the auxiliary combustion chamber, an opening for receiving a fuel delivery device and an opening for receiving an ignition device; the improvement wherein:
the cavity opens toward the main combustion chamber and



the cup-shaped insert opens away from the main combustion chamber, the side wall of the cup-shaped insert having a plurality of regions spacedly arranged from one another and force-fittedly applied against the inner wall of the cavity to frictionally maintain the insert in the cavity.

4,057,038
AUXILIARY COMBUSTION CHAMBER FOR A STRATIFIED CHARGE INTERNAL COMBUSTION ENGINE
Kurt Reichel, Wolfsburg; Gerd Decker, Vorsfelde; Hans-Alfred Kuck, Isenbüttel, and Walter Brandstetter, Gifhorn, all of Germany, assignors to Volkswagenwerk Aktiengesellschaft, Germany
Filed Apr. 30, 1976, Ser. No. 681,817
Claims priority, application Germany, May 22, 1975, 2522585
Int. Cl.² F02B *19/10, 19/16*
U.S. Cl. 123—32 SP **3 Claims**

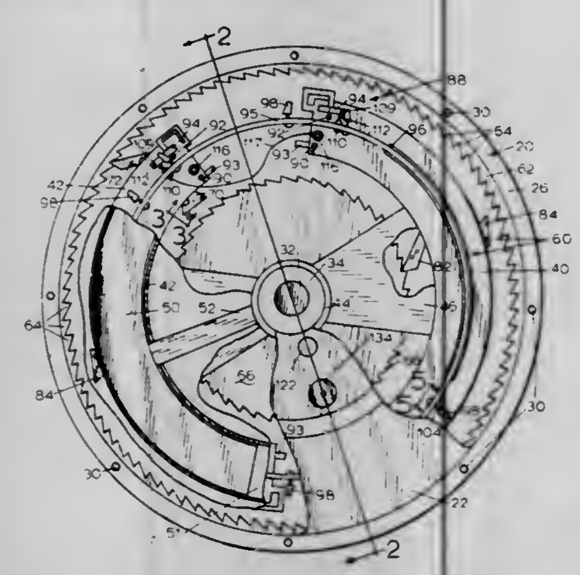


1. An auxiliary combustion chamber, usable in a stratified charge internal combustion engine having at least one main combustion chamber enclosed by a cylinder and a cylinder head and an exhaust passage in said cylinder head, comprising an inert secured in a bore on said cylinder head, said bore being adjacent to said exhaust passage, said insert comprising a tubular shell, having openings for ignition means and fuel supply means and having a passage communicating with said main combustion chamber, said shell having a relatively thin walled section which is in close contact with the interior wall of said bore in a circumferential region adjacent to said exhaust passage and which has a clearance from the interior wall of said bore in the remaining circumferential regions.

4,057,039
ENGINE HAVING ALTERNATELY ROTATING ORBITAL PISTONS AND CYLINDERS
Adolf P. Pinto, 1807 Hunt Ave., Richland, Wash. 99352
Filed May 7, 1976, Ser. No. 684,156
Int. Cl.² F02B *57/00*
U.S. Cl. 123—43 B **8 Claims**

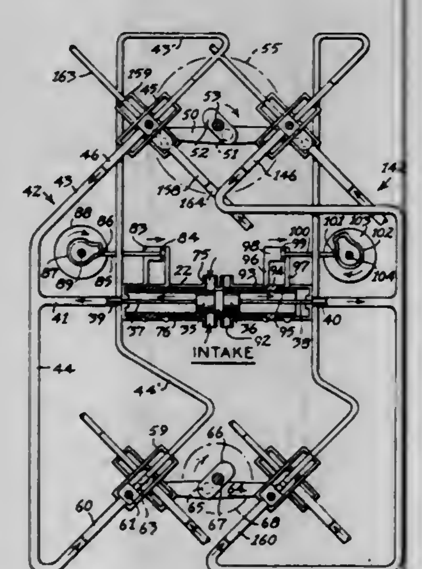
1. A rotary engine comprising:
a. a non-rotatable frame,
b. a crank rotatably journaled centrally in the frame,

c. at least one annular cylinder having closed end portions and a connecting rod, the connecting rod interconnecting the cylinder and the crank for free orbital rotation of the cylinder about the crank and configured to position the cylinder within the frame,
d. at least one annular piston and a piston rod, the piston rod interconnecting the piston and the crank for free orbital rotation of the piston about the crank and configured to position the piston within the cylinder for reciprocating movement therebetween, wherein



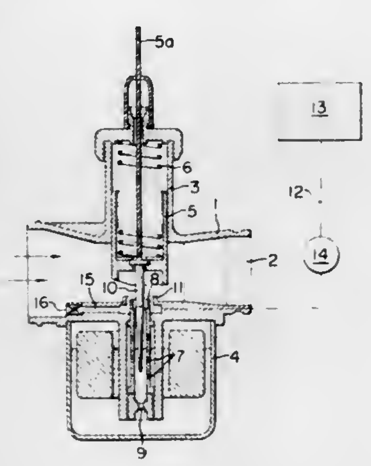
e. the cylinder defines an arc of greater extent than the piston forming a combustion chamber at each end thereof, and
f. escapement means configured to automatically, selectively, intermittently interengage the piston and cylinder with the frame and crank in a manner to transfer orbital rotation of the piston and cylinder in a first direction to the crank and prevent orbital rotation of the piston and cylinder in the opposite direction relative to the frame.

4,057,040
INTERNAL COMBUSTION ENGINE SYSTEM
Archie E. Wax, Kingston Springs, Tenn.
Filed Apr. 12, 1976, Ser. No. 675,710
Int. Cl.² F02B *75/32;* F02G *3/00*
U.S. Cl. 123—46 R **16 Claims**



1. An internal combustion engine system comprising:
a. combustion cylinder means having intake and exhaust means,
b. an engine piston reciprocable in said cylinder means, and having intake, compression, power and exhaust strokes,
c. power output means,
d. link means connecting said piston and said power output means whereby said power stroke is substantially greater than said intake stroke,
e. said link means comprising hydraulic circuit means having a ram passage, first branch circuit means communicating with said ram passage, and second branch circuit means communicating with said ram passage,
f. a ram operatively connected to said engine piston and reciprocably movable in said ram passage,
g. a slow displacement piston movable in said first branch circuit means,
h. a fast displacement piston movable in said second branch circuit means, and
i. transmission means operatively connecting said displacement pistons and said power output means causing said fast displacement piston to move in said second branch circuit means at a speed faster than said slow displacement piston moves in said first branch circuit means.

4,057,041
ICING PREVENTING DEVICE FOR A CARBURETOR FOR TWO-CYCLE ENGINE USE
Makoto Sakai, Kawasaki, Japan, assignor to Kabushiki Kaisha Keibinseiki Seisakusho, Kawasaki, Japan
Filed Oct. 24, 1975, Ser. No. 625,512
Claims priority, application Japan, Oct. 28, 1974, 49-129482[U]
Int. Cl.² F02B *33/04*
U.S. Cl. 123—73 AD **2 Claims**

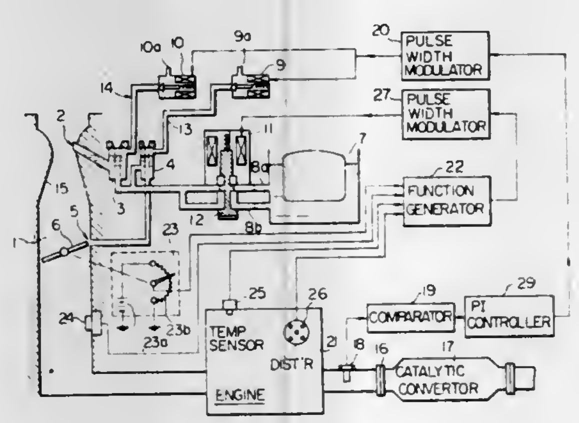


1. In a carburetor for a two-cycle internal-combustion engine having a casing with an intake air passage, a throttle valve slidably mounted in said casing, a fuel nozzle having an outlet opening into the intake air passage and a needle valve mounted on an end face of the throttle valve and projecting therefrom into the fuel nozzle, the improvement comprising an icing-preventing device including an oil nozzle connected to a source of lubricating oil and opening into the intake air passage in a position adjacent the outlet of the fuel nozzle, said oil nozzle having an annular outlet encircling said fuel nozzle.

4,057,042
AIR-FUEL MIXTURE CONTROL APPARATUS FOR INTERNAL COMBUSTION ENGINES USING DIGITALLY CONTROLLED VALVES
Shigeo Aono, Seki, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan
Filed Nov. 7, 1975, Ser. No. 630,078
Claims priority, application Japan, Nov. 8, 1974, 49-128134; Apr. 24, 1975, 50-49175
Int. Cl.² F02B *33/00*
U.S. Cl. 123—119 EC **1 Claim**

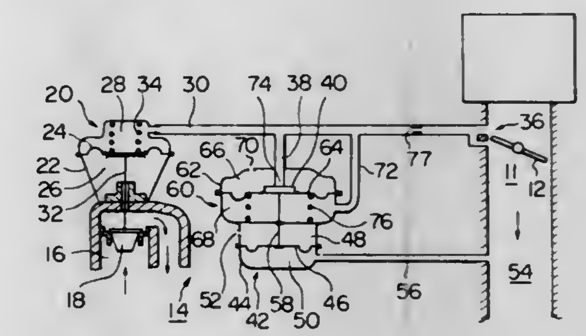
1. Emission control apparatus for an internal combustion engine having, an induction pipe having a venturi, an exhaust pipe, an air-fuel mixing chamber communicated to the venturi of the induction pipe for delivery of a mixture of air and fuel to the induction pipe by the venturi action, a source of fuel at atmospheric pressure, fuel supply conduit means for delivery of fuel from said source to said mixing chamber, air bleed conduit means for delivery of air to said mixing chamber, and a pulse operated air-fuel proportioning device disposed in the fuel supply and air bleed conduit means to control the ratio of air and fuel delivered to said mixing chamber in response to pulse signals applied thereto, the apparatus including:

means disposed in the exhaust pipe for sensing the concentration of an exhaust composition of the emissions from the engine to provide a concentration representative signal;
means comparing the concentration representative signal with a reference value representing a desired air-fuel ratio to provide a signal representative of the deviation of the detected concentration from the desired value; and
means modulating the magnitude of the deviation representative signal in accordance with a predetermined control characteristic to provide an error correction signal;
a pulse-width converter converting the error correction signal into a train of pulses with a duration dependent upon the magnitude of the error correction signal, wherein the pulse-width converter comprises:
first and second capacitors; and
first, second and third transistors each having a control electrode and first and second controlled electrodes, the first controlled electrodes of said first and second transistors being connected to a first terminal of a voltage supply, the second controlled electrode of the first transistor being connected through said first capacitor and through the first and second controlled electrodes of the third



transistor to a second terminal of the voltage supply, the junction between the first capacitor and the first controlled electrode of the third transistor being connected to the control electrode of the second transistor, the second controlled electrode of the second transistor being connected through said second capacitor to the control electrode of the first transistor, the junction between the control electrode of the first transistor and the second capacitor being connected to the second terminal of the voltage supply, the control electrode of the third transistor being connected to receive said error correction signal, the second controlled electrode of the second transistor being connected to said second terminal of said voltage supply via said pulse-operated air-fuel proportioning device disposed in the air bleed conduit means, so that the first capacitor is charged linearly through the first and second controlled electrodes of the third transistor when the first transistor is conductive at a rate proportional to the error correction signal to thereby render the second transistor conductive when the voltage across the first capacitor reaches the threshold level of the second transistor for a duration inversely proportional to the error signal, whereby the air-fuel proportioning device is activated at periodic intervals related to the error correction signal.

4,057,043
EXHAUST GAS RECIRCULATION SYSTEM
Tetsuya Harada, Yokohama, Japan, assignor to Nissan Motor Co., Ltd., Japan
Filed June 11, 1976, Ser. No. 694,944
Claims priority, application Japan, June 13, 1975, 50-80387[U]
Int. Cl.² F02M *25/06*
U.S. Cl. 123—119 A **10 Claims**

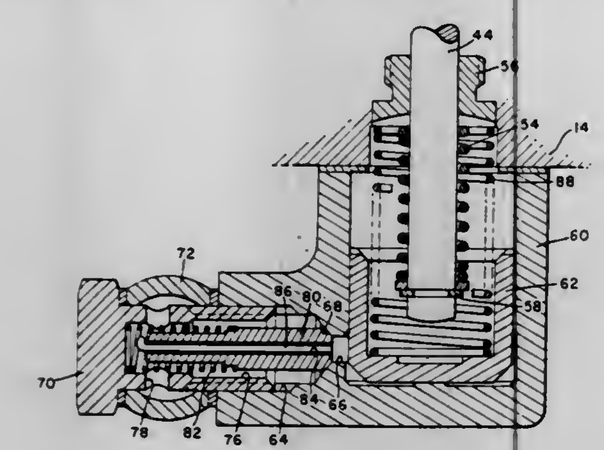


1. An exhaust gas recirculation system for an internal combustion engine, comprising an exhaust gas recirculation (EGR) passageway for feeding exhaust gases of said engine into an intake passageway of said engine, an exhaust gas recirculation (EGR) control valve disposed in said EGR passageway, a vacuum actuator operatively connected to said EGR control valve and having a first vacuum chamber subjected to the vacuum in said intake passageway adjacent to a throttle valve rotatably mounted therein, said EGR control valve being operable in response to the vacuum in said first vacuum chamber to control the amount of the engine exhaust gases fed into said intake passageway, passage means communicating with the atmosphere and with said first vacuum chamber to feed atmospheric air thereinto to reduce the vacuum in said first vacuum chamber, an air supply control valve associated with said passage means, a vacuum servo operatively connected to said air supply control valve and having a second vacuum chamber subjected to an intake passageway vacuum in said intake passageway downstream of said throttle valve, said air supply control valve being operable in response to the vacuum in said second vauum chamber to control the amount of atmospheric air fed into said first vacuum chamber, and operating means operatively connected to said air supply control valve and operable in response to the vacuum in said first vacuum chamber reduced by said atmospheric air fed to minutely adjust the degree of opening of said air supply control valve to minutely adjust the amount of atmospheric air fed into said first vacuum chamber to thereby make it possible for said EGR control valve to meter the amount of said engine exhaust gases fed into said intake passageway to a predetermined ratio to the amount of air drawn into said engine.

4,057,044
HYDRAULIC ANEROID CONTROL AND FLUID FLOW RESTRICTING DEVICE FOR USE THEREWITH
Steven Anthony Reich, Waterloo, Iowa, assignor to Deere & Company, Moline, Ill.
Filed Jan. 19, 1976, Ser. No. 650,182
Int. Cl.² F02D *1/04*
U.S. Cl. 123—140 MP **7 Claims**

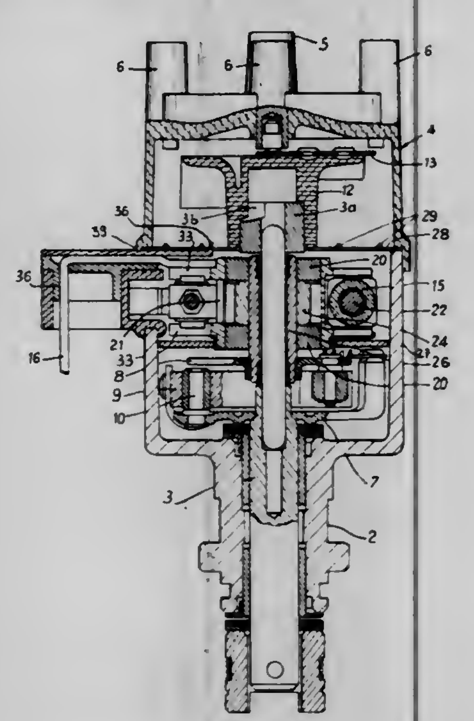
1. In a fuel injection pump assembly for use with a turbocharged internal combustion engine, the injection pump assembly including a governor controlled fuel control rack, an aneroid adapted to be connected to and responsive to pressure within the intake manifold of the engine with which it will be used to limit movement of the fuel control rack in a direction to increase fuel delivery during periods of low intake manifold pressure, the aneroid having a control member shiftable between rack engaged and disengaged positions, means resiliently urging the shiftable control member to the rack disengaged position, and hydraulic cylinder and piston means

adapted to be connected to and responsive to fluid pressure from the oil pump of the engine with which it will be used to move the shiftable control member to the rack engaged position, the improvement comprising: the piston of the hydraulic cylinder and piston means having a predetermined amount of



travel prior to contacting and moving the shiftable member, and the hydraulic cylinder and piston means includes a flow restricting means limiting the flow of fluid thereto whereby, when in use with an engine the aneroid will be unable to limit fuel control rack movement until a period of time after the oil pump of the engine has operated at pressure.

4,057,045
MAGNETIC PULSE TYPE IGNITION DISTRIBUTOR
Jean-Henri Stellwagen, Paris, France, assignor to Societe Anonyme pour l'Equipement Electrique des Vehicules S.E.V. Marchal, Issy les Moulineaux, France
Filed Feb. 14, 1975, Ser. No. 549,904
Claims priority, application France, Oct. 16, 1974, 74.34751
Int. Cl.^{2} F02D *7/02*
U.S. Cl. 123—146.5 A **16 Claims**

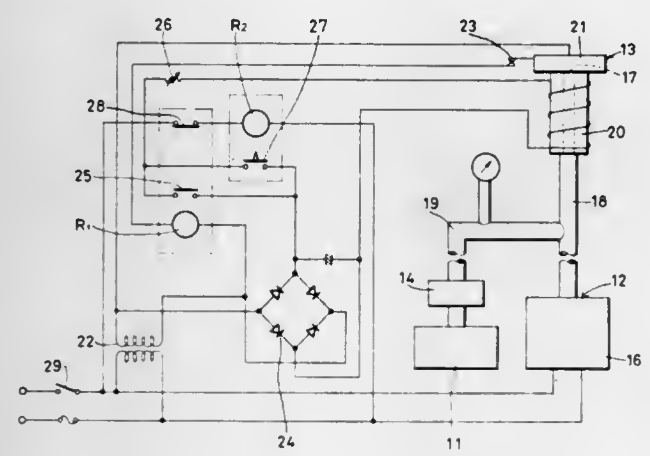


1. In an ignition distributor adapted to be supplied by an ignition coil, said distributor comprising a housing, a drive shaft in said housing, a distributor cap for said housing which carries an input terminal and a plurality of output terminals, and a rotor arm driven by said shaft for successively connecting each output terminal to said input terminal; and

a pick-up assembly in which said shaft rotates, said assembly comprising a timer core fixed to said shaft, a magnetic circuit having stationary poles positioned in alignment with said timer core, an induction coil coupled to said magnetic circuit to produce electrical pulses for controlling the opening and closing of the supply circuit of said ignition coil as said timer core rotates, and two substantially parallel non-magnetic cheek plates encircling said shaft on opposite sides of said timer core,

the improvement which comprises two bearing surfaces one on each side of and fixed to the timer core, and bearing means positioned between said bearing surfaces and the cheek plates of the pick-up assembly.

4,057,046
BLOOD CIRCULATION STIMULATOR
Mamoru Kawaguchi, No. 100, Shimo-Nakashima, Arita, Wakayama, Japan
Filed May 17, 1976, Ser. No. 687,372
Claims priority, application Japan, June 14, 1975, 50-72387
Int. Cl.^{2} A61H *1/00*
U.S. Cl. 128—24 R **2 Claims**



1. A blood circulation stimulator comprising:

an airtight, inflatable air bag shaped to fit in substantially airtight relationship with at least a part of the human body;

compressed air supply means for supplying compressed air;

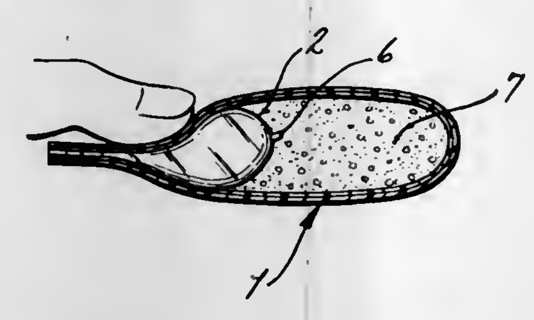
a conduit connected to said compressed air supply means and having an exhaust port, and a branch conduit connected to said conduit and to said air bag to supply compressed air to said air bag;

a two-position valve at said exhaust port for closing said exhaust port in one position and opening said exhaust port in the other position, and solenoid means connected to said valve for urging said valve to the closed position when energized and forced to the open position by compressed air to open said exhaust port when the pressure of air in said conduit overcomes the magnetic force of said solenoid means; and

an electrical circuit coupled to said solenoid means for energizing said solenoid means to move said valve to close said exhaust port and hold said valve closed until the force of the solenoid means is overcome, and electrically detecting the movement of said valve for opening of said exhaust port and re-energizing said solenoid means a predetermined time after said opening to reclose said exhaust port, thereby subjecting the human body to repeated application and release of pressure, and a further negative pressure responsive exhaust valve in which said branch conduit for assisting rapid release of compressed air from said air bag when said exhaust port is opened.

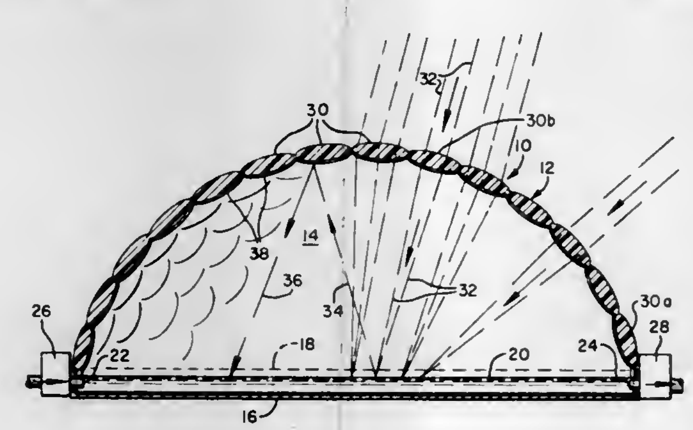
4,057,047
MAGNESIUM SULFATE ANHYDROUS HOT PACK HAVING AN INNER BAG PROVIDED WITH A PERFORATED SEAL
Rodger L. Gossett, Red Bud, Ill., assignor to American Medical Products Company, St. Louis, Mo.
Division of Ser. No. 475,032, May 31, 1974, Pat. No. 3,950,158. This application Jan. 19, 1976, Ser. No. 650,080
Int. Cl.^{2} F24J *1/02*
U.S. Cl. 126—263 **7 Claims**

1. In a hot pack for use in providing an increase in temperature from the ambient temperature comprising a group of three pliable sleeve type plastic bags, two of said bags being of approximately the same size and strength forming the exterior and contiguous interior major liners of the pack, an inner bag comprising a minor liner being formed as a sleeve type bag and having dimensions and strength substantially less than the combined major liners enveloping said inner bag, the upper marginal seams of said major and minor liners being co-extensive and sealed together to form the upper end of the pack, the lower end the minor liner having a closing seam being capable of pressure rupture upon application of manual force, said inner bag having a seal extending below the upper marginal



seams, the improvement which consists of a perforation provided through said inner bag within the seal provided below the upper marginal seams to provide a pressure relief at the time of activation of the pack to prevent the pressure from acting against the upper marginal seams and thereby cause rupture of the pack proximate said seams, the inner bag disposed for holding a quantity of water, the interior major liner disposed for holding a quantity of magnesium sulfate anhydrous which upon reaction with said water provides for an increase in temperature, the ratio by volume of the magnesium sulfate anhydrous to water being between about a **1** to **1** ratio to a **1** to **2** ratio.

4,057,048
SOLAR HEAT COLLECTOR
DeWitt C. Maine, Redmond, Oreg., assignor to Maineline Sales Co., Inc., Redmond, Oreg.
Filed Nov. 12, 1975, Ser. No. 630,992
Int. Cl.^{2} F24J *3/02*
U.S. Cl. 126—271 **6 Claims**



1. A solar heat-collecting structure comprising:

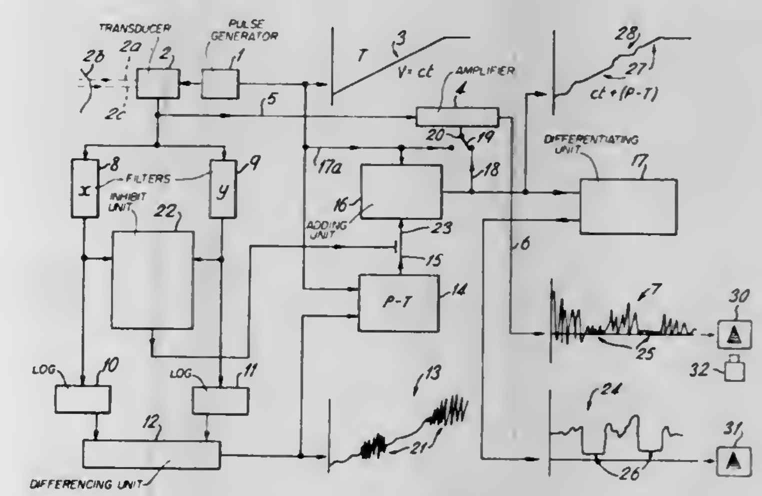
a roof structure generally curved to define an enclosure for receiving direct solar light radiation from variable sun positions,

a planar heat-collecting surface forming a floor of said enclosure,

a plurality of light lenses disposed within and comprising an integral portion of said roof structure, such lenses having various and different focal lengths and being fixedly disposed in various and different attitudes determined by such lenses' locations in said roof structure for collectively transmitting, directing and focusing solar light radiation received from variable sun positions onto different portions of said planar heat-collecting surface to cause simultaneous heating of said different portions,

said roof structure having a light-reflective interior surface, such surface including the inwardly facing surfaces of said light lenses for reflecting light radiation incident to such light-reflective interior surface back toward said heat-collecting surface while concurrently transmitting solar light radiation into said enclosure and onto said heat-collecting surface.

4,057,049
APPARATUS FOR AND METHODS OF PULSE-ECHO EXAMINATION
Christopher Rowland Hill, Carshalton, England, assignor to National Research Development Corporation, London, England
Filed Oct. 7, 1975, Ser. No. 620,318
Claims priority, application United Kingdom, Oct. 11, 1974, 44090/74
Int. Cl.^{2} A61B *10/00*
U.S. Cl. 128—2 V **7 Claims**



1. Apparatus for the examination of a specimen by pulse-echo methods including:

means for emitting at least one examining beam at such a specimen, for receiving echoes of said at least one beam returned from targets within a sub-volume of said specimen and for producing an echo signal;

means for deriving at least two sets of echo-amplitude information signals from said echo signal;

means for producing a first display derived from said echo signal indicating, in a manner substantially independent of the attenuating character of said specimen, and varying as a function of the amplitude of the echo signal, the echo-producing character of said specimen within said sub-volume;

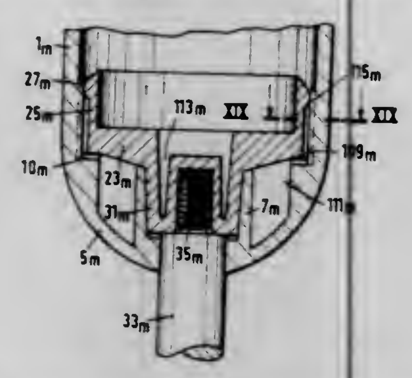
means for comparing and processing said two sets of echo-amplitude information signals to produce a compensation signal indicative of the variation in the attenuation that beams undergo in passage through said specimen to and from sub-volumes within it; and

means for applying said compensation signal to said first display to vary the amplitude of the display to compensate for distorting effects of the said variation in attenuation.

4,057,050
DEVICES FOR EXTRACTING BLOOD
Walter Sarstedt, 5223 Numbrecht, Rommelsdorf, Germany
Filed Nov. 26, 1975, Ser. No. 635,779
Claims priority, application Germany, Nov. 29, 1974, 2456561; July 25, 1975, 2533256
Int. Cl.^{2} A61M *5/315, 1/00*
U.S. Cl. 128—2 F **37 Claims**

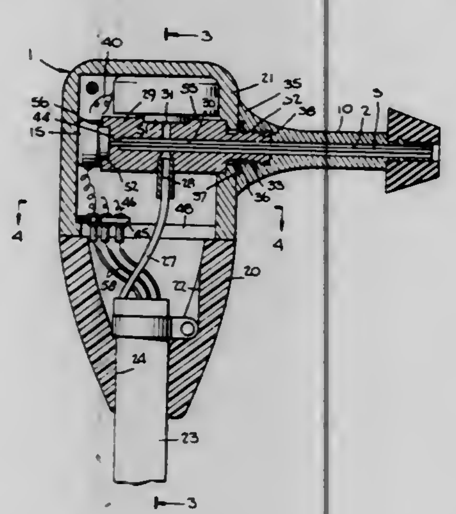
36. A device for extracting blood, the device comprising a cylinder having a first end and a second end, a removable closure member at said first end of said cylinder and a fixed end wall at said second end of said cylinder, a connection means for a cannula carried on said closure member, a piston guided in

said cylinder in an air-tight manner and having a sealing lip, a piston rod guided in a central bore in said fixed end wall, an extension of said piston for releasably receiving said piston rod provided on that end of said piston remote from said closure member, a portion of said fixed end wall forming a rigid stop for said piston in its retracted position, an annular sleeve means concentrically surrounding said central bore provided on said fixed end wall for receiving and retaining said extension of said piston, an annular chamber which surrounds the annular sleeve



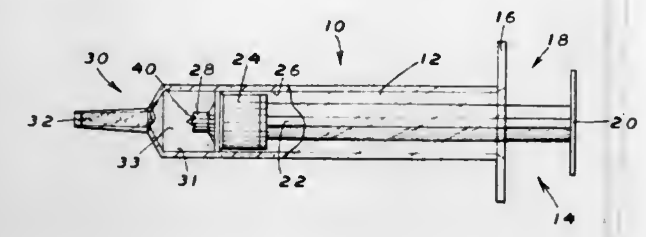
means below the underside of the piston and which serves to receive particles of fluid during a centrifuging operation, and wherein space between said piston sealing lip and the end of said piston extension is vented by means of at least one channel between a plurality of ribs which are located on the inside of said cylinder and which raise said sealing lip of the said piston from the interior wall of said cylinder and at least one further channel formed in said portion of said fixed end wall which provides communication between said annular chamber and the first said at least one channel.

4,057,051
HAND HELD EAR TEST PROBE
Adrian R. Kerouac, Litchfield, N.H., assignor to American Electromedics Corporation, Acton, Mass.
Filed Dec. 29, 1975, Ser. No. 645,082
Int. Cl.² A61B *5/12*
U.S. Cl. 128—2 Z **4 Claims**



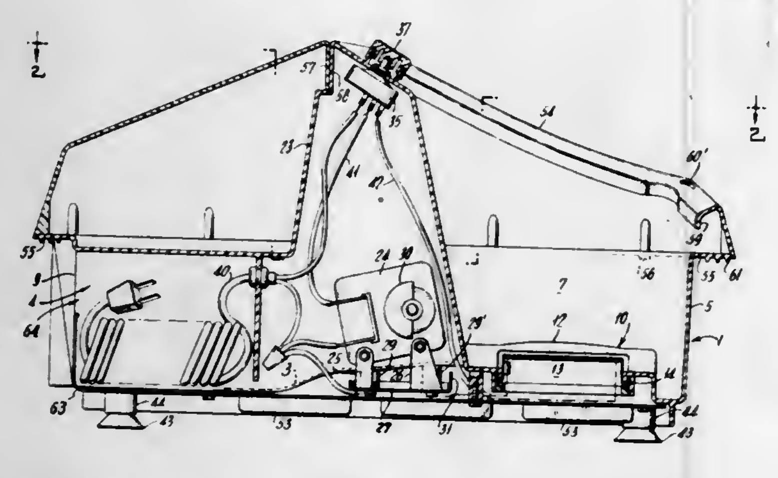
1. An improved ear test probe comprising the combination of:
 an ear tube support including a lower tapered hand gripping portion and an upper hollow portion;
 an ear tube projecting from the upper hollow portion of said support;
 a plurality of conduits in said ear tube;
 a transfer case in said upper hollow portion;
 air coupling means in said transfer case to couple one of said conduits to a source of air under pressure; and
 a transmitter transducer coupled to one conduit in said air tube by said transfer case and a receiver transducer coupled to another conduit in said ear tube by said transfer case.

4,057,052
BLOOD-GAS SYRINGE
Joseph Kaufman, Emerson, and Alois G. Prais, Garfield, both of N.J., assignors to Becton, Dickinson and Company, Rutherford, N.J.
Filed Oct. 26, 1976, Ser. No. 735,162
Int. Cl.² A61B *5/00*
U.S. Cl. 128—2 F **5 Claims**



1. A syringe, which comprises;
a cylindrical barrel having a first open end for receiving a plunger and a second open end adapted to mount a needle on the opening thereof; and
a plunger slidably mounted in said barrel, said plunger being withdrawable from said barrel through said first open end and said plunger comprising;
a. means for receiving a force to move said plunger in or out of said barrel,
b. an elastomeric piston adapted to form a sliding seal with the inner walls of said barrel, said piston having an upper end and a lower end and a bore therethrough communicating between said upper and lower ends,
c. a shank joining said means (a) to said piston (b);
d. an extension of said shank passing through said bore and extending beyond the lower end of said piston, said extension preventing the piston from contacting said barrel second end;
e. a chamber defined by said second open end of said barrel and the lower end of said piston when said extension is in contact with said second open end;
f. an inert fluid disposed in said barrel between the second open end thereof and said piston, in a volume in excess of that required to fill said chamber and the bore of said needle;
said extension having means thereon to permit the entire surface of said piston lower end being in open communication with the outside of said barrel through said second open end when said extension is in contact with said second open end.

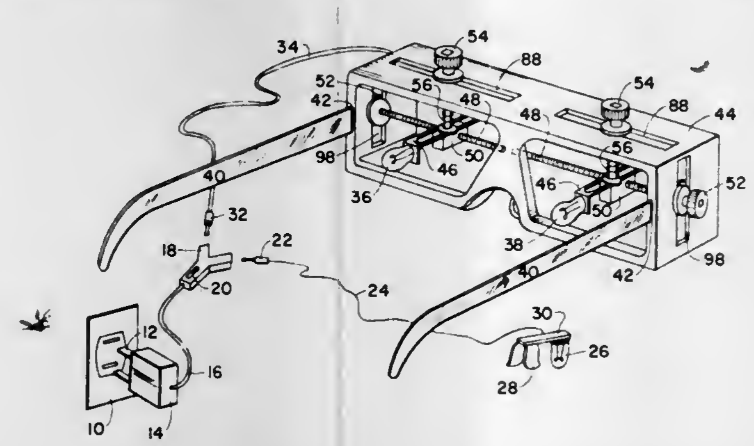
4,057,053
FOOT BATH MASSAGER
Raymond W. Kunz, Monroe, Conn., assignor to Clairol Incorporated, New York, N.Y.
Filed May 4, 1976, Ser. No. 683,129
Int. Cl.² A47K *3/10;* **A61H** *9/00*
U.S. Cl. 128—25 B **13 Claims**



1. A foot treating unit comprising
a. a housing including

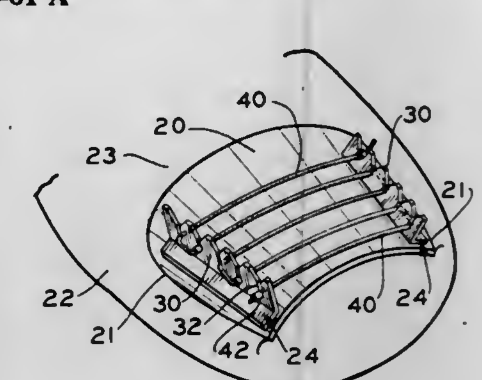
b. a pair of deck areas having top and bottom surfaces wherein feet are received on the top surfaces, and
c. massaging means for massaging feet on said deck areas by multi-directional vibration of said deck areas wherein the massaging means includes a vibrator mounted on a centrally located deck coupling means for oscillation on an axis generally transversely of the deck areas and wherein said vibrator is positioned above the top surfaces of said deck areas and is coupled to said deck areas beneath the bottom surfaces of the deck areas.

4,057,054
EYE TREATMENT APPARATUS
Frank C. Giannone, 1416 N. Bridgeport Drive, Mount Prospect, Ill. 60056
Filed May 20, 1976, Ser. No. 688,174
Int. Cl.² A61H *5/00*
U.S. Cl. 128—76.5 **5 Claims**



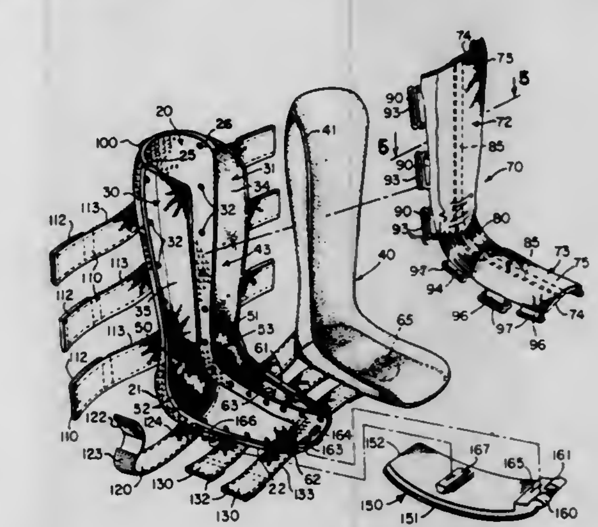
1. Eye treatment apparatus having, in combination, a hollow rectangular housing having at least a horizontal top wall, two vertical end walls and a front portion, two temple pieces connected to said housing and projecting outwardly from said front portion with one temple piece disposed adjacent each end of the housing whereby the housing may be supported on the head of a user with said front portion facing the user's eyes, said front portion having first and second openings, one on each side of the center of said front portion whereby each is generally alined with one of the user's eyes, first and second blocks disposed within said housing and generally alined with said first and second openings respectively, two lamps, means for supporting one of said lamps on said first block to shine through said first opening, means supporting the other of said lamps on said second block to shine through said second opening, means for connecting said lamps to an electrical power supply, said top wall having first and second longitudinal slots disposed respectively alongside said first and second openings, the end wall adjacent said first opening having a first vertical slot and the end wall adjacent said second opening having a second vertical slot, a first vertical threaded element projecting through said first longitudinal slot and threaded into said first block to adjust the vertical position of the first block, a first horizontal threaded member projecting through said first vertical slot and threaded into said first block to adjust the horizontal position of the first block, said two threaded elements constituting the sole means of support of said first block in said housing, a second vertical threaded element and a second horizontal threaded element similarly projecting respectively through said second horizontal and vertical slots and threaded into said second block thereby to constitute the sole support of the second block in said housing and to adjust the vertical and horizontal position of the block, and means operable to maintain the vertical and horizontal positions of said blocks.

4,057,055
TOENAIL APPLIANCE AND METHOD
John H. Clark, 104 Biltmore Ave., Wheeling, W. Va. 26003
Filed Aug. 22, 1975, Ser. No. 607,050
Int. Cl.² A61F *5/00*
U.S. Cl. 128—81 A **17 Claims**



1. An apparatus for straightening an incurvated toenail comprising:
 a first post member adapted to be secured to only the external surface of such toenail, said first post member having a nail engaging portion and an upstanding portion;
 a second post member adapted to be secured to only the external surface of such toenail in spaced opposition to said first post member;
 a tension member under stress interconnecting said first post member and said second post member, said tension member being connected to said first post member at said upstanding portion, whereby,
 said upstanding portion of said first post member defines a moment arm extending from the surface of such toenail thereby establishing a couple at such toenail providing a rotating force tending to straighten such toenail.

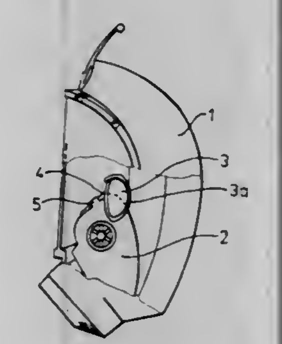
4,057,056
WALKING CAST
Hugh W. Payton, 416 Jupiter St., Washington Court House, Ohio 43160
Filed June 1, 1976, Ser. No. 691,447
Int. Cl.² A61F *5/04*
U.S. Cl. 128—83.5 **17 Claims**



1. A walking cast for removable attachment to the lower leg of a patient for immobilization thereof comprising,
 a posterior shell of rigid non-bendable material having a contoured shape to receive approximately the posterior third of the calf of the lower leg, the ankle posterior to both malleoli and the ventrum of the entire foot, said shell extending from the upper calf, distally to beneath the lower part of the ankle and the foot, said shell having a shape for rigidly supporting the foot in a predetermined neutral position at substantially right angles to the calf and in proper crosswise relation, the sides of said shell being

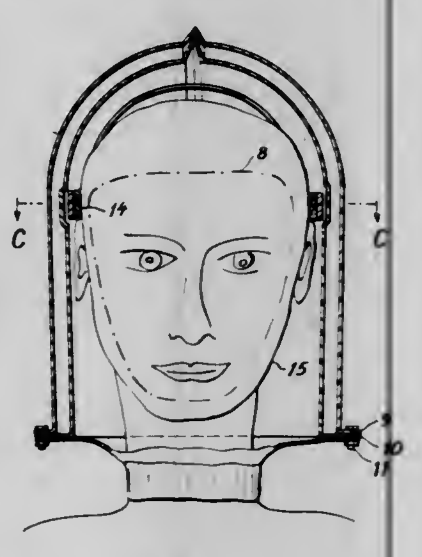
manually bendable about the calf to conform to the size and body shape of the individual patient,
pliable side members attached to the sides of said shell and overlying the lateral portions of the leg, ankle and foot with the adjacent edges of said side members being spaced leaving a gap therebetween, said side members being pliable to conform to the contours of the leg, ankle and the foot of the patient,
and flexible means for closing said gap and confining and securing the calf and foot of the patient in immobilized position embraced within said shell and said side members.

4,057,057
BREATHING MASK, ESPECIALLY A HALF MASK OR A FULL MASK PROVIDED WITH AN INNER MASK
Sigurd Alfons Backlund, Vaasa, Finland, assignor to Kemira Oy, Finland
Filed Sept. 22, 1975, Ser. No. 615,822
Claims priority, application Finland, Oct. 8, 1974, 742934
Int. Cl.² A62B *7/00*
U.S. Cl. 128—142.4 **4 Claims**



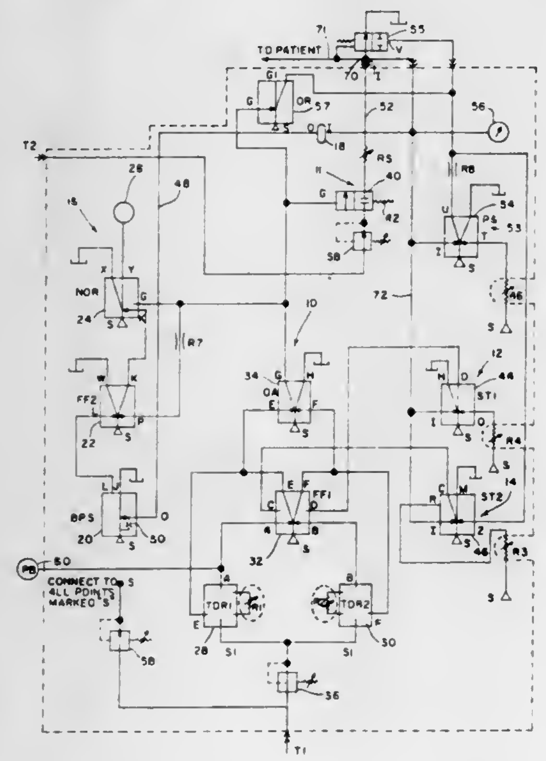
1. A gas mask of the type comprising an outer mask and a separate inner mask having a nose arch and adapted to cover the nose and mouth of a wearer, comprising: a support structure for glasses and means for attaching the support structure directly to the nose arch of the inner mask in order to obtain correct positioning of the glasses in relation to the wearer's face, and in which the nose arch has at least one opening for receiving the means for attaching the glass support structure to an adjustable depth in order to adjust the vertical position of the glass support structure, said means for attaching the glass support structure being tightly held in said opening.

4,057,058
PROTECTION-HOOD OR HELMET-MASK FOR USE IN ENVIRONMENTS DANGEROUS TO WORK
Ostoja Kovacevic, Emil Korsmos vei 24, Oslo 6, Norway
Filed May 11, 1976, Ser. No. 685,141
Int. Cl.² A62B *7/00*
U.S. Cl. 128—142.7 **3 Claims**



1. A helmet adapted completely to surround the head of the user and having means to seal the helmet to the user's body, the helmet being of double-walled construction comprising a pair of spaced inner and outer walls of stiff material, the inner wall having an opening in front and at least the outer wall being transparent at least where it overlies said opening, partition means extending between the inner and outer walls from the top of the opening of the inner wall rearwardly and downwardly to the bottom of the rear of the helmet, means to supply air to the space between said walls on one side of said partition means, and means to remove air from the space between said walls on the other side of said partition means whereby air passes from said supply means between said walls past said opening and again between said walls to said removing means.

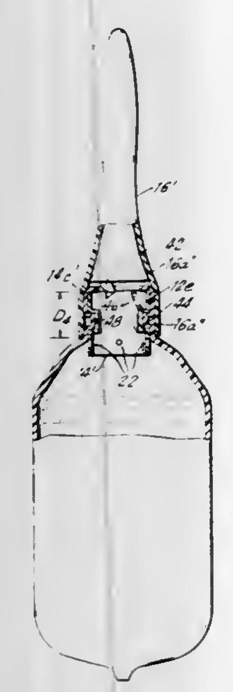
4,057,059
INTERMITTENT POSITIVE PRESSURE BREATHING DEVICE
Karl N. Reid, Jr., Stillwater, Okla.; James Burr Ross, Omaha, Nebr., and Beegamudre N. Murali, Stillwater, Okla., assignors to Oklahoma State University, Stillwater, Okla.
Filed July 29, 1975, Ser. No. 588,870
Int. Cl.² A61M *16/00*
U.S. Cl. 128—145.8 **19 Claims**



1. A positive pressure ventilator comprising:
a. a source of breathing gas;
b. a normally closed first valve means (**40**) for directing the breathing gas from said source to the patient;
c. A first bistable means (**32**) for controlling said first valve means, said first bistable means having a first set of opposed control inputs;
d. a first time delay means (**28**), and a second time delay means (**30**), each independently adjustable in time delay;
e. means responsive to said first time delay means to operate one of said first inputs of said first bistable means to open said first valve means, and to trip said second time delay means, and to initiate the inhalation action; and
f. means responsive to the operation of said second time delay means to operate a second one of said first inputs of said first bistable means to close said first valve means and to trip said first time delay means and initiate the exhalation action; and including
g. between said source of breathing gas and said first valve means a pressure controller (**38**) for maintaining a constant supply pressure to said valve; and
h. between said first valve means and said patient a flow rate control valve (**R5**);
whereby a selected constant value of flow rate of gas is supplied to said patient when said first valve means is open; and including

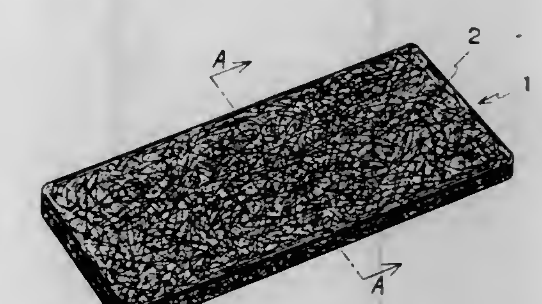
non-rebreathing valve means having an open and a closed position, including
i. spring means to open said non-rebreathing valve in the absence of operating pressure, said non-rebreathing valve connected to the supply line of breathing gas for the patient and including
j. fluidic OR gate means for applying pressure to close said non-rebreathing valve during the inhalation phase, and to open said non-rebreathing valve during the exhalation phase.

4,057,060
DISPOSABLE MEDICINAL APPLICATION APPARATUS
Richard C. Roth, Milltown, N.J., assignor to Block Drug Company, Inc., Jersey City, N.J.
Filed Nov. 10, 1975, Ser. No. 630,185
Int. Cl.² A61M *3/00, 7/02*
U.S. Cl. 128—232 **7 Claims**



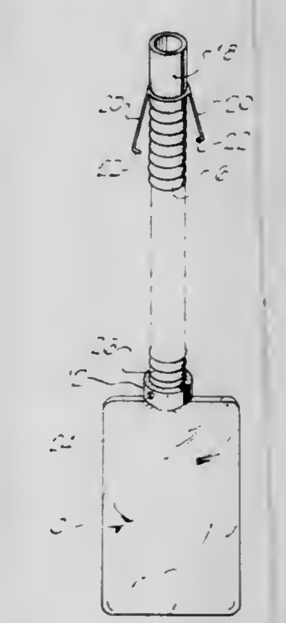
1. Apparatus for application of a medicinal fluid, comprising:
sealed bag means at least partially filled with said medicinal fluid;
a neck piece having a first end and having a generally axial bore formed therethrough in communication with said first end, said neck piece being freely enclosed within said sealed bag means and adapted for manipulation of said first end against an interior surface of said bag means;
an applicator member having opposed first and second ends, said applicator member including discharge means at said first end and having a passage between said discharge means and said second end; said applicator member also including means for piercing a wall of said bag means to form an opening therein in communication with said bore of said neck piece;
lockable means formed upon an exterior surface of said neck piece adjacent said first end and comprising at least one channel formed to a selected depth into the exterior surface of said neck piece and extended from said first end of said neck piece;
locking means formed upon an interior surface of said applicator member within said passage and adjacent to said second end and comprising a similar number of lug means radially extending inward into the passage of said applicator member adjacent to said second end; each channel in said neck piece being adapted to slidingly receive an associated lug means and to securely lock said lug means in said channel with a portion of said bag means compressed between said channel and said lug means;
said locking and lockable means being adapted to cooperatively lock said neck piece and said applicator member together with a portion of the wall of said bag means compressed between said neck piece and said applicator member to form a substantially fluid-tight seal;
wherein said lockable means further comprises a recess formed at the end of said neck piece channels furthest from said first end of said neck piece, said recess having a greater depth into said neck piece than the depth of said channel to snaplockingly receive an associated lug means.

4,057,061
SANITARY NAPKIN
Shigemitsu Ishikawa, Kawanoe, Japan, assignor to Kabushiki Kaisha Angel, Iyomishima, Japan
Filed Dec. 18, 1975, Ser. No. 641,926
Claims priority, application Japan, Dec. 18, 1974, 49-154054[U]; June 28, 1975, 50-90876[U]
Int. Cl.² A61F *13/16*
U.S. Cl. 128—284 **7 Claims**



1. A sanitary napkin comprising an absorbent core, a fluid-barrier sheet covering at least the bottom surface of said core and a fluid-pervious wrapper enclosing said core and said sheet, said absorbent core being a compressed element which comprises cottony pulp compressed in a compression ratio of ½ to 1/10 to a uniform thickness of about 1 to about 5 mm.

4,057,062
URINARY DEVICE
Geraldine Lavigne, 333 Farview Road, Victoria, British Columbia, Canada (V9C1V7)
Filed Feb. 6, 1976, Ser. No. 655,706
Int. Cl.² A61F *5/44*
U.S. Cl. 128—295 **8 Claims**



1. A device especially adapted to be employed in conjunction with a container for the collection of urine, comprising an elongated, flexible, hollow collapsable conduit member, said member including a plurality of continuous telescopic members, each having an annular ring, said conduit member having two distal ends, one end of said conduit member including a first annular walled hollow collar, said collar defining at least two recesses on said wall, said collar including internal thread

means, said thread means adapted to engage external thread means of said container, said other distal end including a second hollow collar, said second collar adapted to receive the urine and including a pair of externally projecting arms, said arms having an end portion out of planar alignment with the remainder of said arm, said end portion adapted to engage said recesses when said conduit member is in the collapsed position and thereby maintain the same, said end portions further adapted to engage said annular ring of a single telescopic member whereby the length of said conduit member is adjusted.

4,057,063
DEVICE FOR STERILIZATION BY TRANSUTERINE TUBE COAGULATION

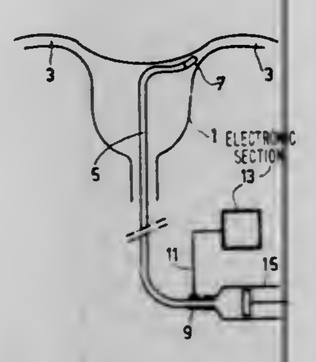
Antonius Cornelis Maria Gieles, and Gerardus Henricus Johannus Somers, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Feb. 27, 1976, Ser. No. 661,947

Claims priority, application Netherlands, Nov. 4, 1975, 7504321

Int. Cl.^{2} A61B *17/36;* **A61N** *3/04*

U.S. Cl. 128—303.17 **6 Claims**



1. A device for sterilizing human females by transuterine tube coagulation, comprising:

means for generating a high frequency voltage;

flexible catheter probe means having an electrode end portion dimensioned to completely contact the wall area of a fallopian tube for transuterine placement of said electrode end portion thereof into said fallopian tube of a human female, means including said probe means for coupling said voltage from said means for generating to said electrode end portion, thereby delivering high frequency voltage from said generating means to said fallopian tube;

means for making a common ground connection between said generating means and the human female;

means responsive to the impedance of the tissues adjacent said electrode end portion for signalling when the substantial increase therein occurs indicative of the substantial completion of the dessication phase of the destruction of said tissues; and

means for interrupting delivery of high frequency voltage to said electrode end portion in response to said signalling thereupon.

4,057,064
ELECTROSURGICAL METHOD AND APPARATUS FOR INITIATING AN ELECTRICAL DISCHARGE IN AN INERT GAS FLOW

Charles F. Morrison, Jr., and Benson C. Weaver, both of Boulder, Colo., assignors to Valleylab, Inc., Boulder, Colo.

Filed Jan. 16, 1976, Ser. No. 649,683

Int. Cl.^{2} A61B *17/36*

U.S. Cl. 128—303.17 **27 Claims**

8. Apparatus for establishing an electrical discharge to an object comprising

a support;

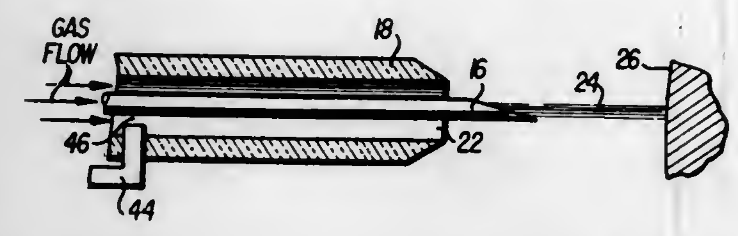
a source of electrical energy;

an active electrode supported by said support and outwardly extending therefrom;

a source of inert gas;

gas flow directing means connected to said source of inert gas for directing the gas past said electrode to thereby facilitate the establishment of a primary electrical discharge to said object in the gas disposed adjacent the end of the electrode and extending outwardly therefrom;

discharge initiating means for initiating said primary electrical discharge, said discharge initiating means including a



second electrode connected to said source of electrical energy and so disposed with respect to said active electrode that a gap is formed therebetween, said gap being adapted for the formation of an auxiliary electrical discharge thereacross to thereby initiate said primary electrical discharge and said gap comprising the only path, at least during the initiation of said auxiliary electrical discharge, for the electrical energy to said active electrode; and

means for returning said electrical energy from said object to said source of electrical energy.

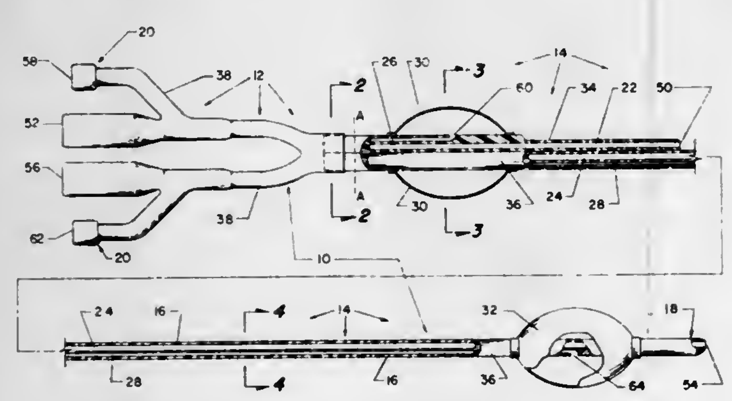
4,057,065
PERCUTANEOUS GASTROINTESTINAL TUBE

G. Bruce Thow, Champaign, Ill., assignor to Dow Corning Corporation, Midland, Mich.

Filed June 21, 1976, Ser. No. 698,397

Int. Cl.^{2} A61M *25/00*

U.S. Cl. 128—348 **1 Claim**



1. A percutaneous gastrointestinal tube for providing intestinal stent plication and separate and independently controllable gastric and intestinal decompression, said tube comprising an elongated elastomeric member, having a distal portion which is surgically insertable through an incision into the patient's stomach and then threadable downward into the intestine and a proximal portion extending from said distal portion and remaining external to the patient's body when in use; said elastomeric member also having

a. a stomach decompression lumen to provide fluid communication between a distal stomach decompression lumen opening in the section of the distal portion which will be in the patient's stomach when said tube is properly disposed in the patient's body, and a proximal stomach decompression lumen opening in said proximal end of said tube;

b. an intestinal decompression lumen to provide fluid communication between a distal intestinal decompression lumen opening disposed at or near the lower distal end of said member and a proximal intestinal decompression lumen opening in the proximal end of said tube;

c. an upper inflatable cuff means for retaining and positioning said member adjacent the inner surface of the stomach wall and to help seal the incision at the inner surface of the stomach;

d. an upper cuff inflation-deflation lumen to provide fluid communication between said upper inflatable cuff means and a proximal upper cuff opening disposed in said proximal portion of said tube;

e. a lower inflatable cuff means disposed near the lower distal end of said member, for insertion of said tube into the patient's body to facilitate the threading of said member downward from the stomach into the intestine, said lower cuff means being inflated during a part of the insertion of said tube into the patient's body; and

f. a lower cuff inflation-deflation lumen connecting and providing fluid communication between said lower inflatable cuff means and a proximal lower cuff opening disposed in said proximal portion of said tube.

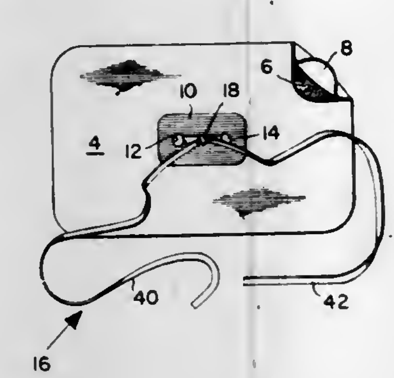
4,057,066
CATHETER HOLDER FOR SECURING A URETHRAL CATHETER TO A PATIENT

Harry E. Taylor, 22 Taylor Drive, Bradford, Pa. 16701

Filed Sept. 2, 1976, Ser. No. 720,085

Int. Cl.^{2} A61M *25/02*

U.S. Cl. 128—349 R **2 Claims**



1. A catheter holder for securing a urethral catheter to a patient comprising:

a flexible anchoring strip having a pressure-sensitive adhesive layer on one side for securing the anchoring strip to a patient's skin,

a cord secured to the anchoring strip with cord ends extending from the anchoring strip,

said cord ends adapted to be looped around a peripheral groove in a connector between a catheter and a drain tube, and tied to secure the catheter holder to said groove,

said anchoring strip having a pair of openings through which the cord passes and the cord is tied to secure to the anchoring strip,

said anchoring strip having a reinforcing panel to reinforce the anchoring strip in the vicinity of the openings.

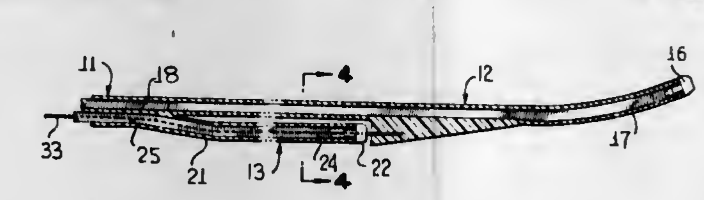
4,057,067
ATRIOVENTRICULAR ELECTRODE

Thomas Z. Lajos, 2454 W. Oakfield Road, Grand Island, N.Y. 14072

Filed Apr. 6, 1976, Ser. No. 674,235

Int. Cl.^{2} A61N *1/04*

U.S. Cl. 128—418 **8 Claims**



1. An atrioventricular electrode comprising a common body, a ventricular component extending from said common body as a continuation thereof, said ventricular component terminating remote from said common body in a ventricular electrode tip, an atrial component extending from said common body and normally reversely turning relative to said common body to assume a generally J-shaped configuration, said atrial component terminating remote from said common body in an atrial electrode tip, and releasable means carried cooperatively by said atrial component and said ventricular component for temporarily retaining said atrial component as a generally straight line continuation of said common body and generally parallel to said ventricular component.

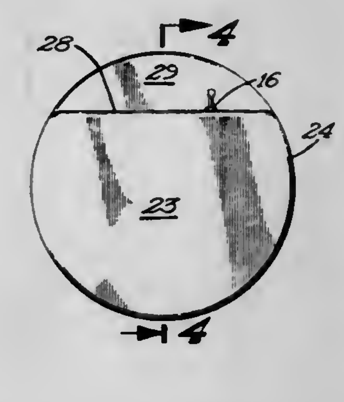
4,057,068
ENCLOSURE FOR AND METHOD OF ENCLOSING A BODY IMPLANTABLE PULSE GENERATOR

Richard H. Comben, Minneapolis, Minn., assignor to Medtronic, Inc., Minneapolis, Minn.

Filed Feb. 20, 1976, Ser. No. 659,650

Int. Cl.^{2} A61N *1/36*

U.S. Cl. 128—419 P **7 Claims**



1. In an enclosure for a body implantable pulse generator of the type having a plurality of members weldable to each other to enclose and hermetically seal said pulse generator and having feedthrough means passing through said enclosure, the improvement wherein said plurality of members comprises first and second members each having a continuous side wall terminating at continuous generally circular means of substantially equal diameter, at least one of said side walls including platform means subtending a portion of the arc of said circular means and web means extending between said platform means and said subtended arc portion of said circular means, and said feedthrough means passing through at least one of said platform means and web means.

4,057,069
METHOD OF NERVE STIMULATION AND A STIMULATOR FOR THE APPLICATION OF THE METHOD

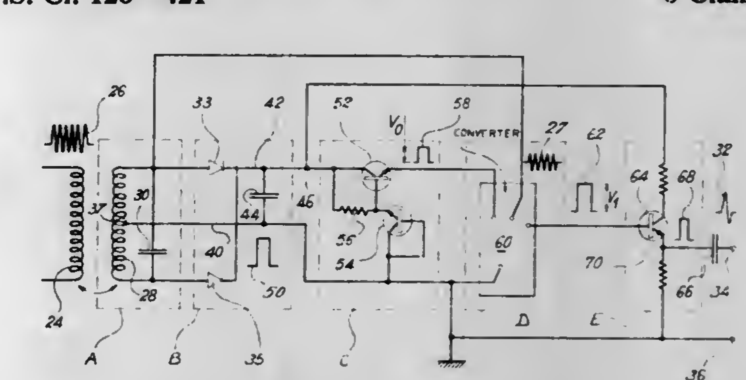
Auguste Dorffer, Grenoble, and Jean-François Piquard, Vizille, both of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed Aug. 25, 1975, Ser. No. 607,688

Claims priority, application France, Aug. 30, 1974, 74.29645

Int. Cl.^{2} A61N *1/36*

U.S. Cl. 128—421 **8 Claims**



1. A method for electric excitation of living cells by means of an electromagnetically inductive receiver implanted in a living

body and equipped with output electrodes, comprising the steps of:

producing an alternating electromagnetic induction field at the location of said receiver of a frequency variable about a reference frequency f_0 by means of a transmitter external to said body operated at a frequency f so set and for a period so selected that the requency difference $f - f_0$ corresponds to a desired amplitude of a cell excitation pulse and the selected period corresponds to a desired cell excitation pulse duration, and repeating said field producing step at predetermined intervals to the extent further cell excitation is desired;

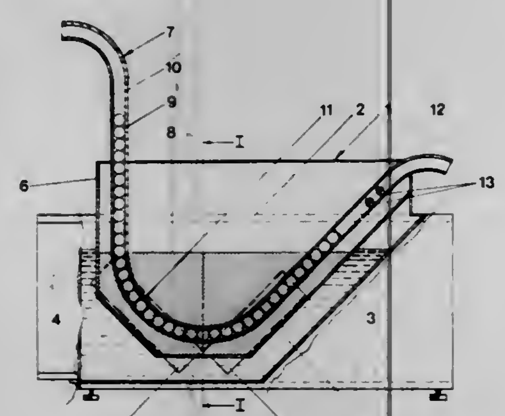
detecting said induction field in said receiver to collect energy therefrom for operating said receiver, and

detecting in said receiver the extent of said frequency difference f-f_0 of said induction field and producing in response thereto at said output electrodes a cell excitation signal of an amplitude corresponding to said frequency difference f -f_0 and of a duration determined by said selected period.

4,057,070
CLEANING APPARATUS FOR MECHANICAL WORKPIECES

Evert van Amerongen, Bennekom, and Willem M. Buhrman, Leusden, both of Netherlands, assignors to SKF Industrial Trading and Development Company B.V., Nieuwegein, Netherlands

Filed May 20, 1976, Ser. No. 688,370
Claims priority, application Netherlands, May 21, 1975, 7505936
Int. Cl.² B08B *3/12*
U.S. Cl. 134—83 **15 Claims**

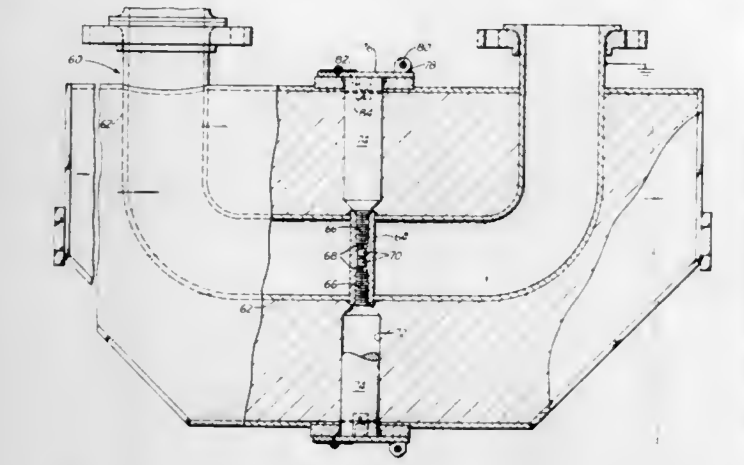


1. A cleaning apparatus comprising:
a reservoir adapted to contain a solvent for cleaning workpieces;
a coupling liquid disposed in contact with said reservoir at the exterior thereof;
conveying means arranged to cause a portion thereof to be disposed in said reservoir for contact with said solvent and causing workpieces supported by said portion to be exposed to said solvent;
a source of high frequency vibratory energy disposed in proximity to the bottom of said reservoir and said portion of said conveying means, said source adapted when energized to impart high frequency vibrations via said coupling liquid to said reservoir and the solvent to cause cavitation in said solvent, and
said conveying means being shaped to cause workpieces supported on said conveying means to advance themselves along said conveying means responsive solely to the combined action of gravity and cavitation produced in said solvent.

4,057,071
ELECTROSTATIC CHARGE REDUCER

Donald F. Rhodes, Pittsburgh, Pa., assignor to Gulf Research & Development Company, Pittsburgh, Pa.

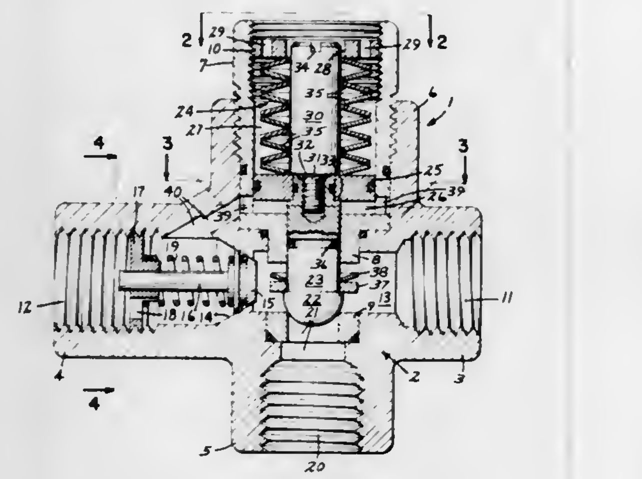
Continuation-in-part of Ser. No. 431,901, Jan. 9, 1974, abandoned. This application Aug. 24, 1976, Ser. No. 717,452
Int. Cl.² H05F *3/06*
U.S. Cl. 137—1 **12 Claims**



1. Apparatus for reducing electrostatic charge on a nonconductive and flammable liquid flowing through pipe for delivery into a tank comprising a metallic cylinder secured to the pipe and extending through the wall of the pipe into the opening through the pipe, said cylinder having a wall thickness of at least 1/8 inch, a source of gamma radiation in the cylinder positioned in the opening through the pipe, the quantity of source of gamma radiation being adequate to impart a dose of gamma radiation of at least 1.75 Rads to the liquid flowing through the pipe, and a lead shield around the pipe adjacent the cylinder shielding the space surrounding the pipe from gamma radiation.

4,057,072
UNLOADER VALVE

James E. Cook, 418 Rice St., Anoka, Minn. 55303
Filed Mar. 4, 1976, Ser. No. 663,758
Int. Cl.² F16K *17/04*
U.S. Cl. 137—116 **3 Claims**



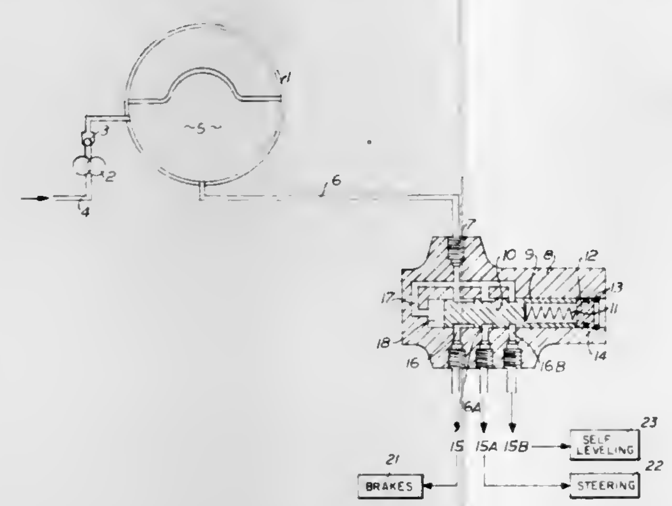
1. An unloader valve comprising:
a. valve housing means having aligned inlet and outlet ports and defining a straight-through first passageway connecting said ports;
b. a one-way outlet check valve in said first passageway adjacent said outlet port;
c. said housing means further defining, a bypass port, a second passageway connecting said bypass port with said first passageway, a valve seat at one end of said second passageway and at one side of said first passageway, and a cylindrical chamber axially aligned with said valve seat;
d. a piston in said chamber dividing the chamber into an inner pressure chamber portion and an outer chamber portion open to the exterior of said housing means;

e. said housing means further defining, an opening between said pressure chamber portion and said first passageway, and a third passageway communicating at one end with said first passageway between said outlet port and said check valve and at its other end with said pressure chamber portion;
f. a bypass valve element disposed in said first passageway and having a stem extending through said opening and connected to said piston, said bypass valve element being movable with said piston toward and away from valve closing engagement with said valve seat;
g. yielding means in said outer chamber portion yieldingly urging said piston and said bypass valve element in a valve closing direction, said yielding means comprising a plurality of resilient conical washers arranged in axial pairs to provide a stack of said washers, the washers of each pair having concave sides in face-to-face relationship; and
h. a conical washer mounted on said bypass valve element stem and positioned to engage said housing means to cushion said bypass valve element during opening movement thereof.

4,057,073
PLURAL-SERVICE HYDRAULIC SYSTEM

Frederick John Adams, Campton, England, assignor to Cam Gears Limited, Hitchin, England

Division of Ser. No. 475,119, May 31, 1974, Pat. No. 4,014,360. This application Aug. 16, 1976, Ser. No. 714,596
Claims priority, application United Kingdom, May 31, 1973, 25891/73
Int. Cl.² G05D *11/02*
U.S. Cl. 137—118 **6 Claims**

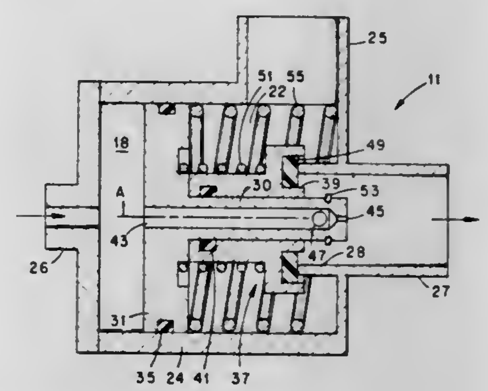


1. A vehicle hydraulic system comprising:
hydraulic brake means;
at least two other hydraulic means which, in operation, reduce the availability of hydraulic pressure to said brake means;
a hydraulic fluid source for providing a supply of hydraulic fluid; and,
flow control means for controlling fluid flow from said source to said at least two other hydraulic means and including valve means responsive solely to the pressure of said hyraulic fluid immediately upstream of said valve for blocking flow communication with at least one of said at least two other hydraulic means when said pressure upstream of said valve falls below a selected level so as to thereby prevent further reduction of said hydraulic pressure due to said at least one of said at least two other hydraulic means, and including means for blocking flow to said at least two other hydraulic means one after another in sequence of priority in response to continued decreases in the level of said pressure of said hydraulic fluid upstream of said valve.

4,057,074
BIDIRECTIONAL PISTON VALVE

Harry C. Fischer, Oak Ridge, Tenn., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Aug. 24, 1976, Ser. No. 717,431
Int. Cl.² G05D *7/00*
U.S. Cl. 137—107 **5 Claims**



1. A valve comprising:
a housing provided with an inlet port and an outlet port having a common axis and also provided with an inlet-outlet port defining a valve seat,
a piston slidably fitted in said housing for movement along said axis and partitioning said housing into a first compartment including said inlet port and a second compartment including said outlet port and valve seat, the head of said piston confronting said inlet port and being formed with an axial passage communicating with a discharge port in the sidewall of the stem of said piston,
a valve disc assembly carried by said piston, said assembly including a hub portion slidably engaging said stem and including a disc for sealably engaging said seat,
means carried by said piston for resiliently biasing said disc assembly outwardly away from the piston head and
means carried by said piston for limiting the outward movement of said disc assembly to a position where said hub portion sealably covers said discharge port, whereby admission to said inlet port of fluid at a selected pressure moves said piston toward said seat to a position where engagement of said disc assembly and said seat displaces said disc assembly inwardly along said stem and uncovers said discharge port.

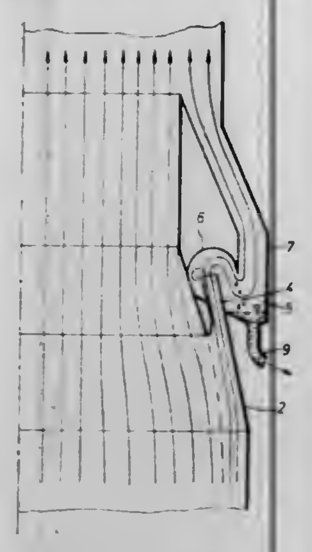
4,057,075
SEPARATOR, ESPECIALLY FOR CHIMNEYS

Edgar Muschelknautz, Leverkusen; Armin Bürkholz; Hermann Wieschen, both of Cologne; Hans Guth, Berg.Neukirchen, and Wolfgang Richter, Opladen, all of Germany, assignors to Bayer Aktiengesellschaft, Levekusen, Germany

Continuation of Ser. No. 487,321, July 10, 1974, abandoned. This application Feb. 9, 1976, Ser. No. 656,478
Claims priority, application Germany, Aug. 1, 1973, 2338913
Int. Cl.² B01D *45/00; 137 171;173*
U.S. Cl. 137—171 **9 Claims**

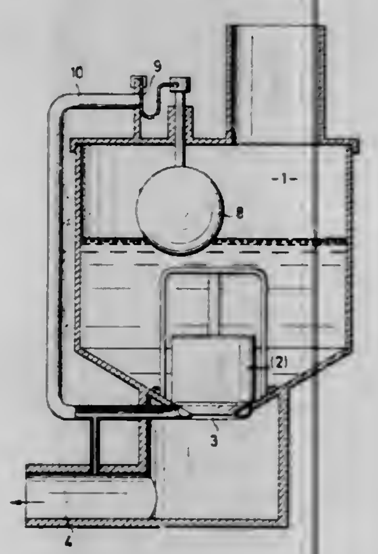
1. Apparatus for separating liquid films, droplets, and sprays contained in pipe borne gas flow of a chimney comprising: an upright pipe provided with a cross sectional construction adapted to accelerate the gas-liquid flow in the pipe, an annular stripping slot at the periphery of the pipe for receiving the accelerated gas-liquid flow and having an outlet end for the gas-liquid flow, an annular baffle surface for deflecting the gas-liquid flow issuing from the outlet end of the stripping slot, the annular baffle surface being above and spaced from said outlet end and being arched so that it is concave as viewed from said outlet end, an annular collecting trap having a liquid outlet and an annular gas outlet opening for receiving the deflected gas-liquid flow, an annular gas outlet channel extending upwardly from the annular gas outlet opening of the col-

lecting trap and leading from the collecting trap to the pipe above the stripping slot for flow of the gas from the collecting



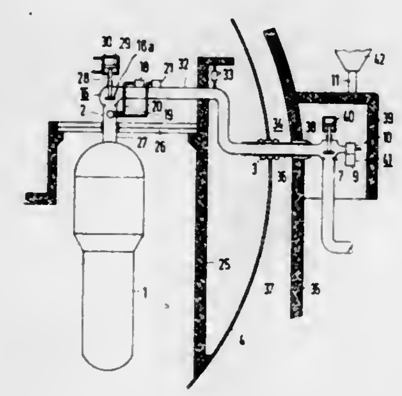
trap upwardly and into the pipe, the liquid outlet of the collecting trap being disposed below tha annular baffle.

4,057,076
WASTE WATER VALVE
Martti Varis, Kalkkipellonmaki A 3, 02600 Leppavaara, and Krister Nordberg, Hietalahdenkatu 7 A, 00180 Helsinki 18, both of Finland
Continuation of Ser. No. 516,880, Oct. 21, 1974, abandoned. This application May 13, 1976, Ser. No. 686,799
Claims priority, application Finland, Oct. 26, 1973, 733324
Int. Cl.² F16K *31/34*
U.S. Cl. 137—413 **1 Claim**



1. A waste water valve arrangement connectable to a vacuum sewage disposal system the function of which is based on a partial vacuum being upheld therein, said arrangement comprising a waste-water collecting chamber having a waste-water inlet; a closure member normally closing an outlet passage forming a connection between said collecting chamber and said vacuum sewage disposal system; a pressure controlled operating device for displacing said closure member by means of a pressure difference available from the atmosphere and said partial vacuum of said sewage disposal system; a float displaced by liquid level variations in said collecting chamber; and a pilot valve controlled by said float, said pilot valve controlling said operating device, said operating device being constantly connected with said partial vacuum of said sewage disposal system and being free of operating elements moving in openings through partitions between spaces under different pressure, said pilot valve being arranged to control said operating device by varying the vacuum therein so as to obtain pressure changes for displacing said closure member to open said connection between said collecting chamber and said sewage disposal system; said closure member being buoyant in the liquid received by said collecting chamber, said partial vacuum of said sewage disposal system being arranged to act on the underside of said closure member, thereby preventing it from floating upwards, said pilot valve having duct means connected to a portion of said underside of the closure member, said pilot valve admitting atmospheric pressure into said duct means when said float is at a predetermined upper level in said collecting chamber for producing an increased pressure at said portion of said underside of the closure member, thereby allowing said closure member to free itself and to float upwards.

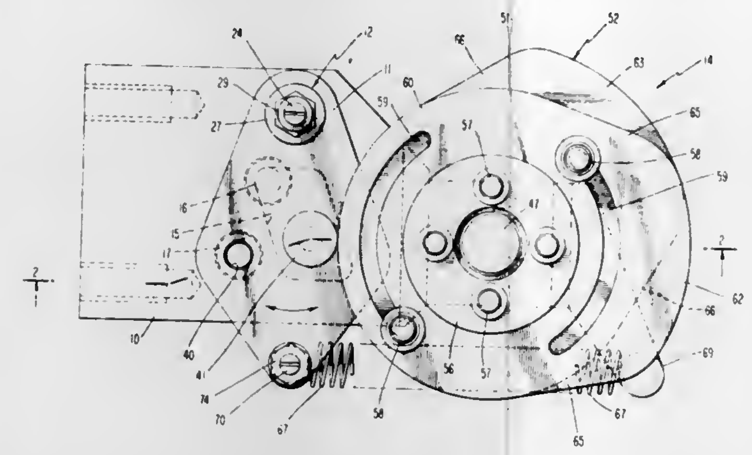
4,057,077
NUCLEAR REACTOR STEAM GENERATOR INSTALLATION
Hans-Peter Schabert, Erlangen, and Erwin Laurer, Mohrendorf, both of Germany, assignors to Kraftwerk Union Aktiengesellschaft, Mulheim (Ruhr), Germany
Filed June 26, 1975, Ser. No. 590,673
Claims priority, application Germany, June 26, 1974, 243058
Int. Cl.² E03B *11/00;* **G21C** *19/20*
U.S. Cl. 137—861 **4 Claims**



1. A nuclear reactor installation comprising a containment having an inside and an outside, nuclear-powered means for producing a live-steam output within said inside, a live-steam pipe connected to said means and extending therefrom through said containment and away from said outside and having a cross section adequate for the pipe to conduct all of said output, a fast-acting shut-off valve within said inside and interposed in said pipe and having a cross section at least equal to the pipe's said cross section, and two pressure-responsive safety valves within said inside and connected in parallel to shunt portions of said output around said shut-off valve so that when the latter is shut the safety valves can operate to discharge said portions back into said pipe behind the shut-off valve, said safety valves each having a cross section smaller than that of said shut-off valve and being normally-closed and opening in response to respectively different steam pressures in said pipe ahead of the shut-off valve.

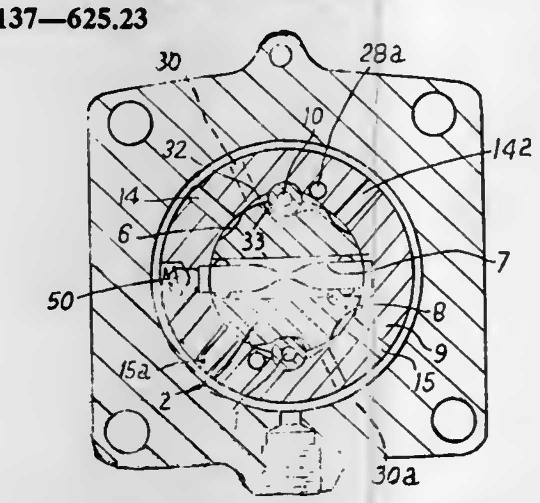
4,057,078
VACUUM SLIDE VALVE
Robert J. Albrecht, River Edge, and Martin J. Fraunberger, Mahwah, both of N.J., assignors to Nabisco, Inc., East Hanover, N.J.
Filed Mar. 4, 1976, Ser. No. 663,767
Int. Cl.² F16K *11/06*
U.S. Cl. 137—625.2 **4 Claims**

1. A vacuum valve comprising in combination, a first stationary metallic plate member, a second moveable plate member formed of an oil impregnated metallic substance lying on said first plate member, the contacting surfaces of said first and second plate members being smooth and flat, means for pivoting said moveable plate member at one end thereof to said stationary plate member, bores in said stationary plate member being provided with means for connection to a vacuum source and vacuum utilizing mechanism respectively, means providing a recess in said moveable plate member extending inwardly thereof from said contacting surface thereof, a cam follower roller mounted on said moveable plate member, cam wheel means mounted on said stationary plate member parallel to said moveable plate member for cooperating with said cam follower roller, spring means acting upon said moveable plate member to hold the cam follower roller against the outer surface of said cam wheel, said cam wheel being formed to slide said second plate member upon said first plate member between a first position and a second position and means pro-



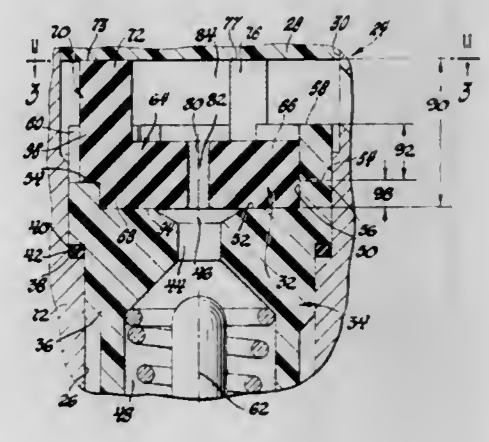
viding a third bore extending through said moveable plate member, said first bore being located to be in fluid flow communication with said recess in both said first and second positions to maintain a vacuum in said recess at all times, said second bore being in communication with said recess in said first position to provide a vacuum at the vacuum utilizing mechanism and being in communication with said third bore in said second position to relieve the vacuum at the vacuum utilizing mechanism.

4,057,079
POWER ASSISTANCE CONTROL DEVICE
Alistair Gordon Taig, Bristol, England, assignor to Bendix-Westinghouse Limited, Bristol, England
Filed Mar. 15, 1976, Ser. No. 666,836
Claims priority, application United Kingdom, Apr. 15, 1975, 15332/75
Int. Cl.² F15B *9/08*
U.S. Cl. 137—625.23 **7 Claims**



1. A fluid power assistance control device including a rotatable force input member, a first valve member coupled to said force input member for rotation therewith, and a second valve member rotatable relative to said first valve member, one of said first and second valve members having at least one projection projecting into the other of said first and second valve members to limit the rotation between said first and second valve members, said projection cooperating with said first and second valve members to substantially define two fluid flow paths, said fluid flow paths communicating with an outlet port and said projection forming fluid flow restrictions within said fluid flow paths such that relative rotation between said first and second valve members increases the fluid flow restriction in one of said two fluid flow paths and decreases the fluid flow restriction in the other of said two fluid flow paths, said first and second valve members cooperating to substantially define reaction cavities which communicate with respective fluid flow paths such that fluid communicated to one of said reaction cavities opposes the rotation of said force input member.

4,057,080
FLUID FLOW CONTROL MEMBERS
James R. Baber, Miamisburg, and Ronald J. Dershem, Trotwood, both of Ohio, assignors to General Motors Corporation, Detroit, Mich.
Filed Apr. 14, 1976, Ser. No. 676,753
Int. Cl.² F15D *1/02*
U.S. Cl. 138—44 **4 Claims**



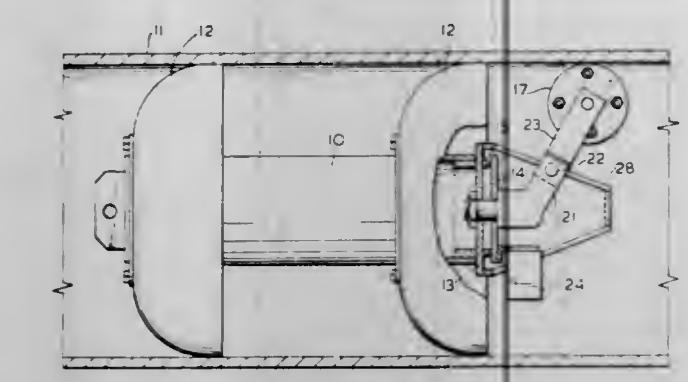
1. A fluid flow controlling orifice body and seat unit arranged to prevent inadvertent axially reversed mis-assembly of the orifice body into the seat;

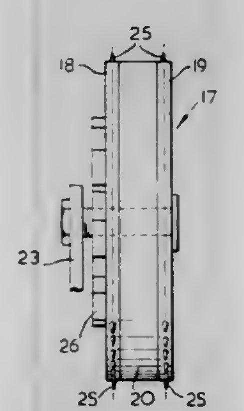
said orifice body having a disc-like main body section with an upper portion and a lower portion and an orifice aperture extending axially therethrough, and a leg portion defined by at least three circumferentially spaced legs extending axially away from said upper portion on the side thereof away from said lower portion and parallel to the axis of said aperture, the space circumferentially and diametrically and chordally between said legs and axially beyond said main body section being open, said upper portion having a first outer diameter, said lower portion having a second outer diameter, and the radially outer edges of said leg portion lying on a circle having a third diameter, one of said diameters being equal to another of said diameters and the remaining diameter being substantially unequal to said one diameter, said second diameter being less than at least one of said first and third diameters;

said seat having a cylindrically formed bore including an orifice body receiving section and a bore side wall, said receiving section having first shoulder means defining an annular seat for abutting engagement with said orifice body lower portion, second shoulder means having at least portions thereof circumferentially spaced radially outwardly and axially spaced relative to said first shoulder means for abutting engagement with another of said orifice body portions, and an annular end surface adjacent to but axially spaced from said second shoulder means, said bore side wall circumferentially surrounding at least an axial portion of said open space between said legs of said orifice body when said orifice body is received by said seat to define a flow chamber fluid connected with said orifice aperture and positioned axially adjacent to said orifice body main body section;

the overall axial length of said orifice body being greater than the axial length of said seat bore orifice body-receiving section from said second shoulder means to said end surface whereby an axially reversed mis-assembly of the orifice body into the seat results in an overall axial length of said orifice body and seat greater than the overall axial length thereof when properly assembled.

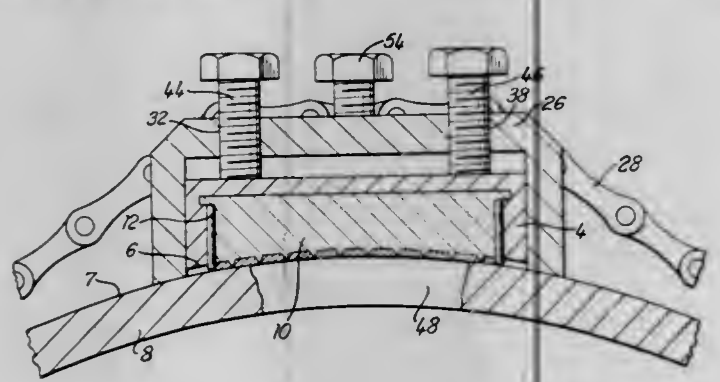
4,057,081
PIPELINE PIGS
Trevor Clifford Jones, Stroud, England, assignor to Underground Location Services Limited, Stonehouse, England
Filed Apr. 6, 1976, Ser. No. 674,737
Claims priority, application United Kingdom, Apr. 9, 1975, 14562/75
Int. Cl.² F16L *55/12;* **G01R** *19/00*
U.S. Cl. 138—97 9 Claims





1. A magnetically detectable attachment for a pipeline pig comprising a wheel formed from two circular plates of magnetic material spaced apart for rotation on a common axis, means for producing a magnetomotive force between the rims of said circular plates and means for rotatably mounting the wheel on a pig with its axis of rotation perpendicular to the longitudinal axis of the pig so that, in use, it rolls along with the peripheries of the two discs in contact with the inner surface of a pipe wall.

4,057,082
PIPELINES
Robert Paul King, Bagshot, England, assignor to The British Petroleum Company Limited, Middlesex, England
Filed June 2, 1976, Ser. No. 692,232
Claims priority, application United Kingdom, June 5, 1975, 24260/75
Int. Cl.² F16L *55/16;* **A44B** *21/00;* **B65D** *63/00;* **F16J** *15/12*
U.S. Cl. 138—99 2 Claims



1. An apparatus for the repair of a pipeline having a hole in the wall thereof and suitable for withstanding an internal pipeline pressure of up to 3000 psi comprising:

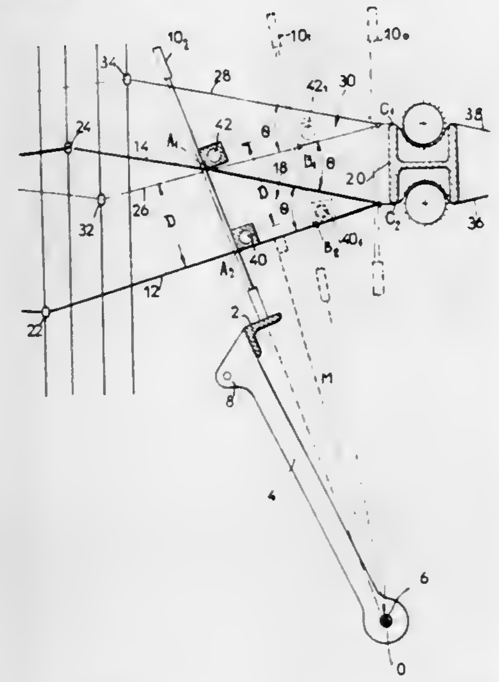
a. a compressible sealing element;

b. a holder for holding the sealing element against the outer surface of the wall of the pipeline;

c. means for applying pressure to the sealing element radially inwardly with respect to the pipeline to compress the sealing element against the surface thereof around the hole and for maintaining the holder on the pipeline against the reaction of the applied pressure comprising an elongate flexible member to be placed around the pipeline and holder and capable of being tensioned and means for applying tension to the elongate flexible member; and

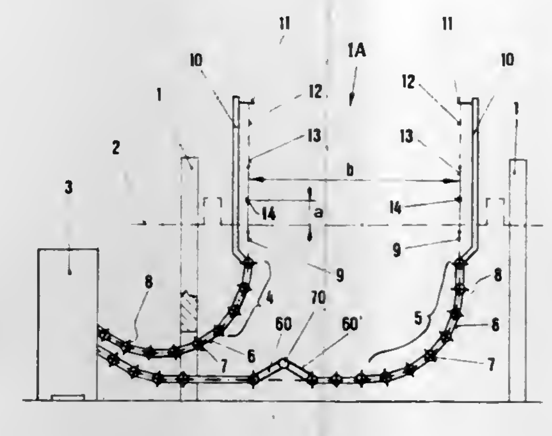
d. means to prevent extrusion of the sealing element comprising a ring of rods disposed so that their axes are lying mutually parallel and their inner ends contact the pipeline surface around the sealing element within the holder.

4,057,083
DOUBLE-LAYER WEAVING LOOM
Yves Juillard, and Victor Riner, both of Mulhouse, France, assignors to Societe Alsacienne de Constructions Mecaniques de Mulhouse, Mulhouse Cedex, France
Filed Aug. 31, 1976, Ser. No. 719,333
Claims priority, application France, Sept. 5, 1975, 75.27246
Int. Cl.² D03D *41/00*
U.S. Cl. 139—20 5 Claims



1. A multiple shuttleless loom comprising: a breast beam, double shed forming means having healds with warp thread guiding eyes vertically, alternately-movable between lowermost and uppermost positions to form two sheds, each with a lower layer and an upper layer, a sley pivotally mounted for rocking movement on a transverse horizontal axis, a reed secured to said sley for corresponding rocking movement together therewith between an extreme rear position and an extreme fore position through an intermediate position, reciprocating weft thread inserting needles supported by said sley for inserting weft thread into said sheds, said needles beginning entry into the sheds upon said reed passing through said intermediate position during the rearward movement thereof, said lower layers having segments located between said extreme rear position and said intermediate position of said reed, said loom being characterized in that said lowermost positions of said heald eyes are so located with respect to said breast beam that center-lines normal to said segments of said lower layers pass substantially through said pivotal axis of said sley.

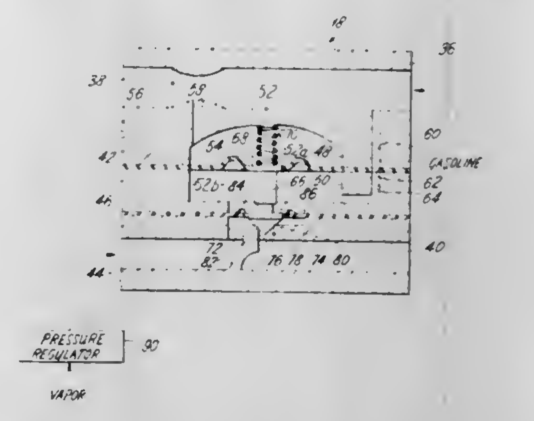
4,057,084
JACQUARD-HARNESS OF A WEAVING MACHINE
Otto Müller, Utikon am See, Switzerland, assignor to Stäuble Ltd., Horgen-Zurich, Switzerland
Filed June 7, 1976, Ser. No. 693,549
Claims priority, application Switzerland, June 12, 1975, 7595/75
Int. Cl.² D03C *3/00, 3/38*
U.S. Cl. 139—59 8 Claims



1. In a harness of a weaving machine having heddles and a movable harness therein, wherein the spacing of the heddles are movable and adjustable preferable in the width of the machine to facilitate an adjustment of the width of the selected material, wherein the movable harness has in the path of the harness cords a plurality of series arranged and spaced comber boards which are arranged one behind the other and having a guide bore per harness cord therein, the improvement comprising a connection between each pair of series arranged comber boards which consists of at least one rigid, namely bend-resistant connecting rod which is pivotally interconnected through a pivotal joint connection to an adjacent connecting rod, said pivotal joint being located adjacent each of the comber boards so that a center line of each comber board coincides with the pivot axis of the pivotal joint connection, each of the comber boards having a plurality of guide bores therein which are series arranged and have a harness cord extending therethrough with the guide bores in alternating ones of said comber boards having a mirror image relationship to the bores in the next adjacent comber board said guide bores in each of said comber boards being symmetrical to a plane connecting the center lines of the comber boards.

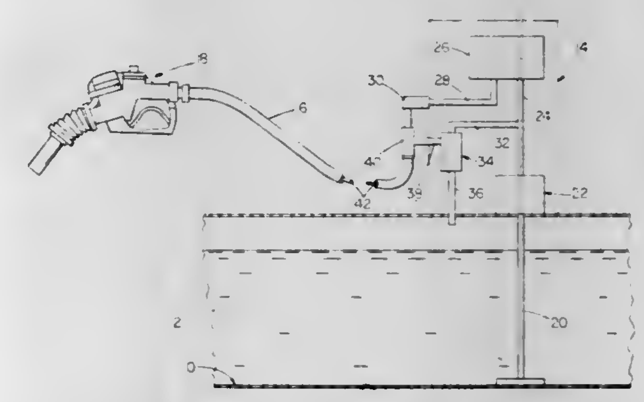
4,057,085
VAPOR RECOVERY SYSTEM
Marwan S. Shihabi, Northridge, Calif., assignor to International Telephone and Telegraph Corporation, New York, N.Y.
Division of Ser. No. 606,312, Aug. 20, 1975, Pat. No. 4,020,861, which is a division of Ser. No. 494,391, Aug. 19, 1974, abandoned, which is a continuation-in-part of Ser. No. 439,225, Feb. 4, 1974, abandoned, which is a continuation-in-part of Ser. No. 429,555, Jan. 2, 1974, abandoned. This application Apr. 22, 1976, Ser. No. 679,462
Int. Cl.² B65B *31/04;* **B67D** *5/04;* **G05D** *11/02*
U.S. Cl. 141—59 1 Claim

1. A system for simultaneous gasoline delivery and gasoline vapor recovery, said system comprising: a gasoline storage tank having a gasoline outlet and a gasoline vapor inlet; a control apparatus including a first passage having a venturi, a low pressure port, at said venturi and a high pressure port in said just passage adjacent said low pressure port, a gasoline inlet, a gasoline outlet, a gasoline vapor inlet and a gasoline vapor outlet, said control apparatus gasoline outlet being in communication with said control apparatus gasoline inlet through said first passage and said venturi, said control apparatus also including a diaphragm valve in a second passage connecting said control apparatus gasoline vapor inlet and said control apparatus gasoline vapor outlet to control the amount of gasoline vapor flowing through said control apparatus gasoline vapor outlet, said diaphragm valve including a diaphragm, means forming first and second cavities on opposite sides of said diaphragm, first and second conduit means connecting said first and second cavities, respectively, directly to said low and high pressure ports, respectively, said diaphragm valve opening and closing in response to an increase and decrease in the difference between the pressures in said ports; means connected from said storage tank gasoline outlet to said control apparatus gasoline inlet to supply gasoline under pressure thereto thereat; a blower connected from said control apparatus gasoline vapor outlet to said storage tank gasoline vapor



inlet to establish a partial vacuum at said control apparatus gasoline vapor outlet; a delivery conduit having one end connected from said control apparatus gasoline outlet and having a dispenser at its other end; a return conduit having an intake end, and another end connected to said control apparatus gasoline vapor inlet; and means to hold said dispenser and said return conduit intake end adjacent one another to provide recovery of gasoline vapor through said return conduit intake end during gasoline discharge through said dispenser and means for shutting off flow vapor through said second passage when flow of gasoline through said first passage ceases.

4,057,086
VAPOR CONTROL
James W. Healy, 54 Plymouth Road, Wakefield, Mass. 01880
Filed Feb. 27, 1975, Ser. No. 553,529
Int. Cl.² B65B *57/14*
U.S. Cl. 141—206 3 Claims



1. In a liquid dispensing nozzle comprising a body having an inlet and an outlet and defining a liquid conduit therebetween, said outlet defining a spout insertable into a container, a valve in said conduit controlling the flow of liquid from said inlet to said outlet, said valve biased toward a closed configuration, a manual valve operator for opening said valve, and means for releasably retaining said valve operator in an orientation which holds said valve open and for automatically releasing said valve operator in response to either of two conditions in said container, said conditions being buildup of vapor pressure to a predetermined vapor pressure and liquid reaching a predetermined level, the improvement wherein said means comprise a release unit biased to a neutral position in the absence of either of said conditions in said container, and movable, in response to said conditions, to first and second positions which are in

opposite directions from said neutral position, a movable member secured to said valve operator, and retainer means disposed intermediate said release unit and said movable member, said release unit in said neutral position forcing said retainer means into engagement with said movable member to prevent movement thereof, but in said first and second positions releasing said retainer means.

4,057,087

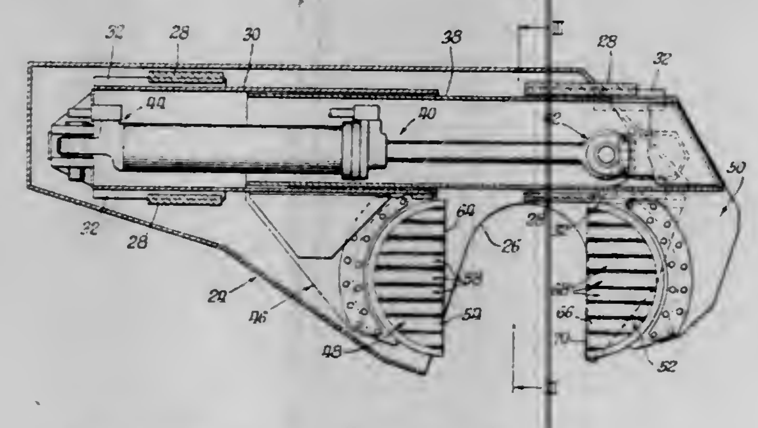
CORRUGATED BLADE FOR TREE HARVESTER

Dorrance Oldenburg, Yorkville, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Jan. 22, 1976, Ser. No. 651,492

Int. Cl.² A01G *23/08*

U.S. Cl. 144—34 E **6 Claims**



1. Apparatus for cutting a tree comprising:

a first member;

a second member operatively coupled with the first member so that the first and second members are relatively movable;

a first blade mounted to the first member and comprising a first cutting blade body defining a cutting edge, said first cutting blade body defining a plurality of generally parallel elongated ridges, the tops of which are rounded in cross-section, the depressions therebetween each being rounded in cross-section, said ridges running substantially the entire length of the first cutting blade body from the cutting edge thereof, each ridge of the first cutting blade body being substantially uniform in width along its full length, said ridges running to the cutting edge to define a cutting edge the shape of which is determined by said ridges;

a second blade mounted to the second member and comprising a second cutting blade body defining a cutting edge, said second cutting blade body defining a plurality of generally parallel elongated ridges, the tops of which are rounded in cross-section, the depressions therebetween each being rounded in cross-section, said ridges running substantially the entire length of the second cutting blade body from the cutting edge thereof, each ridge of the second cutting blade body being substantially uniform in width along its full length, said ridges running to the cutting edge to define a cutting edge the shape of which is determined by said ridges;

the apparatus being positionable so that a tree may be disposed between the first and second blades; and,

means for selectively relatively moving the first and second members to bring the blades into contact with a tree positioned therebetween to cut such relatively positioned tree.

4,057,088

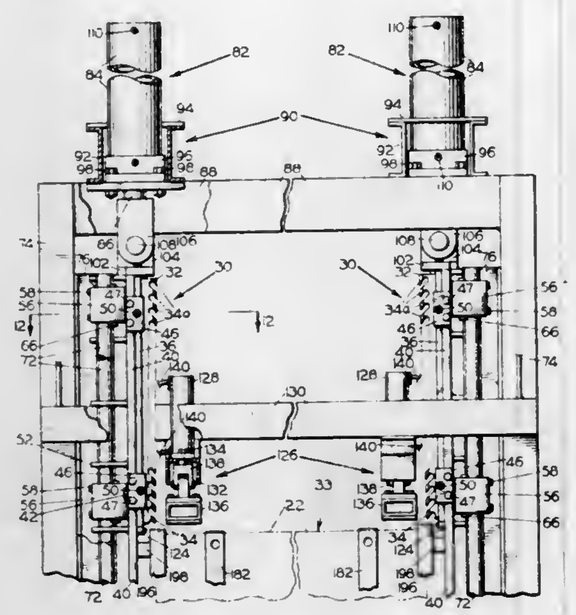
APPARATUS FOR FORMING SERRATIONS IN OPPOSED EDGES OF WOODEN PANELS FOR USE IN I-BEAMS

Donald Ralph Gross, Emmett; Nick Lewis Schaefer, Boise; John Raymond Russell, Boise, and Clifford Ray Johnson, Boise, all of Idaho, assignors to Trus Joist Corporation, Boise, Idaho

Filed Aug. 27, 1976, Ser. No. 718,352

Int. Cl.² B27F *1/06*

U.S. Cl. 144—91 **15 Claims**



1. An apparatus for forming serrations in opposed edges of wooden panels comprisng;

a. anvils arranged for supporting a stack of the panels in the apparatus and having serrated margins located inwardly adjacent to the edges of the stack,

b. two spaced sets of broaches having cutting faces defining the pattern of the serrations, one being mounted in the apparatus above each anvil margin and movable horizontally with respect thereto,

c. said sets of broaches being tapered and having lower portions which are spaced apart by a distance which is substantially equal to the width of the stacks, and being arranged for cutting the serrations simultaneously in both edges of the panels when forced therepast.

d. actuation means connected to the broaches and arranged for translating them between raised positions wherein their lower portions are above the stack and lowered positions wherein their upper portions are below the stack for simultaneously forming the serrations in both edges of the panels.

4,057,089

PNEUMATIC TIRE FOR MOTOR VEHICLES

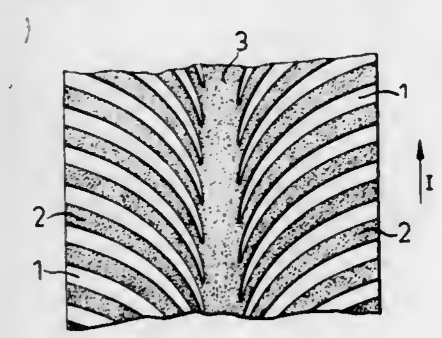
Peter Johannsen, Hannover, Germany, assignor to Continental Gummi-Werke Aktiengesellschaft, Hannover, Germany

Filed Nov. 20, 1975, Ser. No. 633,981

Claims priority, application Germany, Nov. 21, 1974, 2455130

Int. Cl.² B60C *11/06*

U.S. Cl. 152—209 R **4 Claims**



1. A pneumatic tire for high speed motor vehicles upon hard road surfacing, which has a circumferential tread surface with a circumferential central section, said tread surface to protect against danger of hydroplaning being provided with grooves therein extending from said central section toward both sides of said tread surface and said grooves being curved along structural curvature of a parabola of the second order and being provided instantaneously to eliminate water effectively from said tread surface, the structural curvature of said grooves being determined mathematically by a functional equation $x = y^2 x$ constant, in which x is the coordinate extending in the axial direction of said tire, and in which y is the coordinate extending in the circumferential direction of said tire.

4,057,090

PUNCTURE SEALING PNEUMATIC TIRE

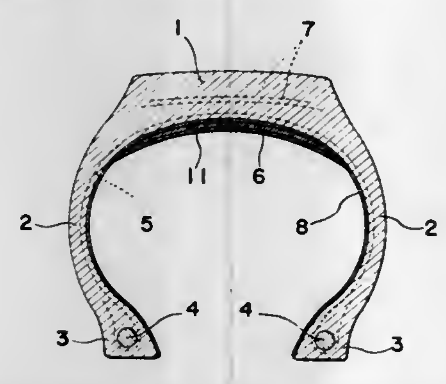
Katuyuki Hoshikawa, Honjo; Soji Noda, Takarazuka, and Akitaka Kimura, Kobe, all of Japan, assignors to Sumitomo Rubber Industries, Ltd., Kobe, Japan

Filed Sept. 21, 1976, Ser. No. 725,177

Claims priority, application Japan, Dec. 11, 1975, 50-148121

Int. Cl.² B60C *21/08, 5/14*

U.S. Cl. 152—347 **2 Claims**



1. A puncture sealing pneumatic tire comprising in combination a carcass constituted by at least one cord layer, a hard rubber tread portion and sidewalls superimposed on said carcass, at least one breaker layer, rubber inner lining impermeable to air, and a puncture sealing layer which is applied on the inner surface of said inner lining, extends at least over an area corresponding to the area of said tread portion, and has a composition including polybutene, polyisobutylene, silicic anhydride of 5–40 parts by weight to 100 parts by weight of polybutene having a silicic acid content of at least 99% and displaying a loss on drying not exceeding 1.5%, and powdered elastomer material having a particle size distribution in the range of from 5 to 30 mesh sieve size, said polyisobutylene, said silicic anhydride, and said powdered elastomer material being respectively included in the range of from 40 to 150 parts by weight, in the range of from 5 to 30 parts by weight, and in the range of from 25 to 90 parts by weight to each of 100 parts by weight of said polybutene, whereby said puncture sealing material has a viscosity value in the range of from 2.0 to 4.5 and an adhesivity value of at least 100.

4,057,091

PNEUMATIC TIRE

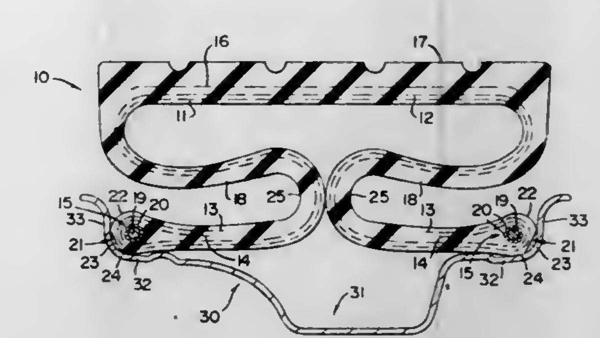
James Dennis Gardner, Akron, and Robert William Glasscock, Canal Fulton, both of Ohio, assignors to The Firestone Tire & Rubber Company, Akron, Ohio

Filed Apr. 7, 1976, Ser. No. 674,710

Int. Cl.² B60C *5/12, 15/00*

U.S. Cl. 152—353 R **9 Claims**

1. In combination a pneumatic tire and rim wherein the rim is comprised of an annular drop center area bounded axially outwardly on either side by annular rim base sections which are in turn bounded axially outwardly by annular rim flanges, said tire is comprised of an annular road-engaging tread, sidewalls connecting the lateral edges of said tread to bead areas which contain annular bead bundles, said tire in a first position when mounted on said rim and uninflated having its bead areas and lower sidewall areas extending axially inwardly from each rim flange in a direction substantially parallel to the axis of rotation of said rim and said sidewalls folded upon themselves to form annular re-entrant walls, said tire in a second position when mounted on said rim and inflated having its bead areas and lower sidewall areas substantially perpendicular to the axis



of rotation of said rim, first position utilized when said tire is stored and said second position utilized when said tire is operational, said change in position resulting from a rotation of said bead areas about the center of said bead bundles upon inflation.

4,057,092

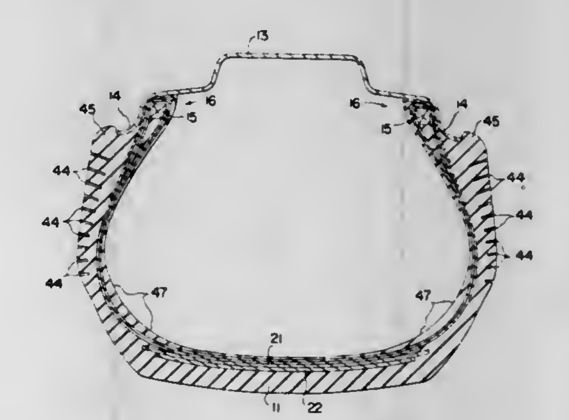
PNEUMATIC TIRE FOR USE WHEN DEFLATED

Frank R. Tracy, Wellington, Ohio, assignor to The General Tire & Rubber Company, Akron, Ohio

Continuation-in-part of Ser. No. 589,223, June 23, 1975, abandoned. This application Mar. 12, 1976, Ser. No. 666,515

Int. Cl.² B60C *17/00, 15/00, 13/00*

U.S. Cl. 152—379.1 **2 Claims**



1. A pneumatic tire to be mounted on a wheel rim having opposed annular flanges comprising:

a. a tread portion extending circumferentially around the tire;

b. two annular rim-engaging bead portions having bead rings embedded therein;

c. a pair of flexible sidewall portions along the sides of the tire, each sidewall portion connecting one edge of the tread portion with the associated bead portion;

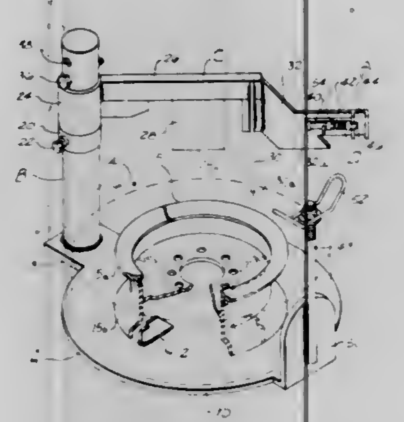
d. carcass plies extending through said sidewall portions and folded around said bead rings so that the end portions of said plies are located in said sidewall portions;

e. a thick circumferential lug located on each sidewall portion externally of said carcass plies and end portions thereof, said circumferential lug protruding axially outwardly and radially inwardly from said carcass plies adjacent to the bead portion and providing locking means for projecting beyond the rim flange when the tire is inflated and for hooking around the end of the flange when the tire is underinflated; and

f. each said sidewall portion having an annular thickened section located externally of said carcass plies and end portions thereof, said annular thickened section having its thickest part located adjacent to said circumferential lug and tapering to a thinner part adjacent the middle of said sidewall portion, said annular thickened section also having a plurality of concentric circumferential slots in its external surface, said slots extending inwardly to a depth

of approximately one-third to two-thirds of the distance between said external surface and said carcass plies, so that said thickened sidewall portion is relatively flexible when said tire is inflated, but when said tire is deflated, said slots close to cause said thickened sidewall portion to become relatively stiff to provide support to hold said lug hooked to said rim flange.

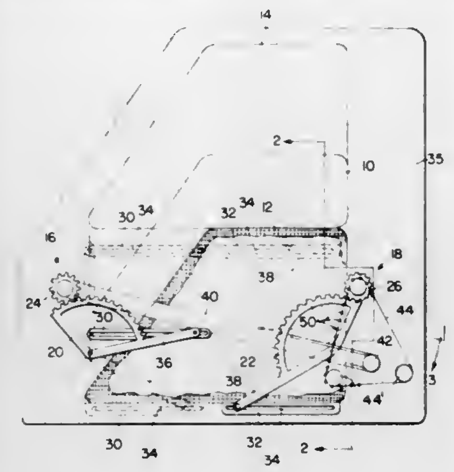
4,057,093
PROTECTIVE APPARATUS FOR MOUNTING TIRES
John S. Joines, Rte. 3, Greer, S.C. 29651
Filed Feb. 9, 1977, Ser. No. 766,887
Int. Cl.² B60C *25/00*
U.S. Cl. 157—1 **10 Claims**



9. A safety and protective apparatus for use in mounting a tire on a multi-piece rim assembly to prevent rim escapement during inflation of said tire comprising:
- a base member;
- an upstanding support mounted on said base member;
- an arm member pivotably carried by said upstanding support;
- said arm member being pivotable away from said base member to permit placement of said tire and rim assembly on said base member and pivotable over said base to a superposed position directly above said tire and rim;
- engagement means carried by said arm member for engaging said rim at circumferentially spaced points to prevent escapement and flying apart thereof during inflation of the tire; and
- releasable lock means carried by said base member for locking the free end of said arm member in a hold-down position when said arm member is in said superposed position.

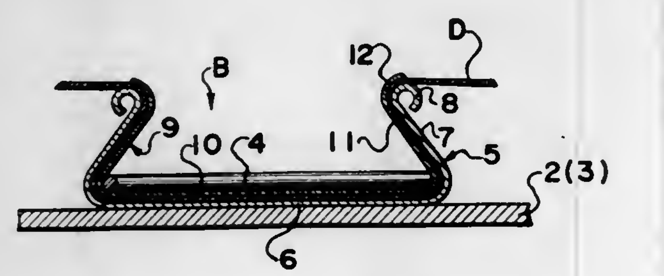
4,057,094
CAR WINDOW SCREEN
Thomas Smith, 4511 W. Grenshaw, Chicago, Ill. 60624
Filed July 19, 1976, Ser. No. 706,270
Int. Cl.² E06B *9/52*
U.S. Cl. 160—37 **1 Claim**

1. An apparatus for selectively moving a transparent pane and a screen pane across a window opening comprising:
- first and second mechanisms for moving said transparent and screen panes, respectively, from a respective first position leaving the opening uncovered, to a respective second position covering said opening, said mechanisms including respective segmental gears disposed on one side of the panes, respective pinions engaging said gears, each of said pinions including a handle for the rotation thereof, and wherein said panes have respective lower end portions formed with a longitudinal slit, and each of said gears includes an arm rigid therewith having an end thereof adapted to slide within one of said slits, and
- inhibiting means for preventing the movement of said screen pane from the first and second positions thereof upon said transparent pane occupying a position other than the latter's first position but not yet at the second position, said inhibiting means including first belt-means, first belt-supporting means attached to a door frame for said first belt-means to be movable by the handle of said first mechanism, second belt-means and second belt-supporting means attached to the door frame for said second belt-means to be movable by the handle of said second mechanism, said first belt-means having narrower and wider portions of first and second lengths, respectively, and said second belt-means having a plurality of substantially equi-spaced longitudinal pins thereon, and being disposed transversely to said first belt-means, and wherein said second length of said wider portion of said first belt-means



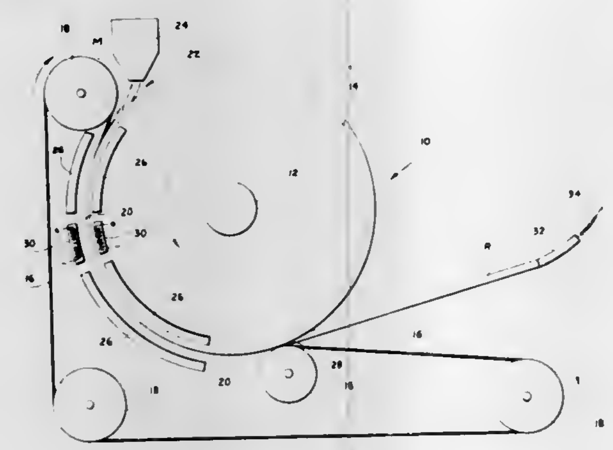
is operatively contactable by at least two successively spaced pins, said narrow portion being operatively non-contactable by said pins, said second length of said wider portion corresponding to the distance for said transparent pane to operatively move from said first to said second position, whereby a rotation of one of said handles causes the handle-associated pane to move across the window opening and the handle of said second mechanism is substantially prevented from being rotated upon said wider portion of said first belt-means being interposed between said two successively spaced pins.

4,057,095
FLEXIBLE SHEET FIXING DEVICE
Yoshinari Hirota, 773-38, Shimokizaki, Oaza, Urawa, Saitama, Japan
Filed Nov. 3, 1975, Ser. No. 628,124
Int. Cl.² A44B *21/00*
U.S. Cl. 160—392 **3 Claims**



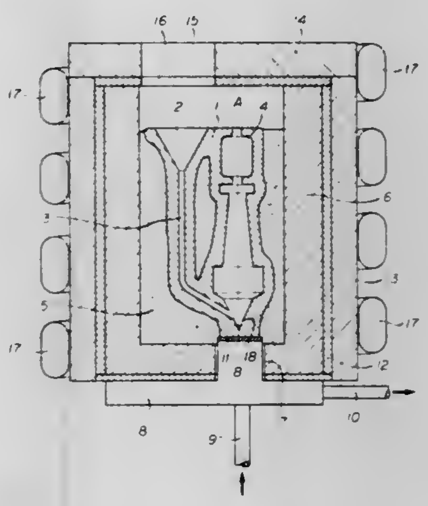
1. A device for stretching and fixing flexible sheets over a skeleton framework to enclose the framework, said device comprising, in combination, an elongated channel having a substantially flat base and outwardly extending flanges converging toward each other to define, with said base, an outwardly opening groove which has a dovetail shape in cross-section; said base being arranged to be secured to a skeleton framework so that plural such channels can be secured to the framework to extend longitudinally thereof in spaced parallel relation to each other; an elongated, undulating zig-zag spring resiliently engageable in said dovetail groove adjacent said base; and a pressing plate in the form of an elongated channel member having a base and flanges extending outwardly from said base, said elongated channel member being sufficiently flexible laterally for pressing of the same into the dovetail groove of said channel with the flanges of said channel member resiliently pressing outwardly against the flanges of said channel; whereby, after a flexible sheet has been stretched transversely over said channel and into the dovetail grooves thereof, a respective pressing plate may be pressed into the dovetail groove of each channel so that the sheet is retained between the interior surfaces of the channel and the exterior surfaces of the pressing plate, and a respective said zig-zag spring may be inserted into each pressing plate to firmly compress the flexible sheet between the exterior surfaces of the pressing plate and the interior surfaces of the channel.

4,057,096
STARTING DUMMY BAR POSITIONER FOR CONTINUOUS CASTING OF METALS
Kerim Askin, Carrollton, Ga., assignor to Southwire Company, Carrollton, Ga.
Filed Apr. 9, 1976, Ser. No. 675,340
Int. Cl.² B22D *11/06, 11/08*
U.S. Cl. 164—49 **12 Claims**



7. An improved method for continuously casting molten metal into a rod of indefinite length by use of a rotatable casting wheel having an elongate, arcuate-shaped molding passageway for receiving and cooling molten metal during its movement through the passageway to at least partially solidify the same, comprising the steps of:
- providing means adjacent an intermediate position in the passageway for frictionlessly but positively retaining a metal member for blocking the passageway at said position;
- activating said retaining means;
- inserting a metal blocking member into the passageway and passing the member therealong to said intermediate position for retention by said retaining means;
- pouring molten metal into an upper opening of the passageway to be contained therein by said blocking member;
- at least partially solidifying the molten metal in said passageway;
- deactivating said retaining means to release the blocking member; and
- initiating rotation of said casting wheel to pass said blocking member and the at least partially solidified molten metal along the passageway and out of said passageway through a lower opening therein.

4,057,097
CASTING PROCESS WITH INSTANTANEOUS UNIDIRECTIONAL SOLIDIFICATION
Benno Lux, Veyrier; Wilfried Kurz, Lausanne, both of Switzerland; Jean-Claude Hubert, Saint-Maur; François Mollard, Gaillard, both of France, and Guido Walt, Geneva, Switzerland, assignors to Battelle Memorial Institute, Geneva, Switzerland
Filed Mar. 5, 1976, Ser. No. 664,093
Claims priority, application Switzerland, Mar. 7, 1975, 2895/75
Int. Cl.² B22D *27/20*
U.S. Cl. 164—60 **6 Claims**

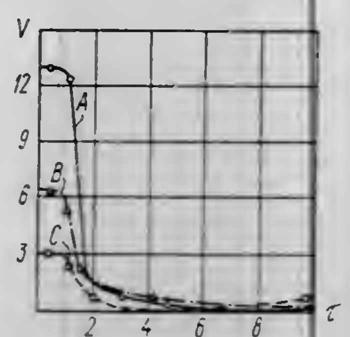


1. A process for producing a solid body of a metallic alloy with a unidirectionally oriented fine dendritic structure obtained by solidification of an alloy melt within a cavity of a mold associated with controllable heating and cooling means capable of producing a unidirectional temperature gradient in said melt, said process comprising the steps of:
- a. progressively precooling the entire body of the alloy melt within the mold cavity down to a supercooled liquid state in metastable equilibrium so as to thereby form a homageneous supercooled melt of said alloy throughout the mold cavity while simultaneously maintaining a unidirectional temperature gradient along said supercooled melt; and
- b. provoking complete solidification of the entire supercooled alloy melt practically instantaneously throughout the mold cavity by disturbing the said state of metastable equilibrium in said supercooled alloy melt, so as to thereby solidify said body with growth of a fine dendritic crystal structure oriented parallel to the direction of said temperature gradient.

4,057,098
METHOD OF PRODUCING THIN-WALLED CASTINGS
Boris Pavlovich Platonov, ulitsa Komsomolskaya, 11, kv. 4; Anton Abramovich Ryzhikov, Naberezhnaya Zhdanova, 80, kv. 28, and Jury Borisovich Platonov, ulitsa Dyakonova, 8, kv. 40, all of Gorky, U.S.S.R.
Continuation of Ser. No. 593,521, July 7, 1975, abandoned, which is a continuation of Ser. No. 506,836, Sept. 17, 1974, abandoned, which is a continuation of Ser. No. 359,887, May 14, 1973, abandoned. This application June 21, 1976, Ser. No. 697,717
Int. Cl.² B22D *15/02, 27/04*
U.S. Cl. 164—125 **1 Claim**

1. A method of producing castings having thin walls and thick walls comprising the steps of: pouring inoculated cast iron consisting essentially of, by weight, 3.6–3.8% carbon, 2.8–3.2% silicon, up to 0.4% manganese, not more than 0.01% magnesium and the remainder being iron at a melt temperature within the range of from 1420° to 1450° C into moulds; and subsequently cooling portions of the cast iron with thin walls of the castings being up to 3 mm that the initial cooling rate is

10°-14° C/sec to form nodular cast iron in the thin-walled portions and simultaneously cooling portions of the cast iron



with thick walls of the castings of a thickness that the initial cooling rate is 1°-4° C/sec to form gray cast iron in the thick-walled portions.

4,057,099

DEVICE FOR OSCILLATING A CONTINUOUS CASTING MOULD

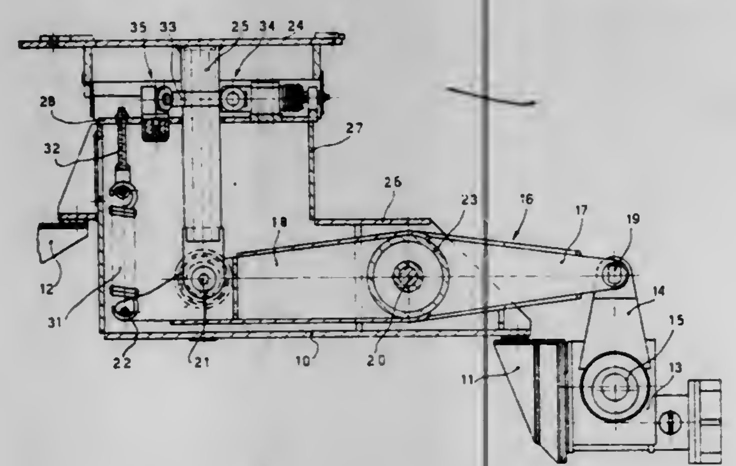
Luigi Danieli, Udine, Italy, assignor to Officine Meccaniche Danieli, Udine, Italy

Filed Dec. 11, 1975, Ser. No. 639,692

Claims priority, application Italy, Dec. 11, 1974, 83446/74; Dec. 12, 1974, 83449/74; Nov. 19, 1975, 83476/75

Int. Cl.² B22D *11/04*

U.S. Cl. 164—260 **10 Claims**



1. In a device for oscillating ingot moulds in continuous casting plants, the oscillations being in a linear or a curvilinear course, the improvement comprising in reciprocal coordination and cooperation

lever means mounted on a fulcrum and extending laterally to an ingot mould and attached to a pair of arms disposed symmetrically with respect to said ingot mould,

a pair of vertical uprights positioned laterally to said ingot mould and hinged onto said arms of said lever and both extending upwards to a surface supporting said ingot mould and being rigidly fixed to said surface,

guide surfaces geometrically defined by the course of said ingot mould and secured to said vertical uprights,

roller guides for each vertical upright anchored to a carrying structure and cooperating with said guide surfaces, and

elastic adjustable traction means extending above said lever attached to said lever and to a fixed support and located laterally to the ingot mould to urge an upward thrust to said lever;

said guide surfaces being anchored in close proximity to said support surface supporting the ingot mould and said lever means is positioned below the upper surface of the ingot mould.

4,057,100

APPARATUS FOR THE LUBRICATION OF HOT HEAD CONTINUOUS CASTING MOLDS

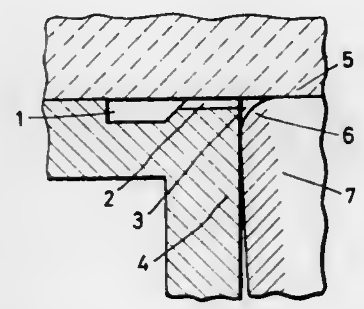
Edgar Lossack; Kurt Krämer, and Gerd Bulian, all of Bonn, Germany, assignors to Vereinigte Aluminum-Werke Aktiengesellschaft, Bonn, Germany

Filed June 1, 1976, Ser. No. 691,616

Claims priority, application Germany, June 7, 1975, 2525483

Int. Cl.² B22D *11/00*

U.S. Cl. 164—418 **6 Claims**



1. Apparatus for continuously casting molten metal comprising:

a mold having a longitudinal axis, an inner, axially extending wall defining a mold cavity, and an upper surface;

a hot head member formed of a heat insulating material having a first portion extending transversly over at least a part of said mold cavity, at least part of said hot head member being contiguous with a surface of said mold, said first portion and axially extending mold wall together with a fluctuating level of molten metal during continuous casting of metal in said mold funtioning to define a variable volume cavity,

a liquid reservoir defined in said mold for holding a separating or lubricating agent; and

a fluid path communicating between said reservoir and said mold cavity across at least a portion of the interface between said mold and hot head member and around the periphery of said mold, said fluid path opening into the upper half of said liquid reservoir so as to prevent gravity flow of liquid from at least the lower half of said reservoir to said mold cavity, whereby periodic pressure changes within said variable volume cavity are utilized for pumping said separating or lubricating agent from said reservoir to the mold cavity.

4,057,101

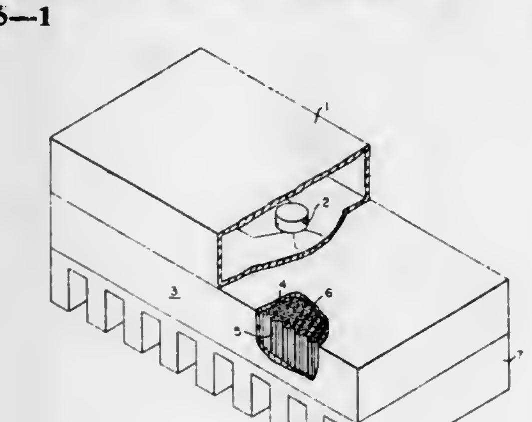
HEAT SINK

Roswell J. Ruka, Pittsburgh, and Robert G. Charles, Allison Park, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Mar. 10, 1976, Ser. No. 665,599

Int. Cl.² C09K *5/06;* H01B *7/34*

U.S. Cl. 165—1 **8 Claims**



1. A method of storing heat comprising repeatedly transferring heat to a heat sink which comprises a compound selected from the group consisting of $LiClO_4.3R_2O$ and $(COOH)_2.2R_2O$, where 100% of each R is independently selected from 0 to 100% hydrogen and 0 to 100% deuterium.

5. A method of protecting electronic circuitry from temporary overheating comprising (1) transferring heat from said circuit to a heat sink comprising a compound selected from the group consisting of $LiClO4.3R_2O$ and $(COOH)_2.2R_2O$, where 100% of each R is independently selected from 0 to 100% hydrogen and 0 to 100% deuterium; and (2) radiating said heat away from said heat sink.

4,057,102

ROTARY HEAT EXCHANGER, IN PARTICULAR FOR A GAS TURBINE

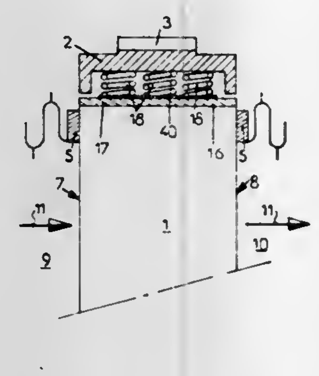
Jack Guillot, Juvisy sur Orge, France, assignor to Bennes Marrel, Zone Industrielle, Andrezieux Boutheon, France

Division of Ser. No. 418,803, Nov. 23, 1973, Pat. No. 3,985,181. This application June 6, 1975, Ser. No. 584,661

Claims priority, application France, Nov. 22, 1972, 72.42150

Int. Cl.² F28D *19/00*

U.S. Cl. 165—8 **1 Claim**



1. A rotary heat exchanger for a gas turbine comprising a disc of cellular ceramic material having a peripheral lining of refractory material, a smooth metallic collar surrounding said lining in engagement therewith, an annular driving rim having a smooth radially inward surface surrounding said collar in radial spaced relation and a plurality of annular rows of radially disposed springs disposed in compression between said rim and said collar for transmitting driving torque from said rim to said collar and said disc.

4,057,103

FEEDWATER PREHEATER WITH TWO STEAM CHAMBERS

Herbert Tratz, Ottensoos; Fritz Kelp, and Erich Netsch, both of Erlangen, all of Germany, assignors to Kraftwerk Union Aktiengesellschaft, Mulheim (Ruhr), Germany

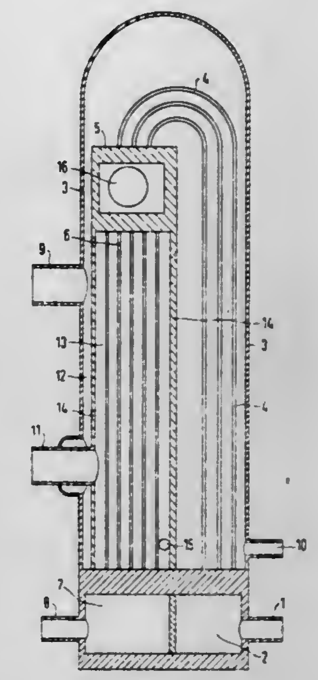
Filed Dec. 8, 1975, Ser. No. 638,458

Claims priority, application Germany, Dec. 10, 1974, 2458474

Int. Cl.² F22D *1/32*

U.S. Cl. 165—11 **3 Claims**

1. Feedwater preheater installable horizontally within a turbine exhaust steam housing for heating feedwater by means of condensing bleeder steam from the turbine, comprising inlet and outlet chambers for the feedwater both located at one side of the preheater, an outer steam chamber adjacent said inlet and outlet chambers, an inner steam chamber disposed within said outer steam chamber, means for supplying the bleeder steam at different pressures to the respective steam chambers, a water chamber closed in itself partially defining said inner steam chamber, a plurality of feedwater conducting tubes communicating with said feedwater inlet chamber and disposed in said outer steam chamber, said tubes having a substantially 180° bend formed therein at a location of said outer steam chamber remote from said feedwater inlet chamber and communicating at said bend thereof with said water chamber, and a plurality of additional tubes disposed in said inner steam chamber and communicating at one end thereof with said



water chamber and at the other end thereof with said outlet chamber.

4,057,104

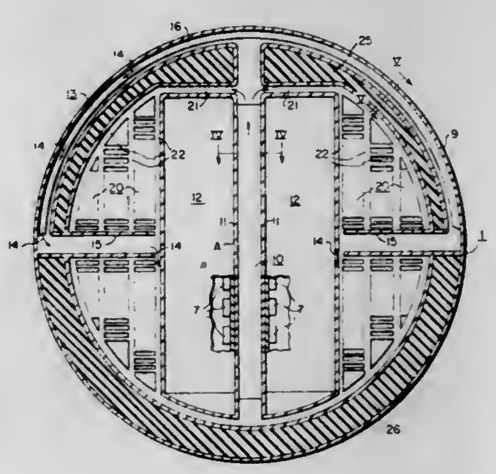
TEMPERATURE CONTROLLED AIRBORNE ELECTRONIC ASSEMBLY

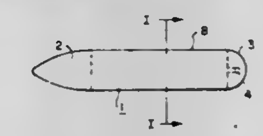
Frank E. Altoz, Baltimore, Md., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Aug. 26, 1976, Ser. No. 717,965

Int. Cl.² F28D *15/00;* G05D *23/00*

U.S. Cl. 165—35 **6 Claims**





1. An airborne assembly comprising,

a pod for mounting on the exterior of an aircraft in subjection to air flow past the aircraft during flight,

heat creating electronic components disposed within said pod, p1 evaporative cooling fluid disposed within said pod, p1 vertically extending evaporator means within said pod in close thermal coupling with said electronic components and having bottom inlet for said cooling fluid in liquid state and an upper exit for said cooling fluid in vapor state,

a first condenser means for the cooling fluid vapor from said evaporator means utilizing the outer skin of said pod for transfer of heat to the air passing thereover,

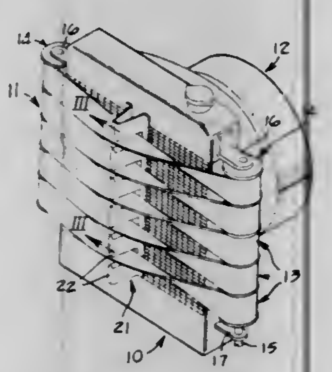
duct means for return of cooling fluid in liquid state from said first condenser means to said evaporator inlet,

a second condenser means in form of heat sink means within said pod, and

p1 duct means for conveying cooling fluid to and from said second condenser means in series with said evaporator means and in parallel with said first condenser means,

said second condenser means being so constructed and arranged as to be effective at pod skin temperatures at which said first condenser means becomes ineffective.

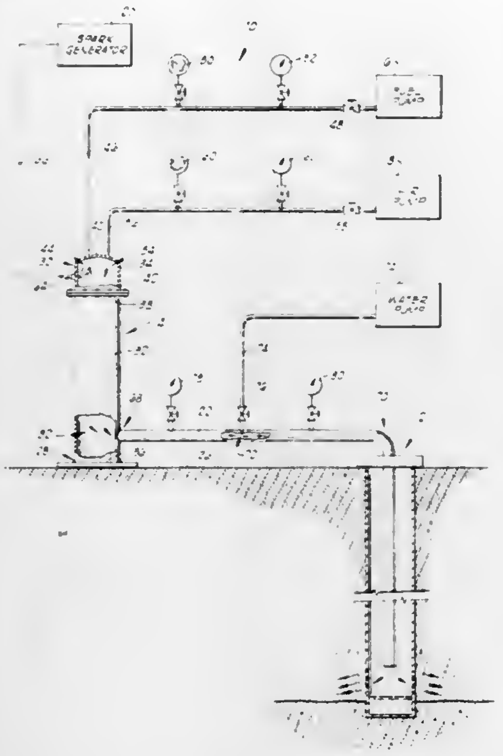
4,057,105
SELF-CLEANING SCREEN ASSEMBLY FOR RADIATORS AND METHOD
John M. Bailey, Dunlap, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.
Filed June 30, 1976, Ser. No. 701,335
Int. Cl.² F28F *19/00;* **F28G** *13/00*
U.S. Cl. 165—119 **15 Claims**



1. A self-cleaning screen assembly in combination with a vertically disposed radiator comprising
perforated endless belt means circumventing said radiator comprising a plurality of horizontally disposed and vertically spaced endless belts each half-twisted to form a "mobius strip",
first guide means mounted on either end of said radiator for engaging and guiding said belt means thereover,
second guide means mounted on a first side of said radiator for engaging and guiding said belt means thereover comprising a vertically disposed bracket secured on the first side of said radiator intermediate the lateral side thereof and wherein said bracket has a plurality of vertically spaced guide members secured thereon to extend forwardly of said radiator, each pair of vertically adjacent guide members defining a guide opening there between having one of said belts disposed therein,
third guide means mounted on a second side of said radiator, opposite to said first side thereof, for engaging and guiding said belt means thereover, and
drive means drivingly connected to said belt means for moving said belt means about said radiator.

4,057,106
HOT WATER FLOOD
Walter L. Clingman, 2013 Andover Court, Oklahoma City, Okla. 73120
Filed July 12, 1976, Ser. No. 704,425
Int. Cl.² E21B *43/24*
U.S. Cl. 166—57 **1 Claim**

1. Injection apparatus for injecting hot water into an oil well head, the injection apparatus comprising:
a substantially cylindrical combustion chamber having an upper end and a lower end;
a fuel pump connected to the upper end of the combustion chamber, the fuel pump injecting combustible fuel into the combustion chamber at a predetermined fuel injection rate;
an air pump connected to the upper end of the combustion chamber, the air pump injecting air into the combustion chamber at a predetermined air injection rate;
a spark generator connected to the combustion chamber near the upper end thereof, the spark generator providing sparks for initiating combustion of the combustible fuel injected by the fuel pump into the combustion chamber;
an injection conduit connected between the lower end of the combustion chamber and the well head, the injection conduit providing communication between the combustion chamber and the well head, whereby the combustion gases are injected through the injection conduit into the well head; and



a water pump connected to the injection conduit between the combustion chamber and the well head, the water pump injecting water into the injection conduit at a predetermined water injection rate, whereby the injected water is heated by the combustion gases and injected therewith into the well head via the injection conduit.

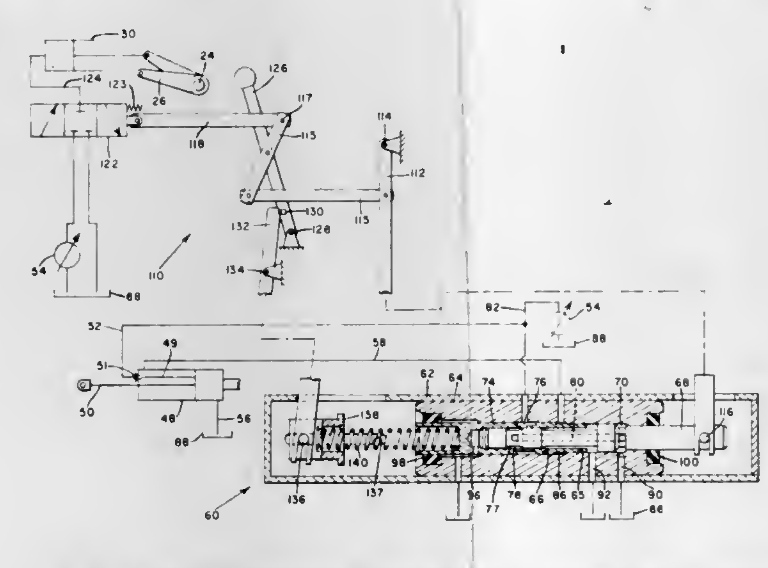
4,057,107
METHOD OF INITIATING UNDERGROUND IN-SITU COMBUSTION
Günter Pusch, Celle, and Rudolf Gedenk, Ovelgonne, both of Germany, assignors to Deutsche Texaco Aktiengesellschaft, Hamburg, Germany
Division of Ser. No. 595,266, July 11, 1975, Pat. No. 4,014,721, which is a continuation of Ser. No. 427,158, Dec. 21, 1973, abandoned. This application Nov. 2, 1976, Ser. No. 737,936
Claims priority, application Germany, Dec. 29, 1972, 2263960
Int. Cl.² C06B *25/02;* **E21B** *43/24*
U.S. Cl. 166—260 **11 Claims**

1. A method for initiating in-situ combustion in an underground formation containing a combustible material said formation being penetrated by an injection well which comprises the steps of:
a. introducing into said formation via said injection well an ignition mixture containing from about 2 to about 30 parts by weight of the total weight of said mixture of olefinic hydrocarbons or unsaturated fatty acids, from about 0.1 to 15 parts by weight of an organic peroxide and from about 0.001 to 0.1 parts by weight of a heavy metal salt,
b. injecting into said formation via said injection well an oxygen-containing gas,
c. continuing said injection of said oxygen-containing gas to ignite said combustible material in said formation.

4,057,108
COMPLETING WELLS IN DEEP RESERVOIRS CONTAINING FLUIDS THAT ARE HOT AND CORROSIVE
Leo P. Broussard, Picayune, Mich., assignor to Shell Oil Company, Houston, Tex.
Filed Nov. 19, 1976, Ser. No. 743,267
Int. Cl.² E21B *33/10, 43/00*
U.S. Cl. 166—314 **10 Claims**

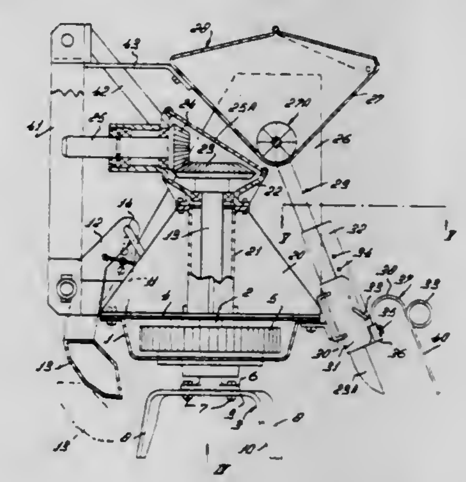
1. A well completing process which comprises:
drilling a borehole into a relatively deep, hot, highly pressurized subterranean reservoir which contains fluid which, at the reservoir conditions, is corrosive to low alloy steel;
installing in the borehole a casing string assembly in which the bottom portion has a corrosion resistant composition capable of resisting corrosion by the reservoir fluid at the reservoir conditions, with said bottom portion being at least about 20 feet long and being arranged to extend substantially into or through the reservoir interval;
equipping the borehole with wellhead components inclusive of a tubing string hanger capable of suspending and sealing around a tubing string extending within the casing string;
suspending a tubing string having a composition capable of resisting corrosion by the reservoir fluid at the reservoir conditions from the tubing hanger so that the tubing string extends into the corrosion resistant portion of the casing string;
establishing at least one path of fluid communication between the reservoir and the interiors of the tubing and casing strings;
circulating fluids within the tubing and casing strings to the extent required to establish a hydrostatic pressure within the bore-hole, at depth of the reservoir, which is less than the fluid pressure within the reservoir;
producing fluid from the reservoir by allowing an outflow of fluid through the top of the tubing string while injecting fluid into the top of the casing string-tubing string annulus at a rate and pressure sufficient to confine substantially all of the reservoir fluid that enters the borehole within the tubing string and the corrosion resistant portion of the casing string; and
as reservoir fluid flows up through the tubing string to a point beyond the tubing hanger, mixing substantially each portion reaching that location with a corrosion inhibitor effective for substantially preventing its corroding of a low alloy steel.

4,057,109
TRACTOR WITH HYDRAULIC DRAFT CONTROL
Roger John Nelson, Cedar Falls, Iowa, assignor to Deere & Company, Moline, Ill.
Filed Aug. 4, 1975, Ser. No. 601,659
Int. Cl.² A01B *63/112*
U.S. Cl. 172—7 **12 Claims**



1. In a tractor having power adjusting means for effecting adjustment of an associated implement to increase or decrease draft load, a draft load control comprising: a sourse of pressurized fluid; draft sensor means responsive to draft load and providing a fluid output proportional thereto; load control valve means having an output receiving and main chambers provided therein; pilot piston means positioned in the output receiving chamber and movable therein in response to the fluid output; means fluidly connecting the source to the main chamber responsive to the movement of the pilot piston means to afford or block pressurization of the main chamber by the source; main piston means positioned within the main chamber and movable therein with respect to the pilot piston means in response to the affording or blocking of pressurization, one of said piston means encircled at least at one end thereof by the other of said piston means and control means operatively associated with the main piston means and responsive to the movement of the main piston means to selectively actuate the power adjusting means to effect adjustment of the associated implement.

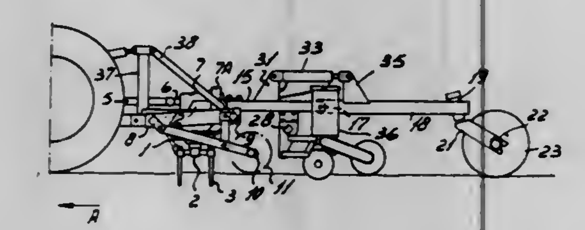
4,057,110
ROTARY HARROWS
Cornelis van der Lely, 7, Bruschenrain, Zug, Switzerland
Continuation of Ser. No. 504,076, Sept. 9, 1974, abandoned, which is a continuation of Ser. No. 312,881, Dec. 7, 1972, abandoned. This application Oct. 17, 1975, Ser. No. 623,422
Claims priority, application Netherlands, Jan. 7, 1972, 7271682
Int. Cl.² A01B *33/06, 33/10, 49/06*
U.S. Cl. 172—49 **7 Claims**



7. A rotary harrow comprising a frame with coupling means at the front of said frame for attaching the harrow to a prime mover, a plurality of soil working members rotatably mounted in a row on upwardly extending shafts supported on a portion of said frame and said row extending transverse to the direction of travel, driving means connected to at least some of said shafts to rotate said soil working members and the lower end of each driven shaft having a substantially horizontal portion which extends substantially perpendicular to the axis of rotation of the corresponding soil working member, said horizontal portion supporting at least one straight blade-like soil working element that extends in an inclined outward position with respect to its corresponding axis of rotation, the diameter of the path described by the lower end of said blade-like element exceeding the distance between the driven shafts of two neighboring soil working members so that overlapping paths are worked by those members, the leading edge of said blade-like element, with respect to the normal direction of rotation of its corresponding soil working member, having a straight cutting edge part that extends rearwardly and downwardly for at least two-thirds of the length of said blade-like element to said lower end, the rear edge of said blade-like element extending substantially straight and downwardly towards said lower end and substantially parallel to the shaft of the corresponding soil working member when that element is viewed from the side, said cutting edge part being located closer to the axis of rota-

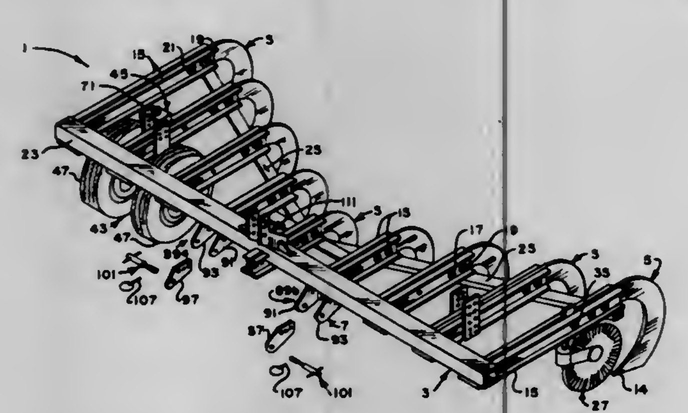
tion of the corresponding soil working member than is said rear edge.

4,057,111
SOIL CULTIVATING MACHINES
Ary van der Lely, Maasland, and Cornelis Johannes Gerardus Bom, Rozenburg, both of Netherlands, assignors to C. van der Lely N. V., Maasland, Netherlands
Filed Dec. 15, 1975, Ser. No. 640,731
Claims priority, application Netherlands, Dec. 16, 1974, 7416324
Int. Cl.² A01B *33/16, 33/06*
U.S. Cl. 172—72 **10 Claims**



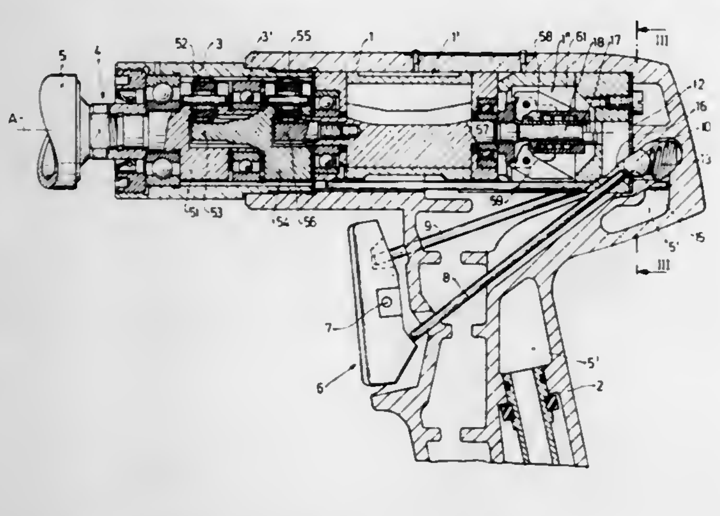
1. A soil cultivating machine comprising a frame and an elongated portion of said frame extending transverse to the direction of travel of the machine, a plurality of soil working members being rotatable about upwardly extending axes defined by upwardly extending shafts positioned in a transverse row and journalled in said frame portion, drive means connected to rotate said shafts, a supporting structure being located above said frame portion and comprising at least two transverse spaced apart beams, a front beam located adjacent the front of said frame portion and a rear beam positioned adjacent the rear of said frame portion, an elongated tool bar extending across substantially the entire working width of said row and said bar being positioned at the rear of said soil working members, rearwardly extending supporting means interconnecting said bar with said supporting structure, a part of said supporting means extending to the rear of said tool bar and at least one ground engaging support wheel being connected to said part, means for adjusting the vertical position of said bar with respect to said wheel, said bar together with said supporting means being detachably fastened to the supporting structure of said machine.

4,057,112
SUBSOIL PLOW
Quentin Taylor, Bethany, Ill., assignor to Grain Systems, Inc., Assumption, Ill.
Filed July 14, 1976, Ser. No. 705,150
Int. Cl.² A01B *13/08, 59/06, 61/04*
U.S. Cl. 172—166 **9 Claims**



1. A subsoil plow having a rigid frame, a plurality of plow teeth, means for mounting each of said teeth on the frame in a plowing position, and means for hitching said frame to a tractor or the like, said tractor being adapted to pull the plow through a field with said teeth penetrating the ground to a desired depth, each of said teeth being a generally forward facing member having an upper portion, a downwardly extending shank, and a bottom tip portion, said mounting means comprising pairs of frame members, one pair for each said tooth, spaced for receiving the upper portion of a respective tooth, said tooth being connected to said frame members by safety release means adapted to release said tooth upon application of a predetermined load to said tooth as occasioned upon the tooth striking an object as it is pulled through the field and by a pivot member located directly above said tip portion of the tooth so that in the event said safety release means releases said tooth while the plow is being drawn through the field, said tooth will rotate rearwardly and upwardly about said pivot member up out of the ground without said tip portion moving below its plowing position, said teeth being arranged in a generally V-shaped array with one of the teeth constituting a center tooth being disposed substantially on the longitudinal center line of the plow forward of the other teeth and with at least one pair of said teeth being spaced laterally outwardly and rearwardly of said center tooth, on both sides thereof, said frame comprising a forward main frame member, said pairs of frame members extending rearwardly from said forward main frame member with one pair of said frame members being located substantially on the longitudinal center line of said plow holding said center tooth, said one pair of frame members being shorter than the other pairs of said frame members, and with said other pairs of frame members being spaced equidistantly from one another and each of said other pairs extending rearwardly a distance greater than its inner adjacent pair of said frame members thereby to hold said teeth in said generally V-shaped array.

4,057,113
PNEUMATICALLY POWERED HAND TOOL WITH SPEED-CONTROL GOVERNOR
Kurt Paule, Stuttgart; Karl Roll, Leinfelden, and Max Burklin, Waldenbugh, all of Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany
Filed Aug. 3, 1976, Ser. No. 711,411
Claims priority, application Germany, Aug. 22, 1975, 2537395
Int. Cl.² B23Q *5/027*
U.S. Cl. 173—12 **10 Claims**



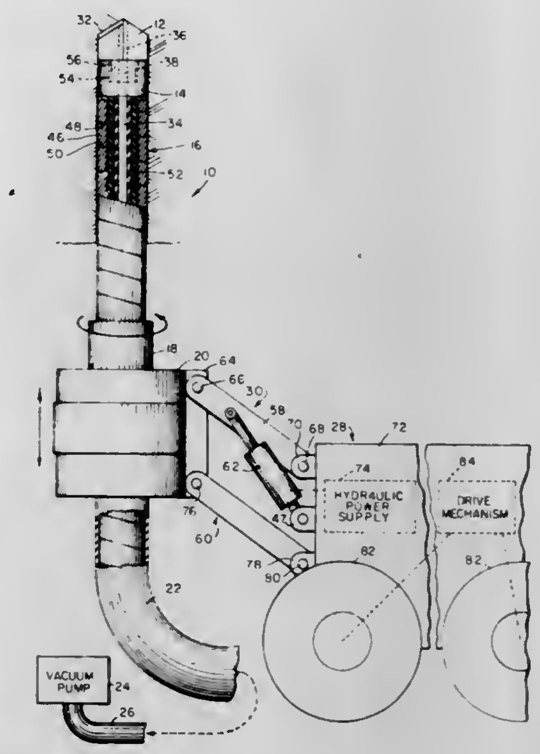
1. A pneumatic hand tool comprising:
a housing having a compressed-gas inlet;
a pneumatically powered motor in said housing;
a tool holder on said housing connected to said motor;
a governor in said housing connected to said motor;
a normally open speed-control valve in said housing closable by said governor only on said motor reaching a predetermined speed;
means including one gas passage extending between said gas inlet and said governor for feeding compressed gas to said motor through said speed-control valve, whereby said motor is operated at or below said predetermined speed;
means including another gas passage extending between said inlet and said motor around said speed-control valve and a bypass valve in said other passage displaceable between an open position for feeding compressed gas directly to said motor and thereby operating same at a speed greater than said predetermined speed and a closed position wherein said motor can operate no faster than said predetermined speed; and
an operating member on said housing displaceable by the user of said tool and engageable with said bypass valve for displacing same into said open position.

4,057,114
HAND-HELD ICE AUGER
Paul J. Anderson, 947 Poplar St., Hancock, Mich. 49930
Filed Jan. 7, 1976, Ser. No. 647,209
Int. Cl.² E21B *3/02*
U.S. Cl. 173—26 **2 Claims**

1. A hand-held auger powered by a remotely located engine, the combination comprising:
a flexible shaft;
first coupling means fastened to one end of the flexible shaft for attaching it to a rotating shaft on said engine;
a housing having an opening which receives the other end of said flexible shaft;
gear reduction means disposed in said housing and including a drive shaft which is coupled for rotation by said flexible shaft at a substantially reduced rate therefrom;
an auger bit; and
second coupling means for connecting the auger bit to said drive shaft, said second coupling means including:
an auger extension shaft which is rotatably mounted to said housing and extends through a second opening therein to connect with said auger bit, said auger extension shaft also being mounted for translational motion between an engaged position in which it couples to said drive shaft for rotation thereby and a disengaged position in which it is decoupled from said drive shaft;
a bias spring which urges said auger extension shaft into its disengaged position; and
a handle which is disposed around said auger extension shaft and beneath said housing, said handle being restrained from motion along the axis of said auger extension shaft but being freely rotatable thereabout.

4,057,115
FLEXIBLE SHAFT FOR A ROOF DRILL
John Blanz, Carlisle, Mass., assignor to The United States of America as represented by the Secretary of the Interior, Washington, D.C.
Filed May 7, 1976, Ser. No. 684,019
Int. Cl.² B23Q *5/00*
U.S. Cl. 173—160 **9 Claims**

1. A flexible shaft for a roof drill comprising:
a. a rock bit
b. flat band wound in a helical configuration defining an outer casing, adjacent convolutions of said flat band in nesting relationship with one another at edges thereof to form outer and inner concentric flat cylindrical surfaces for said outer casing;
c. a circular rod wound in ak helical configuration defining an intermediate casing that is disposed within said outer casing, adjacent convolutions of said circular rod touching one another and in close adjacency with said inner surface of said outer casing;
d. a tubular member having a hollow core defining a longitudinal passage, said tubular member disposed within said intermediate casing and defining an inner sleeve having an outer surface in close adjacency with surfaces of said intermediate casing;

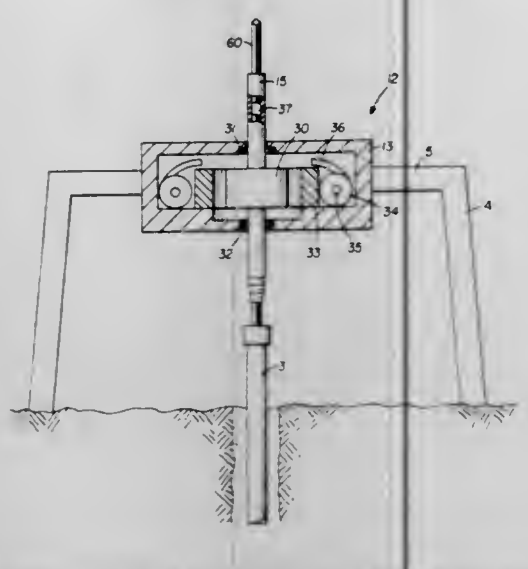


e. said outer casing wound in a first direction and said intermediate casing wound in a second direction, said first direction opposite said second direction, said outer casing, said intermediate casing, and said inner sleeve coaxially disposed about a longitudinal axis of said shaft and extending the length of said shaft, and
f. a transition member having one end of said flat band and circular rod attached thereto and said rock bit mounted thereon for a drilling operation therewith.

4,057,116
SLIM HOLD DRILLING
John H. Striegler, Richardson, Tex., assignor to Atlantic Richfield Company, Los Angeles, Calif.
Continuation of Ser. No. 307,544, Nov. 17, 1972, abandoned, which is a division of Ser. No. 223,484, Feb. 4, 1972, Pat. No. 3,724,562, which is a division of Ser. No. 65,177, Aug. 9, 1970, Pat. No. 3,670,832. This application May 8, 1974, Ser. No. 467,947
Int. Cl.² E21B *3/04, 3/10*
U.S. Cl. 173—165 **2 Claims**

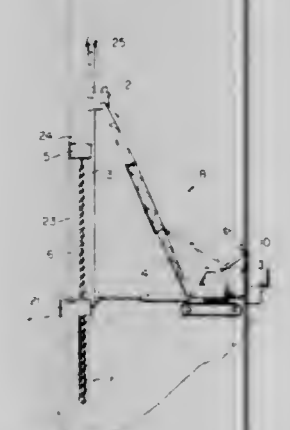
1. In a drilling rig having a space in its floor for a rotary table, the improvement comprising a power unit carried by said rig floor in the space for said rotary table, said power unit comprising a support means carried by said rig floor in the space for said rotary table, an electric motor means having a

hollow rotor shaft, said motor means being carried by said support means so that the ends of its rotor shaft extend above



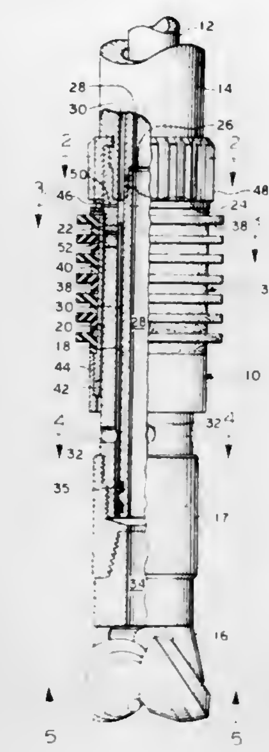
and below said support means, said rotor shaft being adapted to receive a kelly in its hollow interior to drive said kelly.

4,057,117
AUGER SPOIL DISPOSAL BOX
Christopher William Bermingham, Dundas, Canada, assignor to Bermingham Construction Limited, Hamilton, Canada
Filed July 27, 1976, Ser. No. 708,948
Claims priority, application Canada, Aug. 29, 1975, 234632
Int. Cl.² E02D *17/144*
U.S. Cl. 175—88 **12 Claims**



1. A drilling apparatus comprising: an auger for drilling a hole in the ground; leads extending parallel to and supporting said auger and means for guiding said auger to move longitudinally of said leads during drilling; drive means for rotating said auger and for moving said auger longitudinally of said leads; and a container for receiving spoil produced by said auger during drilling, said container being guided upon a lower end of said leads, said auger extending through said container and said container being movable on said leads independently of said auger; means for moving said container longitudinally of said leads independently of said auger between a ground-engaging loading position, wherein the container is situated on the ground at the top of a hole being drilled by the auger to receive spoil removed from the hole by the auger, and an elevated dumping position wherein the container is raised above the ground, and means for discharging spoil from the container when the latter is in the dumping position.

4,057,118
BIT PACKER FOR DUAL TUBE DRILLING
George Alan Ford, Houston, Tex., assignor to Walker-Neer Manufacturing Co., Inc., Wichita Falls, Tex.
Filed Oct. 2, 1975, Ser. No. 618,811
Int. Cl.² E21B *17/00, 17/04, 21/00*
U.S. Cl. 175—215 **10 Claims**



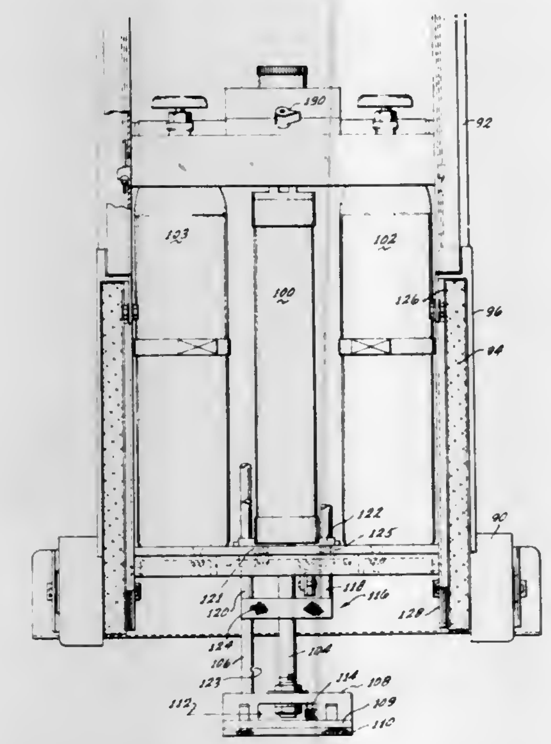
1. A bit packer for use with a string of dual concentric drill pipe above a bit comprising:
an inner tubular member including means for providing fluid-tight interconnection with the inner pipe of said string to provide a conduit for drilling fluid and cuttings from bit to surface;
an outer tubular member arranged concentrically with said inner member and including means for providing fluid-tight interconnection with the outer pipe of said string to provide an annular conduit for drilling fluid from surface to bit;
packing means encircling said outer member and adapted to contact the hole wall and seal the annular space between the hole wall and the outer member;
bearing means for mounting said packing means rotatably with respect to said outer member; and
means for providing a flow of drilling fluid from said annular conduit to said bearing means.

4,057,119
POWERED HAND TRUCK FOR CLIMBING STEPS
James L. Melson, 11365 Orcas Ave., Lake View Terrace, Calif. 91342
Filed Jan. 19, 1976, Ser. No. 650,279
Int. Cl.² B62B *5/02*
U.S. Cl. 180—8 A **28 Claims**

1. A powered hand truck capable of climbing stair steps comprising:
a frame extending in a longitudinal direction from a lower end to an upper end and extending laterally from a left side to a right side, having a front side for retaining a load and a back side, and having a pair of runners extending in the longitudinal direction along the lower portion of the back of said frame;
a pair of support wheels attached for rotation about a common lateral axis to the lower end of said frame;
powered means pivotally connected to said frame for limited rotational swinging movement about a lateral axis, said powered means having a powered ram and being selectively operable to extend said ram in a generally longitudinal direction below said wheels, and to maintain said ram held at an attained extension, and to retract said ram;

manually actuable means for operating said powered means to extend said ram for elevating the hand truck to an upper stair step; and
neutralizing means connected between said frame and said powered means and responsive during extension of said ram in climbing a stair step to predetermined pivotal rotation of said powered means toward said front side of said frame as the elevated hand truck begins to roll onto the stair step for automatically operating said powered means to terminate further extension of said ram and maintain the then-attained extension of said ram.

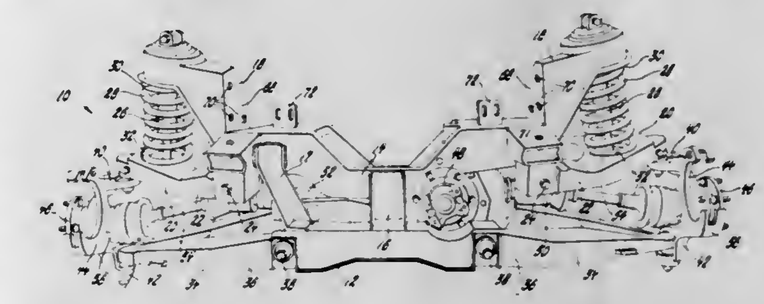
22. In a powered hand truck having a frame extending in a longitudinal direction from a lower end to an upper end and extending laterally from a left side to a right side and having a front side for retaining a load and a back side, having a pair of runners extending in the longitudinal direction along the lower portion of the back of the frame having a pair of wheels attached for rotation about a common lateral axis to the lower end of the frame, having powered means pivotally connected to the frame for limited movement about a lateral axis and having a ram controllably extensible in a generally longitudinal direction below the wheels and controllably retractable, the improvement comprising:
a guard, extensible below the wheels and retractable with the ram, and pivotable with the powered means, disposed



to the rear of the powered means and frontward of said runners, whereby when the hand truck rolls onto a step the guard shields the ram from contacting the edge of the step and limits the rearward roll of the hand truck onto the step until the ram is retracted.

26. In a powered hand truck having a frame extending in a longitudinal direction from a lower end to an upper end and extending laterally from a left side to a right side and having a front side for retaining a load and a back side, having a pair of runners extending in the longitudinal direction along the lower portion of the back of the frame having a pair of wheels attached for rotation about a common lateral axis to the lower end of the frame, said wheels including selectively engageable ratchets, having powered means pivotally connected to the frame for limited movement about a lateral axis and having a ram controllably extensible in response to actuation of an extension trigger by the operator in a generally longitudinal direction below the wheels and controllably retractable, and having neutralizing means connected between the frame and the powered means and responsive to predetermined motion of said powered means relative to said frame for automatically operating said powered means to terminate further extension of said ram and maintain the then attained extension of said ram, the improvement comprising:
a tripping mechanism interconnected between the extension trigger and the ratchets of the wheels for engaging the wheel ratchets when the extension trigger is actuated.

4,057,120
FRONT WHEEL DRIVE AND SUSPENSION ARRANGEMENT
Jerry M. Roethlisberger, Bridgeport, Mich., assignor to General Motors Corporation, Detroit, Mich.
Filed May 19, 1975, Ser. No. 578,524
Int. Cl.² B60K *17/30, 17/34*
U.S. Cl. 180—44 R **2 Claims**



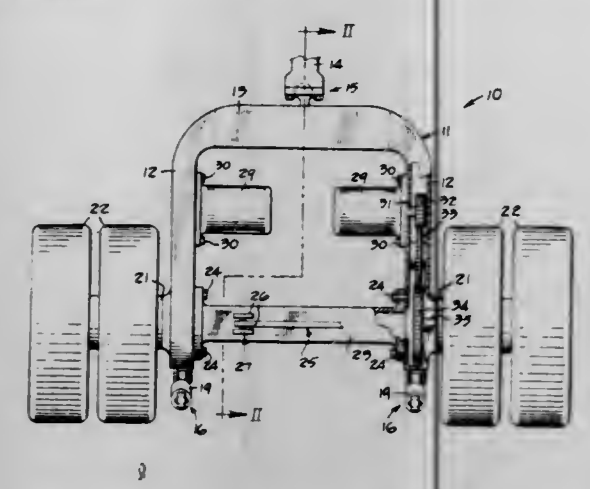
1. For attachment to the front portion of a vehicular frame as a preassembled unit, an independent front wheel drive and suspension subassembly comprising vertically spaced upper and lower cross members extending laterally across said frame, a centrally located strap member interconnecting said cross members, a pair of steering knuckles each having a central opening and upper and lower support members formed thereon, a lower control arm pivotally connected at the ends thereof between each end of said lower cross-member and one of said lower support members, an upper control arm pivotally connected at the respective ends thereof between each end of said upper cross member and one of said upper support members, a spring tower including a vertical wall portion secured to each of the respective ends of said upper cross member and a substantially horizontal seat portion extending outwardly from said vertical wall portion, a plurality of mounting apertures formed in each of said vertical wall portions, a mounting bracket formed on the upper surface of the upper lateral cross member adjacent each end thereof a predetermined distance from said vertical wall portion, said mounting brackets and said apertured vertical wall portions adapted to receive fastener means for securing said independent front wheel drive and suspension subassembly to said front portion of said vehicular frame, a concentric coil spring and shock absorber mounted between said seat portion of each of said spring towers and the upper surface of said upper control arms, a differential mounted between said lower and upper cross members adjacent one side of said centrally located strap member, a drive axle operatively connected to each side of said differential and extending therefrom through the space between said lower and upper cross members and thence through said opening in said adjacent steering knuckle, a wheel mounting plate mounted on the end of each of said drive wheels adjacent said steering knuckle.

4,057,121
MODULAR REAR AXLE SUSPENSION AND DRIVE ARRANGEMENT FOR TRUCKS
Robert N. Stedman, Chillicothe, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.
Filed Mar. 8, 1976, Ser. No. 664,719
Int. Cl.² B60K *1/00*
U.S. Cl. 180—56 **12 Claims**

1. A modular axle suspension and drive arrangement adapted for attachment to the main frame of a vehicle comprising
a generally U-shaped sub-frame having a pair of laterally spaced side beams secured together at forward ends thereof by a forward cross-beam disposed transversely relative thereto,

a drive motor, having an output shaft, mounted on each of said side beams,

a spindle secured on a rearward end of each of said side beams and extending laterally outwardly therefrom, the drive motor mounted on each of said side beams being disposed longitudinally between said spindle and said cross-beam,



at least one roadwheel rotatably mounted on each of said spindles, and

drive means drivingly interconnected between the output shaft of each drive motor and a respective roadwheel for selectively driving the same.

4,057,122

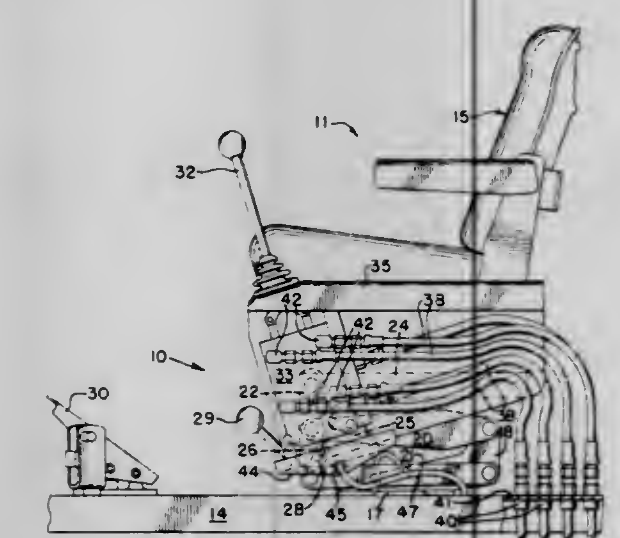
CONTROL ARRANGEMENT FOR A VEHICLE WITH AN ADJUSTABLE SEAT

Roy D. Brownell, and Dean M. Lawrence, both of Aurora, Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed July 6, 1976, Ser. No. 702,545

Int. Cl.² B60K *26/00*

U.S. Cl. 180—77 S **3 Claims**



1. A vehicle comprising:

a frame;

an operator station selectively positionable relative to the frame;

foot control means mounted on the frame and operable from the operator station for operably controlling the vehicle;

hand control means mounted on and operable from the operator station for operably controlling the vehicle and movable with the station relative to the foot control; and

means mounted on and operable from the operator station for selectively positioning the station relative to the foot control and movable with the station relative to the foot control.

4,057,123

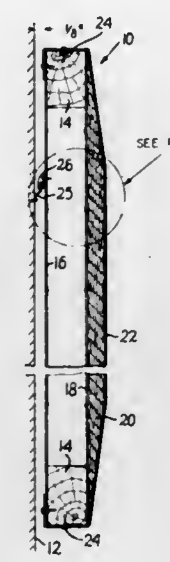
LIGHTWEIGHT SOUND ABSORBENT PANELS HAVING HIGH NOISE REDUCTION COEFFICIENT

Gordon A. Erickson, St. Paul, Minn., assignor to Conwed Corporation, St. Paul, Minn.

Filed Dec. 3, 1975, Ser. No. 637,415

Int. Cl.² E04B *2/74*

U.S. Cl. 181—286 **8 Claims**



1. A portable sound absorbing panel which has a fire rating of Class 1 according to ASTM Test No. C-423-66 comprising:

a. a frame comprising a plurality of framing members capable of receiving staples, said frame defining an area and said frame having front and rear faces;

b. a layer of sheet material affixed to said front and rear faces of said frame and defining a volume therebetween, said sheet material being a fire resistant laminate;

c. at least one layer of sound absorbing material positioned on one of said faces atop said layer of sheet material said sound absorbing material being a glass fiber blanket having a density of from about ½ to about 3 pounds per cubic foot;

d. a covering material on top of the said sound absorbing material said covering material being selected from the group consisting of woven fiberglass and polyesters which have been chemically treated for fire retardancy;

e. said volume being at least about ¼ inch in thickness throughout a substantial portion of said area of said frame.

4,057,124

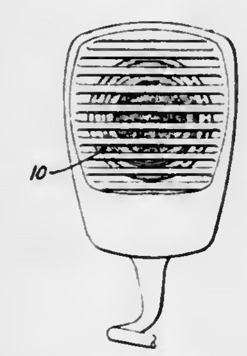
SOUND SUPPRESSOR

Harold C. Braden, 7589 Bear Creek Road, Fairview, Pa. 16415

Filed Dec. 30, 1975, Ser. No. 645,417

Int. Cl.² F01N *7/00*

U.S. Cl. 181—242 **3 Claims**



1. A sound suppressor for a microphone, said microphone having a voice passage therein, comprising:

two annular sheets of metal foil, each having an opening in the center,

a round disc of metallic foil and a round disc of soft, paper-towel-like material resting on each other and sandwiched between said annular sheets of metal foil, concentric with each other and closing said opening in the center and secured to said annular sheets of foil along the periphery of said opening,

adhesive material holding said annular sheets together and holding said discs therebetween, and

the outside of one said annular sheet of material having pressure-sensitive adhesive thereon for holding said sound suppressor to said microphone over said voice passage.

4,057,125

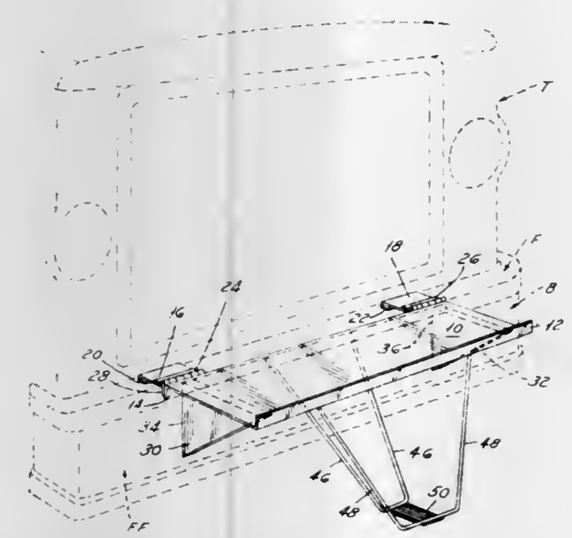
BUMPER-MOUNTED TRUCK SERVICING PLATFORM

Frederick J. Kroft, R.F.D. No. 1, Box 90, Medaryville, Ind. 47957

Filed Nov. 29, 1976, Ser. No. 745,787

Int. Cl.² B60R *3/00*

U.S. Cl. 182—91 **2 Claims**



1. A service platform for removable mounting on a vehicle bumper disposed adjacent a vertical wall portion of the vehicle, the bumper having an upper flange extending horizontally toward such wall portion and a front vertical flange providing a frontal face, comprising, in combination:

a generally planar rectangularly shaped platform member;

a pair of hooks each having a planar first portion adapted to overlie the upper edge of the bumper and extend completely thereacross, and a planar second portion connected to the first portion at an edge thereof and underlying the first portion and disposed in parallel space relation therefrom a distance only slightly exceeding the thickness of the upper flange of the bumper, whereby said hook must be slidably inserted or removed over the inner edge of the top flange in a substantially horizontal direction, and wherein the free length of the planar second portion of each hook is less than the horizontal distance between the inner edge of the bumper upper flange and the adjacent vertical wall of the vehicle but of sufficiently great length so that said hook cannot be pivoted upwardly when operatively embracing such flange;

said hooks being spaced apart along a longer side of the platform and pivotally connected thereto at the edge of the platform;

said platform being swingable relative to the hooks to a substantially vertical position while the hooks are in a horizontal position and shiftable toward the vertical wall of the vehicle to dispose said second hook portion between the inner edge of the bumper upper flange and the vertical wall of the vehicle and said platform shiftable away from said vertical wall of the vehicle to cause said hooks to slidably embrace the bumper upper flange;

said platform including a pair of braces disposed on the underside thereof in laterally spaced apart relation for engaging the frontal face of the bumper when the platform is in a horizontal position with the hooks embracing the bumper upper flange;

said hinge connection between the hooks and platform being disposed at the intersection of the upper flange and vertical flange of the bumper when the platform is mounted on the bumper whereby the weight of the platform and a load carried thereby is taken by the first hook portion in flat face-to-face engagement with the bumper upper flange; and

a step connected to the platform and disposed spaced below and somewhat forwardly of the same.

4,057,126

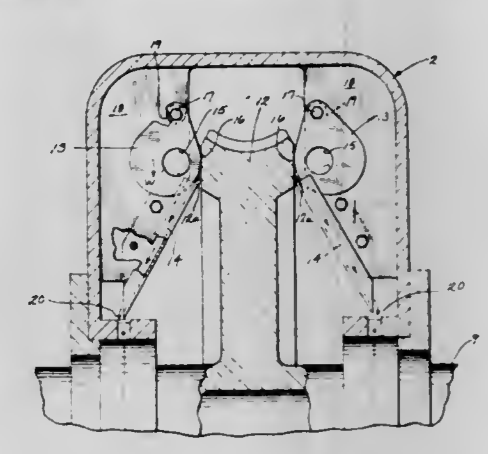
LUBRICANT WIPER

Robert K. Stephens, Brookfield, Wis., assignor to The Falk Corporation, Milwaukee, Wis.

Filed Mar. 25, 1976, Ser. No. 670,208

Int. Cl.² F01M *1/00*

U.S. Cl. 184—11 R **4 Claims**



1. A self-adjusting lubricant wiper for wiping lubricant from a generally vertical side of a rotating object, said wiper being adapted to be pivotally connected to a support for positioning near said rotating object, said wiper being a generally tear-drop shaped member which is adapted to be pivotally attached to the support at its narrow upper end, said wiper having a center of gravity which is to the opposite side of the pivot point of the curved wiping surface so that the wiping surface is maintained by gravity in a wiping relationship with the side of said rotating object.

4,057,127

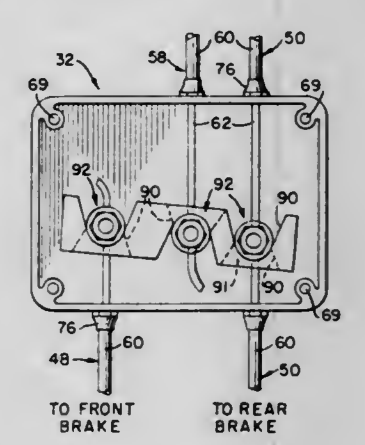
SAFETY ACTUATING DEVICE ADAPTED FOR TWO WHEELED VEHICLES

Cooper Coolidge Woodring, Plandome, N.Y., assignor to J. C. Penney Company, Inc., New York, N.Y.

Filed Nov. 6, 1975, Ser. No. 629,573

Int. Cl.² B62L *3/08*

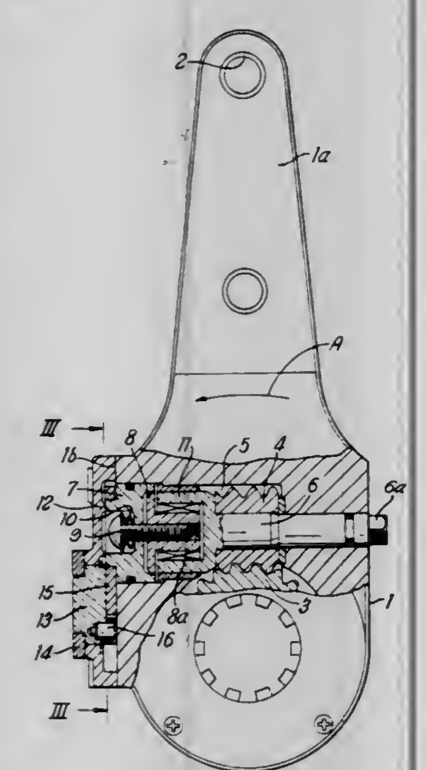
U.S. Cl. 188—24 **19 Claims**



1. A safety actuating brake device for controlling the application of braking action to a vehicle having at least two wheels, one wheel being a forward wheel, the other wheel being a rearward wheel, each wheel having associated therewith means for braking and unbraking the rotation thereof in response to displacement inputs directed thereto and forward and rearward associated operator control means which comprises:

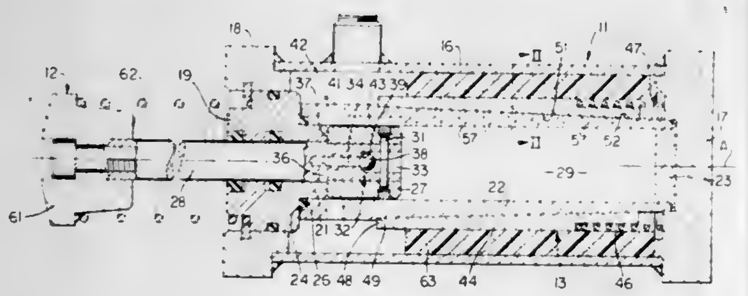
a. movable control means positioned intermediate the forward and rearward braking means and the associated operator control means and being displaceable for at least initiating braking action on the rear wheel in response to at least one displacement input;
b. means operatively communicating said movable control means with said rearward braking means;
c. means operatively communicating said rearward operator control means with said movable control means and with said associated rearward braking means;
d. means operatively communicating said movable control means with said forward braking means;
e. means operatively communicating said forward operator control means with said movable control means, wherein the operative communication between the forward and rearward operator control means to said movable control means and the operative communication between said movable control means to said respective forward and rearward vehicle wheels being such that actuation of said associated rearward operator control means produces at least a corresponding displacement and braking action of said rearward wheel, and actuation of said associated forward operator control means produces a displacement of said movable control means which enables at least an initial displacement of said rearward brake means which at least initially exceeds the displacement and braking action applied to said forward wheel thereby assuring at least initial rearward braking action on said vehicle when operational control movements are applied to either said rearward or forward operator controls.

4,057,128
SLACK ADJUSTERS FOR VEHICLE BRAKES
Ralph Coupland, Lincoln, England, assignor to Clayton Dewandre Company Limited, Lincoln, England
Filed Feb. 5, 1976, Ser. No. 655,500
Claims priority, application United Kingdom, Feb. 12, 1975, 5943/75
Int. Cl.² F16D *65/56*
U.S. Cl. 188—79.5 K **7 Claims**



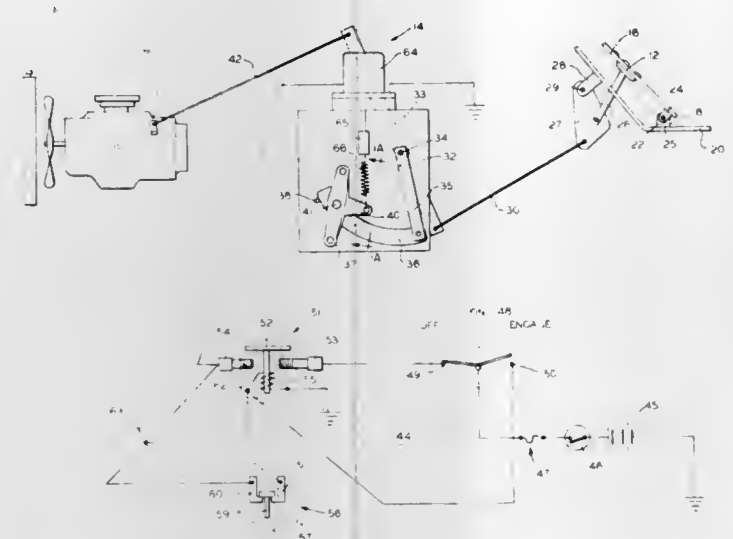
1. An automatic slack adjuster for a vehicle brake mechanism comprising a rockably mounted actuating arm, a rotatable worm wheel on said arm meshed with said worm and adapted to be secured upon a brake camshaft, the axis of said worm being perpendicular to that of the camshaft, means connecting said arm to actuating means for rocking said arm about the axis of said camshaft during brake operation, a member pivotally mounted on said arm for oscillation about a fixed axis, means whereby said member is displaced about its pivot axis when said arm is rocked through more than a predetermined angle in the brake applying direction, motion transmitting means extending between said member and said worm comprising a unidirectional sprag clutch so constructed and arranged that whenever said arm rocks through more than said predetermined angle to rotate said camshaft in the brake applying direction the resultant pivotal displacement of said member is ineffective to rotate said worm but upon rocking of said arm in the return direction said member is effective to rotate said worm and thereby rotate said worm wheel to impart a corrective adjustment to said camshaft, a friction clutch in said motion transmitting means having frictionally engaged elements and means resiliently biasing said elements together, said biasing means providing for drive interruption in said friction clutch when the load at the brake camshaft exceeds a predetermined amount during said return movement of said member.

4,057,129
SELF ADJUSTING ENERGY ABSORBER EMPLOYING CONICAL CONTROL SLEEVE
Ransom J. Hennells, 45500 N. Territorial Road, Plymouth, Mich. 48170
Filed June 28, 1976, Ser. No. 700,616
Int. Cl.² F16F *9/48*
U.S. Cl. 188—285 **8 Claims**



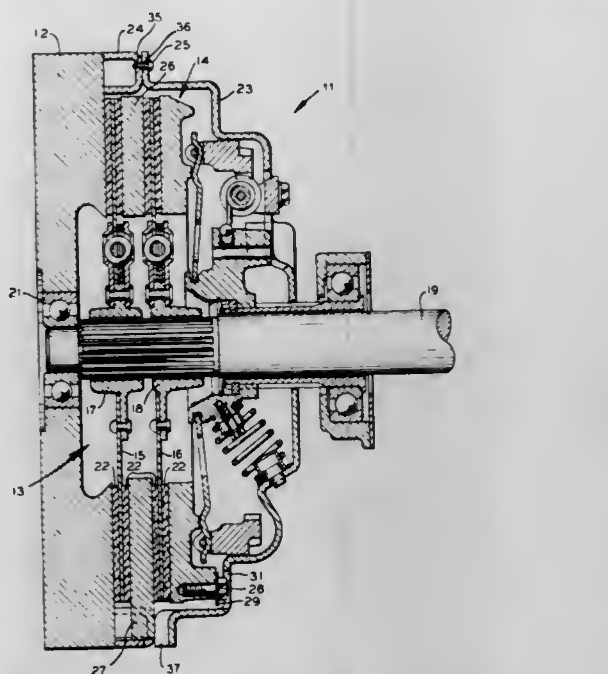
1. In a fluid-type energy absorber having a substantially closed housing, ram means slidably disposed on said housing for receiving a shock load thereon, said ram means including a piston slidably disposed within said housing and fixedly connected to a piston rod extending outwardly from one end of said housing, a sleeve member disposed within said housing and cooperating with said piston for forming first and second fluid chambers which are in selective fluid communication with one another, said piston being slidably supported for displacement relative to said sleeve member in the axially extending direction thereof, and flow passage means providing selective fluid communication between said first and second chambers for limiting the fluid flow between said chambers for absorbing the energy of an externally applied load as said piston is moved axially relative to said sleeve member, said flow passage means including opening means extending radially through the wall of said sleeve member and being elongated in the axially extending direction of said sleeve member, the improvement comprising control means for automatically adjusting said flow passage means responsive to the magnitude of the externally applied load to at least momentarily increase the minimum flow area of said flow passage means substantially in proportion to the pressure increase of the fluid within one of the chambers as said pressure increases in response to imposition of an external load, said control means including a control sleeve which is relatively movable with respect to said sleeve member for increasing the minimum flow area of said flow passage means, said control sleeve being concentric with said sleeve member and extending axially thereof over at least that portion of said sleeve member containing said opening means therein, said piston being slidably engaged with one of the annular peripheral surfaces of said sleeve member, and said control sleeve being closely positioned adjacent the other annular peripheral surface of said sleeve member.

4,057,130
THROTTLE HOLDING DEVICE
Dean S. Robertson, Aurora, Ill., assignor to Clark Equipment Company, Buchanan, Mich.
Filed Sept. 25, 1975, Ser. No. 616,737
Int. Cl.² B60K *29/02*
U.S. Cl. 192—3 T **4 Claims**



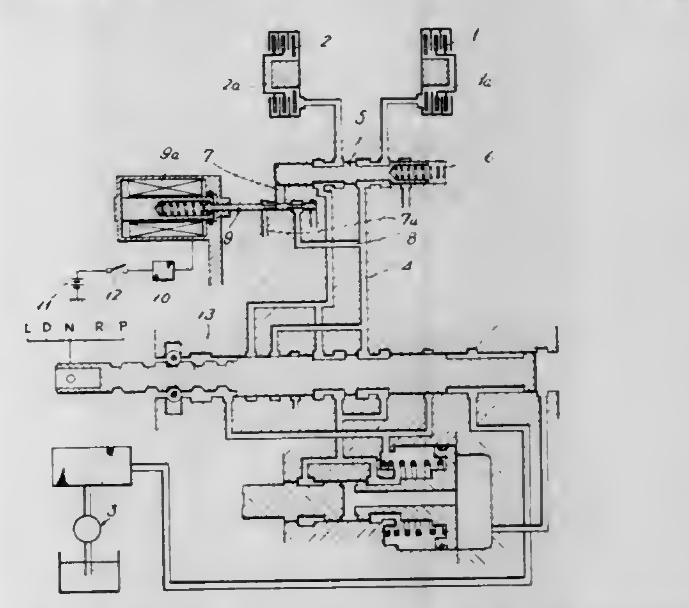
1. A holding device for a throttle of an internal combustion engine including an internal combustion engine throttle lever, a throttle rod operatively connected to the throttle lever, the throttle rod being segmented into two portions having a bell crank mechanism disposed between respective ends of opposite portions of the throttle rod, the first segment of the throttle rod operatively connected between the throttle lever and one end portion of the bell crank mechanism, the second segment of the throttle rod operatively connected between the opposite end of the bell crank mechanism and one end of the second segment of the throttle rod, the opposite end of the second segment of the throttle rod being operatively connected to a throttle pedal operable to urge the throttle lever toward a throttle open position, the bell crank mechanism having a mounting member, a bellcrank lever pivotally mounted on the member, a coextensive member rigidly connected adjacent the bellcrank lever, the coextensive member engageable with a friction device capable of gripping said coextensive member to retain the bell crank mechanism and the throttle rod connected thereto in a preset position, and means for operating the friction device including an electrical solenoid capable when energized of urging the brake into engagement with the coextensive member to restrict its movement, and an operating circuit for engaging and disengaging the solenoid, said circuit comprising an energy source, a manually operated electrical switch for connecting said electrical energy means to the solenoid, a three-position switch disposed in the circuit engageable in a first position to activate the circuit, in a second position to maintain the circuit in an operating condition and in a third position to deactivate the circuit, a magnetic switch engageable upon engagement of the three-position switch to the first position, the engagement of the magnetic switch supplying electrical energy to the solenoid for operation thereof, and a hydraulically operated switch provided in the operating circuit capable of disconnecting the solenoid from said electrical energy source when the hydraulic pressure in the switch is above a predetermined minimum, whereby the throttle lever is movable between a throttle closed position and a throttle open position and the friction device may be engaged to hold the throttle rod in a predetermined position which maintains the throttle lever in an open position and may be disengaged to release the throttle rod and return the throttle lever to a closed position.

4,057,131
MULTIPLE DISK CLUTCH STAMPED ADAPTER RING
Richard A. Flotow, Fort Wayne, Ind., assignor to Dana Corporation, Toledo, Ohio
Filed May 10, 1976, Ser. No. 684,626
Int. Cl.² F16D *13/00*
U.S. Cl. 192—70.13 **5 Claims**



1. An adapter ring attached to a clutch cover to extend the axial length of the clutch cover to accommodate a clutch assembly of increased length, the adapter ring comprising: a stamped sheet metal annular element having a generally "U"-shaped cross-section with a central portion, an outwardly facing leg and an inwardly facing leg wherein said central portion and said inwardly facing leg have a plurality of slots formed therein for receiving lugs of a driven plate.

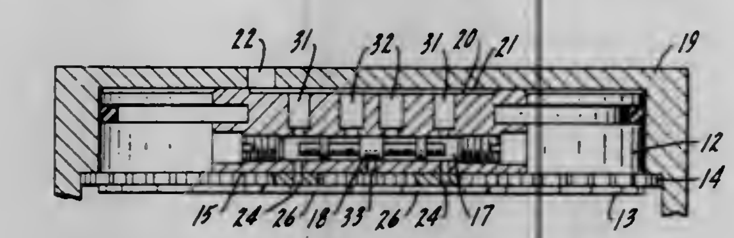
4,057,132
SHIFT CONTROL FOR HIGH AND LOW SPEED CLUTCHES OF MOTORCARS
Torao Hattori, Wako, and Masakazu Maezono, Niiza, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan
Filed Apr. 5, 1976, Ser. No. 673,891
Claims priority, application Japan, Apr. 8, 1975, 50-41776
Int. Cl.² F16D *25/10, 43/284*
U.S. Cl. 192—87.19 **1 Claim**



1. A control apparatus for motorcars, having an automatic transmission with a speed-change sensor and a shift valve therein, for controlling the operation of the latter, the apparatus comprising an oil-pressure operated high-speed clutch interposed in a high-speed system, and an oil-pressure operated low-speed clutch interposed in a low-speed system of said

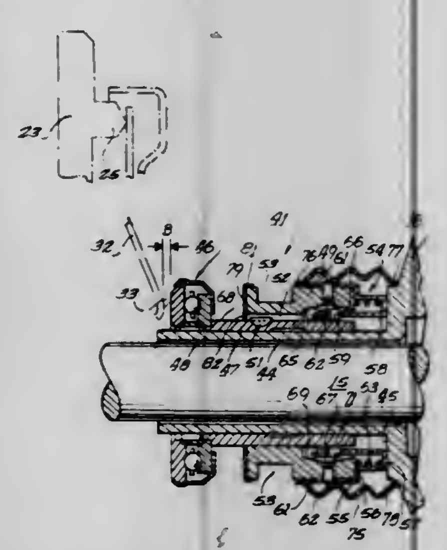
transmission, said systems being selectively connectable through said shift valve to a line pressure supply passage connected to an oil-pressure source and having a manually operable valve interposed therebetween, wherein said shift valve is operable by the oil pressure in one of a plurality of operational modes of said transmission, and has at one end an oil-pressure chamber connectable to said supply passage through an electromagnetic pilot valve responsive to said sensor.

4,057,133
SLIP SPEED RESPONSIVE DEVICE FOR CONTROLLING ENGAGEMENT OF FLUID ACTUATED CLUTCH
John J. Tuzson, Evanston, Ill., assignor to Borg-Warner Corporation, Chicago, Ill.
Filed May 24, 1976, Ser. No. 689,423
Int. Cl.² F16D *43/284*
U.S. Cl. 192—103 F **6 Claims**



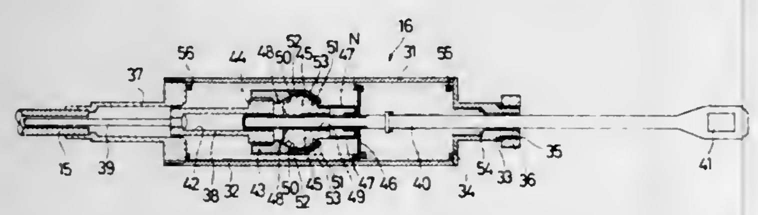
1. In a fluid actuated friction clutch having rotatable driving and driven elements and a fluid pressure responsive piston for engaging said elements, said piston and one of said elements forming a chamber adapted to receive fluid under pressure, the improvement comprising a bleed passage communicating with said chamber, and fluid control means responsive to relative rotation of said elements for increasing the rate of bleed from said chamber as the relative rotation of said elements decreases, said fluid control means including a cylinder communicating with said chamber, spaced vent passages communicating with said cylinder, a fluid pressure responsive shuttle valve movable in said cylinder between positions blocking and unblocking said bleed passage, and means rotatable in response to rotation of one of said elements for alternately blocking said vent passages, thereby developing fluid pressure forces acting on said shuttle valve.

4,057,134
AUTOMATIC CLUTCH WEAR ADJUSTER
Sidney Ulane Gatewood, Roseville, Mich., assignor to Borg-Warner Corporation, Chicago, Ill.
Filed May 28, 1976, Ser. No. 691,059
Int. Cl.² F16D *13/75*
U.S. Cl. 192—111 A **21 Claims**



1. A self-adjusting clutch release bearing assembly operated by a clutch release fork, the clutch including clutch release levers adapted to be engaged by a release bearing to disengage the clutch, said bearing assembly comprising a bearing carrier adapted to axially reciprocate on the driven shaft and including a sleeve encompassing the driven shaft and supporting the release bearing, a collar telescoped over said sleeve and adapted to move relative thereto, means to limit movement of said collar away from said clutch, said clutch release fork being operatively connected to said collar, a pair of opposed one-way clutches between said sleeve and collar, and biasing means urging said one-way clutches apart so that at least one clutch is always engaged with said collar and sleeve and, at other times, both clutches are engaged with said collar and sleeve.

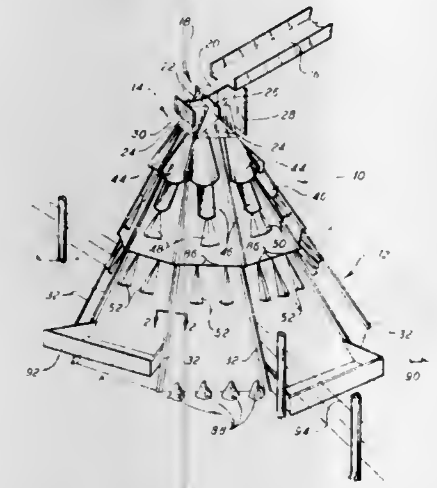
4,057,135
SELF-ADJUSTING RELEASE MECHANISM FOR A CLUTCH ASSEMBLY
Masanori Mori, Toyota, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Kariya, Japan
Filed Aug. 31, 1976, Ser. No. 719,269
Claims priority, application Japan, Sept. 19, 1975, 50-129391; June 15, 1976, 51-77654
Int. Cl.² F16D *13/75*
U.S. Cl. 192—111 A **9 Claims**



1. A clutch assembly for connecting driving and driven shafts comprising:

a. clutch means for normally effecting a driving connection between said shafts;
b. clutch release levers actuable for disengaging the driving connection normally effected by said clutch means between said shafts;
c. clutch release bearing means normally spaced from said release levers and engageable with said release levers for effecting the disengagement of the driving connection between said shafts;
d. means for actuating the clutch assembly; and
e. means for automatically adjusting the space between said clutch release levers and said clutch release bearing means to a predetermined distance, said automatically adjusting means including:
i. a housing;
ii. first retainer means mechanically connected to said actuating means and movably disposed in said housing, said first retainer means having a hollow portion therein open at least one end and cam surfaces positioned on the inner surface of said hollow portion;
iii. a rod member for moving said clutch release bearing means relative to said clutch release levers, said rod member having a first portion with one end mechanically connected to said clutch release bearing means and a second portion disposed in said housing with one end movably positioned into said hollow portion through said open end of said first retainer means;
iv. at least one cam means disposed in said hollow portion between said first retainer means and said rod member for selective engagement and disengagement with said rod member in response to the relative movement between said cam means and said first retainer means, said cam means being urged into engagement with said rod member when acted upon by said cam surfaces of said first retainer means;
v. leaf spring means connected to said cam means for urging said cam means outwardly away from said rod member;
vi. second retainer means movably positioned in said housing, slidable relative to said rod member, and operatively connected to said cam means by said leaf spring means;
vii. a pair of springs positioned in said housing for acting on opposing sides of said second retainer means, the biasing forces of said pair of springs being balanced when said second retainer means is in a predetermined neutral position; and
viii. spring means for biasing said rod member in the clutch disengaging direction.

4,057,136
GRAVITY FOR SOLID PARTICULATE MATTER
Arthur E. La Porte, Jr., 62 Thurlow Ave., Rochester, N.Y. 14609
Filed Aug. 12, 1976, Ser. No. 713,801
Int. Cl.² A01K *5/00;* **B65G** *11/20*
U.S. Cl. 193—3 **6 Claims**



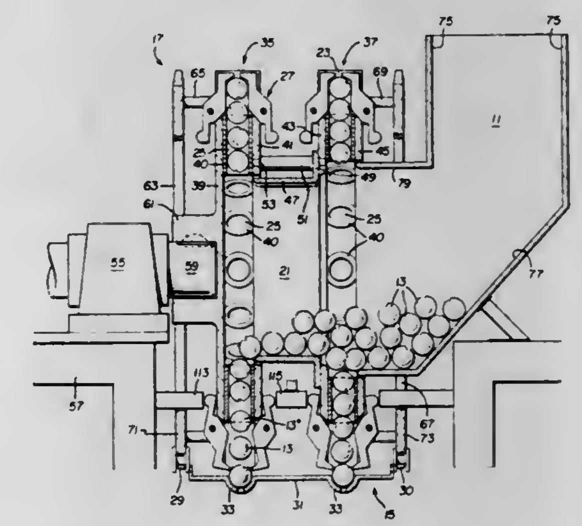
1. A structure for distributing a supply of solid, particulate material into a plurality of discrete portions of predetermined relative size, said structure comprising:

a. an inclined chute having a discharge end adapted to deliver a supply of feed by gravity;
b. an upper distributing section having four gables with upper edges disposed in a common horizontal plane, all meeting at a single point, and a plurality of discrete surfaces sloping outwardly and downwardly from said single point, the latter being located below said discharge end and in such lateral relation thereto that a supply of particulate material delivered by gravity from said discharge end falls substantially symmetrically about said point and down each of said discrete surfaces; and
c. a lower distributing section having at least one external surface disposed below and sloping outwardly and downwardly from said upper distributing section, and a plurality of divider elements extending outwardly from said external surface at selected locations thereon, each of said elements having side surfaces diverging away from one another and from the plane of said external surface from an uppermost point substantially in said plane, whereby material sliding down said external surface is divided by said elements into a plurality of discrete portions of predetermined relative proportion.

4,057,137
METHOD AND APPARATUS FOR FEEDING ARTICLES ONTO A MOVING CONVEYOR
Clarence M. Hansen, East Lansing, and Richard L. Ledebuhr, Haslett, both of Mich., assignors to Dura Corporation, Southfield, Mich.
Filed Dec. 29, 1975, Ser. No. 644,501
Int. Cl.² B65G *29/00*
U.S. Cl. 198—443 **6 Claims**

1. In an apparatus for conveying pieces of drupaceous fruit in spaced fruit-supporting cups mounted on a continuously moving conveyor, an improved rotary feed assembly for separating a flow of fruit from a hopper into individual pieces and for synchronously depositing said individual pieces into said fruit-supporting cups, the assembly comprising:

a plurality of rotatable feed wheels each of which includes a centrally hollow hub portion communicating to said hopper, each successive feed wheel hub from said hopper having a reduced internal diameter as compared to that of an adjacent feed wheel nearer the hopper to distribute said fruit among said feed wheels, a plurality of circumferentially spaced fruit discharge ports formed about the periphery of each said feed wheel, and a corresponding plurality of individual, radially extending feed passages communicating between a passage entry thereinto in said hub portion and said spaced ports, each said passage holding for movement therethrough at least two pieces of said fruit, each said hub portion adapted to receive a plurality of said pieces of fruit, the fruit being sorted into said passages and moved outwardly in said passages from the entry and toward said exit ports, and an outermost one of the pieces being maintained adjacent the discharge port

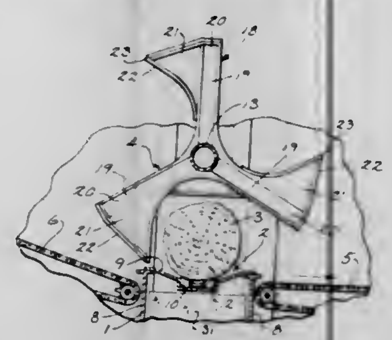


substantially throughout the rotation of its feed wheel at least partially be centrifugal force;
means for rotating said feed wheels to generate said centrifugal force and to synchronize the rotational velocity of the distal ends of said feed passages with the linear velocity of said moving conveyor;
the conveyor comprising a parallel pair of chains engaging said feed wheels and a plurality of plates carried on and between said chains and containing fruit receiving cups, each of said cups providing a space between said rotary feed wheels and said plates to allow said piece of fruit to be deposited thereinto; and
gating means normally blocking the exit of said outermost one of said pieces from each of said discharge ports of said feed passages and responsive to said port being operably positioned with respect to one of said fruit-supporting cups for unblocking said port and depositing an individual piece into said cup without relative motion therebetween during said depositing.

4,057,138
APPARATUS FOR ROUTING LOGS
Edward Andrew Grebe, Wauwatosa, Wis., assignor to Wisconsin Bridge & Iron Co., Milwaukee, Wis.
Filed Feb. 5, 1976, Ser. No. 655,635
Int. Cl.² B65G *47/00*
U.S. Cl. 198—480 **4 Claims**

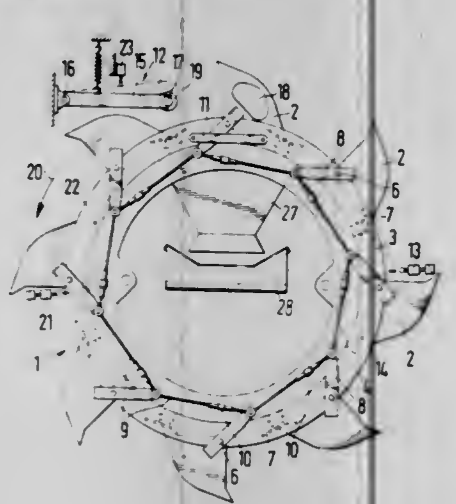
1. An apparatus for routing logs to various locations, comprising a conveyor to convey logs in an end-to-end relation, a rotatable log kicker disposed above the conveyor and mounted for rotation about an axis disposed generally parallel to the direction of travel of the conveyor, said log kicker having a plurality of outwardly extending arms disposed to engage the log on the conveyor as the kicker is rotated in either direction

to move the log laterally to either side of the conveyor, reversible drive means operably connected to the log kicker and operable to rotate the arms through an arc of travel generally equal to the arc between adjacent arms, means operably connected to the drive means for operating said drive means at a



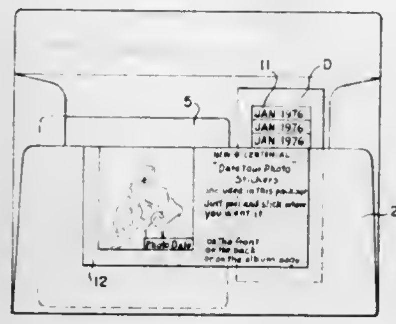
first speed through a first portion of said arc of travel and for operating said drive means at a second speed during a second position of said arc of travel, said second speed being slower than said first speed, and brake means for stopping rotation of said arms when said arms have completed travel through said arc.

4,057,139
REVERSIBLE ARRANGEMENT FOR TRANSPORTING BULK MATERIALS
Georg Mausolf, Klein Dohren; Herbert Bellenbaum, and Josef Dietrich, both of Salzgitter, all of Germany, assignors to Salzgitter Maschinen AG, Salzgitter, Germany
Filed June 1, 1976, Ser. No. 691,412
Claims priority, application Germany, May 31, 1976, 2524212
Int. Cl.² B65G *29/00*
U.S. Cl. 198—509 **20 Claims**



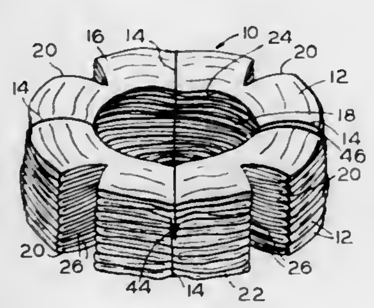
1. In an arrangement for transporting bulk materials, a combination comprising a support; transporting means mounted on said support for rotation in opposite circumferential directions about a central axis and including a bucket wheel, a plurality of buckets each having two inlet openings, and means for mounting each of said buckets on said bucket wheel for pivoting relative thereto about a pivot axis substantially parallel to said central axis between two end positions in each of which one of said openings faces in one of said circumferential directions, and for shared movement therewith in a circular path; means for rotating said transporting means in a transporting mode in which each of said buckets assumes a first end position with a respective opening thereof facing in the circumferential direction of movement of said buckets for entry of bulk material into said bucket through said respective opening, and in a reversing mode in which said buckets move in an opposite circumferential direction than during said transporting mode; and means for concurrently pivoting said buckets during said reversing mode from said first into a second end position of each of said buckets in which the other opening of the latter faces in said opposite circumferential direction, including detaining means arranged at a predetermined location along said path and operative for engaging a respective one of said buckets, means for actuating said detaining means into engagement with said respective bucket at said location to thereby discontinue the movement of said respective bucket in said path and pivot the same about said pivot axis during the continuing rotation of said bucket wheel in said opposite direction, and means for interconnecting said buckets for synchronized pivoting between said end positions thereof.

4,057,140
PHOTO-FINISHING PACKET WITH DATE STRIPS FOR PHOTOGRAPHIC PRINTS
Abraham Hutzel, Clinton, Md., assignor to Cullen Photo Service, Inc., Alexandria, Va.
Filed Apr. 26, 1976, Ser. No. 680,372
Int. Cl.² B65D *77/24, 85/30, 27/08*
U.S. Cl. 206—216 **3 Claims**



1. In a photo-finishing packet envelope containing a plurality of photographic negatives and prints thereof having the photographs covering the entire face of each photographic print, a unitary sheet of backing material and a strip of printed material coextensive with said sheet adhesively affixed with pressure-sensitive adhesive to one face of said backing material but readily strippable therefrom while retaining the adhesive on only the back face of said strip, said strip being scored incisively along a plurality of parallel lines to subdivide the strip into a plurality of small parts corresponding approximately in number to that of the photographic prints within the envelope, and with each part being imprinted identically with the date of the finishing operation, each of said small parts adapted to be affixed by the consumer, following its separation from the backing material, to a portion of each print to date the photograph for future reference.

4,057,141
BALED TIRE PRODUCT
Albert F. Laurie, 7239 N. Chase, Portland, Oreg. 97217, and G. W. Bunch, 11775 SW. Warner, Tigard, Oreg. 97223
Filed May 5, 1975, Ser. No. 574,595
Int. Cl.² B65D *85/06, 71/02*
U.S. Cl. 206—304 **12 Claims**



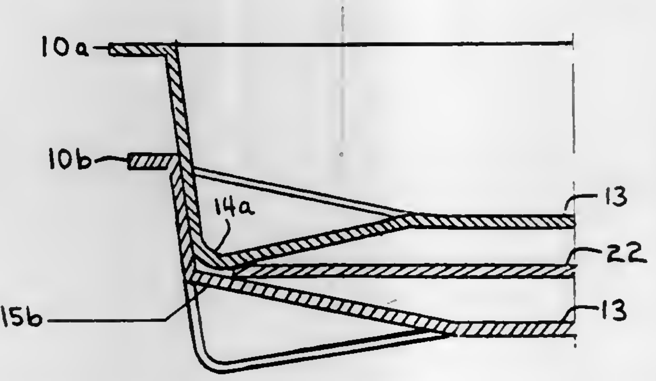
1. A baled tire product comprising a stack of rubber tires having the axes of their center openings in approximate alignment,

said stack being compressed in a direction along said axes into a short annular bale so as to maintain the alignment of said center openings,

said bale being maintained in its compressed condition by a series of baling ties encircling the annulus of said bale at circumferentially spaced-apart positions thereon,

said bale having a series of openings spaced between said ties, each said opening extending generally radially inwardly from the outer circumferential periphery of said annulus from top to bottom thereof and terminating short of said central openings so as to expose the interior annular space within each said tire to ambient air and yet maintain the integrity of said bale.

4,057,142
PACKAGING OF SEMICONDUCTOR DISCS
Günther Lechner; Karl Pritscher, and Helmut Kirschner, all of Burghausen, Germany, assignors to Wacker-Chemitronic Gesellschaft fur Elektronik-Grundstoffe mbH, Burghausen, Germany
Filed July 26, 1976, Ser. No. 708,458
Claims priority, application Germany, July 30, 1975, 2534074
Int. Cl.² B65D *21/02, 65/16, 81/16, 85/30*
U.S. Cl. 206—332 **5 Claims**



1. A stackable plastic pallet assembly for packing semiconductor discs in a vertically-disposed stack of substantially identical pallets, comprising:

at least one stackable plastic pallet having a plurality of circular depressions, each of which may accommodate a semiconductor disc and means for releasably securing the discs in said depressions, said means comprising a plurality of part sector-shaped surfaces which surround and slope downwardly toward the center of said depressions on which the outermost rims of the discs may rest and a plurality of part sector-shaped surfaces which surround and slope upwardly toward the center of said depressions and which, upon stacking of said at least one pallet in a vertically-disposed stack of substantially identical pallets, cooperate with the downwardly sloping part sector-shaped surfaces of the pallet therebelow to clamp the outermost rims of the discs contained in the depressions of the lowermost pallet therebetween, thereby immobilizing the discs.

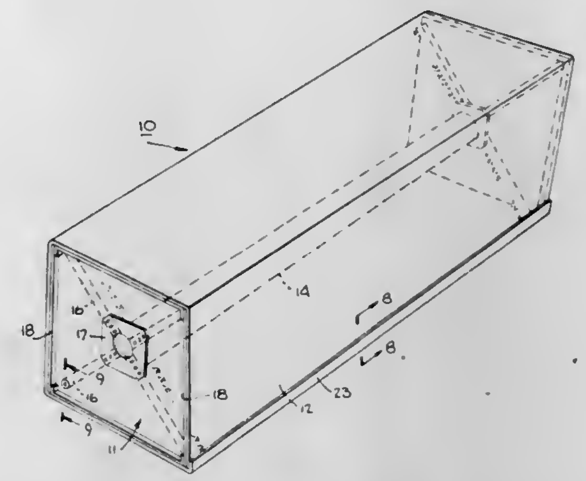
4,057,143
SHIPPING CARTON FOR PLUSH REELS
Theodore P. Kessler, Rancocas, N.J., assignor to Timron, Inc., Moorestown, N.J.
Filed Aug. 18, 1975, Ser. No. 605,442
Int. Cl.² B65D *85/66*
U.S. Cl. 206—400 **4 Claims**

1. A shipping carton comprising

a reel for pile fabric including a pair of end frames and a spacer bar disposed between said end frames, each end frame including an end board of polygonal shape having a peripheral ear projecting therefrom in perpendicular relation;

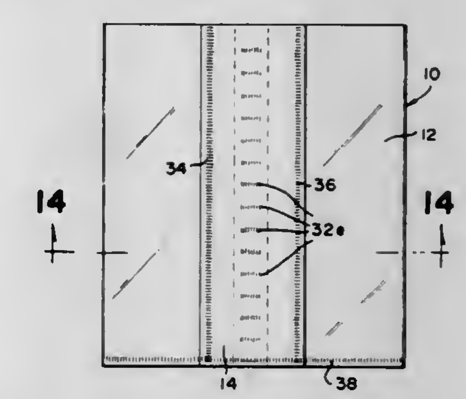
a cardboard sheet wrapper disposed about said reel, said wrapper having a pair of oppositely disposed side edges disposed about a said ear of a respective end board of said reel and pair of oppositely disposed terminal edges disposed in overlapping relation longitudinally of said reel, said terminal edges being unsupported from within the carton and being imperforate; and

adhesive securing said ears of said end frames to said side edges to said wrapper and said terminal edges of said



wrapper to each other without buckling of said wrapper said adhesive being such that the pressure required to complete the securement is capable of buckling the unsupported terminal edges.

4,057,144
HIGH STRENGTH BAG FOR STORING MATERIALS IN STERILE CONDITION
Samuel J. Schuster, 1099 Hillside Street, Monterey Park, Calif. 91754
Continuation-in-part of Ser. No. 541,720, Jan. 17, 1975, abandoned. This application Nov. 25, 1975, Ser. No. 635,380
Int. Cl.² A61B *19/02;* **B65D** *33/16*
U.S. Cl. 206—439 **28 Claims**

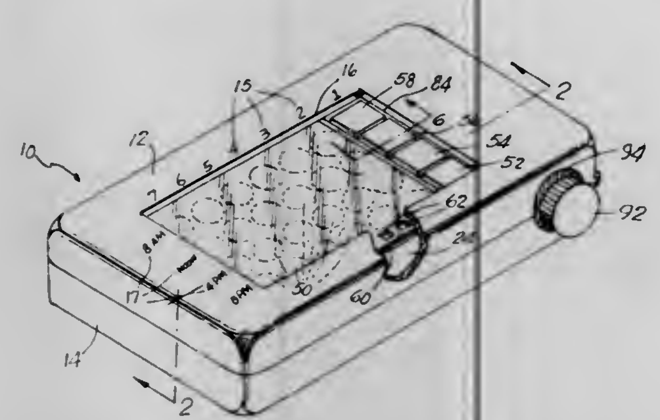


1. A high strength, bacteria-impermeable, sealable bag for receiving material for sterilization after sealing of the bag by a process employing a sterilizing vapor, the bag comprising:

a container former of plastic sheet and having opposed faces and opposed transverse ends, one of the faces including overlapping longitudinal margins, the other face being continuous, the longitudinal margins being joined by a plurality of longitudinally-spaced heat seals defining between them passages for the sterilizing vapor; and

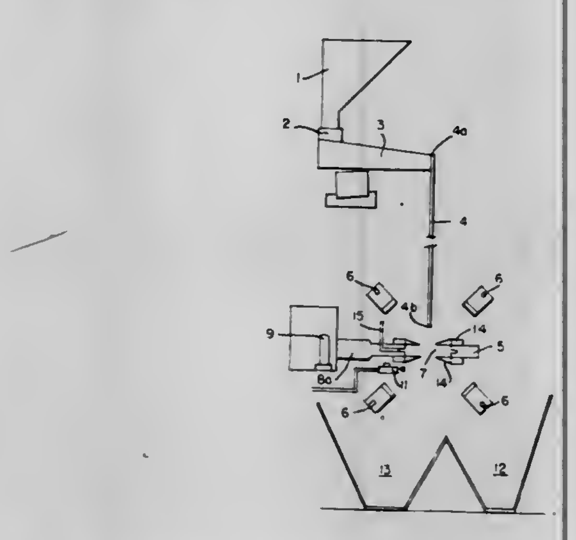
a membrane covering the longitudinal margins and passages and bonded to the container by continuous, longitudinally-extending heat seal joinder lines, the membrane being highly permeable to the sterilizing vapor, a transverse heat seal joinder line adjacent one of the transverse ends uniting the membrane and the container and closing one end of the bag, the other end being open to receive the material to be sterilized, the membrane being secured to the overlapping margins by the longitudinally-spaced heat seals.

4,057,145
COMPLIANCE DISPENSER FOR ORAL MEDICATION
Betty B. Wray, 3115 Ramsgate Road; Peter F. Stager, 2404 Kings Way, and Charles W. Linder, 501 Aumond Road, all of, Augusta, Ga. 30904
Filed Mar. 19, 1976, Ser. No. 668,537
Int. Cl.² B65D *85/56, 83/04*
U.S. Cl. 206—538 **15 Claims**



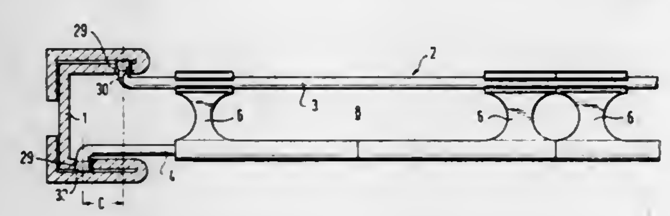
1. A compliance dispenser for oral medication, which comprises:
means for containing a plurality of individual dosages of oral medication which includes dosage compartments arranged in groups, each group including a plurality of dosage compartments;
means for selecting one group of said dosage compartments from among said groups of compartments for allowing dispensation of said dosages therefrom, said selecting means comprising belt means movably disposed across said plurality of dosage compartments, said belt means having an opening formed therein which permits access only to one selected group of dosage compartments at a time; and
manually operable lid means for selectively permitting access to an individual dosage compartment within said selected group of dosage compartments, said lid means positioned over said opening in said belt means and connected to said belt means so as to be moveable therewith.

4,057,146
OPTICAL SORTING APPARATUS
Fernando Castaneda, and Roy Jimenez, both of San Jose, Costa Rica, assignors to Xeltron, S.A., Jan Jose, Costa Rica
Filed Apr. 16, 1975, Ser. No. 568,761
Claims priority, application Costa Rica, May 24, 1974, 2770
Int. Cl.² B07C *5/342*
U.S. Cl. 209—75 **18 Claims**



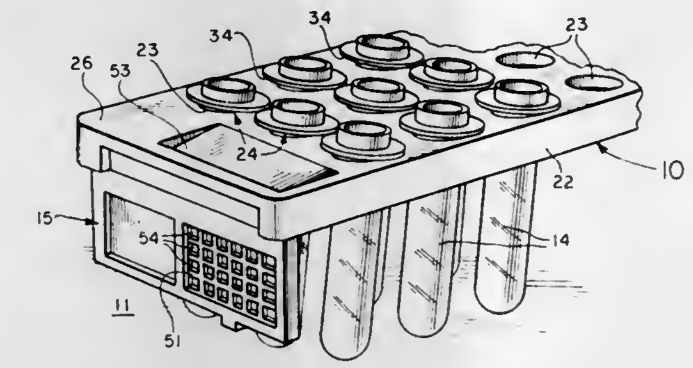
1. Optical sorting apparatus for sorting objects falling over an unimpeded path in response to light reflected from said objects including,
a pair of light detecting means with different response characteristics producing a pair of light related signals,
processing means for integrating said pair of light related signals and for producing an output if a relationship between said integrated light related signals exceeds a first threshold,
comparator means receiving as an input, one of said pair of light related signals and producing an output if, and only if, said input signal lies outside of a predetermined range,
synchronization means responsive to one of said pair of light related signals and connected to said processing means and to said comparator means for enabling both said processing means and comparator means only in the presence of said one of said pair of light related signals, and
reject means responsive to output signals from both said processing means and said comparator means to reject an object if an output signal is provided by either said processing means of said comparator means.

4,057,147
APPARATUS FOR SUSPENDING GOODS FOR DISPLAY
Horst Fleischmann, Munich, Germany, assignor to PFP-Anstalt Fuer Produkt-Entwicklung und Verwertung, Schaan, Liechtenstein
Filed Mar. 22, 1976, Ser. No. 668,814
Claims priority, application Germany, Mar. 26, 1975, 2513493
Int. Cl.² A47F *7/19*
U.S. Cl. 211—47 **8 Claims**



1. Apparatus for the spaced display of goods in suspended serial arrangement comprising:
carrier bracket means including at least two supporting legs extending parallel to one another from a support member, each of said supporting legs having at one end thereof a bearing pin, said support member having at least two bores, each said bearing pin being rotatably disposed in a said bore, spacer members removably disposed on said supporting legs, said spacer members having surface areas from which goods to be displayed can be suspended in spaced relationship over the length of said supporting legs, each said spacer member comprising a bridging portion having along one side thereof a socket for engaging one of said supporting legs and at the other side thereof a socket for engaging the other of said supporting legs, one of said sockets being of predetermined length and the other of said sockets being of a different length, said sockets each having one end lying in a common plane and the other end of one of said sockets lying in a plane that is spaced a perpendicular distance from said first mentioned plane, said bridging portion of each said spacer member including two oppositely facing, semi-circular surfaces extending between said sockets and a said socket on one side of said bridging portion having an opening facing in a predetermined direction with respect to said bridging portion and said socket on the opposite side of said bridging portion having an opening facing in a direction that is 90° from said predetermined direction.

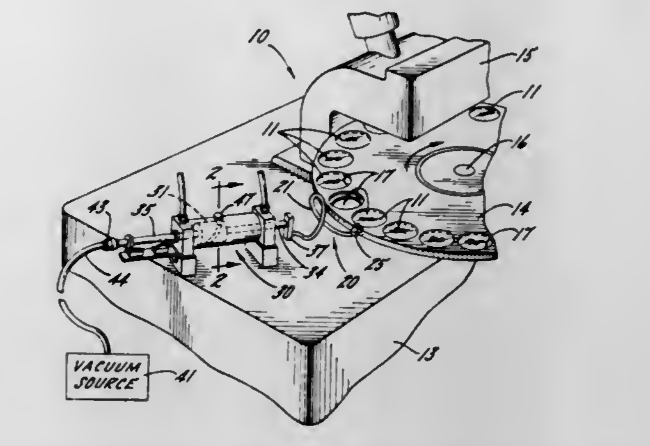
4,057,148
MULTIPLE SAMPLE SUPPORT ASSEMBLY AND APPARATUS FOR FACILITATING RADIOIMMUNOASSAYS AND THE LIKE
Rolf Meyer, Des Plaines, and John E. Burgess, Arlington Heights, both of Ill., assignors to G. D. Searle & Co., Skokie, Ill.
Continuation of Ser. No. 483,024, June 25, 1974, abandoned, which is a continuation-in-part of Ser. No. 292,738, Sept. 27, 1972, abandoned. This application July 17, 1975, Ser. No. 596,760
Int. Cl.² B01L *9/06*
U.S. Cl. 211—74 **8 Claims**



1. A support assembly for holding sample tubes, said assembly comprising: a tray including at least one aperture; at least one apertured and generally annular retaining device for disposition about a sample tube and in which a sample tube is insertable to be resiliently gripped and thereby retained therein, said retaining device being disposed in the tray aperture such that the retaining device and a sample tube inserted therein is freely suspended downwardly from the tray in a self-aligning substantially vertical orientation though in a manner allowing free-swinging orbital and angular movement within predetermined limits; said retaining device including a section which extends through and is dimensioned to loosely fit within the tray aperture, which section has an upper portion which overlaps the upper surface of the tray to effect retention and accommodation of the retaining device in the tray aperture and prevents same from falling through said aperture; said retaining device further including a resilient section which protrudes from the aperture below the tray, said protruding section including an enlarged shoulder portion of a diameter greater than that of the tray aperture, which shoulder portion is spaced from a lower surface of the tray and which shoulder portion defines means limiting the extent of movement of said retaining device in said aperture; said protruding section of said retaining device further including circumferentially spaced gripping portions which downwardly extend and which resiliently engage an inserted tube to adjustably retain the tube such that a vertical sliding displacement of an inserted tube relative to the retaining device and the tray can be effected upon the application of a predetermined force to the tube.

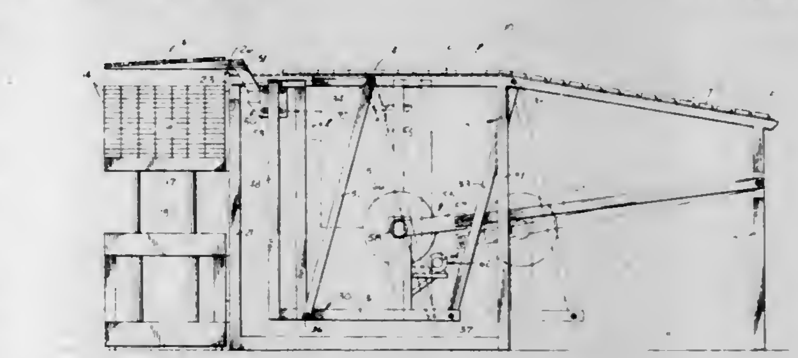
4,057,149
MECHANISM FOR TRANSFERRING PARTS
Frederick W. Clarke, Rockford, Ill., assignor to Rogers and Clarke Manufacturing Co., Rockford, Ill.
Filed Feb. 17, 1976, Ser. No. 658,416
Int. Cl.² B65G *47/91*
U.S. Cl. 214—1 BV **10 Claims**

1. Mechanism for picking up and transferring a part, said mechanism comprising a rod spiraled progressively around and along a straight line and defining a helix whose axis coincides with said line, means on one end of said rod and spaced radially from said axis, said means being selectively operable to first pick up and then release a part, and drive means connected to the other end of said rod for turning said rod about said axis while simultaneously advancing said rod in the direction of said axis whereby a part picked up by said selectively operable



means is transferred along a helical path as said rod is turned and advanced.

4,057,150
LUMBER STACKING APPARATUS
Sidney L. Lunden, c/o Lunden Industries, Inc., Bldg. N7D, Spokane, Wash. 99216
Filed Sept. 17, 1976, Ser. No. 724,325
Int. Cl.² B65G *57/10*
U.S. Cl. 214—6 DK **6 Claims**

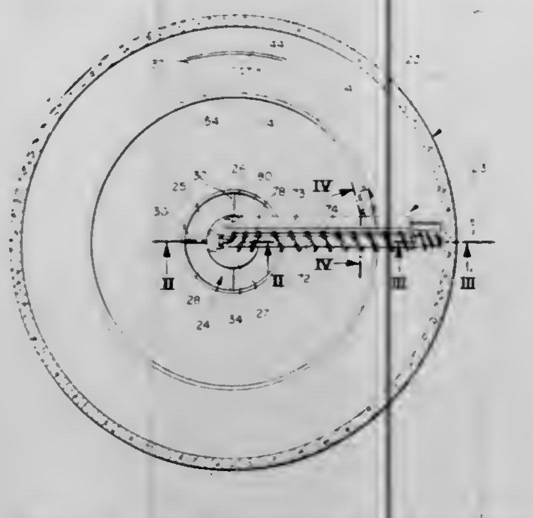


1. A lumber stacking apparatus, comprising:
a frame;
a carriage operatively mounted on the frame;
parallelogram linkages interconnecting the carriage and the frame for enabling the carriage to swing back and forth in an arcuate path between a course pick-up station and a course stacking station while maintaining the carriage horizontal during the swinging movement;
carriage drive means operatively connected to the carriage for moving the carriage back and forth between the course pick-up station and the course stacking station;
course support means mounted on the carriage for vertical movement with respect to the carriage for carrying a lumber course from the course pick-up station to the course stacking station; and
means operatively connected to the course support means for (1)
elevating the course support means at the course pick-up station to pick up a course of lumber, and (2) maintaining the course support means elevated while the carriage is being swung from the course pick-up station to the course stacking station to carry the course of lumber to the course stacking station.

4,057,151
SILO UNLOADER AND APPARATUS THEREFOR
Richard L. Weaver, Rte. 1, Myerstown, Pa. 17067
Filed Jan. 18, 1972, Ser. No. 218,736
Int. Cl.² A01F *25/20;* **B65G** *65/46*
U.S. Cl. 214—17 DA **21 Claims**

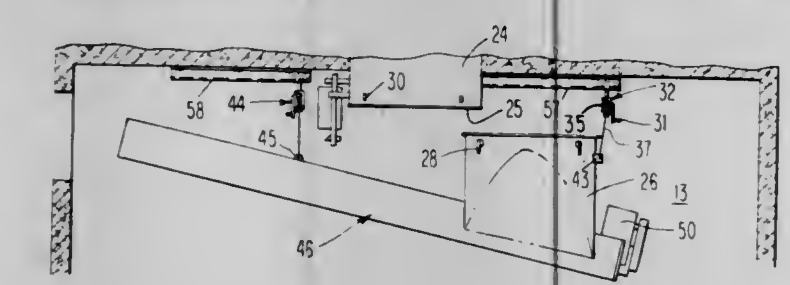
15. Apparatus for use in unloading a silo from the bottom thereof through a generally central opening therein, compris-

ing an auger, means mounting the auger for generally radial disposition, means for rotatably driving the auger about its own generally radial axis, and means for driving the auger in a sweeping motion about a pivot point located generally radially



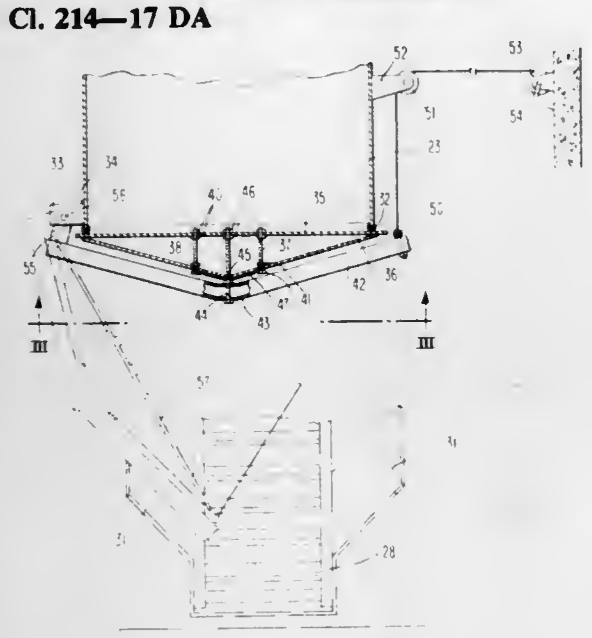
inwardly of the auger, and means for lubricating both said driving means from beyond the radial outermost end of the auger, outside the silo with which the apparatus may be associated.

4,057,152
SILO CENTER DISCHARGE APPARATUS
Richard L. Weaver, Rte. 4, Myerstown, Pa. 17067
Filed Dec. 15, 1975, Ser. No. 641,154
Int. Cl.^{2} B65G *65/46*
U.S. Cl. 214—17 DA **4 Claims**



1. In a silo unloader of the bottom unloader type wherein a rotary auger is utilized to sweep across the floor of a silo to engage silage and wherein the auger rotates on its own axis employing flitting on the auger to convey silage radially inwardly of the silo to a silo discharge opening located generally centrally of the floor of the silo, the improvement comprising a generally centrally located fixedly mounted upper discharge chute and a movable lower discharge hopper disposed beneath said upper discharge chute, and means facilitating lateral displacement of said hopper relative to said chute, including means for lowering said hopper relative to said chute and including means detachably connecting said chute and hopper together, wherein lower means are provided beneath the floor of the silo for conveying silage discharged through the chute and hopper outwardly of the silo, wherein said hopper and said lower means for conveying are connected for lateral displacement and vertical lowering movement together as a unit, wherein track means are provided, connected to any of said hopper and said lower conveying means for facilitating their lateral displacement, and wherein track means comprise a pair of tracks with wheel-like means therein, the tracks being fixedly carried beneath the silo floor and the wheel-like means being movable therein.

4,057,153
SILO CENTER DISCHARGE MECHANISM
Richard L. Weaver, Rte. 4, Myerstown, Pa. 17067
Continuation-in-part of Ser. No. 526,690, Nov. 25, 1974, Pat. No. 3,977,543, which is a division of Ser. No. 354,496, April 26, 1973, Pat. No. 3,874,524. This application Nov. 26, 1975, Ser. No. 635,394
Int. Cl.^{2} B65G *65/46*
U.S. Cl. 214—17 DA **10 Claims**



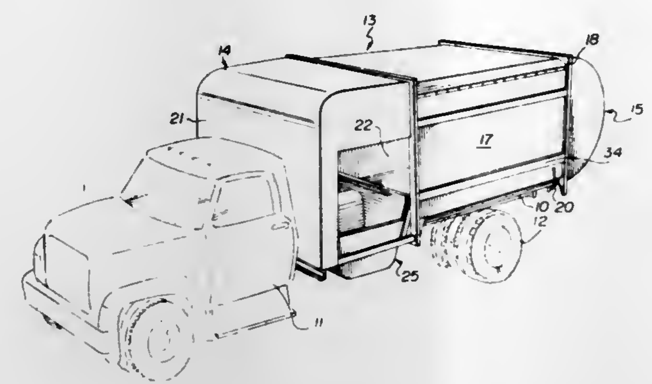
1. In a silo bottom unloader wherein a generally radially disposed auger is pivotally mounted inside the silo for sweeping across the bottom of the silo while rotating and delivering silage to a generally centrally located bottom discharge passageway for subsequent delivery of the silage to a conveyor mechanism that carries silage outwardly of the silo, the improvement comprising a bottom closure for the passageway, said closure comprising a pivotally openable door sealing means for sealing said door relative to the lower end of said passageway, said door having a generally flat surface in a closed generally horizontal sealing position of said door, said door having a support mechanism therebeneath pivotally disposed relative to the lower end of said passageway, said flat surface comprising a combination sealing surface and lateral deflection means for deflecting silage delivered through said passageway, laterally thereof, wherein said passageway comprises a generally circular lower end, wherein said upper surface of said door is mounted on and carried by said support mechanism, and including a generally conical member disposed beneath said horizontal surface member and by which said horizontal surface member is carried, and wherein said support mechanism comprises a frame member traversing said conical member therebeneath, including means generally rigidly connecting said horizontal surface member and said frame member

---

4,057,154
REFUSE COMPACTING VEHICLE
Allen Abram Neufeldt, 85 Nymark Avenue, Willowdale, Ontario, Canada (M2J 2H1)
Filed Feb. 24, 1977, Ser. No. 771,571
Int. Cl.^{2} B65F *3/00*
U.S. Cl. 214—82 **11 Claims**

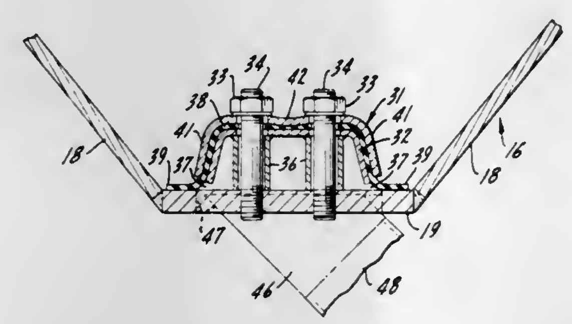
1. In a self-loading refuse carrier, the combination with a motor vehicle having a compartment adapted to receive and compact refuse therein, of a loading and compacting mechanism comprising:

a pusher-blade extending across a lower portion of said compartment between opposite sidewalls thereof, means for moving said pusher-blade horizontally backward and forward between a refuse-receiving position and a refuse-compacting position, a bucket pivotally mounted along the upper edge of said blade for pivotal movement between a lower refuse-receiving position and an upper refuse-discharging position, at least one cam wheel articulated between the bucket and the blade by means of pivotal arms; and a cam guideway forming an inclined path between a lower refuse-receiving position and an upper refuse-discharging and compacting position, whereby said cam wheel in response to movement of said pusher-blade



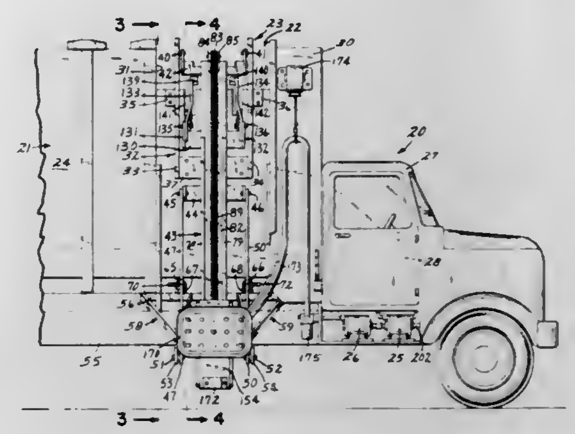
in a compacting direction travels up said guideway, thereby forcing said bucket to swing from a lower horizontal refuse-receiving position to an upper vertical refuse-discharging position, said bucket in vertical position acting as a vertical extension of the compacting blade with continued movement of the blade in compacting direction.

4,057,155
RAILROAD CAR
Ronald George Deeks, Oakville, Canada, assignor to Procor Limited, Oakville, Canada
Filed Nov. 4, 1976, Ser. No. 738,520
Int. Cl.^{2} B60P *1/60*
U.S. Cl. 214—83.28 **13 Claims**



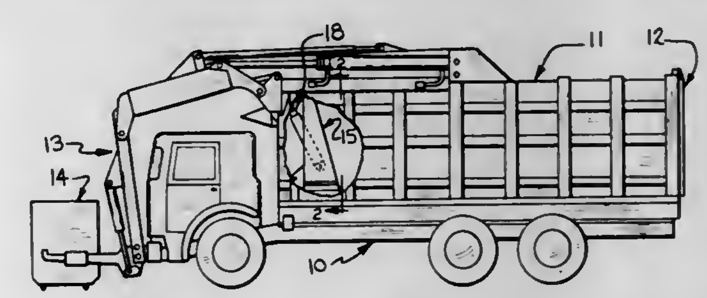
1. A container for powdered material having a surface sloping toward a bottom outlet opening, and means for aerating said material to cause discharge through said outlet opening, comprising: a pair of separate, correspondingly shaped, clamping members, one of which is nested within the other; means spacing the lower terminal edges on opposing sides of each of said clamping members slightly above said sloping surface so as to define a pair of spaced gas gaps between said terminal edges of each clamping member and said sloping surface on opposite sides of said clamping members; flexible, gas-impervious sheet material clamped between said clamping members and having a pair of spaced portions extending beyond said terminal edges into contact with said sloping surface on opposite sides of said clamping members so that each portion of sheet material seals one of said spaced gas gaps; means for attaching said clamping members to said container and causing said clamping members to immobilize said sheet material except for said pair of portions extending beyond said terminal edges and sealing said spaced gas gaps; and means for forcing pressurized gas between said clamping members and said sloping surface so as to cause said spaced portions of said sheet material to flutter as said gas escapes therebetween through said spaced gas gaps into said powdered material.

4,057,156
LIFTING ARM APPARATUS
Vern C. Thompson, Minneapolis, and John A. Riggle, Minnetonka, both of Minn., assignors to Reuter, Inc., Hopkins, Minn.
Filed Mar. 15, 1976, Ser. No. 666,886
Int. Cl.^{2} B65F *3/02*
U.S. Cl. 214—302 **6 Claims**



1. Material handling apparatus comprising, in combination:
a vehicle having a body with a top opening;
a generally vertical track member pivoted about a vertically movable horizontal axis near the top of said body, and including first and second pairs of guidance surfaces;
a carriage member movable along said track member and including container engaging means;
drive means including an endless chain for reversibly causing movement of said carriage member along said track member between a lower extreme position and an upper extreme position;
container engaging means;
mounting means securing said container engaging means on said carriage for a limited lifting extension and lowering retraction with respect thereto;
reversible means for supporting said track member and causing pivotal movement thereof to extend said mounting means so as to bring said container engaging means into engagement with a container resting on the ground;
means releasably operable to maintain said engagement;
and reversible means including said track member for causing pivotal movement of said carriage, at the upper extreme position thereof, whereby an engaged container is inverted into said body.

4,057,157
LOAD COMPACTING AND EJECTING MECHANISM FOR A REFUSE TRUCK
Glenn S. Park, and William A. Herpich, both of Galion, Ohio, assignors to Peabody International Corporation, Galion, Ohio
Filed Oct. 8, 1976, Ser. No. 730,707
Int. Cl.^{2} B65F *3/02*
U.S. Cl. 214—302 **10 Claims**



1. A load compacting and ejecting mechanism for a refuse truck that has a hollow rectangular body, an openable tailgate at the rear of the body and a refuse receiving opening near the front of the body, said mechanism comprising, in combination:
a. a generally vertical ejector plate which extends across said

body and is guided for movement between the front and rear of said body,

b. a centrally located compaction plate mounted on said ejector plate for movement between a forward position in which it constitutes a part of the ejector plate surface and a position rearwardly of the surface of said ejector plate,

c. main hydraulic cylinder means connected between the front of said body and the structure of said compaction plate for moving said ejector and compaction plates through said body,

d. second hydraulic cylinder means connected between the structure of said ejector plate and said compaction plate for controlling the movement of said compaction plate relative to said ejector plate,

e. a hydraulic fluid circuit including a source of hydraulic fluid under pressure and a control valve for alternatively connecting said source to the base and rod ends of said main cylinder,

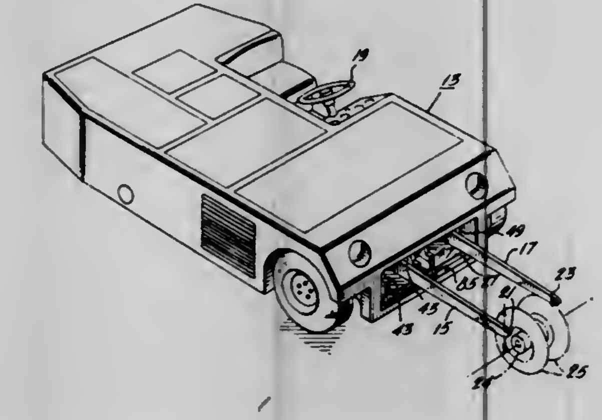
f. a second hydraulic fluid circuit connecting the base and rod ends of said second cylinder means through a pair of oppositely effective one-way valves connected in parallel in said second circuit,

1. the first of said one-way valves providing for fluid flow from the base end to the rod end of said second cylinder means,
2. the second of said one-way valves normally being closed for preventing fluid flow from the rod end to the base end of said second cylinder means and including pressure responsive means for the opening thereof, and

g. means connecting the pressure responsive means of said second one-way valve to the base end of said main cylinder means,

whereby when the resistance to rearward movement of said ejector plate and said compaction plate causes the pressure in the base end of said main cylinder means to reach a predetermined level, said second one-way valve is opened thereby and said main cylinder means moves said compaction plate rearwardly of the surface of said ejector plate, thus the second hydraulic cylinder plus said pair of one-way valves serves as a lock to either lock the movement of said compaction and ejector plates or allow relative movement therebetween.

4,057,158
AIRCRAFT TOWING VEHICLE
Igor Lissy, 115 S. Ivy Lane, Glen Mills, Pa. 19342
Filed June 1, 1976, Ser. No. 691,741
Int. Cl.² B60B *29/00*
U.S. Cl. 214—330 **22 Claims**



1. A towing vehicle for moving on a surface a towable vehicle having a pivotable wheel, comprising:

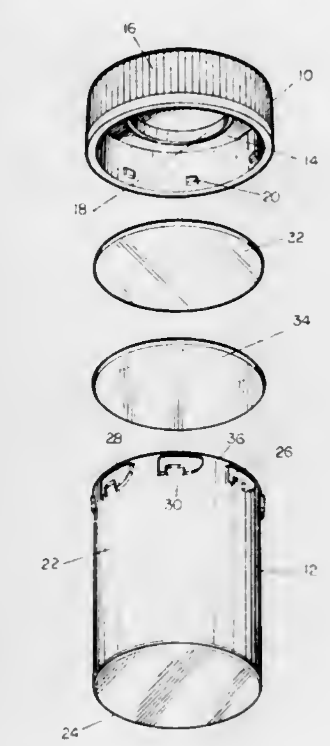
a frame;

a plurality of individually steerable wheels pivotally connected to said frame;

hitch means extending from said frame and formed to engage the pivotable wheel for maintaining the axes of said pivotable wheel fixed relative to said frame; and

steering means operatively connected to said towing vehicle wheels responsive to a steering command for separately positioning each towing vehicle wheel, the axes of all said towing vehicle wheels and the pivotable wheel intersecting at a common point.

4,057,159
VAPOR-SEAL SAFETY CAP AND CONTAINER
William E. Fillmore, Toledo; Wayne E. Garver, Sylvania; George V. Mumford, Toledo, and James H. Price, Maumee, all of Ohio, assignors to Owens-Illinois, Inc., Toledo, Ohio
Filed Oct. 18, 1976, Ser. No. 733,690
Int. Cl.² B65D *55/02, 85/56;* **A61J** *1/00*
U.S. Cl. 215—222 **6 Claims**



1. a vapor-sealing, child-resistant closure and container combination comprising: an open-mouthed container having a plurality of circumferentially spaced projections extending radially outwardly adjacent the open end thereof, an annular rim portion on the open end thereof, said projections having a downwardly facing notch therein; a closure having a top panel and an annular skirt depending from the periphery of the top panel, a plurality of radially inwardly extending and circumferentially spaced lugs on the inner surface of said skirt, said lugs being adapted to engage the notches in the projections on the skirt of said container, an integral annular abutment formed on, and depending from, the inner surface of the top panel of said closure; and a liner sytem carried by said closure, including a first liner member formed from a flexible and resilient material interposed between the free edge of the annular abutment and the lugs on the skirt of the closure, and a second liner layer formed from a deformable material underlying said first liner layer between the free edge of the annular abutment and the lugs on the skirt of the closure; said annular abutment adapted to bias said first resilient liner layer downwardly to force said second deformable liner layer into vapor-sealing engagement with the annular rim on said container, when the lugs on said closure are engaged within the notches in the projections on the skirt of the container.

4,057,160
SELF-RETAINING BOTTLE STOPPER
George Victor; Robert G. Fisher, and Kaspar Bischof, all of Modesto, Calif., assignors to E. & J. Gallo Winery, Modesto, Calif.
Filed Feb. 2, 1976, Ser. No. 654,326
Int. Cl.² B65D *41/06, 41/28*
U.S. Cl. 215—318 **4 Claims**

1. In combination, a self-retaining bottle stopper and a finish of a bottle adapted to contain pressurized contents:

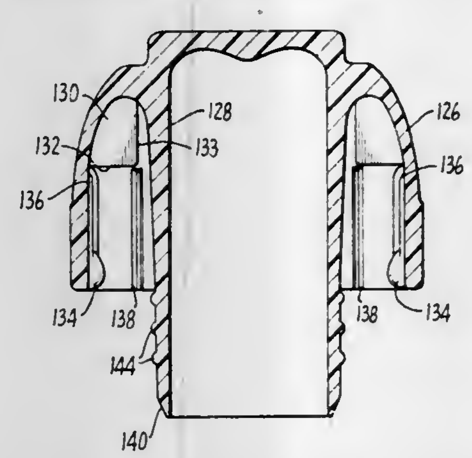
a. said finish comprising a tubular neck having an annular top margin about the opening thereof, an inner circumference, an outer circumference and a plurality of straight, helical ribs of uniform width and height, each of said helical ribs partially circumscribing said outer circumference and defining partially overlapping thread zones;

b. said stopper comprising:

i. a cup-shaped crown defining a skirt for capping said neck;

ii. a hollow cylindrical shank depending co-axially from within said crown, including means for sealably engaging the inner circumference of said neck;

iii. a plurality of resilient, deformable webs all circumferentially arrayed within said crown, such that each presents an edge in a plane perpendicular to the axis of said shank for encountering the top margin of said necks;

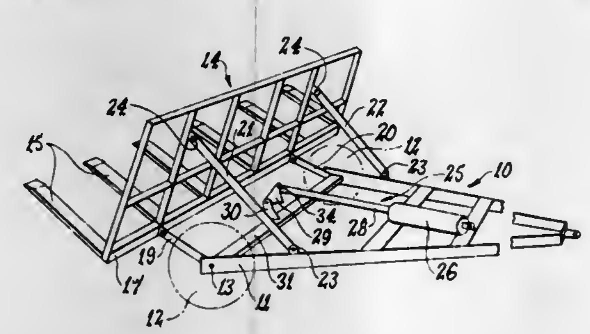


iv. a plurality of lugs projecting radially inwardly from said skirt and annularly aligned in a plane perpendicular to said shank and adapted to lockingly confront said ribs on the lower side from said top margin;

v. said web edges and said lugs being spaced relative to said top margin and said lower rib side furthest from said top margin such that at least two of said lugs lockingly encounter said lower rib side of selected ribs upon full axial insertion of said stopper into said finish; and

vi. an inwardly extending relatively thin fin integrally associated with each of said lugs and axially aligned with respect to the axis of said shank, each said fin being adapted to collapsibly deform to the contour of a corresponding rib, thereby to partially define a rib thread path.

4,057,161
LIFTING AND HANDLING APPARATUS
Gavin Boyce Youl, 57 Clarence Street, Perth 7300, Tasmania, Australia
Filed May 12, 1976, Ser. No. 685,621
Claims priority, application Australia, May 13, 1975, 1581/75; July 17, 1975, 2392/75
Int. Cl.² E02F *3/00*
U.S. Cl. 214—777 **5 Claims**



1. Lifting and handling apparatus including:

a frame having ground engaging means, at least part of which is located adjacent one end of said frame, said part including a pair of ground engaging wheels, each wheel having its axis of rotation located substantially the same distance from said one end of the frame;

load support means comprising a base section and a back section which is secured to and is upstanding from a rear edge portion of said base section;

linkage means connecting said load support means on said frame so that said load support means is movable relative to said frame between a loading position in which it projects beyond one end of said frame, and a carrying position in which it is located above said frame; and

drive means connected to said frame and to said load support means, and being operable to cause movement of said load support means between said loading and carrying positions;

said linkage means including a primary linkage which is pivotally connected to said frame and to said load support means adjacent the junction between said base and back sections, and a control linkage which is pivotally connected to said frame and to said back section, each of said pivotal connections having its axis substantially parallel to said wheel axis, and the frame connection of said control linkage being located further from said one end of the frame than is the frame connection of said primary linkage;

each said linkage means including two arms, each of which is located adjacent a respective opposite side of said frame, each said control linkage arm comprising an upper section connected to said load supporting means and a lower section connected to said frame, said arm sections being arranged in end to end relationship and being pivotally connected at their adjacent ends, the said upper arm section being of substantially the same length as each of said primary linkage arms; and restraining means acting between each said lower arm section and said frame during a first part of the movement of said load support means from said loading position, whereby said lower arm sections are held stationary relative to said frame, and being arranged to have no influence on said lower arm section during a second part of said movement from said loading position;

said linkage means interacting between said frame and said load support means so as to automatically cause lifting and tilting of said load support means during said movement thereof from said loading position to said carrying position, whereby in said loading position said base section is substantially horizontal so as to be adapted to receive a load thereon, and in said carrying position both said base and back sections slope relative to the horizontal to define a load retaining channel between them, and the junction of said base and back sections is located above and forwardly of the zone of engagement between said ground engaging means and the ground which is located nearest said one end of the frame.

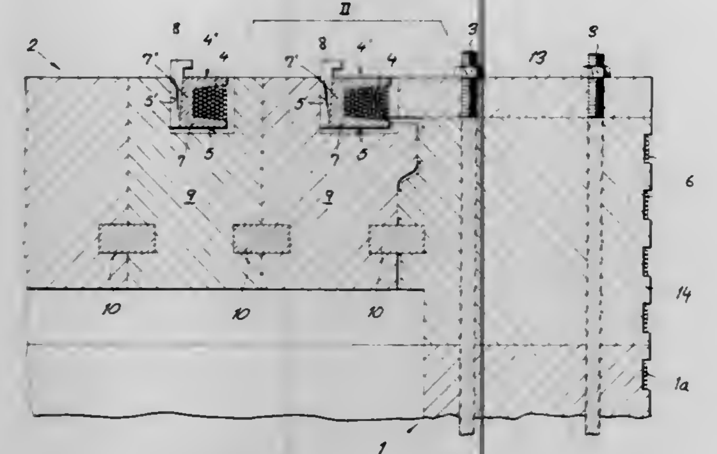
4,057,162
PRESSURE VESSEL FOR NUCLEAR REACTOR
Heiko Gross, Krefeld, Germany, assignor to Siempelkamp Giesserei KG, Krefeld, Germany
Filed Dec. 5, 1975, Ser. No. 638,075
Claims priority, application Germany, Dec. 6, 1974, 2457661
Int. Cl.² B65D *45/32*
U.S. Cl. 220—3 **6 Claims**

1. A pressurizable vessel, especially for a nuclear reactor, comprising:

a cylindrical shell and a cover mounted on said shell, said cover comprising at an upper side thereof at least two continuous radially spaced concentric annular grooves;

respective annular prestressing arrangements with respective prestressing cables received in said grooves, each of said arrangements comprising a U-section support element open toward the outer periphery of said cover and received in the respective groove, said element of each arrangement receiving the prestressing cables thereof;

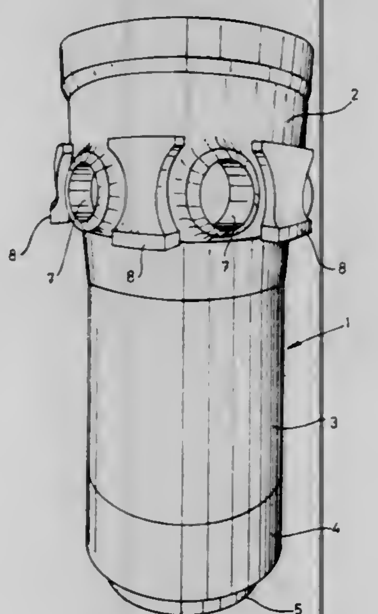
wedges received between each element and a wall of the respective groove for maintaining the cables of the respective arrangement under a predetermined stress, said cover comprising a plurality of concentric rings each formed with at least one such groove and receiving a respective



prestressing arrangement, at least some of said rings bearing inwardly upon neighboring rings, the neighboring rings being formed with confronting recesses; and

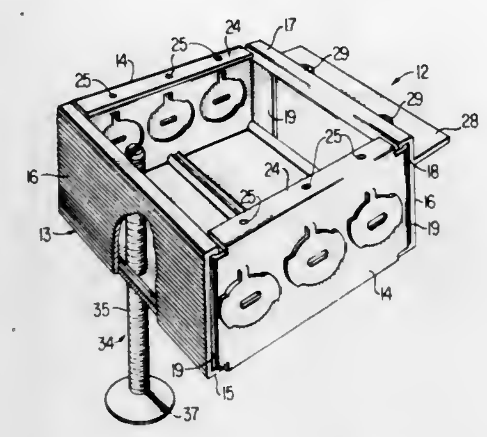
keying means form-fitting in said recesses for preventing relative displacement of said rings in a direction transverse to the cover.

4,057,163
METAL CONTAINER WITH THICK WALLS
Jean E. L. Widart, Saint Severin, and Alain F. C. Scailteur, Liege, both of Belgium, assignors to Cockerill-Ougree-Providence et Esperance-Longdoz en abrege "Cockerill", Seraing, Belgium
Filed July 8, 1976, Ser. No. 703,344
Claims priority, application Belgium, July 8, 1975, 45082; Feb. 20, 1976, 164487
Int. Cl.² B65D *7/42*
U.S. Cl. 220—3 **2 Claims**



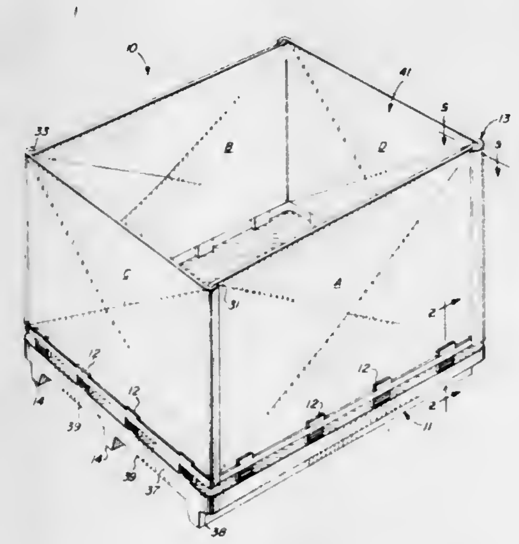
1. In a forged metal cylindrical nuclear reactor pressure vessel including a core shell course portion, a nozzle shell course portion welded to one end of the core shell course portion, and a bottom cap closing off the other end of the core shell course portion, the improvement wherein: said nozzle shell course portion comprises an integral, forged wall portion of enlarged thickness and defining a radially outward projecting nozzle and support ring, said nozzle and support ring being machined at circumferentially spaced locations to define circular nozzles separated by integral radially projecting support means with said support means and said nozzles occupying a common circumferential plane.

4,057,164
ELECTRICAL OUTLET BOX MOUNTING
William Maier, 125 Lawlor Terrace, Stratford, Conn. 06497
Filed Feb. 20, 1976, Ser. No. 659,893
Int. Cl.² H02G *3/12*
U.S. Cl. 220—3.6 **8 Claims**



1. An electrical outlet box for mounting in an opening in the front panel of a hollow wall having a yieldable wall stud and front and back wall panels supported on opposite sides of said stud, said outlet box comprising a bottom wall, a pair of opposite side walls and an open front, a single laterally projecting mounting flange means extending from one only of said side walls for securing said box to said stud with said open front facing outwardly through the opening in the front panel, a threaded hole in said bottom wall of said box adjacent the other of said side walls, and leveling means for adjusting the level of the box by moving said other side of said box relative to said one side of said box when said one side is secured to said stud by its mounting flange, said leveling means comprising a leveling screw extending through said threaded hole in threaded engagement therewith, said leveling screw being adjustable inwardly and outwardly of said box to engage the back wall panel and give support to said box adjacent the side of said box opposite the side from which the mounting flange projects.

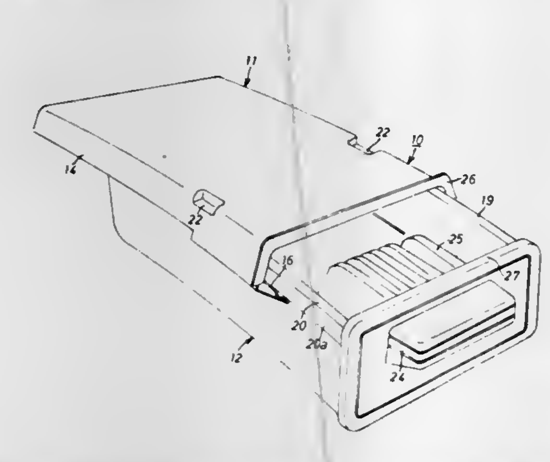
4,057,165
REUSABLE FOLDING CONTAINER
Kurt J. Kardell, 115 Industrial Drive, Tempe, Ariz. 85281
Filed Apr. 21, 1977, Ser. No. 789,361
Int. Cl.² B65D *7/24, 5/20*
U.S. Cl. 220—6 **11 Claims**



1. A collapsible shipping and storage container comprising:
a four-sided base structure,
four panel members each mountable on a different edge of said base structure,
hinge means, one for interconnecting each of said panels to a different edge of said base structure,
each of said hinge means comprising a resilient member

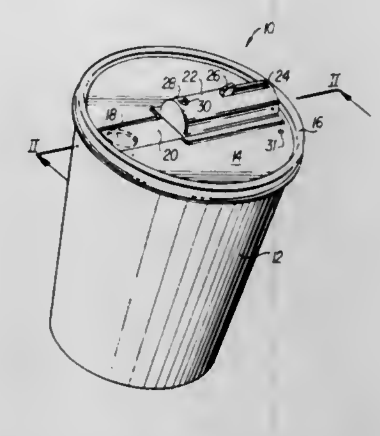
connected at one end to one of said panel members and at the other end to a different edge of said base structure,
said resilient member being provided with a plurality of spaced slots extending longitudinally of an edge of said base structure outwardly of said container and part way through said resilient member,
the pivotal axis of each hinge means being arranged along a different slot thereof from a reference point on said base structure to pivot inwardly of the juxtapositioned edge of the base structure over a common surface of it to a position substantially parallel with said surface,
said pivotal axis of the four hinge means being mounted sequentially each at a greater distance substantially equal to the thickness of the associated panel than the preceeding one from said reference point, and
fastening means mounted along parallel edges of said panels which are laterally positioned to its hinge means for cooperatively engaging with juxtapositioned edges of adjacent panels when all of said panels are positioned substantially perpendicular to said base structure for holding said panels in container erected position.

4,057,166
DRAWER TYPE ASH RECEIVER
Shinichiro Yamazaki, Toyota, and Teruyuki Hanabashi, Owariasahi, both of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Japan
Filed Oct. 22, 1976, Ser. No. 734,726
Claims priority, application Japan, Oct. 31, 1975, 50-149534[U]
Int. Cl.² B65D *7/24, 43/20;* **A24F** *19/00*
U.S. Cl. 220—8 **8 Claims**



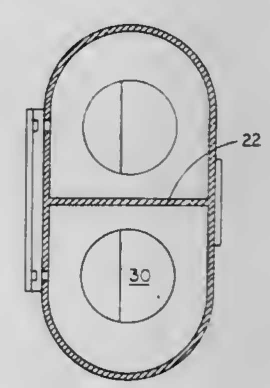
1. In an ash receiver assembly comprising a container in the form of a drawer and a supporting member from which the container is telescopically suspended and which provides a cover over said container when the latter is in a fully-closed position;
the improvement wherein the supporting member has a front end and a rear end and includes, in one piece, opposite-spaced side flanges, each having a forward end, and a rear end flange, the spaced side flanges being flared downwardly and outwardly and extending substantially along the whole length of said container, and a pair of receiving arms which extend inwardly from respective forward ends of the side flanges, each of the receiving arms having resilient means thereon; said container has opposite-spaced side rim means to engage with the flared side flanges and rear end rim means to engage with the rear end flange, the side rim means having outer tapered surfaces which are slidably guided by the flared side flanges of said supporting member and which are urged upwardly from lower surfaces thereof by the resilient means on said receiving arms to ensure air-tightness of said container when the latter is in the fully-closed position.

4,057,167
VALVED RECEPTACLE CLOSURE
Jin Ku Lee, 8108 Gorman Ave., No. 229, Laurel, Md. 20810
Filed Dec. 1, 1976, Ser. No. 746,604
Int. Cl.² A47G *19/22;* **B65D** *51/18, 43/20*
U.S. Cl. 220—90.4 **15 Claims**



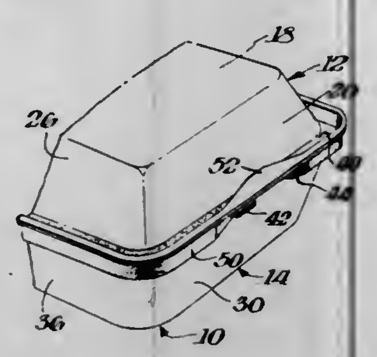
1. A closure adapted to be mounted in a cover of a fluent material receptacle, said cover having an opening which communicates with the fluent material in the receptacle, said closure comprising valve means movable from a first position closing said opening to a second position exposing said opening, mounting means on said cover for slidably engaging said valve means with respect to said cover, resilient means for urging said valve means into said second position, and latch means operatively connected to said valve means for releasably securing said valve means in said first position against the force of said resilient means.

4,057,168
VENTED TEST TUBE TOP
Barry L. Bosshold, 115 Shelter Lagoon Drive, Santa Cruz, Calif. 95060
Filed July 7, 1975, Ser. No. 593,328
Int. Cl.² B65D *51/16, 51/18*
U.S. Cl. 220—209 **5 Claims**



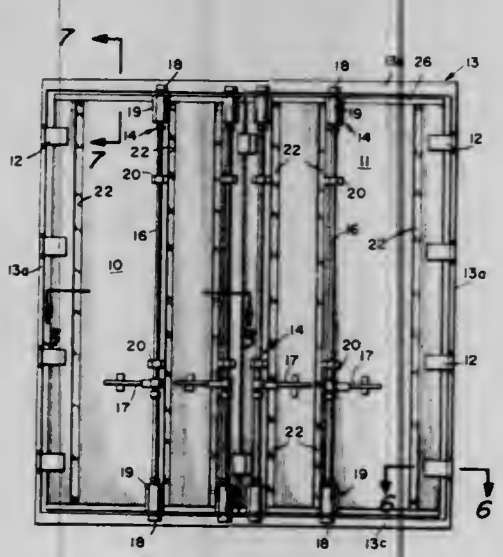
1. A vented top for a test media container comprising:
a holder body adapted to be grasped in the hand;
a pair of openings through said body;
means in each of said openings for gripping a laboratory test media container therein:
a cap hingedly carried on said body for pivotal movement between a closed position covering said pair of openings and an open position displaced therefrom to enable access thereto;
means on said cap for sealing off said openings in isolation from each other; and
venting means on said cap for each of said openings enabling the release of gases from said each opening to the exterior.

4,057,169
DUAL TONGUE AND SLOT CONTAINER LOCK
Joe R. Payne, La Habra, Calif., assignor to Keyes Fibre Company, Waterville, Maine
Filed Feb. 17, 1977, Ser. No. 769,567
Int. Cl.² B65D *41/18;* A47J *41/00;* B65D *1/00*
U.S. Cl. 220—306 10 Claims



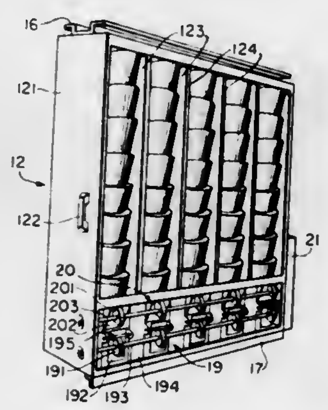
1. A container including two mating portions capable of packaging a product therebetween in the closed position, one of the portions having an inwardly flexible side wall with a laterally outwardly directed locking tongue protruding from its closeable edge, the other portion having a skirt along its corresponding closeable edge which overlies the closeable edge of the one portion in the closed position, an inwardly directed recess in the skirt located in opposition to the locking tongue, the improvement comprising a pair of slots in the recess separated from each other by an interconnecting web and a notch bifurcating the locking tongue into two protruding sections whereby each bifurcated section of the tongue is inserted in one of the slots in the recess and the notch accommodates the web of the recess to lock the two portions together in the closed position, and the two portions of the container may be unlocked by flexing the side wall of the one portion inwardly to withdraw the tongue sections from the slots in the recess of the other portion to permit the container to be opened.

4,057,170
CARGO CONTAINER DOOR CONSTRUCTION
Robert S. Dougherty, Upper Ames Ave., Ross, Calif. 94957
Filed Aug. 23, 1976, Ser. No. 716,700
Int. Cl.² B65D *45/28, 51/18*
U.S. Cl. 220—323 8 Claims



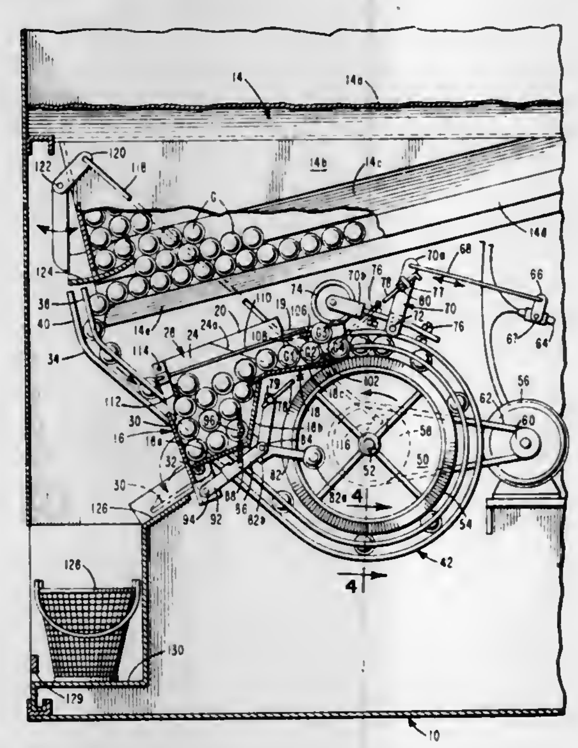
1. A cargo container door, comprising:
a formed sheet metal skin having a plurality of formed corrugations extending vertically from top to bottom, and having left and right vertically extending edges formed into an outer lip with a recess at the inner side of the lip;
a stiffener bar welded onto each of the upper and lower edges and extending throughout the width of the door, said bar being of approximately the same inside-to-outside thickness as, and generally flush with, the left and right edge lips; and
means forming closed off ends on the corrugations at the upper and lower edges;
whereby a generally uniform lipped edge is provided around the periphery of the door for receiving a sealing gasket, the upper and lower edges are sufficiently stiff to provide a sturdy door construction with a relatively thin sheet metal skin, and all surfaces of the door are open and accessible.

4,057,171
ARTICLE STORAGE DEVICES WITH ARTICLE RELEASERS FOR USE IN VENDING MACHINES
Kunitake Hatori, Maebashi; Toshihiko Ozaki, and Ryohei Kondo, both of Isesaki, all of Japan, assignors to Sankyo Electric Company Limited, Isesaki, Japan
Filed July 21, 1976, Ser. No. 707,210
Int. Cl.² B65G *3/44*
U.S. Cl. 221—6 11 Claims



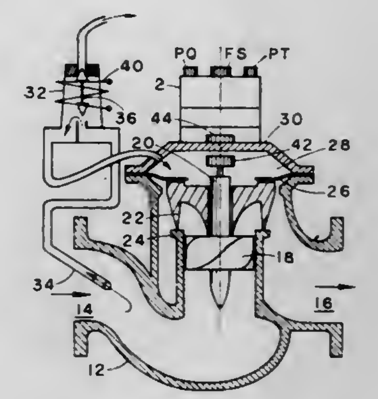
1. An article storage unit device with means for discharging one article at a time for use in a vending machine, comprising a housing defining at least one article storing space in which articles are stored in a vertical stack and having a bottom opening for providing a passage through which an article is discharged,
first stop means for holding the lowermost one of said vertically stacked articles at a position facing said bottom opening and being temporarily releasable for permitting the discharge of the lowermost article in the vertical stack,
second stop means for temporarily holding an article adjacent to and above said lowermost article in the vertical stack for only the time period during which said first stop means is being released,
driving means for temporarily driving said first stop means to be released and contemporaneously driving said second stop means to hold, whereby only one lowermost article in the vertical stack is discharged from said bottom opening,
said first stop means comprising first cam means mounted on a first driving shaft, said first cam means permitting articles in said article storing space to pass when disposed at a first predetermined angular position by the rotation of said first driving shaft and engaging with and holding the article when disposed at a second predetermined angular position by the rotation of said first driving shaft, said second means comprising second cam means mounted on a second driving shaft, said second cam means permitting articles in said article storing space to pass when disposed at a predetermined angular position by the rotation of said second driving shaft and engaging with and holding the article when disposed at a second predetermined angular position by the rotation of said second driving shaft, and said first and second driving shafts being operatively and commonly connected to said driving means with an angular difference therebetween whereby said second cam means holds an article during the time said first cam means permits articles to pass, and
first and second plate means movably mounted to follow the cam contour of said first and second cam means, respectively, said first plate means being operable to engage an article when said first cam means is disposed in said second predetermined angular position and to release the article when said first cam means is disposed in said first predetermined angular position, and said second plate means being operable to engage an article when said second cam means is disposed in said second predetermined angular position and to release the article when disposed in said first predetermined angular position.

4,057,172
APPARATUS FOR DISPENSING GOLF BALLS
Harvey F. Olander, Corpus Christi, Tex., assignor to Gustafson Mfg. Co., Corpus Christi, Tex.
Filed July 29, 1976, Ser. No. 709,725
Int. Cl.² B65H *33/14*
U.S. Cl. 221—10 19 Claims



1. An apparatus for dispensing golf balls comprising:
a hopper for storing golf balls;
a receptacle for retaining a predetermined number of golf balls in position for dispensing, said receptacle having an openable and closable gate normally closing one end thereof;
means for guiding and conveying golf balls from the hopper to the receptacle, said guiding and conveying means comprising:
a wheel rotatable about a substantially horizontal axis and having a resilient outer circumferential surface, and
a passageway of a width slightly greater than the diameter of a golf ball, one end of said passageway being adjacent the hopper and the other end thereof being adjacent the receptacle, said passageway terminating in an at least part-circular portion substantially concentric with the wheel periphery, said at least part-circular portion terminating at the other end of the passageway adjacent the uppermost portion of the wheel and having a bottom spaced from the wheel periphery by a distance slightly less than the diameter of a golf ball, and
means for rotating said wheel to refill said receptacle until a predetermined number of golf balls are in said receptacle after said gate is closed after discharge of golf balls therefrom.

4,057,173
ELECTRICAL CONTROL SYSTEM FOR AUTOMATIC METERING VALVE
Aharon Tal, 131 Hanassi Street, Chof Yam, Herzlia, Israel
Filed Apr. 6, 1976, Ser. No. 674,284
Claims priority, application Israel, Apr. 8, 1975, 47049
Int. Cl.² B67D *5/30*
U.S. Cl. 222—20 11 Claims



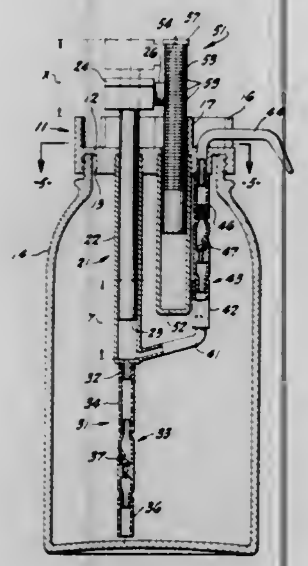
11. A control system for an automatic metering valve delivering a preset quantity of a fluid and including a housing for the valve; a rotary impeller disposed within the housing and rotatable at a velocity in accordance with the rate of delivery of the fluid; and an automatic shut-off mechanism for turning-off the valve when the present quantity of fluid has been delivered; said control system including sensible element disposed internally of the valve housing and rotated with the impeller, a sensor sensing element to produce electrical signals corresponding to the number of rotations thereof and of the impeller, a presettable counter circuit effective to count said electrical signals, and a switching circuit effective to actuate the valve shut-off mechanism to turn-off the valve when the counter circuit reaches a preset number corresponding to the present quantity of fluid to be delivered; said switching circuit including: a capacitor having a charging circuit and a discharging circuit; a switching device in the capacitor discharging circuit and have a control electrode effective to fire the switching device and thereby to cause the capacitor to discharge; and a relay having a winding in the capacitor charging circuit and a pair of contacts in the capacitor discharging circuit, and contacts being normally closed when the capacitor is charged and the relay coil draws little current, and being automatically opened to interrupt the connection to the switching device when the capacitor has discharged causing the relay winding to draw a larger amount of current for recharging the capacitor.

4,057,174
MEASURING LIQUID DISPENSER WITH FLAT TOP
John J. Trujillo, 18837 Lamson Road, Castro Valley, Calif. 94546
Filed Nov. 7, 1975, Ser. No. 629,694
Int. Cl.² B67D *5/22*
U.S. Cl. 222—49 6 Claims

1. A liquid dispensing device comprising
a cap structure adapted to engage the open top of a liquid container and having a floor with a low upstanding wall thereabout and a slotted boss on said floor extending upwardly to a height not greater than that of said wall,
a pump including a hollow barrel depending from said floor and a plunger slidably disposed in said barrel in extension through said floor with an enlarged upper end disposed atop the floor of said cap structure,
an elongated gauge rod with markings along the length thereof depending from said cap structure and slidably disposed through the floor and boss thereof with a lateral projection atop said rod disposed to engage the enlarged upper end of said plunger, said gauge rod being movable upwardly from a depressed position with the lateral rod projection aligned with the top of said boss whereby the

upper end of said pump plunger and said gauge rod are movable upwardly of said wall during use and are otherwise disposable below the top of said wall to provide a substantially flat top to the cap structure,

locking means for adjustably positioning the top of said gauge rod a measured distance above said cap structure as indicated by said markings to establish the maximum movement of said pump plunger, and



valve means connecting the bottom of said pump barrel to the interior of said container and to distance means extending through said cap structure

whereby adjustable positioning of said gauge rod predetermines the volume of liquid dispensed by said container by each full stroke of said plunger.

4,057,175

SERVING CONTAINER FOR LIQUIDS OR POURABLE MATERIALS CONTAINED IN CARDBOARD PACKAGES

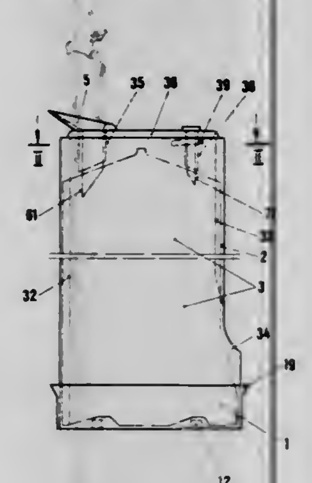
Hans Kessler, Dufourstrasse 48, Zurich, Switzerland (CH8008)

Filed Mar. 11, 1976, Ser. No. 665,802

Claims priority, application Switzerland, Mar. 13, 1975, 3183/75

Int. Cl.² B67B *7/24*

U.S. Cl. 222—86 **7 Claims**



1. A serving container for flowable material in package of square edged shape, the container comprising a base portion and sleeve inserted into the base portion and fitted over the package, the sleeve having a lid provided with two tubes of different diameters having inclined tips extending into the interior of the sleeve and for extending into the package and serving as pouring and vent tubes, one of said sleeve and said base portion being provided with means for exerting pressure on the edges of the inserted package, said means for exerting pressure comprising the diagonal dimensions of said sleeve which an smaller than the diagonal dimensions of the package, and a outward curving of the sidewalls of the sleeve and the base portion.

4,057,176

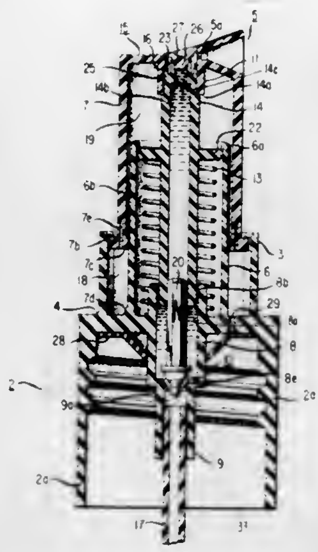
MANUALLY OPERATED SPRAY PUMP

William Horvath, Watchung, N.J., assignor to Plastic Research Products, Inc., Warren, N.J.

Continuation-in-part of Ser. No. 597,293, July 18, 1975, abandoned. This application May 5, 1976, Ser. No. 683,338

Int. Cl.² B05B *7/32*

U.S. Cl. 222—193 **28 Claims**



1. A pressure actuated dispenser including a spray nozzle constructed in combination with the closure of a container of a reservoir of fluid product for dispensing said product in a carrier gas in the form of high pressure spray, said dispenser comprising in combination:

means including fixed and movable elements forming an annular variable volume carrier gas chamber constructed for compression and expansion in response to pressure and release from pressure on said dispenser;

a pump for said fluid product, said pump including a pump chamber and a hollow stem piston mechanically coupled for reciprocating action in synchronism with said movable elements of said variable volume chamber;

central valve means communicating between said product reservoir and said pump chamber;

means for maintaining said reservoir at substantially ambient pressure;

means for forming a mixing chamber surrounded by said annular gas chamber, said mixing chamber having an aperture communicating with said spray nozzle, and comprising a first inlet means including a normally closed flexible member of membraneous material for admitting said compressed carrier gas from said variable volume carrier gas chamber to said mixing chamber, and a second inlet means including a normally closed flexible member of membraneous material for admitting fluid product under pressure from said hollow stem piston to said mixing chamber;

a first means responsive to an initial compression stroke on said dispenser for simultaneously depressing said hollow stem piston to close said central valve means, compressing the carrier gas in said variable volume carrier gas chamber and deflecting the normally closed flexible member of said first inlet means to admit a blast of said compressed carrier gas into said central mixing chamber;

a second means responsive to a subsequent return stroke of said hollow piston stem upon release of pressure on said dispenser, to release said central valve means and to draw said fluid product into said pump chamber; and

said first means responsive to the subsequent compression strokes of said dispenser for simultaneously again depressing said hollow stem piston to close said central valve means while pumping said fluid product from said pump chamber up through said hollow stem piston again compressing the carrier gas in said variable volume carrier gas chamber, deflecting the flexible member of said first inlet means to admit a blast of said compressed carrier gas

through said first inlet means and deflecting the flexible member of said second inlet means to admit said product through said second inlet means to admit said product through said second inlet means to mix in said mixing chamber to form an atomized spray of said product which is propelled out through said spray nozzle.

4,057,177

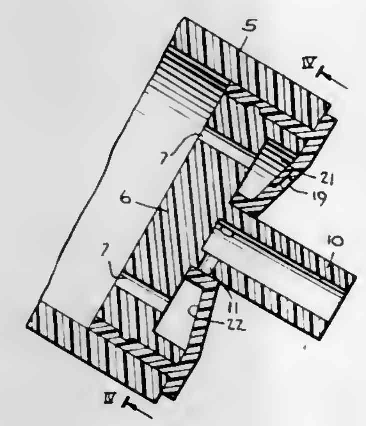
VALVED SQUEEZE BOTTLE FOR VISCOUS PRODUCTS

Robert H. Laauwe, 237 Green Ridge Road, Franklin Lakes, N.J. 07417

Filed Jan. 18, 1977, Ser. No. 760,384

Int. Cl.² B65D *25/52;* F16K *17/18*

U.S. Cl. 222—215 **9 Claims**



1. A squeeze bottle for containing and dispensing a viscous product and which is made of elastically deformable material so that after the bottle is squeezed and released from squeezing pressure, the bottle inherently springs back to its original unsqueezed shape, said bottle having a mouth provided with a dispensing valve comprising superimposed inner and outer parts normally closing said mouth, said inner part having at least one first product flow passage extending from its inside to its outside and a projection extending outwardly from its outside and the projection having a side in which at least one second product flow passage is formed, said second passage communicating with the outside of said valve and said outer part having a flexible diaphragm surrounding said projection and having a tubular neck slidably fitting the projection and normally covering and closing said second passage when the diaphragm is unflexed but uncovering and opening the second passage by sliding axially on the projection when the diaphragm is flexed outwardly, said parts forming a space between the outside of said inner part and the inside of said diaphragm into which when said bottle is squeezed a viscous product in the bottle can be squeezed via said first passage to apply pressure between the outside of the inner part and the inside of the diaphragm to cause the latter to flex outwardly and slide said tubular neck on said projection so as to uncover and open said second passage, said diaphragm being made of elastically deformable material and so that it inherently springs back to its original unflexed condition with said tubular neck covering and closing said second passage when the product in said space and bottle is released from squeeze pressure, one of said parts having an inwardly opening check valve for venting said bottle so that after release of squeeze pressure on the bottle air can replace product squeezed from the bottle and permit the latter to spring back to its unsqueezed shape and said diaphragm to spring back to its unflexed condition.

4,057,178

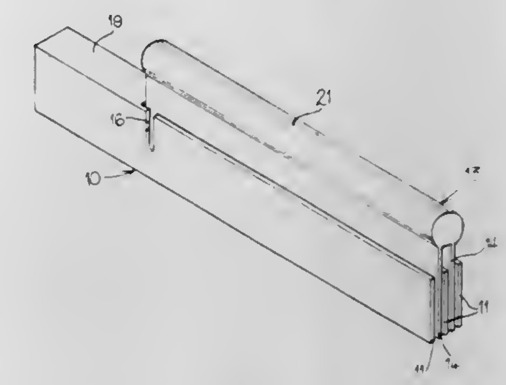
MATERIAL PLEATER

Edna Henderson Martin, 309 Oregon St., Birmingham, Ala. 35224

Filed Dec. 13, 1976, Ser. No. 750,133

Int. Cl.² A41H *43/00*

U.S. Cl. 223—35 **3 Claims**



1. A material pleater comprising:

a. an elongated member,

b. a plurality of parallel, longitudinally extending plate-like members carried by said elongated member with adjacent ones of said plate-like members spaced from each other to receive a pleat of said material therebetween,

c. an elongated pleat depresser having longitudinally extending spaced apart depresser elements with each said depresser element being disposed to move between adjacent ones of said plate-like members and depress a pleat of said material therebetween to form pleats between said plate-like members, and

d. there being transversely aligned outwardly opening slots in said plate-like members which are in transverse alignment with and face transversely aligned outwardly opening slots in said depressor elements for receiving means for detachably connecting said pleats thus formed to each other so that upon movement of said plate-like members and said pleat depresser away from each other said pleats remain in the formed position.

4,057,179

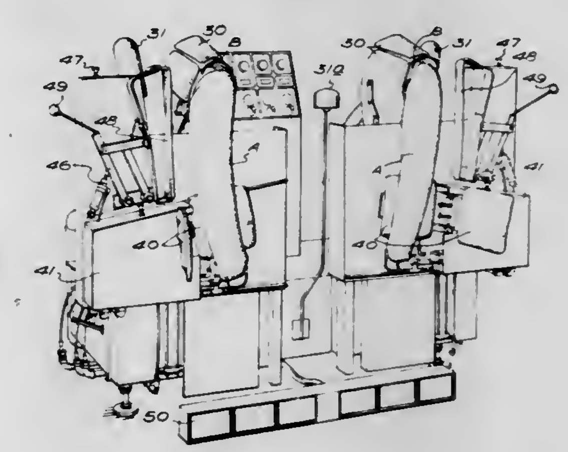
GARMENT PRESSING MACHINES

Nicholas Wynne Everett, Carnforth, England, assignor to Ibis Engineers Limited, Kendal, England

Filed July 12, 1976, Ser. No. 704,759

Int. Cl.² A41H *5/00*

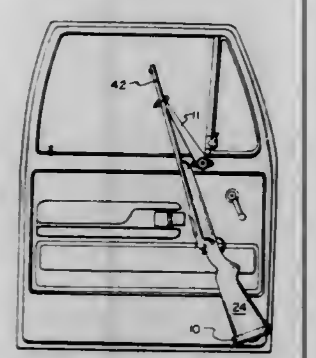
U.S. Cl. 223—73 **5 Claims**



1. A method of nipping and draping the armhole area of sleeves of jackets comprising the steps of: positioning the sleeve of a jacket on an elongated expansible sleeve form; bringing an expansible enlarged diameter internal pressing head into engagement with said form internally of the shoulder end of the sleeve whereby the seams between the jacket body and the adjacent sleeve which form the armhole area of the

jacket are nipped or clamped between said form and said pressing head; and allowing said sleeve to set.

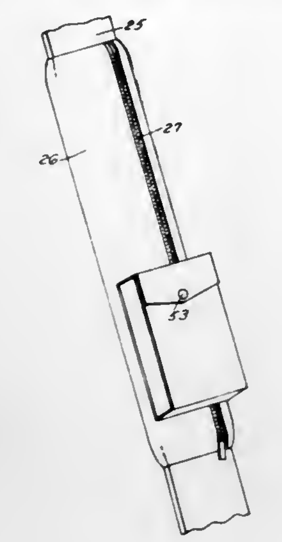
4,057,180
DOOR MOUNTED VEHICLE GUN RACK
Robert K. Whittaker, Rte. 2, Box 220, Kimberly, Idaho 83341
Filed Oct. 6, 1975, Ser. No. 619,609
Int. Cl.² A47B *81/00*
U.S. Cl. 224—1 R **1 Claim**



1. A two-piece gun rack for a vehicle door for holding mounted rifles, shotguns, and the like in an upright position adjacent said vehicle door comprising:
- a gun butt rest adapted to be secured to a lower portion of an inside panel of a vehicle door such that it can be rotated about a substantially horizontal axis and fixedly secured in any rotatable position;
- an elongated support arm having at one end thereof attaching means for securing the support arm to an upper portion of the inside panel of the vehicle door such that it can be rotated about a substantially horizontal axis and fixedly secured in any rotatable position and at the other end thereof barrel holding means comprising two legs in a generally right angle configuration, one leg consisting of an elongated extension member having a flat surface face containing an elongated slot, the other leg consisting of a pair of spaced apart, parallel arms, said parallel arms being turned at their outer ends away from the extension member, a curved surface face of said extension member for receiving a gun barrel therein extending between said elongated slot and said parallel arms;
- elastic cord means having one end through and slidable along the slot in the said one leg and having an enlarged knob formed at the other end, whereby when said elastic means is positioned to extend between the parallel arms the enlarged knob having a diameter greater than the space between said parallel arms will engage the turned outer ends to hold the elastic means therein; and
- fastening means slidable along the leg having the slot therein and securing the one end of the elastic means against being pulled through the slot.

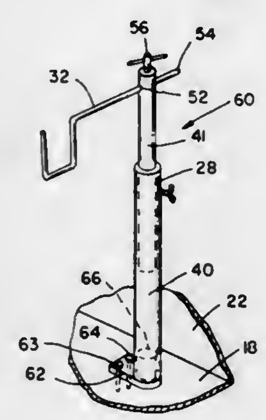
4,057,181
CONTAINER AND ITS MOUNTING ON A SAFETY HARNESS
Joseph C. Finnigan, 1204 Allendale Road, McLean, Va. 22101
Filed Oct. 30, 1975, Ser. No. 627,119
Int. Cl.² B60R *21/00*
U.S. Cl. 224—29 R **8 Claims**

1. In combination with a safety shoulder belt for the occupant of an automobile, a covering member embracing the belt adjacent the portion of the belt extending over the shoulder of the user and having an outer frontal surface away from the user, said member having resilient material embracing the belt to cushion pressure of the shoulder belt against the neck and shoulder of the user of the belt, means to detachably mount said covering member on said shoulder belt, an article container having clip means and means on the outer surface of said covering member to removably receive said clip means and



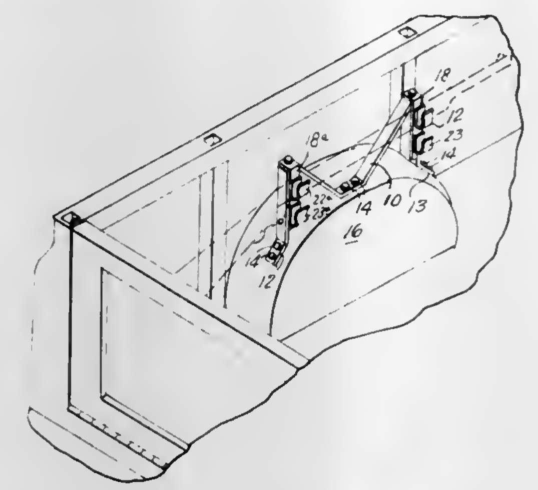
mount the container on the outer frontal surface of the covering member.

4,057,182
MOTORCYCLE CARRIERS
Lee R. Kolkhorst, deceased, late of Paradise, Calif., and by Virginia E. Kolkhorst, executrix, 1362 Kerr Lane, Paradise, Calif. 95969
Filed July 14, 1975, Ser. No. 595,640
Int. Cl.² B60R *7/02, 9/10*
U.S. Cl. 224—42.45 R **1 Claim**



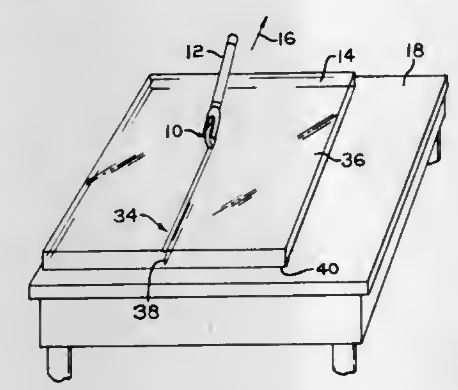
1. Apparatus for restricting the motion of a motorcycle carried by a pickup truck or similar vehicle which has a bed including a horizontal portion and at least one sidewall portion wherein the motorcycle is positioned with both wheels adjacent a sidewall and is provided with a rear-mounted hook-receiving member which is affixed to the motorcycle laterally off center, said apparatus comprising in combination, a mounting bracket affixed to said bed and including an upwardly directed stud portion, a substantially vertical hollow strut including mutually telescoping first and second members, said first telescoping member being removably mounted to said bed by slipping over said stud portion and the said second telescoping member being mounted relatively above said first telescoping member in overlapping telescoping relationship, means for fixing the vertical position of said second telescoping member relative to said first telescoping member, a transverse hook member slidably attached to the top of said second telescoping member adjacent and having an upwardly opening hook contour at the other end and means for adjusting the lateral position of said transverse hook member, so that the rear portion of the motorcycle can be lifted and the rearmounted hook receiving member thereof engaged with the hook contour of the transverse hook member to suspend the rear wheel of the motorcycle in a raised position relative to the horizontal portion of the vehicle bed so that the weight of the motorcycle causes the rear wheel to swing laterally toward and remain biased against the vertical strut, and the front wheel of the motorcycle can be turned against the sidewall and locked in position to restrict the motion of the motorcycle as it is being carried by the vehicle.

4,057,183
GUN RACK
Philip J. Ness, 5948 Mendocino Blvd., Sacramento, Calif. 95824
Filed Apr. 6, 1976, Ser. No. 674,117
Int. Cl.² B60R *9/00*
U.S. Cl. 224—42.45 R **1 Claim**



1. A rack for guns or the like to be mounted on an upwardly extending curvilinear wheel well of a pickup truck bed comprising an M-shaped frame having two vertical legs curved at their ends to conform to the wheel well shape and a valley therebetween also conforming to the wheel well, means at the lower extremities of said legs and at the bottom of said valley to secure said frame to the wheel well within the vehicle, inverted L-shaped support elements secured at the top of each of said vertical legs to extend downwardly along the vertical legs, and at least one U-shaped clip secured to each said support element to support a gun or the like therebetween.

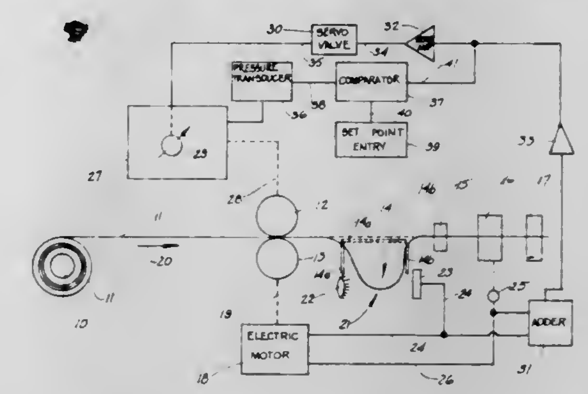
4,057,184
METHOD OF SCORING GLASS USING A SCORING WHEEL HAVING AN ARCUATE SCORING SURFACE
Edmund R. Michalik, West Mifflin, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.
Filed Sept. 19, 1975, Ser. No. 615,149
Int. Cl.² C03B *33/02, 33/10*
U.S. Cl. 225—2 **13 Claims**



1. In a method of scoring a refractory material selected from the group consisting of glasses, ceramics and glass-ceramics wherein the method includes the steps of contacting a surface of the refractory material with scoring means; providing relative movement between the scoring means and the piece of refractory material, while applying pressure to the scoring means to provide the refractory material with a score along a predetermined score path, the improvement comprising:
- the imposing an indentation in the surface, the indentation during scoring has a substantially constant predetermined radius of curvature along its depth when viewed through an intersecting plane normal and transverse to the score path

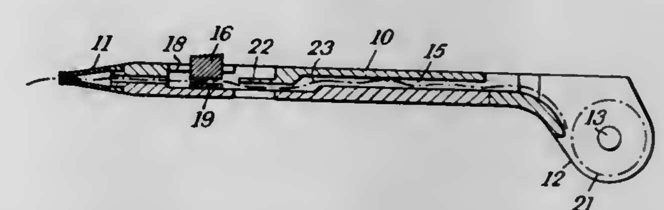
---

4,057,185
METHOD AND MEANS FOR OPERATING A PAIR OF PINCH ROLLS
Jerry L. Slama, Monroe; David J. Francis, Hamilton, and Gordon R. Shepherd, West Chester, all of Ohio, assignors to Armco Steel Corporation, Middletown, Ohio
Filed Aug. 16, 1976, Ser. No. 714,316
Int. Cl.² B65H *23/22*
U.S. Cl. 226—1 **10 Claims**



6. In an operation of the type utilizing first and second pinch rolls on a processing line for engaging therebetween a strip of material to facilitate the withdrawal of said strip from a supply thereof and to advance said strip along said line, the improved method of operating said pinch rolls comprising:
- a. positioning said first pinch roll for engaging said strip and operating said first pinch roll at a preselected velocity so as to tend to advance said strip along said line;
- b. positioning said second pinch roll to engage said strip and operating said second pinch roll at a preselected value of torque;
- c. monitoring the actual torque developed by said second pinch roll;
- d. developing an error signal representing the difference between said actual torque developed and said preselected torque value; and
- e. adjusting said actual torque developed to minimize the magnitude of said error signal.

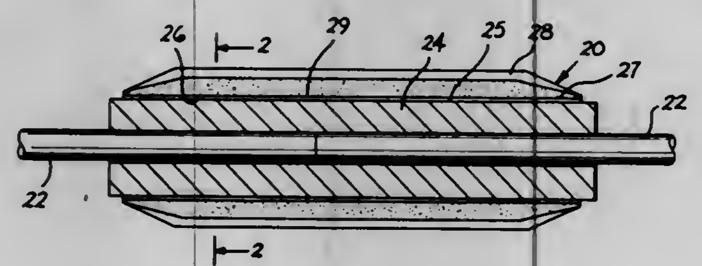
4,057,186
WIRING PENS
Denyer Edward Hedger, Southampton, England, assignor to Vero Electronics Limited, Eastleigh, England
Filed Oct. 21, 1976, Ser. No. 734,506
Int. Cl.² B65H *17/34*
U.S. Cl. 226—127 **12 Claims**



1. A wiring pen for use in connecting electrical components on a circuit board with electrically conductive wire and comprising:
- an elongated pen-shaped body having a bore longitudinally extending along the entire length of said body and a slot with said bore passing through said slot;
- means for holding a supply of electrically conductive wire at one end of the body;
- a tip at the other end of the body from which wire emerges after passing from the supply through said bore;

a slider slideably arranged within said slot;
a tongue spaced from said slider to define therebetween a path for the wire which when open allows free passage of the wire along the bore during the connection of electrical components with the wire;
a connecting member between said tongue and said slider, said connecting member tending to maintain said tongue and said slider spaced apart to define said path but permitting said tongue and said slider to be manually moved together to grip a wire passing along said path; and,
said slider being slideable along said slot for moving a gripped wire along said bore towards said tip of said body.

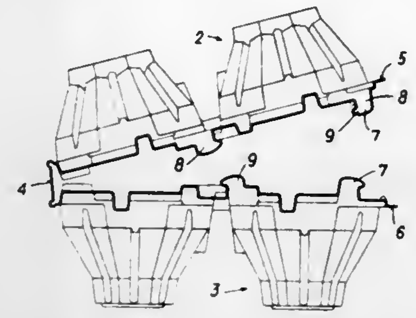
4,057,187
JOINING WIRE-LIKE MEMBERS
Benjamin Howell Cranston, Hamilton Township, Mercer County; Gary Evan Kleinedler, Hopewell Township, Mercer County; Donald Arthur Machusak, Hopewell Borough, Mercer County, all of N.J., and Charles Augustus Wiechard, Tucker, Ga., assignors to Western Electric Company, Inc., New York, N.Y.
Continuation of Ser. No. 527,786, Nov. 27, 1974, abandoned. This application Oct. 8, 1975, Ser. No. 620,609
Int. Cl.² H02R *43/02;* **B23K** *19/00*
U.S. Cl. 228—107 **12 Claims**



1. A method of joining first and second wire-like metallic members, comprising:
coating a substantial portion of the exterior surface of a hollow metallic member with a primary explosive composition;
juxtaposing the end portions of the first and the second members in approximate coaxial alignment within said hollow metallic member; and
detonating said primary explosive composition to propel and impact said hollow member against said aligned first and second members at a velocity of impact sufficient to spurt a jet of material, comprising at least one member surface, between said impacted hollow member and said impacted first and second members, respectively, to form metallurgical bonds therewith to indirectly join said aligned first and second members.

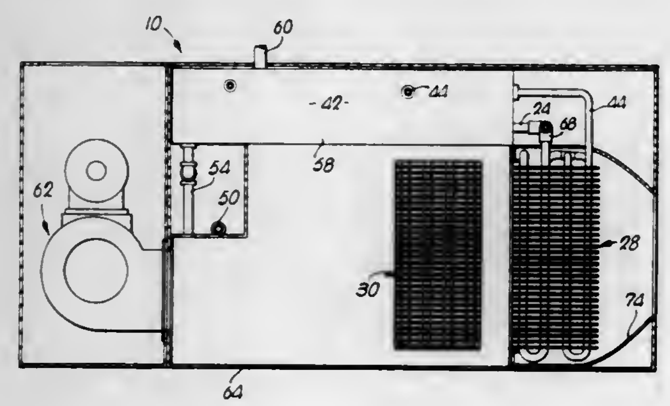
4,057,188
DEEP DRAWN PLASTIC PACKING CASE WITH INTERLOCKING, HOLLOW FASTENER PROJECTIONS
Dieter Steinhardt, Penzingerstr. 117, Vienna, Austria (1140)
Division of Ser. No. 612,240, Sept. 11, 1975, abandoned. This application Oct. 19, 1976, Ser. No. 733,922
Claims priority, application Austria, Sept. 16, 1974, 7478/74; May 13, 1975, 3657/75
Int. Cl.² B65D *1/26*
U.S. Cl. 229—29 M **5 Claims**

1. A packing case produced of deep drawn plastic sheet material, comprising two halves joined by a web and provided with recesses for receiving appropriate goods, at least the edges of the two packing halves coming into contact one over the other during the locking of the packing case having hollow projections which are integral with the packing halves and intermeshing by pairs to constitute a locking part, the improvement consisting in that the hollow projections are hook shaped and a hollow stem projecting from the one packing half changes into a hollow nose projecting vertically from said



stem and intermeshes in the locking position with a similar nose of a hollow stem on the other packing half.

4,057,189
FORCED AIR HOT WATER FURNACE
Lloyd L. Shoemaker, Cole Camp, Mo., assignor to Lloyd's Furnaces, Cole Camp, Mo.
Filed May 21, 1976, Ser. No. 688,741
Int. Cl.² F24H *3/06*
U.S. Cl. 237—17 **1 Claim**

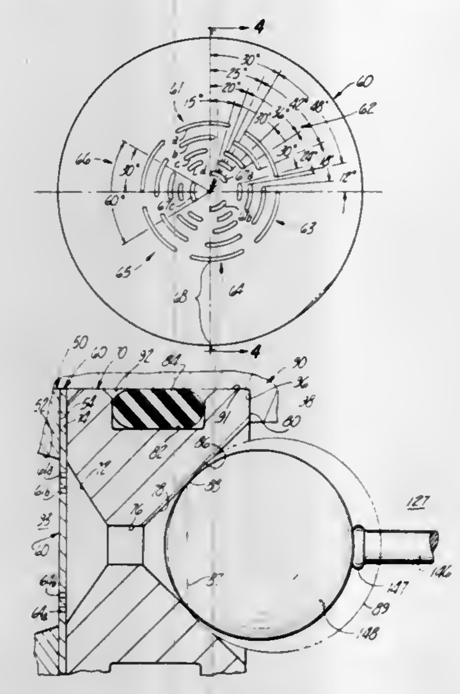


1. A forced air hot water furnace comprising:
a reservoir provided with a supply of fluid, said reservoir having an inlet port for ingress of said fluid and an outlet port for egress of said fluid;
pump means provided with inlet and outlet ports, the inlet port of the pump being in communication with the outlet port of the reservoir;
coiled tubing having a series of interconnected, U-shaped stretches, said stretches lying in multiple, nonparallel planes, the coiled tubing having a fluid inlet and a fluid outlet, the outlet port of the pump being in communication with the fluid inlet of the coiled tubing;
means for heating the fluid in the coiled tubing;
at least one radiator provided for transfer of heat in a fluid conduit to surrounding air, said said fluid conduit having an upstream section with an orifice of predetermined cross-sectional area and a downstream section with an orifice of smaller cross-sectional flow area;
fluid coupling means between the outlet of the coiled tubing and the upstream section of the fluid conduit of the radiator; and
a blower for forcing air toward said radiator means so as to pass the upstream radiator section first.

4,057,190
FUEL BREAK-UP DISC FOR INJECTION VALVE
Alexander Michael Kiwior, Warren, and James Daniel Bode, Royal Oak, both of Mich., assignors to Bendix Corporation, Southfield, Mich.
Filed June 17, 1976, Ser. No. 696,999
Int. Cl.² B05B *1/30*
U.S. Cl. 239—558 **3 Claims**

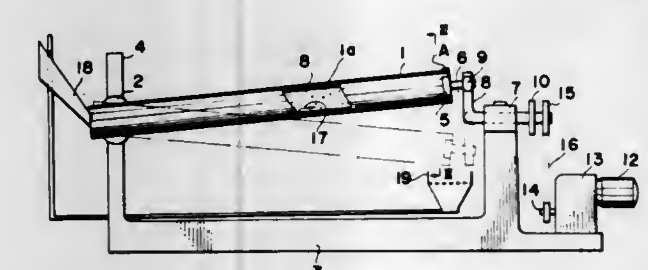
1. In a fuel injection valve adapted to be mounted on an

internal combustion engine so to be communicated with an intake passage of a combustion chamber thereof comprising:
fuel outlet means adapted to be communicated with said intake passage and comprising a fuel metering member and a fuel breakup member;
said fuel metering member comprising a converging inlet surface, a diverging outlet surface, and a metering orifice intermediate said inlet surface and said outlet surface, said metering orifice having a total orifice flow area thereacross for effecting a predetermined flow rate of fuel therethrough; and said fuel breakup member comprising a



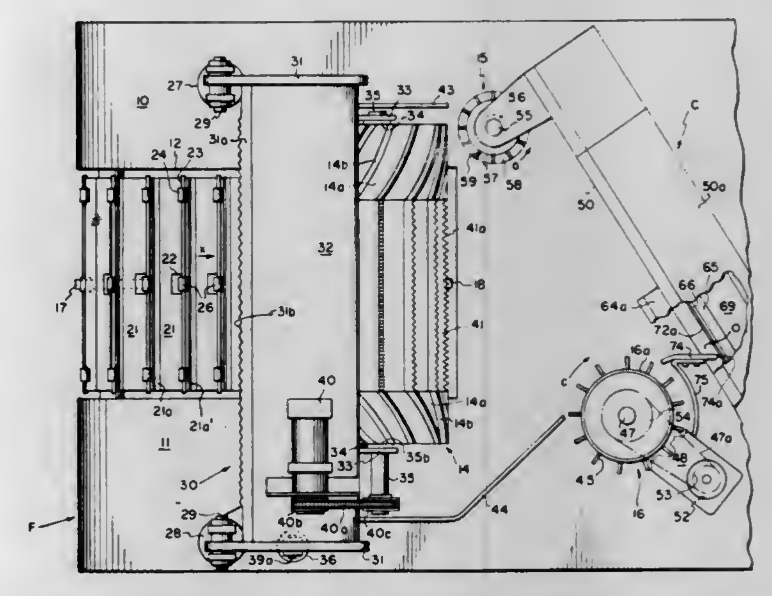
thin disk having an axial thickness not substantially greater than 0.05 mm secured across said diverging outlet surface and comprising a plurality of narrow slots therethrough for breaking said fuel up into uniformly small droplets, said slots having a total slot area thereacross establishing a minimum orifice-to-slot area ratio with said total orifice area of not less than 1.5, said orifice-to-slot area ratio and said 0.05 mm axial thickness of said thin disk cooperating to permit said orifice area to determine substantially the entire magnitude of said predetermined flow rate.

4,057,191
GRINDING METHOD
Ietatsu Ohno, 1-2, 1-chome Kasuya, Setagaya, Tokyo, Japan
Filed Aug. 23, 1976, Ser. No. 717,010
Int. Cl.² B02C *17/14*
U.S. Cl. 241—30 **2 Claims**



1. The grinding method comprising in combination the steps of:
a. confining a longitudinal hollow tank at one end in a fixed universal joint for limited rotational movement, said hollow tank having an internal surface lining,
b. feeding materials to be ground with a grinding agent in said first end of the tank,
c. grinding said materials by moving the opposite end of said tank in an arcuate path without rotating the tank, whereby the materials are ground by engaging the grinding agent and circling the inner peripheral lining of the tank as they flow from said one end to said opposite end of the tank, and
d. extracting materials and grinding agent from the said opposite end of the tank.

4,057,192
TREE HARVESTING MACHINE
Leward N. Smith, Remus, Mich., assignor to Morbark Industries, Inc., Winn, Mich.
Filed June 2, 1975, Ser. No. 582,429
Int. Cl.² B02C *18/08*
U.S. Cl. 241—92 **8 Claims**

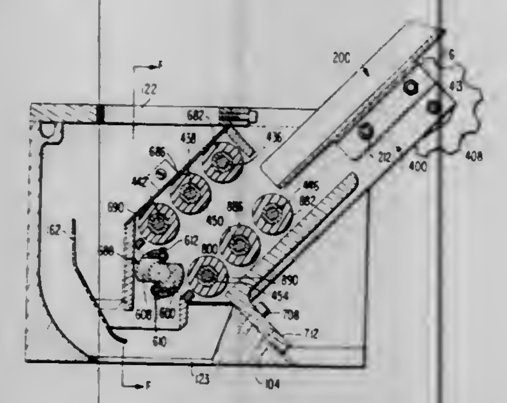


1. In a machinery for reducing forest products to wood chips:
a chipper disc assembly having a front face and a rear face and at least one opening therein leading from the rear face to the front face;
means for rotating said disc assembly in the direction of rotation at a chip cutting speed;
a feed mechanism for moving the said products to the rear face of said disc assembly comprising: a longitudinally disposed live feed bed to which said disc assembly is angularly disposed; a top roll crosswisely disposed to the live feed bed and vertically movable to crush limbs down to the trunk of a tree being fed toward the rear face of the chipper disc assembly; generally vertically disposed side guides having tree engaging surfaces thereon disposed downstream of said roll; at least one of said side guides comprising roll with vane means thereon for revolving a forked tree partly about its axis; and means for revolving said rolls and live bed at coordinated tree feeding speeds in directions of rotation to move a tree toward the chipper disc assembly;
a disc assembly housing including a rear wall with an opening to admit said products, a front wall, and a perimetral wall with an opening to egress chips; and
disc knife blade means for said opening positioned to cut said products with rotation of said disc assembly into chips and propel them through said opening forwardly.

4,057,193
APPARATUS FOR INTRODUCING CONTROLLED AMOUNTS OF PIGMENT INTO THERMOMECHANICALLY FORMED PLASTIC ARTICLES
William B. Bradbury, Brielle, N.J.; Robert H. Watts, Cincinnati, and E. Timm Scott, Norwalk, both of Ohio, assignors to PMS Consolidated, Somerset, N.J.
Filed Jan. 21, 1976, Ser. No. 650,938
Int. Cl.² B02C *18/44*
U.S. Cl. 241—281 **5 Claims**

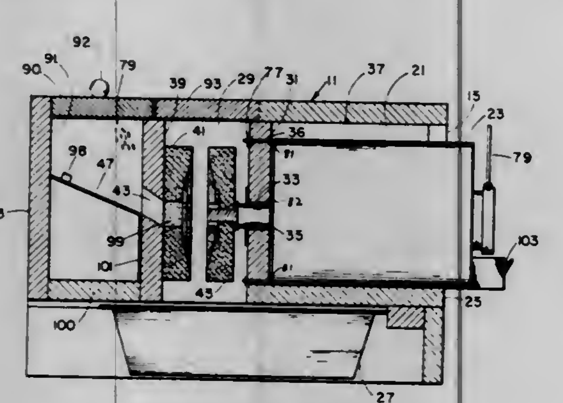
1. An apparatus for comminuting a pigment bar to add color to a supply of plastic material prior to the molding of the plastic material, comprising:

a. comminuting means having a rotary cutter with radially protruding discontinuous, cutting elements to comminute said pigment bars, said comminuting means having an inlet for said plastic material, and an outlet for said plastic material and said comminuted pigment;
b. feeding means attached to said comminuting means to feed said pigment bars into said comminuting means, said feeding means having a plurality of driven rollers bearing against said pigment bars;
c. first motor means drivingly connected to said driven rollers in said feeding means by interengaging gears;



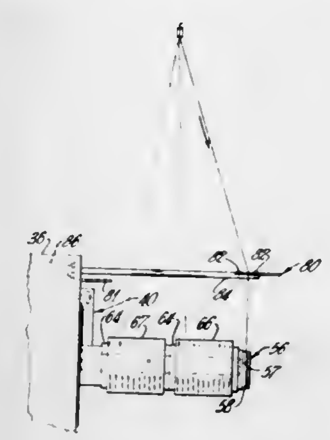
d. second motor means drivingly connected to said rotary cutter of said comminuting means so as to rotate said cutter;
e. movable mounting means attaching said first motor means to said comminuting means such that said first motor may be moved out of driving connection with said driven rollers, and by disengaging said interengaging gears; and
f. manual rotating means conected to said driven rollers such that said rollers may be rotated manually when said first motor is out of driving connection therewith.

4,057,194
PORTABLE FLOUR MILL
Roger W. Orton, 2274 W. La Loma Drive, Rancho Cordova, Calif. 95670
Filed Aug. 23, 1976, Ser. No. 716,754
Int. Cl.² B02C *7/13, 7/14*
U.S. Cl. 241—248 **10 Claims**



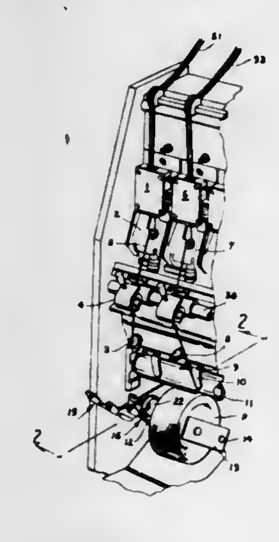
1. In a flour grinding mill, the combination of an up-standing box-like housing having an opening in the top portion thereof, a removable interior wall, a fixed interior wall, grinding wheels laterally disposed in said housing and spaced apart in said housing with respect to each other, one of said grinding wheels being fixed to the removable interior wall, the other said grinding wheel being journaled for rotation in the fixed interior wall opposite said fixedly mounted grinding wheel, driving means operable to rotatably drive said grinding wheel journaled for rotation in the fixed interior wall, an entrance-way in the removable interior wall, a feed hopper inside the housing an exitway coincident with said entrance-way of said fixedly mounted grinding wheel, one of said grinding wheels comprising a substantially cylindrical body portion having a grinding face including at least one radially extending "v" shaped groove.

4,057,195
APPARATUS FOR PACKAGING STRAND
Bernard H. Jones; Daniel Cox, and Don R. Gallagher, all of Anderson, S.C., assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio
Filed Apr. 7, 1976, Ser. No. 674,478
Int. Cl.² B65H *54/02*
U.S. Cl. 242—18 G **10 Claims**



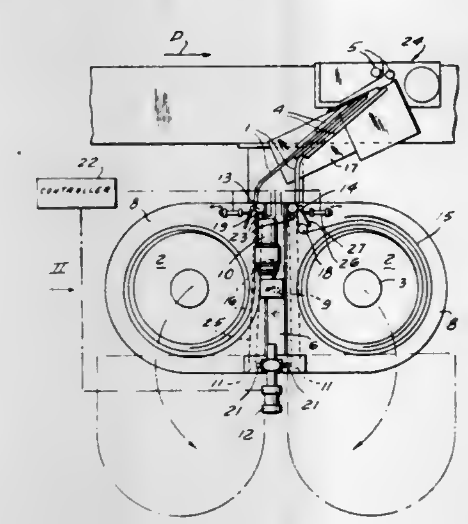
1. Apparatus for packaging strand comprising:
a. a driven rotatable collet having a first package collection region for collecting a first strand, a second package collection region for collecting a second strand and a temporary collection region;
b. a strand engaging member having a recess, a first guide surface and a second guide surface, the first guide surface and the second guide surface being on opposite sides of the member; and
c. means for moving the member along a path to move the first strand and the second strand from the package collection regions to the temporary collection region, the first guide surface being adapted to contact and guide the first strand toward the recess and the second guide surface being adapted to contact the second strand as the member is moved to move the strands to the temporary collection region.

4,057,196
APPARATUS AND METHOD FOR WINDING YARN ON A BOBBIN
James W. Amos, Siluria, Ala., assignor to Canton Textile Mills, Inc., Canton, Ga.
Filed Jan. 3, 1977, Ser. No. 756,487
Int. Cl.² B65H *54/02*
U.S. Cl. 242—18 PW **7 Claims**



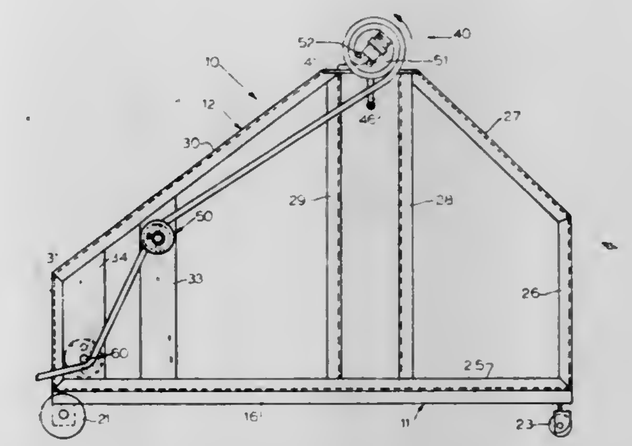
1. Apparatus for winding yarn on an empty bobbin so as to form a reserve winding having an accessible end at one end of the bobbin, said apparatus comprising yarn feed means for continuously feeding a running yarn, yarn collecting means for receiving and collecting a running yarn fed by said yarn feed means, a pair of pivotally mounted spaced apart bobbin supporting arms each having a bobbin supporting flanged roller rotatably mounted thereon for respectively engaging the ends of a bobbin having axially extending angularly spaced slots formed in one end thereof and extending inwardly by a distance farther than the distance by which the associated roller projects into the bobbin so that yarn from said yarn feed means may pass inwardly through one of said slots and outwardly through the other of said slots, means for rotating the bobbin, a reciprocable guide disposed to receive the running yarn from said yarn feed means and effective to cause the yarn to wind evenly along the bobbin, and a yarn control guide movably mounted on one of said bobbin supporting arms and movable from a normal position to a position of engagement with the running yarn from said yarn feed means so as to hold the running yarn clear of said reciprocable guide in order to form a reserve winding having an accessible end at one end of the bobbin.

4,057,197
APPARATUS FOR FEEDING STRIP MATERIAL TO GLUEING DEVICE
Manfred Rottmann, Hiddenhausen, Germany, assignor to F. Meyer & Schwabedissen GmbH & Co. KG., Herford, Germany
Filed May 25, 1976, Ser. No. 691,554
Claims priority, application Germany, June 12, 1975, 2526158
Int. Cl.² B65H *19/04*
U.S. Cl. 242—58 **11 Claims**



1. A feed apparatus for strip material, said apparatus comprising:
a stack of support plates spaced apart one above another in an upright direction;
means on each of said plates for holding a supply of strip material therein;
means for displacing said stack in said upright direction through a plurality of positions each corresponding to alignment of a respective one of said plates with a fixed take-off guide;
a fixed roller on each of said plates;
a displaceable roller on each of said plates movable toward and away from the respective fixed roller;
means on each of said plates for moving the respective displaceble roller toward the respective fixed roller for pinching the strip material from the respective supply;
means for rotating one of said rollers on each plate and thereby pulling the material off the respective supply when same is pinched between the respective rollers; and
means for displacing each of said plates out of said stack in a transverse direction transverse to the upright direction.

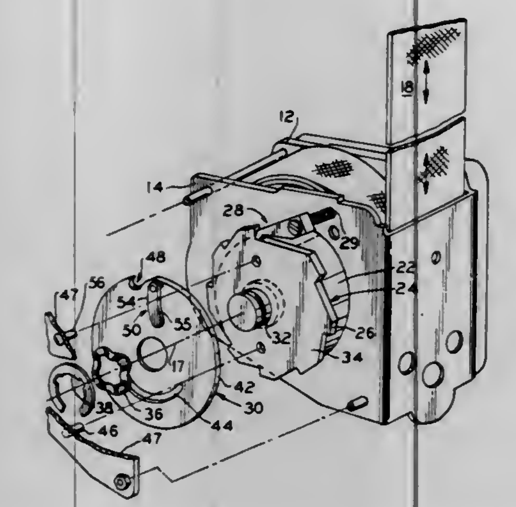
4,057,198
FIRE HOSE WINDING APPARATUS
Bert Dean Whitfield, Murdock Staff House, Butner, N.C. 27509
Filed Aug. 25, 1976, Ser. No. 717,629
Int. Cl.² B65H *75/40*
U.S. Cl. 242—86.2 **1 Claim**



1. An apparatus for manually winding fire hose of the type having male and female coupling members at the respective ends thereof, comprising in combination:
a. a horizontal rectangular base structure mounting wheel means proximate the forward and rearward corners thereof for supporting the apparatus and including wheels pivotal on a vertical axis at each of the corners at the rearward end of said base structure;
b. vertical support structure means fixedly secured to and extending upwardly from said horizontal base;
c. hand-operated reel means mounted on the upper portion of said vertical support means and comprising:
i. a horizontal drive shaft journaled for rotation about a horizontal axis transverse to the longitudinal axis of the apparatus;
ii. handle means at a first end of said shaft for driving such shaft; and
iii. enlarged disc means at the second end of said shaft mounting a pair of pin projections oppositely spaced equal distances from the rotational center of said disc;
d. first idler roller means projecting from said vertical support structure means and being longitudinally aligned with said pin projections substantially along the longitudinal gravitational center of said apparatus, said first idler roller means positioned at a lower forward end of said apparatus immediately above said base structures and immediately behind the wheel means located at such forward end; and
e. second idler roller means projecting from said vertical support structure means and being longitudinally aligned with said pin projections and first idler roller means and being positioned therebetween at a position higher than and rearwardly of said first idler roller means and lower than said pin projections, said second idler roller means being adjustable to different widths of flattened hose and including a fixed post member mounted on said vertical support structure means, a roller sleeve adapted for rotation about said post and a guide disc adjustably mounted at the outward end of said post member for engaging an edge portion of the flattened hose

whereby a fire hose length may be wound upon said apparatus with the hose routed under the bottom roller surface of said first idler roller means, over the top roller surface of said second idler roller means and onto the pin projections of said reel means.

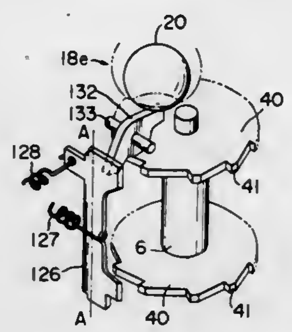
4,057,199
TENSIONLESS RETRACTOR
Harold R. Seibbe, Chardon, and Edward J. Smith, Mentor, both of Ohio, assignors to REPA Feinstanzwerk GmbH, Industriegebiet, Germany
Filed Mar. 1, 1976, Ser. No. 662,555
Int. Cl.² A67B *35/00;* **B65H** *75/48*
U.S. Cl. 242—107.7 **15 Claims**



9. Apparatus comprising an axially extending reel supported for rotation about a central axis thereof, means on said reel for connecting an automotive seat belt thereto in a manner such that the belt is wound or unwound from the reel as the reel is rotated about its central axis, means for biasing said reel in a first direction tending to wind the belt about the reel, locking surface means fixedly connected to the reel, a locking member biased for movement toward a position in which it engages the locking surface means and resists rotation of said reel in said first direction, a control member positionable in the path of movement of a portion of said locking member and movable relative to the locking member, said control member comprising a first portion engageable with said locking member to hold the locking member out of engagement with said locking surface means and a second portion for allowing said locking member to move into engagement with said locking surface means, gate means mounted on said control member and movable relative thereto to a first position holding said locking member from movement into engagement with said locking surface means during a preselected range of movement of said control member relative to said locking member, said gate means being movable to a second position allowing the second portion of the control member to cooperate with the locking member to move into engagement with said locking surface means during a preselected sequence of movements of said control member relative to said locking member.

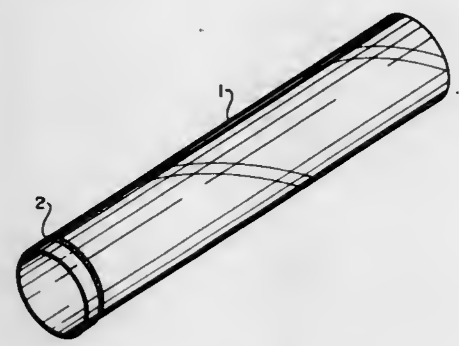
4,057,200
EMERGENCY LOCKING RETRACTOR FOR VEHICLE SEAT BELTS
Susumu Ubukata; Shozo Iyoda, and Kenji Oda, all of Nagoya, Japan, assignors to Susumu Ubukata, Nagoya, Japan
Division of Ser. No. 562,336, March 26, 1975, abandoned. This application July 9, 1976, Ser. No. 704,104
Claims priority, application Japan, June 1, 1974, 49-62147; July 15, 1974, 49-81487; Sept. 26, 1974, 49-111211
Int. Cl.² A62B *35/02;* **B65H** *75/48*
U.S. Cl. 242—107.4 A **6 Claims**

1. An emergency locking retractor for a seat belt of a vehicle comprising, in combination: a frame adapted to be secured to the vehicle; a drum rotatably supported by said frame and having one end of the belt anchored thereto for winding and unwinding the same, said drum having an axis of rotation oriented at an angle other than zero relative to the horizontal; first biasing means for causing said drum to rotate in the belt winding direction; a locking wheel rotatable in unison with said drum; detent means pivotable about an axis parallel to the axis of drum rotation between an operative position where said detent means engages said locking wheel to lock said drum against rotation in the belt unwinding direction, and an inoperative position where said detent means is disengaged from said locking wheel; second biasing means for biasing said detent means from the inoperative toward the operative position; acceleration sensing means including an inertial element normally held in a predetermined position so as to be displaceable relative to said frame in response to acceleration of the vehicle; and actuator means interposed between said sensing means and said detent means and having a first end disposed under said inertial element to be urged downwardly thereby, and a second



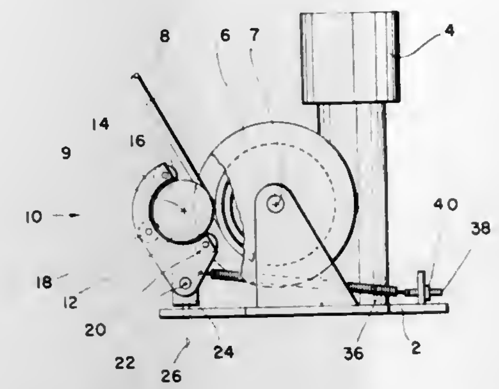
end disposed for abutting contact with said detent means to hold the latter in the inoperative position against the bias of said second biasing means; said actuator means including a mechanism for converting upward displacement of said first end in response to displacement of said inertial element into a displacement of said second end in a direction which is substantially the direction from the inoperative toward the operative position of said detent means and which is different from that of the displacement of said first end, whereby upon displacement of said first end, said second end permits said detent means to move from the inoperative to the operative position under the bias of said second biasing means.

4,057,201
YARN CORE INCLUDING SLIP RESISTANT TRANSFER COATING
Robert M. Wilkinson, Florissant, Mo., assignor to Alton Box Board Company, Alton, Ill.
Filed June 16, 1976, Ser. No. 696,574
Int. Cl.² B65H *75/28*
U.S. Cl. 242—125.1 **3 Claims**



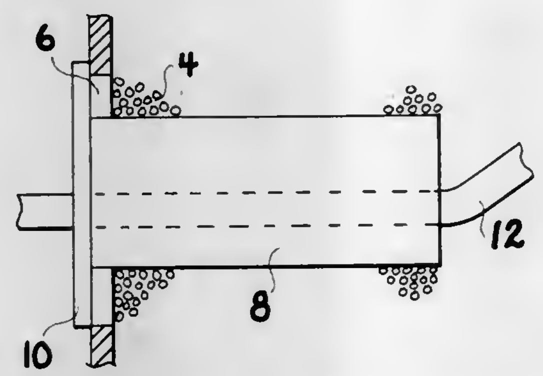
1. A yarn core having a transfer coating comprising, a length of cylinder like member, said member having a smooth outer covering to assist in yarn winding and transfer, a frictional transfer ring provided proximate one end of the core and formed of a slip resistant coating material to facilitate the engagement of yarn, said transfer ring including a shallow cavity formed in the cylindrical like member at the vicinity of the said ring, and including the slip resistant coating material applied therein, said slip resistant coating material comprising a composition of a colloidal silica that enhances the coefficient of friction of the transfer ring and effectively temporarily adheres the yarn as it is being wound with respect to the core.

4,057,202
WINCH CABLE ROLLER ASSEMBLY
Harold F. Carr, Jr., Hixson, Tenn., assignor to Ernest Holmes Division, Dover Corporation, Chattanooga, Tenn.
Filed Sept. 2, 1976, Ser. No. 719,900
Int. Cl.² B65H *57/00*
U.S. Cl. 242—157 R **12 Claims**



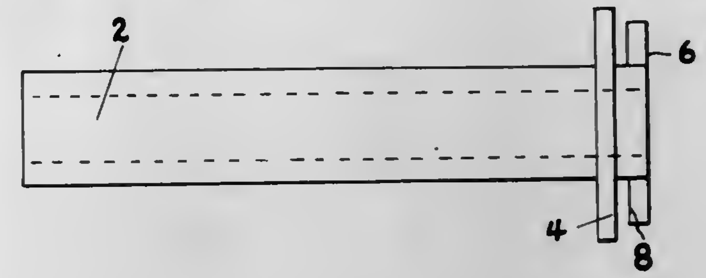
1. A cable engaging apparatus for a drum having cable spooled thereon, comprising:
a roller means comprised of a pluality of resilient discs mounted coaxially;
means for mounting said roller means with its axis approximately parallel to the axis of said drum; and
forcing means connected to said mounting means for urging the circumferential surface of said discs towards the drum and into resilient engagement with said cable spooled on said drum, said discs thereby applying an axially directed guide force thereto;
whereby as each wrap of said cable is spooled on said drum, it is forced into an axially adjacent position with the preceding wrap.

4,057,203
PACKAGE OF FLEXIBLE MATERIAL WITH OVAL PAYOUT TUBE
James W. Newman, Scarsdale, and Ronald E. Zajac, Yonkers, both of N.Y., assignors to Windings, Inc., Goldens Bridge, N.Y.
Filed May 14, 1976, Ser. No. 686,569
Int. Cl.² B65H *55/02*
U.S. Cl. 242—163 **2 Claims**



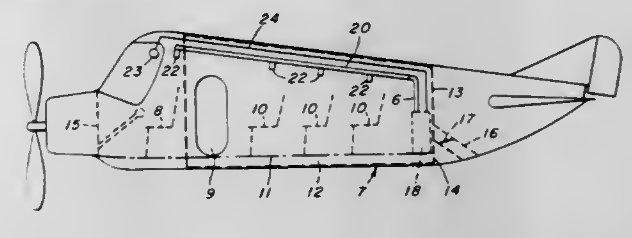
1. A package comprising a coil of flexible material wound in a plurality of layers of Figure-8 winds with the cross-overs progressing around the package in each layer and having a radial opening through the wall of the coil from the outside to a central core space of the wound flexible material, said radial opening having a greater length in the direction substantially perpendicular to the axis about which said material was wound, and a payout tube passing through said radial opening through which the inner end of the material is drawn out, said payout tube being oval in cross-section with its major axis extending parallelly to said perpendicular direction, the cross-section of the material being less than the minor axis of said payout tube.

4,057,204
TUBE FOR INNER END FEEDOUT OF FLEXIBLE MATERIAL AND PACKAGE UTILIZING THE SAME
Ronald E. Zajac, Yonkers, N.Y., assignor to Windings, Inc., Goldens Bridge, N.Y.
Filed May 19, 1976, Ser. No. 688,023
Int. Cl.² B65H *55/02, 57/12*
U.S. Cl. 242—163 **3 Claims**



1. A tube for insertion into a coil of material wound in a plurality of figure-8s for inner end feedout having a flange adjacent one end thereof and a pair of projections spaced from the flange and having their inner surfaces tapered.

4,057,205
AIRCRAFT WITH OXYGEN SUPPLY AND METHOD OF SUPPLYING OXYGEN THERETO
Richard R. Vensel, 53 Academy Ave., Pittsburgh, Pa. 15228
Filed Aug. 13, 1976, Ser. No. 714,113
Int. Cl.² B64D *13/06*
U.S. Cl. 244—118 P **12 Claims**



1. The combination, with an airplane having an unpressurized cabin such that the pressure within the cabin corresponds to the pressure of the atmosphere surrounding the plane at any altitude at which the airplane is flying, of means in the cabin of the plane for monitoring the oxygen content of the atmosphere within the cabin, a source of oxygen supply aboard the airplane, and means responsive only to said monitoring means for releasing oxygen from the supply source into the cabin when the oxygen content for any cause falls below a predetermined partial pressure and terminating the release of oxygen from said source when said partial pressure of oxygen is restored.

4,057,206
EJECTION SEQUENCING SYSTEM WITH AIRSPEED AND ALTITUDE SENSING
James W. Duncan, Arden, and Walter R. Peck, Asheville, both of N.C., assignors to Stencel Aero Engineering Corporation, Asheville, N.C.
Continuation of Ser. No. 587,277, June 16, 1975, abandoned. This application June 8, 1976, Ser. No. 693,843
Int. Cl.² B64D *17/62*
U.S. Cl. 244—147 **6 Claims**

1. An ejection sequencing system for controlling the deployment of a recovery parachute from its container, said recovery parachute being connected to an ejected load, said system comprising:
first means for continuously sensing pressure altitude and for generating a first signal when the pressure altitude of the ejected load is less than a predetermined maximum amount;
second means for continuously sensing the true airspeed of the ejected load in the airstream and for generating a

second signal when the ejected load true airspeed is less than a predetermined maximum amount; and

means responsive to said first and second signals for initiating deployment of the recovery parachute from its container;

said second means including an airstream probe having

an air inlet end, an air outlet end and a flow passage extending therebetween, said flow passage having a restricted portion therein;

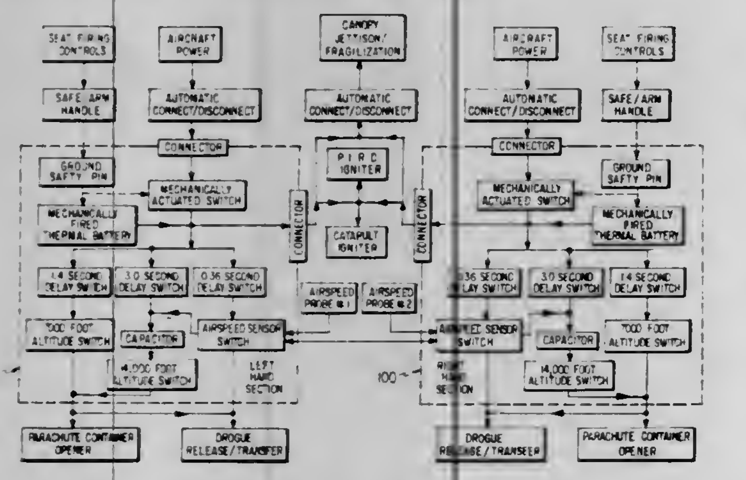
a first temperature sensing device disposed in said restricted portion of said flow passage for measuring the free-stream temperature of the airstream;

a second temperature sensing device disposed between said restricted portion and said outlet end for measuring the ambient temperature of the airstream;

means for determining the true airspeed of the ejected load from the difference between the ambient temperature and the free-stream temperature; and

an interior housing for said second temperature sensing device disposed within said flow passage between said restricted portion and said outlet end, said interior housing being connected to said probe by vanes.

4. An airspeed sensing system comprising



probe means positionable in the airstream, said probe means having an air inlet end, an air inlet end and a flow passage extending therebetween, said flow passage having a restricted portion therein; and

temperature sensing means for measuring the free-stream static and total temperatures, said temperature sensing means including computing means for solving the formula:

$$V = 109.5\sqrt{T_t - T}$$

where V is the true airspeed, T_t is the free-stream temperature and T is the ambient temperature, said temperature sensing means comprising

a first temperature sensing device disposed within said restricted portion of said flow passage for measuring the free-stream temperature of the airstream;

a second temperature sensing device disposed between said restricted portion and said outlet end for measuring the ambient temperature within said probe; and

an interior housing for said second temperature sensing device disposed within said flow passage between said restricted portion and said outlet end, said interior housing being connected to said probe by vanes.

4,057,207

SPACE VEHICLE MODULE

John Paul Hogan, 600 Elm St., Williamsburg, Iowa 52361

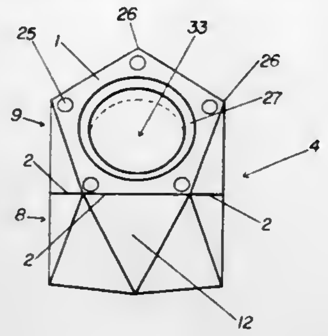
Filed Apr. 8, 1976, Ser. No. 674,884

The portion of the term of this patent subsequent to May 4, 1993, has been disclaimed.

Int. Cl.² B64G *1/00;* **E04B** *1/348*

U.S. Cl. 244—159 **22 Claims**

1. A space station structure designed as a vehicle through which artificial gravity and a pressure tight terrestrial environment can be provided occupants of the structure, comprised of a plurality of generally cylindrical individual modules, each module following the geometry of at least two truncated icosahedra that are joined along their truncation surfaces, the truncations occurring where a cluster of five icosahedral faces about a vertex point have been removed from the surface of an icosahedron; at least one of said icosahedra being truncated about at least two non-adjacent vertex points.



4,057,208

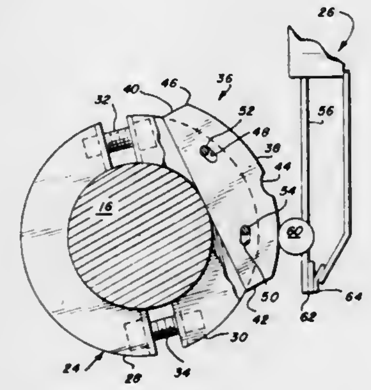
SLIDE CAM ASSEMBLY FOR RAILROAD-CROSSING GATE MECHANISM

Frank Andrews, Chicago, and Richard W. McKee, Lake Bluff, both of Ill., assignors to Federal Signal Corporation, Oak Brook, Ill.

Filed Feb. 18, 1976, Ser. No. 659,100

Int. Cl.² B61L *29/04, 29/08*

U.S. Cl. 246—125 **4 Claims**



1. Motor control apparatus for controlling a drive motor of a railroad crossing gate mechanism of the type wherein a gate arm is mounted on a horizontally disposed rotatable shaft and a drive motor is utilized to rotate the shaft for moving the gate arm between horizontal and upright positions, said motor control apparatus comprising, in combination, cam follower and switch means associated with said drive motor for starting and stopping the same; collar means engaged around said shaft for conjoint rotation therewith; a cam segment having an arcuate radially outer cam surface extending less than 180 degrees relative to the circumference of said collar and carried on said collar for engagement with said cam follower to close said switch means, said cam segment being mounted on said collar so as to be circumferentially slidable thereon a limited distance relative to said collar; said collar, cam segment and cam follower means being relatively positioned so that said cam segment moves downwardly relative to said cam follower during raising of said gate arm, and as the gate arm reaches its upright position said outer cam surface disengages from said cam follower permitting said switch to open; and said cam segment being located generally to one side of said shaft at the point of disengagement, whereby gravity will assist said cam follower in displacing said cam segment downwardly to its lowermost position relative to said collar, thereby creating a predetermined gap between said cam segment and said cam follower in the upright position of said gate arm.

4,057,209

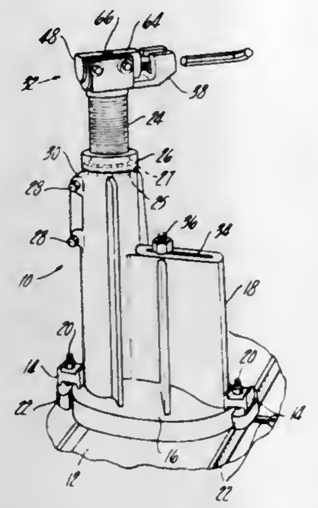
LATERAL ADJUSTMENT MECHANISM FOR A MACHINE ANCHOR

Scott L. Holman, Farmington Hills, Mich., assignor to Bay City Foundry Company, Franklin, Mich.

Filed Dec. 6, 1976, Ser. No. 747,829

Int. Cl.² A47G *19/00*

U.S. Cl. 248—13 **11 Claims**



1. An anchoring arrangement having a lateral adjustment capability for supporting a structure with respect to a base surface comprising:

an anchor housing adapted to be secured to said base surface;

a vertically extending shaft received within said anchor housing;

means for adjusting the elevational position of said vertically extending shaft;

lateral adjustment means carried by the upper end of said vertically extending shaft; said adjustment means including an at least partially cylindrical slide member, such slide member having mounted means for securing said supported structure thereto;

means supporting said slide member for lateral movement along an axis parallel to the surface of said base structure, said means including a body member having a socket formed therein and adapted to slidably receive said slide member for movement therein, said body member being formed with a slot extending into said socket along the length thereof to form opposed socket walls, said slide member disposed in said socket with said mounting means accessible through said slot;

drive means included in said lateral adjustment means and adapted to reciprocate said slide member in said socket to thereby produce said lateral adjustment;

locking means for locking said slide member in any given adjusted position along said line of lateral movement, said locking means including means for drawing said socket walls formed by said slot into engagement with said slide member.

4,057,210

ARTICLE HOLDING DOUBLE-SLING KIT

Lester R. Wellman, 110 Lakewood Place, Highland Park, Ill. 60035

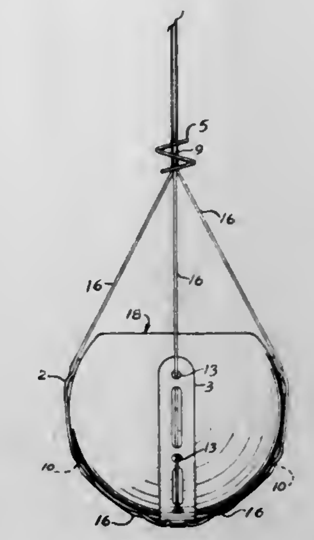
Filed July 28, 1976, Ser. No. 709,381

Int. Cl.² F16M *13/00*

U.S. Cl. 248—318 **6 Claims**

1. An article-holding kit which comprises:

a. a first pair of elongated strips, each of which contains (i) a plurality of apertures along its length and, (ii) elongated slots intermediate said apertures and in alignment therewith, a first one of said strips having at least two parallel slots proximate to the center thereof, said slots adapted to receive, in crossed configuration, the second of said strips which contains at least two off-sets on each edge (i) proximate to the center thereof and, (ii) which abut the edges off said first strip when the strips are interlaced in latched, cross configuration; and,



b. a second pair of shorter, elongated strips, each of which contains a plurality of apertures along its length, and one of which is foldable upon itself, whereby the apertures therein are aligned.

4,057,211

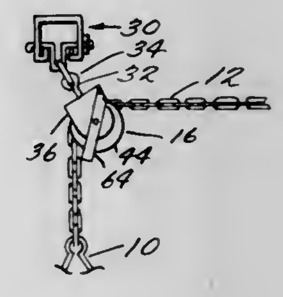
SAFETY SYSTEM FOR OVERHEAD SUPPORT OF WEIGHTED ARTICLES

Junius Thomas Moore, Charleston, W. Va., assignor to The Moore Company, Inc., Charleston, W. Va.

Filed Feb. 13, 1976, Ser. No. 658,051

Int. Cl.² B42F *13/00*

U.S. Cl. 248—332 **14 Claims**



1. In a system for raising and lowering a weighted article between supported elevated and supported lower positions, the combination comprising:

an overhead support means;

a pair of pulley members supported from said support means at laterally spaced points from each other;

means to swivel support one of said pulley members from said overhead support means;

a fixed attachment means supported within reach of a person;

a link chain connected at one end to the article and passing vertically upwardly over the swivel supported pulley member and then the other pulley member and extending downwardly and connected at its other end to said attachment means said chain having a length when fully extended sufficient to permit said article to be suspended within reach of a person;

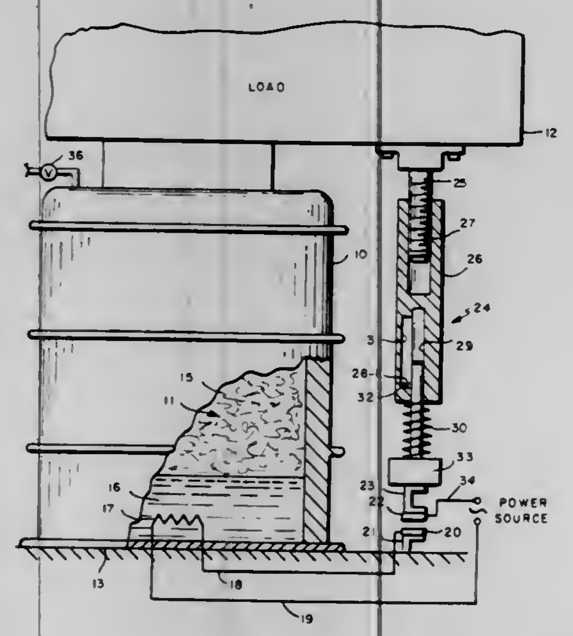
means on said chain positioned a sufficient distance from the end of the chain connected to said attachment means for connecting the chain to said attachment means when the chain is drawn downwardly to raise the article to the elevated position;

said means to swivel support one of the said pulley members permitting said one of said pulley members to swivel at an angle to a vertical through its point of support to said support means during normal operation of raising, lower-

ing and supporting the article in elevated and lower positions;

The improvement comprising said swivel supported pulley member including a housing, a pulley sheave rotatably supported in said housing, a chain arrestor arm projecting from said housing and fixed relative to said housing and having at least a portion extending transverse of and spaced from the pulley sheave and out of the path of said chain during normal operation, said arrestor arm having stop means on said portion for engaging and stopping said chain when tension in said chain between said swivel supported pulley member and said fixed attachment means is abruptly reduced and said swivel supported pulley member swings toward the vertical and moves the arm fixed thereto and stop means into engagement with the chain.

4,057,212
FLUIDIC VIBRATION ISOLATOR
Dale W. Schubert, Sudbury, Mass., assignor to Barry Wright Corporation, Watertown, Mass.
Filed Aug. 15, 1975, Ser. No. 604,908
Int. Cl.² F16M *13/00*
U.S. Cl. 248—358 R **3 Claims**



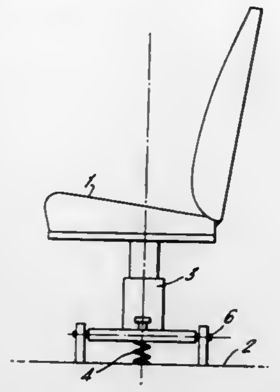
1. A vibration isolator system comprising a vibration isolator having a closed chamber, a liquid in said chamber, a vapor of said liquid in said chamber, heating means positioned in said chamber for heating said liquid and sensing means for sensing the relative height of said isolator to control the temperature of said liquid in said chamber, said sensing means comprises an adjustable height spring or rigid structure supporting a first contact, a second contact means coupling said contacts to a source of energy and means coupling said heating means to said contacts.

4,057,213
SEAT FOR WORK MACHINE OR VEHICLE
Kalevi Kokkila, Tampere, Finland, assignor to Rauma-Repola Oy, Finland
Filed Jan. 19, 1976, Ser. No. 650,034
Claims priority, application Finland, Feb. 6, 1975, 0331/75
Int. Cl.² A45D *19/04*
U.S. Cl. 248—385 **6 Claims**

1. A driver's seat assembly in a work machine or vehicle for minimizing shock to the driver caused by sudden lateral and angular changes in position due to uneven terrain while permitting the driver to maintain maximum control over the control elements of said work machine or vehicle, said seat assembly comprising:

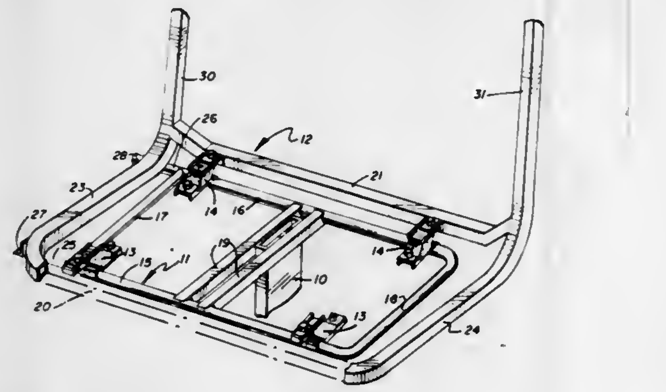
a. a seat member;

b. means for pivotably mounting said seat member in a work machine or vehicle for restricting movement of said seat member to lateral motion or swinging, said means for pivotably mounting being positioned at the cab floor, having a pivot axis in proximity to the floor, the pivot axis being generally parallel to a longitudinal axis of the work machine or vehicle; and



c. means connected to said seat member and to said work machine or vehicle for damping lateral movement and absorbing the lateral shock caused by sudden changes in contour of terrain.

4,057,214
SEAT WITH ENERGY ABSORBING MOUNTING
Arthur J. Harder, Jr., Franklin Park, Ill., assignor to Coach and Car Equipment Corporation, Elk Grove Village, Ill.
Filed July 26, 1976, Ser. No. 708,481
Int. Cl.² A47C *3/025*
U.S. Cl. 248—399 **9 Claims**



1. In a seat:

a base;

a horizontally disposed seat frame having front and rear members each located above said base;

front and rear energy absorbing means, cantilevered inwardly from said front and rear members of the seat frame, respectively, for resiliently mounting said respective front and rear members on said base;

each of said energy absorbing means comprising a block of elastic, resilient material having upper and lower horizontal surfaces and parallel, inclined inner and outer surfaces extending upwardly from said lower surface in an outward direction relative to said seat frame;

each inclined surface having a bottom edge at said lower horizontal surface and a top edge at said upper horizontal surface;

top and bottom plates attached to said upper and lower horizontal block surfaces respectively;

both of said inclined surfaces on each of said blocks being substantially totally exposed to facilitate unrestricted flexing thereof;

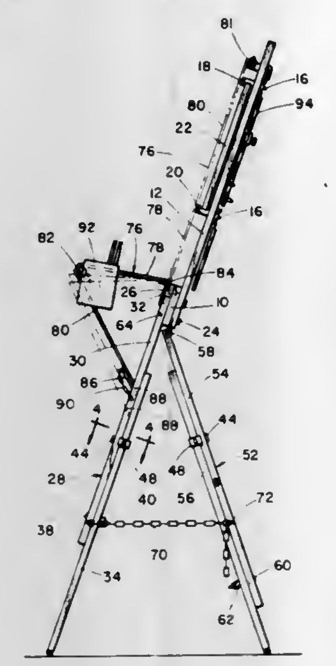
each top plate comprising an end portion located outwardly of the top edge of said outer inclined block surface;

means for connecting said end portion of said top plate of the front energy absorbing means to the front member of said seat frame;

means for connecting said end portion of said top plate of the rear energy absorbing means to the rear member of said seat frame;

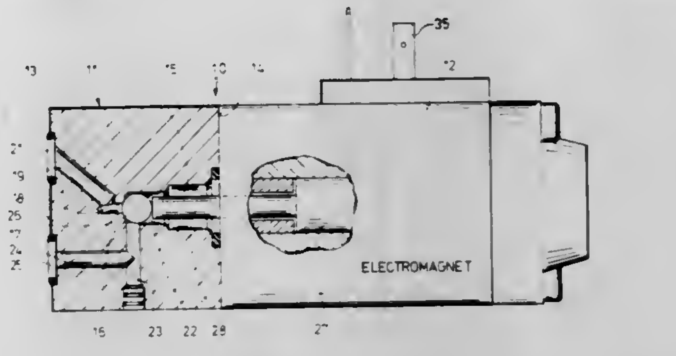
and means for connecting the bottom plate of each of said energy absorbing means to said base.

4,057,215
COLLAPSIBLE EASEL FOR ARTISTS
Gene A. Stettler, 641 Florida Ave., York, Pa. 17404
Filed Aug. 12, 1976, Ser. No. 713,716
Int. Cl.² A47B *97/08*
U.S. Cl. 248—460 **6 Claims**



1. A collapsible easel for use by an artist comprising in combination, an elongated relatively narrow normally horizontal frame member having opposite faces, a relatively narrow support member connected at one end to said frame member and extending perpendicularly therefrom, a first pair of longitudinally adjustable legs pivotally connected at one end to opposite end portions of one face of said frame member, a second pair of longitudinally adjustable legs pivotally connected at one end to opposite end portions of the other face of said frame member, the legs of said pairs being perpendicular to the elongated axis of said frame member and said pairs of legs respectively being pivotally movable in opposite directions relative to each other through arcs of substantially 180° relative to the elongated axis of said frame member respectively between compact folded position adjacent opposite surfaces of said support and extended supporting positions in which said legs all extend from said frame member in opposite directions from said support, a pair of normally horizontal rails extending transversely to the vertical axis of said support member and relatively adjustable to said member and each other, said rails also having grooves therein facing each other to engage opposite horizontal edges of an artist's canvas or boards, a pair of elongated panels hingedly connected along one edge to each other, means connecting the opposite edge of one panel to said frame member to form a shelf when extending horizontally in use from said frame member, the other panel comprising a brace and being adapted to extend downward and inward from the outer edge of said shelf panel for engagement with the first pair of legs to brace said shelf panel substantially in operative horizontal position, pin means adjustably positionable longitudinally at desired selected positions along said first pair of legs below the pivotal connection thereof to said frame member and said first pair of legs having similar rows of holes extending transversely therein to receive said pins in similar selected holes in each row for engagement by the lower edge of said brace panel when the pairs of legs are disposed in downwardly extending supporting position for said horizontal frame member and support thereon, and said panels further being adapted to be disposed in extended planar relation to each other and be hingedly moved into a compact extended position overlying the normally front face of said support member and protect the face of any painting or artist's panel mounted upon said support member for carrying purposes.

4,057,216
ELECTROMAGNETIC VALVE
Heinz Flaschar, Asperg, and Heinz Gand, Stuttgart, both of Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany
Filed Jan. 22, 1976, Ser. No. 651,470
Claims priority, application Germany, Feb. 4, 1975, 7503234[U]
Int. Cl.² F16K *31/06*
U.S. Cl. 251—129 **12 Claims**



1. An electromagnetic valve, comprising a valve housing having an elongated bore formed with a valve seat, said bore comprising a plurality of portions which successively decrease in cross-section in the direction of the elongation of said bore towards the interior of said valve housing so as to include a largest bore portion, a medium-sized bore portion and a smallest bore portion; a fluid inlet port and a fluid outlet port communicating with said bore at opposite sides of said valve seat, said fluid outlet port comprising a longitudinally-extending passage and a transverse passage communicating with said longitudinally-extending passage and extending in direction transversely of the elongation of said bore until said transverse passage reaches said medium-sized bore portion; a valve member movable in said bore between first and second positions in which it respectively engages and is spaced from said valve seat; and electromagnetic means having a portion engageable with said valve member and being movable between one position and another position in which it respectively permits and prevents movement of said valve member between said first and second positions thereof.

4,057,217
VALVE CONSTRUCTION
Peter S. MacDonald, Ironia, N.J., assignor to Sargent Industries, Inc., Los Angeles, Calif.
Continuation of Ser. No. 433,330, Jan. 14, 1974, abandoned. This application Aug. 4, 1975, Ser. No. 601,714
Int. Cl.² F16K *1/22*
U.S. Cl. 251—308 **23 Claims**

16. A valve for controlling the flow rate of a fluid even with temperature changes including:

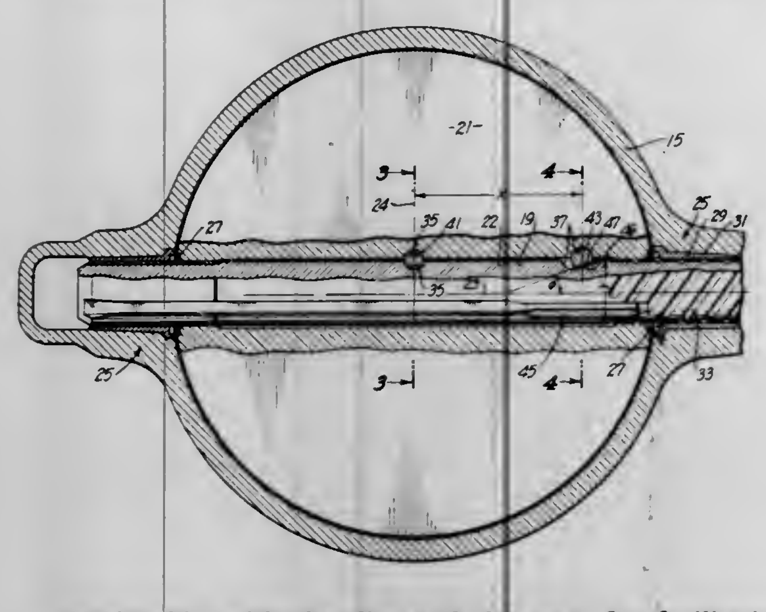
a housing;

a stem having an axis and pivotal relative to the housing on the axis of the stem as a fulcrum and having a first rate of expansion or contraction in response to such temperature changes;

a disc mounted on the stem interiorly of the housing, the disc being pivotable with the stem to open and close the valve and having a second rate of expansion or contraction in response to such temperature changes where the second rate is different from the first rate;

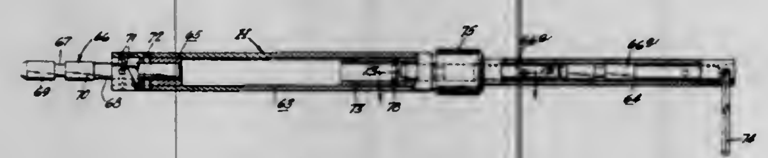
first means interconnecting the stem and the disc at an intermediate position along the axial length of the stem in the housing and providing a reference for any difference between the first rate of expansion or contraction of the stem in response to the temperature changes and the sec-

ond rate of expansion or contraction of the disc in response to the temperature changes; and
second means interconnecting the disc and the stem at a position displaced from the first means and in a slidable



relationship with the disc and the stem for facilitating radial and axial displacement of the disc with respect to the stem as a result of the differences between the first and second rates of expansion or contraction to inhibit angular displacement of the disc relative to the stem.

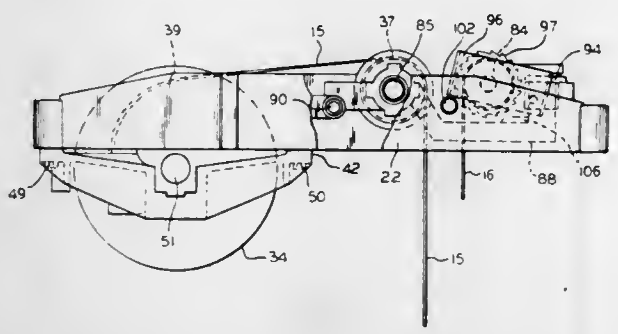
4,057,218
WINCH-HOIST ACTUATING APPARATUS
Bernard E. Wallace, Exton, Pa., assignor to B. E. Wallace Products Corporation, Malvern, Pa.
Division of Ser. No. 453,919, March 22, 1974, abandoned. This application Aug. 15, 1975, Ser. No. 604,963
Int. Cl.² B66D *1/00*
U.S. Cl. 254—167 **6 Claims**



4. For a winch-hoist of the character described, having a socket-equipped operating lever and a tubular manually-actuated handle which is adjustable in length and having an interior hollow formed as a container for removable spare parts; an overload-relieving link of rod formation adapted to cooperate with such a lever and such a handle, said link having two spaced-apart seating areas for cooperation with a lever socket to secure said link to said lever, a zone between said areas having a reduced diameter with respect to said seating areas and adapted to cooperate with a removable holding device, and an elongated zone extending from one of said seating areas and into the interior of such handle and including a portion adapted to be exposed and so proportioned as to bend under a predetermined overload without the bending of the handle; sleeve and means interposed between said tubular handle and said elongated zone to releasably secure said elongated zone in the interior of said handle.

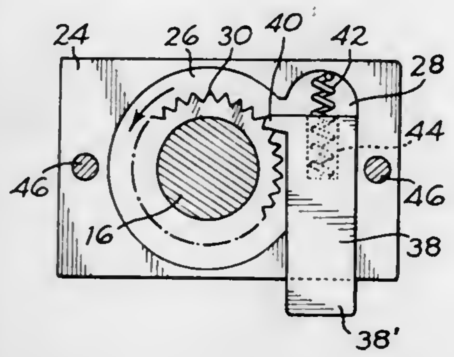
4,057,219
COUNTERPOISING LOAD SUPPORT APPARATUS AND METHOD
Valentine S. Sobolewski, Muskego, Wis., assignor to General Electric Company, Schenectady, N.Y.
Division of Ser. No. 574,581, May 5, 1975, Pat. No. 4,003,552. This application Sept. 8, 1976, Ser. No. 721,363
Int. Cl.² B66D *1/48*
U.S. Cl. 254—175 **3 Claims**

1. A safety device for use with apparatus including a main cable for supporting a load and means for taking up and feeding out said main cable for raising and lowering said load, said safety device comprising:
arm means including means for supporting said arm means for pivoting about an axis,
means on said arm means over which said main cable passes to support said load and impose a force on said arm means which tends to pivot said arm means in a first rotational direction about said axis,
spring means interposed between said support means and arm means remote from said axis such that said spring means are normally active when there is a predetermined stress in said main cable to urge said arm means to pivot in a direction opposite of that imposed by the main cable,
auxiliary drum means and means that are independent of said arm means supporting said auxiliary drum means normally



for free rotation, said auxiliary drum means being constructed and arranged for winding and unwinding an auxiliary cable therefrom which auxiliary cable is attached at one end to said drum means and at another end to said load, said main cable normally providing substantially all of the support for said load,
ratchet wheel means having teeth in its periphery and attached to said auxiliary drum means for joint rotation therewith,
pawl means mounted on said arm means such as to be clear of said ratchet wheel teeth when said arm means is pivoted in said first direction, loss of said predetermined stress in said main cable causing said arm to pivot in an opposite direction under the influence of said spring means to thereby engage said ratchet wheel to prevent its rotation and transfer said load to said auxiliary cable.

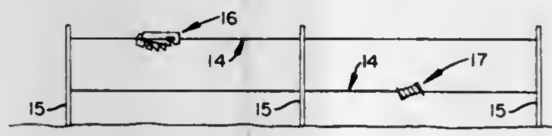
4,057,220
RATCHET TYPE OPERATOR FOR CABLE WINCHES AND THE LIKE
Donald S. Kudlacek, 3412 Oak St., Longview, Wash. 98632
Filed June 10, 1976, Ser. No. 694,658
Int. Cl.² B66D *1/00*
U.S. Cl. 254—186 HC **4 Claims**



1. A ratchet type operator for a rotatable shaft, comprising:
a. a base,
b. a first cavity in the base,
c. a shaft,
d. a ratchet gear secured to one end of the shaft and confined within the first cavity,
e. a second cavity in the base tangent to and communicating with the first cavity,

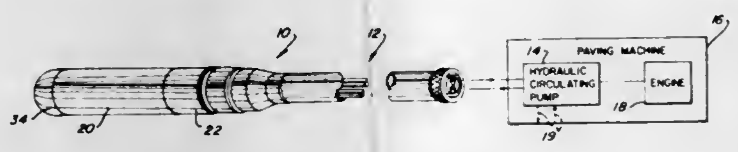
f. a ratchet arm within and guided by the second cavity for reciprocation tangentially with respect to the ratchet gear,
g. a ratchet dog on the ratchet arm extending laterally therefrom and arranged for releasable engagement with the ratchet gear, at a point displaced circumferentially from a diametrical line extending through the ratchet gear normal to the direction of reciprocation of the ratchet arm whereby a force on the ratchet dog is transferred through the ratchet arm and substantially entirely along an outer longitudinal edge of the second cavity by an outer longitudinal edge of the ratchet arm minimizing the shear forces on the ratchet dog, and
h. spring means engaging said ratchet arm for urging the ratchet dog resiliently into engagement with the ratchet gear, allowing rotation of the shaft in one direction and preventing rotation of the shaft in the opposite direction.

4,057,221
WIRE TIGHTENING TOOL
Jimmie E. Leath, 1909 W. Wall, Midland, Tex. 79701
Filed Sept. 17, 1976, Ser. No. 724,303
Int. Cl.² B21F *27/00*
U.S. Cl. 256—40 **17 Claims**



1. A tool for stretching the individual strands of a barbed wire fence from a slack into a taut condition comprising:
a wire engaging member which is cylindrical in form and includes a reduced diameter midportion, and opposed ends; said member having means forming spaced first and second slots therewithin for initially engaging spaced marginal lengths of the slack wire, said slots extend from one said end towards said midportion and opens in an outward direction;
spaced first and second tabs for subsequently holding the tool respective to other spaced marginal lengths of the tightened wire;
said slots and said first of said tabs are arranged on one end of said member and in spaced relationship respective to one another; the second of said tabs being arranged on the end of the member which is opposed to the first of said tabs; to thereby enable said slots to engage the first recited spaced marginal lengths of the wire, and said tool can then be rotated to wind another marginal length of wire upon the tool, and thereafter said tabs can engage the wire to prevent unwinding of the tool respective to the wire.

4,057,222
CONCRETE VIBRATOR
John S. Lyle, Denver, Colo., assignor to Koehring Company, Milwaukee, Wis.
Filed Feb. 17, 1976, Ser. No. 658,594
Int. Cl.² B01F *1/00;* F01C *1/10;* F03C *3/00;* F04C *1/06*
U.S. Cl. 366—123 **1 Claim**



1. Apparatus for vibrating a flowable medium, such as poured concrete aggregate, comprising:
an end cap;
a first tubular section having a front-end threadedly connected to a rear end of said end cap;
said first tubular section having a rearwardly facing shoulder;
a first bearing assembly mounted within said first tubular section adjacent a front end thereof in abutting relationship with said rearwardly facing shoulder;
a second tubular section having a front end threadedly connected to a rear end of said first tubular section;
said second tubular section having a first forwardly facing shoulder and a second forwardly facing shoulder spaced rearwardly therefrom;
a second bearing assembly mounted in said second tubular section in abutting relationship with said first forwardly facing shoulder;
an unbalanced mass disposed in said first tubular section, said mass having axially opposed front and rear pintles rotatably mounted in said first and second bearing assemblies, respectively;
a first nut threadedly connected to said front pintle forwardly of said first bearing assembly to retain said first bearing assembly;
a second nut threadedly connected to a rear end of said rear pintle to retain said second bearing assembly;
a third bearing assembly disposed in said second tubular section in abutting relationship with said second forwardly facing shoulder;
a third nut rotatably mounted in said third bearing assembly and including a forward projection removably received in a rearwardly open slot of said second nut to form a rotary drive connection therebetween;
a stationary ring disposed at a rear end of said second tubular section;
a closure connected to said second tubular section by removable fasteners extending through said stationary ring, to secure said stationary ring between said second tubular section and said closure;
a shaft having a front end rotatably mounted in a needle bearing in said second tubular section and a rear end rotatably mounted in a needle bearing in said closure, said shaft extending through a bore of said stationary ring;
the front end of said shaft being threadedly connected to said third nut to form a rotary drive connection therebetween;
an internally toothed ring journalled for rotation in said bore of said stationary ring;
an externally toothed rotor keyed on said shaft for rotation within said internally toothed ring;
said internally toothed ring having one tooth less than said rotor;
a first sealing ring held between a front end of said stationary ring and a rear end of said second tubular section to form a fluid seal therebetween;
a second sealing ring held between a rear end of said stationary ring and a front end of said closure to form a fluid seal therebetween;
a fluid inlet conduit and a fluid outlet conduit extending through said closure in directions parallel to one another and parallel to the axis of said shaft;
said inlet conduit being connectible to a source of pressurized hydraulic fluid;
a first pair of arcuate slots located in a forward face of said closure in fluid communication with said inlet and outlet conduits, respectively;
said first pair of slots facing rearward faces of said internally toothed ring and said rotor and communicating with spaces between such ring and rotor, to conduct hydraulic fluid thereto and therefrom for rotatably driving said shaft and said unbalanced mass;
said first pair of slots extending beyond an outer periphery of said internally toothed ring and communicating with cut-outs formed in the bore wall of said stationary ring to conduct hydraulic fluid across the outer periphery of said internally toothed ring to lubricate the latter;
a second pair of slots located in a rear face of said second tubular section and facing front faces of said internally

toothed ring and said rotor in axial alignment with respective ones of said first pair of slots, to equalize pressures at the front and rear faces of said internally toothed ring and said rotor;

a fluid seal disposed around said shaft in said second tubular section axially between said third bearing assembly and said rotor to prevent the passage of hydraulic fluid to said unbalanced mass;

retaining means disposed forwardly of said fluid seal and rearwardly opposite said third bearing; and

said closure having a hole aligned with said shaft, to facilitate removal of said needle bearing from said closure.

4,057,223

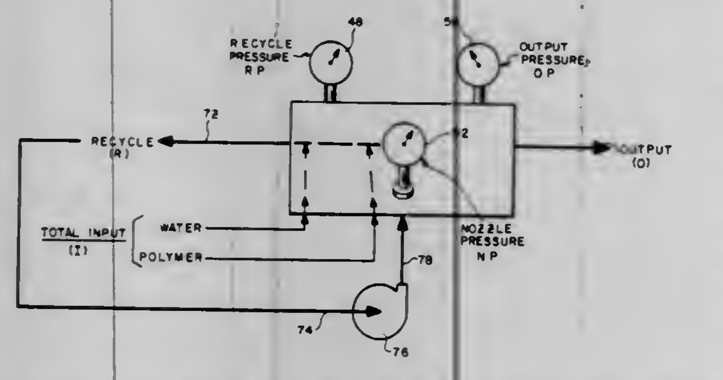
MIXING BLOCK FOR MIXING POLYMERS

Roy R. Rosenberger, Wheaton, Ill., assignor to Nalco Chemical Company, Oak Brook, Ill.

Filed Oct. 3, 1975, Ser. No. 619,551

Int. Cl.² B01F *15/00, 5/16;* **E03B** *1/00*

U.S. Cl. 366—172 **5 Claims**



1. A device for rapidly mixing high viscosity fluid from a high viscosity fluid source with water from a water source comprising a substantially rectangular block with a bore extending throughout its entire length, said bore having a center section, a first end section and a second end section with the center section of the bore being of smaller diameter than the first end section, with the first end section containing a recycle outlet and defining a pre-mixing chamber for mixing the high viscosity fluids and the water with the center section partially outwardly flared where it joins the pre-mixing chamber with said flared portion having an apex and a base with the second end section defining an outlet port for discharging a mixture of high viscosity fluids and water, a high viscosity fluid inlet nozzle in communication with the apex of the flared portion of the pre-mixing chamber, said nozzle being adapted to adduct high viscosity fluids into the pre-mixing chamber, a water inlet in communication with the pre-mixing chamber, means for determining the pressure within the pre-mixing chamber, adjustable flow restricting means positioned within the center section of the bore, said flow restricting means being adapted to regulate the flow through the pre-mixing chamber and through the second end section wherein the adjustable flow restricting means is a cylindrical plug having a bevelled face in partial communication with the center section of the bore, a recycle inlet in communication with said adjustable flow restricting means and recycling means comprising a pump and fluid conductors connecting the recycle outlet and the recycle inlet for recycling a portion of a mixture of high viscosity fluid and water.

4,057,224

PROCESS AND APPARATUS FOR DIRECTLY CONTACTING TWO COUNTERFLOWING IMMISCIBLE LIQUID PHASES

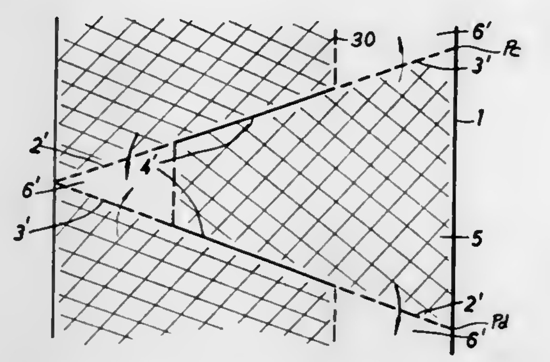
Eckart Müller, Bergen-Enkheim; Thomas Simo, Frankfurt am Main; Helmut Markwort, and Berthold Scholz, both of Oberursel, all of Germany, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Germany

Filed Dec. 10, 1976, Ser. No. 749,335

Claims priority, application Germany, Dec. 19, 1975, 2557327

Int. Cl.² B01F *15/02*

U.S. Cl. 366—336 **22 Claims**



14. In an apparatus for contacting a heavy-liquid phase with a light-liquid phase which comprises a vertical cylindrical vessel formed near its top with an inlet for said heavy-liquid phase and with an outlet for said light-liquid phase and near its bottom with an inlet for said light-liquid phase and with an outlet for said heavy-liquid phase, and which contains plates having perforations forming flow passages for the light-liquid phase and perforations forming flow passages for the heavy-liquid phase and disposed above the perforations forming flow passages for the light-liquid phase, the superposed perforated portions forming mixing zones for mixing the two liquid phases occupying 10–30% of the cross-sectional area of the vessel, the plates being unperforated in an area which occupies 40–80% of the cross-sectional area of the container so that this area and an area which occupies 10–30% of the cross-sectional area of the container and through which liquid is withdrawn define a separating zone for the liquid phases, the improvement wherein said separating zone is filled with a material which accelerates coalescence.

4,057,225

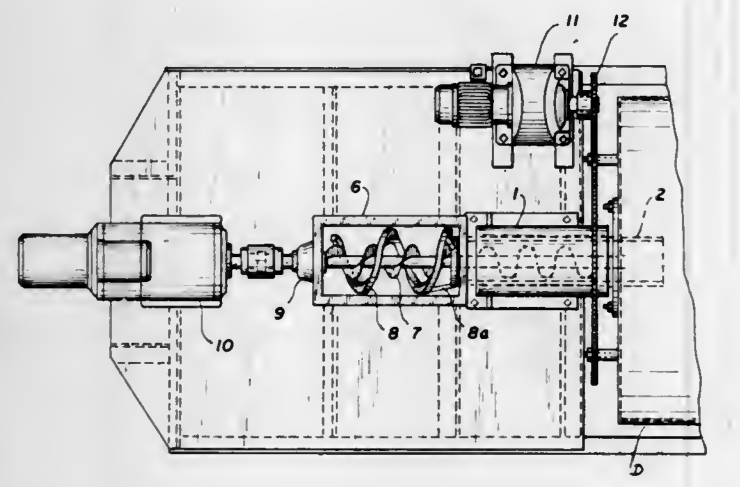
SCREW FEEDER FOR GRANULAR MATERIAL

Roy E. Ferree, Valencia, Pa., assignor to ESM Inc., Valencia, Pa.

Filed July 14, 1976, Ser. No. 705,091

Int. Cl.² B01F *9/08, 15/02*

U.S. Cl. 366—157 **3 Claims**



1. A screw feeding apparatus for particulate matter, comprising a feed chamber in which is mounted a pair of concentric augers which are substantially co-extensive in length, variable speed drive means for driving the inner auger of smaller diameter, a rotating housing rigidly connected, at one end, to the outer auger of greater diameter and surrounding a portion of the inner auger, a drum rigidly connected at the other end of said rotating housing, and a separate driving means for driving said drum about its axis.

4,057,226

MIXING DEVICE

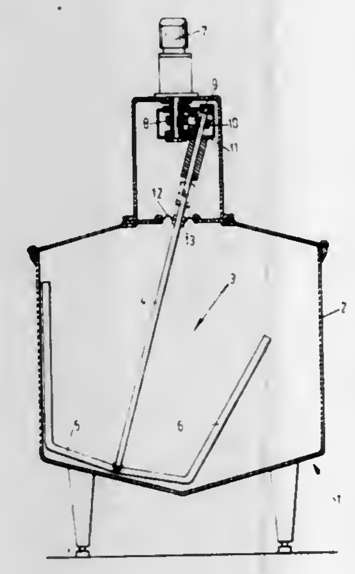
Jacob Mink de Mos, Warnsveld, and Pieter Koek, Eefde, both of Netherlands, assignors to N.V. Machinefabriek Terlet, Zutphen, Netherlands

Filed Dec. 26, 1973, Ser. No. 427,553

Claims priority, application Netherlands, Aug. 29, 1973, 7311901

Int. Cl.² B01F *7/00*

U.S. Cl. 366—244 **1 Claim**



1. A mixing device comprising, in combination:

a vessel having a bottom, a side wall defining a vessel axis and a top, all defining a closed space of circular cross section for receiving material to be mixed, said top having a central opening therein;

a mixing shaft projecting through said opening into said closed space at an inclination to said vessel axis to present an inner end within said vessel reaching to adjacent said bottom and an outer end outside said vessel;

flexible sealing means joining a section of said shaft between its ends to said cover whereby hermetically to isolate said space and establish a pivot substantially on said vessel axis;

blade means on the inner end of said shaft and including portions radially offset therefrom; and

drive means connected to said outer end of the shaft for orbiting said outer end without causing rotation of said shaft whereby said inner end of the shaft sweeps a conical path within said vessel, said portions of the blade means being radially offset from said conical path sufficiently to reach into close proximity with said side wall of the vessel, said drive means comprising a drive shaft aligned with said vessel axis, an arm fixed to said drive shaft and bearing means rotatably connecting said outer end of the mixer shaft to said arm in offset relation to said drive shaft, said blade means being fixed to said inner end of the mixer shaft and including means engaging said outer end of the mixer shaft preventing rotation thereof, the means last mentioned comprising a bracket pivoted about an axis normal to said vessel axis and having a slot extending in the direction of the bracket axis, said outer end of the mixer shaft being non-rotatably guided in said slot.

4,057,227

METHOD FOR MAKING CERAMIC CASTING SLURRIES

Carlton E. Cruff, Manchester, and Edward G. Day, Rocky Hill, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Aug. 27, 1976, Ser. No. 718,265

Int. Cl.² B28C *5/46*

U.S. Cl. 366—2 **9 Claims**

1. A method for rapidly preparing a ceramic slurry having controlled viscosity, density and the like for use in forming casting molds, wherein a liquid binder ingredient and insoluble ceramic particulate ingredients of various particle sizes are mixed in a container, comprising the steps of:

placing the slurry ingredients in the container in the desired amounts, including removing sufficient air from the container to prevent subsequent air entrapment in the slurry ingredients;

mixing the slurry ingredients by epicyclic agitation to effect rapid wetting and homogenization thereof, substantial air entrapment in the ingredients being prevented during mixing by said prior removal of air from the container; and

terminating said agitation and removing the ceramic slurry from the container for immediate use in forming casting molds, total slurry preparation time, including placement of the ingredients in the container and epicyclic mixing, being archievable within one hour.

4,057,228

MIXING OF MATERIALS

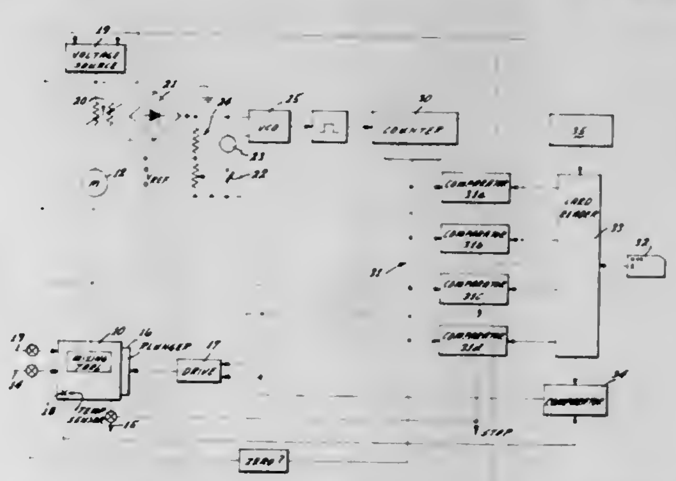
Martin Völker, and Heinz Mühlhoff, both of Langenhagen, Germany, assignors to Kabel- und Metallwerke Gutehoffnungshutte Aktiengesellschaft, Hannover, Germany

Filed Jan. 29, 1975, Ser. No. 545,136

Claims priority, application Germany, Jan. 30, 1974, 2404292

Int. Cl.² B29B *1/06*

U.S. Cl. 366—79 **6 Claims**



1. In an apparatus for mixing materials which includes a mixing chamber, a mixing tool, and a motor driving the mixing tool, the improvement comprising:

first means connected to the motor to derive therefrom a signal representative of the power consumption of the motor during operation under mixing load;

second means providing a correcting signal representing power consumption of the motor when driving the mixing tool, but without mixing and being connected to the first means to provide a signal representing the difference between the signal as provided by the first means and the correcting signal;

third means connected to be responsive to the different signal to provide a train of pulses at a frequency representing true mixing power;

counter means connected to the third means for connecting the pulses as provided by the third means;

externally programmable reference means responsive to external control manifestations and providing presettable digital reference signals representing predetermined mixing states in terms of work needed to obtain said state;

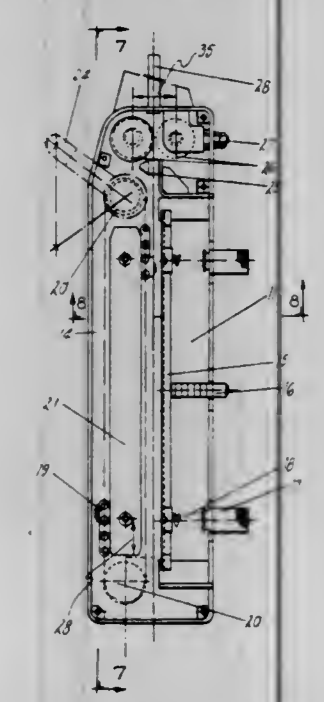
means connected to the programmable reference means to provide thereto corrective values representing deviations of said predetermined work, so as to modify said reference signals;

comparator means connected to said reference means, and said counter means for controlling the duration of mixing in response to agreement between the digital reference signals provided by the reference means and the state of the counter;

means for sensing the temperature of the mixture in the chamber; and

means connected to the means for sensing, for controlling the mixing operation in additional dependency upon temperature of the substance being mixed to reduce mixing power as expanded in the case of detecting a predetermined excess temperature.

4,057,229
IGNITION ROD AND FEED DEVICE
J. A. Zeley, Apartado Postal 60061, Caracas, Venezuela
Filed Mar. 29, 1976, Ser. No. 671,110
Claims priority, application Germany, Mar. 27, 1975, 2513584
Int. Cl.^{2} B23K 7/06
U.S. Cl. 266—48 9 Claims

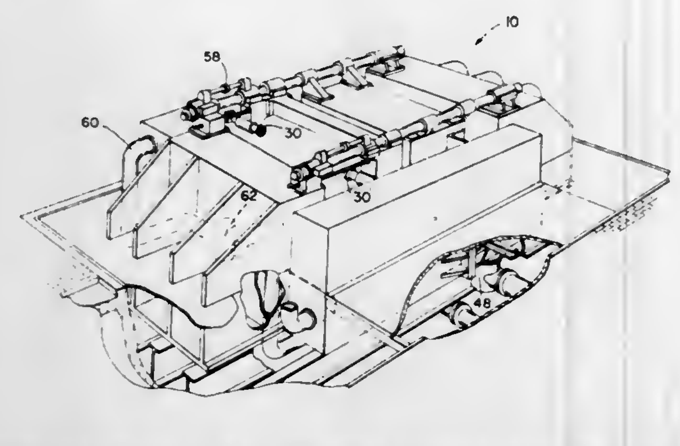


1. Means for storing and delivering ignition rod for an oxygen flame cutting or joining process to a point of use comprising:

a plurality of individual rod elements,
means for storing said rod elements,
means for positioning said rod elements in end to end fashion,
means for joining said rod elements together to form a single ignition rod, and
means for delivering said ignition rod to the point of use.

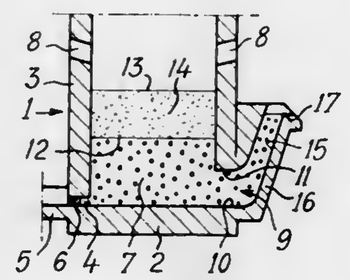
4,057,230
DIE QUENCH MACHINE AND METHOD
Raymond H. Hays, and Kenneth D. Gladden, both of East Peoria, Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.
Filed Mar. 3, 1976, Ser. No. 663,593
Int. Cl.^{2} C21D 1/66, 9/30
U.S. Cl. 266—117 8 Claims

1. Die quenching apparatus, comprising:
1. a pair of relatively horizontally movable opposed platens;
2. a plurality of die blocks supported on the first of said platens;
3. a corresponding plurality of die blocks supported on the second of said platens for cooperation with said first platen and die blocks, said first and second die blocks each having an internal cavity and further having generally opposed outer surfaces for receiving and substantially surrounding a first plurality of portions of a work piece when said platens are moved towards each other;
4. a plurality of relatively small fluid passageways extending through the opposed surfaces of said die blocks, said passageways providing fluid communication with said die block cavities;
5. a plurality of opposed fixtures movable together relative to said platens for holding said work piece at its ends in said die blocks;



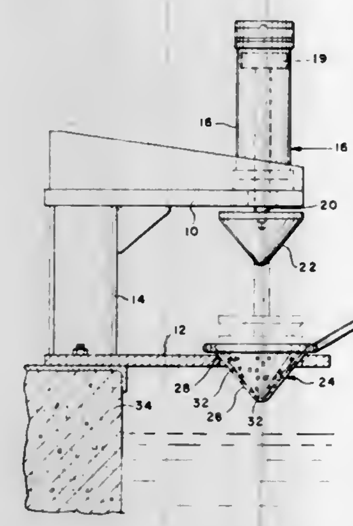
6. means for moving said opposed fixtures wih said work piece held therebetween and at least one of said platens relative to one another at such a rate that said work piece is grasped substantially simultaneously by said first and second platen supported die blocks;
7. quench means for introducing fluid to each of said die block cavities substantially simultaneously with said grasping of said work piece by said first and second platen supported die block; and
8. means for pressuring said fixtures towards one another.

4,057,231
CUPOLA FURNACE
Louis G. Chazé, Rennes, France, assignor to Centre Technique des Industries de la Fonderie, Paris, France
Filed June 6, 1975, Ser. No. 584,387
Claims priority, application France, June 27, 1974, 74.22491
Int. Cl.^{2} F27B 1/20
U.S. Cl. 266—219 6 Claims



1. A cupola furnace for containing molten iron and slag with the slag on top of the molten iron and from which both the molten iron and slag are removed discontinuously, said furnace comprising a crucible with a lower wall and a wall extending upwardly from said lower wall for containing said molten iron with said slag on the top of said molten iron, one said wall having a first opening at said lower wall of said crucible for removing molten iron from said crucible at said lower wall and said upwardly extending wall having a second opening therein at said lower wall of said crucible and spaced from said first opening, and a siphon tube with an inlet and an outlet having its inlet connected to said second opening and having its outlet above the uppermost portion of said second opening, said first opening being disposed to permit removal of said molten iron until the upper level thereof is spaced from said lower wall by a distance no greater than the distance between said lower wall and the uppermost portion of said first opening, and said second opening being disposed and having a size such that said uppermost portion thereof is above said uppermost portion of said first opening and the lowermost portion of said second opening is at least as close to said lower wall as said uppermost portion of said first opening, whereby said crucible may contain molten iron and slag having upper levels above said uppermost portion of said second opening, the molten iron may be withdrawn through said first opening until the upper level thereof is at most as low as said uppermost portion of said first opening and until said slag passes through said second opening into said tube and thereafter, the level of said molten iron may be raised to cause said slag to flow out of said outlet.

4,057,232
PRESS FOR SEPARATING MOLTEN METAL FROM DROSS
George P. Ross, and James L. Bedortha, both of Steubenville, Ohio, assignors to National Steel Corporation, Pittsburgh, Pa.
Filed Oct. 29, 1976, Ser. No. 737,110
Int. Cl.^{2} C22B 19/00
U.S. Cl. 266—227 4 Claims



1. In a power driven press for separating molten metallic zinc from dross in the operation of a zinc-coating apparatus for coating metal and having a zinc pot for containing a molten zinc bath through which the metal to be coated is drawn,

a source of power in the form of a pressurized fluid motor having a piston reciprocable in the cylinder,

ram means arranged to be driven from the source,

a ladle in the form of a skimmer including an elongated handle to enable hand-manipulation to collect and contain dross to be pressed, the skimmer having a perforated wall defining a convex outer surface,

support means in the form of a rigid C-frame for the ram and ladle, the lower arm of the C-frame having a ring-shaped seat therein having a surface substantially complementary to an outer surface portion of the skimming vessel and arranged to removably support the ladle on the C-frame in a fixed position under the ram,

a drive shaft for the ram reciprocably mounted in the upper arm of the C-frame and connected to the piston of the power source for reciprocably moving the ram toward and away from the ladle supported thereunder,

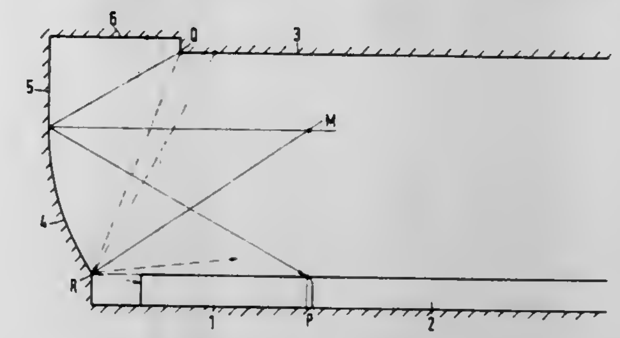
a ram head connected to the drive shaft, the ram head having a downwardly facing convex external surface,

the perforated wall having an upwardly facing concave internal surface substantially complementary in shape to the convex surface of the ram head,

the convex surface of the ram head and the concave wall surface of the ladle being arranged for concentrically interfitting relationship when the ram head is forcably driven into a mass of dross and molten zinc metal in the ladle and shaped to work the mass upwardly between the adjacent surfaces of the ram head and ladle to coalesce the vestiges of molten metal in the dross to form droplets by applying pressure against the dross and molten metal constituting the mass to force the molten metal through the perforations in the ladle wall, and

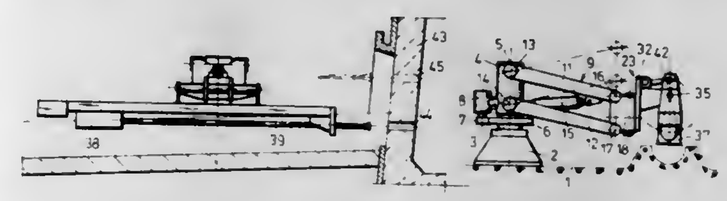
means rigidly mounting the C-frame on the zinc pot with the seat thereon extending over the pot whereby molten zinc metal expressed from the mass of dross is collected in the pot.

4,057,233
CONTINUOUS FURNACE
Robert Spessert, Bergisch Gladbach, Germany, assignor to "OFU" Ofenbau-Union GmbH, Dusseldorf, Germany
Filed July 8, 1976, Ser. No. 703,503
Claims priority, application Germany, July 10, 1975, 2530794
Int. Cl.^{2} C21D 1/12
U.S. Cl. 266—252 8 Claims



1. A continuous furnace for metal elongated objects arranged in transversely extending disposition for travel along a plane through the furnace, said furnace comprising a chamber including inner side walls and a heating surface arranged in spaced relation with respect to the transport plane of the objects for directing heat radiation theretowards to heat said objects, said side walls including a first region closer to the transport plane concave inwards in shape and forming an angle with said transport plane or more than 90° as measured from the transport plane to said first region, said side walls including a second region further from the transport plane shaped to form an angle with said transport plane of at least 90° as measured from the transport plane to said second region, said side walls receiving heat radiation from said heating surface and due to the shape of said side walls the reflection of heat to said objects at the ends thereof proximate the side walls is minimized.

4,057,234
TAPHOLE BORING OR PLUGGING MACHINE FOR SHAFT FURNACES, ESPECIALLY BLAST FURNACES
Eberhard Brücher, Siegen-Weidenau, and Karl-Heinz Schüssler, Siegen, both of Germany, assignors to Dango & Dienenthal, Siegen, Germany
Filed Sept. 29, 1975, Ser. No. 617,775
Claims priority, application Germany, Mar. 6, 1975, 2509805
Int. Cl.^{2} C21B 7/12
U.S. Cl. 266—272 2 Claims

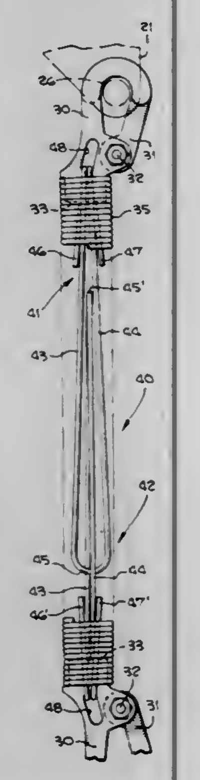


1. A taphole boring or plugging machine for shaft furnaces and especially blast furnaces and particularly those which operate under high pressures, by means of which tapholes may be bored and sealed at various heights of said furnaces and at various angles in said furnaces which comprises:

a console mounted on the mill floor and including a vertical column;

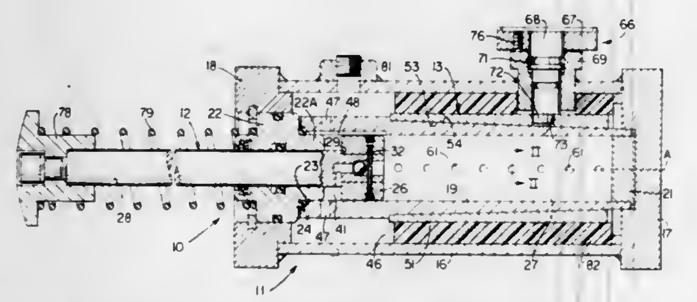
a sleeve supported on said vertical column and pivotable about the vertical axis of said column;
drive means operatively associated with said sleeve for pivoting said sleeve about said column;
a machine tool arm having one end pivotally connected to said sleeve;
a support bracket provided at the other end of the machine tool arm;
a tool holding carriage or sealing gun supported by the support bracket;
wherein said machine tool arm (9) comprises two parallel links, one end of each of said links being connected to said sleeve by means which permit each of said links to pivot about a horizontal axis; and a connecting piece (18) pivotally connected to the other end of each of said parallel links and forming a paralellogram the sides of which consist of said links, said sleeve and said connecting piece; and a universal joint including a vertical axle (19) and a horizontal axle (22) said universal joint being supported by said connecting piece so as to be pivotable about said vertical axle (19), and said universal joint supporting said support bracket so that it is pivotable about said horizontal axle (22), said support bracket consisting of an essentially vertically extending support plate (32) and a pair of essentially horizontal web plates (33) extending from said support plate and a support sleeve (34) between said web plates having a tilting axis (35) and on which are mounted end plates (36) for supporting said tool holding carriage (37).

4,057,235
SPRING RETAINER FOR GARAGE DOOR HARDWARE
William Halopoff, 17720 Crusader St., Cerritos, Calif. 90701
Filed June 3, 1976, Ser. No. 692,288
Int. Cl.² F16F *1/12*
U.S. Cl. 267—73 5 Claims



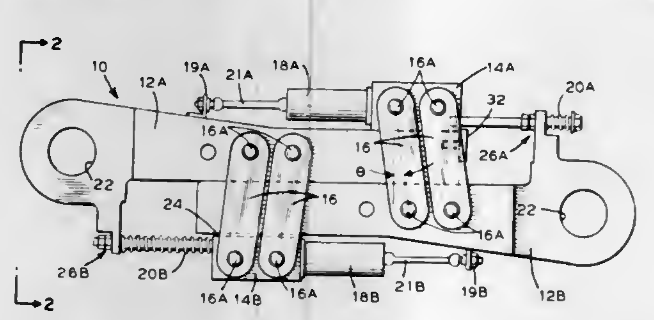
1. In a counterbalance spring assembly which includes a coil counterbalance spring having a bracket at each end for attachment respectively to a stationary supporting structure and to a movable panel, each said bracket comprising spring engaging means at one end, a hook member at the other end and an intermediate portion exterior with respect to the spring having a transversely extending opening therethrough, and a safety device for restraining parts of the spring in event of rupture of the counterbalance spring when under tension,
said safety device comprising a pair of mutually extendable elongated composite retention elements each having a length not exceeding the length of the counterbalance spring in retracted position of the counterbalance spring,
an inner section of each of the retention elements located intermediate opposite ends of the spring having a sliding engagement with the other of the retention elements,
and an outer section of each retention element adjacent the corresponding end of the spring being attached to a respective one of said brackets at the intermediate portion thereof,
interlocking means on the inner section of said retention elements operative when the counterbalance spring is at substantially the full extended position,
said retention elements having yieldable stop means operable when the counterbalance spring ruptures under tension whereby to prevent rupture of the safety device.

4,057,236
ENERGY ABSORBER
Ransom J. Hennells, 45500 N. Territorial Road, Plymouth, Mich. 48170
Continuation-in-part of Ser. No. 608,885, Aug. 29, 1975. This application May 14, 1976, Ser. No. 686,585
Int. Cl.² F16F *9/48*
U.S. Cl. 267—116 10 Claims



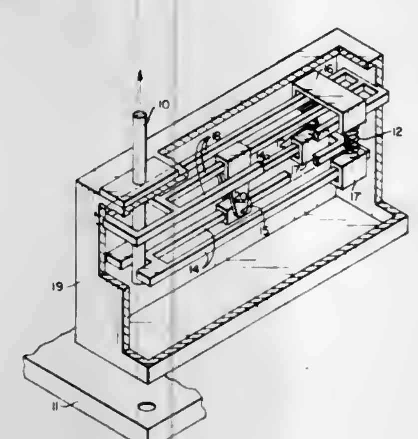
1. In a fluid-type energy absorber, comprising:
housing means including a central tubular housing member and a pair of end members positioned adjacent opposite ends of said central tubular housing member;
sleeve means disposed in said housing means for forming a first fluid chamber within the interior of said sleeve means and a second fluid chamber between said sleeve means and said tubular housing member;
ram means slidably disposed on said housing means for receiving a shock load thereon, said ram means including a piston slidably disposed within one of said fluid chambers and piston rod means connected to said piston and extending outwardly from said housing means;
opening means associated with said sleeve means for permitting controlled flow of fluid from said one chamber into the other chamber to decelerate the ram means when the piston is moved axially of said one chamber in a first direction away from an initial impact position wherein it is disposed adjacent one end of said housing means;
a third fluid chamber formed at said one of said housing means directly behind said piston when same is moving in said first direction, said third chamber being in continuous communication with said other chamber;
one-way check valve means associated with said piston for permitting fluid flow therethrough from said third chamber into said one chamber when said piston is moving axially of said one chamber in a second direction which is opposite said first direction, said one-way check valve means preventing flow of fluid from said one chamber directly into said third chamber when said piston is moving in said first direction;
said one-way check valve means including first passage means formed in said ram means for providing communication between said third chamber and said one chamber, and a movable check valve member associated with said first passage means; and
second passage means for providing direct and continuous communication between said third chamber and said one chamber only when said piston is disposed in a position closely adjacent said one end of said housing means to permit the flow of additional fluid into said one chamber as said piston is moving in said second direction, whereby said piston can be rapidly returned to said initial position, said second passage means being independent of said one-way check valve means.

4,057,237
SNUBBER
Joseph Daniel Nemeth, Clinton, Ohio, assignor to The Babcock & Wilcox Company, New York, N.Y.
Filed May 19, 1976, Ser. No. 687,712
Int. Cl.² F16F *1/00*
U.S. Cl. 267—134 3 Claims



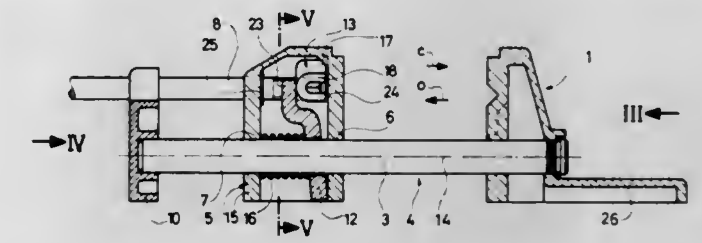
1. A snubber comprised of a pair of elongated members engaged in sliding frictional contact with one another, each member having an adjacently disposed restraining device, and means for connecting the device to the adjacent member and to the other member, the connecting means including means for pivotally linking the device to said other member.

4,057,238
ADJUSTABLE EFFECTIVENESS SUPPORT SPRING DEVICE
Wayne B. Lloyd, Baltimore, Md., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.
Filed May 20, 1976, Ser. No. 688,496
Int. Cl.² F16F *7/00*
U.S. Cl. 267—136 2 Claims



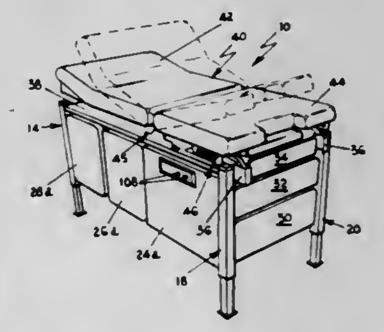
1. A vibration isolating support spring device, comprising
a mount member which may be subject to vibration,
a vertically movable rod for supporting connection to a load to be protected from vibration,
a horizontal lever means having an operative connection with said rod,
fulcrum means carried by said mount member and movable to different positions along said lever means in rockable support thereof,
compression coil spring means carried by said mount member and movable to different positions along said lever means in rod-force-opposing action thereon, and
adjustable means for simultaneously moving the fulcrum and spring means to their aforesaid different positions in behalf of balancing different external load conditions imposed on said rod.

4,057,239
VISE
Heribert Hopf, and Siegfried Schramm, both of Schwabisch Hall, Germany, assignors to Keiper GmbH, Schwabisch Hall, Germany
Filed Apr. 14, 1976, Ser. No. 676,915
Claims priority, application Germany, Apr. 26, 1975, 7513517[U]
Int. Cl.² B25B *5/02*
U.S. Cl. 269—170 23 Claims



1. A clamp comprising:
a fixed clamping member;
a movable clamping member displaceable through a relatively long distance toward said fixed member in a closing direction and away from said fixed member in an opposite opening direction;
a tippable locking element having a hole;
an elongated locking element received in said hole said extending in said direction;
means for displacing said tippable element between a slide position with said hole loosely surrounding said elongated element and a locked position with said tippable element canted and said elongated element wedged in said hole; and
means expansible in said directions through a relatively short distance and including a nut bearing in one of said directions against one of said locking elements and a threaded element threaded through said nut and bearing in the other direction against one of said members, the other locking element bearing in the other direction against the other member.

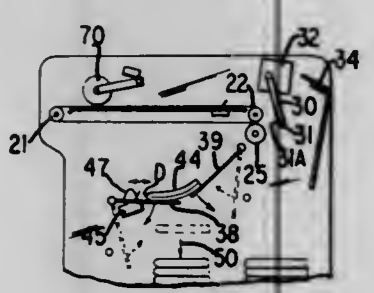
4,057,240
EXAMINATION TABLE
Frank M. Damico, Hull, and Raymond D. Nass, Stevens Point, both of Wis., assignors to Joerns Furniture Company, Stevens Point, Wis.
Continuation of Ser. No. 609,171, Sept. 2, 1975, abandoned. This application Feb. 2, 1977, Ser. No. 764,747
Int. Cl.² A61G *13/00*
U.S. Cl. 269—325 16 Claims



1. A variable height examination table for supporting a patient during a medical examination comprising: a cabinet including a top, a bottom, side walls and end walls defining storage space within said cabinet; a leg at each corner of said cabinet, generally at the junctures of said side and end walls whereby said legs do not interfere with said storage space of said cabinet, for supporting said cabinet on a support surface; patient support means mounted on said top of said cabinet, outside said storage space of said cabinet, for supporting a patient; each of said legs including a stationary section adapted

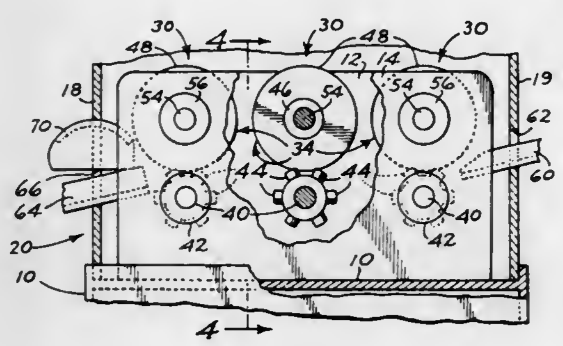
to rest on the support surface and a vertically movable section; and motive power means for raising and lowering said vertically movable leg sections, and thus said cabinet and patient support means, with respect to said stationary leg sections; said motive power means including a power unit mounted beneath said bottom of said cabinet outside said storage space, flexible connector means extending beneath said bottom of said cabinet to each said leg, said connector means being operably connected to each said leg for moving said vertically movable leg sections with respect to said stationary leg sections, power transfer means located beneath said bottom of said cabinet and connected to said power unit and operably connected to said flexible connector means for extending and retracting said flexible connector means, and means for controlling operation of said power unit whereby said vertically movable leg sections can be raised and lowered and the height of said patient support means above a support surface is selectively adjustable.

4,057,241
LAUNDRY FOLDER AND STACKER
Benjamin Alvin Buss, and Stephen A. Buss, both of 1315 23rd Ave. Court, East Moline, Ill. 61244
Continuation of Ser. No. 546,924, Feb. 4, 1975, abandoned. This application July 15, 1976, Ser. No. 705,459
Int. Cl.² B65H *45/02*
U.S. Cl. 270—82 **5 Claims**



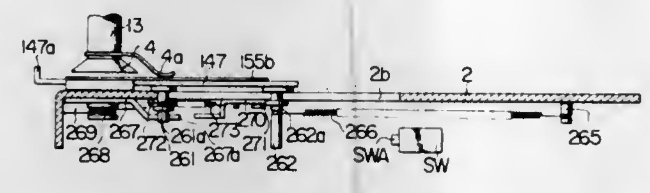
1. In a laundry textile article folding and stacking machine, apparatus including endless belt conveyor means extending horizontally from front to rear of the machine for freely receiving an article to be folded placed on top thereof near the front of the machine and carrying the article to the rear thereof, the article having a leading edge in the direction of travel which is moved toward the rear of the machine by said conveyor means, said conveyor means including belt means supported by first and second roll means, said first roll means being toward the front of the machine and said second roll means being toward the rear thereof and over which said leading edge freely passes, third roll means juxtaposed relative to and below said second roll means in nip relationship with said second roll means for forming a folding station therewith, downwardly depending oscillatable arm means pivotally mounted on pivot means located generally above said second and third rolls means, said arm means having a lower end with folding blade means mounted on said lower end, said folding blade means being positioned opposite said folding station, an abutment surface located to the rear of said second and third roll means, motor and timing means connected to said oscillatable arm means for swingably oscillating said folding blade means relative to said second and third roll means and relative to said abutment surface, the leading edge of said article passing over said second roll means and over said blade means and depending downwardly to the rear of said blade means when said blade means is initially positioned near said second and third roll means, said blade means being swung away from said second and third roll means and toward said abutment surface after a predetermined length of said article from its leading edge has passed over said second roll means and over said blade means for holding said predetermined length of the article against said abutment surface for forming a loop in said article between said blade means and said second and third roll means, and the looped article then being moved toward and being inserted into the folding station between said second and third roll means by said blade means being swung toward said second and third roll means to fold said article, and a substantially planar stacking surface located below and adjacent the side of said second and third roll means toward the front of the machine, said stacking surface sloping downwardly and forwardly from said second and third roll means to receive folded articles from said folding station which freely slide onto said sloping surface and therealong, said stacking surface comprising a pair of swingable stacker plates each pivoted at an outside edge and having free edges therebetween which extend crosswise of the movement of an article down said plates, and the free edges of said plates overlapping each other, with the free edge of the plate nearest to the folding station being on top of the free edge the other plate so that a folded article will slide thereover.

4,057,242
PAPER MONEY CRIMPING APPARATUS
Allen E. Rau, 702 E. 49th St., Tacoma, Wash. 98404
Filed Apr. 14, 1976, Ser. No. 676,929
Int. Cl.² B65H *5/06*
U.S. Cl. 271—3 **6 Claims**



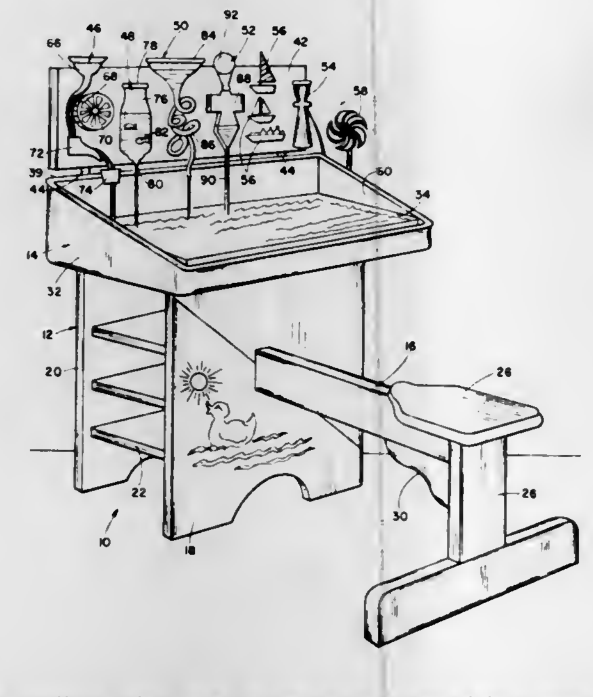
2. New paper money crimping apparatus comprising:
a. a plurality of pairs of parallel rolls arranged along a linear money travel path, adjacent pairs being spaced from each other in the feed direction by a distance of less than the length of the money to be crimped for transferring the same from one pair to the next,
b. roll mounting means rotatably mounting the rolls,
c. the rolls of each pair being arranged with their surfaces in peripheral pressure engagement with each other,
d. one roll of each pair having a peripheral surface of resiliently deformable backup material,
e. the other roll of each pair having on its peripheral surface a plurality of relatively stiff embossing projections arranged in a selected pattern,
f. the roll of each pair being adapted to receive flatwise paper money to be crimped between their engaging surfaces and for passing it from one roll pair to the next,
g. infeed means for feeding fresh paper money to the first pair of rolls,
h. outfeed means for discharging crimped paper money from the last pair of rolls, and
i. drive means connected to the rolls for driving the same at a predetermined rotational speed,
j. the drive means comprising a constant speed electric motor for each pair of rolls, the motors being operated at substantially the same speed.

4,057,243
SHEET FEED TERMINATION DETECTOR
Sakae Fujimoto, Chofu, Japan, assignor to Ricoh Co., Ltd., Tokyo, Japan
Division of Ser. No. 375,887, July 2, 1973, abandoned. This application Apr. 2, 1975, Ser. No. 564,332
Claims priority, application Japan, July 11, 1972, 47-68666; July 24, 1972, 47-73923; July 24, 1972, 47-73926; July 27, 1972, 47-75449
Int. Cl.² B65H *7/04*
U.S. Cl. 271—256 **7 Claims**



1. In apparatus for feeding successive sheets, in combination,
a. a sheet receptacle for supporting a stack of sheets to be fed;
b. means, including a cyclically operable sheet-feeding element engageable with the uppermost sheet of a stack on the receptacle, for successively feeding sheets therefrom;
c. a detecting member for detecting the termination of sheet delivery, said detecting member being movable, by an idling sheet-feeding operation of the feeding element when the sheets on the sheet receptacle have been exhausted, through a range of positions including a predetermined position;
d. means for producing a signal indicative of the detection of the termination of sheet delivery in response to movement of said detecting member to said predetermined position; and
e. means for controlling movement of said detecting member in response to idling operation of the feeding element such that said detecting member reaches said predetermined position upon completion of a predetermined plural number of idling sheet-feeding operations of said feeding element.

4,057,244
CHILD'S PLAY SEAT APPARATUS
Phyllis L. Gaspar, 6522 S. Erie, Tulsa, Okla. 74136
Filed Mar. 13, 1975, Ser. No. 558,139
Int. Cl.² A47B *39/12, 83/02*
U.S. Cl. 272—1 A **6 Claims**

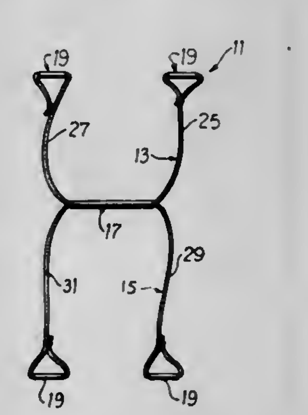


1. A child's play seat apparatus comprising support frame means, box-like play area means carried at one end of the support frame means and having the upper side thereof open, tray means disposed in said play area means and insertable and removable through said open upper side of said play area means, and seat means secured to the support frame means and disposed in spaced relation to the play area means for supporting a child using the seat apparatus, wherein the support frame means comprises a pair of spaced upstanding wall members having a box-like play area secured at the upper end thereof, with said seat means secured to one of said wall members and extending outwardly therefrom, wherein the seat means comprises support arm means having one end secured to the outer surface of said one wall member and extending outwardly therefrom, and a straddle-type seat member secured to the opposite end of the support arm.

4,057,245
ATHLETE'S LANDING PIT STANDARD PROTECTOR
Donald W. Gordon, 2718 Standish, Anaheim, Calif. 92806
Filed Jan. 12, 1976, Ser. No. 648,228
Int. Cl.² A63K *3/04*
U.S. Cl. 272—101 **1 Claim**

1. A landing pit for use by pole-vaulters, comprising:
a soft landing cushion;
a pair of standards positioned adjacent opposite sides of said landing cushion;
a pair of vertical posts supported by said standards;
a clearance bar horizontally extending between said vertical posts;
track means on said standards for permitting movement of said posts relative to said standards in a direction perpendicular to said clearance bar;
cushion members separate from said landing cushion positioned adjacent each of said pair of vertical posts, said cushion members completely overlapping said pair of standards, each of said cushion members comprising a pair of elongated members, one on each side of each post with the direction of elongation of each of said separate members being perpendicular to said clearance bar, said landing cushion having cut-out portions at its front corners defining spaces in which said standards and said cushion members are positioned and with the adjacent elongated sides of said members defining a slot overlying said track means; and
fastener means for holding said elongated cushion members against each of said posts, said fastener means being readily detachable to permit one of said elongated members to be easily moved for access to said standards and movement of said posts relative to said landing cushion and said cushion members along said track means.

4,057,246
MULTIPURPOSE PUSH PULL EXERCISER
Bradford W. Wilson, 1642-A Coriander, Costa Mesa, Calif. 92626
Filed Mar. 15, 1976, Ser. No. 666,925
Int. Cl.² A63B *21/00*
U.S. Cl. 272—137 **9 Claims**



1. A multi-purpose exerciser comprising:
first and second elongated flexible elements;
a tube means having a passage extending therethrough, said first and second elongated flexible elements extending

through said passage of said tube means; said tube means being of sufficient length to permit manual grasping thereof during exercise, and said tube means holding intermediate sections of said first and second elongated flexible elements together throughout the entire length of the tube means

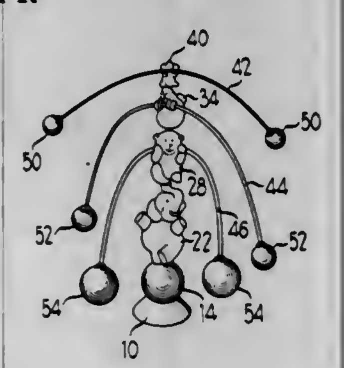
said first elongated flexible element including first and second elongated, flexible segments projecting from opposite ends of said passage of said tube means, respectively;

said second elongated flexible element including third and fourth elongated, flexible segments projecting from opposite ends of said passage of said tube means, respectively;

each of said elongated flexible segments being resilient and having an outer end remote from said tube means; and

means defining a handle on each of said elongated flexible segments adjacent the outer end thereof.

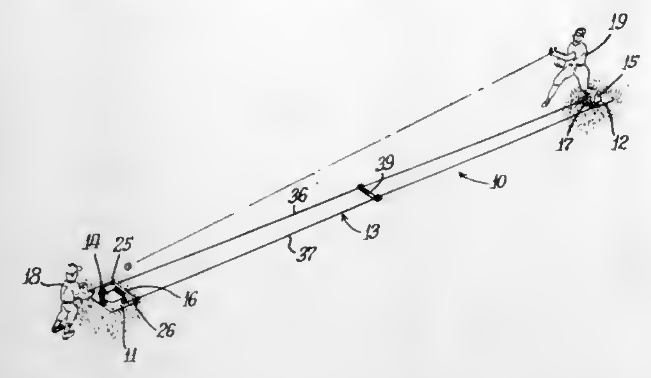
4,057,247
BALANCING TOY SET
Howard J. Morrison, Deerfield, Ill., assignor to Marvin Glass & Associates, Chicago, Ill.
Filed Dec. 4, 1975, Ser. No. 637,728
Int. Cl.² A63H *15/00*
U.S. Cl. 273—1 R **7 Claims**



1. A balancing toy set, comprising: a base portion for positioning on a support surface such as a table or the like; and a plurality of balancing members each having complementary fulcrum portions at the tops and bottoms of at least some of the members for vertically stacking on the base, each balancing member having a pair of opposing outwardly and downwardly extending arms having weighted hollow spherical balls on the ends thereof, the arms being of sufficient length and weight so as to lower the center of gravity of the respective balancing members below the bottom of the respective member, said weights for the respective balancing members being of different amounts and the arms being of different lengths proportionate to the respective weights compared with the weights of other members so that the balancing members can be stacked on said base in a progressive upwardly decreasing series with the lightest weighted member at the top of the stack, and wherein said balancing members are of different sizes proportionate to the length of the arms and the amounts of the weights thereon.

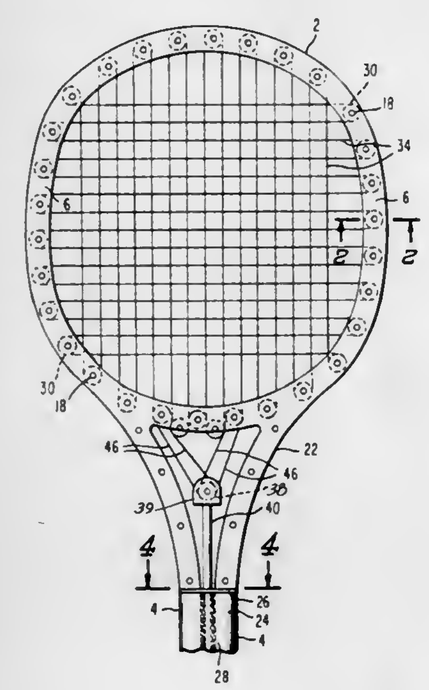
4,057,248
BASEBALL PRACTICE DEVICE
William J. Stoecker, 14606 S. Hamlin, Midlothian, Ill. 60445
Filed Jan. 5, 1976, Ser. No. 646,603
Int. Cl.² A63B *69/40*
U.S. Cl. 273—26 R **6 Claims**

1. A baseball practice device comprising a pair of ground-engaging panels and calibrated cord means directly connecting said panels at ground level in opposed spaced relation; said cord means, when taut, marking a predetermined distance between said panels, said predetermined distance being the conventional distance measured between home plate and the pitcher's mound of conventional softball or baseball, each said panel having an unobstructed upper surface for being engaged by a practicing operator's foot, and further characterized as comprising a home plate portion and a pitcher's plate portion; whereby said connected panels enable cooperative alternate



pitching and catching practice by associated players stationed thereat.

4,057,249
TENNIS RACKET
Frederick W. Reedhead, 66 Birchwood Knoll; Rowland E. Reedhead, 170 Berwyn Place, both of Trenton, N.J. 08638, and George W. Reynolds, 52 Cloverdale Circle, New Shrewsbury, N.J. 07724
Continuation-in-part of Ser. No. 524,805, Nov. 18, 1974, abandoned. This application Aug. 28, 1975, Ser. No. 608,492
Int. Cl.² A63B *51/12*
U.S. Cl. 273—73 E **7 Claims**



1. A tennis racket or the like comprising a frame including a head portion, a throat portion and a handle portion,

said frame embodying two similar members each formed of hollow material and fixedly arranged in spaced parallel planes;

pins fixedly secured to each said member for holding said members in fixed spaced relation;

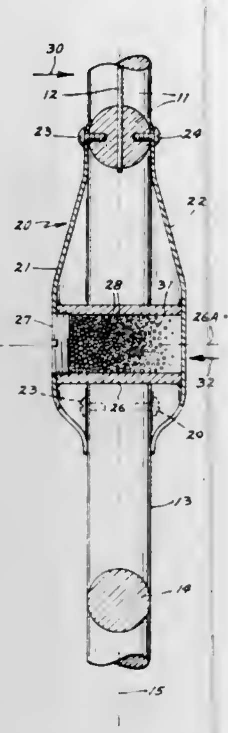
sheaves rotatably mounted on said pins and located in the space between said members;

stringing for the head of the racket comprising a single endless string which is unattached to said frame, said single endless string passing only about said sheaves and being freely movable axially to equalize the tension on the stringing axially of the stringing;

tensioning means including rotatable sheave means receiving a part of said stringing which extends into the throat area of the racket, said tensioning means extending lengthwise of the handle and throat portion of said racket; and

threaded means rotatably mounted in said handle portion and engaging said tensioning means to adjust the axial tension of said stringing.

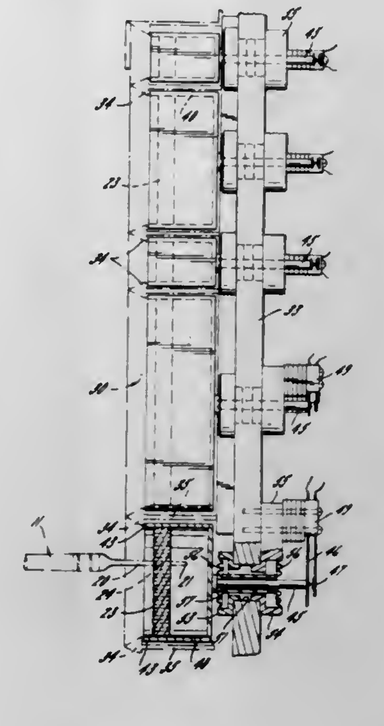
4,057,250
TENNIS RACKET CONSTRUCTION
William G. Kuban, 5125 Ranier Pass, Columbia Heights, Minn. 55421
Filed Sept. 5, 1975, Ser. No. 610,534
Int. Cl.² A63B *49/02*
U.S. Cl. 273—73 G **7 Claims**

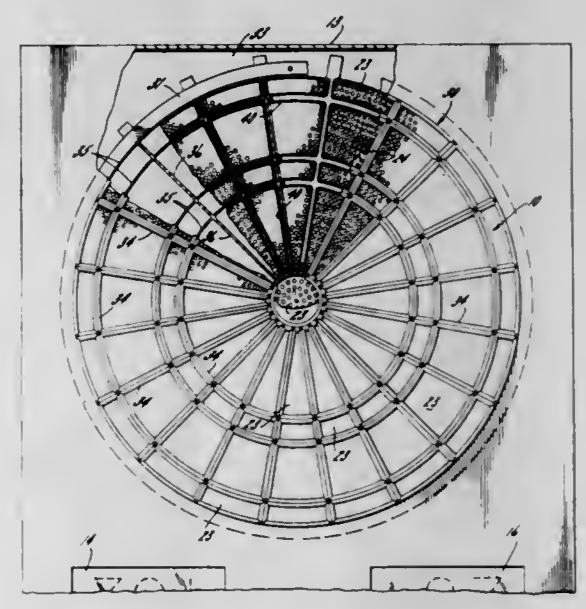


1. A sports racket having a bow portion, a handle attached to said bow portion and means providing a ball striking surface held by said bow portion, said ball striking surface generally defining a plane, a support attached to said racket adjacent the bow portion, and weight means movably retained relative to said support so as to permit substantially unrestrained movement of said weight means in direction transverse to said plane under forces generated during manual swinging of said racket to permit the weight means to physically shift when the sports racket strikes a ball, said weight means being of sufficient mass so that when the weight means shifts it effects a counteracting force reducing rebound of the sports racket after striking a ball.

4,057,251
DART GAME WITH APERTURED TARGET PLATES RESILIENTLY MOUNTED
Richard F. Jones, Rockford, and Ernest L. Ping, Loves Park, both of Ill., assignors to Arachnid, Incorporated, Rockford, Ill.
Filed May 10, 1976, Ser. No. 685,093
Int. Cl.² A63B *65/02, 67/00, 63/00*
U.S. Cl. 273—95 R **10 Claims**

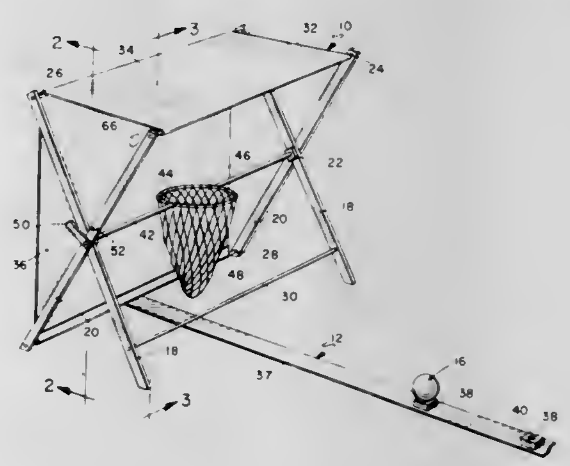
1. A dart game comprising the combination of (a) a dart having a slender tip and (b) a dart board which forms a target for said dart, said dart board comprising an array of target plates each having a number of closely spaced holes molded in the outer face thereof, each of said holes having a cross-sectional dimension corresponding substantially to the cross-sectional dimension of said tip whereby said tip may enter into and will remain in one of said holes when said dart is thrown at said board, a main support located inwardly of said target plates, cups telescopically receiving said target plates and slidable inwardly and outwardly relative to said support, means biasing said cups outwardly relative to said support, each of said cups having an open outer end and a closed inner end, each target plate being spaced inwardly from the open end of its respective cup, ribs located outwardly of said target plates and extending around the margins of said plates, there being one rib between adjacent margins of adjacent plates, the open ends of said cups being engageable with the inner sides of said ribs to keep the





outer faces of said target plates spaced inwardly from the inner sides of said ribs.

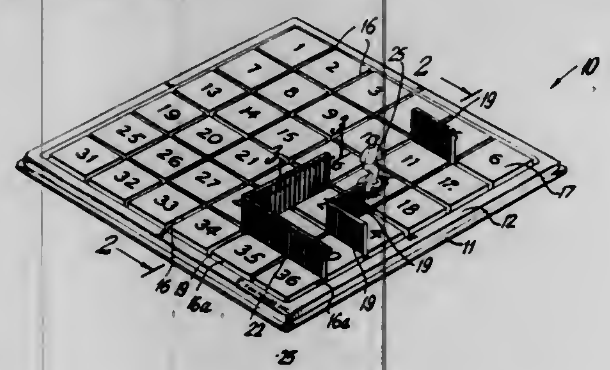
4,057,252
BALL GAME WITH X-FRAMED BACKSTOP
Raymond Lionel Pelton, 15420 Olde Highway 80, Space 186, El Cajon, Calif. 92021
Filed May 3, 1976, Ser. No. 682,580
Int. Cl.² A63B *53/08, 63/04, 67/02*
U.S. Cl. 273—101 **9 Claims**



1. An indoor ball game comprising:
a frame,

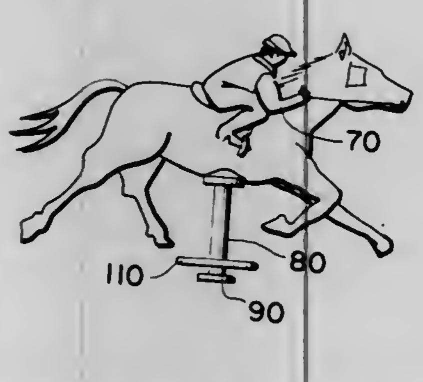
a resilient sheet material received over said frame forming substantially a planar back panel and a top panel,
said frame having a generally opened front,
a net supported in front of said back panel and under said top panel,
said net having an open mouth facing upwardly,
said frame comprising spaced pairs of legs joined near their centers to form X-shaped frame members in their deployed orientation,
a plurality of transverse rods, said X-shaped frame members being joined by said plurality of transverse rods extending between said frame members near the upper and lower ends of the corresponding legs,
said sheet material being secured to the upper forward transverse rod,
passing over the upper rearward transverse rod and being secured to the lower rearward tranverse rod.

4,057,253
MAZE BOARD GAME APPARATUS
Frank S. Csoka, Sea Cliff, N.Y., assignor to Fun Things, Inc., New York, N.Y.
Filed Sept. 17, 1976, Ser. No. 724,865
Int. Cl.² A63F *3/00*
U.S. Cl. 273—131 BA **15 Claims**



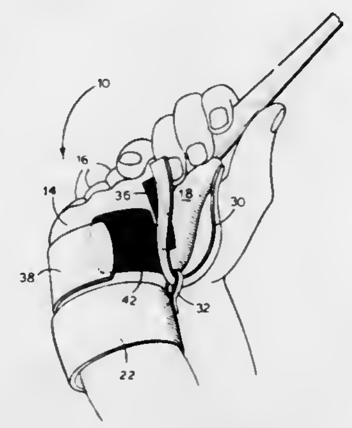
1. A maze game comprising a game board formed with a plurality of means to receive a partition, said means being formed so as to define a plurality of regions, each region being indentified by a specific distinguishing character, and a plurality of partitions each of said partitions being formed so as to be removably insertable into said game board means between adjacent regions so that the inserted partition is disposed therein, wherein a plurality of inserted partitions defines a maze on the game board, further comprising a plurality of surfaces, each surface having the pattern defining the plurality of regions as shown on the game board.

4,057,254
APPARATUS FOR PLAYING A HORSE-RACING GAME
Gerard E. Girres, Great Falls, Mont., assignor to The Raymond Lee Organization Inc., a part interest
Filed May 4, 1976, Ser. No. 683,020
Int. Cl.² A63F *3/00*
U.S. Cl. 273—134 CH **1 Claim**



1. Apparatus for playing a horse racing game comprising:
a horizontal rectangular base;
a rectangular playing surface located above the base and held parallel to it by a plurality of like vertical posts, the surface bearing printed and ruled indicia suggestive of the sport of horse racing and further bearing a plurality of slots arranged to form a concentric family of closed loops spaced equidistantly from each other in the shape of a horse racing track, each of the loops having a single circular hole therein, all of said holes being arranged in vertical alignment;
a plurality of playing pieces, each piece taking on the form of a horse and rider; and
a like plurality of vertical standards, each standard being attached to the bottom of a corresponding piece and having a small circular disc located at its lowermost end and a larger circular disc located above the small disc with the small discs being at most equal in size to the holes and the larger disc being larger than the holes so as to allow the standards to be introduced into the slots and removed therefrom only at those points along the slots where the holes are located.

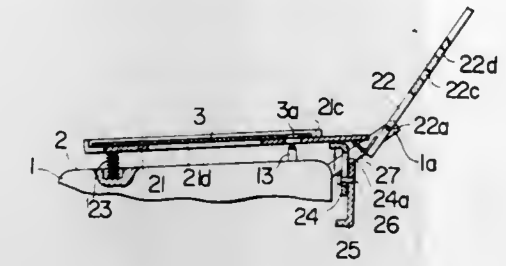
4,057,255
GOLF SWING AID
Forest M. Bishop, 1217 George Washington Way No. 76, Richland, Wash. 98352
Filed June 4, 1976, Ser. No. 692,849
Int. Cl.² A63B *69/36*
U.S. Cl. 273—189 R **6 Claims**



1. A golf swing aid for establishing a desired condition of vertical unflexing of the wrist in the golf ball address position of a golfer, the aid comprising:
a. a glove having a front, a back and a thumb,
b. a substantial wrist band on the open end of the glove,
c. a flexible, substantially inelastic tie member connected at one of its ends to the forward end of the thumb, and having a length sufficient to extend rearward over the back of the thumb to the wrist band, and
d. connecting means on the wrist band substantially aligned with the thumb in the use position of the glove and engaging the tie member for interconnecting the forward end of the thumb and the wrist band in a selected condition of tension of the tie member for establishing a desired condition of vertical unflexing of the wrist in the address position.

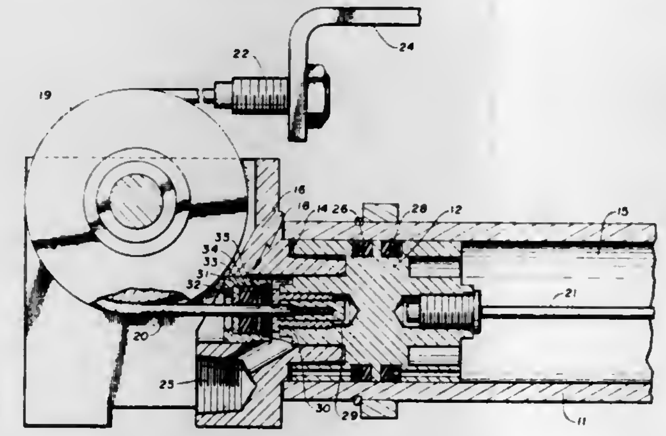
4,057,256
APPARATUS FOR DETACHABLY MOUNTING A RECORD SHEET IN PLACE IN A SHEET TYPE RECORDER/PLAYER
Masakazu Muranaka, Tokyo, and Saburo Kato, Yokohama, both of Japan, assignors to Ricoh Co., Ltd., Japan
Filed May 17, 1976, Ser. No. 686,682
Claims priority, application Japan, May 17, 1975, 50-58967
Int. Cl.² G11B *3/10*
U.S. Cl. 274—9 C **4 Claims**

1. A device for accurately positioning a record sheet having a plurality of positioning holes, comprising a recorder/player having a playing head movable in a predetermined path in contact with the record sheet, a plurality of positioning pins fixed to the top of said recorder/player alignable in the positioning holes of the record sheet, a placement plate movably mounted on said recorder having a marginal edge defined thereon and having a playing head receiving opening in said marginal edge and a plurality of first positioning pin receiving apertures in the marginal edge alignable with said positioning pins, mounting means connected between said placement plate and said recorder/player to move said placement plate, a retaining plate disposable over said placement plate and pivotally mounted to said recorder/player, having a second plurality of positioning pin receiving apertures alignable with said positioning pins, wherein said pivotally mounted retaining plate is



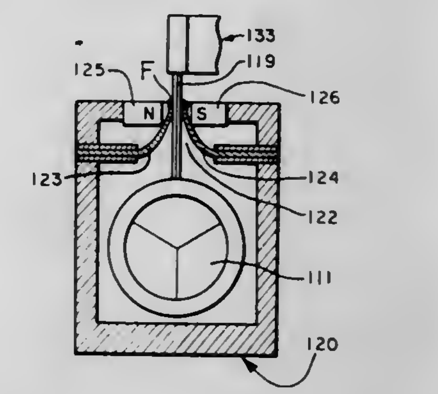
pivotable from a first position away from said placement pins of said recorder/player to a second position toward said recorder/player for engaging said second pin receiving apertures on said placement pins, an abutment connected to said retaining plate adjacent one end of said placement plate for lifting said placement plate away from said recorder/player at that end, a spring between said placement plate and said recorder/player for biasing said placement plate away from said recorder/-player when said retaining plate is in said first position, alignment means on said placement plate adjacent said abutment on said retaining plate for maintaining said first pin receiving apertures in alignment with said positioning pins while said retaining plate is moved from said first position to said second position.

4,057,257
SEAL ASSEMBLY
David W. Berg, Minneapolis, Minn., assignor to Tol-O-Matic, Inc., Minneapolis, Minn.
Filed Jan. 10, 1977, Ser. No. 758,043
Int. Cl.² F01B *9/00;* **F16J** *15/18*
U.S. Cl. 277—4 **10 Claims**



1. A seal assembly for use in a cable cylinder to form an effective seal about a generally cylindrical cable, said seal assembly comprising:
a first generally disc shaped seal retaining member having a center opening extending around said generally cylindrical cable;
a second generally disc shaped seal retaining member having a center opening extending around said generally cylindrical cable;
a gland having a generally cylindrical bore extending around said generally cylindrical cable, a shoulder portion extending radially inwardly from said cylindrical bore near one end thereof for engagement by said first generally disc shaped seal retaining member and an inner groove near the other end of said cylindrical bore for engagement by said second generally disc shaped retaining member, said gland including an inner retaining lip adjacent to said inner groove and on the opposite side of said inner groove as said cylindrical bore for retaining said second disc shaped seal retaining member within said groove and one of said gland and said second disc shaped seal retaining member including means enabling said second seal retaining member to be manually urged past said inner retaining lip for seating within said groove;
a seal member disposed within the cylindrical bore of said gland and between said first and second retaining members for forming an effective seal with the inner surface of said cylindical bore and the outer surface of said generally cylindrical cable.

4,057,258
MEASURING ARRANGEMENT
Alfons Ernst, Traunreut, and Alfred Reichl, Trostberg, both of Germany, assignors to Dr. Johannes Heidenhain GmbH, Traunreut, Germany
Filed Dec. 19, 1975, Ser. No. 642,471
Claims priority, application Germany, Dec. 20, 1974, 2460406
Int. Cl.² F16J *15/16*
U.S. Cl. 277—12 **19 Claims**



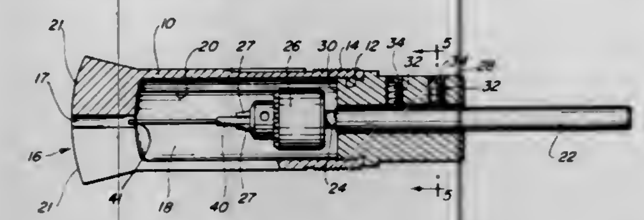
1. A measuring instrument for measuring the relative position of an object, comprising: a measuring element movable along a path; a supporting means for connecting the movable measuring element to the object whose position is to be measured; an elongated hollow body enclosing the area around the measuring element's path; an elongated slot formed in the hollow body, the slot extending along substantially the entire length of one longitudinally extending side of the hollow body, the slot being of sufficient size to permit the passage therethrough of the supporting means; flexible sealing members extending over the slot to seal the slot along its entire length and to accommodate the passage of the supporting means; and, a fluid which cooperates with the sealing members to seal the slot.

4,057,259
COLLET STOP AND CHUCK ASSEMBLY
Domingo F. Pesante, 222 S. Princeton Ave., Arlington Heights, Ill. 60005
Filed June 30, 1976, Ser. No. 701,296
Int. Cl.² B23B *31/20*
U.S. Cl. 279—1 S **2 Claims**

1. A stop pin assembly for collets including a hollow collet having a gripping head at one end and an axial bore, and having interior and exterior threads on the opposite end, in combination with:
a. an adapter axially bored and adapted to be removably secured to said interior threads of said collet;
b. an elongated rod having a flat surface thereon, said rod

positioned in said bore of said adapter and extending therefrom;

c. a drill chuck having expandible jaws, said chuck positioned in the interior of said collet and removably secured to one end of said rod by friction;



d. a stop pin removably secured at one end in said chuck jaws and axially aligned in said collet; and

e. means in said adapter cooperating with the flat surface of said rod to adjustably position said rod longitudinally in said adapter.

4,057,260

DEVICE FOR CONNECTING THE BITS WITH THE CUTTING HEAD OF A DRIFT ADVANCING MACHINE OR THE LIKE

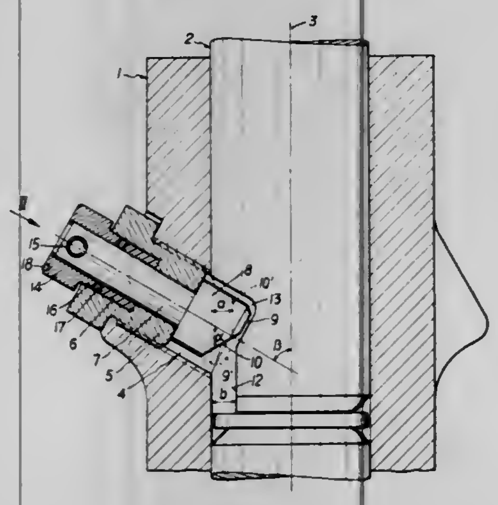
Siegfried Sigott, Zeltweg, Austria, assignor to Vereinigte Osterreichische Eisen-und Stahlwerke, Vienna, Austria

Filed Jan. 22, 1976, Ser. No. 651,583

Claims priority, application Austria, Jan. 23, 1975, 506/75

Int. Cl.² B23B *31/10*

U.S. Cl. 279—77 **9 Claims**



1. A device for connecting a bit to a cutting head, comprising:

a sleeve-shaped bit holder fixed to the head and accommodating a bit, said sleeve-shaped bit holder having a cavity disposed along an axis,

a locking bolt disposed within a mounting obliquely arranged to the axis of said sleeve-shaped bit holder, said locking bolt being pivotally supported and having a recess on one side of a front end thereof protruding into the cavity of the bit holder, said locking bolt fron end extending in a locking pivotal position thereof into a recess formed in the bit,

said locking bolt also having a recessed portion defining with a front surface said front end of said locking bolt, said bit recess and said front end of said locking bolt being sized, so that when said locking bolt is moved into a releasing pivotal position, said front end of said locking bolt does not extend into said bit recess, and removal of the bit is possible, and

said recessed portion of said locking bolt being defined by an inclined plane extending from said fron surface of said locking bolt, and inclined plane including with the locking bolt axis an angle that is at least of the same magnitude as the angle at which the locking bolt and mounting therefor are inclined relative to the sleeve-shaped bit holder axis.

4,057,261

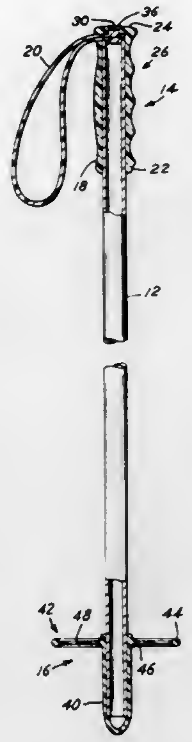
SKI POLE

Jeffrey M. Koblick, Hopkins, Minn., assignor to K-Tel International, Inc., Minnetonka, Minn.

Filed June 7, 1976, Ser. No. 693,354

Int. Cl.² A63C *11/22*

U.S. Cl. 280—11.37 H **4 Claims**



1. An improved hand grip and retaining strap assembly for a ski pole which includes a ski pole shaft having a generally cylindrical first end and a recess in the first end thereof, the improved hand grip and retaining strap assembly comprising:

a hand grip which includes a generally cylindrical, elongated side wall portion, having a first end and a second end, and which has a end wall portion that substantially closes the first end of the side wall portion and that has a recess therein facing the second end of the side wall portion, the end wall portion and the side wall portion defining a generally cylindrical, elongated recess within the hand grip, with the elongated recess being open at the second end of the side wall portion and being adapted to receive the first end of the ski pole shaft therein so that the first end of the ski pole shaft may be frictionally retained within the elongated recess and be positioned adjacent to the end wall portion and so that the longitudinal axes of the first end of the ski pole shaft and the elongated recess are coaxial;

a retaining strap having a first end and a second end;

a first securing knob secured on the first end of the retaining strap and being adapted to be pressed within and engaged by the recess in the first end of the ski pole shaft;

a second securing knob secured on the second end of the retaining strap and being adapted to be pressed within the engaged by the recess in the end wall portion of the hand grip; and

the side wall portion of the hand grip having a side opening therein substantially adjacent to the first end of the side wall portion, with the side opening being of such a size and shape that the composite thickness of the first and second ends of the retaining strap, including the first and second securing knobs, may be passed therethrough, from the exterior of the hand grip into the interior of the elongated recess, the improved hand grip and retaining strap when assembled being characterized by the first and second ends of the retaining strap being disposed within the elongated recess, with the retaining strap extending through the side opening with said first and second end in contact with each other, and by the first end of the ski pole shaft being disposed within the elongated recess in the hand grip so that the first end of the ski pole shaft is positioned adjacent to the end wall portion of the hand grip and in contact with said first and, with the first securing knob facing the first end of the ski pole shaft and being within and engaged by the recess in the first end of the ski pole shaft and with the second securing knob facing the end wall portion of the hand grip and being within and engaged by the recess in the end wall portion, said second end contacting said end wall the engagement between the first securing knob and the recess in the first end of the ski pole shaft and the engagement between the second securing knob and the recess in the end wall portion constituting the sole means of retaining the first and second ends of the retaining strap within the hand grip.

4,057,262

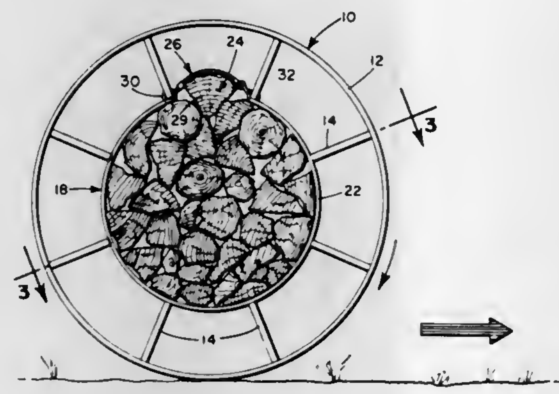
LOG TRANSPORTER

William David Boon, 501 W. 5th St., Portageville, Mo. 63873

Filed May 20, 1976, Ser. No. 688,319

Int. Cl.² B62D *61/00*

U.S. Cl. 280—78 **8 Claims**



1. A transporter comprising:

a. a pair of spaced hoops,

b. a plurality of spokes interconnecting said hoops,

c. means interconnecting said spokes to form a load carrying enclosure, wherein said spokes are generally U-shaped, each of said spokes having outer end portions connected to said hoops and a central portion which defines a portion of said load carrying enclosure, and

d. load retaining means connecting at least two of said spokes to retain a load carried within said load carrying enclosure.

4,057,263

VEHICLE FRAME

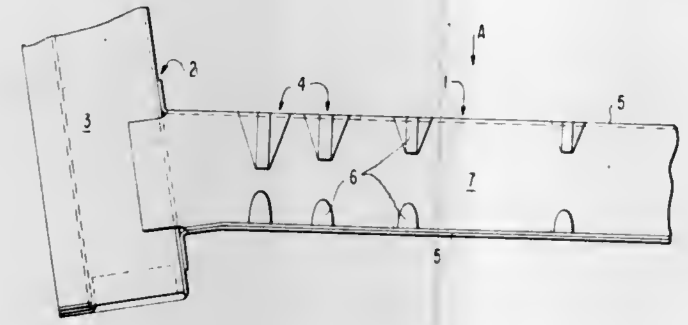
Norbert Schwuchow, Sindelfingen; Gerhard Burk, Magstadt, and Dietrich Rothacker, Sindelfingen, all of Germany, assignors to Daimler-Benz Aktiengesellschaft, Germany

Filed Dec. 11, 1975, Ser. No. 639,903

Claims priority, application Germany, Dec. 17, 1974, 2459519

Int. Cl.² B62D *27/04*

U.S. Cl. 280—106 R **17 Claims**



1. A vehicle frame comprising longitudinal bearers having longitudinally extending walls defining a hollow profile, said walls intersecting at longitudinally extending edges, at least one of said edges being provided with intentionally weakened portions for reducing the compressive strength in the end area of said bearers without changing the bending and torsional strengths of said bearers, and at least one member extending transversely to said bearers and interconnecting said bearers, characterized in that said weakened portions are constructed by bead means having a configuration with a portion being of greatest extent at said edges, said bead means having lateral portions of said configuration extending from said portion of greatest extent to respective walls of said bearers forming said edges, and said lateral portions joining to said walls to be in the surface of said walls.

4,057,264

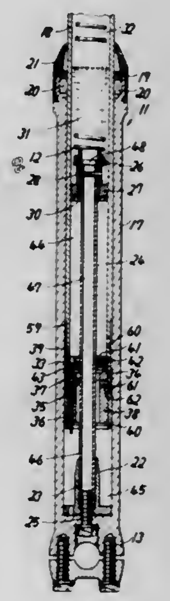
FRONT FORK FOR SUSPENDING A FRONT WHEEL OF A MOTORCYCLE

Kensei Suzuki, No.10-1, Terada Tonoji, Inuyama, Aichi; Takashi Sanada, No.1511-4, Imawatari, Kani, and Kenzo Okazima, No.2637, Dota, Kani, both of Kani, Gifu, all of Japan

Filed July 25, 1975, Ser. No. 599,122

Int. Cl.² B62K *25/08*

U.S. Cl. 280—276 **3 Claims**



1. A front fork for suspending a front wheel of a motorcycle, comprising

an outer tube;

an inner tube slidable within said outer tube;

means defining adjacent an upper end of said outer tube a working-oil accumulating chamber which contains a body of oil and above the same a body of air, a lower oil chamber adjacent a lower end of said outer tube, and a pressure chamber intermediate said upper and lower chambers and becoming reduced in volume during the expansion stroke of the front fork;

passage means for providing fluid communication between said chambers, said passage means comprising a passage formed on an outer periphery of said inner tube held in sliding contact with said outer tube, a first port formed in said inner tube for providing fluid communication between said passage and said pressure chamber, a second port formed in said inner tube for providing fluid communication between said passage and an outer periphery of a lock piston disposed on a lower part of said inner tube, and orifices formed in said lock piston and communicable with said second port for providing said damping effect;

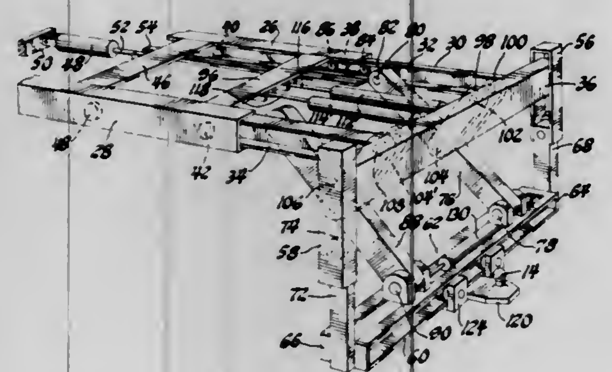
orifice means in said passage means for providing a damping effect;

means for varying the effective cross-sectional area of said orifice means for thereby adjusting said damping effect; and

means for preventing working oil which is expelled from said pressure chamber into said lower chamber during the expansion stroke of said front fork from becoming mixed with air from said layer in said upper chamber, said means for preventing working oil comprising a hollow rod fitted to a bottom wall of said outer tube and extending up-

wardly into the inner tube and carrying at an upper end an auxilary piston, said auxilary piston separating said accumulating chamber from said pressure chamber, said hollow rod providing fluid communication between said accumulating chamber and said lower chamber.

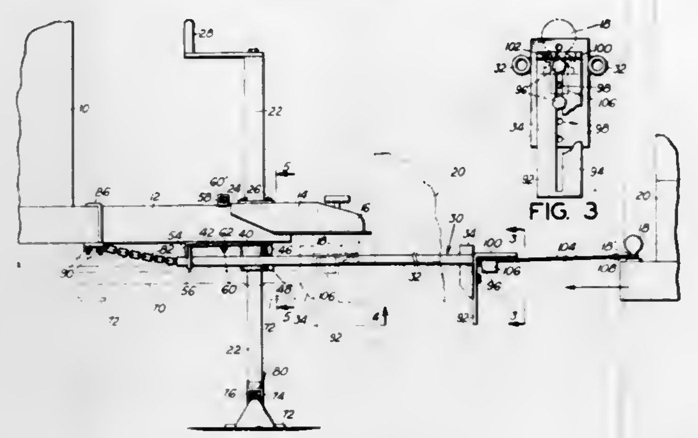
4,057,265
TOWING APPARATUS
Bud W. Grace, 31480 Myrna, Livonia, Mich. 48154
Filed Nov. 24, 1976, Ser. No. 744,638
Int. Cl.² B60D *1/18*
U.S. Cl. 280—468 **9 Claims**



1. A combination comprising:
a towing vehicle having a frame, forward wheels and rear wheels mounted on said frame, said wheel means being adapted to engage the ground;
a hitching frame mounted on the vehicle so as to be movable from a forward position toward a rearward position with respect to the vehicle along a first path of motion, and first power means connected to the hitching frame for moving it along said first path of motion;
a support member carried on the hitching frame so as to be movable from a lower position toward an upper position along a linear, generally vertical path of motion, and second power means for moving the support member along said vertical path of motion, independently of the motion of the hitching frame along said first path of motion, the second power means being operative to engage the support member with the ground to raise the rear wheel means above the ground when the forward wheel means are engaged therewith; and
a hitching ball suited for coupling to a second vehicle to be towed by said towing vehicle and means mounting the hitching ball on the support member for motion therewith.

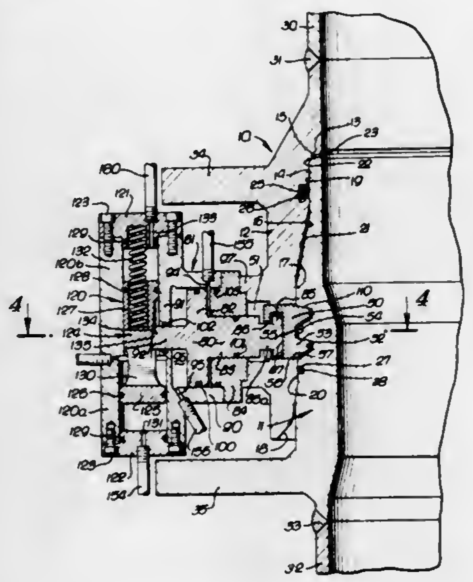
4,057,266
COUPLING GUIDE FOR TRAILER HITCHES
Lee Holmes Duncan, Box 387, Sisters, Oreg. 97759, and Lee Harold Duncan, 87749 MacKinzie Highway, Springfield, Oreg. 97477
Filed Mar. 26, 1976, Ser. No. 670,839
Int. Cl.² B60D *1/06*
U.S. Cl. 280—475 **15 Claims**

10. A coupling guide for bringing into registry a hitch component carried by a tow vehicle and a companion hitch component carried by a trailer tongue, wherein the hitch component carried by the trailer tongue is secured integrally thereto and the trailer tongue mounts an adjustable jack for supporting the forward end of a trailer, the coupling guide comprising:
a. an elongated bar mounted on the trailer tongue for longitudinal and lateral swinging movement relative to the tongue,
b. a base slidably supporting the bar for longitudinal and lateral swinging movement relative thereto, the base having an opening therethrough for the reception of said adjustable jack,
c. attaching means engaging the base for securing the latter to the trailer tongue,
d. a jack base for supporting the bottom end of the jack, the jack base including an elongated beam having elevating pads at its opposite ends for elevating the beam above the ground support.
e. a jack connector mounted on the beam for movement along the latter,
f. pivotal attachment means on the jack connector for connecting the bottom end of the jack to the jack connector,



g. a pair of elongated restraining members connected at one of their ends to the rearward end of the bar and at the other of their ends to laterally spaced terminals fixed relative to the tongue and located on opposite sides of the longitudinal centerline of the tongue, and
h. connector means on the forward end of the bar for engaging a hitch component on a tow vehicle.

4,057,267
FLUID CONTROLLED PIPE CONNECTORS
Martin B. Jansen, Jr., Ventura, Calif., assignor to Vetco Offshore Industries, Inc., Ventura, Calif.
Filed Feb. 17, 1976, Ser. No. 658,417
Int. Cl.² F16L *35/00*
U.S. Cl. 285—18 **18 Claims**



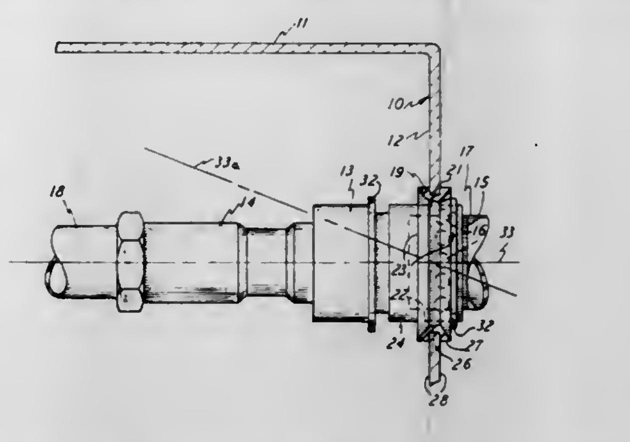
1. A connector comprising a tubular pin member, a tubular box member telescopically disposed over said pin member, lock means shiftable laterally of said box member and pin member for securing said members to each other, fluid operated shifting means for shifting means for shifting said lock means laterally of said pin member and box member, and separate means engaging said fluid operated shifting means for retaining said lock means in position securing said members to each other.

4,057,268
DISCONNECTABLE PIPE UNION AND DEVICE FOR MANOEUVRING SAME
Hubert Sicard, Marseilles, France, assignor to Compagnie Maritime d'Expertises - Comex, Marseilles, France
Filed Nov. 14, 1975, Ser. No. 632,156
Claims priority, application France, Nov. 18, 1974, 74.41050
Int. Cl.² F16L *21/06*
U.S. Cl. 285—31 **7 Claims**

1. A pipe union comprising an annular body for receiving and engaging a pipe end portion to which the union is to be secured, ring means comprising at least one ring for receiving and extending around said pipe end portion at a portion thereof spaced from the end of said pipe, said ring having an inner truncated conical surface co-axial with and extending at an angle to the longitudinal axis of said pipe, said surface increasing in diameter in the direction of said end of said pipe and said ring being mounted for movement parallel to said axis and toward said end of said pipe, a plurality of anchoring jaws for extending around said pipe end portion intermediate said surface of said ring and said pipe end portion, each of said jaws having an internal surface engageable with the outer surface of said pipe end portion and having an external surface conforming to the surface of a truncated cone co-axial with said pipe axis and engaging and mating with said inner surface of said ring, said jaws being movable toward said pipe axis with movement of said ring parallel to said pipe axis and toward said annular body, the engagement of said external surface of said jaws with the inner surface of said ring forcing said jaws toward said pipe axis, screw threaded means interconnecting said body and said ring means for moving said ring toward and away from said body and parallel to said pipe axis, said ring means also having at least one further truncated, conical surface facing outwardly of and co-axial with said pipe axis, said further surface increasing in diameter in the same direction as said inner conical surface of said ring, and each of said jaws also having a further surface facing toward and co-axial with said pipe axis, said last-mentioned further surface conforming to the surface of a truncated cone and being engageable and matable with said further surface of said ring means for moving said jaws away from said pipe axis with movement of said ring parallel to said pipe axis and away from said annular body.

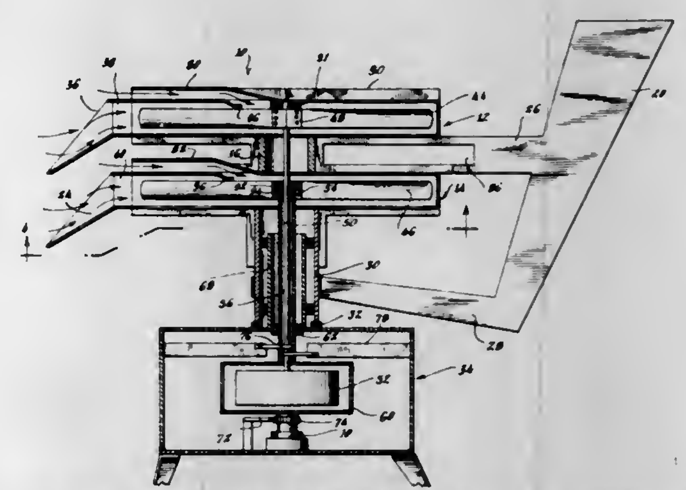
4,057,269
HOSE COUPLING RETAINER ASSEMBLY
John E. Bislew, Kansasville, Wis., assignor to J. I. Case Compny, Racine, Wis.
Continuation-in-part of Ser. No. 586,305, June 12, 1975, abandoned. This application June 9, 1976, Ser. No. 694,201
Int. Cl.² F16L *41/00*
U.S. Cl. 285—158 **2 Claims**

1. A hose coupling retainer assembly comprising a support member having spaced-apart and oppositely facing surfaces and having an opening extending through said member and between said surfaces, an elastomeric member disposed in said opening and having a groove extending exteriorly therearound and receiving the portion of said support member bordering said opening, for snap-fitting said elastomeric member snugly into said opening, said elastomeric member having spaced-apart and parallel end surfaces disposed at opposite axial ends of said elastomeric member, a hose coupling member having a uniformly cylindrical external wall, said elastomeric member having a uniformly circular central opening extending therethrough and of the diameter of said cylindrical external wall and snugly movably receiving said hose coupling member which extends through said central opening, said hose coupling member having snap ring grooves spaced apart greater than the distance of the spacing of said elastomeric member end surfaces and with said hose coupling member being free to slide back and forth in said central opening, and snap rings disposed in said snap ring grooves and extending radially into



alternate and mutually exclusive abutment with said elastomeric member when said coupling member slides back and forth axially of said elastomeric member, for retaining said coupling member in said elastomeric member while permitting tipping of said coupling member relative to the axis of said central opening and under deflection of said elastomeric member.

4,057,270
FLUID TURBINE
Barry Alan Lebost, 3224 Grand Concourse, Bronx, N.Y. 10468
Filed Apr. 3, 1975, Ser. No. 565,025
Int. Cl.² F03D *1/02*
U.S. Cl. 290—54 **45 Claims**



1. A fluid turbine for generating electrical power comprising:
first rotor means including
a first housing having a fluid entrance passage,
a plurality of first rotor blades within said first housing, said rotor blades being adapted to rotate in one direction when exposed to a source of fluid,
second rotor means including
a second housing having a fluid entrance passage,
a plurality of second rotor blades within said second housing, said rotor blades being adapted to rotate in the opposite direction when exposed to a source of fluid,
means connected to said first and second rotor housings for independently rotating said housings coaxial to said first and second rotor blades in response to omni-directional fluid flow to position said fluid entrance passages in said first and second rotor housings normal to the direction of fluid flow, and
electrical means operatively connected to said first and second rotor blades for generating electrical power in response to the opposite rotation of said first and second rotor blades,

both of said first and second rotor housings including means adjacent said fluid entrance passage for increasing the velocity of the fluid flow to said rotor blades.

4,057,271

AUTOMOBILE BONNET EJECTION AND RETAINING DEVICE

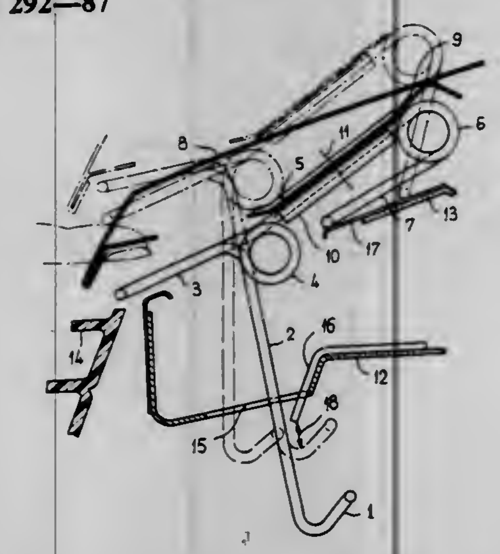
André Colinet, Boulogne-Billancourt, France, assignor to Regie Nationale des Usines Renault, Boulogne-Billancourt and Automobiles Peugeot, Paris, both of, France

Filed Feb. 5, 1976, Ser. No. 655,390

Claims priority, application France, Feb. 7, 1975, 75.03872

Int. Cl.[2] E05C *19/06*

U.S. Cl. 292—87 6 Claims



1. A bonnet ejection and retaining device for use in a motor vehicle having a bonnet movable between a locked position, a partially open position and a fully open position, and including a main bonnet locking device having one component attached to the bonnet engageable with another component attached to another part of the motor vehicle to hold the bonnet in the locked position, ejection means operable upon the release of the components of the main bonnet locking device from each other for moving the bonnet from the locked towards the fully open position, and retention means having a first component attached to the bonnet engageable with a second component attached to another part of the motor vehicle to stop the movement of the bonnet towards the fully open position and to releasably hold the bonnet in the partially open position, the improvement wherein said ejection means and one of said two components of said retention means are combined into the bonnet ejection and retaining device comprised of: a fastening member for fastening the device to the motor vehicle; an ejection spring means connected to said fastening member and operable upon the release of the components of the main bonnet locking device for moving the bonnet from the locked position towards the fully open position; and a hook assembly means having a first portion connected to said fastening member, a hook arm forming said one component of said retention means, a control lug, and a wound spring integral with said hook arm and connected to said first portion, the hook arm being free from engagement with the other of said two components of said retention means when said bonnet is in the locked position and being releasably engaged by the other of said two components during movement of the bonnet from the locked position to releasably hold the bonnet in the partially open position, the control lug being operable to release said hook arm from engagement with said other component so that the bonnet can be moved from the partially open to the fully open position.

4,057,272

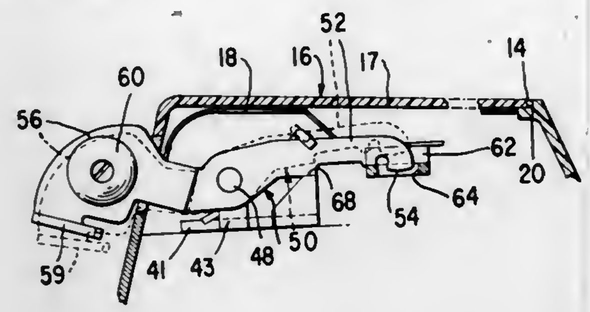
ARM TOP COVER FOR LOCKING DEVICES

Erwin Vahle, Stutensee-Bl., and Helmut Tautz, Karlsruhe, both of Germany, assignors to The Singer Company, New York, N.Y.

Filed May 4, 1976, Ser. No. 682,927

Int. Cl.[2] E05C *19/10*

U.S. Cl. 292—128 4 Claims



1. In a sewing machine having a bracket arm with a removable top cover, a top cover locking device comprising:

a. a pivot support attached within said bracket arm and located substantially beneath said removable top cover;

b. a bracket pivotally attached at its mid-point to said pivot support forming a first and a second limb, said first limb extending inside said bracket arm from said pivot support, said bracket arm being formed with a hole therein through which said second limb, extending from said pivot support, projects;

c. engaging means on said bracket arm and said top cover for assuring a proper assembled relation therebetween;

d. cooperating latch means formed on said first bracket limb and on said top cover, said cooperating latch means being arranged for interlocking engagement when said top cover occupies said assembled relation on said bracket arm; and

e. cooperating clip means formed in said bracket arm and on said top cover, said cooperating clip means being arranged for interlocking engagement, in concert with said cooperating latch means, when said top cover occupies said assembled relation on said bracket arm.

4,057,273

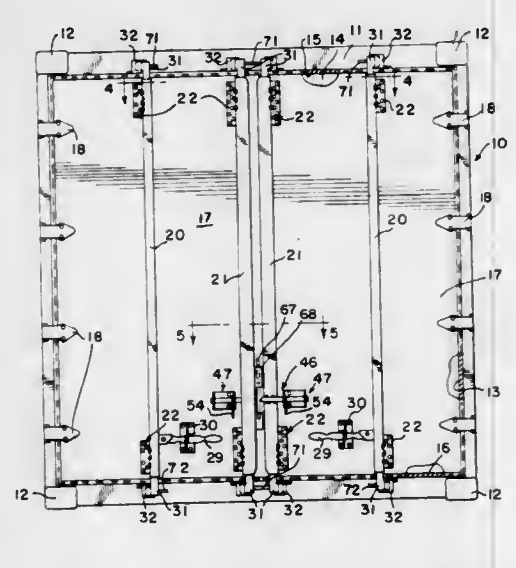
CONTAINER DOOR SECURING MECHANISM

George W. Carr, Albuquerque, N. Mex., assignor to Pullman Incorporated, Chicago, Ill.

Filed Oct. 24, 1975, Ser. No. 625,789

Int. Cl.[2] E05C *9/08*

U.S. Cl. 292—218 17 Claims



1. A container having a loading opening including a pair of hinged doors swingable outwardly from closed to open position relative to said opening, said doors having vertical edge portions in the closed position being disposed in substantially contiguous relation, the improvement of a door closing and locking mechanism comprising;

a vertical locking bar for each of said doors,

hinge means having a vertical axis substantially parallel to said door coupling said locking bar and door for rotation of said locking bar about said vertical axis,

said locking bar including upper and lower locking cam means,

keeper means mounted on said container engageable by said locking cam means,

said bars each having a parallelogram wall construction and having a generally rectangular configuration in horizontal cross section and including a flat surface portion abutably engageable with said door and said vertical axis being laterally offset from said flat surface portion, said bars including an apertured wall in the closed position of said bars being disposed substantially normal to the door to which it is connected,

a slide bolt assembly on each door disposed laterally with respect to each said bar,

said assembly including a bracket,

a slide bolt slideably supported on said bracket and movable into engagement with said apertured wall of an adjacent bar for locking said bar against rotation in the closed position of said door.

4,057,274

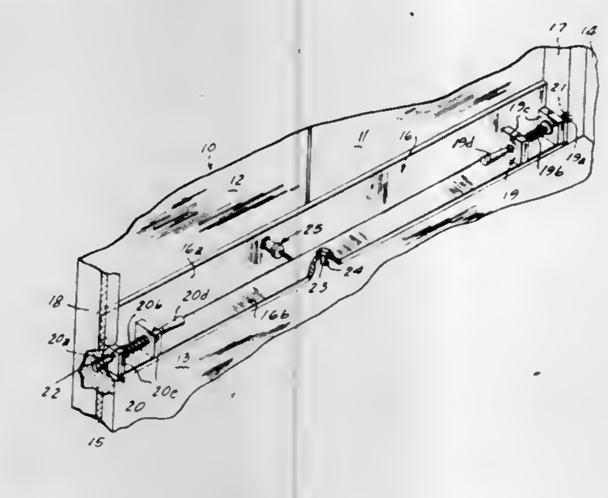
METHOD AND APPARATUS FOR BRACING AND SECURING DOORS

James J. Van Gompel, Fremont, Ind., assignor to Brammall, Inc., Angola, Ind.

Filed Sept. 29, 1976, Ser. No. 727,400

Int. Cl.[2] E05C *7/04*

U.S. Cl. 292—259 R 11 Claims



1. A door brace and security apparatus adapted for a storage area closure means comprising:

a. a storage area defined by wall and floor surfaces and having access thereto controlled by a closure means adjacent the wall and floor surfaces;

b. bracing means connected by detachable connecting means to at least one of the wall and floor surfaces within the storage area adjacent the closure means, said connecting means retaining the bracing means in position prior to locking to the closure means;

c. a retaining member having one free end and a flag member attached to the other end;

d. aperture means in the closure means through which said retaining member free end is positioned; and

e. a locking means mounted on said bracing means for slidably engaging said retaining member free end when said free end is positioned through said closure means aperture and pushed into said locking means, and for locking to said retaining member free end when said retaining member is pulled away from said locking means, said locking means being aligned with said aperture means when said closure means is closed.

4,057,275

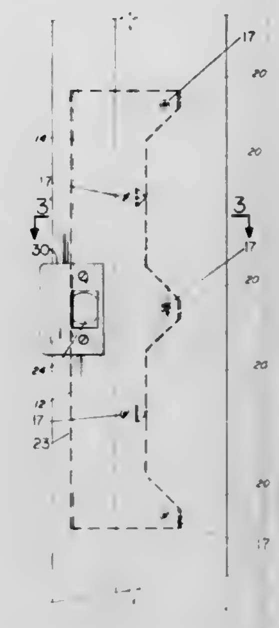
DOOR JAMB REINFORCING PLATE

Louis J. La Beaud, P.O. Box 50814, New Orleans, La. 70150

Filed July 28, 1976, Ser. No. 709,147

Int. Cl.[2] E05C *21/00*

U.S. Cl. 292—340 5 Claims



1. In combination with a doorway having wooden jambs and a door adapted to swinging inwardly and outwardly therebetween, each jamb with an oppositely disposed front and back, and one jamb defining a hollow in front for receiving a latch bolt of said door, a jamb protector for said one jamb comprising: a reinforcing plate having two contiguous sides with a common longitudinal edge defining a ninety degree angle between said sides, a first and narrower of said two sides for recessing into the back of said one jamb and outwardly, as said door swings, in said hollow and the second and wider of said two sides, defining a plurality of fastening holes, for placing against the the back of said one jamb; a third and discontinuous side parallel and opposite to the first and narrower side and defined by a plurality of longitudinally spaced triangular points for penetrating into the back of said one jamb; and a plurality of individual fastenings adapted to engage through said fastening holes into the back of said one jamb, whereby the reinforcing plate is fixed to the back of said one jamb against separation therefrom in all directions by each side and strengths the jamb against splitting, splintering and kick-outs in attempts to force said door.

4,057,276

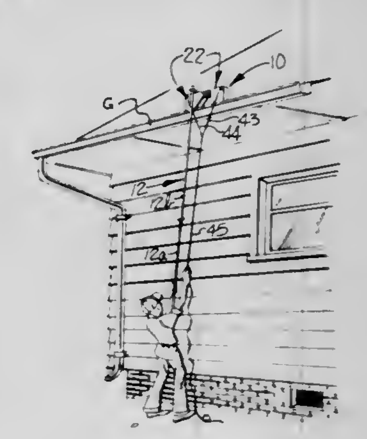
GUTTER CLEANING APPARATUS

Grover C. Currie, Rte. 1, Box 345-C, Lenoir, N.C. 28645

Filed Sept. 13, 1976, Ser. No. 722,803

Int. Cl.[2] B25J *1/00;* E04D *13/06*

U.S. Cl. 294—19 R 10 Claims



1. An apparatus for remotely removing accumulated leaves and other debris from an overhead gutter of a building or the like, and comprising

an elongate pole having one end adapted to be held by a

workman and an opposite end adapted to reach above an overhead gutter or the like,

a pair of cooperating scoops, with each of said scoops having a pair of side walls and a bottom wall to define a relatively large internal cavity adapted to receive a substantial quantity of debris therein,

means mounting said scoops adjacent said opposite end of said pole for relative pivotal movement about an axis which extends transverse to the axis of said pole and such that said scoops are relatively pivotable between an open position wherein said cavities are separated and face generally toward said one end of said pole and a closed position wherein said cavities are substantially face to face and the scoops collectively define an enclosure of substantial volume, said scoops being freely rotatable in unison about said transverse axis to facilitate the alignment of said scoops with the bottom of a gutter when said pole is extended in an angular direction relative to the gutter,

at least one tine attached to and extending forwardly from each scoop in a direction generally toward the other scoop such that the tines penetrate and grasp any debris positioned between the scoops as the scoops are pivoted to their closed position, and

means operable from said one end of said pole for selectively pivoting said scoops between said open and closed positions,

whereby a workman may lower the scoops into an overhead gutter with the scoops in said open position and then pivot the same to said closed position to collect a substantial quantity of debris within said enclosure.

4,057,277

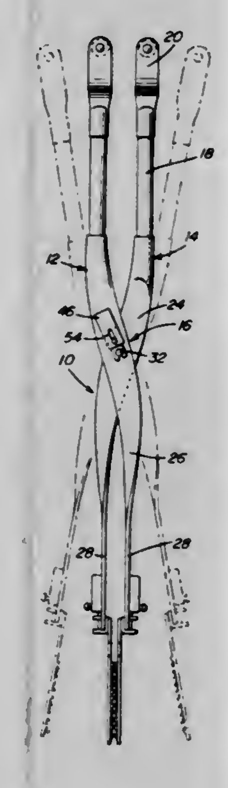
YARD AND GARDEN TOOL

Marie L. Burkholder, 806 Devonshire Terrace, Hampton, Va. 23666

Filed Nov. 24, 1976, Ser. No. 744,791

Int. Cl.^{2} A01B *1/18*

U.S. Cl. 294—50.8 **9 Claims**



1. A weed puller and garden tool comprising a pair of elongated handles oriented in intersecting relation, means pivotally and detachably interconnecting said elongated handles, handgrip means at one end of each of said handles and detachable connecting means at the other end of each of said handles for interchangeably mounting garden or lawn care tools or implements thereto to facilitate use of the handles when pivotally interconnected and when separated from each other, said means pivotally and detachably connecting the handles including a projecting stud rigid with one of the handles and received through an opening in the other of the handles, said stud including a peripheral groove adjacent the free end thereof, the other of the handles including a movable lock plate slidably mounted thereon with one end of the lock plate including a notch received in the peripheral groove in the stud for locking the handles together with the notch in the lock plate moving peripherally in the groove during pivotal movement of the handles, spring means biasing the lock plate to locking position, and handle means on the lock plate to retract the lock plate to a released position to enable the stud to be removed from the opening thereby detaching the handles.

4,057,278

MULTI-SHELL GRAB BUCKET

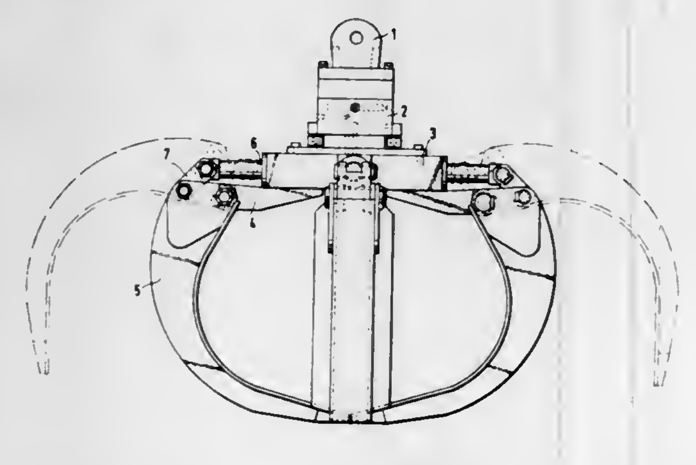
Heinrich Götzen, Wetter, Germany, assignor to Heinrich Götzen Maschinenbau, Germany

Filed June 4, 1976, Ser. No. 692,727

Claims priority, application Germany, June 6, 1975, 2525152

Int. Cl.^{2} B66C *3/16*

U.S. Cl. 294—88 **9 Claims**



1. In a multi-shell grab bucket apparatus: a distributor head having a plurality of engine cylinder chambers rigidly fixed with respect to said distributor head and disposed in a common plane and extending radially outwardly from and angularly spaced about a center axis, engine pistons mounted for sliding reciprocatory movement within respective ones of said engine cylinder chamber and defining therewith double-acting reciprocating engines, and means defining fluid supply passages internally of said distributor head for supplying a fluid pressure medium to opposite ends of said engine cylinder chambers to effect reciprocation of the engine pistons; a plurality of actuatable scoops connected to respective ones of said engine pistons such that reciprocation of said engine pistons effects actuation of said scoops; and means connected to said distributor head for enabling suspension thereof from a boom, said means for enabling suspension of said distributor head including means connectable to an external source of fluid pressure medium for supplying the medium to said fluid supply passages located internally of said distributor head to effect actuation of said scoops.

4,057,279

CENTER LIFTING DEVICE

Timo Pykälä, Espoo, Finland, assignor to Oy Finnlines Ltd., Helsinki, Finland

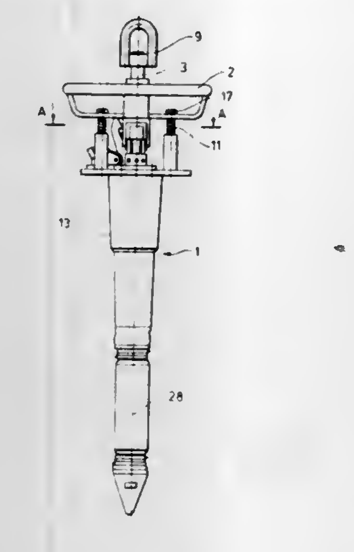
Filed Sept. 17, 1976, Ser. No. 724,250

Claims priority, application Finland, Sept. 29, 1975, 752712

Int. Cl.^{2} B66C *1/46*

U.S. Cl. 294—93 **10 Claims**

1. A center lifting device for lifting and transferring rolls of material, such as papers rolls and the like having a hollow opening formed therein, comprising inner and outer parts arranged with said inner part located within said outer part and being movable inside the outer part over a limited distance in relation to each other, said outer part being adapted to be fitted partly into the hollow opening in the material roll to be lifted, said inner part having an upper end including means for attaching the inner part to be a lifting device, said outer part having a lower end including expandable and contractable means for selective gripping and releasing engagement with said hollow opening in response to relative movement of the parts and an upper end including means for selectively preventing said inner part from rising in relation to said outer part; a driving member, means for resiliently mounting said driving member on the upper end of said outer part for axial movement between upper and lower positions with respect to said upper end



of the outer part and including means cooperating with said preventing means for releasing the preventing means when the driving member is forced downwards to permit said inner part to rise with respect to said outer part; and releasable locking means for retaining said driving member at its lower position adjacent the upper end of the outer part and cooperating with said inner part to release the lock means from the driving member when the inner part moves upwards in relation to the outer part at the initial stage of a lift.

4,057,280

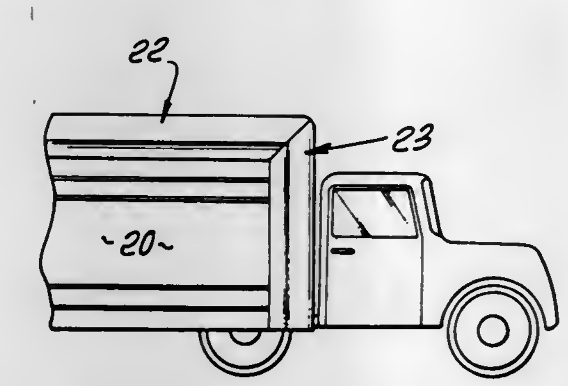
AERODYNAMIC DRAG REDUCTION DEVICES FOR SURFACE VEHICLES

Paul B. MacCready, Jr., and Peter B. S. Lissaman, both of Pasadena, Calif., assignors to AeroVironment Inc., Pasadena, Calif.

Division of Ser. No. 503,290, Sept. 5, 1974, Pat. No. 3,934,922. This application Nov. 6, 1975, Ser. No. 629,366

Int. Cl.^{2} B62D *35/00*

U.S. Cl. 296—1 S **3 Claims**



1. In combination with a truck that includes a cab having a roof, and a box-like body elongated rearwardly of the cab, the body having an exterior front wall facing forwardly toward the cab, said front wall extending downwardly substantially below the level of the cab roof, the body also having laterally opposite exterior side walls, and an exterior top wall, each side wall meeting said top wall at a rearwardly elongated corner, the improvement that comprises,

a. an elongated protrusion extending adjacent and along one of said corners in enveloping relation therewith, said protrusion having two rearwardly elongated edge portions respectively attached to said body exterior side wall and top wall, said protrusion having a rearwardly elongated mid-portion which is outwardly convex and which protrudes laterally throughout the major length of the protrusion.

4,057,281

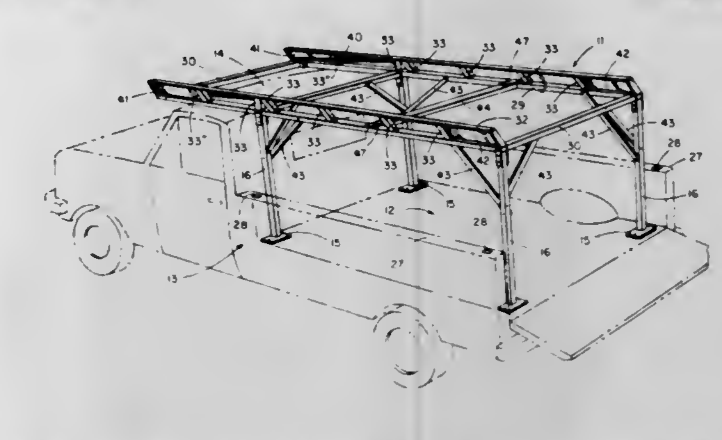
CARRYING RACK FOR TRUCKS

Luther J. Garrett, 8345 S. 84th Court, Hickory Hills, Ill. 60457

Filed Apr. 7, 1976, Ser. No. 674,374

Int. Cl.^{2} B60D *3/00*

U.S. Cl. 296—3 **7 Claims**



1. A detachable and foldable rack to facilitate carrying material above a bed and a cab of a truck comprising:

a plurality of legs;

a support pad for each leg, said pad adapted to be permanently and rigidly attached to the bed of the truck;

detachable securing means to detachably secure said legs to said support pads;

a rectangular frame including longitudinally extending side rails and transversely extending crossbars including a rear section overlying the bed of said truck and a front section overlying the cab of said truck;

a pair of top rails overlying said side rails and said frame;

support members disposed between said side rails and said top rails;

bracing means diagonally extending between each leg and said frame, said bracing means being detachably secured at an end thereof;

bracket means pivotably connecting said legs to said frame allowing said legs to be folded against said frame whenever the legs are detached from said support pads, and at least an end of said bracing means is also detached.

4,057,282

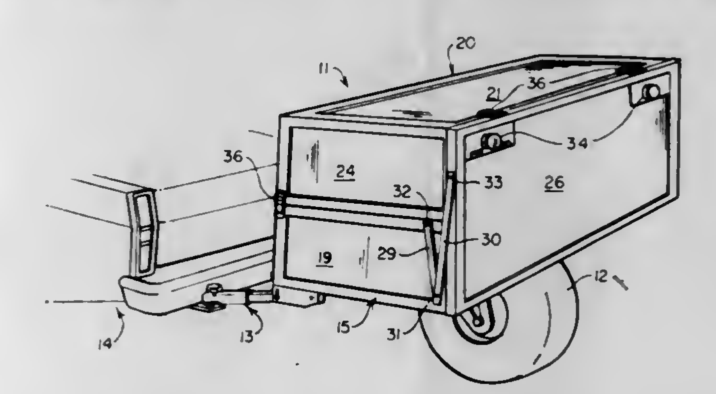
VEHICLE TRAILER

Kenneth B. Kidd, 3722 W. Peoria, Phoenix, Ariz. 85029

Filed Apr. 14, 1976, Ser. No. 676,729

Int. Cl.^{2} B60P *3/34*

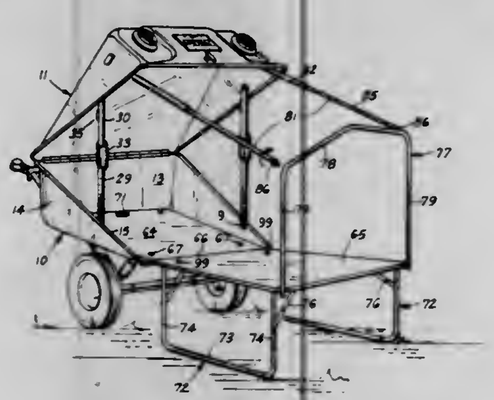
U.S. Cl. 296—10 **5 Claims**



1. A vehicle trailer comprising: a base structure comprising wheel means and attachment means constructed and arranged for attaching said trailer to the rear of a vehicle; mounted atop said wheel means, a first box-like member having four sides and being open at its top and rear; attached to said first box-like member and having a first stable position atop said first box-like member, a second box-like member having four sides and being open at its bottom and rear; hinged attachment means

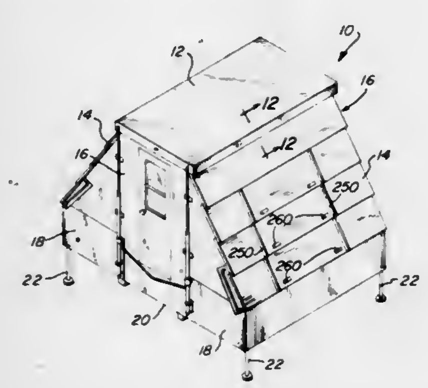
between said box-like members between the upper rear corners of said first box-like member and the lower rear corners of said second box-like member; a panel hingedly attached to the lower rear of said first box-like member and attached by a hinged arm member to said first box-like member, said hinged arm member being positioned between a first pin in said first box-like member located adjacent to said hinged attachment means and a second pin in said panel; so constructed and arranged that said panel when in an upright first stable position closes the rear open sides of both said first box-like member and said second box-like member and said panel when in a horizontal second stable position is adjacent, to the rear, and substantially in line with the bottom side of said first box-like member, so that said second box-like member, when rotated about said hinged attachment means comes to rest and is supported by said panel when said panel is in its horizontal second stable position, said bottom open side of said second box-like member thereby becoming the upper side of said second box-like member.

4,057,283
MOTORCYCLE TRAILER
David L. Barnett, Phoenix, Ariz., assignor to Robert L. Howard, Phoenix, Ariz.
Filed June 26, 1975, Ser. No. 590,446
Int. Cl.² B60P *3/34*
U.S. Cl. 296—23 C **9 Claims**



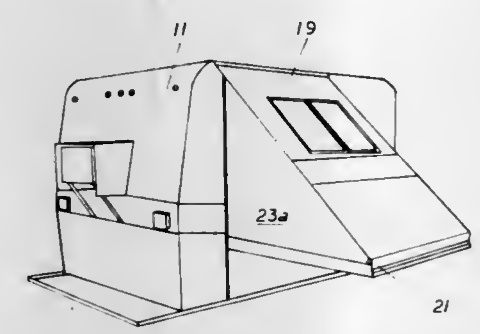
1. In a motorcycle trailer,
a. a lower body part comprising:
I. a bottom defined by a free rear edge, a front edge and side edges,
II. a front wall upstanding from said front edge and presenting a top edge, and
III. a pair of triangular side walls upstanding from said side edges and presenting inclined top edges extending from ends of the top edge of said front wall to ends of said rear edge of the bottom;
b. an upper body part comprising:
I. a top substantially conforming in size and shape to said bottom of the lower body part and presenting a free front edge, a rear edge and side edges,
II. a rear wall depending from said rear edge of said top and having a lower edge, and
III. a pair of triangular side walls depending from the side edges of said top and having inclined lower edges extending from ends of the front edge of the top to ends of the lower edge of said rear wall;
c. a hinge pivotally connecting the front edge of said top with the top edge of said front wall;
d. a hitch connected to said lower body part, extending forwardly therefrom, and including means for connecting the hitch to a motorcycle;
e. a wheel suspension secured to the bottom of said lower body part and including a pair of wheels and spring means interposed between said wheels and said bottom;
f. means for supporting said holding said upper body part in open relation to said lower body part in which said bottom and said top are disposed at an acute angle relative to each other;
g. a bed part of substantially the same size and shape of said bottom as defined by front, rear, and side edges;
h. a hinge connection between the rear edge of said bottom and the front edge of said bed part, said hinge providing for swinging movement of said bed part into a horizontal position in which it aligns with said bottom;
i. collapsible means attached to said bed part for supporting the bed part in said horizontal position;
j. a frame pivotally mounted on said bed part at the rear edge thereof, said frame of U shape comprising a cross-bar in the form of a wide V with legs extending from the ends of said cross-bar to pivotal connections therefor at the rear edges of said bed part;
k. means for supporting said frame from said upper body part when the latter is in said open position, said means comprising a pair of telescoping arms with each arm including an outer tube having one end pivoted to a side wall of the upper body part on the inner face thereof, an inner member slidable in said tubular member and having means at its outer end for detachably connecting it to said frame at the end of the cross-bar of the frame, and a spring clasp on the inner face of each of said side walls receiving said outer tubular members when the telescoping arm thereat is collapsed; and
l. a canopy held in effective position by said body parts, said frame and the supporting means for the frame.

4,057,284
COLLAPSIBLE CAMPER
Paul Clifford Blank, Del Camino Place Rte. 4, Space 103, Longmont, Colo. 80501
Filed May 3, 1976, Ser. No. 682,642
Int. Cl.² B60P *3/34*
U.S. Cl. 296—23 F **9 Claims**



1. A collapsible camper having two opposing longitudinal sides, said camper comprising:
means in the bottom of said camper for providing a central floor portion,
means on each of said opposing sides for selectively extending the size of said central floor portion, said floor extending means being selectable between a first expanded position and a second collapsed position,
means cooperative with said floor extending means for uplifting a canopy over said camper when said floor extending means moves to said first position, and
means on each of said opposing sides of said central floor portion and cooperative with said floor extending means for forming side walls between said floor extending means and said uplifted canopy, each of said side wall forming means including a plurality of sliding panels, means attached to each of said panels for guiding the sliding movement of each panel relative to an adjacent panel, and, means attached to each of said panels for limiting the sliding movement of each panel relative to an adjacent panel, each of said side wall forming means further including means for mounting one of said sliding panels to a respective one of said floor extending means and means for removeably attaching a second of said sliding panels adjacent to said uplifted canopy whereby said second sliding panel can be moved away from said floor extending means toward said uplifted canopy and attached adjacent thereto to slide said plurality of sliding panels relative to each other to form one of said side walls and said second sliding panel can be removed from attachment adjacent said uplifted canopy and moved toward said floor extending means to slide said plurality of sliding panels relative to each other to collapse said side wall.

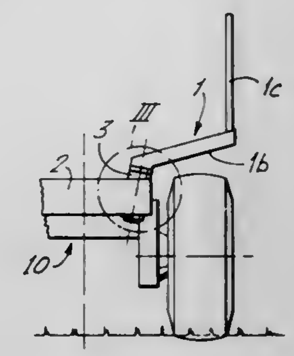
4,057,285
COLLAPSIBLE FOLDING BEDS FOR VEHICLES
Charles Bemos, 1213 Green St., N., New Port Richey, Fla. 33552
Filed July 30, 1976, Ser. No. 710,293
Int. Cl.² B60P *3/32*
U.S. Cl. 296—23 H **1 Claim**



1. In a vehicle (**11**) with a top (**13**) and a vertical side (**18**), a wall-mounted extendable bed arrangement comprising in combination:
a. a rectangular aperture defined in said side with two opposed inner edges having first and second vertical guide rails (**37**) towards each of said inner edges, an upper roller holding station (**41**) defined at about the center of said rail arrangement, a lower holding station (**43**) at the bottom of said rail arrangement;
b. a rectangular flat side wall (**19**) pivoted to the vehicle top (**13**), and normally forming a flat flush outer surface with the vehicle side (**18**), the bottom of said side wall extending outwards when the said side wall is outwardly pivoted;
c. a rectangular bed frame (**21**) with longitudinal bed frame sides, having an inner section (**29**) designed to be disposed towards the inside of the vehicle and an outer section (**39**) desinged to extend out of the vehicle, said inner section being slightly tapered, said bed frame (**21**) being normally vertically disposed with the taper of said inner section extending upwards;
d. first and second rollers (**35**) coupled to said bed frame sides, and movingly locked into said guide rails for up and down movement therein said rollers resting at said upper station (**41**) where said bed frame (**21**) is vertically disposed;
e. a defined storage area (**45**) under said vehicle where said bed frame outer section (**39**) can be normally received when said bed frame is in the vertical position, said outer section (**39**) pivoting outwards as said rollers travel downwards and being in the horizontal position when said rollers enter said lower station; and
f. foldable side panels (**23***a*, **23***b*) of triangular shape attached to the sides of said frame, said side panels folding over the bed in collapsed position and sealing the vehicle when the bed is used.

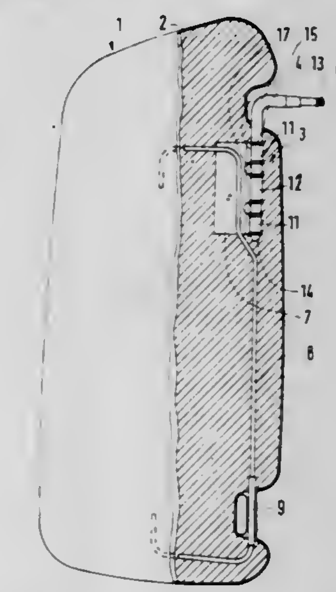
4,057,286
RETAINING MEMBER FOR VEHICLE CHASSIS
Kunto Elonen, Tampere, Finland, assignor to Rauma-Repola Oy, Finland
Filed Nov. 26, 1975, Ser. No. 635,430
Int. Cl.² B60P *7/06*
U.S. Cl. 296—43 **4 Claims**

1. In a vehicle adapted to transport a commodity and having means for retaining the commodity on the chassis of the vehicle, the improvement comprising:
a. a bearing mounted on said chassis, said bearing having a longitudinal axis tilted upwardly and outwardly with respect to a line perpendicular to said chassis, and
b. a rigid retaining member having a first portion thereof rotatably journalled in said bearing, a second portion extending generally horizontally outward from said journalled first portion, and a third portion extending gener-



ally vertically upward from said second portion, the longitudinal axis of said bearing being tilted sufficiently from the perpendicular to the chassis and the three portions of said retaining member being joined to each other at such respective angles that, when said retaining member is permitted to rotate under the influence of gravity, said second portion assumes an upward and outward extension away from the chassis and said third portion assumes a position generally perpendicular to the chassis.

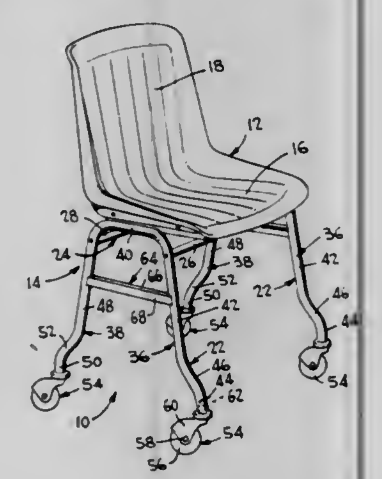
4,057,287
SUN SHADE FOR MOTOR VEHICLE
Harry L. Lilja, Solhem 5102, S-443 00 Lerum, Sweden
Filed June 23, 1976, Ser. No. 698,873
Claims priority, application Sweden, June 25, 1975, 7507284
Int. Cl.² B60J *3/00*
U.S. Cl. 296—97 K **4 Claims**



1. A sunshade intended for use in motor vehicles, comprising: a light-shielding unit, a hinge for pivotally suspending said unit in a fixed portion of the vehicle, said hinge comprisng a rod-shaped shaft part and a sleeve-shaped part, one of said parts being anchored to said fixed portion and the other being rigidly connected with the shielding unit, said two parts being pivotally connected to each other with a suitably chosen friction, said sleeve-shaped part having at least two sleeve portions, an anchoring plate connecting said sleeve portions to each other at a distance from the pivoting axis of the hinge, at least one of the sleeve portions being biased relative to the other of the sleeve portions by a bias force so that said one sleeve portion tends to take a radially displaced position relative to the pivoting axis of the hinge, said anchoring plate having a recess between the sleeve portions extending a prede-

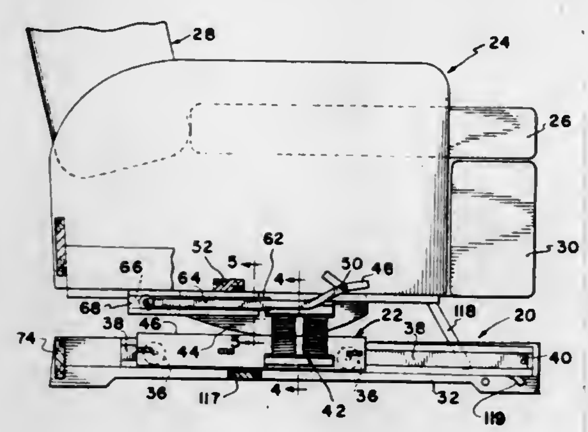
termined distance from said pivoting axis, said distance determining the moment arm of said bias force.

4,057,288
STACKABLE WHEELED CHAIR
Robert T. Schwartz, Takoma Park, Md., and Marc S. Harrison, Foster, R.I., assignors to American National Red Cross, Washington, D.C.
Filed Nov. 9, 1976, Ser. No. 739,860
Int. Cl.² A47C *3/04*
U.S. Cl. 297—239 **6 Claims**



1. A stackable wheeled chair comprising:
seat means;
supporting frame means carrying said seat means;
said frame means including:
a pair of laterally spaced generally inverted U-shaped leg means, and
transversely extending stringer means having laterally spaced ends secured respectively to said leg means, said seat means being carried by said stringer means intermediate said ends;
said leg means each comprising:
a front and a rear normally upstanding leg member each having upper and lower ends,
a connecting member connecting said upper ends of said front and rear leg members of each pair to each other to form said generally inverted U-shaped leg means;
a stacking member spanning said front and rear leg members in each leg means below said connecting member, and
caster means carried by said lower end of each front and rear leg member;
said front and rear leg members of each leg means diverging from said upper ends to said lower ends thereof whereby said upper ends of said front and rear leg members are closer to each other than said lower ends;
said front leg member including an upper portion terminating in said upper end and extending downwardly and forwardly therefrom, a lower portion terminating in said lower end and extending generally vertically, and an intermediate flared portion interconnecting said upper and lower portions and extending downwardly and forwardly at a greater angle to the vertical than said upper portion,
each rear leg member including an upper portion terminating in said upper end and extending downwardly and rearwardly therefrom, a lower portion terminating in said lower end and extending generally vertically, and an intermediate flared portion extending downwardly and rearwardly at a greater angle to the vertical than said upper portion,
said caster means each including a caster member comprising a wheel member, a generally horizontally extending axle rotatably supporting said wheel member, an offset wheel support member carrying said axle and including a generally vertically extending pin, said pin being rotatably supported about a generally vertically extending axis in said lower end portion of its respective leg member;
each of said stacking members comprising a generally horizontally extending portion adapted to rest on the upper surface of a connecting member of the next lower chair in a stack and a generally vertically extending portion adapted to engage against the outer side surface of a connecting member of the next lower chair in a stack to provide side-to-side security to a stack of chairs, and
each of said wheel members being adapted to engage against the upper surface of said flaring portion of a leg member of the next lower chair in a stack when the front and rear offset supports extend fowardly and rearwardly, respectively, to provide front-to-back security to a stack of chairs;
said leg means, connecting member, stacking members, flaring portions, and wheel members being so arranged and constructed that contact between leg means of stacked chairs substantially only occurs at the points at which said stacking members engage said connecting members and said wheel members engage said flaring portions to thereby preclude wedging of stacked chairs.

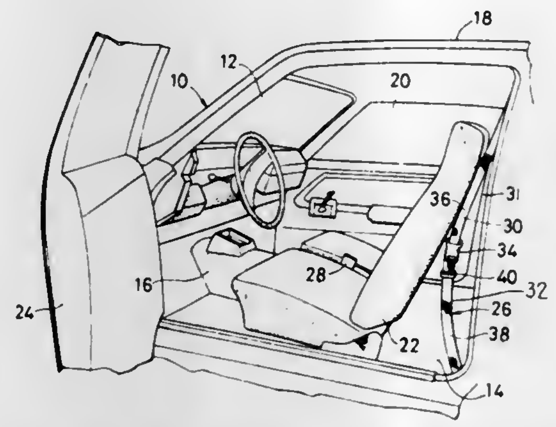
4,057,289
ROCKABLE AGAINST-THE-WALL TYPE RECLINING CHAIR
W. Dale Jones, 7020 Aztec Drive, NE., Albuquerque, N. Mex. 87110
Filed Sept. 3, 1976, Ser. No. 720,244
Int. Cl.² A47C *3/02*
U.S. Cl. 297—259 **11 Claims**



1. An against-the-wall type rackable reclining chair comprising a stationary base, carriage means mounted on said base for forward and rearward movement relative to said base between forward and rearward end limits of movement, a chair frame mounted upon said carriage means for rocking movement, a chair seat, a chair back, reclining linkage means mounting said chair seat and said chair back upon said chair frame for coordinated movement relative to said chair frame between an upright and a reclined position, and means permitting rocking movement of said chair frame on said carriage means only when said carriage is adjacent its forward end limit of movement relative to said base.

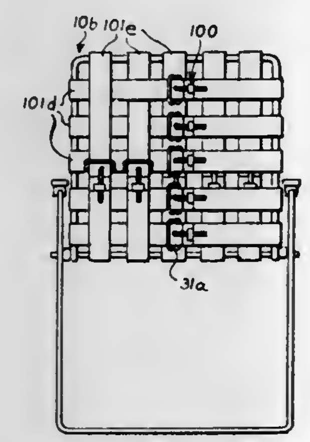
4,057,290
VEHICLE OCCUPANT RESTRAINING BELT ARRANGEMENT
Tatsuhiro Arima, Fujisawa, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan
Filed July 27, 1976, Ser. No. 709,215
Claims priority, application Japan, Sept. 8, 1975, 50-123700[U]
Int. Cl.² A44B *11/12*
U.S. Cl. 297—389 **4 Claims**

1. In a vehicle occupant restraining belt arrangement:
a strip of webbing;
a male latch plate adapted to be inserted within a female buckle, said male latch plate having an opening through which said strip of webbing is slidably disposed, said male latch plate having one end formed with said opening and an opposite end;
means for limiting movement of said male latch plate in one direction along said strip of webbing beyond a predetermined position on said strip of webbing, said limiting means comprising a slide member having an eye means for



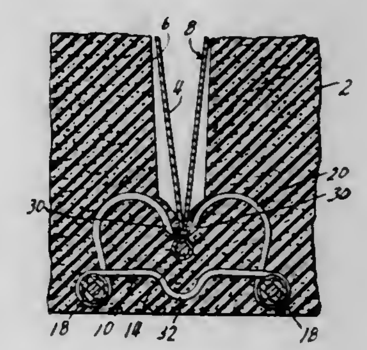
receiving said strip of webbing with suitable resistance for slidably positioning said slide member on said strip of webbing, said slide member further comprising slot means for receiving the opposite end of said male latch plate to hold said male latch plate substantially parallel to said strip of webbing.

4,057,291
REMOVABLE COVER FOR OUTDOOR-TYPE CHAIRS
Emanuel Dubinsky, 99 Kingston Ave., Yonkers, N.Y. 10701
Continuation-in-part of Ser. No. 538,455, Jan. 3, 1975, Pat. No. 4,010,980. This application July 15, 1976, Ser. No. 705,611
Int. Cl.² A47C *4/30*
U.S. Cl. 297—441 **5 Claims**



1. A removable cover for a chair having a frame having a seat portion and a back portion, said cover comprising a first plurality of straps extendable about said frame, each of said straps having separable and lockably interconnectable first and second corresponding ends having through apertures therein and a tension adjusting means insertable through and cooperable with said first and second corresponding end apertures for lockably interconnecting said strap about said frame at a desired tension level, said first corresponding end of each of said first plurality of straps comprising a plurality of said through apertures longitudinally spaced apart along the length of said strap by a predetermined distance therebetween and an adjustable slide buckle means having a plurality of spaced apart cross bar members through which said first corresponding end of said strap is adjustably and lockably threadable for varying the longitudinal length of said strap, said second corresponding end of each of said first plurality of straps comprising at least one through aperture and a reinforcement bar means adjacent said one aperture capable of substantially evenly distributing tension applied thereto for providing tension bearing support for said one aperture, one of said plurality of apertures in said first corresponding end being positionable adjacent said cross bar member closest to the adjusted end length of said strap for each variable length of said strap, said closest cross bar member adjacent said positionable one aperture being further capable of substantially evenly distributing tension applied thereto for providing tension bearing support for said positionable one aperture for enabling said slide buckle means to provide both strap size adjustability and tension bearing support for said positionable one aperture, said tension adjusting means comprising a buckle-type closure larger in size than said strap apertures and having an aperture therein with a pawl-like means extending into said closure aperture and a longitudinally serrated ratchet-type strip having a plurality of longitudinally extending serrations therein and extendable into said buckle-type closure aperture with said serrations being engageable with said pawl-like means in ratchet fashion, said ratchet-type strip being insertable through said strap first corresponding end positionable one aperture and said second corresponding end one aperture and said buckle-type closure aperture and interlockable therein by said ratchet fashion engagement of said pawl-like means with said serrations for adjusting the tension of said lockably interconnected straps and holding said tension at a desired level, said pawl-like means being sequentially engageable with said longitudinal serrations during said adjustment of said strap tension, said interlockable ratchet-type strap bearing on tension against said reinforcement bar and said slide buckle means closest cross bar member both during adjustment of said tension and during holding of said tension at said desired level, whereby the tension applied to said first corresponding end positionable one aperture and said second corresponding end one aperture is substantially evenly distributed between said strap first and second corresponding ends, said first plurality of straps being extendable substantially parallel to each other with spaces between adjacent straps when said straps are extended about said frame, and a second plurality of straps extendable about said frame over some of said first plurality of straps and under some other of said first plurality of straps in a woven-like configuration, said first and second plurality of straps being cooperable in said woven-like configuration in a position for covering said back and seat of said chair.

4,057,292
TRIM RETAINER DEVICE FOR UPHOLSTERED CUSHIONS
Harmon W. Arnold, Carthage, Mo., assignor to Flex-O-Lators, Inc., Carthage, Mo.
Filed June 11, 1976, Ser. No. 695,087
Int. Cl.² A47C *7/02, 7/18*
U.S. Cl. 297—452 **10 Claims**



1. In combination with an upholstered seat assembly including a pliable trim sheet assembly covering a foam seat cushion pad of said seat assembly, said pad having a deep groove formed in the top surface thereof along a line thereof along which said trim sheet assembly is to be secured thereto, and said trim sheet assembly having a listing portion extending along said line and depending into said groove, a retainer assembly for securing said trim sheet assembly to said pad, said retainer assembly comprising:
a. an elongated support structure molded in said pad generally along the base of said groove, and

b. a series of pairs of resilient claw teeth mounted on said support structure in spaced relation along the length thereof, the teeth of each of said pairs being laterally spaced relative to said groove and meeting substantially at the longitudinal midline thereof, whereby when said listing portion of said trim sheet assembly is pressed into said groove and between said pairs of teeth, it forces the teeth of each of said pairs of teeth resiliently apart, whereupon the elastic recovery of said teeth causes the points of said teeth to engage and retain said trim sheet listing therebetween.

4,057,293

PROCESS FOR IN SITU CONVERSION OF COAL OR THE LIKE INTO OIL AND GAS

Donald E. Garrett, 505 W. 9th St., Claremont, Calif. 91711

Filed July 12, 1976, Ser. No. 704,236

Int. Cl.² E21C *41/00*

U.S. Cl. 299—2 **15 Claims**

1. A process for the in situ gasification of coal, or similar hydrocarbon solid, by means of a reversing cycle oxygen-steam system, the process comprising the steps of:

a. forming at least one retorting room in a coal deposit by segregating an area from surrounding areas by means of substantially impervious walls to prevent substantial gas leakage from said retorting room, said retorting room having a roof defined by the coal deposit and further having a gas inlet passage and a gas outlet passage;

b. blasting within said retorting room to effect at least a partial roof collapse to form a substantially homogeneous, porous rubblized coal mass in said retorting room;

c. introducing oxygen-containing gas in said gas inlet passage of the retorting room and initiating and conducting pyrolysis of the coal mass at a temperature of between about 900° and about 2500° F.;

d. withdrawing oil and gas products from the pyrolysis through said gas outlet passage of the retorting room;

e. after substantial completion of the pyrolysis conducted in step (c) and product withdrawal from step (d), reversing the direction of gas flow through the retorting room by introducing steam into said gas outlet passage thereby to effect a water-gas reaction with residual carbon in said retorting room to produce a relatively high BTU gas product and

f. withdrawing said relatively high BTU gas product from the water-gas reaction through said gas inlet passage of the retorting room.

4,057,294

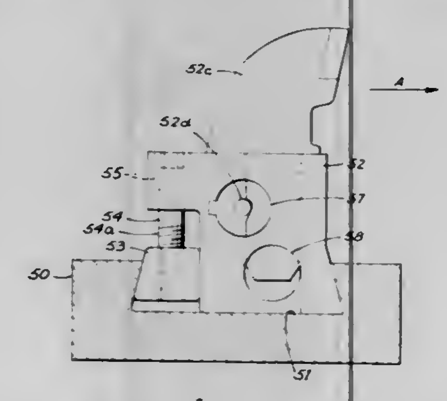
WEDGE ARRANGEMENT FOR REMOVABLY AFFIXING A WORK TOOL OR WORK TOOL HOLDER TO A BASE MEMBER ON MINING, ROAD WORKING OR EARTH MOVING MACHINERY, AND THE LIKE

Claude B. Krekeler, Cincinnati, Ohio, assignor to The Cincinnati Mine Machinery Company, Cincinnati, Ohio

Filed Aug. 1, 1975, Ser. No. 601,035

Int. Cl.² E21C *13/00*

U.S. Cl. 299—93 **71 Claims**



1. In mining, road working and earth moving machinery a wedging arrangement for removably affixing a work tool holder to a base member, said arrangement comprising: one of said base member and said work tool holder having a slot therein, the other of said base member and said work tool holder being received in said slot; a wedge element in said slot; and holding means to hold said wedge element in said slot in wedging engagement with both of said work tool holder and said base member.

4,057,295

SILO HAVING A CYLINDRICAL WALL AND A DISCHARGE DEVICE

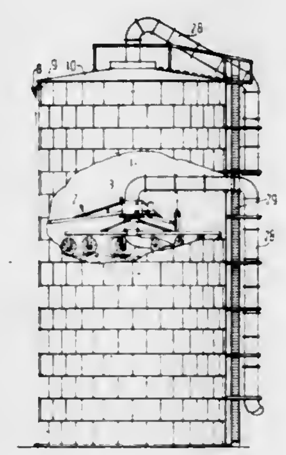
Fredericus Liet, and Cornelis Hendrikus Liet, both of Losser, Netherlands, assignors to Trioliet-Mullos Silo Nederland B.V., Losser, Netherlands

Filed July 21, 1975, Ser. No. 597,510

Claims priority, application Netherlands, July 22, 1974, 7409901

Int. Cl.² B65G *53/50*

U.S. Cl. 302—56 **4 Claims**



1. In a silo having a cylindrical wall for containing material such as ensilage, a frame disposed within said silo and including a bearing disposed centrally of the silo, means for raising and lowering said frame within said silo, a delivery tube rotatably journalled in said bearing and having an inlet section extending radially outwardly therefrom and terminating in an inlet mouth at a position located between the center of said silo and said cylindrical wall and in spaced relation to both, means for rotating said delivery tube so that said inlet mouth follows a circular path at said position, and conveying means rotated with said delivery tube and having first conveying elements disposed radially outwardly of said path for feeding ensilage inwardly from said cylindrical wall to said path followed by said inlet mouth and second conveying elements disposed radially inwardly of said path for feeding ensilage outwardly from the center of the silo to said path followed by said inlet mouth, said conveying means comprising a plurality of radially extending and circumferentially spaced arms, said first and second conveying elements being formed as wheels connected to said arms, and rigid rake elements depending from said arms and projecting below said wheels, said rake elements being movable to positions in which they do not project below said wheels.

4,057,296

BRAKE CONTROL VALVE ASSEMBLY FOR EFFECTING INCREASED REAR BRAKING ACTION UPON MALFUNCTION OF THE FRONT SYSTEM

Hiroyuki Oka, and Masashi Ishihara, both of Toyodashi, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Japan

Filed Sept. 13, 1976, Ser. No. 722,501

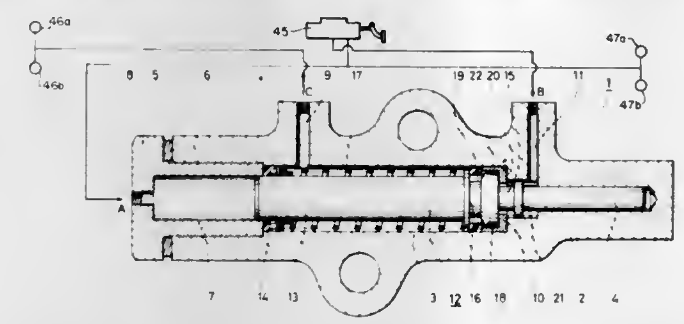
Claims priority, application Japan, Sept. 17, 1975, 50-112422

Int. Cl.² B60T *8/26*

U.S. Cl. 303—6 C **9 Claims**

1. A brake control valve assembly comprising a cylinder

defined by a cylinder casing; a first pressurized brake fluid feed port formed in said cylinder casing for communication with a rear master cylinder; a first pressurized brake fluid discharge port in said cylinder casing for communication with at least one rear wheel cylinder; a piston having a rear end and a front end fitted within said cylinder, said piston being provided between its said ends with a head flange and a spring-receiving flange spaced from one another; a rear seal about said piston in the vicinity of said rear end; a spring between said spring-receiving flange and said rear seal; a seal valve interposed



about said piston between said head flange and said spring-receiving flange; a carrying flange formed on said piston and spaced from said head flange of said piston towards its said front end; and a piston sleeve disposed loosely about and between said head flange and said carrying flange, said brake fluid feed port being in fluid communication with space within said cylinder casing between said front end of said piston and said carrying flange and said fluid discharge port being in fluid communication with space within said cylinder casing between said spring-receiving flange and said rear seal.

4,057,297

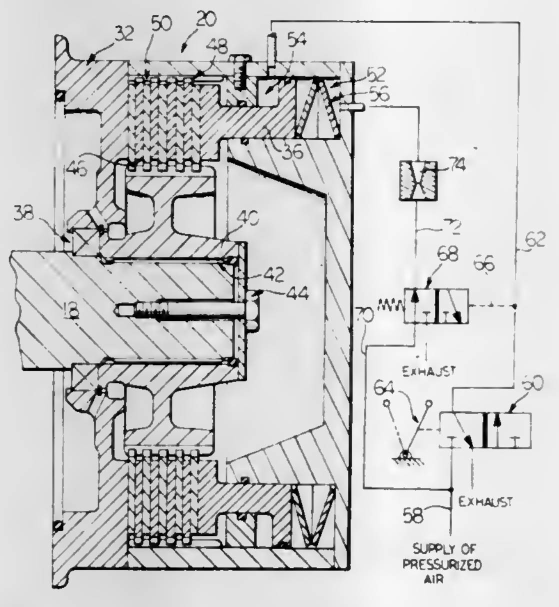
BRAKE MECHANISM WITH SPRING APPLIED FLUID PRESSURE RELEASED ASSEMBLY

Henry E. Beck, Oswego, and Terry R. Collins, Lewistown, both of Ill.

Filed June 28, 1976, Ser. No. 700,242

Int. Cl.² B60T *13/22*

U.S. Cl. 303—71 **1 Claim**



1. A brake mechanism comprising:

a body;

a piston movable relative to the body in a first braking direction and in a second brake-releasing direction, and defining with the body a first chamber;

spring means disposed within the first chamber and operatively connected with the piston and body for urging the piston in a brake-applying direction;

a first valve for selectively directing pressurized fluid into said first chamber to urge the piston in a brake-applying direction in addition to the urging thereof by the spring means, and for selectively allowing release of fluid pressure from the first chamber;

the body and piston defining a second chamber, introduction of pressurized fluid to the second chamber urging the piston in the brake-releasing direction against the resilience of the spring means;

a second valve for selectively directing pressurized fluid into said second chamber, and for selectively allowing release of fluid pressure from the second chamber;

means for providing that the first valve is directly responsive to release of fluid pressure from the second chamber to direct pressurized fluid into the first chamber and responsive to direction of pressurized fluid to the second chamber to release pressurized fluid from the first chamber; and

orifice means through which pressurized fluid is applied from the first valve to the first chamber for delaying full application of pressurized fluid to the first chamber upon release of fluid pressure from the second chamber.

4,057,298

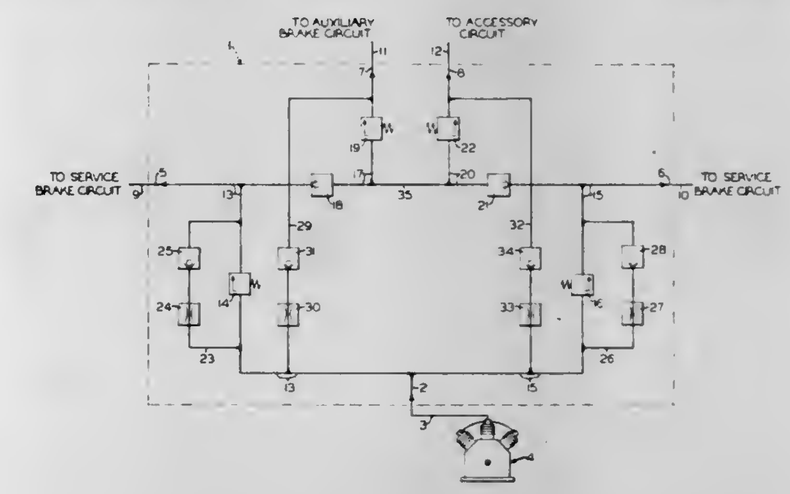
SAFETY VALVE DEVICE FOR MULTIPLE CIRCUIT FLUID PRESSURE OPERABLE BRAKE SYSTEM

Güenter Seegers, Barsinghausen, Germany, assignor to WABCO Westinghouse GmbH, Hannover, Germany

Filed Feb. 24, 1977, Ser. No. 771,767

Int. Cl.² B60T *17/18*

U.S. Cl. 303—84 R **6 Claims**



1. A safety valve device for a multiple fluid pressure operable brake system, said safety valve device comprising:

a. a casing having an inlet port connected to a source of fluid under pressure and a plurality of outlet ports connected to a plurality of fluid pressure circuits each requiring a predetermined degree of operating fluid pressure, respectively, said circuits being communicable with said inlet port via supply passageways;

b. respective cut-out valves interposed in said supply passageways between said fluid pressure circuits and said inlet port and being operable to respective open positions responsively to fluid pressure in the supply passageways at degrees corresponding to those required by the pressure circuits, respectively, for opening communication through the supply passageways between said pressure circuits and said inlet port;

c. bypassing passageways means interposed in said supply passageways for providing restricted flow of fluid pressure from said inlet to said fluid pressure circuits in bypassing relation to the cut-out valves, respectively; and

d. a plurality of check valves interposed, respectively, between said several fluid pressure circuits for providing flow of fluid pressure thereto in one direction from said supply passageways and for inhibiting flow of fluid pressure in an opposite direction from certain selected ones of said circuits to the remaining circuits in the event of failure of fluid pressure in said certain selected ones of said circuits.

4,057,299

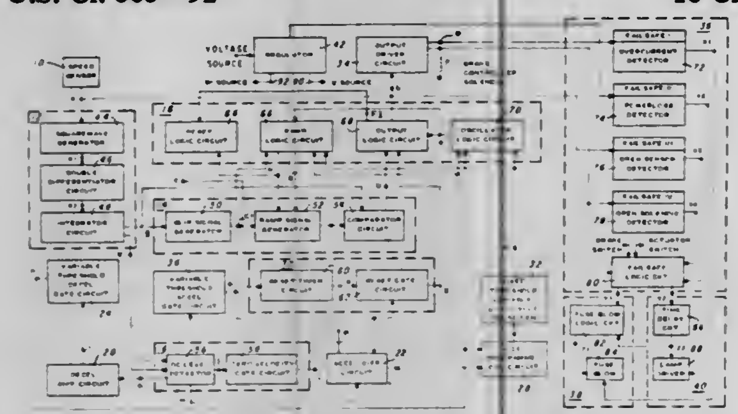
FAIL SAFE CIRCUIT FOR VEHICLE SKID CONTROL BRAKE SYSTEM

James J. Jones, Plano, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Division of Ser. No. 266,798, June 27, 1972, Pat. No. 3,982,793. This application Aug. 9, 1976, Ser. No. 712,638

Int. Cl.² B60T *8/02*

U.S. Cl. 303—92 **10 Claims**



1. A vehicle brake control system for selectively controlling the engagement and disengagement of a brake system of a vehicle in accordance with selected braking conditions, comprising in combination:

first signal means for generating a first control signal when the relationship between signals representing vehicle speed and vehicle wheel speed is at a predetermined condition;

second signal means for generating a second control signal when the vehicle wheel speed rate of change is at a first value and a third control signal when the vehicle wheel speed rate of change is at a second value;

third signal means for generating a fourth control signal proportional to selected conditions of said vehicle wheel speed after said first and second values are reached;

logic means selectively responsive to said first, second, third and fourth control signals for disengaging the vehicle brake system when said predetermined condition and said first value are reached, and sequentially engaging and disengaging the vehicle brake system when said predetermined condition and said second value are reached; and

failsafe means for monitoring the operation of the system and for selectively providing visual and audible signals indicative of system failure and for disconnecting system power so as to prevent damage to the components thereof.

4,057,300

MOTOR VEHICLE BRAKING SYSTEM

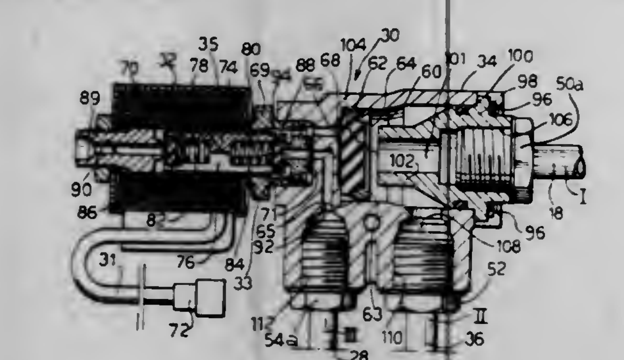
Giancarlo Michellone, Cambiano (Turin), and Virginio Maggioni, Rosta (Turin), both of Italy, assignors to FIAT Societa per Azioni, Turin, Italy

Filed Oct. 14, 1976, Ser. No. 732,224

Claims priority, application Italy, Oct. 31, 1975, 69706/75

Int. Cl.² B60T *8/04*

U.S. Cl. 303—113 **5 Claims**



1. In a fluid operated motor vehicle braking system for at least two wheels of one axle of the vehicle, of the type comprising

main braking pressure generating means,

means for applying braking pressure from said main braking pressure generating means to brake actuators of both wheels of said axle for simultaneous braking of said two wheels of said axle,

auxiliary braking pressure generating means, and

means for applying a reduced braking pressure generated by said auxiliary braking pressure generating means to one of said wheels of said axle if its dynamic state approaches a skid or incipient skid state, while continuing to apply the full braking pressure to the other wheel of said axle if it is not in a skid or an incipient skid state,

the improvement wherein:

said means for applying a reduced braking pressure generated by said auxiliary braking pressure generating means comprises:

distribution means associated with each wheel of said axle, said distribution means including,

an electrovalve,

a distributor,

a first port of said distributor connected to said main braking pressure generating means,

a second port of said distributor connected to a brake pipe leading to the brake actuator of an associated wheel of said axle,

a third port of said distributor connected to a conduit leading to said auxiliary braking pressure generating means,

a main chamber of said distributor,

a main valve shutter slidingly housed in said main chamber and separating said main chamber into first and second compartments said first compartment communicating with both said first and said second ports,

means defining a first communication passage leading from said second compartment to said electrovalve,

means defining a second communication passage leading from said third port to said electrovalve,

a valve shutter of said electrovalve controlling communication between said first communication passage and said second communication passage whereby to close communication between said third port and said second compartment of said main chamber when said electrovalve is in a first operating position and to open such communication when said electrovalve is in a second operating position, said main shutter being displaced by pressure in said second compartment of said main chamber when said electrovalve is in said second operating position whereby to close communication between said first and said second ports and to open communication between said third and said second ports.

4,057,301

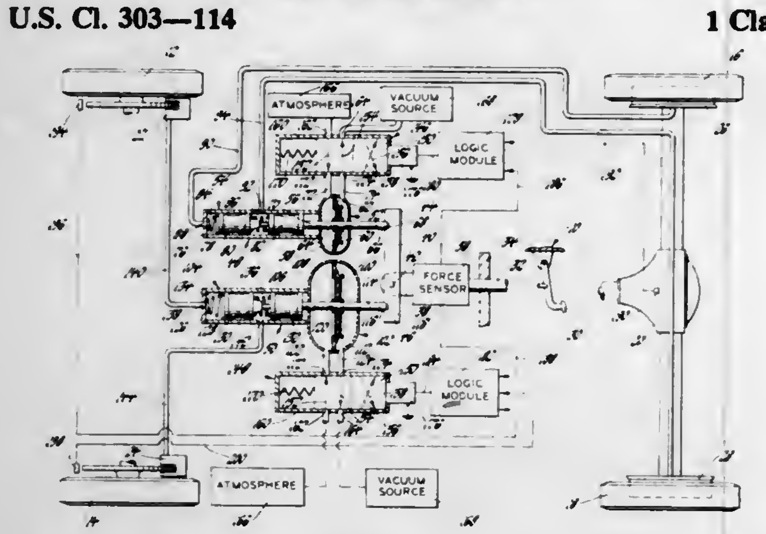
BRAKE SYSTEM

David J. Foster, Rochester, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed June 21, 1976, Ser. No. 697,954

Int. Cl.² B60T *8/04*

U.S. Cl. 303—114 **1 Claim**



1. A brake system comprising:

first and second brake booster and master cylinder assemblies each including a brake booster having a power wall adapted to be exposed to differential pressures acting thereacross and in one condition urging the power wall to a brake release position and in another condition urging the power wall to a master cylinder actuating position, and a master cylinder variably actuatable by said power wall in its master cylinder actuating position and connected to actuate a wheel brake for braking a wheel having a wheel speed sensing means associated therewith;

first and second pressure sources operatively connected to said boosters to provide the differential pressures on opposite sides of said power walls;

control means including first and second valve mechanisms for respectively controlling the application of the differential pressures from said sources to opposite sides of the power walls of the first and second boosters, said valve mechanism in one condition selectively applying the higher of said differential pressures to one side and the lower of said differential pressures to the other side of the power walls to urge the power walls to their brake release positions and in another condition selectively applying the higher of said differential pressures to the other side and the lower of said differential pressures to the one side of each of the power walls to urge the power walls toward their master cylinder actuating positions;

and signal generating means for generating signals controlling said control means in accordance with applied brake force, said signal generating means including a sensor generating a wheel deceleration demand signal responsive to manual operating force delivered to said brake booster and master cylinder assemblies, said wheel deceleration demand signal actuating the master cylinders boosted by said brake boosters to the extent differential pressures are selectively applied across said power walls by said valve mechanisms;

said signal generating means further including first and second logic control means respectively for said first and second valve mechanisms, said first and second logic control means receiving signals from said wheel deceleration demand sensor and respectively from said wheel speed sensing means of said first and second brake booster and master cylinder assemblies and independently acting upon the receipt of a signal from the associated wheel speed sensing means indicating actual wheel deceleration in excess of the demanded wheel deceleration to independently operate said first and second valve mechanisms to independently apply the differential pressures to opposite sides of a related power wall while in its master cylinder actuating position in a manner to decrease the actuation of the master cylinder by said related power wall.

4,057,302

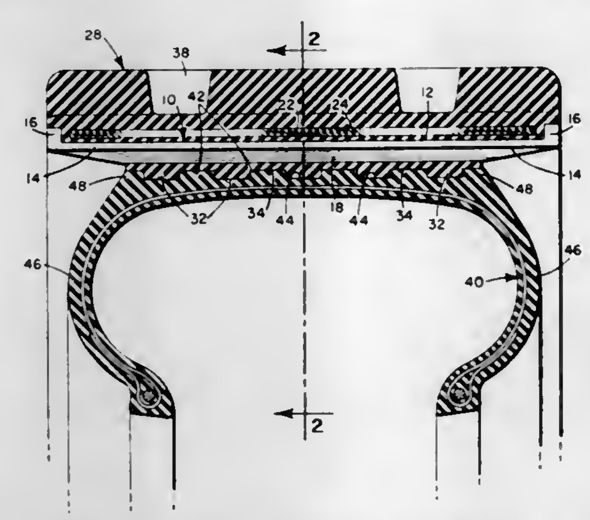
REMOVABLE TREAD BELT

V. A. Caravito, Uniontown, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Jan. 5, 1976, Ser. No. 646,434

Int. Cl.² B62D *55/24*

U.S. Cl. 305—19 **15 Claims**



1. A removable tread belt for installing about the circumferential outer surface of a tire carcass comprising:

an annular belt matrix of axial width greater than that of said circumferential outer surface of said tire whereby said belt matrix will extend outwardly beyond the edges of said circumferential outer surface,

a plurality of rigid bars installed in said belt matrix around the circumference thereof, each of said bars extending across the entire axial width of said belt matrix and being oriented parallel to a plane through the axis of rotation of the tire carcass, each said bar comprising a main portion oriented substantially perpendicular to a radius of said tire carcass and a rib oriented substantially radially of said tire, said main portion having a substantially rectangular cross-section with the long axis thereof oriented perpendicularly to a radius of the tire carcass and having a substantially unbroken bar outer surface distal said tire carcass extending across the axial width of said bar,

an inextensible annular belt installed in said belt matrix and located radially outwardly of said bar outer surface,

a ground contacting tread pattern on the outer circumferential surface of said belt matrix, and

interlocking structure on the inner surface of said belt matrix for engaging complementing interlocking structure carried by the tire carcass.

4,057,303

DRAWER GUIDE

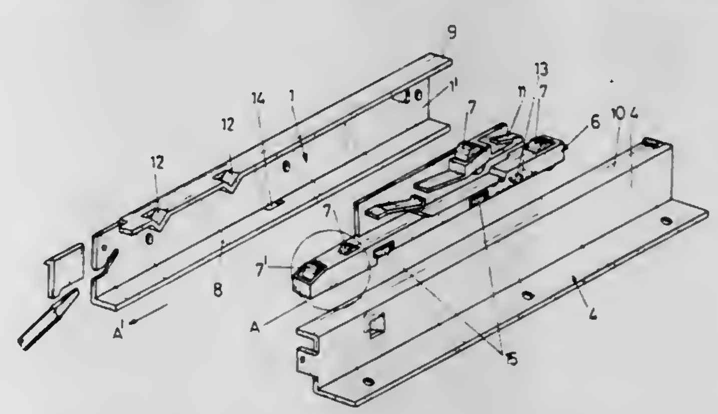
Erich Röck, Hochst, and Bernhard Mages, Dornbirn, both of Austria, assignors to Julius Blum Gesellschaft mbH, Hochst, Austria

Filed May 20, 1976, Ser. No. 688,482

Claims priority, application Austria, May 23, 1975, 3950/75

Int. Cl.² F16C *29/02*

U.S. Cl. 308—3.6 **9 Claims**



1. A drawer guide assembly for a drawer positionable in a structure employing support rail means disposed on each side of said structure in cooperative working relation with guide rail means positioned on each side of the drawer, said quide assembly including: roller means carried in a floating roller carrier means being operable with respect to the said guide assembly, said roller carrier means having additional roller means co-acting with said guide assembly and in tandem arrangement to said roller means to thereby increase the load characteristics of said drawer.

4,057,304

HEAVY DUTY RESILIENT COUPLING ASSEMBLY

Donald R. Gaines, Farmington Hills; Jon M. Smallegan, Ann Arbor, and William H. Trudeau, Brighton, all of Mich., assignors to Gulf & Western Manufacturing Company, Southfield, Mich.

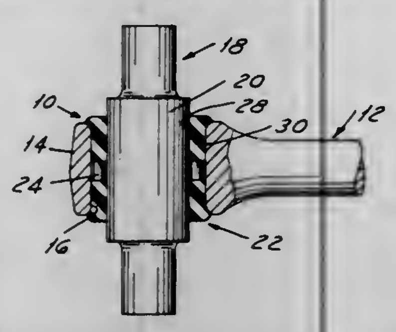
Filed Nov. 1, 1976, Ser. No. 737,071

Int. Cl.² F16C *9/04*

U.S. Cl. 308—237 A **19 Claims**

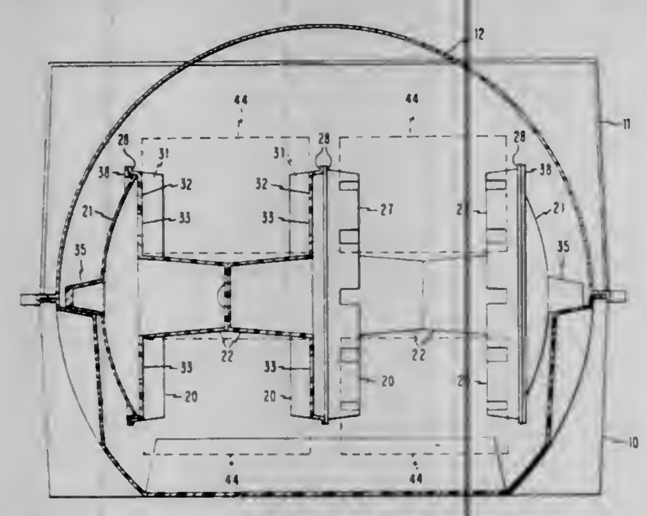
1. A resilient coupling assembly comprising a housing member having a generally cylindrical bore opening to the exterior thereof, a shank member having a generally cylindrical portion received in said bore with an annular space between said bore and said cylindrical portion of said members, a one-piece circumferentially continuous bushing of a resilient elastomeric material received between said members and constructed and arranged with a generally circular outer surface portion in engagement with said cylindrical bore of said housing member and a generally inner surface portion in engagement with said cylindrical portion of said shank member, said bushing having

a plurality of circumferentially spaced retainer passages each extending generally radially through said bushing and opening into both said cylindrical bore and said cylindrical portion of said members, and a plurality of bearing inserts each received in only one of said retainer passages and between said cylindrical bore and cylindrical portion of said members, each of said



bearing inserts being dimensioned to provide a clearance between each bearing insert and said cylindrical bore and cylindrical portion of said members when said members are unloaded, said bushing being compressible to at least the extent of said clearance without rupture of said resilient elastomeric material.

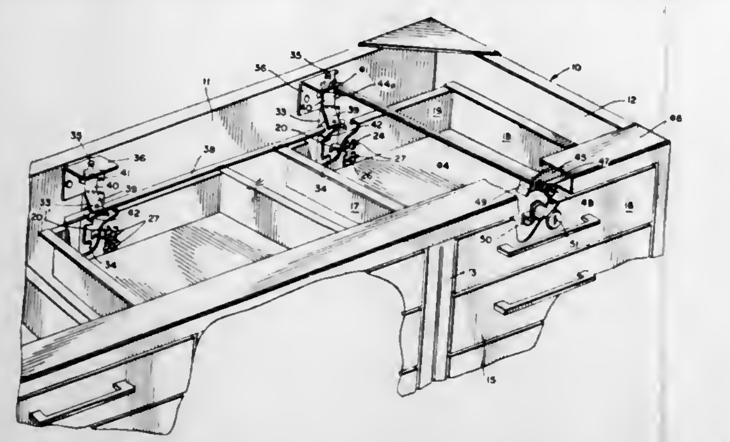
4,057,305
ROTATABLE CASSETTE HOLDER
William Thomas Zdeblick, Park Ridge, Ill., assignor to International Business Machines Corporation, Armonk, N.Y.
Filed May 10, 1976, Ser. No. 684,994
Int. Cl.² A47B *81/06;* **A47F** *1/04;* **G11B** *1/00;* **B65D** *85/672*
U.S. Cl. 312—11 **10 Claims**



1. A recording tape cassette container comprising
a base member presenting horizontally spaced trunion supporting surfaces formed about a horizontal axis;
a cassette retaining holder including horizontally spaced trunion projections mounted on said base member supporting surfaces for rotation about a horizontal axis;
spaced opposed channels including web and flange surfaces formed in said holder for receiving tape cassettes in angularly spaced, spoke-like relation about said horizontal axis; and
retaining means in said opposed channel web surfaces for releaseably securing said cassettes respectively in said spaced, opposed channels.

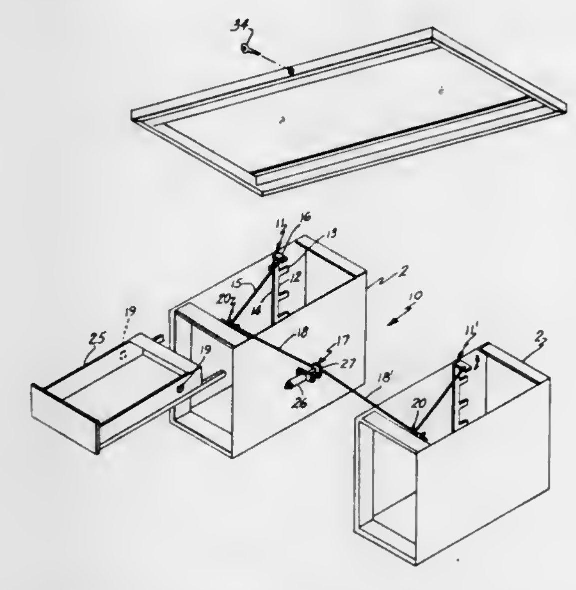
4,057,306
GANG LUCK ASSEMBLY FOR CABINET DRAWERS
Alvin Charles Resch, Jr., Two Rivers, Wis., assignor to American Hospital Supply Corporation, Evanston, Ill.
Filed June 17, 1976, Ser. No. 697,248
Int. Cl.² E05B *65/46*
U.S. Cl. 312—218 **8 Claims**

1. A gang lock assembly for locking a plurality of drawers in a cabinet, each drawer being slidably mounted in the cabinet for movement between a closed position and an open position in which the drawer extends forwardly from the front of the cabinet, the gang lock assembly comprising a latch mounted on the rear end of each drawer, a vertically extending locking bar pivotally mounted on the cabinet behind each drawer for pivoting movement about a vertical axis, each locking bar being pivotable between a locking position in which the locking bar is engageable with the latch on the drawer forwardly of the bar when the drawers are in their closed position to prevent movement of the drawers to their open position and an unlocking position in which the locking bar is not engageable with the latch on the drawer forwardly of the bar, an actuating rod mounted on the cabinet and connected to the locking bar



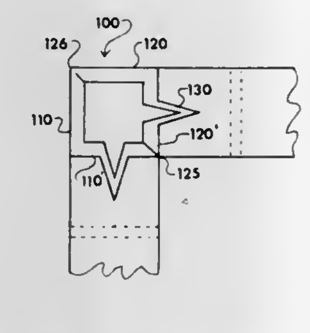
behind one of the drawers, the actuator rod being movable between a forward position in which the locking bar is in its unlocking position and a rearward position in which the locking bar is in its locking position, and cam means on said one drawer engageable with the actuator rod for moving the actuator rod to its rearward position when said one drawer moves to its closed position whereby the actuator rod pivots the locking bar to its locking position.

4,057,307
LOCKING SYSTEM LINKAGE ADJUSTMENT
Douglas Scheerhorn, Grand Rapids, Mich., assignor to Steelcase Inc., Grand Rapids, Mich.
Filed July 22, 1976, Ser. No. 707,860
Int. Cl.² E05B *65/46*
U.S. Cl. 312—219 **13 Claims**



1. A locking system for locking the drawers, doors or like components of a desk pedestal or like compartment, said drawers, doors or like components including a lock stop, said locking system comprising;
a primary locking means having a first movable member selectively movable to a first locking position and to a second unlocking position;
a secondary locking means having a second movable member selectively moveable to a first locking position engaging said lock stop and to a second unlocking disengaging said lock stop position;
a spring clip;
a linkage member coupled to said first moveable member of said primary locking means by said spring clip and to said second moveable member of said secondary locking means for coupling movement between said first and second movable members; and
said spring clip being releaseably coupled to one of said linkage member and said first moveable member and being coupled to the other thereof, said one of said linkage and first moveable members having sufficient length that said spring clip can be releaseably secured in a plurality of different positions along said length so that the position of said spring clip can be changed thereby changing the effective length of said linkage member and effecting adjustment between the relative positions and movements of said first and second movable members of said primary and secondary locking systems.

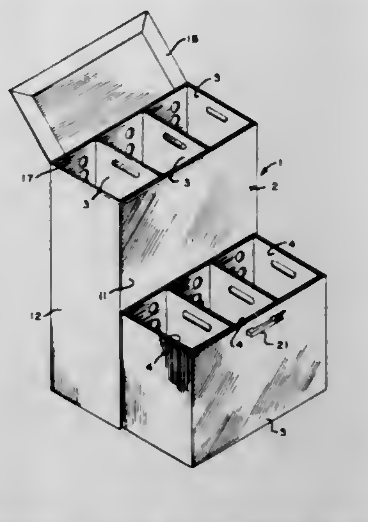
4,057,308
COLLAPSIBLE WALL STRUCTURE FOR CABINETS OR CHESTS
John M. Dunning, III, Greensboro, N.C., assignor to Dunning, Ltd., Sanford, N.C.
Filed May 27, 1976, Ser. No. 690,399
Int. Cl.² A47B *43/00*
U.S. Cl. 312—262 **2 Claims**



1. A foldable wall structure for prefabricated cabinet or chest enclosures comprising:
a. a base wall having front and rear surfaces;
b. a pair of opposing side walls each having inner and outer surfaces;
c. a foldable hinge means permanently secured to said wall structure and connecting said base wall to each of said walls along adjacent edges;
d. said hinge means including an elongated, rectangular, tubular plastic extrusion extending transversely to the longitudinal axis of said base wall and side walls, said rectangular extrusion being formed of a pair of perpendicularly arranged outer walls and a pair of perpendicularly arranged inner walls, said inner and outer walls being connected together to form said rectangular extrusion, said plastic extrusion being at least partially continuous between the adjacent edges of said exterior walls and being completely discontinuous between adjacent edges of said interior walls, and a means for connecting each of said interior walls to the adjacent edge of one of said side walls and said adjoining edge of said base wall, whereby said extrusion hingedly connects a side edge of said base wall to the adjacent side edge of each of said side walls; and
e. said side walls being foldable around said hinge means between a first, erect position wherein said side walls extend perpendicularly forward from the edges of said base wall and a second, shipping/storage position wherein said side walls are folded substantially 270° from said first position to lie flat against the rear surface of said base wall.

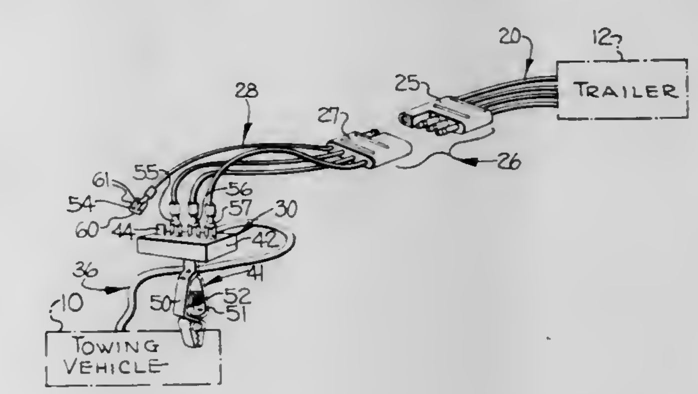
4,057,309
CLOTHES HAMPER
Eleanor M. Fragale, 4931 Fairview, St. Louis, Mo. 63139
Filed July 6, 1976, Ser. No. 702,919
Int. Cl.² A47B *81/00, 43/02*
U.S. Cl. 312—290 **9 Claims**

1. A clothes hamper comprising a rectangular main container having front, side, back and bottom walls, an open top, and a hinged cover for said open top, said front wall having an opening extending substantially from side wall to side wall in its lower part, and a central horizontal partition shelf defining an upper, open-topped compartment and a lower, open-fronted compartment; a plurality of upper, open-topped, free-standing sub-containers removably mounted in said upper compartment for insertion into and removal from said compartment vertically, and a plurality of lower, open-topped, free-standing sub-containers mounted in said lower compartment for movement into and out of said lower compartment laterally through said front wall opening, each of said sub-containers being



dimensioned to receive a wash machine load of a type of laundry, said sub-containers in each of said compartments being immediately contiguous one another and collectively contiguous the entire inner wall of said compartment when mounted within said compartments, and each sub-container being removable from and replaceable in said compartment individually, without moving any other sub-container.

4,057,310
ELECTRICAL COUPLING APPARATUS
Clyde J. Young, Rte. 2, Box 165A, Laurel Hill, N.C. 28351
Filed Sept. 14, 1976, Ser. No. 723,145
Int. Cl.² B60D *1/08*
U.S. Cl. 339—10 **5 Claims**



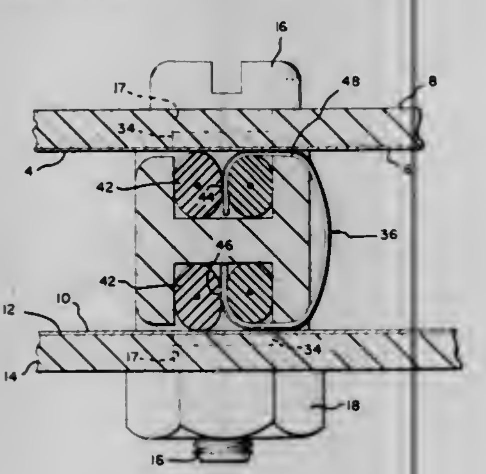
1. An electrical coupling apparatus for interconnecting respective first and second multi-conductor electrical circuits of releasably interconnected vehicles, such as an automobile and trailer, and having provision for assuring a desired connection between the several conductors in said first and second circuits, said apparatus comrising
polarized coupling means for releasably interconnecting said first and second circuits with a fixed predetermined arrangement of the several conductors thereof, and
universal coupling means interposed between said polarized coupling means and one of said first and second circuits for selectively and releasably interconnecting the conductors of said one circuit and the conductors of an intermediate multi-conductor electrical circuit, said universal coupling means comrising
a. an electrically insulating support,
b. a plurality of spaced apart, electrical contacts carried by said support, with each conductor of one of said one circuit or said intermediate circuit being electrically connected to separate ones of said contacts,
c. a plurality of individual terminals, with each conductor of

the other of said one circuit or said intermediate circuit being electrically connected to separate ones of said terminals,

d. means for releasably interconnecting each of said terminals with any one of said contacts, whereby said terminals may be selectively interconnected to said contacts in any desired arrangement; and

e. electrically conductive clamping means for releasably attaching said support to the frame of one of said vehicles, said clamping means being electrically connected with one of said contacts for thereby providing a common ground for the two vehicles.

4,057,311
ELASTOMERIC CONNECTOR FOR PARALLEL CIRCUIT BOARDS
William Robert Evans, Clemmons, N.C., assignor to AMP Incorporated, Harrisburg, Pa.
Filed Nov. 11, 1976, Ser. No. 740,981
Int. Cl.² H05K *1/12*
U.S. Cl. 339—17 M **5 Claims**



1. An electrical connecting device for connecting a first plurality of panel conductors on a first panel-like member to a second plurality of panel conductors on a second panel-like member, said connecting device comprising:

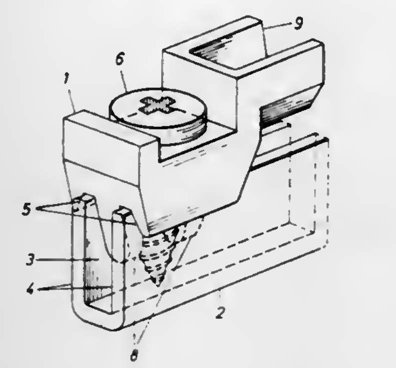
a generally prismatic connector housing body of rigid insulating material, said body having oppositely directed first and second sides and having a third side which is between said first and second sides, each of said first and second sides having a trough-like recess therein,

first and second elastomeric body means in said recesses in said first and second sides respectively, each of said elastomeric body means comprising two elastomeric bodies in side-by-side relationship in one of said recesses, each of said elastomeric body means having projecting surface portions which project beyond said first and second sides respectively,

a flexible circuit having opposite edge portions, said edge portions being held between said elastomeric bodies in each of said recesses and extending over said projecting surface portions of said elastomeric body means, said flexible circuit having intermediate portions which extend over said third side of said housing body,

said flexible circuit having parallel spaced-apart flexible circuit conductors thereon extending between said opposite edge portions whereby, upon mounting said panel-like members in parallel spaced-apart relationship with said first conductors opposed to said second conductors and with said connecting device between said panel-like members, said projecting portions of said elastomeric body means will be compressed towards said first and second surfaces, and said flexible circuit conductors will be urged against said panel conductors and said first panel conductors will be electrically connected to said second panel conductors.

4,057,312
CONNECTING DEVICE AT A BUS BAR
Kjell Gustaf Roland Hagermo, Skarholmen, Sweden, assignor to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden
Filed Aug. 6, 1976, Ser. No. 712,208
Claims priority, application Sweden, Sept. 5, 1975, 7509890
Int. Cl.² H01R *9/10*
U.S. Cl. 339—21 R **5 Claims**

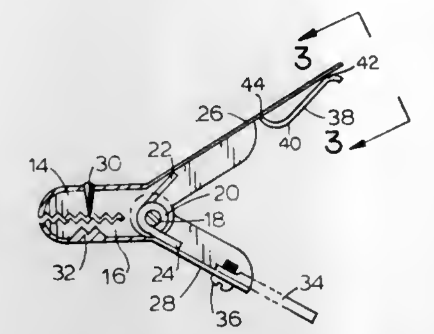


1. A U-shaped bus bar and a connecting device for connecting an electric wire to said U-shaped bus bar, said bus bar having a first wall and a second wall, and a groove defined therebetween, said connecting device comprising: a connecting piece for connection to the bus bar having a main portion, a first surface extending downwardly from said main portion at one side thereof, a second surface extending downwardly from said main portion at the other side thereof so as to form an open gap therebetween with said first surface, each of said first and second surfaces having sloping surfaces which slope inwardly from the bottom thereof to the top thereof toward the other of said first and second surfaces, the distance between corresponding points on said sloping surfaces gradually decreasing so that along corresponding portions of said surfaces the distance therebetween is greater than the distance between the outer parts of said first and second walls of said bus bar and along the remaining corresponding portions of said surfaces the distance therebetween is less than the distance between the outer parts of said first and second walls, said inwardly sloping surfaces contacting said first and second walls to push said walls toward each other when said connecting piece is mounted to said bus bar, said main portion having an opening extending therethrough and formed between said first and second surfaces, said connecting piece further comprising a screw extending through said opening, said screw gripping the inner surfaces of said first and second walls to thereby mount said connecting piece to said bus bar, and means for electrically connecting an electric wire to said main portion and therefore to said bus bar via said first and second surfaces and said screw, said means being mounted on said main portion.

4,057,313
TEST CLIP
Ida Polizzano, 235 S. Harrison St. Apt. 308, East Orange, N.J. 07018
Filed July 19, 1976, Ser. No. 706,171
Int. Cl.² H01R *11/24, 27/00*
U.S. Cl. 339—33 **2 Claims**

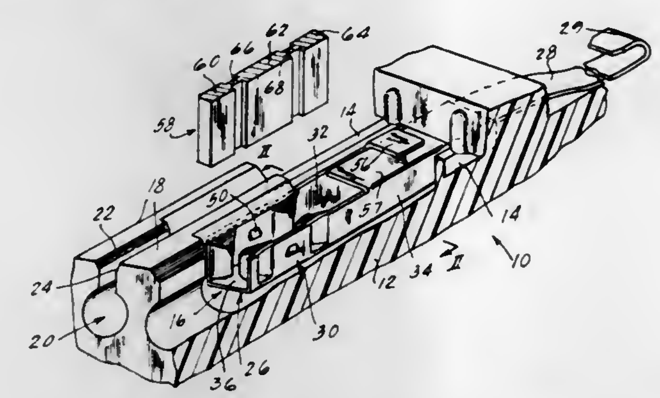
1. An electrical test connecting device comprising:
an alligator clip including
a pair of conductive gripping jaws attached to each other and a conductive leg connected to each jaw, an inner surface of one leg being opposed to an inner surface of the other leg,
spring means for biasing said jaws towards each other,
an electrical conductor connected to one of said legs adapted to be connected to a testing device; and
a conductive clip attached to the inner surface of said other leg, said clip being resilient, elongated, and providing oppositely longitudinally extending arcuate end portions, one of said arcuate end portions being fixedly secured on

the transverse edge thereof to said inner surface, said other arcuate end portion being biased toward said other



leg, said clip adapted to frictionally retain and conductively engage an electrical terminal disposed between said clip and the inner surface of said other leg.

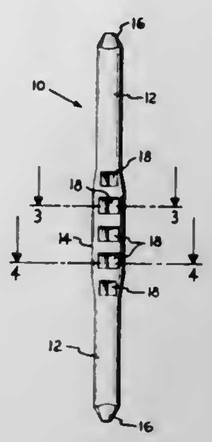
4,057,314
ELECTRICAL CONNECTOR INCLUDING INSULATION-OPENING CONTACT
Istvan Mathe, and Alan Henry Kasper, both of Cicero, Ill., assignors to Bunker Ramo Corporation, Oak Brook, Ill.
Filed Aug. 20, 1975, Ser. No. 606,121
Int. Cl.² H01R *13/38*
U.S. Cl. 339—97 R **42 Claims**



1. An insulation-piercing contact for electrical connection to an insulated conductor, comprising:
a sheet metal structure including first and second surfaces and forming an open channel for receiving an insulated conductor normal to its axis, said channel including a bottom wall and a pair of spaced sidewalls extending generally parallel to each other from said bottom wall,
at least one pair of interior walls extending inwardly of said channel from respective ones of said sidewalls;
each of said interior walls comprising an oblique portion of one of said surfaces directed away from the respective sidewall and toward said bottom wall, a conductor wiping portion of said one surface extending generally in the direction of conductor insertion, an insulation opening portion of said one surface joining said oblique and wiping surface portions and defining a direction change therebetween, and a smooth portion on said oblique surface immediately adjacent said insulation opening portion.

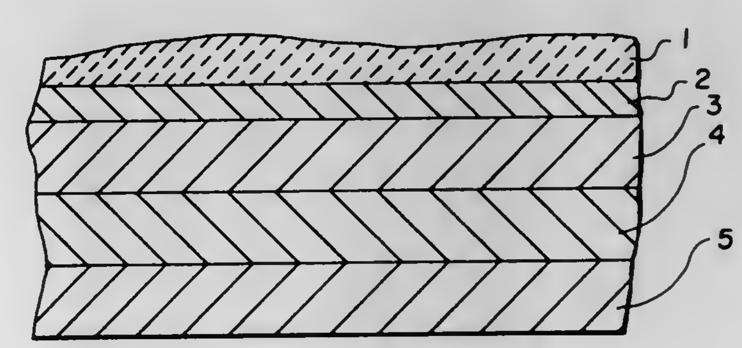
4,057,315
CIRCUIT BOARD PIN
Norman Jay Miller, East Petersburg; John Anthony Zemaitis, Tower City, and Russell Lloyd Zimmerman, Etters, all of Pa., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.
Filed Aug. 2, 1976, Ser. No. 710,617
Int. Cl.² H05K *1/18*
U.S. Cl. 339—221 R **4 Claims**

1. An elongated round circuit board pin having an expanded mounting portion characterized by an irregular surface defined by segments between plural equispaced longitudinal rows of wedge shaped voids, each void having a pair of inwardly directed walls meeting at a longitudinal apex substantially parallel to the axis of the pin, the voids in adjacent rows being



staggered, there being at least three voids in each row at least one void in each row longitudinally overlapping a pair of voids in an adjacent row.

4,057,316
REFLECTION REDUCING MULTILAYER SYSTEM ON A HIGHLY REFRACTIVE INFRARED TRANSMITTING SUBSTRATE
Dionys Hacman, Trubbach, Switzerland, and Adolf Keutscheger, Triesenberg, Liechtenstein, assignors to Balzers Patent- und Beteiligungs-Aktiengesellschaft, Liechtenstein
Filed Feb. 17, 1976, Ser. No. 658,454
Claims priority, application Switzerland, Feb. 18, 1975, 002014/75
Int. Cl.² G02B *5/28*
U.S. Cl. 350—1 **10 Claims**

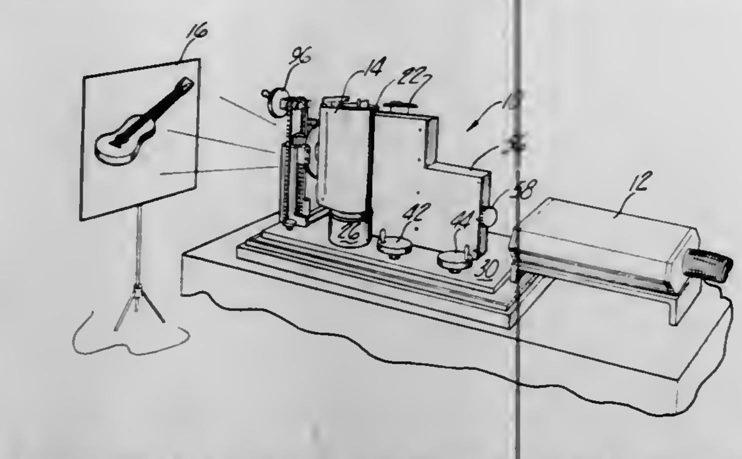


1. A reflection reducing multilayer system on a germanium substrate, said system comprising four individual layers arranged in sequence as follows: Ge, ZnSe, Si and Al_2O_3.

4,057,317
HOLOGRAM PROJECTOR
Juris Upatnieks, Ann Arbor, Mich., assignor to Environmental Research Institute of Michigan, Ann Arbor, Mich.
Filed Nov. 21, 1975, Ser. No. 634,147
Int. Cl.² G02B *27/00*
U.S. Cl. 350—3.5 **10 Claims**

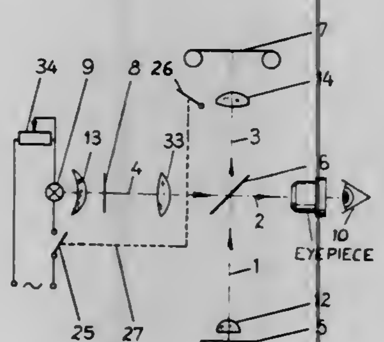
1. A projector for creating a two-dimensional image on a planar surface from a hologram, comprising: means for supporting the hologram; a source of an illuminating light beam; means for directing said light beam at various sections of said hologram by moving said light beam relative to said hologram along two perpendicular axes so as to be operative to illuminate said sections of said hologram to create a three-dimensional image of the object in space; lens means operative to

project a magnified image of said sections of said three-dimensional image created by said light beam; means for selectively



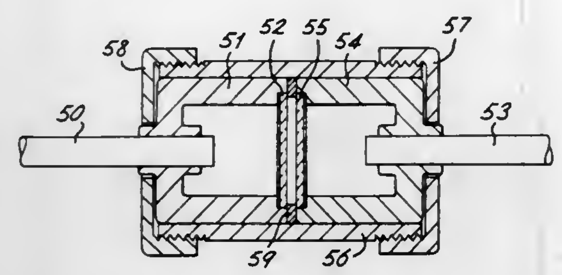
varying the focal plane of the image projected by said lens means within said three-dimensional image.

4,057,318
MICROSCOPE EYE PIECE FOCUSING APPARATUS FOR USE IN PRODUCING SHARP PHOTOGRAPHS
Klaus P. Schindl, Vienna, Austria, assignor to C. Reichert Optische Werke, Vienna, Austria
Continuation of Ser. No. 447,808, March 4, 1974, abandoned. This application Dec. 31, 1975, Ser. No. 645,487
Claims priority, application Austria, Mar. 2, 1973, 1871/73
Int. Cl.² G02B *21/18*
U.S. Cl. 350—19 **6 Claims**



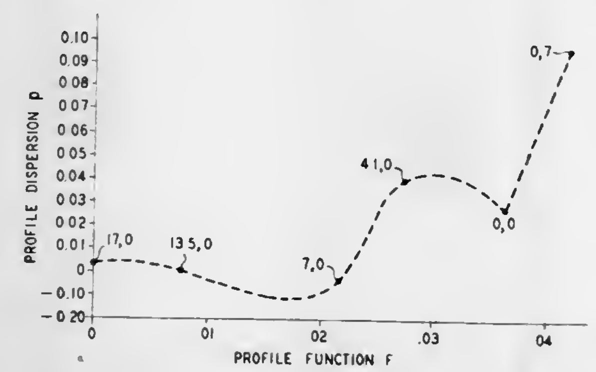
1. A microscope for observing an object with an eye and photographing said object with a camera comprising
a body,
an observation optical system incorporated in said body and including an objective and an eyepiece aligned along a first optical axis, said eye and said eyepiece in combination having an effective focal plane, focusing means to form an image of said object in said effective focal plane,
a reference focusing system incorporated in said body and including a reticle aligned along a second optical axis which intersects said first optical axis, means to project an image of said reticle to a position along said first optical axis, means to prevent projection of said image during photographic exposure, means to move said eyepiece along said first optical axis for observing said image of said reticle in focus, said effective focal plane being located on said first optical axis at said position when the image of the reticle is observed in-focus,
a photographic optical system being adapted to connect to said body and having said camera on a third optical axis which intersects said first optical axis in said body, said first, second and third optical axes having a common intersection, said camera further including a film plane and said film plane being located on said third optical axis at a location optically equivalent, with respect to said object, to said position,
whereby focusing an image of said object at the position provides in-focus imaging of said object at said film plane.

4,057,319
OPTICAL SYSTEM USING A HOLOGRAM COUPLER
Eric Albert Ash, and Oliverio Delfim Dias Soares, both of London, England, assignors to National Research Development Corporation, London, England
Filed Apr. 5, 1976, Ser. No. 673,995
Int. Cl.² G02B *5/16, 27/00*
U.S. Cl. 350—96 C **14 Claims**



1. An optical connection system comprising:
two arrays of optical devices;
two multiple exposure phase hologram plates each having formed therein a series of phase holograms all of the transmission type; and
support means for supporting said plates respectively in fixed positions relative to said two arrays;
the holograms having forms such that individual optical connections each of which involves the passage of light between a specific device in one array and a specific device in the other array can be made respectively via a pair of holograms in each plate, there being associated with each phase hologram a direction of polarisation which differs by 90° between the holograms of a pair of holograms.

4,057,320
OPTICAL FIBER WAVEGUIDE HAVING MINIMUM MODAL DISPERSION
Enrique Alfredo Jose Marcatili, Rumson, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.
Filed July 26, 1976, Ser. No. 709,010
Int. Cl.² G02B *5/14*
U.S. Cl. 350—96 GN **8 Claims**



1. A circular-symmetric optical fiber waveguide comprising a core surrounded by a layer of cladding material, the refractive index of said layer n_2 being less than n_1, the value of the index of refraction on the axis of the core, and the index of refraction n in said core is graded in accordance with the following equation

$$n^2 = n_1^2(1-F),$$

where F is a profile function equal to zero on the axis and equal to $(n_1^2 - n_2^2)/n_1^2$ at the core-cladding interface, characterized in that the profile dispersion is a non-constant value with respect to radius given by the following equation

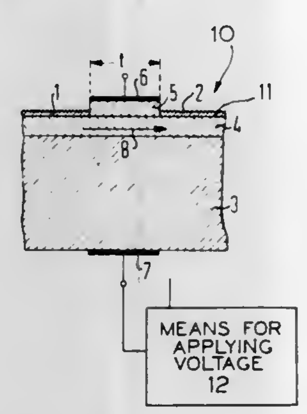
$$p = \frac{n_1}{N_1}\,\frac{\lambda}{F}\,\frac{\partial F}{\partial \lambda},$$

N_1 is the group index on axis, λ is the wavelength, and the profile function F is related to the radial coordinate r and the profile dispersion substantially in accordance with the following equation

$$\frac{1+\frac{r}{2F}\frac{\partial F}{\partial r}}{1-\frac{p}{2}} = D$$

where D is a dispersion parameter approximately equal to 2.

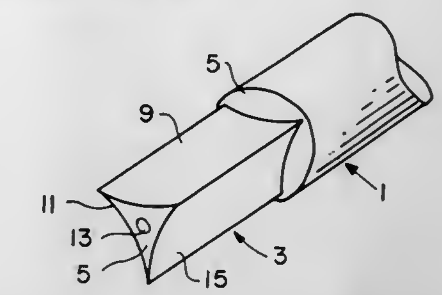
4,057,321
SPECTROSCOPICALLY SELECTIVE FILTER DEVICE
Hans Mahlein, and Achim Reichelt, both of Munich, Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany
Filed Apr. 15, 1976, Ser. No. 677,448
Claims priority, application Germany, Apr. 18, 1975, 2517194
Int. Cl.² G02B *5/14*
U.S. Cl. 350—96 WG **9 Claims**



1. A spectroscopically selective filter device for light which is being conveyed in a film waveguide arranged on a substrate, comprising at least two Bragg reflectors with distributed feedback being disposed on a surface of the film waveguide in a spaced tandem arrangement of a given interval along the direction of light propagation in the film waveguide, a pair of electrodes arranged adjacent opposite surfaces of the film waveguide in each region between the two spaced reflectors, said film waveguide in at least the region between the electrodes consisting of an electro-optical material, and means connected to the electrodes for applying an electrical voltage to the electrodes so that the index of refraction of the electrical optical material is changed to adjust the length of the optical path between each pair of reflectors.

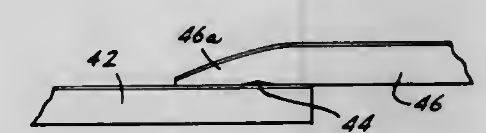
4,057,322
PRECISION SURFACE OPTICAL FIBERS
Charles K. Kao, Roanoke, Va., assignor to International Telephone and Telegraph Corporation, Nutley, N.J.
Filed Nov. 5, 1975, Ser. No. 629,210
Int. Cl.² G02B *5/16*
U.S. Cl. 350—96 R **12 Claims**

1. A precision formed optical fiber comprising:
cylindrical core means for transmitting light energy through said fiber;
cladding means for promoting total internal reflection within said fiber; and



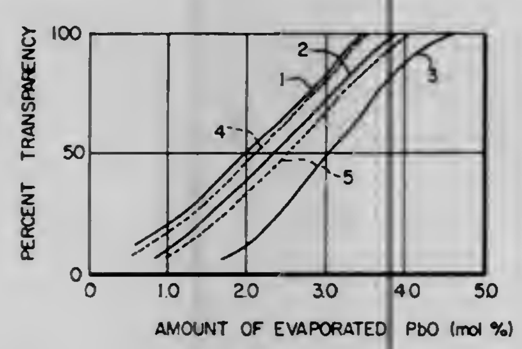
at least three intersecting reference planes formed on the surface of the cladding for providing low light loss connection with said fiber.

4,057,323
PROJECTION SCREEN
Robertson Ward, Jr., 21 W. Elm St., Chicago, Ill. 60610
Division of Ser. No. 502,157, Aug. 30, 1974, Pat. No. 3,992,841. This application Sept. 27, 1976, Ser. No. 727,255
Int. Cl.² G03B *21/56*
U.S. Cl. 350—125 **4 Claims**



1. In a projection screen that includes a plurality of curved interior reflective surfaces arranged to provide at least one generally circularly arranged row of reflective surfaces and whereby each pair of adjacent surfaces is constructed and arranged to provide minimal effect upon reflection of projected light from the region of adjacency of the pair of surfaces, the improvement in construction comprising, in combination:
at least one of each adjacent pair of the plurality of curved surfaces being provided as part of a prefinished panel that is of a size and shape to have an edge portion thereof overlap an edge portion of the adjacent curved reflective surface;
said prefinished panel including a substrate sheet of metal that is originally of uniform thickness and is deformable and easily set upon deformation beyond the metal's elastic limit, and a continuous uniform reflective finish provided on the concave side of the substrate metal sheet prior to deformation of the metal sheet;
a portion of the panel adjacent the edge thereof that overlaps the adjacent curved reflective surface being shaped and arranged and deformed, without destroying the continuous character of the uniform reflective finish on the metal substrate, to have the face of reflective finish at the edge terminus of the panel terminate adjacent the said adjacent reflective surface, with the thickness of the substrate sheet of metal adjacent said edge terminus being lessened, resulting in providing a back surface, opposite the reflective surface, that will lie adjacent the adjacent curved reflective surface, to cause the reflective finish at the edge terminus of the panel to be located closely adjacent the overlapped curved reflective surface, thereby minimizing any discontinuity between the reflective finish on the panel and the overlapped reflective surface.

4,057,324
METHOD OF MAKING A TRANSPARENT FERROELECTRIC CERAMIC ELEMENT
Syunichiro Kawashima, Amagasaki; Masamitsu Nishida, Osaka; Yoshihiro Matsuo, Neyagawa; Hiromu Ouchi, Toyonaka, and Shigeru Hayakawa, Hirakata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan
Filed Sept. 12, 1975, Ser. No. 612,744
Claims priority, application Japan, Sept. 12, 1974, 49-105695
Int. Cl.² C04B *35/64*
U.S. Cl. 350—150 **3 Claims**

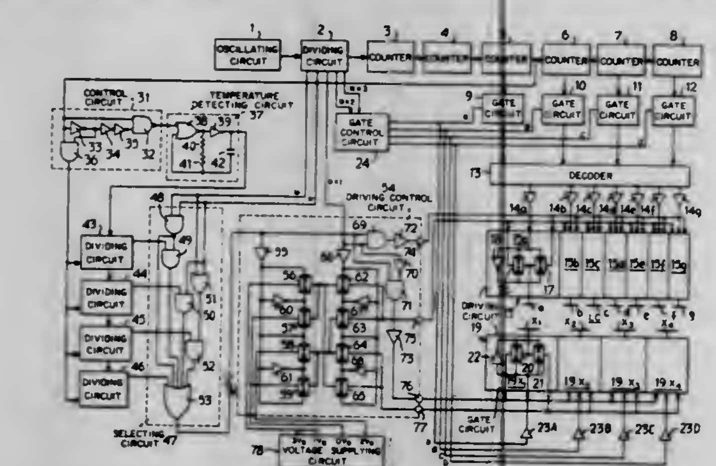


1. A method of making a transparent ferroelectric ceramic element, comprising the steps of:
forming a solid solution of a material of the formula

$$Pb_{1-(3/2)t}La_t(Mg_{1/3}\,Nb_{2/3})_xZr_yTi_zO_e+\alpha PbO,$$

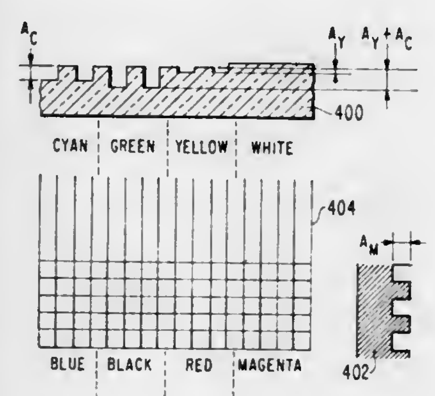
where $t=0.04$–0.15, $x=0.03$–0.60, $y=0.10$–0.95, $z=0.05$–0.90, $x+y+z=1$, and $\alpha=0.00$–0.20;
grinding said solid solution to form a ferroelectric powder; and
hot-pressing said powder at a temperature between 900° C and 1300° C and at a pressure of at least 1000 p.s.i. for a period of time which is sufficient to form a transparent ferroelectric ceramic element.

4,057,325
DISPLAY DEVICE
Kenichi Kondo, Tokyo, Japan, assignor to Kabushiki Kaisha Daini Seikosha, Japan
Filed Apr. 29, 1976, Ser. No. 681,516
Claims priority, application Japan, May 1, 1975, 50-52832
Int. Cl.² G02F *1/13*
U.S. Cl. 350—160 LC **2 Claims**



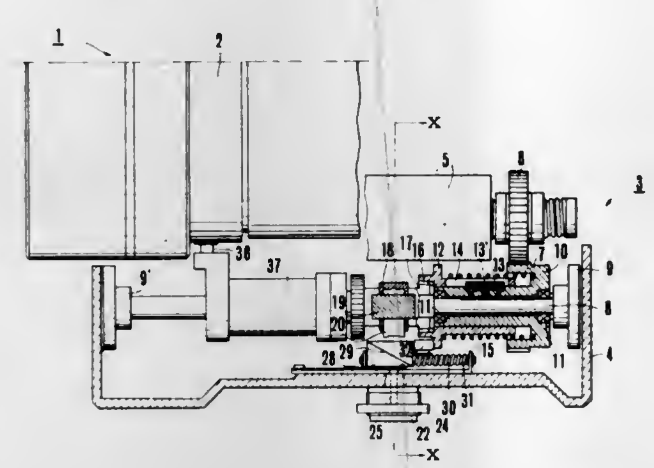
1. A temperature compensated time display device comprising in combination:
oscillator means for developing an oscillatory high frequency time standard signal;
counter and decoder means responsive to the time standard signal for developing periodic signals representative of time;
display means operable in a multiplex mode by driving signals for displaying time in response to the counter and decoder means output signals representaive of time;
temperature detecting means responsive to an output signal developed by said counter and decoder means for periodically developing an oscillatory signal having a frequency representative of ambient temperature;
a divider circuit connected to receive the oscillatory signal representative of ambient temperature for dividing the same;
selecting circuit means responsive to the divided signal representative of ambient temperature and to an output signal of said counter and decoder means for developing an oscillatory drive signal in synchronism with said output signal of said decoder and counter means and having a duty cycle representative of ambient temperature;
a voltage supply circuit for supplying a plurality of different value voltages; and
drive control means receptive of the voltages developed by said voltage supply circuit and responsive to the output signal of said selecting circuit means for driving said display means in a multiplex mode with the voltages developed by said voltage supply circuit at duty cycles corresponding to the duty cycles of said selecting circuit means output signal in order to display time represented by said counter and decoder means output signals;
whereby variations in driving voltages applied to said display means compensate for ambient temperature variations, and this compensation is adjusted periodically under control of said periodic output signal developed by said counter and decoder means and applied to said temperature detecting means.

4,057,326
SIMPLIFIED AND IMPROVED DIFFRACTIVE SUBTRACTIVE COLOR FILTERING TECHNIQUE
Karl Knop, Zurich, Switzerland, assignor to RCA Corporation, New York, N.Y.
Filed June 9, 1976, Ser. No. 694,441
Claims priority, application United Kingdom, May 27, 1976, 51272/76
Int. Cl.² G02B *5/18, 5/22*
U.S. Cl. 350—162 R **11 Claims**



1. A diffractive substractive color filter responsive to illumination thereof with white light for deriving colored zero order diffraction light, said filter comprising:
a variable optical amplitude binary phase delay diffractive structure selectively comprising no more than three different optical amplitudes consisting of a given first optical amplitude corresponding to cyan zero order diffraction light, a given second optical amplitude corresponding to yellow zero order diffraction light, and a third optical amplitude substantially equal to the sum of said first and second amplitudes and corresponding to green zero order diffraction light, and
wherein said structure comprises a plurality of separate regions including a first region, having said third optical amplitude and a second region having solely one of said first and second optical amplitudes.

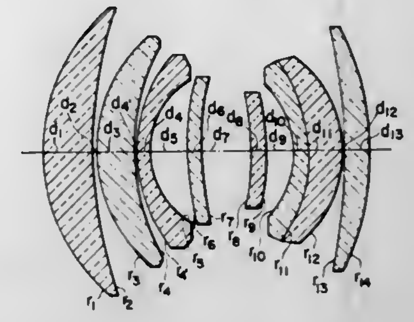
4,057,327
DRIVE APPARATUS FOR AN OPTICAL SYSTEM
Kenichi Kumazawa, Machida, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan
Continuation of Ser. No. 465,511, April 30, 1974, abandoned. This application Dec. 23, 1975, Ser. No. 643,960
Claims priority, application Japan, May 8, 1973, 48-50956
Int. Cl.² G02B *7/04*
U.S. Cl. 350—187 **4 Claims**



1. A driving apparatus for an optical system having an optical axis, said optical system comprising a fixed section including a fixed optical component and a displaceable section including a movable optical component displaceable relative to said fixed optical component along the optical axis of the system, the driving apparatus comprising:
an operable member connected to said displaceable optical component, a mechanical drive assembly including a motor means, a clutch means having an engaged position for connecting said mechanical drive assembly to said operable member and a disengaged position for disengaging said mechanical drive assembly from said operable means,
an intermediate manual drive means connected to said operable member and including a connecting member spaced from the point of the connection to said operable member,
a manual drive assembly including a coupling member selectively connectable to said connecting member for manually driving said operable member,
control means for selecting the engaged or disengaged positions of said clutch means,
said intermediate manual drive means including movable means engageable with said coupling member and being displaceable between an extended position when it is disengaged from said coupling member and a retracted position when it is engaged with said coupling member for actuating said control means and locating said clutch means in the disengaged position, and
contact means displaceable by said movable means when said movable means is in the retracted position and said contact means arranged in the displaceable position in conjunction with said control means for effecting the disengagement of said clutch means.

4,057,328
ENLARGING LENS SYSTEM
Masaki Matsubara, Hachiouji, Japan, assignor to Olympus Optical Co., Ltd., Japan
Filed Dec. 29, 1975, Ser. No. 645,210
Claims priority, application Japan, Dec. 30, 1974, 50-2223
Int. Cl.² G02B *9/64, 9/62*
U.S. Cl. 350—214 **4 Claims**

1. An enlarging lens system comprising a first, second, third, fourth, fifth and sixth lens components, said first lens component being a positive meniscus lens, said second lens component consisting of a positive meniscus lens and negative meniscus lens, said third lens component being a thin lens having weak refractive power, said fourth lens component being a thin lens having weak refractive power, said fifth lens component being a cemented doublet lens consisting of a negative menis-



cus lens and positive meniscus lens, said sixth lens component being a positive meniscus lens, said enlarging lens system having numerical values as given below:

F/3.5 , 2ω = 51° , f = 100		
$r_1 = 43.002$		
$d_1 = 9.7$	$n_1 = 1.658$	$\nu_1 = 57.3$
$r_2 = 82.828$		
$d_2 = 0.94$		
$r_3 = 29.853$		
$d_3 = 7.89$	$n_2 = 1.651$	$\nu_2 = 56.2$
$r_4 = 45.678$		
$d_{4'} = 0.33$		
$r_{4'} = 31.564$		
$d_4 = 2.67$	$n_3 = 1.74$	$\nu_3 = 31.7$
$r_5 = 17.391$		
$d_5 = 7.36$		
$r_6 = 65.049$		
$d_6 = 3.21$	$n_4 = 1.511$	$\nu_4 = 60.5$
$r_7 = 89.759$		
$d_7 = 8.83$		
$r_8 = -80.717$		
$d_8 = 3.21$	$n_5 = 1.511$	$\nu_5 = 60.5$
$r_9 = -65.111$		
$d_9 = 5.82$		
$r_{10} = -19.141$		
$d_{10} = 2.67$	$n_6 = 1.755$	$\nu_6 = 27.5$
$r_{11} = -34.134$		
$d_{11} = 7.09$	$n_7 = 1.678$	$\nu_7 = 55.3$
$r_{12} = -22.956$		
$d_{12} = 0.28$		
$r_{13} = -109.774$		
$d_{13} = 5.35$	$n_8 = 1.678$	$\nu_8 = 55.3$
$r_{14} = -50.866$		
$f_3 = 442.5,$	$f_4 = 616$	

wherein reference symbol f represents the focal length of the lens system as a whole, reference symbols f_3 and f_4 respectively represent focal lengths of the third and fourth lens components, reference symbols r_1 through r_{14} respectively represent radii of curvature of respective lens surfaces, reference symbols d_1 though d_{13} respectively represents thickness of respective lenses and airspaces between respective lenses, reference symbols n_1 through n_8 respectively represent refractive indices of respective lenses and reference symbols ν_1 through ν_8 respectively represent Abbe's number of respective lenses.

4,057,329
ADJUSTABLE FOCAL LENGTH OPTICAL DESIGN
Andor A. Fleischman, Northbrook, Ill., assignor to Bell & Howell Company, Chicago, Ill.
Filed Aug. 9, 1976, Ser. No. 712,637
Int. Cl.² G02B *9/42*
U.S. Cl. 350—222 **1 Claim**

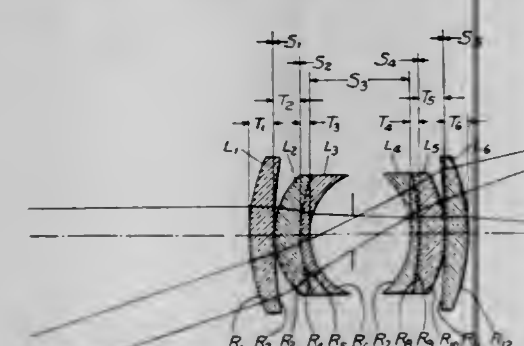
1. An optical design for a photographic objective lens having a plurality of elements, the outer of which are adjustable axially for adjusting the focal length such that pairs of lenses have focal lengths within very close tolerances, the optical design having substantially the following specifications:

Lens	Radii (in.)		Thickness (in.)	Spacing (in.)V	N_D
L_1	$R_1 =$	.7750			
	$R_2 =$	−1.9120	$T_1 = .1070$	51.7	1.734

-continued

Lens	Radii (in.)	Thickness (in.)	Spacing (in.)	V	N_D
			S_1 = .0080 to .0430		
L_2	R_3 = .3720				
	R_4 = −.6670	T_2 = .1170		55.9	1.651
			S_2 = 0		
L_3	R_5 = .6670				
	R_6 = −.2850	T_3 = .0350		29.3	1.722
			S_3 = .1940		
		------ STOP ------			
			S_4 = .2540		
L_4	R_7 = −.3490				
	R_8 = 1.2250	T_4 = .0350		36.4	1.620
			S_5 = 0		
L_5	R_9 = −1.2250				
	R_{10} = .5180	T_5 = .1060		55.9	1.651
			S_6 = .0430 to .0080		
L_6	R_{11} = −5.8300				
	R_{12} = .8010	T_6 = .1210		51.7	1.734
			S_7 = .8818 BFL		

wherein the first column lists the lens elements numerically, the second column lists the respective radii of the elements, using the convention that convex surfaces have positive radii and concave surfaces are negative, the third column lists the

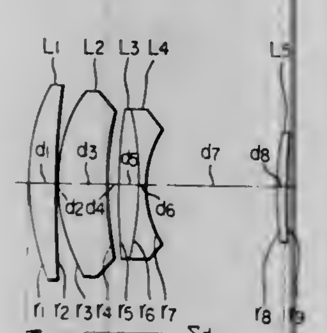


respective thicknesses of the elements, the fourth column lists the axial spacings between adjacent elements, the stop, and the film plane, and the fifth and sixth columns list respectively the dispersion and refractive indices of the optical materials for the lens.

4,057,330
LENS SYSTEM HAVING LARGE RELATIVE APERTURE AND LONG FOCUS

Sei Matui, Kawasaki, Japan, assignor to Nippon Kogaku K.K., Tokyo, Japan

Filed Oct. 3, 1974, Ser. No. 511,529
Claims priority, application Japan, Oct. 5, 1973, 48-111523
Int. Cl.² G02B *13/02*
U.S. Cl. 350—223 4 Claims



1. A lens system having a large relative aperture and long focus and having an object side and an image side, the system comprising, in series, as viewed from the object side, a positive first lens member having its convex surface facing the object side, a positive second lens member having its convex surface facing the object side, a negative third lens member, and a positive fourth lens member, the third lens member comprising a positive lens and a negative lens, the components of the lens system satisfying the following conditions:

$$\text{(I)}\ 0.4\,\Sigma d \leqq [d1 + d2 + d3 + d4 + d5 + d6] \leqq 0.53\,\Sigma d, \text{ and}$$

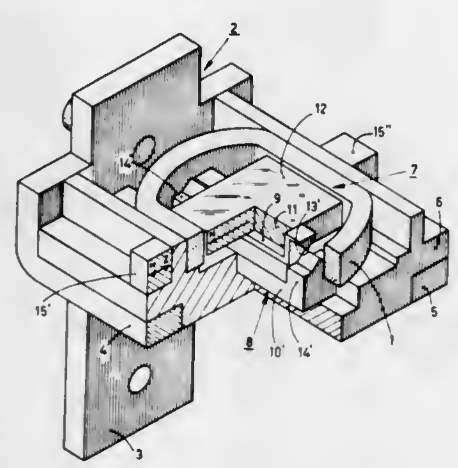
$$\text{(II)}\ 0.4f \leqq |r6| \leqq 0.7f,\ n3 > n4,\ 32 > \nu 4 > \nu 3,$$

where *d* ADSCRIPTS are the center thicknesses of the respective lenses and the air spaces between adjacent lenses, Σ *d* is the total optical length of the lens system, *f* is the composite focal length of the lens system, *r* ADSCRIPTS are the radii of curvature of the surfaces of respective lenses, *n* ADSCRIPTS are the indices of refraction for the glass used to make the respective lenses, and ν ADSCRIPTS are Abbe numbers for the respective lenses.

4,057,331
ELECTRO-MAGNETICALLY CONTROLLABLE BEAM DEFLECTION DEVICE

Daniël Ong, and Johannes Cornelius Antonius Muller, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 19, 1975, Ser. No. 633,284
Claims priority, application Netherlands, Oct. 3, 1975, 7511635
Int. Cl.² G02B *27/17*
U.S. Cl. 350—285 10 Claims



1. An electro-magnetically controllable beam deflection device for use in an optical system for deflecting a radiation beam obtained from a radiation source, in particular to be used in a video player, and comprising:

a frame

a deflection means which is pivotably mounted on the frame

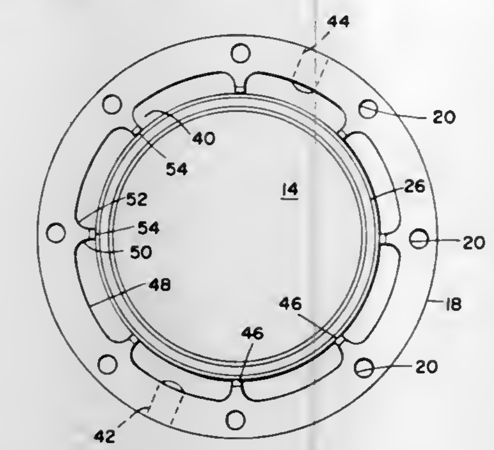
bearing means for pivotably supporting the deflection means by the frame, which bearing means comprise at least one integrated bearing component made of an elastic synthetic material, said bearing means having a first portion connected to the deflection means and a second portion connected to the frame, and

first and second electro-magnetic control means connected to the frame and the deflection means respectively, in the form of electro-magnetic circuits which include at least one electrical coil, the improvement wherein each integrated bearing component between said first and second portions comprises a third portion having a cross-section which is substantially smaller with respect to the other two portions, which third portion is comparatively readily deformable under the influence of the electro-magnetic control forces exerted on the deflection means.

4,057,332
PERIPHERALLY COOLED LASER LENS ASSEMBLY

Hiram A. Brubaker, Peoria; Gerald P. Simmons, Washington, and William E. Streight, East Peoria, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Apr. 21, 1976, Ser. No. 678,846
Int. Cl.² G02B *5/00*
U.S. Cl. 350—319 10 Claims



1. A fluid cooled lens assembly comprising:

a housing including a pair of generally ring-shaped members defining an opening therethrough for admitting energy rays,

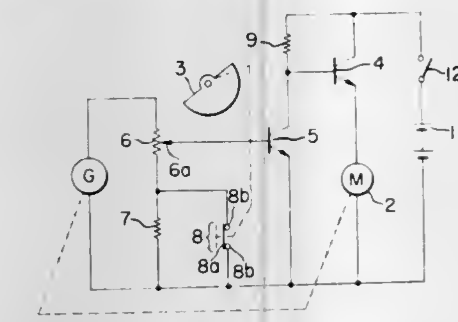
a lens mounted in said opening in said housing, said lens defining a peripheral edge, and

cooling passage means in said housing, said cooling passage means comprising a passage within said housing circumscribing said lens peripheral edge and in fluid communication over said entire peripheral edge for directing coolant fluid to said lens peripheral edge for cooling said lens, and inlet and outlet ports in said housing in communication with said passage for admitting cool fluid and removing fluid that has been heated by said lens.

4,057,333
EXPOSURE TIME CONTROL DEVICE IN A CINECAMERA

Shigeo Akasaka, Kodaira, and Hiroaki Tanaka, Tokyo, both of Japan, assignors to Nippon Kogaku K.K., Tokyo, Japan

Filed Aug. 26, 1975, Ser. No. 608,007
Claims priority, application Japan, Aug. 30, 1974, 49-98936
Int. Cl.² G03B *7/08*
U.S. Cl. 352—141 9 Claims



1. An exposure time control device for a cinecamera comprising:

a. rotatable shutter means;

b. means including an electric motor for driving said rotatable shutter means;

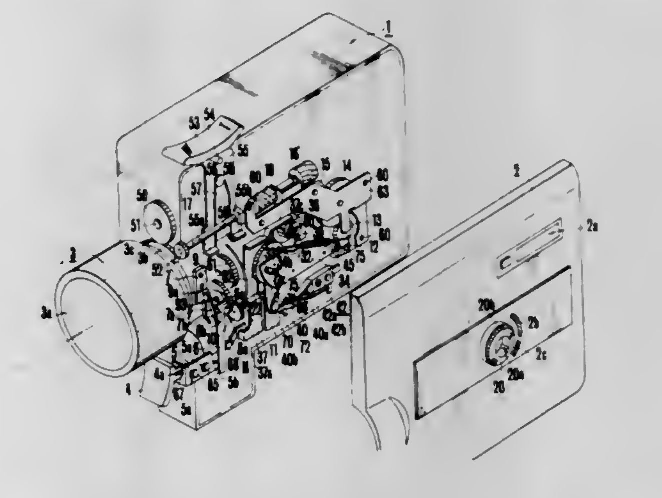
c. changing means operatively associated with said rotatable shutter means to change the number of revolutions of said electric motor within a period during which an aperture is opened and closed by said rotatable shutter means; and

d. circuit means for supplying an electrical signal to said motor for energization thereof, and wherein said changing means includes means to change the magnitude of said electrical signal within a period during which an aperture is opened and closed by said rotatable shutter means thereby to change the number of revolutions of said motor according to said magnitude.

4,057,334
SELF TIMER DEVICE FOR MOTION PICTURE CAMERA

Kazuo Ishikawa; Noritsugu Hirata, both of Yokohama; Tomoshi Takigawa, Machida, and Yasutsugu Yamada, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 5, 1976, Ser. No. 664,364
Claims priority, application Japan, Mar. 11, 1975, 50-29297
Int. Cl.² G03B *1/00*
U.S. Cl. 352—175 26 Claims



1. A self-timer device for a camera equipped with a driving motor for enabling automatic photography, comprising:

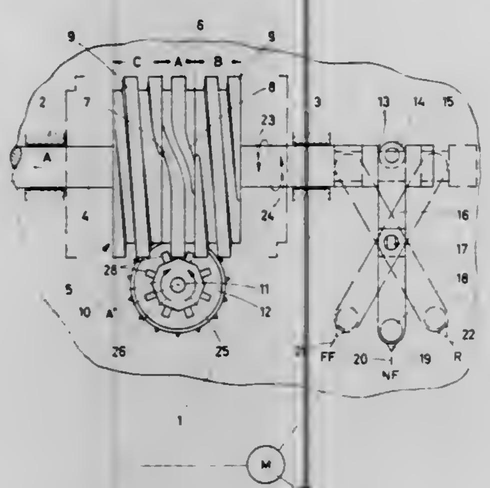
A. timer means for controlling a first time interval until the initiation of picture-taking operation, said timer means having a spring means capable of charging by manual operation and operating to control said first time interval by the force which is charged in said spring means;

B. first operation means for the initiation of the picture-taking operation, said first operating means being operatively associated with said timer means and initiating the picture-taking operation by energizing said driving motor when said first time interval elapsed;

C. manually operable means concurrently applied to the charging of said spring means and to the controlling of a second time interval until the termination of the picture-taking operation subsequent to said first time interval, said manually operable means being shiftable between a first state operatively connected with said timer means and a second state operatively connected with said driving motor and, in said first state, said manually operable means being applied to the charging of said spring means by manual operation, while in said second state, said manually operable means operating to control said second time interval by the driving force of said driving motor upon the energization of said driving motor; said spring means being charged by manual operation to said manually operable means when said manually operable means is in said first state; said timer means initiating the operation for controlling said first time interval by the force which is charged in said spring means when said manually operable means is shifted from said first state to said second state by manual operation under the state that said spring means is charged; said manually operable means initiating the operation for controlling said second time interval by the driving force of said driving motor when said motor is energized by said first operating means after the lapse of said first time interval under the state wherein said manually operable means is shifted to said second state; and

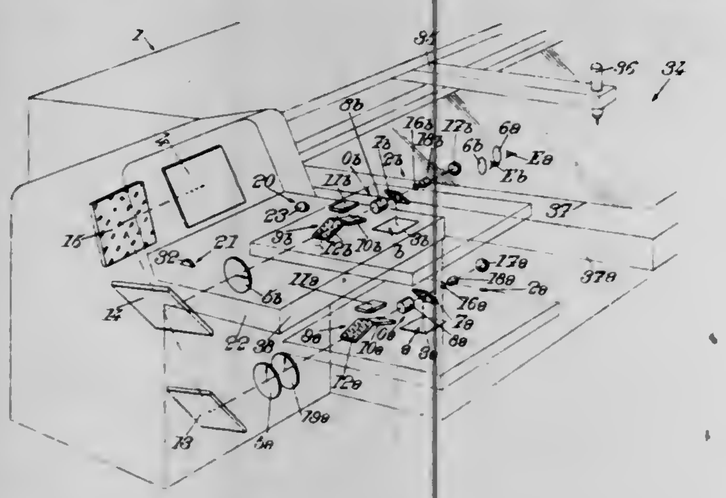
D. second operating means to stop the picture-taking operation, said second operating means being operatively associated with said manually operable means and stopping the picture-taking operation by de-energizing said driving motor when said second time interval elapsed.

4,057,335
FILM DRIVE FOR MOTION PICTURE APPARATUS
Herbert Leisring, Fellbach, Germany, assignor to Robert Bosch GmbH, Stuttgart, Germany
Filed Apr. 19, 1976, Ser. No. 677,884
Claims priority, application Germany, Apr. 24, 1975, 2518171
Int. Cl.^{2} G03B *1/24*
U.S. Cl. 352—188 **10 Claims**



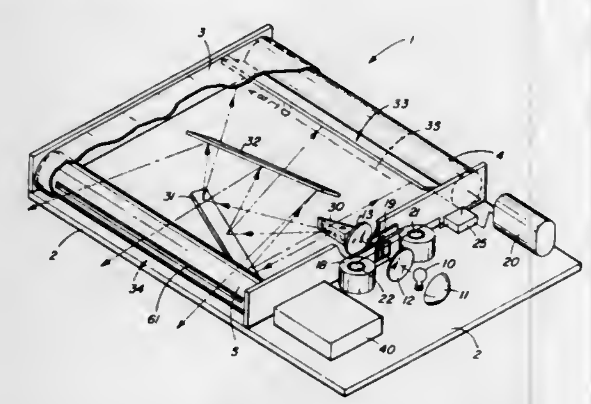
1. A film drive for a motion-picture apparatus, said drive comprising: a film drive wheel rotatable about a first axis and having relative thereto a plurality of angularly equispaced radially extending projections; a function cam rotatable about a second axis transverse to said first axis and having a generally helical peripheral formation engaging said wheel at said projections and including an intermittent-drive section having a holding portion constituting almost a complete turn of said formation of substantially 0° pitch and a switching portion of predetermined pitch greater than 0°, and a constant-drive section of constant pitch greater than 0° and axially offset from said intermittent-drive section; shift means for displacing said axes relative to each other for engagement of said projections with said intermittent-drive section or with said constant-drive section; and drive means for continuously rotating said cam about said drive axis, whereby said drive wheel is advanced intermittently when engaging said intermittent-drive section and continuously when engaging said constant-drive section.

4,057,336
PHOTOGRAMMETRIC PLOTTING APPARATUS
Noël Malinge, Clichy Sous Bois, France, assignor to Engins Matra, France
Filed June 7, 1976, Ser. No. 693,176
Claims priority, application France, June 26, 1975, 75.20164
Int. Cl.^{2} G03B *21/00*
U.S. Cl. 353—6 **14 Claims**



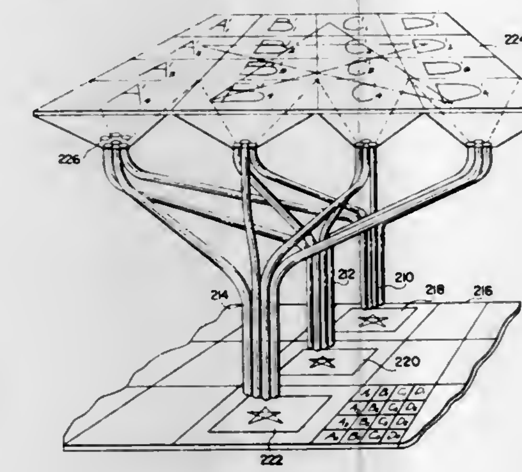
1. A photogrammetric plotting apparatus comprising:
two stereographic plates;
two optical systems having respective optical axes and each for forming an image of a region of a respective one of the two stereographic plates;
means for moving the stereographic plates in their plane with respect to said optical systems to bring corresponding regions of said plates onto the optical axes of said optical systems,
means providing a reference mark indicating the trace of the optical axis of each said optical system on the respective plate, each said reference mark being imaged by the respective optical system; and
observation means for observing the images formed by said optical systems;
in which apparatus the improvement comprises:
two different polarisers, each disposed on the optical axis of a respective one of said optical systems so that the images of the region of the respective plate and the respective reference mark are formed by the same polarised light;
said observation means including a single screen, and said optical system being arranged to project the images of the corresponding regions of the plates and the images of the associated reference marks on said screen, whereby an operator looking at said screen through two analyzers corresponding to said polarisers sees the images of the region of one plate and its respective reference mark with one eye only and sees the images of the corresponding region of the other plate and its respective reference mark with the other eye only.

4,057,337
COMPACT VIEWER
Lee Fitzpatrick Frank, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.
Filed May 3, 1976, Ser. No. 682,303
Int. Cl.^{2} G03B *21/28*
U.S. Cl. 353—26 R **15 Claims**



1. Improved image display apparatus comprising:
a. an image display belt including a plurality of image storage and display portions, each of said belt portions having means for sensing and storing an incident imagewise radiation pattern and means for modulating uniform light incident on said storage and display portions in accordance with a stored pattern;
b. means for supporting and moving said belt along an endless operative path;
c. a first recording station, located along said endless path;
d. an image projection station including means for receiving and supporting an information medium containing micro-images to be viewed and means for projecting, onto a portion of said display belt located at the recording station, a radiation pattern corresponding to the portion of the micro-image supported at said projection station;
e. means for moving a received information medium past said projection station in a predetermined time relation with movement of said belt so as to provide scanning radiation exposure of successive micro-image portions onto successive portions of said belt; and
f. an image viewing station located along said operative path and extending downstream from said recording station so that an entire image comprised of successively recorded image portions can be viewed thereat.

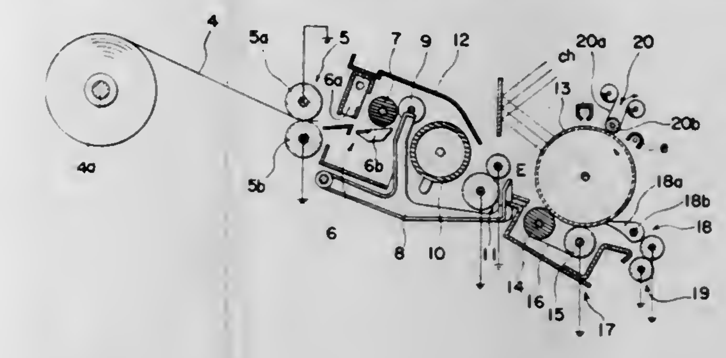
4,057,338
FIBER OPTIC SYSTEM
George J. Yevick, Leonia, N.J., assignor to Izon Corporation, Stamford, Conn.
Division of Ser. No. 427,355, Dec. 21, 1973, and a continuation-in-part of Ser. No. 223,612, Feb. 4, 1972, abandoned. This application Dec. 23, 1975, Ser. No. 643,831
Int. Cl.^{2} G03B *27/00;* **G02B** *5/14*
U.S. Cl. 355—1 **2 Claims**



1. A color optical system including,
a. a plurality of coherent light guides having input termini, said input termini each defining a bundle,
b. said coherent light guides diverging from each other over at least a portion of their length,
c. the distance between the output termini of said guides being greater than the distance between the input termini,
d. the output termini of said coherent light guides being rigidly positioned relative to each other,
e. a screen adjacent said output termini and adapted to either receive colored light output projected therefrom or to pass colored light to the output termini,
f. the said output termini each provided with a projecting lens interposed between it and said screen,
g. a plurality of said bundles,
h. a photographic film positioned beneath the input termini of said bundles for recording information on the screen,
i. a different wavelength filter positioned between the input termini of each bundle end and said film,
j. whereby unexposed film will record a number of identical black and white images equal to the number of bundles, each image corresponding to a color of an associated color filter, and whereby the film upon development will project a color image on the viewing screen from the black and white images.

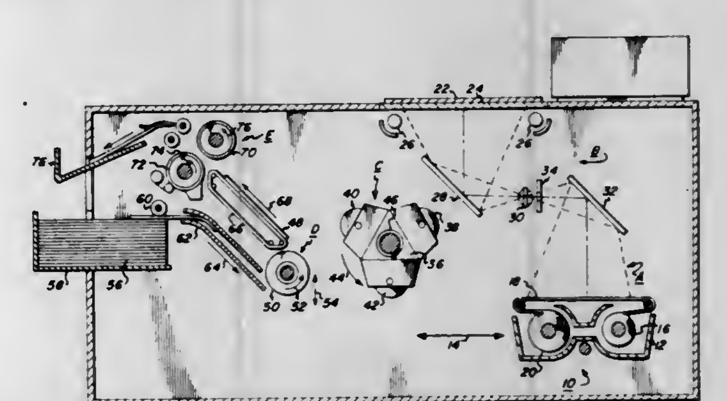
4,057,339
ELECTROSTATIC LATENT IMAGE TRANSFER TYPE COPYING APPARATUS
Osamu Miyamoto, Toyokawa; Isao Iizaka, Shinshiro; Toshio Yamamoto, Toyokawa; Takashi Hikosaka, Aichi, and Shigemitu Shimizu, Toyokawa, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan
Filed Dec. 23, 1975, Ser. No. 643,957
Claims priority, application Japan, Jan. 7, 1975, 50-4717; Jan. 13, 1975, 50-6835; Jan. 10, 1975, 50-6620[U]
Int. Cl.^{2} G03G *15/00*
U.S. Cl. 355—3 R **20 Claims**

10. An electrostatic latent image transfer type copying apparatus which comprises;
a copying paper in a roll and having an insulative dielectric layer and an electroconductive layer over which said dielectric layer is coated;
a photoconductive member;
means for bringing said copying paper into contact with the photoconductive member with the dielectric layer contacting the photoconductive member for transferring said latent image onto the copying paper;
means for transporting the copying paper along a predetermined path to a developing means through said image transferring means, said transporting means including at least one pair of feed rollers in nipping relation to one another for transporting the copying paper therebetween, said feed rollers holding a leading end of the copying



paper in nipping condition when the paper is not moving in said apparatus and transporting the copying paper when rotated;
said feed rollers both being made of electroconductive material with at least one of said roller being of electroconductive elastic material; and
means coupled to said rollers for maintaining said rollers at equal potential, whereby electrostatic contamination on the copying paper due to the compression and frictional charging by said rollers are prevented.

4,057,340
SINGLE COMPONENT COLOR DEVELOPMENT SYSTEM
Lloyd F. Bean, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.
Filed Jan. 22, 1976, Ser. No. 651,323
Int. Cl.^{2} G03G *15/01*
U.S. Cl. 355—4 **21 Claims**



7. An electrostatographic printing machine of the type having a latent image corresponding to an original document being reproduced recorded on a member, wherein the improvement includes:
a housing defining a chamber for storing a supply of particles therein;
a cylindrical member mounted rotatably in the chamber of said housing, said cylindrical member having a plurality of apertures therein with each aperture being smaller in size than the size of the smallest particle attracted thereto;
a blower mounted interiorly of said cylindrical member and arranged to generate an inwardly directed flow of air from the surface of said cylindrical member to the interior thereof forming a pressure differential attracting the particles thereon; and
means for separating the particles from said cylindrical member as the particles advance to the development zone,

wherein said cylindrical member positions the particles closely adjacent to the latent image recorded on the member.

4,057,341

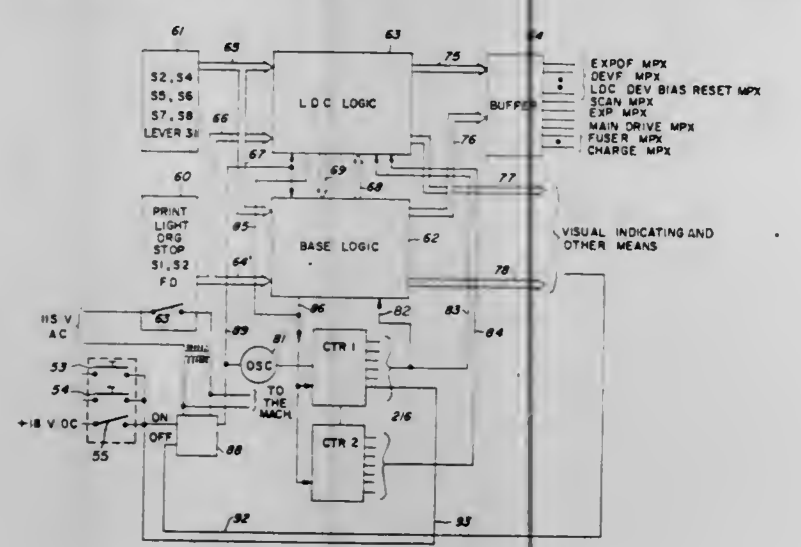
DUAL MODE CONTROL LOGIC FOR A MULTI-MODE COPIER/DUPLICATOR

Lawrence R. Sohm, Fairport, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Continuation of Ser. No. 393,546, Aug. 31, 1973, abandoned. This application Nov. 29, 1974, Ser. No. 528,163

Int. Cl.[2] G03G *15/28*

U.S. Cl. 355—8 **5 Claims**



1. In an automatic reproducing machine comprising:
movable scanning means;
document original feeding means;
xerographic step implementing means including means for charging a photoreceptor layer; means for image-wise exposing said layer to form a latent electrostatic image; means for developing said electrostatic image; and means for transferring the developed image to a copy sheet; the improvement comprising:
a control circuitry for operating said machine selectively in a first mode, wherein said document is held stationary and said scanning means is moved past the document to form a scanned image or in a second mode, wherein said scanning means is held stationary and said document feeding means feeds said document past said scaning means to form an image,
said control circuitry first logic means for operating said machine in said first mode and second logic means for operating said machine in said second mode, said first and second logic means generating a plurality of signal outputs for actuating said xerographic step implementing means;
means for generating a signal indicative of the mode in which said machine is set; and
buffer means for receiving said actuating signal outputs and for selectively applying them to said implementing means, said buffer means including multiplexing means responsive to said mode signal for gating the desired actuating signal outputs corresponding to the mode in which the machine is set to said implementing means.

4,057,342

ILLUMINATION SLIT FOR A REPRODUCING MACHINE

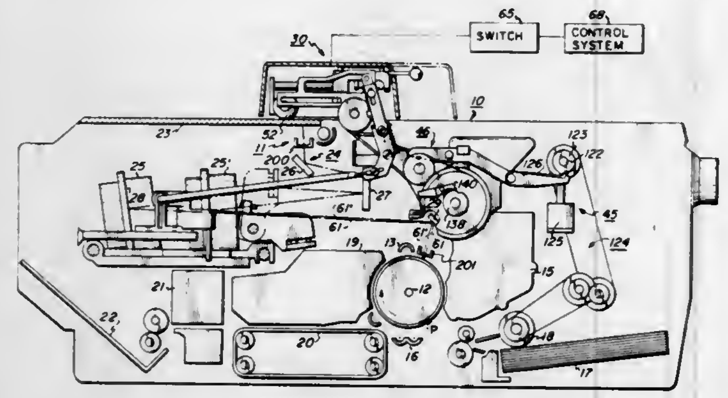
Robert F. Allis, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed May 27, 1976, Ser. No. 690,475

Int. Cl.[2] G03G *15/28;* **G03B** *27/48, 27/70*

U.S. Cl. 355—8 **11 Claims**

1. In an apparatus including means for stripwise viewing an object at an object plane and for projecting an image thereof onto a moving imaging surface at an image plane, said viewing means being arranged along an optical path, said viewing means including:
a lens arranged along said optical path between said object plane and said image plane; and
means for controlling the projected illumination profile of said viewing means, including means for defining an illumination slit having a desired slit profile for controlling said illumination; the improvement wherein, said means for defining said illumination slit comprises:



a first member arranged along said optical path between said lens and said object plane, said first member including a first boundary portion for defining a first part of said desired slit profile; and
a second member arranged along said optical path between said lens and said image plane, said second member including a second boundary portion for defining a second part of said desired slit profile different from said first part;
whereby said first boundary of said first member as projected and said second boundary of said second member combine to define said desired slit profile.

4,057,343

ELECTROSTATIC COPYING MACHINE WITH MULTI-FRAME DRUM ASSEMBLY

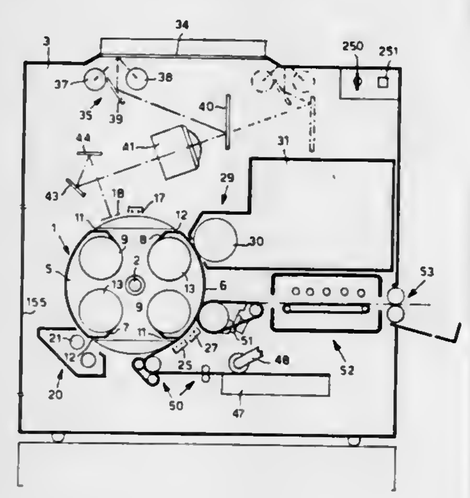
Piero Gontero, Bollengo (Turin), Italy, assignor to Ing. C. Olivetti & C., S.p.A., Italy

Filed Oct. 7, 1976, Ser. No. 730,565

Claims priority, application Italy, Oct. 9, 1975, 69515/75

Int. Cl.[2] G03G *15/00*

U.S. Cl. 355—16 **8 Claims**



1. An electrophotographic copying machine comprising:
a photoconductor drum assembly having:
A rotary member mounted to the machine frame for rotation about an axis,
a plurality of sector members. each having an arcuate support surface constituting part of the cylindrical periphery of the drum, each of said sector members being mounted on said rotary member, slidable in a direction perpendicular to the said axis between a first position in which it defines the respective part of the cylindrical periphery of the drum, and a second position into which it is shifted radially outward with respect to the remainder of the cylindrical periphery,
a photoconductive element carried by each of said sector members, each photoconductive element comprising a web which extends between a feed station and a take-up station of the associated sector members with an intermediate portion of the web wound around the said support surface,
and reversible locking means for maintaining the said sector members in the first position during the rotation of the drum about the said axis.

4,057,344

ELECTRO-PHOTOGRAPHIC COPIER WITH STRIP-SHAPED LATENT-IMAGE CARRIER

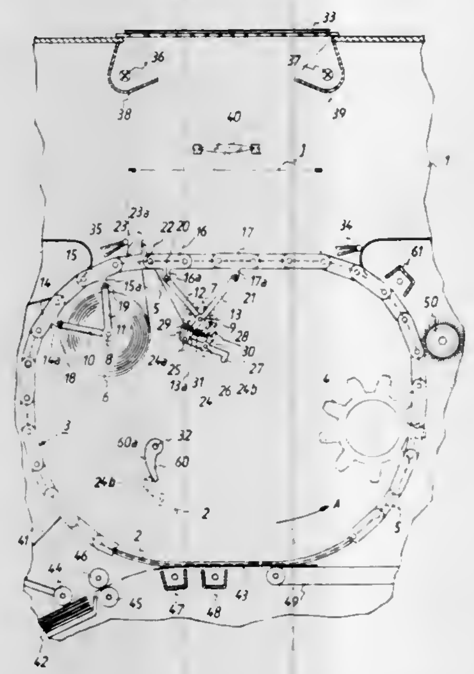
Richard Wick, Munich; Josef Pfeifer, Unterhaching, and Günther Schnall, Eching, all of Germany, assignors to AGFA-Gevaert Aktiengesellschaft, Leverkusen, Germany

Filed Mar. 22, 1976, Ser. No. 669,295

Claims priority, application Germany, Mar. 27, 1975, 2513825

Int. Cl.[2] G03G *15/00*

U.S. Cl. 355—16 **9 Claims**



1. In an electrophotographic copier, a combination comprising pay-out mezns for paying out a convoluted strip-shaped latent-image carrier; take-up means for taking up said carrier as the same is withdrawn from said pay-out means; an image-forming station for forming an image of an original to be copied on said image-carrier; and guide means for guiding said image carrier from said pay-out means to said take-up means in a path which includes at least adjacent said station a planar path portion wherein successive image-receiving increments of said image carrier travel past said station in substantially planar condition, said guide means comprising an articulated chain of support elements supporting said image carrier and having a width at least equal to the width of said image carrier, and guide elements laterally engaging and guiding said support elements.

4,057,345

ADDITIVE LAMPHOUSE

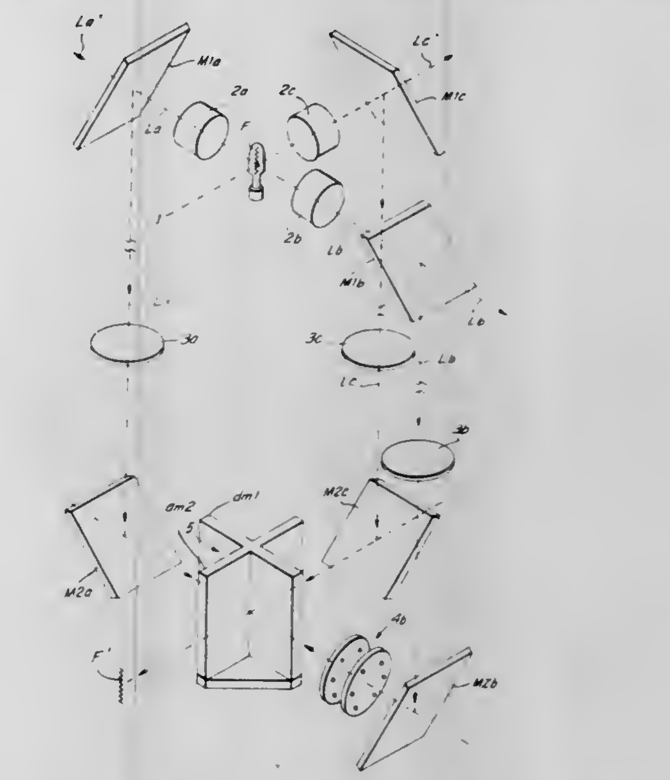
Franz F. Ehrenhaft, Forest Hills, and Seymour Rosin, Massapequa Park, both of N.Y., assignors to Anamorphic Ltd., Forest Hills, N.Y.

Filed Sept. 9, 1976, Ser. No. 722,419

Int. Cl.[2] G03B *27/76*

U.S. Cl. 355—35 **7 Claims**

1. An arrangement for providing color compensated light, comprising, in combination, a single filament light source; means for deriving from the single filament light source three component beams and for transmitting those beams along three optical paths, including three light take-off means located at three different sides of the light source; and means located in the three optical paths for attenuating the three component beams independently of one another, for coloring the three beams in the primary colors red, blue and green and for recombining the beams into a single beam of color compensated light, the means for attenuating, coloring and recombining comprising three attenuating means and a coloring means for coloring the three component beams in respective ones of the three primary colors red, green and blue, each of the three optical paths including one of the three attenuating means, with the attenuating means being located up-path of the coloring means, the coloring means being an optical element which both colors the three component beams in respective ones of the three primary colors red, green and blue and recombines the thusly colored component beams to form the single beam of color



corrected light, the three optical paths at the portions thereof down-path of the three attenuating means extending in respective ones of three different directions, the first and second directions being opposite to each other, and the third direction being perpendicular to the first and second directions, the optical element being comprised of two dichroic mirrors, the two dichroic mirrors intersecting each other at an angle of 90°, each dichroic mirror standing in a plane which is oriented at an angle of 45° to each of said first, second and third directions, one dichroic mirror transmitting only light of a first one of the three primary colors red, blue and green, the other dichroic mirror transmitting only light of a different second one of the three primary colors red, blue and green, the portions of the three optical paths located down-path of said optical element being coincident with one another.

4,057,346

AUTOMATIC FILM TRANSPORTER

Walter Ellingham, 516 Lincoln Ave., Staten Island, N.Y. 10306, and Edward J. Nolan, 402 Davis Ave., Staten Island, N.Y. 10310

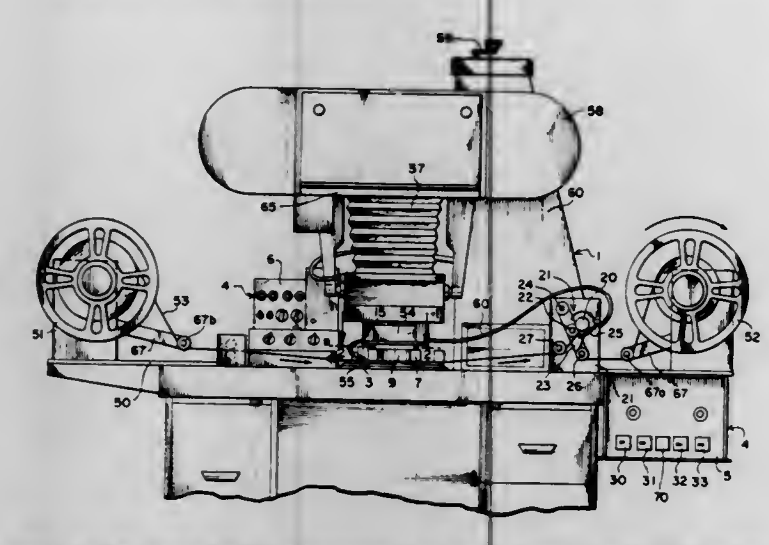
Filed June 16, 1976, Ser. No. 697,082

Int. Cl.[2] G03B *27/52, 27/32*

U.S. Cl. 355—41 **10 Claims**

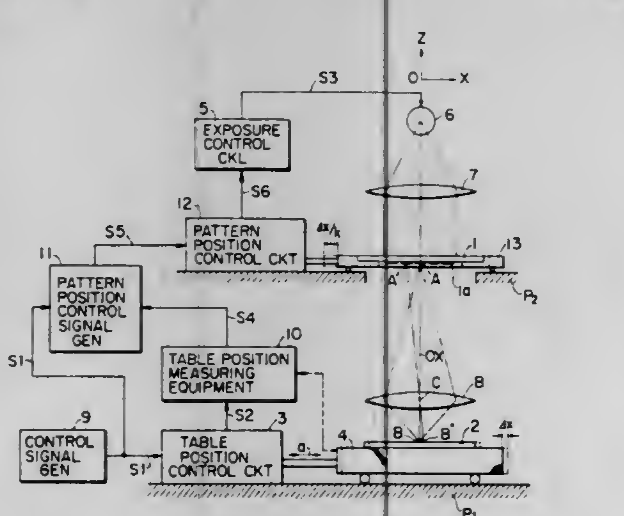
1. In a machine for transporting and printing a film track constituting a plurality of individual film negatives and corresponding perforated holes, and having the film track on a take-up reel and supply reel and extending therebetween to a printer, the latter including a light source lens and a screen for printing film on a printing stock, and a bezel plate having an opening substantially equal in size to that of a negative, the improvement comprising:
a yoke having two projecting arms and therebetween a

substantially semicircular inwardly directed peripheral recess and forming two openings disposed rearwardly adjacent the arms, two posts attached to and extending upwardly from said bezel plate;



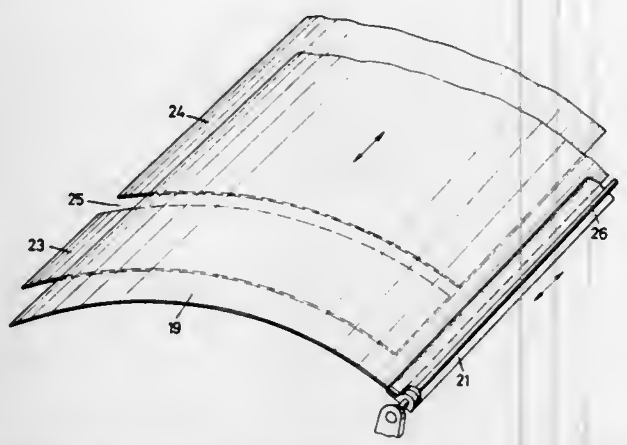
said yoke detachably mounted on said two posts, the latter being inserted in said two holes; and
a photoelectric cell detector connected to one of the arms of said yoke in said peripheral recess.

4,057,347
OPTICAL EXPOSURE APPARATUS
Shigeo Moriyama, Kokubunji; Tatsuo Harada, Fuchu; Yoshio Kawamura, Kokubunji; Seiya Hashimoto, Tokyo, all of Japan; Akihiro Takanashi, Gainesville, Fla.; Toshiei Kurosaki, Shinji Kuniyoshi, and Sumio Hosaka, all of Kokubunji, Japan, assignors to Hitach, Ltd., Japan
Filed Mar. 26, 1976, Ser. No. 670,830
Claims priority, application Japan, Mar. 26, 1975, 50-35581
Int. Cl.² G01B *11/26;* **G03B** *27/54*
U.S. Cl. 355—67 **5 Claims**



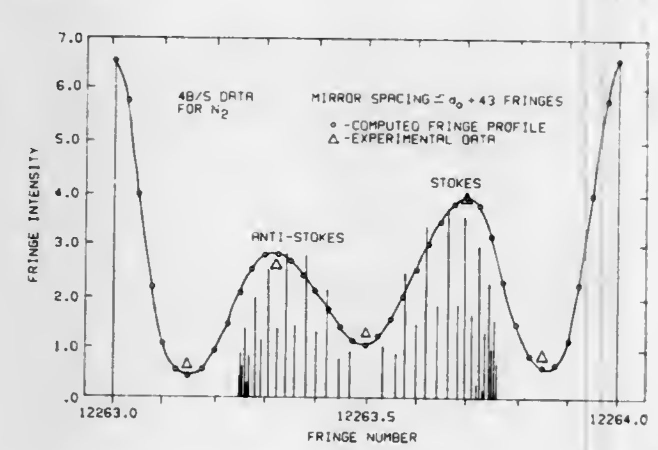
1. An optical exposure apparatus for exposing a workpiece to a reduced light pattern obtained from an original pattern through a projective lens having a reduction ratio smaller than one, comprising:
first means for generating a first control signal and for positioning the workpiece at a predetermined position in accordance with said first control signal;
second means for detecting an error in the actual positioning of the workpiece relative to the position represented by the first control signal generated by said first means and generating an error signal representative of said error; and
third means, responsive to the error signal generated by said second means, representative of the error of positioning of the workpiece, for generating a second control signal and for automatically shifting the original pattern in accordance with said second control signal, so as to cancel the error.

4,057,348
COPYING APPARATUS
Gerhard Ritzerfeld, Schorlemer Allee 14, 100 Berlin 33, Germany
Filed July 3, 1975, Ser. No. 592,846
Claims priority, application Germany, July 4, 1974, 2432424; Feb. 13, 1975, 2506127
Int. Cl.² G03B *27/62*
U.S. Cl. 355—75 **19 Claims**



1. In a copying apparatus, an arrangement for forming images including portions of original documents each of which has a plurality of such portions spaced from one another in a given direction and each having a different set of indicia thereon, said arrangement comprising, in combination, masking means at the apparatus and having at least one opening and indicia on said masking means which are to be correlated with said sets of indicia to form said images; means for supporting a respective original document behind said masking means as considered from the apparatus; and means for exposing a selected one of said portions in said opening for copying by the apparatus of an image composed of said masking means and the respective set of indicia on said selected portion of the respective original document, including means for transporting said supporting and masking means relative to one another in a path coincident with said given direction and operative for bringing each respective set of indicia of the respective original document in correlation with the indicia on said masking means for joint copying by the apparatus.

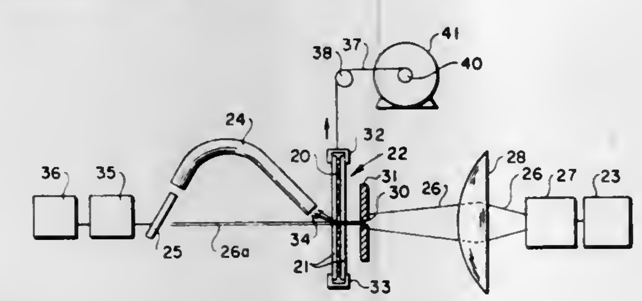
4,057,349
SPECTROSCOPIC TEMPERATURE MEASUREMENT
Joseph J. Barrett, Morris Plains, N.J., assignor to Allied Chemical Corporation, Morris Township, N.J.
Division of Ser. No. 584,085, June 5, 1975, Pat. No. 4,018,529, which is a continuation-in-part of Ser. No. 478,405, June 11, 1974, Pat. No. 3,909,132. This application Aug. 31, 1976, Ser. No. 719,474
The portion of the term of this patent subsequent to Sept. 30, 1992, has been disclaimed.
Int. Cl.² G01J *5/60, 3/44*
U.S. Cl. 356—45 **17 Claims**



1. Apparatus for determining the temperature of a gaseous

material by analyzing light having spectral components periodic in frequency, comprising:
a. light conditioning means for collecting, collimating and transmitting said light;
b. interferometric means adapted to receive said light for selectively separating periodic spectra therefrom and transmitting said spectra in the form of a detectable signal, said interferometric means having interference-producing means for providing a plurality of transmission windows regularly spaced in frequency, the frequency spacing between adjacent windows being adjusted to depart from an odd integral submultiple, *n*, of the frequency difference between adjacent spectral components of the periodic spectrum of said gaseous material, said odd integral submultiple being at least three so as to produce a split-fringe containing first and second branches of the components, and scanning means for causing the transmission peaks for adjacent *n*th orders to substantially coincide with the spectral lines of either branch of the components, whereby each branch of said split-fringe is derived from a plurality of periodic spectral lines and has an integrated intensity substantially equal to their sum;
c. signal conditioning means for measuring the intensity of each of said branches; and
d. detecting means for indicating and recording the intensity ratio of the branches, said intensity ratio correlating with the temperature of said gaseous material.

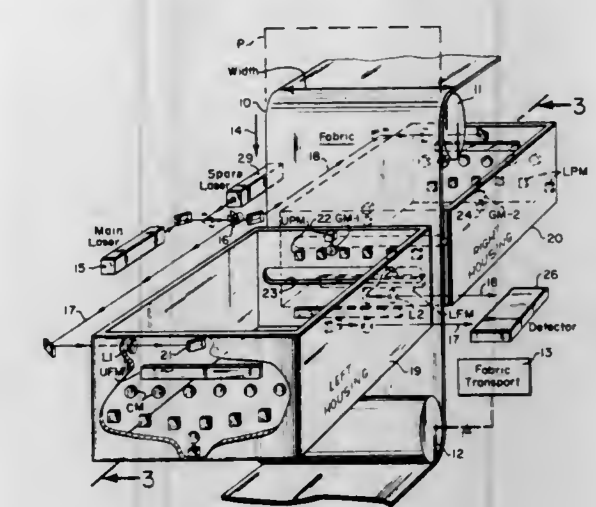
4,057,350
APPARATUS FOR COUNTING CRIMP IN FIBERS
Jeffrey M. Craig, Princeton, N.J., assignor to Akzona Incorporated, Asheville, N.C.
Filed Aug. 24, 1976, Ser. No. 717,736
Int. Cl.² G01N *23/20*
U.S. Cl. 356—199 **10 Claims**



1. An apparatus for counting crimps in a unit length of a fiber, comprising means for generating a laser beam, a plate having a slit through which the laser beam is passed, a cell to hold the fiber in a fixed position, means for moving the cell transversely through the laser beam lengthwise of the fiber, means for conducting pulses from scattered radiation caused by crimps in the fiber being moved through the laser beam, means for converting pulses from scattered radiation to electrical pulses, and means for counting electrical pulses, whereby as the fiber is moved transversely through the laser beam, pulses from scattered radiation caused by fiber crimps are conducted to the converting means, converted to electrical pulses, and counted, thereby counting the crimps in the fiber.

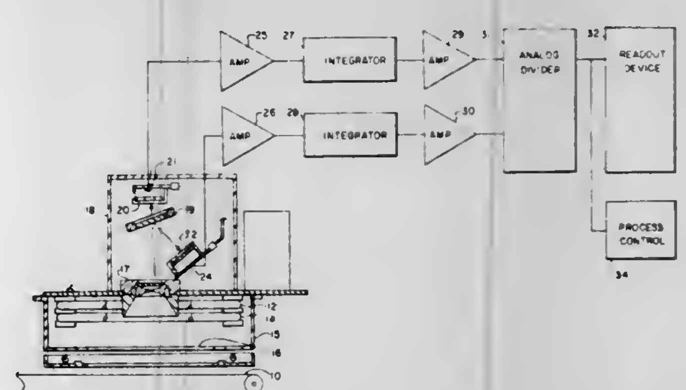
4,057,351
COHERENT SCANNING SYSTEM FOR FABRIC INSPECTION
Sergei Michael Fomenko, Woodland Hills, Calif., assignor to Greenwood Mills, Inc., Greenwood, S.C.
Filed Feb. 23, 1976, Ser. No. 660,253
Int. Cl.² G01N *21/16*
U.S. Cl. 356—238 **10 Claims**

3. A system according to claim 1, in which said plurality of first optical means includes a row of plane mirrors in side-by-side relationship positioned to successively receive light from said scanning mirror and a row of concave mirrors positioned to respectively receive light succesively reflected from said plane mirrors and successively direct said light in said side-by-side parallel directions towards said fabric, said plurality of second optical means including a row of plane mirrors in



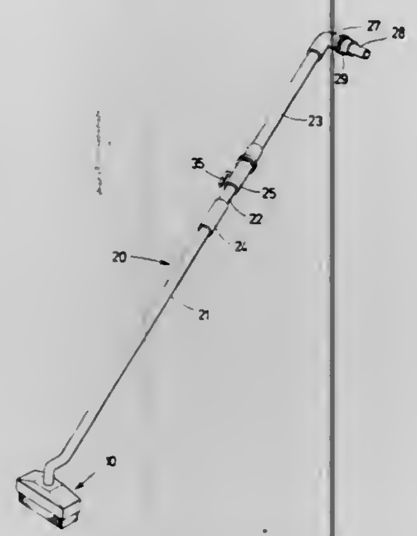
side-by-side relationship respectively in alignment with said concave mirrors and oriented to successively reflect said light beam received from said concave mirrors to said de-scanning mirror.

4,057,352
COLOR GRADING APPARATUS UTILIZING INFRARED LIGHT SOURCE
Raymond E. Babb, Fremont, Calif., assignor to Genevieve I. Hanscom; Robert M. Magnuson and Lois J. Thomson, Calif., part interest to each
Filed May 13, 1976, Ser. No. 686,021
Int. Cl.² G01J *3/50;* **G01N** *21/22*
U.S. Cl. 356—178 **3 Claims**



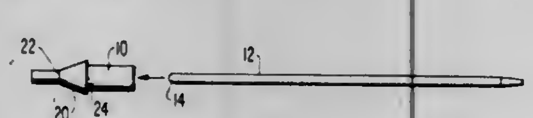
1. Apparatus for monitoring the color of a product, comprising in combination:
an Argon gas discharge light source for emitting infrared energy in the frequency region of 8110 A;
a light source for emitting light in the green wavelength region of approximately 5430 A;
means for directing the light from the Argon and green light sources onto the product;
light transmitting means for receiving the light reflected from said product; and
means for generating a ratio signal responsive to the relative intensities of the infrared and green light reflected from the product.

4,057,353
FLOOR CLEANING DEVICE
Tatsuyuki Kitatani, No. 867, Fukuda, Sakai, Osaka, Japan
Filed May 11, 1976, Ser. No. 685,164
Claims priority, application Japan, Dec. 18, 1975, 50-172962[U]
Int. Cl.² A46B *11/06*
U.S. Cl. 401—43 **5 Claims**



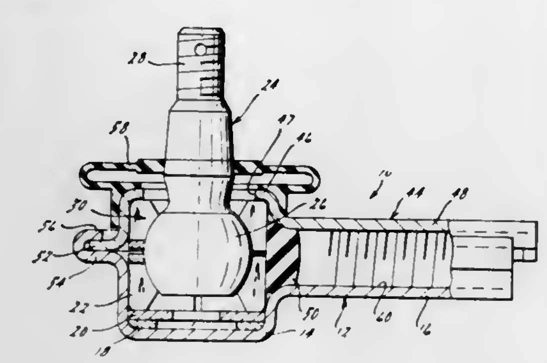
1. A floor cleaning device connected to a water supply by a hose, comprising:
- a hollow pipe handle connected at one end to said hose;
- a partition at a midway portion of said pipe handle dividing said pipe into two flow passages;
- flap means positioned at said partition and pivotable back and forth on both sides of said partition for alternatively closing off one of said flow passages in said pipe;
- pipe means connected to said flap means and extending through said hollow pipe in a water-tight relationship for pivoting said flap means back and forth across said passages;
- a screen stretched across the downstream end of one of said flow passages at said partition; and
- polishing means removably connected to the end of said hollow pipe handle opposite the end connected to said hose for cleaning the floor surface to be cleaned, said polishing means having a plurality of holes therethrough communicating with said hollow pipe, whereby water in said pipe will pass through said holes.

4,057,354
NIB AND SHIELD FOR WRITING IMPLEMENT
Harold F. Bajusz, 379 Innes Road, Woodridge, N.J. 07075, and Nobuhiro Iino, 94-2, Shimo-Hideya, Okegawa, Saitama, Japan (363)
Filed Apr. 21, 1976, Ser. No. 678,747
Int. Cl.² B43K *5/00*
U.S. Cl. 401—199 **2 Claims**



1. A writing implement comprising an elongated barrel having an opening at one end, means within said barrel defining an ink reservoir spaced from said one end, said barrel having side walls located between said ink reservoir and said one barrel and defining an elongated chamber therebetween, an elongated flexible nib having a writing point at one end and a tip at its opposite end, a shield encasing said nib and terminating at one end short of said one nib end to expose the writing point at the one shield end, said nib and said shield being coaxially inserted into the opening at one end of said barrel with the tip of said nib lying in communication with said ink reservoir for transmitting ink from said ink reservoir along said nib to said writing point, said shield extending within said chamber and being spaced from the side walls thereof, said shield extending from said one shield end over the major portion of the length of said nib for reinforcing said nib against flexing movement within said chamber in a direction transverse to its length, and means for retaining said nib and said shield in said barrel, said nib and shield being formed of different plastic materials coextruded one with the other, said shield being formed of a plastic material stronger than the plastic material forming said nib, said shield lying in continuous engagement with said nib substantially throughout the portion of said nib which is coextensive with said shield, said shield encasing said nib for at least 70% of the length of said nib and having a laterally enlarged portion at said one end thereof forming a shoulder engaging the margins of the barrel about said opening when said shield and said nib are inserted into and retained within said barrel, said shield being cylindrical in cross section and being substantially constant in cylindrical cross section for the portion of its length within said chamber and barrel opening said shield having a reduced diameter portion adjacent its opposite end tapering toward the tip of said nib and terminating short of said tip, said ink reservoir including an ink saturated fiber wad, said shield terminating at its opposite end short of the tip of said nib, said tip being received within said fiber wad and exposed laterally for communication with the ink in said reservoir.

4,057,355
FRANGIBLE TIE ROD END BEARING SEAT
William D. Allison, Grosse Pointe Farms, Mich., assignor to Ford Motor Company, Dearborn, Mich.
Division of Ser. No. 593,810, July 7, 1975, Pat. No. 3,988,818. This application July 2, 1976, Ser. No. 702,381
Int. Cl.² F16D *9/00*
U.S. Cl. 403—2 **1 Claim**

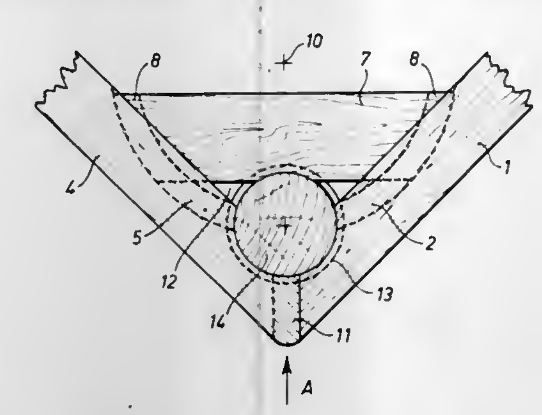


1. A bearing for a preloaded ball and socket joint having a generally annular shape with a partially spherical bearing surface,
- said bearing having a plurality of circumferentially spaced apart radial slots dividing said bearing into a plurality of bearing segments,
- frangible tie bars interconnecting said bearing segments,
- said tie bars having sufficient strength to maintain said bearing as a single piece during normal handling and being fracturable when assembled into said preloaded ball and socket joint whereby said bearing forms a plurality of separate bearing elements.

4,057,356
GLUED CORNER-JOINTS
Richard Bent Nissen, Langa, Denmark (8870)
Filed Nov. 6, 1975, Ser. No. 629,219
Claims priority, application Denmark, Nov. 7, 1974, 5801/74; Apr. 21, 1975, 1700/75
Int. Cl.² F16B *12/46*
U.S. Cl. 403—219 **17 Claims**

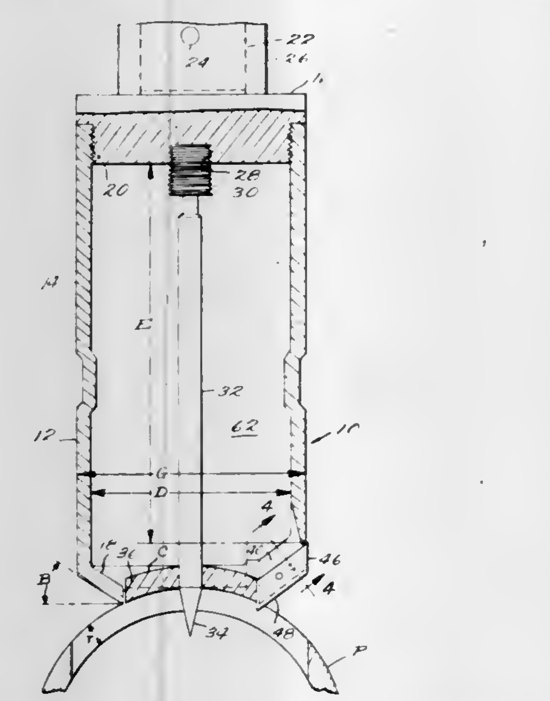
5. A corner joint comprising a pair of elongated, angularly related, elements arranged to form part of the corner joint, a block connecting said pair of elements along the inside of said corner joint and lying in a plane formed by said angularly

related elements, the adjoining surfaces of the block and the respective elements each being provided with and interconnected by tongues and grooves, the tongues and grooves of each said surface having outer tips and bases respectively which lie coincident with segments of circles having a common axis perpendicular to the plane of the elements in the



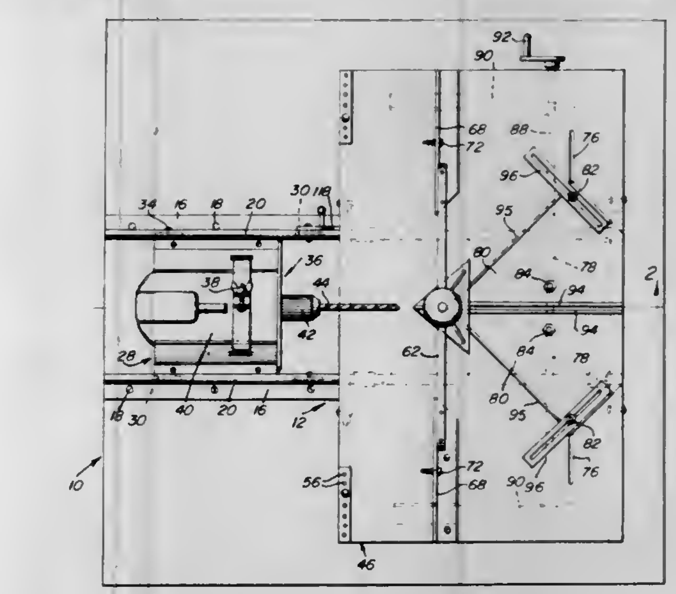
corner joint, the segments of the circles defined by the outer tips and bases of the tongues and grooves of the adjoining surface of one element having a common axis with the segments of the circles defined by the outer tips and bases of the tongues and grooves of the adjoining surface of the other of said elements.

4,057,357
CHIPLESS SHELL CUTTER FOR LARGE DIAMETER PLASTIC PIPE
Joseph L. Daghe, Decatur, and Casimir B. Kuzmicki, Chicago, both of Ill., assignors to Mueller Co., Decatur, Ill.
Filed Nov. 24, 1975, Ser. No. 634,753
Int. Cl.² B23B *41/08, 51/04*
U.S. Cl. 408—67 **23 Claims**



1. A rotatable shell cutter member for cutting a hole in large diameter plastic pipe by cutting a coupon to form a hole and enlarging the formed hole when the shell cutter member is positively advanced against the pipe a predetermined distance per rotation of the same, said shell cutter member comprising:
- a metal hollow body member closed at one end and open at its other end to define a chamber for chips cut from said pipe, said body member having a cylindrical portion terminating at the said other end in a frusto-conical end portion;
- a generally lengthwise extending slot in the frusto-conical end portion, said slot having a leading face and a trailing face as defined by direction of rotation of the shell cutter member;
- a blade member on said trailing face of said slot and spaced from the leading face, said blade member having a cutting edge positioned beyond the frusto-conical end portion of said body member and being generally parallel to said frusto-conical end portion of said body member, said blade member having a chip receiving surface opposing the leading face of said slot and extending rearwardly from the cutting edge of the blade member and inwardly of the body member in a direction to cause chips removed from the pipe to be directed inwardly and upwardly into the chamber of said hollow body member above the coupon; and,
- means to retain the coupon cut from the pipe so that the coupon prevents chips from falling from said chamber of said body member into the hole cut, said coupon retaining means being a pilot drill extending below the lower end of said frusto-conical end portion.

4,057,358
DOWEL BORE FORMING AND ROUTING JIG
Kenneth M. Young, 1601 Ave. J, Cozad, Nebr. 69130
Filed Nov. 3, 1975, Ser. No. 628,607
Int. Cl.² B23B *41/00*
U.S. Cl. 408—91 **4 Claims**

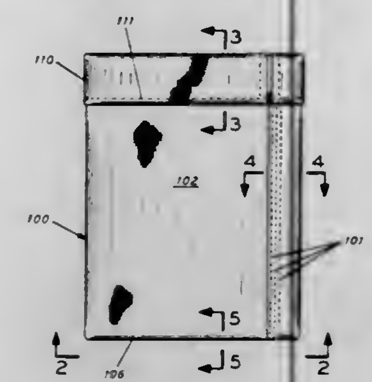


1. In combination, a support table defining a center line, a support member, support means supporting said support member for guided rectilinear reciprocation toward and away from one side of said table in a plane normal to said table and in which said center line is disposed, said support member including means for supporting a rotatable chuck therefrom disposed in said plane above the upper surface of said table and facing toward the opposite side of said table, a pair of abutment members overlying said upper surface on opposite sides of said center line plane and supported from said table for guided movement toward and away from said center line along paths normal to said plane, said abutment members including opposing abutment surfaces paralleling said plane, and abutment member adjustment means connected between said table and abutment members operative to inversely and equally shift said abutment members toward and away from said center line, said support means also including means supporting said table for guided rectilinear shifting along a path normal to said plane relative to the latter and operative to establish equal adjusted predetermined limits of movement of said table along the last mentioned path and thus said center line outwardly of opposite sides of said plane.

4,057,359
BALLISTIC NYLON FABRIC TURBINE GOVERNOR HOUSING SHIELDING MEANS
Edward D. Grooman, Walnut Creek, Calif., assignor to Chevron Research Company, San Francisco, Calif.
Filed Dec. 22, 1975, Ser. No. 643,607
Int. Cl.² B23B *39/04*
U.S. Cl. 415—9 **4 Claims**

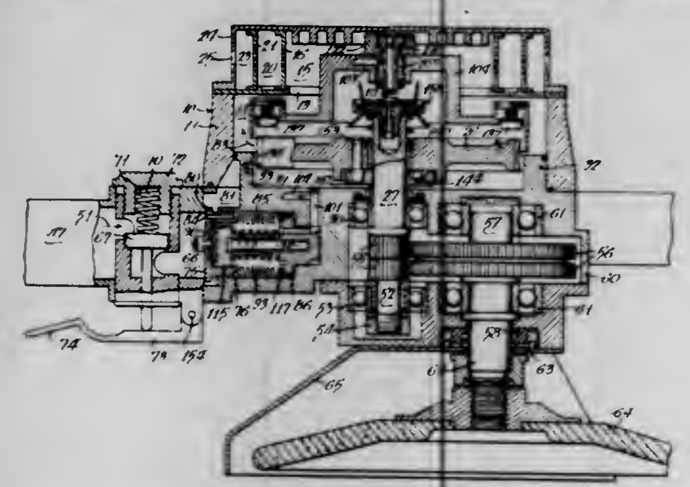
1. A removable lightweight shielding means of ballistic

nylon to provide added protection to a turbine governor housing, comprising: a first plurality of layers of ballistic nylon fabric forming a continuous sidewall and a second plurality of ballistic nylon fabric layers fitted and secured around an open



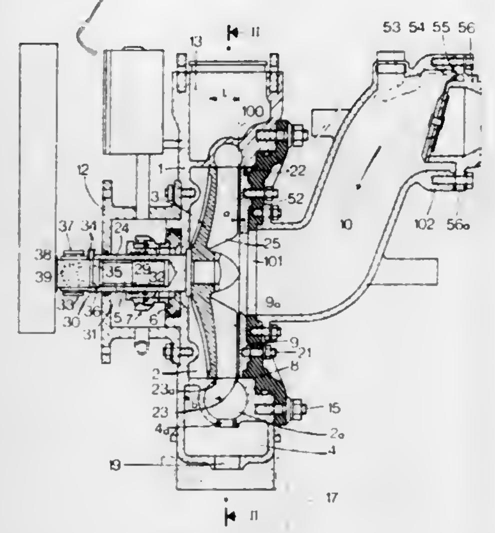
end of said continuous sidewall so as to form a closed end of said shielding means, said shielding means locatable over a turbine housing cover and securable to said housing by a removable means.

4,057,360
PRESSURE GAS ENGINE
James V. Theis, Jr., Delray Beach, and Bruno P. Meyer, Boca Raton, both of Fla., assignors to Hollymatic Corporation, Park Forest, Ill.
Filed June 10, 1976, Ser. No. 694,892
Int. Cl.^{2} F01B *25/06*
U.S. Cl. 415—25 **14 Claims**



1. A pressure gas engine, comprising: a rotor having energy conversion means thereon for converting dynamic gas pressure to power; gas supply means for supplying pressurized gas to said engine; gas passage means from said supply means to said energy conversion means; control means for said pressurized gas comprising a valve seat in said gas passage and a force movable valve movable toward and away from said seat to control and meter the gas flow through said passage, said force movable valve comprising an expansible and retractable bellows having a hollow interior and a chamber surrounding the bellows in which the bellows is located; first gas flow means for diverting a portion of said pressurized gas to the interior of said bellows; second gas flow means for diverting a portion of said pressurized gas to the chamber surrounding said bellows; a pressurized gas vent passage means leading from said bellows interior and including a vent valve seat; a movable vent valve member movable into and away from engagement with said vent valve seat for metering gas flow through said vent passage; and means for moving said vent valve member toward said vent valve seat on increasing speeds of said rotor and away from said vent valve seat on decreasing speeds thereby controlling the rate of venting of said gas and thus the position of said force movable valve relative to its seat.

4,057,361
CENTRIFUGAL PUMP
Georges Renaud, Nogent sur Marne, France, assignor to Societe Pompes Multiflux, Paris, France
Filed Mar. 11, 1975, Ser. No. 557,385
Claims priority, application France, Mar. 11, 1974, 74.08213
Int. Cl.^{2} F04D *5/00;* **F01D** *17/00*
U.S. Cl. 415—53 R **9 Claims**



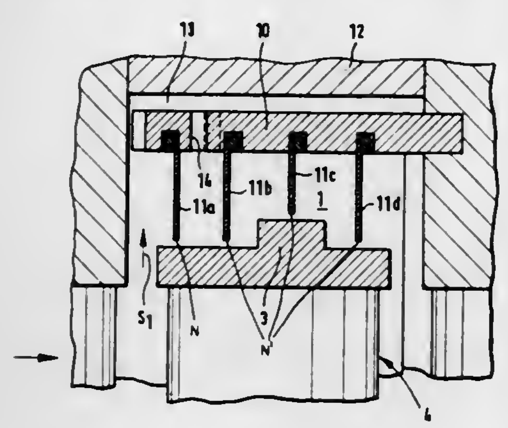
1. In a single stage centrifugal pump having a casing enclosing a cavity housing an axial suction impeller, said impeller being cantilevered to a drive shaft and laterally displaceable, and said cavity including an enlarged peripheral volute portion, the improvement wherein

said cavity is constructed to receive impellers having blades whose widths vary over a predetermined range,

the outside circumference of the impeller has a width which covers substantially the entire opening of said volute portion for all different widths of said range and the rear shroud has increased thickness as blade width decreases, and

the volute portion being free of provisions for adjustment of its width.

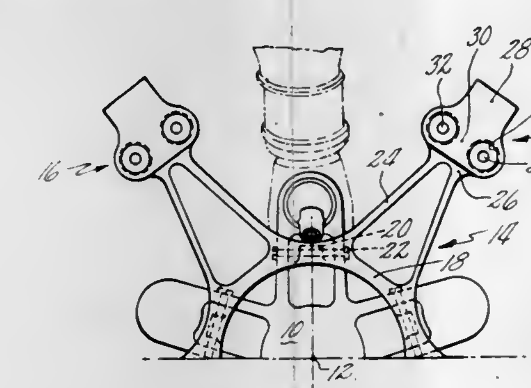
4,057,362
APPARATUS FOR RAISING THE DYNAMIC PERFORMANCE LIMIT OF STEAM FLOW AND GAS FLOW TURBINES AND COMPRESSORS
Rudolf Schwaebel, Nurnberg, Germany, assignor to Maschinenfabrik Augsburg-Nurnberg AG, Nurnberg, Germany
Filed May 7, 1976, Ser. No. 684,105
Claims priority, application Germany, May 9, 1975, 2520653
Int. Cl.^{2} F01D *11/02;* **F04D** *29/08;* **F02F** *11/00*
U.S. Cl. 415—170 R **4 Claims**



1. An apparatus for use in connection with reduction of vibration exciting forces to effect raising of dynamic performance limit of flow in a rotary machine of the turbine and compressor type having a leakage flow, the combination of: rotatable means, stationary wall means in the form of a ring surrounding said rotatable means in radially spaced relationship

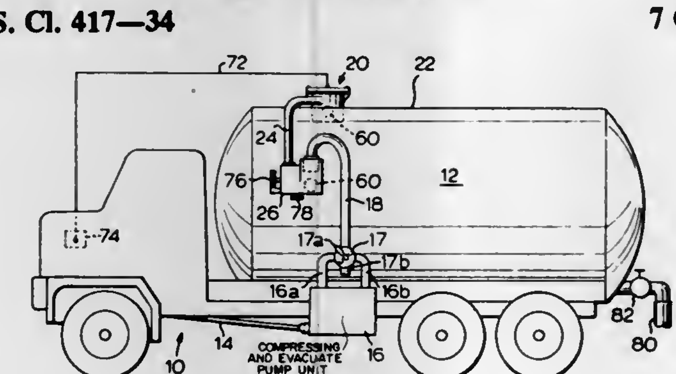
thereto so as to define therewith an annular clearance, noncontacting sealing means arranged in said clearance and supported by said ring while forming a labyrinth seal including throttling elements, housing means surrounding said ring in radially spaced relationship so as to form therewith an annular gap, said labyrinth seal including an active section and at least one throttling element the improvement comprising that said ring provided with passage means extending from said clearance to said annular gap and being located ahead of said active section of said seal and past at least one of said throttling elements, the dimensions of said passage means and of at least one of said throttling elements being so selected that the major portion of the leakage flow is passed directly into said clearance through said passage means which provide less resistance to flow.

4,057,363
EXTENDED ARM BIFILAR AND METHOD TO ELIMINATE SECOND ORDER VIBRATION EXCITATION
Irwin Jeffrey Kenigsberg, and William Francis Paul, both of Trumbull, Conn., assignors to United Technologies Corporation, Hartford, Conn.
Filed Nov. 20, 1975, Ser. No. 633,886
Int. Cl.^{2} B64C *27/32*
U.S. Cl. 416—145 **6 Claims**



1. In a helicopter having a hub, a support member rotatable with said hub having a plurality of radially extended arms, a bifilar absorber mounted at the extremity of each arm having a pendulous mass, the length of said arms measured from the axis of rotation of said rotor to the c.g. of said masses and the weight of said masses being such as to absorb input excitations at design forward speed at pendulum amplitude of approximately $\pm$ 30°, that improvement comprising the combination of said pendulous masses having the same weight with new radially extended supporting arms of substantially double the length of said first mentioned arms.

4,057,364
FLUID TRANSFER SYSTEMS AND VALVES THEREFOR
John Bratschitsch, 210 Edgemont St. South, Hamilton, Ontario, Canada
Division of Ser. No. 499,877, Aug. 23, 1974, abandoned. This application Dec. 12, 1975, Ser. No. 640,318
Int. Cl.^{2} F04B *49/00*
U.S. Cl. 417—34 **7 Claims**



1. A fluid transfer system for transferring liquid from a source thereof to the interior of a liquid-receiving tank by the withdrawal of air from the said interior and for transferring liquid from the tank interior to the exterior thereof by the supply of air to the said interior comprising:

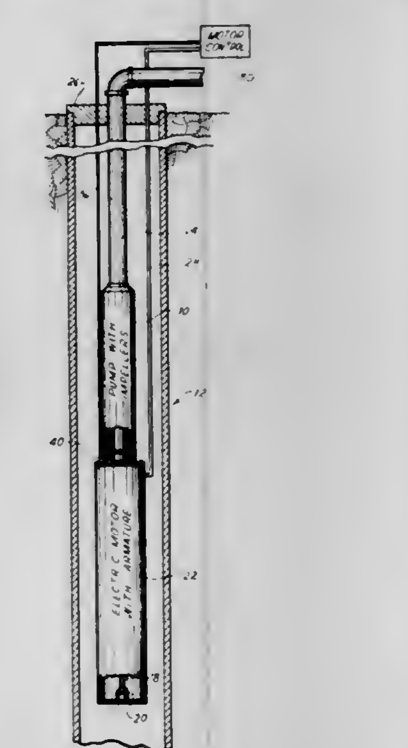
an air transfer pump unit for the said withdrawal of and supply of air;

an air transfer passage connecting the interior of the tank to the air transfer pump unit;

a first float responsive means positioned at least partly in the tank interior and actuated in response to the presence of a predetermined level of liquid in the tank interior to close the air transfer passage and thereby preclude the passage of liquid into the air transfer passage;

and a secondary float valve means connected in the air transfer passage between the said air pump unit and the said first float responsive means and actuated in response to receipt of liquid from the air transfer passage between the first float responsive means and itself to close the air transfer passage and thereby to further preclude the possibility of passage of liquid from the tank interior to the air transfer pump unit.

4,057,365
SUBMERSIBLE THRUST LIMIT SWITCH
Marvin L. Colmer, 530 S. Berkshire, Crosbyton, Tex. 79322
Filed Apr. 12, 1976, Ser. No. 676,368
Int. Cl.^{2} F04B *49/06*
U.S. Cl. 417—44 **10 Claims**



1. In a submersible pump unit having

a. a submersible electric motor enclosed in a motor housing,

b. a vertically oriented motor shaft extending from said motor,

c. fluid seals around said motor shaft and all other openings to prevent fluid from entering the motor so the motor may be operated submerged in water,

d. a source of electrical power,

e. a normally opened switch connecting said motor to said source of power,

f. an electric holding coil to hold said switch closed when energized,

g. a pump attached to said motor,

h. a pump shaft extending from said pump coaxial with said motor shaft,

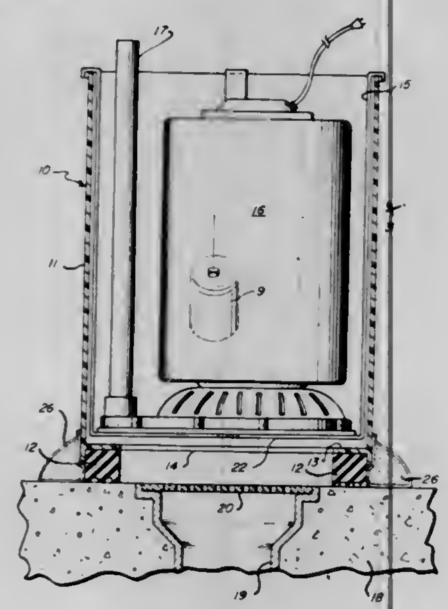
j. a thrust bearing supporting the motor shaft and pump shaft, and

k. a coupling connecting said pump and motor shaft;

m. the improvement comprising

n. a submersible thrust limit switch affixed to said motor housing and bearing against said coupling, forming
o. detection means for detecting axial movement of said shafts, and
p. conductor means on said thrust limit switch for connecting it to the electrical power supply,
q. said switch including
i. a cavity, and
ii. a flexible diaphragm between the cavity and the outside of the switch whereby the pressure within the switch is equal to the pressure outside the switch.

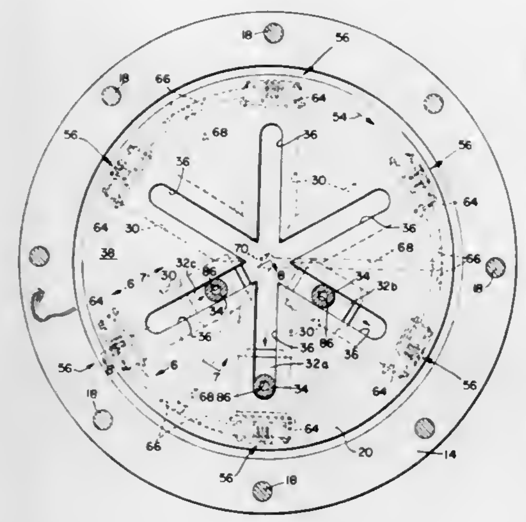
4,057,366
PORTABLE WATER EVACUATOR
Fred T. Niemann, 19 N. Mount Prospect, DesPlaines, Ill. 60016
Filed Feb. 2, 1976, Ser. No. 654,540
Int. Cl.^{2} F04B *21/00, 35/04*
U.S. Cl. 417—234 **6 Claims**



1. A portable water evacuator assembly comprising, in combination: a sump pump; a housing for removably supporting therein said sump pump, said housing being formed to removably seat over and about a floor drain and having a sealing gasket about its periphery at the lower end thereof for providing a substantially water-tight seal between said housing and a support surface such that said sealing gasket seals off the area exterior to the area immediately above the floor drain and such that any water discharged from the floor drain is contained within and rises in said housing; said sump pump being actuated by means responsive to water rising within said housing to pump water out of said housing; and means for discharging water pumped by said sump pump to a remote location.

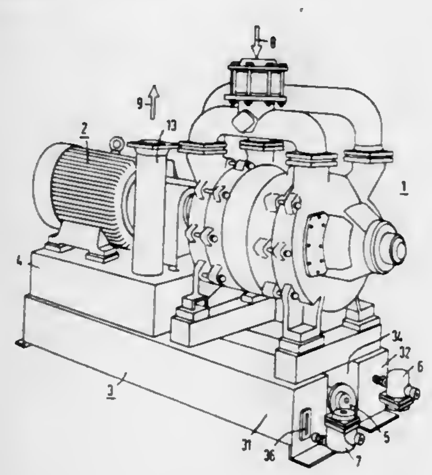
4,057,367
COMBINED ROTARY-RECIPROCATING PISTON COMPRESSOR
James S. Moe, 514 W. Fireweed Lane, Anchorage, Alaska 99503; Marvin B. Carter, and Ray L. Carter, both of Star Route C Box 293, Palmer, Alaska 99645
Filed Dec. 11, 1975, Ser. No. 639,822
Int. Cl.^{2} F04B *27/06*
U.S. Cl. 417—273 **11 Claims**

1. A compressor for refrigeration gas or the like comprising: a stator housing; a rotor having an axis and being mounted for rotation about said axis within said stator housing; means defining an even numbered plurality of similarly internally dimensioned and equispaced gas compression chambers within said rotor, arranged about and intersecting said rotor axis, opposed pairs of said compression chambers forming a single expansible chamber having a single centerline, said centerline being a diameter of said rotor at a right angle to said rotor axis, a plurality of similarly externally dimensioned pistons, one in each expansible chamber; each expansible chamber piston being linearly moveable through substantially the entire length of its chamber, through said rotor axis, a plurality of connecting pins, one on each piston; rotatable plate means for mounting the free ends of said connecting pins and being disposed within said housing on one side of said rotor, the axis of rotation of said plate means being parallel to and offset a predetermined distance from said rotor axis; a first shaft extending from said plate means through said housing on the axis of rotation of said plate means; a second shaft extending from said rotor on a side thereof opposite said one axis through said housing on the



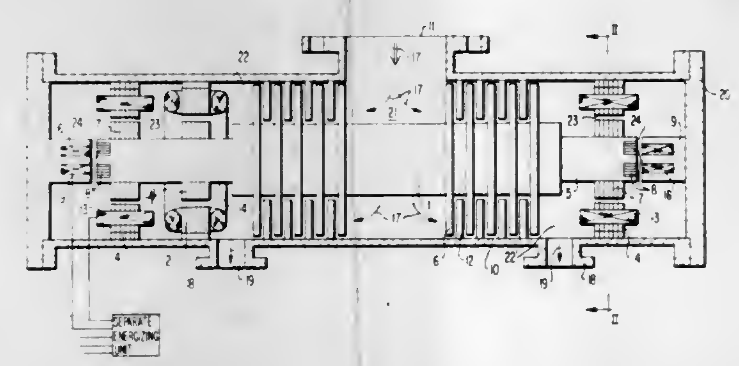
axis of rotation of said rotor, one of said first or second shafts constituting a drive shaft for said compressor; sealing means about each of said shafts for sealing said rotor within said housing; means for admitting refrigeration gas to each of said expansible chambers; outlet means at the radially outward end of each of said gas compression chambers of receiving compressed gas; duct means from said outlet means through said rotor and second shaft for conveying compressed gas from said outlet means; and exhaust outlet means through said housing in fluid communication with said duct means.

4,057,368
BASE FRAME CONSTRUCTION FOR A LIQUID RING COMPRESSOR SET
Heinz Balling, Erlangen, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany
Filed Dec. 15, 1975, Ser. No. 640,959
Claims priority, application Germany, Dec. 19, 1974, 2460268
Int. Cl.^{2} F04B *39/16;* **F04C** *19/00*
U.S. Cl. 417—313 **10 Claims**



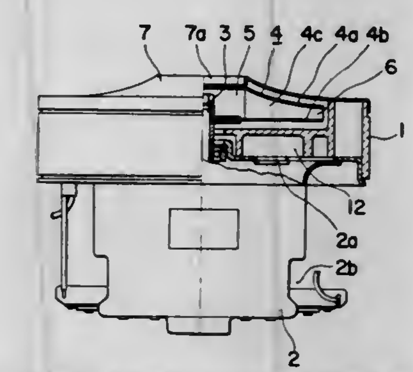
1. In a liquid ring compressor set including a base frame fabricated of hollow sectional members in which a motor and compressor, each including a shaft, of the set are mounted, said compressor including an outlet, said base frame functioning as a liquid separator for said set, the improvement comprising a U-shaped base frame for said set including a pair of spaced-apart leg members each disposed in parallel relationship with respect to the shaft of said compressor of said set, and a connecting member coupled to corresponding ends of said leg members so as to form said U-shaped base frame, one of said leg members including at least one fluid inlet opening disposed in the top surface thereof coupled to said compressor outlet and the other of said leg members including at least one fluid outlet opening disposed in the top surface thereof, said compressor ejecting a fluid mixture into said inlet opening and said fluid mixture flowing through said base frame out of said compressor set through said outlet opening for separating moisture from said fluid mixture.

4,057,369
VACUUM PUMP HAVING A ROTOR SUPPORTED IN THE INTERIOR OF ITS CASING
Gerhard Isenberg, Dachau, and Wolfgang Tuzinsky, Munich, both of Germany, assignors to Maschinenfabrik Augsburg-Nurnberg AG, Munich, Germany
Filed July 22, 1974, Ser. No. 490,849
Claims priority, application Germany, July 21, 1973, 2337226
Int. Cl.^{2} F04B *17/00*
U.S. Cl. 417—365 **15 Claims**



1. A vacuum pump for generating high vacuums free of lubricating vapors, said pump comprising:
a housing having a horizontal extent, said housing including a vacuum intake chamber and at least one outlet means,
a rotor structure supported horizontally along the horizontal extent of said housing, said rotor structure including a shaft and a plurality of rotor vanes mounted on said shaft, said plurality of rotor vanes being in cooperation with a plurality of stator vanes mounted in said housing, and said plurality of rotor and stator vanes being arranged between said intake chamber and said outlet means,
an electric motor means mounted in said housing for rotation said rotor structure, and
electromagnetic support means for rotatably supporting said rotor structure in said housing, said electromagnetic support means supporting said rotor structure both axially and radially,
wherein said electromagnetic support means includes a plurality of radially mounted magnetic cores on said shaft and a plurality of electromagnets mounted in said housing in operative relationship with said plurality of radial magnetic cores for providing radial support of said rotor structure,
wherein said electromagnetic support means further includes at least one axial magnetic core mounted on the end face of said shaft and at least one electromagnet mounted in said housing in operative relationship to said axial magnetic core for providing axial support for said rotor structure, each of said electromagnets of said magnetic support means being electrically energized separately;
wherein said horizontally supported rotor structure includes two journal shafts extending from a central rotor hub, a portion of said plurality of rotor vanes being mounted on each of said two journal shafts and a portion of said stator vanes being mounted in said housing internally extending housing to be in cooperation with said rotor vanes on each journal shaft;
wherein said electric motor means includes a rotor means and a stator means, said rotor means being mounted on one of said two journal shafts, and said stator means being mounted in said housing in operative relationship to said rotor means; and
wherein said plurality of radially mounted magnetic cores includes two annular, laminated magnetic cores, each of said annular cores being mounted on each of said two journal shafts, and said plurality of electromagnets is mounted in said housing in operative relationship to each of said annular magnetic cores, and wherein said at least one axial magnetic core is mounted within the end face of each journal shaft and said at least one electromagnet is mounted in said housing in operative relationship to said axial magnetic cores in each respective end face of said journal shafts.

4,057,370
ELECTRIC BLOWER ASSEMBLY
Shigeaki Numata, and Ryosuke Sasaoka, both of Yokaichi, Japan, assignors to Matsushita Electric Industrial Co., Ltd, Kadoma, Japan
Filed Jan. 5, 1976, Ser. No. 646,593
Claims priority, application Japan, Feb. 4, 1975, 50-15181; Feb. 6, 1975, 50-16015; Feb. 6, 1975, 50-16017; Feb. 27, 1975, 50-24807
Int. Cl.^{2} F04B *17/00;* **F04D** *29/66*
U.S. Cl. 417—366 **3 Claims**

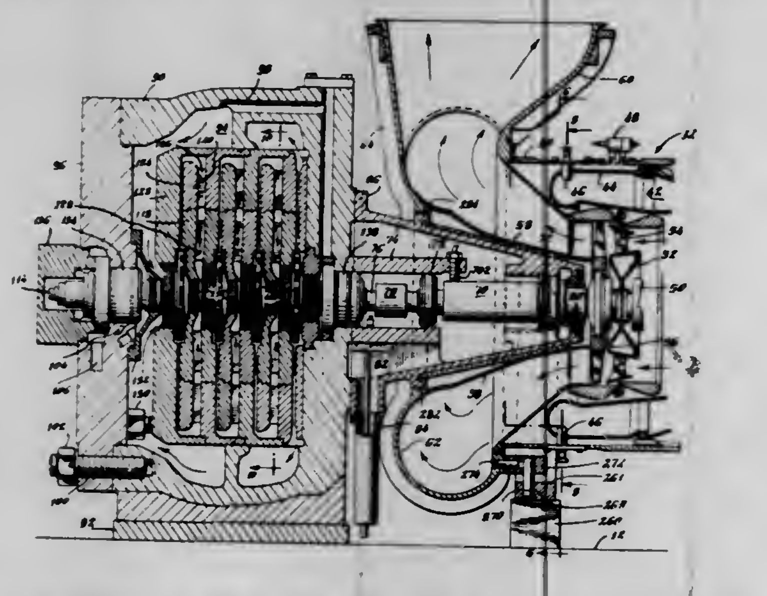


1. An electric blower assembly comprising at least one impeller having a plurality of vanes thereon defining exhaust outlets therebetween, an electric motor on which said impeller is mounted for rotation of said impeller, a plurality of volute chambers which are disposed peripherally around and on the plane of rotation of said impeller and each of which is defined by wall portions disposed parallel to and on opposite sides of said plane of rotation of said impeller, by a main wall disposed between said wall portions and perpendicular to said plane of rotation and extending in a curve having an inner end which is closer to said impeller and an outer end which is further removed from said impeller, and by a wall extension which in each volute chamber extends in direct continuation from the inner end of the main wall of an adjacent volute chamber and has the upper edge inclined downwardly in a direction opposite the direction of rotation of said impeller, the length of each said wall extension being greater than the distance between adjacent impeller vanes, air distribution passages for direction of air around said motor, whereby said motor may be cooled, and channels which are inclined with respect to said plane of rotation of said impellers and extend between outer end portions of said volute chambers and said air distribution passages.

4,057,371
GAS TURBINE DRIVEN HIGH SPEED CENTRIFUGAL COMPRESSOR UNIT
Karol Pilarczyk, Loudonville, N.Y., assignor to Norwalk-Turbo Inc., Latham, N.Y.
Filed May 3, 1974, Ser. No. 466,877
Int. Cl.^{2} F04B *17/00;* **F02C** *7/02*
U.S. Cl. 417—409 **9 Claims**

1. A compact high speed centrifugal compressor-gas turbine engine driver unit comprising a high speed centrifugal compressor including a compressor input shaft, a two-shaft gas turbine engine having a gas generator including a rotor shaft

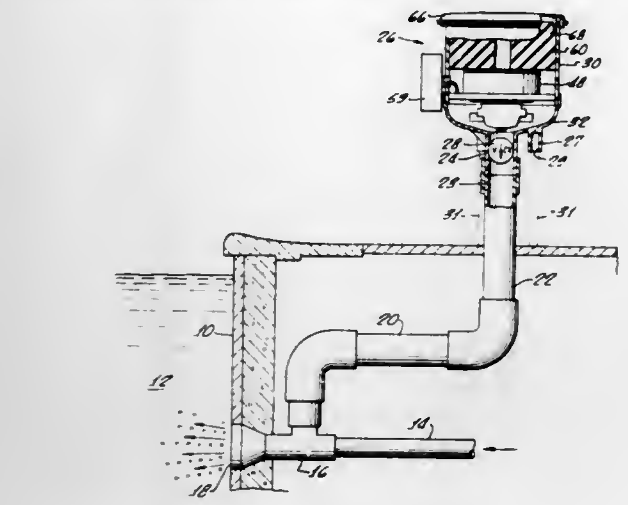
and a power turbine mounted on a power transfer shaft, said gas generator providing combustion products to the power turbine, there being no mechanical connection between the rotor shaft and the power transfer shaft of the gas turbine engine, a partial toroidal-shaped discharge casing in communciation with the power turbine for receiving exhaust gases from the power turbine, the partial toroidal-shaped discharge casing including discharge means for discharging the exhaust gases received by said partial torodial-shaped discharge casing, the compressor input shaft and the power transfer shaft of the gas turbine engine being directly closely integrated with each other, and shaft supporting means mounted to the compressor and extending outwardly therefrom concentric with said compressor input shaft for rotatably receiving said compressor input shaft and said power transfer shaft, and wherein means



are included for mounting the partial torodial-shaped discharge casing relative to the axis of rotation of the compressor shaft and power transfer shaft so as to permit free and uniform heat expansion or contraction movement of the discharge casing in all radial directions normal to the axis of rotation, the mounting means including flex means coupled to the partial toroidal-shaped discharge casing to accomodate expansion and contraction of the partial torodial-shaped casing in the plane of the partial torodial-shaped discharge casing normal to the axis of rotation of the power transfer shaft and vertical movement means permitting vertical movement of the partial toroidal-shaped discharge casing, the flex means and vertical movement means preventing movement of the partial toroidal-shaped discharge casing along its axis of rotation toward the power turbine.

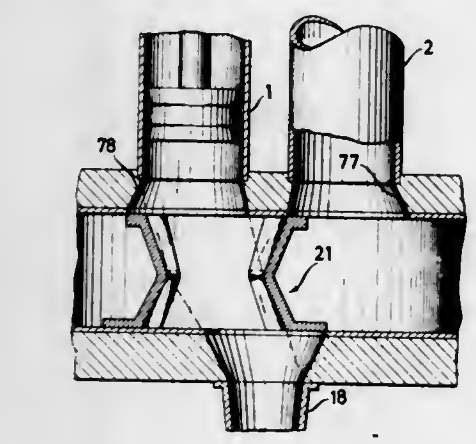
4,057,372
AERATOR
Lawrence E. Johnson, Dana Point, and William W. Conger, IV, Santa Ana, both of Calif., assignors to Lawrence E. Johnson, Dana Point, Calif.
Filed Aug. 25, 1975, Ser. No. 607,299
Int. Cl.² F04B *17/00*
U.S. Cl. 417—424 **13 Claims**

1. An aerator for forcing air into the water of a spa, said aerator comprising
 a housing formed of a cylindrical pipe section, a base secured and sealed to the bottom of said pipe section and having an axially directed output fitting connected therewith,
 an annular support and sealing ring fixed and sealed to and within said pipe section adjacent said base,
 a motor blower unit fixed and sealed to said support ring in axial alignment with said pipe section, said motor blower having an air input on one side of said ring and an air output on the other side of said ring,
 a cover connected with the top of said pipe section, and
 a muffler mounted in said pipe section and comprising a continuous body of foam substantially completely filling the space between said motor blower unit and an upper edge of said pipe section, said body of foam having an aperture extending axially therethrough of a diameter that is several times less than the diameter of the pipe section, said muffler having a substantially flat input end thereof extending parallel to and spaced from said cover to define



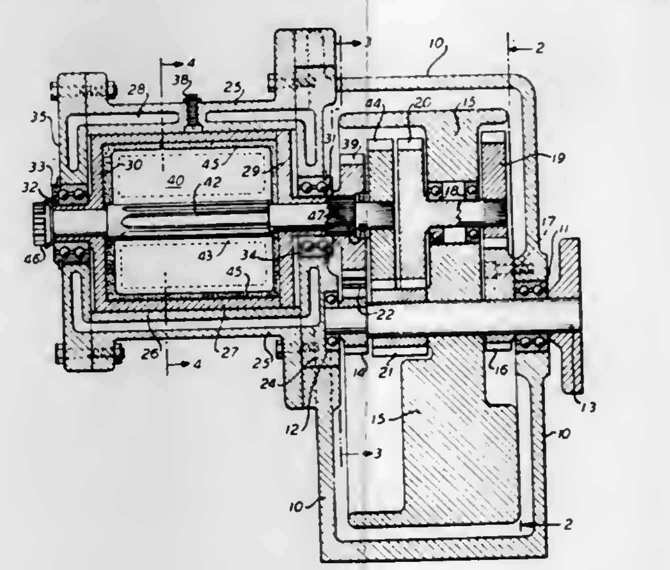
an air inlet chamber including means for providing an air inlet, said inlet chamber being in contact with said input end of said muffler over the entire cross-sectional area of said pipe section.

4,057,373
MULTI-CYLINDER PUMP FOR CONCRETE
Friedrich Schwing, Herne, Germany, assignor to Friedrich Wilhelm Schwing GmbH, Herne, Germany
Filed Aug. 20, 1975, Ser. No. 606,101
Claims priority, application Germany, Aug. 24, 1974, 2440654
Int. Cl.² F04B *7/00*
U.S. Cl. 417—519 **10 Claims**



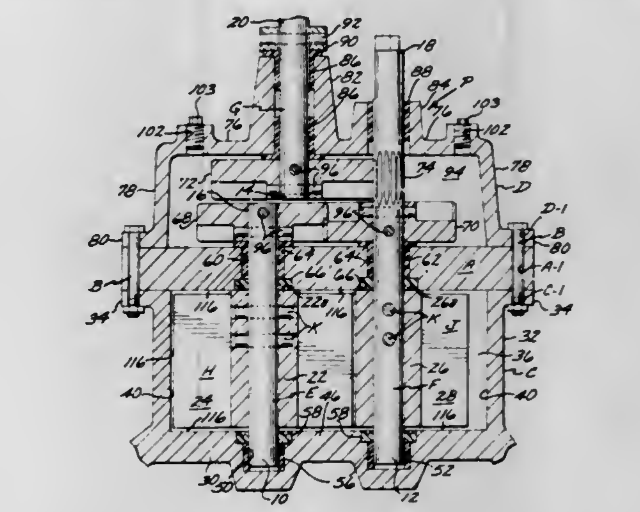
1. A multi-cylinder piston pump for conveying concrete, comprising two cylinders, a filling chamber casing, a respective inlet opening for each cylinder located in an end wall of the filling chamber casing at approximately equal distances from a vertical plane through the casing, said plane containing a horizontal axis which is the axis of the cylindrical wall of the casing, an outlet opening located in the other end wall, the perpendicular projection of the outlet opening on to the inlet openings partially covering said inlet openings, each cylinder being arranged to alternately suck the material through its respective inlet opening and force the material conveyed through the outlet opening, said pump further comprising a shaft containing said horizontal axis, a pivot body fixed on said shaft acting to deflect the material conveyed in the filling chamber, blades on said pivot body enclosing a pressure channel leading to the outlet opening, each blade having its edges sealed against the casing walls, and a base which is fixed to the shaft, the shape of said pressure channel being formed by the intersection of two pipe segments with the portions of the pipe segments which lie within the channel being eliminated, the line of said intersection being located substantially midway between the two end walls of the filling chamber, complementary surfaces on said pipe segments providing a smooth flow path when said pivot body is in one position only, and conical recesses on said inlet and outlet openings providing a smooth flow from said pressure channel to said openings.

4,057,374
ROTARY INTERNAL COMBUSTION ENGINE WITH UNIFORMLY ROTATING PISTONS COOPERATING WITH REACTION ELEMENTS HAVING A VARYING SPEED OF ROTATION AND OSCILLATING MOTION
Frederick W. Seybold, 1979 Dogwood Drive, Scotch Plains, N.J. 07076
Filed Sept. 2, 1976, Ser. No. 719,998
Int. Cl.² F01C *1/00*
U.S. Cl. 418—36 **8 Claims**



1. A rotary internal combustion engine comprising in combination:
 a. a first housing having a circular bore, exhaust and intake ports, water cooling cavities and ignition means,
 b. two side frames supporting said housing,
 c. a hollow cylindrical rotor rotatable in said circular bore, two diametrically opposed wedge-shaped pistons integral with said rotor, and axial, helical slots adjacent to said pistons,
 d. side walls on said rotor with first and second hubs thereon for mounting snap-ring bearings held in said side frames, said first hub being serrated
 e. a first spur gear mounted on said serrated hub,
 f. a multiple-splined shaft journalled in said first and second hubs, one end of said shaft being threaded to receive adjustable locking means, the other, longer serrated end of said shaft mounting a second spur gear,
 g. a reactor element having two diametrically opposed, wedge-shaped means integral with a long hub, said hub being splined and mounted on said multiple-splined shaft, and grooves in said reactor elements to receive seals,
 h. a second and larger housing, said first housing and side frames being bolted thereto,
 i. a drive shaft supported on a first ball bearing held on one side frame and a second ball bearing supported on said second housing,
 j. a large flywheel and a pinion being secured on said drive shaft,
 k. a stud secured in one side frame on which an idler gear is rotatably mounted, said idler gear meshing with the pinion on said drive shaft and said first spur gear,
 l. a compound gear mounted on ball bearings supported on said flywheel, said compound gear comprising a third spur gear and a first elliptic gear,
 m. a second elliptic gear secured to said second housing and mating with said first elliptic gear,
 n. a second wide-faced pinion free to turn on said drive shaft and mating with said second and third spur gears,
 o. whereby, after ignition, the expanding gas causes the reactor element at first to turn in a direction opposite to that of the piston and to exert a useful driving force on the piston as well as on the reactor element.

4,057,375
PUMP STRUCTURE
Paul W. Nachtrieb, 6392 Park Ave., Garden Grove, Calif. 92645
Filed Oct. 22, 1976, Ser. No. 735,026
Int. Cl.² F01C *1/18, 21/12;* **F04C** *1/08, 15/02*
U.S. Cl. 418—189 **9 Claims**



1. A semi-positive displacement pump of the type that includes first and second counter rotating impellers situated on spaced parallel axes in a pump chamber that has an inlet for an incompressible fluid and a discharge outlet therefor, with each of said impellers including a cylindrical hub from which a plurality of circumferentially spaced vanes extend radially, said first and second impellers when synchronously rotated sequentially defining first and second confined spaces that force said liquid in said pump chamber from a position adjacent said inlet to said outlet, said first and second impellers as they synchronously rotate defining third confined spaces of variable volume therebetween that pump a portion of said incompressible fluid in said pump chamber from a position adjacent said outlet to said inlet, said pump being characterized by operating smoothly without pulsations and including:
 a. first, second and third shafts each of which has first and second end portions, with said first and second hubs engaging said first and second shafts adjacent said first end portions thereof and removably secured thereto;
 b. a first gear removably secured to said second end portion of said first shaft;
 c. a second gear removably secured to said second shaft intermediate said first and second end portions thereof and in engagement with said first gear;
 d. a third gear removably secured to said second end portion of said third shaft;
 e. a fourth gear defined on the exterior surface of said second shaft that is engaged by said third gear;
 f. a center plate that has first and second spaced openings therein that rotatably engage intermediate portions of said first and second shafts, said center plate having a plurality of spaced transverse first bolt holes adjacent the edge thereof;
 g. a first housing that includes a flat bottom and a first continuous side wall that extends upwardly from the latter, said side wall having an oppositely disposed fluid inlet and fluid outlet therein, first and second elongate transverse fluid pressure relief cavities in said bottom adjacent said fluid inlet and outlet, said first and second cavities separated by a first portion of said bottom in which first and second recesses are formed that rotatably engage said first end portions of said first and second shafts, said first side wall on the upper extremity thereof developing into a first outwardly extending flange that has a plurality of spaced second bolt holes therein that are aligned with said first bolt holes, with the surface of said center plate most adja-

cent said first housing having third and fourth pressure relief cavities therein aligned with said first and second cavities, and said first housing when said first flange is in abutting contact with said center plate cooperating with the latter to define said pump chamber in which said first and second impellers are disposed;

h. a second housing that includes a top from which a continuous side wall depends, which side wall develops into an outwardly extending second flange in which a plurality of spaced third bolt holes are defined that are in alignment with said first bolt holes when said second flange is in abutting contact with said center plate, said second housing having first and second openings therein that rotatably engage said second and third shafts, said second housing cooperating with said center plate to define a confined space in which said first, second, third and fourth gears are disposed;

i. a plurality of bolts that engage said first, second and third bolt holes to removably hold said first and second housings in abutting contact with said pressure plate;

j. manually operated means for removably engaging said second end portion of said third shaft to rotate the latter and through said first, second, third and fourth gears impart counter synchronized rotation to said first and second impellers for fluid to be pumped in said pump chamber with said incompressible fluid not imparting shock to said vanes as said third confined spaces decrease in volume due to said fluid flowing into said fluid pressure relief cavities when said incompressible fluid is pressurized in said third confined spaces; and

k. engageable means on said second end portion of said second shaft that may be removably engaged by a prime mover to drive said first and second shafts and first and second impellers to pump fluid in the same manner as though said first and second shafts were driven by the manual rotation of said third shaft, with said center plate in cooperation with said first and second housings defining said pump chamber and confined space in which said first, second, third and fourth gears are disposed, said center plate defining said third and fourth fluid pressure relief cavities, and in cooperation with said first and second flanges and bolts holding said first and second housings in fixed spacing relative to one another.

4,057,376

DEVICE FOR DEGASSING PLASTIC MATERIALS

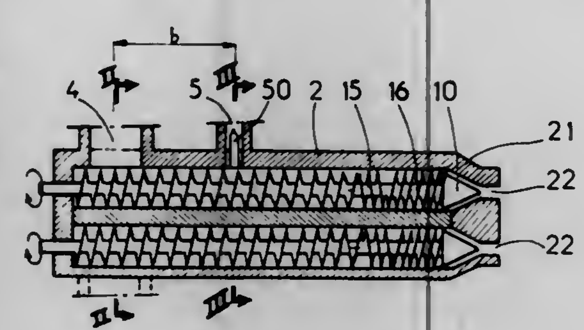
Pierre Berger, Saint-Etienne, France, assignor to Creusot-Loire, Paris, France

Filed July 28, 1976, Ser. No. 709,524

Claims priority, application France, Aug. 1, 1975, 75.24128

Int. Cl.² B29B *1/10*

U.S. Cl. 425—73 5 Claims



1. A device for degassing plastic material comprising an extruder including at least three parallel screws which intermesh in pairs, a casing surrounding said screws, said casing having opposite ends, a central stem extending axially in said casing and around which said screws are arranged, said casing having inner semi-cylindrical surfaces which surround a portion of the periphery of a respective one of said screws, said central stem having outer semi-cylindrical surfaces surrounding a remaining portion of the periphery of the respective screws such that each screw is substantially enclosed in entirety by said casing and central stem, said casing defining supply orifice means for supplying plastic material to said screws and degassing orifice means operatively associated with a suction source for removing gas from said plastic material, means operatively associated with said screws for rotating said screws in the same direction to feed material from said supply orifice means to one end of said casing, an end plate closing said one end of said casing and defining channel means for removing plastic material from said casing, said degassing orifice means being upstream of said supply orifice means with respect to the direction of feed of plastic material, said degassing orifice means comprising a degassing orifice centered in a plane tangential to each pair of said screws, said degassing orifice having a diameter at least equal to the distance between the axes of said pair of screws.

4,057,377

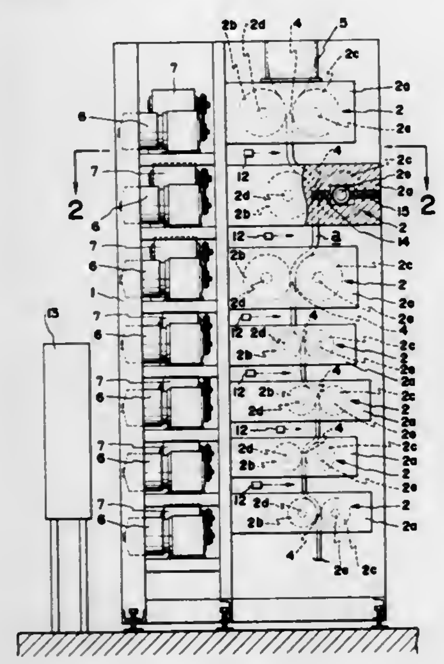
APPARATUS AND METHOD FOR NOODLE ROLLING

Hatuo Sakurazawa, 15 banchi, Sinozuka, Fujioka, Gunma, Japan

Filed May 17, 1976, Ser. No. 686,720

Int. Cl.² A21C *3/02*

U.S. Cl. 425—135 4 Claims



1. An apparatus for noodle rolling comprising:

a. a housing,

b. a plurality of roller sets disposed in the housing, each set being vertically arranged one below the other, each roller set comprising a pair of spaced apart rollers, the rollers of each set being spaced apart a distance sufficient to provide a gap therebetween,

c. a shaft for each roller, each roller being rotatably mounted on its associated shaft,

d. means operative to drive the shafts,

e. speed control means for each roller set, the speed control means controlling said driving means for setting the peripheral feed speed of the rollers in relation to the rollers of the other roller sets,

f. means operable to sense sagging of the noodle strip as it emerges from between a roller set and enters into the next lower roller set, the means being disposed between adjacent roller sets and being operatively connected to an associated speed control means, and

wherein the rollers of each pair are spaced apart a predetermined distance such that the space between such pairs progressively decreases along the vertical descent of the sets and further wherein the gap between any one roller set is such that it lies within a range corresponding to the distance between the shafts of the rollers of the immediately spaced below roller set.

4,057,378

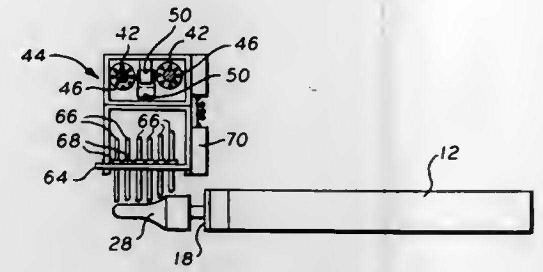
TRAVERSING CORE ROD DETECTING DEVICE

Ernst Dieter Wunderlich, Teaneck, N.J., assignor to Rainville Company, Inc., Middlesex, N.J.

Filed Aug. 18, 1976, Ser. No. 715,631

Int. Cl.² B29D *23/02*

U.S. Cl. 425—137 11 Claims



1. In injection blow molding apparatus having an indexing head with angularly related faces from which a plurality of core rods extend at locations spaced across the width of each face, an injection station, a blowing station, and a pick-off station at angularly spaced locations around the indexing head, and means for rotating the indexing head intermittently about a center to successively bring each face, and the core rods that extend therefrom, into position to cooperate with each of the stations, the combination comprising a carriage, a track extending lengthwise parallel to the extent of the face of the indexing head which is at rest at the pick-off station, the carriage being on said track and moveble lengthwise thereof, motor-operated motion-transmitting means that propel the carriage along the track following discharge of molded parts from the core rods at the pick-off station and only while the indexing head is stationary and prior to delivery of the rods to the injection station, a residue detector connected to and movable with the carriage transversely of the length of the core rods and extending into positions to strike against residue on each core rod while the indexing head remains at rest, if there is any residue on any of the core rods after blown objects have been stripped therefrom at the pick-off station, and a controller responsive to the striking of residue on any core rod by the detector during a traverse of the carriage across the stationary locations of the successive core rods at the pick-off station.

4,057,379

KNEADING AND EXTRUDING APPARATUS FOR EXTRUDABLE MATERIAL

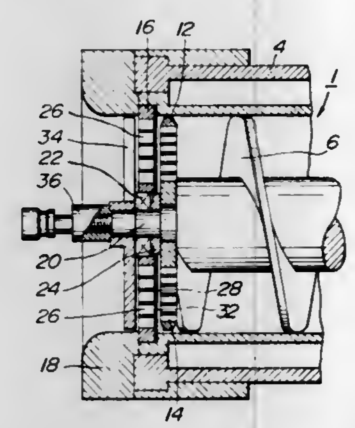
Takuya Sato, Yao, Japan, assignor to Sato Iron Works Co., Ltd., Yao, Japan

Filed Oct. 29, 1974, Ser. No. 518,734

Claims priority, application Japan, June 4, 1974, 49-65193[U]

Int. Cl.² B29F *3/00*

U.S. Cl. 425—199 3 Claims



1. In a kneading and extending apparatus, comprising a base, a housing supported on the base and having an inlet opening at its one end and an outlet opening at the other end for receiving and discharging material, a hopper communicating with said inlet opening, a screw feeder housed in said housing for kneading and forcing said material toward said outlet opening of the housing, driving means connected to said screw feeder for driving said screw feeder, a perforated rotating disc secured to said screw feeder and rotating adjacent to said other end of the housing and formed with a number of holes through which the material passes while rotating, a perforated stationary disc fixed to said other end of the housing downstream of said rotating disc and having clearance with said rotating disc and formed with a number of holes through which the material passes, and a perforated punching plate fixed to a surface of said stationary disc that confronts said rotating disc and formed with a number of holes smaller than the holes through said discs, said perforated punching plate having clearance with said rotating disc within a range of 1–5 millimeters, whereby the material that passes through said holes of said rotating disc is turned into parallel with a surface of said perforated punching plate to aid the material to be sheared between the rotating disc and said punching plate; the improvement wherein said holes of the rotating disc are formed perpendicularly to surfaces of the disc and have a diameter of 10–20 millimeters and the total open area of the holes is about 60–70% of the area of the rotating disc.

4,057,380

TRAY-LIKE CONTAINER AND A METHOD OF AND AN APPARATUS FOR MANUFACTURING THE CONTAINER

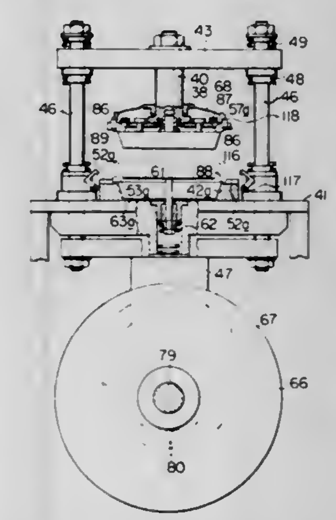
Masaya Hosoe, Tokyo, Japan, assignor to Machida Shigyo Co., Ltd., Machida, Japan

Division of Ser. No. 565,960, April 7, 1975, Pat. No. 3,973,722. This application Oct. 20, 1975, Ser. No. 624,056

Claims priority, application Japan, Apr. 16, 1974, 49-41687; Jan. 9, 1975, 50-4686; Jan. 22, 1975, 50-8680

Int. Cl.² B29C *3/00, 24/00*

U.S. Cl. 425—324.1 15 Claims



1. A molding press adapted to fold a flat paper blank into a tray-like container, the blank having a polygonal base panel with an even number of sides and corners, a continuous border around the base panel, and respective sets of three fold lines radiating from each corner of the polygonal base panel across the border to divide the border into side wall portions, contiguous with the respective sides of the base panel, and corner portions consisting of pairs of contiguous identical triangular panels that form respective gussets connecting adjacent side wall portions of the tray blank, the molding press comprising:

a female mold member having a molding cavity with an open mouth formed with an even number of corners corresponding to corners of a polygonal tray-like container to be formed in said molding cavity, a marginal surface portion surrounding the open mouth of the molding cavity, and seating means located adjacent to respective corners of the open mouth of the molding cavity and adapted to support a flat paper tray blank prior to folding, each seating means having an abutment spaced above the

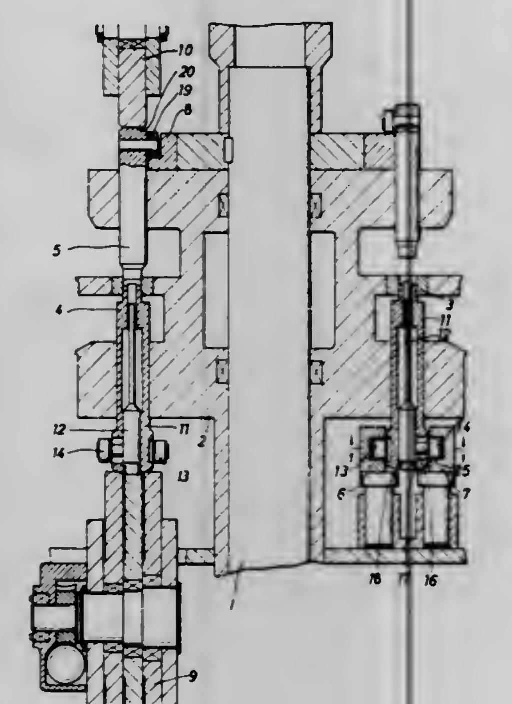
marginal surface and adapted to contact a corresponding corner of such a tray blank at approximately the fold line between the respective pair of triangular panels;

a male mold member having an outer shape complementary to the molding cavity of the female mold member;

means for moving said male member into and away from said female mold member; and

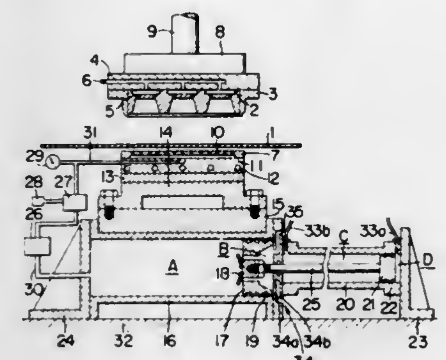
pressing means adapted to exert a force against only alternate ones of the side wall portions of such a tray blank when the blank is supported on the seating means, to press such alternate side wall portions against said marginal surface portion while leaving the other side wall portions adjacent to said alternate ones of the side wall portions unrestrained when the blank is forced into the molding cavity by moving the male mold member into the female mold members, whereby each contiguous pair of corner panels is folded inwardly on the common fold line between the panels by contact with the corresponding abutment, and said other side wall portions are folded upwardly as the blank enters the molding cavity so as to fold the contiguous triangular panels against the adjacent ones of the side wall portions when the mold members are fully engaged.

4,057,381
ROTARY PRESS
Wolfgang Korsch, Berlin, Germany, assignor to Emil Korsch, Spezialfabrik fur Komprimiermaschinen, Berlin, Germany
Filed Jan. 31, 1977, Ser. No. 764,077
Claims priority, application Germany, Feb. 4, 1976, 2604648
Int. Cl.^{2} B29C *3/02;* **B30B** *11/08*
U.S. Cl. 425—345 **6 Claims**



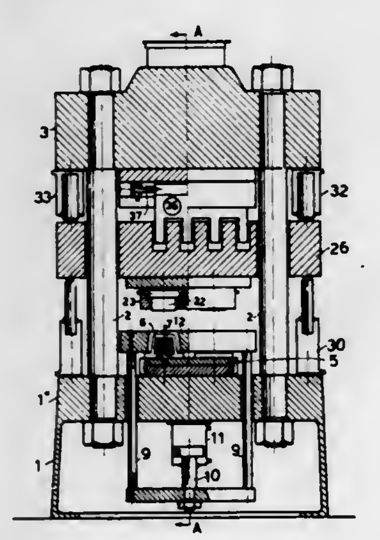
1. A rotary press comprising: a rotary driven matrix table for holding matrixes with boreholes; top and bottom dies; means for moving said dies in their axial direction towards and away from each other during rotation of the matrix table for pressing injected moldable material in said boreholes of the matrix; at least one of said dies for production of profiled articles comprising one outside and at least one inside die element, said outside and inside die elements being movable independently of each other; and at least one profiled press roller for directing said outside and inside die elements to different pressing paths for pressing movement of said outside and inside die elements.

4,057,382
APPARATUS FOR AIR-PRESSURE FORMING THERMOPLASTIC RESIN SHEETS
Masaji Yamamori, Nagoya, Japan, assignor to Mitsubishi Monsanto Kasei Kabushiki Kaisha, Tokyo, Japan
Filed July 29, 1975, Ser. No. 600,029
Claims priority, application Japan, Aug. 5, 1974, 49-89611
Int. Cl.^{2} B29C *17/04*
U.S. Cl. 425—387.1 **7 Claims**



1. In an apparatus for air-pressure forming of thermoplastic resin sheets comprising a set of mold means having a plurality of air purging holes and complementary means having a plurality of compressed air blowing holes and air compressing means for supplying air at a specific pressure to said compressed air blowing holes, said set of mold means and complementary means being disposed in mutually opposed state so adapted that at least one of said means can be moved toward and away from the other, the improvement wherein said air compressing means comprises compressed air generating cylinder means, first piston means movable slidably within said compressed air generating cylinder means, hydraulic cylinder means, and second piston means movable slidably in said hydraulic cylinder means, said first piston means being mechanically connected to and driven by said second piston means which is in turn operatively connected to means for generating a substantially constant hydraulic pressure.

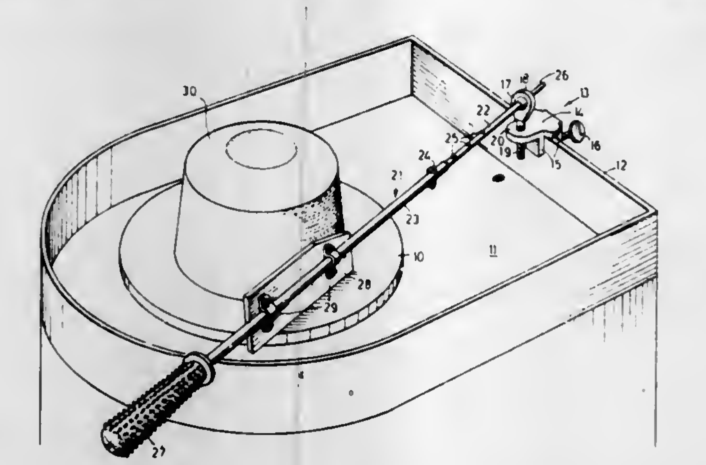
4,057,383
HYDRAULIC PRESS, PARTICULARLY FOR THE SHAPING AND PRESSING OF CYLINDRIC, OR TRUNCATED-CONE, OR LIKE SHAPED HOLLOW CERAMIC ARTICLES
Luigi Bettonica, Via Clusone, 3, Milan, Italy
Filed Jan. 3, 1977, Ser. No. 756,283
Claims priority, application Italy, Jan. 13, 1976, 19183/76
Int. Cl.^{2} B30B *5/02, 11/00*
U.S. Cl. 425—405 H **4 Claims**



1. In a hydraulic press for the shaping and pressing of hollow ceramic articles, the combination of a bed plate fitted with a horizontal table; a double acting hydraulic jack fitted below of

said table; a die having planoparallel front sides, and formed with a recess reproducing the negative outer shape of the article to be shaped and pressed; four uprights, slidingly fitted on guides, and by which said die is connected with the piston of said double acting hydraulic jack; a prismatic plate, slidingly fitted on said table, and to which at least one axially bored patrix is secured, being a bowl made of an elastically flexible and extensible material, reproducing the negative inner shape of the article to be made, laid on said patrix; two parallel, vertically directed columns, secured to said bed plate; a cross-member slidingly fitted on said vertical columns, and to which an ejector is secured, consisting said ejector of a cylindric body connected with a piston that can be operated by a pressure fluid, and having a diameter slightly smaller than that of top orifice of die recess, being same ejector fitted co-axially to said recess; two pairs of hydraulic jacks, by which said cross-member, bearing said ejector, is moved upwardly and downwardly, respectively; stop means for firmly retaining said cross member at the required height, whereby to keep closed the top of die recess while the article is being pressed; a hydraulic pump for feeding a pressure fluid throhgh the axial duct of patrix, wherein the elastically flexible and extensible bowl is laid, and a further hydraulic pump, for feeding the pressure fluid to hydraulic jacks by which the cross member, bearing the ejector, is controlled.

4,057,384
CLAY CENTERING DEVICE FOR A POTTER'S WHEEL
William Vincent Reid, 51 Pinelands Road, Sunnybank Hills, Queensland 4019, Australia
Filed Dec. 28, 1976, Ser. No. 755,065
Claims priority, application Australia, Jan. 30, 1976, 4677/76
Int. Cl.^{2} B28B *1/29*
U.S. Cl. 425—459 **3 Claims**



1. A clay centering device for a potter's wheel including:

a elongated arm,

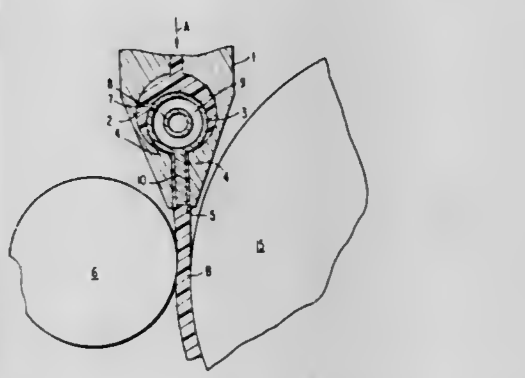
a centering slab, with a substantially straight normally bottom edge, mounted on the arm,

a handle at one end of the arm, and

mounting means attachable to the tray of a potter's wheel,

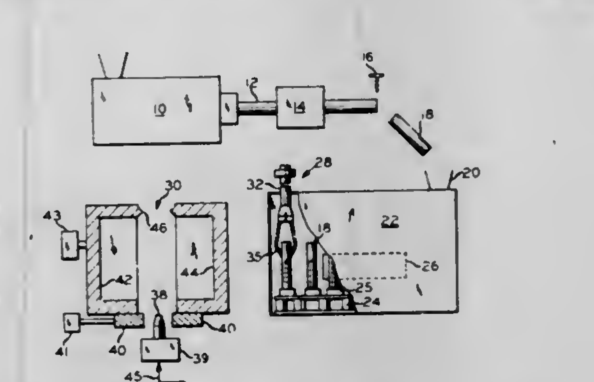
said arm being rotatable about its longitudinal axis, and also being universally pivotable within said mounting means, the arm being adapted to be moved by means of the handle to bring the centering slab across the top of the potter's wheel, its bottom edge in contact therewith, to center a piece of clay on the wheel, to be raised and lowered to bring the centering slab above or down to the wheel, and to be twisted about its axis of rotation to vary the angle of inclination of the centering slab to the top of the wheel to shape the clay on the wheel.

4,057,385
DECKLE COOLING MEANS TO PREVENT LEAKAGE
Takao Yazaki, and Kazuhide Hattori, both of Yokkaichi, Japan, assignors to Mitsubishi Petrochemical Co., Ltd., Tokyo, Japan
Division of Ser. No. 591,722, June 30, 1975, abandoned. This application Aug. 20, 1976, Ser. No. 716,040
Claims priority, application Japan, June 29, 1974, 49-73807
Int. Cl.^{2} B29F *3/04*
U.S. Cl. 425—466 **2 Claims**



1. In a die structure having manifold means within the die structure for receiving molten resin, an outlet slit through which a thin film of molten resin may be extruded and deckle means for controlling the width of the resin film being extruded from said slit the improvement comprising said deckle means being comprised of a cylindrical portion having cooling passages therein disposed in said manifold means in contact with the portions of said die structure defining the entrance to said slit from said manifold and fin means integrally connected to said cylindrical portion and extending into said slit.

4,057,386
MEANS FOR CONTROLLING TEMPERATURE OF PICKER FINGERS TO ADJUST PARISON ALIGNMENT
Charles L. Seefluth, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.
Division of Ser. No. 581,615, May 29, 1975, Pat. No. 3,985,850. This application July 16, 1976, Ser. No. 706,031
Int. Cl.^{2} B29D *23/03*
U.S. Cl. 425—526 **4 Claims**



1. In an apparatus for transferring an open end parison comprising in combination:

a parison heating means including means to deliver heated open end parisons in an upright position ;

vertically disposed plug means;

jaw means on opposed sides of said plug means, and means to move said jaw means in toward said plug means to form a neck finish on one end of a parison;

means carrying a pair of opposed picker fingers which close together so as to grip one and of said parison in said heating means and transfer said parison into position over said plug means; and

means to introduce fluid pressure into an interior of said parison, the improvement comprising means to adjust the temperature of one of said picker fingers to a level different from that of the other picker finger so as to cause said parison to camber slightly to align an opposite end of said parison over said plug means.

4,057,387

PROCESS FOR THE WHITENING OF TEXTILE FIBRES OF POLYESTERS

Klaus Kackstäedter, and Hans Theidel, both of Leverkusen, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Jan. 8, 1976, Ser. No. 647,409

Claims priority, application Germany, Jan. 11, 1975, 2500915

Int. Cl.² D06P *1/38*

U.S. Cl. 8—1 W **3 Claims**

1. In the process for whitening textile fibers of polyester, of polyester blended with cotton or of polyester blended with wool, with a dispersed fluorescent whitening agent by the process of exhaustion from an aqueous liquor and subsequent thermofixation; the improvement comprising enhancing the whitening effect by utilizing a two-phase aqueous liquor containing an ester capable of forming a second phase and a water-soluble alkali metal salt or an ampholyte.

4,057,388

DRY HEAT PROCESS FOR DYEING AND PRINTING ORGANIC MATERIAL WHICH CAN BE DYED WITH CATIONIC DYESTUFFS

Raymond Defago, Riehen; Paul Schaffluetzel, Basel; Arnulf Ruediger Lapple, Arlesheim, all of Switzerland, and Bernard Hugelin, Gaillard, France, assignors to Ciba-Geigy AG, Basel, Switzerland

Continuation of Ser. No. 416,766, Nov. 19, 1973, abandoned. This application Apr. 12, 1976, Ser. No. 675,896

Int. Cl.² D06P *5/00*

U.S. Cl. 8—2.5 A **22 Claims**

1. In a dry heat transfer printing process which comprises

A. bringing a treated face of an auxiliary carrier into contact with the surface of an organic material to be dyed, the treated face of the auxiliary carrier being dry and bearing at least one color layer which contains dyestuff which passes into the vapor state under the transfer process conditions,

B. subjecting the carrier and the material while contacted to the action of heat for a sufficient time to effect transfer of the vaporizable dyestuff from the auxiliary carrier to the organic material to be dyed, and

C. separating the organic material from the auxiliary carrier,

the improvement according to which at least one color layer of the said auxiliary carrier contains at least one transferable salt of a cationic dyestuff with an acid having a pK_s value greater than 3.

4,057,389

PROCESS FOR THE PRINTING WITH DEVELOPING DYES

Erich Feess, Lorsbach, Taunus, and Willy Gronen, Kelkheim, Taunus, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Apr. 6, 1976, Ser. No. 674,286

Claims priority, application Germany, Dec. 20, 1975, 2557554

Int. Cl.² C09B *27/00, 45/48;* **D06P** *3/12*

U.S. Cl. 8—71 **16 Claims**

1. A process for printing cellulosic textile material with a printing paste containing

a. the alkaline solution of a coupling component capable of forming developing dyes,

b. the dispersion of a diazotable amine capable of forming developing dyes,

c. sodium nitrite and

d. a thickener,

which process comprises developing the dyestuff on the fiber by adding a dilute aqueous solution of an organic acid of which at least 30 g are soluble in 100 g water, having at 20° C a pK value of 4 to 2.5 and at normal pressure a boiling point above 175° C, followed by a short air passage and a subsequent contact with an alkaline agent.

4,057,390

SULFUR-CONTAINING BIS-QUATERNARIES

Patrick M. Quinlan, Webster Groves, Mo., assignor to Petrolite Corporation, St. Louis, Mo.

Filed May 24, 1976, Ser. No. 689,134

Int. Cl.² C23F *11/00;* **C09K** *3/00;* **C23F** *9/00*

U.S. Cl. 21—2.7 R **10 Claims**

1. A process of inhibiting corrosion which comprises treating a corrosive aqueous medium with Bis-quaternaries of the following formula:

$$(\text{Ⓝ}^{+}CH_2CH_2)_2 Z \cdot 2X^-$$

is an Ⓝ is a quaternary amino group, Z is the sulfur-containing group S, SO, or SO_2 and X is an anion.

4,057,391

STEAM STERILIZATION OF MATERIALS IN SEALED PACKAGES

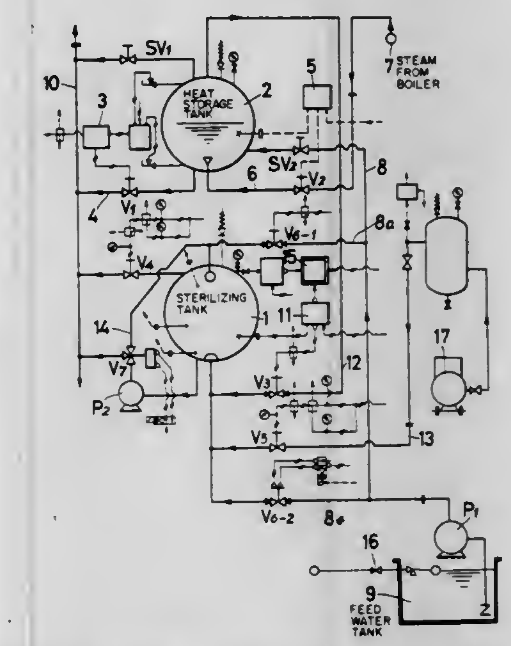
Kanemichi Yamaguchi, Yokohama, Japan, assignor to Toyo Seikan Kaisha Ltd., Japan

Continuation of Ser. No. 469,690, May 13, 1974, abandoned. This application Jan. 2, 1976, Ser. No. 646,027

Claims priority, application Japan, May 22, 1973, 48-57022; May 22, 1973, 48-57023

Int. Cl.² A61L *1/00, 3/00;* **A23L** *3/10*

U.S. Cl. 21—56 **5 Claims**



1. In a method of batch type sterilization of the type wherein sealed packages containing substances to be sterilized are charged into a sterilizing tank having upper and lower portions, steam is admitted into the sterilizing tank into direct contact with the packages to heat and sterilize the sealed packages, and cooling water and pressurized gas are admitted into the sterilizing tank for cooling the sterilized packages, the improvement which comprises the steps of generating steam in a heat storage tank by heating up a body of water therein to a predetermined temperature by steam supplied from a boiler, the amount of water being sufficient to supply the necessary quantity of steam which when heated to the predetermined temperature is sufficient for rapid heating of the sterilizing tank, admitting the steam generated by said heat storage tank into said sterilizing tank without exhausting the steam therein until the pressure within said sterilizing tank reaches a predetermined value for rapidly heating up the interior of the sterilizing tank to a sterilizing temperature of from 135° to 150° C, continuing the admission of said steam generated by said heat storage tank into said sterilizing tank for maintaining said sterilizing temperature for a predetermined time, and admitting the cooling water into said sterilizing tank from the upper and lower portions thereof and then circulating the cooling water in the lower portion through the upper portion of said sterilizing tank, thus cooling the sterilized packages.

3. Apparatus for batch type sterilization comprising a sterilizing tank for accommodating sealed packages containing

substances to be sterilized, said sterilizing tank having upper and lower portions, means for admitting steam into said sterilizing tank into contact with the packages to heat and sterilize said packages, means for admitting cooling water into said sterilizing tank for cooling the sterilized packages, a heat storage tank which is heated by steam from a boiler for generating the steam to be admitted into said sterilizing tank at a predetermined temperature, said heat storage tank holding an amount of water sufficient to supply the necessary quantity of steam which when heated to said predetermined temperature is sufficient for rapid heating of the sterilizing tank to the sterilization temperature needed to sterilize said packages, a first valve means coupled between said heat storage tank and said sterilizing tank for admitting the steam generated by said heat storage tank into said sterilizing tank, and a second valve means provided for said sterilizing tank and discharging to the atmosphere, said second valve means being set to open when the pressure in the sterilizing tank reaches a predetermined value, whereby when the steam is firstly introduced into the sterilizing tank, the air therein is compressed until the pressure within said sterilizing tank reaches the predetermined value and only thereafter is the compressed air in the sterilizing tank released through said second valve means thus quickly heating up the tank.

4,057,392

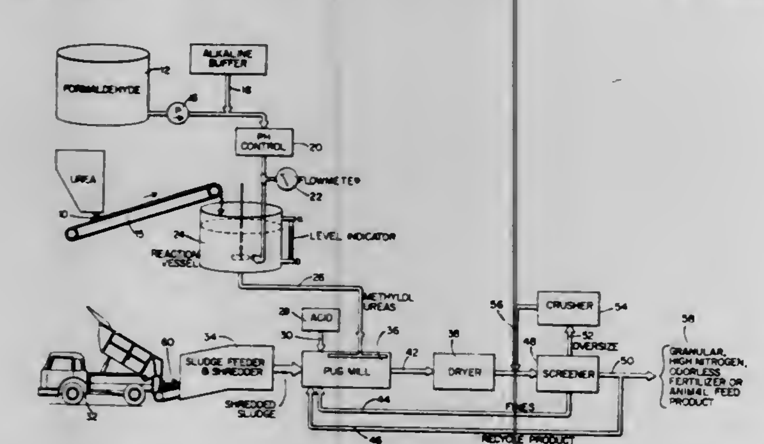
APPARATUS FOR TREATING SEWAGE SLUDGE

James M. O'Donnell, Slatersville, R.I., assignor to Orgonics, Inc., Slatersville, R.I.

Division of Ser. No. 472,714, May 23, 1974, Pat. No. 3,942,970, which is a continuation-in-part of Ser. No. 196,765, Nov. 8, 1971, abandoned. This application Mar. 8, 1976, Ser. No. 665,118

Int. Cl.² C05F ***3/06***

U.S. Cl. 23—259.1 **8 Claims**



1. An apparatus for the treatment of sludge filter cake material, which comprises in combination:

a. means to reduce the particle size of the sludge filter cake to be treated which comprises,
   i. a means to move a continuous bed of the sludge filter cake to be reduced,
   ii. a rotating raking reel means to shred the sludge filter cake on the bed into small particles,
   iii. a rotating leveling reel to provide a uniform bed of the shredded sludge material, and
   iv. means to convey the shredded sludge particles to the inlet section of the mixing means;
b. means to agitate, mix and react the reduced sludge material, which means includes,
   i. a rotating shaft within an elongated vessel,
   ii. the vessel including an inset at the one end of the vessel and an outlet at the other end, and defining a reaction section therein,
   iii. the shaft including a plurality of paddles secured thereto for rotation with the shaft to provide for mixing of the reduced sludge material and movement of the material from the inlet to the outlet,
   iv. means to introduce the reduced sludge into an inlet section of the vessel,
   v. means to introduce an acid material into the reduced sludge material in the vessel,
   vi. means to heat the vessel whereby the reaction section may be maintained at a reaction temperature from about 30° to 80° C,
   vii. means to introduce recycled dry sludge material into the inlet section of the vessel,
   viii. means to introduce into the reaction section of the vessel an aqueous condensable methylol-prepolymer solution for reaction with the sludge and for condensation, and
   ix. means to discharge a granular sludge-polymer reaction product from the outlet;
c. means to dry the discharged reaction product from the outlet to a desired moisture content of less than about 10%; and
d. means to screen the dry reaction product and to recover a dry reaction product of the desired particle size.

4,057,393

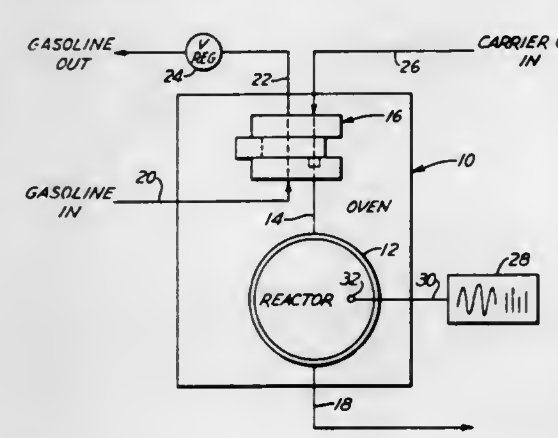
METHOD FOR OCTANE MONITORING

Paul A. Budzak, Cheswick, Pa., and Russell M. Clinton, III, Crosby, Tex., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Division of Ser. No. 499,060, Aug. 20, 1974, Pat. No. 3,933,165. This application Aug. 6, 1975, Ser. No. 602,264

Int. Cl.² G01N ***31/12, 33/22***

U.S. Cl. 23—230 PC **6 Claims**



1. A method of charging a sample of a gasoline stream into a reactor containing an oxygen-containing gas for monitoring the octane number of the gasoline, said reactor being maintained at a temperature whereby combustion of the gasoline occurs in the reactor, comprising maintaining the gasoline stream under pressure high enough to prevent vaporization of the gasoline, periodically displacing a sample of the liquid gasoline into a chamber of large volume relative to the sample and containing a finely divided solid material adapted to hold liquid gasoline in the chamber by capillary action, said chamber being at a reduced pressure and at a temperature such that gasoline is vaporized in the chamber, delivering gasoline vapor from the chamber into the reactor, and after displacement of the liquid gasoline into the chamber passing a carrier gas through the chamber to evaporate gasoline therein and carry gasoline vapors into the reactor, the flow of carrier gas into the chamber being interrupted during the period of displacement of the liquid gasoline into the chamber.

5. In a method of monitoring the octane number of a gasoline stream by reacting in a reactor at substantially atmospheric pressure a sample of the gasoline stream with oxygen in a reaction less vigorous than an explosion and measuring a parameter of the reaction which is correlated with the octane number, the improvement comprising passing a stream of an oxygen-containing carrier gas into a chamber and from the chamber through a conduit into the reactor and through the reactor to purge hydrocarbons and reaction products therefrom, maintaining gasoline from the stream at an elevated temperature and at a pressure maintaining the gasoline in the liquid phase, interrupting the flow of oxygen-containing carrier gas into the chamber by injecting a slug of the liquid gasoline filling a portion of the conduit into the stream of oxygen-containing carrier gas flowing to the chamber, delivering the slug of liquid gasoline into the chamber, maintaining the chamber at a reduced pressure whereby evaporation of gasoline occurs, said chamber forming a part of the conduit and having a large volume relative to the slug, distributing the gasoline over a large surface area in the chamber to prevent flow of liquid gasoline from the chamber and to increase the rate of vaporization of the gasoline in the chamber, flowing gasoline vapors from the chamber into the reactor, and continuing the flow of the oxygen-containing carrier gas through the conduit and the reactor after the interruption.

4,057,394

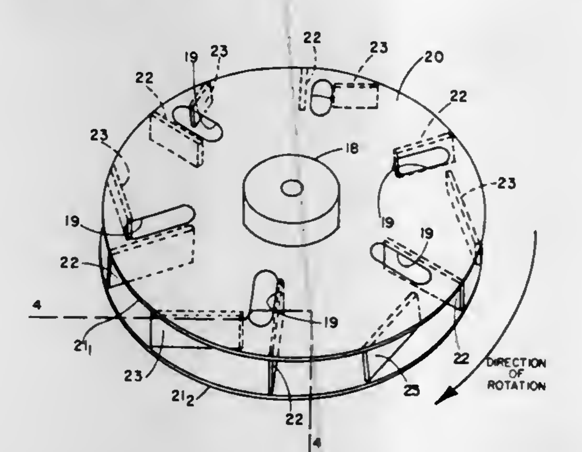
TEST DEVICE AND METHOD FOR DETERMINING BLOOD HEMOGLOBIN

Marvin Alden Genshaw, Elkhart, Ind., assignor to Miles Laboratories, Inc., Elkhart, Ind.

Filed May 24, 1976, Ser. No. 688,981

Int. Cl.² G01N ***31/22, 33/16***

U.S. Cl. 23—230 B **6 Claims**



1. A method for determining the hemoglobin content of blood, which comprises contacting a test device with a sample of blood and measuring light at a wavelength of between about 300 and about 620 nanometers which is reflected from said test device, wherein said test device comprises a substantially opaque, light reflective, blood absorbent matrix having a refractive index of less than about 1.0 or above about 1.7.

4,057,395

PROCESS FOR DETERMINING THE DONOR CONTENT OF POLYCRYSTALLINE SILICON OF HIGH PURITY TO BE USED IN THE SEMICONDUCTOR INDUSTRIES

Dietrich Schmidt, Burghausen, Germany; Karl Erwin Huber, Ach, Austria, and Johann Hofer, Kirchdorf, Germany, assignors to Wacker-Chemitronic Gesellschaft fur Elektronik Grundstoffe mbH, Burghausen, Germany

Filed Dec. 1, 1976, Ser. No. 746,375

Claims priority, application Germany, Mar. 4, 1976, 2608965

Int. Cl.² G01N ***27/04, 25/38***

U.S. Cl. 23—230 R **6 Claims**

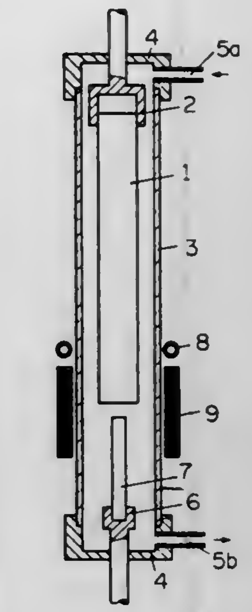
1. A process for determining the donor content of polycrystalline silicon of high purity to be used in the semiconductor industries, the silicon having a known acceptor content of up to at most 0.02 atomic %, and a donor content of at most 0.1 atomic %, the determinaton comprising the steps of

introducing a test rod into a gas-tight quartz tube having an internal diameter only slightly larger than the test rod,

converting the rod into the oligocrystalline state by zone drawing with a seed crystal within a streaming protective gas,

forming a melting zone in the test rod travelling vertically over the entire length,

measuring the resistance of the so formed oligocrystalline test rod, and



calculating the donor concentration from the measured resistance, the protective gas being a noble gas with an admixture of 10 - 800 ppm of oxygen.

4,057,396

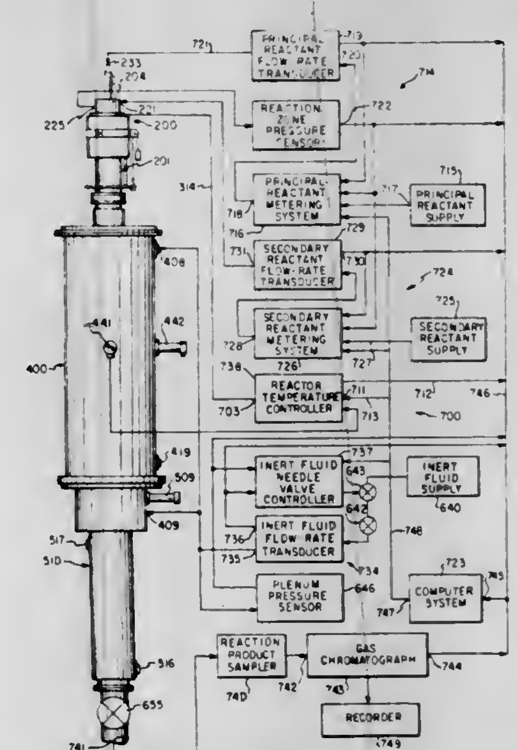
FLUID-WALL REACTOR FOR HIGH TEMPERATURE CHEMICAL REACTION PROCESSES

Edwin Matovich, Brea, Calif., assignor to Thagard Technology Company, Irvine, Calif.

Continuation-in-part of Ser. No. 271,560, July 13, 1972, Pat. No. 3,933,434, Ser. No. 591,949, June 30, 1975, Ser. No. 591,950, June 30, 1975, Ser. No. 606,222, Aug. 20, 1975, Ser. No. 606,246, Aug. 20, 1976, and Ser. No. 616,393, Sept. 24, 1975. This application Nov. 14, 1975, Ser. No. 631,912

Int. Cl.² B01J ***1/00;*** **F27B** ***17/00***

U.S. Cl. 23—252 R **43 Claims**



1. A high temperature fluid-wall reactor in which substantially all of the heat is supplied by radiation coupling, characterized by

A. a reactor tube having an inlet end and an outlet end, the interior of the tube defining a reactor chamber, the reactor tube being made of an electrically resistive, porous refractory material capable of emitting sufficient radiant energy to raise the temperature of reactants within the reactor tube to a level required to initiate and sustain the desired chemical reaction; the pores of the refractory material being of such diameter as to permit a uniform flow of

sufficient inert fluid which is substantially transparent to radiant energy through the tube wall to constitute a protective blanket for the radially inward surface of the reactor tube;

B. a fluid-tight, tubular pressure vessel enclosing the reactor tube to define an inert fluid plenum between the reactor tube and the pressure vessel, the inlet and outlet ends of the reactor tube being sealed from the plenum; the pressure vessel having an inlet for admitting the inert fluid which is directed under pressure into the plenum and through the porous tube wall into the reactor chamber;

C. means for introducing at least one reactant into the reactor chamber through the inlet end of the reactor tube, the reactants being directed in a predetermined path axially of the reactor tube and being confined by the protective blanket substantially centrally within the reactor chamber and out of contact with the inner wall of the reactor tube;

D. means for passing an electric current through the reactor tube for heating the reactor tube to the temperature level at which it emits sufficient radiant energy to initiate and sustain the desired chemical reaction, the radiant energy being directed centrally therewithin substantially coincident with at least a portion of the path of the reactants; and

E. a circumferential heat shield disposed within the pressure vessel and radially outwardly of the reactor tube, the heat shield reflecting radiant energy toward the reactor tube.

4,057,397

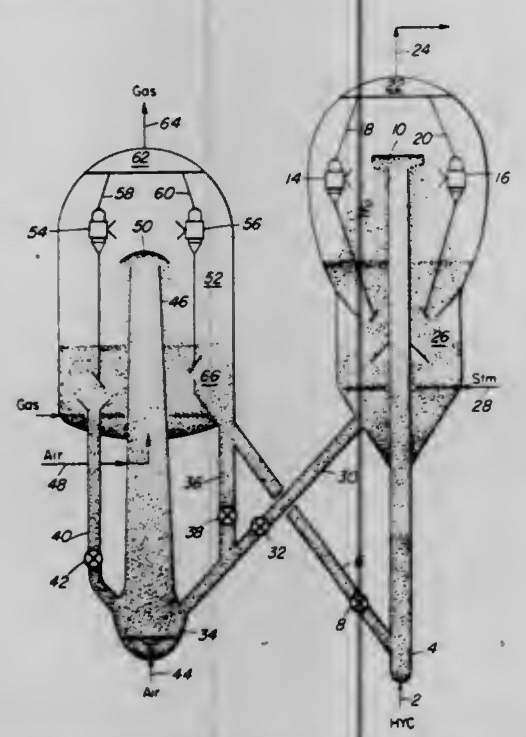
SYSTEM FOR REGENERATING FLUIDIZABLE CATALYST PARTICLES

Benjamin Gross, Cherry Hill, and Hartley Owen, Belle Mead, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Division of Ser. No. 380,173, July 18, 1973. This application Mar. 8, 1976, Ser. No. 665,149

Int. Cl.^{2} B01J *8/24*

U.S. Cl. 23—288 B **5 Claims**



1. An apparatus for regenerating catalyst particles deactivated with carbonaceous material which comprises,

a. a first upwardly extending elongated catalyst contact chamber of larger diameter in a lower bottom portion thereof than in the upper major portion thereof,

b. the upper end of said first elongated contact chamber in open communication with cyclonic separation means,

c. an upper portion of said elongated contact chamber and cyclonic separation means housed within a separate enlarged second chamber,

d. said cyclonic separation means in open communication with outlet conduit means extending from a top portion of said second chamber,

e. a first open ended conduit means in open communication with a lower portion of said second chamber and the lower larger diameter portion of said first catalyst contact chamber,

f. a second conduit means for passing deactivated catalyst particles to the lower larger diameter portion of said first catalyst contact chamber,

g. a third open ended conduit means in extending directly between a lower portion of said second chamber and said second conduit means,

h. valve flow control means in each of said first, second and third conduit means,

i. means for separately introducing gaseous material to a lower bottom portion of each of said first and second chambers and

j. conduit means for withdrawing regenerated catalyst particles from a lower portion of said second chamber for transfer to a hydrocarbon conversion chamber.

4,057,398

PROCESS FOR REDUCING THE FUSION POINT OF COAL ASH

Robert P. Bennett, Bridgewater, and Ira Kukin, West Orange, both of N.J., assignors to Apollo Chemical Corporation, Whippany, N.J.

Filed Feb. 24, 1976, Ser. No. 660,838

Int. Cl.^{2} C10L *9/00, 10/00*

U.S. Cl. 44—4 **8 Claims**

1. A method of reducing the fusion point of coal ash in a boiler comprising the steps of introducing a compound from the class consisting of borates and naturally occurring boron-containing minerals into a boiler containing coal ash and mixing said compound and said coal ash, at least 0.5 kilograms of said compound being introduced per metric ton of coal introduced into the boiler.

2. The method of claim 1 wherein said compound is introduced into the furnace box of the boiler as an intimate mixture of pulverized coal and said compound, and including the additional step of intimately mixing said compound with pulverized coal prior to introduction of the mixture into the furnace box.

4,057,399

PROCESS FOR DEWATERING CARBONACEOUS MATERIALS

Edward L. Cole, Fishkill; Howard V. Hess, Glenham, and William F. Franz, Gardiner, all of N.Y., assignors to Texaco Inc., New York, N.Y.

Filed Mar. 7, 1975, Ser. No. 556,516

Int. Cl.^{2} C10L *9/00, 10/00*

U.S. Cl. 44—6 **5 Claims**

1. A process for the transportation and subsequent dewatering of a solid carbonaceous material which comprises grinding said material to particles capable of passing through an 8 mesh sieve, slurrying the resulting particulate material with water, passing the slurry through a pipeline and then separating the slurry into water and water-wet particles by pumping the slurry to a dewatering screen belt, air-blowing the water-wet particles, mixing said air-blown water-wet particles with a hydrocarbon liquid in an amount between 20 and 500 weight percent basis particulate material, heating the mixture to a temperature between 300° and 705° F. at a pressure between 100 and 3500 psig sufficient to maintain the hydrocarbon and water in the liquid phase and then recovering oil-wet but substantially waterfree solid carbonaceous particles from the mixture.

5. The process of claim 1 in which the said solid carbonaceous material is lignite.

4,057,400

APPARATUS FOR THE GASIFICATION UNDER PRESSURE OF BITUMINOUS COAL ESPECIALLY OF FINE COAL IN A GENERATOR

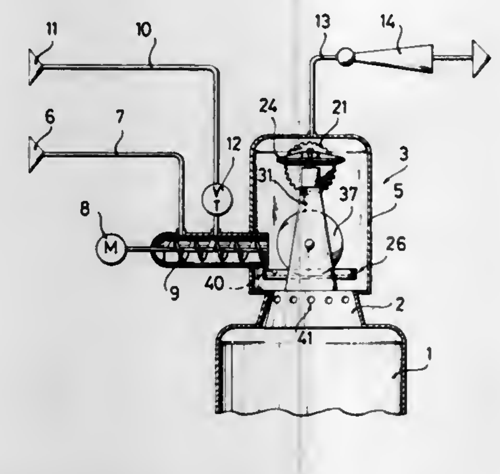
Walter Kaimann, Pollerbecks Brink 40, D-4300 Essen; Rudolf Pasternak, Lubecker Str. 15, D-4390 Gladbeck, and Jochen Bauer, Rosastr. 61, D-4300 Essen, all of Germany

Filed Sept. 7, 1976, Ser. No. 720,984

Claims priority, application Germany, Sept. 9, 1975, 2540151

Int. Cl.^{2} C10J *3/30*

U.S. Cl. 48—77 **1 Claim**



1. Apparatus for the gasification under pressure of fine bituminous coal, comprising

a. a generator having a coal-receiving container provided with an inlet opening to receive coal to be gasified,

b. a gas tight casing on said inlet opening,

c. a pelletizing device in said casing above said inlet opening and including a driven rotary apertured grinding face and roller means cooperating therewith to squeeze fine coal through the apertures to form pellets to feed directly through said inlet opening,

d. a pressure tight conveyor housing connected to said casing for delivering fine coal to said grinding face,

e. a conveyor in said housing, and

f. separate means for feeding fine coal and a binder to said conveyor housing.

4,057,401

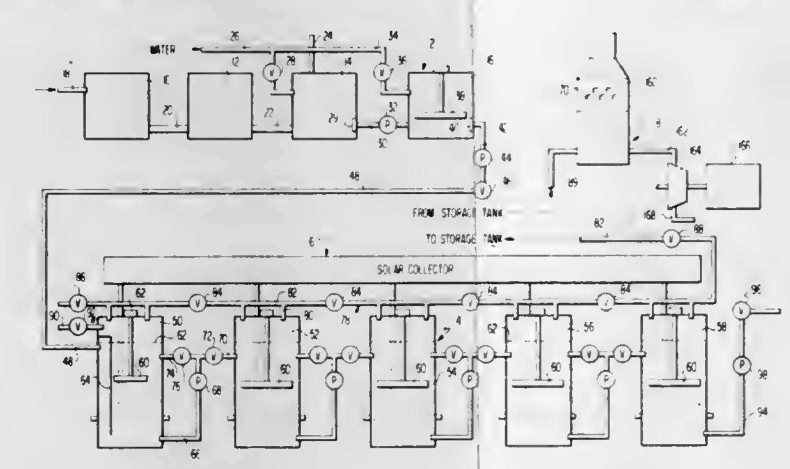
METHANE GAS PROCESS AND APPARATUS

Oliver W. Boblitz, Basye, Va., assignor to Bio-Gas Corporation, Washington, D.C.

Filed Sept. 3, 1976, Ser. No. 720,257

Int. Cl.^{2} C02C *1/14*

U.S. Cl. 48—111 **5 Claims**



1. Apparatus for the manufacture of methane gas comprising:

a plurality of digester tanks arranged in series,

first conduit means connecting said tanks for fluid flow between them, pump means to provide fluid flow through said first conduit means,

agitator means for mixing liquid material contained within said tanks,

a substantially air-tight enclosure surrounding said tanks,

a solar heater to heat a stream of air passing through the heater,

second conduit means connecting said enclosure with said solar heater for passage of a stream of air from said enclosure to said solar heater,

third conduit means connecting said solar heater to said enclosure for passing a stream of air heated in said solar heater into said enclosure for indirect heat exchange with liquid material contained within said tanks,

fourth conduit means connected to said enclosure to remove methane gas produced in said tanks therefrom,

fifth conduit means connected to the last digester tank in said series to remove liquid material from said last tank, and

sixth conduit means connected to the first digester tank in said series to introduce liquid material into said first tank.

3. In the method of producing methane gas by anaerobic digestion of a slurry of water material at a pH of between about 6 and 8 and a temperature between about 100° to 140° F wherein methane gas produced by bacterial action upon the heated slurry is collected and dewatered solid residue for use as fertilizer is obtained, the improvement which comprises exposing a metal screen to rays of the sun passing through a transparent panel spaced apart from said metal screen forming a first longitudinal passageway therebetween, said panel defining the sunward side of a gas-tight chamber, said chamber having a second longitudinal passageway substantially parallel to said first passageway defined by the shadow side of said metal screen and the spaced-apart back of said chamber, passing air through said first passageway, then through said second passageway, next passing the resulting heated air in indirect heat exchange with slurry undergoing anaerobic digestion and finally recycling said air to said first passageway for continuation of said procedure for heating of the digesting slurry using solar energy.

4,057,402

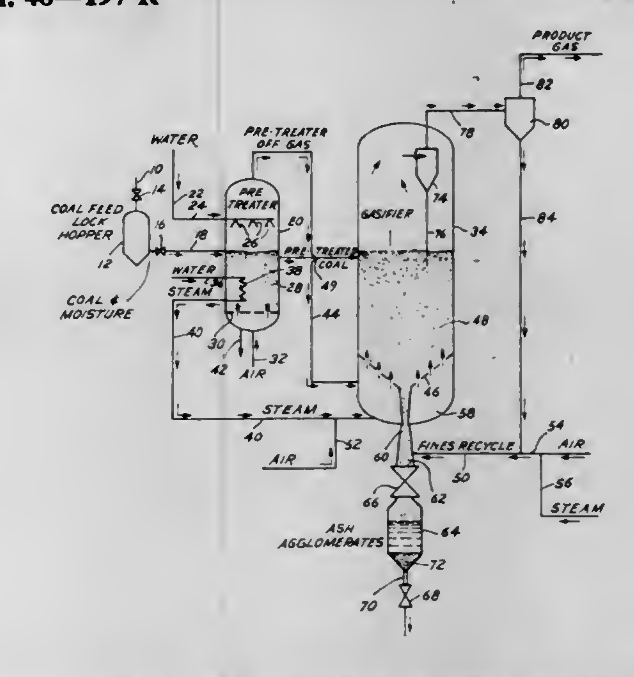
COAL PRETREATMENT AND GASIFICATION PROCESS

Jitendra G. Patel, Bolingbrook; Frank C. Schora, Palatine, and John W. Loeding, Naperville, all of Ill., assignors to Institute of Gas Technology, Chicago, Ill.

Filed June 28, 1976, Ser. No. 700,536

Int. Cl.^{2} C10J *3/16*

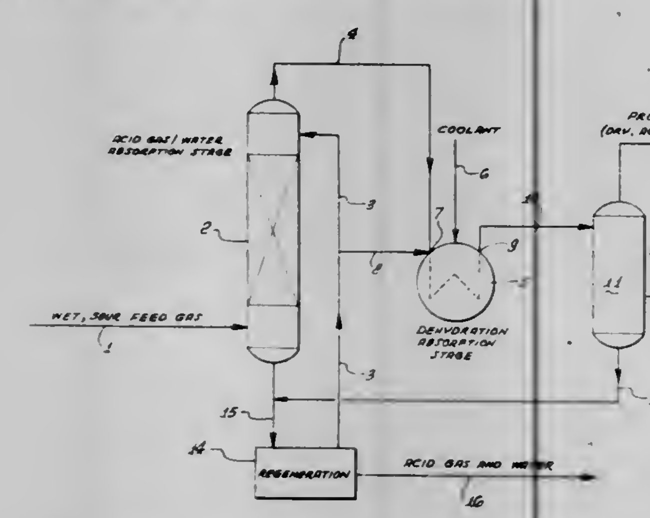
U.S. Cl. 48—197 R **8 Claims**



1. In a process for the conversion of finely divided caking coal to a fuel gas wherein said process includes the steps of pretreating a finely divided coal feed material at a temperature of about 700°-800° F in a fluidized pretreatment zone while forming hot off gases, said pretreatment zone being in direct communication with a gasification zone, passing the pretreated coal from said pretreatment zone to said gasification zone, maintaining said pretreated coal as a fluidized bed in said gasification bed in said gasification zone at preselected conditions

for converting said pretreated coal to ash and a gaseous mixture comprising fuel gas, with drawing said gas from said gasification zone, and withdrawing said ash from said gasification zone, an improvement in said process comprising the steps of adding water directly into said pretreatment zone to dissipate heat generated therein and to generate steam, passing said hot off gases from said pretreatment zone to below the upper surface of said fluidized coal bed in said gasification zone, said off gases comprising said steam, tars, oils and coal fines, passing said off gases upwardly through said fluidized bed, reacting said steam with said coal in said fluidized bed for converting said coal to said ash and said gaseous mixture, said off gases heating said gasification zone for assisting in maintaining said preselected conditions in said gasification zone, substantially destroying said tars and oils during passage through said fluidized bed in said gasification zone, and converting said fines in said off gases to a portion of said gaseous mixture and a portion of said ash.

4,057,403
GAS TREATING PROCESS
A. R. Valdes, Houston, Tex., assignor to Fluor Corporation, Los Angeles, Calif.
Filed Oct. 29, 1973, Ser. No. 410,626
Int. Cl.² B01D *53/14*
U.S. Cl. 55—31 **12 Claims**



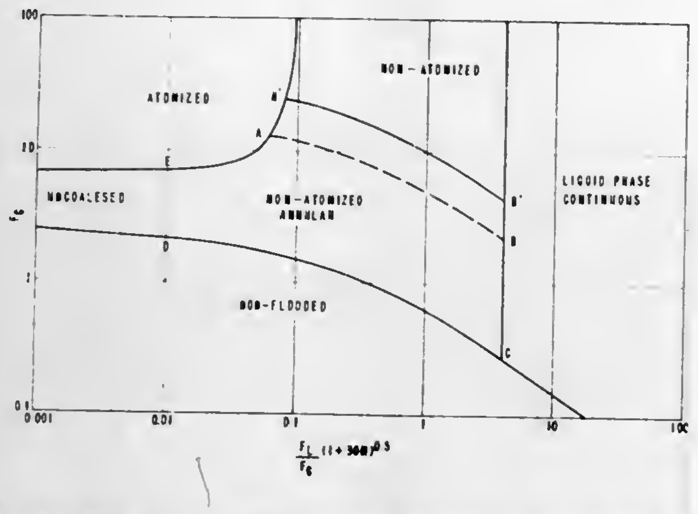
1. In the process of treating a gaseous hydrocarbon stream for the removal therefrom of hydrogen sulfide, carbon dioxide or both acid gases, and moisture, by intimately contacting the stream with a lean absorbent, said absorbent comprising an hydroxy amino ether having the general formula

$$HO+(CH_2)_x-O+_y(CH_2)_zNH_2$$

wherein x is 2 or 3, y is 1 to 4 and z is 2 or 3, and gas-liquid absorbing the acid gas and a first quantity of vapor phase moisture in said absorbent, separating the acid gas-rich, moisture-containing absorbent and regenerating the absorbent with heat in a first stage; the improvement comprising in a second stage dispersing a dehydrating agent comprising additional lean absorbent in the hydrocarbon stream obtained from the first stage, cooling the absorbent-hydrocarbon stream mixture to condense residual moisture therein into solution in the absorbent separating a product gas having a moisture content of not more than 7 pounds of water per MMSCF; and regenerating the absorbent with heat.

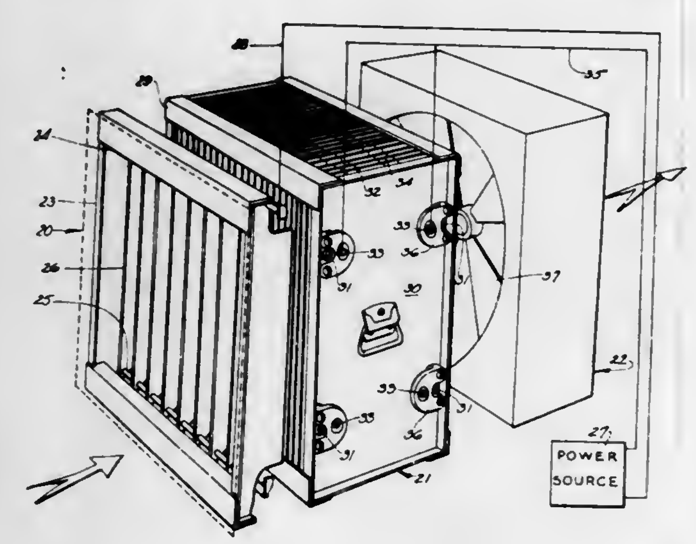
4,057,404
METHOD FOR SEPARATING IMMISCIBLE FLUIDS OF DIFFERENT DENSITY
R. Bertrum Diemer, Jr., Wilmington, N.C., and James B. Dunson, Jr., Newark, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.
Filed Feb. 23, 1976, Ser. No. 660,182
Int. Cl.² B01D *47/00*
U.S. Cl. 55—90 **14 Claims**

1. A method for separating a flowing mixture of immiscible fluids of different density in which a higher density fluid phase is dispersed within a lower density fluid phase comprising passing the mixture through a centrifugal separator having an N_D value of between 50 and 150 under conditions of non-atomizing flow such that the coordinates of the gas phase Froude



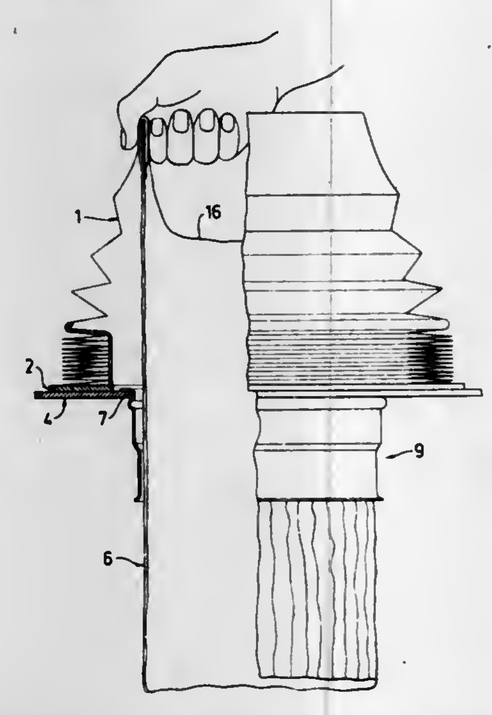
coefficient and $(1 + 30M)^{0.5}$ times the ratio of the liquid phase Froude coefficient to the gas phase Froude coefficient of the fluid mixture at the separator inlet lie within the enclosed area defined by points A, A', B' and B in FIG. 1 hereto.

4,057,405
MEANS FOR THE CLEANING AND SELF-CLEANING OF AN ELECTROSTATIC PRECIPITATOR
William A. Cheney, and Wendell P. Spurgin, both of Cincinnati, Ohio, assignors to United Air Specialists, Inc., Cincinnati, Ohio
Filed Feb. 25, 1976, Ser. No. 661,291
Int. Cl.² B03C *3/76*
U.S. Cl. 55—105 **5 Claims**



1. A two stage electrostatic precipitator comprising: an ionizer; a collecting cell; an air mover for moving air first through said ionizer and then through said collecting cell; contaminant collecting plates in said collecting cell and a plurality of upper and lower support members on which said plates are directly mounted adjacent their four corners; hopper means disposed beneath said ionizer and said collecting cell so as to receive contaminants dislodged from said plates; power means to actuate said ionizer, said collecting cell and said air mover; vibration directing means to apply vibrations of variable frequency directly to one of said lower support members and at right angles to said plates whereby to dislodge contaminants from said plates into said hopper means; said vibration directing means including a vibrator operatively connected to said one lower support member, and control means to actuate said vibrator; interlock means operatively connecting said power means and said control means to prevent simultaneous actuation of said power means and said vibrator; additional means for said control means and said vibrator to vary the frequency of said vibrator, said additional means comprising a source of compressed air and a tank operatively connected to said source, said tank of compressed air being connected to said precipitator and emptied while actuating said vibrator; and a first electric circuitry connected to and including said power means, a second electric circuitry connected to and including said control means, and said interlock means including a switch arrangement operatively connected in said first and in said second electric circuitry and having an off position whereat both the said power means and the said control means are inoperative, an on position whereat only the said power means is operative, and a clean position whereat only the said control means is operative.

4,057,406
APPARATUS FOR REMOVING GAS FILTER
Staffan Jansson, Vaxjo, Sweden, assignor to AB Svenska Flaktfabriken, Nacka, Sweden
Filed Jan. 8, 1976, Ser. No. 647,308
Claims priority, application Sweden, Jan. 13, 1975, 7500295
Int. Cl.² B01D *50/00*
U.S. Cl. 55—385 R **10 Claims**



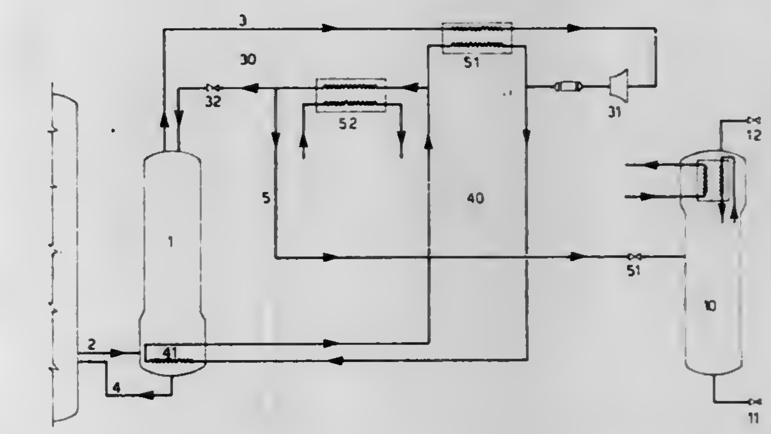
1. In combination with a filter mounted in a working position adjacent and on one side of an opening in a wall, apparatus for enabling the lifting of said filter from its working position on said one side of said wall, through said opening in said wall and into the open environment on the other side of said wall, without substantial dispersal of dirt from said filter into said open environment, comprising:

a annular portable centrally-apertured stand comprising a ring having a circumferential web extending upwardly therefrom and having a passage extending through it of diameter large enough for said filter to be at least partially removed through it, and removably positioned over said opening on the opposite side of said wall from filter, with said passage aligned with said opening;

tubular means of flexible material having one end disposed about an outer portion of said stand and secured to said stand so that the interior of one end of said tubular means surrounds the space directly above said opening in said wall, whereby at least a portion of said tubular means can be manually stripped from said stand and said filter can be withdrawn through said opening into said tubular means by grasping said filter through said flexible material of said tubular means;

said stand being adapted temporarily to maintain its position over said opening and on the surface of said wall on said one side thereof, despite normal forces tending to displace it produced in response to said removing of said filter through said opening.

4,057,407
METHOD AND APPARATUS FOR RECOVERING ARGON FROM AN AIR FRACTIONATING PROCESS
Emanuele Bigi, Bergamo, Italy, assignor to S.I.A.D. Societa' Italiana Acetilene E Derivati, Bergamo, Italy
Filed Mar. 22, 1976, Ser. No. 669,420
Claims priority, application Italy, Mar. 26, 1975, 21663/75
Int. Cl.² F25J *3/04*
U.S. Cl. 62—22 **8 Claims**



1. A method for producing argon by separation from oxygen and nitrogen from an air fractionation process, characterized in that it comprises the steps of:

a. forwarding to a rectifying column a gaseous argon, nitrogen and oxygen containing product coming out from an intermediate point of air fractionation column of said fractionation process;
b. heating a gaseous oxygen-free product containing a major amount of argon drawn from the head of said rectifying column;
c. compressing the oxygen-free product;
d. cooling a first fraction of the compressed product up to the liquefaction temperature of argon according to the compression pressure to form a liquefied product;
e. recycling a portion of the liquefied product to the top of said rectifying column through a throttling element to provide the reflux liquid for the rectifying column, the remaining portion of liquefied product being forwarded to the inlet of an argon column for withdrawing nitrogen;
f. causing a second fraction of compressed, gaseous oxygen-free product to flow to the bottom of said rectifying column for indirect reboil heat exchange, and
g. recycling the second fraction in a partially cooled state, by having transferred calories to the rectification column, for further cooling up to the liquefaction temperature of argon.

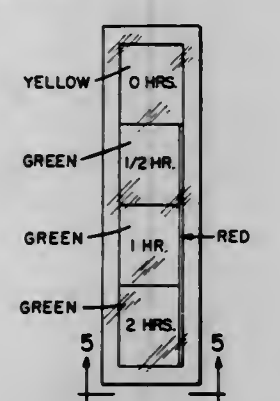
4,057,408
METHOD FOR MAKING PHOTOSENSITIVE COLORED GLASSES
Joseph E. Pierson, and Stanley D. Stookey, both of Painted Post, N.Y., assignors to Corning Glass Works, Corning, N.Y. Division of Ser. No. 646,259, Jan. 2, 1976, Pat. No. 4,017,318. This application Oct. 28, 1976, Ser. No. 736,517
Int. Cl.² C03B *23/20;* C03C *15/00;* C03B *32/00;* C03C *17/00*
U.S. Cl. 65—18 **24 Claims**

1. A method for making a glass article wherein at least a portion thereof is integrally colored by silver which comprises the steps:

a. melting a batch for a glass containing the constituents of alkali fluoride, the constituents of at least one silver halide selected from the group consisting of silver chloride, silver bromide, and silver iodide, and about 0.0 to 0.2% CeO_2;
b. forming said melt into a glass article;
c. exposing at least a portion of said article to high energy or actinic radiation selected from the group consisting of high velocity electrons, X-radiations, and ultra-violet radiations;

d. heating at least said exposed portion of the article to a temperature between about the transformation range and the softening point of the glass for a period of time sufficient to cause nucleation and growth of microcrystals of sodium fluoride containing at least one silver halide selected from the group consisting of silver chloride, silver bromide, and silver iodide to occur within said exposed portion;
e. re-exposing at least said previously-exposed portion of said article to said high energy or actinic radiation;
f. heating at least said re-exposed portion of said article to a temperature between the transformation range and the softening point of the glass for a period of time sufficient to cause metallic silver to be deposited as discrete colloidal particles less than about 200A in the smallest dimension, and/or deposited within said microcrystals, the sivler-containing part of the microcrystals being less than about 200A in the smallest dimension, and/or deposited on the surface of said microcrystals, the portion of the microcrystal coated with silver being less than about 200A in the smallest dimension, said microcrystals having a concentration of at least 0.005% by volume; and then
g. cooling said article to room temperature.

12. A method for making a glass article wherein at least a portion thereof is integrally colored by silver which comprises the steps:
a. contacting the surface of a glass article containing Na_2O, F, at least one halide selected from the group consisting of Cl, Br, and I, "and about 0 to 0.2% CeO_2." with a silver-containing material;



b. heating said glass article and said silver-containing material in contact therewith for a sufficient length of time to effect an exchange of silver ions for sodium ions in at least the surface of the glass;
c. exposing at least a portion of said glass article to high energy or actinic radiation selected from the group consisting of high velocity electrons, X-radiations, and ultra-violet radiations;
d. heating at least said exposed portion of the article to a temperature between about the transformation range and the softening point of the glass for a period of time sufficient to cause nucleation and growth of microcrystals of sodium fluoride containing at least one silver halide selected from the group consisting of silver chloride, silver bromide, and silver iodide to occur within said exposed portion;
e. re-exposing at least said previously-exposed portion of said article to high energy or actinic radiation selected from the group consisting of high velocity electrons, X-radiations, and ultra-violet radiations;
f. heating at least said re-exposed portion of said article to a temperature between the transformation range and the softening point of the glass for a period of time sufficient to cause metallic silver to be deposited as discrete colloidal particles less than 200A in the smallest dimension, and/or deposited within said microcrystals, the silver-containing part of the microcrystal being less than about 200A in the smallest dimension, and/or deposited on the surface of said microcrystals, the portion of the microcrystal coated with silver being less than about 200A in the smallest dimension, said microcrystals having a concentration of at least 0.005% by volume;
g. cooling said article to room temperature.

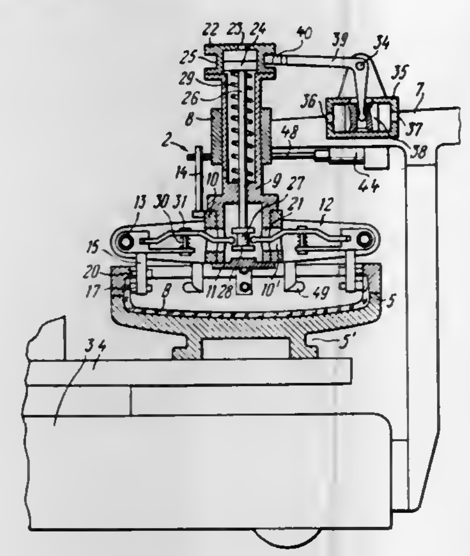
15. A method for coating a glass, glass-ceramic, ceramic, or metal substrate with a colored glaze comprising the steps of:
a. melting a batch for a glass containing the constituents of sodium fluoride and the constituents of at least one silver halide selected from the group consisting of silver chloride, silver bromide, and silver iodide; and about 0–0.2% CeO_2;
b. forming said melt into a glass and comminuting said glass into a frit;
c. applying said frit to the substrate to be coated;
d. firing the coated substrate at a temperature sufficient to sinter the frit into a tightly-adherent glaze;
e. exposing at least a portion of said glazed substrate to high energy or actinic radiation, selected from the group consisting of high velocity electrons, X-radiations, and ultra-violet radiations;
f. heating at least said exposed portion of the glazed substrate to a temperature between about the transformation range and the softening point of the glaze for a period of time sufficient to cause nucleation and growth of microcrystals of sodium fluoride containing at least one silver halide selected from the group consisting of silver chloride, silver bromide, and silver iodide to occur within said exposed portion;
g. re-exposing at least said previously-exposed portion of said glazed substrate to high energy or actinic radiation, selected from the group consisting of high velocity electrons, X-radiations, and ultra-violet radiations;
h. heating at least said re-exposed portion of the glazed substrate to a temperature between the transformation range and the softening point of the glaze for a period of time sufficient to cause metallic silver to be deposited as discrete colloidal particles less than 200A in the smallest dimension, and/or deposited within said microcrystals, the silver-containing part of the microcrystal being less than about 200A in the smallest dimension, and/or deposited on the surface of said microcrystals, the portion of the microcrystal coated with silver being less than about 200A in the smallest dimension, said microcrystals having a concentration of at least 0.005% by volume; and then
i. cooling said glazed substrate to room temperature.

18. A method for making a glass article wherein at least a portion thereof is integrally colored by silver in a single color which comprises the steps:
a. melting a batch for a glass containing the constituents of sodium fluoride, the constituents of at least one silver halide selected from the group consisting of silver chloride, silver bromide, and silver iodide, about 0 to 0.2% CeO_2" and a thermoreducing agent;
b. forming said melt into a glass article;
c. subjecting at least a portion of said glass article to an elevated temperature between about the transformation range and the softening point of the glass for a period of time sufficient to reduce part of the silver to metallic silver and initiate nucleation and growth of microcrystals of sodium fluoride containing at least one silver halide selected from the group consisting of silver chloride, silver bromide, and silver iodide;
d. exposing at least said portion of the glass article subjected to said elevated temperature to high energy or actinic radiation selected from the group consisting of high velocity electrons, X-radiations, and ultra-violet radiations;
e. heating at least said exposed portion to a temperature between the transformation range and the softening point of the glass for a period of time sufficient to cause metallic silver to be deposited as discrete collodial particles less than 200A in the smallest dimension, and/or deposited within said microcrystals, the silver-containing part of the microcrystal being less than about 200A in the smallest dimension, and/or deposited on the surface of said microcrystals, the portion of the microcrystal coated with silver being less than about 200A in the smallest dimension, said microcrystals having a concentration of at least 0.005% by volume; and then
f. cooling said article to room temperature.

4,057,409
APPARATUS FOR MAKING CATHODE-RAY TUBE SCREENS WITH INTEGRALLY FORMED CONTOURED FIXTURES

Alexandr Alexandrovich Kudryavtsev, Novye Cheremushki, kvartal 34a, korpus 4, kv. 3; Vitaly Mikhailovich Firsov, 9 Parkovaya ulitsa, 8, kv. 25; Evgeny Fedorovich Solinov, Novorogozhskaya ulitsa, 15, korpus 2, kv. 59; Mark Klavdievich Symon, 1 Voikovsky proezd, 12, kv. 4; Pavel Ivanovich Litvinov, Novorogozhskaya ulitsa, 11, korpus 2, kv. 25; Albert Pavlovich Veresov, Novorogozhskaya ulitsa, 14, korpus 2, kv. 54; Ivan Alexandrovich Rybakov, Novorogozhskaya ulitsa, 11, korpus 2, kv. 63; Viktor Timofeevich Trishin, ulitsa Smirnovskaya, 11, kv. 27; Vladimir Mikhailovich Goryannikov, ulitsa Litvina-Sedogo, 3, kv. 24; Vyacheslav Pavlovich Savin, Novorogozhskaya ulitsa, 4, korpus 2, kv. 43, all of Moscow, and Igor Georgievich Kashkarov, Dolgoprudny, Vodniki, ulitsa Stantsionnaya, 5, Moskovskaya oblast, all of U.S.S.R.

Filed Feb. 23, 1976, Ser. No. 660,467
Int. Cl.² C03C *27/02;* C03B *21/00*
U.S. Cl. 65—154 **6 Claims**

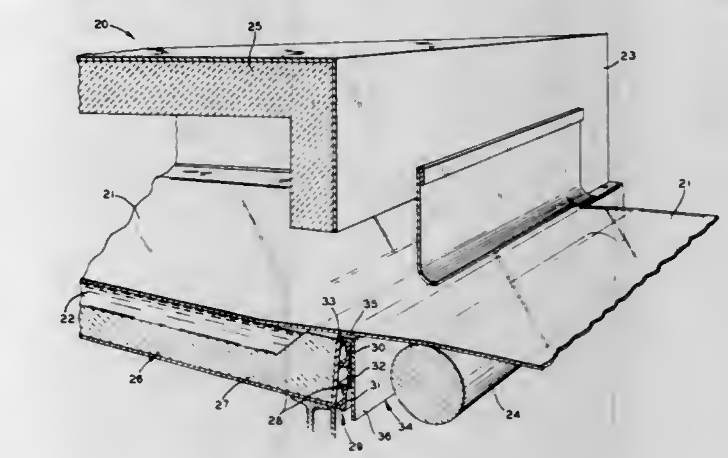


1. An apparatus for manufacturing cathode-ray tube screens having integrally formed contoured fixtures for securing elements inside the screen, comprising means **(5)** arranged on a base **(3)** for holding said screen **(B)** and means for moulding said contoured fixtures **(2)** including a plurality of frames **(12)** each having mounted therein a heater **(49)** and a moulding tool **17;** means for moving **(12, 13, 15, 22-24, & 26-31)** said moulding tools **(17)** from a radially retracted or inward position away from the screen surface to a radially extended or outward position pressing against said screen; means for vertically reciprocating **(34-40)** said contoured fixture moulding means from a position, wherein said heaters and tools face generally opposite to the surfaces where said contoured fixtures are to be formed to a position above the top of said mould holding said screen; and means **(10, 14, & 42-48)** for horizontally swinging in an arc or oscillating said frames **(12)** from a first locked position to a second locked position; whereby one of said locked positions enables said screen to be locally heated by said heaters at such surfaces where said contoured fixtures are to be formed, and the other of said locked positions enables said moulding tools to be moved toward said screen for impressing said contoured fixtures upon said screen.

4,057,410
HEAT SHIELD FOR FLOAT GLASS FORMING APPARATUS AND METHOD OF USING

Lloyd W. Daman, Pemberville; Don V. Marti, II, Toledo; Freddie Mason, Oregon, and Donald E. Shamp, Millbury, all of Ohio, assignors to Libbey-Owens-Ford Company, Toledo, Ohio

Filed Aug. 18, 1976, Ser. No. 715,549
Int. Cl.² C03B *18/02*
U.S. Cl. 65—65 A **7 Claims**



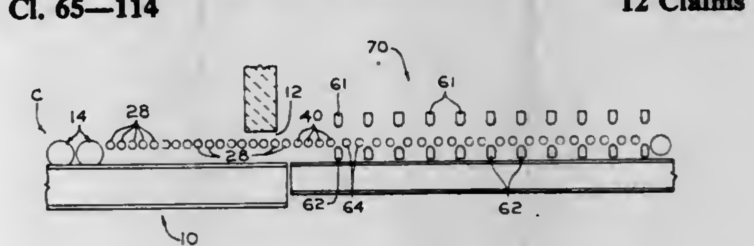
1. A float glass forming apparatus comprising:
a. a tank containing a bath of molten metal upon which a ribbon of glass is continuously formed;
b. an exit end on said tank defining a lip over which said ribbon is discharged;
c. means mounted on said exit end next to said lip for cooling said exit end of said tank; and
d. means loosely mounted on said cooling means adjacent said lip for shielding said cooling means from heat radiating from said ribbon glass whereby the surface of said cooling means is maintained at a temperature such that molten metal escaping from said exit end lip of said tank and contacting said cooling means is solidified.

5. A method of stopping a tin leak at the exit end of an operating float glass forming apparatus having a tank containing a bath of molten tin upon which a ribbon of glass is continuously formed and a cooler at the exit end of the tank wherein the exit end of the tank and cooler absorb heat radiated from the adjacent glass ribbon and lift-out and conveying rolls of higher temperature comprising the steps of:
a. forming a heat shield from a sheet of millboard insulating material;
b. treating the formed sheet of insulating material with a solution of potassium sulfate; and
c. interposing said heat shield between said cooler and said glass ribbon and lift-out and conveying rolls so that said cooler can be operated at a rate to reduce its outside temperature below the melting temperature of the tin.

4,057,411
HEAT TREATING GLASS SHEETS ON A ROLLER HEARTH CONVEYOR

Thomas J. Reese, Sarver, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Feb. 4, 1976, Ser. No. 655,049
Int. Cl.² C03B *27/00*
U.S. Cl. 65—114 **12 Claims**



1. A method of heat-treating a flat glass sheet comprising: conveying the sheet in a horizontal disposition on a roller

conveyor through a tunnel-type furnace and then through a quenching station, heating the sheet during its passage through the furnace to a temperature suitable for tempering at which the sheet is in a softened condition and is susceptible to roll ripple distortion, cooling the sheet during its passage through the quenching station with blasts of cooling medium applied to opposite surfaces of the sheet, and wherein the sheet during an initial, major portion of its travel through the furnace encounters conditions that induce roll ripple distortion in the sheet, and thereafter supporting the sheet as it passes through a predetermined zone extending from a location within the furnace close to the exit end of the furnace to a location within the quenching station on small diameter, closely spaced conveyor rolls which provide upper lines of contact with the sheet spaced sufficiently close together and aligned with a sufficient degree of accuracy to a common upper tangential plane to significantly reduce the severity of roll ripple distortion caused by said roll ripple inducing conditions.

6. An apparatus for heat treating glass sheets comprising: a tunnel-type furnace having entrance and exit openings in the ends thereof and provided with means for heating glass sheets to a temperature suitable for tempering, at which temperature the glass sheets are in a softened condition which renders them susceptible to roll ripple distortion, a quenching station having means for directing tempering medium against opposite surfaces of glass sheets, and a roller conveyor adapted for transporting glass sheets sequentially through said furnace and then said quenching station along a generally horizontal path, said roller conveyor comprised of a plurality of rolls each having a cylindrical sheet-supporting portion extending transversely to the direction of glass sheet movement and presenting a substantially horizontal line of contact with the glass sheets, said conveyor having a predetermined zone extending from a location within the furnace close to the exit end of the furnace to a location within the quenching station, a portion of the conveyor upstream from said predetermined zone presenting roll ripple inducing conditions to glass sheets passing thereover, the rolls in said predetermined zone having small diameters and being sufficiently closely spaced and being aligned with one another to a sufficient degree of accuracy such that the lines of glass contact lie essentially within a common horizontal plane to significantly reduce the severity of roll ripple distortion caused by said roll ripple inducing conditions upstream from said predetermined zone.

4,057,412

FORMING STATION FOR A MACHINE FOR FORMING HOLLOW ARTICLES OF VITREOUS MATERIAL

Lothar Schaar, Heuerssen, Germany, assignor to Hermann Heye, Obernkirchen, Germany

Continuation of Ser. No. 469,846, May 14, 1974, Pat. No. 3,951,637. This application Dec. 12, 1975, Ser. No. 640,385

Claims priority, application Germany, May 15, 1973, 2324953

The portion of the term of this patent subsequent to Apr. 20, 1993, has been disclaimed.

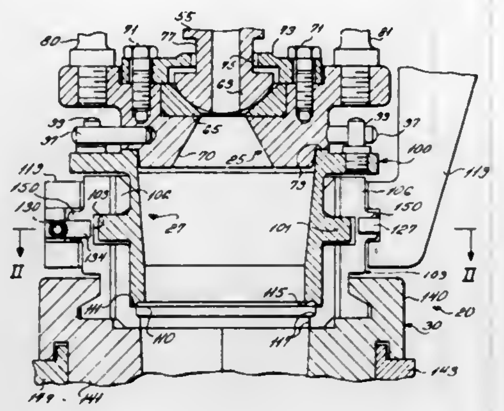
Int. Cl.² C03B *11/00, 9/14*

U.S. Cl. 65—229 8 Claims

1. A machine for forming a hollow article from vitreous material, said machine comprising:

at least one forming station having a pair of separable neck ring halves together forming a nonrotatable neck ring adapted to engage a parison, and an integral guide ring supported and rotatably mounted in said neck ring and rotationally fixed to the parison engaged thereby;

means at said forming station for jointly rotating said guide ring and the parison rotationally fixed thereto relative to said neck ring and thereby making rotation symmetrical the parison rotationally fixed to said guide ring and engaged by said neck ring; and



means at said forming station for preventing rotation of said neck ring jointly with said guide ring during rotation of said guide ring and the parison rotationally fixed thereto.

4,057,413

METHODS AND COMPOSITIONS FOR REGULATING PLANT GROWTH USING PIPERAZINE COMPOUNDS

Klaus Naumann, Cologne; Klaus Lurssen, Grosskoenigsdorf; Klaus Sasse, Schildgen; Ulrich Holtschmidt, and Gunter Schwarzmann, both of Essen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

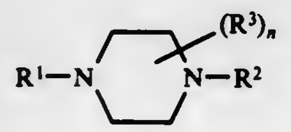
Filed Sept. 12, 1975, Ser. No. 612,813

Claims priority, application Germany, Oct. 9, 1974, 2448003

Int. Cl.² A01N *9/22*

U.S. Cl. 71—76 44 Claims

1. A plant-growth-regulating composition having an agriculturally acceptable carrier and, in an amount, sufficient to exert plant-growth regulating effects, an active ingredient comprising a piperazine compound of the general formula



(I)

wherein

R^1, R^2, and R^3 are individually selected from alkyl, substituted alkyl, alkenyl, substituted alkenyl, alkynyl or cycloalkyl,

n is 0, 1, 2, 3, or 4.

4,057,414

HERBICIDAL COMPOSITIONS

Adolf Fischer, deceased, late of Mutterstadt, Germany (by Cacilia Emma Fischer, heiress-at-law), assignor to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed Nov. 3, 1975, Ser. No. 627,965

Claims priority, application Germany, Nov. 18, 1974, 2454576

Int. Cl.² A01N *9/00*

U.S. Cl. 71—88 1 Claim

1. A herbicide composition consisting essentially of a herbicidally inert carrier having dispersed therein a herbicidally effective amount of a mixture of

a. a member selected from the group consisting of O-(methylaminosulfonyl)-glycolic acid hexamethylene amide and O-(methylaminosulfonyl)-glycolic acid heptamethylene amide, and

b. propionic acid-3,4-dichloroanilide in a weight ratio of (a) to (b) in the range of 4:1 to 1:4.

4,057,415

NITROISOTHIAZOLYLUREAS AS HERBICIDES

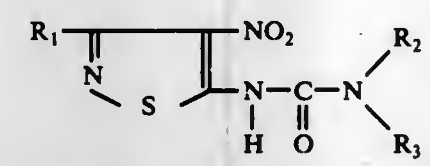
Arthur Albert Ramsey, Middleport, N.Y., assignor to FMC Corporation, Philadelphia, Pa.

Filed June 18, 1976, Ser. No. 697,455

Int. Cl.² C07D *275/02;* A01N *9/12*

U.S. Cl. 71—90 4 Claims

1. A substituted isothiazolylurea of the formula:



in which R_1 is straight or branched alkyl of 1 to 4 carbons; R_2 is alkyl of 1 to 4 carbons; R_3 is hydrogen or alkyl of 1 to 4 carbons.

3. An herbicidal composition comprising an herbicidally effective amount of a compound of claim 1 in admixture with an agriculturally acceptable extender.

4. A method of preventing and destroying plant growth which comprises applying to the locus to be protected an herbicidally effective amount of a compound of claim 1.

4,057,416

3-ALKYLTHIO-, 3-ALKYLSULFINYL-, AND 3-ALKYLSULFONYLISOTHIAZOLE DERIVATIVES AS HERBICIDES

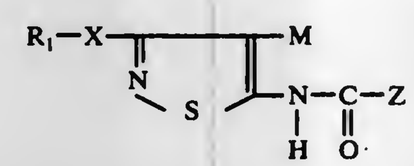
Loren Kenneth Gibbons, Medina, N.Y., assignor to FMC Corporation, Philadelphia, Pa.

Filed June 18, 1976, Ser. No. 697,458

Int. Cl.² C07D *275/02;* A01N *9/12*

U.S. Cl. 71—90 19 Claims

1. A substituted isothiazole of the formula:



wherein R_1 is alkyl or alkenyl of up to six carbon atoms;

Z is $-NR_2R_3$ or R_4 in which R_2 is methyl, R_3 is methyl or hydrogen, and R_4 is alkyl of one to six carbon atoms;

M is cyano or carbamoyl; and X is —, $-SO-$, or $-SO_2-$.

18. A herbicidal composition comprising an herbicidally effective amount of a compound of claim 1 in admixture with an extender.

19. A method of preventing and destroying undesired plant growth which comprises applying to the locus to be protected an herbicidally effective amount of a compound of claim 1.

4,057,417

6-SEC.-BUTYL-1,2,4-TRIAZIN-5(4H)-ONE COMPOUNDS AND HERBICIDAL COMPOSITIONS

Karlfried Dickoré, Leverkusen; Ludwig Eue, and Robert Rudolf Schmidt, both of Cologne, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Mar. 26, 1975, Ser. No. 562,293

Claims priority, application Germany, Apr. 10, 1974, 2417511

Int. Cl.² A01N *9/22, 9/00;* C07D *253/06*

U.S. Cl. 71—93 13 Claims

1. A compound selected from the group consisting of

4-amino-6-sec.-butyl-3-methylthio-1,2,4-triazin-5(4H)-one,

4-benzylideneamino-6-sec.-butyl-3-methylthio-1,2,4-triazin-5(4H)-one,

4-isobutylideneamino-6-sec.-butyl-3-methylthio-1,2,4-triazin-5(4H)-one, and

4-furfurylidene-amino-6-sec.-butyl-3-methylthio-1,2,4-triazin-5(4H)-one.

4,057,418

SULFONYLMETHYLAMINO-SUBSTITUTED BENZOIC ACIDS AND HERBICIDAL METHOD THEREWITH

Wolfgang Hofer; Fritz Maurer; Hans-Jochem Riebel; Rolf Schröder, all of Wuppertal, and Ludwig Eue, Cologne, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

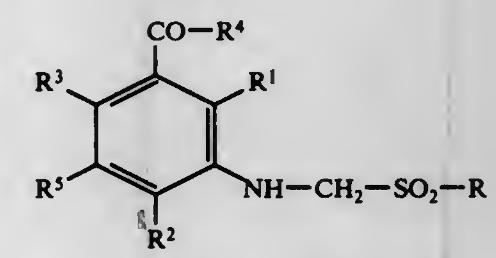
Filed Jan. 19, 1976, Ser. No. 650,580

Claims priority, application Germany, Feb. 3, 1975, 2504383

Int. Cl.² A01N *9/14;* C07C *147/11, 147/107*

U.S. Cl. 71—103 10 Claims

1. Method of combating undesirable vegetation which method comprises applying to a plant or its habitat a herbicidally effective amount of a benzoic acid compound of the formula



(I),

in which

R is alkyl or substituted alkyl of up to 6 carbon atoms, where the substituents are selected from halogen, or

R is aryl, and substituted aryl where the substituents are selected from halogen and alkyl of up to 4 carbon atoms,

R^1 is alkyl, alkoxy or alkylmercapto, of in each case up to 4 carbon atoms, or halogen,

R^2 is hydrogen,

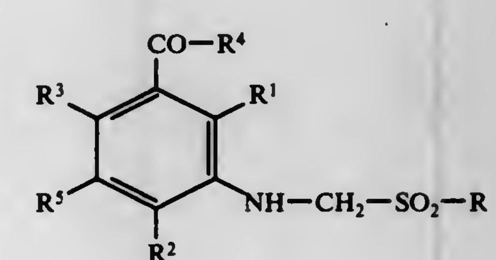
R^3 is hydrogen or halogen, and

R^4 is hydroxyl;

R^5 is halogen or alkyl of up to 4 carbon atoms.

4. Herbicidal composition comprising an agriculturally acceptable carrier and in effective amounts a benzoic acid compound as claimed in claim 1.

5. Benzoic acid compound of the formula



(I),

in which

R is alkyl or substituted alkyl of up to 6 carbon atoms, where the substituents are selected from halogen, or

R is aryl, and substituted aryl where the substituents are selected from halogen and alkyl of up to 4 carbon atoms,

R^1 is alkyl, alkoxy or alkylmercapto, of in each case up to 4 carbon atoms, or halogen,

R^2 is hydrogen,

R^3 is hydrogen or halogen, and

R^4 is hydroxyl,

R^5 is halogen or alkyl of up to 4 carbon atoms.

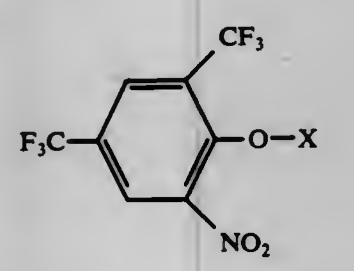
4,057,419

2,4-BIS-(TRIFLUOROMETHYL)-6-NITROPHENOL COMPOUNDS AND HERBICIDAL COMPOSITIONS

Klaus Wagner; Ludwig Eue; Robert R. Schmidt, and Ernst Roos, all of Cologne, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Division of Ser. No. 489,206, July 17, 1974, Pat. No. 3,943,180, which is a division of Ser. No. 335,400, Feb. 23, 1973, Pat. No. 3,894,074. This application Oct. 23, 1975, Ser. No. 625,276
Claims priority, application Germany, Feb. 29, 1972, 2209528
Int. Cl.² A01N *9/20, 9/24;* **C07C** *79/22, 87/00*
U.S. Cl. 71—121 8 Claims

1. 2,4-bis-(trifluoromethyl)-6-nitrophenol compound of the formula

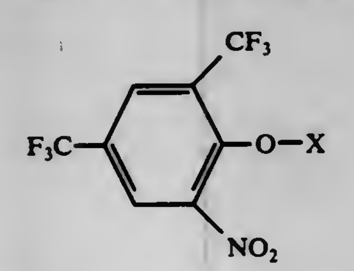


wherein

X is $HN^+R^1R^2R^3$; and R^1, R^2 and R^3 are individually hydrogen, alkyl of from 1 to 12 carbon atoms, alkoxyalkyl of from 1 to 4 carbon atoms in each of the alkoxy and alkyl moieties, hydroxyalkyl of up to 3 carbon atoms, alkenyl of from 2 to 4 carbon atoms, cycloalkyl of from 5 or 6 carbon atoms in the ring system, phenylalkyl of from 1 or 2 carbon atoms in the alkyl moiety and phenyl which may be substituted by chlorine, bromine, trifluoromethyl, nitro or methyl.

6. Herbicidal composition comprising a herbicidally acceptable carrier and, as an active ingredient, effective amounts of a compound as claimed in claim 1.

7. Method of combatting undesired vegetation which method comprises applying to said vegetation or its habitat a herbicidally effective amount of a 2,4-bis-(trifluoromethyl)-6-nitrophenol derivative of the general formula



wherein

X is $HN^+R^1R^2R^3$ and R^1, R^2 and R^3 are individually hydrogen, alkyl of from 1 to 12 carbon atoms, alkoxyalkyl of from 1 to 4 carbon atoms in each of the alkoxy and alkyl moieties, hydroxyalkyl of up to 3 carbon atoms alkenyl of from 2 to 4 carbon atoms, cycloalkyl of from 5 to 6 carbon atoms in the ring system, phenylalkyl of from 1 or 2 carbon atoms in the alkyl moiety, and phenyl which may be substituted by chlorine, bromine, trifluoromethyl, nitro or methyl

---

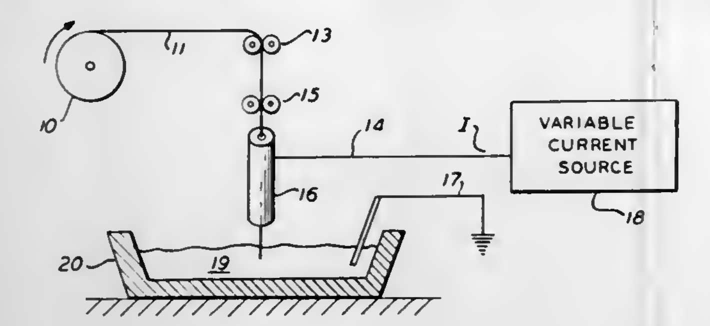
4,057,420

METHODS FOR DISSOLVING VOLATILE ADDITION AGENTS IN MOLTEN METAL

Arthur A. Brace, Mountainside, and Alexander Lesnewich, New Providence, both of N.J., assignors to Airco, Inc., Montvale, N.J.

Filed Feb. 6, 1976, Ser. No. 655,794
Int. Cl.² C21C *7/00*
U.S. Cl. 75—53 5 Claims

1. A method for reacting impurities in molten steel in a vessel exposed to the atmosphere with an addition agent having a boiling point below the melting point of steel comprising the steps of providing a wire having a metallic sheath encapsulating said agent in powder form therein; passing an electric current through at least a portion of said wire thereby resistively preheating said wire; feeding the preheated wire, while said current is passed therethrough, into said molten steel such that said metallic sheath is melted and said addition agent is sublimed before the wire can contact a vessel wall; and con-



trolling the value of said electric current such that said resistive preheating and heating of said wire by conduction of heat from said molten steel are effective to melt said sheath and sublime said addition agent at a predetermined depth in said molten steel such that said sublimed addition agent reacts with said impurities before said agent rises by buoyancy to the surface and escapes from said molten steel.

4,057,421

PROCESS FOR VACUUM DECARBURIZATION OF STEEL

Takashi Fukui, Minoo, and Takami Ikeda, Nishinomiya, both of Japan, assignors to Sumitomo Metal Industries Limited, Osaka, Japan

Continuation of Ser. No. 516,911, Oct. 22, 1974, abandoned. This application Aug. 10, 1976, Ser. No. 713,236
Int. Cl.² C21C *7/10*
U.S. Cl. 75—60 5 Claims

1. A process for the vacuum decarburization of steel under reduced pressure by mounting a ladle filled with molten steel in a closed decarburization vessel and agitating the molten steel by blowing gas through a tuyere in the ladle to prevent oxidation of alloy metals in the low carbon range, the improvement comprising the steps of:

blowing lancing oxygen through an oxygen lance using a laval nozzle having a nozzle exit Mach number in the range of 2 - 4 wherein the laval nozzle has a divergent passage from its throat to its tip;

maintaining the laval nozzle at a fixed height above the surface of the molten steel; and

controlling the flow rate of oxygen in accordance with variations in the presence within the vessel to maintain the Mach number in the above specified range in accordance with the following formula:

$$P_0 = P_2/(1 + \frac{-K-1}{2} M_2^2)\, k/(k-1)$$

wherein M_2 is the Mach number at the nozzle exit;

P_0 is the pressure in the lance in Kg/m², absolute,

P_2 is the pressure in the vessel (kg/m², absolute),

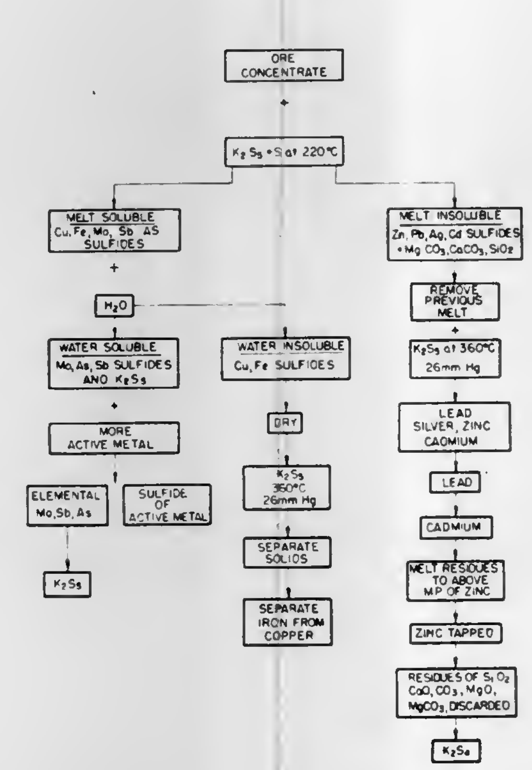
and K is the ratio of specific heats at constant pressure and volume.

4,057,422

ORE TREATMENT PROCESS

Rollan Swanson, 220 California Ave., Santa Monica, Calif. 90403

Continuation-in-part of Ser. No. 467,099, May 6, 1974, Pat. No. 3,957,503. This application Mar. 1, 1976, Ser. No. 662,507
Int. Cl.² C22B *19/04, 13/08*
U.S. Cl. 75—86 6 Claims



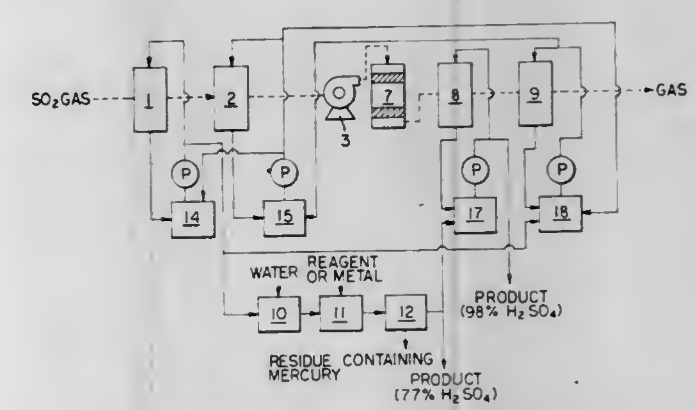
1. A process for extracting an ore containing a metal selected from the group consisting of: iron, copper, zinc, arsenic, antimony, molybdenum, silver and cadmium, said metals being present in either their sulfidic or oxidic forms, comprising preheating said ore to a temperature sufficient to dehydrate same; mixing said ore at said temperature with a anhydrous, air-free melt containing a compound selected from the group consisting of saturated hydrogen and alkali metal polysulfides and an amount of sulfur sufficient to sulfidize those metals present in their oxidic form and to completely oxidize those metals present in their sulfide forms; separating by filtering while hot the melt-soluble sulfides of Mo, As, Sb, Cu, and Fe from the melt-insoluble sulfides with water to separate said saturated polysulfide and the water-soluble sulfides of Mo, As and Sb from the water-insoluble sulfides of Cu and Fe; mixing said water-soluble sulfides in aqueous solution with a more electropositive metal thereby precipitating said metals in their elemental form together with the sulfide of said more electropositive metal and said saturated polysulfide, drying said water-insoluble copper and iron sulfides; reacting copper and iron sulfides with a melt containing a saturated hydrogen or alkali metal polysulfide at a temperature above the melting point of said polysulfide under a vacuum of between one-half Torr and 760 mm; separating the resulting free metals from said melt and magnetically separating said iron from said copper; treating said melt-insoluble Zn, Pb, Ag, and Cd sulfides with a saturated hydrogen or alkali metal polysulfide under a vacuum of between 1/2 Torr and 760 mm; separating lead containing Cd, Ag, and Zn dissolved therein; placing a cover layer of an unsaturated hydrogen or alkali metal polysulfide over said lead, heating the resulting mixture above the melting point of zinc to distill said zinc and collecting said zinc.

4,057,423

METHOD FOR THE MANUFACTURE OF MERCURY FREE SULFURIC ACID

Hisahiro Kinoshita, Tokyo, Japan, assignor to Mitsui Mining & Smelting Co., Ltd. and Hachinohe Smelting Co., Ltd., both of Tokyo, Japan

Division of Ser. No. 286,712, Sept. 6, 1972, Pat. No. 3,954,451. This application Dec. 15, 1975, Ser. No. 640,432
Claims priority, application Japan, Sept. 10, 1971, 46-70625; Feb. 28, 1972, 47-20820; Feb. 29, 1972, 47-21384; Apr. 24, 1972, 47-41633
Int. Cl.² C22B *43/00;* **C01B** *17/90*
U.S. Cl. 75—109 15 Claims



6. In a method of manufacturing substantially mercury-free sulfuric acid by roasting non-ferrous metalsulfide material and then removing dust, cooling, washing and removing mist from the roasted gas to prepare a cool feed gas containing SO_2 and impurities comprising water and mercury, removing said impurities from the roasted gas, converting the SO_2 to SO_3 and absorbing the SO_3 in dilute sulfuric acid, the improvement which comprises:

continuously flowing a stream of said feed gas into and through first scrubbing means and therein continuously scrubbing said feed gas with a continuously circulating stream of first liquid scrubbing agent consisting essentially of sulfuric acid solution having an H_2SO_4 concentration of from 30 to 99 wt.% and having a temperature of from 20° to 70° C to absorb impurities comprising water and mercury present in said cool feed gas into said scrubbing agent and to produce a stream of purified feed gas containing SO_2;

continuously removing said stream of said first liquid scrubbing agent from said first scrubbing means, withdrawing a portion of said stream, adding to said withdrawn portion a reagent effective to precipitate mercury present in said withdrawn portion, removing the precipitated mercury from said withdrawn portion, recovering the balance of said withdrawn portion as a purified dilute sulfuric acid solution, and continuing to circulate the balance of said stream of said first liquid scrubbing agent through said first scrubbing means without precipitating and removing mercury present therein;

continuously feeding said stream of purified feed gas exiting from said first scrubbing means through second scrubbing means and therein continuously scrubbing said purified feed gas with a continuously circulating stream of second liquid scrubbing agent consisting essentially of sulfuric acid solution having an H_2SO_4 concentration of about 98 to 99 wt.% and a temperature of about 60° to 80° C to absorb into said second scrubbing agent an additional quantity of the mercury present in said purified feed gas whereby to produce an additionally purified feed gas containing SO_2, said second liquid scrubbing agent having a higher concentration, a higher temperature or both higher concentration and higher temperature, than said first liquid scrubbing agent;

converting the SO_2 in said additionally purified feed gas to SO_3 and then flowing the SO_3-containing gas through two absorption stages in series and in each of said stages contacting said SO_3-containing gas with different dilute sulfu-

ric acid solutions to absorb the SO_3 whereby to produce two separate concentrated sulfuric acid solutions, the dilute sulfuric acid solution employed in the first absorption stage comprising the purified dilute sulfuric acid solution obtained by precipitating mercury from the scrubbing agent used in the first scrubbing means, the dilute sulfuric acid solution employed in the second absorption stage comprising a second portion of the scrubbing agent employed in the first scrubbing means and which is not subjected to mercury removal, and including the step of feeding the concentrated sulfuric acid solution from the second absorption stage to said second scrubbing means to serve as said second scrubbing agent therein.

4,057,424

ZINC-BASED ALLOY FOR COATING STEEL

Roberto Bruno; Massimo Memmi; Paolo Berardi, and Augusto Musso, all of Rome, Italy, assignors to Italsider S.p.A., Italy

Filed May 25, 1976, Ser. No. 689,911

Claims priority, application Italy, June 13, 1975, 50042/75

Int. Cl.^{2} C22C *18/04*

U.S. Cl. 75—178 A **2 Claims**

1. Zinc-based alloy for coating steel, particularly for continuous coating of flat steel sheet and wire using the Sendzimir process, essentially consisting of the following alloy elements in percentage by weight: Al 0.10–0.30%, Mg 0.30–0.80%, Cr 0–0.20%, Ti 0–0.20%, the balance being zinc, the ratio of Mg/AL being 4 or less and the ratio of Cr/Al being 1.5 or less.

4,057,425

2-SUBSTITUTED BENZIMIDAZOLES IN MULTICOLOR DIFFUSION TRANSFER

Ronald F. Lambert, Wayland, and Howard G. Rogers, Weston, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed July 16, 1975, Ser. No. 596,384

Int. Cl.^{2} G03C *7/00, 1/40, 1/76, 5/30*

U.S. Cl. 96—3 **26 Claims**

1. A diffusion transfer color process comprising exposing a photosensitive element comprising a blue-sensitive silver halide emulsion having a yellow dye developer associated therewith, a greensensitive silver halide emulsion having a magenta dye developer associated therewith, and a red-sensitive silver halide emulsion having a cyan dye developer associated therewith, applying an aqueous alkaline processing composition to said exposed photosensitive element to effect development and to form an imagewise distribution of unoxidized dye developer in undeveloped areas of each of said silver halide emulsions as a function of said development, said process including the step of transferring by diffusion at least a portion of said imagewise distributions of unoxidized dye developer to an image-receiving layer in superposed relationship therewith to thereby provide a multicolor diffusion transfer image, at least one of said silver halide emulsions having associated therewith in the same layer or in an adjacent layer a 2-substituted benzimidazole selected from the group consisting of 2-phenyl-benzimidazole, 2-β-naphthyl-benzimidazole, 2-p-tolyl-benzimidazole, 2-(2'-chlorophenyl)-benzimidazole and 2-(2'-thienyl)-benzimidazole, said 2-substituted benzimidazole being present in a quantity effective to provide improved temperature latitude.

4,057,426

MAGENTA TONER WITH A COATED CARRIER

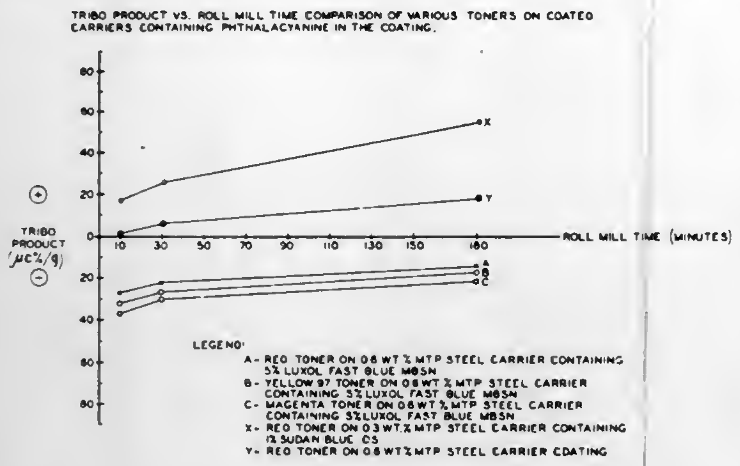
Joseph Mammino, Penfield, and Franklin Jossel, Rochester, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Sept. 29, 1975, Ser. No. 617,763

Int. Cl.^{2} G03G *9/10, 13/01*

U.S. Cl. 96—1 SD **14 Claims**

8. An electrostatographic imaging process comprising establishing an electrostatic latent image on a surface and contacting said surface with an electrostatographic developer comprising toner particles and coated carrier particles, said toner particles comprising a resin and a 2,9-dimethylquinacridone colorant and said coated carrier comprises carrier material particles



overcoated with a composition containing a resin and a copper tetra-4-(octadecylsulfonomido) phthalocyanine colorant to develop said latent image.

4,057,427

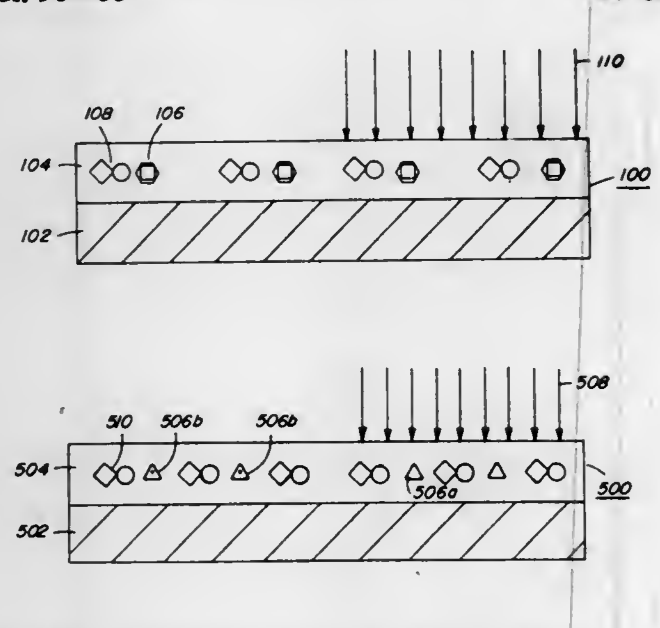
PEROXIDE REDOX AMPLIFICATION IMAGING USING MANGANESE CATALYST IMAGES

Philip Maury Enriquez, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Jan. 12, 1976, Ser. No. 648,079

Int. Cl.^{2} G03C *7/00, 5/24*

U.S. Cl. 96—55 **85 Claims**



1. A method of forming a dye image comprising:

imagewise reducing a cobalt(III) complex to cobalt(II) to form an immobile cobalt complex image in an imaging layer of a photographic element,

forming in the imaging layer an immobile catalytic manganese complex image which is a reversal of the cobalt complex image, said manganese complex image exhibiting a substantially higher degree of catalytic activity than said reversal immobile cobalt complex image, and

employing the imaging layer containing the immobile catalytic manganese complex image and the reversal cobalt complex image as a catalyst in a peroxide redox amplification reaction occurring at the site of said manganese complex image to form a dye image.

4,057,428

PHOTOGRAPHIC ELEMENTS CONTAINING ANIONIC ORGANIC ACIDS

Rowland George Mowrey; Donald Arthur Smith, and Richard Calvin Sutton, all of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Nov. 20, 1972, Ser. No. 307,892

Int. Cl.^{2} G03C *7/00, 3/00, 1/72*

U.S. Cl. 96—74 **13 Claims**

1. A photographic element comprising a support having thereon at least one image dye-providing layer unit containing a silver halide emulsion at a coverage of less than 30 mg./ft.^{2} and a photographic color coupler, and at least one layer containing at least 25 mg./ft.^{2} of a nondiffusible anionic organic polymeric compound having acid groups thereon and having an equivalent weight of at least 70 and less than 300 based on acid groups.

4,057,429

PREPARATION OF PHOTOGRAPHIC SILVER HALIDE EMULSIONS

Luc Achiel De brabandere, Mortsel; Robert Joseph Pollet, Vremde; Herman Alberik Pattyn, Kapellen, and Hendrik Alfons Borginon, Mortsel, all of Belgium, assignors to AGFA-GEVAERT, N. V., Mortsel, Belgium

Filed Mar. 12, 1976, Ser. No. 666,206

Claims priority, application United Kingdom, Apr. 9, 1975, 14586/75

Int. Cl.^{2} G03C *1/02;* **B01J** *17/00*

U.S. Cl. 96—94 R **13 Claims**

1. A method for preparing a silver halide emulsion which comprises the step of precipitating silver halide grains in an aqueous solution of peptizer and adding to the peptizer solution a silver halide grain ripener to accelerate grain growth wherein before or during precipitation from about 500 mg to about 30 g of a silver halide grain ripener corresponding to the following formula is added to the peptizer solution per mole of silver halide to be formed:

$$R^1\text{—S—(CH}_2\text{—)}_n\text{CH}\begin{matrix}\diagup \text{COOR}^4 \\ \diagdown \text{NR}^2\text{R}^3\end{matrix}$$

wherein:

n is an integer from 1 to 5

R^1 is a C_1–C_5 alkyl group

R^2 is hydrogen, a C_1–C_5 alkyl group or a carboxylic acyl group

R^3 is hydrogen, a C_1–C_5 alkyl group or substituted alkyl, and

R^4 is hydrogen, a C_1–C_5 alkyl group, an aryl group or a salt-forming cation.

4,057,430

SILVER HALIDE PHOTOGRAPHIC EMULSION

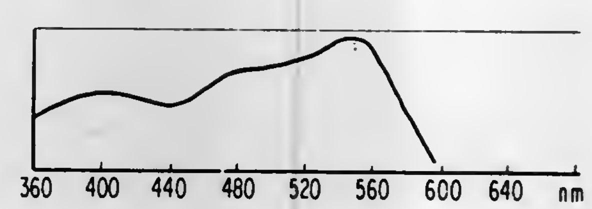
Akira Sato; Akira Ogawa; Masanao Hinata, and Haruo Takei, all of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Continuation of Ser. No. 464,094, April 25, 1974, abandoned. This application Feb. 9, 1976, Ser. No. 656,685

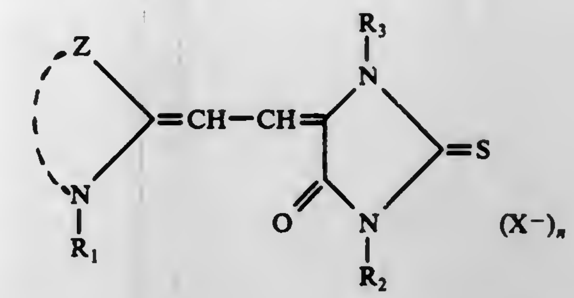
Claims priority, application Japan, Apr. 25, 1973, 48-47467

Int. Cl.^{2} G03C *1/22*

U.S. Cl. 96—100 R **14 Claims**



1. A silver halide photographic emulsion containing at least one sensitizing dye represented by the following general formula (I):



(I)

in which Z represents an atomic group necessary for forming a benzoxazole nucleus or a naphthoxazole nucleus; R_1 represents a member selected from the group consisting of an unsubstituted alkyl group; an alkyl group substituted with a hydroxy group, an alkoxy group, an acyloxy group, a carboxy group, an alkoxycarbonyl group, a sulfo group, or an aryl group; or an allyl group; R_2 represents an alkyl group, an allyl group or an aryl group; R_3 represents an N-(N,N-dialkylaminoalkyl)carbamoylalkyl group, an N-(N,N-trialkylammoniumalkyl)carbamoylalkyl group or an N,N,N-trialkylammoniumalkyl group, with R_2 being a phenyl group where R_3 is an alkoxycarbonylalkyl group; X represents an acid anion; and n represents 0 or 1.

9. The silver halide photographic emulsion of claim 1, wherein said silver halide emulsion contains at least one of a chemical sensitizer, an optical sensitizer, a hardener, an antifoggant, a stabilizer, a coating aid, and a color coupler.

4,057,431

ETHYLENICALLY POLYURETHANE UNSATURATED COMPOSITION

Anthony F. Finelli, Akron; Shirish Jasani, Cuyahoga Falls, both of Ohio, and Columbus Williams, Jr., Doerun, Ga., assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Sept. 29, 1975, Ser. No. 617,883

Int. Cl.^{2} G03C *1/68;* **G08F** *18/24*

U.S. Cl. 96—115 R **10 Claims**

1. A liquid ethylenically unsaturated polyetherurethane composition having no free NCO, being readily removable from a substrate by an alkaline water wash and being capable of being polymerized by actinic light to yield a solid having a Shore A hardness of at least 30, said composition being composed of a polyetherurethane consisting essentially of reaction products of polyether polyol having 2 to 3 hydroxyls, organic polyisocyanate and hydroxyl acrylate or methacrylate having an alkyl radical containing 2 to 3 carbon atoms and sufficient polyethylene polyol acrylate or methacrylate to give the composition a viscosity at 24° C. of 2,000 to 10,000 centipoises.

4,057,432

ACYLACETANILIDE COUPLER WITH HETEROCYCLIC DIACYL AMINO COUPLING-OFF GROUP

Mitsuto Fujiwhara, Hachioji; Tamotsu Kojima, Kokubunji, and Syunji Matsuo, Fussa, all of Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

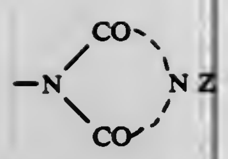
Continuation of Ser. No. 211,468, Dec. 23, 1971, abandoned. This application July 16, 1973, Ser. No. 379,730

Claims priority, application Japan, Dec. 26, 1970, 45-119053

Int. Cl.^{2} G03C *7/00, 1/40*

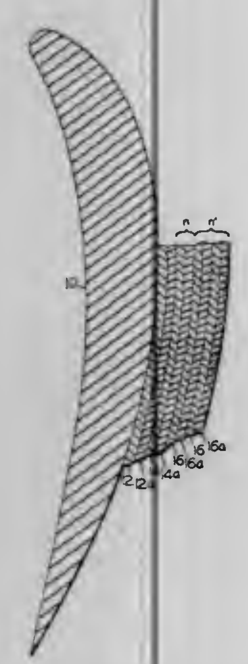
U.S. Cl. 96—56.2 **6 Claims**

1. In a process for forming a yellow image in a silver halide light-sensitive color photographic material, comprising processing the photographic material by a color developer in the presence of an acyl acetanilide type 2-equivalent yellow coupler having active methylene herein and a split off group substituted for one of the two hydrogens on the active methylene, the improvement which comprises the split-off group being represented by the following general formula:



wherein Z is a group selected from alkylene, alkenylene, cycloalkylene, cycloalkenylene, terphenylene, arylene and pyridinediyl.

4,057,433
OXYFLUORIDE-TYPE MOLD FOR CASTING MOLTEN REACTIVE AND REFRACTORY METALS
Robert A. Brown, Scio, Oreg., assignor to Rem Metals Corporation, Albany, Oreg.
Continuation-in-part of Ser. No. 448,254, March 5, 1974, abandoned, which is a continuation of Ser. No. 332,608, Feb. 15, 1973, abandoned, which is a continuation of Ser. No. 174,662, Aug. 25, 1971, abandoned. This application Aug. 1, 1975, Ser. No. 601,611
Int. Cl.² B28B *7/34*
U.S. Cl. 106—38.3 **10 Claims**



1. A mold for casting molten reactive and refractory metals comprising:
a. a facing portion comprising finely divided particles of at least one member of the group consisting of the oxyfluorides of the metals of Group III*a*, and the lanthanide and actinide series of Group III*a*, of the Mendeleevian periodic chart of the atoms, and a binder therefor,
b. said oxyfluorides having free energies of formation at 1000° K. of at least 69 kilocalories per gram atom of contained oxygen and fluorine, and
c. a backup portion comprising finely divided particles of shell mold back up material and a binder therefor.

4,057,434
OPAQUE INFRA-RED TRANSMITTING GLASS-CERAMIC ARTICLES
Hermann L. Rittler, Horseheads, N.Y., assignor to Corning Glass Works, Corning, N.Y.
Continuation-in-part of Ser. No. 603,544, Aug. 11, 1975, abandoned. This application Oct. 8, 1976, Ser. No. 730,808
Int. Cl.² C03C *3/22, 3/04*
U.S. Cl. 106—39.7 **1 Claim**

1. An opaque glass-ceramic article demonstrating a coefficient of thermal expansion (20°-700° C.) less than 15, excellent chemical durability, an infra-red transmittance at a wavelength of 3.5 microns through a polished plate of about 4.25 mm. thickness in excess of 40%, and wherein beta-spodumene solid solution constitutes the principal crystal phase, consisting essentially, by weight on the oxide basis, of about 2.5-4.5% Li_2O, 0.75-3.5% ZnO, 17.5-21% Al_2O_3, 65-71% SiO_2, 3.5-6% TiO_2, and being essentially free from alkaline earth metal oxides, alkali metal oxides other than Li_2O, and ZrO_2.

4,057,435
OPTICAL GLASSES
Jean E. Boudot, and Pascal A. J. Joly, both of Avon, France, assignors to Corning Glass Works, Corning, N.Y.
Filed Oct. 8, 1976, Ser. No. 730,809
Claims priority, application France, Apr. 16, 1976, 76.11357
Int. Cl.² C03C *3/08*
U.S. Cl. 106—47 Q **3 Claims**

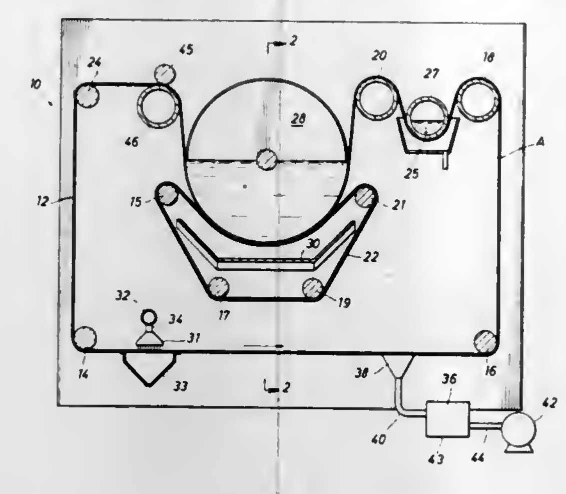
1. A glass having a composition within the CaO—La_2O_3—TiO_2—B_2O_3—SiO_2 family and having a refractive index at least on the order of 1.7, a dispersive index at least on the order of 40, a density of about 3 g/cm³, and a weight loss, as measured in the AO test, of less than 5 mg/cm², consisting essentially, as calculated in weight percent on the oxide basis, of about 18-28% CaO, 9-15% La_2O_3, 9-15% TiO_2, 30-54% B_2O_3, and the remainder SiO_2, the SiO_2 content not exceeding 15% and the sum of B_2O_3 + SiO_2 being about 30-54%.

4,057,436
DISPERSION OF SOLIDS IN ORGANIC SOLVENTS
Peter Kingsley Davies; Leslie Richard Rogers; James Frederick Stansfield, and Arthur Topham, all of Manchester, England, assignors to Imperial Chemical Industries Limited, London, England
Filed Sept. 15, 1975, Ser. No. 613,557
Claims priority, application United Kingdom, Aug. 1, 1975, 32287/75; Sept. 17, 1974, 40416/75; Sept. 17, 1974, 40418/75
Int. Cl.² C08K *5/34*
U.S. Cl. 106—288 Q **3 Claims**

1. A composition comprising a dispersion of from 5% to 70% by weight based on the total weight of the dispersion of a pigment or dyestuff with an average particle size of less than 20 microns in an organic liquid containing dissolved therein from 5% to 100% by weight based on the weight of the pigment or dyestuff of a polymeric or resinous dispersing agent in which the improvement comprises the presence in the dispersion of from 1% to 50% by weight based on the weight of the pigment or dyestuff of a fluidising agent which is a quaternary ammonium salt of a monomeric coloured acid wherein there are from 19 and up to 60 carbon atoms contained in the 4 chains attached to the N-atom of the quaternary ammonium ion.

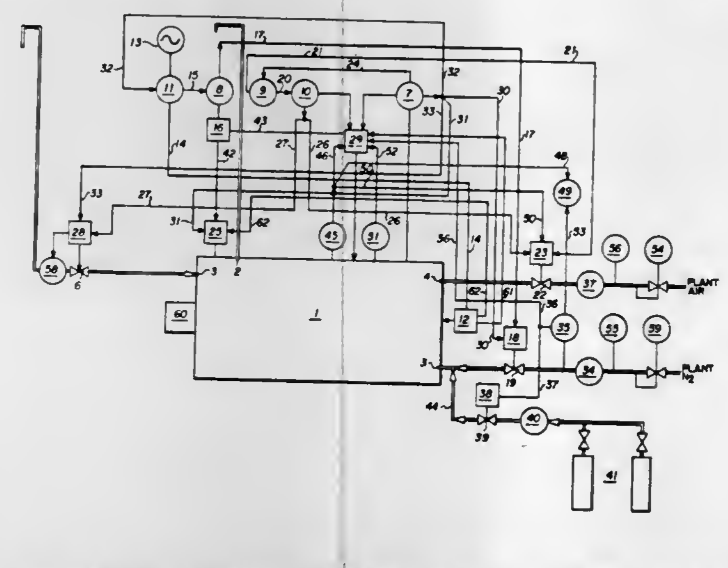
4,057,437
CONTINUOUS BELT FILTER AND FILTRATION METHOD
Aloysius C. Kracklauer, Conroe, Tex., assignor to Sparkler Mfg. Co., Conroe, Tex.
Filed June 9, 1976, Ser. No. 694,166
Int. Cl.² C13D *3/16;* **B01D** *33/02, 33/18, 33/34*
U.S. Cl. 127—9 **9 Claims**

1. Apparatus for use in filtering fluids by a gravity filtration process, comprising:
an endless belt having a pair of parallel spaced-apart edges separated by a porous central portion which serves as a filtering media;
an extended portion mounted in sealing engagement with said belt along each of the edges thereof;
said extended portion including a shaped portion presenting a sealing surface, and a chain;
a cylindrical filter vessel comprised of spaced-apart, circular end members with at least one connecting member therebetween, said end members having
inner and outer surfaces, and a peripheral surface around the outer rim thereof;
guiding means around the circumference of said outer surface to mate with and guide said chain;
a machined portion on said peripheral surface, in leakproof sealing engagement with said sealing surface of said shaped portion;
wherein said filter belt may be removed from said extended



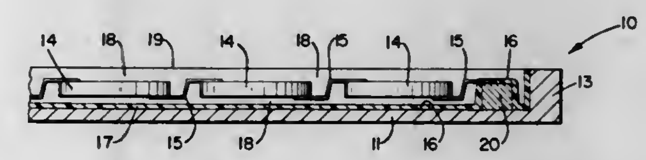
portions for replacement of cleaning, and whereby turning of said filter vessel acts to move said filter belt in a constant manner such that said belt is not stretched, wrinkled, or misaligned as the filtration process proceeds.

4,057,438
METHOD FOR HIGH TEMPERATURE CLEANING
Kenneth R. Mainord, 522 N. First, Apt. 105, Longview, Tex. 75601
Division of Ser. No. 474,916, May 31, 1974, Pat. No. 3,936,659. This application Nov. 3, 1975, Ser. No. 628,217
Int. Cl.² B08B *7/04*
U.S. Cl. 134—2 **5 Claims**



1. A method of cleaning glassware and metal parts in a high temperature oven, comprising the steps of:
purging said oven with an inert gas from a primary gas source to remove air,
circulating the existing atmosphere within the oven after purging with the inert gas,
heating the atmosphere within the oven to a pyrolyzing temperature with heaters connected to a heater controller,
pyrolyzing organic contaminants on articles to be cleaned for a preset pyrolyzing time,
purging the existing atmosphere within the oven with an air-inert gas mixture at the finish of the preset pyrolyzing time,
oxidizing residues by heating the existing atmosphere purged with an air-inert gas mixture to the oxidizing temperature of organic contaminants in the atmosphere for a preset time,
sensing flow of inert gas into the oven from the primary gas source by providing a pressure sensing device located between said oven and said primary gas source for deenergizing the heaters, sounding an alarm, and purging the oven with inert gas from an auxiliary inert gas source in response to detection of a failure of the primary gas source,
sensing the existing atmosphere within said oven to detect a combustible mixture during the pyrolyzing of organic contaminants by providing a combustible gas detector probe within said oven for terminating air flow, deenergizing the heaters and sounding an alarm in response to detection of a combustible atmosphere within the oven,
sensing the existing temperature in said oven during the pyrolyzing of organic contaminants and the oxidizing of residue by providing a temperature probe within said oven for deenergizing the heaters in response to overheating or rapid temperature changes in the oven.

4,057,439
SOLAR PANEL
Joseph Lindmayer, Bethesda, Md., assignor to Solarex Corporation, Rockville, Md.
Filed Aug. 25, 1976, Ser. No. 715,407
Int. Cl.² H01L *31/04*
U.S. Cl. 136—89 P **8 Claims**



1. A solar panel for maintaining solar energy cells in position to receive light impinging thereon, comprising a tray within which said cells are mounted, said tray including side and end members and a base member having a substantially planar surface within the space bounded by said tray, a layer of cured, single component silicone resin adhesively adhered to said planar surface, a layer of cured, multi-component silicone resin adhered to said single component layer, said single component layer being thinner than said multi-component layer, and photovoltaic cells disposed within and encapsulated by said multi-component layer so that said cells are maintained by said panel in position to receive light impinging on surfaces thereof and convert such light into electrical energy while being protected from ambient conditions and delamination by said encapsulant.

4,057,440
SCALE REDUCER FOR ZINC PHOSPHATING SOLUTIONS
Thomas Clifford Atkiss, Pottstown, and William Elgin Keen, Jr., Flourtown, both of Pa., assignors to Pennwalt Corporation, Philadelphia, Pa.
Filed Jan. 29, 1976, Ser. No. 653,679
Int. Cl.² C23F *7/10*
U.S. Cl. 148—6.15 Z **4 Claims**

1. In the process of phosphating iron, steel, galvanized steel and aluminum with an aqueous acidic zinc phosphating solution the improvement comprising adding a scale-reducing amount of dialkyl triamine pentakis methylene phosphonic acid or its alkaline salt in which the alkyl group ranges from C_2 to C_8 carbons and the salt is selected from the group consisting of sodium, potassium and ammonium.

4,057,441
SOLID PROPELLANT WITH BURNING RATE CATALYST
Richard A. Biddle, Newark, Del., assignor to Thiokol Corporation, Newtown, Pa.
Filed Apr. 20, 1976, Ser. No. 678,523
Int. Cl.² C06B *45/10*
U.S. Cl. 149—19.9 **5 Claims**

1. A solid propellant composition comprising a hydroxy terminated polybutadiene based binder component, an oxygen

containing inorganic oxidizer component, and finely divided cupric sulfide.

4,057,442
METHOD OF DISPOSAL OF PYROTECHNIC COMPOSITIONS

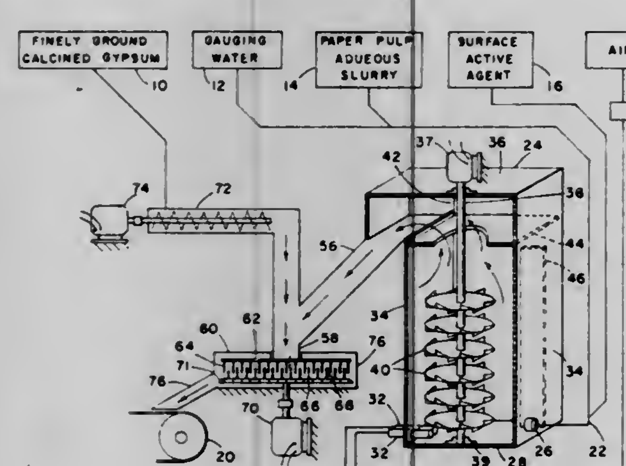
Graham C. Shaw, Garland, Utah; Emil A. Lawton, Sherman Oaks, Calif., and Leon L. Jones, Ogden, Utah, assignors to Thiokol Corporation, Newtown, Pa.
Filed Mar. 29, 1976, Ser. No. 671,478
Int. Cl.² C06B *23/00*
U.S. Cl. 149—109.4 19 Claims

1. A process for the disposal of a solid pyrotechnic composition substantially comprising a solid polymeric binder containing discrete particles of inorganic oxidizer and metallic fuel dispersed therein; and allowing for the recovery of said inorganic oxidizer and metallic fuel which comprises:

a. disrupting the matrix structure of said polymeric binder by treating said pyrotechnic composition with a swelling agent, or depolymerizing agent, substantially chemically unreactive with said inorganic oxidizer and said metallic fuel;
b. separating the inorganic oxidizer and metallic fuel from the disrupted polymeric matrix of step a;
c. contacting the inorganic oxidizer and metallic fuel from step b with a fluid selected from water, or a fluid having a density intermediate to that of the inorganic oxidizer and metallic fuel, and being substantially chemically unreactive therewith, to form a mixture which comprises, a solution of inorganic oxidizer and solid metallic fuel, or a layer of solid metallic fuel, a layer of said fluid of intermediate density and a layer of solid inorganic oxidizer; and
d. separating said mixture of step c.

4,057,443
FOAMED GYPSUM WALLBOARD

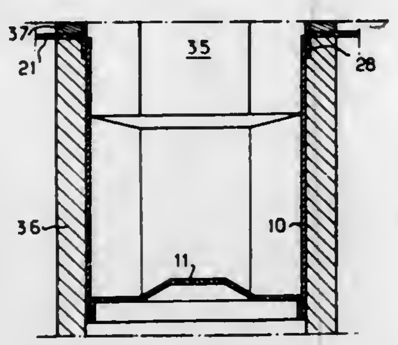
Rodney A. Stiling, Snyder; Edward A. Burkard, East Amherst, and Robert M. Johnson, Kenmore, all of N.Y., assignors to National Gypsum Company, Buffalo, N.Y.
Filed Aug. 20, 1976, Ser. No. 716,239
Int. Cl.² B32B *5/20*
U.S. Cl. 156—43 5 Claims



1. The continuous method of making lightweight gypsum wallboard in which a foam is continuously produced by foaming air bubbles in an aqueous solution of a surface active agent, comprising the steps of continuously admixing a surface active agent with a major portion of the water to be used in forming said gypsum wallboard, subjecting the said mixture to maximum turbulent flow agitation while simultaneously continuously adding air thereto, said subjecting to agitation including moving said mixture upward through a foam generator cell wherein said mixture is subjected to a plurality of spaced, coaxial, rotary high vaned blades each having a central disc portion and a plurality of teeth disposed around the periphery of said disc, said teeth extending out of the plane of said disc and having a relatively short leading edge and a relatively long trailing edge, said leading edge extending substantially perpendicularly from the plane of said central disc portion, said teeth being arranged relative to the disc periphery at an angle such that during rotation said teeth induce radially outward movement of said mixture, and subsequently admixing finely ground calcined gypsum with the foamed liquid product of said agitation, forming said gypsum and foamed liquid mixture into lightweight foamed core gypsum wallboard.

4,057,444
METHOD FOR MANUFACTURE OF CONTAINERS, PARTICULARLY FOR PACKING PURPOSES

Marcel G. Prot, Bercheres-sur-Vesgre, France, assignor to The Mead Corporation, Dayton, Ohio
Filed Sept. 16, 1975, Ser. No. 614,169
Claims priority, application France, Sept. 20, 1974, 74.31886; Aug. 27, 1975, 75.26439
Int. Cl.² B65B *7/28*
U.S. Cl. 156—69 8 Claims



1. A method for the manufacture of a container comprising a cardboard sheath and a plastic bottom, the method comprising the steps of:

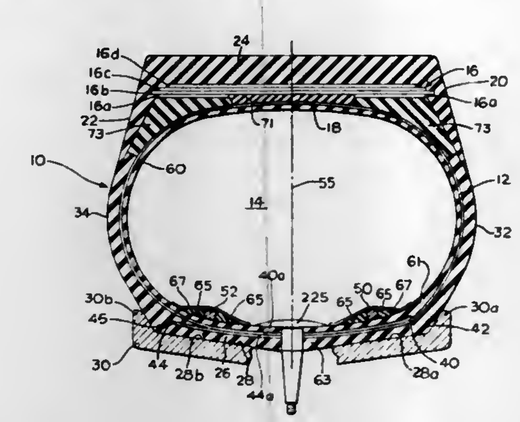
shaping the bottom by thermoforming of a plastic sheet using the sheath to provide a peripheral U-shaped rim in the plastic sheet having the same cross section as that of the sheath;
making the rim integral with the sheath by bonding the rim with the lowermost portion of the inner surface of the sheath;
parting the excess, on the exterior of the sheath, of plastic sheet used to make the bottom from the bottom such that the remaining plastic sheet has a downwardly extending flange juxtaposed and adjacent to the outer wall of the container sheath and a horizontally extending flange integral with the downwardly extending flange;
moving relatively the remaining plastic sheet with the downwardly depending flange and the sheath to position the downwardly depending flange about the outer topmost portion of te sheath; and
making the downwardly depending flange integral with the sheath by bonding the flange with the outer topmost portion of the sheath.

4,057,445
CLOSED TORUS TIRE

Max D. Brinkley, North Canton, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio
Filed Jan. 5, 1976, Ser. No. 646,713
Int. Cl.² B29H *15/00, 17/02*
U.S. Cl. 156—121 15 Claims

1. The method of building a tire having a toric inflatable chamber comprising in combination the steps of:

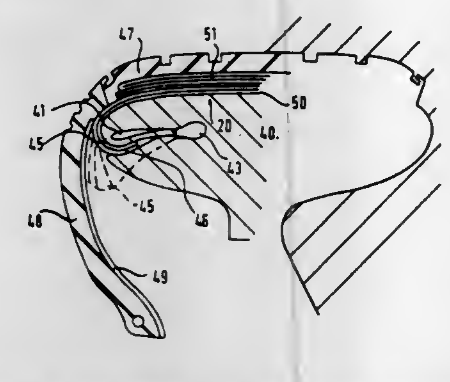
forming a cylindrical sleeve including a ply of cord or wire ply stock, disposing a pair of parallel spaced apart inextensible hoops around one circumferential edge portion of the sleeve, moving the other circumferential edge portion of the sleeve radially outwardly and axially over the remaining portion of the sleeve to form and to locate a first sidewall of said tire, then moving said other circumferential edge portion radially inwardly of said one edge portion and axially through at least one of said hoops, and then disposing said other circumferential edge portion in lapping and contacting relation with and radially inwardly



of said one edge portion thereby to at least initiate between the respective edge portions a splice closing said toric inflatable chamber with said splice being disposed circumferentially of said chamber in the radially inward region of the tire and subsequently curing the tire.

4,057,446
PNEUMATIC TIRE MANUFACTURE

Anthony Gerald Goodfellow, Maghull, near Liverpool, England, assignor to Dunlop Limited, London, England
Filed May 21, 1975, Ser. No. 579,424
Claims priority, application United Kingdom, May 28, 1974, 23575/74
Int. Cl.² B29H *17/04*
U.S. Cl. 156—123 R 5 Claims

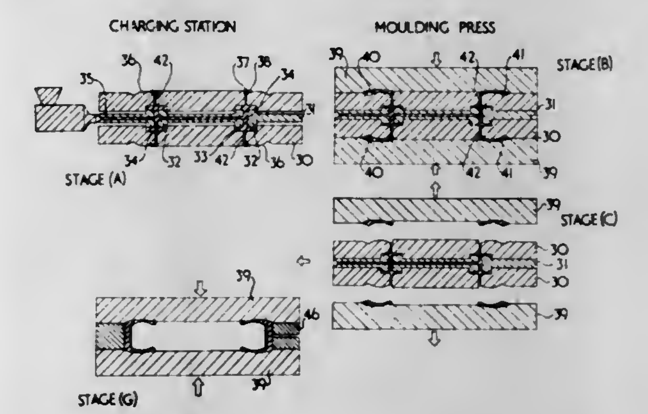


1. A method of manufacturing at least a portion of a pneumatic tire, comprising:

a. locating an annular, substantially inextensible breaker on the radially outer surface of a former, the former including an at least substantially solid annulus which is of greater axial length than radial thickness in radial cross-section and which is of an elastomeric material which yields to permit the diameter of the former to be increased or decreased;
b. increasing the diameter of the former to stretch the breaker;
c. locating the former with the breaker in the stretched condition thereon in a mould;
d. moulding a tire tread portion over the stretched breaker;
e. moulding a tire sidewall in contact with the tread portion;
f. curing the moulded tire tread and sidewall; and
g. removing the former from the interior of the cured tire tread and sidewall.

4,057,447
MANUFACTURE OF PNEUMATIC TIRES

Eric Holroyd, High Legh Park, near Knutsford; Anthony Gerald Goodfellow, Maghull, near Liverpool, and James Neil McGlashen, Winstanley, near Wigan, all of England, assignors to Dunlop Limited, England
Continuation of Ser. No. 348,654, April 6, 1973, abandoned. This application Oct. 3, 1975, Ser. No. 619,461
Claims priority, application United Kingdom, Apr. 6, 1972, 15787/72
Int. Cl.² B29H *17/00*
U.S. Cl. 156—125 17 Claims



1. A method for the manufacture of a pneumatic tire having parts including beads, sidewalls and a tread portion reinforced by means of a breaker assembly, comprising the following steps:

a. working curable but uncured rubber to an extent sufficient to destroy its nerve but not to start the rubber on to a curing cycle;
b. preassembling a breaker assembly for the tread portion of the tire and positioning it in an annular mould cavity for the tread portion of the tire;
c. forming the tire in three parts from said worked uncured rubber by forcing said rubber into annular mould cavities including the mould cavity for the tread portion of the tire in which said breaker assembly has been preassembled, and mould cavities for the sidewall and bead on each side of the tire, at least the sidewall and bead moulds each being provided with gas-tight locking spures to assist in maintaining a formed tire in a desired part of each of the latter moulds when the latter moulds are opened;
d. opening the moulds for the tire parts, at least the moulds for the sidewalls being opened in a pressurized atmosphere such that gas under pressure flows between parts of the moulds for the sidewalls and is prevented by the gas-tight locking sprues from passing around one side of each of the formed tire sidewalls whereby the tire sidewalls are retained in desired parts of the sidewall moulds;
e. reassembling the moulds for the tire parts into a tire mould to bring the tire parts into joining contact; and
f. joining the parts of the tire under head and gas pressure.

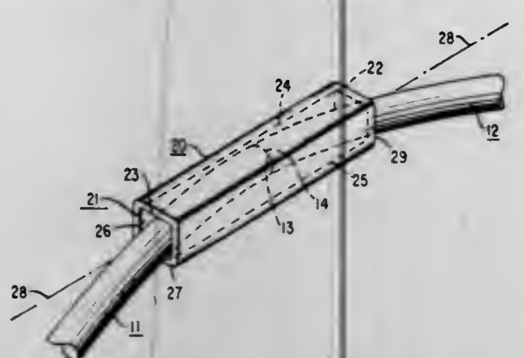
4,057,448
OPTICAL FIBER SPLICING TECHNIQUE

Calvin Max Miller, Lilburn, Ga., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.
Continuation-in-part of Ser. No. 521,656, Nov. 7, 1974, Pat. No. 3,919,037. This application Aug. 26, 1975, Ser. No. 607,777
Int. Cl.² B65H *69/06*
U.S. Cl. 156—158 12 Claims

1. A method of joining the mating ends of a pair of optical fibers comprising the steps of:

inserting said fibers into opposite ends of a loose-fitting optical fiber receiving tube being capable of rotating about its longitudinal axis and having a uniform interior cross section comprising at least one corner, said corner forming a fiber-aligning groove in the interior surfaces of said tube substantially parallel to said longitudinal axis;
bending said fibers with respect to said longitudinal axis to

bias said fibers against said interior surfaces, said biasing generating sufficient forces to rotate said tube until said mating fiber ends are lodged against said fiber-aligning groove to effect transverse alignment of said fibers;



advancing said bent fibers into abutment with each other; and

joining said fibers while they are held in the bent and abutting position.

4,057,449

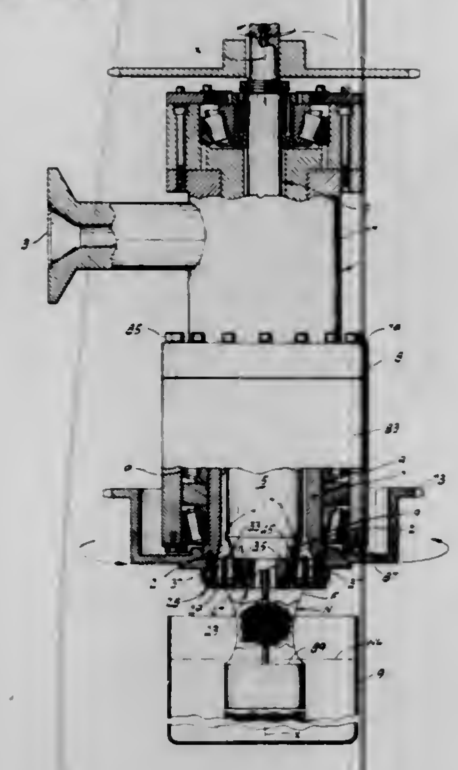
METHODS OF EXTRUDING PLASTIC NETTING

Wayne W. Livingston, Osseo, and Gerald W. Melin, Wyoming, both of Minn., assignors to Bemis Company, Inc., Minneapolis, Minn.

Division of Ser. No. 450,859, March 13, 1974, Pat. No. 3,957,565. This application Mar. 1, 1976, Ser. No. 662,530

Int. Cl.² D04H *3/16*

U.S. Cl. 156—167 **2 Claims**



1. The method of extruding tubular plastic netting comprising extruding a first generally circular series of filaments with each of the filaments inclined in one direction with respect to a plane including the longitudinal axis of the netting, extruding a second generally circular series of filaments concentric with the first and each inclined in the opposite direction with respect to said plane including the longitudinal axis of the netting, and rotating the first and second series in opposite directions, said first and second series being rotated in such direction that the filaments trail in respect to their respective direction of rotation, the angular velocity of the filaments of the first series and the rate of extrusion of the first series being so related that the resultant horizontal velocity of the filaments of the first series upon extrusion relative to a stationary point is approximately zero, the angular velocity of the filaments of the second series and the rate of extrusion of the second series being so related that the resultant horizontal velocity of the filaments of the second series upon extrusion relative to a stationary point is approximately zero, the filaments of the first and second series being joined at intersections thereof.

4,057,450

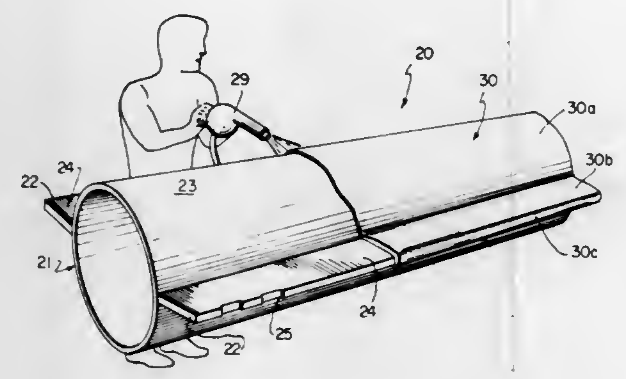
METHOD FOR MAKING BUOYANCY MEMBERS

George Lee, Monterey Park, Calif., assignor to Hitco, Irvine, Calif.

Filed Dec. 30, 1976, Ser. No. 755,659

Int. Cl.² B29C *13/00;* **B29D** *3/02, 9/10;* **B29G** *7/07*

U.S. Cl. 156—213 **9 Claims**



1. A method for producing buoyancy members in the form of a segment of a hollow cylinder, comprising:

forming a bendable, curable layer of fiber-filled polymeric material on exterior surfaces of a cylindrical mold, said mold having two longitudinal, radially extending flanges spaced about its circumference, said surfaces including a surface between said flanges and surfaces of said flanges, said layer terminating in overhanging portions along outer edges of the flanges; assembling on said curable layer a plurality of elongated hollow, rigid, tubular elements in side-by-side relationship to form an assembly with the assembly of tubular elements filling the space between the portions of the curable layer carried by the flanges; bending the overhanging portions of said curable layer to overlie adjacent surface portions of the assembly of tubular elements;

applying at least one flexible reinforcing member transversely across the assembly of tubular elements with the reinforcing member extending across the flanges and being maintained under tension;

applying a layer of fiber-filled curable polymeric material over exposed surfaces of the assembly of tubular elements until the assembly is completely enclosed in a shell of the fiber-filled curable polymeric material,

said at least one reinforcing member being enclosed within said shell but having end portions projecting therefrom; and curing the polymeric material of said shell, converting said shell into a rigid, integral structure.

4,057,451

MIRROR MOUNT APPLYING METHOD

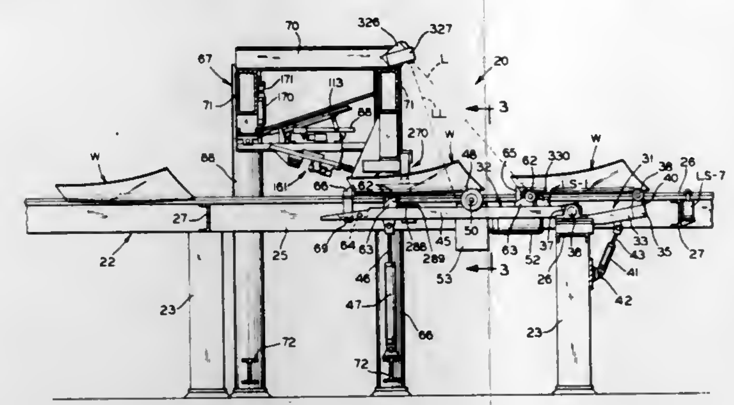
Robert R. Beckham, Toledo, Ohio, assignor to Libbey-Owens-Ford Company, Toledo, Ohio

Division of Ser. No. 545,529, Jan. 30, 1975, Pat. No. 3,948,719. This application Jan. 26, 1976, Ser. No. 652,609

Int. Cl.² B32B *31/20;* **B65H** *7/20, 29/00*

U.S. Cl. 156—320 **4 Claims**

1. A method of affixing a mirror mount on one surface of a glass sheet comprising: supporting a glass sheet having reference indicia thereon in a generally horizontal plane, providing a movable carriage above said glass sheet, said carriage having a press member, a supply of mirror mounts and an indicia detecting means carried thereon, each of said mirror mounts being provided with an outer plastic layer affixed thereto, feeding a single mirror mount from said supply to said press member, heating said mirror mount substantially to the softening point of said plastic layer during the transit of said mount from said supply to said press member, traversing said carriage across said glass sheet and moving said detecting means therewith to detect said reference indicia, generating a signal upon detection of said reference indicia, controlling movement of said carriage in response to said signal to orient said press member and thereby said heated mirror mount in a desired relation to said reference indicia, and actuating said press member upon attainment of said desired relation to apply said mirror mount in a desired region on said glass sheet.



4,057,452

CONSTANT PRESSURE MECHANISM FOR HAND LABELER

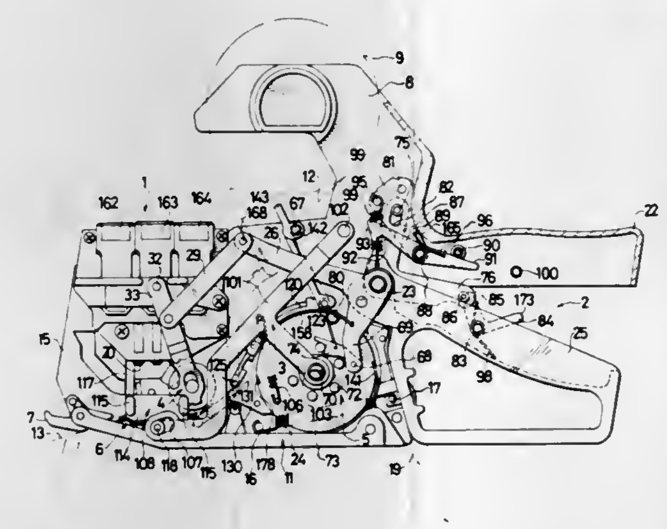
Yo Sato, Tokyo, Japan, assignor to Kabushiki Kaisha Sato Kenkyusho, Tokyo, Japan

Filed Sept. 2, 1976, Ser. No. 720,225

Claims priority, application Japan, Sept. 5, 1975, 50-107120

Int. Cl.² B41F *1/08, 1/38, 1/44*

U.S. Cl. 156—384 **31 Claims**



1. A hand labeler comprising:

a frame;

a printing device fixedly mounted on said frame;

a platen assembly for carrying a label strip, and supported in said frame and positioned such that a label on said platen assembly confronts said printing device;

a hand lever for being operated to move said platen assembly; platen assembly operating means for operatively connecting said hand lever and said platen assembly and for rapidly moving said platen assembly against said printing device with the label on said platen assembly; biasing means connected with said platen assembly operating means for causing said platen assembly operating means to rapidly move said platen assembly with a constant printing pressure against said printing device; said biasing means being connected with said hand lever for being charged by movement of said hand lever and for thereafter being released to discharge and cause said platen assembly operating means to move said platen assembly following further movement of said hand lever;

means for retracting said platen assembly from said printing device; disconnect means for disconnecting said biasing means from said platen assembly operating means prior to said retracting means retracting said platen assembly.

4,057,453

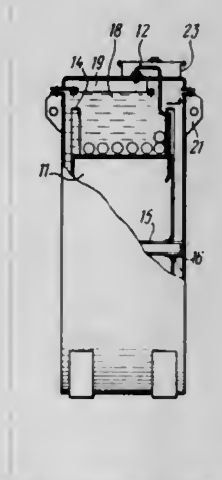
METHOD FOR MANUFACTURING AND LAYING OUT PHASE CORES FOR OIL-FILLED CABLES AND A DEVICE FOR ACCOMPLISHING SAME

Mikhail Kirillovich Bataev; Isaak Efimovich Veits; Sergei Sergeevich Gorodetsky; Lev Ilich Macheret; Lev Alexeevich Kuznetsov; Albert Vasilievich Tjurin, and Jury Eduardovich Yaunzem, all of Moscow, U.S.S.R., assignors to Vsesojuzny Proektno-Izyskatelsky Nauchno-Issledovatelsky Institut "Gidroproekt" imeni S. Ya. Zhuka, Moscow, U.S.S.R.

Filed July 2, 1975, Ser. No. 592,667

Int. Cl.² B32B *1/00*

U.S. Cl. 156—390 **7 Claims**



1. A device for manufacturing phase cores of oil-filled cables comprising: a twisting machine used to obtain a current-carrying core by means of twisting together a number of individual wires, an insulating machine used to apply paper insulation onto said current-carrying core, a vacuum drier, an instrumentation means for making electrical measurements and insulation tests, a drum to receive the insulated current-carrying core, a container for said drum, wherein said drum is installed in said container for rotation, said container serving as a provisional sealed housing where the cable phase core is dried, impregnated with an insulating compound, subjected to electrical measurements and insulation tests and pressurized, wherein said container is provided with a means compensating for temperature variations of the volume of said cable phase core and said insulating compound located inside said container comprising an elastic partition dividing said container into a conserving chamber filled with an insulating compound to protect the insulation of the cable phase core from humidity effects, and a compensating chamber to compensate for temperature variations of the volume of said insulating compound and said cable phase core wherein the cavity of the drum is made airtight and has access to said compensating chamber of said container.

4,057,454

MANDREL FOR FABRICATING AN AIR SPRING

Michael W. Smith, Mogadore, and Stanley J. Houck, Akron, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

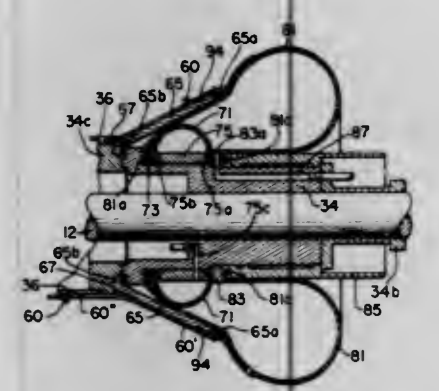
Filed Aug. 24, 1976, Ser. No. 717,734

Int. Cl.² B23B *31/40;* **B29H** *17/22*

U.S. Cl. 156—401 **8 Claims**

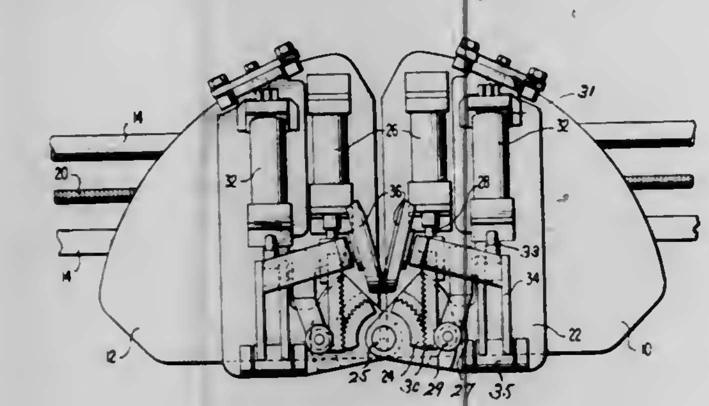
1. Apparatus for fabricating an air spring prior to its being shaped and cured, the air spring having an inextensible ring enfolded coaxially thereof in each of its axial ends, the apparatus comprising means defining a straight cylindrical surface axially coextensive with said air spring between said axial ends, said means including a fixed diameter portion and a variable diameter portion, the variable diameter portion comprising a multiplicity of axially extending fingers each having one end fixed radially adjacent one end of the fixed diameter portion and another end movable radially outward relative to its fixed

end, each said other end having a notch, the plurality of notches cooperating to form a circumferential groove coaxially about said cylindrical surface and open radially outwardly thereof, a rigid body coaxially supporting said means, an inflatable sleeve having two circular edges secured to said rigid body axially between the inward end and the outward end of and radially inward of said fingers and passage means disposed in said rigid body for connecting said sleeve with compressed air whereby said members are moved arcuately outwardly in response to inflation of said sleeve, and a further inflatable sleeve having its two circular edges secured coaxially to said



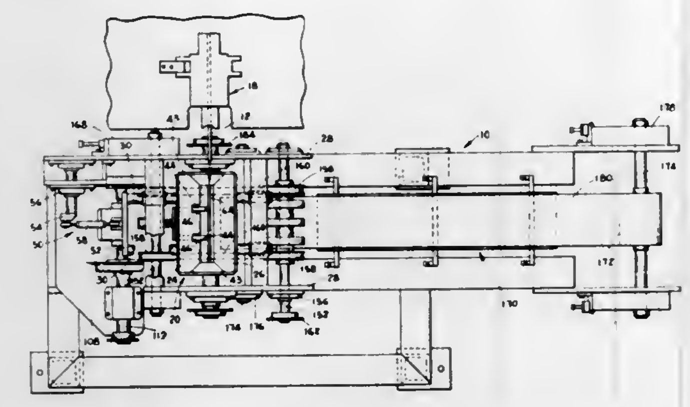
rigid body one edge thereof being secured radially inward of said members and axially between the inner end thereof and the axially inner edge of the first-mentioned bladder, the outer of said edges being secured axially outward of the first-mentioned bladder, and the sleeve extending axially outward from its one edge to a circumferential bight and thence axially inward to the other of its edges, and said passage means separately connecting the latter said sleeve with compressed air whereby the latter said sleeve is expanded in response to said air radially outwardly of the outer ends of said fingers while the same are in their radially expanded position.

4,057,455
TIRE STITCHING APPARATUS
Karl W. Klose, Findlay, Ohio, assignor to Cooper Tire and Rubber Company, Findlay, Ohio
Filed Mar. 11, 1975, Ser. No. 557,337
Int. Cl.² B29H *17/18*
U.S. Cl. 156—410 **7 Claims**



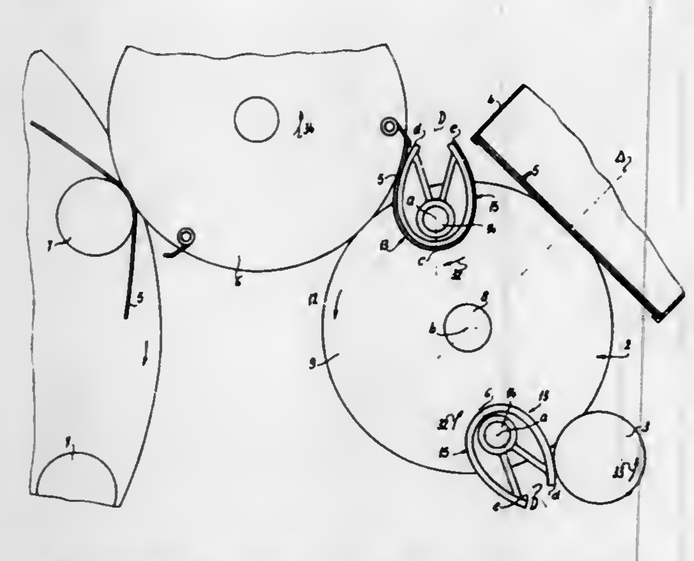
1. An apparatus for stitching on a tire building drum having rounded shoulders a plurality of superimposed rubberized fabric sheets, said apparatus comprising a pair of base members, means for moving said base members in opposite directions along a linear path parallel to the axis of rotation of said drum, a platform arranged in spaced parallel relation to each base member and pivotally connected thereto, a stitcher wheel pivotally connected to each platform, means carried by each platform for moving said stitcher wheel into and out of engagement with said drum, a driven member provided on each platform, and driving means mounted on said base members and engaging said driven member for rotating said platform about said pivotal connection and moving said stitcher wheels over said drum and rounded shoulders.

4,057,456
APPARATUS FOR TRIMMING AN EXTRUDATE
Charles Gwin Renegar, and Frank Edward Colbeck, both of Shelbyville, Tenn., assignors to Hasbro Industries, Inc., Pawtucket, R.I.
Filed Mar. 15, 1976, Ser. No. 667,116
Int. Cl.² B32B *31/00*
U.S. Cl. 156—515 **15 Claims**



1. Apparatus for trimming an extrudate to finished length and fusing the ends thereof, comprising:
a. hopper means for receiving and orienting rough-cut lengths of extrudate, and having an outlet through which oriented lengths of extrudate are adapted to pass;
b. a movable carrier having a plurality of spaced holder means operatively passing the outlet as the carrier moves;
c. each holder means adapted to releasably capture a length of extrudate from the outlet as the carrier moves the holder means past the outlet;
d. a pair of spaced, rotatable cutter discs operatively positioned relative to the carrier for trimming each end of a length of extrudate captured by a holder means as the carrier moves the holder means past the cutter, discs and
e. means for heating the cutter discs whereby each end of the length of extrudate is fused simultaneously with being trimmed.

4,057,457
APPARATUS FOR TRANSFERRING LABELS OR LIKE FLEXIBLE SHEETS
Georges Antoine Tavernier, Lyon, France, assignor to Societe Nouvelle Baele Gangloff, Villeurbane, France
Filed Aug. 5, 1976, Ser. No. 711,877
Claims priority, application France, Aug. 5, 1975, 75.25010
Int. Cl.² B65C *9/08*
U.S. Cl. 156—571 **6 Claims**

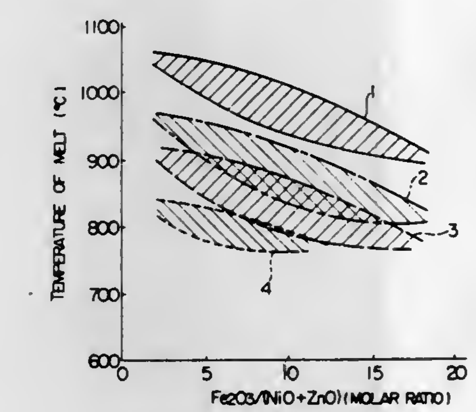


1. In an apparatus for transferring flat flexible sheets which comprises a turntable, means for rotating said turntable about a turntable axis, a stationary magazine holding a stack of sheets adjacent said turntable, at least one pickup head on said turntable about a pickup axis spaced from the said turntable axis and having a curved pickup surface engageable with a sheet of said

stack, and means for rotating said head about an axis parallel to the axis of said turntable, the improvement wherein said pickup surface has an axial plane of symmetry extending through the axis of rotation of said head and a smallest radius of curvature at said plane, the radius of curvature of said surface progressively increasing symmetrically to opposite sides of said plane, said surface having a directrix curve which in polar coordinates corresponds to the formula:

$$r = \frac{A^2 - R^2}{A \cdot \cos \frac{(\pm \theta \sqrt{A^2 - R^2}\ )}{(A)} + R}$$

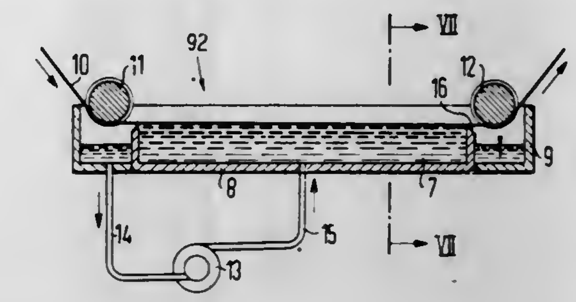
4,057,458
METHOD OF MAKING NICKEL ZINC FERRITE BY LIQUID-PHASE EPITAXIAL GROWTH
Kunihiro Maeda; Hiromichi Imahasi, both of Hitachi, and Matsunosuke Kikuchi, Mito, all of Japan, assignors to Hitachi, Ltd., Japan
Filed Sept. 15, 1975, Ser. No. 613,502
Claims priority, application Japan, Sept. 17, 1974, 49-106079
Int. Cl.² B01J *17/04, 17/34*
U.S. Cl. 156—603 **4 Claims**



1. A method for forming nickel zinc ferrite, which comprises immersing a crystal substrate in a supercooled melt comprising lead oxide, iron oxide, 6% by weight or less of boron oxide or lead fluoride, and such amounts of nickel oxide and zinc oxide that the molar ratio ZnO/(NiO + ZnO) is 0.8 or smaller and then in a supercooled melt comprising lead oxide, iron oxide, zinc oxide, and 6% by weight or less of boron oxide or lead fluoride to form by epitaxial growth at least two layers of nickel zinc ferrite and zinc ferrite on said substrate, and then converting the resulting layers into a homogeneous single layer of nickel zinc ferrite by thermal diffusion treatment.

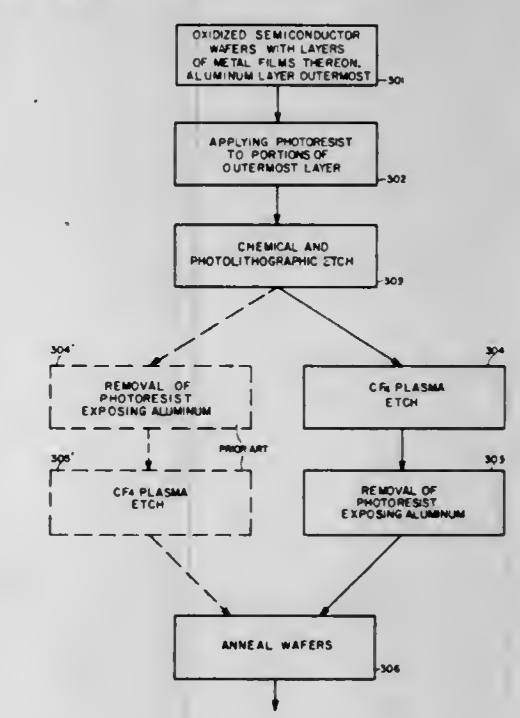
4,057,459
METHOD FOR MANUFACTURING MICRO-WIRING ARRANGEMENTS FOR CONTACTING SEMICONDUCTOR CIRCUITS
Gerhard Mitterhummer, Munich, and Kurt Plehnert, Pullach, both of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany
Filed Sept. 24, 1975, Ser. No. 616,148
Claims priority, application Germany, Sept. 27, 1974, 2446368; July 2, 1975, 2529576
Int. Cl.² C23F *1/02*
U.S. Cl. 156—630 **7 Claims**

1. In a method of manufacturing micro-wiring arrangements on a flexible, insulating carrier band for the purpose of contacting semiconductor circuits, said method including providing a flexible carrier band having at least one opening therethrough for receiving an assembly, a metal layer bonded to one side of the carrier band with a first layer of photosensitive varnish covering the metal layer and a second layer of photosensitive varnish covering the other side of the carrier band and any portion of the metal layer exposed through each opening in the band, and forming a wiring structure in the metal layer by using photo-etching techniques including exposing the first layer of photosensitive varnish with the desired pattern and developing the exposed first layer prior to an etching step, the improvements comprising said step of developing the exposed first layer of photosensitive varnish being accomplished with-



out developing the second layer of photosensitive varnish by floating the band on a surface of a developer bath with the first layer contacting the surface of the bath and creating a flow within the bath of the developer in a direction generally toward said first layer to insure contact of the first layer and to thereby cause developing of the first layer to uncover portions of the metal layer.

4,057,460
PLASMA ETCHING PROCESS
Arjun N. Saxena, Palo Alto, and Courtney Hart, San Jose, both of Calif., assignors to Data General Corporation, Westboro, Mass.
Filed Nov. 22, 1976, Ser. No. 743,734
Int. Cl.² C23F *1/02*
U.S. Cl. 156—643 **7 Claims**



5. A process for plasma etching a semiconductor wafer having metallic layers deposited thereon, which process inhibits the build-up of space charge effects otherwise created by interactions between said plasma and the outermost one of said metallic layers, said process comprising the steps of:
a. first, insulating a portion of the outermost of said layers from etching effects of said plasma in order to reduce interference by atomic effects of said outermost of said layers with said etching effects;
b. second, subjecting said wafer to said etching effects and removing said wafer therefrom after a predetermined etching result has been obtained; and
c. third, removing insulation applied in said insulating step thereby exposing said portion of said outermost of said layers, along with said obtained etching result.

4,057,461

METHOD AND APPARATUS FOR IMPREGNATION OF FIBER MATERIAL BY PRESSURE PULSATION

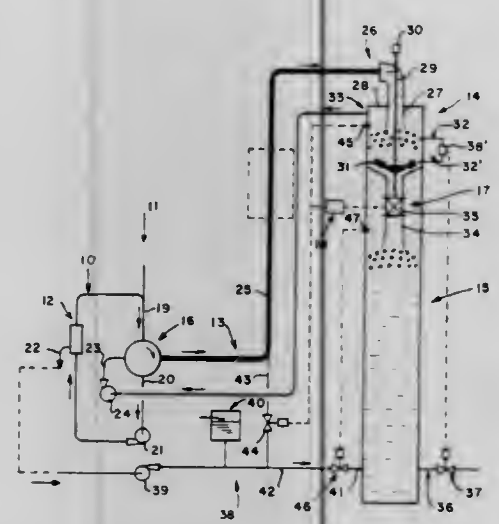
Johan C. F.C. Richter, Nice, France, assignor to Kamyr Aktiebolag, Karlstad, Sweden

Filed Aug. 27, 1976, Ser. No. 690,786

Claims priority, application Sweden, June 2, 1975, 7506255

Int. Cl.^{2} D21C *3/26, 7/00*

U.S. Cl. 162—19 **15 Claims**



1. Apparatus for impregnating fiber material with treatment liquid before treatment thereof, comprising

a. a first means defining a relatively low pressure system, including fiber material in impregnation liquid;

b. means for continuously removing liquid from said first system to maintain said system at relatively low pressure;

c. means for transferring fiber material in impregnation liquid in said first system to a second means defining a relatively high pressure system and boosting the pressure thereof, said transferring means including means communicating with both said first and second systems;

d. a high pressure vertical fiber material treatment vessel;

e. said second pressure system including an upper impregnation portion of said fiber material treatment vessel;

f. means for selectively allowing or blocking communication between said second system and said fiber material treatment vessel so that the pressure in said second system is substantially as high as said treatment vessel pressure when communication between said second system and said treatment vessel is allowed, and so that the pressure in said second system and said treatment vessel is allowed, and so that the pressure in said second system becomes significantly reduced when communication between said second system and said treatment vessel is terminated; and

g. timing means for controlling said selective communication means to control the relative times that said second system is exposed to said pressure substantially as high as said treatment vessel pressure, and said significantly reduced pressure, so that impregnation of fiber material with treatment liquid takes place in said second system.

8. A method of impregnating fiber material with treatment liquid before treatment thereof in a high pressure treatment vessel having an upper impregnation chamber comprising the steps of

a. establishing a first flow system of fiber material and treatment liquid under relatively low pressure;

b. continuously withdrawing liquid from said first system so that the pressure therein is reduced unless supplemental liquid is provided;

c. establishing a second flow system of fiber material and treatment liquid under relatively high pressure;

d. transferring fiber material in treatment liquid in said first system to said second system and boosting the pressure thereof, said second system including the impregnation chamber of the fiber material treatment vessel;

e. selectively allowing or blocking communication between said second system and said treatment vessel so that the pressure in said second system is substantially as high as said treatment vessel pressure when communication between said second system and said treatment vessel is allowed, and so that the pressure in said second system becomes significantly reduced when communication between said second system and said treatment vessel is blocked; and

f. controlling the time that communication between said second system and said treatment vessel is effected to control the relative times that said second system is exposed to high and low pressure so that impregnation of fiber material with treatment liquid takes place in said second system.

4,057,462

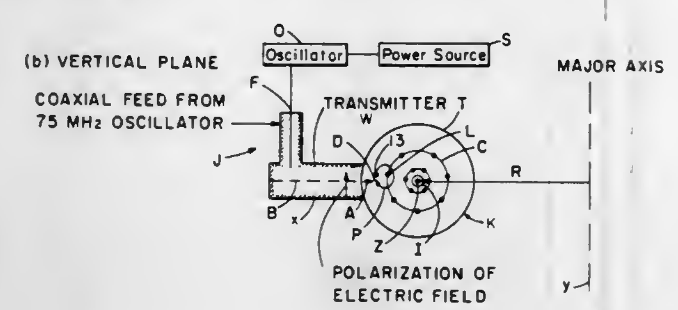
RADIO FREQUENCY SUSTAINED ION ENERGY

Daniel L. Jassby, and William M. Hooke, both of Princeton, N.J., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Feb. 26, 1975, Ser. No. 553,196

Int. Cl.^{2} H01J *37/00;* **G21B** *1/00*

U.S. Cl. 176—5 **1 Claim**



1. In an apparatus for sustaining the energy of ordered charged particles in a confining magnetic field, comprising:

a. means for creating a neutral, two-ion-species, equilibrium, bulk plasma column in a closed toroidal magnetic confinement having helical magnetic field lines for confining both the ordered and equilibrium plasma particles;

b. means containing titanium dioxide for injecting rf resonant energy into the plasma transverse to the axis of the plasma column in resonance with the natural frequency of one of the ions species; and

c. means for injecting colliding, neutral, ordered beams having stored energy into the confined plasma particles to produce colliding, suprathermal ions whose energy and direction are ordered, opposite and confined by the helical magnetic field lines, and

d. said rf energy is injected to sustain the energy of the colliding beams against plasma drag.

4,057,463

METHOD OF OPERATING A NUCLEAR REACTOR WHICH MAINTAINS A SUBSTANTIALLY CONSTANT AXIAL POWER DISTRIBUTION PROFILE WITH CHANGES IN LOAD

Toshio Morita, Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Aug. 29, 1974, Ser. No. 501,569

Int. Cl.^{2} G21C *7/08*

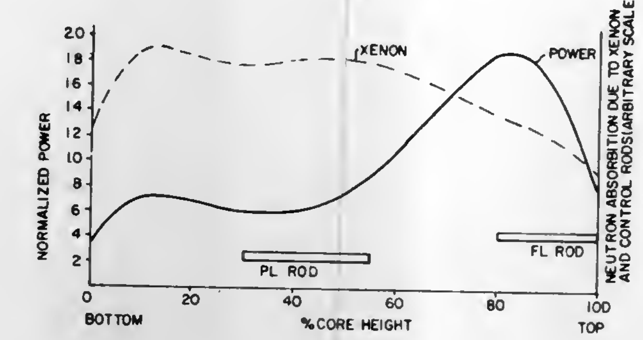
U.S. Cl. 176—22 **16 Claims**

1. A method of operating a nuclear reactor having a reactive core including fissile material with an axial dimension and adjustable control means for controlling the reactivity within the core, comprising the steps of:

monitoring a parameter representative of the power generated within the core at a first and second axial location;

obtaining from the core power parameters measured at said first and second axial locations a representation of the axial power distribution within the core; and

adjusting the control means to produce an axial power distribution to maintain a uniform and symmetric xenon distribution above and below substantially the center of the core over a substantial axial length of the core during normal reactor operation including load follow.



4,057,464

NUCLEAR REACTOR INSTALLATION

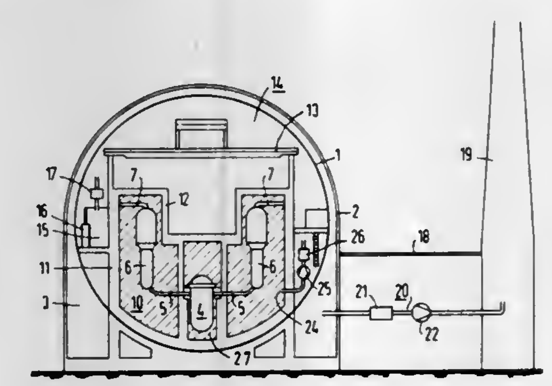
Georg Mair, and Hans-Peter Schabert, both of Erlangen, Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed Aug. 29, 1974, Ser. No. 501,761

Claims priority, application Germany, Sept. 17, 1973, 2346726

Int. Cl.^{2} G21C *9/00*

U.S. Cl. 176—37 **10 Claims**



1. A nuclear reactor installation comprising a reactor building forming a containment which is closed during reactor operation and internally defines an equipment zone containing radiating components and an operating zone which is accessible to workmen, and having a system for providing an atmospheric overpressure in the operating zone relative to the atmospheric pressure in the equipment zone; wherein the improvement comprises said system having means for removing a flow of atmosphere from said equipment zone, filter means for filtering said flow, and means for introducing a flow of the atmosphere filtered by said filter means to said operating zone under said overpressure.

4,057,465

NUCLEAR REACTOR AUXILIARY HEAT REMOVAL SYSTEM

Robert E. Thompson, Bethel Park, and Bill L. Pierce, Whitehall Borough, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Aug. 8, 1975, Ser. No. 603,072

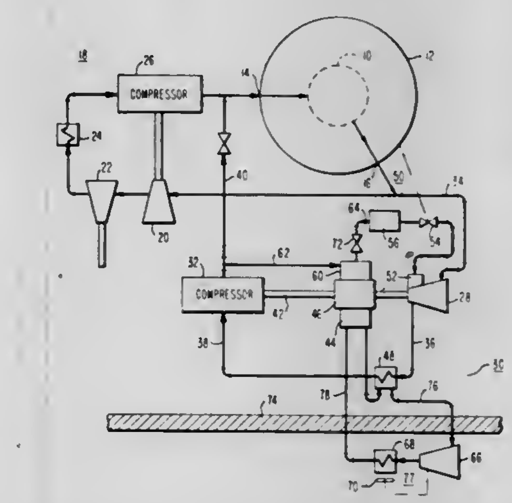
Int. Cl.^{2} G21C *9/00*

U.S. Cl. 176—38 **16 Claims**

1. An auxiliary heat removal system for use in a gas-cooled nuclear reactor system to remove residual heat retained in the reactor core after reactor shutdown comprising:

a first recycling flow loop for conducting gaseous primary cooling fluid heated by said reactor core, said first flow loop including said reactor core, a gas turbine, a first heat exchanging means, and a compression means connected in series therein, and first conduit means for transporting said primary fluid from said core to said gas turbine, said first heat exchanging means, and said compression means in series, and for returning said primary fluid to said reactor core;

a second flow loop for conducting a second cooling fluid, said second flow loop including a fluid pump, second conduit means for transporting said second fluid from said fluid pump to said first heat exchanging means, and means for removing heat from said second cooling fluid, said second fluid being in thermal communication with said primary fluid in said first heat exchanging means;



said fluid pump and said compression means being mechanically coupled to, and driven by, said gas turbine; and

starter means for initiating operation of said gas turbine, said starter means being responsive to preselected conditions of said nuclear reactor system and comprising:

a pneumatic starter;

a container of starter fluid in fluid communication with said starter, said starter fluid being pressurized within said container, and;

a starter valve disposed in the flow path between said pneumatic starter and said container, said starter valve controlling the flow of said starter fluid from said container to said pneumatic starter.

4,057,466

CONDITIONING OF NUCLEAR REACTOR FUEL

John Robert Thompson, San Jose, Calif.; Trevor Cartwright Rowland, Halden, Norway; Richard Alan Proebstle, San Jose, Calif.; Edward Rosicky, Fremont, Calif., and Thoma Mees van't Hoff Snyder, Los Altos, Calif., assignors to General Electric Company, San Jose, Calif.

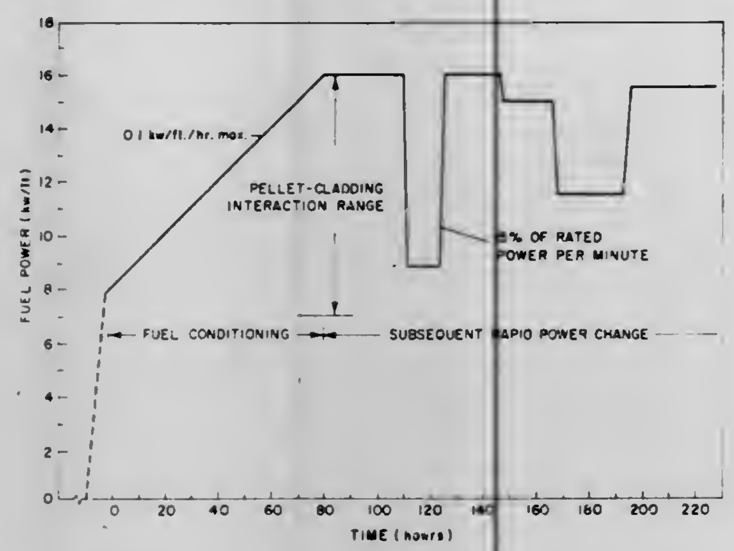
Continuation of Ser. No. 460,298, April 12, 1974, abandoned. This application Feb. 23, 1976, Ser. No. 660,506

Int. Cl.^{2} G21C *9/00*

U.S. Cl. 176—38 **15 Claims**

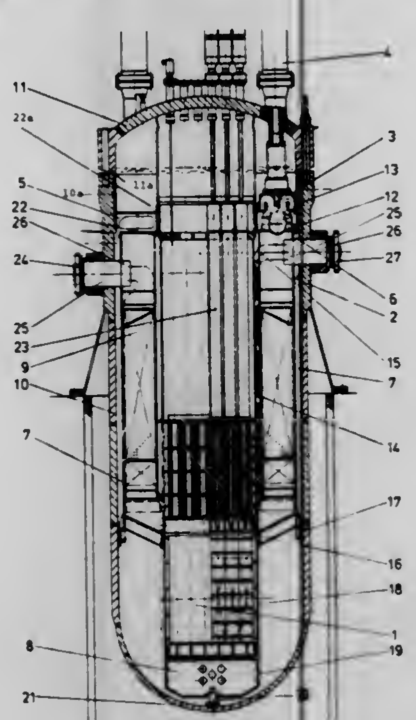
1. In a fuel core of a nuclear reactor wherein said fuel consists of a plurality of cylindrical pellets of fuel in oxide form of about 0.49 inches in diameter contained in a plurality of elongated zirconium alloy cladded tubular fuel elements with a cladding thickness of about 0.032 inches and having a range of power output and a maximum power rating, a method of conditioning said fuel elements to withstand subsequent rapid power changes without cladding failure comprising: (1) increasing the power produced by said fuel elements through a fuel pellet-cladding interaction range of power wherein expansion of said pellets and consequent pellet-cladding interaction causes said pellets to exert forces upon said cladding to a selected power level no greater than said maximum power level at a first rate of power increase below a critical rate which causes cladding damage due to said fuel pellet-cladding interaction, said critical rate being about 0.125 kw/ft/hr, and stepwise increases in power at said first rate comprising steps no greater than about 0.5 kw/ft, whereby said fuel elements are

conditioned for subsequent rapid power changes up to said desired power level with minimized danger of cladding damage; (2) decreasing the power produced by said fuel elements from said selected power level to a lower power level; and (3)



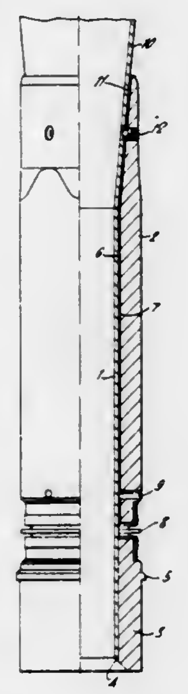
subsequently increasing the power produced by said fuel elements over any portion of the power range of said fuel elements up to said selected power level at a second rate of power increase greater then said critical rate, said second rate of power increase being at least 16 kw/ft/hr.

4,057,467
INTEGRATED PRESSURIZED-WATER REACTOR AND STEAM GENERATOR
Siegfried Kostrzewa, Bruckfeld, Germany, assignor to Interatom, Internationale Atomreaktorbau GmbH., Cologne, Germany
Filed Aug. 28, 1975, Ser. No. 608,755
Claims priority, application Germany, Sept. 5, 1974, 2442500
Int. Cl.² G21C *15/00*
U.S. Cl. 176—65 **8 Claims**



1. An integrated pressurized-water reactor and steam generator combination comprising a pressure vessel having an inside with upper and lower portions, said lower portion including a vertical surface, and internals in said inside and including a core in said lower portion, coolant circulating pumps in said upper portion and having coolant intakes, and a steam generator interposed between said core and said intakes, said internals being removable from said vessel without their destruction; wherein the improvement comprises a hollow ring connected with and supported by said upper portion, and a hollow cylindrical housing having an upper end connected to said hollow ring and suspended thereby, said housing having coolant flow openings and said steam generator being positioned in and supported by said housing said housing being free to expand downwardly from said hollow ring and all said internals being suspended via said housing.

4,057,468
NUCLEAR REACTOR FUEL ELEMENT SUB-ASSEMBLIES
Anthony Randle Lunt, Warrington, England, assignor to United Kingdom Atomic Energy Authority, London, England
Filed Feb. 23, 1976, Ser. No. 660,280
Claims priority, application United Kingdom, Mar. 3, 1975, 8791/75
Int. Cl.² G21C *3/30*
U.S. Cl. 176—78 **3 Claims**



1. A fuel element sub-assembly for a liquid metal cooled fast breeder nuclear reactor, the fuel element sub-assembly being elongate and having a base end region adapted for plugging into fuel assembly support means, and inertia damping means disposed at an upper end region of the sub-assembly, the inertia damping means comprising:

a lower sleeve rigidly attached to the fuel element sub-assembly;

a tubular spine rigidly and co-axially attached to the lower sleeve;

an upper sleeve mounted co-axially on the tubular spine with a radial spacing therebetween and resiliently coupled to the lower sleeve, the upper sleeve having coolant flow ducts extending therethrough to the radial clearance.

4,057,469
PROCESS FOR THE MICROBIOLOGICAL OXIDATION OF STEROIDS
Daikichiro Nishikawa, Tokyo; Yukio Imada; Masayuki Kinoshita, both of Yokohama; Katsuhiko Takahashi, Kawasaki; Hajime Machida, Tokyo, and Michitaro Nagasawa, Noda, all of Japan, assignors to Mitsubishi Chemical Industries Ltd., Tokyo, Japan
Filed June 7, 1976, Ser. No. 693,685
Claims priority, application Japan, June 6, 1975, 50-68379; Sept. 22, 1975, 50-114431
Int. Cl.² C07B *29/02*
U.S. Cl. 195—51 G **21 Claims**

1. In a process for the production of 17-hydroxyandrosta-1,4-dien-3-one and/or androsta-1,4-diene-3,17-dione by fermenting a sterol, its 4-en-3-one sterol derivative or its 1,4-dien-3-one sterol derivative in a culture medium containing a chelating agent capable of forming a chelating compound with iron and copper ions with a microorganism capable of microbiologically oxidizing said sterol or its derivatives to produce 17-hydroxyandrosta-1,4-dien-3-one and/or androsta-1,4-diene-3,17-dione, the improvement which comprises adding to the culture medium at least one glyceride-containing substance selected from the group consisting of glycerides, fats, oil seeds and oil fruits in an amount sufficient that the culture medium contains at least 0.3 percent by weight of glycerides.

4,057,470
USE OF RADIOISOTOPES FOR RAPID IDENTIFICATION OF MICROORGANISMS
Joseph R. Schrot, Silver Spring, Md., assignor to Biospherics Incorporated, Rockville, Md.
Division of Ser. No. 429,629, Dec. 28, 1973, Pat. No. 3,969,496. This application Feb. 18, 1976, Ser. No. 658,859
Int. Cl.² C12K *1/04*
U.S. Cl. 195—127 **6 Claims**

1. An apparatus for identifying a microorganism from radioactive trace material comprising the combination of

means for individually incubating samples of the microorganism with a plurality of preselected substrates each having radioactive trace material therein;

means for collecting gaseous material evolved from the means for incubating in zones arranged in a predetermined pattern, said means for collecting being removable from said means for incubating after incubation;

means for storing a plurality of said means for collecting after removal thereof from said means for incubating;

a plurality of radioactive particle detectors;

conveyor means for individually transporting said means for collecting from said means for storing along a path;

means for mounting said radioactive particle detectors adjacent said path in an array similar to a segment of said pattern;

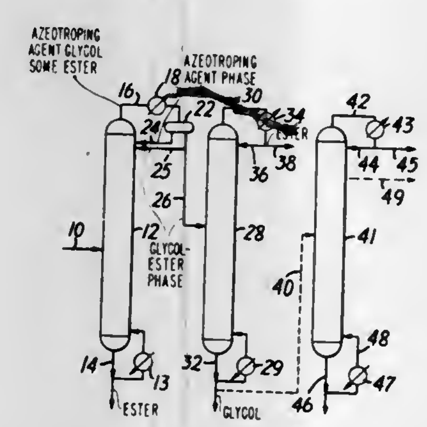
means for controlling and driving said conveyor means to move each said means for collecting to a location along said path at which a first segment of zones in said pattern is adjacent said detectors, to pause at said location, and to then sequentially move the positions at which each segment of zones are successively exposed to said detectors;

means electrically connected to each of said detectors for accumulating a count of radioactive particles detected by each detector at each zone;

means for storing a record of counts representative of known microorganisms incubated in known substrates;

means for comparing a plurality of said known counts with a plurality of counts derived from said detectors and for displaying the results of the comparisons.

4,057,471
RECOVERY OF ALKYLENE GLYCOLS
Chun Fei Chueh, Jamaica, N.Y., assignor to Halcon International, Inc., New York, N.Y.
Filed Sept. 12, 1975, Ser. No. 612,825
Int. Cl.² B01D *3/36*
U.S. Cl. 203—69 **11 Claims**



1. A process for recovering ethylene glycol or propylene glycol from a mixture comprising propylene glycol or ethylene glycol in admixture with at least one of a mono-lower carboxylate ester and a di-lower carboxylate ester of said propylene glycol or ethylene glycol which comprises the steps of:

a. subjecting said mixture to distillation in a distillation zone in the presence of an azeotroping agent effective to form a minimum-boiling azeotrope with said glycol, said azeotroping agent being essentially water and glycol immiscible and having a boiling point at atmospheric pressure of above 135° to about 220° C, whereby an overhead product and a bottoms product are produced, said overhead product comprising said azeotroping agent and said glycol and said bottoms product comprising said ester substantially reduced in glycol content;

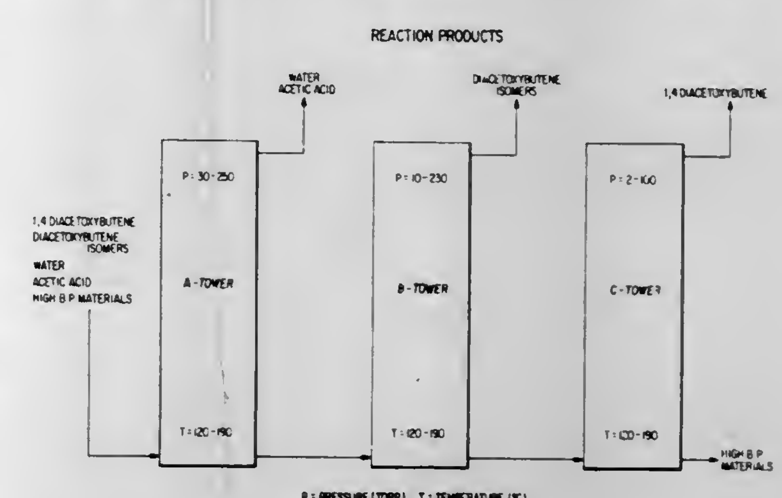
b. separating said overhead product into a first phase comprising said azeotroping agent and a second phase comprising said glycol;

c. returning said first phase to said distillation zone as reflux;

d. supplying a portion of the glycol as reflux to said distillation zone; and

e. withdrawing the remainder of the glycol from said second phase as glycol product, wherein the ratio of the glycol supplied to the glycol withdrawn is at least 0.3:1.

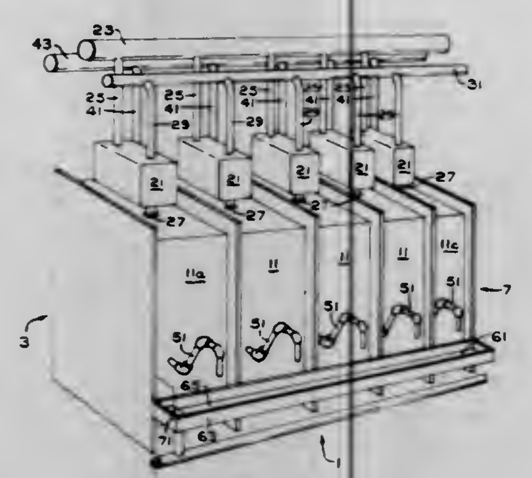
4,057,472
METHOD OF SEPARATING DIACETOXYBUTENE
Jun Toriya; Masato Sato; Ken Shiraga, and Setsuo Matsunaga, Noboru Haji, all of Kurashiki, Japan, assignors to Mitsubishi Chemical Industries Ltd., Tokyo, Japan
Continuation-in-part of Ser. No. 557,260, March 11, 1975, abandoned. This application Feb. 6, 1976, Ser. No. 656,011
Claims priority, application Japan, Mar. 12, 1974, 49-28413
Int. Cl.² C07C *69/02;* **B01D** *3/10*
U.S. Cl. 203—80 **4 Claims**



1. A fractional distillation method of separating diacetoxybutent isomers from a reaction mixture, produced from the reaction of butadiene, acetic acid and molecular oxygen which comprises employing a series of two distillation towers, feeding said reaction mixture into the first tower to distill away water and acetic acid under a pressure of 30 - 250 Torr and a tower bottom temperature within the range of from 120° C to less than 190° C, withdrawing the material remaining in the bottom of the first tower and then feeding said material into the second tower to separate diacetoxybutene from high boiling point materials under a pressure of 2 - 100 Torr and a tower bottom temperature within the range of from 120° C to less than 190° C.

4,057,473
METHOD OF REDUCING CELL LIQUOR HEADER CORROSION

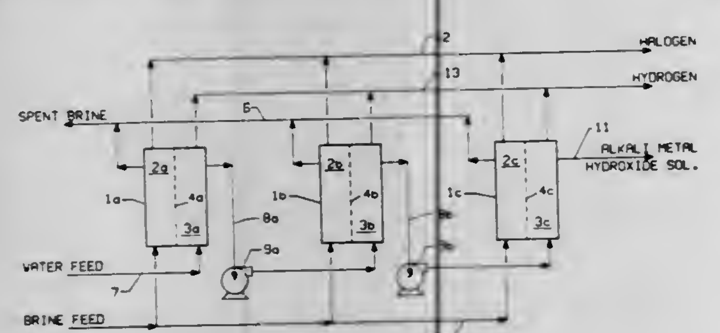
Hugh Cunningham, and Carl W. Raetzsch, both of Corpus Christi, Tex., assignors to PPG Industries, Inc., Pittsburgh, Pa.
Filed Mar. 15, 1976, Ser. No. 667,052
Int. Cl.² C25B *1/16, 1/26;* C23F *13/00*
U.S. Cl. 204—98 6 Claims



1. In a method of conducting electrolysis comprising feeding alkali metal chloride brine to a plurality of individual electrolytic cells electrically in series, passing electrical current through said cells, recovering electrolyte effluent from each of said individual cells through individual metal outlets, and collecting the electrolyte effluent from a plurality of said cells in a common trough vertically disposed beneath said individual metal outlets, the improvement which comprises maintaining an electrode in contact with the electrolyte effluent in said trough whereby to maintain said trough and said electrolyte anodic with respect to all of said metal outlets.

4,057,474
ELECTROLYTIC PRODUCTION OF ALKALI METAL HYDROXIDE

Bruce E. Kurtz, Marcellus, N.Y.; Joel P. Guptill, Griffith, Ind., and Robert H. Fitch, Syracuse, N.Y., assignors to Allied Chemical Corporation, Morris Township, N.J.
Filed June 25, 1976, Ser. No. 699,767
Int. Cl.² C25B *1/14;* C25C *7/00*
U.S. Cl. 204—98 15 Claims

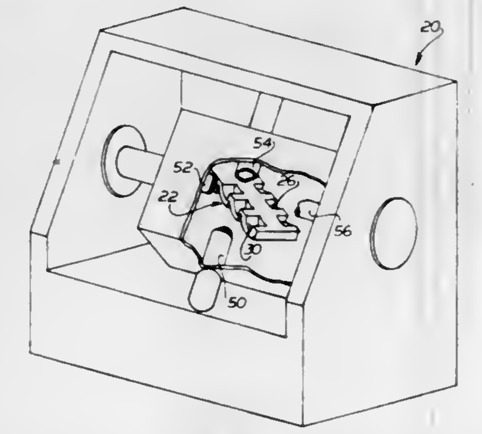


1. In a bank of a plurality of cationic permselective membrane cells for electrolysis of aqueous alkali metal halide solution to form alkali metal hydroxide and diatomic halide gas, each cell comprising;
- a housing;
- an anode and a cathode located within the housing;
- a cationic permselective membrane separating the anode and the cathode and dividing the housing into an anode compartment and a cathode compartment;
- means for feeding enriched and for withdrawing partially depleted aqueous alkali metal halide solution to and from the anode compartment of each cell in the bank;
- means for feeding water or aqueous alkali metal hydroxide solution to the cathode compartment and for withdrawing aqueous alkali metal hydroxide solution from the cathode compartment of each cell in the bank; the improvement which comprises provision of:
- means for transferring catholyte serially from the cathode compartment of one or more preceding cells to the cathode compartment of one or more succeeding cells in the bank.

9. In the process of making aqueous alkali metal hydroxide solution and diatomic halide gas by electrolysis of aqueous alkali metal halide solution in a bank of a plurality of cationic permselective membrane cells, involving feeding enriched and withdrawing partially depleted aqueous alkali metal halide solution to and from the anode compartment of each cell, and feeding water or aqueous alkali metal hydroxide solution to and withdrawing catholyte comprising aqueous alkali metal hydroxide solution from the cathode compartment of each cell, the improvement which comprises transferring catholyte serially from the cathode compartment of one or more preceding cells to the cathode compartment of one or more succeeding cells in the bank.

4,057,475
METHOD OF FORMING A PLURALITY OF ARTICLES

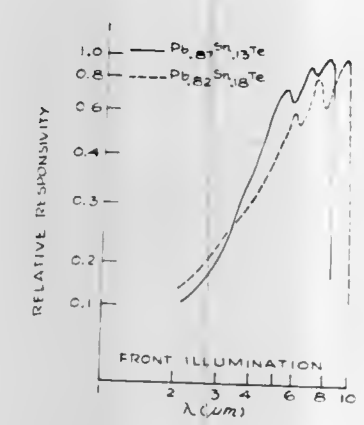
Gustav E. Schrader, Pepper Pike, Ohio, assignor to TRW Inc., Cleveland, Ohio
Filed June 28, 1976, Ser. No. 700,542
Int. Cl.² C25F *3/00;* B23P *1/04, 1/12*
U.S. Cl. 204—129.1 28 Claims



1. A method of at least partially forming a plurality of articles, said method comprising the steps of partially forming a first series of articles in a first longitudinally extending array adjacent to a first edge portion of a workpiece by electrolytically removing material from the workpiece, partially forming a second series of articles in a second longitudinally extending array adjacent to a second edge portion of the workpiece which is opposite from the first edge portion of the workpiece by electrolytically removing material from the workpiece, the first and second longitudinally extending arrays of articles being separated from each other by a longitudinally extending central portion of the workpiece, said steps of partially forming the first and second series of articles including the steps of effecting relative movement between an electrode and the workpiece, establishing a flow of electrolyte between the workpiece and the electrode during the relative movement between the electrode and the workpiece, and establishing an electrical potential between the electrode and the workpiece during the flow of electrolyte between the electrode and the workpiece, said method further comprising the steps of separating the first series of articles from the second series of articles at the longitudinally extending central portion of the workpiece after performing said steps of partially forming the first and second series of articles, and further forming the first and second series of articles after performing said step of separating the first series of articles from the second series of articles, said step of further forming the first and second series of articles includes the step of utilizing the central portion of the workpiece to form a portion of each of the articles.

4,057,476
THIN FILM PHOTOVOLTAIC DIODES AND METHOD FOR MAKING SAME

Esther Krikorian, Claremont, and Michael J. Crisp, Placentia, both of Calif., assignors to General Dynamics Corporation, Pomona, Calif.
Filed May 26, 1976, Ser. No. 690,344
Int. Cl.² C23C *15/00;* H01L *31/00*
U.S. Cl. 204—192 P 24 Claims

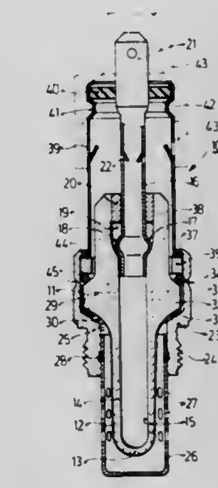


1. An improved method of preparing photovoltaic diodes having thin films $Pb_{1-x}Sn_xTe$, said method comprising:
- sputtering from a prereacted $Pb_{1-x}Sn_xTe$ target wherein x is in the range from 0.0 to about 0.3 a single crystal $Pb_{1-x}Sn_xTe$ film of predetermined composition and about 0.1–10μm thickness, wherein x is in the range from 0.0 to about 0.3, on a selected heat resistant single crystal substrate in a reaction zone containing about 0.5–5μm inert gas after first evacuating said reaction zone to at least about 10^{-7} torr, said sputtering being effected at a substrate temperature of about 220°–350° C and at a film growth rate of about 0.1–3.0μm/hr., the particular film deposition conditions being selected and controlled to provide said film with a carrier concentration of predetermined type and value, a Hall mobility of selected value, and a spectral response with cutoff wavelengths ranging from about 0.6μm to about 25μm; and
- therafter depositing on the resulting composite of said film and said single crystal substrate a second film of preselected composition to form a photovoltaic diode.

19. An improved photovoltaic diode, said diode comprising:
- a heat resistant monocrystalline substrate,
- a first unannealed monocrystalline film of $Pb_{1-x}Sn_xTe$, wherein x is in the range from 0.0 to about 0.3, sputtered on said substrate to form a composite therewith, said first film having selected carrier concentration and Hall mobility and desired carrier type, a spectral response cutoff ranging from about 6μm to about 25μm and
- a second film disposed on said composite and selected from the group consisting of a thin, up to about 50A, barrier metal and a crystalline unannealed sputtered film of $Pb_{1-x}Sn_xTe$ wherein x is in the range from 0.0 to about 0.3, wherein the carrier type is opposite that of said first film, wherein said second film has a selected carrier concentration, and Hall mobility and a thickness not in excess of about 5μm.

4,057,477
DEVICE FOR ELECTROCHEMICALLY MEASURING THE CONCENTRATION OF OXYGEN IN COMBUSTION GASES

Helmut Weyl, Schwieberdingen, and Leo Steinke, Hegnach, both of Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany
Continuation of Ser. No. 447,330, March 1, 1974, Pat. No. 3,960,693. This application Feb. 3, 1976, Ser. No. 654,918
Claims priority, application Germany, Mar. 28, 1973, 2315444
The portion of the term of this patent subsequent to June 1, 1993, has been disclaimed.
Int. Cl.² G01N *27/46*
U.S. Cl. 204—195 S 5 Claims

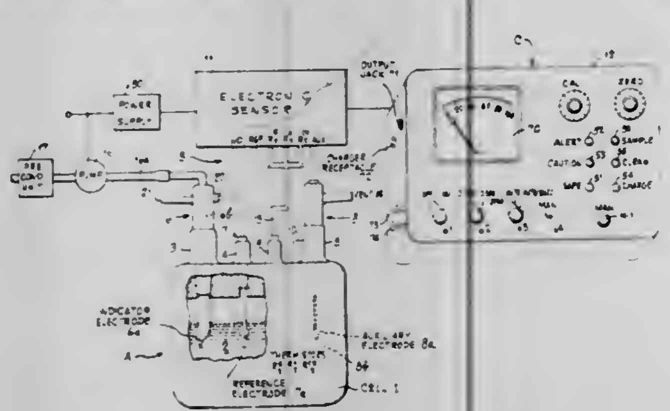


1. A device for electro-chemically measuring the concentration of oxygen in combustion gases, particularly those of internal combustion engines, comprising a housing having a passage which is formed with two spaced open ends with an inner circumferential shoulder intermediate said ends and with a radially inwardly extending rim in the region of one of said open ends; a tubular member of ion-conducting solid electrolyte material having a closed-ended first portion which projects from the other of said open ends, and a second portion which extends through said passage and is formed with an outer circumferential flange of which one axial end face faces towards said other open end and is supported by said shoulder and of which another axial end face faces away from said other open end, the interior of said tubular member being in communication with the ambient atmosphere and the exterior of said first portion being adapted for exposure to a flow of combustion gases, and the materials of said housing and of said tubular member having differential coefficients of thermal expansion and contraction; an electron-conductive inner electrode on an inner surface of said tubular member and being conductively connected with an outside terminal portion; an electron-conductive outer electrode on an outer surface of said tubular member and being conductively connected with said housing; compensating means comprising a discrete annular compensating member installed in said housing separate from but fixed with reference thereto and being confined between said rim and said flange of said tubular member in surrounding engagement with said second portion of said tubular member, said compensating means being of a material having a coefficient of thermal expansion and contraction which compensates for said differential coefficients of said housing and of said tubular member so as to prevent development of cracks or loosening of the seal between said housing and said tubular member; and a body of pulverulent material accommodated in and filling a space defined by said tubular member, housing and annular member, said body being at substantially constant pressure despite the occurrence of differential thermal expansion or contraction due to said differential coefficients.

4,057,478
ELECTROCHEMICAL GAS MONITOR

Stanley Bruckenstein, Williamsville, N.Y., and William G. Sherwood, Arvada, Colo., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed Feb. 5, 1976, Ser. No. 655,575
Int. Cl.² G01N *27/40, 27/52, 27/54*
U.S. Cl. 204—195 P **9 Claims**

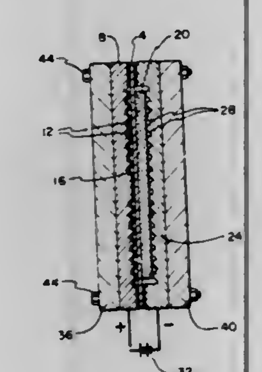


1. An apparatus for quantitatively detecting a selected oxidizable gas present in a gas phase mixture comprising:
means for providing a supply of electrolyte comprising a substantially pure aqueous perchloric acid solution;
a porous electrode comprising an hydrophobic material which is chemically inert to said electrolyte and said gas phase mixture and having a first side comprising gold electrocatalyst means for contacting said electrolyte at an interface and a second side for contacting said gas phase mixture, said electrode allowing at least said selected oxidizable gas present in said gas phase mixture to diffuse from the mixture to said electrocatalyst-electrolyte interface;
means for supplying said gas phase mixture to said second side of said electrode;
means for removing non-selected oxidizable gases which are capable of diffusing to said electrocatalyst-electrolyte interface from said gas phase mixture prior to it being supplied to said second side; and
means electrically connected to said electrode for deriving a signal corresponding to a quantitative measure of the oxidation of the selected oxidizable gas at said interface.

4,057,479
SOLID POLYMER ELECTROLYTE CELL CONSTRUCTION

Barrie C. Campbell, Provo, Utah, assignor to Billings Energy Research Corporation, Provo, Utah

Filed Feb. 26, 1976, Ser. No. 661,789
Int. Cl.² C25B *1/02, 9/00*
U.S. Cl. 204—258 **8 Claims**

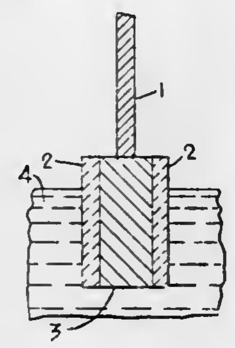


1. A solid polymer electrolyte cell comprising
a solid polymer electrolyte membrane,
an anode disposed on one side of and in contact with said membrane, said anode including a substrate coated with lead dioxide and being formed to enable the flow of fluid between the anode and membrane, with the lead dioxide being maintained in contact with the membrane, and
a cathode formed of a body of sintered material adapted to enable the flow of fluid therethrough and disposed on the other side of and in contact with said membrane.

4,057,480
INCONSUMABLE ELECTRODES

Hanspeter Alder, Flurlingen, Switzerland, assignor to Swiss Aluminium Ltd., Chippis, Switzerland

Division of Ser. No. 470,198, May 15, 1975, Pat. No. 3,960,678. This application Jan. 19, 1976, Ser. No. 649,991
Claims priority, application Switzerland, May 25, 1973, 7522/73
The portion of the term of this patent subsequent to June 1, 1993, has been disclaimed.
Int. Cl.² C25B *11/04*
U.S. Cl. 204—290 R **17 Claims**

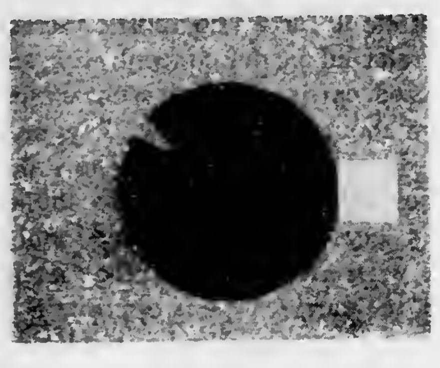


1. In an inconsumable anode comprising an electrode composed of ceramic oxide material, for use in electrolytic recovery of aluminum from a molten charge electrolyte containing aluminum oxide during which electrolytic recovery a predetermined minimum current density is maintained over that portion of the surface of the electrode in contact with the electrolyte to retard the reaction between the electrode and the electrolyte,
the improvement comprising:
a protective ring composed of electrically insulating material which is also resistant against reaction with the electrolyte, said protective ring being disposed on the surface of the electrode at least at the portion of the electrode which during use, normally forms a three phase zone by simultaneous contact with the atmosphere and the electrolyte, whereby said protective ring provides protection to the anode from reaction at the three phase zone.

4,057,481
HIGH PERFORMANCE, QUALITY CONTROLLED BIPOLAR MEMBRANE

Lester T. C. Lee; Gerald J. Dege, both of Parsippany, and Kang-Jen Liu, Somerville, all of N.J., assignors to Allied Chemical Corporation, Morris Township, N.J.

Filed May 24, 1976, Ser. No. 689,305
Int. Cl.² C25B *13/08*
U.S. Cl. 204—296 **16 Claims**



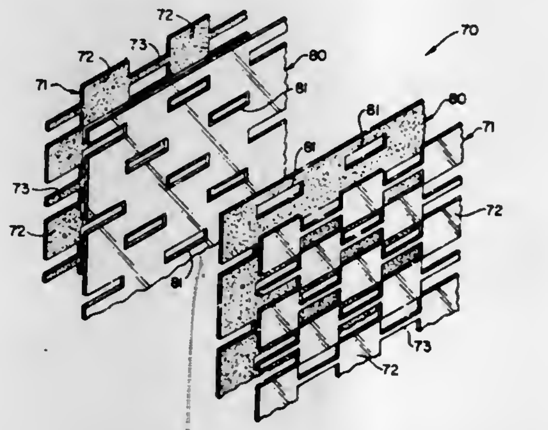
1. In a process for manufacturing a high performance, durable single film bipolar membrane having an ion selectivity above 80% in an electrolyte medium of at least 0.1 molar from a single film wherein an olefinic polymeric film matrix in uniformly impregnated with a mixture of a vinylaromatic monomer and a di- or poly-functional cross-linking agent and said mixture is subsequently polymerized to obtain on the film at least 15 percent by weight of the vinylaromatic mixture based on the total weight of the membrane and said mixture is cross-lined to a degree equivalent to that obtained by a 2 to 20 weight percent of divinylbenzene in styrene, the improvement comprising pre-cleaning the thus prepared cross-linked matrix and thereby removing surface vinylaromatic polymer accumulation, which has not penetrated the matrix surface, from the surface of the cross-linked matrix to render the aromatic nuclei of the impregnated vinylaromatic polymer more readily accessible to functionalization, and thereafter chemically bonding from about 5 to about 98% of the membrane thickness with highly dissociable cationic exchange groups to the aromatic nuclei from one side only, and chemically bonding from about 2 to 50% of highly dissociable anionic exchange groups to the remaining aromatic nuclei.

13. The product produced by the method of claim 1.

4,057,482
APPARATUS FOR REMOVING LIQUID FROM LIQUID BEARING MATERIAL

James T. Candor, 5440 Cynthia Lane, Dayton, Ohio 45429

Division of Ser. No. 569,815, April 21, 1975, Pat. No. 3,966,575, which is a continuation-in-part of Ser. No. 499,178, Aug. 21, 1974, Pat. No. 3,893,898, which is a continuation-in-part of Ser. No. 383,255, July 27, 1973, Pat. No. 3,849,275, which is a division of Ser. No. 263,605, June 16, 1972, Pat. No. 3,795,605, which is a continuation-in-part of Ser. No. 53,402, July 9, 1970, abandoned, which is a continuation-in-part of Ser. No. 25,938, April 6, 1970, Pat. No. 3,687,834, which is a continuation-in-part of Ser. No. 864,851, Oct. 8, 1969, abandoned, which is a continuation-in-part of Ser. No. 811,421, March 28, 1969, abandoned, and a continuation-in-part of Ser. No. 548,666, Feb. 10, 1975, Pat. No. 3,965,581, which is a continuation-in-part of Ser. No. 469,820, May 14, 1974, Pat. No. 3,931,682, and a continuation-in-part of Ser. No. 405,023, Oct. 10, 1973, and Ser. No. 499,178, Oct. 21, 1974. This application June 21, 1976, Ser. No. 697,873
The portion of the term of this patent subsequent to Aug. 29, 1989, has been disclaimed.
Int. Cl.² B01D *13/02*
U.S. Cl. 204—299 R **27 Claims**

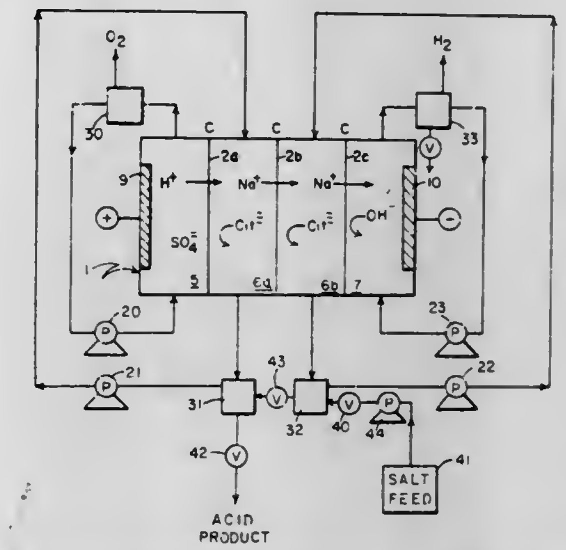


1. Apparatus comprising passage defining means having inlet means and outlet means with an unobstructed passage therebetween so that relatively wide and continuous strip-like material can be passed through said passage from said inlet means to said outlet means in substantially an unobstructed manner, said apparatus further comprising electrostatic means providing a plurality of non-uniform electrostatic fields each at least partially extending across said passage of said passage defining means intermediate said inlet means and said outlet means and each having its higher intensity portion substantially oppositely located relative to the higher intensity portion of an adjacent non-uniform electrostatic field whereby said non-uniform fields can act on said material as said material is passed through said passage.

4,057,483
ELECTRODIALYSIS APPARATUS AND PROCESS FOR ION MODIFICATION

Anthony J. Giuffrida, North Andover, Mass., assignor to Ionics, Incorporated, Watertown, Mass.

Division of Ser. No. 518,587, Oct. 29, 1974, Pat. No. 3,964,985. This application Apr. 7, 1976, Ser. No. 674,345
Int. Cl.² B01D *13/02*
U.S. Cl. 204—301 **2 Claims**



1. An electrolytic cell for converting a water soluble salt of an acid into the corresponding acid comprising a container divided into four individual chambers, said cell having at the terminal ends a cathode and anode chamber containing a cathode and anode electrode respectively, first and second intermediate chambers adjacent to each other and placed between said electrode chambers, all four chambers being separated from each other by cation permeable partitions or membranes, said container also having means for separately introducing into, recycling, and removing fluids from each of said chambers from a separate holdup tank associated with each chamber and means for passing a direct current between electrodes transversely through the said chambers;
said cell further comprising means for continuously recycling solutions through each of said four chambers; and
means for passing a solution between the separate holdup tanks associated with each of said intermediate chambers whereby solution from said second intermediate chamber can be processed by said first intermediate chamber.

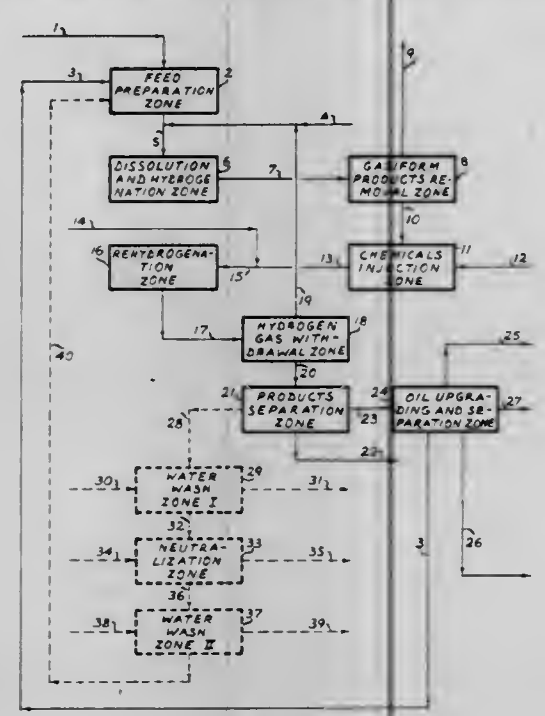
4,057,484
PROCESS FOR HYDROLIQUEFYING COAL OR LIKE CARBONACEOUS SOLID MATERIALS

John Michael Malek, P.O. Box 2870, Pasadena, Calif. 91105

Filed Dec. 15, 1975, Ser. No. 640,946
Int. Cl.² C10G *1/00*
U.S. Cl. 208—8 **13 Claims**

1. In a process for producing hydrocarbons by hydroliquefaction of coal, comprising passing the coal feed into a coal dissolution-hydrogenation zone wherein subjecting the coal under an operating pressure in the range of 1000 to 3000 PSIA and an operating temperature in the range of 700° to 900° F to reactions with hydrogen for yielding desired hydrocarbons in a mixture of gasiform and slurryform hydrogenated coal products containing asphaltenes, the improvement consisting in admixing to these slurryform products, after the gasiform part of said mixture of products leaving said coal dissolution-hydrogenation zone has been taken-off, an alkali selected from the group consisting of alkali metal hydroxides, alkaline earth metal hydroxides, alkali metal carbonates, ammonium hydroxide, in an amount necessary to break, at least

partly, the acid-base type structures of asphaltenes present in said slurryform products, subjecting the latter to react with the admixed said alkali at an operating temperature in the range of 200° F to 900° F and under an operating pressure up to 3000 PSIA, and subjecting the treated slurryform products to reactions with hydrogen in a rehydrogenation zone different from



said coal dissolution-hydrogenation zone under an operating pressure and temperature in the range of 1050 PSIA to 3100 PSIA and 650° to 900° F respectively, to yield a mixture of a hydrogen containing rehydrogenation product gas with slurryform rehydrogenation products, and separating the hydrogen containing gas product from said slurryform products of the rehydrogenation.

4,057,485
SOLVENT EXTRACTION OF OIL FROM TAR SANDS UTILIZING A CHLORINATED ETHANE SOLVENT
Neil Franklin Blaine, deceased, late of Lomita, Calif., and by Geneva Blaine, executrix, 26007 S. Lucille Ave., Lomita, Calif. 90717
Filed Aug. 23, 1976, Ser. No. 716,872
Int. Cl.² C10G *1/04*
U.S. Cl. 208—11 LE 3 Claims

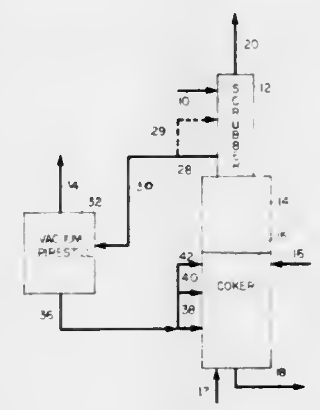
1. In an oil solvent extraction process wherein a tar sand is contacted with a solvent at mild conditions of temperatures from 70° F. to about 800° F. and pressures of 0 to about 200 psig, the improvement wherein said solvent is monochloroethane, dichloroethane, trichloroethane or tetrachloroethane.

4,057,486
SEPARATING ORGANIC MATERIAL FROM TAR SANDS OR OIL SHALE
F. Weldon Meadus; Bryan D. Sparks; Ira E. Puddington, and J. Redmond Farnand, all of Ottawa, Canada, assignors to Canadian Patents and Development Limited, Ottawa, Canada
Filed July 14, 1975, Ser. No. 595,762
Int. Cl.² C10G *1/04*
U.S. Cl. 208—11 LE 18 Claims

1. A method of agglomerating and separating siliceous solids from hydrocarbons of intimate mixtures thereof, the solids being in finely divided form, and further recovering hydrocarbons, the process comprising:

a. distributing an organic solvent or diluent for the hydrocarbon into a feed mixture comprising siliceous solids and hydrocarbons, in sufficient amounts to dissolve or disperse the hydrocarbons and provide a liquid slurry,
b. providing an aqueous agglomerating liquid for the siliceous solids in the diluted mixture in total amounts of from about 8 to about 50% by wt. of the feed mixture, the amount being selected within said range to enable agglomerates to form of at least about 2 mm. diameter but insufficient to form large soft agglomerates, said aqueous liquid being substantially insoluble in the solvent or diluent and having an affinity for the siliceous solids,
c. agitating the multi-phase diluted mixture severely enough and for a sufficient time to intimately contact the aqueous liquid and the siliceous solids, continuing and controlling the agitation to provide a rolling or tumbling motion until the aqueous liquid and the hydrophilic siliceous solids form into discrete compact agglomerates of at least about 2 mm. diameter,
d. separating the compact agglomerates from the organic phase by screening or by density difference, and
e. recovering said hydrocarbons and solvent or diluent.

4,057,487
FLUID COKING PROCESS
William J. Metrailer, Baton Rouge, La., and Joseph P. Matula, Randolph, N.J., assignors to Exxon Research & Engineering Co., Linden, N.J.
Filed July 19, 1976, Ser. No. 706,218
Int. Cl.² C10G *9/32*
U.S. Cl. 208—81 2 Claims



1. In a process wherein a heavy hydrocarbon oil is cracked to a vaporous product including normally liquid hydrocarbons and to coke in a dense fluidized bed of solid particles in a coking zone maintained under fluid coking conditions which comprises the steps of passing a hot vaporous product from said coking zone to a scrubbing zone, introducing a hydrocarbonaceous oil feed to said scrubbing zone for contacting said oil feed with said vaporous product to condense heavy hydrocarbons from said vaporous product and to vaporize lower boiling hydrocarbons from said oil feed, and withdrawing at least a portion of a bottoms fraction from said scrubbing zone, the improvement which comprises: passing at least a portion of said withdrawn bottoms fraction from said scrubbing zone to a vacuum distillation zone and passing a portion of the vacuum distillation zone bottoms fraction to said coking zone, said hydrocarbonaceous oil feed introduced into said scrubbing zone being an atmospheric distillation residuum.

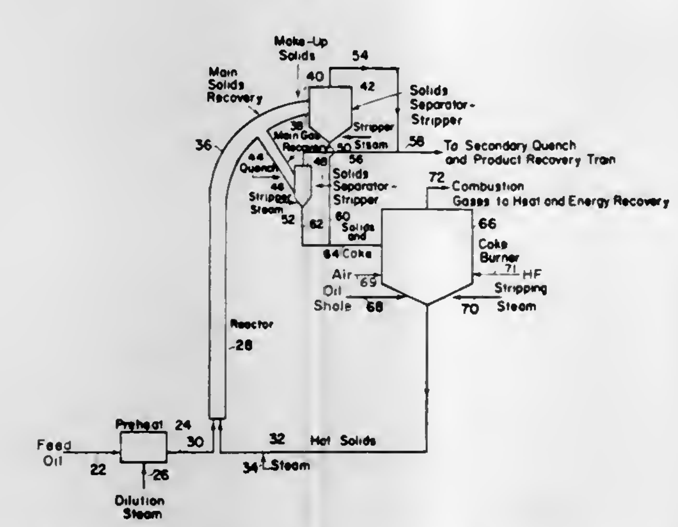
4,057,488
CATALYTIC POUR POINT REDUCTION OF PETROLEUM HYDROCARBON STOCKS
Angelo Anthony Montagna, Monroeville; Allen Evarts Somers; Stephen Luther Peake, both of Pittsburgh, and Sun Woong Chun, Murrysville, all of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.
Filed Nov. 2, 1976, Ser. No. 738,317
Int. Cl.² C10G *23/04*
U.S. Cl. 208—89 6 Claims

1. A pour point reduction process which comprises contacting a petroleum hydrocarbon containing greater than 30 ppm nitrogen and greater than 50 percent by volume of material boiling above 450° F. with a denitrogenation catalyst under denitrogenation conditions, said denitrogenation catalyst comprising at least one hydrogenation component selected from Group VI-B and Group VIII metals on a refractory oxide carrier, recovering a product hydrocarbon from the denitrogenation zone containing less than 30 ppm nitrogen, contacting said product hydrocarbon with a pour point reduction catalyst under pour point reduction conditions, said pour point reduction catalyst comprising a Group IV-B metal, a Group VIII noble metal, and a decationized mordenite support, said pour point reduction conditions comprising a temperature in the range of 450° to 800° F., a liquid hourly space velocity in the range of 0.2 to 10.0, a hydrogen partial pressure in the range of 500 to 5,000 psig, and a hydrogen circulation rate in the range of 500 to 10,000 standard cubic feet per barrel of feed, and recovering therefrom a petroleum hydrocarbon product of reduced pour point.

4,057,489
PROCESS FOR PRODUCING A TRANSFORMER OIL HAVING LOWER POUR POINT AND IMPROVED OXIDATION STABILITY
Angelo Anthony Montagna; Allen Evarts Somers, and Raynor Tyler Sebulsky, all of Pittsburgh, Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.
Filed Dec. 29, 1976, Ser. No. 755,158
Int. Cl.² C10G *23/02*
U.S. Cl. 208—89 7 Claims

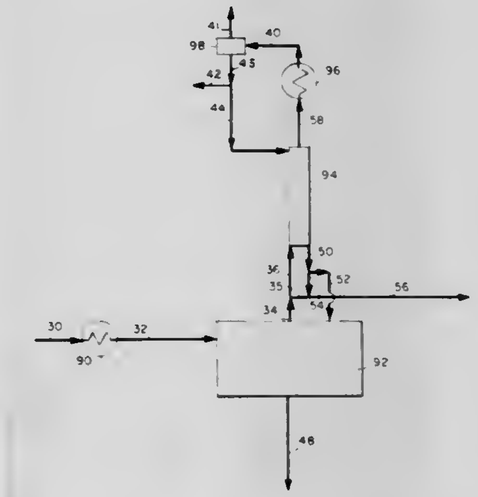
1. A process for producing a transformer oil having a lower pour point and improved oxidation stability which comprises contacting a petroleum lubricating oil feed having a nitrogen concentration of less than 30 ppm and having a Saybolt Universal viscosity at 100° F. in the range of 52 to 62 seconds with hydrogen and a pour point reduction catalyst under pour point reduction reaction conditions, said pour point reduction catalyst comprising a Group IV-B metal, a Group VIII noble metal, and a decationized mordenite support, said pour point reduction conditions providing for a lubricating oil product wherein from 8 to 30 weight percent of said oil feed has been converted to products boiling below 450° F., and subjecting said lubricating oil product having a lower pour point to an oxidation stabilization step to provide said transformeroil.

4,057,490
THERMAL CRACKING PROCESS EMPLOYING CRUSHED OIL SHALE AS FUEL
Francis Edmund Wynne, Jr., Allison Park, Pa., assignor to Gulf Research & Development Company, Pittsburgh, Pa.
Filed July 12, 1976, Ser. No. 704,464
Int. Cl.² C10G *9/32*
U.S. Cl. 208—127 6 Claims



1. In a process for thermal cracking of a hydrocarbon feed oil to produce a product including ethylene, propylene and 1,3-butadiene wherein said feed oil is passed together with entrained hot catalytically inert solids through a cracking zone at a temperature between 1,430° and 2,500° F. for a residence time of 0.05 to 2 seconds and coke-laden hot solids are recovered and passed to a burner zone operated at a temperature above 1,700° F. together with supplementary fuel, the improvement wherein said supplementary fuel comprises crushed oil shale and said entrained hot catalytically inert solids includes solids derived from said shale oil.

4,057,491
SOLVENT RECOVERY PROCESS FOR N-METHYL-2-PYRROLIDONE IN HYDROCARBON EXTRACTION
James D. Bushnell, Berkeley Heights; Milton D. Leighton, Florham Park, and Thomas M. McDonald, Califon, all of N.J., assignors to Exxon Research & Engineering Co., Linden, N.J.
Filed Mar. 26, 1976, Ser. No. 670,887
Int. Cl.² C10G *21/16*
U.S. Cl. 208—321 8 Claims



1. An improved process for removing minor amounts of water extraneously introduced into a lube oil extraction solvent comprising NMP and minor amounts of water, said process comprising removing most of said solvent from a lube oil extract, as a first solvent vapor, by flash evaporation, simple distillation, rectification or combination thereof and stripping residual solvent from said extract with a non-aqueous stripping gas to form a mixture of solvent vapor and stripping gas, separating said solvent from said gas and recovering said solvent, wherein the improvement comprises the steps of:

a. combining said first solvent vapor with said mixture;
b. passing said combined mixture which contains extraneous and non-extraneous water through a first condensing zone wherein most of the solvent in said mixture is condensed to a liquid to form a mixture of condensed solvent, stripping gas and vapor and wherein said vapor contains NMP and said extraneous water;
c. passing said second mixture to a separating zone to separate said condensed solvent from said vapor and stripping gas;
d. passing at least a portion of the separated vapor and stripping gas from said separating zone to a rectifying zone wherein said NMP in said vapor is condensed and separated from said extraneous water and stripping gas;
e. passing said extraneous water vapor and stripping gas from said rectifying zone to a second condensing zone to condense the extraneous water and separate same from the stripping gas; and
f. returning a portion of said condensed water from the second condensing zone back to said rectifying zone to act as reflux therein.

4,057,492

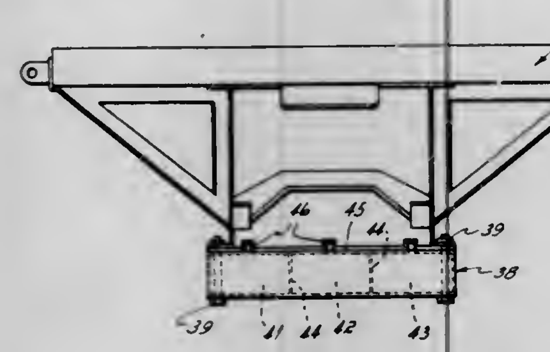
ADJUSTMENT OF MOTION OF SCREENING MACHINE

David D. Stasinski, Forest Park, and William E. Lower, Cincinnati, both of Ohio, assignors to Rotex, Inc., Cincinnati, Ohio

Filed June 18, 1976, Ser. No. 697,318

Int. Cl.² B07B *1/44*

U.S. Cl. 209—366.5 **11 Claims**



1. In a screening machine including a base, a vibrating assembly resiliently supported by the base, said vibrating assembly including a screen, and drive means for applying an excitation force to said vibrating assembly to move it relative to said base so that the screen is moved in a pattern of screening movement, the screen being tiltable with respect to the base by the action of said excitation force on the vibrating assembly,

means for changing said pattern of screening movement, comprising,

a container presenting a plurality of enclosed separate hollow compartments within it, the container being secured to said vibrating assembly for movement with the vibrating assembly when the latter is vibrated by the drive means,

the vibrating assembly having a center of gravity, the said compartments being fixed at different positions with respect to said center of gravity,

each said compartment within said container having a closable port through which ballast can be selectively introduced into the respective compartment,

the addition of such ballast into the compartment changing the relative position of the center of gravity of said vibrating assembly with respect to said excitation force, and thereby changing the pattern of screening movement by changing the tilting effect of said excitation force on said vibrating assembly.

4,057,493

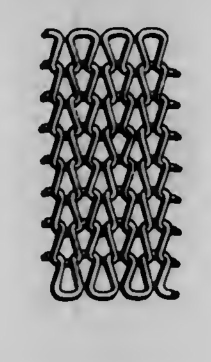
DROPLET CONTROL ELEMENTS

Graham Arthur Davies, 19 Downesway, Alderley Edge, Cheshire; Godfrey Vaughan Jeffreys, 8 Heaton Drive, Four Oaks Park, Sutton Coldfield, Warwickshire, and David Pryce Bayley, Clements House, Station Approach, South Croydon, Surrey, all of England

Continuation of Ser. No. 327,838, Jan. 30, 1973, abandoned. This application Mar. 8, 1976, Ser. No. 665,076

Int. Cl.² B01D *17/04*

U.S. Cl. 210—23 R **10 Claims**



1. A method of treating a liquid-liquid dispersion comprising droplets of a first liquid phase dispersed in a second liquid phase so as to promote coalescence of said droplets of said first liquid phase, which method comprises:

flowing said dispersion through a perforate packing comprising a coalescer body having an entry face, an exit face and a labyrinth of interstitial passages for said dispersion extending between said entry and exit faces, said body comprising high and low surface energy materials formed into threads, fibers or filaments, said high surface energy material being a metal, metal oxide, metal salt, glass or ceramic, and said low surface energy material being a solid organic polymeric material, said first liquid phase wetting one of said materials but not the other and said second liquid phase wetting said other material but not the said one material, said high and low surface energy materials meeting one another throughout said body at a plurality of surface junctions to provide enhanced droplet coalescence properties for said droplets of said first liquid phase, and said surface junctions occurring at said entry and exit faces and being substantially uniformly dispersed throughout said interstitial passages of said body exposed to said dispersion, whereby said body presents to said dispersion an array of surface junctions disposed along the path of flow of said dispersion at which said droplets coalesce, and

removing coalesced droplets of said first liquid phase from the exit face of said coalescer body.

4,057,494

REMOVAL OF CHROMIUM, CHROMATE, MOLYBDATE AND ZINC

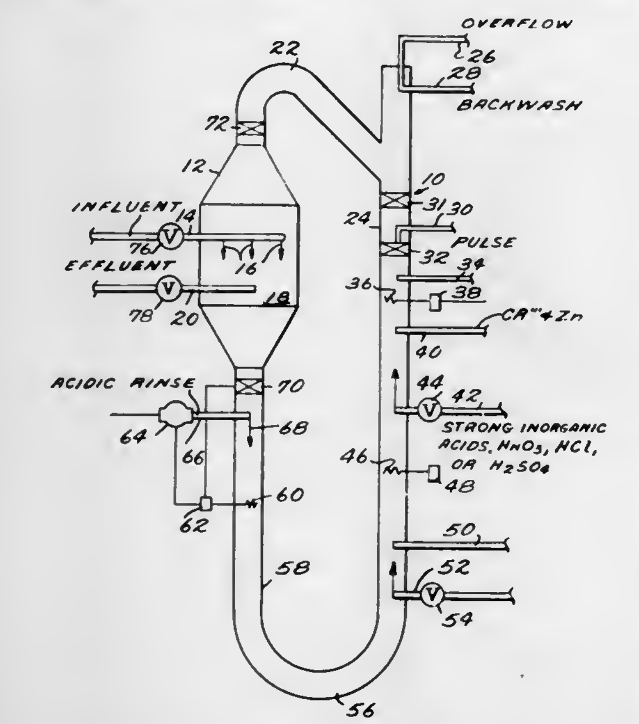
Randhir C. Chopra, Knoxville, Tenn., assignor to Chemical Separations Corporation, Oak Ridge, Tenn.

Continuation-in-part of Ser. No. 488,630, July 15, 1974, Pat. No. 3,972,810. This application July 14, 1976, Ser. No. 705,171

The portion of the term of this patent subsequent to Aug. 3, 1993, has been disclaimed.

Int. Cl.² B01D *15/02;* **C02B** *1/42, 1/56*

U.S. Cl. 210—33 **16 Claims**



1. A continuous cyclic process for removing from influent water at least one of a first member selected from the group consisting of hexavalent chromium and molybdate, and at least one of a second member selected from the group consisting of trivalent chromium and zinc comprising:

1. introducing said water containing said first and second members entrained therein into the upper portion of a first section of an ion exchange vessel having a shiftable ion exchange resin bed therein and causing said water to flow downwardly through said ion exchange resin bed consisting essentially of a mixture of weak base anion exchange resin and weak acid cation exchange resin in hydrogen ion form, wherein each type resin is present in said mixture in an amount of at least 20% by volume of the total volume of said resin mixture and wherein said weak acid cation exchange resin is present in an amount sufficient to supply sufficient hydrogen ions so that said first member is transferred from said water to said weak base anion exchange resin even when said influent water is not acidic, whereby said first and second members are transferred, respectively, to said weak base anion exchange resin and to said weak acid cation exchange resin;
2. withdrawing from the lower portion of said first section the resulting water with substantially reduced amounts of said first and second members;
3. introducing a first regenerating agent into one portion of a second portion of said ion exchange vessel containing said mixture of weak base anion exchange resin loaded with said first member and weak acid cation exchange resin loaded with said second member, from (1) and causing said first regenerating agent to contact said ion exchange resin mixture;
4. withdrawing from said one portion of said second section said first regenerating agent containing one of said first and second members,
5. essentially simultaneous with the introduction of said first regenerating agent in (3) introducing a second regenerating agent into another portion of said second section of said ion exchange vessel containing said mixture of weak base anion exchange resin and weak acid cation exchange resin previously treated in (3) and causing said second regenerating agent to contact said ion exchange resin mixture;
6. withdrawing from said another portion of said second section said second regenerating agent containing the other of said first and second members;
7. transferring ion exchange resin regenerated at (5) in said second section and introducing the same into the lower portion of said first section for contact with water containing said first and second members, thereby displacing ion exchange resin loaded with said first and second members from the upper portion of said first section;
8. transferring said ion exchange resin loaded with said first and second members and displaced from the upper portion of said first section to another section of said ion exchange vessel communicating therewith, thereby displacing another portion of said ion exchange resin loaded with said first and second members from said another section;
9. transferring said another portion of said ion exchange resin loaded with said first and second members and displaced from said another section to said one portion of said second section for regeneration therein;
10. detecting the presence of contaminants in the ion exchange resin bed being transferred between the said second section and said first section and in response thereto introducing aqueous acidic resin rinse medium into said ion exchange vessel intermediate said first and second section in a direction counter-current to the transfer of said resin thereby establishing the introduction of substantially contaminant-free ion exchange resin into said first section.

4,057,495

METHOD FOR TREATING A WASTE WATER CONTAINING A NONIONIC SURFACE ACTIVE AGENT

Mototaka Kinoshita, Chiba; Akio Okabe, Tokyo, and Susumu Ando, Chiba, all of Japan, assignors to Lion Fat & Oil Co., Ltd., Japan

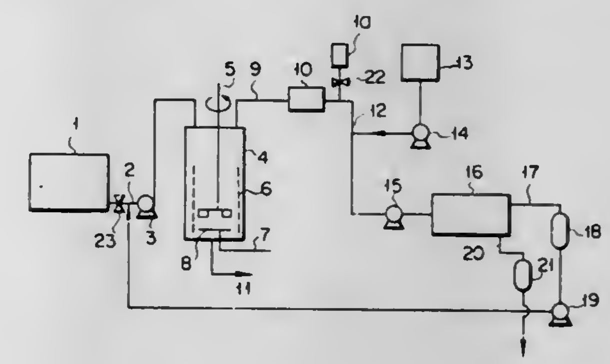
Filed Sept. 17, 1976, Ser. No. 724,254

Claims priority, application Japan, Sept. 17, 1975, 50-112417

Int. Cl.² B01D *21/01*

U.S. Cl. 210—44 **5 Claims**

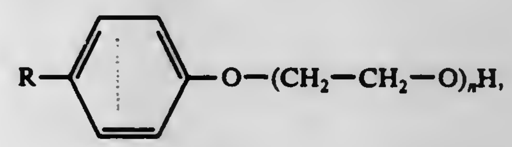
1. A method for recovering a nonionic surface active agent from a nonionic surface active agent containing waste water to purify the waste water, which consists of separating by a foam separation step a low concentration waste water with less than 500 ppm of a nonionic surface active agent into a concentrated water containing more than 500 ppm of nonionic surface active agent and a treated water containing less than 3 ppm of nonionic surface active agent; adding an inorganic electrolyte selected from the group consisting of Na_2SO_4, K_2SO_4, $Al_2(SO_4)_3$, $Fe_2(SO_4)_3$, NaCl, KCl, $CaCl_2$, $MgCl_2$, $FeCl_2$, $FeCl_3$ and $AlCl_3$ to the concentrated water to insure a concentration of electrolyte in the concentrated water of more than 50 ppm, heating the resultant concentrated water containing electrolyte



to 100° to 200° C under a pressure of 2 to 5 kg/cm² to separate it into a high concentration nonionic surface active agent solution and a separated water, and recycling the separated water to the foam separation step, said nonionic surface active agent being selected from the group consisting of polyoxyethylenealkylether represented by a general formula:

$$RO—(CH_2—CH_2—O)_nH,$$

polyoxyethylenealkylphenylether represented by a general formula:



and fatty ester of polyethyleneglycol represented by a general formula:

$$R—COO—(CH_2—CH_2—O)_nH,$$

where R denotes C_6 to C_{24} alkyl radical or alkenyl radical and n denotes 2 to 40.

4,057,496

METHOD AND DEVICE FOR FILTRATION

Sadayoshi Itagaki, Odawara, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-Ashigara, Japan

Filed June 15, 1976, Ser. No. 696,330

Claims priority, application Japan, June 17, 1975, 50-73364

Int. Cl.² B01D *37/00, 23/04*

U.S. Cl. 210—65 **10 Claims**

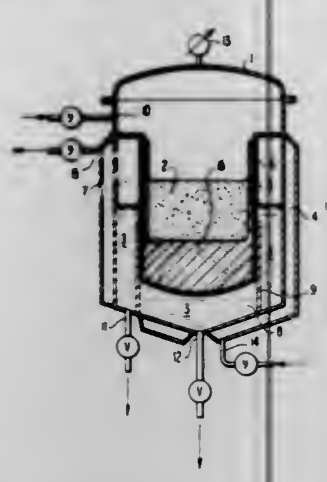
1. A method of filtering slurries to obtain a filtrate and a sedimented filter cake, comprising,

a. supplying a slurry to a bag-shaped filter medium within a filter tank,

b. forcing the liquid from said slurry to enter a bottom filter chamber and a side filter chamber, separated from one another by a baffle extending slightly higher than the expected height of the sedimented filter cake on the bottom of said bag-shaped filter medium, to leave a sedimentation of filter cake on the bottom and side walls of said bag-shaped filter medium,

c. said bottom and side filter chambers having exit ports for the removal of filtrate therefrom, and (d) subsequent to the forcing of the liquid, applying a pressure differential on opposite sides of said bag-shaped filter medium while simultaneously having closed all exit ports of said side

filter chamber and having the exit port of said bottom filter chamber open, whereby said pressure differential



draws liquid from said filter cake on the bottom of said medium.

4,057,497

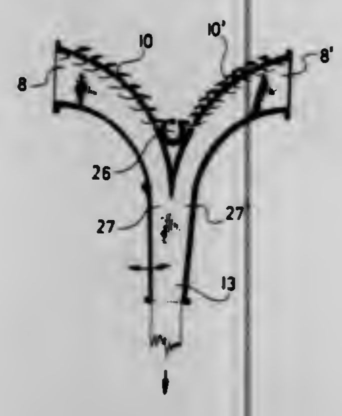
METHOD AND APPARATUS FOR DISPENSING MULTI-COMPONENT LIQUID SUSPENSIONS

Michal Skrabak; Ernest Vavrik; Stanislav Kolarik, and Milos Mazak, all of Bratislava, Czechoslovakia, assignors to Slovenska vysoka skola technicka, Bratislava, Czechoslovakia

Continuation-in-part of Ser. No. 499,789, Aug. 22, 1974, abandoned. This application Nov. 5, 1975, Ser. No. 628,884

Int. Cl.² B01D *21/00, 37/00*

U.S. Cl. 210—65 **2 Claims**



1. A process for dispersing multi-component liquid suspensions, comprising passing at least two liquid suspension streams through adjacent nozzles at different velocities to form a mixed stream in a main outlet nozzle wherein the difference in velocity of the suspension streams, issuing from the adjacent nozzles is sufficient to cause a whirling and oscillating turbulence movement for dispersing the suspension streams, and lensifying the suspension before entering the main outlet nozzle, by centrifugal forces, acting on the outer perforated walls of a curved nozzle whereby a densified suspension is formed and withdrawing a filtrate through a take-off duct disposed at the end portion of the perforated walls.

4,057,498

CONCENTRATORS FOR RECOVERING LIQUID POLLUTANT FLOATING ON THE SURFACE OF A SHEET OF WATER

Jacques Vidilles, 24, Bd Maillot, 92200 Neuilly, France

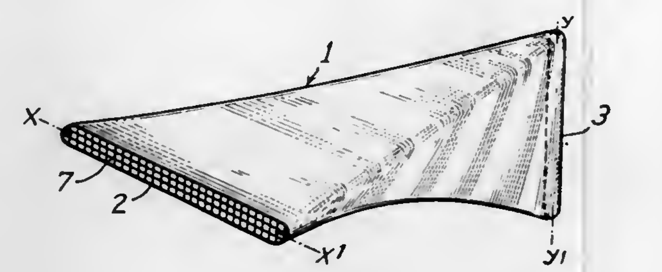
Filed Mar. 3, 1976, Ser. No. 663,540

Claims priority, application France, Mar. 6, 1975, 75.07031

Int. Cl.² E02B *15/04*

U.S. Cl. 210—170 **11 Claims**

1. A concentrator for the recovery of a water-immiscible liquid pollutant floating on the surface of a sheet of water, which comprises a duct of flexible material having an inlet orifice with a larger and a smaller dimension along mutually perpendicular axes for locating with its larger dimension substantially parallel to the surface of the sheet of water, the shape of the duct varying across its length such that at its end remote from the inlet orifice it has a section with a larger and a smaller dimension along mutually perpendicular axes, its larger dimension being in a plane substantially perpendicular to the surface of the sheet of water when the larger dimension of the inlet orifice is parallel to the surface of the sheet of water, a flexible grid connected across the inlet orifice so as to maintain a fixed



geometry of said inlet orifice, at least one outlet orifice for the outflow of the liquid pollutant from the concentrator, a tubular coupling connected to the outlet orifice for the liquid pollutant for recovery of the pollutant therefrom by pumping, an upper transverse float extending the length of the inlet orifice, and at least one float extending the length of the duct, the cross-sectional area of said duct being substantially constant between the inlet and outlet orifices.

4,057,499

APPARATUS FOR SEPARATION OF BLOOD

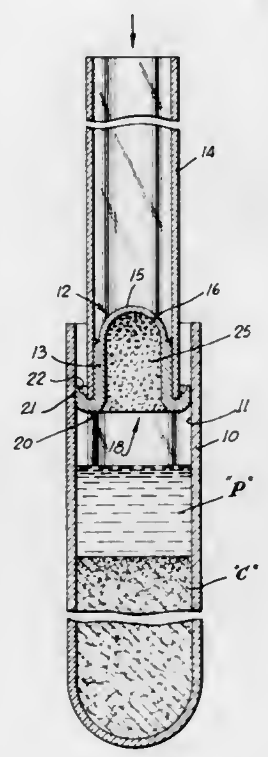
Frank S. Buono, Garfield, N.J., assignor to Becton, Dickinson & Company, East Rutherford, N.J.

Filed Mar. 9, 1973, Ser. No. 339,867

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 24, 1976

Int. Cl. B01d *33/00*

U.S. Cl. 210—136 **13 Claims**



1. A piston assembly for use in separating the liquid phase from the cellular phase of a blood sample in a blood collection tube of the type which is closed at one end and open at the other end which comprises:

a central body member provided with a portion which permits the passage of the liquid phase and with a peripheral projecting flexible flange of greater diameter than the internal diameter of the collection tube and having a smooth lower surface and a radially grooved upper surface so that when the piston assembly is shifted inwardly into the collection tube the lower surface of the flange has sealing wiping engagement with the inner wall of the tube and the liquid phase will be forced through the central body portion to be isolated on the other side of the piston assembly and so that when the piston assembly is shifted outwardly the upper grooved surface of the flange engages the inner wall of the tube whereby air can bypass through the grooves to the inner portion of the collection tube.

4,057,500

EARTH DRAIN

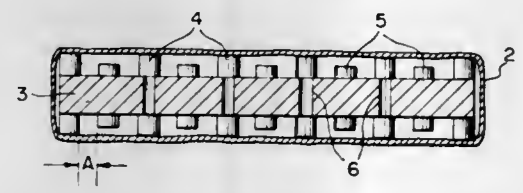
Oleg Wager, Bromma, Sweden, assignor to Burcan International Limited, Dublin, Ireland

Filed July 2, 1976, Ser. No. 702,040

Claims priority, application Canada, July 25, 1975, 232232

Int. Cl.² B01D *29/04;* **E02B** *11/00*

U.S. Cl. 210—170 **8 Claims**



1. An earth drain comprising a core consisting of an elongated web having on at least one surface thereof a first array of discrete, longitudinally and transversely spaced projections of uniform height, and a second array of discrete, longitudinally and transversely spaced projections of a height less than the projections of said first array, the projections of said second array being interspersed amongst projections of said first array, and a filter of sheet-like water permeable material encasing said at least one surface, said projections in said second array being spaced from the adjacent projections in said first array for blocking the approach of the central area of said filter among a group of projections in said first array which surround said central area toward said core under high soil pressure conditions and keeping the spaces between adjacent projections of said first and second arrays free for liquid pressure communication therethrough.

4,057,501

FILTER APPARATUS AND FILTER ELEMENT THEREFOR

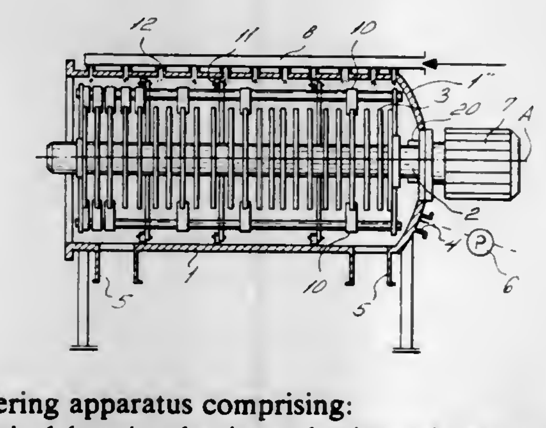
Hans Müller, Im Allmendli, 8703 Erlenbach, Switzerland

Filed June 9, 1976, Ser. No. 694,196

Claims priority, application Switzerland, June 17, 1975, 7963/75; July 11, 1975, 9208/75

Int. Cl.² B01D *33/28*

U.S. Cl. 210—331 **14 Claims**



1. A filtering apparatus comprising:

a cylindrical housing having a horizontal central axis and defining a closed chamber;

means for introducing a liquid carrying particles into said chamber;

a hollow elongated shaft in said chamber;

a plurality of laterally extending arms on said shaft provided with rollers riding on the inside of said housing;

a plurality of generally square and rigid filter supports fixed and spaced longitudinally on said shaft with same passing generally centrally through said supports;

a respective pocket of filter cloth completely and snugly surrounding each of said filter supports, each pocket being formed of a pair of juxtaposed and coextensive generally square filter-cloth panels having three sides permanently joined together and a fourth open side, said shaft passing generally centrally through said pockets;

openable means at each of said pockets joining the respective fourth sides together for forming a filter interior inside each of said pockets, said shaft opening transversely into said interiors;

means for withdrawing liquid from inside said shaft and thereby from said interiors, whereby said particles form filter cake on said panels;

means for rotating said shaft, said supports, said pockets, said arms, and said openable means jointly; and

means for spraying a rinse liquid on said pockets during rotation thereof for washing off said filter cake.

4,057,502

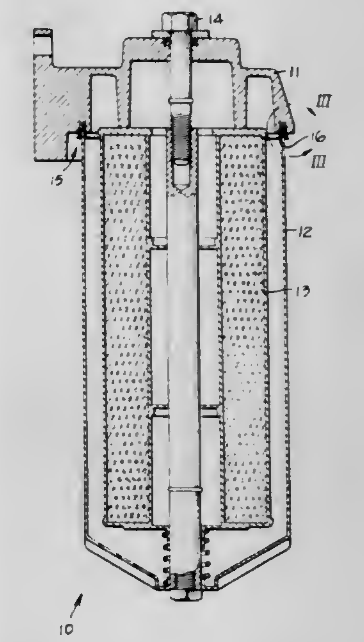
SEAL FOR CARTRIDGE-TYPE FILTER ASSEMBLIES

Albert W. Crumrine, Peoria, and Lawrence F. Fratzke, East Peoria, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Apr. 28, 1976, Ser. No. 680,824

Int. Cl.² C02C *1/14*

U.S. Cl. 210—440 **17 Claims**



1. A filter assembly having an inlet and an outlet comprising

a base having an annular recess defined therein, said recess being generally U-shaped in cross section and defined by a bottom wall and a pair of sidewalls,

a filter mounted on said base and disposed within the confines of said recess,

a substantially impervious case having an open end mounted at said recess on said base, said filter disposed within said case, and

annular sealing means disposed within said recess, between said base and the open end of said case, for automatically centering the open end of said case therein and for applying substantially equal sealing pressures against the bottom and sidewalls defining said recess.

11. A composite annular sealing means disposed in a horizontally disposed plane and adapted for use in filter assemblies and the like comprising;

an annular metallic insert having a generally U-shaped cross section throughout the entire circumferential length thereof and defining an annular top wall disposed in parallel relationship relative to said plane and a pair of radially

spaced sidewalls disposed at different radial distances from a center of said insert and connected to said top wall and disposed in at least generally perpendicular relationship relative to said plane,

an annular elastomeric member, molded as an integral part of said insert, comprising an outer sealing portion disposed exteriorly on said top and sidewalls to define three contiguous sealing surfaces and a plurality of circumferentially disposed slots formed through at least one of the sidewalls of said insert and said elastomeric member.

4,057,503

CONCENTRATES FOR IMPARTING TEMPORARY SOIL RELEASE RESINS IN FABRICS DURING LAUNDERING

Clair Warren Graver, King of Prussia; Clarence Edward Carwheel, Philadelphia, and Charles Joseph Bunczk, Norristown, all of Pa., assignors to Pennwalt Corporation, Philadelphia, Pa.

Filed Oct. 20, 1975, Ser. No. 623,700

Int. Cl.[2] D06M *13/20*

U.S. Cl. 252—8.7 **6 Claims**

1. An acidic aqueous concentrate for dispersion in water for use as the final treatment of a laundering process at a pH of about 4 to about 6.5 to impart temporary soil and stain release properties to fabrics consisting essentially of: acrylic resin — 3 to 10 parts, laundry sour — 3 to 10 parts, coupling and dispersing agent selected from the group consisting of alkyl aryl sulfonates where the alkyl group ranges from C_3 to C_{12} and the aryl group is benzene, naphthalene and diphenyl, alkyl sulfonates where the alkyl group ranges from C_{10} to C_{12}; alkyl sulfates where the alkyl group ranges from C_8 to C_{12}; acids and salts of condensed formaldehyde-naphthalene sulfonates where the salts may be sodium, potassium and ammonium; salts of sulfonated alkylsuccinic acid where the alkyl group ranges from C_4 to C_8 and where the salts are sodium, ammonium and potassium; taurates where the acyl group is oleoyl and coco and the alkyl group is methyl; and sodium and potassium salts of alkylether sulfates where the alkyl group may be C_{12} or C_{13} — 0.5 to 3 parts; fabric finishing agent — 0 to 1 part and water — 93.5 to 76 parts, all parts being by weight.

4,057,504

METHOD OF PREPARING OVERBASED LUBRICATING OIL ADDITIVES

Michio Shiga, Fujisawa; Kimitoshi Hirano, Kawasaki, and Matsuo Matsushita, Yokohama, all of Japan, assignors to Karonite Chemical Co., Ltd., Tokyo, Japan

Filed Nov. 22, 1976, Ser. No. 743,860

Claims priority, application Japan, Dec. 15, 1975, 50-149275

Int. Cl.[2] C10M *1/40, 3/34, 5/22, 7/38*

U.S. Cl. 252—33 **17 Claims**

1. A method for preparing an overbased lubricating oil additive, which comprises the steps of:

I. forming a mixture consisting essentially of (1) an oil-soluble organic acid, or a metal salt thereof, wherein said organic acid is selected from the group consisting of hydrocarbon carboxylic acids and hydrocarbon sulfonic acids wherein the hydrocarbon group has from 8 to 150 carbon atoms, and (2) a compound selected from the group consisting of alkaline earth metal oxides and alkaline earth metal hydroxides, in a lubricating oil as a reaction medium, the metal ratio being in the range of from 2 to 15,

II. adding to said mixture an accelerator composition consisting essentially of

(a) from 0.5 to 1.2 moles of a dihydric alcohol having from 2 to 6 carbon atoms, per one mole of component (2) in said mixture,

(b) from 0.01 to 0.2 moles of an alkyl phenol having from about 4 to 100 carbon atoms in the alkyl groups, per one mole of component (2) in said mixture, and

(c) from 0.1 to 0.6 gram atoms of elemental sulfur, per one mole of component (2) in said mixture,

heating the mixture to a temperature above 120° C and effective to cause the reaction in the liquid phase, until the water formed by the reaction is distilled off; and then

III. blowing carbon dioxide gas into the reaction mixture obtained in step II, at a temperature above 100° C, to transform at least part of the excess of alkaline earth metal into the corresponding carbonate, and distilling off the volatile substances from the reaction product to obtain the overbased lubricating oil additive.

14. An overbased lubricating oil additive prepared by the method of claim 1.

4,057,505

LIQUID CLEANING AND BLEACHING COMPOSITION

Yunosuke Nakagawa, Koshigaya; Kanji Majima, and Sigeyuki Miyamoto, both of Wakayama, all of Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan

Filed July 6, 1976, Ser. No. 702,404

Claims priority, application Japan, July 14, 1975, 50-85961

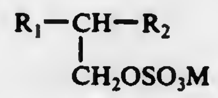
Int. Cl.[2] C11D *9/42*

U.S. Cl. 252—96 **11 Claims**

1. A liquid bleaching detergent composition, consisting essentially of an aqueous solution of:

from 3 to 7 weight percent of sodium, lithium or potassium hypochlorite;

from 0.5 to 8 weight percent of surfactant having the formula



wherein R_1 and R_2 are alkyls having from one to 13 carbon atoms, with the proviso that the total number of carbon atoms of R_1 plus R_2 is from 8 to 14, and M is Li, Na or K;

and the balance is essentially water.

4,057,506

HEAVY-DUTY LIQUID DETERGENT

Steven Lang Sung, Edison, N.J., assignor to Colgate Palmolive Company, New York, N.Y.

Filed Dec. 30, 1975, Ser. No. 645,152

Int. Cl.[2] C11D *3/06, 11/00*

U.S. Cl. 252—135 **7 Claims**

1. In a process for preparing a stable, aqueous, heavy duty liquid detergent containing by weight from about 5% to about 50% water soluble anionic detergent and from about 5% to about 50% builder salt in water, the improvement wherein the builder salt in water is heated at an elevated temperature above about 60° in the presence of a stabilizing amount of fatty acid amide emulsifying agent and thereafter cooling the mixture to below about 40° C, the amount of builder salt dissolved in said water at said elevated temperature being greater than the solubility of said builder salt in water at said lower temperature.

4,057,507

EUROPIUM AND SAMARIUM ACTIVATED RARE EARTH OXYSULFIDE PHOSPHOR

Hajime Yamamoto, Kodaira; Tsuyoshi Kano, Higashiyamato, and Masaki Nakano, Hamura, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Dec. 18, 1975, Ser. No. 642,008

Claims priority, application Japan, Dec. 20, 1974, 49-145572

Int. Cl.[2] C09K *11/46*

U.S. Cl. 252—301.4 S **6 Claims**

1. A rare earth oxysulfide phosphor consisting essentially of a compound of the general formula,

$$\{(Y_u, Gd_{1-u})_{1-x-y-z}Eu_xSm_y(Tb_{1-p}, Pr_p)_z\}_2 \cdot O_2S,$$

wherein $0 \leqq z \leqq 1\times10^{-4}$, $0 \leqq p \leqq 1$, $0 \leqq u \leqq 1$, and x and y satisfy the area B of FIG. 5 defined by a, b, c and d.

4,057,508

X-RAY PHOSPHORS WITH LOW AFTERGLOW

Robert Wade Wolfe, Wysox, and Russell Francis Messier, Furnace, both of Pa., assignors to GTE Sylvania Incorporated, Stamford, Conn.

Filed Dec. 1, 1976, Ser. No. 746,414

Int. Cl.[2] C09K *11/46*

U.S. Cl. 252—301.4 H **6 Claims**

1. An x-ray luminescent composition consisting essentially of an activated host represented by the formula:

$$Ba_{1-x}Sr_xFCl:yEu.aY.bLi$$

wherein x is from 0 to about 0.3 y is from about 0.002 to about 0.2 a is from about 0.001 to about 0.1 b is from 0 to about 0.1, having a smaller afterglow than an X-ray luminescent composition consisting essentially of

$$Ba_{1-x}Sr_xFCl:yEu.$$

4,057,509

POLYGALACTOMANNAN ALLYL ETHER GELS

John R. Costanza, North Plainfield; Ronald N. DeMartino, Wayne, both of N.J., and Arthur M. Goldstein, Plainview, N.Y., assignors to Celanese Corporation, New York, N.Y.

Filed Oct. 26, 1976, Ser. No. 735,668

Int. Cl.[2] B01J *13/00*

U.S. Cl. 252—316 **6 Claims**

1. A gel composition consisting essentially of water, between about 0.05 and 2 weight percent sulfur dioxide, and between about 0.25 and 5 weight percent polygalactomannan allyl ether gum having a degree of substitution between about 0.01 and 3.0.

5. A process for preparing a gel of polygalactomannan allyl ether gum which comprises introducing sulfur dioxide into an aqueous solution of between about 0.25 and 5 weight percent polygalactomannan allyl ether gum having a degree of substitution between about 0.01 and 3.0 in sufficient quantity to increase the viscosity of the aqueous solution to gel formation.

4,057,510

PRODUCTION OF NITROGEN RICH GAS MIXTURES

William B. Crouch, Whittier; Carolina P. Fabiero, Roland Heights, and Allen M. Robin, Anaheim, all of Calif., assignors to Texaco Inc., New York, N.Y.

Filed Sept. 29, 1975, Ser. No. 617,601

Int. Cl.[2] C01B *2/00, 2/14*

U.S. Cl. 252—372 **9 Claims**

1. In the partial oxidation of a hydrocarbonaceous feedstock selected from the group consisting of hydrocarbonaceous fuel, liquid oxygenated hydrocarbonaceous material, and mixtures thereof with air and optionally in the presence of a supplemental temperature moderator in the reaction zone of a free-flow, noncatalytic, unpacked, refractory lined gas generator at a pressure in the range of about 1 to 250 atmospheres and a temperature in the range of about 1300° to 3000° F to produce an effluent gas mixture comprising H_2, CO, H_2O, CO_2, H_2S, COS, N_2 and A, the improvement comprising: reacting said hydrocarbonaceous feedstock containing no metals nor noncombustible materials with air and supplemental H_2O in the range of nil to 1.0 pounds of H_2O per pound of fuel, and wherein the O/C atomic ratio is in the range of 2 to 3.8 when said hydrocarbonaceous feedstock is a gaseous hydrocarbonaceous fuel, and in the range of about 2 to 2.8 when said hydrocarbonaceous feedstock is a liquid hydrocarbonaceous fuel or liquid oxygenated hydrocarbonaceous material; producing an effluent gas mixture substantially comprising N_2, A, and CO_2, and containing at least one gas from the group H_2, CO, H_2O, COS and H_2S, and being free-from particulate carbon, free-oxygen and nitrogen oxides; and removing at least one gas from the group CO_2, H_2O, COS, H_2S, H_2, and CO in a gas drying and purification zone to produce a nitrogen-rich gas mixture.

4,057,511

PROCESS FOR PREVENTING CORROSION AND THE FORMATION OF SCALE IN WATER CIRCULATING SYSTEM

Gerhard Bohnsack, Bergisch-Neukirchen; Hans Geffers; Herbert Kallfass, both of Cologne, and Walter Radt, Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

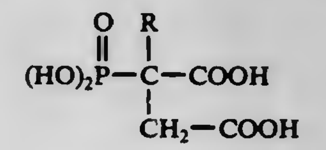
Division of Ser. No. 362,449, May 21, 1973, Pat. No. 3,933,427. This application Nov. 6, 1975, Ser. No. 629,724

Claims priority, application Germany, May 26, 1972, 2225645

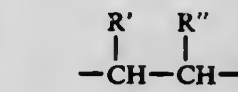
Int. Cl.[2] C23F *11/10, 11/16*

U.S. Cl. 252—389 A **3 Claims**

1. A composition for preventing corrosion and the formation of scale in water-conducting systems which comprises by weight 1 to 20% of a Zn salt, 5 to 30% by weight of H_3PO_4, and the balance of a compound of the formula



wherein R is hydrogen, alkyl, alkenyl, or alkinyl having up to 4 carbon atoms; phenyl; cycloalkyl having 3 to 6 carbon atoms; benzyl; phenethyl or



wherein R′ is hydrogen, alkyl having 1 to 4 carbon atoms or carboxyl, R″ is hydrogen or methyl and R‴ is carboxyl or a water soluble salt thereof.

4,057,512

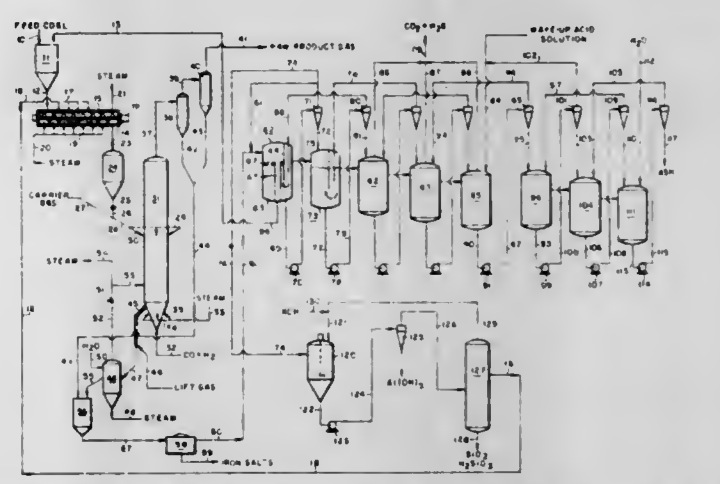
ALKALI METAL CATALYST RECOVERY SYSTEM

Charles J. Vadovic, LaPorte; Robert D. Wesselhoft, and Nicholas C. Nahas, both of Baytown, all of Tex., assignors to Exxon Research & Engineering Co., Linden, N.J.

Filed Sept. 29, 1975, Ser. No. 618,292

Int. Cl.[2] C01D *5/02, 13/00;* **C01F** *7/34;* **C01B** *33/12*

U.S. Cl. 252—413 **16 Claims**



1. A process for the recovery of alkali metal catalyst residues from a mixture of solid particles containing said alkali metal catalyst residues, carbonaceous solids, and ash particles including iron, aluminum and silicon compounds, said mixture being produced by the gasification of carbonaceous solids in the presence of an alkali metal catalyst, which comprises magnetically removing iron constituents from said mixture of solid particles to produce solids of reduced iron content; treating said solids of reduced iron content with an acid solution in

which said alkali metal catalyst residues are soluble and recovering a spent acid solution containing soluble alkali metal compounds, soluble aluminum salts, and soluble silicon compounds; raising the pH of said spent acid solution sufficiently to precipitate said soluble aluminum compounds contained in the spent acid solution as aluminum hydroxide, and thereafter separately recovering said aluminum hydroxide and a solution containing said soluble alkali metal compounds and said soluble silicon compounds.

3. A process as defined by claim 1 wherein said solids of reduced iron content are treated with said acid solution in a multistage countercurrent liquid-solids extraction system.

9. A process as defined by claim 1 including the additional step of separating high carbon content particles having a density less than that of said spent acid solution from low carbon content particles of higher density following the magnetic removal of said iron constituents from said mixture of solid particles.

10. A process as defined by claim 1 including the additional step of heating said solution containing said soluble alkali metal compounds and said soluble silicon compounds, following the precipitation of said soluble aluminum compounds as aluminum hydroxide, to a temperature sufficient to precipitate silicon as orthosilicic acid and recovering an alkali metal solution of reduced silicon content.

4,057,513

HYDROGENATION CATALYST AND PROCESS FOR PREPARING SAME

Wolfgang Biedermann, and Horst Köller, both of Krefeld, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Jan. 23, 1976, Ser. No. 651,994

Claims priority, application Germany, Feb. 14, 1975, 2506348

Int. Cl.^{2} B01J *29/10, 29/20, 29/00*

U.S. Cl. 252—459 **15 Claims**

1. Catalyst comprising cobalt manganese and copper in the form of their oxides, an alkali metal oxide and silicon dioxide, the weight ratio of cobalt to manganese being 25:1 to 1:1, the copper content being 0.01 to 2 percent by weight based on the total weight of catalyst, the amounts of metals in each case being calculated as metals.

7. Process for preparing a catalyst which comprises adding an excess of an aqueous solution of a hydroxide, bicarbonate or carbonate of an alkali metal to an aqueous solution of water-soluble cobalt salts, manganese-(II) salts and copper salts to form a precipitate, adding an aqueous solution of an alkali metal silicate or SiO_2 sol to the precipitate, filtering off the precipitate and washing with water to remove excess alkali metal hydroxide, bicarbonate or carbonate, and thereafter drying and calcining the precipitate.

4,057,514

PROCESS FOR THE PRODUCTION OF GRAPHITE MOLDED ARTICLES OF HIGH ISOTROPY AND HIGH HEAT CONDUCTIVITY

Hans Huschka, Grossauheim, and Franz-Josef Herrmann, Rodenbach, both of Germany, assignors to HOBEG Hochtemperaturreaktor-Brennelement, GmbH, Hanau, Germany

Division of Ser. No. 487,786, July 11, 1974, Pat. No. 4,013,760. This application Aug. 13, 1976, Ser. No. 714,328

Claims priority, application Germany, July 30, 1973, 2338562

Int. Cl.^{2} H01B *1/04*

U.S. Cl. 252—510 **12 Claims**

1. A process of preparing an article containing isotropic pyrolytic carbon particles of high heat conductivity as a filler comprising pyrolyzing a hydrocarbon gas on isotropic carbon granulates to form a deposit of isotropic pyrolytic carbon on the isotropic carbon granulates having a particle size above 100μm, then grinding to form an isotropic carbon powder having a particle size below 100μm and an average particle size larger than 5μm, mixing a binder with the powder filler and then molding an article therefrom.

4,057,515

PERFUME COMPOSITIONS

Harmannus Boelens, Huizen; Jan Theodor Marie Francois Maessen, Naarden, and Leendert Maarten van der Linde, Huizen, all of Netherlands, assignors to N.V. Chemische Fabriek "Naarden", Naarden, Netherlands

Continuation of Ser. No. 8,729, Feb. 4, 1970, abandoned. This application Apr. 17, 1975, Ser. No. 569,317

Claims priority, application Netherlands, Feb. 4, 1969, 6901750

Int. Cl.^{2} A61K *7/46;* **C07C** *45/00*

U.S. Cl. 252—522 **3 Claims**

1. A perfume composition comprising conventional perfume constituents and an effective amount of 4-(tricyclodecylidene)-butanal-1 to impart a fruity-green, muguet-like note.

2. A perfume composition comprising conventional perfume constituents and an effective amount of 4-(tricyclodecenylidene)-butanal-1 to impart a fruity-green, muguet-like note.

3. A perfume composition conprising conventional perfume constitutents and an effective amount of 4-(decalinylidene-2')-butanal-1 to impart a fruity-green, muguet-like note.

4,057,516

PREPARING PERFUMED COMPOSITIONS CONTAINING 8-ALLYL-8-HYDROXYTRICYCLO[5,2.1.0^{2,6}]DECANE ALONE OR COMBINED WITH O-HYDROXYBENZYL ETHYL ETHER

Harmannus Boelens, Huizen, and Hendrik Jacob Wobben, Naarden, both of Netherlands, assignors to Naarden International, N.V., Naarden-Bussum, Netherlands

Filed Nov. 25, 1975, Ser. No. 635,213

Claims priority, application Netherlands, Nov. 27, 1974, 7415485

Int. Cl.^{2} C11B *9/00*

U.S. Cl. 252—522 **4 Claims**

1. A process for the production of perfume compositions comprising adding to perfume components usual for this purpose at least one compound reminiscent of castoreum selected from the group consisting of 8-allyl-8-hydroxytricyclo (5,2,1,0^{2,6}) decane in a quantity of at least 100 ppm of the composition and mixtures of o-hydroxybenzyl ethyl ether and 8-allyl-8-hydroxytricyclo (5,2,1,0,^{2,6}).

4,057,517

SYNTHETIC RESIN FUNGICIDAL PAINT COMPRISING 1,3-DITHIOLO-(4,5-B)PYRAZIN-2-YLIDENE-PROPANEDINITRILE 4-OXIDE

Craig E. Mixan; Christian T. Goralski, and R. Garth Pews, all of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 649,175, Jan. 15, 1976. This application Nov. 10, 1976, Ser. No. 740,632

Int. Cl.^{2} C08L *91/00*

U.S. Cl. 260—22 R **2 Claims**

1. A fungicidal paint comprising a substantially water-insoluble synthetic resinous binder selected from the group consisting of acrylates, alkyd-modified acrylates, polyvinyl acetate-acrylate copolymer, alkyds and oil-modified alkyds in combination with from about 0.25 to about 5 weight percent of 1,3-dithiolo (4,5-b) pyrazine-2-ylidene-propanedinitrile 4-oxide.

4,057,518

PROCESS FOR THE MANUFACTURE OF HEAT RESISTANT MULTICELLULAR MATERIALS

René Angleraud, Feyzin, and Pierre Ledru, Lyon, both of France, assignors to Rhone-Poulenc Industries, Paris, France

Filed Apr. 17, 1975, Ser. No. 569,316

Claims priority, application France, Apr. 19, 1974, 74.13693; Nov. 13, 1974, 74.37431

Int. Cl.^{2} C08J *9/18, 9/22*

U.S. Cl. 260—2.5 N **7 Claims**

1. Process for the manufacture of a multicellular material which comprises preparing pre-expanded granules of:

1. a prepolymer which is a product of reaction of N,N'-4,4'-diphenylmethane-bis-maleimide and 4,4'-diaminodiphenylmethane, the ratio

$$\frac{\text{number of double bonds in the bis-maleimide}}{\text{number of } -NH_2 \text{ groups in the diamine}}$$

being from about 1 to about 5;

2. a flowing agent; and

3. a cell-control agent;

the degree of expansion of which is a maximum of 90%, placing these granules in a mould and effecting complete expansion and thermo-setting of the polymer by heating.

4,057,519

SODIUM SILICATE EXTENDED POLYURETHANE FOAM

John E. Summers, McMurray, and John F. Hadley, Bradford Woods, both of Pa., assignors to H. H. Robertson Company, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 503,288, Sept. 5, 1974, abandoned. This application Dec. 15, 1975, Ser. No. 641,077

Int. Cl.^{2} C08G *18/38, 18/14*

U.S. Cl. 260—2.5 AK **5 Claims**

1. A process for producing a rigid foam structure having a density of 1.5 to 4.5 pounds per cubic foot and a K-factor less than 0.26 which comprises reacting together as a foam forming formulation

A. a hydroxyl-terminated polyester having a viscosity greater than 100,000 cps at 25° C;

B. an organic polyisocyanate prepolymer or quasi-prepolymer prepared by reacting at least one polyol with an excess of organic polyisocyanate;

C. aqueous sodium silicate having a weight ratio of SiO_2/Na_2O of 2.4 to 3.0 and an aqueous content of 25 to 75 percent by weight;

wherein at least one of the three components (A, B, C) contains a dissolved halogenated alkane blowing agent;

in the presence of a surfactant and a catalyst for the reaction of —OH and —N=C=O radicals; and

wherein the weight of said aqueous alkali metal silicate constitutes from 30 to 60 percent of the components.

2. A homogeneous polyurethane foam, essentially free of uncombined water, formed by the process of claim 1.

3. The process of claim 1 wherein the said foam forming formulation includes 0.5 to 5.0 percent by weight of an organic condensable resin selected from the class consisting of melamine-formaldehyde, urea-formaldehyde and methylolated melamine-formaldehyde; and also includes a catalyst for the condensation of melamine resins.

4,057,520

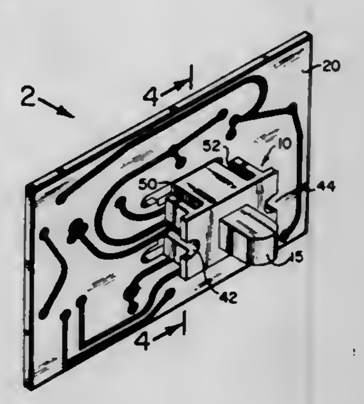
SLIDE SWITCH ASSEMBLY HAVING FLEXIBLE HOUSING WITH MOVABLE CONTACTS MOUNTED ON PRINTED CIRCUIT BOARD

Edwin L. Schwartz, Los Angeles, Calif., assignor to Rite Autotronics Corporation, Los Angeles, Calif.

Filed Oct. 5, 1976, Ser. No. 729,780

Int. Cl.^{2} H01H *15/04, 9/02*

U.S. Cl. 200—16 D **4 Claims**



1. A switching device for selectively connecting a first contact point on a printed circuit board or the like, with at least one other contact point thereon, said switching device being adapted for mounting through slots in the printed circuit board and comprising:

at least one electrically conductive slide contact member;

a housing having side members extending below the body thereof such that said side members may be inserted through respective slots in the printed circuit board, and having at least one cavity formed therein for mounting said slide contact member so that when said side members are inserted through said slots, a segment of said slide contact member contacts the surface of the printed circuit board, and with the length of said segment of the slide contact member and the spacing and position of said contact points being such that said first contact point may be selectively connected to at least one other contact point by the movement of said side members along said slots; and

said side members each including an outwardly protruding lateral lip formed along the end thereof remote from the main portion of the housing and wherein the spacing between the side members relative to that of said slots in such that when the side members are projected through the slots the lips engage the underside of the printed circuit board contiguous to the outer edges of the slots, and said side members each being defined by spaced slots in the side wall of the housing body and are sloped outward from the vertical to the edges of said slots so that when inserted into said slots they provide pressure against the edges thereof.

4,057,521

ABSORBENT ARTICLES MADE FROM CARBOXYLIC SYNTHETIC POLYELECTROLYTES HAVING COPOLYMERIZED N-SUBSTITUTED ACRYLAMIDE CROSSLINKER

James R. Gross, Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Filed Aug. 5, 1974, Ser. No. 494,439

Disclosure was also published under second Trial Voluntary Protest Program on April 13, 1976 as document No. B 494439.

Int. Cl.^{2} C08F *220/34*

U.S. Cl. 260—29.6 HN **6 Claims**

1. A solution useful to form water swellable articles of a carboxylic synthetic polyelectrolyte upon curing which comrpises

1. a solvent selected from the group consisting of water, lower alcohols and mixtures thereof,

2. about 5 to about 60 percent by weight based on (1) of a

crosslinkable carboxylic copolymer which contains in the copolymer

A. about 25 to about 98 percent by weight based on the total weight of the copolymer of units derived from an alkali metal salt of an olefinically unsaturated monosulfonic or monocarboxylic acid;

B. about 2 to about 50 percent by weight of an olefinically unsaturated monocarboxylic acid; and

C. about 0.1 to about 5.0 percent by weight of an N-substituted acrylamide or methacrylamide wherein the substituent group is a hydroxy methylene or an alkoxymethylene group having 1-8 carbons having the formula $H_2C=CR-C(O)-NHCH_2-O-R'$ wherein R is selected from hydrogen or methyl and R' is hydrogen or an alkyl group of 1-8 carbons.

4,057,522

LIQUID ADHESIVE COMPOSITION

Kiyoji Naruse, Yokkaichi, and Tadashi Ito, Ibaraki, both of Japan, assignors to Kiyoji Naruse, Yokkaichi, Japan

Filed Feb. 26, 1976, Ser. No. 661,824

Claims priority, application Japan, Feb. 27, 1975, 50-24305; Feb. 27, 1975, 50-24304

Int. Cl.² C08L *91/00*

U.S. Cl. 260—28.5 AS **7 Claims**

1. A liquid adhesive composition in the form of an aqueous emulsion, which is prepared by kneading a mixture of (a) a substantially atactic polypropylene having an average molecular weight of approximately 3,000 to approximately 30,000, (b) 0.03 to 0.5 part by weight, based on 1 part by weight of said polypropylene, of a polyvinyl alcohol having a saponification degree of at least 70% and (c) approximately 0.05 to 2.0 parts by weight of water based on 1 part by weight of the polyvinyl alcohol, and then, dispersing the kneaded mixture in water.

4,057,523

STABLE, AGED, COATING COMPOSITION

Werner Josef Blank, Stamford, Conn., assignor to American Cyanamid Company, Stamford, Conn.

Continuation of Ser. No. 130,524, April 1, 1971, abandoned. This application Jan. 18, 1973, Ser. No. 324,687

Int. Cl.² C08L *61/20*

U.S. Cl. 260—29.4 UA **7 Claims**

1. A stable, aged composition suitable for depositing a coating by electrophoresis comprising: an aqueous dispersion of a mixture of from about 2% to about 60%, by weight, of (A) a polymeric, water insoluble, substantially fully etherified polymethylol melamine or guanamine, said polymeric material having at least 70% of its molecular weight above about 1,000 and at least 40% of its molecular weight above about 3,000 by weight, and correspondingly from about 98% to about 40% of (B) a water dispersible non-gelled polymeric material carrying an ionic charge which polymeric material contains at least one class of reactive groups selected from the group consisting of carboxyl groups, alcoholic hydroxy groups and amide groups wherein the amount of said groups is at least about 3%, by weight, and not more than about 30%, by weight, based on the total weight of said polymeric material; wherein said groups are heat reactive with (A) and wherein said percentages of (A) and (B), by weight, total 100% and are based on the total solids weight of (A) and (B).

4,057,524

EPOXY DERIVATIVE COMPOSITIONS

William R. Menyhert, Rte. 1 Box 97, Easton, Md. 21601

Continuation-in-part of Ser. No. 456,238, March 29, 1974, abandoned. This application Feb. 2, 1976, Ser. No. 654,720

Int. Cl.² C08L *33/02*

U.S. Cl. 260—29.2 EP **32 Claims**

1. The process for stabilizing the velocity of the primary reaction of an epoxide having at least one oxirane group in an aqueous system which comprises:

passing said epoxide into a reaction zone including an aqueous liquid and carbon dioxide for generating resonance of the oxirane oxygen of said epoxide when it contacts said carbon dioxide,

contacting said epoxide with said carbon dioxide to stabilize said epoxide by equalizing the reactivity rates of the alpha and beta carbon atoms of said oxirane group in the subsequent primary reaction of said epoxide in aqueous phase, and

passing said stabilized epoxide into said aqueous liquid.

4,057,525

METHODS FOR PREPARING STABLE SILICA SOLS AND INORGANIC COATING COMPOSITIONS

Kiyoshi Kikuchi, Hiratsuka; Takeo Okano, Zama; Yukio Terakawa, and Akira Nishihara, both of Tokyo, all of Japan, assignors to Kowa Chemical Industry Ltd., Japan

Filed Mar. 15, 1976, Ser. No. 667,141

Claims priority, application Japan, Mar. 20, 1975, 50-33879; Nov. 11, 1975, 50-135294

Int. Cl.² C08L *61/28*

U.S. Cl. 260—29.4 R **15 Claims**

2. An inorganic coating composition consisting essentially of a stable silica sol, as binder, which is prepared by adding at least one dihydric long chain alcohol having at least 3 carbon atoms, a small amount of a water-soluble melamine resin and an acrylic resin emulsion, to a silica sol having a silica content of about 30% by weight; a mixture of pigment, aggregate and filler in a quantity corresponding to a weight ratio of said silica sol to said mixture of 1 : 2-20; usual additives for coating material in a suitable quantity; and water.

4,057,526

PROCESS FOR PREPARING FROST RESISTANT CONCRETE

Poppe de Rook, Monnickendam, Netherlands, assignor to Akzo N.V., Arnhem, Netherlands

Filed May 6, 1976, Ser. No. 683,958

Claims priority, application Netherlands, May 12, 1975, 7505525

Int. Cl.² C04B *7/35*

U.S. Cl. 260—29.6 S **12 Claims**

1. In a process for the preparation of a frost resistant concrete, in which process a volume percentage of gas in a finely divided form is incorporated in a fresh concrete mixture which is subsequently allowed to cure, the improvement which comprises adding the gas to the mixture while it is entrapped in spheres of a synthetic polymer which is inert under the curing conditions, the dimensions of the spheres being in the range of about 10 to 100 μm and the amount in which they are added in the range of 0.01 to 0.1% by weight, calculated on the dry cement weight.

4,057,527

AQUEOUS ACRYLATE CONTACT ADHESIVE DISPERSIONS

Peter Spiros Columbus, Whitestone, N.Y., assignor to Borden, Inc., Columbus, Ohio

Continuation of Ser. No. 475,222, June 17, 1974, abandoned. This application May 14, 1976, Ser. No. 686,469

Int. Cl.² C08L *33/02*

U.S. Cl. 260—29.6 WB **8 Claims**

1. An aqueous contact adhesive dispersion composition having pH of 3 to 10 which, on drying at room temperature, remains tacky to itself but otherwise becomes non-tacky, comprising, on 100 parts by weight basis, 25 to 75 parts of water having dispersed therein:

A. 25 to 70 parts of a water insoluble binder polymer with a Tg between about $-20°$ C and $+15°$ C which is a reaction product of (a), (b), (c) and (d), as defined below:

a. 50 to 99% by weight of the polymer, of an acrylate monomer or a mixture thereof having the following structural formula:

$$CH_2=\overset{R^1}{\overset{|}{C}}-\overset{O}{\overset{\|}{C}}-OR^2$$

wherein R¹ is selected from H and a lower alkyl group of 1 to 4 carbon atoms and R² is selected from alkyl groups of 1 to 8 carbon atoms;

b. 0.1 to 10% by weight of the polymer, of N-methylol acrylamide or N-methylol methacrylamide;

c. 0.1 to 25% by weight of the polymer, of acrylic acid or methacrylic acid;

d. 2 to 40% by weight of the polymer, of acrylonitrile or methacrylonitrile;

B. an effective amount and up to 3 parts by weight of the composition, of an alkali metal or ammonium salt of a polyacrylic acid to thicken the composition; and

C. an effective amount but not exceeding about 3 parts by weight of the composition, of a surface active agent to impart freeze-thaw stability to the composition.

4,057,528

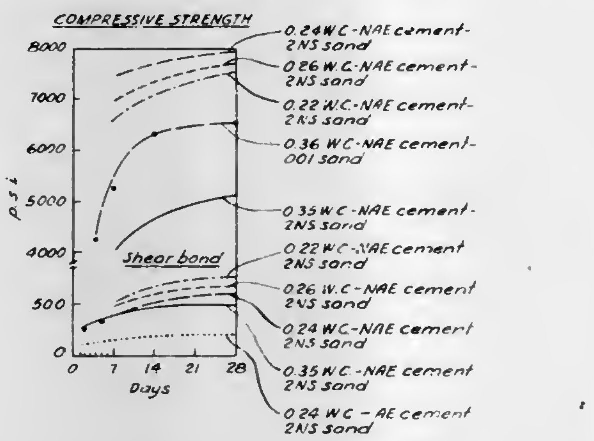
PROCESS FOR REPAIRING CONCRETE STRUCTURES USING PNEUMATICALLY SPRAYABLE CEMENT MORTAR COMPOSITIONS CONTAINING PORTLAND CEMENT, MINERAL AGGREGATE, A STYRENE-BUTADIENE COPOLYMER LATEX AND WATER

David A. Hunt, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Apr. 19, 1976, Ser. No. 678,280

Int. Cl.² C08L *9/10*

U.S. Cl. 260—29.7 S **8 Claims**



1. In the process of repairing concrete structures by applying a cement mortar thereto the improvement consisting of pneumatically applying to the concrete structure to be repaired, a mixture of a substantially non-air entraining portland cement, mineral aggregate, a styrene-butadiene copolymer latex having a styrene to butadiene weight ratio of from about 30:70 to about 70:30, said copolymer being present on a solids basis in an amount of from about 5 to about 25 percent by weight of cement, and from about 0.1 to 5 percent of a polyorganosiloxane foam depressant based on the weight of active polyorganosiloxane, while maintaining the ratio of total water to cement in such mixture at a value of from 0.22 to 0.26.

4,057,529

RUBBER COMPOSITIONS HAVING IMPROVED ADHESION AFTER THERMAL AGING

Thomas J. Leo, Yardley, Pa.; Thomas N. Loser, Princeton, N.J., and Michael J. Reynolds, Morrisville, Pa., assignors to Wyrough and Loser, Inc., Trenton, N.J.

Filed Feb. 27, 1976, Ser. No. 662,050

Int. Cl.² C08K *3/20, 5/09;* **C09K** *15/04, 15/32*

U.S. Cl. 260—42.47 **38 Claims**

1. A rubber composition comprising a highly unsaturated rubber, a magnesium compound capable of donating electrons and a carboxylated cobalt oxy metal complex comprising at least one metal atom selected from Groups IIIA, IIIB, IVA, IVB, VA and VB of the Periodic Table, at least one cobalt atom, said metal and cobalt atoms being linked through oxygen atoms, at least one acyloxy radical attached to a cobalt atom, and any residual valences of said complex being satisfied by acyloxy, aryloxy or alkoxy radicals, said magnesium compound and said cobalt complex being used in small amounts which are sufficient for obtaining a high level of adhesion between the rubber and a metal surface and improving the retention of such adhesion after thermal aging.

13. A method for improving the retention of adhesion after thermal aging of a rubber composition to a metal surface comprising compounding a highly unsaturated rubber with a magnesium compound capable of donating electrons, and a carboxylated cobalt oxy metal complex comprising at least one metal atom selected from Groups IIIA, IIIB, IVA, IVB, VA and VB of the Periodic Table, at least one cobalt atom, said metal and cobalt atoms being linked through oxygen atoms, at least one acyloxy radical attached to a cobalt atom, and any residual valences of said complex being satisfied by acyloxy, aryloxy or alkoxy radicals, said magnesium compound and said cobalt complex being used in small amounts which are sufficient for obtaining a high level of adhesion between the rubber and the metal surface and improving the retention of such adhesion after thermal aging,

and contacting the rubber composition with the metal surface.

27. A composition comprising a magnesium compound capable of donating electrons and a carboxylated cobalt oxy metal complex comprising at least one metal atom selected from Groups IIIA, IIIB, IVA, IVB, VA and VB of the Periodic Table, at least one cobalt atom, said metal and cobalt atoms being linked through oxygen atoms, at least on acyloxy radical attached to a cobalt atom, and any residual valences of said complex being satisfied by acyloxy, aryloxy or alkoxy radicals, said magnesium compound and said cobalt complex being used in small amounts which are sufficient for obtaining a high level of adhesion between a highly unsaturated rubber and a metal surface and improving the retention of such adhesion after the thermal aging when the composition is used in the rubber.

4,057,530

2-PHENYL-INDOLE DERIVATIVES AND PROCESS FOR PREPARING THE SAME

Charles Pigerol, Saint-Ouen; Paul de Cointet de Fillain, Sisteron; Souli Nanthavong, Grenoble, and Jacques Le Blay, Luisant, all of France, assignors to Labaz, Paris, France

Filed June 2, 1975, Ser. No. 582,915

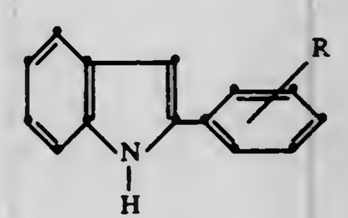
Claims priority, application France, June 18, 1974, 74.21042

Int. Cl.² C07D *209/04, 209/14, 209/18;* **C08K** *5/34*

U.S. Cl. 260—45.8 N **9 Claims**

1. New stabilizers of polyvinyl chloride and co-polymers of vinyl chloride, the said stabilizers being 2-phenyl-indole derivatives corresponding to the following general formula:

I

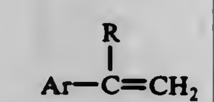


wherein R represents a phenyl group, an amino group, optionally substituted by an acetyl or benzoyl group, a mercapto group, optionally substituted by a branched- or straight-chain alkyl group containing from 1 to 12 carbon atoms or by a cyclohexyl radical, a carboxyl radical, a group R_1O-, wherein R_1 represents an atom of hydrogen, an isopropyl, carboxymethyl, carbethoxymethyl, carbethoxyisopropyl, acetyl, docosanoyl, benzoyl, benzyl, or allyl radical or a branched- or

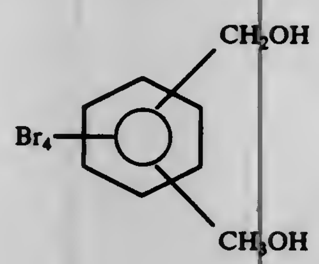
straight-chain alkyl radical containing from 6 to 12 carbon atoms.

4,057,531
FIRE RETARDANT POLYSTYRENE
Michael Dubeck, Birmingham, and David R. Brackenridge, Royal Oak, both of Mich., assignors to Ethyl Corporation, Richmond, Va.
Continuation-in-part of Ser. No. 363,789, May 25, 1973, which is a continuation-in-part of Ser. No. 70,922, Sept. 9, 1970, abandoned. This application Jan. 31, 1977, Ser. No. 764,044
Int. Cl.² C08K *5/05*
U.S. Cl. 260—45.95 R **3 Claims**

1. A flame retardant polystyrene composition comprising (i) a solid polymer of

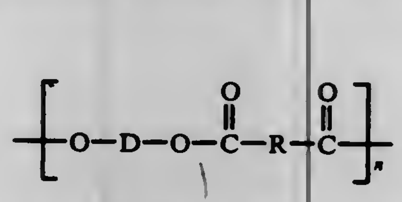


wherein Ar is a benzene or toluene nucleus, and R is —H or —CH_3; and (ii) a flame retardant amount of a compound having the formula



4,057,532
SELF-EXTINGUISHING, NON-DRIPPING, PHENOLPHTHALEIN POLYESTER MOLDING COMPOSITIONS
Lowell Saferstein, Piscataway, and Robert W. Stackman, Morristown, both of N.J., assignors to Celanese Corporation, New York, N.Y.
Filed Feb. 27, 1976, Ser. No. 662,055
Int. Cl.² C08G *63/12*
U.S. Cl. 260—47 C **10 Claims**

1. A flame retardant polyester of the recurring structural formula

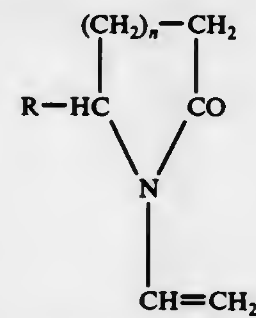


wherein D is a divalent radical remaining after removal of hydroxyl groups from a diol mixture comprising from about 25 to about 60 mole percent of phenolphthalein and correspondingly about 75 to about 40 mole percent of ethylene glycol; and R is a divalent radical remaining after the removal of carboxyl groups from a dicarboxylic acid selected from the group consisting of isophthalic acid, terephthalic acid, and mixtures thereof, and n equals at least 10.

4,057,533
PROCESS FOR PREPARATION OF QUATERNIZED CATIONIC VINYLLACTAM-ACRYLAMIDE COPOLYMERS
Eugene V. Hort, Piscataway, N.J., and Earl P. Williams, Pen Argyl, Pa., assignors to GAF Corporation, New York, N.Y.
Continuation-in-part of Ser. No. 268,840, July 3, 1972, abandoned, and a continuation-in-part of Ser. No. 27,171, April 9, 1970, abandoned. This application Oct. 29, 1975, Ser. No. 627,017
Int. Cl.² C08F *8/32, 8/34*
U.S. Cl. 260—67.5 **8 Claims**

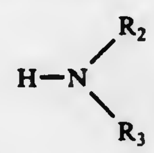
1. The process which comprises the steps sequentially in combination:

A. copolymerizing between about 30 and 95 percent by weight of a N-vinyllactam having the formula:



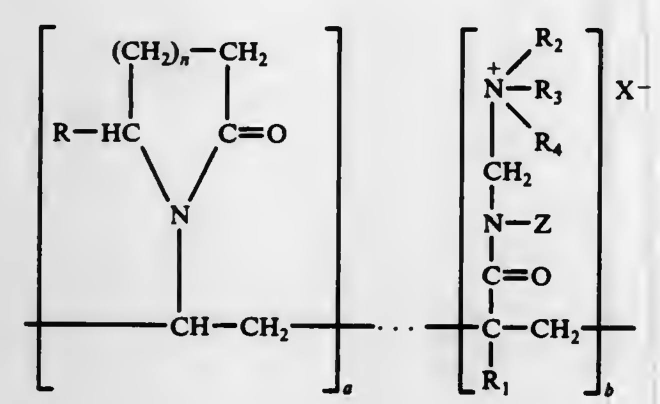
wherein R is hydrogen, methyl or ethyl and *n* is an integer of 1 to 3, with between about 5 and about 70 percent by weight of acrylamide or methacrylamide in a nonacidic aqueous solution in the presence of a free radical catalyst at a temperature of between about 25° and about 150° C.;

B. reacting the resulting copolymer with formaldehyde and a secondary amine having the formula:

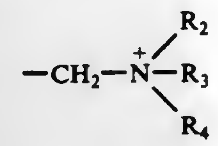


wherein R_2 and R_3 are independently selected from the group consisting of alkyl having from 1 to 4 carbon atoms, hydroxyalkyl having from 1 to 4 carbon atoms and together may represent morpholine, to produce the corresponding cationic vinyllactam-acrylamide copolymer; and

C. quaternizing the cationic polymer by reacting with a compound selected from the group consisting of a benzyl halide, an alkyl halide having from 1 to 6 carbon atoms, an alkyl sulfate having from 1 to 6 carbon atoms, an alkyl ester of sulfonic acid having from 1 to 6 carbon atoms and mixtures thereof to produce a quaternized copolymer having a K value less than 200 consisting essentially of the following recurring units in primarily random distribution:



wherein R, R_2, R_3 and *n* are as defined above; R_1 is selected from the group consisting of hydrogen and methyl; R_4 is selected from the group consisting of alkyl having 1 to 6 carbon atoms and benzyl radicals in an amount of 10 to 100% by weight and hydrogen in an amount of 0 to 90% by weight; X represents an anion; Z is selected from the group consisting of hydrogen and



wherein R_2, R_3, and R_4 are as defined above; *a* represents from 30 to 95 percent by weight of the lactam moiety in the copolymeric product; *b* represents from 5 to 70 percent by weight of the acrylamide moiety in said copolymeric product.

4,057,534
METHOD FOR PREVENTING SCALE FORMATION IN A CONTINUOUS ESTER-INTERCHANGE REACTION FOR PRODUCTION OF POLYESTERS
Tadashi Konishi, and Masashi Kuno, both of Matsuyama, Japan, assignors to Teijin Limited, Osaka, Japan
Filed Apr. 19, 1976, Ser. No. 678,390
Claims priority, application Japan, Apr. 23, 1975, 50-48570
Int. Cl.² C08G *63/14, 63/16*
U.S. Cl. 260—75 R **8 Claims**

1. A method for preventing scale formation in a continuous ester-interchange reaction for the production of polyesters, which comprises subjecting a dialkyl ester of a difunctional carboxylic acid at least 80 mol% of which consists of terephthalic acid and at least one glycol to a continuous ester-interchange reaction in the presence of a catalytic amount of an ester-interchange reaction catalyst composed of a manganese compound selected from the group consisting of manganese halides, manganese oxides and organic acid salts of manganese and a lithium compound selected from the group consisting of lithium acetate, lithium borate, lithium bromide, lithium carbonate, lithium chloride, lithium fluoride, lithium hydride, lithium hydroxide and lithium sulfate, the amount of said ester-interchange reaction catalyst satisfying the following expressions (i) and (ii)

(i) $0.015 < X + Y < 0.2$

(ii) $0.2 \leqq Y/(X + Y) \leqq 0.7$

wherein X is the amount in moles of said manganese compound based on said dialkyl ester, and Y is the amount in moles of said lithium compound based on said dialkyl ester.

4,057,535
ADHESIVE FOR GLUING TOGETHER SOFT BODY TISSUES
Tatyana Esperovna Lipatova, ulitsa Vladimirskaya, 51/53, kv. 22; Roman Alexandrovich Veselovsky, Kharkovskoe shosse, 21/3, kv. 179, and Georgy Alexandrovich Pkhakadze, ulitsa Nikolskobotanicheskaya, 3, kv. 8, all of Kiev, U.S.S.R.
Filed Apr. 14, 1976, Ser. No. 676,989
Int. Cl.² C08G *18/32;* **A61K** *31/74;* **A61L** *17/00;* **C08G** *18/18*
U.S. Cl. 260—77.5 AC **6 Claims**

1. An adhesive for gluing together soft body tissues, which has the following composition, wt.%:
aromatic diisocyanate, from 1 to 50
macrodiisocyanate of the general formula

$$NCO{-}R{-}NH\underset{\underset{O}{\|}}{C}O{-}R'{-}NH\underset{\underset{O}{\|}}{C}O{-}R{-}NCO,$$

where
R is an aromatic diisocyanate radical
R′ is a polyether or polyester radical, from 98.9 to 30
2,4,6-tris(dimethylaminomethyl)phenol, from 0.1 to 20.

4,057,536
PROCESS FOR PREPARING WHOLLY AROMATIC POLYAMIDES BY MIXING SOLID PARTICULATE REACTANTS AND POLYMERIZING
Rufus S. Jones, Jr., Randolph, N.J., assignor to Celanese Corporation, New York, N.Y.
Filed Jan. 14, 1976, Ser. No. 648,986
Int. Cl.² C08G *69/32*
U.S. Cl. 260—78 R **11 Claims**

1. A process for the preparation of a wholly aromatic polyamide from an aromatic diamine and an aromatic diacid halide comprising:

a. mixing solid particulate diamine and solid particulate aromatic diacid halide in the substantial absence of oxygen and in the absence of a solvent or diluent therefor to obtain a uniform stoichiometrically balanced solids mixture; and

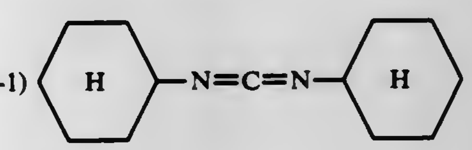
b. thereafter polymerizing the resulting uniform solids mixture in an amide solvent to obtain said wholly aromatic polyamide having an inherent viscosity of at least above about 0.7 to about 6.0, said inherent viscosity being measured on a solution of 0.4 grams of polyamide per 100 cc. of concentrated H_2SO_4 at 25° C.

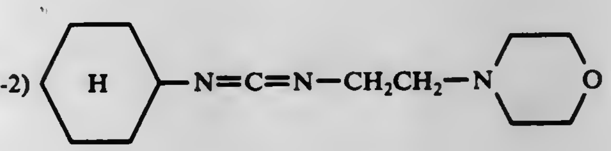
4,057,537
COPOLYMERS OF L-(−)-LACTIDE AND EPSILON CAPROLACTONE
Richard G. Sinclair, Columbus, Ohio, assignor to Gulf Oil Corporation, Pittsburgh, Pa.
Filed Jan. 28, 1975, Ser. No. 544,788
The portion of the term of this patent subsequent to Aug. 30, 1994, has been disclaimed.
Int. Cl.² C08G *63/08*
U.S. Cl. 260—78.3 R **6 Claims**

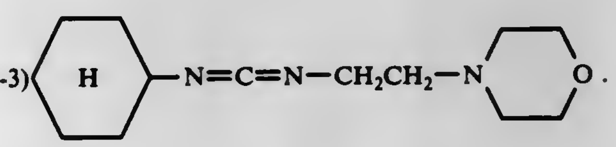
1. A non-gummy, high impact, non-brittle, thermally stable copolymer of an optically active lactide and epsilon caprolactone, said copolymer being obtained by heating a mixture of L-(−)-lactide having a melting point below 100° C. and epsilon caprolactone at a temperature above the melting point of L-(−)-lactide and below 200° C. in the presence of a catalyst, said mixture comprising about 75 to about 90 percent by weight of L-(−)-lactide.

4,057,538
METHOD FOR HARDENING GELATIN
Teiji Habu; Tsuneo Wada; Takashi Sasaki; Shigemasa Itoh; Takayoshi Ohmura; Hiroki Ishii, and Hisashi Yamaguchi, all of Hino, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan
Filed Feb. 12, 1975, Ser. No. 549,329
Claims priority, application Japan, Feb. 13, 1974, 49-17942
Int. Cl.² C09H *7/00*
U.S. Cl. 260—117 **6 Claims**

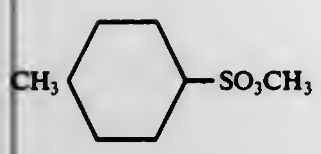
1. A method for hardening gelatin, which comprises treating said gelatin with a combination of a compound selected from the group consisting of:

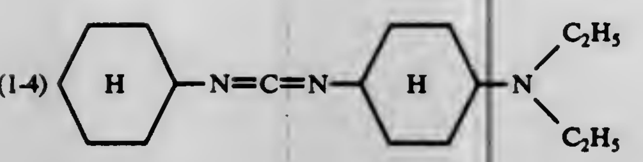
(I-1) 

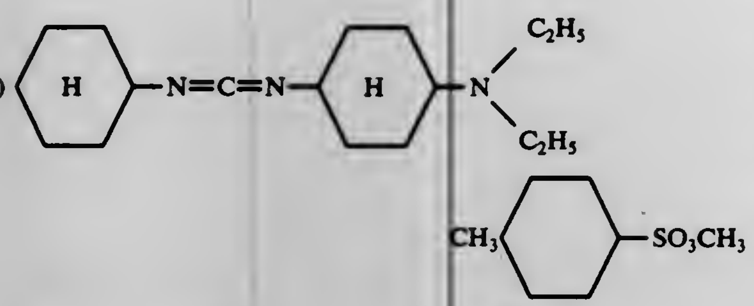
(I-2) 

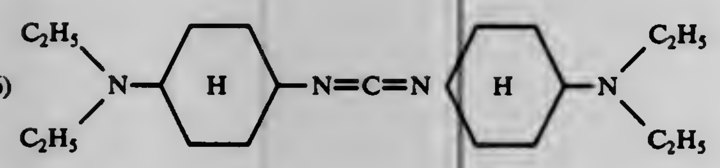
(I-3) 

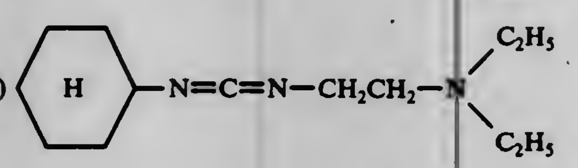
-continued

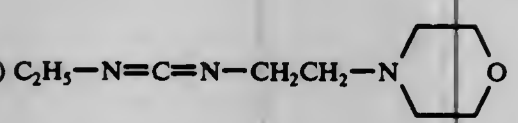


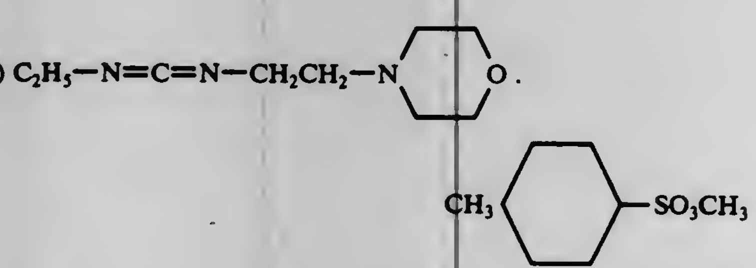
(I-4) 

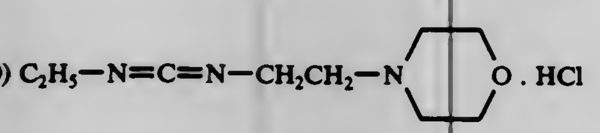
(I-5) 

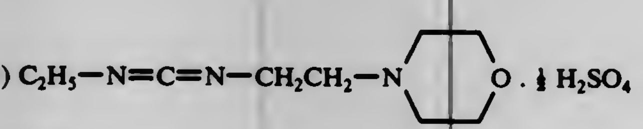
(I-6) 

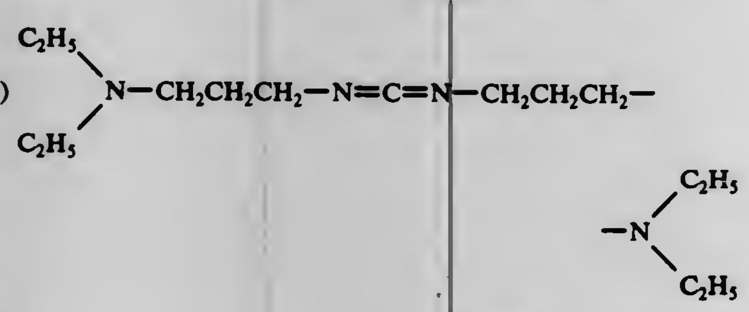
(I-7) 

(I-8) 

(I-9) 

(I-10) 

(I-11) 

(I-12) 

(I-13) $C_2H_5-N=C=N-CH_2CH_2CH_2-N(CH_3)_2$

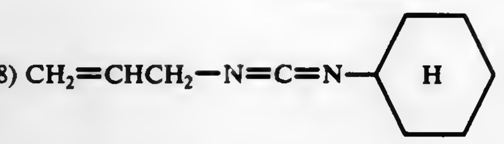
(I-14) $(CH_3)_2CH-N=C=N-CH(CH_3)_2$

(I-15) $CH_2=CHCH_2-N=C=N-CH_2CH_3$

(I-16) $CH_2=CHCH_2-N=C=N-CH(CH_3)_2$

(I-17) $CH_2=CHCH_2-N=C=N-CH_2CH=CH_2$

-continued

(I-18) 

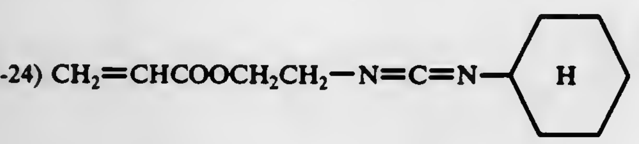
(I-19) $CH_2=CHCH_2-N=C=N-CH_2CH_2CH_2-N(CH_3)_2$

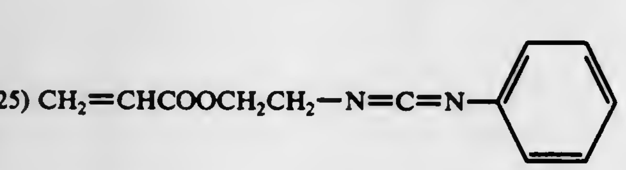
(I-20) $CH_3OCH_2CH_2CH_2-N=C=N-CH_2CH_3$

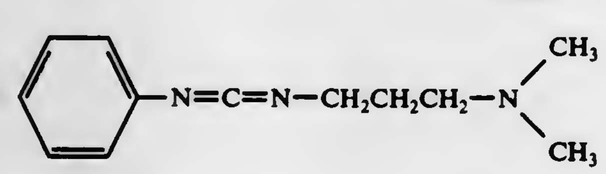
(I-21) $CH_3OCH_2CH_2CH_2-N=C=N-CH_2CH_2SCH_2CH_3$

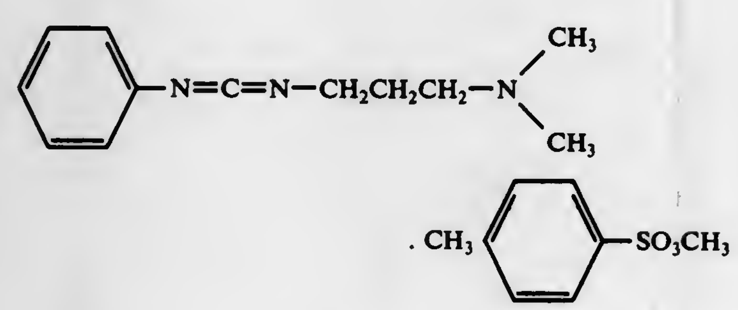
(I-22) $CH_2=CHCOOCH_2CH_2-N=C=N-C_2H_5$

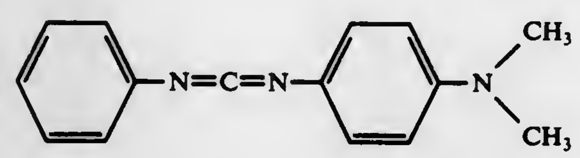
(I-23) $CH_2=CHCOOCH_2CH_2-N=C=N-CH_2CH=CH_2$

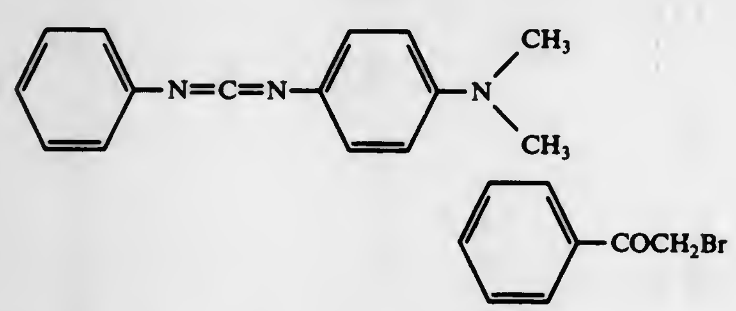
(I-24) 

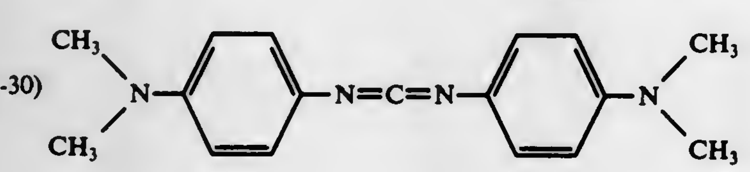
(I-25) 

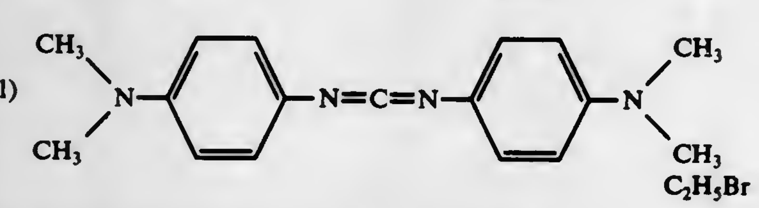
(I-26) 

(I-27) 

(I-28) 

(I-29) 

(I-30) 

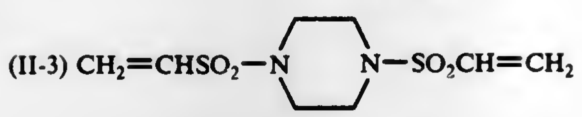
(I-31) 

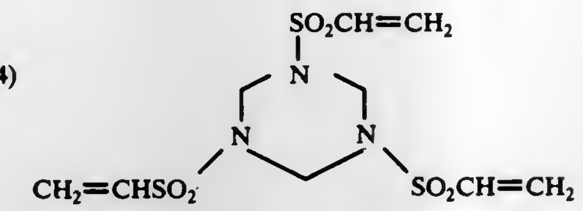
and a compound selected from the group consisting of:

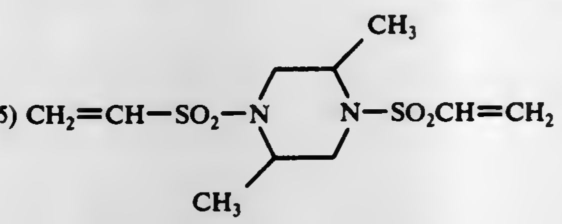
(II-1) $CH_2=CHSO_2CH_2CH_2SO_2CH=CH_2$

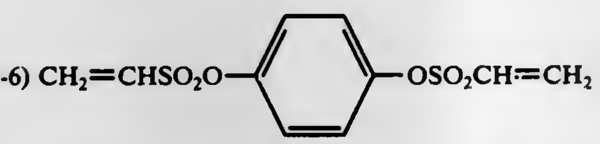
(II-2) $CH_2=CHSO_2CH_2CH_2CH_2CH_2CH_2SO_2CH=CH_2$

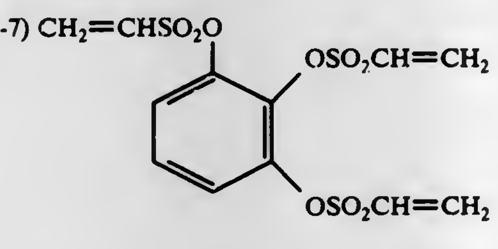
-continued

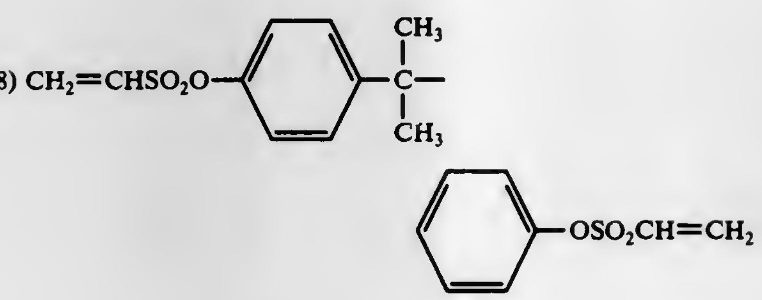
(II-3) 

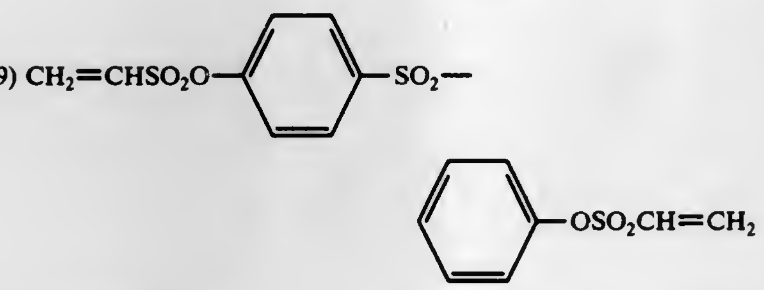
(II-4) 

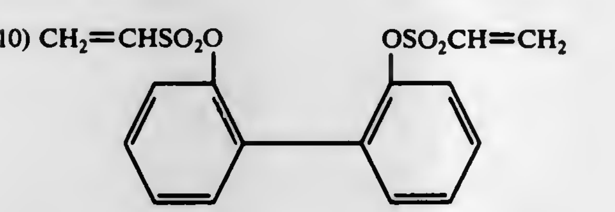
(II-5) 

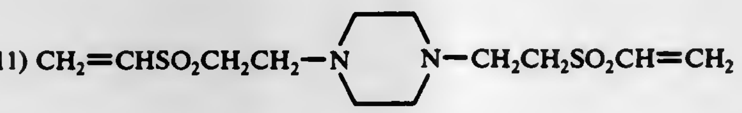
(II-6) 

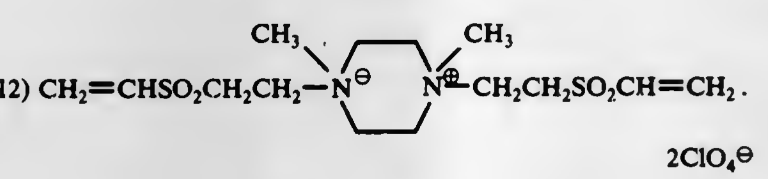
(II-7) 

(II-8) 

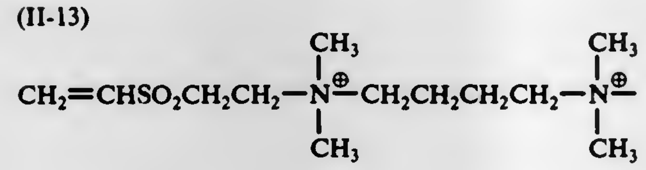
(II-9) 

(II-10) 

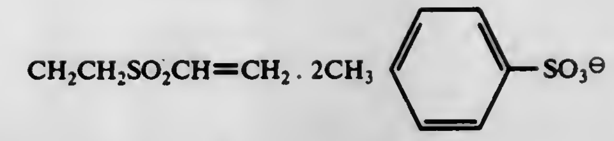
(II-11) 

(II-12) 

(II-13)



-continued



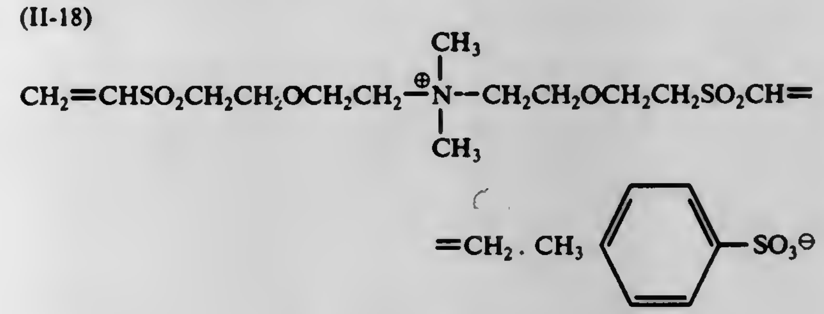
(II-14) $CH_2=CHSO_2CH_2CH_2SO_2CH_2CH_2SO_2CH=CH_2$

(II-15) $CH_2=CHSO_2CH_2CH_2OCH_2CH_2NHCONHCH_2CH_2OCH_2CH_2SO_2CH=CH_2$

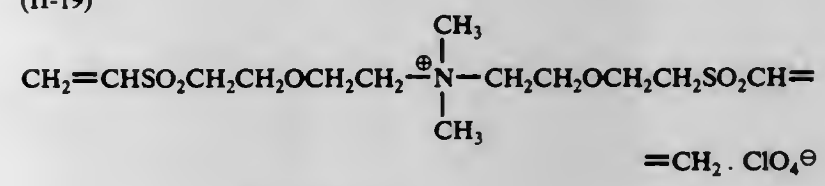
(II-16) $CH_2=CHSO_2CH_2CH_2OCH_2CH_2OCH_2CH_2SO_2CH=CH_2$

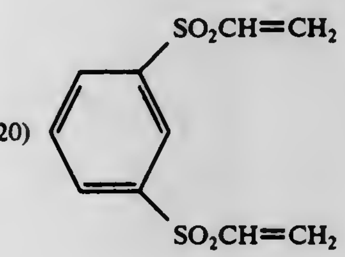
(II-17) $CH_2=CHSO_2CH_2CH_2OCH_2CH_2CH_2CH_2OCH_2CH_2SO_2CH=CH_2$

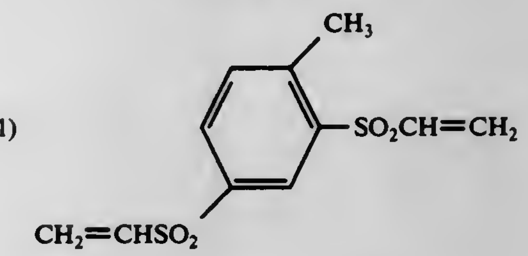
(II-18)

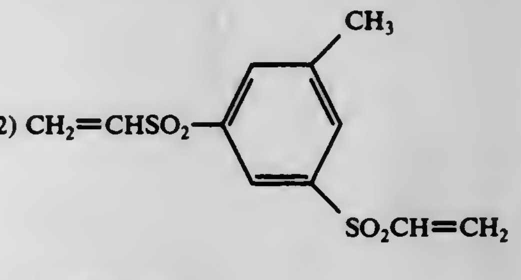


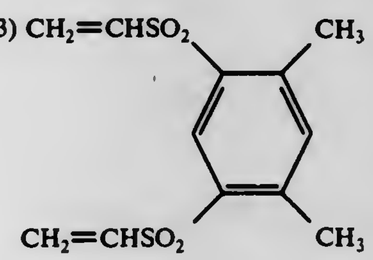
(II-19)

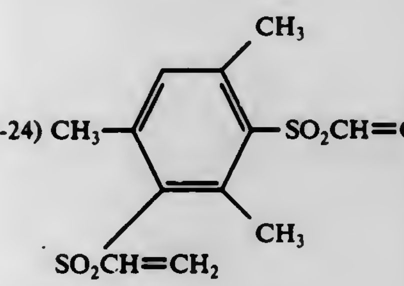


(II-20) 

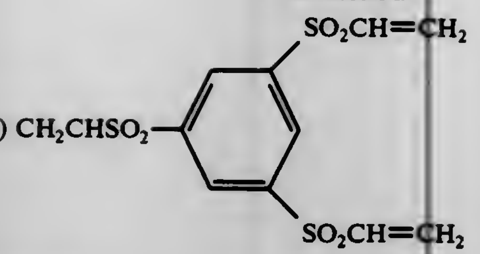
(II-21) 

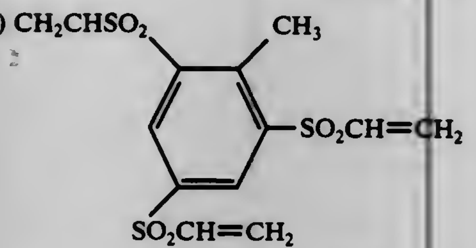
(II-22) 

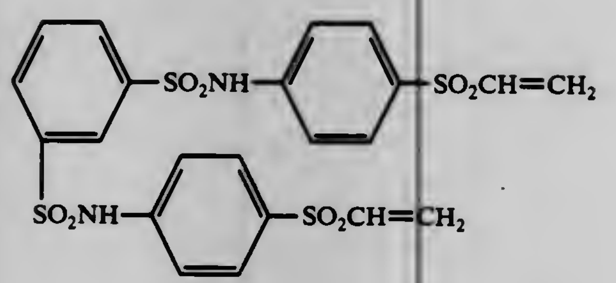
(II-23) 

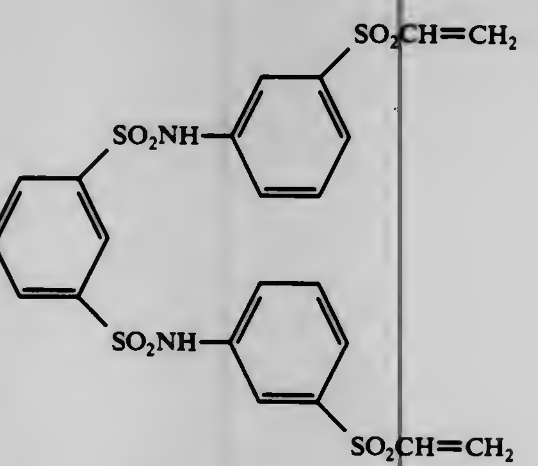
(II-24) 

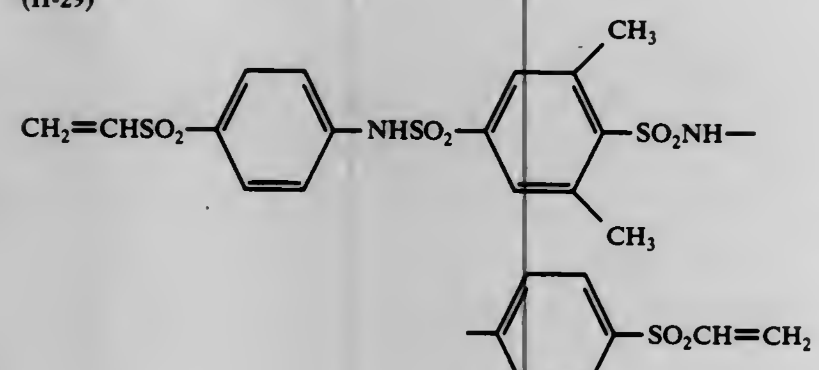
-continued

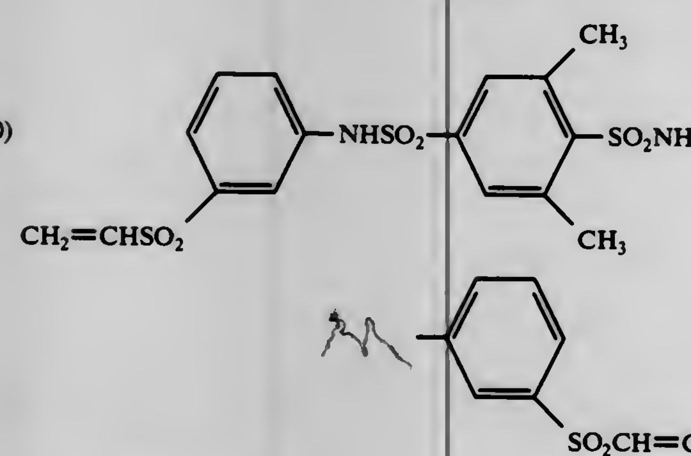
(II-25)


(II-26)


(II-27)


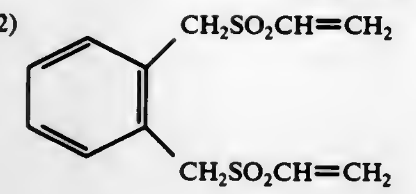
(II-28)


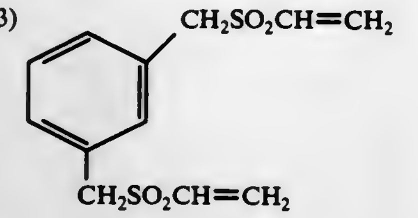
(II-29)


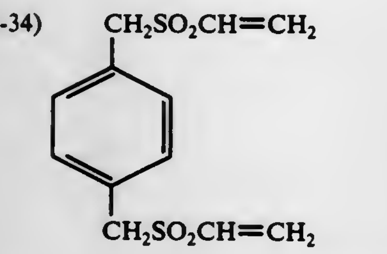
(II-30)


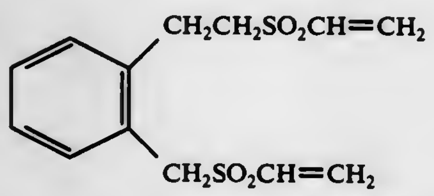
(II-31) $CH_2=CHSO_2CH=CH_2$

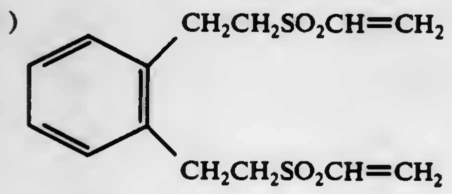
-continued

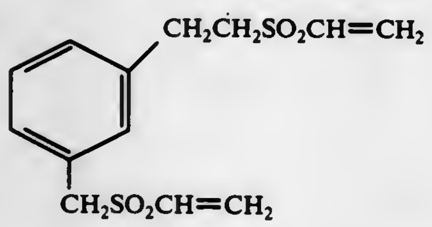
(II-32)


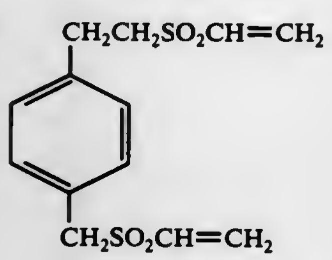
(II-33)


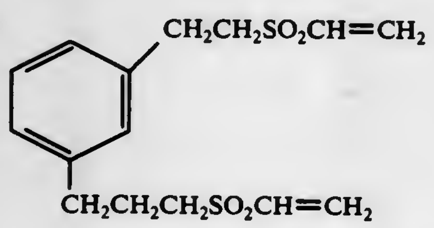
(II-34)


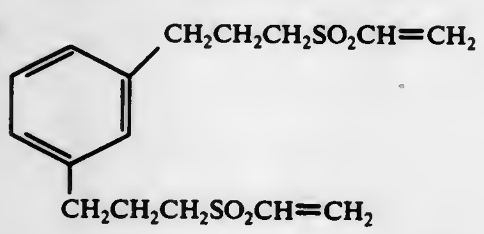
(II-35)


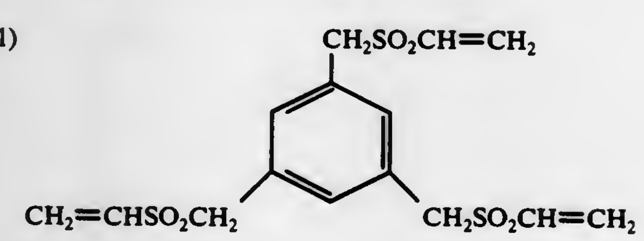
(II-36)


(II-37)


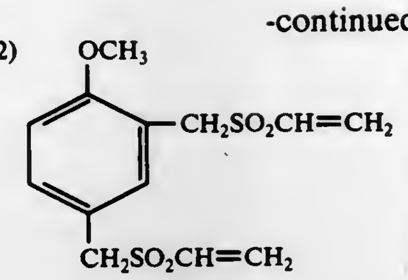
(II-38)


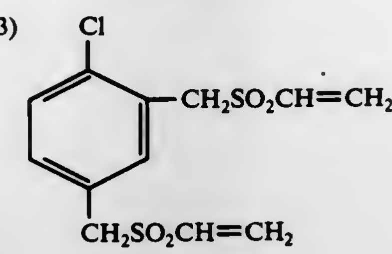
(II-39)


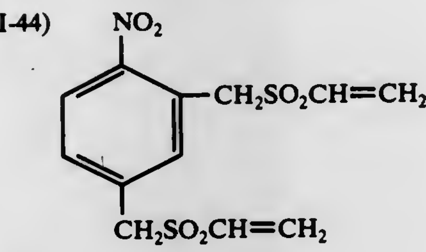
(II-40)


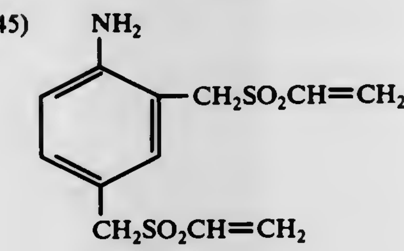
(II-41)


-continued

(II-42)


(II-43)


(II-44)


(II-45)


4,057,539

AZO COMPOUNDS CONTAINING A NAPHTHALIC IMIDE COUPLER

Seiichi Imahori, Komae; Masaharu Kaneko, and Yoshiaki Kato, both of Yokohama, all of Japan, assignors to Mitsubishi Chemical Industries Ltd., Tokyo, Japan

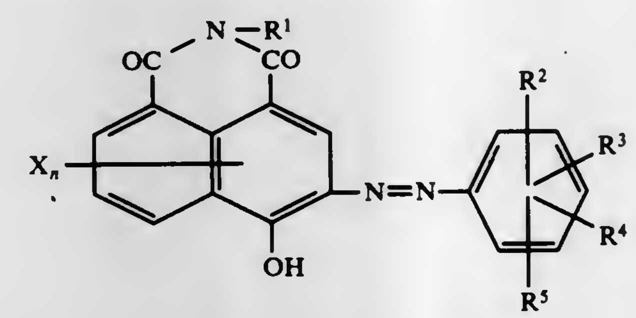
Continuation-in-part of Ser. No. 312,104, Dec. 4, 1972, abandoned. This application Mar. 6, 1975, Ser. No. 555,726

Claims priority, application Japan, Dec. 3, 1971, 46-97730

Int. Cl.² C09B *29/36*

U.S. Cl. 260—155 **16 Claims**

1. An azo dye having the formula (1):



wherein R^1 represents hydrogen, methyl, ethyl, propyl, butyl, β-hydroxyethyl, (C_1-C_3)alkoxy(C_2-C_3)alkyl, methoxycarbonylmethyl, acetylethyl, hydroxyethylaminoethyl, cyanoethyl, N,N-di(C_1-C_2)alkylamino(C_2-C_3)alkyl, ethylaminoethyl, chloroethyl, carboxymethyl, morpholinopropyl, cyclohexyl, phenethyl, benzyl, phenyl, chlorophenyl, methoxyphenyl, nitrophenyl, tolyl, xylyl, dimethylaminophenyl, and (C_1-C_3)alkyl containing an ammonium group wherein the ammonium nitrogen is quaternized by (C_1-C_3)alkyl groups or by an amino group in combination with alkyl groups, or wherein the ammonium nitrogen is the heterocyclic nitrogen atom of a morpholine ring or a pyridine ring, the ammonium group accompanied by an anion;

wherein R^2 is hydrogen, chlorine, bromine, nitro, cyano, carboxyl, methyl, trifluoromethyl, phenyl, β-hydroxylethyl, (C_1-C_2)alkoxy, $(C_1C_2$and $C_4)$alkoxycarbonyl, acetyl, benzoyl, acetylamino, benzoylamino, (C_1-C_2)alkylsulfonyl, phenylsulfonyl, di(C_1-C_2)alkylcarbamoyl, chlorophenoxy, dimethylaminosulfonyl, diethylaminosulfonyl, dibutylaminosulfonyl, or aminocarbonyl; R^3 is hydrogen, cyano, nitro, chlorine, bromine, methoxy or trifluoromethyl; R^4 is hydrogen, chlorine or nitro; and R^5 is hydrogen; and

wherein, when $n = 1$, X is chlorine, bromine and nitro; when $n = 2$, X is bromine or nitro and n has a value from 0–2.

4,057,540

4-CHLOROAZETIDINONE-1-(2',3'-DICHLOROISOPROPYL) ACETATES AND PROCESS FOR PREPARING SAME

Ronald G. Micetich, Edmonton, Canada; Robert B. Morin, Warren, N.J., and Kenneth E. Wilson, Edmonton, Canada, assignors to Connlab Holdings Limited, Ontario, Canada

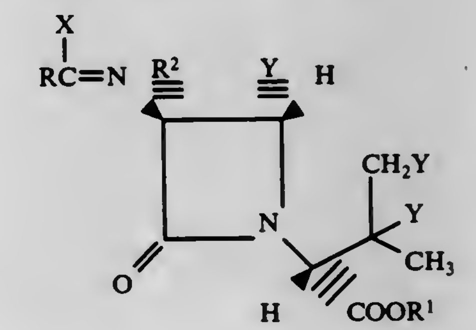
Filed Mar. 17, 1976, Ser. No. 667,825

Claims priority, application United Kingdom, Apr. 22, 1975, 16582/75

Int. Cl.² C07D *205/08, 513/04, 417/12*

U.S. Cl. 260—239 A **5 Claims**

1. A compound of the general formula:

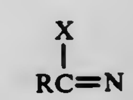


wherein:

R stands for lower alkyl, phenyl, phenyloxyloweralkyl, phenylloweralkyl, 2-thiophenemethyl, 5-tetrazolylmethyl, R^3O— and R^3S—, wherein: R^3 stands for lower alkyl, phenyl or phenyllower-alkyl;

R^1 is hydrogen or a cleavable radical selected from lower alkyl, loweralkoxymethyl, 2,2,2-trichloroethyl, benzyl, p-halobenzyl, p-nitrobenzyl and p-methoxybenzyl, benzhydryl and trimethylsilyl;

R^2 is hydrogen;



is RCONH or phthalimido

Y is chloro or bromo.

4,057,541

METHOD FOR ISOLATION OF 3-HYDROXY STEROIDS AND 3-KETO STEROIDS

Alfred Weber; Rudolf Muller, and Johannes Kurzidim, all of Berlin, Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Germany

Filed June 25, 1976, Ser. No. 699,790

Claims priority, application Germany, June 30, 1975, 2529521

Int. Cl.² C07J *71/00*

U.S. Cl. 260—239.55 A **9 Claims**

1. In a process for the isolation of 3-hydroxy steroids and 3-keto steroids from a mixture thereof with lipids by dissolving the mixture in an organic solvent, mixing the dissolved mixture with a metal salt to form insoluble adducts of the steroids and a metal salt, separating the insoluble adducts, and splitting the adducts to regenerate the free steroid, the improvement which comprises employing as the solvent methyl isobutyl ketone, methyl n-amyl ketone or a mixture thereof and employing calcium bromide as the metal salt.

4,057,542

PROCESS FOR THE PREPARATION OF 17β-HYDROXY-3-OXO-17α-PREGN-4-ENE-21-CARBOXYLIC ACID γ-LACTONE

Hugh L. Dryden, Jr., Deerfield; Mike G. Scaros, Arlington Heights, and Thomas J. Telinski, Chicago, all of Ill., assignors to G. D. Searle & Co., Chicago, Ill.

Filed Aug. 30, 1976, Ser. No. 718,643

Int. Cl.[2] C07J *21/00*

U.S. Cl. 260—239.55 C **11 Claims**

1. A process for the preparation of 17β-hydroxy-3-oxo-17α-pregn-4-ene-21-carboxylic acid γ-lactone which comprises:

a. Reacting 17α-ethynyl-17β-hydroxyandrost-4-en-3-one with an appropriate vic-glycol containing up to 6 carbon atoms to give the corresponding 3,3-[vic-(lower alkylene)-dioxy] 5- or 4-unsaturated compound;

b. Reacting the ketal with a (lower alkyl) vinyl ether in the presence of an acid catalyst to give the corresponding 17β-[1-(lower alkoxy)ethoxy]-3,3-[vic-(lower alkylene)dioxy]-17α-ethynylandrost-(5- or 4-) ene;

c. Reaction of the ketal-acetal with an alkyl lithium or a Grignard reagent followed by treatment with carbon dioxide to give the corresponding salt of 17β-[1-(lower alkoxy)ethoxy]-3,3-[vic-(lower alkylene)dioxy]-17α-pregn-(5- or 4-)en-20-yne-21-carboxylic acid;

d. Conversion of the acid salt to the corresponding methyl ester followed by removal of the (lower alkoxy)-ethoxy group to give methyl 3,3-[vic-(lower alkylen)dioxy]-17β-hydroxy-17α-pregn-(5- or 4-)en-20-yne-21-carboxylate;

e. Catalytic hydrogenation of the ester followed by acidification to give the desired final product.

4,057,543

PROCESS FOR THE PREPARATION OF 17β-HYDROXY-3-OXO-17α-PREGN-4-ENE-21-CARBOXYLIC ACID γ-LACTONE

Hugh L. Dryden, Jr., and Charles S. Markos, both of Deerfield, Ill., assignors to G. D. Searle & Co., Chicago, Ill.

Filed July 1, 1976, Ser. No. 701,463

Int. Cl.[2] C07J *71/00, 1/00*

U.S. Cl. 260—239.57 **4 Claims**

1. A process for the preparation of 17β-hydroxy-3-oxo-17α-pregn-4-ene-21-carboxylic acid γ-lactone which comprises:

a. mineral acid hydrolysis of sarsasaponin to afford sarsasapogenin;

b. acetylation of sarsasapogenin followed by oxidation using a mixture of chromic acid in water and acetic acid to afford 3β-acetoxy-5β-pregn-16-en-20-one;

c. conversion of the resulting 3β-acetoxy-5β-pregn-16-en-20-one to the corresponding oxime using hydroxylamine hydrochloride;

d. rearrangement of that oxime using phosphoryl chloride and triethylamine to aford 3β-acetoxy-5β-androstan-17-one;

e. alkaline hydrolysis of 3β-acetoxy-5β-androstan-17-one to afford the corresponding 3β-hydroxy compound;

f. reacting the 3-hydroxy compound with a lower alkyl vinyl ether in the presence of an acid catalyst to give a 3β-(1-lower alkoxyethoxy)-5β-androstan-17-one;

g. ethynylating the ketone by means of an ethynylating agent selected from the group consisting of potassium hydroxide and acetylene, ethynylmagnesium chloride, lithium acetylide, or sodium acetylide to give the corresponding 17α-ethynyl-17β-hydroxy compound;

h. treating this 17β-hydroxy compound with a lower alkyl vinyl ether in the presence of an acid catalyst to give the corresponding 3β,17β-bis[1-(lower alkoxy)ethoxy]-17α-ethynyl-5β-pregnane;

i. treating the resultant compound with a reagent selected from the group consisting of a Grignard reagent and lithium alkyl followed by carbonation to give 3β,17β-bis[1-(lower alkoxy)ethoxy]-5β-pregn-20-yne-21-carboxylic acid;

j. hydrolyzing the compound under mineral acid conditions to give 3β,17β-dihydroxy-5β-pregn-20-yne-21-carboxylic acid;

k. catalytic hydrogenation of this 20-yne as the triethylamine salt followed by treatment with a mineral acid to effect lactonization and give the desired 3β,17β-dihydroxy-5β,17α-pregnane-21-carboxylic acid γ-lactone;

l. oxidation of the γ-lactone to give 17β-hydroxy-3-oxo-5β,17α-pregnane-21-carboxylic acid γ-lactone;

m. treatment of the 3-oxo compound with bromine in an inert solvent to afford the corresponding 4-bromo-17β-hydroxy-3-oxo-5β,17α-pregnane-21-carboxylic acid γ-lactone;

n. dehydrobromination of the 4-bromo compound to afford 17β-hydroxy-3-oxo-17α-pregn-4-ene-21-carboxylic acid γ-lactone.

4,057,544

α-ALKYLSULFOBENZYL PENICILLINS

Keiichi Sugimoto, Kawanishi; Koji Nishijima, Osaka; Hiroshi Akimoto, Nishinomiya; Tadashi Hanaoka, Osaka, and Nobuharu Kakeya, Kawanishi, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

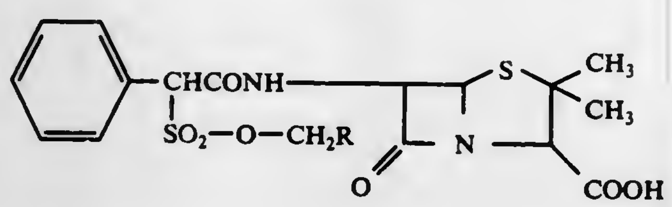
Filed Nov. 20, 1973, Ser. No. 417,527

Claims priority, application Japan, July 9, 1973, 48-77262; July 13, 1973, 48-79606

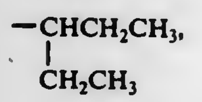
Int. Cl.[2] C07D *499/46*

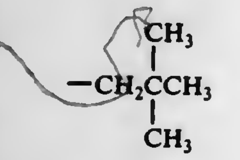
U.S. Cl. 260—239.1 **7 Claims**

1. A penicillin compound selected from the group consisting of a compound of the formula

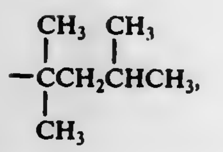


wherein R is isopropyl,





or



and a pharmaceutically acceptable salt thereof.

4,057,545

IMIDAZOLE DERIVATIVES

Klaus Gutsche, Rellingen; Friedrich-Wilhelm Kohlmann, and Peter Scharwächter, both of Moorrege, all of Germany, assignors to Nordmark-Werke GmbH Hamburg, Uetersen, Germany

Filed Oct. 18, 1976, Ser. No. 733,349

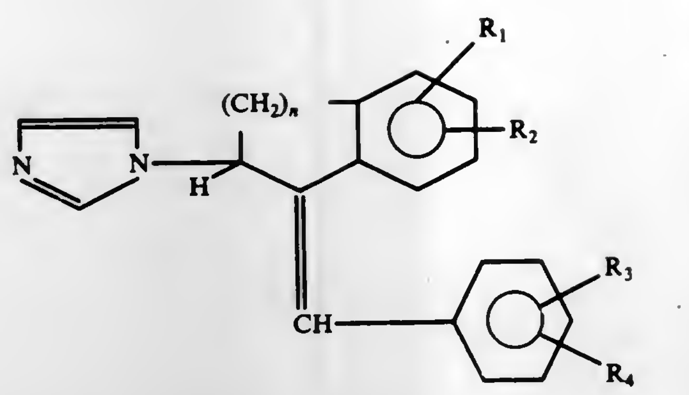
Claims priority, application Germany, Nov. 6, 1975, 2549798

Int. Cl.[2] C07D *233/56, 233/64*

U.S. Cl. 542—428 **9 Claims**

1. An inidazole derivative corresponding to the general formula

(I)



in which R_1, R_2, R_3 and R_4, which may be the same or different, represent a member selected from the group consisting of hydrogen, chlorine, bromine, the lower alkyl groups with 1 to 4 carbon atoms and the lower alkoxy groups with 1 to 4 carbon atoms and n is an integer from 0 to 2, the velencies liberated being saturated by hydrogen where $n = 0$, and their pharmacologically compatible salts with acids.

4,057,546

4-AMINO-1,2,4-TRIAZIN-5-ONES

Helmut Timmler, and Wilfried Draber, both of Wuppertal, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

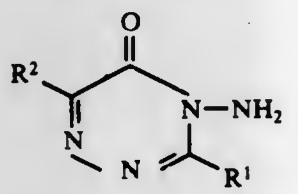
Division of Ser. No. 531,637, Dec. 11, 1974, Pat. No. 3,959,372. This application Oct. 23, 1975, Ser. No. 625,277

Claims priority, application Germany, Dec. 24, 1973, 2364474

Int. Cl.[2] C07D *253/06*

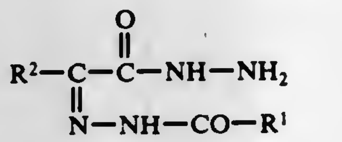
U.S. Cl. 544—182 **7 Claims**

1. Process for the preparation of a 4-amino-1,2,4-triazin-5-one compound of the formula:



(III)

which process comprises heating a glyoxylic acid hydrazide-2-acylhydrazone compound of the formula



(I)

wherein

R^1 is hydrogen or alkyl, and

R^2 is alkyl, phenyl or substituted phenyl

in the presence of a polar organic solvent at a temperature of 60° to 150° C.

4,057,547

AZABICYCLIC COMPOUNDS, AND PRODUCTION THEREOF

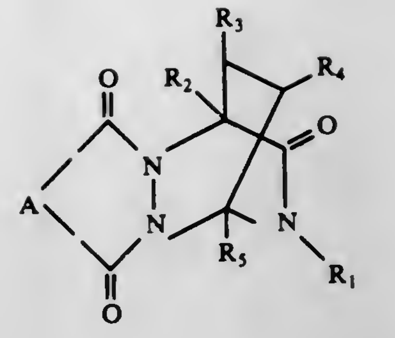
Seymour Levine, North Brunswick, and Vinayak V. Kane, Princeton, both of N.J., assignors to Ortho Pharmaceutical Corporation, Raritan, N.J.

Filed Feb. 2, 1976, Ser. No. 654,311

Int. Cl.[2] C07D *487/04, 253/08*

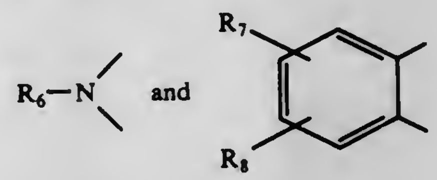
U.S. Cl. 544—184 **28 Claims**

1. A compound having the formula:



wherein:

A is a member selected from the group consisting of



;

R_1 is a member selected from the group consisting of loweralkyl, phenyl, substituted phenyl wherein the substituent is 1–3 groups selected from loweralkyl, loweralkoxy, halo and amino, phenyl loweralkyl, substituted phenyl loweralkyl wherein the substituent is 1–3 groups selected from loweralkyl, loweralkoxy, halo and amino, loweralkylaminodophenyl, and heterocyclic aryl selected from pyridyl, quinolyl, imidazolyl, pyrazinyl, pyrrolyl, thienyl, thiazolyl, thiadiazolyl, pyrazolyl, triazolyl, oxazolyl and pyrimidinyl;

R_2–R_5 are each members selected from the group consisting of hydrogen, halo, cyano, COOR′, CONR′R″, $CH_2NR'R''$, OR‴, loweralkyl, phenyl, substituted phenyl wherein the substituent is 1–3 groups selected from loweralkyl, loweralkoxy, halo and amino, phenyl loweralkyl, and substituted phenyl loweralkyl wherein the substituent is 1–3 groups selected from loweralkyl, loweralkoxy, halo and amino, said R′ and R″ each being a member selected from the group consisting of hydrogen and loweralkyl and said R‴ being a member selected from the group consisting of hydrogen, loweralkyl, phenyl and substituted phenyl wherein the substituent is 1–3 groups selected from loweralkyl, loweralkoxy, halo and amino;

R_6 is a member selected from the group consisting of loweralkyl, phenyl, and substituted phenyl wherein the substituent is 1–3 groups selected from lowerakyl, loweralkoxy, halo and amino; and

R_7 and R_8 are each members selected from the group consisting of hydrogen, halo, loweralkyl, loweralkoxy, and amino; and

pharmaceutically acceptable quaternary salts thereof wherein R_1 is pyridyl, quinolyl, imidazolyl, pyrazinyl, pyrrolyl, thiazolyl, thiadiazolyl, pyrazolyl, triazolyl, oxazolyl or pyrimidinyl.

4,057,548

PROCESS FOR PREPARING METHOTREXATE OR AN N-SUBSTITUTED DERIVATIVE THEREOF AND/OR A DI (LOWER) ALKYL ESTER THEREOF AND PRECURSOR THEREFOR

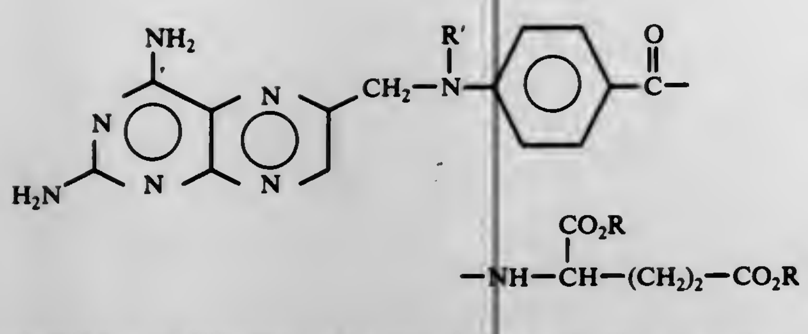
Jacek Wiecko, 7031 Ethel St., St. Louis, Mo. 63117

Continuation-in-part of Ser. No. 631,134, Nov. 11, 1975, abandoned. This application Mar. 30, 1976, Ser. No. 671,960

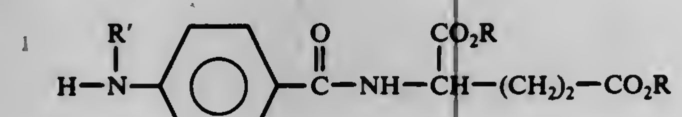
Int. Cl.[2] C07D *471/04*

U.S. Cl. 260—250 BC **6 Claims**

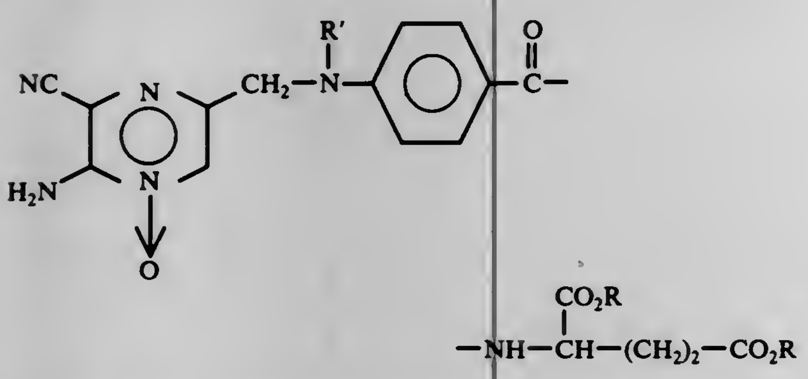
1. A process for preparing a compound having the formula:



wherein R is hydrogen or a lower alkyl group and R′ is hydrogen or a methyl group which consists essentially of the steps of (a) reacting in one step the compounds (1) aminomalononitrile, (2) β-bromopyruvaldoxime or β-chloropyruvaldoxime and (3) a p-aminobenzoyl-L-glutamic acid or di(lower) alkyl ester thereof having the formula:



wherein R is a lower alkyl group or hydrogen and R′ is a methyl group or hydrogen to form the pyrazine oxide precursor having the formula:



wherein R is a lower alkyl group or hydrogen and R′ is a methyl group or hydrogen; (b) treating said compound with either titanium trichloride or iodoformamidinium iodide to deoxygenate said compound; and (c) treating said deoxygenated compound with a guanidine salt of a weak organic acid.

4,057,549
TRIARYLPROPYL-AZABICYCLOOCTANES
Gilbert W. Adelstein, Evanston; Esam Z. Dajani, Buffalo Grove, and Chung Hwai Yen, Skokie, all of Ill., assignors to G. D. Searle & Co., Chicago, Ill.
Division of Ser. No. 568,439, April 16, 1975, Pat. No. 3,998,832. This application Oct. 18, 1976, Ser. No. 733,503
Int. Cl.^{2} C07D *221/22*
U.S. Cl. 260—293.54 **4 Claims**

3. A compound according to claim 1 which is 2-[3,3-diphenyl-3-(2-thienyl)propyl]-2-azabicyclo[2.2.2]-octane.

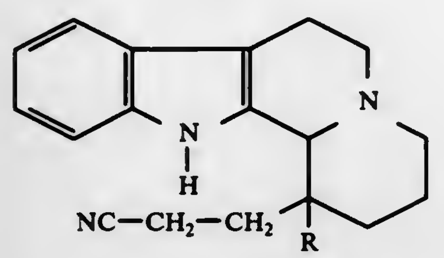
4,057,550
NITROGEN-CONTAINING POLYCYCLIC COMPOUNDS
Csaba Szántay; Lajos Szabó; György Kálaus; Egon Karpati, and László Szporny, all of Budapest, Hungary, assignors to Richter Gedeon Vegyeszeti Gyar Rt., Budapest, Hungary
Filed Sept. 17, 1975, Ser. No. 614,239
Claims priority, application Hungary, Sept. 27, 1974, RI 547
Int. Cl.^{2} C07D *471/02, 455/02*
U.S. Cl. 260—293.55 **2 Claims**

1. 14,15-Dihydro-14-cyano-eburnamenine-(3β,16α).

2. 14,15-Dihydro-14-cyano-21-ethyl-eburnamenine-(3β,16α).

4,057,551
INDOLO[2,3-A]QUINOLIZINES
Csaba Szantay; Lajos Szabo; Gyorgy Kalaus; Egon Karpati, and Laszlo Szporny, all of Budapest, Hungary, assignors to Richter Gedeon Vegyeszeti Gyar Rt., Budapest, Hungary
Filed Sept. 17, 1975, Ser. No. 614,240
Claims priority, application Hungary, Sept. 27, 1974, RI 545
Int. Cl.^{2} C07D *471/02, 455/02*
U.S. Cl. 260—293.55 **5 Claims**

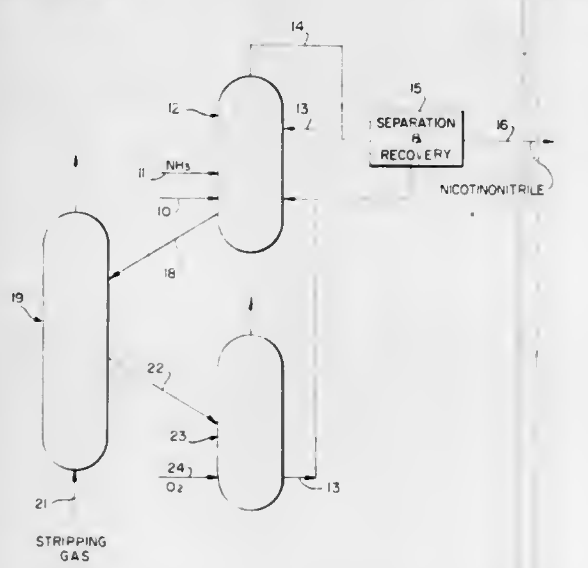
1. A compound of the formula (I),



(I)

wherein R is an alkyl group having 1 to 6 carbon atoms, and a pharmaceutically acceptable salt thereof.

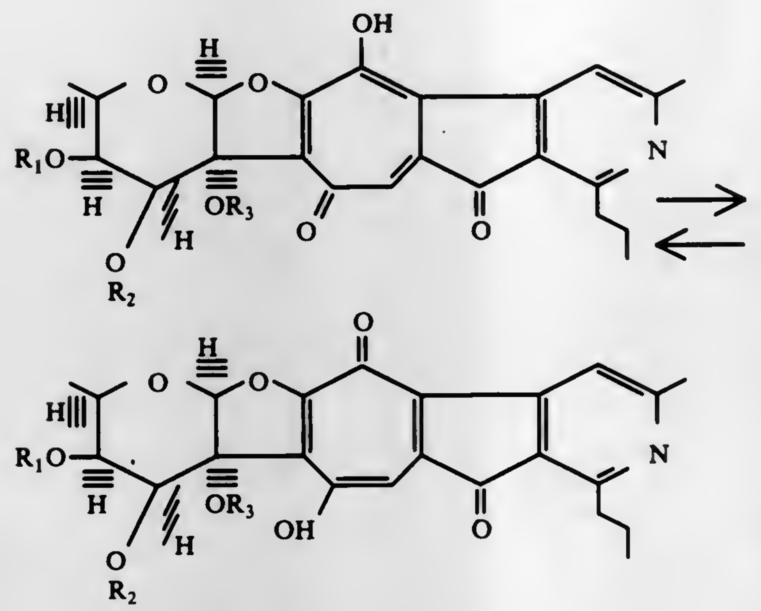
4,057,552
PRODUCTION OF CYANOPYRIDINES FROM PIPERIDINES
Hermann Richtzenhain, Much-Schwellenbach, Germany, and Paul Janssen, deceased, late of Bensberg-Refrath, Germany (by Almuth Janssen, heir), assignors to The Lummus Company, Bloomfield, N.J.
Filed July 1, 1976, Ser. No. 701,694
Int. Cl.^{2} C07D *213/57*
U.S. Cl. 260—294.9 **6 Claims**



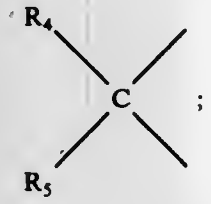
1. A process for producing a cyano-pyridine, comprising: contacting an alkyl piperidine with ammonia in the absence of any gaseous oxygen and in the presence of oxidized vanadia supported on a porous support, said support containing from about 25% to about 75%, by weight, of the vanadia having been placed in molten form substantially entirely within the pores of the support, the support having a surface area greater than about 50 m^2/gm and a porosity greater than about 0.4 cc/gm, said support being selected from the group consisting of gamma-alumina and silica-alumina.

4,057,553
CERTAIN PYRANO-FURO-AZULENO-PYRIDINES
Julius Berger, Passaic; Karen Emalyn Reichelt, Belleville, both of N.J., and Willy Schüep, Birsfelden, Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.
Filed Aug. 26, 1976, Ser. No. 717,857
Int. Cl.^{2} C07D *521/00*
U.S. Cl. 260—295 A **14 Claims**

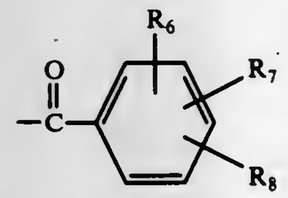
1. A coloring agent having the tautomeric formulae:



wherein R_1 and R_2 are individually hydrogen or taken together form



R_3 is hydrogen or



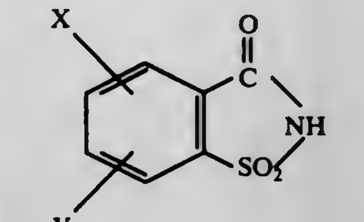
R_4 and R_5 are lower alkyl or taken together with attached carbon atoms forms cycloalkyl from 3 to 8 carbon atoms; and R_6, R_7 and R_8 are hydrogen, halogen or nitro.

4,057,554
QUATERNARY AMMONIUM SALTS OF POLYEPIHALOHYDRIN
Derek Redmore, Ballwin, and Frederick T. Welge, Affton, both of Mo., assignors to Petrolite Corporation, St. Louis, Mo.
Division of Ser. No. 301,176, Oct. 26, 1972, Pat. No. 3,885,913. This application Mar. 10, 1975, Ser. No. 556,570
Int. Cl.^{2} C08G *65/32*
U.S. Cl. 260—296 D **7 Claims**

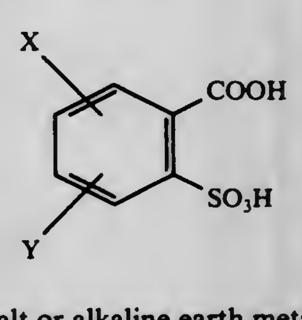
1. Polyquaternaries of polyepichlorohydrins and tertiary amine where the polyquaternary contains both heterocyclic and aliphatic tertiary amines and is formed by the quaternization of the polyepichlorohydrin with about one mol of a mixture of about $\frac{1}{4}$ to $\frac{1}{2}$ mol of an aliphatic tertiary amine and correspondingly about $\frac{3}{4}$ to $\frac{1}{2}$ mol of a heterocyclic amine which is pyridine, quinoline, isoquinoline, alkyl derivatives thereof or mixtures thereof per equivalent of polyepichlorohydrin.

4,057,555
PROCESS FOR PRODUCING SACCHARIN
Wataro Koike; Takahiro Kimoto, both of Shizuoka, and Sadayoshi Matsui, Shimizu, all of Japan, assignors to Ihara Chemical Industry Co., Ltd., Tokyo, Japan
Filed Apr. 15, 1976, Ser. No. 677,256
Claims priority, application Japan, Dec. 6, 1975, 50-145246; June 11, 1975, 50-70311
Int. Cl.^{2} C07D *275/06*
U.S. Cl. 260—301 **11 Claims**

1. A process for producing 1.2-benzoisothiazole3-on-1.1-dioxide having the formula:



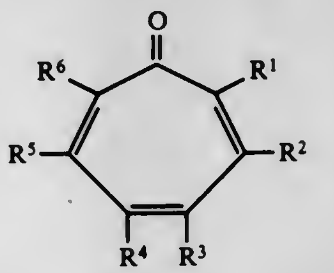
wherein X represents hydrogen, halogen, nitro, lower alkyl or lower alkoxy and Y represents hydrogen, halogen, lower alkyl, or lower alkoxy which comprises: (a) reacting phosgene with an o-sulfobenzoic acid compound having the formula:



or an alkali metal salt or alkaline earth metal salt thereof in the presence of dimethylformamide, thereby producing a mixture of a dichlorotolylsultone and a chlorosulfonylbenzoylchloride; (b) reacting the reaction products of step (a) with an alcohol having the formula ROH wherein R represents a lower alkyl group; (c) reacting the reaction product of step (b) with ammonia to form the ammonium salt of said 1.2-benzoisothiazole-3-on-1.1dioxide; and converting said ammonium salt to said 1.2-benzoisothiazole-3-on-1.1-dioxide.

4,057,556
TROPONYL-OXAMIC ACID DERIVATIVES
Jehan F. Bagli, Kirkland, and Tibor Bogri, Montreal, both of Canada, assignors to Ayerst, McKenna & Harrison Ltd., Montreal, Canada
Filed June 17, 1976, Ser. No. 697,296
Int. Cl.^{2} C07C *103/42*
U.S. Cl. 424—305 **26 Claims**

1. A compound of formula I



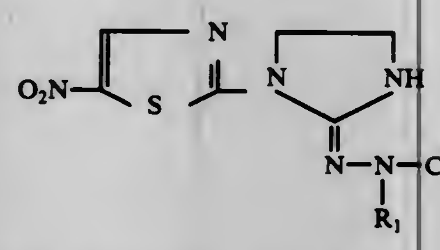
(I)

in which R^1 and R^4 are the same or different selected from the group consisting of hydrogen, halo, trifluoromethyl, lower alkoxy, lower alkyl, phenyl, hydroxy, phenoxy, mercapto, (2-carboxyphenyl)thio, NR^7R^8 wherein R^7 and R^8 each is hydrogen or lower alkyl or R^7 is lower alkyl and R^8 is p-toluenesulfonyl, and a radical of formula $NR^9COCOOR^{10}$ wherein R^9 and R^{10} each is hydrogen or lower alkyl; and R^2, R^3, R^5 and R^6 are the same or different selected from the group consisting of hydrogen, halo, trifluoromethyl, lower alkoxy,

lower alkyl, phenyl, hydroxy, phenoxy, mercapto, (2-carboxyphenyl)thio and NR^7R^8 wherein R^7 and R^8 each is hydrogen or lower alkyl or R^7 is lower alkyl and R^8 is p-toluenesulfonyl; with the proviso that at least one of R^1 and R^4 must be a radical of formula $NR^9COCOOR^{10}$ wherein R^9 and R^{10} are as defined herein; or a therapeutically acceptable salt thereof.

4,057,557
CERTAIN 5-NITROTHIAZOLYLIMIDAZOLIDINE COMPOUNDS
Gerd Ascher, and Hellmuth Reinshagen, both of Vienna, Austria, assignors to Sandoz Ltd., Basel, Switzerland
Filed Feb. 6, 1976, Ser. No. 655,721
Claims priority, application Switzerland, Feb. 13, 1975, 1776/75; Feb. 13, 1975, 1780/75
Int. Cl.^{2} C07D *417/04*
U.S. Cl. 260—306.8 R **12 Claims**

1. Compounds of formula I,

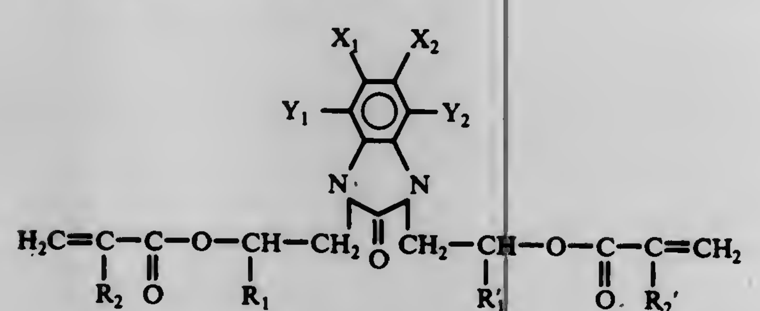


I

in which R_1 is hydrogen, lower alkyl or phenyl,
R_2 is hydrogen, lower alkyl or alkoxy, trifluoromethyl, the group —CH=CH—COOH or a group —$N(R_3)(R_4)$, in which R_3 and P_4, which may be the same or different, each signifies hydrogen or lower alkyl, and
X is oxygen, sulphur or imino, provided that when R_2 is lower alkyl or —CH=CH—COOH, then X is oxygen,
or a chemotherapeutically acceptable acid addition salt thereof.

4,057,558
HALOGENATED BIS-ACRYLATES
Jurgen Habermeier, Pfeffingen, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.
Filed Dec. 27, 1976, Ser. No. 755,115
Claims priority, application Switzerland, Jan. 7, 1976, 105/76
Int. Cl.^{2} C07D *235/26*
U.S. Cl. 548—305 **10 Claims**

1. A bis-acrylate of the formula



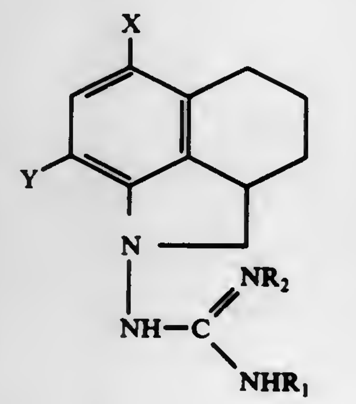
wherein R_1 and R_1' each denote hydrogen, methyl, ethyl or phenyl, R_2 and R_2' each denote hydrogen or methyl, X_1 denotes chlorine or bromine and X_2, Y_1 and Y_2 denote hydrogen, chlorine or bromine and, when X_2 denotes hydrogen, Y_1 and Y_2 also denote hydrogen.

4,057,559
CARBAZOLE ACETIC ACID DERIVATIVES
Andre A. Asselin, Lemoyne; Leslie G. Humber, and Thomas A. Dobson, both of Dollard des Ormeaux, all of Canada, assignors to American Home Products Corporation, New York, N.Y.
Continuation-in-part of Ser. No. 402,240, Oct. 1, 1973, abandoned. This application May 7, 1975, Ser. No. 575,552
Int. Cl.^{2} C07D *209/86*
U.S. Cl. 260—315 **8 Claims**

1. 1-Ethyl-1,2,3,4-tetrahydrocarbazole-1-acetic acid.

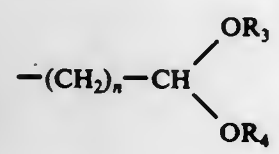
4,057,560
1,2,2a,3,4,5
HEXAHYDROBENZ[c,d,]INDOL-1-YL-2-GUANDINES
Gerhard Bormann, Munchenstein, and Franz Troxler, Bottmingen, both of Switzerland, assignors to Sandoz Ltd., Basel, Switzerland
Filed July 10, 1974, Ser. No. 487,194
Claims priority, application Switzerland, July 16, 1973, 10327/73; July 16, 1973, 10328/73
Int. Cl.^{2} C07D *209/90*
U.S. Cl. 260—326.86 **28 Claims**

1. A compound of formula I,

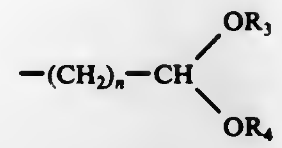


I

wherein
R_1 is hydroxy, or



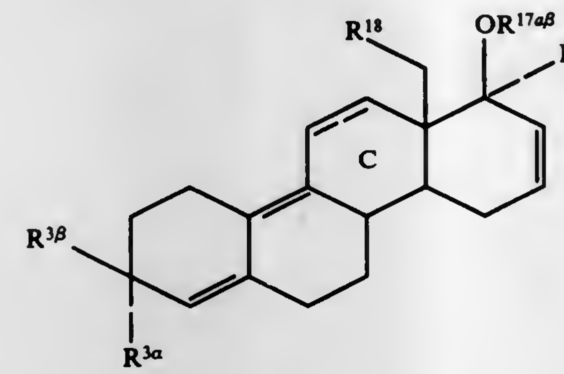
wherein
n is an integer from 1 to 5, and
R_3 and R_4 are independently alkyl of 1 to 4 carbon atoms, or
R_3 and R_4 together form an alkylene chain of 2 or 3 carbon atoms,
R_2 is hydrogen, alkyl of 1 to 4 carbon atoms, phenylalkyl of 7 to 9 carbon atoms, or phenylalkyl of 7 to 9 carbon atoms mono- or disubstituted on the phenyl radical by halogen, alkyl of 1 to 4 carbon atoms or alkoxy of 1 to 4 carbon atoms, and
either
X is hydrogen, and
Y is methyl,
or
X is methylthio or dialkylamino, wherein the alkyl chains are independently of 1 to 4 carbon atoms, and
Y is hydrogen,
or
X is chlorine or bromine, and
Y is chlorine,
or, when R_1 is



X also signifies hydrogen, chlorine, bromine or methyl, and Y signifies hydrogen
or a pharmaceutically acceptable acid addition salt thereof.

4,057,561
D-HOMO-19-NORSTEROIDS
Andor Furst, Basel; Jürg Gutzwiller, Bettingen; Marcel Müller, Frenkendorf, all of Switzerland; Rudolf Wiechert, Berlin, Germany; Ulrich Eder, Berlin, Germany, and Günter Neef, Berlin, Germany, assignors to Hoffmann-La Roche Inc., Nutley, N.J.
Filed Feb. 22, 1977, Ser. No. 770,433
Claims priority, application Austria, Feb. 23, 1976, 1269/76; Switzerland, Jan. 3, 1977, 2/77
Int. Cl.^{2} C07C *49/48, 69/02;* **C07D** *309/22*
U.S. Cl. 260—345.9 S **16 Claims**

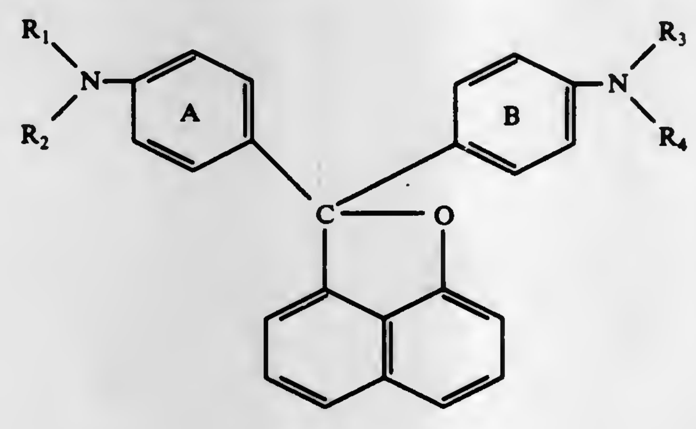
1. A compound of the formula



wherein $R^{3\alpha}$ is hydrogen, $R^{3\beta}$ is hydroxy, lower alkanoyloxy or aroyloxy and $R^{3\alpha}$ and $R^{3\beta}$ taken together are oxo; $R^{17a\alpha}$ is hydrogen, lower alkyl, ethynyl, vinyl, allyl, methallyl, propadienyl, 1-propynyl, butadiynyl or chloroethynyl; $R^{17a\beta}$ is hydrogen, alkanoyl, aroyl, lower alkyl, cycloalkyl-lower-alkyl, benzyl, furfuryl or tetrahydropyranyl; R^{18} is hydrogen or methyl and the dotted line in the C-ring denotes an additional carbon to carbon bond in the 11,12-position.

4,057,562
CERTAIN NAPHTHOFURANS AND METHOD FOR THEIR MANUFACTURE
Heinz Balli, Rieben, and Albert Egger, Allschwil, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.
Division of Ser. No. 524,850, Nov. 18, 1974, Pat. No. 3,974,180. This application Apr. 2, 1976, Ser. No. 673,240
Claims priority, application Switzerland, Nov. 27, 1973, 16635/73
Int. Cl.^{2} C07D *307/92*
U.S. Cl. 260—346.71 **6 Claims**

1. A furan of the formula



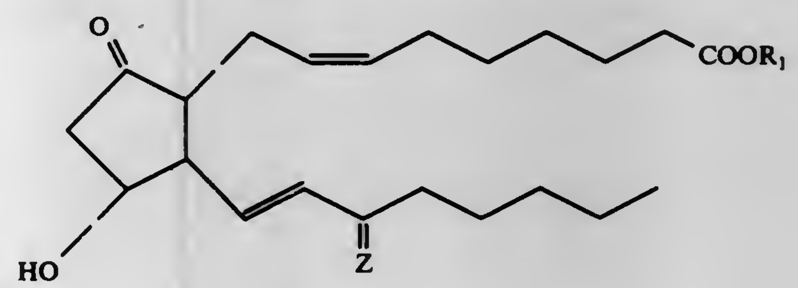
in which R_1, R_2, R_3 and R_4 are independently alkyl of 1 to 4 carbon atoms or phenyl;
and the phenyl rings A and B are independently unsubstituted or are substituted by alkyl of 1 to 4 carbon atoms or halo.

4,057,563
PREPARATION OF DYE CYANIDES
Lyman Chalkley, 6626 Tyrian St., La Jolla, Calif. 92037
Filed May 24, 1976, Ser. No. 689,067
Int. Cl.^{2} C09B *11/10, 11/06*
U.S. Cl. 260—390 **10 Claims**

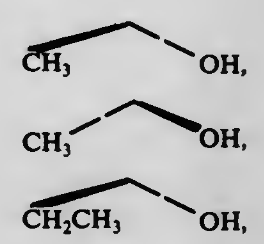
1. The process of preparation of an amino triarylmethane dye cyanide by reaction of an amino triarylmethane dye base with hydrogen cyanide in absence of additional acid.

4,057,564
2a, 2b-DIHOMO-15-ALKYL-PGE$_2$ ANALOGS
Gilbert A. Youngdale, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.
Division of Ser. No. 511,220, Oct. 2, 1974, Pat. No. 3,974,195. This application Mar. 3, 1976, Ser. No. 663,566
Int. Cl.^{2} G07C *177/00*
U.S. Cl. 260—410.9 R **7 Claims**

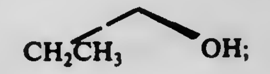
1. An optically active compound of the formula:



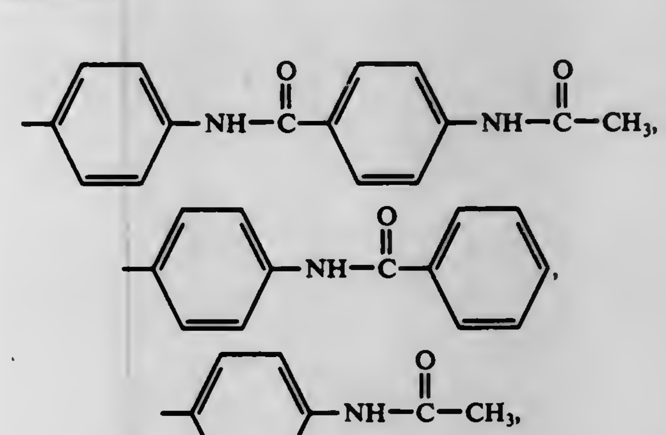
wherein Z is



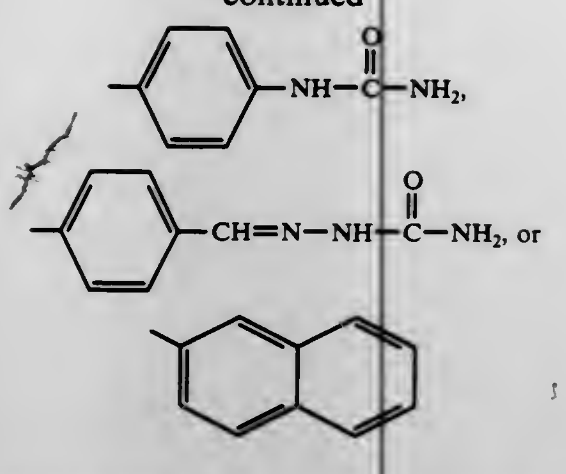
or



and
wherein R_1 is hydrogen, alkyl of one to 12 carbon atoms, inclusive,



-continued



or pharmacologically acceptable salts thereof when R_1 is hydrogen.

4,057,565
2-DIALKYLAMINOBENZYL AND 2-DIALKYLAMINOMETHYLPHENYL DERIVATIVES OF SELECTED TRANSITION METALS

Leo Ernest Manzer, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

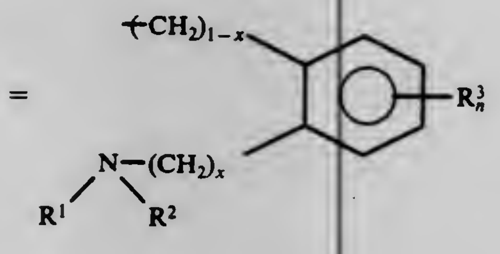
Filed July 22, 1975, Ser. No. 597,981
Int. Cl.² C07F *5/00, 7/00, 7/28, 11/00*
U.S. Cl. 260—429 R **11 Claims**

1. Transition metal compounds of the formulae

M^1A_3 (1)

wherein

M^1 = Sc, Y or a rare earth metal, and

A = 

where

x = 0 or 1

R^1, R^2 and the R^3's are each C_1–C_8 alkyl, and

n = 0, 1, 2, 3 or 3 + x,

when x = 0, the position in the benzene ring adjacent to the —NR^1R^2 substituent, other than that occupied by the —CH_2— substituent, being unsubstituted,

M^2A_2 (2)

wherein

M^2 = Cr or Mo, and

M^3A_4 (3)

wherein

M^3 = Ti, Zr or Hf,

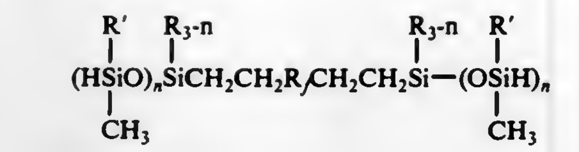
there being a coordination bond between M^1, M^2 or M^3 and the nitrogen of A.

4,057,566
FLUOROCARBON SILOXANE COMPOSITIONS

Philip L. Carter; Yung K. Kim, and Michael O. Riley, all of Midland, Mich., assignors to Dow Corning Corporation, Midland, Mich.

Filed Jan. 8, 1976, Ser. No. 647,473
Int. Cl.² C07F *7/08*
U.S. Cl. 260—448.2 H **6 Claims**

1. A composition of the formula



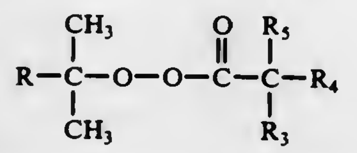
wherein each R and R' is independently methyl, phenyl, or 3,3,3-trifluoropropyl, R_f is a perfluoroalkylene radical of 2 to 10 carbon atoms, a perfluorocycloalkylene radical, or a perfluoroalkylene radical of 2 to 10 carbon atoms or a perfluorocycloalkylene radical containing one or more —C—O—C— linkages and each n is independently 1, 2, or 3.

4,057,567
POLYMERIZATION METHOD AND T-ALKYL PERESTERS OF T-HYDROPEROXIDES FOR USE THEREIN

Ronald L. Friedman, San Rafael, and Roger N. Lewis, Martinez, both of Calif., assignors to Argus Chemical Corporation, Brooklyn, N.Y.

Continuation-in-part of Ser. No. 157,683, June 28, 1971, Pat. No. 3,726,847, which is a continuation-in-part of Ser. No. 725,931, May 1, 1968, Pat. No. 3,624,123. This application Feb. 20, 1973, Ser. No. 333,904
Int. Cl.² C07C *179/18*
U.S. Cl. 260—453 RZ **5 Claims**

1. An organic peroxide of the formula:



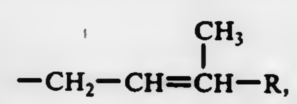
wherein R_3, R_4 and R_5 together with the associated tertiary carbon atom and adjacent carbonyl group form a neodecanoate group; and R is selected from 2,2-dimethyl propyl and straight chain alkyl of 2-5 carbon atoms.

4,057,568
PROCESS FOR SYNTHESIS OF BORIC ACID ESTER

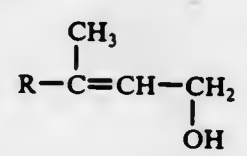
Shizumasa Kijima; Isao Yamatu, both of Tokyo; Kimio Hamamura, Kashiwa; Norio Minami, Kawasaki; Youji Yamagishi, and Yuichi Inai, both of Tokyo, all of Japan, assignors to Eisai Co., Ltd., Tokyo, Japan

Division of Ser. No. 640,305, Dec. 12, 1975, Pat. No. 3,998,858. This application Sept. 22, 1976, Ser. No. 725,427
Int. Cl.² C07F *5/04*
U.S. Cl. 260—462 R **14 Claims**

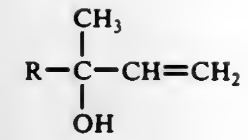
1. A process for synthesizing boric acid ester of 2,3-dimethoxy-5-methyl-6-substituted-1,4-benzohydroquinone, wherein the substituent at the 6 position is



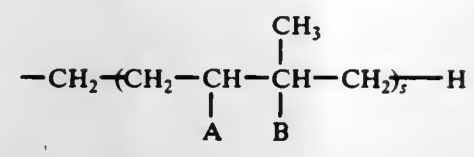
wherein R is as defined below, which comprises reacting (A) boric acid ester of 2,3-dimethoxy-5-methyl-1,4-benzohydroquinone prepared by reacting 2,3-dimethoxy-5-methyl-1,4-benzohydroquinone with a substance selected from the group consisting of orthoboric acid, boron oxide, metaboric acid and borax, with (B) a prenol having the formula



or an isoprenol having the formula



wherein R is



in which s is an integer of from zero to 11, and A and B are hydrogens or A—B form a direct bond

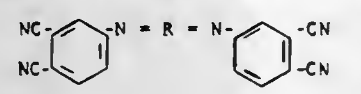
or a reactive derivative of said prenol or said isoprenol selected from the group consisting of lower alkyl ethers, esters and halides.

4,057,569
BISORTHODINITRILES

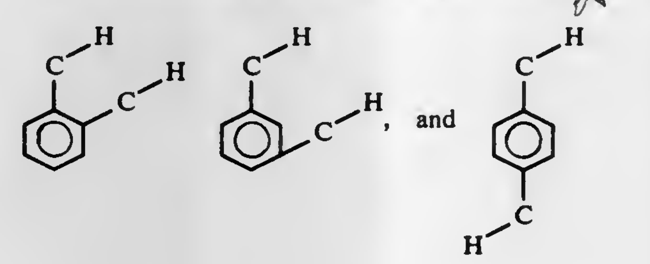
James R. Griffith, Riverdale Heights, and Jacques G. O'Rear, Temple Hills, both of Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 28, 1976, Ser. No. 681,087
Int. Cl.² C07C *121/78*
U.S. Cl. 260—465 E **3 Claims**

1. A bisorthodinitrile of the general formula:



wherein R is selected from the class consisting of



4,057,570
PROCESS FOR PREPARING ACRYLONITRILE

Robert A. Innes, Pittsburgh, and Anthony J. Perrotta, Monroeville, both of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 645,419, Dec. 30, 1975. This application Aug. 18, 1976, Ser. No. 715,281
Int. Cl.² C07C *120/14*
U.S. Cl. 260—465.3 **13 Claims**

1. A process for preparing acrylonitrile which comprises reacting at an elevated temperature in the vapor phase propylene, oxygen and ammonia over a catalyst consisting essentially of a compound defined by the formula:

$USb_{3-x}A_xO_{9-10}$,

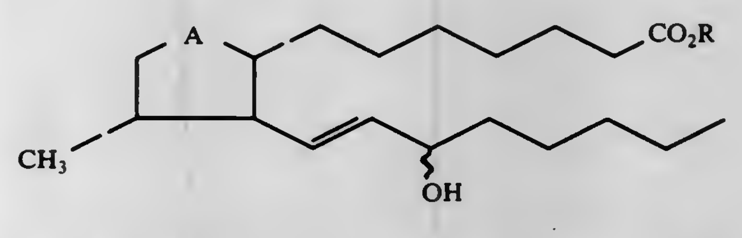
wherein A is a Group IV B element, x is the number about 0.25 to about 1.50, said catalyst having been prepared by heating a mixture containing (1) oxides or uranium, antimony and an element from Group IV B of the Periodic Table or (2) compounds of said elements that will decompose or be converted to said oxides during said heating, wherein the atomic ratio of antimony to uranium is about 1.35:1 to about 2.75:1, the atomic ratio of the Group IV B element to uranium is about 0.25:1 to about 1.65:1 and the atomic ratio of the sum of antimony and Group IV B element to uranium is about 3.5:1 to about 2.5:1, at a temperature of at least about 850° C. for about 15 minutes to about 24 hours.

4,057,571
NOVEL 11-DEOXY-SUBSTITUTED PROSTAGLANDINS OF THE E AND F SERIES

Charles Vincent Grudzinskas, Garnerville, N.Y., and Martin Joseph Weiss, Oradell, N.J., assignors to American Cyanamid Company, Stamford, Conn.

Continuation-in-part of Ser. No. 274,559, July 24, 1972. This application Feb. 24, 1975, Ser. No. 552,403
Int. Cl.² C07C *177/00*
U.S. Cl. 560—121 **1 Claim**

1. A compound of the structure:



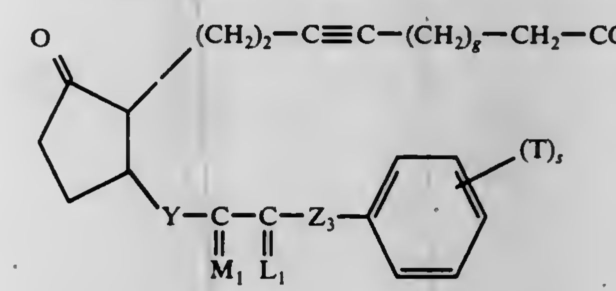
wherein A is CHOH or C=O; and R is H or alkyl of from 1 to 12 carbon atoms.

4,057,572
4,4,5,5-TETRADEHYDRO-ω-ARYL-11-DEOXY-PGE₁, ANALOGS

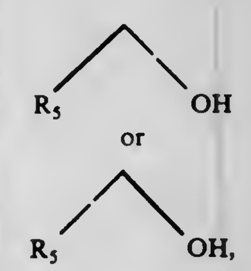
Chiu-Hong Lin, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 619,077, Oct. 2, 1975, Pat. No. 4,013,695. This application Nov. 4, 1976, Ser. No. 738,714
Int. Cl.² C07C *65/22*
U.S. Cl. 560—53 **32 Claims**

1. A prostaglandin analog of the formula



wherein g is one, 2, or 3; wherein Y is trans-CH=CH—; wherein M_1 is

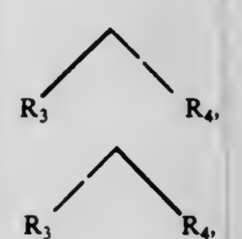


wherein R_5 is hydrogen or methyl;

wherein Z_3 is oxa or methylene, with the proviso that Z_3 is oxa only when R_3 and R_4 are hydrogen or methyl;

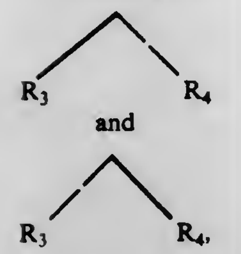
wherein T is chloro, fluoro, trifluoromethyl, alkyl of one to 3 carbon atoms, inclusive, or alkoxy of one to 3 carbon atoms, inclusive, and s is zero, one, 2, or 3, the various T's being the same or different, with the proviso that not more than two T's are other than alkyl;

wherein L_1 is



or a mixture of

-continued

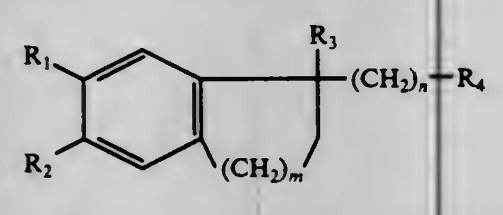


wherein R_3 and R_4 are hydrogen, methyl, or fluoro, being the same or different, with the proviso that one of R_3 and R_4 is fluoro only when the other is hydrogen or fluoro; and

wherein R_1 is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, two, or three chloro or alkyl of one to 3 carbon atoms, inclusive, or a pharmacologically acceptable cation.

4,057,573
HYDROAROMATIC COMPOUNDS
Georges Haas, and Alberto Rossi, both of Oberwil, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.
Filed Feb. 11, 1975, Ser. No. 548,956
Claims priority, application Switzerland, Feb. 14, 1974, 2094/74
Int. Cl.² C07C *69/76*
U.S. Cl. 560—52 11 Claims

1. A compound of the general formula

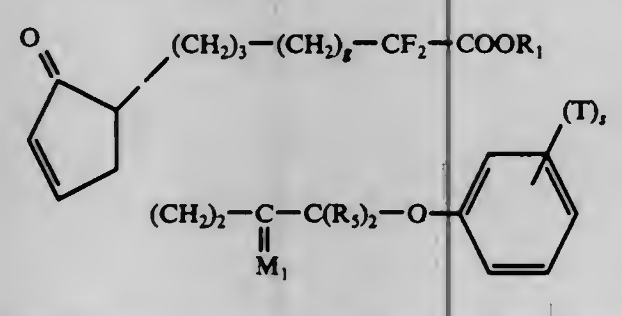


(I)

wherein one of the two radicals R_1 and R_2 denotes benzoyl, or benzoyl substituted by at least one member selected from lower alkyl, lower alkoxy, halogen and trifluoromethyl, and the other denotes hydrogen, hydroxy, hydroxy esterified by a lower alkanecarboxylic acid, or hydroxy etherified by a lower alkanol, R_3 denotes hydrogen, lower alkyl or lower hydroxyalkyl, R_4 denotes carboxyl, or carboxyl esterified by a lower alkanol or a lower alkanol which is substituted by hydroxy or lower alkoxy, m denotes 1 or 2 and n denotes 0 or 1, therapeutically acceptable salts of said carboxyl compounds.

4,057,574
2,2-DIFLUORO-16-PHENOXY-13,14-DIHYDRO-PGA$_2$ ANALOGS
Udo F. Axen, Plainwell, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.
Division of Ser. No. 552,708, Feb. 25, 1975, Pat. No. 4,001,300. This application Sept. 17, 1976, Ser. No. 724,236
Int. Cl.² C07C *65/22*
U.S. Cl. 560—53 58 Claims

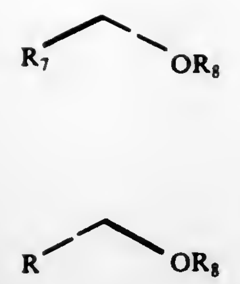
1. A compound of the formula



or a mixture comprising that compound and the enantiomer thereof,

wherein g is 2 to 4, inclusive;

wherein M_1 is

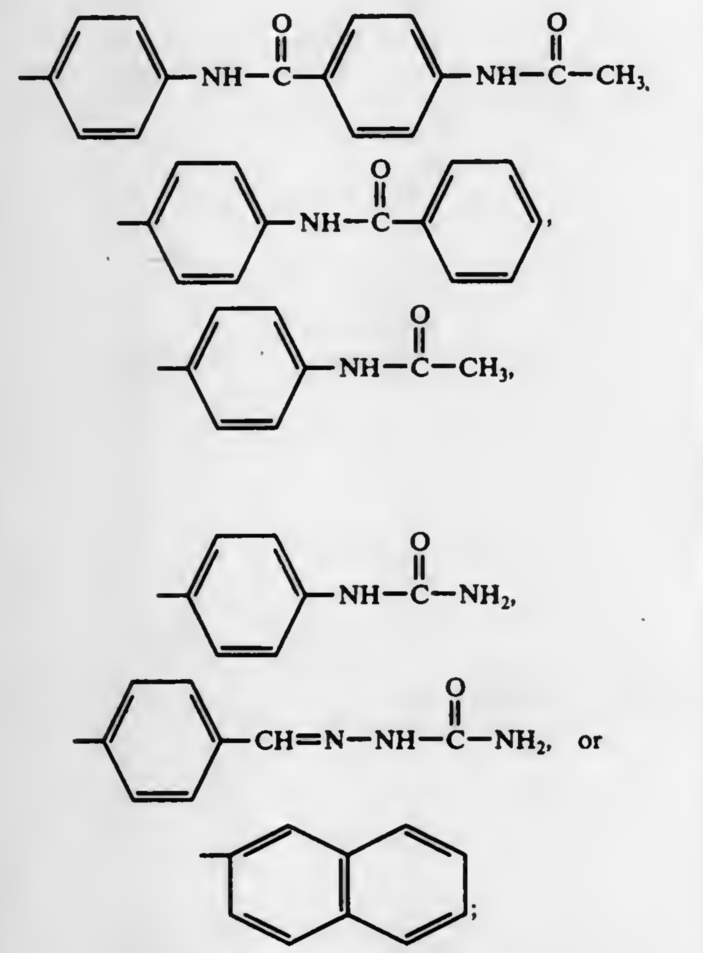


or

wherein R_7 and R_8 are hydrogen or methyl, with the proviso that one of R_7 or R_8 is methyl only when the other is hydrogen;

wherein T is alkyl of one to 3 carbon atoms, inclusive, fluoro, chloro, trifluoromethyl, or —OR_4 wherein R_4 is alkyl of one to 3 carbon atoms, inclusive, and wherein s is zero, one, 2, or 3, with the proviso that not more than two T's are other than alkyl;

wherein R_1 is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, 2, or 3 chloro, alkyl of one to 4 carbon atoms, inclusive, or a pharmacologically acceptable cation,



and

wherein R_5 is hydrogen or methyl, with the proviso that R_5 is methyl only when R_7 and R_8 are both hydrogen.

4,057,575
PROCESS FOR THE PREPARATION OF UNSATURATED ESTERS
Donald L. Klass, Barrington, Ill., assignor to Union Oil Company of California, Brea, Calif.
Continuation of Ser. No. 670,159, Sept. 25, 1967, abandoned, which is a continuation-in-part of Ser. No. 141,832, Sept. 29, 1961. This application June 23, 1976, Ser. No. 699,198
Int. Cl.² C07C *67/05*
U.S. Cl. 560—245 11 Claims

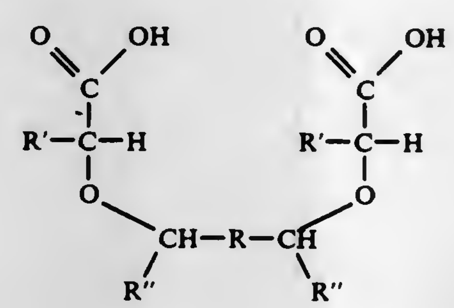
9. A vapor phase process for the preparation of unsaturated esters which comprises passing a substantially anhydrous gas mixture comprising (1) an unsaturated organic compound selected from the group consisting of alkenes and styrene, (2) a carboxylic acid having the formula R'COOH wherein R' is selected from the group consisting of alkyl, aralkyl, aryl and carboxy derivatives thereof having from 1 to 17 carbon atoms per molecule, and (3) oxygen, over a Group VIII noble metal compound and a redox agent therefor, said noble metal compound and said redox agent being supported on a solid support, said gas mixture being contacted with said supported noble metal compound and redox agent in the presence of a member selected from the group consisting of alkali metal and alkaline earth metal salts of said alkanoic acid

4,057,576
PROCESS FOR ISOLATING 2-HYDROXYNAPHTHALENE CARBOXYLIC ACIDS FROM REACTION MIXTURES OF THE ALKALI METAL SALTS OF 2-HYDROXYNAPHTHALENE WITH CARBON DIOXIDE
Wilfried Bachmann, Frankfurt am Main; Christian Gnabs, Kelkheim, Taunus; Kurt Janecka, Offenbach (Main); Eberhard Mundlos, Heusenstamm; Theodor Papenfuhs, Frankfurt am Main, and Gerhard Waese, Dietzenbach, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany
Filed June 3, 1975, Ser. No. 583,295
Claims priority, application Germany, June 4, 1974, 2426852
Int. Cl.² C07C *51/44, 51/48, 37/28*
U.S. Cl. 260—525 8 Claims

1. A process for the isolation of 2-hydroxynaphthalenecarboxylic acid from its reaction mixture derived from the reaction of the alkali metal salts of 2-hydroxynaphthalene with carbon dioxide which comprises diluting the reaction mixture with such an amount of water that the ratio of water to organic product is about 4:1 to 6:1, maintaining the reaction mixture at a temperature of about 80° to 100° C, adjusting the pH to about 6 to 7 by addition of aqueous mineral acid, adding, if required, such an amount of 2-hydroxynaphthalene that 1 mole or more of 2-hydroxynaphthalene is present per mole of 2-hydroxynaphthalenecarboxylic acid, allowing the phases to separate into an upper and lower phase, separating the lower phase at a temperature of about 80° to 100° C, cooling said upper phase to a temperature of about 15° to 25° C to precipitate 2-hydroxynaphthalene, separating the precipitate, adjusting the pH of the remaining liquid upper phase to about 1 to 2 and isolating the 2-hydroxynaphthalenecarboxylic acid that has separated.

4,057,577
PROCESS FOR PREPARING DI(ALKOXY-CARBOXY) HYDROCARBYLENES
Shigeto Suzuki, San Francisco, Calif., assignor to Chevron Research Company, San Francisco, Calif.
Filed Aug. 5, 1976, Ser. No. 711,934
Int. Cl.² C07C *59/22*
U.S. Cl. 260—535 P 11 Claims

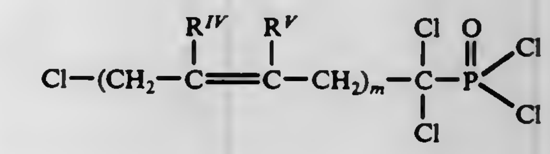
1. A process for preparing di(alkoxycarboxy) compounds of the formula



wherein R is straight or branched chain alkylene, oxaalkylene or cycloalkylene; each R' is hydrogen or straight or branched chain alkyl; and each R'' is hydrogen, straight or branched alkyl, arylalkyl, haloalkyl or oxaalkyl, which comprises contacting carbon monoxide with a saturated aldehyde and a non-adjacent dihydric alcohol in the presence of a catalytic amount of hydrogen fluoride at a temperature of from about 0° to about 100° C and a carbon monoxide partial pressure of from about 10 psia to about 4000 psia.

4,057,578
ADDUCTS OF OLEFINS AND TRICHLOROMETHANE PHOSPHONIC DICHLORIDE
Meir Asscher, and Hadassa Rosin, both of Rehovot, Israel, assignors to Rhone-Progil, Paris, France
Division of Ser. No. 529,556, Dec. 4, 1974, which is a continuation of Ser. No. 235,384, March 16, 1972, abandoned. This application Apr. 12, 1976, Ser. No. 675,937
Claims priority, application Israel, Mar. 17, 1971, 36431
Int. Cl.² C07F *9/34*
U.S. Cl. 260—543 P 9 Claims

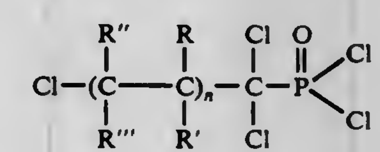
1. Adducts of trichloromethane phosphonic dichloride and olefinically unsaturated compounds having the general formula:



wherein R^{IV} and R^{V} are each selected from the group consisting of hydrogen, methyl and chlorine, and m is an integer from 1 to about 200.

4,057,579
ADDUCTS OF OLEFINS AND TRICHLOROMETHANE PHOSPHONIC DICHLORIDE
Meir Asscher, and Hadassa Rosin, both of Rehovot, Israel, assignors to Rhone-Progil, Paris, France
Continuation of Ser. No. 235,384, March 16, 1972, abandoned. This application Dec. 4, 1974, Ser. No. 529,556
Claims priority, application Israel, Mar. 17, 1971, 36431
Int. Cl.² C07F *9/34*
U.S. Cl. 260—543 P 19 Claims

1. Compounds having the general formula



wherein R and R' may be the same or different and are each selected from the group consisting of hydrogen, C_1 to C_6 alkyl and fluorine; R'' is selected from the group consisting of hydrogen, C_1 to C_{12} alkyl, fluorine, bromine, chlorine, phenyl and substituted phenyl in which the substituent is selected from the group consisting of chlorine, a vinyl group, nitro and carboxy; R''' is selected from the group consisting of hydrogen, C_1 to C_6, alkyl fluorine, chlorine, bromine, or R and R'' together define a ring selected from the group consisting of a cyclohexane ring, a cyclooctane ring, a norbornane ring, a norbornanone ring, a 2,6,6-trimethylbicyclo[3.1.1]heptane ring and a succinic anhydride ring; and n is an integer from 1 to about 500.

4,057,580
PRODUCTION OF WATER-SOLUBLE POLYAMINE CONDENSATE POLYMERS HAVING GREATER LINEAR CHARACTERISTICS
Kenneth G. Phillips, River Forest; Edward G. Ballweber, Glenwood, and Radhakrishnan Selvarajan, Oak Park, all of Ill., assignors to Nalco Chemical Company, Oak Brook, Ill.
Filed July 27, 1976, Ser. No. 709,029
Int. Cl.² C07C *85/04*
U.S. Cl. 260—567.6 P 5 Claims

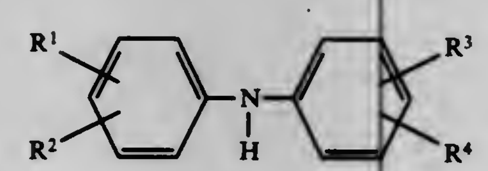
1. In a process for the production of water-soluble polyamine polymers by condensation reaction from ethylene dichloride and ammonia under pressure of 4–10 atmospheres, the

improvement which comprises conducting the reaction in two stages and

1. reacting ethylene dichloride and ammonia at a temperature of about 110–120° C and at pH of 9.0–10.0 for 1–3 hours in the presence of a first amount of alkali metal hydroxide to produce a polyamine reaction mixture; and
2. thereafter adding to said polyamine reaction mixture a second equal amount of alkali metal hydroxide wherein the total of the first and second amounts is equivalent to about 150% based on the equivalent weight of the available chlorine present and continuing heating the reaction mixture for about 8–12 hours at about 102°–112° C to produce a polyamine condensate polymer product of increased linear characteristics.

4,057,581
PROCESS FOR PREPARING DIPHENYLAMINES
Hermann-Dieter Krall, Meerbusch; Oskar Weissel, and Hans-Helmut Schwarz, both of Krefeld, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany
Filed Apr. 15, 1976, Ser. No. 677,478
Claims priority, application Germany, May 10, 1975, 2520893
Int. Cl.² C07C *87/54, 91/16, 91/18*
U.S. Cl. 260—571 **18 Claims**

1. In a process for preparing a diphenylamine having the formula



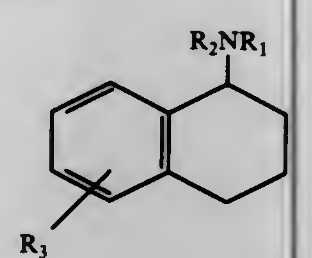
wherein

R^1, R^2, R^3 and R^4 are the same or different and are hydrogen, alkyl containing 1 to 4 carbon atoms or alkoxy containing 1 to 4 carbon atoms

by catalytic dehydrogenation of a dicyclohexylamine, N-cyclohexylidene-cyclohexylamine, N-cyclohexyl-aniline or N-cyclohexylidene-aniline in the presence of a nickel/-chromium catalyst the improvement which comprises employing as the nickel/chromium catalyst one which contains at least one member of the group manganese, aluminum and copper.

4,057,582
AMINOTETRALINS AND USE IN INDUCING ANESTHESIA
Daniel Ambrose Dunnigan, Winthrop Harbor; Adolph Oscar Geiszler, Mundelein, and James Brooks Holland, Zion, all of Ill., assignors to Abbott Laboratories, North Chicago, Ill.
Filed Sept. 26, 1973, Ser. No. 401,018
Int. Cl.² C07C *91/16*
U.S. Cl. 260—574 **2 Claims**

1. A compound selected from the group consisting of a member of the formula



where R_1 is selected from the group consisting of a branched or straight chain alkyl of 6–9 carbon atoms and cyclohexyl, R_2 is selected from the group consisting of hydrogen, loweralkyl and lower alkanol, wherein said R_2 contains 1–3 carbon atoms, and R_3 is 5-methoxy or 6-methoxy; and nontoxic pharmaceutically acceptable acid addition salts thereof.

4,057,583
PROCESS FOR THE PREPARATION OF PINACOLONE
Walter Merz, Leverkusen, and Dieter Nachtsheim, Dormagen, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany
Filed Dec. 15, 1975, Ser. No. 640,801
Claims priority, application Germany, Dec. 27, 1974, 2461503
Int. Cl.² C07C *45/02*
U.S. Cl. 260—593 R **16 Claims**

1. Process for the preparation of pinacolone which process comprises

1. mixing a butene compound selected from
   a. 2-methyl-but-2-ene of the formula

$$CH_3-\overset{\overset{\textstyle CH_3}{|}}{C}=CH-CH_3$$

   b. 2-methyl-but-1-ene of the formula

$$CH_2=\overset{\overset{\textstyle CH_3}{|}}{C}-CH_2-CH_3$$

   c. the addition products of the two said butenes of the general formula

$$CH_3-\underset{\underset{\textstyle X}{|}}{\overset{\overset{\textstyle CH_3}{|}}{C}}-CH_2-CH_3$$

in which

X is Cl, Br, HSO_4 or H_2PO_4,

and mixtures of said compounds with an aqueous solution of hydrochloric or hydrobromic acid to provide 15% to 40% by weight of said acid in the aqueous phase of the resulting mixture;

2. adding formaldehyde to the resulting mixture over a period of 0.5 to 10 hours, at a pressure of from 1 to 20 bars (absolute) and at a temperature of from 50° to 200° C. at a rate of 0.5 to 1.5 moles of formaldehyde per mole of butene compound,
3. allowing the mixture to react for an additional period of 0.5 to 3 hours; and
4. separating off the pinacolone by distillation.

4,057,584
PROCESS FOR PREPARING HEXAFLUOROPROPANONE-2
Takashi Touzuka, Settsu, and Yonosuke Ohsaka, Takatsuki, both of Japan, assignors to Daikin Kogyo Co., Ltd., Osaka, Japan
Filed June 11, 1976, Ser. No. 695,110
Claims priority, application Japan, June 24, 1975, 50-79021
Int. Cl.² C07C *45/04*
U.S. Cl. 260—593 H **2 Claims**

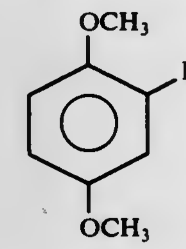
1. A process for preparing hexafluoropropanone-2 from hexafluoropropene which comprises contacting at a temperature of 80° to 300° C. hexafluoropropene and oxygen in a molar ratio of 1:10–0.1 with a fluorinated alumina containing fluorine in a concentration of 0.5 to 50% by weight.

4,057,585
METHOD OF PREPARING 2,3-DICHLOROANISOLE
Wilford Lee Mendelson, Philadelphia, and Robert Lee Webb, West Chester, both of Pa., assignors to SmithKline Corporation, Philadelphia, Pa.
Filed Sept. 2, 1976, Ser. No. 719,795
Int. Cl.² C07C *41/04*
U.S. Cl. 260—612 D **8 Claims**

1. The method of preparing 2,3-dichloro-1-loweralkoxybenzenes comprising the reaction of 1,2,3-trichlorobenzene with an alkali metal lower alkoxide with heating at about 100°–200° C. for from about ½–24 hours in an inert organic solvent selected from the group consisting of dimethylformamide, dimethyl acetamide and dimethylsulfoxide and additionally in the presence of an alkanol selected from the group consisting of methanol and ethanol and said alkanol is present in the reaction mixture in a quantity sufficient to solvate the metal lower alkoxide reagent.

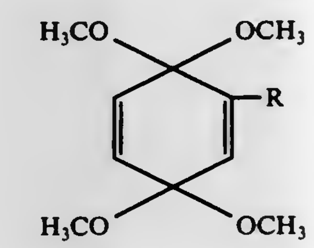
4,057,586
PROCESS FOR THE MANUFACTURE OF HYDROQUINONE DIMETHYL ETHERS
Rudolf Pistorius, Wehrheim, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany
Filed Oct. 21, 1976, Ser. No. 734,455
Claims priority, application Germany, Oct. 23, 1975, 2547464
Int. Cl.² C07C *41/00*
U.S. Cl. 260—613 D **7 Claims**

1. Process for the manufacture of hydroquinone dimethyl ethers of the formula



I,

wherein R is hydrogen, an alkyl group having from 1 to 4 carbon atoms or hydrogen, which comprises hydrogenating catalytically p-benzoquinone tetramethyl diketals of the formula



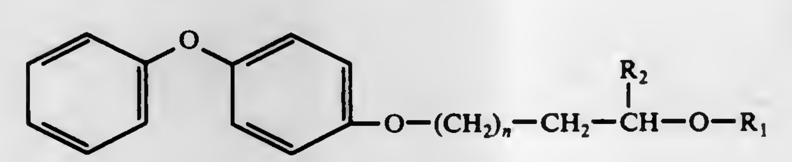
II,

wherein R has the same meaning as in formula I, in the presence of a noble metal catalyst at a temperature from about 0° to +150° C.

4,057,587
DIPHENYL ETHER DERIVATIVES
Friedrich Karrer, Basel, and Saleem Farooq, Aesch, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.
Filed Oct. 20, 1975, Ser. No. 623,877
Claims priority, application Switzerland, Oct. 24, 1974, 14247/74; Sept. 18, 1975, 12297/75
Int. Cl.² C07C *43/22*
U.S. Cl. 260—613 R **7 Claims**

1. A compound of the formula I

(I)



wherein

R_1 represents a C_3-C_5-alkenyl, C_3-C_5-halogenoalkenyl or C_3-C_5-alkynyl radical,

R_2 represents a hydrogen atom or a methyl radical, and

n represents the number 1 or 2.

4,057,588
PROCESS FOR THE PREPARATION OF PHLOROGLUCINOL
Hans-Georg Zengel, Kleinwallstadt, and Manfred Bergfeld, Erlenbach, Main, both of Germany, assignors to Akzona Incorporated, Asheville, N.C.
Filed Jan. 21, 1976, Ser. No. 651,089
Claims priority, application Germany, Jan. 22, 1975, 2502429
Int. Cl.² C07C *39/10*
U.S. Cl. 260—621 R **8 Claims**

1. A process for the preparation of phloroglucinol from benzene-tricarboxylic acid — (1,3,5) — triamide comprising the steps of:

a. utilizing chlorine to chlorinate benzene — tricarboxylic acid — (1,3,5) — triamide in an aqueous inorganic acid medium selected from the group consisting of aqueous hydrochloric acid, aqueous sulfuric acid, and aqueous phosphoric acid, an aqueous alcoholic medium, or a mixture thereof, at a temperature from about 0° to about 40° C, to form benzene — tricarboxylic acid(1,3,5) — tri-N-chloramide;
b. reacting an aqueous suspension of said tri-N-chloramide with ammonia at a temperature not exceeding 25° C until said tri-N-chloramide has dissolved and subsequently heating the reaction mixture to boiling to form 1,3,5-triureido-benzene; and
c. hydrolyzing said 1,3,5-triureido-benzene in an inorganic acid solution selected from the group consisting of hydrochloric acid solution and sulfuric acid solution at a temperature from about 140° to about 200° C and corresponding characteristic partial pressure to form phloroglucinol.

4,057,589
HYDROXYLATION OF UNSATURATED DIOLS TO PREPARE NOVEL TETRAOLS
Robert Bacskai, Kensington, Calif., assignor to Chevron Research Company, San Francisco, Calif.
Division of Ser. No. 612,417, Sept. 11, 1975, Pat. No. 3,991,126. This application June 18, 1976, Ser. No. 697,594
Int. Cl.² C07C *29/02, 29/10*
U.S. Cl. 260—635 E **3 Claims**

1. A process for preparing tetraols of the formula

$$\underset{\underset{\textstyle OH}{|}}{CH_2}-(CH_2)_m-\underset{\underset{\textstyle OH}{|}}{CH}-\underset{\underset{\textstyle OH}{|}}{\overset{\overset{\textstyle CH_3}{|}}{C}}-(CH_2)_n-\underset{\underset{\textstyle OH}{|}}{CH_2}$$

wherein n is an integer from 1 to about 6 and m is an integer from 0 to 6, from a mixture of unsaturated diols comprising methylene alkane diols of the formula

$$HOCH_2-(CH_2)_n-\overset{\overset{\textstyle CH_2}{\|}}{C}-(CH_2)_n-CH_2OH$$

and methyl alkene diols of the formula

$$HOCH_2-(CH_2)_m-CH=\overset{\overset{\textstyle CH_3}{|}}{C}-(CH_2)_n-CH_2OH$$

wherein n and m are as defined above, which comprises the steps of: (1) contacting said mixture of unsaturated diols with less than the stoichiometric amount of a peroxy acid to selectively epoxidize the methyl alkene diols of said mixture; and hydroxylating the epoxide of the first step in the presence of water at a temperature of at least about 120° C.

4,057,590
PROCESS FOR MAKING PENTACHLORONITROBENZENE
Walter A. Gay, Cheshire, Conn., assignor to Olin Corporation, New Haven, Conn.
Filed Jan. 24, 1977, Ser. No. 761,565
Int. Cl.² C07C *79/12*
U.S. Cl. 260—646 **13 Claims**

1. The process for producing pentachloronitrobenzene comprising

reacting pentachlorobenzene with substantially pure nitric acid at a temperature from about 40° to about 85° C, with the provisos that

i. a weight ratio of said nitric acid to said pentachlorobenzene of at least about 3.0:1 is employed when the reaction is effected at a temperature in the range of about 40° to about 49° C;
ii. a weight ratio of said nitric acid to said pentachlorobenzene of at least about 2.5:1 is employed when the reaction is effected at a temperature in the range of about 50° to about 59° C;
iii. a weight ratio of said nitric acid to said pentachlorobenzene of at least about 2.0:1 is employed when the reaction is effected at a temperature in the range of about 60° to about 75° C; and
iv. a weight ratio of said nitric acid to said pentachlorobenzene in the range of about 2.0:1 to 3.5:1 is employed when the reaction is effected at a temperature in the range of about 76° to about 85° C.

4,057,591
PROCESS FOR PREPARING OLIGOMERS OF TETRAFLUOROETHYLENE
Masahiro Ozawa; Fumio Inoue, both of Kamifukuoka; Tadaaki Komatsu, Saitama, and Kimiaki Matsuoka, Kawagoe, all of Japan, assignors to Central Glass Company, Limited, Ube, Japan
Filed June 16, 1976, Ser. No. 696,718
Claims priority, application Japan, June 16, 1975, 50-72054
Int. Cl.² C07C *21/18;* C08F *2/38;* C07C *17/26*
U.S. Cl. 260—653.1 R **19 Claims**

1. A process for preparing oligomers of tetrafluoroethylene comprising subjecting tetrafluoroethylene monomer to an oligomerization reaction in the presence of a fluoride compound selected from the group consisting of potassium fluoride, sodium fluoride, cesium fluoride, ammonium fluoride, and a quaternary ammonium fluoride and a crown ether, at a temperature of about from 20° to 200° C, said oligomerization reaction being carried out in an organic solvent which is inert under said reaction conditions, said fluoride compound being employed in an amount greater than 0.01 mol per liter of said solvent and said crown ether being employed in an amount greater than 1/50 mol of the employed fluoride compound.

4,057,592
OXYCHLORINATION OF ETHYLENE WITH FLUID BED CATALYST
Albert Antonini; Philippe Joffre, both of Paris, and Francois Laine, Martiques, all of France, assignors to Rhone-Poulenc Industries, France
Continuation of Ser. No. 144,652, May 18, 1971, abandoned, which is a continuation-in-part of Ser. No. 730,605, May 20, 1968, abandoned. This application Dec. 23, 1974, Ser. No. 535,797
The portion of the term of this patent subsequent to Sept. 23, 1992, has been disclaimed.
Int. Cl.² C07C *17/02*
U.S. Cl. 260—659 A **17 Claims**

1. A process for the oxychlorination of ethylene to produce a product in which at least 15 mole percent of the ethylene is transformed into 1,1,2-trichloroethane and 1,1,2,2-tetrachloroethane, in which less than 5 mole percent of the ethylene is transformed into combustion products and in which less than 3 mole percent of the ethylene is transformed to unsaturated C_2 chlorinated compounds, comprising passing a gaseous feed mixture of ethylene, hydrogen chloride and an oxygen containing gas through a reaction zone maintained at a temperature within the range of 280° to 370° C and containing a fluid bed catalyst comprising an oxychlorination catalyst deposited on a carrier consisting essentially of silica and magnesia having a surface area within the range of 10 to 200 m²/g, in which the molar feed ratios of the reactants are a ratio of O_2/C_2H_4 within the range of above 0.9 to 1.5, a ratio of HCl/O_2 within the range of 1.40 to 3.0 and a ratio of HCl/C_2H_4 within the range of 2.20 to 3.65.

4,057,593
PROCESS FOR PREPARING CIS-OLEFINS
Hans Jürgen Bestmann, Erlangen; Werner Theo Stransky, and Otto Vostrowsky, both of Uttenreuth, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany
Continuation of Ser. No. 521,170, Nov. 5, 1974, abandoned. This application Mar. 29, 1976, Ser. No. 671,417
Claims priority, application Germany, Nov. 7, 1973, 2355534
Int. Cl.² C07C *1/00, 1/24*
U.S. Cl. 260—682 **18 Claims**

1. An improved process for preparing cis-olefins of the formula

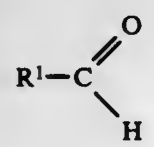
$$\mathrm{R{-}\overset{H}{\overset{|}{C}}{=}\overset{H}{\overset{|}{C}}{-}R^1}, \qquad \text{III}$$

wherein

R is straight-chain or branched (C_1–C_{15}) alkyl or (C_2–C_{15}) alkenyl and
R^1 is a straight-chain or branched (C_1–C_{20}) alkyl or (C_2–C_{20}) alkenyl group, which process comprises dissolving potassium in a hexaalkylphosphoric acid triamide, adding to the solution obtained a phosphonium salt of the formula

$$\mathrm{R{-}CH_2{-}\overset{+}{P}\ (C_6H_5)_3\bar{B}r} \qquad \text{I}$$

and adding to the reaction mixture obtained an aldehyde of the formula



II

and isolating the product obtained.

4,057,594
Patent Not Issued For This Number

4,057,595
METHOD OF MODIFYING THE PHYSICAL PROPERTIES OF URETHANE ELASTOMERS
Lawrence A. Rauner, and Joseph A. Colquhoun, both of Midland, Mich., assignors to Dow Corning Corporation, Midland, Mich.
Filed May 19, 1975, Ser. No. 578,562
Int. Cl.² C08L *83/06*
U.S. Cl. 260—824 R **14 Claims**

1. A method of modifying the physical properties of urethane elastomers which method consists of (I) introducing into an uncured urethane elastomer from 5.1 to 36 weight percent, based on the weight of the urethane and siloxane-polyoxyalkylene copolymer, a siloxane-polyoxyalkylene copolymer selected from the group consisting of

$$\mathrm{H(OR)_xO\underset{Me}{\overset{Me}{Si}}(OSiMe_2)_yO\underset{Me}{\overset{Me}{Si}}(OR)_xOH},\ \text{and} \qquad \text{(A)}$$

$$\mathrm{H(OR)_xO\underset{Me}{\overset{Me}{Si}}(OSiMe_2)_yO\underset{Me}{\overset{Me}{Si}}(OR)_xO\underset{Me}{\overset{Me}{Si}}(OSiMe_2)_y{-}} \qquad \text{(B)}$$

$$\mathrm{O\underset{Me}{\overset{Me}{Si}}(OR)_xO\underset{Me}{\overset{Me}{Si}}(OSiMe_2)_yO\underset{Me}{\overset{Me}{Si}}(OR)_xOH}$$

wherein each x has an average value of 3 to 45, each y has an average value of 8 to 198, Me is a methyl radical, wherein +OR+_x is a polyoxyalkylene polymer or copolymer wherein R is composed of ethylene radicals or butylene radicals and mixtures of ethylene or butylene radicals with propylene radicals, the amount of ethylene or butylene radicals relative to the propylene radicals being such that the ratio of carbon atoms to oxygen atoms in the total +OR+ block ranges from 2.0/1 to 2.9/1, which siloxane-polyoxyalkylene copolymer is prepared by the process which consists essentially of reacting a dihydroxy functional linear dimethylpolysiloxane with a dihydroxy functional polyoxyalkylene polymer, wherein the hydroxy groups on the polyoxyalkylene polymer are primary hydroxyl groups and where the mole ratio of the hydroxy on the polyoxyalkylene polymer to the hydroxy on the linear dimethylpolysiloxane is 2:1 to 0.5:1, in a solvent solution at 40–75 percent solids based on the total weight of the dimethylpolysiloxane, polyoxyalkylene polymer and solvent, in the presence of a non-rearranging acid condensation catalyst at a temperature of 80°–130° C. for a period of 3–15 hours,

(II) curing the urethane polymer whereby the siloxane polyoxyalkylene copolymer is reacted into the urethane polymer, thereby modifying the physical properties of the urethane polymer.

4,057,596
ANTI-STICKING SILICONE COMPOSITIONS OF NON-SOLVENT TYPE
Minoru Takamizawa, Annaka; Humio Okada, Takasaki; Nobuyuki Hasebe, and Hiromi Toida, both of Annaka, all of Japan, assignors to Shinetsu Chemical Company, Tokyo, Japan
Filed June 6, 1974, Ser. No. 476,989
Claims priority, application Japan, June 11, 1973, 48-65580
Int. Cl.² C08L *83/06, 83/14*
U.S. Cl. 260—825 **5 Claims**

1. An anti-sticking, non-solvent type silicone composition which comprises

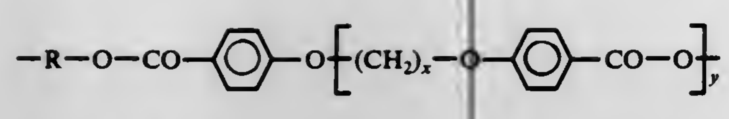
a. a diorganopolysiloxane of substantially straightchain molecular structure having vinylmethylsilyl terminal groups at both chain ends, more than 90% of the organic groups bonded to the silicon atoms other than the terminal silicon atoms therein being methyl groups and the remaining organic groups being monovalent organic groups having no aliphatic unsaturation, and having a viscosity within the range between 30 centistokes and 5,000 centistokes at 25° C,
b. a diorganopolysiloxane of substantially straightchain molecular structure having hydrogendimethylsilyl terminal groups at both chain ends, more than 90% of the organic groups bonded to the silicon atoms other than the terminal silicon atoms therein being methyl groups and the remaining organic groups being monovalent organic groups having no aliphatic unsaturation, and having a viscosity within the range between 2 centistokes and 100 centistokes at 25° C,
c. a methylvinylpolysiloxane having at least three vinyl groups bonded directly to the silicon atoms in one molecule, and having a viscosity within the range between 10 centistokes to gum-like consistency at 25° C,
d. a methylhydrogenpolysiloxane having at least three hydrogen atoms bonded directly to the silicon atoms in one molecule, and having a viscosity within the range between 10 centistokes and 500 centistokes at 25° C, and
e. a catalyst capable of accelerating addition reaction between the vinyl groups bonded directly to the silicon atoms and the hydrogen atoms bonded directly to the silicon atoms;

said anti-sticking composition having a viscosity within the range between 30 centistokes and 10,000 centistokes at 25° C, and wherein the molar ratio of the hydrogen atoms bonded directly to the silicon atoms in said component (b) to the vinyl bonded directly to the silicon atoms in said component (a) is within the range between 0.1 and 1.0; the molar ratio of the hydrogen atoms bonded directly to the silicon atoms in said components (b) and (d) to the vinyl groups bonded directly to the silicon atoms in said components (a) and (c) is within the range between 0.5 and 5.0; and the total amount of said components (a) and (b) is from 30 to 95% by weight based on the weight of the composition.

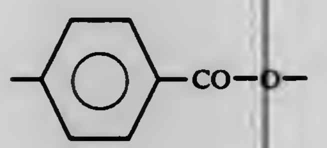
4,057,597
BLOCK-TYPE ARYL COPOLYESTERS AND FILAMENTS BASED ON THESE COPOLYESTERS
Bernard Fayolle, Ecully, France, assignor to Rhone-Poulenc-Textile, Paris, France
Filed Aug. 25, 1976, Ser. No. 717,677
Claims priority, application France, Aug. 27, 1975, 75.26737; June 8, 1976, 76.17484
Int. Cl.² C08L *67/00;* B28B *3/20;* D01D *5/12;* D01F *11/00*
U.S. Cl. 260—860 **8 Claims**

1. Spinnable and moldable block-type copolyesters, characterized in that they consist essentially of:

from 10 to 90% of recurring flexible units of the formula



in which R is an aliphatic, alicyclic or araliphatic radical, x is an integer from 2 to 6, inclusive, and y is 0 or 1, and from 90 to 10% of recurring rigid units of the formula



the copolyesters having an inherent viscosity of at least 0.25, measured on an 0.5% strength by weight solution in a 60/40 mixture of phenol and tetrachloroethane at 25° C.

4,057,598

MULTIPHASE BLOCK AND GRAFT COPOLYMERS COMPRISING A HYDROPHILIC CONTINUOUS PHASE AND HYDROPHOBIC DOMAINS

Robert D. Lundberg, Somerville, and Neville G. Thame, Edison, both of N.J., assignors to Exxon Research & Engineering Co., Linden, N.J.

Continuation of Ser. No. 327,831, Jan. 29, 1973, abandoned. This application Feb. 27, 1975, Ser. No. 553,613

Int. Cl.² C08L *53/00*

U.S. Cl. 260—857 G **6 Claims**

1. A composition of matter which comprises a thermoplastic having an average molecular weight of at least 10,000 selected from the group consisting of copolymers represented by graft copolymers having the general formula

$$\begin{matrix} B \\ | \\ [A]_m \end{matrix}$$

and block copolymers having the general formula xB—[AB]-$_n$—ya wherein n is an integer $\geqq 1$, m is >1, x and y are 0 or 1, and y is 1 when n is 1, A is a thermoplastic hydrophobic polymer block having a softening point of at least about 35° C. and a molecular weight of at least about 2,00, A being selected from the group consisting of polystyrene, poly(t-butyl styrene), polyvinyl toluene, polymethylmethacrylate, polyamides and copolymers thereof, and B is a thermoplastic hydrophilic polymer block which comprises from about 30–97 weight % of said copolymer, B being selected from the group consisting of poly(ethylene oxide), polyacrylamide, poly- α-hydroxyethylmethacrylate and copolymers thereof wherein the hydrophilic portion is greater than 50%, and said composition further characterized as being a water swollen gel.

4,057,599

PROCESS FOR THE PREPARATION OF VINYL AROMATIC-MODIFIED POLYPHENYLENE ETHERS

Glenn Dale Cooper, Delmar, and Irwin Schraga, Guilderland, both of N.Y., assignors to General Electric Company, Pittsfield, Mass.

Filed Oct. 18, 1976, Ser. No. 733,519

Int. Cl.² C08L *23/00, 25/00*

U.S. Cl. 260—874 **10 Claims**

1. In a process for the preparation of a composition comprising a polyphenylene ether resin and a vinyl aromatic resin which comprises heating a mixture comprising a polyphenylene ether resin and a vinyl aromatic compound under polymerization conditions until the vinyl aromatic compound has at least partially polymerized the improvement which comprises forming said mixture from (i) a polyphenylene ethermethylene chloride complex obtained by oxidizing a phenol in a warm solution of methylene chloride in the presence of a complex catalyst, extracting the catalyst and cooling in precipitate the complex and (ii) said vinyl aromatic compound, heating said mixture to decompose said complex and to remove the methylene chloride from the mixture, and thereafter continuing said heating until the vinyl aromatic compound has at least partially polymerized.

4,057,600

PROCESS FOR PRODUCING BLOCK COPOLYMERS

Akio Kimura; Kenji Seki; Mamoru Ukita; Satoshi Asahi, all of Sodegaura, and Sanae Tagami, Ichihara, all of Japan, assignors to Idemitsu Kosan Company Limited, Tokyo, Japan

Filed Dec. 6, 1976, Ser. No. 747,937

Claims priority, application Japan, Dec. 16, 1975, 50-149097

Int. Cl.² C08F *295/00*

U.S. Cl. 260—878 B **19 Claims**

1. A process for producing a block copolymer which comprises

i. polymerizing ethylene or propylene or copolymerizing ethylene or propylene with another α-olefin having from 2 to 7 carbon atoms in the presence of a Ziegler-type catalyst comprising (a) an organic metal compound or a hydrogenated compound thereof wherein the metal is selected from groups I to III of the Periodic Table and (b) a transition metal compound of a metal selected from groups IV to VI of the Periodic Table, and
ii. copolymerizing the resultant polymer or copolymer with a radical-polymerizable vinyl compound in the presence of an organic sulfoxide.

4,057,601

BLOCK COPOLYMERS OF ALKADIENES AND MONOVINYL ARENES

George A. Moczygemba, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Nov. 20, 1975, Ser. No. 633,884

Int. Cl.² C08L *53/02*

U.S. Cl. 260—880 B **9 Claims**

1. A copolymer having the structure D-E-C, wherein
D is a hydrogenated block of low vinyl poly-1,3-butadiene,
E is a hydrogenated polyisoprene block, and
C is a polystyrene block.

4,057,602

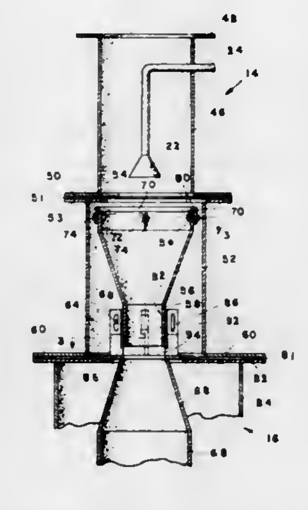
VENTURI SCRUBBER

Ernest L. Kolm, 419 W. Cambridge, Alliance, Ohio 44601

Continuation of Ser. No. 233,091, March 9, 1972, abandoned. This application May 30, 1974, Ser. No. 474,701

Int. Cl.² B01D *47/10*

U.S. Cl. 261—63 **17 Claims**



1. In a venturi scrubber having a first region for receiving a primary stream of gas, a second region extending from the downstream end of the first region and converging in the downstream direction, a third region of reduced diameter extending in a smooth inner surface configuration at the downstream end of the second region and forming the venturi throat, and a fourth region extending in a smooth inner surface configuration from the downstream end of the third region and diverging in the downstream direction, means to inject liquid in droplet form into the primary stream of gas, the improvement which comprises:

at least one first duct opening into the scrubber at a point located within a first zone encompassing the downstream portion of the third region and the upstream portion of the fourth region; and

means for directing a secondary stream of gas through the first duct into the first zone of the scrubber whereby the gas enters the first zone at an acute angle to the primary stream of gas so as to cause a substantial increase in turbulence within the primary stream of gas and a resultant increase in the surface area of the liquid droplets in said stream.

4,057,603

SAFETY APPARATUS FOR A CARBURETOR

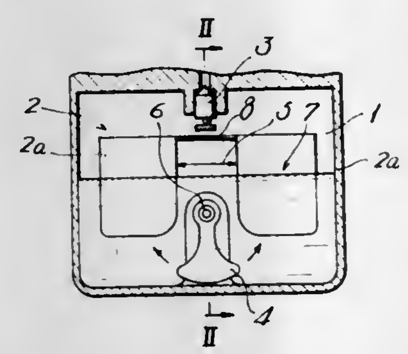
Gen Irie, Asaka, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 19, 1976, Ser. No. 668,789

Claims priority, application Japan, Mar. 24, 1975, 50-38406[U]

Int. Cl.² F02M *5/02*

U.S. Cl. 261—70 **1 Claim**



1. Safety apparatus for a carburetor comprising a float chamber adapted for containing fuel therein, said float chamber having opposite end walls, a float, a first shaft mounted proximate one of said end walls pivotably supporting said float in said chamber to follow the level of the fuel therein, a fuel valve disposed above said float for being closed thereby upon upward movement of the float, a pendulum weight, a second shaft mounted at the other end wall and pivotably supporting said pendulum weight in said chamber beneath said float for applying force to said float to close said fuel valve upon inclination of said chamber, said second shaft being positioned substantially midway of the width of said float, said shafts extending at right angles to one another, said pendulum having an upper end pivotably mounted on said shaft, said float including two spaced sections between which said pendulum is pivotably supported on said second shaft and an arm connected to said sections, said pendulum weight being a flat member having a narrow upper portion and a widened lower portion, said lower portion having opposite ends each positioned for contacting a respective float section depending on the direction of inclination of the chamber.

4,057,604

EXHAUST POLLUTION REDUCTION APPARATUS FOR INTERNAL COMBUSTION ENGINE CARBURETOR

Eugene C. Rollins, 3515 Fowler Ave., Ogden, Utah 84403

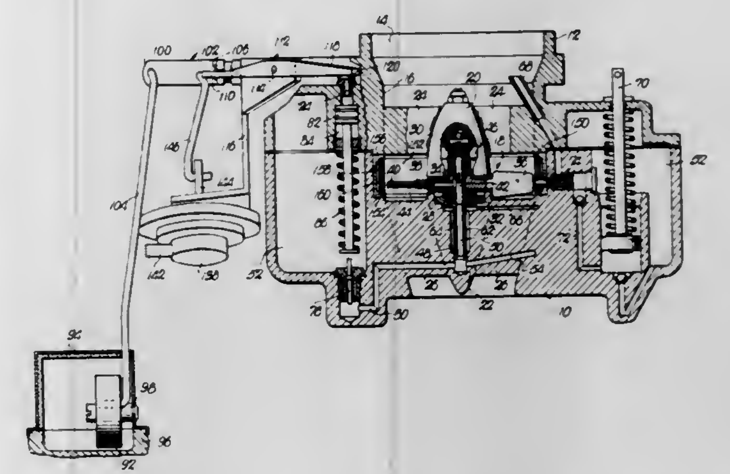
Filed Apr. 8, 1976, Ser. No. 674,853

Int. Cl.² F02M *17/16*

U.S. Cl. 261—88 **6 Claims**

1. In a carburetor for use with an internal combustion engine, said carburetor having an air horn defining a central bore, an air rotor rotatable within said bore in response to ambient air drawn into and through the bore during engine operation, at least one liquid fuel discharge jet on the rotor and rotatable therewith, and means for supplying the jet with liquid fuel during said rotation of the rotor, the improvement comprising:

said jet being positioned to direct a stream of fuel forwardly with respect to the direction of rotation of the rotor and therefore against the force of air within the bore,
said jet being disposed in close proximity to the periphery of the bore,



said jet also being directed at least partially radially inwardly toward the axis of rotation of the rotor,
said jet also being directed at least partially in counterflow relationship to the normal direction of travel of air through the horn.

4,057,605

MANUFACTURE OF LIGHT GRANULAR MATERIALS

Raymond Chauvin, Verneuil-en-Halatte, France, assignor to Charbonnages de France, Paris, France

Continuation of Ser. No. 433,617, Jan. 15, 1974, abandoned. This application Dec. 4, 1975, Ser. No. 637,648

Claims priority, application Luxembourg, Jan. 19, 1973, 66860

Int. Cl.² B01J *2/04*

U.S. Cl. 264—13 **11 Claims**

1. A method of manufacturing porous granular material useful as lightweight aggregate for concrete, and obtained from silico-aluminous material, comprising:

a. crushing the silico-aluminous material to a powder having a particle size of less than about 200 microns,
b. mixing said powder with water to form a slip which can be divided into droplets, said slip containing 25–40% by weight of water,
c. forming said slip into droplets which fall into a fluidized bed of solid particles, said bed being maintained at a temperature of 200°-500° C,
d. evaporating the water from said droplets in said bed to convert said droplets to expanded granules,
e. recovering said expanded granules, and
f. subjecting said expanded granules to ceramic firing.

4,057,606

METHOD OF PRODUCING ANISOTROPIC FERRITE MAGNET

Seihin Kobayashi, Kosai; Michihiro Torii, Hamamatsu, and Hiroaki Kobayashi, Toyohashi, all of Japan, assignors to Fuji Electrochemical Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 429,739, Jan. 2, 1974, abandoned. This application Sept. 25, 1975, Ser. No. 616,681

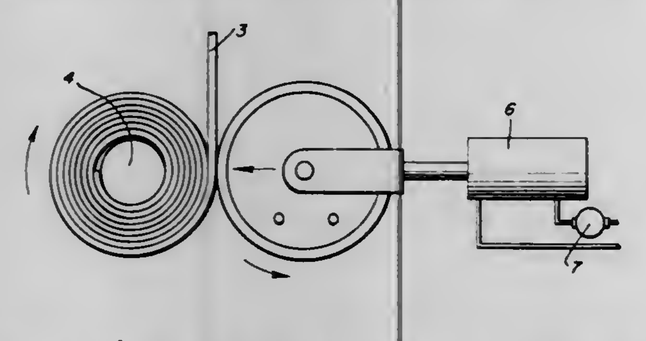
Claims priority, application Japan, July 14, 1972, 47-70010; July 14, 1972, 47-70011

Int. Cl.² B06B *1/02*

U.S. Cl. 264—24 **9 Claims**

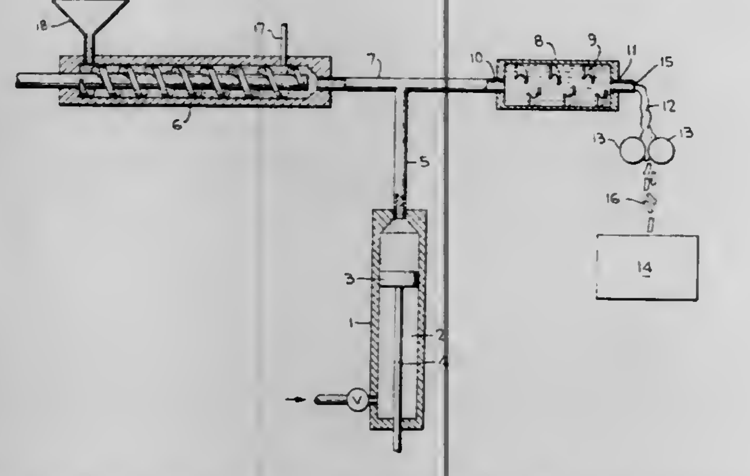
1. A method of producing an anisotropic ferrite magnet having a radial particle orientation comprising mixing pulverized ferrite particles with an organic binder suitable for forming ferrite magnets to develop the particles in the planar direc-

tion perpendicular to the C-axis, said pulverized ferrite particles having a hexagonal crystal structure of the magnetoplumbite type and comprising a substance having the chemical composition $MO{:}6Fe_2O_3$ in which M is Ba, Sr or Pb, said pulverized ferrite having been calcined and having a well-advanced crystal growth, rolling said mixture between calender rollers to form a ferrite sheet, said calender rollers being driven at substantially the same speed to align the particles with their easy axis oriented in a direction perpendicular to the plane of the ferrite sheet, placing said ferrite sheet in a solvent atmosphere for said ferrite sheet at about 30° 40° C, so as to



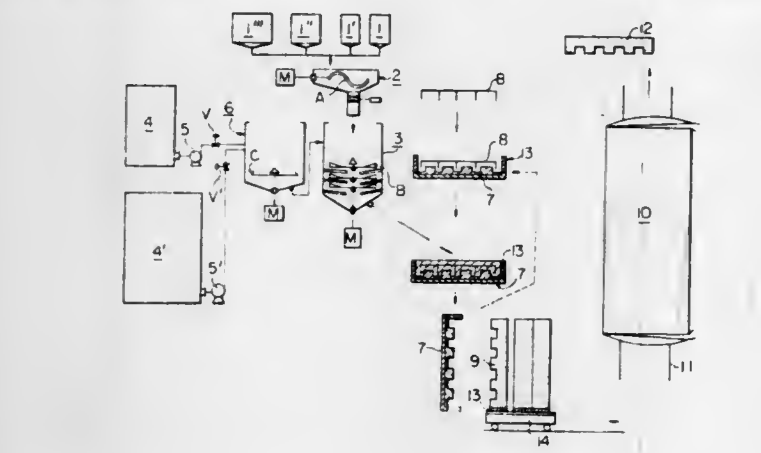
yield a desired viscosity in said ferrite sheet for making said sheet integral during subsequent winding, said winding of said sheet being done convolutely and at tightly under pressure and a temperature of about 30°–90° to form a cylindrical shaped integral mass, free of air space between adjacent layers of said wound sheet which form said integral mass, wherein the starting end of said sheet has the cross section shown in FIG. 1 (c) of the drawings. Cutting said cylindrical shaped integral mass into the shape of a cylinder, sintering the cylindrically shaped ferrite mass at about 1,000° to 1,3000° C and applying a magnetic field to said sintered mass to complete said anisotropic ferrite magnet having said radial particle orientation.

4,057,607
PROCESS FOR PREPARING SHEAR DEGRADABLE PARTICLE-CONTAINING RESIN POWDERS
John W. Soehngen, Berkeley Heights, and Martin J. Hannon, Martinsville, both of N.J., assignors to Celanese Corporation, New York, N.Y.
Filed Dec. 19, 1975, Ser. No. 642,415
Int. Cl.² C08K *3/08*
U.S. Cl. 264—28 **15 Claims**



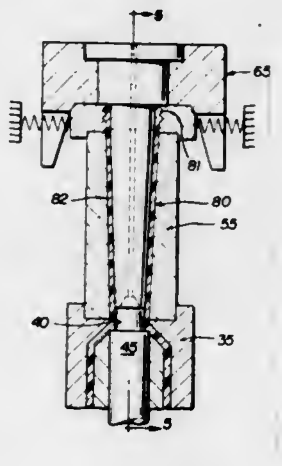
1. An improved process for preparing shear degradable particle-containing resin powders which process comprises (a) preparing a first composition consisting essentially of shear degradable particles and molten resin in the absence of high shearing forces on the particles, (b) intimately blending said first composition with a second composition consisting essentially of molten resin and curing agent to form a shear degradable particle-containing molten resin mixture in the absence of high shearing forces on the shear degradable particles and without activating the curing agent, (c) solidifying the shear degradable particle-containing molten resin mixture, and (d) grinding the solidified mixture to desired particle size.

4,057,608
PROCESS OF CONTINUOUS MANUFACTURE OF LIGHT-WEIGHT FOAMED CONCRETE
Akihiro Hashimoto, Atsugi; Shigeo Hayashi; Sadao Yamamoto, both of Yokohama, and Hitoshi Chujo, Tokyo, all of Japan, assignors to Showa Denko Kabushiki Kaisha and Misawa Homes Institute of Research and Development, both of Tokyo, Japan
Filed Apr. 19, 1976, Ser. No. 678,375
Int. Cl.² B29H *7/20*
U.S. Cl. 264—42 **8 Claims**



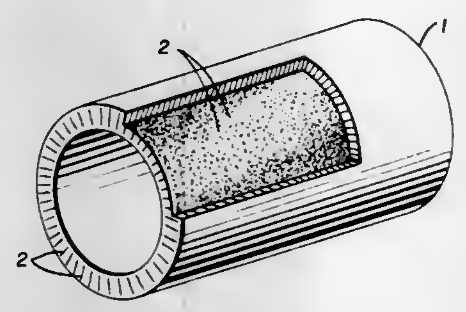
1. A process for manufacturing light-weight foamed concrete articles which comprises the steps of:
separately introducing two materials in a continuous manner at stated flow rates into a continuously stirred vessel, one of the two materials being a rapid setting hydraulic cement composition in the form of a finely divided dry powder and the other being an aqueous foamed liquid containing a foaming agent and a setting retarder;
continuously withdrawing the foamed cement slurry, so prepared, from the vessel before the foamed cement slurry begins to set, and; then,
placing the foamed slurry in a mold thereby to be cast therein.

4,057,609
METHOD OF MAKING BLOWN PLASTIC ARTICLES
Albert R. Uhlig, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio
Continuation of Ser. No. 500,679, Aug. 26, 1974, abandoned. This application Jan. 23, 1976, Ser. No. 651,673
Int. Cl.² B29C *17/07*
U.S. Cl. 264—89 **8 Claims**



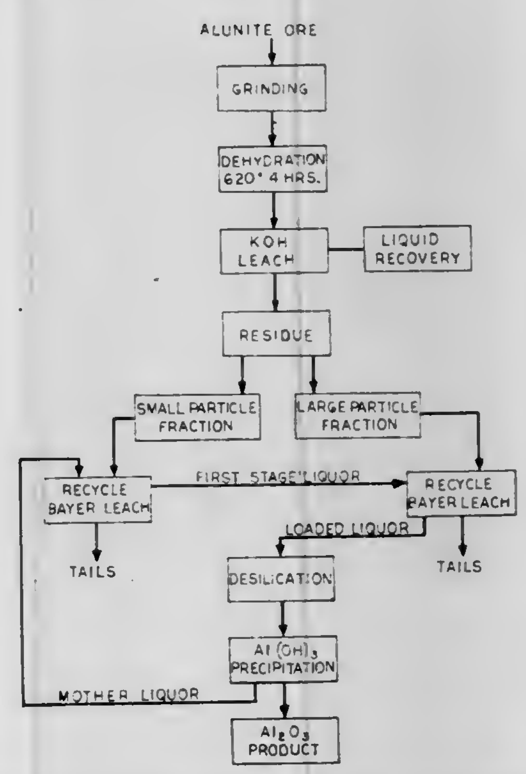
1. In a method of making a blown plastic article, the steps of (1) downwardly displacing an elongated core pin for axially inserting the core pin into substantially the entire length of an elongated open ended parison mold cavity which is substantially the same length as the core pin but slightly longer, the core pin having a frusto-conical recess in its end, (2) as the core pin approaches the distal end of the mold cavity, abutting the cantilevered end of the core pin against the free end of an axially movable, essentially cylindrical, biased support which is concentric with the core pin and projects into the mold cavity, the support including a frusto-conical projection which is telescopically received within the core pin recess and centers the core pin in the mold cavity through engagement of tapered surfaces of the projection and recess, with said free end of the core pin and the cylindrical portion of the support being of substantially the same external diameter at their abutting ends, with the abuttment of these members forming an essentially tubular cavity end portion having essentially the same inner diameter as the cavity portion immediately adjacent said end portion, and said support having an enlarged portion closing the adjacent end of the cavity, (3) jointly and axially displacing the core pin, the support, and the enlarged portion downwardly against the biasing force of the support (a) to guide the core pin during the final phases of the movement thereof into the mold cavity, (b) to remove the enlarged portion of the support from the cavity and (c) to expose the cavity to a source of plastic material in order to fill the cavity with plasticized plastic material under pressure introduced through an annular orifice surrounding the free end of said support to form an essentially tubular parison having an open end, (4) stripping the parison while supported on the pin from the mold cavity by vertically raising the core pin, with a minor terminal tubular portion of the parison projecting beyond the core pin, said terminal tubular portion having a thickness substantially the same as that portion of the parison adjacent the cantilevered end of the core pin, (5) displacing the parison on the core pin along an arcuate path to a blow molding station, (6) vertically lowering the core pin and parison to a position between a pair of blow mold sections (7) closing the mold sections and thereby pinching shut the projecting end of the parison, (8) blow molding the parison at said blow molding station to form a blown article, (9) stripping the blown article from the blow pin by vertically raising the blow pin relative to the blown article, and (10) displacing the blow pin along an arcuate path back to a position in vertical alignment with the parison mold.

4,057,610
HOSE REINFORCED WITH DISCONTINUOUS FIBERS ORIENTED IN THE RADIAL DIRECTION
Lloyd Arnold Goettler, and Arthur James Lambright, both of Akron, Ohio, assignors to Monsanto Company, St. Louis, Mo.
Filed July 25, 1975, Ser. No. 599,115
Int. Cl.² B29D *3/02;* **B29F** *3/04*
U.S. Cl. 264—108 **35 Claims**



1. A process for preparing hose of extrudable polymer reinforced with discontinuous fibers which comprises extruding composite comprising extrudable polymer and 5-200 parts by weight discontinuous fibers per 100 parts by weight matrix through a die having a channel of curvilinear cross-section formed between surfaces of a central mandrel and an outer die member in which (Ao/Ai) is about two or more and (Wo/Wi) ÷ (Ro/Ri) is two or more wherein Ao is the channel outlet area, Ai is the channel inlet area, Wo is the channel width at the outlet, Wi is the channel width at the inlet, Ro is the channel outlet main radius, and Ri is the channel inlet mean radius to form an extruded hose in which the radial component of fiber orientation exceeds the circumferential component of fiber orientation.

4,057,611
PROCESS FOR RECOVERING ALUMINUM FROM ALUNITE
Larry D. Jennings, Arvada, and Wayne W. Hazen, Wheatridge, both of Colo., assignors to Southwire Company, Carrollton, Ga.; National Steel Corporation, Pittsburgh, Pa. and Earth Sciences, Inc., Golden, Colo.
Continuation-in-part of Ser. No. 644,128, Dec. 24, 1975, abandoned. This application May 31, 1977, Ser. No. 801,744
Int. Cl.² C01F *7/06, 7/02*
U.S. Cl. 423—127 **8 Claims**

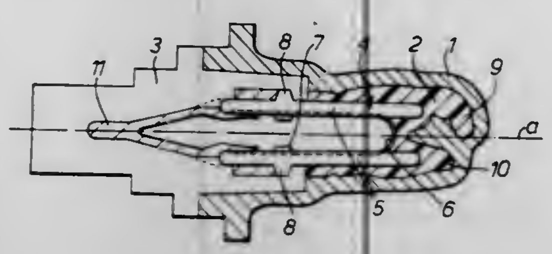


1. A method for recovering aluminum hydroxide from alunite ore which comprises:
a. grinding the ore to provide a particulate product having a maximum particle size up to about −20M;
b. dehydrating the particulate alunite ore;
c. leaching the dehydrated ore with an alkaline solvent or water to remove compounds of sulfur and alkali metals and leave a particulate residue containing aluminum values;
d. separating the particulate residue into two fractions of smaller and larger size particles, wherein the dividing line between the large size particle fraction and the small size particle fraction is between −20M and −100M;
e. digesting one fraction with at least one alkali metal hydroxide to an aluminum to caustic ratio of the leach liquor of about 0.4 and 0.5 to convert the aluminum values in the fraction to soluble aluminates;
f. separating the liquids and solids resulting from step (e);
g. digesting the remaining fraction with the liquor from the separation of step (f) to convert the aluminum values in the fraction into soluble aluminates; and
h. precipitating aluminum hydroxide from the soluble aluminates.

4,057,612
METHODS OF MAKING A DOLL HAVING FUNCTIONAL INSERTS
William Frederick Clark, and Richard Joseph Maddocks, both of London, England, assignors to Lesney Products & Co. Limited, London, England
Filed Apr. 26, 1976, Ser. No. 680,515
Claims priority, application Australia, Apr. 30, 1975, 18087/75
Int. Cl.² B29C *5/04, 5/12;* **B29D** *3/00*
U.S. Cl. 264—275 **10 Claims**

1. In a method for making a doll in a rotational mold, the doll having at least one spring biased insert member extending into at least two digits of one hand by actuation of which member

the doll hand can be caused to grasp and hold on object, the steps comprising: inserting each said insert member into a hand portion of said mold, said hand portion of said mold being separated from a insert portion of said mold by a projecting shoulder, said insert member having two spaced extending



members adapted to be inserted into digit portions of said mold each said extending member having a boss projecting therefrom, said inserting including introducing said extending members into digit portions of said mold until each said boss engages one said shoulder and introducing hardenable molding material into said mold and about portions of said insert.

4,057,613

PROCESS FOR PRODUCING CARBON DISULFIDE

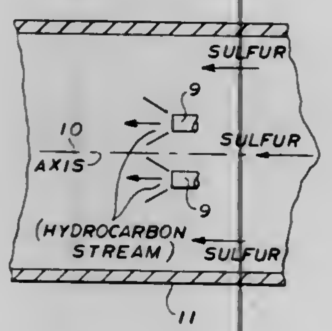
Morton Meadow, Trenton, and Sidney Berkowitz, Highland Park, both of N.J., assignors to FMC Corporation, Philadelphia, Pa.

Division of Ser. No. 355,991, April 30, 1973, Pat. No. 3,927,185. This application Dec. 11, 1975, Ser. No. 639,725

The portion of the term of this patent subsequent to Dec. 16, 1992, has been disclaimed.

Int. Cl.² C01B *31/26*

U.S. Cl. 423—443 **9 Claims**



1. Process for producing carbon bisulfide by the reaction of sulfur and a hydrocarbon in gaseous state in which a stream of hydrocarbon gas comprising a hydrocarbon having at least 3 carbon atoms is introduced into a co-current stream of sulfur vapor in a tubular reactor to form a hot reaction mixture at a temperature at which the noncatalytic reaction of said sulfur and said hydrocarbon to form carbon bisulfide occurs whereby to react non-catalytically said sulfur and hydrocarbon to form carbon bisulfide in said reactor, said reactor having solid walls, wherein the improvement comprises introducing said hydrocarbon gas as a plurality of streams clustered about the axis of the tubular reactor, the flow conditions and mixing conditions of the sulfur stream and hydrocarbon stream being such that the hydrocarbon stream become substantially completely mixed with sulfur vapor before the hydrocarbon comes into contact with a solid surface in the reaction zone, so that a non-catalytic reaction occurs between substantially all the higher hydrocarbon and sulfur prior to such contact.

4,057,614

PROCESS FOR PRODUCING SODIUM FLUORIDE FROM SODIUM SILICOFLUORIDE

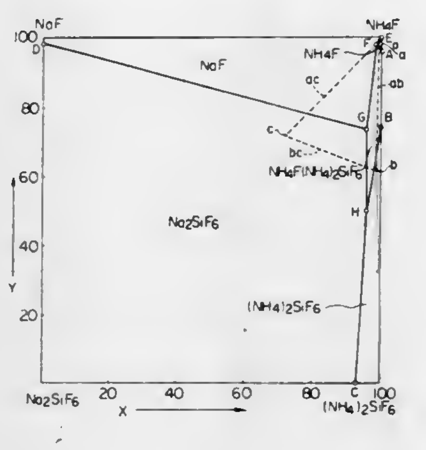
Tetsuhiro Ono; Minoru Aramaki; Tamotsu Mizuno, and Masao Fujinaga, all of Ube, Japan, assignors to Central Glass Company, Limited, Ube, Japan

Filed Nov. 3, 1976, Ser. No. 738,626

Claims priority, application Japan, Nov. 4, 1975, 50-131402

Int. Cl.² C01D *3/02;* C01B *33/12;* C01C *1/16;* C01B *33/00*

U.S. Cl. 423—490 **8 Claims**



1. A process for producing sodium fluoride from sodium silicofluoride comprising the steps of adding sodium silicofluoride to an ammonium fluoride solution in an Na_2SiF_6/NH_4F ratio by gram equivalent of 0.01 to 0.4:1 for double decomposition reaction at a temperature ranging from room temperature to 100° C to give a slurry containing sodium fluoride as crystals and ammonium silicofluoride in a dissolved form, separating the sodium fluoride crystals from said slurry, adding ammonia to the separated solution to decompose said ammonium silicofluoride into silica and ammonium fluoride, and recovering said ammonium fluoride in a dissolved form and said silica in the form of crystals.

4,057,615

METHOD OF TAGGING EXCIPIENTS WITH ^{99M}TECHNETIUM

André Bardy, Morangis; Jacqueline Beydon; Renée Gobin, both of Paris, and Michel Hegesippe, Cernay-la-Ville, all of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed July 29, 1975, Ser. No. 599,977

Claims priority, application France, Aug. 6, 1974, 74.27249

Int. Cl.² A61K *29/00, 43/00;* G01T *1/161*

U.S. Cl. 424—1 **7 Claims**

1. A method of using ^{99m}Tc for tagging excipients in medical diagnosis by scintigraphy, which method comprises mixing, in an aqueous solution of alkalimetal pertechnetate, an excipient and a reducing agent complex present in a lower concentration, wherein the association constant of the anion of the reducing agent complex with reduced technetium is less than the association constant of the excipient with reduced technetium, thus forming a radio-pharmaceutical substance which is a complex between the excipient and ^{99M} technetium.

4,057,616

METAL HYDROXIDE SCINTIGRAPHIC AGENTS AND METHOD OF PREPARATION

Robert G. Wolfangel, St. Louis, Mo., assignor to Mallinckrodt, Inc., St. Louis, Mo.

Division of Ser. No. 368,867, June 11, 1973. This application Nov. 7, 1975, Ser. No. 629,751

Int. Cl.² A61K *43/00, 29/00*

U.S. Cl. 424—1 **7 Claims**

1. A method for preparing water-insoluble metal hydroxides in the form of substantially spherical particles having diameters between 10μ and 100μ which comprises converting a solution of a hydrolyzable salt of the said metal into an aerosol mist and directing the said mist into a vessel substantially filled with a stirred solution of a strong base and a wetting agent.

2. A method as set forth in claim 1 wherein the metal hydroxide is selected from the group consisting of ferrous hydroxide, ferric hydroxide and stannous hydroxide.

7. A method as set forth in claim 1 wherein the substantially spherical particles produced are thereafter tagged with a radionuclide.

4,057,617

METHOD OF LABELING PROTEINS WITH TECHNETIUM

Jean Abramovici, 127, Av. du Pesage; André Marie Ermans, 2, Av. de la Foret, both of Ixelles, 1050 Brussels, and Omer Jeghers, 95A, rue Fechereux, 4561 Neufchateau, all of Belgium

Filed Nov. 26, 1975, Ser. No. 635,774

Claims priority, application Belgium, May 15, 1975, 829128; Aug. 12, 1975, 159144

Int. Cl.² A61K *37/04, 33/00, 43/00*

U.S. Cl. 424—1 **18 Claims**

1. A method of labeling fibrinogen with 99m technetium comprising reducing pertechnetate at a pH of about 11 to 12 by the addition of a solution of acetic acid and stannous chloride in the presence of a base, contacting the thus reduced pertechnetate with fibrinogen thereby labeling the fibrinogen with 99m technetium and purifying the resulting mixture by removing unwanted degradation products of the fibrinogen and non-bound technetium.

4,057,618

RADIOIODINATED BLEOMYCIN

Sydney E. Salmon, and Rosa H. Liu, both of Tucson, Ariz., assignors to University Patents, Inc., Stamford, Conn.

Filed Apr. 30, 1976, Ser. No. 682,150

Int. Cl.² A61K *29/00, 43/00*

U.S. Cl. 424—1 **7 Claims**

1. Radioiodinated hydroxyphenylacyl bleomycin, wherein the radioiodine is selected from the group consisting of I^{123}, I^{125} and I^{131}.

4,057,619

OCULAR THERAPEUTIC SYSTEM WITH SELECTED MEMBRANES FOR ADMINISTERING OPHTHALMIC DRUG

Takeru Higuchi, Lawrence, Kans., and Anwar Hussain, Lexington, Ky., assignors to Alza Corporation, Palo Alto, Calif.

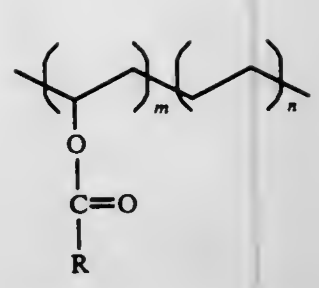
Continuation-in-part of Ser. No. 591,712, June 30, 1975, abandoned, which is a continuation-in-part of Ser. No. 281,446, Aug. 17, 1972, Pat. No. 3,903,880, which is a continuation-in-part of Ser. No. 80,531, Oct. 14, 1970, abandoned. This application July 15, 1976, Ser. No. 705,470

The portion of the term of this patent subsequent to Sept. 9, 1992, has been disclaimed.

Int. Cl.² A61K *9/00, 9/22*

U.S. Cl. 424—14 **13 Claims**

1. An ocular therapeutic system for the controlled administration of drug to the eye comprising a flexible body formed of a polymeric material containing a drug capable of diffusing through the material at a therapeutically effective rate, the body shaped, sized and adapted for comfortable insertion and retention in the cul-de-sac of the conjunctiva between the sclera of the eyeball and the lid to be held in place against the eyeball by the pressure of the lid, and wherein said material comprises an ethylene-vinyl alkyl substituted acetate copolymer having the following formula:



which copolymer has a vinyl alkyl acetate content m of about 4 to 80% by weight, an ethylene content n of $(100 - m)$% by weight, a melt index of about 0.1 to 1000 grams per 10 minutes, and R is an alkyl group having 2 to 7 carbon atoms.

4,057,620

THERAPEUTIC COMPOSITION WITH MARKED POLYDETOXIFYING PROPERTIES, ESPECIALLY WITH REGARD TO TOBACCO

Robert Louis Prugnaud, Paris, France, assignor to Laboratoire Theranol, Paris, France

Continuation-in-part of Ser. No. 116,660, Feb. 18, 1971, abandoned. This application Apr. 3, 1974, Ser. No. 457,634

Claims priority, application France, Feb. 24, 1970, 70.06599

Int. Cl.² A61K *9/36, 35/12, 35/78, 31/51*

U.S. Cl. 424—35 **7 Claims**

1. A therapeutic detoxifying composition comprising:

a. extract of Crataegus

b. a vitamin selected from the group consisting of vitamins PP, B, B_1, B_6 and C, and

c. an organic salt of quinine selected from the group consisting of ascorbate, lactate, malate and pyruvate wherein (a), (b) and (c) are present in weight ratios of 4.5 to 450(a) to 7.5 to 750(b) and 1.5 to 150(c).

4,057,621

DESENSITIZING OXALATE DENTAL COMPOSITION AND METHOD OF TREATMENT

David H. Pashley, 427 Scotts Way, Augusta, Ga. 30904, and William C. Outhwaite, Rte. 1, Box 252, N. Augusta, S.C. 29841

Filed May 24, 1976, Ser. No. 689,110

Int. Cl.² A61K *7/16*

U.S. Cl. 424—49 **3 Claims**

1. A method of desensitizing hypersensitive dentin and cementum by applying to said dentin and cementum a desensitizing amount of a composition which has as the essential ingredient a member selected from the group consisting of a mono- and di-substituted alkali metal and ammonium oxalate in aqueous solution, said ingredient being applied in a desensitizing amount in a concentration of between about 2.0% by weight of said ingredient and a weight percent which is solution saturation.

4,057,622

WATER-IN-OIL CREAMS WITH POLYMERIC EMULSIFIERS

Brigitte Hase; Christian Hase, both of Erkrath; Joachim Galinke, Langenfeld, and Bernd Wegemund, Haan, all of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Dusseldorf, Germany

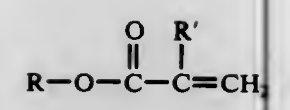
Filed Mar. 25, 1976, Ser. No. 670,362

Claims priority, application Germany, Mar. 29, 1975, 2514101

Int. Cl.² A61K *31/74*

U.S. Cl. 424—78 **7 Claims**

1. A cosmetic emulsion of the water-in-oil type consisting essentially of (1) from 2% to 20% by weight of a polymeric emulsifier capable of forming water-in-oil creams selected from the group consisting of (i) a copolymer of (a) N-vinylimidazole, (b) acrylates of the formula



wherein R is a member having from 6 to 24 carbon atoms selected from the group consisting of alkyl, cycloalkyl, alkylcycloalkyl and oleyl, and R' is a member selected from the group consisting of hydrogen and methyl, and (c) vinyl acetate wherein the molar ratios of (*a*) + (*c*) : (*b*) are from 1:1 to 1:20 and the molar ratios of (*c*) : (*a*) are 0:1 to 3:1, and (ii) salts thereof with organic or inorganic acids, (2) from 20% to 75% by weight of water and (3) the remainder to 100% by weight of a cosmetically-acceptable oily phase.

4,057,623

COSMETIC EMULSIONS CONTAINING N-VINYLPYRROLIDONE-ALKYL ACRYLATE COPOLYMERS

Brigitte Hase, Erkrath; Joachim Galinke, Langenfeld, and Bernd Wegemund, Haan, all of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Dusseldorf, Germany

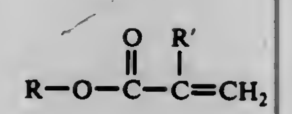
Filed Mar. 25, 1976, Ser. No. 670,381

Claims priority, application Germany, Mar. 29, 1975, 2514100

Int. Cl.² A61K *31/74*

U.S. Cl. 424—78 **9 Claims**

1. A cosmetic emulsion of the water-in-oil type consisting essentially of (1) from 2% to 20% by weight of a polymeric emulsifier capable of forming water-in-oil creams consisting essentially of a copolymer of (a) N-vinylpyrrolidone and (b) acrylates of the formula:



wherein R is a member having from 6 to 24 carbon atoms selected from the group consisting of alkyl, alkenyl, cycloalkyl and alkylcycloalkyl, and R' is a member selected from the group consisting of hydrogen and methyl, and (c) vinyl acetate wherein the molar ratios of [(a)+(c)]:(b) are from 1:1 to 1:20 and the molar ratios of (c):(a) are 0:1 to 3:1, (2) from 20% to 75% by weight of water and (3) the remainder to 100% by weight of a cosmetically acceptable oily material.

4,057,624

COSMETIC EMULSIONS CONTAINING ACRYLAMIDE COPOLYMER

Brigitte Hase, Erkrath; Joachim Galinke, Langenfeld, and Bernd Wegemund, Haan, all of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Dusseldorf, Germany

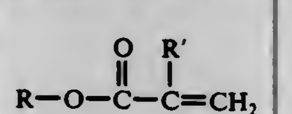
Filed Mar. 25, 1976, Ser. No. 670,382

Claims priority, application Germany, Mar. 29, 1975, 2514098

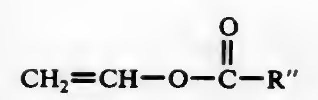
Int. Cl.² A61K *31/74*

U.S. Cl. 424—78 **10 Claims**

1. A cosmetic emulsion of the water-in-oil type consisting essentially of (1) from 2% to 20% by weight of a polymeric emulsifier capable of forming water-in-oil creams consisting of a copolymer of (a) acrylamide and (b) esters selected from the group consisting of acrylates of the formula:



wherein R is a member having from 6 to 24 carbon atoms selected from the group consisting of alkyl, alkenyl, cycloalkyl and alkylcycloalkyl, and R' is a member selected from the group consisting of hydrogen and methyl, and vinyl alkylcarboxylates of the formula:



wherein R'' is alkyl having from 5 to 24 carbon atoms, (2) from 20% to 75% by weight of water, and (3) the remainder to 100% by weight of a cosmetically acceptable oily material.

4,057,625

COSMETIC EMULSIONS CONTAINING N-VINYLPYRROLIDONE/VINYL ALKYLCARBOXYLATE COPOLYMER

Brigitte Hase, Erkrath; Joachim Galinke, Langenfeld, and Bernd Wegemund, Haan, all of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Dusseldorf, Germany

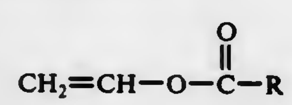
Filed Mar. 25, 1976, Ser. No. 670,383

Claims priority, application Germany, Mar. 29, 1975, 2514099

Int. Cl.² A61K *31/74*

U.S. Cl. 424—78 **8 Claims**

1. A cosmetic emulsion of the water-in-oil type consisting essentially of (1) from 2% to 20% by weight of a polymeric emulsifier capable of forming water-in-oil creams consisting of a copolymer of (a) N-vinylpyrrolidone, (b) at least one vinyl C_{5-24} alkylcarboxylate of the formula



wherein R is alkyl having from 5 to 24 carbon atoms, and (c) vinyl acetate wherein the molar ratios of [(a) + (c)]: (b) are from 1:2 to 1:20 and the molar ratios of (c):(a) are 0:1 to 3:1, (2) from 20% to 75% by weight of water, and (3) the remainder to 100% by weight of a cosmetically acceptable oily material.

4,057,626

PROCESS FOR DETOXIFYING INFLUENZA B VIRUS

Don P. Metzgar, Stroudsburg, and Raymond H. Newhart, Pocono Summit, both of Pa., assignors to Richardson-Merrell Inc., Wilton, Conn.

Filed Oct. 8, 1976, Ser. No. 731,003

Int. Cl.² A61K *39/18;* **C12K** *7/00*

U.S. Cl. 424—89 **4 Claims**

1. A method of detoxifying a virus of the influenza B group which comprises treating an aqueous concentrate of said virus with from 250 to 500 micrograms of formaldehyde per ml of virus concentrate at a temperature of from 17 to 37° C. for a period of time ranging from 5 to 30 days.

4,057,627

ACNE PREPARATION FOR ORAL ADMINISTRATION

Helmut Anton Stickl, Strarenweg 6, 8033 Krailling, near Munich, Germany

Continuation of Ser. No. 343,096, March 20, 1973, abandoned. This application June 18, 1975, Ser. No. 587,988

Claims priority, application Germany, Mar. 21, 1972, 2213677; Feb. 8, 1973, 2306223

Int. Cl.² A61K *39/02*

U.S. Cl. 424—92 **26 Claims**

1. An acne composition for oral administration, comprising inactivated *Corynebacterium acnes* as an immunizing constituent and a pharmaceutically-acceptable carrier therefor.

21. A method of treating acne infection in man by oral administration of a composition according to claim 1.

4,057,628

REMOVAL OF HEPATITIS ASSOCIATED ANTIGEN FROM PLASMA

Rodger L. Bick, Los Angeles, Calif., assignor to William L. Wilson; Rodger L. Bick and Lajos F. Fekete, all of Santa Monica, Calif.

Filed Apr. 19, 1976, Ser. No. 678,024

Int. Cl.² A61K *35/16, 39/12;* **C12K** *7/00*

U.S. Cl. 424—101 **4 Claims**

1. Process for separating hepatitis associated antigen from certain desired blood plasma fractions comprising:

preparing an aqueous admixture including the desired blood plasma fraction and from about 2 to 7 weight per volume percent of a block copolymer of ethylene oxide and polyoxypropylene polymer at a temperature of approximately 22 degrees centigrade and a pH of from about 6.5 to 7.5 to form a precipitate in said admixture;

separating said precipitate from said admixture; and retaining said precipitate for beneficial use.

4,057,629

TYROSINE DERIVATIVES AND PROCESS FOR PREPARING THE SAME

Tosaku Miki; Yasuhiro Hosokawa; Tamotsu Miwa; Hiroshi Fujita; Masahide Asano, and Shunzo Aibara, all of Tokyo, Japan, assignors to Daiichi Seiyaku Co., Ltd., Tokyo, Japan

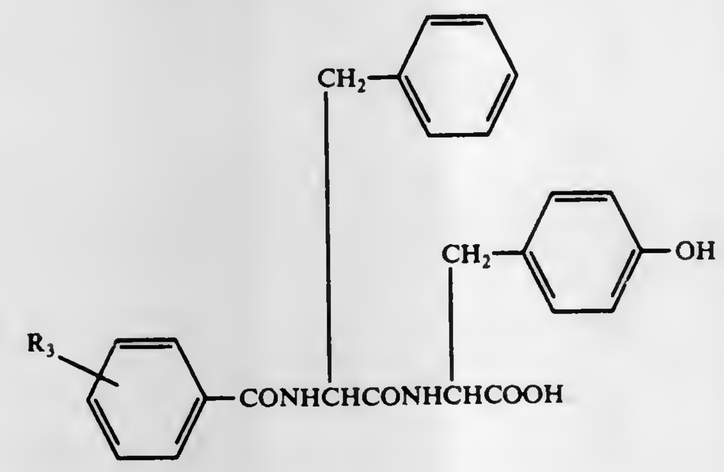
Division of Ser. No. 639,117, Dec. 9, 1975, Pat. No. 4,025,644. This application Dec. 20, 1976, Ser. No. 752,826

Claims priority, application Japan, Dec. 18, 1974, 49-145133; Dec. 18, 1974, 49-145134; Apr. 2, 1975, 50-39959; Apr. 4, 1975, 50-41000

Int. Cl.² A61K *37/00;* **C07C** *103/52*

U.S. Cl. 424—177 **4 Claims**

1. The compound having the formula:



wherein R_3 is hydrogen or a lower alkoxy, or a salt thereof.

4,057,630

ANTIARTHRITIC COMPOSITIONS COMPRISING BIS-COORDINATED GOLD(1+) SALTS AND METHODS OF PRODUCING ANTIARTHRITIC ACTIVITY

David Taylor Hill, North Wales, Pa., assignor to SmithKline Corporation, Philadelphia, Pa.

Filed Aug. 2, 1976, Ser. No. 710,506

Int. Cl.² A61K *31/66*

U.S. Cl. 424—204 **14 Claims**

8. The method of producing antiarthritic activity which comprises administering internally to an animal organism in an amount to produce said activity a phosphine or phosphite bis-coordinated gold(1+) salt of the formula:

$$[(R_3P)(R_3'P)]Au^+X^-$$

in which:

R and R' which may be the same or different are phenyl, lower alkyl or lower alkoxy; and

X is halide, perchlorate, or tetrafluoroborate.

4,057,631

7-(α-SUBSTITUTED PHENYLACETAMIDO)-3-(1-CARBOXYMETHYLTHIOETHYLTETRAZOLYL-5-THIOMETHYL)-3-CEPHEM-4-CARBOXYLIC ACIDS

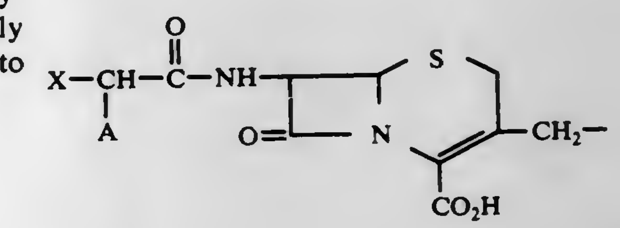
David A. Berges, Wayne, Pa., assignor to SmithKline Corporation, Philadelphia, Pa.

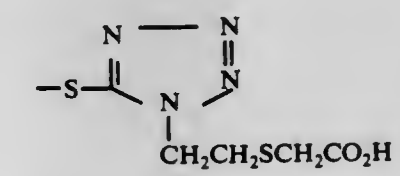
Filed Sept. 2, 1976, Ser. No. 719,751

Int. Cl.² C07D *501/36;* **A61K** *31/545*

U.S. Cl. 424—246 **6 Claims**

1. A compound or its nontoxic alkali metal salts, said compound being of the structure:





in which:

X is thienyl, furyl, phenyl or phenyl monosubstituted with hydroxy, hydroxymethyl, formamido or ureido; and

A is NH_2, OH, COOH, SO_3H, formyloxy or, when the α-C-hydrogen is absent, methoxyimino.

5. A pharmaceutical composition having antibacterial activity comprising a nontoxic antibacterially effective quantity of a compound as claimed in claim 1 and a pharmaceutically acceptable carrier therefor.

4,057,632

METHOD OF TREATMENT USING TETRAZOLE-5-CARBOXAMIDE DERIVATIVES

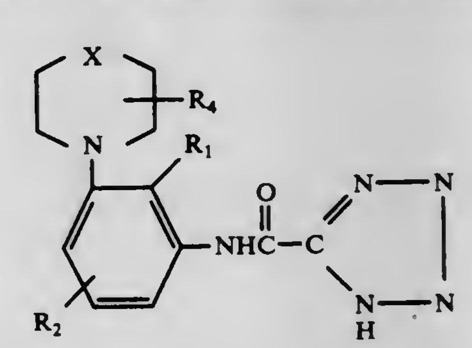
John H. Sellstedt, Pottstown, and Dieter H. Klaubert, West Chester, both of Pa., assignors to American Home Products Corporation, New York, N.Y.

Division of Ser. No. 669,570, March 23, 1976, Pat. No. 4,013,647. This application Sept. 24, 1976, Ser. No. 726,706

Int. Cl.² A61K *31/535*

U.S. Cl. 424—248.54 **4 Claims**

1. A process for preventing the release of pharmacological mediators from an immediate hypersensitivity reaction between reaginic type antibodies and an antigen, thereby preventing the symptoms manifest in bronchial asthma, seasonal pollinosis, allergic rhinitis, urticaria, allergic conjunctivitis, food allergy and anaphylactoid reactions of a sensitized animal, which comprises prophylactically administering to said animal an effective amount of a compound of the formula:



in which

R^1 is CN or $—CONH_2$;

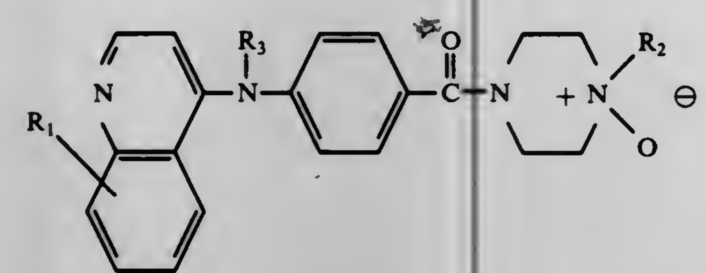
R^2 is hydrogen, lower alkyl, lower alkoxy, halo, polyhalo(lower)alkyl, lower alkyl carbonyl or carb(lower)alkoxy;

X is $—CH_2—$, —O— or

where R^3 is lower alkyl; and
R^H is hydrogen or lower alkyl;
or a pharmaceutically acceptable salt thereof.

4,057,633
COMPOSITIONS AND METHOD OF USING QUINOLYLAMINOBENZOYLPIPERAZINO-1-OXIDES
Charles E. Coverdale, Portage, and Louis L. Skaletzky, Kalamazoo, both of Mich., assignors to The Upjohn Company, Kalamazoo, Mich.
Division of Ser. No. 508,790, Sept. 23, 1974, Pat. No. 3,992,382, which is a continuation-in-part of Ser. No. 370,341, June 15, 1973, abandoned. This application Aug. 18, 1976, Ser. No. 715,229
Int. Cl.² A61K *31/495*
U.S. Cl. 424—250 **9 Claims**

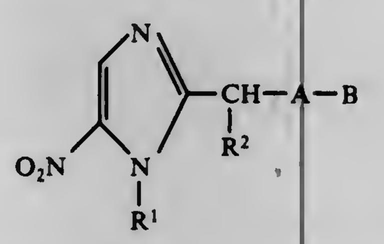
1. A pharmaceutical dosage unit form adapted to systemic administration to obtain antihypertensive and anti-anxiety effects which comprises an effective amount for said effects of a compound of the formula:



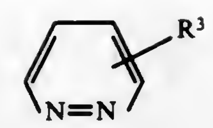
hydrates thereof and pharmaceutically acceptable acid addition salts thereof, wherein R_1 is halogen, lower alkyl, or trifluoromethyl; R_2 is selected from lower alkyl, benzyl, phenyl and phenyl substituted with one of the groups selected from halogen, lower alkyl, and trifluoromethyl; R_3 is hydrogen; in combination with a pharmaceutical carrier.

4,057,634
ANTIPROTOZOAL(1-ALKYL-5-NITRO-IMIDAZOLYL-2-ALKYL)-PYRIDAZINES
Erhardt Winkelmann, Kelkheim, Taunus; Akhileswer Sinharay, Frankfurt am Main, and Wolfgang Raether, Dreieichenhain, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany
Division of Ser. No. 543,165, Jan. 22, 1975, Pat. No. 3,991,191. This application June 23, 1976, Ser. No. 698,850
Claims priority, application Germany, Jan. 24, 1974, 2403340
Int. Cl.² A01N *9/22;* **A61K** *31/495;* **C07D** *237/06*
U.S. Cl. 424—250 **9 Claims**

1. A (1-alkyl-5-nitro-imidazolyl-2-alkyl)-heteroaryl compound of the formula



in which R^1 is methyl or ethyl, R^2 is hydrogen or methyl, A is sulfur, sulfoxide or sulfone, B is



and R^3 is hydrogen, methyl, methoxy, halogen, cyano or nitro.

5. A pharmaceutical composition for the treatment of protozoal diseases, said composition comprising an amount of a compound as in claim 1 which is effective against protozoa in combination with a pharmaceutical excipient.

4,057,635
CARBAMATES OF ERGOLINES AND THERAPEUTIC COMPOSITIONS THEREWITH
Giorgio Ferrari, and Jiri Jan Krepinsky, both of Milan, Italy, assignors to Simes Societa Italiana Medicinali e Sintetici S.p.A., Milan, Italy
Division of Ser. No. 471,701, May 20, 1974, Pat. No. 3,944,582. This application Aug. 19, 1975, Ser. No. 605,878
Claims priority, application Italy, May 23, 1973, 24513/73
Int. Cl.² A61K *31/40;* **C07D** *457/06*
U.S. Cl. 424—261 **21 Claims**

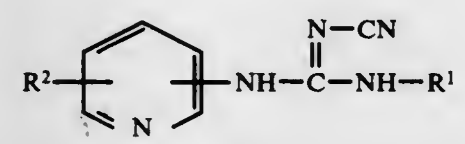
3. D-6-methyl-8β-(4-methyl-piper-azinylcarbonyloxy-methyl)-9,10-didehydroergoline.

10. C-6-methyl-8β-(α-methylphenethyl-aminocarbonyloxy-methyl)-9,10-didehydroergoline.

21. A spasmolytic or vasodilator pharmaceutical composition containing as the active ingredient a compound of claim 10.

4,057,636
ANTIHYPERTENSIVE PYRIDYLGUANIDINE COMPOUNDS
Hans Jorgen Petersen, Herlev, Denmark, assignor to Leo Pharmaceutical Products Ltd. A/S, Ballerup, Denmark
Filed Dec. 1, 1975, Ser. No. 636,747
Claims priority, application United Kingdom, Dec. 20, 1974, 55209/74
Int. Cl.² A61K *31/44;* **C07D** *211/00*
U.S. Cl. 424—263 **19 Claims**

1. A compound of the formula I



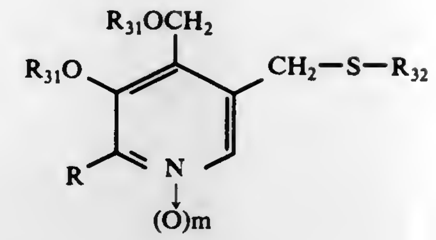
I

or the tautomeric forms thereof in which the R^1-substituted cyano-guanidyl radical is placed in the 2-, 3- or 4-position of the pyridine ring, and in which R^1 stands for aliphatic hydrocarbon having from 1 to 8 carbon atoms, cycloalkyl having from 3 to 8 carbon atoms, phenyl, benzyl or phenethyl, and R^2 stands for hydrogen, halogen, hydroxy, lower alkyl or lower alkoxy radicals, or a salt thereof with a non-toxic, pharmaceutically acceptable acid.

12. A composition for the treatment of hypertension containing as an active component, an effective amount of at least one compound according to claim 1, together with a carrier therefor.

4,057,637
5-MERCAPTOPYRIDOXINE ESTERS
Tsung-Ying Shen, Westfield; Howard Jones, Holmdel; Dennis M. Mulvey, Milford, and Conrad P. Dorn, Plainfield, all of N.J., assignors to Merck & Co., Inc., Rahway, N.J.
Division of Ser. No. 470,231, May 16, 1974, Pat. No. 3,971,797, which is a continuation-in-part of Ser. No. 368,774, June 15, 1973, abandoned. This application May 11, 1976, Ser. No. 685,211
Int. Cl.² A61K *31/44;* **C07D** *213/62*
U.S. Cl. 424—263 **6 Claims**

1. A compound of structural formula:



or pharmaceutically acceptable salt thereof, wherein
m is 0 or 1;
R is C_{1-5}alkyl;
R_{31} groups are the same or different and are hydrogen

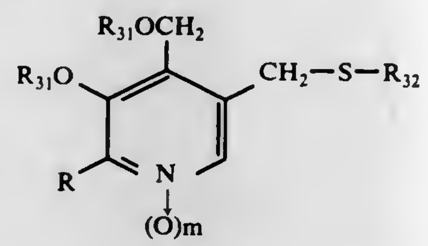
$$-\overset{\overset{\displaystyle O}{\|}}{C}-NH_2 \text{ or } -\overset{\overset{\displaystyle O}{\|}}{C}-OR_{40},$$

where R_{40} is C_{1-5}alkyl or C_{2-5}alkenyl, R_{32} is hydrogen or

$$-\underset{\underset{\displaystyle O}{\|}}{C}-OR_{40},$$

with the proviso that if both R_{31} groups are hydrogen and m is 0, then R_{32} is not hydrogen.

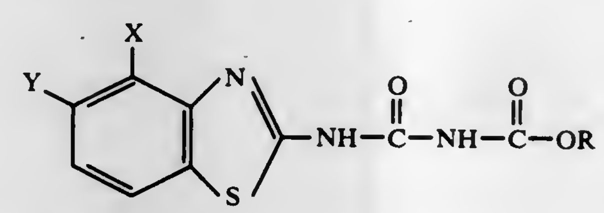
5. A method of treating rheumatoid arthritis in humans and warm-blooded animals in need of such treatment which comprises the administration of from 1 mg. to 140 mg. per killogram of body weight per day of a compound of structural formula:



wherein m, R, R_{31} and R_{32} are as defined in claim 1.

4,057,638
BENZOTHIAZOLE ALLOPHANATE FUNGICIDES
Thomas Fulton Schlaf, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.
Continuation-in-part of Ser. No. 593,107, July 3, 1975, abandoned. This application Oct. 15, 1976, Ser. No. 732,746
Int. Cl.² A01N *9/12, 9/22;* **C07D** *277/82*
U.S. Cl. 424—270 **28 Claims**

1. A compound of the formula:

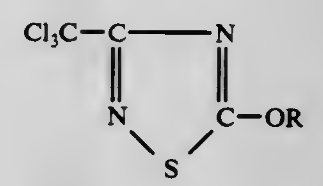


where
X or Y may independently be hydrogen, methyl, ethyl, fluorine, chlorine or bromine; and
R is alkyl of 1 to 4 carbon atoms.

19. A method of preventing injury to plants due to fungi consisting essentially of applying to the plants a fungicidally effective amount of a compound of claim 1.

4,057,639
METHOD FOR USING 3-TRICHLOROMETHYL-5-LOWER ALKOXY-1,2,4-THIADIAZOLE COMPOUNDS AS INSECTICIDES AND ACARICIDES
Thomas O. Evrard, Little Rock, Ark., assignor to Olin Corporation, New Haven, Conn.
Filed Feb. 14, 1977, Ser. No. 768,238
Int. Cl.² A01N *9/12, 9/22*
U.S. Cl. 424—270 **7 Claims**

1. A method for controlling insects and acarids which comprises
contacting said insects and acarids with an insecticidally or acaricidally effective amount of a 3-trichloromethyl-5-lower alkoxy-1,2,4-thiadiazole compound having the formula:

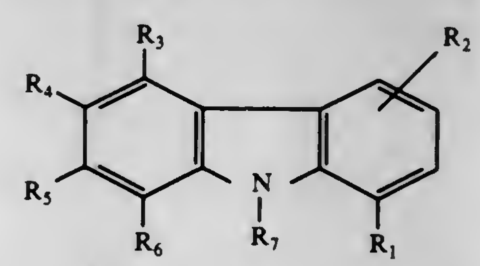


(I)

wherein R is lower alkyl having 1 to about 4 carbon atoms.

4,057,640
5,6,7,8:TETRAHYDROCARBAZOLE-1-CARBOXYLIC ACID DERIVATIVES
Helmut Biere; Hanns Ahrens; Clemens Rufer; Eberhard Schroder, and Henning Koch, all of Berlin, Germany, assignors to Schering Aktiengesellschaft, Berlin & Bergkamen, Germany
Division of Ser. No. 489,162, July 17, 1974, Pat. No. 3,956,295. This application May 6, 1976, Ser. No. 683,752
Claims priority, application Germany, July 18, 1973, 2337154; June 27, 1974, 2431292
Int. Cl.² C07D *209/88;* **A61K** *31/40*
U.S. Cl. 424—274 **6 Claims**

1. A 5,6,7,8-tetrahydrocarbazole of the formula



wherein R_1 is carboxy or a salt thereof with a physiologically acceptable base or an alkyl ester thereof of 1 to 8 carbon atoms,
R_2 through R_6 each are a hydrogen atom, a halogen atom, alkyl or 1–4 carbon atoms, trifluoromethyl, or alkoxy of 1–4 carbon atoms, or
R_5 and R_6 collectively with the carbon atoms to which they are attached also are a cyclopentene, cyclohexene or benzene ring, and
R_7 is a hydrocarbon of 3–8 carbon atoms or, when at least one of R_2 to R_6 is other than a hydrogen atom, a hydrogen atom, methyl or ethyl.

6. A pharmaceutical composition comprising, in admixture with a pharmaceutically acceptable carrier, an antiinflammatorily effective amount per unit dosage of a carbazole of claim 1.

4,057,641

METHOD OF TREATING INFLAMMATION WITH 2-(2,3-DIHYDRO-2-ISOPROPYL-4-OXO-4H-1-BENZOPYRAN-6-YL)PROPIONIC ACID

Richard Anthony Appleton, Kevan Brown, both of Loughborough, England, assignors to Fisons Limited, London, England
Filed Mar. 12, 1975, Ser. No. 557,897
Claims priority, application United Kingdom, Mar. 22, 1974, 12784/74
Int. Cl.[2] A61K *31/35;* **C07D** *311/72*
U.S. Cl. 424—283 **1 Claim**

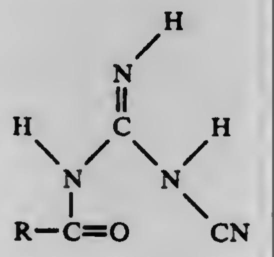
1. A method of treatment of an inflammatory condition which comprises administration of an effective amount of 2-(2,3-dihydro-2-isopropyl-4-oxo-4H-1-benzopyran-6-yl)propionic acid to a patient suffering from such a condition.

4,057,642

ACYL CYANOGUANIDINES

Howard Jones, Holmedl, and Tsung-Ying Shen, Westfield, both of N.J., assignors to Merck & Co., Inc., Rahway, N.J.
Filed Sept. 30, 1975, Ser. No. 618,107
Int. Cl.[2] A61K *31/165, 31/275;* **C07C** *103/20*
U.S. Cl. 424—304 **5 Claims**

1. A compound of the formula:

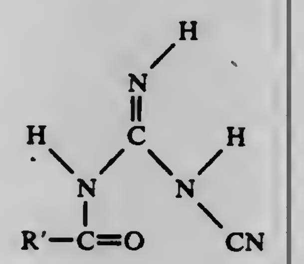


I

wherein

R is C_{1-5}alkylthiophenyl, C_{1-5}alkylsulfinylphenyl or C_{1-5}alkylsulfonylphenyl.

5. A method of treating rheumatoid arthritis which comprises administering to a patient a therapeutically effective amount of a compound of the formula:



IV

wherein

R' is C_{1-5}alkoxyphenyl, C_{1-5}alkylthiophenyl, C_{1-5}-alkylsulfinylphenyl or C_{1-5}alkylsulfonylphenyl.

4,057,643

ANTIFUNGAL COMPOSITIONS OF BUTANEDIOL BIS (CHLOROACETATE)

Sol J. Barer, Clark, N.J., assignor to Celanese Corporation, New York, N.Y.
Filed Mar. 15, 1976, Ser. No. 666,801
Int. Cl.[2] A01N *9/24*
U.S. Cl. 424—311 **4 Claims**

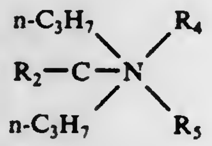
1. A method of combatting fungal infection on plants which comprises applying to said plants an antifungal effective amount of 1,4-butanediol bis(chloroacetate).

4,057,644

ACTIVE DERIVATIVES OF METHYLAMINE IN THERAPEUTIC COMPOSITIONS AND METHODS OF USE

Charles Pigerol, Saint-Ouen; Pierre Eymard, Fontaine; Jean-Claude Vernieres, Domene; Jean-Pierre Werbenec, Eysines, and Madeleine Broll, Le Fontanil, all of France, assignors to Labaz, Paris, France
Continuation-in-part of Ser. No. 606,880, Aug. 22, 1975, which is a division of Ser. No. 577,732, May 15, 1975, abandoned. This application July 22, 1976, Ser. No. 707,897
Claims priority, application Belgium, June 3, 1976, 167579
Int. Cl.[2] A61K *31/13*
U.S. Cl. 424—325 **13 Claims**

1. Method for treating Parkinson's disease and correcting extra-pyramidal disturbances provoked by neuroleptics comprising the administration to a subject in need of such treatment of a dosage of from 10 to 60 mg. per 60 kg. of body weight per day of at least one methylamine derivative of the formula:



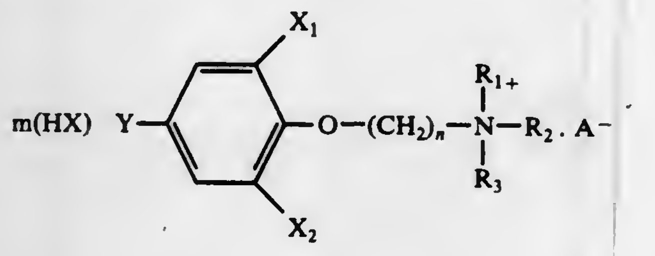
or a pharmaceutically acceptable acid addition salt thereof, in which R_2 represents n-propyl, isopropyl or isobutyl, R_4 represents hydrogen or methyl, R_5 represents methyl, ethyl, isopropyl, allyl or propargyl.

4,057,645

SUBSTITUTED PHENOXYALKYL QUATERNARY AMMONIUM COMPOUNDS AS ANTIARRHYTHMIC AGENTS

Stanley J. Strycker, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.
Division of Ser. No. 484,525, July 1, 1974, Pat. No. 3,932,664, which is a division of Ser. No. 164,086, July 19, 1971, Pat. No. 3,875,215. This application Jan. 12, 1976, Ser. No. 648,554
Int. Cl.[2] A61K *31/14, 31/24*
U.S. Cl. 424—329 **6 Claims**

4. A method for combatting cardiac arrhythmias which comprises administering to an animal a cardiac antiarrhythmic amount of a quaternary ammonium compound corresponding to the formula



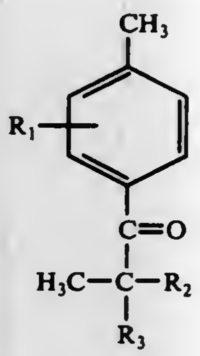
wherein Y represents amino, loweralkylamino or diloweralkylamino; R_1 and R_2 represent lower alkyl; R_3 represents acetonyl; X_1 and X_2 represent halogen; A^- represents a stoichiometric equivalent quantity of a pharmaceutically-acceptable anion; n represents one of the integers 2, 3 or 4; HX represents a stoichiometric equivalent quantity of a pharmaceutically-acceptable acid; and m represents one of the integers zero and one.

4,057,646

SUBSTITUTED OR UNSUBSTITUTED P-ALKANOYL TOLUENES AS MALE ANTI-FERTILITY AGENTS

Francis E. Harrington, Mendham, and Robert S. Ho, Denville, both of N.J., assignors to Sandoz, Inc., E. Hanover, N.J.
Filed Aug. 25, 1976, Ser. No. 717,525
Int. Cl.[2] A61K *31/12*
U.S. Cl. 424—331 **5 Claims**

1. A method of controlling fertility in male animals, which comprises administering to a male animal in need of said treatment an anti-fertility effective amount of a compound of the formula:



where

R_1 represents hydrogen, halo having an atomic weight of about 19 to 36, or straight chain lower alkoxy, and

R_2 and R_3 each independently represent alkyl having 1 to 2 carbon atoms.

4,057,647

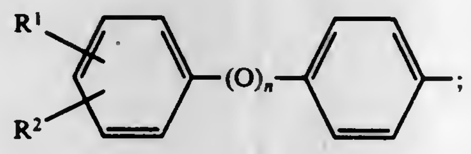
ARALIPHATIC DIHALOGEN COMPOUNDS AND PROCESS FOR THEIR PREPARATION

Joachim Gante; Hans-Adolf Kurmeier; Dieter Orth; Erich Schacht, and Albrecht Wild, all of Darmstadt, Germany, assignors to Merck Patent Gesellschaft mit beschrankter Haftung, Darmstadt, Germany
Filed June 14, 1976, Ser. No. 695,804
Claims priority, application Germany, June 28, 1975, 2528958
Int. Cl.[2] A61K *31/045, 31/085;* **C07C** *31/02, 43/20*
U.S. Cl. 424—340 **20 Claims**

1. An araliphatic dihalogen compound of the formula

Z-Q-Y

wherein Z is



R^1 and R^2 are F, Cl or Br; Q is $-CH(CH_3)-CH_2-$, $-C(OH)(CH_3)-CH_2-$ or $-C(CH_3)=CH-$; Y is CH_2OH and; n is 0 or 1.

18. A method of relieving inflammation in a patient afflicted therewith comprising administering to the patient an anti-flammatorily effective amount of a compound of claim 1, in admixture with a pharmaceutically-acceptable carrier.

4,057,648

COMPOSITIONS FOR THE CONTROL OF MICROORGANISMS

Gerhard Hool, Basel, Switzerland, and Hans Kündig, Johannesburg, South Africa, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.
Division of Ser. No. 469,993, May 15, 1974, Pat. No. 3,982,022, which is a division of Ser. No. 146,854, May 25, 1971, abandoned. This application Mar. 29, 1976, Ser. No. 671,188
Claims priority, application Belgium, May 16, 1970, 89520
Int. Cl.[2] A01N *9/24;* **A61K** *31/09*
U.S. Cl. 424—341 **12 Claims**

1. A composition for the control of bacteria comprising antibacterially effective amounts of 5-chloro-2-(2,4-dichlorophenoxy)-phenol and of a compound selected from the group consisting of 2-phenoxyethanol and 2-(p-chlorophenoxy)-ethanol in a proportion within the range of 3 to 1 and 1 to 5.

4,057,649

METHOD OF TREATING FOOD PRODUCTS WITH SELENIUM SALTS

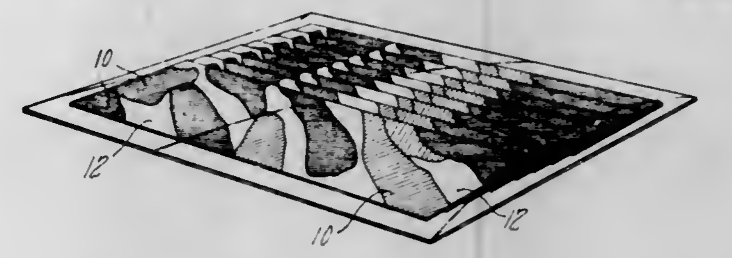
Djemal Eddine Bensalem, 6, rue Charles Valin, Alger, Algeria
Filed Apr. 28, 1975, Ser. No. 572,198
Claims priority, application France, Apr. 26, 1974, 74.14574
Int. Cl.[2] C12G *1/00*
U.S. Cl. 426—15 **8 Claims**

1. In a method of preparing a nutrititional material from foodstuffs, including the step of fermentation of said nutritional material with a yeast, the improvement consisting essentially of incorporating into said nutritional material after said fermentation, an effective amount of an anti-mycotic adjuvant to minimumize the effect of residual yeast wherein said adjuvant is a selenium salt.

4,057,650

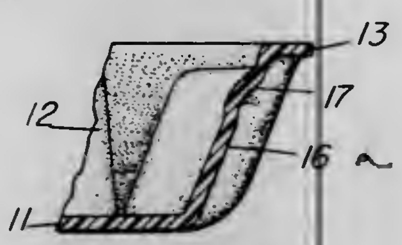
BACON-LIKE MEAT PRODUCT OF REDUCED FAT CONTENT

Julius L. Keszler, Boston Post Road, Westbrook, Conn. 06498
Continuation of Ser. No. 556,736, March 10, 1975, abandoned, which is a continuation-in-part of Ser. No. 350,142, April 11, 1973, Pat. No. 3,890,451. This application July 1, 1976, Ser. No. 701,797
The portion of the term of this patent subsequent to June 17, 1992, has been disclaimed.
Int. Cl.[2] A23L *1/31*
U.S. Cl. 426—92 **5 Claims**



1. A cured sterilized and uncooked composite nondehydrated meat product having a controlled fat content of less than about 75% by weight and well suited for cutting into bacon-like strips comprising a plurality of meat pieces having a weight of about one-half pound or less integrally bonded into a solid unified meat mass by compression within a mold and heating to an internal temperature of about 135° F, said meat pieces have a lean meat content of about 40% - 50% by weight and a fat content of at least about 50% by weight, said product having integrated boundaries between said abutting meat pieces as well as between lean and fat areas thereof, and a binder at least partially absorbed by the meat pieces and wherein said heating effects sterilization and fused integration of the meat pieces at said boundaries without the binder being substantially noticeable in the final product, said meat pieces comprising about 75% or more of the product, said binder consisting essentially of an aqueous brine curing agent and ground lean meat, the ratio of said brine to meat pieces being 1:6 to 1:15 and said ground meat comprising about 10% by weight or less of the composite meat product.

4,057,651
MEAT TRAY
John Florian, Bakersfield, Calif., assignor to Mobil Oil Corporation, New York, N.Y.
Filed Jan. 2, 1975, Ser. No. 537,990
Disclosure was also published under second Trial Voluntary Protest Program on Jan. 13, 1976 as document No. B537,990
Int. Cl.² B65D *1/36, 81/26*
U.S. Cl. 229—2.5 **6 Claims**



1. A package consisting of a plurality of pieces of cut meat in a tray comprising a flat rectangular bottom wall having rounded corners and having a plurality of holes therein to receive and retain juices, side walls integral with said bottom wall disposed upwardly and flared outwardly of said bottom wall, each of said side walls being integral with adjacent side walls at the curved corners of said tray, an integral flange extending outwardly of said side walls at the upper edges thereof, said side walls being formed with flutes transversely of said walls from the bottom wall to said flange, the curved corner surfaces at joinder of said side walls being formed as an upper portion adjacent said flange in a smooth curve to which said side walls are tangent and a lower portion in a smooth curve of curvature reverse to that of said upper portion to thereby provide a fluted corner terminating at a shoulder between said portions and an overwrap of transparent film about said tray and pieces of meat contained therein.

4,057,652
FREEZE PARTICLE PROCESS
Benjamin Lawrence, Springfield Township, Hamilton County, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio
Filed Oct. 4, 1976, Ser. No. 729,565
Int. Cl.² A23F *1/08, 3/00*
U.S. Cl. 426—388 **6 Claims**

1. A process for making an instant beverage comprising the steps of:

A. forming a first mixture comprising from about 15% to about 80% of an aromatic beverage condensate and from about 20% to about 85% of dry beverage solubles;
B. freezing said first mixture of step (A);
C. grinding the frozen first mixture of step (B) thereby forming frozen particles; and
D. forming a second mixture comprising from about 0.2% to about 15% of the particles of step (C) and from about 85% to about 99.8% of dry beverage solubles chilled to a temperature of less than about 10° F; and
E. warming said second mixture of step (D) thereby melting the frozen particles and imparting aroma and flavor to the mixture.

4,057,653
METHOD OF FORMING FOODSTUFFS HAVING A UNIFORM CROSS-SECTION
Alvin Borsuk, and Charles H. Johnson, both of Madison, Wis., assignors to Oscar Mayer & Co. Inc., Madison, Wis.
Division of Ser. No. 557,256, March 11, 1975, Pat. No. 3,948,158. This application Nov. 21, 1975, Ser. No. 634,272
Int. Cl.² A23L *1/31, 1/34*
U.S. Cl. 426—513 **4 Claims**

1. The method of obtaining a uniform cross-sectionally dimensioned loaf of food in a mold filled with a stuffable food material and thereafter subjected to heat for cooking same and thereafter chilling for preparing same for removal from the mold, wherein the mold includes a movably positionable member movable in one direction during cooking of the food material and upon expansion thereof and movable in the opposite direction upon the application of a force thereto during chilling of the food material and the contraction thereof, which method comprises the steps of: mounting said member relative the mold such that the member will resist movement in either direction and be maintained at a set position until subjected to a force of a given magnitude, heating the mold and food material to cook the food material whereby expansion of the food material causes movement of said member in said one direction, chilling the mold and cooked food material, and squeezing the cooked food material in the mold during chilling by applying to said member a force of a predetermined value to move said member in said opposite direction.

4,057,654
WHEAT-GERM PRODUCT AND ITS USE
Walton J. Smith, Rte. 4, Grafton, N.H. 03240
Continuation of Ser. No. 460,386, April 12, 1974, abandoned. This application Nov. 20, 1975, Ser. No. 633,784
Int. Cl.² A21D *2/38, 10/00*
U.S. Cl. 426—555 **4 Claims**

1. A method for the use of raw undefatted wheat germ in baked food products which comprises

1. baking under conditions normally used for biscuits and cookies a batter comprising by weight of from 20 to 60% raw wheat germ, from 10 to 40% flour, from 5 to 20% added fat, from 6 to 30% soluble carbohydrate and 0 to 20% water to provide a finished prebaked intermediate product,
2. grinding and mixing from 10 to 20% by weight of said finished prebaked intermediate product with a baking mix comprising flour and water to provide a second batter and
3. baking said batter to provide a baked, undefatted wheat germ - containing food product.

4,057,655
PROCESS FOR PREPARING A LACTULOSE-CONTAINING POWDER FOR FEED
Katsuto Okada, Tokyo; Katsuhiro Ogasa, and Mamoru Tomita, both of Yokohama, all of Japan, assignors to Morinaga Milk Industry Co., Ltd., Tokyo, Japan
Filed July 6, 1976, Ser. No. 702,680
Claims priority, application Japan, July 4, 1975, 50-81936; July 8, 1975, 50-83188
Int. Cl.² A23K *1/08*
U.S. Cl. 426—583 **2 Claims**

1. A process for preparing a free-flowing lactulose-containing powder from a dairy plant waste liquor containing lactose which waste liquor is selected from the group consisting of cheese whey solutions, casein whey solutions, quarque whey solutions, partially delactosed whey solutions and permeates obtained by the ultrafiltration of whey solutions or skim milk, which comprises adding calcium hydroxide to said solution to adjust the pH of said solution to a value within the range of 9.4 to 11.2, heating the resulting solution at a temperature of from about 60° to 130° C for a time sufficient to reduce the pH to a value within the range of from 7.5 to 9.0; then homogenizing, concentrating and drying.

4,057,656
HIGH-PROTEIN QUICK COOKING MEAT-LIKE FOOD MADE FROM PLANT PROTEIN MATERIALS
Albert Spiel, 98 De Haven Drive, Yonkers, N.Y. 10703
Division of Ser. No. 275,957, July 28, 1972, which is a continuation-in-part of Ser. No. 218,117, Jan. 17, 1972. This application July 3, 1974, Ser. No. 485,615
Int. Cl.² A23J *3/00;* **A23K** *1/14;* **A23L** *1/20*
U.S. Cl. 426—630 **12 Claims**

1. A method of preparing chunks useful in the production of protein food products which, when hydrated, are palatable,

meat-like in texture, bland, chewable chunks comprising the steps of:

a. preheating at 160° to 200° F. a proteinaceous feed selected from the class consisting of solvent-extracted meal, grits, and flakes of a proteinaceous vegetable material having 30 weight percent or higher protein and an NSI of about 30 to about 70 whereby said feed contains moisture in the amount of 5 to 10 weight percent;
b. force feeding said preheated feed into a screw worm press having an impervious barrel, a screw worm rotating in said barrel and a cone slideably mounted on the shaft of the screw worm at the outlet of said press for adjusting the pressure along said screw worm;
c. subjecting said feed in said press to a mechanical pressure of at least 1,800 to 5000 pounds per square inch for a time of 1.5 to 5 minutes and at a temperature of 150° to 200° C. to convert said moisture into steam whereby said feed is partially disembittered, toasted without scorching, and is compacted into a hard and substantially fused mass; and
d. fragmenting the mass into chunks which when hydrated and dried are cohesive, porous, bland, storable, appetizing in appearance, high in protein and quick and easy to cook or prepare for consumption and which are chewable, light-colored, meat-like in texture, bland and palatable when rehydrated.

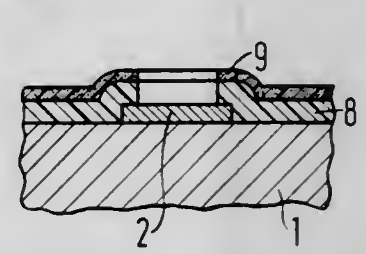
4,057,657
CURABLE PRE-POLYMER COMPOSITIONS, METHOD OF MAKING AND METHOD OF COATING ARTICLES THEREWITH
John Lyndon Garnett, 29 Arabella Street, Longueville, New South Wales, and John Denis Rock, 12 Kara Street, Lane Cove, New South Wales, both of Australia (2066)
Filed Dec. 4, 1974, Ser. No. 529,384
Claims priority, application Australia, Dec. 13, 1973, 5977/73
Int. Cl.² B05D *3/06*
U.S. Cl. 427—44 **12 Claims**

1. A process for the preparation of a prepolymer capable of being cured by ultra-violet or ionising radiation, comprising the steps of subjecting a mixture of a polymerizable ethylenically unsaturated monomer or a mixture of such monomers and a polymer selected from the group consisting of polyamides, polyesters including alkyl resins, polycarbonates, epoxy resins, polyvinylalcohols, polyvinylchlorides, polysilanes and polysiloxanes, to ultra-violet or ionising radiation, until a predetermined but incomplete degree of polymerisation is achieved; and removing the prepolymer so formed from the radiation.

4,057,658
METHOD OF IMPREGNATING WOOD WITH PLASTICS
Gunnar Arthur Sigvard Sjöö, Memoargatan 12, 422 42 Hisings Backa, and Jan Anders Sundlin, Fack 400, 41 Goteborg, both of Sweden
Filed Dec. 5, 1974, Ser. No. 529,776
Claims priority, application Sweden, Dec. 14, 1973, 7316900
Int. Cl.² B05D *3/06*
U.S. Cl. 427—44 **9 Claims**

1. In a method of increasing the strength of wood through impregnation thereof with a polymerizable liquid, comprising positioning the wood in a container,
evacuating said container to remove moisture and air from the wood, and
subsequently impregnating the wood under pressure with a polymerizable liquid and a setting agent,
the improvement in which the setting agent is dormant at temperatures up to 30° C. but is rapidly activated at higher temperatures and comprises at least one of the following substances,
2,2-bis(t-butyl peroxy) butane,
2,5-dimethyl-2,5-di(t-butyl peroxy) hexane,
2,5-dimethyl-2,5-di(t-butyl peroxy) hexyne-3,
n-butyl-4,4-bis(t-butyl peroxy) valerate,
1,1-bis(t-butyl peroxy)-3,3,5-trimethyl cyclohexane,
and after the impregnating, polymerization of the polymerizable liquid in the wood impregnated therewith is conducted in an oven at temperatures in the range of 60° to 150° C.

4,057,659
SEMICONDUCTOR DEVICE AND A METHOD OF PRODUCING SUCH DEVICE
Erich Pammer, Munich, and Friedrich Schnell, Haar, both of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany
Filed June 5, 1975, Ser. No. 584,147
Claims priority, application Germany, June 12, 1974, 2428373
Int. Cl.² B05D *5/12*
U.S. Cl. 427—89 **4 Claims**

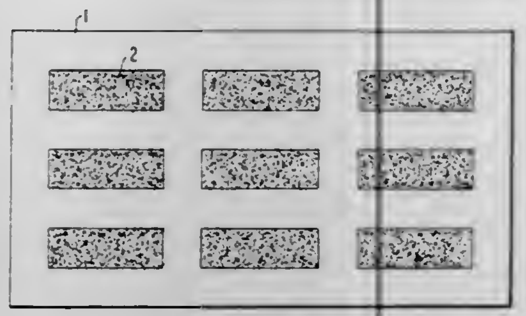


1. In a method of producing electrical contacts on a semiconductor device wherein a semiconductor body is provided with at least one metal contact layer, the area around each such contact layer is completely coated with an insulating layer leaving free a contact surface on each such metal contact layer, at least two different metal layers are additionally successively applied onto each one of said contact surfaces so that the outer metal layer consists of a soft-solderable metal and has a thickness substantially greater than that of the two other metal layers combined, and any excess metal on said insulating layer is removed by a photo-lacquer etching technique, the improvement which comprises:
vapor depositing as each of said metal contact layers an aluminum layer,
applying a layer of a heat-resistant organic insulating material selected from the group consisting of polyphenylene, polyxylene, and polysiloxane, as said insulating layer,
vapor depositing as a first one of said two additional metal layers a layer of titanium onto each one of said contact surfaces,
applying as the outer one of said two additional metal layers a layer of soft-solderable metal selected from the group consisting of copper and silver, and
removing any excess of such additional metals from said insulating layer on areas around each one of said contact surfaces by etching while using an etch mask composed of a photo-lacquer.

4,057,660
METHOD FOR PRODUCING THERMOPLASTIC FILM ELECTRIC ELEMENT
Masafumi Yoshida; Tohru Sasaki, and Shuji Terasaki, all of Iwaki, Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan
Filed Aug. 28, 1975, Ser. No. 608,612
Claims priority, application Japan, Sept. 3, 1974, 49-100506
Int. Cl.² B05D *5/12*
U.S. Cl. 427—100 **9 Claims**

1. A method for producing a thermoplastic film electric element comprising the steps of:
attaching electrically conductive thin layers on both surfaces of a thermoplastic film, respectively;
applying a D.C. electric field across the electrically conductive thin layers to polarize the film, then removing at least a part of the electrically conductive thin layers, and there-

after attaching a plurality of non-continuous, electrically conductive, thin-layer, operating electrodes on the film



surfaces from which the part of the electrically conductive thin layers has been removed.

4,057,661

METHOD OF MANUFACTURING A THIN-FILM ELECTRODE

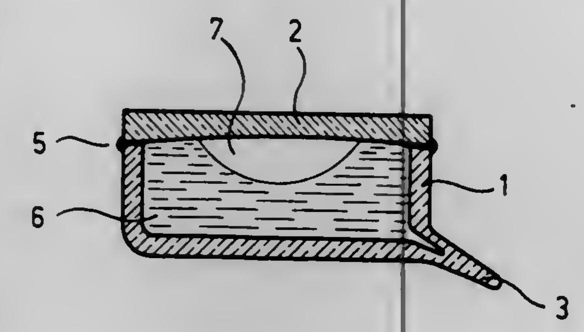
Harry Züst, Erlenbach, Switzerland, assignor to Contraves AG, Zurich, Switzerland

Division of Ser. No. 577,723, May 15, 1975, abandoned. This application June 28, 1976, Ser. No. 700,453

Claims priority, application Switzerland, May 30, 1974, 7378/74

Int. Cl.² C23C *13/02*

U.S. Cl. 427—125 **3 Claims**



1. A method of manufacturing a thin-film electrode consituting a multi-layer electrode structure supported at an electrically insulating surface of a supporting element, comprising the steps of:

a. depositing a thin-film layer on said surface and, in succession,

b. depositing an additional thin-film layer on top of the previously deposited thin-film layer,

c. said second depositing step being carried out at least once,

d. the last one of the depositing steps comprising vapor depositing an electrochemically active black layer of gold, said vapor deposition being carried out in a vacuum chamber under reduced pressure of a residual gas in a pressure range of 0.1 to 2 Torr.

4,057,662

BLOCK-RESISTANT GYPSUM BOARD

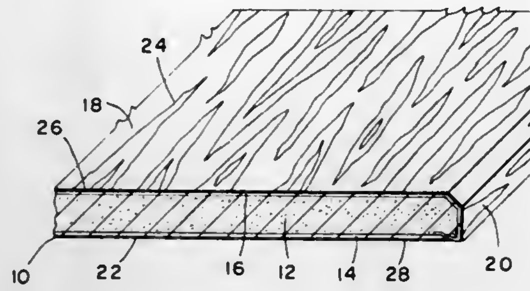
Robert M. Johnson, Kenmore; Daniel A. Winkowski, Tonawanda, and Rodney A. Stiling, Snyder, all of N.Y., assignors to National Gypsum Company, Buffalo, N.Y.

Filed Feb. 12, 1976, Ser. No. 657,377

Int. Cl.² B05D *5/00, 7/00;* **B32B** *31/12, 31/14*

U.S. Cl. 427—209 **5 Claims**

1. The method of making gypsum wallboard comprising the steps of forming a set gypsum core between face paper and back paper, modifying said gypsum wallboard of set core and paper by coating said back paper with a formed-in-place thin film of polyethylene, and also modifying said gypsum wallboard of set core and paper by coating said face paper with a protective acrylic resin coating formed in place having the characteristic of tending to adhere to a back paper of an adjacent stacked wallboard if said wallboard is stacked with the resin coating adjacent plain uncoated back paper following the



application of said resin coating, whereby said wallboards may be stacked face to back without causing blocking.

4,057,663

PROCESS FOR TREATING HYDROPHOBIC SURFACES

John M. Preston, Lynchburg, Va., assignor to General Electric Company, Lynchburg, Va.

Filed Aug. 10, 1976, Ser. No. 713,149

Int. Cl.² C23C *3/02*

U.S. Cl. 427—307 **9 Claims**

7. A process for making the hydrophobic surface of a polymeric material hydrophilic and receptive to a metal plating which comprises:

a. contacting the polymeric material with an alkaline cleaner solution for a period of 1-3 minutes at a temperature of about 60° C.;

b. water rinsing the polymeric material for a period of 1-3 minutes;

c. immersing the polymeric material in an MPA concentrate having a P_2O_5 concentration of 70-82% at a temperature of 100°-140° C. for a period of ten minutes to eight hours;

d. water rinsing the polymeric material for a period of 1-3 minutes; and

e. plating the polymeric material with a suitable metal.

4,057,664

PROCESS FOR THE PRODUCTION OF QUICK-CURING EPOXIDE RESIN COATINGS WHICH ARE RESISTANT TO CHEMICALS AND TO WEATHERING

Thaddeus Audykowski, Basel, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Aug. 18, 1975, Ser. No. 605,787

Claims priority, application Switzerland, Aug. 28, 1974, 11726/74

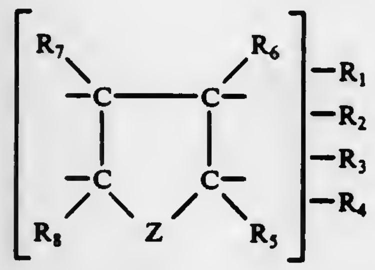
Int. Cl.² B05D *1/02, 1/34*

U.S. Cl. 427—386 **12 Claims**

1. Process for the production of chemically resistant, firmly adhering epoxide resin layers on solid surfaces by mixing a liquid component (A), which contains the epoxide compound, having on average more than one epoxide group in the molecule, with a liquid component (B) which contains the curing agent, shortly before use, with exclusion of unreacted organic solvents, applying this mixture to the surface, and subsequent curing, characterised in that

a. the curing agent contained in the component (B) consists essentially of 1.7 to 15.5% by weight of $Zn(BF_4)_2$, 7.0 to 65.0% by weight of a cyclic ether or thioether of the formula I

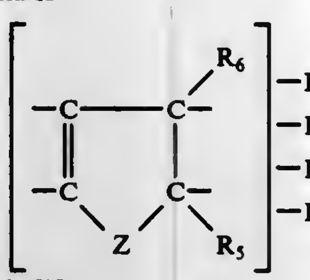
(I)



-continued

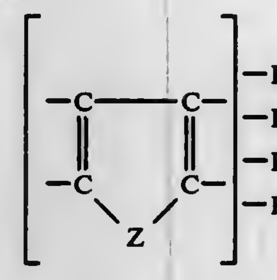
or of the formula II

(II)



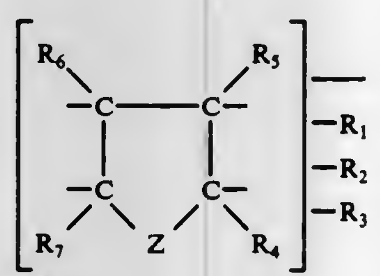
or of the formula III

(III)



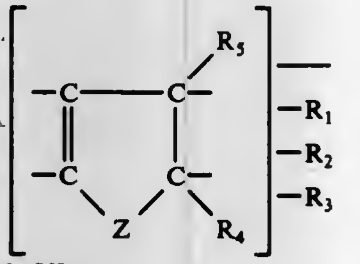
wherein R_1, R_2, R_3, R_4, R_5, R_6 and R_7 denote hydrogen atoms or monovalent organic radicals and the radicals R_1, R_2, R_3, R_4 and R_5 can also be members of a ring system, R_8 denotes a monovalent organic radical and Z denotes an oxygen atom or sulphur atom, or of a cyclic ether or thioether which contain, per molecule, at least two monovalent radicals of the formula IV

(IV)



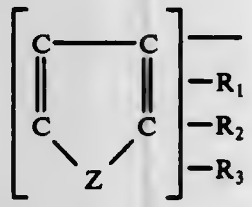
or of the formula V

(V)



or of the formula VI

(VI)



wherein R_1, R_2, R_3, R_4, R_5, R_6 and R_7 denotes hydrogen atoms or monovalent organic radicals, and the radicals R_1, R_2 and R_3 can also be members of a ring system, and Z denotes an oxygen atom or sulphur atom, 10 to 90% by weight of an acid ester of phosphoric acid or of pyrophosphoric acid or of a phosphonic acid ester which contains at least on cyclic phosphonate group with 5 or 6 ring atoms and 1.0 to 9.0% by weight of water, and that

b. the components (A) and (B) are mixed in a ratio such as to provide 0.5 to 2.5 parts by weight of $Zn(BF_4)_2$ per 100 parts by weight of the epoxide compound or of the epoxide compound mixture.

4,057,665

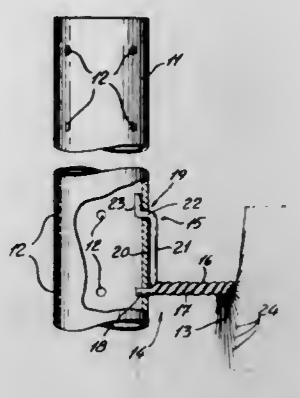
ARTIFICIAL TREE STRUCTURE

John W. Szulewski, 245 Oakville Ave., Dorval, Quebec, Canada

Filed Apr. 21, 1976, Ser. No. 679,076

Int. Cl.² A47G *33/06*

U.S. Cl. 428—8 **6 Claims**



1. An artificial tree comprising an elongated trunk member supportable from a lower end to extend on a vertical axis, said trunk member having at least a tubular portion, a plurality of pairs of spaced-apart apertures in said tubular portion, said pairs of spaced-apart apertures each lying on an axis substantially coextensive to the long axis of said elongated member, a plurality of limb members each having a connector end, said connector end having engageable means constituted by a first rod section and a second rod section extending substantially transverse to said first rod section, said second rod section including an angled rod portion extending substantially in the same direction as said first rod section and terminating in an upwardly extending end portion substantially transverse to said first rod section, said first rod section being locatable in a lower one of a pair of said pairs of apertures, said angled rod portion being engageable within an uppermost aperture of a pair of said pairs of apertures whereby each said limbs can be attached and deteched from said trunk member by vertical arcuate displacement thereof.

4,057,666

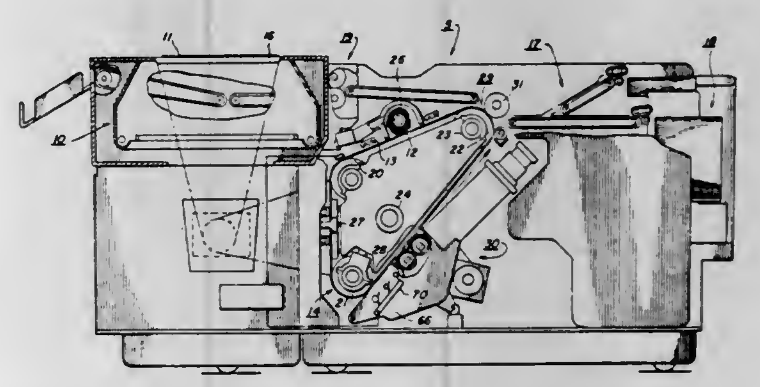
MAGNETIC BRUSH DEVELOPER ROLL FOR ELECTROSTATIC REPRODUCTION MACHINES

Arthur Drummond, Jr., Walworth, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Oct. 29, 1973, Ser. No. 410,835

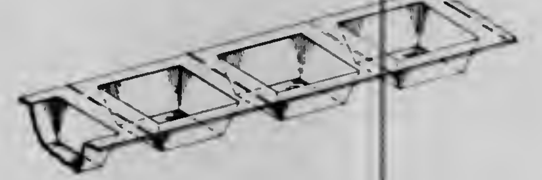
Int. Cl.² B32B *7/02*

U.S. Cl. 428—35 **2 Claims**



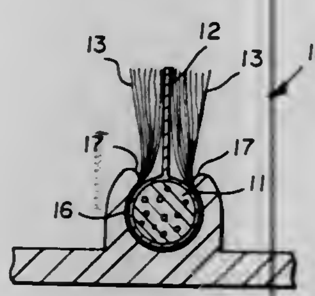
1. A sleeve like part for use as a magnetic brush developer comprising a first base material impregnated with particles of a second material, to form a rigid part, said second material being harder than said first base material whereby the wear resistance of said second material is greater than the wear resistance of said first base material, and a third electrically conductive filler material to promote electrical conductivity of said part.

4,057,667
ORIENTED SARAN COEXTRUDATE
Glenn C. Wiggins, Midland; Marvin J. Kreh, Essexville, and Robert S. Davis, Midland, all of Mich., assignors to American Can Company, Greenwich, Conn.
Division of Ser. No. 237,953, March 24, 1972, Pat. No. 3,924,051, which is a continuation of Ser. No. 70,524, Sept. 8, 1970, abandoned, which is a continuation of Ser. No. 630,889, April 14, 1967, abandoned. This application Aug. 6, 1975, Ser. No. 602,535
The portion of the term of this patent subsequent to Dec. 26, 1989, has been disclaimed.
Int. Cl.² B65D *1/00;* A21D *10/02;* B32B *15/08, 27/08*
U.S. Cl. 428—35 **9 Claims**



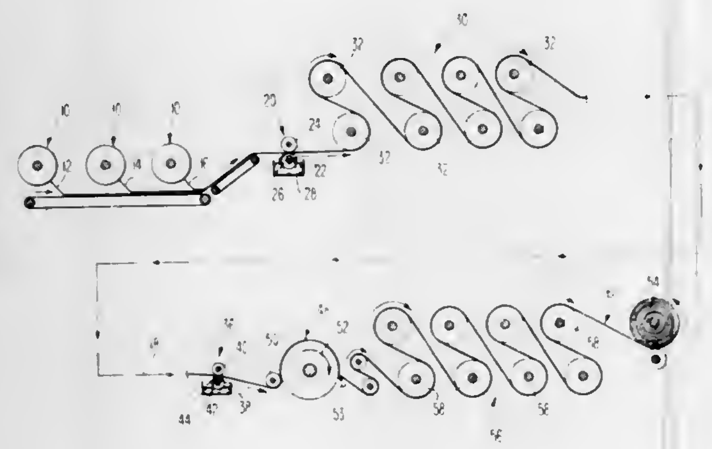
1. A pouch comprising two sheets of a bilaterally oriented plastic laminate comprised of a first layer of a vinylidene chloride-vinyl chloride copolymer containing a predominant amount of vinylidene chloride in the copolymer molecule, and a second layer of an ethylene-unsaturated ester type copolymer containing a predominant amount of ethylene in the copolymer molecule and wherein said unsaturated ester is selected from the group consisting of vinyl acetate and isobutyl acrylate, said first layer and said second layer being non-separable with tape and said laminate being prepared by coextruding said first layer and said second layer as a plural layered tube, chilling said tube at a temperature of about 5° C to about 25° C and then tempering said tube at a temperature of about 20° C to about 50° C immediately prior to blowing said tube into a bubble with a fluid whereby the molecules of said copolymer are bilaterally oriented and wherein the total area of said bubble is at least about 16 times the area of said tube, said layer of vinylidene chloride-vinyl chloride of one laminate being joined to said layer of vinylidene chloride-vinyl chloride of the other laminate to form said pouch.

4,057,668
PILE WEATHERSTRIPPING WITH INTERFITTING SHAPED BASE
Jay C. Metzler, Pittsford, N.Y., assignor to Schlegel Corporation, Rochester, N.Y.
Division of Ser. No. 536,315, Dec. 26, 1974, Pat. No. 4,024,004. This application Feb. 28, 1977, Ser. No. 772,476
Int. Cl.² D02G *3/00*
U.S. Cl. 428—85 **10 Claims**



1. A pile weatherstripping comprising:
a. a continuous length of a resin anchorage base shaped for an interference fit in a retainer slot;
b. even lengths of filaments secured to opposite sides of said base along the length of said base;
c. said filaments extending away from said base in the same general direction on each of said sides of said base; and
d. said filaments being long enough and dense enough to form insulating pile rows extending out of said retainer slot when said base is fitted in said retainer slot.

4,057,669
METHOD OF MANUFACTURING A DRY-FORMED, ADHESIVELY BONDED, NONWOVEN FIBROUS SHEET AND THE SHEET FORMED THEREBY
Albert L. McConnell, Wallingford, Pa., assignor to Scott Paper Company, Philadelphia, Pa.
Filed Mar. 13, 1975, Ser. No. 558,134
Int. Cl.² B29D *27/00*
U.S. Cl. 428—152 **24 Claims**

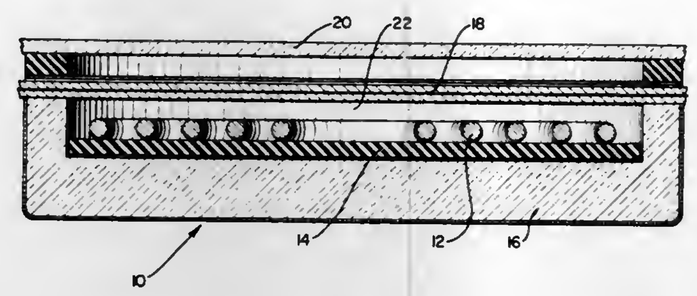


1. A method for forming a bulky, flexible, stretchable, nonwoven fibrous sheet, said method comprising the steps of:
A. dry-forming a low integrity, fibrous web having a basis weight of from about 5 to about 100 lbs. per ream of 2,880 square feet;
B. applying a temporary binder uniformly and continuously over the planar extent of a surface of the web;
C. setting the binder to form brittle, fragile, interfiber bonds which establish sufficient web integrity for subsequent processing, said fragile bonds being brittle enough to be broken during a subsequent creping operation; thereafter
D. applying a permanent binder to a surface of the web which is stabilized by said temporary binder, said permanent binder being applied in a solids weight percent of from about 5 to about 30, based on the dry weight of the temporarily bonded web, said permanent binder being applied in a spaced-apart pattern covering from about 5 to about 60% of the surface area of the web and extending at least 10% through the thickness of said web;
E. adhering to a creping surface, by use of the permanent binder, the areas of a surface of the web in which the permanent binder has been applied;
F. creping said web from the creping surface for breaking temporary brittle bonds in said web to enhance the bulk, flexibility and extensibility characteristics of said web; and
G. setting said permanent binder to complete the formation of the nonwoven sheet which is stabilized by said permanent binder.

4,057,670
COOKING SURFACES OF GLASS-CERAMIC PLATES WITH LAYERS WITH DIFFERENT VALUES FOR RADIATION TRANSMISSION
Herwig Scheidler, Finthen, Germany, assignor to JENAer Glaswerk Schott & Gen., Mainz, Germany
Filed Jan. 28, 1976, Ser. No. 653,085
Int. Cl.² B32B *17/06*
U.S. Cl. 428—189 **16 Claims**

1. A glass-ceramic cooking plate for use with heating elements on the underside of the plate, the heat energy from the heating elements being transmitted through the plate to the upper surface of the plate, said plate comprising a glass-ceramic base layer having a high transmittance value for radiation whose wave length is from 0.7 to 5 microns and a covering

layer smaller in thickness than the base layer, tenaciously adhered to the top of the base layer, said covering layer ab-



sorbing substantially all radiation with wave lengths of 0.7 to 5 microns transmitted the base layer.

4,057,671
HEATED LAMINATED WINDOW AND METHOD OF ASSEMBLING SAME
George W. Shoop, Pittsburgh, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.
Filed June 27, 1975, Ser. No. 591,218
Int. Cl.² B32B *15/00;* B60L *1/02*
U.S. Cl. 428—208 **19 Claims**

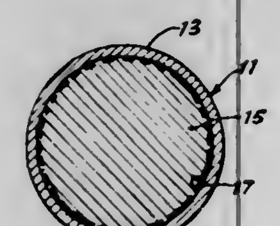
1. A transparent electroconductive window comprising a non-electroconductive assembly element of transparent material selected from the group consisting of glass, polycarbonates, acrylic esters, polyesters, polyvinyl acetals and polyurethanes, an electroconductive circuit portion selected from the group of transparent electroconductive coatings, lines of electroconductive material and electroconductive wire carried by said element, and a self-soldering bus substantially all metallic bar consisting essentially of a mixture of finely divided particles of a highly conductive metal selected from the group consisting of silver, gold, platinum, copper and aluminum and high melting point electroconductive alloys within an electroconductive metal alloy having a fusion point between about 70° C. and about 150° C., said mixture consisting essentially of 85–97 parts by weight of particles of said metal and 15–3 parts by weight of said metal alloy.

4,057,672
COMPOUNDED POLYVINYL CHLORIDE
Mark D. Creekmore, Akron, Ohio, and Henry F. Panning, Abington, Pa., assignors to The Goodyear Tire & Rubber Company, Akron, Ohio
Continuation-in-part of Ser. No. 364,796, May 29, 1973, abandoned. This application Dec. 16, 1974, Ser. No. 532,426
Int. Cl.² B32B *27/30*
U.S. Cl. 428—220 **11 Claims**

1. A cast compounded polyvinyl chloride film having a thickness of about 0.5 to about 4.5 mils where said polyvinyl chloride has an inherent viscosity in the range of about 1.05 to about 1.15 as determined in cyclohexanone according to ASTM D-1243-66 said film characterized when having a thickness of about 0.8 mils, by an Elmendort tear resistance in the range of about 100 to about 650 grams/mil according to ASTM No. D-1922-61T, a coefficient of friction (film against metal) of about 0.2 to about 2.0 according to ASTM No. D-1894-63, a water vapor transmission rate of 37.8° C. and a humidity of about 90 percent in the range of about 15 to about 50g/100 in²/24 hrs according to ASTM No. E-96-66, Procedure E, and an oxygen transmission of about 350 to about 1200cc/100 in²/1 atm according to ASTM No. D-1434-63, said film comprised of 100 parts by weight of polyvinyl chloride resin, from about 20 to about 45 parts by weight of at least one plasticizer selected from at least one of di(2-ethylhexyl)adipate, epoxidized soyabean oil, epoxidized linseed oil, acetyltributylcitrate, butylbenzylphthalate, dibutyl sebacate, butylstearate, acetyl triethyl citrate, p-tert-butylphenyl salicylate, butylphthalyl butyl glycolate, di-(2-ethylhexyl)phthalate, diethyl phthalate, diisobutyl adipate, diisooctyl phthalate, diphenyl-2-ethylhexyl phosphate, ethylphthalyl, ethyl glycolate, glycerol monooleate, monoisopropyl citrate, mono-, di- and tristearyl citrate, triacetin(glycerol triacetate), triethyl citrate, 3-(2-xenoyl)-1,2-epoxy propane, 1,3-butylene glycol adipic acid polyester of about 1700 to about 2200 molecular weight terminated with at least one organic acid selected from myristic, palmitic and stearic acids, dicyclohexyl phthalate, di(2-ethylhexyl)-acelate, di-n-hexyl azelate, dihexyl phthalate, diphenyl phthalate, diphenyl phthalate, epoxidized butyl esters of linseed oil fatty acids, diisononyl adipate and diisononyl phthalate, from about 0.1 to about 2.5 parts by weight of a pigment having an average particle size in the range of about 2 to about 10 microns selected from pigments comprised of about 50 to about 100 parts by weight percent silica (SIO_2), and correspondingly none to about 50 weight percent other oxides selected from aluminum, magnesium, calcium, iron, potassium and sodium, from about 0.05 to about 0.25 parts by weight of a heat stabilizer comprising zinc stearate and calcium stearate in a zinc to calcium weight ratio of about 1:1 to about 3.9:1, from about 0.25 to about 1.5 parts by weight of tris-nonylphenyl phosphite chelator, from about 2 to about 9 parts by weight of at least one surfactant selected from: polyoxyethylene (20) sorbitan monooleate, the mono and diglycerides of fat-forming fatty acids, a nonylphenoxy polyoxyethylene ethanol containing 4 to 5 moles of ethoxylate, glycerol monooleate, sorbitan monooleate, polyoxyethylene(9) monooleate, α-alkyl, α-alkenyl and α-alkylaryl-omega-hydroxypoly(oxyethylene) comprised of at least one of α-(2,4,6-triisobutylphenyl)-omega-hydroxypoly(oxyethylene), α-(Z)-9-octadecenyl-omega-hydroxypoly-(oxyethylene), and α-alkyl (C_{16}-C_{18})-omega-hydroxypoly(oxyethylene), α-alkyl-omega-hydroxy poly(oxyethylene) derived from ethylene oxide and C_{11}-C_{15} straight chain secondary alcohols, n-alkyl-sulfonate where said alkyl group has 10–18 carbon atoms, α-di-sec-butylphenyl-omega-hydroxypoly(oxyethylene) derived from ethylene oxide and di-sec-butylphenol, α-dodecyl-omega-hydroxypoly(oxyethylene) mixture of dihydrogen phosphate and monohydrogen phosphate esters derived by esterification of the product of ethylene oxide and n-dodecyl alcohol, α-(p-dodecylphenyl)-omega-hydroxypoly(oxyethylene) derived from ethylene oxide and dodecylphenol, α-(p-nonylphenyl)-omega-hydroxxypoly(oxyethylene) mixture of dihydrogen phosphate and monohydrogen phosphate esters derived from esterification of α-(p-nonylphenyl)-omega-hydroxypoly(oxyethylene), α-(p-nonyl phenyl)-omega-hydroxypoly(oxyethylene) derived from condensation of nonylphenol and ethylene oxide, α-(p-nonylphenyl)-omega-hydroxypoly(oxyethylene)sulfate, ammonium and sodium salts where said nonyl group is a propylene trimer isomer and said poly (oxyethylene) content averages about 4 moles, poly(oxypropylene) block polymer with poly(oxyethylene) having an average molecular weight of about 11,000 to about 18,000, polyoxyethylene(20)sorbitan monostearate, polyoxyethylene(20)sorbitan tristearate, polyoxyethylene(20)sorbitan monooleate, polyoxyethylene(20)sorbitan trioleate, sodium n-alkylbenzenesulfonate where said alkyl group contains an average of about 10 to about 16 carbon atoms, sorbitan monopalmitate, sorbitan monostearate, sorbitan trioleate, sorbitan tristearate, α-[p-(1,1,3,3-tetramethylbutyl)phenyl]-omega-hydroxypoly(oxyethylene) derived from ethylene oxide and p-(1,1,3,3-tetramethylbutyl)phenol, tetrasodium N-(1,2-dicarboxyethyl)-N-octadecyl-sulfosuccinamate, and α-tridecyl-omega-dicarboxyethyl)-N-octadecyl-sulfosuccinamate, and α-tridecyl-omega-hydroxypoly(oxyethylene) mixture of dihydrogen phosphate and monohydrogen phosphate esters derived from esterification of the product of ethylene oxide and tridecyl alcohol, and from about 0.1 to about 1 part by weight of a slip-antiblock agent selected from at least one of the group consisting of ethylene-N,N'-bis-oleamide, hydrofol glyceride, hydrogenated fish oil, calcium ricinoleate and fatty acids amides selected from amides with aliphatic hydrocarbon chains containing in the range of about 16 to 40 even numbered carbon atoms, said hydrocarbon chains being saturated or partly unsaturated said film prepared by the method which comprises (I) sequentially mixing with about 450 to about 600 parts by weight of an organic solvent (A) about 3 to about 40

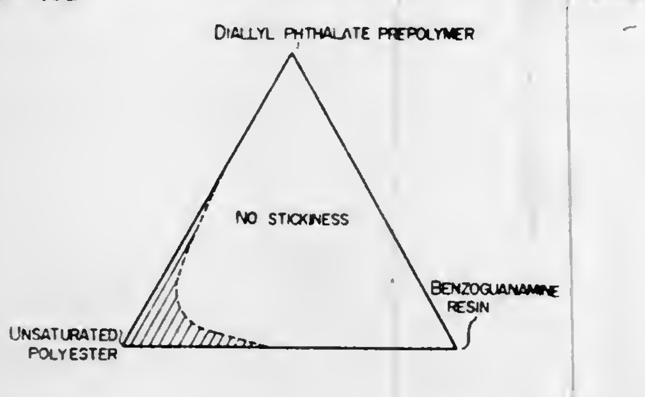
parts by weight of a pigment masterbatch prepared by high shear mixing at a temperature in the range of about 135° C. to about 190° C, 100 parts by weight of polyvinyl chloride resin with from about 10 to about 60 parts by weight of said plasticizer, from about 2 to about 6 parts by weight of said pigment, from about 1 to about 5 parts by weight of said stabilizer and from about 0.5 to about 3.0 parts by weight of said chelator, (B) 100 parts by weight of polyvinyl chloride resin and (C) about 2 to about 9 parts by weight of said surfactant, about 0.1 to about 1.0 parts by weight of the slip agent, about 0.1 to about 1.4 parts by weight of said chelator and about 18 to about 43 parts by weight of said plasticizer, (II) casting said mixture as a film, and (III) drying the cast film at a temperature in the range of about 25° C. to about 95° C.

4,057,673
FABRIC CONDITIONING WITH IMPROVED COMPOSITION CONTAINING A PLASTICIZER
Pasquale J. Falivene, Union City, N.J., assignor to Colgate Palmolive Company, New York, N.Y.
Continuation of Ser. No. 513,238, Oct. 9, 1974, abandoned, which is a continuation of Ser. No. 359,395, May 11, 1973, abandoned, which is a continuation of Ser. No. 82,461, Oct. 20, 1970, abandoned. This application Nov. 10, 1975, Ser. No. 630,605
Int. Cl.² B32B *5/16;* **B05D** *3/12*
U.S. Cl. 428—411 2 Claims



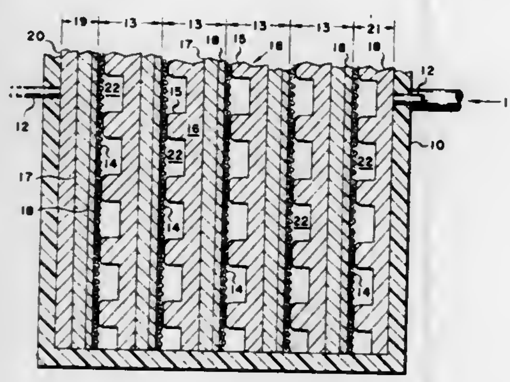
1. An article for conditioning fibrous materials by treating them with a conditioning composition which comprises a solid base, at least one side of said base coated with a continuous coating of a conditioning composition comprising a major proportion of nonionic, anionic or cationic surface active conditioning agent and from ½ to 25% by weight of conditioning composition of plasticizing agent selected from the group consisting of water soluble alkyl phenyl polyoxyethylene ethanols containing from 2 to 20 oxyethylene groups, the alkyl containing from 6 to 12 carbon atoms, water-soluble poly -($C_2 - C_3$) - alkylene glycols having from 2 to 20 $C_2 - C_3$ alkoxy groups per molecule, lower alkyl polyols of 2 to 6 hydroxy groups per molecule and esterified dicarboxylic acid containing substantially terminally located carboxyl groups and an intermediate alkylene chain of from 4 to 10 carbon atoms, said acid being esterified with $C_3 - C_{10}$ alcohol and wherein from 10 to 30% of the thickness of said composition penetrates said base said plasticizing agent improving the transferability of the conditioning agent to the fibrous materials by preventing cracking or flaking off of conditioning agent from the base during a conditioning operation in which the conditioning article is in control with tumbling fibrous materials for a time long enough to apply a sufficient amount of conditioning composition to such materials to condition them.

4,057,674
PROCESS FOR PREPARING DRY, LAMINATING IMPREGNATED PAPERS OR CLOTHS, AND PROCESS FOR PRODUCING DECORATIVE PLATES USING THE SAME
Ryuzo Nakatsuka, Yokohama; Kenji Saito, Fujieda, and Tadashi Kawamoto, Takatsuki, all of Japan, assignors to Sumitomo Bakelite Company, Limited, Tokyo, Japan
Continuation of Ser. No. 359,461, May 11, 1973, abandoned. This application Apr. 1, 1975, Ser. No. 564,060
Claims priority, application Japan, Nov. 2, 1972, 47-109398
Int. Cl.² B32B *27/06, 27/10;* **C09J** *5/00*
U.S. Cl. 428—481 11 Claims



1. A process for producing a dry, impregnated laminating paper or cloth comprising the steps of:
1. impregnating a paper or cloth with a solution of mixed resins in an organic solvent in one step, said resin solution comprising
a radical polymerization catalyst, a crosslinking monomer, optionally a releasing agent, and a ternary resin composition consisting of
A. 10 to 90% by weight of an organic solvent-soluble diallyl phthalate prepolymer having an average molecular weight of 2,000 to 20,000 and a softening point of 70° to 140° C., which prepolymer has been obtained by partially polymerizing a diallyl phthalate monomer and separating and purifying the resulting prepolymer, and
90 to 10% by weight, in total, of (B) an organic solvent-soluble non-crystalline unsaturated polyester and
C. an organic solvent-soluble benzoguanamine resin obtained by condensing in an alkaline reaction system 1 mole of benzoguanamine with 1 to 4 moles of formaldehyde, the weight ratio of (C)/(B) being up to 0.85 and the amount of (C) being at least 2% by weight of the total weight of (A), (B) and (C); and
(2) then drying the thus impregnated paper or cloth.

4,057,675
ELECTROCHEMICAL CELL
Harry J. Halberstadt, Los Altos, and Leroy S. Rowley, San Jose, both of Calif., assignors to Lockheed Missiles & Space Company, Inc., Sunnyvale, Calif.
Filed Feb. 19, 1974, Ser. No. 443,905
Int. Cl.² H01M *4/40, 12/02*
U.S. Cl. 429—39 1 Claim



1. In a reactive metal anode-aqueous electrolyte electrochemical cell, a plurality of bipolar electrodes connected in series, each bipolar electrode consisting of an open mesh electrically conducting cathode screen supported on a ribbed cathode backplate, said ribs forming continuous electrolyte channels between said cathode screen and said cathode backplate, and an alkali metal anode bonded to the reverse side of said cathode backplate, the surface of said anode being covered by a protective insulating film naturally formed on said anode in the presence of water, and means for maintaining anode-cathode contact between the plurality of electrodes as the anodes are consumed during operation of the cell.

4,057,676
CELL CONTAINING CARBON-FLUORINE COMPOUND CATHODE, ALKALI METAL ANODE AND SOLID HALO-ALUMINUM ALKALI METAL COMPOUND ELECTROLYTE
Bhaskara M. L. Rao, Fanwood, and Paul A. Malachesky, Berkeley Heights, both of N.J., assignors to Exxon Research & Engineering Co., Linden, N.J.
Filed Jan. 4, 1977, Ser. No. 756,642
Int. Cl.² H01M *10/44*
U.S. Cl. 429—50 13 Claims

1. A current producing primary cell from which a current can be drawn at a temperature below the melting point of the electrolyte, comprising:
a. a cathode having a compound formed of fluorine and carbon;
b. an alkali metal-containing anode; and
c. a solid electrolyte consisting essentially of one or more compounds of the formula:

$MAlX_4$

wherein M is an alkali metal and X is one or more halogens selected from the group consisting of chlorine and bromine.

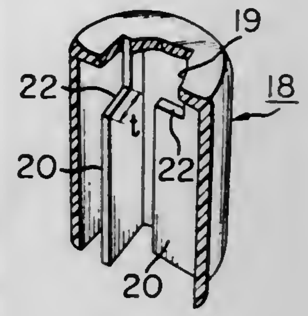
10. A method of operating a current-producing primary cell, comprising:
drawing a current from said cell at a temperature below the melting point of the electrolyte of said cell wherein said cell comprises a cathode having a compound formed of fluorine and carbon, an alkali metal-containing anode, and a solid electrolyte consisting essentially of one or more compounds of the formula:

$MAlX_4$

wherein M is an alkali metal and X is one or more halogens selected from the group consisting of chlorine and bromine.

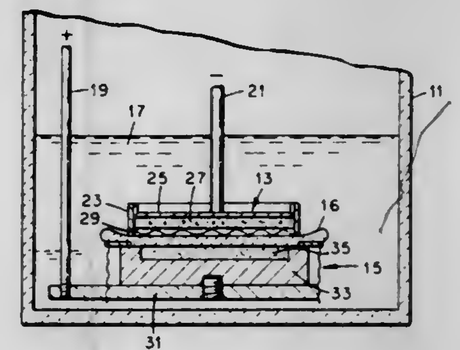
4,057,677
ADAPTER
Kenichi Mabuchi, Tokyo, Japan, assignor to Mabuchi Motor Co., Ltd., Tokyo, Japan
Division of Ser. No. 467,305, May 6, 1974, Pat. No. 3,998,516. This application Dec. 31, 1975, Ser. No. 645,626
Claims priority, application Japan, May 6, 1974, 49-467305[U]
Int. Cl.² H01M *2/10*
U.S. Cl. 429—100 2 Claims

1. An adapter to enable a non-standard sized battery to be operatively placed in a battery compartment designed to house a standard sized battery which is larger than the non-standard size battery, said adapter comprising an elongated, molded plastic tubular body having a transverse wall integral with one end thereof and with an opening through said end wall, said tubular body having a shorter axial length than a non-standard sized battery whereby the non-standard sized battery extends outwardly of said tubular member when the non-standard sized battery is contained within said adapter, said tubular body further including a plurality of inwardly directed and axially extending resilient ribs formed integrally with said transverse end wall and the inside surface of said tubular body for releasably holding a portion of the non-standard sized battery contained within said adapter, each of said ribs including a notch extending axially from the inner surface of said transverse end wall and along at least a portion of the inwardly directed edge of said ribs, the opening in said transverse end



wall including a plurality of cuts therein that correspond to the shape and depth of each said notch in each said rib whereby the unnotched portion of each said rib contacts and resiliently retains the non-standard sized battery and whereby said adapter is capable of being manufactured by a molding process in a single operation utilizing cooperating male and female molds.

4,057,678
MOLTEN SALT BATTERY HAVING INORGANIC PAPER SEPARATOR
Robert D. Walker, Jr., Gainesville, Fla., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.
Filed Mar. 16, 1977, Ser. No. 778,186
Int. Cl.² H01M *10/39*
U.S. Cl. 429—104 10 Claims

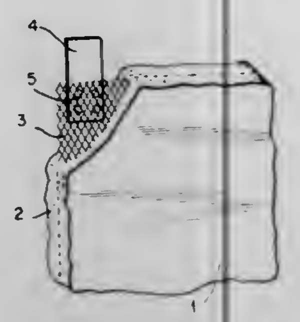


1. In a molten salt battery comprising an anode containing metallic lithium, a cathode containing a chalcogen or chalcogenide, a molten salt electrolyte containing lithium ions in contact with said anode and said cathode, and a porous separator disposed between said anode and cathode for providing electrical insulation and ionic transport between said anode and cathode, the improvement wherein said separator comprises a porous sheet comprising a homogeneous mixture of 2–20 wt.% chrysotile asbestos fibers and the remainder of said homogeneous mixture inorganic material non-reactive with the anode and the electrolyte.

4,057,679
ORGANIC ELECTROLYTE BATTERIES
Arabinda N. Dey, Needham, Mass., assignor to P. R. Mallory & Co. Inc., Indianapolis, Ind.
Division of Ser. No. 503,821, Sept. 6, 1974, Pat. No. 3,945,852. This application Jan. 2, 1976, Ser. No. 646,108
Int. Cl.² H01M *6/14*
U.S. Cl. 429—194 5 Claims

1. A high energy density cell comprising an anode electrode of an active light metal selected from the group consisting of lithium, sodium, potassium, magnesium, calcium, beryllium,

and aluminum; an electrolyte salt of said light metals; an organic solvent having dissolved therein said electrolyte salt; an active cathode material selected from the group consisting of metal chromates, dichromates, oxides, halides, permanganates, arsenates, periodates, vanadates, persulfates, sulfites and mixtures thereof; and a cathode current collector in direct contact with said active cathode material; said current collector being composed of a material selected from the group consisting of the metals of Groups IV*b*, V*b*, and VI*b* of the Periodic Table and mixtures thereof.



4,057,680

METHOD OF POLYMERIZING α-OLEFINS

Isamu Yamazaki; Yoichi Toyama, both of Tokyo; Kiwami Hirota, Yokohama, and Hisashi Takeuchi, Tokyo, all of Japan, assignors to Showa Denko Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 295,013, Oct. 4, 1972, abandoned, which is a continuation-in-part of Ser. No. 92,149, Nov. 23, 1970, abandoned. This application Aug. 10, 1976, Ser. No. 713,199

Claims priority, application Japan, Mar. 3, 1970, 45-17663; Nov. 26, 1969, 44-94256

Int. Cl.^{2} C08F *4/66, 10/06*

U.S. Cl. 526—142 **2 Claims**

1. In a method of polymerizing alpha-olefins and styrene by contacting an alpha-olefin or styrene under polymerization conditions with a stereospecific catalyst comprising (a) a titanium trichloride component containing aluminum chloride as a solid solution and (b) an organo-aluminum compound, the improvement consisting of subjecting said titanium trichloride component to grinding during or after contact with a treating agent for a period of from about 5 to 50 hours in an impact, ball or vibratory mill, and in an inert atmosphere at a temperature of from room temperature to about 200° C., said treating agent being a lactone selected from beta-propiolactone, gamma-butyrolactone, gamma-valerolactone, gamma-nonalactone, epsilon-caprolactone, and coumarine, and said titanium trichloride being contacted with said treating agent so that 0.01–1 mol of said treating agent is incorporated in 1 mol of said titanium trichloride.

4,057,681

PROCESS FOR HOMOGENEOUSLY POLYMERIZED HIGH UNSATURATION C4-C10 ISOOLEFIN CONJUGATED DIENE COPOLYMERS

Martin L. Gorbaty, Fanwood, N.J., assignor to Exxon Research & Engineering Co., Linden, N.J.

Continuation-in-part of Ser. No. 584,456, June 6, 1975, abandoned. This application Apr. 28, 1976, Ser. No. 681,326

Int. Cl.^{2} C08F *2/06, 4/14, 4/52*

U.S. Cl. 526—185 **51 Claims**

1. In a solution polymerization process for preparing a substantially gel-free, high number average molecular weight, high unsaturation copolymer of a C_4–C_{10} isoolefin and at least one C_5–C_9 cyclic conjugated multiolefin wherein said copolymer contains about 5 to about 40 mole percent unsaturation and wherein the polymerization is performed by using as a catalyst a catalytic amount of either an aluminum halide dissolved in a polar solvent or a hydrocarbyl aluminum dihalide and wherein the polymerization is carried out at a temperature below −100° C., the improvement which comprises using a cosolvent in the amount of about 20 to about 40 volume percent based on the monomers plus cosolvent wherein the cosolvent comprises a blend of about 15 to about 90 volume percent of at least one C_5–C_8 cycloparaffin and about 85 to about 10 volume percent of at least one C_4–C_8 acyclic paraffin based on the total volume of cosolvent.

12. In a solution polymerization process for preparing a substantially gel-free, high number average molecular weight, high unsaturation copolymer of a C_4–C_{10} isoolefin, at least one C_5–C_{14} acyclic conjugated diolefin and at least one C_5–C_9 cyclic conjugated multiolefin wherein said copolymer contains about 5 to about 40 mole percent unsaturation and wherein the polymerization is performed by using as a catalyst a catalytic amount of either an aluminum halide dissolved in a polar solvent or a hydrocarbyl aluminum dihalide and wherein the polymerization is carried out at a temperature below −100° C., the improvement which comprises using a cosolvent in the amount of about 20 to about 40 volume percent based on the monomers plus cosolvent wherein the cosolvent comprises a blend of about 15 to about 90 volume percent of at least one C_5–C_8 cycloparaffin and about 85 to about 10 volume percent of at least one C_4–C_8 acyclic paraffin based on the total volume of cosolvent.

4,057,682

POLYMERIZATION OF α-PINENE

Erwin Richard Ruckel, Darien, and Long Shyong Wang, Stamford, both of Conn., assignors to Arizona Chemical Company, Wayne, N.J.

Filed Sept. 16, 1975, Ser. No. 613,777

Int. Cl.^{2} C08F *4/58*

U.S. Cl. 526—190 **9 Claims**

1. A process for polymerizing alpha-pinene which comprises the steps of: establishing a catalyst system comprising (1) a mixture of (a) a minor amount of alkyl halide, alkenyl or aralkyl halide and (b) an alkyl germanium halide, alkyl germanium alkoxide or an aryl germanium halide and (2) a major amount of aluminum chloride or aluminum bromide or mixtures of the latter in an inert solvent, adding at a temperature between about minus 30° C. and about plus 30° C. alpha-pinene incrementally with agitation, adjusting and maintaining the temperature of the mixture at about minus 30° C. to about plus 30° C. for from about one to about four hours, quenching the latter mixture with an aqueous solution, separating aqueous phase from the hydrocarbon phase, and recovering a solid polymer therefrom.

4,057,683

GRAFT COPOLYMER AND PROCESS FOR MAKING SAME

Katherine Anne Cline Elting, Houston, Tex., assignor to Milchem Incorporated, Houston, Tex.

Filed Mar. 15, 1976, Ser. No. 667,176

Int. Cl.^{2} C08F *289/00;* **C08L** *55/00*

U.S. Cl. 526—194 **133 Claims**

1. A process comprising polymerizing a monomeric compound containing a polymerizably reactive vinyl group in an aqueous medium at a pH not greater than about 3.5 in the presence of a ceric salt which is soluble in at least one component of said medium and an inorganic substrate having hydroxyl groups or which forms hydroxyl groups in said aqueous medium and which is capable of initiating polymerization of said monomeric compound, wherein said inorganic substrate is a reducing agent in said reaction.

4,057,684

ALKYL AMINO-GLUCOPYRANOSIDE DERIVATIVE AND PROCESS FOR PRODUCING THE SAME

Goro Kimura, Kamakura, and Junzo Sekine, Tokyo, both of Japan, assignors to Tokyo Tanabe Company, Limited, Japan

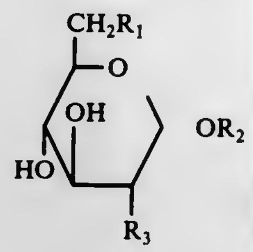
Filed June 20, 1975, Ser. No. 588,893

Claims priority, application Japan, July 5, 1975, 50-76975

Int. Cl.^{2} A61K *31/70;* **C07H** *15/04*

U.S. Cl. 536—4 **11 Claims**

1. An alkyl amino-glucopyranoside having the following formula:



[I]

in which R_1 is an N-carbamyl-N′-(2-chloroethyl)-N′-nitroso-amino group, R_2 is an alkyl group having from 1 to 4 carbon atoms, and R_3 is an hydroxyl group or an N-carbamyl-N′-(2-chloro-ethyl)-N′-nitroso-amino group.

4,057,685

CHEMICALLY MODIFIED ENDOTOXIN IMMUNIZING AGENT

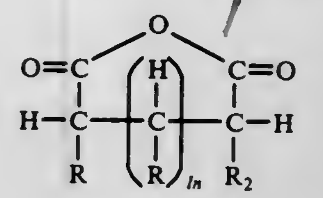
Floyd Cottam McIntire, Waukegan, Ill., assignor to Abbott Laboratories, North Chicago, Ill.

Continuation of Ser. No. 223,012, Feb. 2, 1972, abandoned, which is a continuation-in-part of Ser. No. 147,686, May 27, 1971, abandoned, which is a continuation-in-part of Ser. No. 20,834, March 18, 1970, abandoned, which is a continuation-in-part of Ser. No. 784,174, Dec. 16, 1968, abandoned. This application May 9, 1974, Ser. No. 468,624

Int. Cl.^{2} C08B *37/00*

U.S. Cl. 536—18 **2 Claims**

1. A bacterial endotoxin derivative of reduced toxicity comprising a gram-negative bacterial lipopolysaccharide having at least one free amino group and an anhydride selected from the group consisting of compounds of the formula



wherein *n* is 0 or 1, and R, R_1 and R_2 each represent hydrogen, C_1–C_6 alkyl, C_2–C_6 alkenyl, C_5–C_6 cycloalkyl, phthalyl or methylphthalyl wherein any two R groups taken together form a saturated cyclic substituent.

4,057,686

SULPHONIC ACID SALTS OF S-ADENOSILMETHIONINE

Alberto Fiecchi, Milan, Italy, assignor to Bioresearch Limited, Milan, Italy

Filed July 9, 1975, Ser. No. 594,601

Claims priority, application Italy, July 12, 1974, 25128/74

Int. Cl.^{2} C07H *19/16*

U.S. Cl. 536—26 **23 Claims**

1. Stable salts of S-adenosil-L-methionine (SAM) with sulphonic acids selected from the group consisting of methanesulphonic, ethanesulphonic, 1-n-dodecanesulphonic, 1-n-octadecanesulphonic, 2-chloroethanesulphonic, 2-bromoethanesulphonic, 2-hydroxyethanesulphonic, 3-hydroxypropanesulphonic, d-,1-,d,1-10-camphorsulphonic, d-,1-,d,1-3-bromocamphor-10-sulphonic, cysteic, benzenesulphonic, p-chlorobenzenesulphonic, 2-mesitylbenzenesulphonic, 4-biphenylsulphonic, 1-naphthalenesulphonic, 2-naphthalenesulphonic, 5-sulphosalicylic, p-acetylbenzenesulphonic, 1,2-ethanedisulphonic, o-benzenedisulphonic and chondroitinesulphuric acids, and double salts of said acids with sulphuric acid.

4,057,687

CONNECTION BETWEEN CORE AND ARMATURES OF STRUCTURES COMPRISING A CORE OF AGGLOMERATED FIBRES

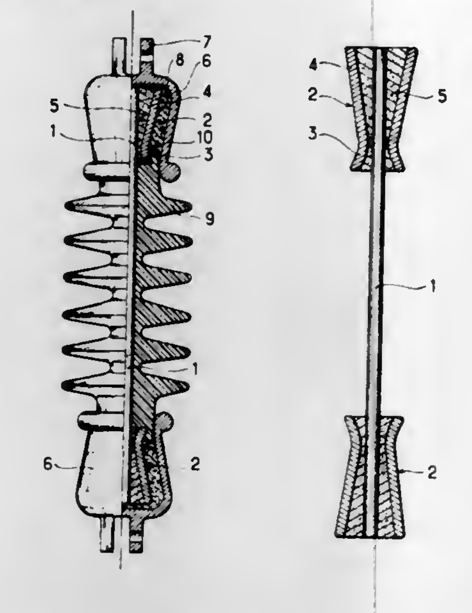
Michel Willem, Abrest, France, assignor to Ceraver, Paris, France

Filed Nov. 12, 1975, Ser. No. 631,276

Claims priority, application France, Nov. 25, 1974, 74.38589

Int. Cl.^{2} H01B *17/12, 17/14;* **F16B** *7/02*

U.S. Cl. 174—179 **5 Claims**



1. In a structure for transmitting great mechanical stresses, comprising an elongated core including at least one agglomerated glass fibre rod and fixing armatures fitted to respective ends of the rod and wherein each fixing armature comprises means defining two end-to-end truncated conical surfaces which telescopingly receive an end of said rod and which flare outwardly, away from each other, said surfaces being of nozzle shape and forming a sealing recess within each fixing armature for the rod and having portions which taper on either side of an intermediate zone, said sealing recesses opening freely on their ends facing each other, and a sealing substance within each recess for sealing the gap between said rod and said conical surfaces and being capable of sliding on the conical surfaces when said rod is submitted to longitudinal force relative to said armatures.

4,057,688

INTERCOM EMBODYING TAP TRANSDUCERS

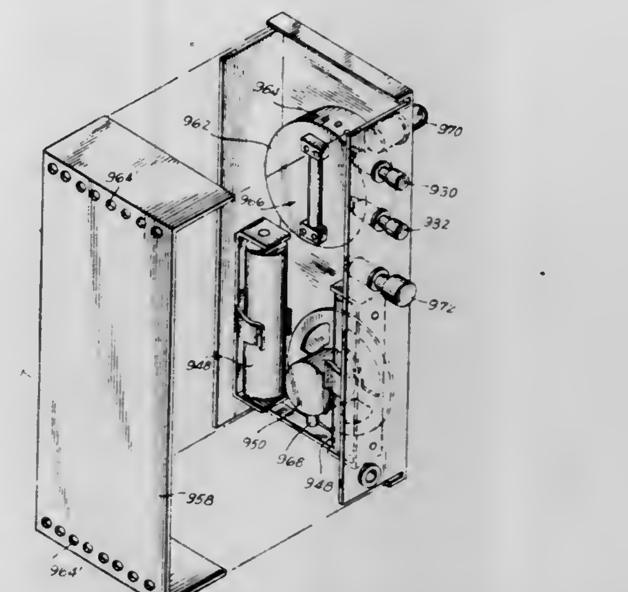
Gerard J. O'Brien, deceased, late of Jersey City, N.J., and by Catherine H. O'Brien, executrix, 33 Pamrapo Ave., Jersey City, N.J. 07305

Continuation-in-part of Ser. No. 396,758, Sept. 13, 1973, Pat. No. 3,932,711. This application Jan. 12, 1976, Ser. No. 648,565

Int. Cl.^{2} H04M *9/02*

U.S. Cl. 179—1 H **15 Claims**

1. An intercom for transmitting electrical signals containing sound or speech information, the intercom comprising a housing at least a portion of which forms a soundboard sensitive to vibratory input; a pair of electrically conductive bearing means rigidly mounted on said soundboard and electrically insulated therefrom; a conductive switching bar extending between and loosely engaged in said bearing means, said switching bar being least mechanically stable or being in a state of least equilibrium when the axis thereof is in a substantially vertical orientation to provide optimum vibratory or switching characteristics; a source of electrical energy having one pole thereof connected to one of said bearing means; conversion means for converting the electrical signals into audible sound or speech, said conversion means having two input terminals one of which is connected to the other pole of said source of electrical energy and the other terminal of which is connected to the other of said bearing means, whereby said conductive switching bar, said source of electrical energy and said conversion means together form a series circuit; actuation means connected in said series circuit for selectively enabling and disabling the operation of said series circuit, a current flowing through said series circuit only in the enabled condition thereof, said current being converted into said electrical signals containing sound or speech information when said soundboard is exposed to sound or speech and said current is repeatedly interrupted to correspond to the vibratory characteristics of said sound or speech patterns due to the make and break conditions of said conductive



switching bar with relation to said bearing means; output terminal means connected to said circuit for transmitting said electrical signals to a remote location; and detection means for detecting when the axis of said switching bar substantially deviates from the vertical direction, whereby said electrical signals appearing at said output terminal means may be used to reliably produce sound or speech at the location or the intercom or to transmit the same to a remote location.

4,057,689

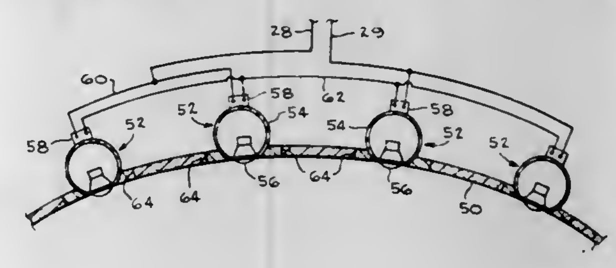
HIGH FIDELITY SOUND REPRODUCTION SYSTEM AND MODULES THEREOF

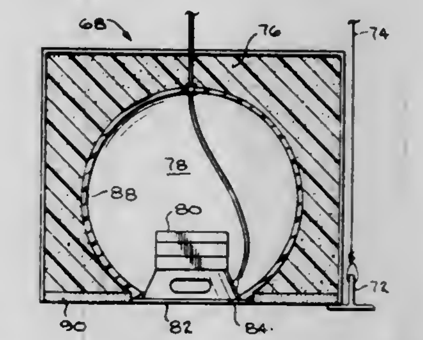
Robert J. Stallings, Jr., Sugar Land, Tex., assignor to Roy H. Smith, Jr., Houston, Tex.

Continuation-in-part of Ser. No. 377,762, July 9, 1973, Pat. No. 3,976,838. This application Aug. 19, 1976, Ser. No. 715,694

Int. Cl.^{2} H04R *1/02*

U.S. Cl. 179—1 E **13 Claims**





1. A high fidelity loudspeaker system comprising a multiplicity of modules each consisting essentially of a loudspeaker having a diaphragm and a magnet structure together with a member having a generally spherical cavity, said cavity being

truncated with a circular opening and the loudspeaker being secured to and supported by the member so that its diaphragm lies in and fills said circular opening while the magnet structure extends cantilever style into the generally spherical cavity, in combination with a number of baffle plates having openings therein to receive and support said modules with said diaphragms disposed in said openings and essentially flush with the outer surface of said baffle plate, there being a like multiplicity of openings in said baffle plates and each such opening supporting one of said modules, said baffle plates being disposed so that their nether surfaces form an essentially continuous surface, said loudspeakers being electrically interconnected to reinforce one another, whereby each speaker may be utilized to receive a common input signal covering the full audio spectrum.

5. An article of manufacture for a high fidelity sound reproduction system, said article comprising a single dynamic loudspeaker and a block-shaped cavity-defining primary enclosure having one face intersected by said cavity to define a single opening, the remaining area of said face defining a rigid baffle surface, the cavity in said enclosure except for said opening being defined by a smooth, substantially continuous curved surface,

said loudspeaker having a longitudinal axis with inner and outer ends, a magnet structure at the inner end and a diaphragm at the outer end,

said loudspeaker being disposed in the enclosure with its magnet and disposed in said cavity and its diaphragm end supported by the enclosure to fill and close said opening.

13. In a high fidelity sound reproduction system, the combination of

A. a dynamic loudspeaker having a longitudinal axis with inner and outer ends, a magnet disposed at the inner end and a single membrane diaphragm at the outer end,

B. a primary enclosure defining a substantially unvented concave cavity and having an opening to said cavity, said cavity being defined by a substantially continuous curved surface, and

C. an outwardly convex secondary enclosure or baffle plate also having an opening therethrough of substantially the same size as the opening in said primary enclosure, said enclosures being secured together with said openings substantially coincident, said loudspeaker being disposed with its inner end extending cantilever style within said cavity and supported on said enclosures at its outer end with said diaphragm filling said openings and the outer periphery of the diaphragm approximately flush with the outer surface of the secondary enclosure.

4,057,690

METHOD AND APPARATUS FOR DETECTING THE PRESENCE OF A SPEECH SIGNAL ON A VOICE CHANNEL SIGNAL

Federico Vagliani, Milan, and Alcide Molinari, Vimercate, both of Italy, assignors to Telettra Laboratori di Telefonia Elettronica e Radio S.p.A., Milan, Italy

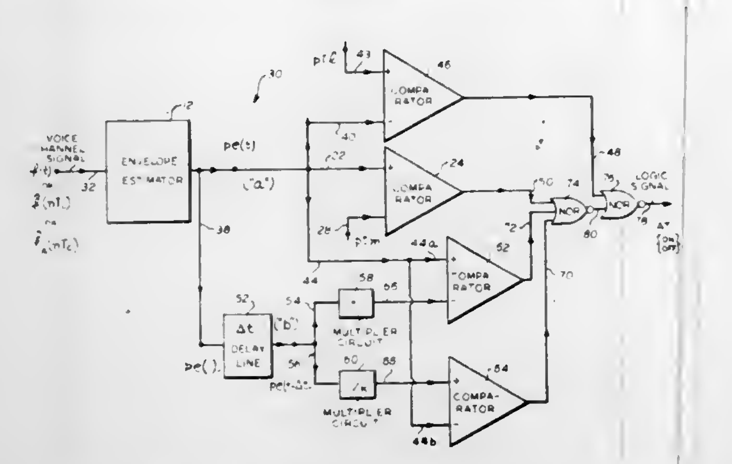
Filed June 24, 1976, Ser. No. 699,364

Claims priority, application Italy, July 3, 1975, 25053/75

Int. Cl.² G10L *1/04*

U.S. Cl. 179—15 AS **34 Claims**

14. A method for detecting the presence of a speech signal in a voice channel signal, said method providing an active channel indication when said speech signal presence is detected in said voice channel signal and an idle channel indication when the absence of said speech signal presence is detected in said voice channel signal, said voice channel signal being capable of containing both said speech signal and background noise, said speech signal having an envelope associated therewith having a magnitude variable over time, said background noise having an envelope associated therewith having a magnitude substantially constant over time, said voice channel signal having an envelope associated therewith having a magnitude dependent on said magnitudes of said speech signal and said background noise envelopes; said method comprising the steps of making a first evaluation of said voice channel signal envelope magnitude over a first time domain to obtain a first resultant output signal, making a second evaluation of said voice channel signal envelope magnitude over a second time domain to obtain a second resultant output signal, said second time domain being different from said first domain, determining the difference in magnitude between said first and second evaluation resultant



output signals, comparing said difference with at least a first predetermined value and providing an active channel conditon when said difference exceeds said predetermined value and an idle channel condition when said difference is less than said predetermined value, said active channel indication being provided when said active channel condition is present, said idle channel indication being provided when said idle channel condition is present.

4,057,691

SWITCHING NETWORK WITH CROSSTALK ELIMINATION CAPABILITY

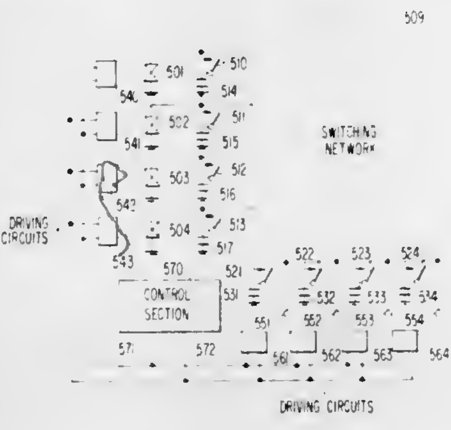
Hirokazu Goto, and Kunio Nagashima, both of Tokyo, Japan, assignors to Nippon Electric Company, Ltd., Tokyo, Japan

Filed June 23, 1976, Ser. No. 699,131

Claims priority, application Japan, June 24, 1975, 50-78936; Dec. 24, 1975, 50-155411; Dec. 24, 1975, 50-155412

Int. Cl.² H04Q *3/52*

U.S. Cl. 179—18 GF **6 Claims**



1. A switching network comprising:

a group of incoming lines connected to telephone subscribers;

a group of outgoing lines intersecting said incoming line group;

a plurality of switching elements provided at preselected crosspoints formed between these incoming lines and outgoing lines for interconnecting a desired incoming line in said incoming line group and a desired outgoing line in said outgoing line group in response to a call from a subscriber;

a plurality of ON-state detectors connected to the respective incoming lines for detecting the ON-state of said switching elements in response to variation of current or voltage;

a plurality of direct current isolating circuits connected to said respective incoming lines for preventing direct currents from flowing between the subscribers and said incoming lines;

a plurality of OFF-hook detectors connected to these direct isolating circuits for detecting the OFF-hook state of the subscribers;

a plurality of decision circuits responsive to outnut signals on said ON-state detectors and output signals of said OFF-hook detectors for determining the state where the subscribers are in the ON-hook state where each incoming line is idle; and

a plurality of grounding means for grounding said incoming lines through impedance elements having a sufficiently low impedance value at a desired frequency band of signals to be exchanged when the output signals of said decision circuits show that the subscribers are in the ON-hook state and each said incoming line is idle.

4,057,692

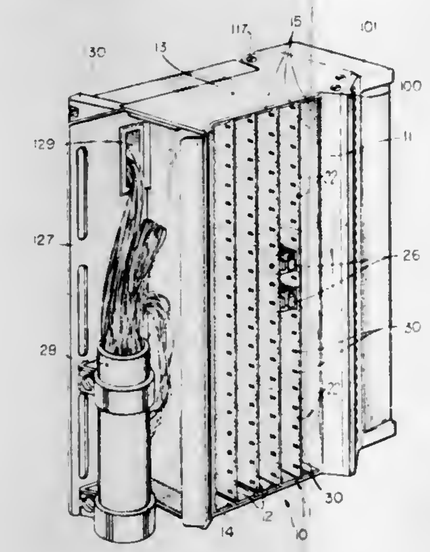
PROTECTOR APPARATUS FOR TELECOMMUNICATIONS LINES

George DeBortoli, and Detlef Zimmermann, both of Ottawa, Canada, assignors to Northern Telecom Limited, Montreal, Canada

Filed Oct. 27, 1976, Ser. No. 736,173

Int. Cl.² H04M *3/22*

U.S. Cl. 179—98 **9 Claims**



1. Protector apparatus for telecommunication lines, comprising a metal housing, a plurality of metal portions extending between opposed sides of said housing to provide a plurality of columnar spaces, formations on said metal columnar partitions, said formations spaced at regular predetermined positions to define a plurality of protector positions in each columnar space, an insulating back member in said housing, a plurality of terminals extending through said back member, at least four terminals for each protector position, each of said terminals including a part for connection to protectors in said protector position, and a part for connection of a conductor, said housing of elongated form, said partitions extending longitudinally of said housing, whereby said protector positions are provided in vertical columns and horizontal rows, said partitions including formations at each protector position for cooperating with detent means on said protectors to provide predetermined partial withdrawal positions for said protectors.

4,057,693

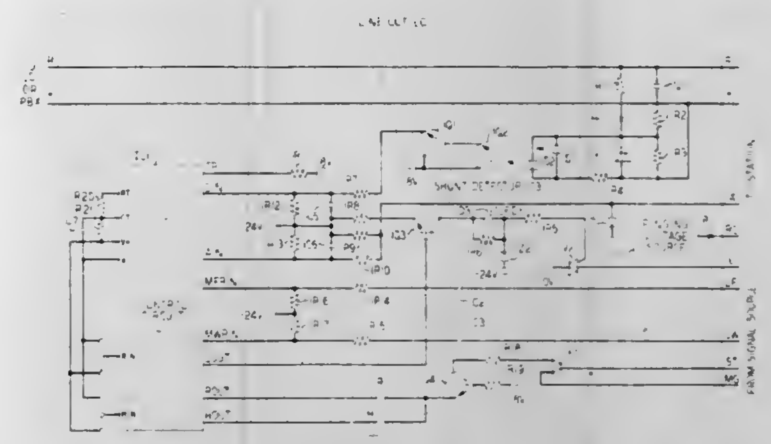
LOGIC CONTROL FOR ELECTRONIC KEY TELEPHONE LINE CIRCUIT

Ronald Joseph Angner, Freehold, N.J.; Marion Lee Blount, Palo Alto, Calif., and James Volney Lacy, Red Bank, N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed July 28, 1976, Ser. No. 708,857

Int. Cl.² H04M *1/72*

U.S. Cl. 179—99 **9 Claims**



1. A line circuit for use in a key telephone system for controlling the hold function between a switching machine and at least one telephone station, said line circuit adapted for A-lead control between said line circuit and said station, said hold control circuit comprising

means for providing a momentary station transition signal whenever any of said telephone stations makes a transition from an on-hook to off-hook condition or from an off-hook to an on-hook condition,

means for detecting the presence or absence of a signal on said A-lead,

means for establishing first and second timed intervals where said second timed interval is longer than said first timed interval,

means for recording any provided circuit transition signal for a period of time determined by said established first timed interval,

means for recording a subsequently provided station transition signal for a period of time determined by said established second timed interval,

means controlled jointly by a detected absence of a signal on said A-lead and a recorded provided station transition signal for providing a station disconnect signal,

means for providing a hold bridge enable signal upon a detected absence of a signal on said A-lead and a concurrent absence of a recorded subsequently provided station transition signal, and

means operable during said first timed interval when a provided circuit transition is recorded for reducing said second timed interval to said first timed interval.

4,057,694

SPEAKER DIAPHRAGM HAVING FLAT RESPONSE CURVE

Akio Obuchi, Tokorozawa, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed Oct. 21, 1976, Ser. No. 734,691

Claims priority, application Japan, Oct. 23, 1975, 50-126858

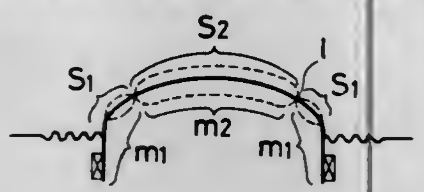
Int. Cl.² H04R *9/06*

U.S. Cl. 179—115.5 R **6 Claims**

1. In a audio speaker including a diaphragm having concentric, contiguous inner and outer portions, said diaphragm being adapted to vibrate in a split mode wherein the interface between said inner and outer portions is defined by a nodal circle, and a voice coil operatively associated with one of said portions, the improvement characterized by:

the nodal circle being positioned such that the ratio $S_i : S_o$ is approximately equal to the ratio $m_i : m_o$, where

S_i is the surface area of the inner portion,



S_o is the surface area of the outer portion,

m_i is the mass of the inner portion, and

m_o is the mass of the outer portion.

4,057,695

TELECOMMUNICATION SYSTEM WITH CONTROLLED GAIN ACTIVE FILTERS

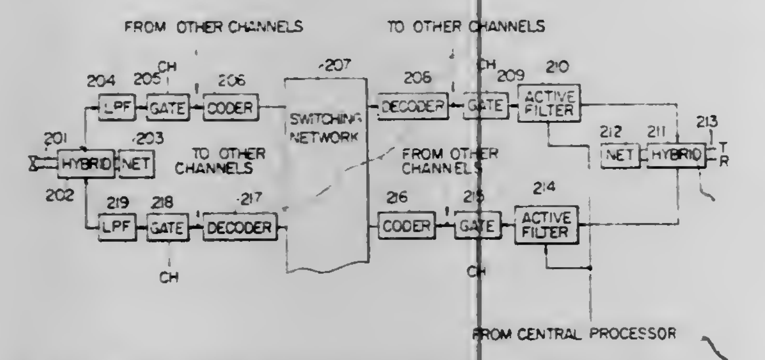
Toru Ohno, Yokohama, Japan, assignor to Hitachi, Ltd., Japan

Filed May 12, 1976, Ser. No. 685,809

Claims priority, application Japan, May 14, 1975, 50-56067

Int. Cl.² H04B *3/36*

U.S. Cl. 179—170 R **6 Claims**



1. A telecommunication system comprising:

a first pulse code modulation coder for converting voice-frequency signals into pulse code modulation signals;

a time division multiplex pulse code modulation switching network having one side thereof connected to said coder and switching said pulse code modulation signals from said coder through the network to the opposite side thereof;

a first pulse code modulation decoder connected to said one side of said switching network and converting pulse code modulation signals switched through said network from the opposite side thereof into voice-frequency signals;

a plurality of transmission lines over which voice-frequency signals are transmitted;

a plurality of respective active filters coupling the output of said first decoder and the input of said first coder to said transmission lines;

a plurality of subscriber's lines connected with the opposite side of said switching network, through a second pulse code modulation decoder and a second pulse code modulation coder, respectively; and

central processing means, connected with said plurality of subscriber's lines and said switching network, for effecting selective connections through said network. between said subscriber's lines and said transmission lines, and being connected to said active filters for controlling the gain of each of said respective active filters in accordance with characteristics of said subscriber's lines.

4,057,696

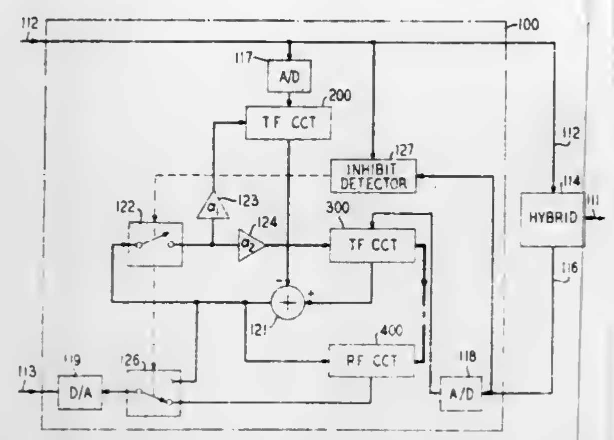
RECURSIVE-LIKE ADAPTIVE ECHO CANCELLER

Richard Dennis Gitlin, Monmouth Beach, and John Stewart Thompson, Tinton Falls, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Aug. 9, 1976, Ser. No. 712,518

Int. Cl.² H04B *3/20*

U.S. Cl. 179—170.2 **15 Claims**



1. An echo canceller of the type having a transversal filter means for synthesizing from an input signal on a receiving signal path a replica signal to approximate an echo signal on a sending signal path for subtraction from the echo signal, means for subtracting the replica signal from the echo signal to produce a residual echo signal, said transversal filter means responsive to the residual echo signal for changing the replica signal to reduce the residual echo signal, said canceller further comprising first adaptive signal processing means responsive to the residual echo signal for modifying the echo signal on said sensing signal path before the subtraction, and second adaptive signal processing means coupled to receive the residual echo signal and responsive to said first adaptive processing means for providing an operation inverse to that of said first processing means to produce a clear sending signal essentially free of the echo signal.

4,057,697

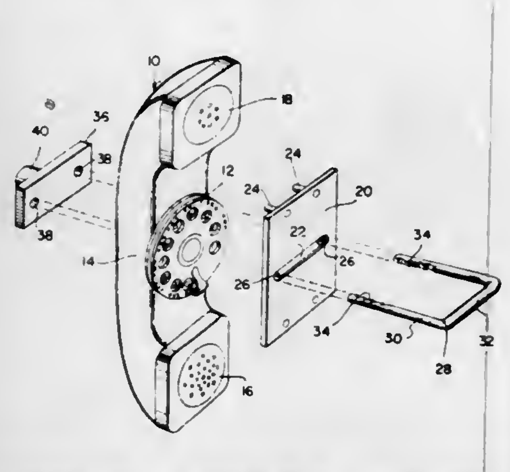
TELEPHONE DIAL LOCK

Marie Addoo, 135-01 234th St., Laurelton, Queens, N.Y. 11422

Filed Jan. 7, 1976, Ser. No. 647,214

Int. Cl.² H04M *1/66*

U.S. Cl. 179—189 D **1 Claim**



1. A telephone dial lock apparatus for preventing unauthorized use for making outgoing calls of a telephone instrument of the type having a dialing mechanism in the handle member of the handset comprising:

a rectangular shield plate having two broad faces adapted to covering and obscuring said dialing mechanism;

first and second spaced-apart holes in said shield plate, the spacing between said holes being greater than the lateral dimension of said handle member;

a groove in one face of said shield plate extending between said first and second spaced-apart holes;

a generally U-shaped shackle, the cross member of said U-shaped shackle being substantially straight and the spacing between the legs of said U-shaped shackle being substantially equal to the spacing between said first and second spaced-apart holes in said shield plate;

the legs of said U-shaped shackle being inserted through the first and second spaced-apart holes in said shackle and the straight cross member of said U-shaped shackle nesting within said groove;

a plurality of support pins extending from the face of said shield plate opposite to the face containing the groove;

said support pins being adapted to rest upon the inner surface of the handle portion of said handset adjacent to said dialing mechanism whereby said shield plate is supported from and in close proximity to said dialing mechanism;

said legs being long enough to extend substantially past the handle member of said handset when said U-shaped shackle is inserted fully into said shield plate and said shield plate is placed adjacent to said dialing mechanism with said two legs straddling said handle member;

ratchet indentations on the portion of facing sides of the legs of said U-shaped shackle which extends past said handle member, said ratchet indentations being inclined toward the closed end of the U;

a lock plate having two spaced-apart holes therethrough, the spaced-apart holes in said lock plate having diameter and spacing adapted to the passage therethrough of said two legs;

spring loaded dogs in said lock plate adapted to oneway engagement with the ratchet indentations in said two legs, whereby said lock plate can be pressed onto said two legs without the use of a key;

said lock plate, spring-loaded dogs and ratchet indentations being adapted to resist the disassembly thereof;

a barrel type lock for use with a cooperating key in said lock plate; and

said barrel type lock being adapted to releasing of said spring loaded dogs from engagement with said ratchet indentations when said key is operated in said barrel type lock.

4,057,698

SWITCHING MECHANISM OF A TIMEPIECE

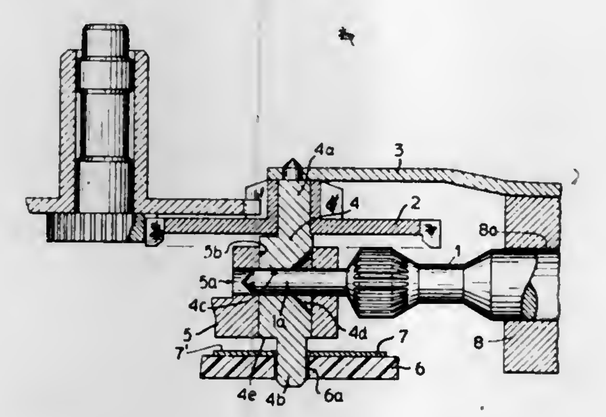
Yasuichi Nakagawa, Kashiwa; Masataka Ikenishi, Soka; Yoshio Hozumi, Tokyo; Shozo Kushida, Chiba, and Koichi Tsukutani, Matsudo, all of Japan, assignors to Kabushiki Kaisha Daini Seikosha, Japan

Filed Apr. 7, 1976, Ser. No. 674,844

Claims priority, application Japan, Apr. 8, 1975, 50-47192[U]

Int. Cl.² H01H *3/32, 15/24;* **G04C** *3/00*

U.S. Cl. 200—16 A **3 Claims**



1. A switching mechanism for a timepiece, comprising:

a base plate having a first bore extending therethrough and having a second bore extending therethrough and intersecting said first bore;

a circuit board having a surface opposite said second bore and having stationary contacts mounted on said surface opposite said second bore;

a contact member dimensioned to slidably fit within the second bore of said base plate and having an axial dimension aligned with said second bore, said contact member having a transverse bore extending therethrough and alignable with the first bore through said base plate, and said contact member having a conductive lower end portion extending from said base plate and terminating at a contact surface for contacting said stationary contacts on said circuit board to complete an electrical connection therebetween;

biasing means comprising a spring for biasing said contact member downwardly to a lowered position with said contact surface contacting said stationary contacts on said circuit board;

an adjusting stem having an end portion dimensioned for insertion into the first bore through said base plate and into the transverse bore through said contact member for maintaining said contact member at a raised position with said contact surface thereof raised from said stationary contacts on said circuit board so that said stationary contacts are in an unconnected condition; and

mounting means slidably mounting said adjusting stem in an aligned position aligned with the second bore through said base plate for permitting said adjusting stem to travel in an axial direction thereof between a retracted position with said stem clear of the transverse bore through said contact member with said contact member at the lowered position and an operative position with said stem inserted into the first bore of said base plate and into the transverse bore of said contact member to maintain said contact member in the raised position, and wherein said contact member and said stem together include means for raising said contact member from the lowered to the raised position as said stem travels from the retracted to the operative position.

4,057,699

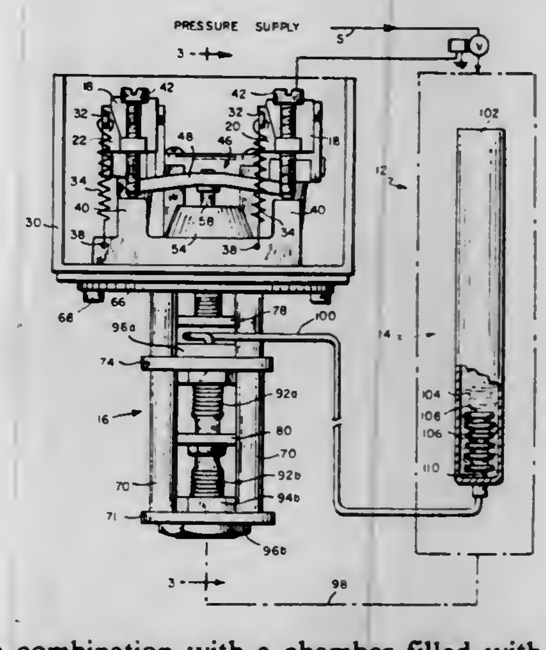
DENSITY CONTROL MONITOR WITH OPPOSING BELLOWS

Robert D. Reis, Hingham, Mass., assignor to United Electric Controls Company, Watertown, Mass.

Continuation of Ser. No. 459,462, April 10, 1974, abandoned. This application Jan. 9, 1976, Ser. No. 648,042

Int. Cl.² H01H *35/32*

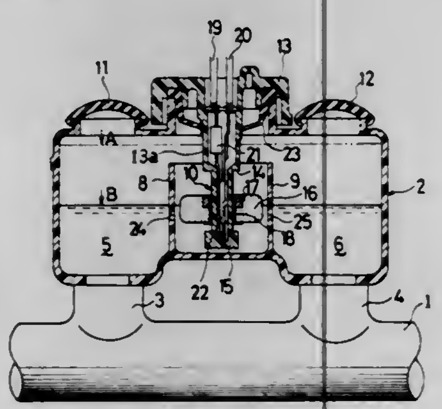
U.S. Cl. 200—83 D **6 Claims**



1. The combination with a chamber filled with a gaseous medium at a predetermined temperature and pressure, of switch means, switch controlled means operable to supply a gaseous medium to the chamber and monitoring means for controlling operation of the switch to maintain the chamber filled with said gaseous medium at said predetermined temperature and pressure, said monitoring means comprising reciprocably movable pressure-responsive means, overriding means operable by said pressure-responsive means, said overriding means being interposed between the pressure-responsive means and said switch for effecting operation of the switch, a sensing element in the chamber, said sensing element compris-

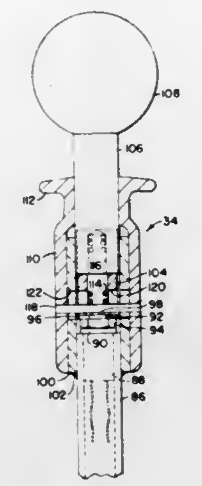
ing a sealed tube containing a gaseous medium at the same temperature and pressure as that in the chamber, displaceable means in the sealed tube responsive to a change in pressure therein, means responsive to the displacement of the displaceable means in the sealed tube to move the pressure-responsive means proportionately in one direction and conductor means connecting the chamber to the pressure-responsive means for transmitting a change of pressure within the chamber to the pressure-responsive means to move it proportionately in the opposite direction.

4,057,700
FLUID LEVEL INDICATOR
Katsushi Nakashima, Kariya, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Japan
Filed Feb. 20, 1976, Ser. No. 659,936
Claims priority, application Japan, Feb. 21, 1975, 50-22289
Int. Cl.² H01H *35/18*
U.S. Cl. 200—84 C 2 Claims



1. A fluid level indicator for a reservoir of a brake tandem master cylinder, comprising:
a pair of vertically extending partition walls provided within said reservoir and defining three chambers;
float means disposed within the middle chamber defined by said partition walls, said float means being reciprocated in response to changes in the level of the brake fluid within said chamber;
fluid level indicating circuit means for indicating the fluid level in response to the movement of said float means when the fluid level attains a predetermined level;
said fluid level indicating circuit means including a reed switch positioned at said predetermined fluid level and actuated by means of a magnet incorporated within said float means;
said pair of partition walls being provided with communication bores at a position just below said predetermined fluid level for communicating said three chambers with one another; wherein,
said reservoir is provided with a first cap member detachably mounted upon the top of said reservoir and a second and third cap member detachably mounted to said reservoir adjacent to and located on opposite sides of said first cap member, respectively;
said first cap member being provided with a dependent cylindrical stepped projection extending into said middle chamber of said reservoir;
said fluid level indicating circuit means being disposed within said projection of said first cap member;
said float means is slidably engaged with said projection of said first cap member;
said projection of said first cap member is provided with two shoulder portions between which said float means is movable; and,
said partition walls are formed integrally with said reservoir and extending vertically upwardly from the bottom of said reservoir and displaced from the top of said reservoir so as to form an opening which connects said three chambers.

4,057,701
CONTROL LEVER
Robert Michael Sisk, and Lary Lynn Williams, both of Dubuque, Iowa, assignors to Deere & Company, Moline, Ill.
Filed Aug. 9, 1976, Ser. No. 712,606
Int. Cl.² H01H *9/06*
U.S. Cl. 200—213 6 Claims



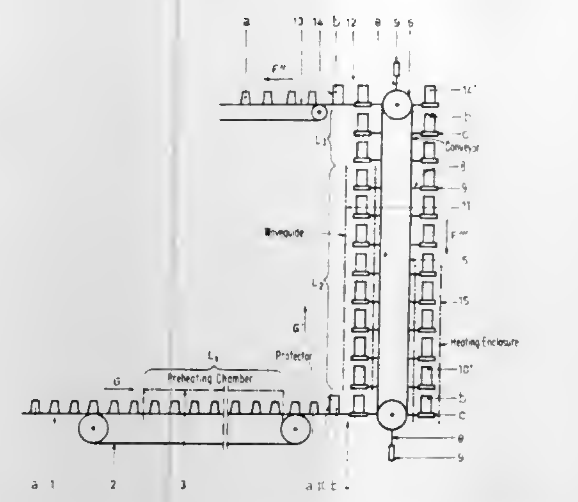
1. In a control mechanism including a control lever incorporating an electric switch whereby selective actuations of functions controlled by movement of the lever and operation of the switch may be accomplished without requiring the operator to move his hands from the lever, the improvement comprising: said lever defining a hand grip at one end thereof; a switch actuator including a sleeve slidably mounted on the lever adjacent to and for movement toward and away from the hand grip and including a finger grip; said lever being provided with a transverse opening elongated in the direction of movement of said sleeve; a pin extending through the opening and fixed to said sleeve for movement therewith; said lever including a hollow section traversed by said pin; a switch supported in said hollow section by the lever and including an actuator element located in the path of movement of the pin and biased in the direction of the hand grip toward a first position for effecting a closed condition in the switch; biasing means acting between the lever and the switch actuator for urging the latter in a direction away from the hand grip to a normal position wherein it holds the actuator element in a second position for effecting an open condition in the switch.

4,057,702
PROCESS AND PLANT FOR THE FRITTING OF CERAMIC PRODUCTS
Jean Francois Lacombe-Allard, Paris, France, assignor to Automatisme & Technique, Arcueil, France
Filed Oct. 22, 1974, Ser. No. 517,069
Claims priority, application France, Oct. 31, 1973, 73.38987; Sept. 18, 1974, 74.31573
Int. Cl.² H05B *9/06;* C04B *35/64*
U.S. Cl. 219—10.55 A 3 Claims

1. A process for fritting ceramic products, comprising preheating the products to be fritted at a given temperature, then exposing the preheated products directly to a hyperfrequential electro-magnetic field to raise the temperature of the products high enough to cause fritting of the products, and protecting the products during said fritting against losses by radiation and against thermal shocks, the maximum temperature of the protective means being less than the fritting temperature.

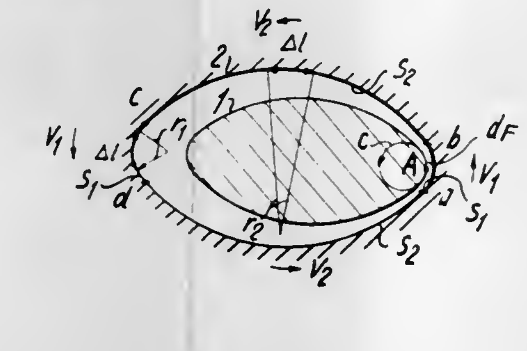
3. A plant for fritting ceramic products, comprising a preheating furnace heated by electrical resistance, a conveyor for carrying said products through the furnace, a waveguide downstream from the furnace, conveying means for receiving the preheated articles from the furnace conveyor and carrying them through said waveguide, a station at the inlet of the waveguide where said preheated products are provided with protectors, said conveying means including fritting bearers for

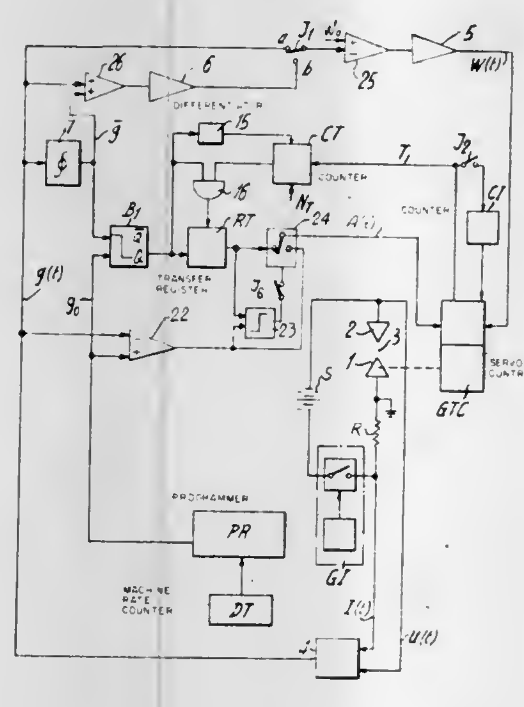
the products and protectors traveling through the waveguide, means for subjecting said products in the waveguide to microwave heating to raise them to fritting temperature, a station at the outlet of the waveguide where said protectors are removed from the fritted products and returned to said fritting bearers,



and a controlled temperature enclosure, said conveying means including an endless conveyor chain supporting said fritting bearers for carrying the protectors through said waveguide and then through said enclosure after they leave said last-mentioned station.

4,057,703
METHOD OF MACHINING BY EROSIVE ELECTRICAL DISCHARGES
Jean Pfau, Geneva, Switzerland, assignor to Ateliers des Charmilles S.A., Geneva, Switzerland
Filed Nov. 12, 1975, Ser. No. 630,959
Claims priority, application Switzerland, Nov. 14, 1974, 15183/74
Int. Cl.² B23P *1/08*
U.S. Cl. 219—69 C 13 Claims

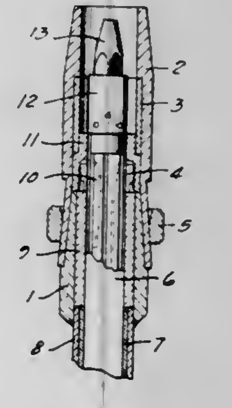




1. In a process for machining a surface of an electrode workpiece by electrical discharges initiated and supplied with current by a succession of voltage pulses applied to a machining zone across a machining gap between an electrode tool and said electrode workpiece according to which a relative displacement between said electrodes is achieved along a cyclic translation movement following a closed path inscribed in a surface of predetermined shape and in such a manner as to decrease the gap between said electrodes on a portion of the machines surface and to produce a cyclic displacement of the machining zone, the improvement comprising varying the speed of said translation movement so as to remove for all the machined surface of the workpiece the same quantity of material per unit area during at least one cycle of translation.

9. An apparatus for machining a surface of an electrode workpiece by electrical discharges initiated and supplied with current by a succession of voltage pulses applied to a machining zone across a machining gap between an electrode tool and said electrode workpiece according to which a relative displacement between said electrodes is achieved along a cyclic translation movement following a closed path inscribed in a surface of predetermined shape and in such a manner as to decrease the gap between said electrodes on a portion of the machined surface and to produce a cyclic displacement of the machining zone, said apparatus comprising means for varying the relative displacement of the electrode tool and electrode workpiece according to a cyclic translation movement along a predetermined path, means for controlling the speed with which said cyclic translation movement is effected, said last mentioned means being responsive to a first electrical value, and means for modifying said electrical value as a function of the variation between a second electrical value representing the machining gap and the machining current and a reference value, wherein said first electrical value comprises two different electrical values one corresponding to the maximum speed of translation movement and the other corresponding to the minimum speed of translation movement, further comprising means for selecting one of said different electrical values, said last mentioned means responding as a function of the difference between said second electrical value and said reference value.

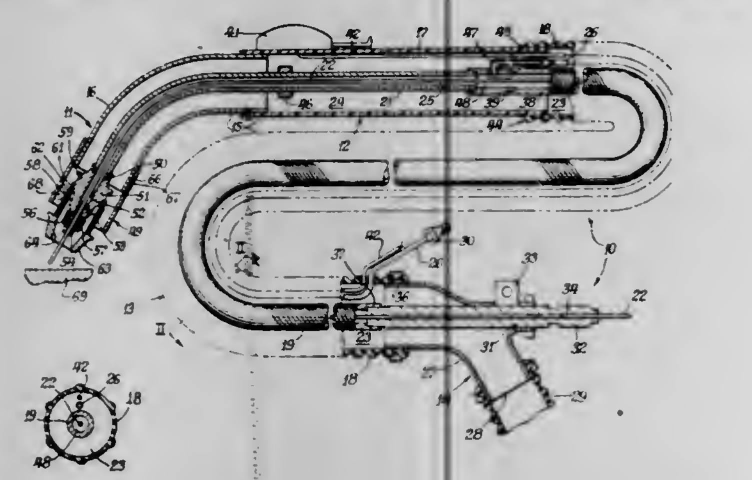
4,057,704
GAS SHIELDED ARC WELDING TORCH
Ewald Geus, Blasbach, and Vesa Tammi, Giessen, both of Germany, assignors to Alexander Binzel Corporation, Germany
Filed Nov. 26, 1975, Ser. No. 635,339
Claims priority, application Germany, Nov. 29, 1974, 2456478; Sept. 24, 1975, 2542470
Int. Cl.² B23K *9/32*
U.S. Cl. 219—75 12 Claims



1. The combination comprising a welding torch including a current and coolant carrying torch tube and cable assembly with a coolant receiving gas nozzle seat affixed thereto at one end thereof, a gas nozzle, said nozzle seat having a conically shaped outer diameter surface portion decreasing towards an end of the nozzle seat opposite the torch tube and cable assembly, said nozzle having an attachment end with an inner cylindrical wall received directly around the nozzle seat and in direct contact therewith, said attachment end having expan-

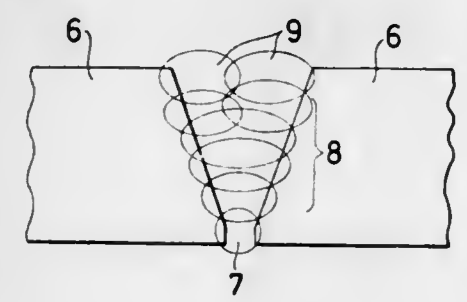
sion slits, the angle of inclination of said outer surface portion and the inner diameter of said inner cylindrical wall of said attachment end being such that said attachment when seated is in a stressed, expanded condition on the nozzle seat and in substantially complete contact with said seat, and a constricting ring received around said nozzle and effective to increase the contact pressure between said seat and said attachment end.

4,057,705
FUME EXTRACTING WELDING GUN
Herbert D. Cockrum, and Charles E. Kater, both of Decatur, Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.
Continuation of Ser. No. 412,454, Nov. 2, 1973. This application Apr. 9, 1975, Ser. No. 566,599
Int. Cl.² B23K *9/00*
U.S. Cl. 219—130 **3 Claims**



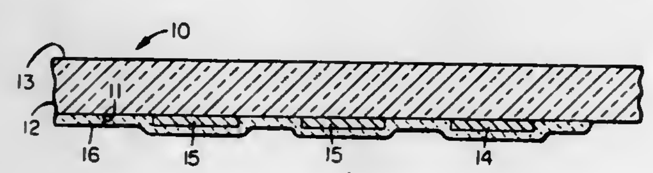
1. A fume extracting welding gun, through which a consumable electrode wire is fed, comprising:
a head portion having a tubular housing, an inner conduit, and a distal end thereof;
a control handle portion having a tubular sheath connected to the tubular housing, said inner conduit being disposed within the tubular sheath;
a flexible connector portion having a flexible outer tube, a flexible inner conduit, and a proximal end, said flexible outer tube being connected to the tubular sheath and said flexible inner conduit being connected to the inner conduit;
first positioning means extending inwardly from the tubular housing for concentrically maintaining the inner conduit within the head portion and defining a first annular fume extraction passageway;
second positioning means extending inwardly from the tubular sheath for concentrically maintaining the inner conduit within the control handle portion and defining a second annular fume extraction passageway, said second positioning means including a clip extending between the tubular sheath and the inner conduit;
third positioning means extending from the flexible outer tube for concentrically maintaining the flexible inner conduit within the flexible connector portion at the proximal end and defining a third annular fume extraction passageway, said first, second and third annular fume extraction passageways serially extending fully between said distal and proximal ends of the gun and having substantially common radial dimensions, said third positioning means including an elbow having a wire feed adapter, a cylindrical inlet and a cylindrical outlet, said wire feed adapter being connected to the flexible inner conduit, said cylindrical inlet being connected to the flexible outer tube, and said cylindrical outlet extending angularly outwardly from said wire feed adapter;
suction means in communication with said cylindrical outlet and the third fume extraction passageway for moving fumes from the distal end of the head portion, through the fume extraction passageways and outwardly from the gun;
means for conducting the consumable electrode wire through said wire feed adapter, said flexible inner conduit, and said inner condunits said inner conduit and said wire defining an annular shielding gas passageway;
means for conducting a shielding gas into the gun, through the annular shielding gas passageway and outwardly from the distal end of the head portion; and
means for conducting electricity into the gun, through said wire feed adapter and the inner conduits, and to the consumable electrode wire at the head portion of the gun.

4,057,706
COATING COMPOSITION AND A COATED ELECTRODE FOR ARC WELDING
Takashi Tanigaki, Yokohama; Yoshikazu Tanaka, Sagamihara, and Takeshi Koshio, Yokohama, all of Japan, assignors to Nippon Steel Corporation, Tokyo, Japan
Filed Apr. 9, 1976, Ser. No. 675,271
Claims priority, application Japan, Apr. 18, 1975, 50-46547
Int. Cl.² B23K *35/22*
U.S. Cl. 219—146 **4 Claims**



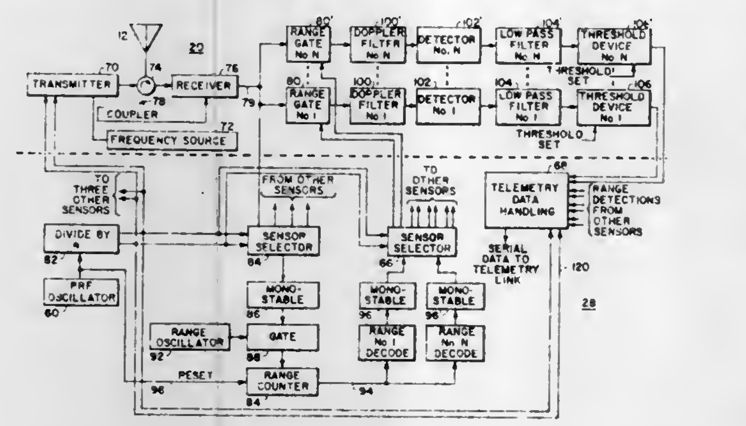
1. A coating composition for a welding electrode comprising 35 to 55% $CaCO_3$, 1 to 8% Fe_2O_3, 1 to 7% CaF_2, with the ratio of Fe_2O_3 to CaF_2 being from 0.4 to 1.6, 1 to 5% Mn, 4 to 9% Si and 2 to 9% Ni with the balance being a slag forming agent, an arc stabilization agent and a binding agent.

4,057,707
ELECTRIC HEATING UNIT
Richard E. Allen, Corning, N.Y., assignor to Corning Glass Works, Corning, N.Y.
Filed Oct. 17, 1975, Ser. No. 623,419
Int. Cl.² H05B *3/16*
U.S. Cl. 219—543 **6 Claims**



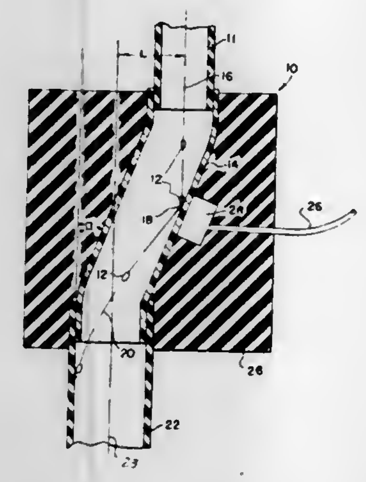
1. An electrical cooking or heating unit comprising;
I. a thin flat plate of a glassy material and having relatively smooth upper and lower surfaces with a portion of said plate selected as a heating portion upon whose upper surface vessels are to be placed for cooking purposes;
II. an electrical resistance heating element integral with said lower surface of said selected portion of said plate, such heating element being formed of at least one sinuous strip of an electrical resistance alloy comprising by weight from about 90 to 98% platinum with the remainder being substantially gold; and
III. a porous and partially sintered glaze covering said heating element and integral with such element and said lower surface of said selected portion of said plate.

4,057,708
MINIMUM MISS DISTANCE VECTOR MEASURING SYSTEM
Ashford C. Greeley, Scottsdale, and Sam M. Daniel, Tempe, both of Ariz., assignors to Motorola Inc., Schaumburg, Ill.
Continuation-in-part of Ser. No. 565,514, April 7, 1975, abandoned. This application May 10, 1976, Ser. No. 684,594
Int. Cl.² G01S *9/04*; G06F *15/58*
U.S. Cl. 235—413 **20 Claims**



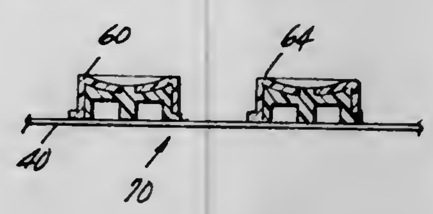
1. A system for measuring the minimum miss distance vector of a missile from a target comprising:
a plurality of sensor means mounted on the target in predetermined locations for sensing ranges to the missile, said sensor means producing range data;
synchronize means for sequentially operating said sensor means, for converting said sensed ranges to a digital form, and for associating with said digital data additional digital data identifying from which of said plurality of sensor means the digital range data is derived;
means for transmitting said range data and said identifying data corresponding to said range data; and
data processing means for receiving and processing said range data and for associating with said range data additional corresponding time and predetermined data corresponding to said sensor means locations according to a predetermined nonlinear algorithm to provide the desired missile trajectory and vector miss distance information.

4,057,709
PARTICLE DETECTOR
Joergen Lyngsgaard, 4755 Dover Road, and Ariel Stiebel, 88 Marlborough, both of Bloomfield Hills, Mich. 48013
Filed July 6, 1976, Ser. No. 702,843
Int. Cl.² B65G *51/36*
U.S. Cl. 235—92 PK **13 Claims**



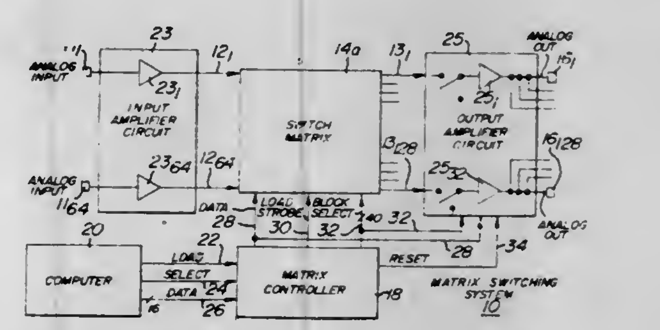
1. A particle detector comprising a first tubular conduit having an outlet to which said particles are translated one by one, said first tubular conduit being made of a shock absorbing material, a second tubular conduit having an inlet connected to the outlet of said first conduit and an outlet, said second tubular conduit being made of a hard resounding material and being disposed with its longitudinal axis at an angle to the trajectory of said particles for causing said particles to impact upon a wall of said second tubular conduit, a third tubular conduit made of shock absorbing material having an input connected to the output of said second tubular conduit, and an impact transducer affixed to the exterior of the wall of said second tubular conduit proximate to the area of impact of said particles for providing an electrical signal for each impact of a particle on said wall.

4,057,710
KEYBOARD ASSEMBLY
Arthur S. Willmott, 59 E. 2nd St., Mineola, N.Y. 11501
Filed Mar. 29, 1976, Ser. No. 671,179
Int. Cl.² G06C *7/02*
U.S. Cl. 235—145 R **2 Claims**



1. A method of making a keyboard assembly in which a sheet of thin flexible plastic film is bonded to a series of key portions arranged in a predetermined order, comprising the steps of molding a first series of key portions in a first mold, placing said first series of key portions into a second mold, introducing said film into said second mold, and then molding a second series of key portions underlying said first series of key portions to bond said film to said first key portions in said mold, said first series of key portions being provided with first runners extending between the key portions inwardly of said first series of key portions, and said second series of key portions being provided with runners outwardly of said second series of key portions, breaking away said first runners from said first series of key portions without breaking the bond between said film and said key portions.

4,057,711
ANALOG SWITCHING SYSTEM WITH FAN-OUT
Abhaya Asthana, Long Branch, and George Hannauer, E. Windsor, both of N.J., assignors to Electronic Associates, Inc., Long Branch, N.J.
Filed Mar. 17, 1976, Ser. No. 667,960
Int. Cl.² G06J *1/00*
U.S. Cl. 364—600 **25 Claims**



1. An analog switching system having fan-out for switching each of a plurality of analog signal sources to one or more predetermined analog signal destinations comprising
a three stage switch matrix including a plurality of input, middle and output switch blocks each having input and output terminals,
each switch block including a plurality of analog switch means with each analog switch means having an associated latching means, said plurality of latching means being adapted for coupling any one input terminal of a switch block to any one or more of the output terminals of

that block, each switch block having a high input impedance operational amplifier associated with each analog switch means,
control means coupled to each of said switch blocks for addressing each switch block and actuating at least one of said latching means to provide a connection assignment for at least one of said analog switch means.

4,057,712

METHOD AND APPARATUS FOR DISPLAYING BRAKE STOPPING DISTANCE OF A VEHICLE

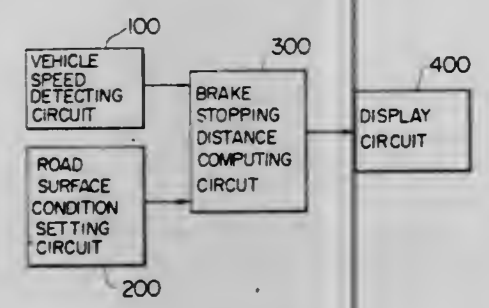
Yasuyuki Sakakibara, Okazaki, and Akira Kuno, Nagoya, both of Japan, assignors to Nippon Soken, Inc., Nishio, Japan

Filed July 23, 1976, Ser. No. 708,083

Claims priority, application Japan, Sept. 23, 1975, 50-115213

Int. Cl.² B60Q *1/00;* **G06G** *7/78*

U.S. Cl. 364—426.2 **6 Claims**



1. A brake stopping distance displaying apparatus for a vehicle comprising:
a vehicle speed detecting circuit for generating a signal corresponding to the running speed of a running vehicle;
a setting circuit presettable as desired in response to the surface conditions of a road on which said vehicle is running for generating a signal corresponding to a preset friction coefficient of said road surface;
a computing circuit connected to said vehicle speed detecting circuit and said setting circuit for generating from the signals therefrom a signal corresponding to a brake stopping distance which is proportional to the square of said running speed and inversely proportional to said friction coefficient; and
a display circuit connected to said computing circuit for responding to the signal from said computing circuit to display a result of said computation of the brake stopping distance.

4,057,713

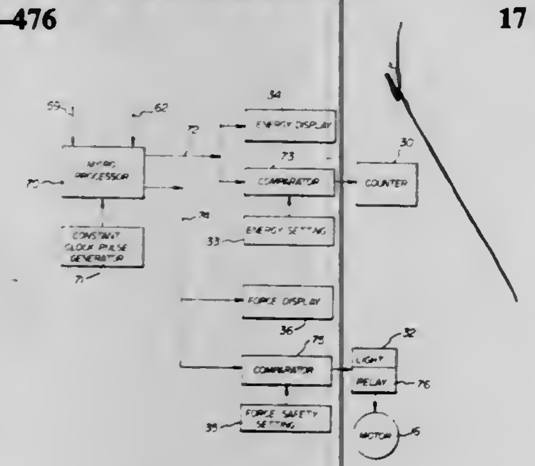
PRESS TRUE-HIT SAFETY COUNTER

Klaus Hermann Mette, Burlington, and Andrew Raoul St. Denis, Windsor, both of Canada, assignors to Firan Electronics, Inc., Oakville, Canada

Filed July 7, 1976, Ser. No. 703,226

Int. Cl.² H03K *21/18*

U.S. Cl. 364—476 **17 Claims**



1. A workpiece counter for a power press having a press bed and a reciprocating ram powered by a flywheel through a clutch and crankshaft with said flywheel being powered by a rotary power source, said workpiece counter comprising (a) means for calculating the energy of the flywheel and associated moving components based on the rotational speed of the flywheel for small increments of each revolution thereof, (b) means for calculating any energy loss of the flywheel between small increments of each revolution of the crankshaft, (c) means for determining the maximum incremental energy loss during each revolution of the crankshaft, (d) means for comparing said maximum incremental energy loss against a predetermined value and (e) a counting device which is activated each time said maximum incremental energy loss exceeds said predetermined amount.

4,057,714

DURABILITY OR SERVICE-LIFE MONITORING DEVICE FOR A TURBOGENERATOR SHAFT

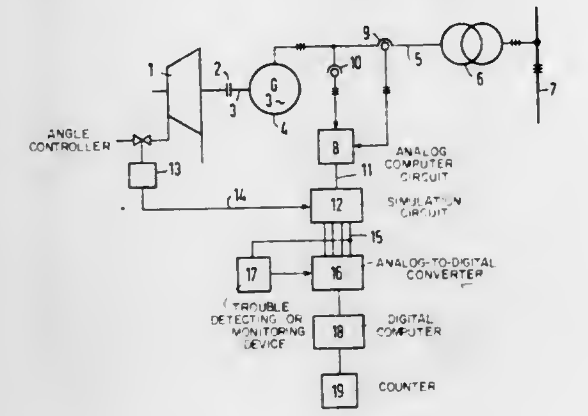
Kurt Fork, Rosenbach near Neunkirchen; Dietrich Lambrecht, Mulheim (Ruhr); Hermann Waldmann, Wieher near Uttenreuth, and Helmut Hofmann, Erlangen, all of Germany, assignors to Kraftwerk Union Aktiengesellschaft, Mulheim (Ruhr), Germany

Filed Sept. 29, 1976, Ser. No. 727,795

Claims priority, application Germany, Sept. 30, 1975, 2543587

Int. Cl.² G01L *3/00;* **G01M** *15/00;* **G06F** *15/20*

U.S. Cl. 264—494 **4 Claims**



1. Device for monitoring the service life of the shaft of a turbine-generator set comprising an analog computer circuit having a pair of inputs and an output,
means for feeding to the inputs of said analog computer circuit electrical quantities proportional to the voltage and the current of the generator, said analog computer circuit having means for converting said electrical quantities that are proportional to said generator voltage and current to an electrical quantity proportional to the electrical torque in the air gap of the generator, a simulation circuit having an input connected to said output of said analog computer circuit for receiving therefrom said electrical quantity proportional to the electrical torque in the air gap of the generator, said simulation circuit comprising means for determining the torques in individual sections of the shaft of the turbine-generator set and having a multiplicity of outputs corresponding to the number of individual sections of the shaft,
an analog-to-digital converter having an output and having inputs connected to said outputs of said simulation circuit for receiving therefrom analog data corresponding to the torques in individual sections of the shaft and converting them to corresponding digital data,
a digital computer having an input connected to said output of said analog-to-digital converter and connected therethrough to said simulation circuit,
a trouble-monitoring device connected parallel to said analog-to-digital converter, and having means for restricting said analog-to-digital converter to feed said digital data through said output thereof to said input of said digital computer only if a torque of extreme value is present in a section of the shaft,

said digital computer having means for converting said digital data into signals proportional to the service life of the shaft.

4,057,715

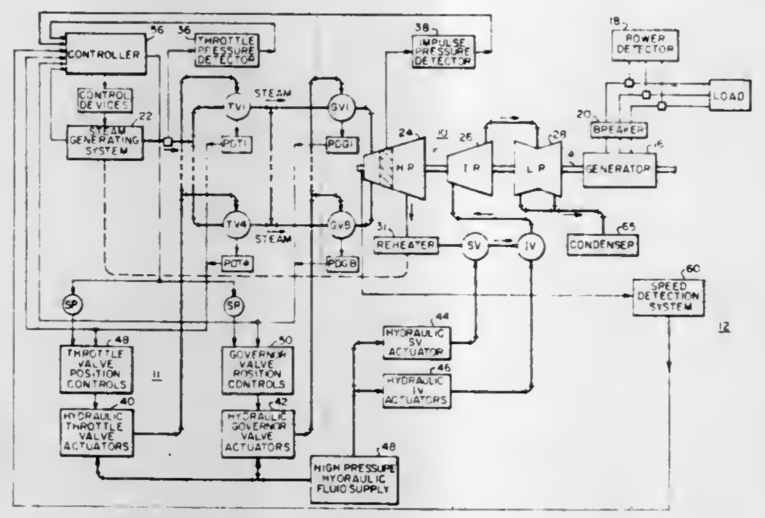
WIDE RANGE SYSTEM FOR TRANSFERRING STEAM GENERATOR AND TURBINE OPERATION BETWEEN COMPUTERS IN A MULTIPLE TURBINE COMPUTER CONTROL SYSTEM

Donald J. Jones, Pittsburgh, Pa., and Guy E. Davis, Martinez, Calif., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Nov. 6, 1973, Ser. No. 413,276

Int. Cl.² F01D *17/02;* **G05B** *15/00;* **G06F** *15/06*

U.S. Cl. 364—494 **34 Claims**



1. A control system for an electric power plant having at least one steam turbine and a steam generator, said control system comprising multiple digital computers including at least a first digital computer and a second digital computer, means for generating input signals representating predetermined process variables associated with said steam generator, means for generating input signals representing turbine speed and other predetermined process variables associated with said steam turbine, means for coupling the input signals to both of said computers, each of said computers including means for sequentially controlling its programmed operation and substantially identical means for generating control outputs for operating at least predetermined startup valves of said steam generator and throttle and governor valves of said steam turbine as a function of the input signals, means for sensing predetermined control system malfunctions, said control output generating means including a speed control for operating said turbine valves in response to a speed reference and a representation of the actual speed during turbine acceleration to synchronous speed, said control output generating means further including a steam generator startup valve control for operating the steam generator startup valves to control at least working fluid pressure at a predetermined process point, means for coupling the outputs of one of said computers to operate the steam generator startup valves and the turbine valves, means for substantially conforming the structure of the other computer to the structure of said one computer in real time including means for generating control outputs in the other computer substantially equal to those from said one computer, and means for smoothly executing a transfer in the control of the steam generator startup valves and the speed loop control of the turbine from said one computer to said other computer when said sensing means detects a control system malfunction during steam generator or turbine startup.

4,057,716

CIRCUIT BREAKER TRIP AND RELEASE TYPE CONTROL MECHANISM

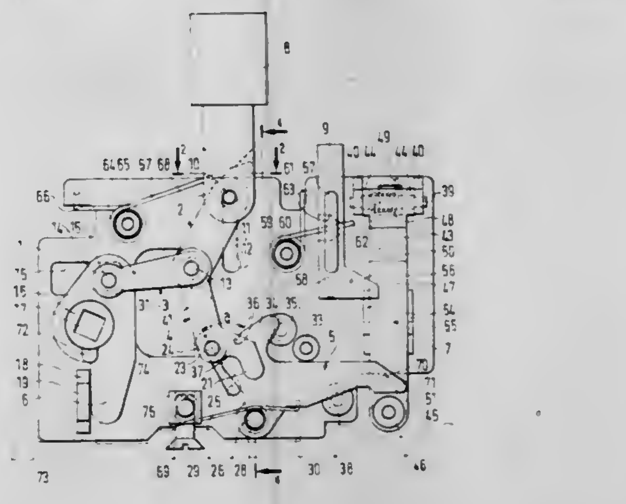
Paul Canonne, and Gérard Neumann, both of Barentin, France, assignors to Societe d'Appareillage Electrique Saparel, Saint Marcellin, France

Filed Oct. 15, 1975, Ser. No. 622,795

Claims priority, application France, Oct. 16, 1974, 74.34781

Int. Cl.² H01H *3/32*

U.S. Cl. 200—153 H **9 Claims**



1. In a trip and release type control mechanism comprising:
two laterally spaced bed-plates,
a main connecting rod,
aligned elongated openings within flanges,
an axle projecting through said openings and extending between said bed-plates and being articulated to one end of said main connecting rod,
a trip knob articulated to said axle for movement therewith along with said main connecting rod,
a secondary connecting rod,
a retaining connecting rod,
said secondary connecting rod being articulated on one end with the other end of said main connecting rod and being commonly articulated to one end of said retaining connecting rod,
said elongated openings comprising at one end a notch into which said axle falls when the control mechanism is in trip position,
a control cam, said control cam being articulated to the other end of said retaining connecting rod, said control cam comprising two cylindrical shoulders, a through hole drilled within said cylindrical shoulders for inserting a control shaft, said control cam being mounted for pivoting about said cylindrical shoulder,
a pin mounted to said retaining connecting rod at a point remote from the articulation of said retaining connecting rod to said main connecting rod and said secondary connecting rod,
a latch,
a pivot pin spanning between said bed-plates for pivotably mounting said latch therebetween,
a first spring coiled about said latch pin pivot and pressing said latch in release position against a first stop,
a roller freely rotatable about said pin mounted to said retaining connecting rod on an edges of said latch,
the improvement comprising:
second elongated openings within said bed-plates for receiving respective ends of the pin to which said roller is mounted,
a release lever pivotably mounted at one end of said bed-plates at a position intermediate of said bed-plates and having at an opposite end facing the side of said latch, a catch stop fixed to the end of said release lever facing the side of said latch, said release lever comprising at least one ramp intermediate of said catch stop and said release lever pivot axis, said release lever extending parallel to said

bed-plates and normally contacting said latch at a position above said catch stop,

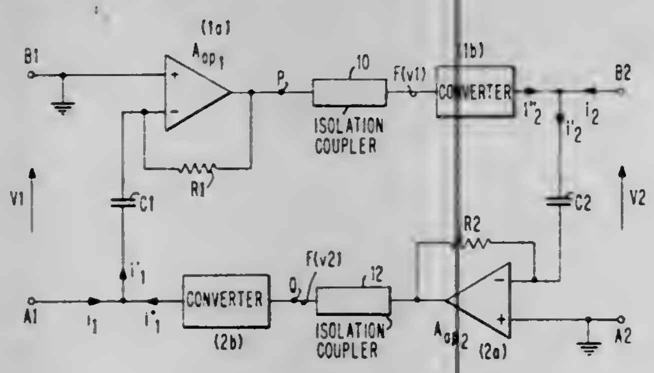
a second spring for biasing said release lever into contact with the side of said latch,

a release knob mounted adjacent said release lever for movement along the side of said release lever and comprising a finger for contact with said at least one ramp to force said release lever to pivot against the bias of said second spring means away from the side of said latch to release said latch, and

a third spring for biasing said trip knob to raised position at the end of said first elongated opening remote from said notch;

whereby, longitudinal movement of said release knob causes said finger in contacting said ramp to cause said release knob to release said latch whereby pivoting away from said latch, thereby permitting said latch to ride over the catch stop carried by said release lever.

4,057,717
TRANSFORMER WITH ACTIVE ELEMENTS
Michel Ferry, Vallauris, France, assignor to International Business Machines Corporation, Armonk, N.Y.
Filed Apr. 7, 1976, Ser. No. 674,339
Claims priority, application France, May 6, 1975, 75.15087
Int. Cl.² G06G *7/62;* **H03H** *7/06*
U.S. Cl. 364—802 **7 Claims**



1. An active transformer of the type which includes two primary terminals to which is applied a voltage v_1 with a current i_1, and two secondary terminals supplying a voltage v_2 with a current i_2 when connected to a load circuit, said transformer comprising:

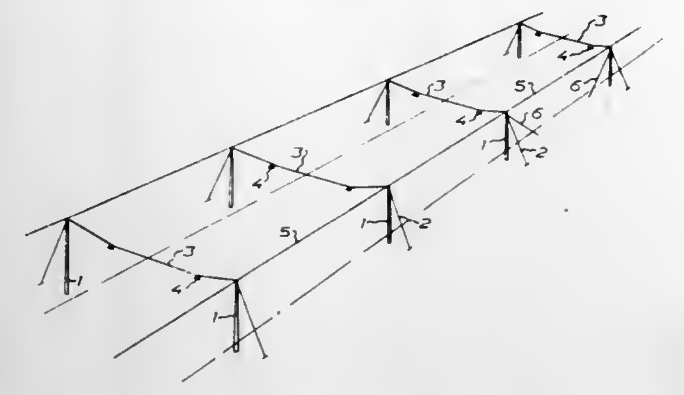
a first circuit whose input, connected to said primary terminals, generates an input current of the form $i_1' = jC_1\omega v_1$ and whose output supplies a current of the form $i_2'' = -jN\omega v_1$ at said secondary terminals;

a second circuit whose input, connected to said secondary terminals, generates an input current of the form $i_2' = jC_2\omega v_2$, and whose output supplies a current $i_1'' = -jN\omega v_2$ at said primary terminals;

the terms C_1, C_2 and N being respectively the dual equivalents of the terms L_1, L_2 and M found in relations associated with a conventional transformer, and said currents satisfying the relations $i_1 = i_1' - i_1''$ and $i_2 = i_2' - i_2''$.

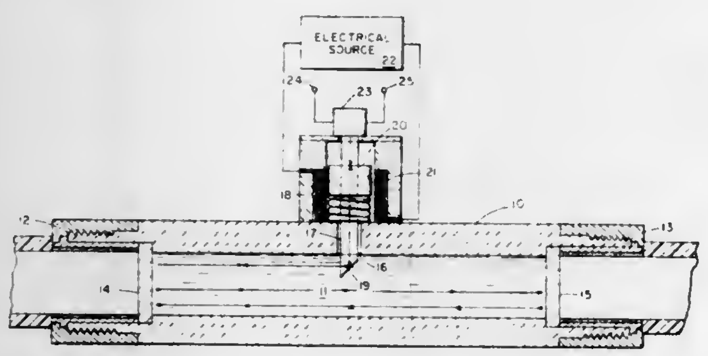
4,057,718
ARRANGEMENT FOR SUPPORTING LIGHTING FITTINGS AND THE LIKE
Lars David Svensson, Vikingavagen 112, Taby, Sweden (S-183 43)
Filed May 13, 1976, Ser. No. 685,789
Int. Cl.² F21V *21/00;* **H02G** *7/20*
U.S. Cl. 362—249 **9 Claims**

1. An arrangement for suspending lighting fittings or the like comprising a system of standards erected along a traffic-route or like area including a plurality of standards in at least one row having one or more intermediate individual standards between individual standards at opposite ends of the row and a continuous line system including means stringing lighting fittings mounted on top of said system of standards, each intermediate standard of said system of standards being individually releasable from said means and disconnected from said line system when such an intermediate standard is moved



downwardly; said line system being retained substantially in a horizontal plane above the traffic-route by other standards of said system of standards despite failure of an intermediate individual standard.

4,057,719
FIBER OPTICS ELECTRO-MECHANICAL LIGHT SWITCH
Adolph Lee Lewis, La Mesa, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.
Filed Aug. 27, 1976, Ser. No. 718,285
Int. Cl.² G02B *5/14*
U.S. Cl. 250—227 **7 Claims**



1. An electro-mechanically operated light switch for transferring light energy relative to a fiber optic light transmission path comprising:

a body member having a cylindrical bore of substantially optical smoothness and configured to receive a fiber optic terminal at each end;

a window fabricated of material substantially transparent to the wavelengths of light energy transmitted by said fiber optic light transmission path and supported at each end of said body member contiguous to each said fiber optic terminal;

a liquid material substantially filling said cylindrical bore between said windows and having an index of refraction higher than said body member for sustaining substantially total internal reflection along the optical axis of said cylindrical bore;

a port in said body member disposed transversely relative to said optical axis;

a transparent member movably mounted in said port and resiliently supported relative to said body member for extending into said liquid material;

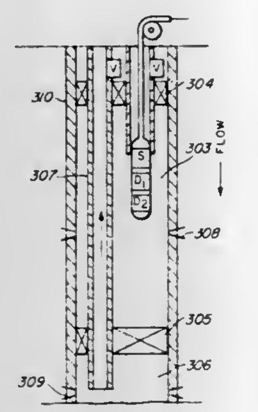
said transparent member having an angularly disposed reflective end for redirecting light energy when extended into said liquid material;

a ferromagnetic element affixed to said transparent member;

an electrically conductive coil supported on said body member for electromagnetic flux linkage with said ferromagnetic member; and

a source of electrical energy adapted to be selectively connected to said electrically conductive coil.

4,057,720
BEHIND CASING FLUID FLOW DETECTION IN PRODUCING WELLS USING GAS LIFT
Hans J. Paap, and Dan M. Arnold, both of Houston, Tex., assignors to Texaco Inc., New York, N.Y.
Filed Nov. 3, 1975, Ser. No. 628,171
Int. Cl.² G01V *5/00*
U.S. Cl. 250—266 **23 Claims**



1. A method for measuring the direction, linear flow rate and volume flow rate of behind casing water migration in a cased portion of a producing well operating on gas lift and producing well fluid through casing perforations which is transmitted to the earth's surface in relatively small diameter production tubing, without substantially interrupting the production of the well, comprising the steps of:

a. locating a well tool sized and adapted for passage through relatively small diameter production tubing and having a source of fast neutrons with at least some of which having sufficient energy to cause the nuclear reaction O^{16} (n,p) N^{16} and at least two gamma ray detectors longitudinally spaced from said source and each other to a position adjacent above or below the producing perforations to be investigated by passing said tool through the production tubing while keeping the well on production;

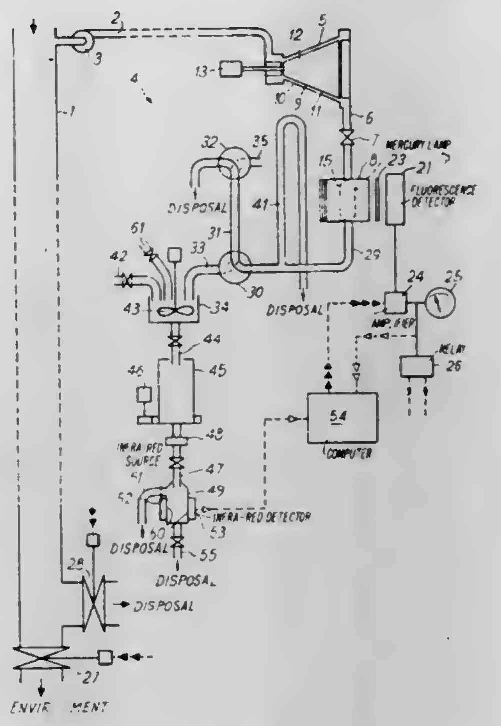
b. repetitively irradiating the borehole environs with bursts of fast neutrons from said source;

c. detecting substantially between said neutron bursts at each of said detectors gamma rays primarily caused by the decay of the unstable isotope N^{16} and generating signals representative thereof; and

d. combining said signals according to a predetermined relationship to derive an indication of the direction and linear flow rate of any elemental oxygen nuclei comprising undesired fluid flow in a preferred direction behind the well casing at said adjacent position.

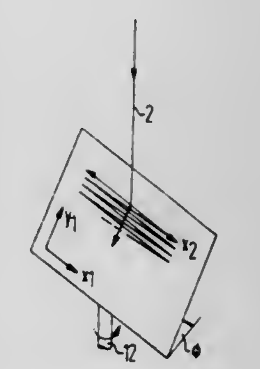
4,057,721
OIL POLLUTION MONITORING AND MONITORING UNIT
Raymond Michael deVial, Beckenham, and Philip Maurice Taylor, Croydon, both of England, assignors to Bailey Meter & Controls Limited, England
Filed May 10, 1976, Ser. No. 684,838
Claims priority, application United Kingdom, May 8, 1975, 19359/75
Int. Cl.² G01T *1/169*
U.S. Cl. 250—301 **6 Claims**

1. A method of continuously monitoring a water stream in respect of its contamination content of oil, including continuously exciting fluorescent radiation in the stream as it passes a monitoring point and producing a continuous monitoring indication dependent upon a measure of the amount of fluorescent radiation so excited, recurrently withdrawing from the stream discrete samples of the contaminated water and making by an infra-red absorption procedure respective determinations of the degree of contamination of said samples by oil, each infrared absorption procedure comprising adding to the sample a solvent for the oil, separating out from the water of the sample a solution of the oil in the solvent and measuring the infra-red absorption capability of the percentage of oil in the solution,



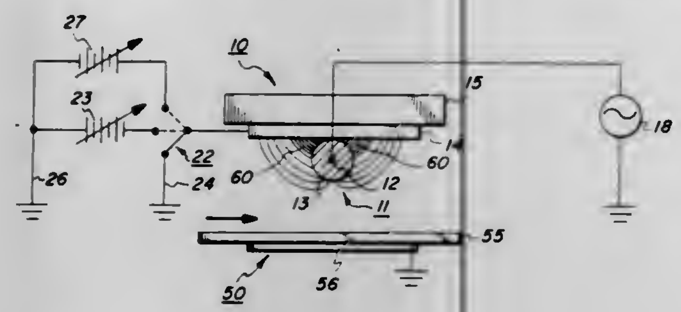
and recurrently recalibrating or correcting the monitoring indicating in dependence upon respective comparisons between the determinations and those monitoring indications that pertained to the respective moving parts of the stream from which the respective discrete samples were withdrawn.

4,057,722
METHOD AND APPARATUS FOR THE GENERATION OF DISTORTION-FREE IMAGES WITH ELECTRON MICROSCOPE
Eduard Hieke, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany
Filed Sept. 20, 1976, Ser. No. 724,620
Claims priority, application Germany, Sept. 25, 1975, 2542812; Apr. 20, 1976, 2617159
Int. Cl.² H01J *37/28*
U.S. Cl. 250—311 **10 Claims**



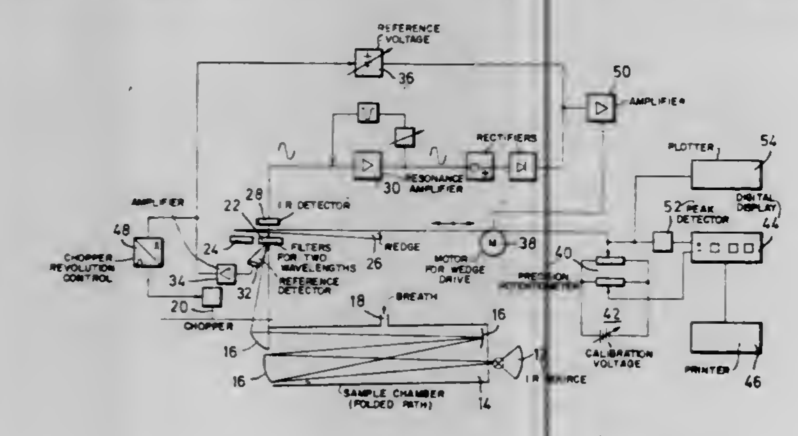
2. A method for the production of undistorted images of an inclined specimen in a scanning electron microscope comprising the steps of rotating the scanning raster of the scanning beam through an angle calculated from the angle of inclination and the working distance between said specimen and said microscope, and rotating said specimen until the scanning line direction and the direction of advance of scanning become aligned with two generally orthogonal directions on the surface of said specimen.

4,057,723
COMPACT CORONA CHARGING DEVICE
Dror Sarid, and Brian E. Springett, both of Rochester, N.Y., assignors to Xerox Corporation, Stamford, Conn.
Filed Jan. 23, 1976, Ser. No. 651,769
Int. Cl.² H05F *3/04;* H01T *1/14*
U.S. Cl. 250—326 24 Claims



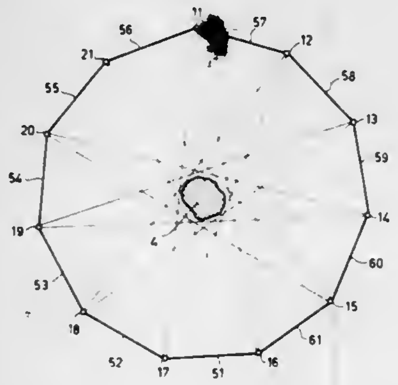
1. A corona device comprising:
a conductive member;
a corona electrode in contact with or spaced from said member no more than about 0.15 cm to produce exponential-like current characteristics, said electrode comprising a conductive wire coated with a thick dielectric material, the thickness of the dielectric being sufficient to prevent the flow of conduction current through said wire, said member being electrically insulated from said wire, and
means for applying an a.c. corona generating voltage to said wire to establish a corona discharge at the surface of said electrode and means for applying a d.c. reference potential to said member.

4,057,724
DETERMINATION OF THE ALCOHOL CONTENT OF BLOOD
Werner Karl Adrian, Im Roth 19, Ettlingen, Germany, and Robert Frank Borkenstein, 821 S. High St., Bloomington, Ind. 47401
Filed Mar. 17, 1976, Ser. No. 667,847
Claims priority, application Germany, Mar. 17, 1975, 2511771
Int. Cl.² G01N *21/26*
U.S. Cl. 250—343 5 Claims



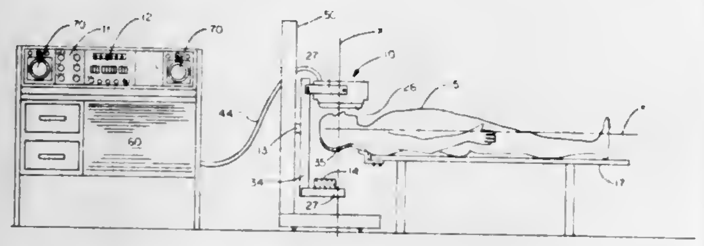
1. An arrangement for determining the alcohol content of blood by measuring the concentration of alcohol in exhaled breath, comprising a measuring chamber, an inlet on the measuring chamber by which exhaled breath can be blown in, a radiation inlet at one end of the measuring chamber and a radiation outlet at the other end of the measuring chamber, a radiation source in the form of a wide band thermal radiator located upstream of the radiation inlet, an interrupting device in the path of the beam, a filter having a pass band at 3.46 μm arranged as a tuned receiver downstream of the radiation outlet of the measuring chamber, a first photo-electric detector arranged beyond the filter, a second detector arranged in the path of the beam beyond the radiation outlet of the measuring chamber and in front of the filter, an amplifier connected to the output of the first detector, reference voltage source connected to the output of the second detector, a differential amplifier connected to both the output of the amplifier and the output of the reference voltage source, a drive motor connected to the output of the differential amplifier, an absorption device which is displaceable in and at right angles to the path of the beam between the radiation outlet of the measuring chamber and the photo-electric detector, the absorption device being in the form of a wedge connected to the drive motor and having absorption in the band width of the filter, the drive motor being adapted to automatically displace the wedge to maintain at zero the voltage at the output of the differential amplifier and an indicator which is connected to the drive motor for the wedge and arranged to indicate the position of the wedge in the path of the beam.

4,057,725
DEVICE FOR MEASURING LOCAL RADIATION ABSORPTION IN A BODY
Wolfgang Wagner, Norderstedt, Germany, assignor to U.S. Philips Corporation, New York, N.Y.
Filed Sept. 5, 1975, Ser. No. 610,616
Claims priority, application Germany, Sept. 6, 1974, 2442809
Int. Cl.² G01N *23/00*
U.S. Cl. 250—360 3 Claims



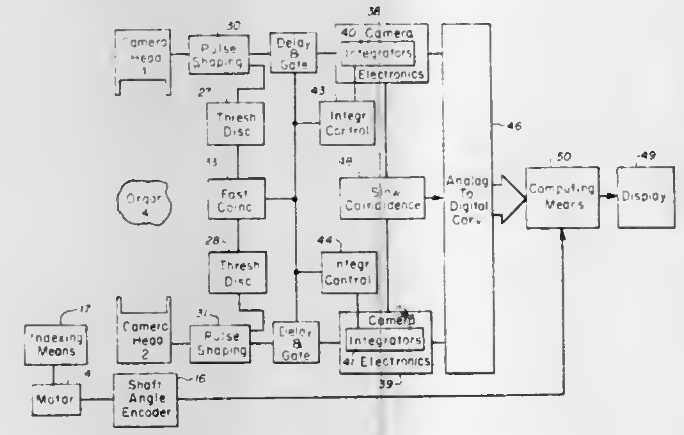
1. A device for measuring the spatial distribution of radiation absorption in a body, comprising:
a multiplicity of radiators regularly distributed about a circle of diameter sufficient to surround said body, each radiator emitting a wedge-shaped beam of radiation in the plane of said circle toward a different arc portion of said circle between two other radiators; and
a multiplicity of adjoining detectors in each of said different arc portions of said circle to measure radiation from the associated radiator emitting radiation thereto, each detector having only a comparatively small effective measuring field, the spatial distribution being calculated from the measured radiation values from said detectors.

4,057,726
COLLIMATOR TRANS-AXIAL TOMOGRAPHIC SCINTILLATION CAMERA
Ronald J. Jaszczak, Arlington Heights, Ill., assignor to G. D. Searle & Co., Skokie, Ill.
Filed Dec. 22, 1975, Ser. No. 643,256
Int. Cl.² G01T *1/20, 1/166*
U.S. Cl. 250—363 S 14 Claims



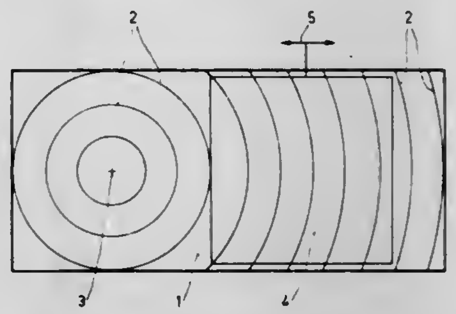
1. In a scintillation camera system in which a scintillation camera detector is arranged to precess in an orbit about a patient and facing said patient which orbit defines a transverse plane perpendicular to a cranial-caudal axis of said patient, and including indexing means for continuously advancing said detector in said orbit and for initiating and terminating radiation counting intervals at incremental arcs in said orbit, and computation means for processing the radiation counts detected and accumulated through each of said arcs to produce a representation of radioactive distribution in the plane defined by said orbit, and visual display means for displaying an image of said representation, the improvement comprising a collimator attached to said detector and interposed between said detector and said patient and having first shielding means defining highly radiation absorbent septa positioned to lie in straight lines generally parallel to said cranial-caudal axis as said detector precesses in said orbit, and a second shielding means defining less radiation absorbent septa in configurations the loci of which form closed curves parallel to the aforesaid orbit.

4,057,727
POSITRON IMAGING SYSTEM WITH IMPROVED COUNT RATE AND TOMOGRAPHIC CAPABILITY
Gerd Muehllehner, Mount Prospect, and Michael P. Buchin, Schaumburg, both of Ill., assignors to G. D. Searle & Co., Skokie, Ill.
Filed Oct. 22, 1976, Ser. No. 734,797
Int. Cl.² G01T *1/164, 1/20*
U.S. Cl. 250—363 S 11 Claims



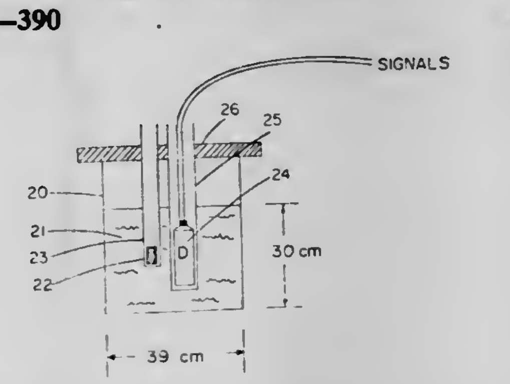
1. In a positron imaging system with improved count rate capability for detecting the radioactive distribution of positron events within an organ of interest of a living subject, and including scintillation detectors producing electrical signals in response to said events, electronic means for processing said electrical signals and for supplying image reconstruction signals to a display means to produce an image of said radioactive distribution, the improvement comprising:
a pair of Anger-type scintillation cameras as said scintillation detectors, each camera having a unitary planar scintillation crystal, said crystal being greater than one-half inch in thickness, said cameras being respectively positioned on opposite sides of said organ; and pulse shaping means for reducing the pulse duration below approxmatley 900 nanoseconds, and for reducing the integration time of said pulse below approximately 500 nanoseconds, whereby the count rate capability and counting statistics of the system is improved for greater image quality and processing speed.

4,057,728
X-RAY EXPOSURE DEVICE COMPRISING A GAS-FILLED CHAMBER
Kristian Peschmann; Hans-Georg Junginger, both of Aachen, and Hans-Jürgen Hirsch, Tuddern, all of Germany, assignors to U.S. Philips Corporation, New York, N.Y.
Filed Feb. 6, 1976, Ser. No. 655,754
Claims priority, application Germany, Feb. 7, 1975, 2505173
Int. Cl.² G01T *1/18*
U.S. Cl. 250—374 4 Claims



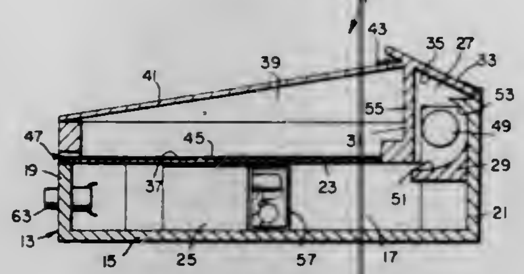
1. An X-ray exposure device comprising a flat and plane rectangular chamber filled with an ionizable gas, electrode structures disposed on the walls of the chamber which generate a potential distribution corresponding to that of two concentric spherical electrodes having a given central axis during operation, and an insulating foil on which charge carriers resulting from ionization of the gas by X-radiation are incident and displaceable in the longitudinal direction within the chamber for producing a latent charge image thereon.

4,057,729
MEASUREMENT OF SLURRY CONSISTENCIES
John Stringer Hewitt, 89 Nymark Ave., Willowdale-Toronto, Ontario, Canada
Filed Feb. 6, 1976, Ser. No. 655,722
Int. Cl.² G01T *3/00*
U.S. Cl. 250—390 4 Claims



1. A process for determining the consistency of a hydrogenous slurry containing not more than about 15% by weight of suspended material, and the density of the suspended material, which comprises:
immersing in the slurry a fast neutron emitting source; causing the fast neutrons to slow down, diffuse and be absorbed by the slurry upon travel within the slurry;
immersing in the slurry a first neutron detector at a predetermined distance of from 1–8 cm. from the fast neutron emitting source, and a second neutron detector at a predetermined distance of from 12–20 cm. from the neutron source;
counting and recording the neutrons detected by said first and second neutron detectors at their respective predetermined locations in the slurry;
determining the slurry consistency and density of the suspended material from the neutron counts recorded at said locations in the slurry.

4,057,730
CHART VIEWER
George E. Dane, 1546 21st St., Manhattan Beach, Calif. 90266
Filed Apr. 23, 1976, Ser. No. 679,724
Int. Cl.^{2} G01N *21/38*
U.S. Cl. 250—461 R **20 Claims**



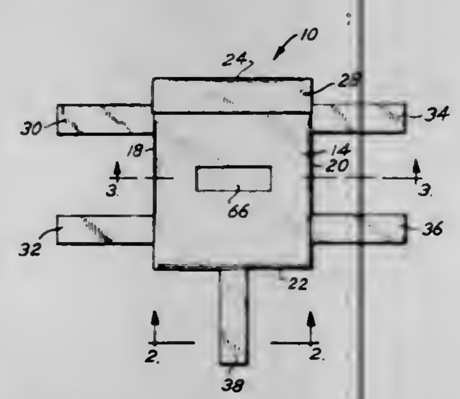
1. A chart viewing device for viewing in a darkened environment printed matter that has been at least partially treated with a long wave ultraviolet-sensitive fluorescent material, comprising:

a housing having an upper portion and a lower chart-supporting portion viewable from above said upper portion of said housing;

illumination means including a long wave ultraviolet light source disposed in said housing for illuminating the upper surface of said chart-supporting portion of said housing; and

filter means including a U-V filter mounted at the top of said upper portion of said housing for allowing the viewing of long wave ultraviolet light-stimulated fluorescent light produced within said housing, and for essentially preventing the transmission therethrough of ultraviolet light energy.

4,057,731
STERILE CONTAINER FOR X-RAY CASSETTE HOLDERS
Herbert S. Loseff, 308 Woodley Road, Winnetka, Ill. 60093
Continuation-in-part of Ser. No. 613,531, Sept. 15, 1975, abandoned. This application Jan. 5, 1977, Ser. No. 756,918
Int. Cl.^{2} H05G *1/00*
U.S. Cl. 250—475 **7 Claims**



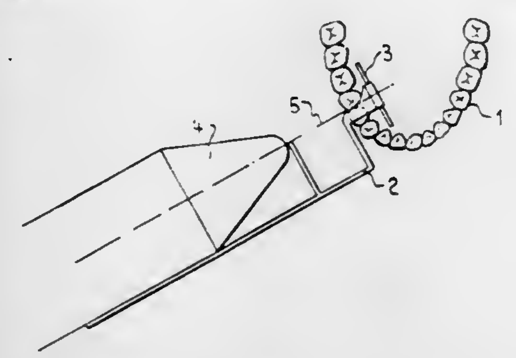
1. An improved sterile container for receiving and completely enclosing a non-sterile x-ray cassette holder so as to avoid the contamination of a sterile operative field by the non-sterile x-ray cassette holder when the x-ray cassette holder is utilized to take x-rays in the sterile operative field during surgery, the improved sterile container comprising:

a pair of relatively flexible walls, each having an inside surface, an outside surface, side edges, a bottom edge and a top edge and each being arranged so that their inside surfaces face each other, with the bottom and side edges of one of the flexible walls being aligned and connected with the corresponding bottom and side edges of the other flexible wall so as to form a container having closed sides and a closed bottom end and with the top edges of the flexible walls being adjacent to each other so as to define a top end which may be selectively opened or closed and which when opened is adapted to receive an x-ray cassette holder for insertion into the interior of the container;

sterile fastening means for permitting the container having an x-ray cassette holder disposed therein to be selectively secured to a patient while an x-ray is being taken, the said sterile fastening means serving to position the x-ray cassette relative to the patient and to maintain the patient relative to the x-ray cassette during the x-ray exposure, and

means for selectively holding the top end of the container closed so as to enclose an x-ray cassette holder within the container.

4,057,732
FILM HOLDER FOR BITE-WING RADIOGRAPHS
Rolf Marcus Klauser, Luzernerstrasse 6, 6010 Kriens, Switzerland
Filed Feb. 4, 1976, Ser. No. 655,434
Int. Cl.^{2} G03B *41/16*
U.S. Cl. 250—479 **3 Claims**

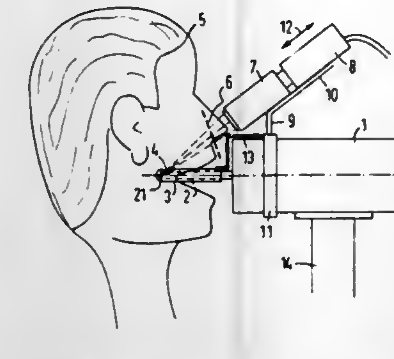


1. A film holder for bite-wing radiographs comprising an elongate centering device having at one end a resilient clip device with a bite portion therebetween to enable the bite portion to be clamped between a patients teeth with the clip device within the patients mouth and the centering device extending outwardly from the patients face, said clip device having two shanks for receiving an X-ray film of optional size and of a length corresponding to the distance from the edge to the medial line of the widest X-ray film to be used; said centering device comprising an indicator rod portion extending parallel to a central guide axis of the holder and provided for guiding an X-ray cone relative to an X-ray film in said clip device; and an index projection extending at right angles to said indicator rod and secured thereto intermediate its ends; and index projection indicating the horizontal medial axis of the X-ray film and its end indicating the position of the central axis; said holder being integrally formed of plastic material.

4,057,733
DENTAL X-RAY DIAGNOSTIC INSTALLATION
Dieter Hofmockel, Erlangen; Ulrich Grassmé, Nurnberg; Johannes Seissl, Erlangen-Buckenhof, and Ernst Otto Fleer, Bensheim-Auerbach, all of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany
Filed Feb. 11, 1976, Ser. No. 657,296
Claims priority, application Germany, Feb. 17, 1975, 2506630
Int. Cl.^{2} G03B *41/16*
U.S. Cl. 250—491 **16 Claims**

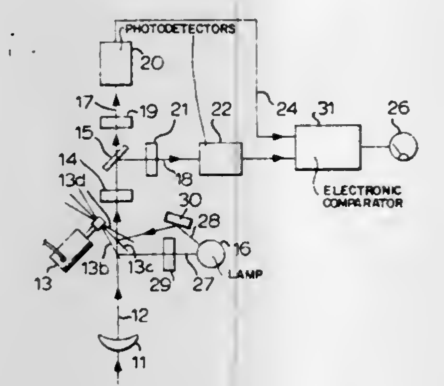
1. In a dental X-ray diagnostic installation, an X-ray tube arranged within a housing; and said X-ray tube having an anode for insertion into the mouth of a patient, the improvement comprising: an X-ray image intensifier for receiving

radiation from said X-ray tube, said X-ray image intensifier having an input screen; and means extending between the



X-ray tube and image intensifier for aligning said input screen with the focus of said X-ray tube.

4,057,734
SPECTROSCOPIC APPARATUS WITH BALANCED DUAL DETECTORS
Anthony Rene Barringer, Willowdale, Canada, assignor to Barringer Research Limited, Rexdale, Canada
Filed Aug. 28, 1975, Ser. No. 606,131
Int. Cl.^{2} G01N *21/26*
U.S. Cl. 250—575 **15 Claims**



1. Spectroscopic apparatus for analyzing spectra of predetermined wavelengths, comprising:

a. means for receiving radiation containing the spectra to be measured from a first source and for forming the radiation into a first beam,

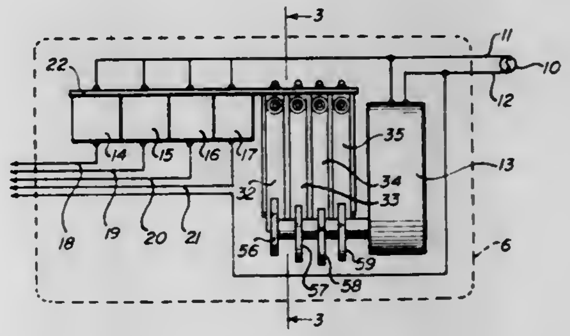
b. first and second photoelectric channels respectively comprising first and second photodetectors for converting radiation incident upon said photodetectors into electric currents and electronic circuit means connected to said first and second photodetectors for producing first and second signals which respectively are proportional in amplitude to the intensity of the radiation shining on said first and second photodetectors, said first photodetector being positioned to receive a first portion of radiation in said beam, said first portion constituting a measuring beam, and said second photodetector being positioned to receive a second portion of radiation in said beam, said second portion constituting a reference beam, said measuring beam containing the spectra to be measured and said reference beam containing spectral components of wavelengths such that comparison of the intensity of the measuring and reference beams provides a measure of the intensity of said spectra,

c. means optically coupled to a reference source of radiation for producing a second beam of radiation,

d. means operable cyclically for sequentially exposing said first and second photodetectors simultaneously to radiation in said first beam, and exposing said first and second photodetectors simultaneously to radiation in said second beam, and

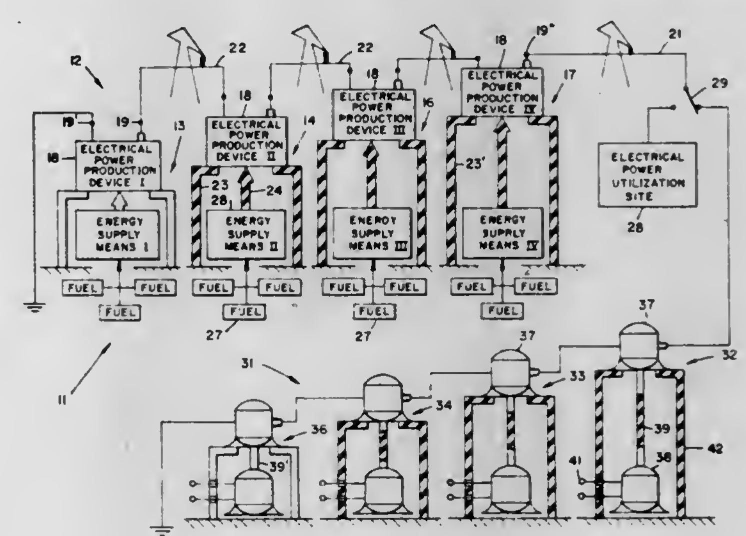
e. means for comparing the levels of said first and second signals when said first and second photodetectors are exposed to radiation from said first source including means responsive to the respective levels of said first and second signals when said first and second photodetectors are exposed to radiation in said second beam for compensating for the effect of any unbalance between said first and second photoelectric channels.

4,057,735
CHRISTMAS TREE LIGHTING CONTROL
George B. Davis, Jr., 7512 Marbury Road, Bethesda, Md. 20034
Continuation-in-part of Ser. No. 542,803, Jan. 21, 1975, Pat. No. 3,946,244. This application Dec. 2, 1975, Ser. No. 637,025
Int. Cl.^{2} H02J *3/00*
U.S. Cl. 307—11 **9 Claims**



4. An ornamental lighting control including at least two solid state duty cycle units having a common power input and respectively variable duty cycle outputs, connector means respectively connected to each of said outputs for connecting thereto an ornamental lighting source to be controlled and wherein the duty cycle of said outputs determines the light output intensity of a lighting source connected therewith, motor means, control means movable by said motor means to effect predetermined random variations in the duty cycle of each duty cycle unit whereby the light output intensity pattern of each lighting source, respectively connected to each duty cycle unit, differs from each of the others for a predetermined operating interval of said control means.

4,057,736
ELECTRICAL POWER GENERATION AND DISTRIBUTION SYSTEM
Morris R. Jeppson, P.O. Box 4943, Carmel, Calif. 94921
Filed Sept. 13, 1974, Ser. No. 505,787
Int. Cl.^{2} H02J *11/00*
U.S. Cl. 307—78 **45 Claims**



1. An electrical power production system for generating electrical power from non-electrical energy of a form contained within a fluid and for delivering said electrical power to a high voltage transmission line comprising:

a plurality of relatively low voltage electrical power production stations, each having at least one device for producing electrical power from the non-electrical energy content of said fluid and having insulative support means for said device enabling said device to be operated at an elevated voltage level, each of said stations having a lower voltage region and means for receiving said fluid at said lower voltage region, and each further having conduit means for transmitting said fluid to said device from said lower voltage region for conversion of said non-electrical energy content to electrical power, at least a portion of said conduit means being formed of electrically insulative material, and

conductor means connecting said power production stations in series relationship and terminal means for connecting at least a final one thereof to said transmission line whereby the relatively low voltages produced by said power production stations individually are cumulatively applied to said transmission line to establish a relatively high voltage thereon.

4,057,737

VERY-HIGH-POWER-TRANSMISSION CABLE SYSTEM

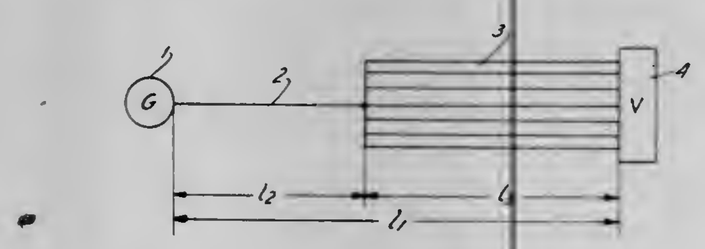
Werner Rasquin, Cologne, Germany, assignor to Felten & Guilleaume Carlswerk AG, Cologne, Germany

Continuation of Ser. No. 382,713, July 26, 1973, abandoned. This application May 21, 1975, Ser. No. 579,497

Claims priority, application Germany, July 29, 1972, 2237428

Int. Cl.² H02B *7/30, 11/02*

U.S. Cl. 307—147 **7 Claims**



1. In combination, an electrical load having load terminals across which predetermined voltage is to be applied; an A.C. power source located remote from said electrical load; and a long-distance power-transmission cable system comprising a first cable system and a second cable system connected in series with each other and connecting said source to said load and operative for transmitting a predetermined power from said source to said load, said second cable system having a natural loading greater than the power which it is transmitting and accordingly having a capacitive character so that its current increases in direction from its load end to its source end whereas its voltage remains approximately constant along its length, said first cable system having a natural loading lower than the power which it is transmitting and accordingly having an inductive character so that its voltage increases in direction from its load end to its source end whereas its current remains approximately unchanged along its length, whereby at the source end of the series combination of said first and second cable system the voltage is lower than if both cable systems had a natural loading lower than the transmitted power and the current is lower than if both cable systems had a natural loading greater than the transmitted power.

4,057,738

ELECTRONIC CIRCUIT FOR ELIMINATING CHATTER

Izuhiko Nishimura, Suwa, Japan, assignor to Kabushiki Kaisha Suwa Seikosha, Tokyo, Japan

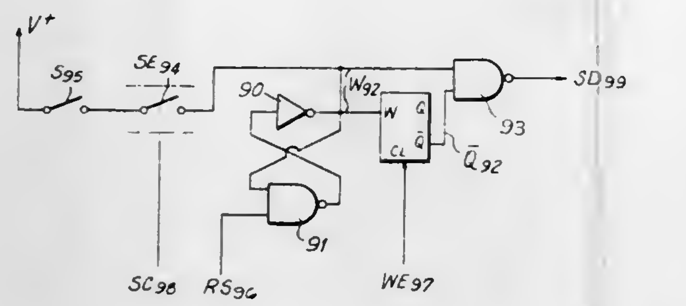
Filed Nov. 5, 1975, Ser. No. 629,185

Claims priority, application Japan, Nov. 5, 1974, 49-127345; Nov. 9, 1974, 49-129121

Int. Cl.² H03K *17/00, 17/56*

U.S. Cl. 307—247 A **6 Claims**

1. An electronic circuit for insuring the application of a contact signal comprising in combination contact means for producing a contact signal representative of a change of state; a first periodic pulse signal having a leading edge; asynchronous logic means for receiving as a first input said contact signal and as a second input said first periodic pulse signal, and in response to a coincidence in the changed state of said contact signal and said first periodic pulse signal producing at least one write-in pulse, said asynchronous logic gating means being a set-reset flip-flop means including an inverter means defining an output terminal and a NAND gate means defining a reset input terminal, said first periodic pulse signal being applied to said reset input terminal, and said contact signal being applied to said output terminal, said set-reset flip-flip means producing at least one write-in pulse in response to



detecting a coincidence in the state of said first periodic reset pulse signal and said change of state contact signal; a second periodic pulse signal having a leading edge and being synchronized with respect to said first periodic pulse signal so that said leading edge of said first periodic pulse signal defining said coincidence condition precedes a leading edge of said second periodic pulse signal; and synchronous logic means for receiving as a first input said write-in pulses produced by said asynchronous logic means and as a second input said second periodic pulse signal, and in response to each said write-in pulse and the leading edge of said second periodic pulse signal, producing an output signal representative of the changed state of said contact signal.

4,057,739

ELECTRO-CHROMIC DISPLAY DRIVING CIRCUIT

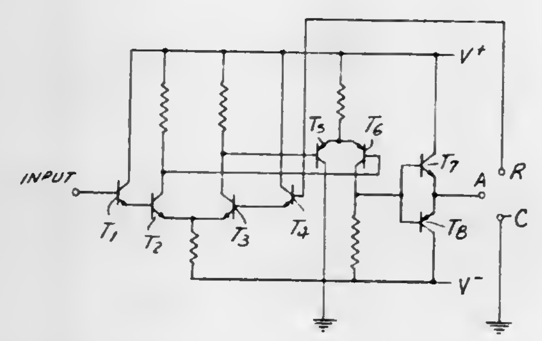
Tsutomu Otake, Suwa, Japan, assignor to Kabushiki Kaisha Suwa Seikosha, Tokyo, Japan

Filed June 1, 1976, Ser. No. 691,694

Claims priority, application Japan, May 29, 19[illegible]-64581

Int. Cl.² H03K *17/00*

U.S. Cl. 307—270 **9 Claims**



1. A display driving circuit comprising in combination electro-chromic display means comprising a first conductor means adapted to be referenced to a first potential, and second conductor means spaced apart from said first conductor means and adapted to be referenced to one of a second potential and a third potential, wherein said third potential is greater than said first potential, and said second potential is less than said first potential, and an oxidation-reduction sensitive compound disposed between said first and second spaced apart conductor means, said compound being normally at a first level of transparency in response to a first predetermined potential difference between said first potential and said second potential, and being altered to a second level of transparency in response to a second predetermined potential difference between said third potential and said first potential, and injection type transistor means for alternately and successively applying said second and third potential to said second conductor means, said injection transistor means effecting a transient characterized by an initial sharp increase in current in response to said first predetermined potential difference and a sharp negative decrease to a negative value following said initial sharp increase from a zero level, followed in turn by a return to a zero level, in response to said second predetermined potential difference.

4,057,740

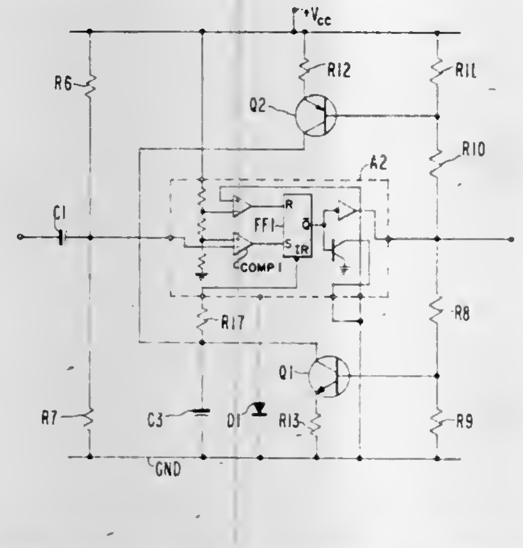
CONSTANT DUTY CYCLE MONOSTABLE

Leonard E. Arguello, San Jose, Calif., assignor to W. R. Grace & Co., New York, N.Y.

Filed Aug. 23, 1976, Ser. No. 716,612

Int. Cl.² H03K *17/00;* **F02P** *1/00*

U.S. Cl. 307—273 **6 Claims**



1. Monostable multivibrator circuit with constant duty cycle comprising:

a flip-flop having a first input for switching the flip-flop to a first state, a second input for switching the flip-flop to a second state, and an output;

a comparator means coupled to the first input and capable of generating an output signal when an input signal applied thereto reaches a predetermined level;

a timing and storage means coupled to the second input of said flip-flop;

a charging means coupled to the timing and storage means; and,

a discharging means coupled to the timing and storage means and responsive to output signals from the flip-flop, whereby said timing and storage means is charged by said charging means and is discharged responsive to receipt of an output signal from said flip-flop, and whereby said flip-flop produces its output signal responsive to receipt of an output signal from said comparator means.

4,057,741

LOGIC CIRCUIT FOR BISTABLE D-DYNAMIC FLIP-FLOPS

Christian Piguet, Neuchatel, Switzerland, assignor to Lasag S.A., Thun, Switzerland

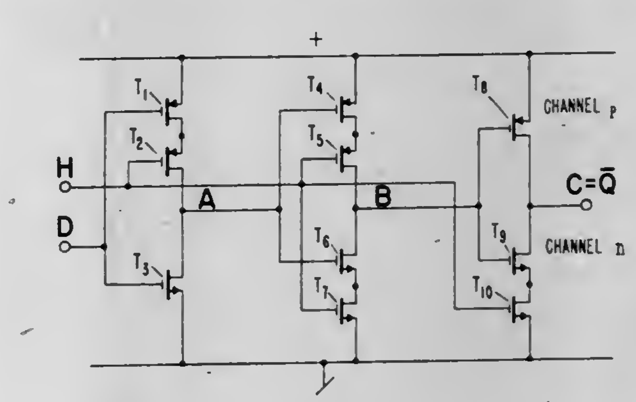
Filed Sept. 16, 1975, Ser. No. 613,917

Claims priority, application Sweden, Sept. 16, 1974, 7401255

Int. Cl.² H03K *3/286, 3/353*

U.S. Cl. 307—279 **8 Claims**

1. A logic circuit for a dynamic D-flip-flop assembled with complementary field effect transistors having insulated grids comprising: a power of supply having a positive pole, a negative pole, and at least three logic gates (A', B', C'), each of which produces an internal variable (A, B, C), wherein each gate is formed by at least three field effect transistors with insulated grids connected in series between the positive pole and ground, and wherein each gate is controlled by at least two variables, one being an input clock signal (H), the first gate (A') including a first transistor (T_1) with a first type of conductivity having a source electrode connected by a first node (N_1) to the positive pole, and a drain electrode connected by a second node (N_2) to the source electrode of a second transistor (T_2) with the same type of conductivity, the drain electrode of said second transistor (T_2) is connected by a third node (N_3) on the one hand to the drain electrode of a third transistor (T_3) with a second type of conductivity whose source electrode is connected by a fourth node (N_4) to ground, and on the other hand to the grid of two transistors (T_4, T_6) of a second gate (B'), the grids of said first and third transistors (T_1, T_3) of the first gate (A') are connected to the input of an external command variable (D), and the gird of said second transistor (T_2) of said first gate (A') is connected to said input of the clock signal (H), the second gate (B') of the circuit includes a fourth transistor (T_4) having the first type of conductivity, and a grid connected to the drain electrode of said second transistor (T_2) of the first gate (A'), its source electrode being connected by a fifth node (N_5) to the positive pole and its drain electrode by a sixth node (N_6) to the source of a fifth transistor (T_5) having the first type of conductivity, the drain electrode of which is connected by a seventh node (N_7) on the one hand to the drain electrode of a sixth transistor (T_6) having a second type of conductivity, whose grid is connected to the drain electrode of said third



transistor (T_3) of the first gate (A'), on the other hand the seventh node (N_7) connects the drain electrode of the fifth transistor (T_5) to the grids of two transistors (T_8, T_9) of the third gate (C'), the source electrodes of said sixth transistor (T_6) is connected by an eighth node (N_8) to the drain electrode of a seventh transistor (T_7) with the second type of conductivity, whose source electrode is connected by a ninth node (N_9) to ground, the grids of said fifth and seventh transistors (T_5, T_7) are connected to said input of the clock signal (H); the third gate (C') of the structure includes an eighth transistor (T_8) of the first type of conductivity, whose grid is connected to the drain electrode of said sixth transistor (T_6) of the second gate (B'), its source electrode is connected by a tenth node (N_{10}) to the positive pole and the drain electrode by an eleventh node (N_{11}) on the one hand to the output (C = Q) of the circuit, and on the other hand to the drain electrode of a ninth transistor (T_9) with the second type of conductivity, whose grid is connected to the drain electrode of said sixth transistor (T_6) of the second gate (B'), its source electrode being connected by a twelfth node (N_{12}) to the drain electrode of a tenth transistor (T_{10}) with the second type of conductivity, whose source electrode is connected by a thirteenth node (N_{13}) to ground, and the grid to said input of the clock signal (H).

4,057,742

VEHICLE LIGHT SWITCH APPARATUS

Ernest W. Binegar, 37 Indian Creek Road, New Smyrna, Fla. 32069

Filed Mar. 19, 1976, Ser. No. 668,706

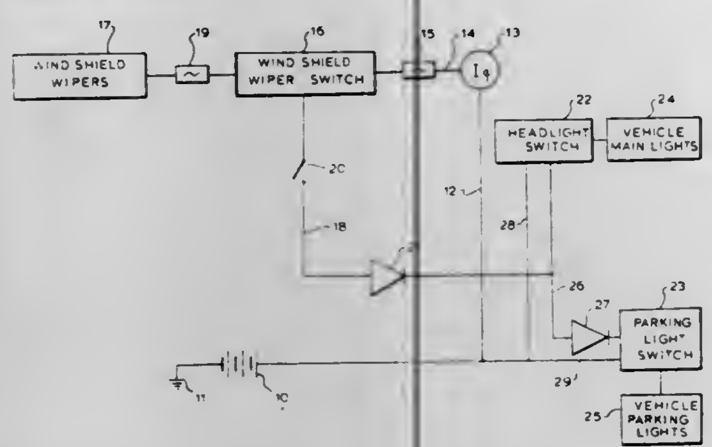
Int. Cl.² H02G *3/00*

U.S. Cl. 307—10 LS **7 Claims**

1. A system for automatically turning on vehicle lights responsive to the operation of the vehicle windshield wipers comprising in combination:

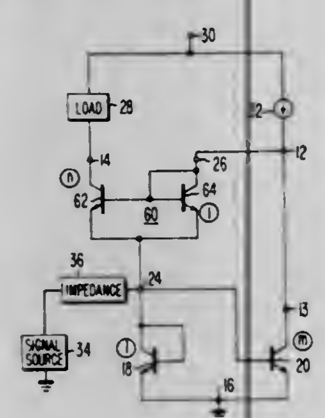
a vehicle windshield wiper switch located in a vehicle;

vehicle light switch means having a headlight switch and parking light switch;
a first circuit connecting said windshield wiper switch to said headlight switch of said vehicle light switch means;
a first diode located in said first circuit for operatively disengaging said first circuit responsive to actuation of said headlight switch;



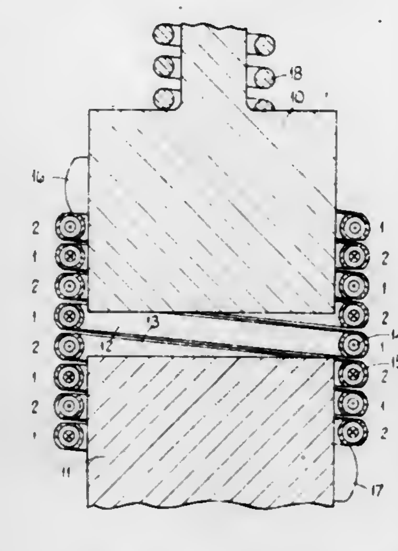
a second circuit coupled between said first circuit and said parking light switch of said vehicle light switch means; and
a second diode located in said second circuit for operatively disengaging said second circuit without disengaging said first circuit when said vehicle light switch means is connected to said parking light switch whereby said vehicle windshield wiper switch controls said vehicle lights unless over-ridden by said headlight switch.

4,057,743
CURRENT SENSING CIRCUIT
Allen LeRoy Limberg, Hopewell Township, Mercer County, N.J., assignor to RCA Corporation, New York, N.Y.
Filed Apr. 8, 1976, Ser. No. 675,259
Int. Cl.² H03K *17/00*
U.S. Cl. 307—296 R 8 Claims



1. In a current sensing circuit for sensing the flow of current through one of the terminals of an impedance, which circuit includes
first and second terminals between which an operating potential may be applied;
means for establishing a current through said impedance;
a current mirror amplifier having input, output and common terminals, said common terminal being connected to said first terminal and said input terminal being connected to said one terminal of said impedance;
amplifier means having input, output and common terminals, said amplifier means common terminal connected to said one terminal of said impedance;
a constant current source for supplying a direct current, said source connected between said second terminal and an interconnection between the output terminal of said current mirror amplifier and the input terminal of said amplifier means; and
load means including a direct current path connected between said second terminal and said amplifier means output terminal:
an improvement for lowering the input impedance of said current sensing circuit without need for increasing the current through said load means comprising said current mirror amplifier exhibiting a current gain as between its input and output terminals that is substantially greater than unity.

4,057,744
ELECTROMAGNETIC DEVICES
Alec Harry Seilly, North Wembley, England, assignor to Lucas Industries Limited, Birmingham, England
Filed Dec. 27, 1976, Ser. No. 754,408
Claims priority, application United Kingdom, Jan. 22, 1976, 2522/76
Int. Cl.² H02K *33/00*
U.S. Cl. 310—27 4 Claims

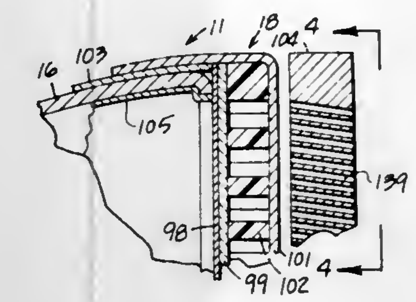


1. An electromagnetic device including a winding through which electric current can be passed, a pair of relatively movable members, a pair or a plurality of pairs of helical coils with the turns of the coils alternately arranged with the turns of the other coil or coils, each of said coils being formed from a length of tubular magnetizable material, the wall of said material being of reduced section over the portions of the coil disposed next to the adjacent coil or coils, said winding comprising conductors disposed within said lengths of material and arranged so that when electric current is supplied to the conductors the current flow in a turn of one coil will be in the opposite direction to the direction of current flow in the adjacent turns of the other coil or coils, the section of said reduced sections being such that flux leakage occurs, said coils being operatively connected to said members whereby the turns of the coils will separate from each other due to the leakage flux to achieve relative movement of the members.

4,057,745
SCANNING X-RAY SOURCE
Richard D. Albert, 317 Hartford Road, Danville, Calif. 94526
Division of Ser. No. 481,954, June 24, 1974, Pat. No. 3,949,229. This application Mar. 4, 1976, Ser. No. 663,988
Int. Cl.² H01J *35/08*
U.S. Cl. 313—55 9 Claims

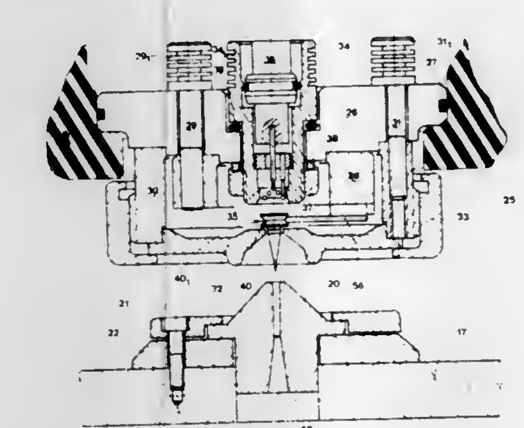
1. A scanning X-ray source having a vacuum envelope with a cathode therein for producing electrons and having a broad anode structure spaced from said cathode and positioned to receive electrons therefrom and having means for directing a narrow electron beam from said cathode to said anode structure for producing X-rays by impact of electrons on said anode structure, said X-ray source further having beam deflection means between said cathode and anode structure for sweeping said electron beam across said anode structure to establish a moving point source of X-rays thereat, said anode structure comprising:

a thin first layer of metallic anode material facing said cathode to receive said electron beam and producing said X-rays in response to electron impact on said first layer, and



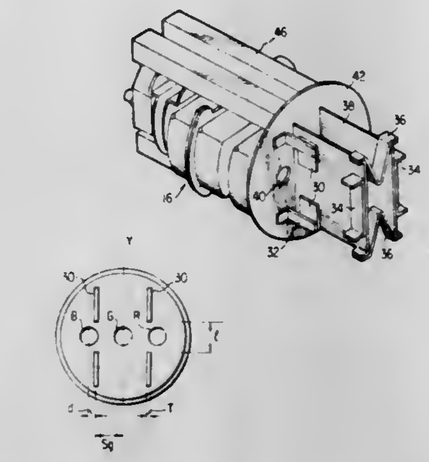
a second layer of backing plate material extending parallel to said first layer and forming at least part of a high strength end wall of said vacuum envelope, said second layer of backing plate material being thicker than said first layer of anode material and being formed of a substance of lower atomic number than the metal of said first layer.

4,057,746
DEMOUNTABLE HIGH POWER ELECTRON BEAM GUN
Paul Dumonte, deceased, late of Vitry, France (by Annie Dumonte, administratrix), assignor to Sciaky Vitry, S. A., Vitry, France
Filed June 24, 1976, Ser. No. 699,246
Claims priority, application France, June 23, 1975, 75.19604
Int. Cl.² H01J *1/00*
U.S. Cl. 313—237 12 Claims



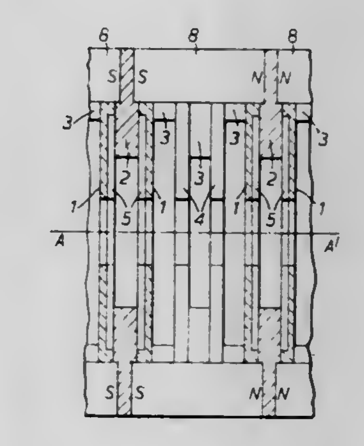
1. An electron gun for the generation of high power density electron beams adapted to the welding of workpieces comprising:
means for holding in coaxial position and electrically insulated from one another replacable filament, a wehnelt and anode;
multiple heat and electricity conducting rod means for maintaining the said cathode in coaxial position, one end of each said rod means being rigidly with respect to the said holding means, the other end of each rod means being applied against the outer side wall of the said replacable cathode so as to form a positioning clamp for the said cathode.

4,057,747
IN-LINE PLURAL BEAM COLOR CATHODE RAY TUBE HAVING DEFLECTION DEFOCUS CORRECTING ELEMENTS
Eizaburo Hamano, Fukaya, Japan, assignor to Tokyo Shibaura Electric Company, Ltd., Japan
Filed Oct. 14, 1975, Ser. No. 622,447
Claims priority, application Japan, Oct. 14, 1974, 49-117185
Int. Cl.² H01J *29/50*
U.S. Cl. 313—413 13 Claims



11. A color cathode ray tube comprising:
an evacuated envelope including a face plate, a neck portion and an interconnecting funnel section;
a phosphor screen formed on the inner surface of the face plate;
a shadow mask including a plurality of apertures disposed adjacent to the phosphor screen;
electron gun means for projecting a central electron beam and a pair of side beams in an in-line arrangement directed toward the screen through a pin-cushion shaped horizontal deflection field produced by a deflection yoke; and
high magnetic permeability deflection defocus correcting means disposed adjacent the paths of the side beams to impart asymmetrical forces to the side beams to compensate for the beam distortion caused by the non-uniformity of the pin-cushion shaped deflection field.

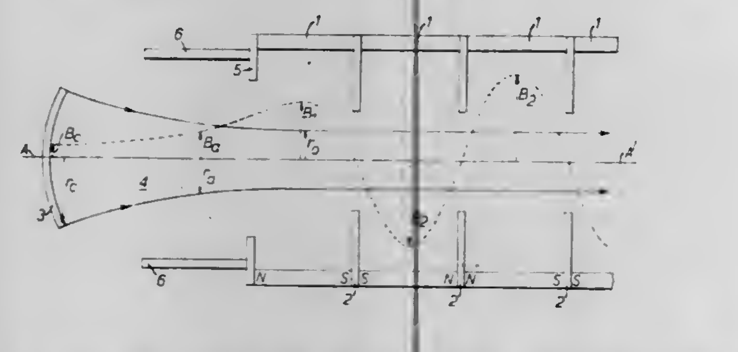
4,057,748
TRAVELLING WAVE TUBES
Peter Robert Davis, Chelmsford, England, assignor to English Electric Valve Company Ltd., England
Filed Feb. 17, 1976, Ser. No. 658,827
Claims priority, application United Kingdom, Mar. 8, 1975, 9908/75
Int. Cl.² H01J *25/34*
U.S. Cl. 315—3.5 9 Claims



1. A fundamental coupled cavity travelling wave tube including a stack of apertured plates defining an electron beam path and assembled to provide a plurality of successive coupled cavities for the fundamental mode of operation in which a ferromagnetic plate is located at each end of each cavity and

a plurality of non-magnetic plates are disposed therebetween, and a ferromagnetic pole piece is sandwiched between and contacted by each pair of ferromagnetic plates defining adjacent ends of adjacent cavities, and a periodic permanent magnetic focusing structure surrounding said cavities and consisting of a plurality of ring shaped magnets each of which is in magnetic contact with the pole pieces of an associated cavity, each pair of ferromagnetic plates projecting radially inwardly from the pole piece sandwiched therebetween to provide permanent fields extending into and surrounding the electron beam path of the tube, said ferromagnetic plates being provided with copper portions extending radially outwardly from adjacent said beam path to conduct heat away therefrom which is caused by electron beam impingement on such ferromagnetic plates.

4,057,749
TRAVELLING WAVE TUBE HAVING AN IMPROVED MAGNETIC FOCUSSING FIELD
Peter Robert Davis, Chelmsford, England, assignor to English Electric Valve Company Ltd., England
Filed Apr. 2, 1976, Ser. No. 673,348
Claims priority, application United Kingdom, Apr. 3, 1975, 13588/75
Int. Cl.² H01J *25/34*
U.S. Cl. 315—3.5 5 Claims

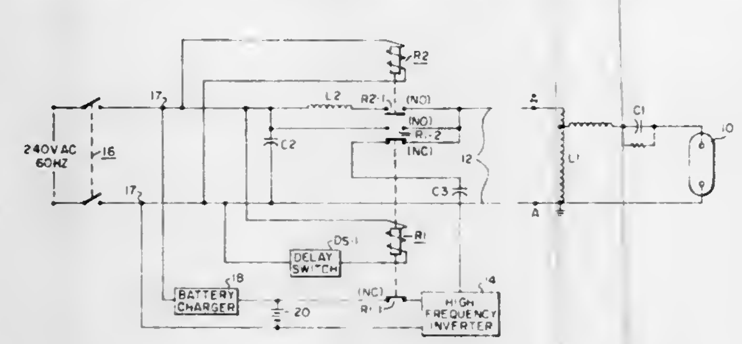


1. A travelling wave tube having an electron gun arrangement which produces an initially converging electron beam and a periodic permanent magnetic focussing structure in which the first peak value of the periodic magnetic field encountered by the electron beam is less than the immediately following peak values, the electron gun arrangement and the periodic permanent magnetic focussing structure being arranged so that the position of said first peak value and the position where the diameter of the electron beam attains its first minima coincide, and the periodic permanent magnetic focussing structure being further arranged so that the first zero magnetic field encountered by the electron beam is within the structure itself and is between the position of said first peak and the next following peak.

4,057,750
APPARATUS AND METHOD FOR SUSTAINING THE OPERATION OF HID LAMPS
Robert T. Elms; Joseph C. Engel, Monroeville, and Gary F. Saletta, Irwin, all of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.
Filed May 10, 1976, Ser. No. 684,513
Int. Cl.² H05B *41/14, 41/26*
U.S. Cl. 315—86 9 Claims

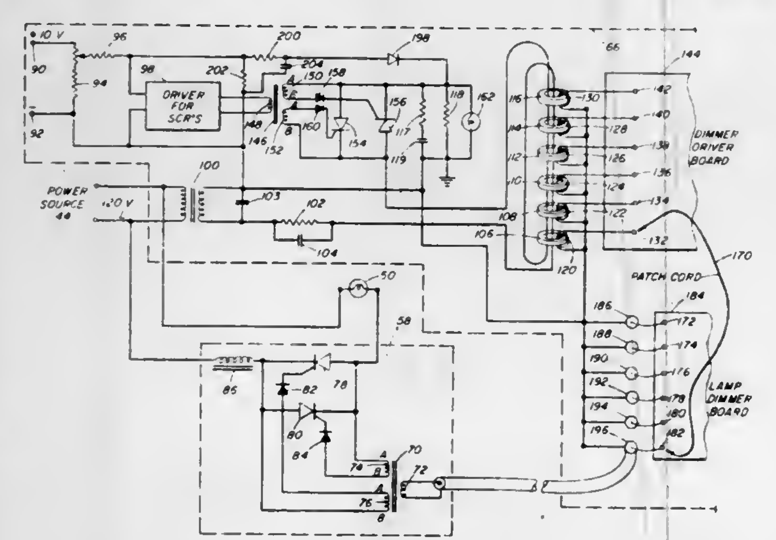
1. In combination with a lighting installation which is normally operable from a 60 Hz AC source and comprises multiple high-pressure discharge lamps each having separate ballast means associated there-with and proximate thereto together with the customary wiring for connecting the lamps and ballasts to the 60 Hz AC source for delivering the normal operating 60 Hz current to such lamps, the improvement which comprises apparatus for preventing such multiple lamps from extinguishing during periods of power interruption of the AC energizing source or during periods of appreciably reduced AC source line voltage, either of which would normally cause the lamps to extinguish for a prolonged period, said apparatus comprising:

a. combined rectifier means and battery means having input terminals adapted to be connected across said AC source to provide standby power;
b. a single high-frequency inverter means having an input and an output, means for connecting the input of said inverter means across the terminals of said battery means, said inverter means when functioning providing a high-frequency AC output voltage sufficient to operate said lamps;
c. means for connecting the output of said high-frequency inverter means to each of said lamps through impedance means which pass a very reduced high-frequency current



as compared to normal lamp operating current so that upon power interruption or appreciable drop in line voltage of said AC source, said lamps are operated from the output of said battery means-powered inverter means at a reduced power level and operation of said lamps is sustained at such reduced power level from available battery means power until full line voltage is restored and said lamps are operating with normal power consumption, and means connected in the wiring intermediate said lamps and said AC source blocks the output of said inverter means from said AC source, and means connected in the wiring intermediate said inverter means and said lamps blocks 60 Hz current from the output of said inverter means.

4,057,751
CONTROLLED DIMMER LIGHTING SYSTEM
Salvatore J. Bonsignore, Wyckoff, N.J., and Sabert N. Howell, Huntington, N.Y., assignors to CBS Inc., New York, N.Y.
Filed Oct. 14, 1975, Ser. No. 621,727
Int. Cl.² H05B *37/02*
U.S. Cl. 315—316 8 Claims



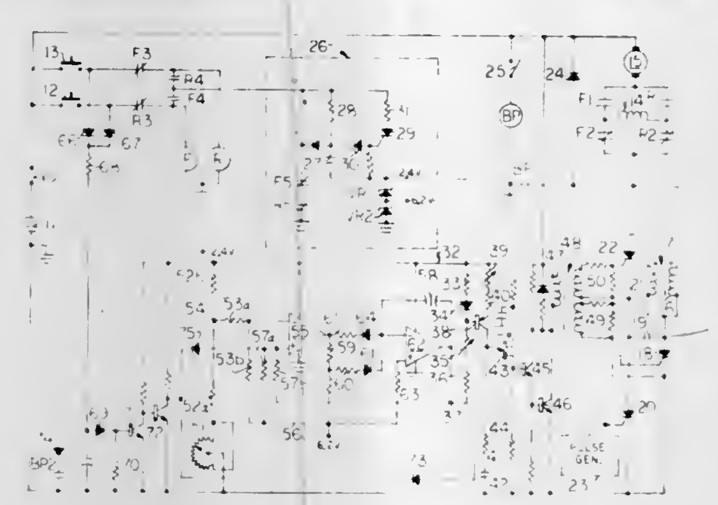
1. In a controlled lighting system for television studios and the like including an AC voltage source for supplying voltage to a multiplicity of power outlets arranged in a grid on an overhead supporting structure, a multiplicity of lamps supported on overhead supporting structure, and a lighting control console disposed remotely from said outlets and said lamps including a source of control signal voltage, apparatus for variably controlling the current from said AC voltage source to a lamp load consisting of a preselected group of *n* of said lamps, wherein *n* is two or more, said apparatus comprising:

n pulse-controlled dimmer units, one each of which is connected between one of said power outlets and a respective different one of said *n* lamps and supported proximate its associated lamp, each of said dimmer units having a current capacity appropriate to the wattage of its corresponding lamp and consisting essentially of a pair of gate controlled rectifiers having anode, cathode and gate electrodes connected with their anode-to-cathode paths in inverse parallel arrangement between one terminal of said AC voltage source and one terminal of the associated lamps, and pulse transformer means for applying pulses to said gate electrodes for rendering said rectifiers alternately conductive in successively occurring half cycles of said AC voltage source,

time-variable pulse generating means disposed in said control console and connected to and operative in response to said source of control voltage to generate a pulse train output in which successive pulses occur during discrete half cycles of the output voltage from said AC voltage source, and

pulse-coupling means connected between said pulse generating means and the pulse transformer means in each of said *n* dimmer units for supplying said pulse train output to each of said *n* dimmer units, thereby to control in unison, the current supplied from said AC voltage source to each of the *n* lamps in said group.

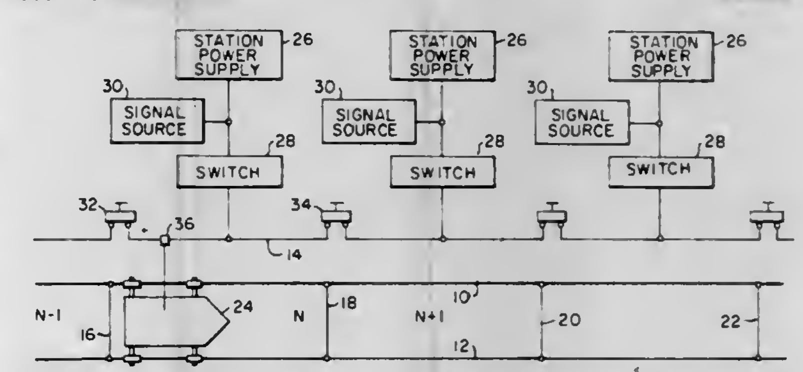
4,057,752
FIRING CONTROL OSCILLATOR FOR A SOLID STATE SWITCH
Robert W. Artrip, Northfield, and Robert G. Klimo, Parma, both of Ohio, assignors to Towmotor Corporation, Mentor, Ohio
Filed Oct. 28, 1975, Ser. No. 626,610
Int. Cl.² H02P *7/00*
U.S. Cl. 318—345 B 14 Claims



1. In a system for controlling the power from a source of direct current to a motor, said system including a silicon controlled rectifier connected in series with said source and said motor to supply current from said source to said motor when said silicon controlled rectifier is gated into conduction, a commutating circuit for commutating said silicon controlled rectifier at a controlled time after said silicon controlled rectifier has been gated into conduction, a relay having main contacts for connecting said field and armature in series when said relay is energized, and an energizing circuit including a switch for energizing said relay, the improvement comprising:

a. a chargeable and dischargeable timing capacitor,
b. means for producing a reference voltage, including operator-controllable means for varying the level of said reference voltage,
c. means for charging said timing capacitor at a constant current rate which is proportional to the level of said reference voltage,
d. means responsive to a predetermined rise in charging voltage across said timing capacitor for concurrently discharging said capacitor and producing a pulse,
e. means for utilizing said pulse to gate the silicon controlled rectifier into conduction,
f. means for delaying charging of said capacitor for a predetermined time following energization of said relay and actuation of the contacts associated therewith.

4,057,753
TRAIN VEHICLE CONTROL APPARATUS
Robert H. Perry, Canonsburg, and Howard N. Miller, McMurray, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.
Filed Oct. 14, 1975, Ser. No. 621,974
Int. Cl.² H02P *3/14*; B60L *1/00*
U.S. Cl. 318—376 5 Claims



1. In apparatus operative with a power supply for controlling the power regeneration operation of a train vehicle moving along a track, said apparatus comprising

means connected to said power supply and providing a predetermined control signal,
switch means connected between said signal providing means and said track for energizing said track with said control signal,
means for sensing the provision of said control signal in said track and
means connected to said sensing means for controlling the power regeneration operation of said train vehicle moving along said track, with said controlling means connecting said train vehicle to said power supply when said control signal is provided and disconnecting said train vehicle from said power supply when said control signal is not provided.

4,057,754
APPARATUS TO MEASURE THE ECCENTRICITY OF A SHAFT
Tamas I. Pattantyus-Abraham, Pittsburgh; Leonard C. Vercellotti, Oakmont, and William H. South, Greenock, all of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.
Filed May 6, 1976, Ser. No. 684,059
Int. Cl.² G01R *33/12*
U.S. Cl. 324—207 4 Claims

1. Apparatus for determining the eccentricity of a shaft, comprising:

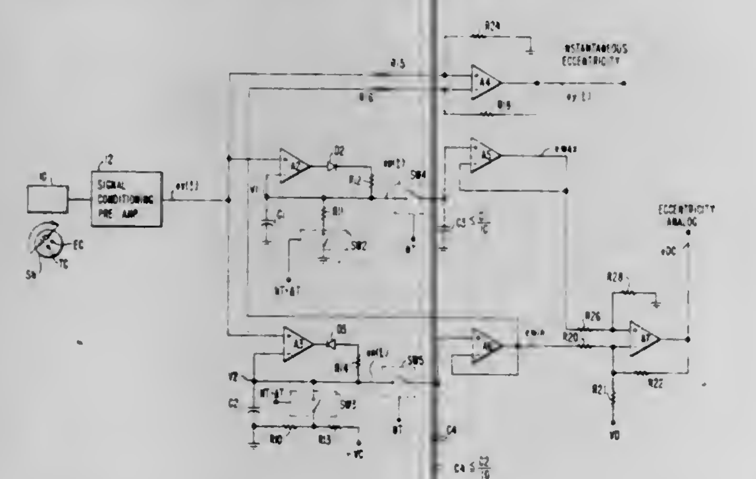
a. transducer means for converting said eccentricity into a sinusoidally varying electrical signal at the output thereof, the difference between sequential positive and negative peaks of said electrical signal being indicative of said eccentricity during the interval between said positive and negative peaks;
b. positive peak detector means, the input of which is connected to the output of said transducer means, the output of said positive peak detector means having a positive peak signal thereof which is generally indicative of said positive peak for a first predetermined period of time starting with the occurrence of said positive peak and ending with the reset of said positive peak detector means;
c. negative peak detector means, the input of which is connected to the output of said transducer means, the output

of said negative peak detector means having a negative peak signal thereof which is generally indicative of said negative peak for a second predetermined period of time starting with the occurrence of said negative peak and ending with the reset of said negative peak detector means;

d. positive peak signal storage means, the input of which is connected to the output of said positive peak detector means for storing said positive peak signal for a storage period when said positive peak signal is transferred from said positive peak detector means to said positive peak signal storage means;

e. negative peak signal storage means, the input of which is connected to the output of said negative peak detector means for storing said negative peak signal for said storage period when said negative peak signal is transferred from said negative peak detector means to said negative peak signal storage means;

f. reset means interconnected with both said positive peak detector means and said negative peak detector means for generally concurrently resetting said positive peak detector means and said negative peak detector means at a reset frequency which is generally equal to or lower than the



frequency of said sinusoidally varying electrical signal, the period of said resetting frequency being generally equal to said storage period;

g. sampling means interconnected with both said positive peak detector means and said negative peak detector means for generally concurrently transferring said positive peak signal and said negative peak signal to said positive peak signal storage means and said negative peak signal storage means respectively at said reset frequency but at a predetermined increment of time prior to the application of said reset signal and during both said first and said second predetermined periods of time;

h. adding means having one input thereof connected to the output of said positive peak signal storage means and having another input thereof connected to the output of said negative peak signal storage means, said adding means providing an output signal which is generally equal to the difference between the signal value on said one input and the signal value on said other input thus providing an indication of said eccentricity associated with said interval during a portion of the storage period immediately following said next interval; and

i. means for comparing the stored negative peak signal with the sinusoidal signal.

4,057,755

THERMAL CONDUCTIVITY DETECTOR CIRCUIT

Helfried Piesche, Owingen, Germany, assignor to Bodenseewerk Perkin-Elmer & Co., GmbH, Uberlingen, Germany

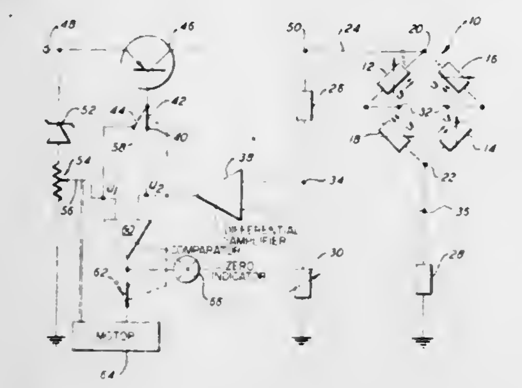
Filed Sept. 10, 1976, Ser. No. 722,248

Int. Cl.² G01R *27/02*

U.S. Cl. 324—62 **6 Claims**

1. In a thermal conductivity detector circuit including a measuring bridge having respective pairs of filaments electrically connected in corresponding legs of said bridge, said measuring bridge positioned in one leg of a second bridge circuit, an adjustable resistor electrically connected in the leg of said second bridge opposite the leg containing said measuring bridge circuit, a differential amplifier connected to the output terminals of said second bridge, current control means connected in circuit between a supply voltage source and said second bridge for supplying current to said second bridge, the output voltage of said differential amplifier controlling the flow of current through said current control means whereby said second bridge becomes balanced, wherein the improvement comprises an auxiliary voltage source for controlling said current control means including:

a. a second voltage supply having an adjustable output voltage;



b. means for electrically comparing the adjustable output voltage of said second supply to the output of said differential amplifier;

c. means responsive to the output of said comparing means for varying the output voltage of said second voltage supply;

d. means for disconnecting said differential amplifier output and electrically connecting said adjustable output voltage of said supply to said current control means when said adjustable output voltage equals the output voltage of said differential amplifier; and

e. means for interrupting said means for varying the voltage supply when said adjustable output voltage equals the output of said differential amplifier.

4,057,756

SIGNAL PROCESSORS

Anthony John Ley, New Canaan, Conn.; Eric Metcalf, Ropley, and Michael Cedric Jeffery, Aldershot, both of England, assignors to The Solartron Electronic Group Ltd., Farnborough, England

Filed Mar. 29, 1976, Ser. No. 671,883

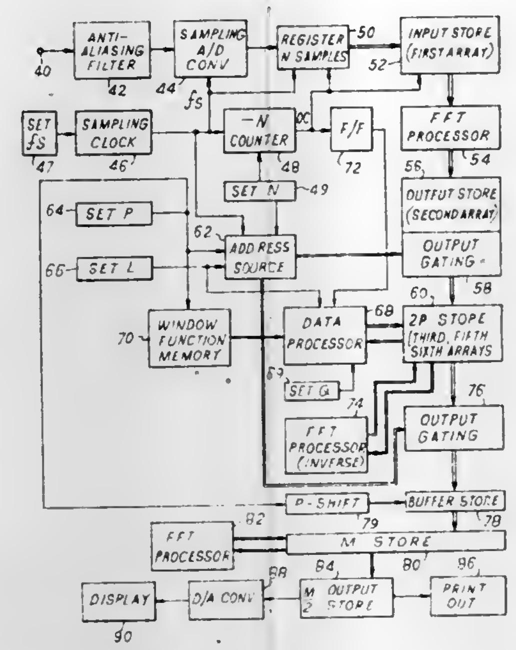
Claims priority, application United Kingdom, Apr. 3, 1975, 13767/75

Int. Cl.² G01R *23/16*

U.S. Cl. 324—77 B **11 Claims**

1. A signal processor comprising means for repeatedly sampling an input signal to form samples, means operative to subject a succession of first, overlapping arrays of the samples to a Discrete Fourier Transform operation to form second, frequency domain arrays, means operative to select from each second array a restricted third array of contiguous point values including a centre value at the centre frequency of a predetermined restricted frequency band, means operative to multiply each restricted third array by a fourth array havng the form of a predetermined window function and representing the Discrete Fourier Trandformation of the impulse response of a band pass filter, thereby to form a fifth array from each third array, means operative to rotate a selected one of the third and fifth arrays through such phase angles as compensate for array to array shifts of epoch of the first arrays created by the overlap of the first arrays, and means operative to subject the fifth arrays to an Inverse Discrete Fourier Transform operation to form sixth time domain arrays of which central groups of point

values are sequential samples of a time-domain signal equivalent to a frequency-shifted result of an aperiodic convolution of



said input signal with said impulse response of said band pass filter.

4,057,757

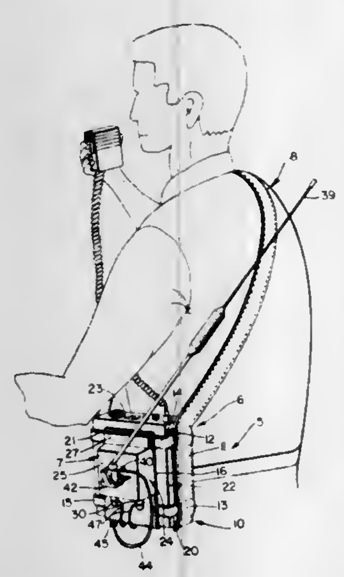
POWER PACK AND CARRIER FOR CB RADIO

William T. Darden, Jr., 20 Springside Drive, Asheville, N.C. 28806

Filed June 17, 1976, Ser. No. 697,106

Int. Cl.² H01B *1/38*

U.S. Cl. 325—16 **6 Claims**



1. A power pack and carrier comprising a body member of a flexible non-elastic material having a pocket receiving a CB radio, said pocket having an outer wall, a housing forming a part of said outer wall, dry cell batteries connected together in series and contained within said housing, means electrically connecting the batteries to the radio, said pocket having an open upper end affording access to the controls of the radio, said pocket being formed in part by straps having adjustable fastening means by which the radio is secured in said pocket and for varying the size of the pocket to accommodate radios of different sizes, a body engaging member forming a part of said carrier and adapted to engage and be supported by a part of the body of the user, and said pocket having a lower end wall provided with a restricted opening to receive an antenna coupling for attachment to the radio.

4,057,758

MOBILE DIVERSITY RADIO COMMUNICATION SYSTEM

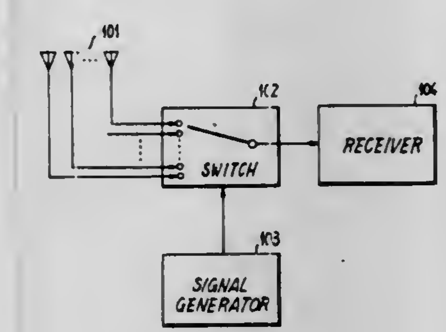
Takeshi Hattori, and Fumiyuki Adachi, both of Yokohama, Japan, assignors to Nippon Telegraph and Telephone Public Corporation, Japan

Filed Oct. 2, 1975, Ser. No. 618,916

Claims priority, application Japan, Oct. 21, 1974, 49-120377

Int. Cl.² H04B *7/02*

U.S. Cl. 325—56 **18 Claims**



1. In a mobile diversity radio communication system, for operating over a multipath medium, of the type including a base station and at least one mobile station, wherein at least one of said stations comprises transmitting means for transmitting radio signals to another station of the system, wherein at least the other station comprises receiving means for receiving radio signals from said transmitting means, an antenna system for radiating the radio signals being transmitted and an antenna system for receiving said radio signals, and wherein at least one of said stations includes a plurality of antenna systems for operating in a space diversity mode, the improvement which comprises:

said transmitting means comprising modulation means for frequency shift modulating the radio signals being transmitted by a digital baseband signal; and

switching means connected to said plurality of antenna systems operable for switching between ones of said antenna systems to render ones of said antenna systems active at a constant rate which rate is higher than the signaling rate of the digital baseband signal but less than the frequency shift width of the frequency shift modulated radio signal, being transmitted thereby to compress average-power dispersion in a signal element of the digital baseband signal.

4,057,759

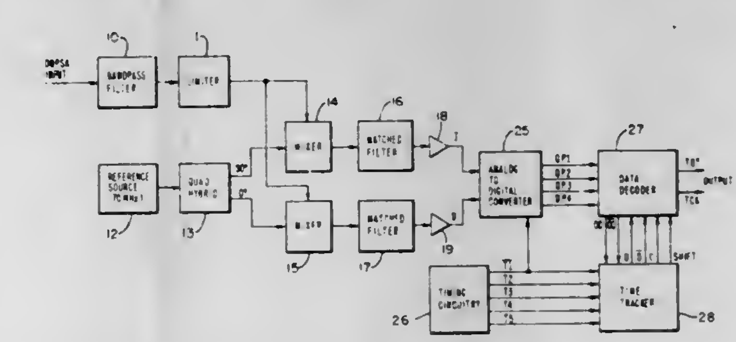
COMMUNICATION RECEIVING APPARATUS

Arthur F. Genova, Waltham, and Thomas J. Lennon, Burlington, both of Mass., assignors to GTE Sylvania Incorporated, Stamford, Conn.

Filed June 23, 1976, Ser. No. 698,943

Int. Cl.² H04B *1/16*

U.S. Cl. 325—320 **10 Claims**



1. Receiving apparatus for processing received differential phase shift keyed signals comprising

detecting means for producing quadrature components of each received signal;

analog-to-digital converting means coupled to said detecting

means for deriving digital representations of the resultant of the quadrature components of each signal a number of times during the period of a received signal; the period of a received signal being the duration of the time period during which a received signal is being received;

first storage means coupled to the analog-to-digital converting means for storing a digital representation of a resultant for a period equal to the period of a received signal;

subtraction means coupled to said analog-to-digital converting means and to said first storage means for producing a digital representation of the difference between the digital representation of the resultant stored in the first storage means and each subsequently derived digital representation of a resultant during the period the digital representation of the resultant is stored in the first storage means;

second storage means coupled to said subtraction means for storing one of the digital representations of a difference produced during the period the digital representation of a resultant is stored in the first storage means;

data readout means coupled to said second storage means for reading out the digital representation of a difference stored in said second storage means;

said first storage means being operable to store a digital representation therein in response to an actuating signal;

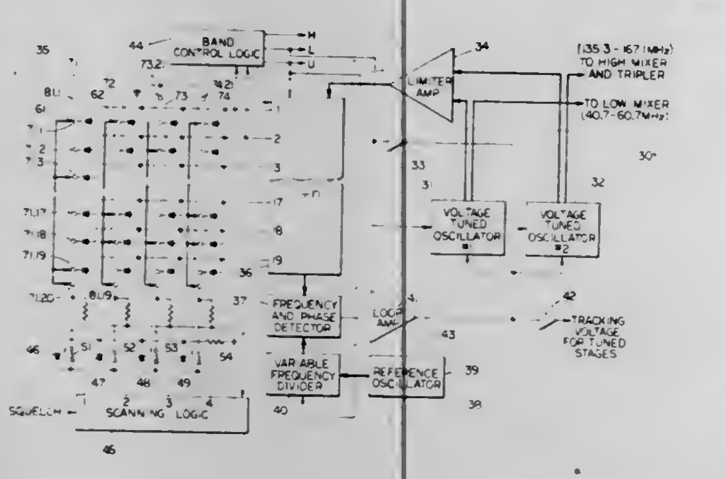
said second storage means being operable to store a digital representation therein in response to an actuating signal;

said data readout means being operable to read out the digital representation stored in said second storage means in response to an actuating signal;

control means coupled to said first storage means, said second storage means, and said data readout means for producing said actuating signals to the first storage means, second storage means, and data readout means during each period of a received signal; and

timing adjusting means coupled to said subtraction means and said control means for adjusting the times during the period of a received signal that the control means produces the actuating signals to the first and second storage means and to the data readout means; the timing adjusting means adjusting said times in response to the digital representations of differences produced by the subtraction means during a number of periods, each period being equal to the period of a received signal.

4,057,760
FREQUENCY SYNTHESIZED SCANNER HAVING CONDUCTIVE PROGRAMMING ELEMENTS FOR CHANNEL SELECTION
Richard C. Koch, Denver, Colo., assignor to Regency Electronics, Inc., Indianapolis, Ind.
Filed June 7, 1976, Ser. No. 694,016
Int. Cl.² H04B *1/06*
U.S. Cl. 325—455 **7 Claims**



1. In a stepping radio receiver for production of audio signals from radio frequency signals and capable of tuning to several separate channels which radio receiver includes:

a. an RF signal receiving means, a mixer means, and and oscillator means;

b. said RF signal receiving means being for providing sufficient RF signal level for said mixer means;

c. said RF signal receiving means and said oscillator means being coupled to said mixer means;

d. an audio detection means coupled to said mixer means for producing an audio signal when an RF signal is being received, said audio detection means including squelch means for preventing the production of an audio signal when an RF signal is not being received:

e. said oscillator means being coupled to said mixer means and operable at a given several frequencies, there being one frequency for each channel to which the receiver can tune; said oscillator means including a frequency synthesizer for determining the frequency of oscillation of said oscillator means;

f. said frequency synthesizer including:

1. voltage tuned oscillator means for providing an oscillator output frequency corresponding to a voltage present at its input,
2. a binary-number-controlled digital divider coupled to the output of said voltage tuned oscillator, said digital divider including means permitting division by a number corresponding to any selected one of several different binary numbers, each of said several different binary numbers having at least 6 bits and corresponding to a channel to be tuned to;
3. reference means for providing a reference frequency and
4. phase detector means for providing a voltage in response to phase differences between the output of said digital divider and the output of said reference means,

g. scanning logic means which is defeatable and which has several outputs which are coupled to said oscillator means for stepping said oscillator means through said given several frequencies;

h. locking means which is connected to the scanning logic means for defeating said stepping means as long as an RF signal is being received and allowing resumption of operation of said scanning logic means when no signal is being received;

the improvement which comprises:

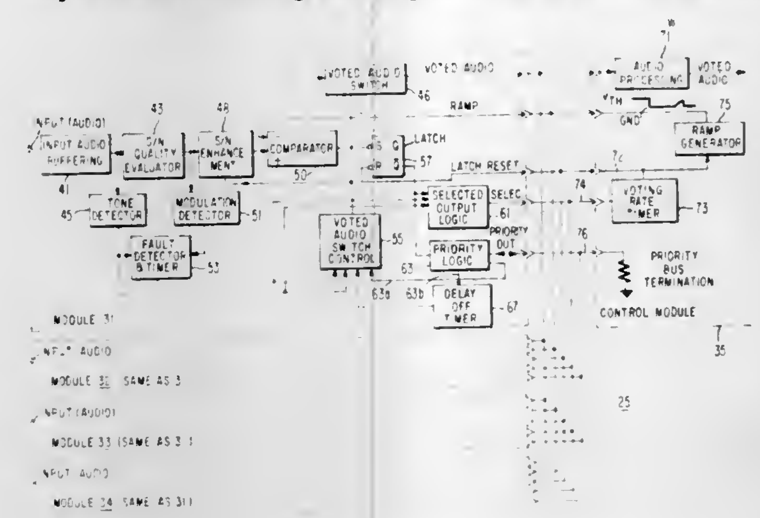
said means permitting division by a number corresponding to any selected one of several different binary numbers including:

1. several sockets, each socket having several electrical contact elements there being at least as many electrical contact elements as there are bits in said binary numbers,
2. a majority of the corresponding electrical contact elements of said plurality of sockets each connecting through diodes to respective common lines,
3. one contact element of each of said several sockets being coupled to a respective one of the outputs of said scanning logic means and
4. a plurality of conductive contact means each inserted into a respective one of said several sockets to electrically connect said one contact element which is coupled to said scanning logic means to a portion of the remaining electrical contact elements of said respective one of said several sockets.

4,057,761
RECEIVED SIGNAL SELECTING SYSTEM WITH PRIORITY CONTROL
Donald Duane Harbert, Prosperity, and Ronald Gilbert Ferrie, Pittsburgh, both of Pa., assignors to RCA Corporation, New York, N.Y.
Filed Dec. 30, 1975, Ser. No. 645,338
Int. Cl.² H04B *1/10*
U.S. Cl. 328—154 **3 Claims**

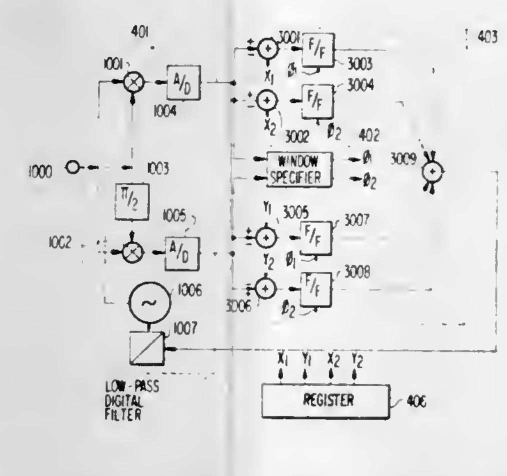
1. In a system for selecting a signal from a plurality of signals, a separate signal quality detector being respectively responsive to each of said signals for providing a level signal indicative of signal quality, a separate selection gate being responsive to each of said signals with the outputs of said gates being connected in common to a utilization circuit, and means connected to each of said quality detectors responsive to said level signals for providing a control signal to the selection gate corresponding to the quality detector responsive to the best quality signal to cause that selection gate to couple the signal to which it is responsive to said utilization circuit, the improvement for preventing more than one signal being selected at a time comprising:

means responsive to said control signal being provided to any of said selection gates for providing an activity signal,



said last mentioned means including further means coupled to each of said selection gates and responsive to said activity signal indicating that one of said selection gates has been operated to pass that one of said plurality of signals to which it is responsive to said utilization circuit to cause the remaining said selection gates to block the passage of the remaining signals of said plurality of signals to said utilization circuit, said further means being responsive to the absence of said activity signal to permit the first one of said selection gates thereafter having said control signal provided thereto to continue to pass to said utilization circuit the signal of said plurality of signals to which that last-mentioned one selection gate is responsive.

4,057,762
DEVICE FOR PHASE SYNCHRONIZING A REPRODUCED REFERENCE CARRIER SIGNAL WITH WINDOWS SPECIFIED FOR PRESELECTED ONES OF AMPLITUDE AND PHASE MODULATED SIGNAL POINTS
Junji Namiki, Tokyo, Japan, assignor to Nippon Electric Company, Ltd., Tokyo, Japan
Filed Dec. 21, 1976, Ser. No. 753,143
Claims priority, application Japan, Dec. 26, 1975, 50-158851
Int. Cl.² H03D *5/00*
U.S. Cl. 329—50 **5 Claims**



1. For use in a receiver for an incoming amplitude and phase modulated signal selectively representative of true signal points (X_i, Y_i), N in number, arranged on an X-Y complex amplitude plane, a phase synchronizing device for phase synchronizing a reproduced reference carrier signal with an incoming reference carrier signal defining said X-Y plane and contained implicity in said incoming modulated signal, comprising:

a demodulator responsive to said incoming modulated signal and said reproduced carrier signal for producing complex signals selectively representative of coarse signal points (x_i', Y_i') distributed on said X-Y plane around said true points,

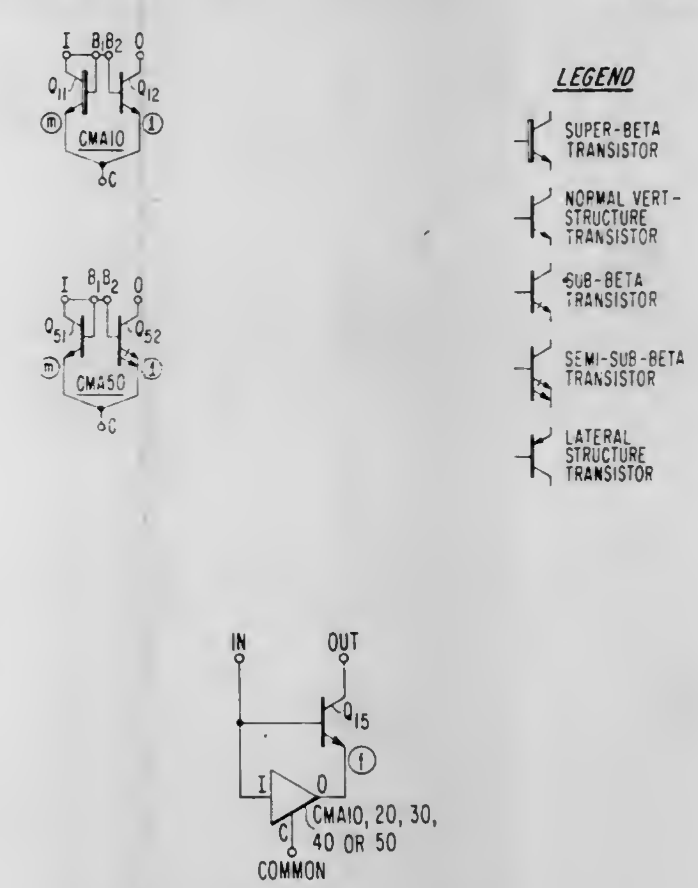
a window specifier responsive to said complex signals for producing window signals defining predetermined areas on said X-Y plane which include predetermined ones, n in number, of said true points, n being not greater than N,

means responsive to said complex signals and said window signals for producing difference signals representative of differences (x_i, y_i) in X and Y components between said true points and the coarse points included in said areas,

means for calculating a linear sum of the differences, p in number, in the X components and the differences, q in number, in the Y components to produce a sum signal representative of said sum, p and q being not greater than n and not simultaneously equal to zero, and

means responsive to said sum signal for phase controlling said reproduced carrier signal.

4,057,763
CURRENT AMPLIFIERS
Carl Franklin Wheatley, Jr., Somerset, N.J., assignor to RCA Corporation, New York, N.Y.
Filed May 17, 1976, Ser. No. 687,214
Int. Cl.² H03F *3/04*
U.S. Cl. 330—288 **69 Claims**



3. A current mirror amplifier comprising:

input, output and common terminals;

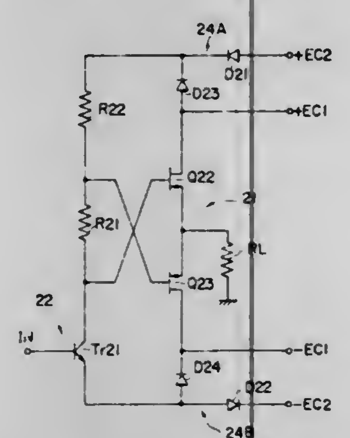
first and second transistors of a first conductivity type, each having base and emitter and collector electrodes, said first transistor being a superbeta type and said second transistor being a conventional process vertical-structure type, the emitter electrodes of said first and said second transistors being connected to said common terminal;

first galvanic connection means between the collector electrode of said first transistor and said input terminal;

second galvanic connection means between the collector electrode of said second transistor and said output terminal; and

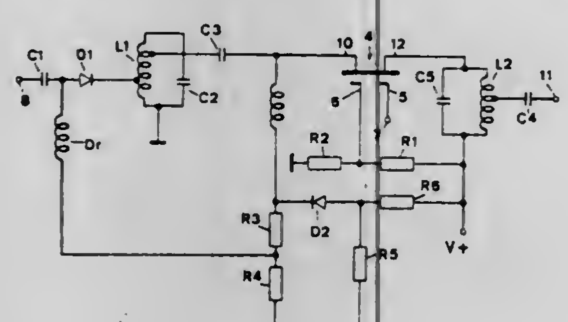
a direct-coupled feedback connection between the collector electrode of said first transistor and an interconnection between the base electrodes of said first and said second transistors.

4,057,764
AMPLIFIER
Kenji Yokoyama, Hamamatsu, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Hamamatsu, Japan
Filed Mar. 16, 1976, Ser. No. 667,443
Claims priority, application Japan, Mar. 19, 1975, 50-36733
Int. Cl.² H03F *3/04*
U.S. Cl. 330—264 **4 Claims**



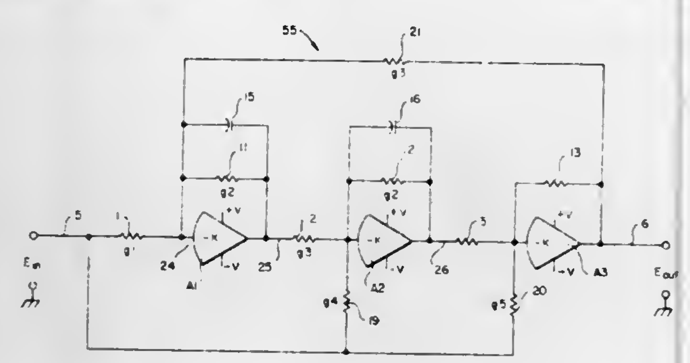
1. An amplifier comprising:
a first power source building up quickly upon power-on of the amplifier;
a second power source building up with a time delay as compared with said first power source upon power-on of the amplifier;
a power amplifying circuit connected to said first power source and including at least one FET;
a drive circuit connected to said power amplifying circuit for driving the latter, and including means for providing at least one bias voltage for said at least one FET; and
switch-over means connected to said drive circuit, said first power source and said second power source for supplying, to said drive circuit, power from said first power source before said second power source builds up and power from said second power source after said second power source builds up.

4,057,765
VARIABLE AMPLIFIER FOR RF INPUT STAGE
Josef H. Schuermann, Oberbummel, Germany, assignor to Texas Instruments Deutschland GmbH, Freising, Germany
Filed June 19, 1976, Ser. No. 706,404
Claims priority, application Germany, July 25, 1975, 2533355
Int. Cl.² H03G *3/30*
U.S. Cl. 330—279 **19 Claims**



1. A variable gain r.f. input amplifier having a signal input terminal, field effect transistor means including a signal input electrode and a control electrode for receiving a control voltage for adjusting the attenuation of the transistor means, current controlled resistor means consisting of a single semiconductor diode serially connected in a signal path between said amplifier signal input terminal and the input electrode of said field effect transistor means, and diode biasing circuit means including source resistor means for said field effect transistor means having an intermediate tap connected to said semiconductor diode for biasing said diode in response to decreasing conduction of said field effect transistor means from a condition providing low attentuation to a condition providing substantial attenuation in said signal path only after the gain of said field effect transistor means has been reduced by about 10 dB in response to said control voltage.

4,057,766
ACTIVE NETWORKS HAVING BIQUADRATIC TRANSFER FUNCTIONS
Man Shek Lee, Belmont, Calif., assignor to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.
Filed Aug. 30, 1976, Ser. No. 718,730
Int. Cl.² H03F *1/36*
U.S. Cl. 330—107 **10 Claims**



9. A frequency-selective network satisfying a prescribed transfer function, the network including input and output ports with only one terminals thereof being grounded and having a transfer function which is generally representable as

$$\frac{E_{out}(s)}{E_{in}(s)} = -\frac{(n2s^2 + n1s + n0)}{(d2s^2 + d1s + d0)},$$

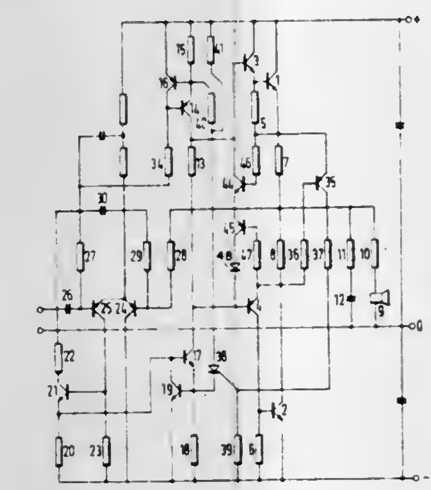
where $n2$, $n1$, $n0$, $d2$, $d1$, and $d0$ are constant coefficients which may be zero and s is the complex frequency variable, the network comprising: first, second, and third operational amplifiers each having at least one input line and having at least one output line; first, second, and third input resistors in the one input lines of associated amplifiers; said first, second, and third resistors and first, second, and third amplifiers being electrically connected in series, the one input line of said first amplifier being electrically connected through said first resistor to the other — ungrounded input terminal; a first capacitor electrically connected between the one output line and the one input line of said first amplifier; a second capacitor electrically connected between the one output line and the one input line of said second amplifier; a fourth resistor electrically connected between the one output line and the one input line of said third amplifier; a fifth resistor electrically connected between the third amplifier one output line and the first amplifier one input line; a sixth resistor electrically connected between the third amplifier one input line and the other — ungrounded input terminal; and means for coupling the other — ungrounded output terminal to one output line of one of said amplifiers; the particular transfer function being a function of the normalized conductances $g1$, $g2$, and $g3$ of said first, second and sixth resistors, respectively, being prescribed by selected values of these conductances which are at least initially normalized with respect to the capacitances of said first and second capacitors with the normalized conductances of said third and fourth resistors being at least initially set to unity, and being representable as

$$\frac{E_{out}(s)}{E_{in}(s)} = -\frac{(g3s^2 + g1\,g2)}{(s^2 + g2^2)} = -A\frac{(s^2 + n0)}{(s^2 + d0)},$$

where A is the gain of network, $n2 = d2 = 1$, and $n1 = d1 = 0$, values of other coefficients and the normalized conductances of said resistors satisfying the relationships

$$g1 = \frac{n0\,A}{g2};\ g2 = \sqrt{d0};\ g3 = A.$$

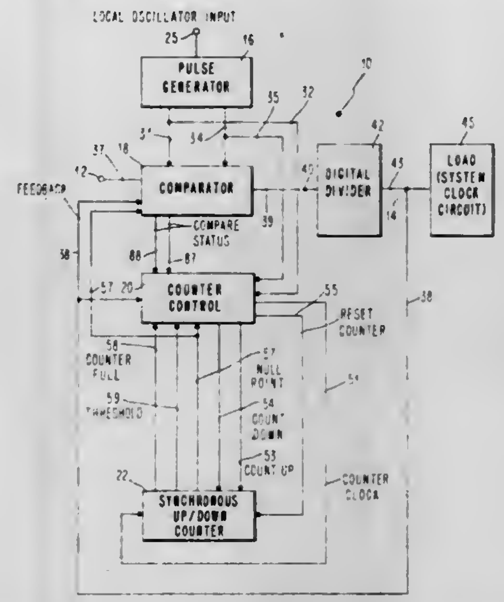
4,057,767
DEVICE FOR PROTECTING AN AUDIO AMPLIFIER AGAINST OVERLOAD OR SHORT CIRCUIT
Robert Ronald Laupman, Wijchen, Netherlands, assignor to Novanex Automation N. V., Netherlands
Continuation of Ser. No. 542,773, Jan. 21, 1975, abandoned. This application July 6, 1976, Ser. No. 702,901
Claims priority, application Netherlands, Jan. 24, 1974, 7400977
Int. Cl.² H03F *21/00*
U.S. Cl. 330—207 P **5 Claims**



1. In an audio amplifier circuit, the combination of:
a pair of output transistors and a pair of resistors, the collector-emitter circuits of said transistors being connected in series through said resistors and the junction of said resistors defining an output terminal of the amplifier;
control means connected to the base electrodes of said transistors for alternately biassing said transistors to conduct in accord with an audio input signal, said control means including first means responsive to voltage developed across one of said resistors for limiting the bias applied to one of said transistors, and second means responsive to voltage developed across the other of said resistors for limiting the bias applied to the other of said transistors; and
decoupling means connected across said resistors and responsive to a predetermined excess current through either one of said resistors for removing bias on said transistors.

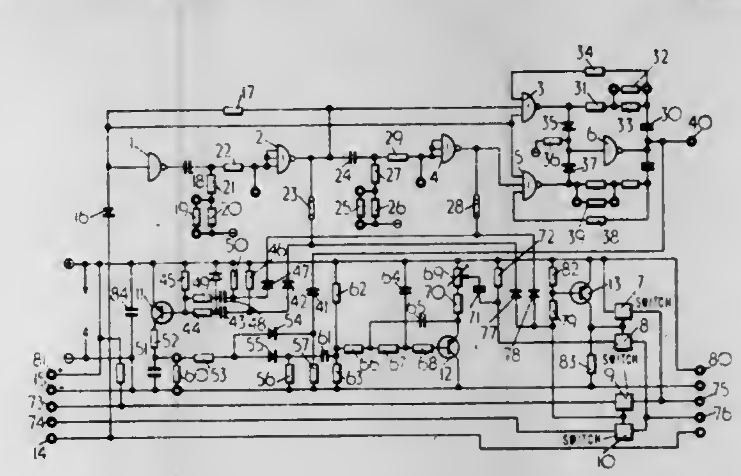
4,057,768
VARIABLE INCREMENT PHASE LOCKED LOOP CIRCUIT
Hans Yohanan Juliusburger, Putnam Valley, and Donald Wortzman, Carmel, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.
Filed Nov. 11, 1976, Ser. No. 740,700
Int. Cl.² H03B *3/00*
U.S. Cl. 331—1 A **7 Claims**

1. A digital phase locked loop circuit for synchronizing the phase and frequency of a digital local feedback signal with a digital data input signal comprising
means for comparing the feedback signal and the data input signal during a predetermined sequence and measuring a number of pulses which represents the instantaneous phase deviation between said signals, and
means responsive to an output of said comparator means for



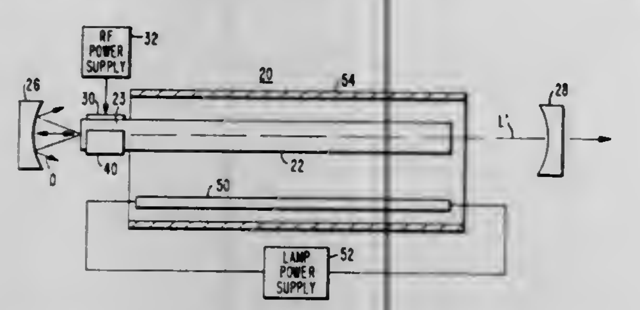
effecting phase adjustments of the feedback signals by adding to or deleting groups of pulses from the comparator output signal during each said sequence that are proportional to the instantaneous phase deviation between the feedback signal and the data input signal.

4,057,769
CIRCUIT FOR GENERATING TWO DISTINCTIVE TONE BURSTS WITH EXPONENTIALLY DECAYING ENVELOPES
Lawrence Dudley Woolf, Jersey, Guernsey (Channel Island), assignor to Rediffusion Reditronics Limited, Jersey, Guernsey (Channel Is.)
Filed Sept. 14, 1976, Ser. No. 723,097
Claims priority, application United Kingdom, Sept. 16, 1975, 38002/75
Int. Cl.² H03B *3/02, 3/04*
U.S. Cl. 331—49 **11 Claims**



1. An electrical signal generator comprising an electric wave oscillator, for producing oscillations at two predetermined frequencies and having two separate input circuits respectively to provide oscillations at said two frequencies and a common output circuit for providing the oscillations, an attenuator device coupled to said output circuit for attenuating oscillations produced by the oscillator in a manner which varies over a period of time, control means connected with the two oscillator input circuits to produce a burst of oscillations at one said predetermined frequency and a subsequent burst of oscillations at the other said predetermined frequency, and said control means further being connected with the attenuator device to set the attenuator for decay of the oscillations over the priod of each burst.

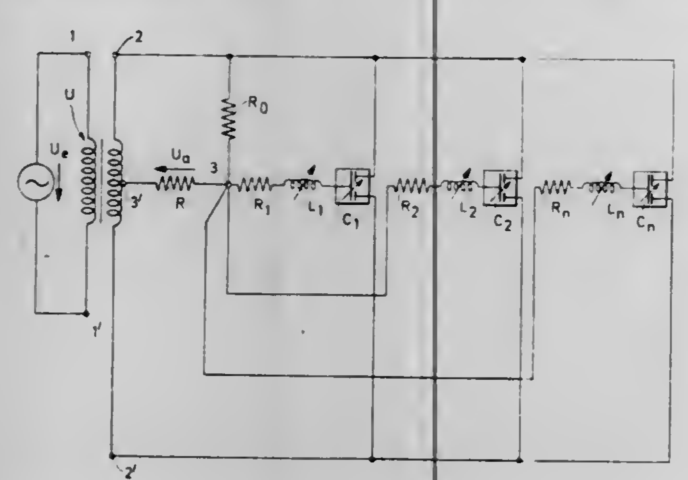
4,057,770
ACOUSTO-OPTIC Q-SWITCH
Tom Henningsen, Monroeville, and John J. Conroy, Verona, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.
Filed Apr. 5, 1976, Ser. No. 673,562
Int. Cl.[2] H01S *3/11*
U.S. Cl. 331—94.5 Q **7 Claims**



1. In a laser apparatus having a resonant optical cavity including a laser medium, means for exciting the laser medium to emit a light beam, optical reflective element at either end of the optical cavity to multiply-reflect the light beam through the laser medium with one of the optical reflective elements being partially transmissive to the light beam to transmit a laser output beam, and an etalon disposed between one end of said laser medium and one of said optical reflective elements to determine the frequency bands of the laser output beam, the combination of,

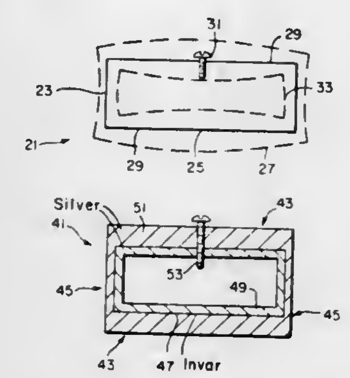
an acoustic-optic Q-switch means affixed in combination with said etalon and responsive to RF excitation by transmitting acoustic waves through said etalon to diffract the light beam emitted by said laser medium.

4,057,771
FREQUENCY-RESPONSE CORRECTIVE NETWORK
Hans-Joachim Schmidt, Nurnberg, Germany, assignor to Tekade Felten & Guilleaume Fernmeldeanlagen GmbH, Nurnberg, Germany
Filed Mar. 12, 1976, Ser. No. 666,230
Claims priority, application Germany, Mar. 21, 1975, 2512459
Int. Cl.[2] H03H *7/10, 7/16;* **H04B** *3/14*
U.S. Cl. 333—70 R **17 Claims**



1. A corrective equalizer network for obtaining a desired attenuation versus frequency characteristic, comprising a source having output terminals; a plurality of non-active stages each having an input connected across the output terminals of the source for receiving input signals from the latter, an output for supplying output signals to a load, and adjustable reactance elements intermediate the respective input and output of every stage; means for tuning at least one of the adjustable reactance elements of each stage so as to set every stage to be resonant at different frequencies of the frequency spectrum of the input signals; and means for adjusting at least one of the adjustable reactance elements of each stage independently from other adjustable reactance elements of every other stage so as to selectively vary the amplitude of at least a selected one of the respective frequencies of the spectrum for altering the level of attenuation at said selected one frequency, whereby the output signals supplied to the load have the desired attenuation versus frequency characteristic for the entire frequency spectrum.

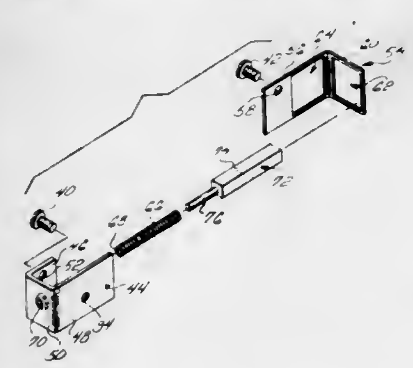
4,057,772
THERMALLY COMPENSATED MICROWAVE RESONATOR
Richard V. Basil, Jr., Canoga Park; Leons Ondrups, Pacific Palisades, and James K. Shimizu, Palos Verdes Estates, all of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.
Filed Oct. 18, 1976, Ser. No. 733,833
Int. Cl.[2] H01P *1/30, 7/06*
U.S. Cl. 333—83 T **23 Claims**



13. A thermally compensated frequency controlled microwave resonator for operation over a predetermined operational temperature range, comprising:

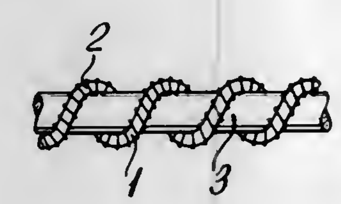
a rectangular resonator having conductive inner wall surfaces and oppositely disposed broad and narrow walls, at least one of said walls being a composite wall of integral wall layers one of which having a relatively lower thermal expansion coefficient than another of said layers, said composite wall deforming with changes in temperature and having a critical temperature whereat said composite wall snaps from one stabilized curvature condition to a different stabilized curvature condition, said critical temperature being outside said operational temperature range, said composite wall having an initial deformation in one of said stabilized curvature conditions to render said composite wall frequency sensitive.

4,057,773
MAGNETIC SWITCH
Morton Cohen, 41-27 Westmoreland St., Little Neck, N.Y. 11363
Filed Feb. 9, 1976, Ser. No. 656,098
Int. Cl.[2] H01H *9/00*
U.S. Cl. 335—205 **17 Claims**



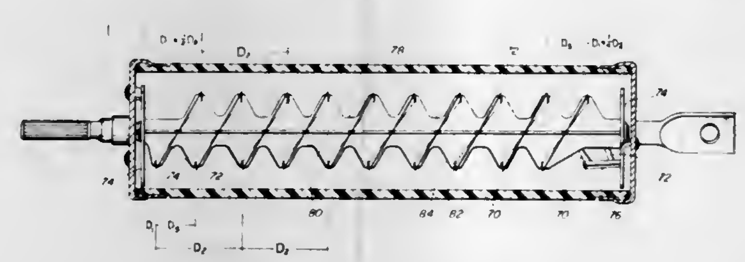
1. A switch activated by a magnetic force comprising: a housing; at least two spaced apart electrical terminals; on said housing; an electrically conductive coil spring supported at one end thereof within said housing; an elongated, magnetically responsive, conductive member axially supported by said spring in a cantilevered fashion within said housing, said elongated member and said spring being adapted to move from aligned to deflected positions responsive to a magnetic force; first contact means interconnecting the supported end of said spring with one of said terminals, and second contact means interconnected to the other of said terminals encircling said conductive member and contacting said conductive member in one of said aligned and deflected positions.

4,057,774
MINIATURE TIME-DELAY FUSE
Hiroo Arikawa, 1-14-9, Oyamadai, Setagaya, Tokyo; Fumitake Akiyama, 1332 Kamisugeta-cho, Hodogaya, Yokohama, and Masaya Maruo, 1-29-14, Shinkoyasu, Kanagawa, Yokohama, all of Japan
Filed Apr. 16, 1976, Ser. No. 677,749
Claims priority, application Japan, Apr. 16, 1975, 50-045334
Int. Cl.[2] H01H *85/04*
U.S. Cl. 337—164 **8 Claims**



1. A time-delay fuse having improved time delay characteristics comprising an insulated tubular member having two ends, sealing means at said ends, an elongated generally cylindrical core member diagonally disposed in said tubular member in intimate contact with said sealing means, a wire strand spirally wound on said elongated core member and fixed at both ends thereof, said wire strand being defined by a pair of mutually fusible wire elements consisting of a first wire element wound over a second wire core and said elongated core member being selected from a material which has a high thermal conductivity.

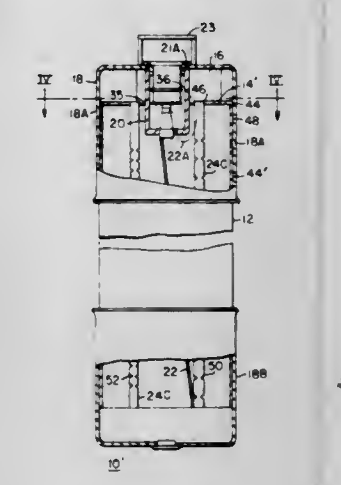
4,057,775
SUPPORT ASSEMBLY FOR FUSIBLE ELEMENT OF A HIGH VOLTAGE FUSE
Bruce A. Biller, Chicago, Ill., assignor to S & C Electric Company, Chicago, Ill.
Filed Nov. 19, 1975, Ser. No. 633,293
Int. Cl.[2] H01H *85/02*
U.S. Cl. 337—186 **21 Claims**



1. A support assembly for supporting in a predetermined three-dimensional helical path at least one fusible element within the body of a fuse comprising:

a first and a second support member, each of said support members identically formed of a sheetlike electrically non-conductive material and having a slot formed along the central axis thereof from one end to at least the middle thereof, and each of said support members having fusible element retaining recesses formed along the edges thereof in a predetermined positional relationship, said first and second support members being joined together along said slots approximately at right angles to each other with respect to said central axis, the predetermined positional relationship being such that the fusible element retaining recesses align to form the predetermined three-dimensional helical path of the fusible element when said first and second support members are joined.

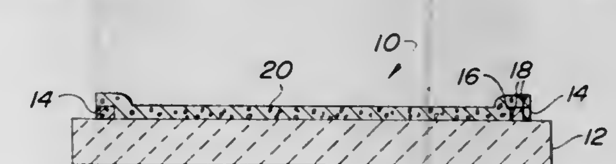
4,057,776
FUSE WITH RADIALLY ORIENTED ELEMENTS
Donald D. Blewitt and Robert D. Binz, West View Borough, both of Pittsburgh, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.
Filed Jan. 28, 1976, Ser. No. 653,042
Int. Cl.[2] H01H *85/08*
U.S. Cl. 337—295 **5 Claims**



1. A fuse, comprising:

a. electrically insulating, hollow, cylindrical fuse barrel means;
b. terminal means disposed adjacent one end of said barrel means;
c. flat, circular, plate means disposed transverse to the center line of said cylindrical barrel means adjacent to the other end of said barrel means, said plate means having a radial slot therein;
d. a fuse ribbon electrically connected to said terminal means and extending within said barrel means longitudinally thereof in a generally radial orientation, said fuse ribbon having an end portion thereof which feeds through said slot and folds over against one side of said plate means perpendicular to said slot, said ribbon being folded over again upon a portion of itself and said plate means in a parallel orientation to said slot, said end portion being also folded against the edge of said plate and along the outside of said barrel; and
e. cylindrical ferrule means disposed securely against said barrel in electrical contact with said end portion.

4,057,777
TERMINATION FOR ELECTRICAL RESISTOR AND METHOD OF MAKING SAME
Kenneth M. Merz, Gladwyne, and Howard E. Shapiro, Philadelphia, both of Pa., assignors to TRW Inc., Cleveland, Ohio
Filed Nov. 19, 1975, Ser. No. 633,398
Int. Cl.[2] H01C *1/012*
U.S. Cl. 338—309 **38 Claims**



1. A conductive termination material for electrical components comprising a mixture of fine metal particles of an alloy of nickel and iron and a glass frit.

4,057,778

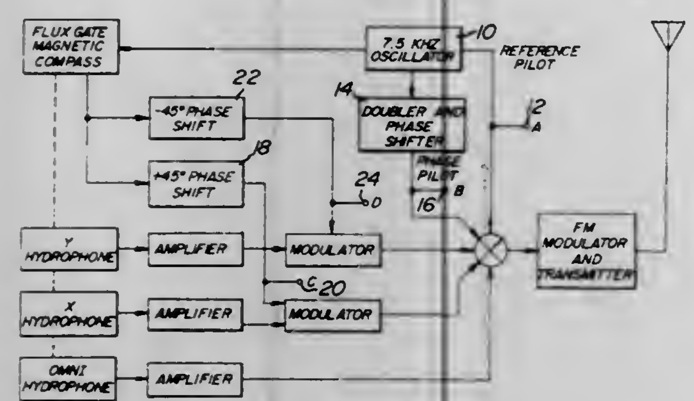
BUILT-IN TEST EQUIPMENT FOR SONOBUOY

Albert M. Bates, Southampton, and Anthony J. Madera, Doylestown, both of Pa., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Nov. 1, 1976, Ser. No. 737,305

Int. Cl.² H04B *11/00*

U.S. Cl. 340—2 **11 Claims**



1. Built-in equipment for self testing a plurality of operating signals within a sonobuoy, comprising, in combination:

sampling means adapted to receive the operating signals for sampling respective ones of the operating signals and for sequentially producing sample signals thereof;

reference means for generating a plurality of reference signals each indicative of the tolerance level of a respective one of the operating signals; and

comparison means connected to receive said sample and reference signals for comparing the corresponding respective ones of said sample and reference signals and for producing tolerance signals each indicative of a respective one of the operating signals when beyond its tolerance level.

4,057,779

ULTRASONIC DETECTION SYSTEM

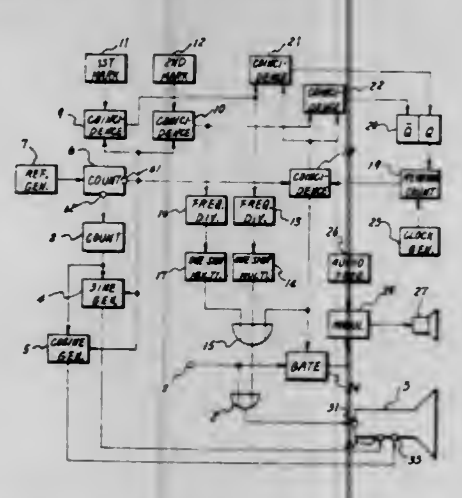
Masajiro Iida; Hideharu Morimatsu, both of Takarazuka; Itsuo Fukuoka, and Yoshinari Yoshida, both of Nishinomiya, all of Japan, assignors to Furuno Electric Company, Limited, Japan

Filed Feb. 2, 1976, Ser. No. 654,476

Claims priority, application Japan, Feb. 18, 1975, 50-20595

Int. Cl.² G01S *7/62*

U.S. Cl. 340—3 C **7 Claims**



1. An ultrasonic detection system, comprising means for emitting a train of ultrasonic wave pulses in all peripheral directions, means for receiving said ultrasonic wave pulses reflected back from the respective directions by means of rotating directivity and producing a reception signal and means for indicating said reception signal on a cathode ray tube screen scanner circularly in synchronism with the emitted ultrasonic wave pulses, said system further comprising means for generating a train of low frequency pulses, a reversible counter circuit for counting said low frequency pulses, means for inverting said reversible counter circuit at two different counts of said reversible counter circuit, means for indicating a radial bright line on said screen in response to each count output of said reversible counter circuit, and means for sampling said reception signal in response to each of said count outputs and producing an audible signal in response to said sampled reception signal, whereby a simulated radial bright line is reciprocated between two directions corresponding to said two different counts of said reversible counter circuit and, at the same time, the presence of the reception signal in the direction of said bright line is audibly signalled.

4,057,780

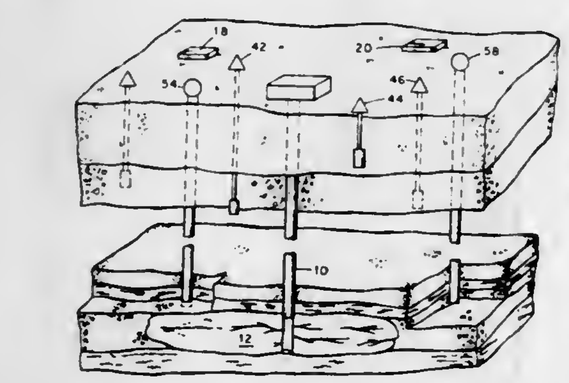
METHOD FOR DESCRIBING FRACTURES IN SUBTERRANEAN EARTH FORMATIONS

Lowell Z. Shuck, Morgantown, W. Va., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Mar. 19, 1976, Ser. No. 668,346

Int. Cl.² G01V *1/02, 1/28*

U.S. Cl. 340—15.5 MC **4 Claims**



1. A method for describing the configuration and directional orientation of a natural or a previously induced fracture extending from a wellbore penetrating a sub-surface earth formation containing the fracture, comprising the steps of positioning a plurality of acoustic sensors at selected locations about the wellbore, introducing a liquid explosive of a preselected detonation rate in the range of about 100 to 3000 meters per second into the fracture, detonating the liquid explosive at the wellbore to effect propagation of the explosion in the fracture at said selected rate from the wellbore towards the extremities of fracture remote to the wellbore with said detonating explosive producing and transmitting acoustic emission through earth formations surrounding the fracture for reception by said acoustic sensors, and analyzing and comparing the characteristics of the acoustic emission received by each of the plurality of acoustic sensors for effecting the description of the fracture.

4,057,781

WELL BORE COMMUNICATION METHOD

Serge A. Scherbatskoy, 3517 Westridge, Fort Worth, Tex. 76116

Filed Mar. 19, 1976, Ser. No. 668,646

Int. Cl.² G01V *1/40*

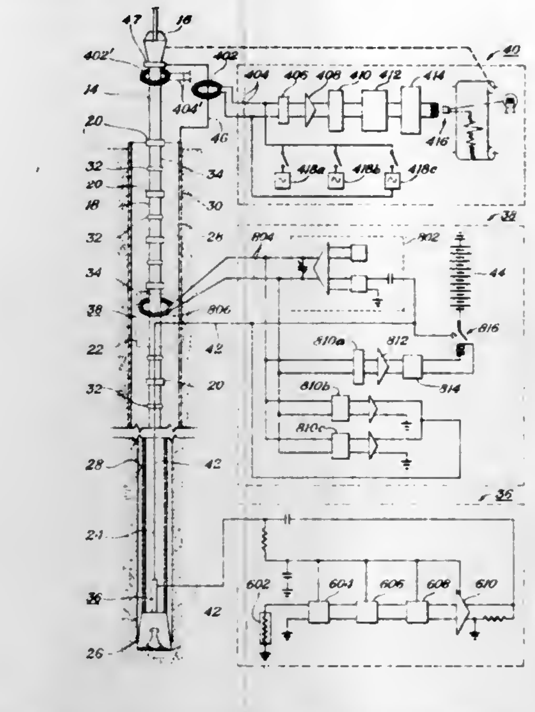
U.S. Cl. 340—18 LD **33 Claims**

21. A system for transmitting data from a sensor at the bottom of a drill string to an indicator at the surface of the earth, comprising:

a. a wireless signal transmitter positioned at an intermediate location between said bottom and said surface;

b. an electrical wire directly interconnecting said sensor and said signal transmitter with said sensor and said transmitter being disposed several hundred feet apart;

c. an electrical power source interconnected with said electrical wire and adapted to energize said sensor and said transmitter; and



d. a wireless communication channel including said transmitter and said indicator.

4,057,782

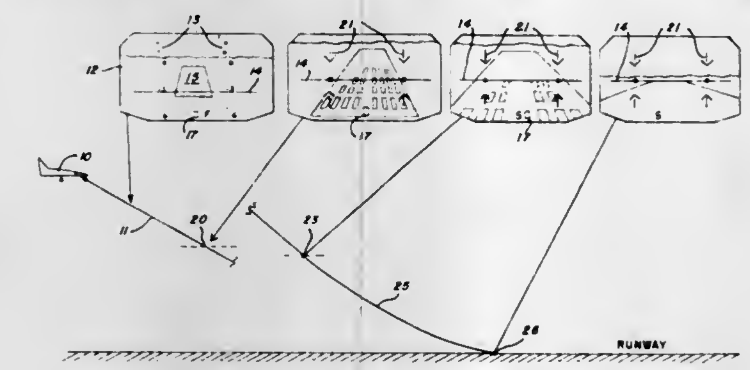
LOW ALTITUDE HEAD UP DISPLAY FOR AIRCRAFT

Hans Rudolf Muller, Kirkland, Wash., assignor to Sundstrand Data Control, Inc., Redmond, Wash.

Filed Apr. 5, 1976, Ser. No. 673,794

Int. Cl.² G08C *5/00*

U.S. Cl. 340—27 AT **6 Claims**



1. A head up visual approach aircraft instrument, having a screen on which the pilot of an aircraft views a collimated display of flight guidance information against a background of the outside world, the display including first indicia movable vertically on the screen as a target for the pilot, second indicia movable vertically on the screen representing the flight path of the aircraft, for alignment of both indicia with an outside world aiming point by manipulation of the aircraft altitude and speed, wherein said instrument comprises:

means for positioning said first indicia on said screen successively in accordance with an approach path to said outside world aiming point, then along a transition path from said approach path and then in alignment with the horizon to define a path above and generally parallel with the ground; and

means for positioning said second indicia successively in accordance with an approach path command, and then with a transition path command, manipulation of the aircraft by the pilot to align said second indicia with said first indicia causing said aircraft to follow said approach and transition paths and to continue in a path above and generally parallel with the ground, as for ejection of cargo from the aircraft while airborne.

4,057,783

DEVICE FOR TRANSMITTING THE CONDITION OF A SWITCH BETWEEN TWO PARTS IN RELATIVE ROTARY MOVEMENT

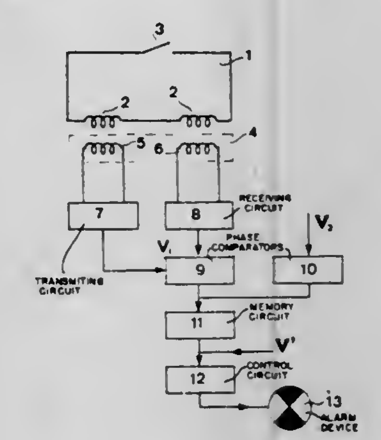
Jean-Claude Blanchier, Orsay, France, assignor to Jaeger, Levallois Perret, France

Division of Ser. No. 519,271, Oct. 30, 1974, Pat. No. 3,990,041. This application Aug. 13, 1976, Ser. No. 714,283

Claims priority, application France, Nov. 7, 1973, 73.39588; June 28, 1974, 74.22741

Int. Cl.² B60C *23/02*

U.S. Cl. 340—58 **10 Claims**



1. A switch-condition transmitting device comprising:

a. a first assembly consisting of a switch and at least two coils which are serially connected when said switch is closed;

b. a second assembly comprising at least a transmission coil and detection coil, said coils of the second assembly being magnetically coupled to each other and being positioned so that in one relative position of said assemblies the transmission coil is magnetically coupled to one coil of the first assembly while the detection coil is magnetically coupled to the other coil of the first assembly;

c. exciting means for causing the transmission coil of the second assembly to generate an alternating magnetic field; and

d. detecting means coupled to the detection coil of the second assembly for producing different outputs respectively when said switch is closed and when said switch is open, said detecting means comprising a phase comparator having a first input connected to said exciting means and a second input connected to said detection coil, said phase comparator providing at an output a first output signal when said switch is open and said detection coil is excited only from the field of said transmission coil, and a second output signal when said switch is closed and said detection coil is excited from said other coil of the first assembly.

4,057,784

BI-DIRECTIONAL SCANNER ASSEMBLY

Benny R. Tafoya, Furlong, Pa., assignor to Sperry Rand Corporation, New York, N.Y.

Filed Sept. 27, 1976, Ser. No. 727,196

Int. Cl.² G06K *7/10*

U.S. Cl. 340—146.3 F **9 Claims**

1. The method of optically scanning a coded symbol comprising tne steps of;

a. generating two beams of light;

b. causing the different beams to be reflected off respective counter-rotating surfaces;

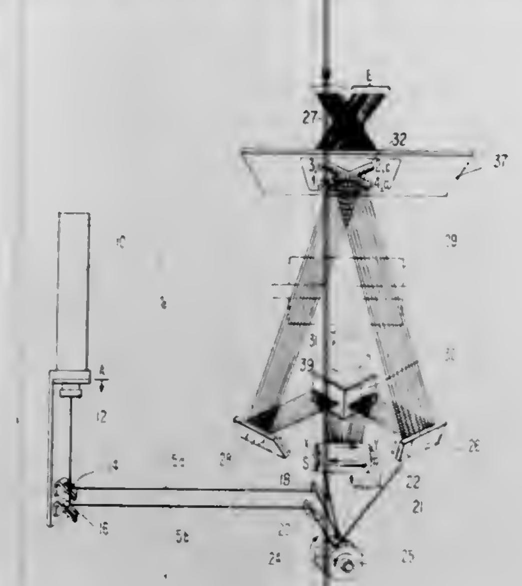
c. directing the beam reflected from a clockwise rotating surface to a vibrating reflective surface;

d. directing said vibrated beam against a V-shaped reflective surface;

e. directing further the beam reflected from said V-shaped reflective surface to first and second reflective surfaces to trace an X-shaped scan against said coded symbol;

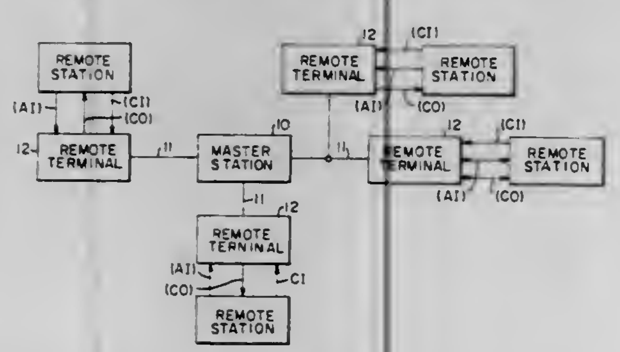
f. directing upon the completion of said X scan the beam reflected from the counter-clockwise rotating surface

successively to said vibrating, V-shaped and first and second reflective surfaces to form an X scan that impinges



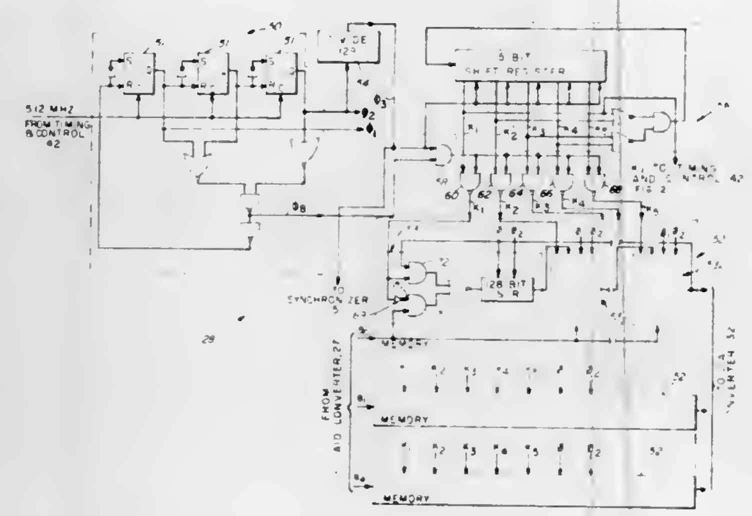
upon said coded symbol which is off-set from and oppositely traced from said first-mentioned X scan.

4,057,785
SEQUENCE OF EVENTS RECORDER AND SYSTEM FOR TRANSMITTING SEQUENCE DATA FROM A REMOTE STATION TO A MASTER STATION
William E. Furniss, Murrysville, Pa.; George I. Vancsa, Wexford, and Joseph R. Onufer, Edison, both of N.J., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.
Filed Mar. 14, 1975, Ser. No. 558,513
Int. Cl.^{2} H04G 9/00
U.S. Cl. 340—163 **22 Claims**



1. System apparatus for detecting and recording a time sequence of status changes of a plurality of two-state devices at each of a plurality of locations, said apparatus comprising:
- a remote terminal unit for each of the locations,
- means for processing and recording data at a master station in response to data signals received from said remote terminals,
- means for transmitting data signals between said remote terminals and said master station under predetermined control conditions,
- each of said terminals including first means for periodically detecting the state of each device associated therewith,
- second means for comparing the currently detected state of each associated device with the previously detected state of the associated device to detect a difference between such state,
- third means for storing the identity and the currently detected state of an associated device when such state differs from the previously detected state, and for storing a representation of the elapsed time at which the difference is detected relative to a reference time point, and
- said master station means including means for recording absolute time to enable correlation of transmitted elapsed time data from said remote terminals.

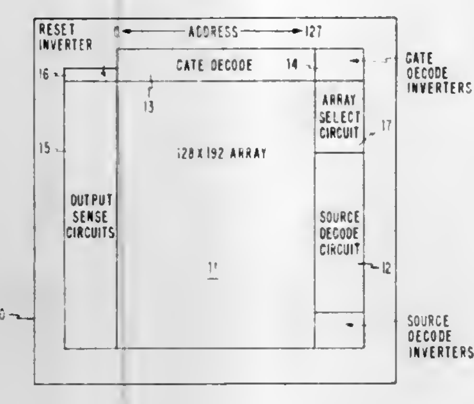
4,057,786
RECIRCULATING DELAY LINE TIME COMPRESSOR HAVING PLURAL INPUT TAPS
John D. Collins, Burlington, Mass., assignor to Raytheon Company, Lexington, Mass.
Continuation of Ser. No. 513,352, Oct. 9, 1974, abandoned, which is a division of Ser. No. 346,389, March 30, 1973, Pat. No. 3,879,661, which is a continuation of Ser. No. 229,210, Feb. 1, 1972, abandoned. This application May 10, 1976, Ser. No. 684,517
Int. Cl.^{2} G11C 21/00
U.S. Cl. 365—76 **1 Claim**



1. Apparatus for storing an input signal of time duration T_1 and for retrieving such stored input signal in a different, shorter time duration T_2, comprising:
- a. means for serially obtaining a predetermined number, N, of samples of the input signal at a rate R_1;
- b. a recirculating delay line having a plurality of serially coupled storage stages;
- c. means for shifting a sample stored in one of such stages to the next succeeding stage at a rate R_2, where R_2 is greater than R_1;
- d. means, operative as such shifting means shifts samples from stage to succeeding stage at the rate R_2, for storing a first one of such obtained samples in the n th one of such stages and for storing the next succeeding one of such obtained samples in the $(n-1) + R_2/R_1$ th succeeding storage stage as the first one of such obtained samples shifts from such n th one of such storage stages to the $n+R_2/R_1$th stage; and
- e. means, coupled to one of such stages, for retrieving the N samples as such samples are shifted thereto at the rate R_2, such N samples being retrieved in the time duration T_2.

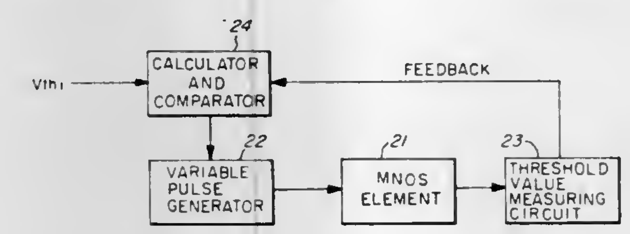
4,057,787
READ ONLY MEMORY
Dale A. Heuer, Stewartville; John F. Roemer, and Michael J. Sheehan, both of Rochester, all of Minn., assignors to International Business Machines Corporation, Armonk, N.Y.
Continuation of Ser. No. 539,904, Jan. 9, 1975, which is a continuation of Ser. No. 391,425, Aug. 23, 1973, abandoned. This application Feb. 13, 1976, Ser. No. 657,796
Int. Cl.^{2} G11C 11/40
U.S. Cl. 365—104 **13 Claims**

1. A solid state read only memory unit comprising a plurality of bit locations arranged in rows and columns with each bit location having first and second output electrodes and a gate position, said bit location being capable of transistor action between said first and second electrodes when a gate is installed at said gate position, said bit location upon being addressed by charging the first output electrode and said gate position indicating a first logic level at said second output electrode when a gate is installed at said gate position and a second logic level when a gate is not installed at said gate position;
- first address means including a series of source lines each connected to the first output electrodes of a row of said bit locations, a plurality of first address circuits and first decoding means for selecting at least one source line in accordance with the input received from said first address circuits;
- second address means including a series of gate connecting lines each connected to gates installed in a column of bit locations, a plurality of second address circuits and a second decoding means interconnected with said second



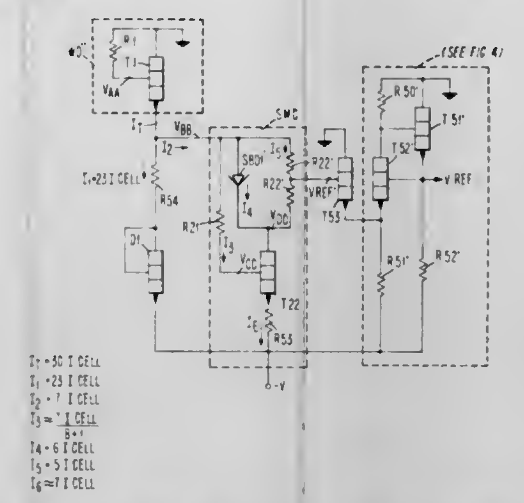
address circuits and said gate connecting lines for selecting one of said gate connecting lines in accordance with the input received from said second address circuits;
- sense means including a plurality of sense lines each connected to a row of bit location second output electrodes; and
- switch means selectively operable to connect all sense lines to a common potential to thereby remove a charge resident on such sense lines.

4,057,788
SEMICONDUCTOR MEMORY STRUCTURES
Jay P. Sage, Newton Center, Mass., assignor to Raytheon Company, Lexington, Mass.
Filed Oct. 6, 1975, Ser. No. 619,890
Claims priority, application Japan, Oct. 21, 1974, 49-120265
Int. Cl.^{2} G11C 13/00
U.S. Cl. 365—174 **6 Claims**



1. In combination:
- a semiconductor memory device comprising a semiconductor substrate, an insulating layer provided on said semiconductor substrate, an electric charge capture layer provided on said insulating layer, and an electrode layer provided on said electric charge capture layer; and
- means for setting any of a plurality of predetermined voltages to said electrode layer relative to said semiconductor substrate to inject an electric charge into said electric charge capture layer from said semiconductor substrate, having a unidirectional component corresponding to said threshold voltage to be set and a cyclically varying component at least the amplitude or pulse length of which is gradually diminished during a plurality of cycles of said cyclically varying component.

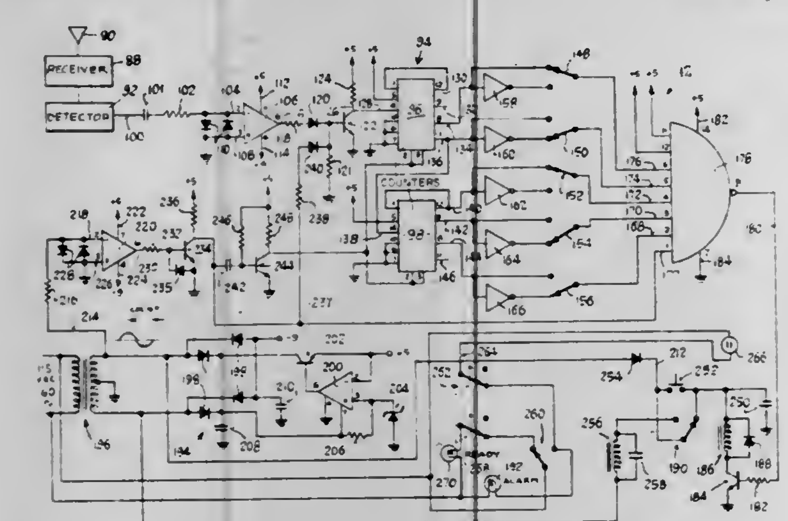
4,057,789
REFERENCE VOLTAGE SOURCE FOR MEMORY CELLS
Richard I. Spadavecchia, Hopewell Junction, and James R. Struk, Wappingers Falls, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.
Filed June 19, 1974, Ser. No. 480,794
Int. Cl.^{2} G11C 7/06, 11/40
U.S. Cl. 365—189 **2 Claims**



1. A reference voltage source for use in a random access monolithic memory having a plurality of data storage cells, each of said cells comprising a first transistor and a second transistor,
- each of said cells being adapted to assume either a first stable state of conductivity or a second stable state of conductivity,
- sense amplifier means coupled to said plurality of data storage cells,
- selection means coupled to said plurality of cells for causing predetermined ones of said plurality of cells to electrically manifest to said sense amplifier means whether said predetermined ones of said plurality of cells are respectively in said first stable state of conductivity or said second stable state of conductivity,
- said sense amplifier means being responsive to said electrical manifestations of said predetermined ones of said plurality of cells and said reference voltage source for providing a first electrical output for each of said predetermined ones of said plurality of cells which is in said first stable state and a second electrical output for each of said predetermined ones of said plurality of cells which is in said second stable state,
- said reference voltage source comprising:
- a third transistor having a collector, base and emitter;
- said collector of said third transistor being directly connected to a first potential;
- a first resistor connecting said base of said third transistor to said first potential;
- a fourth transistor having a collector, base and emitter;
- a second resistor connecting said collector of said fourth transistor to said emitter of said third transistor;
- means directly connecting said base of said fourth transistor to said collector of said fourth transistor;
- means directly connecting said emitter of said fourth transistor to a second potential source;
- a fifth transistor having a collector, base and emitter;
- a third resistor connecting said emitter of said fifth transistor to said second potential source;
- a fourth resistor connecting said emitter of said third transistor to said base of said fifth transistor;
- a Schottky Barrier diode connected between said emitter of said third transistor and said collector of said fifth transistor;
- fifth and sixth resistors serially connected between said emitter of said third transistor and said collector of said fifth transistor;
- a sixth transistor having a collector, base and emitter;
- means directly connecting said collector of said sixth transistor to said first potential;
- means directly connecting said base of said sixth transistor to the juncture of said fifth and sixth resistors;

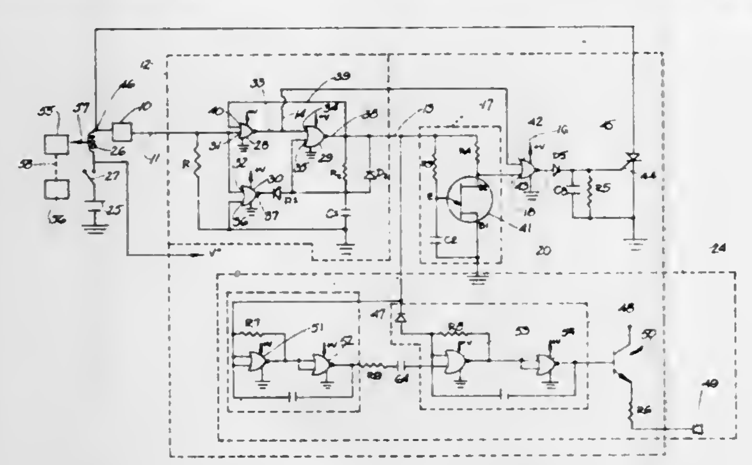
a seventh resistor connecting said emitter of said sixth transistor to said second potential;
a seventh transistor having a collector, base and emitter;
means directly connecting said emitter of said seventh transistor to said emitter of said sixth transistor;
an eighth resistor connecting said collector of said seventh transistor to said first potential;
an eighth transistor having a collector, base and emitter,
said collector of said eighth transistor being connected to said first potential source;
means directly connecting said base of said eighth transistor to said collector of said seventh transistor;
a ninth resistor connecting said emitter of said eighth transistor to said second potential;
a reference voltage source output terminal directly connected to said base of said seventh transistor and said emitter of said eighth transistor;
and means connecting said reference voltage source output terminal to said sense amplifier means, whereby the potential of said reference voltage source manifested at said reference voltage source output terminal tracks the magnitude of the electrical manifestations from said predetermined ones of said plurality of cells.

4,057,790
PERSONAL AID SIGNALLING SYSTEM
George William Fleming, P.O. Box 542, Virginia Beach, Va. 23451, and Alfred N. Paul, 111 Washington Post Drive, Wilton, Conn. 06897
Continuation-in-part of Ser. No. 473,201, May 24, 1974, abandoned. This application Jan. 29, 1976, Ser. No. 653,532
Int. Cl.² G08B *1/08*; H04M *11/02*
U.S. Cl. 340—224 **6 Claims**



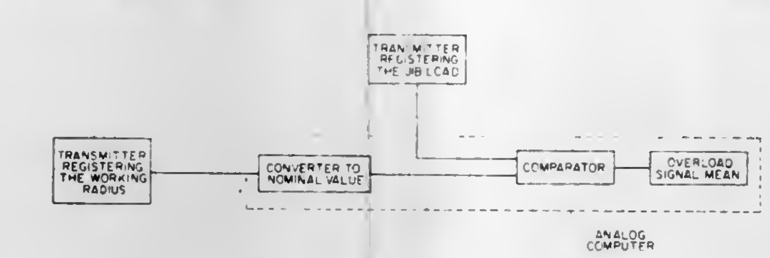
1. A personal-aid call system for activating a remote alarm signal, comprising in combination:
a. a self-contained portable transmitter adapted to be carried by a person, said transmitter generating a composite output signal characterized by a carrier frequency and a modulating frequency,
b. manual control means for enabling actuation of said transmitter, at will, by said person,
c. a receiver tuned to receive said composite signal, said receiver having a detector for demodulating the composite signal to yield a demodulated signal having a frequency characterized by a fixed relationship to that of the modulating frequency,
d. decoder means including a gated, resettable counter device of the frequency divider type,
e. means for generating a control signal which is independent of the composite output signal, to gate said frequency-divider type counter device thereby enabling the counter device over a predetermined counting interval of time,
f. said counter device being connected to the detector output of said receiver for measuring the frequency of the demodulated signal by counting consecutive, uniformly spaced cycles thereof over said predetermined counting interval of time,
g. means connected with said control signal generating means for periodically resetting the counter device to zero,
h. said counter device having a plurality of parallel, digital output terminals,
i. said decoder means including a plurality of manually selectable switches respectively connected to at least some of the digital output terminals of the frequency-divider type counter device,
j. said decoder means further including a plurality of digital inverters connected respectively in line with at least some of said counter device output terminals and connected respectively with said switches,
k. a gate having multiple inputs connected with said switches, respectively, for sensing a condition wherein there is a uniform digital voltage level on all of said gate inputs,
l. indicating means connected with said decoder means for providing an alarm when a particular modulating frequency is detected by the counter device whereby the user, when needing assistance, actuates the transmitter which in turn triggers the alarm for the purpose of alerting others to the existence of such a need, and
m. means associated with said control signal generating means for momentarily disabling the alarm during said predetermined counting interval of time, thereby preventing inadvertent actuation of the alarm while the counter device is tallying a count.

4,057,791
MOTION RESPONSIVE ALARM SYSTEM
Charles F. Bimmerle, 4399 Foley Road, Cincinnati, Ohio 45238; James R. Braig, 3235 McGill Lane, Cincinnati, Ohio 45239, and Ivars J. Vilums, 2322 Kline Ave., Cincinnati, Ohio 45211
Filed Feb. 9, 1976, Ser. No. 656,161
Int. Cl.² G08B *13/14*
U.S. Cl. 340—261 **10 Claims**



1. In an alarm system of the type for responding to motion, the improved combination comprising:
a. sensing means for detecting a motional disturbance and producing a pulsating signal in response thereto;
b. latch means connected for receiving said signal from said sensing means and having an output normally at a first logical level, said output of said latch means transitioning to a second logical level in response to the first pulse of said signal and remaining at said second logical level until said sensing means is characterized by the absence of said signal for a first predetermined time;
c. trigger means responsive to said output of said latch means for developing a trigger signal only after said output of said latch means has continuously been at said second logical level for a second predetermined time;
d. alarm means connected to said trigger means for generating an alarm signal in response to said trigger signal; and
e. a source of potential.
8. A sensor array for a motion responsive alarm comprising a first group of motion responsive sensors, the axes of each of which are parallel to a first plane and angularly disposed from each other and a second group of motion responsive sensors the axes of each of which are parallel to a second plane and angularly disposed from each other, said second plane being perpendicular to said first plane.

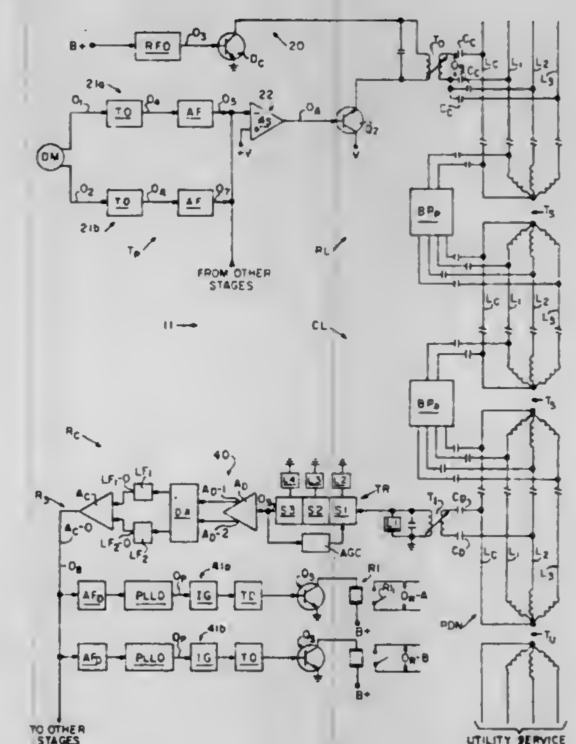
4,057,792
OVERLOAD SAFETY DEVICE FOR TELESCOPIC CRANES
Ludwig Pietzsch, Karlsruhe; Gerd Huhne, Morsch; Knud Overlach, and Peter Fuchs, both of Karlsruhe, all of Germany, assignors to Ludwig Pietzsch, Karlsruhe, Germany
Continuation of Ser. No. 353,715, April 23, 1973, abandoned, which is a continuation-in-part of Ser. No. 79,589, Oct. 9, 1970, abandoned. This application Feb. 11, 1975, Ser. No. 549,026
Claims priority, application Germany, Jan. 21, 1970, 2002484; Mar. 20, 1970, 2013388
Int. Cl.² G08B *21/00, 29/00*
U.S. Cl. 340—267 C **2 Claims**



1. Overload safety device for telescopic cranes comprising transmitter means for registering a working radius of a crane jib having a base jib member and transmitter means for registering a load applied to the jib, analog computer means operatively connected to both said first and second transmitter means for comparing a nominal value predetermined by the working radius with actual values furnished by the transmitter means for registering the load, and signal means responsive to a condition wherein said actual values equal said nominal value for releasing an overload signal, said nominal value being proportional to a permissible limit moment for a respective working radius, said permissible limit moment being composed of a moment of the jib weight and a moment for the permissible load, said transmitter means for registering the load being mounted on said base jib member of said crane jib and being adapted to measure the bending moment of said base jib member, a variable resistance serially connected to said bending moment measuring transmitter means, said resistance having a magnitude proportional to the variable length of said telescopic crane, and further including a fixed resistance connected in parallel with said variable resistance.

4,057,793
CURRENT CARRIER COMMUNICATION SYSTEM
Raymond E. Johnson, 705 SW. 7th St., Fort Lauderdale, Fla. 33315, and Boris Ellison, 6210 SW. 145th St., Miami, Fla. 33158
Filed Oct. 28, 1975, Ser. No. 626,071
Int. Cl.² H04M *11/04*
U.S. Cl. 340—310 R **7 Claims**

1. A current carrier communication system for selectively transmitting binary electrical signals from a first location to a second location over the AC power lines in an AC power distribution network in a building comprising:
at least first and second sources of binary electrical signals at said first location;
a first tone generating means operatively connected to said first source of binary electrical signals for generating a first tone signal at a first frequency in response to the binary electrical signal from said first source of binary electrical signals;
a second tone generating means operatively connected to said second source of binary electrical signals for generating a second tone signal at a second frequency, in response to the binary electrical signal from said second source of binary electrical signals;
linear tone summing means operatively connected to said first and second tone generating means for generating a modulating signal output that is a linear sum of said first and second tone signals;
a source of RF signals operatively connected to said linear tone summing means to produce a modulated RF output signal modulated by said modulating signal output of said linear tone summing means;
transmission coupling means at said first location directly coupling said modulated RF output signal to the AC power lines;
receiver coupling means at said second location directly coupled to the AC power lines to receive said modulated RF output signal therefrom;
TRF multi-stage receiver means operatively connected to said receiver coupling means for receiving said modulated RF output signal therefrom and producing an amplified modulated RF output signal corresponding to said received modulated RF output signal;
differential signal generator means connected to said TRF receiver means for generating a first differential output signal corresponding to said RF output signal from said

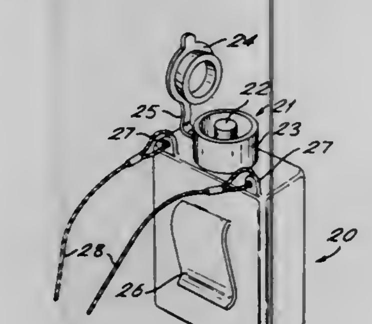


TRF receiver means and a second differential output signal corresponding to said RF output signal from said TRF receiver means but with a 180° phase shift from said first differential output signal;
first demodulation means operatively connected to said first differential output signal from said differential signal generator means for demodulating said first differential output signal to produce a first demodulated output signal;
second demodulation means operatively connected to said second differential output signal from said differential signal generator means for demodulating said second differential output signal to produce a second demodulated output signal;
combining means operatively connected to said first and second demodulated output signals from said first and second demodulation means for combining said first and second demodulated output signals to eliminate even order noise therefrom present in said RF output signal and producing a composite signal output corresponding in frequency to said linearly summed modulating signal output of said linear tone summing means;
first phase locked loop detector means operatively connected to said demodulation means for detecting the presence of a tone in said composite signal output correspond-

ing to said first tone signal from said first tone generating means and generating a first detected binary electrical signal output corresponding to the binary electrical signal from said first source of binary electrical signals; and,

second phase locked loop detector means operatively connected to said demodulation means for detecting the presence of a tone in said composite signal output corresponding to said second tone signal from said second tone generating means and generating a second detected binary electrical signal output corresponding to the binary electrical signal from said second source of binary electrical signals.

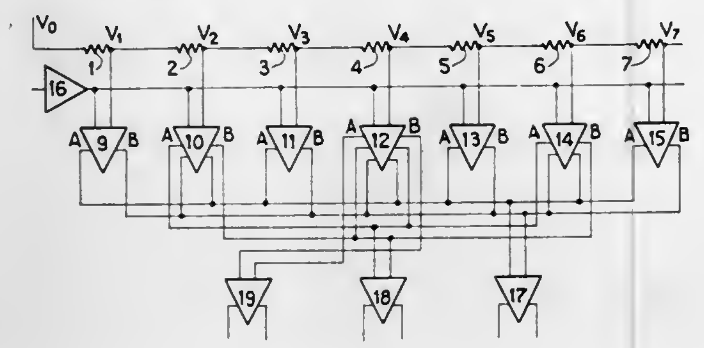
4,057,794
CALLING AIDS
Karl Grossfield, London, England, assignor to National Research Development Corporation, London, England
Filed Apr. 2, 1975, Ser. No. 564,652
Claims priority, application United Kingdom, Apr. 4, 1974, 14968/74
Int. Cl.² H04M *11/02*
U.S. Cl. 340—311 **6 Claims**



1. An emergency-call transmission system, comprising:
a. a plurality of similar indirectly-coupled transmission subsystems which each include a portable transmitter to be carried by an individual person at risk, and a stationary sited receiver,
each said transmitter having a housing and an actuator mechanism which includes a switch part and a cover part integrally associated with said housing, said cover part being movable between a first position in which it covers the switch part and renders the same non-actuable and another position in which it exposes the switch part for actuation,
each said transmitter including a transmission signal generator of multi-element code sequence form,
each said receiver including a detector for said code sequence of the respective sub-system transmitter, and
each said receiver being separately located to define an individual zone of effectiveness for said respective transmitter; and
b. a stationary sited monitor unit including a plurality of first call indicators respectively directly connected to said receivers and operable therewith in response to said respective transmitters.

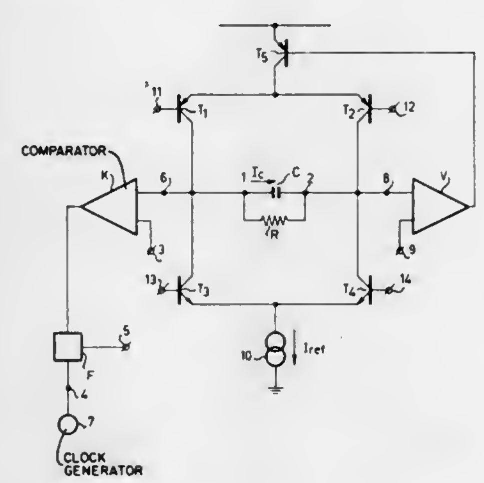
4,057,795
ANALOG-TO-DIGITAL ENCODER
Claude Timsit, Grigny, France, assignor to Association pour le Developpement de l'Enseignement et de la Recherche en Systematique Appliquee (A.D.E.R.S.A.), Velizy-Villacoublay, France
Filed Oct. 20, 1975, Ser. No. 624,124
Claims priority, application France, Apr. 22, 1974, 74.13923
Int. Cl.² H03K *13/175*
U.S. Cl. 340—347 AD **11 Claims**

1. A high-speed analogue-to-digital encoder for converting an input analogue signal into a combination of N bits, the encoder comprising:
a first group of comparators each having a test input and a reference input;
a source of reference voltages feeding a resistive network having a plurality of series connected resistors, and connected in parallel to said reference inputs;
an input circuit for feeding an analogue voltage to be encoded in parallel to said test inputs;
at least a pair of current outputs from each said comparators of said first group for delivering a logic current signal resulting from the comparison achieved in the comparator and a logic current complementary signal for generating lower order bits;



additional pairs of current outputs from some comparators of said first group of comparators, for generating higher order bits;
a second group of comparators, each having a first and a second current inputs, and at least a current output;
said inputs of said comparators of said second group being connected to said outputs of said comparators of said first group in such a manner that each comparator of said second group delivers a bit of a predetermined order of the voltage to be encoded.

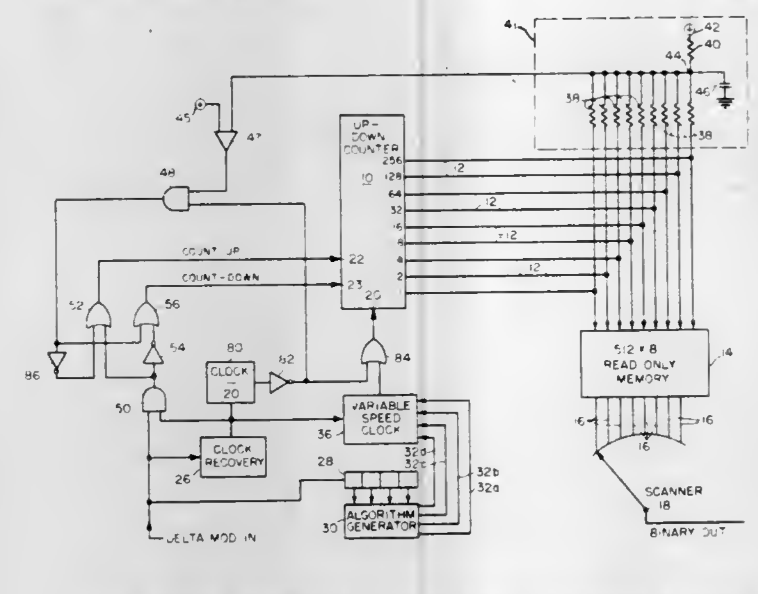
4,057,796
ANALOG-DIGITAL CONVERTER
Abraham Hoogendoorn; Robert Emile Johan van de Grift, and Theodorus Jozef van Kessel, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.
Continuation of Ser. No. 582,310, May 30, 1975, abandoned. This application Nov. 4, 1975, Ser. No. 628,595
Int. Cl.² H03K *13/02*
U.S. Cl. 340—347 AD **14 Claims**



1. An analog-to-digital converter for converting an input analog signal comprising
a comparator having first and second inputs and an output;
a differential amplifier having first and second inputs and an output;
a capacitor having a first electrode connected to said first input of said comparator, and a second electrode to said first input of said differential amplifier;
a flip-flop, having an input connected to the output of said comparator, and an output representing the digitized form of said input analog signal;

means connected to the output of said differential amplifier for controlling the current through said capacitor;
a clock generator, for applying a clock signal to said flip-flop;
a first transistor switch controlled by said flip-flop and connected to said first electrode of said capacitor; and
a second transistor switch connected to the second electrode of said capacitor and driven in phase opposition to said fist transistor switch by the output signal of said flip-flop.

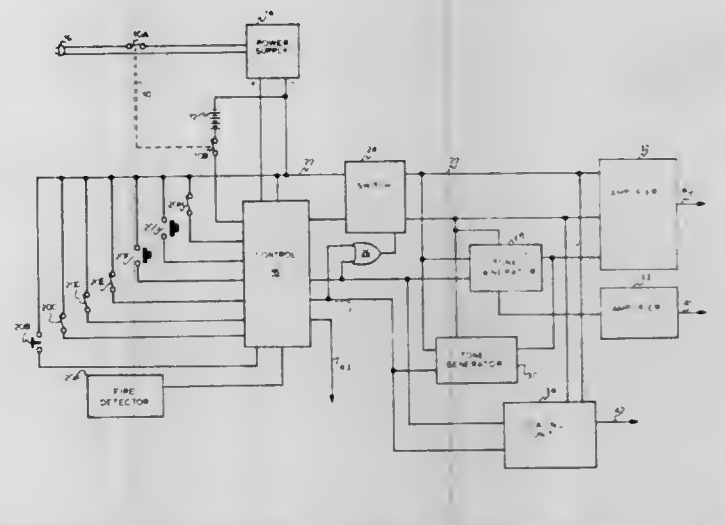
4,057,797
ALL DIGITAL DELTA TO PCM CONVERTER
Adam A. Jorgensen, Rochester, N.Y., assignor to Stromberg-Carlson Corporation, Rochester, N.Y.
Filed Dec. 3, 1975, Ser. No. 637,226
Int. Cl.² H03K *13/22*
U.S. Cl. 340—347 DD **6 Claims**



1. A digital signalling circuit for converting a delta modulated signal to a binary coded signal without producing an intermediate analog signal comprising:
a. an up-down counter having a count capacity sufficient to define uniquely a predetermined number of different quantization levels,
b. means responsive to an applied delta modulated signal for producing a clock signal having a rate equal to the maximum permitted repetition rate of pulses in the applied signal,
c. means for indexing said up-down counter responsively to both an applied delta modulated signal and the clock signal produced by said means for producing a clock signal,
d. drift correction means for biasing said counter toward its mid-value output at a rate much slower than the rate of the means for producing a clock signal, said drift correction means including means for comparing a signal proportional to the output of the counter averaged over a period very much longer than the period of the clock signal with a steady signal indicative of the mid-value output of the counter, and means for periodically indexing the counter toward its mid-value output in response to the output of said means for comparing at intervals much longer than the period of the clock signal, and
e. means for producing time divided binary coded signals in response to the successive output counts of said counter.

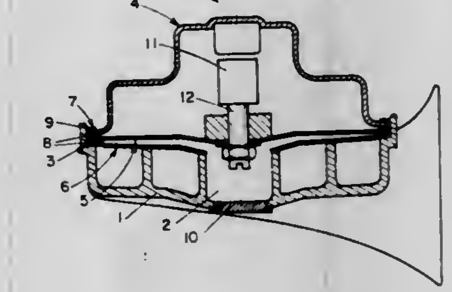
4,057,798
SECURITY SYSTEM
George Andrew Ellson, 6715 SW. Cherry Hill, Beaverton, Oreg. 97005
Filed Mar. 3, 1976, Ser. No. 663,464
Int. Cl.² G08B *29/00*
U.S. Cl. 340—420 **14 Claims**

1. A system for the automatic detection of the presence of intrusion or fire within a security area, comprising:
means for sensing a fire alarm condition and including means for generating a first distinguishable signal in response to said fire alarm condition;
means for sensing an intrusion alarm condition and including means for generating a second distinguishable signal in response to said intrusion alarm condition, said means for generating including:
verification means operatively coupled to said means for sensing an intrusion alarm condition for verifying the intrusion;
first alarm means responsive to the verification of the intrusion for providing a pre-alarm signal;



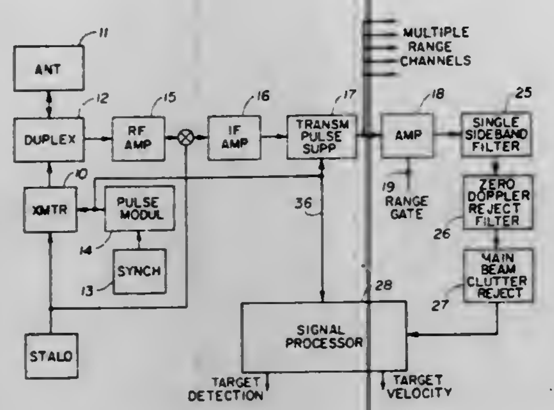
second alarm means operably associated with said first alarm means for providing said second distinguishable signal, said second alarm means including means for selectively delaying the generation of said second distinguishable signal a selected period of time after said pre-alarm signal; and
means responsive to said first and said second distinguishable signals for automatically signaling the presense of fire or intrusion.

4,057,799
ELECTRO-ACOUSTIC SIGNALLING HORNS
Bertrand Antoine Warnod, Neuilly, France, assignor to Klaxon S.A., Courbevoie, France
Filed Dec. 2, 1976, Ser. No. 746,754
Claims priority, application France, Dec. 19, 1975, 75.38952
Int. Cl.² G08B *3/10*
U.S. Cl. 340—388 **7 Claims**



1. An electro-acoustic signalling horn comprising a case containing an electromagnetic excitation system and having an open front face, a diaphragm subjected to the action of said system and extending across said front face, a closure plate disposed at the front of said casing and having an edge portion folded over a corresponding peripheral edge portion of said case and said diaphragm to unite said case and diaphragm into an assembly, a sound box comprising a unitary element having a base wall and scroll-like wall means upstanding therefrom, a continuous edge of said wall means remote from said base wall secured to said closure plate by an adhesive, said base wall, wall means and closure plate together defining a labyrinthine passage, said sound box having a peripheral edge configuration cooperating with said edge portion of said plate.

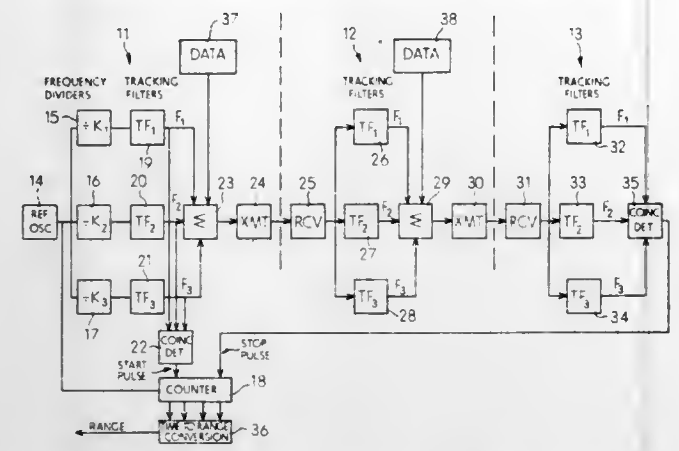
4,057,800
MULTI-PRF SIGNAL PROCESSOR SYSTEM
Frederick M. Ganz, Head-of-the-River, Smithtown, N.Y., assignor to Grumman Aerospace Corporation, Bethpage, N.Y.
Filed June 1, 1976, Ser. No. 691,884
Int. Cl.[2] G01S *9/44*
U.S. Cl. 343—8 11 Claims



1. In a doppler pulse echo system for determining the velocity of a target of the type including a transmitter for transmitting a series of energy pulses toward said target at a predetermined pulse repetition frequency (PRF), means for modifying said pulse repetition frequency at predetermined intervals, a signal processing device for processing the echo signal returned by said target to determine the doppler frequency representative of velocity of said target, the doppler frequency spectrum comprising a plurality of velocity bands of predetermined frequency width, said processing device comprising:
- a doppler filter bank including a plurality of filter circuits each filter circuit responsive to a predetermined band of frequencies at each PRF,
- a plurality of signal threshold devices, each connected to a different one of said filter circuits,
- means for applying a signal derived from said echo return to said filter bank,
- memory means for storing data sets comprising the identities of the specific threshold device producing an output signal and the PRF of the transmitted signal at which said threshold output is produced,
- means for converting the first data set at one PRF to one of said velocity bands,
- means for converting another data set at a different PRF to one of said velocity bands,
- means for determining from said velocity bands a single unambiguous velocity band which satisfies each of said data sets,
- means for determining the target velocity according to the doppler frequency represented by said unambiguous velocity band.

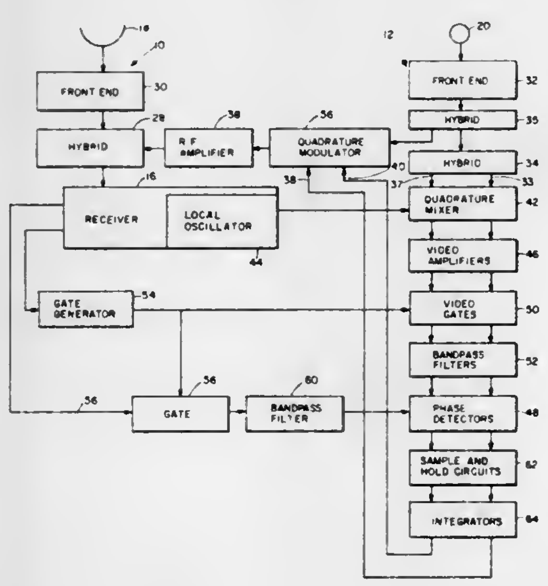
4,057,801
CONTINUOUS-WAVE RANGING SYSTEM
James Eugene Holladay, Jr., Salt Lake City, and Billie Mike Spencer, Bountiful, both of Utah, assignors to Sperry Rand Corporation, New York, N.Y.
Filed Apr. 1, 1976, Ser. No. 672,808
Int. Cl.[2] G01S *9/37*
U.S. Cl. 343—12 R 10 Claims

1. A continuous wave-ranging system, comprising in combination;
- a first station including first means for providing three sinusoidal signals which coincide in phase repetitively at equal intervals,
- said first station including second means for transmitting and third means for receiving said signals,
- a second station disposed at an unknown distance from said first station,
- said second station including fourth means for receiving and transmitting said signal back to said first station,
- said first station including fifth means responsive to said second means and said third means for detecting phase coincidences of said signals and for measuring the time



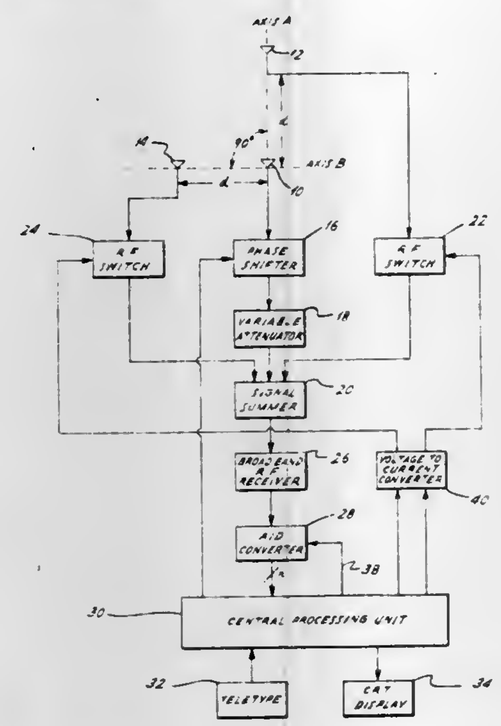
between said phase coincidences of said signals during transmission to and reception from said second station.

4,057,802
SIDELOBE CANCELLATION SYSTEM
Kenneth Dollinger, Nashua, N.H., assignor to Sanders Associates, Inc., Nashua, N.H.
Continuation of Ser. No. 612,433, Sept. 11, 1975. This application Jan. 5, 1976, Ser. No. 757,109
Int. Cl.[2] H04B *7/00*
U.S. Cl. 343—100 LE 3 Claims



1. Apparatus for cancelling sidelobe interference energy, comprising:
- a primary antenna for receiving a signal which may include a desired signal and an interfering signal;
- an auxiliary antenna for receiving a signal including primarily said interfering signal;
- means coupled to said primary antenna for substantially cancelling said interfering signal;
- a correlator coupled to said primary and auxiliary antennas for generating a signal indicative of the difference between the signals applied thereto:
- first bandpass filtering means coupling said primary antenna to said correlator;
- second bandpass filtering means coupling said auxiliary antenna to said correlator;
- said first and second bandpass filtering means having a frequency response such as to exclude at least the main lobe of the radar pulse spectrum of the desired signal; and
- means coupling the outut of said correlator to said cancellation means.

4,057,803
ADAPTIVE DIRECTION OF ARRIVAL ANTENNAE SYSTEM
Ernest W. Coleman, Orlando, Fla., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.
Filed Apr. 8, 1976, Ser. No. 674,716
Int. Cl.[2] G01S *3/48;* H01Q *3/26*
U.S. Cl. 343—113 R 10 Claims



1. An antennae system for adaptively determining the direction of arrival angle α of a signal source, comprising, in combination:
- first, second and third antennae fixed in a right triangle configuration for receiving the signal source and for producing respective output signals indicative of said source:
- phase shifting means having a first input connected to receive the output signal from the respective one of said antennae fixed at the right angle apex of said configuration and for producing a phase shifted output signal upon receipt of a control signal at a second input;
- means connected to receive the phase shifted output signal, output signals from the respective others of said antennae and control signals for alternatingly summing said phase shifted output signal with selected ones of the other antenna output signals according to the receipt of said control signals and for producing summed output signals indicative thereof;
- detecting means connected to receive the summed output signals for detecting the levels thereof and for producing an output indicative of said levels; and
- processing means connected to provide said control signals to said phase shifting means second input and to said summing means and connected to receive the detecting means output for calculating the antenna pattern null angles θ of orthogonal pairs of said antennae according to the equation

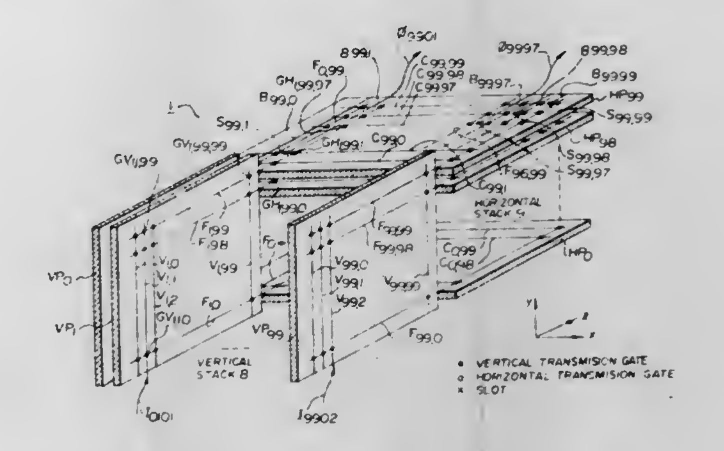
$$\theta = \cos^{-1}\frac{180 - \psi}{90}$$

wherein ψ = the phase angle of the summed output signals having the lowest output level and the antennae in each of said pairs are separated by one quarter wavelength, and for producing the direction of arrival angle of the signal source according to the equation

$$\alpha = \tan^{-1}\frac{\cos\theta_1}{\cos\theta_2}$$

wherein θ_1 = the null angle of one orthogonal antennae pair and θ_2 = the null angle of the other orthogonal antennae pair.

4,057,804
BRANCHED PATH COMMUNICATIONS APPARATUS FOR ROUTING COMMUNICATIONS SIGNALS
William Raymond Holme, Brampton, Canada, assignor to Holme Communications Systems, Inc., Canada
Continuation-in-part of Ser. No. 383,408, July 27, 1973, abandoned. This application Sept. 22, 1975, Ser. No. 615,830
Claims priority, application Canada, Aug. 11, 1975, 233242; June 21, 1973, 174682
Int. Cl.[2] H04L *5/00*
U.S. Cl. 343—200 17 Claims

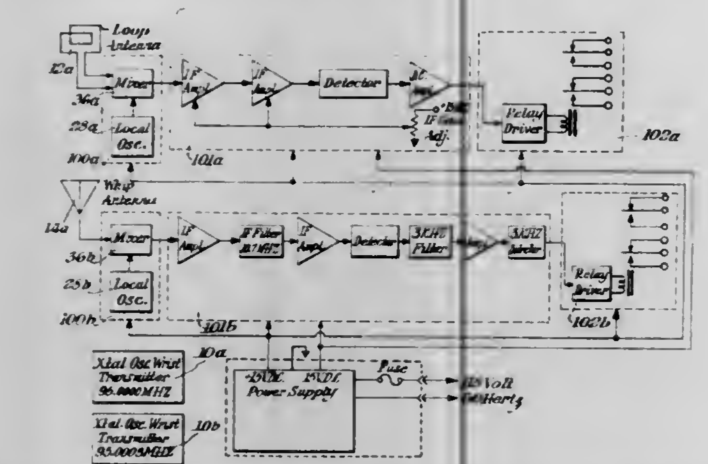


1. A path routing arrangement for use in a frequency division branched path carrier communications system, said path routing arrangement comprising:
- a. an integer number N of first transmission tracks and an equal number of second transmission tracks;
- b. branched path means interconnecting said first transmission tracks and said second transmission tracks in a branched path manner for selectively providing a desired carrier transmission path between a preselected one of said first transmission tracks and a preselected one of said second transmission tracks whereby a desired transmission path through said path routing arrangement is defined for a first communications carrier having a predetermined first carrier frequency and propagating in a first direction along the defined path and for a second communications carrier having a predetermined second carrier frequency and propagating in the opposite direction along the defined path; said second carrier frequency being different than said first carrier frequency by a predetermined amount; said branched path means including an integer number N of third transmission tracks defining branching paths between said first transmission tracks and said second transmission tracks; said desired transmission path being a transmission path defined by said preselected transmission tracks and a unique one of said third transmission tracks which is interconnected with said preselected first and second tracks; each of said transmission tracks and any carrier transmission path so defined being electrically unbalanced and shielded to substantially confine communications carriers propagating therein and allowing communication carriers gaining access thereto to propagate in and energize the transmission track or path, as the case may be.

4,057,805
RADIO-CONTROLLED MACHINE POWER CUT-OFF
Donald Hugh Dowling, Newark, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.
Filed Mar. 30, 1976, Ser. No. 672,030
Int. Cl.[2] H04B *7/00*
U.S. Cl. 343—225 6 Claims

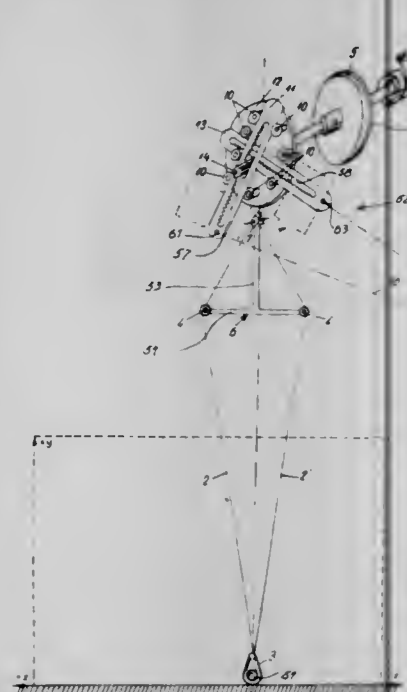
1. A radio-controlled machine power safety cut-off comprising
- a pair of battery-powered radio transmitters adapted for individual wear on the wrists of the machine operator,
- a first radio receiver means having its antenna disposed at a danger zone of said machine responsive to the predeter-

mined magnitude of a broadcast signal emitted by either or both of said radio transmitters signalling intrusion of said radio transmitters closer than a preselected safe distance, said first radio receiver being provided with associated switching means cutting off the operating power of said machine, upon occurrence of said intrusion, and



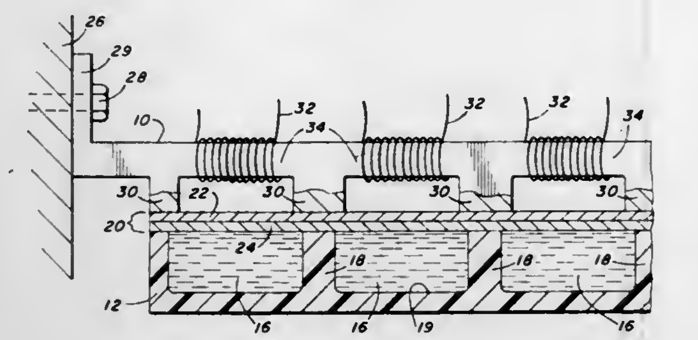
a second radio receiver means having its antenna disposed adjacent said machine responsive to the broadcast signals of said pair of radio transmitters, said second radio receiver being provided with associated switching means cutting off the operating power to said machine whenever either or both of said radio transmitters fails to emit said broadcast signals.

4,057,806
APPARATUS FOR ANALYZING MOVEMENTS OF AN ANIMATE OR INANIMATE OBJECT
Vassil Lazarov Furnadjiev, Sofia, and Boris Krestanov Samardjiev, Plovdiv, both of Bulgaria, assignors to CS na BSFS, Sofia, Bulgaria
Filed July 2, 1976, Ser. No. 702,186
Claims priority, application Bulgaria, July 2, 1975, 30438
Int. Cl.² G01D *5/02, 9/30*
U.S. Cl. 346—33 R **6 Claims**



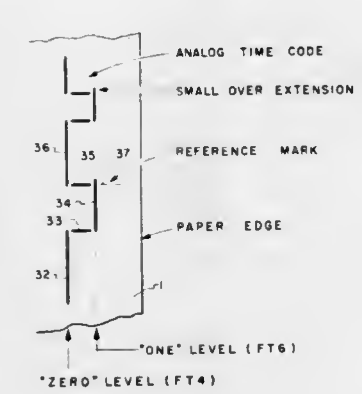
1. In an apparatus for analyzing movements of a prescribed object, a holder for carrying the object, a shaft having front and rear ends and exhibiting a splined outer surface at its front end, torsion-applying means coupled to the shaft and supporting the shaft for bi-directional rotation under load about a first axis, a first disc fixedly supported on the shaft, a second disc fixedly supported on the shaft forwardly of the first disc and disposed around the forward splined end of the shaft, a T-shaped element having a central arm secured to and extending outwardly from the second disc, first and second strands individually extending from a prescribed point of the holder to the periphery of the first disc through the respective ends of the crossarm of the T-shaped element for effecting a rotation of the shaft upon a movement of the holder, first and second racks each having internal teeth, means carried by the second disc for individually supporting the first and second racks in toothed engagement with the splined front end of the shaft for movement in mutually perpendicular directions, and recording means associated with the first and second racks for generating separate indicia instantaneously indicative of the then-occurring movements of the respective racks.

4,057,807
SEPARABLE LIQUID DROPLET INSTRUMENT AND MAGNETIC DRIVERS THEREFOR
Kenneth H. Fischbeck, Dallas, and Richard H. Vernon, Richardson, both of Tex., assignors to Xerox Corporation, Stamford, Conn.
Filed Jan. 15, 1976, Ser. No. 649,187
Int. Cl.² G01D *15/18*
U.S. Cl. 346—140 R **10 Claims**



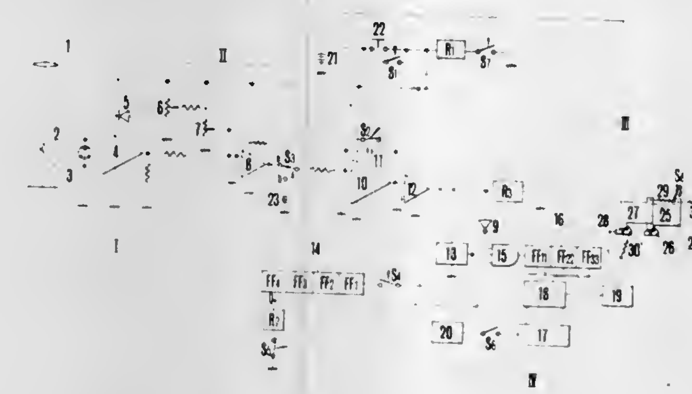
1. In a liquid drop generator comprising: a housing having a plurality of pressure chambers therein, said pressure chambers opening onto an outer surface of said housing and elastic diaphragm means sealing each chamber opening thereby forming an outer wall of a respective chamber; driver unit means having a plurality of members permeable to magnetic fields, said housing releasably secured to the driver unit means" each of said permeable members releasably engaging a portion of said elastic diaphragm means of a respective one of said chambers; means for selectively effecting a magnetic field in each of said permeable members; said elastic diaphragm means being so constructed and arranged to deform to decrease the volume of a respective chamber in response to said effected magnetic field.

4,057,808
RECORDING APPARATUS
Donald E. Shafer, Littleton, Colo., assignor to Honeywell Inc., Minneapolis, Minn.
Filed June 2, 1976, Ser. No. 692,131
Int. Cl.² G01D *9/42;* **B41B** *13/00*
U.S. Cl. 346—107 R **6 Claims**



1. A light box matrix having a plurality of interior compartments and an exterior face in which a plurality of slits are arranged in a recording array, a plurality of flash tubes, means for mounting one of said flash tubes in individual ones of said compartments, an opaque member mounted in another of said compartments, said opaque member being configured to provide light tight isolation of said flash tubes from each other, said opaque member having a cylindrical opening therein to direct light from one of said flash tubes to pass to and through a first one of said slits, said opaque member having a first reflecting surface disposed at a first angle with respect to said cylindrical opening to reflect light from a second one of said flash tubes to and through a second one of said slits, said opaque member having a second reflecting surface disposed at a different angle with respect to said cylindrical opening to reflect light from a third one of said flash tubes to and through a third one of said slits.

4,057,809
EXPOSURE CONTROL CIRCUIT
Soichi Nakamoto, Machida; Tadashi Ito; Fumio Ito, both of Yokohama, and Nobuhiko Shinoda, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan
Filed Mar. 12, 1976, Ser. No. 666,458
Claims priority, application Japan, Mar. 18, 1975, 50-32616
Int. Cl.² G03D *7/08*
U.S. Cl. 354—23 D **15 Claims**



1. An exposure control device comprising:
a. a first circuit for converting an exposure factor into an analog signal which represents the exposure factor,
b. an analog-digital converter for converting said analog signal into a digital signal, said analog-digital converter including:
1. an integrating circuit for integrating an input signal to produce a time-variable output signal having a slope dependent upon the input signal level,
2. an analog signal source having an analog signal of a predetermined reference level and of opposite polarity to that of the analog signal of said first circuit,
3. changeover means for applying selectively either of the analog signals of said first circuit and said analog signal source to said integrating circuit,
4. a control circuit for controlling operation of said changeover means in such a manner that after a predetermined time interval from the time of application of the analog signal from said first circuit to said integrating circuit, said control circuit produces an output which actuates said changeover means to cause the application of the analog signal from said analog source to said integrating circuit,
5. a pulse generator for producing pulses at a predetermined frequency,
6. counter means for counting pulses,
7. gate means responsive to the output of said control means to pass the pulses from said pulse generator to said counter means, and
8. output detecting means coupled to the output terminal of said integrating circuit upon attainment of the output of said integrating circuit to a predetermined level for producing an output; and
c. exposure control means coupled to said counter means for controlling the amount of exposure of a photographic film in accordance with the content of said counter means corresponding to the number of pulses counted by said counter means.

4,057,810
EXPOSURE CONTROL SYSTEM
Hiroshi Iwata, Osaka, Japan, assignor to West Electric Co., Ltd., Japan
Filed Aug. 13, 1975, Ser. No. 604,246
Claims priority, application Japan, Aug. 20, 1974, 49-96438; Oct. 18, 1974, 49-20899
Int. Cl.² G03B *7/14*
U.S. Cl. 354—29 **8 Claims**

1. An exposure control system comprising
a plurality of shutter blades which also function as the diaphragn blades,
a driving device comprising
a stator having a plurality of pairs of angularly separated opposed poles, field coils mounted on each pair of stator poles, and
a rotor having a pair of poles one of which is magnetized to the N pole and the other is magnetized to the S pole, and positioned stationarily between one of said pairs of poles, which is located at the center of poles when said shutter blades are closed, means operatively connecting said rotor to said shutter blades;
a plurality of switches, each connected to a different pair of said opposed field coils, switch selection means responsive to a control signal for selectively actuating different ones of said switches or pairs of said switches connected to adjacent field coils to establish a magnetic field within said stator at an angle having a one-to-one correlation with the value defined by said control signal, said magnetic field interacting with said rotor poles to generate a driving force to rotate said rotor into alignment with said magnetic field,
aperture setting means responsive to the brightness of a subject for providing said control signal for actuating said switch selection means, said control signal being provided to said switch selection means prior to the actuation of said switches or pairs of switches by said selection means, thereby causing said shutter blades to define a predetermined aperture depending upon the brightness of said subject,
exposure time setting means responsive to the brightness of said subject for controlling the operating time of said switch selection means; thereby controlling the opening time of said shutter blades depending on the brightness of said subject, and
electrical power supply means for providing current to said switches, whereby said shutter blades are driven to define a predetermined aperture for a predetermined time depending upon the brightness of a subject, thereby attaining the optimum exposure.

4,057,811

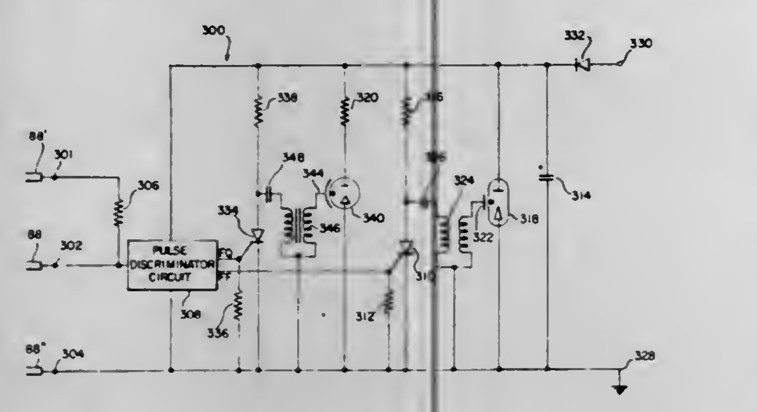
QUENCH STROBE WITH PREDETERMINED QUENCH RATE

George C. Harrison, Chelmsford, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Sept. 2, 1976, Ser. No. 720,005

Int. Cl.^{2} G03B *15/05*

U.S. Cl. 354—33 **8 Claims**



1. A photographic camera apparatus comprising
a housing;
an electronic flash tube;
a capacitor for energizing said flash tube to cause said flash tube to emit light energy;
trigger means responsive for a first select output signal for initiating the discharge of said capacitor through said flash tube thereby energizing said flash tube;
means for mounting an objective lens on said housing;
means associated said housing for receiving a source of electrical energy;
means within said housing for defining a film exposure plane;
a blade assembly mounted and arranged within said housing for displacement from an initial closed arrangement, wherein said assembly precludes scene light from impinging on said exposure plane to a second arrangement wherein said blade assembly defines a maximum aperture through which scene light is permitted to impinge on said exposure plane and then to a final closed arrangement wherein said blade assembly again precludes scene light from impinging on said exposure plane, such a displacement of said blade assembly serving to define an exposure interval during which scene light is incident upon said film exposure plane;
scene light detecting means energizable by the source of electrical energy for providing an output signal in correspondence to the amount of scene light detected subsequent to the commencement of an exposure interval;
means, at least in part energizable by the source of electrical energy, for initiating the displacement of said blade assembly from its said initial closed arrangement towards its said second arrangement thereby commencing said exposure interval and for providing said first select output signal to trigger the discharge of said capacitor through said flash tube subsequent to the intiating of the exposure interval, and then responsive to said output signal of said scene light detectingmeans reaching a predetermined value, for effecting the displacement of said blade assembly into its final closed arrangement in anticipation of the amount of exposure influencing light which is admitted by said blade assembly before reaching said final closed arrangement under generally steady state scene lighted conditions and for providing a second select output signal; and
means responsive to said second select output signal for quenching said energizing flash tube by discharging said capacitor at a predetermined rate corresponding directly to the rate at which the light energy emitted by said flash tube is quenched, said discharging means including a switching element triggerable in correspondence with said second select output signal and a resistive element in series connection with respect to said switching element, said switching element and resistive element exhibiting, when triggered, a collective impedance which operates to discharge said capacitor at a rate providing for a select amount of exposure influencing artificial illumination to be emitted by said flash tube subsequent to the initial appearance of said second select output signal, said select amount of exposure influencing artificail illumination substantially corresponding to said amount of exposure influencing light which is admitted by said blade assembly subsequent to said scene light detecting means reaching said predetermined value under generally steady state scene lighted conditions.

4,057,812

CAMERA SHUTTER HAVING AN ELECTRONIC TIMING DEVICE

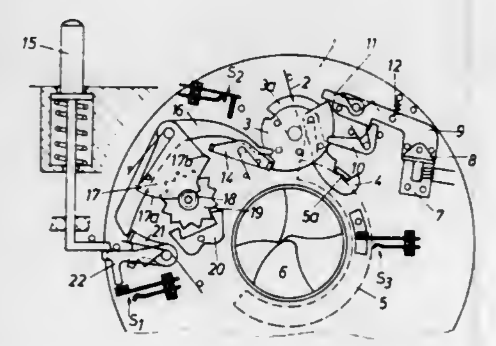
Waldemar T. Rentschler; Franz W. R. Starp, and Karl Helber, all of Calmbach, Black Forest, Germany, assignors to Prontor-Werk Alfred Gauthier GmbH, Wildbad, Black Forest, Germany

Continuation of Ser. No. 716,487, March 27, 1968, abandoned, and Ser. No. 111,629, Feb. 8, 1971, abandoned, and Ser. No. 299.179, Oct. 19, 1972, abandoned, and Ser. No. 492,099, July 26, 1974, abandoned. This application Apr. 14, 1976, Ser. No. 676,763

Claims priority, application Germany, Apr. 1, 1967, 41782

Int. Cl.^{2} G03B *7/08, 9/08, 9/58*

U.S. Cl. 354—51 **8 Claims**



1. Timing arrangement for controlling the operation of a camera shutter blade system comprising
actuatable shutter blade drive means including movable means arranged upon actuation of the drive means to carry out an opening movement and thereafter a closing movement for operating the shutter blade system,
a timing circuit containing a photo-electric resistor and associated capacitor for controlling the duration of the shutter exposure time as determined by the photo-electric resistor,
a charge starting contact actuatable to commence the timing operation of said timing circuit and operatively arranged for immediate actuation by said movable means upon initial actuation of the driving means and before the opening movement is carried out,
an electromagnetically actuated locking device energizable by the timing circuit upon actuation of the charge starting contact and including mechanical locking means arranged with respect to the drive means for mechanical movement from a normally locking position prior to actuation of the drive means to an unlocking position upon de-energization of the locking device and in the locking position said locking means being operatively connected to the drive means to hold the shutter blade system open for the duration of the exposure time as determined by said photo-electric resistor after the opening movement and before the closing movement of the movable means, the mechanical movement of the mechanical locking means from the locking position to the unlocking position taking a determinable amount of time, and
a mechanical brake device arranged for direct braking contact with the movable means after initial actuation of the drive means and immediate actuation of the charge starting contact and in turn commencement of the timing operation of the timing circuit to delay the opening movement of the movable means by an initial offsetting amount of time which selectively pre-compensates for the corresponding determinable amount of time taken by the mechanical locking means of the electromechanically actuated locking device to move from the locking position to the unlocking position thereof upon de-energization by the timing circuit in order for the closing movement of the movable means to be carried out.

4,057,813

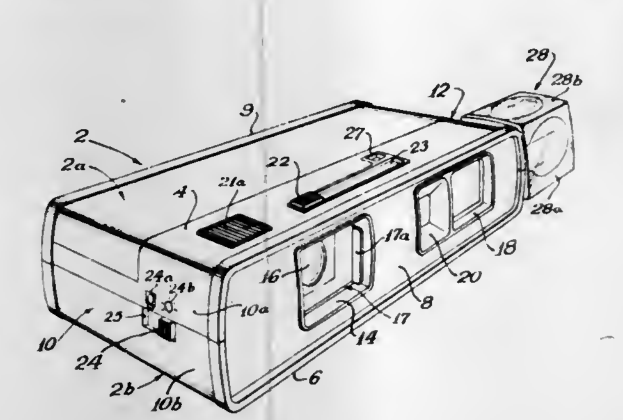
POCKET SIZED CAMERA

Ib Penick, 18 E. Willow Road, Wheeling, Ill. 60090

Division of Ser. No. 346,288, March 30, 1973, abandoned. This application Nov. 12, 1975, Ser. No. 631,062

Int. Cl.^{2} G03B *15/03*

U.S. Cl. 354—144 **6 Claims**



1. In a pocket-sized still camera having a horizontally elongated housing formed by top and bottom walls, vertical front and rear walls extending between the front and rear margins of said top and bottom walls, and end walls extending between the side margins of the top, bottom, front and rear walls, the top and bottom walls of the housing being closely spaced relative to the front to back dimensions thereof and to the spacing between said housing end walls, to provide a relatively thin and narrow camera housing elongated in the direction between the end walls thereof and which can be readily placed in a shirt pocket when oriented so the longitudinal axis thereof is vertically oriented, said front wall having an opening behind which the camera lens means is located; exposed manually operable trigger means for operating shutter mechanism on the camera; a flash unit-receiving member mounted for rotation into a number of different operative stable positions and having an outer flash unit-receiving end exposed to the outside of the housing and adapted to support a multilamp flash unit having a number of flash lamp and reflector sections spaced around a central axis of symmetry thereof coextensive with the axis of rotation of the flash unit-receiving member, and exposed manually operable film winding means for advancing the film in the camera one frame position after the taking of a picture, the improvement wherein said flash unit-receiving member is positioned at one of said end walls of the housing so the axis of rotation of the flash unit-receiving member extends horizontally or transversely from the housing end wall, so the multilamp flash unit supported therein has its central axis of symmetry similarly extending horizontally or transversely of said housing end wall in a direction of the longitudinal dimension of the camera housing and the camera with the flash unit attached can be positioned comfortably in a shirt pocket or the like, there is provided exposed manually operable flash operation on-off control means operable at least when the flash unit is mounted in said flash unit-receiving member for movement between "on" and "off" positions, flash unit operating means in the housing responsive to the movement of the flash on-off control to the "on" position for rendering the flash lamp section in front of the flash unit supported on the flash unit-receiving member operative upon operation of said manually operable trigger means, said flash unit being inoperative when the flash on-off control is in its "off" position even when the flash unit is mounted on said flash unit-receiving member, whereby the multilamp flash unit need not be removed from the flash unit-receiving member if a flash operation is not desired, and flash unit rotation means responsive to the operation of said manually operable film winding means for effecting rotation of the flash unit-receiving member in a given direction to the next stable position thereof only in response to the first film winding operation after a picture is taken when the flash on-off control is in its "on" position and independently of the actual position of the flasher on-off control at the time the film winding operation takes place.

4,057,814

SUB-MINIATURE CAMERA CONSTRUCTION

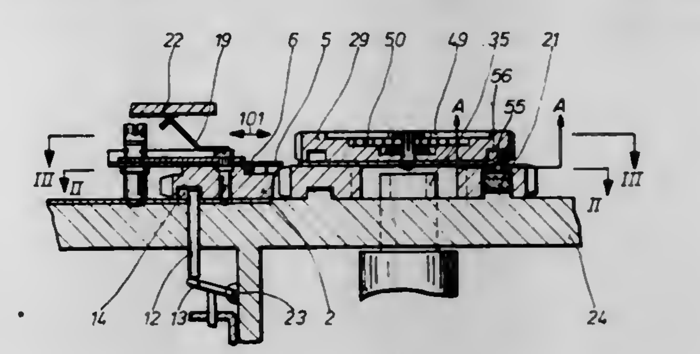
Martin Grünbacher, and Hans Werner Johannsen, both of Braunfels, Germany, assignors to Firma Minox GmbH, Giessen, Germany

Filed Jan. 12, 1976, Ser. No. 648,362

Claims priority, application Germany, Jan. 22, 1975, 2502364

Int. Cl.^{2} G03B *17/42, 19/02, 17/36*

U.S. Cl. 354—204 **15 Claims**



1. In a camera, the combination of a rotatable winding knob to move film in the camera and to cock a shutter of an objective, a slide operatively connected to said winding knob and displaceable between initial and end positions, a spring connected to said slide to urge the slide into the initial position, a release button blocked from actuation by said slide in its inital position and released for actuation when the slide is in its end position, means co-acting between said release button and said slide for releasing said slide for displacement to its initial position under action of said spring upon actuation of said release button, and electric contact means closed by said slide returning to its initial position for actuating a circuit to operate a shutter of a camera.

4,057,815

ANTI-FLARE STRUCTURE FOR PHOTOGRAPHIC OPTICAL SYSTEM

Bruce K. Johnson, Andover, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

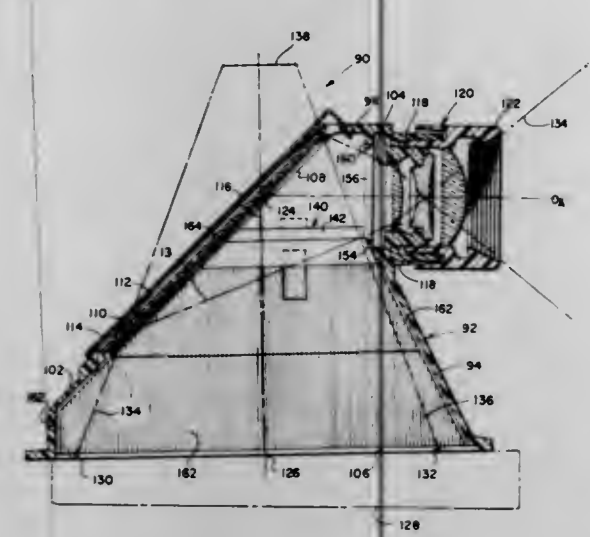
Filed Oct. 9, 1975, Ser. No. 620,924

Int. Cl.^{2} G03B *17/02*

U.S. Cl. 354—288 **23 Claims**

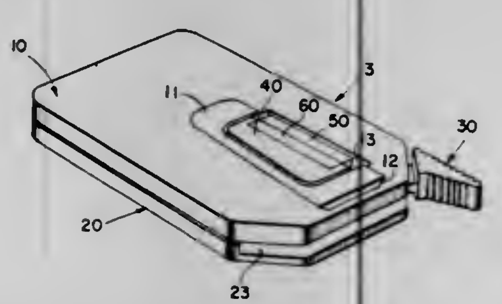
1. Photographic apparatus comprising:
means for defining an image plane at which a film unit having a photosensitive area of given dimensions may be positioned for exposure;
an objective lens assembly, having a given field in object space, for directing image-bearing light rays from a scene being photographed onto the entire photosensitive area of the film unit when the film unit is positioned at said image plane to record an image of the scene thereon, said objective lens assembly and the photosensitive area of the film cooperating to define a field of view of said photographic apparatus which is smaller than said field of said objective lens assembly; and
an opaque enclosure structure having an outlet aperture disposed in optical alignment with the film unit's photosensitive area and an inlet aperture in optical communica-

tion with said objective lens assembly, said objective lens assembly being configured and arranged with repsect to said opaque enclosure structures so that unwanted image-bearing light rays originating within said field of said objective lens assembly but outside said field of view of said photographic apparatus enter said enclosure structure through its said inlet aperture, said enclosure structure comprising internal light-absorbing specularly reflective wall surfaces including portions located and oriented to initially intercept substantially all such unwanted image-bearing light rays and to redirect initial reflections of



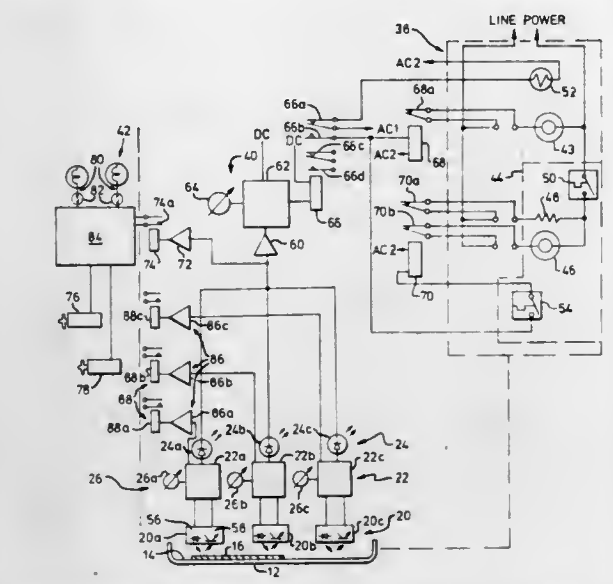
substantially all such unwanted image-bearing light rays in predetermined directions so that they either do not impinge upon the photosensitive area of the film unit or only impinge upon the photosensitive area of the film unit after undergoing a plurality of additional reflections from said internal wall surfaces sufficient to dissipate their energy to a point below which they will not adversely effect the photographic quality of the image recorded thereon, said internal wall surfaces including a plurality of serrated wall surfaces comprising juxtaposed converging wall surfaces for reflecting therebetween certain of such unwanted image-bearing light rays to dissipate their energy.

4,057,816
ACCESSORY ADAPTER
John C. Killian, Jr., Sudbury, and John B. Morse, Boston, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.
Filed Jan. 13, 1976, Ser. No. 648,724
Int. Cl.² F16M *11/04;* G03B *17/00*
U.S. Cl. 354—293 **4 Claims**



1. An adapter for securing a photographic accessory having a tripod screw to a camera having a dovetail slot, comprising a housing, means forming a tripod socket in said housing, a dovetail shoe mounted on said housing and adapted to extend into the dovetail slot in the camera, means forming an aperture in one side of said dovetail shoe, a lock slide, means mounting said lock slide in said aperture for movement between a first position within the confines of said dovetail shoe and a second position beyond the confines of said shoe, a resilient element mounted on said lock slide in position to engage the dovetail slot in said second position of said lock slide, and cam means for moving said lock slide between said first and second positions.

4,057,817
FILM PROCESSOR STANDBY CONTROL SYSTEM
A. Norman Korb, Portland, and Rex L. Breunsbach, Mulino, both of Oreg., assignors to Lok-A-Bin Systems, Inc., Portland, Oreg.
Filed Nov. 7, 1975, Ser. No. 629,997
Int. Cl.² G03D *13/00*
U.S. Cl. 354—298 **15 Claims**



12. In combination, a film processor and a standby unit for controlling the operating mode of said processor such that said processor is normally maintained in a low energy consuming standby mode and is switched to a high energy consuming processing mode only for a predetermined processing period in response to the presence of a film in the infeed tray of said processor,

said processor including water-circulating means, a drive motor and a film-drying chamber including a blower means, a heater and a main thermostat controlling the operation of said heater and blower means,

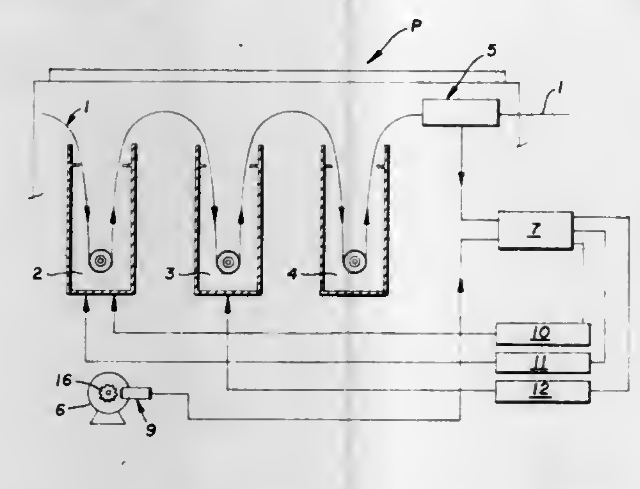
said standby unit including electrically operated processor control means normally operable to maintain said processor in its standby mode wherein said drive motor is deactivated and said blower means and heater are deactivated, a timer means for controlling the operation of said processor control means, film detector means for detecting the presence of a film in said infeed tray and timer-activating means for activating said timer means for a predetermined period in response to a sensing of a film in said tray by said detector means,

said detector means comprising infrared light emitter means positioned above said tray and directed toward said tray for reflecting an infrared light beam from an upper surface of said tray or a film in said tray and means positioned and operable for sensing the reflected beam and differentiating between said beam when reflected from said tray surface and when reflected from said film surface by producing a variable level detection signal representative of said differentiation, and triggering means for producing a control signal in response to the application of said detection signal to said triggering means at a threshold level indicative of the presence of a film in said tray, and means for operating said timer means in response to the application of said control signal, said timer means being operable when activated to operate said processor control means in a manner to switch said processor from its standby mode to its processing mode for said predetermined period during which said drive motor, blower means and heater are activated and controlled by said main thermostat,

said processor including a water flow-restricting valve means in said water-circulating means with said restricting valve means having a flow-restricting position and a full flow position, said processor control means being operable with said timer means deactivated to maintain said flow-restricting valve means in said flow-restricting position, said processor control means being operable with said timer means activated to operate said restricting valve means in its said full flow position,

said film-drying chamber including auxiliary thermostat means having a lower temperature operating range than said main thermostat, said auxiliary thermostat being operable in the standby mode of said processor to operate said processor control means intermittently to activate said heater and said blower means to raise the temperature within said drying chamber when said temperature drops below a predetermined minimum level during said standby mode, said processor control means remaining operable to operate said heater and blower means until said auxiliary thermostat recloses upon the raising of the temperature within said drying chamber within an acceptable standby temperature range.

4,057,818
AUTOMATIC REPLENISHER SYSTEM FOR A PHOTOGRAPHIC PROCESSOR
Alfred J. Gaskell, Hopkins, and Ralph L. Charnley, Minneapolis, both of Minn., assignors to Pako Corporation, Minneapolis, Minn.
Filed June 25, 1975, Ser. No. 590,078
Int. Cl.² G03D *13/00*
U.S. Cl. 354—298 **11 Claims**



1. An automatic replenisher system for photographic film processors of the type having a liquid confining processing tank and a conveyor system defining a film path extending through the tank and therebeyond, said system comprising,

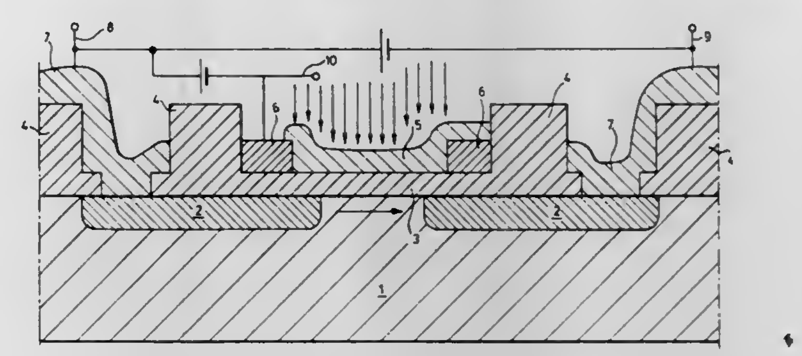
a normally deenergized replenisher pump for supplying replenishing liquid to the tank,

means for automatically periodically energizing the pump at predetermined intervals regardless of the density of the film processed in said tank,

light-sensitive film density scanning means positioned in the film path beyond the tank for measuring the image density of the processed film and for producing an electrical control signal responsive to the density of said processed film,

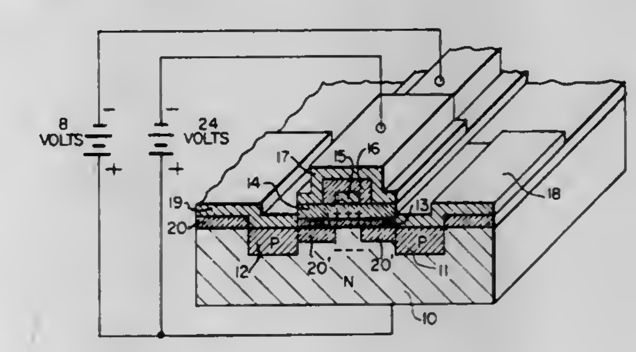
comparator circuit means receiving said signal for comparing the same to a reference signal and de-energizing said replenisher pump as a function of the comparing, whereby the time duration between energizing and de-energizing is a function of measured image density of the processed film.

4,057,819
SEMICONDUCTOR DEVICE
Alan Ernest Owen, 19 Tantallon Place, Edinburgh 9, Scotland, and John Mavor, 20 Ellen's Glen Road, Edinburgh EH17 7QP, Scotland
Filed Aug. 5, 1976, Ser. No. 711,873
Int. Cl.² H01L *29/78*
U.S. Cl. 357—23 **10 Claims**



1. A bistable illumination-sensitive switch device comprising a semiconductor body, a first electrode and a second electrode in or on said body between which a channel current can flow in a region of the body adjacent to a surface thereof, a dielectric layer on at least a part of said surface, a charge injecting photosensitive material on said dielectric layer having the ability to inject charges into said dielectric layer, the charge injecting photosensitive material being adjacent to an auxiliary electrode which, while the device is illuminated and electrically biased in an appropriate way will cause charge injection into the dielectric layer to modify the electrical condition of the dielectric layer and affect the channel current flowing in the semiconductor body after the illumination ceases.

4,057,820
DUAL GATE MNOS TRANSISTOR
Robert C. Gallagher, Ellicott City, Md., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.
Filed June 29, 1976, Ser. No. 701,049
Int. Cl.² H01L *29/78, 27/02, 29/34, 29/04*
U.S. Cl. 357—23 **8 Claims**



1. An MNOS memory transistor, comprising in combination:

a. a semiconductor substrate of a first conductivity type having first and second regions of a second conductivity type therein, said first and second regions extending to a common surface of said substrate to form a drain, a source and a channel therebetween;

b. at least a first insulating structure including a substantially uniform layer disposed on said common surface overlying and substantially coextensive with said channel, said uniform layer being operative at times to trap charges;

c. a first electrically conductive layer disposed on and overlying only a portion of said insulating structure and said channel inwardly of the inner edges of the source and drain to form a first gate;

d. a second electrically conductive layer overlying substantially the remaining portions of said insulating structure

and the portions of said channel outwardly of the first gate to form a second gate; and

e. means for applying electrical signals to said first and second regions of opposite conductivity types, said substrate, and said first and second gates, said means being operative to cause said uniform layer to trap charges in response to predetermined electrical signals applied to the first and second gate and substrate.

4,057,821

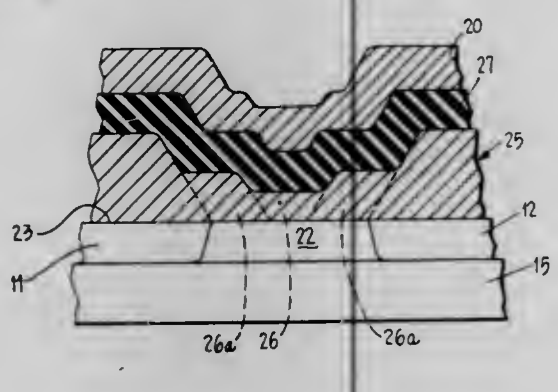
NON-VOLATILE SEMICONDUCTOR MEMORY DEVICE

Pramodbhai D. Patel, San Jose, Calif., assignor to Nitron Corporation/McDonnell-Douglas Corporation, Long Beach, Calif.

Filed Nov. 20, 1975, Ser. No. 633,879

Int. Cl.[2] H01L *29/78, 29/34*

U.S. Cl. 357—23 **7 Claims**



1. An insulative gate field effect transistor comprising a semiconductive substrate of a first conductivity type; a pair of spaced semiconductive diffusion regions of opposite conductivity type to said first conductivity type, said diffusion regions being separated by an interstitial portion of said substrate and sharing a common boundary surface therewith; a field oxide layer adhered to said common boundary surface, said layer having a minimum thickness in the region thereof overlying said interstitial portion and a substantially greater thickness in the remaining regions thereof; a composite dielectric layer having a total thickness in the range from about 450A °±50A to about 850A °±50A and including a first layer adhered to said oxide layer and a second layer adhered to said first layer, said first dielectric layer having a thickness in the range from about 20% to about 50% of said total thickness of said composite dielectric layer, said second dielectric layer having an electrical conductivity less than the electrical conductivity of said first dielectric layer; and

an electrically conductive electrode in direct contact with said second layer in the region overlying said interstitial substrate portion.

4,057,822

CHANNEL TYPE PHOTO-ELECTRIC ENERGY TRANSDUCER

Kenryo Watanabe, Tenri, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Aug. 19, 1975, Ser. No. 605,843

Claims priority, application Japan, Aug. 22, 1974, 49-96712

Int. Cl.[2] H01L *29/34*

U.S. Cl. 357—52 **4 Claims**

1. An energy transducing semiconductor device comprising:

a semiconductor wafer of one conductivity type;

a first channel region of the other conductivity type opposite to that of the semiconductor wafer;

a junction barrier disposed between the wafer and the first channel region;

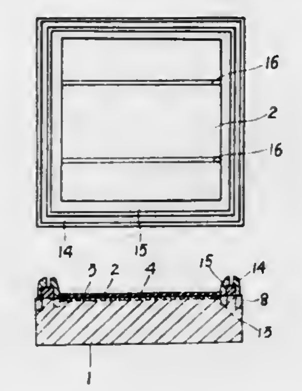
a first oxide disposed over the first channel region to protect the junction barrier against the outside ambient atmosphere;

a heavily doped first region having the same conductivity as that of the wafer, disposed so as to surround the peripheral portion of the wafer;

a heavily doped second region having the same conductivity as that of the first channel region, disposed so as to surround the peripheral portion of the junction barrier, the heavily doped second region having a looped structure inside of the heavily doped first region so as to define a closed loop, said heavily doped second region having a looped structure having at least one conductive bridging portion extending from one point on said looped structure to another point thereon disposed over the first oxide;

a second oxide disposed over the wafer in the space between the heavily doped first section and the heavily doped second region;

a second channel region of the same conductivity type as the first channel region disposed between the second oxide and the wafer, said second channel region being of such low concentration that leakage current between it and the heavily doped first region surrounding the peripheral portion of the wafer is substantially avoided, whereby dark current through the semiconductor device is determined only by leakage current between the wafer and the first channel region;



a first metal layer operatively associated with the heavily doped first region, having an extension over the second oxide;

a second metal layer operatively associated with the heavily doped second region, having an extension over the second oxide;

the first and second metal layers being disposed so as to have an isolation gap therebetween;

whereby the second oxide is overlaid with the first and second metal layers which have an isolation gap therebetween.

4,057,823

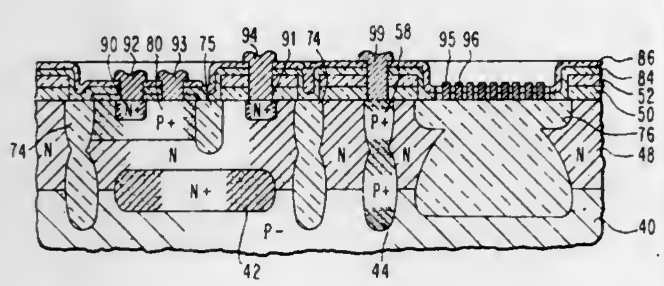
POROUS SILICON DIOXIDE MOISTURE SENSOR AND METHOD FOR MANUFACTURE OF A MOISTURE SENSOR

Paul Johannes Burkhardt, Poughkeepsie, and Michael Robert Poponiak, Newburgh, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed July 2, 1976, Ser. No. 701,788

Int. Cl.[2] H01L *29/34, 23/16, 23/36*

U.S. Cl. 357—52 **13 Claims**



1. A moisture sensor comprising a monocrystalline silicon body;

a region within the said body of high porosity silicon dioxide;

a metal counter electrode on a part of said porous silicon dioxide area; and

said porous silicon dioxide having a porosity sufficient that ambient moisture can quickly diffuse into the porous silicon dioxide under the said electrode, adsorb onto the silicon dioxide surface and cause measurable changes in the said device.

4,057,824

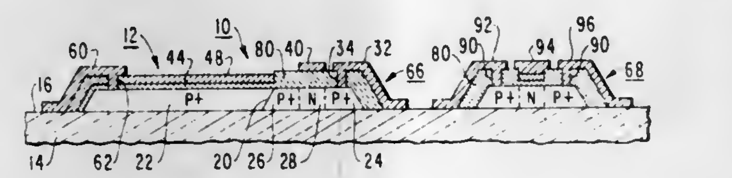
P+ SILICON INTEGRATED CIRCUIT INTERCONNECTION LINES

Murray Henderson Woods, Princeton, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Apr. 30, 1976, Ser. No. 682,148

Int. Cl.[2] H01L *27/12, 29/78, 29/34, 29/06*

U.S. Cl. 357—56 **14 Claims**



1. In combination with a plurality of heteroepitaxial silicon mesa devices on a common substrate, at least one of said mesa devices comprising a first doped region and a second differently doped region, an improvement comprising:

a means for interconnecting one of said regions of said at least one mesa device to another of said mesa devices, said means comprising a P+ silicon region having a first insulating coating thereon and a second insulating coating means for preventing oxidation of said P+ silicon region, said second insulating coating being located adjacent said first insulating coating.

4,057,825

SEMICONDUCTOR DEVICE WITH COMPOSITE METAL HEAT-RADIATING PLATE ONTO WHICH SEMICONDUCTOR ELEMENT IS SOLDERED

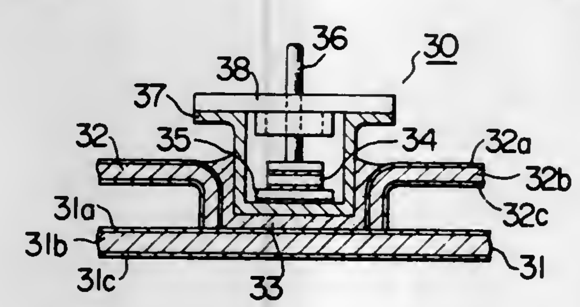
Kazutoyo Narita; Tadashi Sakaue, and Yuzi Niino, all of Hitachi, Japan, assignors to Hitachi, Ltd., Japan

Filed July 1, 1976, Ser. No. 701,809

Claims priority, application Japan, July 18, 1975, 50-87293; Sept. 19, 1975, 50-112623

Int. Cl.[2] H01L *23/02, 23/28*

U.S. Cl. 357—81 **10 Claims**



1. A semiconductor device comprising a semiconductor element soldered to a metal heat-radiating plate, in which said metal heat-radiating plate consists of a first metal layer for providing mechanical strength and second metal layers disposed on both sides of said first metal layer, for serving as a thermal and electrical conducting medium, and said semiconductor element is soldered onto one of said second metal layers.

4,057,826

SYNC RESPONSIVE SYSTEMS FOR VIDEO DISC PLAYERS

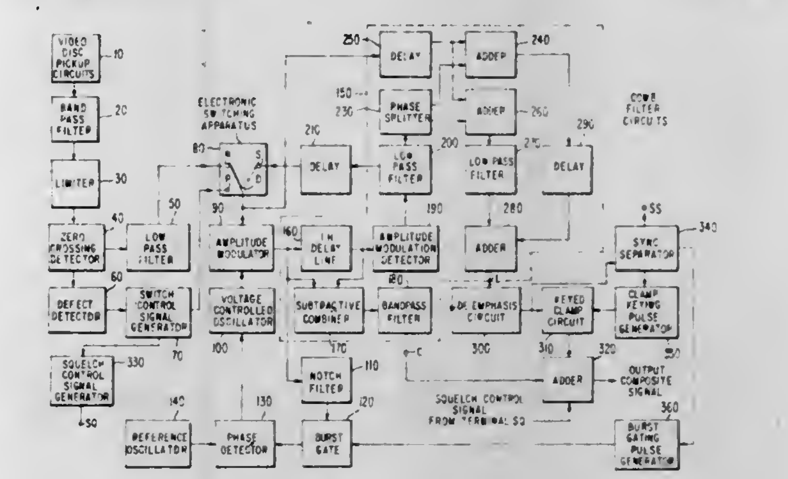
Alfred Lynn Baker, Indianapolis, Ind., assignor to RCA Corporation, New York, N.Y.

Filed June 26, 1975, Ser. No. 590,485

Claims priority, application United Kingdom, Nov. 18, 1974, 49925/74

Int. Cl.[2] H04N *5/785, 9/02*

U.S. Cl. 358—4 **11 Claims**



1. In disc record playback apparatus including a pickup system for recovering from a disc record carrier waves frequency modulated in accordance with a composite color video signal, said composite color video signal including a deflection synchronizing component and picture signal components comprising a luminance signal component occupying a given frequency band and a chrominance signal component sharing a portion of said given frequency;

frequency demodulation apparatus responsive to a carrier wave output of said pickup system for developing a demodulated signal output substantially confined to said given frequency band;

a source of oscillations at a frequency above said given frequency band;

means for modulating the amplitude of oscillations from said source in accordance with said demodulated signal output of said frequency demodulation apparatus;

first comb filter means, including a 1H delay line having an input receiving an output of said modulating means, for developing a first comb filtered signal output substantially free of said chrominance signal component, said first comb filter means having a frequency response characteristic exhibiting a plurality of regularly spaced nulls over said shared portion of said given frequency band;

second comb filter means, including said 1H delay line, for developing a second comb filtered signal output substantially free of said luminance signal component;

means for deriving a delayed composite color video signal from said 1H delay line;

means for identifying departures from a given frequency deviation range of the instantaneous frequency of the signals supplied to said frequency demodulation apparatus;

means responsive to the output of said departure identifying means for altering the operation of said modulating means during said departures so that the amplitude of said oscillations from said source is modulated in accordance with said delayed composite color video signal provided by said deriving means, in place of the signal output of said frequency demodulation apparatus;

a de-emphasis circuit responsive to said first comb filtered signal output of said first comb filter means for developing a de-emphasized signal output, said de-emphasis circuit having a frequency response characteristic exhibiting a declining response with increase in input frequency over a portion of said given frequency band;

an adder, responsive to respective outputs of said de-empha-

sis circuit and of said second comb filter means, for forming a composite color video signal output; and

means for recovering said deflection synchronizing component to the substantial exclusion of other components of said signal output of said frequency demodulation apparatus; said recovering means comprising a sync separator having an input, and means, independent of said adder and responsive to an output of said de-emphasis circuit, for coupling a de-emphasized version of said first comb filtered signal output of said first comb filter to said input of said sync separator.

4,057,827

APPARATUS FOR READING COLOR TELEVISION SIGNAL FROM A DISC-SHAPED RECORD CARRIER

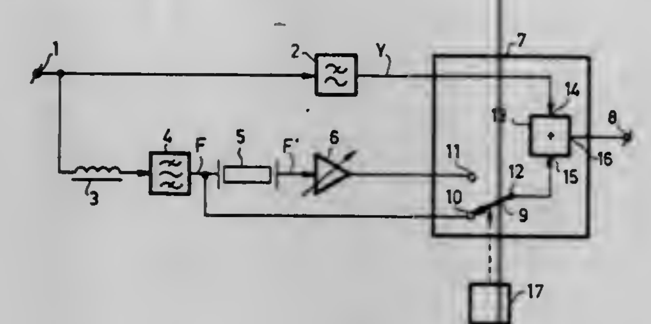
Adrianus Huibert Hoogendijk, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed July 14, 1975, Ser. No. 595,708

Claims priority, application Netherlands, May 21, 1975, 7505938

Int. Cl.^{2} H04N *5/76*

U.S. Cl. 358—8 **4 Claims**



1. An apparatus for reading a disc-shaped record carrier on which a color television signal is recorded in adjacent tracks, of the type provided with a scanning unit for scanning the record carrier, a decoding device for converting the signal read from the record carrier with the aid of the scanning unit into a standard PAL type color television signal, and a command device for selectively repeating the scanning of predetermined frames of the television signal recorded on the record carrier, the improvement wherein the decoding device is provided with a correction circuit, which comprises an input terminal for receiving a color television signal derived from the read-out signal, a first filter connected to said input terminal for extracting the luminance signal contained in said color television signal, a second filter connected to said input terminal for extracting the chrominance signal contained in said color television signal, a delay means connected to said second filter for delaying the extracted chrominance signal by one line period, a signal controlled recombination circuit means connected to said first filter and to said delay means and controlled by the command device for selectively providing at an output terminal an output signal composed of the luminance signal and the chrominance signal of the color television signal applied to the input terminal and in response to the repetition of a predetermined frame providing an output signal composed of the luminance signal applied to the input terminal and the chrominance signal extracted from the color television signal applied to said input terminal and delayed by one line period.

4,057,828

CONTRAST COMPRESSION CIRCUITS

John F. Monahan, Quincy, Ill., assignor to Harris Corporation, Cleveland, Ohio

Filed Nov. 17, 1975, Ser. No. 632,181

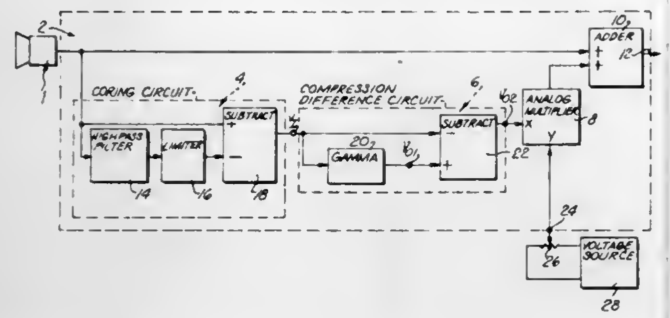
Int. Cl.^{2} H04N *9/53, 5/20, 5/535*

U.S. Cl. 358—32 **5 Claims**

1. An amplitude compression circuit for de-emphasizing variations in amplitude of a wide band electrical signal, comprising:

coring means responsive to said wide band signal for noise reduction of said signal by high frequency coring to produce a noise filtered signal;

difference signal source means responsive to said noise filtered signal for producing a compression difference signal corresponding to the difference between said noise filtered signal and an amplitude compressed said noise filtered signal; and,



signal adder means for additively combining said compression difference signal back again with said wide band signal to produce a de-emphasized output signal.

4,057,829

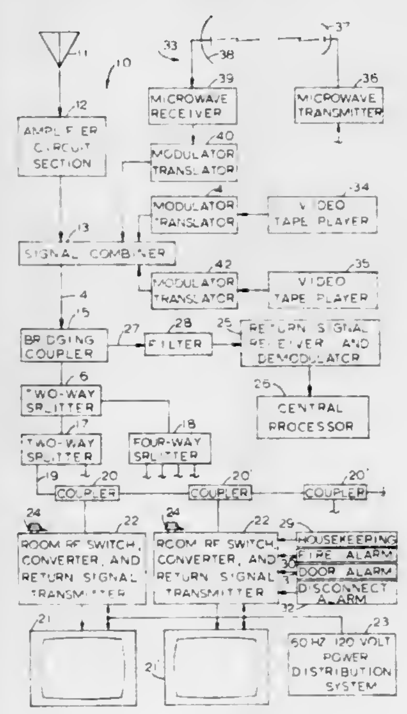
COMMUNICATIONS TV MONITORING AND CONTROL SYSTEM

Robert M. Moorehead, Richardson, Tex., assignor to Spectradyne, Inc., Richardson, Tex.

Continuation-in-part of Ser. No. 425,254, Dec. 18, 1973, abandoned. This application Aug. 6, 1975, Ser. No. 602,315

Int. Cl.^{2} H04N *7/18*

U.S. Cl. 358—86 **11 Claims**



1. In a communications television monitoring and control system for a video signal distribution system constructed to transmit a plurality of video signal program channels from a head end through a common cable section connected through a distribution section to a plurality of television sets at various viewing locations: a plurality of control devices, including an RF switch and a video signal converter at various television set locations; a plurality of return RF signal transmitters, each connected for message activation by an associated one of said RF switches with one of said plurality of control devices; with said RF signal transmitters connected to feed message RF signaling, including preassigned RF signal transmitter location message signalling, back through said video signal distribution system when said RF switch is switched to a message activate state with video channel selection; and, return RF signal receiver means connected to said video signal distribution system for receiving return RF signals from said plurality of return RF signal transmitters for application to central message processing means.

4,057,830

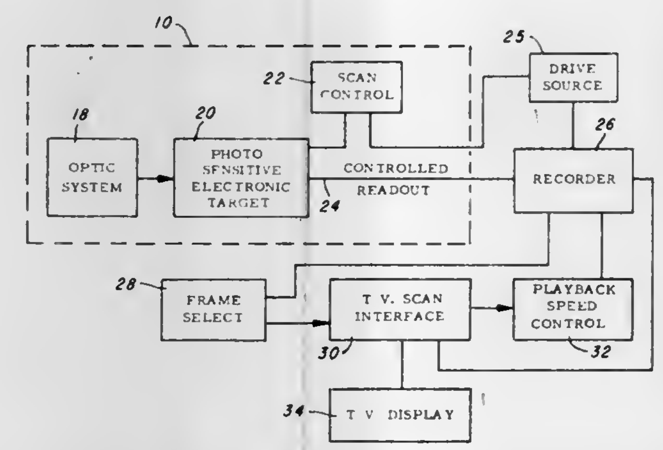
ELECTRONIC PHOTOGRAPHY SYSTEM

Willis A. Adcock, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 543,106, Jan. 22, 1975, abandoned, which is a continuation of Ser. No. 460,396, April 12, 1974, abandoned, which is a continuation of Ser. No. 266,826, June 27, 1972, abandoned. This application Oct. 29, 1976, Ser. No. 736,975

Int. Cl.^{2} H04N *5/78, 7/18*

U.S. Cl. 358—127 **8 Claims**



1. An electronic still picture photography system comprising:

a. an electronic camera with an optical electronic transducer means having data storage capability for storing an instantaneous optical image and a scanner which scans said transducer means at a relatively slow rate to read a stored image from the data storage of said transducer means;

b. a recording apparatus having a record head coupled to said transducer means for recording, in analog form, single image still pictures received from the transducer means on selected portions of a magnetic recording medium including means for passing said magnetic recording medium past said record head at a first relatively slow velocity to record each of said single image still pictures;

c. a television receiver type display device for visually displaying said still pictures; and

d. a playback apparatus having means for selecting a recorded single image still picture to be displayed and a read head for reading the selected single image still picture from said magnetic recording medium including means for passing said magnetic recording medium past said read head at a relatively higher velocity than said recording medium passes said record head in said recording apparatus; wherein

e. the rate of the scanner of said electronic camera is compatible with the first relatively slow velocity at which still pictures are recorded on said magnetic recording medium and the rate at which said still pictures are read from said magnetic recording medium is compatible with the scan rate of the scanner of said display device to effect a stationary display of said optical image.

4,057,831

VIDEO RECORD DISC MANUFACTURED BY A PROCESS INVOLVING CHEMICAL OR SPUTTER ETCHING

Bernardus Antonius Johannus Jacobs; Johannes van der Wal, and Gerrit Berend Gerritsen, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 527,245, Nov. 26, 1974, abandoned, which is a division of Ser. No. 344,865, March 26, 1973, Pat. No. 3,894,179, which is a continuation-in-part of Ser. No. 344,636, March 26, 1973, abandoned. This application Aug. 11, 1976, Ser. No. 713,521

Claims priority, application Netherlands, Sept. 5, 1972, 7212045

Int. Cl.^{2} B32B *3/00;* **C23C** *15/00;* **G11B** *11/12, 25/04;* **H04N** *5/86*

U.S. Cl. 358—128 **4 Claims**

1. A disc-shaped information carrier comprising a disc-shaped plate and a substantially spiral information-providing track on a surface of said plate produced by subjecting a tightly adhering thin layer of base material disposed on said plate and a thin metal layer coating said base material layer to a sputter etching process to selectively remove portions of the thin metal layer and the underlying base material layer from the surface of said plate.

4,057,832

APPARATUS FOR READING A DISK-SHAPED RECORD CARRIER WITH TRACK JUMPING FOR CHARGING MOTION EFFECTS

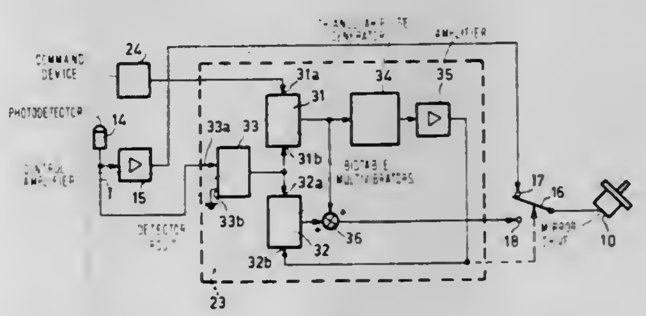
Hermanus Antonius Kappert, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 4, 1975, Ser. No. 628,594

Claims priority, application Netherlands, Aug. 21, 1975, 7509906

Int. Cl.^{2} H04N *5/76*

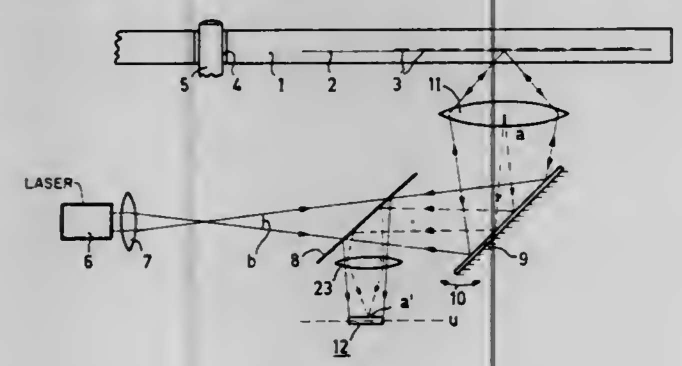
U.S. Cl. 358—128 **8 Claims**



1. Apparatus for reading a disk-shaped record carrier on which information is recorded in optically coded form in tangentially extending tracks, which apparatus is of the type comprising a radiation source means for producing a read beam of radiation, a directing system means for making a scanning spot produced by said read beam of radiation on the record carrier cooperate with a desired track, a read detector means for converting the information contained in said read beam after cooperation with the record carrier into an electrical signal, a measuring detector means for measuring the radial position of the scanning spot relative to the desired track, and for supplying a corresponding control signal to the directing system, and a switching device means for causing the scanning spot to effect a jump-wise displacement from a track being followed to an adjacent track in response to a start signal, which switching device comprises a signal source means for supplying a control signal which is suitable for causing said jump-wise displacement to the directing system, which control signal consists of two consecutive signal periods of mutually substantially the same duration and substantially the same shape, but of opposite polarity, the improvement wherein the switching device includes a detection circuit means for detecting the instant at which the scanning spot is displaced half-way between two adjacent tracks during the jump-wise displacement and for at that instant supplying a detection signal to the

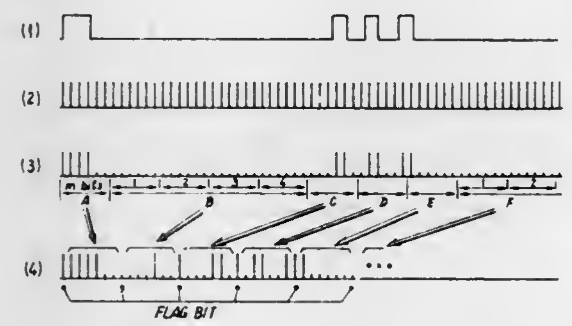
signal source, and wherein said signal source means comprises means for supplying a control signal whose two signal periods have a duration which automatically substantially equals the time interval between the start signal and the detection signal.

4,057,833
CENTERING DETECTION SYSTEM FOR AN APPARATUS FOR PLAYING OPTICALLY READABLE RECORD CARRIERS
Josephus Johannes Maria Braat, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.
Continuation-in-part of Ser. No. 530,165, Dec. 6, 1974, Pat. No. 3,962,720. This application Mar. 23, 1976, Ser. No. 669,639
Claims priority, application Netherlands, Jan. 28, 1976, 7600842
Int. Cl.^{2} H04N *5/76*; G11B *7/12*
U.S. Cl. 358—128 6 Claims



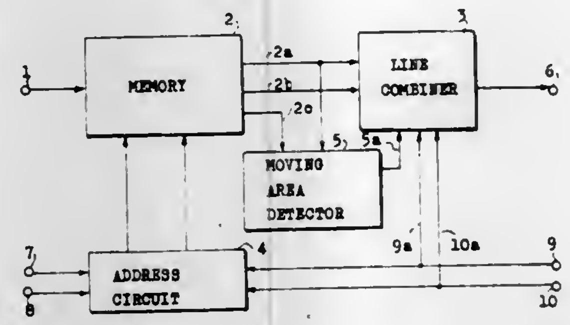
1. Apparatus for reading a record carrier on which information is stored in an optically readable track-shaped information structure, which apparatus is of the type comprising a radiation source, an objective system means for passing radiation emitted by the radiation source to a radiation-sensitive information detection system via the record carrier, the detection system comprising means for converting a read beam which is supplied by the radiation source and modulated by the information structure into an electrical signal, and which apparatus furthermore comprises a centering detection system which is connected to an electronic circuit for deriving a control signal for correcting the centering of the read beam relative to a track portion to be read, the improvement wherein the centering detection system and the information detection system are constituted by an even number of at least two and at most four radiation-sensitive detectors which are situated in the far field of the information structure in separate quadrants of an imaginary X-Y coordinate system, whose origin is disposed on the optical axis of the objective system and whose X-axis effectively extends in the track direction and whose Y-axis effectively extends transversely to the track direction, that the outputs of two detectors which are disposed at the same side of the Y-axis are connected to both a subtractor circuit and an adder circuit, that a multiplier circuit is provided to whose inputs signals derived from the subtractor circuit and from the adder circuits are applied, and that the output of the multiplier circuit is connected to a filter circuit which only transmits frequencies lower than the frequency which corresponds to twice the average spatial frequency of the information structure in the track direction, at the output of which filter circuit a control signal for correcting the centering of the read beam is obtained.

4,057,834
SIGNAL COMPRESSION SYSTEM FOR BINARY DIGITAL SIGNALS
Yukio Nakagome, Yokohama; Hiroichi Teramura, Tokyo; Yasuo Fukata, Mitaka, and Yasuhiro Yamasaki, Machida, all of Japan, assignors to Kokusai Denshin Denwa Kabushiki Kaisha, Japan
Continuation-in-part of Ser. No. 459,848, April 10, 1974, abandoned. This application July 18, 1975, Ser. No. 597,403
Claims priority, application Japan, Apr. 12, 1974, 49-40831; July 25, 1973, 48-83071
Int. Cl.^{2} H04N *7/12*
U.S. Cl. 358—133 3 Claims



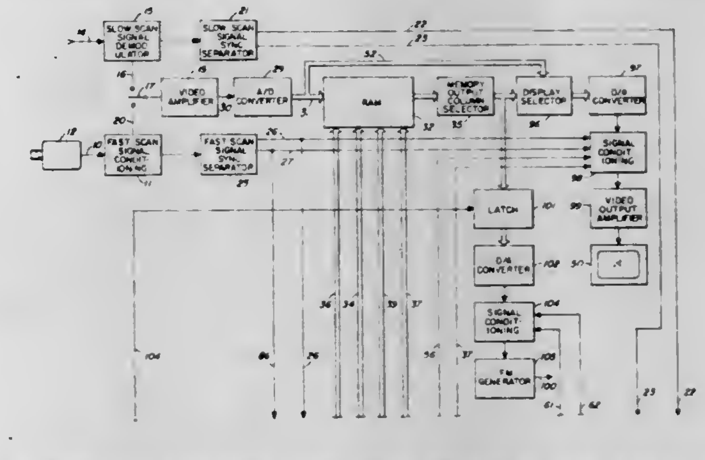
1. A signal compression system, comprising:
sampling means for sampling at successive constant intervals a binary digital input signal to obtain a sampled binary pulse signal;
first temporary storage means connected to said sampling means for successively storing therein a predetermined number of bits of the sampled binary pulse signal which constitute a block of bits;
bit change detecting means connected to said first temporary storage means for producing either a non-detecting output signal or a detection output signal when no bit is detected or when any bit change is detected, respectively, by comparing each of the bits in a block of bits stored in the first temporary storage means with the last bit of a block of bits immediately preceding in time the block of bits stored in said first temporary storage means;
second temporary storage means connected to said first temporary storage means and said bit change detecting means for storing therein in response to said detection output signal, in a parallel signal configuration, the bits which are stored in said first temporary storage means and transferred to this second temporary storage means at intervals of said predetermined number of bits;
coding means connected to said bit change detecting means for coding only the duration of the bits in which no bit change is detected as represented by said non-detecting output signal and for developing a coded pulse signal representative of the detected duration; and
signal interlacing means connected to said temporary storage means and said coding means for interlacing said coded pulse signal, or the contents of said second temporary storage means when it contains a blocks of bits having a bit change, with at least one sign bit discriminating them from each other to produce a converted output, so that said coded pulse signal is included in the compressed output in response to said non-detection output signal of said bit change detecting means.

4,057,835
SYSTEM FOR CONVERTING NUMBER OF LINES OF TELEVISION SIGNAL
Koji Kinuhata, Tokyo; Kitsutaro Amano, Yokohama; Hiroshi Sasaki, Kashiwa, and Hideo Yamamoto, Sagamihara, all of Japan, assignors to Kokusai Denshin Denwa Kabushiki Kaisha, Japan
Filed June 29, 1976, Ser. No. 701,035
Claims priority, application Japan, Sept. 27, 1975, 50-116847
Int. Cl.^{2} H04N *5/02*
U.S. Cl. 358—140 3 Claims



1. A system for converting the number of lines of an input television signal having frames each formed by two adjacent interlaced fields comprising:
input terminal means for receiving said input television signal:
memory means connected to said input terminal means for successively storing said input television signal;
first synchronizing terminal means for receiving horizontal synchronizing pulses and vertical synchronizing pulses of said input television signal;
second synchronizing terminal means for receiving horizontal synchronizing pulses and vertical synchronizing pulses of an output television signal to be obtained;
address circuit means connected to said memory means, said first synchronizing terminal means and said second synchronizing terminal means for performing the write-in operation to the memory means in response to said horizontal synchronizing pulses and said vertical synchronizing pulses of the first synchronizing terminal means and for performing the read-out operation from the memory means in response to said horizontal synchronizing pulses and said vertical synchronizing pulses of said second synchronizing terminal means;
detection means connected to said memory means for detecting from the contents of said memory means, moving picture areas of said frames each formed by a block of successive moving picture elements, each of which has a level difference more than a predetermined threshold level from the level of a corresponding picture element in an immediately preceding frame of said input television signal, and for generating a moving area detection signal in response to each detection of said moving picture areas;
line combiner means connecting said memory means, said detection means and said second synchronizing terminal means for forming each interlaced frame of said output television signal by signals of two adjacent fields of said input television signal read-out from said memory means in response to said moving area detection signal, said horizontal synchronizing pulses of said second synchronizing terminal means under a condition where signals of each field of said each frame of said output television signal are formed by sequentially weighting and combining line signals of the former and the latter of the two fields of said input television signal, so that the order of lines is not reversed in said output frame while the lines are not repeated in the same field, and under a condition where the weight factor of said weighting and combining is constant for said moving picture area but variable for each stational picture area other than said moving picture area in accordance with a distance between an instant line signal of said output frame and a line signal of the same field to be combined with said instant line signal; and
output terminal means connected to said line combiner means for obtaining said output television signal.

4,057,836
SLOW SCAN TELEVISION SCAN CONVERTER
Clarence Jennings Munsey, Lakeside, Calif., assignor to Robot Research, Inc., San Diego, Calif.
Continuation-in-part of Ser. No. 651,517, Jan. 22, 1976, abandoned, which is a continuation of Ser. No. 571,084, April 24, 1975, abandoned. This application Jan. 7, 1977, Ser. No. 758,019
Int. Cl.^{2} H04N *7/12*
U.S. Cl. 358—140 10 Claims

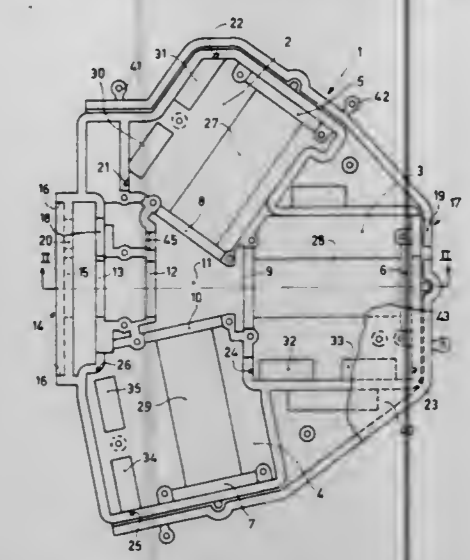


1. A system for storing video information at both a slow scan rate and a fast scan rate, and for retrieving video information signals from said stored information at both the slow scan rate and the fast scan rate, comprising:
a random access memory for storing information provided by digital video information signals;
an addressing means for addressing a selected location in the memory;
slow scan counting means for providing a count at the slow scan rate, wherein said slow scan count is provided to the addressing means for indicating a said selected location to be addressed in the memory when either storing or retrieving information at the slow scan rate;
fast scan counting means for providing a count at the fast scan rate, wherein said fast scan count is provided to the addressing means for indicating a said selected location to be addressed in the memory when either storing or retrieving information at the fast scan rate; and
address selection control means responsive to the fast scan counting means for causing the addressing means to address said selected locations in the memory indicated by the count provided by the fast scan counting means during intervals corresponding to one line of video information provided at the fast scan rate, and to address said selected locations in the memory indicated by the count provided by the slow scan counting means during blanking intervals between said video line intervals.

4,057,837
TELEVISION CAMERA COMPRISING A RIGID HOUSING
Howard Curtis Needs, and Harald Henricus Cornelis Maria Spapens, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.
Filed Jan. 26, 1976, Ser. No. 652,546
Claims priority, application Netherlands, Feb. 19, 1975, 7501931
Int. Cl.^{2} H04N *5/64*
U.S. Cl. 358—254 12 Claims

1. A television camera comprising more than one pick-up tube each having a given axis and an entrance optical system including an optical distribution system having a given axis, the entrance optical system and the pick-up tubes being situated in

a plane containing the axis of the optical system with the axes of each of the pick-up tubes intersecting the axis of the optical system and one another, two walls extending parallel to said plane, a plurality of partition walls forming with said two walls



an integral rigid housing, providing spaces for different components, said optical distribution system and the pick-up tubes being positioned each within one of said spaces with said pick-up tubes being positioned to receive an image from said optical distribution system.

4,057,838

PROCESS AND APPARATUS FOR EXACTLY ADJUSTING THE BEGINNING AND END OF REPRODUCING IN AN ENGRAVING UNIT

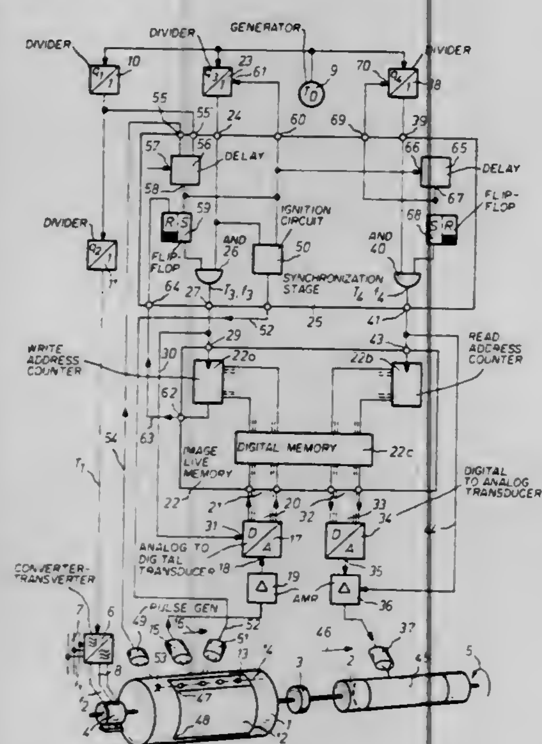
Juergen Doelves, and Dieter Herforth, both of Kiel, Germany, assignors to Dr. -Ing. Rudolf Hell GmbH, Germany

Filed Mar. 25, 1976, Ser. No. 670,405

Claims priority, application Germany, Mar. 25, 1975, 2513042

Int. Cl.² H04N *1/26*

U.S. Cl. 358—299 **7 Claims**



6. Apparatus for adjusting the beginning and ending of reproduction of an image pattern mounted on a rotating scanning cylinder onto a rotating recording cylinder by means of a circumferential pulse comprising, means for adjusting the delay of a signal, a forward-backward counter which has a forward counting-input and backward counting-input which are alternately loaded with a first counting pulse sequence signal train in order to count in or out a number of pulses of said first counting pulse sequence signal train, a backwards counter which receives the output data of said forward-backward counter for accepting the counter reading and having an acceptance input which is connected to a signal source in order to initiate the acceptance of the counter reading with the signal, a coding circuit for encoding a counter reading of the backwards counter connected to the data output of said backwards counter whereby said coding circuit emits the delayed signal when the counter reading is reached, a switch, said backwards counting-input of the backwards counter is loadable with a second counting pulse sequence signal train through said switch and said switch can be switched on by said signal and switched off by said delayed signal.

4,057,839

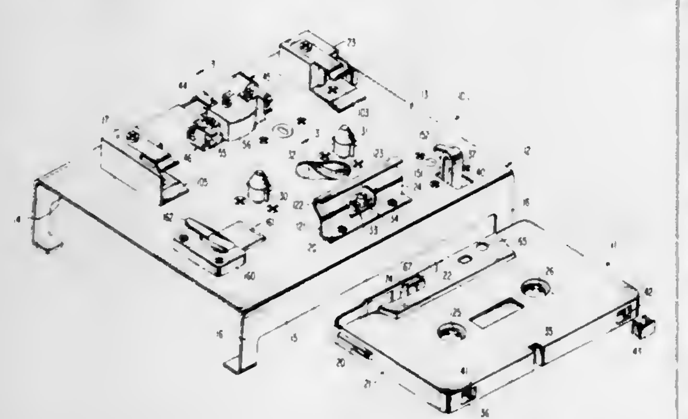
TAPE CASSETTE DRIVE

Frank H. Banks, Wakefield, Mass., assignor to MFE Corporation, Salem, N.H.

Filed Dec. 22, 1975, Ser. No. 643,324

Int. Cl.² G11B *15/48;* **G06K** *7/14;* **G11B** *5/08*

U.S. Cl. 360—93 **15 Claims**



1. A tape drive for a tape cassette wherein the cassette includes a substantially rectangular cassette housing containing first and second reels of tape and means for guiding the tape past a series of openings formed along a leading edge of the cassette and formed in surfaces normal to the leading edge adjacent thereto, the tape having an aperture formed therein, said tape drive comprising:

A. a frame member,

B. first and second motor drive spindles mounted to said frame member for driving the tape cassette reels,

C. transducer means mounted to said frame member to contact the tape through a first of the tape cassette openings,

D. a radiant energy source for directing radiant energy into the tape cassette through a second of the tape cassette openings along a radiant energy axis which intersects the plane of the tape and which passes through a third of the tape cassette openings, and

E. means for sensing the radiant energy including

i. a sensor housing having a longitudinal cavity formed therein along a cavity axis which intersects the radiant energy axis,

ii. a radiant energy detector mounted in said cavity on the cavity axis and displaced from the radiant energy axis,

iii. means in said cavity for redirecting the radiant energy received along the radiant energy axis to parallel the cavity axis, and

iv. first and second spaced fingers extending from said sensor housing and interfitting the third cassette opening thereby to accommodate the tape, said fingers guiding the tape and blocking ambient light from reaching said detector.

4,057,840

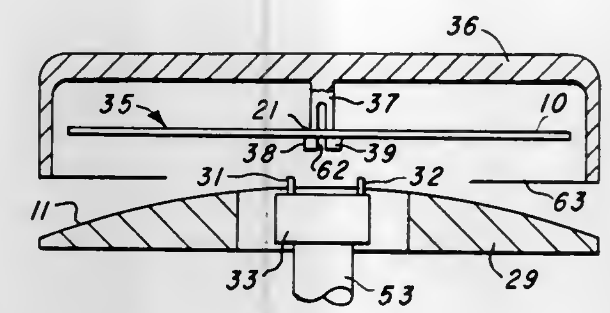
FLEXIBLE DISC RECORDING CARTRIDGE

Dale Tackitt Wingo, Richardson, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Jan. 7, 1976, Ser. No. 647,023

Int. Cl.² G11B *5/016, 3/60;* **G01D** *15/24*

U.S. Cl. 360—99 **11 Claims**



1. A flexible disc cartridge comprising:

a. flexible disc shaped member having upper and lower opposite major surfaces and a centrally located opening extending from said upper major surface to said lower major surface with a magnetic field responsive layer formed on said upper major surface;

b. a housing with said disc shaped member being contained within said housing;

c. a retaining member affixed to said housing and extending through the centrally located opening of said disc shaped member for retaining said disc shaped member with said disc shaped member being free to rotate on said retaining member, said housing having;

d. a first opening opposite said lower major surface for receiving a rotational means which rotates said disc shaped member about said retaining member; and

e. a second opening opposite said upper major surface for receiving a recording and/or reading head which records and/or reads tracks of information by means of the magnetic field responsive layer on the upper major surface of said disc shaped member.

4,057,841

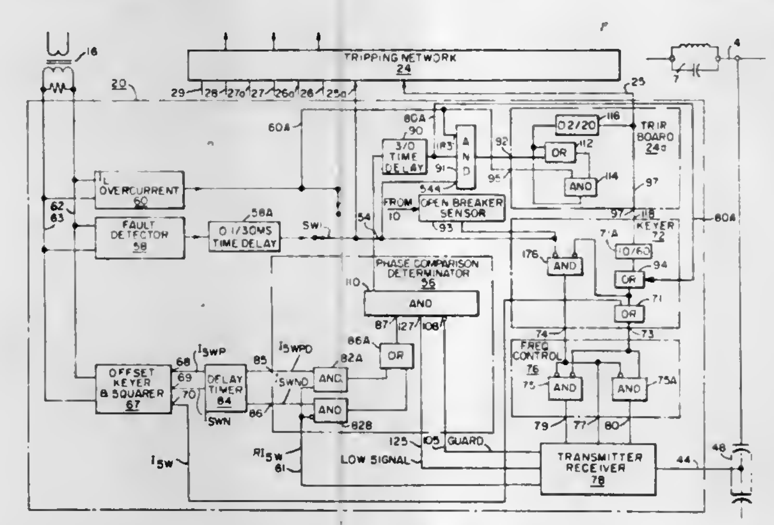
UNSUPERVISED TRIP KEYING FOR PHASE COMPARISON RELAYING APPARATUS

Walter L. Hinman, Jr., New Providence, and Russell W. Gonnam, Morris Plains, both of N.J., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Aug. 20, 1976, Ser. No. 716,048

Int. Cl.₂H02H *3/28*

U.S. Cl. 361—64 **4 Claims**



1. In phase comparison relaying apparatus for protecting an alternating current power transmission line including at least one conductor interconnected by circuit breaker means at its local and remote end terminals between first and second busses, the improvement comprising:

a. first circuit means, cooperatively associated with one end terminal of the conductor, adapted to receive signals representative of current flow in the conductor at both of its end terminals, for comparing said signals and for generating a breaker trip enabling signal whenever the received signals have a predetermined relationship;

b. second circuit means, adapted to receive said trip enabling signal, for forwarding said trip enabling signal to the associated interconnecting circuit breaker means, said second circuit means being further adapted to receive at least one arming signal representative of an undesirable current condition in the conductor and to inhibit forwarding of said trip enabling signal only in the absence of said arming signal; and

c. third circuit means also adapted to receive said breaker trip enabling signal for forwarding said breaker trip enabling signal to the non-associated end terminal of the conductor.

4,057,842

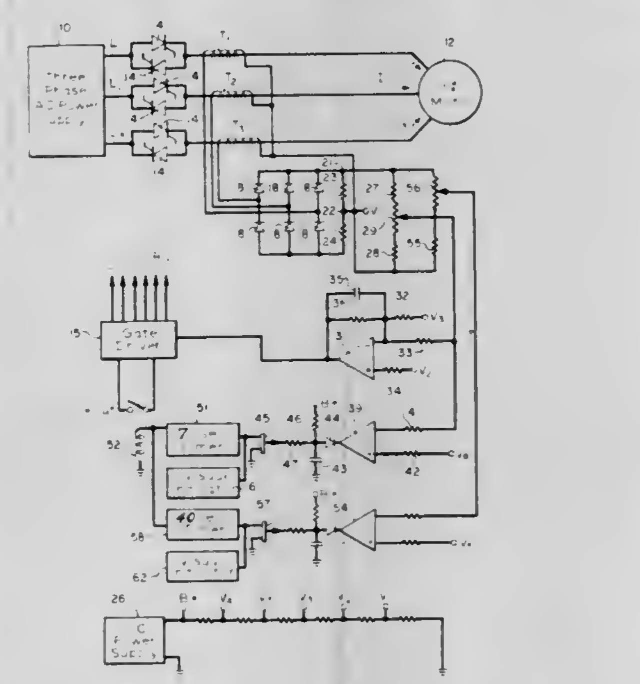
CURRENT REGULATION SYSTEM FOR THREE-PHASE LOAD

Bruce K. Bauman, Glen Rock; Dean K. Norbeck, and Donald L. Tollinger, both of York, all of Pa., assignors to Borg-Warner Corporation, Chicago, Ill.

Filed Jan. 28, 1976, Ser. No. 652,915

Int. Cl.² H02H *3/08;* **G05F** *1/44*

U.S. Cl. 361—93 **3 Claims**



1. A control system for regulating the current flow at a desired level from a three-phase AC power supply to a three-phase load, comprising:

coupling means, including three line conductors, for coupling the three-phase AC power supply to the threephase load to supply three load currents thereto;

three wye-connected current transformers, each of which is coupled to a respective one of said three line conductors, for sensing the three load currents and developing currents proportional to the load currents;

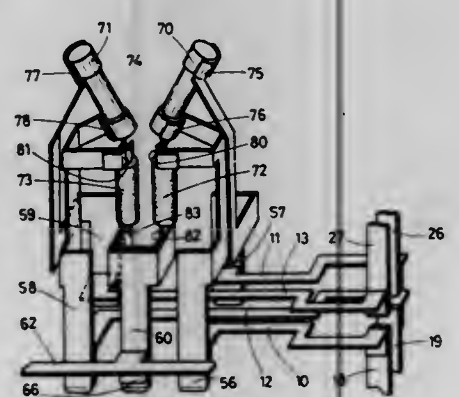
a three-phase full wave bridge circuit, having an output resistor, for rectifying and adding the currents, developed by said current transformers, to produce an output voltage signal across said resistor,

the center of said wye-connected transformers and one terminal of said output resistor being interconnected and held at a fixed reference potential in order that any current imbalance between the three load currents is reflected at full relative magnitude across said output resistor, said output voltage signal being proportional to the greatest of the three load currents;

means, including a potentiometer, coupled to said output resistor for developing a feedback signal proportional to

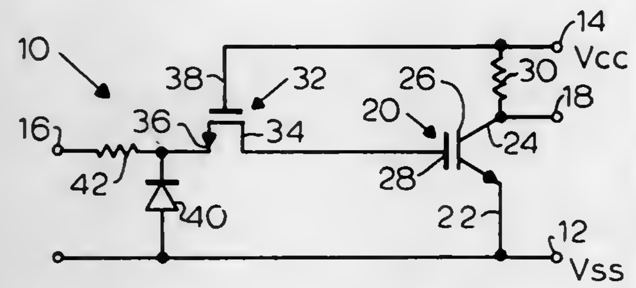
said output voltage signal, the desired level of the three load currents being set by adjusting said potentiometer;
comparison means, including a differential amplifier, for comparing said feedback signal with a reference signal to produce an error signal proportional to the difference between the two compared signals;
and control means, coupled to said coupling means, responsive to said error signal for adjusting the amplitudes of the three load currents in order to maintain them at the desired level.

4,057,843
CABLE CONNECTION UNITS AND PROTECTION DEVICES
Yves Saligny, Cluses, France, assignor to Etablissements Carpano & Pons SA, Cluses, France
Filed Apr. 9, 1976, Ser. No. 675,484
Claims priority, application France, Apr. 25, 1975, 75.13088
Int. Cl.[2] H02H *3/22*
U.S. Cl. 361—104 **17 Claims**



1. A connection unit for cables, in particular telecommunications cables, comprising:
a pile of insulating support plates having first and second outer faces;
means defining a plurality of orifices traversing said pile of plates from said first to said second outer face;
at least some of said plates carrying at least one preformed conducting element, said conducting elements being disposed in pairs consisting of a first conducting element having a first end connected to or forming a lead-in terminal and a bent second end disposed in a first of said orifices, and a second conducting element having a first end connected to or forming a lead-out terminal and a bent second end disposed in a second of said orifices;
said lead-in terminals being grouped together on one of said first and second faces of said pile and said lead-out terminals also being grouped together on one of said first and second faces of said pile, for connection of lines of a cable;
a grounding circuit disposed adjacent said first face of said pile;
said bent second ends of said first conducting elements being bent towards said first face and being dimensioned and prestressed to tend to come into contact with corresponding parts of said grounding circuit;
each pair of said first and second orifices receiving said second ends of a pair of first and second conducting elements being associated with a third said orifice;
and at least one plug module comprising means for electrically connecting and protecting a pair of said lead-in and lead-out terminals, said module comprising first, second and third parallel plug pins pluggable in said second face of said pile in associated first, second and third orifices whereby said first plug pin contacts said bent second end of said first conducting element and holds it out of contact with said grounding circuit, said second plug pin contacts said bent second end of said second conducting element and said third plug pin contacts a corresponding part of said grounding circuit, said module comprising means for electrically connecting said first and second plug pins and a lightning protector connected between said first and third plug pins.

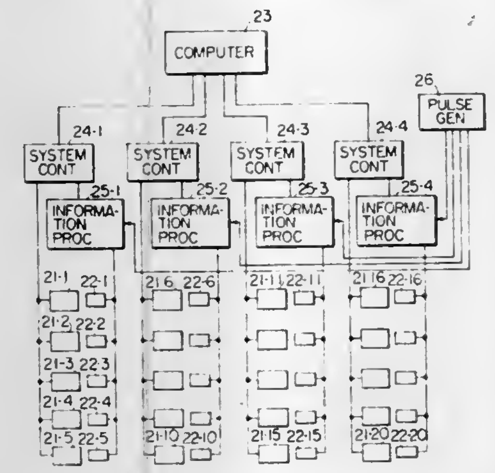
4,057,844
MOS INPUT PROTECTION STRUCTURE
Sean Anthony Smedley, Saratoga, Calif., assignor to American Microsystems, Inc., Santa Clara, Calif.
Filed June 24, 1976, Ser. No. 699,527
Int. Cl.[2] H02H *7/20, 9/04*
U.S. Cl. 361—111 **1 Claim**



1. An input protection device for a V-groove field effect transistor formed in a monolithic semiconductor substrate with a source region therein, base region therein overlying said source, and drain region overlying said base region, at least one V-groove extending into the substrate exposing the base region, an insulative layer overlying the exposed portion of the base region, at least one gate conductor overlying at least a portion of the insulative layer and power supply means connected between said drain and said source through load means, said device comprising
a planar field effect transistor formed on said substrate and having its own source, its own drain and its own insulated gate electrode,
signal input means for connecting an input signal to said V-groove transistor, said input means being in electrical interconnection with the source of said planar transistor,
the drain of said planar transistor being in electrical interconnection with said gate conductor of said V-groove transistor,
the insulated gate electrode being in electrical interconnection with said power supply means, and
said source of said planar transistor being formed in said substrate in a manner that defines it as a protective diode at a junction of said source and said substrate and at the same time as an input resistor extending from the region of said insulated gate electrode to said signal input means.

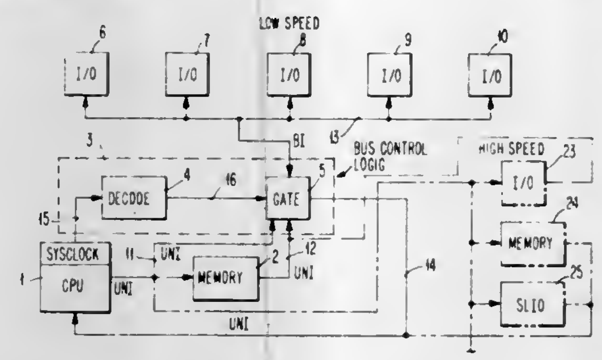
4,057,845
GROUP CONTROL SYSTEM FOR VISUAL INFORMATION PROCESSING
Masakazu Ejiri, Tokorozawa; Seiji Kashioka, Kokubunji; Takafumi Miyatake, Hachioyi; Haruo Yoda, Kodaira, and Masayoshi Kameyama, Sagamihara, all of Japan, assignors to Hitachi, Ltd., Japan
Filed Apr. 6, 1976, Ser. No. 674,094
Claims priority, application Japan, Apr. 9, 1975, 50-42374
Int. Cl.[2] G06F *3/05;* G06K *9/04*
U.S. Cl. 364—200 **10 Claims**

1. A group control system, coupled to a computer which processes information supplied thereto from said system, comprising:
first means for generating plural groups of sequential pulses each of said pulse groups being shifted in time with respect to each other;
plural groups of image pickup devices, coupled to said first means, the image pickup devices in each respective group being responsive to a respective group of sequential pulses generated by said first means, with each image pickup device of a respective group of image pickup devices converting a received image pattern into electrical image signals representative of the received image pattern under the synchronizing control of the pulses in that respective pulse group to which said respective group of image pickup devices is responsive;
a plurality of visual information processors, coupled to said first means and the respective groups of image pickup devices, each visual information processor being responsive to a respective group of sequential pulses generated by said first means and extracting predetermined feature information of the image patterns represented by the



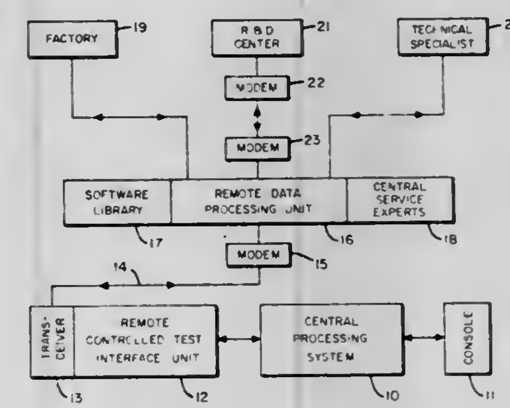
electrical image signals generated by the image pickup devices of that respective group of image pickup devices to which said each visual information processor is coupled, under the synchronizing control of the pulses in that respective pulse group to which said that respective group of image pickup devices is responsive; and
second means, coupled to said visual information processor and said computer, for supplying feature information extracted by said visual information processors to said computer.

4,057,846
BUS STEERING STRUCTURE FOR LOW COST PIPELINED PROCESSOR SYSTEM
William Clyde Cockerill; Louis Michael Hornung; Donavon William Johnson, and Richard Alan Vrba, all of Austin, Tex., assignors to International Business Machines Corporation, Armonk, N.Y.
Filed June 7, 1976, Ser. No. 693,821
Int. Cl.[2] G06F *3/00*
U.S. Cl. 364—200 **7 Claims**



1. In a word processing system including a CPU, a memory, and a plurality of I/O devices which operate at speeds slower than said CPU and said memory, apparatus for controlling the flow of information among said CPU, said memory, and said I/O devices comprising:
a first unidirectional buss connected to the output of the CPU for transmitting information signals from the CPU;
a second unidirectional buss connected to the output of said memory for transmitting information signals from said memory;
a third unidirectional buss connected to the input of said CPU for transmitting information signals to said CPU;
a bidirectional buss connected to said I/O devices for transmitting information to and from said I/O devices;
decoding means connected to said CPU for decoding control signals from the CPU; and
gating means responsive to said decoding means and connected to said first unidirectional buss, said second unidirectional buss, said third unidirectional buss, and said bidirectional buss for receiving information from said first and second unidirectional busses and said bidirectional buss and transferring the received information onto said third unidirectional buss or said bidirectional buss.

4,057,847
REMOTE CONTROLLED TEST INTERFACE UNIT
William P. Lowell, Shoreview, and Douglas M. Jagunich, New Brighton, both of Minn., assignors to Sperry Rand Corporation, New York, N.Y.
Filed June 14, 1976, Ser. No. 695,874
Int. Cl.[2] G06F *3/00, 11/04*
U.S. Cl. 364—200 **14 Claims**



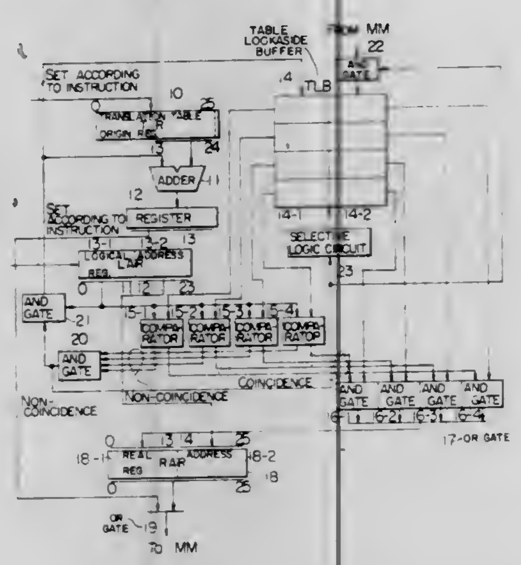
1. A universal remotely controlled test interface unit for operating central processing units and peripheral devices of a data processing system from a remote location comprising:
a communications transceiver for receiving from a remote data processing unit information containing control signals and data signals,
input data control means for receiving and processing said information from said communications transceiver,
buffer storage means connected to said input data control means for receiving and storing said data signals,
format control means connected to said input data control means for receiving and processing said control signals,
control register means for receiving and storing the data contents of said buffer storage means,
logic gating means connecting said buffer storage means to said control register means for transferring the contents of said buffer storage means to said control register means under the control of said format control means,
said control register means being partitioned into a plurality of groups of storage cells by said control signals to define a parallel line interface compatible with the processing unit to be operated from said remote location by said data signals, and
said control register means further comprising groups of control storage cells and groups of data storage cells adapted to test the unit to be operated from a remote data processing unit.

4,057,848
ADDRESS TRANSLATION SYSTEM
Kenji Hayashi, Hadano, Japan, assignor to Hitachi, Ltd., Japan
Filed June 9, 1975, Ser. No. 584,829
Claims priority, application Japan, June 13, 1974, 49-67355
Int. Cl.[2] G06F *7/04*
U.S. Cl. 364—200 **7 Claims**

1. An address translation system for mapping a plurality of logical spaces onto a real space, comprising
a logical address register in which a logical address is set;
a table lookaside buffer for storing translation pairs each including said logical address and a corresponding real

address to translate said logical address set in said logical address register into said real address whose bit number is larger than that of said logical address;

a searching means for judging whether said table lookaside buffer contains the same logical address as that set in said logical address register or not;



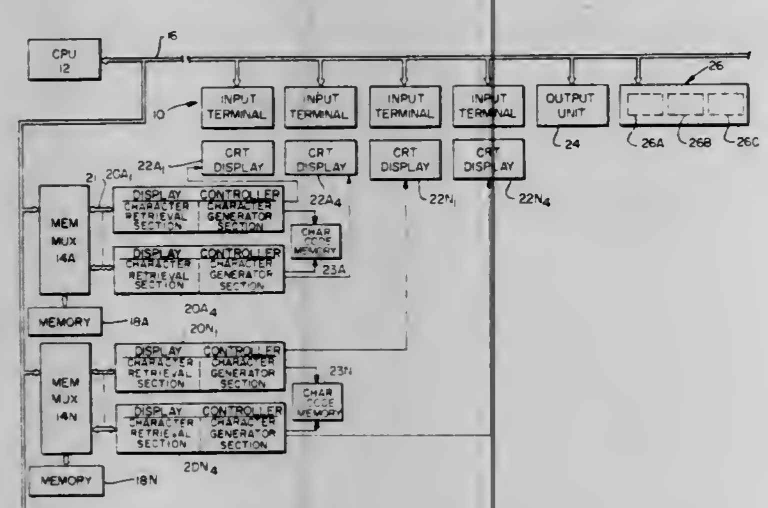
an output means for outputting the real address of the translation pair corresponding to said logical address when said logical address is contained in said table lookaside buffer; and

a real address register in which the real address from said output means is set.

4,057,849
TEXT EDITING AND DISPLAY SYSTEM

Charles W. Ying, Andover, and Richard Ying, Brookline, both of Mass., assignors to Atex, Incorporated, Bedford, Mass.

Continuation of Ser. No. 508,359, Sept. 23, 1974, abandoned. This application Aug. 23, 1976, Ser. No. 717,000
Int. Cl.² G11B *27/02*
U.S. Cl. 364—200 **24 Claims**



1. A unit for displaying characters including predetermined delimiter characters on a plurality of lines, said unit comprising:

A. memory means for storing character codes in a plurality of addressable storage locations, the character codes representing the characters to be displayed, each character code designating whether it represents a delimiter character;

B. display means for displaying characters at a predetermined number of consecutive display positions along a given line in a predetermined timing sequence in response to the character codes;

C. timing means connected to said display means for establishing the predetermined timing sequence;

D. transfer means connected to said memory means, said display means and said timing means for transferring the character codes from said memory means to said display means;

E. address generator means connected to said timing means and said memory means for applying addresses to said memory means thereby to cause a retrieval of character codes from said memory means in a sequence corresponding to the consecutive display positions

F. delimiter means connected to said transfer means and responsive to the retrieval of character codes from said memory means for indicating the transfer of a character code representing a delimiter character from said memory means,

G. address recording means connected to said delimiter means and said address generator means for recording the storage location address from said address generator means when said transfer means receives the character code representing the last delimiter character that is to be displayed on a line, and

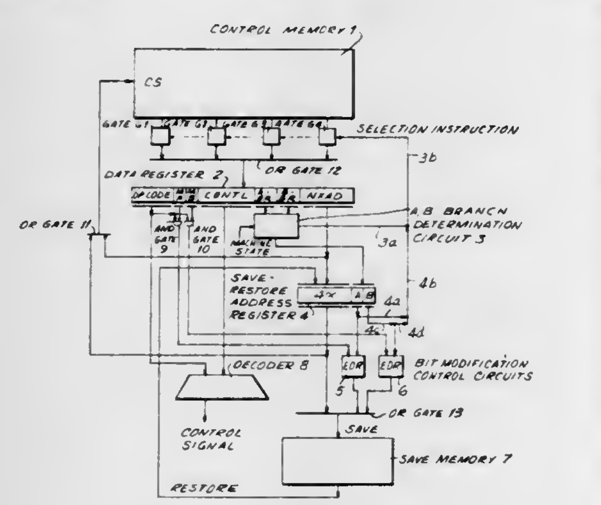
H. address transfer means connected to said address recording means and said address generator means for transferring the contents of said address recording means to said address generator means as an updated character code address for the first character in a succeeding line of characters; and

I. control means connected to said transfer means and said delimiter means for inhibiting the transfer from said transfer means to said display means of character codes succeeding the character code representing the last delimiter character for the given line.

4,057,850
PROCESSING LINK CONTROL DEVICE FOR A DATA PROCESSING SYSTEM PROCESSING DATA BY EXECUTING A MAIN ROUTINE AND A SUB-ROUTINE

Saburo Kaneda, Yokohama, and Koichi Tokura, Ichikawa, both of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Nov. 24, 1975, Ser. No. 634,401
Claims priority, application Japan, Nov. 26, 1974, 49-137361
Int. Cl.² G06F *9/12, 9/20*
U.S. Cl. 364—200 **3 Claims**



1. A processing link control device in a data processing system for modifying a conditional branch instruction address for a return address from a sub-routine to a main routine, said processing link control device comprising

a control memory having an address input and a plurality of outputs;

a plurality of AND gates each having a first input, a second input and an output, the first inputs of the AND gates being connected to the outputs of the control memory;

a data register having an input coupled to the outputs of the AND gates, said data register storing an instruction code field, modification bits field, a control bit field, condition branching fields and the next address in corresponding areas thereof;

a branch determination circuit determining an instruction for

selecting in accordance with a machine state, a single micro-instruction of four which are read out from the control memory, said branch determination circuit being connected to the second input of each of the AND gates for controlling said gates, said branch determination circuit having inputs connected to the condition branching field areas of the data register, and an output;

a first bit modification control circuit having a pair of inputs and an output, an input of the first bit modification control circuit being connected to the modification bits field of the data register;

a second bit modification control circuit having a pair of inputs and an output, an input of the second bit modification control circuit being connected to the modification bits field of the data register;

a save-restore address register storing the address and branch address bits in corresponding areas thereof, said save-restore address register having input means coupled to the next address area of the data register and input means coupled to the output of the branch determination circuit, output means coupled to the address input of the control memory, output means from a first branch address bit area thereof coupled to the second input of each of the AND gates for controlling said gates and connected to the other input of the first bit modification control circuit, and output means from a second branch address bit area thereof coupled to the second input of each of the AND gates for controlling said gates and connected to the other input of the second bit modification control circuit; and

a save memory for storing the return address, said save memory having input means coupled to the address area of the save-restore address register and to the outputs of the first and second bit modification control circuits, and output means coupled to the address area of the save-restore address register, said address area including the branch address bits, whereby any of a plurality of return addresses is designated by selection of the modification bits in the branch and link instruction and access is provided simultaneously for four word address positions of the control memory by the next address, four micro-instructions are read out from the control memory by the next address and only one of the four micro-instructions is selected by the condition branching fields via the AND gates and set in the data register.

4,057,851
CHIRAL
2-SUBSTITUTED-4-HYDROXY-2-CYCLOPENTEN-1-ONE

Charles J. Sih, Madison, and James B. Heather, Middleton, both of Wis., assignors to Wisconsin Alumni Research Foundation, Madison, Wis.

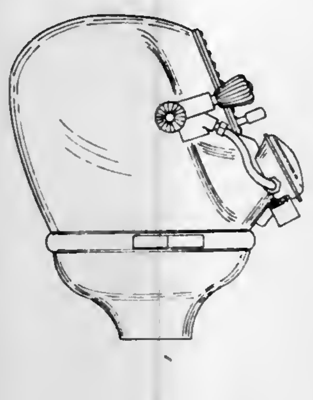
Division of Ser. No. 478,713, June 13, 1974, Pat. No. 3,968,141, which is a continuation of Ser. No. 309,766, Nov. 27, 1972, abandoned. This application May 20, 1976, Ser. No. 688,276
Int. Cl.² C07C *61/38*
U.S. Cl. 560—121 **1 Claim**

1. 2-(6′-carbomethoxyhexyl)-4(R)-hydroxy-2-cyclopenten-1-one.

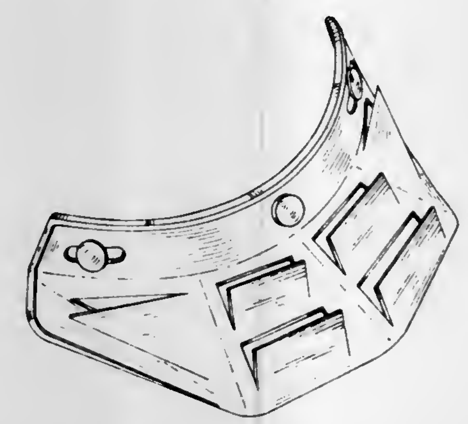
DESIGNS

NOVEMBER 8, 1977

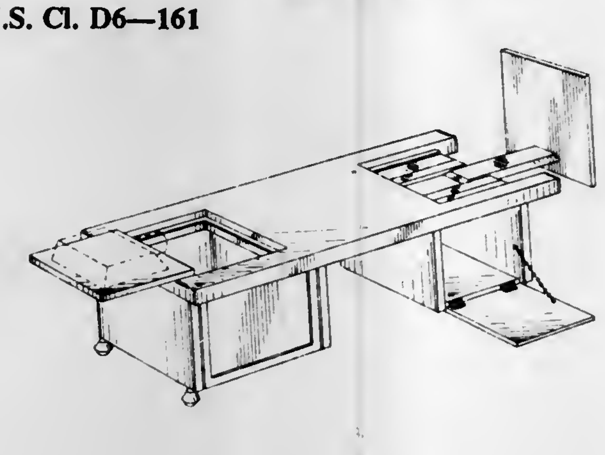
246,271
DIVING HELMET
Leon A. Cerniway, and Bruce C. Marx, both of Orange County, Calif., assignors to U.S. Divers Co., Santa Ana, Calif.
Filed Jan. 9, 1976, Ser. No. 647,929
Term of patent 14 years
Int. Cl. D2—*03*
U.S. Cl. D2—232



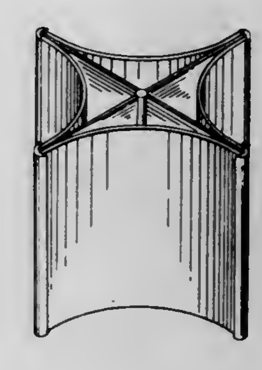
246,272
SUN VISOR
William P. Bay, Rte. 1, Box 53, Ormond Beach, Fla. 32074
Filed June 18, 1976, Ser. No. 697,339
Term of patent 14 years
Int. Cl. D2—*03*
U.S. Cl. D2—233



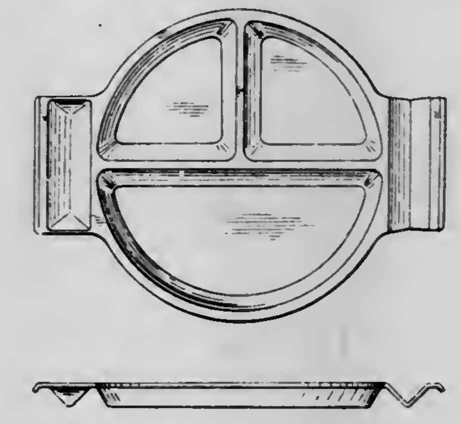
246,273
COMBINED STORAGE CABINET PROJECTOR SUPPORT AND MOVIE SCREEN UNIT
George Kavis, 355 E. 146th St., Harvey, Ill. 60426
Filed June 27, 1975, Ser. No. 591,145
Term of patent 14 years
Int. Cl. D6—*03*
U.S. Cl. D6—161



246,274
COMBINED STORAGE AND DISPLAY DEVICE FOR GRAPHIC PICTURES OR THE LIKE
Carl Nelson, and Bruce Grossman, both of 1900 W. Estes, Chicago, Ill. 60626
Filed Dec. 1, 1975, Ser. No. 636,692
Term of patent 14 years
Int. Cl. D6—*07;* D20—*02*
U.S. Cl. D6—234

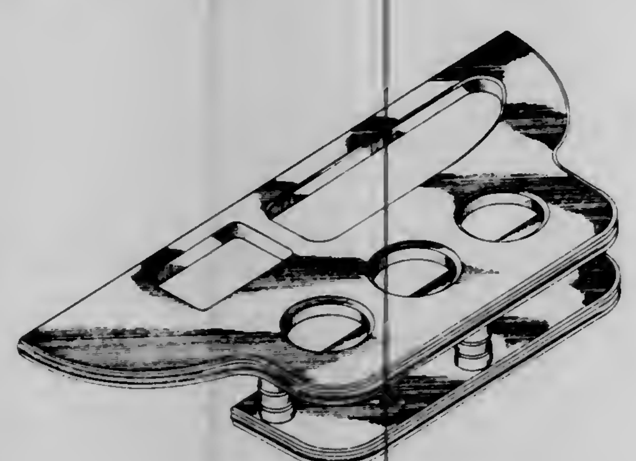


246,275
COMPARTMENTED PLATE
Robert L. Wiley, Lake Forest, Ill., assignor to SiLITE, Incorporated, Chicago, Ill.
Filed Apr. 26, 1976, Ser. No. 680,292
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—21

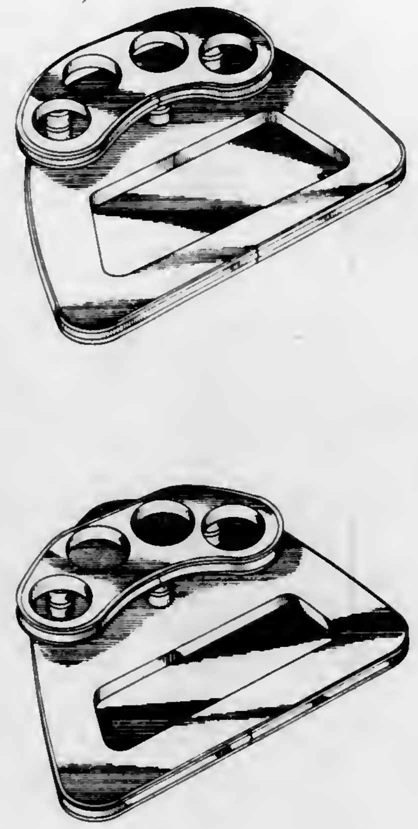


246,276
DINNER PLATE
Otto J. Lund, Wrightwood, Calif., assignor to H. F. Coors Company, Inc., Inglewood, Calif.
Filed Jan. 2, 1976, Ser. No. 646,040
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—35

246,277
SNACK TRAY
Frank Forselius, 12924 S. Main St., Los Angeles, Calif. 90061
Filed Feb. 23, 1976, Ser. No. 660,669
Term of patent 14 years
Int. Cl. D7—*99*
U.S. Cl. D7—38

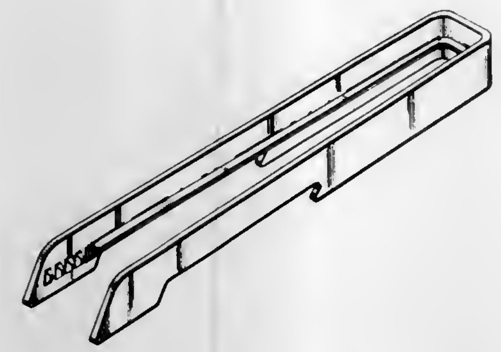


246,278
SNACK TRAY
Frank Forselius, 12924 S. Main St., Los Angeles, Calif. 90061
Filed June 16, 1976, Ser. No. 696,778
Term of patent 14 years
Int. Cl. D7—*99*
U.S. Cl. D7—38



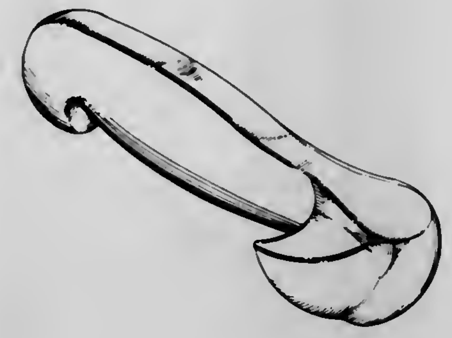
246,279
NAPKIN STAND
Frederick Arnold Haas, Jr., 279 Brainerd St., South Hadley, Mass. 01075
Filed Mar. 10, 1976, Ser. No. 665,371
Term of patent 14 years
Int. Cl. D7—*06*
U.S. Cl. D7—72

246,280
TONGS
Robert H. C. M. Daenen, Aalst, Belgium, assignor to Dart Industries Inc., Los Angeles, Calif.
Filed Feb. 5, 1976, Ser. No. 655,324
Term of patent 14 years
Int. Cl. D7—*06*
U.S. Cl. D7—105



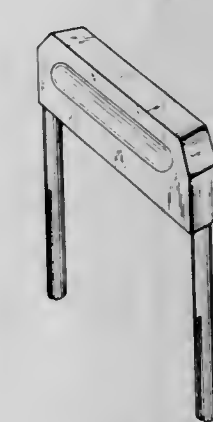
246,281
KNIFE
Daniel A. Ferrara, Jr., New Milford, Conn., assignor to Ferrara-Benedek Design, Inc., New York, N.Y.
Filed Apr. 21, 1976, Ser. No. 679,119
Term of patent 14 years
Int. Cl. D7—*03*
U.S. Cl. D7—150

246,282
KNIFE HANDLE
Dennis B. Jackson, Nunawading, Australia, assignor to Wiltshire Cutlery Company Proprietary Ltd., Australia
Filed May 13, 1975, Ser. No. 577,058
Claims priority, application Australia, Nov. 14, 1974, 66057/74
Term of patent 14 years
Int. Cl. D7—*03*
U.S. Cl. D7—152

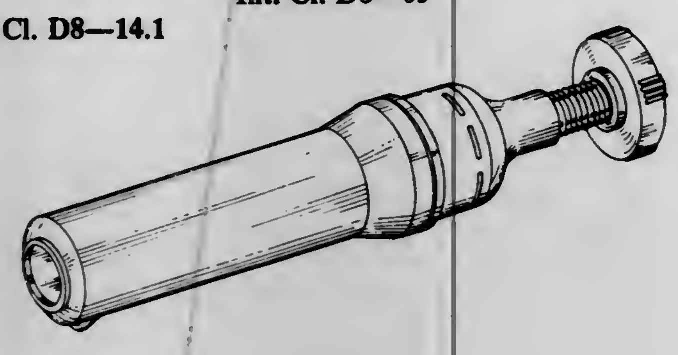


246,283
SKI BOOT BUCKLING TOOL
Alan D. Sapowith, 438 Old Connecticut Path, Apt. 2, Framingham, Mass. 01710
Filed Jan. 23, 1976, Ser. No. 651,969
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D8—14

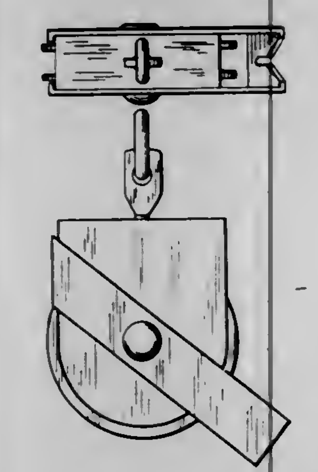
246,284
DEVICE FOR REMOVING SHEETS FROM A FILE OF PAPERS
Edelmiro Salas Arce, E 18 Temple St., Santa Ana, Rio Piedras, P.R. 00927
Filed May 28, 1976, Ser. No. 690,870
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D8—14



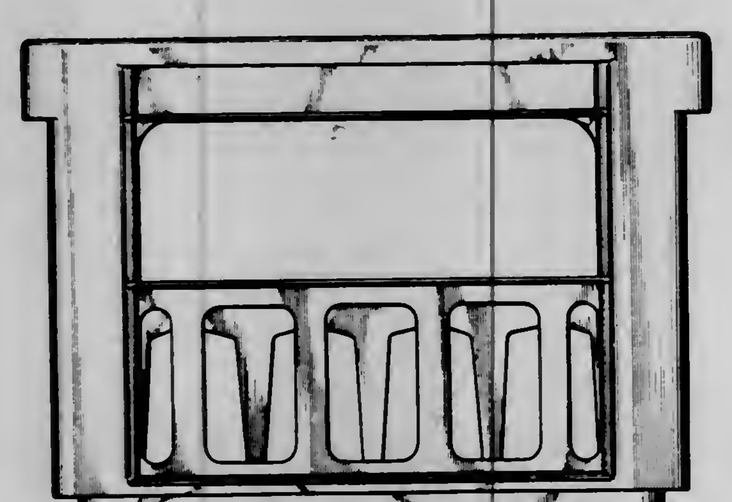
246,285
HAND DRIVEN CAULKING GUN
Fred James Gallagher, 200 Maitland Ave., Apartment 6, Altamonte Springs, Fla. 32701
Filed Feb. 20, 1976, Ser. No. 659,663
Term of patent 3½ years
Int. Cl. D8—*05*
U.S. Cl. D8—14.1



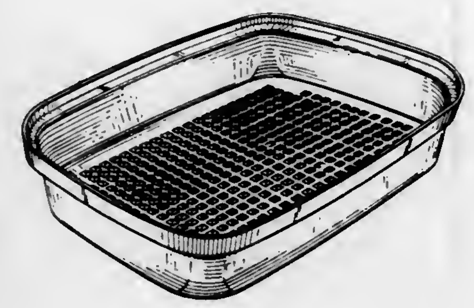
246,286
PULLEY
Junius Thomas Moore, Charleston, W. Va., assignor to The Moore Company, Inc., Charleston, W. Va.
Filed Feb. 13, 1976, Ser. No. 658,045
Term of patent 14 years
Int. Cl. D12—*05*
U.S. Cl. D8—360



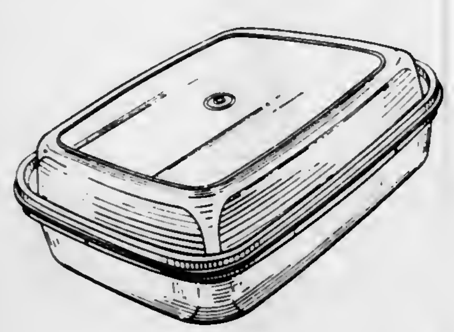
246,287
BOTTLE CRATE
Erwin Tietz, Varmlandsgatan 22, Alingsas, Sweden
Filed Feb. 21, 1975, Ser. No. 551,708
Claims priority, application Sweden, Aug. 22, 1974, 1334/74
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—177



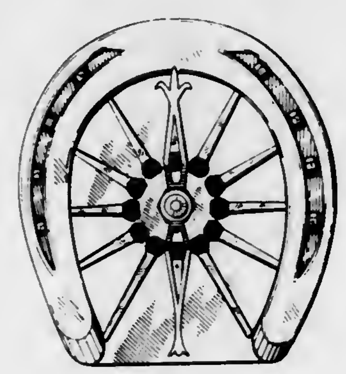
246,288
FOOD CONTAINER
Richard A. Boucher, Northboro, Mass., assignor to Dart Industries Inc., Los Angeles, Calif.
Filed Jan. 9, 1976, Ser. No. 647,951
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—219



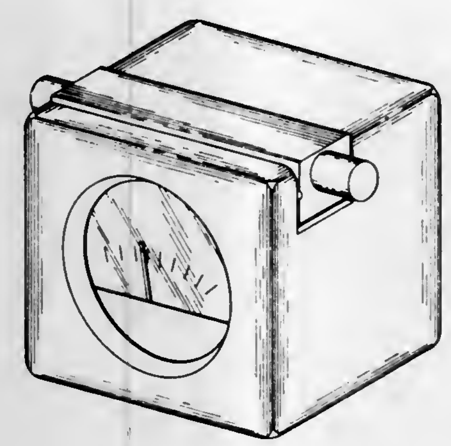
246,289
FOOD CONTAINER
Richard A. Boucher, Northboro, Mass., assignor to Dart Industries Inc., Los Angeles, Calif.
Filed Jan. 9, 1976, Ser. No. 647,833
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—240



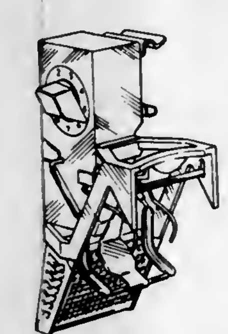
246,290
CLOCK
Charles R. Shelton, 36505 Florida Ave., No. 205, Hemet West, Calif. 92343
Filed June 16, 1976, Ser. No. 696,568
Term of patent 14 years
Int. Cl. D10—*01*
U.S. Cl. D10—6



246,291
WATTMETER OR SIMILAR HOUSING
Rudolph William Krolopp, Palatine, Villa Park, Ill., assignors to Motorola, Inc., Schaumburg, Ill.
Filed Mar. 8, 1976, Ser. No. 665,026
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—75

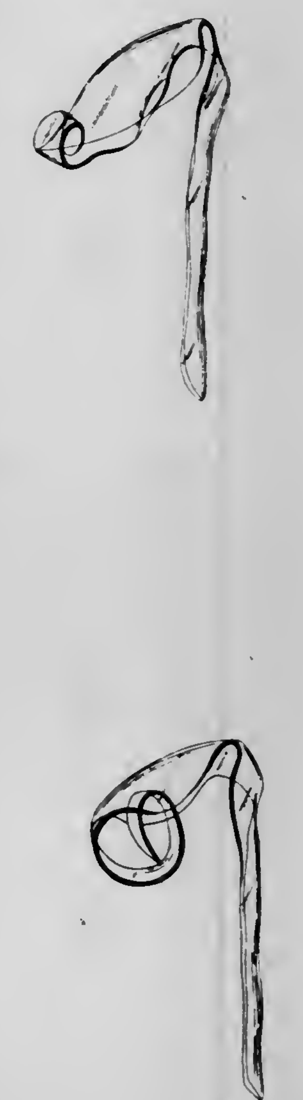


246,292
YARN FAULT DETECTOR
Kenneth Albert Jordan, Oadby, England, assignor to Trip-Lite Ltd., England
Filed Aug. 15, 1975, Ser. No. 605,366
Claims priority, application United Kingdom, Feb. 25, 1975, 970006/75
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—46

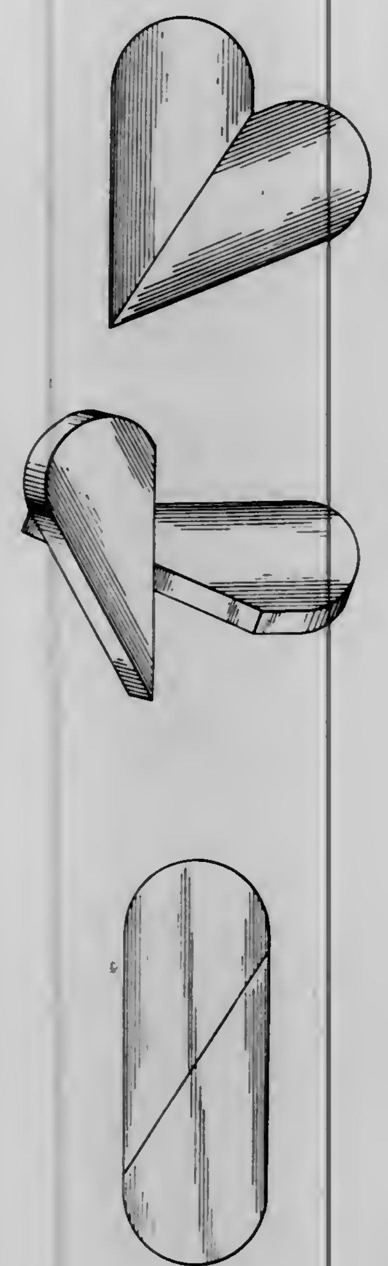


246,293
ADJUSTABLE BRACELET OR SIMILAR ARTICLE
Michael V. Doughty, 21075 Marie, Warren, Mich. 48089
Filed July 7, 1975, Ser. No. 593,753
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D11—4

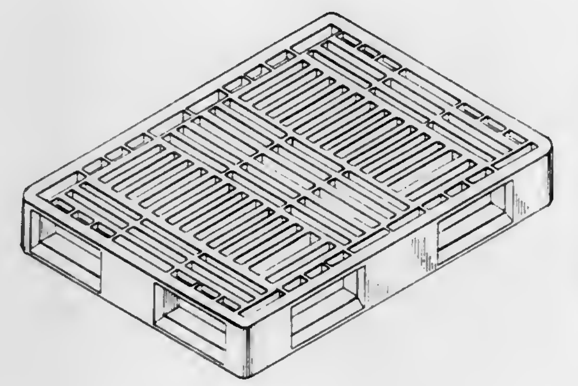
246,294
ARTIFICIAL LEAF
Susan Kaye Hetherington, 4018 Northridge, Norman, Okla. 73069
Filed Oct. 7, 1976, Ser. No. 730,457
Term of patent 14 years
Int. Cl. D11—*04*
U.S. Cl. D11—117



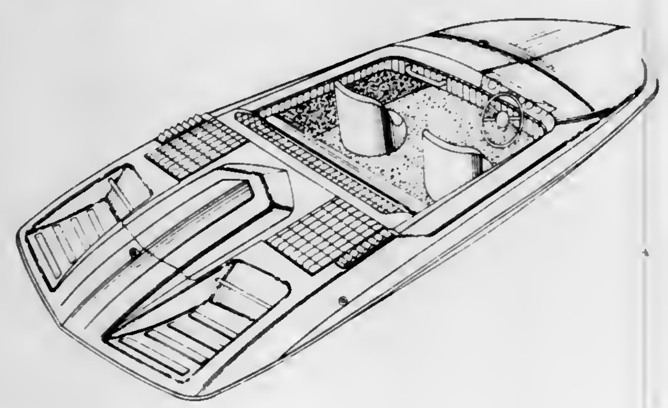
246,295
CONVERTIBLE PLAQUE
Richard C. Lewis, 464 Green Bay Road, Winnetka, Ill. 60093
Filed Mar. 15, 1976, Ser. No. 666,928
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D11—133



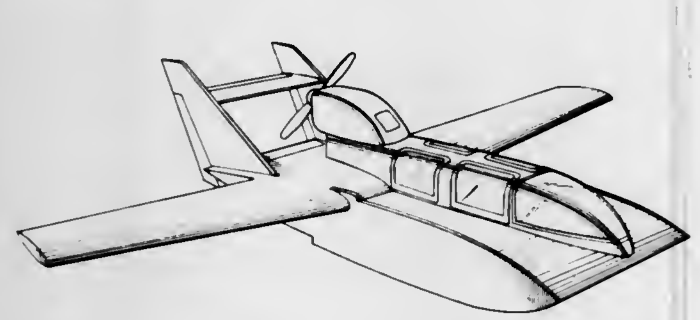
246,296
PALLET
Mituru Fujii, Urawa, and Izumi Narusawa, Tokyo, both of Japan, assignors to Dainippon Ink and Chemicals, Inc., Tokyo, Japan
Filed Apr. 27, 1971, Ser. No. 138,011
Claims priority, application Japan, Oct. 30, 1970, 50-37355
The portion of the term of this patent subsequent to Nov. 18, 1991, has been disclaimed.
Term of patent 14 years
Int. Cl. D9—*99*
U.S. Cl. D12—53



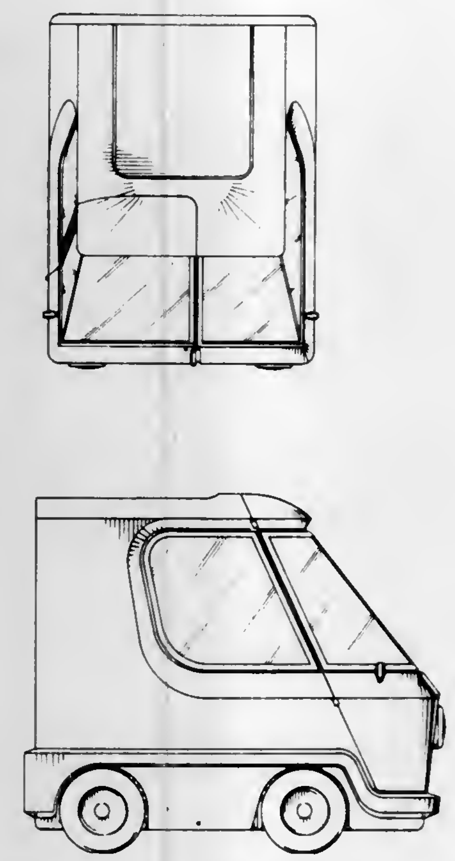
246,297
BOATS
Warwick M. Whitley, Austin, Tex., and Arthur E. Carlson, Garden Grove, Calif., assignors to Conroy, Inc., San Antonio, Tex.
Filed Apr. 20, 1976, Ser. No. 678,644
Term of patent 14 years
Int. Cl. D12—*06*
U.S. Cl. D12—62



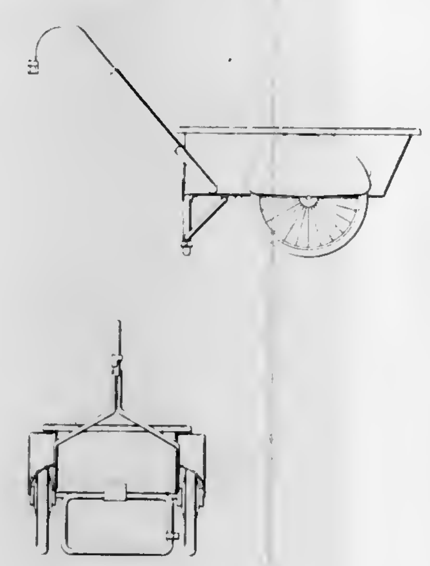
246,298
AMPHIBIOUS AIRPLANE
Carl I. Hansen, Box 106, Melvin Village, N.H. 03850
Filed Sept. 3, 1976, Ser. No. 720,264
Term of patent 7 years
Int. Cl. D12—*14*
U.S. Cl. D12—75



246,299
ELECTRIC CAR
Robert E. Haggard, 602 Warren St., Everett, Wash. 98201
Filed Oct. 4, 1976, Ser. No. 729,413
Term of patent 14 years
Int. Cl. D12—*08*
U.S. Cl. D12—90

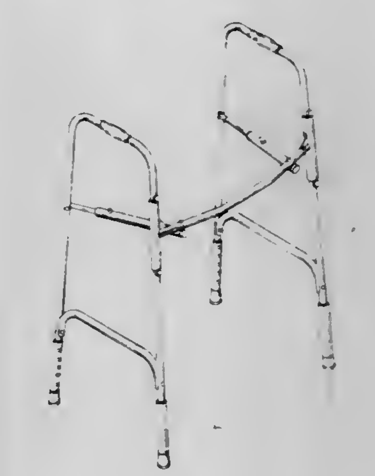


246,300
TRAILER
Charles W. Dortch, Houston, and Donald K. Vaught, Victoria, both of Tex., assignors to George C. Ballas, Sr., Houston, Tex.
Filed June 18, 1976, Ser. No. 697,676
Term of patent 14 years
Int. Cl. D12—*10*
U.S. Cl. D12—105

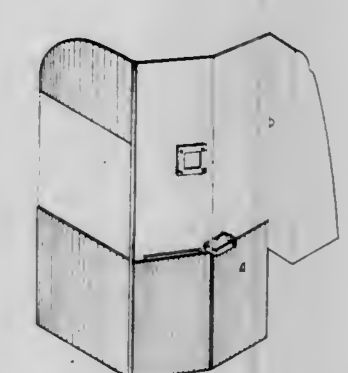


246,301
NESTABLE STROLLER
Antoine Trubiano, Pointe aux Trembles, Canada, assignor to Cari-All Inc., Montreal East, Canada
Filed May 6, 1976, Ser. No. 683,916
Term of patent 14 years
Int. Cl. D12—*12*
U.S. Cl. D12—129

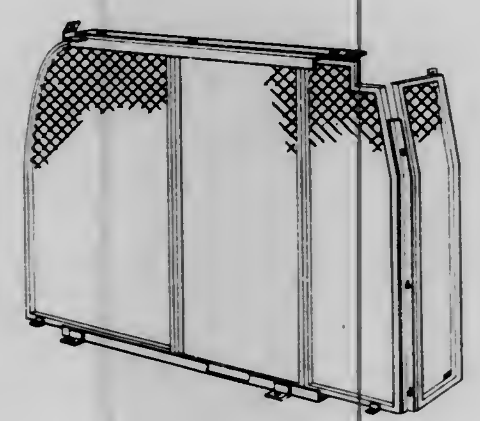
246,302
FOLDING WALKER
Morton I. Thomas, 101 Gedney St., Nyack, N.Y. 10960
Filed Sept. 15, 1975, Ser. No. 613,699
Term of patent 14 years
Int. Cl. D12—*12*
U.S. Cl. D12—130



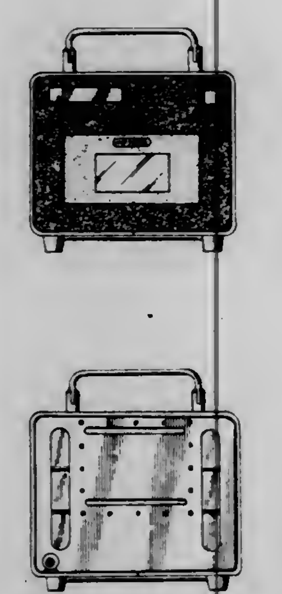
246,303
PROTECTIVE PARTITION FOR PUBLIC TRANSPORTATION VEHICLES
Dan Lee Davis, 21400 W. 7 Mile, Apt. 214, Detroit, Mich. 48219
Filed Mar. 5, 1976, Ser. No. 664,144
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—195



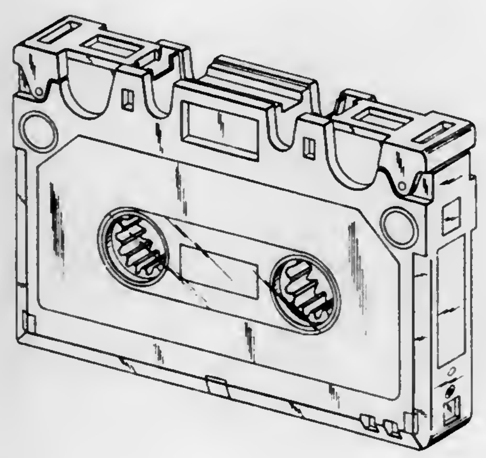
246,304
VEHICLE INTERIOR PARTITION
James Horn, 6421 Dorcas St., Philadelphia, Pa. 19111
Filed Sept. 13, 1976, Ser. No. 722,618
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—195



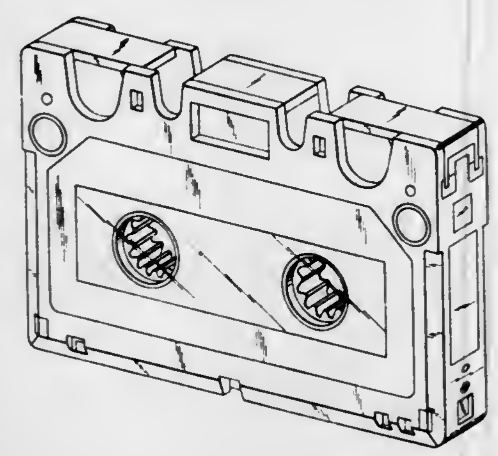
246,305
CASSETTE RECORDER HOUSING
William Gergely, Jr., 108 Twinbrook Terrace, Monroe, Conn. 06468, and Okun Kwan, 41 Inca Drive, Trumbull, Conn. 06011
Filed June 28, 1976, Ser. No. 700,590
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D14—6



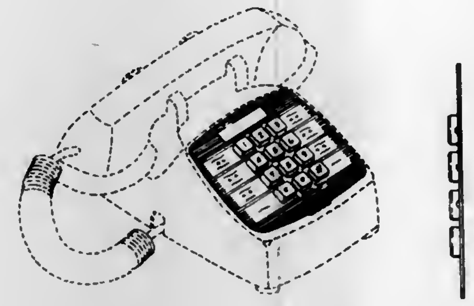
246,306
TAPE CASSETTE
Yoshio Kishi, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan
Filed June 25, 1976, Ser. No. 699,796
Claims priority, application Japan, Dec. 27, 1975, 50-51653
Term of patent 14 years
Int. Cl. D14—*99*
U.S. Cl. D14—11



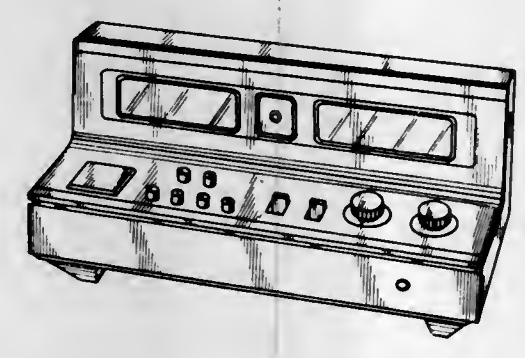
246,307
TAPE CASSETTE
Yoshio Kishi, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan
Filed June 25, 1976, Ser. No. 699,798
Claims priority, application Japan, Dec. 27, 1975, 50-51654
Term of patent 14 years
Int. Cl. D14—*99*
U.S. Cl. D14—11



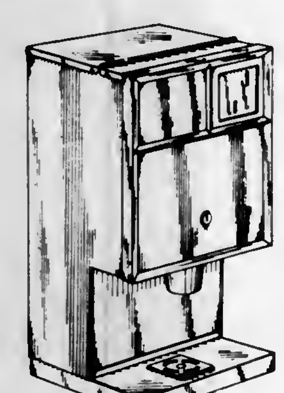
246,308
ILLUMINATED TELEPHONE DIAL
John R. Scantlin, 685 MacCulloch Drive, Los Angeles, Calif. 90049
Filed June 1, 1976, Ser. No. 691,238
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—66



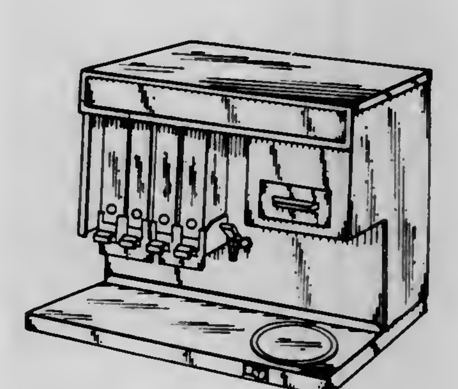
246,309
CLOCK RADIO
Aya Nakamura, Osaka, Japan, assignor to Sharp Kabushiki Kaisha
Filed Nov. 20, 1975, Ser. No. 633,824
Claims priority, application Japan, May 30, 1975, 50-22008
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—73



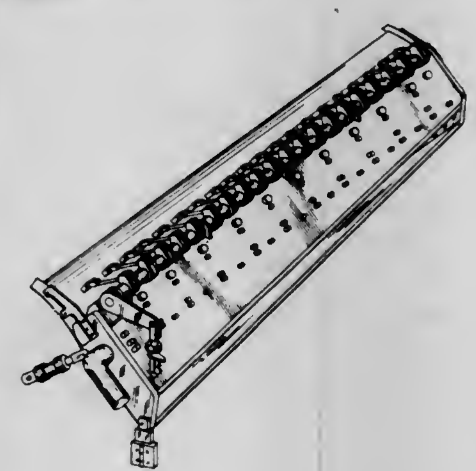
246,310
COFFEE DISPENSER
Martelle Jerome Syverson, deceased, late of Albert Lea, Minn., by David B. Syverson and Jon R. Syverson, executors, both of Albert Lea, Minn., assignors to Fountain Industries, Inc., Albert Lea, Minn.
Filed July 16, 1975, Ser. No. 596,216
Term of patent 14 years
Int. Cl. D15—*08*
U.S. Cl. D15—113



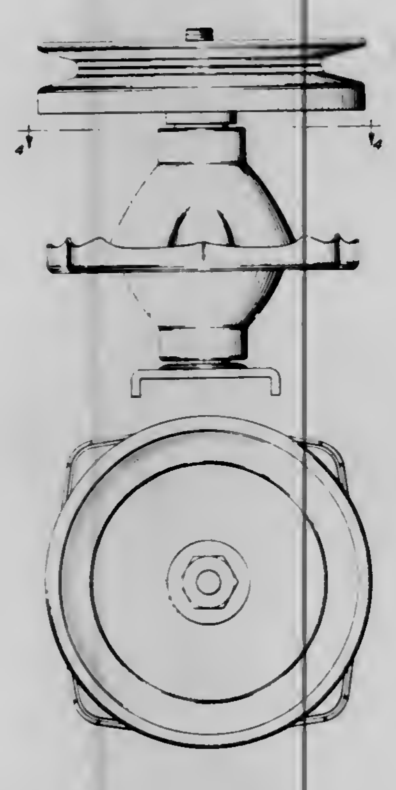
246,311
BEVERAGE DISPENSER
Martelle Jerome Syverson, deceased, late of Albert Lea, Minn., by David B. Syverson and Jon R. Syverson, executors, both of Albert Lea, Minn., assignors to Fountain Industries, Inc., Albert Lea, Minn.
Filed July 16, 1975, Ser. No. 596,215
Term of patent 14 years
Int. Cl. D15—*08*
U.S. Cl. D15—116



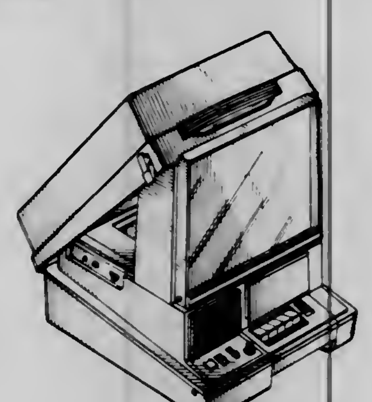
246,312
APPARATUS FOR FORMING PAPER ON A CYLINDER MOLD
John Herbert Gordon, Bradford, and Frank A. Duchnowski, Lawrence, both of Mass., assignors to J. H. Horne & Sons Company, Inc., Lawrence, Mass.
Filed Jan. 30, 1975, Ser. No. 545,340
Term of patent 14 years
Int. Cl. D15—*99*
U.S. Cl. D15—135



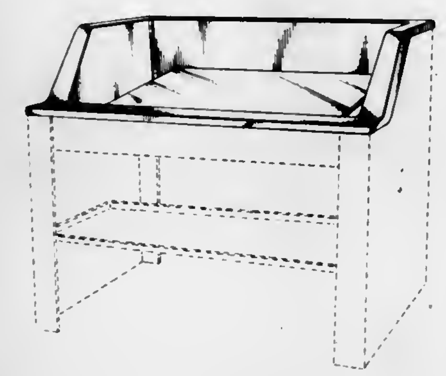
246,313
PULLEY, SHAFT AND BLADE-HOLDER ASSEMBLY FOR A POWER-DRIVEN LAWNMOWER OR THE LIKE
John C. Gunn, and James E. Null, both of Newark, Ohio, assignors to Buckeye Industrial Sales, Inc., Newark, Ohio
Filed Apr. 29, 1976, Ser. No. 681,752
Term of patent 14 years
Int. Cl. D15—*99*
U.S. Cl. D15—148



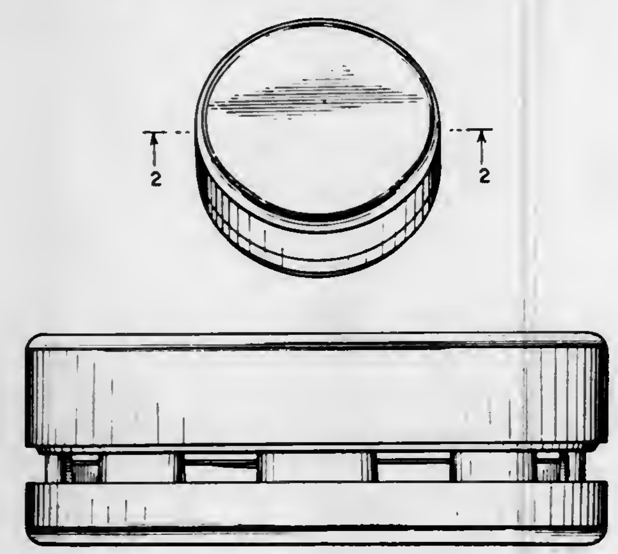
246,314
FILMSTRIP PROJECTOR
Norman R. Kubnick, Skokie, and Dennis J. Erber, Palatine, both of Ill., assignors to Bell & Howell Company, Chicago, Ill.
Continuation-in-part of Ser. No. 539,878, Jan. 9, 1975, abandoned. This application Jan. 7, 1976, Ser. No. 647,256
Term of patent 14 years
Int. Cl. D16—*02*
U.S. Cl. D16—18



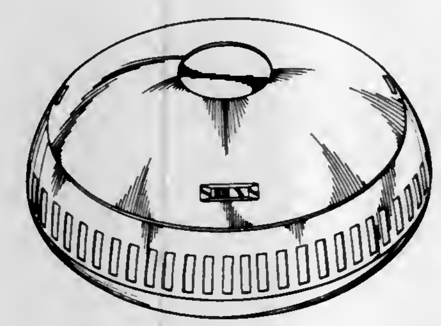
246,315
COMBINED SINK AND LIGHT BOX
Leo K. Tongish, 10206 San Juan Ave., South Gate, Calif. 90280
Filed Feb. 22, 1977, Ser. No. 770,458
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D23—58



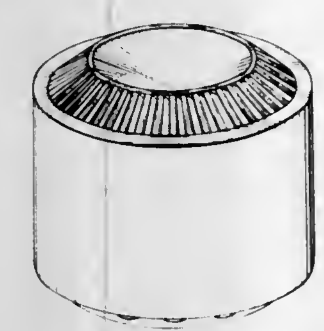
246,316
DISPENSER FOR AIR TREATING MATERIAL
Frederick B. Hadtke, New Providence, N.J., assignor to Airwick Industries, Inc., Carlstadt, N.J.
Filed Feb. 24, 1976, Ser. No. 660,941
Term of patent 14 years
Int. Cl. D23—*04*
U.S. Cl. D23—150



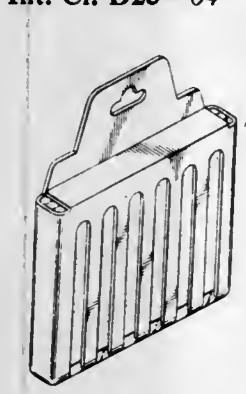
246,317
DISPENSER FOR AIR-TREATING MATERIAL
Eric Desmond Heath, Prestbury; Stewart Charles Arthur Young, Macclesfield; Michael James Wade, Wilmslow, and Brian Smith, Clifton, all of England, assignors to Airwick Industries, Inc., Carlstadt, N.J.
Filed July 22, 1976, Ser. No. 707,593
Claims priority, application United Kingdom, Jan. 27, 1976, 974123/76
Term of patent 14 years
Int. Cl. D23—*04*
U.S. Cl. D23—150



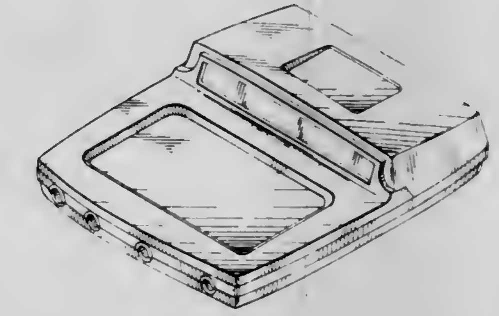
246,318
DISPENSER FOR AIR TREATING MATERIAL
Albert F. Layton, Hillsdale, and Frederick B. Hadtke, New Providence, both of N.J., assignors to Airwick Industries, Inc., Carlstadt, N.J.
Filed Dec. 27, 1976, Ser. No. 755,114
Term of patent 14 years
Int. Cl. D23—*04*
U.S. Cl. D23—150



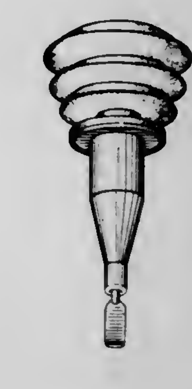
246,319
DISPENSER FOR AIR TREATING MATERIAL
Bernard Rabussier, Aventon; Jean-Pierre Mandon, Poitiers; Philippe Lecomte, Plaisance Vouille, and Louis Nuer, Poitiers, all of France, assignors to Airwick Industries, Inc., Carlstadt, N.J.
Filed Jan. 21, 1977, Ser. No. 761,511
Claims priority, application Switzerland, July 22, 1976, 108755/76
Term of patent 14 years
Int. Cl. D23—*04*
U.S. Cl. D23—150



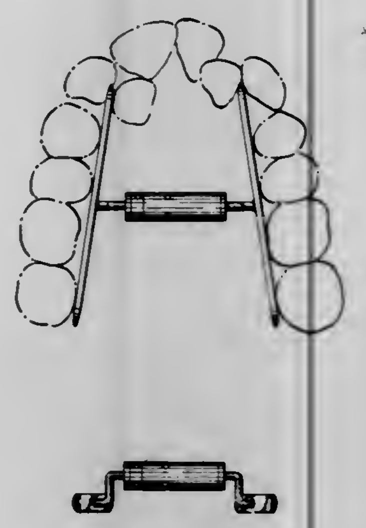
246,320
DENTAL CONSOLE
Danny Michael Truette, Pineville, N.C., assignor to Pelton & Crane Company, Charlotte, N.C.
Filed Nov. 12, 1976, Ser. No. 741,517
Term of patent 14 years
Int. Cl. D24—*01*
U.S. Cl. D24—5



246,321
DISPOSABLE SYRINGE FOR STORING AND ADMINISTERING PHARMACEUTICAL PREPARATIONS
Claes Peter Löfman, Stockholm, Sweden, assignor to Astra Lakemedel Aktiebolag, Sodertalje, Sweden
Filed Nov. 20, 1975, Ser. No. 633,604
Claims priority, application Sweden, June 5, 1975, 751159; June 5, 1975, 751160
Term of patent 14 years
Int. Cl. D24—*04*
U.S. Cl. D24—24

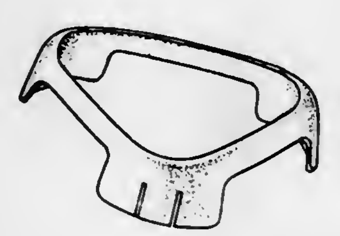


246,322
MAXILLARY ORTHOPEDIC SUTURE SEPARATING ORTHODONTIC APPLIANCE
James S. Krygier, Suite 103, Plaza Apt. Bldg., Wilmington, Del. 19806
Filed Nov. 12, 1976, Ser. No. 741,284
Term of patent 14 years
Int. Cl. D24—*03*
U.S. Cl. D24—34

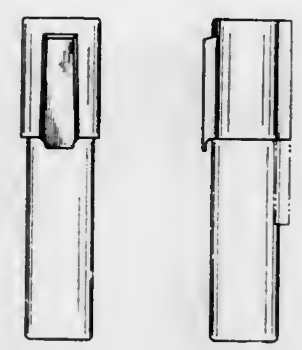


246,323
DECORATIVE END PIECE FOR USE ON UPRIGHT ENDS OF FREE-STANDING OFFICE DIVIDERS
John Kirk, 59 Olsen Drive, Don Mills, Ontario, Canada
Filed Oct. 30, 1975, Ser. No. 627,497
Claims priority, application Canada, Oct. 3, 1975, 0310752
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—75

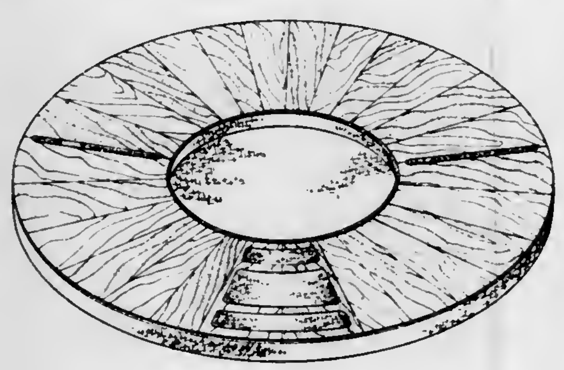
246,324
PROTECTIVE CAP FOR A SHAVING HEAD
Klaas Tiemen Oord, Drachten, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.
Filed Jan. 12, 1976, Ser. No. 648,312
Claims priority, application Netherlands, July 17, 1975, 7550441
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D28—50



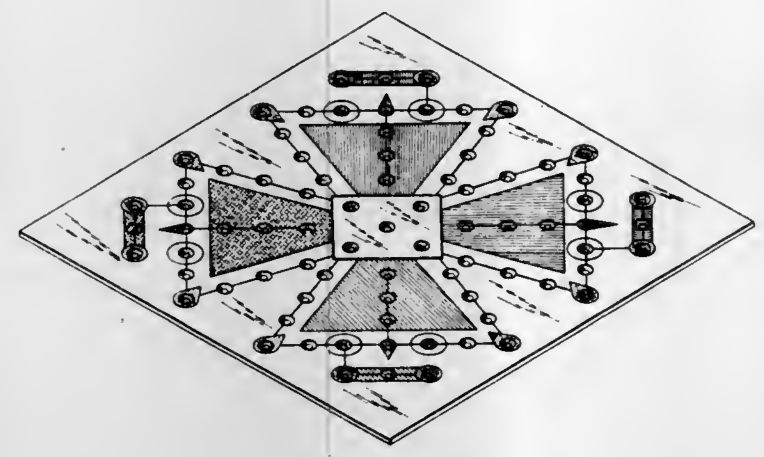
246,325
FIRE EXTINGUISHER
William J. Rakocy, Clifton, N.J., and Howard L. Rauch, Brooklyn, N.Y., assignors to North American Philips Corporation, New York, N.Y.
Filed June 11, 1975, Ser. No. 586,053
Term of patent 14 years
Int. Cl. D29—*01*
U.S. Cl. D29—2



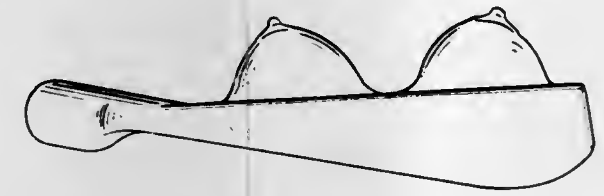
246,326
BACKGAMMON GAMEBOARD
James R. Watson, 6631 Orchid, Dallas, Tex. 75230
Filed Feb. 2, 1976, Ser. No. 654,289
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 SS



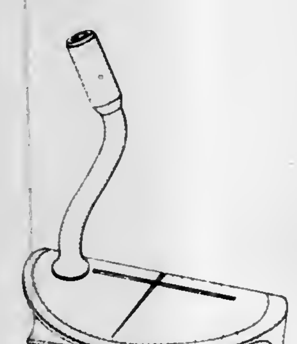
246,327
GAME BOARD
Dan L. Luther, 1819 Smythe St., No. 86, San Ysidro, Calif. 92173
Filed Apr. 15, 1976, Ser. No. 677,499
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 PB



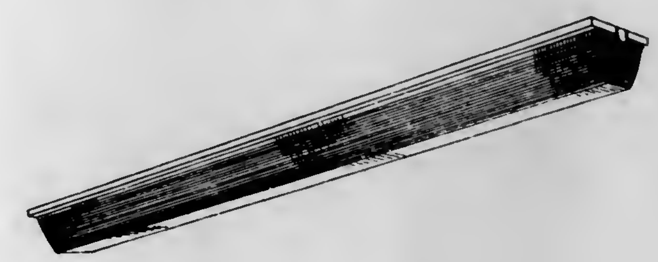
246,328
GOLF CLUB HEAD
George E. Tanner, 15315 Wilmer Ave., Paramount, Calif. 90723
Filed June 23, 1976, Ser. No. 699,177
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 GH



246,329
GOLF PUTTER HEAD
Harry H. Little, 202 Cedar Lane, Apt. 11, Vienna, Va. 22180
Filed June 24, 1976, Ser. No. 699,574
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 GH

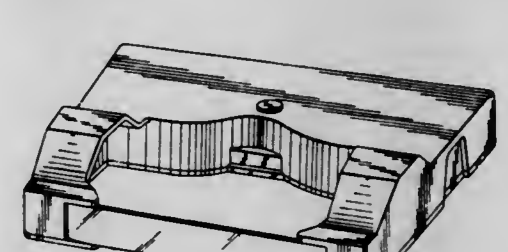


246,330
FLUORESCENT LIGHT FIXTURE
Kenneth P. Krase, Chicago, and Kenneth R. Hawkins, Gurnee, both of Ill., assignors to Kenall Manufacturing Company, Chicago, Ill.
Filed May 27, 1976, Ser. No. 690,505
Term of patent 14 years
Int. Cl. D26—*05*
U.S. Cl. D48—23 A



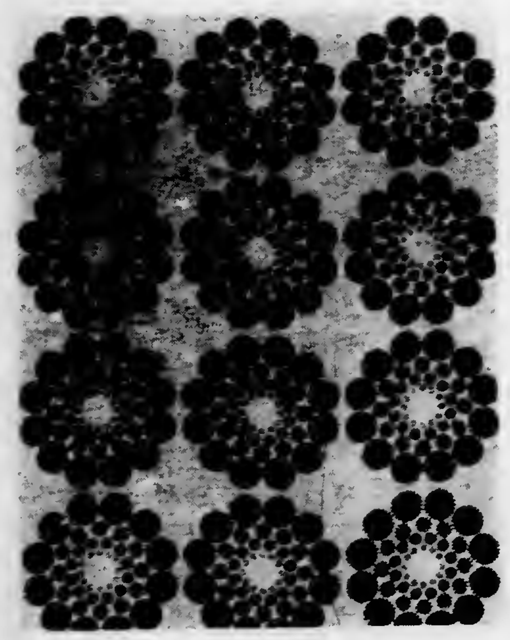
246,331
GUITAR HEAD
Grover G. Fields, Stanton, Calif., assignor to CBS Inc., New York, N.Y.
Filed Nov. 18, 1974, Ser. No. 524,786
Term of patent 14 years
Int. Cl. D17—*03*
U.S. Cl. D56—1 A

246,332
INK RIBBON CARTRIDGE
Mario Bellini, Milan, Italy, assignor to Ing. C. Olivetti & C., S.p.A., Ivrea (Turin), Italy
Filed Jan. 5, 1976, Ser. No. 646,710
Claims priority, application Italy, July 10, 1975, 53214/75
Term of patent 14 years
Int. Cl. D18—*99*
U.S. Cl. D64—11 A



246,333
CARD HOLDER OR THE LIKE
Walter Boecher, Jr., P.O. Box 3455, Lantana, Fla. 33462
Filed Mar. 19, 1976, Ser. No. 668,703
Term of patent 14 years
Int. Cl. D20—*02*
U.S. Cl. D96—12 A

246,334
UPHOLSTERY FABRIC OR THE LIKE
Verner Panton, Binningen, Switzerland, assignor to Mira-X S.A. Suhr, Switzerland
Filed Mar. 26, 1975, Ser. No. 562,371
Claims priority, application Switzerland, Dec. 27, 1974, 60138/74
Term of patent 14 years
Int. Cl. D6—*13*
U.S. Cl. D92—1 T



246,335
MILK REQUIREMENT INDICATOR
John Leslie Hopkins, 8 Carrwood Road, Bramhall, Stockport, Cheshire, and Arthur Holmes, Rombald 25 Ryburn Avenue, Blackburn, Lancashire, both of England
Filed Dec. 31, 1975, Ser. No. 645,620
Term of patent 14 years
Int. Cl. D20—*99*
U.S. Cl. D96—2

LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 8TH DAY OF NOVEMBER, 1977

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

AB Svenska Flaktfabriken: *See—*
Jansson, Staffan, 4,057,406, Cl. 55-385.00R.
Abbott Laboratories: *See—*
Dunnigan, Daniel Ambrose; Geiszler, Adolph Oscar; and Holland, James Brooks, 4,057,582, Cl. 260-574.000.
McIntire, Floyd Cottam, 4,057,685, Cl. 536-18.000.
Abramovici, Jean; Ermans, Andre Marie; and Jeghers, Omer. Method of labeling proteins with technetium. 4,057,617, Cl. 424-1.000.
Adachi, Fumiyuki: *See—*
Hattori, Takeshi; and Adachi, Fumiyuki, 4,057,758, Cl. 325-56.000.
Adams, Frederick John, to Cam Gears Limited. Plural-service hydraulic system. 4,057,073, Cl. 137-118.000.
Adams, Truman W., to Indianapolis Center For Advanced Research. Releasable anchor. 4,057,024, Cl. 114-298.000.
Adcock, Willis A., to Texas Instruments Incorporated. Electronic photography system. 4,057,830, Cl. 358-127.000.
Addoo, Marie. Telephone dial lock. 4,057,697, Cl. 179-189.00D.
Adelstein, Gilbert W.; Dajani, Esam Z.; and Yen, Chung Hwai, to G. D. Searle & Co. Triarylpropyl-azabicyclooctanes. 4,057,549, Cl. 260-293.540.
Adrian, Werner Karl; and Borkenstein, Robert Frank. Determination of the alcohol content of blood. 4,057,724, Cl. 250-343.000.
AeroVironment Inc.: *See—*
MacCready, Paul B., Jr.; and Lissaman, Peter B. S., 4,057,280, Cl. 296-1.00S.
AGFA-Gevaert Aktiengesellschaft: *See—*
Wick, Richard; Pfeifer, Josef; and Schnall, Gunther, 4,057,344, Cl. 355-16.000.
AGFA-GEVAERT, N. V.: *See—*
De brabandere, Luc Achiel; Pollet, Robert Joseph; Pattyn, Herman Alberik; and Borginon, Hendrik Alfons, 4,057,429, Cl. 96-94.00R.
Ahrens, Hanns: *See—*
Biere, Helmut; Ahrens, Hanns; Rufer, Clemens; Schroder, Eberhard; and Koch, Henning, 4,057,640, Cl. 424-274.000.
Aibara, Shunzo: *See—*
Miki, Tosaku; Hosokawa, Yasuhiro; Miwa, Tamotsu; Fujita, Hiroshi; Asano, Masahide; and Aibara, Shunzo, 4,057,629, Cl. 424-177.000.
Airco, Inc.: *See—*
Brace, Arthur A.; and Lesnewich, Alexander, 4,057,420, Cl. 75-53.000.
Airscrew Howden Limited: *See—*
Letts, Robert Arthur, 4,056,882, Cl. 29-597.000.
Aisin Seiki Kabushiki Kaisha: *See—*
Mori, Masanori, 4,057,135, Cl. 192-111.00A.
Nakashima, Katsushi, 4,057,700, Cl. 200-84.00C.
Yamazaki, Shinichiro; and Hanabashi, Teruyuki, 4,057,166, Cl. 220-8.000.
Akasaka, Shigeo; and Tanaka, Hiroaki, to Nippon Kogaku K.K. Exposure time control device in a cinecamera. 4,057,333, Cl. 352-141.000.
Akimoto, Hiroshi: *See—*
Sugimoto, Keiichi; Nishijima, Koji; Akimoto, Hiroshi; Hanaoka, Tadashi; and Kakeya, Nobuharu, 4,057,544, Cl. 260-239.100.
Akiyama, Fumitake: *See—*
Arikawa, Hiroo; Akiyama, Fumitake; and Maruo, Masaya, 4,057,774, Cl. 337-164.000.
Akzo N.V.: *See—*
de Rook, Poppe, 4,057,526, Cl. 260-29.60S.
Akzona Incorporated: *See—*
Craig, Jeffrey M., 4,057,350, Cl. 356-199.000.
Zengel, Hans-Georg; and Bergfeld, Manfred, 4,057,588, Cl. 260-621.00R.
Albert, Richard D. Scanning X-ray source. 4,057,745, Cl. 313-55.000.
Albrecht, Robert J.; and Fraunberger, Martin J., to Nabisco, Inc. Vacuum slide valve. 4,057,078, Cl. 137-625.200.
Alcan Research and Development Limited: *See—*
Gilliand, Andre Ferdinand Louis; and Looser, Christian, 4,056,921, Cl. 53-167.000.
Alder, Hanspeter, to Swiss Aluminium Ltd. Inconsumable electrodes. 4,057,480, Cl. 204-290.00R.
Alexander Binzel Corporation: *See—*
Geus, Ewald; and Tammi, Vesa, 4,057,704, Cl. 219-75.000.
Allen, Richard E., to Corning Glass Works. Electric heating unit. 4,057,707, Cl. 219-543.000.
Allied Chemical Corporation: *See—*
Barrett, Joseph J., 4,057,349, Cl. 356-45.000.
Kurtz, Bruce E.; Guptill, Joel P.; and Fitch, Robert H., 4,057,474, Cl. 204-98.000.
Lee, Lester T. C.; Dege, Gerald J.; and Liu, Kang-Jen, 4,057,481, Cl. 204-296.000.
Prevorsek, Dusan C.; Kwon, Young D.; and Sharma, Raj K., 4,056,973, Cl. 73-91.000.
Allis, Robert F., to Xerox Corporation. Illumination slit for a reproducing machine. 4,057,342, Cl. 355-8.000.
Allison, William D., to Ford Motor Company. Frangible tie rod end bearing seat. 4,057,355, Cl. 403-2.000.
Alton Box Board Company: *See—*
Wilkinson, Robert M., 4,057,201, Cl. 242-125.100.
Altoz, Frank E., to Westinghouse Electric Corporation. Temperature controlled airborne electronic assembly. 4,057,104, Cl. 165-35.000.
Alvarez-Calderon F., Alberto M. Inflatable envelope systems for use in excavations. 4,056,939, Cl. 61-35.000.
Alza Corporation: *See—*
Higuchi, Takeru; and Hussain, Anwar, 4,057,619, Cl. 424-14.000.
Amano, Kitsutaro: *See—*
Kinuhata, Koji; Amano, Kitsutaro; Sasaki, Hiroshi; and Yamamoto, Hideo, 4,057,835, Cl. 358-140.000.
American Can Company: *See—*
Wiggins, Glenn C.; Kreh, Marvin J.; and Davis, Robert S., 4,057,667, Cl. 428-35.000.
American Cyanamid Company: *See—*
Blank, Werner Josef, 4,057,523, Cl. 260-29.4UA.
Grudzinskas, Charles Vincent; and Weiss, Martin Joseph, 4,057,571, Cl. 560-121.000.
American Electromedics Corporation: *See—*
Kerouac, Adrian R., 4,057,051, Cl. 128-2.00Z.
American Home Products Corporation: *See—*
Asselin, Andre A.; Humber, Leslie G.; and Dobson, Thomas A., 4,057,559, Cl. 260-315.000.
Sellstedt, John H.; and Klaubert, Dieter H., 4,057,632, Cl. 424-248.540.
American Hospital Supply Corporation: *See—*
Resch, Alvin Charles, Jr., 4,057,306, Cl. 312-218.000.
American Medical Products Company: *See—*
Gossett, Rodger L., 4,057,047, Cl. 126-263.000.
American Microsystems, Inc.: *See—*
Smedley, Sean Anthony, 4,057,844, Cl. 361-111.000.
American National Red Cross: *See—*
Schwartz, Robert T.; and Harrison, Marc S., 4,057,288. Cl. 297-239.000.
Amos, James W., to Canton Textile Mills, Inc. Apparatus and method for winding yarn on a bobbin. 4,057,196, Cl. 242-18.0PW.
AMP Incorporated: *See—*
Evans, William Robert, 4,057,311, Cl. 339-17.00M.
Anamorphic Ltd.: *See—*
Ehrenhaft, Franz F.; and Rosin, Seymour, 4,057,345, Cl. 355-35.000.
Anderson-Cook, Inc.: *See—*
Anderson, Marvin R.; and Jungesjo, Harald N., 4,056,901, Cl. 51-165.870.
Anderson, Marvin R.; and Jungesjo, Harald N., to Anderson-Cook, Inc. Dresser and grinding machine therefor. 4,056,901, Cl. 51-165.870.
Anderson, Paul J. Hand-held ice auger. 4,057,114, Cl. 173-26.000.
Ando, Susumu: *See—*
Kinoshita, Mototaka; Okabe, Akio; and Ando, Susumu, 4,057,495, Cl. 210-44.000.
Andrews, Frank; and McKee, Richard W., to Federal Signal Corporation. Slide cam assembly for railroad-crossing gate mechanism. 4,057,208, Cl. 246-125.000.
Angleraud, Rene; and Ledru, Pierre, to Rhone-Poulenc Industries. Process for the manufacture of heat resistant multicellular materials. 4,057,518, Cl. 260-2.50N.
Angner, Ronald Joseph; Blount, Marion Lee; and Lacy, James Volney, to Bell Telephone Laboratories, Incorporated. Logic control for electronic key telephone line circuit. 4,057,693, Cl. 179-99.000.
Antonini, Albert; Joffre, Philippe; and Laine, Francois, to Rhone-Poulenc Industries. Oxychlorination of ethylene with fluid bed catalyst. 4,057,592, Cl. 260-659.00A.
Aono, Shigeo, to Nissan Motor Co., Ltd. Air-fuel mixture control apparatus for internal combustion engines using digitally controlled valves. 4,057,042, Cl. 123-119.0EC.
Apollo Chemical Corporation: *See—*
Bennett, Robert P.; and Kukin, Ira, 4,057,398, Cl. 44-4.000.
Appleton, Richard Anthony; and Brown, Kevin, to Fisons Limited. Method of treating inflammation with 2-(2,3-dihydro-2-isopropyl-4-oxo-4H-1-benzopyran-6-yl)propionic acid. 4,057,641, Cl. 424-283.000.
Arachnid, Incorporated: *See—*
Jones, Richard F.; and Ping, Ernest L., 4,057,251, Cl. 273-95.00R.
Aramaki, Minoru: *See—*
Ono, Tetsuhiro; Aramaki, Minoru; Mizuno, Tamotsu; and Fujinaga, Masao, 4,057,614, Cl. 423-490.000.

Arbel Industrie: *See—*

Laurent, Jacky Adrien Paul; and Croix-Marie, Francis Jean-Marie, 4,057,018, Cl. 104-48.000.

Arca Holding S.A.: *See—*

Elfstrom, Carry Allon, 4,056,906, Cl. 52-233.000.

Arguello, Leonard E., to W. R. Grace & Co. Constant duty cycle monostable. 4,057,740, Cl. 307-273.000.

Argus Chemical Corporation: *See—*

Friedman, Ronald L.; and Lewis, Roger N., 4,057,567, Cl. 260-453.0RZ.

Arikawa, Hiroo; Akiyama, Fumitake; and Maruo, Masaya. Miniature time-delay fuse. 4,057,774, Cl. 337-164.000.

Arima, Tatsuhiro, to Nissan Motor Co., Ltd. Vehicle occupant restraining belt arrangement. 4,057,290, Cl. 297-389.000.

Arizona Chemical Company: *See—*

Ruckel, Erwin Richard; and Wang, Long Shyong, 4,057,682, Cl. 526-190.000.

Armco Steel Corporation: *See—*

Slama, Jerry L.; Francis, David J.; and Shepherd, Gordon R., 4,057,185, Cl. 226-1.000.

Arnold, Dan M.: *See—*

Paap, Hans J.; and Arnold, Dan M., 4,057,720, Cl. 250-266.000.

Arnold, Harmon W., to Flex-O-Lators, Inc. Trim retainer device for upholstered cushions. 4,057,292, Cl. 297-452.000.

Artrip, Robert W.; and Klimo, Robert G., to Towmotor Corporation. Firing control oscillator for a solid state switch. 4,057,752, Cl. 318-345.00B.

Aryamane, Avinash P.: *See—*

Williamson, Harold L.; and Aryamane, Avinash P., 4,056,884, Cl. 29-623.000.

Asahi, Satoshi: *See—*

Kimura, Akio; Seki, Kenji; Ukita, Mamoru; Asahi, Satoshi; and Tagami, Sanae, 4,057,600, Cl. 260-878.00B.

Asano, Masahide: *See—*

Miki, Tosaku; Hosokawa, Yasuhiro; Miwa, Tamotsu; Fujita, Hiroshi; Asano, Masahide; and Aibara, Shunzo, 4,057,629, Cl. 424-177.000.

Asano, Shinzo, to Fuji Shiko Kabushiki Kaisha; and Kabushiki Kaisha Asano Tekkosho. Rolling printing machine. 4,057,013, Cl. 101-212.000.

Ascher, Gerd; and Reinshagen, Hellmuth, to Sandoz Ltd. Certain 5-nitrothiazolylimidazolidine compounds. 4,057,557, Cl. 260-306.80R.

Ash, Eric Albert; and Dias Soares, Oliverio Delfim, to National Research Development Corporation. Optical system using a hologram coupler. 4,057,319, Cl. 350-96.00C.

Askin, Kerim, to Southwire Company. Starting dummy bar positioner for continuous casting of metals. 4,057,096, Cl. 164-49.000.

Asscher, Meir; and Rosin, Hadassa, to Rhone-Progil. Adducts of olefins and trichloromethane phosphonic dichloride. 4,057,578, Cl. 260-543.00P.

Asscher, Meir; and Rosin, Hadassa, to Rhone-Progil. Adducts of olefins and trichloromethane phosphonic dichloride. 4,057,579, Cl. 260-543.00P.

Asselin, Andre A.; Humber, Leslie G.; and Dobson, Thomas A., to American Home Products Corporation. Carbazole acetic acid derivatives. 4,057,559, Cl. 260-315.000.

Association pour le Developpement de l'Enseignement et de la Recherche en Systematique Appliquee (A.D.E.R.S.A.): *See—*

Timsit, Claude, 4,057,795, Cl. 340-347.0AD.

Asthana, Abhaya; and Hannauer, George, to Electronic Associates, Inc. Analog switching system with fan-out. 4,057,711, Cl. 364-600.000.

Atchisson, Maxwell G. Open bolt conversion apparatus. 4,057,003, Cl. 89-138.000.

Ateliers des Charmilles S.A.: *See—*

Pfau, Jean, 4,057,703, Cl. 219-69.00C.

Atencio, Jimmie P. Engineering and educational table and method of use. 4,056,892, Cl. 35-10.000.

Atex, Incorporated: *See—*

Ying, Charles W.; and Ying, Richard, 4,057,849, Cl. 364-200.000.

Atkiss, Thomas Clifford; and Keen, William Elgin, Jr., to Pennwalt Corporation. Scale reducer for zinc phosphating solutions. 4,057,440, Cl. 148-6.15Z.

Atlantic Richfield Company: *See—*

Striegler, John H., 4,057,116, Cl. 173-165.000.

Audykowski, Thaddeus, to Ciba-Geigy Corporation. Process for the production of quick-curing epoxide resin coatings which are resistant to chemicals and to weathering. 4,057,664, Cl. 427-386.000.

Automation Industries, Inc.: *See—*

van Valkenburg, Howard E.; and McCarroll, Vincent P., 4,056,971, Cl. 73-629.000.

Automatisme & Technique: *See—*

Lacombe-Allard, Jean Francois, 4,057,702, Cl. 219-10.55A.

Automobiles Peugeot: *See—*

Colinet, Andre, 4,057,271, Cl. 292-87.000.

Axen, Udo F., to Upjohn Company, The. 2,2-Difluoro-16-phenoxy-13,14-dihydro-PGA$_2$ analogs. 4,057,574, Cl. 560-53.000.

Ayerst, McKenna & Harrison Ltd.: *See—*

Bagli, Jehan F.; and Bogri, Tibor, 4,057,556, Cl. 424-305.000.

B. E. Wallace Products Corporation: *See—*

Wallace, Bernard E., 4,057,218, Cl. 254-167.000.

B/W Controls Inc.: *See—*

Bongort, Edgar A.; and Cruickshank, William T., 4,056,979, Cl. 73-313.000.

Babb, Raymond E., to Hanscom, Genevieve I.; Magnuson, Robert M.; and Thomson, Lois J., part interest to each. Color grading apparatus utilizing infrared light source. 4,057,352, Cl. 356-178.000.

Babcock & Wilcox Company, The: *See—*

Nemeth, Joseph Daniel, 4,057,237, Cl. 267-134.000.

Schlichting, John; and Tornow, Robert Norman, 4,057,033, Cl. 122-32.000.

Baber, James R.; and Dershem, Ronald J., to General Motors Corporation. Fluid flow control members. 4,057,080, Cl. 138-44.000.

Bachmann, Wilfried; Gnabs, Christian; Janecka, Kurt; Mundlos, Eberhard; Papenfuhs, Theodor; and Waese, Gerhard, to Hoechst Aktiengesellschaft. Process for isolating 2-hydroxynaphthalene carboxylic acids from reaction mixtures of the alkali metal salts of 2-hydroxynaphthalene with carbon dioxide. 4,057,576, Cl. 260-525.000.

Backlund, Sigurd Alfons, to Kemira Oy. Breathing mask, especially a half mask or a full mask provided with an inner mask. 4,057,057, Cl. 128-142.400.

Bacskai, Robert, to Chevron Research Company. Hydroxylation of unsaturated diols to prepare novel tetraols. 4,057,589, Cl. 260-635.00E.

Bagli, Jehan F.; and Bogri, Tibor, to Ayerst, McKenna & Harrison Ltd. Troponyl-oxamic acid derivatives. 4,057,556, Cl. 424-305.000.

Bailey, John M., to Caterpillar Tractor Co. Self-cleaning screen assembly for radiators and method. 4,057,105, Cl. 165-119.000.

Bailey Meter & Controls Limited: *See—*

deVial, Raymond Michael; and Taylor, Philip Maurice, 4,057,721, Cl. 250-301.000.

Bajusz, Harold F.; and Iino, Nobuhiro. Nib and shield for writing implement. 4,057,354, Cl. 401-199.000.

Baker, Alfred Lynn, to RCA Corporation. Sync responsive systems for video disc players. 4,057,826, Cl. 358-4.000.

Balli, Heinz; and Egger, Albert, to Ciba-Geigy Corporation. Certain naphthofurans and method for their manufacture. 4,057,562, Cl. 260-346.710.

Balling, Heinz, to Siemens Aktiengesellschaft. Base frame construction for a liquid ring compressor set. 4,057,368, Cl. 417-313.000.

Ballweber, Edward G.: *See—*

Phillips, Kenneth G.; Ballweber, Edward G.; and Selvarajan, Radhakrishnan, 4,057,580, Cl. 260-567.60P.

Balzers Patent- und Beteiligungs-Aktiengesellschaft: *See—*

Hacman, Dionys; and Keutschegger, Adolf, 4,057,316, Cl. 350-1.000.

Bamburg, Robert A.; Duncan, Farris N.; and Floyd, Roger M., to Olinkraft, Inc. Method of packaging and shipping bulk material using reusable outer shell. 4,056,913, Cl. 53-27.000.

Banks, Frank H., to MFE Corporation. Tape cassette drive. 4,057,839, Cl. 360-93.000.

Bardy, Andre; Beydon, Jacqueline; Gobin, Renee; and Hegesippe, Michel, to Commissariat a l'Energie Atomique. Method of tagging excipients with 99M technetium. 4,057,615, Cl. 424-1.000.

Barer, Sol J., to Celanese Corporation. Antifungal compositions of butanediol bis (chloroacetate). 4,057,643, Cl. 424-311.000.

Barnett, David L., to Howard, Robert L. Motorcycle trailer. 4,057,283, Cl. 296-23.00C.

Barnett, Larkin H., III, to Virginia National Bank. Strip shingle alignment fixtures. 4,056,889, Cl. 33-188.000.

Barrett, Joseph J., to Allied Chemical Corporation. Spectroscopic temperature measurement. 4,057,349, Cl. 356-45.000.

Barringer, Anthony Rene, to Barringer Research Limited. Detection of concealed metalliferous deposits, hydrocarbons and explosives. 4,056,969, Cl. 73-28.000.

Barringer, Anthony Rene, to Barringer Research Limited. Spectroscopic apparatus with balanced dual detectors. 4,057,734, Cl. 250-575.000.

Barringer Research Limited: *See—*

Barringer, Anthony Rene, 4,056,969, Cl. 73-28.000.

Barringer, Anthony Rene, 4,057,734, Cl. 250-575.000.

Barry Wright Corporation: *See—*

Schubert, Dale W., 4,057,212, Cl. 248-358.00R.

BASF Aktiengesellschaft: *See—*

Fischer, Adolf, deceased, 4,057,414, Cl. 71-88.000.

Basil, Richard V., Jr.; Ondrups, Leons; and Shimizu, James K., to Hughes Aircraft Company. Thermally compensated microwave resonator. 4,057,772, Cl. 333-83.00T.

Bataev, Mikhail Kirillovich; Veits, Isaak Efimovich; Gorodetsky, Sergei Sergeevich; Macheret, Lev Ilich; Kuznetsov, Lev Alexeevich; Tjurin, Albert Vasilievich; and Yaunzem, Jury Eduardovich, to Vsesoiuzny Proektno-Izyskatelsky Nauchno-Issledovatelsky Institut "Gidroproek" Imeni S. Ya. Zhuka. Method for manufacturing and laying out phase cores for oil-filled cables and a device for accomplishing same. 4,057,453, Cl. 156-390.000.

Bates, Albert M.; and Madera, Anthony J., to United States of America, Navy. Built-in test equipment for sonobuoy. 4,057,778, Cl. 340-2.000.

Bator, James S., to Kennametal Inc. Cutting insert. 4,056,871, Cl. 407-114.000.

Battelle Memorial Institute: *See—*

Lux, Benno; Kurz, Wilfried; Hubert, Jean-Claude; Mollard, Francois; and Walt, Guido, 4,057,097, Cl. 164-60.000.

Bauer, Jochen: *See—*

Kaimann, Walter; Pasternak, Rudolf; and Bauer, Jochen, 4,057,400, Cl. 48-77.000.

Bauman, Bruce K.; Norbeck, Dean K.; and Tollinger, Donald L., to Borg-Warner Corporation. Current regulation system for three-phase load. 4,057,842, Cl. 361-93.000.

Bay City Foundry Company: *See—*

Holman, Scott L., 4,057,209, Cl. 248-13.000.

Bayer Aktiengesellschaft: *See—*

Biedermann, Wolfgang; and Koller, Horst, 4,057,513, Cl. 252-459.000.

Bohnsack, Gerhard; Geffers, Hans; Kallfass, Herbert; and Radt, Walter, 4,057,511, Cl. 252-389.00A.

Dickore, Karlfried; Eue, Ludwig; and Schmidt, Robert Rudolf, 4,057,417, Cl. 71-93.000.

Hofer, Wolfgang; Maurer, Fritz; Riebel, Hans-Jochem; Schroder, Rolf; and Eue, Ludwig, 4,057,418, Cl. 71-103.000.

Kackstaedter, Klaus; and Theidel, Hans, 4,057,387, Cl. 8-1.00W.

Krall, Hermann-Dieter; Weissel, Oskar; and Schwarz, Hans-Helmut, 4,057,581, Cl. 260-571.000.

Merz, Walter; and Nachtsheim, Dieter, 4,057,583, Cl. 260-593.00R.

Muschelknautz, Edgar; Burkholz, Armin; Wieschen, Hermann; Guth, Hans; and Richter, Wolfgang, 4,057,075, Cl. 137-171.000.

Naumann, Klaus; Lurssen, Klaus; Sasse, Klaus; Holtschmidt, Ulrich; and Schwarzmann, Gunter, 4,057,413, Cl. 71-76.000.

Timmler, Helmut; and Draber, Wilfried, 4,057,546, Cl. 544-182.000.

Wagner, Klaus; Eue, Ludwig; Schmidt, Robert R.; and Roos, Ernst, 4,057,419, Cl. 71-121.000.

Bayley, David Pryce: *See—*

Davies, Graham Arthur; Jeffreys, Godfrey Vaughan; and Bayley, David Pryce, 4,057,493, Cl. 210-23.00R.

Bean, Lloyd F., to Xerox Corporation. Single component color development system. 4,057,340, Cl. 355-4.000.

Beck, Henry E.; and Collins, Terry R. Brake mechanism with spring applied fluid pressure released assembly. 4,057,297, Cl. 303-71.000.

Beckham, Robert R., to Libbey-Owens-Ford Company. Mirror mount applying method. 4,057,451, Cl. 156-320.000.

Becton, Dickinson and Company: *See—*

Kaufman, Joseph; and Prais, Alois G., 4,057,052, Cl. 128-2.00F.

Bedortha, James L.: *See—*

Ross, George P.; and Bedortha, James L., 4,057,232, Cl. 266-227.000.

Bell & Howell Company: *See—*

Fleischman, Andor A., 4,057,329, Cl. 350-222.000.

Bell Telephone Laboratories, Incorporated: *See—*

Angner, Ronald Joseph; Blount, Marion Lee; and Lacy, James Volney, 4,057,693, Cl. 179-99.000.

Gitlin, Richard Dennis; and Thompson, John Stewart, 4,057,696, Cl. 179-170.200.

Marcatili, Enrique Alfredo Jose, 4,057,320, Cl. 350-96.0GN.

Miller, Calvin Max, 4,057,448, Cl. 156-158.000.

Bellenbaum, Herbert: *See—*

Mausolf, Georg; Bellenbaum, Herbert; and Dietrich, Josef, 4,057,139, Cl. 198-509.000.

Bemis Company, Inc.: *See—*

Livingston, Wayne W.; and Melin, Gerald W., 4,057,449, Cl. 156-167.000.

Bemos, Charles. Collapsible folding beds for vehicles. 4,057,285, Cl. 296-23.00H.

Bendix Corporation: *See—*

Kiwior, Alexander Michael; and Bode, James Daniel, 4,057,190, Cl. 239-558.000.

Bendix-Westinghouse Limited: *See—*

Taig, Alistair Gordon, 4,057,079, Cl. 137-625.230.

Bennes Marrel, Zone Industrielle: *See—*

Guillot, Jack, 4,057,102, Cl. 165-8.000.

Bennett, Robert P.; and Kukin, Ira, to Apollo Chemical Corporation. Process for reducing the fusion point of coal ash. 4,057,398, Cl. 44-4.000.

Bennett, William J. Piano teaching aid. 4,056,999, Cl. 84-479.000.

Bensalem, Djemal Eddine. Method of treating food products with selenium salts. 4,057,649, Cl. 426-15.000.

Beran, Josef: *See—*

Klinger, Friedrich; Beran, Josef; and Brezina, Jan, 4,056,974, Cl. 73-92.000.

Berardi, Paolo: *See—*

Bruno, Roberto; Memmi, Massimo; Berardi, Paolo; and Musso, Augusto, 4,057,424, Cl. 75-178.00A.

Berg, David W., to Tol-O-Matic, Inc. Seal assembly. 4,057,257, Cl. 277-4.000.

Berger, Julius; Reichelt, Karen Emalyn; and Schuep, Willy, to Hoffmann-La Roche Inc. Certain pyrano-furo-azuleno-pyridines. 4,057,553, Cl. 260-295.00A.

Berger, Pierre, to Creusot-Loire. Device for degassing plastic materials. 4,057,376, Cl. 425-73.000.

Berges, David A., to SmithKline Corporation. 7-(α-Substituted phenylacetamido)-3-(1-carboxymethylthioethyltetrazolyl-5-thiomethyl)-3-cephem-4-carboxylic acids. 4,057,631, Cl. 424-246.000.

Bergfeld, Manfred: *See—*

Zengel, Hans-Georg; and Bergfeld, Manfred, 4,057,588, Cl. 260-621.00R.

Berkowitz, Sidney: *See—*

Meadow, Morton; and Berkowitz, Sidney, 4,057,613, Cl. 423-443.000.

Bermingham, Christopher William, to Bermingham Construction Limited. Auger spoil disposal box. 4,057,117, Cl. 175-88.000.

Bermingham Construction Limited: *See—*

Bermingham, Christopher William, 4,057,117, Cl. 175-88.000.

Bernardo, Gerald; and Jackson, Richard Malcolm Clive, to Schlegel (U.K.) Limited. Surface waterstops. 4,056,909, Cl. 52-396.000.

Bertin & Cie: *See—*

Laurent, Jacky Adrien Paul; and Croix-Marie, Francis Jean-Marie, 4,057,018, Cl. 104-48.000.

Bestmann, Hans Jurgen; Stransky, Werner Theo; and Vostrowsky, Otto, to Hoechst Aktiengesellschaft. Process for preparing cis-olefins. 4,057,593, Cl. 260-682.000.

Bettonica, Luigi. Hydraulic press, particularly for the shaping and pressing of cylindric, or truncated-cone, or like shaped hollow ceramic articles. 4,057,383, Cl. 425-405.00H.

Beydon, Jacqueline: *See—*

Bardy, Andre; Beydon, Jacqueline; Gobin, Renee; and Hegesippe, Michel, 4,057,615, Cl. 424-1.000.

Bick, Rodger L., to Wilson, William L.; Bick, Rodger L.; and Fekete, Lajos F. Removal of hepatitis associated antigen from plasma. 4,057,628, Cl. 424-101.000.

Biddle, Richard A., to Thiokol Corporation. Solid propellant with burning rate catalyst. 4,057,441, Cl. 149-19.900.

Biedermann, Wolfgang; and Koller, Horst, to Bayer Aktiengesellschaft. Hydrogenation catalyst and process for preparing same. 4,057,513, Cl. 252-459.000.

Biere, Helmut; Ahrens, Hanns; Rufer, Clemens; Schroder, Eberhard; and Koch, Henning, to Schering Aktiengesellschaft. 5,6,7,8:Tetrahydrocarbazole-1-carboxylic acid derivatives. 4,057,640, Cl. 424-274.000.

Bigi, Emanuele, to S.I.A.D. Societa' Italiana Acetilene E Derivati. Method and apparatus for recovering argon from an air fractionating process. 4,057,407, Cl. 62-22.000.

Biller, Bruce A., to S & C Electric Company. Support assembly for fusible element of a high voltage fuse. 4,057,775, Cl. 337-186.000.

Billings Energy Research Corporation: *See—*

Campbell, Barrie C., 4,057,479, Cl. 204-258.000.

Biloff, Elmer E. Hand held powered metal clinching tool. 4,056,870, Cl. 29-21.100.

Bimmerle, Charles F.; Braig, James R.; and Vilums, Ivars J. Motion responsive alarm system. 4,057,791, Cl. 340-261.000.

Binegar, Ernest W. Vehicle light switch apparatus. 4,057,742, Cl. 307-10.0LS.

Binz, Robert D.: *See—*

Blewitt, Donald D.; and Binz, Robert D., 4,057,776, Cl. 337-295.000.

Bio-Gas Corporation: *See—*

Boblitz, Oliver W., 4,057,401, Cl. 48-111.000.

Bioresearch Limited: *See—*

Fiecchi, Alberto, 4,057,686, Cl. 536-26.000.

Biospherics Incorporated: *See—*

Schrot, Joseph R., 4,057,470, Cl. 195-127.000.

Bischof, Kaspar: *See—*

Victor, George; Fisher, Robert G.; and Bischof, Kaspar, 4,057,160, Cl. 215-318.000.

Bishop, Forest M. Golf swing aid. 4,057,255, Cl. 273-189.00R.

Bislew, John E., to J. I. Case Compny. Hose coupling retainer assembly. 4,057,269, Cl. 285-158.000.

Black, Edith. Pierced earring having perfuming means. 4,056,951, Cl. 63-13.000.

Blaine, Geneva, executrix: *See—*

Blaine, Neil Franklin, deceased; and Blaine, Geneva, executrix, 4,057,485, Cl. 208-11.0LE.

Blaine, Neil Franklin, deceased; and by Blaine, Geneva, executrix. Solvent extraction of oil from tar sands utilizing a chlorinated ethane solvent. 4,057,485, Cl. 208-11.0LE.

Blanchier, Jean-Claude, to Jaeger. Device for transmitting the condition of a switch between two parts in relative rotary movement. 4,057,783, Cl. 340-58.000.

Blank, Paul Clifford. Collapsible camper. 4,057,284, Cl. 296-23.00F.

Blank, Werner Josef, to American Cyanamid Company. Stable, aged, coating composition. 4,057,523, Cl. 260-29.4UA.

Blanz, John, to United States of America, Interior. Flexible shaft for a roof drill. 4,057,115, Cl. 173-160.000.

Blewitt, Donald D.; and Binz, Robert D., to Westinghouse Electric Corporation. Fuse with radially oriented elements. 4,057,776, Cl. 337-295.000.

Block Drug Company, Inc.: *See—*

Roth, Richard C., 4,057,060, Cl. 128-232.000.

Blount, Marion Lee: *See—*

Angner, Ronald Joseph; Blount, Marion Lee; and Lacy, James Volney, 4,057,693, Cl. 179-99.000.

Blume, Friedrich, to Braun Aktiengesellschaft. Shear foil and method of making the same. 4,056,992, Cl. 76-104.00R.

Boblitz, Oliver W., to Bio-Gas Corporation. Methane gas process and apparatus. 4,057,401, Cl. 48-111.000.

Bode, James Daniel: *See—*

Kiwior, Alexander Michael; and Bode, James Daniel, 4,057,190, Cl. 239-558.000.

Bodenseewerk Perkin-Elmer & Co., GmbH: *See—*

Piesche, Helfried, 4,057,755, Cl. 324-62.000.

Boelens, Harmannus; Maessen, Jan Theodor Marie Francois; and van der Linde, Leendert Maarten, to N.V. Chemische Fabriek "Naarden". Perfume compositions. 4,057,515, Cl. 252-522.000.

Boelens, Harmannus; and Wobben, Hendrik Jacob, to Naarden International, N.V. Preparing perfumed compositions containing 8-allyl-8-hydroxytricyclo[5,2.1.0^{2,6}]decane alone or combined with O-hydroxybenzyl ethyl ether. 4,057,516, Cl. 252-522.000.

Boer, Werner: *See—*

Warnke, Hans; and Boer, Werner, 4,057,006, Cl. 91-487.000.

Bogri, Tibor: *See—*

Bagli, Jehan F.; and Bogri, Tibor, 4,057,556, Cl. 424-305.000.

Bohnsack, Gerhard; Geffers, Hans; Kallfass, Herbert; and Radt, Walter, to Bayer Aktiengesellschaft. Process for preventing corrosion and the formation of scale in water circulating system. 4,057,511, Cl. 252-389.00A.

Bom, Cornelis Johannes Gerardus: *See—*

van der Lely, Ary; and Bom, Cornelis Johannes Gerardus, 4,057,111, Cl. 172-72.000.

Bond, James A.; Eckard, Spurgeon E.; and Schnacke, Arthur W., to General Electric Company. Low temperature cooler/condenser. 4,056,946, Cl. 62-121.000.
Bongort, Edgar A.; and Cruickshank, William T., to B/W Controls Inc. Liquid level sensor. 4,056,979, Cl. 73-313.000.
Bonsignore, Salvatore J.; and Howell, Sabert N., to CBS Inc. Controlled dimmer lighting system. 4,057,751, Cl. 315-316.000.
Boon, William David. Log transporter. 4,057,262, Cl. 280-78.000.
Borden, Inc.: *See—*
Columbus, Peter Spiros, 4,057,527, Cl. 260-29.6WB.
Boretos, John W.; and Poirier, Robert A., to United States of America, Health, Education and Welfare. Aortic heart valve catheter. 4,056,854, Cl. 3-1.500.
Borg-Warner Corporation: *See—*
Bauman, Bruce K.; Norbeck, Dean K.; and Tollinger, Donald L., 4,057,842, Cl. 361-93.000.
Gatewood, Sidney Ulane, 4,057,134, Cl. 192-111.00A.
Tuzson, John J., 4,057,133, Cl. 192-103.00F.
Borginon, Hendrik Alfons: *See—*
De brabandere, Luc Achiel; Pollet, Robert Joseph; Pattyn, Herman Alberik; and Borginon, Hendrik Alfons, 4,057,429, Cl. 96-94.00R.
Borkenstein, Robert Frank: *See—*
Adrian, Werner Karl; and Borkenstein, Robert Frank, 4,057,724, Cl. 250-343.000.
Bormann, Gerhard; and Troxler, Franz, to Sandoz Ltd. 1,2,2a,3,4,5 Hexahydrobenz[c,d]indol-1-yl-2-guanidines. 4,057,560, Cl. 260-326.860.
Borsuk, Alvin; and Johnson, Charles H., to Oscar Mayer & Co. Inc. Method of forming foodstuffs having a uniform cross-section. 4,057,653, Cl. 426-513.000.
Bosshold, Barry L. Vented test tube top. 4,057,168, Cl. 220-209.000.
Bottazzini, Franco; and Donati, Laura, to K.D. Ottica s.n.c. System for locking, in an easily disengageable manner, the lenses to eyeglasses, sportive swimming goggles or diving masks and similar general sportive articles, and the resulting articles. 4,056,853, Cl. 2-443.000.
Boudot, Jean E.; and Joly, Pascal A. J., to Corning Glass Works. Optical glasses. 4,057,435, Cl. 106-47.00Q.
Braat, Josephus Johannes Maria, to U.S. Philips Corporation. Centering detection system for an apparatus for playing optically readable record carriers. 4,057,833, Cl. 358-128.000.
Brace, Arthur A.; and Lesnewich, Alexander, to Airco, Inc. Methods for dissolving volatile addition agents in molten metal. 4,057,420, Cl. 75-53.000.
Bracht, Lothar: *See—*
Fangmeier, Ralf; and Bracht, Lothar, 4,056,958, Cl. 72-98.000.
Brackenridge, David R.: *See—*
Dubeck, Michael; and Brackenridge, David R., 4,057,531, Cl. 260-45.95R.
Bradbury, William B.; Watts, Robert H.; and Scott, E. Timm, to PMS Consolidated. Apparatus for introducing controlled amounts of pigment into thermomechanically formed plastic articles. 4,057,193, Cl. 241-281.000.
Braden, Harold C. Sound suppressor. 4,057,124, Cl. 181-242.000.
Braig, James R.: *See—*
Bimmerle, Charles F.; Braig, James R.; and Vilums, Ivars J., 4,057,791, Cl. 340-261.000.
Brammall, Inc.: *See—*
Van Gompel, James J., 4,057,274, Cl. 292-259.00R.
Brandstetter, Walter: *See—*
Reichel, Kurt; Decker, Gerd; Kuck, Hans-Alfred; and Brandstetter, Walter, 4,057,038, Cl. 123-32.0SP.
Bratschitsch, John. Fluid transfer systems and valves therefor. 4,057,364, Cl. 417-34.000.
Braun Aktiengesellschaft: *See—*
Blume, Friedrich, 4,056,992, Cl. 76-104.00R.
Brettrager, Henry J. Sheet slitter and punch assembly. 4,056,993, Cl. 83-82.000.
Breunsbach, Rex L.: *See—*
Korb, A. Norman; and Breunsbach, Rex L., 4,057,817, Cl. 354-298.000.
Brezina, Jan: *See—*
Klinger, Friedrich; Beran, Josef; and Brezina, Jan, 4,056,974, Cl. 73-92.000.
Brinkley, Max D., to Goodyear Tire & Rubber Company, The. Closed torus tire. 4,057,445, Cl. 156-121.000.
British Petroleum Company Limited, The: *See—*
King, Robert Paul, 4,057,082, Cl. 138-99.000.
Broll, Madeleine: *See—*
Pigerol, Charles; Eymard, Pierre; Vernieres, Jean-Claude; Werbenec, Jean-Pierre; and Broll, Madeleine, 4,057,644, Cl. 424-325.000.
Bromwich, Robert Alan Charles, to Foster Wheeler Energy Corporation. Testing of inaccessable parts. 4,056,972, Cl. 73-620.000.
Broussard, Leo P., to Shell Oil Company. Completing wells in deep reservoirs containing fluids that are hot and corrosive. 4,057,108, Cl. 166-314.000.
Brown, Kevin: *See—*
Appleton, Richard Anthony; and Brown, Kevin, 4,057,641, Cl. 424-283.000.
Brown, Robert A., to Rem Metals Corporation. Oxyfluoride-type mold for casting molten reactive and refractory metals. 4,057,433, Cl. 106-38.300.
Brownell, Roy D.; and Lawrence, Dean M., to Caterpillar Tractor Co. Control arrangement for a vehicle with an adjustable seat. 4,057,122, Cl. 180-77.00S.
Brubaker, Hiram A.; Simmons, Gerald P.; and Streight, William E., to Caterpillar Tractor Co. Peripherally cooled laser lens assembly. 4,057,332, Cl. 350-319.000.
Brucato, Jacqueline I.; and Brucato, Steve J. Water actuated plant fertilizing device. 4,056,898, Cl. 47-48.500.
Brucato, Steve J.: *See—*
Brucato, Jacqueline I.; and Brucato, Steve J., 4,056,898, Cl. 47-48.500.
Brucher, Eberhard; and Schussler, Karl-Heinz, to Dango & Dienenthal. Taphole boring or plugging machine for shaft furnaces, especially blast furnaces. 4,057,234, Cl. 266-272.000.
Bruckenstein, Stanley; and Sherwood, William G., to United States of America, Interior. Electrochemical gas monitor. 4,057,478, Cl. 204-195.00P.
Bruno, Roberto; Memmi, Massimo; Berardi, Paolo; and Musso, Augusto, to Italsider S.p.A. Zinc-based alloy for coating steel. 4,057,424, Cl. 75-178.00A.
Buchin, Michael P.: *See—*
Muehllehner, Gerd; and Buchin, Michael P., 4,057,727, Cl. 250-363.00S.
Buczak, Edwin J. Assembling hand grips onto handles. 4,056,875, Cl. 29-234.000.
Budzak, Paul A.; and Clinton, Russell M., III, to Gulf Research & Development Company. Method for octane monitoring. 4,057,393, Cl. 23-230.0PC.
Buhrman, Willem M.: *See—*
van Amerongen, Evert; and Buhrman, Willem M., 4,057,070, Cl. 134-83.000.
Bulian, Gerd: *See—*
Lossack, Edgar; Kramer, Kurt; and Bulian, Gerd, 4,057,100, Cl. 164-418.000.
Bunch, G. W.: *See—*
Laurie, Albert F.; and Bunch, G. W., 4,057,141, Cl. 206-304.000.
Bunczk, Charles Joseph: *See—*
Graver, Clair Warren; Carwheel, Clarence Edward; and Bunczk, Charles Joseph, 4,057,503, Cl. 252-8.700.
Bunger, David A., to D. H. Baldwin Company. Electronic music system. 4,056,996, Cl. 84-1.190.
Bunker Ramo Corporation: *See—*
Mathe, Istvan; and Kasper, Alan Henry, 4,057,314, Cl. 339-97.00R.
Buono, Frank S. Apparatus and method for separation of blood. 4,057,499, Cl. 210-136.000.
Burcan International Limited: *See—*
Wager, Oleg, 4,057,500, Cl. 210-170.000.
Burford, Charles E.; and West, Joe E., to Burford Corporation. Downstroke baler. 4,057,009, Cl. 100-46.000.
Burford Corporation: *See—*
Burford, Charles E.; and West, Joe E., 4,057,009, Cl. 100-46.000.
Burgess, John E.: *See—*
Meyer, Rolf; and Burgess, John E., 4,057,148, Cl. 211-74.000.
Burk, Gerhard: *See—*
Schwuchow, Norbert; Burk, Gerhard; and Rothacker, Dietrich, 4,057,263, Cl. 280-106.00R.
Burkard, Edward A.: *See—*
Stiling, Rodney A.; Burkard, Edward A.; and Johnson, Robert M., 4,057,443, Cl. 156-43.000.
Burkhardt, Paul Johannes; and Poponiak, Michael Robert, to International Business Machines Corporation. Porous silicon dioxide moisture sensor and method for manufacture of a moisture sensor. 4,057,823, Cl. 357-52.000.
Burkholder, Marie L. Yard and garden tool. 4,057,277, Cl. 294-50.800.
Burkholz, Armin: *See—*
Muschelknautz, Edgar; Burkholz, Armin; Wieschen, Hermann; Guth, Hans; and Richter, Wolfgang, 4,057,075, Cl. 137-171.000.
Burklin, Max: *See—*
Paule, Kurt; Roll, Karl; and Burklin, Max, 4,057,113, Cl. 173-12.000.
Bushnell, James D.; Leighton, Milton D.; and McDonald, Thomas M., to Exxon Research & Engineering Co. Solvent recovery process for N-methyl-2-pyrrolidone in hydrocarbon extraction. 4,057,491, Cl. 208-321.000.
Buss, Benjamin Alvin; and Buss, Stephen A. Laundry folder and stacker. 4,057,241, Cl. 270-82.000.
Buss, Stephen A.: *See—*
Buss, Benjamin Alvin; and Buss, Stephen A., 4,057,241, Cl. 270-82.000.
C. G. Doris (Compagnie Generale pour les Developpements Operationnels des Richesses Sous-marines): *See—*
Lamy, Jacques Edouard, 4,056,944, Cl. 61-107.000.
C. Reichert Optische Werke: *See—*
Schindl, Klaus P., 4,057,318, Cl. 350-19.000.
C. van der Lely N. V.: *See—*
van der Lely, Ary; and Bom, Cornelis Johannes Gerardus, 4,057,111, Cl. 172-72.000.
Cam Gears Limited: *See—*
Adams, Frederick John, 4,057,073, Cl. 137-118.000.
Campbell, Barrie C., to Billings Energy Research Corporation. Solid polymer electrolyte cell construction. 4,057,479, Cl. 204-258.000.
Canadian Patents and Development Limited: *See—*
Meadus, F. Weldon; Sparks, Bryan D.; Puddington, Ira E.; and Farnand, J. Redmond, 4,057,486, Cl. 208-11.0LE.
Candor, James T. Apparatus for removing liquid from liquid bearing material. 4,057,482, Cl. 204-299.00R.
Canon Kabushiki Kaisha: *See—*
Endo, Ichiro; Kobayashi, Hajime; and Takekawa, Nobuhiro, 4,057,016, Cl. 101-465.000.

Ishikawa, Kazuo; Hirata, Noritsugu; Takigawa, Tomoshi; and Yamada, Yasutsugu, 4,057,334, Cl. 352-175.000.
Kumazawa, Kenichi, 4,057,327, Cl. 350-187.000.
Nakamoto, Soichi; Ito, Tadashi; Ito, Fumio; and Shinoda, Nobuhiko, 4,057,809, Cl. 354-23.00D.
Canonico, Domenic A.: *See—*
McDonald, Robert E.; and Canonico, Domenic A., 4,056,963, Cl. 72-253.00R.
Canonne, Paul; and Neumann, Gerard, to Societe d'Appareillage Electrique Saparel. Circuit breaker trip and release type control mechanism. 4,057,716, Cl. 200-153.00H.
Canton Textile Mills, Inc.: *See—*
Amos, James W., 4,057,196, Cl. 242-18.0PW.
Caravito, V. A., to Goodyear Tire & Rubber Company, The. Removable tread belt. 4,057,302, Cl. 305-19.000.
Carl Schenck AG: *See—*
Klinger, Friedrich; Beran, Josef; and Brezina, Jan, 4,056,974, Cl. 73-92.000.
Carr, George W., to Pullman Incorporated. Container door securing mechanism. 4,057,273, Cl. 292-218.000.
Carr, Harold F., Jr., to Ernest Holmes Division, Dover Corporation. Winch cable roller assembly. 4,057,202, Cl. 242-157.00R.
Carter, Marvin B.: *See—*
Moe, James S.; Carter, Marvin B.; and Carter, Ray L., 4,057,367, Cl. 417-273.000.
Carter, Philip L.; Kim, Yung K.; and Riley, Michael O., to Dow Corning Corporation. Fluorocarbon siloxane compositions. 4,057,566, Cl. 260-448.20H.
Carter, Ray L.: *See—*
Moe, James S.; Carter, Marvin B.; and Carter, Ray L., 4,057,367, Cl. 417-273.000.
Carwheel, Clarence Edward: *See—*
Graver, Clair Warren; Carwheel, Clarence Edward; and Bunczk, Charles Joseph, 4,057,503, Cl. 252-8.700.
Case, James E.; and Ruppert, Richard L., to Dayton Sure-Grip & Shore Company, The. Method for releasing tilt-up panel hoisting member. 4,056,912, Cl. 52-745.000.
Cassard, Jacques; Lachenal, Jean-Michel; and Romagnolo, Gerard, to Ugine Carbone. Composite guide roller for a rolling mill. 4,056,873, Cl. 29-132.000.
Castaneda, Fernando; and Jimenez, Roy, to Xeltron, S.A. Optical sorting apparatus. 4,057,146, Cl. 209-75.000.
Caterpillar Tractor Co.: *See—*
Bailey, John M., 4,057,105, Cl. 165-119.000.
Brownell, Roy D.; and Lawrence, Dean M., 4,057,122, Cl. 180-77.00S.
Brubaker, Hiram A.; Simmons, Gerald P.; and Streight, William E., 4,057,332, Cl. 350-319.000.
Cockrum, Herbert D.; and Kater, Charles E., 4,057,705, Cl. 219-130.000.
Crumrine, Albert W.; and Fratzke, Lawrence F., 4,057,502, Cl. 210-440.000.
Gibson, Myron R., 4,057,036, Cl. 123-8.090.
Hays, Raymond H.; and Gladden, Kenneth D., 4,057,230, Cl. 266-117.000.
Oldenburg, Dorrance, 4,057,087, Cl. 144-34.00E.
Shaffer, Walter M., 4,056,989, Cl. 74-745.000.
Shaffer, Walter M., 4,057,019, Cl. 104-247.000.
Stedman, Robert N., 4,057,121, Cl. 180-56.000.
Willard, Kaarlela O., 4,056,893, Cl. 37-142.00R.
CBS Inc.: *See—*
Bonsignore, Salvatore J.; and Howell, Sabert N., 4,057,751, Cl. 315-316.000.
Celanese Corporation: *See—*
Barer, Sol J., 4,057,643, Cl. 424-311.000.
Costanza, John R.; DeMartino, Ronald N.; and Goldstein, Arthur M., 4,057,509, Cl. 252-316.000.
Jones, Rufus S., Jr., 4,057,536, Cl. 260-78.00R.
Kalnin, Ilmar L., 4,056,874, Cl. 75-.50R.
Saferstein, Lowell; and Stackman, Robert W., 4,057,532, Cl. 260-47.00C.
Soehngen, John W.; and Hannon, Martin J., 4,057,607, Cl. 264-28.000.
Central Glass Company, Limited: *See—*
Ono, Tetsuhiro; Aramaki, Minoru; Mizuno, Tamotsu; and Fujinaga, Masao, 4,057,614, Cl. 423-490.000.
Ozawa, Masahiro; Inoue, Fumio; Komatsu, Tadaaki; and Matsuoka, Kimiaki, 4,057,591, Cl. 260-653.10R.
Centre Stephanois de Recherches Mecaniques Hydromecanique et Frottement: *See—*
Michalon, Daniel, 4,057,017, Cl. 104-20.000.
Centre Technique des Industries de la Fonderie: *See—*
Chaze, Louis G., 4,057,231, Cl. 266-219.000.
Ceraver: *See—*
Willem, Michel, 4,057,687, Cl. 174-179.000.
Chaivre, Joseph W.; and Jadach, Albert A., to Towne Robinson Fastener Company. Method and apparatus for forming a wheel nut with welded cap. 4,056,862, Cl. 10-72.00R.
Chalkley, Lyman. Preparation of dye cyanides. 4,057,563, Cl. 260-390.000.
Champ, Michel Andre: *See—*
Nabucet, Georges Joseph Marie; and Champ, Michel Andre, 4,057,026, Cl. 114-221.00A.
Charbonnages de France: *See—*
Chauvin, Raymond, 4,057,605, Cl. 264-13.000.
Charles, Robert G.: *See—*
Ruka, Roswell J.; and Charles, Robert G., 4,057,101, Cl. 165-1.000.
Charnley, Ralph L.: *See—*
Gaskell, Alfred J.; and Charnley, Ralph L., 4,057,818, Cl. 354-298.000.
Chateau, Louis, to Ducellier & Cie. Depression sensor for an electronic ignition advance device for an internal combustion engine. 4,056,980, Cl. 73-398.0AR.
Chauvin, Raymond, to Charbonnages de France. Manufacture of light granular materials. 4,057,605, Cl. 264-13.000.
Chaze, Louis G., to Centre Technique des Industries de la Fonderie. Cupola furnace. 4,057,231, Cl. 266-219.000.
Chemical Separations Corporation: *See—*
Chopra, Randhir C., 4,057,494, Cl. 210-33.000.
Chemische Werke Huls Aktiengesellschaft: *See—*
Kalka, Josef; Waskonig, Walter; and Lueg, Karl, 4,056,981, Cl. 73-421.00B.
Cheney, William A.; and Spurgin, Wendell P., to United Air Specialists, Inc. Means for the cleaning and self-cleaning of an electrostatic precipitator. 4,057,405, Cl. 55-105.000.
Chevron Research Company: *See—*
Bacskai, Robert, 4,057,589, Cl. 260-635.00E.
Grooman, Edward D., 4,057,359, Cl. 415-9.000.
Suzuki, Shigeto, 4,057,577, Cl. 260-535.00P.
Chopra, Randhir C., to Chemical Separations Corporation. Removal of chromium, chromate, molybdate and zinc. 4,057,494, Cl. 210-33.000.
Chrobak, Eryk; Natkaniec, Benedykt; Wasyleczko, Zenon; Stawinski, Antoni; and Roczek, Andrzej, to Fabryka Sprzetu i Narzedzi Gorniczych im. Gen. Karola. Chain quick-connecting link. 4,056,929, Cl. 59-85.000.
Chrysler Corporation: *See—*
Gau, Leonard P., 4,056,977, Cl. 73-272.00R.
Chueh, Chun Fei, to Halcon International, Inc. Recovery of alkylene glycols. 4,057,471, Cl. 203-69.000.
Chujo, Hitoshi: *See—*
Hashimoto, Akihiro; Hayashi, Shigeo; Yamamoto, Sadao; and Chujo, Hitoshi, 4,057,608, Cl. 264-42.000.
Chun, Sun Woong: *See—*
Montagna, Angelo Anthony; Somers, Allen Evarts; Peake, Stephen Luther; and Chun, Sun Woong, 4,057,488, Cl. 208-89.000.
Ciba-Geigy AG: *See—*
Defago, Raymond; Schaffluetzel, Paul; Lapple, Arnulf Ruediger; and Hugelin, Bernard, 4,057,388, Cl. 8-2.50A.
Woodley, George Edward, 4,056,878, Cl. 29-526.00R.
Ciba-Geigy Corporation: *See—*
Audykowski, Thaddeus, 4,057,664, Cl. 427-386.000.
Balli, Heinz; and Egger, Albert, 4,057,562, Cl. 260-346.710.
Haas, Georges; and Rossi, Alberto, 4,057,573, Cl. 560-52.000.
Habermeier, Jurgen, 4,057,558, Cl. 548-305.000.
Hool, Gerhard; and Kundig, Hans, 4,057,648, Cl. 424-341.000.
Karrer, Friedrich; and Farooq, Saleem, 4,057,587, Cl. 260-613.00R.
Cincinnati Mine Machinery Company, The: *See—*
Krekeler, Claude B., 4,057,294, Cl. 299-93.000.
Clairol Incorporated: *See—*
Kunz, Raymond W., 4,057,053, Cl. 128-25.00B.
Clark Equipment Company: *See—*
Robertson, Dean S., 4,057,130, Cl. 192-3.00T.
Clark, John H. Toenail appliance and method. 4,057,055, Cl. 128-81.00A.
Clark, William Frederick; and Maddocks, Richard Joseph, to Lesney Products & Co. Limited. Methods of making a doll having functional inserts. 4,057,612, Cl. 264-275.000.
Clarke, Frederick W., to Rogers and Clarke Manufacturing Co. Mechanism for transferring parts. 4,057,149, Cl. 214-1.0BV.
Clayton Dewandre Company Limited: *See—*
Coupland, Ralph, 4,057,128, Cl. 188-79.50K.
Clingman, Walter L. Hot water flood. 4,057,106, Cl. 166-57.000.
Clinton, Russell M., III: *See—*
Budzak, Paul A.; and Clinton, Russell M., III, 4,057,393, Cl. 23-230.0PC.
Close, Dolores R. Liquid-recycling planter. 4,056,899, Cl. 47-79.000.
Cloyd, John Keen, to Volk & Son Manufacturing Co., Inc. Poultry trussing retainer. 4,056,865, Cl. 17-1.00S.
Coach and Car Equipment Corporation: *See—*
Harder, Arthur J., Jr., 4,057,214, Cl. 248-399.000.
Cockerill-Ougree-Providence et Esperance-Longdoz en abrege "Cockerill": *See—*
Widart, Jean E. L.; and Scailteur, Alain F. C., 4,057,163, Cl. 220-3.000.
Cockerill, William Clyde; Hornung, Louis Michael; Johnson, Donavon William; and Vrba, Richard Alan, to International Business Machines Corporation. Bus steering structure for low cost pipelined processor system. 4,057,846, Cl. 364-200.000.
Cockrum, Herbert D.; and Kater, Charles E., to Caterpillar Tractor Co. Fume extracting welding gun. 4,057,705, Cl. 219-130.000.
Cohen, Morton. Magnetic switch. 4,057,773, Cl. 335-205.000.
Colbeck, Frank Edward: *See—*
Renegar, Charles Gwin; and Colbeck, Frank Edward, 4,057,456, Cl 156-515.000.
Cole, Edward L.; Hess, Howard V.; and Franz, William F., to Texaco Inc. Process for dewatering carbonaceous materials. 4,057,399, Cl. 44-6.000.
Coleman, Ernest W., to United States of America, Navy. Adaptive direction of arrival antennae system. 4,057,803, Cl. 343-113.00R.

Colgate Palmolive Company: *See*—
  Falivene, Pasquale J., 4,057,673, Cl. 428-411.000.
  Sung, Steven Lang, 4,057,506, Cl. 252-135.000.
Colinet, Andre, to Regie Nationale des Usines Renault; and Automobiles Peugeot. Automobile bonnet ejection and retaining device. 4,057,271, Cl. 292-87.000.
Collins, John D., to Raytheon Company. Recirculating delay line time compressor having plural input taps. 4,057,786, Cl. 365-76.000.
Collins, Terry R.: *See*—
  Beck, Henry E.; and Collins, Terry R., 4,057,297, Cl. 303-71.000.
Colmer, Marvin L. Submersible thrust limit switch. 4,057,365, Cl. 417-44.000.
Colquhoun, Joseph A.: *See*—
  Rauner, Lawrence A.; and Colquhoun, Joseph A., 4,057,595, Cl. 260-824.00R.
Columbus, Peter Spiros, to Borden, Inc. Aqueous acrylate contact adhesive dispersions. 4,057,527, Cl. 260-29.6WB.
Comben, Richard H., to Medtronic, Inc. Enclosure for and method of enclosing a body implantable pulse generator. 4,057,068, Cl. 128-419.00P.
Commissariat a l'Energie Atomique: *See*—
  Bardy, Andre; Beydon, Jacqueline; Gobin, Renee; and Hegesippe, Michel, 4,057,615, Cl. 424-1.000.
  Dorffer, Auguste; and Piquard, Jean-Francois, 4,057,069, Cl. 128-421.000.
Compagnie Generale pour les Developpements Operationnels des Richesses Sous-Marines "C.G. Doris": *See*—
  Lamy, Jacques Edouard, 4,056,945, Cl. 61-107.000.
Compagnie Maritime d'Expertises - Comex: *See*—
  Sicard, Hubert, 4,057,268, Cl. 285-31.000.
Conger, William W., IV: *See*—
  Johnson, Lawrence E.; and Conger, William W., IV, 4,057,372, Cl. 417-424.000.
Connlab Holdings Limited: *See*—
  Micetich, Ronald G.; Morin, Robert B.; and Wilson, Kenneth E., 4,057,540, Cl. 260-239.00A.
Conroy, John J.: *See*—
  Henningsen, Tom; and Conroy, John J., 4,057,770, Cl. 331-94.50Q.
Continental Gummi-Werke Aktiengesellschaft: *See*—
  Johannsen, Peter, 4,057,089, Cl. 152-209.00R.
Contraves AG: *See*—
  Zust, Harry, 4,057,661, Cl. 427-125.000.
Conwed Corporation: *See*—
  Erickson, Gordon A., 4,057,123, Cl. 181-286.000.
Cook, James E. Unloader valve. 4,057,072, Cl. 137-116.000.
Cooper, Glenn Dale; and Schraga, Irwin, to General Electric Company. Process for the preparation of vinyl aromatic-modified polyphenylene ethers. 4,057,599, Cl. 260-874.000.
Cooper Tire and Rubber Company: *See*—
  Klose, Karl W., 4,057,455, Cl. 156-410.000.
Cornforth, James L. Buoyant life-saving device. 4,056,861, Cl. 9-14.000.
Corning Glass Works: *See*—
  Allen, Richard E., 4,057,707, Cl. 219-543.000.
  Boudot, Jean E.; and Joly, Pascal A. J., 4,057,435, Cl. 106-47.00Q.
  Pierson, Joseph E.; and Stookey, Stanley D., 4,057,408, Cl. 65-18.000.
  Rittler, Hermann L., 4,057,434, Cl. 106-39.700.
Costanza, John R.; DeMartino, Ronald N.; and Goldstein, Arthur M., to Celanese Corporation. Polygalactomannan allyl ether gels. 4,057,509, Cl. 252-316.000.
Coupland, Ralph, to Clayton Dewandre Company Limited. Slack adjusters for vehicle brakes. 4,057,128, Cl. 188-79.50K.
Coverdale, Charles E.; and Skaletzky, Louis L., to Upjohn Company, The. Compositions and method of using quinolylaminobenzoylpiperazino-1-oxides. 4,057,633, Cl. 424-250.000.
Cox, Daniel: *See*—
  Jones, Bernard H.; Cox, Daniel; and Gallagher, Don R., 4,057,195, Cl. 242-18.00G.
Craig, Jeffrey M., to Akzona Incorporated. Apparatus for counting crimp in fibers. 4,057,350, Cl. 356-199.000.
Cranston, Benjamin Howell; Kleinedler, Gary Evan; Machusak, Donald Arthur; and Wiechard, Charles Augustus, to Western Electric Company, Inc. Joining wire-like members. 4,057,187, Cl. 228-107.000.
Creekmore, Mark D.; and Panning, Henry F., to Goodyear Tire & Rubber Company, The. Compounded polyvinyl chloride. 4,057,672, Cl. 428-220.000.
Creusot-Loire: *See*—
  Berger, Pierre, 4,057,376, Cl. 425-73.000.
Crisp, Michael J.: *See*—
  Krikorian, Esther; and Crisp, Michael J., 4,057,476, Cl. 204-192.00P.
Croix-Marie, Francis Jean-Marie: *See*—
  Laurent, Jacky Adrien Paul; and Croix-Marie, Francis Jean-Marie, 4,057,018, Cl. 104-48.000.
Crouch, William B.; Fabiero, Carolina P.; and Robin, Allen M., to Texaco Inc. Production of nitrogen rich gas mixtures. 4,057,510, Cl. 252-372.000.
Cruff, Carlton E.; and Day, Edward G., to United Technologies Corporation. Method for making ceramic casting slurries. 4,057,227, Cl. 366-2.000.
Cruickshank, William T.: *See*—
  Bongort, Edgar A.; and Cruickshank, William T., 4,056,979, Cl. 73-313.000.
Crumrine, Albert W.; and Fratzke, Lawrence F., to Caterpillar Tractor Co. Seal for cartridge-type filter assemblies. 4,057,502, Cl. 210-440.000.
CS na BSFS: *See*—
  Furnadjiev, Vassil Lazarov; and Samardjiev, Boris Krestanov, 4,057,806, Cl. 346-33.00R.
Csoka, Frank S., to Fun Things, Inc. Maze board game apparatus. 4,057,253, Cl. 273-131.0BA.
Cullen Photo Service, Inc.: *See*—
  Hutzel, Abraham, 4,057,140, Cl. 206-216.000.
Cunningham, Hugh; and Raetzsch, Carl W., to PPG Industries, Inc. Method of reducing cell liquor header corrosion. 4,057,473, Cl. 204-98.000.
Currie, Grover C. Gutter cleaning apparatus. 4,057,276, Cl. 294-19.00R.
Curt G. Joa, Inc.: *See*—
  Hirsch, John L., 4,056,919, Cl. 53-124.00D.
D. H. Baldwin Company: *See*—
  Bunger, David A., 4,056,996, Cl. 84-1.190.
  Uetrecht, Dale M., 4,056,995, Cl. 84-1.010.
Daghe, Joseph L.; and Kuzmicki, Casimir B., to Mueller Co. Chipless shell cutter for large diameter plastic pipe. 4,057,357, Cl. 408-67.000.
Daiichi Seiyaku Co., Ltd.: *See*—
  Miki, Tosaku; Hosokawa, Yasuhiro; Miwa, Tamotsu; Fujita, Hiroshi; Asano, Masahide; and Aibara, Shunzo, 4,057,629, Cl. 424-177.000.
Daikin Kogyo Co., Ltd.: *See*—
  Touzuka, Takashi; and Ohsaka, Yonosuke, 4,057,584, Cl. 260-593.00H.
Daimler-Benz Aktiengesellschaft: *See*—
  Schwuchow, Norbert; Burk, Gerhard; and Rothacker, Dietrich, 4,057,263, Cl. 280-106.00R.
Dajani, Esam Z.: *See*—
  Adelstein, Gilbert W.; Dajani, Esam Z.; and Yen, Chung Hwai, 4,057,549, Cl. 260-293.540.
Daman, Lloyd W.; Marti, Don V., II; Mason, Freddie; and Shamp, Donald E., to Libbey-Owens-Ford Company. Heat shield for float glass forming apparatus and method of using. 4,057,410, Cl. 65-65.00A.
Damico, Frank M.; and Nass, Raymond D., to Joerns Furniture Company. Examination table. 4,057,240, Cl. 269-325.000.
Dana Corporation: *See*—
  Flotow, Richard A., 4,057,131, Cl. 192-70.130.
Dane, George E. Chart viewer. 4,057,730, Cl. 250-461.00R.
Dango & Dienenthal: *See*—
  Brucher, Eberhard; and Schussler, Karl-Heinz, 4,057,234, Cl. 266-272.000.
Daniel, Sam M.: *See*—
  Greeley, Ashford C.; and Daniel, Sam M., 4,057,708, Cl. 235-413.000.
Danieli, Luigi, to Officine Meccaniche Danieli. Device for oscillating a continuous casting mould. 4,057,099, Cl. 164-260.000.
Danner, Kenneth H., to Rosemount Inc. Heated roll inductive heater construction. 4,056,883, Cl. 29-611.000.
Darden, William T., Jr. Power pack and carrier for CB radio. 4,057,757, Cl. 325-16.000.
Data General Corporation: *See*—
  Saxena, Arjun N.; and Hart, Courtney, 4,057,460, Cl. 156-643.000.
Davies, Graham Arthur; Jeffreys, Godfrey Vaughan; and Bayley, David Pryce. Droplet control elements. 4,057,493, Cl. 210-23.00R.
Davies, Peter Kingsley; Rogers, Leslie Richard; Stansfield, James Frederick; and Topham, Arthur, to Imperial Chemical Industries Limited. Dispersion of solids in organic solvents. 4,057,436, Cl. 106-288.00Q.
Davis, George B., Jr. Christmas tree lighting control. 4,057,735, Cl. 307-11.000.
Davis, Guy E.: *See*—
  Jones, Donald J.; and Davis, Guy E., 4,057,715, Cl. 364-494.000.
Davis, Peter Robert, to English Electric Valve Company Ltd. Travelling wave tubes. 4,057,748, Cl. 315-3.500.
Davis, Peter Robert, to English Electric Valve Company Ltd. Travelling wave tube having an improved magnetic focussing field. 4,057,749, Cl. 315-3.500.
Davis, Robert S.: *See*—
  Wiggins, Glenn C.; Kreh, Marvin J.; and Davis, Robert S., 4,057,667, Cl. 428-35.000.
Davy-Loewy Limited: *See*—
  Howard, David Robert, 4,056,957, Cl. 72-19.000.
Dawdy, Jack A., to National Gypsum Company. Wallboard application method and apparatus therefor. 4,056,904, Cl. 52-127.000.
Day, Edward G.: *See*—
  Cruff, Carlton E.; and Day, Edward G., 4,057,227, Cl. 366-2.000.
Dayton Sure-Grip & Shore Company, The: *See*—
  Case, James E.; and Ruppert, Richard L., 4,056,912, Cl. 52-745.000.
DCA Food Industries, Inc.: *See*—
  Kaufman, Harold B., Jr., 4,056,950, Cl. 62-381.000.
DeBortoli, George; and Zimmermann, Detlef, to Northern Telecom Limited. Protector apparatus for telecommunications lines. 4,057,692, Cl. 179-98.000.
De brabandere, Luc Achiel; Pollet, Robert Joseph; Pattyn, Herman Alberik; and Borginon, Hendrik Alfons, to AGFA-GEVAERT, N. V. Preparation of photographic silver halide emulsions. 4,057,429, Cl. 96-94.00R.
Decker, Gerd: *See*—
  Reichel, Kurt; Decker, Gerd; Kuck, Alfred; and Schulz, Erwin, 4,057,037, Cl. 123-32.0SP.
  Reichel, Kurt; Decker, Gerd; Kuck, Hans-Alfred; and Brandstetter, Walter, 4,057,038, Cl. 123-32.0SP.

de Cointet de Fillain, Paul: *See*—
  Pigerol, Charles; de Cointet de Fillain, Paul; Nanthavong, Souli; and Le Blay, Jacques, 4,057,530, Cl. 260-45.80N.
Deeks, Ronald George, to Procor Limited. Railroad car. 4,057,155, Cl. 214-83.280.
Deere & Company: *See*—
  Nelson, Roger John, 4,057,109, Cl. 172-7.000.
  Reich, Steven Anthony, 4,057,044, Cl. 123-140.0MP.
  Ring, Curtis Phillip, 4,057,005, Cl. 91-413.000.
  Sisk, Robert Michael; and Williams, Lary Lynn, 4,057,701, Cl. 200-213.000.
Defago, Raymond; Schaffluetzel, Paul; Lapple, Arnulf Ruediger; and Hugelin, Bernard, to Ciba-Geigy AG. Dry heat process for dyeing and printing organic material which can be dyed with cationic dyestuffs. 4,057,388, Cl. 8-2.50A.
Dege, Gerald J.: *See*—
  Lee, Lester T. C.; Dege, Gerald J.; and Liu, Kang-Jen, 4,057,481, Cl. 204-296.000.
DeMartino, Ronald N.: *See*—
  Costanza, John R.; DeMartino, Ronald N.; and Goldstein, Arthur M., 4,057,509, Cl. 252-316.000.
Dembski, Gary R. Tethered decoy. 4,056,890, Cl. 43-3.000.
de Mos, Jacob Mink; and Koek, Pieter, to N.V. Machinefabriek Terlet. Mixing device. 4,057,226, Cl. 366-244.000.
Denker, James M., to Nutron Corporation. Rotary fluid device having two rotor sections. 4,057,007, Cl. 91-501.000.
de Rook, Poppe, to Akzo N.V. Process for preparing frost resistant concrete. 4,057,526, Cl. 260-29.60S.
Dershem, Ronald J.: *See*—
  Baber, James R.; and Dershem, Ronald J., 4,057,080, Cl. 138-44.000.
Deutsche Texaco Aktiengesellschaft: *See*—
  Pusch, Gunter; and Gedenk, Rudolf, 4,057,107, Cl. 166-260.000.
deVial, Raymond Michael; and Taylor, Philip Maurice, to Bailey Meter & Controls Limited. Oil pollution monitoring and monitoring unit. 4,057,721, Cl. 250-301.000.
de Vries, Robert. Detachable link-chain. 4,056,928, Cl. 59-83.000.
Dey, Arabinda N., to P. R. Mallory & Co. Inc. Organic electrolyte batteries. 4,057,679, Cl. 429-194.000.
Di/An Controls, Inc.: *See*—
  Kodis, Robert D., 4,057,015, Cl. 101-93.290.
Dias Soares, Oliverio Delfim: *See*—
  Ash, Eric Albert; and Dias Soares, Oliverio Delfim, 4,057,319, Cl. 350-96.00C.
Dickore, Karlfried; Eue, Ludwig; and Schmidt, Robert Rudolf, to Bayer Aktiengesellschaft. 6-Sec.-butyl-1,2,4-triazin-5(4H)-one compounds and herbicidal compositions. 4,057,417, Cl. 71-93.000.
Diemer, R. Bertrum, Jr.; and Dunson, James B., Jr., to Du Pont de Nemours, E. I., and Company. Method for separating immiscible fluids of different density. 4,057,404, Cl. 55-90.000.
Dietrich, Josef: *See*—
  Mausolf, Georg; Bellenbaum, Herbert; and Dietrich, Josef, 4,057,139, Cl. 198-509.000.
Dimitriadis, James Christ. Animal bathing apparatus. 4,057,032, Cl. 119-1.000.
Dobson, Thomas A.: *See*—
  Asselin, Andre A.; Humber, Leslie G.; and Dobson, Thomas A., 4,057,559, Cl. 260-315.000.
Dr. -Ing. Rudolf Hell GmbH: *See*—
  Doelves, Juergen; and Herforth, Dieter, 4,057,838, Cl. 358-299.000.
Dr. Johannes Heidenhain GmbH: *See*—
  Ernst, Alfons; and Reichl, Alfred, 4,057,258, Cl. 277-12.000.
Doelling, Sylvia Lee. Dressmaker's aid with rotating platform. 4,056,886, Cl. 33-10.000.
Doelves, Juergen; and Herforth, Dieter, to Dr. -Ing. Rudolf Hell GmbH. Process and apparatus for exactly adjusting the beginning and end of reproducing in an engraving unit. 4,057,838, Cl. 358-299.000.
Dolder, Adelheid: *See*—
  Dolder, Hans, 4,056,907, Cl. 52-266.000.
Dolder, Hans, to Dolder, Adelheid. Building blocks and support structure. 4,056,907, Cl. 52-266.000.
Dollinger, Kenneth, to Sanders Associates, Inc. Sidelobe cancellation system. 4,057,802, Cl. 343-100.0LE.
Donati, Laura: *See*—
  Bottazzini, Franco; and Donati, Laura, 4,056,853, Cl. 2-443.000.
Donovan, William F., to United States of America, Army. Kinetic barrel gun. 4,057,002, Cl. 89-8.000.
Dorffer, Auguste; and Piquard, Jean-Francois, to Commissariat a l'Energie Atomique. Method of nerve stimulation and a stimulator for the application of the method. 4,057,069, Cl. 128-421.000.
Dorn, Conrad P.: *See*—
  Shen, Tsung-Ying; Jones, Howard; Mulvey, Dennis M.; and Dorn, Conrad P., 4,057,637, Cl. 424-263.000.
Dougherty, Robert S. Cargo container door construction. 4,057,170, Cl. 220-323.000.
Dow Chemical Company, The: *See*—
  Gross, James R., 4,057,521, Cl. 260-29.6HN.
  Hunt, David A., 4,057,528, Cl. 260-29.70S.
  Mixan, Craig E.; Goralski, Christian T.; and Pews, R. Garth, 4,057,517, Cl. 260-22.00R.
  Strycker, Stanley J., 4,057,645, Cl. 424-329.000.
Dow Corning Corporation: *See*—
  Carter, Philip L.; Kim, Yung K.; and Riley, Michael O., 4,057,566, Cl. 260-448.20H.
  Rauner, Lawrence A.; and Colquhoun, Joseph A., 4,057,595, Cl. 260-824.00R.
  Thow, G. Bruce, 4,057,065, Cl. 128-348.000.
Dowling, Donald Hugh, to Du Pont de Nemours, E. I., and Company. Radio-controlled machine power cut-off. 4,057,805, Cl. 343-225.000.
Draber, Wilfried: *See*—
  Timmler, Helmut; and Draber, Wilfried, 4,057,546, Cl. 544-182.000.
Driesenga, Edwin J., to Keeler Corporation. Back and bail assembly. 4,056,864, Cl. 16-126.000.
Drummond, Arthur, Jr., to Xerox Corporation. Magnetic brush developer roll for electrostatic reproduction machines. 4,057,666, Cl. 428-35.000.
Dryden, Hugh L., Jr.; Scaros, Mike G.; and Telinski, Thomas J., to G. D. Searle & Co. Process for the preparation of 17β-hydroxy-3-oxo-17α-pregn-4-ene-21-carboxylic acid γ-lactone. 4,057,542, Cl. 260-239.55C.
Dryden, Hugh L., Jr.; and Markos, Charles S., to G. D. Searle & Co. Process for the preparation of 17β-hydroxy-3-oxo-17α-pregn-4-ene-21-carboxylic acid γ-lactone. 4,057,543, Cl. 260-239.570.
Dubeck, Michael; and Brackenridge, David R., to Ethyl Corporation. Fire retardant polystyrene. 4,057,531, Cl. 260-45.95R.
Dubinsky, Emanuel. Removable cover for outdoor-type chairs. 4,057,291, Cl. 297-441.000.
Ducellier & Cie: *See*—
  Chateau, Louis, 4,056,980, Cl. 73-398.0AR.
Dumonte, Annie, administratrix: *See*—
  Dumonte, Paul, deceased, 4,057,746, Cl. 313-237.000.
Dumonte, Paul, deceased (by Dumonte, Annie, administratrix), to Sciaky Vitry, S. A. Demountable high power electron beam gun. 4,057,746, Cl. 313-237.000.
Duncan, Farris N.: *See*—
  Bamburg, Robert A.; Duncan, Farris N.; and Floyd, Roger M., 4,056,913, Cl. 53-27.000.
Duncan, James W.; and Peck, Walter R., to Stencel Aero Engineering Corporation. Ejection sequencing system with airspeed and altitude sensing. 4,057,206, Cl. 244-147.000.
Duncan, Lee Harold: *See*—
  Duncan, Lee Holmes; and Duncan, Lee Harold, 4,057,266, Cl. 280-475.000.
Duncan, Lee Holmes; and Duncan, Lee Harold. Coupling guide for trailer hitches. 4,057,266, Cl. 280-475.000.
Dunlop Limited: *See*—
  Goodfellow, Anthony Gerald, 4,057,446, Cl. 156-123.00R.
  Holroyd, Eric; Goodfellow, Anthony Gerald; and McGlashen, James Neil, 4,057,447, Cl. 156-125.000.
Dunnigan, Daniel Ambrose; Geiszler, Adolph Oscar; and Holland, James Brooks, to Abbott Laboratories. Aminotetralins and use in inducing anesthesia. 4,057,582, Cl. 260-574.000.
Dunning, John M., III, to Dunning, Ltd. Collapsible wall structure for cabinets or chests. 4,057,308, Cl. 312-262.000.
Dunning, Ltd.: *See*—
  Dunning, John M., III, 4,057,308, Cl. 312-262.000.
Dunson, James B., Jr.: *See*—
  Diemer, R. Bertrum, Jr.; and Dunson, James B., Jr., 4,057,404, Cl. 55-90.000.
Du Pont de Nemours, E. I., and Company: *See*—
  Diemer, R. Bertrum, Jr.; and Dunson, James B., Jr., 4,057,404, Cl. 55-90.000.
  Dowling, Donald Hugh, 4,057,805, Cl. 343-225.000.
  Manzer, Leo Ernest, 4,057,565, Cl. 260-429.00R.
  Miller, Norman Jay; Zemaitis, John Anthony; and Zimmerman, Russell Lloyd, 4,057,315, Cl. 339-221.00R.
  Schlaf, Thomas Fulton, 4,057,638, Cl. 424-270.000.
Dura Corporation: *See*—
  Hansen, Clarence M.; and Ledebuhr, Richard L., 4,057,137, Cl. 198-443.000.
E. & J. Gallo Winery: *See*—
  Victor, George; Fisher, Robert G.; and Bischof, Kaspar, 4,057,160, Cl. 215-318.000.
Earth Sciences, Inc.: *See*—
  Jennings, Larry D.; and Hazen, Wayne W., 4,057,611, Cl. 423-127.000.
Eastman Kodak Company: *See*—
  Enriquez, Philip Maury, 4,057,427, Cl. 96-55.000.
  Frank, Lee Fitzpatrick, 4,057,337, Cl. 353-26.00R.
  Mowrey, Rowland George; Smith, Donald Arthur; and Sutton, Richard Calvin, 4,057,428, Cl. 96-74.000.
Ebata, Hiroyuki, to Yoshida Kogyo K.K. Net jointing structure. 4,056,868, Cl. 24-205.16C.
Eckard, Spurgeon E.: *See*—
  Bond, James A.; Eckard, Spurgeon E.; and Schnacke, Arthur W., 4,056,946, Cl. 62-121.000.
Edeco-West, Inc.: *See*—
  Gerhardt, Fred, 4,056,962, Cl. 72-170.000.
Eder, Ulrich: *See*—
  Furst, Andor; Gutzwiller, Jurg; Muller, Marcel; Wiechert, Rudolf; Eder, Ulrich; and Neef, Gunter, 4,057,561, Cl. 260-345.90S.
Egger, Albert: *See*—
  Balli, Heinz; and Egger, Albert, 4,057,562, Cl. 260-346.710.
Ehrenhaft, Franz F.; and Rosin, Seymour, to Anamorphic Ltd. Additive lamphouse. 4,057,345, Cl. 355-35.000.
Eisai Co., Ltd.: *See*—
  Kijima, Shizumasa; Yamatu, Isao; Hamamura, Kimio; Minami, Norio; Yamagishi, Youji; and Inai, Yuichi, 4,057,568, Cl. 260-462.00R.
Eisma, Benjamin J., Jr., to Sparton Corporation. Welded muffler clamp. 4,056,869, Cl. 24-277.000.
Ejiri, Masakazu; Kashioka, Seiji; Miyatake, Takafumi; Yoda, Haruo;

and Kameyama, Masayoshi, to Hitachi, Ltd. Group control system for visual information processing. 4,057,845, Cl. 364-200.000.
Electronic Associates, Inc.: *See—*
Asthana, Abhaya; and Hannauer, George, 4,057,711, Cl. 364-600.000.
Elfstrom, Carry Allon, to Arca Holding S.A. Building framework for timber house of log-cabin appearance. 4,056,906, Cl. 52-233.000.
Ellingham, Walter; and Nolan, Edward J. Automatic film transporter. 4,057,346, Cl. 355-41.000.
Ellison, Boris: *See—*
Johnson, Raymond E.; and Ellison, Boris, 4,057,793, Cl. 340-310.00R.
Ellson, George Andrew. Security system. 4,057,798, Cl. 340-420.000.
Elms, Robert T.; Engel, Joseph C.; and Saletta, Gary F., to Westinghouse Electric Corporation. Apparatus and method for sustaining the operation of HID lamps. 4,057,750, Cl. 315-86.000.
Elonen, Kunto, to Rauma-Repola Oy. Retaining member for vehicle chassis. 4,057,286, Cl. 296-43.000.
Elting, Katherine Anne Cline, to Milchem Incorporated. Graft copolymer and process for making same. 4,057,683, Cl. 526-194.000.
Emil Korsch, Spezialfabrik fur Komprimiermaschinen: *See—*
Korsch, Wolfgang, 4,057,381, Cl. 425-345.000.
Endo, Ichiro; Kobayashi, Hajime; and Takekawa, Nobuhiro, to Canon Kabushiki Kaisha. Process for electrostatic printing and apparatus therefor. 4,057,016, Cl. 101-465.000.
Engel, Joseph C.: *See—*
Elms, Robert T.; Engel, Joseph C.; and Saletta, Gary F., 4,057,750, Cl. 315-86.000.
Engins Matra: *See—*
Malinge, Noel, 4,057,336, Cl. 353-6.000.
English Electric Valve Company Ltd.: *See—*
Davis, Peter Robert, 4,057,748, Cl. 315-3.500.
Davis, Peter Robert, 4,057,749, Cl. 315-3.500.
Enriquez, Philip Maury, to Eastman Kodak Company. Peroxide redox amplification imaging using manganese catalyst images. 4,057,427, Cl. 96-55.000.
Environmental Research Institute of Michigan: *See—*
Upatnieks, Juris, 4,057,317, Cl. 350-3.500.
Erickson, Gordon A., to Conwed Corporation. Lightweight sound absorbent panels having high noise reduction coefficient. 4,057,123, Cl. 181-286.000.
Ermans, Andre Marie: *See—*
Abramovici, Jean; Ermans, Andre Marie; and Jeghers, Omer, 4,057,617, Cl. 424-1.000.
Ernest Holmes Division, Dover Corporation: *See—*
Carr, Harold F., Jr., 4,057,202, Cl. 242-157.00R.
Ernst, Alfons; and Reichl, Alfred, to Dr. Johannes Heidenhain GmbH. Measuring arrangement. 4,057,258, Cl. 277-12.000.
ESM Inc.: *See—*
Ferree, Roy E., 4,057,225, Cl. 366-157.000.
Etablissements Carpano & Pons SA: *See—*
Saligny, Yves, 4,057,843, Cl. 361-104.000.
Ethyl Corporation: *See—*
Dubeck, Michael; and Brackenridge, David R., 4,057,531, Cl. 260-45.95R.
Eue, Ludwig: *See—*
Dickore, Karlfried; Eue, Ludwig; and Schmidt, Robert Rudolf, 4,057,417, Cl. 71-93.000.
Hofer, Wolfgang; Maurer, Fritz; Riebel, Hans-Jochem; Schroder, Rolf; and Eue, Ludwig, 4,057,418, Cl. 71-103.000.
Wagner, Klaus; Eue, Ludwig; Schmidt, Robert R.; and Roos, Ernst, 4,057,419, Cl. 71-121.000.
Evans, William Robert, to AMP Incorporated. Elastomeric connector for parallel circuit boards. 4,057,311, Cl. 339-17.00M.
Everett, Nicholas Wynne, to Ibis Engineers Limited. Garment pressing machines. 4,057,179, Cl. 223-73.000.
Evrard, Thomas O., to Olin Corporation. Method for using 3-trichloromethyl-5-lower alkoxy-1,2,4-thiadiazole compounds as insecticides and acaricides. 4,057,639, Cl. 424-270.000.
Exxon Research & Engineering Co.: *See—*
Bushnell, James D.; Leighton, Milton D.; and McDonald, Thomas M., 4,057,491, Cl. 208-321.000.
Gorbaty, Martin L., 4,057,681, Cl. 526-185.000.
Lundberg, Robert D.; and Thame, Neville G., 4,057,598, Cl. 260-857.00G.
Metrailer, William J.; and Matula, Joseph P., 4,057,487, Cl. 208-81.000.
Rao, Bhaskara M. L., 4,056,885, Cl. 29-623.100.
Rao, Bhaskara M. L.; and Malachesky, Paul A., 4,057,676, Cl. 429-50.000.
Vadovic, Charles J.; Wesselhoft, Robert D.; and Nahas, Nicholas C., 4,057,512, Cl. 252-413.000.
Eymard, Pierre: *See—*
Pigerol, Charles; Eymard, Pierre; Vernieres, Jean-Claude; Werbenec, Jean-Pierre; and Broll, Madeleine, 4,057,644, Cl. 424-325.000.
F. Meyer & Schwabedissen GmbH & Co. KG.: *See—*
Rottmann, Manfred, 4,057,197, Cl. 242-58.000.
Fabiero, Carolina P.: *See—*
Crouch, William B.; Fabiero, Carolina P.; and Robin, Allen M., 4,057,510, Cl. 252-372.000.
Fabryka Sprzetu i Narzedzi Gorniczych im. Gen. Karola: *See—*
Chrobak, Eryk; Natkaniec, Benedykt; Wasyleczko, Zenon; Stawinski, Antoni; and Roczek, Andrzej, 4,056,929, Cl. 59-85.000.
Falivene, Pasquale J., to Colgate Palmolive Company. Fabric conditioning with improved composition containing a plasticizer. 4,057,673, Cl. 428-411.000.
Falk Corporation, The: *See—*
Stephens, Robert K., 4,057,126, Cl. 184-11.00R.
Fangmeier, Ralf; and Bracht, Lothar, to Th. Kieserling & Albrecht. Method and apparatus for straightening of elongated workpieces. 4,056,958, Cl. 72-98.000.
Farnand, J. Redmond: *See—*
Meadus, F. Weldon; Sparks, Bryan D.; Puddington, Ira E.; and Farnand, J. Redmond, 4,057,486, Cl. 208-11.0LE.
Farooq, Saleem: *See—*
Karrer, Friedrich; and Farooq, Saleem, 4,057,587, Cl. 260-613.00R.
Farquhar, Norman G.; and Schwab, John A., to Westinghouse Electric Corporation. Process fluid cooling system. 4,057,034, Cl. 122-382.000.
Fayolle, Bernard, to Rhone-Poulenc-Textile. Block-type aryl copolyesters and filaments based on these copolyesters. 4,057,597, Cl. 260-860.000.
Federal Signal Corporation: *See—*
Andrews, Frank; and McKee, Richard W., 4,057,208, Cl. 246-125.000.
Feess, Erich; and Gronen, Willy, to Hoechst Aktiengesellschaft. Process for the printing with developing dyes. 4,057,389, Cl. 8-71.000.
Fekete, Lajos F.: *See—*
Bick, Rodger L., 4,057,628, Cl. 424-101.000.
Felten & Guilleaume Carlswerk AG: *See—*
Rasquin, Werner, 4,057,737, Cl. 307-147.000.
Ferrari, Giorgio; and Krepinsky, Jiri Jan, to Simes Societa Italiana Medicinali e Sintetici S.p.A. Carbamates of ergolines and therapeutic compositions therewith. 4,057,635, Cl. 424-261.000.
Ferree, Roy E., to ESM Inc. Screw feeder for granular material. 4,057,225, Cl. 366-157.000.
Ferrie, Ronald Gilbert: *See—*
Harbert, Donald Duane; and Ferrie, Ronald Gilbert, 4,057,761, Cl. 328-154.000.
Ferry, Michel, to International Business Machines Corporation. Transformer with active elements. 4,057,717, Cl. 364-802.000.
FIAT Societa per Azioni: *See—*
Michellone, Giancarlo; and Maggioni, Virginio, 4,057,300, Cl. 303-113.000.
Fiecchi, Alberto, to Bioresearch Limited. Sulphonic acid salts of S-adenosilmethionine. 4,057,686, Cl. 536-26.000.
Fillmore, William E.; Garver, Wayne E.; Mumford, George V.; and Price, James H., to Owens-Illinois, Inc. Vapor-seal safety cap and container. 4,057,159, Cl. 215-222.000.
Finelli, Anthony F.; Jasani, Shirish; and Williams, Columbus, Jr., to Goodyear Tire & Rubber Company, The. Ethylenically polyurethane unsaturated composition. 4,057,431, Cl. 96-115.00R.
Finnigan, Joseph C. Container and its mounting on a safety harness. 4,057,181, Cl. 224-29.00R.
Firan Electronics, Inc.: *See—*
Mette, Klaus Hermann; and St. Denis, Andrew Raoul, 4,057,713, Cl. 364-476.000.
Firestone Tire & Rubber Company, The: *See—*
Gardner, James Dennis; and Glasscock, Robert William, 4,057,091, Cl. 152-353.00R.
Firsov, Vitaly Mikhailovich: *See—*
Kudryavtsev, Alexandr Alexandrovich; Firsov, Vitaly Mikhailovich; Solinov, Evgeny Fedorovich; Symon, Mark Klavdievich; Litvinov, Pavel Ivanovich; Veresov, Albert Pavlovich; Rybakov, Ivan Alexandrovich; Trishin, Viktor Timofeevich; Goryannikov, Vladimir Mikhailovich; Savin, Vyacheslav Pavlovich; and Kashkarov, Igor Georgievich, 4,057,409, Cl. 65-154.000.
Fischbeck, Kenneth H.; and Vernon, Richard H., to Xerox Corporation. Separable liquid droplet instrument and magnetic drivers therefor. 4,057,807, Cl. 346-140.00R.
Fischer, Adolf, deceased (by Fischer, Caecilia Emma, heiress-at-law), to BASF Aktiengesellschaft. Herbicidal compositions. 4,057,414, Cl. 71-88.000.
Fischer, Caecilia Emma, heiress-at-law: *See—*
Fischer, Adolf, deceased, 4,057,414, Cl. 71-88.000.
Fischer, Harry C., to United States of America, Energy Research and Development Administration. Bidirectional piston valve. 4,057,074, Cl. 137-107.000.
Fisher, Chester Donald: *See—*
Wert, Edward; and Fisher, Chester Donald, 4,056,867, Cl. 24-37.000.
Fisher, Robert G.: *See—*
Victor, George; Fisher, Robert G.; and Bischof, Kaspar, 4,057,160, Cl. 215-318.000.
Fisher, Walter A., to Griswold Machine & Engineering, Inc. Trench box height adaptor. 4,056,940, Cl. 61-41.00A.
Fisons Limited: *See—*
Appleton, Richard Anthony; and Brown, Kevin, 4,057,641, Cl. 424-283.000.
Fitch, Robert H.: *See—*
Kurtz, Bruce E.; Guptill, Joel P.; and Fitch, Robert H., 4,057,474, Cl. 204-98.000.
Flaschar, Heinz; and Gand, Heinz, to Robert Bosch GmbH. Electromagnetic valve. 4,057,216, Cl. 251-129.000.
Fleer, Ernst Otto: *See—*
Hofmockel, Dieter; Grassme, Ulrich; Seissl, Johannes; and Fleer, Ernst Otto, 4,057,733, Cl. 250-491.000.
Fleischman, Andor A., to Bell & Howell Company. Adjustable focal length optical design. 4,057,329, Cl. 350-222.000.
Fleischmann, Horst, to PFP-Anstalt Fuer Produkt-Entwicklung und

Verwertung. Apparatus for suspending goods for display. 4,057,147, Cl. 211-47.000.
Fleming, George William; and Paul, Alfred N. Personal aid signalling system. 4,057,790, Cl. 340-224.000.
Flex-O-Lators, Inc.: *See—*
Arnold, Harmon W., 4,057,292, Cl. 297-452.000.
Florian, John, to Mobil Oil Corporation. Meat tray. 4,057,651, Cl. 229-2.500.
Flotow, Richard A., to Dana Corporation. Multiple disk clutch stamped adapter ring. 4,057,131, Cl. 192-70.130.
Floyd, Roger M.: *See—*
Bamburg, Robert A.; Duncan, Farris N.; and Floyd, Roger M., 4,056,913, Cl. 53-27.000.
Fluor Corporation: *See—*
Valdes, A. R., 4,057,403, Cl. 55-31.000.
FMC Corporation: *See—*
Gibbons, Loren Kenneth, 4,057,416, Cl. 71-90.000.
Meadow, Morton; and Berkowitz, Sidney, 4,057,613, Cl. 423-443.000.
Ramsey, Arthur Albert, 4,057,415, Cl. 71-90.000.
Fomenko, Sergei Michael, to Greenwood Mills, Inc. Coherent scanning system for fabric inspection. 4,057,351, Cl. 356-238.000.
Ford, George Alan, to Walker-Neer Manufacturing Co., Inc. Bit packer for dual tube drilling. 4,057,118, Cl. 175-215.000.
Ford Motor Company: *See—*
Allison, William D., 4,057,355, Cl. 403-2.000.
Fork, Kurt; Lambrecht, Dietrich; Waldmann, Hermann; and Hofmann, Helmut, to Kraftwerk Union Aktiengesellschaft. Durability or service-life monitoring device for a turbogenerator shaft. 4,057,714, Cl. 264-494.000.
Foster, Daniel S. Boat propulsion with surface-running propeller drive. 4,057,027, Cl. 115-39.000.
Foster, David J., to General Motors Corporation. Brake system. 4,057,301, Cl. 303-114.000.
Foster Wheeler Energy Corporation: *See—*
Bromwich, Robert Alan Charles, 4,056,972, Cl. 73-620.000.
Fragale, Eleanor M. Clothes hamper. 4,057,309, Cl. 312-290.000.
Francis, David J.: *See—*
Slama, Jerry L.; Francis, David J.; and Shepherd, Gordon R., 4,057,185, Cl. 226-1.000.
Frank, Lee Fitzpatrick, to Eastman Kodak Company. Compact viewer. 4,057,337, Cl. 353-26.00R.
Franz, William F.: *See—*
Cole, Edward L.; Hess, Howard V.; and Franz, William F., 4,057,399, Cl. 44-6.000.
Fratzke, Lawrence F.: *See—*
Crumrine, Albert W.; and Fratzke, Lawrence F., 4,057,502, Cl. 210-440.000.
Fraunberger, Martin J.: *See—*
Albrecht, Robert J.; and Fraunberger, Martin J., 4,057,078, Cl. 137-625.200.
Friedman, Ronald L.; and Lewis, Roger N., to Argus Chemical Corporation. Polymerization method and t-alkyl peresters of t-hydroperoxides for use therein. 4,057,567, Cl. 260-453.0RZ.
Friedrich Wilhelm Schwing GmbH: *See—*
Schwing, Friedrich, 4,057,373, Cl. 417-519.000.
Fuchs, Peter: *See—*
Pietzsch, Ludwig; Huhne, Gerd; Overlach, Knud; and Fuchs, Peter, 4,057,792, Cl. 340-267.00C.
Fuji Electrochemical Co., Ltd.: *See—*
Kobayashi, Seihin; Torii, Michihiro; and Kobayashi, Hiroaki, 4,057,606, Cl. 264-24.000.
Fuji Photo Film Co., Ltd.: *See—*
Itagaki, Sadayoshi, 4,057,496, Cl. 210-65.000.
Sato, Akira; Ogawa, Akira; Hinata, Masanao; and Takei, Haruo, 4,057,430, Cl. 96-100.00R.
Fuji Shiko Kabushiki Kaisha: *See—*
Asano, Shinzo, 4,057,013, Cl. 101-212.000.
Fujimoto, Sakae, to Ricoh Co., Ltd. Sheet feed termination detector. 4,057,243, Cl. 271-256.000.
Fujinaga, Masao: *See—*
Ono, Tetsuhiro; Aramaki, Minoru; Mizuno, Tamotsu; and Fujinaga, Masao, 4,057,614, Cl. 423-490.000.
Fujita, Hiroshi: *See—*
Miki, Tosaku; Hosokawa, Yasuhiro; Miwa, Tamotsu; Fujita, Hiroshi; Asano, Masahide; and Aibara, Shunzo, 4,057,629, Cl. 424-177.000.
Fujitsu Limited: *See—*
Kaneda, Saburo; and Tokura, Koichi, 4,057,850, Cl. 364-200.000.
Fujiwhara, Mitsuto; Kojima, Tamotsu; and Matsuo, Syunji, to Konishiroku Photo Industry Co., Ltd. Acylacetanilide coupler with heterocyclic diacyl amino coupling-off group. 4,057,432, Cl. 96-56.200.
Fukata, Yasuo: *See—*
Nakagome, Yukio; Teramura, Hiroichi; Fukata, Yasuo; and Yamasaki, Yasuhiro, 4,057,834, Cl. 358-133.000.
Fukui, Takashi; and Ikeda, Takami, to Sumitomo Metal Industries Limited. Process for vacuum decarburization of steel. 4,057,421, Cl. 75-60.000.
Fukumura, Kagenori: *See—*
Sakai, Toshimitsu; Fukumura, Kagenori; and Saito, Tadashi, 4,056,991, Cl. 74-863.000.
Fukuoka, Itsuo: *See—*
Iida, Masajiro; Morimatsu, Hideharu; Fukuoka, Itsuo; and Yoshida, Yoshinari, 4,057,779, Cl. 340-3.00C.
Fun Things, Inc.: *See—*
Csoka, Frank S., 4,057,253, Cl. 273-131.0BA.
Furlette, James L.; and Stadler, Donald A. Torque limiting coupling. 4,056,953, Cl. 64-30.00D.
Furnadjiev, Vassil Lazarov; and Samardjiev, Boris Krestanov, to CS na BSFS. Apparatus for analyzing movements of an animate or inanimate object. 4,057,806, Cl. 346-33.00R.
Furniss, William E.; Vancsa, George I.; and Onufer, Joseph R., to Westinghouse Electric Corporation. Sequence of events recorder and system for transmitting sequence data from a remote station to a master station. 4,057,785, Cl. 340-163.000.
Furst, Andor; Gutzwiller, Jurg; Muller, Marcel; Wiechert, Rudolf; Eder, Ulrich; and Neef, Gunter, to Hoffmann-La Roche Inc. D-Homo-19-norsteroids. 4,057,561, Cl. 260-345.90S.
Furuno Electric Company, Limited: *See—*
Iida, Masajiro; Morimatsu, Hideharu; Fukuoka, Itsuo; and Yoshida, Yoshinari, 4,057,779, Cl. 340-3.00C.
G. D. Searle & Co.: *See—*
Adelstein, Gilbert W.; Dajani, Esam Z.; and Yen, Chung Hwai, 4,057,549, Cl. 260-293.540.
Dryden, Hugh L., Jr.; Scaros, Mike G.; and Telinski, Thomas J., 4,057,542, Cl. 260-239.55C.
Dryden, Hugh L., Jr.; and Markos, Charles S., 4,057,543, Cl. 260-239.570.
Jaszczak, Ronald J., 4,057,726, Cl. 250-363.00S.
Meyer, Rolf; and Burgess, John E., 4,057,148, Cl. 211-74.000.
Muehllehner, Gerd; and Buchin, Michael P., 4,057,727, Cl. 250-363.00S.
G. D. Societa per Azioni: *See—*
Seragnoli, Enzo, 4,056,915, Cl. 53-59.00R.
Seragnoli, Enzo, 4,056,916, Cl. 53-59.00R.
Seragnoli, Enzo, 4,056,917, Cl. 53-59.00R.
GAF Corporation: *See—*
Hort, Eugene V.; and Williams, Earl P., 4,057,533, Cl. 260-67.500.
Gaines, Donald R.; Smallegan, Jon M.; and Trudeau, William H., to Gulf & Western Manufacturing Company. Heavy duty resilient coupling assembly. 4,057,304, Cl. 308-237.00A.
Galinke, Joachim: *See—*
Hase, Brigitte; Hase, Christian; Galinke, Joachim; and Wegemund, Bernd, 4,057,622, Cl. 424-78.000.
Hase, Brigitte; Galinke, Joachim; and Wegemund, Bernd, 4,057,623, Cl. 424-78.000.
Hase, Brigitte; Galinke, Joachim; and Wegemund, Bernd, 4,057,624, Cl. 424-78.000.
Hase, Brigitte; Galinke, Joachim; and Wegemund, Bernd, 4,057,625, Cl. 424-78.000.
Gallagher, Don R.: *See—*
Jones, Bernard H.; Cox, Daniel; and Gallagher, Don R., 4,057,195, Cl. 242-18.00G.
Gallagher, Robert C., to Westinghouse Electric Corporation. Dual gate MNOS transistor. 4,057,820, Cl. 357-23.000.
Gand, Heinz: *See—*
Flaschar, Heinz; and Gand, Heinz, 4,057,216, Cl. 251-129.000.
Gante, Joachim; Kurmeier, Hans-Adolf; Orth, Dieter; Schacht, Erich; and Wild, Albrecht, to Merck Patent Gesellschaft mit beschrankter Haftung. Araliphatic dihalogen compounds and process for their preparation. 4,057,647, Cl. 424-340.000.
Ganz, Frederick M., to Grumman Aerospace Corporation. Multi-PRF signal processor system. 4,057,800, Cl. 343-8.000.
Gardner, James Dennis; and Glasscock, Robert William, to Firestone Tire & Rubber Company, The. Pneumatic tire. 4,057,091, Cl. 152-353.00R.
Garnett, John Lyndon; and Rock, John Denis. Curable pre-polymer compositions, method of making and method of coating articles therewith. 4,057,657, Cl. 427-44.000.
Garrett, Donald E. Process for in situ conversion of coal or the like into oil and gas. 4,057,293, Cl. 299-2.000.
Garrett, Luther J. Carrying rack for trucks. 4,057,281, Cl. 296-3.000.
Garver, Wayne E.: *See—*
Fillmore, William E.; Garver, Wayne E.; Mumford, George V.; and Price, James H., 4,057,159, Cl. 215-222.000.
Gaskell, Alfred J.; and Charnley, Ralph L., to Pako Corporation. Automatic replenisher system for a photographic processor. 4,057,818, Cl. 354-298.000.
Gaspar, Phyllis L. Child's play seat apparatus. 4,057,244, Cl. 272-1.00A.
Gassmann, Horst-Detlef, to Hilti Aktiengesellschaft. Damping chamber for an explosive charge-driven fastening element setting gun. 4,056,935, Cl. 60-632.000.
Gatewood, Sidney Ulane, to Borg-Warner Corporation. Automatic clutch wear adjuster. 4,057,134, Cl. 192-111.00A.
Gau, Leonard P., to Chrysler Corporation. Swirler for a fluid flowmeter and method of making same. 4,056,977, Cl. 73-272.00R.
Gay, Walter A., to Olin Corporation. Process for making pentachloronitrobenzene. 4,057,590, Cl. 260-646.000.
Gedenk, Rudolf: *See—*
Pusch, Gunter; and Gedenk, Rudolf, 4,057,107, Cl. 166-260.000.
Geffers, Hans: *See—*
Bohnsack, Gerhard; Geffers, Hans; Kallfass, Herbert; and Radt, Walter, 4,057,511, Cl. 252-389.00A.
Geiszler, Adolph Oscar: *See—*
Dunnigan, Daniel Ambrose; Geiszler, Adolph Oscar; and Holland, James Brooks, 4,057,582, Cl. 260-574.000.
General Dynamics Corporation: *See—*
Krikorian, Esther; and Crisp, Michael J., 4,057,476, Cl. 204-192.00P.
General Electric Company: *See—*
Bond, James A.; Eckard, Spurgeon E.; and Schnacke, Arthur W., 4,056,946, Cl. 62-121.000.

Cooper, Glenn Dale; and Schraga, Irwin, 4,057,599, Cl. 260-874.000.
Hildebrand, George Lee; Sleeper, Thomas Till; Healey, William Allen; Hall, Stuart Jeffery; and Pfuntner, Richard A., 4,056,976, Cl. 73-231.00M.
Preston, John M., 4,057,663, Cl. 427-307.000.
Roberts, John A., 4,056,967, Cl. 73-1.00G.
Sobolewski, Valentine S., 4,057,219, Cl. 254-175.000.
Thompson, John Robert; Rowland, Trevor Cartwright; Proebstle, Richard Alan; Rosicky, Edward; and Snyder, Thoma Mees van't Hoff, 4,057,466, Cl. 176-38.000.
General Motors Corporation: *See—*
Baber, James R.; and Dershem, Ronald J., 4,057,080, Cl. 138-44.000.
Foster, David J., 4,057,301, Cl. 303-114.000.
Roethlisberger, Jerry M., 4,057,120, Cl. 180-44.00R.
General Tire & Rubber Company, The: *See—*
Tracy, Frank R., 4,057,092, Cl. 152-379.100.
Genova, Arthur F.; and Lennon, Thomas J., to GTE Sylvania Incorporated. Communication receiving apparatus. 4,057,759, Cl. 325-320.000.
Genshaw, Marvin Alden, to Miles Laboratories, Inc. Test device and method for determining blood hemoglobin. 4,057,394, Cl. 23-230.00B.
Gerhardt, Fred, to Edeco-West, Inc. Rolling machine assembly. 4,056,962, Cl. 72-170.000.
Gerritsen, Gerrit Berend: *See—*
Jacobs, Bernardus Antonius Johannus; van der Wal, Johannes; and Gerritsen, Gerrit Berend, 4,057,831, Cl. 358-128.000.
Geus, Ewald; and Tammi, Vesa, to Alexander Binzel Corporation. Gas shielded arc welding torch. 4,057,704, Cl. 219-75.000.
Giannone, Frank C. Eye treatment apparatus. 4,057,054, Cl. 128-76.500.
Gibbons, Loren Kenneth, to FMC Corporation. 3-Alkylthio-, 3-alkylsulfinyl-, and 3-alkylsulfonylisothiazole derivatives as herbicides. 4,057,416, Cl. 71-90.000.
Gibson, Myron R., to Caterpillar Tractor Co. Rotary engine with variable orifice prechamber. 4,057,036, Cl. 123-8.090.
Gieles, Antonius Cornelis Maria; and Somers, Gerardus Henricus Johannus, to U.S. Philips Corporation. Device for sterilization by transuterine tube coagulation. 4,057,063, Cl. 128-303.170.
Gilliam, Charles David, to New York School of Locksmithing, Inc. Tool for determining safe lock component positions. 4,056,956, Cl. 70-446.000.
Gilliand, Andre Ferdinand Louis; and Looser, Christian, to Alcan Research and Development Limited. Aseptic packing unit and a service unit for providing the packing unit with sterile utilities. 4,056,921, Cl. 53-167.000.
Girres, Gerard E., to Raymond Lee Organization Inc., The, a part interest. Apparatus for playing a horse-racing game. 4,057,254, Cl. 273-134.0CH.
Gitlin, Richard Dennis; and Thompson, John Stewart, to Bell Telephone Laboratories, Incorporated. Recursive-like adaptive echo canceller. 4,057,696, Cl. 179-170.200.
Giuffrida, Anthony J., to Ionics, Incorporated. Electrodialysis apparatus and process for ion modification. 4,057,483, Cl. 204-301.000.
Gladden, Kenneth D.: *See—*
Hays, Raymond H.; and Gladden, Kenneth D., 4,057,230, Cl. 266-117.000.
Glass, Dwight W., to Keystone Consolidated Industries, Inc. Ignition lock. 4,056,955, Cl. 70-422.000.
Glasscock, Robert William: *See—*
Gardner, James Dennis; and Glasscock, Robert William, 4,057,091, Cl. 152-353.00R.
Gnabs, Christian: *See—*
Bachmann, Wilfried; Gnabs, Christian; Janecka, Kurt; Mundlos, Eberhard; Papenfuhs, Theodor; and Waese, Gerhard, 4,057,576, Cl. 260-525.000.
Gobin, Renee: *See—*
Bardy, Andre; Beydon, Jacqueline; Gobin, Renee; and Hegesippe, Michel, 4,057,615, Cl. 424-1.000.
Goettler, Lloyd Arnold; and Lambright, Arthur James, to Monsanto Company. Hose reinforced with discontinuous fibers oriented in the radial direction. 4,057,610, Cl. 264-108.000.
Goldstein, Arthur M.: *See—*
Costanza, John R.; DeMartino, Ronald N.; and Goldstein, Arthur M., 4,057,509, Cl. 252-316.000.
Gonnam, Russell W.: *See—*
Hinman, Walter L., Jr.; and Gonnam, Russell W., 4,057,841, Cl. 361-64.000.
Gontero, Piero, to Ing. C. Olivetti & C., S.p.A. Electrostatic copying machine with multi-frame drum assembly. 4,057,343, Cl. 355-16.000.
Goodfellow, Anthony Gerald, to Dunlop Limited. Pneumatic tire manufacture. 4,057,446, Cl. 156-123.00R.
Goodfellow, Anthony Gerald: *See—*
Holroyd, Eric; Goodfellow, Anthony Gerald; and McGlashen, James Neil, 4,057,447, Cl. 156-125.000.
Goodhouse, Carl J., to Robertshaw Controls Company. Presettable defrost timer. 4,056,948, Cl. 62-155.000.
Goodyear Tire & Rubber Company, The: *See—*
Brinkley, Max D., 4,057,445, Cl. 156-121.000.
Caravito, V. A., 4,057,302, Cl. 305-19.000.
Creekmore, Mark D.; and Panning, Henry F., 4,057,672, Cl. 428-220.000.
Finelli, Anthony F.; Jasani, Shirish; and Williams, Columbus, Jr., 4,057,431, Cl. 96-115.00R.
Smith, Michael W.; and Houck, Stanley J., 4,057,454, Cl. 156-401.000.
Goralski, Christian T.: *See—*
Mixan, Craig E.; Goralski, Christian T.; and Pews, R. Garth, 4,057,517, Cl. 260-22.00R.
Gorbaty, Martin L., to Exxon Research & Engineering Co. Process for homogeneously polymerized high unsaturation C4–C10 isoolefin conjugated diene copolymers. 4,057,681, Cl. 526-185.000.
Gordon, Donald W. Athlete's landing pit standard protector. 4,057,245, Cl. 272-101.000.
Gorodetsky, Sergei Sergeevich: *See—*
Bataev, Mikhail Kirillovich; Veits, Isaak Efimovich; Gorodetsky, Sergei Sergeevich; Macheret, Lev Ilich; Kuznetsov, Lev Alexeevich; Tjurin, Albert Vasilievich; and Yaunzem, Jury Eduardovich, 4,057,453, Cl. 156-390.000.
Goryannikov, Vladimir Mikhailovich: *See—*
Kudryavtsev, Alexandr Alexandrovich; Firsov, Vitaly Mikhailovich; Solinov, Evgeny Fedorovich; Symon, Mark Klavdievich; Litvinov, Pavel Ivanovich; Veresov, Albert Pavlovich; Rybakov, Ivan Alexandrovich; Trishin, Viktor Timofeevich; Goryannikov, Vladimir Mikhailovich; Savin, Vyacheslav Pavlovich; and Kashkarov, Igor Georgievich, 4,057,409, Cl. 65-154.000.
Gossett, Rodger L., to American Medical Products Company. Magnesium sulfate anhydrous hot pack having an inner bag provided with a perforated seal. 4,057,047, Cl. 126-263.000.
Goto, Hirokazu; and Nagashima, Kunio, to Nippon Electric Company, Ltd. Switching network with crosstalk elimination capability. 4,057,691, Cl. 179-18.0GF.
Gotzen, Heinrich, to Heinrich Gotzen Maschinenbau. Multi-shell grab bucket. 4,057,278, Cl. 294-88.000.
Grace, Bud W. Towing apparatus. 4,057,265, Cl. 280-468.000.
Grain Systems, Inc.: *See—*
Taylor, Quentin, 4,057,112, Cl. 172-166.000.
Grassme, Ulrich: *See—*
Hofmockel, Dieter; Grassme, Ulrich; Seissl, Johannes; and Fleer, Ernst Otto, 4,057,733, Cl. 250-491.000.
Graver, Clair Warren; Carwheel, Clarence Edward; and Bunczk, Charles Joseph, to Pennwalt Corporation. Concentrates for imparting temporary soil release resins in fabrics during laundering. 4,057,503, Cl. 252-8.700.
Grebe, Edward Andrew, to Wisconsin Bridge & Iron Co. Apparatus for routing logs. 4,057,138, Cl. 198-480.000.
Greeley, Ashford C.; and Daniel, Sam M., to Motorola Inc. Minimum miss distance vector measuring system. 4,057,708, Cl. 235-413.000.
Greendale, John H., to United States of America, Army. Adjustable helmet suspension system. 4,056,852, Cl. 2-417.000.
Greenwood Mills, Inc.: *See—*
Fomenko, Sergei Michael, 4,057,351, Cl. 356-238.000.
Griffith, James R.; and O'Rear, Jacques G., to United States of America, Navy. Bisorthodinitriles. 4,057,569, Cl. 260-465.00E.
Griswold, James L. Trench shoring assembly with rigid main frame support. 4,056,938, Cl. 61-41.00A.
Griswold Machine & Engineering, Inc.: *See—*
Fisher, Walter A., 4,056,940, Cl. 61-41.00A.
Gronen, Willy: *See—*
Feess, Erich; and Gronen, Willy, 4,057,389, Cl. 8-71.000.
Grooman, Edward D., to Chevron Research Company. Ballistic nylon fabric turbine governor housing shielding means. 4,057,359, Cl. 415-9.000.
Gross, Benjamin; and Owen, Hartley, to Mobil Oil Corporation. System for regenerating fluidizable catalyst particles. 4,057,397, Cl. 23-288.00B.
Gross, Donald Ralph; Schaefer, Nick Lewis; Russell, John Raymond; and Johnson, Clifford Ray, to Trus Joist Corporation. Apparatus for forming serrations in opposed edges of wooden panels for use in I-beams. 4,057,088, Cl. 144-91.000.
Gross, Heiko, to Siempelkamp Giesserei KG. Pressure vessel for nuclear reactor. 4,057,162, Cl. 220-3.000.
Gross, James R., to Dow Chemical Company, The. Absorbent articles made from carboxylic synthetic polyelectrolytes having copolymerized N-substituted acrylamide crosslinker. 4,057,521, Cl. 260-29.6HN.
Grossfield, Karl, to National Research Development Corporation. Calling aids. 4,057,794, Cl. 340-311.000.
Grudzinskas, Charles Vincent; and Weiss, Martin Joseph, to American Cyanamid Company. Novel 11-deoxy-substituted prostaglandins of the E and F series. 4,057,571, Cl. 560-121.000.
Grumman Aerospace Corporation: *See—*
Ganz, Frederick M., 4,057,800, Cl. 343-8.000.
Grunbacher, Martin; and Johannsen, Hans Werner, to Minox GmbH, Firma. Sub-miniature camera construction. 4,057,814, Cl. 354-204.000.
GTE Automatic Electric Laboratories Incorporated: *See—*
Lee, Man Shek, 4,057,766, Cl. 330-107.000.
GTE Sylvania Incorporated: *See—*
Genova, Arthur F.; and Lennon, Thomas J., 4,057,759, Cl. 325-320.000.
Seidel, Heinz H., 4,056,872, Cl. 407-114.000.
Wolfe, Robert Wade; and Messier, Russell Francis, 4,057,508, Cl. 252-301.40H.
Guarnere, Joseph V., to TIW Industries, Inc. Wall support mechanism for adjusting the vertical orientation and height of a wall member. 4,056,903, Cl. 52-122.000.
Guillot, Jack, to Bennes Marrel, Zone Industrielle. Rotary heat exchanger, in particular for a gas turbine. 4,057,102, Cl. 165-8.000.
Gulf Oil Corporation: *See—*
Sinclair, Richard G., 4,057,537, Cl. 260-78.30R.

Gulf Research & Development Company: *See—*
Budzak, Paul A.; and Clinton, Russell M., III, 4,057,393, Cl. 23-230.0PC.
Innes, Robert A.; and Perrotta, Anthony J., 4,057,570, Cl. 260-465.300.
Montagna, Angelo Anthony; Somers, Allen Evarts; Peake, Stephen Luther; and Chun, Sun Woong, 4,057,488, Cl. 208-89.000.
Montagna, Angelo Anthony; Somers, Allen Evarts; and Sebulsky, Raynor Tyler, 4,057,489, Cl. 208-89.000.
Rhodes, Donald F., 4,057,071, Cl. 137-1.000.
Wynne, Francis Edmund, Jr., 4,057,490, Cl. 208-127.000.
Gulf & Western Manufacturing Company: *See—*
Gaines, Donald R.; Smallegan, Jon M.; and Trudeau, William H., 4,057,304, Cl. 308-237.00A.
Gunjian, Armen G. Grill cleaning brush. 4,056,863, Cl. 15-160.000.
Guptill, Joel P.: *See—*
Kurtz, Bruce E.; Guptill, Joel P.; and Fitch, Robert H., 4,057,474, Cl. 204-98.000.
Gustafson Mfg. Co.: *See—*
Olander, Harvey F., 4,057,172, Cl. 221-10.000.
Gustav F. Gerdts KG: *See—*
Zimmermann, Heino, 4,056,978, Cl. 73-304.00R.
Guth, Hans: *See—*
Muschelknautz, Edgar; Burkholz, Armin; Wieschen, Hermann; Guth, Hans; and Richter, Wolfgang, 4,057,075, Cl. 137-171.000.
Gutsche, Klaus; Kohlmann, Friedrich-Wilhelm; and Scharwachter, Peter, to Nordmark-Werke GmbH Hamburg. Imidazole derivatives. 4,057,545, Cl. 542-428.000.
Gutzwiller, Jurg: *See—*
Furst, Andor; Gutzwiller, Jurg; Muller, Marcel; Wiechert, Rudolf; Eder, Ulrich; and Neef, Gunter, 4,057,561. Cl. 260-345.90S.
H. H. Robertson Company: *See—*
Summers, John E.; and Hadley, John F., 4,057,519, Cl. 260-2.5AK.
Haas, Georges; and Rossi, Alberto, to Ciba-Geigy Corporation. New hydroaromatic compounds. 4,057,573, Cl. 560-52.000.
Habermeier, Jurgen, to Ciba-Geigy Corporation. Halogenated bis-acrylates. 4,057,558, Cl. 548-305.000.
Habu, Teiji; Wada, Tsuneo; Sasaki, Takashi; Itoh, Shigemasa; Ohmura, Takayoshi; Ishii, Hiroki; and Yamaguchi, Hisashi, to Konishiroku Photo Industry Co., Ltd. Method for hardening gelatin. 4,057,538, Cl. 260-117.000.
Hachinohe Smelting Co., Ltd.: *See—*
Kinoshita, Hisahiro, 4,057,423, Cl. 75-109.000.
Hacman, Dionys; and Keutschegger, Adolf, to Balzers Patent- und Beteiligungs-Aktiengesellschaft. Reflection reducing multilayer system on a highly refractive infrared transmitting substrate. 4,057,316, Cl. 350-1.000.
Hadley, John F.: *See—*
Summers, John E.; and Hadley, John F., 4,057,519, Cl. 260-2.5AK.
Hagermo, Kjell Gustaf Roland, to Telefonaktiebolaget L M Ericsson. Connecting device at a bus bar. 4,057,312, Cl. 339-21.00R.
Hahn, Karl Friedrich, to Heye, Hermann. Apparatus for cooling tools of glass-forming machines by evaporation of a cooling liquid. 4,056,949, Cl. 62-373.000.
Haji, Noboru: *See—*
Toriya, Jun; Sato, Masato; Shiraga, Ken; and Matsunaga, Setsuo, 4,057,472, Cl. 203-80.000.
Halberstadt, Harry J.; and Rowley, Leroy S., to Lockheed Missiles & Space Company, Inc. Electrochemical cell. 4,057,675, Cl. 429-39.000.
Halcon International, Inc.: *See—*
Chueh, Chun Fei, 4,057,471, Cl. 203-69.000.
Hall, Stuart Jeffery: *See—*
Hildebrand, George Lee; Sleeper, Thomas Till; Healey, William Allen; Hall, Stuart Jeffery; and Pfuntner, Richard A., 4,056,976, Cl. 73-231.00M.
Halliar, William R.; and Stark, Marvin, to Pullman Incorporated. Cam operated hatch cover holddown. 4,057,020, Cl. 105-377.000.
Halopoff, William. Spring retainer for garage door hardware. 4,057,235, Cl. 267-73.000.
Halverson, Gilbert: *See—*
Tucker, Thomas Lee; and Halverson, Gilbert, 4,056,887, Cl. 33-126.600.
Hamamura, Kimio: *See—*
Kijima, Shizumasa; Yamatu, Isao; Hamamura, Kimio; Minami, Norio; Yamagishi, Youji; and Inai, Yuichi, 4,057,568, Cl. 260-462.00R.
Hamano, Eizaburo, to Tokyo Shibaura Electric Company, Ltd. In-line plural beam color cathode ray tube having deflection defocus correcting elements. 4,057,747, Cl. 313-413.000.
Hanabashi, Teruyuki: *See—*
Yamazaki, Shinichiro; and Hanabashi, Teruyuki, 4,057,166, Cl. 220-8.000.
Hanaoka, Tadashi: *See—*
Sugimoto, Keiichi; Nishijima, Koji; Akimoto, Hiroshi; Hanaoka, Tadashi; and Kakeya, Nobuharu, 4,057,544, Cl. 260-239.100.
Hannauer, George: *See—*
Asthana, Abhaya; and Hannauer, George, 4,057,711. Cl. 364-600.000.
Hannon, Martin J.: *See—*
Soehngen, John W.; and Hannon, Martin J., 4,057,607, Cl. 264-28.000.
Hanscom, Genevieve I.: *See—*
Babb, Raymond E., 4,057,352, Cl. 356-178.000.
Hansen, Clarence M.; and Ledebuhr, Richard L., to Dura Corporation. Method and apparatus for feeding articles onto a moving conveyor. 4,057,137, Cl. 198-443.000.
Harada, Tatsuo: *See—*
Moriyama, Shigeo; Harada, Tatsuo; Kawamura, Yoshio; Hashimoto, Seiya; Takanashi, Akihiro; Kurosaki, Toshiei; Kuniyoshi, Shinji; and Hosaka, Sumio, 4,057,347, Cl. 355-67.000.
Harada, Tetsuya, to Nissan Motor Co., Ltd. Exhaust gas recirculation system. 4,057,043, Cl. 123-119.00A.
Harbert, Donald Duane; and Ferrie, Ronald Gilbert, to RCA Corporation. Received signal selecting system with priority control. 4,057,761, Cl. 328-154.000.
Harder, Arthur J., Jr., to Coach and Car Equipment Corporation. Seat with energy absorbing mounting. 4,057,214, Cl. 248-399.000.
Harrington, Francis E.; and Ho, Robert S., to Sandoz, Inc. Substituted or unsubstituted p-alkanoyl toluenes as male anti-fertility agents. 4,057,646, Cl. 424-331.000.
Harris Corporation: *See—*
Monahan, John F., 4,057,828, Cl. 358-32.000.
Harrison, George C., to Polaroid Corporation. Quench strobe with predetermined quench rate. 4,057,811, Cl. 354-33.000.
Harrison, Marc S.: *See—*
Schwartz, Robert T.; and Harrison, Marc S., 4,057,288, Cl. 297-239.000.
Hart, Courtney: *See—*
Saxena, Arjun N.; and Hart, Courtney, 4,057,460, Cl. 156-643.000.
Hasbro Industries, Inc.: *See—*
Renegar, Charles Gwin; and Colbeck, Frank Edward, 4,057,456, Cl. 156-515.000.
Hase, Brigitte; Hase, Christian; Galinke, Joachim; and Wegemund, Bernd, to Henkel Kommanditgesellschaft auf Aktien. Water-in-oil creams with polymeric emulsifiers. 4,057,622, Cl. 424-78.000.
Hase, Brigitte; Galinke, Joachim; and Wegemund, Bernd, to Henkel Kommanditgesellschaft auf Aktien. Cosmetic emulsions containing N-vinylpyrrolidone-alkyl acrylate copolymers. 4,057,623, Cl. 424-78.000.
Hase, Brigitte; Galinke, Joachim; and Wegemund, Bernd, to Henkel Kommanditgesellschaft auf Aktien. Cosmetic emulsions containing acrylamide copolymer. 4,057,624, Cl. 424-78.000.
Hase, Brigitte; Galinke, Joachim; and Wegemund, Bernd, to Henkel Kommanditgesellschaft auf Aktien. Cosmetic emulsions containing N-vinylpyrrolidone/vinyl alkylcarboxylate copolymer. 4,057,625, Cl. 424-78.000.
Hase, Christian: *See—*
Hase, Brigitte; Hase, Christian; Galinke, Joachim; and Wegemund, Bernd, 4,057,622, Cl. 424-78.000.
Hasebe, Nobuyuki: *See—*
Takamizawa, Minoru; Okada, Humio; Hasebe, Nobuyuki· Toida, Hiromi, 4,057,596, Cl. 260-825.000.
Hashimoto, Akihiro; Hayashi, Shigeo; Yamamoto, Sadao; and Chujo, Hitoshi, to Showa Denko Kabushiki Kaisha; and Misawa Homes Institute of Research and Development. Process of continuous manufacture of light-weight foamed concrete. 4,057,608, Cl. 264-42.000.
Hashimoto, Seiya: *See—*
Moriyama, Shigeo; Harada, Tatsuo; Kawamura, Yoshio; Hashimoto, Seiya; Takanashi, Akihiro; Kurosaki, Toshiei; Kuniyoshi, Shinji; and Hosaka, Sumio, 4,057,347, Cl. 355-67.000.
Hata, Yoshitaka, to Nissan Motor Co., Ltd. Multi-cylinder internal combustion engine and method of operation thereof. 4,056,931, Cl. 60-274.000.
Hatano, Mitsuru, to Toyo Kogyo Co., Ltd. Automatic multi-speed transmission and overdrive combination. 4,056,990, Cl. 74-781.00R.
Hatori, Kunitake; Ozaki, Toshihiko; and Kondo, Ryohei, to Sankyo Electric Company Limited. Article storage devices with article releasers for use in vending machines. 4,057,171, Cl. 221-6.000.
Hattori, Kazuhide: *See—*
Yazaki, Takao; and Hattori, Kazuhide, 4,057,385, Cl. 425-466.000.
Hattori, Takeshi; and Adachi, Fumiyuki, to Nippon Telegraph and Telephone Public Corporation. Mobile diversity radio communication system. 4,057,758, Cl. 325-56.000.
Hattori, Torao; and Maezono, Masakazu, to Honda Giken Kogyo Kabushiki Kaisha. Shift control for high and low speed clutches of motorcars. 4,057,132, Cl. 192-87.190.
Hayakawa, Shigeru: *See—*
Kawashima, Syunichiro; Nishida, Masamitsu; Matsuo, Yoshihiro; Ouchi, Hiromu; and Hayakawa, Shigeru, 4,057,324, Cl. 350-150.000.
Hayashi, Kenji, to Hitachi, Ltd. Address translation system. 4,057,848, Cl. 364-200.000.
Hayashi, Shigeo: *See—*
Hashimoto, Akihiro; Hayashi, Shigeo; Yamamoto, Sadao; and Chujo, Hitoshi, 4,057,608, Cl. 264-42.000.
Hayes, Alfred F.: *See—*
Rayburn, Billy R., 4,056,891, Cl. 34-55.000.
Hays, Raymond H.; and Gladden, Kenneth D., to Caterpillar Tractor Co. Die quench machine and method. 4,057,230, Cl. 266-117.000.
Hazen, Wayne W.: *See—*
Jennings, Larry D.; and Hazen, Wayne W., 4,057,611, Cl. 423-127.000.
Healey, William Allen: *See—*
Hildebrand, George Lee; Sleeper, Thomas Till; Healey, William Allen; Hall, Stuart Jeffery; and Pfuntner, Richard A., 4,056,976, Cl. 73-231.00M.
Healy, James W. Vapor control. 4,057,086, Cl. 141-206.000.
Heather, James B.: *See—*
Sih, Charles J.; and Heather, James B., 4,057,851, Cl. 560-121.000.
Hedger, Denyer Edward, to Vero Electronics Limited. Wiring pens. 4,057,186, Cl. 226-127.000.

Hedstrom Company: *See—*
Ziegler, William H., Jr., 4,056,902, Cl. 52-73.000.
Hegesippe, Michel: *See—*
Bardy, Andre; Beydon, Jacqueline; Gobin, Renee; and Hegesippe, Michel, 4,057,615, Cl. 424-1.000.
Heidemann, Rolf, to Windmoller & Holscher. Printing press convertible from intaglio to flexographic printing and vice versa. 4,057,012, Cl. 101-153.000.
Heinrich Gotzen Maschinenbau: *See—*
Gotzen, Heinrich, 4,057,278, Cl. 294-88.000.
Heiser, Elmer F. Press system or the like. 4,056,965, Cl. 72-351.000.
Helber, Karl: *See—*
Rentschler, Waldemar T.; Starp, Franz W. R.; and Helber, Karl, 4,057,812, Cl. 354-51.000.
Henkel Kommanditgesellschaft auf Aktien: *See—*
Hase, Brigitte; Hase, Christian; Galinke, Joachim; and Wegemund, Bernd, 4,057,622, Cl. 424-78.000.
Hase, Brigitte; Galinke, Joachim; and Wegemund, Bernd, 4,057,623, Cl. 424-78.000.
Hase, Brigitte; Galinke, Joachim; and Wegemund, Bernd, 4,057,624, Cl. 424-78.000.
Hase, Brigitte; Galinke, Joachim; and Wegemund, Bernd, 4,057,625, Cl. 424-78.000.
Hennells, Ransom J. Self adjusting energy absorber employing conical control sleeve. 4,057,129, Cl. 188-285.000.
Hennells, Ransom J. Energy absorber. 4,057,236, Cl. 267-116.000.
Henningsen, Tom; and Conroy, John J., to Westinghouse Electric Corporation. Acousto-optic Q-switch. 4,057,770, Cl. 331-94.50Q.
Herforth, Dieter: *See—*
Doelves, Juergen; and Herforth, Dieter, 4,057,838, Cl. 358-299.000.
Herpich, William A.: *See—*
Park, Glenn S.; and Herpich, William A., 4,057,157, Cl. 214-302.000.
Herrmann, Franz-Josef: *See—*
Huschka, Hans; and Herrmann, Franz-Josef, 4,057,514, Cl. 252-510.000.
Hess, Howard V.: *See—*
Cole, Edward L.; Hess, Howard V.; and Franz, William F., 4,057,399, Cl. 44-6.000.
Heuer, Dale A.; Roemer, John F.; and Sheehan, Michael J., to International Business Machines Corporation. Read only memory. 4,057,787, Cl. 365-104.000.
Hewitt, John Stringer. Measurement of slurry consistencies. 4,057,729, Cl. 250-390.000.
Heye, Hermann: *See—*
Hahn, Karl Friedrich, 4,056,949, Cl. 62-373.000.
Schaar, Lothar, 4,057,412, Cl. 65-229.000.
Hiatt, Carl C.; and Larson, Nils F., to Hiatt-Larson Corporation. Structural building element. 4,056,910, Cl. 52-600.000.
Hiatt-Larson Corporation: *See—*
Hiatt, Carl C.; and Larson, Nils F., 4,056,910, Cl. 52-600.000.
Hieke, Eduard, to Siemens Aktiengesellschaft. Method and apparatus for the generation of distortion-free images with electron microscope. 4,057,722, Cl. 250-311.000.
Higuchi, Takeru; and Hussain, Anwar, to Alza Corporation. Ocular therapeutic system with selected membranes for administering ophthalmic drug. 4,057,619, Cl. 424-14.000.
Hikosaka, Takashi: *See—*
Miyamoto, Osamu; Iizaka, Isao; Yamamoto, Toshio; Hikosaka, Takashi; and Shimizu, Shigemitu, 4,057,339, Cl. 355-3.00R.
Hildebrand, George Lee; Sleeper, Thomas Till; Healey, William Allen; Hall, Stuart Jeffery; and Pfuntner, Richard A., to General Electric Company. Mass rate of flow meter. 4,056,976, Cl. 73-231.00M.
Hill, Christopher Rowland, to National Research Development Corporation. Apparatus for and methods of pulse-echo examination. 4,057,049, Cl. 128-2.00V.
Hill, David Taylor, to SmithKline Corporation. Antiarthritic compositions comprising bis-coordinated gold(1+) salts and methods of producing antiarthritic activity. 4,057,630, Cl. 424-204.000.
Hilti Aktiengesellschaft: *See—*
Gassmann, Horst-Detlef, 4,056,935, Cl. 60-632.000.
Hinata, Masanao: *See—*
Sato, Akira; Ogawa, Akira; Hinata, Masanao; and Takei, Haruo, 4,057,430, Cl. 96-100.00R.
Hinman, Walter L., Jr.; and Gonnam, Russell W., to Westinghouse Electric Corporation. Unsupervised trip keying for phase comparison relaying apparatus. 4,057,841, Cl. 361-64.000.
Hirano, Kimitoshi: *See—*
Shiga, Michio; Hirano, Kimitoshi; and Matsushita, Matsuo, 4,057,504, Cl. 252-33.000.
Hirata, Noritsugu: *See—*
Ishikawa, Kazuo; Hirata, Noritsugu; Takigawa, Tomoshi; and Yamada, Yasutsugu, 4,057,334, Cl. 352-175.000.
Hirota, Kiwami: *See—*
Yamazaki, Isamu; Toyama, Yoichi; Hirota, Kiwami; and Takeuchi, Hisashi, 4,057,680, Cl. 526-142.000.
Hirota, Yoshinari. Flexible sheet fixing device. 4,057,095, Cl. 160-392.000.
Hirsch, Hans-Jurgen: *See—*
Peschmann, Kristian; Junginger, Hans-Georg; and Hirsch, Hans-Jurgen, 4,057,728, Cl. 250-374.000.
Hirsch, John L., to Curt G. Joa, Inc. Diaper packer. 4,056,919, Cl. 53-124.00D.
Hitachi, Ltd.: *See—*
Ejiri, Masakazu; Kashioka, Seiji; Miyatake, Takafumi; Yoda, Haruo; and Kameyama, Masayoshi, 4,057,845, Cl. 364-200.000.
Hayashi, Kenji, 4,057,848, Cl. 364-200.000.
Maeda, Kunihiro; Imahasi, Hiromichi; and Kikuchi, Matsunosuke, 4,057,458, Cl. 156-603.000.
Moriyama, Shigeo; Harada, Tatsuo; Kawamura, Yoshio; Hashimoto, Seiya; Takanashi, Akihiro; Kurosaki, Toshiei; Kuniyoshi, Shinji; and Hosaka, Sumio, 4,057,347, Cl. 355-67.000.
Narita, Kazutoyo; Sakaue, Tadashi; and Niino, Yuzi, 4,057,825, Cl. 357-81.000.
Ohno, Toru, 4,057,695, Cl. 179-170.00R.
Yamamoto, Hajime; Kano, Tsuyoshi; and Nakano, Masaki, 4,057,507, Cl. 252-301.40S.
Hitco: *See—*
Lee, George, 4,057,450, Cl. 156-213.000.
Ho, Robert S.: *See—*
Harrington, Francis E.; and Ho, Robert S., 4,057,646, Cl. 424-331.000.
Hobbs, Howard Frederick, to Variable Kinetic Drives, Ltd. Torque converters. 4,056,986, Cl. 74-688.000.
HOBEG Hochtemperaturreaktor-Brennelement, GmbH: *See—*
Huschka, Hans; and Herrmann, Franz-Josef, 4,057,514, Cl. 252-510.000.
Hoechst Aktiengesellschaft: *See—*
Bachmann, Wilfried; Gnabs, Christian; Janecka, Kurt; Mundlos, Eberhard; Papenfuhs, Theodor; and Waese, Gerhard, 4,057,576, Cl. 260-525.000.
Bestmann, Hans Jurgen; Stransky, Werner Theo; and Vostrowsky, Otto, 4,057,593, Cl. 260-682.000.
Feess, Erich; and Gronen, Willy, 4,057,389, Cl. 8-71.000.
Pistorius, Rudolf, 4,057,586, Cl. 260-613.00D.
Winkelmann, Erhardt; Sinharay, Akhileswer; and Raether, Wolfgang, 4,057,634, Cl. 424-250.000.
Hofer, Johann: *See—*
Schmidt, Dietrich; Huber, Karl Erwin; and Hofer, Johann, 4,057,395, Cl. 23-230.00R.
Hofer, Wolfgang; Maurer, Fritz; Riebel, Hans-Jochem; Schroder, Rolf; and Eue, Ludwig, to Bayer Aktiengesellschaft. Sulfonylmethylamino-substituted benzoic acids and herbicidal method therewith. 4,057,418, Cl. 71-103.000.
Hoffmann, Georges. Mechanism for parallel connection of infinitely-adjustable looping gearings. 4,056,987, Cl. 74-689.000.
Hoffmann-La Roche Inc.: *See—*
Berger, Julius; Reichelt, Karen Emalyn; and Schuep, Willy, 4,057,553, Cl. 260-295.00A.
Furst, Andor; Gutzwiller, Jurg; Muller, Marcel; Wiechert, Rudolf; Eder, Ulrich; and Neef, Gunter, 4,057,561, Cl. 260-345.90S.
Hofmann, Helmut: *See—*
Fork, Kurt; Lambrecht, Dietrich; Waldmann, Hermann; and Hofmann, Helmut, 4,057,714, Cl. 264-494.000.
Hofmockel, Dieter; Grassme, Ulrich; Seissl, Johannes; and Fleer, Ernst Otto, to Siemens Aktiengesellschaft. Dental X-ray diagnostic installation. 4,057,733, Cl. 250-491.000.
Hogan, John Paul. Space vehicle module. 4,057,207, Cl. 244-159.000.
Holladay, James Eugene, Jr.; and Spencer, Billie Mike, to Sperry Rand Corporation. Continuous-wave ranging system. 4,057,801, Cl. 343-12.00R.
Holland, James Brooks: *See—*
Dunnigan, Daniel Ambrose; Geiszler, Adolph Oscar; and Holland, James Brooks, 4,057,582, Cl. 260-574.000.
Hollymatic Corporation: *See—*
Theis, James V., Jr.; and Meyer, Bruno P., 4,057,360, Cl. 415-25.000.
Holman, Scott L., to Bay City Foundry Company. Lateral adjustment mechanism for a machine anchor. 4,057,209, Cl. 248-13.000.
Holme Communications Systems, Inc.: *See—*
Holme, William Raymond, 4,057,804, Cl. 343-200.000.
Holme, William Raymond, to Holme Communications Systems, Inc. Branched path communications apparatus for routing communications signals. 4,057,804, Cl. 343-200.000.
Holroyd, Eric; Goodfellow, Anthony Gerald; and McGlashen, James Neil, to Dunlop Limited. Manufacture of pneumatic tires. 4,057,447, Cl. 156-125.000.
Holstein & Kappert Aktiengesellschaft: *See—*
Mnilk, Reinhold; Kurreck, Manfred; and Tiede, Wolfgang, 4,056,914, Cl. 53-35.000.
Holt, Ian; and Pincherle, Hugh Andrew, to Rank Organisation Limited, The. Method of manufacturing electro-optical cell. 4,056,881, Cl. 29-592.00R.
Holtschmidt, Ulrich: *See—*
Naumann, Klaus; Lurssen, Klaus; Sasse, Klaus; Holtschmidt, Ulrich; and Schwarzmann, Gunter, 4,057,413, Cl. 71-76.000.
Honda Giken Kogyo Kabushiki Kaisha: *See—*
Hattori, Torao; and Maezono, Masakazu, 4,057,132, Cl. 192-87.190.
Irie, Gen, 4,057,603, Cl. 261-70.000.
Honeywell Inc.: *See—*
Shafer, Donald E., 4,057,808, Cl. 346-107.00R.
Hood, Frederick E.; Mitchell, Donald K.; and Uhring, Gary S., to Hood Sailmakers, Inc. Halyard rig for roll-furling mainsail. 4,057,023, Cl. 114-107.000.
Hood Sailmakers, Inc.: *See—*
Hood, Frederick E.; Mitchell, Donald K.; and Uhring, Gary S., 4,057,023, Cl. 114-107.000.
Hoogendijk, Adrianus Huibert, to U.S. Philips Corporation. Apparatus for reading color television signal from a disc-shaped record carrier. 4,057,827, Cl. 358-8.000.
Hoogendoorn, Abraham; van de Grift, Robert Emile Johan; and van

Kessel, Theodorus Jozef, to U.S. Philips Corporation. Analog-digital converter. 4,057,796, Cl. 340-347.0AD.
Hooke, William M.: *See—*
Jassby, Daniel L.; and Hooke, William M., 4,057,462, Cl. 176-5.000.
Hool, Gerhard; and Kundig, Hans, to Ciba-Geigy Corporation. Compositions for the control of microorganisms. 4,057,648, Cl. 424-341.000.
Hopf, Heribert; and Schramm, Siegfried, to Keiper GmbH. Vise. 4,057,239, Cl. 269-170.000.
Hornung, Louis Michael: *See—*
Cockerill, William Clyde; Hornung, Louis Michael; Johnson, Donavon William; and Vrba, Richard Alan, 4,057,846, Cl. 364-200.000.
Hort, Eugene V.; and Williams, Earl P., to GAF Corporation. Process for preparation of quaternized cationic vinyllactam-acrylamide copolymers. 4,057,533, Cl. 260-67.500.
Horvath, William, to Plastic Research Products, Inc. Manually operated spray pump. 4,057,176, Cl. 222-193.000.
Hosaka, Sumio: *See—*
Moriyama, Shigeo; Harada, Tatsuo; Kawamura, Yoshio; Hashimoto, Seiya; Takanashi, Akihiro; Kurosaki, Toshiei; Kuniyoshi, Shinji; and Hosaka, Sumio, 4,057,347, Cl. 355-67.000.
Hoshikawa, Katuyuki; Noda, Soji; and Kimura, Akitaka, to Sumitomo Rubber Industries, Ltd. Puncture sealing pneumatic tire. 4,057,090, Cl. 152-347.000.
Hosoe, Masaya, to Machida Shigyo Co., Ltd. Tray-like container and a method of and an apparatus for manufacturing the container. 4,057,380, Cl. 425-324.100.
Hosokawa, Yasuhiro: *See—*
Miki, Tosaku; Hosokawa, Yasuhiro; Miwa, Tamotsu; Fujita, Hiroshi; Asano, Masahide; and Aibara, Shunzo, 4,057,629, Cl. 424-177.000.
Houck, Stanley J.: *See—*
Smith, Michael W.; and Houck, Stanley J., 4,057,454, Cl. 156-401.000.
Howard, David Robert, to Davy-Loewy Limited. Drive arrangement for the rolls of a rolling mill. 4,056,957, Cl. 72-19.000.
Howard, Robert L.: *See—*
Barnett, David L., 4,057,283, Cl. 296-23.00C.
Howell, Sabert N.: *See—*
Bonsignore, Salvatore J.; and Howell, Sabert N., 4,057,751, Cl. 315-316.000.
Hozumi, Yoshio: *See—*
Nakagawa, Yasuichi; Ikenishi, Masataka; Hozumi, Yoshio; Kushida, Shozo; and Tsukutani, Koichi, 4,057,698, Cl. 200-16.00A.
Huber, Karl Erwin: *See—*
Schmidt, Dietrich; Huber, Karl Erwin; and Hofer, Johann, 4,057,395, Cl. 23-230.00R.
Hubert, Jean-Claude: *See—*
Lux, Benno; Kurz, Wilfried; Hubert, Jean-Claude; Mollard, Francois; and Walt, Guido, 4,057,097, Cl. 164-60.000.
Hugelin, Bernard: *See—*
Defago, Raymond; Schaffluetzel, Paul; Lapple, Arnulf Ruediger; and Hugelin, Bernard, 4,057,388, Cl. 8-2.50A.
Hughes Aircraft Company: *See—*
Basil, Richard V., Jr.; Ondrups, Leons; and Shimizu, James K., 4,057,772, Cl. 333-83.00T.
Hughes, Charles C., to R. A. Jones & Co. Inc. Carton erecting apparatus. 4,057,008, Cl. 93-53.0BF.
Hughey, Edward W., Jr. Device for measuring the pitch of propeller blades and the like. 4,056,888, Cl. 33-174.00C.
Huhne, Gerd: *See—*
Pietzsch, Ludwig; Huhne, Gerd; Overlach, Knud; and Fuchs, Peter, 4,057,792, Cl. 340-267.00C.
Humber, Leslie G.: *See—*
Asselin, Andre A.; Humber, Leslie G.; and Dobson, Thomas A., 4,057,559, Cl. 260-315.000.
Hunt, David A., to Dow Chemical Company, The. Process for repairing concrete structures using pneumatically sprayable cement mortar compositions containing portland cement, mineral aggregate, a styrene-butadiene copolymer latex and water. 4,057,528, Cl. 260-29.70S.
Huschka, Hans; and Herrmann, Franz-Josef, to HOBEG Hochtemperaturreaktor-Brennelement, GmbH. Process for the production of graphite molded articles of high isotropy and high heat conductivity. 4,057,514, Cl. 252-510.000.
Hussain, Anwar: *See—*
Higuchi, Takeru; and Hussain, Anwar, 4,057,619, Cl. 424-14.000.
Hutzel, Abraham, to Cullen Photo Service, Inc. Photo-finishing packet with date strips for photographic prints. 4,057,140, Cl. 206-216.000.
Ibis Engineers Limited: *See—*
Everett, Nicholas Wynne, 4,057,179, Cl. 223-73.000.
Idemitsu Kosan Company Limited: *See—*
Kimura, Akio; Seki, Kenji; Ukita, Mamoru; Asahi, Satoshi; and Tagami, Sanae, 4,057,600, Cl. 260-878.00B.
Ieda, Tsuguo: *See—*
Shibasaki, Tadashi; and Ieda, Tsuguo, 4,056,964, Cl. 72-273.000.
Ihara Chemical Industry Co., Ltd.: *See—*
Koike, Wataro; Kimoto, Takahiro; and Matsui, Sadayoshi, 4,057,555, Cl. 260-301.000.
Ihle, Josef, to Ungerer geb. Dollinger, Irma. Flying shear for the cross-cutting of metal strips or bands. 4,056,994, Cl. 83-311.000.
Iida, Masajiro; Morimatsu, Hideharu; Fukuoka, Itsuo; and Yoshida, Yoshinari, to Furuno Electric Company, Limited. Ultrasonic detection system. 4,057,779, Cl. 340-3.00C.
Iino, Nobuhiro: *See—*
Bajusz, Harold F.; and Iino, Nobuhiro, 4,057,354, Cl. 401-199.000.
Iizaka, Isao: *See—*
Miyamoto, Osamu; Iizaka, Isao; Yamamoto, Toshio; Hikosaka, Takashi; and Shimizu, Shigemitu, 4,057,339, Cl. 355-3.00R.
Ikeda, Takami: *See—*
Fukui, Takashi; and Ikeda, Takami, 4,057,421, Cl. 75-60.000.
Ikenishi, Masataka: *See—*
Nakagawa, Yasuichi; Ikenishi, Masataka; Hozumi, Yoshio; Kushida, Shozo; and Tsukutani, Koichi, 4,057,698, Cl. 200-16.00A.
Imada, Yukio: *See—*
Nishikawa, Daikichiro; Imada, Yukio; Kinoshita, Masayuki; Takahashi, Katsuhiko; Machida, Hajime; and Nagasawa, Michitaro, 4,057,469, Cl. 195-51.00G.
Imahasi, Hiromichi: *See—*
Maeda, Kunihiro; Imahasi, Hiromichi; and Kikuchi, Matsunosuke, 4,057,458, Cl. 156-603.000.
Imahori, Seiichi; Kaneko, Masaharu; and Kato, Yoshiaki, to Mitsubishi Chemical Industries Ltd. Azo compounds containing a naphthalic imide coupler. 4,057,539, Cl. 260-155.000.
Imperial Chemical Industries Limited: *See—*
Davies, Peter Kingsley; Rogers, Leslie Richard; Stansfield, James Frederick; and Topham, Arthur, 4,057,436, Cl. 106-288.00Q.
Inai, Yuichi: *See—*
Kijima, Shizumasa; Yamatu, Isao; Hamamura, Kimio; Minami, Norio; Yamagishi, Youji; and Inai, Yuichi, 4,057,568, Cl. 260-462.00R.
Indianapolis Center For Advanced Research: *See—*
Adams, Truman W., 4,057,024, Cl. 114-298.000.
Infratab Corporation: *See—*
Seiter, Charles, 4,057,029, Cl. 116-114.00V.
Ing. C. Olivetti & C., S.p.A.: *See—*
Gontero, Piero, 4,057,343, Cl. 355-16.000.
Innes, Robert A.; and Perrotta, Anthony J., to Gulf Research & Development Company. Process for preparing acrylonitrile. 4,057,570, Cl. 260-465.300.
Inoue, Fumio: *See—*
Ozawa, Masahiro; Inoue, Fumio; Komatsu, Tadaaki; and Matsuoka, Kimiaki, 4,057,591, Cl. 260-653.10R.
Institute of Gas Technology: *See—*
Patel, Jitendra G.; Schora, Frank C.; and Loeding, John W., 4,057,402, Cl. 48-197.00R.
Interatom, Internationale Atomreaktorbau GmbH.: *See—*
Kostrzewa, Siegfried, 4,057,467, Cl. 176-65.000.
International Business Machines Corporation: *See—*
Burkhardt, Paul Johannes; and Poponiak, Michael Robert, 4,057,823, Cl. 357-52.000.
Cockerill, William Clyde; Hornung, Louis Michael; Johnson, Donavon William; and Vrba, Richard Alan, 4,057,846, Cl. 364-200.000.
Ferry, Michel, 4,057,717, Cl. 364-802.000.
Heuer, Dale A.; Roemer, John F.; and Sheehan, Michael J., 4,057,787, Cl. 365-104.000.
Juliusburger, Hans Yohanan; and Wortzman, Donald, 4,057,768, Cl. 331-1.00A.
Spadavecchia, Richard I.; and Struk, James R., 4,057,789, Cl. 365-189.000.
Zdeblick, William Thomas, 4,057,305, Cl. 312-11.000.
International Telephone and Telegraph Corporation: *See—*
Kao, Charles K., 4,057,322, Cl. 350-96.00R.
Shihabi, Marwan S., 4,057,085, Cl. 141-59.000.
Ionics, Incorporated: *See—*
Giuffrida, Anthony J., 4,057,483, Cl. 204-301.000.
Irie, Gen, to Honda Giken Kogyo Kabushiki Kaisha. Safety apparatus for a carburetor. 4,057,603, Cl. 261-70.000.
Isenberg, Gerhard; and Tuzinsky, Wolfgang, to Maschinenfabrik Augsburg-Nurnberg AG. Vacuum pump having a rotor supported in the interior of its casing. 4,057,369, Cl. 417-365.000.
Ishida, Takashi, to Okuma Machinery Works Ltd. Cam machining apparatus. 4,056,900, Cl. 51-33.00W.
Ishihara, Masashi: *See—*
Oka, Hiroyuki; and Ishihara, Masashi, 4,057,296, Cl. 303-6.00C.
Ishii, Hiroki: *See—*
Habu, Teiji; Wada, Tsuneo; Sasaki, Takashi; Itoh, Shigemasa; Ohmura, Takayoshi; Ishii, Hiroki; and Yamaguchi, Hisashi, 4,057,538, Cl. 260-117.000.
Ishikawa, Kazuo; Hirata, Noritsugu; Takigawa, Tomoshi; and Yamada, Yasutsugu, to Canon Kabushiki Kaisha. Self timer device for motion picture camera. 4,057,334, Cl. 352-175.000.
Ishikawa, Shigemitsu, to Kabushiki Kaisha Angel. Sanitary napkin. 4,057,061, Cl. 128-284.000.
Itagaki, Sadayoshi, to Fuji Photo Film Co., Ltd. Method and device for filtration. 4,057,496, Cl. 210-65.000.
Italsider S.p.A.: *See—*
Bruno, Roberto; Memmi, Massimo; Berardi, Paolo; and Musso, Augusto, 4,057,424, Cl. 75-178.00A.
Ito, Fumio: *See—*
Nakamoto, Soichi; Ito, Tadashi; Ito, Fumio; and Shinoda, Nobuhiko, 4,057,809, Cl. 354-23.00D.
Ito, Tadashi: *See—*
Nakamoto, Soichi; Ito, Tadashi; Ito, Fumio; and Shinoda, Nobuhiko, 4,057,809, Cl. 354-23.00D.
Naruse, Kiyoji; and Ito, Tadashi, 4,057,522, Cl. 260-28.5AS.
Itoh, Masayasu: *See—*
Koshino, Kenji; and Itoh, Masayasu, 4,057,022, Cl. 113-120.00G.

Itoh, Shigemasa: *See—*
Habu, Teiji; Wada, Tsuneo; Sasaki, Takashi; Itoh, Shigemasa; Ohmura, Takayoshi; Ishii, Hiroki; and Yamaguchi, Hisashi, 4,057,538, Cl. 260-117.000.
Iwata, Hiroshi, to West Electric Co., Ltd. Exposure control system. 4,057,810, Cl. 354-29.000.
Iyoda, Shozo: *See—*
Ubukata, Susumu; Iyoda, Shozo; and Oda, Kenji, 4,057,200, Cl. 242-107.40A.
Izon Corporation: *See—*
Yevick, George J., 4,057,338, Cl. 355-1.000.
J. C. Penney Company, Inc.: *See—*
Woodring, Cooper Coolidge, 4,057,127, Cl. 188-24.000.
J. I. Case Compny: *See—*
Bislew, John E., 4,057,269, Cl. 285-158.000.
Jackson, Richard Malcolm Clive: *See—*
Bernardo, Gerald; and Jackson, Richard Malcolm Clive, 4,056,909, Cl. 52-396.000.
Jacobs, Bernardus Antonius Johannus; van der Wal, Johannes; and Gerritsen, Gerrit Berend, to U.S. Philips Corporation. Video record disc manufactured by a process involving chemical or sputter etching. 4,057,831, Cl. 358-128.000.
Jadach, Albert A.: *See—*
Chaivre, Joseph W.; and Jadach, Albert A., 4,056,862, Cl. 10-72.00R.
Jaeger: *See—*
Blanchier, Jean-Claude, 4,057,783, Cl. 340-58.000.
Jagunich, Douglas M.: *See—*
Lowell, William P.; and Jagunich, Douglas M., 4,057,847, Cl. 364-200.000.
Jamison, Eugene M. Method and apparatus for forming cylindrical spacers from metal blanks. 4,056,961, Cl. 72-148.000.
Janecka, Kurt: *See—*
Bachmann, Wilfried; Gnabs, Christian; Janecka, Kurt; Mundlos, Eberhard; Papenfuhs, Theodor; and Waese, Gerhard, 4,057,576, Cl. 260-525.000.
Jansen, Martin B., Jr., to Vetco Offshore Industries, Inc. Fluid controlled pipe connectors. 4,057,267, Cl. 285-18.000.
Janssen, Almuth, heir: *See—*
Richtzenhain, Hermann; and Janssen, Paul, deceased, 4,057,552, Cl. 260-294.900.
Janssen, Paul, deceased: *See—*
Richtzenhain, Hermann; and Janssen, Paul, deceased, 4,057,552, Cl. 260-294.900.
Jansson, Staffan, to AB Svenska Flaktfabriken. Apparatus for removing gas filter. 4,057,406, Cl. 55-385.00R.
Jasani, Shirish: *See—*
Finelli, Anthony F.; Jasani, Shirish; and Williams, Columbus, Jr., 4,057,431, Cl. 96-115.00R.
Jassby, Daniel L.; and Hooke, William M., to United States of America, Energy Research and Development Administration. Radio frequency sustained ion energy. 4,057,462, Cl. 176-5.000.
Jaszczak, Ronald J., to G. D. Searle & Co. Collimator trans-axial tomographic scintillation camera. 4,057,726, Cl. 250-363.00S.
Jeffery, Michael Cedric: *See—*
Ley, Anthony John; Metcalf, Eric; and Jeffery, Michael Cedric, 4,057,756, Cl. 324-77.00B.
Jeffreys, Godfrey Vaughan: *See—*
Davies, Graham Arthur; Jeffreys, Godfrey Vaughan; and Bayley, David Pryce, 4,057,493, Cl. 210-23.00R.
Jeghers, Omer: *See—*
Abramovici, Jean; Ermans, Andre Marie; and Jeghers, Omer, 4,057,617, Cl. 424-1.000.
JENAer Glaswerk Schott & Gen.: *See—*
Scheidler, Herwig, 4,057,670, Cl. 428-189.000.
Jennings, Larry D.; and Hazen, Wayne W., to Southwire Company; National Steel Corporation; and Earth Sciences, Inc. Process for recovering aluminum from alunite. 4,057,611, Cl. 423-127.000.
Jeppson, Morris R. Electrical power generation and distribution system. 4,057,736, Cl. 307-78.000.
Jimenez, Roy: *See—*
Castaneda, Fernando; and Jimenez, Roy, 4,057,146, Cl. 209-75.000.
Joerns Furniture Company: *See—*
Damico, Frank M.; and Nass, Raymond D., 4,057,240, Cl. 269-325.000.
Joffre, Philippe: *See—*
Antonini, Albert; Joffre, Philippe; and Laine, Francois, 4,057,592, Cl. 260-659.00A.
Johannsen, Hans Werner: *See—*
Grunbacher, Martin; and Johannsen, Hans Werner, 4,057,814, Cl. 354-204.000.
Johannsen, Peter, to Continental Gummi-Werke Aktiengesellschaft. Pneumatic tire for motor vehicles. 4,057,089, Cl. 152-209.00R.
Johnson, Bruce K., to Polaroid Corporation. Anti-flare structure for photographic optical system. 4,057,815, Cl. 354-288.000.
Johnson, Charles H.: *See—*
Borsuk, Alvin; and Johnson, Charles H., 4,057,653, Cl. 426-513.000.
Johnson, Clifford Ray: *See—*
Gross, Donald Ralph; Schaefer, Nick Lewis; Russell, John Raymond; and Johnson, Clifford Ray, 4,057,088, Cl. 144-91.000.
Johnson, Donavon William: *See—*
Cockerill, William Clyde; Hornung, Louis Michael; Johnson, Donavon William; and Vrba, Richard Alan, 4,057,846, Cl. 364-200.000.
Johnson, Lawrence E.; and Conger, William W., IV, to Johnson, Lawrence E. Aerator. 4,057,372, Cl. 417-424.000.
Johnson, Raymond E.; and Ellison, Boris. Current carrie: communication system. 4,057,793, Cl. 340-310.00R.
Johnson, Robert M.; Winkowski, Daniel A.; and Stiling, Rodney A., to National Gypsum Company. Block-resistant gypsum board. 4,057,662, Cl. 427-209.000.
Johnson, Robert M.: *See—*
Stiling, Rodney A.; Burkard, Edward A.; and Johnson, Robert M., 4,057,443, Cl. 156-43.000.
Joines, John S. Protective apparatus for mounting tires. 4,057,093, Cl. 157-1.000.
Joly, Pascal A. J.: *See—*
Boudot, Jean E.; and Joly, Pascal A. J., 4,057,435, Cl. 106-47.00Q.
Jones, Bernard H.; Cox, Daniel; and Gallagher, Don R., to Owens-Corning Fiberglas Corporation. Apparatus for packaging strand. 4,057,195, Cl. 242-18.00G.
Jones, Donald J.; and Davis, Guy E., to Westinghouse Electric Corporation. Wide range system for transferring steam generator and turbine operation between computers in a multiple turbine computer control system. 4,057,715, Cl. 364-494.000.
Jones, Howard; and Shen, Tsung-Ying, to Merck & Co., Inc. Acyl cyanoguanidines. 4,057,642, Cl. 424-304.000.
Jones, Howard: *See—*
Shen, Tsung-Ying; Jones, Howard; Mulvey, Dennis M.; and Dorn, Conrad P., 4,057,637, Cl. 424-263.000.
Jones, James J., to Texas Instruments Incorporated. Fail safe circuit for vehicle skid control brake system. 4,057,299, Cl. 303-92.000.
Jones, Leon L.: *See—*
Shaw, Graham C.; Lawton, Emil A.; and Jones, Leon L., 4,057,442, Cl. 149-109.400.
Jones, Richard F.; and Ping, Ernest L., to Arachnid, Incorporated. Dart game with apertured target plates resiliently mounted. 4,057,251, Cl. 273-95.00R.
Jones, Richard Warren. Apparatus and method for sampling a liquid. 4,056,982, Cl. 73-421.00B.
Jones, Rufus S., Jr., to Celanese Corporation. Process for preparing wholly aromatic polyamides by mixing solid particulate reactants and polymerizing. 4,057,536, Cl. 260-78.00R.
Jones, Trevor Clifford, to Underground Location Services Limited. Pipeline pigs. 4,057,081, Cl. 138-97.000.
Jones, W. Dale. Rockable against-the-wall type reclining chair. 4,057,289, Cl. 297-259.000.
Jorgensen, Adam A., to Stromberg-Carlson Corporation. All digital delta to PCM converter. 4,057,797, Cl. 340-347.0DD.
Jossel, Franklin: *See—*
Mammino, Joseph; and Jossel, Franklin, 4,057,426, Cl. 96-1.0SD.
Juillard, Yves; and Riner, Victor, to Societe Alsacienne de Constructions Mecaniques de Mulhouse. Double-layer weaving loom. 4,057,083, Cl. 139-20.000.
Julius Blum Gesellschaft mbH: *See—*
Rock, Erich; and Mages, Bernhard, 4,057,303, Cl. 308-3.600.
Juliusburger, Hans Yohanan; and Wortzman, Donald, to International Business Machines Corporation. Variable increment phase locked loop circuit. 4,057,768, Cl. 331-1.00A.
Jungesjo, Harald N.: *See—*
Anderson, Marvin R.; and Jungesjo, Harald N., 4,056,901, Cl. 51-165.870.
Junginger, Hans-Georg: *See—*
Peschmann, Kristian; Junginger, Hans-Georg; and Hirsch, Hans-Jurgen, 4,057,728, Cl. 250-374.000.
K.D. Ottica s.n.c.: *See—*
Bottazzini, Franco; and Donati, Laura, 4,056,853, Cl. 2-443.000.
K-Tel International, Inc.: *See—*
Koblick, Jeffrey M., 4,057,261, Cl. 280-11.37H.
Kabel- und Metallwerke Gutehoffnungshutte Aktiengesellschaft: *See—*
Volker, Martin; and Muhlhoff, Heinz, 4,057,228, Cl. 366-79.000.
Kabushiki Kaisha Angel: *See—*
Ishikawa, Shigemitsu, 4,057,061, Cl. 128-284.000.
Kabushiki Kaisha Asano Tekkosho: *See—*
Asano, Shinzo, 4,057,013, Cl. 101-212.000.
Kabushiki Kaisha Daini Seikosha: *See—*
Kondo, Kenichi, 4,057,325, Cl. 350-160.0LC.
Nakagawa, Yasuichi; Ikenishi, Masataka; Hozumi, Yoshio; Kushida, Shozo; and Tsukutani, Koichi, 4,057,698, Cl. 200-16.00A.
Kabushiki Kaisha Fuji Tekkosho: *See—*
Matsumoto, Yukimichi, 4,056,918, Cl. 53-118.000.
Kabushiki Kaisha Keihinseiki Seisakusho: *See—*
Sakai, Makoto, 4,057,041, Cl. 123-73.0AD.
Kabushiki Kaisha Sato Kenkyusho: *See—*
Sato, Yo, 4,057,452, Cl. 156-384.000.
Kabushiki Kaisha Suwa Seikosha: *See—*
Nishimura, Izuhiko, 4,057,738, Cl. 307-247.00A.
Otake, Tsutomu, 4,057,739, Cl. 307-270.000.
Kackstaedter, Klaus; and Theidel, Hans, to Bayer Aktiengesellschaft. Process for the whitening of textile fibres of polyesters. 4,057,387, Cl. 8-1.00W.
Kaimann, Walter; Pasternak, Rudolf; and Bauer, Jochen. Apparatus for the gasification under pressure of bituminous coal especially of fine coal in a generator. 4,057,400, Cl. 48-77.000.
Kakeya, Nobuharu: *See—*
Sugimoto, Keiichi; Nishijima, Koji; Akimoto, Hiroshi; Hanaoka, Tadashi; and Kakeya, Nobuharu, 4,057,544, Cl. 260-239.100.
Kalaus, Gyorgy: *See—*
Szantay, Csaba; Szabo, Lajos; Kalaus, Gyorgy; Karpati, Egon; and Szporny, Laszlo, 4,057,550, Cl. 260-293.550.
Szantay, Csaba; Szabo, Lajos; Kalaus, Gyorgy; Karpati, Egon; and Szporny, Laszlo, 4,057,551, Cl. 260-293.550.

Kalka, Josef; Waskonig, Walter; and Lueg, Karl, to Chemische Werke Huls Aktiengesellschaft. Process and apparatus for withdrawing a sample from a reaction vessel under pressure. 4,056,981, Cl. 73-421.00B.
Kallfass, Herbert: *See—*
Bohnsack, Gerhard; Geffers, Hans; Kallfass, Herbert; and Radt, Walter, 4,057,511, Cl. 252-389.00A.
Kalnin, Ilmar L., to Celanese Corporation. Process for the production of carbon fiber reinforced magnesium composite articles. 4,056,874, Cl. 75-.50R.
Kameyama, Masayoshi: *See—*
Ejiri, Masakazu; Kashioka, Seiji; Miyatake, Takafumi; Yoda, Haruo; and Kameyama, Masayoshi, 4,057,845, Cl. 364-200.000.
Kamimura, Toshio, to Teijin Seiki Company Limited. Fail-safe fluid control valve. 4,057,004, Cl. 91-30.000.
Kamyr Aktiebolag: *See—*
Richter, Johan C. F.C., 4,057,461, Cl. 162-19.000.
Kane, Vinayak V.: *See—*
Levine, Seymour; and Kane, Vinayak V., 4,057,547, Cl. 544-184.000.
Kaneda, Saburo; and Tokura, Koichi, to Fujitsu Limited. Processing link control device for a data processing system processing data by executing a main routine and a sub-routine. 4,057,850, Cl. 364-200.000.
Kaneko, Masaharu: *See—*
Imahori, Seiichi; Kaneko, Masaharu; and Kato, Yoshiaki, 4,057,539, Cl. 260-155.000.
Kano, Tsuyoshi: *See—*
Yamamoto, Hajime; Kano, Tsuyoshi; and Nakano, Masaki, 4,057,507, Cl. 252-301.40S.
Kao, Charles K., to International Telephone and Telegraph Corporation. Precision surface optical fibers. 4,057,322, Cl. 350-96.00R.
Kao Soap Co., Ltd.: *See—*
Nakagawa, Yunosuke; Majima, Kanji; and Miyamoto, Sigeyuki, 4,057,505, Cl. 252-96.000.
Kappert, Hermanus Antonius, to U.S. Philips Corporation. Apparatus for reading a disk-shaped record carrier with track jumping for charging motion effects. 4,057,832, Cl. 358-128.000.
Karasawa, Hideyasu, to Tomy Kogyo Co., Inc. Toy bird. 4,056,896, Cl. 46-132.000.
Kardell, Kurt J. Reusable folding container. 4,057,165, Cl. 220-6.000.
Karonite Chemical Co., Ltd.: *See—*
Shiga, Michio; Hirano, Kimitoshi; and Matsushita, Matsuo, 4,057,504, Cl. 252-33.000.
Karpati, Egon: *See—*
Szantay, Csaba; Szabo, Lajos; Kalaus, Gyorgy; Karpati, Egon; and Szporny, Laszlo, 4,057,550, Cl. 260-293.550.
Szantay, Csaba; Szabo, Lajos; Kalaus, Gyorgy; Karpati, Egon; and Szporny, Laszlo, 4,057,551, Cl. 260-293.550.
Karrer, Friedrich; and Farooq, Saleem, to Ciba-Geigy Corporation. Diphenyl ether derivatives. 4,057,587, Cl. 260-613.00R.
Kashioka, Seiji: *See—*
Ejiri, Masakazu; Kashioka, Seiji; Miyatake, Takafumi; Yoda, Haruo; and Kameyama, Masayoshi, 4,057,845, Cl. 364-200.000.
Kashkarov, Igor Georgievich: *See—*
Kudryavtsev, Alexandr Alexandrovich; Firsov, Vitaly Mikhailovich; Solinov, Evgeny Fedorovich; Symon, Mark Klavdievich; Litvinov, Pavel Ivanovich; Veresov, Albert Pavlovich; Rybakov, Ivan Alexandrovich; Trishin, Viktor Timofeevich; Goryannikov, Vladimir Mikhailovich; Savin, Vyacheslav Pavlovich; and Kashkarov, Igor Georgievich, 4,057,409, Cl. 65-154.000.
Kasper, Alan Henry: *See—*
Mathe, Istvan; and Kasper, Alan Henry, 4,057,314, Cl. 339-97.00R.
Kater, Charles E.: *See—*
Cockrum, Herbert D.; and Kater, Charles E., 4,057,705, Cl. 219-130.000.
Kato, Saburo: *See—*
Muranaka, Masakazu; and Kato, Saburo, 4,057,256, Cl. 274-9.00C.
Kato, Yoshiaki: *See—*
Imahori, Seiichi; Kaneko, Masaharu; and Kato, Yoshiaki, 4,057,539, Cl. 260-155.000.
Kaufman, Harold B., Jr., to DCA Food Industries, Inc. Food processor with an air balancing system. 4,056,950, Cl. 62-381.000.
Kaufman, Joseph; and Prais, Alois G., to Becton, Dickinson and Company. Blood-gas syringe. 4,057,052, Cl. 128-2.00F.
Kawaguchi, Mamoru. Blood circulation stimulator. 4,057,046, Cl. 128-24.00R.
Kawamoto, Tadashi: *See—*
Nakatsuka, Ryuzo; Saito, Kenji; and Kawamoto, Tadashi, 4,057,674, Cl. 428-481.000.
Kawamura, Yoshio: *See—*
Moriyama, Shigeo; Harada, Tatsuo; Kawamura, Yoshio; Hashimoto, Seiya; Takanashi, Akihiro; Kurosaki, Toshiei; Kuniyoshi, Shinji; and Hosaka, Sumio, 4,057,347, Cl. 355-67.000.
Kawanami, Shunpei. Means and method for bending elongated materials incorporating two arms. 4,056,960, Cl. 72-128.000.
Kawasaki Jukogyo Kabushiki Kaisha: *See—*
Yoshida, Toshio, 4,056,942, Cl. 61-65.000.
Kawashima, Syunichiro; Nishida, Masamitsu; Matsuo, Yoshihiro; Ouchi, Hiromu; and Hayakawa, Shigeru, to Matsushita Electric Industrial Co., Ltd. Method of making a transparent ferroelectric ceramic element. 4,057,324, Cl. 350-150.000.
Keeler Corporation: *See—*
Driesenga, Edwin J., 4,056,864, Cl. 16-126.000.
Keen, William Elgin, Jr.: *See—*
Atkiss, Thomas Clifford; and Keen, William Elgin, Jr., 4,057,440, Cl. 148-6.15Z.
Keiper GmbH: *See—*
Hopf, Heribert; and Schramm, Siegfried, 4,057,239, Cl. 269-170.000.
Kelman, Charles. Intraocular lens and method of implanting same. 4,056,855, Cl. 3-13.000.
Kelp, Fritz: *See—*
Tratz, Herbert; Kelp, Fritz; and Netsch, Erich, 4,057,103, Cl. 165-11.000.
Kemira Oy: *See—*
Backlund, Sigurd Alfons, 4,057,057, Cl. 128-142.400.
Kenealy, Brian Vaughan. Valve operating mechanism. 4,056,984, Cl. 74-89.150.
Kenigsberg, Irwin Jeffrey; and Paul, William Francis, to United Technologies Corporation. Extended arm bifilar and method to eliminate second order vibration excitation. 4,057,363, Cl. 416-145.000.
Kennametal Inc.: *See—*
Bator, James S., 4,056,871, Cl. 407-114.000.
Kerouac, Adrian R., to American Electromedics Corporation. Hand held ear test probe. 4,057,051, Cl. 128-2.00Z.
Kessler, Hans. Serving container for liquids or pourable materials contained in cardboard packages. 4,057,175, Cl. 222-86.000.
Kessler, Theodore P., to Timron, Inc. Shipping carton for plush reels. 4,057,143, Cl. 206-400.000.
Keszler, Julius L. Bacon-like meat product of reduced fat content. 4,057,650, Cl. 426-92.000.
Ketelsen, Peter H. Apparatus for calibration of a moisture analyzer. 4,056,966, Cl. 73-1.00G.
Keutschegger, Adolf: *See—*
Hacman, Dionys; and Keutschegger, Adolf, 4,057,316, Cl. 350-1.000.
Keyes Fibre Company: *See—*
Payne, Joe R., 4,057,169, Cl. 220-306.000.
Keystone Consolidated Industries, Inc.: *See—*
Glass, Dwight W., 4,056,955, Cl. 70-422.000.
Kidd, Kenneth B. Vehicle Trailer. 4,057,282, Cl. 296-10.000.
Kijima, Shizumasa; Yamatu, Isao; Hamamura, Kimio; Minami, Norio; Yamagishi, Youji; and Inai, Yuichi, to Eisai Co., Ltd. Process for synthesis of boric acid ester. 4,057,568, Cl. 260-462.00R.
Kikuchi, Kiyoshi; Okano, Takeo; Terakawa, Yukio; and Nishihara, Akira, to Kowa Chemical Industry Ltd. Methods for preparing stable silica sols and inorganic coating compositions. 4,057,525, Cl. 260-29.40R.
Kikuchi, Matsunosuke: *See—*
Maeda, Kunihiro; Imahasi, Hiromichi; and Kikuchi, Matsunosuke, 4,057,458, Cl. 156-603.000.
Killian, John C., Jr.; and Morse, John B., to Polaroid Corporation. Accessory adapter. 4,057,816, Cl. 354-293.000.
Kim, Yung K.: *See—*
Carter, Philip L.; Kim, Yung K.; and Riley, Michael O., 4,057,566, Cl. 260-448.20H.
Kimoto, Takahiro: *See—*
Koike, Wataro; Kimoto, Takahiro; and Matsui, Sadayoshi, 4,057,555, Cl. 260-301.000.
Kimura, Akio; Seki, Kenji; Ukita, Mamoru; Asahi, Satoshi; and Tagami, Sanae, to Idemitsu Kosan Company Limited. Process for producing block copolymers. 4,057,600, Cl. 260-878.00B.
Kimura, Akitaka: *See—*
Hoshikawa, Katuyuki; Noda, Soji; and Kimura, Akitaka, 4,057,090, Cl. 152-347.000.
Kimura, Goro; and Sekine, Junzo, to Tokyo Tanabe Company, Limited. Alkyl amino-glucopyranoside derivative and process for producing the same. 4,057,684, Cl. 536-4.000.
King, Robert Paul, to British Petroleum Company Limited, The. Pipelines. 4,057,082, Cl. 138-99.000.
Kinoshita, Hisahiro, to Mitsui Mining & Smelting Co., Ltd.; and Hachinohe Smelting Co., Ltd. Method for the manufacture of mercury free sulfuric acid. 4,057,423, Cl. 75-109.000.
Kinoshita, Masayuki: *See—*
Nishikawa, Daikichiro; Imada, Yukio; Kinoshita, Masayuki; Takahashi, Katsuhiko; Machida, Hajime; and Nagasawa, Michitaro, 4,057,469, Cl. 195-51.00G.
Kinoshita, Mototaka; Okabe, Akio; and Ando, Susumu, to Lion Fat & Oil Co., Ltd. Method for treating a waste water containing a nonionic surface active agent. 4,057,495, Cl. 210-44.000.
Kinuhata, Koji; Amano, Kitsutaro; Sasaki, Hiroshi; and Yamamoto, Hideo, to Kokusai Denshin Denwa Kabushiki Kaisha. System for converting number of lines of television signal. 4,057,835, Cl. 358-140.000.
Kirschner, Helmut: *See—*
Lechner, Gunther; Pritscher, Karl; and Kirschner, Helmut, 4,057,142, Cl. 206-332.000.
Kitatani, Tatsuyuki. Floor cleaning device. 4,057,353, Cl. 401-43.000.
Kiwior, Alexander Michael; and Bode, James Daniel, to Bendix Corporation. Fuel break-up disc for injection valve. 4,057,190, Cl. 239-558.000.
Klass, Donald L., to Union Oil Company of California. Process for the preparation of unsaturated esters. 4,057,575, Cl. 560-245.000.
Klaubert, Dieter H.: *See—*
Sellstedt, John H.; and Klaubert, Dieter H., 4,057,632, Cl. 424-248.540.
Klauser, Rolf Marcus. Film holder for bite-wing radiographs. 4,057,732, Cl. 250-479.000.

Klaxon S.A.: *See—*
Warnod, Bertrand Antoine, 4,057,799, Cl. 340-388.000.
Kleinedler, Gary Evan: *See—*
Cranston, Benjamin Howell; Kleinedler, Gary Evan; Machusak, Donald Arthur; and Wiechard, Charles Augustus, 4,057,187, Cl. 228-107.000.
Klimo, Robert G.: *See—*
Artrip, Robert W.; and Klimo, Robert G., 4,057,752, Cl. 318-345.00B.
Klinger, Friedrich; Beran, Josef; and Brezina, Jan, to Carl Schenck AG. Method and hydraulic testing apparatus for performing resonance tests. 4,056,974, Cl. 73-92.000.
Klockner-Werke AG: *See—*
Warnke, Hans; and Boer, Werner, 4,057,006, Cl. 91-487.000.
Watermann, Willy, 4,056,941, Cl. 61-45.00D.
Klose, Karl W., to Cooper Tire and Rubber Company. Tire stitching apparatus. 4,057,455, Cl. 156-410.000.
Knop, Karl, to RCA Corporation. Simplified and improved diffractive subtractive color filtering technique. 4,057,326, Cl. 350-162.00R.
Kobashi, Kiyoshi: *See—*
Nohira, Hidetaka; and Kobashi, Kiyoshi, 4,056,933, Cl. 60-278.000.
Kobayashi, Hajime: *See—*
Endo, Ichiro; Kobayashi, Hajime; and Takekawa, Nobuhiro, 4,057,016, Cl. 101-465.000.
Kobayashi, Hiroaki: *See—*
Kobayashi, Seihin; Torii, Michihiro; and Kobayashi, Hiroaki, 4,057,606, Cl. 264-24.000.
Kobayashi, Seihin; Torii, Michihiro; and Kobayashi, Hiroaki, to Fuji Electrochemical Co., Ltd. Method of producing anisotropic ferrite magnet. 4,057,606, Cl. 264-24.000.
Kobe Steel, Ltd.: *See—*
Tani, Yoshio, 4,056,911, Cl. 52-738.000.
Koblick, Jeffrey M., to K-Tel International, Inc. Ski pole. 4,057,261, Cl. 280-11.37H.
Koch, Henning: *See—*
Biere, Helmut; Ahrens, Hanns; Rufer, Clemens; Schroder, Eberhard; and Koch, Henning, 4,057,640, Cl. 424-274.000.
Koch, Richard C., to Regency Electronics, Inc. Frequency synthesized scanner having conductive programming elements for channel selection. 4,057,760, Cl. 325-455.000.
Kodis, Robert D., to Di/An Controls, Inc. Bar code printing system. 4,057,015, Cl. 101-93.290.
Koehring Company: *See—*
Lyle, John S., 4,057,222, Cl. 366-123.000.
Koek, Pieter: *See—*
de Mos, Jacob Mink; and Koek, Pieter, 4,057,226, Cl. 366-244.000.
Kohlmann, Friedrich-Wilhelm: *See—*
Gutsche, Klaus; Kohlmann, Friedrich-Wilhelm; and Scharwachter, Peter, 4,057,545, Cl. 542-428.000.
Koike, Wataro; Kimoto, Takahiro; and Matsui, Sadayoshi, to Ihara Chemical Industry Co., Ltd. Process for producing saccharin. 4,057,555, Cl. 260-301.000.
Kojima, Tamotsu: *See—*
Fujiwhara, Mitsuto; Kojima, Tamotsu; and Matsuo, Syunji, 4,057,432, Cl. 96-56.200.
Kokkila, Kalevi, to Rauma-Repola Oy. Seat for work machine or vehicle. 4,057,213, Cl. 248-385.000.
Kokusai Denshin Denwa Kabushiki Kaisha: *See—*
Kinuhata, Koji; Amano, Kitsutaro; Sasaki, Hiroshi; and Yamamoto, Hideo, 4,057,835, Cl. 358-140.000.
Nakagome, Yukio; Teramura, Hiroichi; Fukata, Yasuo; and Yamasaki, Yasuhiro, 4,057,834, Cl. 358-133.000.
Kolarik, Stanislav: *See—*
Skrabak, Michal; Vavrik, Ernest; Kolarik, Stanislav; and Mazak, Milos, 4,057,497, Cl. 210-65.000.
Kolkhorst, Lee R., deceased; and by Kolkhorst, Virginia E., executrix. Motorcycle carriers. 4,057,182, Cl. 224-42.45R.
Kolkhorst, Virginia E., executrix: *See—*
Kolkhorst, Lee R., deceased; and Kolkhorst, Virginia E., executrix, 4,057,182, Cl. 224-42.45R.
Koller, Horst: *See—*
Biedermann, Wolfgang; and Koller, Horst, 4,057,513, Cl. 252-459.000.
Kolm, Ernest L. Venturi scrubber. 4,057,602, Cl. 261-63.000.
Komatsu, Tadaaki: *See—*
Ozawa, Masahiro; Inoue, Fumio; Komatsu, Tadaaki; and Matsuoka, Kimiaki, 4,057,591, Cl. 260-653.10R.
Kondo, Kenichi, to Kabushiki Kaisha Daini Seikosha. Display device. 4,057,325, Cl. 350-160.0LC.
Kondo, Ryohei: *See—*
Hatori, Kunitake; Ozaki, Toshihiko; and Kondo, Ryohei, 4,057,171, Cl. 221-6.000.
Konishi, Tadashi; and Kuno, Masashi, to Teijin Limited. Method for preventing scale formation in a continuous ester-interchange reaction for production of polyesters. 4,057,534, Cl. 260-75.00R.
Konishiroku Photo Industry Co., Ltd.: *See—*
Fujiwhara, Mitsuto; Kojima, Tamotsu; and Matsuo, Syunji, 4,057,432, Cl. 96-56.200.
Habu, Teiji; Wada, Tsuneo; Sasaki, Takashi; Itoh, Shigemasa; Ohmura, Takayoshi; Ishii, Hiroki; and Yamaguchi, Hisashi, 4,057,538, Cl. 260-117.000.
Koppers Company, Inc.: *See—*
Wert, Edward; and Fisher, Chester Donald, 4,056,867, Cl. 24-37.000.
Korb, A. Norman; and Breunsbach, Rex L., to Lok-A-Bin Systems, Inc. Film processor standby control system. 4,057,817, Cl. 354-298.000.
Korsch, Wolfgang, to Emil Korsch, Spezialfabrik fur Komprimiermaschinen. Rotary press. 4,057,381, Cl. 425-345.000.
Koshino, Kenji; and Itoh, Masayasu, to Toyota Jidosha Kogyo Kabushiki Kaisha. Vessel having a pattern-molded bottom, a manufacturing process therefor. 4,057,022, Cl. 113-120.00G.
Koshio, Takeshi: *See—*
Tanigaki, Takashi; Tanaka, Yoshikazu; and Koshio, Takeshi, 4,057,706, Cl. 219-146.000.
Kostrzewa, Siegfried, to Interatom, Internationale Atomreaktorbau GmbH. Integrated pressurized-water reactor and steam generator. 4,057,467, Cl. 176-65.000.
Kovacevic, Ostoja. Protection-hood or helmet-mask for use in environments dangerous to work. 4,057,058, Cl. 128-142.700.
Kowa Chemical Industry Ltd.: *See—*
Kikuchi, Kiyoshi; Okano, Takeo; Terakawa, Yukio; and Nishihara, Akira, 4,057,525, Cl. 260-29.40R.
Kracklauer, Aloysius C., to Sparkler Mfg. Co. Continuous belt filter and filtration method. 4,057,437, Cl. 127-9.000.
Kraftwerk Union Aktiengesellschaft: *See—*
Fork, Kurt; Lambrecht, Dietrich; Waldmann, Hermann; and Hofmann, Helmut, 4,057,714, Cl. 264-494.000.
Schabert, Hans-Peter; and Laurer, Erwin, 4,057,077, Cl. 137-861.000.
Tratz, Herbert; Kelp, Fritz; and Netsch, Erich, 4,057,103, Cl. 165-11.000.
Krall, Hermann-Dieter; Weissel, Oskar; and Schwarz, Hans-Helmut, to Bayer Aktiengesellschaft. Process for preparing diphenylamines. 4,057,581, Cl. 260-571.000.
Kramer, Kurt: *See—*
Lossack, Edgar; Kramer, Kurt; and Bulian, Gerd, 4,057,100, Cl. 164-418.000.
Kreh, Marvin J.: *See—*
Wiggins, Glenn C.; Kreh, Marvin J.; and Davis, Robert S., 4,057,667, Cl. 428-35.000.
Krekeler, Claude B., to Cincinnati Mine Machinery Company, The. Wedge arrangement for removably affixing a work tool or work tool holder to a base member on mining, road working or earth moving machinery, and the like. 4,057,294, Cl. 299-93.000.
Krepinsky, Jiri Jan: *See—*
Ferrari, Giorgio; and Krepinsky, Jiri Jan, 4,057,635, Cl. 424-261.000.
Krikorian, Esther; and Crisp, Michael J., to General Dynamics Corporation. Thin film photovoltaic diodes and method for making same. 4,057,476, Cl. 204-192.00P.
Kroft, Frederick J. Bumper-mounted truck servicing platform. 4,057,125, Cl. 182-91.000.
Kuban, William G. Tennis racket construction. 4,057,250, Cl. 273-73.00G.
Kubo, Seitoku; Kuramochi, Kojiro; Morisawa, Kunio; and Ohnuma, Kiyoshi, to Toyota Jidosha Kogyo Kabushiki Kaisha. Driving system for use in motor vehicle. 4,056,988, Cl. 74-695.000.
Kuck, Alfred: *See—*
Reichel, Kurt; Decker, Gerd; Kuck, Alfred; and Schulz, Erwin, 4,057,037, Cl. 123-32.0SP.
Kuck, Hans-Alfred: *See—*
Reichel, Kurt; Decker, Gerd; Kuck, Hans-Alfred; and Brandstetter, Walter, 4,057,038, Cl. 123-32.0SP.
Kudlacek, Donald S. Ratchet type operator for cable winches and the like. 4,057,220, Cl. 254-186.0HC.
Kudryavtsev, Alexandr Alexandrovich; Firsov, Vitaly Mikhailovich; Solinov, Evgeny Fedorovich; Symon, Mark Klavdievich; Litvinov, Pavel Ivanovich; Veresov, Albert Pavlovich; Rybakov, Ivan Alexandrovich; Trishin, Viktor Timofeevich; Goryannikov, Vladimir Mikhailovich; Savin, Vyacheslav Pavlovich; and Kashkarov, Igor Georgievich. Apparatus for making cathode-ray tube screens with integrally formed contoured fixtures. 4,057,409, Cl. 65-154.000.
Kuechler, Irvin R., to Vent-Cair, Inc. Method of installing apparatus for extracting grease and smoke. 4,056,877, Cl. 29-469.000.
Kukin, Ira: *See—*
Bennett, Robert P.; and Kukin, Ira, 4,057,398, Cl. 44-4.000.
Kumazawa, Kenichi, to Canon Kabushiki Kaisha. Drive apparatus for an optical system. 4,057,327, Cl. 350-187.000.
Kundig, Hans: *See—*
Hool, Gerhard; and Kundig, Hans, 4,057,648, Cl. 424-341.000.
Kuniyoshi, Shinji: *See—*
Moriyama, Shigeo; Harada, Tatsuo; Kawamura, Yoshio; Hashimoto, Seiya; Takanashi, Akihiro; Kurosaki, Toshiei; Kuniyoshi, Shinji; and Hosaka, Sumio, 4,057,347, Cl. 355-67.000.
Kuno, Akira: *See—*
Sakakibara, Yasuyuki; and Kuno, Akira, 4,057,712, Cl. 364-426.200.
Kuno, Masashi: *See—*
Konishi, Tadashi; and Kuno, Masashi, 4,057,534, Cl. 260-75.00R.
Kunz, Raymond W., to Clairol Incorporated. Foot bath massager. 4,057,053, Cl. 128-25.00B.
Kuramochi, Kojiro: *See—*
Kubo, Seitoku; Kuramochi, Kojiro; Morisawa, Kunio; and Ohnuma, Kiyoshi, 4,056,988, Cl. 74-695.000.
Kureha Kagaku Kogyo Kabushiki Kaisha: *See—*
Yoshida, Masafumi; Sasaki, Tohru; and Terasaki, Shuji, 4,057,660, Cl. 427-100.000.
Kurmeier, Hans-Adolf: *See—*
Gante, Joachim; Kurmeier, Hans-Adolf; Orth, Dieter; Schacht, Erich; and Wild, Albrecht, 4,057,647, Cl. 424-340.000.

Kurosaki, Toshiei: *See—*
Moriyama, Shigeo; Harada, Tatsuo; Kawamura, Yoshio; Hashimoto, Seiya; Takanashi, Akihiro; Kurosaki, Toshiei; Kuniyoshi, Shinji; and Hosaka, Sumio, 4,057,347, Cl. 355-67.000.
Kurreck, Manfred: *See—*
Mnilk, Reinhold; Kurreck, Manfred; and Tiede, Wolfgang, 4,056,914, Cl. 53-35.000.
Kurtz, Bruce E.; Guptill, Joel P.; and Fitch, Robert H., to Allied Chemical Corporation. Electrolytic production of alkali metal hydroxide. 4,057,474, Cl. 204-98.000.
Kurz, Wilfried: *See—*
Lux, Benno; Kurz, Wilfried; Hubert, Jean-Claude; Mollard, Francois; and Walt, Guido, 4,057,097, Cl. 164-60.000.
Kurzidim, Johannes: *See—*
Weber, Alfred; Muller, Rudolf; and Kurzidim, Johannes, 4,057,541, Cl. 260-239.55A.
Kushida, Shozo: *See—*
Nakagawa, Yasuichi; Ikenishi, Masataka; Hozumi, Yoshio; Kushida, Shozo; and Tsukutani, Koichi, 4,057,698, Cl. 200-16.00A.
Kuzmicki, Casimir B.: *See—*
Daghe, Joseph L.; and Kuzmicki, Casimir B., 4,057,357, Cl. 408-67.000.
Kuznetsov, Lev Alexeevich: *See—*
Bataev, Mikhail Kirillovich; Veits, Isaak Efimovich; Gorodetsky, Sergei Sergeevich; Macheret, Lev Ilich; Kuznetsov, Lev Alexeevich; Tjurin, Albert Vasilievich; and Yaunzem, Jury Eduardovich, 4,057,453, Cl. 156-390.000.
Kwon, Young D.: *See—*
Prevorsek, Dusan C.; Kwon, Young D.; and Sharma, Raj K., 4,056,973, Cl. 73-91.000.
Kyokado Engineering Co. Ltd.: *See—*
Suzuki, Manao, 4,056,937, Cl. 61-36.00B.
Laauwe, Robert H. Valved squeeze bottle for viscous products. 4,057,177, Cl. 222-215.000.
Labaz: *See—*
Pigerol, Charles; de Cointet de Fillain, Paul; Nanthavong, Souli; and Le Blay, Jacques, 4,057,530, Cl. 260-45.80N.
Pigerol, Charles; Eymard, Pierre; Vernieres, Jean-Claude; Werbenec, Jean-Pierre; and Broll, Madeleine, 4,057,644, Cl. 424-325.000.
La Beaud, Louis J. Door jamb reinforcing plate. 4,057,275, Cl. 292-340.000.
Laboratoire Theranol: *See—*
Prugnaud, Robert Louis, 4,057,620, Cl. 424-35.000.
Lachenal, Jean-Michel: *See—*
Cassard, Jacques; Lachenal, Jean-Michel; and Romagnolo, Gerard, 4,056,873, Cl. 29-132.000.
Lacombe-Allard, Jean Francois, to Automatisme & Technique. Process and plant for the fritting of ceramic products. 4,057,702, Cl. 219-10.55A.
Lacy, James Volney: *See—*
Angner, Ronald Joseph; Blount, Marion Lee; and Lacy, James Volney, 4,057,693, Cl. 179-99.000.
Laine, Francois: *See—*
Antonini, Albert; Joffre, Philippe; and Laine, Francois, 4,057,592, Cl. 260-659.00A.
Lajos, Thomas Z. Atrioventricular electrode. 4,057,067, Cl. 128-418.000.
Lambert, Ronald F.; and Rogers, Howard G., to Polaroid Corporation. 2-Substituted benzimidazoles in multicolor diffusion transfer. 4,057,425, Cl. 96-3.000.
Lambrecht, Dietrich: *See—*
Fork, Kurt; Lambrecht, Dietrich; Waldmann, Hermann; and Hofmann, Helmut, 4,057,714, Cl. 264-494.000.
Lambright, Arthur James: *See—*
Goettler, Lloyd Arnold; and Lambright, Arthur James, 4,057,610, Cl. 264-108.000.
Lammermann, Heinz, to Robert Bosch GmbH. Method of making a filter. 4,056,876, Cl. 29-469.500.
Lamy, Jacques Edouard, to C. G. Doris (Compagnie Generale pour les Developpements Operationnels des Richesses Sous-marines). Process and device for laying submarine pipelines. 4,056,944, Cl. 61-107.000.
Lamy, Jacques Edouard, to Compagnie Generale pour les Developpements Operationnels des Richesses Sous-Marines "C.G. Doris". Process and device for laying submarine pipelines. 4,056,945, Cl. 61-107.000.
La Porte, Arthur E., Jr. Gravity for solid particulate matter. 4,057,136, Cl. 193-3.000.
Lapple, Arnulf Ruediger: *See—*
Defago, Raymond; Schaffluetzel, Paul; Lapple, Arnulf Ruediger; and Hugelin, Bernard, 4,057,388, Cl. 8-2.50A.
Larson, Nils F.: *See—*
Hiatt, Carl C.; and Larson, Nils F., 4,056,910, Cl. 52-600.000.
Lasag S.A.: *See—*
Piguet, Christian, 4,057,741, Cl. 307-279.000.
Laupman, Robert Ronald, to Novanex Automation N. V. Device for protecting an audio amplifier against overload or short circuit. 4,057,767, Cl. 330-207.00P.
Laurent, Jacky Adrien Paul; and Croix-Marie, Francis Jean-Marie, to Bertin & Cie; and Arbel Industrie. Transfer system for long vehicles such as wagons. 4,057,018, Cl. 104-48.000.
Laurer, Erwin: *See—*
Schabert, Hans-Peter; and Laurer, Erwin, 4,057,077, Cl. 137-861.000.
Laurie, Albert F.; and Bunch, G. W. Baled tire product. 4,057,141, Cl. 206-304.000.
Lavigne, Geraldine. Urinary device. 4,057,062, Cl. 128-295.000.
Lawrence, Benjamin, to Procter & Gamble Company, The. Freeze particle process. 4,057,652, Cl. 426-388.000.
Lawrence, Dean M.: *See—*
Brownell, Roy D.; and Lawrence, Dean M., 4,057,122, Cl. 180-77.00S.
Lawrence Peska Assoc.: *See—*
Pace, Joseph L., 4,056,859, Cl. 7-14.10R.
Lawton, Emil A.: *See—*
Shaw, Graham C.; Lawton, Emil A.; and Jones, Leon L., 4,057,442, Cl. 149-109.400.
Leath, Jimmie E. Wire tightening tool. 4,057,221, Cl. 256-40.000.
Le Blay, Jacques: *See—*
Pigerol, Charles; de Cointet de Fillain, Paul; Nanthavong, Souli; and Le Blay, Jacques, 4,057,530, Cl. 260-45.80N.
Lebost, Barry Alan. Fluid turbine. 4,057,270, Cl. 290-54.000.
Lechner, Gunther; Pritscher, Karl; and Kirschner, Helmut, to Wacker-Chemitronic Gesellschaft fur Elektronik-Grundstoffe mbH. Packaging of semiconductor discs. 4,057,142, Cl. 206-332.000.
Ledebuhr, Richard L.: *See—*
Hansen, Clarence M.; and Ledebuhr, Richard L., 4,057,137, Cl. 198-443.000.
Ledru, Pierre: *See—*
Angleraud, Rene; and Ledru, Pierre, 4,057,518, Cl. 260-2.50N.
Lee, George, to Hitco. Method for making buoyancy members. 4,057,450, Cl. 156-213.000.
Lee, Jin Ku. Valved receptacle closure. 4,057,167, Cl. 220-90.400.
Lee, Lester T. C.; Dege, Gerald J.; and Liu, Kang-Jen, to Allied Chemical Corporation. High performance, quality controlled bipolar membrane. 4,057,481, Cl. 204-296.000.
Lee, Man Shek, to GTE Automatic Electric Laboratories Incorporated. Active networks having biquadratic transfer functions. 4,057,766, Cl. 330-107.000.
Leighton, Milton D.: *See—*
Bushnell, James D.; Leighton, Milton D.; and McDonald, Thomas M., 4,057,491, Cl. 208-321.000.
Leisring, Herbert, to Robert Bosch GmbH. Film drive for motion picture apparatus. 4,057,335, Cl. 352-188.000.
LeMay, Dan B., to Tylan Corporation. Mass flow sensor system. 4,056,975, Cl. 73-202.000.
Lennon, Thomas J.: *See—*
Genova, Arthur F.; and Lennon, Thomas J., 4,057,759, Cl. 325-320.000.
Leo Pharmaceutical Products Ltd. A/S: *See—*
Petersen, Hans Jorgen, 4,057,636, Cl. 424-263.000.
Leo, Thomas J.; Loser, Thomas N.; and Reynolds, Michael J., to Wyrough and Loser, Inc. Rubber compositions having improved adhesion after thermal aging. 4,057,529, Cl. 260-42.470.
Lesnewich, Alexander: *See—*
Brace, Arthur A.; and Lesnewich, Alexander, 4,057,420, Cl. 75-53.000.
Lesney Products & Co. Limited: *See—*
Clark, William Frederick; and Maddocks, Richard Joseph, 4,057,612, Cl. 264-275.000.
Letts, Robert Arthur, to Airscrew Howden Limited. Method of making a dimensionally stable commutator. 4,056,882, Cl. 29-597.000.
Levine, Seymour; and Kane, Vinayak V., to Ortho Pharmaceutical Corporation. Azabicyclic compounds, and production thereof. 4,057,547, Cl. 544-184.000.
Lewis, Adolph Lee, to United States of America, Navy. Fiber optics electro-mechanical light switch. 4,057,719, Cl. 250-227.000.
Lewis, Roger N.: *See—*
Friedman, Ronald L.; and Lewis, Roger N., 4,057,567, Cl. 260-453.0RZ.
Ley, Anthony John; Metcalf, Eric; and Jeffery, Michael Cedric, to Solartron Electronic Group Ltd., The. Signal processors. 4,057,756, Cl. 324-77.00B.
Libbey-Owens-Ford Company: *See—*
Beckham, Robert R., 4,057,451, Cl. 156-320.000.
Daman, Lloyd W.; Marti, Don V., II; Mason, Freddie; and Shamp, Donald E., 4,057,410, Cl. 65-65.00A.
Liet, Cornelis Hendrikus: *See—*
Liet, Fredericus; and Liet, Cornelis Hendrikus, 4,057,295, Cl. 302-56.000.
Liet, Fredericus; and Liet, Cornelis Hendrikus, to Trioliet-Mullos Silo Nederland B.V. Silo having a cylindrical wall and a discharge device. 4,057,295, Cl. 302-56.000.
Lilja, Harry L. Sun shade for motor vehicle. 4,057,287, Cl. 296-97.00K.
Limberg, Allen LeRoy, to RCA Corporation. Current sensing circuit. 4,057,743, Cl. 307-296.00R.
Lin, Chiu-Hong, to Upjohn Company, The. 4,4,5,5-Tetradehydro-ω-aryl-11-deoxy-PGE_1, analogs. 4,057,572, Cl. 560-53.000.
Linder, Charles W.: *See—*
Wray, Betty B.; Stager, Peter F.; and Linder, Charles W., 4,057,145, Cl. 206-538.000.
Lindmayer, Joseph, to Solarex Corporation. Method of forming silicon solar energy cell having improved back contact. 4,056,879, Cl. 29-572.000.
Lindmayer, Joseph, to Solarex Corporation. Solar panel. 4,057,439, Cl. 136-89.00P.
Lion Fat & Oil Co., Ltd.: *See—*
Kinoshita, Mototaka; Okabe, Akio; and Ando, Susumu, 4,057,495, Cl. 210-44.000.
Lipatova, Tatyana Esperovna; Veselovsky, Roman Alexandrovich; and Pkhakadze, Georgy Alexandrovich. Adhesive for gluing together soft body tissues. 4,057,535, Cl. 260-77.5AC.

Lissaman, Peter B. S.: *See—*
MacCready, Paul B., Jr.; and Lissaman, Peter B. S., 4,057,280, Cl. 296-1.00S.
Lissy, Igor. Aircraft towing vehicle. 4,057,158, Cl. 214-330.000.
Littelfuse, Inc.: *See—*
Williamson, Harold L.; and Aryamane, Avinash P., 4,056,884, Cl. 29-623.000.
Litvinov, Pavel Ivanovich: *See—*
Kudryavtsev, Alexandr Alexandrovich; Firsov, Vitaly Mikhailovich; Solinov, Evgeny Fedorovich; Symon, Mark Klavdievich; Litvinov, Pavel Ivanovich; Veresov, Albert Pavlovich; Rybakov, Ivan Alexandrovich; Trishin, Viktor Timofeevich; Goryannikov, Vladimir Mikhailovich; Savin, Vyacheslav Pavlovich; and Kashkarov, Igor Georgievich, 4,057,409, Cl. 65-154.000.
Liu, Kang-Jen: *See—*
Lee, Lester T. C.; Dege, Gerald J.; and Liu, Kang-Jen, 4,057,481, Cl. 204-296.000.
Liu, Rosa H.: *See—*
Salmon, Sydney E.; and Liu, Rosa H., 4,057,618, Cl. 424-1.000.
Livingston, Wayne W.; and Melin, Gerald W., to Bemis Company, Inc. Methods of extruding plastic netting. 4,057,449, Cl. 156-167.000.
Lloyd, Wayne B., to Westinghouse Electric Corporation. Adjustable effectiveness support spring device. 4,057,238, Cl. 267-136.000.
Lloyd's Furnaces: *See—*
Shoemaker, Lloyd L., 4,057,189, Cl. 237-17.000.
Lockheed Missiles & Space Company, Inc.: *See—*
Halberstadt, Harry J.; and Rowley, Leroy S., 4,057,675, Cl. 429-39.000.
Loeding, John W.: *See—*
Patel, Jitendra G.; Schora, Frank C.; and Loeding, John W., 4,057,402, Cl. 48-197.00R.
Lok-A-Bin Systems, Inc.: *See—*
Korb, A. Norman; and Breunsbach, Rex L., 4,057,817, Cl. 354-298.000.
Looser, Christian: *See—*
Gilliand, Andre Ferdinand Louis; and Looser, Christian, 4,056,921, Cl. 53-167.000.
Loseff, Herbert S. Sterile container for x-ray cassette holders. 4,057,731, Cl. 250-475.000.
Loser, Thomas N.: *See—*
Leo, Thomas J.; Loser, Thomas N.; and Reynolds, Michael J., 4,057,529, Cl. 260-42.470.
Lossack, Edgar; Kramer, Kurt; and Bulian, Gerd, to Vereinigte Aluminum-Werke Aktiengesellschaft. Apparatus for the lubrication of hot head continuous casting molds. 4,057,100, Cl. 164-418.000.
Lowell, William P.; and Jagunich, Douglas M., to Sperry Rand Corporation. Remote controlled test interface unit. 4,057,847, Cl. 364-200.000.
Lower, William E.: *See—*
Stasinski, David D.; and Lower, William E., 4,057,492, Cl. 209-366.500.
Lucas Industries Limited: *See—*
Seilly, Alec Harry, 4,057,744, Cl. 310-27.000.
Lueg, Karl: *See—*
Kalka, Josef; Waskonig, Walter; and Lueg, Karl, 4,056,981, Cl. 73-421.00B.
Lummus Company, The: *See—*
Richtzenhain, Hermann; and Janssen, Paul, deceased, 4,057,552, Cl. 260-294.900.
Lundberg, Robert D.; and Thame, Neville G., to Exxon Research & Engineering Co. Multiphase block and graft copolymers comprising a hydrophilic continuous phase and hydrophobic domains. 4,057,598, Cl. 260-857.00G.
Lunden, Sidney L. Lumber stacking apparatus. 4,057,150, Cl. 214-6.0DK.
Lunt, Anthony Randle, to United Kingdom Atomic Energy Authority. Nuclear reactor fuel element sub-assemblies. 4,057,468, Cl. 176-78.000.
Lurssen, Klaus: *See—*
Naumann, Klaus; Lurssen, Klaus; Sasse, Klaus; Holtschmidt, Ulrich; and Schwarzmann, Gunter, 4,057,413, Cl. 71-76.000.
Lux, Benno; Kurz, Wilfried; Hubert, Jean-Claude; Mollard, Francois; and Walt, Guido, to Battelle Memorial Institute. Casting process with instantaneous unidirectional solidification. 4,057,097, Cl. 164-60.000.
Lyle, John S., to Koehring Company. Concrete vibrator. 4,057,222, Cl. 366-123.000.
Lyngsgaard, Joergen; and Stiebel, Ariel. Particle detector. 4,057,709, Cl. 235-92.0PK.
Mabuchi, Kenichi, to Mabuchi Motor Co., Ltd. Adapter. 4,057,677, Cl. 429-100.000.
Mabuchi Motor Co., Ltd.: *See—*
Mabuchi, Kenichi, 4,057,677, Cl. 429-100.000.
MacCready, Paul B., Jr.; and Lissaman, Peter B. S., to AeroVironment Inc. Aerodynamic drag reduction devices for surface vehicles. 4,057,280, Cl. 296-1.00S.
MacDonald, Peter S., to Sargent Industries, Inc. Valve construction. 4,057,217, Cl. 251-308.000.
Macheret, Lev Ilich: *See—*
Bataev, Mikhail Kirillovich; Veits, Isaak Efimovich; Gorodetsky, Sergei Sergeevich; Macheret, Lev Ilich; Kuznetsov, Lev Alexeevich; Tjurin, Albert Vasilievich; and Yaunzem, Jury Eduardovich, 4,057,453, Cl. 156-390.000.
Machida, Hajime: *See—*
Nishikawa, Daikichiro; Imada, Yukio; Kinoshita, Masayuki; Takahashi, Katsuhiko; Machida, Hajime; and Nagasawa, Michitaro, 4,057,469, Cl. 195-51.00G.
Machida Shigyo Co., Ltd.: *See—*
Hosoe, Masaya, 4,057,380, Cl. 425-324.100.
Machusak, Donald Arthur: *See—*
Cranston, Benjamin Howell; Kleinedler, Gary Evan; Machusak, Donald Arthur; and Wiechard, Charles Augustus, 4,057,187, Cl. 228-107.000.
Maddocks, Richard Joseph: *See—*
Clark, William Frederick; and Maddocks, Richard Joseph, 4,057,612, Cl. 264-275.000.
Madera, Anthony J.: *See—*
Bates, Albert M.; and Madera, Anthony J., 4,057,778, Cl. 340-2.000.
Maeda, Kunihiro; Imahasi, Hiromichi; and Kikuchi, Matsunosuke, to Hitachi, Ltd. Method of making nickel zinc ferrite by liquid-phase epitaxial growth. 4,057,458, Cl. 156-603.000.
Maessen, Jan Theodor Marie Francois: *See—*
Boelens, Harmannus; Maessen, Jan Theodor Marie Francois; and van der Linde, Leendert Maarten, 4,057,515, Cl. 252-522.000.
Maezono, Masakazu: *See—*
Hattori, Torao; and Maezono, Masakazu, 4,057,132, Cl. 192-87.190.
Mages, Bernhard: *See—*
Rock, Erich; and Mages, Bernhard, 4,057,303, Cl. 308-3.600.
Maggioni, Virginio: *See—*
Michellone, Giancarlo; and Maggioni, Virginio, 4,057,300, Cl. 303-113.000.
Magnuson, Robert M.: *See—*
Babb, Raymond E., 4,057,352, Cl. 356-178.000.
Mahlein, Hans; and Reichelt, Achim, to Siemens Aktiengesellschaft. Spectroscopically selective filter device. 4,057,321, Cl. 350-96.0WG.
Maier, William. Electrical outlet box mounting. 4,057,164, Cl. 220-3.600.
Maine, DeWitt C., to Maineline Sales Co., Inc. Solar heat collector. 4,057,048, Cl. 126-271.000.
Maineline Sales Co., Inc.: *See—*
Maine, DeWitt C., 4,057,048, Cl. 126-271.000.
Mainord, Kenneth R. Method for high temperature cleaning. 4,057,438, Cl. 134-2.000.
Mair, Georg; and Schabert, Hans-Peter, to Siemens Aktiengesellschaft. Nuclear reactor installation. 4,057,464, Cl. 176-37.000.
Majima, Kanji: *See—*
Nakagawa, Yunosuke; Majima, Kanji; and Miyamoto, Sigeyuki, 4,057,505, Cl. 252-96.000.
Malachesky, Paul A.: *See—*
Rao, Bhaskara M. L.; and Malachesky, Paul A., 4,057,676, Cl. 429-50.000.
Malco Plastics: *See—*
Tramposch, Herbert; and Polad, Michael, 4,057,011, Cl. 101-93.030.
Malek, John Michael. Process for hydroliquefying coal or like carbonaceous solid materials. 4,057,484, Cl. 208-8.000.
Malinge, Noel, to Engins Matra. Photogrammetric plotting apparatus. 4,057,336, Cl. 353-6.000.
Mallinckrodt, Inc.: *See—*
Wolfangel, Robert G., 4,057,616, Cl. 424-1.000.
Mammino, Joseph; and Jossel, Franklin, to Xerox Corporation. Magenta toner with a coated carrier. 4,057,426, Cl. 96-1.0SD.
Manzer, Leo Ernest, to Du Pont de Nemours, E. I., and Company. 2-Dialkylaminobenzyl and 2-dialkylaminomethylphenyl derivatives of selected transition metals. 4,057,565, Cl. 260-429.00R.
Marcatili, Enrique Alfredo Jose, to Bell Telephone Laboratories, Incorporated. Optical fiber waveguide having minimum modal dispersion. 4,057,320, Cl. 350-96.0GN.
Markos, Charles S.: *See—*
Dryden, Hugh L., Jr.; and Markos, Charles S., 4,057,543, Cl. 260-239.570.
Markwort, Helmut: *See—*
Muller, Eckart; Simo, Thomas; Markwort, Helmut; and Scholz, Berthold, 4,057,224, Cl. 366-336.000.
Marti, Don V., II: *See—*
Daman, Lloyd W.; Marti, Don V., II; Mason, Freddie; and Shamp, Donald E., 4,057,410, Cl. 65-65.00A.
Martin, Edna Henderson. Material pleater. 4,057,178, Cl. 223-35.000.
Martin Marietta Corporation: *See—*
Valentine, Jean A., 4,057,001, Cl. 86-1.00R.
Maruo, Masaya: *See—*
Arikawa, Hiroo; Akiyama, Fumitake; and Maruo, Masaya, 4,057,774, Cl. 337-164.000.
Marvin Glass & Associates: *See—*
Morrison, Howard J., 4,057,247, Cl. 273-1.00R.
Maschinenfabrik Augsburg-Nurnberg AG: *See—*
Isenberg, Gerhard; and Tuzinsky, Wolfgang, 4,057,369, Cl. 417-365.000.
Schwaebel, Rudolf, 4,057,362, Cl. 415-170.00R.
Mason, Freddie: *See—*
Daman, Lloyd W.; Marti, Don V., II; Mason, Freddie; and Shamp, Donald E., 4,057,410, Cl. 65-65.00A.
Mathe, Istvan; and Kasper, Alan Henry, to Bunker Ramo Corporation. Electrical connector including insulation-opening contact. 4,057,314, Cl. 339-97.00R.
Matovich, Edwin, to Thagard Technology Company. Fluid-wall reactor for high temperature chemical reaction processes. 4,057,396, Cl. 23-252.00R.
Matsubara, Masaki, to Olympus Optical Co., Ltd. Enlarging lens system. 4,057,328, Cl. 350-214.000.

Matsui, Sadayoshi: *See—*
Koike, Wataro; Kimoto, Takahiro; and Matsui, Sadayoshi, 4,057,555, Cl. 260-301.000.
Matsumoto, Yukimichi, to Kabushiki Kaisha Fuji Tekkosho. Winding machine. 4,056,918, Cl. 53-118.000.
Matsunaga, Setsuo: *See—*
Toriya, Jun; Sato, Masato; Shiraga, Ken; and Matsunaga, Setsuo, 4,057,472, Cl. 203-80.000.
Matsuo, Syunji: *See—*
Fujiwhara, Mitsuto; Kojima, Tamotsu; and Matsuo, Syunji, 4,057,432, Cl. 96-56.200.
Matsuo, Yoshihiro: *See—*
Kawashima, Syunichiro; Nishida, Masamitsu; Matsuo, Yoshihiro; Ouchi, Hiromu; and Hayakawa, Shigeru, 4,057,324, Cl. 350-150.000.
Matsuoka, Kimiaki: *See—*
Ozawa, Masahiro; Inoue, Fumio; Komatsu, Tadaaki; and Matsuoka, Kimiaki, 4,057,591, Cl. 260-653.10R.
Matsushita Electric Industrial Co., Ltd.: *See—*
Kawashima, Syunichiro; Nishida, Masamitsu; Matsuo, Yoshihiro; Ouchi, Hiromu; and Hayakawa, Shigeru, 4,057,324, Cl. 350-150.000.
Matsushita Electric Industrial Co., Ltd: *See—*
Numata, Shigeaki; and Sasaoka, Ryosuke, 4,057,370, Cl. 417-366.000.
Matsushita, Matsuo: *See—*
Shiga, Michio; Hirano, Kimitoshi; and Matsushita, Matsuo, 4,057,504, Cl. 252-33.000.
Matui, Sei, to Nippon Kogaku K.K. Lens system having large relative aperture and long focus. 4,057,330, Cl. 350-223.000.
Matula, Joseph P.: *See—*
Metrailer, William J.; and Matula, Joseph P., 4,057,487, Cl. 208-81.000.
Maurer, Fritz: *See—*
Hofer, Wolfgang; Maurer, Fritz; Riebel, Hans-Jochem; Schroder, Rolf; and Eue, Ludwig, 4,057,418, Cl. 71-103.000.
Mausolf, Georg; Bellenbaum, Herbert; and Dietrich, Josef, to Salzgitter Maschinen AG. Reversible arrangement for transporting bulk materials. 4,057,139, Cl. 198-509.000.
Mavor, John: *See—*
Owen, Alan Ernest; and Mavor, John, 4,057,819, Cl. 357-23.000.
Mayer, J. Richard. Benthic semi-barrier to control the growth of weeds in aquatic environments. 4,056,936, Cl. 61-1.00R.
Mazak, Milos: *See—*
Skrabak, Michal; Vavrik, Ernest; Kolarik, Stanislav; and Mazak, Milos, 4,057,497, Cl. 210-65.000.
Mazzetti, Flavio J. Flow diversion sampler. 4,056,983, Cl. 73-423.00R.
McCarroll, Vincent P.: *See—*
van Valkenburg, Howard E.; and McCarroll, Vincent P., 4,056,971, Cl. 73-629.000.
McConnell, Albert L., to Scott Paper Company. Method of manufacturing a dry-formed, adhesively bonded, nonwoven fibrous sheet and the sheet formed thereby. 4,057,669, Cl. 428-152.000.
McDonald, Robert E.; and Canonico, Domenic A., to United States of America, Energy Research and Development Administration. Means of determining extrusion temperatures. 4,056,963, Cl. 72-253.00R.
McDonald, Thomas M.: *See—*
Bushnell, James D.; Leighton, Milton D.; and McDonald, Thomas M., 4,057,491, Cl. 208-321.000.
McGlashen, James Neil: *See—*
Holroyd, Eric; Goodfellow, Anthony Gerald; and McGlashen, James Neil, 4,057,447, Cl. 156-125.000.
McIntire, Floyd Cottam, to Abbott Laboratories. Chemically modified endotoxin immunizing agent. 4,057,685, Cl. 536-18.000.
McKee, Richard W.: *See—*
Andrews, Frank; and McKee, Richard W., 4,057,208, Cl. 246-125.000.
McManus, Ira J. Composite concrete slab and steel joist construction. 4,056,908, Cl. 52-334.000.
Mead Corporation, The: *See—*
Prot, Marcel G., 4,057,444, Cl. 156-69.000.
Meadow, Morton; and Berkowitz, Sidney, to FMC Corporation. Process for producing carbon disulfide. 4,057,613, Cl. 423-443.000.
Meadus, F. Weldon; Sparks, Bryan D.; Puddington, Ira E.; and Farnand, J. Redmond, to Canadian Patents and Development Limited. Separating organic material from tar sands or oil shale. 4,057,486, Cl. 208-11.0LE.
Medtronic, Inc.: *See—*
Comben, Richard H., 4,057,068, Cl. 128-419.00P.
Meier-Windhorst, Christian August. Apparatus for wet treatment of travelling webs. 4,056,954, Cl. 68-22.00R.
Melin, Gerald W.: *See—*
Livingston, Wayne W.; and Melin, Gerald W., 4,057,449, Cl. 156-167.000.
Melson, James L. Powered hand truck for climbing steps. 4,057,119, Cl. 180-8.00A.
Memmi, Massimo: *See—*
Bruno, Roberto; Memmi, Massimo; Berardi, Paolo; and Musso, Augusto, 4,057,424, Cl. 75-178.00A.
Mendelson, Wilford Lee; and Webb, Robert Lee, to SmithKline Corporation. Method of preparing 2,3-dichloroanisole. 4,057,585, Cl. 260-612.00D.
Menyhert, William R. Epoxy derivative compositions. 4,057,524, Cl. 260-29.2EP.
Merck & Co., Inc.: *See—*
Jones, Howard; and Shen, Tsung-Ying, 4,057,642, Cl. 424-304.000.
Shen, Tsung-Ying; Jones, Howard; Mulvey, Dennis M.; and Dorn, Conrad P., 4,057,637, Cl. 424-263.000.
Merck Patent Gesellschaft mit beschrankter Haftung: *See—*
Gante, Joachim; Kurmeier, Hans-Adolf; Orth, Dieter; Schacht, Erich; and Wild, Albrecht, 4,057,647, Cl. 424-340.000.
Merz, Kenneth M.; and Shapiro, Howard E., to TRW Inc. Termination for electrical resistor and method of making same. 4,057,777, Cl. 338-309.000.
Merz, Walter; and Nachtsheim, Dieter, to Bayer Aktiengesellschaft. Process for the preparation of pinacolone. 4,057,583, Cl. 260-593.00R.
Messier, Russell Francis: *See—*
Wolfe, Robert Wade; and Messier, Russell Francis, 4,057,508, Cl. 252-301.40H.
Metallgesellschaft Aktiengesellschaft: *See—*
Muller, Eckart; Simo, Thomas; Markwort, Helmut; and Scholz, Berthold, 4,057,224, Cl. 366-336.000.
Metcalf, Eric: *See—*
Ley, Anthony John; Metcalf, Eric; and Jeffery, Michael Cedric, 4,057,756, Cl. 324-77.00B.
Metrailer, William J.; and Matula, Joseph P., to Exxon Research & Engineering Co. Fluid coking process. 4,057,487, Cl. 208-81.000.
Mette, Klaus Hermann; and St. Denis, Andrew Raoul, to Firan Electronics, Inc. Press true-hit safety counter. 4,057,713, Cl. 364-476.000.
Metzgar, Don P.; and Newhart, Raymond H., to Richardson-Merrell Inc. Process for detoxifying influenza B virus. 4,057,626, Cl. 424-89.000.
Metzler, Jay C., to Schlegel Corporation. Pile weatherstripping with interfitting shaped base. 4,057,668, Cl. 428-85.000.
Meyer, Bruno P.: *See—*
Theis, James V., Jr.; and Meyer, Bruno P., 4,057,360, Cl. 415-25.000.
Meyer, Rolf; and Burgess, John E., to G. D. Searle & Co. Multiple sample support assembly and apparatus for facilitating radioimmunoassays and the like. 4,057,148, Cl. 211-74.000.
MFE Corporation: *See—*
Banks, Frank H., 4,057,839, Cl. 360-93.000.
Micetich, Ronald G.; Morin, Robert B.; and Wilson, Kenneth E., to Connlab Holdings Limited. 4-Chloroazetidinone-1-(2',3'-dichloroisopropyl) acetates and process for preparing same. 4,057,540, Cl. 260-239.00A.
Michalik, Edmund R., to PPG Industries, Inc. Method of scoring glass using a scoring wheel having an arcuate scoring surface. 4,057,184, Cl. 225-2.000.
Michalon, Daniel, to Centre Stephanois de Recherches Mecaniques Hydromecanique et Frottement. Continuous transport system, in particular for public transport. 4,057,017, Cl. 104-20.000.
Michellone, Giancarlo; and Maggioni, Virginio, to FIAT Societa per Azioni. Motor vehicle braking system. 4,057,300, Cl. 303-113.000.
Miki, Tosaku; Hosokawa, Yasuhiro; Miwa, Tamotsu; Fujita, Hiroshi; Asano, Masahide; and Aibara, Shunzo, to Daiichi Seiyaku Co., Ltd. Tyrosine derivatives and process for preparing the same. 4,057,629, Cl. 424-177.000.
Milchem Incorporated: *See—*
Elting, Katherine Anne Cline, 4,057,683, Cl. 526-194.000.
Miles Laboratories, Inc.: *See—*
Genshaw, Marvin Alden, 4,057,394, Cl. 23-230.00B.
Miller, Calvin Max, to Bell Telephone Laboratories, Incorporated. Optical fiber splicing technique. 4,057,448, Cl. 156-158.000.
Miller, Howard N.: *See—*
Perry, Robert H.; and Miller, Howard N., 4,057,753, Cl. 318-376.000.
Miller, Norman Jay; Zemaitis, John Anthony; and Zimmerman, Russell Lloyd, to Du Pont de Nemours, E. I., and Company. Circuit board pin. 4,057,315, Cl. 339-221.00R.
Minami, Norio: *See—*
Kijima, Shizumasa; Yamatu, Isao; Hamamura, Kimio; Minami, Norio; Yamagishi, Youji; and Inai, Yuichi, 4,057,568, Cl. 260-462.00R.
Minolta Camera Kabushiki Kaisha: *See—*
Miyamoto, Osamu; Iizaka, Isao; Yamamoto, Toshio; Hikosaka, Takashi; and Shimizu, Shigemitu, 4,057,339, Cl. 355-3.00R.
Minox GmbH, Firma: *See—*
Grunbacher, Martin; and Johannsen, Hans Werner, 4,057,814, Cl. 354-204.000.
Misawa Homes Institute of Research and Development: *See—*
Hashimoto, Akihiro; Hayashi, Shigeo; Yamamoto, Sadao; and Chujo, Hitoshi, 4,057,608, Cl. 264-42.000.
Mitchell, Donald K.: *See—*
Hood, Frederick E.; Mitchell, Donald K.; and Uhring, Gary S., 4,057,023, Cl. 114-107.000.
Mitsubishi Chemical Industries Ltd.: *See—*
Imahori, Seiichi; Kaneko, Masaharu; and Kato, Yoshiaki, 4,057,539, Cl. 260-155.000.
Nishikawa, Daikichiro; Imada, Yukio; Kinoshita, Masayuki; Takahashi, Katsuhiko; Machida, Hajime; and Nagasawa, Michitaro, 4,057,469, Cl. 195-51.00G.
Toriya, Jun; Sato, Masato; Shiraga, Ken; and Matsunaga, Setsuo, 4,057,472, Cl. 203-80.000.
Mitsubishi Monsanto Kasei Kabushiki Kaisha: *See—*
Yamamori, Masaji, 4,057,382, Cl. 425-387.100.
Mitsubishi Petrochemical Co., Ltd.: *See—*
Yazaki, Takao; and Hattori, Kazuhide, 4,057,385, Cl. 425-466.000.
Mitsui Mining & Smelting Co., Ltd.: *See—*
Kinoshita, Hisahiro, 4,057,423, Cl. 75-109.000.
Mitterhummer, Gerhard; and Plehnert, Kurt, to Siemens Aktiengesell-

schaft. Method for manufacturing micro-wiring arrangements for contacting semiconductor circuits. 4,057,459, Cl. 156-630.000.
Miwa, Tamotsu: *See—*
Miki, Tosaku; Hosokawa, Yasuhiro; Miwa, Tamotsu; Fujita, Hiroshi; Asano, Masahide; and Aibara, Shunzo, 4,057,629, Cl. 424-177.000.
Mixan, Craig E.; Goralski, Christian T.; and Pews, R. Garth, to Dow Chemical Company, The. Synthetic resin fungicidal paint comprising 1,3-dithiolo-(4,5-b)pyrazin-2-ylidene-propanedinitrile 4-oxide. 4,057,517, Cl. 260-22.00R.
Miyamoto, Osamu; Iizaka, Isao; Yamamoto, Toshio; Hikosaka, Takashi; and Shimizu, Shigemitu, to Minolta Camera Kabushiki Kaisha. Electrostatic latent image transfer type copying apparatus. 4,057,339, Cl. 355-3.00R.
Miyamoto, Sigeyuki: *See—*
Nakagawa, Yunosuke; Majima, Kanji; and Miyamoto, Sigeyuki, 4,057,505, Cl. 252-96.000.
Miyatake, Takafumi: *See—*
Ejiri, Masakazu; Kashioka, Seiji; Miyatake, Takafumi; Yoda, Haruo; and Kameyama, Masayoshi, 4,057,845, Cl. 364-200.000.
Mizuno, Tamotsu: *See—*
Ono, Tetsuhiro; Aramaki, Minoru; Mizuno, Tamotsu; and Fujinaga, Masao, 4,057,614, Cl. 423-490.000.
Mizusawa, Shinichiro; Tamura, Chiharu; Nakamura, Norihiko; and Yanagihara, Hiromichi, to Toyota Jidosha Kogyo Kabushiki Kaisha. After-burning preventive and flame-out apparatus. 4,056,934, Cl. 60-311.000.
Mnilk, Reinhold; Kurreck, Manfred; and Tiede, Wolfgang, to Holstein & Kappert Aktiengesellschaft. Method and apparatus for removing residue of filling material in machines for manufacturing filled plastic containers. 4,056,914, Cl. 53-35.000.
Mobil Oil Corporation: *See—*
Florian, John, 4,057,651, Cl. 229-2.500.
Gross, Benjamin; and Owen, Hartley, 4,057,397, Cl. 23-288.00B.
Mobile Auto Crushers Corporation of America: *See—*
Smith, Gary D., 4,057,010, Cl. 100-50.000.
Moczygemba, George A., to Phillips Petroleum Company. Block copolymers of alkadienes and monovinyl arenes. 4,057,601, Cl. 260-880.00B.
Moe, James S.; Carter, Marvin B.; and Carter, Ray L. Combined rotary-reciprocating piston compressor. 4,057,367, Cl. 417-273.000.
Molinari, Alcide: *See—*
Vagliani, Federico; and Molinari, Alcide, 4,057,690, Cl. 179-15.0AS.
Mollard, Francois: *See—*
Lux, Benno; Kurz, Wilfried; Hubert, Jean-Claude; Mollard, Francois; and Walt, Guido, 4,057,097, Cl. 164-60.000.
Monahan, John F., to Harris Corporation. Contrast compression circuits. 4,057,828, Cl. 358-32.000.
Monsanto Company: *See—*
Goettler, Lloyd Arnold; and Lambright, Arthur James, 4,057,610, Cl. 264-108.000.
Montagna, Angelo Anthony; Somers, Allen Evarts; Peake, Stephen Luther; and Chun, Sun Woong, to Gulf Research & Development Company. Catalytic pour point reduction of petroleum hydrocarbon stocks. 4,057,488, Cl. 208-89.000.
Montagna, Angelo Anthony; Somers, Allen Evarts; and Sebulsky, Raynor Tyler, to Gulf Research & Development Company. Process for producing a transformer oil having lower pour point and improved oxidation stability. 4,057,489, Cl. 208-89.000.
Moore Company, Inc., The: *See—*
Moore, Junius Thomas, 4,057,211, Cl. 248-332.000.
Moore, Junius Thomas, to Moore Company, Inc., The. Safety system for overhead support of weighted articles. 4,057,211, Cl. 248-332.000.
Moorehead, Robert M., to Spectradyne, Inc. Communications TV monitoring and control system. 4,057,829, Cl. 358-86.000.
Morbark Industries, Inc.: *See—*
Smith, Leward N., 4,057,192, Cl. 241-92.000.
Mori, Masanori, to Aisin Seiki Kabushiki Kaisha. Self-adjusting release mechanism for a clutch assembly. 4,057,135, Cl. 192-111.00A.
Morimatsu, Hideharu: *See—*
Iida, Masajiro; Morimatsu, Hideharu; Fukuoka, Itsuo; and Yoshida, Yoshinari, 4,057,779, Cl. 340-3.00C.
Morin, Robert B.: *See—*
Micetich, Ronald G.; Morin, Robert B.; and Wilson, Kenneth E., 4,057,540, Cl. 260-239.00A.
Morinaga Milk Industry Co., Ltd.: *See—*
Okada, Katsuto; Ogasa, Katsuhiro; and Tomita, Mamoru, 4,057,655, Cl. 426-583.000.
Morisawa, Kunio: *See—*
Kubo, Seitoku; Kuramochi, Kojiro; Morisawa, Kunio; and Ohnuma, Kiyoshi, 4,056,988, Cl. 74-695.000.
Morita, Toshio, to Westinghouse Electric Corporation. Method of operating a nuclear reactor which maintains a substantially constant axial power distribution profile with changes in load. 4,057,463, Cl. 176-22.000.
Moriyama, Shigeo; Harada, Tatsuo; Kawamura, Yoshio; Hashimoto, Seiya; Takanashi, Akihiro; Kurosaki, Toshiei; Kuniyoshi, Shinji; and Hosaka, Sumio, to Hitachi, Ltd. Optical exposure apparatus. 4,057,347, Cl. 355-67.000.
Morrison, Charles F., Jr.; and Weaver, Benson C., to Valleylab, Inc. Electrosurgical method and apparatus for initiating an electrical discharge in an inert gas flow. 4,057,064, Cl. 128-303.170.
Morrison, Howard J., to Marvin Glass & Associates. Balancing toy set. 4,057,247, Cl. 273-1.00R.
Morse, John B.: *See—*
Killian, John C., Jr.; and Morse, John B., 4,057,816, Cl. 354-293.000.
Motorola Inc.: *See—*
Greeley, Ashford C.; and Daniel, Sam M., 4,057,708, Cl. 235-413.000.
Mowrey, Rowland George; Smith, Donald Arthur; and Sutton, Richard Calvin, to Eastman Kodak Company. Photographic elements containing anionic organic acids. 4,057,428, Cl. 96-74.000.
Mu, Paul T.: *See—*
Rayburn, Billy R., 4,056,891, Cl. 34-55.000.
Muehllehner, Gerd; and Buchin, Michael P., to G. D. Searle & Co. Positron imaging system with improved count rate and tomographic capability. 4,057,727, Cl. 250-363.00S.
Mueller Co.: *See—*
Daghe, Joseph L.; and Kuzmicki, Casimir B., 4,057,357, Cl. 408-67.000.
Mueller, Otto, to Stauble Ltd. Jacquard-harness of a weaving machine. 4,057,084, Cl. 139-59.000.
Muhlhoff, Heinz: *See—*
Volker, Martin; and Muhlhoff, Heinz, 4,057,228, Cl. 366-79.000.
Muller, Eckart; Simo, Thomas; Markwort, Helmut; and Scholz, Berthold, to Metallgesellschaft Aktiengesellschaft. Process and apparatus for directly contacting two counterflowing immiscible liquid phases. 4,057,224, Cl. 366-336.000.
Muller, Hans. Filter apparatus and filter element therefor. 4,057,501, Cl. 210-331.000.
Muller, Hans Rudolf, to Sundstrand Data Control, Inc. Low altitude head up display for aircraft. 4,057,782, Cl. 340-27.0AT.
Muller, Johannes Cornelius Antonius: *See—*
Ong, Daniel; and Muller, Johannes Cornelius Antonius, 4,057,331, Cl. 350-285.000.
Muller, Marcel: *See—*
Furst, Andor; Gutzwiller, Jurg; Muller, Marcel; Wiechert, Rudolf; Eder, Ulrich; and Neef, Gunter, 4,057,561, Cl. 260-345.90S.
Muller, Rudolf: *See—*
Weber, Alfred; Muller, Rudolf; and Kurzidim, Johannes, 4,057,541, Cl. 260-239.55A.
Mulvey, Dennis M.: *See—*
Shen, Tsung-Ying; Jones, Howard; Mulvey, Dennis M.; and Dorn, Conrad P., 4,057,637, Cl. 424-263.000.
Mumford, George V.: *See—*
Fillmore, William E.; Garver, Wayne E.; Mumford, George V.; and Price, James H., 4,057,159, Cl. 215-222.000.
Mundlos, Eberhard: *See—*
Bachmann, Wilfried; Gnabs, Christian; Janecka, Kurt; Mundlos, Eberhard; Papenfuhs, Theodor; and Waese, Gerhard, 4,057,576, Cl. 260-525.000.
Munsey, Clarence Jennings, to Robot Research, Inc. Slow scan television scan converter. 4,057,836, Cl. 358-140.000.
Murali, Beegamudre N.: *See—*
Reid, Karl N., Jr.; Ross, James Burr; and Murali, Beegamudre N., 4,057,059, Cl. 128-145.800.
Muranaka, Masakazu; and Kato, Saburo, to Ricoh Co., Ltd. Apparatus for detachably mounting a record sheet in place in a sheet type recorder/player. 4,057,256, Cl. 274-9.00C.
Muschelknautz, Edgar; Burkholz, Armin; Wieschen, Hermann; Guth, Hans; and Richter, Wolfgang, to Bayer Aktiengesellschaft. Separator, especially for chimneys. 4,057,075, Cl. 137-171.000.
Musso, Augusto: *See—*
Bruno, Roberto; Memmi, Massimo; Berardi, Paolo; and Musso, Augusto, 4,057,424, Cl. 75-178.00A.
Naarden International, N.V.: *See—*
Boelens, Harmannus; and Wobben, Hendrik Jacob, 4,057,516, Cl. 252-522.000.
Nabisco, Inc.: *See—*
Albrecht, Robert J.; and Fraunberger, Martin J., 4,057,078, Cl. 137-625.200.
Nabucet, Georges Joseph Marie; and Champ, Michel Andre. Pyrotechnic cutter apparatus. 4,057,026, Cl. 114-221.00A.
Nachtrieb, Paul W. Pump structure. 4,057,375, Cl. 418-189.000.
Nachtsheim, Dieter: *See—*
Merz, Walter; and Nachtsheim, Dieter, 4,057,583, Cl. 260-593.00R.
Nagasawa, Michitaro: *See—*
Nishikawa, Daikichiro; Imada, Yukio; Kinoshita, Masayuki; Takahashi, Katsuhiko; Machida, Hajime; and Nagasawa, Michitaro, 4,057,469, Cl. 195-51.00G.
Nagashima, Kunio: *See—*
Goto, Hirokazu; and Nagashima, Kunio, 4,057,691, Cl. 179-18.0GF.
Nahas, Nicholas C.: *See—*
Vadovic, Charles J.; Wesselhoft, Robert D.; and Nahas, Nicholas C., 4,057,512, Cl. 252-413.000.
Nakagawa, Yasuichi; Ikenishi, Masataka; Hozumi, Yoshio; Kushida, Shozo; and Tsukutani, Koichi, to Kabushiki Kaisha Daini Seikosha. Switching mechanism of a timepiece. 4,057,698, Cl. 200-16.00A.
Nakagawa, Yunosuke; Majima, Kanji; and Miyamoto, Sigeyuki, to Kao Soap Co., Ltd. Liquid cleaning and bleaching composition. 4,057,505, Cl. 252-96.000.
Nakagome, Yukio; Teramura, Hiroichi; Fukata, Yasuo; and Yamasaki, Yasuhiro, to Kokusai Denshin Denwa Kabushiki Kaisha. Signal compression system for binary digital signals. 4,057,834, Cl. 358-133.000.
Nakamoto, Soichi; Ito, Tadashi; Ito, Fumio; and Shinoda, Nobuhiko, to Canon Kabushiki Kaisha. Exposure control circuit. 4,057,809, Cl. 354-23.00D.
Nakamura, Koyo; and Sanbuichi, Hiroshi, to Nissan Motor Co., Ltd. Control system for promoting catalytic removal of noxious compo-

nents from exhaust gas of internal combustion engine. 4,056,932, Cl. 60-276.000.
Nakamura, Norihiko: *See—*
Mizusawa, Shinichiro; Tamura, Chiharu; Nakamura, Norihiko; and Yanagihara, Hiromichi, 4,056,934, Cl. 60-311.000.
Nakano, Masaki: *See—*
Yamamoto, Hajime; Kano, Tsuyoshi; and Nakano, Masaki, 4,057,507, Cl. 252-301.40S.
Nakashima, Katsushi, to Aisin Seiki Kabushiki Kaisha. Fluid level indicator. 4,057,700, Cl. 200-84.00C.
Nakatsuka, Ryuzo; Saito, Kenji; and Kawamoto, Tadashi, to Sumitomo Bakelite Company, Limited. Process for preparing dry, laminating impregnated papers or cloths, and process for producing decorative plates using the same. 4,057,674, Cl. 428-481.000.
Nalco Chemical Company: *See—*
Phillips, Kenneth G.; Ballweber, Edward G.; and Selvarajan, Radhakrishnan, 4,057,580, Cl. 260-567.60P.
Rosenberger, Roy R., 4,057,223, Cl. 366-172.000.
Namiki, Junji, to Nippon Electric Company, Ltd. Device for phase synchronizing a reproduced reference carrier signal with windows specified for preselected ones of amplitude and phase modulated signal points. 4,057,762, Cl. 329-50.000.
Nanthavong, Souli: *See—*
Pigerol, Charles; de Cointet de Fillain, Paul; Nanthavong, Souli; and Le Blay, Jacques, 4,057,530, Cl. 260-45.80N.
Narita, Kazutoyo; Sakaue, Tadashi; and Niino, Yuzi, to Hitachi, Ltd. Semiconductor device with composite metal heat-radiating plate onto which semiconductor element is soldered. 4,057,825, Cl. 357-81.000.
Naruse, Kiyoji; and Ito, Tadashi, to Naruse, Kiyoji. Liquid adhesive composition. 4,057,522, Cl. 260-28.5AS.
Nass, Raymond D.: *See—*
Damico, Frank M.; and Nass, Raymond D., 4,057,240, Cl. 269-325.000.
National Gypsum Company: *See—*
Dawdy, Jack A., 4,056,904, Cl. 52-127.000.
Johnson, Robert M.; Winkowski, Daniel A.; and Stiling, Rodney A., 4,057,662, Cl. 427-209.000.
Stiling, Rodney A.; Burkard, Edward A.; and Johnson, Robert M., 4,057,443, Cl. 156-43.000.
National Research Development Corporation: *See—*
Ash, Eric Albert; and Dias Soares, Oliverio Delfim, 4,057,319, Cl. 350-96.00C.
Grossfield, Karl, 4,057,794, Cl. 340-311.000.
Hill, Christopher Rowland, 4,057,049, Cl. 128-2.00V.
National Steel Corporation: *See—*
Jennings, Larry D.; and Hazen, Wayne W., 4,057,611, Cl. 423-127.000.
Ross, George P.; and Bedortha, James L., 4,057,232, Cl. 266-227.000.
Natkaniec, Benedykt: *See—*
Chrobak, Eryk; Natkaniec, Benedykt; Wasyleczko, Zenon; Stawinski, Antoni; and Roczek, Andrzej, 4,056,929, Cl. 59-85.000.
Naumann, Klaus; Lurssen, Klaus; Sasse, Klaus; Holtschmidt, Ulrich; and Schwarzmann, Gunter, to Bayer Aktiengesellschaft. Methods and compositions for regulating plant growth using piperazine compounds. 4,057,413, Cl. 71-76.000.
Needs, Howard Curtis; and Spapens, Harald Henricus Cornelis Maria, to U.S. Philips Corporation. Television camera comprising a rigid housing. 4,057,837, Cl. 358-254.000.
Neef, Gunter: *See—*
Furst, Andor; Gutzwiller, Jurg; Muller, Marcel; Wiechert, Rudolf; Eder, Ulrich; and Neef, Gunter, 4,057,561, Cl. 260-345.90S.
Nelson, Roger John, to Deere & Company. Tractor with hydraulic draft control. 4,057,109, Cl. 172-7.000.
Nemeth, Joseph Daniel, to Babcock & Wilcox Company, The. Snubber. 4,057,237, Cl. 267-134.000.
Ness, Philip J. Gun rack. 4,057,183, Cl. 224-42.45R.
Netsch, Erich: *See—*
Tratz, Herbert; Kelp, Fritz; and Netsch, Erich, 4,057,103, Cl. 165-11.000.
Neufeldt, Allen Abram. Refuse compacting vehicle. 4,057,154, Cl. 214-82.000.
Neumann, Gerard: *See—*
Canonne, Paul; and Neumann, Gerard, 4,057,716, Cl. 200-153.00H.
New York School of Locksmithing, Inc.: *See—*
Gilliam, Charles David, 4,056,956, Cl. 70-446.000.
Newhart, Raymond H.: *See—*
Metzgar, Don P.; and Newhart, Raymond H., 4,057,626, Cl. 424-89.000.
Newman, James W.; and Zajac, Ronald E., to Windings, Inc. Package of flexible material with oval payout tube. 4,057,203, Cl. 242-163.000.
Niemann, Fred T. Portable water evacuator. 4,057,366, Cl. 417-234.000.
Niino, Yuzi: *See—*
Narita, Kazutoyo; Sakaue, Tadashi; and Niino, Yuzi, 4,057,825, Cl. 357-81.000.
Nippon Electric Company, Ltd.: *See—*
Goto, Hirokazu; and Nagashima, Kunio, 4,057,691, Cl. 179-18.0GF.
Namiki, Junji, 4,057,762, Cl. 329-50.000.
Nippon Gakki Seizo Kabushiki Kaisha: *See—*
Yokoyama, Kenji, 4,057,764, Cl. 330-264.000.
Nippon Kogaku K.K.: *See—*
Akasaka, Shigeo; and Tanaka, Hiroaki, 4,057,333, Cl. 352-141.000.
Matui, Sei, 4,057,330, Cl. 350-223.000.
Nippon Soken, Inc.: *See—*
Sakakibara, Yasuyuki; and Kuno, Akira, 4,057,712, Cl. 364-426.200.
Nippon Steel Corporation: *See—*
Tanigaki, Takashi; Tanaka, Yoshikazu; and Koshio, Takeshi, 4,057,706, Cl. 219-146.000.
Nippon Telegraph and Telephone Public Corporation: *See—*
Hattori, Takeshi; and Adachi, Fumiyuki, 4,057,758, Cl. 325-56.000.
Nishida, Masamitsu: *See—*
Kawashima, Syunichiro; Nishida, Masamitsu; Matsuo, Yoshihiro; Ouchi, Hiromu; and Hayakawa, Shigeru, 4,057,324, Cl. 350-150.000.
Nishihara, Akira: *See—*
Kikuchi, Kiyoshi; Okano, Takeo; Terakawa, Yukio; and Nishihara, Akira, 4,057,525, Cl. 260-29.40R.
Nishijima, Koji: *See—*
Sugimoto, Keiichi; Nishijima, Koji; Akimoto, Hiroshi; Hanaoka, Tadashi; and Kakeya, Nobuharu, 4,057,544, Cl. 260-239.100.
Nishikawa, Daikichiro; Imada, Yukio; Kinoshita, Masayuki; Takahashi, Katsuhiko; Machida, Hajime; and Nagasawa, Michitaro, to Mitsubishi Chemical Industries Ltd. Process for the microbiological oxidation of steroids. 4,057,469, Cl. 195-51.00G.
Nishimura, Izuhiko, to Kabushiki Kaisha Suwa Seikosha. Electronic circuit for eliminating chatter. 4,057,738, Cl. 307-247.00A.
Nissan Motor Co., Ltd.: *See—*
Aono, Shigeo, 4,057,042, Cl. 123-119.0EC.
Arima, Tatsuhiro, 4,057,290, Cl. 297-389.000.
Harada, Tetsuya, 4,057,043, Cl. 123-119.00A.
Hata, Yoshitaka, 4,056,931, Cl. 60-274.000.
Nakamura, Koyo; and Sanbuichi, Hiroshi, 4,056,932, Cl. 60-276.000.
Nissen, Richard Bent. Glued corner-joints. 4,057,356, Cl. 403-219.000.
Nitron Corporation/McDonnell-Douglas Corporation: *See—*
Patel, Pramodbhai D., 4,057,821, Cl. 357-23.000.
Noda, Soji: *See—*
Hoshikawa, Katuyuki; Noda, Soji; and Kimura, Akitaka, 4,057,090, Cl. 152-347.000.
Nohira, Hidetaka; and Kobashi, Kiyoshi, to Toyota Jidosha Kogyo Kabushiki Kaisha. Exhaust gas purifier in an internal combustion engine. 4,056,933, Cl. 60-278.000.
Nolan, Edward J.: *See—*
Ellingham, Walter; and Nolan, Edward J., 4,057,346, Cl. 355-41.000.
Norbeck, Dean K.: *See—*
Bauman, Bruce K.; Norbeck, Dean K.; and Tollinger, Donald L., 4,057,842, Cl. 361-93.000.
Nordberg, Krister: *See—*
Varis, Martti; and Nordberg, Krister, 4,057,076, Cl. 137-413.000.
Nordischer Maschinenbau Rud. Baader: *See—*
Wenzel, Werner, 4,056,866, Cl. 17-57.000.
Nordmark-Werke GmbH Hamburg: *See—*
Gutsche, Klaus; Kohlmann, Friedrich-Wilhelm; and Scharwachter, Peter, 4,057,545, Cl. 542-428.000.
Northern Telecom Limited: *See—*
DeBortoli, George; and Zimmermann, Detlef, 4,057,692, Cl. 179-98.000.
Norwalk-Turbo Inc.: *See—*
Pilarczyk, Karol, 4,057,371, Cl. 417-409.000.
Novanex Automation N. V.: *See—*
Laupman, Robert Ronald, 4,057,767, Cl. 330-207.00P.
Numata, Shigeaki; and Sasaoka, Ryosuke, to Matsushita Electric Industrial Co., Ltd. Electric blower assembly. 4,057,370, Cl. 417-366.000.
Nutron Corporation: *See—*
Denker, James M., 4,057,007, Cl. 91-501.000.
N.V. Chemische Fabriek "Naarden": *See—*
Boelens, Harmannus; Maessen, Jan Theodor Marie Francois; and van der Linde, Leendert Maarten, 4,057,515, Cl. 252-522.000.
N.V. Machinefabriek Terlet: *See—*
de Mos, Jacob Mink; and Koek, Pieter, 4,057,226, Cl. 366-244.000.
O'Brien, Catherine H., executrix: *See—*
O'Brien, Gerard J., deceased; and O'Brien, Catherine H., executrix, 4,057,688, Cl. 179-1.00H.
O'Brien, Gerard J., deceased; and by O'Brien, Catherine H., executrix. Intercom embodying tap transducers. 4,057,688, Cl. 179-1.00H.
Obuchi, Akio, to Pioneer Electronic Corporation. Speaker diaphragm having flat response curve. 4,057,694, Cl. 179-115.50R.
Oda, Kenji: *See—*
Ubukata, Susumu; Iyoda, Shozo; and Oda, Kenji, 4,057,200, Cl. 242-107.40A.
O'Donnell, James M., to Orgonics, Inc. Apparatus for treating sewage sludge. 4,057,392, Cl. 23-259.100.
Officine Meccaniche Danieli: *See—*
Danieli, Luigi, 4,057,099, Cl. 164-260.000.
"OFU" Ofenbau-Union GmbH: *See—*
Spessert, Robert, 4,057,233, Cl. 266-252.000.
Ogasa, Katsuhiro: *See—*
Okada, Katsuto; Ogasa, Katsuhiro; and Tomita, Mamoru, 4,057,655, Cl. 426-583.000.
Ogawa, Akira: *See—*
Sato, Akira; Ogawa, Akira; Hinata, Masanao; and Takei, Haruo, 4,057,430, Cl. 96-100.00R.
Ohmura, Takayoshi: *See—*
Habu, Teiji; Wada, Tsuneo; Sasaki, Takashi; Itoh, Shigemasa; Ohmura, Takayoshi; Ishii, Hiroki; and Yamaguchi, Hisashi, 4,057,538, Cl. 260-117.000.
Ohno, Ietatsu. Grinding method. 4,057,191, Cl. 241-30.000.
Ohno, Toru, to Hitachi, Ltd. Telecommunication system with controlled gain active filters. 4,057,695, Cl. 179-170.00R.

Ohnuma, Kiyoshi: *See—*
- Kubo, Seitoku; Kuramochi, Kojiro; Morisawa, Kunio; and Ohnuma, Kiyoshi, 4,056,988, Cl. 74-695.000.

Ohsaka, Yonosuke: *See—*
- Touzuka, Takashi; and Ohsaka, Yonosuke, 4,057,584, Cl. 260-593.00H.

Oka, Hiroyuki; and Ishihara, Masashi, to Toyota Jidosha Kogyo Kabushiki Kaisha. Brake control valve assembly for effecting increased rear braking action upon malfunction of the front system. 4,057,296, Cl. 303-6.00C.

Okabe, Akio: *See—*
- Kinoshita, Mototaka; Okabe, Akio; and Ando, Susumu, 4,057,495, Cl. 210-44.000.

Okada, Humio: *See—*
- Takamizawa, Minoru; Okada, Humio; Hasebe, Nobuyuki; and Toida, Hiromi, 4,057,596, Cl. 260-825.000.

Okada, Katsuto; Ogasa, Katsuhiro; and Tomita, Mamoru, to Morinaga Milk Industry Co., Ltd. Process for preparing a lactulose-containing powder for feed. 4,057,655, Cl. 426-583.000.

Okano, Takeo: *See—*
- Kikuchi, Kiyoshi; Okano, Takeo; Terakawa, Yukio; and Nishihara, Akira, 4,057,525, Cl. 260-29.40R.

Okazima, Kenzo: *See—*
- Suzuki, Kensei; Sanada, Takashi; and Okazima, Kenzo, 4,057,264, Cl. 280-276.000.

Oklahoma State University: *See—*
- Reid, Karl N., Jr.; Ross, James Burr; and Murali, Beegamudre N., 4,057,059, Cl. 128-145.800.

Okuda, Kazumi. Diamond bearing microscopic certificate of appraisal. 4,056,952, Cl. 63-32.000.

Okuma Machinery Works Ltd.: *See—*
- Ishida, Takashi, 4,056,900, Cl. 51-33.00W.

Olander, Harvey F., to Gustafson Mfg. Co. Apparatus for dispensing golf balls. 4,057,172, Cl. 221-10.000.

Oldenburg, Dorrance, to Caterpillar Tractor Co. Corrugated blade for tree harvester. 4,057,087, Cl. 144-34.00E.

Olin Corporation: *See—*
- Evrard, Thomas O., 4,057,639, Cl. 424-270.000.
- Gay, Walter A., 4,057,590, Cl. 260-646.000.

Olinkraft, Inc.: *See—*
- Bamburg, Robert A.; Duncan, Farris N.; and Floyd, Roger M., 4,056,913, Cl. 53-27.000.

Olympus Optical Co., Ltd.: *See—*
- Matsubara, Masaki, 4,057,328, Cl. 350-214.000.

Ondrups, Leons: *See—*
- Basil, Richard V., Jr.; Ondrups, Leons; and Shimizu, James K., 4,057,772, Cl. 333-83.00T.

Ong, Daniel; and Muller, Johannes Cornelius Antonius, to U.S. Philips Corporation. Electro-magnetically controllable beam deflection device. 4,057,331, Cl. 350-285.000.

Ono, Nobutaka, to Osaka Bobbin Kabushiki Kaisha. Method of dyeing wound up yarn. 4,056,860, Cl. 8-155.100.

Ono, Tetsuhiro; Aramaki, Minoru; Mizuno, Tamotsu; and Fujinaga, Masao, to Central Glass Company, Limited. Process for producing sodium fluoride from sodium silicofluoride. 4,057,614, Cl. 423-490.000.

Onufer, Joseph R.: *See—*
- Furniss, William E.; Vancsa, George I.; and Onufer, Joseph R., 4,057,785, Cl. 340-163.000.

O'Rear, Jacques G.: *See—*
- Griffith, James R.; and O'Rear, Jacques G., 4,057,569, Cl. 260-465.00E.

Orgonics, Inc.: *See—*
- O'Donnell, James M., 4,057,392, Cl. 23-259.100.

Orth, Dieter: *See—*
- Gante, Joachim; Kurmeier, Hans-Adolf; Orth, Dieter; Schacht, Erich; and Wild, Albrecht, 4,057,647, Cl. 424-340.000.

Ortho Pharmaceutical Corporation: *See—*
- Levine, Seymour; and Kane, Vinayak V., 4,057,547, Cl. 544-184.000.

Orton, Roger W. Portable flour mill. 4,057,194, Cl. 241-248.000.

Osaka Bobbin Kabushiki Kaisha: *See—*
- Ono, Nobutaka, 4,056,860, Cl. 8-155.100.

Oscar Mayer & Co. Inc.: *See—*
- Borsuk, Alvin; and Johnson, Charles H., 4,057,653, Cl. 426-513.000.

Otake, Tsutomu, to Kabushiki Kaisha Suwa Seikosha. Electro-chromic display driving circuit. 4,057,739, Cl. 307-270.000.

Otto Stuber KG: *See—*
- Stuber, Wolfgang, 4,056,926, Cl. 57-81.000.

Ouchi, Hiromu: *See—*
- Kawashima, Syunichiro; Nishida, Masamitsu; Matsuo, Yoshihiro; Ouchi, Hiromu; and Hayakawa, Shigeru, 4,057,324, Cl. 350-150.000.

Outhwaite, William C.: *See—*
- Pashley, David H.; and Outhwaite, William C., 4,057,621, Cl. 424-49.000.

Overlach, Knud: *See—*
- Pietzsch, Ludwig; Huhne, Gerd; Overlach, Knud; and Fuchs, Peter, 4,057,792, Cl. 340-267.00C.

Owen, Alan Ernest; and Mavor, John. Semiconductor device. 4,057,819, Cl. 357-23.000.

Owen, Hartley: *See—*
- Gross, Benjamin; and Owen, Hartley, 4,057,397, Cl. 23-288.00B.

Owens-Corning Fiberglas Corporation: *See—*
- Jones, Bernard H.; Cox, Daniel; and Gallagher, Don R., 4,057,195, Cl. 242-18.00G.

Owens-Illinois, Inc.: *See—*
- Fillmore, William E.; Garver, Wayne E.; Mumford, George V.; and Price, James H., 4,057,159, Cl. 215-222.000.
- Uhlig, Albert R., 4,057,609, Cl. 264-89.000.

Oy Finnlines Ltd.: *See—*
- Pykala, Timo, 4,057,279, Cl. 294-93.000.

Ozaki, Toshihiko: *See—*
- Hatori, Kunitake; Ozaki, Toshihiko; and Kondo, Ryohei, 4,057,171, Cl. 221-6.000.

Ozawa, Masahiro; Inoue, Fumio; Komatsu, Tadaaki; and Matsuoka, Kimiaki, to Central Glass Company, Limited. Process for preparing oligomers of tetrafluoroethylene. 4,057,591, Cl. 260-653.10R.

P. R. Mallory & Co. Inc.: *See—*
- Dey, Arabinda N., 4,057,679, Cl. 429-194.000.

Paap, Hans J.; and Arnold, Dan M., to Texaco Inc. Behind casing fluid flow detection in producing wells using gas lift. 4,057,720, Cl. 250-266.000.

Pace, Joseph L., to Lawrence Peska Assoc. Wire stringing device. 4,056,859, Cl. 7-14.10R.

Pako Corporation: *See—*
- Gaskell, Alfred J.; and Charnley, Ralph L., 4,057,818, Cl. 354-298.000.

Palka, Mike F. Outboard motor propeller guard. 4,057,028, Cl. 115-42.000.

Pammer, Erich; and Schnell, Friedrich, to Siemens Aktiengesellschaft. Semiconductor device and a method of producing such device. 4,057,659, Cl. 427-89.000.

Panning, Henry F.: *See—*
- Creekmore, Mark D.; and Panning, Henry F., 4,057,672, Cl. 428-220.000.

Papenfuhs, Theodor: *See—*
- Bachmann, Wilfried; Gnabs, Christian; Janecka, Kurt; Mundlos, Eberhard; Papenfuhs, Theodor; and Waese, Gerhard, 4,057,576, Cl. 260-525.000.

Park, Glenn S.; and Herpich, William A., to Peabody International Corporation. Load compacting and ejecting mechanism for a refuse truck. 4,057,157, Cl. 214-302.000.

Partsch, Ernest W. Absorption refrigerator. 4,056,947, Cl. 62-148.000.

Pashley, David H.; and Outhwaite, William C. Desensitizing oxalate dental composition and method of treatment. 4,057,621, Cl. 424-49.000.

Pasternak, Rudolf: *See—*
- Kaimann, Walter; Pasternak, Rudolf; and Bauer, Jochen, 4,057,400, Cl. 48-77.000.

Patel, Jitendra G.; Schora, Frank C.; and Loeding, John W., to Institute of Gas Technology. Coal pretreatment and gasification process. 4,057,402, Cl. 48-197.00R.

Patel, Pramodbhai D., to Nitron Corporation/McDonnell-Douglas Corporation. Non-volatile semiconductor memory device. 4,057,821, Cl. 357-23.000.

Pattantyus-Abraham, Tamas I.; Vercellotti, Leonard C.; and South, William H., to Westinghouse Electric Corporation. Apparatus to measure the eccentricity of a shaft. 4,057,754, Cl. 324-207.000.

Pattyn, Herman Alberik: *See—*
- De brabandere, Luc Achiel; Pollet, Robert Joseph; Pattyn, Herman Alberik; and Borginon, Hendrik Alfons, 4,057,429, Cl. 96-94.00R.

Paul, Alfred N.: *See—*
- Fleming, George William; and Paul, Alfred N., 4,057,790, Cl. 340-224.000.

Paul, William Francis: *See—*
- Kenigsberg, Irwin Jeffrey; and Paul, William Francis, 4,057,363, Cl. 416-145.000.

Paule, Kurt; Roll, Karl; and Burklin, Max, to Robert Bosch GmbH. Pneumatically powered hand tool with speed-control governor. 4,057,113, Cl. 173-12.000.

Payne, Joe R., to Keyes Fibre Company. Dual tongue and slot container lock. 4,057,169, Cl. 220-306.000.

Payton, Hugh W. Walking cast. 4,057,056, Cl. 128-83.500.

Peabody International Corporation: *See—*
- Park, Glenn S.; and Herpich, William A., 4,057,157, Cl. 214-302.000.

Peake, Stephen Luther: *See—*
- Montagna, Angelo Anthony; Somers, Allen Evarts; Peake, Stephen Luther; and Chun, Sun Woong, 4,057,488, Cl. 208-89.000.

Pearce, John Scott: *See—*
- Pearce, Mary Ellen; and Pearce, John Scott, 4,056,897, Cl. 47-39.000.

Pearce, Mary Ellen; and Pearce, John Scott. Planter design and construction. 4,056,897, Cl. 47-39.000.

Peck, Walter R.: *See—*
- Duncan, James W.; and Peck, Walter R., 4,057,206, Cl. 244-147.000.

Pelton, Raymond Lionel. Ball game with x-framed backstop. 4,057,252, Cl. 273-101.000.

Penick, Ib. Pocket sized camera. 4,057,813, Cl. 354-144.000.

Pennwalt Corporation: *See—*
- Atkiss, Thomas Clifford; and Keen, William Elgin, Jr., 4,057,440, Cl. 148-6.15Z.
- Graver, Clair Warren; Carwheel, Clarence Edward; and Bunczk, Charles Joseph, 4,057,503, Cl. 252-8.700.

Perrotta, Anthony J.: *See—*
- Innes, Robert A.; and Perrotta, Anthony J., 4,057,570, Cl. 260-465.300.

Perry, Robert H.; and Miller, Howard N., to Westinghouse Electric Corporation. Train vehicle control apparatus. 4,057,753, Cl. 318-376.000.

Pesante, Domingo F. Collet stop and chuck assembly. 4,057,259, Cl. 279-1.00S.

Peschmann, Kristian; Junginger, Hans-Georg; and Hirsch, Hans-Jurgen, to U.S. Philips Corporation. X-ray exposure device comprising a gas-filled chamber. 4,057,728, Cl. 250-374.000.

Petersen, Hans Jorgen, to Leo Pharmaceutical Products Ltd. A/S. Antihypertensive pyridylguanidine compounds. 4,057,636, Cl. 424-263.000.

Petrolite Corporation: *See—*
- Quinlan, Patrick M., 4,057,390, Cl. 21-2.70R.
- Redmore, Derek; and Welge, Frederick T., 4,057,554, Cl. 260-296.00D.
- Winslow, Joseph D., Jr., 4,056,968, Cl. 73-19.000.

Pews, R. Garth: *See—*
- Mixan, Craig E.; Goralski, Christian T.; and Pews, R. Garth, 4,057,517, Cl. 260-22.00R.

Pfau, Jean, to Ateliers des Charmilles S.A. Method of machining by erosive electrical discharges. 4,057,703, Cl. 219-69.00C.

Pfeifer, Josef: *See—*
- Wick, Richard; Pfeifer, Josef; and Schnall, Gunther, 4,057,344, Cl. 355-16.000.

PFP-Anstalt Fuer Produkt-Entwicklung und Verwertung: *See—*
- Fleischmann, Horst, 4,057,147, Cl. 211-47.000.

Pfuntner, Richard A.: *See—*
- Hildebrand, George Lee; Sleeper, Thomas Till; Healey William Allen; Hall, Stuart Jeffery; and Pfuntner, Richard A., 4,056,976, Cl. 73-231.00M.

Phillips, Kenneth G.; Ballweber, Edward G.; and Selvarajan, Radhakrishnan, to Nalco Chemical Company. Production of water-soluble polyamine condensate polymers having greater linear characteristics. 4,057,580, Cl. 260-567.60P.

Phillips Petroleum Company: *See—*
- Moczygemba, George A., 4,057,601, Cl. 260-880.00B.
- Seefluth, Charles L., 4,057,386, Cl. 425-526.000.

Pierce, Bill L.: *See—*
- Thompson, Robert E.; and Pierce, Bill L., 4,057,465, Cl. 176-38.000.

Pierson, Joseph E.; and Stookey, Stanley D., to Corning Glass Works. Method for making photosensitive colored glasses. 4,057,408, Cl. 65-18.000.

Piesche, Helfried, to Bodenseewerk Perkin-Elmer & Co., GmbH. Thermal conductivity detector circuit. 4,057,755, Cl. 324-62.000.

Pietzsch, Ludwig; Huhne, Gerd; Overlach, Knud; and Fuchs, Peter, to Pietzsch, Ludwig. Overload safety device for telescopic cranes. 4,057,792, Cl. 340-267.00C.

Pigerol, Charles; de Cointet de Fillain, Paul; Nanthavong, Souli; and Le Blay, Jacques, to Labaz. 2-Phenyl-indole derivatives and process for preparing the same. 4,057,530, Cl. 260-45.80N.

Pigerol, Charles; Eymard, Pierre; Vernieres, Jean-Claude; Werbenec, Jean-Pierre; and Broll, Madeleine, to Labaz. Active derivatives of methylamine in therapeutic compositions and methods of use. 4,057,644, Cl. 424-325.000.

Piguet, Christian, to Lasag S.A. Logic circuit for bistable D-dynamic flip-flops. 4,057,741, Cl. 307-279.000.

Pilarczyk, Karol, to Norwalk-Turbo Inc. Gas turbine driven high speed centrifugal compressor unit. 4,057,371, Cl. 417-409.000.

Pincherle, Hugh Andrew: *See—*
- Holt, Ian; and Pincherle, Hugh Andrew, 4,056,881, Cl. 29-592.00R.

Ping, Ernest L.: *See—*
- Jones, Richard F.; and Ping, Ernest L., 4,057,251, Cl. 273-95.00R.

Pinto, Adolf P. Engine having alternately rotating orbital pistons and cylinders. 4,057,039, Cl. 123-43.00B.

Pioneer Electronic Corporation: *See—*
- Obuchi, Akio, 4,057,694, Cl. 179-115.50R.

Piotrowski, Eugene Gregory, to Worth Company, The. Anchor davit. 4,057,025, Cl. 114-210.000.

Piquard, Jean-Francois: *See—*
- Dorffer, Auguste; and Piquard, Jean-Francois, 4,057,069, Cl. 128-421.000.

Pistorius, Rudolf, to Hoechst Aktiengesellschaft. Process for the manufacture of hydroquinone dimethyl ethers. 4,057,586, Cl. 260-613.00D.

Pkhakadze, Georgy Alexandrovich: *See—*
- Lipatova, Tatyana Esperovna; Veselovsky, Roman Alexandrovich; and Pkhakadze, Georgy Alexandrovich, 4,057,535, Cl. 260-77.5AC.

Plastic Research Products, Inc.: *See—*
- Horvath, William, 4,057,176, Cl. 222-193.000.

Platonov, Boris Pavlovich; Ryzhikov, Anton Abramovich; and Platonov, Jury Borisovich. Method of producing thin-walled castings. 4,057,098, Cl. 164-125.000.

Platonov, Jury Borisovich: *See—*
- Platonov, Boris Pavlovich; Ryzhikov, Anton Abramovich; and Platonov, Jury Borisovich, 4,057,098, Cl. 164-125.000.

Plehnert, Kurt: *See—*
- Mitterhummer, Gerhard; and Plehnert, Kurt, 4,057,459, Cl. 156-630.000.

PMS Consolidated: *See—*
- Bradbury, William B.; Watts, Robert H.; and Scott, E. Timm, 4,057,193, Cl. 241-281.000.

Poirier, Robert A.: *See—*
- Boretos, John W.; and Poirier, Robert A., 4,056,854, Cl. 3-1.500.

Polad, Michael: *See—*
- Tramposch, Herbert; and Polad, Michael, 4,057,011, Cl. 101-93.030.

Polaroid Corporation: *See—*
- Harrison, George C., 4,057,811, Cl. 354-33.000.
- Johnson, Bruce K., 4,057,815, Cl. 354-288.000.
- Killian, John C., Jr.; and Morse, John B., 4,057,816, Cl. 354-293.000.
- Lambert, Ronald F.; and Rogers, Howard G., 4,057,425, Cl. 96-3.000.

Polizzano, Ida. Test clip. 4,057,313, Cl. 339-33.000.

Pollet, Robert Joseph: *See—*
- De brabandere, Luc Achiel; Pollet, Robert Joseph; Pattyn, Herman Alberik; and Borginon, Hendrik Alfons, 4,057,429, Cl. 96-94.00R.

Poponiak, Michael Robert: *See—*
- Burkhardt, Paul Johannes; and Poponiak, Michael Robert, 4,057,823, Cl. 357-52.000.

PPG Industries, Inc.: *See—*
- Cunningham, Hugh; and Raetzsch, Carl W., 4,057,473, Cl. 204-98.000.
- Michalik, Edmund R., 4,057,184, Cl. 225-2.000.
- Reese, Thomas J., 4,057,411, Cl. 65-114.000.
- Shoop, George W., 4,057,671, Cl. 428-208.000.

Prais, Alois G.: *See—*
- Kaufman, Joseph; and Prais, Alois G., 4,057,052, Cl. 128-2.00F.

Preston, John M., to General Electric Company. Process for treating hydrophobic surfaces. 4,057,663, Cl. 427-307.000.

Prevorsek, Dusan C.; Kwon, Young D.; and Sharma, Raj K., to Allied Chemical Corporation. Testing viscoelastic solids. 4,056,973, Cl. 73-91.000.

Price, James H.: *See—*
- Fillmore, William E.; Garver, Wayne E.; Mumford, George V.; and Price, James H., 4,057,159, Cl. 215-222.000.

Pritscher, Karl: *See—*
- Lechner, Gunther; Pritscher, Karl; and Kirschner, Helmut, 4,057,142, Cl. 206-332.000.

Procor Limited: *See—*
- Deeks, Ronald George, 4,057,155, Cl. 214-83.280.

Procter & Gamble Company, The: *See—*
- Lawrence, Benjamin, 4,057,652, Cl. 426-388.000.

Proebstle, Richard Alan: *See—*
- Thompson, John Robert; Rowland, Trevor Cartwright; Proebstle, Richard Alan; Rosicky, Edward; and Snyder, Thoma Mees van't Hoff, 4,057,466, Cl. 176-38.000.

Prontor-Werk Alfred Gauthier GmbH: *See—*
- Rentschler, Waldemar T.; Starp, Franz W. R.; and Helber, Karl, 4,057,812, Cl. 354-51.000.

Prot, Marcel G., to Mead Corporation, The. Method for manufacture of containers, particularly for packing purposes. 4,057,444, Cl. 156-69.000.

Prugnaud, Robert Louis, to Laboratoire Theranol. Therapeutic composition with marked polydetoxifying properties, especially with regard to tobacco. 4,057,620, Cl. 424-35.000.

Puddington, Ira E.: *See—*
- Meadus, F. Weldon; Sparks, Bryan D.; Puddington, Ira E.; and Farnand, J. Redmond, 4,057,486, Cl. 208-11.0LE.

Pullman Incorporated: *See—*
- Carr, George W., 4,057,273, Cl. 292-218.000.
- Halliar, William R.; and Stark, Marvin, 4,057,020, Cl. 105-377.000.

Pusch, Gunter; and Gedenk, Rudolf, to Deutsche Texaco Aktiengesellschaft. Method of initiating underground in-situ combustion. 4,057,107, Cl. 166-260.000.

Pykala, Timo, to Oy Finnlines Ltd. Center lifting device. 4,057,279, Cl. 294-93.000.

Quantz, Reginald L. Convertible backpack and cot construction. 4,056,857, Cl. 5-112.000.

Quinlan, Patrick M., to Petrolite Corporation. Sulfur-containing bisquaternaries. 4,057,390, Cl. 21-2.70R.

R. A. Jones & Co. Inc.: *See—*
- Hughes, Charles C., 4,057,008, Cl. 93-53.0BF.

Radt, Walter: *See—*
- Bohnsack, Gerhard; Geffers, Hans; Kallfass, Herbert; and Radt, Walter, 4,057,511, Cl. 252-389.00A.

Raether, Wolfgang: *See—*
- Winkelmann, Erhardt; Sinharay, Akhileswer; and Raether, Wolfgang, 4,057,634, Cl. 424-250.000.

Raetzsch, Carl W.: *See—*
- Cunningham, Hugh; and Raetzsch, Carl W., 4,057,473, Cl. 204-98.000.

Rainville Company, Inc.: *See—*
- Wunderlich, Ernst Dieter, 4,057,378, Cl. 425-137.000.

Rampton, Roger H. Tonal pitch indicator for a kettledrum. 4,056,998, Cl. 84-419.000.

Ramsey, Arthur Albert, to FMC Corporation. Nitroisothiazolylureas as herbicides. 4,057,415, Cl. 71-90.000.

Rank Organisation Limited, The: *See—*
- Holt, Ian; and Pincherle, Hugh Andrew, 4,056,881, Cl. 29-592.00R.

Rao, Bhaskara M. L., to Exxon Research & Engineering Co. Method of preparing lithium-aluminum alloy electrodes. 4,056,885, Cl. 29-623.100.

Rao, Bhaskara M. L.; and Malachesky, Paul A., to Exxon Research & Engineering Co. Cell containing carbon-fluorine compound cathode, alkali metal anode and solid halo-aluminum alkali metal compound electrolyte. 4,057,676, Cl. 429-50.000.

Rasquin, Werner, to Felten & Guilleaume Carlswerk AG. Very-high-power-transmission cable system. 4,057,737, Cl. 307-147.000.

Rau, Allen E. Paper money crimping apparatus. 4,057,242, Cl. 271-3.000.

Rauma-Repola Oy: *See—*
- Elonen, Kunto, 4,057,286, Cl. 296-43.000.
- Kokkila, Kalevi, 4,057,213, Cl. 248-385.000.

Rauner, Lawrence A.; and Colquhoun, Joseph A., to Dow Corning Corporation. Method of modifying the physical properties of urethane elastomers. 4,057,595, Cl. 260-824.00R.

Rayburn, Billy R., to Rayburn, Billy R.; Mu, Paul T.; and Hayes, Alfred F. Sequential switching device. 4,056,891, Cl. 34-55.000.
Raymond Lee Organization Inc., The: *See—*
Girres, Gerard E., 4,057,254, Cl. 273-134.0CH.
Raytheon Company: *See—*
Collins, John D., 4,057,786, Cl. 365-76.000.
Sage, Jay P., 4,057,788, Cl. 365-174.000.
RCA Corporation: *See—*
Baker, Alfred Lynn, 4,057,826, Cl. 358-4.000.
Harbert, Donald Duane; and Ferrie, Ronald Gilbert, 4,057,761, Cl. 328-154.000.
Knop, Karl, 4,057,326, Cl. 350-162.00R.
Limberg, Allen LeRoy, 4,057,743, Cl. 307-296.00R.
Wheatley, Carl Franklin, Jr., 4,057,763, Cl. 330-288.000.
Woods, Murray Henderson, 4,057,824, Cl. 357-56.000.
Rediffusion Reditronics Limited: *See—*
Woolf, Lawrence Dudley, 4,057,769, Cl. 331-49.000.
Redmore, Derek; and Welge, Frederick T., to Petrolite Corporation. Quaternary ammonium salts of polyepihalohydrin. 4,057,554, Cl. 260-296.00D.
Reedhead, Frederick W.; Reedhead, Rowland E.; and Reynolds, George W. Tennis racket. 4,057,249, Cl. 273-73.00E.
Reedhead, Rowland E.: *See—*
Reedhead, Frederick W.; Reedhead, Rowland E.; and Reynolds, George W., 4,057,249, Cl. 273-73.00E.
Reese, Thomas J., to PPG Industries, Inc. Heat treating glass sheets on a roller hearth conveyor. 4,057,411, Cl. 65-114.000.
Regency Electronics, Inc.: *See—*
Koch, Richard C., 4,057,760, Cl. 325-455.000.
Regie Nationale des Usines Renault: *See—*
Colinet, Andre, 4,057,271, Cl. 292-87.000.
Reich, Steven Anthony, to Deere & Company. Hydraulic aneroid control and fluid flow restricting device for use therewith. 4,057,044, Cl. 123-140.0MP.
Reichel, Kurt; Decker, Gerd; Kuck, Alfred; and Schulz, Erwin, to Volkswagenwerk Aktiengesellschaft. Spark-ignited internal combustion engine operated with charge stratification. 4,057,037, Cl. 123-32.0SP.
Reichel, Kurt; Decker, Gerd; Kuck, Hans-Alfred; and Brandstetter, Walter, to Volkswagenwerk Aktiengesellschaft. Auxiliary combustion chamber for a stratified charge internal combustion engine. 4,057,038, Cl. 123-32.0SP.
Reichelt, Achim: *See—*
Mahlein, Hans; and Reichelt, Achim, 4,057,321, Cl. 350-96.0WG.
Reichelt, Karen Emalyn: *See—*
Berger, Julius; Reichelt, Karen Emalyn; and Schuep, Willy, 4,057,553, Cl. 260-295.00A.
Reichl, Alfred: *See—*
Ernst, Alfons; and Reichl, Alfred, 4,057,258, Cl. 277-12.000.
Reid, John; and Stiern, Walter W. Water saver. 4,056,856, Cl. 4-67.00A.
Reid, Karl N., Jr.; Ross, James Burr; and Murali, Beegamudre N., to Oklahoma State University. Intermittent positive pressure breathing device. 4,057,059, Cl. 128-145.800.
Reid, William Vincent. Clay centering device for a potter's wheel. 4,057,384, Cl. 425-459.000.
Reinshagen, Hellmuth: *See—*
Ascher, Gerd; and Reinshagen, Hellmuth, 4,057,557, Cl. 260-306.80R.
Reis, Robert D., to United Electric Controls Company. Density control monitor with opposing bellows. 4,057,699, Cl. 200-83.00D.
Rem Metals Corporation: *See—*
Brown, Robert A., 4,057,433, Cl. 106-38.300.
Renaud, Georges, to Societe Pompes Multiflux. Centrifugal pump. 4,057,361, Cl. 415-53.00R.
Renegar, Charles Gwin; and Colbeck, Frank Edward, to Hasbro Industries, Inc. Apparatus for trimming an extrudate. 4,057,456, Cl. 156-515.000.
Rentschler, Waldemar T.; Starp, Franz W. R.; and Helber, Karl, to Prontor-Werk Alfred Gauthier GmbH. Camera shutter having an electronic timing device. 4,057,812, Cl. 354-51.000.
REPA Feinstanzwerk GmbH: *See—*
Scibbe, Harold R.; and Smith, Edward J., 4,057,199, Cl. 242-107.700.
Resch, Alvin Charles, Jr., to American Hospital Supply Corporation. Gang luck assembly for cabinet drawers. 4,057,306, Cl. 312-218.000.
Reuter, Inc.: *See—*
Thompson, Vern C.; and Riggle, John A., 4,057,156, Cl. 214-302.000.
Reynolds, George W.: *See—*
Reedhead, Frederick W.; Reedhead, Rowland E.; and Reynolds, George W., 4,057,249, Cl. 273-73.00E.
Reynolds, Michael J.: *See—*
Leo, Thomas J.; Loser, Thomas N.; and Reynolds, Michael J., 4,057,529, Cl. 260-42.470.
Rhodes, Donald F., to Gulf Research & Development Company. Electrostatic charge reducer. 4,057,071, Cl. 137-1.000.
Rhone-Poulenc Industries: *See—*
Angleraud, Rene; and Ledru, Pierre, 4,057,518, Cl. 260-2.50N.
Antonini, Albert; Joffre, Philippe; and Laine, Francois, 4,057,592, Cl. 260-659.00A.
Rhone-Poulenc-Textile: *See—*
Fayolle, Bernard, 4,057,597, Cl. 260-860.000.
Rhone-Progil: *See—*
Asscher, Meir; and Rosin, Hadassa, 4,057,578, Cl. 260-543.00P.
Asscher, Meir; and Rosin, Hadassa, 4,057,579, Cl. 260-543.00P.
Richardson-Merrell Inc.: *See—*
Metzgar, Don P.; and Newhart, Raymond H., 4,057,626, Cl. 424-89.000.
Richter Gedeon Vegyeszeti Gyar Rt.: *See—*
Szantay, Csaba; Szabo, Lajos; Kalaus, Gyorgy; Karpati, Egon; and Szporny, Laszlo, 4,057,550, Cl. 260-293.550.
Szantay, Csaba; Szabo, Lajos; Kalaus, Gyorgy; Karpati, Egon; and Szporny, Laszlo, 4,057,551, Cl. 260-293.550.
Richter, Johan C. F.C., to Kamyr Aktiebolag. Method and apparatus for impregnation of fiber material by pressure pulsation. 4,057,461, Cl. 162-19.000.
Richter, Wolfgang: *See—*
Muschelknautz, Edgar; Burkholz, Armin; Wieschen, Hermann; Guth, Hans; and Richter, Wolfgang, 4,057,075, Cl. 137-171.000.
Richtzenhain, Hermann; and Janssen, Paul, deceased (by Janssen, Almuth, heir), to Lummus Company, The. Production of cyanopyridines from piperidines. 4,057,552, Cl. 260-294.900.
Ricoh Co., Ltd.: *See—*
Fujimoto, Sakae, 4,057,243, Cl. 271-256.000.
Muranaka, Masakazu; and Kato, Saburo, 4,057,256, Cl. 274-9.00C.
Riebel, Hans-Jochem: *See—*
Hofer, Wolfgang; Maurer, Fritz; Riebel, Hans-Jochem; Schroder, Rolf; and Eue, Ludwig, 4,057,418, Cl. 71-103.000.
Riggle, John A.: *See—*
Thompson, Vern C.; and Riggle, John A., 4,057,156, Cl. 214-302.000.
Riley, Michael O.: *See—*
Carter, Philip L.; Kim, Yung K.; and Riley, Michael O., 4,057,566, Cl. 260-448.20H.
Riner, Victor: *See—*
Juillard, Yves; and Riner, Victor, 4,057,083, Cl. 139-20.000.
Ring, Curtis Phillip, to Deere & Company. Dual flow hydraulic system and control valve therefor. 4,057,005, Cl. 91-413.000.
Rite Autotronics Corporation: *See—*
Schwartz, Edwin L., 4,057,520, Cl. 200-16.00D.
Rittler, Hermann L., to Corning Glass Works. Opaque infra-red transmitting glass-ceramic articles. 4,057,434, Cl. 106-39.700.
Ritzerfeld, Gerhard. Copying apparatus. 4,057,348, Cl. 355-75.000.
Robert Bosch GmbH: *See—*
Flaschar, Heinz; and Gand, Heinz, 4,057,216, Cl. 251-129.000.
Lammermann, Heinz, 4,056,876, Cl. 29-469.500.
Leisring, Herbert, 4,057,335, Cl. 352-188.000.
Paule, Kurt; Roll, Karl; and Burklin, Max, 4,057,113, Cl. 173-12.000.
Weyl, Helmut; and Steinke, Leo, 4,057,477, Cl. 204-195.00S.
Roberts, John A., to General Electric Company. Pneumatic system for a gas sensor. 4,056,967, Cl. 73-1.00G.
Robertshaw Controls Company: *See—*
Goodhouse, Carl J., 4,056,948, Cl. 62-155.000.
Robertson, Dean S., to Clark Equipment Company. Throttle holding device. 4,057,130, Cl. 192-3.00T.
Robin, Allen M.: *See—*
Crouch, William B.; Fabiero, Carolina P.; and Robin, Allen M., 4,057,510, Cl. 252-372.000.
Robot Research, Inc.: *See—*
Munsey, Clarence Jennings, 4,057,836, Cl. 358-140.000.
Rock, Erich; and Mages, Bernhard, to Julius Blum Gesellschaft mbH. Drawer guide. 4,057,303, Cl. 308-3.600.
Rock, John Denis: *See—*
Garnett, John Lyndon; and Rock, John Denis, 4,057,657, Cl. 427-44.000.
Roczek, Andrzej: *See—*
Chrobak, Eryk; Natkaniec, Benedykt; Wasyleczko, Zenon; Stawinski, Antoni; and Roczek, Andrzej, 4,056,929, Cl. 59-85.000.
Roemer, John F.: *See—*
Heuer, Dale A.; Roemer, John F.; and Sheehan, Michael J., 4,057,787, Cl. 365-104.000.
Roethlisberger, Jerry M., to General Motors Corporation. Front wheel drive and suspension arrangement. 4,057,120, Cl. 180-44.00R.
Rogers and Clarke Manufacturing Co.: *See—*
Clarke, Frederick W., 4,057,149, Cl. 214-1.0BV.
Rogers, Howard G.: *See—*
Lambert, Ronald F.; and Rogers, Howard G., 4,057,425, Cl. 96-3.000.
Rogers, Leslie Richard: *See—*
Davies, Peter Kingsley; Rogers, Leslie Richard; Stansfield, James Frederick; and Topham, Arthur, 4,057,436, Cl. 106-288.00Q.
Roll, Karl: *See—*
Paule, Kurt; Roll, Karl; and Burklin, Max, 4,057,113, Cl. 173-12.000.
Rollins, Eugene C. Exhaust pollution reduction apparatus for internal combustion engine carburetor. 4,057,604, Cl. 261-88.000.
Romagnolo, Gerard: *See—*
Cassard, Jacques; Lachenal, Jean-Michel; and Romagnolo, Gerard, 4,056,873, Cl. 29-132.000.
Roos, Ernst: *See—*
Wagner, Klaus; Eue, Ludwig; Schmidt, Robert R.; and Roos, Ernst, 4,057,419, Cl. 71-121.000.
Rosemount Inc.: *See—*
Danner, Kenneth H., 4,056,883, Cl. 29-611.000.
Rosenberger, Roy R., to Nalco Chemical Company. Mixing block for mixing polymers. 4,057,223, Cl. 366-172.000.
Rosicky, Edward: *See—*
Thompson, John Robert; Rowland, Trevor Cartwright; Proebstle, Richard Alan; Rosicky, Edward; and Snyder, Thoma Mees van't Hoff, 4,057,466, Cl. 176-38.000.

Rosin, Hadassa: *See—*
Asscher, Meir; and Rosin, Hadassa, 4,057,578, Cl. 260-543.00P.
Asscher, Meir; and Rosin, Hadassa, 4,057,579, Cl. 260-543.00P.
Rosin, Seymour: *See—*
Ehrenhaft, Franz F.; and Rosin, Seymour, 4,057,345, Cl. 355-35.000.
Ross, George P.; and Bedortha, James L., to National Steel Corporation. Press for separating molten metal from dross. 4,057,232, Cl. 266-227.000.
Ross, James Burr: *See—*
Reid, Karl N., Jr.; Ross, James Burr; and Murali, Beegamudre N., 4,057,059, Cl. 128-145.800.
Rossi, Alberto: *See—*
Haas, Georges; and Rossi, Alberto, 4,057,573, Cl. 560-52.000.
Rotex, Inc.: *See—*
Stasinski, David D.; and Lower, William E., 4,057,492, Cl. 209-366.500.
Roth, Richard C., to Block Drug Company, Inc. Disposable medicinal application apparatus. 4,057,060, Cl. 128-232.000.
Rothacker, Dietrich: *See—*
Schwuchow, Norbert; Burk, Gerhard; and Rothacker, Dietrich, 4,057,263, Cl. 280-106.00R.
Rottmann, Manfred, to F. Meyer & Schwabedissen GmbH & Co. KG. Apparatus for feeding strip material to glueing device. 4,057,197, Cl. 242-58.000.
Rovner, Philip Lee. Reed holding device for musical instruments. 4,056,997, Cl. 84-383.00R.
Rowland, Trevor Cartwright: *See—*
Thompson, John Robert; Rowland, Trevor Cartwright; Proebstle, Richard Alan; Rosicky, Edward; and Snyder, Thoma Mees van't Hoff, 4,057,466, Cl. 176-38.000.
Rowley, Leroy S.: *See—*
Halberstadt, Harry J.; and Rowley, Leroy S., 4,057,675, Cl. 429-39.000.
Ruckel, Erwin Richard; and Wang, Long Shyong, to Arizona Chemical Company. Polymerization of α-pinene. 4,057,682, Cl. 526-190.000.
Rufer, Clemens: *See—*
Biere, Helmut; Ahrens, Hanns; Rufer, Clemens; Schroder, Eberhard; and Koch, Henning, 4,057,640, Cl. 424-274.000.
Ruka, Roswell J.; and Charles, Robert G., to Westinghouse Electric Corporation. Heat sink. 4,057,101, Cl. 165-1.000.
Ruppert, Richard L.: *See—*
Case, James E.; and Ruppert, Richard L., 4,056,912, Cl. 52-745.000.
Russell, John Raymond: *See—*
Gross, Donald Ralph; Schaefer, Nick Lewis; Russell, John Raymond; and Johnson, Clifford Ray, 4,057,088, Cl. 144-91.000.
Rybakov, Ivan Alexandrovich: *See—*
Kudryavtsev, Alexandr Alexandrovich; Firsov, Vitaly Mikhailovich; Solinov, Evgeny Fedorovich; Symon, Mark Klavdievich; Litvinov, Pavel Ivanovich; Veresov, Albert Pavlovich; Rybakov, Ivan Alexandrovich; Trishin, Viktor Timofeevich; Goryannikov, Vladimir Mikhailovich; Savin, Vyacheslav Pavlovich; and Kashkarov, Igor Georgievich, 4,057,409, Cl. 65-154.000.
Ryzhikov, Anton Abramovich: *See—*
Platonov, Boris Pavlovich; Ryzhikov, Anton Abramovich; and Platonov, Jury Borisovich, 4,057,098, Cl. 164-125.000.
S & C Electric Company: *See—*
Biller, Bruce A., 4,057,775, Cl. 337-186.000.
S.I.A.D. Societa' Italiana Acetilene E Derivati: *See—*
Bigi, Emanuele, 4,057,407, Cl. 62-22.000.
Saferstein, Lowell; and Stackman, Robert W., to Celanese Corporation. Self-extinguishing, non-dripping, phenolphthalein polyester molding compositions. 4,057,532, Cl. 260-47.00C.
Sage, Jay P., to Raytheon Company. Semiconductor memory structures. 4,057,788, Cl. 365-174.000.
St. Denis, Andrew Raoul: *See—*
Mette, Klaus Hermann; and St. Denis, Andrew Raoul, 4,057,713, Cl. 364-476.000.
Saito, Kenji: *See—*
Nakatsuka, Ryuzo; Saito, Kenji; and Kawamoto, Tadashi, 4,057,674, Cl. 428-481.000.
Saito, Tadashi: *See—*
Sakai, Toshimitsu; Fukumura, Kagenori; and Saito, Tadashi, 4,056,991, Cl. 74-863.000.
Sakai, Makoto, to Kabushiki Kaisha Keihinseiki Seisakusho. Icing preventing device for a carburetor for two-cycle engine use. 4,057,041, Cl. 123-73.0AD.
Sakai, Toshimitsu; Fukumura, Kagenori; and Saito, Tadashi, to Toyota Jidosha Kogyo Kabushiki Kaisha. Hydraulic control device for use with automatic speed change gear device. 4,056,991, Cl. 74-863.000.
Sakakibara, Yasuyuki; and Kuno, Akira, to Nippon Soken, Inc. Method and apparatus for displaying brake stopping distance of a vehicle. 4,057,712, Cl. 364-426.200.
Sakaue, Tadashi: *See—*
Narita, Kazutoyo; Sakaue, Tadashi; and Niino, Yuzi, 4,057,825, Cl. 357-81.000.
Sakurazawa, Hatuo. Apparatus and method for noodle rolling. 4,057,377, Cl. 425-135.000.
Saletta, Gary F.: *See—*
Elms, Robert T.; Engel, Joseph C.; and Saletta, Gary F., 4,057,750, Cl. 315-86.000.
Saligny, Yves, to Etablissements Carpano & Pons SA. Cable connection units and protection devices. 4,057,843, Cl. 361-104.000.
Salmon, Sydney E.; and Liu, Rosa H., to University Patents, Inc. Radioiodinated bleomycin. 4,057,618, Cl. 424-1.000.
Salzgitter Maschinen AG: *See—*
Mausolf, Georg; Bellenbaum, Herbert; and Dietrich, Josef, 4,057,139, Cl. 198-509.000.
Samardjiev, Boris Krestanov: *See—*
Furnadjiev, Vassil Lazarov; and Samardjiev, Boris Krestanov, 4,057,806, Cl. 346-33.00R.
Sanada, Takashi: *See—*
Suzuki, Kensei; Sanada, Takashi; and Okazima, Kenzo, 4,057,264, Cl. 280-276.000.
Sanbuichi, Hiroshi: *See—*
Nakamura, Koyo; and Sanbuichi, Hiroshi, 4,056,932, Cl. 60-276.000.
Sanders Associates, Inc.: *See—*
Dollinger, Kenneth, 4,057,802, Cl. 343-100.0LE.
Sandoz, Inc.: *See—*
Harrington, Francis E.; and Ho, Robert S., 4,057,646, Cl. 424-331.000.
Sandoz Ltd.: *See—*
Ascher, Gerd; and Reinshagen, Hellmuth, 4,057,557, Cl. 260-306.80R.
Bormann, Gerhard; and Troxler, Franz, 4,057,560, Cl. 260-326.860.
Sankyo Electric Company Limited: *See—*
Hatori, Kunitake; Ozaki, Toshihiko; and Kondo, Ryohei, 4,057,171, Cl. 221-6.000.
Sargent Industries, Inc.: *See—*
MacDonald, Peter S., 4,057,217, Cl. 251-308.000.
Sarid, Dror; and Springett, Brian E., to Xerox Corporation. Compact corona charging device. 4,057,723, Cl. 250-326.000.
Sarstedt, Walter. Devices for extracting blood. 4,057,050, Cl. 128-2.00F.
Sasaki, Hiroshi: *See—*
Kinuhata, Koji; Amano, Kitsutaro; Sasaki, Hiroshi; and Yamamoto, Hideo, 4,057,835, Cl. 358-140.000.
Sasaki, Takashi: *See—*
Habu, Teiji; Wada, Tsuneo; Sasaki, Takashi; Itoh, Shigemasa; Ohmura, Takayoshi; Ishii, Hiroki; and Yamaguchi, Hisashi, 4,057,538, Cl. 260-117.000.
Sasaki, Tohru: *See—*
Yoshida, Masafumi; Sasaki, Tohru; and Terasaki, Shuji, 4,057,660, Cl. 427-100.000.
Sasaoka, Ryosuke: *See—*
Numata, Shigeaki; and Sasaoka, Ryosuke, 4,057,370, Cl. 417-366.000.
Sasse, Klaus: *See—*
Naumann, Klaus; Lurssen, Klaus; Sasse, Klaus; Holtschmidt, Ulrich; and Schwarzmann, Gunter, 4,057,413, Cl. 71-76.000.
Sato, Akira; Ogawa, Akira; Hinata, Masanao; and Takei, Haruo, to Fuji Photo Film Co., Ltd. Silver halide photographic emulsion. 4,057,430, Cl. 96-100.00R.
Sato Iron Works Co., Ltd.: *See—*
Sato, Takuya, 4,057,379, Cl. 425-199.000.
Sato, Masato: *See—*
Toriya, Jun; Sato, Masato; Shiraga, Ken; and Matsunaga, Setsuo, 4,057,472, Cl. 203-80.000.
Sato, Takuya, to Sato Iron Works Co., Ltd. Kneading and extruding apparatus for extrudable material. 4,057,379, Cl. 425-199.000.
Sato, Yo, to Kabushiki Kaisha Sato Kenkyusho. Constant pressure mechanism for hand labeler. 4,057,452, Cl. 156-384.000.
Savin, Vyacheslav Pavlovich: *See—*
Kudryavtsev, Alexandr Alexandrovich; Firsov, Vitaly Mikhailovich; Solinov, Evgeny Fedorovich; Symon, Mark Klavdievich; Litvinov, Pavel Ivanovich; Veresov, Albert Pavlovich; Rybakov, Ivan Alexandrovich; Trishin, Viktor Timofeevich; Goryannikov, Vladimir Mikhailovich; Savin, Vyacheslav Pavlovich; and Kashkarov, Igor Georgievich, 4,057,409, Cl. 65-154.000.
Saxena, Arjun N.; and Hart, Courtney, to Data General Corporation. Plasma etching process. 4,057,460, Cl. 156-643.000.
Scailteur, Alain F. C.: *See—*
Widart, Jean E. L.; and Scailteur, Alain F. C., 4,057,163, Cl. 220-3.000.
Scaros, Mike G.: *See—*
Dryden, Hugh L., Jr.; Scaros, Mike G.; and Telinski, Thomas J., 4,057,542, Cl. 260-239.55C.
Schaar, Lothar, to Heye, Hermann. Forming station for a machine for forming hollow articles of vitreous material. 4,057,412, Cl. 65-229.000.
Schabert, Hans-Peter; and Laurer, Erwin, to Kraftwerk Union Aktiengesellschaft. Nuclear reactor steam generator installation. 4,057,077, Cl. 137-861.000.
Schabert, Hans-Peter: *See—*
Mair, Georg; and Schabert, Hans-Peter, 4,057,464, Cl. 176-37.000.
Schacht, Erich: *See—*
Gante, Joachim; Kurmeier, Hans-Adolf; Orth, Dieter; Schacht, Erich; and Wild, Albrecht, 4,057,647, Cl. 424-340.000.
Schaefer, Nick Lewis: *See—*
Gross, Donald Ralph; Schaefer, Nick Lewis; Russell, John Raymond; and Johnson, Clifford Ray, 4,057,088, Cl. 144-91.000.
Schaffluetzel, Paul: *See—*
Defago, Raymond; Schaffluetzel, Paul; Lapple, Arnulf Ruediger; and Hugelin, Bernard, 4,057,388, Cl. 8-2.50A.
Scharwachter, Peter: *See—*
Gutsche, Klaus; Kohlmann, Friedrich-Wilhelm; and Scharwachter, Peter, 4,057,545, Cl. 542-428.000.
Scheerhorn, Douglas, to Steelcase Inc. Locking system linkage adjustment. 4,057,307, Cl. 312-219.000.
Scheidler, Herwig, to JENAer Glaswerk Schott & Gen. Cooking

surfaces of glass-ceramic plates with layers with different values for radiation transmission. 4,057,670, Cl. 428-189.000.
Scherbatskoy, Serge A. Well bore communication method. 4,057,781, Cl. 340-18.0LD.
Schering Aktiengesellschaft: *See—*
Biere, Helmut; Ahrens, Hanns; Rufer, Clemens; Schroder, Eberhard; and Koch, Henning, 4,057,640, Cl. 424-274.000.
Weber, Alfred; Muller, Rudolf; and Kurzidim, Johannes, 4,057,541, Cl. 260-239.55A.
Schilte, Hank John. Sealing machines. 4,056,922, Cl. 53-373.000.
Schindl, Klaus P., to C. Reichert Optische Werke. Microscope eye piece focusing apparatus for use in producing sharp photographs. 4,057,318, Cl. 350-19.000.
Schlaf, Thomas Fulton, to Du Pont de Nemours, E. I., and Company. Benzothiazole allophanate fungicides. 4,057,638, Cl. 424-270.000.
Schlegel Corporation: *See—*
Metzler, Jay C., 4,057,668, Cl. 428-85.000.
Schlegel (U.K.) Limited: *See—*
Bernardo, Gerald; and Jackson, Richard Malcolm Clive, 4,056,909, Cl. 52-396.000.
Schlichting, John; and Tornow, Robert Norman, to Babcock & Wilcox Company, The. Industrial technique. 4,057,033, Cl. 122-32.000.
Schmidt, Dietrich; Huber, Karl Erwin; and Hofer, Johann, to Wacker-Chemitronic Gesellschaft fur Elektronik Grundstoffe mbH. Process for determining the donor content of polycrystalline silicon of high purity to be used in the semiconductor industries. 4,057,395, Cl. 23-230.00R.
Schmidt, Hans-Joachim, to Tekade Felten & Guilleaume Fernmeldeanlagen GmbH. Frequency-response corrective network. 4,057,771, Cl. 333-70.00R.
Schmidt, Robert R.: *See—*
Wagner, Klaus; Eue, Ludwig; Schmidt, Robert R.; and Roos, Ernst, 4,057,419, Cl. 71-121.000.
Schmidt, Robert Rudolf: *See—*
Dickore, Karlfried; Eue, Ludwig; and Schmidt, Robert Rudolf, 4,057,417, Cl. 71-93.000.
Schnacke, Arthur W.: *See—*
Bond, James A.; Eckard, Spurgeon E.; and Schnacke, Arthur W., 4,056,946, Cl. 62-121.000.
Schnall, Gunther: *See—*
Wick, Richard; Pfeifer, Josef; and Schnall, Gunther, 4,057,344, Cl. 355-16.000.
Schnell, Friedrich: *See—*
Pammer, Erich; and Schnell, Friedrich, 4,057,659, Cl. 427-89.000.
Scholz, Berthold: *See—*
Muller, Eckart; Simo, Thomas; Markwort, Helmut; and Scholz, Berthold, 4,057,224, Cl. 366-336.000.
Schoppe, Fritz. Combustion of pulverized coal. 4,057,021, Cl. 110-28.00A.
Schora, Frank C.: *See—*
Patel, Jitendra G.; Schora, Frank C.; and Loeding, John W., 4,057,402, Cl. 48-197.00R.
Schrader, Gustav E., to TRW Inc. Method of forming a plurality of articles. 4,057,475, Cl. 204-129.100.
Schraga, Irwin: *See—*
Cooper, Glenn Dale; and Schraga, Irwin, 4,057,599, Cl. 260-874.000.
Schramm, Siegfried: *See—*
Hopf, Heribert; and Schramm, Siegfried, 4,057,239, Cl. 269-170.000.
Schroder, Eberhard: *See—*
Biere, Helmut; Ahrens, Hanns; Rufer, Clemens; Schroder, Eberhard; and Koch, Henning, 4,057,640, Cl. 424-274.000.
Schroder, Rolf: *See—*
Hofer, Wolfgang; Maurer, Fritz; Riebel, Hans-Jochem; Schroder, Rolf; and Eue, Ludwig, 4,057,418, Cl. 71-103.000.
Schrot, Joseph R., to Biospherics Incorporated. Use of radioisotopes for rapid identification of microorganisms. 4,057,470, Cl. 195-127.000.
Schubert, Dale W., to Barry Wright Corporation. Fluidic vibration isolator. 4,057,212, Cl. 248-358.00R.
Schuep, Willy: *See—*
Berger, Julius; Reichelt, Karen Emalyn; and Schuep, Willy, 4,057,553, Cl. 260-293.00A.
Schuermann, Josef H., to Texas Instruments Deutschland GmbH. Variable amplifier for RF input stage. 4,057,765, Cl. 330-279.000.
Schulz, Erwin: *See—*
Reichel, Kurt; Decker, Gerd; Kuck, Alfred; and Schulz, Erwin, 4,057,037, Cl. 123-32.0SP.
Schussler, Karl-Heinz: *See—*
Brucher, Eberhard; and Schussler, Karl-Heinz, 4,057,234, Cl. 266-272.000.
Schuster, Samuel J. High strength bag for storing materials in sterile condition. 4,057,144, Cl. 206-439.000.
Schwab, John A.: *See—*
Farquhar, Norman G.; and Schwab, John A., 4,057,034, Cl. 122-382.000.
Schwaebel, Rudolf, to Maschinenfabrik Augsburg-Nurnberg AG. Apparatus for raising the dynamic performance limit of steam flow and gas flow turbines and compressors. 4,057,362, Cl. 415-170.00R.
Schwartz, Edwin L., to Rite Autotronics Corporation. Slide switch assembly having flexible housing with movable contacts mounted on printed circuit board. 4,057,520, Cl. 200-16.00D.
Schwartz, Robert T.; and Harrison, Marc S., to American National Red Cross. Stackable wheeled chair. 4,057,288, Cl. 297-239.000.
Schwarz, Hans-Helmut: *See—*
Krall, Hermann-Dieter; Weissel, Oskar; and Schwarz, Hans-Helmut, 4,057,581, Cl. 260-571.000.
Schwarzmann, Gunter: *See—*
Naumann, Klaus; Lurssen, Klaus; Sasse, Klaus; Holtschmidt, Ulrich; and Schwarzmann, Gunter, 4,057,413, Cl. 71-76.000.
Schwing, Friedrich, to Friedrich Wilhelm Schwing GmbH. Multi-cylinder pump for concrete. 4,057,373, Cl. 417-519.000.
Schwuchow, Norbert; Burk, Gerhard; and Rothacker, Dietrich, to Daimler-Benz Aktiengesellschaft. Vehicle frame. 4,057,263, Cl. 280-106.00R.
Sciaky Vitry, S. A.: *See—*
Dumonte, Paul, deceased, 4,057,746, Cl. 313-237.000.
Scibbe, Harold R.; and Smith, Edward J., to REPA Feinstanzwerk GmbH. Tensionless retractor. 4,057,199, Cl. 242-107.700.
Scientific Instruments, Inc.: *See—*
Tucker, Thomas Lee; and Halverson, Gilbert, 4,056,887, Cl. 33-126.600.
Scott, E. Timm: *See—*
Bradbury, William B.; Watts, Robert H.; and Scott, E. Timm, 4,057,193, Cl. 241-281.000.
Scott Paper Company: *See—*
McConnell, Albert L., 4,057,669, Cl. 428-152.000.
Sebulsky, Raynor Tyler: *See—*
Montagna, Angelo Anthony; Somers, Allen Evarts; and Sebulsky, Raynor Tyler, 4,057,489, Cl. 208-89.000.
Seefluth, Charles L., to Phillips Petroleum Company. Means for controlling temperature of picker fingers to adjust parison alignment. 4,057,386, Cl. 425-526.000.
Seegers, Guenter, to WABCO Westinghouse GmbH. Safety valve device for multiple circuit fluid pressure operable brake system. 4,057,298, Cl. 303-84.00R.
Seidel, Heinz H., to GTE Sylvania Incorporated. Positive rake cutting insert for use in negative rake holders. 4,056,872, Cl. 407-114.000.
Seilly, Alec Harry, to Lucas Industries Limited. Electromagnetic devices. 4,057,744, Cl. 310-27.000.
Seissl, Johannes: *See—*
Hofmockel, Dieter; Grassme, Ulrich; Seissl, Johannes; and Fleer, Ernst Otto, 4,057,733, Cl. 250-491.000.
Seiter, Charles, to Infratab Corporation. Time-temperature indicator. 4,057,029, Cl. 116-114.00V.
Seki, Kenji: *See—*
Kimura, Akio; Seki, Kenji; Ukita, Mamoru; Asahi, Satoshi; and Tagami, Sanae, 4,057,600, Cl. 260-878.00B.
Sekine, Junzo: *See—*
Kimura, Goro; and Sekine, Junzo, 4,057,684, Cl. 536-4.000.
Sellstedt, John H.; and Klaubert, Dieter H., to American Home Products Corporation. Method of treatment using tetrazole-5-carboxamide derivatives. 4,057,632, Cl. 424-248.540.
Selvarajan, Radhakrishnan: *See—*
Phillips, Kenneth G.; Ballweber, Edward G.; and Selvarajan, Radhakrishnan, 4,057,580, Cl. 260-567.60P.
Seragnoli, Enzo, to G. D. Societa per Azioni. Compensating store device in systems for directly feeding cigarettes from cigarette manufacturing machine or machines to the hopper of the cigarette packeting machine. 4,056,915, Cl. 53-59.00R.
Seragnoli, Enzo, to G. D. Societa per Azioni. Compensating store device in systems for directly feeding cigarettes from cigarette manufacturing machine or machines to the hopper of the cigarette packeting machine. 4,056,916, Cl. 53-59.00R.
Seragnoli, Enzo, to G. D. Societa per Azioni. System for transferring and storing cigarettes. 4,056,917, Cl. 53-59.00R.
Seybold, Frederick W. Rotary internal combustion engine with uniformly rotating pistons cooperating with reaction elements having a varying speed of rotation and oscillating motion. 4,057,374, Cl. 418-36.000.
Shafer, Donald E., to Honeywell Inc. Recording apparatus. 4,057,808, Cl. 346-107.00R.
Shaffer, Walter M., to Caterpillar Tractor Co. Vehicle drive. 4,056,989, Cl. 74-745.000.
Shaffer, Walter M., to Caterpillar Tractor Co. Self-contained steering guidance means. 4,057,019, Cl. 104-247.000.
Shamp, Donald E.: *See—*
Daman, Lloyd W.; Marti, Don V., II; Mason, Freddie; and Shamp, Donald E., 4,057,410, Cl. 65-65.00A.
Shapiro, Howard E.: *See—*
Merz, Kenneth M.; and Shapiro, Howard E., 4,057,777, Cl. 338-309.000.
Sharma, Raj K.: *See—*
Prevorsek, Dusan C.; Kwon, Young D.; and Sharma, Raj K., 4,056,973, Cl. 73-91.000.
Sharp Kabushiki Kaisha: *See—*
Watanabe, Kenryo, 4,057,822, Cl. 357-52.000.
Shaw, Graham C.; Lawton, Emil A.; and Jones, Leon L., to Thiokol Corporation. Method of disposal of pyrotechnic compositions. 4,057,442, Cl. 149-109.400.
Sheehan, Michael J.: *See—*
Heuer, Dale A.; Roemer, John F.; and Sheehan, Michael J., 4,057,787, Cl. 365-104.000.
Shell Oil Company: *See—*
Broussard, Leo P., 4,057,108, Cl. 166-314.000.
Shen, Tsung-Ying; Jones, Howard; Mulvey, Dennis M.; and Dorn, Conrad P., to Merck & Co., Inc. 5-Mercaptopyridoxine esters. 4,057,637, Cl. 424-263.000.
Shen, Tsung-Ying: *See—*
Jones, Howard; and Shen, Tsung-Ying, 4,057,642, Cl. 424-304.000.

Shepherd, Gordon R.: *See—*
Slama, Jerry L.; Francis, David J.; and Shepherd, Gordon R., 4,057,185, Cl. 226-1.000.
Sherman, Henry B. Internal combustion turbine. 4,056,930, Cl. 60-39.780.
Sherwood, William G.: *See—*
Bruckenstein, Stanley; and Sherwood, William G., 4,057,478, Cl. 204-195.00P.
Shibasaki, Tadashi; and Ieda, Tsuguo, to Sumitomo Light Metal Industries, Ltd. Apparatus for metal extrusion. 4,056,964, Cl. 72-273.000.
Shields, Walter A. Loading apparatus. 4,056,920, Cl. 53-142.000.
Shiga, Michio; Hirano, Kimitoshi; and Matsushita, Matsuo, to Karonite Chemical Co., Ltd. Method of preparing overbased lubricating oil additives. 4,057,504, Cl. 252-33.000.
Shihabi, Marwan S., to International Telephone and Telegraph Corporation. Vapor recovery system. 4,057,085, Cl. 141-59.000.
Shimizu, James K.: *See—*
Basil, Richard V., Jr.; Ondrups, Leons; and Shimizu, James K., 4,057,772, Cl. 333-83.00T.
Shimizu, Shigemitu: *See—*
Miyamoto, Osamu; Iizaka, Isao; Yamamoto, Toshio; Hikosaka, Takashi; and Shimizu, Shigemitu, 4,057,339, Cl. 355-3.00R.
Shinetsu Chemical Company: *See—*
Takamizawa, Minoru; Okada, Humio; Hasebe, Nobuyuki; and Toida, Hiromi, 4,057,596, Cl. 260-825.000.
Shinoda, Nobuhiko: *See—*
Nakamoto, Soichi; Ito, Tadashi; Ito, Fumio; and Shinoda, Nobuhiko, 4,057,809, Cl. 354-23.00D.
Shiraga, Ken: *See—*
Toriya, Jun; Sato, Masato; Shiraga, Ken; and Matsunaga, Setsuo, 4,057,472, Cl. 203-80.000.
Shoemaker, Lloyd L., to Lloyd's Furnaces. Forced air hot water furnace. 4,057,189, Cl. 237-17.000.
Shoop, George W., to PPG Industries, Inc. Heated laminated window and method of assembling same. 4,057,671, Cl. 428-208.000.
Showa Denko Kabushiki Kaisha: *See—*
Hashimoto, Akihiro; Hayashi, Shigeo; Yamamoto, Sadao; and Chujo, Hitoshi, 4,057,608, Cl. 264-42.000.
Yamazaki, Isamu; Toyama, Yoichi; Hirota, Kiwami; and Takeuchi, Hisashi, 4,057,680, Cl. 526-142.000.
Shuck, Lowell Z., to United States of America, Energy Research and Development Administration. Method for describing fractures in subterranean earth formations. 4,057,780, Cl. 340-15.5MC.
Sicard, Hubert, to Compagnie Maritime d'Expertises - Comex. Disconnectable pipe union and device for manoeuvring same. 4,057,268, Cl. 285-31.000.
Siemens Aktiengesellschaft: *See—*
Balling, Heinz, 4,057,368, Cl. 417-313.000.
Hieke, Eduard, 4,057,722, Cl. 250-311.000.
Hofmockel, Dieter; Grassme, Ulrich; Seissl, Johannes; and Fleer, Ernst Otto, 4,057,733, Cl. 250-491.000.
Mahlein, Hans; and Reichelt, Achim, 4,057,321, Cl. 350-96.0WG.
Mair, Georg; and Schabert, Hans-Peter, 4,057,464, Cl. 176-37.000.
Mitterhummer, Gerhard; and Plehnert, Kurt, 4,057,459, Cl. 156-630.000.
Pammer, Erich; and Schnell, Friedrich, 4,057,659, Cl. 427-89.000.
Vogelsberg, Dieter, 4,056,925, Cl. 57-34.0AT.
Siempelkamp Giesserei KG: *See—*
Gross, Heiko, 4,057,162, Cl. 220-3.000.
Sigott, Siegfried, to Vereinigte Osterreichische Eisen-und Stahlwerke. Device for connecting the bits with the cutting head of a drift advancing machine or the like. 4,057,260, Cl. 279-77.000.
Sih, Charles J.; and Heather, James B., to Wisconsin Alumni Research Foundation. Chiral 2-substituted-4-hydroxy-2-cyclopenten-1-one. 4,057,851, Cl. 560-121.000.
Simes Societa Italiana Medicinali e Sintetici S.p.A.: *See—*
Ferrari, Giorgio; and Krepinsky, Jiri Jan, 4,057,635, Cl. 424-261.000.
Simmons, Gerald P.: *See—*
Brubaker, Hiram A.; Simmons, Gerald P.; and Streight, William E., 4,057,332, Cl. 350-319.000.
Simo, Thomas: *See—*
Muller, Eckart; Simo, Thomas; Markwort, Helmut; and Scholz, Berthold, 4,057,224, Cl. 366-336.000.
Simonbuild Limited: *See—*
Thorpe, Walter, 4,056,905, Cl. 52-223.00R.
Sinclair, Richard G., to Gulf Oil Corporation. Copolymers of L-(−)-lactide and epsilon caprolactone. 4,057,537, Cl. 260-78.30R.
Singer Company, The: *See—*
Vahle, Erwin; and Tautz, Helmut, 4,057,272, Cl. 292-128.000.
Sinharay, Akhileswer: *See—*
Winkelmann, Erhardt; Sinharay, Akhileswer; and Raether, Wolfgang, 4,057,634, Cl. 424-250.000.
Sisk, Robert Michael; and Williams, Lary Lynn, to Deere & Company. Control lever. 4,057,701, Cl. 200-213.000.
Sjoo, Gunnar Arthur Sigvard; and Sundlin, Jan Anders. Method of impregnating wood with plastics. 4,057,658, Cl. 427-44.000.
Skaletzky, Louis L.: *See—*
Coverdale, Charles E.; and Skaletzky, Louis L., 4,057,633, Cl. 424-250.000.
SKF Industrial Trading and Development Company B.V.: *See—*
van Amerongen, Evert; and Buhrman, Willem M., 4,057,070, Cl. 134-83.000.
Skrabak, Michal; Vavrik, Ernest; Kolarik, Stanislav; and Mazak, Milos, to Slovenska vysoka skola technicka. Method and apparatus for dispensing multi-component liquid suspensions. 4,057,497, Cl. 210-65.000.
Slama, Jerry L.; Francis, David J.; and Shepherd, Gordon R., to Armco Steel Corporation. Method and means for operating a pair of pinch rolls. 4,057,185, Cl. 226-1.000.
Sleeper, Thomas Till: *See—*
Hildebrand, George Lee; Sleeper, Thomas Till; Healey, William Allen; Hall, Stuart Jeffery; and Pfuntner, Richard A., 4,056,976, Cl. 73-231.00M.
Slovenska vysoka skola technicka: *See—*
Skrabak, Michal; Vavrik, Ernest; Kolarik, Stanislav; and Mazak, Milos, 4,057,497, Cl. 210-65.000.
Smallegan, Jon M.: *See—*
Gaines, Donald R.; Smallegan, Jon M.; and Trudeau, William H., 4,057,304, Cl. 308-237.00A.
Smedley, Sean Anthony, to American Microsystems, Inc. MOS input protection structure. 4,057,844, Cl. 361-111.000.
Smith, Donald Arthur: *See—*
Mowrey, Rowland George; Smith, Donald Arthur; and Sutton, Richard Calvin, 4,057,428, Cl. 96-74.000.
Smith, Edward J.: *See—*
Scibbe, Harold R.; and Smith, Edward J., 4,057,199, Cl. 242-107.700.
Smith, Gary D., to Mobile Auto Crushers Corporation of America. Vehicle mounted compactor apparatus. 4,057,010, Cl. 100-50.000.
Smith, Leward N., to Morbark Industries, Inc. Tree harvesting machine. 4,057,192, Cl. 241-92.000.
Smith, Michael W.; and Houck, Stanley J., to Goodyear Tire & Rubber Company, The. Mandrel for fabricating an air spring. 4,057,454, Cl. 156-401.000.
Smith, Roy H., Jr.: *See—*
Stallings, Robert J., Jr., 4,057,689, Cl. 179-1.00E.
Smith, Thomas. Car window screen. 4,057,094, Cl. 160-37.000.
Smith, Walton J. Wheat-germ product and its use. 4,057,654, Cl. 426-555.000.
SmithKline Corporation: *See—*
Berges, David A., 4,057,631, Cl. 424-246.000.
Hill, David Taylor, 4,057,630, Cl. 424-204.000.
Mendelson, Wilford Lee; and Webb, Robert Lee, 4,057,585, Cl. 260-612.00D.
Snyder, Thoma Mees van't Hoff: *See—*
Thompson, John Robert; Rowland, Trevor Cartwright; Proebstle, Richard Alan; Rosicky, Edward; and Snyder, Thoma Mees van't Hoff, 4,057,466, Cl. 176-38.000.
Sobolewski, Valentine S., to General Electric Company. Counterpoising load support apparatus and method. 4,057,219, Cl. 254-175.000.
Societe Alsacienne de Constructions Mecaniques de Mulhouse: *See—*
Juillard, Yves; and Riner, Victor, 4,057,083, Cl. 139-20.000.
Societe Anonyme pour l'Equipement Electrique des Vehicules S.E.V. Marchal: *See—*
Stellwagen, Jean-Henri, 4,057,045, Cl. 123-146.50A.
Societe d'Appareillage Electrique Saparel: *See—*
Canonne, Paul; and Neumann, Gerard, 4,057,716, Cl. 200-153.00H.
Societe Nouvelle Baele Gangloff: *See—*
Tavernier, Georges Antoine, 4,057,457, Cl. 156-571.000.
Societe Pompes Multiflux: *See—*
Renaud, Georges, 4,057,361, Cl. 415-53.00R.
Soehngen, John W.; and Hannon, Martin J., to Celanese Corporation. Process for preparing shear degradable particle-containing resin powders. 4,057,607, Cl. 264-28.000.
Sohm, Lawrence R., to Xerox Corporation. Dual mode control logic for a multi-mode copier/duplicator. 4,057,341, Cl. 355-8.000.
Solarex Corporation: *See—*
Lindmayer, Joseph, 4,056,879, Cl. 29-572.000.
Lindmayer, Joseph, 4,057,439, Cl. 136-89.00P.
Solartron Electronic Group Ltd., The: *See—*
Ley, Anthony John; Metcalf, Eric; and Jeffery, Michael Cedric, 4,057,756, Cl. 324-77.00B.
Solinov, Evgeny Fedorovich: *See—*
Kudryavtsev, Alexandr Alexandrovich; Firsov, Vitaly Mikhailovich; Solinov, Evgeny Fedorovich; Symon, Mark Klavdievich; Litvinov, Pavel Ivanovich; Veresov, Albert Pavlovich; Rybakov, Ivan Alexandrovich; Trishin, Viktor Timofeevich; Goryannikov, Vladimir Mikhailovich; Savin, Vyacheslav Pavlovich; and Kashkarov, Igor Georgievich, 4,057,409, Cl. 65-154.000.
Sollish, Bruce D., to Yeda Research and Development Co., Ltd. Ultrasonic velocity and thickness gage. 4,056,970, Cl. 73-629.000.
Somers, Allen Evarts: *See—*
Montagna, Angelo Anthony; Somers, Allen Evarts; Peake, Stephen Luther; and Chun, Sun Woong, 4,057,488, Cl. 208-89.000.
Montagna, Angelo Anthony; Somers, Allen Evarts; and Sebulsky, Raynor Tyler, 4,057,489, Cl. 208-89.000.
Somers, Gerardus Henricus Johannus: *See—*
Gieles, Antonius Cornelis Maria; and Somers, Gerardus Henricus Johannus, 4,057,063, Cl. 128-303.170.
South, William H.: *See—*
Pattantyus-Abraham, Tamas I.; Vercellotti, Leonard C.; and South, William H., 4,057,754, Cl. 324-207.000.
Southwire Company: *See—*
Askin, Kerim, 4,057,096, Cl. 164-49.000.
Jennings, Larry D.; and Hazen, Wayne W., 4,057,611, Cl. 423-127.000.
Ward, George C., 4,056,959, Cl. 72-128.000.
Spadavecchia, Richard I.; and Struk, James R., to International Busi-

ness Machines Corporation. Reference voltage source for memory cells. 4,057,789, Cl. 365-189.000.
Spapens, Harald Henricus Cornelis Maria: *See—*
Needs, Howard Curtis; and Spapens, Harald Henricus Cornelis Maria, 4,057,837, Cl. 358-254.000.
Sparkler Mfg. Co.: *See—*
Kracklauer, Aloysius C., 4,057,437, Cl. 127-9.000.
Sparks, Bryan D.: *See—*
Meadus, F. Weldon; Sparks, Bryan D.; Puddington, Ira E.; and Farnand, J. Redmond, 4,057,486, Cl. 208-11.0LE.
Sparton Corporation: *See—*
Eisma, Benjamin J., Jr., 4,056,869, Cl. 24-277.000.
Spectradyne, Inc.: *See—*
Moorehead, Robert M., 4,057,829, Cl. 358-86.000.
Spencer, Billie Mike: *See—*
Holladay, James Eugene, Jr.; and Spencer, Billie Mike, 4,057,801, Cl. 343-12.00R.
Sperry Rand Corporation: *See—*
Holladay, James Eugene, Jr.; and Spencer, Billie Mike, 4,057,801, Cl. 343-12.00R.
Lowell, William P.; and Jagunich, Douglas M., 4,057,847, Cl. 364-200.000.
Tafoya, Benny R., 4,057,784, Cl. 340-146.30F.
Spessert, Robert, to "OFU" Ofenbau-Union GmbH. Continuous furnace. 4,057,233, Cl. 266-252.000.
Spiel, Albert. High-protein quick cooking meat-like food made from plant protein materials. 4,057,656, Cl. 426-630.000.
Springett, Brian E.: *See—*
Sarid, Dror; and Springett, Brian E., 4,057,723, Cl. 250-326.000.
Spurgin, Wendell P.: *See—*
Cheney, William A.; and Spurgin, Wendell P., 4,057,405, Cl. 55-105.000.
Stackman, Robert W.: *See—*
Saferstein, Lowell; and Stackman, Robert W., 4,057,532, Cl. 260-47.00C.
Stadler, Donald A.: *See—*
Furlette, James L.; and Stadler, Donald A., 4,056,953, Cl. 64-30.00D.
Stager, Peter F.: *See—*
Wray, Betty B.; Stager, Peter F.; and Linder, Charles W., 4,057,145, Cl. 206-538.000.
Stallings, Robert J., Jr., to Smith, Roy H., Jr. High fidelity sound reproduction system and modules thereof. 4,057,689, Cl. 179-1.00E.
Stansfield, James Frederick: *See—*
Davies, Peter Kingsley; Rogers, Leslie Richard; Stansfield, James Frederick; and Topham, Arthur, 4,057,436, Cl. 106-288.00Q.
Stark, Marvin: *See—*
Halliar, William R.; and Stark, Marvin, 4,057,020, Cl. 105-377.000.
Starp, Franz W. R.: *See—*
Rentschler, Waldemar T.; Starp, Franz W. R.; and Helber, Karl, 4,057,812, Cl. 354-51.000.
Stasinski, David D.; and Lower, William E., to Rotex, Inc. Adjustment of motion of screening machine. 4,057,492, Cl. 209-366.500.
Stauble Ltd.: *See—*
Mueller, Otto, 4,057,084, Cl. 139-59.000.
Stawinski, Antoni: *See—*
Chrobak, Eryk; Natkaniec, Benedykt; Wasyleczko, Zenon; Stawinski, Antoni; and Roczek, Andrzej, 4,056,929, Cl. 59-85.000.
Stedman, Robert N., to Caterpillar Tractor Co. Modular rear axle suspension and drive arrangement for trucks. 4,057,121, Cl. 180-56.000.
Steelcase Inc.: *See—*
Scheerhorn, Douglas, 4,057,307, Cl. 312-219.000.
Steinhardt, Dieter. Deep drawn plastic packing case with interlocking, hollow fastener projections. 4,057,188, Cl. 229-29.00M.
Steinke, Leo: *See—*
Weyl, Helmut; and Steinke, Leo, 4,057,477, Cl. 204-195.00S.
Stellwagen, Jean-Henri, to Societe Anonyme pour l'Equipement Electrique des Vehicules S.E.V. Marchal. Magnetic pulse type ignition distributor. 4,057,045, Cl. 123-146.50A.
Stencel Aero Engineering Corporation: *See—*
Duncan, James W.; and Peck, Walter R., 4,057,206, Cl. 244-147.000.
Stephens, Robert K., to Falk Corporation, The. Lubricant wiper. 4,057,126, Cl. 184-11.00R.
Stettler, Gene A. Collapsible easel for artists. 4,057,215, Cl. 248-460.000.
Stewart, Richard E., to Westinghouse Electric Corporation. Method for connecting dynamoelectric machine coils. 4,056,880, Cl. 29-596.000.
Stickl, Helmut Anton. Acne preparation for oral administration. 4,057,627, Cl. 424-92.000.
Stiebel, Ariel: *See—*
Lyngsgaard, Joergen; and Stiebel, Ariel, 4,057,709, Cl. 235-92.0PK.
Stiern, Walter W.: *See—*
Reid, John; and Stiern, Walter W., 4,056,856, Cl. 4-67.00A.
Stiling, Rodney A.; Burkard, Edward A.; and Johnson, Robert M., to National Gypsum Company. Foamed gypsum wallboard. 4,057,443, Cl. 156-43.000.
Stiling, Rodney A.: *See—*
Johnson, Robert M.; Winkowski, Daniel A.; and Stiling, Rodney A., 4,057,662, Cl. 427-209.000.
Stoecker, William J. Baseball practice device. 4,057,248, Cl. 273-26.00R.
Stookey, Stanley D.: *See—*
Pierson, Joseph E.; and Stookey, Stanley D., 4,057,408, Cl. 65-18.000.
Stransky, Werner Theo: *See—*
Bestmann, Hans Jurgen; Stransky, Werner Theo; and Vostrowsky, Otto, 4,057,593, Cl. 260-682.000.
Streight, William E.: *See—*
Brubaker, Hiram A.; Simmons, Gerald P.; and Streight, William E., 4,057,332, Cl. 350-319.000.
Striegler, John H., to Atlantic Richfield Company. Slim hold drilling. 4,057,116, Cl. 173-165.000.
Stromberg-Carlson Corporation: *See—*
Jorgensen, Adam A., 4,057,797, Cl. 340-347.0DD.
Struk, James R.: *See—*
Spadavecchia, Richard I.; and Struk, James R., 4,057,789, Cl. 365-189.000.
Strycker, Stanley J., to Dow Chemical Company, The. Substituted phenoxyalkyl quaternary ammonium compounds as antiarrhythmic agents. 4,057,645, Cl. 424-329.000.
Stuber, Wolfgang, to Otto Stuber KG. Method and apparatus for detecting so-called moire effect during spinning. 4,056,926, Cl. 57-81.000.
Su, Cherng Yi. Internal combustion engines. 4,057,035, Cl. 123-8.270.
Sugimoto, Keiichi; Nishijima, Koji; Akimoto, Hiroshi; Hanaoka, Tadashi; and Kakeya, Nobuharu, to Takeda Chemical Industries, Ltd. α-Alkylsulfobenzyl penicillins. 4,057,544, Cl. 260-239.100.
Sumitomo Bakelite Company, Limited: *See—*
Nakatsuka, Ryuzo; Saito, Kenji; and Kawamoto, Tadashi, 4,057,674, Cl. 428-481.000.
Sumitomo Light Metal Industries, Ltd.: *See—*
Shibasaki, Tadashi; and Ieda, Tsuguo, 4,056,964, Cl. 72-273.000.
Sumitomo Metal Industries Limited: *See—*
Fukui, Takashi; and Ikeda, Takami, 4,057,421, Cl. 75-60.000.
Sumitomo Rubber Industries, Ltd.: *See—*
Hoshikawa, Katuyuki; Noda, Soji; and Kimura, Akitaka, 4,057,090, Cl. 152-347.000.
Summers, John E.; and Hadley, John F., to H. H. Robertson Company. Sodium silicate extended polyurethane foam. 4,057,519, Cl. 260-2.5AK.
Sundlin, Jan Anders: *See—*
Sjoo, Gunnar Arthur Sigvard; and Sundlin, Jan Anders, 4,057,658, Cl. 427-44.000.
Sundstrand Data Control, Inc.: *See—*
Muller, Hans Rudolf, 4,057,782, Cl. 340-27.0AT.
Sundstrom, Edward K. Method of producing a card file. 4,056,894, Cl. 40-104.030.
Sung, Steven Lang, to Colgate Palmolive Company. Heavy-duty liquid detergent. 4,057,506, Cl. 252-135.000.
Sutton, Richard Calvin: *See—*
Mowrey, Rowland George; Smith, Donald Arthur; and Sutton, Richard Calvin, 4,057,428, Cl. 96-74.000.
Suzuki, Kensei; Sanada, Takashi; and Okazima, Kenzo. Front fork for suspending a front wheel of a motorcycle. 4,057,264, Cl. 280-276.000.
Suzuki, Manao, to Kyokado Engineering Co. Ltd. Method of consolidating soils. 4,056,937, Cl. 61-36.00B.
Suzuki, Shigeto, to Chevron Research Company. Process for preparing di(alkoxy-carboxy) hydrocarbylenes. 4,057,577, Cl. 260-535.00P.
Svensson, Lars David. Arrangement for supporting lighting fittings and the like. 4,057,718, Cl. 362-249.000.
Swanson, Rollan. Ore treatment process. 4,057,422, Cl. 75-86.000.
Swiss Aluminium Ltd.: *See—*
Alder, Hanspeter, 4,057,480, Cl. 204-290.00R.
Symon, Mark Klavdievich: *See—*
Kudryavtsev, Alexandr Alexandrovich; Firsov, Vitaly Mikhailovich; Solinov, Evgeny Fedorovich; Symon, Mark Klavdievich; Litvinov, Pavel Ivanovich; Veresov, Albert Pavlovich; Rybakov, Ivan Alexandrovich; Trishin, Viktor Timofeevich; Goryannikov, Vladimir Mikhailovich; Savin, Vyacheslav Pavlovich; and Kashkarov, Igor Georgievich, 4,057,409, Cl. 65-154.000.
Szabo, Lajos: *See—*
Szantay, Csaba; Szabo, Lajos; Kalaus, Gyorgy; Karpati, Egon; and Szporny, Laszlo, 4,057,550, Cl. 260-293.550.
Szantay, Csaba; Szabo, Lajos; Kalaus, Gyorgy; Karpati, Egon; and Szporny, Laszlo, 4,057,551, Cl. 260-293.550.
Szantay, Csaba; Szabo, Lajos; Kalaus, Gyorgy; Karpati, Egon; and Szporny, Laszlo, to Richter Gedeon Vegyeszeti Gyar Rt. Nitrogen-containing polycyclic compounds. 4,057,550, Cl. 260-293.550.
Szantay, Csaba; Szabo, Lajos; Kalaus, Gyorgy; Karpati, Egon; and Szporny, Laszlo, to Richter Gedeon Vegyeszeti Gyar Rt. Indolo[2,3-a]quinolizines. 4,057,551, Cl. 260-293.550.
Szporny, Laszlo: *See—*
Szantay, Csaba; Szabo, Lajos; Kalaus, Gyorgy; Karpati, Egon; and Szporny, Laszlo, 4,057,550, Cl. 260-293.550.
Szantay, Csaba; Szabo, Lajos; Kalaus, Gyorgy; Karpati, Egon; and Szporny, Laszlo, 4,057,551, Cl. 260-293.550.
Szulewski, John W. Artificial tree structure. 4,057,665, Cl. 428-8.000.
Tafoya, Benny R., to Sperry Rand Corporation. Bi-directional scanner assembly. 4,057,784, Cl. 340-146.30F.
Tagami, Sanae: *See—*
Kimura, Akio; Seki, Kenji; Ukita, Mamoru; Asahi, Satoshi; and Tagami, Sanae, 4,057,600, Cl. 260-878.00B.
Taig, Alistair Gordon, to Bendix-Westinghouse Limited. Power assistance control device. 4,057,079, Cl. 137-625.230.
Takahashi, Katsuhiko: *See—*
Nishikawa, Daikichiro; Imada, Yukio; Kinoshita, Masayuki; Takahashi, Katsuhiko; Machida, Hajime; and Nagasawa, Michitaro, 4,057,469, Cl. 195-51.00G.
Takamizawa, Minoru; Okada, Humio; Hasebe, Nobuyuki; and Toida,

Hiromi, to Shinetsu Chemical Company. Anti-sticking silicone compositions of non-solvent type. 4,057,596, Cl. 260-825.000.
Takanashi, Akihiro: *See—*
Moriyama, Shigeo; Harada, Tatsuo; Kawamura, Yoshio; Hashimoto, Seiya; Takanashi, Akihiro; Kurosaki, Toshiei; Kuniyoshi, Shinji; and Hosaka, Sumio, 4,057,347, Cl. 355-67.000.
Takeda Chemical Industries, Ltd.: *See—*
Sugimoto, Keiichi; Nishijima, Koji; Akimoto, Hiroshi; Hanaoka, Tadashi; and Kakeya, Nobuharu, 4,057,544, Cl. 260-239.100.
Takei, Haruo: *See—*
Sato, Akira; Ogawa, Akira; Hinata, Masanao; and Takei, Haruo, 4,057,430, Cl. 96-100.00R.
Takekawa, Nobuhiro: *See—*
Endo, Ichiro; Kobayashi, Hajime; and Takekawa, Nobuhiro, 4,057,016, Cl. 101-465.000.
Takeuchi, Hisashi: *See—*
Yamazaki, Isamu; Toyama, Yoichi; Hirota, Kiwami; and Takeuchi, Hisashi, 4,057,680, Cl. 526-142.000.
Takigawa, Tomoshi: *See—*
Ishikawa, Kazuo; Hirata, Noritsugu; Takigawa, Tomoshi; and Yamada, Yasutsugu, 4,057,334, Cl. 352-175.000.
Tal, Aharon. Electrical control system for automatic metering valve. 4,057,173, Cl. 222-20.000.
Tammi, Vesa: *See—*
Geus, Ewald; and Tammi, Vesa, 4,057,704, Cl. 219-75.000.
Tamura, Chiharu: *See—*
Mizusawa, Shinichiro; Tamura, Chiharu; Nakamura, Norihiko; and Yanagihara, Hiromichi, 4,056,934, Cl. 60-311.000.
Tanaka, Hiroaki: *See—*
Akasaka, Shigeo; and Tanaka, Hiroaki, 4,057,333, Cl. 352-141.000.
Tanaka, Yoshikazu: *See—*
Tanigaki, Takashi; Tanaka, Yoshikazu; and Koshio, Takeshi, 4,057,706, Cl. 219-146.000.
Tani, Yoshio, to Kobe Steel, Ltd. Steel bar for concrete reinforcement having a non-circular cross-section. 4,056,911, Cl. 52-738.000.
Tanigaki, Takashi; Tanaka, Yoshikazu; and Koshio, Takeshi, to Nippon Steel Corporation. Coating composition and a coated electrode for arc welding. 4,057,706, Cl. 219-146.000.
Tarrant, D. Jarratt. Hull construction. 4,056,943, Cl. 61-96.000.
Tautz, Helmut: *See—*
Vahle, Erwin; and Tautz, Helmut, 4,057,272, Cl. 292-128.000.
Tavernier, Georges Antoine, to Societe Nouvelle Baele Gangloff. Apparatus for transferring labels or like flexible sheets. 4,057,457, Cl. 156-571.000.
Taylor, Harry E. Catheter holder for securing a urethral catheter to a patient. 4,057,066, Cl. 128-349.00R.
Taylor, Philip Maurice: *See—*
deVial, Raymond Michael; and Taylor, Philip Maurice, 4,057,721, Cl. 250-301.000.
Taylor, Quentin, to Grain Systems, Inc. Subsoil plow. 4,057,112, Cl. 172-166.000.
Teijin Limited: *See—*
Konishi, Tadashi; and Kuno, Masashi, 4,057,534, Cl. 260-75.00R.
Teijin Seiki Company Limited: *See—*
Kamimura, Toshio, 4,057,004, Cl. 91-30.000.
Tekade Felten & Guilleaume Fernmeldeanlagen GmbH: *See—*
Schmidt, Hans-Joachim, 4,057,771, Cl. 333-70.00R.
Telefonaktiebolaget L M Ericsson: *See—*
Hagermo, Kjell Gustaf Roland, 4,057,312, Cl. 339-21.00R.
Telettra Laboratori di Telefonia Elettronica e Radio S.p.A.: *See—*
Vagliani, Federico; and Molinari, Alcide, 4,057,690, Cl. 179-15.0AS.
Telinski, Thomas J.: *See—*
Dryden, Hugh L., Jr.; Scaros, Mike G.; and Telinski, Thomas J., 4,057,542, Cl. 260-239.55C.
Terakawa, Yukio: *See—*
Kikuchi, Kiyoshi; Okano, Takeo; Terakawa, Yukio; and Nishihara, Akira, 4,057,525, Cl. 260-29.40R.
Teramura, Hiroichi: *See—*
Nakagome, Yukio; Teramura, Hiroichi; Fukata, Yasuo; and Yamasaki, Yasuhiro, 4,057,834, Cl. 358-133.000.
Terasaki, Shuji: *See—*
Yoshida, Masafumi; Sasaki, Tohru; and Terasaki, Shuji, 4,057,660, Cl. 427-100.000.
Terrulli, Antonio J. Novelty toy. 4,056,895, Cl. 46-1.00R.
Texaco Inc.: *See—*
Cole, Edward L.; Hess, Howard V.; and Franz, William F., 4,057,399, Cl. 44-6.000.
Crouch, William B.; Fabiero, Carolina P.; and Robin, Allen M., 4,057,510, Cl. 252-372.000.
Paap, Hans J.; and Arnold, Dan M., 4,057,720, Cl. 250-266.000.
Texas Instruments Deutschland GmbH: *See—*
Schuermann, Josef H., 4,057,765, Cl. 330-279.000.
Texas Instruments Incorporated: *See—*
Adcock, Willis A., 4,057,830, Cl. 358-127.000.
Jones, James J., 4,057,299, Cl. 303-92.000.
Wingo, Dale Tackitt, 4,057,840, Cl. 360-99.000.
Th. Kieserling & Albrecht: *See—*
Fangmeier, Ralf; and Bracht, Lothar, 4,056,958, Cl. 72-98.000.
Thagard Technology Company: *See—*
Matovich, Edwin, 4,057,396, Cl. 23-252.00R.
Thame, Neville G.: *See—*
Lundberg, Robert D.; and Thame, Neville G., 4,057,598, Cl. 260-857.00G.
Theidel, Hans: *See—*
Kackstaedter, Klaus; and Theidel, Hans, 4,057,387, Cl. 8-1.00W.
Theis, James V., Jr.; and Meyer, Bruno P., to Hollymatic Corporation. Pressure gas engine. 4,057,360, Cl. 415-25.000.
Thiokol Corporation: *See—*
Biddle, Richard A., 4,057,441, Cl. 149-19.900.
Shaw, Graham C.; Lawton, Emil A.; and Jones, Leon L., 4,057,442, Cl. 149-109.400.
Thomas, Charles S. Tape printer and stripper assembly. 4,057,014, Cl. 101-228.000.
Thomas, Geoffrey Owen, to United States of America, Navy. Mechanism for deep ocean instrumentation remote release. 4,057,000, Cl. 85-33.000.
Thompson, John Robert; Rowland, Trevor Cartwright; Proebstle, Richard Alan; Rosicky, Edward; and Snyder, Thoma Mees van't Hoff, to General Electric Company. Conditioning of nuclear reactor fuel. 4,057,466, Cl. 176-38.000.
Thompson, John Stewart: *See—*
Gitlin, Richard Dennis; and Thompson, John Stewart, 4,057,696, Cl. 179-170.200.
Thompson, Robert E.; and Pierce, Bill L., to Westinghouse Electric Corporation. Nuclear reactor auxiliary heat removal system. 4,057,465, Cl. 176-38.000.
Thompson, Vern C.; and Riggle, John A., to Reuter, Inc. Lifting arm apparatus. 4,057,156, Cl. 214-302.000.
Thomson, Lois J.: *See—*
Babb, Raymond E., 4,057,352, Cl. 356-178.000.
Thorpe, Walter, to Simonbuild Limited. Pre-stressed concrete structures. 4,056,905, Cl. 52-223.00R.
Thow, G. Bruce, to Dow Corning Corporation. Percutaneous gastrointestinal tube. 4,057,065, Cl. 128-348.000.
Tiede, Wolfgang: *See—*
Mnilk, Reinhold; Kurreck, Manfred; and Tiede, Wolfgang, 4,056,914, Cl. 53-35.000.
Timmler, Helmut; and Draber, Wilfried, to Bayer Aktiengesellschaft. 4-Amino-1,2,4-triazin-5-ones. 4,057,546, Cl. 544-182.000.
Timron, Inc.: *See—*
Kessler, Theodore P., 4,057,143, Cl. 206-400.000.
Timsit, Claude, to Association pour le Developpement de l'Enseignement et de la Recherche en Systematique Appliquee (A.D.E.R.S.A.). Analog-to-digital encoder. 4,057,795, Cl. 340-347.0AD.
TIW Industries, Inc.: *See—*
Guarnere, Joseph V., 4,056,903, Cl. 52-122.000.
Tjurin, Albert Vasilievich: *See—*
Bataev, Mikhail Kirillovich; Veits, Isaak Efimovich; Gorodetsky, Sergei Sergeevich; Macheret, Lev Ilich; Kuznetsov, Lev Alexeevich; Tjurin, Albert Vasilievich; and Yaunzem, Jury Eduardovich, 4,057,453, Cl. 156-390.000.
Toida, Hiromi: *See—*
Takamizawa, Minoru; Okada, Humio; Hasebe, Nobuyuki; and Toida, Hiromi, 4,057,596, Cl. 260-825.000.
Tokura, Koichi: *See—*
Kaneda, Saburo; and Tokura, Koichi, 4,057,850, Cl. 364-200.000.
Tokyo Shibaura Electric Company, Ltd.: *See—*
Hamano, Eizaburo, 4,057,747, Cl. 313-413.000.
Tokyo Tanabe Company, Limited: *See—*
Kimura, Goro; and Sekine, Junzo, 4,057,684, Cl. 536-4.000.
Tol-O-Matic, Inc.: *See—*
Berg, David W., 4,057,257, Cl. 277-4.000.
Tollinger, Donald L.: *See—*
Bauman, Bruce K.; Norbeck, Dean K.; and Tollinger, Donald L., 4,057,842, Cl. 361-93.000.
Tomita, Mamoru: *See—*
Okada, Katsuto; Ogasa, Katsuhiro; and Tomita, Mamoru, 4,057,655, Cl. 426-583.000.
Tomy Kogyo Co., Inc.: *See—*
Karasawa, Hideyasu, 4,056,896, Cl. 46-132.000.
Topham, Arthur: *See—*
Davies, Peter Kingsley; Rogers, Leslie Richard; Stansfield, James Frederick; and Topham, Arthur, 4,057,436, Cl. 106-288.00Q.
Torii, Michihiro: *See—*
Kobayashi, Seihin; Torii, Michihiro; and Kobayashi, Hiroaki, 4,057,606, Cl. 264-24.000.
Toriya, Jun; Sato, Masato; Shiraga, Ken; and Matsunaga, Setsuo, to Haji, Noboru; and Mitsubishi Chemical Industries Ltd. Method of separating diacetoxybutene. 4,057,472, Cl. 203-80.000.
Tornow, Robert Norman: *See—*
Schlichting, John; and Tornow, Robert Norman, 4,057,033, Cl. 122-32.000.
Touzuka, Takashi; and Ohsaka, Yonosuke, to Daikin Kogyo Co., Ltd. Process for preparing hexafluoropropanone-2. 4,057,584, Cl. 260-593.00H.
Towmotor Corporation: *See—*
Artrip, Robert W.; and Klimo, Robert G., 4,057,752, Cl. 318-345.00B.
Towne Robinson Fastener Company: *See—*
Chaivre, Joseph W.; and Jadach, Albert A., 4,056,862, Cl. 10-72.00R.
Toyama, Yoichi: *See—*
Yamazaki, Isamu; Toyama, Yoichi; Hirota, Kiwami; and Takeuchi, Hisashi, 4,057,680, Cl. 526-142.000.
Toyo Kogyo Co., Ltd.: *See—*
Hatano, Mitsuru, 4,056,990, Cl. 74-781.00R.
Toyo Seikan Kaisha Ltd.: *See—*
Yamaguchi, Kanemichi, 4,057,391, Cl. 21-56.000.
Toyota Jidosha Kogyo Kabushiki Kaisha: *See—*
Koshino, Kenji; and Itoh, Masayasu, 4,057,022, Cl. 113-120.00G.

Kubo, Seitoku; Kuramochi, Kojiro; Morisawa, Kunio; and Ohnuma, Kiyoshi, 4,056,988, Cl. 74-695.000.
Mizusawa, Shinichiro; Tamura, Chiharu; Nakamura, Norihiko; and Yanagihara, Hiromichi, 4,056,934, Cl. 60-311.000.
Nohira, Hidetaka; and Kobashi, Kiyoshi, 4,056,933, Cl. 60-278.000.
Oka, Hiroyuki; and Ishihara, Masashi, 4,057,296, Cl. 303-6.00C.
Sakai, Toshimitsu; Fukumura, Kagenori; and Saito, Tadashi, 4,056,991, Cl. 74-863.000.
Tracy, Frank R., to General Tire & Rubber Company, The. Pneumatic tire for use when deflated. 4,057,092, Cl. 152-379.100.
Tramposch, Herbert; and Polad, Michael, to Malco Plastics. Means for printing OCR and bar code on cards. 4,057,011, Cl. 101-93.030.
Tratz, Herbert; Kelp, Fritz; and Netsch, Erich, to Kraftwerk Union Aktiengesellschaft. Feedwater preheater with two steam chambers. 4,057,103, Cl. 165-11.000.
Trioliet-Mullos Silo Nederland B.V.: *See—*
Liet, Fredericus; and Liet, Cornelis Hendrikus, 4,057,295, Cl. 302-56.000.
Trishin, Viktor Timofeevich: *See—*
Kudryavtsev, Alexandr Alexandrovich; Firsov, Vitaly Mikhailovich; Solinov, Evgeny Fedorovich; Symon, Mark Klavdievich; Litvinov, Pavel Ivanovich; Veresov, Albert Pavlovich; Rybakov, Ivan Alexandrovich; Trishin, Viktor Timofeevich; Goryannikov, Vladimir Mikhailovich; Savin, Vyacheslav Pavlovich; and Kashkarov, Igor Georgievich, 4,057,409, Cl. 65-154.000.
Troxler, Franz: *See—*
Bormann, Gerhard; and Troxler, Franz, 4,057,560, Cl. 260-326.860.
Trudeau, William H.: *See—*
Gaines, Donald R.; Smallegan, Jon M.; and Trudeau, William H., 4,057,304, Cl. 308-237.00A.
Trujillo, John J. Measuring liquid dispenser with flat top. 4,057,174, Cl. 222-49.000.
Trus Joist Corporation: *See—*
Gross, Donald Ralph; Schaefer, Nick Lewis; Russell, John Raymond; and Johnson, Clifford Ray, 4,057,088, Cl. 144-91.000.
TRW Inc.: *See—*
Merz, Kenneth M.; and Shapiro, Howard E., 4,057,777, Cl. 338-309.000.
Schrader, Gustav E., 4,057,475, Cl. 204-129.100.
Tsukutani, Koichi: *See—*
Nakagawa, Yasuichi; Ikenishi, Masataka; Hozumi, Yoshio; Kushida, Shozo; and Tsukutani, Koichi, 4,057,698, Cl. 200-16.00A.
Tucker, Thomas Lee; and Halverson, Gilbert, to Scientific Instruments, Inc. Device for the measurement of liquid level. 4,056,887, Cl. 33-126.600.
Tuzinsky, Wolfgang: *See—*
Isenberg, Gerhard; and Tuzinsky, Wolfgang, 4,057,369, Cl. 417-365.000.
Tuzson, John J., to Borg-Warner Corporation. Slip speed responsive device for controlling engagement of fluid actuated clutch. 4,057,133, Cl. 192-103.00F.
Tylan Corporation: *See—*
LeMay, Dan B., 4,056,975, Cl. 73-202.000.
Ubukata, Susumu; Iyoda, Shozo; and Oda, Kenji, to Ubukata, Susumu. Emergency locking retractor for vehicle seat belts. 4,057,200, Cl. 242-107.40A.
Uetrecht, Dale M., to D. H. Baldwin Company. Single master tone generator. 4,056,995, Cl. 84-1.010.
Ugine Carbone: *See—*
Cassard, Jacques; Lachenal, Jean-Michel; and Romagnolo, Gerard, 4,056,873, Cl. 29-132.000.
Uhlig, Albert R., to Owens-Illinois, Inc. Method of making blown plastic articles. 4,057,609, Cl. 264-89.000.
Uhring, Gary S.: *See—*
Hood, Frederick E.; Mitchell, Donald K.; and Uhring, Gary S., 4,057,023, Cl. 114-107.000.
Ukita, Mamoru: *See—*
Kimura, Akio; Seki, Kenji; Ukita, Mamoru; Asahi, Satoshi; and Tagami, Sanae, 4,057,600, Cl. 260-878.00B.
Umiastowski, John. Yarn-twisting method and apparatus. 4,056,924, Cl. 57-5.000.
Underground Location Services Limited: *See—*
Jones, Trevor Clifford, 4,057,081, Cl. 138-97.000.
Ungerer geb. Dollinger, Irma: *See—*
Ihle, Josef, 4,056,994, Cl. 83-311.000.
Union Oil Company of California: *See—*
Klass, Donald L., 4,057,575, Cl. 560-245.000.
United Air Specialists, Inc.: *See—*
Cheney, William A.; and Spurgin, Wendell P., 4,057,405, Cl. 55-105.000.
United Electric Controls Company: *See—*
Reis, Robert D., 4,057,699, Cl. 200-83.00D.
United Kingdom Atomic Energy Authority: *See—*
Lunt, Anthony Randle, 4,057,468, Cl. 176-78.000.
United States of America
Army: *See—*
Donovan, William F., 4,057,002, Cl. 89-8.000.
Greendale, John H., 4,056,852, Cl. 2-417.000.
Energy Research and Development Administration: *See—*
Fischer, Harry C., 4,057,074, Cl. 137-107.000.
Jassby, Daniel L.; and Hooke, William M., 4,057,462, Cl. 176-5.000.
McDonald, Robert E.; and Canonico, Domenic A., 4,056,963, Cl. 72-253.00R.
Shuck, Lowell Z., 4,057,780, Cl. 340-15.5MC.
Walker, Robert D., Jr., 4,057,678, Cl. 429-104.000.
Health, Education and Welfare: *See—*
Boretos, John W.; and Poirier, Robert A., 4,056,854, Cl. 3-1.500.
Interior: *See—*
Blanz, John, 4,057,115, Cl. 173-160.000.
Bruckenstein, Stanley; and Sherwood, William G., 4,057,478, Cl. 204-195.00P.
Navy: *See—*
Bates, Albert M.; and Madera, Anthony J., 4,057,778, Cl. 340-2.000.
Coleman, Ernest W., 4,057,803, Cl. 343-113.00R.
Griffith, James R.; and O'Rear, Jacques G., 4,057,569, Cl. 260-465.00E.
Lewis, Adolph Lee, 4,057,719, Cl. 250-227.000.
Thomas, Geoffrey Owen, 4,057,000, Cl. 85-33.000.
U.S. Philips Corporation: *See—*
Braat, Josephus Johannes Maria, 4,057,833, Cl. 358-128.000.
Gieles, Antonius Cornelis Maria; and Somers, Gerardus Henricus Johannus, 4,057,063, Cl. 128-303.170.
Hoogendijk, Adrianus Huibert, 4,057,827, Cl. 358-8.000.
Hoogendoorn, Abraham; van de Grift, Robert Emile Johan; and van Kessel, Theodorus Jozef, 4,057,796, Cl. 340-347.0AD.
Jacobs, Bernardus Antonius Johannus; van der Wal, Johannes; and Gerritsen, Gerrit Berend, 4,057,831, Cl. 358-128.000.
Kappert, Hermanus Antonius, 4,057,832, Cl. 358-128.000.
Needs, Howard Curtis; and Spapens, Harald Henricus Cornelis Maria, 4,057,837, Cl. 358-254.000.
Ong, Daniel; and Muller, Johannes Cornelius Antonius, 4,057,331, Cl. 350-285.000.
Peschmann, Kristian; Junginger, Hans-Georg; and Hirsch, Hans-Jurgen, 4,057,728, Cl. 250-374.000.
Wagner, Wolfgang, 4,057,725, Cl. 250-360.000.
United Technologies Corporation: *See—*
Cruff, Carlton E.; and Day, Edward G., 4,057,227, Cl. 366-2.000.
Kenigsberg, Irwin Jeffrey; and Paul, William Francis, 4,057,363, Cl. 416-145.000.
University Patents, Inc.: *See—*
Salmon, Sydney E.; and Liu, Rosa H., 4,057,618, Cl. 424-1.000.
Upatnieks, Juris, to Environmental Research Institute of Michigan. Hologram projector. 4,057,317, Cl. 350-3.500.
Upjohn Company, The: *See—*
Axen, Udo F., 4,057,574, Cl. 560-53.000.
Coverdale, Charles E.; and Skaletzky, Louis L., 4,057,633, Cl. 424-250.000.
Lin, Chiu-Hong, 4,057,572, Cl. 560-53.000.
Youngdale, Gilbert A., 4,057,564, Cl. 260-410.90R.
Vadovic, Charles J.; Wesselhoft, Robert D.; and Nahas, Nicholas C., to Exxon Research & Engineering Co. Alkali metal catalyst recovery system. 4,057,512, Cl. 252-413.000.
Vagliani, Federico; and Molinari, Alcide, to Telettra Laboratori di Telefonia Elettronica e Radio S.p.A. Method and apparatus for detecting the presence of a speech signal on a voice channel signal. 4,057,690, Cl. 179-15.0AS.
Vahle, Erwin; and Tautz, Helmut, to Singer Company, The. Arm top cover for locking devices. 4,057,272, Cl. 292-128.000.
Valdes, A. R., to Fluor Corporation. Gas treating process. 4,057,403, Cl. 55-31.000.
Valentine, Jean A., to Martin Marietta Corporation. Endless carrier sleeve for discrete fragments. 4,057,001, Cl. 86-1.00R.
Valleylab, Inc.: *See—*
Morrison, Charles F., Jr.; and Weaver, Benson C., 4,057,064, Cl. 128-303.170.
van Amerongen, Evert; and Buhrman, Willem M., to SKF Industrial Trading and Development Company B.V. Cleaning apparatus for mechanical workpieces. 4,057,070, Cl. 134-83.000.
Vancsa, George I.: *See—*
Furniss, William E.; Vancsa, George I.; and Onufer, Joseph R., 4,057,785, Cl. 340-163.000.
van de Grift, Robert Emile Johan: *See—*
Hoogendoorn, Abraham; van de Grift, Robert Emile Johan; and van Kessel, Theodorus Jozef, 4,057,796, Cl. 340-347.0AD.
van der Lely, Ary; and Bom, Cornelis Johannes Gerardus, to C. van der Lely N. V. Soil cultivating machines. 4,057,111, Cl. 172-72.000.
van der Lely, Cornelis. Rotary harrows. 4,057,110, Cl. 172-49.000.
van der Linde, Leendert Maarten: *See—*
Boelens, Harmannus; Maessen, Jan Theodor Marie Francois; and van der Linde, Leendert Maarten, 4,057,515, Cl. 252-522.000.
van der Wal, Johannes: *See—*
Jacobs, Bernardus Antonius Johannus; van der Wal, Johannes; and Gerritsen, Gerrit Berend, 4,057,831, Cl. 358-128.000.
Van Gompel, James J., to Brammall, Inc. Method and apparatus for bracing and securing doors. 4,057,274, Cl. 292-259.00R.
van Kessel, Theodorus Jozef: *See—*
Hoogendoorn, Abraham; van de Grift, Robert Emile Johan; and van Kessel, Theodorus Jozef, 4,057,796, Cl. 340-347.0AD.
van Valkenburg, Howard E.; and McCarroll, Vincent P., to Automation Industries, Inc. Distance amplitude compensation system. 4,056,971, Cl. 73-629.000.
Variable Kinetic Drives, Ltd.: *See—*
Hobbs, Howard Frederick, 4,056,986, Cl. 74-688.000.
Varis, Martti; and Nordberg, Krister. Waste water valve. 4,057,076, Cl. 137-413.000.
Vavrik, Ernest: *See—*
Skrabak, Michal; Vavrik, Ernest; Kolarik, Stanislav; and Mazak, Milos, 4,057,497, Cl. 210-65.000.

Veits, Isaak Efimovich: *See—*
Bataev, Mikhail Kirillovich; Veits, Isaak Efimovich; Gorodetsky, Sergei Sergeevich; Macheret, Lev Ilich; Kuznetsov, Lev Alexeevich; Tjurin, Albert Vasilievich; and Yaunzem, Jury Eduardovich, 4,057,453, Cl. 156-390.000.
Vensel, Richard R. Aircraft with oxygen supply and method of supplying oxygen thereto. 4,057,205, Cl. 244-118.00P.
Vent-Cair, Inc.: *See—*
Kuechler, Irvin R., 4,056,877, Cl. 29-469.000.
Vercellotti, Leonard C.: *See—*
Pattantyus-Abraham, Tamas I.; Vercellotti, Leonard C.; and South, William H., 4,057,754, Cl. 324-207.000.
Vereinigte Aluminum-Werke Aktiengesellschaft: *See—*
Lossack, Edgar; Kramer, Kurt; and Bulian, Gerd, 4,057,100, Cl. 164-418.000.
Vereinigte Osterreichische Eisen-und Stahlwerke: *See—*
Sigott, Siegfried, 4,057,260, Cl. 279-77.000.
Veresov, Albert Pavlovich: *See—*
Kudryavtsev, Alexandr Alexandrovich; Firsov, Vitaly Mikhailovich; Solinov, Evgeny Fedorovich; Symon, Mark Klavdievich; Litvinov, Pavel Ivanovich; Veresov, Albert Pavlovich; Rybakov, Ivan Alexandrovich; Trishin, Viktor Timofeevich; Goryannikov, Vladimir Mikhailovich; Savin, Vyacheslav Pavlovich; and Kashkarov, Igor Georgievich, 4,057,409, Cl. 65-154.000.
Vernieres, Jean-Claude: *See—*
Pigerol, Charles; Eymard, Pierre; Vernieres, Jean-Claude; Werbenec, Jean-Pierre; and Broll, Madeleine, 4,057,644, Cl. 424-325.000.
Vernon, Richard H.: *See—*
Fischbeck, Kenneth H.; and Vernon, Richard H., 4,057,807, Cl. 346-140.00R.
Vero Electronics Limited: *See—*
Hedger, Denyer Edward, 4,057,186, Cl. 226-127.000.
Veselovsky, Roman Alexandrovich: *See—*
Lipatova, Tatyana Esperovna; Veselovsky, Roman Alexandrovich; and Pkhakadze, Georgy Alexandrovich, 4,057,535, Cl. 260-77.5AC.
Vetco Offshore Industries, Inc.: *See—*
Jansen, Martin B., Jr., 4,057,267, Cl. 285-18.000.
Victor, George; Fisher, Robert G.; and Bischof, Kaspar, to E. & J. Gallo Winery. Self-retaining bottle stopper. 4,057,160, Cl. 215-318.000.
Vidilles, Jacques. Concentrators for recovering liquid pollutant floating on the surface of a sheet of water. 4,057,498, Cl. 210-170.000.
Vilums, Ivars J.: *See—*
Bimmerle, Charles F.; Braig, James R.; and Vilums, Ivars J., 4,057,791, Cl. 340-261.000.
Virginia National Bank: *See—*
Barnett, Larkin H., III, 4,056,889, Cl. 33-188.000.
Vogelsberg, Dieter, to Siemens Aktiengesellschaft. Method and apparatus for the SZ-twisting of electrical cables. 4,056,925, Cl. 57-34.0AT.
Volk & Son Manufacturing Co., Inc.: *See—*
Cloyd, John Keen, 4,056,865, Cl. 17-1.00S.
Volker, Martin; and Muhlhoff, Heinz, to Kabel- und Metallwerke Gutehoffnungshutte Aktiengesellschaft. Mixing of materials. 4,057,228, Cl. 366-79.000.
Volkswagenwerk Aktiengesellschaft: *See—*
Reichel, Kurt; Decker, Gerd; Kuck, Alfred; and Schulz, Erwin, 4,057,037, Cl. 123-32.0SP.
Reichel, Kurt; Decker, Gerd; Kuck, Hans-Alfred; and Brandstetter, Walter, 4,057,038, Cl. 123-32.0SP.
Vostrowsky, Otto: *See—*
Bestmann, Hans Jurgen; Stransky, Werner Theo; and Vostrowsky, Otto, 4,057,593, Cl. 260-682.000.
Vrba, Richard Alan: *See—*
Cockerill, William Clyde; Hornung, Louis Michael; Johnson, Donavon William; and Vrba, Richard Alan, 4,057,846, Cl. 364-200.000.
Vsesoiuzny Proektno-Izyskatelsky Nauchno-Issledovatelsky Institut "Gidroproek" Imeni S. Ya. Zhuka: *See—*
Bataev, Mikhail Kirillovich; Veits, Isaak Efimovich; Gorodetsky, Sergei Sergeevich; Macheret, Lev Ilich; Kuznetsov, Lev Alexeevich; Tjurin, Albert Vasilievich; and Yaunzem, Jury Eduardovich, 4,057,453, Cl. 156-390.000.
W. R. Grace & Co.: *See—*
Arguello, Leonard E., 4,057,740, Cl. 307-273.000.
WABCO Westinghouse GmbH: *See—*
Seegers, Guenter, 4,057,298, Cl. 303-84.00R.
Wacker-Chemitronic Gesellschaft fur Elektronik-Grundstoffe mbH: *See—*
Lechner, Gunther; Pritscher, Karl; and Kirschner, Helmut, 4,057,142, Cl. 206-332.000.
Schmidt, Dietrich; Huber, Karl Erwin; and Hofer, Johann, 4,057,395, Cl. 23-230.00R.
Wada, Tsuneo: *See—*
Habu, Teiji; Wada, Tsuneo; Sasaki, Takashi; Itoh, Shigemasa; Ohmura, Takayoshi; Ishii, Hiroki; and Yamaguchi, Hisashi, 4,057,538, Cl. 260-117.000.
Waese, Gerhard: *See—*
Bachmann, Wilfried; Gnabs, Christian; Janecka, Kurt; Mundlos, Eberhard; Papenfuhs, Theodor; and Waese, Gerhard, 4,057,576, Cl. 260-525.000.
Wager, Oleg, to Burcan International Limited. Earth drain. 4,057,500, Cl. 210-170.000.
Wagner, Klaus; Eue, Ludwig; Schmidt, Robert R.; and Roos, Ernst, to Bayer Aktiengesellschaft. 2,4-Bis-(trifluoromethyl)-6-nitrophenol compounds and herbicidal compositions. 4,057,419, Cl. 71-121.000.
Wagner, Wolfgang, to U.S. Philips Corporation. Device for measuring local radiation absorption in a body. 4,057,725, Cl. 250-360.000.
Waldmann, Hermann: *See—*
Fork, Kurt; Lambrecht, Dietrich; Waldmann, Hermann; and Hofmann, Helmut, 4,057,714, Cl. 264-494.000.
Walker-Neer Manufacturing Co., Inc.: *See—*
Ford, George Alan, 4,057,118, Cl. 175-215.000.
Walker, Robert D., Jr., to United States of America, Energy Research and Development Administration. Molten salt battery having inorganic paper separator. 4,057,678, Cl. 429-104.000.
Wallace, Bernard E., to B. E. Wallace Products Corporation. Winch-hoist actuating apparatus. 4,057,218, Cl. 254-167.000.
Walt, Guido: *See—*
Lux, Benno; Kurz, Wilfried; Hubert, Jean-Claude; Mollard, Francois; and Walt, Guido, 4,057,097, Cl. 164-60.000.
Wang, Long Shyong: *See—*
Ruckel, Erwin Richard; and Wang, Long Shyong, 4,057,682, Cl. 526-190.000.
Ward, George C., to Southwire Company. Apparatus for conveying heated rod. 4,056,959, Cl. 72-128.000.
Ward, Robertson, Jr. Projection screen. 4,057,323, Cl. 350-125.000.
Warnke, Hans; and Boer, Werner, to Klockner-Werke AG. Valve plate arrangement for hydrostatic piston machines. 4,057,006, Cl. 91-487.000.
Warnod, Bertrand Antoine, to Klaxon S.A. Electro-acoustic signalling horns. 4,057,799, Cl. 340-388.000.
Waskonig, Walter: *See—*
Kalka, Josef; Waskonig, Walter; and Lueg, Karl, 4,056,981, Cl. 73-421.00B.
Wasyleczko, Zenon: *See—*
Chrobak, Eryk; Natkaniec, Benedykt; Wasyleczko, Zenon; Stawinski, Antoni; and Roczek, Andrzej, 4,056,929, Cl. 59-85.000.
Watanabe, Kenryo, to Sharp Kabushiki Kaisha. Channel type photoelectric energy transducer. 4,057,822, Cl. 357-52.000.
Watermann, Willy, to Klockner-Werke AG. Mine roof support for an underground mine gallery. 4,056,941, Cl. 61-45.00D.
Watts, Robert H.: *See—*
Bradbury, William B.; Watts, Robert H.; and Scott, E. Timm, 4,057,193, Cl. 241-281.000.
Wax, Archie E. Internal combustion engine system. 4,057,040, Cl. 123-46.00R.
Weaver, Benson C.: *See—*
Morrison, Charles F., Jr.; and Weaver, Benson C., 4,057,064, Cl. 128-303.170.
Weaver, Richard L. Silo unloader and apparatus therefor. 4,057,151, Cl. 214-17.0DA.
Weaver, Richard L. Silo center discharge apparatus. 4,057,152, Cl. 214-17.0DA.
Weaver, Richard L. Silo center discharge mechanism. 4,057,153, Cl. 214-17.0DA.
Webb, Robert Lee: *See—*
Mendelson, Wilford Lee; and Webb, Robert Lee, 4,057,585, Cl. 260-612.00D.
Weber, Alfred; Muller, Rudolf; and Kurzidim, Johannes, to Schering Aktiengesellschaft. Method for isolation of 3-hydroxy steroids and 3-keto steroids. 4,057,541, Cl. 260-239.55A.
Weber, Carl W. Inflatable cushion and method of making the same. 4,056,858, Cl. 5-365.000.
Wegemund, Bernd: *See—*
Hase, Brigitte; Hase, Christian; Galinke, Joachim; and Wegemund, Bernd, 4,057,622, Cl. 424-78.000.
Hase, Brigitte; Galinke, Joachim; and Wegemund, Bernd, 4,057,623, Cl. 424-78.000.
Hase, Brigitte; Galinke, Joachim; and Wegemund, Bernd, 4,057,624, Cl. 424-78.000.
Hase, Brigitte; Galinke, Joachim; and Wegemund, Bernd, 4,057,625, Cl. 424-78.000.
Weiss, Martin Joseph: *See—*
Grudzinskas, Charles Vincent; and Weiss, Martin Joseph, 4,057,571, Cl. 560-121.000.
Weissel, Oskar: *See—*
Krall, Hermann-Dieter; Weissel, Oskar; and Schwarz, Hans-Helmut, 4,057,581, Cl. 260-571.000.
Welge, Frederick T.: *See—*
Redmore, Derek; and Welge, Frederick T., 4,057,554, Cl. 260-296.00D.
Wellman, Lester R. Article holding double-sling kit. 4,057,210, Cl. 248-318.000.
Wenzel, Werner, to Nordischer Maschinenbau Rud. Baader. Fish processing machines. 4,056,866, Cl. 17-57.000.
Werbenec, Jean-Pierre: *See—*
Pigerol, Charles; Eymard, Pierre; Vernieres, Jean-Claude; Werbenec, Jean-Pierre; and Broll, Madeleine, 4,057,644, Cl. 424-325.000.
Wert, Edward; and Fisher, Chester Donald, to Koppers Company, Inc. Elevator belt splice. 4,056,867, Cl. 24-37.000.
Wesselhoft, Robert D.: *See—*
Vadovic, Charles J.; Wesselhoft, Robert D.; and Nahas, Nicholas C., 4,057,512, Cl. 252-413.000.
West Electric Co., Ltd.: *See—*
Iwata, Hiroshi, 4,057,810, Cl. 354-29.000.
West, Joe E.: *See—*
Burford, Charles E.; and West, Joe E., 4,057,009, Cl. 100-46.000.

Western Electric Company, Inc.: *See—*

Cranston, Benjamin Howell; Kleinedler, Gary Evan; Machusak, Donald Arthur; and Wiechard, Charles Augustus, 4,057,187, Cl. 228-107.000.

Westinghouse Electric Corporation: *See—*

Altoz, Frank E., 4,057,104, Cl. 165-35.000.

Blewitt, Donald D.; and Binz, Robert D., 4,057,776, Cl. 337-295.000.

Elms, Robert T.; Engel, Joseph C.; and Saletta, Gary F., 4,057,750, Cl. 315-86.000.

Farquhar, Norman G.; and Schwab, John A., 4,057,034, Cl. 122-382.000.

Furniss, William E.; Vancsa, George I.; and Onufer, Joseph R., 4,057,785, Cl. 340-163.000.

Gallagher, Robert C., 4,057,820, Cl. 357-23.000.

Henningsen, Tom; and Conroy, John J., 4,057,770, Cl. 331-94.50Q.

Hinman, Walter L., Jr.; and Gonnam, Russell W., 4,057,841, Cl. 361-64.000.

Jones, Donald J.; and Davis, Guy E., 4,057,715, Cl. 364-494.000.

Lloyd, Wayne B., 4,057,238, Cl. 267-136.000.

Morita, Toshio, 4,057,463, Cl. 176-22.000.

Pattantyus-Abraham, Tamas I.; Vercellotti, Leonard C.; and South, William H., 4,057,754, Cl. 324-207.000.

Perry, Robert H.; and Miller, Howard N., 4,057,753, Cl. 318-376.000.

Ruka, Roswell J.; and Charles, Robert G., 4,057,101, Cl. 165-1.000.

Stewart, Richard E., 4,056,880, Cl. 29-596.000.

Thompson, Robert E.; and Pierce, Bill L., 4,057,465, Cl. 176-38.000.

Weyl, Helmut; and Steinke, Leo, to Robert Bosch GmbH. Device for electrochemically measuring the concentration of oxygen in combustion gases. 4,057,477, Cl. 204-195.00S.

Wheatley, Carl Franklin, Jr., to RCA Corporation. Current amplifiers. 4,057,763, Cl. 330-288.000.

Whitfield, Bert Dean. Fire hose winding apparatus. 4,057,198, Cl. 242-86.200.

Whittaker, Robert K. Door mounted vehicle gun rack. 4,057,180, Cl. 224-1.00R.

Wick, Richard; Pfeifer, Josef; and Schnall, Gunther, to AGFA-Gevaert Aktiengesellschaft. Electro-photographic copier with strip-shaped latent-image carrier. 4,057,344, Cl. 355-16.000.

Widart, Jean E. L.; and Scailteur, Alain F. C., to Cockerill-Ougree-Providence et Esperance-Longdoz en abrege "Cockerill". Metal container with thick walls. 4,057,163, Cl. 220-3.000.

Wiechard, Charles Augustus: *See—*

Cranston, Benjamin Howell; Kleinedler, Gary Evan; Machusak, Donald Arthur; and Wiechard, Charles Augustus, 4,057,187, Cl. 228-107.000.

Wiechert, Rudolf: *See—*

Furst, Andor; Gutzwiller, Jurg; Muller, Marcel; Wiechert, Rudolf; Eder, Ulrich; and Neef, Gunter, 4,057,561, Cl. 260-345.90S.

Wiecko, Jacek. Process for preparing methotrexate or an N-substituted derivative thereof and/or a di (lower) alkyl ester thereof and precursor therefor. 4,057,548, Cl. 260-250.0BC.

Wieschen, Hermann: *See—*

Muschelknautz, Edgar; Burkholz, Armin; Wieschen, Hermann; Guth, Hans; and Richter, Wolfgang, 4,057,075, Cl. 137-171.000.

Wiggins, Glenn C.; Kreh, Marvin J.; and Davis, Robert S., to American Can Company. Oriented saran coextrudate. 4,057,667, Cl. 428-35.000.

Wild, Albrecht: *See—*

Gante, Joachim; Kurmeier, Hans-Adolf; Orth, Dieter; Schacht, Erich; and Wild, Albrecht, 4,057,647, Cl. 424-340.000.

Wilkinson, Robert M., to Alton Box Board Company. Yarn core including slip resistant transfer coating. 4,057,201, Cl. 242-125.100.

Willard, Kaarlela O., to Caterpillar Tractor Co. Eccentric retaining bolt for earthworking tools and method. 4,056,893, Cl. 37-142.00R.

Willem, Michel, to Ceraver. Connection between core and armatures of structures comprising a core of agglomerated fibres. 4,057,687, Cl. 174-179.000.

Williams, Charles E.: *See—*

Williams, Charles H.; and Williams, Charles E., 4,057,031, Cl. 119-1.000.

Williams, Charles H.; and Williams, Charles E. Window perch for pet animals. 4,057,031, Cl. 119-1.000.

Williams, Columbus, Jr.: *See—*

Finelli, Anthony F.; Jasani, Shirish; and Williams, Columbus, Jr., 4,057,431, Cl. 96-115.00R.

Williams, Earl P.: *See—*

Hort, Eugene V.; and Williams, Earl P., 4,057,533, Cl. 260-67.500.

Williams, Lary Lynn: *See—*

Sisk, Robert Michael; and Williams, Lary Lynn, 4,057,701, Cl. 200-213.000.

Williamson, Harold L.; and Aryamane, Avinash P., to Littelfuse, Inc. Method of making a miniature plug-in fuse. 4,056,884, Cl. 29-623.000.

Willmott, Arthur S. Keyboard assembly. 4,057,710, Cl. 235-145.00R.

Wilson, Bradford W. Multipurpose push pull exerciser. 4,057,246, Cl. 272-137.000.

Wilson, James R. Time giving device. 4,056,927, Cl. 58-44.000.

Wilson, Kenneth E.: *See—*

Micetich, Ronald G.; Morin, Robert B.; and Wilson, Kenneth E., 4,057,540, Cl. 260-239.00A.

Wilson, William L.: *See—*

Bick, Rodger L., 4,057,628, Cl. 424-101.000.

Windings, Inc.: *See—*

Newman, James W.; and Zajac, Ronald E., 4,057,203, Cl. 242-163.000.

Zajac, Ronald E., 4,057,204, Cl. 242-163.000.

Windmoller & Holscher: *See—*

Heidemann, Rolf, 4,057,012, Cl. 101-153.000.

Wingo, Dale Tackitt, to Texas Instruments Incorporated. Flexible disc recording cartridge. 4,057,840, Cl. 360-99.000.

Winkelmann, Erhardt; Sinharay, Akhileswer; and Raether, Wolfgang, to Hoechst Aktiengesellschaft. Antiprotozoal(1-alkyl-5-nitro-imidazolyl-2-alkyl)-pyridazines. 4,057,634, Cl. 424-250.000.

Winkowski, Daniel A.: *See—*

Johnson, Robert M.; Winkowski, Daniel A.; and Stiling, Rodney A., 4,057,662, Cl. 427-209.000.

Winslow, Joseph D., Jr., to Petrolite Corporation. Hydrogen probe system. 4,056,968, Cl. 73-19.000.

Wisconsin Alumni Research Foundation: *See—*

Sih, Charles J.; and Heather, James B., 4,057,851, Cl. 560-121.000.

Wisconsin Bridge & Iron Co.: *See—*

Grebe, Edward Andrew, 4,057,138, Cl. 198-480.000.

Wobben, Hendrik Jacob: *See—*

Boelens, Harmannus; and Wobben, Hendrik Jacob, 4,057,516, Cl. 252-522.000.

Wolfangel, Robert G., to Mallinckrodt, Inc. Metal hydroxide scintigraphic agents and method of preparation. 4,057,616, Cl. 424-1.000.

Wolfe, Robert Wade; and Messier, Russell Francis, to GTE Sylvania Incorporated. X-ray phosphors with low afterglow. 4,057,508, Cl. 252-301.40H.

Womack, Eugene S. Rigid golf flag with resilient peripheral edge. 4,057,030, Cl. 116-175.000.

Woodley, George Edward, to Ciba-Geigy AG. Method of fixing a sandwich panel to a support. 4,056,878, Cl. 29-526.00R.

Woodring, Cooper Coolidge, to J. C. Penney Company, Inc. Safety actuating device adapted for two wheeled vehicles. 4,057,127, Cl. 188-24.000.

Woods, Murray Henderson, to RCA Corporation. P+ Silicon integrated circuit interconnection lines. 4,057,824, Cl. 357-56.000.

Woolf, Lawrence Dudley, to Rediffusion Reditronics Limited. Circuit for generating two distinctive tone bursts with exponentially decaying envelopes. 4,057,769, Cl. 331-49.000.

Worrallo, Anthony Charles. Hinge structures. 4,056,985, Cl. 74-435.000.

Worth Company, The: *See—*

Piotrowski, Eugene Gregory, 4,057,025, Cl. 114-210.000.

Wortzman, Donald: *See—*

Juliusburger, Hans Yohanan; and Wortzman, Donald, 4,057,768, Cl. 331-1.00A.

Wray, Betty B.; Stager, Peter F.; and Linder, Charles W. Compliance dispenser for oral medication. 4,057,145, Cl. 206-538.000.

Wunderlich, Ernst Dieter, to Rainville Company, Inc. Traversing core rod detecting device. 4,057,378, Cl. 425-137.000.

Wynne, Francis Edmund, Jr., to Gulf Research & Development Company. Thermal cracking process employing crushed oil shale as fuel. 4,057,490, Cl. 208-127.000.

Wyrough and Loser, Inc.: *See—*

Leo, Thomas J.; Loser, Thomas N.; and Reynolds, Michael J., 4,057,529, Cl. 260-42.470.

Xeltron, S.A.: *See—*

Castaneda, Fernando; and Jimenez, Roy, 4,057,146, Cl. 209-75.000.

Xerox Corporation: *See—*

Allis, Robert F., 4,057,342, Cl. 355-8.000.

Bean, Lloyd F., 4,057,340, Cl. 355-4.000.

Drummond, Arthur, Jr., 4,057,666, Cl. 428-35.000.

Fischbeck, Kenneth H.; and Vernon, Richard H., 4,057,807, Cl. 346-140.00R.

Mammino, Joseph; and Jossel, Franklin, 4,057,426, Cl. 96-1.0SD.

Sarid, Dror; and Springett, Brian E., 4,057,723, Cl. 250-326.000.

Sohm, Lawrence R., 4,057,341, Cl. 355-8.000.

Yamada, Yasutsugu: *See—*

Ishikawa, Kazuo; Hirata, Noritsugu; Takigawa, Tomoshi; and Yamada, Yasutsugu, 4,057,334, Cl. 352-175.000.

Yamagishi, Youji: *See—*

Kijima, Shizumasa; Yamatu, Isao; Hamamura, Kimio; Minami, Norio; Yamagishi, Youji; and Inai, Yuichi, 4,057,568, Cl. 260-462.00R.

Yamaguchi, Hisashi: *See—*

Habu, Teiji; Wada, Tsuneo; Sasaki, Takashi; Itoh, Shigemasa; Ohmura, Takayoshi; Ishii, Hiroki; and Yamaguchi, Hisashi, 4,057,538, Cl. 260-117.000.

Yamaguchi, Kanemichi, to Toyo Seikan Kaisha Ltd. Steam sterilization of materials in sealed packages. 4,057,391, Cl. 21-56.000.

Yamamori, Masaji, to Mitsubishi Monsanto Kasei Kabushiki Kaisha. Apparatus for air-pressure forming thermoplastic resin sheets. 4,057,382, Cl. 425-387.100.

Yamamoto, Hajime; Kano, Tsuyoshi; and Nakano, Masaki, to Hitachi, Ltd. Europium and samarium activated rare earth oxysulfide phosphor. 4,057,507, Cl. 252-301.40S.

Yamamoto, Hideo: *See—*

Kinuhata, Koji; Amano, Kitsutaro; Sasaki, Hiroshi; and Yamamoto, Hideo, 4,057,835, Cl. 358-140.000.

Yamamoto, Sadao: *See—*

Hashimoto, Akihiro; Hayashi, Shigeo; Yamamoto, Sadao; and Chujo, Hitoshi, 4,057,608, Cl. 264-42.000.

Yamamoto, Toshio: *See—*

Miyamoto, Osamu; Iizaka, Isao; Yamamoto, Toshio; Hikosaka, Takashi; and Shimizu, Shigemitu, 4,057,339, Cl. 355-3.00R.

Yamasaki, Yasuhiro: *See—*

Nakagome, Yukio; Teramura, Hiroichi; Fukata, Yasuo; and Yamasaki, Yasuhiro, 4,057,834, Cl. 358-133.000.

Yamatu, Isao: *See—*

Kijima, Shizumasa; Yamatu, Isao; Hamamura, Kimio; Minami, Norio; Yamagishi, Youji; and Inai, Yuichi, 4,057,568, Cl. 260-462.00R.

Yamazaki, Isamu; Toyama, Yoichi; Hirota, Kiwami; and Takeuchi, Hisashi, to Showa Denko Kabushiki Kaisha. Method of polymerizing α-olefins. 4,057,680, Cl. 526-142.000.

Yamazaki, Shinichiro; and Hanabashi, Teruyuki, to Aisin Seiki Kabushiki Kaisha. Drawer type ash receiver. 4,057,166, Cl. 220-8.000.

Yanagihara, Hiromichi: *See—*

Mizusawa, Shinichiro; Tamura, Chiharu; Nakamura, Norihiko; and Yanagihara, Hiromichi, 4,056,934, Cl. 60-311.000.

Yaunzem, Jury Eduardovich: *See—*

Bataev, Mikhail Kirillovich; Veits, Isaak Efimovich; Gorodetsky, Sergei Sergeevich; Macheret, Lev Ilich; Kuznetsov, Lev Alexeevich; Tjurin, Albert Vasilievich; and Yaunzem, Jury Eduardovich, 4,057,453, Cl. 156-390.000.

Yazaki, Takao; and Hattori, Kazuhide, to Mitsubishi Petrochemical Co., Ltd. Deckle cooling means to prevent leakage. 4,057,385, Cl. 425-466.000.

Yeda Research and Development Co., Ltd.: *See—*

Sollish, Bruce D., 4,056,970, Cl. 73-629.000.

Yen, Chung Hwai: *See—*

Adelstein, Gilbert W.; Dajani, Esam Z.; and Yen, Chung Hwai, 4,057,549, Cl. 260-293.540.

Yevick, George J., to Izon Corporation. Fiber optic system. 4,057,338, Cl. 355-1.000.

Ying, Charles W.; and Ying, Richard, to Atex, Incorporated. Text editing and display system. 4,057,849, Cl. 364-200.000.

Ying, Richard: *See—*

Ying, Charles W.; and Ying, Richard, 4,057,849, Cl. 364-200.000.

Yoda, Haruo: *See—*

Ejiri, Masakazu; Kashioka, Seiji; Miyatake, Takafumi; Yoda, Haruo; and Kameyama, Masayoshi, 4,057,845, Cl. 364-200.000.

Yokoyama, Kenji, to Nippon Gakki Seizo Kabushiki Kaisha. Amplifier. 4,057,764, Cl. 330-264.000.

Yoshida Kogyo K.K.: *See—*

Ebata, Hiroyuki, 4,056,868, Cl. 24-205.16C.

Yoshida, Masafumi; Sasaki, Tohru; and Terasaki, Shuji, to Kureha Kagaku Kogyo Kabushiki Kaisha. Method for producing thermoplastic film electric element. 4,057,660, Cl. 427-100.000.

Yoshida, Toshio, to Kawasaki Jukogyo Kabushiki Kaisha. Method for moving built structures by flotation. 4,056,942, Cl. 61-65.000.

Yoshida, Yoshinari: *See—*

Iida, Masajiro; Morimatsu, Hideharu; Fukuoka, Itsuo; and Yoshida, Yoshinari, 4,057,779, Cl. 340-3.00C.

Youl, Gavin Boyce. Lifting and handling apparatus. 4,057,161, Cl. 214-777.000.

Young, Clyde J. Electrical coupling apparatus. 4,057,310, Cl. 339-10.000.

Young, Kenneth M. Dowel bore forming and routing jig. 4,057,358, Cl. 408-91.000.

Youngdale, Gilbert A., to Upjohn Company, The. 2a,2b-Dihomo-15-alkyl-PGE_2 analogs. 4,057,564, Cl. 260-410.90R.

Zajac, Ronald E., to Windings, Inc. Tube for inner end feedout of flexible material and package utilizing the same. 4,057,204, Cl. 242-163.000.

Zajac, Ronald E.: *See—*

Newman, James W.; and Zajac, Ronald E., 4,057,203, Cl. 242-163.000.

Zdeblick, William Thomas, to International Business Machines Corporation. Rotatable cassette holder. 4,057,305, Cl. 312-11.000.

Zeley, J. A. Ignition rod and feed device. 4,057,229, Cl. 266-48.000.

Zemaitis, John Anthony: *See—*

Miller, Norman Jay; Zemaitis, John Anthony; and Zimmerman, Russell Lloyd, 4,057,315, Cl. 339-221.00R.

Zengel, Hans-Georg; and Bergfeld, Manfred, to Akzona Incorporated. Process for the preparation of phloroglucinol. 4,057,588, Cl. 260-621.00R.

Ziegler, William H., Jr., to Hedstrom Company. Tree house kit. 4,056,902, Cl. 52-73.000.

Zimmerman, Russell Lloyd: *See—*

Miller, Norman Jay; Zemaitis, John Anthony; and Zimmerman, Russell Lloyd, 4,057,315, Cl. 339-221.00R.

Zimmermann, Detlef: *See—*

DeBortoli, George; and Zimmermann, Detlef, 4,057,692, Cl. 179-98.000.

Zimmermann, Heino, to Gustav F. Gerdts KG. Probe for measuring liquid levels. 4,056,978, Cl. 73-304.00R.

Zust, Harry, to Contraves AG. Method of manufacturing a thin-film electrode. 4,057,661, Cl. 427-125.000.

Zweegers, Petrus Wilhelmus. Agricultural implement. 4,056,923, Cl. 56-366.000.

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE	DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 48,560	4,002,772	Mar. 30, 1976	Jan. 11, 1977	B 371,912	3,995,738	Mar. 2, 1976	Dec. 7, 1976
B 54,859	4,000,101	Feb. 17, 1976	Dec. 28, 1976	B 372,016	3,989,685	Mar. 9, 1976	Nov. 2, 1976
B 59,512	3,999,216	Mar. 16, 1976	Dec. 21, 1976	B 372,232	4,000,967	Mar. 16, 1976	Jan. 4, 1977
B 66,272	4,014,978	Feb. 24, 1976	Mar. 29, 1977	B 372,722	3,998,925	Mar. 9, 1976	Dec. 21, 1976
B 71,613	4,008,393	Mar. 16, 1976	Feb. 15, 1977	B 373,344	4,053,067	Feb. 3, 1976	Oct. 11, 1977
B 73,017	4,001,879	Mar. 9, 1976	Jan. 4, 1977	B 373,354	3,989,870	Jan. 27, 1976	Nov. 2, 1976
B 78,315	3,982,192	Feb. 10, 1976	Sep. 21, 1976	B 374,553	4,008,394	Mar. 30, 1976	Feb. 15, 1977
B 79,099	3,982,177	Jan. 13, 1976	Sep. 21, 1976	B 374,588	3,985,899	Jan. 27, 1976	Oct. 12, 1976
B 97,259	3,999,614	Mar. 9, 1976	Dec. 28, 1976	B 376,749	4,014,856	Mar. 30, 1976	Mar. 29, 1977
B 105,006	4,007,074	Mar. 23, 1976	Feb. 8, 1977	B 378,513	3,981,750	Jan. 27, 1976	Sep. 21, 1976
B 111,130	4,001,380	Mar. 16, 1976	Jan. 4, 1977	B 378,760	4,001,477	Mar. 9, 1976	Jan. 4, 1977
B 141,968	4,013,442	Mar. 30, 1976	Mar. 22, 1977	B 379,177	3,981,976	Jan. 27, 1976	Sep. 21, 1976
B 150,142	3,981,767	Jan. 27, 1976	Sep. 21, 1976	B 380,137	4,014,802	Mar. 23, 1976	Mar. 29, 1977
B 159,570	4,036,870	Mar. 23, 1976	July 19, 1977	B 381,006	4,009,447	Apr. 6, 1976	Feb. 22, 1977
B 160,045	3,983,446	Jan. 13, 1976	Sep. 28, 1976	B 381,709	3,984,587	Jan. 13, 1976	Oct. 5, 1976
B 160,099	3,987,221	Jan. 13, 1976	Oct. 19, 1976	B 381,985	3,990,775	Feb. 3, 1976	Nov. 9, 1976
B 163,463	3,981,659	Jan. 27, 1976	Sep. 21, 1976	B 382,120	4,013,639	Mar. 23, 1976	Mar. 22, 1977
B 167,470	4,001,101	Mar. 2, 1976	Jan. 4, 1977	B 383,697	4,008,211	Feb. 17, 1976	Feb. 15, 1977
B 181,208	4,001,391	Mar. 9, 1976	Jan. 4, 1977	B 384,225	3,998,523	Mar. 16, 1976	Dec. 21, 1976
B 200,759	3,986,872	Feb. 3, 1976	Oct. 19, 1976	B 384,330	3,985,613	Jan. 27, 1976	Oct. 12, 1976
B 208,916	3,987,106	Jan. 13, 1976	Oct. 19, 1976	B 384,654	3,992,681	Feb. 24, 1976	Nov. 16, 1976
B 214,925	3,997,648	Mar. 9, 1976	Dec. 14, 1976	B 385,024	3,994,911	Feb. 10, 1976	Nov. 30, 1976
B 231,416	4,000,054	Mar. 30, 1976	Dec. 28, 1976	B 385,483	3,993,684	Feb. 17, 1976	Nov. 23, 1976
B 236,266	4,013,624	Mar. 23, 1976	Mar. 22, 1977	B 385,631	3,982,924	Jan. 27, 1976	Sep. 28, 1976
B 236,342	4,001,182	Feb. 10, 1976	Jan. 4, 1977	B 386,257	3,981,915	Feb. 3, 1976	Sep. 21, 1976
B 248,240	3,983,556	Jan. 13, 1976	Sep. 28, 1976	B 386,673	3,993,717	Feb. 3, 1976	Nov. 23, 1976
B 257,143	4,000,111	Mar. 16, 1976	Dec. 28, 1976	B 386,828	3,992,440	Feb. 3, 1976	Nov. 16, 1976
B 270,274	3,982,223	Feb. 17, 1976	Sep. 21, 1976	B 387,337	D 243,157	Mar. 16, 1976	Jan. 25, 1977
B 270,351	3,997,893	Mar. 30, 1976	Dec. 14, 1976	B 388,675	4,012,459	Mar. 30, 1976	Mar. 15, 1977
B 271,743	4,001,195	Mar. 16, 1976	Jan. 4, 1977	B 389,155	4,000,970	Mar. 30, 1976	Jan. 4, 1977
B 276,026	3,992,405	Feb. 3, 1976	Nov. 16, 1976	B 389,304	3,986,829	Jan. 27, 1976	Oct. 19, 1976
B 279,415	4,000,697	Mar. 16, 1976	Jan. 4, 1977	B 390,031	3,985,799	Jan. 13, 1976	Oct. 12, 1976
B 279,969	3,986,073	Jan. 13, 1976	Oct. 12, 1976	B 390,408	3,992,426	Feb. 3, 1976	Nov. 16, 1976
B 281,162	4,009,481	Mar. 23, 1976	Feb. 22, 1977	B 390,979	4,003,850	Mar. 23, 1976	Jan. 18, 1977
B 283,941	3,995,313	Feb. 3, 1976	Nov. 30, 1976	B 391,473	3,988,370	Mar. 2, 1976	Oct. 26, 1976
B 288,757	4,001,072	Mar. 30, 1976	Jan. 4, 1977	B 391,797	3,988,046	Mar. 9, 1976	Oct. 26, 1976
B 301,143	3,991,107	Jan. 27, 1976	Nov. 9, 1976	B 391,828	4,014,933	Apr. 6, 1976	Mar. 29, 1977
B 302,160	3,985,774	Feb. 3, 1976	Oct. 12, 1976	B 391,844	3,999,165	Mar. 16, 1976	Dec. 21, 1976
B 306,668	3,985,713	Feb. 3, 1976	Oct. 12, 1976	B 392,798	3,996,249	Mar. 30, 1976	Dec. 7, 1976
B 307,698	3,993,763	Feb. 3, 1976	Nov. 23, 1976	B 394,248	3,989,764	Jan. 27, 1976	Nov. 2, 1976
B 308,659	3,981,947	Jan. 27, 1976	Sep. 21, 1976	B 394,350	3,982,200	Jan. 13, 1976	Sep. 21, 1976
B 311,450	3,988,976	Mar. 9, 1976	Nov. 2, 1976	B 394,742	4,009,285	Apr. 13, 1976	Feb. 22, 1977
B 311,779	4,013,481	Feb. 10, 1976	Mar. 22, 1977	B 395,554	3,998,156	Mar. 9, 1976	Dec. 21, 1976
B 313,280	4,003,591	Apr. 6, 1976	Jan. 18, 1977	B 395,975	4,001,085	Mar. 2, 1976	Jan. 4, 1977
B 326,211	3,988,272	Mar. 23, 1976	Oct. 26, 1976	B 396,164	3,989,590	Feb. 3, 1976	Nov. 2, 1976
B 328,065	4,014,752	Mar. 30, 1976	Mar. 29, 1977	B 396,377	D 243,148	Apr. 6, 1976	Jan. 25, 1977
B 328,077	4,014,860	Apr. 13, 1976	Mar. 29, 1977	B 397,674	3,998,438	Mar. 16, 1976	Dec. 21, 1976
B 328,116	4,000,774	Mar. 9, 1976	Jan. 4, 1977	B 398,084	3,996,239	Feb. 3, 1976	Dec. 7, 1976
B 330,719	4,001,121	Mar. 16, 1976	Jan. 4, 1977	B 398,220	3,990,834	Feb. 3, 1976	Nov. 9, 1976
B 330,736	3,996,299	Feb. 3, 1976	Dec. 7, 1976	B 398,488	3,987,991	Feb. 24, 1976	Oct. 26, 1976
B 332,442	4,001,231	Mar. 30, 1976	Jan. 4, 1977	B 399,098	3,997,665	Feb. 24, 1976	Dec. 14, 1976
B 333,110	3,989,867	Mar. 16, 1976	Nov. 2, 1976	B 399,632	4,001,046	Mar. 9, 1976	Jan. 4, 1977
B 333,247	4,001,201	Mar. 16, 1976	Jan. 4, 1977	B 399,908	3,983,323	Jan. 13, 1976	Sep. 28, 1976
B 333,838	4,006,263	Mar. 23, 1976	Feb. 1, 1977	B 400,871	3,988,893	Feb. 17, 1976	Nov. 2, 1976
B 335,783	4,013,744	Mar. 30, 1976	Mar. 22, 1977	B 401,042	D 242,197	Mar. 16, 1976	Nov. 9, 1976
B 336,754	3,989,805	Mar. 16, 1976	Nov. 2, 1976	B 401,221	4,014,791	Apr. 6, 1976	Mar. 29, 1977
B 337,023	4,013,188	Mar. 30, 1976	Mar. 22, 1977	B 402,162	3,994,902	Mar. 2, 1976	Nov. 30, 1976
B 337,823	4,002,746	Mar. 23, 1976	Jan. 11, 1977	B 402,328	3,995,545	Apr. 6, 1976	Dec. 7, 1976
B 339,194	3,982,215	Feb. 3, 1976	Sep. 21, 1976	B 402,553	3,983,219	Feb. 17, 1976	Sep. 28, 1976
B 339,446	4,001,067	Feb. 24, 1976	Jan. 4, 1977	B 402,657	4,013,665	Apr. 6, 1976	Mar. 22, 1977
B 340,170	4,000,444	Mar. 30, 1976	Dec. 28, 1976	B 402,929	3,991,251	Feb. 3, 1976	Nov. 9, 1976
B 344,669	4,013,655	Mar. 16, 1976	Mar. 22, 1977	B 403,076	4,014,917	Apr. 20, 1976	Mar. 29, 1977
B 347,661	3,999,218	Mar. 16, 1976	Dec. 21, 1976	B 403,243	3,996,232	Mar. 30, 1976	Dec. 7, 1976
B 348,433	3,984,405	Feb. 3, 1976	Oct. 5, 1976	B 403,326	4,001,212	Mar. 23, 1976	Jan. 4, 1977
B 349,370	3,989,684	Jan. 27, 1976	Nov. 2, 1976	B 403,477	3,995,315	Feb. 3, 1976	Nov. 30, 1976
B 351,455	4,001,309	Feb. 24, 1976	Jan. 4, 1977	B 403,507	3,982,095	Feb. 10, 1976	Sep. 21, 1976
B 354,222	4,012,305	Mar. 23, 1976	Mar. 15, 1977	B 403,766	3,994,834	Feb. 10, 1976	Nov. 30, 1976
B 354,959	3,995,996	Feb. 17, 1976	Dec. 7, 1976	B 403,883	4,001,481	Mar. 23, 1976	Jan. 4, 1977
B 356,187	3,981,222	Jan. 20, 1976	Sep. 21, 1976	B 405,726	3,981,241	Jan. 13, 1976	Sep. 21, 1976
B 356,470	4,014,789	Mar. 23, 1976	Mar. 29, 1977	B 406,546	D 242,966	Mar. 16, 1976	Jan. 11, 1977
B 357,526	4,001,319	Mar. 23, 1976	Jan. 4, 1977	B 407,205	4,000,966	Mar. 16, 1976	Jan. 4, 1977
B 358,260	3,989,661	Mar. 30, 1976	Nov. 2, 1976	B 407,737	3,992,546	Feb. 3, 1976	Nov. 16, 1976
B 358,427	3,989,896	Feb. 3, 1976	Nov. 2, 1976	B 407,812	4,010,006	Mar. 23, 1976	Mar. 1, 1977
B 359,768	4,013,684	Mar. 30, 1976	Mar. 22, 1977	B 408,123	4,014,887	Apr. 13, 1976	Mar. 29, 1977
B 359,901	3,981,729	Jan. 13, 1976	Sep. 21, 1976	B 409,848	3,983,270	Jan. 27, 1976	Sep. 28, 1976
B 361,954	4,014,753	Apr. 6, 1976	Mar. 29, 1977	B 410,074	4,001,303	Feb. 24, 1976	Jan. 4, 1977
B 363,565	4,004,821	Mar. 30, 1976	Jan. 25, 1977	B 410,694	3,995,530	Mar. 23, 1976	Dec. 7, 1976
B 364,797	3,996,131	Feb. 17, 1976	Dec. 7, 1976	B 411,471	3,982,933	Feb. 17, 1976	Sep. 28, 1976
B 367,092	4,014,920	Apr. 13, 1976	Mar. 29, 1977	B 411,624	4,001,205	Mar. 16, 1976	Jan. 4, 1977
B 367,305	3,998,640	Mar. 2, 1976	Dec. 21, 1976	B 411,765	3,993,428	Feb. 24, 1976	Nov. 23, 1976
B 367,621	3,989,589	Feb. 3, 1976	Nov. 2, 1976	B 412,068	3,981,244	Jan. 13, 1976	Sep. 21, 1976
B 369,221	3,985,834	Feb. 24, 1976	Oct. 12, 1976	B 412,124	4,007,000	Mar. 23, 1976	Feb. 8, 1977
B 369,373	4,013,683	Mar. 23, 1976	Mar. 22, 1977	B 413,379	4,001,325	Mar. 9, 1976	Jan. 4, 1977
B 369,379	4,013,754	Mar. 30, 1976	Mar. 22, 1977	B 414,028	3,993,738	Feb. 17, 1976	Nov. 23, 1976
B 370,309	3,989,640	Jan. 20, 1976	Nov. 2, 1976	B 414,266	3,993,614	Feb. 10, 1976	Nov. 23, 1976
B 371,095	4,005,074	Mar. 23, 1976	Jan. 25, 1977	B 414,481	3,982,979	Jan. 20, 1976	Sep. 28, 1976
B 371,635	4,010,290	Mar. 23, 1976	Mar. 1, 1977	B 414,971	D 242,208	Feb. 10, 1976	Nov. 9, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 415,021	3,994,173	Mar. 2, 1976	Nov. 30, 1976
B 415,122	3,997,503	Feb. 10, 1976	Dec. 14, 1976
B 415,590	4,009,317	Mar. 23, 1976	Feb. 22, 1977
B 416,257	4,001,335	Mar. 16, 1976	Jan. 4, 1977
B 416,589	3,990,363	Jan. 27, 1976	Nov. 9, 1976
B 417,014	3,981,851	Jan. 13, 1976	Sep. 21, 1976
B 417,164	4,001,360	Mar. 2, 1976	Jan. 4, 1977
B 417,349	3,985,076	Mar. 9, 1976	Oct. 12, 1976
B 417,498	4,013,471	Mar. 23, 1976	Mar. 22, 1977
B 418,489	3,989,592	Jan. 13, 1976	Nov. 2, 1976
B 419,173	3,999,728	Mar. 9, 1976	Dec. 28, 1976
B 419,582	3,989,681	Mar. 2, 1976	Nov. 2, 1976
B 420,176	4,001,017	Mar. 16, 1976	Jan. 4, 1977
B 420,321	3,990,645	Mar. 30, 1976	Nov. 9, 1976
B 420,472	3,993,934	Feb. 24, 1976	Nov. 23, 1976
B 421,373	4,001,326	Mar. 23, 1976	Jan. 4, 1977
B 421,608	4,013,806	Mar. 23, 1976	Mar. 22, 1977
B 421,975	3,994,693	Mar. 2, 1976	Nov. 30, 1976
B 422,063	3,994,835	Feb. 3, 1976	Nov. 30, 1976
B 422,156	4,010,401	Mar. 23, 1976	Mar. 1, 1977
B 423,365	3,996,186	Feb. 17, 1976	Dec. 7, 1976
B 423,404	3,990,958	Mar. 2, 1976	Nov. 9, 1976
B 423,441	3,997,137	Feb. 17, 1976	Dec. 14, 1976
B 423,867	3,990,844	Feb. 3, 1976	Nov. 9, 1976
B 423,883	3,986,871	Jan. 27, 1976	Oct. 19, 1976
B 424,354	D 242,416	Feb. 10, 1976	Nov. 23, 1976
B 424,410	4,021,196	Mar. 30, 1976	May 3, 1977
B 424,989	3,990,569	Feb. 3, 1976	Nov. 9, 1976
B 425,193	4,002,107	Mar. 23, 1976	Jan. 11, 1977
B 425,285	4,014,676	Apr. 13, 1976	Mar. 29, 1977
B 425,462	3,998,396	Mar. 9, 1976	Dec. 21, 1976
B 425,588	3,985,111	Jan. 13, 1976	Oct. 12, 1976
B 426,157	4,013,714	Mar. 23, 1976	Mar. 22, 1977
B 426,227	3,999,028	Mar. 2, 1976	Dec. 21, 1976
B 426,266	3,998,839	Mar. 2, 1976	Dec. 21, 1976
B 426,274	4,014,949	Jan. 20, 1976	Mar. 29, 1977
B 426,424	3,993,742	Feb. 3, 1976	Nov. 23, 1976
B 426,639	3,992,539	Feb. 3, 1976	Nov. 16, 1976
B 426,819	3,995,868	Feb. 17, 1976	Dec. 7, 1976
B 427,883	3,982,277	Jan. 20, 1976	Sep. 21, 1976
B 427,946	4,006,161	Mar. 23, 1976	Feb. 1, 1977
B 428,103	4,000,211	Feb. 10, 1976	Dec. 28, 1976
B 428,271	3,987,415	Mar. 23, 1976	Oct. 19, 1976
B 428,408	3,995,252	Mar. 2, 1976	Nov. 30, 1976
B 428,877	3,984,649	Jan. 27, 1976	Oct. 5, 1976
B 429,018	3,990,061	Feb. 10, 1976	Nov. 2, 1976
B 429,027	4,001,260	Mar. 23, 1976	Jan. 4, 1977
B 429,157	3,990,628	Jan. 27, 1976	Nov. 9, 1976
B 429,434	3,989,223	Feb. 17, 1976	Nov. 2, 1976
B 430,157	3,992,465	Feb. 17, 1976	Nov. 16, 1976
B 430,172	3,982,563	Jan. 13, 1976	Sep. 28, 1976
B 430,213	4,013,514	Mar. 30, 1976	Mar. 22, 1977
B 430,276	3,982,171	Jan. 20, 1976	Sep. 21, 1976
B 430,287	D 242,489	Feb. 10, 1976	Nov. 23, 1976
B 430,326	4,003,581	Mar. 23, 1976	Jan. 18, 1977
B 430,334	3,981,677	Jan. 27, 1976	Sep. 21, 1976
B 431,072	3,985,610	Jan. 20, 1976	Oct. 12, 1976
B 431,334	3,988,095	Mar. 16, 1976	Oct. 26, 1976
B 431,713	4,000,167	Feb. 10, 1976	Dec. 28, 1976
B 431,785	3,999,950	Feb. 24, 1976	Dec. 28, 1976
B 431,797	4,007,290	Mar. 30, 1976	Feb. 8, 1977
B 432,049	3,995,123	Mar. 23, 1976	Nov. 30, 1976
B 432,140	3,999,163	Mar. 23, 1976	Dec. 21, 1976
B 432,265	4,013,480	Mar. 23, 1976	Mar. 22, 1977
B 432,594	4,003,404	Mar. 30, 1976	Jan. 18, 1977
B 432,969	3,997,017	Mar. 2, 1976	Dec. 14, 1976
B 432,991	3,991,669	Mar. 2, 1976	Nov. 16, 1976
B 433,094	3,987,768	Jan. 27, 1976	Oct. 26, 1976
B 433,707	4,013,594	Mar. 23, 1976	Mar. 22, 1977
B 433,892	4,016,061	Apr. 6, 1976	Apr. 5, 1977
B 433,930	4,012,324	Mar. 23, 1976	Mar. 15, 1977
B 434,206	3,994,610	Feb. 3, 1976	Nov. 30, 1976
B 434,441	D 242,849	Mar. 16, 1976	Dec. 28, 1976
B 435,481	4,000,892	Mar. 9, 1976	Jan. 4, 1977
B 435,570	4,000,908	Mar. 16, 1976	Jan. 4, 1977
B 435,617	4,001,234	Mar. 16, 1976	Jan. 4, 1977
B 436,724	3,991,856	Feb. 24, 1976	Nov. 16, 1976
B 437,209	4,001,193	Feb. 3, 1976	Jan. 4, 1977
B 437,559	3,993,287	Feb. 3, 1976	Nov. 23, 1976
B 437,596	3,985,638	Jan. 27, 1976	Oct. 12, 1976
B 437,894	4,001,015	Mar. 2, 1976	Jan. 4, 1977
B 437,986	4,011,399	Apr. 20, 1976	Mar. 8, 1977
B 438,048	4,001,394	Mar. 23, 1976	Jan. 4, 1977
B 438,484	3,992,451	Feb. 17, 1976	Nov. 16, 1976
B 438,882	3,983,719	Feb. 24, 1976	Oct. 5, 1976
B 438,916	3,983,050	Jan. 13, 1976	Sep. 28, 1976
B 439,542	3,982,199	Jan. 27, 1976	Sep. 21, 1976

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 439,778	4,001,455	Feb. 3, 1976	Jan. 4, 1977
B 440,548	4,001,271	Mar. 16, 1976	Jan. 4, 1977
B 440,632	4,014,955	Apr. 13, 1976	Mar. 29, 1977
B 440,633	4,000,116	Feb. 10, 1976	Dec. 28, 1976
B 440,858	3,993,670	Feb. 3, 1976	Nov. 23, 1976
B 441,543	4,014,755	Mar. 23, 1976	Mar. 29, 1977
B 441,605	4,026,862	Feb. 3, 1976	May 31, 1977
B 441,723	3,988,249	Mar. 16, 1976	Oct. 26, 1976
B 441,789	4,001,449	Mar. 30, 1976	Jan. 4, 1977
B 442,163	D 242,192	Mar. 16, 1976	Nov. 9, 1976
B 442,295	4,000,477	Mar. 16, 1976	Dec. 28, 1976
B 442,431	4,011,260	Mar. 23, 1976	Mar. 8, 1977
B 442,810	3,997,533	Feb. 24, 1976	Dec. 14, 1976
B 442,866	3,982,351	Feb. 24, 1976	Sep. 28, 1976
B 442,953	4,002,657	Mar. 23, 1976	Jan. 11, 1977
B 442,970	3,989,890	Feb. 3, 1976	Nov. 2, 1976
B 443,163	3,981,242	Feb. 3, 1976	Sep. 21, 1976
B 443,446	D 242,494	Apr. 6, 1976	Nov. 23, 1976
B 443,563	3,996,204	Feb. 24, 1976	Dec. 7, 1976
B 443,647	3,990,737	Feb. 17, 1976	Nov. 9, 1976
B 443,712	3,982,233	Jan. 27, 1976	Sep. 21, 1976
B 444,078	4,014,854	Mar. 23, 1976	Mar. 29, 1977
B 444,294	4,013,634	Mar. 30, 1976	Mar. 22, 1977
B 444,437	3,995,171	Mar. 9, 1976	Nov. 30, 1976
B 445,166	4,001,252	Mar. 2, 1976	Jan. 4, 1977
B 445,459	3,988,889	Feb. 3, 1976	Nov. 2, 1976
B 445,493	3,994,903	Mar. 2, 1976	Nov. 30, 1976
B 445,690	3,999,584	Feb. 3, 1976	Dec. 28, 1976
B 446,107	4,001,276	Mar. 9, 1976	Jan. 4, 1977
B 446,956	4,014,765	Apr. 13, 1976	Mar. 29, 1977
B 447,000	3,984,419	Feb. 3, 1976	Oct. 5, 1976
B 447,440	3,991,724	Feb. 17, 1976	Nov. 16, 1976
B 449,892	3,997,919	Mar. 23, 1976	Dec. 14, 1976
B 449,988	4,014,794	Mar. 30, 1976	Mar. 29, 1977
B 450,196	3,997,701	Feb. 10, 1976	Dec. 14, 1976
B 450,413	4,007,463	Mar. 23, 1976	Feb. 8, 1977
B 450,521	3,982,838	Feb. 17, 1976	Sep. 28, 1976
B 450,701	3,991,084	Mar. 16, 1976	Nov. 9, 1976
B 450,708	3,989,724	Mar. 9, 1976	Nov. 2, 1976
B 450,870	3,998,951	Mar. 16, 1976	Dec. 21, 1976
B 450,967	3,983,055	Jan. 13, 1976	Sep. 28, 1976
B 451,248	3,997,758	Mar. 2, 1976	Dec. 14, 1976
B 451,308	3,991,037	Feb. 17, 1976	Nov. 9, 1976
B 451,396	4,000,450	Apr. 13, 1976	Dec. 28, 1976
B 451,438	Re. 29,066	Mar. 2, 1976	Dec. 7, 1976
B 451,534	3,986,033	Jan. 13, 1976	Oct. 12, 1976
B 452,034	4,002,367	Mar. 23, 1976	Jan. 11, 1977
B 452,138	4,004,278	Mar. 23, 1976	Jan. 18, 1977
B 452,293	4,014,726	Mar. 30, 1976	Mar. 29, 1977
B 452,501	4,001,111	Mar. 16, 1976	Jan. 4, 1977
B 452,672	3,981,602	Jan. 13, 1976	Sep. 21, 1976
B 452,879	4,001,089	Mar. 16, 1976	Jan. 4, 1977
B 452,883	3,981,735	Jan. 27, 1976	Sep. 21, 1976
B 452,915	4,013,933	Mar. 30, 1976	Mar. 22, 1977
B 452,938	3,994,719	Feb. 17, 1976	Nov. 30, 1976
B 452,944	4,009,773	Mar. 30, 1976	Mar. 1, 1977
B 453,031	3,998,678	Mar. 16, 1976	Dec. 21, 1976
B 453,067	4,005,394	Mar. 23, 1976	Jan. 25, 1977
B 453,238	3,997,063	Mar. 2, 1976	Dec. 14, 1976
B 453,432	4,000,514	Mar. 16, 1976	Dec. 28, 1976
B 453,533	3,997,744	Feb. 17, 1976	Dec. 14, 1976
B 453,616	3,987,376	Jan. 27, 1976	Oct. 19, 1976
B 453,759	3,989,790	Jan. 27, 1976	Nov. 2, 1976
B 453,960	4,014,701	Apr. 13, 1976	Mar. 29, 1977
B 454,283	3,995,153	Feb. 3, 1976	Nov. 30, 1976
B 454,833	4,008,733	Mar. 30, 1976	Feb. 22, 1977
B 455,425	3,990,060	Feb. 3, 1976	Nov. 2, 1976
B 455,481	3,991,092	Feb. 24, 1976	Nov. 9, 1976
B 455,486	4,001,353	Mar. 16, 1976	Jan. 4, 1977
B 455,686	4,001,156	Mar. 2, 1976	Jan. 4, 1977
B 455,759	3,984,242	Feb. 24, 1976	Oct. 5, 1976
B 455,806	3,998,919	Mar. 23, 1976	Dec. 21, 1976
B 456,069	3,998,991	Mar. 9, 1976	Dec. 21, 1976
B 456,148	3,984,269	Jan. 13, 1976	Oct. 5, 1976
B 456,153	3,997,992	Mar. 9, 1976	Dec. 21, 1976
B 456,384	4,014,859	Apr. 6, 1976	Mar. 29, 1977
B 456,579	3,993,715	Feb. 10, 1976	Nov. 23, 1976
B 456,869	4,001,277	Mar. 9, 1976	Jan. 4, 1977
B 456,900	3,996,262	Feb. 3, 1976	Dec. 7, 1976
B 456,905	4,013,431	Mar. 23, 1976	Mar. 22, 1977
B 457,547	3,996,397	Feb. 17, 1976	Dec. 7, 1976
B 457,850	3,993,586	Feb. 10, 1976	Nov. 23, 1976
B 457,862	3,987,195	Jan. 27, 1976	Oct. 19, 1976
B 457,886	3,988,498	Jan. 13, 1976	Oct. 26, 1976
B 457,931	4,001,229	Mar. 16, 1976	Jan. 4, 1977
B 458,500	3,997,805	Feb. 24, 1976	Dec. 14, 1976
B 458,617	3,984,422	Feb. 3, 1976	Oct. 5, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 458,964	3,996,615	Mar. 2, 1976	Dec. 7, 1976
B 459,190	4,010,786	Mar. 30, 1976	Mar. 8, 1977
B 459,381	4,000,017	Mar. 9, 1976	Dec. 28, 1976
B 459,408	4,018,890	Mar. 23, 1976	Apr. 19, 1977
B 459,597	3,996,711	Feb. 17, 1976	Dec. 14, 1976
B 459,811	3,982,173	Jan. 20, 1976	Sep. 21, 1976
B 459,821	4,005,954	Mar. 30, 1976	Feb. 1, 1977
B 460,388	3,989,448	Jan. 27, 1976	Nov. 2, 1976
B 460,441	3,981,828	Jan. 13, 1976	Sep. 21, 1976
B 460,846	3,985,817	Feb. 24, 1976	Oct. 12, 1976
B 461,184	3,992,482	Feb. 17, 1976	Nov. 16, 1976
B 461,250	4,000,768	Mar. 16, 1976	Jan. 4, 1977
B 461,336	3,982,231	Feb. 3, 1976	Sep. 21, 1976
B 461,352	3,981,681	Jan. 13, 1976	Sep. 21, 1976
B 461,685	4,013,661	Mar. 30, 1976	Mar. 22, 1977
B 461,752	4,016,541	Apr. 20, 1976	Apr. 5, 1977
B 461,874	3,982,276	Jan. 27, 1976	Sep. 21, 1976
B 462,030	4,009,342	Mar. 23, 1976	Feb. 22, 1977
B 462,386	3,988,188	Jan. 13, 1976	Oct. 26, 1976
B 462,424	3,989,602	Feb. 24, 1976	Nov. 2, 1976
B 462,828	3,998,395	Mar. 9, 1976	Dec. 21, 1976
B 462,893	3,984,253	Feb. 24, 1976	Oct. 5, 1976
B 463,322	3,989,982	Jan. 20, 1976	Nov. 2, 1976
B 463,388	3,992,605	Feb. 10, 1976	Nov. 16, 1976
B 463,473	4,002,068	Mar. 23, 1976	Jan. 11, 1977
B 463,591	4,015,051	Mar. 30, 1976	Mar. 29, 1977
B 463,671	3,985,385	Jan. 13, 1976	Oct. 12, 1976
B 464,027	3,999,390	Mar. 16, 1976	Dec. 28, 1976
B 464,290	3,990,307	Feb. 3, 1976	Nov. 9, 1976
B 464,491	4,015,612	Mar. 30, 1976	Apr. 5, 1977
B 464,587	3,991,091	Feb. 3, 1976	Nov. 9, 1976
B 464,593	3,997,659	Mar. 9, 1976	Dec. 14, 1976
B 465,145	3,981,148	Jan. 27, 1976	Sep. 21, 1976
B 465,202	3,989,757	Feb. 24, 1976	Nov. 2, 1976
B 465,393	3,987,390	Jan. 27, 1976	Oct. 19, 1976
B 465,688	3,989,770	Jan. 27, 1976	Nov. 2, 1976
B 465,955	3,997,502	Feb. 3, 1976	Dec. 14, 1976
B 466,304	4,007,095	Mar. 23, 1976	Feb. 8, 1977
B 466,318	3,999,115	Mar. 9, 1976	Dec. 21, 1976
B 466,390	3,983,349	Feb. 24, 1976	Sep. 28, 1976
B 466,419	4,011,087	Mar. 23, 1976	Mar. 8, 1977
B 466,444	3,986,039	Jan. 20, 1976	Oct. 12, 1976
B 466,906	3,993,037	Mar. 16, 1976	Nov. 23, 1976
B 466,929	3,991,195	Jan. 27, 1976	Nov. 9, 1976
B 467,250	3,997,428	Feb. 3, 1976	Dec. 14, 1976
B 467,328	3,997,599	Mar. 9, 1976	Dec. 14, 1976
B 467,412	3,981,265	Jan. 13, 1976	Sep. 21, 1976
B 467,486	3,991,725	Mar. 16, 1976	Nov. 16, 1976
B 467,971	3,983,453	Jan. 13, 1976	Sep. 28, 1976
B 468,052	3,988,335	Feb. 10, 1976	Oct. 26, 1976
B 468,100	3,995,107	Mar. 9, 1976	Nov. 30, 1976
B 468,330	4,001,475	Mar. 16, 1976	Jan. 4, 1977
B 468,350	3,981,922	Jan. 13, 1976	Sep. 21, 1976
B 468,421	4,014,739	Mar. 30, 1976	Mar. 29, 1977
B 468,603	4,003,839	Mar. 23, 1976	Jan. 18, 1977
B 469,036	4,005,926	Mar. 16, 1976	Feb. 1, 1977
B 469,228	4,052,954	Feb. 17, 1976	Oct. 11, 1977
B 469,468	4,000,220	Mar. 16, 1976	Dec. 28, 1976
B 469,947	3,984,153	Jan. 20, 1976	Oct. 5, 1976
B 470,170	3,986,410	Jan. 13, 1976	Oct. 19, 1976
B 470,305	4,014,043	Apr. 6, 1976	Mar. 22, 1977
B 470,348	3,981,929	Jan. 13, 1976	Sep. 21, 1976
B 470,576	3,997,507	Feb. 24, 1976	Dec. 14, 1976
B 470,601	3,985,655	Mar. 9, 1976	Oct. 12, 1976
B 470,798	3,987,480	Jan. 20, 1976	Oct. 19, 1976
B 470,853	4,002,101	Mar. 23, 1976	Jan. 11, 1977
B 470,899	3,996,441	Mar. 2, 1976	Dec. 7, 1976
B 470,900	4,001,213	Mar. 2, 1976	Jan. 4, 1977
B 470,945	4,014,848	Apr. 13, 1976	Mar. 29, 1977
B 471,116	4,001,318	Feb. 17, 1976	Jan. 4, 1977
B 471,221	3,981,974	Jan. 13, 1976	Sep. 21, 1976
B 471,405	3,993,576	Feb. 10, 1976	Nov. 23, 1976
B 471,494	3,993,660	Mar. 16, 1976	Nov. 23, 1976
B 471,579	3,985,689	Jan. 13, 1976	Oct. 12, 1976
B 471,617	3,994,871	Feb. 10, 1976	Nov. 30, 1976
B 471,681	4,012,844	Apr. 13, 1976	Mar. 22, 1977
B 471,735	3,989,408	Feb. 3, 1976	Nov. 2, 1976
B 471,836	4,000,150	Feb. 24, 1976	Dec. 28, 1976
B 472,241	3,992,453	Feb. 17, 1976	Nov. 16, 1976
B 472,256	3,985,789	Jan. 13, 1976	Oct. 12, 1976
B 472,284	3,982,078	Jan. 13, 1976	Sep. 21, 1976
B 472,591	4,013,029	Apr. 6, 1976	Mar. 22, 1977
B 472,760	4,001,330	Apr. 13, 1976	Jan. 4, 1977
B 473,039	3,985,747	Feb. 10, 1976	Oct. 12, 1976
B 473,040	3,985,738	Feb. 10, 1976	Oct. 12, 1976
B 473,813	3,989,071	Mar. 9, 1976	Nov. 2, 1976
B 473,972	3,984,043	Jan. 13, 1976	Oct. 5, 1976

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 474,573	3,988,375	Jan. 20, 1976	Oct. 26, 1976
B 474,747	3,997,704	Feb. 24, 1976	Dec. 14, 1976
B 475,236	3,989,990	Feb. 3, 1976	Nov. 2, 1976
B 475,385	4,001,071	Mar. 9, 1976	Jan. 4, 1977
B 475,681	3,983,332	Jan. 20, 1976	Sep. 28, 1976
B 475,801	4,056,759	Mar. 30, 1976	Nov. 1, 1977
B 476,267	4,005,068	Apr. 6, 1976	Jan. 25, 1977
B 476,372	3,985,771	Feb. 24, 1976	Oct. 12, 1976
B 476,542	4,013,549	Mar. 30, 1976	Mar. 22, 1977
B 476,568	3,999,456	Mar. 16, 1976	Dec. 28, 1976
B 476,577	3,982,070	Jan. 20, 1976	Sep. 21, 1976
B 476,681	3,986,181	Jan. 13, 1976	Oct. 12, 1976
B 476,776	3,998,715	Mar. 23, 1976	Dec. 21, 1976
B 476,967	3,995,206	Mar. 9, 1976	Nov. 30, 1976
B 477,252	3,985,759	Jan. 13, 1976	Oct. 12, 1976
B 477,481	3,991,076	Feb. 3, 1976	Nov. 9, 1976
B 477,584	D 242,855	Apr. 6, 1976	Dec. 28, 1976
B 477,597	3,993,912	Feb. 17, 1976	Nov. 23, 1976
B 477,892	4,010,355	Mar. 30, 1976	Mar. 1, 1977
B 478,234	4,010,421	Mar. 30, 1976	Mar. 1, 1977
B 478,739	3,992,253	Feb. 17, 1976	Nov. 16, 1976
B 478,759	4,055,681	Mar. 16, 1976	Oct. 25, 1977
B 479,175	3,985,700	Feb. 17, 1976	Oct. 12, 1976
B 479,242	3,983,074	Feb. 17, 1976	Sep. 28, 1976
B 479,502	3,999,030	Mar. 16, 1976	Dec. 21, 1976
B 479,681	D 242,672	Mar. 16, 1976	Dec. 14, 1976
B 479,969	4,001,132	Mar. 9, 1976	Jan. 4, 1977
B 480,114	4,001,327	Mar. 2, 1976	Jan. 4, 1977
B 480,251	4,008,700	Mar. 23, 1976	Feb. 22, 1977
B 480,287	4,006,029	Mar. 30, 1976	Feb. 1, 1977
B 480,292	3,994,011	Mar. 16, 1976	Nov. 23, 1976
B 480,350	3,994,164	Feb. 10, 1976	Nov. 30, 1976
B 480,384	3,999,737	Mar. 23, 1976	Dec. 28, 1976
B 480,452	3,994,923	Feb. 10, 1976	Nov. 30, 1976
B 480,473	3,995,608	Mar. 2, 1976	Dec. 7, 1976
B 480,604	3,985,251	Jan. 13, 1976	Oct. 12, 1976
B 480,625	3,996,227	Feb. 24, 1976	Dec. 7, 1976
B 480,662	3,988,382	Mar. 2, 1976	Oct. 26, 1976
B 480,740	3,996,431	Mar. 2, 1976	Dec. 7, 1976
B 480,749	3,999,207	Mar. 9, 1976	Dec. 21, 1976
B 480,987	4,001,459	Mar. 30, 1976	Jan. 4, 1977
B 481,048	3,998,542	Mar. 16, 1976	Dec. 21, 1976
B 481,190	4,013,468	Mar. 30, 1976	Mar. 22, 1977
B 481,600	3,981,235	Jan. 27, 1976	Sep. 21, 1976
B 481,737	3,982,057	Jan. 13, 1976	Sep. 21, 1976
B 481,778	4,001,385	Mar. 30, 1976	Jan. 4, 1977
B 481,930	3,992,717	Feb. 24, 1976	Nov. 16, 1976
B 481,989	4,008,337	Mar. 23, 1976	Feb. 15, 1977
B 482,058	4,001,398	Mar. 2, 1976	Jan. 4, 1977
B 482,660	3,995,026	Feb. 10, 1976	Nov. 30, 1976
B 482,709	3,985,733	Feb. 24, 1976	Oct. 12, 1976
B 482,907	3,984,811	Jan. 20, 1976	Oct. 5, 1976
B 483,247	4,001,889	Apr. 13, 1976	Jan. 4, 1977
B 483,256	3,981,723	Feb. 10, 1976	Sep. 21, 1976
B 483,268	3,995,215	Mar. 9, 1976	Nov. 30, 1976
B 483,606	3,986,990	Jan. 27, 1976	Oct. 19, 1976
B 483,615	3,988,637	Jan. 27, 1976	Oct. 26, 1976
B 483,746	4,014,923	Mar. 23, 1976	Mar. 29, 1977
B 483,762	3,993,608	Feb. 10, 1976	Nov. 23, 1976
B 483,865	3,985,693	Jan. 13, 1976	Oct. 12, 1976
B 484,029	3,983,558	Feb. 10, 1976	Sep. 28, 1976
B 484,067	3,992,374	Feb. 17, 1976	Nov. 16, 1976
B 484,068	3,994,937	Mar. 2, 1976	Nov. 30, 1976
B 484,121	3,997,770	Mar. 16, 1976	Dec. 14, 1976
B 484,269	4,000,159	Feb. 10, 1976	Dec. 28, 1976
B 484,332	3,986,540	Mar. 2, 1976	Oct. 19, 1976
B 484,365	3,983,578	Jan. 27, 1976	Sep. 28, 1976
B 484,419	4,001,292	Mar. 9, 1976	Jan. 4, 1977
B 484,437	4,013,740	Mar. 30, 1976	Mar. 22, 1977
B 484,482	3,994,017	Mar. 23, 1976	Nov. 23, 1976
B 484,769	3,999,498	Mar. 16, 1976	Dec. 28, 1976
B 485,051	3,992,418	Feb. 17, 1976	Nov. 16, 1976
B 485,060	3,983,067	Feb. 17, 1976	Sep. 28, 1976
B 485,169	3,989,791	Mar. 16, 1976	Nov. 2, 1976
B 485,188	4,001,170	Mar. 16, 1976	Jan. 4, 1977
B 485,401	3,985,859	Jan. 27, 1976	Oct. 12, 1976
B 485,575	3,996,565	Feb. 24, 1976	Dec. 7, 1976
B 485,926	4,006,357	Mar. 23, 1976	Feb. 1, 1977
B 485,972	4,017,472	Mar. 23, 1976	Apr. 12, 1977
B 486,280	3,983,130	Feb. 3, 1976	Sep. 28, 1976
B 486,614	3,995,835	Feb. 17, 1976	Dec. 7, 1976
B 486,678	4,001,273	Mar. 2, 1976	Jan. 4, 1977
B 486,828	3,989,651	Mar. 2, 1976	Nov. 2, 1976
B 487,062	D 241,256	Feb. 10, 1976	Nov. 9, 1976
B 487,078	4,012,895	Mar. 30, 1976	Mar. 22, 1977
B 487,133	3,989,826	Jan. 27, 1976	Nov. 2, 1976
B 487,260	3,990,610	Jan. 27, 1976	Nov. 9, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 487,411	3,983,579	Feb. 24, 1976	Sep. 28, 1976
B 487,423	3,998,810	Mar. 2, 1976	Dec. 21, 1976
B 487,427	3,995,788	Mar. 2, 1976	Dec. 7, 1976
B 487,467	4,014,847	Apr. 13, 1976	Mar. 29, 1977
B 487,529	4,022,750	Mar. 30, 1976	May 10, 1977
B 488,111	3,985,765	Jan. 13, 1976	Oct. 12, 1976
B 488,395	3,982,245	Jan. 27, 1976	Sep. 21, 1976
B 488,634	3,982,158	Jan. 20, 1976	Sep. 21, 1976
B 488,756	3,991,810	Mar. 16, 1976	Nov. 16, 1976
B 488,836	4,013,121	Mar. 30, 1976	Mar. 22, 1977
B 489,290	3,998,081	Feb. 17, 1976	Dec. 21, 1976
B 489,328	3,990,088	Jan. 20, 1976	Nov. 2, 1976
B 489,331	3,996,175	Feb. 17, 1976	Dec. 7, 1976
B 489,485	D 243,266	Apr. 13, 1976	Feb. 1, 1977
B 489,550	4,000,710	Mar. 16, 1976	Jan. 4, 1977
B 489,685	3,984,085	Feb. 24, 1976	Oct. 5, 1976
B 490,067	3,986,600	Jan. 27, 1976	Oct. 19, 1976
B 490,547	3,999,439	Feb. 24, 1976	Dec. 28, 1976
B 490,551	D 243,168	Apr. 6, 1976	Jan. 25, 1977
B 490,589	3,990,680	Feb. 3, 1976	Nov. 9, 1976
B 490,623	3,996,964	Mar. 2, 1976	Dec. 14, 1976
B 490,647	3,985,196	Feb. 24, 1976	Oct. 12, 1976
B 490,806	3,989,486	Feb. 3, 1976	Nov. 2, 1976
B 490,812	3,998,842	Mar. 30, 1976	Dec. 21, 1976
B 490,946	3,993,652	Feb. 17, 1976	Nov. 23, 1976
B 490,995	3,995,031	Feb. 3, 1976	Nov. 30, 1976
B 491,032	3,981,892	Feb. 10, 1976	Sep. 21, 1976
B 491,052	3,985,790	Mar. 2, 1976	Oct. 12, 1976
B 491,111	3,997,916	Feb. 17, 1976	Dec. 14, 1976
B 491,455	3,991,167	Feb. 3, 1976	Nov. 9, 1976
B 491,501	3,984,914	Jan. 13, 1976	Oct. 12, 1976
B 491,618	4,007,950	Mar. 16, 1976	Feb. 15, 1977
B 491,650	3,999,044	Mar. 9, 1976	Dec. 21, 1976
B 491,673	3,994,770	Feb. 17, 1976	Nov. 30, 1976
B 491,711	4,053,467	Mar. 23, 1976	Oct. 11, 1977
B 491,776	3,986,298	Mar. 16, 1976	Oct. 19, 1976
B 491,883	3,984,412	Feb. 3, 1976	Oct. 5, 1976
B 491,906	D 242,223	Feb. 10, 1976	Nov. 9, 1976
B 492,039	3,997,541	Feb. 24, 1976	Dec. 14, 1976
B 492,093	4,003,658	Mar. 23, 1976	Jan. 18, 1977
B 492,120	3,995,692	Feb. 24, 1976	Dec. 7, 1976
B 492,301	3,981,073	Jan. 13, 1976	Sep. 21, 1976
B 492,373	4,010,908	Mar. 30, 1976	Mar. 8, 1977
B 492,688	3,983,415	Jan. 20, 1976	Sep. 28, 1976
B 492,716	3,998,739	Mar. 2, 1976	Dec. 21, 1976
B 492,774	4,001,843	Mar. 9, 1976	Jan. 4, 1977
B 492,902	3,993,859	Feb. 24, 1976	Nov. 23, 1976
B 492,946	3,991,303	Jan. 27, 1976	Nov. 9, 1976
B 493,254	D 243,267	Apr. 13, 1976	Feb. 1, 1977
B 493,370	3,984,792	Mar. 16, 1976	Oct. 5, 1976
B 493,463	4,013,510	Mar. 23, 1976	Mar. 22, 1977
B 493,474	4,013,565	Mar. 23, 1976	Mar. 22, 1977
B 493,501	3,988,061	Feb. 3, 1976	Oct. 26, 1976
B 493,686	4,008,338	Mar. 23, 1976	Feb. 15, 1977
B 493,955	3,989,830	Mar. 9, 1976	Nov. 2, 1976
B 493,981	3,990,165	Mar. 9, 1976	Nov. 9, 1976
B 494,138	4,034,002	Mar. 23, 1976	July 5, 1977
B 494,234	3,983,808	Feb. 10, 1976	Oct. 5, 1976
B 494,339	4,001,255	Mar. 16, 1976	Jan. 4, 1977
B 494,383	3,991,289	Feb. 3, 1976	Nov. 9, 1976
B 494,439	4,057,521	Apr. 13, 1976	Nov. 8, 1977
B 494,440	4,056,502	Feb. 17, 1976	Nov. 1, 1977
B 494,669	3,991,104	Feb. 3, 1976	Nov. 9, 1976
B 494,691	3,987,457	Mar. 16, 1976	Oct. 19, 1976
B 494,806	3,989,210	Feb. 3, 1976	Nov. 2, 1976
B 494,944	3,992,469	Feb. 17, 1976	Nov. 16, 1976
~~B 495,185~~	3,999,166	Mar. 9, 1976	Dec. 21, 1976
B 495,331	4,000,456	Mar. 16, 1976	Dec. 28, 1976
B 495,402	3,983,988	Feb. 17, 1976	Oct. 5, 1976
B 495,408	4,000,222	Feb. 3, 1976	Dec. 28, 1976
B 495,489	3,984,571	Feb. 3, 1976	Oct. 5, 1976
B 495,550	3,993,666	Feb. 3, 1976	Nov. 23, 1976
B 495,554	3,993,665	Feb. 3, 1976	Nov. 23, 1976
B 495,759	3,989,998	Feb. 3, 1976	Nov. 2, 1976
B 495,781	4,013,699	Mar. 23, 1976	Mar. 22, 1977
B 495,903	3,995,997	Feb. 17, 1976	Dec. 7, 1976
B 496,430	3,991,140	Feb. 10, 1976	Nov. 9, 1976
B 496,431	3,985,894	Jan. 13, 1976	Oct. 12, 1976
B 496,487	3,982,261	Jan. 20, 1976	Sep. 21, 1976
B 496,500	3,985,962	Feb. 3, 1976	Oct. 12, 1976
B 496,502	3,987,444	Jan. 20, 1976	Oct. 19, 1976
B 496,792	3,999,959	Feb. 17, 1976	Dec. 28, 1976
B 496,964	3,999,219	Apr. 20, 1976	Dec. 21, 1976
B 496,999	3,983,804	Jan. 27, 1976	Oct. 5, 1976
B 497,021	3,985,039	Jan. 13, 1976	Oct. 12, 1976
B 497,194	3,988,267	Feb. 3, 1976	Oct. 26, 1976
B 497,292	3,994,052	Feb. 3, 1976	Nov. 30, 1976
B 497,293	4,011,412	Mar. 30, 1976	Mar. 8, 1977
B 497,473	3,990,839	Feb. 3, 1976	Nov. 9, 1976
B 497,571	4,009,997	Mar. 23, 1976	Mar. 1, 1977
B 497,584	3,988,184	Feb. 24, 1976	Oct. 26, 1976
B 497,702	3,996,589	Mar. 2, 1976	Dec. 7, 1976
B 497,780	3,997,500	Feb. 24, 1976	Dec. 14, 1976
B 497,853	3,987,934	Feb. 17, 1976	Oct. 26, 1976
B 497,896	D 243,091	Apr. 6, 1976	Jan. 18, 1977
B 497,960	3,991,325	Jan. 20, 1976	Nov. 9, 1976
B 498,208	4,001,480	Apr. 13, 1976	Jan. 4, 1977
B 498,288	4,013,657	Mar. 23, 1976	Mar. 22, 1977
B 498,775	3,993,868	Mar. 2, 1976	Nov. 23, 1976
B 498,205	3,989,611	Feb. 10, 1976	Nov. 2, 1976
B 498,500	3,982,241	Jan. 20, 1976	Sep. 21, 1976
B 498,775	3,993,868	Mar. 2, 1976	Nov. 23, 1976
B 498,820	3,996,670	Mar. 9, 1976	Dec. 14, 1976
B 498,951	3,996,907	Mar. 2, 1976	Dec. 14, 1976
B 499,171	3,985,192	Jan. 27, 1976	Oct. 12, 1976
B 499,209	3,995,907	Feb. 24, 1976	Dec. 7, 1976
B 499,227	3,981,344	Jan. 27, 1976	Sep. 21, 1976
B 499,324	4,001,375	Mar. 16, 1976	Jan. 4, 1977
B 499,352	3,981,391	Jan. 27, 1976	Sep. 21, 1976
B 499,370	4,013,544	Mar. 30, 1976	Mar. 22, 1977
B 499,718	3,990,058	Jan. 27, 1976	Nov. 2, 1976
B 499,786	4,000,663	Mar. 16, 1976	Jan. 4, 1977
B 500,171	3,997,262	Mar. 30, 1976	Dec. 14, 1976
B 500,176	3,995,316	Feb. 3, 1976	Nov. 30, 1976
B 500,408	D 242,721	Mar. 16, 1976	Dec. 14, 1976
B 500,945	3,996,817	Feb. 24, 1976	Dec. 14, 1976
B 500,959	4,014,853	Apr. 13, 1976	Mar. 29, 1977
B 500,981	3,984,681	Jan. 27, 1976	Oct. 5, 1976
B 501,122	3,981,385	Feb. 17, 1976	Sep. 21, 1976
B 501,181	3,984,761	Feb. 10, 1976	Oct. 5, 1976
B 501,253	3,994,015	Feb. 3, 1976	Nov. 23, 1976
B 501,317	3,985,643	Jan. 13, 1976	Oct. 12, 1976
B 501,379	4,013,696	Mar. 30, 1976	Mar. 22, 1977
B 501,415	3,982,051	Jan. 13, 1976	Sep. 21, 1976
B 501,482	4,012,650	Jan. 13, 1976	Mar. 15, 1977
B 501,503	4,001,640	Mar. 2, 1976	Jan. 4, 1977
B 501,540	3,985,694	Jan. 13, 1976	Oct. 12, 1976
B 501,975	3,998,466	Mar. 2, 1976	Dec. 21, 1976
B 501,993	3,981,606	Jan. 13, 1976	Sep. 21, 1976
B 502,151	3,998,614	Mar. 23, 1976	Dec. 21, 1976
B 502,161	4,000,500	Mar. 2, 1976	Dec. 28, 1976
B 502,289	3,982,274	Jan. 13, 1976	Sep. 21, 1976
B 502,381	D 242,231	Mar. 16, 1976	Nov. 9, 1976
B 502,540	3,983,698	Jan. 13, 1976	Oct. 5, 1976
B 502,571	D 242,433	Apr. 6, 1976	Nov. 23, 1976
B 502,589	3,989,652	Jan. 27, 1976	Nov. 2, 1976
B 502,652	3,989,186	Feb. 24, 1976	Nov. 2, 1976
B 502,667	3,991,431	Feb. 24, 1976	Nov. 16, 1976
B 502,973	3,982,161	Jan. 27, 1976	Sep. 21, 1976
B 502,993	3,992,489	Feb. 17, 1976	Nov. 16, 1976
B 503,029	3,986,879	Jan. 27, 1976	Oct. 19, 1976
B 503,345	4,001,235	Feb. 24, 1976	Jan. 4, 1977
B 503,371	4,009,401	Mar. 30, 1976	Feb. 22, 1977
B 503,436	3,988,819	Feb. 24, 1976	Nov. 2, 1976
B 503,456	4,007,702	Mar. 23, 1976	Feb. 15, 1977
B 503,521	3,999,646	Mar. 16, 1976	Dec. 28, 1976
B 503,579	3,989,680	Feb. 10, 1976	Nov. 2, 1976
B 503,618	3,997,782	Mar. 9, 1976	Dec. 14, 1976
B 503,742	3,989,756	Feb. 17, 1976	Nov. 2, 1976
B 503,776	4,016,000	Mar. 23, 1976	Apr. 5, 1977
B 503,780	3,990,055	Mar. 16, 1976	Nov. 2, 1976
B 503,817	3,988,307	Jan. 13, 1976	Oct. 26, 1976
B 504,056	3,993,923	Feb. 24, 1976	Nov. 23, 1976
B 504,061	3,987,534	Mar. 16, 1976	Oct. 26, 1976
B 504,156	3,999,048	Mar. 23, 1976	Dec. 21, 1976
B 504,169	3,981,219	Jan. 13, 1976	Sep. 21, 1976
B 504,404	3,996,499	Feb. 24, 1976	Dec. 7, 1976
B 504,405	4,007,401	Apr. 13, 1976	Feb. 8, 1977
B 504,439	3,999,398	Mar. 16, 1976	Dec. 28, 1976
B 504,503	3,999,210	Mar. 9, 1976	Dec. 21, 1976
B 504,582	4,005,138	Mar. 30, 1976	Jan. 25, 1977
B 504,778	3,986,650	Feb. 24, 1976	Oct. 19, 1976
B 504,877	3,997,564	Feb. 24, 1976	Dec. 14, 1976
B 504,899	3,991,273	Mar. 9, 1976	Nov. 9, 1976
B 505,126	3,981,745	Feb. 10, 1976	Sep. 21, 1976
B 505,221	4,013,627	Mar. 30, 1976	Mar. 22, 1977
B 505,582	4,001,659	Mar. 23, 1976	Jan. 4, 1977
B 505,689	3,987,631	Mar. 2, 1976	Oct. 26, 1976
B 505,813	3,985,175	Jan. 13, 1976	Oct. 12, 1976
B 506,144	3,991,147	Feb. 10, 1976	Nov. 9, 1976
B 506,148	3,988,319	Feb. 3, 1976	Oct. 26, 1976
B 506,167	3,990,652	Feb. 10, 1976	Nov. 9, 1976
B 506,286	3,982,085	Jan. 20, 1976	Sep. 21, 1976
B 506,461	3,987,348	Jan. 20, 1976	Oct. 19, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 506,566	3,985,402	Jan. 20, 1976	Oct. 12, 1976
B 506,624	3,999,695	Mar. 9, 1976	Dec. 28, 1976
B 506,648	3,994,857	Feb. 3, 1976	Nov. 30, 1976
B 506,744	3,981,176	Jan. 13, 1976	Sep. 21, 1976
B 506,760	4,012,835	Apr. 13, 1976	Mar. 22, 1977
B 506,839	4,005,389	Mar. 23, 1976	Jan. 25, 1977
B 506,840	4,002,928	Mar. 23, 1976	Jan. 11, 1977
B 506,916	3,986,140	Feb. 3, 1976	Oct. 12, 1976
B 506,926	3,993,232	Feb. 17, 1976	Nov. 23, 1976
B 507,087	3,991,389	Feb. 17, 1976	Nov. 9, 1976
B 507,131	4,000,499	Mar. 2, 1976	Dec. 28, 1976
B 507,166	4,014,738	Apr. 13, 1976	Mar. 29, 1977
B 507,396	3,995,167	Feb. 10, 1976	Nov. 30, 1976
B 507,476	3,994,680	Feb. 10, 1976	Nov. 30, 1976
B 507,647	3,982,240	Jan. 27, 1976	Sep. 21, 1976
B 508,118	3,992,283	Feb. 17, 1976	Nov. 16, 1976
B 508,119	3,992,285	Feb. 17, 1976	Nov. 16, 1976
B 508,369	3,985,847	Jan. 13, 1976	Oct. 12, 1976
B 508,639	4,004,194	Mar. 23, 1976	Jan. 18, 1977
B 508,817	3,989,891	Feb. 3, 1976	Nov. 2, 1976
B 508,878	3,994,117	Feb. 3, 1976	Nov. 30, 1976
B 508,940	3,981,321	Feb. 17, 1976	Sep. 21, 1976
B 508,961	3,987,477	Feb. 3, 1976	Oct. 19, 1976
B 509,043	3,996,767	Feb. 24, 1976	Dec. 14, 1976
B 509,165	3,999,155	Mar. 2, 1976	Dec. 21, 1976
B 509,185	3,989,996	Feb. 3, 1976	Nov. 2, 1976
B 509,238	3,982,399	Feb. 24, 1976	Sep. 28, 1976
B 509,474	3,997,260	Feb. 17, 1976	Dec. 14, 1976
B 509,586	4,006,645	Feb. 3, 1976	Feb. 8, 1977
B 509,606	3,989,986	Feb. 3, 1976	Nov. 2, 1976
B 509,772	3,999,004	Mar. 16, 1976	Dec. 21, 1976
B 509,819	4,014,712	Apr. 13, 1976	Mar. 29, 1977
B 510,026	4,016,763	Apr. 13, 1976	Apr. 12, 1977
B 510,184	D 242,784	Apr. 6, 1976	Dec. 21, 1976
B 510,278	4,008,972	Mar. 30, 1976	Feb. 22, 1977
B 510,281	3,993,215	Mar. 9, 1976	Nov. 23, 1976
B 510,346	D 242,207	Feb. 10, 1976	Nov. 9, 1976
B 510,458	4,000,221	Feb. 10, 1976	Dec. 28, 1976
B 510,521	3,990,656	Mar. 2, 1976	Nov. 9, 1976
B 510,588	3,981,539	Jan. 27, 1976	Sep. 21, 1976
B 510,677	3,989,541	Feb. 24, 1976	Nov. 2, 1976
B 510,682	4,000,978	Mar. 30, 1976	Jan. 4, 1977
B 510,836	4,013,795	Mar. 23, 1976	Mar. 22, 1977
B 510,850	3,989,841	Feb. 3, 1976	Nov. 2, 1976
B 510,855	3,981,059	Jan. 27, 1976	Sep. 21, 1976
B 511,907	3,999,622	Mar. 30, 1976	Dec. 28, 1976
B 510,998	3,992,336	Feb. 10, 1976	Nov. 16, 1976
B 511,002	3,998,717	Mar. 2, 1976	Dec. 21, 1976
B 511,099	3,990,162	Feb. 3, 1976	Nov. 9, 1976
B 511,156	3,981,364	Jan. 27, 1976	Sep. 21, 1976
B 511,346	3,984,072	Jan. 27, 1976	Oct. 5, 1976
B 511,407	3,981,485	Feb. 10, 1976	Sep. 21, 1976
B 511,454	3,982,333	Feb. 24, 1976	Sep. 28, 1976
B 511,665	4,001,037	Mar. 2, 1976	Jan. 4, 1977
B 511,885	3,981,346	Jan. 27, 1976	Sep. 21, 1976
B 511,886	3,989,991	Feb. 3, 1976	Nov. 2, 1976
B 511,909	3,981,183	Feb. 17, 1976	Sep. 21, 1976
B 512,324	3,985,084	Feb. 17, 1976	Oct. 12, 1976
B 512,547	3,984,193	Jan. 13, 1976	Oct. 5, 1976
B 512,745	3,981,294	Jan. 13, 1976	Sep. 21, 1976
B 512,779	4,014,897	Apr. 13, 1976	Mar. 29, 1977
B 512,818	3,997,363	Apr. 6, 1976	Dec. 14, 1976
B 512,849	3,982,141	Feb. 3, 1976	Sep. 21, 1976
B 512,964	3,995,279	Feb. 10, 1976	Nov. 30, 1976
B 513,014	3,991,113	Feb. 10, 1976	Nov. 9, 1976
B 513,027	3,995,143	Feb. 17, 1976	Nov. 30, 1976
B 513,134	4,006,764	Mar. 23, 1976	Feb. 8, 1977
B 513,280	3,988,211	Jan. 20, 1976	Oct. 26, 1976
B 513,368	3,982,138	Feb. 3, 1976	Sep. 21, 1976
B 513,706	3,986,064	Jan. 13, 1976	Oct. 12, 1976
B 513,756	3,993,869	Feb. 3, 1976	Nov. 23, 1976
B 513,781	4,001,324	Feb. 24, 1976	Jan. 4, 1977
B 513,789	3,981,599	Feb. 3, 1976	Sep. 21, 1976
B 513,791	4,008,608	Mar. 30, 1976	Feb. 22, 1977
B 514,259	4,013,649	Mar. 23, 1976	Mar. 22, 1977
B 514,687	3,986,522	Jan. 27, 1976	Oct. 19, 1976
B 514,839	4,033,816	Mar. 2, 1976	July 5, 1977
B 515,135	3,990,085	Feb. 17, 1976	Nov. 2, 1976
B 515,303	3,987,939	Jan. 20, 1976	Oct. 26, 1976
B 515,368	4,014,733	Apr. 6, 1976	Mar. 29, 1977
B 515,452	3,995,243	Feb. 10, 1976	Nov. 30, 1976
B 515,455	3,982,149	Jan. 27, 1976	Sep. 21, 1976
B 515,642	4,001,258	Feb. 24, 1976	Jan. 4, 1977
B 515,908	3,984,676	Jan. 20, 1976	Oct. 5, 1976
B 516,002	3,988,638	Jan. 13, 1976	Oct. 26, 1976
B 516,032	3,986,634	Jan. 27, 1976	Oct. 19, 1976
B 516,047	3,985,741	Feb. 10, 1976	Oct. 12, 1976
B 516,060	3,983,572	Feb. 17, 1976	Sep. 28, 1976
B 516,069	3,986,208	Mar. 16, 1976	Oct. 12, 1976
B 516,296	3,984,404	Feb. 3, 1976	Oct. 5, 1976
B 516,537	3,996,784	Feb. 17, 1976	Dec. 14, 1976
B 516,564	3,993,931	Feb. 17, 1976	Nov. 23, 1976
B 516,609	3,994,486	Feb. 24, 1976	Nov. 30, 1976
B 516,625	4,013,542	Mar. 30, 1976	Mar. 22, 1977
B 516,804	3,991,209	Mar. 23, 1976	Nov. 9, 1976
B 516,825	3,988,885	Feb. 3, 1976	Nov. 2, 1976
B 517,273	D 242,798	Mar. 16, 1976	Dec. 21, 1976
B 517,504	3,999,855	Mar. 9, 1976	Dec. 28, 1976
B 517,668	4,013,423	Apr. 6, 1976	Mar. 22, 1977
B 517,762	3,986,065	Mar. 16, 1976	Oct. 12, 1976
B 517,858	4,000,999	Feb. 17, 1976	Jan. 4, 1977
B 517,956	D 243,088	Apr. 6, 1976	Jan. 18, 1977
B 517,957	D 243,089	Apr. 6, 1976	Jan. 18, 1977
B 518,076	4,014,914	Mar. 30, 1976	Mar. 29, 1977
B 518,226	3,993,509	Feb. 10, 1976	Nov. 23, 1976
B 518,326	4,008,282	Mar. 23, 1976	Feb. 15, 1977
B 518,656	3,989,732	Feb. 17, 1976	Nov. 2, 1976
B 518,859	3,989,971	Feb. 3, 1976	Nov. 2, 1976
B 518,999	3,990,323	Feb. 3, 1976	Nov. 9, 1976
B 519,095	3,993,621	Feb. 24, 1976	Nov. 23, 1976
B 519,355	4,014,829	Apr. 13, 1976	Mar. 29, 1977
B 519,377	3,987,223	Jan. 27, 1976	Oct. 19, 1976
B 519,446	3,985,815	Feb. 24, 1976	Oct. 12, 1976
B 519,485	3,991,134	Feb. 10, 1976	Nov. 9, 1976
B 519,486	3,992,481	Feb. 17, 1976	Nov. 16, 1976
B 519,487	3,992,337	Feb. 17, 1976	Nov. 16, 1976
B 519,599	3,995,350	Feb. 17, 1976	Dec. 7, 1976
B 519,623	4,012,049	Apr. 6, 1976	Mar. 15, 1977
B 519,680	4,014,660	Mar. 30, 1976	Mar. 29, 1977
B 519,932	3,988,618	Feb. 3, 1976	Oct. 26, 1976
B 519,979	3,982,067	Feb. 3, 1976	Sep. 21, 1976
B 520,063	3,989,934	Mar. 2, 1976	Nov. 2, 1976
B 520,075	3,989,935	Feb. 24, 1976	Nov. 2, 1976
B 520,076	3,989,936	Mar. 2, 1976	Nov. 2, 1976
B 520,082	3,989,937	Mar. 23, 1976	Nov. 2, 1976
B 520,115	4,003,072	Mar. 23, 1976	Jan. 11, 1977
B 520,227	4,002,823	Mar. 30, 1976	Jan. 11, 1977
B 520,256	3,985,730	Jan. 13, 1976	Oct. 12, 1976
B 520,277	3,995,635	Feb. 17, 1976	Dec. 7, 1976
B 520,341	3,992,028	Mar. 16, 1976	Nov. 16, 1976
B 520,384	3,986,592	Jan. 27, 1976	Oct. 19, 1976
B 520,514	3,988,308	Mar. 9, 1976	Oct. 26, 1976
B 520,534	3,997,119	Feb. 17, 1976	Dec. 14, 1976
B 520,543	3,986,768	Jan. 27, 1976	Oct. 19, 1976
B 520,546	4,001,133	Mar. 2, 1976	Jan. 4, 1977
B 520,613	3,991,341	Mar. 16, 1976	Nov. 9, 1976
B 520,658	3,998,778	Mar. 9, 1976	Dec. 21, 1976
B 520,878	4,014,849	Apr. 6, 1976	Mar. 29, 1977
B 520,884	4,000,433	Mar. 16, 1976	Dec. 28, 1976
B 520,924	3,982,113	Jan. 27, 1976	Sep. 21, 1976
B 520,928	3,983,617	Jan. 13, 1976	Oct. 5, 1976
B 520,952	4,000,876	Mar. 16, 1976	Jan. 4, 1977
B 520,995	4,009,996	Mar. 23, 1976	Mar. 1, 1977
B 521,025	3,998,838	Mar. 23, 1976	Dec. 21, 1976
B 521,044	3,983,435	Feb. 24, 1976	Sep. 28, 1976
B 521,045	3,983,433	Feb. 24, 1976	Sep. 28, 1976
B 521,046	3,983,434	Feb. 24, 1976	Sep. 28, 1976
B 521,125	3,994,865	Feb. 10, 1976	Nov. 30, 1976
B 521,126	3,997,510	Feb. 10, 1976	Dec. 14, 1976
B 521,127	3,996,201	Feb. 17, 1976	Dec. 7, 1976
B 521,128	3,997,511	Feb. 10, 1976	Dec. 14, 1976
B 521,324	3,983,143	Jan. 27, 1976	Sep. 28, 1976
B 521,480	3,982,665	Jan. 13, 1976	Sep. 28, 1976
B 521,600	3,981,458	Jan. 27, 1976	Sep. 21, 1976
B 521,612	4,000,251	Mar. 9, 1976	Dec. 28, 1976
B 521,620	3,983,749	Jan. 27, 1976	Oct. 5, 1976
B 521,643	3,997,567	Mar. 2, 1976	Dec. 14, 1976
B 521,711	3,989,835	Feb. 10, 1976	Nov. 2, 1976
B 521,793	3,996,981	Feb. 24, 1976	Dec. 14, 1976
B 521,984	3,983,220	Feb. 17, 1976	Sep. 28, 1976
B 521,985	4,012,404	Mar. 23, 1976	Mar. 15, 1977
B 521,986	3,981,607	Feb. 3, 1976	Sep. 21, 1976
B 522,009	3,995,444	Feb. 17, 1976	Dec. 7, 1976
B 522,038	3,993,119	Feb. 3, 1976	Nov. 23, 1976
B 522,227	3,992,904	Mar. 30, 1976	Nov. 23, 1976
B 522,309	3,991,603	Feb. 3, 1976	Nov. 16, 1976
B 522,354	3,984,959	Jan. 20, 1976	Oct. 12, 1976
B 522,446	4,001,194	Mar. 30, 1976	Jan. 4, 1977
B 522,537	3,999,587	Mar. 30, 1976	Dec. 28, 1976
B 522,567	3,996,238	Feb. 17, 1976	Dec. 7, 1976
B 522,568	D 242,785	Apr. 6, 1976	Dec. 21, 1976
B 522,577	3,982,123	Jan. 27, 1976	Sep. 21, 1976
B 522,629	4,001,155	Mar. 16, 1976	Jan. 4, 1977
B 523,226	4,006,367	Mar. 23, 1976	Feb. 1, 1977

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 523,696	3,986,071	Jan. 13, 1976	Oct. 12, 1976
B 523,885	3,981,040	Feb. 17, 1976	Sep. 21, 1976
B 523,952	3,988,707	Mar. 23, 1976	Oct. 26, 1976
B 524,026	3,992,206	Feb. 10, 1976	Nov. 16, 1976
B 524,121	3,982,536	Feb. 3, 1976	Sep. 28, 1976
B 524,179	3,985,872	Jan. 13, 1976	Oct. 12, 1976
B 524,464	3,985,580	Feb. 10, 1976	Oct. 12, 1976
B 524,806	4,000,065	Mar. 2, 1976	Dec. 28, 1976
B 524,849	4,014,938	Mar. 23, 1976	Mar. 29, 1977
B 525,133	3,996,481	Mar. 23, 1976	Dec. 7, 1976
B 525,204	4,001,109	Mar. 16, 1976	Jan. 4, 1977
B 525,809	3,985,040	Feb. 24, 1976	Oct. 12, 1976
B 525,961	3,985,557	Jan. 13, 1976	Oct. 12, 1976
B 526,106	3,990,073	Jan. 27, 1976	Nov. 2, 1976
B 526,190	3,982,129	Feb. 17, 1976	Sep. 21, 1976
B 526,279	4,013,138	Apr. 13, 1976	Mar. 22, 1977
B 526,289	3,992,641	Feb. 24, 1976	Nov. 16, 1976
B 526,388	3,992,017	Feb. 3, 1976	Nov. 16, 1976
B 526,445	3,984,978	Jan. 20, 1976	Oct. 12, 1976
B 526,447	4,000,052	Feb. 24, 1976	Dec. 28, 1976
B 526,510	3,989,708	Jan. 20, 1976	Nov. 2, 1976
B 526,654	4,011,534	Mar. 23, 1976	Mar. 8, 1977
B 526,942	4,013,700	Mar. 30, 1976	Mar. 22, 1977
B 526,997	3,985,695	Jan. 13, 1976	Oct. 12, 1976
B 527,040	4,013,515	Mar. 23, 1976	Mar. 22, 1977
B 527,054	3,981,559	Feb. 17, 1976	Sep. 21, 1976
B 527,171	3,998,248	Mar. 9, 1976	Dec. 21, 1976
B 527,187	3,995,202	Feb. 17, 1976	Nov. 30, 1976
B 527,333	3,999,732	Mar. 23, 1976	Dec. 28, 1976
B 527,669	3,982,206	Jan. 13, 1976	Sep. 21, 1976
B 527,693	3,995,233	Feb. 3, 1976	Nov. 30, 1976
B 527,788	D 242,337	Feb. 10, 1976	Nov. 16, 1976
B 527,972	4,000,016	Mar. 9, 1976	Dec. 28, 1976
B 527,999	3,981,682	Feb. 3, 1976	Sep. 21, 1976
B 528,297	4,001,138	Mar. 16, 1976	Jan. 4, 1977
B 528,303	3,991,023	Feb. 10, 1976	Nov. 9, 1976
B 528,401	3,991,619	Feb. 3, 1976	Nov. 16, 1976
B 528,756	3,990,476	Feb. 3, 1976	Nov. 9, 1976
B 528,761	3,982,221	Feb. 10, 1976	Sep. 21, 1976
B 528,962	3,989,666	Feb. 24, 1976	Nov. 2, 1976
B 528,966	3,989,667	Feb. 24, 1976	Nov. 2, 1976
B 529,156	3,989,158	Jan. 13, 1976	Nov. 2, 1976
B 529,194	4,000,776	Mar. 23, 1976	Jan. 4, 1977
B 529,214	4,013,004	Apr. 20, 1976	Mar. 22, 1977
B 529,659	3,996,875	Feb. 24, 1976	Dec. 14, 1976
B 529,836	3,994,345	Feb. 3, 1976	Nov. 30, 1976
B 529,925	4,014,003	Mar. 30, 1976	Mar. 22, 1977
B 529,974	3,987,098	Feb. 17, 1976	Oct. 19, 1976
B 530,174	3,993,635	Feb. 24, 1976	Nov. 23, 1976
B 530,255	3,996,103	Mar. 2, 1976	Dec. 7, 1976
B 530,263	4,009,736	Mar. 30, 1976	Mar. 1, 1977
B 530,285	4,013,903	Apr. 6, 1976	Mar. 22, 1977
B 530,303	4,006,029	Mar. 23, 1976	Feb. 1, 1977
B 530,318	3,985,752	Jan. 13, 1976	Oct. 12, 1976
B 530,437	4,014,857	Apr. 13, 1976	Mar. 29, 1977
B 530,569	3,999,865	Mar. 16, 1976	Dec. 28, 1976
B 530,580	4,001,151	Mar. 2, 1976	Jan. 4, 1977
B 530,605	3,989,064	Feb. 3, 1976	Nov. 2, 1976
B 530,709	4,012,944	Apr. 6, 1976	Mar. 22, 1977
B 530,813	3,986,131	Feb. 17, 1976	Oct. 12, 1976
B 530,873	4,001,016	Feb. 17, 1976	Jan. 4, 1977
B 530,925	3,983,161	Feb. 24, 1976	Sep. 28, 1976
B 531,096	3,984,415	Feb. 10, 1976	Oct. 5, 1976
B 531,267	3,997,040	Feb. 24, 1976	Dec. 14, 1976
B 531,425	3,992,595	Feb. 3, 1976	Nov. 16, 1976
B 531,566	3,997,820	Mar. 16, 1976	Dec. 14, 1976
B 531,686	3,990,017	Mar. 23, 1976	Nov. 2, 1976
B 531,753	3,988,843	Mar. 2, 1976	Nov. 2, 1976
B 531,929	3,986,067	Jan. 20, 1976	Oct. 12, 1976
B 532,005	3,992,397	Feb. 24, 1976	Nov. 16, 1976
B 532,140	4,001,299	Mar. 2, 1976	Jan. 4, 1977
B 532,319	3,990,292	Feb. 3, 1976	Nov. 9, 1976
B 532,326	3,993,959	Mar. 23, 1976	Nov. 23, 1976
B 532,424	D 242,292	Feb. 10, 1976	Nov. 9, 1976
B 532,476	3,992,756	Feb. 3, 1976	Nov. 23, 1976
B 532,477	4,014,895	Apr. 13, 1976	Mar. 29, 1977
B 532,679	4,010,706	Apr. 6, 1976	Mar. 8, 1977
B 532,901	3,984,318	Jan. 13, 1976	Oct. 5, 1976
B 532,969	3,981,706	Jan. 13, 1976	Sep. 21, 1976
B 532,976	4,000,837	Mar. 23, 1976	Jan. 4, 1977
B 533,056	3,983,969	Jan. 13, 1976	Oct. 5, 1976
B 533,259	3,999,556	Feb. 24, 1976	Dec. 28, 1976
B 533,454	3,996,566	Mar. 2, 1976	Dec. 7, 1976
B 533,580	3,982,255	Feb. 3, 1976	Sep. 21, 1976
B 533,652	4,000,196	Mar. 23, 1976	Dec. 28, 1976
B 533,734	3,984,799	Jan. 27, 1976	Oct. 5, 1976
B 533,968	3,986,576	Jan. 27, 1976	Oct. 19, 1976
B 534,016	3,983,381	Feb. 3, 1976	Sep. 28, 1976
B 534,313	3,981,675	Jan. 27, 1976	Sep. 21, 1976
B 534,314	3,981,786	Feb. 10, 1976	Sep. 21, 1976
B 534,333	3,981,480	Feb. 17, 1976	Sep. 21, 1976
B 534,334	D 242,722	Mar. 16, 1976	Dec. 14, 1976
B 534,443	3,989,970	Jan. 27, 1976	Nov. 2, 1976
B 534,574	3,995,624	Feb. 24, 1976	Dec. 7, 1976
B 534,591	3,991,141	Feb. 17, 1976	Nov. 9, 1976
B 534,680	4,014,904	Apr. 20, 1976	Mar. 29, 1977
B 534,767	3,982,180	Feb. 3, 1976	Sep. 21, 1976
B 534,915	4,012,668	Mar. 23, 1976	Mar. 15, 1977
B 534,991	3,983,517	Jan. 27, 1976	Sep. 28, 1976
B 535,076	3,981,718	Jan. 20, 1976	Sep. 21, 1976
B 535,209	4,001,873	Mar. 16, 1976	Jan. 4, 1977
B 535,256	3,999,150	Mar. 23, 1976	Dec. 21, 1976
B 535,268	3,999,045	Mar. 30, 1976	Dec. 21, 1976
B 535,386	3,981,150	Jan. 13, 1976	Sep. 21, 1976
B 535,391	3,981,386	Jan. 27, 1976	Sep. 21, 1976
B 535,411	3,990,543	Feb. 24, 1976	Nov. 9, 1976
B 535,437	3,997,555	Feb. 24, 1976	Dec. 14, 1976
B 535,448	3,997,123	Mar. 16, 1976	Dec. 14, 1976
B 535,466	3,981,309	Jan. 27, 1976	Sep. 21, 1976
B 535,813	3,981,819	Jan. 27, 1976	Sep. 21, 1976
B 535,928	3,981,466	Jan. 13, 1976	Sep. 21, 1976
B 536,009	3,982,112	Jan. 27, 1976	Sep. 21, 1976
B 536,082	3,997,783	Mar. 16, 1976	Dec. 14, 1976
B 536,322	4,001,272	Mar. 23, 1976	Jan. 4, 1977
B 536,403	3,998,341	Mar. 23, 1976	Dec. 21, 1976
B 536,511	3,995,989	Mar. 9, 1976	Dec. 7, 1976
B 536,675	3,985,773	Jan. 20, 1976	Oct. 12, 1976
B 536,923	4,007,828	Mar. 30, 1976	Feb. 15, 1977
B 536,935	3,985,729	Jan. 13, 1976	Oct. 12, 1976
B 537,058	4,000,969	Mar. 23, 1976	Jan. 4, 1977
B 537,102	3,981,829	Jan. 13, 1976	Sep. 21, 1976
B 537,709	3,981,368	Jan. 13, 1976	Sep. 21, 1976
B 537,711	3,985,748	Jan. 13, 1976	Oct. 12, 1976
B 537,722	3,985,423	Feb. 3, 1976	Oct. 12, 1976
B 537,903	3,986,492	Jan. 20, 1976	Oct. 19, 1976
B 537,990	4,057,651	Jan. 13, 1976	Nov. 8, 1977
B 538,472	3,992,884	Feb. 3, 1976	Nov. 23, 1976
B 538,491	3,982,928	Feb. 17, 1976	Sep. 28, 1976
B 538,686	3,982,199	Jan. 13, 1976	Sep. 21, 1976
B 538,753	3,993,642	Feb. 10, 1976	Nov. 23, 1976
B 539,374	3,996,229	Mar. 9, 1976	Dec. 7, 1976
B 539,746	3,983,423	Feb. 17, 1976	Sep. 28, 1976
B 540,078	3,984,701	Jan. 13, 1976	Oct. 5, 1976
B 540,218	3,986,108	Feb. 10, 1976	Oct. 12, 1976
B 540,632	3,981,600	Jan. 13, 1976	Sep. 21, 1976
B 540,703	4,013,206	Apr. 13, 1976	Mar. 22, 1977
B 540,767	3,986,010	Mar. 16, 1976	Oct. 12, 1976
B 540,872	3,982,135	Jan. 20, 1976	Sep. 21, 1976
B 540,888	4,005,528	Mar. 30, 1976	Feb. 1, 1977
B 541,015	3,993,208	Jan. 27, 1976	Nov. 23, 1976
B 541,376	3,981,690	Feb. 17, 1976	Sep. 21, 1976
B 541,415	3,982,080	Feb. 3, 1976	Sep. 21, 1976
B 541,464	3,995,424	Feb. 17, 1976	Dec. 7, 1976
B 541,496	3,982,232	Jan. 27, 1976	Sep. 21, 1976
B 541,501	4,005,826	Apr. 13, 1976	Feb. 1, 1977
B 541,517	3,986,156	Jan. 13, 1976	Oct. 12, 1976
B 541,710	3,994,472	Feb. 24, 1976	Nov. 30, 1976
B 542,135	3,986,939	Feb. 10, 1976	Oct. 19, 1976
B 542,158	3,981,886	Jan. 13, 1976	Sep. 21, 1976
B 542,226	3,993,748	Feb. 24, 1976	Nov. 23, 1976
B 542,258	4,013,536	Mar. 23, 1976	Mar. 22, 1977
B 543,078	3,995,687	Feb. 17, 1976	Dec. 7, 1976
B 543,941	3,985,528	Jan. 13, 1976	Oct. 12, 1976
B 544,034	3,997,175	Feb. 17, 1976	Dec. 14, 1976
B 544,476	3,993,585	Feb. 24, 1976	Nov. 23, 1976
B 544,899	3,994,962	Feb. 17, 1976	Nov. 30, 1976
B 544,961	3,983,492	Jan. 13, 1976	Sep. 28, 1976
B 545,050	3,982,073	Jan. 20, 1976	Sep. 21, 1976
B 545,265	D 243,090	Apr. 13, 1976	Jan. 18, 1977
B 545,299	4,001,259	Feb. 24, 1976	Jan. 4, 1977
B 545,344	4,012,746	Mar. 30, 1976	Mar. 15, 1977
B 545,464	3,992,387	Feb. 10, 1976	Nov. 16, 1976
B 545,630	3,981,337	Jan. 27, 1976	Sep. 21, 1976
B 545,777	4,004,906	Jan. 27, 1976	Jan. 25, 1977
B 545,856	4,006,939	Mar. 30, 1976	Feb. 8, 1977
B 545,935	3,990,337	Jan. 27, 1976	Nov. 9, 1976
B 545,945	3,995,260	Jan. 27, 1976	Nov. 30, 1976
B 546,097	3,999,309	Mar. 23, 1976	Dec. 28, 1976
B 546,295	3,987,070	Jan. 20, 1976	Oct. 19, 1976
B 546,426	3,982,063	Jan. 27, 1976	Sep. 21, 1976
B 546,631	3,983,729	Feb. 3, 1976	Oct. 5, 1976
B 546,665	3,990,062	Jan. 20, 1976	Nov. 2, 1976
B 546,677	4,015,654	Apr. 6, 1976	Apr. 5, 1977
B 546,911	3,981,058	Jan. 13, 1976	Sep. 21, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 546,922	3,987,742	Mar. 16, 1976	Oct. 26, 1976
B 547,016	3,999,741	Mar. 23, 1976	Dec. 28, 1976
B 547,208	4,001,218	Feb. 24, 1976	Jan. 4, 1977
B 547,547	3,997,670	Feb. 24, 1976	Dec. 14, 1976
B 547,994	3,990,081	Jan. 20, 1976	Nov. 2, 1976
B 548,028	3,991,517	Feb. 3, 1976	Nov. 16, 1976
B 548,058	3,983,050	Feb. 17, 1976	Sep. 28, 1976
B 548,155	3,981,477	Jan. 13, 1976	Sep. 21, 1976
B 548,440	3,993,401	Feb. 3, 1976	Nov. 23, 1976
B 548,302	3,983,414	Feb. 17, 1976	Sep. 28, 1976
B 548,440	3,993,401	Feb. 3, 1976	Nov. 23, 1976
B 548,462	D 242,283	Feb. 10, 1976	Nov. 9, 1976
B 548,688	3,995,984	Mar. 9, 1976	Dec. 7, 1976
B 548,719	3,990,553	Feb. 17, 1976	Nov. 9, 1976
B 548,978	3,998,139	Mar. 9, 1976	Dec. 21, 1976
B 549,198	3,981,975	Jan. 13, 1976	Sep. 21, 1976
B 549,244	3,981,125	Jan. 27, 1976	Sep. 21, 1976
B 549,394	3,981,611	Jan. 27, 1976	Sep. 21, 1976
B 549,931	3,986,141	Jan. 20, 1976	Oct. 12, 1976
B 549,964	3,995,899	Feb. 24, 1976	Dec. 7, 1976
B 550,693	3,982,194	Jan. 20, 1976	Sep. 21, 1976
B 550,744	3,993,550	Feb. 17, 1976	Nov. 23, 1976
B 550,810	4,000,910	Mar. 23, 1976	Jan. 4, 1977
B 551,133	3,996,740	Mar. 2, 1976	Dec. 14, 1976
B 551,463	3,996,254	Feb. 17, 1976	Dec. 7, 1976
B 551,527	3,982,599	Jan. 13, 1976	Sep. 28, 1976
B 551,809	3,996,743	Feb. 24, 1976	Dec. 14, 1976
B 551,952	Re. 29,059	Mar. 2, 1976	Dec. 7, 1976
B 552,006	3,992,129	Feb. 3, 1976	Nov. 16, 1976
B 552,489	3,994,864	Feb. 10, 1976	Nov. 30, 1976
B 552,498	3,983,139	Jan. 13, 1976	Sep. 28, 1976
B 552,508	4,001,250	Mar. 16, 1976	Jan. 4, 1977
B 552,629	3,994,773	Mar. 23, 1976	Nov. 30, 1976
B 552,709	4,001,467	Mar. 23, 1976	Jan. 4, 1977
B 552,932	3,989,292	Feb. 3, 1976	Nov. 2, 1976
B 553,421	4,001,146	Mar. 23, 1976	Jan. 4, 1977
B 553,460	3,990,019	Feb. 3, 1976	Nov. 2, 1976
B 553,584	3,992,456	Feb. 17, 1976	Nov. 16, 1976
B 553,629	3,999,242	Feb. 24, 1976	Dec. 28, 1976
B 554,039	3,999,944	Feb. 24, 1976	Dec. 28, 1976
B 554,164	4,001,465	Mar. 9, 1976	Jan. 4, 1977
B 554,283	3,981,152	Jan. 27, 1976	Sep. 21, 1976
B 554,291	4,001,209	Mar. 9, 1976	Jan. 4, 1977
B 554,380	4,001,147	Mar. 9, 1976	Jan. 4, 1977
B 554,594	3,985,960	Jan. 20, 1976	Oct. 12, 1976
B 554,655	4,015,048	Feb. 24, 1976	Mar. 29, 1977
B 554,848	4,001,265	Feb. 24, 1976	Jan. 4, 1977
B 554,939	3,994,013	Feb. 10, 1976	Nov. 23, 1976
B 555,146	4,007,636	Apr. 20, 1976	Feb. 15, 1977
B 555,437	3,991,152	Feb. 3, 1976	Nov. 9, 1976
B 555,456	3,993,423	Mar. 30, 1976	Nov. 23, 1976
B 555,772	3,982,641	Jan. 13, 1976	Sep. 28, 1976
B 556,057	3,985,349	Jan. 13, 1976	Oct. 12, 1976
B 556,496	3,990,244	Mar. 16, 1976	Nov. 9, 1976
B 556,897	3,992,972	Feb. 3, 1976	Nov. 23, 1976
B 557,153	3,991,603	Feb. 3, 1976	Nov. 16, 1976
B 557,274	4,016,375	Mar. 23, 1976	Apr. 5, 1977
B 557,299	3,990,357	Feb. 3, 1976	Nov. 9, 1976
B 557,621	3,990,800	Feb. 3, 1976	Nov. 9, 1976
B 557,721	4,013,435	Mar. 23, 1976	Mar. 22, 1977
B 557,856	3,991,019	Feb. 10, 1976	Nov. 9, 1976
B 558,220	3,990,009	Jan. 27, 1976	Nov. 2, 1976
B 558,251	3,981,289	Jan. 13, 1976	Sep. 21, 1976
B 558,813	3,989,188	Feb. 3, 1976	Nov. 2, 1976
B 558,818	3,983,762	Jan. 13, 1976	Oct. 5, 1976
B 558,819	3,990,160	Feb. 3, 1976	Nov. 9, 1976
B 558,973	3,981,126	Feb. 10, 1976	Sep. 21, 1976
B 559,111	3,984,854	Feb. 24, 1976	Oct. 5, 1976
B 559,142	4,001,124	Mar. 2, 1976	Jan. 4, 1977
B 559,394	4,016,094	Apr. 20, 1976	Apr. 5, 1977
B 559,441	4,013,609	Mar. 23, 1976	Mar. 22, 1977
B 559,631	4,011,406	Mar. 23, 1976	Mar. 8, 1977
B 559,697	3,995,770	Mar. 16, 1976	Dec. 7, 1976
B 559,700	4,001,189	Mar. 23, 1976	Jan. 4, 1977
B 559,701	4,001,190	Mar. 23, 1976	Jan. 4, 1977
B 559,737	3,984,668	Jan. 20, 1976	Oct. 5, 1976
B 559,954	3,982,673	Feb. 3, 1976	Sep. 28, 1976
B 560,261	3,987,493	Mar. 16, 1976	Oct. 19, 1976
B 560,488	3,989,940	Mar. 16, 1976	Nov. 2, 1976
B 560,717	3,982,034	Feb. 10, 1976	Sep. 21, 1976
B 560,765	3,983,389	Feb. 3, 1976	Sep. 28, 1976
B 561,062	D 242,248	Feb. 10, 1976	Nov. 9, 1976
B 561,165	4,013,002	Mar. 30, 1976	Mar. 22, 1977
B 561,166	4,011,809	Mar. 30, 1976	Mar. 15, 1977
B 561,365	4,005,078	Apr. 13, 1976	Jan. 25, 1977
B 561,387	3,985,706	Feb. 10, 1976	Oct. 12, 1976
B 561,405	4,003,770	Mar. 30, 1976	Jan. 18, 1977
B 561,712	3,992,126	Feb. 17, 1976	Nov. 16, 1976
B 561,732	3,991,460	Feb. 3, 1976	Nov. 16, 1976
B 561,764	3,984,634	Jan. 27, 1976	Oct. 5, 1976
B 561,770	4,000,366	Mar. 16, 1976	Dec. 28, 1976
B 561,784	3,984,710	Jan. 27, 1976	Oct. 5, 1976
B 562,413	4,000,930	Mar. 16, 1976	Jan. 4, 1977
B 562,462	3,985,836	Jan. 13, 1976	Oct. 12, 1976
B 562,519	4,013,125	Mar. 30, 1976	Mar. 22, 1977
B 562,601	3,998,360	Mar. 16, 1976	Dec. 21, 1976
B 562,698	3,983,972	Jan. 13, 1976	Oct. 5, 1976
B 562,813	3,985,491	Feb. 3, 1976	Oct. 12, 1976
B 563,070	3,996,230	Mar. 9, 1976	Dec. 7, 1976
B 563,165	4,000,977	Mar. 9, 1976	Jan. 4, 1977
B 563,244	3,983,562	Jan. 27, 1976	Sep. 28, 1976
B 563,301	3,995,589	Feb. 17, 1976	Dec. 7, 1976
B 563,412	3,992,127	Feb. 24, 1976	Nov. 16, 1976
B 563,419	3,999,051	Mar. 23, 1976	Dec. 21, 1976
B 563,722	3,990,925	Jan. 13, 1976	Nov. 9, 1976
B 563,780	3,987,769	Feb. 3, 1976	Oct. 26, 1976
B 563,932	4,000,638	Mar. 23, 1976	Jan. 4, 1977
B 564,252	4,001,293	Mar. 2, 1976	Jan. 4, 1977
B 564,255	4,015,996	Mar. 30, 1976	Apr. 5, 1977
B 564,314	3,984,996	Jan. 20, 1976	Oct. 12, 1976
B 564,902	4,001,351	Mar. 23, 1976	Jan. 4, 1977
B 565,180	3,981,685	Jan. 27, 1976	Sep. 21, 1976
B 565,275	3,990,299	Apr. 6, 1976	Nov. 9, 1976
B 565,717	3,999,138	Apr. 13, 1976	Dec. 21, 1976
B 565,754	4,011,626	Mar. 30, 1976	Mar. 15, 1977
B 566,464	3,996,367	Feb. 3, 1976	Dec. 7, 1976
B 566,556	3,998,511	Mar. 23, 1976	Dec. 21, 1976
B 566,572	3,988,590	Mar. 16, 1976	Oct. 26, 1976
B 566,585	4,001,083	Mar. 2, 1976	Jan. 4, 1977
B 567,058	3,985,188	Jan. 13, 1976	Oct. 12, 1976
B 567,076	4,011,187	Mar. 23, 1976	Mar. 8, 1977
B 567,158	3,988,073	Mar. 23, 1976	Oct. 26, 1976
B 567,207	3,991,689	Apr. 13, 1976	Nov. 16, 1976
B 567,435	3,995,724	Feb. 3, 1976	Dec. 7, 1976
B 567,854	3,985,038	Feb. 3, 1976	Oct. 12, 1976
B 567,892	4,000,855	Mar. 16, 1976	Jan. 4, 1977
B 568,226	3,992,698	Feb. 24, 1976	Nov. 16, 1976
B 568,770	3,982,213	Feb. 10, 1976	Sep. 21, 1976
B 569,125	3,986,980	Feb. 24, 1976	Oct. 19, 1976
B 569,293	4,004,149	Mar. 30, 1976	Jan. 18, 1977
B 569,501	3,999,250	Mar. 9, 1976	Dec. 28, 1976
B 569,519	3,993,133	Feb. 3, 1976	Nov. 23, 1976
B 569,646	3,985,222	Jan. 13, 1976	Oct. 12, 1976
B 569,859	3,994,160	Mar. 9, 1976	Nov. 30, 1976
B 570,172	3,987,763	Feb. 3, 1976	Oct. 26, 1976
B 570,615	3,998,570	Mar. 23, 1976	Dec. 21, 1976
B 570,862	3,991,639	Feb. 24, 1976	Nov. 16, 1976
B 570,925	4,040,802	Mar. 23, 1976	Aug. 9, 1977
B 571,219	3,991,388	Feb. 24, 1976	Nov. 9, 1976
B 571,638	4,001,244	Mar. 9, 1976	Jan. 4, 1977
B 571,659	3,995,186	Apr. 13, 1976	Nov. 30, 1976
B 572,642	3,990,715	Feb. 10, 1976	Nov. 9, 1976
B 572,726	4,015,020	Feb. 24, 1976	Mar. 29, 1977
B 573,033	3,995,224	Mar. 23, 1976	Nov. 30, 1976
B 573,114	4,014,843	Apr. 6, 1976	Mar. 29, 1977
B 573,991	4,013,704	Mar. 30, 1976	Mar. 22, 1977
B 573,994	4,000,641	Mar. 23, 1976	Jan. 4, 1977
B 574,128	3,982,961	Feb 17, 1976	Sep. 28, 1976
B 574,616	4,000,424	Mar. 2, 1976	Dec. 28, 1976
B 574,996	3,989,718	Feb. 17, 1976	Nov. 2, 1976
B 575,583	4,000,928	Mar. 16, 1976	Jan. 4, 1977
B 575,757	3,981,170	Jan. 27, 1976	Sep. 21, 1976
B 575,761	4,013,123	Apr. 13, 1976	Mar. 22, 1977
B 575,776	4,013,124	Apr. 20, 1976	Mar. 22, 1977
B 575,851	3,985,826	Feb. 10, 1976	Oct. 12, 1976
B 576,385	4,009,498	Mar. 30, 1976	Mar. 1, 1977
B 576,859	3,991,526	Feb. 24, 1976	Nov. 16, 1976
B 576,903	3,995,032	Feb. 3, 1976	Nov. 30, 1976
B 578,447	3,982,658	Jan. 20, 1976	Sep. 28, 1976
B 579,104	3,982,081	Jan. 27, 1976	Sep. 21, 1976
B 579,116	3,986,227	Feb. 3, 1976	Oct. 19, 1976
B 579,153	4,013,745	Mar. 30, 1976	Mar. 22, 1977
B 579,806	3,995,318	Feb. 3, 1976	Nov. 30, 1976
B 580,379	4,000,796	Apr. 6, 1976	Jan. 4, 1977
B 580,826	3,988,391	Feb. 17, 1976	Oct. 26, 1976
B 580,921	3,984,054	Jan. 13, 1976	Oct. 5, 1976
B 581,564	4,036,653	Mar. 23, 1976	July 19, 1977
B 581,843	4,000,562	Mar. 16, 1976	Jan. 4, 1977
B 583,051	3,990,714	Feb. 3, 1976	Nov. 9, 1976
B 583,089	3,982,174	Jan. 27, 1976	Sep. 21, 1976
B 583,712	3,995,064	Feb. 10, 1976	Nov. 30, 1976
B 584,520	3,981,149	Jan. 27, 1976	Sep. 21, 1976
B 584,997	4,000,030	Mar. 9, 1976	Dec. 28, 1976
B 585,247	3,989,914	Feb. 3, 1976	Nov. 2, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE	DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 585,731	3,993,603	Feb. 3, 1976	Nov. 23, 1976	B 591,141	4,013,631	Mar. 23, 1976	Mar. 22, 1977
B 586,215	3,985,302	Jan. 20, 1976	Oct. 12, 1976	B 592,143	3,984,713	Jan. 27, 1976	Oct. 5, 1976
B 586,380	3,983,885	Mar. 2, 1976	Oct. 5, 1976	B 592,146	4,001,084	Mar. 2, 1976	Jan. 4, 1977
B 586,387	3,981,311	Feb. 3, 1976	Sep. 21, 1976	B 592,658	4,001,164	Mar. 23, 1976	Jan. 4, 1977
B 586,663	3,992,080	Feb. 3, 1976	Nov. 16, 1976	B 593,781	4,015,953	Mar. 16, 1976	Apr. 5, 1977
B 587,118	Re. 29,067	Mar. 2, 1976	Dec. 7, 1976	B 594,871	3,999,245	Mar. 16, 1976	Dec. 28, 1976
B 587,786	3,991,204	Feb. 17, 1976	Nov. 9, 1976	B 596,692	3,992,349	Feb. 17, 1976	Nov. 16, 1976
B 587,936	3,999,052	Mar. 23, 1976	Dec. 21, 1976	B 597,410	4,000,925	Mar. 30, 1976	Jan. 4, 1977
B 589,179	4,001,102	Mar. 23, 1976	Jan. 4, 1977	B 657,438	3,985,701	Jan. 20, 1976	Oct. 12, 1976
B 589,687	3,995,349	Mar. 23, 1976	Dec. 7, 1976	B 747,785	3,981,899	Feb. 10, 1976	Sep. 21, 1976
B 589,966	3,985,828	Feb. 17, 1976	Oct. 12, 1976	B 750,679	4,007,049	Mar. 23, 1976	Feb. 8, 1977
B 590,158	3,985,163	Feb. 10, 1976	Oct. 12, 1976	B 843,038	3,981,785	Feb. 3, 1976	Sep. 21, 1976
B 590,159	3,985,164	Feb. 3, 1976	Oct. 12, 1976	B 845,044	4,001,338	Mar. 30, 1976	Jan. 4, 1977
B 590,502	4,001,171	Mar. 23, 1976	Jan. 4, 1977	B 848,336	3,993,752	Mar. 30, 1976	Nov. 23, 1976

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 8TH DAY OF NOVEMBER, 1977

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

American Cyanamid Company: *See*—
  Floyd, Middleton Brawner, Jr.; McGahren, William James; Schaub, Robert Eugene; and Weiss, Martin Joseph, Re. 29,469, Cl. 560-121.000.
Brandt-Pra, Inc.: *See*—
  Jones, Alan P., Re. 29,470, Cl. 235-92.0SB.
Clayton, Anthony B., to Hercules Incorporated. Process for making a C_1-C_7 aliphatic hydrocarbyl ester of an N-[2,6-di(C_1-C_7 alkyl)phenyl] α-aminocarboxylic acid. Re. 29,468, Cl. 560-43.000.
Floyd, Middleton Brawner, Jr.; McGahren, William James; Schaub, Robert Eugene; and Weiss, Martin Joseph, to American Cyanamid Company. Hydroxylated 15-deoxy derivatives of 9-hydroxyl-13-trans-prostenoic acid. Re. 29,469, Cl. 560-121.000.
Hercules Incorporated: *See*—
  Clayton, Anthony B., Re. 29,468, Cl. 560-43.000.
Jones, Alan P., to Brandt-Pra, Inc. Control mechanisms for document-handling apparatus. Re. 29,470, Cl. 235-92.0SB.
Levy, Ezra: *See*—
  Nussim, Manasse; Levy, Ezra; and Naiman, Jacob, Re. 29,467, Cl. 260-465.00D.
McGahren, William James: *See*—
  Floyd, Middleton Brawner, Jr.; McGahren, William James; Schaub, Robert Eugene; and Weiss, Martin Joseph, Re. 29,469, Cl. 560-121.000.
Naiman, Jacob: *See*—
  Nussim, Manasse; Levy, Ezra; and Naiman, Jacob, Re. 29,467, Cl. 260-465.00D.
Nussim, Manasse; Levy, Ezra; and Naiman, Jacob, to Plantex, Ltd. Benzylcyano-amides. Re. 29,467, Cl. 260-465.00D.
Plantex, Ltd.: *See*—
  Nussim, Manasse; Levy, Ezra; and Naiman, Jacob, Re. 29,467, Cl. 260-465.00D.
Schaub, Robert Eugene: *See*—
  Floyd, Middleton Brawner, Jr.; McGahren, William James; Schaub, Robert Eugene; and Weiss, Martin Joseph, Re. 29,469, Cl. 560-121.000.
Weiss, Martin Joseph: *See*—
  Floyd, Middleton Brawner, Jr.; McGahren, William James; Schaub, Robert Eugene; and Weiss, Martin Joseph, Re. 29,469, Cl. 560-121.000.

LIST OF PLANT PATENTEES

Brooklyn Botanic Garden Corporation: *See*—
  Specht, Carl H., 4,145, Cl. 51.000.
Denver Wholesale Florists Company: *See*—
  Krapes, David A., 4,143, Cl. 73.000.
Gordon, Robert B. Apple tree. 4,144, 11-8-77, Cl. 34.000.
Krapes, David A., to Denver Wholesale Florists Company. Carnation named Renegade. 4,143, 11-8-77, Cl. 73.000.
Schwantje, Werner, to Sunnyside Nurseries, Inc. African Violet plant — Paula. 4,147, 11-8-77, Cl. 69.000.
Simpson, Robert C. *Ilex verticillata* bush named Winter Red. 4,146, 11-8-77, Cl. 65.000.
Specht, Carl H., to Brooklyn Botanic Garden Corporation. Magnolia tree. 4,145, 11-8-77, Cl. 51.000.
Sunnyside Nurseries, Inc.: *See*—
  Schwantje, Werner, 4,147, Cl. 69.000.

LIST OF DESIGN PATENTEES

Airwick Industries, Inc.: *See*—
  Hadtke, Frederick B., 246,316, Cl. D23-150.000.
  Heath, Eric Desmond; Young, Stewart Charles Arthur; Wade, Michael James; and Smith, Brian, 246,317, Cl. D23-150.000.
  Layton, Albert F.; and Hadtke, Frederick B., 246,318, Cl. D23-150.000.
  Rabussier, Bernard; Mandon, Jean-Pierre; Lecomte, Philippe; and Nuer, Louis, 246,319, Cl. D23-150.000.
Astra Lakemedel Aktiebolag: *See*—
  Lofman, Claes Peter, 246,321, Cl. D24-24.000.
Ballas, George C., Sr.: *See*—
  Dortch, Charles W.; and Vaught, Donald K., 246,300, Cl. D12-105.000.
Bay, William P. Sun visor. 246,272, 11-8-77, Cl. D2-233.000.
Bell & Howell Company: *See*—
  Kubnick, Norman R.; and Erber, Dennis J., 246,314, Cl. D16-18.000.
Bellini, Mario, to Ing. C. Olivetti & C., S.p.A. Ink ribbon cartridge. 246,332, 11-8-77, Cl. D64-11.00A.
Boecher, Walter, Jr. Card holder or the like. 246,333, 11-8-77, Cl. D96-12.00A.
Boucher, Richard A., to Dart Industries Inc. Food container. 246,288, 11-8-77, Cl. D9-219.000.
Boucher, Richard A., to Dart Industries Inc. Food container. 246.289, 11-8-77, Cl. D9-240.000.
Buckeye Industrial Sales, Inc.: *See*—
  Gunn, John C.; and Null, James E., 246,313, Cl. D15-148.000.
Cari-All Inc.: *See*—
  Trubiano, Antoine, 246,301, Cl. D12-129.000.
Carlson, Arthur E.: *See*—
  Whitley, Warwick M.; and Carlson, Arthur E., 246,297, Cl. D12-62.000.
CBS Inc.: *See*—
  Fields, Grover G., 246,331, Cl. D56-1.00A.
Cerniway, Leon A.; and Marx, Bruce C., to U.S. Divers Co. Diving helmet. 246,271, 11-8-77, Cl. D2-232.000.
Conroy, Inc.: *See*—
  Whitley, Warwick M.; and Carlson, Arthur E., 246,297, Cl. D12-62.000.
Daenen, Robert H. C. M., to Dart Industries Inc. Tongs. 246,280, 11-8-77, Cl. D7-105.000.
Dainippon Ink and Chemicals, Inc.: *See*—
  Fujii, Mituru; and Narusawa, Izumi, 246,296, Cl. D12-53.000.
Dart Industries Inc.: *See*—
  Boucher, Richard A., 246,288, Cl. D9-219.000.
  Boucher, Richard A., 246,289, Cl. D9-240.000.
  Daenen, Robert H. C. M., 246,280, Cl. D7-105.000.
Davis, Dan Lee. Protective partition for public transportation vehicles. 246,303, 11-8-77, Cl. D12-195.000.
Dortch, Charles W.; and Vaught, Donald K., to Ballas, George C., Sr. Trailer. 246,300, 11-8-77, Cl. D12-105.000.
Doughty, Michael V. Adjustable bracelet or similar article. 246,293, 11-8-77, Cl. D11-4.000.
Duchnowski, Frank A.: *See*—
  Gordon, John Herbert; and Duchnowski, Frank A., 246,312, Cl. D15-135.000.
Erber, Dennis J.: *See*—
  Kubnick, Norman R.; and Erber, Dennis J., 246,314, Cl. D16-18.000.
Ferrara-Benedek Design, Inc.: *See*—
  Ferrara, Daniel A., Jr., 246,281, Cl. D7-150.000.
Ferrara, Daniel A., Jr., to Ferrara-Benedek Design, Inc. Knife. 246,281, 11-8-77, Cl. D7-150.000.
Fields, Grover G., to CBS Inc. Guitar head. 246,331, 11-8-77, Cl. D56-1.00A.
Forselius, Frank. Snack tray. 246,277, 11-8-77, Cl. D7-38.000.
Forselius, Frank. Snack tray. 246,278, 11-8-77, Cl. D7-38.000.

Fountain Industries, Inc.: *See—*
Syverson, Martelle Jerome, deceased; Syverson, David B.; and Syverson, Jon R., executors, 246,310, Cl. D15-113.000.
Syverson, Martelle Jerome, deceased; Syverson, David B.; and Syverson, Jon R., executors, 246,311, Cl. D15-116.000.
Fujii, Mituru; and Narusawa, Izumi, to Dainippon Ink and Chemicals, Inc. Pallet. 246,296, 11-8-77, Cl. D12-53.000.
Gallagher, Fred James. Hand driven caulking gun. 246,285, 11-8-77, Cl. D8-14.100.
Gergely, William, Jr.; and Kwan, Okun. Cassette recorder housing. 246,305, 11-8-77, Cl. D14-6.000.
Gordon, John Herbert; and Duchnowski, Frank A., to J. H. Horne & Sons Company, Inc. Apparatus for forming paper on a cylinder mold. 246,312, 11-8-77, Cl. D15-135.000.
Grossman, Bruce: *See—*
Nelson, Carl; and Grossman, Bruce, 246,274, Cl. D6-234.000.
Gunn, John C.; and Null, James E., to Buckeye Industrial Sales, Inc. Pulley, shaft and blade-holder assembly for a power-driven lawn-mower or the like. 246,313, 11-8-77, Cl. D15-148.000.
H. F. Coors Company, Inc.: *See—*
Lund, Otto J., 246,276, Cl. D7-35.000.
Haas, Frederick Arnold, Jr. Napkin stand. 246,279, 11-8-77, Cl. D7-72.000.
Hadtke, Frederick B., to Airwick Industries, Inc. Dispenser for air treating material. 246,316, 11-8-77, Cl. D23-150.000.
Hadtke, Frederick B.: *See—*
Layton, Albert F.; and Hadtke, Frederick B., 246,318, Cl. D23-150.000.
Haggard, Robert E. Electric car. 246,299, 11-8-77, Cl. D12-90.000.
Hansen, Carl I. Amphibious airplane. 246,298, 11-8-77, Cl. D12-75.000.
Hawkins, Kenneth R.: *See—*
Krase, Kenneth P.; and Hawkins, Kenneth R., 246,330, Cl. D48-23.00A.
Heath, Eric Desmond; Young, Stewart Charles Arthur; Wade, Michael James; and Smith, Brian, to Airwick Industries, Inc. Dispenser for air-treating material. 246,317, 11-8-77, Cl. D23-150.000.
Hetherington, Susan Kaye. Artificial leaf. 246,294, 11-8-77, Cl. D11-117.000.
Holmes, Arthur: *See—*
Hopkins, John Leslie; and Holmes, Arthur, 246,335, Cl. D96-2.000.
Hopkins, John Leslie; and Holmes, Arthur. Milk requirement indicator. 246,335, 11-8-77, Cl. D96-2.000.
Horn, James. Vehicle interior partition. 246,304, 11-8-77, Cl. D12-195.000.
Ing. C. Olivetti & C., S.p.A.: *See—*
Bellini, Mario, 246,332, Cl. D64-11.00A.
J. H. Horne & Sons Company, Inc.: *See—*
Gordon, John Herbert; and Duchnowski, Frank A., 246,312, Cl. D15-135.000.
Jackson, Dennis B., to Wiltshire Cutlery Company Proprietary Ltd. Knife handle. 246,282, 11-8-77, Cl. D7-152.000.
Jordan, Kenneth Albert, to Trip-Lite Ltd. Yarn fault detector. 246,292, 11-8-77, Cl. D10-46.000.
Kavis, George. Combined storage cabinet projector support and movie screen unit. 246,273, 11-8-77, Cl. D6-161.000.
Kenall Manufacturing Company: *See—*
Krase, Kenneth P.; and Hawkins, Kenneth R., 246,330, Cl. D48-23.00A.
Kirk, John. Decorative end piece for use on upright ends of free-standing office dividers. 246,323, 11-8-77, Cl. D25-75.000.
Kishi, Yoshio, to Sony Corporation. Tape cassette. 246,306, 11-8-77, Cl. D14-11.000.
Kishi, Yoshio, to Sony Corporation. Tape cassette. 246,307, 11-8-77, Cl. D14-11.000.
Krase, Kenneth P.; and Hawkins, Kenneth R., to Kenall Manufacturing Company. Fluorescent light fixture. 246,330, 11-8-77, Cl. D48-23.00A.
Krolopp, Rudolph William, to Motorola, Inc. Wattmeter or similar housing. 246,291, 11-8-77, Cl. D10-75.000.
Krygier, James S. Maxillary orthopedic suture separating orthodontic appliance. 246,322, 11-8-77, Cl. D24-34.000.
Kubnick, Norman R.; and Erber, Dennis J., to Bell & Howell Company. Filmstrip projector. 246,314, 11-8-77, Cl. D16-18.000.
Kwan, Okun: *See—*
Gergely, William, Jr.; and Kwan, Okun, 246,305, Cl. D14-6.000.
Layton, Albert F.; and Hadtke, Frederick B., to Airwick Industries, Inc. Dispenser for air treating material. 246,318, 11-8-77, Cl. D23-150.000.
Lecomte, Philippe: *See—*
Rabussier, Bernard; Mandon, Jean-Pierre; Lecomte, Philippe; and Nuer, Louis, 246,319, Cl. D23-150.000.
Lewis, Richard C. Convertible plaque. 246,295, 11-8-77, Cl. D11-133.000.
Little, Harry H. Golf putter head. 246,329, 11-8-77, Cl. D34-5.0GH.
Lofman, Claes Peter, to Astra Lakemedel Aktiebolag. Disposable syringe for storing and administering pharmaceutical preparations. 246,321, 11-8-77, Cl. D24-24.000.
Lund, Otto J., to H. F. Coors Company, Inc. Dinner plate. 246,276, 11-8-77, Cl. D7-35.000.
Luther, Dan L. Game board. 246,327, 11-8-77, Cl. D34-5.0PB.
Mandon, Jean-Pierre: *See—*
Rabussier, Bernard; Mandon, Jean-Pierre; Lecomte, Philippe; and Nuer, Louis, 246,319, Cl. D23-150.000.
Marx, Bruce C.: *See—*
Cerniway, Leon A.; and Marx, Bruce C., 246,271, Cl. D2-232.000.
Mira-X S.A. Suhr: *See—*
Panton, Verner, 246,334, Cl. D92-1.00T.
Moore Company, Inc., The: *See—*
Moore, Junius Thomas, 246,286, Cl. D8-360.000.
Moore, Junius Thomas, to Moore Company, Inc., The. Pulley. 246,286, 11-8-77, Cl. D8-360.000.
Motorola, Inc.: *See—*
Krolopp, Rudolph William, 246,291, Cl. D10-75.000.
Nakamura, Aya, to Sharp Kabushiki Kaisha. Clock radio. 246,309, 11-8-77, Cl. D14-73.000.
Narusawa, Izumi: *See—*
Fujii, Mituru; and Narusawa, Izumi, 246,296, Cl. D12-53.000.
Nelson, Carl; and Grossman, Bruce. Combined storage and display device for graphic pictures or the like. 246,274, 11-8-77, Cl. D6-234.000.
North American Philips Corporation: *See—*
Rakocy, William J.; and Rauch, Howard L., 246,325, Cl. D29-2.000.
Nuer, Louis: *See—*
Rabussier, Bernard; Mandon, Jean-Pierre; Lecomte, Philippe; and Nuer, Louis, 246,319, Cl. D23-150.000.
Null, James E.: *See—*
Gunn, John C.; and Null, James E., 246,313, Cl. D15-148.000.
Oord, Klaas Tiemen, to U.S. Philips Corporation. Protective cap for a shaving head. 246,324, 11-8-77, Cl. D28-50.000.
Panton, Verner, to Mira-X S.A. Suhr. Upholstery fabric or the like. 246,334, 11-8-77, Cl. D92-1.00T.
Pelton & Crane Company: *See—*
Truette, Danny Michael, 246,320, Cl. D24-5.000.
Rabussier, Bernard; Mandon, Jean-Pierre; Lecomte, Philippe; and Nuer, Louis, to Airwick Industries, Inc. Dispenser for air treating material. 246,319, 11-8-77, Cl. D23-150.000.
Rakocy, William J.; and Rauch, Howard L., to North American Philips Corporation. Fire extinguisher. 246,325, 11-8-77, Cl. D29-2.000.
Rauch, Howard L.: *See—*
Rakocy, William J.; and Rauch, Howard L., 246,325, Cl. D29-2.000.
Salas Arce, Edelmiro. Device for removing sheets from a file of papers. 246,284, 11-8-77, Cl. D8-14.000.
Sapowith, Alan D. Ski boot buckling tool. 246,283, 11-8-77, Cl. D8-14.000.
Scantlin, John R. Illuminated telephone dial. 246,308, 11-8-77, Cl. D14-66.000.
Sharp Kabushiki Kaisha: *See—*
Nakamura, Aya, 246,309, Cl. D14-73.000.
Shelton, Charles R. Clock. 246,290, 11-8-77, Cl. D10-6.000.
SiLITE, Incorporated: *See—*
Wiley, Robert L., 246,275, Cl. D7-21.000.
Smith, Brian: *See—*
Heath, Eric Desmond; Young, Stewart Charles Arthur; Wade, Michael James; and Smith, Brian, 246,317, Cl. D23-150.000.
Sony Corporation: *See—*
Kishi, Yoshio, 246,306, Cl. D14-11.000.
Kishi, Yoshio, 246,307, Cl. D14-11.000.
Syverson, David B.: *See—*
Syverson, Martelle Jerome, deceased; Syverson, David B.; and Syverson, Jon R., executors, 246,310, Cl. D15-113.000.
Syverson, Martelle Jerome, deceased; Syverson, David B.; and Syverson, Jon R., executors, 246,311, Cl. D15-116.000.
Syverson, Jon R., executors: *See—*
Syverson, Martelle Jerome, deceased; Syverson, David B.; and Syverson, Jon R., executors, 246,310, Cl. D15-113.000.
Syverson, Martelle Jerome, deceased; Syverson, David B.; and Syverson, Jon R., executors, 246,311, Cl. D15-116.000.
Syverson, Martelle Jerome, deceased; by Syverson, David B.; and Syverson, Jon R., executors, to Fountain Industries, Inc. Coffee dispenser. 246,310, 11-8-77, Cl. D15-113.000.
Syverson, Martelle Jerome, deceased; by Syverson, David B.; and by Syverson, Jon R., executors, to Fountain Industries, Inc. Beverage dispenser. 246,311, 11-8-77, Cl. D15-116.000.
Tanner, George E. Golf club head. 246,328, 11-8-77, Cl. D34-5.0GH.
Thomas, Morton I. Folding walker. 246,302, 11-8-77, Cl. D12-130.000.
Tietz, Erwin. Bottle crate. 246,287, 11-8-77, Cl. D9-177.000.
Tongish, Leo K. Combined sink and light box. 246,315, 11-8-77, Cl. D23-58.000.
Trip-Lite Ltd.: *See—*
Jordan, Kenneth Albert, 246,292, Cl. D10-46.000.
Trubiano, Antoine, to Cari-All Inc. Nestable stroller. 246,301, 11-8-77, Cl. D12-129.000.
Truette, Danny Michael, to Pelton & Crane Company. Dental console. 246,320, 11-8-77, Cl. D24-5.000.
U.S. Divers Co.: *See—*
Cerniway, Leon A.; and Marx, Bruce C., 246,271, Cl. D2-232.000.
U.S. Philips Corporation: *See—*
Oord, Klaas Tiemen, 246,324, Cl. D28-50.000.
Vaught, Donald K.: *See—*
Dortch, Charles W.; and Vaught, Donald K., 246,300, Cl. D12-105.000.
Wade, Michael James: *See—*
Heath, Eric Desmond; Young, Stewart Charles Arthur; Wade, Michael James; and Smith, Brian, 246,317, Cl. D23-150.000.
Watson, James R. Backgammon gameboard. 246,326, 11-8-77, Cl. D34-5.0SS.
Whitley, Warwick M.; and Carlson, Arthur E., to Conroy, Inc. Boats. 246,297, 11-8-77, Cl. D12-62.000.
Wiley, Robert L., to SiLITE, Incorporated. Compartmented plate. 246,275, 11-8-77, Cl. D7-21.000.
Wiltshire Cutlery Company Proprietary Ltd.: *See—*
Jackson, Dennis B., 246;282, Cl. D7-152.000.
Young, Stewart Charles Arthur: *See—*
Heath, Eric Desmond; Young, Stewart Charles Arthur; Wade, Michael James; and Smith, Brian, 246,317, Cl. D23-150.000.

CLASSIFICATION OF PATENTS

ISSUED NOVEMBER 8, 1977

NOTE.—First number, class; second number, subclass; third number, patent number

CLASS 2	
417	4,056,852
443	4,056,853
CLASS 3	
1.5	4,056,854
13	4,056,855
CLASS 4	
67 A	4,056,856
CLASS 5	
112	4,056,857
365	4,056,858
CLASS 7	
14.1 R	4,056,859
CLASS 8	
1 W	4,057,387
2.5 A	4,057,388
71	4,057,389
155.1	4,056,860
CLASS 9	
14	4,056,861
CLASS 10	
72 R	4,056,862
CLASS 15	
160	4,056,863
CLASS 16	
126	4,056,864
CLASS 17	
1 S	4,056,865
57	4,056,866
CLASS 21	
2.7 R	4,057,390
56	4,057,391
CLASS 23	
230 B	4,057,394
230 PC	4,057,393
230 R	4,057,395
252 R	4,057,396
259.1	4,057,392
288 B	4,057,397
CLASS 24	
37	4,056,867
205.16 C	4,056,868
277	4,056,869
CLASS 29	
21.1	4,056,870
132	4,056,873
234	4,056,875
469	4,056,877
469.5	4,056,876
526 R	4,056,878
572	4,056,879
592 R	4,056,881
596	4,056,880
597	4,056,882
611	4,056,883
623	4,056,884
623.1	4,056,885
CLASS 33	
10	4,056,886
126.6	4,056,887
174 C	4,056,888
188	4,056,889
CLASS 34	
55	4,056,891
CLASS 35	
10	4,056,892
CLASS 37	
142 R	4,056,893
CLASS 40	
104.03	4,056,894
CLASS 43	
3	4,056,890
CLASS 44	
4	4,057,398
6	4,057,399
CLASS 46	
1 R	4,056,895
132	4,056,896
CLASS 47	
39	4,056,897
48.5	4,056,898
79	4,056,899
CLASS 48	
77	4,057,400
111	4,057,401
197 R	4,057,402
CLASS 51	
33 W	4,056,900
165.87	4,056,901
CLASS 52	
73	4,056,902
122	4,056,903
127	4,056,904
223 R	4,056,905
233	4,056,906
266	4,056,907
334	4,056,908
396	4,056,909
600	4,056,910
738	4,056,911
745	4,056,912
CLASS 53	
27	4,056,913
35	4,056,914
59 R	4,056,915
	4,056,916
	4,056,917
118	4,056,918
124 D	4,056,919
142	4,056,920
167	4,056,921
373	4,056,922
CLASS 55	
31	4,057,403
90	4,057,404
105	4,057,405
385 R	4,057,406
CLASS 56	
366	4,056,923
CLASS 57	
5	4,056,924
34 AT	4,056,925
81	4,056,926
CLASS 58	
44	4,056,927
CLASS 59	
83	4,056,928
85	4,056,929
CLASS 60	
39.78	4,056,930
274	4,056,931
276	4,056,932
278	4,056,933
311	4,056,934
632	4,056,935
CLASS 61	
1 R	4,056,936
35	4,056,939
36 B	4,056,937
41 A	4,056,938
	4,056,940
45 D	4,056,941
65	4,056,942
96	4,056,943
107	4,056,944
	4,056,945
CLASS 62	
22	4,057,407
121	4,056,946
148	4,056,947
155	4,056,948
373	4,056,949
381	4,056,950
CLASS 63	
13	4,056,951
32	4,056,952
CLASS 64	
30 D	4,056,953
CLASS 65	
18	4,057,408
65 A	4,057,410
114	4,057,411
154	4,057,409
229	4,057,412
CLASS 68	
22 R	4,056,954
CLASS 70	
422	4,056,955
446	4,056,956
CLASS 71	
76	4,057,413
88	4,057,414
90	4,057,415
	4,057,416
93	4,057,417
103	4,057,418
121	4,057,419
CLASS 72	
19	4,056,957
98	4,056,958
128	4,056,959
	4,056,960
148	4,056,961
170	4,056,962
253 R	4,056,963
273	4,056,964
351	4,056,965
CLASS 73	
1 G	4,056,966
	4,056,967
19	4,056,968
28	4,056,969
91	4,056,973
92	4,056,974
202	4,056,975
231 M	4,056,976
272 R	4,056,977
304 R	4,056,978
313	4,056,979
398 AR	4,056,980
421 B	4,056,981
	4,056,982
423 R	4,056,983
620	4,056,972
629	4,056,970
	4,056,971
CLASS 74	
89.15	4,056,984
435	4,056,985
688	4,056,986
689	4,056,987
695	4,056,988
745	4,056,989
781 R	4,056,990
863	4,056,991
CLASS 75	
.5 R	4,056,874
53	4,057,420
60	4,057,421
86	4,057,422
109	4,057,423
178 A	4,057,424
CLASS 76	
104 R	4,056,992
CLASS 83	
82	4,056,993
311	4,056,994
CLASS 84	
1.01	4,056,995
1.19	4,056,996
383 R	4,056,997
419	4,056,998
479	4,056,999
CLASS 85	
33	4,057,000
CLASS 86	
1 R	4,057,001
CLASS 89	
8	4,057,002
138	4,057,003
CLASS 91	
30	4,057,004
413	4,057,005
487	4,057,006
501	4,057,007
CLASS 93	
53 BF	4,057,008
CLASS 96	
1 SD	4,057,426
3	4,057,425
55	4,057,427
56.2	4,057,432
74	4,057,428
94 R	4,057,429
100 R	4,057,430
115 R	4,057,431
CLASS 100	
46	4,057,009
50	4,057,010
CLASS 101	
93.03	4,057,011
93.29	4,057,015
153	4,057,012
212	4,057,013
228	4,057,014
465	4,057,016
CLASS 104	
20	4,057,017
48	4,057,018
247	4,057,019
CLASS 105	
377	4,057,020
CLASS 106	
38.3	4,057,433
39.7	4,057,434
47 Q	4,057,435
288 Q	4,057,436
CLASS 110	
28 A	4,057,021
CLASS 113	
120 G	4,057,022
CLASS 114	
107	4,057,023
210	4,057,025
221 A	4,057,026
298	4,057,024
CLASS 115	
39	4,057,027
42	4,057,028
CLASS 116	
114 V	4,057,029
175	4,057,030
CLASS 119	
1	4,057,031
	4,057,032
CLASS 122	
32	4,057,033
382	4,057,034
CLASS 123	
8.09	4,057,036
8.27	4,057,035
32 SP	4,057,037
	4,057,038
43 B	4,057,039
46 R	4,057,040
73 AD	4,057,041
119 A	4,057,043
119 EC	4,057,042
140 MP	4,057,044
146.5 A	4,057,045
CLASS 126	
263	4,057,047
271	4,057,048
CLASS 127	
9	4,057,437
CLASS 128	
2 F	4,057,050
	4,057,052
2 V	4,057,049
2 Z	4,057,051
24 R	4,057,046
25 B	4,057,053
76.5	4,057,054
81 A	4,057,055
83.5	4,057,056
142.4	4,057,057
142.7	4,057,058
145.8	4,057,059
232	4,057,060
284	4,057,061
295	4,057,062
303.17	4,057,063
	4,057,064
348	4,057,065
349 R	4,057,066
418	4,057,067
419 P	4,057,068
421	4,057,069
CLASS 134	
2	4,057,438
.83	4,057,070
CLASS 136	
89 P	4,057,439
CLASS 137	
1	4,057,071
107	4,057,074
116	4,057,072
118	4,057,073
171	4,057,075
413	4,057,076
625.2	4,057,078
625.23	4,057,079
861	4,057,077
CLASS 138	
44	4,057,080
97	4,057,081
99	4,057,082
CLASS 139	
20	4,057,083
59	4,057,084
CLASS 141	
	4,057,085
206	4,057,086
CLASS 144	
34 E	4,057,087
91	4,057,088
CLASS 148	
6.15 Z	4,057,440
CLASS 149	
19.9	4,057,441
109.4	4,057,442
CLASS 152	
209 R	4,057,089
347	4,057,090
353 R	4,057,091
379.1	4,057,092
CLASS 156	
43	4,057,443
69	4,057,444
121	4,057,445
123 R	4,057,446
125	4,057,447
158	4,057,448
167	4,057,449
213	4,057,450
320	4,057,451
384	4,057,452
390	4,057,453
401	4,057,454
410	4,057,455
515	4,057,456
571	4,057,457
603	4,057,458
630	4,057,459
643	4,057,460
CLASS 157	
1	4,057,093
CLASS 160	
37	4,057,094
392	4,057,095
CLASS 162	
19	4,057,461
CLASS 164	
49	4,057,096
60	4,057,097
125	4,057,098
260	4,057,099
418	4,057,100
CLASS 165	
1	4,057,101
8	4,057,102
11	4,057,103
35	4,057,104
119	4,057,105
CLASS 166	
57	4,057,106
260	4,057,107
314	4,057,108
CLASS 172	
7	4,057,109
49	4,057,110
72	4,057,111
166	4,057,112
CLASS 173	
12	4,057,113
26	4,057,114
160	4,057,115
165	4,057,116
CLASS 174	
179	4,057,687
CLASS 175	
88	4,057,117
215	4,057,118
CLASS 176	
5	4,057,462
22	4,057,463
37	4,057,464
38	4,057,465
	4,057,466
65	4,057,467
78	4,057,468
CLASS 179	
1 E	4,057,689
1 H	4,057,688
15 AS	4,057,690
18 GF	4,057,691
98	4,057,692
99	4,057,693
115.5 R	4,057,694
170 R	4,057,695
170.2	4,057,696
189 D	4,057,697
CLASS 180	
8 A	4,057,119
44 R	4,057,120
56	4,057,121
77 S	4,057,122
CLASS 181	
242	4,057,124
286	4,057,123
CLASS 182	
91	4,057,125
CLASS 184	
11 R	4,057,126
CLASS 188	
24	4,057,127
79.5 K	4,057,128
285	4,057,129
CLASS 192	
3 T	4,057,130
70.13	4,057,131

87.19	4,057,132
103 F	4,057,133
111 A	4,057,134
	4,057,135
CLASS 193	
3	4,057,136
CLASS 195	
51 G	4,057,469
127	4,057,470
CLASS 198	
443	4,057,137
480	4,057,138
509	4,057,139
CLASS 200	
16 A	4,057,698
16 D	4,057,520
83 D	4,057,699
84 C	4,057,700
153 H	4,057,716
213	4,057,701
CLASS 203	
69	4,057,471
80	4,057,472
CLASS 204	
98	4,057,473
	4,057,474
129.1	4,057,475
192 P	4,057,476
195 P	4,057,478
195 S	4,057,477
258	4,057,479
290 R	4,057,480
296	4,057,481
299 R	4,057,482
301	4,057,483
CLASS 206	
216	4,057,140
304	4,057,141
332	4,057,142
400	4,057,143
439	4,057,144
538	4,057,145
CLASS 208	
8	4,057,484
11 LE	4,057,485
	4,057,486
81	4,057,487
89	4,057,488
	4,057,489
127	4,057,490
321	4,057,491
CLASS 209	
75	4,057,146
366.5	4,057,492
CLASS 210	
23 R	4,057,493
33	4,057,494
44	4,057,495
65	4,057,496
	4,057,497
136	4,057,499
170	4,057,498
	4,057,500
331	4,057,501
440	4,057,502
CLASS 211	
47	4,057,147
74	4,057,148
CLASS 214	
1 BV	4,057,149
6 DK	4,057,150
17 DA	4,057,151
	4,057,152
	4,057,153
82	4,057,154
83.28	4,057,155
302	4,057,156
	4,057,157
330	4,057,158
777	4,057,161
CLASS 215	
222	4,057,159
318	4,057,160
CLASS 219	
10.55 A	4,057,702
69 C	4,057,703
75	4,057,704
130	4,057,705
146	4,057,706
543	4,057,707
CLASS 220	
3	4,057,162
	4,057,163
3.6	4,057,164
6	4,057,165
8	4,057,166
90.4	4,057,167
209	4,057,168
306	4,057,169
323	4,057,170
CLASS 221	
6	4,057,171
10	4,057,172
CLASS 222	
20	4,057,173
49	4,057,174
86	4,057,175
193	4,057,176
215	4,057,177
CLASS 223	
35	4,057,178
73	4,057,179
CLASS 224	
1 R	4,057,180
29 R	4,057,181
42.45 R	4,057,182
	4,057,183
CLASS 225	
2	4,057,184
CLASS 226	
1	4,057,185
127	4,057,186
CLASS 228	
107	4,057,187
CLASS 229	
2.5	4,057,651
29 M	4,057,188
CLASS 235	
92 PK	4,057,709
92 SB	Re.29,470
145 R	4,057,710
413	4,057,708
CLASS 237	
17	4,057,189
CLASS 239	
558	4,057,190
CLASS 241	
30	4,057,191
92	4,057,192
248	4,057,194
281	4,057,193
CLASS 242	
18 G	4,057,195
18 PW	4,057,196
58	4,057,197
86.2	4,057,198
107.4 A	4,057,200
107.7	4,057,199
125.1	4,057,201
157 R	4,057,202
163	4,057,203
	4,057,204
CLASS 244	
118 P	4,057,205
147	4,057,206
159	4,057,207
CLASS 246	
125	4,057,208
CLASS 248	
13	4,057,209
318	4,057,210
332	4,057,211
358 R	4,057,212
385	4,057,213
399	4,057,214
460	4,057,215
CLASS 250	
227	4,057,719
266	4,057,720
301	4,057,721
311	4,057,722
326	4,057,723
343	4,057,724
360	4,057,725
363 S	4,057,726
	4,057,727
374	4,057,728
390	4,057,729
461 R	4,057,730
475	4,057,731
479	4,057,732
491	4,057,733
575	4,057,734
CLASS 251	
129	4,057,216
308	4,057,217
CLASS 252	
8.7	4,057,503
33	4,057,504
96	4,057,505
135	4,057,506
301.4 H	4,057,508
301.4 S	4,057,507
316	4,057,509
372	4,057,510
389 A	4,057,511
413	4,057,512
459	4,057,513
510	4,057,514
522	4,057,515
	4,057,516
CLASS 254	
167	4,057,218
175	4,057,219
186 HC	4,057,220
CLASS 256	
40	4,057,221
CLASS 260	
2.5 AK	4,057,519
2.5 N	4,057,518
22 R	4,057,517
28.5 AS	4,057,522
29.2 EP	4,057,524
29.4 R	4,057,525
29.4 UA	4,057,523
29.6 HN	4,057,521
29.6 S	4,057,526
29.6 WB	4,057,527
29.7 S	4,057,528
42.47	4,057,529
45.8 N	4,057,530
45.95 R	4,057,531
47 C	4,057,532
67.5	4,057,533
75 R	4,057,534
77.5 AC	4,057,535
78 R	4,057,536
78.3 R	4,057,537
117	4,057,538
155	4,057,539
239 A	4,057,540
239.1	4,057,544
239.55 A	4,057,541
239.55 C	4,057,542
239.57	4,057,543
250 BC	4,057,548
293.54	4,057,549
293.55	4,057,550
	4,057,551
294.9	4,057,552
295 A	4,057,553
296 D	4,057,554
301	4,057,555
306.8 R	4,057,557
315	4,057,559
326.86	4,057,560
345.9 S	4,057,561
346.71	4,057,562
390	4,057,563
410.9 R	4,057,564
429 R	4,057,565
448.2 H	4,057,566
453 RZ	4,057,567
462 R	4,057,568
465 D	Re.29,467
465 E	4,057,569
465.3	4,057,570
525	4,057,576
535 P	4,057,577
543 P	4,057,578
	4,057,579
567.6 P	4,057,580
571	4,057,581
574	4,057,582
593 H	4,057,584
593 R	4,057,583
612 D	4,057,585
613 D	4,057,586
613 R	4,057,587
621 R	4,057,588
635 E	4,057,589
646	4,057,590
653.1 R	4,057,591
659 A	4,057,592
682	4,057,593
683.44	4,057,594
824 R	4,057,595
825	4,057,596
857 G	4,057,598
860	4,057,597
874	4,057,599
878 B	4,057,600
880 B	4,057,601
CLASS 261	
63	4,057,602
70	4,057,603
88	4,057,604
CLASS 264	
13	4,057,605
24	4,057,606
28	4,057,607
42	4,057,608
89	4,057,609
108	4,057,610
275	4,057,612
494	4,057,714
CLASS 266	
48	4,057,229
117	4,057,230
219	4,057,231
227	4,057,232
252	4,057,233
272	4,057,234
CLASS 267	
73	4,057,235
116	4,057,236
134	4,057,237
136	4,057,238
CLASS 269	
170	4,057,239
325	4,057,240
CLASS 270	
82	4,057,241
CLASS 271	
3	4,057,242
256	4,057,243
CLASS 272	
1 A	4,057,244
101	4,057,245
137	4,057,246
CLASS 273	
1 R	4,057,247
26 R	4,057,248
73 E	4,057,249
73 G	4,057,250
95 R	4,057,251
101	4,057,252
131 BA	4,057,253
134 CH	4,057,254
189 R	4,057,255
CLASS 274	
9 C	4,057,256
CLASS 277	
4	4,057,257
12	4,057,258
CLASS 279	
1 S	4,057,259
77	4,057,260
CLASS 280	
11.37 H	4,057,261
78	4,057,262
106 R	4,057,263
276	4,057,264
468	4,057,265
475	4,057,266
CLASS 285	
18	4,057,267
31	4,057,268
158	4,057,269
CLASS 290	
54	4,057,270
CLASS 292	
87	4,057,271
128	4,057,272
218	4,057,273
259 R	4,057,274
340	4,057,275
CLASS 294	
19 R	4,057,276
50.8	4,057,277
88	4,057,278
93	4,057,279
CLASS 296	
1 S	4,057,280
3	4,057,281
10	4,057,282
23 C	4,057,283
23 F	4,057,284
23 H	4,057,285
43	4,057,286
97 K	4,057,287
CLASS 297	
239	4,057,288
259	4,057,289
389	4,057,290
441	4,057,291
452	4,057,292
CLASS 299	
2	4,057,293
93	4,057,294
CLASS 302	
56	4,057,295
CLASS 303	
6 C	4,057,296
71	4,057,297
84 R	4,057,298
92	4,057,299
113	4,057,300
114	4,057,301
CLASS 305	
19	4,057,302
CLASS 307	
10 LS	4,057,742
11	4,057,735
78	4,057,736
147	4,057,737
247 A	4,057,738
270	4,057,739
273	4,057,740
279	4,057,741
296 R	4,057,743
CLASS 308	
3.6	4,057,303
237 A	4,057,304
CLASS 310	
27	4,057,744
CLASS 312	
11	4,057,305
218	4,057,306
219	4,057,307
262	4,057,308
290	4,057,309
CLASS 313	
55	4,057,745
237	4,057,746
413	4,057,747
CLASS 315	
3.5	4,057,748
	4,057,749
86	4,057,750
316	4,057,751
CLASS 318	
345 B	4,057,752
376	4,057,753
CLASS 324	
62	4,057,755
77 B	4,057,756
207	4,057,754
CLASS 325	
16	4,057,757
56	4,057,758
320	4,057,759
455	4,057,760
CLASS 328	
154	4,057,761
CLASS 329	
50	4,057,762
CLASS 330	
107	4,057,766
207 P	4,057,767
264	4,057,764
279	4,057,765
288	4,057,763
CLASS 331	
1 A	4,057,768
49	4,057,769
94.5 Q	4,057,770
CLASS 333	
70 R	4,057,771
83 T	4,057,772
CLASS 335	
205	4,057,773
CLASS 337	
164	4,057,774
186	4,057,775
295	4,057,776
CLASS 338	
309	4,057,777
CLASS 339	
10	4,057,310
17 M	4,057,311
21 R	4,057,312
33	4,057,313
97 R	4,057,314
221 R	4,057,315
CLASS 340	
2	4,057,778
3 C	4,057,779
15.5 MC	4,057,780
18 LD	4,057,781
27 AT	4,057,782
58	4,057,783
146.3 F	4,057,784
163	4,057,785
224	4,057,790
261	4,057,791
267 C	4,057,792
310 R	4,057,793
311	4,057,794
347 AD	4,057,795
	4,057,796
347 DD	4,057,797
388	4,057,799
420	4,057,798
CLASS 343	
8	4,057,800
12 R	4,057,801
100 LE	4,057,802
113 R	4,057,803
200	4,057,804
225	4,057,805
CLASS 346	
33 R	4,057,806
107 R	4,057,808
140 R	4,057,807
CLASS 350	
1	4,057,316
3.5	4,057,317
19	4,057,318
96 C	4,057,319
96 GN	4,057,320
96 R	4,057,322
96 WG	4,057,321
125	4,057,323
150	4,057,324
160 LC	4,057,325
162 R	4,057,326
187	4,057,327
214	4,057,328
222	4,057,329
223	4,057,330
285	4,057,331
319	4,057,332
CLASS 352	
141	4,057,333
175	4,057,334
188	4,057,335
CLASS 353	
6	4,057,336
26 R	4,057,337
CLASS 354	
23 D	4,057,809
29	4,057,810
33	4,057,811
51	4,057,812
144	4,057,813
204	4,057,814
288	4,057,815
293	4,057,816
298	4,057,817
	4,057,818
CLASS 355	
1	4,057,338
3 R	4,057,339
4	4,057,340
8	4,057,341
	4,057,342
16	4,057,343
	4,057,344
35	4,057,345
41	4,057,346
67	4,057,347
75	4,057,348
CLASS 356	
45	4,057,349
178	4,057,352
199	4,057,350
238	4,057,351
CLASS 357	
23	4,057,819
	4,057,820
	4,057,821
52	4,057,822
	4,057,823
56	4,057,824
81	4,057,825
CLASS 358	
4	4,057,826
8	4,057,827
32	4,057,828

86	4,057,829
127	4,057,830
128	4,057,831
	4,057,832
	4,057,833
133	4,057,834
140	4,057,835
	4,057,836
254	4,057,837
299	4,057,838
CLASS 360	
93	4,057,839
99	4,057,840
CLASS 361	
64	4,057,841
93	4,057,842
104	4,057,843
111	4,057,844
CLASS 362	
249	4,057,718
CLASS 364	
200	4,057,845
	4,057,846
	4,057,847
	4,057,848
	4,057,849
	4,057,850
426.2	4,057,712
476	4,057,713
494	4,057,715
600	4,057,711
802	4,057,717
CLASS 365	
76	4,057,786
104	4,057,787
174	4,057,788
189	4,057,789
CLASS 366	
2	4,057,227
79	4,057,228
123	4,057,222
157	4,057,225
172	4,057,223
244	4,057,226
336	4,057,224
CLASS 401	
43	4,057,353
199	4,057,354
CLASS 403	
2	4,057,355
219	4,057,356
CLASS 407	
114	4,056,871
	4,056,872
CLASS 408	
67	4,057,357
91	4,057,358
CLASS 415	
9	4,057,359
25	4,057,360
53 R	4,057,361
170 R	4,057,362
CLASS 416	
145	4,057,363
CLASS 417	
34	4,057,364
44	4,057,365
234	4,057,366
273	4,057,367
313	4,057,368
365	4,057,369
366	4,057,370
409	4,057,371
424	4,057,372
519	4,057,373
CLASS 418	
36	4,057,374
189	4,057,375
CLASS 423	
127	4,057,611
443	4,057,613
490	4,057,614
CLASS 424	
1	4,057,615
	4,057,616
	4,057,617
	4,057,618
14	4,057,619
35	4,057,620
49	4,057,621
78	4,057,622
	4,057,623
	4,057,624
	4,057,625
89	4,057,626
92	4,057,627
101	4,057,628
177	4,057,629
204	4,057,630
246	4,057,631
248.54	4,057,632
250	4,057,633
	4,057,634
261	4,057,635
263	4,057,636
	4,057,637
270	4,057,638
	4,057,639
274	4,057,640
283	4,057,641
304	4,057,642
305	4,057,556
311	4,057,643
325	4,057,644
329	4,057,645
331	4,057,646
340	4,057,647
341	4,057,648
CLASS 425	
73	4,057,376
135	4,057,377
137	4,057,378
199	4,057,379
324.1	4,057,380
345	4,057,381
387.1	4,057,382
405 H	4,057,383
459	4,057,384
466	4,057,385
526	4,057,386
CLASS 426	
15	4,057,649
92	4,057,650
388	4,057,652
513	4,057,653
555	4,057,654
583	4,057,655
630	4,057,656
CLASS 427	
44	4,057,657
	4,057,658
89	4,057,659
100	4,057,660
125	4,057,661
209	4,057,662
307	4,057,663
386	4,057,664
CLASS 428	
8	4,057,665
35	4,057,666
	4,057,667
85	4,057,668
152	4,057,669
189	4,057,670
208	4,057,671
220	4,057,672
411	4,057,673
481	4,057,674
CLASS 429	
39	4,057,675
50	4,057,676
100	4,057,677
104	4,057,678
194	4,057,679
CLASS 526	
142	4,057,680
185	4,057,681
190	4,057,682
194	4,057,683
CLASS 536	
4	4,057,684
18	4,057,685
26	4,057,686
CLASS 542	
428	4,057,545
CLASS 544	
182	4,057,546
184	4,057,547
CLASS 548	
305	4,057,558
CLASS 560	
43	Re.29,468
52	4,057,573
53	4,057,572
	4,057,574
121	Re.29,469
	4,057,571
	4,057,851
245	4,057,575

CLASSIFICATION OF DESIGNS

D2—	232	246,271
	233	246,272
D6—	161	246,273
	234	246,274
D7—	21	246,275
	35	246,276
	38	246,277
		246,278
	72	246,279
	105	246,280
	150	246,281
	152	246,282
D8—	14	246,283
		246,284
	14.1	246,285
	360	246,286
D9—	177	246,287
	219	246,288
	240	246,289
D10—	6	246,290
	46	246,292
	75	246,291
D11—	4	246,293
	117	246,294
	133	246,295
D12—	53	246,296
	62	246,297
	75	246,298
	90	246,299
	105	246,300
	129	246,301
	130	246,302
	195	246,303
		246,304
D14—	6	246,305
	11	246,306
		246,307
	66	246,308
	73	246,309
D15—	113	246,310
	116	246,311
	135	246,312
	148	246,313
D16—	18	246,314
D23—	58	246,315
	150	246,316
		246,317
		246,318
		246,319
D24—	5	246,320
	24	246,321
	34	246,322
D25—	75	246,323
D28—	50	246,324
D29—	2	246,325
D34—	5 GH	246,328
		246,329
	5 PB	246,327
	5 SS	246,326
D48—	23 A	246,330
D56—	1 A	246,331
D64—	11 A	246,332
D92—	1 T	246,334
D96—	2	246,335
	12 A	246,333

CLASSIFICATION OF PLANTS

P.—	34	4,144
	51	4,145
	65	4,146
	69	4,147
	73	4,143

GEOGRAPHICAL INDEX OF RESIDENCE OF INVENTORS

(U.S. States, Territories and Armed Forces, the Commonwealth of Puerto Rico, and the Canal Zone)

Alabama	1	Kentucky	21	Oregon	41
Alaska	2	Louisiana	22	Pennsylvania	42
American Samoa	3	Maine	23	Puerto Rico	43
Arizona	4	Maryland	24	Rhode Island	44
Arkansas	5	Massachusetts	25	South Carolina	45
California	6	Michigan	26	South Dakota	46
Canal Zone	7	Minnesota	27	Tennessee	47
Colorado	8	Mississippi	28	Texas	48
Connecticut	9	Missouri	29	Utah	49
Delaware	10	Montana	30	Vermont	50
District of Columbia	11	Nebraska	31	Virginia	51
Florida	12	Nevada	32	Virgin Islands	52
Georgia	13	New Hampshire	33	Washington	53
Guam	14	New Jersey	34	West Virginia	54
Hawaii	15	New Mexico	35	Wisconsin	55
Idaho	16	New York	36	Wyoming	56
Illinois	17	North Carolina	37	U.S. Air Force	57
Indiana	18	North Dakota	38	U.S. Army	58
Iowa	19	Ohio	39	U.S. Navy	59
Kansas	20	Oklahoma	40		

(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

PATENTS

1 :	4,057,178		4,057,510		4,057,793		4,057,542		4,056,976		4,057,574
	4,057,196		4,057,520		4,057,803		4,057,543		4,057,007		4,057,595
2 :	4,057,367		4,057,563	13 :	4,056,959		4,057,575		4,057,015		4,057,633
4 :	4,057,031		4,057,567		4,057,096		4,057,580		4,057,023		4,057,645
	4,057,165		4,057,577		4,057,145		4,057,582		4,057,086		4,057,667
	4,057,282		4,057,589		4,057,448		4,057,685		4,057,115		4,057,709
	4,057,283		4,057,628		4,057,621		4,057,705		4,057,212	27 :	4,057,068
	4,057,618		4,057,651	16 :	4,057,088		4,057,726		4,057,425		4,057,072
	4,057,708		4,057,675		4,057,180		4,057,727		4,057,483		4,057,123
5 :	4,057,639		4,057,719	17 :	4,056,884		4,057,731		4,057,679		4,057,156
6 :	4,056,856		4,057,730		4,056,890		4,057,775		4,057,699		4,057,250
	4,056,865		4,057,736		4,056,893		4,057,813		4,057,759		4,057,257
	4,056,870		4,057,740		4,056,895		4,057,828		4,057,786		4,057,261
	4,056,877		4,057,745		4,056,898	18 :	4,056,888		4,057,788		4,057,449
	4,056,891		4,057,766		4,056,955		4,057,014		4,057,811		4,057,787
	4,056,892		4,057,772		4,056,989		4,057,020		4,057,815		4,057,818
	4,056,899		4,057,821		4,057,019		4,057,024		4,057,816		4,057,847
	4,056,962		4,057,836		4,057,028		4,057,125		4,057,839	28 :	4,057,108
	4,056,975		4,057,844		4,057,036		4,057,131		4,057,849	29 :	4,057,189
	4,056,999	8 :	4,056,983		4,057,047		4,057,274	26 :	4,056,861		4,057,201
	4,057,029		4,057,064		4,057,054		4,057,394		4,056,862		4,057,262
	4,057,032		4,057,222		4,057,065		4,057,826		4,056,864		4,057,292
	4,057,085		4,057,284		4,057,087	19 :	4,057,005		4,056,869		4,057,309
	4,057,119		4,057,611		4,057,094		4,057,044		4,056,872		4,057,390
	4,057,144		4,057,760		4,057,105		4,057,109		4,056,901		4,057,548
	4,057,160		4,057,808		4,057,112		4,057,207		4,056,938		4,057,554
	4,057,168	9 :	4,056,948		4,057,121		4,057,701		4,056,940		4,057,616
	4,057,169		4,056,971		4,057,122	20 :	4,057,619		4,056,961	30 :	4,057,254
	4,057,170		4,057,011		4,057,130	21 :	4,057,008		4,056,977	31 :	4,057,358
	4,057,174		4,057,053		4,057,133		4,057,051		4,056,979	32 :	4,056,912
	4,057,182		4,057,164		4,057,148	22 :	4,056,913		4,056,993		4,056,998
	4,057,183		4,057,227		4,057,149		4,057,275		4,057,027	33 :	4,057,802
	4,057,194		4,057,363		4,057,208		4,057,487		4,057,114	34 :	4,056,874
	4,057,235		4,057,523		4,057,210		4,057,594		4,057,120		4,056,885
	4,057,245		4,057,590		4,057,214	24 :	4,056,854		4,057,129		4,056,894
	4,057,246		4,057,650		4,057,223		4,056,879		4,057,134		4,056,908
	4,057,252		4,057,654		4,057,230		4,056,997		4,057,137		4,056,973
	4,057,267		4,057,682		4,057,241		4,057,000		4,057,190		4,057,052
	4,057,280		4,057,756		4,057,247		4,057,002		4,057,192		4,057,060
	4,057,293	10 :	Re.29,468		4,057,248		4,057,104		4,057,209		4,057,078
	4,057,351		4,057,441		4,057,251		4,057,140		4,057,236		4,057,143
	4,057,352		4,057,565		4,057,259		4,057,167		4,057,265		4,057,176
	4,057,359		4,057,638		4,057,281		4,057,238		4,057,301		4,057,177
	4,057,372		4,057,805		4,057,297		4,057,288		4,057,304		4,057,187
	4,057,375	12 :	4,056,886		4,057,305		4,057,439		4,057,307		4,057,193
	4,057,396		4,056,887		4,057,314		4,057,470		4,057,317		4,057,217
	4,057,422		4,056,951		4,057,323		4,057,524		4,057,355		4,057,249
	4,057,450		4,056,953		4,057,329		4,057,569		4,057,517		4,057,313
	4,057,460		4,057,001		4,057,332		4,057,735		4,057,528		4,057,320
	4,057,466		4,057,285		4,057,357		4,057,820		4,057,531		4,057,338
	4,057,476		4,057,360		4,057,366	25 :	4,056,852		4,057,564		4,057,349
	4,057,484		4,057,678		4,057,402		4,056,875		4,057,566		4,057,350
	4,057,485		4,057,742		4,057,502		4,056,967		4,057,572		4,057,354

	4,057,374		4,056,950		4,057,823		4,057,791		4,057,570		4,057,473
	4,057,378		4,056,956	37 :	4,056,910	40 :	4,057,059		4,057,585		4,057,512
	4,057,397		4,057,067		4,057,198		4,057,106		4,057,626		4,057,521
	4,057,398		4,057,127		4,057,206		4,057,244		4,057,630		4,057,683
	4,057,420		4,057,136		4,057,276		4,057,386		4,057,631		4,057,689
	4,057,462		4,057,203		4,057,308		4,057,601		4,057,632		4,057,720
	4,057,481		4,057,204		4,057,310	41 :	4,057,048		4,057,669		4,057,781
	4,057,491		4,057,253		4,057,311		4,057,141		4,057,671		4,057,807
	4,057,506		4,057,270		4,057,404		4,057,266		4,057,672		4,057,829
	4,057,509		4,057,291		4,057,757		4,057,433		4,057,715		4,057,830
	4,057,532		4,057,337	39 :	4,056,858		4,057,798		4,057,750		4,057,840
	4,057,533		4,057,340		4,056,930		4,057,817		4,057,753		4,057,846
	4,057,536		4,057,341		4,056,946	42 :	Re.29,470		4,057,754	49 :	4,057,442
	4,057,547		4,057,342		4,056,965		4,056,867		4,057,761		4,057,479
	4,057,553		4,057,345		4,056,995		4,056,871		4,057,770		4,057,604
	4,057,598		4,057,346		4,056,996		4,056,880		4,057,776		4,057,801
	4,057,607		4,057,371		4,057,003		4,056,902		4,057,777	51 :	4,056,889
	4,057,610		4,057,399		4,057,056		4,056,966		4,057,778		4,056,897
	4,057,613		4,057,408		4,057,080		4,057,034		4,057,784		4,057,033
	4,057,637		4,057,415		4,057,091		4,057,066		4,057,785		4,057,181
	4,057,642		4,057,416		4,057,092		4,057,071		4,057,842		4,057,277
	4,057,643		4,057,426		4,057,157		4,057,101	44 :	4,057,392		4,057,322
	4,057,646		4,057,427		4,057,159		4,057,124	45 :	4,057,093		4,057,401
	4,057,673		4,057,428		4,057,185		4,057,151		4,057,195		4,057,663
	4,057,676		4,057,434		4,057,199		4,057,152	47 :	4,056,883		4,057,790
	4,057,681		4,057,443		4,057,232		4,057,153		4,056,963	53 :	4,057,150
	4,057,688		4,057,471		4,057,237		4,057,158		4,057,040		4,057,220
	4,057,693		4,057,474		4,057,294		4,057,184		4,057,074		4,057,242
	4,057,696		4,057,478		4,057,302		4,057,205		4,057,202		4,057,255
	4,057,711		4,057,527		4,057,405		4,057,215		4,057,456		4,057,782
	4,057,743		4,057,571		4,057,410		4,057,218		4,057,494	54 :	4,057,055
	4,057,751		4,057,599		4,057,431		4,057,225	48 :	4,056,943		4,057,211
	4,057,763		4,057,656		4,057,445		4,057,315		4,056,968		4,057,780
	4,057,824		4,057,662		4,057,451		4,057,393		4,057,009	55 :	4,056,919
	4,057,841		4,057,666		4,057,454		4,057,411		4,057,010		4,057,025
35 :	4,056,927		4,057,668		4,057,455		4,057,440		4,057,030		4,057,039
	4,057,273		4,057,697		4,057,475		4,057,463		4,057,116		4,057,126
	4,057,289		4,057,707		4,057,482		4,057,465		4,057,118		4,057,138
36 :	Re.29,469		4,057,710		4,057,492		4,057,488		4,057,172		4,057,219
	4,056,855		4,057,723		4,057,537		4,057,489		4,057,221		4,057,240
	4,056,859		4,057,768		4,057,549		4,057,490		4,057,299		4,057,269
	4,056,903		4,057,773		4,057,602		4,057,503		4,057,365		4,057,306
	4,056,904		4,057,789		4,057,609		4,057,508		4,057,403		4,057,653
	4,056,920		4,057,797		4,057,652		4,057,519		4,057,437		4,057,851
	4,056,936		4,057,800		4,057,752		4,057,529		4,057,438		

DESIGN PATENTS

6 :	246,271		246,328	17 :	246,273		246,283	33 :	246,298	42 :	246,304
	246,276		246,331		246,274		246,288	34 :	246,316	43 :	246,284
	246,277	9 :	246,281		246,275		246,289		246,318	48 :	246,297
	246,278		246,305		246,291		246,312		246,325		246,300
	246,290	10 :	246,322		246,295	26 :	246,293	36 :	246,302		246,326
	246,308	12 :	246,272		246,314		246,303	37 :	246,320	51 :	246,329
	246,315		246,285		246,330	27 :	246,310	39 :	246,313	53 :	246,299
	246,327		246,333	25 :	246,279		246,311	40 :	246,294	54 :	246,286

PLANT PATENTS

6 :	4,144		4,147	8 :	4,143	18 :	4,146	36 :	4,145		

☆ U. S. GOVERNMENT PRINTING OFFICE : O - 1977

CHANGE OF ADDRESS FORM

NAME—FIRST, LAST

COMPANY NAME OR ADDITIONAL ADDRESS LINE

STREET ADDRESS

CITY | STATE | ZIP CODE

PLEASE PRINT OR TYPE

(or) COUNTRY

Mail this form to: NEW ADDRESS

Superintendent of Documents
Government Printing Office SSOM
Washington, D.C. 20402

Attach last subscription label here.

SUBSCRIPTION ORDER FORM

SUBSCRIPTION ORDER FORM

ENTER MY SUBSCRIPTION TO:

@ $ Domestic; @ $ Foreign.

NAME—FIRST, LAST

COMPANY NAME OR ADDITIONAL ADDRESS LINE

STREET ADDRESS

CITY | STATE | ZIP CODE

PLEASE PRINT OR TYPE

(or) COUNTRY

☐ Remittance Enclosed (Make checks payable to Superintendent of Documents)

☐ Charge to my Deposit Account No. ....

MAIL ORDER FORM TO:
Superintendent of Documents
Government Printing Office
Washington, D.C. 20402

OFFICIAL GAZETTE of the UNITED STATES PATENT and TRADEMARK OFFICE

November 15, 1977 Volume 964 Number 3

CONTENTS

The following are mailed under direction of the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, to whom all subscriptions should be made payable and all communications addressed:

THE OFFICIAL GAZETTE (PATENTS SECTION), issued weekly, subscription $342.20 per annum for first class mailing, also available as fourth-class mail at $250.00; foreign mailing $85.55 additional; single copies $6.60 each.

THE OFFICIAL GAZETTE (TRADEMARK SECTION), issued weekly, subscription $88.40 per annum, foreign mailing $22.10 additional; single copies $1.70 each.

CIRCULARS OF GENERAL INFORMATION concerning PATENTS, price 60 cents each.

CIRCULARS OF GENERAL INFORMATION concerning TRADEMARKS, price 50 cents each.

PRINTED COPIES OF PATENTS are furnished by the Patent and Trademark Office at 50 cents each; PLANT PATENTS in color, $1.00 each; copies of TRADEMARKS AND DESIGN PATENTS at 20 cents each. Address orders to the Commissioner of Patents and Trademarks, Washington, D.C., 20231.

Printing authorized by Section 11(a)3 of Title 35, U.S. Code P.T.O.

PATENT AND TRADEMARK OFFICE NOTICES

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b)).

3,161,614, Re. S.N. 832,842, Filed Sept. 13, 1977, Cl. 260/46.5, POLYFUNCTIONAL ALKOXY ENDBLOCKED POLYSILOXANES AND THEIR CURED COMPOSITIONS, Paul L. Brown, et al., Owner of Record: *Dow Corning Corporation, Midland, Mich.*, Attorney or Agent: Robert F. Fleming, Jr., et al., Ex. Gp.: 143

3,294,981, Re. S.N. 832,721, Filed Sept. 12, 1977, Cl. 307/237, SIGNAL TRANSLATION EMPLOYING TWO-STATE TECHNIQUES, Amar G. Bose, Owner of Record: *Bose Corporation, Framingham, Mass.*, Attorney or Agent: Charles Hieken, Ex. Gp.: 254

3,906,307, Re. S.N. 834,152, Filed Sept. 16, 1977, Cl. 315/408, CIRCUIT ARRANGEMENT FOR PRODUCING A SAWTOOTH CURRENT THROUGH A LINE DEFLECTION COIL IN AN IMAGE DISPLAY APPARATUS, Johannes Simon Albert Van Hattum, Owner of Record: *U.S. Philips Corporation, New York, N.Y.*, Attorney or Agent: Frank R. Trifari, Ex. Gp.: 222

3,908,791, Re. S.N. 834,153, Filed Sept. 16, 1977, Cl. 182/8, SAFETY CLAMP, Richard A. Kleine, et al., Owner of Record: *Unarco Industries, Inc., Chicago, Ill.*, Attorney or Agent: Benjamin H. Sherman, et al., Ex. Gp.: 353

3,925,679, Re. S.N. 835,561, Filed Sept. 22, 1977, Cl. 290/1, MODULAR OPERATION CENTERS AND METHODS OF BUILDING SAME FOR USE IN ELECTRIC POWER GENERATING PLANTS AND OTHER INDUSTRIAL AND COMMERCIAL PLANTS, PROCESSES AND SYSTEMS, Paul A. Berman, et al., Owner of Record: *Westinghouse Electric Corporation, Pittsburgh, Pa.*, Attorney or Agent: Allen M. Krass, et al., Ex. Gp.: 217

3,925,679, Re. S.N. 835,569, Filed Sept. 22, 1977, Cl. 290/1, MODULAR OPERATING CENTERS AND METHODS OF BUILDING SAME FOR USE IN ELECTRIC POWER GENERATING PLANTS AND OTHER INDUSTRIAL AND COMMERCIAL PLANTS, PROCESSES AND SYSTEMS, Paul A. Berman, et al., Owner of Record: *Westinghouse Electric Corporation, Pittsburgh, Pa.*, Attorney or Agent: C. F. Renz, et al., Ex. Gp.: 217

3,992,305, Re. S.N. 835,937, Filed Sept. 22, 1977, Cl. 352/14, SHUTTLE SPEED CONTROL DEVICE, Yukio Katahira, Owner of Record: *Nihon Beru-Haueru Kabushiki Kaisha (Bell and Howell Japan, Ltd.), Higashimurayama, Japan*, Attorney or Agent: Aaron Passman, et al., Ex. Gp.: 211

PATENT NOTICES

Certificates of Correction for the Week of Nov. 15, 1977

Re. 29,350	4,013,590	4,028,664	4,038,226
D. 244,039	4,014,396	4,029,294	4,038,245
D. 244,040	4,015,180	4,029,477	4,038,559
D. 245,160	4,016,157	4,029,763	4,038,754
D. 245,166	4,016,162	4,029,766	4,038,778
3,566,073	4,017,591	4,030,005	4,038,894
3,809,826	4,018,149	4,030,273	4,039,224
3,836,344	4,018,813	4,030,423	4,039,470
3,840,411	4,018,863	4,030,503	4,039,591
3,854,919	4,019,333	4,030,508	4,039,718
3,855,297	4,019,352	4,030,774	4,039,855
3,864,469	4,020,289	4,030,840	4,039,932
3,874,941	4,020,363	4,030,870	4,040,062
3,925,383	4,020,420	4,031,038	4,040,284
3,933,795	4,021,229	4,031,088	4,040,393
3,933,892	4,021,445	4,031,187	4,040,554
3,935,787	4,022,157	4,031,324	4,040,592
3,939,635	4,022,376	4,032,044	4,040,701
3,944,531	4,022,642	4,032,443	4,040,924
3,947,473	4,022,771	4,032,787	4,041,096
3,948,904	4,023,160	4,032,848	4,041,194
3,952,164	4,023,373	4,032,908	4,041,198
3,956,626	4,023,620	4,032,992	4,041,286
3,956,876	4,024,132	4,033,415	4,041,365
3,960,789	4,024,277	4,033,443	4,041,632
3,961,383	4,024,408	4,033,475	4,041,703
3,965,550	4,024,415	4,033,736	4,041,712
3,969,945	4,024,517	4,033,789	4,041,927
3,974,192	4,024,838	4,033,868	4,041,953
3,975,426	4,025,333	4,034,022	4,042,030
3,982,003	4,025,510	4,034,038	4,042,101
3,982,592	4,025,842	4,034,784	4,042,479
3,985,791	4,026,347	4,035,094	4,042,511
3,988,301	4,026,539	4,035,111	4,042,514
3,989,692	4,026,785	4,035,194	4,043,085
3,994,294	4,026,913	4,035,443	4,043,251
4,000,292	4,026,937	4,035,828	4,043,628
4,004,932	4,027,057	4,036,169	4,046,920
4,005,565	4,027,209	4,036,289	
4,005,802	4,027,410	4,036,931	
4,007,220	4,028,485	4,037,211	
4,007,303	4,028,542	4,037,609	

Disclaimers

3,198,043.—*Paul K. Davis*, Alameda, Calif. PIPE CUTTING AND HANDLING APPARATUS. Patent dated Aug. 3, 1965. Disclaimer filed Aug. 22, 1977, by the assignee, *Pacific Roller Die Co., Inc.*

Hereby enters this disclaimer to claim 12 of said patent.

3,381,504.—*Thomas R. Smith*, Newton, Iowa. OSCILLATABLE AGITATOR FOR A LAUNDRY MACHINE. Patent dated May 7, 1968. Disclaimer filed Aug. 15, 1977, by the assignee, *The Maytag Company.*

Hereby enters this disclaimer to all the claims of said patent.

3,565,118.—*Thronton Stearns*, Winchester, Mass. THERMAL INSULATION FOR FLUID STORAGE CONTAINERS. Patent dated Feb. 23, 1971. Disclaimer filed Sept. 9, 1977, by the assignee, *Vacuum Barrier Corporation.*

Hereby enters this disclaimer to claim 1 of said patent.

3,859,522.—*Robert M. Cuthbert*, Delta, British Columbia, Canada. METHOD FOR NON-DESTRUCTIVE TESTING OF FISH FOR SEX. Patent dated Jan. 7, 1975. Disclaimer filed June 30, 1977, by the assignee, *British Columbia Research Council.*

Hereby enters this disclaimer to claims 1 and 2 of said patent.

3,860,443.—*Walter L. Lachman*, Concord, Mass., *Robert A. Penty*, Kennebunk, Maine, and *Paul F. Jahn*, Chelmsford, Mass. GRAPHITE COMPOSITE. Patent dated Jan. 14, 1974. Disclaimer filed June 24, 1977, by the assignee, *Fiber Materials, Inc.*

Hereby enters this disclaimer to all claims of said patent.

3,864,649.—*Richard C. Doyle*, Benicia, Calif. ELECTRICAL SAFETY DEVICE WITH IMPROVED TRIP MECHANISM. Patent dated Feb. 4, 1975. Disclaimer filed Sept. 9, 1977, by the assignee, *Minnesota Mining and Manufacturing Company.*

Hereby enters this disclaimer to the remaining term of said patent.

4,030,548.—*Edwin A. Richardson*, Houston, and *Ronald F. Scheuerman*, Bellaire, Tex. ECONOMICALLY DISSOLVING BARIUM SULFATE SCALE WITH A CHELATING AGENT. Patent dated June 21, 1977. Disclaimer filed Sept. 16, 1977, by the assignee *Shell Oil Company.*

Hereby enters this disclaimer to all of the claims of said patent.

Dedication

3,939,614.—*Cyril P. Frommelt* and *Sylvan J. Frommelt*, Dubuque, Iowa. LOADING DOCK SEAL. Patent dated Feb. 24, 1976. Dedication filed Sept. 15, 1977, by the assignee, *Dubuque Awning & Tent Company.*

Hereby dedicates to the Public the entire term of said patent.

Disclaimer and Dedication

3,580,748.—*William T. Delong*, Manchester Township, York County, Pa. WELDING FLUX COMPONENT. Patent dated May 25, 1971. Disclaimer and Dedication filed Sept. 12, 1977, by the assignee, *Teledyne, Inc.*

Hereby disclaims and dedicates to the Public all claims of said patent.

Acceptable Drawings for Patents

Approximately ten years ago, the Office's standards for acceptable drawings with respect to certain matters including the blackness and minimum thickness of inked lines, and shading of drawings, were relaxed in order to reduce the backlog of informal drawings at that time.

Apparently, because of the increased use of pens with a round, open-end capillary tip in place of the conventional draftsman's drawing pen, the Office now has a problem of obtaining acceptable reproduction copies of thin, light and gray lines which appear on many drawings. As a result, approximately 10,000 drawings sheets filed each year are *not* acceptable for normal reproduction and microfilming from the printed copy. Special printing steps must be taken to try to print very thin or light lines. Inked lines should be at least 0.012 inch in width and no closer together than 0.05 inch. Shading lines should be constructed to meet these criteria for acceptable drawings. The inked lines must not rub off the standard bristol board sheet, and their reflectance should not exceed 12%.

Applicants and draftsmen are requested not to use thin or light lines on their drawings. In the future, drawing requirements will be more stringent regarding the blackness and minimum thickness of lines to be acceptable. The Chief Draftsman has been instructed to adhere strictly to the above standards and criteria after January 1, 1978 so that special printing requirements can be held to a minimum.

Persons interested in examples of acceptable and unacceptable lines for drawings may obtain one set of "Printed Examples from Unacceptably Inked Drawings" by writing to:

The Chief Draftsman
U.S. Patent and Trademark Office
Washington, D.C. 20231

RICHARD J. SHAKMAN,
Oct. 20, 1977. *Assistant Commissioner for Administration.*

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF OCTOBER 8, 1977

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	6-22-76
GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	1-3-77
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	2-1-77
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	10-22-76
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	10-27-76
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales.	8-18-76
SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	6-15-76
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	1-7-77
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating.	10-12-76
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	7-9-76
DESIGNS, GROUP 290—C. D. QUARFORTH, Director Industrial Arts; Household, Personal and Fine Arts.	3-24-76
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—D. J. STOCKING, Director Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	9-1-76
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus: Plastics Working Apparatus; Plastic Block and Earthenware Apparatus: Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks.	3-17-77
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—G. M. FORLENZA, Director Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	11-1-76
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GAY, Director Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication.	11-1-76
GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director Joints; Fasteners; Rod, Pipe and Electrical Connectors; Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines.	2-3-77

Expiration of patents: The patents within the range of numbers indicated below expire during October 1977, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents........ Numbers 2,954,560 to 2,958,080, inclusive
Plant Patents........ Numbers 1,974 to 1,977, inclusive

REISSUES

NOVEMBER 15, 1977

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 29,471

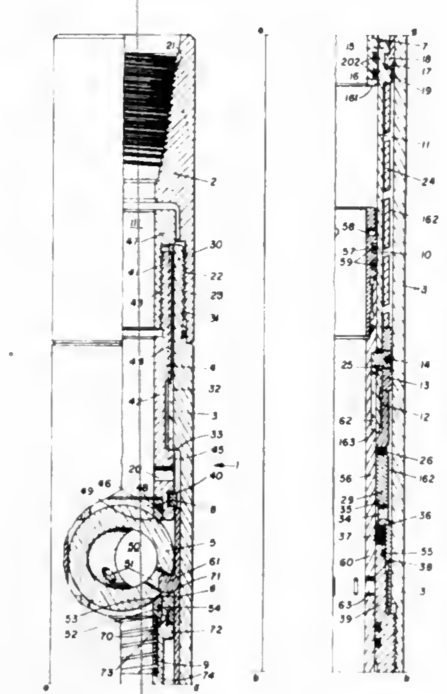
OIL WELL TESTING APPARATUS

Richard L. Giroux, Duncan, Okla., assignor to Halliburton Company, Duncan, Okla.

Original No. 3,814,182, dated June 4, 1974, Ser. No. 340,778, Mar. 13, 1973. Application for reissue June 1, 1976, Ser. No. 691,800

Int. Cl.² E21B *41/00*

U.S. Cl. 166—334 **23 Claims**



24. Apparatus for testing the productivity of an oil bearing formation penetrated by a borehole having a testing string therein extending from the surface of the earth to a packer isolating said formation, said apparatus comprising:

housing means having an open bore therethrough;

mandrel means having an open bore therethrough coaxially aligned with and slidably received in the open bore of said housing means, with one of said housing means and said mandrel means being arranged to be connected to that portion of the testing string extending to the surface and the other of said housing means and said mandrel means being arranged to be connected to that portion of the testing string extending to the packer for providing slidable movement of said mandrel means with respect to said housing means between a contracted position and an expanded position during vertical reciprocal movement of said testing string;

a flow tube in the open bore of said housing means having a single end connected to the interior wall of said housing means for providing an open flow path through the open bore of said housing means, said flow path communicating with the open bore of said mandrel means;

valve means in said flow tube movable between an open condition and a closed condition for opening and closing the flow path through said flow tube; and

valve activating means having a portion extending between the interior wall of said housing means and the periphery of the unconnected end of said flow tube, and connecting said mandrel means and said valve means for moving said valve means to the closed condition when said mandrel means and said housing means are in the expanded position and for moving said valve means to the open condition when said mandrel means and said housing means are in the contracted position.

Re. 29,472

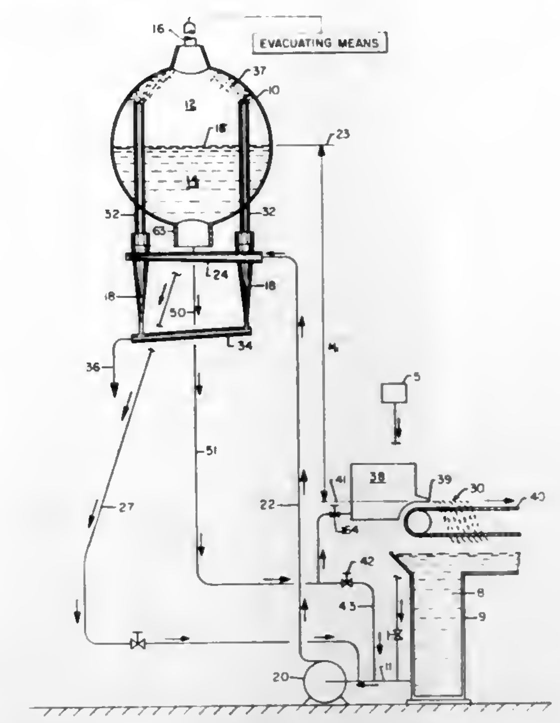
CONDUIT SYSTEM FOR CONVEYING FIBROUS STOCK FROM DEAERATOR CHAMBER TO HEADBOX IN PAPERMAKING MACHINE

Robert G. Kaiser, Seminole, Fla., assignor to Clark & Vicario Corporation, St. Petersburg, Fla.

Original No. 3,812,007, dated May 21, 1974, Ser. No. 184,839, Sept. 29, 1971. Continuation-in-part of Ser. No. 813,646, April 4, 1969, abandoned. Application for reissue May 14, 1976, Ser. No. 686,580

Int. Cl.² B01D *19/00;* **D21F** *1/06*

U.S. Cl. 162—343 **17 Claims**



7. [The papermaking apparatus of claim **1** wherein said dropleg supply conduit means comprises] *In a papermaking apparatus comprising*

papermaking stock receiver means defining an enclosed evacuated chamber having a collecting zone for deaerated aqueous supply stock, and evacuating means associated with said chamber for maintaining its collecting zone under a vacuum sufficient to deaerate aqueous papermaking stock introduced therein,

means for introducing aqueous papermaking stock into the collecting zone of said chamber in a manner facilitating deaeration thereof to produce deaerated supply stock therein,

a papermaking machine including a forming wire for converting deaerated supply stock into a web of paper, and structure associated with said papermaking machine having an interior delivery passage provided with an exit slot for delivery therefrom in the direction of the papermaking machine axis of an effluent jet of stock onto said wire for conversion into a paper web upon removal of liquid therefrom,

the improvement which comprises

dropleg supply conduit means defining a flow course communicating said papermaking machine associated structure delivery passage and its exit slot to a bottom portion of the evacuated chamber collecting zone through which deaerated supply stock can be conveyed from said collecting zone to said papermaking machine and comprising a depending and relatively wide chute of rectangular cross-section having the entry end of its passage in the form of an elongated slot extending along a substantial portion of a major lateral expanse of said collecting zone bottom portion and communicating therewith, the exit end of the passage of said chute being arranged with its transverse width extending in the direction of the transverse length of said exit slot and communi-

cating therewith [,], *the flow course of said conduit means between entry thereto and exit therefrom having no flow course deviation therein extending laterally of the axis of the papermaking machine, said receiver means being elevated above said exit slot a sufficient height to overcome the effect of vacuum on gravity outflow of stock from said receiver means, said distance of elevation being additionally such as to provide a stock pressure head sufficient to overcome flow frictional losses in said supply conduit means flow course and said papermaking machine associated structure delivery passage and its exit slot.*

Re. 29,473

CHEMICAL COMPOSITION

Walter P. Fitzgerald, Jr., San Diego, Calif., assignor to DHP Corporation, Wilmington, Del.

Original No. 3,755,179, dated Aug. 28, 1973, Ser. No. 120,327, Mar. 2, 1971. Continuation-in-part of Ser. No. 828,710, May 28, 1969, Pat. No. 3,640,879, which is a continuation-in-part of Ser. No. 791,512, Jan. 15, 1969, abandoned. Application for reissue Nov. 22, 1976, Ser. No. 744,113

The portion of the term of this patent subsequent to Feb. 8, 1989, has been disclaimed.

Int. Cl.^{2} C11D *7/54*

U.S. Cl. 252—95 **4 Claims**

1. A chemical composition consisting essentially of a mixture of (a) a member selected from the group consisting of an alkali metal pyrosulfate, an alkaline earth metal pyrosulfate or mixtures thereof, [and] (b) a member selected from the group consisting of an alkali metal hypochlorite, an alkaline earth metal hypochlorite or mixtures thereof *and (c) an agent rendering the pH of the chemical composition alkaline*, component (a) being present in from about 1 to about 99 parts by weight, [and] component (b) being present in from about 99 to 1 parts by weight, *and component (c) being present in an amount sufficient to render the pH of the composition in excess of 8.*

Re. 29,474

METHOD FOR THE DETERMINATION OF PROTEINS AND POLYPEPTIDES

Rolf E. A. V. Axen, Upplands Balinge; Jerker O. Porath, and Leif Edvin Wide, both of Uppsala, all of Sweden, assignors to Pharmacia AB, Uppsala, Sweden

Original No. 3,555,143, dated Jan. 12, 1971, Ser. No. 643,190, June 2, 1967. Application for reissue July 23, 1975, Ser. No. 598,141

Claims priority, application Sweden, June 2, 1966, 7541/66

Int. Cl.^{2} A61K *43/00*

U.S. Cl. 424—1 **23 Claims**

1. A method for the determination of a member selected from the group consisting of proteins and polypeptides in aqueous samples, which comprises contacting particles of water insoluble polymers to which have been bound, by covalent bonds, antibodies against the said member to be determined, with the aqueous sample containing said member and with the same member labelled with a radioactive isotope to bind part of said labelled member and unlabelled member to said antibodies to produce a two-phase system comprising a solid phase comprising said bound part of labelled member and unlabelled member and a liquid phase comprising unbound labelled member and unlabelled member, separating the two phases from each other, and measuring the radioactivity of at least one of the said solid and said liquid phases, the value of said radioactivity being each a function of the concentration of the said member in the aqueous sample.

Re. 29,475

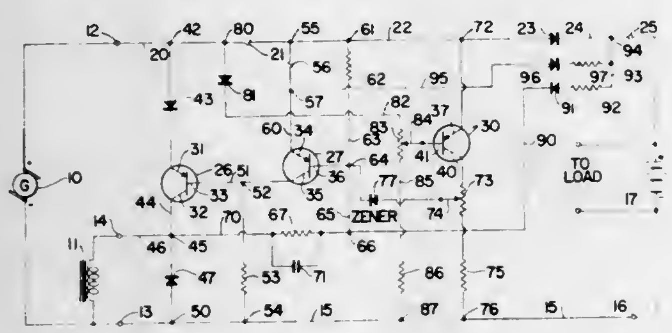
BATTERY CHARGING CIRCUIT RESPONSIVE TO GENERATOR OUTPUT VOLTAGE AND CURRENT

James Lee Jensen, St. Louis Park, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Original No. 3,350,619, dated Oct. 31, 1967, Ser. No. 787,455, Jan. 19, 1959. Division of Ser. No. 640,168, Feb. 14, 1957. Application for reissue July 24, 1972, Ser. No. 274,358

Int. Cl.^{2} H02H *7/06;* **H02J** *7/14*

U.S. Cl. 322—28 **15 Claims**



1. In combination, a power source, a control winding for varying the voltage input of said power source as a function of current flow therethrough, a first transistor having emitter, collector, and base electrodes, a second transistor having emitter, collector, and base electrodes, [and] *an* output circuit energized by said power source, a first circuit connected across the said output circuit including the emitter-collector circuit of said first transistor and said control winding, a second circuit connected across said output circuit including the emitter-collector circuit of said second transistor, means connecting the base electrode of said first transistor with the collector electrode of said second transistor, voltage responsive means connected with said output circuit and the base electrode of said second transistor, and means for causing said first transistor to operate at only two stable conditions of operation, one of which is the substantially fully conductive state and the other of which is the substantially fully non-conductive state, said last named means including a feedback circuit connecting said first circuit and the base circuit of said second transistor.

PLANT PATENTS

GRANTED NOVEMBER 15, 1977

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

4,148

PEAR TREE

Clifford B. Cordy, Central Point, Oreg., assignor to Naumes of Oregon, Inc., Medford, Oreg.

Filed May 10, 1976, Ser. No. 684,797

Int. Cl.^{2} A01H *5/03*

U.S. Cl. Plt.—36 **1 Claim**

1. A new and distinct variety of pear tree, substantially as shown and described herein, distinguished by the physical characteristics of the fruit including its shape and overall dark red coloration of the fruit skin.

4,149

OAK TREE

J. Frank Schmidt, III, 19237 NE. Halsey St., Portland, Oreg. 97230

Filed Nov. 4, 1976, Ser. No. 738,666

Int. Cl.^{2} A01H *5/12*

U.S. Cl. Plt.—51 **1 Claim**

1. A new and distinct variety of oak tree substantially as herein shown and described, characterized particularly as to novelty by the maroon coloration of its newly formed leaves which coloration is long-lasting to give the entire tree a distinct maroon appearance until late spring or early summer.

4,150

CHERRY TREE

Ralph S. Moore, Visalia, Calif., assignor to L. E. Cooke Co., Visalia, Calif.

Filed Jan. 27, 1977, Ser. No. 763,107

Int. Cl.^{2} A01H *5/03*

U.S. Cl. Plt.—37 **1 Claim**

1. A new and distinct variety of fruiting cherry tree of the Bing type, essentially as described and illustrated, of vigorous, upright growth habit with large dark red fruit similar to the Black Tartarian variety but larger and generally having a sweeter more pleasing flavor; a tree which grows and fruits well in warm dry areas such as the south San Joaquin Valley in California and which bears abundant annual crops; the variety is further characterized by the keeping quality of its fruit, by abundant medium green foliage and ease of propagation by regular nursery methods.

4,151

ROSE PLANT SEEDLING

Robert G. Jelly, Richmond, Ind., assignor to E. G. Hill Co., Inc., Richmond, Ind.

Filed Feb. 3, 1977, Ser. No. 765,396

Int. Cl.^{2} A01H *5/00*

U.S. Cl. Plt.—20 **1 Claim**

1. A new and distinct red rose cultivar substantially as herein shown and described, characterized by the brilliant red color of its very large blossoms, its vigorous habit of growth, its retention of the good cropping characteristics of its pollen parent, and its improved flower form over that of its seed parent.

4,152

WHITE ROSE PLANT SEEDLING

Robert G. Jelly, Richmond, Ind., assignor to E. G. Hill Co., Inc., Richmond, Ind.

Filed Feb. 3, 1977, Ser. No. 765,397

Int. Cl.^{2} A01H *5/00*

U.S. Cl. Plt.—14 **1 Claim**

1. A new and distinct variety of rose plant substantially as herein shown and described, characterized by its abundant and continuous production of white blossoms of relative small size but excellent form, borne on long, moderately strong stems, and by its extraordinary vigor for a greenhouse rose.

PATENTS

GRANTED NOVEMBER 15, 1977

ERRATA

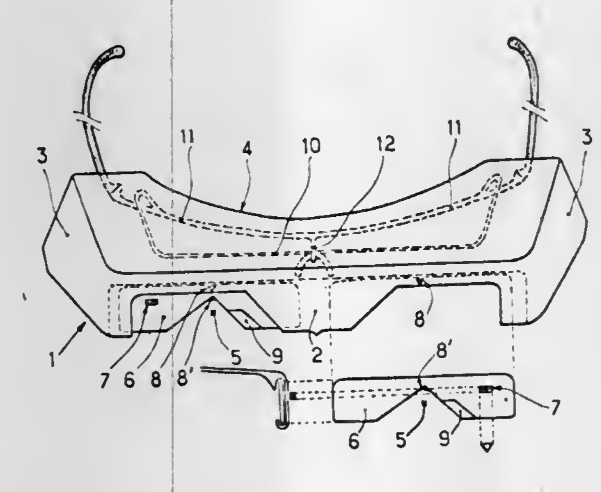
For CLASS	See PATENT NO.
407–089	4,057,884
132–112	4,057,901
187–001 R	4,058,191
242–007.22	4,058,278
366–160	4,058,296
366–081	4,058,297
366–076	4,058,298
062–006	4,058,382
062–085	4,058,383
062–457	4,058,384
250–493	4,058,486
424–180	4,058,519
544–165	4,058,523
544–136	4,058,524
544–182	4,058,525
544–182	4,058,526
560–043	4,058,550
560–043	4,058,551
560–052	4,058,552
560–180	4,058,553
560–180	4,058,554
560–191	4,058,555
560–231	4,058,556
424–330	4,058,642
358–260	4,058,674
235–449	4,058,705
235–449	4,058,706
235–448	4,058,707
364–424	4,058,709
364–433	4,058,710
364–101	4,058,711
364–564	4,058,712
364–724	4,058,713
564–754	4,058,714
364–726	4,058,715
364–824	4,058,716
364–824	4,058,717
362–238	4,058,718
362–190	4,058,719
362–082	4,058,720
363–080	4,058,758
364–900	4,058,798
365–014	4,058,799
365–003	4,058,800
365–039	4,058,801
355–014	4,058,815
354–354	4,058,823
361–038	4,058,842

PATENTS

GRANTED NOVEMBER 15, 1977

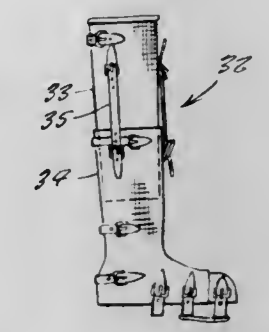
GENERAL AND MECHANICAL

4,057,852
ANTI-DAZZLE EYE SHADE
Claude Contant, 232 Boulevard de la Madeleine, Nice, France (06000)
Filed Feb. 18, 1976, Ser. No. 659,135
Claims priority, application France, Feb. 18, 1975, 75.05892
Int. Cl.² A61F *9/00*
U.S. Cl. 2—12 **8 Claims**



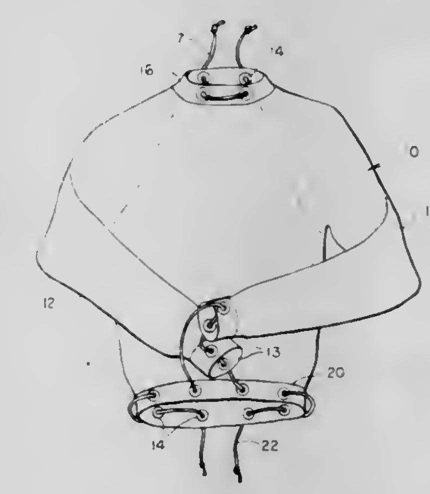
1. An anti-dazzle visor to selectively limit the wearer's unobstructed field of view for protection against natural or artificial light rays from outside said limited field of view, comprising a support and adaptation means for adapting said support to the wearer, said support comprising:
- a horizontal part with a curved side for adjustment to the wearer's head;
- an essentially vertical front part connected at the top thereof to said horizontal part at the side thereof opposite said curved side, said front part being provided at the level of the wearer's eyes with sloping cutouts, said cutouts being held at a distance in front of the eyes determined by the width of said horizontal part;
- two parts connected to said horizontal part and said front part at the sides to form blinders at the level of the temples of the wearer;
- two notched parts each having a notch widened at the bottom and each being connected to each of a respective one of said sloping cutouts and being rectilinearly slidable in a lateral direction for rectilinar lateral slidability of the notches within said cutouts without producing a gap either at the top or sides of the notched parts, each of said notched parts defining an unobstructed field of view determined by the lateral position of the notch, for a fixed head position, and the distance of the notch from the eye, the greater the distance, the more limited the field of view;
- pushbutton means connected to each of said notched parts for allowing easy lateral shifting adjustment thereof within said sloping cutouts; and
- marking means on each of said notched parts and on said front part for indicating the relative lateral position of each of said notched parts,
- wherein said support is pivotally connected to said adaptation means such that the support, and particularly said front part, may be tilted upwardly and downwardly, and
- wherein a portion of one side of each of said notched parts adjacent to and on the same side of each notch is made of tinted transparent material to absorb or reduce the intensity of light rays reaching the eye from certain angles outside the desired field of view.

4,057,853
SNAKE LEGGINGS
Larry A. McLane, Rte. 1, Box 49, Amaconda, Mont. 59711
Filed July 1, 1976, Ser. No. 701,570
Int. Cl.² A41D *13/00*
U.S. Cl. 2—22 **1 Claim**



1. A snake legging, comprising in combination, a main body of double layer, close woven, stainless steel mesh, an upper edge of said legging being crimped and embossed, and enclosed within a heavy padding, a vertical side of said legging being split, forming adjacent vertical edgings which are closeable by engaging strips of resilient hooks and loops along each vertical edge and by a plurality of straps, a forward end of a foot portion of said legging comprising a toe cap made of rigid, non-pliable material, an underside of said foot portion being left open and including a plurality of crossing straps between opposite sides of said legging, and which straps extend under a shoe or boot of a wearer, said legging including means for higher or lower protection of a leg, as needed, and comprising said main body being made of an upper and a lower section, which telescopically interfit, and which are securable in selected, extended position by means of vertically interconnecting straps.

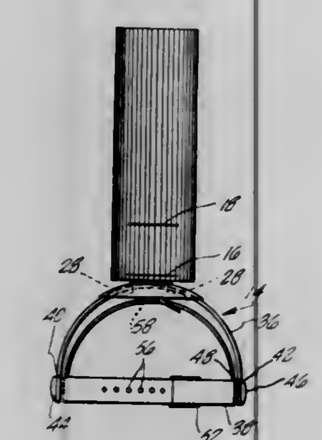
4,057,854
CONVERTIBLE GARMENT
John H. Phelps, Sr., Cathlamet, Wash., assignor to George King and Peggy King, both of Bellevue, Wash.
Filed Feb. 7, 1977, Ser. No. 766,343
Int. Cl.² A41B *1/10*
U.S. Cl. 2—128 **4 Claims**



1. A garment covertible to a pack comprising:
- a garment to be worn on the upper body and having an upper head opening, a waist having a lower opening and a pair of elongated sleeves terminating in wrist ends,
- first closure means for said head opening,
- second closure means for said waist lower opening,
- means for securing said wrist ends of said sleeves to said

waist for converting the garment into a wearable pack supported on the shoulders of the wearer with the arms passing between the sleeves and the remainder of the garment, and means for tightening said first and second closure means to provide a closed storage space within the garment when worn as a pack.

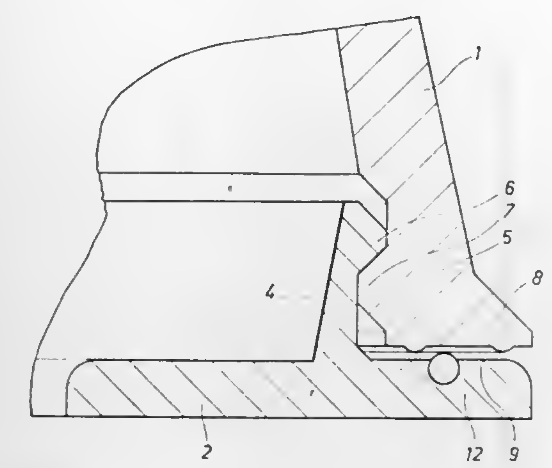
4,057,855
ADJUSTABLE SUN HAT
Karnig Hovhannessian, 5154 Romaine St., Los Angeles, Calif. 90029
Filed Nov. 13, 1975, Ser. No. 631,533
Int. Cl.² A42B *1/18*
U.S. Cl. 2—177 **6 Claims**

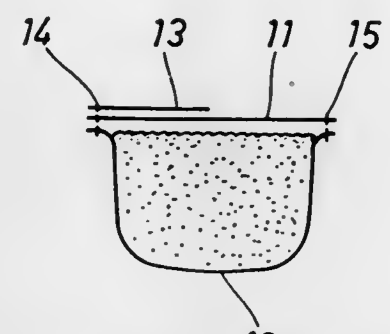


1. An adjustable sun hat comprising a headband assembly, a central support member carried by said headband assembly and slidably mounted thereon about a first axis, a body portion defining a plurality of radially extended pleats (carried by) is pivotally secured to said central support member such that said body portion can be pivoted upwardly with respect to said central support member to substantially collapse said body portion to facilitate carrying, and means for pivoting said central support member and said body portion with respect to said headband assembly about a second axis, said second axis being substantially perpendicular to said first axis whereby said body portion of said hat can be positioned in any desired angular orientation on the wearer's head to block the sun's rays.

4,057,856
FIXING ARRANGEMENT FOR THE SEALING PAD ON THE EAR HOOD OF A HEARING PROTECTION MEANS
Yrjö Aho, Westend, Finland, assignor to Exel Oy, Helsinki, Finland
Filed Feb. 12, 1976, Ser. No. 657,700
Claims priority, application Finland, Feb. 14, 1975, 750412
Int. Cl.² A41D *21/00*
U.S. Cl. 2—209 **3 Claims**

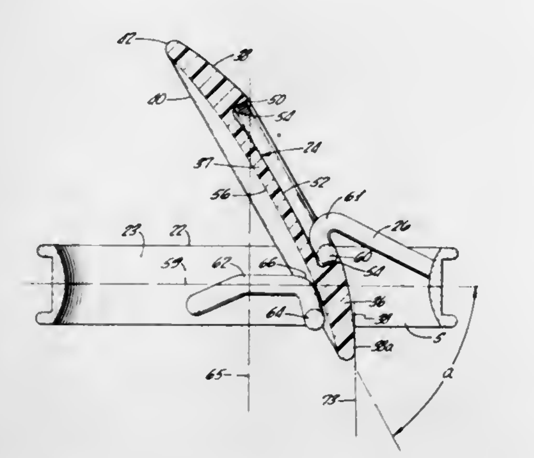
1. An arrangement for fixing a sealing pad to an ear hood of a hearing protection means, comprising an ear hood having an annular marginal surface, an annular washer plate member provided with an outer annular marginal surface for mating engagement with the annular marginal surface of the ear hood, said washer plate member and ear hood being releasably secured to each other and an annular sealing pad provided around its outer edge with an inwardly directed annular skirt portion, said skirt portion being gripped between the mating surfaces of said washer plate member and said ear hood when





assembled, and said annular sealing pad being supported on said annular washer plate member.

4,057,857
HEART VALVE WITH ARCUATE OCCLUDER
Bruce E. Fettel, Diamond Bar, Calif., assignor to Shiley Laboratories, Inc., Irvine, Calif.
Filed Sept. 8, 1975, Ser. No. 611,273
Int. Cl.² A61F *1/22*
U.S. Cl. 3—1.5 **12 Claims**

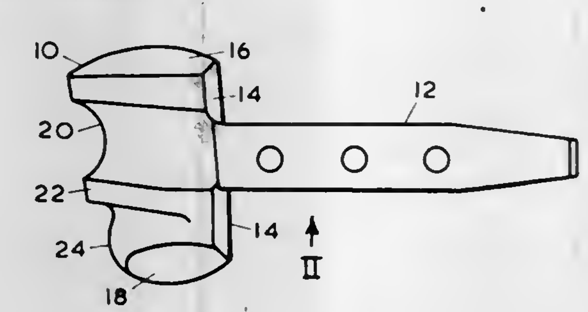


1. In a heart valve prosthesis having a valve ring, means for securing the valve ring in the place of a natural heart valve, a free floating, rotatable, discoid valve occluder and means for mounting the occluder for repetitive movement between the open and closed positions, the improvement wherein:

the valve occluder is a vane having radial symmetry about a center axis perpendicular to the general plane of the vane, and having a generally arcuate convex distal surface with a distal depression surrounding the center of the vane and having a concave proximal surface which is generally arcuate with a large arc of curvature to define a thin disc with a relatively smooth proximal surface; and

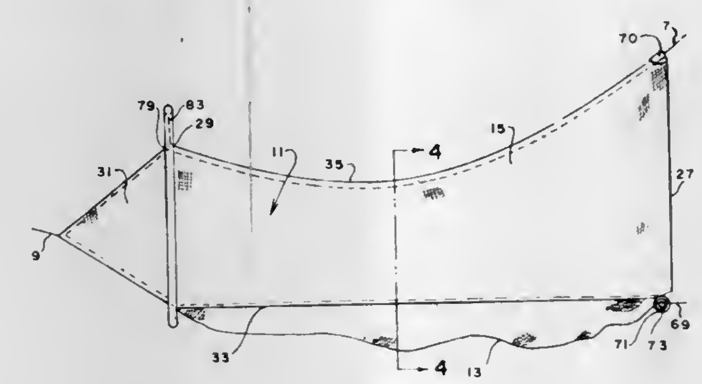
the mounting means comprising opening support structure extending on the distal side of the occluder from the valve ring to the depression in the vane, the inner portion of the opening support structure extending into the depression to engage therein to control the opening movement of the occluder and to provide a knuckle-like joint between the opening support structure and the occluder during opening; and a closing support structure extending from the ring into the arcuate concavity of the proximal surface to provide a rocker-like contact support surface for the occluder during closure, the contact between the support surface and the occluder moving toward the center during closure said mounting means permitting free rotation of said occluder about its center as the occluder opens and closes.

4,057,858
ELBOW PROSTHESIS
Arthur Jacob Helfet, 1917 Trust Bank Centre, Heerengracht, Cape Town, South Africa
Filed Feb. 13, 1976, Ser. No. 657,939
Claims priority, application United Kingdom, Feb. 17, 1975, 6677/75
Int. Cl.² A61F *1/24*
U.S. Cl. 3—1.91 **8 Claims**



1. A hingeless elbow prosthesis including humeral and ulnar implants, in which the head of the humeral implant has a convex medial condylar formation presenting a smooth curved trochlar groove in the shape of part of a helix and providing a bearing surface for a head of the ulnar implant, and in which the ulnar implant presents a condylar head contoured to fit into the trochlear groove, so that as the ulnar implant pivots around the humeral implant, with the condylar head mating with the trochlear groove, the ulnar implant moves along the pivotal axis and the ulna performs the required valgus in extension and varus in flexion.

4,057,859
SUSPENDIBLE SLEEPING SURFACE AND TENT
Jeffrey M. Setterholm, 7392 Dale Ave., Apt. 3, Richmond Heights, Mo. 63117
Filed Nov. 11, 1975, Ser. No. 630,800
Int. Cl.² A45F *1/60*
U.S. Cl. 5—121 **6 Claims**



1. A suspendible combination tent and sleeping surface structure for enclosing and supporting an occupant, said structure comprising:

body means for enclosing said occupant, said body means having a generally horizontal longitudinal axis and being formed of a flexible material, a lower web of said body means forming a sleeping surface for said occupant;

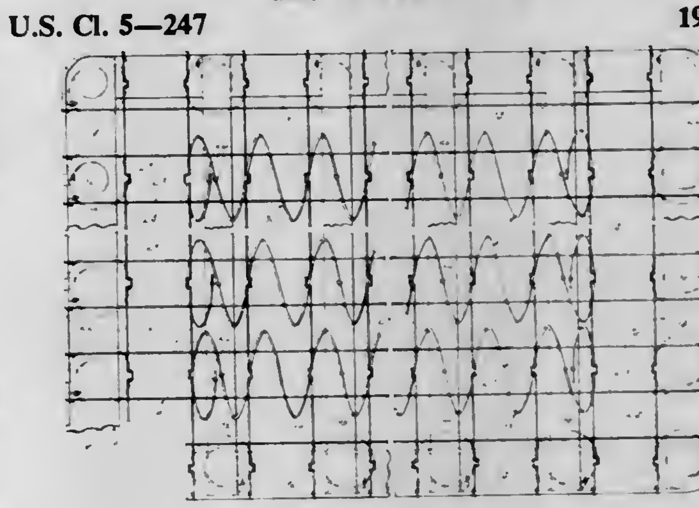
transverse compression element means, at the longitudinal ends of said body means, for spreading the lower surface of said body means in a direction transverse of said longitudinal axis; and

suspension means for suspending said body means between fixed tie points and for applying a longitudinal tension to said body part,

said structure being characterized in that when the structure is unoccupied the longitudinal edges of said lower web portion are inwardly bowed as viewed in top plan, the lower web portion is upwardly bowed as viewed in side elevation, and the upper edge of said body part is downwardly bowed as viewed in side elevation,

said structure being further characterized in that when said structure is occupied tension in the lower web is primarily tranverse and is substantially more than half the local occupant weight, so that transverse horizontal spreading of said lower web portion is accomplished primarily by tension in the structure, and in that vertical force components supporting local occupant weight are transferred from the edges of the sleeping surface to a portion of the body means above the occupant.

4,057,860
BOX SPRING ASSEMBLY
Larry Higgins, Carthage; John Thomas King, Sarcoxie; Blondie Butler, Carthage, all of Mo., and Francis R. Struewing, deceased, late of Carthage, Mo. (by Barbara C. Struewing, administratrix), assignors to Leggett & Platt, Incorporated, Carthage, Mo.
Filed Oct. 10, 1975, Ser. No. 621,496
Int. Cl.² A47C *23/02*
U.S. Cl. 5—247 **19 Claims**



1. A box spring assembly for use in supporting a bed mattress, said assembly comprising

a rectangular base frame located in the bottom plane of said box spring assembly,

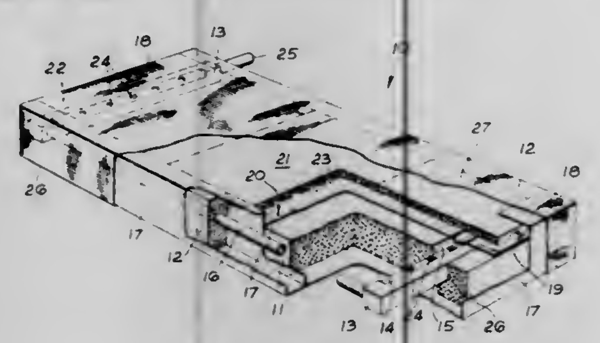
a plurality of slats extending between two opposite sides of said base frame,

a rectangular border wire generally overlying said base frame, said border wire being located in a plane spaced from but parallel to the plane of said base frame,

a grid of wires located in the plane of said border wire and defining the top plane of said box spring assembly, said grid comprising a plurality of longitudinal and transverse wires secured at their opposite ends to said border wire, and

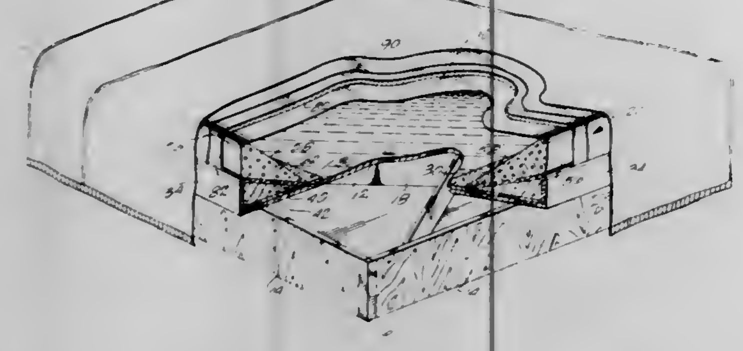
a plurality of parallel spiral spring wires extending generally perpendicular to said slats, and spiral spring wires being secured at the bottom to said slats and at the top to said grid of wires.

4,057,861
MATTRESS
Frederick Hugh Howorth, Chorley, England, assignor to Howorth Air Engineering Limited, Bolton, England
Filed June 17, 1976, Ser. No. 696,944
Claims priority, application United Kingdom, June 28, 1975, 27431/75
Int. Cl.² A47C *23/00, 25/00, 27/00*
U.S. Cl. 5—365 **1 Claim**



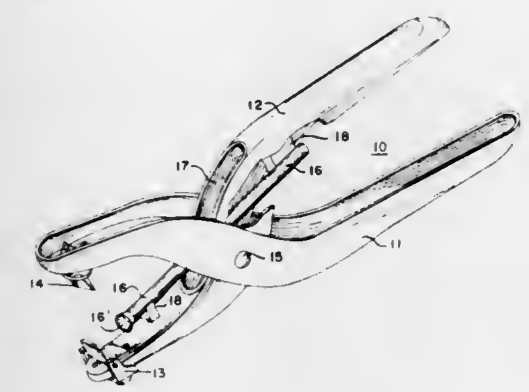
1. A mattress comprising: a base member dimensioned and constructed to be capable of providing support for a patient;
an air-impermeable waterproof covering over the upper surface of the base member to prevent ingress of body fluids to the interior of the base member;
A removable diffuser of air-permeable open-celled foam material overlaying and supported by the upper surface of the base member;
air distribution passages between the upper surface of the diffuser and the waterproof covering arranged to enable conditioned air to be supplied to a substantial part of the diffuser for issuing from the surface of the diffuser, the air distribution passages being constituted by channels formed in at least one of the underside of the diffuser and the upper surface of the base; and
air supply means for conducting conditioned air from a source to the channels to be distributed by the passages and issue from the upper surface of the overlay to impinge upon and pass around a patient lying on the mattress.

4,057,862
WATER BED
Richard A. LaBianco, 2071 La France, South Pasadena, Calif. 91030
Filed May 24, 1976, Ser. No. 688,961
Int. Cl.² A47C *27/08*
U.S. Cl. 5—370 **52 Claims**



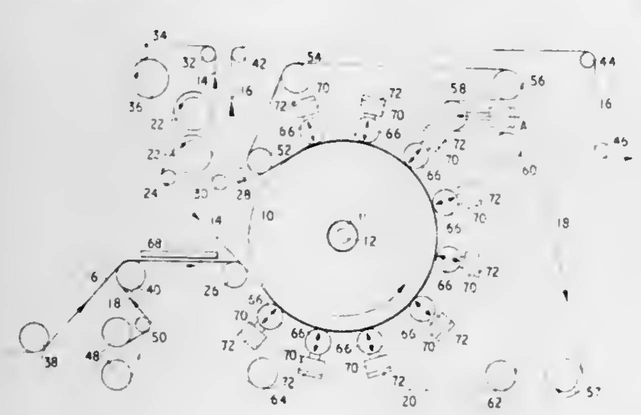
1. A framework for confining a water-filled bladder of a water bed, the framework comprising an elevated means of lateral support for extending around the periphery of the water-filled bladder to provide lateral support for the periphery of the bladder, the lateral support means having a fixed lower support member and an upper support member resting on a surface of the lower support member, and means hinging an inner portion of the upper support member to enable the upper support member to pivot away from said surface of the lower support member to increase the size of an elongated space located between the upper and lower support members to provide means for receiving bedclothes overlying the water-filled bladder.

4,057,863
PLIER ASSEMBLY
Homer G. Bewley, 1731 Mountain View Drive, Boise, Idaho 83704
Filed Sept. 12, 1975, Ser. No. 609,477
Int. Cl.² B25F *1/00*
U.S. Cl. 7—5.4 **4 Claims**



1. A plier, comprising:
a first S-shaped jaw handle and a second S-shaped jaw handle pivotally mounted to each other, the superimposed corresponding sections of said jaw handles forming suitably configured handles and jaw extremities;
a blade including a knife disposed transversely to and being dependently carried on the interior side of the jaw extremity of said first jaw handle; and
an anvil jaw subassembly including a mounting flange providing means for mounting the anvil jaw to the jaw extremity of the jaw handle opposing said jaw handle carrying said blade, and said anvil jaw being defined by an L-shaped working flange provided by an upstanding flange which is pivotally mounted to said mounting flange transversely with respect to said plier.

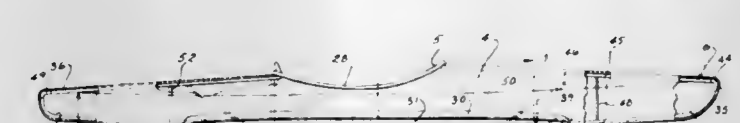
4,057,864
WET TRANSFER PRINTING PROCESS AND APPARATUS
Kenneth Wild, Middleton, England, assignor to Tootal Limited, Manchester, England
Filed June 27, 1975, Ser. No. 591,152
Claims priority, application United Kingdom, July 9, 1974, 30276/74; Apr. 28, 1975, 17523/75
Int. Cl.² D06P *7/00*
U.S. Cl. 8—2.5 R **4 Claims**



1. A process for wet transfer printing comprising impregnating a fabric web with an aqueous solution by passing the web through an impregnation mangle, passing the wet impregnated fabric web together with a transfer web, with one web on top of the other, between the periphery of a heated cylinder and a moving, endless, water impervious belt which is guided around a major portion of the periphery of the cylinder and tensioned so as to subject the webs to a first pressure and, during passage of the webs around the cylinder, successively passing the webs beneath a plurality of pressure applicator means mounted radially outwardly of the cylinder at circumferentially spaced locations around the cylinder whereby to periodically subject the webs to additional pressures when the webs pass between said circumferentially spaced pressure applicator means and said cylinder, the individual magnitudes of said additional pressures applied by the pressure applicator means to the webs being of progressively increasing level, considered in the direction of passage of the webs around the cylinder, and the combined effect of the first and additional pressures being sufficient to flatten the fabric web whereby the transfer and fabric webs are placed in intimate contact and also being sufficient to form a substantially continuous aqueous film between the two webs.

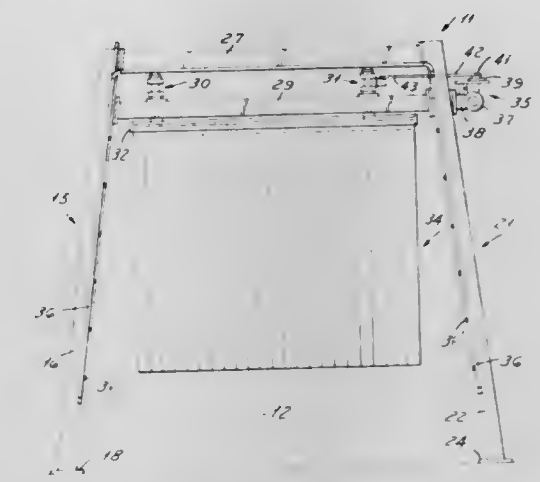
2. A wet transfer printing machine comprising impregnation mangle means for impregnating a fabric web with an aqueous solution, a rotatable cylinder, means for heating the cylinder to a predetermined temperature, an endless belt of water impervious material which is guided around a major portion of the periphery of the cylinder, means for tensioning said endless belt, guide means for guiding a transfer web and said wet, impregnated fabric web around the cylinder beneath said belt, with one web on top of the other, whereby the belt tension subjects the transfer/fabric web combination to a first pressure, and a plurality of pressure applicator means mounted radially outwardly of the cylinder at circumferentially spaced locations around the cylinder, each pressure applicator means including a pressure applicator member and actuator means for displacing said pressure applicator member towards the cylinder, said pressure applicator means being actuated to subject the transfer/fabric web combination to additional pressures when the web combination passes between said circumferentially spaced pressure applicator means and said cylinder, the actuator means being adjusted such that the individual magnitudes of said additional pressures applied by said pressure applicator means to said transfer/fabric web combination are of progressively increasing level, considered in the direction of passage of said web combination around the cylinder the combined effect of the first and additional pressures being sufficient to flatten the fabric web whereby the transfer and fabric webs are placed in intimate contact and also being sufficient to form a substantially continuous aqueous film between the two webs.

4,057,865
FOLDABLE KAYAK
Robert Trautwein, 2048 N. 32nd St., Milwaukee, Wis. 53208
Filed June 30, 1976, Ser. No. 701,112
Int. Cl.² B63B *7/06*
U.S. Cl. 9—2 F **9 Claims**



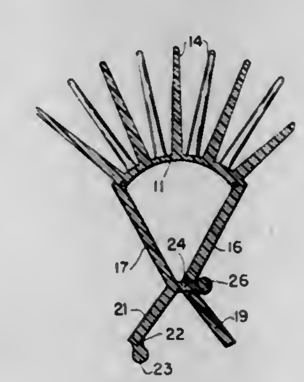
1. A foldable kayak comprising forward bow and rearward stern rigid bottom sections with hinge means joining the same together on a generally central transverse vertical parting plane and extending substantially short of the ends of the kayak, a flexible water tight skin forming the bow and stern of the kayak and extending above said bottom sections with a central opening in the top thereof for access of an operator, inflatable means integral with said skin and mounting the same around the periphery of said bottom section, and separable bow and stern removable frame means carried by said bottom sections, and extending therefrom longitudinally within end portions of said skin to support and shape the bow and stern portions of said skin.

4,057,866
APPARATUS FOR WASHING AND DRYING MOTOR VEHICLES
James A. Belanger, Northville, Mich., assignor to Belanger, Inc., Northville, Mich.
Filed Oct. 1, 1976, Ser. No. 728,824
Int. Cl.² B60S *3/04*
U.S. Cl. 15—97 B **14 Claims**



1. Apparatus for automatically washing, drying, buffing, polishing, or otherwise finishing a motor vehicle which is transported therethrough comprising:
a frame;
a first generally horizontal support carried by said frame;
rack means for carrying a plurallity of pack units of finishing material for operatively engaging said motor vehicle;
said rack means including a first generally rectangular rack having its longitudinal dimension parallel to said horizontal support, said first rack being adapted to carry a plurality of said pack units; and a second generally rectangular rack having its longitudinal dimension parallel to said horizontal support, said second rack being adapted to carry a plurality of said pack units; said first and second racks being disposed on opposite sides of said horizontal support such that both of said racks will serially engage said motor vehicle as it is transported through said frame;
arm means supportively carrying said rack means, said arm means including a first portion pivotally connected to said support and a second portion coupled to said rack means; and
drive means carried by said frame operatively coupled to said arm means for at least partially rotating said arm means in an arc about said first pivotally connected portion to rockably move said rack means in a generally horizontal plane to facilitate the washing, drying, buffing, polishing or otherwise finishing of said motor vehicle.

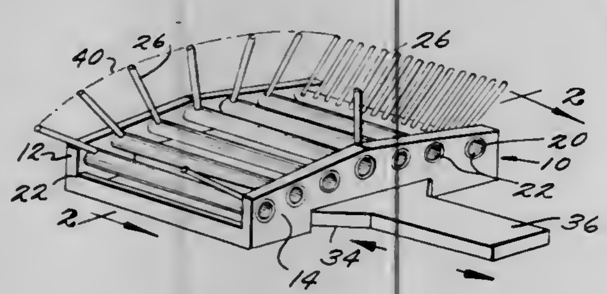
4,057,867
POCKET HAIR BRUSH
Gene Ballin, Locust Valley, N.Y., assignor to Product Resources International, Inc., New York, N.Y.
Filed May 21, 1976, Ser. No. 688,806
Int. Cl.² A46B *7/02*
U.S. Cl. 15 -185 **9 Claims**



1. A brush and cover device integrally formed of a poly-

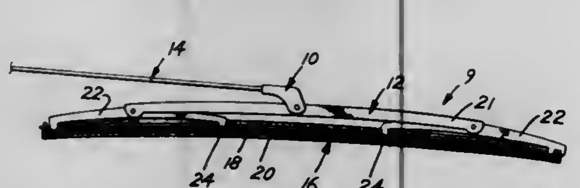
meric resin comprising a flexible intermediate rectangular panel having bristles projecting upwardly from the top face thereof, a pair of side panels integral with and extending along the sides of said intermediate panel and joined thereto by self hinges of reduced thickness and swingable between a closed position upwardly along the sides of said bristles and a downwardly converging open position, wing panels extending along the outer side edges of said side panels and forming dihedral angles therewith, said wing panels overlying said bristles when said side panels are in closed position and diverging downwardly and outwardly when said side panels are in their open position and locking means integrally formed with said side panels for releasably locking said side panels in their respective open and closed positions.

4,057,868
COLLAPSIBLE BRUSH
Roger D. Latham, 5213 W. 12th St., Sioux Falls, S. Dak. 57106
Filed Jan. 6, 1977, Ser. No. 757,242
Int. Cl.² A46B *9/10*
U.S. Cl. 15—203 **14 Claims**



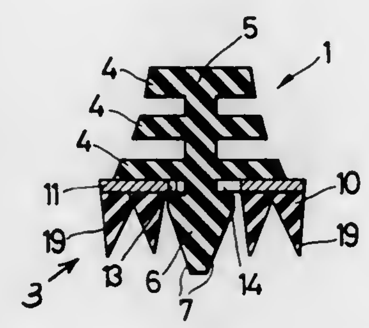
1. A collapsible brush comprising:
a frame;
a plurality of cylindrical rods supported by said frame in a manner such that their longitudinal axes are parallel to one another;
a row of bristles supported by each of said rods;
a groove in each of said rods extending generally longitudinally thereof and including a curved segment;
a handle mounted for movement with respect to said frame, said handle including a plurality of projections extending within respective ones of the grooves whereby when said handle is moved so that the projections engage the curved groove segments, the rods are rotated about their longitudinal axes to move the rows of bristles between collapsed and raised positions.

4,057,869
WINDSHIELD WIPER UNIVERSAL CONNECTOR FOR BAYONET AND HOOK ARMS
Rodney A. Longman, Deerfield Beach, and Thomas J. Chiaramonte, Boca Raton, both of Fla., assignors to Pylon Corporation, Fort Lauderdale, Fla.
Filed Jan. 13, 1977, Ser. No. 759,084
Int. Cl.² B60S *1/40*
U.S. Cl. 15—250.32 **8 Claims**



1. A universal connector for selectively coupling a windshield wiper blade holder with the end of a windshield wiper arm of either the bayonet mounting type or the hook mounting type comprising a unitary molded body having a pair of spaced apart side members for straddling a central portion to receive the bayonet arm end, first complementary means for detachably securing the bayonet arm end to the body, said body including a smoothly contoured exterior surface, adapted to receive a hook type arm, and second complementary means for detachably securing the hook type arm to the body.

4,057,870
WINDSHIELD WIPER BLADE
Wolfgang Priesemuth, Postkamp 13, D-2210 Itzehoe-Nordoe, Germany
Filed Oct. 3, 1975, Ser. No. 619,394
Claims priority, application Germany, Oct. 8, 1974, 2447923
Int. Cl.² B60S *1/04*
U.S. Cl. 15—250.41 **9 Claims**

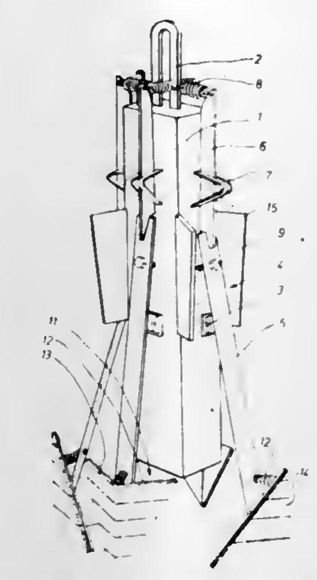


1. A windshield wiper assembly comprising resilient mounting means, a wiper blade of resilient material having a base portion secured to said resilient mounting means, a central longitudinal web integral with said base portion and a longitudinal wiping portion integral with said longitudinal web and engageable with the surface of a windshield, said wiping portion being wider than said web and spaced from the base, auxiliary wiper means mounted on said wiper blade comprising a supporting wiper structure extending the length of said wiper blade on each side of said wiping portion to form a frame having longitudinal elements spaced by less than the width of said wiping portion, with each of said elements fixed to and supported by said web on each side between said base portion and said wiping portion, and an auxiliary wiper body of resilient material secured on said element on each side, said auxiliary wiper body being of less height from said element than said wiping portion and formed with an edge for engagement with the surface of the windshield, said central longitudinal web flexing under engagement of said wiping portion with the surface of the windshield to cause engagement of one of said auxiliary wiper bodies on one side of said wiping portion with said surface, and connecting elements extending between said base portion of said wiper blade and underlying said wiper structure elements on opposite sides of said wiping portion to retain said supporting wiper structures on said wiper blade while allowing flexing of said central web with said wiping portion and said supporting structures.

4,057,871
CLEANING DEVICE FOR CAVITIES PREFERABLY IN CHILL MOULDS FOR STEEL INGOTS
Walter Emil Erich Heydorn, Hallefors, Sweden, assignor to Ingenjorsfirman R. Ohrnell AB, Karlstad, Sweden
Filed Nov. 3, 1976, Ser. No. 738,399
Claims priority, application Sweden, Nov. 3, 1975, 7512258
Int. Cl.² B67C *1/08;* **A46B** *7/02*
U.S. Cl. 15—56 **3 Claims**

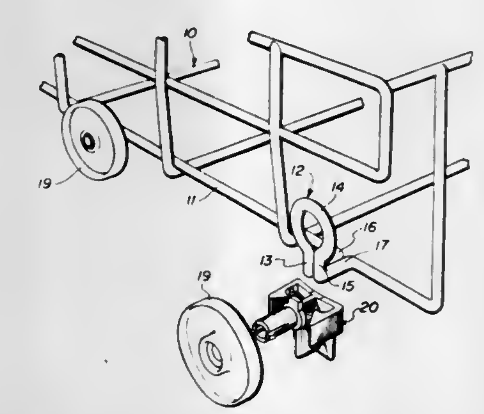
1. A cleaning device for cavities, preferably in chill molds for steel ingots, comprising an elongated support body, a plurality of lever means each having an upper end and a lower end, means on said body for pivotally mounting said lever means intermediate said ends about an axis perpendicular to the axis of said body, an elongated cleaning means pivotally mounted on the lower end of each of said lever means for pivotal movement about an axis parallel to the axis of said mounting means, each of said cleaning means having a cleaning surface facing away from said body, the said mounting means

permitting the lower ends of said lever means and said cleaning means mounted thereon to expand outwardly, first spring means connected to said lever means to normally pivot said lower ends of said lever means outwardly from said body, second spring means connected between said cleaning means



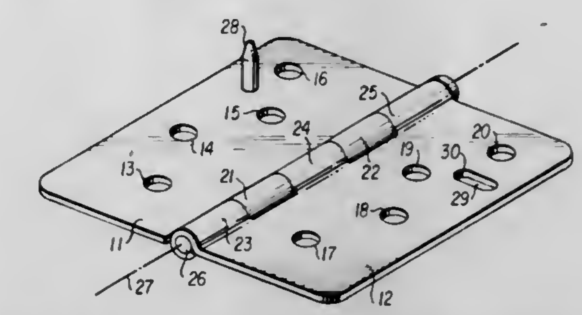
and said lever means to pivot said cleaning means so that the lower ends of said cleaning means extend inwardly toward said body forming an oblique angle with the axis of said body when said cleaning means are out of contact with the interior surface of a mold.

4,057,872
ROLLER MOUNT
Bradley J. Schmidt, East Dundee, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.
Filed Feb. 17, 1976, Ser. No. 658,642
Int. Cl.² B60B *33/00*
U.S. Cl. 16—29 **16 Claims**



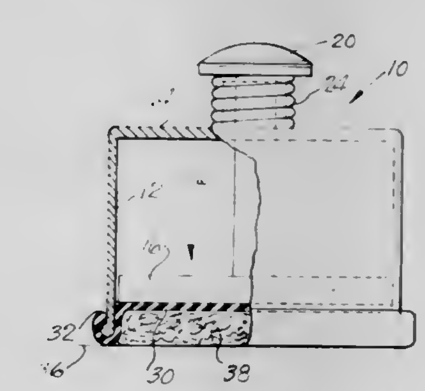
1. A mount adapted for complimentarily journalling a hubbed roller or a wire basket or the like having a wire eyelet including a first leg, a substantially closed loop extending from the leg and a second leg extending from the loop substantially parallel to and adjacent the first leg, the mount comprising an axle having a free-ended shaft adapted to rotatably carry the roller and a free-ended extension for location within the eyelet loop, a plurality of arms extending from the axle extension free end for embracing the eyelet wire at a corresponding plurality of locations, and means on the axle extension for radially locating the axle in and on the eyelet, said means for radially locating said axle include shoulder means radially extending from the axle extension for engagement with the loop, collar means axially separating said shaft and said extension and located to engage a portion of the loop for spacing the collar from the eyelet, and a collar flange extending from said collar in a first direction to bear against the loop and against the collar so as to cooperate in preventing mount tipping.

4,057,873
DOOR HINGE COUPLING DEVICE
Rudolph Bursani, 3735 69th Way North, St. Petersburg, Fla. 33710
Filed Mar. 25, 1976, Ser. No. 670,406
Int. Cl.² E05D *11/00*
U.S. Cl. 16—137 **2 Claims**



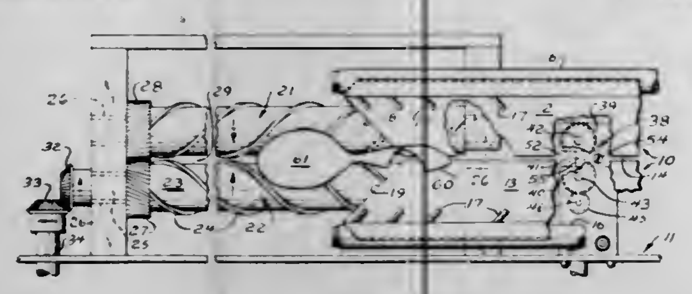
1. In a hinge of the type having two hinge plates pivotally connected about a pintle axis to each other by a pin, the improvement which comprises,
an elongated slot of uniform width having opposite ends with a longitudinal axis formed in one of said hinge plates, said axis being perpendicular to said pintle axis, and
a projection bent outwardly from said other hinge plate along a line perpendicular to said pintle axis to extend normally therefrom penetrating said slot to bear firmly against both ends of said slot whenever said hinge is closed, whereby said projection has two oppositely disposed contacting surfaces, one contacting surface being no greater than a right angle and the angle of the second contacting surface being an acute angle relative to said other hinge plate, both said contacting surfaces bearing against opposite ends of said slot when said hinge is closed.

4,057,874
FOOD PATTIE MOLDING TOOL
Fred T. Walker, Jr., Box 146, Babcock, Wis. 54413
Filed Mar. 26, 1976, Ser. No. 670,677
Int. Cl.² A22C *7/00*
U.S. Cl. 17—32 **6 Claims**



1. A household, manually operable food pattie molding tool comprising, a cylinder having an open bottom, a piston slidably disposed for reciprocating movements within the cylinder and having a pushrod projecting upwardly out of the cylinder, means for guiding reciprocating movements of the pushrod, a manually operated handle fastened to the top of said pushrod, resilient means biasing the piston upwardly, and resilient diaphragm means covering the open bottom and secured to said cylinder but not to said piston or pushrod for deformably yielding upwardly into engagement with the interior surface of the cylinder and the under surface of the piston when the diaphragm, tool and piston are pressed downwardly on a quantity of plastic food to mold the same and for returning downwardly to it original shape to serve as the sole means for automatically ejecting the molded pattie when the tool is lifted.

4,057,875
FEED APPARATUS FOR POULTRY GIZZARD PROCESSING MACHINE
Carl J. Hill, Rte. 3, Box 229, Ball Ground, Ga. 30107
Filed Nov. 3, 1976, Ser. No. 738,437
Int. Cl.² A22C *17/14*
U.S. Cl. 17—43 **9 Claims**

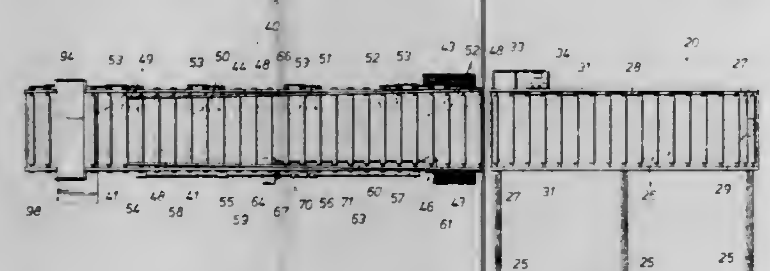


1. In an apparatus for processing poultry gizzards comprising in combination a power drive, a longitudinal feed trough having an upstream end and a downstream end and along which said gizzards are moved longitudinally thereof in an established direction toward the downstream end, said trough having a longitudinal opening of a width sufficient to permit the gut and gullet of the gizzard to pass therethrough while sufficiently narrow to prevent the gizzard and the stomach attached thereto from descending therethrough so that they will remain on the trough, and a device below the trough opening and between said ends for removing the gullet and the gut from the stomach and gizzard, the improvement wherein said device comprises:

a pair of gears rotatable about substantial vertical axes and having top sides and bottom sides, said gears interengaging each other and defining a nip therebetween, said nip being positioned below said opening, one of said gears being connected to said power drive to rotate the gears in a direction such that at the nip the gears are moving in said established direction, whereby the gut and gullet will be engaged by the gears at said nip and pulled thereby in said established direction; and

knife means immediately adjacent one of said sides at about said nip and having a cutting edge facing in the reverse of said established direction for severing the gut and gullet as they are so engaged and pulled.

4,057,876
METHOD AND APPARATUS FOR CONVEYING AND BREAKING APART FIBER MODULES
Joe F. Sawyer, 3602 Gila Trail, Temple, Tex. 76501
Filed Oct. 10, 1975, Ser. No. 621,385
Int. Cl.² D01G *7/10*
U.S. Cl. 19—80 R **10 Claims**



1. An apparatus for conveying and breaking apart fiber modules comprising in combination:

means for supporting at least one fiber module in a generally horizontal position, said support means having a fiber module receiving zone at one end thereof, and a fiber module delivery zone, spaced from said receiving zone;

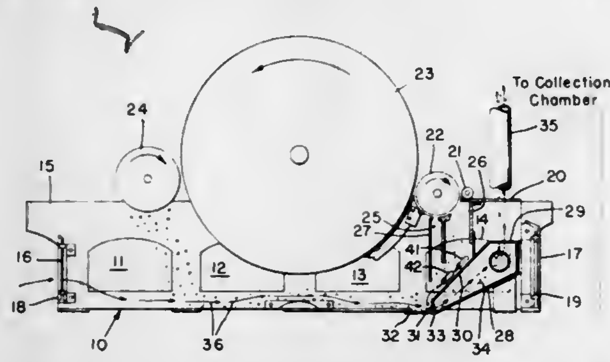
means for breaking apart a fiber module, said breaker means located adjacent the fiber module delivery zone of said support means; first drive means for conveying a fiber module along said support means from said receiving zone to said breaker means, wherein the first drive means includes a plurality of sets of power driven rollers, one of said sets being generally located at said fiber module delivery zone and at least one of said sets being generally located intermediate said fiber module delivery zone and said fiber module receiving zone, each of said sets having associated therewith at least one gear box for rotating said sets of power driven rollers; one set of said power driven roller sets, generally located at the fiber module receiving zone, having associated therewith two gear boxes of different gear ratios capable of operating said one set of power driven rollers at a first speed being equal to the speed at which said set generally located at said delivery zone operates, and at a second speed which is substantially greater than said first speed; and clutch means, associated with said set generally located at said receiving zone and with said set generally located intermediate said receiving zone and said delivery zone, for enabling said set generally located at said receiving zone to convey a fiber module along said support means at said second speed until the fiber module abuts a fiber module, which has previously been conveyed along said support means, at a location beyond said set generally located intermediate said receiving zone and said delivery zone;

means for removing the broken apart fiber module from said breaker means;

a shuttle carriage for transferring a fiber module from a first location laterally displaced from the support means to a second location which is axially aligned with the receiving zone of said support means, said shuttle carriage including a frame and a generally horizontal fiber module receiving surface; and

second drive means for conveying a fiber module from said shuttle carriage to the receiving zone of said support means, said second drive means including a plurality of rotatably mounted power driven rollers comprising said generally horizontal fiber module receiving surface, said rollers being operable to convey a fiber module from said shuttle carriage to the fiber module receiving zone of said support means.

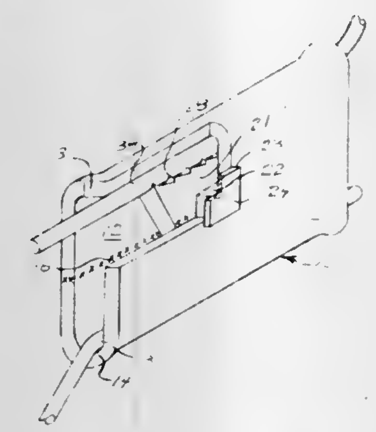
4,057,877
WASTE CLEANING IMPROVEMENT FOR CARDING MACHINES
Josef K. Gunter, Durham, N.C., assignor to Gunter & Cooke, Inc., Durham, N.C.
Filed June 4, 1976, Ser. No. 692,649
Int. Cl.² D01G *15/82*
U.S. Cl. 19—107 **1 Claim**



1. In a carding machine having in series a feed roll, a lickerin roll, a main cylinder, and a doffer roll mounted for rotation on a supporting card frame having closed sides and having a doffer waste collection area having an end wall and said wall in said doffer waste collection area having an opening therein to admit the flow of air longitudinally through said card frame, and a lickerin waste collecting chamber beneath the lickerin and feed rolls, a plenum chamber having a downwardly sloping waste-collecting chute in said lickerin waste-collecting chamber, said chute terminating in a waste-collecting plenum intake nozzle, and a suction exhaust means communicating with said plenum chamber to induce a flow of air longitudinally along the interior of the carding machine frame from the doffer waste and lickerin waste chambers to exhaust said waste

to a remote location, side doors mounted on said supporting frame immediately adjacent to said lickerin waste chamber, the improvement comprising at least one elongated sloping opening on each of said side doors at opposite sides of said frame and in juxtaposition and inclined relative to the sloping waste-collecting chute to admit a flow of air therethrough in a cross current flow to the longitudinal flow of air induced to flow through said frame and over said chute to said nozzle thereby sweeping substantially transversely across said sloping chute directly adjacent to said elongated sloping opening to remove downwardly waste normally collected on said chute adjacent to said side doors to said nozzle with other waste collected on said chute.

4,057,878
WIRE CONNECTOR
Sidney P. Kaye, Delta, Canada, assignor to Tree Island Steel Co. Ltd., New Westminster, Canada
Filed Sept. 13, 1976, Ser. No. 722,804
Claims priority, application United Kingdom, Sept. 17, 1975, 38213/75
Int. Cl.² F16G *11/04;* **B25G** *3/20*
U.S. Cl. 24—134 R **4 Claims**



1. A wire connector for connecting a pair of wires comprising:

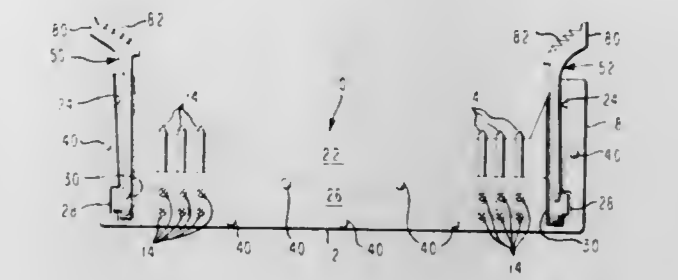
a. an elongated sleeve open at each end for slidably receiving wires to be connected, said sleeve having substantially parallel opposite edge walls for seating the wires to be connected,

b. an elastic pin disposed transversely within the sleeve intermediately between said side edges and being non-rotatably secured at least at one end to the sleeve,

c. a double-ended jamming cam non-rotatably mounted on the pin yieldably maintained by the pin in frictional engagement with the wires so as to, automatically, rotate into jamming engagement with the wires when tension is applied to the wires to withdraw them from the sleeve.

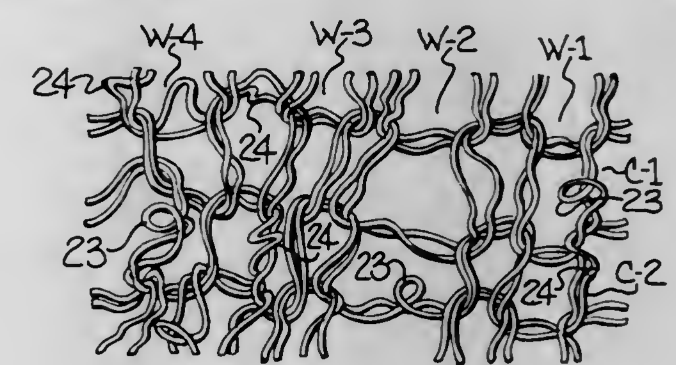
4,057,879
HEADERS WITH INSERTABLE LATCH MEMBERS
George Thomas Eigenbrode, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.
Division of Ser. No. 557,578, March 12, 1975, Pat. No. 3,993,390. This application June 23, 1976, Ser. No. 698,799
Int. Cl.² A44B *19/00;* **E05C** *19/06*
U.S. Cl. 24—230 R **2 Claims**

1. An insertable latch for holding a block in a circuit board header, said latch being molded and comprising a base having a top and sides, a ribbed rectangular member extending from one side of said base, an elongated tapered latch arm extending from its top, and a latch release member disposed at an oblique angle to said arm at its free end, said latch arm having a side surface joining the opposite side of said base at an included angle slightly less than 180°, said latch release member projecting beyond said side surface of the arm and thereby presenting



a latch surface, said latch surface being disposed substantially perpendicularly to said side surface.

4,057,880
METHOD OF PRODUCING SNAG RESISTANT HOSIERY ARTICLE
Robert M. Matthews, Pittsboro, and William J. Lawson, Siler City, both of N.C., assignors to Kellwood Company, St. Louis, Mo.
Filed Sept. 23, 1976, Ser. No. 725,998
Int. Cl.² D04B *1/26;* **D02G** *1/00*
U.S. Cl. 28—154 **2 Claims**



1. A method of producing a stretchable hosiery article blank for use in forming panty hose characterized by increased snag resistance in at least certain portions thereof, said method comprising

mechanically crimping a self-crimping bicomponent thermoplastic yarn, having the latent characteristic of becoming crimped when heated, by arranging the bicomponent yarn in a sinuous configuration including a series of stitch-like bends and heat setting the bicomponent yarn in said sinuous configuration,

knitting the mechanically crimped bicomponent yarn while forming a normal size greige hosiery blank of substantially one-half the size of a corresponding greige hosiery blank knit of a self-crimping bicomponent yarn which has not been machanically crimped so that the normal size hosiery blank may be processed in the usual manner prior to development of the latent crimp,

carrying out the normal procedures in producing a panty hose, such as toe closing, slitting, seaming and the like,

forming additional crimp in the knitted mechanically crimped bicomponent yarn by developing the latent crimp characteristic thereof through the further application of heat to the panty hose whereby at least certain portions of the panty hose are formed of yarn having two distinct types of crimp, one type being imparted to the yarn prior to being knit in the hosiery blank and forming substantially U-shaped crimps in certain stitch loops, and the other type of crimp being imparted thereto after the yarn is knit in the hosiery blank and forming complete coils in certain stitch loops, said two types of crimp imparting substantially increased snag resistance to the portions of the panty hose formed of said bicomponent yarn.

4,057,881

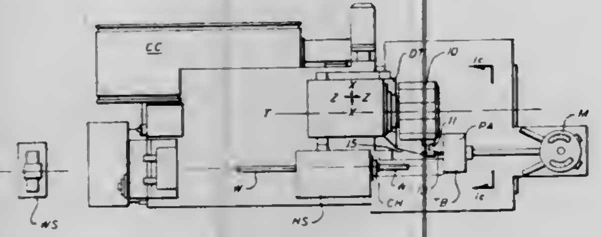
MACHINE TOOL APPARATUS

Richard G. Stephens, 3414 Hickory Lane, Binghamton, N.Y. 13903

Filed Feb. 11, 1976, Ser. No. 657,078

Int. Cl.² B23B *3/18, 39/20*

U.S. Cl. 29—27 C **34 Claims**



1. In a turret lathe having a machine base, headstock means fixedly mounted on said base and operable to continuously rotate a workpiece about a first axis, a turret rotatably indexable about a second axis to a plurality of discrete index positions to selectively present successive tools carried on said turret to said workpiece, means for indexing said turret about said second axis, and means for translating said turret relative to said base in a first coordinate direction parallel to said first axis whereby one or more of said tools carried on said turret may perform turning operations on said workpiece as said workpiece is rotated by said headstock means, the combination of: a first power-coupling device carried on said turret and connected to power a first tool carried on said turret, a power-coupling assembly having a base portion spaced a predetermined distance from said turret and mounted to be translated simultaneously and equally with said turret, said turret being rotatable about said second axis relative to said power-coupling assembly, said power-coupling assembly including a second power-coupling device movably mounted relative to said base portion and actuator means affixed to said base portion, said actuator means being operable to extend and retract said second power-coupling device from and toward said base portion of said assembly to engage and disengage said second power-coupling device with and from said first power-coupling device, a power source mounted on said base at a fixed distance from said headstock means, and power-connection means extensible in said first coordinate direction for transmitting power from said power source to said second power-coupling device.

4,057,882

APPARATUS FOR COMPRESSING SLEEVES ONTO STRUCTURAL RODS

Geoffrey Malcolm Bowmer, Sandton, Transvaal, South Africa, assignor to Zeitgeist AG., Zug, Switzerland

Continuation-in-part of Ser. No. 487,029, July 10, 1974, abandoned. This application Apr. 12, 1976, Ser. No. 676,349

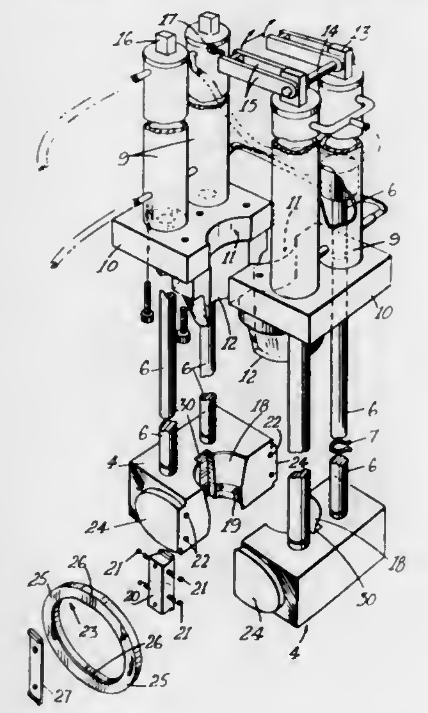
Claims priority, application South Africa, Aug. 6, 1973, 73/5327; Mar. 25, 1974, 74/1914

Int. Cl.² B23P *11/00*

U.S. Cl. 29—283.5 **7 Claims**

1. Apparatus for fastening to adjacent substantially co-axially disposed reinforcng rod ends a sleeve of uniform external cross-section throughout its length and having internal cross-sectional dimensions to enable it to receive and embrace both rod ends, comprising at least two fluid pressure operated jack units each having a cylinder, a piston and a piston rod; latching means for releasably securing the jack cylinders together in parallel spaced relationship to one another around one of the reinforcing rods in a zone not occupied by the sleeve; at least two die segments, which collectively provide an axial bore at least part of which is dimensionally smaller in cross-section than the external cross-sectional dimension of the sleeve, loosely mounted on the free ends of the piston rods so as to be capable of limited rotational movement relative thereto in a longitudinal direction; die segment retaining means at the extremities of the piston rods; pusher means associated with the jack cylinders extending in a direction towards the die segments which engage one end of the sleeve and prevent it from moving axially relative to the rods; ring-shaped locking members for temporarily securing the die segments in operative relationship one to the other and which permit the aforesaid limited rotational movement thereof; and complementary formations on the die segments for receiving the ring-shaped locking members.

2. Apparatus for fastening to adjacent substantially co-axially disposed reinforcing rod ends a sleeve of uniform external cross-section throughout its length and having internal cross-sectional dimensions to enable it to receive and embrace both rod ends, comprising at least two fluid pressure operated jack units each having a cylinder, a piston and a piston rod; mounting plates to which the jack cylinders are attached and through which the piston rods pass; latching means for releasably securing the jack cylinders with their mounting plates together



in parallel relationship around one of the reinforcing rods in a zone not occupied by the sleeve; die segments corresponding in number to the number of mounting plates, which collectively provide an axial bore at least part of which is dimensionally smaller in cross-section than the external cross-sectional dimension of the sleeve, loosely mounted on the free ends of the piston rods so as to be capable of limited roational movement relative thereto in a longitudinal direction; die segment retaining means at the extremities of the piston rods; pusher means on the mounting plates extending in a direction towards the die segments which engage one end of the sleeve and prevent it from moving axially relative to the rods; ring-shaped locking members for securing the die segments in operative relationship one to the other and which permit the aforesaid limited rotational movement thereof; and complementary formations on the die segments for receiving the ring-shaped locking members.

4,057,883

METHOD OF ASSEMBLING ROTARY BALL VALVE

George J. Paptzun, and Anthony B. Monnig, both of Cincinnati, Ohio, assignors to The Lunkenheimer Company, Cincinnati, Ohio

Division of Ser. No. 416,051, Nov. 15, 1973, Pat. No. 3,948,480. This application Jan. 26, 1976, Ser. No. 652,173

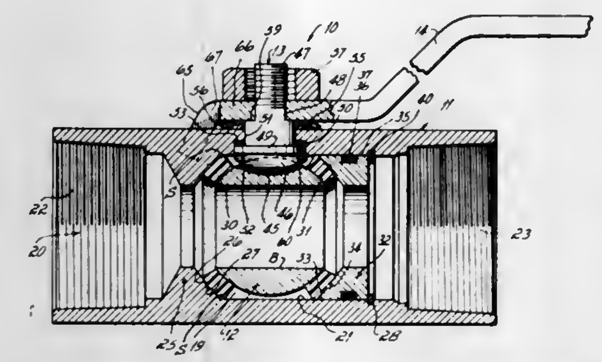
Int. Cl.² B23P *15/00;* **F16K** *5/14*

U.S. Cl. 29—157.1 R **22 Claims**

1. A method of assembling a rotary ball valve having a valve body, a passageway therethrough defined by passageway walls, an integral seat support in said valve body extending into said passageway, a first flat annular seat ring made of a material susceptible to cold-flow, a ball valve member, a second flat annular seat ring made of a material susceptible to cold-flow, a movable seat support and an assembly retaining means, said seat supports each defining frustoconical seat ring support surfaces facing said ball valve member and wherein spaces between said frustonconical surfaces and said ball valve member increase in dimension from points near said passageway toward points radially outwardly thereof, the method comprising the steps of:

inserting, in order, into said passageway said first flat annular seat ring, said ball valve member, said second flat annular seat ring, said movable seat support and said assembly retaining means;

applying force to said ball valve member, seat rings, movable seat support and said assembly retaining means to urge said seat rings, said ball valve member, and said movable seat support toward said integral seat support in



order to secure said assembly retaining means in said passageway and thereby hold said seat rings, said ball valve member and said movable seat support in their respective positions, and

thereby deforming said flat annular seat rings to conform to the ball valve member and to the seat supports in sealing engagement therewith so that said seat rings form respective seals between said ball valve member and said supports; and

the method further including the step of compressing said seat rings respectively between said ball valve member and said frustoconical surfaces, respectively, thereby deforming said seat rings from flat configuration to frustoconical configuration, tapered in cross-section in order to fill portions of said spaces in sealing engagement with said ball valve member and said frustoconical surfaces.

4,057,884

TOOL HOLDER

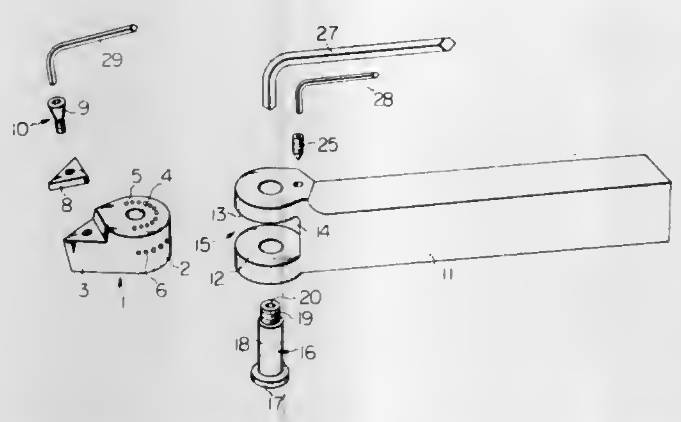
Masakazu Suzuki, Sowa, Japan, assignor to Suzuki Iron Works Co., Ltd., Japan

Filed Apr. 20, 1976, Ser. No. 678,719

Claims priority, application Japan, Jan. 16, 1976, 51-3900

Int. Cl.² B26D *1/00*

U.S. Cl. 407—89 **3 Claims**



1. A tool holder comprising a tool bit supporting member having a generally cylindrical body portion having an axial bore therethrough and a tool bit supporting portion projecting from the side surface of the cylindrical body portion for releasably mounting a tool bit on the upper surface thereof, the upper surface of said cylindrical body portion having a plurality of indexing and fixing recesses therein angularly spaced around said bore and the peripheral side surface of said body portion having a plurality of rough indexing recesses therein angularly spaced around said surface, a shank having vertically spaced limbs at the forward end thereof defining a recess therebetween for slidably receiving therein the cylindrical body portion of the tool bit supporting member, a bolt extending vertically between the limbs of the shank and through said bore in the cylindrical body portion of the tool bit supporting member for pivotally mounting and securing the tool bit supporting member to the shank, an adjusting and fixing screw threadingly engaging with the upper limb of the shank and having a tip end for engaging selectively with one of the angularly spaced indexing recesses in the upper surface of the cylindrical body portion, and a ball mounted in the shank and urged resiliently against the peripheral side of said body portion for engaging in one of the angularly spaced rough indexing recesses in the side surface of the cylindrical body portion.

4,057,885

METHOD OF PRODUCING AN OSCILLATING WEIGHT FOR AUTOMATIC TIMEPIECES

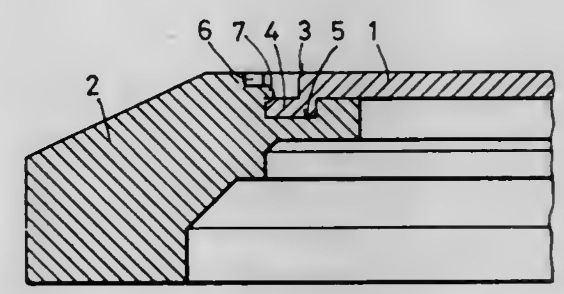
Urs Giger, Solothurn, and Friedrich Perrot, Lengnau, both of Switzerland, assignors to Eta A.G. Ebauches-Fabrik, Switzerland

Filed May 13, 1976, Ser. No. 686,068

Claims priority, application Switzerland, May 30, 1975, 7030/75

Int. Cl.² B23P *13/00, 11/00*

U.S. Cl. 29—177 **5 Claims**



1. In a method of producing an automatic timepiece oscillating weight of the type comprising a heavy-metal segment and a metallic center portion having a flanged rim, wherein an arcuate groove is formed in the upper face of the segment adjacent to the periphery thereof, the flanged rim of the center portion is axially inserted in the groove, and portions of the segment and of the flanged rim are wedged together at at least two mutually spaced spots for rigidly connecting the center portion to the segment, the improvement comprising the steps of:

forming the groove slightly wider than the flanged rim to be inserted therein for facilitating assembly, and

wedging the segment portion over the rim portion or the rim portion under the segment portion by means of localized pressure exerted substantially at right angles to the plane of the center portion.

4,057,886

TOY CONSTRUCTION SYSTEM HAVING REUSABLE DISTENSIBLE JOINING MEMBERS

Robert L. Brass, 4 Norwood Lane, Westport, Conn. 06880

Division of Ser. No. 660,320, Feb. 23, 1976, abandoned. This application Jan. 3, 1977, Ser. No. 756,334

Int. Cl.² B23P *19/02*

U.S. Cl. 29—235 **9 Claims**

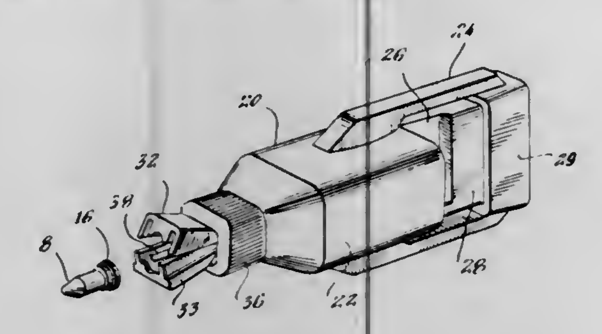
1. A device for temporarily inserting and thereafter withdrawing elastomeric, bullet-shaped joinder units from holes in toy structural elements, said joinder units having a base and a body portion with a bore therein, said body portion having a relaxed outer diameter greater than the diameter of said holes

and, when longitudinally stressed, less than the diameter of said holes, said device including

jaws for gripping said base,

a wire insertable in said bore to longitudinally stress said joinder unit,

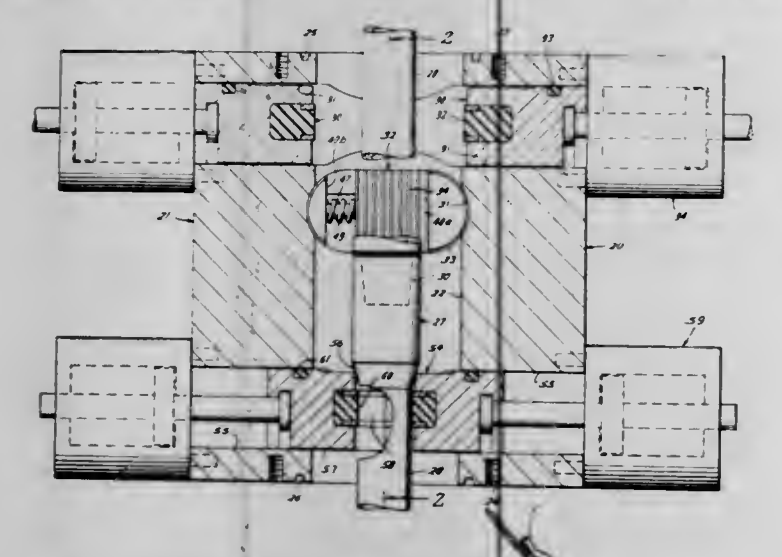
means for moving said wire longitudinally and in a relative direction away from said base, and



a trigger in said device for controlling said wire-moving means,

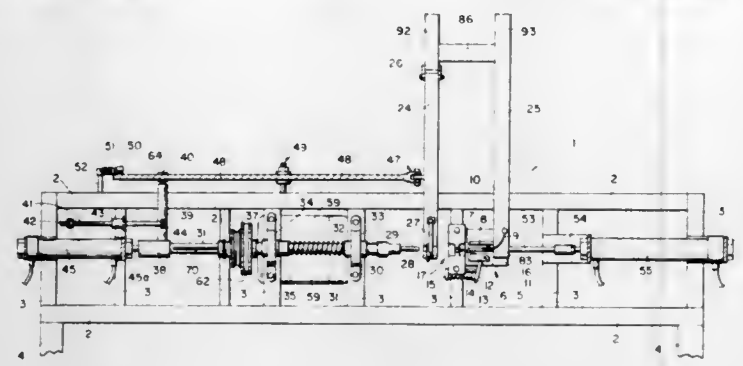
whereby said joinder unit may be longitudinally stressed to permit insertion or removal of said joinder units in or from the holes in said toy structural elements.

4,057,887
PIPE DISCONNECTING APPARATUS
Marvin R. Jones, and Paul E. Helfer, both of Houston, Tex., assignors to Cameron Iron Works, Inc., Houston, Tex.
Division of Ser. No. 467,158, May 6, 1974, Pat. No. 3,957,113. This application Jan. 2, 1976, Ser. No. 646,247
Int. Cl.² B25B *17/00*
U.S. Cl. 29—240 **41 Claims**



1. Apparatus for disconnecting the lower threaded end of an upper section from the upper threaded end of a lower section of a pipe string which is held against movement within the bore of an underwater wellhead through which the strings extends, comprising a housing adapted to be connected as a part of the wellhead, said housing having a bore therethrough alignable with the bore of the wellhead to receive the ends of said sections, and guideways extending outwardly from the bore, and a ram guidably movable longitudinally within each guideway toward and away from the bore, each ram including means arranged to grippingly engage and move along a side of the end of the upper section, and thereby exert a force on said upper section tending to rotate it about its axis, as the ram is moved in one direction, and to be relieved from said gripping engagement, as the ram is moved in the opposite direction, whereby said ram may be returned to a position from which it may again be moved in said one direction for exerting force on said upper section.

4,057,888
NUT DRIVING ASSEMBLY APPARATUS
Robert G. Gottlieb, Prairie Village, Kans., assignor to Lewis Industries, Inc., Kansas City, Mo.
Filed Aug. 9, 1976, Ser. No. 712,928
Int. Cl.² B23P *19/04*
U.S. Cl. 29—240 **17 Claims**



1. An apparatus for assembling a first member having a central channel with internal threads and a second member having a shank with external threads, by interconnection of the threads, said apparatus comprising:

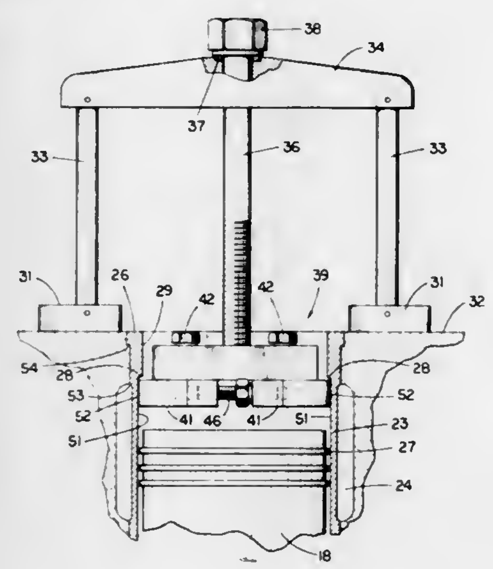
a. a thrust rod having a longitudinal axis, said rod being rotatable and moveable back and forth on said axis yet stabilized against lateral movement with respect thereto,

b. holding means mounted on one end of said thrust rod, said holding means having a gripping end that meshes with said first member,

c. a spindle which extends through said holding means and through said first member enmeshed by said gripping end of the holding means, said spindle having an outermost tip which contacts said second member and which retracts through said first member upon interconnection of the two members by means of their threads, and

d. thrusting means whereby said shank of the second member is urged axially toward said central opening of the first member.

4,057,889
ENGINE CYLINDER SLEEVE PULLER AND METHOD
Marvin D. Ferguson, R.R. 2, Box 258, Clayton, Ind. 46118
Filed Mar. 19, 1976, Ser. No. 668,727
Int. Cl.² B23P *19/02*
U.S. Cl. 29—427 **12 Claims**



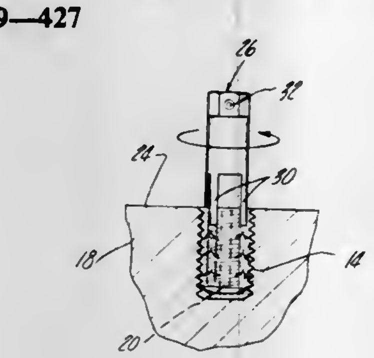
1. A method for removal of cylinder tubes from cylinder blocks comprising the steps of:

mounting a puller support on the cylinder block in registry with the open end of the cylinder tube;

forcibly and rigidly engaging diametrically opposite areas on the inner cylindrical surface of the cylinder tube above a piston therein with a pair of puller jaws, in an arc greater than 90° for each jaw, by applying force to said jaws in a direction radially outward with respect to the cylinder axis;

then applying a force in the direction of the cylinder axis only to the puller jaws through the puller support to force the jaws towards the support and thereby pull the cylinder tube outwardly of the cylinder block as the jaws remain forcibly and rigidly engaged with said areas, but without increasing radially outward directed force on said jaws.

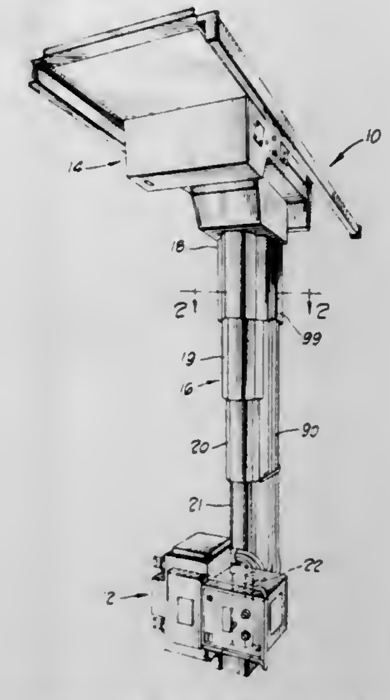
4,057,890
METHOD OF REMOVING BROKEN THREADED FASTENERS
Orlin J. Feen, 11102 Dale Ave., Warren, Mich. 48089
Continuation-in-part of Ser. No. 620,040, Oct. 6, 1975, abandoned, which is a division of Ser. No. 465,288, April 29, 1974, abandoned. This application Dec. 27, 1976, Ser. No. 754,238
Int. Cl.² B23P *19/02*
U.S. Cl. 29—427 **2 Claims**



1. A method of removing the broken shank portion of an externally threaded fastener of the type having a head portion adapted to provide a drive surface for installation of said shank portion into a mating threaded bore, the method comprising the steps of: forming a plurality of circumferentially spaced slots along the length of said shank, said slots being formed into the threaded portion of said shank fastener prior to installation thereof in said mating threaded bore; filling the slots with a lubricant material; forcing the lubricant material in each slot into the surrounding threads by inserting a tool having projections complementarily shaped to the slots into the slots; rotating said shank portion out of said bore by means of said tool, by engagement with said circumferentially spaced slots, whereby any portion of said fastener shank may be removed along which said circumferentially spaced grooves extend.

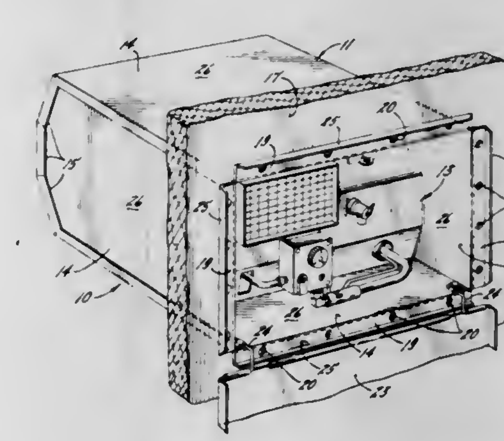
4,057,891
TELESCOPIC COLUMN FOR X-RAY APPARATUS
William H. Amor, Jr., Auburn Township, Cuyahoga County, and Robert J. Steffek, Wickliffe, both of Ohio, assignors to Picker Corporation, Cleveland, Ohio
Division of Ser. No. 418,128, Nov. 21, 1973, Pat. No. 3,986,697. This application June 4, 1976, Ser. No. 692,973
Int. Cl.² B23P *11/02*
U.S. Cl. 29—434 **3 Claims**

1. In a method of fabricating a telescopic column for connecting a mechanism to a support, which column comprises tubular sections that telescope together with substantial radial clearance and which are guided in telescopic movement relative to each other by guide bars and rollers carried by facing surfaces of telescoped portions, the steps comprising drilling apertures in said sections along the extent of said guide bars and at locations where rollers are supported, counterboring said apertures along the extent of said guide bars and at the locations of the rollers at one of the inside and outside surfaces of said sections, providing plugs with body portions shaped congruent with the apertures and each with a flange receivable within the counterbores, the body portions being dimensioned to fit within the apertures with an interference fit when the sections and plugs are at uniform temperatures, establishing a temperature differential between the plugs and sections sufficient to permit the plugs to fit into the apertures with a clearance fit, placing plugs into the apertures and eliminating the



temperature differential, and securing the guide bars and rollers to said plugs on opposite surfaces of said sections.

4,057,892
METHOD OF INSTALLING A WATER HEATER IN A RECREATIONAL VEHICLES
Donald M. White, Rockford, Ill., assignor to Atwood Vacuum Machine Company, Rockford, Ill.
Division of Ser. No. 537,903, Jan. 2, 1975, Pat. No. 3,986,492. This application Aug. 2, 1976, Ser. No. 710,460
Int. Cl.² B23P *19/00*
U.S. Cl. 29—526 R **1 Claim**

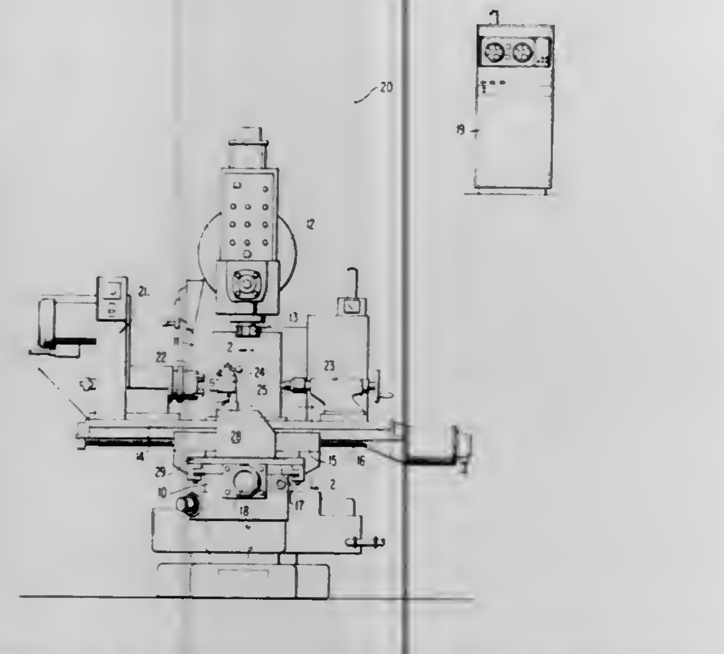


1. A method of installing a water heater having a boxlike case of rectangular cross-section, said case being made of sheet metal panels and having an open forward end, said method comprising the steps of inserting the forward end of said case forwardly through an opening in a wall and past the forward side of the wall, bending the forward margins of said panels outwardly to form flanges lying in face-to-face relation with the forward side of said wall, and securing said flanges to said wall.

4,057,893
MILLING TABLE LATHE
Joe Delano Smith; David Daniel McCall, and James Alexander Kyzer, all of Orangeburg, S.C., assignors to Still-Walter Tool & Manufacturing Company, Orangeburg, S.C.
Filed Apr. 7, 1976, Ser. No. 674,638
Int. Cl.² B23P *23/02*; B23Q *37/00*
U.S. Cl. 29—560 **7 Claims**

1. A milling table lathe comprising in combination a numerically controlled milling machine including a stationary ma-

chine bed and a numerically controlled translational milling table mounted on said bed lathe head attachment for said milling table removably mounted thereon said attachment including workpiece holding and rotating means, a fixed cutting tool holder support unit carrying a holder with a cutting tool thereon for turning a workpiece in said holding and rotat-



ing means during numeric control translation of the rotating workpiece relative to said cutting tool holder support unit while mounted on said table, said support unit including a support member for said tool holder spanning said milling table and spaced therefrom and being fixedly secured to said stationary machine bed on which said milling table is translationally mounted.

4,057,894

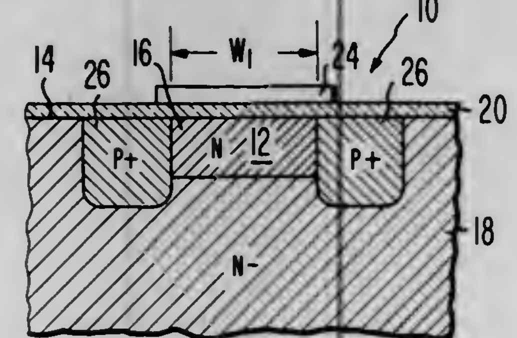
CONTROLLABLY VALUED RESISTOR

Heshmat Khajezadeh, Somerville, and Stephen Carl Ahrens, Delran, both of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Feb. 9, 1976, Ser. No. 656,295

Int. Cl.² B01J *17/00*

U.S. Cl. 29—577 C **5 Claims**



1. In a method of making a monolithic semiconductor device having a resistor disposed adjacent to a planar surface thereof, which method includes forming a first region of one type conductivity adjacent to said surface and forming two spaced ohmic contacts thereto, the improvement including steps for controllably establishing the value of said resistor comprising:

forming said first region in a second region of said one type conductivity disposed adjacent to said surface, said second region having a lower impurity concentration than said first region, whereby the conductive path of said resistor is contained within the more-heavily-doped first region, and

forming two additional regions of said opposite type conductivity respectively on opposite sides of said conductive path adjacent to both said surface and the junction between said first and said second regions, said additional regions having a higher impurity concentration and a greater depth than said first region and extending into said first region, whereby the width of said resistor, as measured along the perpendicular to said conductive path at various locations along said conductive path, is established by the extent of said additional regions into said first region.

4,057,895

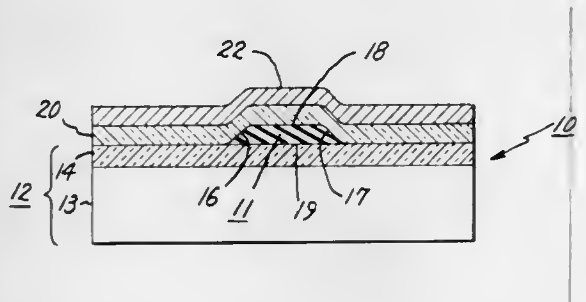
METHOD OF FORMING SLOPED MEMBERS OF N-TYPE POLYCRYSTALLINE SILICON

Mario Ghezzo, Ballston Lake, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Sept. 20, 1976, Ser. No. 724,988

Int. Cl.² H01L *7/50*

U.S. Cl. 29—591 **8 Claims**



1. A method of forming a conductive member of N-type and high conductivity polycrystalline silicon on a surface of an insulating substrate with at least one side thereof sloping gradually to said surface of the insulating substrate comprising

forming a layer of polycrystalline silicon on said surface of the insulating substrate,

forming a region of N-type and high conductivity including boron impurities in a concentration in excess of about 10^{18} atoms per cubic centimeter and extending from the exposed surface of said layer of polycrystalline silicon to the opposite surface thereof, said region having at least one generally planar side portion, said side portion of said region gradually sloping from the exposed surface of said layer of polycrystalline silicon to the opposite surface thereof and making a small acute angle with the base of said region lying on said surface of the insulating substrate,

etching said layer of polycrystalline silicon with an etch which etches polycrystalline silicon containing boron impurities in excess of said concentration at a rate substantially less than the rate at which it etches polycrystalline silicon not containing boron impurities for a period of time to remove the portion of said layer of polycrystalline silicon not containing boron in excess of said concentration,

whereby said region of said polycrystalline layer remains to provide said conductive member on said insulating substrate.

4,057,896

RAZOR HANDLE

Robert A. Trotta, Winthrop, Mass., assignor to The Gillette Company, Boston, Mass.

Continuation of Ser. No. 576,252, May 12, 1975, abandoned. This application Oct. 14, 1976, Ser. No. 732,467

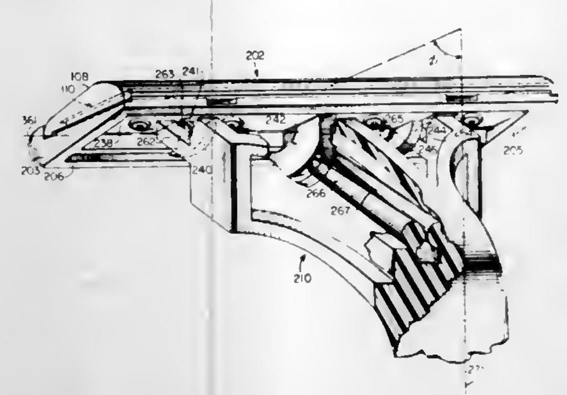
Int. Cl.² B26B *21/14, 21/52*

U.S. Cl. 30—89 **8 Claims**

1. A razor handle for a razor blade assembly adapted to be movably mounted on said handle and having cam means thereon for receiving a biasing force from said handle, said razor handle comprising:

pivot mounting means disposed on arm portions of said razor handle; and

first and second cam follower means having portions extending from said razor handle and adapted to engage said cam means of said razor blade assembly and to simultaneously



move for exerting biasing force thereon, said extending portion of said first cam follower means having a longitudinal axis substantially parallel to a longitudinal axis of said extending portion of said second cam follower means.

4,057,897

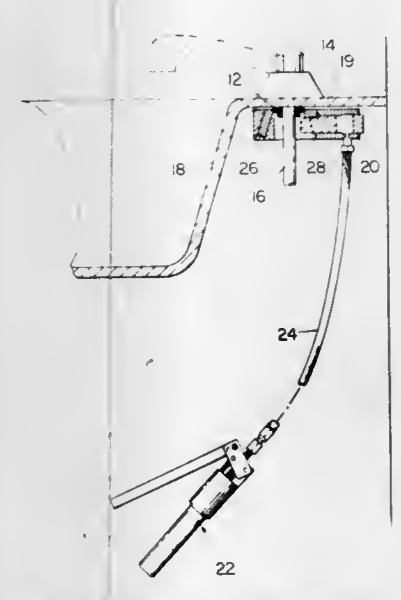
PORTABLE HYDRAULIC TOOL USEFUL FOR CUTTING NUTS

Charles Mitchell Seymour, 1581 Oak Road, Simi, Calif. 93606

Filed Apr. 19, 1976, Ser. No. 677,971

Int. Cl.² B26B *7/00*

U.S. Cl. 30—272 R **4 Claims**



1. A portable hydraulic tool for cutting and removing basin nuts securing faucets to a flat surface of a sink where the basin nuts are secured onto the threaded portions of the faucet assembly which extend through holes and protrude down to the rear of and underneath the sink in very cramped quarters, comprising:

a compact hydraulic working unit including a frame body member having a flat surface, and an opening of generally oval configuration extending from said flat surface for receiving the threaded pipe, said opening having an additional recess extending from said flat surface around the major portion of said opening for accommodating said basin nut while the balance of said opening is of a lesser cross-sectional size to centrally locate said pipe without the need for visually observing the relative position of said working unit relative to the basin nut and pipe;

a hydraulic cylinder in said body unit;

a piston having one end mounted in said cylinder and the other end extending into said opening for engaging said pipe;

means including a jaw having a curved configuration lying substantially flush with the flat recessed side of said frame member and movable in said recess for engaging one side of the basin nut, the center of the curved portion of said jaw being secured to said piston and spaced back from the face of said piston so that the point of engagement of the front face of said piston is significantly forward from the point of engagement of the center of the jaw;

means including a cutting blade for cutting the side of the basin nut opposite to said jaw and said piston, said cutting blade extending into said recess to a point substantially in the plane of the flat side of said unit; and

means including a remotely located hand-powered hydraulic pump and a flexible high pressure hydraulic line for supplying hydraulic fluid under high pressure to said hydraulic cylinder and for forcing said piston and jaw forward relative to said body member so that the basin nut is engaged and severed by said cutting blade.

4,057,898

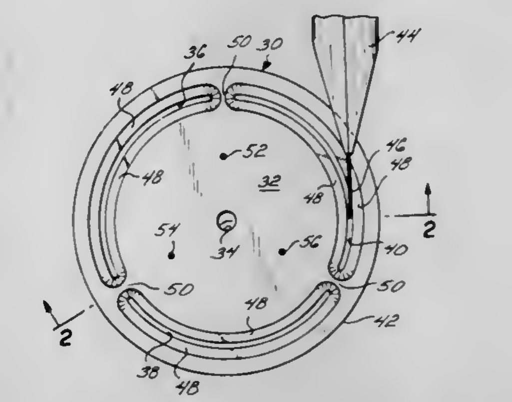
REPAIR TEMPLATE FOR CARPETS OR THE LIKE

Dennis E. Piosky, 416 Scranton Ave., Lynbrook, N.Y. 11563

Filed Aug. 16, 1976, Ser. No. 714,494

Int. Cl.² B26B *11/00, 29/02*

U.S. Cl. 30—289 **5 Claims**



1. A template for repair of a carpet or the like that is used by dimensioning a replacement cut-out from said carpet material for a visibly damaged area in said carpet of a comparatively small size, said template comprising a body sized to extend in covering relation over said damaged area and having an operative position in superposed relation thereto, said body having a positioning opening therein through which said damaged area is sighted during the placement of said template in said operative position, and an arrangement of disconnected knife-guiding grooves located in said body in surrounding relation to said positioning opening to enable the removal of said damaged area within a carpet removal cut-out having a shape and size dictated by said knife-guiding grooves, said grooves having beveled sides which converge toward and terminate in edges bounding each of said knife-guiding grooves to precisely shape and size said carpet removal and replacement cut-outs, said shaped and sized carpet removal cut-out providing a correspondingly shaped and sized opening in said carpet, said template being adapted to be operatively positioned in cutting relation to a selected carpet area of minimal visibility for obtaining a replacement cut-out using said knife-guiding grooves thereof, whereby said replacement cut-out is dimensioned so as to be readily inserted in place in said opening previously occupied by said removal cut-out.

4,057,899

STAKED BEARING CUTTER

Edward M. Ostendorf, St. Charles, Mo., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

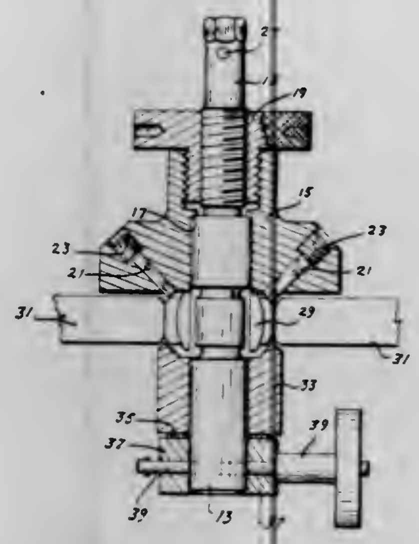
Filed Jan. 5, 1977, Ser. No. 756,940

Int. Cl.² B26B *27/00;* **B26F** *1/38*

U.S. Cl. 30—296 R **3 Claims**

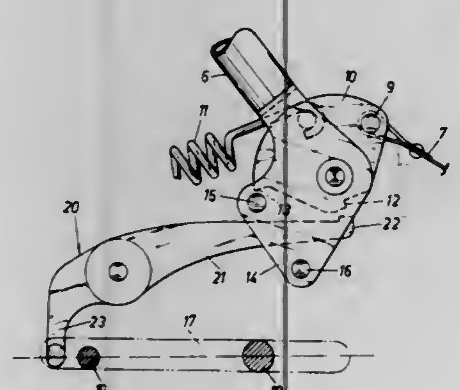
1. A staked bearing cutter for relieving material on a 360° staked bearing, said cutter comprising an elongated pin member having a plurality of shoulders thereon, a threaded section near the upper end of said pin member, a housing having an internal opening therethrough for receiving said pin member

therein, a shoulder on said housing being engaged with a shoulder on said pin member, the upper portion of the internal opening in said housing being threaded, a bushing having a threaded internal opening therethrough for engagement with the threads on said pin member, the lower external surface of



said bushing being threaded for engagement with the internal threads in said housing, means for maintaining the cutter in concentric relationship to said staked bearing and means for cutting away the staked material holding the bearing in place by rotating said pin member causing the gradual removal of the staked material around the bearing.

4,057,900
POWER SAW
György Nagy, Molndal, and Bengt Olof Johan Stellan Morner, Hovas, both of Sweden, assignors to AB Partner, Sweden
Filed May 25, 1976, Ser. No. 689,923
Claims priority, application Sweden, June 4, 1975, 7506347
Int. Cl.² B27G *19/06;* **B27B** *17/02*
U.S. Cl. 30—382 **9 Claims**



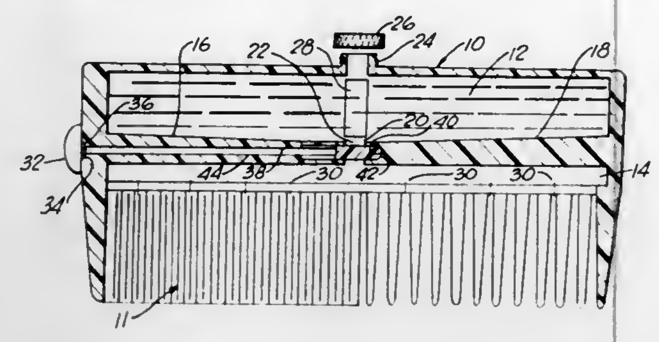
4. In a power saw having a cutter bar, a saw chain mounted to travel around said cutter bar and a safety brake for stopping the saw chain, an improved device to provide for automatic release of said safety brake comprising:

a blocking mechanism for holding said braking means in a non-braking position,

said cutter bar being mounted in the saw in a manner to permit short pivotal movements upwards from its normal position relative to the body of said saw, and

mechanical release means mounted in the saw and coupled to the cutter bar to receive a force transmission from an upward pivotal movement of the cutter bar, and having a segment thereof responsive to said force transmission to release the said blocking mechanism and cause said brake to be actuated.

4,057,901
WET COMB
Gary Bloem, 175-19th Ave., San Francisco, Calif. 94121
Filed Aug. 4, 1975, Ser. No. 601,612
Int. Cl.² A45D *24/22*
U.S. Cl. 132—112 **1 Claim**

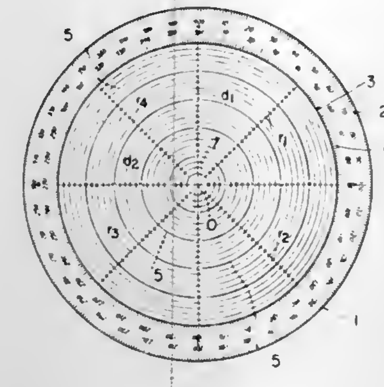


1. A wet comb comprising a flat elongated comb back means, said back means having a plurality of comb teeth means extending laterally from said back means, said back means containing liquid reservoir means which comprise an elongated flat reservoir extending in the same direction as said back means and mounted within said back means, said reservoir laterally tapering from both ends to valve means to form a gravity flow path for feeding liquid to said valve at the apex of said taper, said reservoir means having capped filler means extending upwardly through said back means for filling said reservoir means with liquid and capping said reservoir means after filling, sight glass means mounted on the side of said reservoir means and extending through said back for visually determining the amount of liquid in said reservoir means, metering chamber means mounted below said reservoir means, said chamber means also being mounted in said back and comprising an elongated flat chamber extending in the same direction as said back means and mounted under said reservoir means, said valve means operably connecting said reservoir means to said chamber means for feeding liquid to said chamber means by gravity when said teeth are pointed downwards, said valve means comprising a resilient tapered valve face for sealingly engaging a corresponding tapered valve seat mounted in said back means, valve control means extending from said valve means through said back means and terminating in finger gripable knob means, said knob means having means extending therefrom for releasably securing said knob to said back, said valve control means comprising a stem extending along the length of said back means from said valve face to one end of said back means through valve stem guide means in said back means, said stem operably engaging said face means, said means for securing said knob to said back comprising a plunger secured to said knob at one end opposite the diameter of said plunger, a notch releasably receiving said plunger and comprising an opening in said back oppositely facing said plunger and of a configuration to partially envelop and releasably secure said plunger, effluent means in said chamber means for passing liquid from said chamber means laterally in the direction of said teeth when said teeth are pointed downward.

4,057,902
MULTIPURPOSE DISK PROTRACTOR
Atsushi Matsui, 12, Baban-Cho, Shizuoka, Shizuoka, Japan
Continuation of Ser. No. 604,066, Aug. 12, 1975, abandoned. This application Sept. 30, 1976, Ser. No. 728,026
Claims priority, application Japan, Aug. 22, 1974, 49-96355
Int. Cl.² G01B *3/12*
U.S. Cl. 33—1 N **4 Claims**

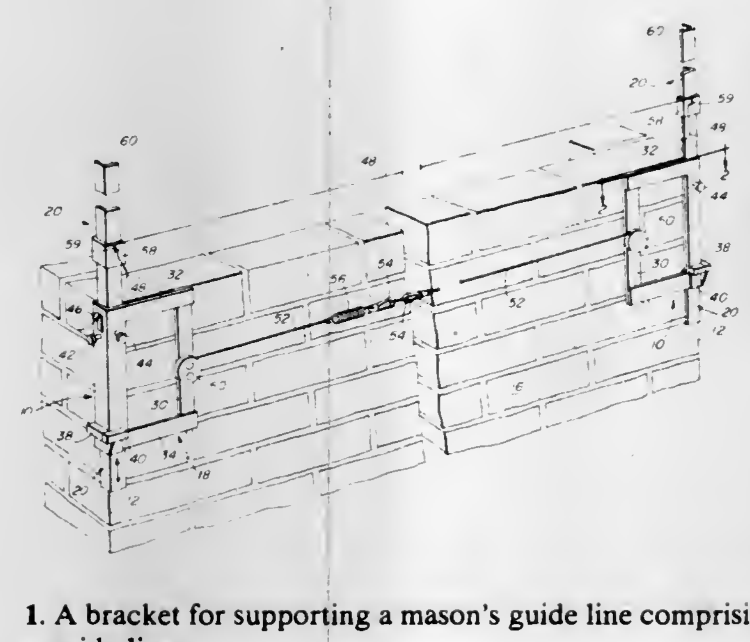
1. A disk protractor comprising: a transparent, circular, planar disk having an outer peripheral circumference of 400 n length units, where *n* is an integer; a length scale graduated in said length units and inscribed along and around the circumferential edge of the circular disk from an origin zero point; an angle scale graduated in degrees of angle and inscribed along and around a circle inscribed concentrically relative to said

outer peripheral circumference and having an origin zero point on the same radial line from the center of the circle as the zero point of the length scale; and a polar distance scale comprising a plurality of concentric radially spaced apart circles having a



common center coincident with the center of the circular disk and having graduations to indicate distances from the center, the latter circles being equally spaced a distance apart thereof by 2 *n* of said length units at the outer peripheral circumference.

4,057,903
GUIDE LINE HOLDER
Pasquale Cantera, 11 White Ave., Newton Center, Mass. 02159
Filed June 11, 1976, Ser. No. 694,962
Int. Cl.² B43L *7/00*
U.S. Cl. 33—86 **9 Claims**



1. A bracket for supporting a mason's guide line comprising:

a guide line,

a base including structure defining an inside corner for engaging the outside corner of intersecting walls, said structure defining first and second planes for planar contact with only exposed vertical faces of said walls,

first and second position indicator means for indicating the orientation of said first and second planes with respect to the vertical,

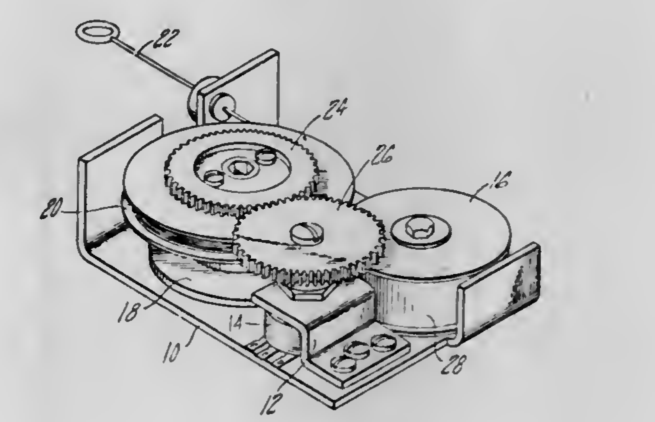
adjustable means on said base for engaging said wall faces to adjust the orientation of said first and second planes with respect to the vertical;

a retaining line for retaining said base against said wall faces, said retaining line extending from substantially the vertical midpoint of said base and including hook means securable at a location remote for said base, said retaining line including biasing means for tensioning the line,

means for altering the length of said retaining line comprising a reel for storing retaining line on said base,

a guide line support secured to said base and projecting therefrom parallel to the line of intersection of said first and second planes, and comprising means for engaging said line which means are slidable relative to said base in a direction parallel to said line of intersection.

4,057,904
SELF-ADJUSTING STRING EXTENSIOMETER
Joseph D. Vrabel, Concord, and Dennis W. Gosselin, Saugus, both of Mass., assignors to The United States of America as represented by the Secretary of the Department of Transportation, Washington, D.C.
Continuation of Ser. No. 590,814, June 27, 1975, abandoned. This application July 16, 1976, Ser. No. 705,929
Int. Cl.² G01B *3/10;* **H01C** *10/00;* **G01B** *7/02;* **G01D** *1/00*
U.S. Cl. 33—125 R **6 Claims**



1. Apparatus for measuring changes in distance proportionally small to an overall distance, said distance measuring apparatus automatically adjusting to the overall distance, said distance measuring apparatus comprising:

an extendable element;

rotatable drum means for storing said extendable element;

electrical signal generator means, said signal generator means including a pair of relatively movable members and providing an output signal which varies in accordance with the relative positioning of said movable members, said signal generator means further including fixed stops for determining the opposite limits of the relative movement between said members to thereby determine the signal generator means output signal excursion;

signal generator means drive means, said drive means including a rotatable shaft having a first end coupled to said signal generator means for causing relative movement between said members, said drive means further including a slip-clutch installed in said rotatable shaft whereby the second end of said shaft may rotate relative to said shaft first end when either limit of relative motion between said signal generator means relatively movable members is reached;

gear means, said gear means including a first gear mounted for rotation with said rotatable drum means and at least a second gear mounted for rotation with said second end of said signal generator means drive means rotatable shaft, said second gear being coupled to said first gear whereby movements of said drum means commensurate with unwinding or rewinding of said extendable element thereon will be transmitted to said signal generator means through said slip-clutch to cause relative motion between said signal generator means relatively movable members to thereby cause said signal generator means to provide an electrical output signal corresponding to the degree of extension or retraction of said extendable element; and

spring means for applying substantially constant tension to said drum means, said spring means comprising a spring applying rotational torque to said drum means to bias said extendable element in the direction of being rewound on said drum means.

4,057,905

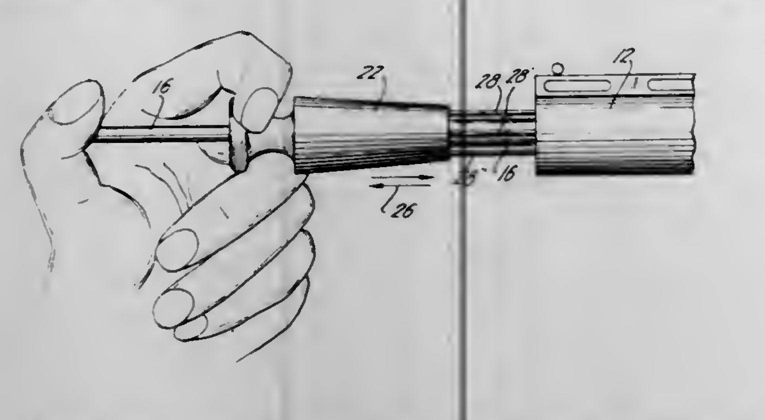
DEVICE FOR THE SECUREMENT OF A SIGHTING INSTRUMENT WITHIN THE BORE OF A SHOTGUN

Joseph Piaja, 470 Piaget Ave., Apt. H3, Clifton, N.J. 07011

Filed Mar. 24, 1976, Ser. No. 669,981

Int. Cl.[2] F41G *1/54*

U.S. Cl. 33—234 **2 Claims**



1. In combination, a sighting instrument and a device for the securement of said sighting instrument in the bore of a shotgun, said combination including:

a. a muzzle stopper having a truncated, cone-like contour including a circumferentially formed fingergrip therein, said stopper provided with an axially extending cylindrical bore, said bore comprising a first main bore, and a second larger diameter counterbore,

b. a main shaft extending through said cylindrical bore and adapted for spring-biased reciprocal movement therewithin,

c. a spring annularly surrounding said main shaft and in contact with said counterbore for facilitating said spring-biased reciprocal movement;

d. an end core disposed at the end of said shaft located furthest away from said finger-grip of said muzzle stopper; and

e. three resilient ball-bearing rods each having a ball-bearing at the same one end thereof, each of said rods situated about said shaft at a 120° angular displacement from each other, each of rods being secured at its non-bearing end to that portion of said stopper opposite to said finger-grip, each of said ball-bearings normally pressing against the periphery of said end cone, wherein the longitudinal position of said ball-bearings with respect to said shaft is self-established through said reciprocating movement of said muzzle stopper, thereby attaining a precise fit of said muzzle stopper within the gun bore and an absolute concentricity of said main shaft with respect to the bore, wherein said sighting device is mounted on the end of said main shaft opposite said end cone.

4,057,906

NAVIGATIONAL INSTRUMENTS

Richard Creighton King, Rozel, 19 The Drive, East Preston, Littlehampton, Sussex, BN16 1QL, England

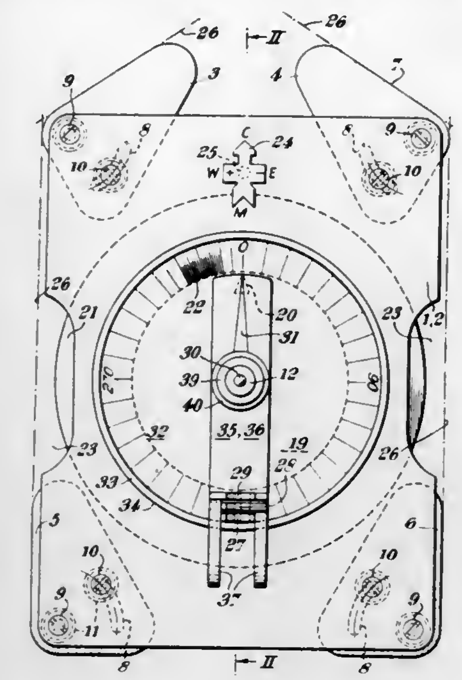
Filed Jan. 23, 1976, Ser. No. 651,621

Claims priority, application United Kingdom, Feb. 12, 1975, 5864/75; Oct. 17, 1975, 42590/75

Int. Cl.[2] G01C *1/00, 21/00*

U.S. Cl. 33—278 **18 Claims**

1. A portable navigational instrument comprising a supporting body having a plurality of edge portions which form extremeties of the instrument and are angularly adjustable to angles which correspond to a plurality of walls of a vessel, said walls having arbitrary angular orientation with respect to the fore and aft axis of the vessel, and means for holding said edge portions at the angles to which they are adjusted, whereby when said edge portions are so adjusted the instrument may be placed against each one of said walls of the vessel without its orientation with respect to the vessel changing, and means



supported by the supporting body for determining the bearing of the object.

4,057,907

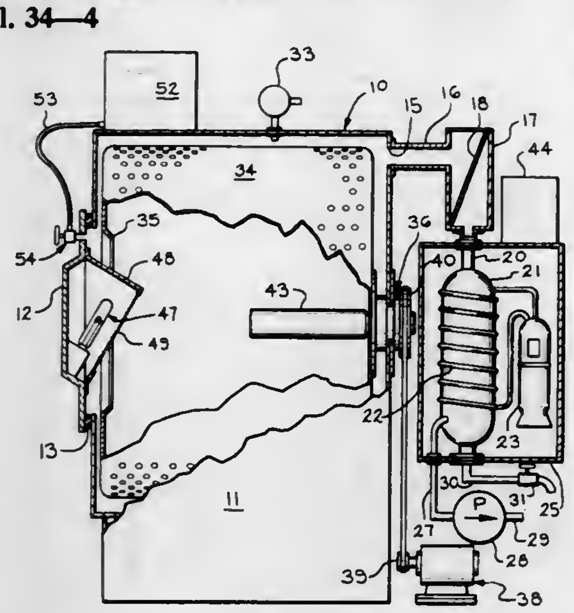
METHOD AND APPARATUS FOR DRYING CLOTHES

Norman G. Rapino, 2220 Robinson Ave., Toledo, Ohio 43620, and Frank P. DeMuro, 3324 Secor Road, Apt. No. 9, Toledo, Ohio 43606

Continuation-in-part of Ser. No. 489,475, July 18, 1974, Pat. No. 3,972,126. This application July 26, 1976, Ser. No. 708,650

Int. Cl.[2] F26B *3/30, 7/00, 19/00*

U.S. Cl. 34—4 **3 Claims**



1. A method of drying clothes comprising the steps of placing the clothes in a sub-atmospheric space, maintaining the sub-atmospheric pressure within the space, agitating the clothes, ultrasonically vibrating the clothes to break large water agglomerates into smaller units and applying microwave radiation to the clothes to excite the water molecules and speed evaporation.

4,057,908

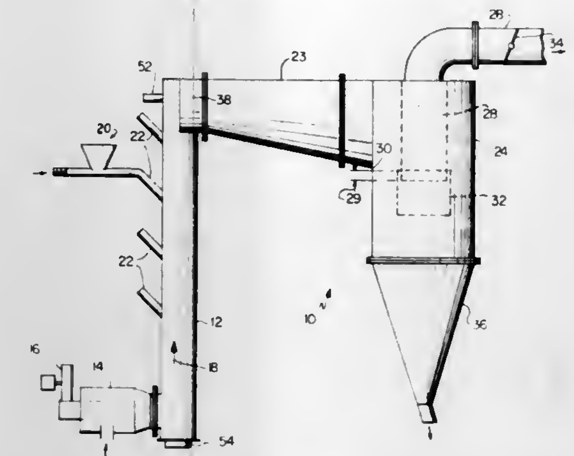
METHOD AND APPARATUS FOR DRYING DAMP POWDER

Melvin J. Mirliss, Long Beach, and Richard B. Nielsen, Los Angeles, both of Calif., assignors to Grefco, Inc., Bala Cynwyd, Pa.

Filed May 20, 1976, Ser. No. 688,462

Int. Cl.[2] F26B *3/08, 17/00;* **F27B** *15/00*

U.S. Cl. 34—10 **13 Claims**



1. A damp powder drier for producing unfractured particles or agglomerates, said drier comprised of:

an extended duct having an inlet end and an outlet end;

an enclosed volume having generally circular side walls;

supply means, including a feed port, to provide a continuous supply of damp material to be dried to said extended duct;

means to provide a flow of heated gas into the inlet end of said extended duct, said heated gas moving within said duct at low velocity and sufficient to suspend said damp material in said gas flow;

delivery means connecting said outlet end of said duct of extended length to said enclosed volume and providing entrance to said enclosed volume generally tangentially to said circular side walls thereof whereby a swirling motion is induced in said gas; and

discharge means to collect dried material from said enclosed volume and to exhaust said gas from said chamber by a separate path,

said extended duct, said enclosed volume and said delivery means being unobstructed and providing in combination an unobstructed flow path for said gas.

4,057,909

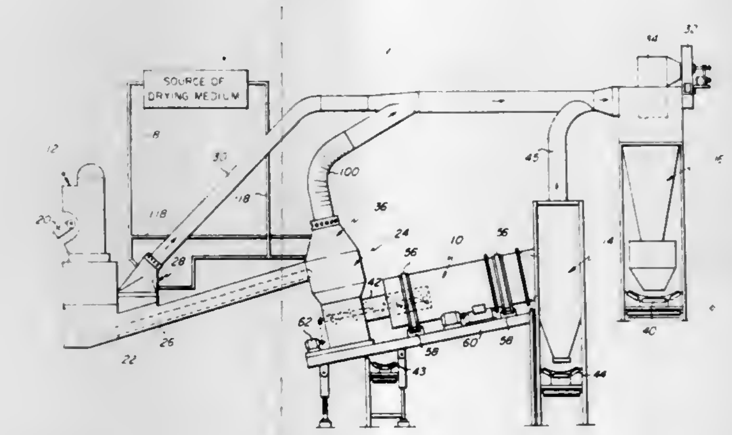
CONTINUOUS DRYING HOODS

Malcolm M. Paterson, Atkinson, N.H.; John S. DiMercurio, Medford, and Albert H. Mooradian, Winchester, both of Mass., assignors to Raytheon Company, Lexington, Mass.

Filed Feb. 13, 1976, Ser. No. 658,136

Int. Cl.[2] F26B *21/00*

U.S. Cl. 34—76 **11 Claims**



1. A material handling system comprising a chamber, means for directing material into said chamber, a collector hood mounted at the top of said chamber and having primary and second compartments both having their interiors in direct communication with the interior of said chamber, said second compartment encircling at least a major portion of the primary compartment, air inlet aperture means in said second compartment, duct means connected with said primary compartment, and fan means for creating an air stream flowing first into said second compartment through the air inlet aperture means, then into said chamber, and then into said primary compartment and duct means.

4,057,910

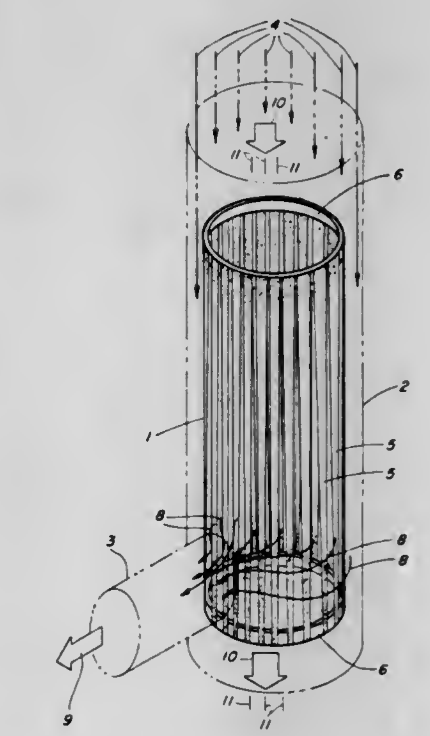
EXHAUST QUENCH AIR DIFFUSER

Harold Gerard Sachleben, Sr., Bellmawr, N.J., and Jerry Jay Warren, Richmond, Va., assignors to Allied Chemical Corporation, Morris Township, N.J.

Filed June 25, 1976, Ser. No. 699,917

Int. Cl.[2] F26B *13/24;* **B29B** *3/00*

U.S. Cl. 34—227 **5 Claims**



1. An apparatus for diffusing flowing quench air at the exhaust of said air from a quench stack for cooling moving synthetic melt-spun fibers, said stack having an exhaust outlet in an exhaust portion of said stack, comprising

a series of slats arranged peripherally between said fibers and said quench stack in said exhaust portion,

said slats being spaced apart to each other and form a plurality of gaps between said slats varying in width, said variation in width of said gaps being wider around the circumference nearer said air exhaust outlet of said quench stack and correspondingly being narrower around the circumference away from said air exhaust outlet of said quench stack.

4,057,911

PORTABLE PSYCHO-PHYSICAL AUTOMOBILE DRIVER TESTING DEVICE

Thomas F. Sack, 354 N. Bromley Ave., Scranton, Pa. 18504

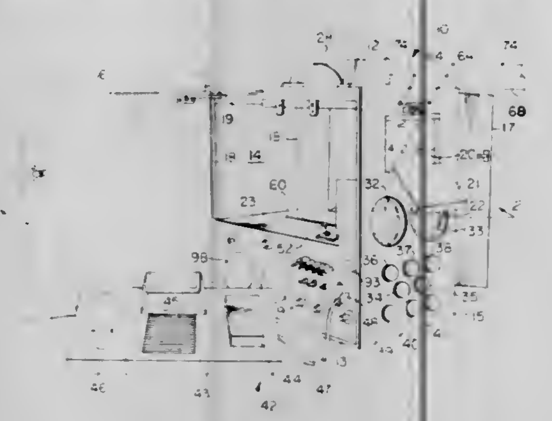
Filed July 29, 1976, Ser. No. 709,717

Int. Cl.[2] G09B *9/04*

U.S. Cl. 35—11 R **6 Claims**

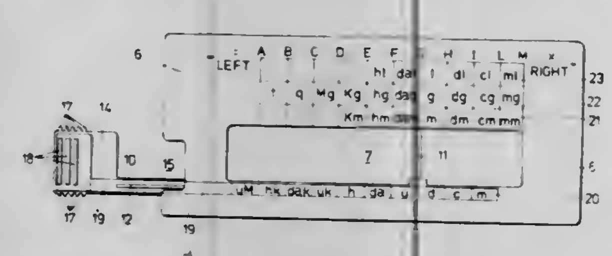
1. A portable psycho-physical automobile driver testing device comprising a cabinet having top and bottom walls interconnected by end walls and a pair of side walls pivotally mounted to swing outwardly from the cabinet, one of said end walls having a sight opening therein and directed toward a person being tested, a partition within said cabinet intermediate said top and bottom walls and extending between said end walls to define a compartment between said bottom wall and

the partition, a control panel within said cabinet enclosing the area defined by said end walls, said partition and said bottom wall to enclose said compartment, means within said cabinet mounted on the inner face of said top wall for testing depth perception of a person located at a predetermined distance from said one end wall and viewing said means through said sight opening, a first plurality of colored lights on said one end wall, a pair of headlights on said one end wall, means interconnecting said first plurality of colored lights and said headlights



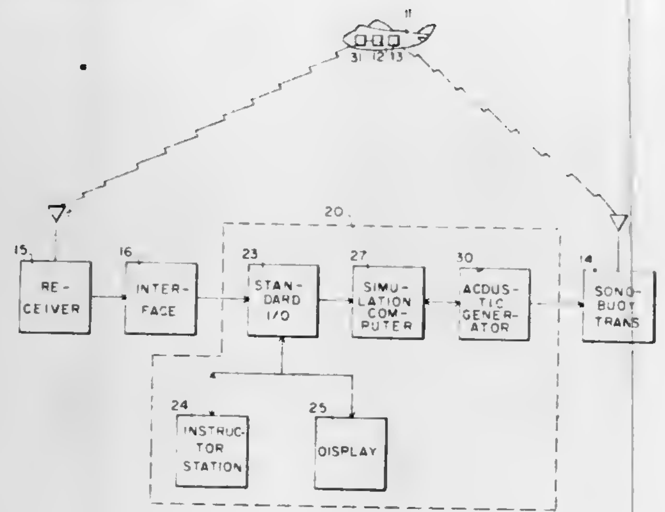
to said control panel for testing respectively reaction time and glare recovery, a second plurality of lights on said one end wall having printed indicia thereon, means interconnecting said second plurality of lights and said control panel for testing night vision, and means including switches on said control panel operable by an examiner positioned in front of said control panel to operate the testing device for actuating said interconnecting means to said first plurality of colored lights, said headlights and said second plurality of colored lights.

4,057,912
INSTRUMENT FOR FACILITATING THE CALCULATION OF EQUIVALENT VALUES
Francesco Di Noia, Verona, Italy, assignor to Idea Didattica Editrice, Italy
Filed May 21, 1976, Ser. No. 688,729
Claims priority, application Italy, Oct. 28, 1975, 84949/75
Int. Cl.² G09B *19/02;* G06G *1/06;* G09B *1/28*
U.S. Cl. 35—31 E **8 Claims**



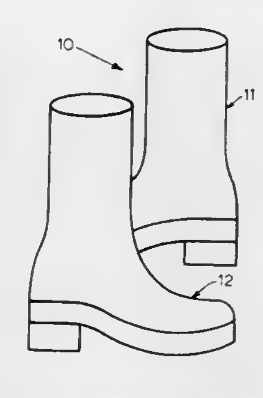
1. A calculating instrument for converting a numeral representing a given quantity in one unit into a numeral representing the same quantity in a different unit, comprising plate means carrying at least one scale of graduations representing different units of a given quantity, with said graduations being situated at a given distance one from the next along said scale, so that the latter scale is stationary with respect to said plate means, movable scale means operatively connected with said plate means for movement with respect thereto in a direction parallel to said stationary scale, said movable scale means carrying a series of graduations situated one from the next at the same distance as said graduations of said stationary scale and said graduations of said movable scale means being indicative of different characteristics of a numeral, pointer means operatively connected with said movable scale means for movement therewith and extending between said movable scale means and said stationary scale, said pointer means being situated along the graduations of said movable scale means at a location where a part of a numeral situated on one side of said pointer means has a given relationship with respect to a part of the numeral situated on the other side of said pointer means, said plate means including a means for initially situating a given numeral indicating the magnitude of a quantity whose units are represented by said stationary scale at a position with respect to said stationary scale where said numeral will indicate said quantity in a given unit of said stationary scale, said pointer means being movable together with said movable scale means with respect to the numeral thus situated initially at a given position with respect to said stationary scale to a location where said numeral can be converted into another numeral indicating the same quantity in a different unit of said stationary scale.

4,057,913
SIMULATED TRAINING SYSTEM THAT UTILIZES OPERATIONAL EQUIPMENT
Robert M. Eisenberg, Woodbine, Md., assignor to The Singer Company, Binghamton, N.Y.
Filed Mar. 26, 1976, Ser. No. 670,620
Int. Cl.² G09B *9/08*
U.S. Cl. 35—12 B **7 Claims**



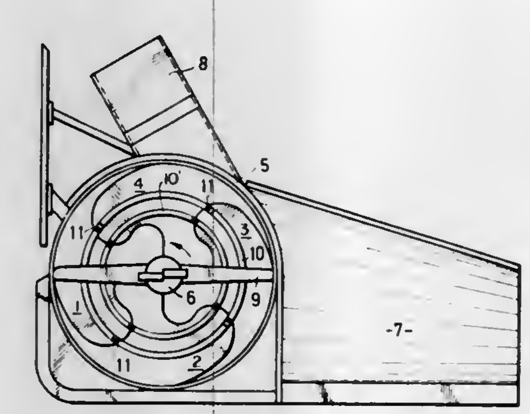
1. A training system that utilizes simulation and operational equipment to train operators in a real-world environment which comprises: a receiver that receives signals pertaining to the location and status of operational equipment from said operational equipment, means for transmitting signals to operational equipment, and a simulator coupled to said receiver and said transmitting means for processing the signal received from said receiver and producing a signal that will stimulate operational equipment when the signal produced by said simulator is transmitted to the operational equipment by said transmitting means.

4,057,914
ORTHOPEDIC BOOTS
Ozmer Lee Oxendine, Box 083-A, Rte. 3, Maxton, N.C. 28364
Filed Dec. 27, 1976, Ser. No. 754,454
Int. Cl.² A43B *7/16*
U.S. Cl. 36—81 **5 Claims**



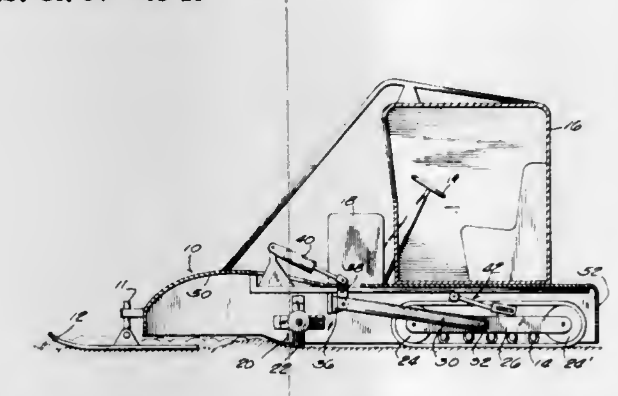
1. A pair of orthopedic shoes for compensation of leg length deformities of the wearer comprising:
a. a first shoe for use on the foot of the wearer's shorter leg, said first shoe having a relatively thick sole area providing built-up compensation means for the shortness of the wearer's shorter leg; and
b. a second shoe for use on the foot of the wearer's longer leg, said second shoe presenting an outward appearance of having a relatively thick sole, the outer sole material of said second shoe being formed around a shell member to provide an outward appearance of a built-up sole, said shell member providing a recessed area within said second shoe for receiving the foot of the longer leg of the wearer;
whereby said first and second shoes provide a level walking condition for the wearer.

4,057,915
RING STRUCTURE FOR PREVENTING BLADE DAMAGE
Alfred Schmidt, Jr., St. Blasien, Germany, assignor to Firma Ing. Alfred Schmidt GmbH, Schwarzwald, Germany
Filed Mar. 17, 1975, Ser. No. 558,953
Claims priority, application Germany, Mar. 30, 1974, 2415542
Int. Cl.² E01H *5/09*
U.S. Cl. 37—43 C **5 Claims**



1. A centrifugal snow blower for clearing snow fall comprising a housing defining an opening in the direction of clearing, a fan rotatable about a central axis arranged within said housing, said fan comprising a rotatable shaft having a plurality of curved scoop-like blades, each of which has one end attached to said shaft, each of said blades extending radially from and axially of said shaft to protrude axially through said opening and at least in part out of said housing, said blades each terminating in a rounded leading or cutting edge with the forwardmost extent of each blade being located in a common plane outside said housing and perpendicular to the shaft, and means for preventing introduction of obstacles into said housing and damage to said blades comprising a ring concentric to the central axis of said fan welded to said rounded leading or cutting edges between their forwardmost extent and the front of said housing.

4,057,916
SNOWMOBILE TRAIL LEVELER
Benjamin C. Roemer, Manitowish Waters, Wis. 54545
Filed Nov. 17, 1975, Ser. No. 632,651
Int. Cl.² E01H *5/00*
U.S. Cl. 37—43 R **4 Claims**

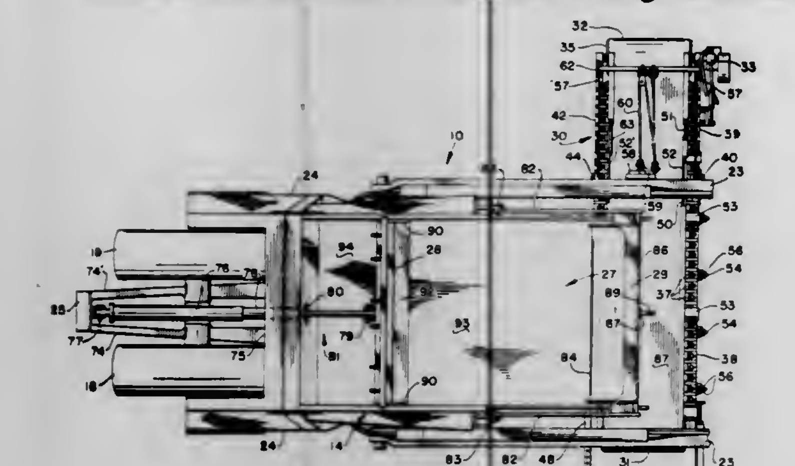


1. A trail leveler for smoothing the washboard type pattern of snowmobile trails, the leveler being adapted to move over the trail and comprising:
a housing and means to support said housing on the snow as the leveler is moved over the trail to be worked by the leveler;
a rotating member carried by said housing and extending generally transversely to the intended path of the leveler, said rotating member having a plurality of axially extending blades which, upon rotation of said member, are adapted to hit the high sections of the snowmobile trail and to thereby remove such high portions upon impact with the blades and to throw the removed high portions upwardly and towards the inside of said housing; and
motor means adapted to rotate said member in a direction opposite to the intended path of the leveler to thereby cause said blades to bite into the bottom sections of the high portions of the trail as the leveler is moved over the trail;
said housing being further characterized by a shield portion on the top inside surface thereof with depending side walls for substantially enclosing the space in which the removed high portions are thrown upwardly, and a depending trailing edge portion thereon to distribute the removed high portions evenly over the trail;
adjustment means for changing the vertical position of said rotatable member with respect to said means to support said housing to thereby adjust the vertical position of said blades with respect to the surface of the trail to be leveled;
said means to support said housing being further characterized by a first means positioned at the front end of said housing and of a second support means positioned generally towards the rear of said housing, and wherein said adjustment means is connected between said housing and one of said support means and is operable to change the vertical distance between said housing and said one of said support means;
said adjustment means further characterized by being connected between said housing and said second support means, and wherein said adjustment means includes lever means which is pivotally connected at one of its ends to said housing and is pivotally connected to the other of its ends to said second support means, and wherein said adjustment means also includes motor means for pivoting said lever means around its connection to said housing, said lever means comprised of a yoke shaped member with the cross member of the yoke being pivotally attached to said housing and with the lever arms of the yoke extending in a generally fore and aft direction adjacent the sides of said housing and being pivotally connected at their ends to said second support means, said lever means further including a crank section which is fixed to said cross member and which is connected to said lever motor means, said lever motor means adapted to rotate said yoke shaped member around the axis of said cross member; and
said adjustment means further characterized by having a stop means for limiting the degree of movement of said second support means with respect to said housing.

4,057,917
METHOD OF PADDING PIPE
Norman B. Burrows, Rte. 2, Box 3109, Odessa, Tex. 79763
Division of Ser. No. 619,948, Oct. 6, 1975, Pat. No. 3,981,089. This application Mar. 30, 1976, Ser. No. 672,023
Int. Cl.² E02F *5/22*
U.S. Cl. 37—195 **10 Claims**

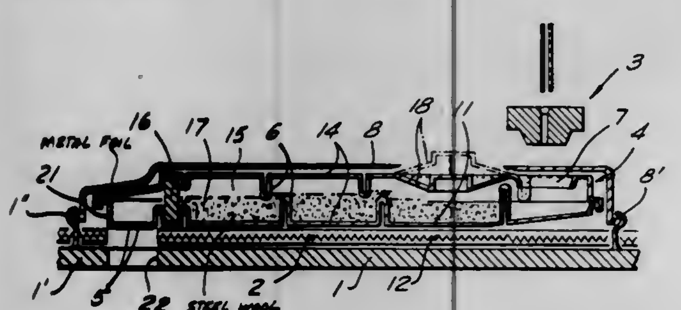
1. A method of placing padding material within a previously dug ditch comprising the steps of:
mounting a container and a lateral conveyor onto an earth bound vehicle;
placing padding material within said container
moving said vehicle along a path of travel which is spaced from, adjacent to, and parallel to said ditch;
forming an outlet within said container and forcing said

padding material contained within said container to move through said outlet;
forcing padding material to flow through said outlet by moving opposed walls of said container toward one another so that any padding material contained therebetween is forced to move towards and through said outlet;



receiving material which flows through said outlet by said lateral conveyor;
conveying padding material laterally away from said outlet and into said ditch, thereby uniformly placing padding material within said ditch.

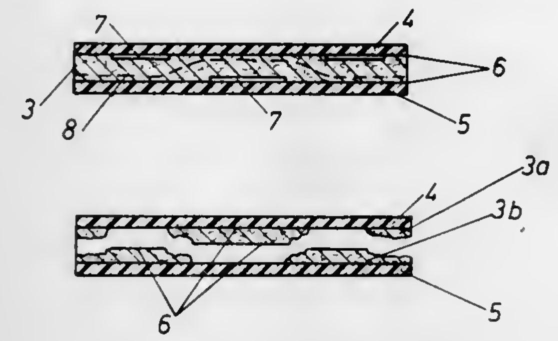
4,057,918
STEAM IRON
Hans Zeier, Beethovenstrasse 5, Zurich, Switzerland (8002)
Filed July 12, 1976, Ser. No. 704,695
Claims priority, application Germany, July 11, 1975, 2530926
Int. Cl.² D06F *25/06*
U.S. Cl. 38—77.3 **14 Claims**



1. A steam iron comprising a housing, a sole plate on said housing having a pressing surface, a heating element in said housing, a discardable steam-generating chamber received in said housing and heated by said element, said element having a heat-emitting surface juxtaposed with said steam-generating chamber, said steam-generating chamber being composed of shells of thin metallic sheet secured together by beaded flanges and having a heat-receiving surface juxtaposed with said heating element, and stressing means elastically deforming said steam-generating chamber against said heating element to press said heat-receiving surface into face-to-face contact with said heat-emitting surface.

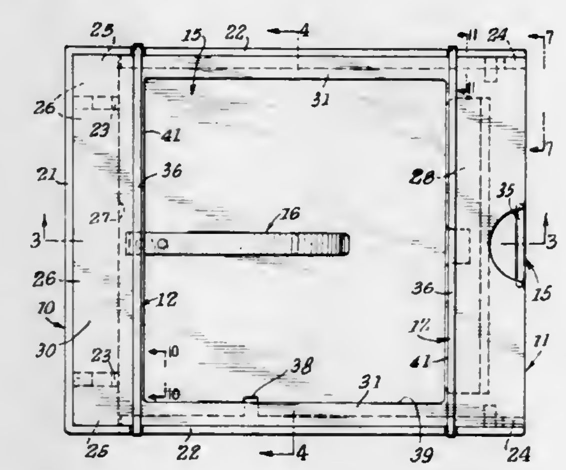
4,057,919
LAMINATED DATA CARRIER PROTECTED AGAINST FORGERY, PARTICULARLY IDENTIFICATION CARD
Wolfgang Gauch, Lohdorf; Wittich Kaule, Munich, and Güenter Pauli, Groebenzell, all of Germany, assignors to G.A.O. Gesellschaft fur Automation und Organisation mbH, Germany
Continuation of Ser. No. 561,634, March 24, 1975, abandoned. This application Aug. 13, 1976, Ser. No. 714,261
Claims priority, application Austria, Apr. 2, 1974, 2709/74
Int. Cl.² G09F *3/03*
U.S. Cl. 40—2.2 **15 Claims**

1. A laminated data carrier protected against forgery, particularly an identification card, consisting of a data-carrying fibrous paper blank interposed between two films bonded to the opposite surfaces of the paper blank at respective bonding interfaces to provide a laminated structure, the adhesion of the fibers of said paper blank to each other being of less strength than that of said bonding interfaces, so that said paper blank is splittable along substantially a plane substantially midway between and substantially parallel to said bonding interfaces, with respective portions of the split paper blank adhering to each of said films at the associated bonding interface; said data



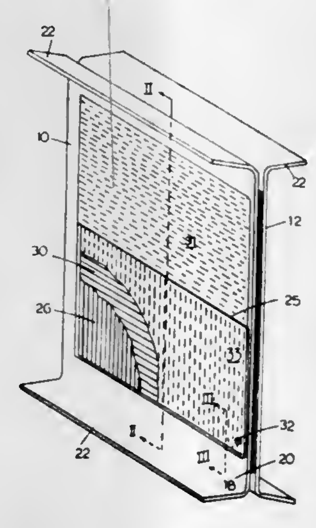
carrier having local areas in at least one of said bonding interfaces in which the bond between the film and the respective surface of the paper blank is at least weakened, relative to the remainder of the respective bonding interface, so that, when an attempt is made to split the data carrier paper blank along substantially a plane between its opposite surfaces, and said local areas are reached, the tear, following the source of least resistance, will turn toward the surface of paper blank, resulting in paper blank surface tearing at said local reas and thus visually perceivable paper blank surface destruction.

4,057,920
PICTURE VIEWER WITH SUCCESSIVE FEED MEANS
John H. Weggeland, 202 Bougenvillea, Lehigh Acres, Fla. 33936
Filed Nov. 24, 1975, Ser. No. 634,919
Int. Cl.² G09F *11/30*
U.S. Cl. 40—79 **7 Claims**



1. A picture viewer comprising:
a rectangular housing having three closed and one open side, a top and a bottom,
a manually slidable shuttle normally disposed on the bottom of said housing and guided for manual movement from said position within said housing and a position extending from the mentioned open side of the housing, the rearward portion of said shuttle being provided with an abutment means for locating a stack of pictures disposed upon said shuttle, said abutment engaging the rearward edge of the lowermost picture of the stack whereby, when the shuttle is moved to its extended position, only said lowermost picture is transported by the shuttle to a position beyond the forward side of the stack,
an upwardly flexed tongue provided on the top surface of the rearward end of the shuttle to upwardly raise the rear end of the picture upon the shuttle; and
the forward end of the shuttle being provided with a raised rearwardly directed lip, the underface of said lip being engaged by the forward end of the picture that is upwardly raised by the tongue, and upon return movement of the shuttle, the picture thereon is moved by the mentioned lip of the shuttle to a position on the top of the stack and into register with the abutment which locates the stack.

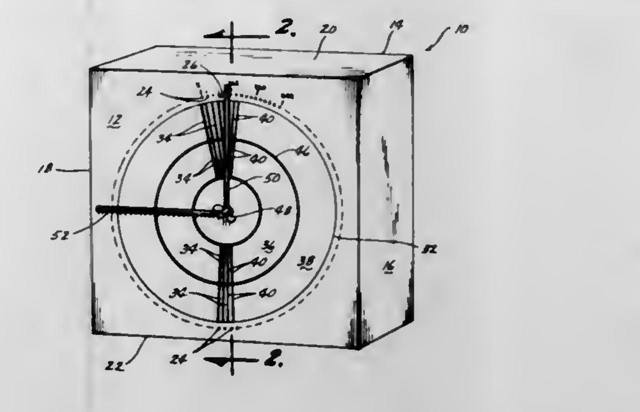
4,057,921
DECORATIVE DEVICE
Derek William Ball, 6 Ellerton Way, Karori, Wellington, New Zealand
Filed May 24, 1976, Ser. No. 689,036
Claims priority, application New Zealand, Apr. 13, 1976, 180594
Int. Cl.² G09F *13/24*
U.S. Cl. 40—106.21 **7 Claims**



1. A decorative device comprising:
a pair of sealed sheet-like chambers in face-to-face relationship, the major portion of each said chamber being transparent; spacing means around the periphery of each sheet for forming said chambers; a pair of mutually immiscible fluid phases of different specific gravities provided in each said chamber;
a first coloring substance homogeneously dissolved in at least one phase in one chamber; a second coloring substance homogeneously dissolved in one phase of the other of said pair of chambers; a third coloring substance homogeneously dissolved in the other phase in one of said chambers; said first, second and third coloring substances being insoluble in the other fluid phase in its respective chamber; and a stand means on at least one end of said pair of chambers for resting said device in an upright position;
the arrangement being such that when said device is at rest there is created a static display of predetermined color combinations and when said apparatus is inverted there is created a kinetic superimposition of irregular images or patterns as each of said pairs of phases returns to equilibrium.

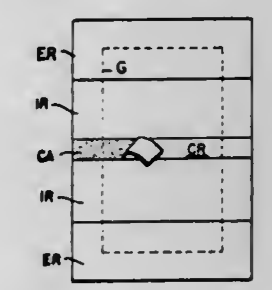
4,057,922
METHOD AND DEVICE FOR LIVESTOCK RECORD KEEPING
Steven L. Kerns, Ames, Iowa, assignor to Management Utilities, Inc., Ames, Iowa
Filed July 16, 1976, Ser. No. 705,801
Int. Cl.² G09F *1/10*
U.S. Cl. 40—124.2 **5 Claims**

1. A livestock record keeping device comprising a frame, means for rotatably mounting a wheel on said frame, a wheel rotatably mounted on said means, said wheel having a plurality of animal symbol holding means positioned therearound, said frame having a plurality of peg receiving apertures representing each day of the year around the periphery of said wheel,



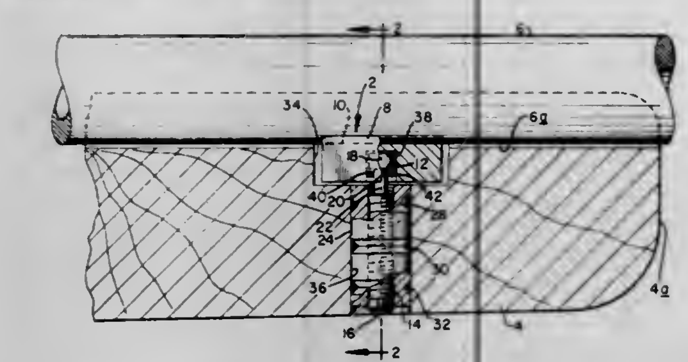
and a plurality of radially extending adjustably spaced apart marking rods mounted on said wheel.

4,057,923
ADHESIVE PICTURE MOUNT
Marston Chase, 1330 New Hampshire Ave., NW., Washington, D.C. 20036
Continuation of Ser. No. 582,156, May 30, 1975, Pat. No. 3,987,569, which is a continuation of Ser. No. 452,554, March 19, 1974, Pat. No. 3,893,252, which is a continuation of Ser. No. 877,583, Nov. 26, 1969, abandoned, which is a division of Ser. No. 690,858, Dec. 15, 1967, Pat. No. 3,517,106. This application Aug. 3, 1976, Ser. No. 711,237
Int. Cl.² G09F *1/10*
U.S. Cl. 40—158 R **8 Claims**



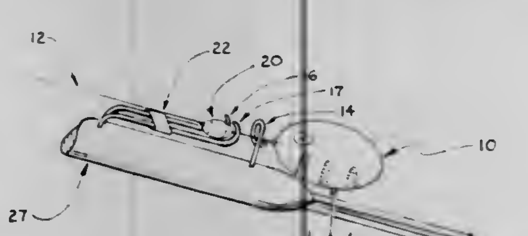
1. An assembly for the mounting of pictures comprising an adhesive picture mount in combination with a mounting board and associated oversheet; said adhesive picture mount comprising a web, a layer of pressure sensitive adhesive on both surfaces of the web, and a cover sheet releasably retained on the adhesive on each surface of the web, each cover sheet comprising two or more readily separable sections extending across the mount, said sections being selectively removable to expose the adhesive whereby one cover sheet section may be removed from one surface while the other cover sheet sections on said one surface remain in place thereby enabling the securing of a picture to an area of adhesive exposed by removal of the said one section while the remainder of the cover sheet sections on said one surface are removed, the remainder of the picture subsequently being secured to the adhesive exposed by the removal of the remainder of the cover sheet sections on said one surface of the web, said mount in turn being attachable to said mounting board by removal of the cover sheet sections from the other surface of the web; said oversheet being detachably secured to the mounting board in overlying relation thereto and serving as a support adapted to receive the picture mount on its outer surface, the oversheet being in registry with the mounting board and having guide lines thereon serving as guide elements on its outer surface for positioning the picture mount on the front face of the mounting board, said oversheet being selectively removable from the mounting board beneath the picture mount for a securing of the picture mount to the mounting board.

4,057,924
RIFLE BARREL STABILIZER
Robert P. Joseph, 805 Stark St., Austin, Tex. 78756
Filed Nov. 4, 1976, Ser. No. 738,749
Int. Cl.^{2} F41C *27/00*
U.S. Cl. 42—75 A **6 Claims**



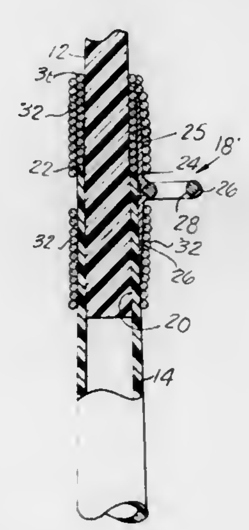
1. In a device for adjusting the force between a rifle barrel and rifle stock forearm; a stabilizer block having a longitudinal concaved groove formed in one side of said block, said concaved groove having a radius equal to the radius of the rifle barrel; a downwardly depending threaded screw; means rotatably securing said threaded screw to said block; and a screw housing secured in said stock forearm, said screw housing having a threaded bore to receive said threaded screw such that turning the screw within said threaded bore moves the screw and block relative to the forearm to adjust the force between the forearm and the rifle barrel.

4,057,925
FISHING LURE RETRIEVER
Yen Bak Wong, 3180 38th Ave., Sacramento, Calif. 95820
Filed May 14, 1976, Ser. No. 686,288
Int. Cl.^{2} A01K *97/00*
U.S. Cl. 43—17.2 **10 Claims**



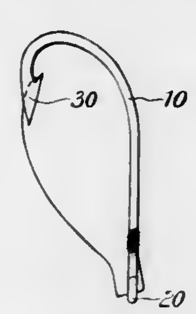
1. A device for retrieving a snagged fishing line having a lure and interconnected swivel fitting at the lower end thereof located a first predetermined distance from the nose of the lure comprising:
- an elongated body of substantial weight having a forward end, a rearward end, an upper side and a lower side,
- two grappling hooks of heavy guage wire stock capable of plastic deformation, each having a shank portion in substantial parallel alignment with the axis of said body, but below said axis, each extending from the forward end of said body for a distance approximately twice the length of the body of said lure, with one grappling hook extending slightly farther than the other,
- wherein the two grappling hooks are formed of one continuous piece of heavy guage wire and extending through the full length of said body extending out the rearward end thereof to form a loop suitable for attaching a cord,
- a first eyelet, for detachably connecting to said fishing line, located on the upper side of said body toward the rearward end thereof,
- a second eyelet, for detachably connecting to said fishing line, located on the upper side of said body toward the forward end thereof, the opening in said eyelet being large enough to allow said swivel fitting to pass therethrough,
- two wire members protruding substantially vertical for a short distance from the upper side of said body at a point substantially back from the forward end of said body, said members after extending vertically a short distance being bent forward forming a shank portion extending forward and then bent upwardly and curved slightly backwardly forming a hook at the end thereof at a distance less than said first predetermined distance prior to reaching said second eyelet, the slot between said hooks being in substantial alignment with said eyelets, and being less than the width of said swivel fitting, whereby said swivel fitting may be engaged in the slot of said upwardly extending wire members,
- said two wire members being fabricated of a material that can be bent so that the wire members may be spread to avoid engagement of the swivel fitting and a keeper is slidably mounted on said wire members so that it may be moved rearwardly to permit spreading of said wire members or moved forwardly to firmly hold the wire members a fixed distance apart, thereby defining a slot narrower than the width of said swivel fitting.

4,057,926
FISHING ROD
Carl R. Cordell, Jr., P.O. Box 2020, Hot Springs, Ark. 71901
Filed July 23, 1976, Ser. No. 708,199
Int. Cl.^{2} A01K *87/00*
U.S. Cl. 43—18 GF **4 Claims**



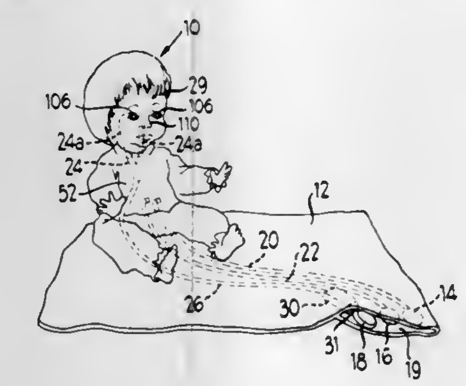
1. A fishing rod comprising a longitudinally tapered, hollow, unreinforced, tubular butt section and a solid rod-like, longitudinally tapered tip section, both sections being formed of fiberglass, a portion of the tip section being inserted in the outer end of the butt section, and a continuous filament wrapping engaging continuous parts of the tip and butt sections so as to conceal the joint of the said two sections.

4,057,927
REVERSE ACTION WEEDLESS HOOK
Kenneth P. Marlowe, Zwolle, La., assignor to Raymond Lee Organization Inc., a part interest
Filed June 3, 1976, Ser. No. 692,281
Int. Cl.^{2} A01K *83/00*
U.S. Cl. 43—43.6 **5 Claims**



1. A weedless fishhook device comprising:
- a generally J shaped fishhook with an eye at the top of the J and an upwardly facing barb at the bottom of the J; and
- an elongated wire spring having a fixed end secured to the fishhook adjacent the eye and a movable end having a spherical ball affixed thereto, said movable end normally extending along the barb with the ball being hooked underneath the barb with the spring passing through the eye intermediate its ends, the spring having a shape at which when the ball is disengaged from the barb the spring snaps downwardly and away from the barb leaving the bottom of the J and the barb fully exposed.

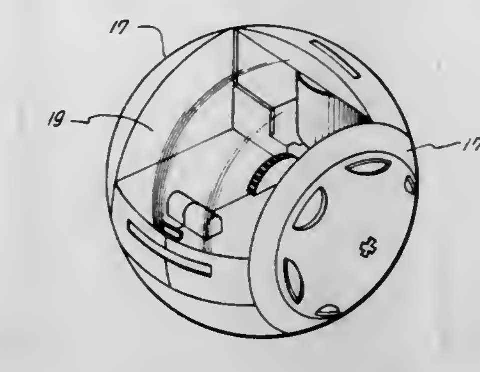
4,057,928
ARTICULATED DOLL
Rouben T. Terzian, Chicago, Ill., assignor to Marvin Glass & Associates, Chicago, Ill.
Filed Feb. 5, 1976, Ser. No. 655,621
Int. Cl.^{2} A63H *13/00*
U.S. Cl. 46—120 **5 Claims**



1. An articulated doll, comprising:
- a doll torso;
- a doll head mounted on the top of said torso by connection means for movement of the head about a definite side-to-side horizontal axis in a bobbing motion to indicate an affirmative characteristic and for movement in a swiveling action about a generally vertical axis to indicate a negative characteristic;
- a blanket for said doll for covering at least a portion of the doll; and
- actuating means disposed within a compartment of said blanket remote from said connection means but operatively associated therewith, through said blanket, for effecting movement of said head relative to said torso about either of said axes to indicate either affirmative or negative characteristics, with said blanket concealing said actuating means, wherein said doll head has apertures generally in the eye areas thereof, conduit means communicating between said apertures and said compartment of said blanket, and a liquid reservoir in said compartment connected with said conduit means, said actuating means further including means for moving liquid from said reservoir for excreting liquid from said apertures to simulate tearing by said doll.

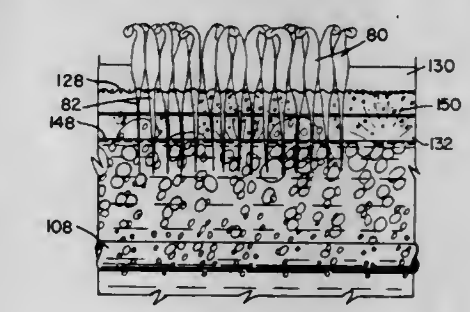
4,057,929
MOBILE RECONFIGURABLE SPHERICAL TOY
Iwakichi Ogawa, Kashiwa, Japan, assignor to Takara Co., Ltd., Japan
Filed June 9, 1976, Ser. No. 694,250
Int. Cl.^{2} A63H *17/00*
U.S. Cl. 46—201 **19 Claims**

1. A toy assembly comprising;
- a base member having a first and second side wall;
- a drive train extending between said first and second sides and having output shaft ends extending respectively from each side wall;
- a rotatable auxiliary shaft mounted within said base member for providing first and second rotatable coupling ends extending respectively from each side wall, and



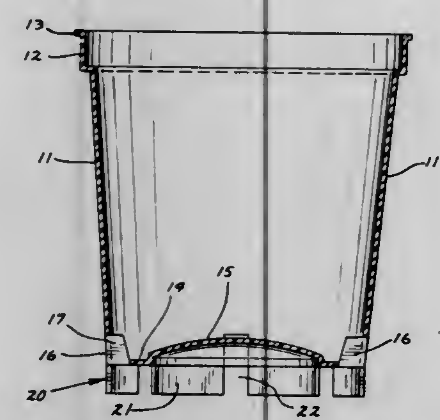
- a plurality of section members, each having means for attachment to said base member, and contoured such that when said section members are connected to said base member, a substantially spherical toy object results.

4,057,930
HYDROPONIC METHOD AND APPARATUS
Rayford A. Barham, 9101 Snowheights Northeast, Albuquerque, N. Mex. 87112
Continuation-in-part of Ser. No. 496,448, Aug. 12, 1974, abandoned. This application Mar. 18, 1976, Ser. No. 668,064
Int. Cl.^{2} A01G *31/02*
U.S. Cl. 47—61 **18 Claims**



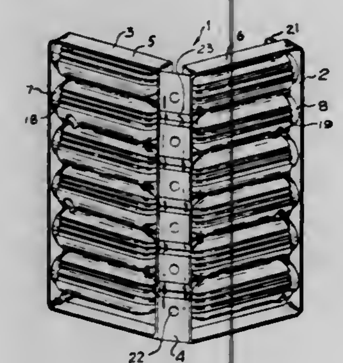
1. A hydroponic chamber comprising: a liquid holding chamber; a perforated, generally planar seed support member suspended in said chamber entirely above a predetermined level of liquid therein; means defining a substantially uniplanary arranged aeration grid in said chamber, substantially above the bottom of said chamber but just beneath said liquid predetermined level at least within the top one-half of the liquid; and means providing a supply of air under pressure to said aeration grid; said seed support being disposed at a predetermined height above said liquid predetermined level; said predetermined height being dependent upon the type of crop to be grown and so calculated that almost all of the root structure of a selected crop will be suspended in the space defined between said seed support member and said liquid predetermined level during growth; said aeration grid thus providing a supply of air bubbles which coalesce and burst at the surface of said liquid to provide a circulation of moisture droplets and moisture laden air about crop roots growing in said defined space; said chamber being sufficiently deep to define a settling tank of liquid undisturbed by action of said aeration grid, whereby any material washed from said seed support member by action of said aeration grid may fall therebeneath by gravity to settle at the bottom of said chamber so that such material is not recirculated onto the growing crop.

4,057,931
STACKABLE FLOWER POT
Kenneth R. Stutelberg, Bloomington, and Dennis C. Anderson, Northfield, both of Minn., assignors to National Polymers, Inc., Lakeville, Minn.
Filed Nov. 20, 1974, Ser. No. 525,580
Int. Cl.² A01G *9/02*
U.S. Cl. 47—66 **8 Claims**



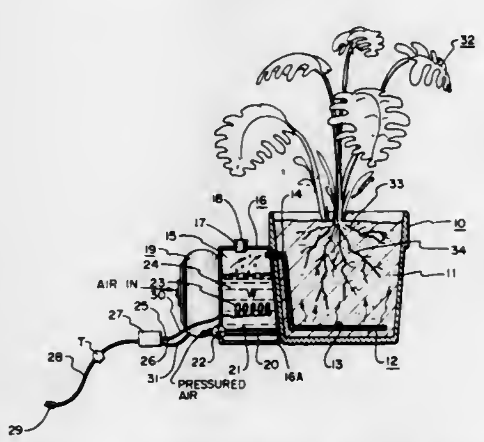
1. A flower pot having a side wall with a cylindrical upper edge portion defining an interior opening, and a bottom wall, and means fixedly attached to said flower pot and extending downwardly adjacent the periphery of said bottom wall to provide support members extending parallel to the longitudinal axis thereof for supporting said flower pot on a supporting surface, said support members being spaced apart to define recesses between adjacent support members, said recesses being dimensioned and positioned in relationship to the radius and thickness of the upper edge of said flower pot to adapt said flower pot for being supported by the upper edges of at least two other similar flower pots with at least a separate one of the support members of said first mentioned flower pot extending into the interior of each of two other similar flower pots to prevent said first mentioned flower pot from transversely sliding off the tops of other similar flower pots on which the first mentioned flower pot is supported.

4,057,932
CONTAINER FOR SEEDLINGS
Henry Anderson Spencer, 8005-137th St., Edmonton, Alberta, Canada (T5R0C1)
Continuation-in-part of Ser. No. 538,540, Jan. 6, 1975, abandoned, which is a continuation-in-part of Ser. No. 445,443, Feb. 25, 1974, abandoned, which is a continuation of Ser. No. 250,994, May 9, 1972, abandoned, which is a continuation-in-part of Ser. No. 126,605, March 22, 1971, abandoned. This application Oct. 1, 1976, Ser. No. 728,640
Int. Cl.² A01G *9/02*
U.S. Cl. 47—77 **27 Claims**



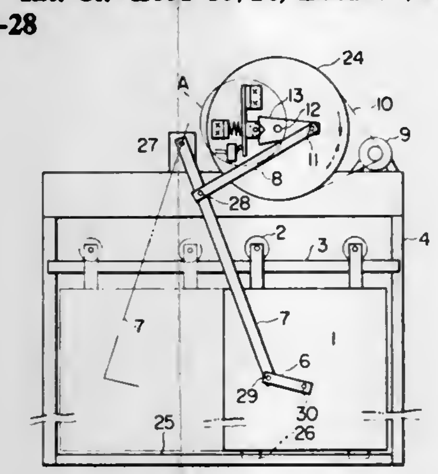
1. A container for growing seedlings, said container being normally upstanding when in use and comprising: a pair of first and second wall members, each formed of thin-walled, flexible, substantially non-porous sheet plastic, each said wall member comprising a series of spaced, inwardly-projecting, elongate shoulders integrally joined by webs, the shoulders of the first wall member being mutually opposed relative to the shoulders of the second wall member, said mutually opposed shoulders being provided with inter-engaging means, whereby when the wall members are pressed together, a series of open-topped cells are formed, defined by the shoulders and their connecting webs and closed along the greatest part of their length; said shoulders and webs combining to form a series of parallel, inwardly-directed, relatively broad, deep grooves within said shoulders, said grooves extending perpendicularly downwardly from the wall members' upper edge portions; the lower end portions of each pair of opposed webs and integrally joined shoulders combining to form the base of each cell, within which is formed an aperture, said aperture being smaller than the aperture at the top of the cell; said webs constituting the predominant portion of the side walls of the container, and each pair of opposed webs forming the side walls of an individual cell of said series of cells; each said web being corrugated longitudinally of said cell, the grooves of the corrugations on the interior side walls of each said cell extending downwardly directly toward the base aperture and constituting a series of root grooves for directing root growth toward said aperture; and hinge means connecting the wall members at their lower ends.

4,057,933
APPARATUS FOR AERATING COMMINUTED MATTER SUCH AS SOIL
Lyle F. Enyeart, 802 16th Ave., Scottsbluff, Nebr. 69361
Filed May 5, 1976, Ser. No. 683,258
Int. Cl.² A01G *9/24, 31/02*
U.S. Cl. 47—79 **3 Claims**



1. In combination, a plant container for receiving comminuted material to surround and support the root system of a plant; an air compressor having a pressurized air outlet; a separate normally-closed water container partially filled with water and having a base and receiving said pressurized air outlet beneath the water container's water level and proximate said base, said water container including a separate outlet means above the water level and extending into said plant container for conveying water-entrained air from said water container to said plant container at a position below the top and above the bottom of said material when said plant container is filled; an externally connectable heating element disposed within said water container beneath said water level; and removable solid closure means for facilitating filling of said water container.

4,057,934
PROTECTION SYSTEM FOR AUTOMATICALLY OPENABLE AND CLOSABLE DOOR
Isao Okubo, Katsuta; Takayoshi Ito, Naka, and Norihiko Mitsui, Katsuta, all of Japan, assignors to Hitachi, Ltd., Japan
Continuation of Ser. No. 564,220, April 1, 1975, abandoned. This application Oct. 8, 1976, Ser. No. 730,853
Claims priority, application Japan, Apr. 5, 1974, 49-37898
Int. Cl.² E05F *15/20;* **B66B** *13/24*
U.S. Cl. 49—28 **5 Claims**



1. A protection system for an automatically openable and closable door comprising:

driving means for opening and closing said door;

means for producing a driving force;

means for transmitting said driving force from said driving force producing means to a part of said driving means through a coupling by a frictional force in a normal condition wherein no external force is exerted for obstructing the door throughout at least one of the entire opening and closing operations, a relative displacement being caused in said driving force transmitting means in response to an abnormal condition wherein an external force is exerted on said door obstructing at least one of the opening and closing operations of said door and the output driving force from said driving means exceeds a driving force which is required to at least one of open and close said door in said normal condition, said driving force transmitting means being responsive to the abnormal condition in the door opening operation;

means for detecting the relative displacement caused in said driving force transmitting means; and

means for controlling movement of said door for stopping or for stopping and then reversing the at least one of opening and closing operations of said door by controlling said driving force producing means in response to the actuation of said relative displacement detecting means.

4,057,935
QUICK RELEASE MECHANISM FOR WINDOW GUARD OR THE LIKE
Rod G. Rohrberg, Torrance; Henry Patrick Trentz, Lomita, and Victor Herbert Ziegler, Torrance, all of Calif., assignors to Rod G. Rohrberg and Henry P. Trentz, both of Torrance, Calif.
Filed Feb. 3, 1977, Ser. No. 765,199
Int. Cl.² E06B *9/02;* **E05C** *3/28*
U.S. Cl. 49—56 **12 Claims**

1. A quick release latching device for releasably securing a guard to a wall surrounding an opening in said wall, comprising:

a tube member supported on said wall and extending between inner and outer portions of said wall,

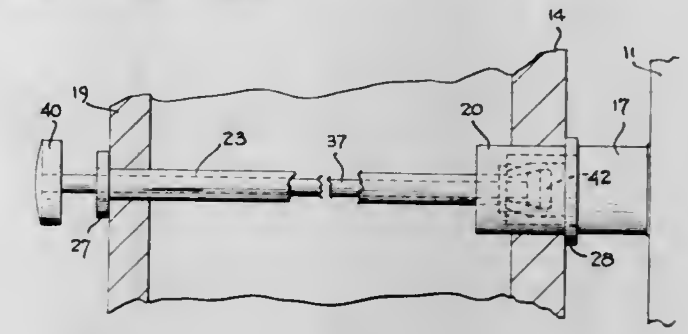
a sleeve member mounted on an outer portion of said wall and attached to said tube member near one end of said tube member,

a rod member slidably mounted within the tube member and extending from a point beyond the inner surface of said wall to a point within said sleeve member,

a latching member attached to the end of said rod member extending within said sleeve member,

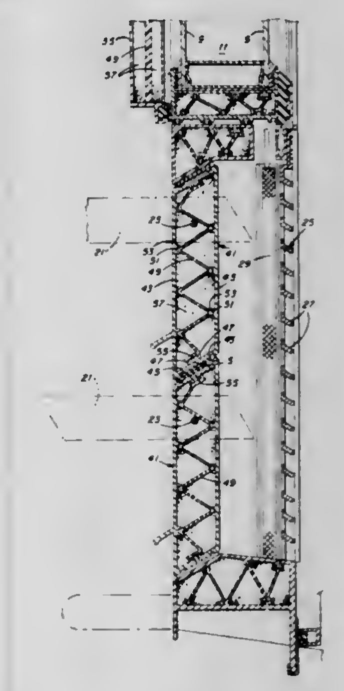
manually operable actuator member attached to the end of said rod member extending beyond the inner surface of said wall,

a resilient retainer collet attached to said one end of said tube member proximate to where the sleeve member is attached thereto, and



retainer means attached to said guard and having a receptacle formed therein for receiving said retainer collet, said latching member forcing said collet against the inner wall of said receptacle to secure the sleeve member to the receptacle when the device is in the latched condition, said sleeve member being released from the receptacle when the actuator member is depressed towards the inner wall surface to draw the latching member away from the collet.

4,057,936
THERMALLY INSULATED WINDOW SYSTEM
William Burk Wyatt, Jr., Nashville, Tenn., and Bruce D. Benefield, Huntsville, Ala., assignors to Videre Corporation, Nashville, Tenn.
Continuation-in-part of Ser. No. 765,280, Feb. 3, 1977. This application Mar. 11, 1977, Ser. No. 776,609
Int. Cl.² E05B *65/04*
U.S. Cl. 49—61 **6 Claims**



1. An insulated window system, for use in windows or doors, completely sealable by insulated panel members comprising:

an insulated frame section comprising a plurality of thermal break panel members, each panel member comprising

a pair of spaced channel-shaped sections having inwardly extending flanges along both sides thereof, facing each other,

a rigid plastic sheet of serrated cross-section situate between said channels and contacting the inner surface of each of said channels,

said plastic sheet having means thereon to contact the flanges of both of said channels to bind the channels

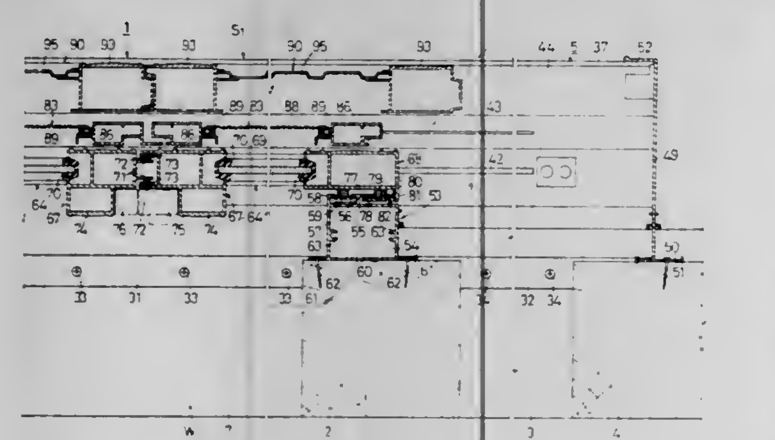
together and seal the spacing therebetween to provide a closed shell, and

foamed-in-place, expanded, closed-cell foamed polymeric material filling and monolithically sealing said shell to form the panel member; a double-pane window mounted within a first portion of the insulated frame section;

shutter sections attached adjacent the inner surface of the double-pane window movable from a first position completely covering the windowpanes to a second position exposing at least a portion of the windowpanes; and

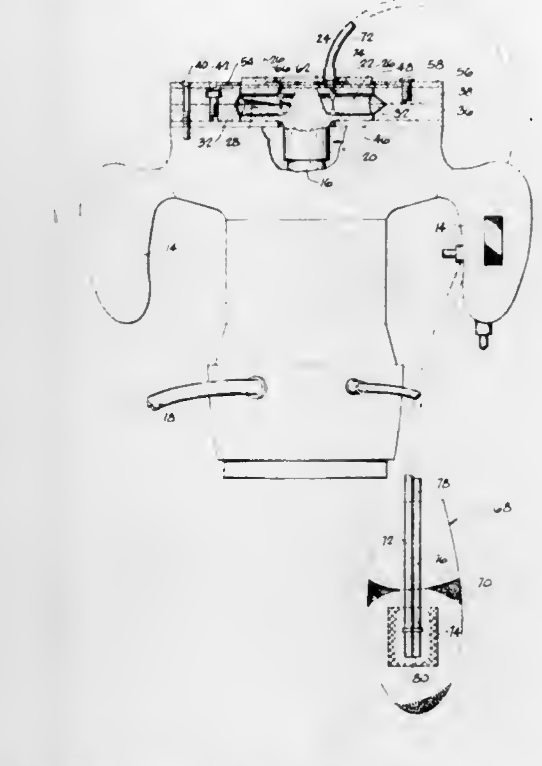
sealable vent means mounted in a second portion of the insulated frame section such that the window and vent occupy the area of said insulated frame section.

4,057,937
WINDOW SASH ASSEMBLY
Yoshihiro Nakamura, Shizuoka, Japan, assignor to Riken Keikinzoku Kogyo Kabushiki Kaisha, Shizuoka, Japan
Filed June 1, 1976, Ser. No. 691,829
Claims priority, application Japan, May 30, 1975, 50-74074; Feb. 3, 1976, 51-11646
Int. Cl.² E05F *11/38*
U.S. Cl. 49—372 **13 Claims**



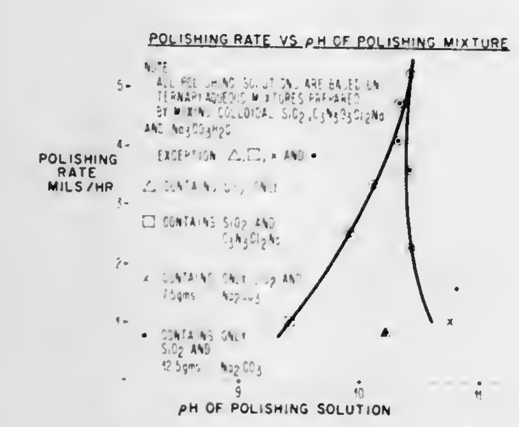
1. A window sash assembly for use on an exterior wall surface at a window opening defined by an upper lintel, a lower sill and side members, said window sash assembly comprising a rectangular framework formed by an upper horizontal frame member, a lower horizontal frame member and a pair of vertical side frame members extending between and engaged with the outer ends of the horizontal frame members, said framework including a window covering portion adapted to overlie the window opening and at least one window panel housing portion adapted to overlie the wall surface beside the window opening, and at least one partition pillar vertically oriented between the upper and lower horizontal frame member and defining, to the opposite sides thereof, the window covering portion and the window panel housing portion, said frame members and said partition pillar having generally planar inner faces mountable against an exterior wall surface, said upper horizontal frame member including downwardly facing upper slide web means, said lower horizontal frame member including upwardly facing lower slide web means in opposed cooperative relation to said upper slide web means, and at least one window panel positioned between and slidable along said upper and lower slide web means between the window covering portion and the window panel housing portion, the window panel being completely receivable within the window panel housing portion, said partition pillar having an outer face positioned immediately inward of the upper and lower slide web means for movement of the window panel thereacross in sliding between the window covering portion and the housing portion, said window panel, when in the window covering portion, including an outer side frame member overlying the outer face of the partition pillar, and sealing means engaged between the outer face of the partition pillar and the overlying outer side frame member of said window panel.

4,057,938
PORTABLE SAND BLASTING DEVICE
John H. Rohlfs, 1955 Torringford West St., Torrington, Conn. 06790
Filed June 17, 1976, Ser. No. 697,013
Int. Cl.² B21J *13/00*
U.S. Cl. 51—429 **29 Claims**



1. A portable sand blasting device comprising a housing adapted to be held and manipulated manually, an electric motor supported by the housing and having a rotatable output shaft, electrical conductor means for connecting the motor to a source of electrical power, a high speed air and sand impeller mounted on the motor output shaft and having inlet and discharge openings respectively for receiving and discharging air and entrained sand and at least one air and sand passageway interconnecting said inlet and discharge openings, at least one additional air inlet opening for said impeller, nozzle means arranged to receive air and entrained sand from said discharge opening and to discharge a high speed stream of air and sand for a blasting operation, a sand receptacle for holding a supply of sand, and air and sand supply conduit means connected between sand in said receptacle and said impeller inlet opening.

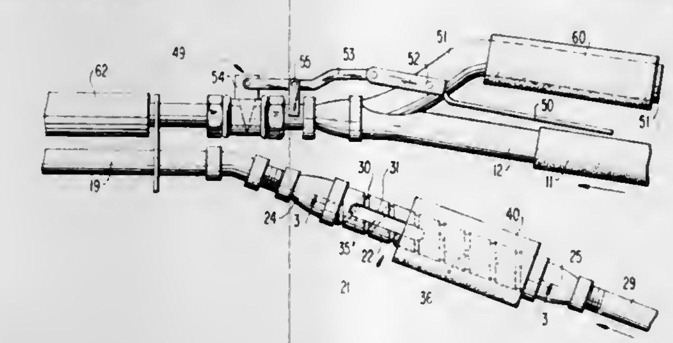
4,057,939
SILICON WAFER POLISHING
Jagtar S. Basi, Fishkill, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.
Filed Dec. 5, 1975, Ser. No. 638,018
Int. Cl.² B24B *1/00*
U.S. Cl. 51—281 R **16 Claims**



1. A reagent composition for polishing substrates comprising an aqueous mixture of silicon dioxide particles in a size range of about 5 to about 200 millimicrons, a soluble alkali metal base and an oxidizing agent selected from the group consisting of sodium and potassium salts of dihaloisocyanuric acid, wherein the ratio of said base to said oxidizing agent is in the range of about 05:1 to about 3.2:1, and with the ratio of silicon particles to said base in the range of about 8.5:1 to about 55.6:1.

9. A process for polishing crystalline silicon which comprises applying to a surface of said silicon a polishing composition of claim 1, and polishing said silicon therewith.

4,057,940
CONTROL FOR SAND BLASTING NOZZLE
Otto Wemmer, 3710 Greenbriar Drive, Columbia, S.C. 29206
Filed Dec. 2, 1976, Ser. No. 746,939
Int. Cl.² B24C *7/00*
U.S. Cl. 51—438 **8 Claims**



1. In a sand blasting apparatus having a blasting fluid supply, a discharge nozzle with a suction inducing means and a grit delivery conduit leading from a supply of grit to the suction inducing means of said sand blasting nozzle, a valve assembly positioned in said grit conduit between said suction inducing means and said grit supply and comprising an elongated valve body having a cylindrical wall disposed about the longitudinal axis thereof to define a passage extending therethrough, said valve body being connected in said conduit with said passage in line therewith; a smooth outer surface around the periphery of said valve body defining a cylindrical valve seat exposed to the atmosphere; spiral thread means on the cylindrical surface of said seat; an aperture extending along said seat and through said wall to provide an opening between the atmosphere and said passage; and a resilient deformable cylindrical sleeve carried on said body and surrounding a portion of said valve seat, the inner portion of said sleeve being deformed by engaging said thread means and said sleeve being arranged for longitudinal movement along said seat surface between a first position to cover and seal said aperture and a second position to uncover said aperture and expose said passage to the atmosphere upon rotation of said sleeve in contact with said thread means, thereby adjustably controlling the degree of suction induced in the grit delivery conduit by the suction inducing means of said nozzle.

4,057,941
MODULAR GREEN HOUSE CONSTRUCTION
Seymour L. Schwartz, North Hollywood, Calif., assignor to Airflow Aluminum Awning Company, Gardena, Calif.
Filed Dec. 19, 1975, Ser. No. 642,418
Int. Cl.² E04B *1/12, 7/02*
U.S. Cl. 52—63 **9 Claims**

1. A modular building construction comprising:

a plurality of panels having a frame formed of a universal beam comprised of:

an elongate substantially hollow beam having a substantially rectangular cross section;

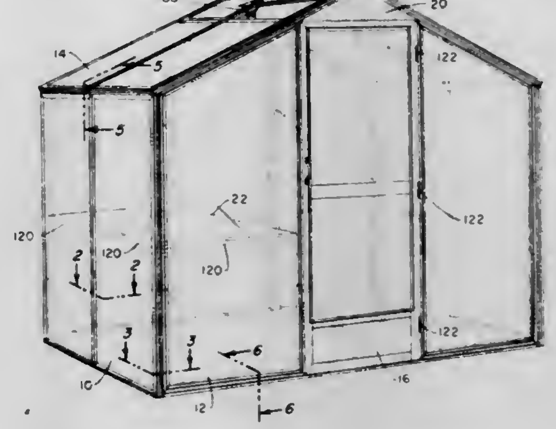
a pair of outwardly facing, mirror image, continuous slots on opposite sides of said beam for interlocking adjacent beams when their sides are in abutment;

an outward facing, ribbed channels on a third side of said beam for forming a continuous, peripheral, screw-receiving channel when a plurality of said beams are formed into panel frames;

cover securing means on a fourth side of said beam for securing a panel covering,

interlocking means for interlocking the mirror image slots of abutting universal beams to form walls and a ceiling;

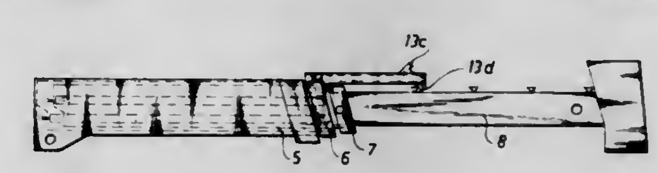
capping bracket means for sliding over and capping said frames for joining adjacent walls to form corners;



said capping bracket having a flange extending over the rib channel for securing adjacent panels; and

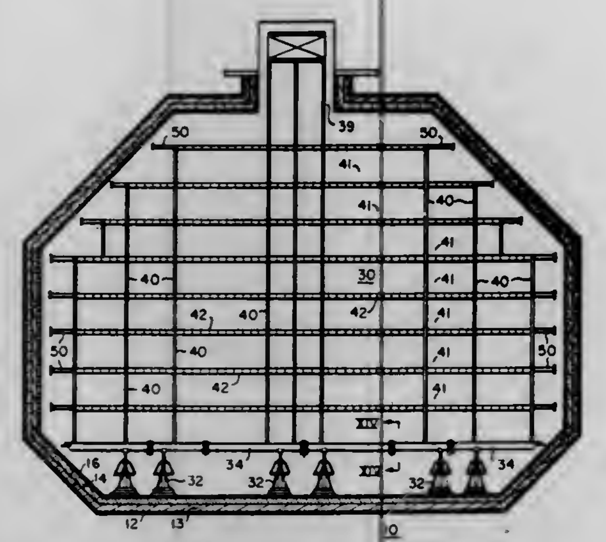
a substantially transparent material stretched across and secured to said cover securing means for enclosing said modular building.

4,057,942
TELESCOPIC BOOM WITH HYDRAULIC ACTUATING MECHANISM
Wilhelm Kranefeld, Wetter, and Helmut Schneider, Kamen-Methler, both of Germany, assignors to O & K Orenstein & Koppel Aktiengesellschaft, Berlin, Germany
Filed May 3, 1976, Ser. No. 682,645
Claims priority, application Germany, May 2, 1975, 2519558
Int. Cl.² B66C *23/04*
U.S. Cl. 52—115 **3 Claims**



1. A telescopic boom for movable cranes, which includes in combination: at least one hydraulically displaceable telescopic slide, bearing means connected to said hydraulically displaceable slide, at least one mechanically displaceable telescopic slide, a holding bar for operatively pushing out and retracting said at least one mechanically displaceable telescopic slide, said holding bar having a free end portion with a pushing member and with a pulling member offset by 180° with regard to said pushing member, said holding bar having its other end portion provided with transverse bolt means for engagement with said bearing means, and multiple dovetail-shaped cam means connected transversely to direction of actuation of said at least one mechanically displaceable telescopic slide and spaced from each other in the axial direction of said at least one mechanically displaceable telescopic slide.

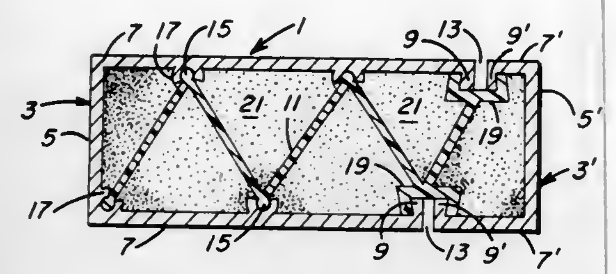
4,057,943
MODULAR SCAFFOLDING FOR ASSEMBLING THE INSIDE OF AN LNG VESSEL
Robert W. Lienhard, Pittsburgh, Pa., assignor to Swiss Fabricating, Inc., Pittsburgh, Pa.
Filed Feb. 23, 1976, Ser. No. 659,991
Int. Cl.[2] E04G *3/02, 11/04*
U.S. Cl. 52—126 **11 Claims**



1. Scaffolding apparatus, for use in finishing the interior of an LNG vessel which has a top, bottom and sides, comprising:
a base spaced apart from the bottom of the LNG vessel;
a plurality of adjustable supports disposed between said base and the bottom of the LNG vessel for supporting said base from the bottom of the LNG vessel;
a plurality of vertical columns supported from and extending upward from said base and each of said plurality of vertical columns being formed from a plurality of vertical members;
a plurality of spaced apart horizontal levels each supported only from said plurality of vertical columns and dividing the inside of the LNG vessel into a number of horizontal levels;
each horizontal level comprises a plurality of horizontal members connected to and supported from some of said plurality of vertical columns;
a plurality of adjustable horizontal outriggers, disposed around the periphery of each horizontal level for varying the area defined by each horizontal level, some of said outriggers connected to some of said plurality of vertical columns and the rest of said outriggers connected to some of said horizontal members; and,
outrigger connecting means for connecting each outrigger to its associated vertical column or horizontal member and being constructed to prevent pivotal movement about the axis of connection between said outrigger and the associated vertical column or horizontal member.

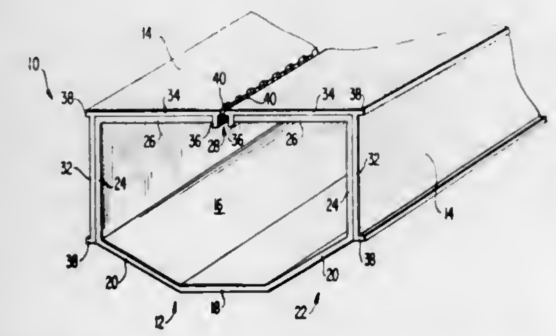
4,057,944
THERMALLY INSULATED PANEL
William Burk Wyatt, Jr., Nashville, Tenn., and Bruce D. Benefield, Huntsville, Ala., assignors to Vidore Corporation, Nashville, Tenn.
Filed Mar. 11, 1977, Ser. No. 776,610
Int. Cl.[2] E04C *2/40;* **E04B** *3/70*
U.S. Cl. 52—309.11 **8 Claims**

1. A thermally insulated panel member comprising:
a pair of spaced channel-shaped sections having inwardly extending flanges along both sides thereof, facing each other;
a rigid plastic sheet of serrated cross-section situate between said channels and contacting the inner surface of each of said channels;
said plastic sheet having means thereon to contact the flanges of both of said channels to bind the channels together and seal the spacing therebetween to provide a closed shell; and



closed-cell foamed polymeric material filling and monolithically sealing said shell to form a panel.

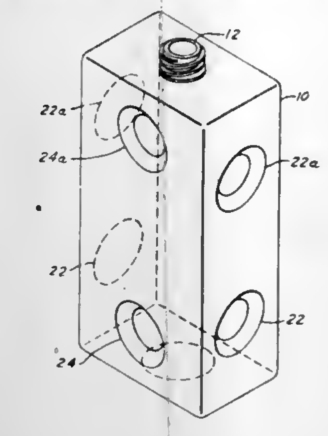
4,057,945
INSULATING SPACER FOR DOUBLE INSULATED GLASS
Gerald Kessler, Box 389, Youngstown, Ohio 44501
Filed Oct. 19, 1976, Ser. No. 733,902
Int. Cl.[2] E06B *3/24*
U.S. Cl. 52—398 **10 Claims**



1. An insulating spacer for precision separation of plates in double insulated glass, comprising:
a metal spacer for interposition between two glass panes, said metal spacer permitting conventional sealant bonding of the glass to the spacer, said metal spacer having a slot running the length thereof; and
insulating means attached to said metal spacer to thermally isolate said metal spacer from the two panes of glass, thereby greatly reducing the heat transfer from one pane of glass to the other through the spacer, said insulating means comprising an elongated plastic element formed of two symmetrical sections, each fitting tightly to a portion of said metal spacer so that each is fixedly held to the metal spacer, and each correspondingly covering at least a portion of one of the two sides of the spacer which contact the glass plates, said two symmetrical sections of said insulator making minimal contact with each other, said sections being separated adjacent the slot of said metal spacer.

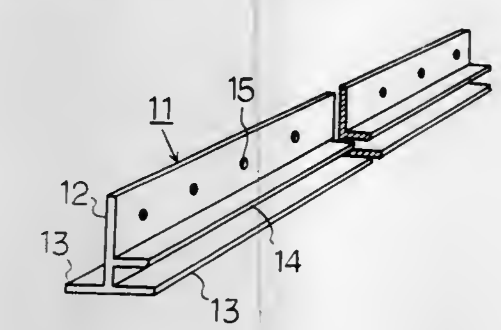
4,057,946
BOTTLE FOR BUILDING CONSTRUCTION
Charles W. Barrett, 47616 N. Shore Drive, Belleville, Mich. 48111
Filed May 18, 1973, Ser. No. 361,469
Int. Cl.[2] B65D *21/02;* **E04B** *1/12;* **E04C** *1/10*
U.S. Cl. 52—436 **14 Claims**

1. An assemblage of at least two bottles of generally rectangular cross section having a pair of generally flat opposite side surfaces devoid of projections, said bottles being arranged in end-to-end relationship one of said bottles having a top end having a short uncapped filling neck of predetermined length projecting therefrom, the other of said bottles having a bottom end having a tapered indentation of a depth which is less than said predetermined length of said neck by a mortar joint thickness and which receives the end of said uncapped neck of said one of said bottles, said indentation also having abutment surfaces for engagement by the top side edge of said uncapped neck and which include outwardly tapered side surface portions which when said bottles are not centered will engage the edge of said uncapped neck and move the bottles laterally to



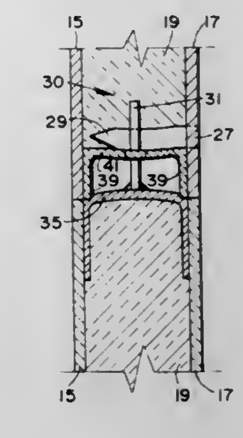
bring said generally flat side surfaces flush when said neck is slid down said tapered side abutment surfaces, and material between said bottles in said mortar joint spacing simulating mortar.

4,057,947
JOINING AND FIXING STRUCTURE FOR CEILING BOARDS AND PANELLING
Kunimasa Oide, 3-33, Seiwadai-nishi-1, Kawanishi, Hyogo, Japan
Filed Mar. 9, 1976, Ser. No. 665,199
Claims priority, application Japan, Mar. 17, 1975, 50-32586
Int. Cl.[2] E04B *5/52*
U.S. Cl. 52—496 **6 Claims**



1. Means for forming a planar surface comprising a plurality of substantially parallel base members spaced apart and parallel to said surface, each of said members being provided with a joining device,
each said joining device comprising a substantially flat upstanding plate portion adjacent one side of each of said base members and affixed thereto, an engaging plate substantially perpendicular to said upstanding plate and extending on either side of the edge of said upstanding plate remote from said base members,
a plurality of substantially flat members adapted to form said surface and having slits corresponding to said engaging plate, said engaging plate in said slits, whereby said flat members are securely joined in an end-to-end relationship,
each said joining device being provided with a rib flange perpendicular to said upstanding plate and extending outwardly from one side of said upstanding plate, said flange being parallel to said engaging plate and spaced therefrom by a distance substantially equal to the thickness of said flat members from said surface to said slits.

4,057,948
LOCKING DEVICE
William D. Wise, Box 29, Genoa, Nev. 89411
Filed June 17, 1976, Ser. No. 696,890
Int. Cl.[2] E04C *1/10*
U.S. Cl. 52—582 **5 Claims**



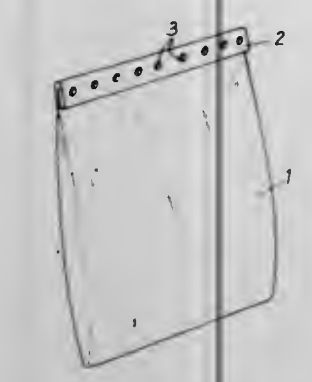
1. A panel locking device for assembling and interlocking two double walled, bonded core, structural panels of the kind which exhibit a substantial amount of thermal expansion and contraction in normal installed use and wherein said locking device provides the interlocking along the adjoining edges of the panels by structurally integrating the locking device within the two panels, said locking device comprising,
a first panel comprising two spaced outer covers an inner core bonded to the outer covers, and a perimeter frame means
a second panel comprising two spaced outer covers an inner core bonded to the outer covers, and a perimeter frame means,
said first perimeter frame means comprising a first relatively rigid but elastically deflectable male web and a lug connected to the web at one end of the lug and having an outwardly projecting end with a pin receiving and panel aligning hole extending through the outer end of the lug,
said second perimeter means comprising a female channel having two flanges and a second relatively rigid but elastically deflectable web between the flanges and formed with a lug receiving slot extending through the web,
an aligning and locking pin having a tapered tip,
and wherein a pair of the pin receiving hole in the lug is so located as to permit initial entry of the tapered tip of the pin into the pin receiving hole along the backside of the female web when the two panels are aligned in initial edge contact with the edges of the female channel flanges engaged with the male web and with the lug extending through the slot in the web of the female channel and wherein the pin receiving hole is also so located so as to require sufficient elastic deflection of the male and female webs as to retain the panels tightly locked together under tension under all conditions of subsequent thermal expansion and contraction of the bonded cores and structural panels when the pin is driven into the hole up to the full diameter of the pin.

4,057,949
BAGGING METHODS
Maurice F. Greffe, Meylan, France, assignor to Societe des Brevets Greffe, Meylan, France
Filed Nov. 19, 1976, Ser. No. 743,300
Claims priority, application France, Dec. 22, 1975, 75.39237
Int. Cl.[2] B65B *31/02*
U.S. Cl. 53—22 B **12 Claims**

1. A method of bagging material in a bag to reduce the quantity of air trapped in the bag comprising the steps of:
filling a quantity of material in the bag,
forming a closure for the previously filled bag by
a. first bringing the lips of the bag opening together and

folding the lips over on themselves to form a fold area and,

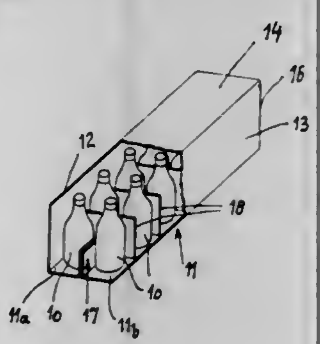
b. then providing a plurality of seals spaced apart along the fold area



subjecting the bag to a reduced pressure to deaerate it through the closure, and

subjecting the bag to atmospheric pressure, the said closure forming an obstacle to the intrusion of the outside gases.

4,057,950
CARDBOARD CONTAINER FOR BOTTLES AND THE LIKE
Heinz Focke, 309 Verden Moorstrasse, Germany
Division of Ser. No. 390,263, Aug. 21, 1973, Pat. No. 3,937,391. This application Nov. 18, 1975, Ser. No. 633,136
Claims priority, application Germany, Oct. 23, 1969, 1953350
Int. Cl.² B65B *21/06*
U.S. Cl. 53—26 **1 Claim**



1. A process for inserting a double row of articles such as bottles, cans or the like into a container and preparing said container from a unitary blank having integral top, side, bottom and end walls, wherein said bottom wall is formed of two portions of the blank on opposite sides thereof with a flap co-extensive in length with each bottom portion and from at least one cross-piece provided with a slit which is adapted to be placed in a form locking manner on a central longitudinal piece formed from said flaps, comprising positioning said rows of articles with each row disposed upright in oppositely slanting positions adjacent each other at the top, placing said cross-piece between adjacent articles in the row adjacent the tops of the articles, folding the unitary blank about the two rows of articles while the articles are disposed in the oppositely slanted position, and extending the flaps upwardly between said rows, bringing the separated rows of articles together and lowering the cross-pieces over the longitudinal central piece defined by said flaps.

4,057,951
PACKAGING MACHINE
Walter Max Schneider, Lansing, Ill., assignor to Land O'Frost Inc., Lansing, Ill.
Filed Jan. 28, 1977, Ser. No. 763,297
Int. Cl.² B65B *57/06, 57/12, 31/02*
U.S. Cl. 53—55 **42 Claims**

1. A multi-station packaging device for automatically packing a portion of a food product into a food container and performing all subsequent operations including filling, purging, and sealing the food container, and discharging the filled food container for further handling, comprising in combination,

a support table,

a turret mounted on said support table,

said turret including a plurality of food container retention means, each of said retention means adapted to retain a single food container thereon,

at least a first processing station positioned adjacent to said support table and in association with said turret,

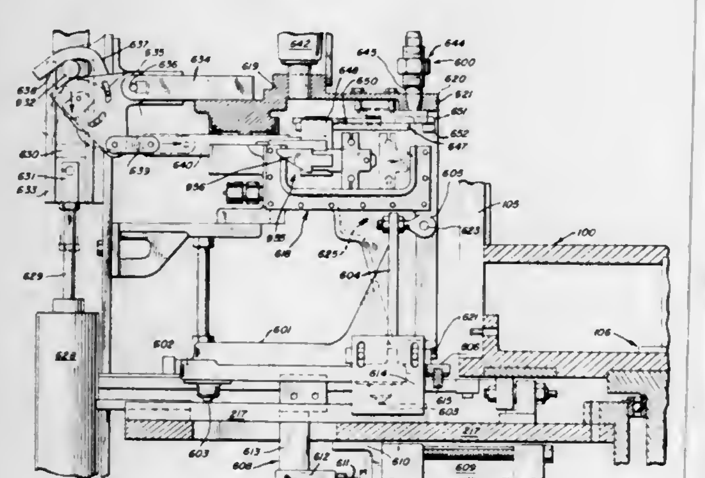
said first processing station including magazine means for carrying a plurality of food containers therein, and further including deposition means for retrieving a single food container from said magazine means and depositing said food container on said turret retention means,

at least a second processing station positioned adjacent to said support table and in association with said turret,

said second processing station including loading means for loading a pre-determined portion of a food product into said single food container,

at least a third processing station positioned adjacent to said support table and in association with said turret,

said third processing station including vacuum means positioned in operative cooperation with said corresponding retention means of said turret thereby to create vacuum environment surrounding said filled food container,



purging means associated with said vacuum means for purging said food container with said food product contained therein,

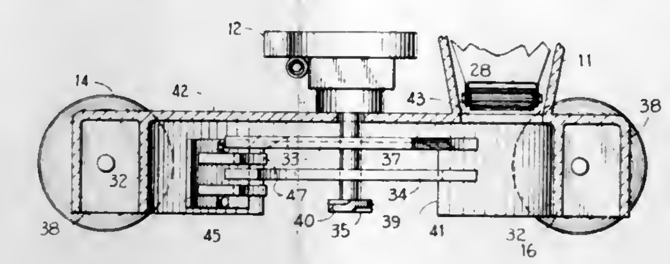
sealing means associated with said vacuum means for simultaneously sealing said food container while said food container and contained food product is in the purged condition and under vacuum conditions,

discharge means for effecting the discharge of said food container with said food product contained therein from said retention means of said turret for further handling,

and indexing means for effecting an indexing function between said turret relative to each of said processing stations such that said food container may be consecutively processed at each of said processing stations,

whereby said packaging machine may be operated on an automatic and continuous basis to remove a single food container from said magazine means and position the same on said turret retention means, and said indexing means operating to effect a relative indexing function to occur such that said food container is consecutively processed at each consecutive food processing station to provide a filled, purged and sealed food container and discharging said food container from said retention means for further handling.

4,057,952
ROTARY MOWER AND SHREDDER DEVICE
George K. Brokaw, 110 Forest Lane, Berkeley, Calif. 94708
Filed Jan. 19, 1976, Ser. No. 650,508
Int. Cl.² A01D *35/264*
U.S. Cl. 56—16.9 **2 Claims**



1. A rotary lawn mower apparatus adapted to cut and shred light and relatively heavy articles as well as cutting grass, comprising:

a housing mounted on wheels so as to be close to the ground, and including a horizontal upper wall and an open bottom;

an opening in said horizontal upper wall of the housing;

a hopper mounted on the upper side of the housing over said opening;

roller-type feeding means mounted on the hopper for feeding material from the hopper down through the opening into the housing, including relatively heavy articles;

a vertically oriented, motor driven shaft extending substantially through the height of the housing and mounted for rotation within the housing;

a cutting and chopping blade in the housing affixed horizontally to the shaft close to said horizontal upper wall of the housing, having opposed sharp cutting ends positioned below the housing opening and adapted to cut articles entering the housing from the hopper;

said horizontal upper wall of the housing having bracing means affixed to its under side, at the downstream side of the opening, extending into close proximity with the path of said sharp cutting ends of the cutting and chopping blade, for bracing relatively heavy articles as they enter the housing from the hopper and are engaged by said cutting ends;

a shredding and mulching blade affixed horizontally to the shaft, spaced below and rotationally staggered from the cutting and chopping blade, and having opposed shredding ends;

said housing having pairs of vertically spaced shredder bars affixed to its inside periphery and positioned in registry with one another above and below the path of said shredding ends such that articles engaged between the shredding ends and the shredder bars will be shredded;

a grass mowing blade affixed horizontally to the shaft so as to be close to the ground, spaced below and rotationally staggered from the shredding and mulching blade, and having opposed mowing ends adapted to mow grass when the housing is advanced on its wheels; and

said cutting and chopping blade having a substantially higher moment of inertia about its rotational axis than said mowing blade;

whereby, in addition to cutting grass, the apparatus will cut and shear off organic articles, including relatively heavy articles, as they are fed in from the hopper, and shred them into a fine mulch.

4,057,953
TRIANGULAR LAWN RAKE
William P. Rugg, Greenfield, Mass., assignor to Rugg Manufacturing Company, Greenfield, Mass.
Filed May 14, 1976, Ser. No. 686,583
Int. Cl.² A01D *7/00*
U.S. Cl. 56—400.17 **13 Claims**

1. In a lawn rake,

a. a handle;

b. a triangular spread of teeth,

said teeth, considered progressively from the center to the opposite sides of the spread, being of gradually increasing extent radially from the spread triangle apex,

whereby the projecting of all said teeth is to common tangency with the same straight line or vertical plane transverse or normal to said handle, and thereby for raking cleanly from and close against a laterally straight, vertical edge or surface;

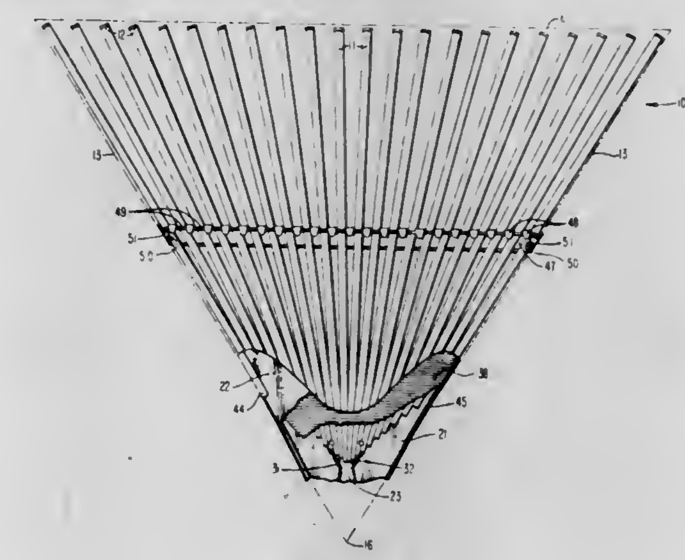
c. downturned working ends integrally formed at the outer ends of said teeth,

said teeth working ends being all of the same vertical extent or height;

d. socket head means for durably and securely joining the inner ends of said teeth to said handle, said socket head means comprising

d_1. flat transverse means individually separately engaging and fixing said teeth inner ends in laterally contiguous, co-planar array and with the backs of said teeth parallel-extending therefrom,

whereby said teeth outer ends also all occupy the same transverse or horizontal plane, and



whereby with their said working ends all of the same height said teeth uniformly engage the lawn surface when swung through all rake use attitudes of handle inclination thereto;

d_2. thin, flat, transverse, light-weight, rigid plate members, engaged to the opposite sides of said teeth spread and flat transverse means, and extending radially beyond the teeth inner ends to supply to said teeth spread a proper balance as between resiliency and stiffness,

said plate members formed also to accommodate the positioning of said teeth inner ends, considered progressively from the center to the opposite sides of said teeth spread, at gradually increasing distances radially from said spread triangle apex, whereby said teeth of said triangular spread project to said same straight transverse line with teeth backs all of the same identical length;

d_3. a receptacle for and mounting therewithin one end of said handle, said receptacle integrally formed in said plate members; and

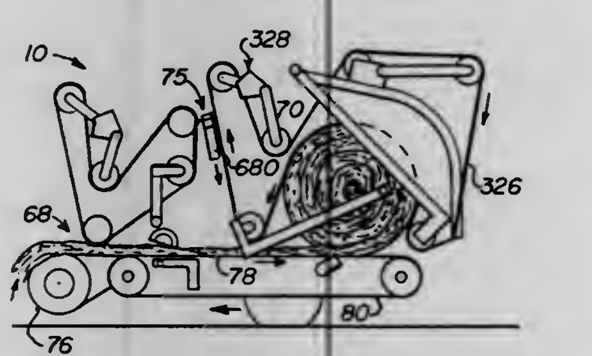
d_4. means securing together said teeth spread, flat transverse means, and plate members.

4,057,954
MATERIAL LAYER DIVERTING MEANS FOR A CROP MATERIAL ROLL FORMING MACHINE
Aquila D. Mast, Lancaster, Pa., assignor to Sperry Rand Corporation, New Holland, Pa.
Filed Feb. 9, 1976, Ser. No. 656,752
Int. Cl.² A01D *39/00*
U.S. Cl. 56—341 **10 Claims**

1. In a crop material roll forming machine, the combination comprising:

a mobile frame adapted to move across a field;

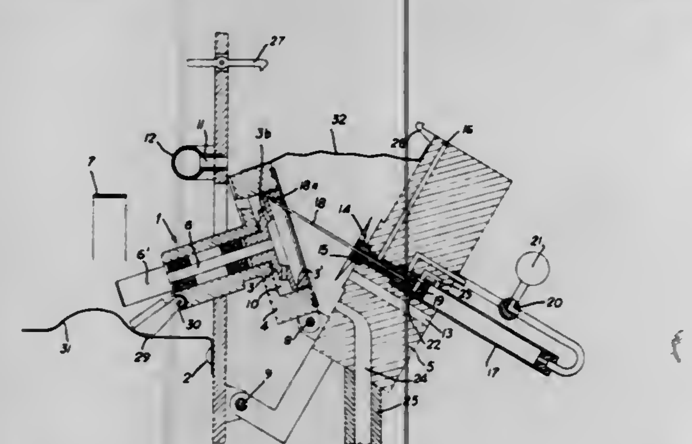
crop material delivery means supported by said frame above the field;
upper flexible means;
means movably mounting said upper flexible means to said frame above said delivery means to define a roll forming region therebetween having inlet and discharge ends;
said delivery means including means operable to move crop material along one path from said inlet end toward said discharge end of said region;
said upper flexible means having a portion located at said discharge end of said region in closely spaced relationship



above said delivery means and being movably operable to move crop material along another path generally upwardly away from said discharge end of said region; and
means movable with said upper flexible means and adapted to extend outwardly therefrom and into the space between said portion of the latter and said delivery means at said discharge end of said region, said outwardly extending means being effective to divert crop material upon its arrival at said discharge end of said region out of said one path and into said another path for movement therealong by said upper flexible means.

4,057,955
CLEANING DEVICE FOR OPEN-END SPINNING UNITS

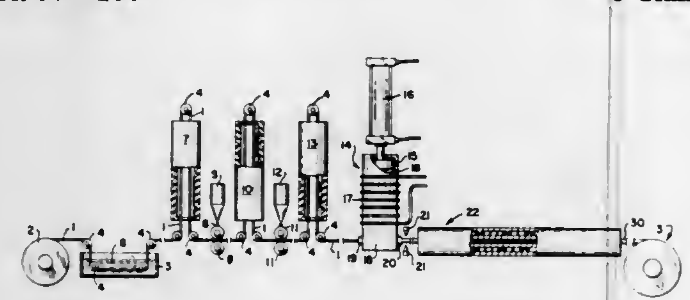
Christian Roehrich, Chaillevette, France, assignor to Nuova San Giorgio S.p.A., Genova-Sestri, Italy
Filed May 27, 1976, Ser. No. 690,624
Claims priority, application Switzerland, June 3, 1975, 7117/75
Int. Cl.² D01H *11/00, 1/12*
U.S. Cl. 57—56 **5 Claims**



1. A cleaning device for the spinning rotor in an open end spinning unit of the type wherein a portion of the rotor has a fiber collecting groove formed therein, the spinning unit further being of the type where the rotor is carried by a housing and wherein a cover is disposed in a closed position wherein it closes a portion of said housing and is movable in an overturning direction relative to the housing to form a space with said housing, said device comprising means for stopping movement of said cover in said overturning direction for at least partially supporting said cover in a predetermined open position relative to said housing, an axially extending tube mounted on said cover for movement therewith, said tube having first and second end portions, said tube being slidably movable relative to said housing in an axial direction between an advanced position where said first end portion is disposed closely adjacent said annular groove of said rotor and said second end portion is in communication with a source of pressure and a retracted position, said first end portion including baffle means for directing fluid substantially tangentially with respect to said rotor to thereby rotatably drive said rotor while cleaning said annular groove, curtain means for sealing the space formed between said cover and said housing as said housing moves to said predetermined open position, and means for connecting said space to a source of suction.

4,057,956
RUBBER COVERED CABLE

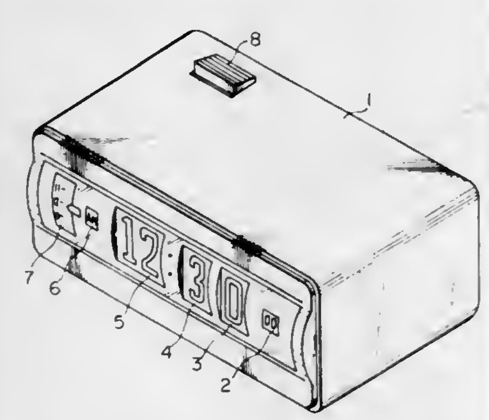
Russell W. Tolle, 4032 Johnson Road, P.O. Box 721, Chanute, Kans. 66720
Filed Mar. 17, 1976, Ser. No. 667,507
Int. Cl.² D07B *1/16*
U.S. Cl. 57—164 **8 Claims**



1. A continuous process for producing a steel cable having an outer coating of vulcanized rubber thereon, comprising:
a. applying an outer coating of a vulcanizable rubber compound to the outer surface of a flexible, high tensile strength steel cable to provide a coated cable,
b. pulling said coated cable through a heated die having an inside diameter smaller than the outside diameter of the coated cable, thereby vulcanizing said outer coating and reducing the thickness thereof, whereupon
c. said steel cable is covered with a flexible, continuous, vulcanized outer coating of rubber, and wherein the diameter of the covered cable is significantly less than prior to passage thereof through said die.

4,057,957
ALARM DEVICE OF CLOCKS

Rokusaburo Kimura, Kobe, and Sadashige Horii, Shijonawate, both of Japan, assignors to Matsushita Electric Works, Ltd., Japan
Filed Apr. 8, 1976, Ser. No. 675,162
Int. Cl.² G04C *21/16*
U.S. Cl. 58—21.155 **3 Claims**



1. An alarming device of clocks comprising
a drive source; a clock mechanism supported between a pair of opposing base plates to be driven by said drive source and including a time indicating means which is intermittently shifted by means of intermittent rotary shafts rotated intermittently;

an alarm sound source;
a set time indexing wheel rotated about a shaft and shifted in an axial direction of said shaft as actuated by said clock mechanism when a set time is reached;
an actuating lever pivotable respectively in a first plane including said axial direction of the shaft of said indexing wheel and in a second plane perpendicular to said first plane and parallel to a surface of one of said base plates;
a switching means for said alarm sound source comprising a stationary contactor and a movable contactor reciprocally actuated following pivoting movement of said actuating lever in respective directions in said first and second planes; and
a snoozing means for restricting said movements of the actuating lever for a fixed period,
said snoozing means including a snooze cam movable along said second plane and an eccentric rotary shaft formed at an end of one of said intermittent rotary shafts of said clock mechanism, the arrangement being such that said actuating lever pivotally moves along the first plane responsive to said shift of the indexing wheel in said axial direction to switch said switching means into ON-state, the actuating lever is pivotally moved manually along the second plane so as to be restricted by said snoozing means in a position for switching the switching means into OFF-state, and said snooze cam of the snoozing means is shifted in response to said intermittent rotary motions of said eccentric rotary shaft so as to release said restriction of the actuating lever after a predetermined time has lapsed.

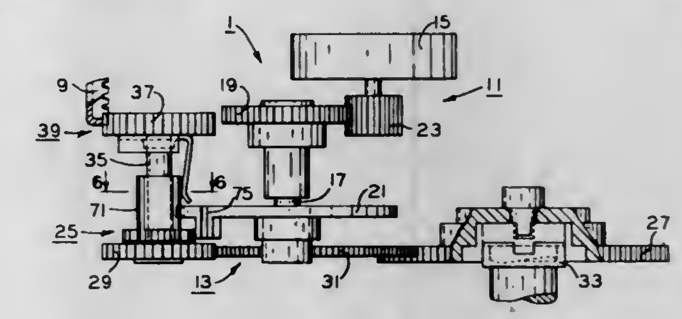
4,057,958
WATCH WINDER

Thomas Wuntch, 10638 Boedeker St., Dallas, Tex. 75230
Filed Sept. 20, 1976, Ser. No. 724,867
Int. Cl.² G04B *3/00;* **G04D** *3/00*
U.S. Cl. 58—82 R **14 Claims**

1. Apparatus for winding a mechanical self-winding wrist watch having an internal self-winding stem and rotor, said apparatus comprising:
a detachable mandrel adapted for the mounting of a watch thereon;
an eccentric winding shaft rotatably mounted to said mandrel wherein the axes of rotation of the watch supported by said mandrel and that of the stem of the internal self-winding rotor of the watch are coincident with the axis of rotation of said winding shaft;
a catch for securing said mandrel to said eccentric winding shaft; and
means for imparting rotation to said winding shaft and said mandrel attached thereto for the winding of a wrist watch mounted thereon.

4,057,959
DIGITAL TIMER AND METHOD OF OPERATING SUCH

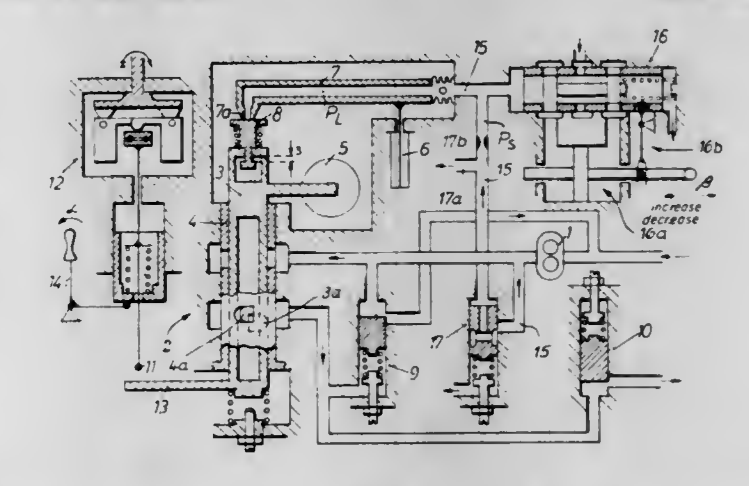
Gene L. Insley, Rock Falls, and Merle J. Lewis, Morrison, both of Ill., assignors to General Electric Company, Fort Wayne, Ind.
Division of Ser. No. 464,255, April 25, 1974, Pat. No. 3,898,792. This application Apr. 24, 1975, Ser. No. 571,416
Int. Cl.² G04B *19/02*
U.S. Cl. 58—125 C **14 Claims**



9. A digital timer comprising a support, a rod rotatably mounted on the support, at least one digital time indicating drum mounted on the rod, means for effecting conjoint rotation of the at least one digital time indicating drum with the rod, a gear attached to the rod, another gear drivenly meshed with the first named gear and extending in an operating plane generally angularly disposed with respect to that of the first named gear, a mutilated geneva gear adjacent the other gear and adapted to be intermittently rotated, a clutch device associated with the other gear and the mutilated geneva gear to effect conjoint intermittent rotation of the other gear with the mutilated geneva gear, the clutch device including resilient means for releasable engagement with the mutilated geneva gear and operable generally to at least momentarily release the mutilated geneva gear interrupting the conjoint rotation of the other gear therewith upon the occurrence of a certain condition, and means for driving the mutilated geneva gear in a predetermined time sequence including a rotatable impulse segment, means on the impulse segment for driving engagement with the mutilated geneva gear to effect the intermittent rotation thereof only during a predetermined portion of each revolution of the impulse segment, a timing motor, and a gear train drivingly connected between the timing motor and the impulse segment.

4,057,960
CONTROL SYSTEM FOR GAS TURBINES

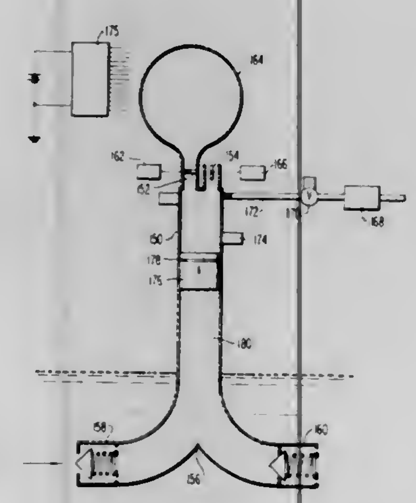
Reinhold Werner, Oberursel, Germany, assignor to Klockner-Humboldt-Deutz Aktiengesellschaft, Cologne, Germany
Filed May 24, 1976, Ser. No. 689,339
Claims priority, application Germany, May 24, 1975, 2523078
Int. Cl.² F02C *9/08*
U.S. Cl. 60—39.03 **15 Claims**



15. A method of controlling a gas turbine having power take-off means with a gas generator comprising a compressor, a combustion chamber, and a compressor turbine, which tur-

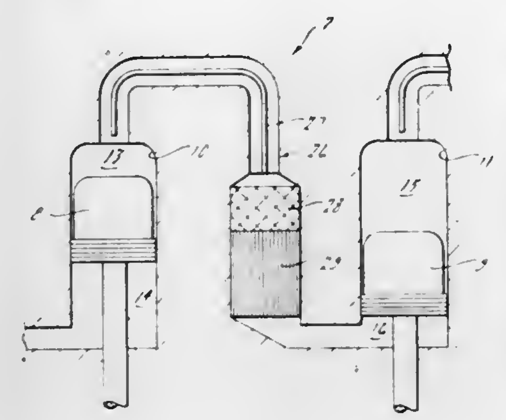
bine also includes a fuel metering valve and means for controlling the cross section of said fuel metering valve in conformity with values of condition of state of the gas generator, which includes in combination the steps of employing as values of condition of state for adjusting the fuel metering valve first the temperature at the inlet to the combustion chamber and alternately at the exit of the compressor, and finally effecting the adjustment of the through-put of the power take-off means dependent upon the difference in the measuring value of the temperature at the inlet to the combustion chamber or at the exit of the compressor and the setting member for the speed governor.

4,057,961
PULSE-JET WATER PROPULSOR
Peter R. Payne, Rte. 5, Box 282, Annapolis, Md. 21401
Continuation-in-part of Ser. No. 358,232, May 8, 1973, Pat. No. 3,898,800. This application May 22, 1975, Ser. No. 580,096
Int. Cl.² B63H *11/06*
U.S. Cl. 60—221 **1 Claim**



1. A water pulse-jet engine comprising:
a. a tubular member, said tubular member being closed at one end and open at the other end to a source of water such that the water has access to said tubular member;
b. said open end having a bifurcated duct with inlet and outlet ports and valve means associated with each of said ports;
c. a piston disposed in said tubular member to urge said water out of said outlet port during movement in one direction in said tubular member and permitting water to flow into said tubular member during movement in the opposite direction, said valve means being coordinated with the movement of said piston by internal pressure variations in said bifurcated duct;
d. means for oscillating said piston in said tubular member thereby producing useful power by the movement of water through said outlet port, comprising a source of compressed air disposed at the closed end of said tubular member;
e. a vacuum system for initially starting the engine by evacuating the space between said piston and said closed end, comprising a vacuum valve, a conduit coupling said vacuum valve to said tubular member and a vacuum pump coupled to said vacuum valve;
f. valve means disposed at said closed end to selectively gate the compressed air into and out of the tubular member; and
g. a liquid level sensor positioned in said tubular member, said liquid level sensor controlling the operation of said vacuum system in response to increased liquid level in said tubular member.

4,057,962
DEVICE FOR DECREASING THE START-UP TIME FOR STIRLING ENGINES
Richard C. Belaire, Livonia, Mich., assignor to Ford Motor Company, Dearborn, Mich.
Filed Dec. 6, 1976, Ser. No. 748,264
Int. Cl.² F02G *1/04*
U.S. Cl. 60—526 **4 Claims**

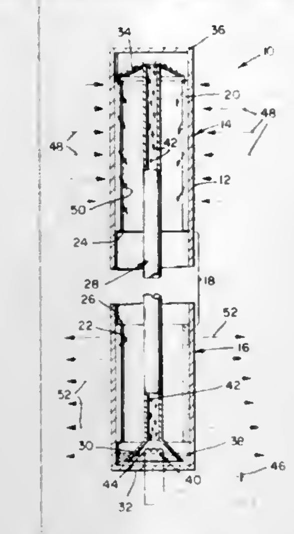


1. A closed fluid working circuit for a regenerative type Stirling engine having a conventional electrical circuit and system for starting, the closed fluid working circuit having a plurality of chambers subdivided by double-acting pistons operating therein, the subdivided chambers being respectively hot and cold and connected in series whereby a hot chamber is always in communication with a cold chamber of the next most adjacent cylinder, said intercommunication between adjacent cylinders containing a foraminous regenerator matrix and a cooling mechanism, the improvement comprising:
a. means defining an electrical heating element invested within said regenerator matrix, said element extending throughout a zone of said regenerator matrix to effect raising the temperature of said regenerator matrix to a temperature level substantially above a predetermined mean operating temperature within a predetermined period of time, measured from when said element is energized, and
b. control means effective to energize the electrical element upon closing of the starting circuit of said engine and effective to de-energize said element when a predetermined temperature level is reached in a hot chamber.

4,057,963
HEAT PIPE CAPABLE OF OPERATING AGAINST GRAVITY AND STRUCTURES UTILIZING SAME
Algerd Basiulis, Redondo Beach, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.
Filed Mar. 11, 1976, Ser. No. 665,757
Int. Cl.² F28D *15/00*
U.S. Cl. 60—641 **9 Claims**

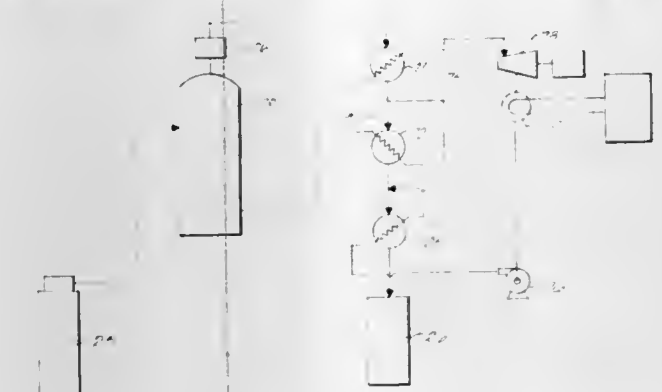
1. A heat pipe capable of operating against gravity comprising:
means for defining a heat pipe envelope;
means for defining a working fluid in said envelope means;
means for defining evaporator and condenser sections in said envelope means with means therein for exerting capillary attraction on said working fluid means in its liquid state, said evaporator means being gravitationally higher than said condenser means;
means in said envelope means for maintaining a physical separation between said capillary attraction means of said evaporator and condenser section means;
means for defining a conduit coupled between said evaporator and condenser section means for said working fluid means in its liquid state; and
means producing bubbles for transporting said working fluid means in its liquid state through said conduit means from said condensing section means to said evaporator section means.

4. A heat pipe as in claim 1 wherein said bubble producing means comprises a heater element coupled to a low power, high temperature electric power supply for enabling the bub-



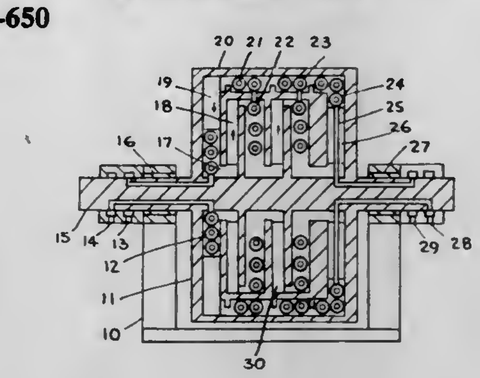
bles to form at said heater element, to rise to the top of said conduit means, and to carry therewith small amounts of said working fluid means in its liquid state.

4,057,964
WORKING FLUIDS AND SYSTEMS FOR RECOVERING GEOTHERMAL OR WASTE HEAT
Arthur J. L. Hutchinson, Pasadena, Calif., assignor to Geothermal Investment Co., South Pasadena, Calif.
Continuation-in-part of Ser. No. 565,942, April 7, 1975, abandoned, which is a continuation of Ser. No. 449,220, March 8, 1974, abandoned, which is a continuation-in-part of Ser. No. 301,056, Oct. 26, 1972, abandoned, which is a continuation-in-part of Ser. No. 195,154, Nov. 3, 1971, abandoned. This application Aug. 24, 1976, Ser. No. 717,096
Int. Cl.² F03G *7/00*
U.S. Cl. 60—641 **6 Claims**



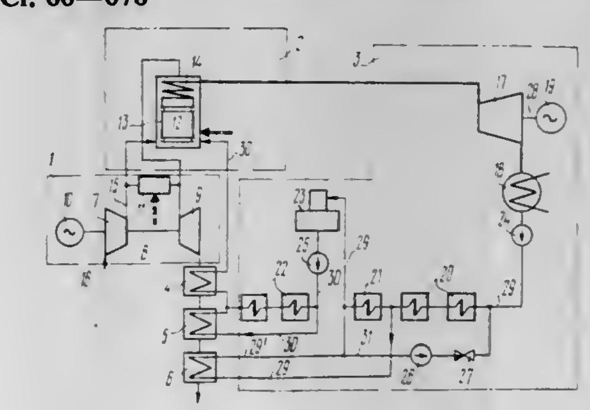
1. A process for converting naturally occurring heat energy from within the earth carried by a hot fluid consisting of steam and water to mechanical energy comprising the steps of:
flashing a portion of the fluid to steam;
recovering the heat energy in the steam;
passing the water in heat exchange relationship with an operating fluid having a critical temperature below the input temperature of the water;
superheating the operating fluid with the heat from the water;
expanding the operating fluid in a power extracting gas expansion device;
condensing the operating fluid after extraction; and
repeating the steps in a continuous process.

4,057,965
THERMODYNAMIC MACHINE WITH STEP TYPE HEAT ADDITION
Michael Eskeli, 7994-41 Locke Lane, Houston, Tex. 77042
Continuation-in-part of Ser. No. 600,312, July 30, 1975, Pat. No. 3,986,361, and a continuation-in-part of Ser. No. 675,304, April 9, 1976. This application July 6, 1976, Ser. No. 703,097
Int. Cl.² F02C *1/04*
U.S. Cl. 60—650 **9 Claims**



1. In a thermodynamic machine, wherein a working fluid is compressed and expanded in a cycle, with the compression being provided within an outwardly extending rotor passage and the expansion is being provided within an inwardly extending rotor passage, the outward and the inward ends of said passages being connected by fluid passages to form a continuous working fluid circulation loop, said circulation loop being provided with a heat removal heat exchanger, a heat addition heat exchanger and a regenerative heat exchanger to exchange heat between two streams of the working fluid, the improvement comprising:
a. providing said regenerative heat exchanger for its heat addition with heat addition steps comprising at least one outwardly extending and at least one inwardly extending fluid passage means, and a heat exchange means to add heat into the working fluid simultaneously with work exchange by the working fluid with the fluid passage means.

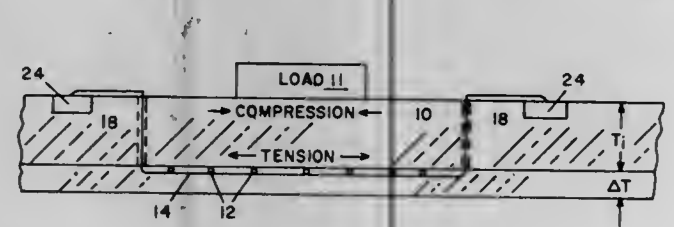
4,057,966
STEAM-GAS POWER PLANT
Evgeny Nikolaevich Prutkovsky, ulitsa Kronshtadskaya, 24, kv. 24; Mikhail Albertovich Bermatov, ulitsa Bukharestskaya, 33, korpus 2, kv. 192; Evgeny Alexandrovich Tarasov, ulitsa Kapitana Voronina, 8, kv. 4; Valery Ilich Ozerov, ulitsa Savushkina, 26, kv. 7, all of Leningrad; Alexandr Fedorovich Fedosjuk, ulitsa Pavlova, 13, kv. 28, and Vladimir Andreevich Krokhin, ulitsa Mendeleeva, 34, kv. 4, both of Nevinnomyssk Stavropolskogo kraya, all of U.S.S.R.
Filed Aug. 12, 1975, Ser. No. 604,077
Int. Cl.² F02C *7/02;* **F01K** *7/34*
U.S. Cl. 60—678 **6 Claims**



1. A steam-gas power plant comprising: a condensate line; a condenser in said line, a pump in said line downstream of the condenser, a low-pressure gas-water heat exchanger for heating the condensate; a line of outlet of the condensate from said low-pressure gas-water heat exchanger; low-pressure regeneration pre-heaters connected in series in said condensate line,

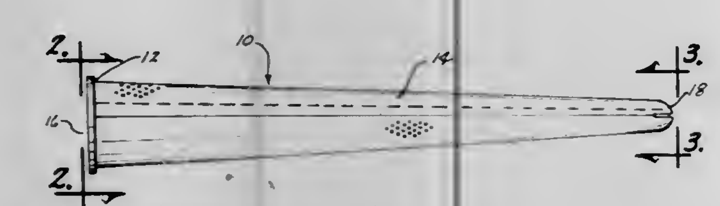
some of said low-pressure regeneration preheaters being connected in said condensate line in parallel with said low-pressure gas-water heat exchanger; a line of inlet of the condensate into said regeneration low-pressure pre-heaters; means for preventing boiling of the condensate in said low-pressure gas-water heat exchanger, including a main having one end thereof connected to said line of outlet of the condensate from said low-pressure pressure gas-water heat exchanger and the other end thereof connected to said line of inlet of the condensate into one of said regeneration low-pressure pre-heaters downstream of said pump, arranged along the flow of the condensate upstream of said low-pressure regeneration pre-heaters which are connected in said condensate line in parallel with said low-pressure gas-water heat exchanger.

4,057,967
REINFORCED ICE MATRIX
William L. Hill, Richardson, Tex., assignor to Suntech, Inc., St. Davids, Pa.
Filed May 14, 1976, Ser. No. 686,625
Int. Cl.² F25D *1/00*
U.S. Cl. 61—1 R **12 Claims**



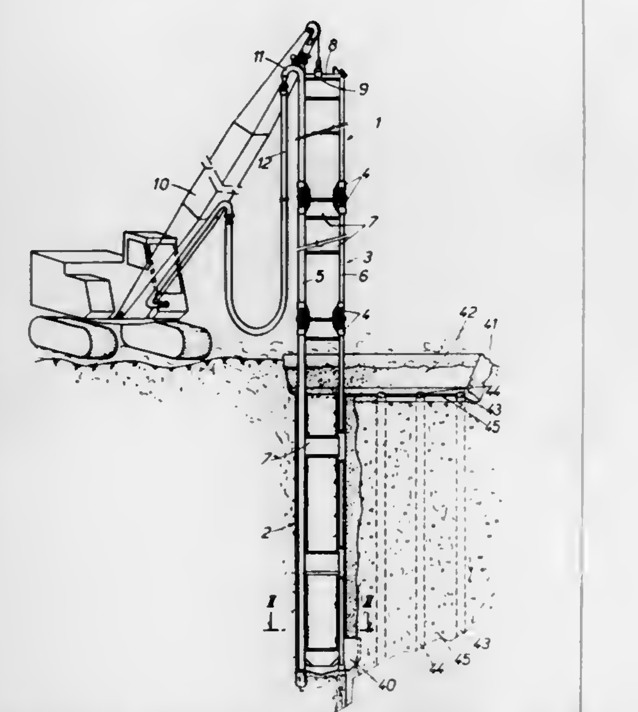
1. An ice matrix designed to increase the load bearing capacity of an ice sheet and comprising:
a. an ice sheet which, upon having a load placed on its surface, forms compressive stresses in its upper half and tensile stresses in its lower half; and
b. a plurality of structural members having substantially all of their lengths which extend in a substantially horizontal direction embedded in the tensile stressed lower half portion of the ice sheet in a substantially horizontal direction to reinforce the ice sheet in tension, thereby increasing the load bearing capacity of the ice sheet.

4,057,968
IRRIGATION GRAVEL GUARD
Robert A. Scott, 1910 Spring Road, Grand Island, Nebr. 68801
Filed Sept. 12, 1974, Ser. No. 505,610
Int. Cl.² E02B *13/00*
U.S. Cl. 61—12 **2 Claims**



1. In combination,
an irrigation pipe,
a gravel screen positioned in said pipe,
said gravel screen comprising a first ring shaped support, a first hollow, truncated conical shaped screen means having first and second ends and being secured at its said first end to said first support, a second ring shaped support secured to said second end of said first screen means, a third ring shaped support secured to said second support and having substantially the same diameter thereas, a second hollow substantially conical shaped screen means secured to said third support and extending therefrom, said second screen means having first and second ends, said first end of said second screen means being open and being secured to said third support, said second end of said second screen means having a diameter less than said first end thereof, said second end of said second screen means being substantially closed except for perforations extending therethrough.

4,057,969
METHOD AND DEVICE FOR OBTAINING A WATER-TIGHT SHIELD IN THE SOIL WITH THE USE OF NOZZLES
Jacques Rochmann, Boulogne, France, assignor to Soletanche, Paris, France
Filed June 24, 1976, Ser. No. 699,595
Claims priority, application France, July 3, 1975, 75.20921
Int. Cl.² E02D *5/20*
U.S. Cl. 61—35 **18 Claims**

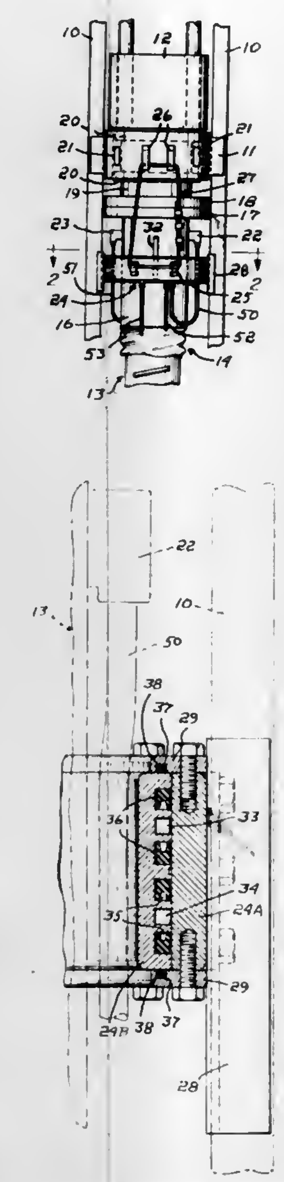


1. In a method for obtaining a water-tight shield in a soil by driving a tool in the soil and injecting a settable grout to disintegrate the soil, the grout being mixed with the disintegrated soil for providing a mortar which after setting will form said shield, the improvement wherein the grout is injected through an injection nozzle with a comparatively low flow rate under a comparatively high pressure and is then mixed with the soil by a recycling through use of a hydraulic transformer associated with said injection nozzle, said transformer operating to increase the flow and decrease the pressure of the grout with respect to the flow and pressure through said injection nozzle.

4,057,970
ROTARY FLUID SUPPLY JOINTS FOR EXPANSIBLE MANDRELS
Charles L. Guild, 7 Stone Tower Lane, Barrington, R.I. 02806, and Willard B. Goodman, P.O. Box 62, Newport, Oreg. 97365
Filed Oct. 20, 1976, Ser. No. 734,319
Int. Cl.² E02D *7/30*
U.S. Cl. 61—53.72 **12 Claims**

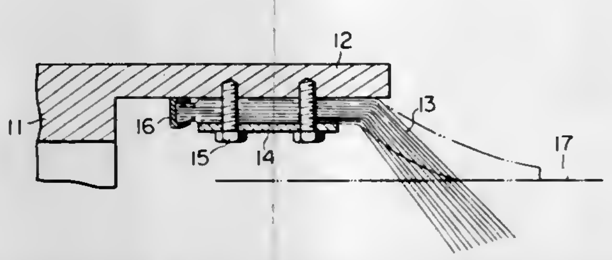
1. A rotary fluid supply joint to encircle an expansible mandrel below but adjacent the head thereof, the mandrel to be driven by a pile driver having a hoist ring slidable along vertical guide rails, the mandrel of the type having fluid pressure operated means by which the mandrel is expanded from a pile-entering condition into a pile-gripping condition, and conduits in communication therewith, each conduit having a relatively short upper hose section at the upper end of the mandrel and a relatively long lower hose section, both sections externally of the mandrel and the lower section extending to the ground, said joint including inner and outer rings, the inner ring free to turn within the outer ring, said outer ring including shoes for sliding engagement with said rails and means by which it may be attached to and supported by said hoist ring,

said inner ring including means by which it may be connected to the mandrel to turn therewith, each ring including two vertically spaced conduit portions, corresponding conduit portions of the two rings in communication with each other as



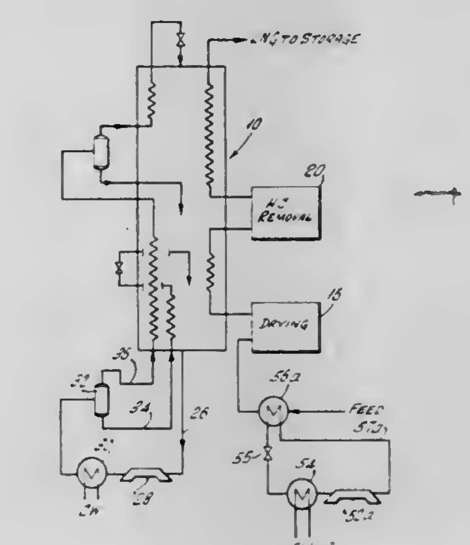
the inner ring turns, each conduit portion of the outer ring having a port to which an appropriate one of the longer hose sections is connectable and each conduit portion of the inner ring having a port to which an appropriate one of the shorter hose sections is connectable.

4,057,971
BRUSH-TYPE PACKING MEANS FOR SHIELD EXCAVATOR
Hironobu Yamazaki, Kashiwa, Japan, assignor to Tekken Kensetu Co. Ltd., Japan
Filed May 25, 1976, Ser. No. 689,724
Claims priority, application Japan, Mar. 4, 1976, 51-22612
Int. Cl.² E01G *5/16*
U.S. Cl. 61—84 **8 Claims**



1. A brush-type packing means for a shield tunnel excavator comprising at least two rows of substantially ring-shaped wire brushes respectively made of wires bunched and having a high resiliency and wear resistance and spaced in the longitudinal direction of said excavator providing substantially an annular space therebetween each said ring-shaped brush being secured along the inner periphery of a substantially cylindrical excavator body adjacent the tail end thereof and projected inward at its free end, means for securing said brushes to a position for closing a gap between tunnelled ground surface and peripheral surface of a tunnel wall element inserted in excavated tunnel, and a viscous sealing material impermeable to water and substantially filled in said annular space, said sealing material having a fluidity suitable for permeating into clearances between respective wires of said brush but not passing through the brush.

4,057,972
FRACTIONAL CONDENSATION OF AN NG FEED WITH TWO INDEPENDENT REFRIGERATION CYCLES
Jan A. Sarsten, Millington, N.J., assignor to Exxon Research & Engineering Co., Linden, N.J.
Continuation of Ser. No. 533,149, Dec. 16, 1974, abandoned, which is a continuation of Ser. No. 397,440, Sept. 14, 1973, abandoned. This application May 3, 1976, Ser. No. 682,331
Int. Cl.² F25J *3/06*
U.S. Cl. 62—23 **4 Claims**

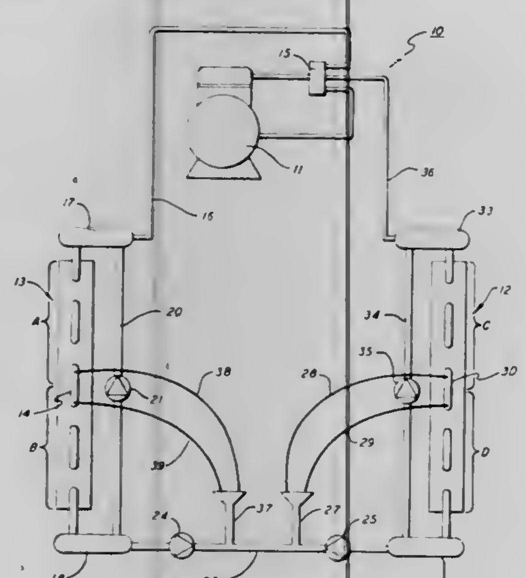


1. A process for the liquefaction of a natural gas stream which may contain heavy hydrocarbons consisting of:
a. cooling said natural gas stream to ambient temperature by heat exchange with ambient temperature surroundings;
b. further cooling said natural gas stream from ambient temperature to below ambient temperature by heat exchange with a first closed cycle refrigeration system to the temperature at which said gas stream is dried, said first refrigeration system rejecting heat received from said natural gas to said ambient temperature surrounding during said cooling;
c. further cooling said natural gas stream from the temperature at which said gas stream is dried to a colder temperature at which heavy hydrocarbons which may be contained in said gas stream are removed, by heat exchange with said first closed cycle refrigeration system, said first refrigeration system rejecting heat received from said gas stream to said ambient temperature surroundings during said cooling;
d. thereafter cooling and liquefying said dried and heavy hydrocarbon removed gas by heat exchange with a second closed cycle refrigeration system having an operating fluid a multi-component refrigerant and said second closed cycle refrigeration system rejecting heat received from said natural gas only to said ambient temperature surroundings and without any heat transfer to said first refrigeration system.

4,057,973
CONSTANT BOILING MIXTURES OF 1-CHLORO-2,2,2-TRIFLUOROETHANE AND 2-CHLOROHEPTAFLUOROPROPANE
Kevin P. Murphy, Orchard Park; Richard F. Stahl, Hamburg, and Sabatino R. Orfeo, Orchard Park, all of N.Y., assignors to Allied Chemical Corporation, Morris Township, N.J.
Filed Dec. 21, 1976, Ser. No. 753,063
Int. Cl.[2] C09K *5/04;* **F25B** *9/00*
U.S. Cl. 62—114 **4 Claims**
1. Constant boiling mixtures consisting essentially of about 29 mole % of 1-chloro-2,2,2-trifluoroethane and about 71 mole % of 2-chloroheptafluoropropane.

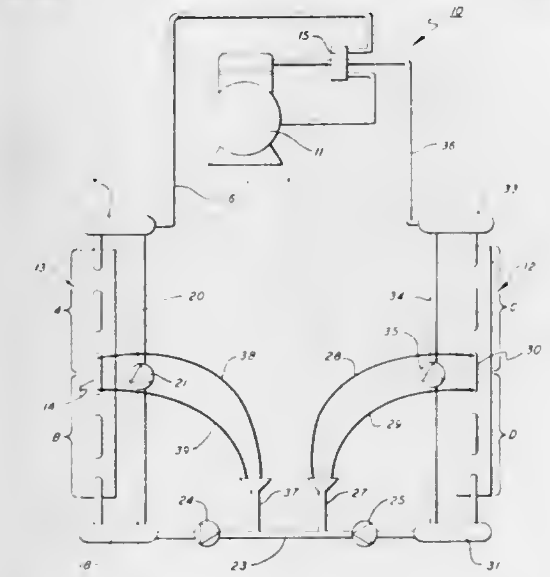
4,057,974
CONSTANT BOILING MIXTURES OF 1-CHLORO-2,2,2-TRIFLUOROETHANE AND OCTAFLUOROCYCLOBUTANE
Kevin P. Murphy, Orchard Park; Richard F. Stahl, Hamburg, and Sabatino R. Orfeo, Orchard Park, all of N.Y., assignors to Allied Chemical Corporation, Morris Township, N.J.
Filed Dec. 21, 1976, Ser. No. 753,064
Int. Cl.[2] C09K *5/04;* **F25B** *9/00*
U.S. Cl. 62—114 **4 Claims**
1. Constant boiling mixtures consisting essentially of about 22 mole % of 1-chloro-2,2,2-trifluoroethane and about 78 mole % of octafluorocyclobutane.

4,057,975
HEAT PUMP SYSTEM
James J. del Toro, Liverpool, and Rudy C. Bussjager, Minoa, both of N.Y., assignors to Carrier Corporation, Syracuse, N.Y.
Filed Sept. 7, 1976, Ser. No. 720,721
Int. Cl.[2] F25B *13/00;* **B22D** *23/00*
U.S. Cl. 62—324 **6 Claims**



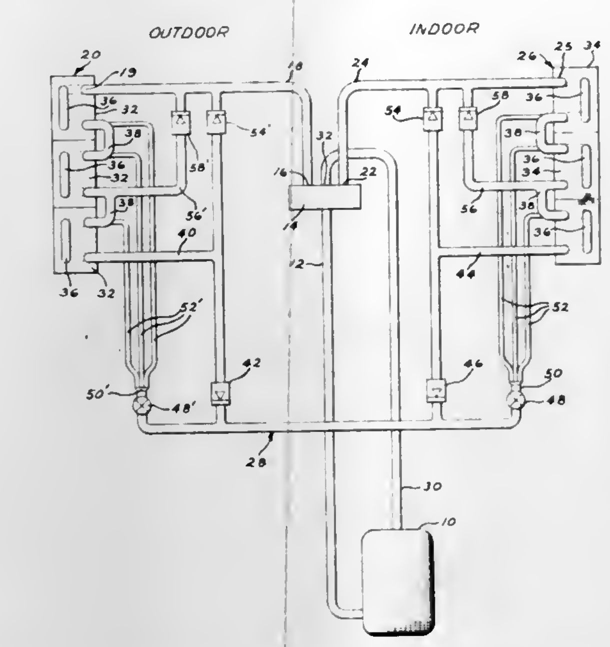
1. In a heat pump system having a compressor, a pair of heat exchangers and means for selectively reversing the flow of refrigerant through the system so that the function of the exchangers is also reversed, the improvement comprising
means for separating each exchanger into a plurality of heat transfer zones, each zone containing a number of flow circuits,
flow control means for routing refrigerant discharged from the compressor through each of the zones of one exchanger in a series flow progression and routing the refrigerant discharged from said one exchanger into the other exchanger simultaneously through each of the zones of said other exchanger whereby flow is parallel through the zones, and
switching means operatively associated with said flow control means for automatically reversing the flow geometry through the exchangers in response to reversing the flow of refrigerant through the system whereby refrigerant flow is parallel through said one exchanger and in series through said other exchanger.

4,057,976
HEAT EXCHANGER
James J. del Toro, Liverpool, and Rudy C. Bussjager, Minoa, both of N.Y., assignors to Carrier Corporation, Syracuse, N.Y.
Filed Sept. 7, 1976, Ser. No. 720,722
Int. Cl.[2] F25B *13/00;* **B22D** *23/00*
U.S. Cl. 62—324 **13 Claims**



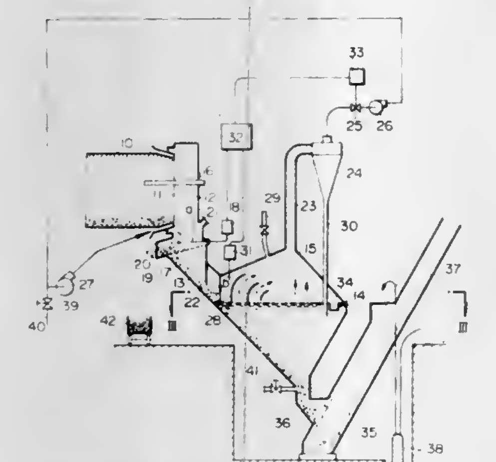
1. A heat exchanger suitable for use in a heat pump wherein the exchanger acts as a condenser when the flow of refrigerant through the exchanger is in one direction and as an evaporator when the flow of refrigerant through the exchanger is in the opposite direction, the exchanger including
one or more refrigerant flow circuits contained within the exchanger,
means to separate the circuits into a plurality of heat transfer zones that are arranged so that when air flows through the heat exchanger, the air flows through the heat transfer zones in parallel, and
control means operatively associated with the last mentioned means for routing refrigerant in series through the heat transfer zones when the flow of refrigerant through the exchanger is in one direction and to route the refrigerant simultaneously through each of the zones when the flow of refrigerant is in the opposite direction.

4,057,977
REVERSE CYCLE HEAT PUMP CIRCUIT
Leo B. Chambless, Tyler, Tex., assignor to General Electric Company, Louisville, Ky.
Filed Oct. 6, 1976, Ser. No. 729,907
Int. Cl.[2] F25B *13/00*
U.S. Cl. 62—324 **5 Claims**
1. A reversible refrigeration system adapted for heating and cooling, comprising:
a motor compressor unit;
an indoor heat exchanger and an outdoor heat exchanger each including a plurality of circuits;
a valve for reversing the flow of refrigerant through said system to operate said system in a heating or cooling mode with each of said heat exchangers arranged interchangeably as a condenser or as an evaporator;
a conduit interconnecting the outlets of said heat exchangers;
means connecting the circuits in each of said heat exchangers in series between a heat exchanger inlet line and an outlet line when a heat exchanger operates as a condenser; and



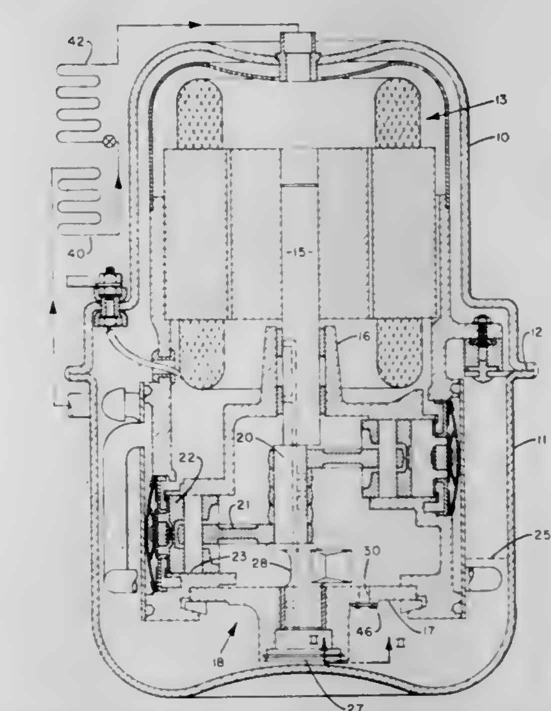
means connecting the circuits in each of said heat exchanger in parallel between said conduit and said reversing valve when a heat exchanger operates as an evaporator.

4,057,978
APPARATUS FOR COOLING PELLETS
Yoshimasa Sato; Toshio Tsukuda, both of Niihama; Hajime Inoue, Abiko, and Akio Mutsuta, Wakayama, all of Japan, assignors to Sumitomo Heavy Industries, Ltd., Tokyo and Sumitomo Metal Industries, Ltd., Osaka, both of, Japan
Filed Feb. 17, 1976, Ser. No. 658,364
Int. Cl.[2] F25D *23/12*
U.S. Cl. 62—331 **6 Claims**



1. An apparatus for cooling hot pellets with water, which comprises the combination of
a. a furnace for producing the hot pellets and having a discharge opening for the hot pellets,
b. a discharge chute for the hot pellets, one end of the chute being coupled to the discharge opening and the discharge chute being shielded from the air so as to maintain a non-oxidizing atmosphere in the chute,
c. a cooling bath containing cooling water, the other end of the discharge chute being in communication with the cooling bath whereby the hot pellets are received in the cooling bath from the discharge opening of the furnace through the shielded chute, cooling of the hot pellets in the cooling bath generating vapor,
d. a hood mounted over and covering the cooling bath for gathering the vapor,
e. a gate means at the other end of the discharge chute and arranged to prevent substantial entry of vapor and air from the hood into the chute,
f. an exhaust duct connected to the hood for discharging the vapor therefrom,
g. a regulating damper coupled with the exhaust duct for regulating the amount of vapor and air to be exhausted from the hood through the duct,
h. a means for detecting pressure difference between the chute and the hood, and
i. a means for actuating the damper so as to maintain the pressure in the hood lower than that in the chute in response to the pressure difference detecting means.

4,057,979
REFRIGERANT COMPRESSOR UNIT
Richard S. Abell, Manlius, and Tadek M. Kropiwnicki, W. Syracuse, both of N.Y., assignors to Carrier Corporation, Syracuse, N.Y.
Filed Nov. 4, 1976, Ser. No. 738,766
Int. Cl.[2] F25B *43/02, 39/04*
U.S. Cl. 62—469 **2 Claims**



1. In a refrigerant compressor unit comprising a sealed casing, a reciprocating piston type compressor mounted in said casing, said compressor having a closed cylinder block including a bottom wall positioned in proximity to the bottom wall of said casing, a crankshaft journaled vertically in said cylinder block, said casing serving as an oil sump surrounding said cylinder block and containing an oil supply at a level above the bottom wall of said cylinder block, an oil pump operable to pump oil from said supply to the working parts of the compressor in said cylinder block, said bottom wall of said cylinder block being formed with a drain opening therethrough to permit lubricating oil to return from said cylinder block to said oil sump, the pressure in said cylinder block exceeding the pressure acting on the surface of said oil in said sump in a first operating condition of said compressor, with said pressure acting on the surface of said oil exceeding the pressure in said cylinder block in a second operating condition of said compressor, the improvement comprising:
a valve normally closing said drain opening, said valve opening when the pressure in the cylinder block exceeds the pressure acting on the surface of said oil to permit the return of oil from said cylinder block to said oil sump via said drain opening, said valve assuming its normally closed position relative to said drain opening when the pressure acting on the surface of said oil exceeds the pressure in said cylinder block to prevent oil from flowing from said sump through said drain opening to said cylinder block.

4,057,980

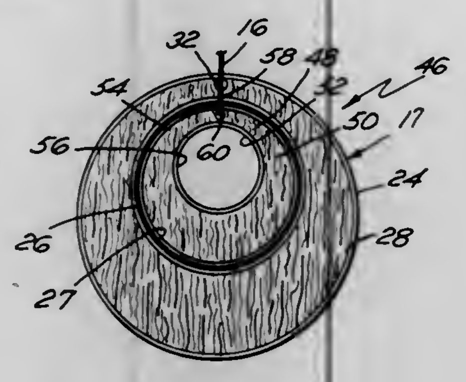
EARRING WITH ORNAMENT OF NON-RIGID PLASTIC HAVING RESILIENT FILLER

Adolph DeCesaris, 39 N. Olney St., Johnston, R.I. 02919

Filed Apr. 29, 1974, Ser. No. 465,139

Int. Cl.[2] A44C *7/00*

U.S. Cl. 63—13 **5 Claims**



1. An earring construction of the piercing type, comprising a body portion formed of a nonrigid plastic material, a filler portion formed of a resilient material located within said body portion, an opening formed in said body portion adjacent to a peripheral edge thereof and an earwire extending through said opening and being attachable to the ear lobe of a wearer for mounting the earring construction on the wearer's ear.

4,057,981

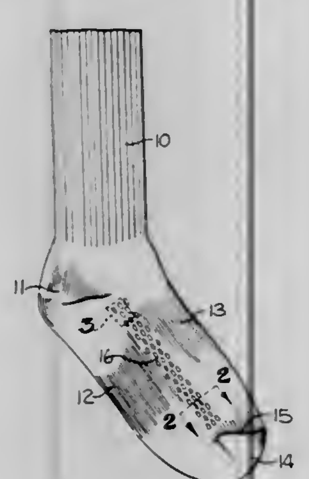
VENTILATED CUSHION FOOT SOCK AND METHOD

John J. Runac, New York, N.Y., assignor to Crescent Hosiery Mills, Niota, Tenn.

Filed Dec. 2, 1976, Ser. No. 746,841

Int. Cl.[2] D04B *9/46;* **A41B** *11/02*

U.S. Cl. 66—185 **11 Claims**



1. A sock including integrally knit leg and foot portions, said foot portion comprising a heel, a sole encompassing substantially half of the wales of said foot portion, an instep encompassing at least one-fourth of the wales of said foot portion and a toe, terry loops extending inwardly of and throughout at least said sole, terry loops extending inwardly of and throughout said instep, and elongate ventilator panels extending along opposite sides of said sole, said elongate ventilator panels having opposite ends contiguous with said heel and toe, having lower sides contiguous with said terry loops of said sole, and having upper sides contiguous with said terry loops of said instep, said ventilator panels comprising an open mesh stitch construction of open stitches interspersed with plain stitches to permit the passage of air therethrough and to provide for ventilation of the foot when the sock is worn.

4,057,982

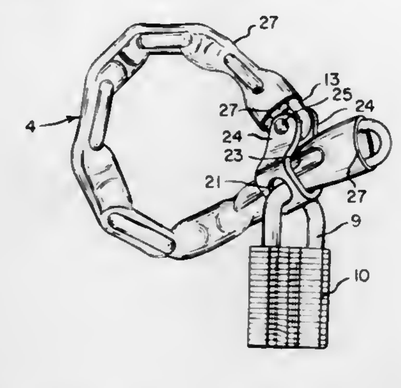
THEFT-DETERRENT CHAIN LOCKING DEVICE

Walker E. Drayton, York, Pa., assignor to American Chain & Cable Company, Inc., Bridgeport, Conn.

Continuation-in-part of Ser. No. 353,461, April 23, 1973, Pat. No. 3,939,677. This application Apr. 11, 1975, Ser. No. 567,385

Int. Cl.[2] E05B *73/00, 71/00*

U.S. Cl. 70—14 **5 Claims**



1. An adjustable locking device comprising:
a. a chain;
b. locking shackle member;
c. an adjustment device including a body member,
 1. said body member being constructed of a single blank of strip-shaped material bent into a configuration defining an opening shaped to slidably receive said chain therethrough and to hold said chain against rotation, and
 2. a pair of holes in said body member aligned with each other crosswise of said opening for receiving the shackle member in the path of axial movement of alternate links of the chain; and (d) attaching means for attaching the body member to one link of said chain.

4,057,983

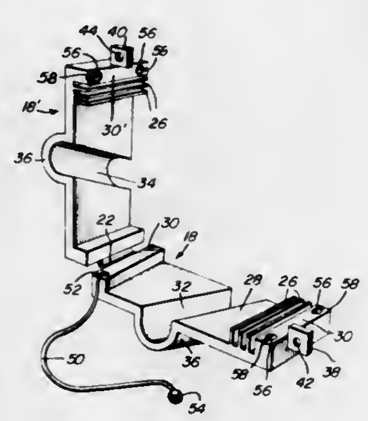
LOCK FOR SKIS

Steven J. Morgan, 4925 SW. 45th, Apt. 2, Portland, Oreg. 97221

Filed July 14, 1976, Ser. No. 705,133

Int. Cl.[2] E05B *73/00*

U.S. Cl. 70—18 **14 Claims**



1. A lock for skis, comprising, in combination:
a. a pair of clamp elements each provided with a recess disposed for receiving a ski;
b. hinge means connected to the clamp elements for pivotally connecting together the elements and permitting relative movement between the elements to and from a position clampingly retaining a pair of skis and their associated poles;
c. locking means connected to the clamp elements for retaining the elements in abutting, ski-holding relationship forming the clamping position; and
d. each element being provided with a plurality of planar knock-out partitions in the associated recess, the partitions standing upwardly in the recess toward the other of the elements when the elements are in the position clampingly retaining a pair of skis and extending in a plane parallel to a longitudinal extent of skis received in the lock for permitting adjustment of the lock to skis of various widths by removal of selected ones of the partitions.

8. A lock for skis, comprising, in combination:
a. a pair of clamp elements each provided with a recess disposed for receiving a ski;
b. hinge means connected to the clamp elements for pivotally connecting together the elements and permitting relative movement between the elements to and from a position clampingly retaining a pair of skis and their associated poles; and
c. locking means connected to the clamp elements for retaining the elements in abutting, ski-holding relationship forming the clamping position, each of the clamp elements further including a groove arranged for receiving a ski pole, the grooves being disposed at acute angles relative to the ski receiving recesses, the angles being taken along respective axes parallel to a longitudinal extent of skis and poles received in the lock, for orienting the poles at an acute angle relative to the skis and to one another when the elements are in the clamping position, the grooves being formed in the elements on either side of the respective recesses, opposite grooves cooperating to retain a single ski pole when the elements are in clamping position, the grooves of each of the elements being at the acute angle with respect to one another.

9. A lock for skis, comprising, in combination:
a. a pair of clamp elements each provided with a recess disposed for receiving a ski;
b. hinge means connected to the clamp elements for pivotally connecting together the elements and permitting relative movement between the elements to and from a position clampingly retaining a pair of skis and their associated poles;
c. locking means connected to the clamp elements for retaining the elements in abutting, ski-holding relationship forming the clamping position; and
d. a flexible member having a pair of spaced ends is anchored to one of the elements at one of the ends and is selectively attachable to and removable from at least one of the elements at the other of the ends only when the elements are in a position other than the clamping position, the flexible member being provided with an enlarged end portion, with the elements being provided with at least one indentation sized for receiving the enlarged portion and a slot communicating with the indentation for receiving a portion of the flexible member adjacent the enlarged end portion.

4,057,984

SKI LOCK DEVICE WITH SINGLE ACTUATING MEANS

Mauricio V. Avaiusini, 1038 S. 317th St., Federal Way, Wash. 98003

Continuation-in-part of Ser. No. 634,403, Nov. 24, 1975. This application July 19, 1976, Ser. No. 706,888

Int. Cl.[2] E05B *69/00, 9/08*

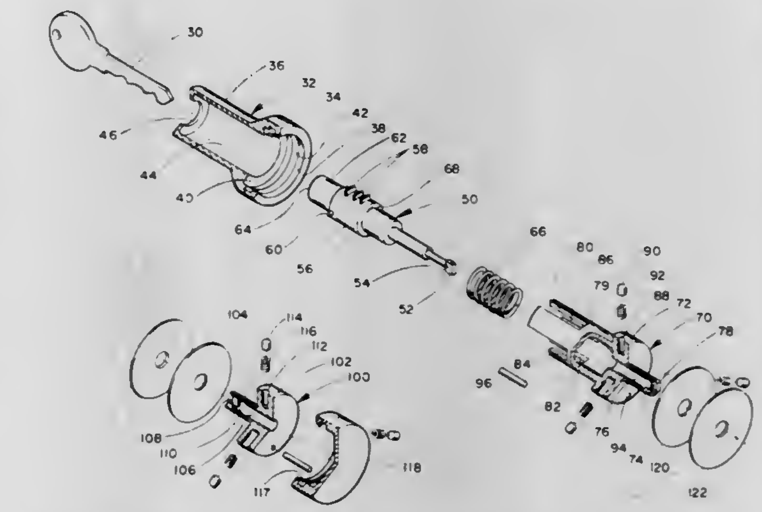
U.S. Cl. 70—58 **7 Claims**

1. Apparatus for locking a pair of skis together with their lower surfaces in juxtaposition, comprising:

a first attachment mountable onto an upper surface portion of a first ski, comprising a mounting bolt having a tubular shank part adapted to snugly fit into an opening therefor formed through the first ski, between the upper and lower surfaces of such ski, an enlarged head part connected to said shank part and adapted to project upwardly from the upper surface of such ski, and an end surface on said shank part opposite the head part which is at least substantially flush with the underside of the first ski;

a second attachment mountable onto a corresponding upper surface portion of a second ski, comprising a mounting bolt having a tubular shank part adapted to snugly fit into an opening therefore formed through the second ski, between the upper and lower surfaces of such ski, an enlarged head part connected to said shank part and adapted to project upwardly from the upper surface of such ski, and an end surface on said shank part opposite the head part which is at least substantially flush with the underside of the second ski, said end surface including a non-circular end opening bordered internally of said shank part by lock surface means;

lock bolt means including a lock bolt having an end portion which in cross-sectional shape matches the non-circular end opening and a lock surface on the inner side of said end portion, said lock bolt being normally retracted into the tubular shank part of the first attachment but being



extendible out from such tubular shank part into the opening in the end of the tubular shank part of the second attachment; and

key operated lock means for rotating the extended lock bolt into a position in which its lock surface is engageable with the lock surface means on the second attachment to prevent the two attachments, and hence the two skis to which they are attached, from being separated.

4,057,985

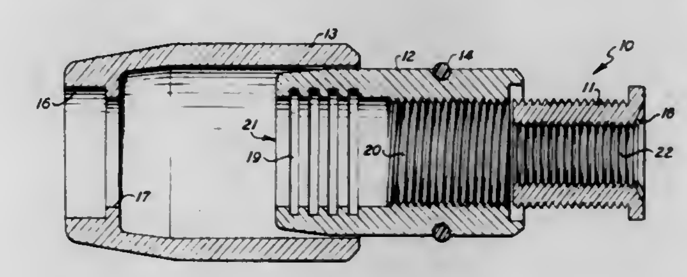
LOCKING NUT ASSEMBLY

Michael A. Stahl, Miami Beach, Fla., assignor to Far Out Products, Ltd., Hollywood, Fla.

Filed Apr. 16, 1976, Ser. No. 677,835

Int. Cl.[2] F16B *41/00*

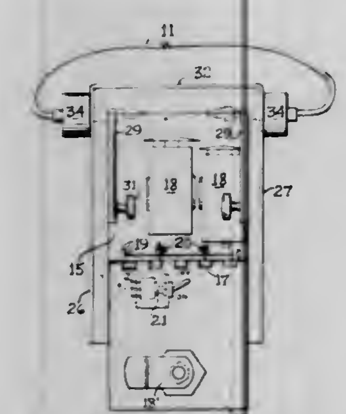
U.S. Cl. 70—231 **1 Claim**



1. A locking nut assembly comprising:
a. an axle nut having a threaded bore at one end and a locking bore at the other end thereof;
b. a separate bushing member having a threaded inner bore to threadingly engage a bicycle axle and a threaded outer surface to threadingly engage the threaded bore of said axle nut;
c. said axle nut having an outer surface including flat surface areas and an annular groove;
d. a resilient ring member disposed within said annular groove; and
e. a cover member slidingly disposed over said outer surface of the axle nut and having an inner surface engaging the outer periphery of said ring member to prevent rattling of said cover member **13**,
f. said cover member having a tapered, smooth outer surface and an end portion with a bore opening juxtaposed the locking bore of the axle nut;
g. said cover member being freely rotatable when locked in position over said outer surface of the axle nut to prevent rotation of the assembly for removal thereof when said

axle nut is tightened on the bicycle axle against a frame member of the bicycle.

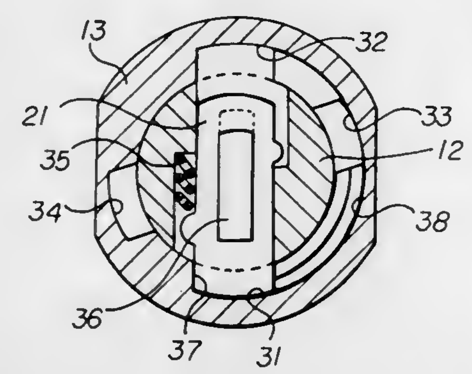
4,057,986
SELF-CONTAINED ALARM LOCK
Sarah Zolke, 5246 Pratt, Skokie, Ill. 60076, and William Soto, 330 Springfield Drive, Apt. 301, Roselle, Ill. 60172
Filed July 19, 1976, Ser. No. 706,474
Int. Cl.² B60R *25/10*
U.S. Cl. 70—233 **4 Claims**



1. A self-contained portable alarm lock having a battery-powered electric circuit and audio alarm components,
a. a portable rectangular shaped case for the electric circuit and audio alarm components,
b. a door in one wall of said case including a lock therefor,
c. a current-conductive object-restraining member, the free ends of which provide insert pins adapted to be restrictively attached to said case,
d. openings formed in opposite side walls of said case adjacent one end thereof for receiving said insert pins provided by the free ends of said object-restraining member,
e. a pair of elongated U-shaped bar type manually operated slidable latches carried on confronting interior opposite side walls of said case, with said latches movable in the direction of said openings and into contact with said insert pins when the same are projected into said openings for releasably latching the same to said case,
f. track members on said confronting interior opposite side walls over which said manually operated latches are slidably moved into and out of latching contact with said latching pins,
g. means in contact with said insert pins of said object-restraining member when the same are projected into said openings and in a position to be attached to said case by said slidable latches for connecting said object-restraining member in the alarm circuit of the portable alarm lock, and
h. concealed means within said case cooperating with said restraining member for selectively conditioning for actuation the alarm circuit.

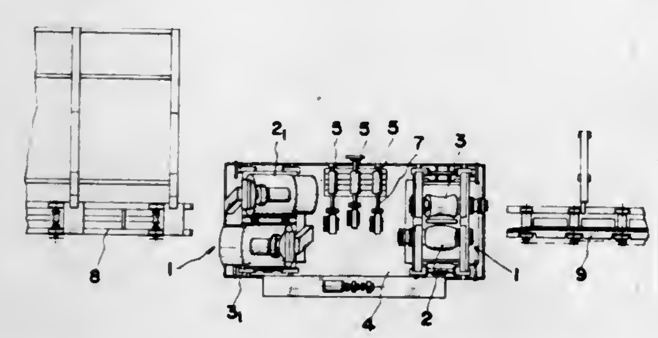
4,057,987
KEY CONTROLLED SECURITY APPARATUS
George P. Patriquin, Gardner, Mass., assignor to Hudson Lock, Inc., Hudson, Mass.
Division of Ser. No. 565,777, April 7, 1975, Pat. No. 3,973,421. This application Dec. 18, 1975, Ser. No. 642,170
Int. Cl.² E05B *27/00*
The portion of the term of this patent subsequent to Aug. 9, 1993 has been disclaimed.
U.S. Cl. 70—364 R **9 Claims**

1. A lock comprising:
a housing;
an actuator means retained by and rotatable between predetermined stations within said housing, said actuator defining a keyway for receiving a key;
operator means for effecting control functions in response to rotation of said actuator means into said predetermined stations;
locking tumbler means coupled between said housing and said actuator means and extending into said keyway, said locking tumbler means being biased in a locking position and movable into a sheer position by a proper key in said keyway;
locking tumbler blocking means preventing rotational movement of said actuator means from a locked station with said locking tumbler means in said locking positions and allowing rotational movement thereof with said locking tumbler means in said shear positions;
positional tumbler means coupled between said housing and said actuator means and extending into said keyway, said positional tumbler means being biased into a primary



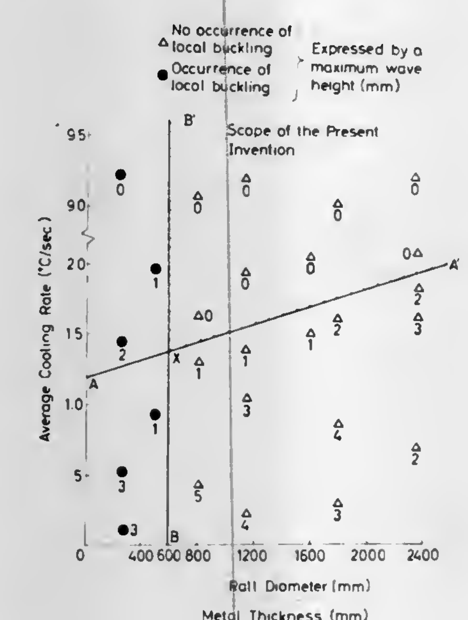
position and movable in one direction into an intermediate position by a first proper key in said keyway and movable farther in said one direction into an auxiliary position by a second proper key in said keyway; and
tumbler stop means effective with said positional tumbler means in said intermediate position to allow rotation of said actuator means in a given direction from said locked station to an operational station circumferentially spaced therefrom, and effective with said positional tumbler in said auxiliary position to limit rotation of said actuator means in said given direction from said locked station to an intermediate station cirumferentially spaced between said operational and locked stations.

4,057,988
RECTIFYING EQUIPMENT OF BAR MATERIAL
Kotaro Tsukamoto, 7-8, Kashima 4-Block, Yodogawa, Osaka, Osaka, Japan
Filed Aug. 16, 1976, Ser. No. 714,961
Int. Cl.² B21D *3/04*
U.S. Cl. 72—98 **1 Claim**



1. An apparatus for straightening rod or bar-shaped material, comprising a pair of end straightening means spaced in the direction of the length of the material to be straightened and each having a pair of side-by-side rolls thereon, one having a convex roll profile and the other having a concave roll profile, and the axes of said rolls being oppositely inclined to the horizontal, and driving means connected to the respective rolls for driving the rolls in the same rotational direction, and at least three intermediate straightening means between said pair of end straightening means and each comprising a guide horizontally slidably mounted for movement perpendicular to the direction between said end straightening means, a supporter on the end of said guide which is adjacent the path of the material through the apparatus, and a straightening tube freely rotatably mounted within said supporter, said straightening tube having the shape of a nozzle with the larger end toward the direction from which the material to be straightened enters the apparatus and having a diameter at least slightly larger than the diameter of the material to be straightened, whereby when the material to be straightened has larger curves therein, said guides can be horizontally adjusted for engaging the curved material as it is rotated by said end straightening means for reducing the curvature thereof.

4,057,989
METHOD FOR LEVELLING A METAL STRIP OR SHEET
Hiroshi Takechi; Mitsunobu Abe; Ryoseki Katsutani, all of Kisarazu, and Yoshio Saito, Futsu, all of Japan, assignors to Nippon Steel Corporation, Tokyo, Japan
Filed Aug. 9, 1976, Ser. No. 713,043
Claims priority, application Japan, Aug. 13, 1975, 50-97514
Int. Cl.² B21D *1/02;* **B21B** *45/02;* **C21D** *9/46*
U.S. Cl. 72—128 **4 Claims**

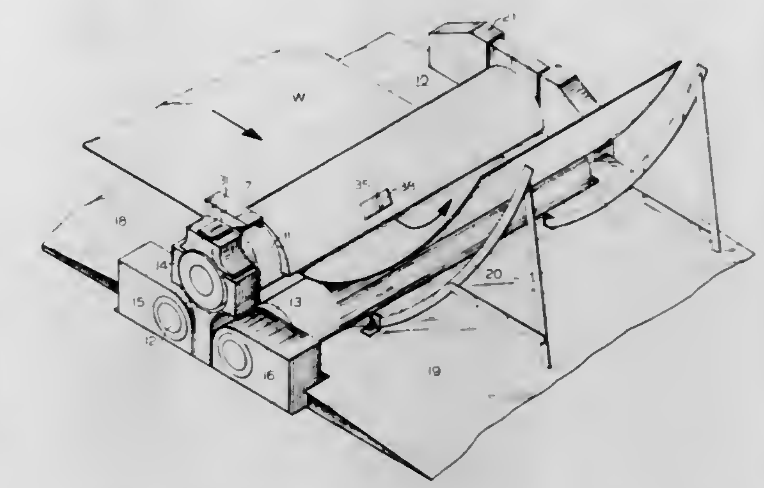


1. A method for levelling a metal strip or sheet which is at a temperature of about 210° C comprising applying a repeated bending to the heated metal strip or sheet by means of a roll arrangement of two or more rolls each having a diameter of at least 600 times the thickness of the metal while cooling the metal strip or sheet from at least about 210° C to about 50° C at a cooling rate not lower than a critical cooling rate C as defined by the following formula and not higher than 200° C/sec.,

$$C = 1.2 + 0.3 \times 10^{-3} \frac{\text{Roll Diameter (mm)}}{\text{Metal Thickness (mm)}}.$$

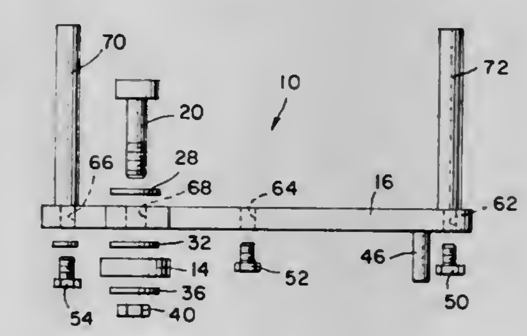
4,057,990
BENDER ROLL GUARD
Amos P. Kelsey, Hamburg; John A. Palumbo, and James L. Thiel, both of Lackawanna, all of N.Y., assignors to Bethlehem Steel Corporation, Bethlehem, Pa.
Filed Dec. 29, 1976, Ser. No. 755,417
Int. Cl.² B21D *55/00*
U.S. Cl. 72—166 **5 Claims**

1. A protective shield for the bite between a pair of coacting rolls comprising
a. a guard rotatably mounted adjacent to and surrounding a portion of one of the rolls and in frictional contact therewith,
b. a guide plate located adjacent said guard, and



c. a guide rod attached to said guard and in contact with said guide plate with means to limit the rotation of said guard upon rotation of said one of the rolls.

4,057,991
APPARATUS FOR OFFSETTING WEAR IN CHAIN SAW BAR GUIDE RAILS
Edward Wise, and Mary G. Wise, both of 2220 Kenmar Road, Fortuna, Calif. 95540
Filed Nov. 19, 1975, Ser. No. 633,267
Int. Cl.² B21D *3/02*
U.S. Cl. 72—211 **3 Claims**



1. Apparatus for offsetting lateral channel wear in chain saw bar guide rails comprising lightweight hand held apparatus for manually aligning the guide rails of a chain saw bar, said apparatus having opposed adjustable roller means for rollingly engaging and moving chain saw bar guide rails together, said roller means secured to base means, said roller means comprising at least one first roller means adjustably secured to said base, at least one second roller means opposed to said first roller means and arranged to form a bite space between said second and first roller means, the axes of rotation of each of said opposed first and second roller means lying in substantially the same plane, said first and second roller means being arranged on said base, means operably engaging said roller means for adjusting said bite of said roller means and comprising screw means threadably engaging threaded hole means in said base for laterally displacing at least one of said roller means in said plane, said threaded hole means terminating in channel means for axially mounting one of said roller means, threaded stud means adjustably extendable from said base towards the outer face of said adjustable roller means for adjusting the depth of bite of said roller means, means for guiding said apparatus along the periphery of a chain saw bar comprising stud means extending from said base in the direction of said rollers for holding said base in alignment with the outer walls of chain saw bar guide rails, said stud means being spaced a distance substantially the same as the thickness of a chain saw bar, means for moving said roller means along the

outer walls of the parallel rail of chain saw bar guide rails comprising hand held means for pulling and pushing said apparatus along the periphery of a chain saw bar.

4,057,992

MANDREL FOR COLD DRAWING AND/OR SIZING TUBES

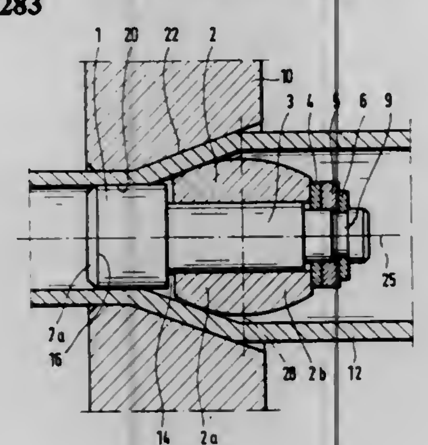
Bernhard Max Willimzik, Mechernich-Katzvey, Germany, assignor to GRANGES NYBY AB, Sweden

Filed May 7, 1976, Ser. No. 684,021

Claims priority, application Germany, Apr. 9, 1976, 2615575

Int. Cl.² B21C *1/24*

U.S. Cl. 72—283 **20 Claims**



1. A floating mandrel for the cold drawing and/or sizing of tubes comprising:

a drawing portion engageable with inside walls of a tube during drawing operations,

a shoulder portion also engageable with inside walls of a tube during drawing operations, said shoulder portion being axially spaced from said drawing portion with its shoulder and drawing portions defining a lubricant space therebetween, said lubricant space being delimited in a direction transverse to the drawing axis of said mandrel by a tube being drawn when said mandrel is in an in-use drawing position,

and movement accommodating means for accommodating relative axial movement of said drawing portion and said shoulder portion to thereby vary the volume of said lubricant space and create a pumping effect on lubricant in said lubricant space during drying operations.

4,057,993

HAND OPERATED GRIPPING APPARATUS

Hans Undin, Akersberg, Sweden, assignor to Pressmaster, Ltd., Stockholm, Sweden

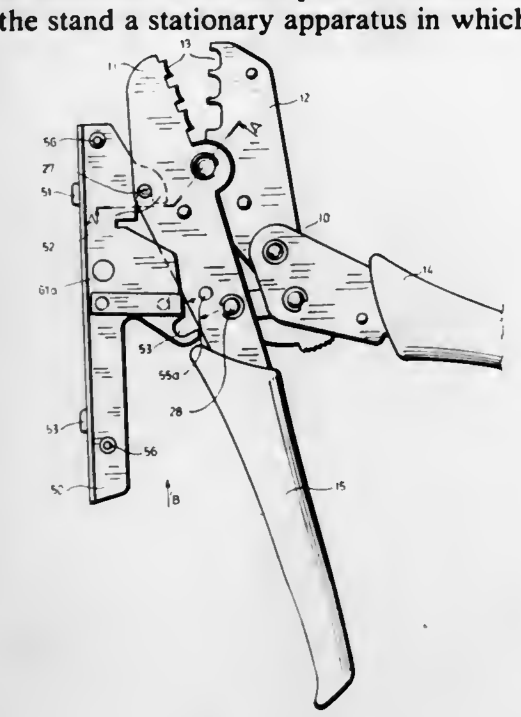
Filed Feb. 19, 1976, Ser. No. 659,331

Claims priority, application Sweden, Mar. 25, 1975, 7503488

Int. Cl.² B21D *9/08*

U.S. Cl. 72—410 **12 Claims**

1. Manually operable portable tool, especially ferrule crimping apparatus, mountable on a table stand and comprising first and second lever devices interconnected intermediate their ends so as to provide a pair of opposed jaws movable relative to each other to grip a workpiece, and a pair of opposed handles pivotable relatively to each other to actuate the jaws, wherein the first lever device includes at least two longitudinally spaced tens which are parallel with the pivot axis of the handles and are engagable in corresponding longitudinally spaced open-ended slot means in the stand, so that the tool by the sequential insertion of the said pens in the said slot means forms with the stand a stationary apparatus in which the first



lever device extends substantially parallel with a surface on which the stand is set up, and is operable by movement of the handle of the second lever device (of the tool).

4,057,994

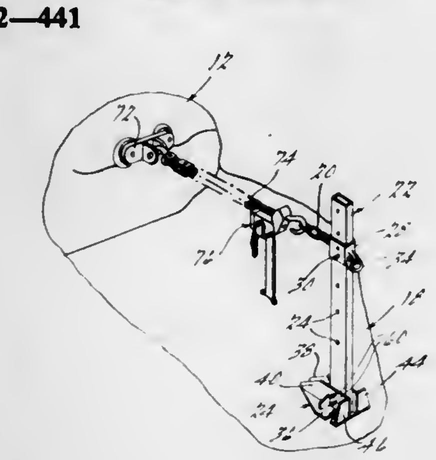
AUTOMOBILE BODY PULLING TOOL

Raymond P. Wolgast, Bloomfield Hills, and Joe Lamanna, Troy, both of Mich., assignors to Detroit Autobody Equipment, Inc., Troy, Mich.

Filed Jan. 22, 1976, Ser. No. 651,544

Int. Cl.² B21D *1/12*

U.S. Cl. 72—441 **5 Claims**



1. An apparatus for applying a pulling force to a surface to be reshaped, said apparatus comprising a generally upright column member, means on said column securing a pulling element extending between said colunn and said surface to be reshaped, a support base structure for said column and including a base plate adapted to be fixedly secured to a support surface provided with pairs of spaced openings or the like, said base structure being arranged generally horizontally and formed with a pair of inwardly projecting recesses adapted to receive mounting bolts for securing the same to any one of said pairs of openings in said surface, said support base including a pair of upright vertical members welded thereto and spaced apart a distance sufficient to define a recess approximately equal to the width of one of said column and having said one end of said column nestingly disposed therebetween, said upright members being formed with first and second generally vertically aligned pairs of apertures, said one end of said column being formed with a first opening aligned with said first pair of apertures and with a second opening aligned with said second pair of apertures, a first elongated generally cylindrically-shaped pin-like member positionable in a generally horizontal attitude within said first pair of apertures and said first opening and defining a pivotal axis about which said column is pivotable relative to said base structure, a second elongated generally cylindrically-shaped pin-like member selectively positionable in spaced parallelism relative to said first member and disposed within said second pair of apertures and said second opening simultaneously when said first member is positioned within said first pair of apertures and said first opening, whereby to fixedly secure said column in a generally vertical orientation upon said base structure, and force applying means secured to a lower portion of said column and to said base structure whereby said base structure and column are pivoted relative to each other when applying a force to said column to thereby apply a pulling force to the surface to be reshaped by said pulling element when one of said pin-like members is removed.

4,057,995

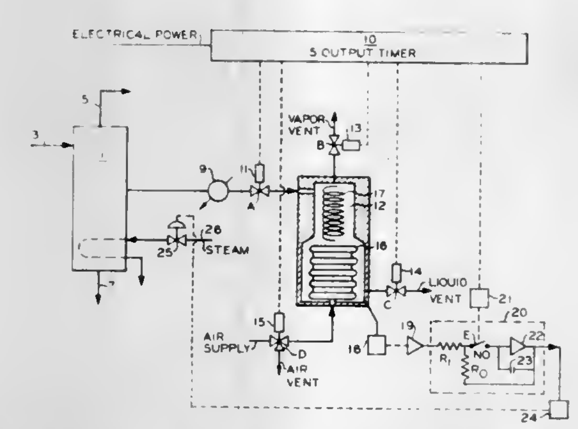
APPARATUS AND METHOD FOR MEASURING LOW BOILING COMPONENT CONTAINED IN RELATIVELY HIGH-BOILING LIQUID

Louis D. Kleiss, Borger, Tex., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed May 13, 1975, Ser. No. 577,138

Int. Cl.² G01N *7/00*

U.S. Cl. 73—23 **7 Claims**



1. An apparatus for measuring the concentration of light hydrocarbon in a relatively high boiling liquid, said apparatus comprising:

a. a liquid-tight chamber having an inlet means and means for purging with liquid sample;

b. within the chamber (1) a bellows sealed to the chamber so that the exterior of the bellows forms an interior wall of the chamber and (2) a spring acting on the bellows at least partially to collapse the bellows;

c. a means for supplying gas pressure to the interior of the bellows to counteract the collapsing pressure of said spring;

d. in communication with the interior of the chamber a means for measuring the absolute pressure within the chamber; and

e. means for maintaining a constant temperature surrounding said chamber.

4,057,996

SYSTEMS FOR MONITORING THE COMPOSITION OF EXHAUST GASES

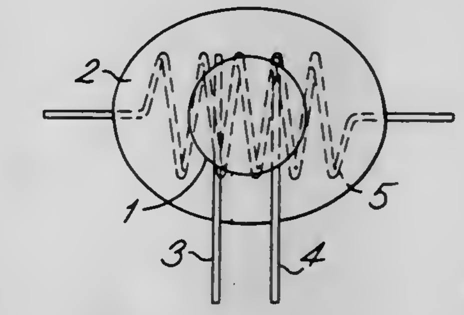
Jack Graham Firth, St Albans; Thomas Alwyn Jones, Dronfield, near Sheffield, and Brenda Rimmington, Sheffield, all of England, assignors to National Research Development Corporation, London, England

Filed Jan. 8, 1976, Ser. No. 647,983

Claims priority, application United Kingdom, Jan. 17, 1975, 02130/75

Int. Cl.² G01N *27/12*

U.S. Cl. 73—23 **5 Claims**



1. A system for monitoring the composition of exhaust gases emitted from an apparatus for the controlled combustion of carbonaceous fuel, the system comprising:

a gas-sensitive resistor consisting essentially of gallium oxide;

means mounting said resistor for exposure to the exhaust gases in operation of the apparatus;

means for maintaining said resistor at a substantially constant temperature above that of the exhaust gases to which said resistor is exposed; and

means for generating a signal dependent on the resistance of said resistor.

4,057,997

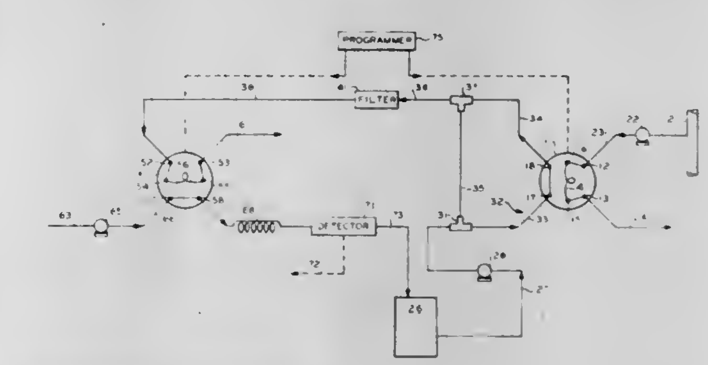
SAMPLE PREPARATION

Craig S. Chandler, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Mar. 31, 1976, Ser. No. 672,090

Int. Cl.² G01N *31/08, 1/22*

U.S. Cl. 73—23.1 **23 Claims**



1. Apparatus comprising:

fluid sample material supply means for providing a supply of fluid sample material;

first, second, and third diluent conduit means for providing respective first, second, and third diluent fluid paths, each said diluent conduit means having an upstream end and a downstream end;

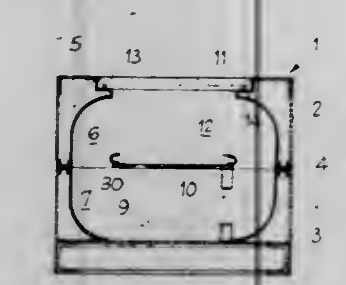
diluent material supply means for providing a flow of diluent material to the upstream ends of said first and second diluent conduit means;

first tee means for providing fluid communication among the downstream end of said first diluent conduit means, the downstream end of said second diluent conduit means, and the upstream end of said third diluent conduit means;

means for injecting a preselected volume of sample material

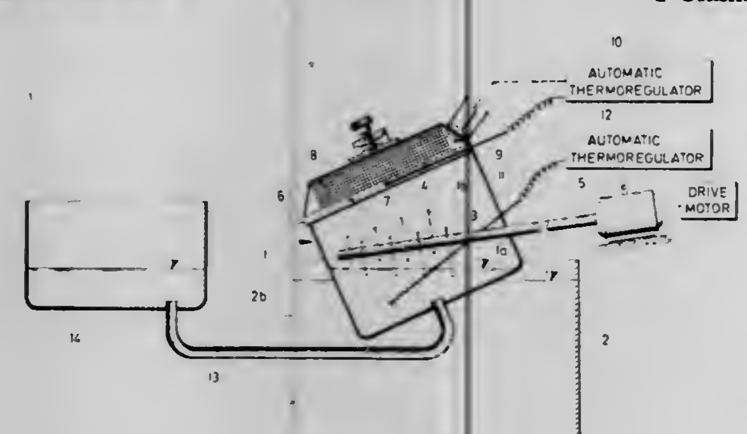
from said sample material supply means into said first diluent conduit means at a location intermediate of the upstream and downstream ends of said first diluent conduit means; and
means for removing a preselected volume of material from said third diluent conduit means to provide a diluted sample.

4,057,998
CHROMATOGRAPH, MORE PARTICULARLY FOR GAS PHASE CHROMATOGRAPHY
Claude Moreaux, Livry-Gargan, France, assignor to Societe Anonyme Intersmat, Pavillons-sous-Bois, France
Filed July 6, 1976, Ser. No. 702,875
Claims priority, application France, July 9, 1975, 75.21528
Int. Cl.² G01N *31/08*
U.S. Cl. 73—23.1 **11 Claims**



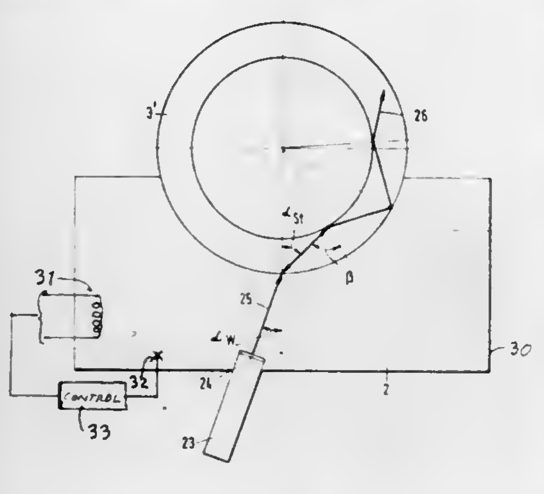
1. Chromatograph, more particularly for gas phase chromatography, comprising a modular enclosed space having compartments, temperature controlling means provided in each of said compartments, removable function modules selectively insertable in said compartments for providing selected different chromatography analysis functions, means provided in said compartments for receiving and releasably locking selected ones of said function modules, and means for selectively interconnecting said function modules according to the analysis problem to be solved.

4,057,999
APPARATUS FOR TESTING ENGINE OIL
Vladimír Bazika; Přemysl Pražak, and Dana Havelková, all of Prague, Czechoslovakia, assignors to CKD Praha, Oborovy podnik, Prague, Czechoslovakia
Filed July 14, 1976, Ser. No. 705,000
Claims priority, application Czechoslovakia, July 30, 1975, 5340/75
Int. Cl.² G01N *11/00, 33/26*
U.S. Cl. 73—53 **1 Claim**



1. An apparatus for testing engine oils, and in particular, oils to be used in compression ignition engines, comprising in combination,
a receptacle adapted to receive a liquid oil sample to be tested;
a cover plate having an opening and mounted on said receptacle;
a shaft having a plurality of projections extending therefrom, rotatably mounted in said receptacle, said projections being adapted to submerge into and emerge from said liquid oil and to splash said oil against said cover plate;
driving means operatively connected to said shaft for rotating it;
a test plate mounted in said opening of said cover plate to thereby seal said receptacle;
first temperature sensing means operatively mounted in said test plate;
heating means adapted to heat said test plate;
first thermal regulating means operatively connected to said heating means, on the one hand, and said first temperature sensing means, on the other hand, and adapted to maintain said test plate at a predetermined temperature;
second temperature sensing means operatively mounted in said receptacle to sense the temperature of said oil therein and to maintain it at a predetermined temperature; and
second thermal regulating means operatively connected to said second temperature sensing means, whereby the oil deposited on the test plate by being splashed thereagainst by said rotating projections can be tested by visually evaluating it.

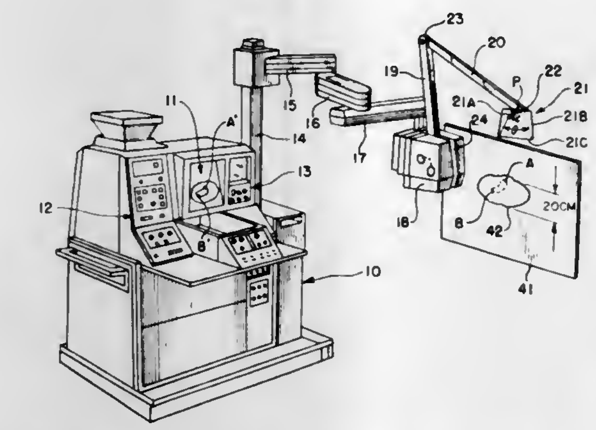
4,058,000
ULTRASONIC IMMERSION TYPE TESTING
Karl Ries, Mulheim; Kurt Hannoschöck, Sonsbeck, and Günter Simoneit, Mulheim, all of Germany, assignors to Mannesmann Aktiengesellschaft, Dusseldorf, Germany
Filed Feb. 22, 1977, Ser. No. 770,587
Claims priority, application Germany, Feb. 20, 1976, 2607485
Int. Cl.² G01N *29/04*
U.S. Cl. 73—644 **2 Claims**



1. In a method of inspecting test objects for detecting defects by means of ultrasonics using the immersion test method, wherein a transducer directs a beam of ultrasonic waves towards the test object through water, the improvement comprising:
the step of adjusting the temperature of the water for a fixed orientation of said transducer relative to the test object, to change the refraction angle of the beam into the test object.

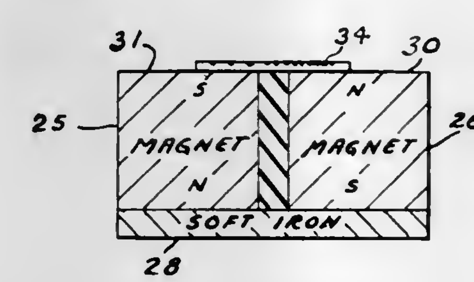
4,058,001
ULTRASOUND IMAGING SYSTEM WITH IMPROVED SCAN CONVERSION
Albert S. Waxman, Santa Clara, Calif., assignor to G. D. Searle & Co., Skokie, Ill.
Filed Aug. 2, 1976, Ser. No. 710,942
Int. Cl.² G01N *29/00;* **A61B** *10/00*
U.S. Cl. 73—620 **12 Claims**

1. In an ultrasonic instrument for use in medical diagnosis having a transducer for transmitting vibrations at ultrasonic frequencies into the body of a patient and for detecting echoes produced at tissue interfaces within said patient by said vibrations and for generating responsive electrical echo signals, and a display unit for producing a two-dimensional visual representation of said tissue interfaces in a scanning plane, the improvement comprising a digital scan converter for receiving inputs from said transducer and having location determination means for assigning two-dimensional coordinates in said scanning plane, and having addressable memory storage locations in communication with said transducer for storing representations of the amplitudes of said echo signals at corresponding memory storage locations having the addresses of the aforesaid two-dimensional coordinates, circuit means for communicating said stored representations to said display unit, and echo



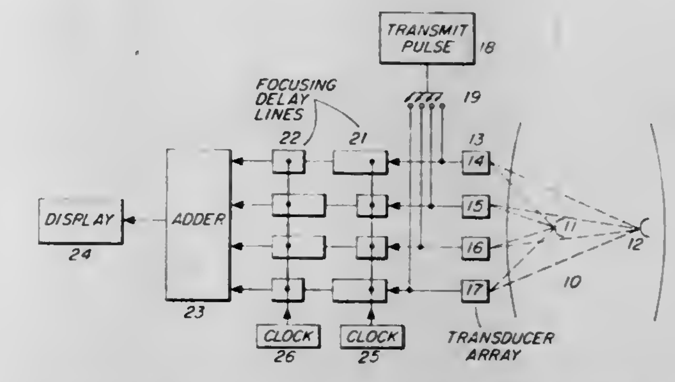
signal accumulation and normalization means accepting incoming echo signals having an amplitude less than a prerequisite amplitude, for comparing to said prerequisite the previously stored contents of said memory storage locations at the address corresponding to each said incoming signal, and, if said stored contents is less than said prerequisite, accumulating said incoming signal with said contents, normalizing the value thereby obtained by the number of occurrences of said accumulation and transmitting to said storage locations in normalized value thereby obtained for registration at said corresponding address.

4,058,002
DISPERSIVE ELECTROMAGNETIC SURFACE ACOUSTIC WAVE TRANSDUCER
Thomas J. Moran, Dayton, Ohio, assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.
Filed Dec. 23, 1976, Ser. No. 753,967
Int. Cl.² G01N *29/00*
U.S. Cl. 73—620 **7 Claims**



1. A dispersive surface acoustic wave electromagnetic transducer comprising:
a. means for providing a magnetic field; and
b. a meander line coil having conductors with progressively changing spacing between conductors at a predetermined rate of change of spacing, positioned in the said magnetic field.

4,058,003
ULTRASONIC ELECTRONIC LENS WITH REDUCED DELAY RANGE
Albert Macovski, Menlo Park, Calif., assignor to The Board of Trustees of the Leland Stanford Junior University, Stanford, Calif.
Filed July 21, 1976, Ser. No. 707,329
Int. Cl.² G01N *9/24*
U.S. Cl. 73—609 **16 Claims**

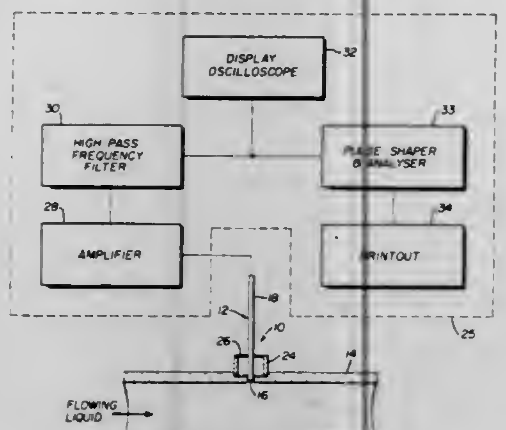


1. Apparatus for receiving ultrasonic reflections from an object comprising:
a source of pulsed ultrasonic radiation which insonifies the object and produces a sequence of ultrasonic reflections;
a transducer array for receiving the sequence of ultrasonic reflections and producing a plurality of transducer signals;
a first focusing array of delay structurs whose inputs are connected to the transducer signals and whose delay varies with the magnitude of the distance of each transducer to the axis of the array;
a second focusing array of delay structurs whose inputs are connected to the outputs of the first focusing array of delay structures and whose delay varies with the magnitude of the distance of each transducer to the axis of the array in a manner opposite to that of the first focusing array of delay structures so that the sum of the delays from each transducer through the first and second focusing delay structures decreases with the magnitude of the distance to the axis of the array;
means for adding the outputs of the second focusing array of delay structures to produce a focused signal; and
means for utilizing the focused signal.

4,058,004
APPARATUS FOR MEASURING EROSION PRODUCED BY CAVITATION
Frederick G. Hammitt, 1306 Olivia St., Ann Arbor, Mich. 48104; Osman Saleh Mohamed Ahmed, 23 Wildwood Terrace, Glen Ridge, N.J. 07028; Niranjan Rasik Bhatt, 810 Victoria St., Windsor, Conn. 06095, and Jia-Bo Gilbert Hwang, 2385-2 Bishop, Ann Arbor, Mich. 48105
Filed Apr. 16, 1976, Ser. No. 677,792
Int. Cl.² G01N *17/00*
U.S. Cl. 73—86 **2 Claims**

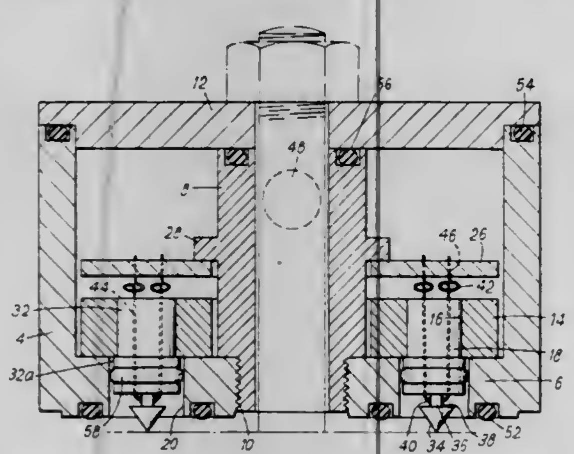
1. Apparatus for sensing the collapse of cavitation bubbles in liquid flowing through a conduit having an inner surface and an opening extending through said surface to provide communication with said liquid, said apparatus comprising an elongated pulse transmitting rod member extending into said opening in a position in which the inner end thereof is substantially flush with said inner conduit surface adjacent said opening, the outer end of said rod member being disposed outside said conduit a predetermined remote distance from said conduit in a location in which said outer end can be maintained at a temperature substantially unaffected by the temperature of said liquid and said conduit, a diaphragm type member having a central opening and being mounted on said conduit, said rod member extending through said opening and being affixed to said diaphragm member in a sealing relationship therewith, said diaphragm member enabling transmission of relatively

undistorted and unattenuated pulses through said rod member, and a transducer mounted on said outer end of said rod member and operable to develop electrical signals in response to a



sensing of pulses transmitted through said rod and caused by forces in said conduit resulting from the collapse of cavitation bubbles in said liquid.

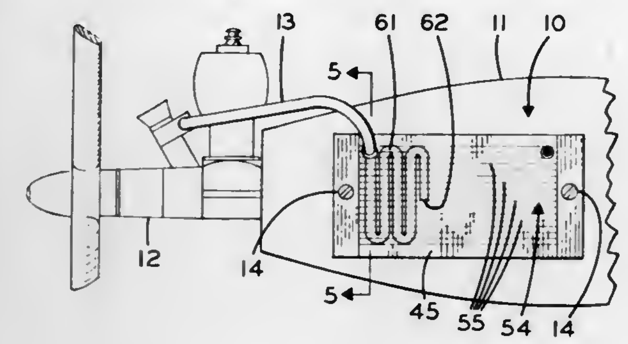
4,058,005
IMPROVEMENTS IN OR RELATING TO STRAIN TRANSDUCERS
John David Barnett, 12 Craig Drive, Whaley Bridge, Stockport, Cheshire, England
Filed Sept. 8, 1976, Ser. No. 721,592
Int. Cl.² G01B *7/18*
U.S. Cl. 73—88.5 R **8 Claims**



1. Strain measurement apparatus for measurement of strain at the surface of a structure and comprising a substantially rigid support, means for securing the support to said surface at a first region thereof, at least one resiliently deformable carrier element bearing at least one strain gauge being mounted on said support, location means between said at least one carrier element and the support to permit displacement of the carrier element relative to the support in a direction transverse to the direction of strain measurement, resilient means acting on said at least one carrier element in said transverse direction to apply a force urging the or each carrier element into engagement with a respective further region of the surface spaced from said first region to be deformed by straining of the surface between said first and further regions thereby to generate signals in said at least one strain gauge responsive to said strain.

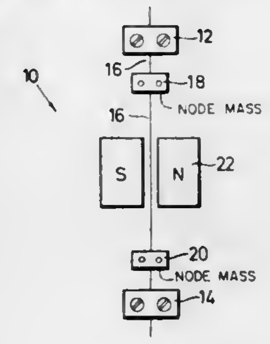
4,058,006
METERING DEVICE
James H. Crocket, 1442 N. Fruit Ave., Fresno, Calif. 93728
Filed Oct. 2, 1975, Ser. No. 618,765
Int. Cl.² G01M *15/00*
U.S. Cl. 73—113 **7 Claims**

1. A metering device comprising a housing having an elongated reservoir, with a metering end, for fluid to be metered, dimensioned to retain said fluid in an elongated coherent mass having a terminal end remote from said metering end wherein said reservoir has a transverse dimension which is sufficiently small to generate movement of said coherent mass by capillary attraction therethrough during metering and wherein the elongated reservoir is successively return bent in the housing to extend in substantially parallel sections to provide a compact device; and means mounted on said housing in covering rela-



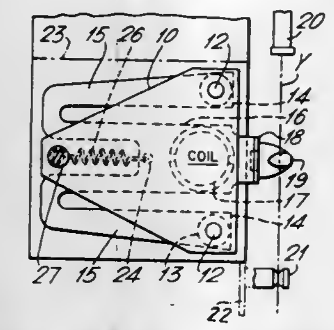
tion to the reservoir for making visible said fluid within the reservoir and for displaying reference means against which said terminal end of the fluid can be read to indicate the time required to meter said fluid and said parallel sections of the reservoir are substantially right-angularly related to said reference means to facilitate the reading of said terminal end of the fluid against the reference means.

4,058,007
VIBRATING WIRE MEASURING INSTRUMENT
Rainer Exner, Dransfeld, Germany, assignor to Sartorius-Werke GmbH, Gottingen, Germany
Filed Mar. 15, 1976, Ser. No. 666,952
Claims priority, application Germany, Apr. 24, 1975, 2518294
Int. Cl.² G01L *5/00*
U.S. Cl. 73—141 A **12 Claims**



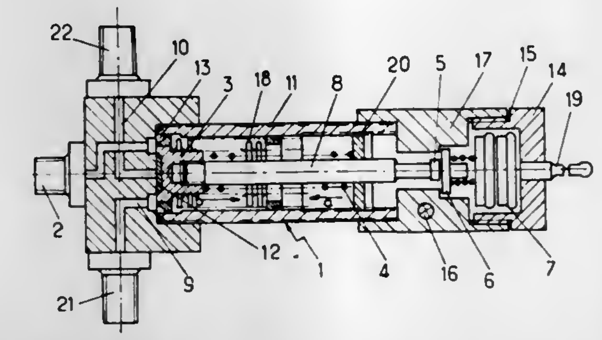
1. A vibrating wire measuring instrument for measuring forces, especially a wire balance comprising: at least one integral wire mounted between a pair of fixing members, at least one of said fixing members being movable with respect to the other in response to an applied force and said wire being of constant cross-section over its length; and two decoupling masses attached rigidly to said wire, forming vibrational nodes and dividing said wire into two connection nonvibrating portions between each of said masses and a respective one of said fixing members and into an intermediate vibrating portion, each nonvibrating connection portion extending between one of said vibrational nodes and a fixing member and the intermediate vibrating portion extending between the vibrational node decoupling masses; whereby the instrument enables energy to be introduced into said wire and cause said intermediate portion to be excited into transverse vibrations at a frequency representative of the force applied to the movable fixing member.

4,058,008
YARN TENSION TRANSDUCER
John Scott Pilkington, Cheadle, England, assignor to Abbey Electronics Limited, England
Filed Sept. 29, 1976, Ser. No. 728,013
Claims priority, application United Kingdom, Oct. 4, 1975, 40729/75
Int. Cl.² G01L *5/04*
U.S. Cl. 73—144 **6 Claims**



1. A yarn tension transducer comprising a movable yarn guide against which a running yarn touches and which is under a biasing force towards the yarn, movement of the guide in either of two opposite directions in response to yarn tension fluctuations being converted electrically into an indication of yarn tension values, the yarn guide being mounted on a springy thin plate which is of ferromagnetic material and generally of W shape with a central portion between two outer arms, the plate being clamped by the respective ends of the two outer arms, and the yarn guide being carried at a forward end of the central portion with the latter lying between two similar electrical induction coils located opposite one another, whereby the central portion of the plate operates as a spring-loaded armature.

4,058,009
ARRANGEMENT FOR MONITORING PNEUMATIC TIRE INFLATION PRESSURE
Hansruedi Etter-Felix, Neuhaus, Egnach (Thurgau), Switzerland
Filed Aug. 28, 1975, Ser. No. 608,537
Int. Cl.² B60C *23/04*
U.S. Cl. 73—146.8 **10 Claims**



1. An arrangement for monitoring pneumatic tire inflation pressure, comprising a cylinder; an elongated bellows tube in said cylinder and having an end connected thereto and another end; a piston sealingly mounted in said other end and movable with said bellows tube during expansion and contraction of the same, said piston in part bounding a pressure chamber outside said bellows tube; and channel means for communicating said pressure chamber with a tire so that the piston is subject to the inflation pressure in the tire and shifts in said cylinder under concomittant change in the axial length of said bellows tube, in response to changes in the inflation pressure, said channel means including at least two channels each adapted to communicate with a different tire and each having an opening communicating with said pressure chamber, and said piston being movable to and from a position in which it blocks at least one of said openings.

4,058,010
AIRPORT WIND SHEAR MONITORING METHOD AND APPARATUS
Charles F. Woodhouse, Glen Wilton, Va., assignor to Approach Fish, Clifton Forge, Va.
Filed Apr. 6, 1976, Ser. No. 674,231
Int. Cl.² G01W *1/02*
U.S. Cl. 73—189 **42 Claims**

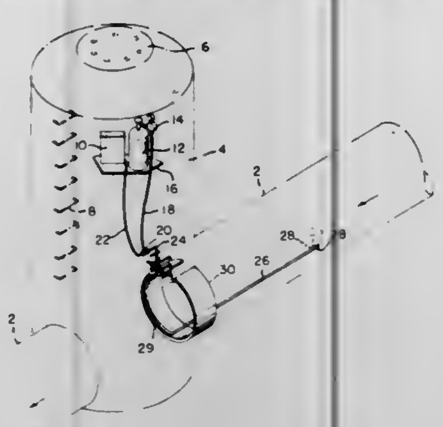
1. A method of detecting hazardous wind conditions in the low altitude flight path of an aircraft, said method comprising the steps of:

a. calibrating the lift/drag flying characteristics of a tethered flight vehicle,
b. positioning a plurality of tether anchors to the ground at spaced positions along an approximate extension line from an aircraft runway end,
c. securing a tether mast to each anchor with a spherical segment of articulation freedom,
d. flexibly tethering a said calibrated flight vehicle to each of said masts for flight at a respective altitude near an aircraft approach path to said runway,
e. measuring the resultant tether restraint force exerted by the flight of a vehicle on a respective mast,
f. measuring the resultant azimuth angle to which a tether restraint force aligns a respective mast to determine the direction of wind acting upon the respective vehicle,
g. coordinating the resultant tether restraint force of a respective vehicle to the calibrated flying characteristics of said vehicle to determine the velocity of wind acting thereon, and
h. coordinating the wind and velocity determinations from said plurality of vehicles to determine the safety of wind conditions within said approach path for aircraft operation.

4,058,011
FLOW MONITORING APPARATUS
Kenneth W. Martig, Jr., Olympia, Wash., assignor to Pro-Tech, Inc., Paoli, Pa.
Continuation of Ser. No. 503,392, Sept. 5, 1974, Pat. No. 3,965,740. This application June 14, 1976, Ser. No. 695,545
The portion of the term of this patent subsequent to Oct. 14, 1993, has been disclaimed.
Int. Cl.² G01F *1/20*
U.S. Cl. 73—194 R **5 Claims**

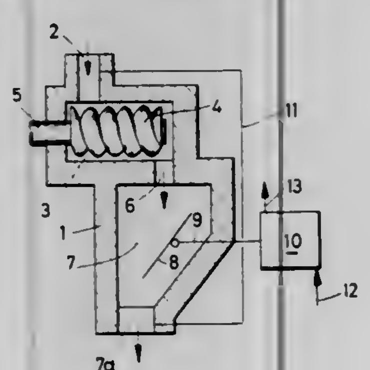
1. Portable flow-monitoring apparatus for use in a cylindrical water or sewer pipe, comprising a flexible collar-like structure adapted to fit within an open end of the pipe and contiguous with the inside wall of the pipe, having the intended upper portion of the collar-like structure separated into a pair of ends adapted to be spaced farther apart or closer together to flex the collar-like structure circumferentially, including means adjacent the respective ends and adapted to expand the collar-like structure for frictional retention in place against the inside wall of the pipe and, in contrast, to contract it for ready removal therefrom, sensor means mounted on part thereof and includ-

ing a bubble outlet, and a bubble fluid conductor extending from outside the collar-like structure to the inside wall thereof



and through about a semicircle in contact therewith and to the sensor means and bubble outlet.

4,058,012
APPARATUS FOR MEASURING THE FLOW OF FINE-GRAINED HOT SOLIDS
Georg Gauch, Gotzenhain, Germany, assignor to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Germany
Filed Nov. 1, 1976, Ser. No. 737,372
Claims priority, application Germany, Dec. 4, 1975, 2554534
Int. Cl.^{2} G01F *1/28*
U.S. Cl. 73—228 5 Claims



1. Apparatus for measuring the flow rate of fine-grained solids, particularly coal or coke, which are at temperatures up to about 1000° C and impinge from a predetermined height on sensing plate means and impart impulses thereto which are fed to a measuring system, comprising gastight housing means provided with an inlet for the solids, intermediate chamber means adjacent said inlet containing substantially horizontally acting conveyor means for conveying the solids to a passage, downcomer well means disposed below the passage and containing said sensing plate and a bypass conduit for gases connecting the inlet of the housing means and the outlet region of the downcomer well.

4,058,013
MEAT THERMOMETER
David H. Trott, Cincinnati, Ohio, assignor to Crossbow, Inc., Cincinnati, Ohio
Continuation-in-part of Ser. No. 664,624, March 8, 1976. This application Sept. 13, 1976, Ser. No. 722,650
Int. Cl.^{2} G01K *5/62, 13/00*
U.S. Cl. 73—352 4 Claims

1. In a grilling thermometer having an elongated stem, a temperature sensor in said stem, and an indicator connected to said sensor and projecting from said stem, the improvement comprising,

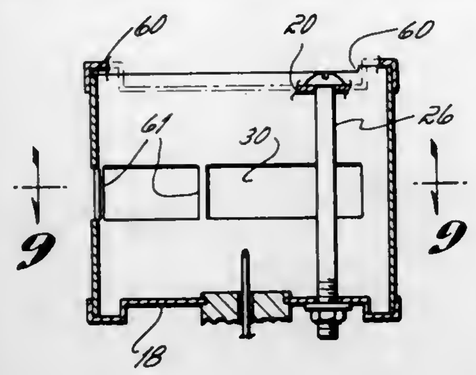
a disk mounted on said stem perpendicular to the axis of said stem,

a cylindrical housing mounted on said disk,

a cap mounted on said housing perpendicular to the axis of said stem,

said indicator projecting into said housing through the center of said disk and extending radially toward said housing,

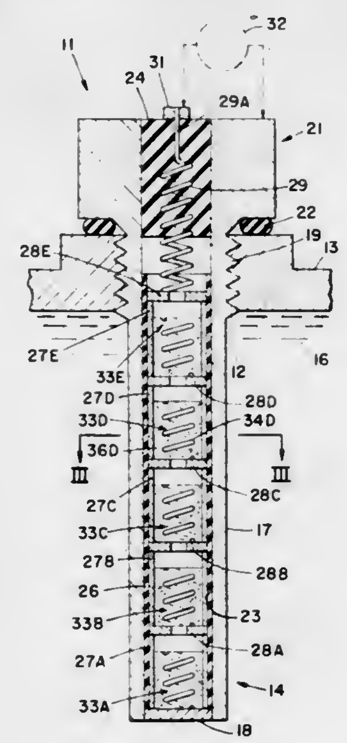
a bolt connecting said cap to said disk to clamp said housing



between said cap and disk, said bolt being offset from the center of said disk in a portion of said housing remote from said indicator adjacent said cap,

the edge portion of said cylindrical housing remote from said bolt being recessed, thereby maintaining said disk and cap in substantial parallelism when said housing and cap are assembled to said disk.

4,058,014
MAXIMUM TEMPERATURE RANGE INDICATOR
James C. Durand, Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.
Filed July 16, 1976, Ser. No. 705,845
Int. Cl.^{2} G01K *11/00;* G01R *27/00;* H01H *37/76*
U.S. Cl. 73—358 9 Claims



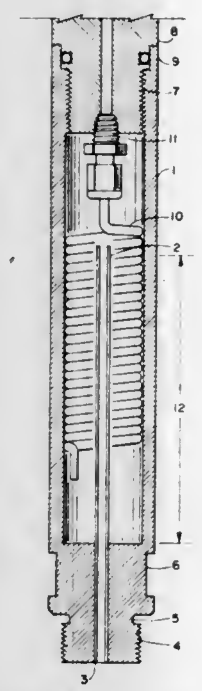
1. A maximum temperature range indicator comprising:

a plurality of spaced-apart electrical contacts,

a plurality of electrical resistor segments connecting said contacts together in electrical series relationship to establish high-resistance conductive paths between successive pairs of said contacts, and

a plurality of temperature-responsive electrical switches each being maintained operatively spaced between a different pair of said contacts, each of said switches coacting with a temperature-sensitive means for closing a low-resistance conductive path between an associated pair of said contacts upon occurrence of a predetermined temperature, the predetermined temperature to which each of said temperature-sensitive means responds being a different predetermined temperature whereby the maximum temperature range experienced by said indicator over a period of time may be determined by measuring the electrical resistance through the electrical circuit formed by said pluralities of contacts and resistor segments and switches.

4,058,015
CONTAMINATION TRAP FOR PRESSURE GAUGES
Ralph A. Stode, Ponca City, Okla., assignor to Continental Oil Company, Ponca City, Okla.
Filed Jan. 10, 1977, Ser. No. 757,813
Int. Cl.^{2} G01L *7/00*
U.S. Cl. 73—395 4 Claims



1. A pressure sensitive contamination trap to protect pressure sensors from water and other foreign materials, comprising a sealed vessel containing a first fluid, said vessel having an intake conduit to the vessel interior above the level of the first fluid, and a buffer tube filled with a second fluid, said buffer tube projecting below the level of the first fluid, said second fluid being in contact with said first fluid at one end of the buffer tube and with a pressure sensor at the other end of the buffer tube, wherein said second fluid is of lower specific gravity and immiscible with said first fluid.

4,058,016
COMBINATION VACUUM/PRESSURE GAUGE AND DUAL PURPOSE CASING CONSTRUCTION
Edwin L. Schwartz, Los Angeles, Calif., assignor to Rite Autotronics Corporation, Los Angeles, Calif.
Filed Apr. 1, 1976, Ser. No. 672,675
Int. Cl.^{2} G01L *7/16*
U.S. Cl. 73—419 15 Claims

11. A combination pressure/vacuum gauge comprising:

a casing having a base;

first and second cylinders located on said base on a common axial line;

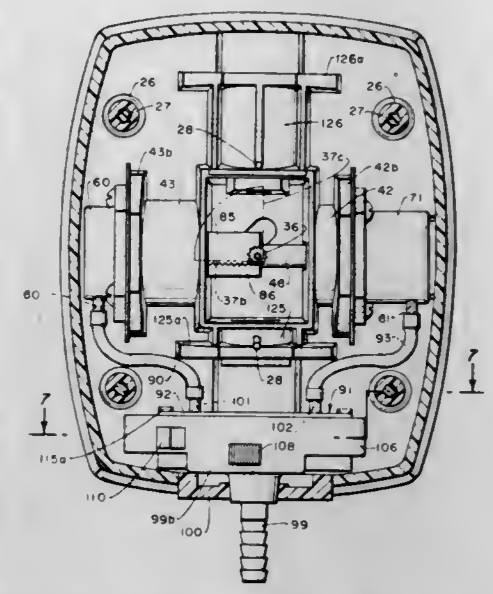
first and second pistons in said first and second cylinders, respectively;

a piston rod connected between said pistons in said cylinders;

spring means operative between said second cylinder and said second piston for biasing both said pistons toward one end of each of said cylinders;

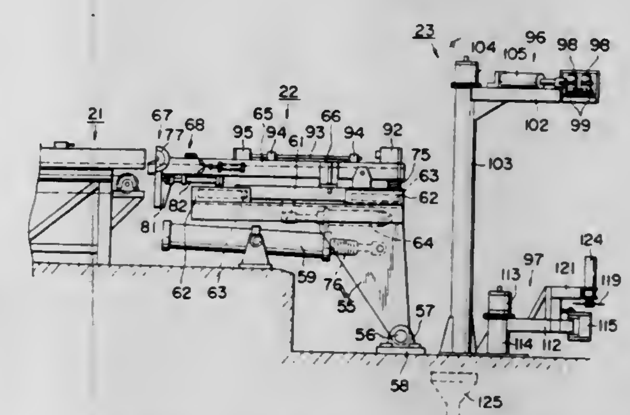
a pressure opening in said first cylinder adjacent its said one end, and a vacuum opening in said second cylinder adjacent the end opposite its said one end; and

valve means for connecting a pressure source to said pressure opening or a vacuum source to said vacuum opening



causing said pistons to move from said one end of said cylinders.

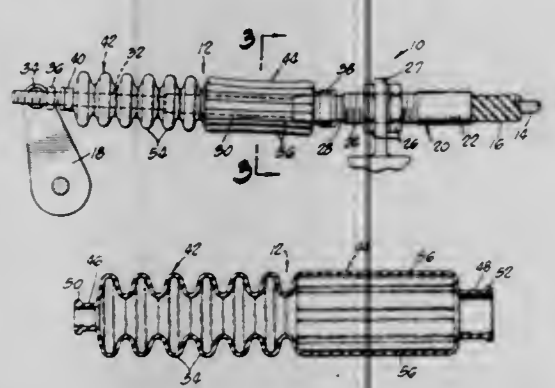
4,058,017
AUTOMATIC PROBE FEEDING, SETTING AND WITHDRAWING APPARATUS
Kenichi Tsujimoto; Yoshiharu Ikeuchi, and Akira Kuriyama, all of Wakayama, Japan, assignors to Sumitomo Metal Industries Ltd., Osaka, Japan
Filed July 8, 1976, Ser. No. 703,426
Claims priority, application Japan, July 11, 1975, 50-85601; July 19, 1975, 50-88954; July 15, 1975, 50-98664[U]; July 15, 1975, 50-98665[U]
Int. Cl.^{2} G01N *1/04*
U.S. Cl. 73—423 R 13 Claims



1. An automatic probe feeding, setting and withdrawing apparatus comprising, in combination: a probe container case provided with a probe dispensing mechanism comprising rows of probe supporting arms, each row of said arms being arranged in two vertically spaced stages and in pairs of two for reciprocation inwardly and outwardly from the both sides of a bottom portion of said case by a link mechanism; probe transfer means provided with a motor-driven probe push member at an end of a carriage board formed with a V-shaped channel in its surface; probe setting means comprising a movable block provided for sliding movement on a board pivotally supported in close proximity to one end of said probe transfer means, and a probe fitting block disposed parallel to said movable block and equipped at both ends thereof with probe clamps adapted for holding the probe from its sides and upper surface as well as having at its front end a pair of swingable probe fitting guides, said probe fitting block being also provided at a side thereof with bars designed to kick up the probe through openings formed in the probe resting surface thereof; and probe withdrawing and recovering means comprising a probe grasping mechanism having a pair of pawls arranged for opening and

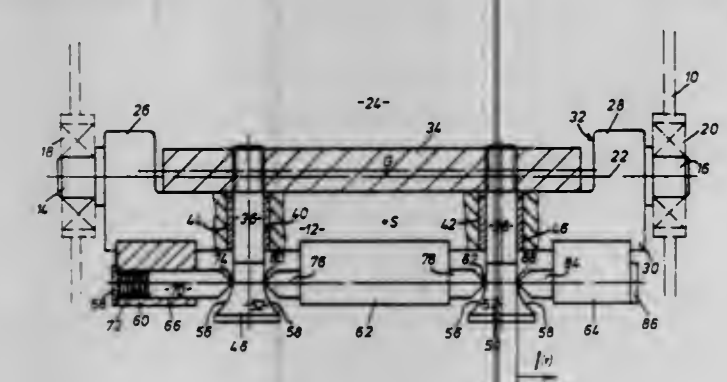
closing to grasp the upper portion of the probe, said mechanism being pivotally supported to be movable back and forth on the track of movement of a probe holding rod, and a probe cutting mechanism having a motor-driven cutter attached with a pair of swingably supported pawls arranged for opening and closing to grasp the lower portion of the probe, said mechanism being pivotally supported to be movable back and forth on the track of movement of a probe holding rod.

4,058,018
PRESSURE COMPENSATED FLEXIBLE BELLOWS
Warner R. Lauper, San Pedro, Calif., assignor to Quadrastat Controls Corporation, Glendale, Calif.
Filed Apr. 15, 1976, Ser. No. 677,300
Int. Cl.[2] F16J *15/50*
U.S. Cl. 74—18.2 **12 Claims**



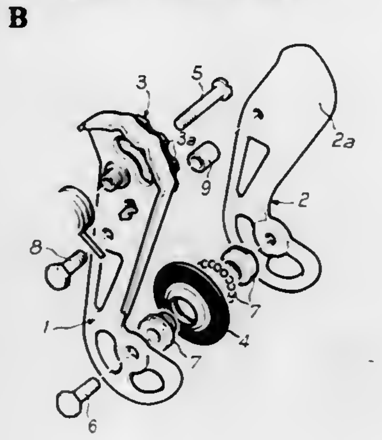
1. An internal pressure compensated flexible bellows for protecting a moving mechanism, comprising:
a. an axially extendable and contractable elongated tubular member having flexible surrounding deformable wall sections and being formed at its opposite ends to respectively provide a turbular connector;
b. self-contained means including said surrounding wall sections for maintaining a substantially constant internal pressure of fluid entrapped within said bellows by the closure of said tubular end connectors, during longitudinally extended and contracted movements of said bellows; and
c. in which said wall comprises at least one section capable of radial expansion and contraction, and at least one other section capable of longitudinal extension and contraction.

4,058,019
UNBALANCE VIBRATION GENERATOR
Günther Braun, Wuppertal-Elberfeld, Germany, assignor to Losenhausen Maschinenbau AG, Dusseldorf, Germany
Filed June 24, 1976, Ser. No. 699,483
Claims priority, application Germany, July 19, 1975, 2532333
Int. Cl.[2] F16H *37/00;* **B07B** *1/44*
U.S. Cl. 74—87 **15 Claims**



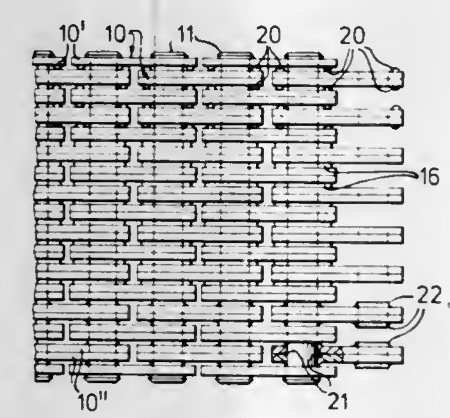
1. In an unbalance vibration generator adapted to be driven at varying rotational speeds comprising:
a first unbalance mass having a center of gravity; means for mounting said first unbalance mass for rotation about an axis of rotation; said center of gravity of said first unbalance mass being located at a distance from said axis of rotation, whereby said center of gravity of the first unbalance mass and said axis of rotation define a radially extending plane;
a second unbalance mass having a center of gravity; means for rotating said second unbalance mass together with said first unbalance mass and for guiding said second unbalance mass for radial movement in said radially extending plane,
said center of gravity of said second unbalance mass being located in said radially extending plane at a distance from said axis of rotation and on the side of said axis of rotation opposite to the center of gravity of said first unbalance mass; and
resilient restraining means engaging said second unbalance mass to counteract any radially outward movement of said second unbalance mass due to the centrifugal force acting thereon,
the improvement wherein said restraining means comprises spring means and cam means, said spring means being arranged to act on said second unbalance mass through said cam means,
said first and second unbalance masses, said spring means and said cam means being so dimensioned that the resultant centrifugal force of the two unbalance masses is substantially constant at all rotational speeds within a range of rotational speeds.

4,058,020
DEVICE FOR GUIDING THE CHAIN OF DERAILLEUR BICYCLE GEAR CHANGERS
Roger Huret, and Jacques Huret, both of 60, avenue Felix Faure, 92000 Nanterre, France
Continuation of Ser. No. 539,852, Jan. 9, 1975, abandoned. This application Oct. 26, 1976, Ser. No. 735,317
Claims priority, application France, Jan. 30, 1974, 74.03142
Int. Cl.[2] F16H *7/22*
U.S. Cl. 74—217 B **16 Claims**



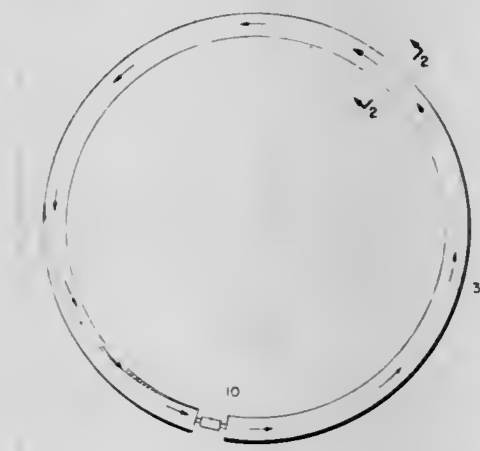
1. In a device for guiding the link chain of a bicycle derailleur gear changer on a bicycle having a wheel including a hub, a plurality of sprocket wheels attached to said hub and an endless chain link drive chain having links formed of pairs of articulated fish plates, and a derailleur gear changer for moving the chain between said plurality of sprocket wheels attached to the hub of the bicycle wheel, the improvement comprising external and internal cheek plates rigidly secured to each other in slightly spaced relation to each other with the external cheek plate being spaced further from the bicycle wheel than the internal cheek plate, said cheek plates being pivotally mounted on said derailleur gear changer about an axis extending parallel to the axis of rotation of the sprocket wheels for pivotal movement in planes substantially perpendicular to said axes; said plates moving together with the derailleur gear changer transversely with respect to said planes of pivotal movement on a path which covers each of said plurality of sprocket wheels; a chain guide pulley and a separate chain tensioning pulley rotatably mounted between said cheek plates in spaced relation to each other adjacent opposite ends of the plates, said chain guide pulley being normally located above the tensioning pulley closer to said sprocket than the tensioning pulley, said link chain passing in contact with the pulleys generally diagonally from said tensioning pulley to said guiding pulley between said cheek plates, said cheek plates, at least in the region thereof adjacent the part of the chain guiding pulley which is normally contacted by the link chain during operation of the bicycle, having extension portions extending radially beyond the periphery of said chain guiding pulley through a distance corresponding to at least the height of a chain link, said radial extensions terminating in edges which are turned over in opposite directions extending away from the guiding pulley; the edges of the extensions of the cheek plates having a breadth sufficient to support a segment of chain extending between one of said sprocket wheels and said chain-tensioning pulley; said turned over edge of the radial extension of the external cheek plate having, at least in the zone adjacent the chain-guiding pulley, a breadth at least equal to the maximum breadth of the links of the chain.

4,058,021
LEAF CHAIN AND TO DRIVING ARRANGEMENTS EMPLOYING SAME
Peter Wood, Cheadle, England, assignor to Renold Limited, Manchester, England
Continuation of Ser. No. 551,618, Feb. 21, 1975, abandoned. This application Oct. 12, 1976, Ser. No. 731,334
Claims priority, application United Kingdom, Feb. 28, 1974, 9221/74
Int. Cl.[2] F16H *7/06;* **F16G** *13/00, 13/18*
U.S. Cl. 74—229 **25 Claims**



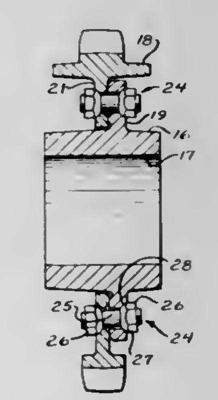
14. A limited torque, positive drive transmitting arrangement comprising:
a rotatable drum having a fluted periphery, said drum being rotatable in at least one of opposite directions about an axis of rotation;
a tensioned leaf chain passing over or around the drum, the leaf chain including:
a plurality of interlacing leaf chain links having respective peripheral edges, respective ends and respective opposite sides;
bearing pins interconnecting the leaf chain links such that portions of sides of the adjacent links are adjacent each other; and
spacing means disposed between the adjacent sides of each adjacent pair of the leaf chain links for maintaining the peripheral outermost edges of each adjacent pair of the leaf chain links in spaced apart relationship, said spacing means of at least one of said leaf chain links comprising bulges formed in a side of said at least one leaf chain link; and
the edges of the leaf chain links all being of substantially identical figure-of-eight configuration and the flutes of the fluted periphery of the drum extending substantially straight and in parallel with the rotational axis of the drum, the flutes being all of substantially identical, uniform, cross-sectional shape and being substantially uniformly spaced, the depth, shape and spacing of the flutes being such that the peripheral edge of each of the links of the chain in engagement with the drum engages flute surface portions of adjacent flutes in the drum at corresponding sides thereof.

4,058,022
MOBIUS DRIVE BELT FASTENER
A. Harry S. Pickburn, 4457 Chestnut Ridge Road, Tonawanda, N.Y. 14150
Filed Jan. 19, 1976, Ser. No. 650,361
Int. Cl.[2] F16G *3/07, 7/00*
U.S. Cl. 74—231 MB **4 Claims**



1. A mobius drive belt fastener means comprising a first belt securing means, and second belt securing means, said securing means being joinable one to the other along a substantially common longitudinal axis, said securing means being rotatable with respect to one another along said longitudinal axis, said first securing means has locking surface means extending therefrom, said second securing means has locking surface engaging means for lockably engaging said locking surface, when said securing means are coupled to one another, coupling means for joining said securing means to one another along said longitudinal axis whereby said securing means when attached to the butt ends of a drive belt can be lockably rotated along said axis to form a mobius belt drive loop.

4,058,023
ROTATING ASSEMBLY FOR MATERIAL HANDLING EQUIPMENT
Floyd O. Smith, Portland, Oreg., assignor to ESCO Corporation, Portland, Oreg.
Filed Dec. 8, 1975, Ser. No. 638,971
Int. Cl.[2] F16H *55/30*
U.S. Cl. 74—243 DR **2 Claims**



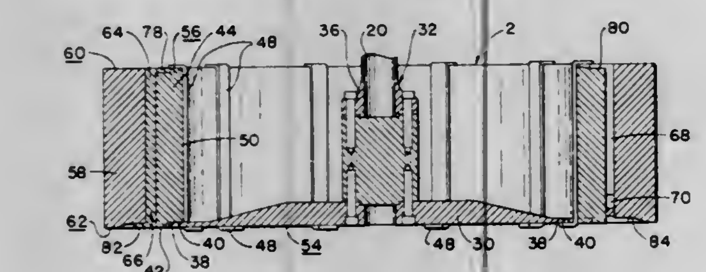
1. A rotating assembly for material handling equipment comprising:
a cast metal hub and a cast metal sprocket fixed thereto and having a common axis of rotation, said sprocket including a plurality of segments circumferentially spaced apart along generally radial lines,
a plurality of circumferentially spaced-apart openings ex-

tending axially through each of said hub and segments and provided therein during casting thereof, and openings in said hub being generally aligned with the openings in said segments for the receipt of a bolt means in each pair of aligned openings,

each segment opening having spherical zonal surfaces at both ends thereof said hub having a flange providing a pair of faces, one of said faces abutting said segments, the other of said faces having a spherical zonal depression about each hub opening, and

bolt means extending through each pair of openings and having a slightly smaller diameter than said openings, said bolt means being equipped at each end thereof with a spherical nut means clampingly engaging a spherical zonal surface, whereby said bolt means is adapted to assume a nonaxial disposition because of opening misalignment while still being essentially only under tension in clamping said hub and segments together.

4,058,024
MULTIPLE RING INERTIAL ENERGY STORAGE WHEEL WITH IMPROVED INTER-RING CONNECTOR
Hayden S. Gordon, Orinda, Calif., assignor to Electric Power Research Institute, Inc., Palo Alto, Calif.
Filed June 9, 1976, Ser. No. 694,257
Int. Cl.^{2} G05G *1/00*
U.S. Cl. 74—572 **17 Claims**



1. In an apparatus for storing inertial energy having a rotor defined by a plurality of independent, concentrically arranged rotor rings; inter-ring spacer means connecting an inner rotor ring to an outer ring and permitting relative, concentric radial movements between the inner and the outer rings to accommodate radial expansions of the rings due to centrifugal forces; and means for rotating the rotor rings about a common, concentric axis; the improvement to the inter-ring spacer means comprising: a spacer ring constructed of a substantially rigid material disposed between an inner ring and an outer ring, the spacer ring having a cylindrical configuration, a plurality of slots alternatingly extending from opposing axial ends of the ring towards the opposite end of the ring and terminating short of such opposite end, and first and second connecting means disposed at the respective axial ends of the ring for engaging the adjacent outer and inner rings, the first and second connecting means being circumferentially offset with respect to each other.

4,058,025
COUNTERWEIGHT ASSEMBLY
Charles A. Wood, 5539 Whispering Creek, Houston, Tex. 77017
Filed June 16, 1975, Ser. No. 587,358
Int. Cl.^{2} F16F *15/22, 15/28*
U.S. Cl. 74—573 R **10 Claims**

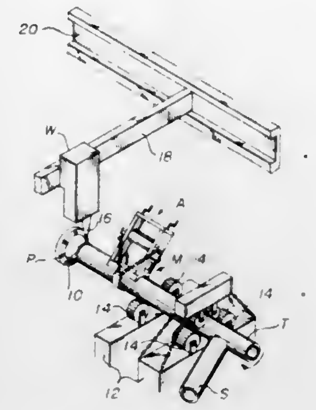
1. An adjustable counterweight assembly for use with a rotatable tubular member, comprising:

a frame;

engaging means mounted on said frame and having a substantially regular arcuate surface for engaging the outer surface of the tubular member;

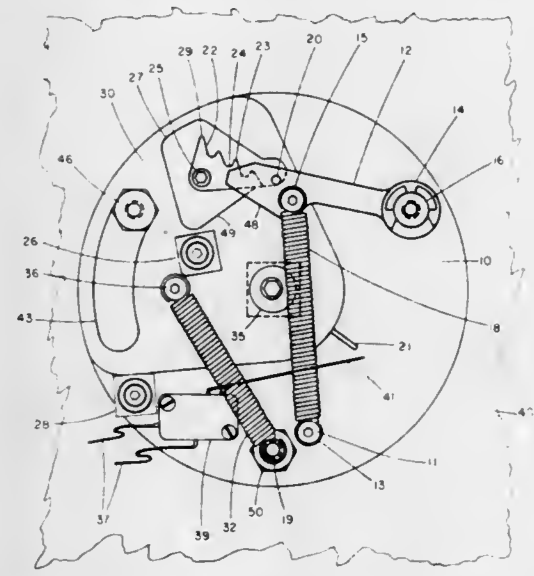
clamping means detachably mounted to said frame and extendable around the tubular member for detachably securing said engaging means to the outer surface of tubular member;

weight carriage means including a weight receptacle mounted on said frame for radial movement with respect to the tubular member; and



adjusting means mounted on said frame for moving said weight carriage radially with respect to the tubular member.

4,058,026
MECHANICAL ACTUATION SIMULATOR
Norman K. Simpson, 1770 C Industrial Road, Las Vegas, Nev. 89102
Filed Apr. 26, 1976, Ser. No. 679,998
Int. Cl.^{2} G05G *1/04*
U.S. Cl. 74—577 R **4 Claims**



1. In an electrically operated dispensing machine in which actuation is initiated by pulling a handle, the improvement of a device for simulating mechanical actuation comprising:

a ratchet member having a surface comprising a plurality of alternating ridges and notches;

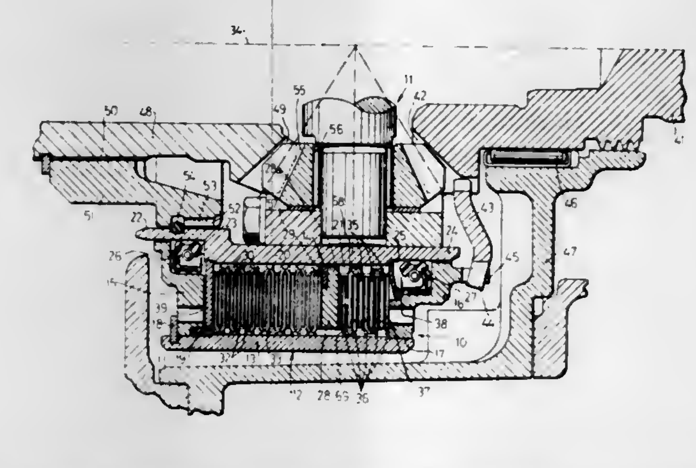
a member for engaging said ratchet member surface comprising a pivotally mounted arm having a protuberance thereon for progressively engaging said ratchet member surface;

said ratchet member being secured for movement to engage said engaging member whereby said protuberance is urged along said ratchet member surface when said handle is pulled.

4,058,027
CONTROL COUPLINGS
Oswald Webb, Coventry, England, assignor to GKN Transmissions Limited, Birmingham, England
Filed July 9, 1976, Ser. No. 704,023
Int. Cl.^{2} F16H *1/44;* **F16D** *35/00, 43/25*
U.S. Cl. 74—711 **10 Claims**

1. A control coupling comprising an enclosure containing a

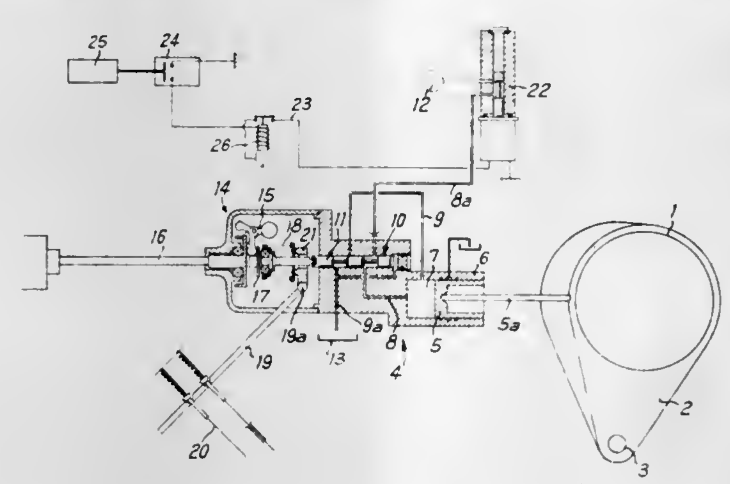
viscous liquid; first and second sets of mutually interleaved elements and third and fourth sets of mutually interleaved elements arranged for rotation about a common axis within the enclosure with the viscous liquid in contact with facing working surfaces of said interleaved elements, said first and third sets of elements having driving connections with a first rotatable member and said second and fourth sets of elements having driving connections with a second rotatable member; spacing means to space apart adjacent elements of at least one of said first and second sets and resilient spacing means to space apart adjacent elements of at least one of said third and fourth sets so that the facing surfaces of adjacent elements of each spaced set are spaced apart by distances greater than the thicknesses of the portions of the elements of the other set interleaved between said facing surfaces; a differential piston sub-



ject to the pressure in the enclosure; an abutment carried by the piston; and first spring means urging the piston to a first position in which the facing surfaces of adjacent elements of the or each spaced set of said third and fourth sets are spaced apart by distances greater than the thicknesses of the portions of the elements of the other set interleaved between said facing surfaces, the arrangement being such that as the pressure of the liquid in the enclosure increases the piston moves against the first spring means to cause the abutment to compress said resilient spacing means and bring the elements of the third and fourth sets into mutually clutching engagement.

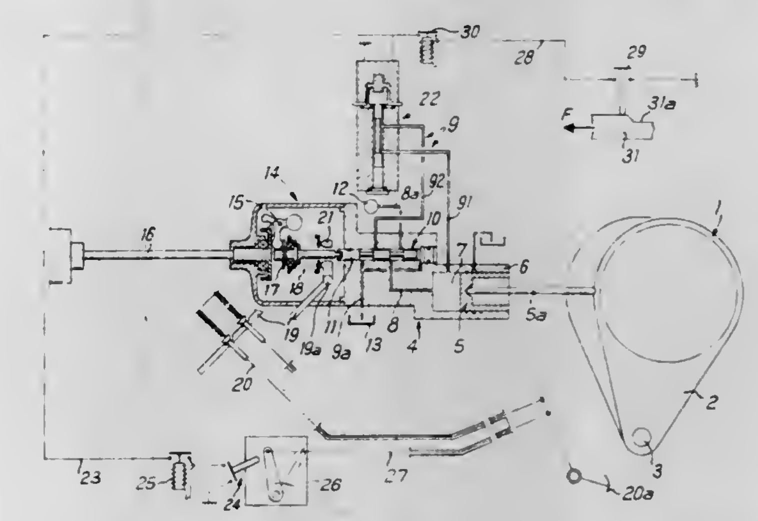
9. The combination of a control coupling according to claim 1 and a differential gearing in which the elements of the first and third sets on the one hand and the elements of the second and fourth sets on the other hand are drivingly connected to two relatively rotatable elements of the gearing.

4,058,028
TRANSMISSION-REGULATING DEVICE FOR MOTOR VEHICLE
André F. Estaque, Bagneux, France, assignor to Societe Anonyme Automobiles Citroen, Paris, France
Filed July 28, 1976, Ser. No. 708,849
Claims priority, application France, July 30, 1975, 75.23739
Int. Cl.^{2} B60K *41/04*
U.S. Cl. 74—865 **2 Claims**



1. A device for regulating the operation of the transmission of a motor vehicle having a variator which includes a step-down control element, said device comprising a hydraulic receiver, an element movable in said receiver to define therewith a chamber, means connecting said movable element with the step-down control element of the variator, distributor means associated with said receiver, a slide valve to said distributor means, a source of pressure fluid, a reservoir for pressure fluid, first conduit means adapted to communicate said chamber through said distributor means with said source, second conduit means adapted to communicate said chamber through said distributor means with said reservoir, a centrifugal regulator movable in response to engine speed, connecting means associating the slide valve with the centrifugal regulator resilient means associated with said connecting means, means for controlling said resilient means in response to operation of an accelerator for said engine, said centrifugal regulator, said resilient means and said control means serving to establish three positions for said slide valve, in the first of which the effect of the resilient means predominates and communication is established between said chamber and said source through said first conduit means while preventing communication between said chamber and said reservoir through said second conduit means, in the second of which the effect of said centrifugal regulator predominates and communication is established between said chamber and said reservoir through said second conduit means while preventing communication between said chamber and said source through said first conduit means, and in the third of which the effects of the resilient means and the centrifugal regulator are in equilibrium and communication is prevented between said chamber and both said source and said reservoir, a two position electrically operable valve in said first conduit means and having a normally open position connecting said first conduit means with said source, an energising circuit for said valve, switch means normally holding said energising circuit open, and a device for detecting the rotary speed of the engine when said speed is at least equal to a predetermined value and for closing said switch means thereby to energise said circuit, close said valve and thus close said first conduit means.

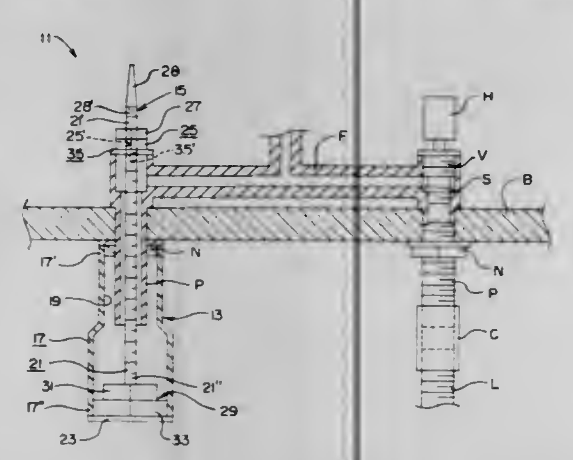
4,058,029
TRANSMISSION-REGULATING DEVICE FOR MOTOR VEHICLE
André F. Estaque, Bagneux, France, assignor to Societe Anonyme Automobiles Citroen, Paris, France
Filed July 28, 1976, Ser. No. 709,420
Claims priority, application France, July 30, 1975, 75.23740
Int. Cl.^{2} B60K *41/18;* **G05G** *21/00*
U.S. Cl. 74—865 **3 Claims**



1. A device for regulating the operation of the transmission of a motor vehicle having a speed reversing gear associated with a speed variator which includes a step-down control element, said device comprising a member tending to maintain said element in its position of low speed reduction, a hydraulic receiver, an element movable in said receiver to define there-

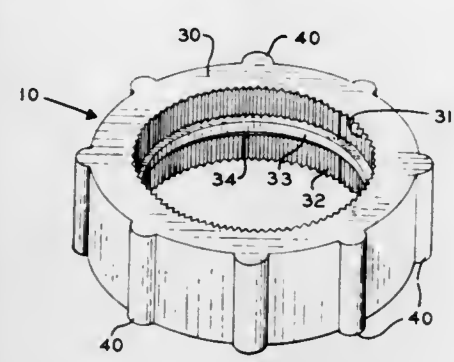
with a chamber, means connecting said movable element with the step-down control element of the variator, distributor means associated with said receiver, a source of pressure fluid, a reservoir for pressure fluid, first conduit means adapted to communicate said chamber through said distributor means with said source, second conduit means adapted to communicate said chamber through said distributor means with said reservoir, a centrifugal regulator movable in response to engine speed, connecting means associating the distributor means with the centrifugal regulator, resilient means associated with said connecting means, means for controlling said resilient means in response to operation of an accelerator for said engine, said centrifugal regulator, said resilient means and said control means serving to establish three positions for said distributor means, in the first of which the effect of the resilient means predominates and communication is established between said chamber and said source through said first conduit means while preventing communication between said chamber and said reservoir through said second conduit means, in the second of which the effect of said centrifugal regulator predominates and communication is established between said chamber and said reservoir through said second conduit means while preventing communication between said chamber and said source through said first conduit means, and in the third of which the effects of the resilient means and the centrifugal regulator are in equilibrium and communication is prevented between said chamber and both said source and said reservoir, a two-position electrically operable valve in said second conduit means and having a normally open position permitting flow through said second conduit means, an energising circuit for said valve, switch means normally holding said energising circuit open, an element for closing said switch means on accelerator for said engine and means connecting said element to said accelerator so that said element is arranged to close said switch means when said accelerator is in a position of rest.

4,058,030
WATER FAUCET TOOL MEANS
Willis H. Simmons, 9766 Redwood Road, Millington, Tenn. 38053
Filed Mar. 11, 1976, Ser. No. 666,179
Int. Cl.[2] B25B *27/24, 13/48*
U.S. Cl. 81—53 R 10 Claims



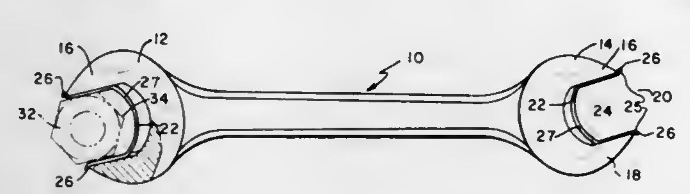
1. Tool means for use on the nuts mounted beneath a water basin on the water inlet pipes of a water faucet that hold the water faucet to the water basin, said tool means comprising:
a. wrench means for closely fitting around one of said nuts holding the water faucet to the water basin, said wrench means including a body member having a first end and a second end and having a longitudinal aperture completely therethrough, the portion of said longitudinal aperture adjacent said first end of said body member having a cross-sectional shape substantially identical to the cross-sectional shape of a first standard size of said nuts holding the water faucet to the water basin;
b. securing means for securing said wrench means to one of said nuts holding the water faucet to the water basin, said securing means including a rod member for extending through said longitudinal aperture of said body member of said wrench means and through one of said nuts holding the water faucet to the water basin, said rod member having a first end and second end, at least said first end of said rod member being threaded, said securing means including a plate member fixedly attached to said second end of said rod member, said plate member being of a shape so as to prevent said wrench means from passing thereover, said securing means including a nut member having a threaded aperture therethrough for coacting with said threaded first end of said rod member in a manner to clamp said wrench means about one of said nuts holding the water faucet to the water basin and against the underneath side of the water basin; and
c. means for transmitting torque between said rod member of said securing means and said wrench means.

4,058,031
WRENCH FOR A SUBSTANTIALLY CIRCULAR WORKPIECE
Masick C. Magarian, 4481 N. Palm Ave., Fresno, Calif. 93704
Filed May 28, 1976, Ser. No. 691,089
Int. Cl.[2] B25B *13/52*
U.S. Cl. 81—64 7 Claims



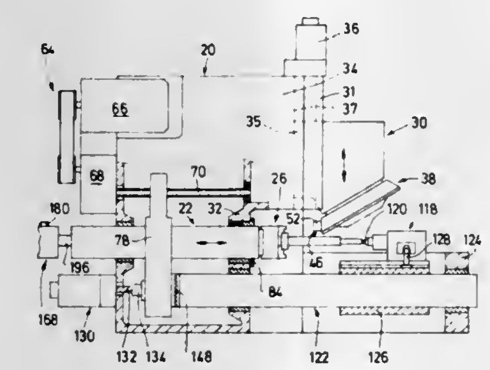
1. A wrench for a substantially circular workpiece comprising an annular elastic body adapted to be tensioned about a workpiece and having a resiliently compressible inner surface adapted to conform to the workpiece when the body is tensioned thereabout, said body having an axial opening and predetermined forward and rearward ends, the inner surface having sets of serrations adjacent to the opposite ends with the individual serrations elongated axially of the opening, the set of serrations adjacent to the forward end being of a diameter approximately but larger than the diameter of the serrations at the rearward end to facilitate installation, and said body having an outer surface providing outwardly extended grasping protuberances.

4,058,032
OPEN-END WRENCH
Richard Benton Jacks, P.O. Box 284, Sunnyvale, Calif.
Continuation of Ser. No. 564,222, April 2, 1975, abandoned. This application July 15, 1976, Ser. No. 705,690
Int. Cl.[2] B25B *13/02*
U.S. Cl. 81—125 2 Claims



1. In an open-end wrench of the type wherein an elongate handle terminates at either end in jaws forming a U-shaped recess to receive a nut, the improvement comprising: groove means formed on the inside of said U-shaped recess, resilient insert means positioned within said groove means so as to protrude into said U-shaped recess, said resilient insert means being formed as a substantially U-shaped length of spring wire having an inner loop portion which entirely protrudes into said U-shaped recess and opposed shank portions which partially protrude into said U-shaped recess, such positioning of the spring wire within said groove means facilitating initial grasping and retention of a nut between said shank portions and subsequent inward locking movements of said spring wire with respect to both said groove means and said U-shaped recess in response to contact of the nut with said loop portion, said substantially U-shaped length of spring wire being additionally provided with outwardly flaring tip portions on said shank portions which protrude slightly beyond open ends of the groove means within said U-shaped recess, the diameter of said spring wire being slightly greater than the depth of said groove means so that outward expansion of said spring wire can be only partially accommodated within said groove means whereby a nut can be slidingly engaged within said U-shaped recess between said shank portions of the spring wire and thereafter with the loop portion of said spring wire to cause said outwardly flaring tip portions of the spring wire to slidably engage within said groove means to lock both the nut and the spring wire in place by compression.

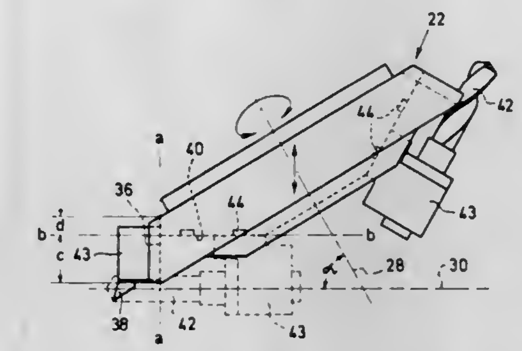
4,058,033
AUTOMATIC TURRET LATHE
Heinrich Lahm, Esslingen-Sirnau, and Dieter Gutbrod, Aichwald-Aichschiess, both of Germany, assignors to Index-Werke KG Hahn & Tessky, Esslingen, Germany
Filed June 1, 1976, Ser. No. 691,347
Claims priority, application Germany, June 12, 1975, 2526343
Int. Cl.[2] B23B *3/00*
U.S. Cl. 82—2 R 23 Claims



1. An automatic turret lathe comprising a stationary headstock, a live spindle supported in said headstock for rotational and axial movement relative thereto, a turret carriage adjustably mounted on said headstock for movement perpendicular to the axis of said live spindle, a turret head supported on said turret carriage for indexing movement about an indexing axis, said turret head being oriented so that its indexing axis intersects the live spindle axis at an acute angle and is constructed to have mounted thereon tools for outside and inside machining of workpieces turned by said live spindle.

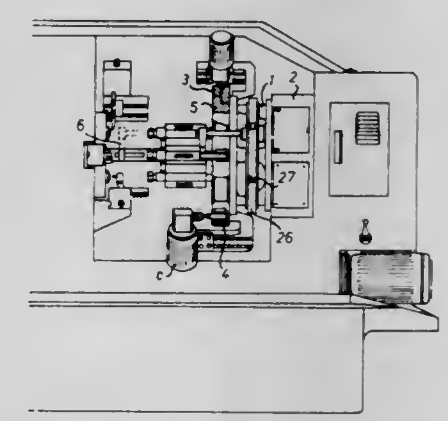
4,058,034
LATHE WITH MULTIPLE TOOL TURRET
Heinrich Lahm, Esslingen-Sirnau, and Dieter Gutbrod, Aichwald-Aichschiess, both of Germany, assignors to Index-Werke KG Hahn & Tessky, Esslingen, Germany
Filed June 1, 1976, Ser. No. 691,413
Claims priority, application Germany, June 12, 1975, 2526342
Int. Cl.[2] B23B *3/00, 29/00*
U.S. Cl. 82—2 R 8 Claims

1. An automatic turret lathe having a live spindle with an axis of rotation, a turret carriage, and an indexing turret head mounted on said turret carriage for indexing movement about an indexing axis and positioned so that its indexing axis is at an acute angle to the live spindle axis, said turret head having a plurality of tool receivers located at angular distances from each other around said indexing axis for supporting alternately outside machining tools and inside machining tools, the tool receivers for said outside machining tools being located at the periphery of said turret head so as to provide a working position in a first plane perpendicular to said live spindle axis, and



the tool receivers for said inside machining tools being arranged so as to provide a working position in a second plane parallel to said live spindle axis and perpendicular to the plane defining the working position of tool receivers for the outside machining tools.

4,058,035
AUTOMATIC LATHE
Hermann Flisch, Eichholz, Switzerland, assignor to Eunipp AG., Zug, Switzerland
Filed June 30, 1976, Ser. No. 701,123
Int. Cl.[2] B23B *3/24, 3/00;* B23P *23/00*
U.S. Cl. 82—3 3 Claims



1. A multispindle automatic lathe comprising a stand, a rotatable spindle drum supported thereby and further supporting a plurality of spindles and indexable in stepwise rotation from one working station to the next for carrying out a number or machining operations by means of tools associated with said spindle drum, a support opposite the stand and carrying machining means capable of carrying out machining operations additional to those performed with the tools associated with the spindle drum, said machining means receiving workpieces from the spindle drum from a transfer device operatively feeding the same and being disposed outside of a zone occupied by said tools and comprising a workpiece carrier disposed coaxially with the axis of the spindle drum and rotatable in synchronism with same.

4,058,036
ADJUSTABLE SPINDLE LINER TUBE OR FILLER TUBE
Richard Arnold Austin, 35 Ohio Ave., West Springfield, Mass. 01089
Filed July 9, 1976, Ser. No. 704,047
Int. Cl.[2] B23B *25/00, 23/02*
U.S. Cl. 82—38 A 17 Claims

1. An adjustable support for supporting bar or tube stock concentrically relative to the work centerline of a machine tool comprising: a tube, a plurality of variable support opening sections sleeved within and spaced along the axial direction of

the tube, and means for adjusting the variable support opening sections for movement into and out of gripping relation with the stock, the sections cooperantly defining a fixed centerline coincident with the work centerline of the machine, each variable support opening section including a plurality of pairs of fixed puller and pivotal spherical rings disposed in spaced

relation to each other, puller fingers movable longitudinally relative to the tube, the spherical rings being pivotable relative to the tube, the puller rings being fixedly mounted on the puller fingers, the spherical rings being actuatable unisonly between non-gripping and gripping positions by the actuation of the puller rings on the spherical rings.

4,058,037

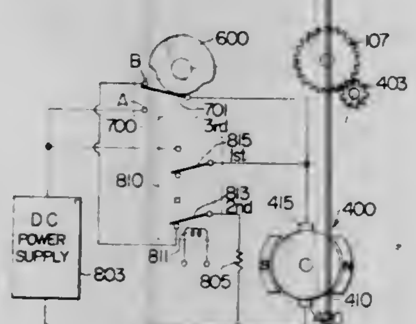
FULL ROTATION TYPE, SHEET WEB SHEARING MACHINE

Sadaji Tashiro, and Yasuyuki Kuroi, both of Kumagaya, Japan, assignors to Hitachi Metals, Ltd., Japan

Filed Mar. 18, 1976, Ser. No. 668,302

Int. Cl.² B26D *5/00*

U.S. Cl. 83—70 **28 Claims**



1. A full rotation type, sheet web shearing machine comprising;

a rotary blade having a shearing edge mounted on a rotatable cylindrical shank,

a stationary blade having a shearing edge elastically contacting the edge of the rotary blade, the stationary blade shearing the sheet web with the rotary blade,

means for driving the rotary blade,

means for detecting a rotation angle from a starting position of the rotary blade,

means for braking the rotary blade and means for sending a timing signal of braking to the means for braking and to the means for driving as the rotation angle coincides with a present angle, so as to bring the rotary blade at a predetermined angle to a halt.

4,058,038

APPARATUS FOR DETACHING A PORTION OF A BODY OF MATERIAL SUCH AS HAY

Lauri Alarik Tenhunen, 74700 Kiuruvesi, Finland

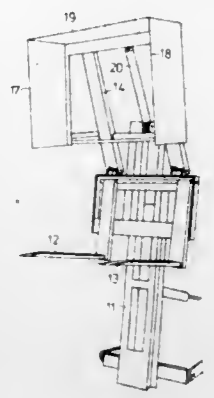
Filed Mar. 11, 1976, Ser. No. 666,141

Claims priority, application Finland, June 2, 1975, 1617/75; July 18, 1975, 2087/75

Int. Cl.² B26D *5/12*

U.S. Cl. 83—109 **17 Claims**

1. In an apparatus for detaching from a body of an edible material such as hay a portion of the body which after detachment can be transported to a desired location, a prime mover, frame means carried by said prime mover, and cutting means carried by said frame means for cutting into a body, such as a body of edible material, while carrying out a slicing stroke with respect to the body during penetration thereof, for detaching from said body a portion thereof, in the form of a block, which can then be transported to a desired location, said



cutting means including a wall structure which terminates in cutting edges for cutting into the body while carrying out said slicing stroke with respect thereto, and said wall structure extending at least in part around said block and determining at least in part the configuration thereof.

4,058,039

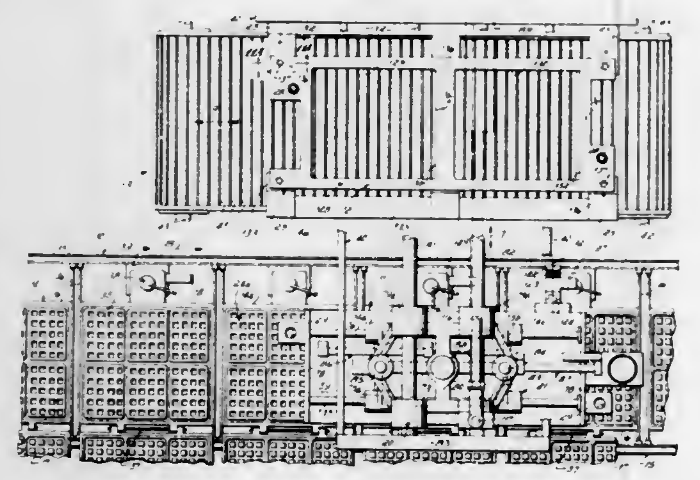
WAFFLE TRANSFER MACHINE

Richard R. Schmid, Cincinnati, Ohio, assignor to Lockwood Manufacturing Company, Cincinnati, Ohio

Filed May 20, 1976, Ser. No. 688,129

Int. Cl.² A21B *5/02;* A47J *37/01*

U.S. Cl. 83—155 **11 Claims**



1. A waffle transfer machine particularly adapted to transfer baked waffles from a waffle iron conveyor to a transfer conveyor, said machine including

a vacuum head structured to pick waffles by vacuum off successive waffle irons carried by said waffle iron conveyor, said vacuum head being connected to a vacuum source,

a carriage structure to which said vacuum head is fixed, said carriage structure being adapted to move said vacuum head in a vertical direction over said waffle iron conveyor for picking up waffles off said waffle irons, in a vertical direction over said transfer conveyor for discharging said waffles onto said transfer conveyor, and said carriage structure also being adapted to move said vacuum head in a horizontal direction for reciprocating said vacuum head between a first position over said waffle iron conveyor and a second position over said transfer conveyor, and

a trimming die positioned over said transfer conveyor, said waffles being passed through said trimming die for trimming same into a regular defined geometry upon discharge from said vacuum head onto said transfer conveyor.

4,058,040

SLOTTED WORKTABLE

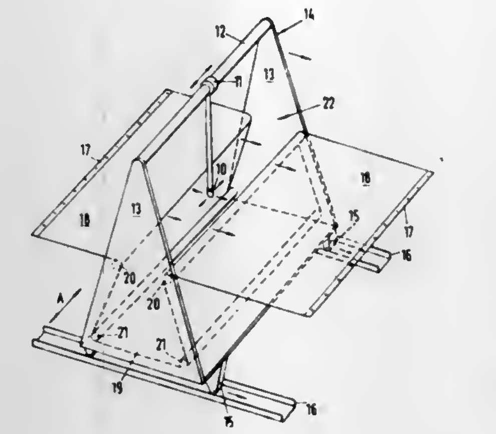
Martin John Fisher, Milton Keynes, England, assignor to The British Hydromechanics Research Association, England

Filed Apr. 7, 1976, Ser. No. 674,444

Claims priority, application United Kingdom, Apr. 9, 1975, 14619/75

Int. Cl.² B26F *3/00*

U.S. Cl. 83—177 **13 Claims**



1. A slotted worktable, comprising, a first frame having two oppositely-facing sides, securing means disposed in a horizontal plane and arranged on said oppositely-facing sides of the first frame, a single length of flexible support material extending between said securing means, a second frame situated between said sides of the first frame and movable in a horizontal plane towards and away from said sides, a first pair of parallel rollers carried by the second frame and spaced apart in a horizontal plane substantially coplanar with said plane of the securing means, further roller means carried by the second frame and extending parallel to the first pair of rollers, below said plane of the first pair of rollers, the flexible support material being trained over the first pair of rollers and the further roller means so that said material passes over the first pair of rollers and below the further roller means to define a slot between the first pair of rollers.

11. A worktable for holding a flat workpiece stationary as the same is operated upon by a movable penetrating tool arranged above the workpiece comprising, in combination, a single length of flexible material forming a wide belt having end portions extending horizontally in opposite directions as well as a central portion, a main frame having means for gripping the end portions of the length of material in tension to define a horizontal working plane upon which the workpiece is stationarily supported, first and second rollers spaced from one another and extending transversely of the length of material and tangent to the working plane, the central portion of the length of material being trained downwardly between the rollers to define a depending loop of material with the upper portion of the loop separated by a relatively narrow transversely extending clearance slot, auxiliary roller means at the lower end of the loop for keeping the loop in taut condition, a subframe, means for mounting the subframe for horizontal shifting movement parallel to the working plane, a penetrating tool support above the working plane, the penetrating tool support being mounted on the subframe so that the tool is centered with respect to the clearance slot, the first and second rollers and the auxiliary roller means being fixedly mounted with respect to the subframe so that upon shifting of the subframe to move the penetrating tool relative to the stationary workpiece the slot moves in unison with the tool to provide under-workpiece clearance for the tool regardless of the position of the tool on the workpiece, the subframe being shiftable through a sufficient distance so that the tool may traverse the belt throughout substantially its entire horizontal length thereby enabling accommodative support of a workpiece of substantially the same horizontal dimension as the belt.

4,058,041

ROTARY DRUM TYPE FLYING SHEAR MACHINE

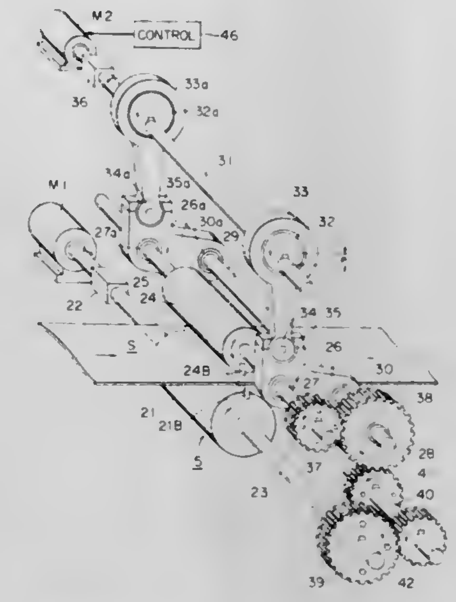
Kunihiro Ito, Kobe, Japan, assignor to Kawasaki Jukogyo Kabushiki Kaisha, Kobe, Japan

Filed Nov. 29, 1976, Ser. No. 745,822

Claims priority, application Japan, Dec. 4, 1975, 50-145362

Int. Cl.² B23D *25/12*

U.S. Cl. 83—305 **2 Claims**



1. In a flying shear machine of the type including a first shear drum provided with a first shear blade cutting edge, a second shear drum provided with a second shear blade cutting edge, said drums being oppositely disposed and having different diameters such that miscuts of stock material can occur between cuts of the material by said cutting edges, drum driving means for continuously driving said drums at speeds such that the tangential speeds of the cutting edges are synchronized with the stock material traveling speed, and drum displacing means for moving said first drum toward and away from said second drum, said cuts being made when said first drum is moved to a position nearest said second drum at which said cutting edges are in registering coincidence to shear the stock material: the improvement comprising motive power means for operating said drum displacing means, said motive power means being independent from said drum driving means, and control means for controlling said motive power means to operate said drum displacing means to cause it to undergo cycles of operation, each cycle including starting at a first shear timing with said first drum in a position remote from said second drum, accelerating said motive power means and hence said drum displacing means in a direction of displacement of the first drum toward the second drum, causing said first drum at a second shear timing to reach said position nearest the second drum, at which said cutting edges assume registering coincidence to shear the stock material and at which said motive power means is at its full velocity. decelerating said motive power means and hence said drum displacing means in a direction of displacement of the first drum to return to said position remote from the second drum at a third shear timing, at which said motive power means stops.

4,058,042

KEY TRANSPOSING ELECTRONIC ORGAN

David R. Wade, Norwood, Ohio, and Walter Munch, Jr., Fort Thomas, Ky., assignors to D. H. Baldwin Company, Cincinnati, Ohio

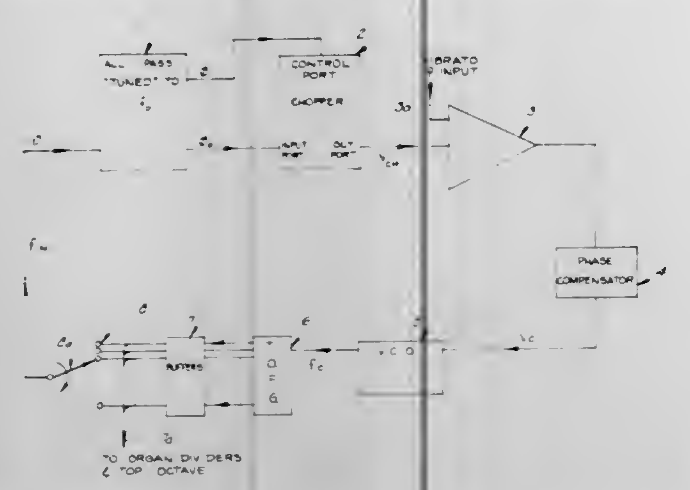
Filed June 20, 1975, Ser. No. 588,625

Int. Cl.² G01H *1/02;* G10C *3/12*

U.S. Cl. 84—1.01 **7 Claims**

1. A method of transposing, comprising generating a plurality of note signals by frequency division, comparing the phase of any note signal with the phase of the same note signal as processed by an all pass network tuned to a reference fre-

quency, generating a dc control signal as a function of the comparison, generating a clock frequency in response to said



dc control signal and using said clock frequency for said frequency division.

4,058,043

PROGRAMMABLE RHYTHM APPARATUS

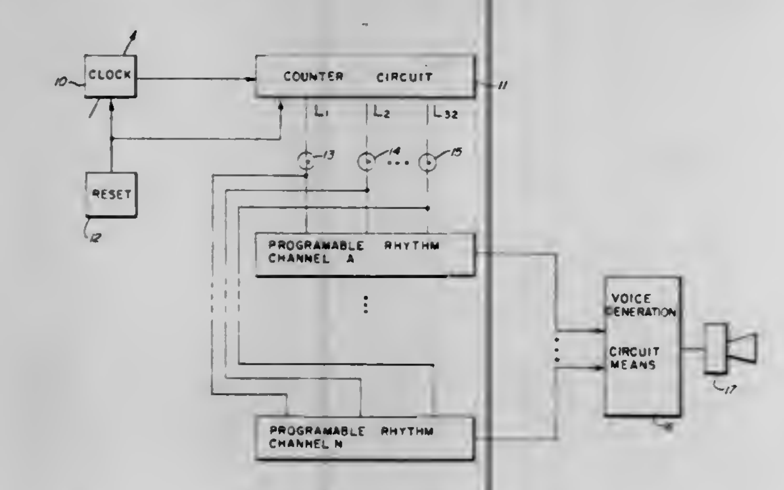
Masashi Shibahara, Kishiwada, Japan, assignor to Nihon Hammond Kabushiki Kaisha, Osaka, Japan

Filed Oct. 30, 1975, Ser. No. 627,262

Claims priority, application Japan, Nov. 1, 1974, 49-126971; Dec. 11, 1974, 49-142929; Dec. 11, 1974, 49-142928; Dec. 11, 1974, 49-142927; Dec. 11, 1974, 49-142926

Int. Cl.² G10F *1/00;* G10H *1/02;* A63J *17/00*

U.S. Cl. 84—1.03 10 Claims



1. A programmable rhythm device for use in an electronic musical instrument comprising:
a pulse producing means for generating a sequence of pulses respectively corresponding to each individual beat of a rhythm pattern,
a plurality of rhythm channels each receiving each pulse in said pulse sequence and each of said rhythm channels being individually programmable by an instrument player for producing an output control signal at selectable times corresponding to any desired beat of a rhythm pattern, and,
said plurality of rhythm channels each comprising:
a selection means for generating an enable signal, and,
a plurality of logic circuit means each responsive to the simultaneous occurrence of said selection enable signal and one of said sequence pulses for programming said logic circuit.

4,058,044

ELECTRICAL MUSICAL INSTRUMENT

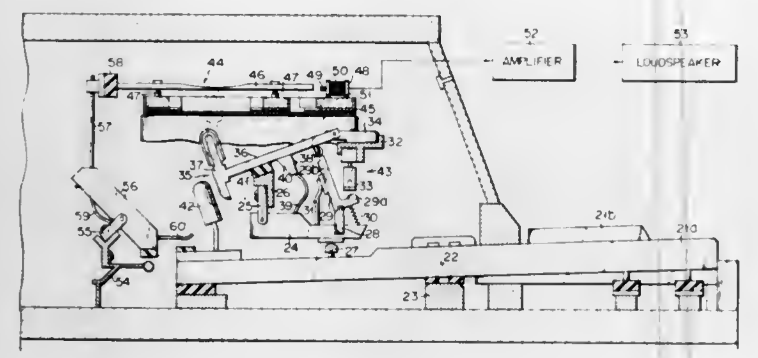
Kazuo Murakami, Hamamatsu, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Japan

Filed June 26, 1975, Ser. No. 590,557

Claims priority, application Japan, June 29, 1974, 49-74882; Oct. 7, 1974, 49-114673; June 29, 1974, 49-76699[U]; June 29, 1974, 49-76701[U]

Int. Cl.² G10H *3/00, 3/08*

U.S. Cl. 84—1.14 22 Claims



1. An electrical musical instrument including:
a plurality of vibratory tone bars arranged side by side in the order of a musical scale, said tone bars having apertures therein.
supporting means for supporting each of said tone bars at their respective nodal points with both ends of each of said tone bars left free, said supporting means for each of said tone bar comprising a pin having a head at one end, said pin being loosely fitted at the middle portion thereof in an aperture of a tone bar at one end of the nodal points thereof, a first damping member elastically engaging that portion of one surface of said tone bar which corresponds to one of the nodal points, and a second damping member elastically engaging that portion of the opposite surface of said tone bar which corresponds to one of the nodal points,
hammers for striking the respective tone bars,
key-operated mechanisms for operating the respective hammers to strike the respective tone bars,
a plurality of mechanical-electrical transducers each corresponding to each of said tone bars and disposed in confronting relation to said tone bars, said transducers generating electric signals in accordance with the vibration of said tone bars, and
means for converting said electrical signals into musical sounds.

4,058,045

PIANO WITH SOUND-ENHANCING SYSTEM

Robert Parry Jennings, Castro Valley, and Kenneth Thomas Aaroe, Hayward, both of Calif., assignors to Solosonic, Hayward, Calif.

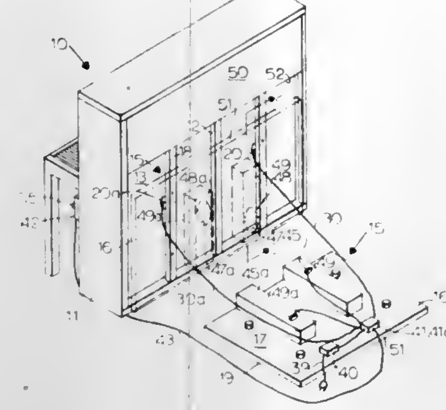
Filed Feb. 5, 1976, Ser. No. 655,451

Int. Cl.² G10H *1/00, 3/02*

U.S. Cl. 84—1.14 18 Claims

1. In a piano having a main frame, a string-holding frame supported by and inside said main frame and having strings thereon, a keyboard with keys, and a sounding board, the combination therewith of:
an amplifying assembly, comprising
pickup means mounted on said sounding board for picking up sound directly from said sounding board supported on said piano,
amplifier means supported on said piano and connected electrically to said pickup means,
loud speaker means supported on said piano and electrically connected to said amplifier means, and

baffle means secured to said piano main frame for preventing feedback from said loudspeaker means to said sounding



board, said amplifier means and said loudspeaker means being secured to and supported by said baffle means.

4,058,046

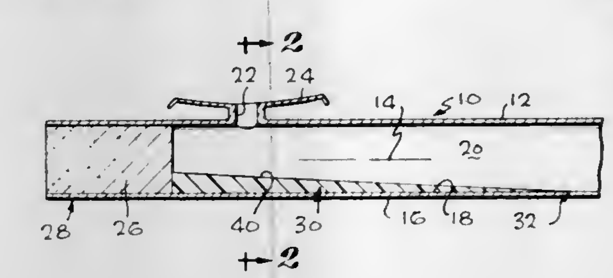
CYLINDRICAL HEAD JOINT WITH ACOUSTIC WEDGING FOR CONCERT FLUTES

Raoul J. Fajardo, P.O. Box 5782, Pasadena, Calif. 91107

Filed Aug. 3, 1976, Ser. No. 711,157

Int. Cl.² G10D *7/02*

U.S. Cl. 84—384 14 Claims



1. A flute head joint comprising:
a wall having an embouchure hole therethrough and a closed inner surface defining a hollow cylinder extending along a central axis between opposite ends of the wall;
a closure element disposed to close the hollow cylinder between one end and the embouchure hole; and
a wedge positioned within the hollow cylinder and decreasing continually in cross-sectional area from one end disposed on one side of the embouchure hole to an opposite end disposed on an opposite side of the embouchure hole a substantial distance therefrom to provide an acoustic taper to the hollow cylinder.

4,058,047

CLAMP NAIL

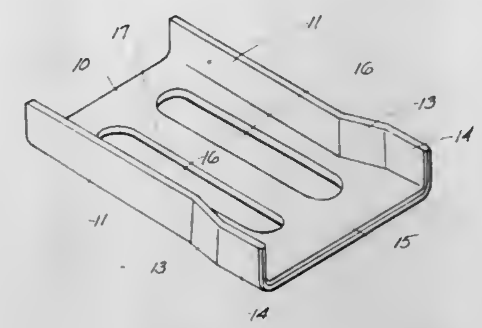
Francis J. Kramer, Edgewood; Robert G. Rothfuss, Bellevue, both of Ky., and William C. Wise, Pleasant Plain, Ohio, assignors to Senco Products, Inc., Cincinnati, Ohio

Filed May 12, 1975, Ser. No. 576,882

Int. Cl.² F16B *15/00*

U.S. Cl. 85—11 6 Claims

1. A clamp nail comprising a channel having a web and marginal flanges extending in the same direction from said web, said web being of constant width over the major portion of its length, and having a relatively short tapered portion which is wider at its leading end in the direction of driving, said flanges extending along the entire length of the nail, including said major portion and said tapered portion, said tapered portion converging from said wider end to said major portion, said tapered portion and converging flanges constituting a transition portion; at least two transversely spaced holes of substantially equal size in said web being symmetrically arranged on opposite sides of the longitudinal axis of the nail, said holes leaving a relatively wide, longitudinally extending column of web material on said axis, said column being of sufficient width to impart strength to the nail in the direction of



driving, the total area of said holes being at least 30% of the area of said web.

4,058,048

CLINCHNAIL

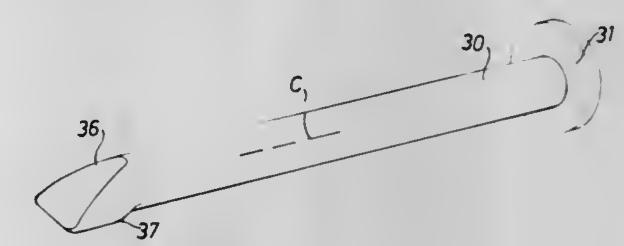
Borje Erling Ingvar Sundberg, Tyreso, Sweden, assignor to Nordisk Kartro Aktiebolag, Sweden

Filed Oct. 1, 1975, Ser. No. 618,369

Claims priority, application Sweden, Oct. 2, 1974, 74123787; Aug. 27, 1975, 75095372

Int. Cl.² E01B *9/12*

U.S. Cl. 85—31 3 Claims



1. A clinch nail comprising:
a. a single elongated shank having a smooth surface throughout its length and a constant cross-sectional configuration throughout said length;
b. a head at one end of said shank;
c. a tip portion at the other end of said shank, said tip portion including two converging surfaces merging to form a substantially straight leading line-like edge extending perpendicularly to, but laterally offset from, the center line of the shank, said line-like edge having a length exceeding the cross-section thickness of said shank, and said tip portion having a length between said constant configuration and said edge which is less than one and one-half times the cross-sectional thickness of said shank.

4,058,049

ANCHOR ROPE

Johan H. Bech, 1265 Tanglewood Court, La Salle, Ontario, Canada

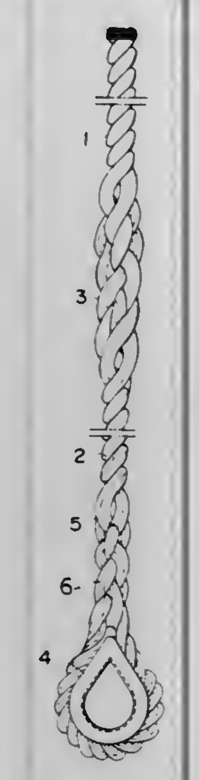
Filed Mar. 22, 1976, Ser. No. 669,386

Int. Cl.² D04C *1/12;* B63B *21/22*

U.S. Cl. 87—8 4 Claims

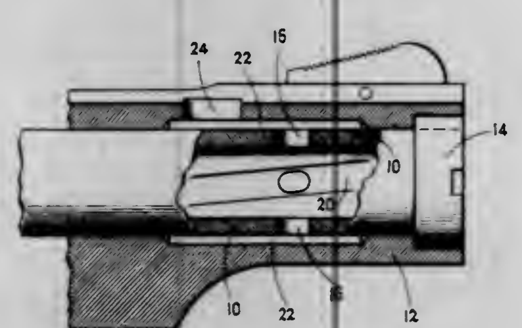
1. A rope for attaching an anchor thereto comprising a long section of rope made of twisted or braided strands of natural or synthetic fibre, in combination with a short section of rope which forms the anchor attachment end of said rope, which is formed into a loop by means of which the anchor is attached

thereto; said short section of anchor attachment rope being provided with a flexible strand of heavy metal therein for the



purpose of adding extra weight to the anchor, without reducing the flexibility of the said long section of rope.

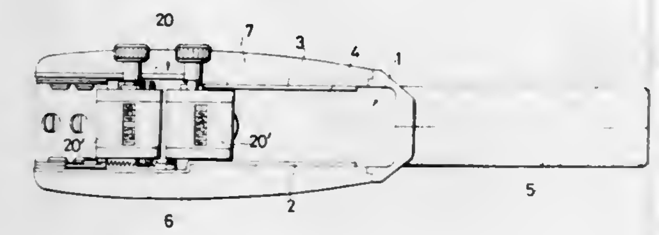
4,058,050
GUN LEVELING DEVICE
Paul E. Brouthers, Monson, Mass., assignor to Dan Wesson Arms, Inc., Monson, Mass.
Filed July 19, 1976, Ser. No. 706,606
Int. Cl.² F41C *21/18*
U.S. Cl. 89—14 C **11 Claims**



1. Apparatus for controlling muzzle jump or recoil of a pistol or revolver having a barrel with grooves forming a rifled bore and a shroud with a bore and fitting about the barrel comprising;

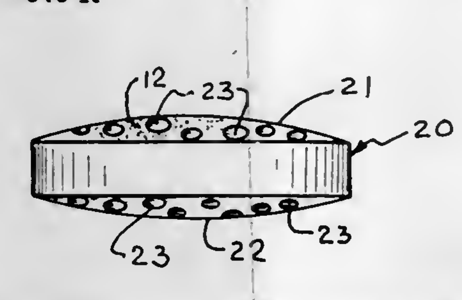
means forming a plurality of radially directed passages extending through the wall of the barrel,
said passages terminating at their inner ends in openings on the inner surface of said barrel, said openings extending parallel to the direction of said grooves,
means forming a channel only in the bore of the shroud to form an expansion chamber between the barrel and shroud and positioned to communicate with the plurality of radially directed passages, and means defining at least one orifice in the upper portion of the shroud extending from the channel to communicate from the chamber to the atmosphere
means for reversing the gas flow in the expansion chamber including said passages disposed at and communicating with a front end of the expansion chamber and said at least one orifice disposed at and communicating with the rear end of the expansion chamber,
the maximum longitudinal distance between said passages and said orifice being greater than the circumferential distance between said orifice and an adjacent passage.

4,058,051
PORTABLE TAGGING MACHINE
Yo Sato, Tokyo, Japan, assignor to Kabushiki Kaisha Sato Kenkyusho, Tokyo, Japan
Filed Apr. 5, 1976, Ser. No. 673,380
Claims priority, application Japan, Apr. 7, 1975, 50-41244
Int. Cl.² B31B *1/90*
U.S. Cl. 93—88 **43 Claims**



1. A tagging machine for tagging articles, comprising:
a casing having a front portion at one end and a rear portion at its opposite end; an article receiving means at said casing one end for receiving an article to be tagged; a grip by which said machine is held, said grip being attached at said casing opposite end; a passageway into said casing from the direction of its said rear portion toward said article receiving means for transmitting a continuous strip of tags therealong;
a lever for operating said machine; a pivot mount for said lever and said lever being pivotally mounted to its said pivot mount and being located in said casing; said lever extending through said casing rear portion and extending near said grip; said lever being movable between a first position and a second portion; biasing means for normally biasing said lever to said first position;
feed means for engaging and feeding a continuous strip of tags along said passageway to said article receiving means; said feed means including pawl means located in and movable along said passageway and being movable toward and away from said article receiving means; said pawl means being engageable with the strip of tags upon movement of said pawl means toward said article receiving means and being disengageable from the strip of tags upon movement of said pawl means in the opposite direction; first link means linking said pawl means to said lever in a manner such that movement of said lever toward its said second position moves said pawl means away from said article receiving means and movement of said lever toward its said first position moves said pawl means toward said article receiving means;
a platen located in said passageway and facing toward a printing means, said platen being provided for having a tag to be printed rest thereupon; printing means facing towards said platen for printing and inscription upon a tag in a strip of tags in said passageway, which tag is the one in the strip then located on said platen; second link means linking said printing means with said lever in a manner such that movement of said lever to its said second position moves said printing means against said platen to print the tag then on said platen and movement of said lever to its said first position moves said printing means off said platen;
tag strip cutting means comprising a cutting blade for cutting the strip of tags; third link means linking said cutting means with said lever in a manner such that movement of said lever to its said second position moves said cutting blade across said passageway and movement of said lever to its said first position raises said cutting blade away from said passageway and away from the strip of tags; said cutting blade being so located and movable that it moves across said passageway at a location selected to be where neighboring tags in the strip thereof will be joined;
tag attaching means located further along said passageway toward said casing front portion than said printing means and said cutting means; said tag attaching means being positioned at said article receiving means and being adapted to attach together an article to be tagged and a tag then at said article receiving means; fourth link means linking said lever and said tag attaching means in a manner such that upon movement of said lever to its said second position, said tag attaching means engages the article and the tag then at said article receiving means and attaches them together, and upon movement of said lever to its said first position, said tag attaching means is moved away from said article receiving means and the article and the tag therein;
pressure return means engageable with said tag attaching means for forcing said tag attaching means away from said article receiving means; fifth link means linking said pressure return means with said lever such that said pressure return means engages said tag attaching means to force said tag attaching means away from said article receiving means upon said lever beginning to move to its said first position;
positioning means for a strip of tags, including a stopper movable into and out of said passageway; said stopper being shaped and oriented to be received in a slit between two adjacent tags of a strip thereof located in said passageway; sixth link means linking said strip positioning means and said lever for moving said stopper into and out of said passageway in a sequence of operation of said stopper such that said stopper is in said passageway when said lever is in said first position and when said lever is moving to said second position, is out of said passageway when said lever has moved to said second position and returns to be in said passageway as said lever is returning from said second position to said first position.

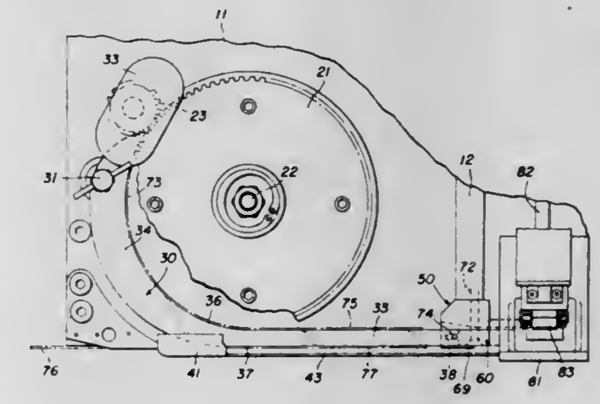
4,058,052
COOKING GRILL AND BRIQUETTES THEREFOR
Mark M. Hart, 37 Huntleigh Woods, St. Louis, Mo. 63131
Filed Aug. 30, 1971, Ser. No. 176,088
Int. Cl.² A23P *1/00*
U.S. Cl. 99—646 R **2 Claims**



1. A solid liquid impervious aluminum briquette having two, oppositely disposed, convex surfaces having liquid retaining means thereon, and a coating of char on at least one of said surfaces.

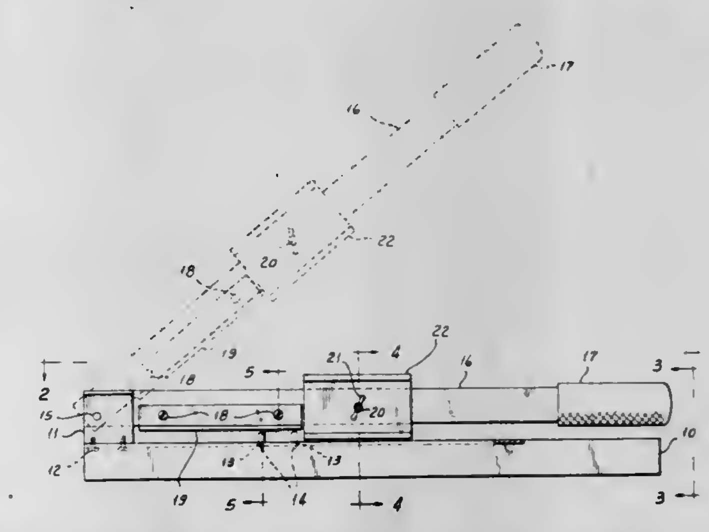
4,058,053
STRAP GUIDE FOR STRAPPING MACHINE
Francis J. Patterson, Calumet City, and Louis M. DeFilippo, Chicago Ridge, both of Ill., assignors to Interlake, Inc., Oak Brook, Ill.
Filed Jan. 5, 1977, Ser. No. 756,872
Int. Cl.² B65B *57/10, 13/04, 13/34*
U.S. Cl. 100—26 **16 Claims**

12. Strap guide apparatus for use in a strapping machine for applying plastic strap around an object with the leading end of the strap overlapping and spaced from the supply portion thereof in a strap-sealing region, said strap guide apparatus comprising a plastic feed track member carried by the machine and having an entry end disposed adjacent to an associated strap supply and an exit end, said feed track member having an inner track surface for guiding the strap therealong from the associated strap supply to the exit end of said feed track member, said feed track member having an outer track surface spaced a predetermined distance from said inner track surface for guiding the strap therealong from around the associated object to the exit end of said feed track member, a first plastic guide member mounted on the machine adjacent to the exit end of said feed track member and adjacent to the strap sealing region, said first guide member having an outer surface with a strap channel recessed therein and extending the length thereof, a second plastic guide member fixedly secured to said first guide member and having an inner guide surface disposed in facing engagement with said outer surface of said first guide



member and substantially coplanar with said exit end of said feed guide surface, said inner guide surface covering said strap channel and cooperating therewith to define a strap guide passage for accommodating movement of the strap longitudinally therethrough along a predetermined path from said inner track surface to the strap-sealing region, said second guide member having an outer guide surface disposed substantially coplanar with said outer track surface and extending substantially parallel to said strap passage, said outer track surface and said outer guide surface cooperating for guiding movement of the leading end of the strap therealong from around the associated object and back to the strap-sealing region in overlapping relationship with the portion of the strap emerging from said strap passage.

4,058,054
CAN FOLDER AND FLATTENER
Stanley Markman, 7 Copley Court, Wayne, N.J. 07470
Filed Oct. 4, 1976, Ser. No. 729,165
Int. Cl.² B30B *7/00*
U.S. Cl. 100—233 **4 Claims**



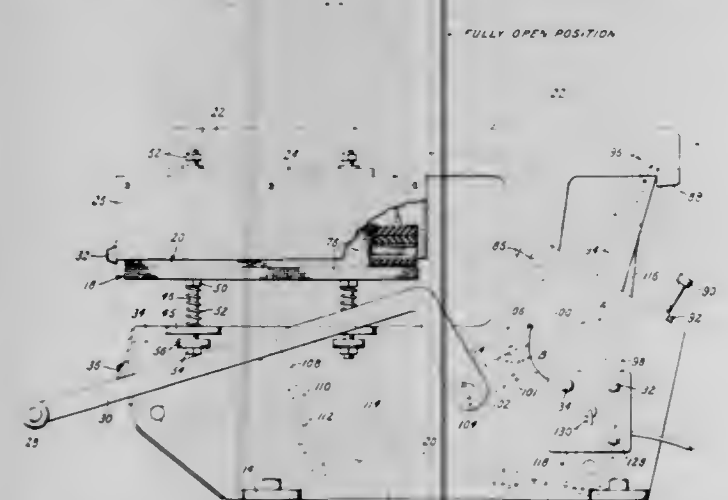
1. A can folding and flattening device comprising:
a. A base plate having apertures formed therein for receiving a pin which functions as a can positioner;
b. Arm support means attached to said base plate;
c. A pivotable handle operatively associated with said base plate and attached to said arm support means whereby

said handle can be rotated toward and away from said base plate;

d. A can folding anvil secured to said handle by means of a stud and wing nut wherein said can folding anvil comprises a first folding face and a second folding face whereby upon loosening of said wing nut said can folding anvil can be rotated to expose either of said faces to said base plate and wherein said first folding face and said second folding face are of different widths; and

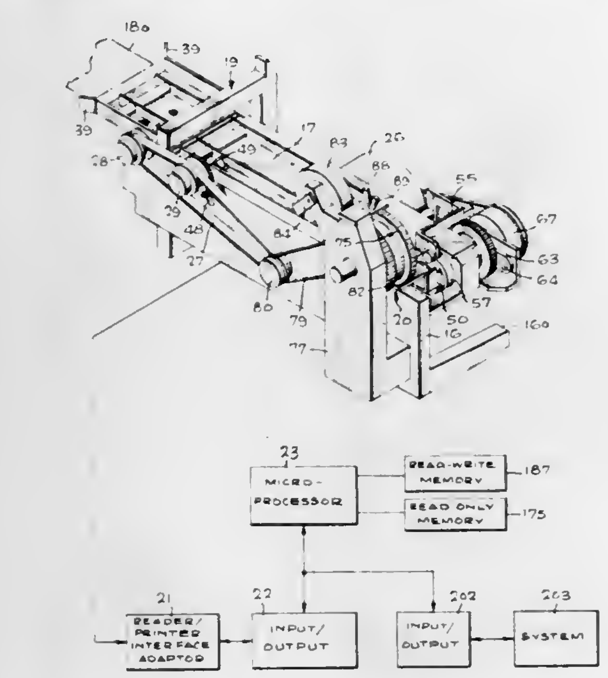
e. A can flattening anvil secured to said handle whereby upon rotation of said handle toward said base plate a folded can, positioned on said base plate, is caused to be flattened, said can flattening anvil having the same width as said base plate.

4,058,055
APPARATUS FOR APPLYING TRANSFERS TO FABRICS
Leon L. Douglas, 407 Lakeside Road, Wynnewood, Pa. 19096
Filed Aug. 5, 1975, Ser. No. 602,072
Int. Cl.² B44B *5/00*
U.S. Cl. 101—10 **10 Claims**



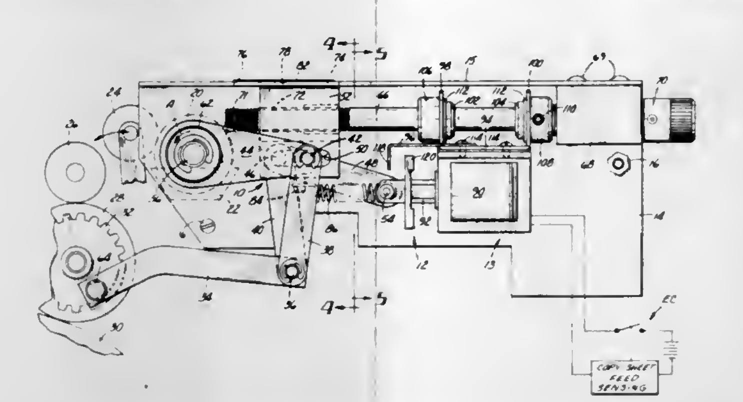
1. An apparatus for applying designs comprised of thermosetting ink from a carrier material to a fabric which comprises:
a frame;
a lower platen connected to said frame by means for permitting the variation of the vertical and angular position between said platen and said frame;
an upper platen, including means for heating said upper platen to a particular temperature, connected to an arm by means for permitting the variation of the vertical and angular position between said platen and said arm when said arm is substantially horizontal, said arm being pivotally connected to said frame at a point spaced between its opposite ends; and
actuation means pivotally connected to said arm and to said frame for compressing said upper platen against said lower platen to a fully engaged position said actuation means including;
a manually operative member, operation of which causes said upper platen to change its position with respect to said lower platen;
a timer having a range of settings which may be set at a pre-selected time within the range; and
an automatic means acting in response to the timer for partially moving said upper platen with respect to said lower platen to a partially open position in between said fully engaged position and a fully open position when the pre-selected time has passed,
thereby permitting disengagement of said platens at said pre-selected time in such a manner so as to avoid smearing of said thermosetting inks of said fabric;
thereby providing an apparatus for applying heat and pressure to the fabric, design and its carrier material placed therebetween, and moving said upper platen away from said lower platen to said fully open position, and positions therebetween including said partially open position.

4,058,056
MICROPROCESSOR CONTROLLED CARD READER/PRINTER
Irwin Rubin, Oxnard, Calif., assignor to Sensor Technology, Inc., Chatsworth, Calif.
Filed June 21, 1976, Ser. No. 698,268
Int. Cl.² B41J *1/22*
U.S. Cl. 101—93.19 **17 Claims**



1. A card reader/printer system comprising:
a stationary read head for sensing marks on said card,
a printer for printing characters onto said card,
a transport mechanism including:
first transport means for transporting said card first past said read head at a uniform rate, said read head sensing said marks as said card is transported past said read head, and
second transport means for then transporting said card incrementally past said printer in steps equal to the distance between adjacent print positions so that consecutive print positions on said card are aligned with said printer, said printer comprising a motor driven, substantially continuously rotating type wheel containing a font of type, the rotational rate of said type wheel being sufficiently great so that an entire set of type characters in said font is successively available to be printed at each print position during the dwell time of said card between consecutive transport steps imparted by said second transport means, and
a processor for directing said printer to print on said card during said incremental transport a message that is responsive to data read from said, said processor including:
first processor means, coupled to said first transport means and to said read head, for entering data read from said card into a memory in storage locations corresponding to the locations of marks on said card,
second processor means for providing, in response to said stored read data, a set of write data to be printed onto said card, and for storing this write data in storage locations of a memory corresponding to the locations in which said write data is to be printed on said card, and
third processor means, conditioned for operation by each successive transport step of said second transport means, for comparing each type wheel character in position to be printed with the write data character stored in the memory location corresponding to the current print location of said card, and for directing printing of said character when the compared characters are the same.

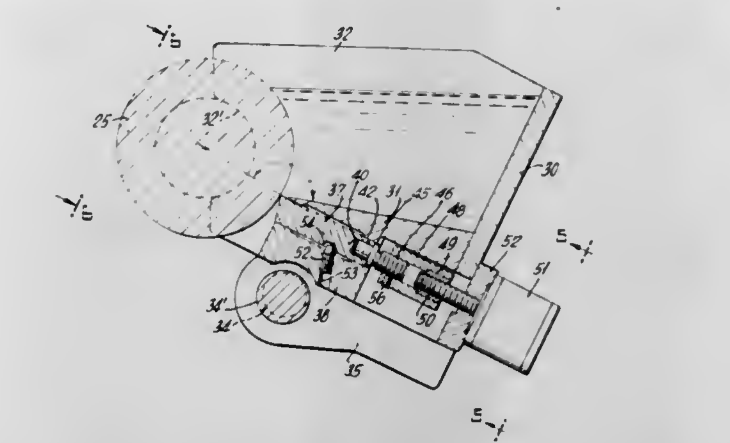
4,058,057
MOISTURE METERING CONTROL APPARATUS
Otto G. Milan, Schaumburg, and Edward J. Klich, Chicago, both of Ill., assignors to Addressograph-Multigraph Corporation, Cleveland, Ohio
Filed Mar. 9, 1977, Ser. No. 775,909
Int. Cl.² B41F *7/40;* **B41L** *25/16*
U.S. Cl. 101—148 **8 Claims**



1. A lithographic duplicating machine comprising:
a master cylinder;
fountain means including a fountain roller for supplying dampening fluid to a master on the master cylinder;
a drive element; and
a control means for metering the rate of feed of the fluid, comprising:
an actuating arm mechanically associated with the fountain roller for rotating the same unidirectionally;
linkage means for oscillating the actuating arm and rotating the fountain roller in intermittent increments, said linkage means comprising:
a first link supported for swinging movement about a pivot means associated with the actuating arm;
a second link pivotably connected with the first link and supported for swinging movement about a fixed pivot;
an operating means for imparting swinging movement to the first and second links as a unit about the fixed pivot in response to movement of the drive element;
means for adjusting the linkage means with respect to its operation in a first mode including means to adjust the position of the fixed pivot to a selected normal position to set the magnitude of the incremental motions of the fountain roller to a desired value by infinitesimal degrees to control the feed of dampening fluid during a printing operation; and
means for moving the fixed pivot, independently of the setting of the adjusting means, between the selected normal position as determined by the adjusting means, and a low-moisture position closer to the axis of the pivot means, providing operation of the linkage means in a second mode in which the fountain roller is rotated in increments of less magnitude than those which characterize operation in the first mode.

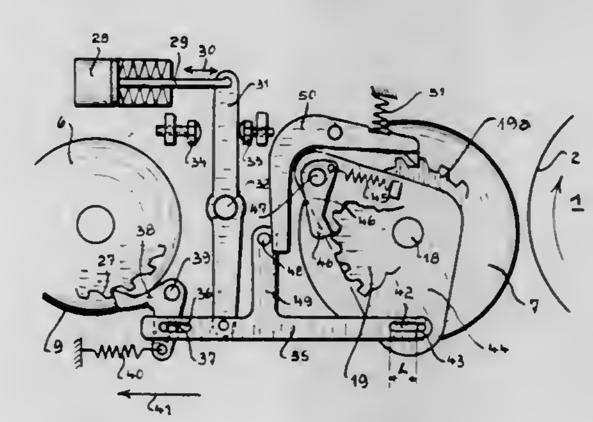
4,058,058
INK FOUNTAIN FOR PRINTING PRESSES
Walter G. Hantscho, Pound Ridge, N.Y., assignor to George Hantscho Company, Inc., Mount Vernon, N.Y.
Filed Feb. 26, 1976, Ser. No. 661,739
Int. Cl.² B41F *31/04*
U.S. Cl. 101—365 **2 Claims**

1. An ink fountain for a printing press comprising a fountain roller and cooperating reservoir, said reservoir including a pair of end walls, a rear wall and a bottom wall and bottom plate extending between said end walls, said bottom plate slidably carrying a plurality of keys in coplanar contiguous relationship, reversible motors carried by said rear wall and having threaded shafts, threaded means carried by each of said keys and engaging a motor shaft for moving said key toward and away from said roller and thus forming a metering gap, said bottom wall overlying said keys and said keys and bottom wall each forming an angle with a tangent to said roller at said metering gap of at least 60°, each of said keys including a recess on the underside thereof and said bottom support includes a



plurality of threaded openings and set screws in said openings and protruding into said recesses for limiting movement of said keys, said threaded means comprising a threaded stud secured to and extending from each key, a sleeve having one end threadably engaging said stud and the other end threadably engaging said motor shaft, and means for adjustably fixing said sleeve relative to said stud.

4,058,059
MECHANISM FOR CLEANING A CYLINDER OF A PRINTING PRESS
Hans Jacob Moestue, Osteraskroken 9, N-1345 Osteras, Norway
Filed Sept. 11, 1975, Ser. No. 612,324
Claims priority, application Norway, Sept. 11, 1974, 743261; Aug. 22, 1975, 752534; Germany, Aug. 27, 1975, 2538105
Int. Cl.² B41F *35/02*
U.S. Cl. 101—425 **11 Claims**

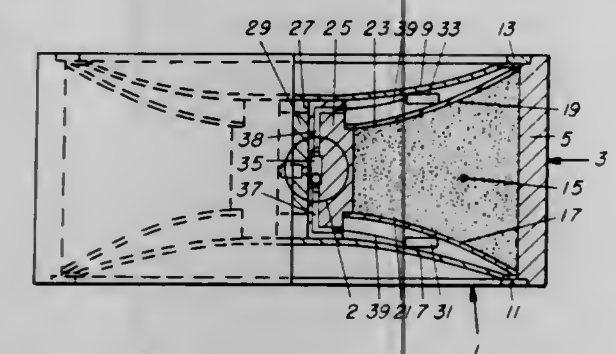


1. A mechanism for cleaning a driven cylinder of a printing press comprising a wash cloth web. a magazine roller from which the wash cloth web is incrementally unwound, means for wetting the wash cloth web with a cleaning fluid, a pressure mechanism which may be pressed against the cylinder to be cleaned and over which the wash cloth web is conducted, a take-up roller upon which used portions of the wash cloth web are wound up, and means for moving the pressure mechanism into and out of contact with the cylinder, the pressure mechanism including a pressure roller, drive means for moving the pressure roller through a constant angle for each increment of the wash cloth web, and secondary drive means including a slip clutch connecting the pressure roller to the take-up roller, the secondary drive means being such that the angle of rotation of the take-up roller subtends an arc the length of which is at least equal to the length of arc subtended by the concurrent angle of

rotation of the pressure roller whereby a constant predetermined tension is maintained in the wash cloth web.

4,058,060
GRAVITY-DEPLOYED MUNITION WITH A MECHANICAL GRAVITY-CONTROLLED SWITCH

Ferdinando V. Dukic, Lake Hopatcong, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.
Filed Oct. 30, 1975, Ser. No. 627,175
Int. Cl.² F42B *21/00;* **F42C** *9/00*
U.S. Cl. 102—8 **4 Claims**

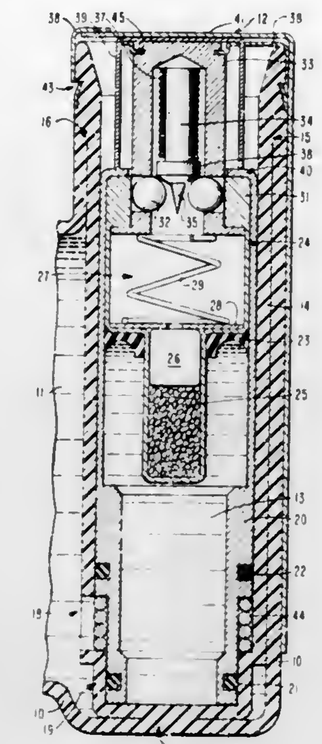


1. In a land mine comprising a housing having two opposite external ends and adapted to be deployed and come to rest by gravity on either of said ends; said mine further comprising a separate explosive charge at each of said ends, and fuze means in said housing for selectively initiating the upper charge only, in response to a firing signal; said fuze means comprising:
a gravity-controlled mechanical switch including a body formed with an elongated cavity oriented transverse to said ends and having two spaced outlet passages and an intermediate inlet passage, and a solid weight slidable in said elongated cavity;
a separate firing train connecting each of said outlet passages to one of said charges; and
firing means connected to said inlet passage for applying an explosive signal wave to said switch;
said weight being slidable along said cavity by gravity, when said mine comes to rest, to a position wherein the firing train connected to the upper charge is exposed to said firing means and the firing means and the firing train connected to the lower charge is effectively isolated by said weight from said firing means.

4,058,061
EXPLOSIVE DEVICE

Dana L. Mansur, Jr., Garden Grove, and Thomas L. Murphy, Los Gatos, both of Calif., assignors to Aerojet-General Corporation, El Monte, Calif.
Filed June 17, 1966, Ser. No. 558,335
Int. Cl.² F42B *23/28*
U.S. Cl. 102—8 **8 Claims**

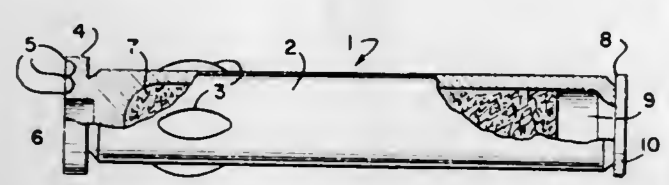
7. An explosive device comprising a sealed enclosure defining a cavity having a flexible wall, a fluid explosive material disposed within said cavity, a striker within said enclosure, pyrotechnic igniter material disposed within said enclosure in spaced relation to said striker, bias means biasing said striker towards the pyrotechnic igniter material, retaining means retaining said striker in a retracted position spaced from the pyrotechnic igniter material, and pressure-operable means responsive to an increase in pressure of said explosive material for releasing said striker from said retaining means, whereby upon an increase in pressure on said flexible wall the pressure condition of the explosive material increases within said cavity to operate on said pressure-operable means thereby releasing said striker from said retaining means to permit said bias means to urge said striker into contact with said pyrotechnic igniter



material to ignite said pyrotechnic material for detonating the explosive material.

4,058,062
POWERHEAD CARTRIDGE

Rhett McNair, Honolulu, Hawaii, assignor to Aqua Craft, Inc., San Diego, Calif.
Division of Ser. No. 581,660, May 28, 1975, abandoned, which is a continuation of Ser. No. 381,593, July 23, 1973, abandoned, which is a continuation-in-part of Ser. No. 98,354, Dec. 17, 1970, Pat. No. 3,747,247. This application Mar. 21, 1977, Ser. No. 779,910
Int. Cl.² F42B *5/02*
U.S. Cl. 102—38 **8 Claims**



1. Underwater powerhead firearm apparatus comprising a cartridge having a head piece and a base primer piece, wherein the head piece comprises a rifle cartridge casing blank having a cylindrical wall joined integrally with an impervious flat, radially extending head, propellant powder within the cylindrical wall, and wherein the primer piece comprises a cartridge casing having a relatively short cylindrical wall inserted within an open end of the rifle cartridge casing, an integrally formed base joined with the short cylindrical wall, and a primer inserted in the base for firing into powder disposed within the cylindrical wall, an open end edge of the rifle casing being necked down around a joint of the base and small cylindrical wall, tightly sealing the cartridge.

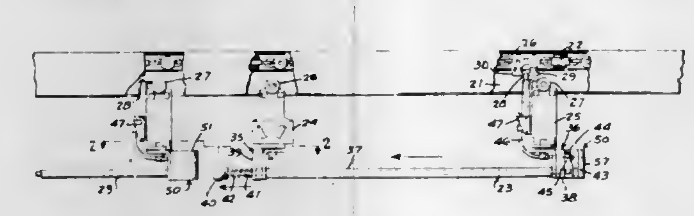
4,058,063
SHAPED CHARGE ROD WARHEAD

William M. Hurst, Socorro, N. Mex., assignor to The Unites States of America as represented by the Secretary of the Navy, Washington, D.C.
Filed Nov. 18, 1968, Ser. No. 777,213
Int. Cl.² F42B *13/10*
U.S. Cl. 102—56 SC **3 Claims**

1. A warhead comprising:
an elongated explosive charge having portions diverging from the longitudinal center of said charge and converging portions adjacent the longitudinal ends of said diverging portions;
means for initiating said explosive charge at a position along its length;
at least one expanding rod structure mounted on each of said converging portions substantially spaced from said initiating means;
the diverging portions of said explosive charge between said initiating means and said rod structures being shaped so that as a detonation front travels from said initiating means toward said rod structures the explosive energy of said portions is substantially focused in a desired plane.

4,058,064
POWER AND FREE CONVEYOR SYSTEM WITH SPACED APART ACTUATION AND ENGAGEMENT MEANS

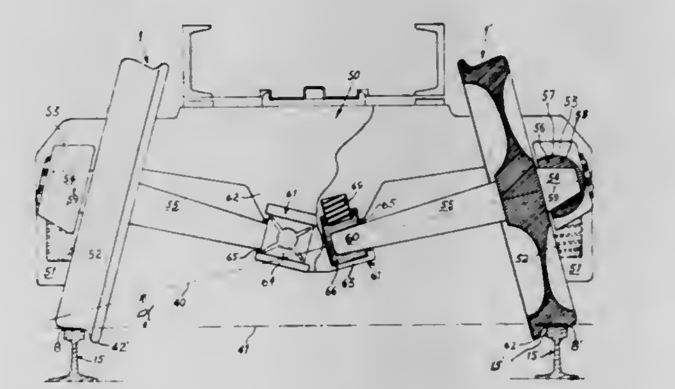
Richard J. Wilder, Sterling Heights, and Ivan Wurfel, Warren, both of Mich., assignors to American Chain & Cable Company, Inc., Bridgeport, Conn.
Continuation of Ser. No. 593,650, July 7, 1975, abandoned. This application Jan. 21, 1977, Ser. No. 761,412
Int. Cl.² B65C *17/42;* **B61B** *10/02*
U.S. Cl. 104—172 S **16 Claims**



1. In a conveyor system, the combination comprising
a conveyor track,
a conveyor movable along said track,
a free track,
a plurality of carriers movable along the free track,
said conveyor having longitudinally spaced pusher and holdback dogs mounted thereon,
each said carrier comprising spaced apart wheeled trolleys and means interconnecting said trolleys for pivotal movement about vertical axes through said trolleys,
a trailing trolley having a pusher movably mounted thereon for movement into and out of the path of the pusher and holdback dogs,
a bumper,
said bumper being mounted for movement on the leading trolley of said carrier and that engages and is moved by a preceding carrier or an obstacle,
and means interconnecting said bumper and said retractable pusher and operating upon engagement of the bumper with the preceding carrier or obstacle to displace said bumper and thereby move said pusher out of the path of said pusher and holdback dogs.

4,058,065
SPRING STUB AXLE RAILWAY VEHICLE

Arthur Seifert, Box 41, Sound View Station, New York, N.Y. 10472
Filed Oct. 23, 1975, Ser. No. 625,261
Int. Cl.² B60B *35/14;* **B61F** *3/16, 5/28, 5/38*
U.S. Cl. 105—180 **5 Claims**



1. In a load carrying truck having side frames for a vehicle traveling on rails having standard heads provided with conventional horizontal running surfaces, paired half axles, each having mounted on the outer portion thereof a rail wheel generally disposed at right angles thereto, each of said half axles being rigid and straight and disposed so that its straight longitudinal axle is inclined downwardly and inwardly at a given vertical angle to the horizontal to tilt its associated rail wheel inwardly from the vertical at an angle approximating said given vertical angle, each of said rail wheel being rigid and fixedly connected to its associated half axle, and each of said rail wheels having a tire portion constituted of a rail flange and a rail riding surface extending outwardly from said flange, said riding surface having a generally frusto-conical configuration and converging inwardly toward said rail flange to provide a transverse line of contact with the horizontal running surface of a conventional rail head disposed substantially horizontally and substantially at said given vertical angle to the central longitudinal axis of its associated half axle, and so that said rail flange is inclined upwardly and inwardly from the inner end of such horizontal transverse line of contact, first means pivotally and rotatably holding the outer portion of each of said half axles in the truck side frames, and second means resiliently mounting said half axles between said two first means to said truck to enable articulation of such half axles about the pivots provided by said first means and to confine such articulation to a given range in a generally vertical plane.

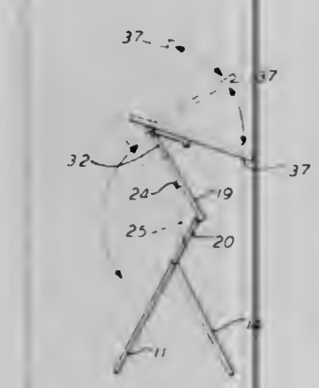
4,058,066
ADJUSTABLE TABLE

Nicholas M. Altman, 10 Mountain Way South, West Orange, N.J. 07052
Filed June 30, 1976, Ser. No. 701,289
Int. Cl.² A47B *27/14*
U.S. Cl. 108—9 **1 Claim**

1. An adjustable table comprising:
a. A pair of front legs,
b. A first transverse bar rigidly attached at opposite ends to

the front legs and holding them in spaced, generally parallel relation to each other,

c. A pair of mounting brackets attached to the front legs,
d. A pair of rear legs pivotably mounted on the mounting brackets,
e. A second transverse bar rigidly attached at opposite ends to the rear legs and holding them in spaced, generally parallel relation to each other,
f. The pair of rear legs pivotable to lie in the plane defined by the front legs,
g. Portions of the mounting bracket positioned to stop the pivoting of the rear legs when they are extended from the front legs sufficiently to sustain the front legs in a standing position together with the rear legs,
h. A pair of upper legs pivotably attached to the front legs at one end and pivotable around the front legs.
i. Control-arm brackets attached to each of the upper legs,
j. Slotted control arms attached to each of the control-arm brackets,
k. A first rod passed through the first transverse bar, having a head at one end engaged with a slot in one of the control arms and a thread on the other end of the rod,
l. A nut on the thread at the other end of the rod which end



is engaged with the slot in the other control arm, whereby the attitude of the upper leg may be affirmatively fixed in an elected position with respect to the front legs when the upper leg is pivoted on its front legs and the nut is tightened,

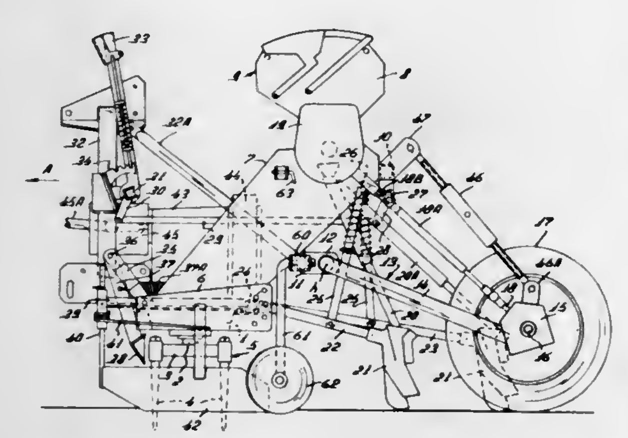
m. A table,
n. A pair of table brackets attached to the back of the table,
o. The table brackets pivotably attached to the other end of the upper legs,
p. A third transverse bar rigidly attached at opposite ends to the upper legs and holding them in spaced, generally parallel relation to each other,
q. A second pair of slotted control arms attached to each of the table brackets,
r. A second rod passed through the third transverse bar, having a head at one end engaged with a slot in one of the second control arms and a thread on the other end of the second rod,
s. A nut on the thread at the other end of the second rod which end is engaged with the slot in the second control arm, whereby the attitude of the table with respect to the upper legs may be affirmatively fixed with respect to the upper legs when the table is pivoted as the nut on the second rod is tightened.

4,058,067
TREATMENT OF SEEDLINGS
John F. Wright, North Tonawanda, and Terrance M. Cannan, Depew, both of N.Y., assignors to FMC Corporation, Philadelphia, Pa.
Continuation of Ser. No. 580,571, May 27, 1975, abandoned. This application Nov. 8, 1976, Ser. No. 739,399
Int. Cl.² A01G ***1/00;*** **A01C** ***1/00;*** **A01N** ***17/00***
U.S. Cl. 111—1 **2 Claims**

1. A method for pretreating and planting a live paddy rice seedling to provide post-planting protection of the seedling from insect attack which comprises:

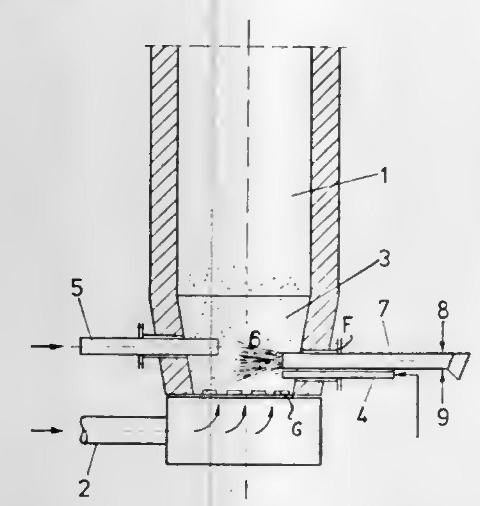
a. Applying to the root system of said seedling prior to planting an aqueous mixture of (1) 2 to 25% of a water soluble hydrophylic polymer selected from gelatin, polyvinyl alcohol, and natural gums; and (2) an insecticidally effective amount of a contact and systemic insecticide, said amount being sufficient to provide insect control for an extended period after planting;
b. Allowing said mixture to partially dry to form over the root system a water-rich coating having a protective skin of sufficient strength to retain its integrity during handling and planting through a layer of water;
c. Planting said seedling through a layer of water without substantially impairing the integrity of said coating.

4,058,068
SOIL CULTIVATING AND SOWING IMPLEMENT
Ary van der Lely, Maasland, and Cornelis Johannes Gerardus Bom, Rozenburg, both of Netherlands, assignors to C. van der Lely N. V., Maasland, Netherlands
Filed Dec. 23, 1975, Ser. No. 643,839
Claims priority, application Netherlands, Dec. 30, 1974, 7416983
Int. Cl.² A01B ***33/00***
U.S. Cl. 111—36 **30 Claims**



1. A rotary harrow comprising a frame and a plurality of soil working members mounted on a portion of said frame, said soil working members being mounted on corresponding shafts and rotatable about upwardly extending axes defined by said shafts, driving means connected to rotate said soil working members, a coupling member on said frame being positioned for connection to a prime mover, at least one supporting ground wheel being pivotably connected to the implement by arm means adjacent the rear of said frame portion and at a level higher than said frame portion, adjusting means interconnecting said wheel with said frame portion, said wheel being vertically displaceable by said adjusting means and turnable about the pivot connection of said arm means to the implement, whereby the relative position of the wheel's rotary axis with respect to said frame portion can be changed, said adjusting mechanism having fixing means that secures said wheel and arm means in a fixed, non-pivotable position with respect to said frame portion.

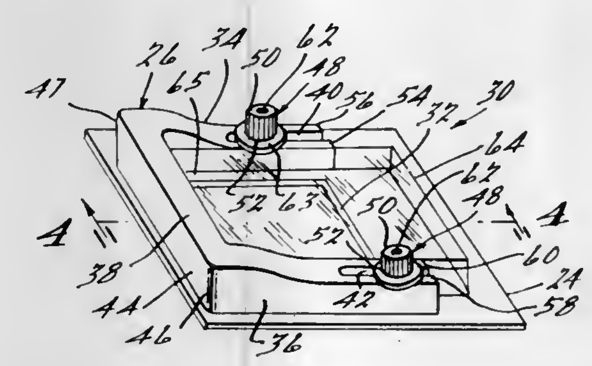
4,058,069
PROCESS AND APPARATUS FOR INCINERATING SUBSTANCES IN A FLUIDIZED THERMAL REACTION FURNACE
Helmut Bäing, Dortmund; Gerd Oberschachtsiek, Holzwickede; Horst Grenzing, Wegberg-Beeckerwald, and Peter Meurer, Herdecke-Ende, all of Germany, assignors to Friedrich Uhde GmbH, Dortmund, Germany
Filed Nov. 21, 1975, Ser. No. 634,079
Claims priority, application Germany, Dec. 3, 1974, 2457029
Int. Cl.² F23D ***19/02;*** **F23G** ***5/00, 7/04***
U.S. Cl. 110—8 F **2 Claims**



1. In a thermal reaction furnace for incinerating substances, the process comprising

a. providing a fluidized bed of small, granular, solid particles,
b. introducing combustion air to the fluidized bed to keep the bed above the fluidization point,
c. igniting a flame before fuel is fed to the cold fluidized bed and directing said flame into the interior of the lower third of the bed,
d. delivering to the fluidized bed in opposed relation to said flame substances to be incinerated, and
e. feeding fuel to said ignition flame in parallel closely arranged fashion thereto after the ignition flame has burned reliably.

4,058,070
SEE-THROUGH SEWING GAUGE
Edna Jones, 20211 Charleston Ave., Detroit, Mich. 48203
Filed Sept. 7, 1976, Ser. No. 720,881
Int. Cl.² D05B ***35/10***
U.S. Cl. 112—153 **10 Claims**



1. A see-through sewing machine gauge adapted to enable an operator to accurately control the distance between the edge of material being sewn and the line of stitching and simultaneously monitor the condition of a bobbin thread supply, said gauge comprising:

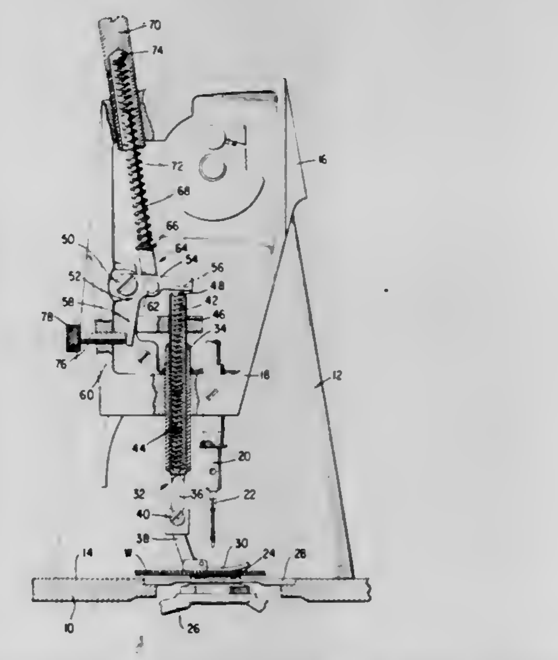
a throat plate having an opening provided therein, said opening being positioned so as to afford a view of said bobbin thread supply when said throat plate is in an operative relationship to said sewing machine;

a gauge member surrounding at least a portion of said opening;

means adjustably securing said gauge member to said throat plate; and

a transparent member retained by said gauge member and overlying said opening so as to prevent objects from interferring with said bobbin thread supply and enable visual monitoring of said bobbin thread supply.

4,058,071
SEWING MACHINE PRESSER BAR MECHANISM
Earl F. Dunn, Edison; Henry Erskine, Somerville, both of N.J., and Edward Hooper, Staten Island, N.Y., assignors to The Singer Company, New York, N.Y.
Filed Dec. 22, 1976, Ser. No. 753,338
Int. Cl.² D05B ***29/02***
U.S. Cl. 112—235 **10 Claims**

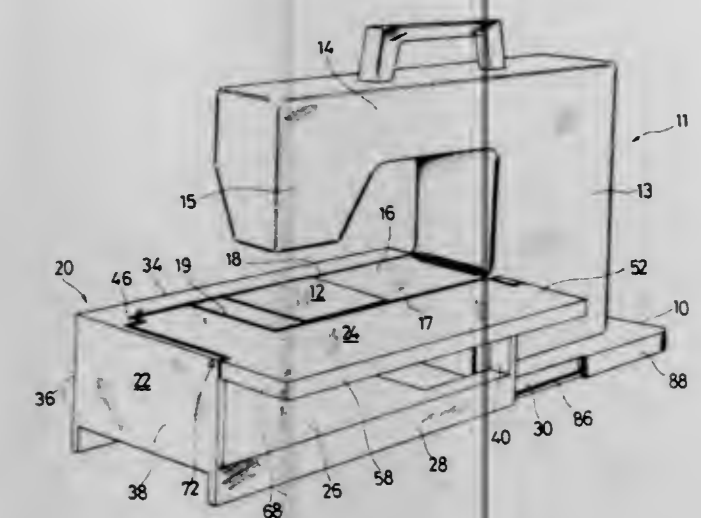


1. A presser mechanism for a sewing machine having a frame including a head overlying a work support, said mechanism comprising a presser bar having a presser foot on one end slidably journaled for endwise movement in said head, a force transfer member mounted in said head, first resilient means acting between said presser bar and said force transfer member for normally urging said presser bar toward the work support and said member away from the work support, a second resilient means acting between said head and said force transfer member for urging said member toward the work support with a force greater than that of said first resilient means, a stop acting of said force transfer member in opposition to the urging of the second resilient means for limiting the extent to which said member is urged toward the work surface thereby to isolate the presser bar and first resilient means from the second resilient means until a predetermined force on said first resilient means is exceeded, and means for adjusting said stop to change the predetermined force.

4,058,072
EXTENSION TABLE FOR SEWING MACHINES
Hitoshi Ishikawa, Toyota; Kimihiko Yamamoto, Nagoya; Toshio Sawada, Okazaki, and Takahiko Kasahara, Anjo, all of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Japan
Filed Nov. 16, 1976, Ser. No. 742,102
Claims priority, application Japan, Nov. 25, 1975, 50-159669[U]
Int. Cl.² D05B ***73/10***
U.S. Cl. 112—258 **6 Claims**

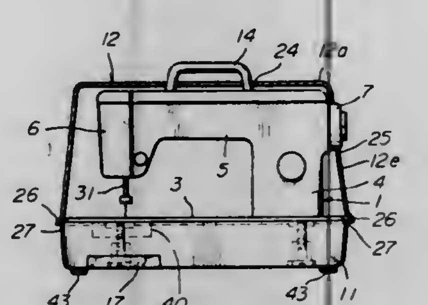
1. The combination with a sewing machine of the portable type upstanding upon a base plate, of an extension table arrangement for enlarging the working area provided by an upper flat surface of a raised bed of the machine in which the bobbin mechanism is housed, said extension table arrangement

comprising a table, a support structure for said table slidable along said base plate between storage and working positions of said table, and means pivotally mounting said table on said support structure for movement from a vertical storage position along one side of said machine for storage with said ma-



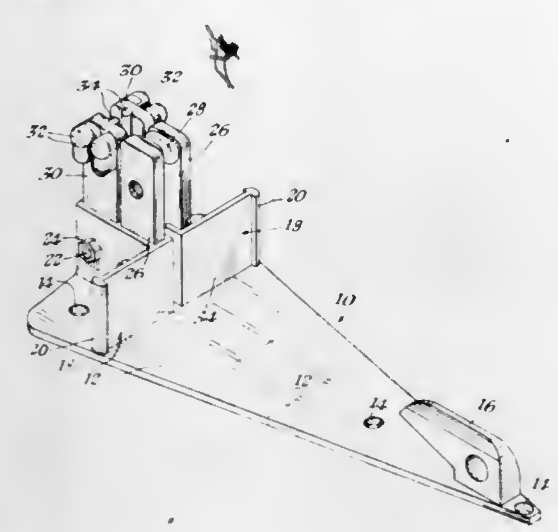
chine within a case, to its horizontal working position co-planar with the upper surface of the machine bed, said table having an elongated L-shaped configuration oriented such that when said table occupies its horizontal working position the short and long sides thereof respectively lie adjacent the end and one frontwall of the bed of the machine.

4,058,073
CASE FOR PORTABLE SEWING MACHINES
Susumu Hanyu, Hachioji, and Takashi Amano, Tokyo, both of Japan, assignors to Janome Sewing Machine Co. Ltd., Tokyo, Japan
Continuation of Ser. No. 610,407, Sept. 4, 1975, Pat. No. 4,037,549. This application Sept. 24, 1976, Ser. No. 726,421
Claims priority, application Japan, Sept. 10, 1974, 49-108150
Int. Cl.² D05B *75/00*
U.S. Cl. 112—258 **7 Claims**



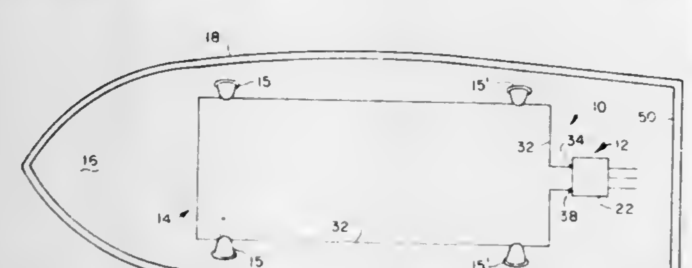
1. A case for a portable sewing machine of the type having a work supporting rectangular bed, a standard secured to said bed, a bracket secured to said standard and spaced from said bed, a flywheel mounted on said standard adjacent to said bracket, and a handle mounted on the top of said bracket, comprising a hollow base having an open top defined by an upper marginal portion and being arranged to receive said bed of the sewing machine, said base being rectangular and having a bottom wall and four side walls extending upwardly from said bottom wall; a separate cover having a top wall and four side walls extending downwardly from said top wall said cover having an opening provided in said top wall through which said handle of the sewing machine, whose bed is supported by said base, extends so that said case can be lifted through the medium of the machine by way of said handle, said cover having a second opening through which said flywheel of the sewing machine extends, said cover further having a lower open end defined by a lower marginal portion abutting against said upper marginal portion of said base without being fastened thereto; and means securing said base to said bed.

4,058,074
ANCHOR CHOCK
Daniel Comstock Hungerford, North Palm Beach, Fla., assignor to Brunswick Corporation, Skokie, Ill.
Filed Feb. 11, 1974, Ser. No. 441,660
Int. Cl.² B63B *21/22*
U.S. Cl. 114—210 **3 Claims**



1. A device for securing a twin fluke anchor having an anchor body including a crown, a stock, a pivotable shank, and a pair of flukes substantially in a common plane, the device comprising:
- base supporting means;
- means connected to said base supporting means for engaging said anchor body;
- resilient shank-actuated clamp connector means connected to said base support means for resiliently clamping said pivotable shank to said base supporting means;
- said resilient connector means includes a pair of upwardly projecting resilient fingers, each finger engageable on one side of said shank, said fingers resiliently engageable to said shank for holding said shank in a predetermined position;
- said fingers include an upper flanged portion protruding laterally inward toward each other, said lateral flanged portions separated by a distance less than the width of said shank, said shank moveable to a position between said fingers, whereby the flange portions will prevent upward, vertical motion of said shank; and
- resilient shank engaging means moveable laterally outwardly from said shank when engaged with said shank, said resilient means having a fluke engaging means whereby said flukes are engaged to said resilient means whenever said shank is positioned between said resilient means.

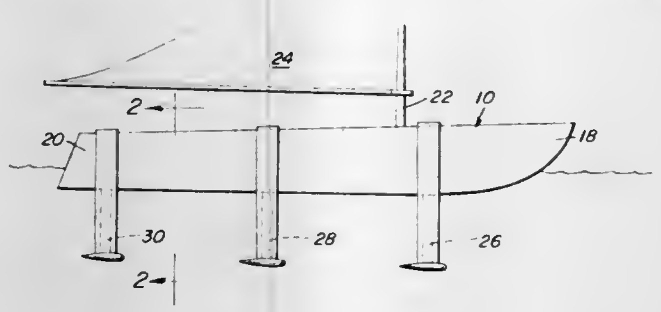
4,058,075
MARINE LIFE GROWTH INHIBITOR DEVICE
Donald R. Piper, Sr., Tampa, Fla., assignor to Ralph M. Guito, Jr. and Walter L. Hooper, both of Tampa, Fla.
Continuation-in-part of Ser. No. 560,923, March 21, 1975, abandoned. This application Aug. 24, 1976, Ser. No. 717,191
Int. Cl.² B63B *59/02*
U.S. Cl. 114—222 **8 Claims**



1. A marine life growth inhibitor device primarily intended

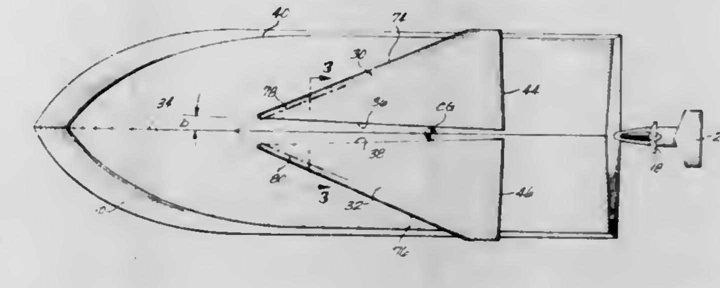
for use in combination with a boat hull, comprising in combination:
- vibratory means comprising speaker means and speaker housing means for housing said speaker means, said speaker means including a speaker diaphragm having a first and a second speaker diaphragm side, said speaker diaphragm being moveable relative to said frame upon application of electrical power to said speaker means for transferring electrical energy into acoustical energy;
- means for mounting said speaker means in said speaker housing means enabling acoustical energy to be directed from said second side of said speaker diaphragm adjacent the first side of the speaker diaphragm;
- said speaker housing means including a first and a second speaker housing portion;
- said first housing portion having a liquid impermeable housing diaphragm for enabling transfer of acoustical energy from said speaker diaphragm to the boat hull;
- means for mounting said first and second housing portions and said housing diaphragm to form a water repellent speaker housing means;
- means mounting said speaker housing means on the boat hull for enabling transfer of acoustical energy from said speaker diaphragm to the boat hull; and
- connection means for connecting said speaker means to an electrical power source to transfer acoustical energy from said speaker diaphragm to the boat hull to inhibit the growth of marine life on the exterior of the boat hull.

4,058,076
HULL FOILS WITH HYDRODYNAMIC RIGHTING FORCES
Philip J. Danahy, 12801 Prestwick Drive, Oxon Hill, Md. 20022
Filed Sept. 2, 1976, Ser. No. 720,077
Int. Cl.² B63B *1/28*
U.S. Cl. 114—281 **15 Claims**



1. In combination with a boat having front and rear ends, a bottom and upwardly projecting sides extending upwardly to an elevation spaced above the static water line of said boat, a depending central strut projecting downwardly from said bottom, a pair of elongated, longitudinally straight and downwardly convergent opposite side flexible foils including leading and trailing longitudinal edges facing in front and rear directions, respectively, of said boat, first anchor means anchoring the lower ends of said foils to the lower end portion of said strut, and second anchor means anchoring the upper end portions of said foils to upper portions of the corresponding sides of said boat above said static waterline, said foils extending lengthwise along generally straight paths and being free of support from said boat and each other intermediate said first and second anchor means and thereby being free to twist and bow, slightly, between said first and second anchor means.

4,058,077
POWER BOATS WITH HYDRODYNAMIC LIFTING DEVICES
Sten E. Johansson, 5711 S. 152nd Place, Seattle, Wash. 98188
Continuation-in-part of Ser. No. 535,719, Dec. 23, 1974, Pat. No. 3,980,035. This application Sept. 7, 1976, Ser. No. 721,057
Int. Cl.² B63B *1/30*
U.S. Cl. 114—283 **10 Claims**



1. A power boat comprising a V-bottom hull having a stern, a keel, a pair of topsides and a pair of bottom surfaces which rise laterally from said keel to where the bottom surfaces join the topsides; and lifting plane means adapted to improve the lifting capability of the forward wetted area of the hull and to substantially eliminate the aft wetted area during planing, said lifting plane means comprising:
- a pair of lifting planes secured to said hull on opposite sides of said keel;
- said lifting planes having inboard edges which are connected to the bottom surfaces of the hull at lines oriented generally alongside the keel, and having upper and lower surfaces which during planing extend at acute angles relative to the bottom surfaces, said lifting planes having a span substantially reaching to where the bottom surfaces join the topsides;
- said lifting planes having trailing edges which are spaced well forwardly of said stern, so that a substantial amount of bottom surface area exists rearwardly of said trailing edges;
- said lifting planes having leading edges which are swept back such that said edges generally are oriented in parallel with the forward contact lines of said V-bottom hull and water at incipient planing on calm water, and said leading edges being positioned to lead the forward boundaries of the water spray from the keel during planing, throughout their full extent, so as to prevent water attachment to the bottom surfaces of the hull both above and substantially aft of said lifting planes; and
- said lifting planes having a longitudinal location relative to the hull such that the resulting lifting force of said lifting planes at planing speeds acts adjacent to the center of gravity of the boat.

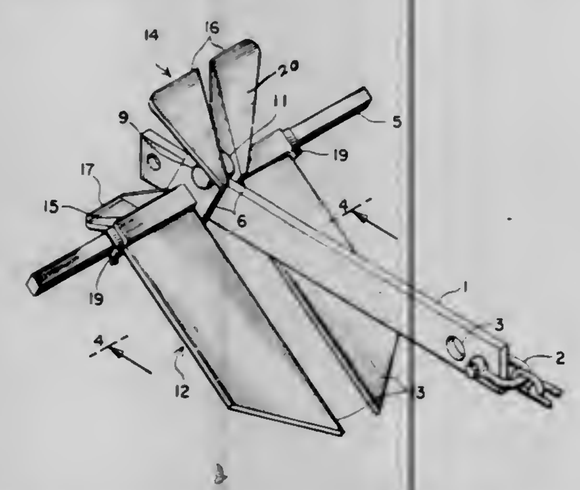
4,058,078
ANCHOR ASSEMBLY
William Stelling, 175 W. 72nd St., New York, N.Y. 10023
Filed Apr. 12, 1976, Ser. No. 676,040
Int. Cl.² B63B *21/24*
U.S. Cl. 114—303 **3 Claims**

1. An exchangeable anchor assembly, including removable and interchangeable parts which can be easily taken apart by the user for storage and quick reassembly, said anchor assembly comprising:
- a stem having a free end adapted to be connected to a line and an opposite end having a round opening;
- a cross bar having an unround cross-section received in said opening of said stem, said cross bar being rotatably disposed with respect to and perpendicular to said stem;
- a pair of removable crown plates disposed at said opposite end of said stem on opposite sides thereof, said crown plates having an opening the dimensions of which are substantially equal to that of said cross bar and being

slidable on said cross bar from opposite ends thereof, said plates being removably connectable with said cross bar;

a set of stop-limit members removably connected between said crown plates; such that said opposite end of said stem is rotatably connected to said cross bar between said stop-limit members, said stop-limit members cooperating with said stem, permitting relative rotatable movement of said cross bar when said stop-limit members abut said stem;

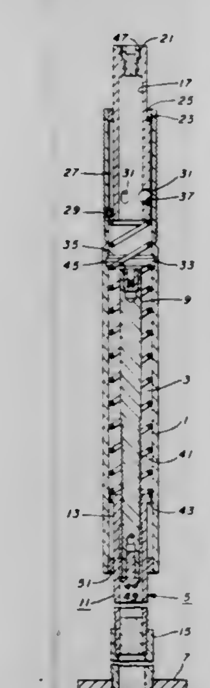
a stabilizer unit, including two wing elements, integrally connected with each of said crown plates, said wing elements lying in planes angularly displaced from each other approximately 60°;



at least two removable fluke units, including a sleeve having an opening the dimensions of which are substantially equal to that of said cross bar and disposed on the ends thereof, each of said fluke units including a fluke portion connected to its said respective sleeve, said sleeve permitting said fluke units to be removed from said cross bar; and

means for removably securing said at least two fluke units onto said cross bar and holding said units against said crown plates for conjoint movement therewith, and for permitting removal of said sleeve from said cross bar whereby to remove said fluke units therewith.

4,058,079
MOVEMENT INDICATOR
Michael J. Taylor, 293 Shasta Drive, Pittsburgh, Pa. 15239, and John P. Isley, 1901 Fern Hill Drive, Valparaiso, Ind. 46383
Filed June 10, 1976, Ser. No. 694,526
Int. Cl.[2] E21D *21/02;* G01V *1/28*
U.S. Cl. 116—114 H **10 Claims**



1. A device for detecting a predetermined discrete movement between first and second displaced points comprising:

a housing having a cylindrical bore therethrough and secured to one point;

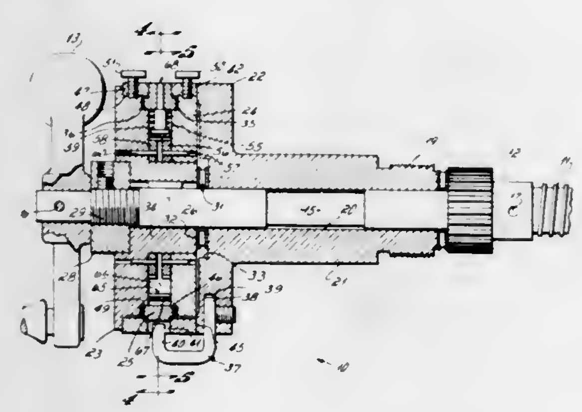
an elongated slidable actuating rod having a first end bearing against the second point and a second end of said actuating rod slidably inserted into a first end of the cylindrical bore in said housing;

a cylindrical indicator sleeve inserted into a second end of the cylindrical bore in said housing and axially slidable between a retracted position within the housing and an extended position wherein a portion of said sleeve extends beyond the second end of the cylindrical bore in said housing;

means biasing the indicator sleeve to the extended position; and

locking means operated by said actuating rod securing said indicator sleeve in the retracted position until the actuating rod moves a predetermined distance inside the housing in response to a corresponding change in the distance between the first and second points to release the indicator sleeve and permit the biasing means to urge said sleeve to the extended position thus presenting a discrete, mechanical indication of said predetermined change in distance between the first and second points.

4,058,080
ENGLISH-METRIC DIAL ASSEMBLY
Otto Hermann, Cincinnati, Ohio, assignor to LeBlond Incorporated, Cincinnati, Ohio
Continuation-in-part of Ser. No. 583,418, June 2, 1975, abandoned. This application May 17, 1976, Ser. No. 687,313
Int. Cl.[2] B23Q *17/00;* G06C *17/00*
U.S. Cl. 116—115.5 **26 Claims**



1. A dial assembly for use in combination with a rotary-to-linear motion translating device to measure, in two different sets of units, movements of an element effected by said motion translating device, said assembly comprising,

a rotatable shaft adapted to be secured to said motion translating device,

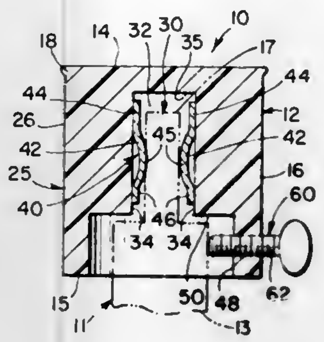
a first scale means mounted upon said shaft and having a direct driving connection with said shaft, said first scale means having unit indicia thereon which is continuing when the first scale means moves through more than one complete revolution,

a second scale means mounted for rotation relative to said shaft, said second scale means having unit indicia thereon which is continuing when the second scale means moves through more than one complete revolution, the unit indicia of said second scale means being demarked in a different unit of measure from the unit indicia of said first scale,

gear train means mechanically interconnecting said first scale means to said second scale means, said gear train means including a pair of spur gears, said spur gears having different numbers of teeth and being drivingly connected to said first and second scale means, and

a continuous toothed belt drivingly interconnecting continuous internally toothed belt maintained in driving interconnected relation with said pair of spur gears.

4,058,081
FULL TANK MARKER
Maureen Adele Maxfield, 44-01 34th Ave., Astoria, N.Y. 11101
Filed Nov. 2, 1976, Ser. No. 738,184
Int. Cl.[2] F16K *37/00;* G09F *3/08*
U.S. Cl. 116—125 **9 Claims**



1. An indicating device for a pressurized tank containing a valve having a head for opening and closing said valve, said device comprising:

a. a body portion having a top end and spaced apart bottom end with a peripheral surface therebetween,

b. indicia means on said top end of said body portion to selectively indicate the amount of fluid in said tank,

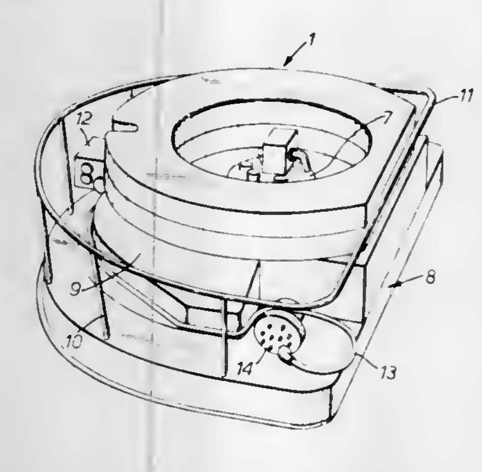
c. gripping means on said peripheral surface to facilitate mounting and removal of said body portion from the valve head,

d. enclosing means extending vertically in said body portion upwardly from said bottom end, said enclosing means including a cavity having a pair of vertically extending spaced apart cavity walls adapted to receive therebetween the valve head, such that vertical mounting and removal of said body portion on the valve head by said gripping means is obtainable,

e. retaining means connected to at least one of said cavity walls and extending within said cavity and adapted for releasably securing by frictional engagement said body portion to the valve head thereby requiring a force applied to said gripping means for mounting and removal of the device from a valve head, and

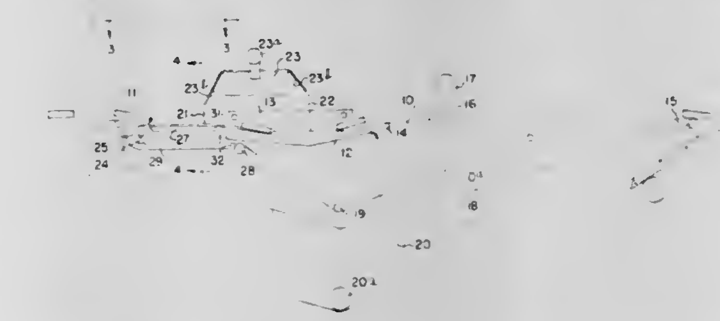
f. said retaining means comprises a first leaf spring secured at one end to said cavity wall and bulged for engagement with the valve head, and a second leaf spring secured at one end to said opposite cavity wall and bulged for engagement with the valve head.

4,058,082
SUBMERSIBLE PAINTING APPARATUS
Russell Edward Winn, Kilbrittain, Ireland, assignor to A/S Jotungruppen, Sandefjord, Norway
Filed June 25, 1976, Ser. No. 699,687
Int. Cl.[2] B05C *1/00*
U.S. Cl. 118—9 **3 Claims**



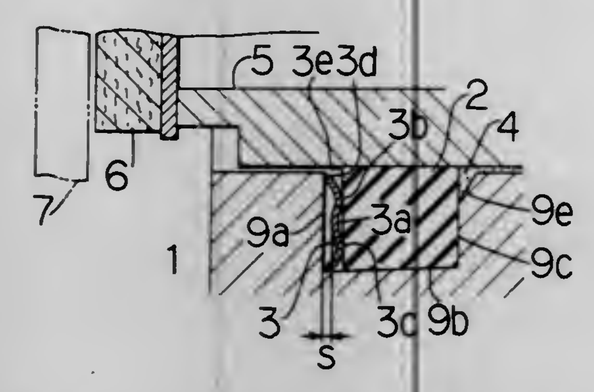
1. A remotely-controllable submersible apparatus for applying paint underwater to a submerged surface, the apparatus comprising a vehicle having a housing defining a chamber having an open side, a pressure-reducing device capable of continuously maintaining a reduced pressure inside the chamber relative to the pressure outside the chamber so as to cause the vehicle to adhere to the submerged surface with the open side of the chamber facing the submerged surface, a steerable driven wheel and at least one supporting wheel mounted so that the vehicle can be driven along the submerged surface with the open side of the chamber adjacent to the submerged surface, a remotely-operable steering device for steering the steerable wheel, a motor for driving at least the steerable wheel, and located at the rear of said vehicle an assembly for applying paint underwater to the submerged surface, the assembly comprising in combination a plurality of non-intermeshing vertically disposed rotary paint brushes each having an axial bore communicating with a feed pipe from a paint manifold, a separate hydraulic motor for independently driving each respective rotary pant brush, resilient suspension means for each hydraulic motor and its associated brush including an upper leaf spring means and a lower leaf spring means, a spring tensioning means connected to one end to said upper leaf spring means and at its other end to a manually adjustable eccentric cam shaft, and remotely-operable hydraulic means for moving the rotary paint brushes either into contact with or away from the submerged surface.

4,058,083
REAR BATTER FLOW FOR BATTER APPLICATOR MACHINES
Michael E. Miller, Bellevue, Ohio, assignor to Sam Stein Associates, Inc., Sandusky, Ohio
Filed Feb. 20, 1976, Ser. No. 659,776
Int. Cl.[2] B05C *3/10, 5/00*
U.S. Cl. 118—16 **10 Claims**



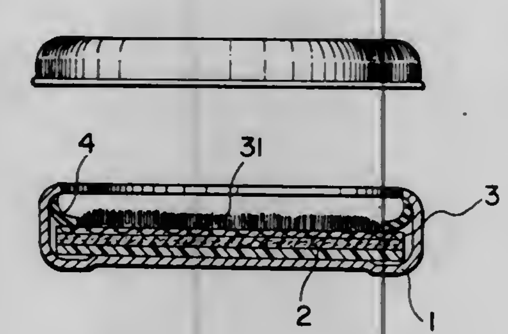
1. A food batter applicator for batters of intermediate viscosities between about 80 and about 360 centipoises, comprising a frame, an endless open mesh wire conveyor belt having support pulleys on said frame and having a food advancing run from a food-introduction end to a food-discharge end and a return run, a batter reservoir through which said return run passes, a rotatable shaft on said frame having sprocket teeth engaging said belt at said food-introduction end, means on said frame guiding said return run of said belt in a generally horizontal direction for a predetermined distance upstream of said drive shaft, a batter holding pan on said frame closely below said generally horizontal portion of said belt sufficient to hold said batter on said holding pan in driven relation to said belt, said pan having a smoothly bent arcuate portion extending partly around said drive shaft with close clearance of about one-eighth inch about said sprocket teeth from a zone immediately below said drive shaft to a zone about 55° to 60° above a horizontal center line of said shaft, said drive shaft having filler spools between said sprocket teeth filling the diameter of said shaft nearly to the root diameter of said sprocket teeth, a batter retaining plate on said frame generally horizontal extending from a zone tangential to said root diameter at the top of said drive shaft downstream for a predetermined distance, whereby said food-advancing run of said belt travels in contact with said batter retaining plate for said last-named predetermined distance, and means for supplying batter substantially continuously to said batter holding pan.

4,058,084
SEALING AND ADJUSTING MEANS IN A DISK BRAKE
Hiroshi Kawaguchi, and Kohji Nishikawa, both of Susono, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Japan
Filed Aug. 18, 1976, Ser. No. 715,542
Claims priority, application Japan, Apr. 10, 1976, 51-44519[U]
Int. Cl.² F16D *65/52*
U.S. Cl. 188—71.8 24 Claims



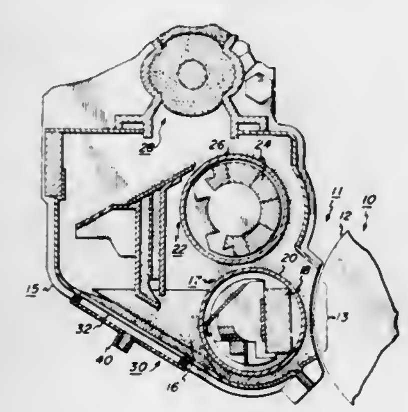
1. Sealing means in a disk brake, in which a piston fitted in a cylinder is to urge a friction pad onto a disk rotating with a wheel of a vehicle in order to stop or to decelerate the vehicle, for maintaining the fluid tightness between said piston and said cylinder, said sealing means comprising:
- a groove substantially rectangular in section disposed circumferentially on the internal periphery of said cylinder, said groove having a forward wall;
- a sealing ring substantially rectangular in section fitted in said groove and having a forward surface; and
- a spring member disposed between the forward surface of said sealing ring and the forward wall of said groove for constantly biasing said sealing ring backwardly, said spring member being shaped such as to allow a predetermined amount of elastic deflection of said sealing ring due to shear forces caused by relative movement between said piston and said cylinder before causing deflection of said spring member;
- wherein the coefficient of friction between said sealing ring and said cylinder is preselected to prevent sliding of said piston relative to said sealing ring until said sealing ring and said spring member have been deflected substantially up to the limit of elastic deflection thereof.

4,058,085
STAMP PAD
Teh-Tsao Yang, 696, Section 4, Pa-Teh Road, Taipei, China /Taiwan
Filed Nov. 19, 1975, Ser. No. 633,430
Int. Cl.² B05C *11/00*
U.S. Cl. 118—264 3 Claims



1. A stamp pad comprising:
a. a pad vessel having a ring-shaped upturned edge;
b. a bolster contained in said pad vessel for soaking and holding ink for stamp use;
c. a substrate with flock perpendicularly planted thereon to form the pad surface placed on top of said bolster in said vessel, said flock drawing ink from said bolster upward through said substrate by capillary action and retaining said ink, said ink being filtered by said substrate, said flock being evenly wetted thereby, said surfae being formed so that when a stamp or seal presses upon said pad surface said flock brushes ink evenly on the stamp character surface and breaks the ink surface tension avoiding superficious adhesion of ink on the stamp surface, said flock forming a spiny surface to clean out the dust and waste jammed in and on the engraved characters allowing the printing of a neat and clear seal; and
d. a ringlet forced under compression into said ring-shaped upturned edge of said pad vessel to retain said substrate on said bolster.

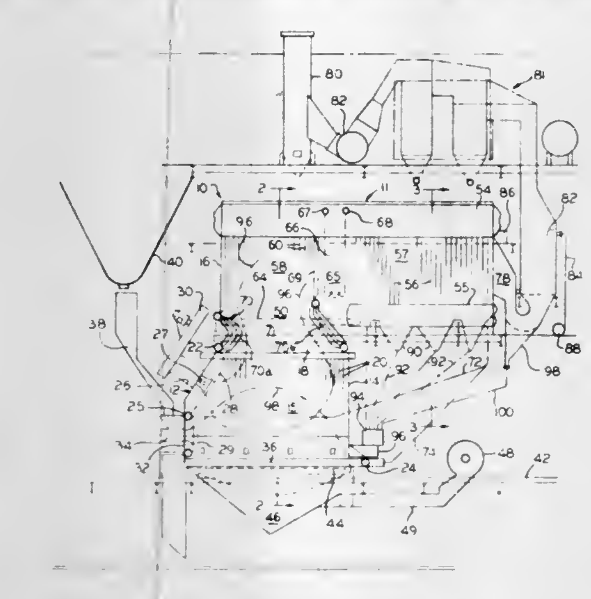
4,058,086
EMISSION CONTROLLER FOR DEVELOPMENT APPARATUS
Don B. Jugle, Penfield, and Anthony F. Lipani, Webster, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.
Filed May 11, 1976, Ser. No. 685,216
Int. Cl.² G03G *15/08*
U.S. Cl. 118—653 2 Claims



1. In an electrostatographic reproduction system in which a latent electrostatic image is developed by a multi-component developer material including toner particles and relatively larger carrier particles an improved emission control apparatus for suppressing airborne toner particles comprising
- a developer housing having a sump containing multi-component developer material, said multi-component developer material including toner particles and relatively larger carrier particles,
- means for applying said developer material to develop latent electrostatic images and cause at least a portion of said toner particles to become airborne,
- filter means positioned in said housing flush with the sump thereof in the flow path of said developer material to effect continuous cleaning thereof, said filter means including a filter member having a pore size ranging from about 20 microns to about 100 microns,
- said filter means being connected to a source of negative pressure to cause airborne particles to move in the direction of said filter member at a predetermined rate whereby said airborne particles combine with the flowing developer material for pre-filtering thereby prior to reaching said filter member.

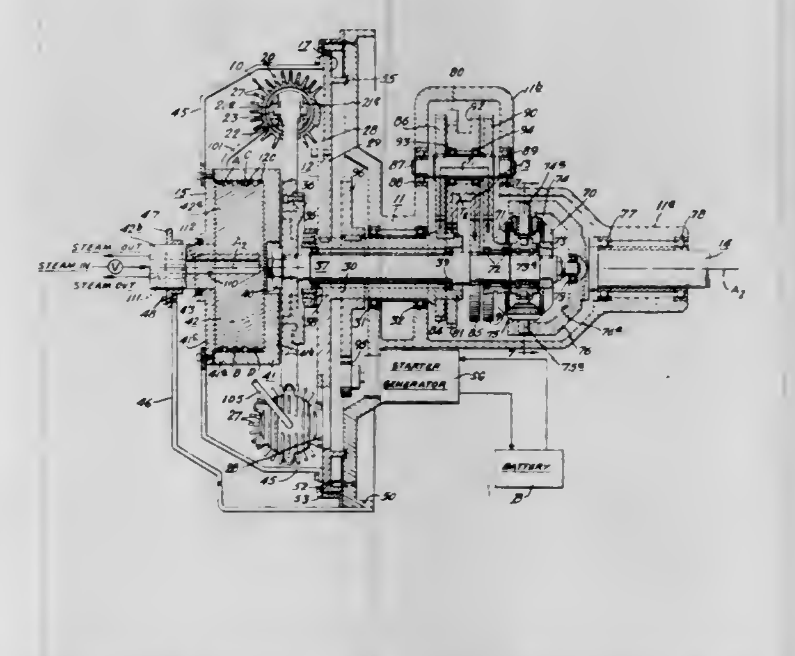
4,058,087
BOILER
Gustav A. Rehm, Milwaukee, Wis., assignor to Aqua-Chem, Inc., Milwaukee, Wis.
Filed Apr. 23, 1976, Ser. No. 679,660
Int. Cl.² F22B *21/14;* F23B *1/22;* F23C *1/02, 1/04*
U.S. Cl. 122—235 R 5 Claims

1. A boiler including first means defining a primary combustion zone,
- second means defining a combustion gas receiving zone disposed above said primary combustion zone,
- passage defining means disposed between said first and second means for connecting said primary combustion zone and said combustion gas receiving zone,
- coal burning means disposed at the lower end of said primary combustion zone and including means for injecting coal into said primary combustion zone, spreader means for distributing said coal across the lower end of said zone, and air delivery means for delivering combustion air upwardly into said primary combustion zone and through said spreader means,
- combustion means disposed adjacent the upper end of said primary combustion zone for delivering combustion air and a fluid fuel to said primary combustion zone, said combustion means being located below the passage defining means and is constructed and arranged for projecting fluid fuel and combustion air downwardly and inwardly into said primary combustion zone and in a direction which intersects said spreader means for producing a flame which extends into said zone and backwardly up through passage defining means into said combustion gas receiving zone whereby heat will be generated in said primary zone when either or both of said coal burning means or combustion means are operated,
- first water tube means disposed in said combustion gas receiving zone,
- second water tube means disposed in said primary combustion zone and disposed to be heated directly by said coal burning means or said combustion means,
- and third water tube means distinct from and interconnecting said first and second water tube means so that circulation therebetween will occur when said combustion means or said coal burning means are operated.



4,058,088
OSCILLATING PISTON ENGINE
Jesse C. Brown, 307 Walter Ave., Delanco, N.J. 08075
Continuation-in-part of Ser. No. 564,782, April 3, 1975, Pat. No. 3,974,801. This application Aug. 11, 1976, Ser. No. 713,531
Int. Cl.² F02B *53/00*
U.S. Cl. 123—18 R 4 Claims

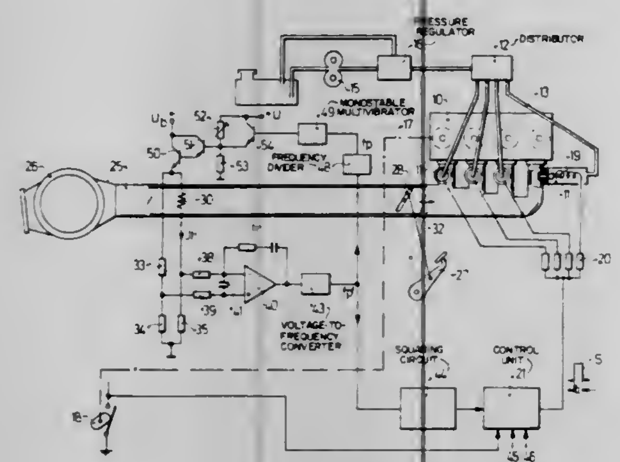
1. An engine, comprising:
- a block,
- at least one pair of cylinders mounted tangentially on diametrically opposite sides of an axis extending through the block,
- means mounting said cylinders for rotation in a bank in unison in a substantially annular path about said axis with one end of each cylinder leading and the other end trailing,
- a double-acting piston displaceable axially in each cylinder between opposite ends thereof,
- means mounting said pistons for axial movement in said cylinders and for rotation in unison about said axis relative to said cylinder mounting means,
- control means operable in response to rotation of said cylinders to supply pressure fluid to and to exhaust pressure fluid from opposite ends of each cylinder in alternating timed relation for causing said pistons and cylinders to move in alternate directions relative to one another as they rotate about the axis, said control means including a rotary valve having a rotor and a stator, means mounting said rotor for rotation with said cylinder mounting means, conduit means connecting said rotor to opposite ends of each cylinder, and passage means in said stator for supplying pressure fluid to said conduit means and exhausting pressure fluid therefrom during rotation of said rotor relative to said stator, said passage means including groove means and port means in said stator and rotor adapted to register with one another upon rotation of said rotor to connect one end of each cylinder to said pressure fluid source and the opposite end of each cylinder to exhaust and to reverse said connection when each piston reaches the end of its stroke in its cylinder so that the opposite end of each cylinder is connected to said pressure fluid source and said one end is connected to exhaust until the piston reaches the end of its return stroke in its cylinder, said groove means including a series of arcuate grooves each divided into segments having arcuate extents corresponding to the arcuate extent of motion of the piston relative to the cylinder during each portion of the stroke of the piston in its cylinder,
- an output shaft journalled in said engine block, and
- gearing means in said engine block connecting said cylinder mounting means and said piston mounting means together and to said output shaft for affording controlled relative motion between the pistons and the cylinders and for converting said relative motion into unidirectional rotation of said output shaft, said gearing means including a differential gear assembly having a pair of input ring gears rotatable relative to one another, a pair of output planetary gears engaging said ring gears, and a yoke connected to said output shaft and rotatably mounting said planetary gears, a first gear train connecting one of said input ring gears to said cylinder mounting means, a second gear train connecting the other of said input ring gears to said piston mounting means, one of said gear trains including a complementary pair of sector gears interengaged with one another, one of said pair of sector gears being rotatable in synchronism with said cylinder mounting means and the other of said pair of sector gears being rotatable in synchronism with said piston mounting means, whereby the sector gears cooperate with the gear trains to impart unidirectional output torque to said output shaft.



4,058,089
ELECTRICALLY CONTROLLED FUEL INJECTION SYSTEM

Peter Schmidt, and Helmut Worz, both of Schwieberdingen, Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany

Filed Sept. 18, 1975, Ser. No. 614,769
Claims priority, application Germany, Oct. 10, 1974, 2448304
Int. Cl.^{2} F02B *3/00*
U.S. Cl. 123—32 ED 9 Claims



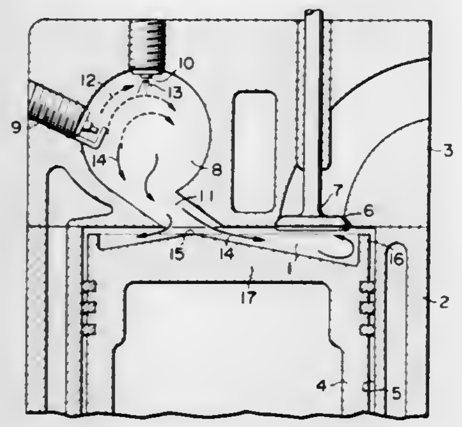
1. An electrically operated fuel injection system for an internal combustion engine, said engine having an induction tube and fuel injection valves, said system including:

A. an air flow rate sensor, having an electrically heated, temperature-dependent resistor, located in said induction tube and connected in an electrical bridge circuit which is part of a closed control loop;
B. a source of electric current;
C. means for apportioning said electric current to said resistor in two components, the first component being a DC component whose magnitude is finite when the air flow is zero, and the second component being a variable current whose magnitude vanishes together with the air flow and whose magnitude can increase with increasing air flow to thereby generate additional heat in said resistor to compensate for heat loss to the air flow;
D. an operational amplifier, whose inputs are connected to separate junction points in said bridge circuit and which provides an output voltage related to the difference of potential between said separate junction points;
E. voltage-to-frequency converter means, connected to receive said output voltage and providing a control signal whose frequency is proportional to the air flow rate;
F. electronic current control means for receiving said control signal and for providing said second heating current component for said resistor;
G. a squaring circuit, connected to receive said control signal and for spacing its frequency;
H. a digitally operating electronic fuel control unit, connected to receive said squared control signal and to provide a fuel control datum for determining the opening time of the fuel injection valves of the engine; and
I. frequency dividing means, connected to receive said control signal and to thereby provide an output signal of a second, reduced frequency which is applied to said current control means.

4,058,090
INTERNAL COMBUSTON ENGINE WITH AUXILIARY COMBUSTION CHAMBER

Takao Suzuki, and Hiroshi Ogita, both of Shizuoka, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Mar. 19, 1975, Ser. No. 559,794
Claims priority, application Japan, Aug. 8, 1974, 49-94787[U]
Int. Cl.^{2} F02B *23/00*
U.S. Cl. 123—32 SP 7 Claims

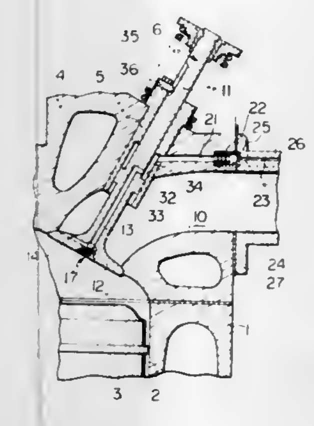


1. An internal combustion engine comprising:
a cylinder;
a cylinder head secured to said cylinder;
a piston reciprocably disposed in said cylinder and having a crown at one end thereof which faces said cylinder head, said crown being substantially conical with the conical substantially straight side thereof sloping from the apex thereof in a direction away from said cylinder head, said piston further comprising a straight annular bank on the peripheral edge of said crown, said bank extending from the peripheral edge of the crown toward said cylinder head in a direction parallel to the axis of said piston;
a main combustion chamber defined by said cylinder, said cylinder head, and the crown of said piston;
means defining an auxiliary combustion chamber or circular cross-section in said cylinder head;
a spark plug in said auxiliary combustion chamber;
means for supplying fuel to said auxiliary combustion chamber;
means defining a communication passage in said cylinder head fluidly communicating said main combustion chamber and said auxiliary combustion chamber, said communication passage being disposed tangentially to the periphery of the auxiliary combustion chamber, the axis of said communication passage being inclined at an angle to the axis of said cylinder, one end of said passage terminating in a first opening which opens into said main combustion chamber and the other end thereof terminating in a second opening which opens into said auxiliary combustion chamber;
the apex of the piston crown lies on a straight line which is parallel to the axis of the piston and intersects the axis of the passage at said first opening so that the apex is adjacent the first opening when the piston is in its top dead center position whereby burning gas in the auxiliary combustion chamber jets therefrom into the main combustion chamber and is guided along the crown of the piston so as to spread throughout the main combustion chamber.

4,058,091
INTERNAL COMBUSTION ENGINE OF A LEAN AIR-FUEL MIXTURE COMBUSTION TYPE

Toshio Tanahashi, Toyota, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Japan

Filed June 3, 1976, Ser. No. 692,504
Claims priority, application Japan, Jan. 21, 1976, 51-5042
Int. Cl.^{2} F02B *19/10;* F02M *39/00*
U.S. Cl. 123—32 VN 7 Claims

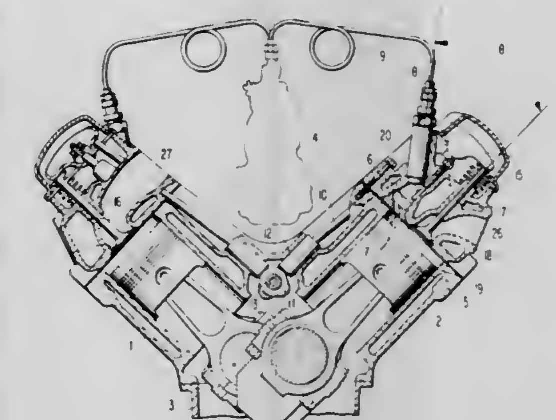


1. An internal combustion engine of a lean air-fuel mixture combustion type, comprising:
a cylinder block,
a piston reciprocally movable in the cylinder block,
a cylinder head fixed onto the cylinder block,
a combustion chamber formed between the inner surface of the cylinder head and the top surface of the piston,
a valve guide fixed to the cylinder head,
an intake valve supported by the valve guide and comprising a valve stem and a valve head having on its outer wall an injection nozzle,
an intake passage one end of which is connected to the combustion chamber via the intake valve, the other end of the intake passage being connected to the atmosphere,
a fuel supply means for feeding a lean air-fuel mixture into the intake passage,
a spark plug having a spark gap located in the combustion chamber,
a pumping chamber formed between the valve stem and the valve guide, the pumping operation of said pumping chamber being caused by the reciprocal movement of the intake valve,
a fuel injection passage formed in the intake valve and arranged so as to connect the pumping chamber with the injection nozzle,
a first check valve disposed in said fuel injection passage and only allowing outflow of a liquid fuel from the pumping chamber to the injection nozzle,
a fuel supply passage arranged so as to connect the pumping chamber with a fuel source,
a second check valve disposed in the fuel supply passage and only allowing inflow of the liquid fuel from the fuel source to the pumping chamber, said injection nozzle being arranged so as to be directed to an ignition area around the spark gap,
a fuel being injected from the injection nozzle into the combustion so as to form a rich air-fuel mixture layer in the ignition area when the intake valve returns to its closing position at the time of the intake stroke of the engine,
said pumping chamber comprising a groove formed on the valve guide and a projection formed on the valve stem, said projection being fitted into said groove.

4,058,092
V-TYPE ENGINES

Noboru Hikosaka, Kamakura; Mitsuo Watanabe, Yokohama, and Shoji Shiozaki, Fujisawa, all of Japan, assignors to Isuzu Motors Limited, Tokyo, Japan

Filed Nov. 26, 1975, Ser. No. 635,518
Claims priority, application Japan, Nov. 27, 1974, 49-136460
Int. Cl.^{2} F02B *3/00, 75/22*
U.S. Cl. 123—32 ST 4 Claims

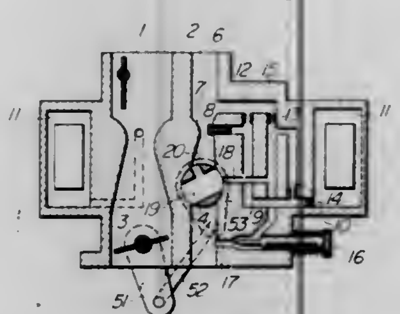


1. A V-type internal combustion engine of the type having a plurality of pistons and piston cylinders positioned in left and right banks, respectively, which are inclined with respect to one another to form a V-shape, the space between said banks being defined as within said V-shape, said engine further having
a cross flow cylinder head with intake ports opening within said V-shape, exhaust ports in said banks opening to the space outside said V-shape, an injection pump disposed within said V-shape,
a cam shaft at the apex of said V-shape, said engine comprising; auxiliary combustion chambers, one for each piston, disposed in said right and left banks in the vicinity of the inner side of the V-shape above said piston cylinders, respectively, and a plurality of throats for providing communication between said respective cylinders and auxiliary combustion chambers, each said auxiliary chamber being positioned along a first transverse line passing thru the center of the respective cylinder, which transverse line is perpendicular to a second transverse line passing through the centers of all cylinders in a given bank, said first and second transverse line defining a plane substantially parallel with the top and bottom surface of said cylinders in a given bank; injection nozzles for each auxiliary combustion chamber respectively, each having its axis disposed in a plane defined by said first transverse line and the axis of a respective cylinder, and inclined at an angle between 0° and 60° with respect to said cylinder axis and having one end projecting into said respective auxiliary combustion chamber and the other end being within said V-shape;
and further comprising for each cylinder, an intake valve and an exhaust valve, a pair of rocker arms disposed symmetrically about said first traverse line and said auxiliary combustion chamber and above said cylinder and valves, one end of said pair of rockers operatively connected to said intake and exhaust valves, respectively, a pair of push rods operatively engaged at one end thereof to the other ends of said rocker arms, respectively, a pair of cams on said cam shaft for operatively engaging the other ends of said push rods, respectively, the said cams for all said cylinders being arranged on said shaft so that adjacent cams engage push rods existing in opposite banks.

4,058,093
CARBURETOR FOR USE IN INTERNAL COMBUSTION ENGINE

Takashige Kohno, Hitachi; Takeshi Takamaru, Mito; Akiyasu Kuwahara, Hitachi, and Michitsugu Mori, Katsuta, all of Japan, assignors to Hitachi, Ltd., Japan

Filed June 19, 1975, Ser. No. 588,365
Claims priority, application Japan, June 21, 1974, 49-70190
Int. Cl.² F02B *19/10, 19/16, 19/18*
U.S. Cl. 123—75 B **4 Claims**



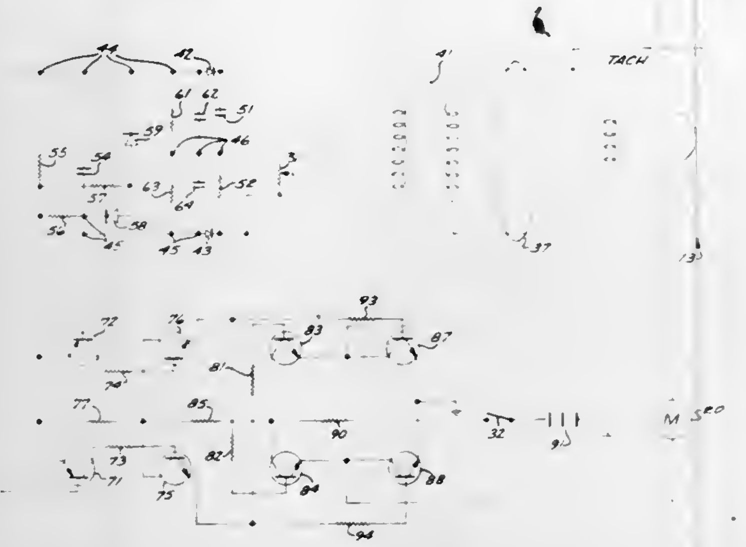
1. A carburetor for use in an internal combustion engine, said carburetor comprising
an air supply duct, a main fuel passageway, and a low speed fuel passageway;
a rotary throttle valve mounted in said air supply duct, said rotary throttle valve having a body portion with a gasified fuel-air passageway extending radially through the body portion for passing gasified fuel-air mixtures, and said rotary throttle valve controlling the amount of flow of the gasified fuel-air mixtures supplied to the engine by rotation of said rotary throttle valve; and
a bypass passageway extending from the low speed fuel passageway to an opening port adjacent said rotary throttle valve, said opening port being disposed to communicate with said gasified fuel-air passageway of said rotary throttle valve when said rotary throttle valve is at idling opening position, and said opening port being continuously closed by said body portion upon said rotary throttle valve being rotated from its idling opening position to a predetermined operational opening of said rotary throttle valve so that said opening port is closed at said predetermined operational opening.

3. In a torch nozzle type internal combustion engine having a main combustion chamber and an auxiliary combustion chamber associated with each cylinder of said engine, a carburetor for supplying a lean fuel-air mixture to said main combustion chamber by means of at least one main air supply duct and a rich fuel-air mixture to said auxiliary combustion chamber by means of an auxiliary air supply duct, said carburetor including a main fuel supply duct and a low speed fuel supply duct, wherein the improvement comprises means associated with said auxiliary air supply duct for providing a variable air bleeder to continuously control the amount and composition of said rich fuel-air mixture during changes from idling to normal operation of said engine, wherein said variable air-bleeder means comprises in combination
valve means mounted for rotation in said auxiliary air supply duct for controlling the amount and composition of the fuel-air mixture, said valve means including a body portion mounted for rotation in said auxiliary air supply duct and at least one passageway extending radially through said body portion for passing the fuel-air mixture; and
bypass passageway means for communicating the low speed fuel supply duct with said auxiliary air supply duct adjacent said valve means, said bypass means having an opening port disposed to be in communication with said one passageway in said valve means at the engine idling position of said valve means, and
wherein said opening port is continuously decreased in opening area upon rotation of said valve means from said idling position to a predetermined open position of said valve means.

4,058,094
SPEED CONTROL DEVICE

Franklin Eldridge Moore, 327 W. 6th St., Long Beach, Calif. 90802

Filed June 30, 1975, Ser. No. 591,779
Int. Cl.² F02D *11/10*
U.S. Cl. 123—102 **3 Claims**



1. A speed governing device adopted to control the rate of a rotating power plant comprising:
control means connected to said power plant for controlling the rotational rate thereof;
a rate sensor connected to the output of said power plant for providing a cyclic feedback signal proportional to the rotational rate of said power plant;
a resonant circuit connected to receive said cyclic feedback signal for producing an output signal of a first polarity when said cyclic signal is above a predetermined frequency and of a second polarity when said cyclic signal below said predetermined frequency;
first amplifying means connected to receive said output signal from said resonant circuit including first biasing means, said first amplifying means in combination with said biasing being rendered responsive to said first polarity of said output signal for producing a first control signal indicative thereof;
second amplifying means connected to receive said output signal from said resonant circuit including second biasing means, said second amplifying and biasing means being operative in combination to be rendered responsive to said second polarity of said output signal for producing a second control signal indicative thereof; and
a servo motor connected to receive said first and second control signals for producing control inputs to said control means according to the presence of said first or second control signal, said first and second amplifying means each include a PNP first transistor forming a first preamplifier stage and an NPN transistor forming a second preamplifier stage in circuit with said first preamplifier stage.

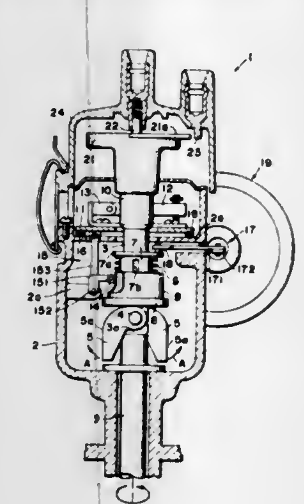
4,058,095
DISTRIBUTOR FOR AN INTERNAL COMBUSTION ENGINE

Nobuo Habu, Shizuoka, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed June 11, 1976, Ser. No. 694,931
Claims priority, application Japan, Dec. 5, 1975, 50-164916[U]
Int. Cl.² F02P *5/04*
U.S. Cl. 123—117 R **10 Claims**

1. A distributor for an internal combustion engine having a first rotary shaft, comprising:
a. a fixed cylindrical housing;
b. a second rotary shaft extending into said housing for rotation in synchronism with the first rotary shaft;

c. a breaker plate rotatably supported within said housing and rotatable relative to said second rotary shaft;
d. a swinging arm mounted on said breaker plate and carrying a movable contact;
e. a stationary contact fixedly mounted on said breaker plate and cooperating with said movable contact;
f. a first contact breaker cam fixedly mounted on said second rotary shaft, said movable contact continuously engaging said first cam;
g. a sleeve loosely mounted on said second rotary shaft;
h. a second ignition timing changing cam loosely fitted on said sleeve, said second cam being rotatable around the axis of said second rotary shaft together with said sleeve and movable in the axial direction of said second rotary

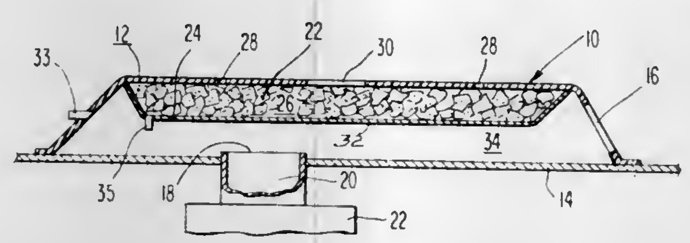


shaft relative to said sleeve, said second cam having an outer peripheral cam surface in the form of a curved surface of a predetermined order;
i. a follower engaging said cam surface;
j. first link means responsive to the movement of said follower for causing corresponding rotation of said breaker plate around the axis of said second rotary shaft;
k. speed sensing means mounted on said second rotary shaft for urging said second cam in the axial direction of said second rotary shaft upon an increase in the rotating speed of said second rotary shaft; and
l. second link means connected to said sleeve for causing rotation of said second cam around the axis of said second rotary shaft through said sleeve in response to the magnitude of the load on the engine.

4,058,096
APPARATUS AND METHOD FOR INCREASING THE HORSEPOWER OF AN INTERNAL COMBUSTION ENGINE

Stephen Edward Brown, 501 South Matlack St., West Chester, Pa. 19380

Filed Feb. 18, 1975, Ser. No. 550,770
Int. Cl.² F02M *31/00;* **F25D** *3/12*
U.S. Cl. 123—119 CG **5 Claims**

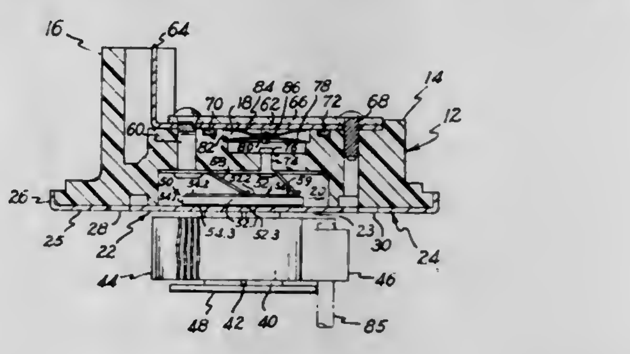


1. An apparatus for use with an internal combustion engine which utilizes a carburetor and which burns a mixture of (a) a fuel which is liquid at ambient temperature and pressure and (b) air; said apparatus comprising in combination an air scoop means having wall means forming a first enclosed chamber; said air scoop means having an air inlet aperture and an air outlet aperture; said air inlet aperture being in communication with an ambient air source and the interior of said first chamber; said air outlet aperture being in communication with the interior of said first chamber and being adapted to communicate with an air inlet means of said carburetor; whereby when air is introduced through said air inlet aperture, the air flows through said first chamber to said air outlet aperture to provide an air flow path through said first chamber; said apparatus further including a second chamber of a generally pan-shaped configuration secured in a sealing engagement to the upper interior surface of said air scoop means and being made of a highly temperature conductive material said second chamber being of a volume less than the volume of said first chamber; said second chamber protruding into the air flow path through said first chamber; said second chamber further having access means for introduction of a coolant medium into said second chamber; whereby when said apparatus is in communication with the carburetor of an internal combustion engine and a coolant medium is introduced into said second chamber the air flowing from the first inlet to the second inlet is cooled by said coolant prior to entering the carburetor, increasing the quantitative amount of oxygen in a given volume of air supplied to said carburetor; whereby increased horsepower can be obtained by providing additional fuel to said engine.

4,058,097
CHOKE CONTROL

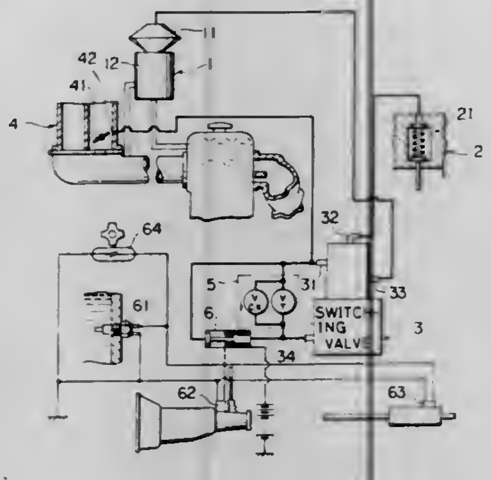
Allen H. Silverstein, Attleboro, and James J. Armstrong, III, Seekonk, both of Mass., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed June 30, 1975, Ser. No. 591,548
Int. Cl.² F02D *11/08*
U.S. Cl. 123—119 F **14 Claims**



1. Control means having an ambient temperature compensating feature for adjusting a choke in an automotive motor system as motor temperature increases after initiation of motor operation comprising heat response means movable in response to increase in temperature of said heat responsive means for adjusting the choke, heat sink means surrounding heat responsive means on three sides for providing uniform, quick heat transfer to said heat responsive means, said heat sink means comprising a bushing to which said heat response means is secured, a plate having heater portion and a mounting portion mounting said bushing and having one surface extending along one lateral edge of said coil and another surface on which said electrical heater means is mounted, and a flange member mounted on said bushing and having one surface extending along another lateral edge of said coil, self-regulating electrical resistance heater means mounted on said heat sink means and energizable from an electrical power source upon initiation of said motor operation for heating said heat responsive means, additional self-regulating electrical resistance heater means mounted on said heat sink means for supplementing heating of said heat responsive means when said additional heater means is energized, and thermostatic switch means connectable to an electrical power source upon initiation of said motor operation and actuable above a selected ambient temperature for energizing said additional heater means.

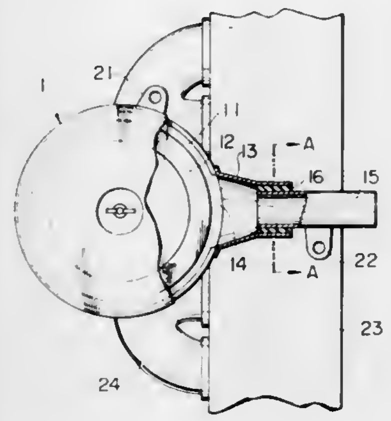
4,058,098
CONTROL SYSTEM FOR USE IN EXHAUST GAS RECIRCULATION SYSTEM
Hidemi Onaka, Susono, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan
Filed Mar. 11, 1976, Ser. No. 665,803
Claims priority, application Japan, June 23, 1975, 50-74453
Int. Cl.² F02B *29/00*
U.S. Cl. 123—119 A **6 Claims**



1. In a fuel system for use in an exhaust gas recirculation system of an internal combustion engine, wherein part of the exhaust gases from the exhaust system is recirculated to the engine intake system to reduce the amount of harmful components contained in the exhaust gases, as well as to prevent lowering in the running performance of the engine by controlling the recirculation of exhaust gases, the improvements comprising:

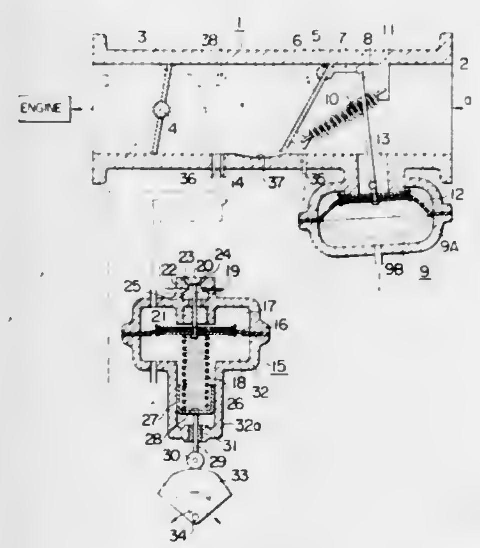
a vacuum operated recirculation control valve means connected between the engine intake and exhaust systems to control recirculation of exhaust gases between said exhaust system and said intake system;
a vacuum operated fuel control mechanism to increase the open, cross-sectional area of a fuel metering member in the engine carburetor, to compensate for the running performance of the engine, which has been lowered due to exhaust gas recirculation;
a negative-pressure switching valve to selectively communicate negative pressure to said recirculation control valve means as well as to fuel control mechanism, said negative-pressure switching valve including a valve body having at least one inlet and two outlets defining two communication paths therebetween, a valve stem, a diaphragm and a diaphragm chamber positioned so that a negative pressure supplied to a compartment of said diaphragm chamber effects switching of communication from one path to the other;
means connecting said fuel control mechanism with one outlet of said negative-pressure switching valve;
means connecting said recirculation control valve with the other said outlet;
means connecting the diaphragm compartment of said negative-pressure switching valve to at least one of a delay element or a delay by-pass valve;
means to actuate said delay by-pass valve comprising means to sense at least one of the following: an acceleration-transient condition; a change gear position; cooling water temperature; vehicle speed; or exhaust gas temperature;
means connecting said delay element and said delay by-pass to the engine carburetor air intake so that the operation of the switching valve is controlled commensurate to the running condition of the engine, the engine vacuum being commensurate with the opening of the throttle valve in the engine carburetor; whereby when said negative-pressure switching valve is actuated, a recirculating path for exhaust gases is closed, and concurrently an additional fuel passage for said fuel control mechanism is closed, thereby controlling both the recirculation of exhaust gases and the concentration of the mixture charge.

4,058,099
AIR CLEANER ASSEMBLY
Taiji Saito, Toyoto, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Japan
Filed Jan. 26, 1976, Ser. No. 652,169
Claims priority, application Japan, Nov. 12, 1975, 50-135225
Int. Cl.² F02M *31/00*
U.S. Cl. 123—122 D **6 Claims**



1. An air cleaner assembly comprising a casing having an air cleaning element therein, intake pipe means connected to both a source of warm air and a source of cool air, switching valve means carried by said intake pipe means for selectively directing either warm air or cool air through said intake pipe means from said sources of said air, a joint tube secured at one end thereof to said casing and having its other end connected with said intake pipe in telescoping relationship therewith, said joint tube providing communication between said intake pipe means and the interior of said casing for introducing air from said intake pipe into said casing, and a resilient sleeve member carried at said other end of said joint tube positoned interiorly within one of said telescoping members and surrounding the other said telescoping member extending axially along the area of telescoping overlap and being sandwiched in airtight engagement between said joint tube and said intake pipe.

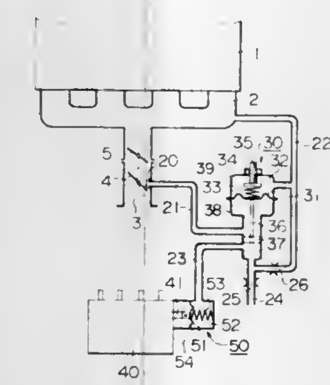
4,058,100
INTAKE AIR FLOW RATE MEASURING DEVICE FOR INTERNAL COMBUSTION ENGINE
Eizi Tanaka, Anjo, and Hiroshi Mochizuki, Okazaki, both of Japan, assignors to Nippon Soken, Inc., Nishio, Japan
Filed Mar. 9, 1976, Ser. No. 665,443
Claims priority, application Japan, Mar. 14, 1975, 50-31359
Int. Cl.² F02M *69/00*
U.S. Cl. 123—139 AW **15 Claims**



10. A flow rate measuring device for intake air into internal combustion engines of the type provided with an air intake pipe (1) and a throttle valve (3) disposed within said air intake pipe (1) for controlling the flow rate of intake air flowing into the engine, said device comprising:

a. an unbalanced sensing vane (6) disposed within said intake pipe (1) at the upstream of said throttle valve (3), said sensing vane being opened or closed in response to the flow rate of intake air flowing into said air intake pipe (1),
b. a shaft (5) operatively coupled to and rotated by said sensing vane, the angular displacement of said shaft representing the flow rate of intake air,
c. means (15) for detecting the pressure difference across said sensing vane (6) and producing a signal representative of both the difference between the detected pressure difference across said sensing vane and a pressure in said intake pipe between said sensing vane and said throttle valve, and
d. means (9) responsive to said signal for controlling the degree of opening of said sensing vane (6) such that the pressure difference across said sensing vane is controlled at a constant value, whereby the degree of opening of said sensing vane is precisely in proportion to the flow rate of intake air.

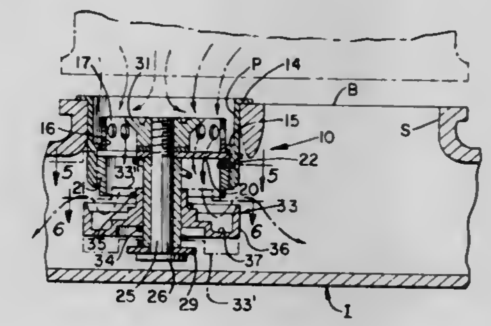
4,058,101
CONTROL APPARATUS FOR DIESEL ENGINE
Kaoru Taira; Teruo Sato; Yoshiya Ishii, all of Toyota; Yukinori Miyata, and Katashi Okamoto, both of Kariya, all of Japan, assignors to Nippondenso Co., Ltd., Kariya and Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, both of, Japan
Filed July 2, 1976, Ser. No. 702,131
Claims priority, application Japan, July 8, 1975, 50-84236
Int. Cl.² F02D *1/04, 1/06;* **F02M** *3/00*
U.S. Cl. 123—140 MP **7 Claims**



1. A control apparatus for a Diesel engine comprising:

a fuel injection pump for injecting fuel to an engine, said fuel injection pump having a control rack for controlling the amount of the fuel injected to the engine;
a main throttle valve installed in an intake manifold of the engine for controlling the speed of intake air flow;
venturi means disposed in the intake manifold of the engine for permitting intake air to flow therethrough with the speed controlled by said main throttle valve;
an auxiliary throttle valve installed in the intake manifold for throttling intake air in its throttling position;
actuating means connected to said auxiliary throttle valve for bringing the same into said throttling position only during low load operation of the engine;
fuel metering means for controlling said control rack and hence the amount of fuel injected to the engine, said fuel metering means having a housing and a deflectable member coupled together for forming therebetween a pressure chamber to be supplied with the negative pressure, said deflectable member being connected to said control rack to control said control rack in response to the negative pressure in said pressure chamber; and
selector valve means operatively connected to said auxiliary throttle valve for transmitting the negative pressure in said venturi means to said pressure chamber of said fuel metering means when said auxiliary throttle valve is opened and for transmitting the negative pressure in said intake manifold downstream of said auxiliary throttle valve to said pressure chamber of said fuel metering means when said auxiliary throttle valve is in its throttling position.

4,058,102
FUEL ECONOMIZER FOR CABURETED INTERNAL COMBUSTION ENGINES
Robert E. Fabritz, 3200 Shepherd St., Mount Ranier, Md. 20822
Filed May 5, 1976, Ser. No. 683,630
Int. Cl.² F02M *29/00*
U.S. Cl. 123—141 **12 Claims**



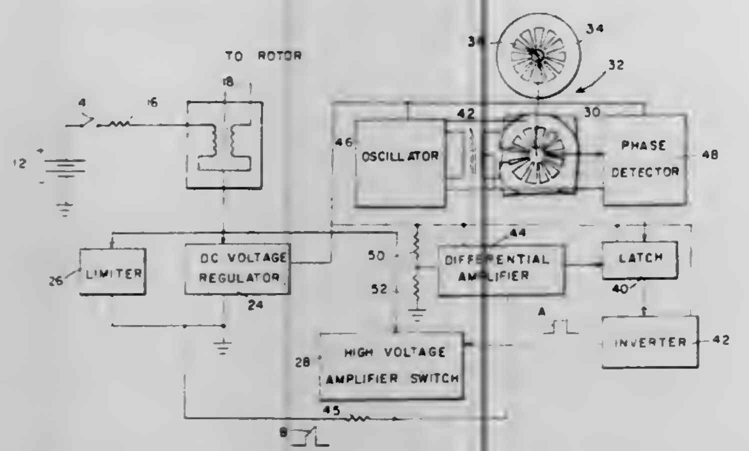
1. A fuel economizer for internal combustion engines having an intake manifold and a carburetor thereon, comprises: a tubular body having an open inlet end and an open outlet end and means on the body for supporting the body in an intake manifold in aligned registry with a carburetor, whereby air and fuel leaving the carburetor will pass through the economizer; means on the body defining trough-like liquid fuel collecting means to collect liquid fuel leaving the carburetor; said liquid fuel collecting means having air passage means associated therewith for directing flow of air over collected fuel therein in contacting relationship therewith to atomize the liquid fuel; air/fuel deflector means movably carried by the body at the outlet end thereof in the path of air and fuel flowing through the outlet end of the body to promote turbulence in the air and fuel; and means yieldably biasing said deflector means toward closing relationship relative to the body, whereby the deflector means is moved toward open position in response to vacuum and increased flow in an intake manifold and is moved toward closed position by said biasing means under conditions of decreased vacuum and flow, said deflector means thus opening and closing in response to engine demand, and the economizer thus effecting thorough atomization of fuel and more efficient fuel combustion and consequently increasing the fuel economy of an engine.

4,058,103
ELECTRONIC IGNITION UNIT
Dale C. Brocker, 19525 Forest Ave., Castro Valley, Calif. 94546
Filed Nov. 3, 1975, Ser. No. 627,934
Int. Cl.² F02P *1/00*
U.S. Cl. 123—148 E **4 Claims**

1. An electronic ignition unit for an internal combustion engine having a drive shaft, spark plugs, an associated ignition coil and source of low voltage current which comprises

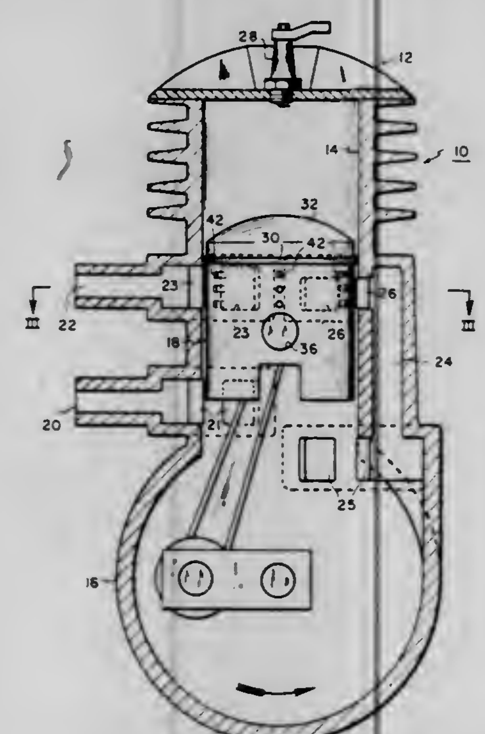
a transector having adjacent but non-contacting rotor and stator, each with electrically-interacting cyclical-pattern conductors thereon,
means for electronically connecting said transector stator conductor with the low voltage source,
means for mechanically connecting said transector rotor with the engine drive shaft so as to produce a sequence of output pulses,
a high voltage switch connected to receive the output pulses generated by said transector in response to rotation of said

transector rotor, and adapted to generate a timed sequence of pulses for delivery to the ignition coil,
means including an electronic latch and a latch-controlling differential amplifier for controlling the period of the pulse application to said high voltage switch, and



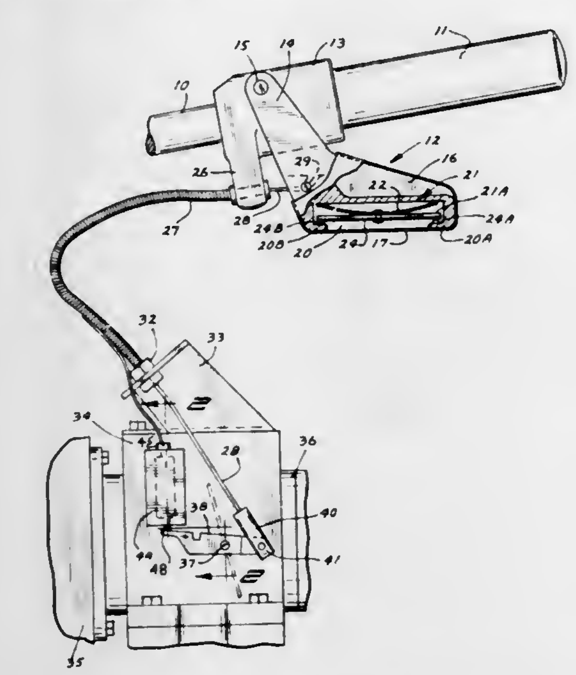
a distributing switch electrically connected to said ignition coil for distribution of high voltage pulses in sequence to the engine spark plugs.

4,058,104
HYDROSTATIC BEARING PISTON FOR A TWO-CYCLE ENGINE
Jon R. Swoager, Imperial, Pa., assignor to Automation Equipment, Inc., Imperial, Pa.
Filed Apr. 23, 1975, Ser. No. 570,783
Int. Cl.² F02F *1/00*
U.S. Cl. 123—193 CP **8 Claims**



1. A two stroke internal combustion engine comprising:
a cylinder having a plurality of continuous vertical rib portions with a plurality of port openings disposed therebetween, the inner most portion of the ribs forming the inner most portion of the cylinder wall;
a piston supported for reciprocating longitudinal movement within said cylinder comprising a head portion and a skirt portion extending from the head portion;
at least one annular groove for receiving a sealing ring formed at the upper end of the piston skirt;
sealing ring means secured by said at least one annular groove for providing a seal between said cylinder and said piston; and
a plurality of bores through the skirt portion located beneath the head portion lower than said at least one annular groove and said sealing ring means with each bore being directed perpendicular at, and opening in close proximity to one of said vertical rib portions to cause a hydrostatic type bearing between the piston and the cylinder wall.

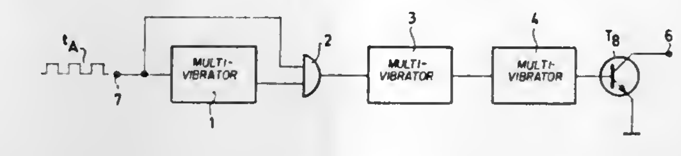
4,058,105
SNOWMOBILE SAFETY SWITCH SYSTEM
Carl W. Schellin, Deerwood, and John P. Lundberg, Pequot Lakes, both of Minn., assignors to Scorpion, Inc., Crosby, Minn.
Filed Apr. 15, 1976, Ser. No. 677,161
Int. Cl.² F02B *77/08*
U.S. Cl. 123—198 DC **10 Claims**



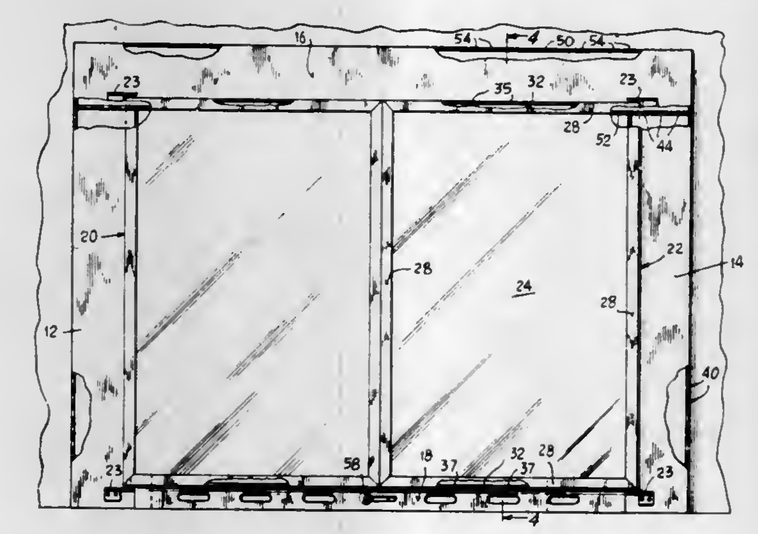
1. In an internal combustion engine having a carburetor, a throttle control arm on the carburetor movable from an idle position to working position, and spring loaded toward said idle position, a remote hand throttle actuator engagable by an operator on a surface and movable in response to force on the surface, linkage means between the throttle control arm and the hand throttle actuator to move the throttle control arm away from idle position when the hand throttle actuator is subjected to force from an operator, the improvement comprising an ignition disabling circuit for the internal combustion engine including a pair of switches, each having an open position and a closed position and each normally being spring loaded to the same position as the other, means to position a first of said switches adjacent the throttle control arm so as to be moved from its normal position when the control arm is in idle position, means positioning a second of said switches on said hand throttle actuator whereby said force on said surface sufficient to normally move the hand throttle actuator and connected throttle control arm from idle position moves said second switch from its normal position, and means to connect said first and second switches in series in the ignition disabling circuit whereby when both of said switches are in normal position the ignition system is disabled.

4,058,106
METHOD AND APPARATUS FOR RPM LIMITATION IN INTERNAL COMBUSTION ENGINES
Ulrich Drews, Schwieberdingen; Bernd Kraus, Stuttgart; Erich Singer, Besigheim, and Hans Schnürle, Walheim, all of Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany
Filed Apr. 22, 1976, Ser. No. 679,379
Claims priority, application Germany, Apr. 22, 1975, 2517697
Int. Cl.² F02B *3/00, 77/00*
U.S. Cl. 123—198 DB **16 Claims**

1. A method for limiting the rpm in an internal combustion engine, said engine including fuel preparation means, comprising the steps of:
interrupting fuel supply for a predetermined period of time after the engine has reached a predeterminable limiting rpm; and
suppressing all fuel supply when the limiting rpm of the engine is exceeded and continuing to suppress all fuel supply for a predetermined time after the engine rpm has again dropped below the limiting rpm.



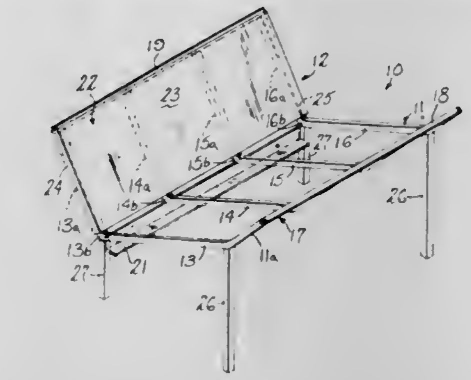
4,058,107
COMBINATION ISOBARIC STEAM-HEATER AND ENCLOSURE FOR USE WITH FIREPLACES
Harrison F. Edwards, Norwich, N.Y., assignor to Norwich Laboratory, Inc., Norwich, N.Y.
Filed July 1, 1976, Ser. No. 701,689
Int. Cl.² F24B *7/06*
U.S. Cl. 126—121 **13 Claims**



1. An enclosure for a fireplace, comprising in combination:
a. a fireplace frame having substantially vertical side members and substantially horizontal top and bottom members extending between and respectively connected to the side members,
b. a pair of doors and means hingedly connecting the same to the frame, said doors being adapted to close off the space encompassed thereby,
c. each of said doors being constituted of two panes of tempered glass disposed in substantially parallel relation and having spacer means for maintaining said panes in closely spaced relation so as to define an air space therebetween,
d. said spacer means including door frames which extend completely around the peripheral portions of the panes and confine and conceal such portions,
e. said door frames having series of ventilating holes at locations adjacent the top and bottom members of the fireplace frame whereby heated air in said air space is convected upward through the holes adjacent the top member, said air being drawn into the air space through the holes adjacent the bottom member,
f. said convected air providing heat to the room and at the same time reducing the temperature of both panes of glass of each door.

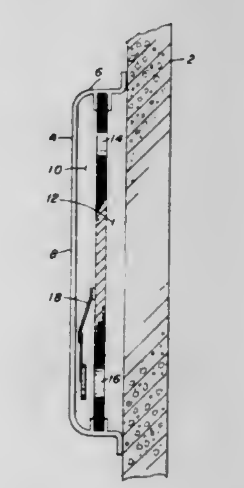
4,058,108
GRATE
Emil F. Dahlquist, Clinton, Conn., assignor to Radiant Grate, Inc., Clinton, Conn.
Filed Sept. 8, 1975, Ser. No. 611,008
Int. Cl.² F23H *13/02*
U.S. Cl. 126—137 **2 Claims**

1. A grate comprising a log-supporting portion and a log-retaining portion, said log-supporting portion comprising a plurality of spaced apart members disposed at an angle of 20° to 30° to the horizontal, said retaining portion extending from said supporting members at an angle therewith of essentially 90°, said supporting members being spaced apart a sufficient distance to allow embers from logs in said grate to fall through and form a bed thereunder, the total area of spacing between said supporting members being substantially greater than the area of said supporting members so as to permit heat due to burning of logs in said grate to radiate outwardly from the



front of said grate, and a removable plate-like wall member disposed over said retaining portion, and legs supporting said grate above a base plane a sufficient distance to permit buildup of an ember bed on the base plane beneath said supporting portion while leaving a defined space between the underside of said log-supporting portion and a formed ember bed whereby embers from said grate will fall from said grate essentially in front of said retaining portion, said plate-like member having end flanges which fit about the ends of said log-retaining portion.

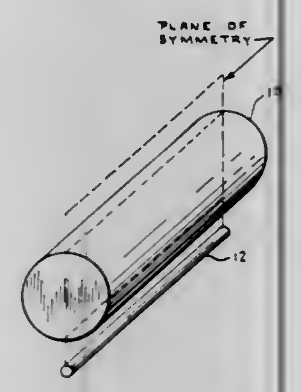
4,058,109
SOLAR HEATING AND INSULATING APPARATUS
Ronald J. Gramm, Pittsburgh, Pa., assignor to Sunwall Incorporated, Pittsburgh, Pa.
Filed May 7, 1976, Ser. No. 684,409
Int. Cl.² F24J *3/02*
U.S. Cl. 126—270 **7 Claims**



1. A solar heating apparatus for attachment to a wall of a building, comprising:
a transparent panel spaced from the wall;
an enclosure attached to the transparent panel, sealing the space between the panel and the wall;
a heat absorber of closed-cell insulating material spaced between the transparent panel and the wall, such that a first air space is formed between the transparent panel and the heat absorber, and a second air space is formed between the heat absorber and the wall, said first and second air spaces being in communication through openings above and below the heat absorber; and
heat sensing damper means for closing at least one of the

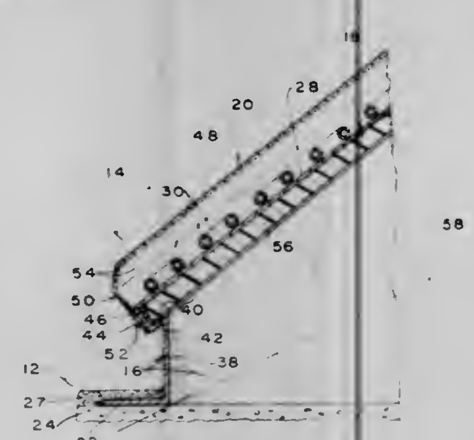
openings between the first and second air spaces in response to changes in temperature.

4,058,110
WIDE ANGLE SOLAR HEAT COLLECTION SYSTEM
F. Sheppard Holt, 46 Emerson Road, Winchester, Mass. 01890
Filed Aug. 5, 1975, Ser. No. 602,043
Int. Cl.^{2} F24J *3/02*
U.S. Cl. 126—271 2 Claims



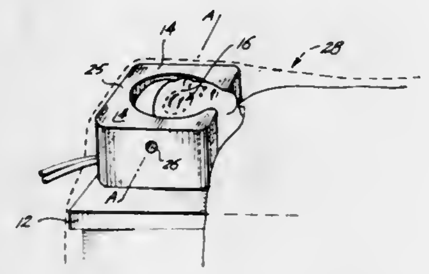
1. A solar energy collection system comprising right circular cylinder lens means for aberrated focusing of solar energy such that said lens means exhibits moderate scan properties in a plane normal to the plane of symmetry; and a hollow body located in the focal region of said lens means, said body having an inlet and an outlet to render it capable of having a circulant flow therethrough, said body being of a size to accommodate focused solar energy received over a moderate scan angle in a plane normal to the plane of symmetry of said means.

4,058,111
SOLAR COLLECTOR
I. L. Wendel, St. Petersburg, Fla., assignor to James L. Lowe, St. Petersburg, Fla.
Continuation-in-part of Ser. No. 596,513, July 16, 1975. This application Feb. 3, 1976, Ser. No. 654,888
Int. Cl.^{2} F24J *3/02;* E04B *7/18*
U.S. Cl. 126—271 3 Claims



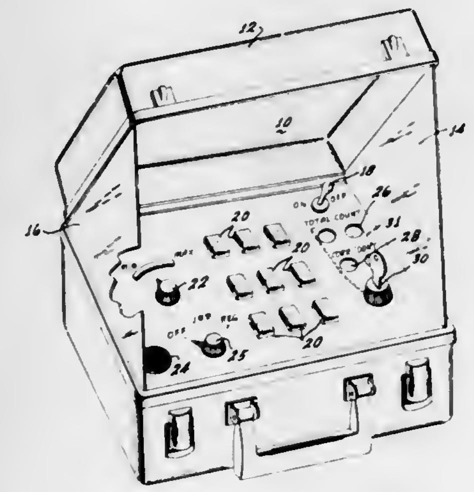
1. A solar collector comprising, a casing positioning a solar collector heat pan at a desired inclination for receiving solar energy, said casing having a substantially continuous side wall with an upper edge portion, said casing having first means for mounting said wall on a support, and said casing having shoulder means at and extending along said upper edge portion and supporting the heat pan facing upwardly within said casing, said wall including an upper portion extending upwardly from said shoulder means to an upper edge of said edge portion, said heat pan including a heat plate substantially flush with said edge, and a solar energy transmitting cover overlying said upper edge portion and mounted on said casing, said cover including a substantially continuous depending solar energy transmitting flange extending upwardly from said edge and said heat plate for passage of solar energy through the last said flange, and the last said flange having a lower portion encircling said upper portion of said wall for effectively preventing entry of wind or foreign matter within the cover.

4,058,112
HEAD POSITIONER AND ARM REST FOR EYE SURGERY
Robert M. Johnson, P.O. Box 525, Kirkland, Wash. 98033
Filed Aug. 19, 1976, Ser. No. 715,651
Int. Cl.^{2} A61B *19/00*
U.S. Cl. 128—1 R 1 Claim



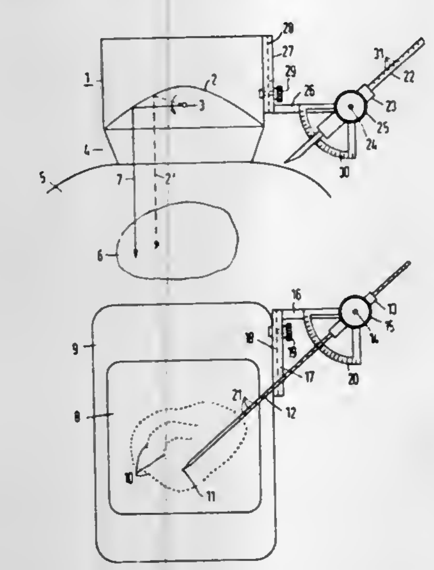
1. A head positioner and surgeon's arm rest for eye surgery and the like on a patient lying prone on a surgical table, comprising:
- a substantially right-rectangular block of resilient material to rest on the head end of said table;
- said block including a U-shaped patient's head-receiving, top-to-bottom open cavity, having an access passage open toward the foot of said table, the portions of said block forming the access passage converging to embrace the sides of the patient's neck above the shoulders;
- said cavity and access passage being shaped to receive and substantially embrace the sides of the patient's head; and
- said block being of a thickness to provide an upper horizontal support and work surface at each side of the patient's head substantially coplanar with the general plane of the surgical situs on the patient whose head is disposed in said cavity.

4,058,113
TIME PERCEPTION DEVICE
Louis G. Fields, 11662 Sunset Blvd., Los Angeles, Calif. 90049
Filed Nov. 13, 1975, Ser. No. 631,472
Int. Cl.^{2} A61B *5/16*
U.S. Cl. 128—2 N 25 Claims



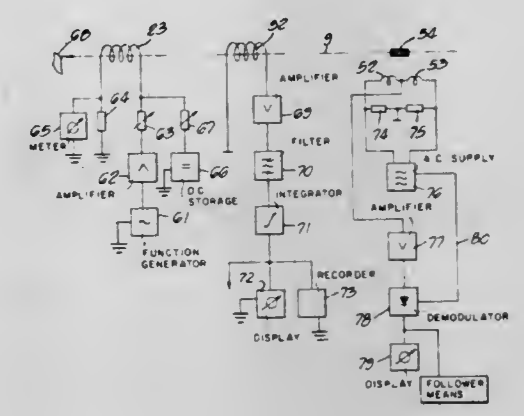
1. Apparatus for performing a self-administered time perception test by a test subject, including:
- a plurality of individual light sources arranged in an array for providing a plurality of individual visual indications;
- first means coupled to the plurality of individual light sources for controlling the individual light sources to flash intermittantly and with all but one of the light sources controlled to flash at regular intervals and with one of the light sources controlled to flash at irregular intervals;
- a plurality of second means coupled to the plurality of individual light sources for selecting any individual one of the plurality of light sources judged by the test subject to be the light source flashing at irregular intervals;
- third means coupled to the first and second means for randomly selecting one of the plurality of light sources to flash at irregular intervals after one of the second means is selected by the test subject,
- coincidence means coupled to the first and second means to produce a coincidence signal when the test subject selects the particular one of the plurality of light sources flashing at irregular intervals;
- a first counter means coupled to the coincidence means for counting each production of a coincidence signal to count the number of correct selections by the test subject; and
- a visual indicator coupled to the first counter means for visually displaying the number of correct selections and additionally including lockable means, including locked and unlocked positions coupled to the visual display for shielding the visual display when in the locked position and exposing the visual display when in the unlocked position.

4,058,114
ULTRASONIC ARRANGEMENT FOR PUNCTURING INTERNAL BODY ORGANS, VESSELS AND THE LIKE
Richard Soldner, Erlangen, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany
Filed Sept. 10, 1975, Ser. No. 612,176
Claims priority, application Germany, Sept. 11, 1974, 2443558
Int. Cl.^{2} A61B *10/00*
U.S. Cl. 128—2 V 4 Claims



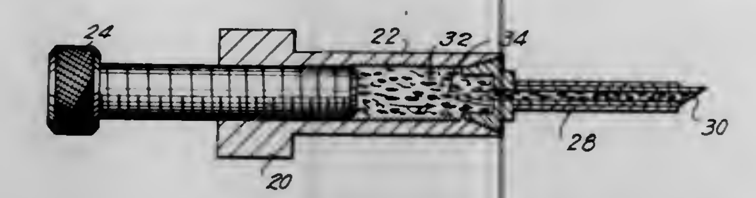
1. An ultrasonic surgical device for puncturing the body of a patient comprising
- an ultra sound applicator including a housing and an ultrasonic beam transmitter positioned within said housing for scanning a beam toward a region of the body of the patient, viewing means operatively associated with said ultrasound applicator and including a housing and a viewing screen for producing an image of the region of the body being scanned, with the image being located with respect to said viewing means housing at a position corresponding to the location of the applicator housing with respect to the region of the body being scanned,
- an elongated aiming pin, pin mounting means for adjustably mounting said aiming pin on said viewing means housing and for releasably locking same in place with respect thereto,
  - said aiming pin having a distal end movable in overlying relation with respect to said viewing screen, said pin mounting means having means for ascertaining the position of said distal end of said aiming pin relative to said viewing means housing
- an elongated puncturing cannula, and cannula mounting means for adjustably mounting said cannula on said ultrasound applicator housing and for releasably locking same in place with respect thereto,
  - said cannula having a distal end movable with respect to said ultrasound applicator housing to reach the region of the body being scanned, said cannula mounting means having means for ascertaining the position of said distal of said cannula relative to said ultrasound applicator housing, and said aiming pin and said pin mounting means, and said cannula and said cannula mounting means, being disposed relative to their respective housings such that the location of the distal end of the aiming pin with respect to the viewing means housing can be duplicated with respect to the location of the distal end of the cannula with respect to the ultrasound applicator housing.

4,058,115
METHOD AND APPARATUS FOR EXAMINING HUMAN PERIODONTAL TISSUES
Friedrich M. O. Förster, Grathlwohlstrasse 4, D-7410 Reutlingen, Germany
Filed Nov. 3, 1975, Ser. No. 628,130
Int. Cl.^{2} A61B *5/10*
U.S. Cl. 128—2 S 18 Claims



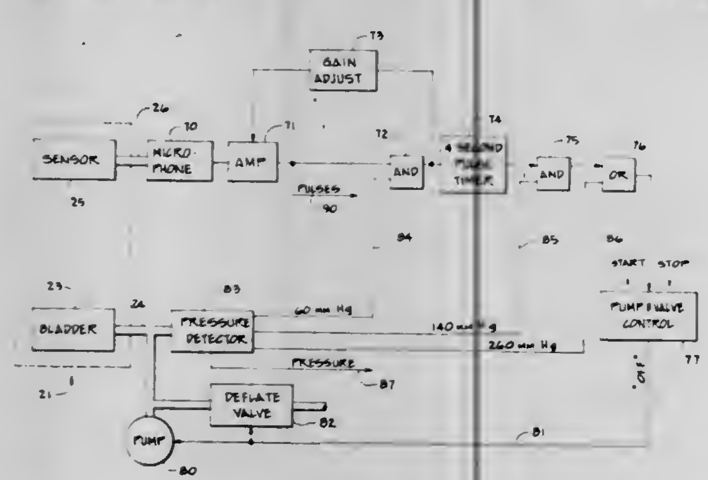
1. Apparatus for examining the human periodontium in which a force acts on the tooth to be examined and the movement of the tooth resulting from the force is determined, the force being transmitted to the tooth by a rigid tube medium sliding in a transducer head and the deflection of the tooth is measured, comprising:
- a conductor through which current flows;
- a means for producing magnetic flux passing through the conductor at right angles;
- a source of supply of electric current connected to the conductor such that the flux density of the magnetic flux is constant within a certain area in the direction in which the resultant force acts between the rigid medium and the transducer head; and
- a dynamic displacement pickup installed in the transducer head including a coil connected to the tube and a permanent magnetic circuit having an air gap in which said coil is movably located, and said dynamic displacement pickup is carried by the transducer head and generates an electric signal proportional to the deflection of the tube from a predetermined position, the electric signal from the dynamic displacement pickup being connected to follower means through an amplifier, and the follower means drivingly connected with the transducer head to move the same until the coil is centrally located in the constant area of the magnetic flux in the air gap.

4,058,116
METHODS, MATERIALS, AND DEVICES FOR PROVIDING ELECTRICAL CONDUCTIVITY PARTICULARLY FOR LIVING BEINGS
Louis Bucalo, 155 Roberts St., Holbrook, N.Y. 11741
Division of Ser. No. 513,295, Oct. 9, 1974, Pat. No. 4,005,699. This application Dec. 17, 1975, Ser. No. 641,494
Int. Cl.[2] A61B *5/04*
U.S. Cl. 128—2.1 E **17 Claims**



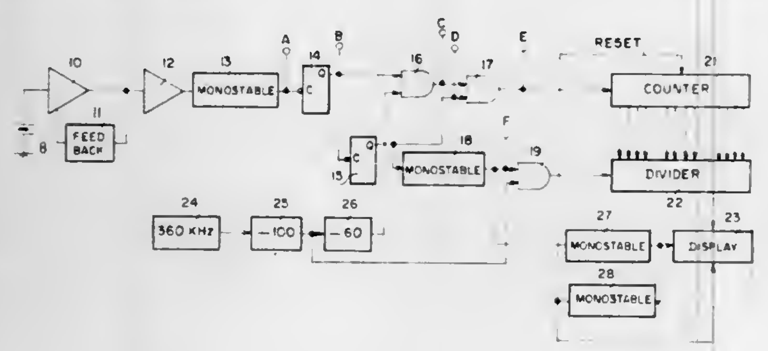
1. In a method of treating a living being, the step of injecting with a syringe, into tissue of the living being, an absorbable viscous substance, in which a plurality of solid bodies are suspended to an extent sufficient to be distributed throughout the viscous substance in an amount sufficient to change the characteristics of the tissue receiving the injection, at least a portion of the bodies being non-absorbable, and at least a portion of the non-absorbable bodies being electrically conductive.

4,058,117
BLOOD PRESSURE MEASURING APPARATUS
William J. Kaspari, Portola Valley; Herman Wong, Los Altos Hills, and Joseph L. Kirch, Hollister, all of Calif., assignors to Palo Alto Research Associates, Portola Valley, Calif.
Filed Oct. 17, 1975, Ser. No. 623,242
Int. Cl.[2] A61B *5/02*
U.S. Cl. 128—2.05 A **6 Claims**



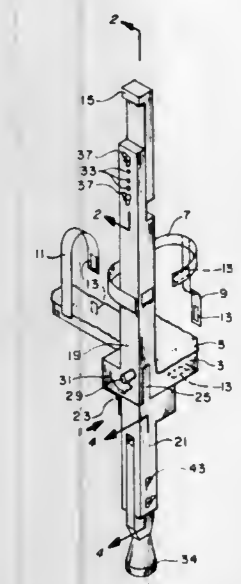
1. A blood pressure measuring apparatus comprising:
an inflatable cuff adapted to occlude an artery when inflated;
means for inflating said cuff means from a cuff condition of non-inflation to a cuff pressure sufficient to occlude an artery without interruption;
means mounted in said cuff means for detecting sounds created when said cuff means occludes an artery;
means coupled to said detecting means for amplifying said sounds;
means responsive to said amplifying means during said inflation of said cuff means for automatically reducing the gain of said amplifying means when said sounds exceed a predetermined amplitude during said uninterrupted inflating of said cuff means, said gain-reducing means comprising means for reducing said gain of said amplifying means only when said cuff means has been inflated to at least a first predetermined pressure;
means responsive to a cessation of said sounds for a predetermined period during said uninterrupted inflating of said cuff means for automatically stopping said inflating of said cuff means;
means for deflating said cuff means automatically after said stopping of said inflating of said cuff means;
means for detecting the first sound having a predetermined amplitude following the initiation of said deflating of said cuff means;
means responsive to said detecting of said first sound for displaying a first cuff pressure, as a measure of systolic blood pressure in said artery; and
means responsive to subsequent sounds during continued deflating of said cuff means for automatically displaying a second cuff pressure as a measure of diastolic blood pressure when a first one of said subsequent sounds has an amplitude which is less than a predetermined amplitude.

4,058,118
PULSE COUNTER
Lawrence John Stupay, Endicott, and Carl Frederick Truesdell, Johnson City, both of N.Y., assignors to Bunker Ramo Corporation, Oak Brook, Ill.
Filed Mar. 19, 1976, Ser. No. 668,616
Int. Cl.[2] A61B *5/02*
U.S. Cl. 128—2.05 T **15 Claims**



1. A cardiotachometer adapted to be attached to a living body and for providing an accurate indication of the heart beat rate of the living body, comprising:
a. heart beat detection means for detecting each heart beat and for providing a discrete electrical pulse for each heart beat, wherein the time between immediately successive discrete electrical pulses represent heart beat intervals;
b. means for holding said detection means against the body at a point where a heart beat can be detected;
c. first pulse generating means for providing a series of first electric pulses at a first rate;
d. first heart beat interval select means coupled to said detection means for selecting a first set of heart beat intervals comprising certain ones of said heart beat intervals;
e. first gate means coupled to said first heart beat interval select means and to said first pulse generating means and having an output for gating to said output the number of said first pulses occurring during each of said first set of intervals, said number of gated first pulses representing the heart beat rate in pulses per heart beat interval;
f. a counter;
g. second heart beat interval select means coupled to said first heart beat interval select means for selecting certain ones of said first set heart beat intervals,
h. second gate means coupled to said first gate means output and to said second heart beat interval select means and having an output coupled to said counter for gating said first pulses occurring during each of said selected first set intervals into said counter;
i. second pulse generating means for providing a series of second electric pulses at a second rate;
j. third gate means coupled to said second pulse generating means and having an output for gating a given number of said second pulses to said output during a predetermined time interval;
k. divider means coupled to said counter and to said third gate means output for dividing said given number of said second pulses by the number of said first pulses occurring during one of said selected first set heart beat intervals to thereby provide an output indicative of the heart beat rate of the living body; and
l. display means coupled to said divider means for displaying the heart beat rate of the living body.

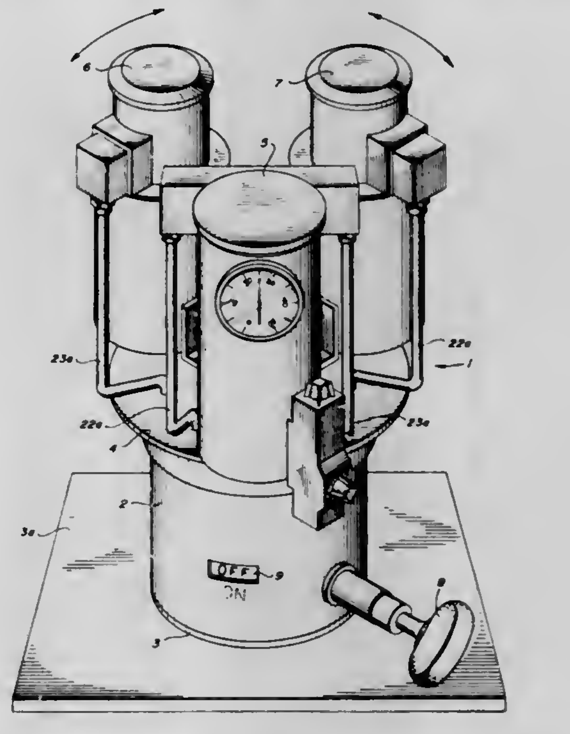
4,058,119
WALKING DEVICE
Craig D. Rosequist, Box 265, Star Route, Mesa, Wash. 99343
Filed Aug. 12, 1976, Ser. No. 706,543
Int. Cl.[2] A61F *3/00*
U.S. Cl. 128—80 R **10 Claims**



1. A walking device comprising:
a standard of such length as to reach from the ground substantially to the wearer's waist,
an elongated knee and shin support extending substantially at right angles to said standard substantially at knee height, of such length as to extend substantially from the knee cap to ankle of the wearer,
at least one strap on said standard above said knee and shin support for encircling the wearer's thigh,
and at least one strap on said knee and shin support horizontally spaced from said standard for encircling the wearer's calf,
said standard comprising:
a thigh piece extending upwardly from said knee and shin support and a support piece extending downwardly from said knee and shin support, said support piece and said thigh piece being joined in a manner such that said support piece is quickly collapsible relative to said thigh piece, while remaining attached thereto, to a position such that when the wearer is seated the support piece does not extend substantially beyond said knee and shin support,
and manually quickly releasable locking means for locking said support piece against collapse.

4,058,120
VAPORIZER CAROUSEL FOR ANESTHESIA MACHINE
Frederick Caparrelli, Locust Valley, N.Y., and Henry Leong, Kendall Park, N.J., assignors to Air Products and Chemicals, Inc., Allentown, Pa.
Filed June 29, 1976, Ser. No. 700,861
Int. Cl.[2] A61M *16/00*
U.S. Cl. 128—188 **14 Claims**

1. An improved anesthesia dispensing machine comprising:
a. a directing block member having a feed port, and an exhaust port including first means for providing fluid communication between an external gas supply and the feed port, and second means for providing fluid communication between the exhaust port and the exterior of the dispensing machine;
b. a turntable having means for mounting a plurality of anesthesia vaporizers thereon, the turntable having a plurality of sets of an inlet port and an outlet port, with each set of an inlet port and an outlet port adapted for communication with the interior of a single vaporizer, said turntable and said block mounted for movement relative to each other;
c. means for effecting rotational and reciprocal movement between the turntable and the directing block member for effecting engagement of the feed port with an inlet port and an outlet port with the exhaust port for a preselected vaporizer;
d. means for sealing said feed port against said inlet port and said exhaust port against said outlet port when engaged;

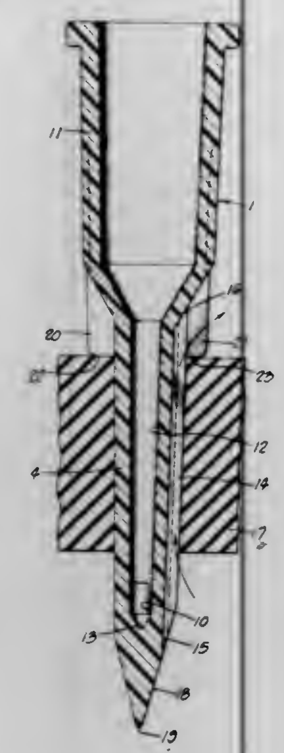


e. valve means in each of said inlet ports, said outlet port, said feed port and said exhaust port, the valve means normally being in a closed position and each of said valve means being separately actuable thus permitting communication through the respective ports when the ports are in sealing engagement with each other;
whereby sealingly engaging a set of inlet and outlet ports with the feed and exhaust ports thus providing communication from an external gas supply to the feedport, through the juxtaposed inlet port, a vaporizer, an outlet port, and through the juxtaposed exhaust port, to the exterior of the dispensing machine.

4,058,121
VENTED NEEDLE FOR MEDICAL LIQUIDS
Pradip Vinobchandra Choksi, Northridge; Donald Leroy Johnston, Arcadia, and Walter Seemayer, Burbank, all of Calif., assignors to American Hospital Supply Corporation, Evanston, Ill.
Filed June 29, 1976, Ser. No. 700,900
Int. Cl.[2] A61M *5/00*
U.S. Cl. 128—221 **13 Claims**

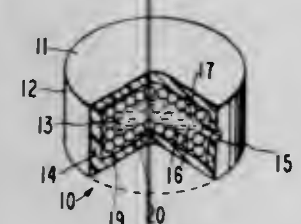
1. A lateral delivery vented needle comprising: a cannula with a closed forward end, a rear end, and a side port adjacent its closed forward end; said cannula having a longitudinal external groove with a forward end adjacent the side port and with a rear end adjacent a rear portion of the cannula; stop means of the cannula preventing a rear portion of the groove from entering a container's resilient stopper; said cannula and stop means forming a unit that has a lateral gas vent means to an exterior of the stop means; and a hub joined to a rear portion of the cannula, whereby the needle can puncture a resilient

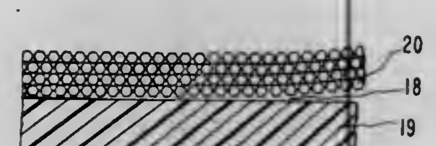
closure of a container, and liquid can be laterally injected into the container through the cannula's side port, while gas within



the container vents around the cannula's closed end to the cannula groove.

4,058,122
OSMOTIC SYSTEM WITH LAMINATED WALL FORMED OF DIFFERENT MATERIALS
Felix Theeuwes, Los Altos, and Atul D. Ayer, Belmont, both of Calif., assignors to Alza Corporation, Palo Alto, Calif.
Continuation of Ser. No. 654,195, Feb. 2, 1976, Pat. No. 4,008,719. This application Dec. 15, 1976, Ser. No. 750,698
The portion of the term of this patent subsequent to Feb. 22, 1994, has been disclaimed.
Int. Cl.² A61M *31/00*
U.S. Cl. 128—260 **15 Claims**

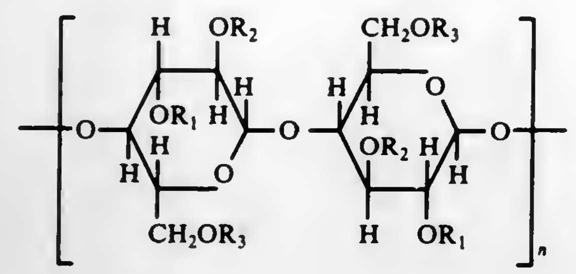




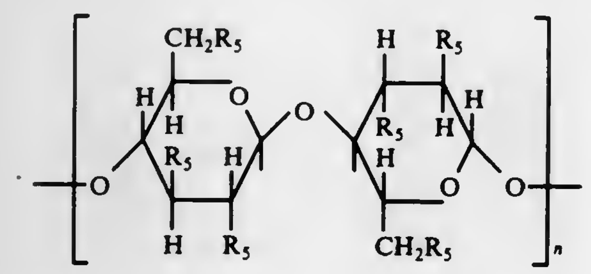
1. An oral osmotic system for dispensing a drug to the gastrointestinal tract of an animal, said system comprising:
a. a shaped, laminated wall having a permeability to fluid expressed by the equation:

$$k = \frac{h}{S\,A}\cdot\frac{Q_p}{t}\cdot\frac{1}{\pi}$$

wherein K is the permeability of the wall to fluid present in the tract, Q_p is the amount of drug delivered from the system in time t, A is the area of the system, h is the thickness of the laminated wall, S is the solubility of drug in fluid imbibed into the system and π is the osmotic pressure of drug in the system, the laminated wall comprising (1) a lamina formed of a semipermeable material that is permeable to the passage of fluid and impermeable to the passage of drug, and which material comprises the formula:



wherein R_1, R_2, and R_3 are independently selected from the group consisting of hydrogen and acyl with at least one of R_1, R_2, and R_3 an acyl group and n is at least 5, said semipermeable material blended with a flux regulator that governs the lamina's permeability to fluid and it is a member selected from the group consisting of a polyhydric alcohol, polyalkylene glycol, poly(α,ω)-alkylenediol, aliphatic diol and an ester of an alkylene glycol, and (2) a lamina that maintains its physical and chemical integrity during the dispensing of drug, the lamina comprising a semipermeable material that is permeable to the passage of drug and impermeable to the passage of drug, said material having the formula:

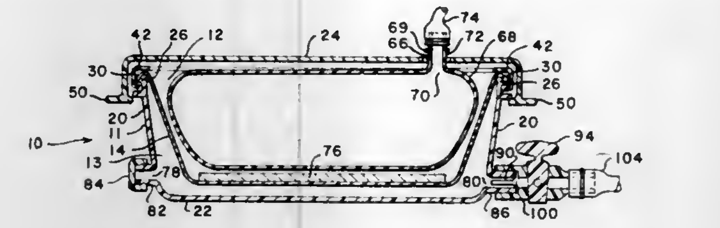


wherein R_5 is a member selected from the group consisting of alkyl, alkoxy, alkylcarbonate, alkylcarbamate, alkylsulfamate and acyloxy, and n is at least 5, said material blended with at least one of a member selected from the group consisting of a flux regulator that governs the permeability of the lamina to fluid and a plasticizer that lowers the second-order phase transition temperature of the lamina forming material;
b. the laminated wall surrounding and forming a compartment containing a drug selected from the group consisting of locally and systemically acting drugs;
c. a passageway in the wall communicating with the compartment and the exterior of the system for dispensing drug from the system; and,
d. wherein in operation when the system is in the gastrointestinal tract, fluid therefrom is imbibed through the laminated wall into the compartment in a tendency towards osmotic equilibrium at a rate determined by the permeability of the laminated wall and the osmotic pressure gradient across the laminated wall, thereby forming a solution containing drug which is dispensed at a controlled rate through the passageway over a prolonged period of time.

4,058,123
COMBINED IRRIGATOR AND EVACUATOR FOR CLOSED WOUNDS
Edwin A. May, Ridgewood, N.J., assignor to International Paper Company, New York, N.Y.
Filed Oct. 1, 1975, Ser. No. 618,482
Int. Cl.² A61F *5/44*
U.S. Cl. 128—278 **19 Claims**

1. A combined irrigator and evacuator for use in bathing a wound with an irrigating solution and removing fluid from the wound, comprising:
a. a rigid housing forming a chamber;
b. means under bias for dividing said chamber into a pressure-irrigating section and a suction-evacuating section,

said bias tending to reduce the volume of said pressure-irrigating section and increase the volume of said suction-evacuating section;
c. seal means for preventing fluid flow between said pressure-irrigating section and said suction-evacuating section;



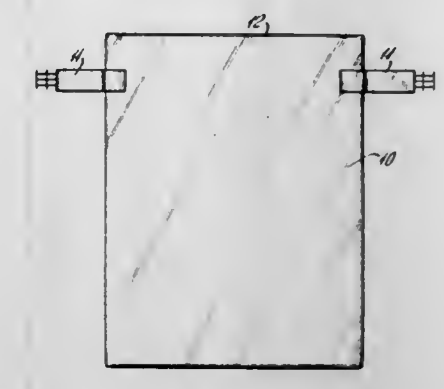
d. access means providing fluid flow access to said sections; and
e. means in said pressure-irrigating section for containing said irrigating solution.

4,058,124
DISPOSABLE ABSORBENT ARTICLES CONTAINING PARTICULATE, FREE-FLOWING, INSOLUBLE SWELLABLE POLYMERS
Steven N. Yen, Highland Mills, and Frederick D. Osterholtz, Warwick, both of N.Y., assignors to Union Carbide Corporation, New York, N.Y.
Division of Ser. No. 303,880, Nov. 6, 1972, Pat. No. 3,900,378, which is a continuation-in-part of Ser. No. 194,511, Nov. 1, 1971, abandoned. This application Mar. 28, 1975, Ser. No. 563,128
Int. Cl.² A61F *13/16, 13/18*
U.S. Cl. 128—284 **5 Claims**

1. A disposable absorbent article containing a mixture prepared by:
a. blending at least one water soluble pulverulent hydrophilic polymer and at least one pulverulent inert filler in a ratio of polymer to filler of from about 1:9 to about 9:1, a substantial portion of said filler having a particle size less than that of said polymer and present in an amount sufficient to cover a substantial portion of the surface area of said pulverulent polymer.
b. thereafter while said blending is continued, contacting said mixture under thorough agitation with a finely divided spray of water at a rate and in an amount not to exceed that at which the mixture is maintained in a free-flowing particulate form, and
c. thereafter exposing said mixture in said free-flowing particulate form to ionizing radiation for a period of time to crosslink said polymer.

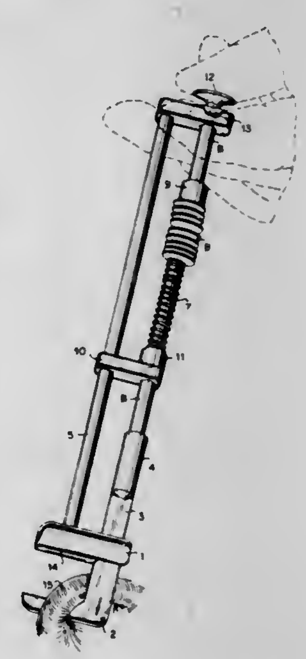
4,058,125
FORCE DISTRIBUTING ADHESIVE TAPE TAB FOR DISPOSABLE DIAPERS
Irving S. Ness, Princeton, N.J., assignor to Johnson & Johnson, New Brunswick, N.J.
Continuation-in-part of Ser. No. 659,313, Feb. 19, 1976. This application June 23, 1976, Ser. No. 699,013
Int. Cl.² A61F *13/16*
U.S. Cl. 128—287 **8 Claims**

1. In a disposable diaper of the type having an inside surface and an outside surface, an improved adhesive tape tab comprising: a tape having a first portion attached to one surface of the diaper and having a second, extendable portion for attachment to another part of the diaper; adhesive material on one surface of the second portion of said tape; a flexible, open-mesh sheet material having a first portion fixedly attached to the adhesive surface of the second portion of said tape, and having a second portion fixedly attached to the surface of the diaper opposite from the surface which said first portion of said tape is attached, whereby during use fastening forces transmitted by the second, extendable portion of said tape are distributed to the



inside and outside surfaces of said diaper through said tape first portion and said open-mesh second portion.

4,058,126
DEVICE FOR THE FRACTURE OF THE BLOOD VESSEL LINING
Harry H. Leveen, 800 Poly Place, Brooklyn, N.Y. 11209
Filed Aug. 2, 1973, Ser. No. 385,075
Int. Cl.² A61B *17/32*
U.S. Cl. 128—305 **3 Claims**



1. A fracture device for the selective fracture of the inner lining of a blood vessel without severing the surrounding outer layer of the vessel which comprises in combination (a) an anvil member 1 having a dull blade affixed thereto supported on a guide arm 5 acting as the superior member of said fracture device and (b) an inferior hammer member 2 having a handle connected to the anvil member said hammer member positioned in register with said anvil member and spring loaded by a spring means positioned between the handle and the guide arm, said anvil and hammer opposingly interconnected by means of a slider arm 3 to work in cooperation whereby a blood vessel interposed therebetween can be partially fractured by a shock imparted to the hammer by a controlled compression of the said spring means and subsequent release of the same causing said hammer to force the blood vessel against the dull blade of the anvil and cutting the inner lining of the same while not cutting the outer layer thereof.

4,058,127

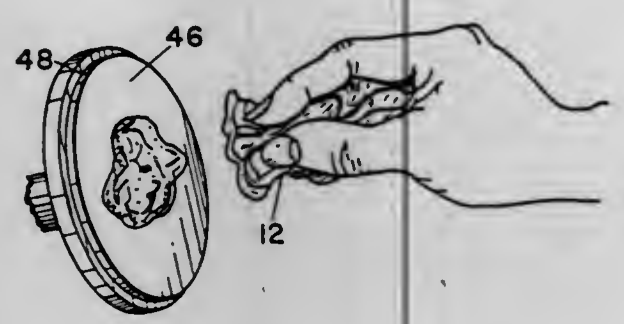
METHOD OF APPLYING VISCOUS FLUID TO A SURFACE

Gilbert Buchalter, 555 Mount Prospect Ave., Newark, N.J. 07104

Division of Ser. No. 416,230, Nov. 15, 1973, Pat. No. 4,002,239. This application Apr. 28, 1976, Ser. No. 681,074

Int. Cl.² A61N *1/04*

U.S. Cl. 128—417 **2 Claims**



1. A method for applying an electrolyte from a cup to a paddle for use on the skin of a patient, said cup being a flexible container having an open face, peripheral edges defining the open face, a layer of bonding agent disposed on said peripheral edges, and a protective cover positioned on said container to close off said open face and being removably secured to said layer of bonding agent, comprising the steps of providing an electrode paddle, providing said cup having a supply of electrolyte therein, removing said protective cover from said cup without removing said layer of bonding agent therefrom, pressing the open face of said cup against the surface of said electrode paddle to removably secure by said bonding agent said container having the electrolyte therein to the surface of said electrode paddle, and when said paddle is ready for use, removing said container from said paddle while squeezing said container to thereby dispense the electrolyte contents thereof onto said paddle, whereby said paddle may then be urged against the skin of a patient until firm and secure contact is made between the paddle and the skin of the patient.

4,058,128

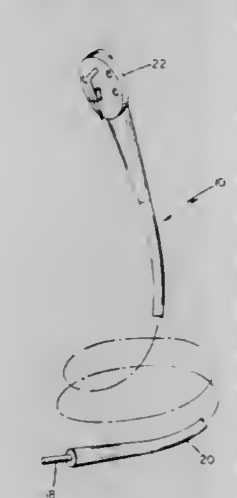
ELECTRODE

Howard A. Frank, 319 Longwood Ave., Boston, Mass. 02115, and Paul M. Zoll, 1101 Beacon St., Brookline, Mass. 02146

Filed Aug. 26, 1976, Ser. No. 718,142

Int. Cl.² A61N *1/04*

U.S. Cl. 128—418 **5 Claims**



1. An electrode comprising a barb element adapted to be inserted into an organ of a mammal, a placement element to slidingly engage said organ during insertion of said barb element, and transversely extending connecting means for connecting a first extremity of said barb element and said placement element and lead means electrically connected to said connecting means for connection to an electrical instrument, said barb element including a longitudinally extending shaft and a barb at a second extremity of said barb element, said barb being sharp in a longitudinal direction away from said first extremity for easy insertion into the body of the mammal and blunt in the opposed longitudinal direction to hold said barb in its inserted position, said placement element providing a substantially fixed placement-defining surface extending longitudinally alongside said barb shaft and being transversely spaced therefrom by said connecting means a predetermined amount to gauge and limit the extent of depth of insertment of said barb and the direction of insertion of said shaft into the body and to hold said barb in position and against rotation in said organ, and said barb element and said connecting means being electrically conductive.

4,058,129

CONTINUOUS PROCESS FOR THE PRODUCTION OF A PASTE WITH ADDITIVES WHICH CAN BE FORMED INTO A SMOKABLE MATERIAL

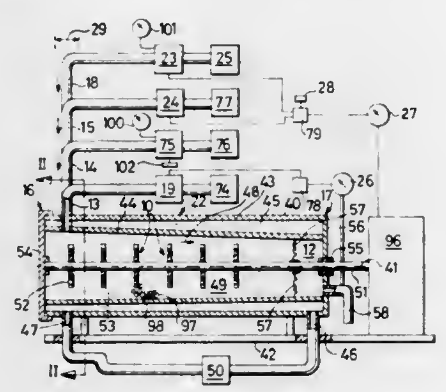
Monique Béringer, Saint Louis, France, and Heinz Spörri, Egg, Switzerland, assignors to Fabriques de Tabac Reunies S.A., Neuchatel, Switzerland

Filed Dec. 8, 1975, Ser. No. 638,951

Claims priority, application Luxembourg, Mar. 27, 1975, 72156; Mar. 27, 1975, 72157

Int. Cl.² A24B *3/14*

U.S. Cl. 131—140 C **6 Claims**



1. A process for the production of a paste which is to be converted into a smokable material, comprising the steps of continuously admitting pulverized plant parts and a liquid into one end of an elongated comminuting chamber at such a rate that the chamber is constantly filled to capacity, said admitting step comprising introducing the plant parts and liquid along separte paths but in close proximity to each other to insure thorough moistening of plant parts immediately after entry into the chamber; stirring the contents of the chamber and simultaneously comminuting the plant parts to thus convert the comminuted plant parts and the liquid into paste; and evacuating the paste at the other end of the chamber.

4,058,130

PIPE-CIGARET

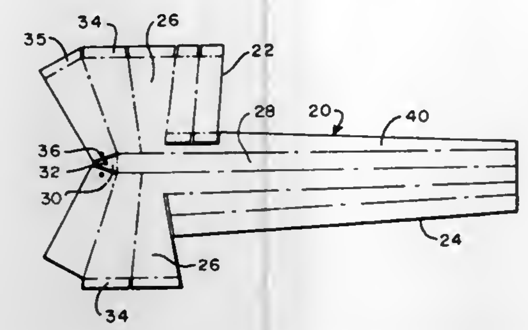
George C. Curtiss, 832 NE. 124th St., North Miami, Fla. 33161

Filed Jan. 8, 1976, Ser. No. 632,731

Int. Cl.² A24F *13/06, 1/22*

U.S. Cl. 131—192 **11 Claims**

1. A pipe-cigaret comprising a substantially T-shaped single sheet of flexible material having an elongated section of a substantially rectangular shape and a shorter and wider section of a substantially rectangular shape extending laterally from an edge at one end thereof, said elongated section having panels foldable and extending the length thereof to form a tubular stem for drawing smoke therethrough to a free tip at the other



end thereof, and said shorter section having panels foldable to form a bowl for filling with tobacco.

4,058,131

IMPROVING HAIR BODY AND MANAGEABILITY WITH DIPERISOPHTHALIC ACID

Richard J. Crawford, Highland Park, and Clarence R. Robbins, Piscataway, both of N.J., assignors to Colgate-Palmolive Company, New York, N.Y.

Continuation of Ser. No. 506,462, Sept. 16, 1974, abandoned, which is a continuation of Ser. No. 219,510, Jan. 20, 1972, abandoned. This application Mar. 11, 1976, Ser. No. 666,378

Int. Cl.² A45D *7/04;* **A61K** *7/06*

U.S. Cl. 132—7 **5 Claims**

1. A method of improving the manageability and body of hair which comprises treating the hair with an effective amount of an aqueous solution having a pH of 8 to 11 and containing about 0.1 to about 10% by weight of diperisophthalic acid for a treatment time, up to one hour, sufficient to improve the manageability and body of the hair while not effecting a change in the color thereof.

4,058,132

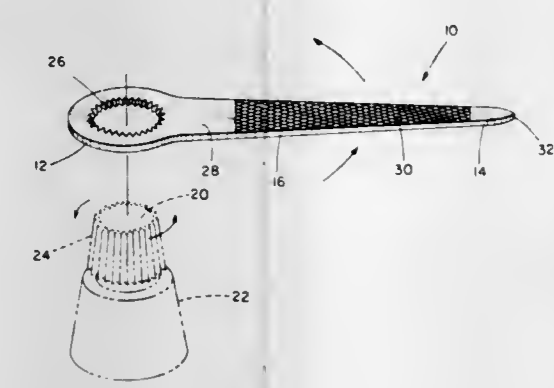
NAIL POLISH BOTTLE OPENER

Frederick P. Dietz, Rte. 2, Box 201, Monee, Ill. 60449, assignor to Charles Jacobus; Josephine Jacobus, both of Chicago; Leroy Wiltgen and Rita Wiltgen, both of Franklin Park, all of, Ill., part interest to each

Filed June 6, 1975, Ser. No. 584,509

Int. Cl.² A45D *29/00*

U.S. Cl. 132—73 **1 Claim**



1. A tool utilized in finger nail care, said tool being substantially planar with opposite substantially flat sides and having a generally, elongate teardrop shape with a wide end portion at one end, a narrow end portion at the opposite end and a mid-portion connecting said end portions, said wide end portion having a generally circular opening therein sized to fit over and between the top and bottom of a conically shaped cap having serrations thereon for a bottle of nail polish, the inwardly facing periphery of said opening having serrations formed thereon which are configured to mate with the serrations on the cap and to grippingly engage the bottle cap whereby said tool can be used as a nail polish bottle opener by first placing the opening over a conically shaped serrated bottle cap, followed by gripping said narrow end portion of said tool and then exerting a torque about the coaxial axes of said opening and the bottle cap, and one side of said tool having a nail file surface formed thereon in the mid-portion and narrow end portion of said tool whereby said tool also can be used as a nail file.

4,058,133

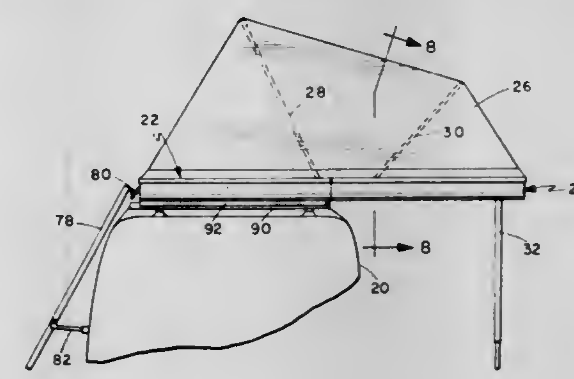
SELF-CONTAINED TENT ASSEMBLY

Dwight L. Barr, 10711 Kariuto Court, San Diego, Calif. 92124, and Leslie A. Barr, 6205 Crystal Lake Ave., San Diego, Calif. 92119

Filed Feb. 4, 1976, Ser. No. 655,210

Int. Cl.² B60D *3/32*

U.S. Cl. 135—4 A **22 Claims**



9. A self-contained tent assembly comprising:

first and second half-shells hinged together at their respective inner ends and capable of folding together in mating relation for defining an enclosure and extendably into aligned relation for defining a planar platform;

a flexible sheet attached to the peripheries of said half-shells, said sheet being shaped and dimensioned to fold within said half-shells when same are mated and for defining an enclosed space above said platform when said half-shells are extended;

support means attached to said half-shells for folding within said half-shells when same are mated and for supporting said sheet above said platform when said half-shells are extended;

said flexible sheet including inclined portion which defines a screened opening, and trough-defining flap means attached to the inside of said flexible sheet along the lower edge of said opening for providing a watershed for draining any water entering the tent assembly through said screened opening.

4,058,134

INTERCEPTOR ACTUATED BY SEISMIC VIBRATIONS

Atsushi Komatsu; Kuichiro Miyazawa, both of Saku; Yoshotomo Yamaura, Yachiho, and Akira Asanuma, Saku, all of Japan, assignors to Kabushiki Kaisha Shinko Seisakusho, Usudama-chi, Japan

Filed Dec. 11, 1975, Ser. No. 639,820

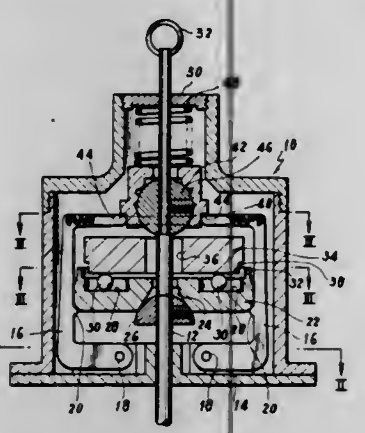
Claims priority, application Japan, Dec. 16, 1974, 49-144317; Dec. 16, 1974, 49-144318; Dec. 16, 1974, 49-144319

Int. Cl.² F16K *17/36*

U.S. Cl. 137—38 **13 Claims**

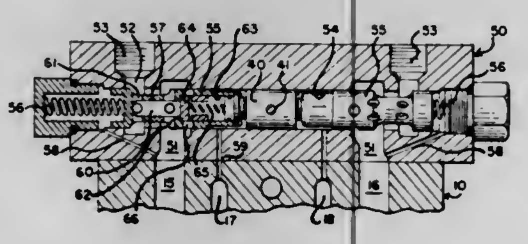
1. Apparatus actuated by seismic vibration comprising a housing, a rod extending vertically through said housing and being vertically movable between upper and lower positions, a spring means acting on said rod for biassing the rod downwardly, a ball mounted on said rod, a keeper member including a central portion rockably engaged with the ball and an outer projecting portion with a step therein, a plurality of stays

pivotably mounted in said housing and disposed around said rod for undergoing inclination relative to the rod, said stays having upper ends engaged in the step of the keeper member to support the rod in the upper position, tension springs mounted on upper portions of the stays and biassing each stay toward the rod, a weight support member fixed to the lower portion of the rod, a first weight having a bore through which the rod passes, said weight being rockably supported by the weight support member and having an outer portion resting on said



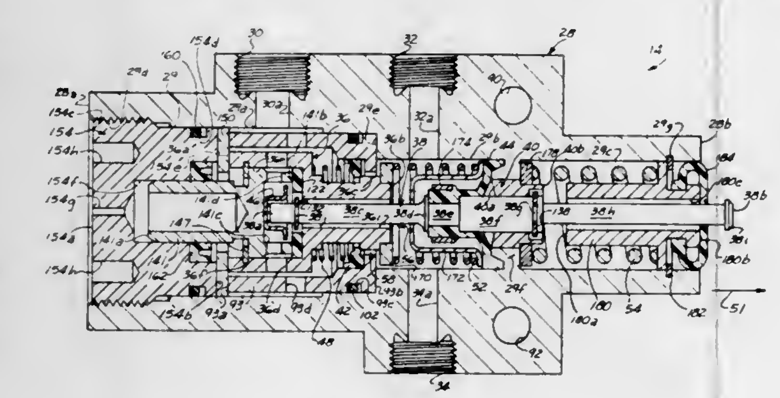
stays to be horizontally maintained thereby, said stays being pivotable outwardly away from the rod by said weight for releasing the engagement of the stays with the keeper member to permit the rod to drop downwardly, and a second weight having a bore through which the rod passes, said second weight being slidably mounted on the first weight so that during vibration it can travel laterally and apply force to said first weight and thereby to said stays to pivot the same away from the rod.

4,058,135
COMPENSATED WORK PORT FLUID VALVES AND WORK PORT COMPENSATORS
John D. Petro, Youngstown, Ohio, assignor to Commercial Shearing, Inc., Youngstown, Ohio
Division of Ser. No. 547,410, Feb. 6, 1975. This application Dec. 16, 1976, Ser. No. 751,203
Int. Cl.² F15B *13/04*
U.S. Cl. 137—106 **4 Claims**



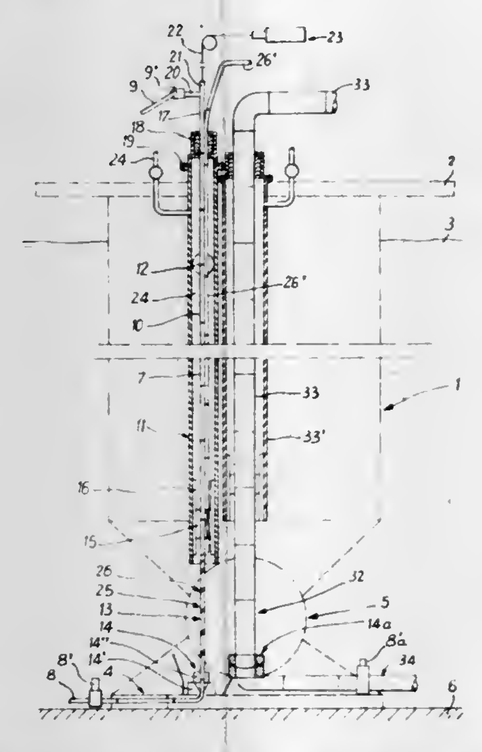
2. A compensated work port fluid valve comprising a directional control valve having a housing with inlet and outlet ports, a bore extending through said housing, a valve member movable in said bore, a first inlet chamber intersecting said bore and connected to the inlet port, a work chamber spaced from said first inlet chamber, an outlet chamber intersecting said bore, said work chamber being adapted to be connected to said first inlet chamber in one position of the valve member and to the outlet chamber in a second position of said valve member, a second bore in said housing, a second inlet chamber intersecting said second bore and connected to said work chamber, a second outlet chamber intersecting said second bore and spaced from said second inlet chamber, a work port connected to said second outlet chamber, a second valve member having an intermediate annular groove is movable in said second bore, resilient bias means urging said second valve member toward the second inlet chamber into a first position in which the second inlet chamber and second outlet chamber are in communication through the annular groove in the second valve member, a first signal passage connecting the second inlet chamber to the second bore at the resilient means whereby pressure fluid in the second inlet chamber supplements the resilient means in urging the second valve member into said first position and a second signal passage connecting the first inlet chamber with said second bore at the end opposite the resilient means whereby pressure fluid in the first inlet chamber acts on the end of the second valve member opposite the resilient means to urge the second valve member toward the second outlet chamber to reduce the flow of fluid around the groove in the second valve member whereby said second valve member is moved in the second bore in response to pressure differential between the first inlet chamber and the second inlet chamber to maintain a substantially constant pressure at the work port, relief check valve means connecting said second inlet and second outlet chambers, said relief check valve means is formed by an axial bore in the second valve member having spaced radial connections through the valve member side wall and resilient biased valve means in said axial bore between said spaced radial passages adapted to open when the pressure in said second outlet chamber exceeds a preselected value.

4,058,136
PRESSURE DISTRIBUTION VALVE
Edward J. Falk, St. Louis County, Mo., assignor to Wagner Electric Corporation, Parsippany, N.J.
Filed Oct. 15, 1976, Ser. No. 732,803
Int. Cl.² G05D *11/03*
U.S. Cl. 137—110 **8 Claims**



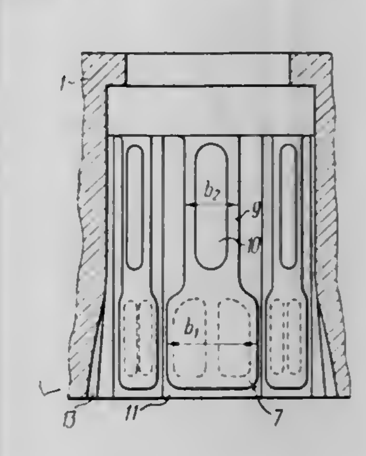
1. A pressure distribution valve comprising:
a. a body;
b. inlet means for supplying fluid pressure to said body;
c. outlet means for receiving fluid pressure from said body;
d. first means for providing open fluid communication between said inlet means and said outlet means during the occurrence of fluid pressure between zero and a first predetermined fluid pressure at said inlet means;
e. means for substantially blocking fluid communication between said inlet means and said outlet means during the occurrence of fluid pressure between said first predetermined fluid pressure and a second predetermined fluid pressure, said second predetermined fluid pressure being higher than said first predetermined fluid pressure;
f. first means for metering fluid pressure from said inlet means to said outlet means in a first ratio when the fluid pressure at said inlet means is between said second predetermined fluid pressure and a third predetermined fluid pressure, said third predetermined fluid pressure being higher than said second predetermined fluid pressure;
g. second means for metering fluid pressure from said inlet means to said outlet means in a second ratio when the fluid pressure at said inlet means is between said third predetermined fluid pressure and a fourth predetermined fluid pressure, said fourth predetermined pressure being higher than said third predetermined fluid pressure;
h. third means for metering fluid pressure from said inlet means to said outlet means in a third ratio to the fluid pressure at said inlet means during the occurrence of fluid pressures at said inlet means between said fourth fluid pressure and a fifth fluid pressure, said fifth fluid pressure being greater than said fourth fluid pressure;
i. said third ratio being greater than said second ratio and said second ratio being greater than said first ratio; and
j. second means for providing open fluid communication between said inlet means and said outlet means when the fluid pressure at said inlet means is greater than said fifth fluid pressure.

4,058,137
RISER PIPE FOR PIVOTALLY ATTACHED STRUCTURE USED TO EXTRACT PETROLEUM FROM BENEATH A BODY OF WATER
Jacques de Saint Palais; Paul Laffont, both of Pau, and Jean Mourlevat, Cazeres, all of France, assignors to Societe Nationale Elf Aquitaine (Production), Courbevoie, France
Filed Apr. 9, 1976, Ser. No. 675,556
Claims priority, application France, Apr. 14, 1975, 75.11505
Int. Cl.² E02D *21/00*
U.S. Cl. 137—236 S **11 Claims**



1. In apparatus for extracting petroleum from beneath a body of water, which apparatus comprises a base at the bottom of said body of water, a base pipe carried by said base, an elongated structure pivotally attached at its lower end to said base by means of a universal joint and projecting above the surface of said body of water, a hollow guide shaft fixed to said structure and extending downward from above said surface toward said base, a plug closing the top of said guide shaft, a pipe within said guide shaft made from a plurality of successive pipe sections, one of which is lowermost, and at least one elastic centering device which centers said pipe in said guide shaft and comprises means providing communication between the spaces between said pipe and shaft above and below said centering means,
the improvement which comprises:
a remotely controlled releasable connector occupying a stationary position and comprising a first part fixed to said lowermost pipe section and a second part fixed to said base pipe,
a slidable connector connecting said lowermost pipe section to the one above it, and
a cylindrical sleeve in said guide shaft within which said slidable connector is slidable,
said sleeve having an inner diameter slightly less than that of the remainder of said guide shaft, said slidable connector comprising means providing communication between the spaces below said pipe and guide shaft above and below said connector, and the part of said releasable connector fixed to the lowermost section of said pipe having an external diameter less than the internal diameter of said sleeve.

4,058,138
STRAIGHTWAY VALVE
Evgeny Vasilievich Viktorov, ulitsa Tambovskaya, 8, kv. 12; Igor Ivanovich Novikov, ulitsa Bela-Kuna, 22, korpus 1, kv. 31; Tatyana Fedorovna Kondratieva, Sytninskaya ploschad, 3, kv. 16; Georgy Vasilievich Gubarev, prospekt Veteranov, 55, kv. 240; Margarita Sergeevna Yamschikova, Nevsky prospekt, 147, kv. 56, all of Leningrad; Vasily Dmitrievich Vasiliev, ulitsa Gorkogo, 45, kv. 7, Sumy; Georgy Mikhailovich Kontsevich, prospekt K. Marxa, 1, kv. 12, Sumy; Anatoly Sergeevich Gubinsky, prospekt K.Marxa, 23, kv. 55, Sumy; Anatoly Alexeevich Velikasov, ulitsa Novomestenskaya, 25, kv. 18, Sumy; Vladimir Ignatievich Taradonov, ulitsa Gazety "Pravda", 34, kv. 78, Sumy, and Valery Pavlovich Isakov, prospekt Metallistov, 80, korpus 3, kv. 251, Leningrad, all of U.S.S.R.
Filed Aug. 12, 1975, Ser. No. 604,078
Int. Cl.² F16K *15/14*
U.S. Cl. 137—512.1 **3 Claims**

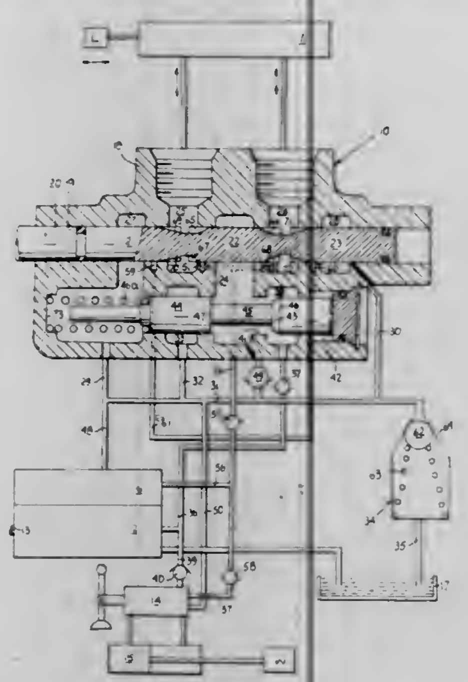


1. A straightway valve including an inlet and an outlet for a working fluid, and comprising: a body with an internal polyhedral surface; at least one through hole in said body; a sleeve installed coaxially in said hole and secured to said body at the side of said inlet, said sleeve having an external polyhedral surface, defining an inner space, and being installed so as to form a passage between said external surface of the sleeve and said internal surface of the body; ports on the side surface of said sleeve for communicating said inner space with said passage; additional channels for said outlet of the working medium at places of intersection of edges made in said body hole at the level of said ports; flexible plates cantilevered between said body and said sleeve; said plates having port-closing and resilient portions; said plates closing said ports and having a variable width decreasing towards the points of plate fastening to said sleeve so that the ratio of the widths of said port-closing portions to that of said resilient portions is 8:1.1.

4,058,139
LOAD RESPONSIVE FLUID CONTROL VALVES
Tadeusz Budzich, 80 Murwood Drive, Moreland Hills, Ohio 44022
Continuation-in-part of Ser. No. 522,324, Nov. 8, 1974, Pat. No. 3,998,134, and a continuation-in-part of Ser. No. 559,818, March 19, 1975, Pat. No. 3,984,979, and a continuation-in-part of Ser. No. 655,561, Feb. 5, 1976. This application July 27, 1976, Ser. No. 709,202
Int. Cl.² F15B *13/08*
U.S. Cl. 137—596.13 **12 Claims**

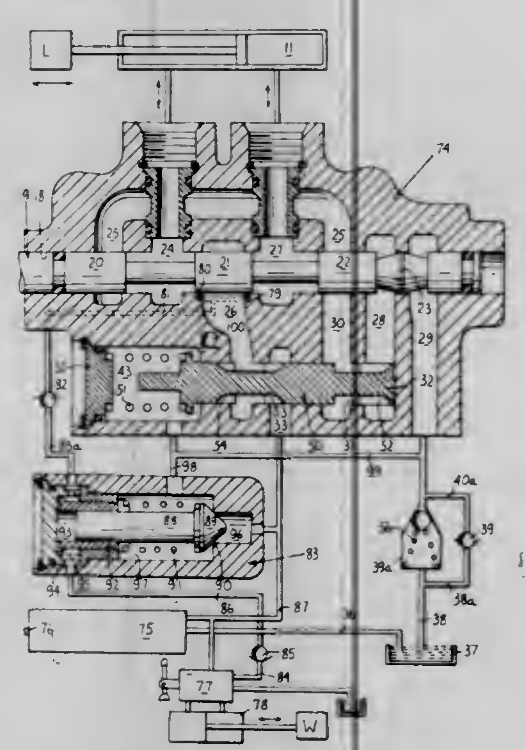
12. A valve assembly supplied with pressure fluid by a pump comprising a housing having a fluid inlet chamber, a fluid supply chamber, first and second load chambers, and fluid exhaust means, first valve means for selectively interconnecting said fluid load chambers with said fluid supply chamber and said fluid exhaust means, variable fluid metering orifice means responsive to movement of said first valve means be-

tween said load chambers and said exhaust means, second valve means having throttling means and isolating means between said inlet chamber and said supply chamber operable to throttle by said throttling means fluid flow from said inlet chamber to said supply chamber to maintain a relatively constant low pressure level in one of said load chambers connected to said exhaust means by said first valve means and to isolate by



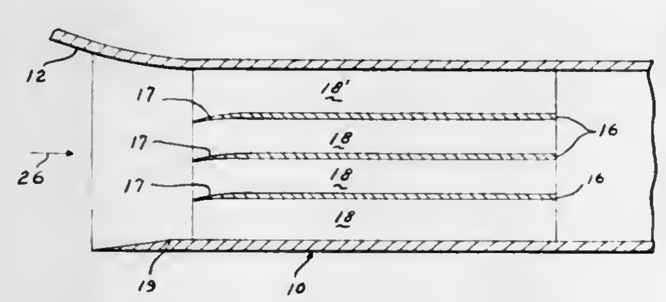
said isolating means said inlet chamber from said supply chamber when pressure in one of said load chambers connected to said exhaust means by said first valve means exceeds said relatively constant low pressure level, and connecting means to connect said supply chamber with said exhaust means when said isolating means isolates said inlet chamber from said supply chamber.

4,058,140
LOAD RESPONSIVE FLUID CONTROL VALVES
Tadeusz Budzich, 80 Murwood Drive, Moreland Hills, Ohio 44022
Continuation of Ser. No. 559,818, March 19, 1975, Pat. No. 3,984,979. This application Aug. 25, 1976, Ser. No. 717,758
The portion of the term of this patent subsequent to Oct. 12, 1993, has been disclaimed.
Int. Cl.² F15B *13/08*
U.S. Cl. 137—596.13 **17 Claims**



1. A valve assembly comprising a housing having a fluid inlet chamber, a fluid supply chamber, first and second fluid load chambers, a fluid outlet chamber, and fluid exhaust means, first valve means for selectively interconnecting said fluid load chambers with said fluid supply chamber and said fluid outlet chamber, variable fluid metering orifice means responsive to movement of said first valve means between said outlet chamber and said exhaust means, second valve means responsive to pressure upstream of said variable orifice means having positive load throttling means and isolating means between said inlet chamber and said supply chamber, said positive load throttling means operable to maintain pressure upstream of said variable orifice means at a low relatively constant preselected pressure level when one of said load chambers is connected to said outlet chamber by said first valve means and said load chamber is subjected to pressure not higher than said low relatively constant preselected pressure level, said isolating means operable to isolate said inlet chamber from said supply chamber when one of said load chambers is connected to said outlet chamber by said first valve means and said load chamber is subjected to pressure higher than said low relatively constant preselected pressure level, and fluid replenishing means operable to interconnect for fluid flow said supply chamber and said exhaust means when said isolating means isolates said inlet chamber from said supply chamber.

4,058,141
SUPERSONIC FLOW DIFFUSER WITH ENERGY REDISTRIBUTION
Siegfried H. Hasinger, and David K. Miller, both of Dayton, Ohio, assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.
Continuation-in-part of Ser. No. 606,378, Aug. 20, 1975, abandoned. This application July 19, 1976, Ser. No. 706,320
Int. Cl.² F15D *1/06;* **B64D** *33/02*
U.S. Cl. 138—39 **6 Claims**

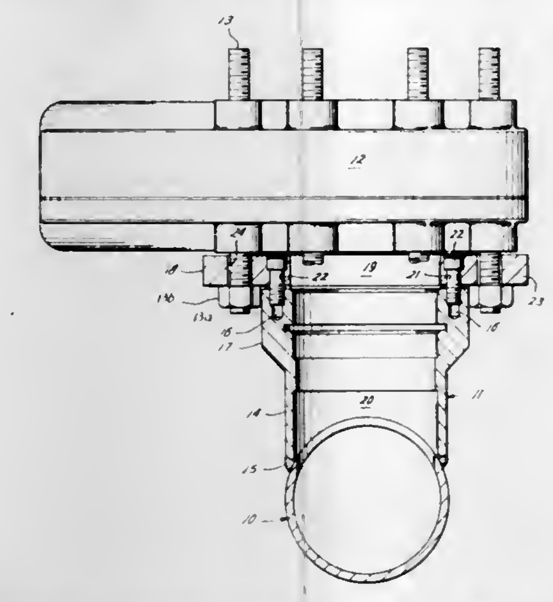


1. A supersonic diffuser, comprising: at least four walls forming a non-axisymmetric diffuser flow channel; means forming a converging inlet and throat section in said channel; a wall extending forward of the flow channel and forming a continuous surface together with one wall of said flow channel; whereby in response to a flow of air along said continuous surface and into the diffuser flow channel a boundary layer forms along the wall extending forward of the flow channel and enters the diffuser flow channel; a plurality of blade members positioned within the diffuser channel downstream of the throat section; said blade members dividing the flow channel into a plurality of flow ducts which are substantially symmetrical around their own axis; means, on at least a portion of said plurality of blade members, for redirecting the flow in the diffuser channel in a direction toward the wall of said flow channel, which forms the continuous surface with the wall which extends forward of the flow channel.

4,058,142
PIPELINE FITTING
William J. Rankin, Tulsa, Okla., assignor to T. D. Williamson, Inc., Tulsa, Okla.
Filed May 4, 1976, Ser. No. 683,059
Int. Cl.² F16L *55/10*
U.S. Cl. 138—89 **4 Claims**

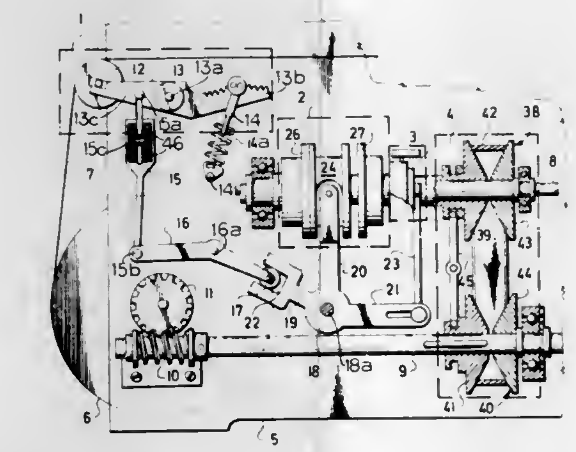
1. A side outlet fitting for a pipeline comprising a tubular

member having one end adapted to be attached to a pipeline to surround an opening therein and having another end with a plurality of threaded holes extending longitudinally thereinto with the holes terminating within said another end, said holes being arranged in a bolt circle of a first radius; an adapter plate extending across said another end and having (i) a central opening in alignment with the opening through the tubular member and of substantially the same size, (ii) unthreaded holes therethrough in respective register with said threaded



holes and each having a counterbored portion, (iii) an annular portion extending radially outwardly of the tubular member and (iv) a plurality of bolt holes through the annular portion with the bolt holes being arranged in a bolt circle of a second radius which is sufficiently larger than the first radius so that nuts can be screwed onto bolts extending through said bolt holes without interference with said tubular housing; and a capscrew threaded into each of said holes with its head within said counterbored portion.

4,058,143
CONSTANT TENSION REGULATOR OF POSITIVELY UNWOUND FLEXIBLE MATERIAL, PARTICULARLY WARP THREADS IN WEAVING MACHINES
Jindrich Henzl; Jindrich Cerny, and Jaromir Malasek, all of Brno, Czechoslovakia, assignors to Vyzkumny a vyvojovy ustav Zavodu vseobecneho strojirenstvi, Brno, Czechoslovakia
Filed Apr. 22, 1976, Ser. No. 679,376
Claims priority, application Czechoslovakia, Apr. 22, 1975, 2775/75
Int. Cl.² D03D *49/06*
U.S. Cl. 139—110 **8 Claims**



1. A constant tension regulator for controlling the tension of positively unwound flexible material such as warp threads, comprising in combination,

a support frame,

a warp beam rotatably supported in said frame and adapted to unwind a plurality of warp threads therefrom,

sensing means contacting said plurality of unwinding warp threads to thereby sense the variations in tension in said threads, a change in tension in said threads causing a change of position of at least a portion of said sensing means;

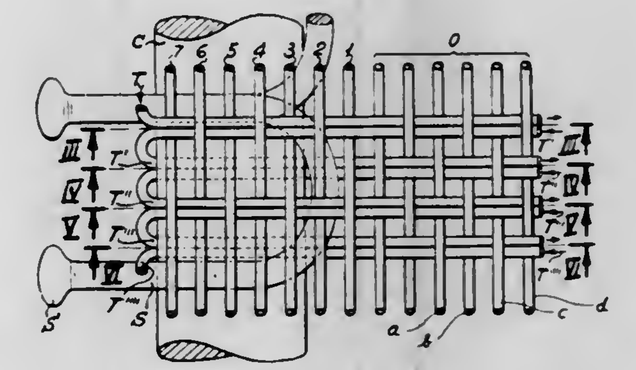
an integrating unit operatively mounted in said frame and adapted to effect a first output corresponding to said change of position of said sensing means;

a proportional adjusting unit operatively mounted in said frame and adapted to effect a second output corresponding to said change of position of said sensing means;

means operatively connecting said integrating unit and proportional adjusting unit to said sensing means, said integrating unit and proportional adjusting unit having common means for adding said first and second outputs; and

a control member operatively connected, on the one hand, to said warp beam, and, on the other hand, to said common means to thereby adjust the unwinding speed of said warp beam in accordance with the tension sensed in said threads.

4,058,144
TAPE-SUPPORTED SLIDE-FASTENER ELEMENT
Ruggero Dal Negro, Milan, Italy, assignor to Italo Americana Prentice S.p.A., Milan, Italy
Continuation-in-part of Ser. No. 21,778, March 23, 1970. This application Nov. 24, 1971, Ser. No. 201,738
Claims priority, application Italy, Mar. 21, 1969, 14395/69; Dec. 12, 1969, 25704/69
Int. Cl.² A44B *19/04*
U.S. Cl. 139—384 B **5 Claims**



1. In a slide fastener, in combination, a pair of slide-fastener halves and a slider of substantially elliptical cross-section, each slide-fastener half comprising:

a fastener element in the shape of a continuous coil with spaced-apart turns of generally elliptical configuration;

a core extending longitudinally of said coil through said turns;

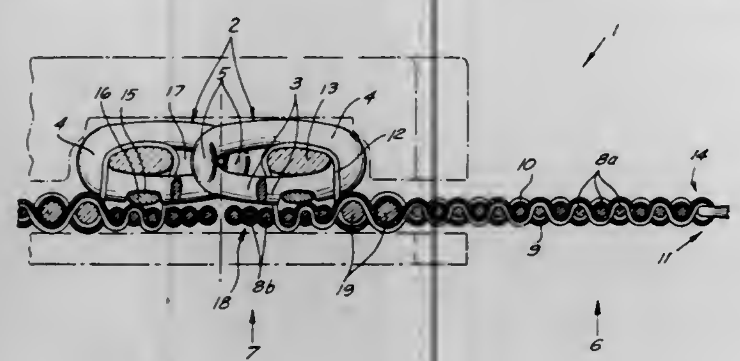
a set of main warp threads parallel to said core disposed alongside said coil in a median plane thereof;

a set of ancillary warp threads parallel to said core partly enshrouding said coil and resting on the turns thereof on the side adjacent said main warp threads, in an array diverging from said median plane above and below the coil, the spacing of said ancillary warp threads from said median plane increasing progressively to an intermediate zone of the coil remote from said main warp threads; and

weft-thread means interwoven with all said warp threads to form a stringer tape, said weft-thread means passing around said core at said intermediate zone on the side remote from said warp threads to anchor said core to said stringer tape;

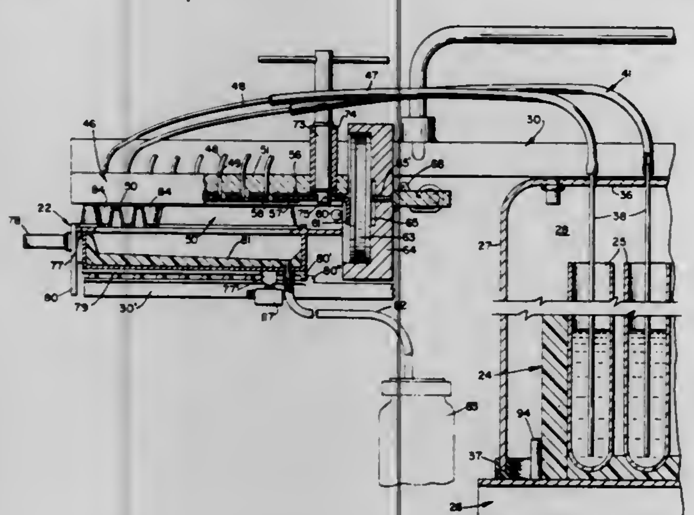
said slider straddling the coils of said slide-fastener halves while bracketing said ancillary warp threads, said slider bearing upon the coils of said fastener halves by way of at least the majority of said ancillary warp threads.

4,058,145
SLIDE FASTENER
Alfons Fröhlich, Essen; Julius Dahlmann, Sprockhovel, and Günter Volter, Wuppertal, all of Germany, assignors to Opti Patent-, Forschungs- und Fabrikations AG, Glarus, Switzerland
Filed July 15, 1976, Ser. No. 705,440
Int. Cl.² A44B *19/42*
U.S. Cl. 139—384 B **4 Claims**



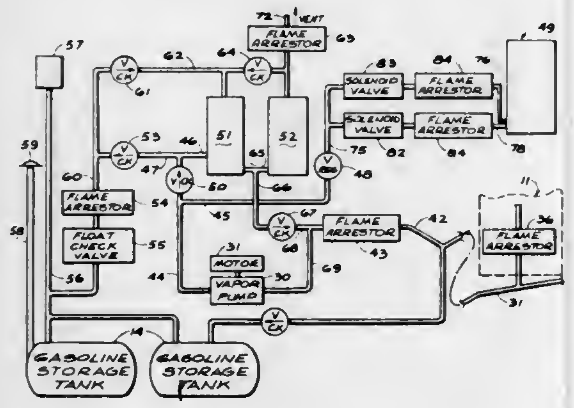
1. A slide-fastener stringer having a pair of stringer halves, each of said stringer halves including a respective support tape and a continuous coupling element mounted on said support tape, said support tape comprising a sewing strip and a facing strip adjacent said sewing strip, both of said strips being formed with warp threads, said support tape having a ground weft thread extending the full width of said tape and interwoven with said warp threads, and a binding weft thread extending the width of said sewing strip and securing said coupling element to said support tape with reverse loops, said coupling element having a succession of coupling heads adapted to interdigitate with an opposing similar coupling element, and limbs connected to said heads and resting against said support tape, said limbs being formed with transverse grooves aligned generally longitudinally of the coupling element, and an insertion thread received in said grooves and woven as a warp thread into said support tape, said coupling element being a helical turn coupling element, said stringer comprising a textile filler cord received in said coupling element and spaced away from the heads thereof, said grooves being disposed substantially centrally beneath said filler cord.

4,058,146
METHOD AND APPARATUS FOR TRANSFERRING LIQUID
Paul Stuart Citrin, Danbury, Conn., assignor to Dynatech Laboratories Incorporated, Alexandria, Va.
Filed July 11, 1975, Ser. No. 595,005
Int. Cl.² B65B *3/04*
U.S. Cl. 141—1 **23 Claims**



1. A method of transferring identical small quantities of liquid from each of a multiplicity of individual supply containers arranged in predetermined relative locations to a corresponding multiplicity of closely spaced receptacles arranged in the same relative locations, with random spacing between the various associated pairs of receptacles and relatively located containers, which comprises the steps of establishing separate continuous passage direct fluid communications between each container and its associated receptacle, and simultaneously forcing liquid from each container into its associated receptacle for a predetermined time while relatively controlling the flow in each passage so that during said predetermined time the same measured amount of liquid is dispensed from each passage into each receptacle.

4,058,147
FLAMMABLE VAPOR RECOVERY SYSTEM
Marvin L. Stary; Edward L. Brown, both of Claremont, and Eric L. Pridonoff, Pasadena, all of Calif., assignors to Clean Air Engineering, Inc., Anaheim, Calif.
Filed Sept. 12, 1975, Ser. No. 612,781
Int. Cl.² B65B *31/06*
U.S. Cl. 141—45 **15 Claims**

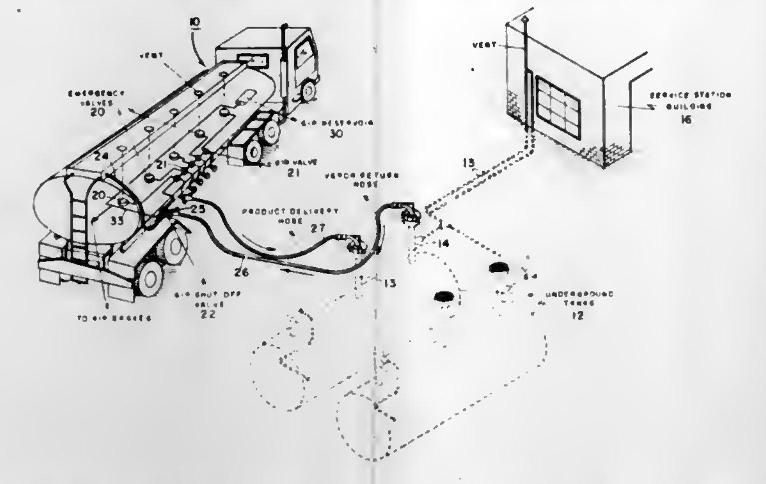


1. Apparatus comprising:
a liquid dispensing system including tank means for holding a flammable liquid, hose means for dispensing said liquid, and discharge nozzle means on said hose means;
means for collecting flammable vapors of said liquid, with varying B.T.U. content, from said dispensing system and including collection line means for withdrawing vapors from the vicinity of said nozzle means during a dispensing operation;
two burners connected to said vapor collecting means to receive therefrom and burn collected vapors of varying B.T.U. content, said two burners having different burning characteristics for burning vapors of different high and low B.T.U. contents respectively; and
automatic control means operable to burn said collected vapors in a first of said burners but not the second when said vapors are of a first B.T.U. content, and responsive automatically to a change in B.T.U. content of said collected vapors to burn said collected vapors when of a second B.T.U. content in said second burner.

4,058,148
VAPOR HOSE HOOKUP ASSURANCE
Gordon C. Potter, Houston, Tex., assignor to Exxon Research & Engineering Co., Linden, N.J.
Filed Mar. 18, 1976, Ser. No. 668,549
Int. Cl.² B65B *3/26*
U.S. Cl. 141—198 **2 Claims**

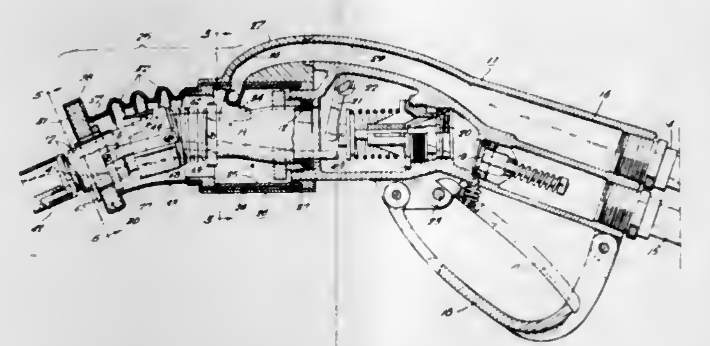
1. Apparatus to assure proper vapor hose hookup in the transfer of a volatile liquid from a truck tank to a storage tank comprising:
a dump valve on said truck tank;
a fill pipe on said storage tank;
a delivery hose for connecting said dump valve and said fill pipe;
a vapor line on said truck tank;
a vapor line on said storage tank;

a vapor return hose for connecting said truck tank vapor line and said storage tank vapor line;
control means connected to said dump valve capable of being actuated to open and close said dump valve; and



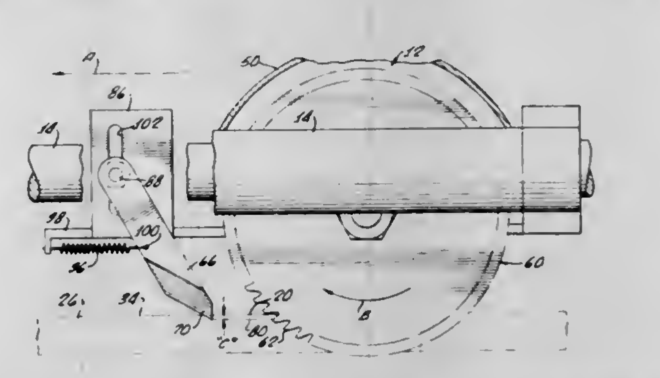
vacuum sensor means connected to said truck tank vapor line and to said control means for actuating said control means to close said dump valve when a predetermined vacuum occurs in said truck tank vapor line.

4,058,149
ATTITUDE VALVE FOR A GASOLINE DISPENSING NOZZLE WITH A VAPOR RECEIVING SYSTEM
William B. Hansel, Media, Pa., assignor to Sun Oil Company of Pennsylvania, Philadelphia, Pa.
Filed Sept. 2, 1975, Ser. No. 609,761
Int. Cl.² B65B *31/06*
U.S. Cl. 141—301 **12 Claims**



1. A liquid fuel dispensing nozzle having a vapor receiving system for receiving vapors displaced from a motor vehicle fuel tank when being filled by insertion of the discharge spout of the nozzle into the fillpipe of the fuel tank, and having an attitude valve which, when in a closed position, prevents the flow of vapors from the storage tanks, through a vapor return line and the vapor receiving system, into the atmosphere when the nozzle is not in use and placed in its rest position, and wherein the attitude valve obtains an open position when the nozzle is in position for dispensing, said nozzle comprising:
a. a nozzle housing;
b. a discharge spout connected to the nozzle housing for insertion into a fillpipe of a fuel tank;
c. a vapor receiving system surrounding the discharge spout;
d. an attitude valve having a valve housing secured in fixed relation to the nozzle, and having a movable valve member located in said valve housing, wherein said valve housing includes:
i. a first port,
ii. a second port,
iii. means for utilizing the pressure at the first port which is greater than the pressure at the second port during operation of the nozzle to maintain the movable member in its closed position wherein the attitude valve is in a closed position, said means including a valve seat in fluid communication with the first and second ports, said valve seat being located within the valve housing so that when the nozzle is placed in its rest position, the movable valve member becomes seated on the valve seat by the force of gravity, between the valve seat and the first port, and any fluid pressure at the first port which is greater than the fluid pressure at the second port causes the movable valve member to be urged against the valve seat, and
iv. means, responsive to the nozzle being placed in its dispensing position, for receiving the movable valve member, so that the movable valve member is unseated from the valve seat and fluid flow from the second port to the first port, through the valve seat, can take place;
e. means for providing fluid communication between the vapor return line and the first port of the attitude valve; and
f. means for providing fluid communication between the second port of the attitude valve and the vapor receiving system.

4,058,150
WOOD CUTTING APPARATUS
Charles A. Pennington, 2910 E. Virginia, Apt. 17, West Covina, Calif. 91791
Filed Mar. 9, 1976, Ser. No. 665,246
Int. Cl.² B27C *9/00*
U.S. Cl. 144—1 R **15 Claims**

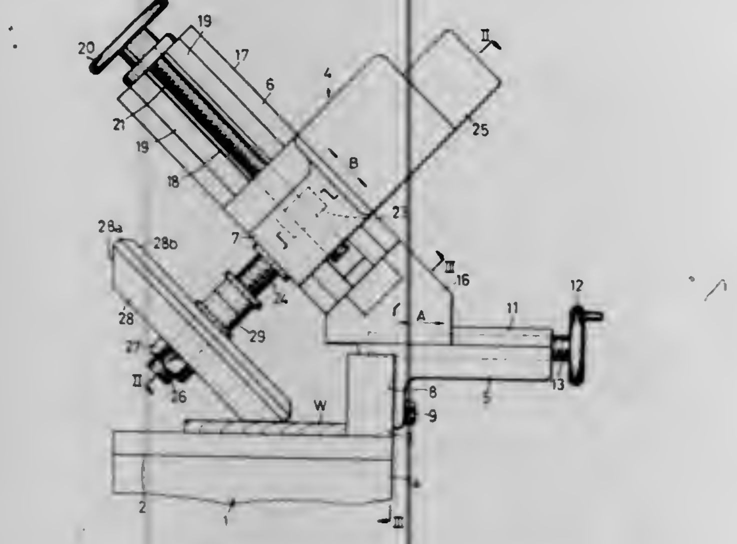


1. Portable apparatus for cutting wood, said apparatus being movable over a workpiece as a unit, comprising, in combination:
a saw having a toothed blade and a motor coupled in operative relationship therewith;
a scarfing blade having a knife cutting edge thereon; and,
means for supporting the scarfing blade at a position spaced in advance of the saw blade along the projected cutting path thereof, with the knife cutting edge being disposed approximately in alignment with one edge of the projected cut of the saw blade,
whereby the scarfing blade is adapted for making a smooth advance knife surface cut in the wood along one edge of the projected cutting path of the saw blade.

4,058,151
AUTOMATIC LUMBER FEEDING DEVICE IN COMBINATION WITH A WOOD WORKING MACHINE
Nobuya Yonezu, Nagoya, Japan, assignor to Minami Kogyo Kabushiki Kaisha, Inuyama, Japan
Filed Oct. 4, 1976, Ser. No. 728,891
Claims priority, application Japan, Oct. 3, 1975, 50-135807[U]
Int. Cl.² B27B *31/00;* **B27C** *1/12*
U.S. Cl. 144—246 E **2 Claims**

1. A lumber feeding device to be used in combination with a wood working machine having a table on which lumber to be worked is placed; a ruler member provided on said table, said ruler member having an operative surface thereon which is vertically disposed, said device having a fixed bracket adapted to be secured to said ruler member of said wood working machine, said fixed bracket consisting of a pair of dovetails in parallel on the upper surface thereof, a central groove longitudinally extended between said dovetails and a threaded shaft rotatably supported within said groove which is rotated by

turning a handle provided to the outer end thereof, a moveable bracket consisting of a reciprocating member having two dovetail grooves which engage, respectively, with said dovetails of said fixed bracket, said reciprocating member having a boss into which said threaded shaft is engaged, a strut piece secured to said reciprocating member in an inclined condition in respect to said fixed bracket, said strut piece being longitudinally provided with a groove and a pair of dovetails in parallel on both sides of said strut piece groove, a second threaded shaft rotatably supported within said strut piece groove, a



roller shaft head arranged to be at right angles to and reciprocally movable along said strut piece, said roller shaft head being provided with two dovetail grooves which engage, respectively, with said dovetails of said strut piece, said roller shaft head having a boss into which said second threaded shaft is engaged, a roller shaft rotatably supported by said roller shaft head, and a feed roller attached to said roller shaft, whereby said feed roller can press at least one surface of said lumber and feed the same along the operative surface of said ruler member.

4,058,152
AUTOMOBILE SAFETY TIRES

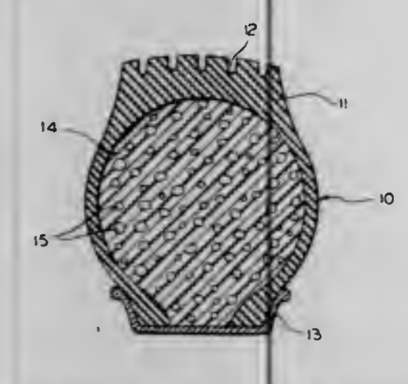
Gilbert Beck, Ludwigshafen; Ludwig Zuern, Bad Duerkheim, and Erhard Stahnecker, Ziegelhausen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Continuation of Ser. No. 487,234, July 10, 1974, abandoned. This application May 13, 1976, Ser. No. 685,976

Claims priority, application Germany, July 12, 1973, 2335481

Int. Cl.² B60C *17/00*

U.S. Cl. 152—310 **4 Claims**



1. A safety tire and wheel assembly including: an outer wheel rim; a tubeless tire seated about said rim; and substantially closed-cell, foamed, discrete particles of a partially crystalline polymer of an olefin of from 2 to 6 carbon atoms filling the space between said rim and the interior walls of said tire, said discrete particles having a final diameter of from 3 to 40 mm and a bulk density of from 10 to 100 g/1, said tire being under a gas pressure of from 0.1 to 5 atmospheres gage, said discrete particles further having a reduced size when initially placed within the tire and expanding thereafter under said gas pressure in said tire.

4,058,153
PROCESS FOR CENTRIFUGALLY CASTING SPHEROIDAL GRAPHITE CAST IRON PIPES

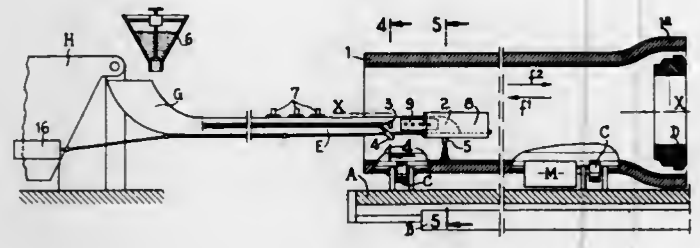
Michel Pierrel, Pont-A-Mousson, France, assignor to Pont-A-Mousson S.A., Nancy, France

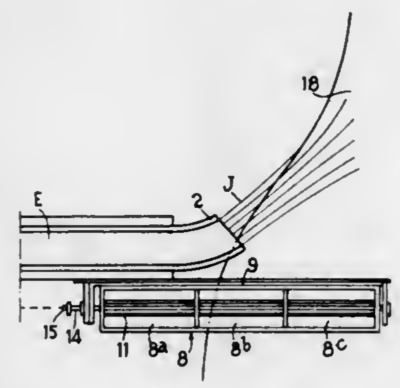
Filed June 17, 1975, Ser. No. 587,564

Claims priority, application France, July 18, 1974, 74.24980

Int. Cl.² B22D *27/20, 13/02*

U.S. Cl. 164—58 **2 Claims**





2. A process for manufacturing spheroidal graphite cast iron by centrifugal casting in a rotary mould, comprising coating the inner surface of the mould with a mixture of silica and bentonite in suspension in water and a thin layer of a powdered inoculating product, pouring liquid iron into the mould from a pouring channel to form a tubular layer of liquid iron in the mould, pouring granular particles of a material having a high heat of fusion on a front of the liquid iron poured into the mould on a length which substantially corresponds to the length of said front and outside the stream of liquid iron issuing from the pouring channel, so as to increase the rate of the cooling of the liquid iron in the form of a tubular layer in the mould, from a zone of the layer spaced from the mould to the free inner surface of the tubular layer while slowing down the cooling of the liquid in the vicinity of the surface of the mould, said particles being poured in accordance with amounts which decrease along the front of liquid iron when the thickness of the liquid iron defined by said front increases.

4,058,154
GUIDING AND SUPPORTING MEANS FOR CONTINUOUSLY CAST METAL STRAND

Hans Streubel, Dusseldorf, Germany; Karl Backhaus, West New York, N.J., and Wolfgang John, New York, N.Y., assignors to Concast Incorporated New York, Montvale, N.J.

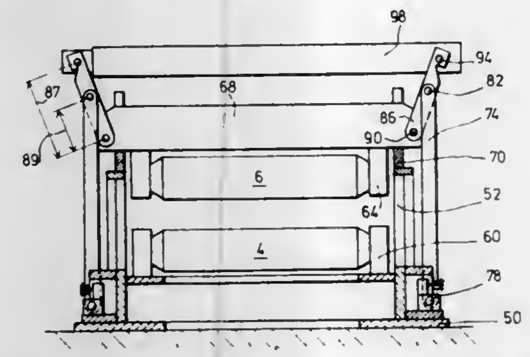
Filed Sept. 23, 1976, Ser. No. 725,738

Int. Cl.² B22D *11/12*

U.S. Cl. 164—82 **21 Claims**

1. A roll segment for supporting and guiding continuously cast metal strands fed therethrough, said segment comprising opposing rolls for contacting the opposite sides of a continuously cast metal strand cast through a mold and passed from said mold between said rolls, first support means for supporting the roll in contact with one of said opposite sides of said strand, second support means for supporting the roll in contact with the other of said opposite sides of said strand, linkage means at

the opposite ends of said rolls for interconnecting said first and second support means and for maintaining said rolls in substantially parallel alignment at the opposite sides of said strand, said linkage means each including a first linkage member pivotally connected at one of its ends to one of said support means, a second linkage member pivotally connected at one of its ends to the other of said support means and pivotally connected at its opposite end to said first linkage member, and means for applying a restraining force to said linkage means, said support means and said rolls for permitting restricted, limited movement of said rolls away from each other when force in excess of said restraining force is applied to said rolls by a continuously cast strand passing therethrough, said restraining force means and said linkage means applying a restraining force to



said support means and said rolls when the cast strand is guided between said rolls as well as when said rolls are moved away from each other.

19. A method for supporting and guiding a continuously cast metal strand between a plurality of rolls acting at opposite sides of the strand surface, comprising the steps of:
- urging under spring-load having a spring-load characteristic line at least one of the rolls towards the strand surface;
- applying said spring-load to said one roll by means of a bell crank having a bell-crank characteristic line; and
- compensating the spring-load characteristic line by means of the bell-crank characteristic line in a manner to thereby produce a substantially constant load along the length of roll movement.

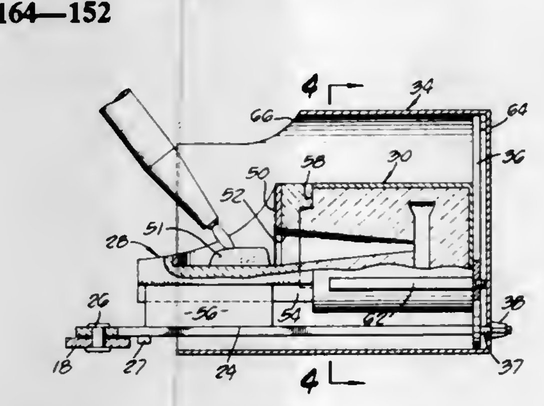
4,058,155
PORTABLE CENTRIFUGAL CASTING MACHINE

George Eash, Encino, Calif., assignor to Crown Manufacturing Company, San Marcos, Calif.

Filed Nov. 12, 1974, Ser. No. 523,025

Int. Cl.² B22D *13/06*

U.S. Cl. 164—152 **5 Claims**



1. An improved centrifugal casting device for open air use, comprising:
- a. a crucible having a recess therein;
- b. a flask having a closed outer end and an open inner end, said flask containing a mold in communication with said crucible recess through said inner end;
- c. mounting means supporting said crucible and flask for rotation about a vertical axis laterally spaced from said crucible and flask; and
- d. a shield having side walls and an end wall removably carried by said mounting means, said walls enclosing said crucible recess and said flask sides and outer end, and said mounting means including means supporting said end wall being outwardly of said crucible and flask during centrifugal operation.

4,058,156
DEVICE FOR THE REMOVAL OF CASTINGS FROM CHILL MOULDS

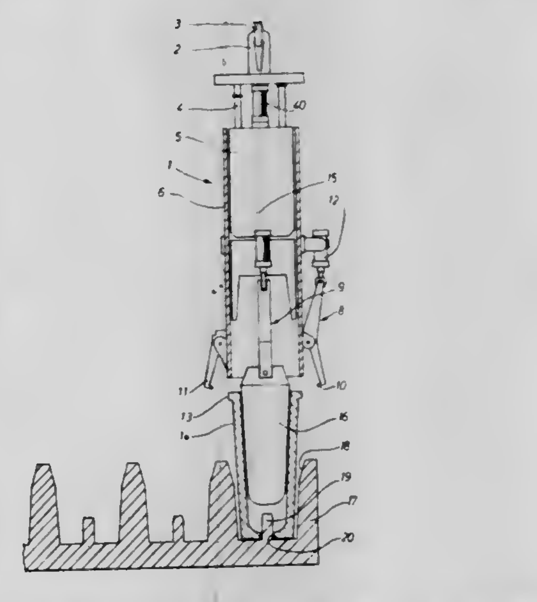
Magnus Gustav Georg Tiberg, Hällefors, Sweden, assignor to Ingenjorsfirman R. Ohrnell AB, Karlstad, Sweden

Filed Nov. 3, 1976, Ser. No. 738,398

Claims priority, application Germany, Nov. 3, 1975, 2549225

Int. Cl.² B22D *29/00;* **B66C** *1/00*

U.S. Cl. 164—405 **2 Claims**



1. Device for the removal of castings from chill moulds, comprising a main body portion adapted to be suspended from hoisting means, a frame releasably connected to said body by connecting means, first controllable gripping means provided to releasably hold the chill mould and second controllable gripping means provided to releasably hold the casting, both of said gripping means being carried by the frame, a ram releasably connected to the frame holding means for the ram adapted to hold the ram at a distance above the chill mould when the mold is held by said first gripping means, power means provided to actuate the connection means in order to release the frame from the main body and to actuate the holding means in order to release the ram to effect an impact of same against the chill mould.

4,058,157
BEARING SUPPORT OF THE HEAT-EXCHANGER DISK OF REGENERATIVE HEAT-EXCHANGER

Klaus Wiegard, Esslingen, Germany, assignor to Daimler-Benz Aktiengesellschaft, Germany

Division of Ser. No. 531,795, Dec. 11, 1974. This application Aug. 31, 1976, Ser. No. 719,237

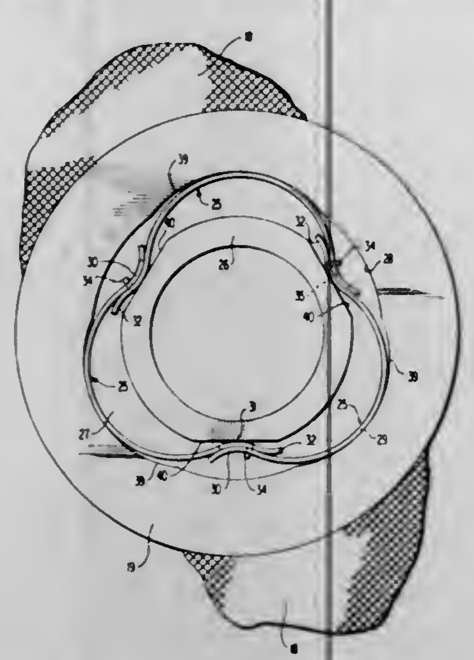
Claims priority, application Germany, Dec. 12, 1973, 23616979

Int. Cl.² F28D *19/00*

U.S. Cl. 165—8 **17 Claims**

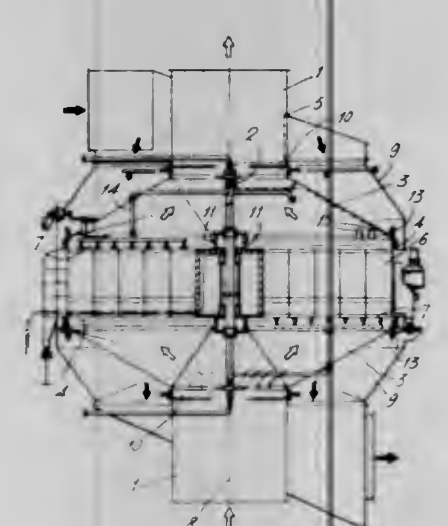
1. A heat-exchanger disk of a regenerative heat-exchanger, which is secured under interposition of spring means on a rotatable support means, characterized in that the spring means are formed by leaf spring elements arranged one adjacent the other in the shape of a ring which are connected with each other at their overlapping ends, the leaf spring elements being provided with outwardly curved arcuate portions and with inwardly curved arcuate portions and being supported under

prestress with the outwardly curved arcuate portions thereof at counter surfaces provided in a central aperture of the heat-



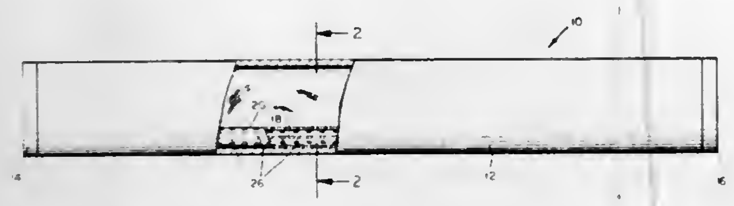
exchanger disk and with the inwardly curved arcuate portions at counter surfaces of the support means.

4,058,158
REGENERATIVE AIR PREHEATERS AND SEAL FRAME SUSPENSION CONTROL SYSTEM THEREFOR
Johannes Cornelis Blom, Belfast, and Colin Edward Tindall, Ballynahinch, both of Northern Ireland, assignors to Davidson & Co. Limited, Belfast, Northern Ireland
Filed July 26, 1976, Ser. No. 708,424
Claims priority, application United Kingdom, Nov. 4, 1975, 45783/75
Int. Cl.² F28D *17/00*
U.S. Cl. 165—9 **13 Claims**



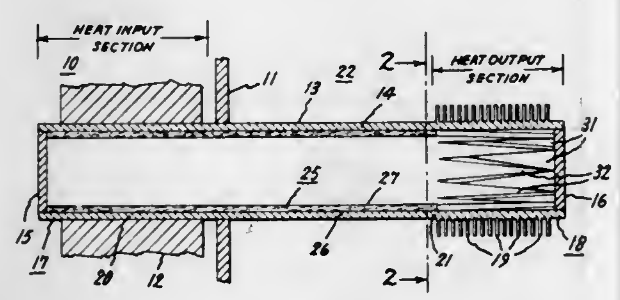
1. A rotary regenerative preheater comprising a regenerative mass having two axial end faces and a central axis, ducts for conducting heat-exchange media to and from the regenerative mass, at least one said duct comprising a sealing frame in close axial relationship with one of the end faces of the regenerative mass, means for causing relative rotation of the mass and the at least one sealing frame about the central axis, electrical contact means associated with the end face and with the sealing frame for changing the condition of an electrical circuit upon deviation from a desired said axial relationship of the end face and frame, electromagnetic drive means operatively linked to the sealing frame for altering the axial relationship with the said one end face, and control means responsive to the condition of the said electrical circuit to operate automatically to cause drive of the electromagnetic drive means and effect control of the said axial relationship.

4,058,159
HEAT PIPE WITH CAPILLARY GROOVE AND FLOATING ARTERY
Wilfrido R. Iriarte, Long Beach, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.
Filed Nov. 10, 1975, Ser. No. 630,236
Int. Cl.² F28D *15/00*
U.S. Cl. 165—105 **11 Claims**



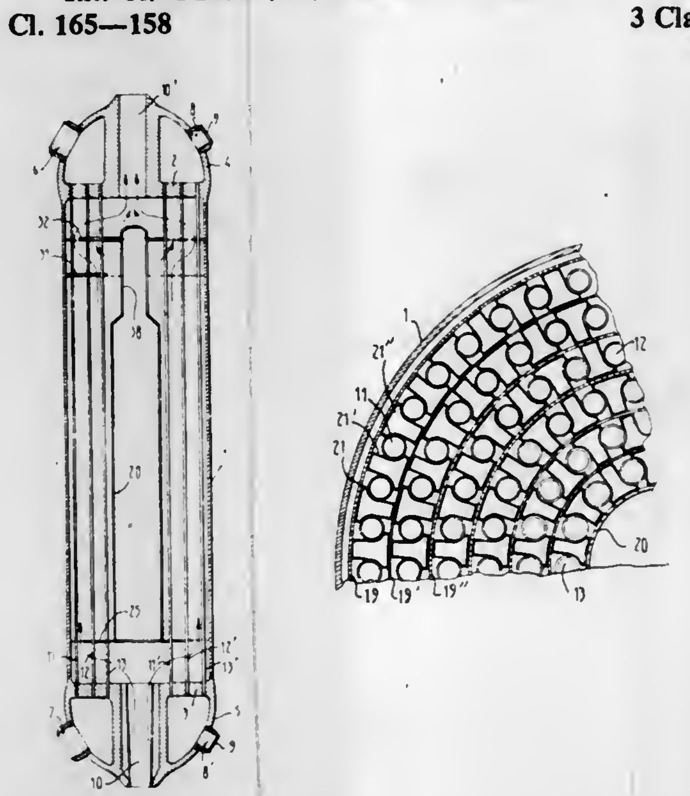
1. A heat pipe comprising an envelope sealed and closed from the environment external to said envelope, means for defining a working fluid therein for condensing and evaporating at opposed ends of said envelope, and means for defining an artery in said envelope and extending freely in an unconnected, thermally contacting manner through substantially the entire length of said envelope for conducting condensations of said working fluid from said condensing end to said evaporating end, said artery means including an exterior surface with means therein extending throughout the length of said artery means for enabling passage of said working fluid through said entire external surface.

4,058,160
HEAT TRANSFER DEVICE
James C. Corman, Scotia, and Gunnar E. Walmet, Schenectady, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.
Division of Ser. No. 449,744, March 11, 1974, Pat. No. 3,955,619, which is a continuation of Ser. No. 307,118, Nov. 16, 1972, abandoned, which is a division of Ser. No. 124,805, March 16, 1971, Pat. No. 3,746,081. This application Mar. 29, 1976, Ser. No. 671,164
Int. Cl.² F28D *15/00*
U.S. Cl. 165—105 **1 Claim**



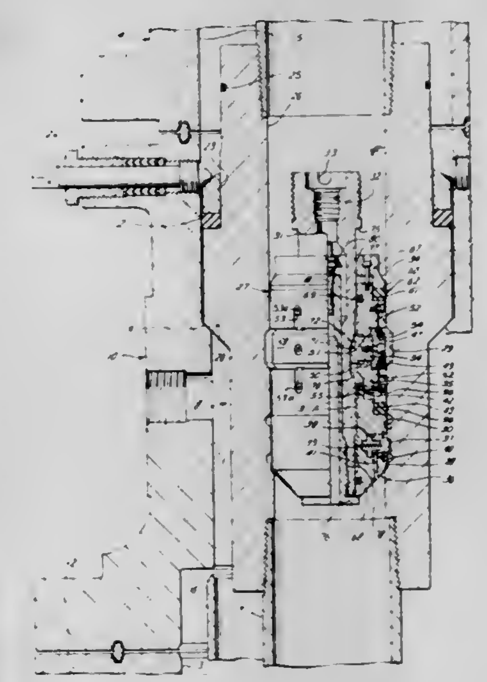
1. In a heat pipe structure, the combination of a first elongated hollow body of relatively high thermal conductivity, said first body being sealed at opposite ends thereof and having an inside wall surface and an outside wall surface, said first body having an elongated chamber therewithin extending coaxially therewith from one sealed end thereof to an opposite sealed end thereof, said chamber being bounded by said inside wall surface of said first hollow body, a second elongated hollow body of wicking material situated in said chamber, said second body being open at opposite ends thereof, said wicking material having a thermal conductivity which is less than that of said first body, said second hollow body having an inside wall surface contacting said chamber and an outside wall surface contacting the inside wall surface of said first body, said second elongated body of wicking material having a plurality of elongated slots therein extending from one open end of said second body in a direction toward the opposite end of said second body so as to expose an elongated area of the inside wall surface of said first body, each of said elongated slots being tapered such that each slot is wider at said one open end of said second body and becomes narrower as the slot extends longitudinally in a direction toward said opposite end of said second body, the elongated area so exposed extending from one sealed end of said first body in a direction toward the opposite end of said first body, said second elongated body of wicking material formed into a plurality of strips between said elongated slots, the strips truncated at their respective ends, and a vaporizable liquid occupying at least said chamber of said first body.

4,058,161
HEAT EXCHANGER
Georges Trepaud, 1, Rond-Point Bugeaud, 75016-Paris, France
Filed Aug. 7, 1975, Ser. No. 602,905
Claims priority, application France, Dec. 5, 1974, 74.39813
Int. Cl.² F28D *7/10;* **F20F** *9/22;* **F28F** *5/00*
U.S. Cl. 165—158 **3 Claims**



1. A heat exchanger comprising, an outer heavy structure including an outer cylindrical shell having fixed thereon an upper head having an outer wall and an inner coaxial wall defining an annular chamber therein and a large central passage, an annular base plate closing the lower end of said chamber and having a plurality of circular rows of perforations, a lower annular head fixed on said shell constructed similarly to the upper head and arranged symmetrically relative thereto whereby its inner coaxial wall defines a large central through passage allowing access to the interior of said structure, each head being provided with an aperture for flow of a fluid, axially through said shell, and a light inner structure comprising an annular bundle of alike axially undulated tubes each having quasi-sinusoidal undulations have successive arcuate deflections relative to the longitudinal axis thereof and spaced axially on the tubes with straight sections of the tubes therebetween, said tubes being arranged in a plurality of concentric circles and having upper and lower ends in the perforations of corresponding annular base plates of said heads and welded thereto, a closed central tubular shaft internally of said bundle of tubes secured to said bundle of tubes and extending less than the axial distance between the base plate of the upper head and that of said lower head and defining with said shell a heat exchange chamber in which said bundle of tubes is disposed, a series of annular radially spaced supporting rings arranged as supporting discs on different axially spaced supporting planes intermediate the deflections on said tubes respectively, paired concentric rings in each supporting disc being arranged on either side of each circle of tubes, a plurality of radially extending tubular stays each inserted between a pair of adjacent tubes in a common circle and welded to the outer and to the inner rings of each pair of paired rings respectively to firmly maintain said tubes without contact between the tubes and the rings, means for securing the peripheral outer rings of each supporting disc at each supporting plane to the inner surface of the outer shell, another series of annular, radially spaced, rings arranged as mobile retaining discs on different axially spaced planes tangential with the crests of the deflections of said tubes and free to move angularly about the longitudinal axis of said shell, each mobile retaining disc comprising paired concentric rings arranged on either side of each circle of tubes and a plurality of radially extending tubular stays, each stay being disposed between a pair of adjacent tubes in a common circle and welded to the outer and to the inner ring of each pair of rings respectively to maintain said tubes without contact between the tubes and the rings, and said tubes being arranged with said deflections in a common direction for expanding and rotating said mobile discs angularly in a common direction about the longitudinal axis of said shell.

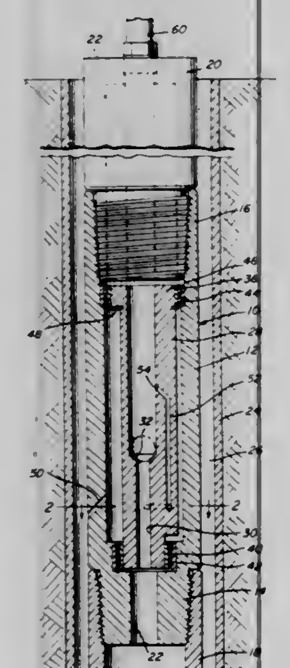
4,058,162
WELL TOOL ADAPTED TO BE LOCKED WITHIN AND SEALED WITH RESPECT TO THE BORE OF THE WELL CONDUIT
Jerry D. Smith, Houston, Tex., assignor to Cameron Iron Works, Inc., Houston, Tex.
Filed Apr. 22, 1976, Ser. No. 679,509
Int. Cl.² E21B *23/02, 33/129*
U.S. Cl. 166—124 **26 Claims**



1. Well apparatus, comprising a well conduit having a bore therethrough and a locking groove about the bore, a well tool including an inner body adapted to be connected to a running string for movement therewith within the bore, an outer body including first and second outer body sections, locking means carried by the first outer body section for radial movement with respect thereto, means connecting the outer body to the inner body for movement therewith into a position in which the locking means is radially opposite the locking groove, means on the bore engageable with means on the outer body to limit movement of said outer body with respect to the conduit when the outer body is so positioned, said connecting means permitting said inner body to be moved with respect to the outer body when movement of said outer body is so limited, first seal means carried by and disposed about the outer body in position to be expanded into sealing engagement between said outer body and the bore of the well conduit in response to vertical movement of said second section relative to said first section, means on the inner body for moving the locking means outwardly into locking position within the groove in the well conduit in response to initial movement of said inner body with respect to said outer body and independently of relative vertical movement of said outer body sections, and then engaging said second body section to move it vertically with respect to the first body section and thereby expand the first seal means

into sealing engagement with the well conduit bore in response to further movement of said inner body with respect to said outer body, and second seal means for sealing between said inner and outer bodies so as to cooperate with said first seal means in preventing flow past said outer body.

4,058,163
SELECTIVELY ACTUATED VIBRATING APPARATUS CONNECTED WITH WELL BORE MEMBER
James L. Yandell, 706 Shenandoah Drive, Conroe, Tex. 77302
Continuation-in-part of Ser. No. 386,106, Aug. 6, 1973, abandoned. This application July 9, 1976, Ser. No. 704,075
Int. Cl.² E21B *41/00*
U.S. Cl. 166—177 **11 Claims**

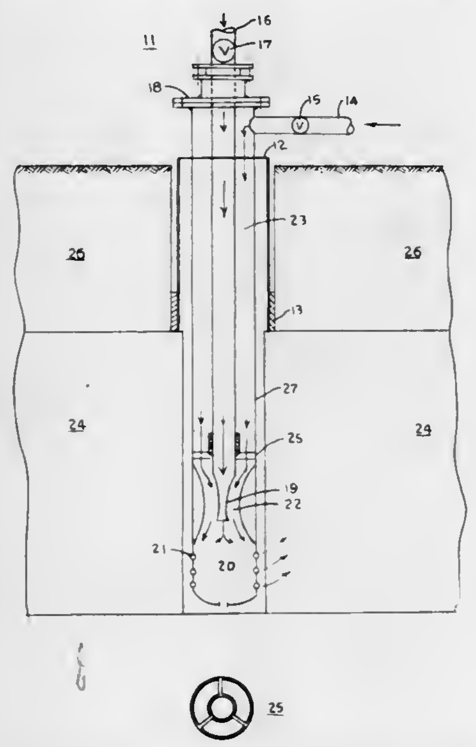


1. In combination with a member inserted into a well bore, a vibrating apparatus connectable to said member to impart lateral vibratory movement thereto for loosening the member in the well bore, said vibratory apparatus comprising a housing having means at the lower end for connection to the member and means at the upper end for connection with a source of pressurized fluid, said housing having a hollow interior communicating with the ends of the housing, an eccentric rotor rotatably journaled in said housing and having a center of mass offset from the axis of rotation, said rotor including a passageway extending therethrough for communication with the upper and lower ends of the housing, said passageway being coincident with the rotational axis of the rotor whereby passage of fluid therethrough will not rotate the rotor, means associated with said passageway to selectively prevent downward fluid flow therethrough and bypass passageway means providing communication past said means when the means is closed, said bypass passageway means including reaction means through which pressurized fluid passes to impart rotary movement to the eccentric rotor and cause the housing and member to vibrate when pressurized fluid flows downwardly through the bypass passageway means and is discharged from the housing into a low pressure zone in the well bore.

4,058,164
HEATING MINE WATER FOR RECOVERY OF IMMOBILE HYDROCARBONS
Xerxes T. Stoddard, 2617 W. 27th Ave., Denver, Colo. 80212, and Ruel C. Terry, 3090 S. High St., Denver, Colo. 80210
Filed Apr. 12, 1976, Ser. No. 676,001
Int. Cl.² E21B *43/24*
U.S. Cl. 166—303 **6 Claims**

1. A method of blending steam and water underground to generate superheated water in thermal recovery of minerals that are capable of becoming flowable upon application of heat, comprising the steps of

establishing a first injection passage between a surface location and an underground mineral deposit,
establishing a second injection passage between a surface location and an underground mineral deposit,
affixing a nozzle means positioned at the lowermost portion of the said first injection passage, the said nozzle means being positioned within a venturi means,
affixing the said venturi means positioned at the lowermost portion of the said second injection passage,
establishing a mixing chamber means in an underground location, said mixing chamber means being in fluid com-

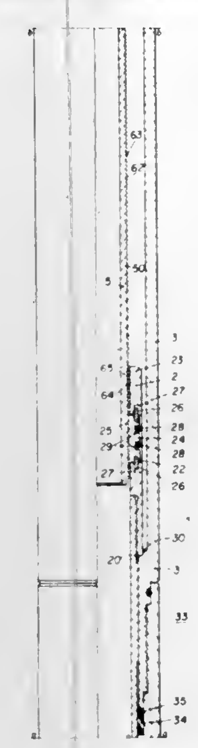


munication with the said first injection passage and the said second injection passage,
injecting steam into the said first injection passage,
injecting water into the said second injection passage,
decreasing the pressure of the steam,
condensing the steam into a liquid while
mixing the condensed steam with water in the said mixing chamber means, and
directing the resultant superheated water from the said mixing chamber means into the mineralized formation underground.

4,058,165
WELLBORE CIRCULATING VALVE
John C. Holden, and Gary Q. Wray, both of Duncan, Okla., assignors to Halliburton Company, Duncan, Okla.
Division of Ser. No. 513,928, Oct. 10, 1974, which is a division of Ser. No. 288,187, Sept. 11, 1972, Pat. No. 3,850,250. This application Oct. 24, 1975, Ser. No. 625,433
The portion of the term of this patent subsequent to Nov. 26, 1991, has been disclaimed.
Int. Cl.² E21B *43/00*
U.S. Cl. 166—314 **9 Claims**

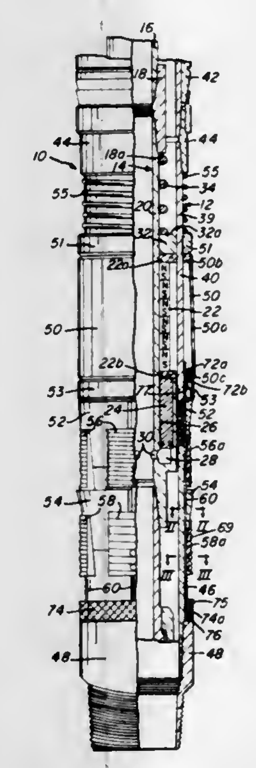
1. A circulating valve for use in an oil well extending from the surface of the earth comprising:
normally closed valve means movable from a closed position to an open position;
opening means being arranged to produce a plurality of movements in said valve means for moving said valve means toward said open position, wherein said valve

means is opened only upon the last movement of said plurality of movements being effected; and



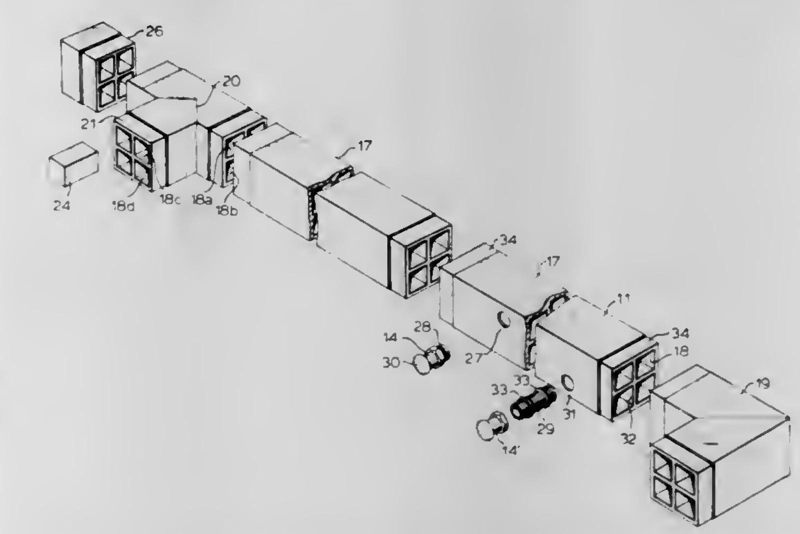
means in said opening means for setting the number of movements produced in said plurality of movements before said valve means is opened.

4,058,166
WELL SETTING TOOL
Charles D. Crickmer, Houston, Tex., assignor to Otis Engineering Corporation, Dallas, Tex.
Filed Mar. 29, 1976, Ser. No. 671,350
Int. Cl.² E21B *23/06*
U.S. Cl. 166—315 **24 Claims**



1. A well tool and setting tool assembly comprising: a well tool mandrel, at least a portion of which is of non-magnetic material; a setting tool mandrel coaxially and releasably positioned within said well tool mandrel; magnet means carried on the exterior of said setting tool mandrel and movable adjacent said non-magnetic portion of said well tool mandrel between a first and a second axial position; setting means carried on the exterior of said well tool mandrel; a magnetic-follower member of magnetic material carried on the exterior of said non-magnetic portion of said well tool mandrel and axially movable with respect thereto; said magnet means and said member being magnetically coupled wherein axial movement of said magnet means causes corresponding axial movement of said member; and said member being connected to said setting means to set said well tool at a desired location upon axial movement of said member from said first to said second axial position.

4,058,167
FIRE PROTECTION APPARATUS
Gerhard Granek, Downsview, and Clifford Paul Robert Greenan, Unionville, both of Canada, assignors to Clifford Paul Robert Greenan, Unionville, Canada
Filed July 13, 1976, Ser. No. 704,821
Int. Cl.² A62C *37/18*
U.S. Cl. 169—61 **8 Claims**

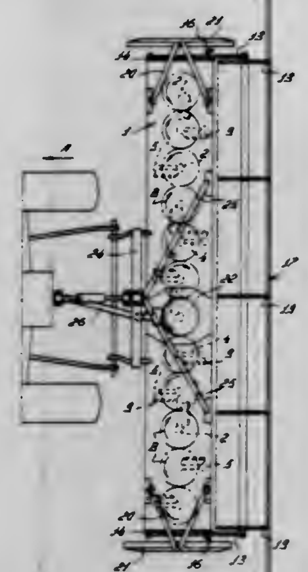


1. Fire protection apparatus comprising a conduit providing a plurality of internal longitudinally continuous compartments and having spaced at intervals along its length a plurality of fluid directing nozzles each connected to a respective compartment of the conduit, said nozzles being arranged to direct fluid to different respective localised areas adjacent the conduit, a plurality of fire hazard detectors, one detector being associated with each of said areas, and means for supplying fire-extinguishing fluid selectively to the compartments of the conduit, said means so operating under the control of the detectors as to supply the fluid to the compartment and nozzle connected thereto which directs the fluid to the area where a fire hazard is detected.

4,058,168
ROTARY HARROWS
Cornelis van der Lely, 7, Bruschenrain, Zug, Switzerland
Continuation of Ser. No. 552,596, Feb. 24, 1975, abandoned, which is a continuation of Ser. No. 338,155, March 5, 1973, abandoned. This application June 17, 1976, Ser. No. 696,836
Claims priority, application Netherlands, Mar. 3, 1972, 7202809
Int. Cl.² A01B *33/06*
U.S. Cl. 172—59 **6 Claims**

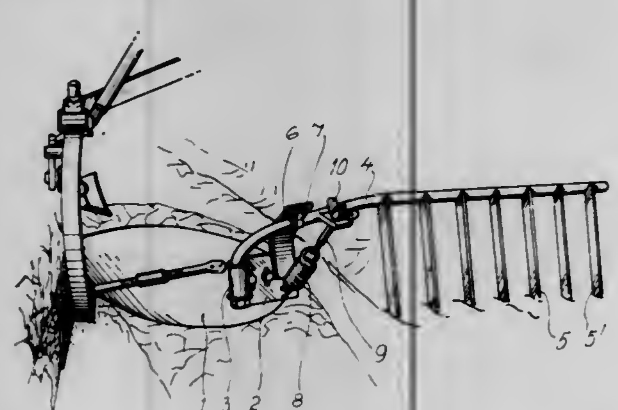
1. A rotary harrow having a frame with a plurality of soil-working members journalled in a portion of said frame, said soil-working members comprising upwardly extending shafts rotatably mounted on said frame portion and said shafts being located side by side in a row that extends transverse to the normal direction of travel a single support extending substantially radially from the lower end of each shaft and the inner end of said support being attached to said shaft, soil-working tine means in a holder of said support and said support with tine means being located at only one side of the axis of rotation of said shaft, the distance between said tine means and the shaft of each corresponding soil-working member being greater than half the distance between two neighboring shafts and said members being positioned to work overlapping strips of soil, said shafts being in driving engagement with driving means that rotates adjacent shafts and their corresponding supports in relative opposite directions, pinions on said shafts being in driving engagement with one another and neighboring pinions

being in mesh, said soil-working members being arranged in two groups which rotate in relative opposite directions, the members of a first group being flanked at their opposite sides by members of a second group along said row and consecutive soil-working members of each group being out of phase by



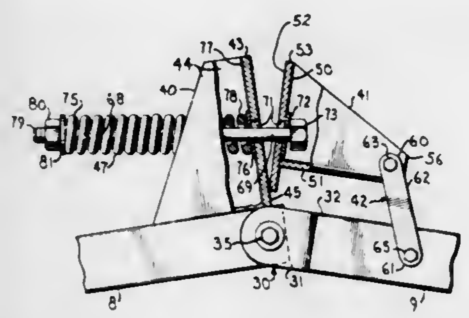
multiples of about 90° from one another about their respective shafts, and when said harrow is viewed from the rear, the first leftmost support of the first group extending forwardly and about 180°, with respect to the first leftmost support of the second group.

4,058,169
AUTOMATICALLY SELF-STEERING PLOW/HARROW COMBINATION WITH RELEASE AND RESET MECHANISM CONNECTING HARROW TO PLOW
Lars-Eric Jacobsson, Galtungs Burs, Stanga, Sweden (S-620 13)
Filed Feb. 13, 1976, Ser. No. 658,110
Claims priority, application Sweden, Feb. 18, 1975, 7501816
Int. Cl.² A01B *49/02*
U.S. Cl. 172—191 **6 Claims**



1. A self-steering plow/harrow combination comprising: a plow blade; a longitudinally extending base structure; a number of harrow teeth attached to the base structure and spaced from each other and each directed downwardly towards the ground plane, the harrow teeth having a mainly rectangular cross section with the cross-sectional length axis inclined in relation to the direction of travel for the harrow teeth; the base structure being attached to the plow blade by pivot means restricting movement of said base structure to movement about a vertical pivot, whereby the base structure is movable in a horizontal plane substantially parallel to the ground plane, said base structure being attached to the plow blade in such a way, that the base structure together with the harrow teeth creates a force opposed to the friction force acting on the plow blade; a release mechanism attached to the plow blade and having means to engage the base structure, the engagement means releasing the base structure for movement in said horizontal plane at a predetermined load; and a reset means attached to the plow blade and the base structure to return the base structure to its original position when the predetermined load is no longer exceeded.

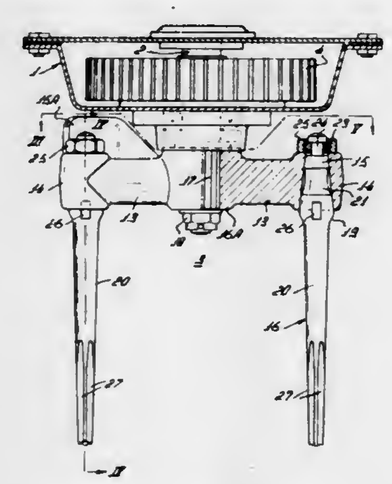
4,058,170
FARM IMPLEMENT HINGE RESTRICTOR
Thomas W. Ankenman, Tipton, and Lee J. Brinker, Glen Elder, both of Kans., assignors to Kent Manufacturing Co., Inc., Tipton, Kans.
Filed May 20, 1976, Ser. No. 688,136
Int. Cl.² A01B *15/14, 61/00*
U.S. Cl. 172—311 **11 Claims**



1. In a farm implement of the foldable tow type having at least two rigid frames positioned end-to-end and connected by a pivotal joint for relative swinging motion about an axis of rotation, a restrictor for preventing excessive oscillation between said frames, said restrictor comprising:

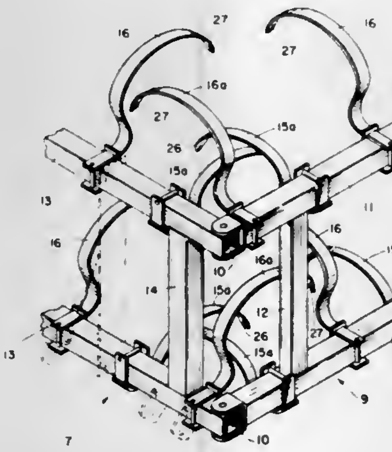
a. a fixed bracket attached to one of said frames and having a face disposed substantially normal to said one frame and positioned adjacent to said pivotal joint;
b. a reciprocating bracket having a face, said reciprocating bracket face engaging said fixed bracket face and extending therefrom in a direction toward the other frame;
c. linkage having a first end thereof pivotally attached to said reciprocating bracket in a spaced relation to the face thereof and having a second end thereof pivotally attached to said other frame in a longitudinally spaced relation with said pivotal joint; and
d. means spaced from said linkage and engaging said fixed bracket and said reciprocating bracket for resiliently urging said fixed and reciprocating bracket faces abuttingly together.

4,058,171
MOUNTING OF SOIL WORKING TINES
Cornelis van der Lely, 7, Bruschenrain, Zug, Switzerland
Filed Jan. 29, 1975, Ser. No. 545,006
Claims priority, application Netherlands, Jan. 31, 1974, 7401323; Feb. 8, 1974, 7401726
Int. Cl.² A01B *23/02, 33/06*
U.S. Cl. 172—713 **15 Claims**



1. A tine mounting for a rotary harrow comprising an elongated support having at least one tine holder adjacent an end thereof and a bore that receives a driving shaft, said tine holder having an internal, substantially vertical bore that receives a fastening portion of a tine, the longitudinal axis of said vertical bore extending substantially parallel to the longitudinal axis of said first mentioned bore, said tine holder having a forward side with respect to the normal direction of rotation of said mounting, said support and said tine holder being integrally formed from a single piece of metal by forging or casting, and including an integral thickened wall located at the forward side of the tine holder, said wall merging into an upwardly extending screen that projects above and forwardly from said holder, said wall also being thicker at its outer lateral side, in a region between the top and bottom of said holder, than it is adjacent said top and bottom.

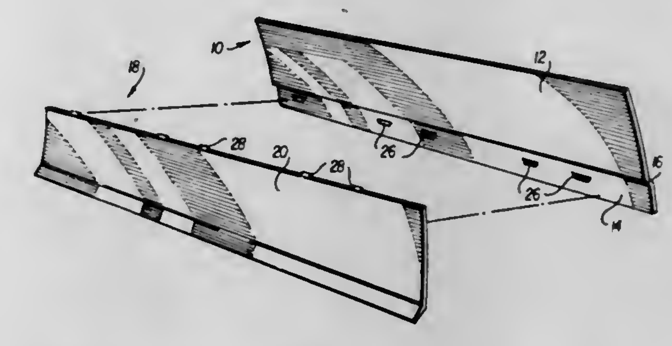
4,058,172
TOOTH ARRANGEMENT IN REARWARDLY FOLDING CULTIVATORS
Calvin B. Blair, Barnard, and Kenneth A. Hake, Tipton, both of Kans., assignors to Kent Manufacturing Co., Inc., Tipton, Kans.
Filed Feb. 18, 1976, Ser. No. 659,017
Int. Cl.² A01B *65/02*
U.S. Cl. 172—311 **3 Claims**



1. A cultivating implement comprising:

a. a main frame;
b. a rearwardly foldable wing frame attached to and extending laterally in respect to said main frame, said wing frame being rearwardly foldable from an operating configuration to a transporting configuration, said wing frame having a central wing section and outer wing sections on each side of said central wing section and a pivot joint between each of said outer wing sections and said central wing section, said central wing section and said outer wing sections each having a forward tool bar and a rearward tool bar;
c. a first and a second set of downwardly extending teeth on said forward tool bar and said rearward tool bar of each of said central wing section and said outer wing sections, the teeth of each of said sets having a convoluted connector section toward a proximal end thereof and an acutely angled distal end depending from an arcuate working section, the teeth of one of said sets of teeth having a substantially horizontal transition section between said arcuate working section and said connector section, the teeth of both of said sets having substantially the same straight length and equal deflection under load;
d. a tooth of said first set being located on each side of a tooth of said second set and spaced apart laterally from each other, said teeth of said first set having distal ends located forwardly of the distal ends of said teeth of said second set, said teeth distal ends of said first and second set projecting forwardly when said wing frame is in an operating configuration and projecting downwardly when said wing frame is in a transporting configuration, the distal ends of both sets of teeth being aligned with respect to a laterally extending line common to all of said wing sections, one of said first and second sets of teeth on each of said forward tool bar and said rearward tool bar of all of said wing sections being attached forwardly of the other of said first and second sets of teeth;
e. a tooth of the first of said sets on the central wing section being located adjacent to one side of each of said pivot joints and a tooth of the second of said sets being located on the other side of each of said pivot joints whereby a tooth of one of said sets overlaps a tooth of the other of said sets without entanglement when said wing frame is folded from said operating configuration to said transport configuration.

4,058,173
BLADE ASSEMBLY WITH REPLACEABLE CUTTING EDGE
Cyril W. Carson, 2155 Holly, Charlotte, Mich. 48813
Filed Mar. 18, 1976, Ser. No. 668,310
Int. Cl.² E02F *376*
U.S. Cl. 172—719 **5 Claims**



1. A blade assembly, comprising:

a moldboard having a rearwardly offset lower end;
a detachable blade having an upper portion engaging said offset lower end of said moldboard;
a plurality of lugs projecting rearwardly from the back face of said upper portion of said blade, each lug having parallel upper and lower surfaces and rearwardly diverging side surfaces;
said lower end of said moldboard having an equal plurality of openings for receiving said lugs, each opening having parallel upper and lower walls and side walls diverging rearwardly at the same angles as the side surfaces of said lugs, the separation between said upper and lower walls being slightly greater than the height of said lug, the separation of said side walls at the forward face of said lower end being slightly greater than the width of said lug at the rear face thereof;
an equal plurality of locking elements, each element having parallel top and bottom faces and parallel side faces which are parallel to one of the side surfaces of said lugs, the height of said element being nearly equal to the height of said opening and the width of said element being nearly equal to the difference between the maximum width of said opening and the maximum width of said lug; and
means to retain said locking element in said socket.

4,058,174
MOTOR GRADER WITH BLADE SUPPORT AND BEARING ASSEMBLY
Robert Allan Atherton, Chillicothe, and Carroll Richard Cole, Decatur, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.
Filed June 14, 1976, Ser. No. 696,097
Int. Cl.² E02F *3/76*
U.S. Cl. 172—781 **11 Claims**

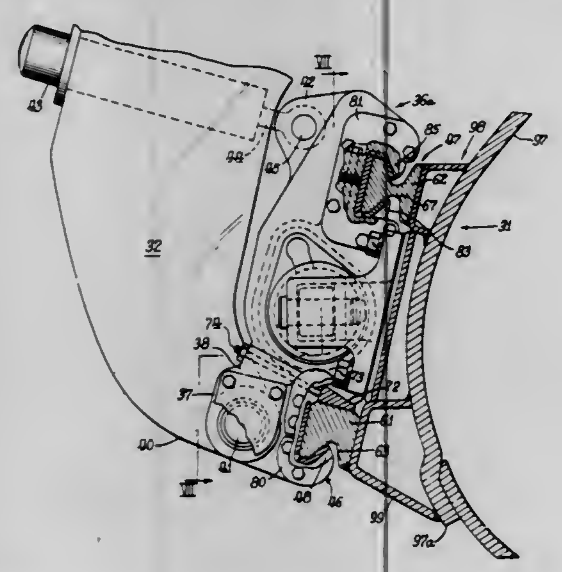
7. In a motor grader which has a circle with a pair of integral, depending blade support arms at its rearward portion, an improved support and bearing means for mounting a grader blade assembly on said arms for endwise movement, said improved means comprising, in combination:

two generally upright bearing housings each of which is

mounted on one of the support arms and forward of said arm;

aligned forwardly open lower jaws extending entirely across said housings, said lower jaws having generally planar upper surfaces, upright planar rear surfaces, and lower surfaces defining bottom surfaces and upstanding front flanges having upwardly and forwardly inclined inner faces;

aligned forwardly open upper jaws extending entirely across said housings, there being means in said upper jaws defining planar rear surfaces, substantially planar top and bottom surfaces, and upper and lower front webs having inner faces which are forwardly inclined toward their adjacent margins;



replaceable anti-friction wear strips lining the interiors of said lower jaws and of said means in said upper jaws;

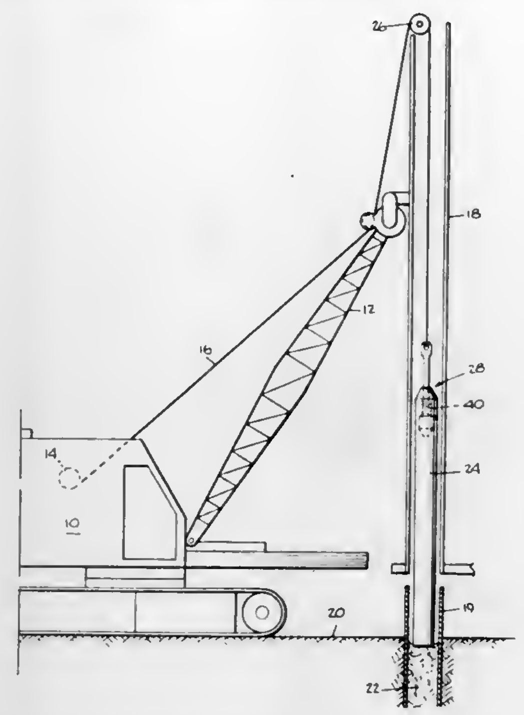
substantially parallel upper and lower support rails on the rear of the blade assembly which extend through said means in said upper jaws and through said lower jaws and are slidable in said wear strips, said support rails being substantially concentric with the surfaces of the means in the upper jaws and with all but the top surfaces of the lower jaws;

means surmounting the top surface of the bottom rail to maintain a snug sliding fit between said rail and the wear strips;

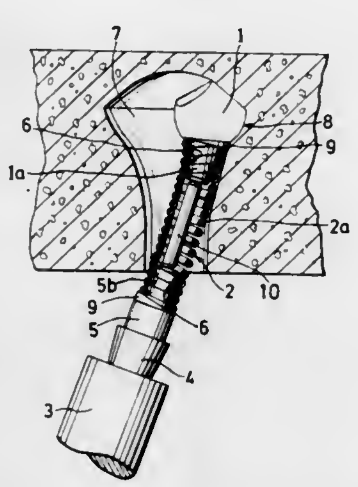
and means for retaining the wear strips in the upper and lower jaws.

4,058,175
METHOD FOR OPERATING PILE DRIVER
Henry A. Nelson Holland, Houston, Tex., assignor to Raymond International Inc., Houston, Tex.
Division of Ser. No. 507,613, Sept. 19, 1974, Pat. No. 4,002,211. This application July 6, 1976, Ser. No. 702,606
Int. Cl.² E02D *7/08*
U.S. Cl. 173—1 **5 Claims**

1. A method of forming a pile with a pile hammer rig including a crane having a hoisting drum, a clutch, driving means for said drum through said clutch, brake means for the drum, a drop-weight, a hoisting rope leading from said drum to said drop-weight, and means for selectively absorbing kinetic energy of the drum and rope interposed between the drum and the dropweight, said method comprising the steps of engaging said clutch to lift said drop-weight to a preselected height by winding the rope on the drum and thence releasing the clutch to let said drop-weight fall freely, thence braking said drum at a preselected time interval prior to impact of the drop-weight to actuate said means for absorbing kinetic energy, and subsequent to impact of said drop-weight releasing said brake means and reengaging the clutch to again lift said drop-weight.

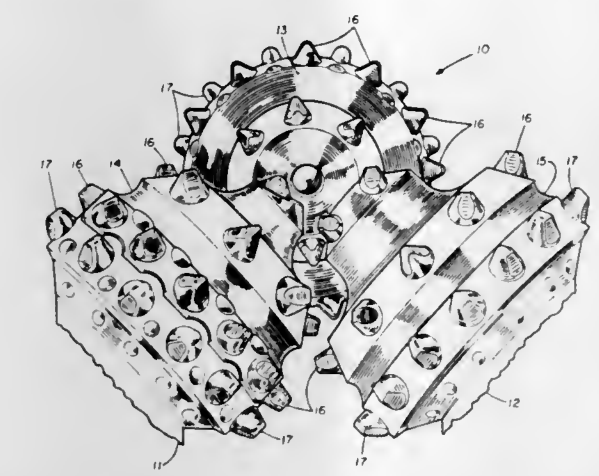


4,058,176
TOOL AND METHOD FOR DRILLING A HOLE WITH AN INCREASED CROSS-SECTIONAL AREA
Artur Fischer, and Klaus Fischer, both of Tumlingen, Gde. Waldachtal, Germany, assignors to Artur Fischer, Tumlingen, Gde. Waldachtal, Germany
Filed Dec. 5, 1975, Ser. No. 638,413
Claims priority, application Germany, Dec. 11, 1974, 2458615; Mar. 8, 1975, 2510134
Int. Cl.² E21C *15/00*
U.S. Cl. 175—61 **16 Claims**



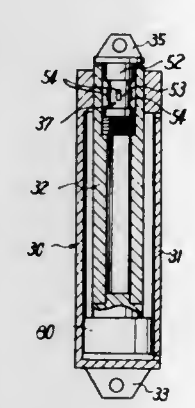
1. A drill for drilling a hole into an exposed surface of a workpiece such that the hole has an increased cross-sectional area in a region remote from the exposed surface, comprising in combination, a force-imparting unit; bit means for drilling such a hole and comprising a plurality of cutting edges; force-transmitting means comprisign a resiliently deflectable elongated and hollow force-transmitting structure having two ends angularly displaceable relative to each other, one end being directly connected to said bit means and the other end being connected to said force-imparting unit, for varying the orientation of said bit means relative to the force-imparting unit and further including a rod of rigid material within said force-transmitting structure, said rod having a cross-section smaller than the inner cross-sectional of said force-transmitting structure and arranged to transmit longitudinal force from said force-imparting unit to said bit means.

4,058,177
ASYMMETRIC GAGE INSERT FOR AN EARTH BORING APPARATUS
James W. Langford, Jr., Red Oak, and Wilbur S. Keller, Arlington, both of Tex., assignors to Dresser Industries, Inc., Dallas, Tex.
Continuation of Ser. No. 671,535, March 29, 1976, abandoned. This application Mar. 7, 1977, Ser. No. 775,226
Int. Cl.² E21B *9/10, 13/01*
U.S. Cl. 175—374 **10 Claims**



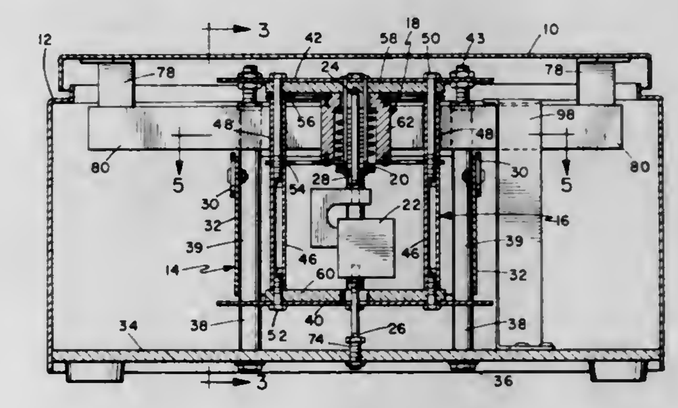
1. A rolling cutter for an earth boring apparatus, comprising:
a cutter body of generally conical configuration;
said cutter body having a nose and a base; and
a row of gage cutting inserts positioned proximate said base, said inserts comprising pressed and sintered granules of wear-resistant material together with a binder, said inserts having a mutiplicity of surfaces culminating in a crest with one surface having a plane section substantially larger than any plane sections on any other surface, said plane section facing generally away from said nose of said cutter body.

4,058,178
HYDRAULIC CYLINDER UNIT
Shinitsu Shinohara, Takamatsu; Hisanori Uchino, Tokyo, and Hiroyuki Yamaji, Kagawa, all of Japan, assignors to Tadano Ironworks Co., Ltd., Takamatsu, Japan
Continuation-in-part of Ser. No. 500,291, Aug. 26, 1974, abandoned, which is a division of Ser. No. 266,355, June 26, 1972. This application Jan. 19, 1976, Ser. No. 650,290
Claims priority, application Japan, Sept. 13, 1971, 46-83664
Int. Cl.² F01B *25/26, 31/12*
U.S. Cl. 177—146 **6 Claims**



1. In a hydraulic cylinder unit comprising:
a. a cylinder means pivotally connected to a base;
b. a piston axially slidably inserted in the cylinder means in a fluid-tight manner between a retracted position and a fully extended position, said piston being extended by hydraulic pressure supplied to said cylinder means; and
c. a rigid piston rod means connected to the piston at base end thereof and projected outwardly from the cylinder means, the piston rod means being connected to a load which is to be carried by the cylinder unit, load-detecting means for detecting load applied to the cylinder unit in the axial direction of the cylinder unit which means is arranged within a hollow space provided in said rigid piston rod means and is mounted on one of the components of said piston rod means which component is strained by a load carried by the cylinder unit as the piston moves between the retracted and fully extended positions, the load-detecting means including at least one gauge for detecting strain of said component, the load-detecting means providing an electrical output signal corresponding to the load in response to strain detected by the gauge.

4,058,179
LOAD CELL SCALE
Robert John Price, El Cajon, Calif., assignor to Orbitran Company, Inc., Lakeside, Calif.
Filed June 16, 1976, Ser. No. 696,565
Int. Cl.² G01G *23/02, 21/10*
U.S. Cl. 177—156 **15 Claims**



1. A load cell scale incorporating a platform mounted for vertical movement limited by an overload limit stop, the platform adapted for the reception of an object to be weighed, and a load cell for converting force into a change in an electrical characteristic comprising:
a fixed frame,
an interconnection member connected for movement with a load on the platform,
a load transfer frame connected to a load cell and mounted on said fixed frame for limited translation relative to said fixed frame,
spring means connected between said interconnection member and said load transfer frame for maintaining said interconnection member and said load transfer frame in a load transfer relationship until a predetermined load is exceeded, and for load in excess of said predetermined load said interconnection member decoupling from said load transfer frame and deforming said spring means until said platform contacts overload limit stops.

4,058,180
ATTACHING DEVICE FOR MOUNTING OF A BROADCAST FERTILIZER SPREADER ON A TRACTOR
Heinz Dreyer, Gaste, Germany, assignor to Amazonen-Werke H. Dreyer, Hasbergen-Gaste, Germany
Filed July 27, 1976, Ser. No. 709,056
Claims priority, application Germany, July 29, 1975, 2533814
Int. Cl.² A01C *19/00;* **B62D** *49/02*
U.S. Cl. 180—14 R **10 Claims**

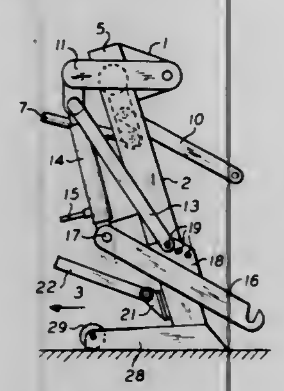
1. In an attaching device for a broadcast fertilizer spreader for mounting of the spreader on a tractor having a three point power lift comprising:
a. a frame,
b. a first top link and a coupling element for the first top link pivotally coupling the first top link to the frame, and a first pair of lower lift arms and coupling elements for the first pair of lower lift arms pivotally coupling the first pair of lower lift arms to the frame, both the first top link and the first pair of lower lift arms being for the tractor three point

power lift and for actuation to raise and lower the frame by a hydraulic system of the three point power lift,

c. a second top link pivotally mounted on the frame and a second pair of lower lift arms pivotally mounted on the frame, for attachment of the device to the spreader,

the improvement which comprises:

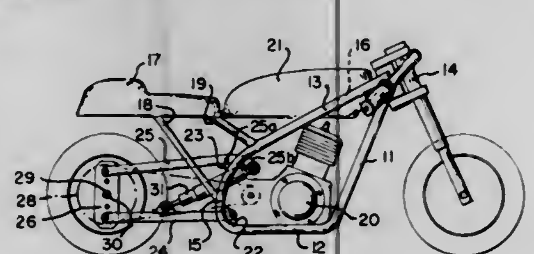
d. the frame comprising two upright supports disposed transversely of the advancement direction of the fertilizer spreader and a cross arm joining upper portions of the upright supports together,



e. the second top link and the coupling element for the first top link being mounted on the cross arm, and the second pair of lower lift arms, and the coupling elements for the first pair of lower lift arms being mounted on the upright supports, and

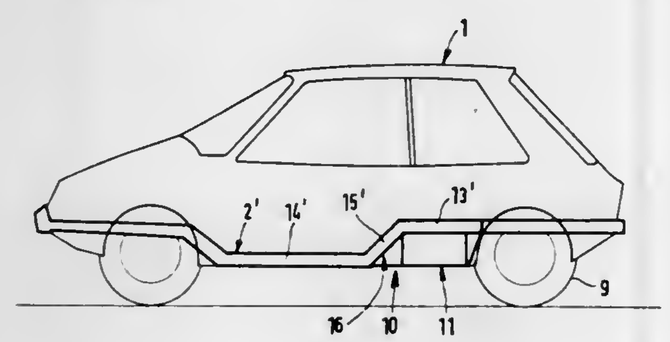
f. a hydraulic system comprising two lift jacks disposed transversely of the direction of advancement of the spreader, each jack having one end joined to one of the upright supports and the other end to the lower lift arm of the second pair of lower lift arms which is coupled to said one upright support.

4,058,181
MOTORCYCLE SUSPENSION SYSTEMS
Erik F. Buell, Box 418, R.D. No. 2, Gisbonia, Pa. 15044
Filed Mar. 16, 1976, Ser. No. 667,391
Int. Cl.² B62K *25/02*
U.S. Cl. 180—32 **5 Claims**



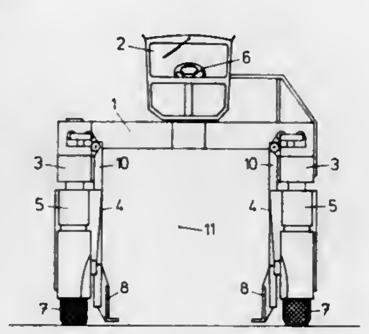
1. In a motorcycle frame having a generally closed configuration having generally horizontal upper and lower frame members and spaced generally front and rear vertical members transverse to and connecting said upper and lower members to form the closed configuration, a power unit in said frame, having a drive sprocket, the improvement comprising a pair of spaced generally horizontally extending swing arms on each side of said frame and rear wheel extending rearwardly from the rear member and each pivoted adjacent one end on said frame, a generally vertical link connecting the other ends of said swing arms and adapted to receive an axle shaft of the rear wheel intermediate the two swing arms, link means connected at one end to one arm of one of said pairs of swing arms, spring means pivotally connected at one end to one of a swing arm of the other pair of swing arms and the frame and at the other end to said link means at its other end said link meas being relatively proportioned to the spring means connection at said one end so that deflection of said swing arms from a first normal position upwardly around their pivot at the frame causes a progressively rising rate of deflection of said spring means, while maintaining both a substantially constant contact patch between the rear wheel and a surface being travelled and a substantially constant wheel base.

4,058,182
ELECTRICALLY DRIVEN VEHICLE, ESPECIALLY PASSENGER MOTOR VEHICLE
Manfred Huber, Munich, Germany, assignor to Bayerische Motoren Werke Aktiengesellschaft, Germany
Filed May 21, 1976, Ser. No. 688,572
Claims priority, application Germany, May 23, 1975, 2522844
Int. Cl.² B60R *21/00;* **B60L** *11/18*
U.S. Cl. 180—68.5 **23 Claims**



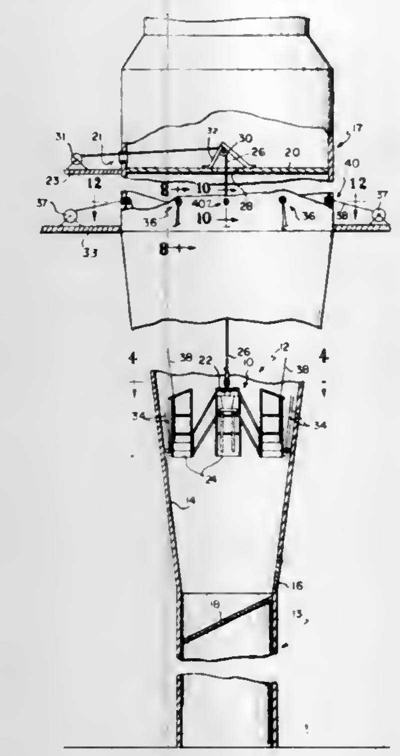
1. An electrically driven vehicle with a vehicle floor comprising electric power source means taken along in the vehicle, said electric power source means being arranged within the area of the vehicle floor and depending therefrom by way of mounting support means, characterized in that the mounting support means include a further means which, in case of a vehicle impact of predetermined strength, disconnects the support means and the power source means to effect a detachment of the electric power source means from the vehicle.

4,058,183
STRADDLE CARRIER
Keijo Kalevi Kröger, Tampere, Finland, assignor to Valmet Oy, Helsinki, Finland
Filed Jan. 8, 1973, Ser. No. 321,736
Claims priority, application Finland, Jan. 11, 1972, 61/72
Int. Cl.² B60K *35/00*
U.S. Cl. 180—89.1 **3 Claims**



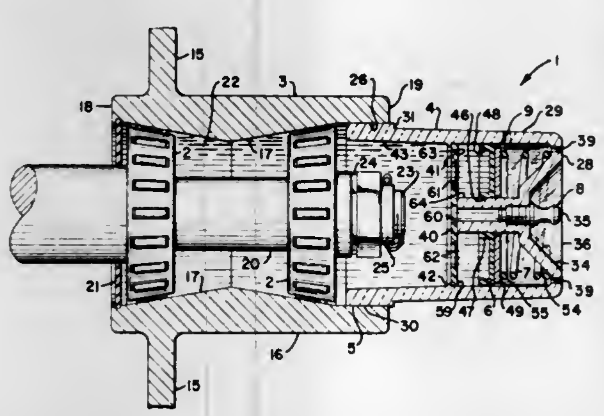
1. A straddle carrier comprising two spaced upper side bodies, the space between said bodies being used for the loads to be transported, a single transverse beam interconnecting said bodies and extending between opposed middle side portions of said bodies, a driver's cab carried by said beam, wheels and means connecting said wheels with said side bodies, said transverse beam being a box-type beam dimensioned to operate as a torsion spring, whereby simultaneous contact of all wheels with an uneven driving surface is achieved.

4,058,184
SCAFFOLD
Alistair J. Stuart, and James B. Burch, both of Indianapolis, Ind., assignors to Hugh J. Baker & Company, Indianapolis, Ind.
Filed Apr. 15, 1976, Ser. No. 677,481
Int. Cl.² E04G *3/10*
U.S. Cl. 182—128 **36 Claims**



1. A hanging scaffold comprising a self-contained central frame having upper and lower frame members; a plurality of support arms pivotally connected to one of said frame members and extending radially outwardly therefrom; a plurality of platforms connected to said support arms opposite said frame; first adjustment means for selectively raising and lowering said upper and lower frame members with respect to each other, said first adjustment means having means interconnecting the other of said frame members with said support arms so as to cause inward and outward movement of said arms in response to relative movement of said frame members to adjust the radial distance of said platforms from said frame; support means for elevationally suspending said frame, support arms and platforms from above; and second adjustment means connected to said support means for selectively adjusting the elevation of said frame, support arms, and platforms.

4,058,185
AUTOMATIC WHEEL BEARING LUBRICATOR
Kenneth C. Ploeger, 5th & Dryden, Odessa, Mo. 64076
Filed Aug. 9, 1976, Ser. No. 712,930
Int. Cl.² F16N *11/04;* **B60B** *27/00*
U.S. Cl. 184—1 D **10 Claims**



1. A wheel bearing lubricator comprising:

a. a hollow body having side walls, a central aperture, a first end, a medial portion, and a second end; said first end being adapted for sealing engagement with a wheel hub; said second end having a substantially cylindrically shaped interior surface, and said medial portion having an relatively enlarged interior surface;

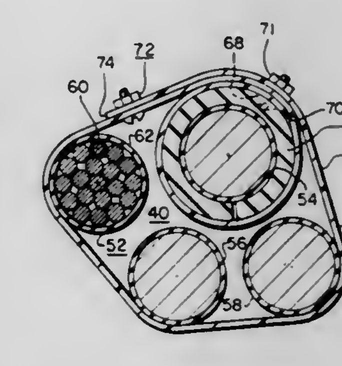
b. a piston slidably mounted within said second end; said piston having a marginal edge thereof normally sealingly engaging the interior surface of said second end; said piston being slidably mounted in said body for translation into said medial portion wherein the marginal edge of said piston assumes a non-sealing position with respect to the interior surface of said medial portion;

c. a relief opening positioned through said body and disposed rearwardly of said piston and in spaced relation thereto;

d. resilient means urging said piston toward said medial portion; and

e. means normally limiting piston travel to translation within the second end of said body; said limiting means being heat responsive whereby upon attaining a predetermined temperature, said limiting means releases said piston, and said resilient means urges said piston into the medial portion of said body and into said non-sealing position therewith thereby allowing lubricant to flow from said medial portion and through said relief opening, and escape from the lubricator as a warning signal.

4,058,186
ELEVATOR SYSTEM WITH RETAINER DEVICE FOR PLURALITY OF TRAVELING CABLES
Clyde M. Mullis, Glen Rock, N.J., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.
Filed May 28, 1976, Ser. No. 691,176
Int. Cl.² B66B *7/06*
U.S. Cl. 187—1 R **4 Claims**



4. An elevator system, comprising:

a building having a hoistway,

an elevator car mounted for vertical movement in the hoistway of said building,

a plurality of flexible traveling cables connected between said elevator car and a predetermined point of the hoistway,

said plurality of traveling cables being suspended from said elevator car such that each hangs in the hoistway with a bight which moves with car movement,

and a plurality of retainer devices disposed about said traveling cables at predetermined spaced locations,

each of said retainer devices including an elastomeric member, a strap member, and fastening means, said elastomeric member encircling one of said traveling cables, with said strap member tightly encircling the elastomeric member and its associated traveling cable, said strap member loosely encircling all of the traveling cables in a nonstretched condition to provide a loose containment thereof, said fastening means maintaining the assembled relation of said elastomeric member and the strap member about said plurality of traveling cables.

4,058,187

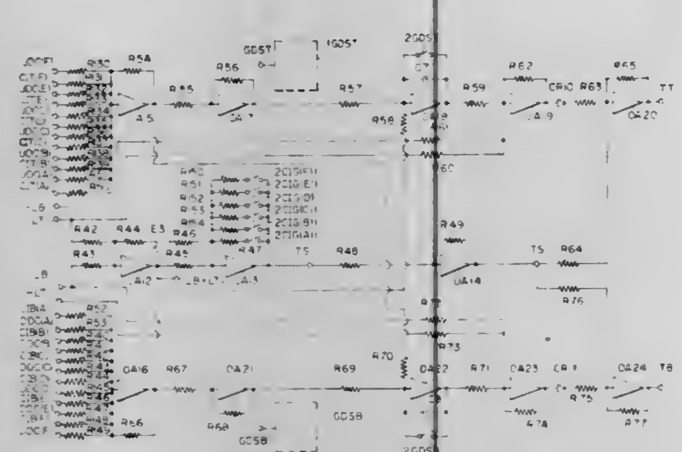
LIMITED STOP ELEVATOR DISPATCHING SYSTEM

Herbert Jacoby, Spring Valley, and Arnold Mendelsohn, New City, both of N.Y., assignors to United Technologies Corporation, Hartford, Conn.

Filed Sept. 4, 1975, Ser. No. 610,510

Int. Cl.² B66B *1/18*

U.S. Cl. 187—29 R **8 Claims**



1. Apparatus for generating dispatching signals for use with an elevator control system which selects and dispatches each of a plurality of cars from each of two terminals at dispatching intervals, said apparatus comprising:

weight responsive means individual to each car, each being responsive to the weight of the passengers in its respective car producing a signal representing that weight;

accumulation means for each terminal receiving said passenger weight signals, each said accumulation means operating in response to said passenger weight signals generating signals representing an estimated loading for the next car to be dispatched from its respective terminal;

signal transmission means for each said accumulation means transmitting the passenger weight signals of each selected car upon its dispatch from each of said terminals to the associated accumulation means;

a computed separation time period generating means responsive to the estimated loading signals of each said accumulation means and generating signals representing the computed time period separating each dispatched car of the system from the car next preceding and the car next succeeding its dispatch if each of the cars is sharing equally the estimated loading at the two terminals;

car differential means associated with one of said terminals producing signals signifying a differential between the cars that are approaching and are located at said one terminal and those that are approaching and are located at the other terminal during each dispatching interval that elapses for said one terminal;

loading differential means associated with said one terminal responsive to the estimated loading signals of each said accumulation means and generating signals signifying a differential between the signals representing the estimated load at said other terminal and the estimated load at said one terminal during each dispatching interval that elapses for said one terminal;

dispatching interval generating means responsive to said computed separation time period signal and to said car and loading differential signals and generating a dispatching interval for each selected car at said one terminal;

and a dispatching signal generator responsive to said dispatching interval generating means generating dispatching signals for each selected car at said one terminal upon an elapse from the disptach of the next preceding car of the time period represented by said dispatching interval for said selected car.

4,058,188

MECHANICAL SHOCK-ABSORBING DEVICE

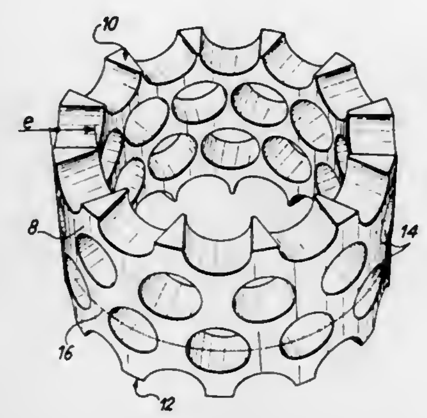
Bernard Vrillon, Wissous, France, assignor to Commissariat a l'Energie Atomique, Paris, France

Filed Feb. 28, 1974, Ser. No. 446,824

Claims priority, application France, Mar. 6, 1973, 73.07934

Int. Cl.² F16F *7/12*

U.S. Cl. 188—1 C **6 Claims**



1. A mechanical shock-absorbing device comprising a metal cylindrical ring, an axis for said ring, an internal diameter for said ring, an external diameter for said ring, a height for said ring along said axis, said internal and external diameters defining the thickness of said cylindrical ring which is the difference between said diameters, said internal and external diameters being constant along said height of said cylindrical ring, said thickness being on the order of one-sixth of said external diameter and a plurality of circular orifices in and over the surface of said cylindrical ring, said circular orifices being so disposed in circles on said ring that there is the same cross-section of metal along each generator line of said cylindrical ring.

4,058,189

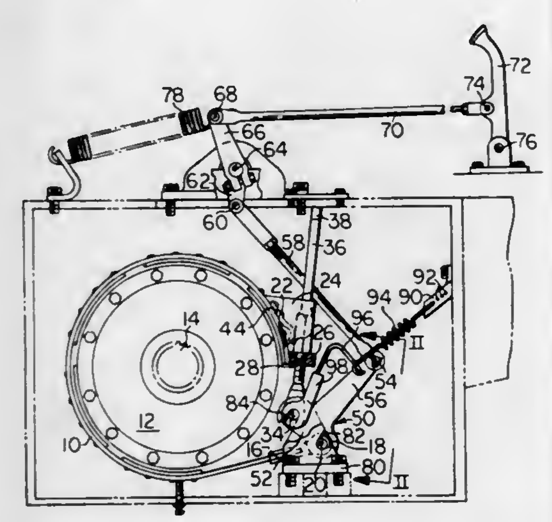
CONTROL LINKAGE FOR A BAND TYPE BRAKE

Monte Chamberlain, Metamora; Glen S. Comer, Jr., Dunlap, and Fredrick H. Elliott, Bartonville, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Mar. 11, 1976, Ser. No. 665,732

Int. Cl.² F16D *49/10*

U.S. Cl. 188—77 R **1 Claim**



1. In a control linkage for a band type brake having an acutating lever provided with a pair of anchor pins, a brake band adapted to be trained about a rotary element to be braked in either direction of rotation and having one end connected to one of said anchor pins, an adjustment bracket connected to the other of said pins, the other end of said band being connected to said adjustment bracket, an anchor bracket having a pair of spaced slots loosely receiving said pins and means for biasing one of said pins towards an end of the slot in which it is received, the improvement comprising additional means resiliently biasing the other pin into engagement with the end of its associated slot and oppositely of said one pin; one of said slots opening generally upwardly and having a lower end and the other of said slots opening generally downwardly and having an upper end, said one pin being received in said upwardly opening slot and said other pin being received in said downwardly open slot, said biasing means biasing said one pin toward said lower end and said additional means biasing said other pin toward said upper end, said additional means applying a predominantly vertical force to said other pin; said additional means comprising a spring and a separate, bent link directly interconnecting said spring and said other pin.

4,058,190

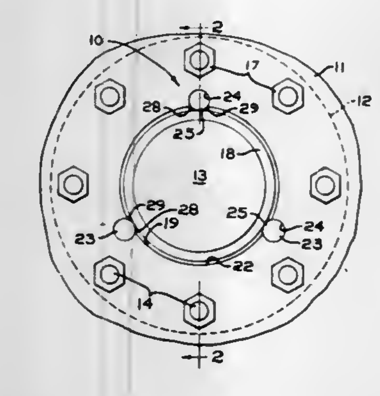
BRAKE DISC MOUNTING

Richard H. Gardner, Pleasant Hill, and Robert D. Kelley, Troy, both of Ohio, assignors to The B. F. Goodrich Company, Akron, Ohio

Division of Ser. No. 506,714, Sept. 17, 1974, Pat. No. 3,978,945. This application June 1, 1976, Ser. No. 691,597

Int. Cl.² F16D *65/12*

U.S. Cl. 188—218 XL **9 Claims**



1. A mounting for a brake disc on a shaft having an annular pilot rib with a circumferentially continuous cylindrical surface for registering said disc and said brake disc being fastened to said shaft for substantially no relative movement circumferentially and limited relative movement radially of said shaft, said mounting comprising a spacer member interposed between said pilot rib and said disc, said spacer member having a width measured in the axial direction of said shaft at least as great as the thickness measured in the radial direction of said shaft, said disc having an inner peripheral surface spaced from said cylindrical surface of said pilot rib and said spacer member being of a softer material than the material of said disc and disposed in a position between and in engagement with said pilot rib and said inner peripheral surface to limit relative radial movement and provide an opening between said disc and said shaft for deformation of a portion of said spacer member upon shrinkage of said disc on said pilot rib.

4,058,191

ELEVATOR SYSTEM INCLUDING AN ELEVATOR CAR HAVING DOOR OPERATED SEALING DEVICES ADJACENT DOOR OPENING

Anthony M. Balbo, Millburn, N.J., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Oct. 6, 1976, Ser. No. 729,919

Int. Cl.² B66B *11/00*

U.S. Cl. 187—1 R **8 Claims**

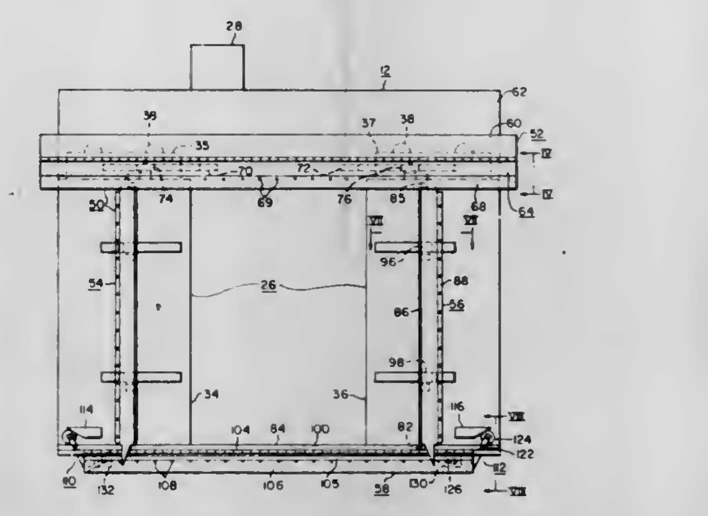
1. An elevator system, comprising:

an elevator car including an opening having first and second sides and top and bottom portions, and door means mounted on said elevator car for horizontal movement to open and close said opening;

a building having a plurality of floors, and door means located at certain of the floors to provide access to the floors through an external wall of the building;

means mounting said elevator car for movement adjacent to but spaced from said external wall, with the door means of a floor being in registry with and operable by the door means of the elevator car when the elevator car is stopped at the floor;

and sealing means carried by said elevator car, said sealing means including first means mechanically and pivotably actuatable between first and second positions by horizontal movement of the door means of said elevator car as it



opens and closes the opening in said elevator car, with the first position being a retracted position, and with the second position being an extended position which closes and seals the space above the top portion of the car opening, between the elevator car and the external wall of the building.

4,058,192

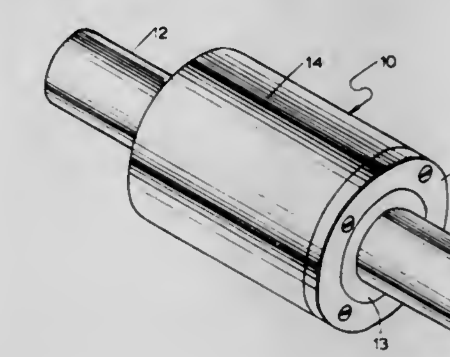
UNI-DIRECTIONAL MECHANISM

Robert Haigh, Northboro, Mass., assignor to Lowell Corporation, Worcester, Mass.

Filed May 21, 1976, Ser. No. 688,690

Int. Cl.² F16D *41/18*

U.S. Cl. 192—46 **4 Claims**



1. A uni-directional mechanism, comprising:

a. a rotatable input element in the form of a wheel with a generally cylindrical periphery,

b. a rotatable output element in the form of a housing having a cylindrical bore whose surface lies adjacent to the periphery of the wheel,

c. a dog mounted in the output element, the dog mounted in a generally radial recess in the housing, the inner end of the dog is semi-cylindrical, the recess having two parallel spaced sides between which the dog is slidably mounted, one of the said sides of the recess is joined to the surface of the cylindrical bore by a plane surface which is inclined at a substantial angle to the radial,

d. notches formed on the input element, each notch consisting of two plane surfaces lying symmetrically to a radius and meeting at an angle of about 90°, the wheel being provided with a substantial land between successive pairs of notches and the dog being provided with a broad surface that slides on successive lands and is large enough to bridge each notch, and

e. a coil spring for biasing the dog toward the said input element, the coil spring being located in the recess and compressed between the inner end of the recess and the

inner end of the dog, the dog being movable automatically from a first aspect where it does not engage a surface of a notch when the input element is rotated in one direction to a second aspect where a portion of said semi-cylindrical inner end of the dog engages one of the spaced sides of the recess and a surface of the dog engages the inclined surface of the recess so that the dog does engage a surface of a notch in driving relationship when the input element is rotated in an opposite direction.

4,058,193

HYDRAULIC CONTROL DEVICE FOR USE IN AN AUTOMATIC TRANSMISSION

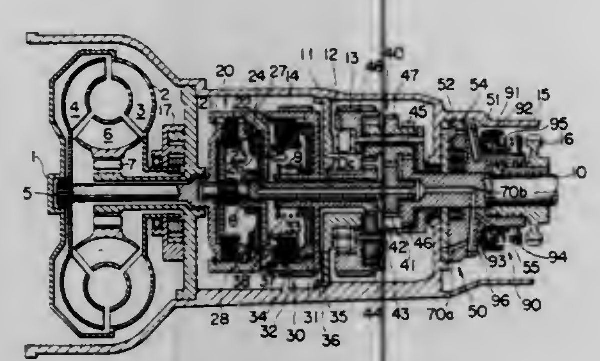
Kunio Morisawa; Isamu Minemoto, and Tatsuo Kyushima, all of Toyota, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Dec. 18, 1975, Ser. No. 641,901

Claims priority, application Japan, Apr. 16, 1975, 50-45160

Int. Cl.² F16D *25/10*

U.S. Cl. 192—109 F **5 Claims**



1. In hydraulic control device for automatic transmissions of the type having an output shaft, an intermediate shaft coupled to the input shaft through a hydraulically actuated frictional engagement device during a forward drive condition, servo means for hydraulically actuating the frictional engagement device, an output shaft operatively connected to the intermediate shaft through a planetary gear mechanism, a hydraulic fluid pressure source including a fluid reservoir and a pump connected to said fluid reservoir for generating a hydraulic fluid pressure, a manual shift position selector mechanism for establishing a forward driven condition, and channel means for supplying fluid pressure from the pump to the servo means when a forward drive condition is established by the shift position selector mechanism, means for modulating the increased fluid pressure supplied by said channel means to said servo means upon actuation of said frictional engagement device for minimizing shock as said intermediate shaft is coupled to said input shaft during shift into a forward drive condition comprising a first passage formed in said intermediate shaft and connected to said servo means, a second passage formed in said output shaft and connected to said first passage, and a third passage connecting said second passage to said pump and said fluid reservoir forming the channel means, and accumulator means fixedly positioned co-axially around said output shaft and fluidly connected to said third passage for providing a fast modulation of the pressure of the fluid supplied by said channel means and for minimizing the size of said hydraulic device.

4,058,194

MULTIPLE DOCUMENT RECOGNITION APPARATUS

John B. Riddle, Los Altos Hills, and Howard Z. Bogert, Jr., Cupertino, both of Calif., assignors to Micro Magnetic Industries, Inc., Palo Alto, Calif.

Filed May 4, 1976, Ser. No. 682,925

Int. Cl.² G07F *7/04*

U.S. Cl. 194—4 C **5 Claims**

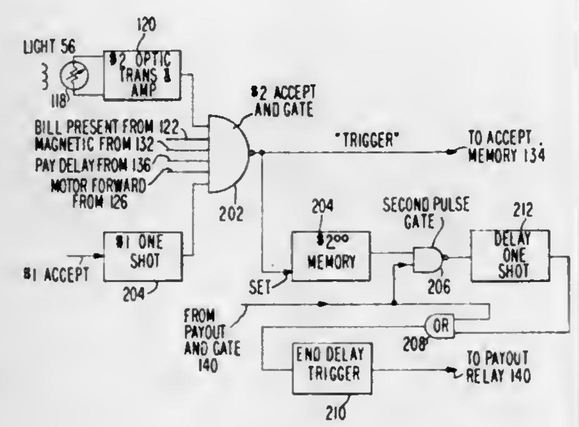
1. A multi-document recognition device comprising:

a. means for recognizing documents having a base level of value;

b. means responsive to said recognizing means for providing a signal indicating that such a base value has been recognized; and

c. means for recognizing documents having higher levels of value than said base level including:

i. means for stimulating said base value indicating means to provide a signal indicative of the base value;



ii. memory means for retaining the information that a higher value document has been recognized, and

iii. means for re-stimulating said base value indicating means, after a base value signal is provided, to provide additional base value signals according to the ratio of the value of the higher value document and the base value.

4,058,195

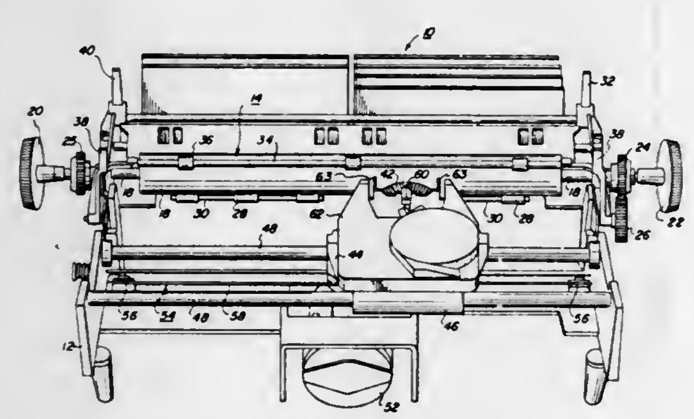
INCREMENT-DECREMENT LOGIC FOR SERIAL PRINTER

John C. Fravel; Louis H. Chang, and Harunori Yoshikawa, all of San Jose, Calif., assignors to Xerox Corporation, Stamford, Conn.

Filed May 3, 1976, Ser. No. 682,881

Int. Cl.² B41J *1/24, 7/48*

U.S. Cl. 197—18 **14 Claims**



1. A serial printer comprising:

a carriage;

a print member rotatably mounted to said carriage and including a plurality of character elements;

drive means coupled to said print member for rotating said print member to a desired rotational position;

means coupled to said print member for generating a plurality of periodic position signals each indicative of the rotational movement of said print member;

means for storing a count indicative of the actual rotational position of said print member, said means for storing including means responsive to an increment pulse for incrementing said count by one and means responsive to a decrement count for decrementing said count by one;

increment-decrement means coupled to said means for generating and responsive to said position signals for generating an increment pulse at a predetermined point during the period of a predetermined one of said position signals during rotation of said print member in one direction and a decrement pulse at said predetermined point during rotation of said print member in the opposite direction, said increment-decrement means including means for inhibiting the generation of a predetermined increment pulse that would normally occur when the print member has been rotated too far and overshoots said desired rotational position by a predetermined amount and then is returned to said desired rotational position; and

means responsive to said count and to a signal representative of said desired rotational position of said print member for controlling the direction and speed of rotation of said print member.

4,058,196

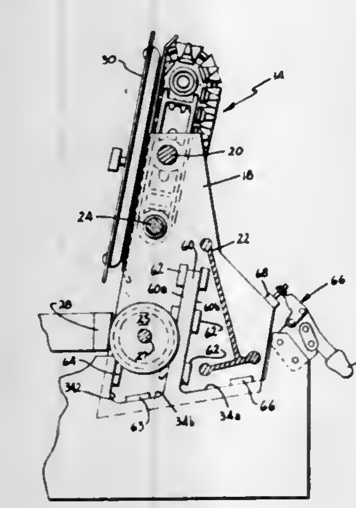
PRINTER WITH INTERCHANGEABLE PAPER-FEED MODULES

William D. Rempel, Howell, Mich., assignor to Sycor, Inc., Ann Arbor, Mich.

Filed Feb. 23, 1976, Ser. No. 660,257

Int. Cl.² B41J *15/04*

U.S. Cl. 197—133 R **27 Claims**



1. A data printer with removable modular paper-feed assembly, comprising: a main support frame structure for the printer; print head means movable relative to at least portions of said frame structure so as to print lines of characters on paper fed by said paper-feed assembly; means carried on said frame structure defining an elongated guideway having longitudinal guide surfaces and means defining limiting and positioning surfaces for a module guided by said guide surfaces; drive means carried by said frame structure, including a motor and a rotatable output drive member; at least one modular paper-feed assembly having side wall sections, at least one support extending between the side wall sections, and movable paper-engaging-and-feeding apparatus mounted between the side wall sections, said feeding apparatus including a continuously movable member having means for engaging and moving paper stock and a rotational drive element coupled to such member for imparting movement thereto; means for releasably and detachably mounting said modular paper-feed assembly upon said frame structure, said means including a follower structure for said elongated guideway, said follower structure carried with said paper-feed assembly and being complementary to and movable longitudinally along said frame structure guide surfaces, said mounting means also having portions cooperatively seatable against said limiting and positioning surfaces to index the paper-feed assembly in a particularly defined position upon the frame structure said guideway and guideway follower being disposed and positioned to define a path of movement for said paper-feed assembly which brings the drive element of the latter angularly toward and into driving engagement with the output drive member of the drive means motor carried by the frame structure when the said limiting and positioning surfaces have indexed the paper-feed assembly in said particularly defined position; and interlock means having a locking element carried on one of said frame structure and said paper-feed assembly and a locking element-engaging portion carried on the other thereof for mutual locking engagement between said paper-feed assembly and said frame structure in said seated, indexed position, said locking engagement rigidly securing said paper-feed assembly in place upon the frame structure and holding said output drive member of the frame structure drive means engaged with said drive element of the paper-feed module, such that actuation of the motor produces movement of said paper-feeding apparatus through the interengaged output drive member and paper-feed assembly drive element.

4,058,197

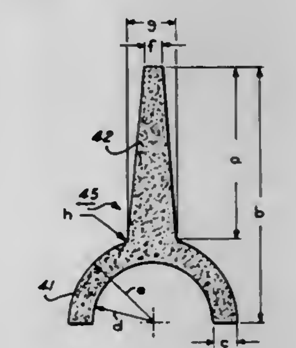
RIBBON TENSION CONTROL FOR A RIBBON CARTRIDGE

Donald P. West, Dallas, Tex., assignor to Xerox Corporation, Stamford, Conn.

Continuation of Ser. No. 537,148, Dec. 30, 1974, abandoned. This application Sept. 27, 1976, Ser. No. 727,107

Int. Cl.² B41J *33/52*

U.S. Cl. 197—151 **9 Claims**

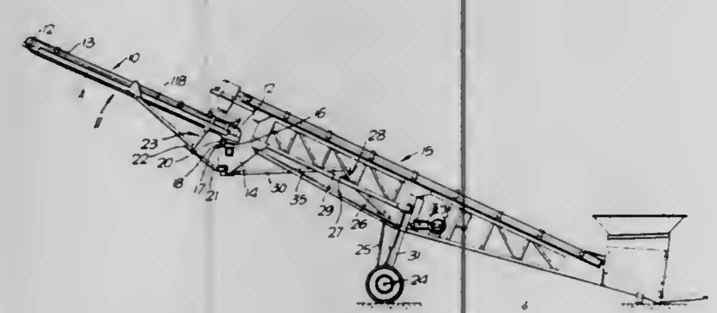


1. In a serial printer having a platen, a laterally movable carrier for traversing a printing line, printhead means supported on said carrier for impacting with said platen to print characters, ribbon feed means supported on said carrier for feeding an ink ribbon past said printhead means, and a ribbon cartridge supported on said carrier, wherein said ribbon cartridge includes means for rotatably supporting a ribbon supply spool, means for rotatably supporting a ribbon take-up spool and means for transferring said ribbon between said supply spool and said take-up spool; the improved ribbon tension control comprising:

a stationary frictional drag means extending radially across and positioned in frictional engagement with all the edges of at least one side of the ribbon positioned on the supply spool, said frictional drag means being of a shape to effect a substantially uniform tension in said ribbon during its transfer, said shape comprising a generally curved section which is coaxial with the ribbon supply spool and a straight-line tapered section extending radially outwardly from the generally curved section and extending approximately to the periphery of the ribbon material on the supply spool, the generally curved section having a width in the radial direction of about 0.16 times the width in the radial direction of the tapered section and said tapered section having a width in the circumferential direction of the spool which decreases by a factor of about 0.5 from its inner extremity to its outer extremity, said generally curved section is positioned against said spool to provide a predetermined area of contact between said spool and said generally curved section regardless of the amount of ribbon remaining on said spool.

4,058,198
CONVEYOR ASSEMBLY

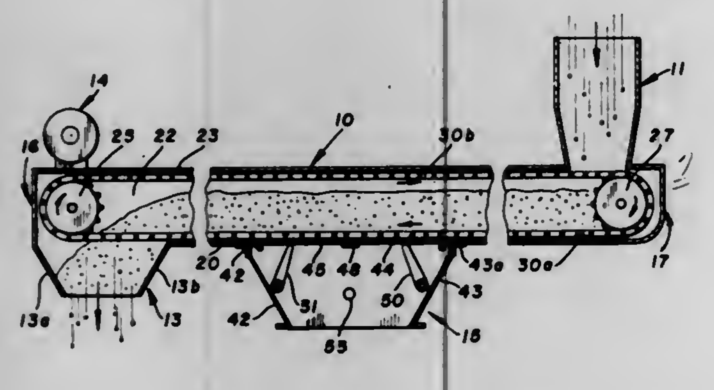
Patrick O'Neill; Patrick Joseph Douglas, and Michael Lee Mallaghan, all of Dungannon, Ireland, assignors to Powerscreen International Limited, Dungannon, Ireland
Filed Mar. 30, 1976, Ser. No. 672,078
Claims priority, application United Kingdom, Apr. 1, 1975, 13176/75
Int. Cl.[2] B65G *21/12*
U.S. Cl. 198—313 **3 Claims**



1. A conveyor assembly comprising a main conveyor, a boom conveyor unit comprising an elongate support structure and a conveyor mounted in said support structure, a mounting pivotally connected at the discharge end of said main conveyor for movement about a transverse axis relative to said main conveyor, a rotatable support on said mounting to which said boom conveyor unit is mounted for movement in a lateral plane, and a linkage adapted to synchronously alter the position of the mounting relative to the main conveyor on alteration of the angle of inclination thereof, said linkage comprising an upright support member having one end connected to a part of the main conveyor which does not vary in height off the ground, and having its other end pivotally connected to a first link, said first link being angularly disposed relative to said upright support member in a direction towards the discharge end of the main conveyor, and pivotally connected at its other (forward) end to a location on the main conveyor which varies in height on alteration of the inclination of the main conveyor, a bell crank arm mounted on said location of variable height and having a fixed position relative to the first link, and a connecting rod pivotally connected to the bell crank in the mounting.

4,058,199
IN-MASS CONVEYOR WITH INTERMEDIATE DISCHARGE

William A. Schlagel, Coon Rapids, Minn., assignor to Schlagel, Inc., Cambridge, Minn.
Filed Aug. 4, 1976, Ser. No. 711,438
Int. Cl.[2] B65G *19/08*
U.S. Cl. 198—370 **5 Claims**

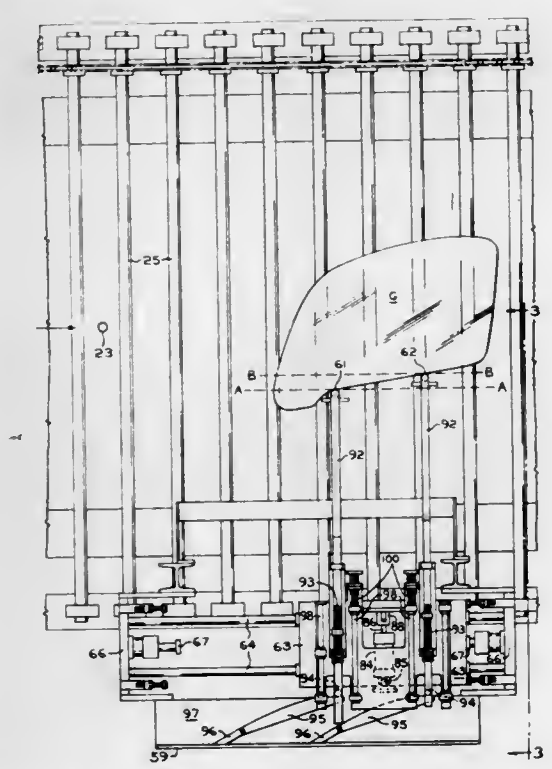


1. A conveyor for conveying material in-mass and including at least one intermediate discharge along the length thereof, said conveyor including:

a. a longitudinally extending housing having a receiving end and a discharge end, said housing including a substantially planar, material support section, upstanding side sections and a top;
b. a continuous, material conveying element arranged within said housing and providing an upper and a lower run portion, said lower run portion being arranged in close association to said housing material support section for travel thereover;
c. means arranged on the respective ends of said housing and carrying said material conveying element;
d. means driving one of said carrying means to impart motion to said material conveying element;
e. said material conveying element including a generally centrally arranged connecting member and a plurality of laterally extending, upstanding material engaging elements;
f. at least one intermediate discharge arranged between said ends of said housing and extending directly downwardly therefrom, said intermediate discharge including a downwardly extending housing having sides engaging said planar, material support section and having a door structure in planar alignment with said planar support section, said door structure forming said planar support section within said housing;
g. said door structure including a pair of door members each being rotatably mounted on transversely extending pivot means, said pivot means being arranged on the ends of said door members adjacent the planar support section, the length of said doors providing an opening the entire width of said housing when the same are in open position; and,
h. common actuating means arranged in association with said doors for sequentially closing the same into alignment with said planar support section, said actuating means including camming means associated with and operating against the bottom of said doors to shift the same upwardly, said camming means being spaced from said pivot mounting means for said doors.

4,058,200
ORIENTING AND ALIGNING MOVING GLASS SHEETS

Robert G. Frank, Murrysville, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.
Filed July 23, 1975, Ser. No. 598,298
Int. Cl.[2] B65G *47/24*
U.S. Cl. 198—382 **12 Claims**

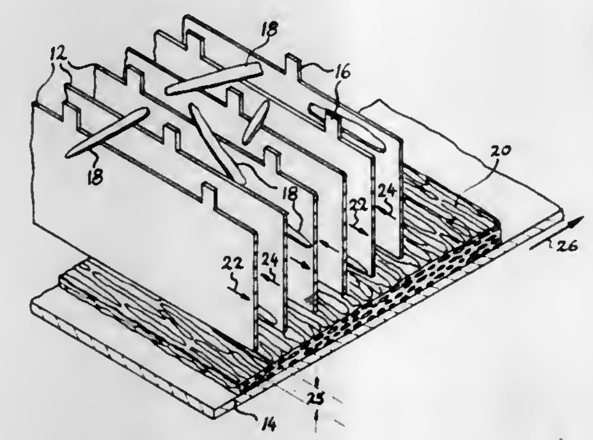


1. Apparatus for individually orienting and aligning each sheet of a series of thin, rigid, glass sheets moving rapidly in a given plane in an essentially straight path along a conveyor toward a sheet treating station where it is desired to have said sheet properly oriented and aligned relative to said sheet treating station, a sheet orienting and alignment station located to one side only of said conveyor and comprising:

1. a carriage provided with a pair of sheet edge engaging members in the form of truncated cones whose outer walls are shaped upward and inward relative to the conical axes of said sheet edge egaging members, said carriage being mounted for movement in a reciprocating path parallel to and to one side of said essentially straight path,
2. means to move said carriage downstream in unison with movement of each sheet in said series between an upstream position and a downstream position at a speed of movement of said sheet and to return said carriage to said upstream position at a more rapid speed,
3. means to move said sheet edge engaging members laterally inward in a direction substantially normal to said conical axes to predetermined lines of engagement with the side of said sheet adjacent said glass edge engaging members in the plane occupied by said sheet during its movement as said carriage moves downstream, said glass engaging members causing less edge chipping and surface marking of the glass than that which results from orienting and aligning moving glass sheets with glass engaging members of cylindrical configuration,
4. means to retract said sheet edge engaging members from said predetermined lines of sheet edge engagement and means to lift said sheet edge engaging members above the plane occupied by said sheets after said sheet edge engaging members reach said predetermined lines of sheet edge engagement to avoid misaligning said previously aligned sheet by avoiding further contact therewith, and
5. means to lower said sheet edge engaging members into said plane in time for said carriage to receive the next rigid sheet at said upstream position and after the trailing edge of a previous sheet engaged during the previous downstream movement of said carriage has passed the positions occupied by said sheet edge engaging members.

4,058,201
METHOD AND APPARATUS FOR ORIENTING WOOD STRANDS INTO PARALLELISM

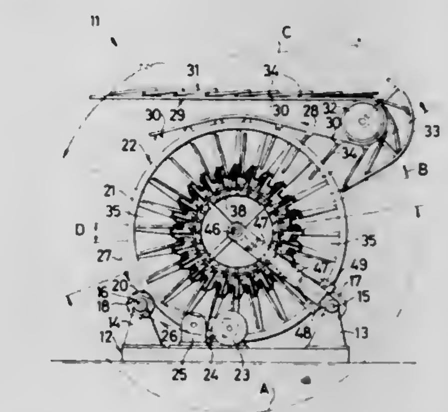
Roland Etzold, Mountain View, Calif., assignor to Elmendorf Research, Inc., Palo Alto, Calif.
Filed Dec. 20, 1974, Ser. No. 535,079
Int. Cl.[2] B65G *47/34*
U.S. Cl. 198—382 **18 Claims**



1. A method of orienting wood strands into parallelism on a moving support to form a mat thereon comprising: providing a group of elongated, generally parallel spaces above the support with each pair of adjacent spaces having a movable boundary therebetween and extending to a predetermined depth and with each boundary having a plurality of spaced projections on the upper margin thereof; directing a mass of loose wood strands toward said group of spaces from above the same so that the strands aligned with the longitudinal axes of the spaces will gravitate therethrough and onto said support; moving each pair of adjacent boundaries in opposite directions relative to each other along respective, generally straight paths to cause corresponding projections to engage those strands which span the distance between the boundaries and to turn such strands into alignment with respective spaces, the speed of movement of the boundaries relative to speed of movement of the support being sufficient to cause upended strands having first ends engaging the strand mat therebelow and second ends engaging adjacent boundaries to be turned into substantial alignment with the longitudinal axes of respective spaces before the movement of the support can cause disorientation of the strands.

4,058,202
APPARATUS FOR PROCESSING PRODUCTS ESPECIALLY PRINTED PRODUCTS

Walter Reist, Hinwil; Egon Hänsch, and Reinhard Gösslinghoff, both of Wetzikon, all of Switzerland, assignors to Ferag AG, Hinwil, Switzerland
Filed Feb. 5, 1976, Ser. No. 655,562
Claims priority, application Switzerland, Feb. 26, 1975, 2430/75
Int. Cl.[2] B65G *29/00*
U.S. Cl. 198—482 **38 Claims**



1. An apparatus for processing products, especially printed products comprising:

a. a revolving cell wheel having an axis of rotation and means providing compartments for the cell wheel;
b. means mounting said cell wheel for rotation about said axis of rotation;
c. means for rotating said cell wheel about said axis of rotation;
d. means defining an infeed location for the delivery of products into the compartments of said cell wheel where the products are processed while residing in said compartments;
e. means defining an outfeed location for the removal of the products from said compartments of said cell wheel;
f. said infeed location and said outfeed location being arranged in offset relationship in the direction of the axis of rotation of said cell wheel;
g. a plurality of product entrainment means arranged in each compartment for axial movement through a work stroke and a return stroke, the axial length of said work stroke being only a fraction of the axial length of said cell wheel;
h. means individual to each compartment for operatively coupling the plurality of entrainment means of the respective compartment with one another; and
i. drive means for driving said entrainment means, said drive means comprising a common stationary guide track describing a closed curve and follower elements coacting with said stationary guide and rotating with said cell wheel to cause said axial movement of said plurality of entrainment means of said respective compartment.

4,058,203

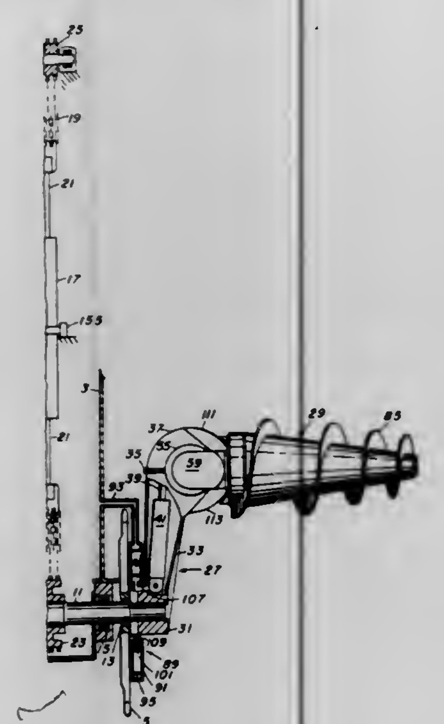
BULK MATERIAL DISLODGING AND GATHERING APPARATUS

Aubrey C. Briggs, Carnegie, Pa., assignor to Dravo Corporation, Pittsburgh, Pa.

Filed July 1, 1976, Ser. No. 701,898

Int. Cl.² B65G *65/22*

U.S. Cl. 198—509 **6 Claims**



1. Apparatus for dislodging and drawing bulk material toward a depending elongated bulk material transporter having lifting means which rotates in an elongated closed plane top to raise the bulk material from the lower end of the transporter to the upper end thereof, said apparatus comprising:

a first elongated member extending laterally out of the plane of said elongated loop formed by the lifting means near the lower end of the transporter,

a second elongated member extending laterally from the extended end of said first elongated member and rotatable with respect to the loop formed by the lifting means about the longitudinal axis of the first elongated member, said second elongated member extending beyond the elongated closed loop formed by the lifting means except when said second elongated member is rotated toward the upper end of the transporter,

elongated dislodging and gathering means for dislodging and drawing bulk material along a longitudinal axis thereof, and

connecting means pivotally connecting one end of the elongated dislodging and gathering means to near the face end of the second elongated member for rotation of the dislodging and gathering means about said one end in a plane containing the longitudinal axis of said elongated dislodging and gathering means.

4,058,204

BELT CONVEYOR

Simon Arieh, Geneva, Switzerland, assignor to Battelle Memorial Institute, Carouge, Geneva, Switzerland

Continuation-in-part of Ser. No. 470,290, May 15, 1974, Pat. No. 3,967,720. This application May 12, 1976, Ser. No. 686,224

Claims priority, application Switzerland, May 16, 1973, 6942/73; May 16, 1975, 6365/75

Int. Cl.² B65G *16/30*

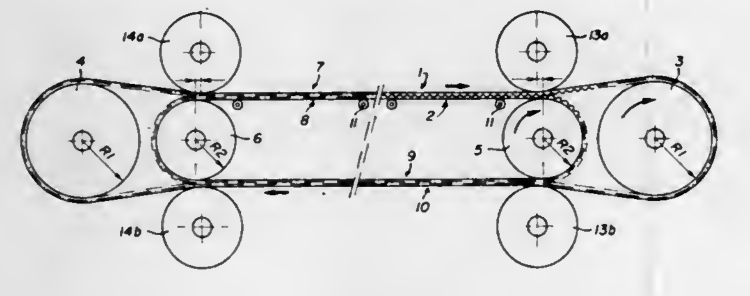
U.S. Cl. 198—833 **6 Claims**

1. In a belt conveyor having at least one straight load bearing zone and comprising:

a. a pair of flexible elementary belts each having a neutral axis and a reinforcing layer embedded in the vicinity of said neutral axis so as to reinforce each belt at least longitudinally;

b. a regular array of projections and intermediate recesses arranged on one side of each elementary belt so that the projections of one belt fit exactly into corresponding recesses of the other belt thereby to provide positive engagement with rigid interlocking of the elementary belts so as to render them solid with each other, at least longitudinally by their superposition and positive engagement along straight portions thereof; and

c. belt guide means which define the paths of the elementary belts so as to provide: first curved path portions arranged to bring the elementary belts progressively together into mutual positive engagement and rigidly interlock relationship at one end of said load bearing zone of the conveyor; a common straight path portion wherein the superposed elementary belts remain positively engaged and rigidly interlocked from said one end to the opposite end of the straight load bearing zone and are thereby made solid with each other at least longitudinally whereby to transmit shear forces due to flexure from one belt to the other, so that the elementary belts thereby form together a straight, rigid composite beam assembly wherein the respective reinforcing layers of the belts of this assembly exert a



combined reinforcing action providing substantial rigidification of the composite beam assembly; and second curved path portions arranged to progressively disengage and thereby separate said elementary belts beyond said opposite end of the load bearing zone, whereby said belts may separately undergo a desired directional change along their respective second curved path portions, the improvement consisting of:

d. said guide means including belt deflecting means so arranged in the vicinity of each end of said straight load bearing zone that said elementary belts are deflected in opposite directions around centers of curvature which are longitudinally shifted with respect to each other at each end of said straight load bearing zone, to thereby substantially obviate friction between said projections and recesses when said belts are on the one hand progressively engaged and thereby brought into rigidly interlocked relationship at one end of said straight load bearing zone, and when the rigidly interlocked belts are, on the other hand, progressively separated from each other beyond the opposite end of said straight zone of the conveyor.

4,058,205

APPARATUS FOR TREATING OIL SHALE

Thomas G. Reed, Jr., 818 Heather Court, Houston, Tex. 77024

Division of Ser. No. 434,598, Jan. 18, 1974, Pat. No. 3,939,057. This application Oct. 17, 1975, Ser. No. 623,354

Int. Cl.² C10B *1/10, 49/04, 53/06*

U.S. Cl. 202—86 **8 Claims**

1. An apparatus for extracting crude oil from oil shale comprising

a rotary preheater for receiving a feed of crushed oil shale feed,

a rotary retort for receiving said crushed oil shale and for heating the oil shale to decompose kerogen to oil and evaporating said oil,

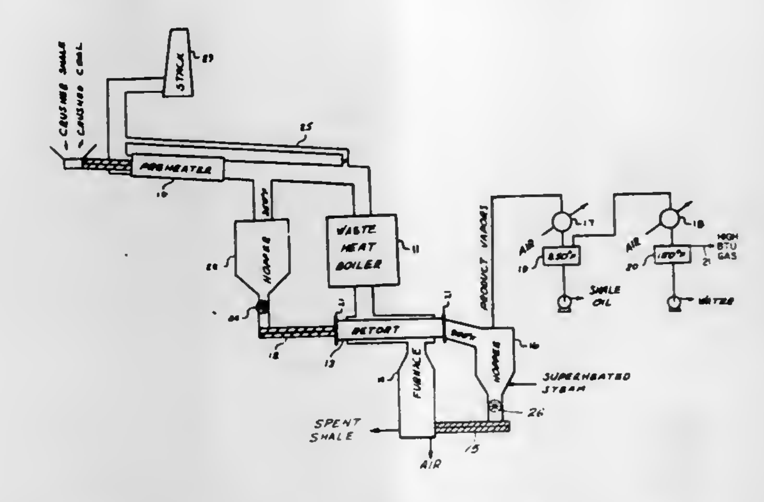
means connected to and communicating with said rotary retort and said rotary preheater for transferring said crushed oil shale from said rotary preheater to said rotary retort, and

for preventing vapors from passing from one into the other,

a hopper means for receiving the retorted oil shale and for stripping residual oil therefrom,

means connected to and communicating with said rotary retort and said hopper for transferring said retorted oil shale from said rotary retort to said hopper,

a furnace for receiving the crushed oil shale substantially stripped of oil and having char thereon and for burning said char to provide hot gases for operation of said apparatus,



means connected to and communicating with said hopper and said furnace for transferring said retorted oil shale from said hopper to said furnace,

means for passing said hot gases from said furnace into contact with said rotary retort for indirectly heating said crushed oil shale therein, and

means to pass said hot gases used to indirectly contact said rotary retort for direct contact with said crushed oil shale feed in said preheater.

4,058,206

DISPLAY CARTON AND BLANK THEREFOR

Hugh B. Morse, San Jose, and Robert B. Johnson, Santa Clara, both of Calif., assignors to Helmut E. W. Masch, San Jose, Calif.

Filed July 19, 1976, Ser. No. 706,889

Int. Cl.² B65D *5/50, 5/54*

U.S. Cl. 206—44 R **21 Claims**

1. A display carton comprising

vertically disposed front and back panels,

a vertically disposed pair of side panels connected to said front and back panels,

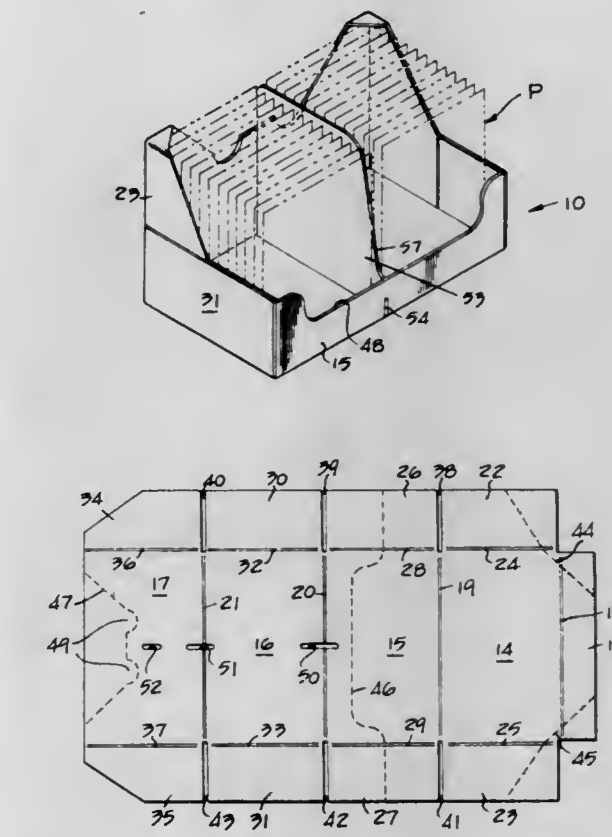
horizontally disposed top and bottom panels each connected to said front, back and side panels,

a vertically disposed separate partition panel disposed in said carton between said side panels and extending between said front and back panels to define an unobstructed receptacle on each side of said partition panel,

means releasably locked said partition panel to at least said front and back panels comprising at least one lock tab formed on opposite ends of said partition panel and engaged within a slot formed in a respective one of said front and back panels and in said bottom panel, said slot extending across a common scoreline connecting said bottom panel to a respective one of said front and back panels; and

means defining a continuous tear line through at least some of said front, back, side and top panels for dividing said carton into a removable upper section and a lower section adapted to retain a plurality of packages on either side of said partition panel in said lower section.

15. A blank cut and scored to consecutively define a rectangular top panel, a rectangular front panel, a rectangular bottom panel sized identically with said top panel, a rectangular back panel sized identically with said front panel, means defining a plurality of slots through at least some of said panels and disposed in colinear relationship thereon for adaption to receive lock tabs of a partition panel therein, means defining separate tear lines in at least some of said panels for forming a continous tear line upon erection of said blank into a display carton for separating said display carton into a removable upper section and a lower section adapted to retain a plurality of packages therein, a flap connected to an edge of said top panel and being substantially coextensive therewith, a pair of side flaps connected on lateral sides of each of said top, front, bottom, and back panels, and wherein said means defining separate tear



lines comprises a first tear line formed in one of the side flaps connected to said top panel, said top panel and the flap connected to a forward edge of said top panel, a second tear line formed in the second side flap connected to said top panel, said top panel and the flap connected to the forward edge of said top panel, and a third tear line formed in the side flaps connected to said front panel and said front panel and a fourth tear line formed solely in said back panel.

4,058,207

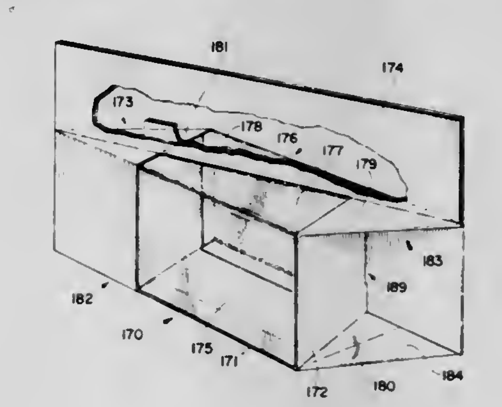
CONTAINER

Irving Morton Koltz, Scarborough, Canada, assignor to International Inpak, Inc., Saddle Brook, N.J.

Continuation of Ser. No. 272,112, July 7, 1972, abandoned, which is a continuation-in-part of Ser. No. 160,806, July 8, 1971, abandoned. This application Apr. 2, 1975, Ser. No. 554,241

Int. Cl.² B65D *25/54*

U.S. Cl. 206—45.34 **2 Claims**

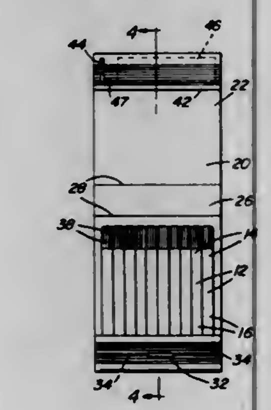


1. A container for merchandise and comprising:

a generally rectangular container having four sides and two ends defining a generally rectangular interior, said sides having a predetermined length and breadth, and,

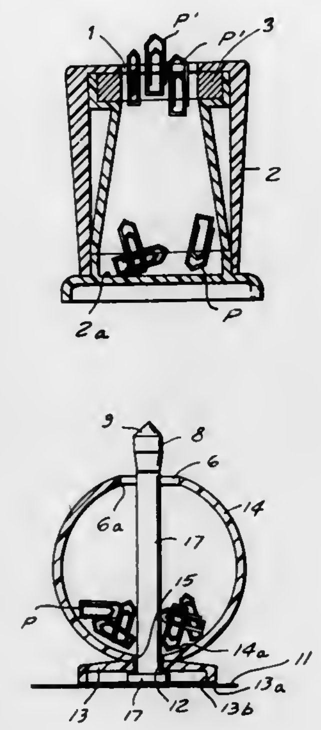
transparent panel means forming at least one said side and extending the full lenght and breadth thereof, and further including transparent panel means forming three sides of said container namely a front side, a rear side, and an upper side, and display panel means formed integrally with said ends and extending along a median line of said transport upper side.

4,058,208
BOOK MATCHES WITH SAFETY LIGHTING FEATURES
Owen H. Lund, 90 Albion Place, Staten Island, N.Y. 10302
Filed Apr. 14, 1976, Ser. No. 676,811
Int. Cl.² A24F *27/00*
U.S. Cl. 206—109 **9 Claims**



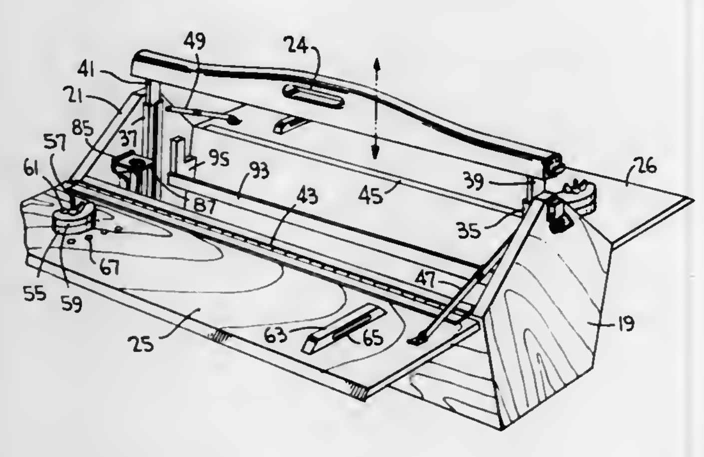
1. A matchbook including a plurality of matches including ignitable head end portions and base end portions, said base end portions connected to, but separable from, a mounting panel, a book cover including front and rear panels joined by means of an integral bendable reversely bent panel portion connecting and extending between adjacent parallel marginal portions of said front and rear panels, the end of said rear panel remote from said front panel including a reversely bent terminal end directed over the front face of said rear panel, said mounting panel being secured between said reversely bent terminal end and the opposing portion of said rear panel with said head ends extending toward said bendable panel portion, said front panel overlying the sides of said matches remote from said rear panel with the end of said front panel remote from said bendable panel portion removably anchored to the adjacent marginal edge of said terminal end, the outer surface of said reversely bent terminal end including a dark coating thereon simulating match head striking surface area thereon, the edge of said front panel remote from said bendable panel portion including a reversely bent terminal end flap closely overlying the inner surface of said front panel and secured to said front panel at one side marginal portion thereof, one of the opposing surface portions of said end flap and said front panel including a match head striking coating thereon in position normally hidden from view and the other of said opposing surface portions being devoid of a match head striking coating, the portion of said end flap remote from said one side marginal edge of said front panel being displaceable away from the opposing front panel portion sufficient to receive one of said head end portions therebetween for frictional engagement with said match head striking coating, said ignitable head end portions include opposite sides, each head end portion including an ignitable coating thereon limited to one of said opposite sides.

4,058,209
PAPER-CLIP DISPENSER
Karl Wilhelm Schmidt, Idar Oberstein, Germany, assignor to Gebruder Schmidt Metallwarenfabrik, Idar-Oberstein, Germany
Filed May 17, 1976, Ser. No. 687,390
Claims priority, application Germany, Jan. 15, 1976, 2601298
Int. Cl.² B65D *83/00;* **A45C** *11/00*
U.S. Cl. 206—350 **8 Claims**



1. A paper-clip dispenser comprising an upwardly open receptacle having a mouth at the top and a hole in the bottom thereof, and a stem movably received in said hole and carrying a magnet at its upper end whereby elevation of said receptacle from a surface enables said stem to fall through said hole and bring said magnet into the proximity of paper clips contained in said receptacle and replacing of said receptacle on a surface causes said stem to raise in said receptacle and carry paper clips to the mouth thereof, said mouth having an edge positioned to wipe excess paper clips from said magnet, said stem extending through said mouth when said receptacle rests on said surface.

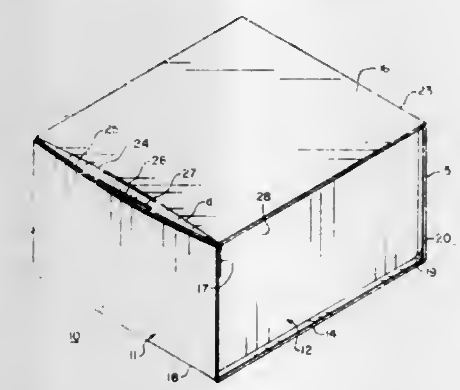
4,058,210
TOOL CASE
William J. Mitchell, Rte. 695, Trevilians, Va. 23170
Filed Sept. 14, 1976, Ser. No. 723,106
Int. Cl.² B65D *85/28, 25/28*
U.S. Cl. 206—372 **9 Claims**



1. A tool case comprising
base, sides and end sections secured together;
lid sections hinged at one edge thereof to the upper edges of said side sections;
a handle;

means for slidably mounting said handle for vertical movement relative to said base;
said handle abutting the free edges of said lids when said lids are closed and said handle is in the lowermost position; and
means for releasably securing said handle to at least one of said end sections when said handle is in its lowermost position.

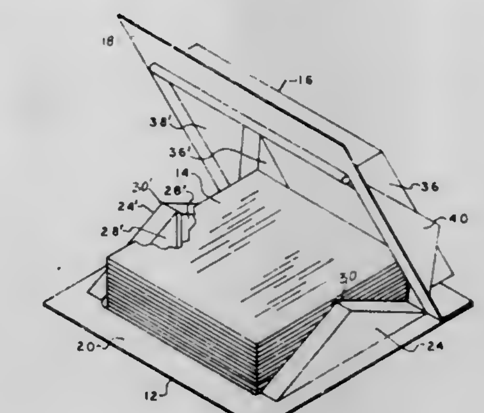
4,058,211
ELECTRIC LAMP BULB PACKAGE AND SLEEVE COMPONENT THEREFROM
Thomas Barbieri, Peapack, and Edward J. Getz, Irvington, both of N.J., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.
Filed Aug. 10, 1976, Ser. No. 713,178
Int. Cl.² B65D *85/42, 13/06*
U.S. Cl. 206—422 **10 Claims**



1. A package comprising;
a wrapper that is of tubular configuration and open at each end and includes a plurality of interconnected walls having end edges that are substantially straight and so arranged that the open ends of the wrapper are terminated along planes that are substantially parallel to one another,
fragile merchandise disposed within said wrapper, and
an open-ended sleeve that is fabricated from stiff single-ply packaging material that is devoid of corrugations and is slip-fitted over said wrapper and is so oriented that oppositely disposed walls of the sleeve overlie and cover the open ends of the wrapper and thus retain the fragile merchandise within the resulting package,
said sleeve having additional walls that are connected to each other and said oppositely disposed walls along a series of spaced junctures which provide the sleeve with a plurality of corner portions that are in frictional engagement with the associated end edges of the wrapper,
at least two of said junctures which are located on opposite sides of the sleeve being of arcuate configuration and providing corner portions that are bowed inwardly and thus exert a wedging force on the engaged portions of the wrapper that retains the wrapper and the contained merchandise within the sleeve despite the smooth inner surfaces of the non-corrugated sleeve.

4,058,212
PACKAGE FOR CONTAINING PRODUCTS
Ihor Wyslotsky, 3311 Montmarte, Hazelcrest, Ill. 60429
Filed Apr. 26, 1976, Ser. No. 680,087
Int. Cl.² B65D *73/00, 45/00*
U.S. Cl. 206—470 **9 Claims**

1. A container for enclosing a product comprising:
a preformed base member of plastic material having a shallow, upwardly opening, first recess for receiving the bottom portion of the product, said recess being defined by a bottom wall and substantially vertically extending side walls which terminate in a peripheral, horizontally disposed first flange extending about the first recess;
a preformed cover member of plastic material having a downwardly opening second recess and a second peripheral flange for mating with the first recess and said first flange, respectively, so as to form an enclosure for the product and to afford areas on contacting faces of said first and second flanges for sealing the cover member on the base member, said first flange being adapted at one side to be permanently joined to said second flange and being adapted at the other three sides to be sealed so as to permit ready separation for opening the cover and hinging it on said one side;
a latching rib on said cover member along the side of said second flange opposite said one side for seating in fric-



tional engagement in a front portion of the recess in said base member so as to provide for frictionally holding said cover member when it is reclosed;
upstanding, reinforcing rib formations on said base member and extending along opposite sides of the first recess which adjoins the permanently sealed side of the container which rib formations serve in part to confine the product in the first recess; and
downwardly opening, reinforcing side wall formations on said cover member which mate with said rib formations and serve to guide the cover into closed position.

4,058,213
LOW TEMPERATURE VAPOR PHASE STERILIZATION AND STORAGE OF BIOLOGICALLY ACTIVE INJECTABLE MATERIALS
Irwin Stone, 1331 Charmwood Square, San Jose, Calif. 95117
Filed July 6, 1976, Ser. No. 702,628
Int. Cl.² B65B *31/00;* **A61L** *13/00;* **A61K** *31/375*
U.S. Cl. 206—524.4 **4 Claims**

1. A method for sterilizing and storing a biologically active particulate solid material adapted for injection into a patient which comprises:
a. placing a charge of the material in a sealable container
b. adding to said container an amount of ethyl alcohol sufficient to produce a sterilizing ethyl alcohol vapor in said container
c. sealing said container and
d. storing said sealed container for a period of time at least sufficient to sterlize said material.

3. An article of manufacture comprising a sealed disposable container containing an amount of biologically active solid particulate material adapted for injection into a patient and an amount of ethyl alcohol sufficient to generate a sterilizing vapor of ethyl alcohol in said container.

4,058,214

CARRYING AND INSULATING ENCLOSURE FOR PIZZA PIE CONTAINERS

Louis C. Mancuso, 121 Brooklyn-Stanhope Road, Stanhope, N.J. 07874

Filed Apr. 21, 1976, Ser. No. 678,889

Int. Cl.² B65D *11/10, 51/16;* **A45C** *11/20*

U.S. Cl. 206—545 **4 Claims**

1. A carrying and insulating enclosure for carry-home foods comrising:
a hollow base comprising a rectangular food support surface, defining a plurality of regularly spaced, shallow moisture storing recesses therein,
an upwardly extending wall member extending the perimeter of said food support surface and integral therewith,
a laterally extending lip disposed along the perimeter of the upper edge of said wall member, said lip defining a plurality of semicircular, laterally extending protrusions lying in paired, diametrically opposed relationship to each other, said protrusions defining a corresponding number of lid detents,
at least two bevelled vent structures provided in at least one pair of diametrically opposed lid detents, and
a lid having a peripheral configuration adapted for complementary press-fittable engagement with said detents, said lid comprising regularly spaced, diametrically opposed projections corresponding in shape to said detents and adapted to mate therewith, at least one pair of said projections provided with vent openings situated to facilitate the selective registration with said bevelled vent structures.

4,058,215

FRAMED EMBROIDERY ASSEMBLY

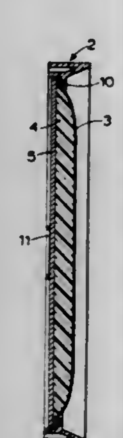
Ian Marchbank, Barnt Green, England, assignor to Abel Morrall Limited, England

Filed Oct. 3, 1975, Ser. No. 619,307

Claims priority, application United Kingdom, Oct. 24, 1974, 46153/74

Int. Cl.² B65D *69/00;* **D06C** *3/08;* **G09F** *1/10*

U.S. Cl. 206—574 **9 Claims**



1. A framed textile fabric assembly comprising a peripheral frame surrounding a central opening, the frame being made of thermoplastics and having an internal flange open to the rear of the frame, a textile fabric having a pattern formed thereon to guide hand embroidery, said textile fabric being permanently secured directly to said frame across said opening and being welded to the rear face of said flange in a groove formed in said rear face during formation of said weld, a back member for releasable fitting to said frame behind said textile fabric and a resilient pad compressible in thickness between said textile fabric and said back member so as to support and tension said textile fabric when said frame, pad and back member are assembled together.

4,058,216

DEVICE FOR PACKING ROLL-LIKE ARTICLES

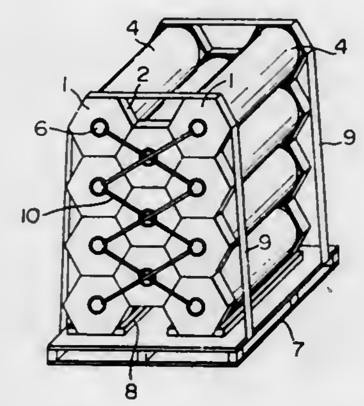
Tadao Tsuyuguchi, Gifu, Japan, assignor to Teijin Limited, Osaka, Japan

Filed Apr. 14, 1975, Ser. No. 568,098

Claims priority, application Japan, Apr. 16, 1974, 49-41704

Int. Cl.² B65D *85/66, 19/00, 71/02*

U.S. Cl. 206—597 **2 Claims**



2. Means for stacking and securing together roll-like articles wound onto a hollow core comprising:
a plurality of said roll-like articles having first and second ends;
a plurality of capping and stacking means on both ends of said roll-like articles for forming flat stacking surfaces on said roll-like articles and for protecting the ends of said articles, said capping means on said first ends contacting each other and said capping means on said second ends also contacting each other, each capping and stacking means comprised of:
a hexagonal face wall adjacent the end surface of said article for protecting said end surface, said face wall having a hole therethrough corresponding to the hollow core of said article,
cushioning material between said face wall and the end surface of said article,
a hollow protrusion surrounding said hole in said face wall extending therefrom into said hollow core, and
a side wall surrounding said face wall and extending therefrom towards said article for protecting the edges of the end of said article;
a support beneath said plurality of roll-like articles;
first band means passing through said hollow protrusions in said capping means and said hollow cores of said roll-like articles for holding said capped roll-like articles together; and
second band means attached to said base and surrounding said roll-like articles for securing said articles to said base.

4,058,217

AUTOMATIC ARTICLE SORTING SYSTEM

Richard Vaughan, Maroubra, and Peter Harold Cole, Wahroonga, both of Australia, assignors to Unisearch Limited, Kensington, Australia

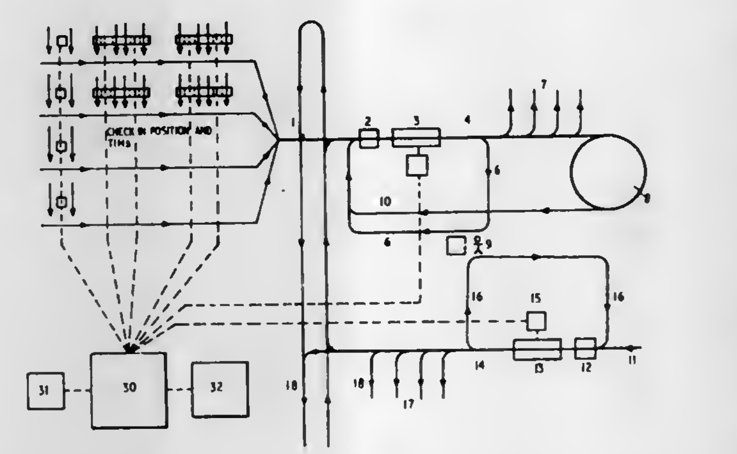
Continuation of Ser. No. 465,512, April 30, 1974, abandoned. This application Dec. 10, 1975, Ser. No. 639,466

Claims priority, application Australia, May 1, 1973, 3145/73; Aug. 30, 1973, 4676/73

Int. Cl.² B07C *3/10*

U.S. Cl. 209—74 M **12 Claims**

1. Apparatus for sorting articles such as airline baggage comprising at least one ticket issuing machine (TIM) containing a predetermined plurality of interrogatable labels each bearing indicia indicative of a serial number taken from a closed and limited set of serial numbers, means in each said TIM for issuing said labels in consecutive order, label interrogation means responsive to said serial numbers on said labels, baggage sorting means constructed and arranged to direct each article of baggage being sorted along a desired one of a plurality of alternate routes, conveyor means arranged to carry articles of baggage from each said TIM past the label interrogation means to the baggage sorting means, said articles passing through said baggage sorting and conveyor means without additional machine readable sorting information therewith,



said articles being transported on said conveyor means between said TIM and said sorting means a computing system linked with each said TIM, with said label interrogation means and with said article sorting means, means for entering routing instructions into the computer in relation to each serial number, said serial number related instructions being entered into the computing system when the TIM issues an interrogatable label to an article of baggage, the computing system being programmed to actuate said sorting means in accordance with a serial number on receipt of a signal from said interrogating means indicating the presence in said interrogating means of an article of baggage carrying a label bearing indicia indicative of that serial number.

4,058,218

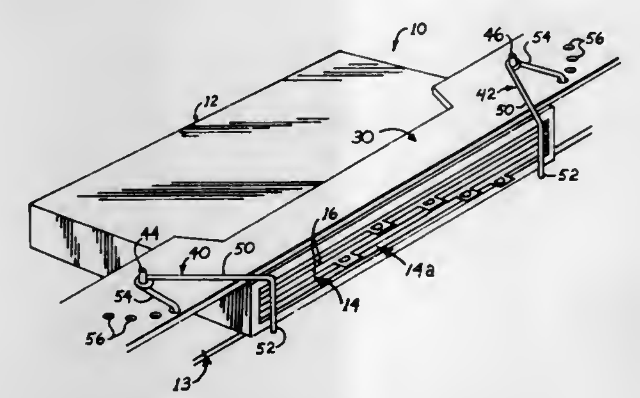
APPARATUS FOR REMOVING A SHEET FROM A STACK OF SHEETS

William C. Kinsinger, New York, N.Y., assignor to Metagraphic Systems, Inc., Bronx, N.Y.

Filed Aug. 26, 1976, Ser. No. 717,922

Int. Cl.² B07C *5/12*

U.S. Cl. 209—80.5 **10 Claims**



1. Apparatus for removing any sheet selected from a stack of sheets without removing adjacent unselected sheets in said stack comprising:
means for selecting and withdrawing a desired sheet in a first direction from one end of said stack;
support means arranged adjacent said stack of sheets;
sheet-engaging means mounted on said support means and extending alongside said one end of said stack adjacent a corner of the stack and extending in a direction substantially perpendicular to the direction that said selected sheet is moved when being withdrawn from said stack;
said sheet-engaging means being operable to resist movement of the unselected sheets in said first direction and being operable to apply a force against at least one side of said selected sheet while the other side of said selected sheet is in contact with a stop member to buckle said selected sheet between said sheet-engaging means and said stop member as it is being withdrawn in said first direction from said stack by said selecting means so that said selected sheet has a decreased width which will allow it to pass said sheet-engaging means while said sheet-engaging means continues to resist the movement of the unselected sheets in said first direction, and so that the area of surface contact of said selected sheet with an adjacent sheet or sheets is substantially reduced.

4,058,219

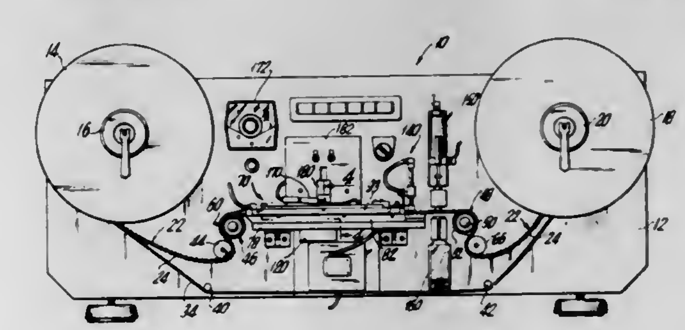
METHOD AND APPARATUS FOR AUTOMATICALLY TESTING REELED AXIAL-LEAD ELECTRICAL DEVICES UNDER ENVIRONMENTAL CONDITIONS

Peter W. Quinn, Danbury, Conn., assignor to Lorlin Industries Inc., Danbury, Conn.

Filed Oct. 26, 1976, Ser. No. 735,419

Int. Cl.² B07C *5/08*

U.S. Cl. 209—81 R **20 Claims**



1. Apparatus for elecrically testing taped electrical components secured to a pair of spaced tapes to form a string of components comprising:
a take-up reel;
a supply reel;
drive means for conveying said taped electrical components from said supply reel to the take-up reel;
an environmental chamber means disposed intermediate said supply and take-up reels for selectively varying the temperature of said electrical components relative to the temperature of the pair of spaced tape carriers; and
electrical testing means disposed downstream of said environmental chamber means for sequentially testing the electrical components prior to the rewinding on the take-up reel.

4,058,220

DISPLAY DEVICE WITH OVERLAPPING CARDS

Albert Henry Torongo, Yardley, Pa., assignor to Borden, Inc., Columbus, Ohio

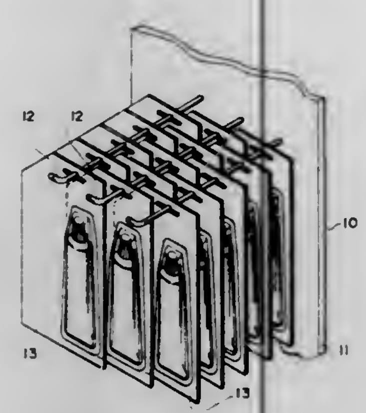
Filed May 12, 1976, Ser. No. 685,642

Int. Cl.² A47F *1/00*

U.S. Cl. 211—57.1 **3 Claims**

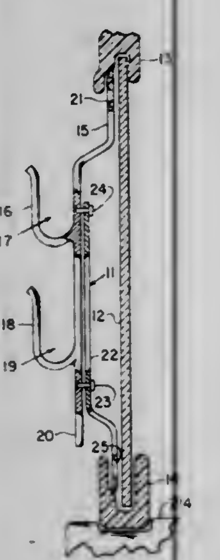
1. A display device and a plurality of overlapping display packages thereon comprising;
a. a board having a plurality of pegs arranged side by side in a row, said pegs being suitable for supporting display packages;
b. a plurality of display packages each of which includes an article of merchandise secured to a card, each of said cards being of a uniform width and having an off-center hole near one upper corner for accepting one of said pegs and a clipped corner at the opposite upper corner of the card, said article of merchandise being positioned off-center at

that side wherein said off-center hole is located, said display packages being suspended on said pegs in multiple layers of overlapping cards, the distance between holes of adjacent suspended cards being less than the overall width



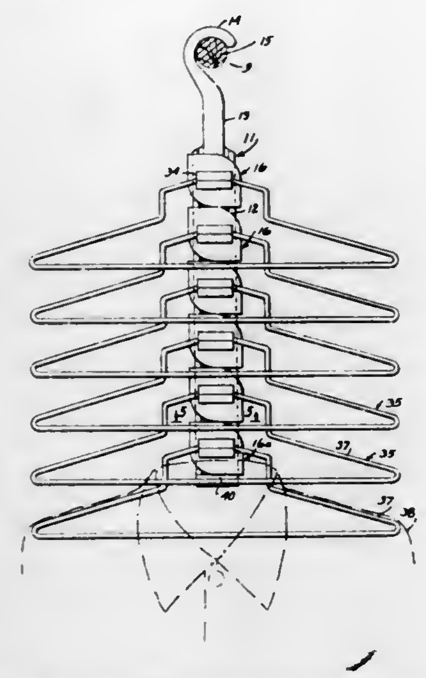
of a single card, and each card being suspended from a single peg through its off-center hole with the clipped corner of the card being immediately adjacent the adjoining peg, whereby at least one of said articles remaining on any one of said pegs is entirely exposed to view.

4,058,221
WINDOW RACK
Johnny C. Elkins, 120 W. 4th St., and Marvin C. Hanz, 423 S. Irving, both of San Angelo, Tex. 76901
Continuation of Ser. No. 256,509, May 24, 1972, abandoned. This application June 15, 1976, Ser. No. 696,303
Int. Cl.² A47F *5/08; 7/00*
U.S. Cl. 211—87 **12 Claims**



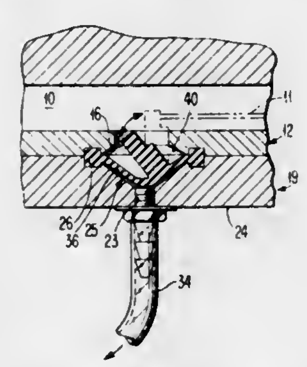
1. A rack assembly for supporting guns from a window and gasket assembly of a vehicle, comprising:
first and second elongated support members;
each of said support members having opposed end portions;
means by which one said opposed end portion of said first member is adjustably affixed in overlapping relationship with respect to one opposed end portion of said second member thereby leaving free opposed ends depending from said rack assembly;
the marginal end portion of each said free opposed end being reduced in thickness and disposed in a common plane; teeth affixed to each said free opposed end for engaging the gasket of a window; said teeth are placed substantially normal to said marginal end portion of said member; each said free opposed end adapted to be placed between the window and the gasket so that the gasket supports the rack; and means affixed to said first and second elongated support members for supporting guns therefrom.

4,058,222
MULTIPLE CLOTHES HANGING DEVICE
Evelyn R. Singer, 3450 Sawtelle Blvd., Los Angeles, Calif. 90066
Filed Aug. 5, 1976, Ser. No. 712,018
Int. Cl.² A47F *7/19*
U.S. Cl. 211—118 **9 Claims**



1. A multiple garment hanging device comprising
an elongate track member,
means for supporting said track member in the vertical position,
means on said track member forming a stop,
a plurality of slides slideable along one side of said track member,
one of said slides being effective to limit against said stop,
the others of said slides being effective to limit against one another,
garment hangers supported by said slides, and
retaining means on each of said slides,
said retaining means slideably engaging said track member to normally retain said respective slide on said track member,
each of said slides being rockable in a plane parallel to the length of said track member to release said retaining means thereof from said track member whereby said rocked slide may be withdrawn from said one side of said track member independently of the remaining ones of said slides.

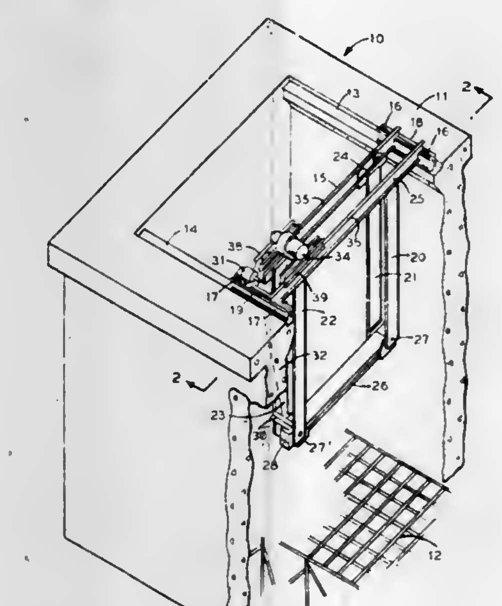
4,058,223
ARTICLE HANDLING DEVICE
Bernd Cruse, Staatsburg, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.
Filed June 19, 1975, Ser. No. 588,531
Int. Cl.² F01B *19/02*
U.S. Cl. 214—1 BB **17 Claims**



1. A device for engaging an article movable in a controlled environment including:
an element selectively movable relative to the article to be engaged to cause said element to selectively engage the article movable in the controlled environment without

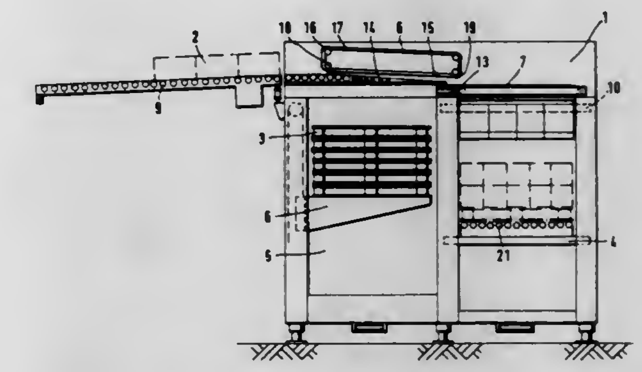
blocking the controlled environment, the article being movable in a plane transverse to the location of said element and adapted to be positioned during its movement in the plane to a position in which said element can engage the article and then be removed from the position in which said element can engage the article;
means to support said element, said support means isolating said element within the controlled environment, said element being free standing within the controlled environment;
means to move said support means to move said element from a position in which said element cannot engage the article to interfere with movement of the article in the controlled environment in the plane transverse to the location of said element to a position in which said element engages the article to control its position within the controlled environment;
said support means is a diaphragm having one side always communicating with the controlled environment;
and said moving means includes means to produce a fluid pressure differential across said diaphragm by acting on the side of said diaphragm remote from the controlled environment to cause movement of said diaphragm and said element.

4,058,224
TRAVERSING AND VERTICALLY SWINGING STRONGBACK
Felix S. Jabsen, Lynchburg, Va., assignor to The Babcock & Wilcox Company, New York, N.Y.
Division of Ser. No. 408,767, Oct. 23, 1973, Pat. No. 3,894,327. This application Mar. 28, 1975, Ser. No. 563,030
Int. Cl.² B65G *7/00*
U.S. Cl. 214—1 CM **3 Claims**



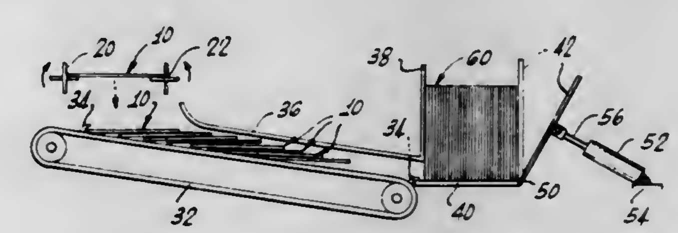
1. Apparatus for manipulating a nuclear fuel element that is submerged in a pool comprising, a bridge spanning the pool and movable therealong, depending members extending from said bridge into the pool and movable on said bridge structure, said depending members being substantially inflexible with a constant separation therebetween, a strongback having a first and second end, said strongback being submerged in the pool and selectively positioned between said depending members, said strongback selectively pivotal about either of its ends, said strongback spanning the separation between said depending members, a pin extending from at least one of said depending members through a pivotal connection on the first end of the said strongback to enable said strongback to pivot through approximately 90° from a direction that is generally between said depending members and parallel to said bridge into a direction that is essentially perpendicular to said bridge and parallel to said depending members in order to engage and support the nuclear reactor fuel element thereon.

4,058,225
METHOD FOR LOADING A LAYER OF GOODS ON A MOVABLE SUPPORTING MEANS AND A PALLET LOADER FOR CARRYING OUT THE METHOD
Bernt Owe Janson, Smedbergsvagen 10,, 43700 Lindome, Sweden
Continuation of Ser. No. 654,474, Feb. 2, 1976, abandoned. This application Jan. 31, 1977, Ser. No. 764,524
Int. Cl.² B65G *37/24*
U.S. Cl. 214—6 P **5 Claims**



1. A device for loading articles onto pallets comprising means for storing a plurality of empty pallets in stacked relation, pallet loading means juxtaposed said pallet storing means, reciprocally movable plate means for transferring the top empty pallet from the stack of pallets to the top of said pallet loading means, said pallet storing means including means for raising the stack of pallets in the storing means after the top pallet has been transferred therefrom, said reciprocally movable plate means being disposed above said top pallet, means for feeding at least one article onto said reciprocal plate means for movement therewith when an empty pallet is transferred from the top of said storing means to the top of said loading means, the at least one article being deposited on said pallet at the top of said loading means when said reciprocal plate means is retracted to the top of said storing means, support means at the top of said loading means including laterally displaceable members for receiving the top pallet from said storing means, elevator means for supporting and raising the loaded pallet above said support means to permit said laterally displaceable members of said support means to be laterally displaced beyond the marginal edges of the loaded pallet, and means for displacing said laterally displaceable members whereby the pallet may then be lowered by said elevator means.

4,058,226
HIGH SPEED AUTOMATIC STACKER FOR PARTITIONS AND THE LIKE
Charles Peters, Jr., Norco, Calif., assignor to Box Innards, Inc., Anaheim, Calif.
Filed Jan. 19, 1976, Ser. No. 650,247
Int. Cl.² B65G *57/00*
U.S. Cl. 214—7 **9 Claims**



1. A high speed automatic stacker for collapsed partitions or the like comprising:
a vertical plate;
an inclined plate inclined at an obtuse angle with respect to the horizontal,
the lower edge of said vertical plate being in a plane above the lower edge of said inclined plate;

a horizontal support between said vertical and inclined plates;

means to successively feed partitions in overlapping relation and in groups beneath said vertical plate and force the partitions of each group to gather into a stack against said inclined plate and supported on edge on said horizontal support;

means for removing each group thus stacked from between said vertical and inclined plates;

means synchronizing said feed means and removing means to cause said removing means automatically to move each group horizontally from between said vertical and inclined plates before the first partition of a succeeding group passes beneath said vertical plate;

and means operable in conjunction with said inclined plate for orienting each inclined stack to the vertical so the removed stacks are vertical.

4,058,227

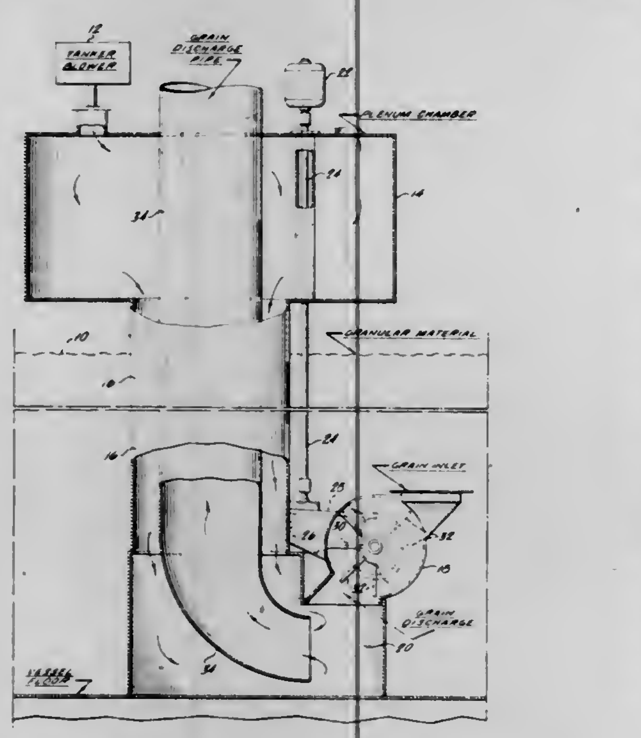
PNEUMATIC CONVEYING OF GRANULAR MATERIALS FROM A NONPRESSURIZED ENVIRONMENT

MacLean C. Shakshober, Chadds Ford; Eugene Schorsch, Springfield, and Paul E. Atkinson, West Chester, all of Pa., assignors to Sun Shipbuilding & Dry Dock Company, Chester, Pa.

Filed Oct. 12, 1976, Ser. No. 731,274

Int. Cl.[2] B65G *53/04*

U.S. Cl. 214—13 **1 Claim**



1. A system for removing granular material such as a food grain from an open container such as a barge to the hold of a ship which comprises:

a. a plenum chamber having input means for a source of pressurized gas and coupled to a first pipe extending into said granular material;

b. a second discharge pipe inside and concentric with said first pipe extending from the bottom of said first pipe through said plenum chamber to provide for discharge of said granular material to the outside of said plenum chamber;

c. valve means at the bottom of said first pipe to control the flow of granular material to said second concentric pipe;

whereby, when a pressurized gas from the ship to receive the granular material is introduced into said plenum chamber, said gas flows downwardly through said first pipe and pushes any granular material admitted by said valve upwardly through said second discharge pipe from which it may be conveyed to the hold of the ship receiving the granular material.

4,058,228

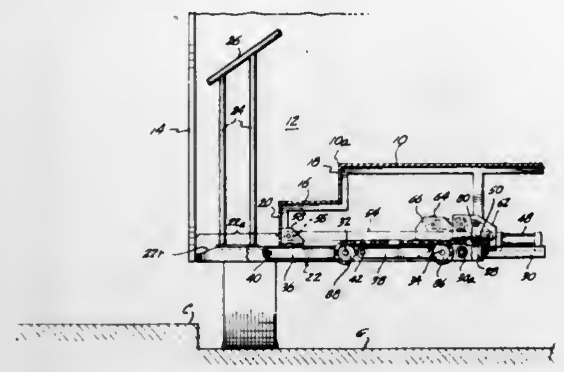
PASSENGER VEHICLE ACCESS STAIR AND ELEVATOR APPARATUS

Edward L. Hall, 16240 NE. 14 St., Bellevue, Wash. 98008

Filed Mar. 4, 1976, Ser. No. 663,770

Int. Cl.[2] B60P *1/44*

U.S. Cl. 214—77 R **15 Claims**



1. In a passenger vehicle having a passenger deck therein accessible through an entryway including a foot passenger access stairway having a fixed passenger access step intermediate in height between the deck and ground level, vehicle-mounted passenger elevator apparatus mounted in cooperative association with said entryway comprising a horizontally disposed passenger platform member dimensioned to accomodate a wheelchair thereon, guiding support means including parallel supporting guides fixedly mounted at respectively opposite sides of said entryway beneath said deck and extending horizontally outward therefrom, and carriage means movably supported on said guides and in turn supporting said platform member normally in a retracted position substantially at the level of said guides and retracted at least part of its width beneath said deck, said guiding support means being formed and operable to guide said platform member for extension movement generally horizontally outward in said entryway from such retracted position and to an extended position and further operable to guide the extended platform member in a path of motion that clears said fixed step and that ranges both upward and downward from said level and inward and outward in said entryway between a raised position substantially flush with and adjacent to said deck and a lowered position beneath the height level of said fixed step and projecting outwardly therefrom to accomodate a wheelchair on said platform member while maintaining said platform member substantially horizontal, and actuator means operable through said guiding support means to move said platform member, when extended, between said lowered position and said raised position, and also between its extended and retracted positions.

4,058,229

LIFTING MECHANISM FOR TRUCKS

James Thomas Triplett, P.O. Box 488, Chester, S.C. 29706

Filed Dec. 3, 1975, Ser. No. 637,457

Int. Cl.[2] B60P *1/48*

U.S. Cl. 214—77 R **7 Claims**

1. A lifting device for a truck for lifting objects loaded on a platform from the ground and the like onto the bed of the truck while maintaining said platform parallel to the ground during the lifting operation, said lifting mechanism comprising:

a frame member adapted to be supported over the bed of said truck,

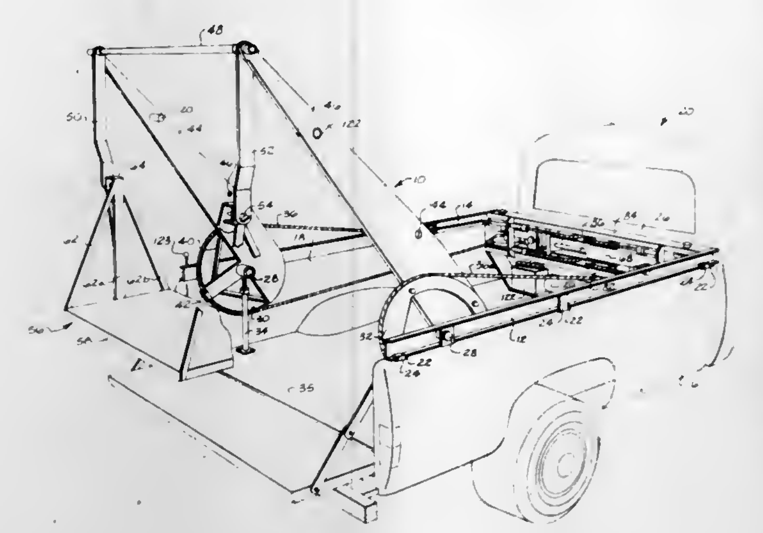
a pair of laterally spaced booms having lower ends thereof pivotally supported on said frame member,

elongated rigid lifting arms pivotally connected to remote ends of said spaced booms,

means for pivotally connecting the free ends of said lifting arms to said platform,

power means for rotating said laterally spaced booms for lifting said platform from said ground onto the bed of said truck,

abutment means for engaging said elongated rigid lifting arms as said booms are rotated over the bed of said truck for shortening the radius of the arcuate path of travel of said platform as said load is loaded onto said truck bed and



said abutment means causing said elongated rigid lifting arms to be pivoted to a position along side of said boom when said boom is rotated to a position substantially parallel to said truck bed.

4,058,230

ARRANGEMENT FOR PNEUMATICALLY REGULATING THE INTRODUCTION OF SUBSTANCES INTO CHAMBERS

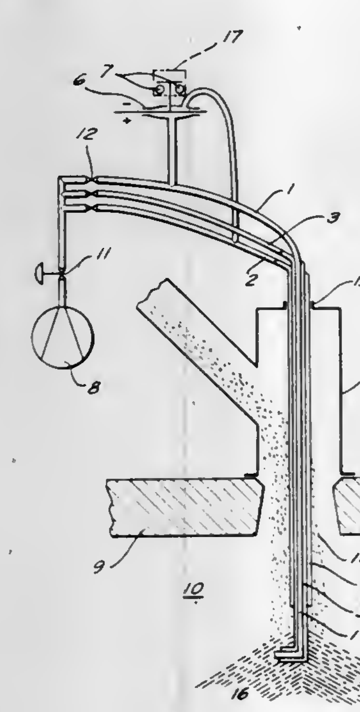
Heinz Bellenberg, Bottrop; Werner Kucharzyk, Essen; Wolfgang Rohde, Essen, and Werner Siebert, Essen, all of Germany, assignors to Bergwerksverband GmbH and Didier Engineering GmbH, both of Essen, Germany

Filed Feb. 27, 1976, Ser. No. 662,017

Claims priority, application Germany, Mar. 8, 1975, 2510191

Int. Cl.[2] F23K *3/00*

U.S. Cl. 214—18.2 **17 Claims**



1. A particulate level sensing arrangement particularly for use in the regulating of the level of coal in a coke oven comprising a chamber which is to be filled with solid particles to a predetermined level; means for feeding the solid particles into said chamber; switch means for said feeding means operative for interrupting the introduction of the solid particles into said chamber in response to a signal generated when the solid particles fill said chamber to said predetermined level, said switch means including a differential pressure switch actuable is response to the generation of a predetermined pressure differential thereacross, said differential pressure switch having two opposing terminals; means for admitting pressurized gas into said chamber so as to permit the generating of a pressure differential across said differential pressure switch; and means for transmitting pressure signals to said differential pressure switch, said transmitting means including a sensing conduit connected with one terminal of said differential pressure switch and having an end portion arranged in said chamber at approximately said predetermined level so as to permit the pressure characteristics generated in said sensing conduit due to the flow of pressurized gas into said chamber to be changed and a corresponding signal to be transmitted to said differential pressure switch when the level of the solid particles in said chamber reaches said predetermined level, and said transmitting means also including compensating means operative in cooperation with said sensing conduit for preventing unintentional actuation of said differential pressure switch by counterbalancing at the other terminal of said differential pressure switch the effect upon said one terminal of pressure waves generated during filling of said chamber with said solid particles.

4,058,231

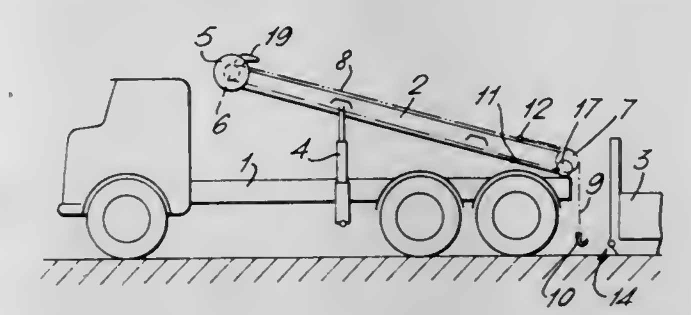
APPARATUS FOR MOVING AN EXCHANGEABLE PLATFORM OR A CONTAINER ON TO AND OFF OF A TIPPING FRAME OF A LORRY, TRAILER, OR THE LIKE

Heikki Visa, Vanhalinna; Ossi Rantala, Lietsala, and Antti Risti, Loimaa, all of Finland, assignors to Autolava Oy, Raisio, Finland

Filed Aug. 21, 1975, Ser. No. 606,516

Int. Cl.[2] B60P *1/64*

U.S. Cl. 214—516 **6 Claims**



1. Apparatus for loading and unloading an exchangeable platform onto and off of a tipping frame having an endless element, wheels located at each end of the tipping frame, the endless element moveably mounted on the said wheels, the improvement comprising: a flexible elongated element fixedly attached at one end thereof to the said endless element at an attachment point, the other end of said elongated element being free and having a hook-like engaging member thereon for releasably engaging said platform; said platform being provided with a fastening means on one end thereof, said fastening means having a hook receiving portion and limiting means, said limiting means being laterally spaced apart to form a space, said engaging member comprising at least one laterally spaced apart hook means and a positioning means, said hook means adapted to engage said hook receiving portion, said positioning means adapted to at least partly enter said space whereby lateral movement of said engaging member is restricted.

4,058,232

SAFETY CAP

Tetsuo Ohno, and Shoji Watanabe, both of Tokyo, Japan, assignors to Iko Trading Co., Ltd., Tokyo, Japan

Filed Oct. 29, 1976, Ser. No. 736,828

Claims priority, application Japan, Mar. 9, 1976, 51-27100

Int. Cl.[2] B65D *55/02, 85/56;* **A61J** *1/00*

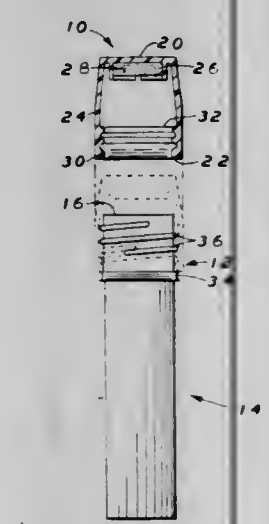
U.S. Cl. 215—217 **2 Claims**

1. A safety closure assembly comprising in combination:

the container neck defining an opening through which the container contents may be inserted and removed;

a closure cap coupled with the container neck and extending across the opening and cooperating in confining the contents within the container until it is desired to remove same therefrom, the cap including an upper closed end and a lower open end;

the exterior of the neck and the interior of the cap having cooperating interengaging means for coupling the cap to the neck in relatively easy fashion and permit the uncoupling of the cap from the neck only upon informed deliberate manipulation of the cap relative to the neck, said cooperating interengaging means comprising a zone of mating threads on the interior of the cap and exterior of the neck, said cooperating means further including rib means and recess means at a predetermined location relative to the threaded zones and adapted to engage with one another to assume a child-deterrent position at which the cap threads and neck threads are disengaged and the cap



may be turned relative to the neck in either direction without permitting the threads to become engaged to permit withdrawal of the cap from the neck, the rib means being on the interior of the cap and being in the form of an annular inwardly extending rib located at the open end of the cap, the recess means being on the exterior of the neck and being defined by a concavity in a circumferentially extending raised strip, the strip being located at a predetermined distance below the threaded zone on the container neck so that when the rib is disposed in the recess the cap threads are disengaged from the neck threads with the cap threads being disposed in the space between the neck threads and the strip, the cap being permitted to be withdrawn from the neck by initially retracting and pulling the cap in an axial direction relative to the neck to cause disengagement of the rib means and recess means and thereafter twisting the cap relative to the neck to permit the cap threads and neck threads to become engaged whereupon further twisting of the cap relative to the neck will permit removal of the cap.

4,058,233

UTENSIL BASKET FOR INSTITUTIONAL DISHWASHING MACHINES

John W. Frangos, 2 Brimbal Hill Drive, Beverly, Mass. 01915

Continuation-in-part of Ser. No. 425,237, Dec. 13, 1973, Pat. No. 3,935,958. This application Feb. 2, 1976, Ser. No. 654,108

Int. Cl.² B65D *7/20, 85/00, 43/14*

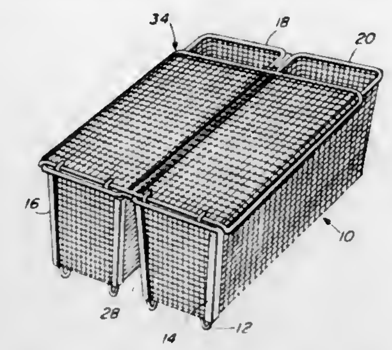
U.S. Cl. 220—19 **10 Claims**

1. Apparatus for use in washing eating utensils and the like, comprising

a. a two-position foraminous basket formed with at least one generally rectangular compartment open to the front of said basket when said basket is in an upright vertical position for receiving utensils placed therein when said basket is in a horizontal position, the length of said compartment being greater than the length of said utensils,

b. foraminous partial cover means detachably connected to said basket across the front of said compartment, and,

c. locking means, including fingers extending from the edges of said cover means and adapted to pass through the walls of said basket for securing said cover means to said basket,



d. said basket being formed with a back wall and at least one side wall substantially perpendicular to one another whereby said basket may be placed on said back wall in a horizontal position for loading and unloading said compartment and in an upright position on said one side wall for washing with said cover means in place,

e. said basket including a plurality of legs extending substantially perpendicularly from said back wall within an area spanned by said cover means.

4,058,234

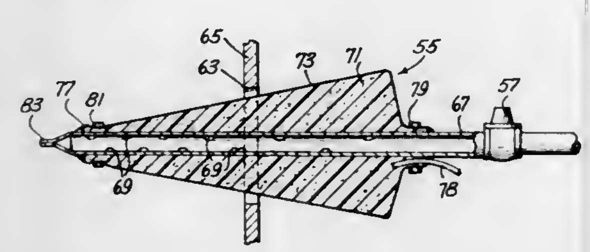
SYSTEM FOR SEALING AND REPAIRING LEAKS IN RUPTURED CONTAINERS

John J. Vrolyk, Simi, and Robert W. Melvold, Northridge, both of Calif., assignors to The United States of America as represented by the Administrator, Environmental Protection Agency, Washington, D.C.

Division of Ser. No. 582,049, May 25, 1975, Pat. No. 4,012,822. This application Dec. 21, 1976, Ser. No. 753,075

Int. Cl.² B65D *41/10*

U.S. Cl. 220—239 **4 Claims**



1. An applicator for use in sealing and repairing a rupture in a container wall with plastic foam material wherein said applicator comprises:

a. a tubular core member provided with a plurality of perforations in the wall thereof,

b. an open-celled sponge body surrounding the core member and communicating with the interior thereof through the perforations for receiving plastic foam material injected into the core member, and

c. a porous expandable outer covering layer surrounding the sponge body, which covering layer:

i. releases fluid pressure created when the sponge body is filled with the plastic foam material, and

ii. permits the sponge body to expand radially on either side of the container wall to thereby seal the rupture.

4,058,235

DISPENSER FOR INTERLEAVED SHEETS OF TISSUE

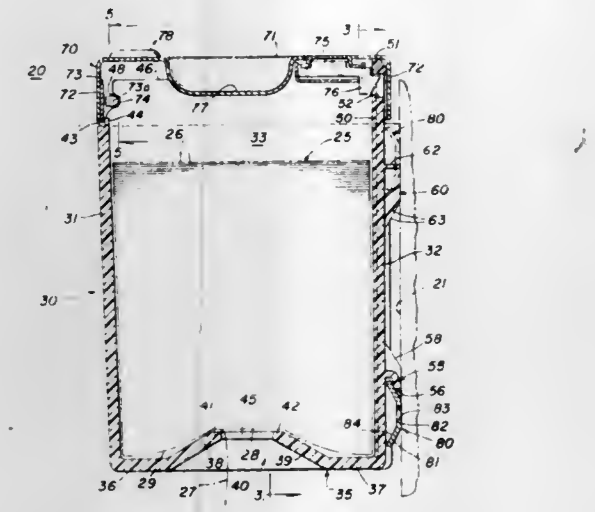
Antonio Macchi Cassia, Milan, Italy, assignor to Steiner American Corporation, Salt Lake City, Utah

Filed July 21, 1976, Ser. No. 707,370

Claims priority, application Italy, May 28, 1976, 23763/76

Int. Cl.² B65D *85/16*

U.S. Cl. 221—48 **13 Claims**



1. A tissue dispenser for dispensing individual sheets of tissue from a stack of folded and interleaved sheets, said dispenser comprising an integral one-piece housing including four interconnected upstanding side walls and a bottom wall closing said side walls and co-operating therewith to define a tissue container for accommodating a stack of folded and interleaved tissue sheets therein, and a removable cover for closing the upper end of said container, said cover being formed of metal and having a recess formed in the top thereof to define an ashtray, said cover further having a plurality of ridges projecting upwardly therefrom along the front edge of said ashtray recess and co-operating to define a plurality of channels for holding cigarettes, said bottom wall including two substantially coplanar portions respectively extending inwardly from two opposed ones of said side walls substantially normal thereto and two inclined portions respectively integral with said flat portions at the inner edges thereof and converging upwardly into said container, the upper edges of said inclined portions being spaced apart and co-operating to define a dispensing slot having a width substantially less than the width of the sheets, said container being adapted to receive the associated stack of tissues therein with the bottommost tissue resting upon the upper ends of said inclined portions and having the free end thereof extending through said dispensing opening and below said container for access by a user, the exertion of a withdrawing force on the free end of the bottommost tissue by a user serving to remove said tissue from said container and pull the leading end of the next interleaved tissue through the dispensing opening for access by the user, whereby said sheets may be dispensed one at a time from said container.

4,058,236

METHOD AND APPARATUS FOR HANDLING AND ORIENTATION OF FRAGILE ARTICLES

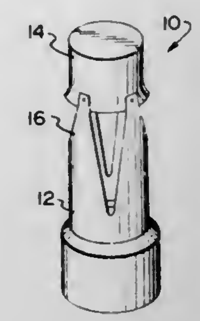
Raymond J. Brennan, Emporium, Pa., assignor to GTE Sylvania Incorporated, Stamford, Conn.

Filed Jan. 12, 1976, Ser. No. 648,269

Int. Cl.² B65H *9/00*

U.S. Cl. 221—163 **9 Claims**

1. An apparatus for handling and orienting fragile, fast warm-up cathodes for cathode ray tubes, said cathodes comprising a two piece unit only one piece of which is magnetic, comprising, in combination: a disoriented supply of said cathodes; vertically arrayed, reciprocating pick-up means associated with said supply and positioned thereover, the terminal portion of said pick-up means which engages said supply being magnetic; means for activating said pick-up means from a delivery zone into engagement with said supply through an apertured stripper means positioned therebetween whereby said pick-up means engages a plurality of said cathodes; means for moving said pick-up means back to said delivery zone



whereby said stripping means is again engaged and all but one of said cathodes is stripped off, said remaining cathode having a particular, desired orientation; and means for removing said cathode from said delivery zone.

4,058,237

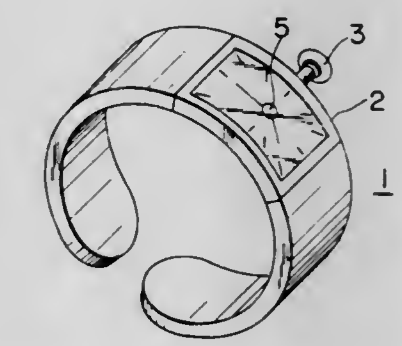
PORTABLE SELF-PROTECTIVE DEVICE

Clark Luke, 2210 N. 57 Way, Hollywood, Fla. 33021

Filed Oct. 31, 1975, Ser. No. 627,782

Int. Cl.² B67D *5/64*

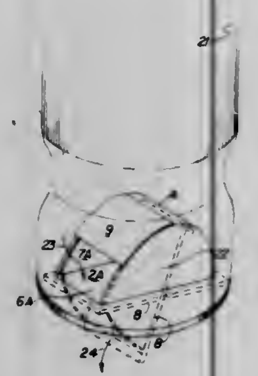
U.S. Cl. 222—78 **2 Claims**



1. A portable self-protective device adapted to be worn on the wrist of a person to be protected in the form of a bracelet, comprising a compartment integral with said bracelet, said compartment containing a quantity of protective fluid material under pressure on said compartment, an outlet nozzle for dispensing said protective fluid material in the form of a directionally controlled stream or spray; means in said compartment for selectively controlling the flow of said protective fluid from said compartment to said nozzle, said means comprising an elongated valve body having an outlet port in communication with said nozzle at one end thereof and at least one inlet port intermediate the ends of the body providing communication between the interiors of said compartment and said valve body; a valve means movable to and from said outlet port to control the flow of said protective fluid through said outlet port, said valve means being mounted integrally on the end of a valve rod extending through the interior of said valve body and seating on the upstream side of said outlet port so that said protective fluid material under pressure acts to more firmly seat said valve means on said outlet port, said valve means having a conical surface which seats on and enters into said outlet port, said valve rod extending out of the compartment and having a threaded portion which mates with cooperating threads on the interior surface of said valve body, whereby rotation of said valve rod by a wearer of the bracelet causes linear movement of said valve means to and from said outlet port to control the flow of protective fluid material through said outlet port, and rotary motion with respect to said outlet port to provide a wiping action between the mating surfaces of said outlet port and said valve means, spring biasing means for biasing said valve means to a closed position to prevent the

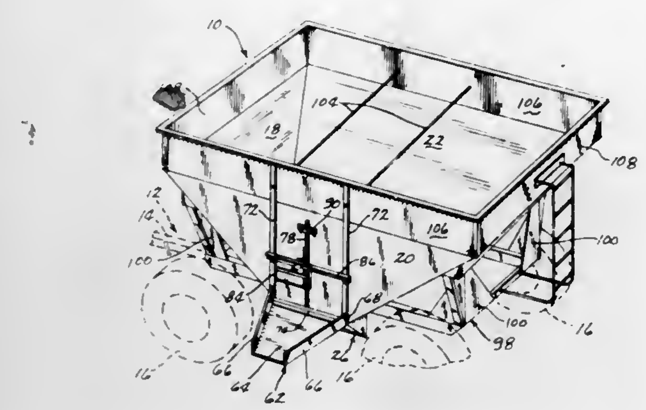
flow of protective fluid material through said outlet port, control means for rotating said valve rod against the bias of said spring biasing means whereby said control means determines whether protective fluid material is dispensed to protect said person.

4,058,238
DISPENSER
Ronald E. Eckman, 1797 Bolling Ave., Louisville, Ky. 40210
Filed Nov. 17, 1975, Ser. No. 632,265
Int. Cl.² G01F *11/26*
U.S. Cl. 222—305 **2 Claims**



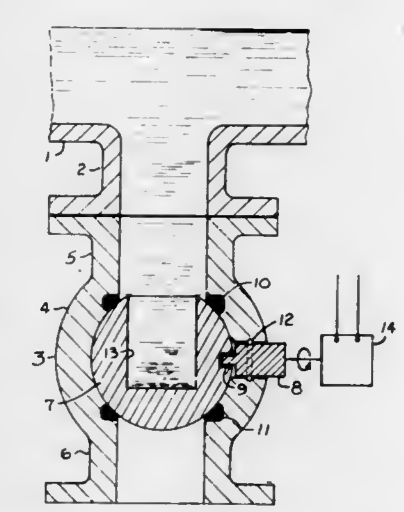
1. An arrangement for delivering measured quantities of fluid material from a container having a cooperative opening including:
- a. a cap member adapted to be secured over said opening of said container, having an inner surface exposed to said container and an outer surface said cap member having first and second cooperative cap means openings therein;
- b. first chamber means rotatably carried in the inner surface of said cap means to be disposed in said container in communicative relation with said first and second cap openings to receive fluid from said container, said chamber means being defined by at least two spaced, generally parallel, first sidewall means adapted to extend laterally from said cap means where a portion of said first sidewall means are received through said first cap opening, first endwall means extending between said sidewall means along a portion of the perimeter of each, and terminating in a first edge to define a first fluid opening to said first chamber for admission of fluid material from said container to said first chamber and second endwall means pivotably secured to the outer surface of said cap means extending between the portions of said sidewall means extending through said first cap opening where said second endwall means define one side of said first fluid opening and where said second endwall means is moveable from first position covering a portion of said first cap opening to a second position to move a portion of said sidewall means through said first cap opening and wherein said first fluid opening is moved from first position within said container to second position to expose said first fluid opening to the outer surface of said cap means;
- c. moveable wall means located within said first chamber extending generally between said sidewall means and having a first edge pivotably secured adjacent the inner surface of said cap means between said first and second cap opening means and extending outwardly therefrom to a sliding edge contacting said first endwall means so that said moveable wall means can be selectively positioned within said first chamber to define a first compartment of selected volume communicating with said first cap opening means and said first fluid opening and a second compartment communicating with said second cap opening means.

4,058,239
GRAVITY FEED BOX
Michael D. Van Mill, Shell Rock, Iowa, assignor to Work Horse Manufacturing Co., Madison, Wis.
Filed Mar. 8, 1976, Ser. No. 664,429
Int. Cl.² B65G *11/12, 65/58*
U.S. Cl. 222—462 **6 Claims**



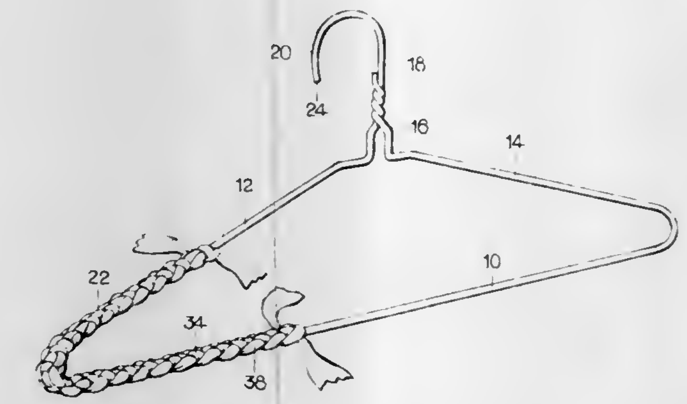
6. A gravity feed box comprising,
- a box having a chamber defined by oppositely disposed end walls and one side wall, and a bottom wall which extends from the side opposite said one side wall downwardly and across and beyond the center of said box to the lower end of said one side wall,
- said bottom wall including a discharge opening at its lower end,
- a spout positioned under said discharge opening and oriented to direct material flowing from said chamber towards the center of said box,
- a closure gate for opening and closing said discharge opening,
- said one side wall including a discharge opening at its lower end and a closure gate being provided for opening and closing said discharge opening in said one side wall, and
- a spout being provided under said discharge opening in said one side wall and oriented to direct material flowing from said chamber laterally away from said box.

4,058,240
AUTOMATIC DRAIN FOR COMPRESSED AIR SYSTEMS
Philip S. Becker, Erie, Pa., assignor to Valex Inc., Erie, Pa.
Filed Apr. 14, 1976, Ser. No. 677,007
Int. Cl.² G01F *11/22*
U.S. Cl. 222—368 **6 Claims**



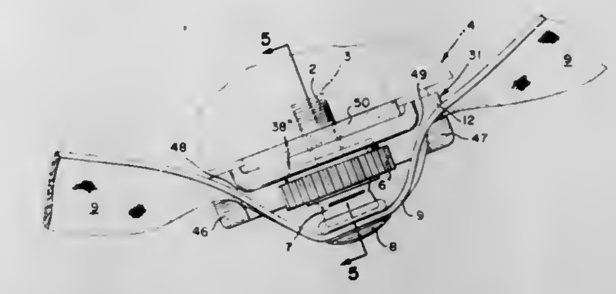
1. In combination with a compressed air system and the like having a liquid collecting sump under the elevated pressure of the air system, a valve for draining the sump without substantial loss of air comprising a valve body having an inlet connected to receive liquid from the sump under said elevated air pressure and an outlet for said liquid to a lower pressure, a valve member rotatable in the body for blocking flow through the body in all angular positions of the member, said body having cup means presented to the inlet in one angular position of the member to receive liquid from the inlet and presented to the outlet in another angular position of the member to empty the cup means, and means for continuously rotating the valve member.

4,058,241
COVERED GARMENT HANGER
Helen C. Craig, 6307 Augusta Road, Greenville, S.C. 29605
Filed Sept. 12, 1975, Ser. No. 612,668
Int. Cl.² A47J *51/094*
U.S. Cl. 223—98 **4 Claims**



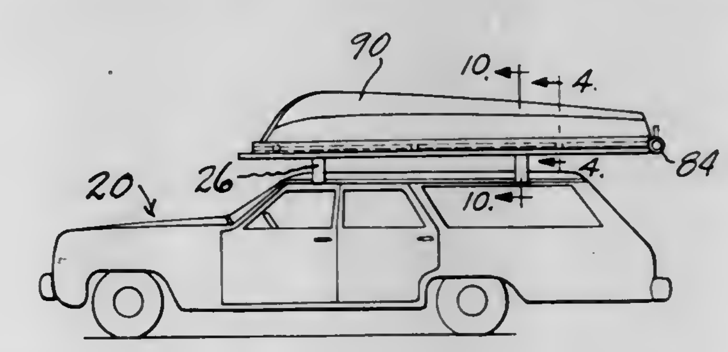
1. A covered garment hanger including a substantially triangular-shaped bar frame comprising:
- a. a horizontal cross bar;
- b. a pair of upwardly converging shoulder bars integral with opposing ends of said cross bar providing a pair of garment supporting shoulders terminating in an inverted Y-shaped neck junction;
- c. an end of one of said shoulder bars extending upwardly to form a suspension hook bar having a shank portion and a substantially U-shaped hook portion;
- d. a semi-elastic fabric strand for being braided over said hanger;
- e. a medial portion of said strand being placed against an end tip of said hook portion to form a first fabric strand on one side of said tip and a second fabric strand on the opposite side of said tip with said fabric strand secured about said tip;
- f. said first fabric strand being initially looped under and then over the hook bar portion and then pulled tightly through the loop thus formed with said second fabric strand being subsequently worked under and then over the hook bar portion and then pulled tightly through the loop thus formed to form a braid over and covering said end tip;
- g. said first fabric strand being then looped under and then over said hanger bar and then pulled tightly through the loop thus formed to form a first series of braided loops laterally adjacent one side of said hanger bar;
- h. said second fabric strand being looped under then over said hanger bar and then pulled tightly through the loop thus formed to form a second series of braided loops laterally adjacent the other side of said hanger bar;
- i. said first and second strands being looped as in paragraphs (g) and (h) to form said braided cover over said entire suspension hook, over one branch of said neck junction downwardly over said shoulder bar, over said cross bar, upwardly over said other shoulder bar and up through said neck junction to entirely cover said garment hanger;
- j. said first and second fabric strands being secured together at said neck junction to finish said braided cover; and
- k. said first and second series of braided loops providing a substantially flat garment supporting surface of wider surface area than said hanger bar portions reducing slipping and creasing of said garments thereon.

4,058,242
CONNECTOR FOR CAMERA HARNESSES
Robert A. Brewer, 15 Castle Park Way, Oakland, Calif. 94611
Filed Aug. 24, 1976, Ser. No. 717,155
Int. Cl.² A45F *5/00;* **F16B** *35/04*
U.S. Cl. 224—5 V **5 Claims**



1. A connector for releasably attaching a camera to a harness, said camera having a threaded screw nut formed in the body and strap lugs adapted for attachment to coupling members on the harness, said harness having a transverse flexible member adapted for wearing across the chest of the wearer, said connector comprising:
- a. a thumb screw member having a threaded shank adapted for threadable connection with said threaded screw nut formed in said camera body member and an enlarged head member adapted for manual turning;
- b. a portion of a snap fastener member connected to said enlarged head of said thumb screw;
- c. a mating portion of said snap fastener member connected to said transverse flexible member for releasable coupling with said portion of said snap fastener member connected to said thumb screw head;
- d. a rigid washer member having an upper and lower face and formed with an opening therethrough for placement in surrounding relation to said threaded shank;
- e. said threaded shank having an unthreaded portion of reduced diameter between said threaded end and said enlarged head portion;
- f. a resilient member attached to the lower face of said washer portion adapted for contact with said camera body;
- g. said opening in said washer member having a dimension greater than said unthreaded portion of said shank and smaller than the threaded portion of said shank;
- h. said rigid washer being formed with an annular area surrounding said opening which is flexible to permit the insertion of said shank through said opening; and
- i. said rigid washer is formed with a pair of slotted openings on opposite sides adapted for releasably receiving said transverse harness strap.

4,058,243
CAR TOP LOAD CARRIER
Leonard E. Tappan, Rte. 3, Box 144, Edwardsburg, Mich. 49112
Filed Apr. 29, 1976, Ser. No. 681,321
Int. Cl.² B60R *9/08*
U.S. Cl. 224—42.1 H **6 Claims**



1. A car top load carrier comprising
a rigid elongated support frame having multiple prefabri-

cated sections, means for detachably and telescopically connecting adjacent said frame sections in longitudinal alignment and end abutment,

means for removably mounting at least some of said support frame sections on the top of a vehicle and cooperating with said frame connecting means to position said frame sections in frame-defining assembled load-bearing relation,

laterally spaced parallel tracks of C-shaped cross section attached to each section of said support frame at their bottom bent marginal sections and each track abutting and longitudinally aligned with an adjacent track of an adjacent frame section when said sections are connected,

an elongated load carrying member,

wheels journaled at one end of said load carrying member,

a plurality of laterally spaced sets of rollers journaled at spaced intervals along the length of said load carrying member and adapted to traverse said tracks, said tracks retaining said rollers against release transversely from said support frame, and

means for securing said load carrying member in operative position on said support frame.

4,058,244

AIR CUSHION NOZZLE

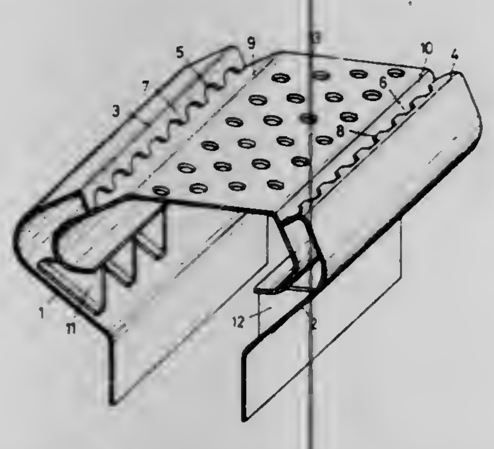
Hilmar Vits, Leichlingen, Germany, assignor to Vits-Maschinenbau GmbH, Langenfeld, Germany

Filed Feb. 17, 1977, Ser. No. 769,717

Claims priority, application Germany, Mar. 27, 1976, 2613135

Int. Cl.² B65H *17/32*

U.S. Cl. 226—97 **10 Claims**



1. An air cushion nozzle for a device for conveying a web in suspension on an air cushion, said nozzle comprising a housing including two opposed walls with bent legs thereon, said legs having spaced recesses therein forming tongues between said recesses, baffle plate means supported on said housing for supporting each leg, said legs being biased, so that said tongues on said legs being in contact with said baffle plate means to form two rows of discharge outlets for jets of air at said recesses extending towards one another in parallel for form the air cushion.

4,058,245

YARN CONTROL MECHANISMS AND THE LIKE

Francis Neil Hurt, Nottingham; Reginald Theaker, Derby, and David Herbert Plant, Nottingham, all of England, assignors to National Research Development Corporation, London, England

Continuation of Ser. No. 553,311, Feb. 26, 1975, abandoned. This application Sept. 30, 1976, Ser. No. 728,734

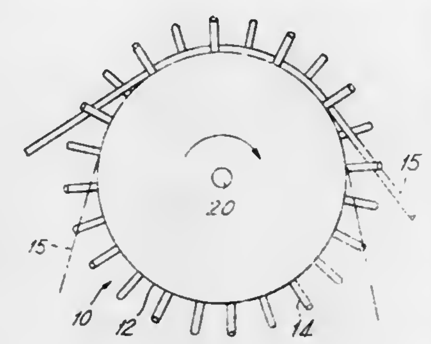
Claims priority, application United Kingdom, Feb. 26, 1974, 08587/74; May 21, 1974, 22763/74

Int. Cl.² B65H *17/22*

U.S. Cl. 226—174 **10 Claims**

1. A rotatable control system for yarn or like material comprising in combination:

an element having an outer cylindrical peripheral surface extending substantially parallel to said element's axis of rotation, said surface being accessible to the yarn to make continuous contact therewith for the length of yarn along the surface, said surface having a number of discrete guide surfaces, at least in part, staggered about an imaginary reference plane which is perpendicular to said axis of rotation of said element, alternate ones of said number of said discrete guide surfaces providing a first set of such surfaces each of which bend only in a first direction relative to said reference plane, and the intervening ones of said guide surfaces providing a second set of said surfaces, each of which bends only in the opposite direction to said



first direction, the divergence of adjacent surfaces relative to said reference plane increasing with increasing distance from said axis of rotation to define, for the material, a zig-zag path which degenerates with increasing distance from said axis of rotation of said element into a line path lying in said reference plane of said element; and

control means for varying the distance of the yarn from said element axis of rotation to thereby vary the tension applied by said element as it is rotated including first and second guide members pivotably mounted about said axis of rotation and each mounting means for guiding passage of said yarn.

4,058,246

SUCTION PIPETTE AND METHOD OF MANUFACTURE FOR RECEIVING OF SEMICONDUCTOR CRYSTAL PLATES

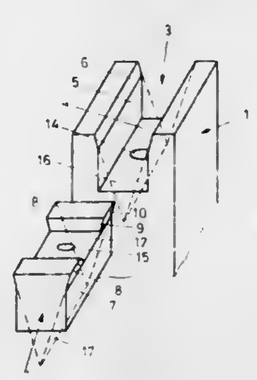
Karl Nicklaus, Steinhausen, Switzerland, assignor to Esec Sales S.A., Zug, Switzerland

Filed Oct. 13, 1976, Ser. No. 732,103

Claims priority, application Switzerland, Oct. 16, 1975, 13454/75

Int. Cl.² H01L *21/68;* **B22F** *7/06*

U.S. Cl. 228—121 **7 Claims**



1. A method of manufacturing a suction pipette of sinterable material for receiving rectangular, including quadratic semiconductor crystal plates, the pipette being formed with a rectangular recess having a floor, walls defining the recess narrowing towards the floor, and an evacuation channel communicating with the floor, comprising the steps of:

inserting a binder into the material to be sintered; fabricating first and second parts for assembly of the pipette, the first part being formed with an open channel and having first and second sidewalls defining the open channel, the second part being insertable into the first part having first and second cam-shaped end-projections formed with first and second inner walls, respectively, and first and second outer walls for making contact with the first and second sidewalls upon insertion of the second part into the first part;

grinding the sidewalls of the first part within the region of the open channel and the outer walls of the projections to a predetermined tapered angle for at least a first portion of the first and second sidewalls, and the first and second outer walls to fittingly abut each other, respectively, upon the insertion of the second part into the first part, the inner walls and at least a second portion of the first and second sidewalls defining the recess; and heat treating or sintering the first and second parts upon insertion of the second part into the first part for uniting the first and second parts by diffusion of the binder within the sinterable material.

4,058,247

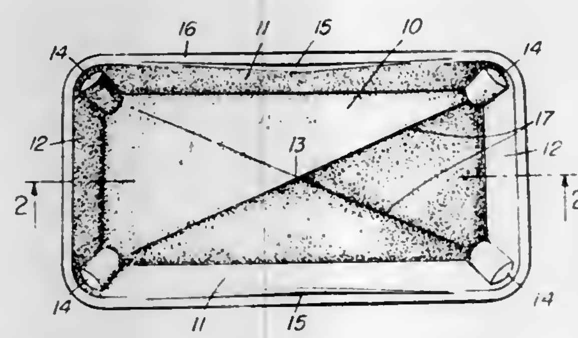
COMMODITY PACKAGING TRAY

John Florian, Bakersfield, Calif., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Nov. 15, 1976, Ser. No. 741,913

Int. Cl.² B65D *1/34*

U.S. Cl. 229—2.5 R **8 Claims**



1. A tray of substantially rectangular shape adapted for packaging of an edible product, said tray comprising: a bottom product-supporting wall and integral side walls upstanding from said bottom wall; said side walls including two oppositely disposed longer side walls; said bottom wall being elevated at its center portion to above the horizontal plane described by the bottoms of the four corners of said tray; said bottom product-supporting wall being depressible to said horizontal plane described by the bottoms of said four corners of said tray when said product is placed on said elevated center portion of the product-supporting wall; and each of said two longer side walls being flexible inwardly upon depression of said bottom product-supporting wall.

4,058,248

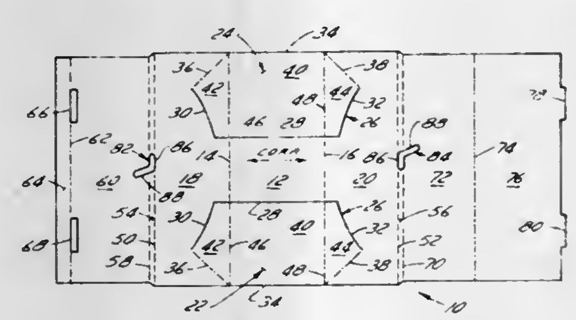
PRODUCE TRAY

James Michael Smith McArdle, Stratford, Canada, assignor to Domtar Limited, Montreal, Canada

Filed June 30, 1976, Ser. No. 701,367

Int. Cl.² B65D *5/20*

U.S. Cl. 229—30 **10 Claims**



1. A tray comprising a bottom panel, side walls foldably connected to opposite sides of said panel via a pair of substantially parallel side fold lines, a pair of end wall forming panels, each of said end wall forming panels being defined in said bottom panel and said side walls by a line of weakness extending across said bottom panel and partway into each of said side walls, and a first pair of fold lines extending one from each end of said line of weakness toward a junction formed with the projection of the adjacent of said side fold lines, a second pair of fold lines extending one from said line of weakness toward each of said junctions to form in each of said end wall forming panels, an end wall and a pair of side connecting walls, said first and second pairs of fold lines being symmetrically arranged with respect to the longitudinal centre line of the tray, each of said side connecting walls being in overlying face-to-face relationship with its adjacent of said side walls, a reinforcing side panel foldably connected to each of said side walls and positioned in face-to-face overlying relationship to the side wall to which it is connected and its adjacent said side connecting wall, end edges at each end of said reinforcing side wall panels, said end edges abutting said end walls thereby to hold said end walls in erected position, one of said reinforcing side wall panels having a flap foldably connected to its free edge and the other of said reinforcing side wall panels having a bottom wall foldably connected to its free end, said foldable connection between said side walls and said reinforcing side wall panels and between said one reinforcing side wall panel and said flap and said other reinforcing side wall panel and said bottom wall being substantially parallel to said pair of fold lines connecting said side walls with said bottom panel, releasable means to lock said bottom wall in face-to-face relationship with said bottom panel and said reinforcing side wall panels in position relative to said side walls, said side connecting walls and said end walls thereby to form the sole means for holding said tray in erected position.

4,058,249

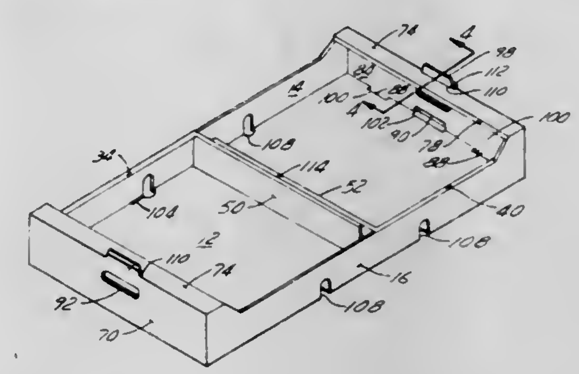
STACKING TRAY

Stanley Edward Buck, Montreal, Canada, assignor to Domtar Limited, Montreal, Canada

Filed Oct. 7, 1976, Ser. No. 730,374

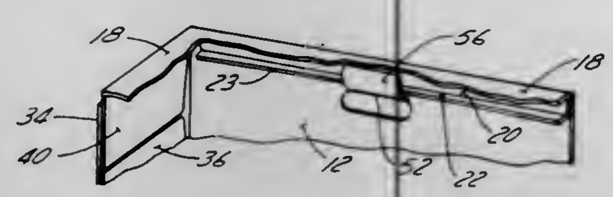
Int. Cl.² B65D *5/22*

U.S. Cl. 229—34 HW **4 Claims**



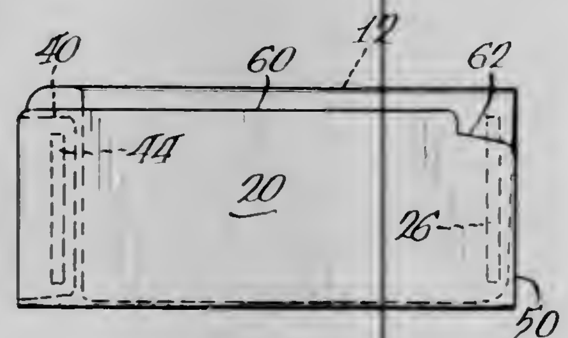
1. A blank and tray formed therefrom comprising a bottom wall, side walls foldably connected along opposite sides of said bottom wall by a first pair of substantially parallel fold lines, and flaps connected to opposite ends of each of said side walls by fold lines substantially perpendicular to said first pair of fold lines, end wall structures foldably connected to opposite ends of said bottom wall by a second pair of fold lines substantially perpendicular to said first pair of fold lines, each of said end wall structures including a first end panel foldably connected to said bottom panel, a first top panel, a second top panel and a second end panel foldably interconnected by a set of fold lines substantially perpendicular to said first set of fold lines, a nesting panel formed from said second top panel and connected to said second end panel, a slot through said first top panel adjacent the connection of said first top panel with said first end panel, said slot and said nesting panel being positioned in a manner that said nesting panel may be projected through said slot when said blank is erected to form said tray.

4,058,250
REINFORCED SIDE CARRY CARTON
Allardus A. Akkerman, Calgary, Canada, assignor to Domtar Limited, Montreal, Canada
Filed May 4, 1976, Ser. No. 682,997
Int. Cl.^{2} B65D *5/46, 25/22*
U.S. Cl. 229—52 B **8 Claims**



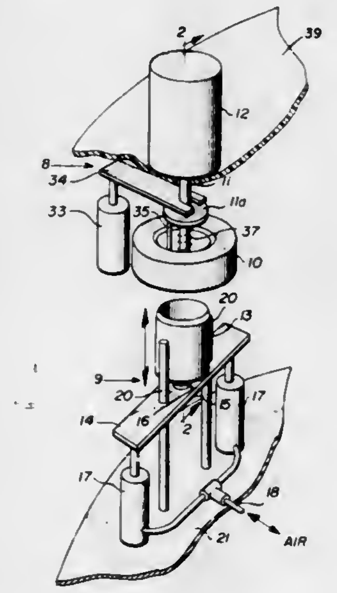
1. A blank for forming a side carry carton comprising a front wall, bottom wall, rear wall, top wall, and manufacturer's joint forming flap interconnected by a set of substantially parallel fold lines, an extension of said manufacturer's joint forming flap connected to said flap by a first fold line substantially parallel to said set of fold lines, said first fold line on said extension inhibiting folding of said extension inward of a finished carbon made from said blank through more than approximately 90° relative to said flap, a handle panel formed in said front wall by a substantially U-shaped slit and a second fold line interconnecting the opposite ends of said U-shaped slit, said second fold line being substantially parallel to said set of fold lines and being spaced from the top edge of said front panel by a distance to permit said first and second fold lines to be substantially in alignment when said carton is constructed, said first fold line on said extension and said extension extending laterally from opposite ends of said second fold line.

4,058,251
FOLDED MONEY PACK ENVELOPE
Mayne B. Stevenson, Park Ridge, Ill., assignor to Arvey Corporation, Chicago, Ill.
Filed Nov. 16, 1976, Ser. No. 742,082
The portion of the term of this patent subsequent to July 27, 1993, has been disclaimed.
Int. Cl.^{2} B65D *27/08*
U.S. Cl. 229—72 **4 Claims**



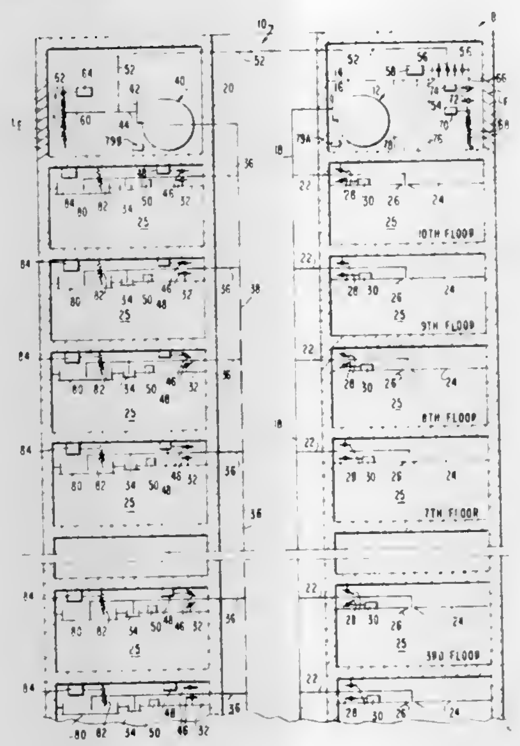
1. A sheet adapted to be folded to produce an envelope, said sheet being generally rectangular in plan view and having four lateral edges, said sheet having first and second spaced parallel fold lines dividing said sheet into a central panel portion and first and second panel portions on opposite sides of said central panel portion, said central panel portion having a flat planar edge on one end thereof, said central panel portion having a further fold line on an end opposite of said flat planar edge and extending parallel thereto to produce a tab, said first panel portion having one flat edge defining an extension of said flat planar edge and being inwardly angularly related thereto, said first panel portion having a second flat edge offset inwardly from said further fold line in said central panel portion and extending generally parallel thereto, said tab having an outer lateral flat edge spaced from said further fold line by a dimension that is less than the spacing between the second flat edge of said first panel portion and said further fold line in said central panel portion, one of said central and first panel portions having a first area of adhesive on a surface thereof adjacent said flat planar edge and a contact surface of one of said tab and said second panel portion having a second area of adhesive between said further fold line and said outer lateral flat edge of said tab, said second panel portion having opposite ends extending parallel to each other and respectively defining extensions of said flat planar edge and said further fold line of said central panel portion so that said tab can be folded along said further fold line, said sheet can be folded along said first fold line to place said first panel portion in overlapping relation with said central panel portion and subsequently along said second fold line to have said second panel portion in overlapping relation with said first panel portion while said tab is in overlapping relation with said second panel portion.

4,058,252
AUTOMATIC SAMPLE PROCESSING APPARATUS
Melvin Williams, 840 Elmwood, Evanston, Ill. 60202
Continuation-in-part of Ser. No. 617,236, Sept. 26, 1975, abandoned, which is a continuation of Ser. No. 487,317, July 10, 1974, Pat. No. 3,908,893, which is a division of Ser. No. 351,631, April 16, 1973, Pat. No. 3,838,809. This application Oct. 23, 1975, Ser. No. 625,029
Int. Cl.^{2} B04B *15/02*
U.S. Cl. 233—14 R **41 Claims**



1. Apparatus for separating a sample into its lighter and heavier components comprising:
means including a hollow shaft;
means comprising a centrifuge drum having an interior chamber coupled to the shaft;
means for rotating the shaft about its longitudinal axis to spin the centrifuge drum and cause the heavier components and the lighter components to separate in the interior chamber;
means comprising a vacuum source;
means including a tube extending from the interior centrifuge drum chamber through the hollow shaft;
a seating member mounted on the hollow shaft to rotate therewith;
a stationary coupling member having an orifice therethrough and adapted to be seated on the seating member;
external means coupling the orifice of the stationary coupling member to the vacuum source means; and
means comprising a needle-like member mounted on the tube to extend from the rotating hollow shaft through the rotating seating member into the orifice of the stationary coupling member,
the separated sample component being aspirated in the tube through the hollow rotating shaft and the needle-like member into the stationary coupling member orifice and therethrough into the external means responsive to the vacuum source means.

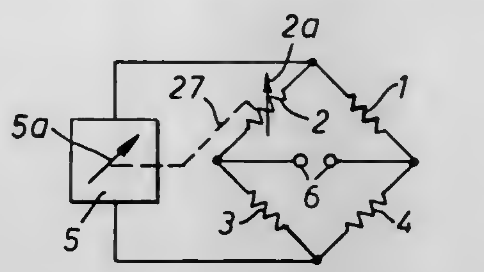
4,058,253
METHOD AND APPARATUS FOR CONSERVATION OF ENERGY AND CONTAINMENT AND EVACUATION OF SMOKE IN A HIGH RISE BUILDING
Michael E. Munk, Port Chester, and Louis F. Bromberg, Spring Valley, both of N.Y., assignors to Michael E. Munk, Port Chester, N.Y.
Filed Mar. 19, 1975, Ser. No. 559,885
Int. Cl.^{2} F24F *7/06, 11/00*
U.S. Cl. 236—46 R **8 Claims**



7. In a high rise building having a plurality of selected locations, the method of normally supplying conditioned air to said building through a plurality of supply and return passageways communicating with a plurality of selected locations through corresponding supply and return registers in a manner to reduce and conserve the consumption of air conditioning energy, said method comprising normally providing conditioned air to and removing air from a pre-determined number of selected locations at a rate which is a pre-determined reduced percentage of the full capacity of said air conditioning system, simultaneously providing conditioned air to and removing air from the remaining number of said selected locations at said full rate, and cyclically varying the specific selected locations being supplied with conditioned air and having air removed therefrom at said reduced pre-determined percentage of said full rate.

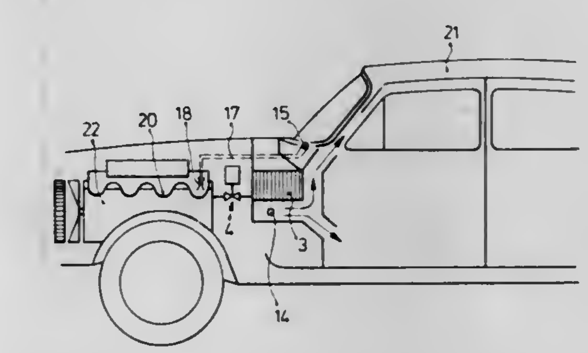
4,058,254
TEMPERATURE-MONITORING AND CONTROL SYSTEM
Knud Julius Hallgreen, Nordborg, Denmark, assignor to Danfoss A/S, Nordborg, Denmark
Continuation-in-part of Ser. No. 510,046, Sept. 27, 1974, abandoned, which is a continuation of Ser. No. 793,505, Jan. 23, 1969, abandoned. This application July 11, 1975, Ser. No. 594,964
Claims priority, application Germany, Jan. 26, 1968, 1753205
Int. Cl.^{2} G05D *23/24*
U.S. Cl. 236—68 B **5 Claims**

1. A system for controlling the thermal comfort in a space used by living beings comprising sensing means adapted to be influenced by convection heat and to receive and deliver radiant heat, first adjustable setting means for continuously supplying heat energy to said sensing means corresponding to an expected activity level so that its surface temperature is above ambient temperature, first indicator means for indicating the temperature of said sensing means, second adjustable setting means for selecting a desired comfort temperature setting, second indicator means associated with said second adjustable setting means for indicating said desired comfort temperature setting, and means for the common setting of said first and second setting means so that an increase in the heat energy supplied to said sensing means corresponds to a lowering of



said desired comfort temperature setting and vice versa; said first and second indicating means being subject to comparison to control the thermal input to said space.

4,058,255
HEATER CONTROL FOR A MOTOR VEHICLE
Ernst Linder, Muhlacker; Wilhelm Hertfelder, Steinenbronn; Eberhard Schnaibel, Hemmingen, and Erich Junginger, Stuttgart, all of Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany
Filed July 2, 1976, Ser. No. 702,087
Claims priority, application Germany, July 11, 1975, 2531015; Apr. 9, 1975, 2615476
Int. Cl.^{2} B60H *1/02*
U.S. Cl. 237—12.3 B **16 Claims**

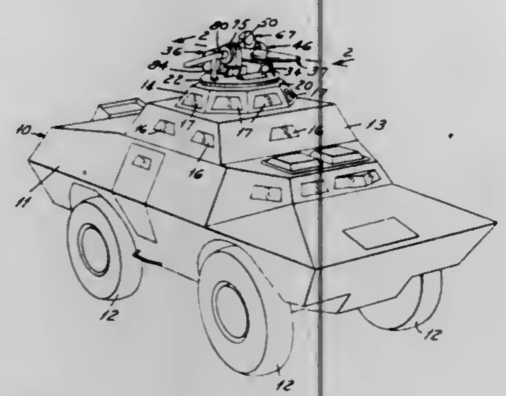


1. A heating system for motor vehicles comprising:
heat exchanger means, connected to the engine of the motor vehicle for circulation of a heating medium through said heat exchanger means;
valve means disposed between said engine and said heat exchanger means for controlling the flow rate of said heating medium through said heat exchanger;
first temperature sensor means, for generating a first electrical signal dependent on the air temperature in the passenger compartment of said motor vehicle;
second temperature sensor means, for generating a second electrical signal dependent on the air temperature adjacent said heat exchanger means;
a set point generator, for generating an electrical set-point signal; and
controller means, for receiving said first and second electrical signals and said set-point signal and for generating an output control signal for actuating said valve means;
wherein said first and second temperature sensor means are connected in series and the change in signal from said first sensor means is greater than the change in signal from said second sensor means for the same change in temperature.

4,058,256
WATER CANNON

James Charles Hobson, St. Clair Shores, and Arthur John Wroble, Grosse Pointe, both of Mich., assignors to Cadillac Gage Company, Warren, Mich.

Continuation of Ser. No. 582,541, May 30, 1975, abandoned. This application Oct. 18, 1976, Ser. No. 733,667
Int. Cl.² B05B *1/08*
U.S. Cl. 239—101 **10 Claims**



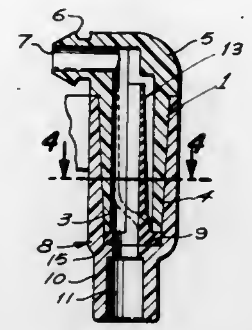
1. In a water cannon for use in controlling large crowds of unruly people, the combination comprising:
A. a cannon body having a discharge nozzle means;
B. a pressurized water supply means connected to said cannon body for supplying water under pressure thereto;
C. a main stage flow control valve means for controlling the discharge of discrete water projectiles in a pulsing fashion from said nozzle means; said main stage flow control valve means includes:
1. a valve plunger axially disposed in said cannon body;
2. a floating valve seat mounted in said cannon body on which said valve plunger seats when the cannon is inoperative; and
3. means for normally biasing the valve plunger into seating engagement with said valve seat; said means for normally biasing the valve plunger includes:
a. spring means; and
b. a piston means connected to said valve plunger for moving the valve plunger into seating engagement with said valve seat when water under pressure is exerted against the piston;
D. means for controlling said flow control valve means in a pulsing manner to discharge the water cannon in an on-off fashion; said means for controlling said flow control valve means includes:
1. a pilot valve means for controlling the water pressure exerted against said piston;
2. a solenoid means for operating said pilot valve means; and
3. an electronic control means for operating said solenoid means in a pulsing manner.

4,058,257
IRRIGATION EMITTER

Lloyd Spencer, 220 Patrician Way, Pasadena, Calif. 91105

Continuation of Ser. No. 529,712, Dec. 5, 1974, abandoned. This application July 9, 1976, Ser. No. 704,048
Int. Cl.² B05B *1/32*
U.S. Cl. 239—107 **31 Claims**

1. An irrigation emitter comprising:
a. a housing forming an enclosure having opposed first and second fixed walls, an inlet at one end thereof and an outlet at the opposite end thereof, the first wall having a longitudinally extending minimum flow groove communicating with the outlet;
b. a longitudinally extending resilient wall interposed between the first and second walls and having at least one free lateral edge in contact with the first wall at one side of the minimum flow groove, the resilient wall being yieldably and progressively biased away from the first fixed wall between the free lateral edge and minimum flow groove to form with the first fixed wall a flush flow passage including the minimum flow groove and communicating between the inlet and outlet;
c. the flexible wall forming with the second fixed wall, a

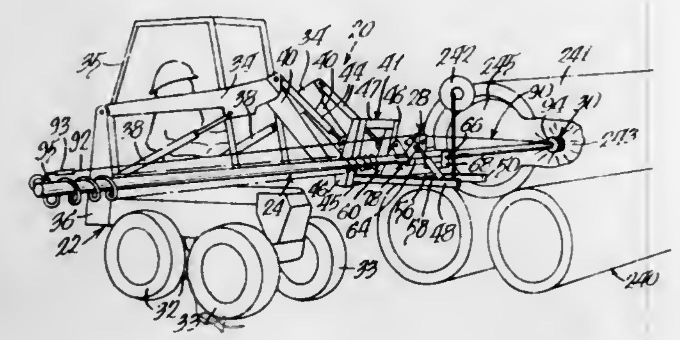


pressure chamber communicating with the inlet and closed to the outlet creating, when subjected to pressure above a predetermined reduced pressure, a force deforming the flexible wall into conformity with the first wall and restricting flow to the minimum flow groove.

4,058,258
INTERIOR PIPE COATING APPARATUS

Paul W. Rosen, 218 Grove, Oak Park, Ill. 60302, and Cary A. Gunderson, 7103 Northcote, Hammond, Ind. 46324

Filed July 29, 1974, Ser. No. 492,446
Int. Cl.² B05B *3/18*
U.S. Cl. 239—165 **9 Claims**



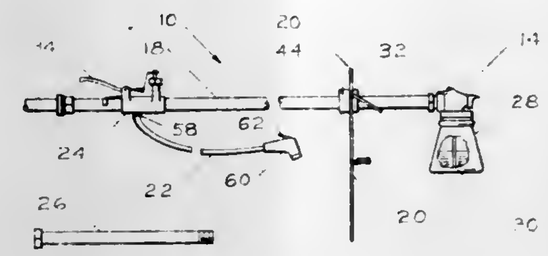
1. In apparatus for coating the interior surface of a pipe or the like, in combination, a mobile vehicle, a traveling boom reciprocally movable on said vehicle and adapted to be moved into and out of the pipe, adjustment means on said vehicle for varying the relative position of said traveling boom and bringing it into alignment with the longitudinal axis of the pipe, means on said vehicle for reciprocating and supporting said traveling boom for movement into and out of the pipe, said means for supporting said traveling boom being adapted to be always spaced from the interior surface of the pipe, and spraying means secured adjacent an end of said traveling boom, said reciprocating and supporting means comprising flexible means secured to opposite ends of said traveling boom, and a driven pulley rotatably supported on said vehicle, said flexible means having a mediate portion wrapping around said pulley, whereby rotation of said pulley drives said flexible means and said traveling boom, and the interior surface of the pipe may be coated without any portion of said apparatus touching the inner surface of the pipe.

4,058,259
HANDLE AND STAND FOR PRESSURE SPRAYING

Socrates J. Schantz, Marine, Ill., assignor to John S. Schantz and Raymond G. Schantz, both of Marine, Ill., part interest to each

Filed June 23, 1976, Ser. No. 698,946
Int. Cl.² B05B *7/30*
U.S. Cl. 239—276 **5 Claims**

1. A remote control handle for a pressure sprayer cannister having means for mixing a concentrated spray solution with an external liquid under pressure, said handle comprising an elongated rigid tubular member of at least about an arm's length, means for connecting a first end of said tubular handle to the cannister and a second end to a flexible hose for providing liquid under pressure, a normally closed valve adjacent the second end for regulating the flow of liquid to the cannister and a pivotable stand, said stand being pivotably connected to the handle adjacent the cannister and having a rod-like free end

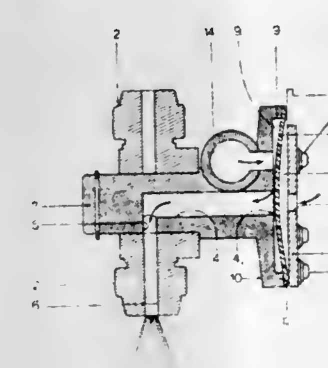


member adapted to be driven into the ground directly underneath the handle to support the handle upon the ground in a triangular position said end member comprising a pair of substantially parallel rigid rod elements connected to one another and spaced apart for receiving and supporting said handle, and which are adapted to be stuck in the ground, said stand being pivotally connected to the handle by an element having a pair of inwardly turned ends for pivotally supporting said tubular handle member.

4,058,260
SELECTABLE, ANTI-LEAK, NOZZLE-HOLDER

Maurice Cyril Lestradet, 291 rue du Marechal Delattre de Tassigny, 51230 Fere Champenoise, France

Filed Sept. 22, 1975, Ser. No. 615,546
Claims priority, application France, Nov. 7, 1974, 74.36938
Int. Cl.² B05B *1/16*
U.S. Cl. 239—394 **11 Claims**

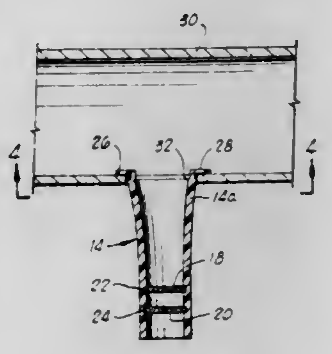


1. A nozzle device for mounting on a vehicle comprising:
an annular body having a plurality of radial passages, a plurality of arms each being provided with a spray nozzle, means for radially interengaging said arms about the periphery of said annular body, each in alignment with a radial passage,
said annular body having an axial opening to receive a plug, said plug having an axial passageway extending longitudinally between opposite ends of the plug and connecting to a radial duct at one end of the plug,
said duct and annular body arranged for selective alignment of said duct with one of said radial passages,
said annular body being mounted rotatably with respect to the plug whereby selection of a given nozzle type is effected by angular displacement of said annular body,
said plug having at its other end an anti-drip means comprising a body at the other end of the core forming in part a dispensing chamber and a diaphragm supported across the dispensing chamber and deflectable to cover at least said axial passageway to stopper it,
said plug having at its other end means defining an inlet duct integral with the plug and a port extending between the inlet duct and dispensing chamber, said inlet duct communicating with the port and extending transversely to the axial passageway in the plug, said inlet duct having opposite open ends permitting inlet feeding from the holder to an adjacent holder.

4,058,261
AERATION TUBE

Gary M. Pollart, P.O. Box 1558, Guymon, Okla. 73942

Filed Feb. 19, 1976, Ser. No. 659,424
Int. Cl.² B05B *1/14, 15/00;* **F16L** *41/02*
U.S. Cl. 239—542 **8 Claims**

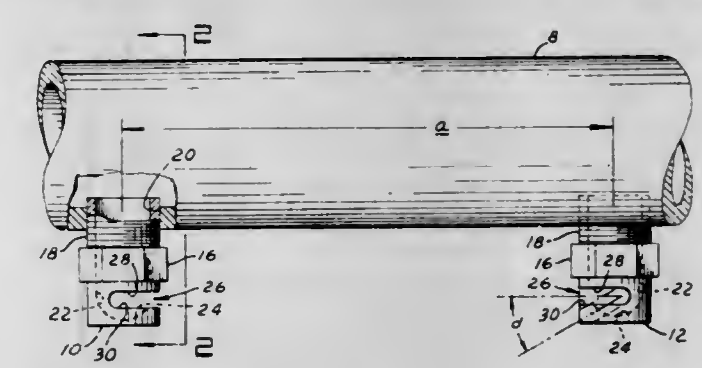


1. In combination:
an irrigation pipe for conducting irrigation water;
means for discharging water from the interior of the pipe to the ground through an opening in the wall of the pipe; and
a tubular aeration device mounted adjacent the side of the pipe and positioned to communicate its interior with said opening in the wall of the pipe, said device comprising:
a shapeable, manually deformable tubular first end portion of selectively variable cross-sectional configuration;
a plurality of retainer hooks secured to said tubular first end portion, and including portions projecting normal to the axis of said tubular first end portion and radially outwardly of the external wall of said tubular first end portion;
a second tubular end portion connected to said first tubular end portion; and
a plurality of rigid diffusion screens positioned in, and extending transversely across, said second tubular end portion.

4,058,262
FLUID SPRAY FOR GENERATING RECTANGULAR COVERAGE

Richard C. Burnham, Greenfield, Mass., assignor to Bete Fog Nozzle Inc., Greenfield, Mass.

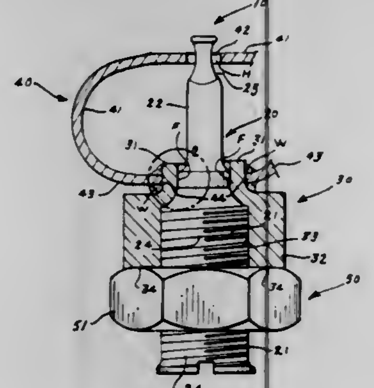
Filed Feb. 13, 1976, Ser. No. 658,070
Int. Cl.² B05B *1/26*
U.S. Cl. 239—545 **6 Claims**



1. Spray apparatus for evaporational cooling of tubular media, the upper surfaces of which define a generally planar surface comprising a conduit carrying liquid under pressure and disposed above and generally parallel to said surface, at least one pair of nozzles depending in axially spaced relation from said conduit, each nozzle having an internal spherical end wall surface and an orifice opening through said spherical end wall surface and extending over an obtuse angle, said orifice

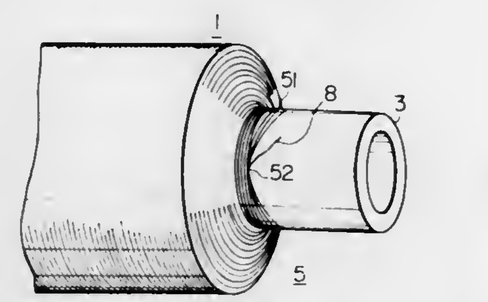
being defined by upper and lower edges spaced apart from three-sixteenths inch to three-fourths inch, said orifice intersecting said spherical surface to provide a spherical surface below said orifice of about five-eighths to three-fourth the surface area of a hemisphere of the same radius as said spherical surface, each nozzle generating an arcuate spray of liquid droplets in generally parallel, superposed spaced relation to said planar surface of said tubular media, said nozzles being disposed in axially spaced relation on said conduit with the orifice of one nozzle opening directly toward the orifice of the other nozzle with the geometric center of each spray in general alignment with the axis of said conduit, the spacing between said pair of nozzles being such that the droplet velocity of the spray of each nozzle generated by a water pressure of 0.5 to 10 psi is attenuated by impact with the spray of the other nozzle, said attenuation being a maximum in a direction parallel to said axis and decreasing to a minimum as the spray angle from each nozzle increases toward a direction transverse to said axis whereby a generally rectangular spray pattern is deposited on said tubular media with its major dimension transverse to said conduit.

4,058,263
ADJUSTABLE PINTLE SPRAY MANIFOLD ASSEMBLY
Donald R. Trenschel, Lake Park, and Frederick G. Eitel, North Palm Beach, both of Fla., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.
Filed Aug. 16, 1976, Ser. No. 714,414
Int. Cl.[2] B05B *1/30, 1/14*
U.S. Cl. 239—551 **6 Claims**



1. An adjustable pintle spray manifold assembly, comprising:
a. a pintle having a lower portion, and an upper portion with an end shaped in a converging-diverging configuration;
b. a support for said pintle, with said pintle support surrounding, and removably connected to, the lower portion of said pintle, and with said pintle support having an upper portion and a lower portion;
c. a manifold having an upper surface with a first opening therethrough sized and shaped to accept, and to permit the passage of, the configurated end of the upper portion of the pintle, and a lower surface with a second opening therethrough sized to accept the upper portion of the pintle support, with said manifold disposed surrounding the upper portion of said pintle support protruding into, and affixed to, the second opening of said manifold, thereby completely closing the second opening;
d. and, means for releasably locking said pintle to said pintle support and also to said manifold that is affixed to said pintle support;
whereby said pintle may be moved upwardly, so that the configurated end of the upper portion of the pintle protrudes through the first opening in the upper surface of said manifold, thereby forming a variable sized annular-shaped orifice between the first opening in the manifold and the configurated end of the pintle, whereby a desired quantity, and rate of spray of a fluid through the variable sized annular-shaped orifice may be easily attained and maintainted, without further adjustment, after said pintle end has once been adjusted.

4,058,264
YARN WOUND PACKAGE PROVIDED WITH A TRANSFER TAIL WIND AND METHOD FOR FORMING THE TRANSFER TAIL WIND
Kohei Kawashima; Keiji Ikeno, and Hajime Nakanishi, all of Matsuyama, Japan, assignors to Teijin Limited, Osaka, Japan
Filed July 16, 1975, Ser. No. 596,213
Int. Cl.[2] B65H *55/04, 54/34;* **D01H** *1/38*
U.S. Cl. 242—18 PW **2 Claims**

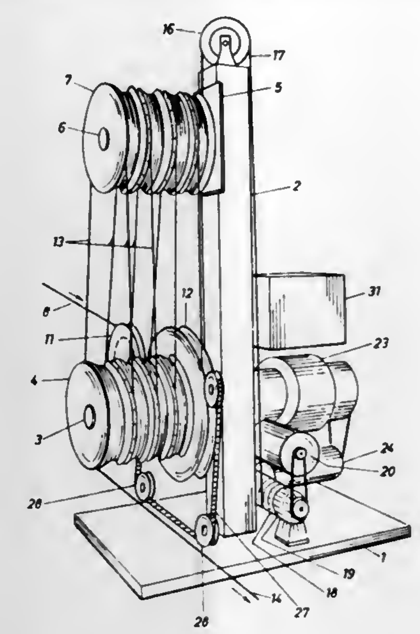


1. A winding method for forming a yarn package from a supplied yarn on a cylindrical bobbin comprising a normal winding portion and a transfer tail wind portion provided with a plurality of windings spirally formed on said bobbin at an end portion thereof adjacent to said normal winding portion, comprising positively leading a major length of said supplied yarn about a spiral path substantially perpendicular to the axis of said bobbin to form a helical winding, axially displacing a minor portion of at least one turn of said supplied yarn toward said normal winding portion, along a substantially V-shaped path to and from a particular portion of said end portion of said bobbin at an initial stage of forming said transfer tail winding portion and subsequent to said initial stage, and without disturbing said helical winding, winding at least one additional turn of said supplied yarn along a spiral path intersecting said particular portion of said end portion of said bobbin, at least two of said sprial windings of said transfer tail wind portion wound on said portion adjacent to an end of said bobbin being formed in superimposed condition at said particular portion of said bobbin, and overlapping said particular portion over a circumferential distance not exceeding one-eighth the circumference of said bobbin.

4,058,265
CABLE MAGAZINE
Per Olov Hedlund, Norsborg, and Lars Olof Hertsius, Bromma, both of Sweden, assignors to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden
Filed Apr. 30, 1976, Ser. No. 682,094
Claims priority, application Sweden, May 27, 1975, 7506065
Int. Cl.[2] B65H *51/20*
U.S. Cl. 242—47.01 **3 Claims**

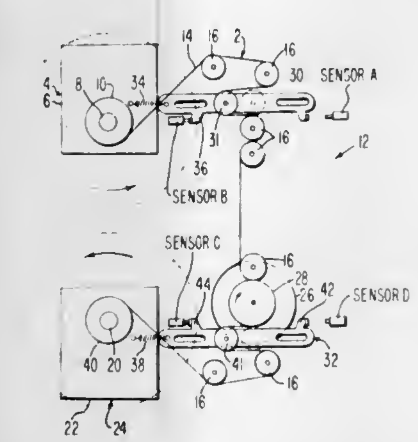
1. In a cable magazine comprising a first shaft and a second shaft spaced parallelly from said first shaft, said first shaft having rotatably mounted thereabout a plurality of pulleys and said second shaft also having rotatably mounted thereabout a plurality of pulleys, said second shaft and its associated plurality of pulleys being movable relative to said first shaft and its associated plurality of pulleys to thereby vary the distance between said shafts in accordance with the amount of cable being stored in said magazine, the improvement comprising: a grooved pulling wheel affixed to said first shaft for pulling cable into said cable magazine, and driving means connected to said first shaft for rotating said first shaft and said pulling wheel affixed thereto, said pulling wheel being affixed to said first

shaft such that said plurality of pulleys of said first shaft are all positioned on one side of said pulling wheel, whereby loops of



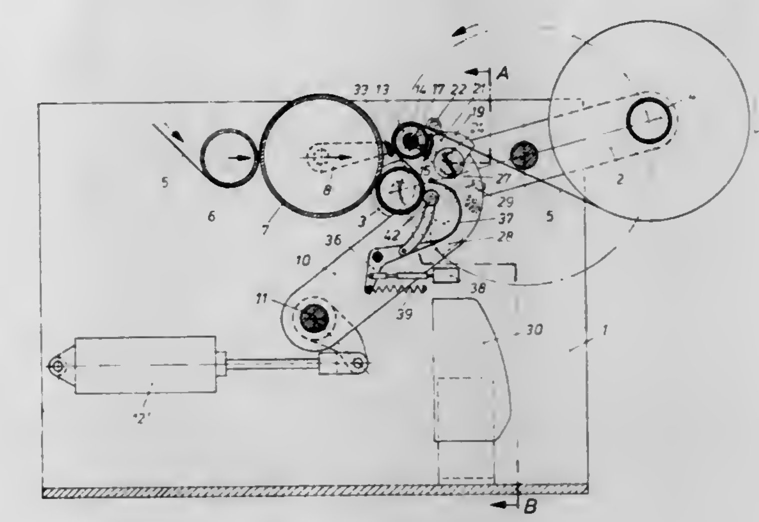
cable are formed between the plurality of pulleys on said first shaft and the plurality of loops on said second shaft.

4,058,266
STRIP LENGTH MONITORING APPARATUS
Jack Beery, Farmington, Mich., assignor to Burroughs Corporation, Detroit, Mich.
Filed Sept. 15, 1976, Ser. No. 723,383
Int. Cl.[2] B65H *75/00, 61/00;* **G01B** *5/04*
U.S. Cl. 242—54 R **18 Claims**



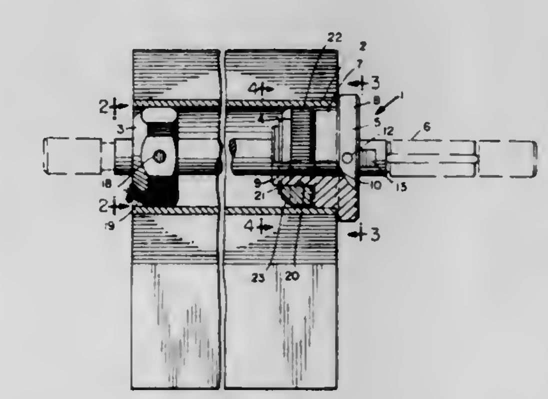
1. An apparatus for monitoring the length of a continuous strip of material, said apparatus comprising:
a supply means for supplying the strip, said supply means including a rotatable shaft adapted for retaining a roll of the strip and for rotatably dispensing a predetermined length of the strip during a given rotation;
capstan drive means for receiving the dispensed portion of the strip from said shaft and for incrementally moving the strip the predetermined length in steps; and
monitoring means for monitoring the length of the strip remaining on the shaft after said rotation by measuring the angular displacement of said shaft after said rotation, by measuring the predetermined length of the dispensed portion, and by correlating said angular displacement and said predetermined length.

4,058,267
WEB SPOOLING MACHINE
Wilhelm Schüttler, Buchenwinkel, Germany, assignor to Maschinenfabrik Stahlkontor Weser Lenze KG, Aerzen, Germany
Filed July 30, 1976, Ser. No. 710,113
Claims priority, application Germany, Aug. 2, 1975, 2534588
Int. Cl.[2] B65H *19/20*
U.S. Cl. 242—56 A **5 Claims**



1. In an apparatus for spooling webs which includes
a base;
spool holding means pivotably attached to said base for holding and for orienting at least one spool relative to said base;
roller means, attached to arms pivoting on said base for engaging and displacing a web being wound up on one of said spools; the improvement comprising:
cutter means pivotably attached to said shaft supporting said roller;
said guide roller supported adjacent to the termini of said arms comprising a framework;
energy storage means carried by said swivelable framework in proximity to said guide roller for powering the pivoting of said cutter means; and
pivotable anvil means for cooperating with said cutter means to sever said web.

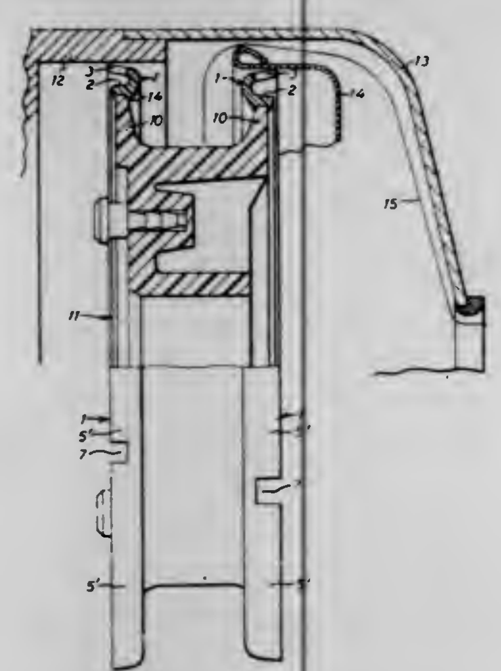
4,058,268
SELF-LOCKING SUPPORT FOR TUBULAR MEMBERS
Ralph P. Puccetti, Oak Park, and King L. Klopfenstein, Prospect Heights, both of Ill., assignors to Triangle Package Machinery Company, Chicago, Ill.
Filed Sept. 27, 1976, Ser. No. 726,623
Int. Cl.[2] B65H *75/24*
U.S. Cl. 242—72 R **8 Claims**



1. A support for rotatably supporting a tubular member comprising
a. an elongated shaft,
b. an annular member mounted on and extending around said shaft in eccentric relation thereto,

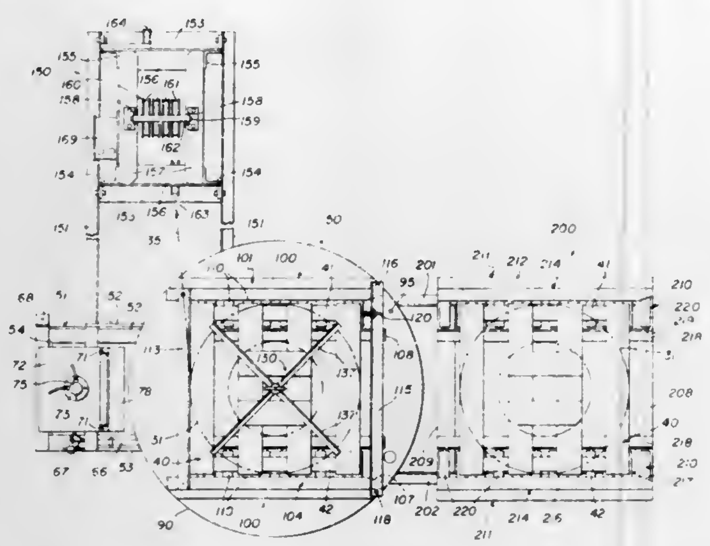
c. a second annular member mounted on and extending around said shaft in eccentric relation thereto, and
d. a third annular member mounted on and extending around said shaft,
e. said annular members being of smaller outside diameter than the inside diameter of such a tubular member and being insertable into said tubular member,
f. a fourth annular member mounted on said shaft for rotation therearound and eccentric thereto in a direction different from the direction of eccentricity of said first mentioned annular member, and
g. said second annular member being rotatable around said fourth annular member relative to said first mentioned annular member into position wherein said first mentioned and said second annular members are effective to apply angularly displaced outwardly directed forces on the interior of said tubular member mounted thereon for securing said tubular member against rotation relative to said first mentioned and second annular members.

4,058,269
LINE PROTECTING ELEMENTS FOR USE IN FISHING REELS
Karl Nurmse, Svangsta, Sweden, assignor to ABU Aktiebolag, Svangstu, Sweden
Filed Nov. 4, 1974, Ser. No. 520,420
Claims priority, application Sweden, Nov. 8, 1973, 7315147
Int. Cl.² A01K *89/01*
U.S. Cl. 242—84.1 K **4 Claims**



1. A ring-shaped line protecting element comprising a piece of elastic material, a line spool in a fishing reel having said elastic material mounted on a circular rim of an end wall of said line spool to cover at least partially a circular space between said rim of said end wall and a part of said fishing reel surrounding said end wall, and to prevent the line from cutting in between said end wall and said part, said elastic material line protecting element comprising a ring-shaped base portion having an inner peripheral surface shaped to be supported by and to engage said circular rim, an outer peripheral surface and a ring-shaped end projection which extends substantially radially outward from one end of said base portion wherein said line protecting element also comprises a ring-shaped resilient flange which extends from one outer end of said ring-shaped projection substantially axially in the direction of the other end of said base portion in radially spaced relation thereto, said substantially axially extending flange spanning the gap between said spool flange and said surrounding part of the fishing reel and having at least an outer edge portion thereof slitted into a ring of substantially axially extending resilient segments for contacting said surrounding part with a light contacting pressure and low friction.

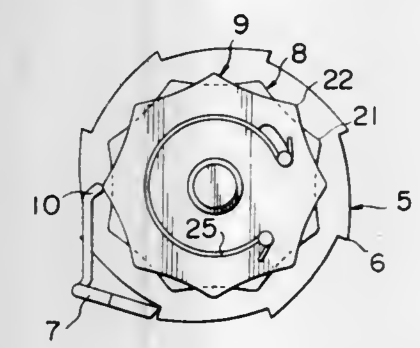
4,058,270
STRAP DISPENSING SYSTEM
James R. Simmons, Frankfort, and Robert P. Rogowski, Ottawa, both of Ill., assignors to Interlake, Inc., Oak Brook, Ill.
Filed Aug. 12, 1976, Ser. No. 713,926
Int. Cl.² B65H *17/52;* **B21C** *47/16*
U.S. Cl. 242—105 **20 Claims**



1. Apparatus for dispensing a continuous strip of strapping material from a heavy coil thereof supported on and held against horizontal movement with respect to a pallet having a pair of spaced-apart feet depending therefrom with the axis of the coil disposed substantially vertically, said apparatus comprising a substantially horizontal turntable mounted for rotation about a substantially vertical axis and having a pair of elongated laterally spaced-apart track assemblies thereon, said turntable being adapted for receiving the pallet thereon in a dispensing position with the pallet feet respectively received in said track assemblies and with the coil disposed substantially coaxially with said turntable, said track assemblies being respectively engageable with the pallet feet for preventing horizontal movement of the pallet from the dispensing position thereof laterally of said track assemblies, two pallet positioning members respectively carried by said turntable adjacent to the opposite ends of said track assemblies and engageable with the pallet for preventing the horizontal movement thereof from the dispensing position thereof longitudinally of said track assemblies, and drive means for effecting rotation of said turntable in a coil-unreeling direction, whereby strapping material may be dispensed directly from the pallet by rotation of said turntable without handling of the coil or removal thereof from the pallet.

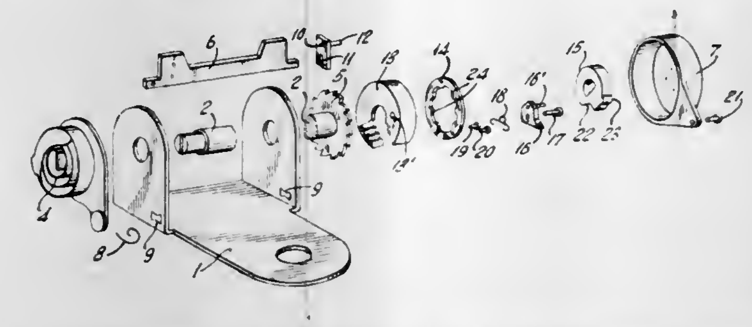
4,058,271
EMERGENCY LOCKING RETRACTOR FOR SEAT BELT ASSEMBLIES
Susumu Ubukata; Yasukazu Mizutani; Syozo Iyoda, and Hiroshi Aoi, Ichinomiya, all of Japan, assignors to Susumu Ubukata, Nagoya, Japan
Filed Feb. 24, 1977, Ser. No. 771,827
Claims priority, application Japan, Mar. 2, 1976, 51-22878; July 20, 1976, 51-86869; Aug. 18, 1976, 51-98350
Int. Cl.² A62B *35/02;* **B65H** *75/48*
U.S. Cl. 242—107.4 B **18 Claims**

1. An emergency locking retractor for a seat belt assembly comprising, in combination, a frame, a reel rotatably supported by said frame and having a belt thereon, first resilient means urging to said reel to rotate in a direction of belt retraction, toothed wheel means rotatable with said reel, said toothed wheel means having teeth or protuberances on and along its periphery at a predetermined pitch, a locking pawl pivotally mounted on said frame for movement into and out of engagement with said teeth or protuberances of said toothed wheel means, said locking pawl being effective to lock said reel against rotation in a direction of belt extension upon engagement with said toothed wheel means, inertia wheel means having protuberanes on and along its periphery at the same pitch as said predetermined pitch and disposed in coaxial relationship to said toothed wheel means so as to be rotatable through a predetermined angle relative to the same, second resilient means for normally holding said inertia wheel means in a predetermined angular position relative to said toothed wheel means, where said protuberances of said toothed wheel means and of said inertia wheel means are at the same phase, and for permitting said inertia wheel means to rotate in synchronism with said toothed wheel means during normal rotation of said reel in the direction of belt extension at relatively low acceleration, said second resilient means yielding upon a high acceleration in exccess of a predetermined value being imparted to said reel in the direction of belt extension to permit angular displacement of said inertia wheel means through said predetermined angle relative to said toothed wheel means so as



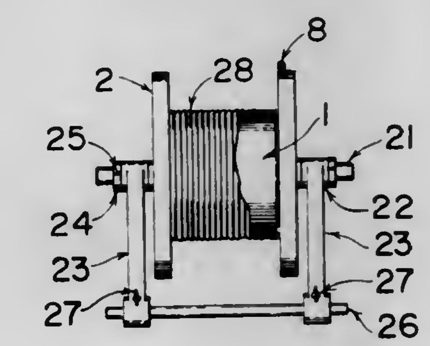
to cause a difference in phase of said protuberances between the toothed wheel means and the inertia wheel means, as well as a change in combined peripheral contour formed by the protuberances of the toothed wheel means and the inertia wheel means, a pivotally supported follower lever following the combined peripheral contour formed by said protuberances, third resilient means urging said follower lever toward the peripheral contour whereby said follower lever is normally held in sliding contact with at least said toothed wheel means and oscillates in conformity with the combined peripheral contour, and means associating said follower lever with said locking pawl in a manner such that the locking pawl permits unobstructed passage therepast of said teeth or protuberances on said toothed wheel means during said normal rotation of the reel and, upon occurence of said change in combined peripheral contour, is held pivoted toward said toothed wheel means for engagement therewith.

4,058,272
INERTIA LOCKED SAFETY BELT TAKE-UP REEL
Takezo Takada, Hikone, Japan, assignor to Takata Kojyo Co., Ltd., Tokyo, Japan
Continuation of Ser. No. 392,703, Aug. 29, 1973, abandoned. This application July 16, 1975, Ser. No. 596,489
Claims priority, application Japan, Sept. 1, 1972, 47-087123
The portion of the term of this patent subsequent to July 29, 1992, has been disclaimed.
Int. Cl.² A62B *35/02;* **B65H** *75/48*
U.S. Cl. 242—107.4 B **8 Claims**



1. An automatic locking safety belt reel mechanism comprising a belt take-up reel, a first ratchet wheel rotatable with said take-up reel, a first pawl disposed proximate said first ratchet wheel and actuatable into engagement therewith to lock said reel against belt withdrawal, spring means biasing said first pawl out of engagement with said first ratchet wheel, a first clutch member rotatable with said reel, a second rotatable clutch member coaxial with said first clutch member and in slipping coupling therewith, a second ratchet wheel coaxial with said clutch members, said first ratchet wheel being normally rotatable relative to said second ratchet wheel, a second pawl disposed proximate said second ratchet wheel, means for actuating said second pawl in response to relative rotation between said first and second clutch members to engage and rock said second ratchet wheel, and actuating means responsive to the rocking of said second ratchet wheel to actuate said first pawl into engagement with said first ratchet wheel.

4,058,273
INFLATABLE CORE WIRE REEL
Donald D. Buell, Ilikai Hotel, 1777 Ala Moana Blvd., Apt. No. 1613, Honolulu, Hawaii 96815
Filed Feb. 5, 1976, Ser. No. 655,455
Int. Cl.² B65H *75/22, 75/24*
U.S. Cl. 242—115 **9 Claims**



1. A knockdown reel for coils of wire comprising:
a. an inflatable core, said core, by selective inflation thereof, having an adjustable diameter to interfit the bore of wire coils and an adjustable length to match the axial length of wire coils;
b. a pair of end flanges;
c. a means to couple the end flanges to the ends of the inflatable core co-axially to form a flanged reel; and
d. a supporting means operatively attached to said flanged reel for support and rotation of the reel thereon and said supporting means being operatively adjustable to accommodate variations in the length of the core and the corresponding distance between the flanges to position the flanges against the sides of the coil;
whereby wire from the fully supported coils may be successively removed from the coils without binding.

4,058,274
PNEUMATIC TUBE SYSTEM
Ernest Hochradel, 61 Edison Terrace, Sparta, N.J. 07871; Werner Hauer, 381 Passaic Ave., Nutley, N.J. 07110; Martin R. Meyer, 75 Voorhis Place, Ringwood, N.J. 07456, and Frederick A. Reuter, 398 Marycrest Drive, Cincinnati, Ohio 45237
Filed Sept. 23, 1976, Ser. No. 725,850
Int. Cl.² B65G *51/32*
U.S. Cl. 243—5 **6 Claims**

1. A pneumatic tube system for conveying carriers, comprising:
two carrier-conveying pneumatic tube branches, each branch including:
a. at least two stations and a branch tube,
b. a carrier reversing tube closed at one end,
c. a diverter having separate ports individually connected to said branch tube, different ones of said stations, and to said carrier reversing tube for selectively completing carrier-conveying paths between (1) said stations and branch tube and (2) said carrier reversing tube,

d. only one air supply connected to said carrier reversing tube to alternatively and selectively transfer carriers into and out of said carrier reversing tube via said diverter,

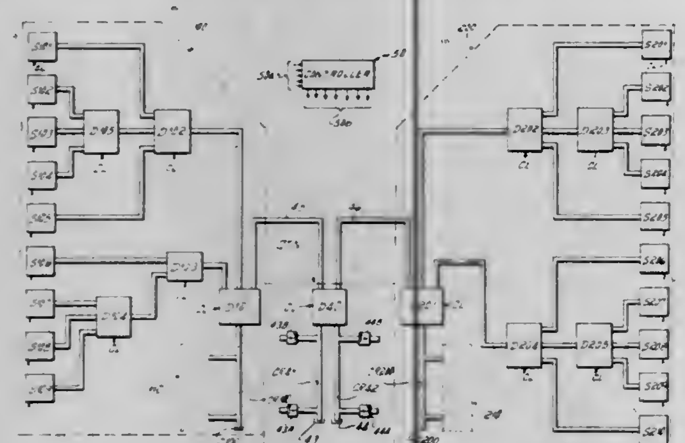
an inter-branch carrier transfer network including:

a. at least one carrier reversing tube closed at one end,

b. a diverter connected between said carrier reversing tube and said branch tubes for selectively connected said branch tubes to said carrier reversing tube, and

said inter-branch carrier transfer network having no air supply associated with it except for said branch air supplies,

a controller for operating said branch and network diverters



and said branch air supplies to sequentially draw a carrier from a sending station in a sending branch into the carrier reversing tube of said sending branch via said sending branch diverter using said sending branch air supply, thence propel said carrier into said carrier reversing tube of said inter-branch carrier transfer network via said diverter and branch tube of said sending branch and said diverter of said inter-branch carrier transfer network using said sending branch air supply, and thereafter draw said carrier from said network carrier reversing tube to a destination station in said destination branch via said diverter of said inter-branch carrier transfer network, said branch tube and diverter of said destination branch using said destination branch air supply.

4,058,275

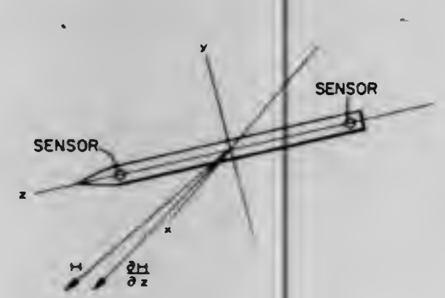
LOW FREQUENCY PASSIVE GUIDANCE METHOD

Clarence K. Banks, San Diego, Calif.; Prescott D. Crout, Lexington, Mass., and Paul B. Homer, China Lake, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Dec. 28, 1970, Ser. No. 102,248

Int. Cl.² F41G *9/00, 11/00;* G01R *38/02, 33/00*

U.S. Cl. 244—3.15 4 Claims



1. A method of detecting and determining the direction to a low frequency electromagnetic field with respect to the line-of-sight of a body having a body axis comprising

positioning at least two sensors for sensing low frequency electromagnetic fields at spaced points in a body;

deriving magnetic field intensity H from at least one of said at least two sensors;

deriving the gradient of the magnetic field intensity $\delta H/\delta r$ from said at least two sensors;

the gradient of the magnetic field intensity being obtained by taking the difference of the measurements of the magnetic field intensity from said at least two sensors separated by the distance between said at least two sensors;

determining the angular difference between the body axis and the line-of-sight to the source which is radiating the electromagnetic low frequency field radiating source based on H and δH.

4,058,276

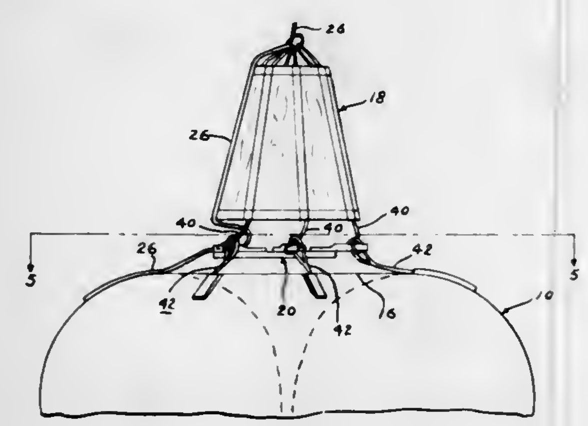
PILOT CHUTE CROWN LINE ATTACHMENT SYSTEM

Herbert R. Brown, Monroe County, N.Y., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Feb. 16, 1977, Ser. No. 769,374

Int. Cl.² B64D *17/68*

U.S. Cl. 244—152 3 Claims



1. A system for attaching a pilot chute to the crown area of a main parachute having a vent pull-down line, comprising: a pilot chute bridle connected between said pilot chute and one position of the crown area of the main parachute canopy; means connecting said pilot chute bridle to a plurality of additional substantially equally spaced positions of the crown area of said main parachute canopy; said means for securing the pilot chute bridle to the additional positions of the crown area including means, responsive to inflation of the main parachute canopy, for releasing the pilot chute bridle from the additional positions of the crown area of the main parachute canopy.

4,058,277

CAPTIVE REMOTE-CONTROLLED HELICOPTER

Hugo Kozakiewicz, Uhldingen-Muhlhofen, and Wolfgang Reuter, Friedrichshafen, both of Germany, assignors to Dornier GmbH., Germany

Continuation-in-part of Ser. No. 594,004, July 8, 1975, abandoned. This application July 28, 1976, Ser. No. 709,268

Claims priority, application Germany, Sept. 19, 1974, 2444775

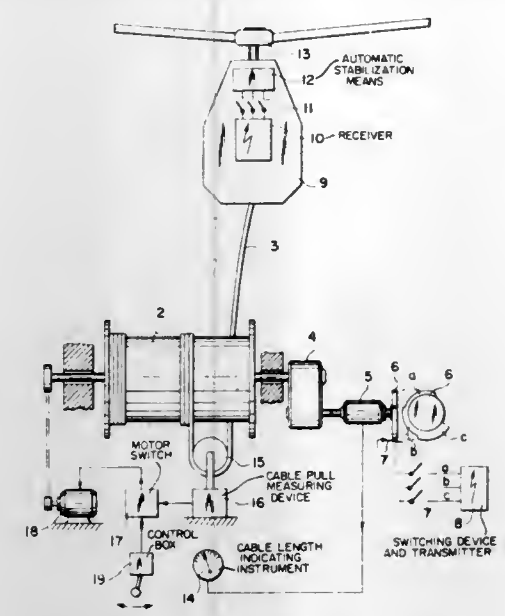
Int. Cl.² B64C *27/04*

U.S. Cl. 244—17.17 5 Claims

1. In a helicopter adapted to fly while moored to a ground station and being remote-controlled therefrom, with means in the helicopter for automatic stabilization of the flight attitude, and in which the mooring cable is wound-on and wound-off of a cable drum by a drive means,

the improvement comprising means whereby said automatic stabilization means in the helicopter is adapted to be switched to different operating modes,

and switching means in the ground station coupled to said cable drum, said switching means actuating a transmitting means to transmit control signals to a receiving mecha-



nism for said automatic stabilization means in dependence upon the wound-off length of said mooring cable.

4,058,278

APPARATUS FOR WINDING PLURAL STRIPS UNDER TENSION

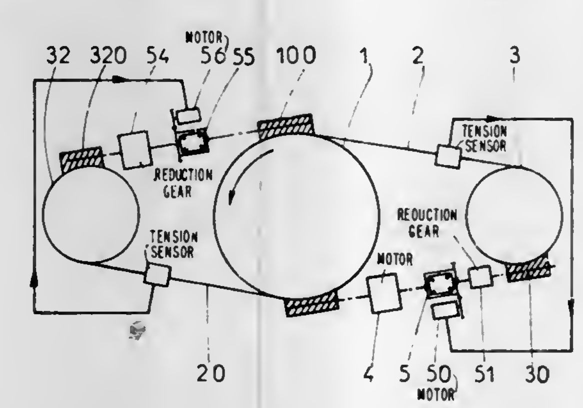
Gaston Denoor, and Georges Thillet, both of Grenoble, France, assignors to B.V.S., Grenoble, France

Filed Mar. 16, 1976, Ser. No. 667,436

Claims priority, application France, Nov. 5, 1975, 75.33750

Int. Cl.² B21F *17/00;* B65H *77/00*

U.S. Cl. 242—7.22 3 Claims



1. Apparatus for winding at least two strips of an elongated product under tension onto a cylindrical body each from a spool holding a supply of product, said apparatus comprising,

a frame displaceable longitudinally along the cylindrical body,

a ring fixed to said frame and coaxially surrounding the cylindrical body,

a first support turret supporting said spools, each spool being rotatably mounted on said turret around a respective fixed axis on said turret,

second and third control turrets for controlling the unwinding of each respective spool, said second and third turrets each including a gear toothing,

a pinion drivingly coupled with each spool and in mesh with the gear toothing of a respective one of the control turrets,

roller bearing means rollably supporting the turrets on said ring for relative rolling movement around the cylindrical body,

a main drive motor means for driving each individual turret around the cylindrical body,

a differential drivingly coupling said main drive motor means and each said control turret, said differential including pinion gears, and

auxiliary motor means for independently driving the pinion gears of said differential to control the tension of the strip.

4,058,279

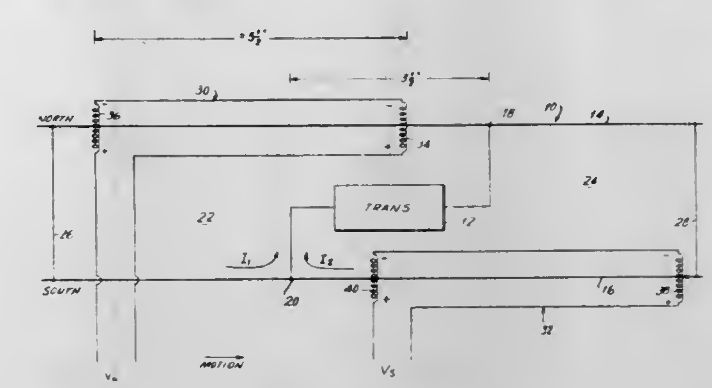
FLAT WHEEL DETECTOR

Klaus H. Frielinghaus, Rochester, NY, assignor to General Signal Corporation, Rochester, N.Y.

Filed Nov. 29, 1976, Ser. No. 745,702

Int. Cl.² B61K *9/12*

U.S. Cl. 246—169 R 5 Claims



1. A system for detecting flat wheels on railroad cars, comprising

a transmitter having a high frequency output;

a pair of closed loops defining a pair of individual test sections for a measuring or testing area; said loops including portions of a pair of rails, and shorting means connected between said rails and defining end boundaries for said respective test sections, such that a high frequency current of substantially fixed magnitude normally flows in each loop through said respective shorting means when a wheel axle is absent from the corresponding test section;

means for connecting said transmitter to said rails, said means including a staggered arrangement so as to produce overlap of said two test sections;

a detection device in each loop for sensing the individual current flow in each loop and for providing, responsive to the presence of an axle in the respective test sections, a relatively high voltage output which differs substantially from an essentially zero voltage output in the absence of an axle therein.

4,058,280

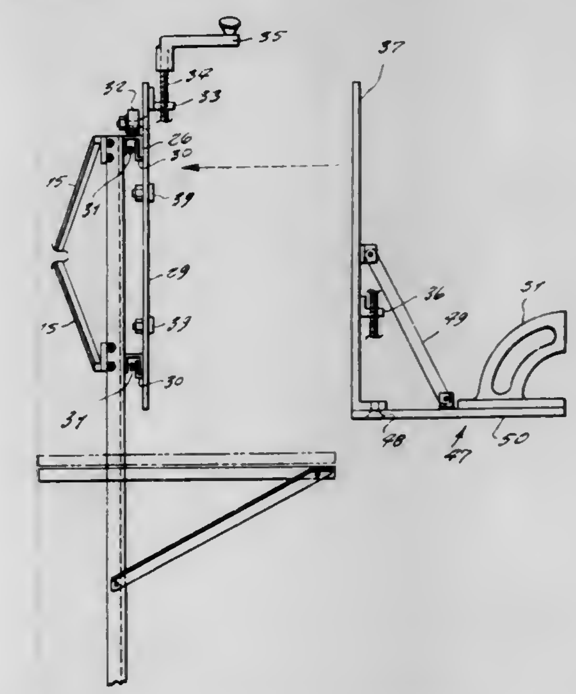
TABLE RAIL

Timothy Clancy, 981 McAllister Ave., Columbus, Ohio 43205

Filed July 21, 1976, Ser. No. 707,330

Int. Cl.² A47B *21/00*

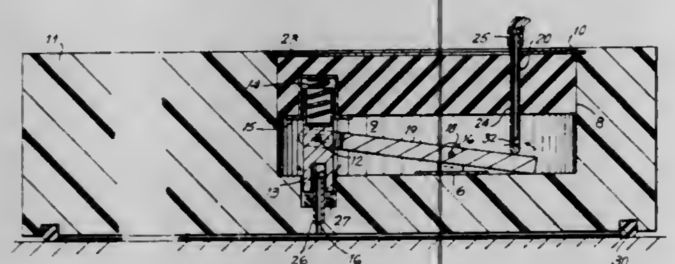
U.S. Cl. 248—2 6 Claims



1. A table rail, comprising in combination, a stable frame mountable in vertical position upon a work table, said stable frame including upper and lower horizontal angles and vertical side angles welded together at their corners, and being

strengthened by a pair of stable braces on a rear side thereof, each opposite end of each said stable brace being secured to a corner of said stable frame, and longitudinally center portions of said stable braces being forcibly urged toward each other by means of a stable brace adjusting assembly, said stable brace adjusting assembly comprises a channel shaped bracket fitted with an upper and lower screw in axial alignment, said longitudinally central portions of said stable braces being clamped between said screws, and each said longitudinally center portion of said stable braces having a transverse extending bolt therethrough, extending through a vertical slot in said bracket, and each said bolt then being fitted with a washer and nut.

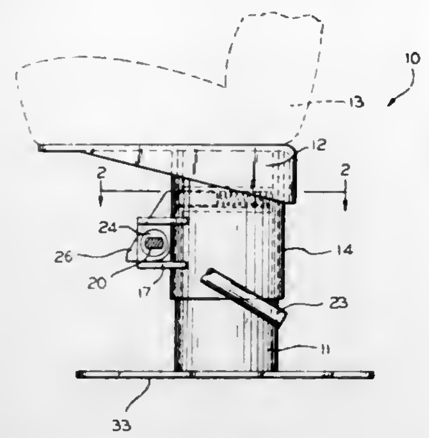
4,058,281
HIGH VACUUM FASTENER
Karmen D. Albert, 74-16 58th Ave., Elmhurst, N.Y. 11373
Filed June 16, 1976, Ser. No. 696,666
Int. Cl.² A45D *42/14;* B25B *11/00*
U.S. Cl. 248—362 **7 Claims**



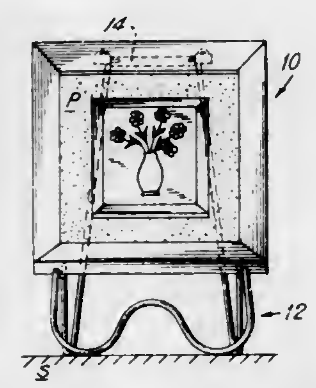
1. A vacuum device for securement against a flat surface and capable of maintaining a vacuum against the surface by means of an external vacuum source comprising:
a block having a smooth first surface for contact against the flat surface, said smooth surface having a closed peripheral groove;
sealing means disposed in said closed peripheral groove defining a vacuum retaining area with the flat surface; and
valve means disposed in said block and having an inlet accessible on a second block surface and communicative to said vacuum retaining area, said valve means including a valve plug disposed within said block, an inlet port disposed in said valve plug for receiving an elongated valve pin, nozzle means secured within said block and communicative to the vacuum-retaining area formed between said first block surface and the flat surface, a valve seat seal surrounding said nozzle means and communicative with said vacuum-retaining area, and means responsive to the insertion of a valve pin in said inlet port for opening said valve seat seal to permit said vacuum-retaining area to be evacuated, and also responsive to the removal of a valve pin from said inlet for closing said valve seat seal to permit maintenance of the vacuum created in said vacuum-retaining area.

4,058,282
ROTATING SEAT PEDESTAL
Robert John Wahls, Spring Grove, Ill., assignor to Freedman Seating Company, Evanston, Ill.
Filed June 21, 1976, Ser. No. 698,417
Int. Cl.² F16M *13/00*
U.S. Cl. 248—418 **4 Claims**

1. In a rotatable seat structure having a pair of tubular telescoping members, with the first of said tubular members mounted to the floor of a vehicle, a seat mounted on the second of said tubular members, compression means to selectively maintain said members in a desired attitude of rotation, said compression means including slot means formed in said exterior member, and indexing means in register with said slot means to positively align said tubular members in at least one preselected attitude of rotation, the improvement comprising:
single control lever means,
said control means mounted on said exterior member said control means being rotatable and comprising means for defeating said indexing means when rotated in first direction and means for engaging said compression means when rotated in a second direction.



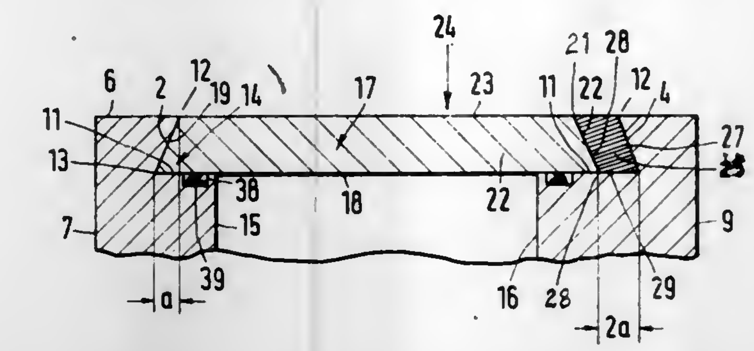
4,058,283
CONVERTIBLE PICTURE FRAME STAND
Jean Frechtman, 400 E. 56th St., New York, N.Y. 10022
Filed May 18, 1976, Ser. No. 687,535
Int. Cl.² A47F *7/14*
U.S. Cl. 248—441 D **4 Claims**



2. A device supporting an article having a frame comprising a stand element supporting said article in a first display mode on a display surface and a hanger element attached to said frame for supporting said article in a second display mode independently of said stand element and in said first display mode in conjunction with said stand element, said stand element including an upper resilient portion for attachment to said hanger element and a lower display portion in contact with said display surface, said hanger element including coupling means for receiving said upper resilient portion of said stand element in said first display mode and access means for defining a connection channel to said coupling means for said upper resilient portion, said access means including an edge surface of said hanger element to provide a limiting stop for said stand element in pivoting away from said article to establish said first display mode at a predetermined display angle.

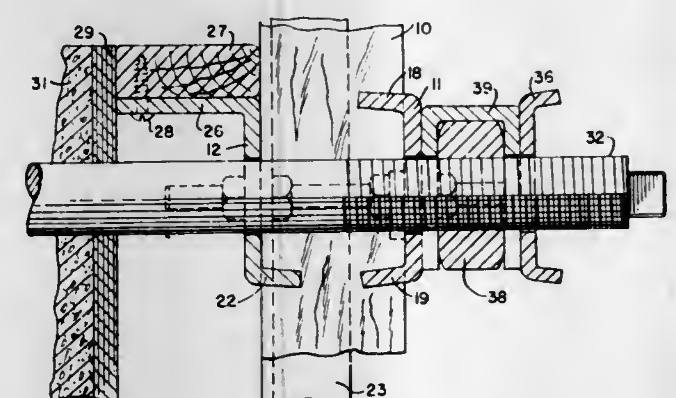
4,058,284
INSERT RECEIVING AND SECURING DEVICE
Johann Rath, Im Wasen 13, 7141 Benningen, Germany
Filed Feb. 9, 1976, Ser. No. 656,274
Claims priority, application Germany, Feb. 8, 1975, 2505381
Int. Cl.² B29D *27/00*
U.S. Cl. 249—163 **14 Claims**

1. In combination, an insert having a top side therewith free of screws and problems of leakage associated with loosening thereof due to thermic changes, and a foam mold used during foaming of synthetic materials having first rims with first fitting surfaces, said mold being provided with a structure having at least three second fitting surfaces complementary with the insert, and a plurality of holding strips having second rims with third complementary fitting surfaces, said second fitting surfaces extending at least partially over said first fitting surfaces



of said first rims, and over said third fitting surfaces of said holding strips, said insert also being provided with third rims having said holding strips extending thereover.

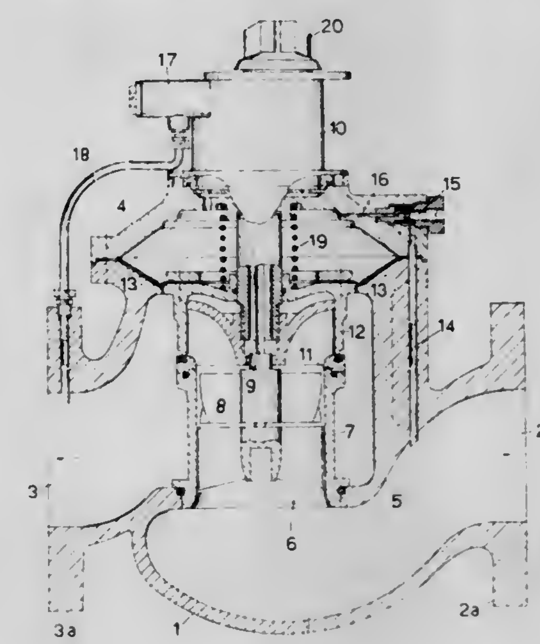
4,058,285
APPARATUS TO ADJUST AND MAINTAIN THE DISTANCE BETWEEN WALL FORMS
Stanley Walski, Media, Pa., assignor to Con-Spec Devices Inc., Wilmington, Del.
Filed May 25, 1976, Ser. No. 689,726
Int. Cl.² E04G *17/08*
U.S. Cl. 249—216 **18 Claims**



1. Apparatus to adjust and maintain spacing between building members comprising
a screw type wall tie adapted to extend between the building members,
a back side plate having means to attach said back side to one of the building members,
a front side plate attached to said back side plate and spaced from said back side plate,
a nut mounted for rotation on one end of said screw type wall tie,
means to enclose said nut attached to said front side plate and enclosing said nut,
said wall tie passing substantially through laterally centered openings in said side plates, and said nut enclosing means,
and means to receive and attach to said screw type wall tie mounted on the opposite end of said wall tie and adapted to be attached to the other of the building members.

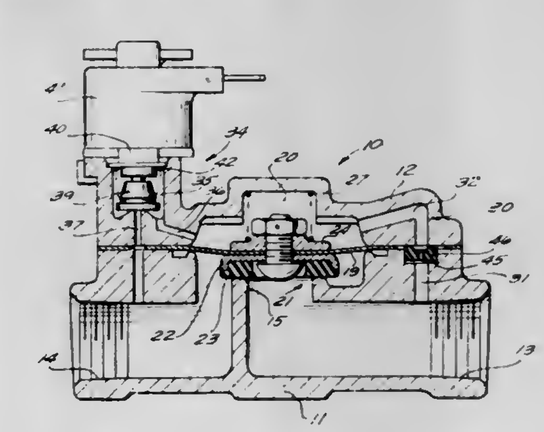
4,058,286
VALVE WITH DELAYED ACTION CLOSING MEANS
Benjamin Berger, Kibbutz Evron, Doar Na Oshrat, Israel
Continuation of Ser. No. 299,675, Oct. 24, 1972, abandoned. This application Sept. 18, 1973, Ser. No. 398,313
Int. Cl.² F16K *31/385*
U.S. Cl. 251—15 **5 Claims**

1. A delayed action closing valve comrising:
a valve casing having an inlet and outlet;
a valve seat intermediate said inlet and outlet;
a valve body engageable with said seat;
a membrance connected to said valve body to partition the interior of said valve casing into a first and a second chamber at respective sides of said membrane;
said membrane being firmly supported in its marginal, peripheral region at both its extreme positions by a portion of said valve casing whereby upon closing of the valve, said membrane is substantially wholly supported by the valve casing and by the valve body;
a water wheel rotatably disposed in said first chamber and positioned in the path of the rising flow to be axially impinged by said flow;
a shaft extending from the hub of said wheel through the valve body and said second chamber, said shaft being driven by the water wheel rotation;



by-pass means providing fluid communication from said inlet to said second chamber and from said second chamber to said outlet;
an auxiliary valve disposed along said by-pass means intermediate said second chamber and said outlet;
flow-metering means connected to said shaft above said second chamber;
said auxiliary valve actuated by said flow-metering means into a closed position after passage of a predetermined quantity of water through said delayed action closing valve to cause said valve body to engage said seat.

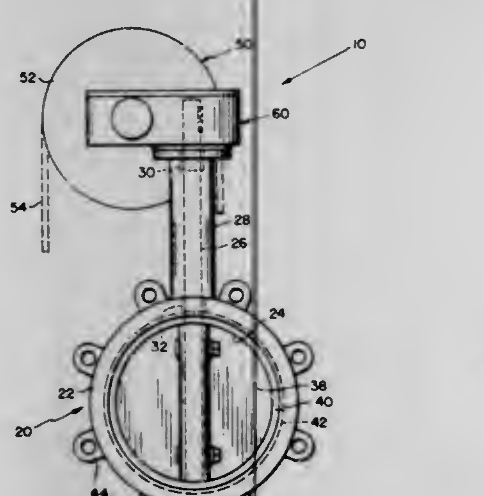
4,058,287
PILOT-OPERATED VALVE HAVING CONSTANT CLOSING RATE
James P. Fromfield, Belleville, N.J., assignor to Automatic Switch Company, Florham Park, N.J.
Filed Sept. 19, 1975, Ser. No. 615,139
Int. Cl.² F16K *31/385*
U.S. Cl. 251—46 **7 Claims**



1. A valve comprising:
a. a valve body having an inlet port for connection to a high pressure region, an outlet port for connection to a low pressure region, and an orifice between said ports surrounded by a valve seat,

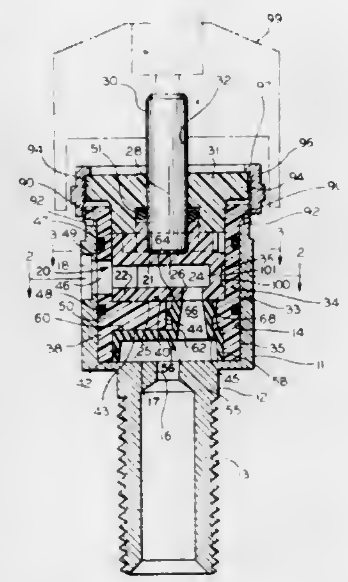
b. a main valve member movable into and out of engagement with said valve seat to close and open said valve, respectively,
c. a chamber within said valve body on the side of said main valve member opposite the side which faces said valve seat,
d. a pilot valve operable independently of the pressure in said chamber for controlling communication between said chamber and a region where the pressure is low as compared to the high pressure at said inlet port,
e. a bleed passageway in said valve body through which said inlet port communicates with said chamber, and
f. a flow control element, in the form of an annular washer of resilient material, within said bleed passageway for mantaining a constant rate of fluid flow through said bleed passageway regardless of the pressure differential between the high and low pressure regions.

4,058,288
SCOTCH YOKE
William L. Carlson, Jr., St. Cloud, Minn., assignor to General Signal Corporation, Rochester, N.Y.
Continuation of Ser. No. 532,077, Dec. 12, 1974, abandoned, which is a continuation of Ser. No. 385,379, Aug. 3, 1973, abandoned. This application June 14, 1976, Ser. No. 695,873
Int. Cl.^{2} F16K *31/44*
U.S. Cl. 251—229 **4 Claims**



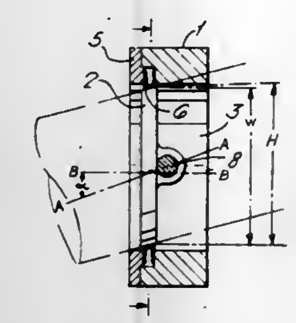
1. A valve comprising:
a. a scotch yoke having a hole therethrough, a threaded rod extending along an axis through said hole in a first direction, means for preventing said rod from moving in said first direction, a yoke arm in said housing pivotable about an axis and extending in a second direction that intersects said first direction, slot means in said yoke arm, a member on said rod and threadingly engaged therewith, said member having projection means extending through said slot means in said yoke arm, a means cooperating with said projection means for absorbing thrust in a sideward direction on said yoke arm and in a sideward direction on said rod, said means for absorbing thrust being positioned in a plane which includes said axis of said rod and is perpendicular to said sideward direction of said rod to thereby minimize bowing and twisting in said yoke arm and said rod, and a threaded hole extending through said member, said rod being threaded into said threaded hole, said means for absorbing sideward thrust to minimize bowing and twisting comprises a guide strap fixed to said housing and a saddle slidably mounted on said guide strap, said guide strap extending in said first direction, said projection means fitting into a hole in said saddle to link said saddle to said yoke arm, whereby rotation of said rod slides said member in said first direction and pivots said yoke arm about said axis;
b. a valve body having a passage for fluid flow, a closure means for controlling flow therethrough and a shaft extending along said shaft axis and connected to said closure means; and
c. actuator means for rotating said threaded rod to rotate said yoke arm and therefore said closure means.

4,058,289
FAUCET VALVE
Glenn W. Hicks, 2749 N. 75th St., Milwaukee, Wis. 53210
Filed Oct. 14, 1975, Ser. No. 622,150
Int. Cl.^{2} F16K *5/00*
U.S. Cl. 251—304 **3 Claims**



1. A valve assembly including a housing, a body means within said housing including a cylindrical bore, an inlet opening formed in said housing and being in communication with said cylindrical bore, an outlet opening formed in said housing and said body means communicating with the side of said cylindrical bore in spaced relation from said inlet opening, a rotatable valve element disposed in said bore and in generally spaced relation from said inlet opening, said valve element having an outer cylindrical surface complementary with and slidably engaging the internal cylindrical surface of the bore, means for rotating said valve element about the axis of said bore, said valve element having an end face lying in a plane generally normal to said rotational axis and facing said inlet opening, a portion of said body means being disposed between said inlet opening and said end face of said valve element, said portion of said body means having a first surface portion lying in a plane normal to said rotational axis and being slidably engaged by said end face, said portion of said body means also having a second generally cup-shaped surface spaced from said first surface in the direction of said inlet opening, a first opening formed in the end face of said valve element, a passage formed in said portion of said body means and extending between said first and second surfaces thereof, a sealing element disposed adjacent said portion of said body means including a hollow tubular portion disposed within said passage and an end engaging said end face of said valve element and a cup-shaped portion of substantially greater diameter than said tubular portion, and conforming generally to the second surface of said portion of the body means, said tubular and said cup-shaped portion of said sealing element being assymetric with respect to each other, the tubular portion of said sealing member of said passage and the opening in said valve being nonconcentric relative to said rotational axis, rotation of said valve element causing movement of said element from a first position wherein said first opening and said tubular portion are in registry to provide a flow path between said inlet and outlet openings to a second position wherein said opening and tubular portion are out of registry, the existence of pressurized water at said inlet opening acting to hold said flexible sealing element against the walls of said passage and said tubular portion against said valve element to affect a seal therebetween.

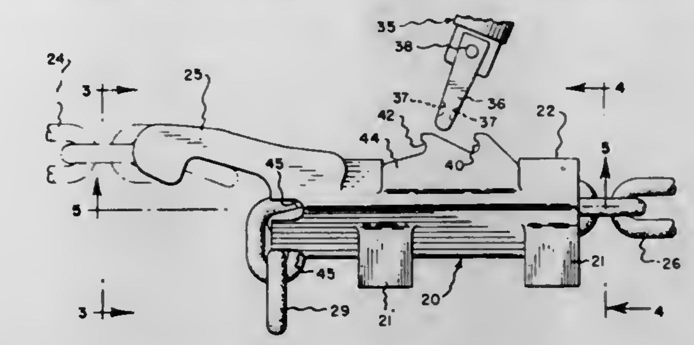
4,058,290
GATE VALVE
Juha Antti Elia Nelimarkka, Helsinki, Finland, assignor to Neles Oy, Helsinki, Finland
Filed Mar. 29, 1976, Ser. No. 671,492
Claims priority, application Finland, Apr. 15, 1975, 751116
Int. Cl.^{2} F16K *1/22*
U.S. Cl. 251—306 **2 Claims**



1. A valve comprising:
a body member, a substantially circular bore therethrough, said bore having an axis and fluid being adapted to flow through said bore;
a metal annular valve seat member;
means for mounting said annular valve seat member in said bore so that said valve seat member has a mating surface thereof disposed in said substantially circular bore so that said annular valve seat member is radially movable with respect to said circular bore both toward and away from an axis of said bore, said mounting means including a packing groove having a larger diameter than the outside diameter of said annular valve seat member;
a disc for engaging said mating surface of said annular valve seat member to close off said bore, said disc including a pair of circular offset faces, each of said faces being of the same diameter; said disc being configured such that a first line connecting the centers of said faces forms an acute angle with a second line extending perpendicularly from the center of either of said faces wherein the inside diameter of said annular valve seat member when unstressed is greater than said diameter of said circular disc faces but less than the length of a third line defining the largest dimension of said disc; and
shaft means for mounting said disc for rotation about an axis of rotation between a closed position and an open position, said axis of rotation being perpendicular to said bore axis and being perpendicular to a plane which includes said bore axis and said third line, said axis of rotation being offset along said bore axis from said disc when said disc is in said closed position; said shaft means being operable to move said disc into contact with said annular valve seat member mating surface to move portions of said annular valve seat member away from said bore axis and to move other portions of said annular valve seat member toward said bore axis so that tight engagement is provided between said annular valve seat member and said disc around the whole periphery of said disc such that the flow of fluid through said bore is closed off.

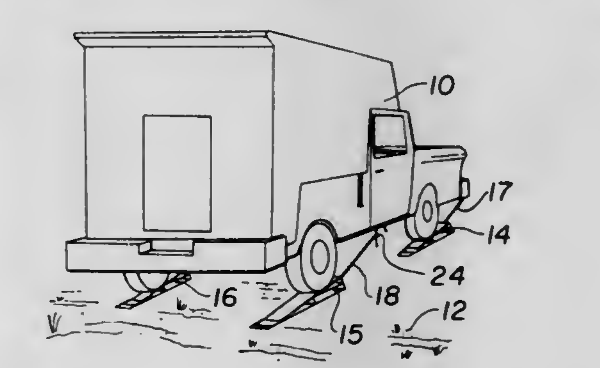
4,058,291
LOAD BINDER
Kenneth D. Schreyer, Clarence; Soma M. Robosy, Hartland, and Charles J. Manney, Kenmore, all of N.Y., assignors to Columbus McKinnon Corporation, Tonawanda, N.Y.
Filed Nov. 10, 1976, Ser. No. 740,423
Int. Cl. B66f *1/06*
U.S. Cl. 254—74 **8 Claims**

1. In a manually operated tool for use in tensioning and locking a welded wire type link chain at least part way about a load, said tool including a tool body portion of elongated form and defining a chain travel accommodating tunnel extending longitudinally thereof; a tool operator actuated lever pivotally supported on said tool body portion and extending into said tunnel for engagement with said chain for advancing said chain between inlet and outlet ends of said tunnel incident to operator actuated chain driving pivotal movements of said lever; guide means mounted on said tool body portion for maintaining said chain within said tunnel in a prescribed angular orientation; and a chain holding means mounted on said tool body portion and arranged to releasably engage said chain for releasably restraining chain retrograde movement through



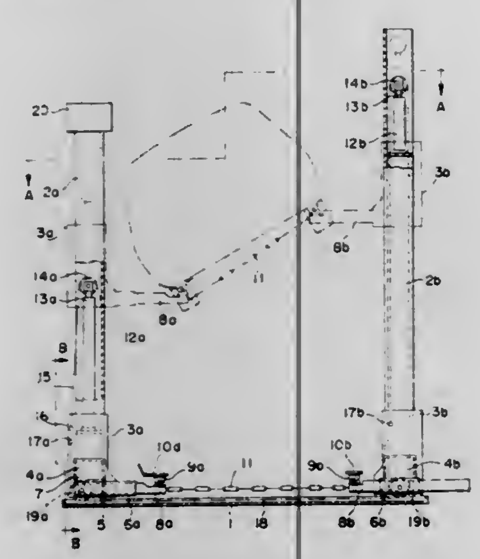
said tunnel in a direction towards said inlet end, the improvement in combination comprising:
said chain holding means including at least two independently operated means successively engageable with alternate links of said chain for restraining chain retrograde movements by an amount essentially equal to one chain pitch increment without effecting change of said prescribed angular orientation of said chain within said tunnel, and said independently operable means being arranged adjacent said outlet end of said tunnel.

4,058,292
VEHICLE LEVELING SYSTEM
Harold E. Goodrich, 2817 Bridgeport Ave., and Dolores M. Fabel, 185 Franciscan Drive, both of San Ramon, Calif. 94583
Filed June 2, 1977, Ser. No. 802,605
Int. Cl.^{2} E02C *3/00*
U.S. Cl. 254—88 **11 Claims**



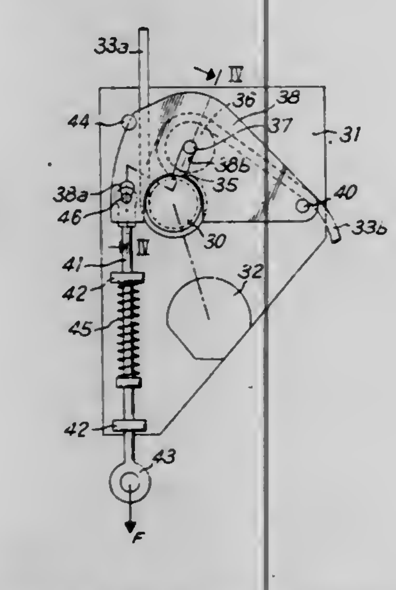
1. A system for leveling a vehicle parked on uneven terrain comprising:
means for determining the wheel of the vehicle on the lowest position on the terrain, said determining means including means for indicating the relative amount that said low wheel should be raised to level the vehicle;
an inclined ramp adapted to be disposed proximate the low wheel of the vehicle; and
means for nonrigidly linking the ramp to the vehicle at a position on the vehicle disposed relatively behind the base of said ramp when the ramp is located proximate the low wheel of the vehicle so that the vehicle can be motivated to cause the low wheel to travel up the ramp until the linking means becomes taut, said linking means including coded indicia corresponding to the determining means to indicate the appropriate length of said linking means required to allow the vehicle to travel up the ramp until the vehicle is substantially level, the linking means then becoming taut to stop the vehicle in the level position.

4,058,293
TWO-MASTED LIFTING APPARATUS
Tamotsu Kameda, 2594-5 Ohmiya, Fujinomiya, Shizuoka, Japan
Filed Oct. 12, 1976, Ser. No. 731,364
Claims priority, application Japan, Apr. 27, 1976, 51-47177
Int. Cl.² B66F *7/26*
U.S. Cl. 254—89 H **12 Claims**



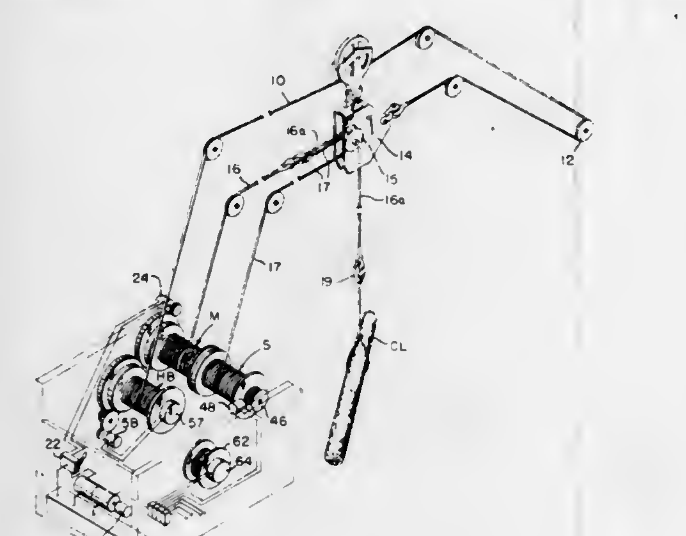
1. A two-masted lifting apparatus comprising:
a base means;
a pair of spaced upright masts disposed on said base means in opposing relation;
a carriage slidably mounted on each of said masts,
a first driving means including means operatively connecting both of said carriages for synchronous movement of said carriages simultaneously along said masts,
a supporting means on each of said carriages for supporting an object to be lifted, each of said supporting means including horizontally movable means each having a portion to accommodate a range of movement of adjustment toward or away from the respective associated mast of each of said supporting means, and
means connecting said supporting means to maintain equidistant movement of adjustment of said portions of said horizontally movable means between said carriages.

4,058,294
APPARATUS FOR HAULING A FLEXIBLE, TEXTILE OR METAL ROPE, CABLE OR THE LIKE
Bruno Jean-Marie Dressler, 3, avenue Leon Bourgain, Courbevoie, France (92400)
Filed Apr. 16, 1976, Ser. No. 677,756
Claims priority, application France, Apr. 18, 1975, 75.12091
Int. Cl.² B66D *1/00*
U.S. Cl. 254—167 **6 Claims**



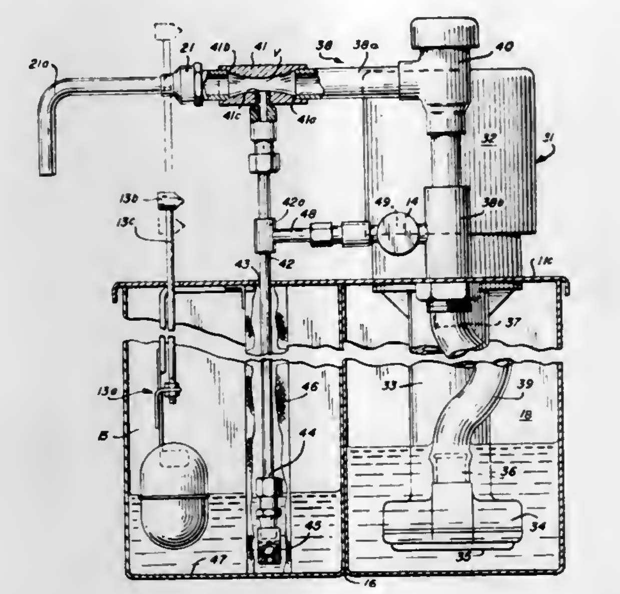
1. Hoisting apparatus for applying a pulling force on a flexible cable comprising a load connection; a first pulley for driving said cable by friction over a part of its circumference between an entrance point of the cable from which the part of the cable subjected to a tension under the effect of a load to be hauled freely extends, and an exit point of the cable from which the part of cable not subjected to tension extends; means for rotating said drive pulley; a frame supporting said drive pulley and rotating means; a pressure roller freely rotatable about an axis parallel to the axis of rotation of said drive pulley for selectively pressing said cable against said drive pulley, a lever arm having first and second end portions and formed by two spaced side plates between which said pressure roller is mounted intermediate said first and second end portions, said first end portion being pivotally mounted to said frame about an axis parallel to the axis of rotation of said drive pulley; a connecting member slidably connecting said second end portion of said lever arm to said load connection, said connecting member being slidable with respect to said frame in a direction substantially perpendicular to said axis of rotation of the drive pulley and said side plates whereby load force applied to said load connection is transmitted to said pressure roller through said connecting member and side plates.

4,058,295
SMALL, VARIABLE-SPEED YARDER
John B. Morfitt, Langley, Canada, assignor to Lantec Industries, Ltd., Langley, Canada
Filed Oct. 10, 1975, Ser. No. 621,512
Int. Cl.² B66D *1/26*
U.S. Cl. 254—184 **5 Claims**



1. A yarder system for operating over the ground having main, haulback and slack-pulling drums with corresponding lines wrapped thereon, a carriage supported for movement by lines suspended above the ground, said main, haulback and slack-pulling lines being coupled to said carriage for moving the carriage outwardly by simultaneously pulling in the haulback line and paying out the main and slack-pulling lines and inwardly by simultaneously pulling in the main and slack-pulling lines and paying out the haulback line, a power supply, a reversible primary motive means, independent main, haulback and slack-pulling planetary drive transmissions, each planetary drive transmission having an output drive and first and second input drives, means coupling the first input drive of each of said planetary drive transmissions to said primary motive means, and hydraulic means coupled to the second input drive of said planetary drive transmission of said haulback drum for providing a variable interlock between the haulback drum and the main and slack-pulling drums and differential drive means coupled to said second input drives of said main and slack pulling planetary drive transmissions for providing a variation in both the relative rotational speeds and direction and the relative rotational speed or direction of the output drives of the main and slack-pulling drums.

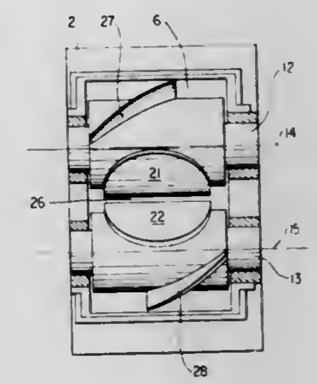
4,058,296
MIXING APPARATUS
Edward M. Wetherby, Westchester, Ill., assignor to Graymills Inc., Chicago, Ill.
Filed Apr. 5, 1976, Ser. No. 673,582
Int. Cl.² B01F *15/00*
U.S. Cl. 366—160 **9 Claims**



1. An apparatus for mixing a first fluid under pressure from a first source with a second fluid from a second source, comprising a primary conduit having an inlet communicating with the first fluid in the first source, and an outlet; a secondary conduit having an inlet communicating with the second fluid in the second source, and an outlet; a diversion conduit having an inlet connected to said primary conduit upstream of the primary conduit outlet and an outlet connected to said secondary conduit upstream of the outlet thereof; valve means for regulating the flow of the first fluid from said primary conduit through said diversion conduit, said valve means being adjustable between open and closed positions; and eductor means having an outlet and a primary inlet, the latter being connected to said primary conduit outlet and disposed downstream of the connection between said primary and diversion conduits, said eductor means being provided with a suction inlet intermediate the primary inlet and outlet of said eductor means, said suction inlet being connected to the secondary conduit outlet and downstream of the connection between said secondary and diversion conduits, said valve means, when in said closed position, effecting flow cut-off of said first fluid through said diversion conduit and maximum flow of said second fluid through said secondary conduit to said eductor, and when in said open position, effecting maximum flow of said first fluid through said diversion conduit and minimum flow of said second fluid through said secondary conduit to said eductor, whereby a continuous fluid flow through at least said secondary conduit downstream of the connection with said diversion conduit occurs when the first fluid in said primary conduit flows through the primary inlet and outlet of said eductor means.

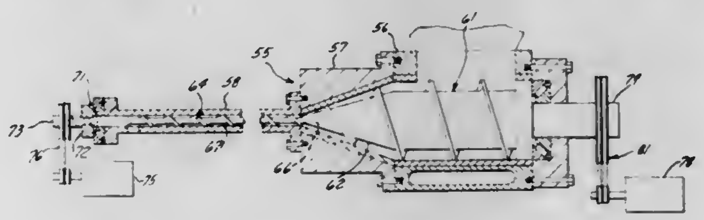
4,058,297
INTERNAL MIXER
Wilhelm Seufert, Korntal, Germany, assignor to Werner & Pfleiderer, Theodorstr, Germany
Filed Dec. 11, 1975, Ser. No. 639,888
Claims priority, application Germany, Dec. 11, 1974, 2458568
Int. Cl.² B29B *1/10*
U.S. Cl. 366—81 **5 Claims**

1. An internal mixer for kneading and rolling comprising:
a mixing chamber;
two mixing shafts, each having an axis and an outer periphery, within said mixing chamber, said axes of said shafts being in spaced parallel relationship;
kneading blades provided on said outer peripheries of said shafts; and
arcuate roller surfaces connected to said outer peripheries of said shafts; and wherein
said shafts are positioned in parallel with respect to one another such that when said shafts are rotated in superposed relation a gap always exists therebetween;



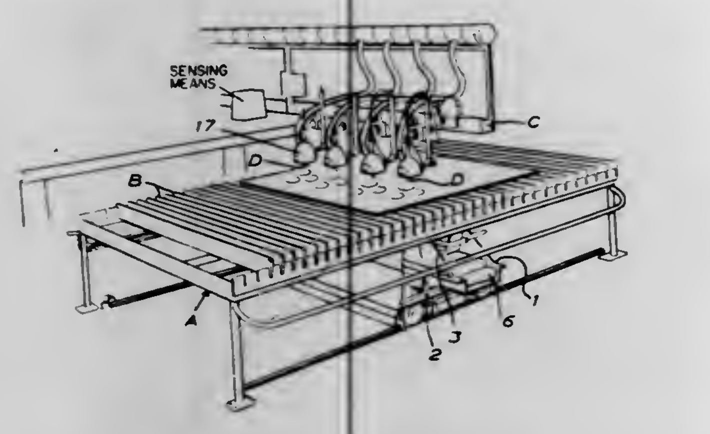
said arcuate surfaces and said kneading blades are arranged on each of said mixing shafts in succession in the circumferential direction; and
said mixing shafts are drivable in opposite directions to impart identical peripheral speeds to said arcuate surfaces.

4,058,298
SCREW EXTRUDER WITH AN ENLARGED FEED SECTION
Joseph J. Duska, Manasquan, and Paul E. McGill, Neshanic, both of N.J., assignors to Midland-Ross Corporation, Cleveland, Ohio
Filed Jan. 5, 1977, Ser. No. 757,045
Int. Cl.² B29B *1/06*
U.S. Cl. 366—76 **10 Claims**



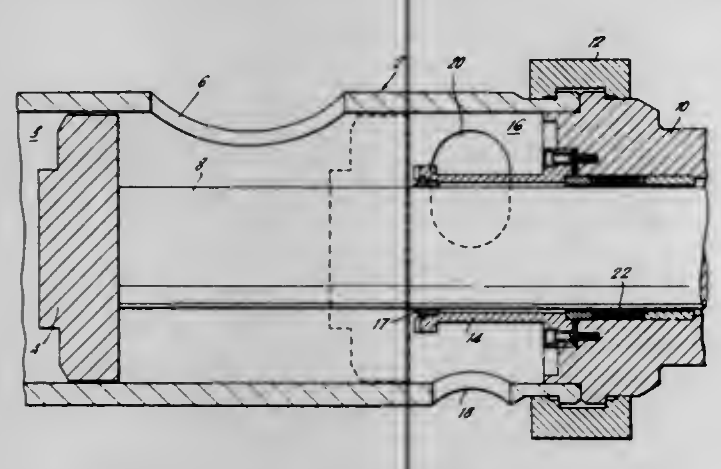
1. An extruder comprising:
a barrel having an upstream feed section of larger screw bore, and a downstream section of smaller screw bore in coaxial alignment with the larger bore, and a relatively short tapered transition section providing a transition bore joining said larger and smaller bore sections;
a screw assembly comprising a first large-diameter screw occupying said upstream section with the thread thereof to sweep said larger bore and said transition bore; and a second smaller diameter screw occupying said downstream section with the thread thereof to sweep said smaller bore, both of said screws having a threaded portion comprising a core and a thread supported thereon, and an axial extension adapting each screw for connection with a drive means;
said second screw having a shaft portion extending coaxially upstream internally of said first screw in bearing relation therewith to connect and maintain said screws in coaxial relationship; and
drive means connecting with said extensions for rotating both screws.

4,058,299
APPARATUS FOR REMOVING POLLUTING MATTER ARISING IN FLAME CUTTING AND LIKE OPERATIONS
Erik Allan Lindkvist, 38 Korpralsvagen, Umea, Sweden (S-902 53)
Filed Aug. 5, 1976, Ser. No. 711,878
Claims priority, application Sweden, Aug. 7, 1975, 7508895
Int. Cl.^{2} B23K *7/02*
U.S. Cl. 266—48 **9 Claims**



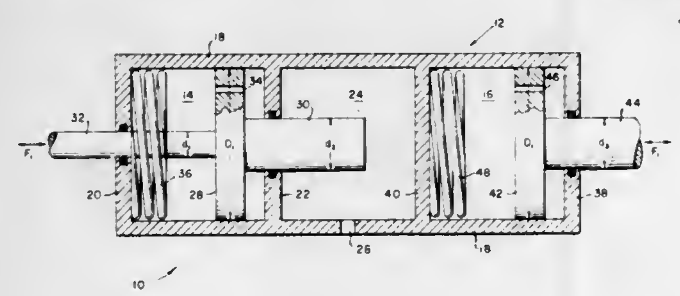
1. An apparatus for removing polluting matter arising in flame cutting and like operations, such as fumes, dust or minute particles, said apparatus being intended for use in combination with a perforated cutting table and a cutting assembly movably arranged above the cutting table and including one or more cutter units, wherein a suction hood is associated with each of the cutter units of the cutting assembly and connected to a suction device, an upwardly facing suction box disposed beneath the cutting table extends transversely of the width of said table and is movable along it, said suction box being connected to the suction device and displaceable together with the cutting assembly with the aid of a device operable by sensing means sensing the position of the cutting assembly so that said box will be located beneath the working area of said cutting assembly, and the movable suction box is provided with means for reducing the speed of jets directed from the flame cutters towards the interior of said suction box and laden with gases, fumes, dust, minute particles and like polluting matter.

4,058,300
CLAY GUN
Pierre H. Mailliet, Howald, and Jean Metz, Luxembourg, both of Luxembourg, assignors to S.A. des Anciens Etablissements Paul Wurth, Grand Duchy, Luxembourg
Filed July 2, 1976, Ser. No. 702,120
Claims priority, application Luxembourg, July 4, 1975, 72902
Int. Cl.^{2} C21B *7/12*
U.S. Cl. 266—273 **9 Claims**



1. In an apparatus for plugging tapholes in a blast furnace, the taphole plugging apparatus including a hydraulic piston actuator, the improvement comprising:
means defining a taphole sealant receiving cylinder, said sealant receiving cylinder having a side wall and first and second oppositely disposed ends and being provided at the first end with a sealant ejection port;
means for delivering sealant to the interior of the cylinder of said sealant receiving cylinder defining means, said delivering means including a supply port in the side wall of said cylinder defining means, said supply port being displaced from the ejection port;
ejector piston means disposed within the cylinder of said sealant receiving cylinder defining means, said piston means including a piston movable to either side of said delivering means supply port;
piston rod means extending into the cylinder of said sealant receiving cylinder defining means through the second end of said cylinder, said rod means coupling said ejector piston means to the hydraulic actuator whereby the actuator controls the movements of said piston means;
casing means extending into the cylinder of said sealant receiving cylinder defining means from the second end thereof, said casing means being coaxial with and located exteriorly of said piston rod means, said casing means cooperating with the inner surfaces of the side wall and the second end of said cylinder to define an annular recess at the second end of said cylinder, a rearwardly facing surface of said piston means piston closing the end of said annular recess when said piston means is at its limit of movement toward the sealant receiving cylinder second end; and
means for removing sealant from the annular recess defined in part by said casing means, said removing means including at least a first aperture located entirely in the portion of the side wall of said cylinder which cooperates to define said annular recess.

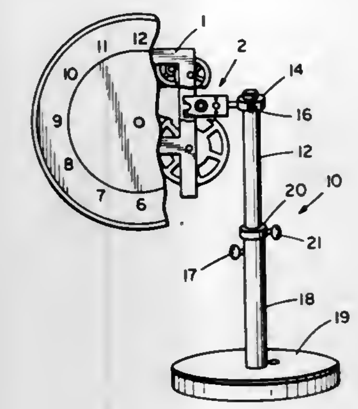
4,058,301
LOAD LIMITER COUPLING
Edwin M. Petrisko, Annapolis, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.
Filed May 28, 1976, Ser. No. 691,181
Int. Cl.^{2} F16F *9/16*
U.S. Cl. 267—124 **5 Claims**



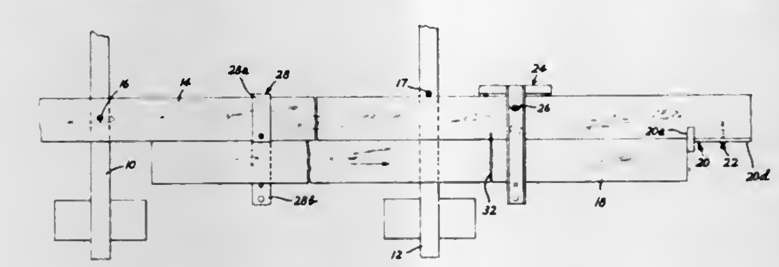
1. A load limiter coupling for transmitting and absorbing loads comprising:
a. a hollow cylinder means having at least three chambers formed by fixed partition walls and the end walls of said cylinder means,
first means within said cylinder for initially rigidly transmitting a tensile load force up to a design maximum; and
second means within said cylinder for initially rigidly transmitting a compressive load force up to a design maximum load, and then absorbing compressive loads in excess of said maximum.

4,058,302
BENCH HOLDER FOR A CLOCK
Robert F. Barrowcliff, 3262 Rustic Drive, Santa Clara, Calif. 95051
Filed May 17, 1976, Ser. No. 686,710
Int. Cl.^{2} B23Q *1/04*
U.S. Cl. 269—76 **5 Claims**

1. In a clock holder having an elongated clock support shaft, the improvement comprising a pair of parallel-disposed, clock-mechanism, platelike holding jaws, a jaw support rod rigidly fixed to one jaw and projecting therefrom, coupling means adjustably supporting the second jaw on the first jaw for a parallel opening and closing movement of the jaws and including a pair of screws with each screw housed within a different jaw to engage receiving threads formed in the opposite jaw, and means serving as a support stand and formed with one or more socket receiving holes to receive the jaw support rod and thereby position the jaws and any clock mechanism clamped thereby at a desired position.



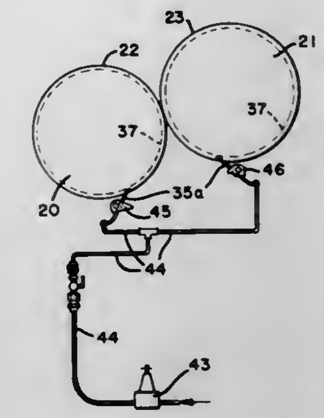
4,058,303
TRUE CUT COMBINATION
Ervin Besler, 2992 Fairweather Drive, Medford, Oreg. 97501
Filed Apr. 21, 1977, Ser. No. 789,527
Int. Cl.^{2} B25B *11/02*
U.S. Cl. 269—315 **9 Claims**



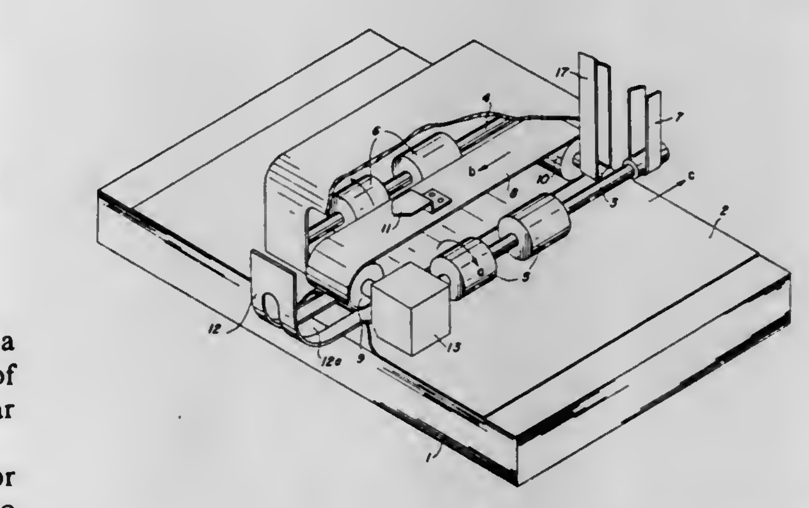
1. A beam cutting assembly for use in conjunction with a pair of work-piece supporting sawbucks, an auxiliary length of timber supported by the sawbucks, and a hand carried circular saw, said assembly comprising,
a. an end stop attachable to the auxiliary length of timber for controlling the position of the leading end of the beam to be cut,
b. a saw guide attachable to the auxiliary length of timber for determining the line of cut, and
c. a carrier attachable to the auxiliary length of timber between the sawbucks for supporting the tail end of the beam during cutting when the beam has been rendered too short to extend from sawbuck to sawbuck.

4,058,304
CYLINDER FOLDER
Richard Gregory Foley, Dayton, Ohio, assignor to Harris Corporation, Dayton, Ohio
Filed Oct. 7, 1976, Ser. No. 730,439
Int. Cl.^{2} B65H *45/20*
U.S. Cl. 270—79 **4 Claims**

1. In apparatus for zig-zag folding a flexible web, including a pair of driven cylinders disposed in parallel adjacent relation and adapted to receive the web therebetween, cooperating means on each cylinder for folding the web alternately on alternate cylinders at longitudinally spaced intervals along the web in response to rotation of the cylinders, and stripper means for each cylinder for engaging a folded portion of the web to deflect and guide the folded web portion from each respective cylinder, the web forming a gap between itself and the cylinder as it is stripped therefrom, the improvement comprising:
stationary means disposed adjacent the circumferential walls of the cylinders and independent thereof for injecting a flow of air under pressure into the gap formed between a folded web portion and a respective cylinder as the stripper means engage and separate the folded web from the cylinders, for aiding the release of the web.



4,058,305
PAPER FEEDING DEVICE
Masaaki Harada, Atsugi, Japan, assignor to Rank Xerox Ltd., London, England
Filed Aug. 16, 1976, Ser. No. 709,036
Claims priority, application Japan, Sept. 25, 1975, 50-114857
Int. Cl.^{2} B65H *3/42, 5/02*
U.S. Cl. 271—16 **2 Claims**



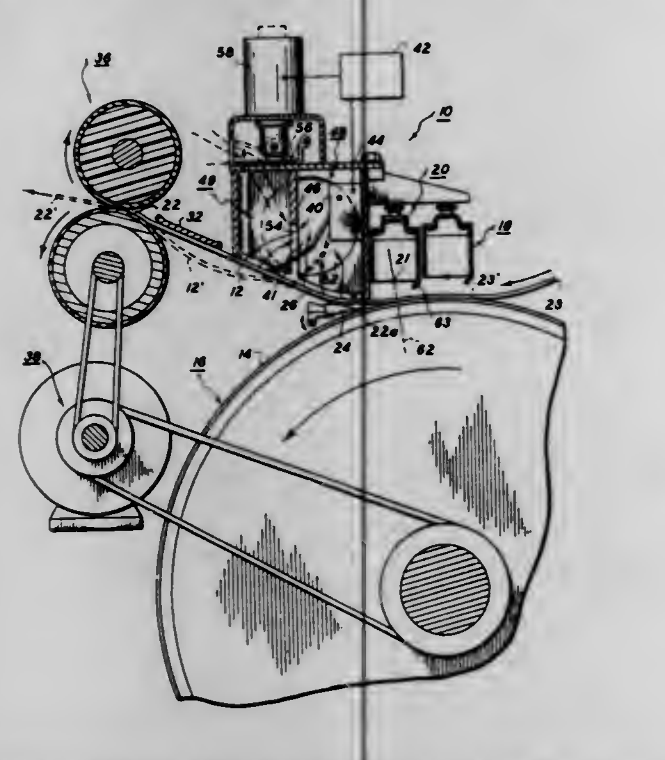
1. A paper feeding device for feeding sheets individually from the top of a sheet stack comprising:
first and second counter-rotating rollers adapted to drive the ends of the top sheet in the stack towards each other to form a buckle therein; and,
belt means disposed above said stack, the belt path being substantially parallel to the axis of said rollers, said belt means having a hook member associated therewith adapted for contact with the buckled portion of the top sheet, movement of the belt causing the hook member to feed the buckled sheet from the stack in a direction substantially parallel to the axis of said rollers.

4,058,306
DETACK AND STRIPPING SYSTEM
Gerald M. Fletcher, Pittsford, N.Y., assignor to Xerox Corporation, Stamford, Conn.
Filed May 24, 1976, Ser. No. 689,277
Int. Cl.^{2} B65H *29/20*
U.S. Cl. 271—80 **10 Claims**

1. In an electrostatic image reproduction system wherein an image on a first image support surface member is transferred to

a second image support surface member at a transfer station by means of electrostatic transfer means leaving an electrostatic transfer charge on the second image support member, and wherein the second image support member is then subjected to transfer charge neutralizing corona emissions by movement through a defined corona emission area from neutralizing corona emission means having a corona emitting element therein to neutralize the transfer charge on the second image support member, and wherein the second image support member is stripped from the first image support member by stripping means and transported away from said first image support member with transport means, and wherein said second image support member moves through the transfer station with a lead edge first, the improvement comprising the steps of:

stripping the lead edge of the second image support member away from the first image support member at a first fixed

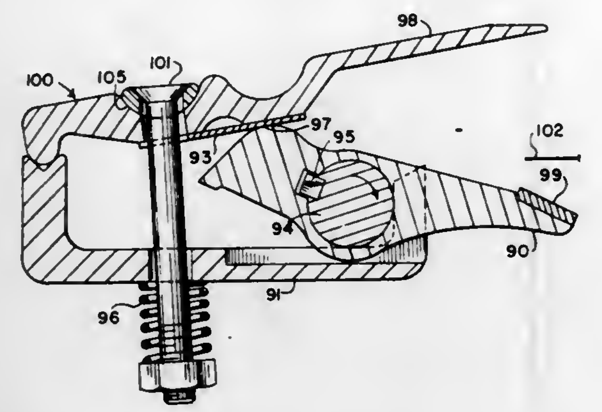


stripping position which is after the lead edge has moved through substantially the entire defined area of said neutralizing corona emissions from said neutralizing corona emission means by mechanically preventing the movement of the lead edge on said first image support member beyond said first fixed stripping position by the stripping means, and

then, after the lead edge of the second image support member has been stripped away from the first image support member, shifting the stripping position of the remainder of the second image support member to a second fixed stripping position intermediately of said defined area of corona emissions by holding a portion of the second image support member on the transport means at a fixed position spaced relative to the first image support surface and the transfer charge neutralizing corona emitting element.

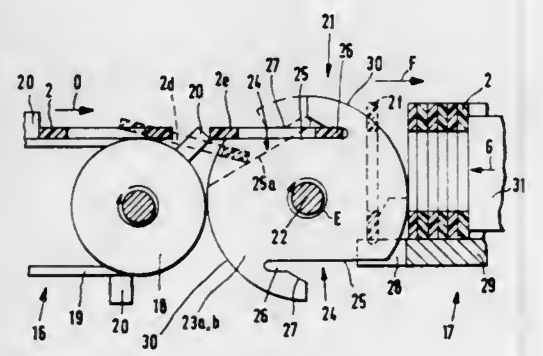
4,058,307
FEED AND TAKEOFF ASSEMBLY
Henry J. Bubley, Deerfield, and John R. Krutsch, Glenview, both of Ill., assignors to American Screen Printing Equipment Company, Chicago, Ill.
Continuation-in-part of Ser. No. 628,151, Nov. 3, 1975. This application Aug. 23, 1976, Ser. No. 716,761
Int. Cl.² B65H *29/10*
U.S. Cl. 271—85 **4 Claims**

1. In a gripper assembly particularly adapted for use with a printing press having a printing head for the controlled transfer of sheet stock, the improvement comprising gripper jaw means having at least one upper jaw and at least one lower jaw, each of said upper jaw and said lower jaw having a forward portion, each of said forward portions being movable away from the other to an open position and movable toward the other to a closed position, a camming means integral with said lower jaw for pivotal movement about an axis generally parallel to a leading edge of said sheet stock, said upper jaw being biased against said camming means by resilient means to assure responsive contact between said camming means and said upper jaw, said camming means pivotable about said axis to displace said forward portions of said upper jaw and said lower jaw into



said open position for accepting sheet stock, said camming means being thereafter movable about said axis to return said upper jaw and said lower jaw to a closed position for gripping said sheet stock for subsequent transfer by the movement of said gripper assembly.

4,058,308
APPARATUS FOR STACKING SUBSTANTIALLY FLAT ARTICLES
Johannes Lörsch, An der Bleiche 49, D-4172 Straelen, Germany
Filed Apr. 5, 1976, Ser. No. 673,870
Claims priority, application Germany, Apr. 11, 1975, 2515789
Int. Cl.² B65H *29/40*
U.S. Cl. 271—178 **4 Claims**



1. Apparatus for stacking substantially flat articles that are rigid at least in a region of the edges of the articles, comprising:

receiving means, an article receiving shaft contained in said receiving means, said receiving means including an elastic back-biasing means for applying a counter-force to articles stacked in said receiving shaft;

feed-in means including driver means for moving said articles toward said receiving means;

said feed-in means and said receiving means being in-line to each other, a stacking position of said articles being transverse to a plane of the in-fed articles;

cam means rotatably disposed between said feed-in means and said receiving means for deflecting in-fed articles toward said receiving shaft;

rotation of said cam means being synchronized with movement of said feed-in means;

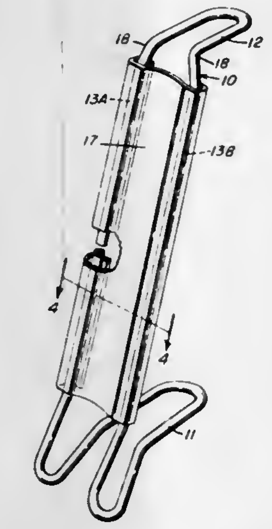
said cam means including at least one curved guide portion maintained against a deflected one of said articles and pressing said deflected articles into said receiving shaft;

an axis of rotation of said cam means being substantially parallel to an in-fed article, and transverse to a direction of movement of said feed-in means;

said cam means further including first and second cam plates separated from each other on the axis of rotation, each of said cam plates including a guide portion and receiving and deflecting recesses cut in said plates for said articles,

said recesses having a width corresponding to the thickness of said articles and angularly displaced from said guide portion of said plates in a direction of rotation of said plates, said cam plates passing through recesses in a bottom portion of said receiving means and projecting up to at least an area of said receiving and deflecting recesses, said articles being thereby clamped by said cam plates at the recesses cut therein and oriented transversely to said bottom portion of each receiving means during rotation of said plates, the guide portion of said plates then urging said articles into said receiving means as said articles are released from said recesses.

4,058,309
BOWLING PIN WIRE GUIDE SLEEVE
Walter T. Hunley, 6134 Music St., New Orleans, La. 70122
Continuation of Ser. No. 603,911, Aug. 12, 1975, abandoned. This application Nov. 23, 1976, Ser. No. 744,389
Int. Cl.² A63D *5/08;* **B23P** *7/04*
U.S. Cl. 273—43 D **3 Claims**



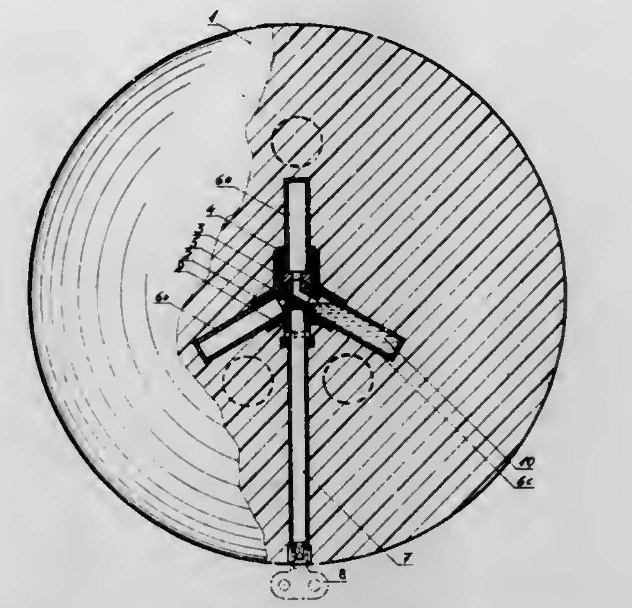
3. In combination, a bowling pin wire guide having a pair of laterally spaced apart parallel guide wires joined by a closed loop at the top and being bent rearwardly, a pin wire guide sleeve comprising a longitudinally extending straight web the length of which exceeds one half the length of the parallel guide wires, pin wire guide engaging means extending from each side of the web adapted to slip over and engage opposite front and rear sides of the spaced apart parallel guide wires below the bend of said closed loop and confine the spaced apart guide wires within the pin wire guide engaging means to provide longitudinal support and positive front and rear engagement of said sleeve and said parallel guidewire in the area of any breaks along said parallel guide wires, and said longitudinally extending web being concave on one of its sides.

4,058,310
BOWLING BALL INCLUDING A MEANS FOR DISPLACING THE CENTER OF GRAVITY
Seppo I. Miettinen, Helsinki, Finland, assignor to The United States of America as represented by the Department of Commerce, Washington, D.C.
Filed Oct. 28, 1975, Ser. No. 626,548
Int. Cl.² A63B *43/04*
U.S. Cl. 273—63 E **4 Claims**

1. In a bowling ball, a means for displacing the center of gravity, comprising

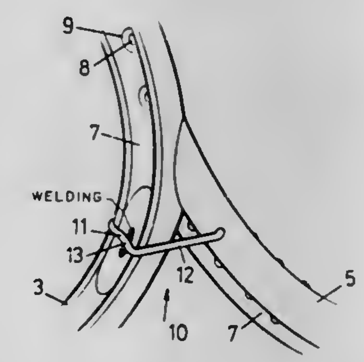
within the ball, substantially at its geometrical center, a three-way valve, wherefrom radiate three tubes with one closed end, at least one of these tubes lying substantially in the vertical plane passing through the geometrical centre of the ball and through the centermost of its three finger holes,

enclosed in said system of tubes and valve, a quantity of a heavy fluid substantially equivalent to the capacity of one tube and which can be selectively made to enter any one of said three tubes with the aid of the three-way valve and of gravity action, and a mechanical member shaped as a



stem, with the aid of which the position of the three-way valve is controllable from the outer surface of the bowling ball.

4,058,311
METAL FRAME RACKET
Lenard W. Atkins, 60A Port Road, Alberton, Australia
Filed June 9, 1976, Ser. No. 694,474
Int. Cl.² A63B *49/02*
U.S. Cl. 273—73 G **3 Claims**

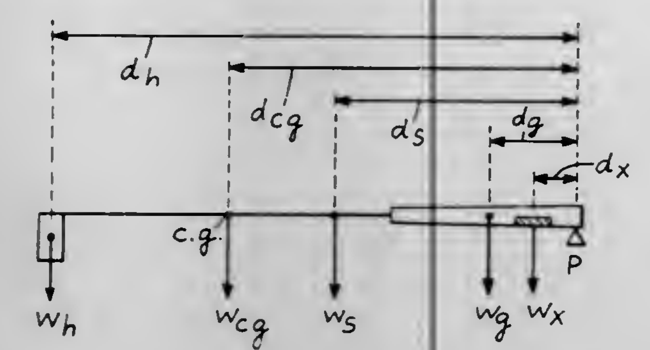


1. A racket of the metal frame type, the racket being formed of a piece of metal tube forming the head and handle of the racket, the tube being formed to merge progressively from the handle into the head, the head being completed by an infill piece bridging the two portions forming the handle at the throat of the racket, the tube being formed of a re-entrant groove extending around the outside of the racket, characterized by a stengthening U-shaped clip bridging each angle formed by the infill piece joining the handle portions, each strengthening clip having a pair of arms straddling the handle portions and the infill piece and a re-entrant portion to enter the groove of the tube of the handle portion, and being welded thereto so that when a twisting action tends to occur on the frame, the strengthening member resists this action while not inhibiting the flexing action of the racket.

4,058,312
GOLF CLUB
Alfred Stuff, Ridgewood, and Anthony Pellizzi, Franklin Lakes, both of N.J., assignors to The Square Two Golf Corporation, Oakland, N.J.
Filed Sept. 5, 1974, Ser. No. 503,474
Int. Cl.² A63B *53/00*
U.S. Cl. 273—77 A **5 Claims**

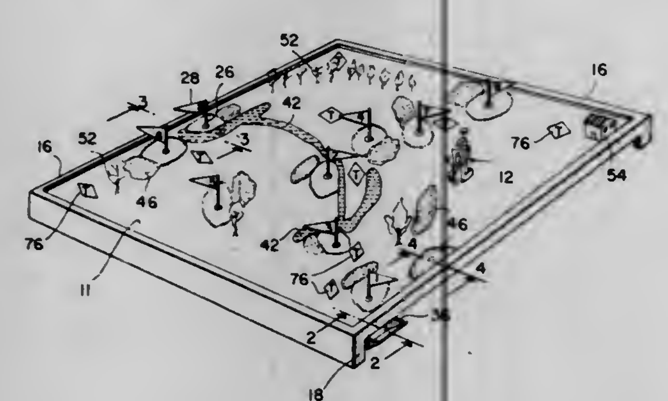
1. A set of golf clubs comprising a plurality of irons or woods, or both, wherein each of the clubs in the set has a shaft

of different length and a club head immovably affixed thereto with each of said club heads having a unique loft angle, said set without designed incremental differences in total weight between the clubs comprising the set, all of which are balanced



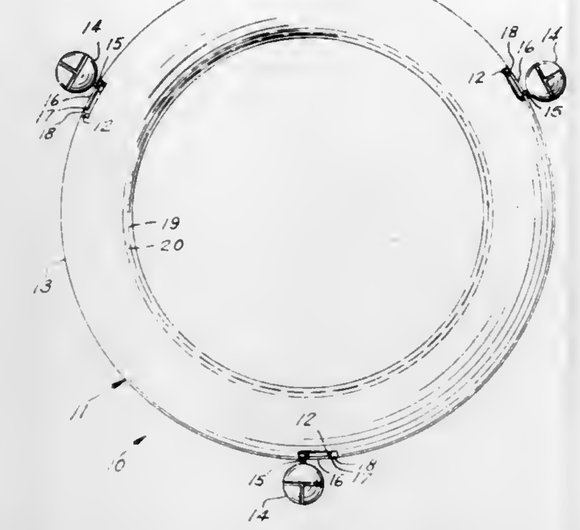
and matched to each other to have substantially the same total weight, and each of which has its center of gravity, as measured on the club shaft, at approximately the same distance from the tip of the grip end of the shaft.

4,058,313
GOLF GAME
Fred Spradlin, P.O. Box 1054, Bonita Springs, Fla. 33923
Filed May 24, 1976, Ser. No. 689,361
Int. Cl.^{2} A63F *7/06*
U.S. Cl. 273—87.4 **7 Claims**



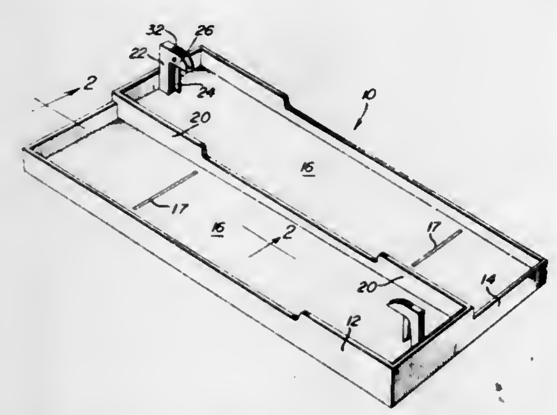
1. A miniature table top game comprising at least one miniature player and a golf course including a structural supporting surface, bounding reenforcing edges, simulated grass surface, at least one sand trap, at least one water trap, and an underneath ball return system, the water trap comprising a removable water container having at least one anti spill upper lip, for insertion into a matching cutout in the structural surface.

4,058,314
HOOP AND DISC WITH SOUNDERS
Frank K. Wolf, 3228 N. Sacramento, Chicago, Ill. 60618
Filed Jan. 6, 1977, Ser. No. 757,483
Int. Cl.^{2} A63B *65/10*
U.S. Cl. 273—106 B **5 Claims**



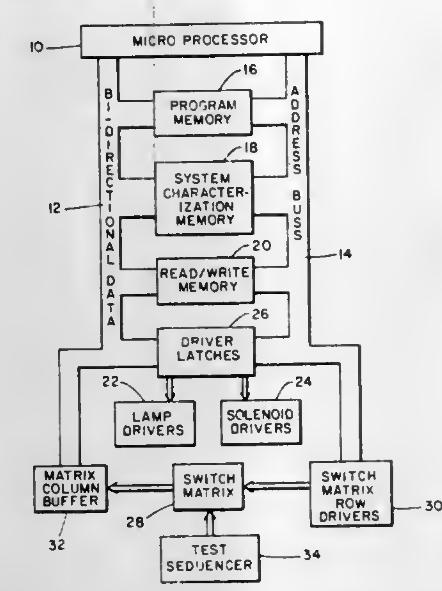
1. A game, comprising a separatable combination of a tubular and circular ring and a disk, said ring having removably received thereon, musical sound producing means, and said disk is provided with fixed sound producing means.

4,058,315
MARBLE SHOOTING GAME
Arthur A. Guise, Jr., Rte. 1, Box 465, Chauvin, La. 70344
Filed Dec. 31, 1975, Ser. No. 645,707
Int. Cl.^{2} A63F *7/00*
U.S. Cl. 273—118 R **2 Claims**



1. A game apparatus comprising; means for playing a game with marbles with a reduced chance of losing the marbles including, a game board with sides, support means on said game board for supporting a first marble thereon, and additional means associated with the support means functioning as a target and which when hit by another marble will project said first marble onto the surface of the game board, said support means including a stand structure attached vertically to one end of said game board and having a marble-holding indentation at the top thereof, said additional means including a target lever associated with the supporting stand structure to actuate a marble-disengaging lever on said support stand structure when the target lever is hit by another marble, said target lever being pivotally supported between parallel ears on the support stand structure which form the indentation therebetween for supporting the first marble and allow said first marble to be projecting off the support when the target lever is actuated by being hit by another marble.

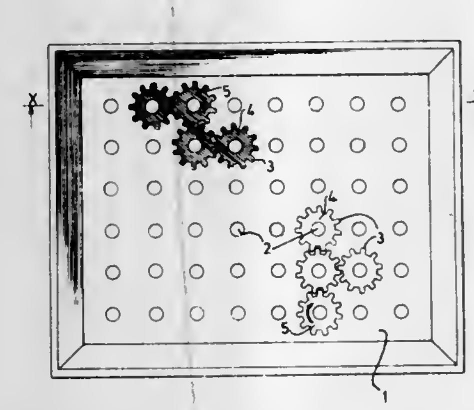
4,058,316
ELECTRONIC CONTROL AND TEST CIRCUIT FOR PINBALL TYPE GAMES
Anthony J. Miller, Skokie, Ill., assignor to The Seeburg Corporation, Chicago, Ill.
Filed Nov. 17, 1976, Ser. No. 742,634
Int. Cl.^{2} A63D *13/00*
U.S. Cl. 273—121 A **10 Claims**



1. A control and test circuit for electronic pinball type game devices having lights, ball switches, ball ejectors and score display means responsive to movement of a pinball over the game surface, said circuit comprising

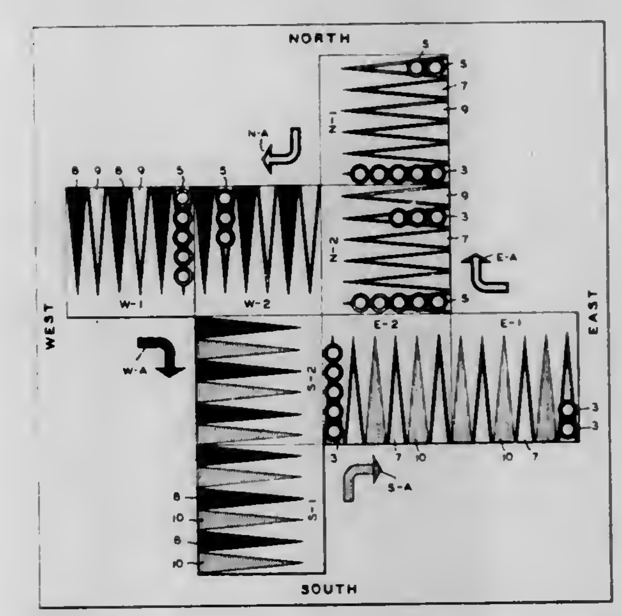
a. driver means for operating specified lamps and ball ejectors,
b. a switch matrix means having a plurality of switches connected thereto, said switches being operated by ball contact with various locations on said game surface,
c. computer means for monitoring said switch matrix means and controlling said driver means and said score display means responsive to detecting switch operation in accordance with a program therefor, and
d. test sequencing means connected to said switch matrix means for causing said computer means to sequentially operate each light, ejector, and switch position to test said game, said sequencing means including means for repetitively testing a given light, ejector or switch position before proceeding to the next test position.

4,058,317
APPARATUS FOR PLAYING A BOARD GAME
John Brian McCarthy, 13 Coolnevaun, Kilmacud, Dublin, Ireland
Filed June 22, 1976, Ser. No. 698,322
Claims priority, application United Kingdom, June 23, 1975, 26575/75
Int. Cl.^{2} A63F *3/00*
U.S. Cl. 273—130 R **13 Claims**



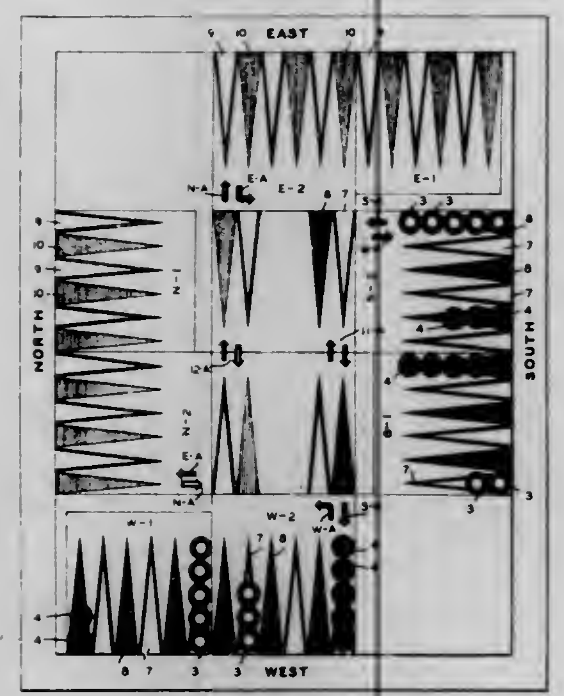
8. An apparatus for playing a board game, said apparatus comprising at least two sets wherein one of said sets is distinguishable from another of said sets, each set having a plurality of counters each capable of rotatable positioning upon a base plate, said base plate having a regular of positioning means for rotatably receiving said counters said positioning means being spaced equally, each counter having surface means for providing driving engagement with any of said counters positioned adjacent thereof, and each set including a master counter, each master counter having means for indicating the required direction of rotation of said master counter in a selected clockwise and counter-clockwise direction.

4,058,318
MULTI-PLAYER BACKGAMMON
Robert Melvin Thomas, 43 E. Edsall Blvd., Palisades Park, N.J. 07650, and Robert Edward Thomas, 222 Lakeside Drive, Hopatcong, N.J. 07843
Filed May 12, 1976, Ser. No. 685,586
Int. Cl.^{2} A63F *3/02*
U.S. Cl. 273—134 AD **8 Claims**



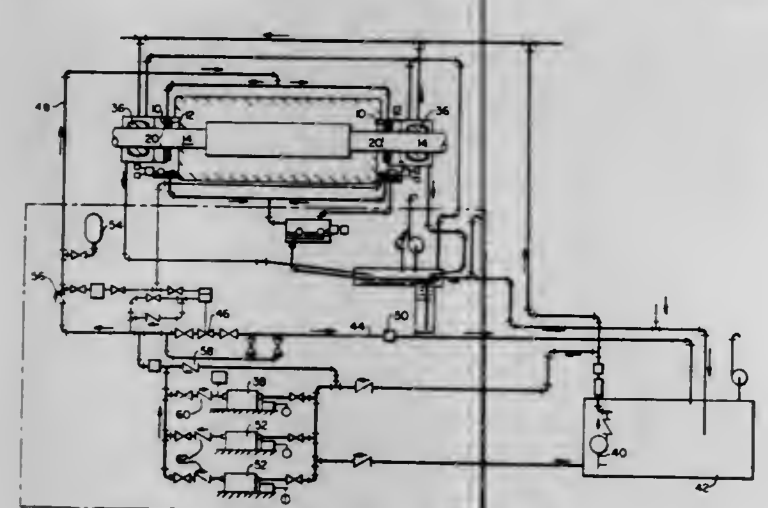
3. A multi-player backgammon game board for the play of at least three players, said game board consisting of forty-eight playing points contained in eight boards of six playing points each, wherein the boards are aligned in relation to each other to allow each player to move his playing pieces through his two boards and through two other contiguous boards played by another player.

4,058,319
MULTI-PLAYER BACKGAMMON
Robert Melvin Thomas, 42 E. Edsall Blvd., Palisades Park, N.J. 07650, and Robert Edward Thomas, 222 Lakeside Drive, Hopatcong, N.J. 07843
Filed May 12, 1976, Ser. No. 685,588
Int. Cl.² A63F *3/00*
U.S. Cl. 273—134 AD **16 Claims**



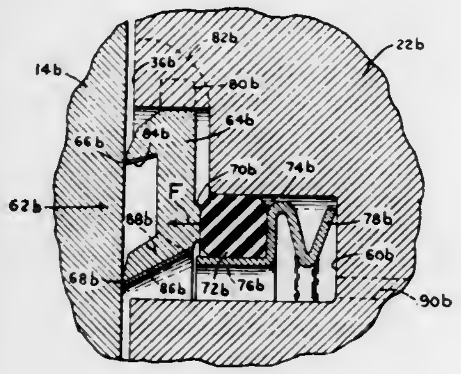
1. A multi-player backgammon game board having the rectangular configuration of FIG. 1 of the drawings and having on its surface the eight board pattern and the central playing area shown in said FIG. 1.

4,058,320
GENERATOR SEAL OIL SUPPLY SYSTEM
Nicholas S. Kosanovich, Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.
Filed July 26, 1976, Ser. No. 708,815
Int. Cl.² F16J *15/40*
U.S. Cl. 277—3 **8 Claims**



1. A system with a seal fluid supply, said system comprising:
a. a housing containing a gas;
b. a rotatable shaft passing through said housing, said shaft and housing being separated by a predetermined gap;
c. means for sealing said predetermined gas against gas leakage therethrough;
d. a fluid reservoir;
e. a primary pump with its suction side in fluid communication with said fluid reservoir;
f. first conduit means of fluid communication between the discharge side of said primary pump and said sealing means;
g. second conduit means of fluid communication between said sealing means and said fluid reservoir;
h. bypass means for providing fluid communication between said first conduit means and said fluid reservoir;
i. a secondary pump with its suction side in fluid communication with said fluid reservoir and its discharge side in fluid communication with said first conduit means;
j. means for maintaining a predetermined pressure differential between the fluid in said first conduit means and said gas;
k. means for sensing flow rate in said bypass means and for signaling said secondary pump to operate when said flow rate falls below a predetermined level; and
l. first valving means causing said seal fluid to flow only from the suction side to the discharge side of said primary pump and a second valving means causing said seal fluid to flow only from the suction side to the discharge side of said secondary pump.

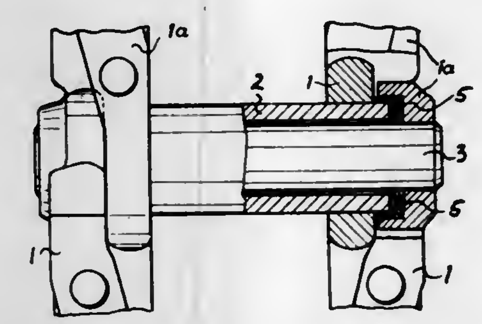
4,058,321
OIL SEAL CONSTRUCTION FOR ROTARY MECHANISMS
Michael T. Gavrun, Bayonne, and Robert W. Loyd, Jr., Wyckoff, both of N.J., assignors to Curtiss-Wright Corporation, Wood-Ridge, N.J.
Filed Oct. 12, 1976, Ser. No. 731,691
Int. Cl.² F16J *15/34*
U.S. Cl. 277—81 P **4 Claims**



1. A rotary mechanism having a housing with a pair of spaced end walls and an intermediate wall to define a cavity therebetween and a piston rotor mounted for relative rotation within said housing cavity with the end faces of said piston rotor being disposed adjacent to said housing end walls and at least one of said rotor end faces having an annular groove, an annular side seal construction comprising:
a. a one-piece seal ring receivable within said rotor annular groove for axial movement relative thereto and having a pair of radially-spaced, annular, axially-projecting disposed generally at an angle radially inward, and portions having relatively sharp annular outer edges for sealing engagement with the adjacent housing end wall, the overall axial dimension of the seal ring being less than the radial spacing between said annular outer edges of the seal ring;
b. a ring of elastomeric material disposed axially behind said seal ring for engagement therewith and also being engageable with a wall of said rotor groove to minimize leakage around said ring on its side remote from the adjacent housing end wall;
c. annular metallic spring means disposed behind said elastomeric ring for applying an annular axial force against the elastomeric ring for causing the elastomeric ring to engage the adjacent side wall of its groove and to urge the seal ring axially outwardly of said groove with the effective region of application of said axial force on said seal ring being radially between its said radially-spaced annular outer edges,
d. an L-shaped annular retainer means disposed adjacent to said elastomeric ring to restrain the elastomeric ring

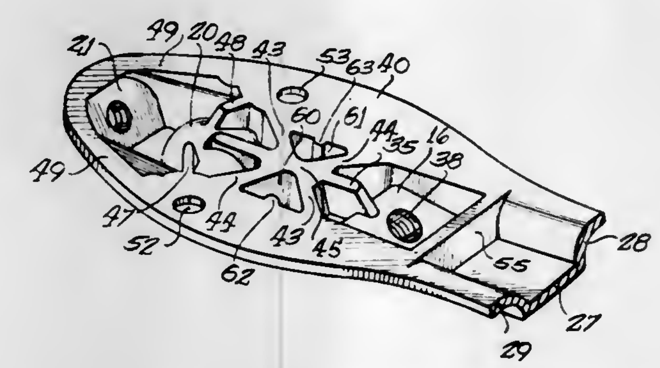
against radial movement away from the rotor groove side wall engageable by said elastomeric ring and for transmitting axial spring force against the elastomeric ring.

4,058,322
BEARING SEAL FOR ENDLESS TRACKS
Carl Fass, Ennepetal-Voerde, Germany, assignor to Intertrac Viehmann & Co., Gevelsberg, Germany
Filed June 1, 1976, Ser. No. 691,444
Claims priority, application Germany, June 12, 1975, 2526327
Int. Cl.² F16J *15/34*
U.S. Cl. 277—96.1 **4 Claims**



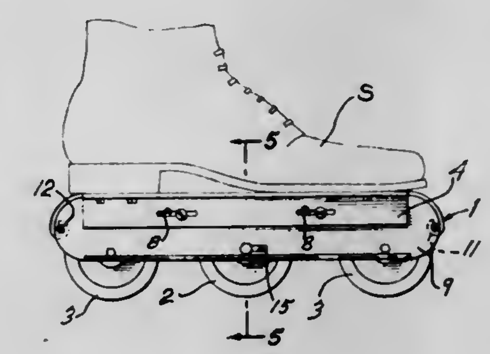
1. A sealing ring made of a resilient material, comprising in combination:
a. a first radial side having a concave annular face;
b. a second, axially opposite radial side having a concave annular face;
c. a radially inner axial face provided with a circumferential groove; and
d. a collar having an outer cylindrical face defining the outer diameter of the sealing ring; said collar extending axially in the direction of orientation of said first radial side and having a free circular terminal edge projecting axially beyond said first radial side.

4,058,323
DIE CAST ROLLER SKATE SOLE PLATE
Robert R. Ware, Jr., River Forest, Ill., assignor to Chicago Roller Skate Company, Chicago, Ill.
Filed Apr. 23, 1976, Ser. No. 679,717
Int. Cl.² A63C *17/00*
U.S. Cl. 280—11.1 R **3 Claims**



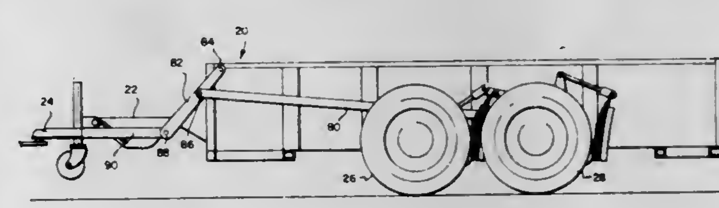
1. A lightweight, strong sole plate for a roller skate and formed of small crystalline structure cast metal, the plate including a raised periphery, an action screw boss, a front truck ball socket, a longitudinal rib of uniform cross section extending between the screw boss and the front ball socket, and at least two diagonally disposed ribs of a uniform cross section, each rib extending from the sole plate periphery on a given side of the action screw boss to the periphery on an opposite side of the front ball socket and crossing the other diagonally disposed rib and the longitudinal rib at a given point between the action screw boss and the front ball socket, the uniform rib thicknesses encouraging relatively small crystalline structural growth during solidification of liquid metal into the cast metal sole plate, the periphery and the two diagonal ribs together defining two recesses, one recess located on either side of the longitudinal rib, and the periphery defining auxiliary bead formations extending into the recesses sufficiently to prevent lodgement of shot peening materials in the recesses during sole plate casting cleaning.

4,058,324
ROLLER SKATE WITH MANEUVERABILITY ADJUSTMENTS
Lucien Dallaire, 165 - 35th St., East, St. Georges de Beauce, Quebec, Canada (G5Y 2P7)
Filed Jan. 30, 1976, Ser. No. 653,652
Claims priority, application Canada, Feb. 5, 1975, 219451
Int. Cl.² A63C *17/06*
U.S. Cl. 280—11.22 **3 Claims**



1. A roller skate adapted to be mounted against the bottom of a shoe, comprising an elongated roller carrier in the form of an open bottom casing defining a pair of laterally spaced-apart upright longitudinal sides, a pair of lateral members extending along the sides of said roller carrier and having upper horizontal flanges provided with transverse slots, means extending through said transverse slots and into the bottom of a shoe to secure said lateral members to said shoe while allowing lateral adjustment of the same with respect to said shoe, said lateral members including vertically extending portions applied against the opposite sides of said elongated roller carrier having longitudinally extending slots, bolt means projecting through said longitudinally extending slots and arranged to adjustably position and secure the roller carrier to said lateral members, an odd number of rollers rotatably carried by the elongated roller carrier and extending between the sides of the latter, one of said rollers being a middle roller, means to adjustably set said middle roller up and down relative to the other rollers, said means including an excentric bushing on which said middle roller is rotatable, said excentric bushing mounted between the sides of said roller carrier and a bolt extending through holes of the sides of said roller carrier and through said central bushing and supporting said bushing and roller and tightening the sides of said roller carrier against said bushing to prevent rotation of the latter.

4,058,325
ELEVATING TRAILER
Arthur G. Schramm, 3111 E. Highland, Phoenix, Ariz. 85016
Filed May 3, 1976, Ser. No. 682,625
Int. Cl.² B62D *32/00*
U.S. Cl. 280—43.18 **6 Claims**

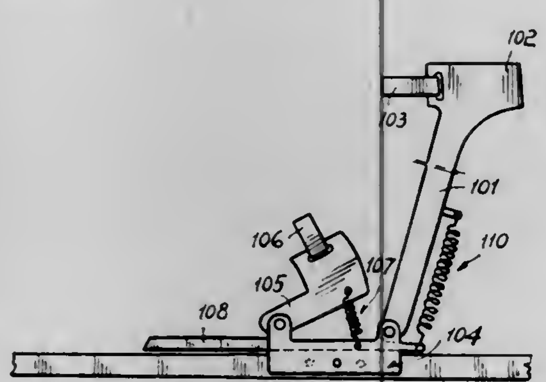


1. In an elevatable trailer; a frame having a forward end and opposite sides; a pair of bell crank arms each pivotally mounted on said frame on a horizontal axis at each opposite side of said frame; said horizontal axes of said bell crank arms being spaced apart relative to each other in a direction relative to said for-

ward end of said frame; wheels rotatably mounted on said bell crank arms in spaced relation to said respective horizontal axes; cantilever members fixed to said bell crank arms and having end portions extending a substantial distance upwardly from said horizontal axis; connecting rods pivotally coupled to said end portions of said cantilever members; an actuating lever pivoted to said frame on each side thereof at a location between the pivotal axes of said bell crank arms; a cross bar having opposite ends pivotally coupled to said actuating levers; a tongue coupled to said cross bar and having a forward end extending beyond said forward portion of said frame; a hitch coupled to said forward end of said tongue; a tongue guide carried by said forward portion of said frame; said tongue reciprocally mounted to move to forward and rear positions relative to said tongue guide; releasable latch means disposed to lock said tongue in said forward position for holding said bell crank arms in a pivoted position wherein said frame and said horizontal axes are in elevated position; and an equalizer lever having an intermediate portion pivotally mounted on each of said actuating levers; each equalizer lever having opposite ends; and said connecting rods at each side of said frame pivotally coupled to said opposite ends of said equalizer levers.

4,058,326
SKI BINDINGS

Antonio Faulin, V.Giovanni da Procida 4, Milan, Italy
Filed June 2, 1975, Ser. No. 583,027
Claims priority, application Italy, June 7, 1974, 23711/74; Jan. 10, 1975, 19193/75
Int. Cl.² A63C *9/00*
U.S. Cl. 280—617 9 Claims



1. A ski binding comprising a base element for rigid connection to a ski, a rigid elongated element including a shaped portion at one end for at least partially enveloping a skier's leg at the shin-bone, said rigid elongated element being pivotally connected at the other end to said base element for rotation about an axis extending perpendicularly to the longitudinal axis of the ski and parallel to the plane of the ski, a second element connected to said base element in a position for embracing the metatarsus of the skier's foot and removably maintaining the sole of the skier's foot in contact with the ski, and a plate-like element rigid with said base element at the forward portion thereof, said plate-like element having a shaped upper surface for mating engagement with the sole of the skier's footwear.

4,058,327
DISPLAY DEVICE

Peter Sullivan, Grand Valley, Canada, and John P. Yackel, Circle Pines, Minn., assignors to American Guidance Service, Inc., Circle Pines, Minn.
Filed Nov. 1, 1976, Ser. No. 737,349
Int. Cl.² B42D *3/16*
U.S. Cl. 281—33 9 Claims

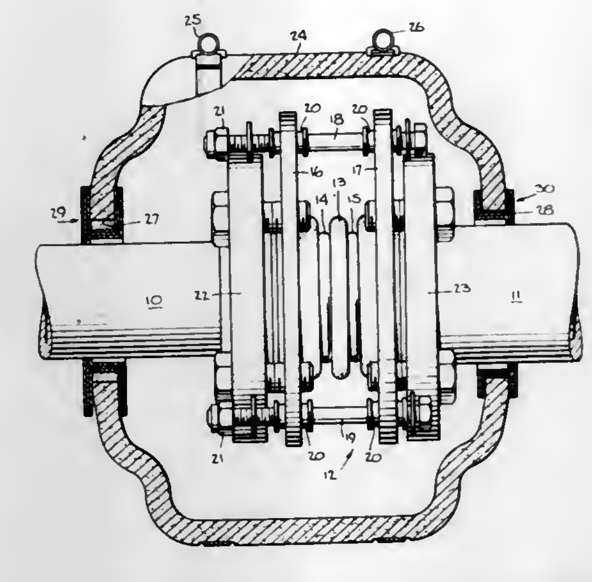
1. A compact book-like storage and display device comprising a one-piece molded synthetic resinous casing and a stack of a plurality of pages bearing the material to be displayed loosely bound to one free edge of said casing, said device further characterized by:

A. a front cover and a back cover each integral with and hingedly connected to opposite sides of a relatively narrower spine, said covers being generally flat and semi-rigid and said spine being generally arcuate in transverse cross-section and rigid;
B. one of said covers being a compound cover composed of two generally flat and semi-rigid panels each having an angularly extending end wall portion;
C. the first of said panels being integral with and hingedly connected on one side to the spine and integral with and hingedly connected on the other side to the other panel along the edges of said angularly extending end wall portions;
D. a perpendicularly extending wall portion along the top and bottom edges of both of said panels and spaced inwardly from the edges of the panels opposite the angularly extending end wall portions, said wall portions defining a shallow storage compartment on the inner face of each of said panels;
E. said stack of pages bearing the material to be displayed being loosely bound to the free edge of said other panel opposite from its hinged connection to the first panel and outside of said storage compartment thereon, said loose binding lying generally along a line parallel to the spine, being loose enough to permit the pages to be folded against either side of said other panel, and comprising a plurality of perforations along one side edge of said stack of pages and the adjacent side edge of said other panel to which the pages are bound;
F. at least one generally annular fastening element extending through contiguous perforations of said pages and panel;
G. positive latching means provided adjacent the edge of said other panel on the inner surface thereof adjacent to the perpendicular wall portion and adjacent to said loose binding, said latching means comprising a plurality of spaced apart perpendicular projecting tabs spaced from said perpendicular wall portion by about the thickness of said front cover, whereby the free edge of said front cover is engageable between said perpendicular wall portion and said tabs;
H. said device when closed forming a generally flat book-like storage unit; and
I. said device when folded into a generally triangular prism, having one of said covers as a base, said loose binding as one edge, the other of said covers as one side and the stack of pages as the other side, forming an easel display for the material on said pages.

4,058,328
HEAT-RESPONSIVELY SELF-SEALING PROTECTIVE JACKET FOR EXPANSION JOINTS

Harvey R. Nickerson, Roseland; Helm A. Rink, North Haledon, and John K. Menzel, Orange, all of N.J., assignors to Resistoflex Corporation, Roseland, N.J.
Filed Oct. 29, 1976, Ser. No. 736,778
Int. Cl.² F16L *11/12*
U.S. Cl. 285—45 10 Claims

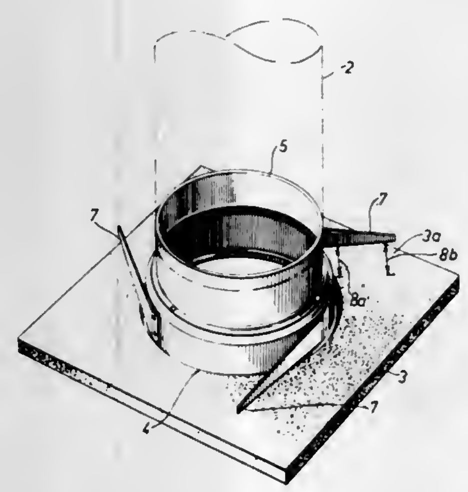
1. A fire-safe jacket for protecting a joint in a fluid piping system which joint is capable of expanding or flexing or both, said jacket comprising a plurality of segments of refractory material joinable around said joint to form an enclosure thereabout with an air gap between the exterior of said joint and the interior of said enclosure, said segments being so configured and dimensioned as to provide when assembled a respective opening through which adjacent piping components pass to and from said joint, said respective openings each having a diameter greater than the outside diameter of said corresponding adjacent piping component, and a gland in the form of a ring covered with a layer of intumescent material inserted within each of said respective openings for substantially bridging the radial gap between said opening and said correspond-



ing adjacent piping component passing therethrough, said ring making a sliding fit with the latter.

4,058,329
CONNECTING PIECE FOR MOUNTING A VENTILATION ELEMENT IN AN OPENING IN A CEILING OR WALL

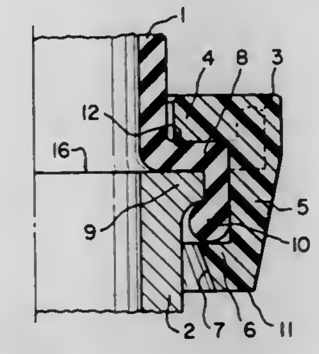
Leif Johansson, Ganglaten, Sweden, assignor to Aktiebolaget Svenska Flaktfabriken, Nacka, Sweden
Filed June 8, 1976, Ser. No. 693,763
Claims priority, application Sweden, June 16, 1975, 7506894
Int. Cl.² F16L *41/00*
U.S. Cl. 285—162 8 Claims



1. A connecting piece for mounting a ventilation element in an opening in a ceiling or wall slab, said connecting piece comprising a cylindric shell having stop means extending outward in a common radial plane on the front side to abut the front surface of the slab surrounding said opening, and clamp means cooperating with the stop means to secure the connecting piece in the opening, characterized in that the clamp means comprises a plurality of elongated wings of a resilient flexible material, mounted at one end on the outer surface of said shell and normally tangentially projecting outwardly from the shell outer surface so that upon the insertion of the connecting piece into the opening, the wings may be flexed inwardly to lie circumferentially along the shell surface, each wing having a front edge portion facing toward the stop means with a spacing from said common radial plane which increases with the distance from the point of mounting, whereby the wings after their passage through the opening due to their resillience will be straightened so that the front edge portions abut the rear surface of the slab surrounding the opening and thereby together with the stop means secure the connecting piece on ceiling or wall slabs of different thicknesses.

4,058,330
COUPLING ARRANGEMENT

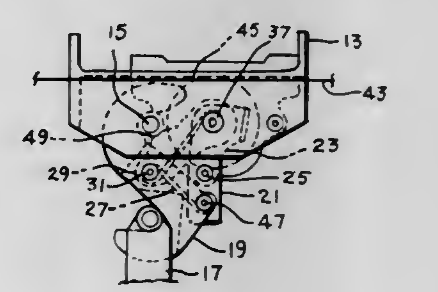
Franz-Josef Wolf, D-6483 Bad Soden-Salmunster, Sprudelallee 19, Germany
Filed Apr. 12, 1976, Ser. No. 675,962
Claims priority, application Germany, May 3, 1975, 7514275; Nov. 19, 1975, 2551939
Int. Cl.² F16L *55/00*
U.S. Cl. 285—174 7 Claims



1. An arrangement for coupling an elastic structural member to an inherently stable structural rigid member by means of a fastening element, said arrangement comprising an elastic member having an end terminating in a flexurally elastic flange and a rigid member having a bend-resistant flange, the flanges being adapted to be joined to one another, an edge of the flexurally elastic flange of the elastic structural member projecting beyond an edge of the bend-resistant flange of the rigid structural member and carrying a bulge thereon at the terminal end thereof, and a fastening element having a flange and a skirt and adapted to be pushed axially from the direction of the elastic member over the flanges of the elastic and the rigid structural members when they are in abutment in such a way that a bottom face of the skirt inverts the projecting edge of the flexurally elastic flange with its bulge which faces away from the direction in which the fastening element is pushed around the edge of the bend-resistant flange and the skirt forces the inverted bulge beyond the bend-resistant flange and toward said rigid member so that said bend-resistant flange is captured between said bulge and non-inverted portion of the elastic flange while the flange of the fastening element rests on the non-inverted portion of the flexurally elastic flange.

4,058,331
REMOTELY ACTUATED TWO STAGE STRUCTURAL LATCH

George W. Koonce, Fort Worth, Tex., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.
Filed Oct. 29, 1976, Ser. No. 738,496
Int. Cl.² E05C *19/10*
U.S. Cl. 292—97 4 Claims



1. A remotely actuated two stage structural latch comprising, in combination, a support housing, a main shaft passing through and rotatable in said housing, a first link having one end pivotally attached to one end of said main shaft, an S shaped hook member pivotally attached to the other end of said first link, a second link having one end attached to said main shaft for pivotting on a common axis with said first link, a first pivot pin disposed on the other end of said second link,

a third link having one end pivotally attached to said second link for pivotting around said first pivot pin, the other end of said third link being pivotally attached to a second pin on said S shaped hook, a third pin fixedly attached to said support housing, a clevis pin in spaced alignment with said third pin, and means for rotating said main shaft to produce a corresponding rotation of said first link causing said S shaped hook to rotate and engage said third pin and said clevis pin, further rotation of said S shaped hook member operating to draw said clevis pin and said support member nearer together when the rotation is in clockwise direction and operating to release the support member from the clevis pin when the rotation is in the counterclockwise direction.

4,058,332

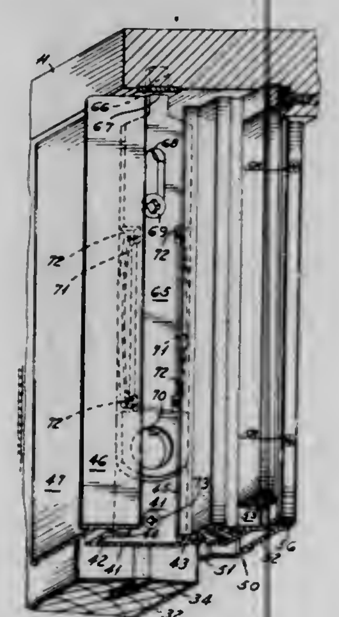
ASTRAGAL AND FLUSH BOLT ASSEMBLY

Joseph DiFazio, Troy, Mich., assignor to Acorn Building Components, Inc., Detroit, Mich.

Filed Feb. 2, 1976, Ser. No. 654,444

Int. Cl.² E05C *1/04, 7/04*

U.S. Cl. 292—147 **8 Claims**



1. In an astragal assembly to be secured to a relatively stationary member such as a door jamb, or the edge of an inactive door or the like, said astragal including a generally flat elongated body to be mounted on said stationary member and a stop member secured to said body along one edge thereof to limit swinging movement of a relatively active door member, the improvement comprising:

first and second spaced apart elongated legs formed integrally with said flat body and extending outwardly therefrom away from said relatively stationary member, the flat body and legs together defining an outwardly opening channel to receive and retain a slidable flush bolt;

said slidable flush bolt being a thin, flat elongated member having opposed sides and an elongated slot therethrough;

resilient means in said channel to engage each side of said flush bolt to slide with said flush bolt and to frictionally retain said flush bolt in said channel;

means for fastening said channel to said stationary member;

said fastening means extending through said slot for limiting the sliding movement of said flush bolt in said channel; and

a thermally insulating material interposed between said stop member and said body, said stop member being secured to one edge of said thermally insulating material and said second leg being connected to the other edge of said thermally insulating material so that said thermally insulating material forms a thermal barrier between the astragal body and the astragal stop member;

said stop member preventing swinging of said relatively movable door past the relatively stationary member in a first direction and said first leg of said channel cooperating with said door latch to prevent swinging movement of said relatively active member past said relatively stationary member in the opposite direction.

4,058,333

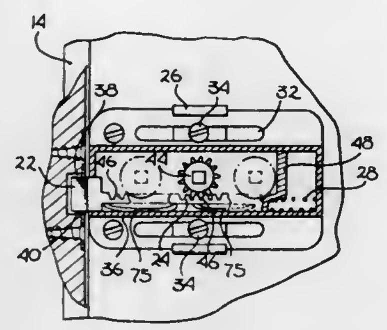
DOOR LATCH FOR RECREATIONAL VEHICLE AND OTHER APPLICATIONS

Forrest D. Roe, La Mirada, and Sidney Simon, Encino, both of Calif., assignors to Perma Bilt Industries, Torrance, Calif.

Filed July 23, 1976, Ser. No. 708,220

Int. Cl.² E05C *1/12*

U.S. Cl. 292—172 **8 Claims**



1. A door latch having special utility in recreational vehicles and the like comprising:

a latch housing, said latch housing having a toothed rack assembly, a gear member rotatably coupled thereto, and an elongated shaft member;

a retractable bolt member having an extended and a retracted position, said bolt member coupled to said rack such that movement of said rack in a predetermined direction causes said bolt member to move into said retracted position;

a slideable bar member disposed across said housing, said bar member selectively positioning said elongated shaft in said housing;

a door knob, said door knob having an elongated hollow stem, said shaft extending into said stem and being secured therein such that movement of said knob causing said gear member to rotate thereby moving said bolt into said retracted position; and wherein,

a flexing means is disposed between said latch housing and said toothed rack assembly, said flexing means for yieldable coupling said gear member to said toothed rack assembly such that movement of said door knob in one direction causes said bolt to move into said retracted position without any flexing of said flexing means, said toothed rack assembly presses against said flexing means and is thereby selectively disengaged from said gear member.

7. A door latch having special utility in recreational vehicles and the like comprising:

a latch housing, said latch housing having (i) first and second toothed rack assemblies; (ii) first and second gear members, said tooth rack assemblies being slidably disposed in said housing such that said gear members are disposed thereinbetween, and (iii) an elongated shaft disposed in said first gear assembly wherein said first gear is a working pinion gear and said second gear is a stablizing pinion gear, said first and second gears maintaining said first and second racks in a parallel and spaced apart configuration;

a retractable bolt member having an extended and a retracted position, said bolt member disposed in said housing between said first and second rack assemblies such that movement of either of said racking assemblies causes said bolt to move into said retracted positions;

a door knob, said door knob having an elongated hollow stem, said shaft extending into said stem and being secured therein such that movement of said knob causes said first gear member to rotate thereby moving said bolt into said retracted position; and

wherein a spring means is circumferentially disposed about said shaft and adjacent said working pinion gear such that said working pinion gear is rendered selectively disengageable from said rack assembly thereby permitting lateral movement of said door knob.

4,058,334

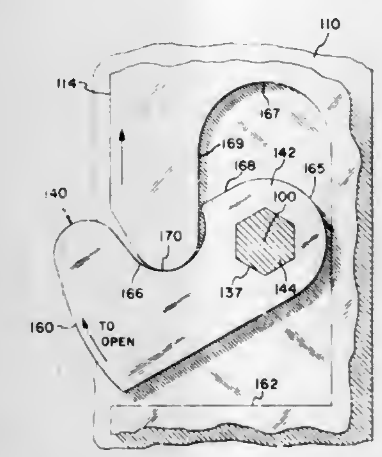
SELF-LOCKING DEVICES

Joseph E. Prather, Bernardsville, and Ramzi A. Khalifa, Rutherford, both of N.J., assignors to Edson Tool and Manufacturing Company, Inc., Belleville, N.J.

Continuation-in-part of Ser. No. 676,509, April 13, 1976. This application Sept. 16, 1976, Ser. No. 723,710

Int. Cl.² E05C *3/04*

U.S. Cl. 292—241 **13 Claims**



1. A self-locking device for locking a movable structural member to a stationary structural member, or to another movable structural member, or for unlocking the same, comprising: a first structural member; a second structural member which is movable in a first or opening direction; a rotatable self-locking cam and an actuating means therefor capable of rotating said self-locking cam, said rotatable self-locking cam being rotatably mounted on said first structural member; a curved surface on said rotatable self-locking cam, capable of contacting and preventing movement of said second structural member in said first or opening direction; a cam surface on said rotatable self-locking cam, capable of contacting and moving said second structural member in said first or opening direction; an ear on said second structural member, said actuating means being capable of rotating said rotatable self-locking cam in an angular direction, whereby said cam surface on said rotatable self-locking cam contacts said ear on said second structural member to forcibly move said second structural member in said first or opening direction, while said curved surface on said rotatable self-locking cam is being simultaneously moved out of the way of said second structural member, due to the angular rotation of said rotatable self-locking cam to permit the movement of said second structural member in said first or opening direction to move and to unlock said second structural member from said first structural member; an angular rotation-limiting plate having surfaces extending into the path of rotation of said rotatable self-locking cam, with one surface located on one side of the center of rotation of said rotatable self-locking cam and another surface located on the other side of the center of rotation and said rotatable self-locking cam and located such that said rotatable self-locking cam is capable of rotation of from about 50° to about 270° and being mounted on said first structural member to contact the sides of said rotatable self-locking cam and limit the angular rotation of said rotatable self-locking cam during the unlocking and opening of said second structural member within a prescribed degree of angularity, said surfaces being located on said angular rotation-limting plate such that said rotatable self-locking cam rotates between said surfaces and is always in an operative position when in its open position for self-closing and locking of said self-locking device, and then, said ear on said second structural member subsequently becoming an actuating means during the closing and locking of said second structural member to said first structural member and being subsequently capable of rotating said rotatable self-locking cam in an angular direction opposite to that of said first angular direction, whereby said second structural member returns to its original closed and locked position, wherein it is prevented from movement in said first or opening direction by said curved surface on said rotatable self-locking cam.

4,058,335

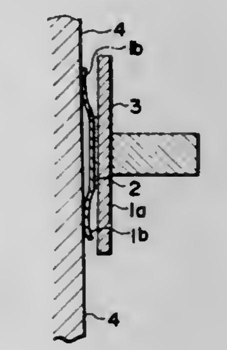
MAGNETIC SHEET THE MAGNETIC ATTRACTION OF WHICH IS STRENGTHENED

Seiji Abe, 8-1-305, Fukuzumi 2-chome, Koto, Tokyo, Japan

Filed Jan. 27, 1976, Ser. No. 652,706

Int. Cl.² E05C *19/16*

U.S. Cl. 292—251.5 **8 Claims**



1. A magnetic sheet comprising:

a mounting base; and

magnetic sheet means attached at the central portion thereof to one side of said mounting base for attracting said mounting base to a magnetically attractive surface, the ends of said magnetic sheet around said central portion being flexible and free from said mounting base.

4,058,336

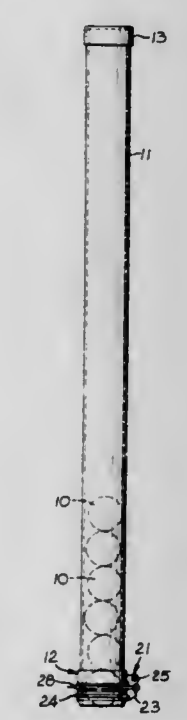
DEVICES FOR PICKING UP BALLS

Sydney Parkinson, 8 Pine Grove, Ashton-on-Mersey, Sale, Cheshire, England

Filed Apr. 23, 1976, Ser. No. 679,762

Int. Cl.² A47F *13/06*

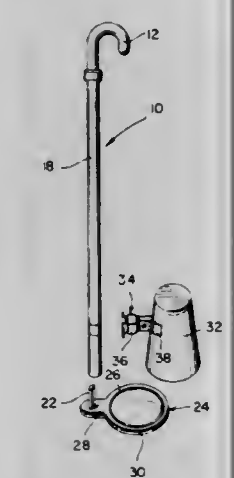
U.S. Cl. 294—19 A **8 Claims**



1. A device for picking up balls comprising: a tube having, at one end, a ball retainer arrangement including a pawl tooth resiliently loaded towards an operative rest position projecting inwardly of the tube and pivotable in a direction away from the said one end to an inoperative position free of the tube interior, the ball retainer arrangement including a knob means disposed externally of the tube for permitting the pawl tooth to be

pivoted manually into the inoperative position against its resilient loading, the knob means being connected with the pawl tooth by way of a neck providing a recess for location therein of a resilient band extending circumferentially around the said one end of the tube for loading the pawl tooth into the operative position.

4,058,337
ANIMAL LITTER COLLECTION UNIT
Mircea Isac, 59-28 Madison St., Brooklyn, N.Y. 11227
Filed Nov. 2, 1976, Ser. No. 738,260
Int. Cl.² A47F *13/06*
U.S. Cl. 294—19 R **4 Claims**



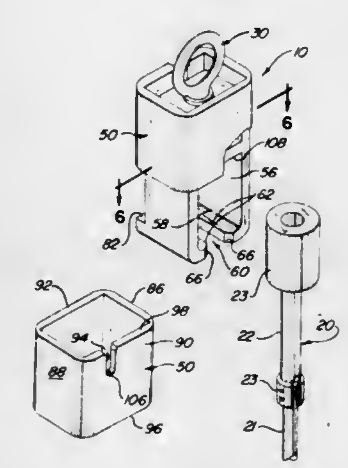
1. An animal litter collection unit comprising:
an upright cane-like implement having an inner shaft telescopically received within an outer tubular sleeve, means rotatably securing said inner shaft to said outer sleeve, said inner shaft having a handle at one end thereof for carrying said implement and for rotating said inner shaft relative to said outer sleeve,
an inverted container,
means slidably connecting said inverted container to said outer sleeve,
a lid for said container, and
means slidably mounting said lid to the other end of said inner shaft so it can be rotated to a position beneath said container and removed along with said container from said cane-like implement upon rotation of said inner sleeve and downward sliding movement of said container,
said means slidably connecting said inverted container to said outer sleeve including a double clamp, said clamp having a first portion slidably mounted on said outer sleeve, and a second portion slidably retaining said container.

4,058,338
HANDLE ASSEMBLY
Richard N. Brown, Macungie, Pa., assignor to General Electric Company, Bridgeport, Conn.
Filed Oct. 28, 1976, Ser. No. 736,505
Int. Cl.² A47J *45/07*
U.S. Cl. 294—31.2 **5 Claims**

1. A handle assembly for securing a handle on a utensil comprising:
a. a flexible band positioned around said utensil, said band having a central portion and two end portions, each of said end portions being shaped to include an elongated leg portion and a foot portion arranged generally perpendicular to the leg portion;
b. a block for holding said band in assembled position on said utensil, said block having end wall means and side wall means, two slots formed in said side wall means arranged generally parallel to each other for receiving the leg portions of said band, one leg portion being positioned in one of said slots with its foot portion being in engagement with the end wall means of the block and the other leg portion being positioned in the other slot with its foot portion being positioned in engagement with the foot portion of the other end of the band;
c. a handle having a socket for receiving said block and the end portions of said band; and

d. fastening means connected to the handle, the block and the end portions of said band for securely holding them in assembled position.

4,058,339
PIVOTAL LATCH FOR A SUCKER ROD PULLER
William Boyd Burchard, Jr., Box Y, Folsom, N. Mex. 88419
Filed Mar. 17, 1976, Ser. No. 667,874
Int. Cl.² B66C *1/00*
U.S. Cl. 294—91 **15 Claims**

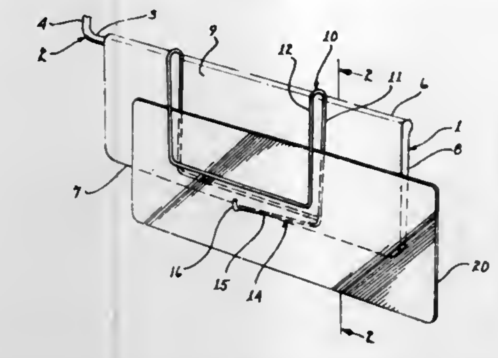


1. A sucker rod puller having means attached thereto for connecting to a means for elevating the sucker rod, said sucker rod puller comprising:
a latch having activated and deactivated states,
a main body receptive of said sucker rod, said latch being disposed in said main body in the deactivated state and
a sleeve over said main body, said sleeve being held in a first position by said activated state of said latch for containing said sucker rod and capable of being manually retained in a second position for maintaining said latch in said deactivated state, said sleeve defining the outer perimeter of said puller in said activated and deactivated states and said latch being inward of said perimeter in said activated state.

4,058,340
RETAINER FOR SUN VISOR EXTENSION
David Pinkas, 15239 Agua Fria Drive, Sun City, Ariz. 85351
Filed Apr. 8, 1976, Ser. No. 675,148
Int. Cl.² B60J *3/02*
U.S. Cl. 296—97 G **6 Claims**

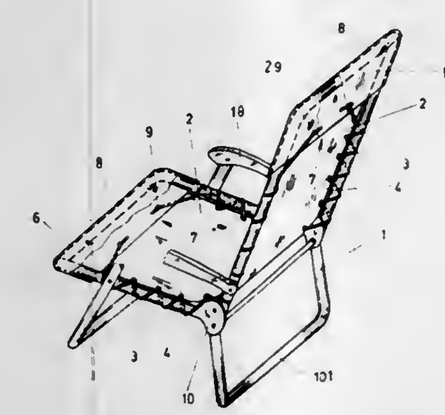
1. Apparatus for retaining a slidably positionable sun shield adjacent one surface of a vehicle mounted sun visor, said apparatus comprising in combination:
a. a rectangular wire frame for partially transversely circumscribing the sun visor, said wire frame being folded upon itself to extend across one edge of the sun visor and define

a first and second U-shaped section for exerting a gripping force upon opposed sides of the sun visor;
b. a leg supported by said first U-shaped section and having a free end extending transverse to another edge of the sun visor for securing said wire frame about the sun visor; and
c. a prong disposed at the free end of said leg for engaging the surface of the sun visor adjacent said second U-shaped



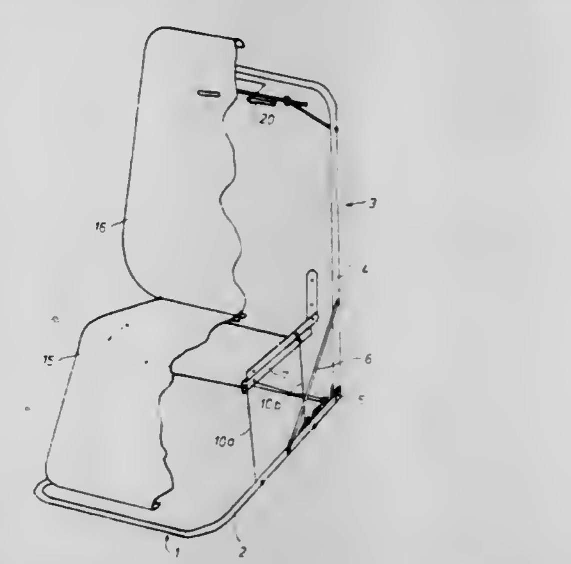
section to maintain said leg transverse to the other edge of the sun visor;
whereby, on insertion of the shield intermediate said second U-shaped section and the adjacent surface of the sun visor, the gripping force exerted by said second U-shaped section retains the shield parallel and adjacent the sun visor while accomodating longitudinally and laterally directed slidable movement of the shield.

4,058,341
COLLAPSIBLE CHAIRS
Johannes Prins, Burg. v. Veenlaan, 411 Enschede, Netherlands
Filed Apr. 9, 1976, Ser. No. 675,632
Claims priority, application Germany, Sept. 17, 1975, 2541385
Int. Cl.² A47C *4/00*
U.S. Cl. 297—39 **1 Claim**



1. A collapsible item of furniture for lying or sitting thereon comprising
a back rest,
a seat or lying base 28,
a front leg pivoted centrally to the seat,
an arm rest pivotally connected at one end to the upper end of the front leg, said arm rest being pivotally connected to its other end to said back rest, said front leg collapsible toward the rear leg when said chair is folded,
leg means including two posterior leg portions,
an articulation means connecting said back rest and said base and said posterior leg portions.
said articulation means comprising a first extension portion connected to said base,
a second extension portion connected to said back rest,
a third extension portion connected to said posterior leg portion,
a first serrated means on said second extension portion turnable about an axis to pivot said back rest, a second serrated means on said third extension portion in continual meshed engagement with said first serrated means and rotatable about an axis to pivot said posterior leg portions, said first and second serrated means being in continual meshed engagement for simultaneously and concurrently driving and turning engagement with each other and to concurrently pivot said back rest and said posterior leg portions simultaneously, said articulation means comprising two bowl-shaped base members for encapsulating said first and second serrated means, said first extension comprising rigid extensions formed on said bowl-shaped base members, stub shafts carried by said bowl-shaped base members and defining the respective axes for said first and second serrated means, and said bowl-shaped base members having recesses therein defining slots through which project said second and third extension.

4,058,342
CHILD'S CAR SEAT
John P. Ettridge, 14 Somers St., North Brighton, South Australia, Australia (5048)
Filed Nov. 10, 1976, Ser. No. 740,615
Claims priority, application Australia, Nov. 14, 1975, 3966/75
Int. Cl.² A47C *1/032*
U.S. Cl. 297—250 **4 Claims**



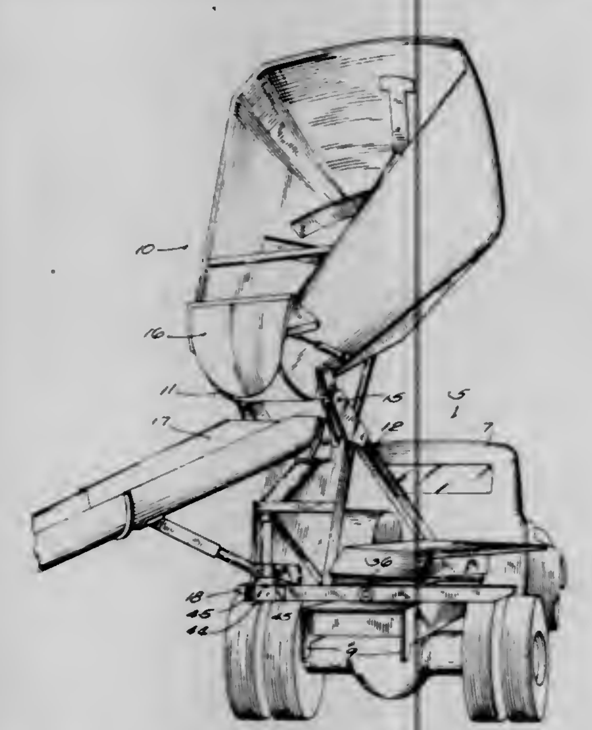
1. A child car seat comprising a base frame adapted to rest on a vehicle seat, a back rest frame extending upwardly and rearwardly therefrom so that the base frame and back rest frame are at a suitable angle to each other conforming to the general angle of the car seat itself, characterised by a seat frame and a seat back pivoted to each other, the seat frame being attached to the base frame by pairs of parallel links, and the seat back toward its upper end is linked to the back rest frame by a link extending therebetween, the parallel linkage moving the seat frame downwardly and forwardly in a parallel manner from a sitting to a reclining position, with the seat back moving also downwardly and forwardly at its bottom to increase its angle of inclination to a reclining position upon such downwardly and forwardly movement of the seat frame, and locking means to restrain the seat frame and seat back in their respective desired positions relative to the base frame and back rest frame by a locking link extending between the seat frame and the base frame.

4,058,343
CONCRETE TRANSPORTING AND PLACING VEHICLE WITH LATERALLY SHIFTABLE BODY
Glenway W. Maxon, III, Milwaukee, Wis., assignor to Maxon Industries, Inc., Milwaukee, Wis.
Filed Jan. 25, 1977, Ser. No. 762,242
Int. Cl.² B60P *1/30*
U.S. Cl. 298—9 **11 Claims**

1. In a material transporting vehicle of the type having a chassis and a body especially designed to hold a sizable volume of material to be transported, mounted on a body frame having parallel sides and front and rear ends, the body having a discharge mouth at one end thereof, and means mounting the body frame with the body thereon on the chassis of the vehicle in a manner that enables the discharge mouth of the body to be

directed to either side of the chassis without substantially shifting the center of gravity of the loaded body with respect to the chassis, said means comprising:

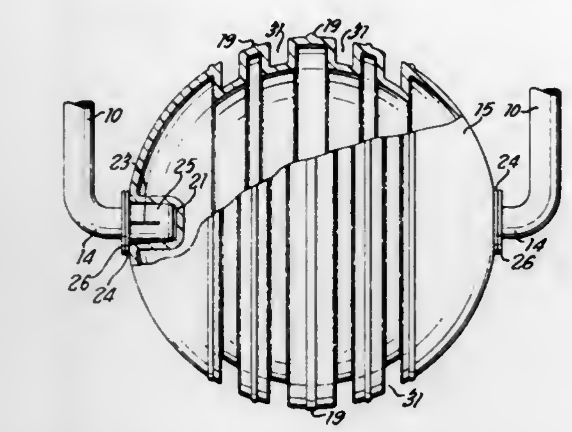
A. rigid supporting structure fixed with respect to the chassis, said structure including cantilevered arms that project laterally beyond the sides of the chassis at spaced intervals along the length thereof, said cantilevered arms as well as the rest of said rigid structure having coplanar top surfaces;
B. the body frame having a bottom surface all portions of which lie in a common plane and slidably set upon the coplanar top surfaces of said rigid structure;
C. pivot means connecting the body frame with said rigid



supporting structure, the axis of said pivot means being fixed with respect to said rigid supporting structure and normal to the plane of the slidably engaged surfaces of the body frame and rigid supporting structure and substantially intersecting the center of gravity of the body; and
D. power means reacting between the body frame and the chassis, operable to swing the body frame about the axis of said pivot means from a transport position parallel with the sides of the chassis to either a right or left diagonally disposed position, in each of which the discharge mouth of the body is spaced laterally a substantial distance from the centerline of the vehicle chassis and in each of which the body frame is solidly supported by said rigid supporting structure.

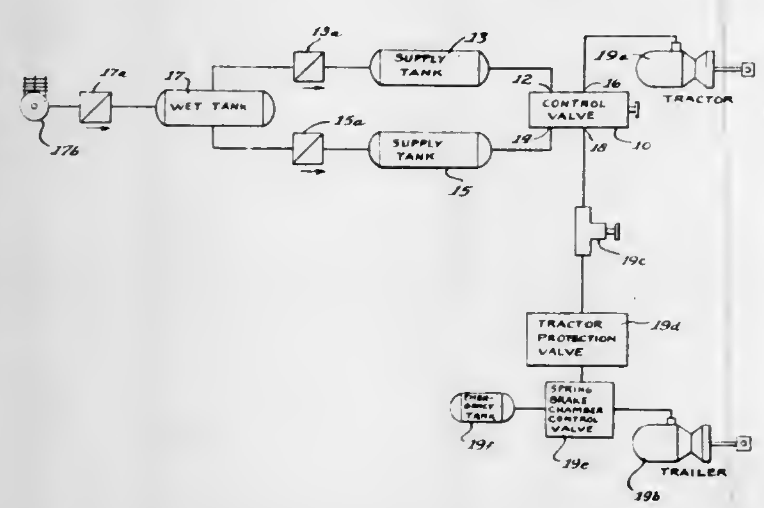
4,058,344
GROUND ENGAGING MEMBER FOR MOVABLE STRUCTURES
James Dyson, Badminton, England, assignor to Kirk-Dyson Designs Ltd., London, England
Filed Mar. 2, 1976, Ser. No. 663,218
Claims priority, application United Kingdom, Mar. 5, 1975, 9189/75
Int. Cl.² B60B *9/00*
U.S. Cl. 301—7 2 Claims

1. A wheelbarrow comprising a frame and a supporting ground engaging ball member rotatably mounted therein, said ball member being molded in one piece from a plastic material consisting of a mixture of an ethylene-vinyl acetate co-polymer and a low density polyethylene with diametrically opposite sockets therein, a bearing assembly mounted in each of said sockets, said frame terminating in stub shafts adapted to fit a bearing assembly, said bearing assemblies each having an outer cup-shaped member non-rotatably mounted in a socket with said outer cup-shaped member terminating in an outer peripheral flange for engaging the outer surface of said ball member, said outer cup-shaped member being of a length less than the depth of said socket with the inner end of said cup-shaped member being spaced from the bottom of said socket upon the engagement of said peripheral flange with said ball member, an inner cup-shaped member non-rotatably mounted on said shaft and rotatably mounted in said outer cup-shaped member, said inner cup-shaped member terminating in an outer peripheral



flange engaging the outer peripheral flange of the outer cup-shaped member, said inner cup-shaped bearing being of a length less than said outer cup-shaped member with the inner end of said inner member being spaced from the inner end of the outer cup-shaped member upon the engagement of said flanges of said cup-shaped members.

4,058,345
BRAKE APPARATUS INCLUDING CONTROL VALVE WITH INTEGRAL CHECK VALVE
Boleslaw M. Klimek, Des Plaines, Ill., assignor to The Echlin Manufacturing Company, Branford, Conn.
Filed Feb. 23, 1976, Ser. No. 660,492
Int. Cl.² B60T *13/38*
U.S. Cl. 303—6 M 5 Claims

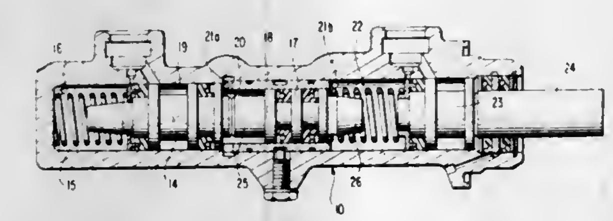


2. Pneumatic apparatus adapted for use in a tractor-trailer braking system with first and second spring brake actuators and first and second pressure sources, said apparatus comprising:

a first control valve adapted for coupling to each of such pressure sources and to a first of such spring brake actuators, said first control valve including means for selectively providing exhaust pressure or pressure from such pressure sources at least partially in response to external force applied to said control valve and to pressure supplied by such pressure sources, said first control valve inhibiting communication between such pressure sources;
a second control valve connected to said first control valve, including an output port, said second control valve including means for selectively providing communication between said first control valve and said output port of said second control valve, at least partially in response to external force applied thereto and to pressure supplied by said first control valve; and

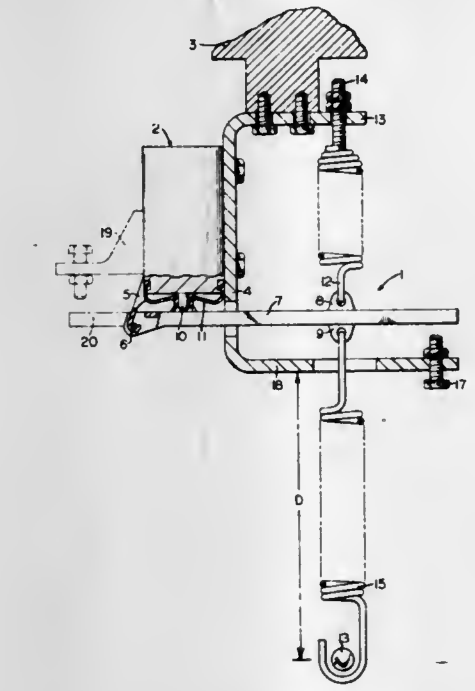
means connected to said output port of said second control valve, for supplying pressure to such second spring brake actuator at least partially in response to pressure at said output port of said second control valve.

4,058,346
MASTER BRAKE CYLINDER FOR MOTOR VEHICLES
Manfred H. Burckhardt, Waiblingen, Germany, assignor to Daimler-Benz Aktiengesellschaft, Stuttgart, Germany
Filed Feb. 5, 1976, Ser. No. 655,552
Claims priority, application Germany, Feb. 5, 1975, 2504699
Int. Cl.² B60T *8/20*
U.S. Cl. 303—22 R 15 Claims



1. A master brake cylinder for two-circuit brake systems of motor vehicles, which comprises two cylinder and piston means for the two brake circuits disposed in tandem arrangement one behind the other and forming pressure spaces in the master brake cylinder, characterized in that the piston means for the front axle brake circuit has a larger diameter than the piston means for the rear axle brake circuit, and in that the pressure space in the master brake cylinder for the front axle brake circuit is connected with the pressure space in the master brake cylinder of the rear axle brake circuit by way of a connecting line means, and control means operable in dependence on the vehicle load and operative in said connecting line means.

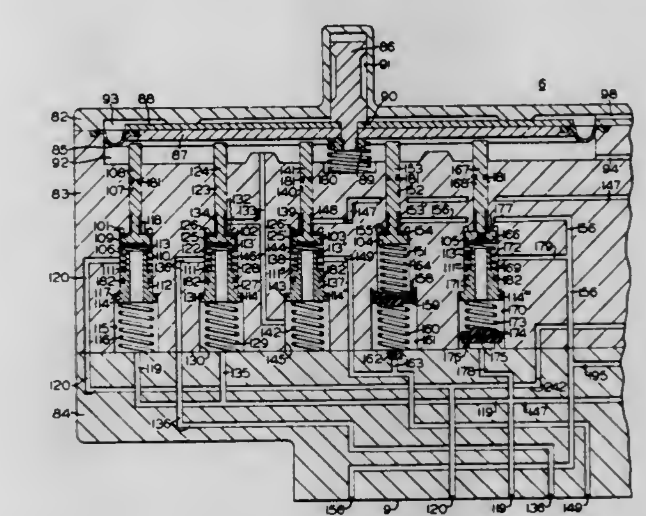
4,058,347
LOAD-RESPONSIVE LINKING DEVICE FOR VEHICLE BRAKE PRESSURE REGULATORS
Erich Reinecke, Beinhorn, Germany, assignor to WABCO Westinghouse GmbH, Hannover, Germany
Filed July 15, 1976, Ser. No. 705,717
Claims priority, application Germany, July 16, 1975, 2531756
Int. Cl.² B60T *8/18*
U.S. Cl. 303—22 R 8 Claims



1. A vehicle load-responsive linking device for use with a vehicle brake pressure regulator operable to a supply disposition for effecting supply of brake actuating fluid, said linking device being operably disposed between a sprung portion and an unsprung portion of the vehicle, on which the brake pressure regulator is mounted, and an unsprung portion of the vehicle and comprising:

a. a fulcrum lever having one end pivotally supported in a bearing carried on the brake pressure regulator;
b. a primary spring having one end connected to said sprung portion and the other end connected to said lever at an axial point between said one end and a free end of the lever for exerting a first force thereon in one direction normal to the axis of the lever;
c. a secondary spring having one end connected to said unsprung portion of the vehicle and the other end connected to said lever at said axial point thereof for exerting a second force thereon in an opposite direction relative to said one direction, said first force being variable according to the distance between the sprung and unsprung portions of the vehicle, according to vehicle load;
d. a piston rod having one end extending out of the brake pressure regulator, and against which piston rod end said one end of said lever is biased into abutting contact by said first force of the primary spring, said piston rod being axially movable in a direction corresponding to said opposite direction for effecting operation of the brake pressure regulator to said supply disposition and consequent corresponding angular displacement of said lever; and characterized by:
e. a stop member carried on a bracket portion on the brake pressure regulator, said stop member being abuttingly engageable by said free end of said lever for limiting said angular displacement thereof and, therefore, said axial movement of said piston rod to an amount coinciding with said operation of the brake pressure regulator to said supply disposition.

4,058,348
BRAKE APPARATUS WITH A COMBINED BRAKE CYLINDER AND RESERVOIR
James E. Hart, Trafford, Pa., assignor to Westinghouse Air Brake Company, Wilmerding, Pa.
Filed Mar. 4, 1977, Ser. No. 774,241
Int. Cl.² B60T *15/22*
U.S. Cl. 303—35 32 Claims

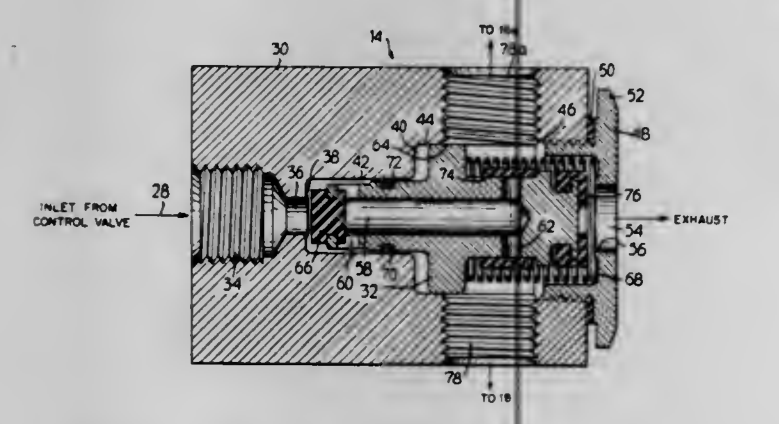


1. A fluid pressure brake apparatus for controlling braking of a vehicle, said brake apparatus comprising:

a. a brake pipe normally charged to a chosen pressure,
b. braking means having:
   i. a pair of fluid motors of unequal size, each having therein a movable abutment operatively connected to the movable abutment in the other fluid motor, said abutments being operative cojointly to effect a brake application to a degree in accordance with the sum of two differential fluid pressure forces acting in the same direction on the respective corresponding sides of said abutments,
   ii. a one-way flow valve carried by the movable abutment of the larger fluid motor to enable flow of fluid under

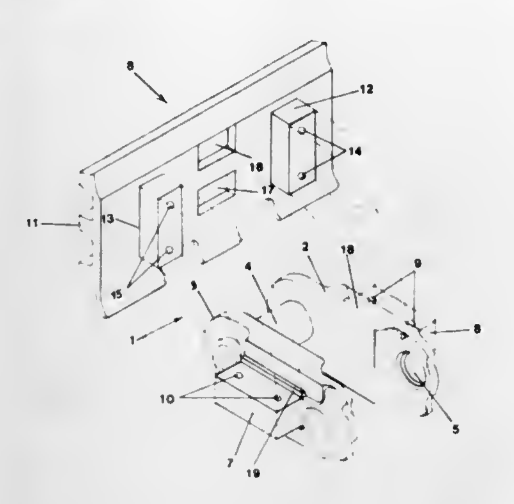
pressure from a first fluid pressure storage reservoir provided in said larger fluid motor at one side of the larger abutment to a second fluid pressure storage reservoir at the other side of said larger abutment, and
iii. biasing means acting on said one side of said larger abutment and effective to normally bias both of said abutments to a brake release position, and
c. a brake control valve device having valve means operable in response to charging said brake pipe to said certain chosen pressure to effect the supply of fluid under pressure from said brake pipe to said first and second storage reservoirs and to one side of the smaller abutment and the release of fluid under pressure from the other side thereof, said valve means being operable in response to a reduction of the pressure in said brake pipe from said chosen pressure to simultaneously cause the release of fluid under pressure from said one side of said smaller abutment, and the release of fluid under pressure from said first fluid pressure storage reservoir at said one side of said larger abutment to reduce the pressure therein to a degree corresponding to the degree of reduction of the pressure in said brake pipe whereby fluid under pressure acting on the respective other side of said pair of tandem-arranged abutments establish a fluid pressure braking force corresponding to the sum of the respective differential fluid pressure forces acting on said respective other sides of said pair of tandem-arranged abutments.

4,058,349
PRESSURE HOLDING VALVE
John M. Ury, Milwaukee, Wis., assignor to Wagner Electric Corporation, Parsippany, N.J.
Filed Sept. 29, 1976, Ser. No. 727,880
Int. Cl.² B60T *15/30*
U.S. Cl. 303—69 **6 Claims**



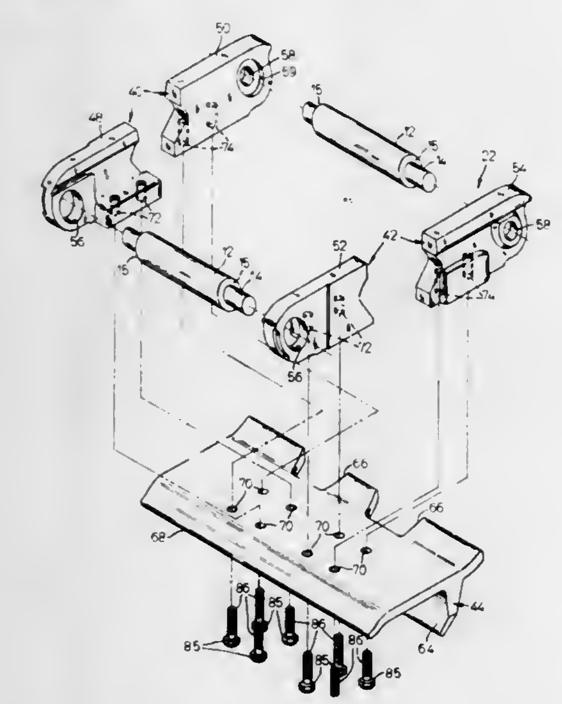
1. A pressure holding valve suitable to effect the application and removal of release air pressure to spring-actuated parking brakes comprising:
a. means for blocking the entry of air pressure into said pressure holding valve until a first predetermined input air pressure is attained;
b. an exhaust valve in said pressure holding valve for admitting atmospheric air pressure to said parking brakes;
c. means for closing said exhaust valve when said first predetermined air pressure is attained;
d. means for connecting said input air pressure to said parking brakes;
e. means for holding the air pressure in said parking brakes substantially equal to the highest input air pressure attained after said first predetermined air pressure is once exceeded and until the input air pressure decreases to a second predetermined level;
f. said second predetermined air pressure being lower than said first predetermined air pressure; and
g. means for fully opening said exhaust valve when said second predetermined air pressure is attained whereby the brake air pressure is fully exhausted.

4,058,350
TRACK FOR CRAWLER TYPE VEHICLES
Evangelista Russo, Contrada Patrizia, 88050 Sellia Marina (Catanzaro), Italy (88050)
Filed Mar. 19, 1976, Ser. No. 668,632
Int. Cl.² B62D *55/20*
U.S. Cl. 305—54 **4 Claims**



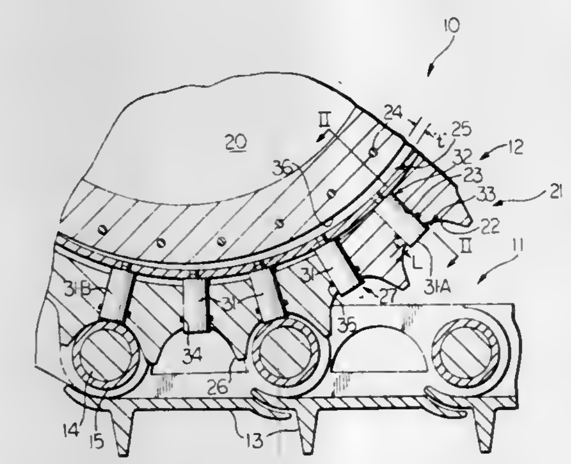
1. A track for crawler type vehicles comprising: track links having a longitudinal axis, each link being composed of bushings and a pair of link plates whose ends have a curved shape to permit each said link to rotate to both sides of the longitudinal axis of the links connected therewith; an external rim and an internal rim on each said link plate, each said external rim being higher than said internal rim; means on each said link plate to permit track shoes to be mounted on either of said rims of said link plates; and track shoes provided with attachments to fasten said track shoes to said link plates.

4,058,351
MASTER LINK ASSEMBLY HAVING TWO-PIECE LINKS
Bernard J. Murphy, Springfield, Ill., assignor to Fiat-Allis Construction Machinery, Inc., Deerfield, Ill.
Continuation of Ser. No. 537,950, Jan. 2, 1975, abandoned. This application June 3, 1976, Ser. No. 692,592
Int. Cl.² B62D *55/28*
U.S. Cl. 305—54 **7 Claims**



1. In a crawler track assembly: a plurality of track link assemblies arranged in a longitudinal direction, each track link assembly comprising at least one link and connecting means for articulately connecting adjacent track link assemblies, one of said track link assemblies being a master link assembly and comprising: at least one master link comprising a pair of overlapping half-links arranged in side-by-side relationship, each half-link being articulately connected by connecting means to an adjacent track link assembly, a master track shoe overlying and confronting an edge of each half-link in said pair of half-links, each half-link having a pair of longitudinally spaced apart capscrew holes extending inwardly from said edge and in registry with capscrew holes in said master track shoe, and capscrews for securing said master track shoe to said pair of half-links and connecting said pair of half-links in fixed relationship to each other and to said master track shoe, each capscrew being disposed in a capscrew hole in said master track shoe and a registering capscrew hole in a half-link, said capscrews and said master track shoe being the sole connecting means between each pair of overlapping half-links.

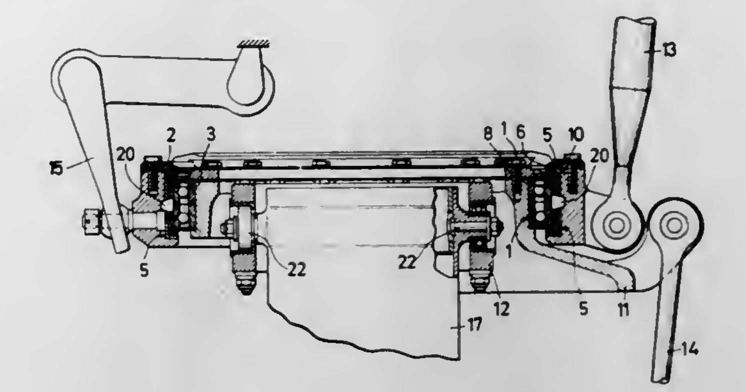
4,058,352
TRACK-TYPE VEHICLE WHEEL HAVING IMPACT RESISTANCE MEANS
John W. Sogge, Cedar Rapids, Iowa, assignor to Caterpillar Tractor Co., Peoria, Ill.
Filed Aug. 9, 1976, Ser. No. 712,562
Int. Cl.² B62D *55/16*
U.S. Cl. 305—57 **9 Claims**



1. A wheel of a track-type vehicle, comprising:
a hub;
a rim having an outer surface and a plurality of generally radially extending openings and being connected to the hub, said rim having an annular chamber, said openings of the rim opening into said chamber;
an annular spring of hoop configuration positioned in said chamber and being of a size sufficient for forcibly urging against the rim about its outer periphery; and
a plurality of plungers, each having a first end portion of a size sufficient for extending through an associated opening and outwardly from the outer surface of the rim and a second end portion in contact with said spring, said plunger being slidably movable into and from the chamber.

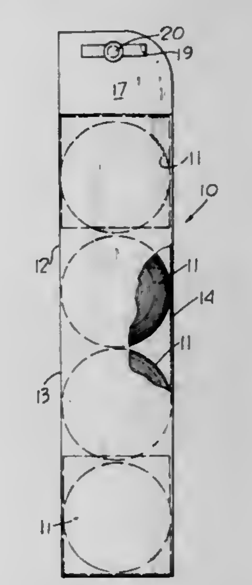
4,058,353
ROLLER BEARING ASSEMBLY WITH FAILSAFE MECHANISM
Hubert Frommlet, Munich; Karl-Heinz Mautz, Ottobrunn, and Klaus Brunsch, Weidach, all of Germany, assignors to Messerschmitt-Bolkow-Blohm Gesellschaft mit beschrankter Haftung, Munich, Germany
Filed Mar. 29, 1976, Ser. No. 671,151
Claims priority, application Germany, Apr. 9, 1975, 2515414
Int. Cl.² F16C *44/02*
U.S. Cl. 308—1 A **12 Claims**

1. In a roller bearing assembly including a first race, a second race and bearing rollers operatively interposed therebetween, the improvement comprising a sliding ring arranged about one of said races and a melting ring interposed between said sliding ring and said one race, said melting ring being composed of material having a melting point higher than the normal operating temperature of said bearing, the material of said melting ring being such that it will melt when the operating temperature of the bearing rises above a normal operating temperature, with at least partial melting of said melting ring operating to



enable relative sliding motion between said one race and said sliding ring.

4,058,354
STORAGE CONTAINER FOR ROLLS OF TOILET TISSUES
Tadeusz Powaska, 166 Adelaide Ave. East, Oshawa, Ontario, Canada
Filed July 17, 1975, Ser. No. 596,758
Int. Cl.² B65H *19/00;* **B65G** *1/16*
U.S. Cl. 312—45 **8 Claims**



1. A toilet tissue roll storage container, comprising a pair of elongated spaced parallel side walls, a rear wall connected between said side walls, a front wall connected between said side walls in opposed relation to said rear wall, and top and bottom end closures, at least one pivotable closure member forming a section of said front wall pivotable to provide access to the interior of the container, a pair of integrally formed extension flaps secured at their respective bases to the top of the container, each of said flaps being bendable between a plane parallel to the top wall of the container and an extended vertical position and having means thereon cooperable with mating means associated with an external surface for mounting of said container in a predetermined location.

4,058,355
TELEPRINTER CONSOLE
Horst Stahl, Weidach, and Franz Thorand, Munich, both of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany
Filed May 15, 1975, Ser. No. 577,939
Int. Cl.² A47B *85/00*
U.S. Cl. 312—241 **4 Claims**

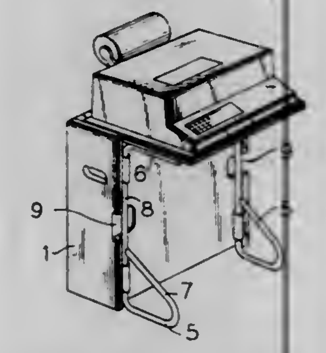
1. A portable console for storing and for setting up for use an apparatus, the console comprising:
a rectangular box having a one-piece first side;
a plate comprising a second side of said box adjacent said

first side and normal thereto in a storage configuration of the box;

hinge means connecting said plate swivelably about an edge of said first side of the box in the storage position for movement of said plate from a storage position to a selected use position through an angle of one of 90° and 270°;

the second side of said box having a length normal to an axis of said hinge means which is greater than a length of said first side of the box normal to said axis, whereby the second side extends beyond the first side in the use position;

a third side of said box parallel and opposite to said second side in the storage configuration thereof and affixed in a position normal to said first side of said box;

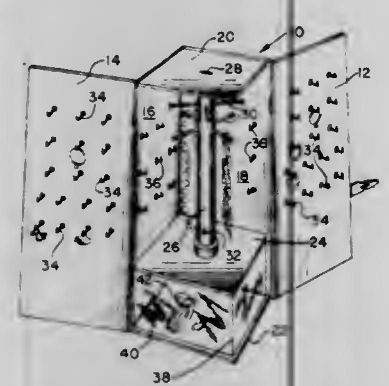


at least one bracket member swivelably mounted to an outer side of said third side of said box, said bracket comprising a tubular support portion extending in a plane of said first side for supporting said plate in a set-up position thereof and for use as a handle for moving the console in the storage configuration thereof, and a lower portion adapted to brace against a ground support surface;

at least one guide rail mounted on an inside surface of said box parallel to said first side, each said rail extending normally to said hinge means axis; and

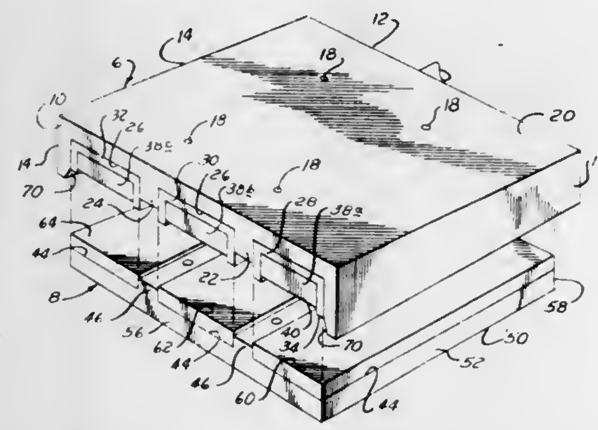
said hinge means being movable along said rail for carrying said edge of said plate into said box and adjacent said third side of said box.

4,058,356
JEWELRY BOX
Dorothy Hamilton Michal, 14544 Cleveland Ave., Posen, Ill. 60469
Filed May 6, 1976, Ser. No. 683,698
Int. Cl.² A47B *88/00, 57/00;* **B65G** *11/04*
U.S. Cl. 312—305 **1 Claim**



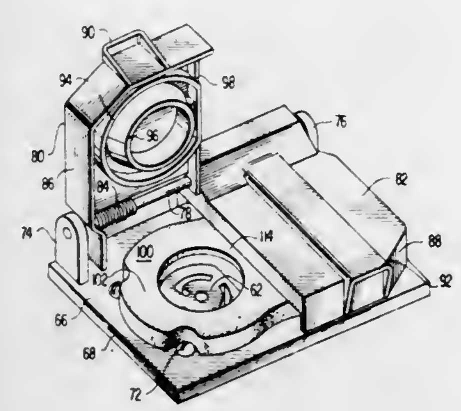
1. A jewelry box comprising a vertically, elongated, rectangular box having sides, top and bottom, two of said sides being fixedly disposed between said top and bottom, the remaining two sides being hingedly mounted to the said first two sides to provide easy access to the interior of said sides, means on the inside of all of said sides for hanging various types of jewelry thereon, a shelf fixed to two said fixed sides a short distance above the bottom thereof forming a compartment between the shelf and the bottom, a transparent removable container positioned in and being of the same substantial size as a single vertically disposed tube positioned between said shelf and said top, means mounting said tube for rotation, fingers extending radially from said tube to hold jewelry, said top being provided with a slot over said tube so that coins may be dropped through said slot into said tube, and a pin removably installed transversely through said tube to provide a stop for coins deposited in said tube.

4,058,357
MAGNETIC RADIO MOUNTING BRACKET
Dewey K. Wallace, 812 Wateka, Richardson, Tex. 75209
Continuation-in-part of Ser. No. 672,186, March 31, 1976. This application Sept. 23, 1976, Ser. No. 725,796
Int. Cl.² H01R *11/30*
U.S. Cl. 339—12 R **12 Claims**



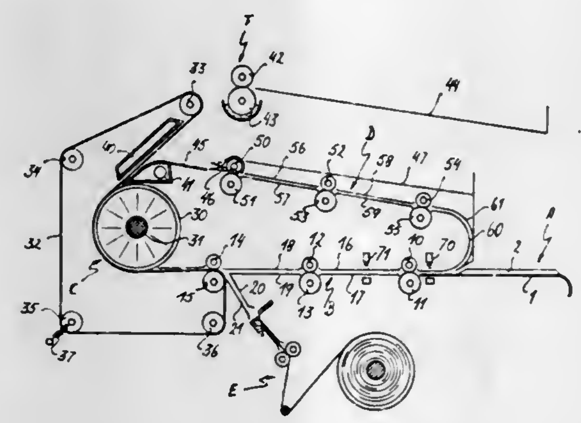
1. Means for detachably mounting an electronic device in a vehicle comprising: a first bracket attachable to a dash on the vehicle; a channel composed of a ferrous type metal; means to secure the channel to the first bracket; a bar magnet secured in the channel; a second bracket attachable to an electronic device; a ferrous metal plate; a means to secure the plate to the second bracket, the plate being adapted to engage the channel and the bar magnet on the first bracket; electrical connector means connected to the channels on said first bracket; electrical connector means connected to the ferrous metal plate; and guide means on the second bracket adapted to slideably engage a slot formed adjacent the channel on the first bracket.

4,058,358
WET LOCATIONS COVER ASSEMBLY
Roger P. Carlisle, Liverpool, N.Y., assignor to Crouse-Hinds Company, Syracuse, N.Y.
Filed Apr. 5, 1976, Ser. No. 673,326
Int. Cl.² H01R *13/52*
U.S. Cl. 339—44 M **4 Claims**



1. A one-piece gasket for use with an apertured cover plate for a single electrical outlet box comprising an annular rib having an external circumferential groove therein adapted to receive the edge of the cover plate defining an aperture, a first radially inwardly directed flange adapted to engage a receptacle in the outlet box, a radially outwardly extending flange adapted to underlie the cover plate to seal the cover plate to the outlet box and a second radially inwardly extending flange disposed parallel to and spaced from said first flange to engage a plug disposed in mating engagement with the receptacle and be engaged by a pivoted door on the cover plate in the absence of a plug to close the aperture in the cover plate.

4,058,359
APPARATUS FOR COPYING SHEET ORIGINALS
Godefridus H. Urselmann, Venlo, Netherlands, assignor to Oce-van der Grinten N.V., Venlo, Netherlands
Filed Jan. 28, 1974, Ser. No. 437,152
Claims priority, application Netherlands, Jan. 29, 1973, 7301199
Int. Cl.² G03B *27/12*
U.S. Cl. 355—109 **12 Claims**



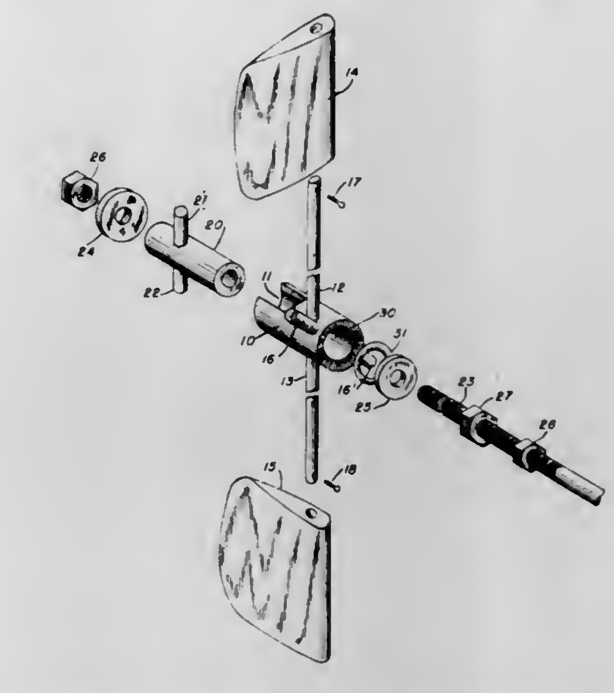
1. In an apparatus for producing any number of copies of a sheet-shaped original fed thereinto, including (a) means for exposing the original with a copy sheet fed thereto; (b) means, including at least one pair of sheet feeding rollers, defining a first path for movement of the original to said exposing means; (c) a feed section for directing the original into said first path; (d) means for guiding a copy sheet in a path leading into said first path, for movement of the copy sheet to said exposing means with the original; (e) means defining a second path for movement of the original from said exposing means back into said first path; and (f) switching means operative in one position thereof to guide the original from said exposing means out of the apparatus, and operative in a second position thereof to guide said original into said second path; said second path and said first path together constituting a path of return movement of the original between said switching means and said exposing means; the combination which further comprises:

1. means operable to engage an edge of the original in said path of return movement for orienting the original so that a side edge thereof lies parallel to or in the direction required for alignment of said side edge with a side edge of a copy sheet guided in said copy sheet path;
2. means for displacing transversely of said first path the pair of said at least one pair of rollers that engages the original as it is moved into said first path;
3. means for sensing a lateral deviation between the actual location of a side edge of an original in said first path and the position thereof required for registration thereof with said side edge of said copy sheet; and
4. control means responsive to said sensing means to activate said roller displacing means so as to correct said lateral deviation.

4,058,360
SELF-FEATHERING PROPELLER
Carl R. Hirschberger, Laurel Ave., Brielle, N.J. 08730
Filed May 27, 1976, Ser. No. 690,577
Int. Cl.² B63H *1/20*
U.S. Cl. 416—140 **7 Claims**

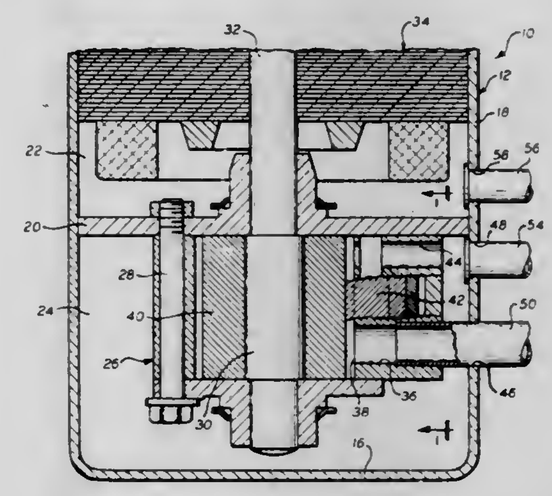
1. A self-feathering propeller comprising,

a. a tubular sleeve member having a pair of slots formed in one end thereof,
b. a pair of blades,
c. mounting means supporting the blades for free rotation about individual axes substantially normal to the axis of the sleeve member,
d. an elongated hub adapted for attachment to a shaft, said hub supporting the said sleeve member for rotation about its axis and carrying radially-extending pintles which



engage the side walls of said slots upon rotation of the hub relative to the sleeve member,
e. first stop means carried by the sleeve member and limiting rotation of the blades about their axes in one direction, and
f. second stop means carried by the hub and limiting rotation of the blades about their axes in the other direction.

4,058,361
REFRIGERANT COMPRESSOR HAVING INDIRECT OUTLET CONNECTION
Angelo C. Giurlando, Sommerville, and David Richardson, Flemington, both of N.J., assignors to Fedders Corporation, Edison, N.J.
Filed Feb. 24, 1975, Ser. No. 552,189
Int. Cl.² F04B *21/00*
U.S. Cl. 417—312 **2 Claims**



1. A compressor construction comprising a sealed housing having a motor compartment and a compressor compartment; a motor in said motor compartment; a rotary compressor in said compressor compartment connected in driving relationship with said motor for compressing refrigerant fluid, said compressor unit having an inlet port adapted to receive low pressure fluid therethrough and an outlet port for the passage of high pressure fluid therethrough; said housing having a housing inlet port; a conduit extending between said housing inlet port and said compressor inlet port to provide a passage for the low pressure fluid; a housing outlet port in said compressor compartment aligned with said compressor outlet and

in spaced relationship thereto whereby said compressor refrigerant fluid is discharged from said compressor unit outlet port into said compressor compartment; and a desuperheater coil connected between said housing outlet port in said compressor compartment and said motor compartment, said desuperheater coil comprising a conduit connected to said housing outlet port and terminating short of said compressor unit to eliminate any direct connection therebetween.

4,058,362
PROTECTION OF METALS OR METAL CONTAINING ARTICLES
Robert A. Sinclair, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.
Filed Dec. 12, 1974, Ser. No. 532,014
Claims priority, application United Kingdom, Jan. 3, 1974, 260/74
Int. Cl.² C23F *15/00;* C09K *15/04*
U.S. Cl. 21—2.5 R **13 Claims**

1. A method for the protection of metal items which are susceptible to corrosion by acid vapors which comprises confining said metal item within an enclosure which does not allow free flow of gas from the enclosure to the environment and further including within the enclosure a black sorbent thermoset foam material made by the pyrolysis of a composition liquid at the pyrolysis temperature said composition comprising at least one aromatic nitrogen containing compound having the formula:

$$X - Ar - Y$$

wherein Ar represents an aromatic nucleus, X represents a substituent having a negative Hammett sigma constant and attached to the aromatic nucleus by a nitrogen, oxygen, or sulfur atom which forms a part of said X substituent, and Y represents a substituent having a positive Hammett sigma constant and attached to the aromatic nucleus by a nitrogen atom which forms a part of said Y substituent, the substituents X and Y being either directly attached to the aromatic nucleus or directly attached to a ring fused to the aromatic nucleus, the sorbent thermoset form having a specific surface area of at least 50 m^2/g, and said pyrolysis comprising heating said composition to initiate reaction of the said composition.

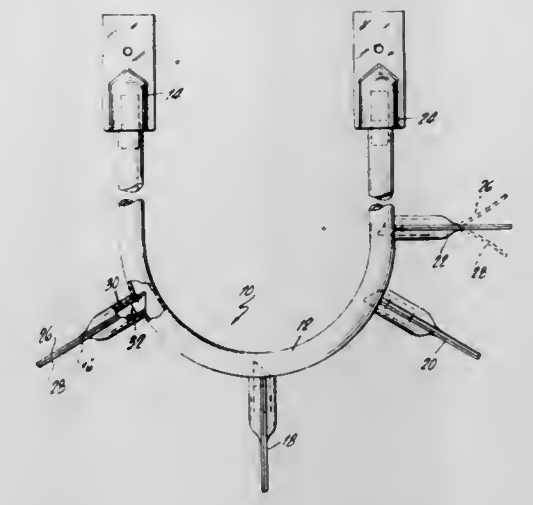
7. An enclosure for the protection of metal items which are susceptible to corrosion by acid vapors comprising a structure which confines gas sufficiently so as to not allow free flow of gas from the enclosure to the environment under stable conditions, said enclosure containing a black sorbent thermoset foam material made by the pyrolysis of a composition liquid at the pyrolysis temperature said composition comprising at least one aromatic nitrogen containing compound having the formula:

$$X - Ar - Y$$

wherein Ar represents an aromatic nucleus, X represents a substituent having a negative Hammett sigma constant and attached to the aromatic nucleus by a nitrogen, oxygen, or sulfur atom which forms a part of said X substituent, and Y represents a substituent having a positive Hammett sigma constant and attached to the aromatic nucleus by a nitrogen atom which forms a part of said Y substituent, the substituents X and Y being either directly attached to the aromatic nucleus, or directly attached to a ring fused to the aromatic nucleus, the sorbent thermoset foam having a specific surface area of at least 50 m^2/g, and said pyrolysis comprising heating said composition to initiate reaction of the said composition.

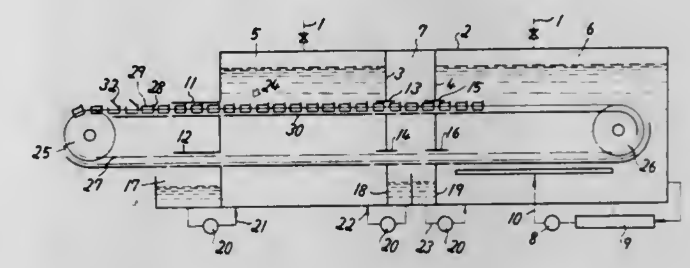
4,058,363
METHOD AND APPARATUS FOR STERILE HANDLING OF FLUIDS
Jerome A. Silbert, 444 E. 84th St., New York, N.Y. 10028
Division of Ser. No. 522,426, Nov. 11, 1974, Pat. No. 3,955,833, which is a continuation-in-part of Ser. No. 433,530, Jan. 15, 1974, abandoned. This application Feb. 25, 1976, Ser. No. 661,135
Int. Cl.² A61L *9/00*
U.S. Cl. 21—58 **33 Claims**

22. A method for the sterile handling of a sterile fluid in a container by an apparatus of the type having a sterile manifold normally sealed from the external environment comprising the steps of joining said container to one end of a sterile hollow connector having a sterile closure at the other end, inserting the closure end inside said manifold, forming a seal sterile from the external environment between said manifold and said closure end, introducing a sterilizing solution into said manifold, moving said sterilizing solution through said manifold to sterilize the interior of the manifold and the portion of said closure



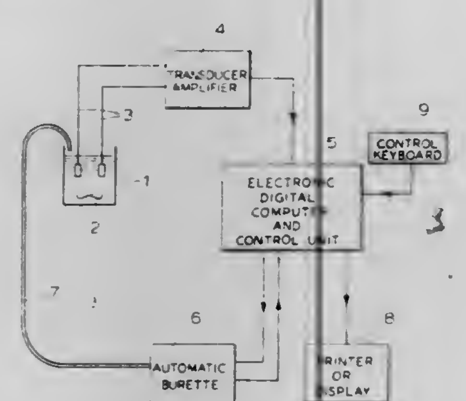
end exposed to the interior of said manifold, removing the sterilizing solution therefrom, breaking the closure and then moving the fluid into said manifold.

4,058,364
HIGH-PRESSURE THERMAL STERILIZER HAVING LIQUID RECIRCULATING MEANS
Masahiro Terumoto, Amagasaki, Japan, assignor to Q. P Corporation, Tokyo, Japan
Filed Nov. 11, 1975, Ser. No. 631,136
Claims priority, application Japan, Nov. 22, 1974, 49-134826; Oct. 7, 1975, 50-121636
Int. Cl.² A23L *3/04;* A61L *3/00*
U.S. Cl. 21—80 **7 Claims**



1. In a high-pressure sterilizer which has a high-pressure tank having an inlet and an outlet for objects to be sterilized and having formed therein a heating chamber which is to contain a heated liquid at a given level therein and a cooling chamber which is to contain a cooling liquid at a given level therein, and transfer means for transferring the objects to be sterilized from the inlet to the outlet of the tank through the heating chamber and cooling chamber thereby continuously to sterilize these objects by heating, the improvement comprising a space chamber between and separating said heating chamber from said cooling chamber, said space chamber being defined by a pair of spaced apart partition walls between said heating chamber and said cooling chamber, each of said partition walls having a pair of respective passage holes therein positioned below said given levels; and wherein said transfer means comprises an endless conveyor having upper and lower travelling portions passing linearly through said heating chamber, said cooling chamber and said space chamber, said upper and lower travelling portions being disposed in alignment with said passage holes formed in said pair of partition walls in opposed relation below the liquid levels in said heating and cooling chambers; at least two reservoir tanks provided within the space chamber to receive and segregate respectively heating liquid and cooling liquid as effluent liquids overflowing through said passage holes; and circulating means for recirculating the effluent liquids from said respective reservoir tanks back into said heating chamber and said cooling chamber, respectively.

4,058,365
PROCESS FOR AUTOMATIC TITRATION
Søren-Christian Krogh, Ganlose, Denmark, assignor to Radiometer A/S, Copenhagen, Denmark
Filed Apr. 20, 1976, Ser. No. 678,625
Claims priority, application Denmark, Apr. 24, 1975, 1802/75
Int. Cl.² G01N *31/16*
U.S. Cl. 23—230 R **12 Claims**



1. A process for controllably obtaining titration in a chemical system by automatic control of successively provided titrant dosages to said chemical system after provision of at least one initial preselected size of titrant dosage, said process comprising the steps of

successively sensing a total of said titrant provided as a result of each of said successively provided dosages up to the time of the most recent provided dosage and successively providing a titrant dosage signal change ΔV to a process controller each time in response to the most recent provided dosage at said time,

successively detecting a change in chemical condition of said chemical system in response to each of said provided dosages and providing a transducer signal change ΔS to said process controller in response to each said detected change in condition, and

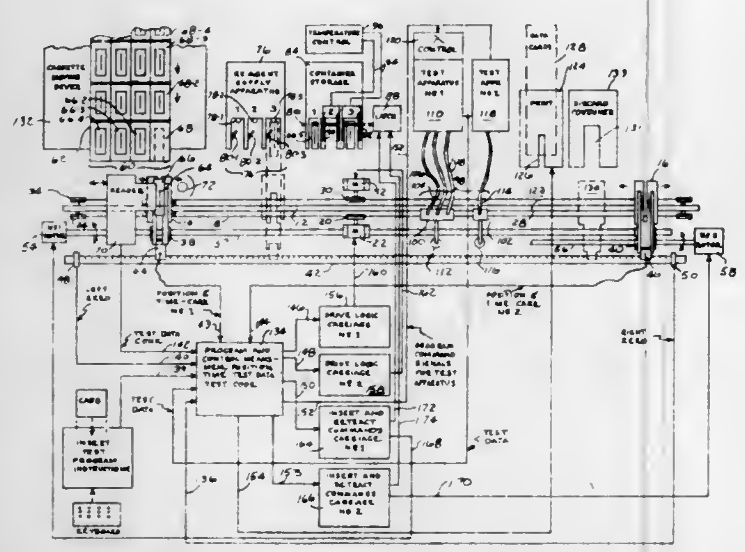
successively controllably varying the size of each of said successively provided dosages by said process controller each time in response to at least the most recent of said provided transducer signal changes ΔS and said provided titrant dosage signal change ΔV which corresponds to said provided transducer signal change ΔS at said time for successively reducing each of said titrant dosage sizes as the relationship ΔS/ΔV increases and for increasing each of said titrant dosage sizes as said relationship ΔS/ΔV decreases, whereby the titrant dosage size each time is a function of at least the most recent relationship ΔS/ΔV at said time.

4,058,366
DETERMINATION OF FLOW CHARACTERISTICS OF PETROLIFEROUS FORMATIONS
Dale K. Cabbiness, Ponca City, Okla., assignor to Continental Oil Company, Ponca City, Okla.
Continuation-in-part of Ser. No. 643,286, Feb. 6, 1976, abandoned. This application Dec. 3, 1976, Ser. No. 747,451
Int. Cl.² G01N *33/24*
U.S. Cl. 23—230 EP **7 Claims**

1. A method for determining the flow characteristics of subterranean petroliferous formations by simultaneously injecting a tracer and a polysaccharide polymer having glucose moieties into said formations, recovering said tracer and polysaccharide from production well effluent at timed intervals and determining flow characteristics by the rate differential observed between recovered tracer and polysaccharedi polymer, wherein the concentration of polysaccharide polymer is observed by;

a. hydrolyzing the polymer to liberate glucose,
b. reacting the liberated glucose with orthotoluidine, and
c. determining the polymer concentration using colorimetric determination.

4,058,367
AUTOMATIC ASYNCHRONOUS FLUID PROCESSING APPARATUS
Saul R. Gilford, Oberlin, Ohio, assignor to Gilford Instrument Laboratories Inc., Oberlin, Ohio
Continuation-in-part of Ser. No. 578,872, May 19, 1976, abandoned, which is a continuation-in-part of Ser. No. 428,803, Dec. 27, 1973, abandoned. This application Aug. 19, 1976, Ser. No. 715,661
Int. Cl.² G01N *1/14, 33/16*
U.S. Cl. 23—253 R **63 Claims**



1. Automated apparatus for processing fluids such as blood and the like for obtaining information relating to the physical and/or chemical properties thereof and providing a readout representative of such information, the apparatus being capable of performing different processes on different fluids not necessarily having the same processing time which comprises:

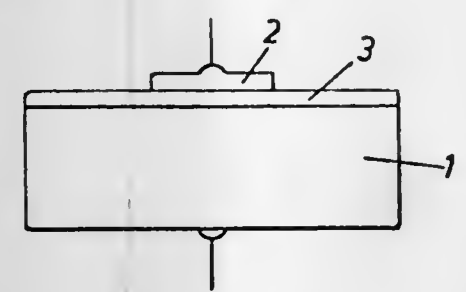
A. means defining a single processing path for said apparatus; means for supporting a plurality of containers each adapted to carry therein a sample of fluid to be processed along said path, any one process perhaps requiring a different processing procedure, each of the containers having respective indicia means identifying the sample adapted to be carried thereby and its processing procedure, the containers being arranged in said supporting means in a random order;

B. transport means for removing a first container from the supporting means, reading its indicia means and moving the same along said processing path in a first preselected pattern according to the processing procedure identified on the indicia means for said first container;

C. at least one processing means stationed along said processing path to define said preselected first pattern, the transport means and processing means having cooperating structure enabling the transport means to stop said first container in said path and at the processing means in said preselected first pattern and to subject the container to the effects of said processing means, the cooperating structure including means to permit the said container to be removed from said transport means and to be translated into operative association with at least said one processing means in said first pattern and returned to said transport means; and

D. control and programming means connected with said apparatus and effective to operate the transport means along said path operable to take a second container and to locate the same in at least a second processing means in said path defining a part of a second preselected pattern according to the processing procedure identified on the indicia means on said second container, the movement of said second container to said second processing means occurring during the period when said one container in said first pattern is at said one processing means being thus effective to utilize the time during said one container is at said one processing means for commencing, completing or continuing the processing of said second container according to the time available therefor, said control and programming means including a memory having the processing procedure data stored therein and acting to monitor the procedures being performed upon consecutively processed containers and the sample adapted to be contained therein in a manner which permits the transport means to move a plurality of containers through at least partially a plurality of preselected patterns during the same period of time and on a time sharing basis between said plurality of preselected patterns and which thus utilizes the minimum processing time possible for each said sample without regard to the processing time of other said samples.

4,058,368
HYDROGEN DETECTOR
Christer Martinus Svensson, Goteborg; Leif Sigurd Lundkvist, Angered; Kurt Ingemar Lundstrom, and Madurai Somanathan Shivaraman, both of Goteborg, all of Sweden, assignors to Semiconductor Sensors, Inc., Cupertino, Calif.
Filed Sept. 9, 1975, Ser. No. 611,404
Claims priority, application Sweden, Sept. 9, 1974, 7411342
Int. Cl.² G01N *27/12, 31/06*
U.S. Cl. 23—254 E **6 Claims**

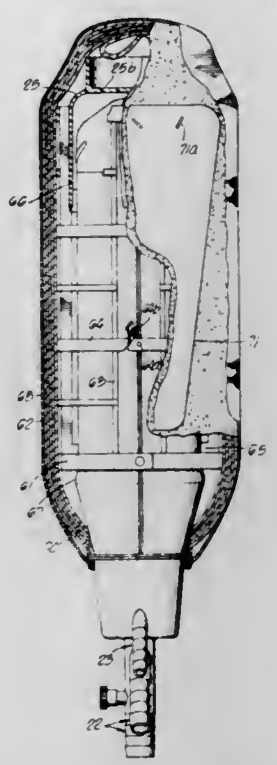


1. An improved device for detection of hydrogen in the form of hydrogen gas, atomic hydrogen or certain gaseous hydrogen compounds, including ammonia, the improvement comprising a semiconductor, a metal electrode and an insulating layer positioned intermediate said semiconductor and said electrode, said metal electrode made from palladium, nickel, platinum or an alloy containing at least 20% palladium by atomic weight.

4,058,369
OXYGENATOR
Donald J. Bentley, Newport Beach, and Donald A. Raible, Orange, both of Calif., assignors to Bentley Laboratories, Inc., Irvine, Calif.
Continuation-in-part of Ser. No. 436,913, Jan. 28, 1974, abandoned. This application Apr. 4, 1975, Ser. No. 565,043
Int. Cl.² A61M *1/03*
U.S. Cl. 23—258.5 B **7 Claims**

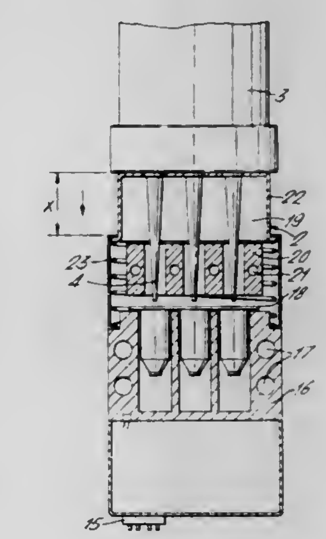
1. A blood oxygenating device having a bubbler assembly for forming films of blood in bubble form by directing oxygen into a stream of venous blood and causing the transfer of oxygen to the films of blood and the release of carbon dioxide from the films of blood, said bubbler assembly including a defoaming means for defoaming bubbled blood wrapped around said bubbler assembly such that all blood and gases flowing out of said bubbler assembly pass through said defoaming means wherein the improvement comprises:

a lattice positioned between said defoaming means and said bubbler assembly for supporting said defoaming means a predetermined distance from and out of contact with the outside wall of said bubbling assembly and affording a passageway for blood bubbles between the outside wall of said bubbler assembly and said defoaming means, said lattice comprising a plurality of spaced-apart ribs disposed along the length of said assembly



and a plurality of spaced-apart bands disposed around and connected to said ribs.

4,058,370
APPARATUS FOR ACCURATE PIPETTING OF SMALL LIQUID VOLUMES
Osmo Antero Suovaniemi, Armas Lindgrenintie 15 A, 00570 Helsinki 57, Finland
Filed Jan. 27, 1975, Ser. No. 544,132
Claims priority, application Finland, July 5, 1974, 742083
Int. Cl.² B01L *3/02, 9/00, 11/00;* C01N *31/00*
U.S. Cl. 23—259 **6 Claims**



1. Apparatus for pipetting liquid volumes including a frame having wall means which form an enclosure, a plurality of removable block members located in said enclosure, each said block member having means therein to hold a plurality of liquid containing means, a plurality of liquid containing means located respectively in at least some of said holding means, a plurality of cover means covering said plurality of removable block members, means for thermoregulating said enclosure to maintain the same and said block members contained therein at substantially the same temperature, a pipette having a plurality of liquid containers, a plurality of opening means in each said cover means, said plurality of opening means receiving said plurality of liquid containers of said pipette and locating said plurality of liquid containers in said enclosure above one of the plurality of liquid containing means, means movably mounting each of said cover means whereby said cover means may be

moved toward and away from said removable block members, movement of one of said cover means toward a removable block member with said plurality of liquid containers received in said plurality of opening means in said cover means causing said plurality of liquid containers to move into the plurality of liquid containing means to remove liquid which may be transferred to another of said plurality of liquid containing means by inserting said plurality of liquid containers through said plurality of opening means in another said cover means.

4,058,371

POLYMER COMBINATIONS USEFUL IN DISTILLATE HYDROCARBON OILS TO IMPROVE COLD FLOW PROPERTIES

Stephan Ilnyckyj, Maplewood, N.J., assignor to Exxon Research & Engineering Co., Linden, N.J.

Filed May 25, 1976, Ser. No. 689,740

Int. Cl.[2] C10L *1/18*

U.S. Cl. 44—62 **6 Claims**

1. A wax-containing distillate petroleum fuel oil boiling in the range of 120° to 500° C. and having a final boiling point above about 370° C., which has been improved in its low temperature flow properties, containing in the range of about 0.001 to 0.5 wt. %, based on the weight of the total composition, of a synergistic flow improving combination of:

a. aliphatic copolymer functioning as a nucleator for wax crystallization in said distillate, wherein said nucleator is a copolymer of ethylene and a vinyl ester of a C_1 to C_8 saturated aliphatic monocarboxylic acid, said copolymer having a (Mn) of from about 500 to 50,000 and in the range of 3 to 40 molar proportions of ethylene per molar proportion of said vinyl ester, and

b. an aromatic oil soluble copolymer comprising principally C_8 and C_{20} monovinyl aromatic monomer and ester of an ethylenically unsaturated acid selected from the group consisting of maleic anhydride, acrylic acid and methacrylic acid, esterified with a saturated, essentially straight chain alcohol having in the range of 6 to 22 carbon atoms, said aromatic copolymer having a number average molecular weight (Mn) in the range of about 500 to about 50,000, and the weight ratio of (a) to (b) is in the range of 1/20 to 5/1.

4,058,372

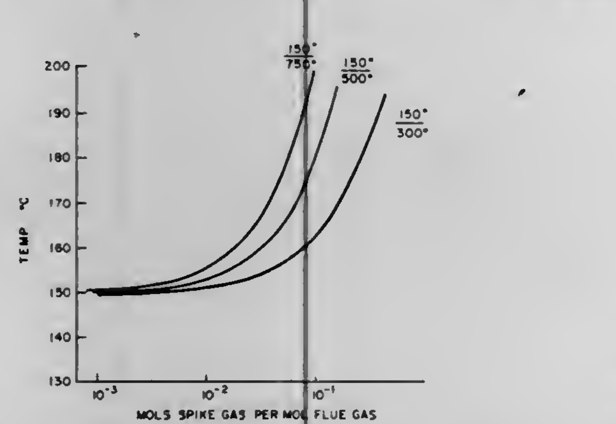
FLUE GAS CONDITIONING WITH SPIKING GAS CONTAINING SULFUR TRIOXIDE

George B. DeLaMater, Media, Pa., assignor to Air Products and Chemicals, Inc., Allentown, Pa.

Filed June 22, 1976, Ser. No. 698,690

Int. Cl.[2] B03C *1/00*

U.S. Cl. 55—5 **5 Claims**



1. In a process for removing fly ash from flue gas at a temperature of from about 140° C to about 160° C by

a. treating the flue gas with a spiking gas containing sulfur trioxide in a sufficient amount for conditioning the flue gas in a mixing zone, and then

b. precipitating the fly ash from the flue gas by electrostatic means, the improvement which comprises:

1. forming a spiking gas containing from about 0.15 to 1.2 mol percent sulfur trioxide, and

2. maintaining the spiking gas at a temperature sufficiently high between a temperature of from about 300° to about 750° C such that on treating the flue gas with the spiking gas, the temperature of any mixture of spiking gas and flue gas from the point of introduction to the point of dilution as determined by the equation

$$T = \frac{NT^sC_p^s + T^fC_p^f}{NC_p^s + C_p^f}$$

wherein: T = Temperature of mixture of spiking gas and flue gas in degrees centigrade,

N = Mols of spiking gas per mol of flue gas

T^s = Temperature of the spiking gas in degrees Centigrade,

T^f = Temperature of the flue gas in degrees Centigrade,

C_p^s = Heat capacity of the spiking gas in Cal/mol/° C,

C_p^f = Heat capacity of the flue gas in Cal/mol/° C,

is not more than 10° C below the dew point temperature of the gas mixture as determined by the equation

$$1\ T_{DP} = 0.002276 - 0.00002943 \ln p_{H_2O} - 0.0000858 \ln p_{H_2SO_4} + 0.00000620(\ln p_{H_2SO_4})(\ln p_{H_2O})$$

wherein: $T_{DP = \text{Dew Point } ^\circ K \text{ and, } pH_2O}$ and $p_{H_2SO_4}$ are partial pressures in mm Hg.

4,058,373

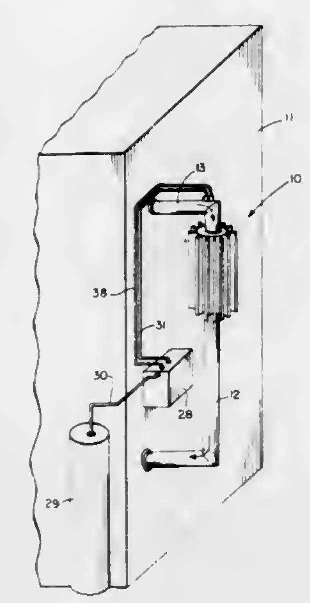
COMBUSTIBLE GAS-IN-OIL DETECTOR

Robert A. Kurz, West Middlesex, and Donald K. Whirlow, Murrysville, both of Pa., assignors to Electric Power Research Institute, Palo Alto, Calif.

Filed Feb. 18, 1977, Ser. No. 770,196

Int. Cl.[2] B01D *59/10*

U.S. Cl. 55—16 **15 Claims**



1. In a system for extracting and analyzing gas carried in a body of liquid, the combination of conduit means for directing a portion of the liquid in a path leading externally from the body and returning thereto, means for cooling the liquid in a portion of the conduit means which is external of the body for creating a temperature gradient along said path for causing the liquid to move through the conduit means by thermosiphonic action, means forming a hollow chamber within a portion of the conduit means with the chamber having semi-permeable outer wall means for passing gas from the liquid into the chamber, and means for moving gas from the chamber for subsequent analysis.

4,058,374

METHOD OF REGENERATING PARTICULATE ADSORPTION AGENTS

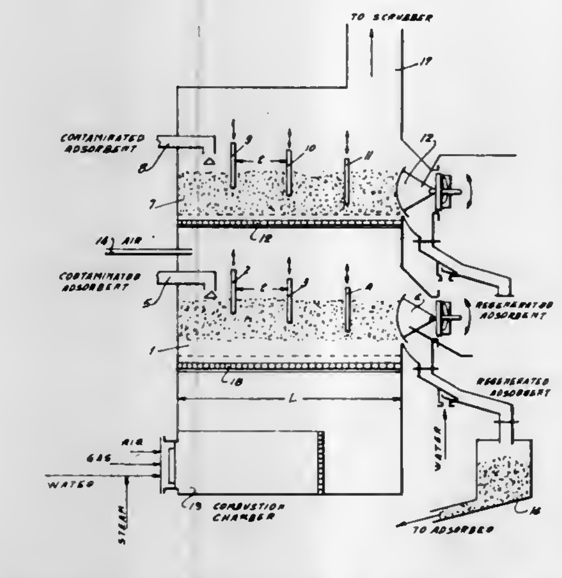
Harald Jüntgen, Essen-Heisingen; Jürgen Klein, Essen, and Günther Gappa, Gelsenkirchen-Buer, all of Germany, assignors to Bergwerksverband GmbH, Essen, Germany

Continuation-in-part of Ser. No. 657,406, Feb. 12, 1976, Pat. No. 4,017,422. This application June 10, 1976, Ser. No. 694,521

Claims priority, application Germany, June 14, 1975, 2526714

Int. Cl.[2] B01D *53/08, 53/12*

U.S. Cl. 55—60 **5 Claims**



1. A method of regenerating at least two contaminated particulate adsorption agents of different properties, comprising the steps of admitting a first quantity of one of the different adsorption agents into a first regeneration zone, and a second quantity of the other of the different adsorption agents into a separate second regeneration zone arranged in a common regeneration chamber with the first regeneration zone; passing hot regenerating gases through the first and second quantities of the one and other adsorption agent present in the first and second separate regeneration zones, respectively, to fluidize and regenerate the different contaminated adsorption agents; removing the regenerated first and second quantities from the respective regeneration zones; and discharging the gases from the regeneration chamber upon passage thereof through the first and second quantities of the different adsorption agents.

4,058,375

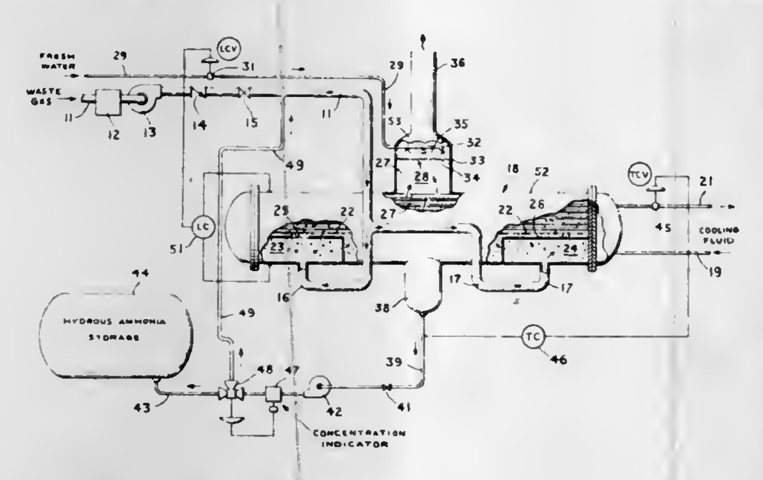
AMMONIA RECOVERY BY SCRUBBING AND CONDENSING

Jackson Lawrence, Troy, N.Y., assignor to Cluett, Peabody & Co., Inc., New York, N.Y.

Continuation-in-part of Ser. No. 542,386, Jan. 20, 1975, abandoned, which is a continuation of Ser. No. 393,605, Aug. 31, 1973, abandoned. This application Nov. 25, 1975, Ser. No. 635,056

Int. Cl.[2] B01D *47/02, 47/06*

U.S. Cl. 55—70 **4 Claims**



1. A method for removing ammonia from a waste gas mixture from a textile treatment chamber and containing ammonia, air and water vapor or steam, and having a first treatment zone containing a body of water and a second treatment zone in flow communication with said first treatment zone; characterized in comprising the steps of

a. maintaining said first treatment zone and said body of water at a predetermined temperature;

b. bringing said waste gas mixture to a pressure of about 30 inches of water and bubbling said mixture upwardly through said first treatment zone and said body of water to dissolve a first quantity of ammonia from said mixture into said body of water;

c. flowing said waste gas mixture to said second treatment zone;

d. exposing said waste gas mixture to a countercurrent flow of water droplets in said second treatment zone to dissolve a second quantity of ammonia from said mixture, said water droplets with said second quantity of ammonia flowing to said body of water;

e. removing said waste gas mixture from said second treatment zone;

f. continuously removing a portion of said body of water containing said first and second dissolved quantities of ammonia as product;

g. measuring the percentage of ammonia content in said product; and

h. recycling said product back to said first and second treatment zones until said product from said measuring step reaches a predetermined ammonia content.

4,058,376

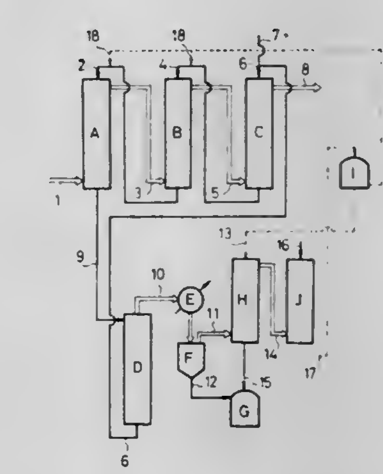
GAS ABSORBTION PROCESS

Waichiro Idzutsu, Yokohama; Masaaki Kuroki; Shigeru Komukai, both of Kawasaki; Daijiro Terasaki, Tokyo, and Sachie Nakajima, Kawasaki, all of Japan, assignors to Tokyo Gas Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 651,152, Jan. 21, 1976, abandoned. This application Dec. 16, 1976, Ser. No. 751,092

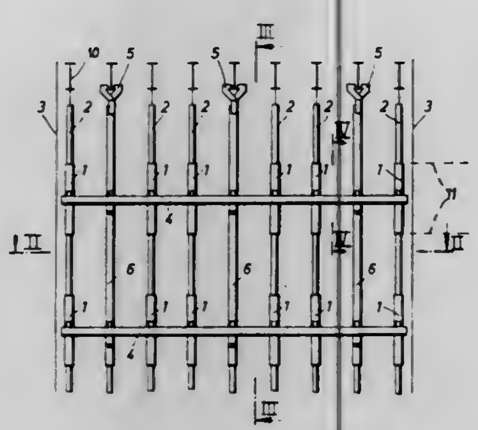
Int. Cl.[2] B01D *19/00*

U.S. Cl. 55—70 **6 Claims**



1. A gas purification process comprising contacting a gas to be purified containing hydrogen cyanide, ammonia and hydrogen sulfide with an aqueous ammonia absorbing solution to absorb hydrogen cyanide from the gas, said process being characterized in that (1) gaseous ammonia is present in the gas prior to the contact with the absorbing solution, (2) the amount of gaseous ammonia present in the gas is at least 1 mole per mole of the sum of hydrogen cyanide and hydrogen sulfide in the gas, (3) the gas is contacted with the absorbing solution in a counter-current manner, and (4) the ammonia concentration in the absorbing solution is not higher than 7 g/l.

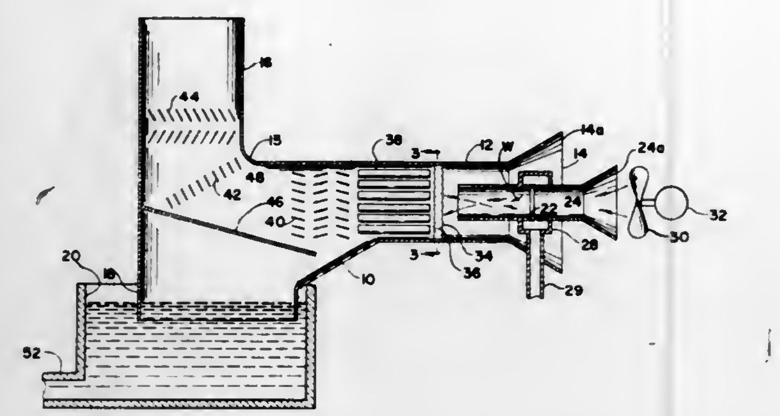
4,058,377
DUST COLLECTING ELECTROSTATIC PRECIPITATOR
Heinz Schminke, Egelsbach; Kurt Rau, Frankfurt am Main, and Willi Bätza, Offenbach, all of Germany, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Germany
Filed Aug. 3, 1976, Ser. No. 711,314
Claims priority, application Germany, Aug. 12, 1975, 2535830
Int. Cl.² B03C *3/04*
U.S. Cl. 55—148 **2 Claims**



1. A collecting-electrode assembly for an electrostatic precipitator comprising;
a support structure;
a multiplicity of mutually parallel transversely spaced vertical collecting electrodes each comprising a plurality of vertically extending sheet-metal strips loosely engaging at lateral edges an adjoining strip, the outermost strips of each collecting electrode having vertical outer edges at the sides of said assembly;
means for suspending each of said strips from said support structure;
at least one horizontal row of short sectional members each respectively engaging the outer edges of some of said collecting electrodes along one side of said assembly, said sectional members extending vertically and being of a length which is a minor fraction of the length of the outer edge engaged thereby;
a horizontally extending rigid bar fixed rigidly to all of said member of said row;
long sectional members embracing the outer edges of others of said collecting electrodes along said one side of said assembly, said long sectional members extending over a length substantially greater than the length of said short sectional members;
means for suspending said long sectional members from said support structure; and
means for suspension of said bar from said long sectional members, said sectional members fitting around the outer edges of the respective collecting electrodes.

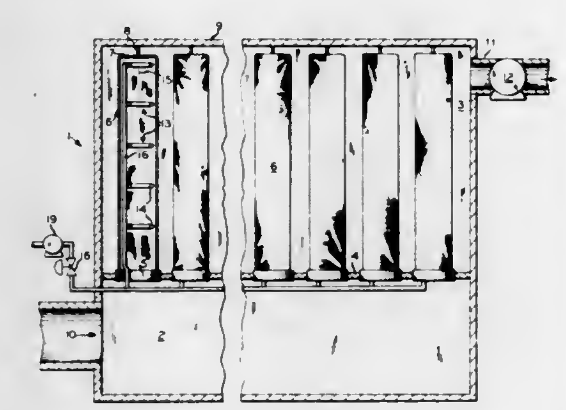
4,058,378
HEAT TRANSFER DEVICE
Forest J. Saxton, 1256 Mitzi Drive, Calistoga, Calif. 94515
Filed Apr. 1, 1976, Ser. No. 672,542
Int. Cl.² B01D *47/00*
U.S. Cl. 55—257 R **7 Claims**

1. A liquid cooling heat transfer system comprising:
a large, generally horizontal air duct positioned near ground level and open to ambient air at the upstream end thereof:
a venturi tube positioned in said air duct along the axis thereof near said upstream end:
annular nozzle means through said venturi tube conditioned to jet liquid downstream thereof in a converging conical path;
an annular duct sealed around said venturi tube in communication with said annular nozzle means;
a liquid conduit connecting a source of warm liquid to said annular duct;
a multiplicity of limited capacity separator ducts arranged across said air duct and extending along a portion of the length thereof downstream of said venturi tube to cause liquid particles moving downstream through said air duct to flow along separated paths; and



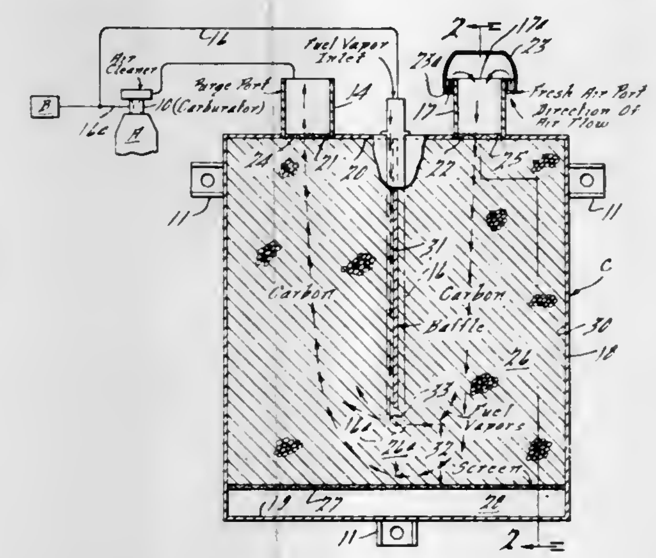
means at the downstream end of said air duct for separating and collecting liquid from an air stream flowing therethrough.

4,058,379
FILTERING APPARATUS
Paul J. Cheng, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.
Filed May 27, 1975, Ser. No. 581,340
Int. Cl.² B01D *46/04*
U.S. Cl. 55—302 **7 Claims**



1. A filter system for filtering a solids-containing gas stream, comprising
a. a filter housing,
b. wall means so disposed within said filter housing as to form a gas inlet portion and a clean gas outlet portion, said wall means having at least one opening therein between said gas inlet portion and said clean gas outlet portion, with said opening being adapted to receive the open first end of an elongated cylindrical filter bag;
c. first conduit means to introduce said solids-containing gas into said gas inlet portion;
d. second conduit means to remove a solids-free gas from said clean gas outlet portion;
e. said elongated cylindrical filter bag disposed in said clean gas outlet portion in association with said opening in said wall means, said elongated cylindrical filter bag having said open first end in a fluid-tight relationship with said opening and a closed second end;
f. third conduit means disposed within said elongated cylindrical filter bag and having the axis thereof parallel to the axis of said elongated cylindrical filter bag;
g. a plurality of ring-shaped pipe means in fluid communication with said third conduit means, each of said ring-shaped pipe means having at least one opening therein and being so adapted as to direct a flow of cleaning gas so as to sweep along the inner surface of said elongated cylindrical filter bag, and wherein the external ring diameter of said ring-shaped pipe means is essentially the same as the internal diameter of said elongated cylindrical filter bag so that said ring-shaped pipe means, in addition to providing a means for directing said flow of cleaning gas along the inner surface of said elongated cylindrical filter bag, also supports said elongated cylindrical filter bag;
h. fourth conduit means in communication with said third conduit means and a source of said cleaning gas; and
i. valve means in said fourth conduit means to regulate flow of said cleaning gas from said source of said cleaning gas through said third and fourth conduits and each of said plurality of ring-shaped pipes.

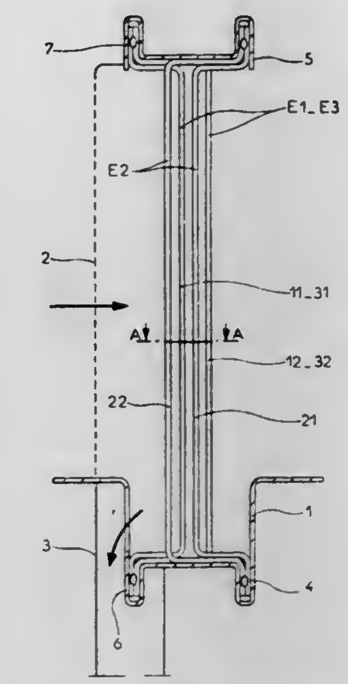
4,058,380
CARBON CELL
Lamar L. King, II, Garden City, Mich., assignor to Ford Motor Company, Dearborn, Mich.
Filed Mar. 2, 1973, Ser. No. 337,517
Int. Cl.² B01D *53/04*
U.S. Cl. 55—387 **1 Claim**



1. A hydrocarbon vapor adsorption-desorption device comprising:
a. a cell having an interior chamber with opposite end walls, one of said end walls having a plurality of ports with at least one port for receiving ambient air and another port for purging vapors,
b. a bed of vapor adsorbing material in said chamber interposed between said end walls,
c. at least one baffle extending from said one end wall toward said opposite end wall in a manner to substantially separate without completeness said bed into longitudinally divided portions with said ports on opposite sides thereof, and
d. at least one port for introducing fuel vapors to said bed immediately beneath said baffle whereby said vapors migrate generally equally into both said bed portions for collection and for subsequent purging.

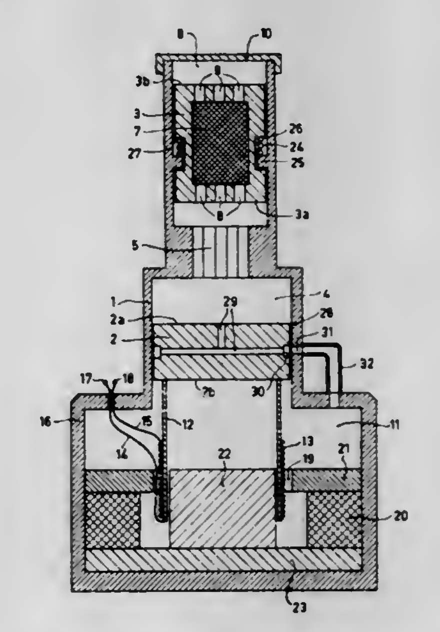
4,058,381
STEAM DRYERS
René Traiteur, Ris-Orangis, France, assignor to Babcock & Wilcox Limited, London, England
Filed Oct. 12, 1976, Ser. No. 731,200
Claims priority, application France, Jan. 20, 1976, 76.01325
Int. Cl.² B01D *45/00, 46/10*
U.S. Cl. 55—444 **2 Claims**

1. A steam drying device for removing water droplets from a stream of the steam comprising a frame having a frontal face transverse to the stream, at least two pair of recessed slipways formed therein transverse to said stream, said slipway recesses being spaced from each other, a perforated sheet of metal fixed to said frame to protect the steam drying device from foreign body damage, a first array of longitudinally disposed bars within said frame spaced transversey from each other and downstream from said perforated sheet of metal each of said bars having two ends, each of said ends being fixed to each other within a respective slipway recess, and a second array of longitudinally disposed bars within said frame spaced transversely from each other and from said first array bars and



downstream from said perforated sheet of metal, each of said second array bars having two ends, each of said ends being fixed to each other within a respective slipway recess to enable said bars to remove water droplets from the steam.

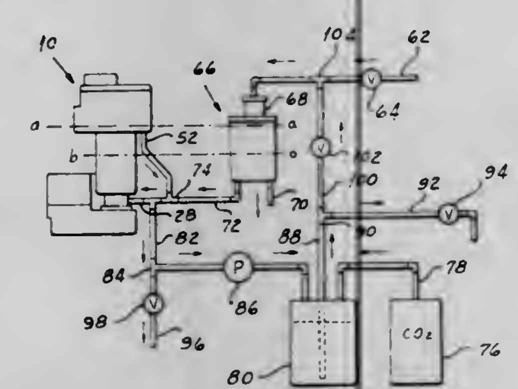
4,058,382
HOT-GAS RECIPROCATING MACHINE WITH SELF-CENTERED FREE PISTON
Jan Mulder, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.
Filed Nov. 24, 1976, Ser. No. 744,521
Claims priority, application Netherlands, Dec. 5, 1975, 7514182
Int. Cl.² F25B *9/00*
U.S. Cl. 62—6 **5 Claims**



1. In a hot-gas reciprocating machine, comprising at least one working space in which a working medium completes a thermodynamic cycle, the working space comprising a compression space and an expansion space of mutually different mean temperature during operation, said spaces being interconnected via heat exchangers, including a regenerator; and at least one free piston which is reciprocatable in a cylinder, one face of the piston varying the volume of the working space, its other face forming part of the boundary of a buffer space in which working medium is also present under a pressure which is at least substantially constant during operation and which corresponds to the mean working medium pressure in the

working space, the improvement comprising a control mechanism responsive to deviation of the mean piston position from a desired nominal central position, for instantaneously bringing the working space in communication with the buffer space at instants corresponding to such an instantaneous pressure of the working medium participating in the cycle that the nominal central position is restored by supplying or extracting working medium to or from the working space as a result of the instantaneous pressure difference between the two spaces.

4,058,383
METHOD OF AND APPARATUS FOR CLEANING THE ICEMAKER OF A CARBONATED BEVERAGE DISPENSING MACHINE
LeRoy Peterson, Hoffman Estates, Ill., assignor to Reynolds Products Inc., Schaumburg, Ill.
Filed Nov. 17, 1975, Ser. No. 632,216
Int. Cl.² F25B *47/00;* **F25C** *1/00;* **F25D** *3/12;* **B67D** *5/62*
U.S. Cl. 62—85 **7 Claims**

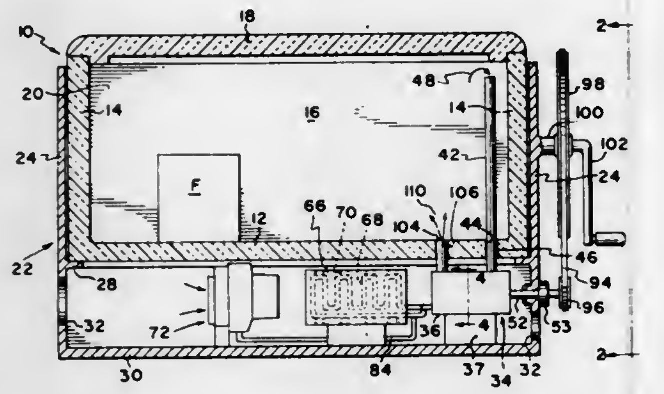


1. A method of cleaning the icemaker and icemaker water feeder tank of a carbonated beverage dispenser having a carbonated water supply, said feeder tank normally supplying said icemaker with still water to a first level, said icemaker having an ice storage chamber with a melt-down outlet at a second level above said first level, including the steps of supplying carbonated water to said feeder tank and to said icemaker, retaining said carbonated water in said feeder tank and in said icemaker for a period of time sufficient substantially to remove accumulated deposits therefrom, and then removing said carbonated water from said icemaker and said feeder tank.

5. Apparatus for cleaning the icemaker and icemaker water feeder tank of a carbonated beverage dispenser having a source of still water and a carbonated water supply system provided with a carbonated water supply tank, said feeder tank normally supplying said icemaker with still water up to a predetermined level, including in combination a first valve connecting said source of still water to said feeder tank, means for supplying said icemaker and said feeder tank with carbonated water from said supply system up to at least said predetermined level, said supplying means comprising a second valve connecting said carbonated water supply system to said icemaker and feeder tank, a drain line, normally inoperative means connecting said drain line to said icemaker and feeder tank, and control means for sequentially closing said first valve to disconnect said feeder tank from said source of still water, opening said second valve to connect said carbonated water supply system to said icemaker and feeder tank, and then rendering said drain line connecting means operative to drain said icemaker and feeder tank after a predetermined time delay sufficient to remove accumulated slime and mineral deposits.

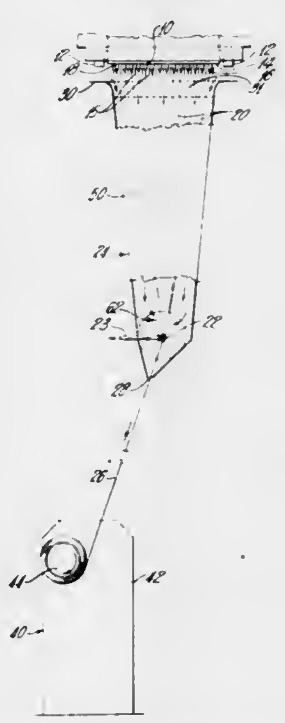
4,058,384
PORTABLE REFRIGERATOR
Harry J. Keefe, 42 Clapboard Ridge, Danbury, Conn. 06810
Filed Mar. 15, 1976, Ser. No. 666,756
Int. Cl.² F25D *3/08, 9/00*
U.S. Cl. 62—457 **10 Claims**

1. Apparatus for cooling air following removal of the air from a portable food storage container or the like and prior to recirculation of the air through said container comprising:
air outlet means for communicating air at a predetermined temperature from said container and air inlet means for communicating cooled air at a lesser temperature to said container;
compressor means connected to said air outlet means for receiving air from said container and compressing the removed air to heat the removed air;
heat exchanger means receiving a flow of compressed air from said compressor means and reducing the temperature of said compressed air;



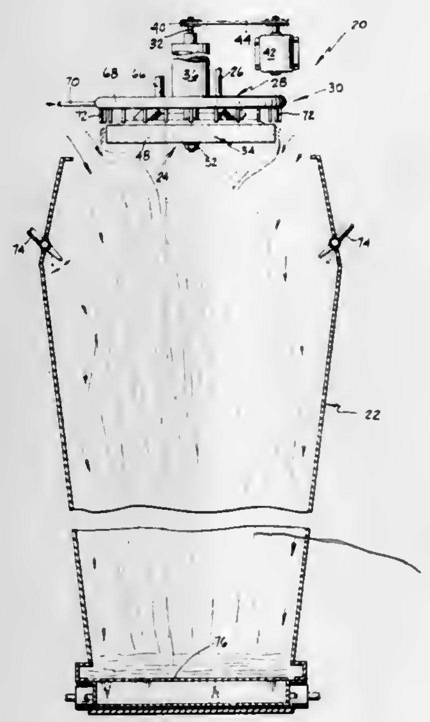
high flow, low suction, air amplifying means, responsive to a small primary flow of compressed air for driving a relatively large flow of ambient air over said heat exchanger means to cool said compressed air;
means for mounting said compressor means, said heat exchanger means, and said amplifier means on said container; and
conduit means connected to said inlet means and said air amplifying means for returning cooled air from said heat exchanger means to said inlet means to cool said container.

4,058,385
METHOD FOR TRANSPORTING GLASS FIBERS
Dale Kleist, St. Louisville, Ohio, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio
Continuation of Ser. No. 477,722, June 10, 1974, abandoned, which is a continuation of Ser. No. 316,141, Dec. 18, 1972, abandoned. This application Oct. 1, 1975, Ser. No. 618,588
Int. Cl.² C03B *37/02*
U.S. Cl. 65—2 **9 Claims**



1. A method for reduction of tension in continuous filaments formed from heat-softened filament forming material wherein the tension in the filaments is due to movement of such filaments at a high linear speed through air comprising:
mechanically attenuating streams of the heat-softened filament forming material into fine filaments;
linearly advancing the filaments through a passageway at a known rate of speed; and,
moving air in the passageway in the same direction and at substantially the same speed as the advancing filaments to reduce tension in the advancing filaments from the effects of air drag, the air and filaments being moved at substantially the same speed through a major portion of the passageway.

4,058,386
METHOD AND APPARATUS FOR ELIMINATING EXTERNAL HOT GAS ATTENUATION IN THE ROTARY FIBERIZATION OF GLASS
Duane Harold Faulkner, Cambridge City, Ind.; Harvell Morton Smith, Denver, Colo., and Larry Edward Howard, Richmond, Ind., assignors to Johns-Manville Corporation, Denver, Colo.
Continuation of Ser. No. 544,097, Jan. 27, 1975, abandoned, which is a continuation-in-part of Ser. No. 317,557, Dec. 22, 1972, abandoned. This application Sept. 20, 1976, Ser. No. 725,072
Int. Cl.² C03B *37/04*
U.S. Cl. 65—6 **10 Claims**



1. A method of producing staple fibers of finite length and having an average diameter of less than about 7 microns from molten mineral material comprising:
a. introducing said molten material at a rate of hundreds of pounds per hour into a rotating rotor internal of a peripheral wall of the rotor, said peripheral wall containing orifices each having an initial diameter no greater than about 18 mils,
b. passing said molten material through said orifices to form primary fibers having an average diameter of less than about 7 microns without using hot gas blast attenuation,
c. forming around but spaced from said peripheral wall a series of streams of moving gas separated by a series of relatively quiescent zones,
d. moving said gas in said streams in a direction transverse to the direction of movement of said primary fibers, and
e. passing said primary fibers into said quiescent zones and into contact with said streams of moving gas, said gaseous streams having a temperature and velocity sufficient to break said primary fibers into staple fibers, but insufficient to cause any significant attenuation of said fibers.

6. In an apparatus for producing primary fibers having an average diameter of less than about 7 microns from a molten mineral material at a rate of hundreds of pounds per hour wherein the molten mineral material is introduced into a rotating rotor internal of a peripheral wall of the rotor and wherein said peripheral wall contains orifices each having an initial diameter no greater than 18 mils and wherein said molten material is passed through said orifices to form said primary fibers without using hot gas blast attenuation, the improvement comprising:
a. means for breaking said primary fibers into staple fibers,
b. said means comprising means for forming around but spaced from said peripheral wall a series of streams of moving gas separated by a series of quiescent zones, said streams having a temperature and velocity sufficient to break said primary fibers into staple fiber but insufficient to significantly attenuate said primary fibers, and
c. said means directing said streams of moving gas in a direction transverse to the direction in which said primary fibers are formed so that said primary fibers enter into said quiescent zones and into contact with said streams of moving gas to be broken into staple fibers.

4,058,387
SIMULTANEOUSLY BAKING AND SEALING A FACEPLATE ASSEMBLY
Neil B. Nofziger, Sylvania, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio
Division of Ser. No. 592,968, July 3, 1975, Pat. No. 4,006,028. This application Sept. 15, 1976, Ser. No. 723,373
Int. Cl.² C03C *27/00*
U.S. Cl. 65—32 **2 Claims**

1. The method of sealing a faceplate to a funnel portion of a color television picture tube with a PbO-containing sealing glass in the presence of organic vapors capable of reducing the PbO in said sealing glass, comprising the steps of:
a. applying between the mating sealing edges of said faceplate portion having phosphors and organic compounds which give off organic vapors when heated associated with said phosphors applied on an inner surface thereof and said funnel portion a sealing amount of a sealing glass composition comprising,
i. at least about 70 weight percent of a PbO containing glass frit component having a sealing temperature of about 350° C. to about 415° C.,
ii. at least about 10–25 weight percent of at least one coarse particulate refractory filler component having a coefficient of thermal expansion of less than about 65×10^{-7} in./in./° C. (0°–300° C.) and a particle size distribution of about:

% of Particles	Microns
90	40–60
75	30–45
50	15–35
25	7–20
10	2–10
5	0.5–3

iii. at least one additive in an amount sufficient to prevent the PbO in said glass frit from being chemically reduced upon exposure of said glass frit to reducing conditions at the sealing temperature thereof, said additive being selected from a group consisting of:
1. a hydroxide or a higher oxide of a cation, wherein the hydroxide and oxide are thermally stable at the sealing temperature of the frits, and further wherein the hydroxide and the oxide are capable of being chemically reduced when exposed to the reducing conditions;
2. an inorganic nitrate having a thermal decomposition temperature of about 30°–600° C., a melting point temperature of about 36°–264° C. and containing water of hydration;
3. an inorganic nitrate having a melting point temperature lower than the firing temperature of the PbO-

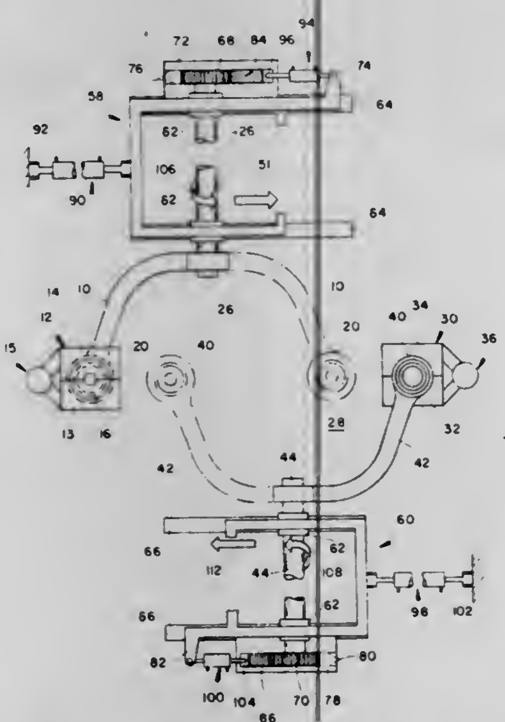
containing glass frit and a thermal decomposition temperature higher than the firing temperature of the PbO-containing glass frit;
4. an inorganic nitrate having a melting point of about 414°-592° C.;
5. an inorganic nitrate which is thermally decomposable between about 150° C. and the fiber softening point temperature of the glass frit to yield HNO_3;
6. an inorganic carbonate which is thermally decomposable to yield carbon dioxide above the firing temperature of the glass frit;
7. an inorganic, oxygen-containing chlorine compound having a thermal decomposition temperature above the firing temperature of the glass frit; and
8. an inorganic dichromate having a decomposition temperature of not more than about 100° C. below to not more than about 100° C. above the firing temperature of the glass frit; and

iv. at least about 0.25-10 weight percent of at least one fine particulate refractory filler component having a coefficient of thermal expansion of less than about 65 × 10^{-7} in./in./° C. (0°-300° C.) and a particle size distribution of about:

% of Particles	Microns
90	5-10
75	3-8
50	2-4
25	0.8-2.5
10	0.5-2.0
5	0.2-1.5

b. subjecting the faceplate portion and funnel portion and sealing glass composition to a temperature sufficient to fuse the sealing glass composition onto the faceplate portion and funnel portion, while simultaneously baking the faceplate and funnel, including the phosphors and organic compounds thereby resulting in the liberation of said organic vapors, and
c. cooling the resulting assembly comprising the faceplate, funnel and sealing glass.

4,058,388
APPARATUS FOR FORMING GLASSWARE WITH SHIFTING INVERT AND REVERT MECHANISM
Anthony T. Zappia, Carmel, Ind., assignor to Ball Packaging Products, Inc., Muncie, Ind.
Filed Aug. 30, 1976, Ser. No. 718,404
Int. Cl.² C03B *9/00, 23/00*
U.S. Cl. 65—229 **10 Claims**



1. Glassware forming apparatus comprising a parison mold, a blow mold, a pair of neck rings for supporting glassware blanks, first and second invert arms for supporting the neck rings for movement in a common vertical plane, said molds opening in said common vertical plane, first and second arbors for supporting the first and second invert arms, respectively, the first and second arbors having axes which extend generally parallel to one another and perpendicularly to the common plane, the first and second invert arms being offset to prevent interference between them as they move the neck rings in the common vertical plane, means for shifting the arbors such that their axes move toward and away from one another during an operating cycle, and means for pivoting the arbors about their axes, said shifting means and pivoting means cooperating to invert the first neck ring with a newly formed blank suspended therein, to hold the blank at a station outside the blow mold while the second neck ring is in position over the blow mold, then to revert the second neck ring to a position adjacent the parison mold, then to shift the blank supported in the first neck ring into the blow mold, to shift the second neck ring into position to receive the next blank formed in the parison mold, to invert the second neck ring to hold the last-mentioned blank at the station outside the blow mold, to revert the first neck ring to the position adjacent the parison mold, to shift the second neck ring to convey the last-mentioned blank into the blow mold, and to shift the first neck ring into position to receive the next blank to be formed in the parison mold.

10. Glassware forming apparatus comprising a parison mold, a blow mold, a neck ring for supporting glassware blanks, an invert arm for supporting the neck ring for movement in a vertical plane extending between the parison mold and blow mold, an arbor for supporting the invert arm, the arbor having an axis which extends generally perpendicularly to the vertical plane, means for shifting the arbor such that its axis moves linearly between the parison mold and blow mold, and means for pivoting the arbor about its axis, the pivoting means inverting the neck ring from the parison mold to a reheat position, the shifting means then shifting the neck ring from the reheat position to transfer a blank supported thereby into the blow mold, the pivoting means then reverting the neck ring to a rest position out of engagement with the parison mold and the shifting means then shifting the neck ring into its position in engagement with the parison mold to receive another blank.

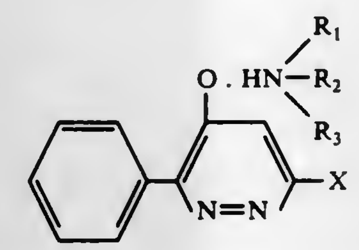
4,058,389
PROCESS FOR THE PREPARATION OF FERTILIZERS AND SOIL MODIFIERS
Luigi Piccolo; Marcello Ghirga; Antonio Paolinelli, and Gian Pietro Paganessi, all of Milan, Italy, assignors to Societa' Italiana Resine S.I.R. S.p.A., Milan, Italy
Continuation of Ser. No. 642,820, Dec. 22, 1975, abandoned. This application Apr. 7, 1977, Ser. No. 785,706
Claims priority, application Italy, Dec. 20, 1974, 30825/74
Int. Cl.² C05D *9/00;* **C01C** *1/244;* **C01G** *49/02*
U.S. Cl. 71—31 **12 Claims**

1. A method for the preparation of a composition useful as soil modifier and of a concentrated solution of ammonium sulphate with a high purity degree, starting from by-products obtained in the production of titanium dioxide from ilmenites or ilmenite slag by the sulphate process, said by-products consisting essentially of ferrous sulphate heptahydrate, which comprises:
a. contacting solid particles of said-by products with gaseous ammonia, thereby to obtain a reaction product consisting essentially of ammonium sulphate and ferrous hydroxide;
b. subjecting said reaction product to oxidation by oxygen or a gas containing molecular oxygen, thereby to convert said ferrous hydroxide into ferric hydroxide;
c. lixiviating with water the product obtained in stage (b), thereby to remove from 85 to 95 wt. % of said ammonium sulphate in the form of an aqueous solution having an ammonium sulphate content of at least 40 wt. %, and separating said solution from the residual solid; and

d. drying said residual solid to a water content of less than 20% by weight, said steps (a) and (b) being carried out at a temperature not higher than 90° C.

4,058,390
AMINE SALTS OF PHENYL-4-HYDROXYPYRIDAZINES AND THE PREPARATION AND HERBICIDAL COMPOSITIONS THEREOF
Rupert Schönbeck, Leonding; Engelbert Kloimstein, Eferding, and Erwin Wittmann, Linz, all of Austria, assignors to Chemie Linz Aktiengesellschaft, Linz, Austria
Filed Dec. 16, 1975, Ser. No. 641,588
Claims priority, application Austria, Dec. 17, 1974, 10073/74
Int. Cl.² A01N *9/24;* **C07D** *237/14*
U.S. Cl. 71—92 **16 Claims**

1. An amine salt of a 3-phenyl-6-halo-4-hydroxy-pyridazine of the formula



wherein X is selected from the group consisting of chlorine and bromine,
R_1 is selected from the group consisting of alkyl containing up to 14 carbon atoms, alkenyl containing up to 6 carbon atoms, cycloalkyl containing 5 to 7 carbon atoms, and alkyl contaning up to 14 carbon atoms which is monosubstituted by hydroxy, alkoxy containing up to 10 carbon atoms, cyano, amino, lower monoalkylamino or lower dialkylamino, and
R_2 and R_3 are each selected from the group consisting of hydrogen and the groups defined above with respect to R_1,
or R_1 and R_2 together with the nitrogen atom to which they are attached form heterocyclic selected from the group consisting of pyrrolidino pyrrolidino monosubstituted by lower alkyl, pyrrolidino disubstituted by lower alkyl, piperidino, piperidino monosubstituted by lower alkyl and piperidino disubstituted by lower alkyl.

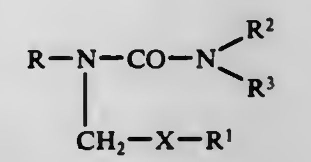
15. A herbicidal composition which comprises at least one amine salt according to claim 1 in admixture with a liquid or solid diluent.

4,058,391
1,2-DIALKYL-3,4,5-TRISUBSTITUTED PYRAZOLIUM SALTS AS HERBICIDAL AGENTS
Barrington Cross, Rocky Hill, and Bryant Leonidas Walworth, Pennington, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.
Division of Ser. No. 584,686, June 6, 1975, Pat. No. 3,963,742, which is a continuation-in-part of Ser. No. 487,826, July 12, 1974, abandoned. This application Feb. 11, 1976, Ser. No. 657,114
Int. Cl.² A01N *9/22*
U.S. Cl. 71—92 **9 Claims**

1. A method for the control of undesirable broad leaf weeds and grass weeds comprising: contacting said weeds with a herbicidally effective amount of a compound selected from the group consisting of: 1,2-dimethyl-3,5-diphenyl-4-methoxypyrazolium perchlorate, 1,2-dimethyl-3,5-diphenyl-4methoxypyrazoliummethyl sulfate, 1,2-dimethyl-3,5-diphenyl-4-n-propoxypyrazolium chloride, 1,2-dimethyl-3,5-diphenyl-4-i-propoxypyrazolium methyl sulfate, 4-n-butoxy-1,2-dimethyl-3,5-diphenylpyrazolium perchlorate and 1,2-dimethyl-3,5-diphenyl-4-n-pentyloxypyrazolium perchlorate.

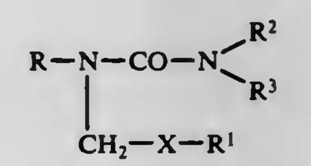
4,058,392
TETRASUBSTITUTED UREA COMPOUNDS AND HERBICIDAL COMPOSITIONS
Rudolf Thomas; Wolfgang Krämer, both of Wuppertal; Ludwig Eue, Cologne; Carl Metzger, and Gerhard Jäger, both of Wuppertal, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany
Filed Sept. 10, 1973, Ser. No. 395,794
Claims priority, application Germany, Sept. 27, 1972, 2247310
Int. Cl.² C07C *127/15, 127/17, 127/19*
U.S. Cl. 71—106 **19 Claims**

1. N,N'-tetrasubstituted urea compound of the formula



wherein
X is oxygen
R is alkyl of from 1 to 4 carbon atoms, phenyl, benzyl or substituted phenyl or benzyl wherein the substituent is at least one of halogen, alkyl of from 1 to 4 carbon atoms, alkoxy of from 1 to 4 carbon atoms, haloalkoxy of from 1 to 5 halo atoms, phenoxy, halophenoxy and nitrophenoxy;
R^1 is —C(Y)-R^4 wherein Y is oxygen and R^4 is alkyl, alkenyl, alkynyl, alkoxyalkyl, haloalkyl, haloalkynyl, cycloalkyl or cycloalkenyl of from 3 to 8 ring carbons and wherein R^4 contains not more than 11 carbon atoms; or is hydrogen or alkyl substituted by alkoxy and alkoxycarbonyl,
R^2 is alkyl, substituted alkyl, alkenyl, substituted alkynyl, wherein the substituents are at least one of alkoxy of from one to three carbon atoms, haloalkyl of from one to two carbon atoms and one to three halogen atoms, and halogen, alkoxy or cycloalkyl of from 3 to 8 ring carbon atoms;
R^3 is alkyl, haloalkyl or alkenyl of up to 4 carbon atoms;
R^2 and R^3 represent an alkylene bridge.

16. Method of combatting undesired vegetation, which method comprises applying to such vegetation or to its habitat, herbicidally effective amounts of an N,N'-tetrasubstituted urea compound of the formula

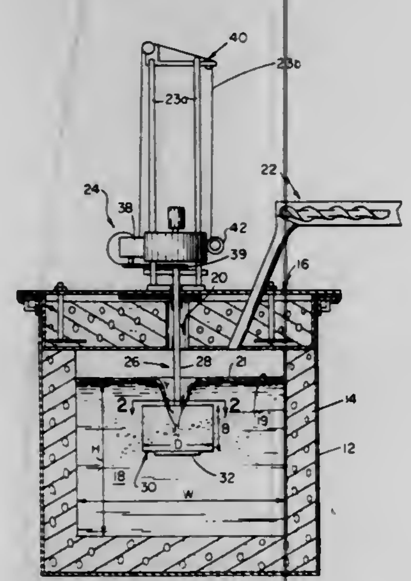


wherein
X is oxygen
R is alkyl of from 1 to 4 carbon atoms, phenyl, benzyl or substituted phenyl or benzyl wherein the substituent is at least one of halogen, alkyl of from 1 to 4 carbon atoms, alkoxy of from 1 to 4 carbon atoms, haloalkoxy of from 1 to 5 halo atoms, phenoxy, halophenoxy and nitrophenoxy;
R^1 is —C(Y)-R^4 wherein Y is oxygen and R^4 is alkyl, alkenyl, alkynyl, alkoxyalkyl, haloalkyl, haloalkynyl, cycloalkyl or cycloalkenyl of from 3 to 8 ring carbons; or is hydrogen or alkyl substituted by alkoxy and alkoxycarbonyl,
R^2 is alkyl, substituted alkyl, alkenyl, substituted alkynyl, wherein the substituents are at least one of alkoxy of from one to three carbon atoms, haloalkyl of from one to two carbon atoms and one to three halogen atoms, and halogen, alkoxy or cycloalkyl of from 3 to 8 ring carbon atoms;
R^3 is alkyl, haloalkyl or alkenyl or up to 4 carbon atoms;
R^2 and R^3 represent an alkylene bridge.

4,058,393
PROCESS FOR THE BENEFICIATION OF TITANIFEROUS ORES
Robert Joseph William McLaughlin, Alphington, Australia, assignor to The University of Melbourne, Victoria, Australia
Filed June 23, 1975, Ser. No. 589,129
Claims priority, application Australia, June 21, 1974, 7920/74
Int. Cl.^{2} C22B *3/00*
U.S. Cl. 75—1 T **19 Claims**

1. A process for the beneficiation of titaniferous ores including mixing the ore with an insoluble source of fluoride ions which source becomes soluble under the following conditions of the process, the fluoride concentration relative to the titania values in the ore lying between 13% and 50% by weight and heating the mixture with dilute hydrochloric acid at a temperature not more than atmospheric boiling point to thereby dissolve a substantial part of the titanium and iron values of the ore.

4,058,394
PYROMETALLURGICAL SYSTEM FOR SOLID-LIQUID CONTACTING
Peter B. Crimes, Sudbury, Mass., assignor to Kennecott Copper Corporation, New York, N.Y.
Filed Feb. 23, 1976, Ser. No. 660,021
Int. Cl.^{2} C21C *7/00*
U.S. Cl. 75—61 **14 Claims**



1. A process for entraining particulate matter in a high density liquid maintained in a vessel having a volume defined by a square of side W or a circle of diameter 1.13W and by a liquid depth H, comprising the steps of:
providing a rotatable stirrer in said liquid having a fully submerged blade assembly with a diameter, D, which is about 0.1W to 0.4W and with a breadth, B, which is about 0.1H to 0.7H,
supplying particulate matter to the surface of said liquid, and
rotating said stirrer at a rate of N RPM such that the particulate matter is drawn down through the vortex produced by said rotating stirrer to said rotating submerged blade assembly, is pumped radially outward therefrom by said submerged rotating blade assembly such that the particulate matter is circulated through said liquid whereby a large area of contact between said liquid and particulate matter is produced.

4,058,395
EXTRACTING COPPER FROM SULPHIDE CONCENTRATES
Michael John Sole, 44 Mountain View Avenue, Aldara Park, Randburg, Transvaal, South Africa
Continuation of Ser. No. 507,100, Sept. 18, 1974, abandoned. This application Sept. 3, 1976, Ser. No. 720,476
Claims priority, application South Africa, Sept. 28, 1973, 73/7645
Int. Cl.^{2} C22B *15/00*
U.S. Cl. 75—72 **4 Claims**

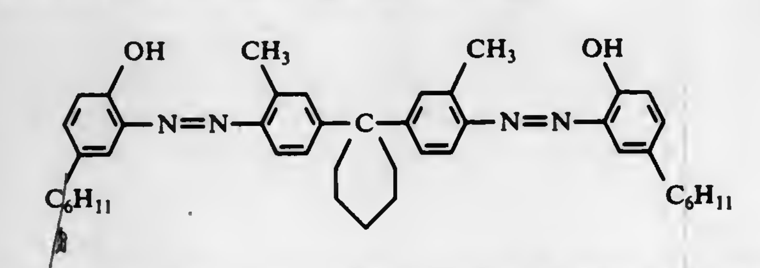
1. In a process for the extraction of copper from copper containing sulphide concentrates comprising the steps of roasting the concentrate to reduce the sulphur content to below 1% by weight and then treating the roasted material to the segregation process by adding a halide salt and a reductant to the roasted mterial at an elevated temperature of about 700° to 800° C. so that the copper segregates in the material in metallic form, the improvement comprising the step of adding to the material between 10 and 30% by weight of silica before subjecting the material to the segregation step, and completing said segregation step in less than about 60 minutes.

4,058,396
RECOVERY OF LEAD FROM BATTERIES
James R. Birk, San Jose, Calif., assignor to Electric Power Research Institute, Inc., Palo Alto, Calif.
Filed Nov. 26, 1976, Ser. No. 744,918
Int. Cl.^{2} C22B *13/00*
U.S. Cl. 75—77 **6 Claims**

1. A method for isolating lead from lead storage batteries comprised of organic materials, said method comprising:
in a lead recovery zone, contacting lead batteries substantially free of acid with molten alkali metal carbonate salt at a temperature substantially in excess of 350° C for a time sufficient to degrade the organic materials to volatiles and char, wherein said char reduces lead compounds to lead and said lead is melted;
withdrawing the char and molten salt to a combustion zone;
burning the char in the presence of oxygen to raise the temperature of said molten salt to the desired temperature;
recycling said salt for contact with fresh battery in said lead recovery zone; and
withdrawing a portion of said molten salt from said combustion zone for removal of impurities and returning the purified salt to the combustion zone.

4,058,397
YELLOW DEVELOPER EMPLOYING A COATED CARRIER
Joseph Mammino, Penfield, and Franklin Jossel, Rochester, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.
Filed Sept. 29, 1975, Ser. No. 617,771
Int. Cl.^{2} G03G *9/10, 13/01*
U.S. Cl. 96—15 D **14 Claims**

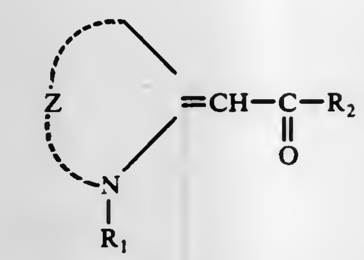
1. An electrostatographic developer for developing electrostatic latent images comprising toner particles and coated carrier particles, said toner particles comprising a resin material and a colorant satisfying the formula:



said coated carrier comprising carrier particles overcoated with a composition comprising a resin and copper tetra-4-(octadecylsulfonomido) phthalocyanine colorant.

4,058,398
IMAGE RECORDING MATERIAL AND METHOD FOR FORMING AN IMAGE USING THE SAME
Chiaki Osada, Odawara; Eiichi Hasegawa, and Masataka Murata, both of Asaka, all of Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan
Filed Sept. 29, 1975, Ser. No. 617,603
Claims priority, application Japan, Sept. 27, 1974, 49-111171
Int. Cl.^{2} G03C *5/08, 1/68*
U.S. Cl. 96—27 R **18 Claims**

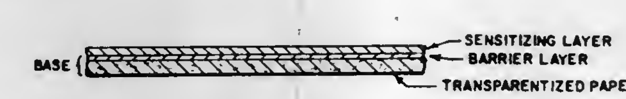
1. A process for forming an image which comprises imagewise exposing a recording material comprising a support, a light-sensitive composition layer on said support, and a transparent film on said light-sensitive composition layer, and then peeling off said transparent film to remove the exposed areas of said light-sensitive composition layer with said transparent film and to leave the unexposed areas of said light-sensitive composition layer on said support, thereby to form an image on said support, wherein said light-sensitive composition comprises:
a. a monomer containing at least two addition-polymerizable unsaturated bonds and having a boiling point of at least 100° C,
b. polyvinyl butyral, and
c. a photopolymerization initiator represented by the formula:



wherein R_1 is an alkyl group or vinylmethyl group, R_2 is an alkyl group, aryl group or thienyl group, and Z is a group of non-metallic atoms necessary to forming a heterocyclic ring, and said transparent film is peeled off at a temperature of about 70° to 150° C.

5. The process according to claim 1, wherein the photopolymerization initiator is selected from the group consisting of 2-benzoylmethylene-3-methyl-β-naphthothiazoline, 2-benzoylmethylene-3-ethyl-β-naphthothiazoline, 3-ethyl-2-(2-thenoyl)methylene-β-naphthothiazoline, 3-ethyl-2-propionylmethylene-β-naphthothiazoline, and 5-chloro-3-ethyl-2-p-methoxybenzoylmethylenebenzothiazoline.

4,058,399
PHOTOSENSITIVE DIAZOTYPE MATERIAL AND METHOD OF MAKING THE SAME
Sharon S. McNeil; Carl R. Bloomquist, and Robert C. Johnston, all of Binghamton, N.Y., assignors to Defiance - Azon Corporation, Johnson City, N.Y.
Continuation of Ser. No. 366,137, June 1, 1973, abandoned, which is a continuation-in-part of Ser. No. 104,991, Jan. 8, 1971, abandoned. This application Jan. 26, 1976, Ser. No. 652,317
Int. Cl.^{2} G03C *1/60, 1/52*
U.S. Cl. 96—75 **2 Claims**



1. A diazotype intermediate assembly which is easily erasable with a conventional soft rubber pencil eraser comprising a transparentized paper base coated with a barrier layer of a rubber-like polymeric material which barrier layer is overcoated with a sensitizing layer; in which said sensitizing layer is obtained by overcoating the barrier layer with an aqueous sensitizing solution consisting essentially of 2–6% by weight of a water soluble cellulose derivative; 0.5–4% by weight of a water soluble melamine-formaldehyde or urea-formaldehyde cross-linking resin; a light sensitive aromatic diazonium compound; an azo coupling agent; an organic acid having a pKa^{25} value of from 2.5 to 4.5; and 1–8% by weight of silica having a particle size of 1–10 microns in an amount sufficient to improve the erasability of said diazotype intermediate assembly compared to the assembly containing no silica; water and an amount of a lower alcohol equal to or less than the amount of water.

2. A process for preparing an erasable photosensitive diazotype assembly comprising steps of:
a. coating a transparentized base with an aqueous emulsion of a rubber-like polymer material and drying to form a barrier layer;
b. overcoating said barrier layer with a sensitizing layer by passing said barrier layer over a fountain of an aqueous sensitizing solution having a maximum viscosity of 75 centipoises at 20° C in contact therewith, such that the top of the fountain contacts the barrier layer surface; said aqueous sensitizing solution consisting essentially of 2–6% by weight of a water soluble cellulose derivative; 0.5–4% by weight of a water soluble melamine-formaldehyde or urea-formaldehyde cross-linking resin; a light sensitive aromatic diazonium compound; an azo coupling agent; an organic acid having a pKa^{25} value of from 2.5 to 4.5; and 1–8% by weight of silica having a particle size of 1–10 microns sufficient to improve the erasability of said diazotype intermediate assembly compared to the assembly containing no silica; water and an amount of a lower alcohol equal to or less than the amount of water.

4,058,400
CATIONICALLY POLYMERIZABLE COMPOSITIONS CONTAINING GROUP VIA ONIUM SALTS
James V. Crivello, Elnora, N.Y., assignor to General Electric Company, Schenectady, N.Y.
Continuation of Ser. No. 466,373, May 2, 1974, abandoned. This application Dec. 9, 1975, Ser. No. 638,981
Int. Cl.^{2} G03C *1/68, 5/00;* **G08F** *8/34*
U.S. Cl. 96—86 P **15 Claims**

1. Cationically polymerizable compositions consisting essentially of
A. a monomeric or prepolymeric cationically polymerizable organic material free of oxirane oxygen selected from vinyl organic monomers, vinyl organic propolymers, cyclic organic ethers, cyclic organic esters, cyclic organic sulfides, cyclic amines and organosilicon cyclics, and
B. an effective amount of photodecomposable armoatic onium salt of a GRoup VIa element capable of effecting the cationic polymerization of (A) when exposed to radiant energy where said photodecomposable aromatic onium salt of a Group VIa element has the formula,

$[(R)(R^1)_b(R^2)_c X]_d^+ [MQ_e]^{-(e-f)}$

where R is a monovalent aromatic orgnic radical, R^1 is a monovalent organic aliphatic radical selected from alkyl, cycloalkyl and substituted alkyl, R^2 is a polyvalent organic radical forming a heterocyclic or fused ring structure selected from aliphatic radicals and aromatic radicals, X is a Group VIa element selected from sulfur, selenium and tellurium, M is a metal or metalloid, Q is a halogen radical, *a* is a whole number equal to 0 to 3 inclusive, *b* is a whole number equal to 0 to 2 inclusive, *c* is a whole number equal to 0 or 1, where the sum of *a* + *b* + *c* is a value equal to 3 or the valence of X,
$d = e - f$
f = valence of M and is an integer
equal to from 2–7 inclusive
e is $>f$ and is an integer having a value up to 8.

4,058,401
PHOTOCURABLE COMPOSITIONS CONTAINING GROUP VIA AROMATIC ONIUM SALTS
James V. Crivello, Elnora, N.Y., assignor to General Electric Company, Schenectady, N.Y.
Continuation of Ser. No. 466,374, May 2, 1974, abandoned. This application Dec. 9, 1975, Ser. No. 638,982
Int. Cl.² G03C *1/68;* **C08F** *8/18*
U.S. Cl. 96—115 R **15 Claims**

1. Photocurable compositions consisting essentially of

A. an epoxy resin polymerizable to a higher molecular weight state,

B. from 0.1 to 15% by weight of a photodecomposable aromatic onium salt of a Group VIa element capable of effecting the cure of epoxy resin when exposed to radiant energy wherein said aromatic onium salt has the formula

$$[(R)_a(R^1)_b(R^2)_cX]_d^+ [MQ_e]^{-(e-f)}$$

where R is a monovalent aromatic organic radical, R¹ is a monovalent organic aliphatic radical selected from alkyl, cycloalkyl and substituted alkyl, R^2 is a polyvalent organic radical forming a heterocyclic or fused ring structure selected from aliphatic radicals and aromatic radicals, X is a Group VIa element selected from sulfur, selenium and tellurium, M is a metal or metalloid, Q is a halogen radical, a is a whole number equal to 0 to 3 inclusive, b is a whole number equal to 0 to 2 inclusive, c is a whole number equal to 0 or 1, where the sum of $a + b + c$ is a value equal to 3 or the valence of X,

$d = e - f$

f = valence of M and is an integer equal to from 2 to 7 inclusive

e is $>f$ and is an integer having a value up to 8 and

C. from 0 to 100 parts by weight of filler, per 100 parts of epoxy resin.

4,058,402
WATER SOLUBLE RODENT REPELLENT COMPOSITION FOR PROTECTING A BURIED MATERIAL SUCH AS A CABLE
Roy E. Stansbury, and James A. Shotton, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.
Division of Ser. No. 861,175, Sept. 25, 1969, Pat. No. 3,643,450. This application July 21, 1971, Ser. No. 164,934
Int. Cl.² C09D *5/14*
U.S. Cl. 106—16 **6 Claims**

1. A composition suitable for application to an object subject to rodent damage by chewing by the rodent of the object to protect said object against such damage by keeping the rodent at a distance from said object when it is buried in the ground and which upon application to said object forms thereon a solid, moisture dispersible layer which comprises in a non-aqueous, liquid solvent, a solid, water-soluble, repellent holding dispersible carrier and an effective N,N-dialkylsulfenyl dithiocarbamate rodent repellent, the rodent repellent being present from about 1–45 weight percent of the composition, the remainder of the composition consisting of said carrier and a solvent, said carrier being present in preponderance in said remainder of the composition, said non-aqueous liquid solvent being selected from the group of dimethylformamide and dimethylsulfoxide and mixtures thereof and said solid, water-soluble carrier being a hydroxylalkyl cellulose, said composition being adapted upon being acted upon by moisture in the ground to release a rodent repellent protective barrier surrounding said object.

4,058,403
REFRACTORY COMPOSITIONS
Kyohei Funabiki, and Tetsuya Tokunaga, both of Fujieda, Japan, assignors to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.
Filed Dec. 11, 1975, Ser. No. 639,679
Claims priority, application Japan, Nov. 12, 1975, 50-141476
Int. Cl.² C04B *35/52;* **C08L** *97/00*
U.S. Cl. 106—56 **11 Claims**

1. In a solid refractory composition comprising an inorganic refractory material and a substantially carbonized organic resin as a carbonaceous binder therefor, the improvement wherein the resin comprises a condensate resin of a phenol and an aldehyde chemically modified by reaction under heating with an extending agent selected from the group consisting of sulfite pulp lignin, kraft pulp lignin, molasses and mixtures thereof, the amount of lignin employed being about 5 to about 300 parts by weight per hundred parts by weight of the phenol, the amount of molasses employed being about 5 to about 500 parts by weight per hundred parts by weight of the phenol, and the amount of refractory material employed being about 0.5 to about 1,000 parts by weight per 100 parts by weight of extending agent.

4,058,404
SINTERED CERAMIC DIELECTRIC BODY
Shinobu Fujiwara, and Hitoshi Tanaka, both of Shinmachi, Japan, assignors to TDK Electronics Co., Ltd., Tokyo, Japan
Continuation-in-part of Ser. No. 423,101, Dec. 10, 1973, abandoned. This application Sept. 16, 1975, Ser. No. 613,739
Int. Cl.² C04B *35/00, 35/46*
U.S. Cl. 106—73.31 **5 Claims**

1. A sintered ceramic dielectric body having a high dielectric constant, as well as a low dielectric loss and almost no variation in the dielectric constant and the dielectric loss with respect to a wide variation of an applied high AC or DC voltage, which consists essentially, by weight, of approximately 18 to 70% of strontium titanate ($SrTiO_3$), approximately 4 to 75% of barium titanate ($BaTiO_3$), 2.5 to 17.4% of bismuth oxide (Bi_2O_3) and 1.7 to approximately 20% of titanium oxide (TiO_2); the ratio by mole of the titanium oxide (TiO_2) to the bismuth oxide (Bi_2O_3) being within the range from approximately 1 to 18.

4,058,405
PUMPABLE CEMENT GROUT AND ADDITIVE
Joseph T. Snyder, Northfield, and Richard E. Huffman, Cleveland Heights, both of Ohio, assignors to Grout Supply Company, Richfield, Ohio
Filed July 9, 1976, Ser. No. 703,940
Int. Cl.² C04B *7/35*
U.S. Cl. 106—87 **8 Claims**

1. A pumpable cement grout or mortar having improved early compressive strength consisting essentially of 100 parts by weight of cement, from about 100 to 300 parts of sand, from about one to five parts by weight of sodium chloride, from about 0.006 to 0.03 parts of aluminum powder, and water.

4,058,406
CEMENTITIOUS COMPOSITION
Dante A. Raponi, Box 9602, Panama City, Fla. 32401
Continuation-in-part of Ser. No. 660,618, Aug. 15, 1967, abandoned, which is a continuation-in-part of Ser. No. 369,302, May 21, 1964, abandoned. This application Jan. 30, 1976, Ser. No. 653,755
Int. Cl.² C04B *7/35*
U.S. Cl. 106—90 **8 Claims**

1. A synthetic resin-inorganic cementitious settable composition, said composition consisting essentially of, by volume:

a. about 1–4 parts polyethylene strips;

b. about 2–8 parts aggregate;

c. about 1–2 parts hydraulic cement; and

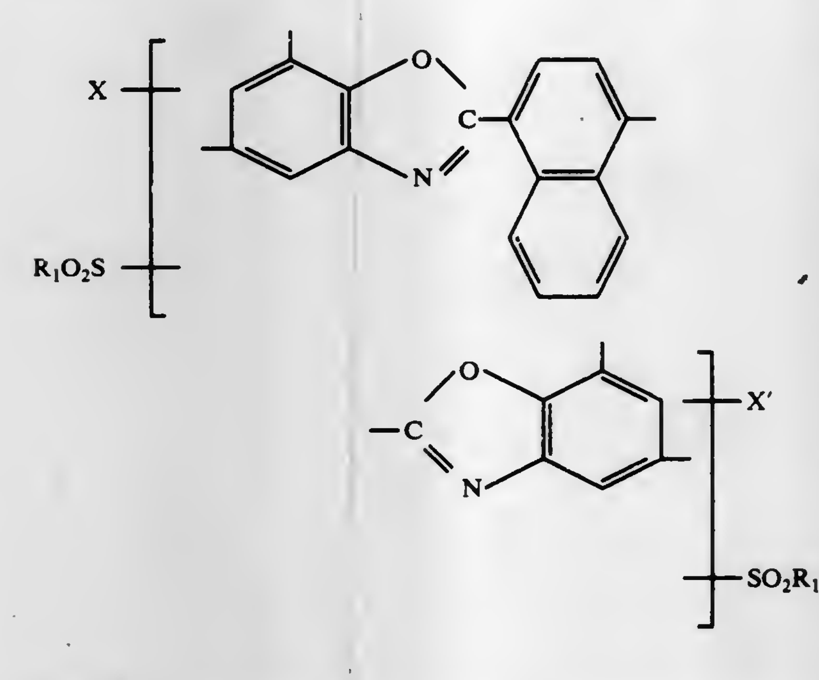
d. about 1–4 parts water.

4,058,407
HYDRAULIC CEMENT MIXES AND PROCESS FOR IMPROVING HYDRAULIC CEMENT MIXES
James A. Ray, Mantua, Ohio, assignor to Martin Marietta Corporation, Bethesda, Md.
Filed Dec. 1, 1976, Ser. No. 746,255
Int. Cl.² C04B *7/352*
U.S. Cl. 106—92 **23 Claims**

1. A hydraulic cement mix including hydraulic cement, aggregate, sufficient water to effect hydraulic setting of the cement, and an additive comprising pods, with or without the beans, of the carob tree, Ceratonia Siliqua, extracts of said pods, with or without beans, or combinations thereof, said additive being present in an amount of up to about 0.25% by weight based upon the weight of the cement to thereby increase the strength of the mix when hardened.

4,058,408
BIS-BENZOXAZOLYL-NAPHTHALENES AS OPTICAL BRIGHTENERS
Hans-Rudolf Meyer, Binningen, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.
Division of Ser. No. 548,043, Feb. 7, 1975, Pat. No. 3,993,659, which is a continuation-in-part of Ser. No. 502,681, Sept. 3, 1974, abandoned, which is a continuation of Ser. No. 276,992, Aug. 1, 1972, abandoned. This application Nov. 3, 1975, Ser. No. 627,997
Claims priority, application Switzerland, Aug. 10, 1971, 11799/71
Int. Cl.² C08K *5/35*
U.S. Cl. 106—176 **7 Claims**

1. Optically brightened organic material consisting essentially of organic material selected from the group consisting of polyesters, polyvinyl chloride, polystyrene, polyacrylonitrile and cellulose acetates, having applied thereto or incorporated therein 0.001 to 2 percent by weight of a compound of the formula



wherein

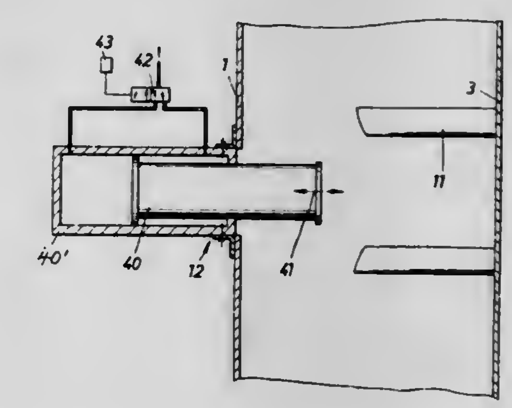
R_1 and R_1' independently of one another denote alkyl with 1 to 6 carbon atoms which is optionally substituted by chlorine, phenyl which is optionally substituted by chlorine or alkyl with 1 to 4 carbon atoms, or phenyl alkyl with 1 to 3 carbon atoms in the alkyl part which is optionally substituted by chlorine or methyl in the phenyl part, and

X and X' independently of one another denote hydrogen, chlorine or alkyl with 1 to 4 carbon atoms.

4,058,409
ANTI-TRANSPIRANT COMPOSITION
George Kesslin, Teaneck, N.J., assignor to Kay-Fries Chemicals, Inc., Stony Point, N.Y.
Continuation of Ser. No. 436,166, Jan. 24, 1974, abandoned. This application Aug. 29, 1975, Ser. No. 608,870
Int. Cl.² C09G *1/10*
U.S. Cl. 106—271 **11 Claims**

1. A film-forming anti-transpirant coating composition for growing plant foilage in the form of an aqueous emulsion concentrate consisting essentially of the intermixture of oxidized emulsifiable polyethylene having molecular weights in the range of from about 1000 to about 3400 with at least 25% polyterpene having molecular weights in the range of from about 600 to about 1800 and an acid number of about zero.

4,058,410
COUNTER-CURRENT LEACHING TOWER
Walter Dietzel, and Siegfried Matusch, both of Braunschweig, Germany, assignors to Braunschweigische Maschinenbauanstalt, Braunschweig, Germany
Filed Feb. 25, 1977, Ser. No. 772,259
Claims priority, application Germany, Mar. 9, 1976, 2609673
Int. Cl.² C13D *1/12*
U.S. Cl. 127—5 **7 Claims**

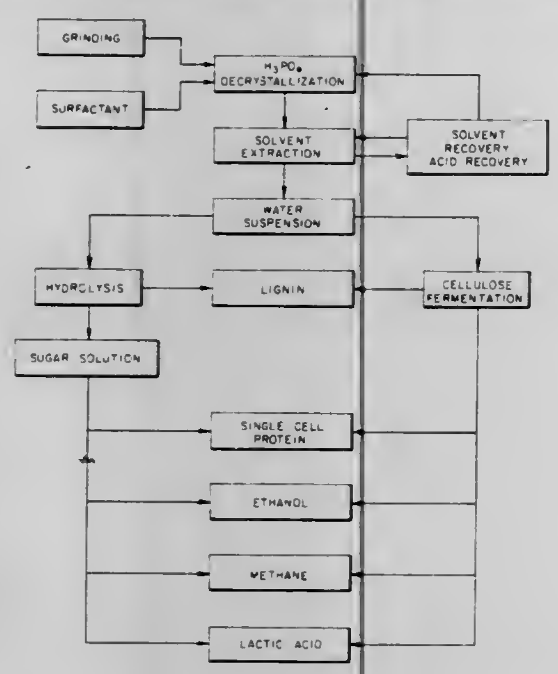


1. An extraction tower for conveying material through a leaching path in counter-current fashion relative to a leaching liquid flow, comprising a tower housing, a plurality of material conveying means including rotatable screw means and baffle means operatively arranged inside said tower for conveying said material through the tower housing, sensor means operatively secured to any of said material conveying means to sense loads to which the respective conveying means are subjected in operation inside said tower, control means responsive to said sensor means, drive means individually connected to said material conveying means, means connecting at least certain of said drive means to said control means for regulating said drive means in response to load signals received from said sensor means, and length varying means as part of said conveying means, said drive means including means operatively connected to said length varying means for varying the effective length of at least certain of said conveying means.

4,058,411
DECRYSTALLIZATION OF CELLULOSE
Winthrop D. Bellamy, and Fred F. Holub, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.
Filed Aug. 30, 1976, Ser. No. 718,756
Int. Cl.² C13K *1/02;* **C08B** *15/00*
U.S. Cl. 127—37 **3 Claims**

1. A process for decrystallizing cellulose in natural cellulosic material which comprises grinding said natural cellulosic material to a size of about 1 millimeter or less in diameter and length, admixing at ambient temperature phosphoric acid with the ground natural cellulosic material to form a gel-like mixture, said phosphoric acid ranging in concentration from 80

weight % to 85 weight % and being used in an amount sufficient to form said gel-like mixture, said phosphoric acid ranging in amount from 3 to 10 parts for one part of said cellulosic material transforming the crystalline regions of said cellulose to amorphous form, admixing at ambient temperature an aqueous solution of tetrahydrofuran with said gel-like mixture to extract said phosphoric acid therefrom forming a solution therewith and a precipitate of amorphous cellulose, said aqueous solution of tetrahydrofuran being comprised of 1 part of water for about 30 to 100 parts of tetrahydrofuran, said tetra-



hydrofuran being used in an amount sufficient to extract the phosphoric acid in at least a substantial amount, separating the resulting phosphoric acid-tetrahydrofuran solution from said precipitate, admixing the resulting separated precipitate with water at ambient temperature to form a water suspension thereof, and separating and recovering at least a substantial amount of said tetrahydrofuran and said phosphoric acid from the resulting phosphoric acid-tetrahydrofuran solution by distilling said tetrahydrofuran from said phosphoric acid-tetrahydrofuran solution.

4,058,412

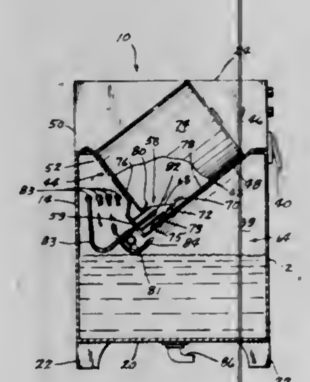
APPARATUS FOR OPENING AND WASHING CANS

Merton C. Knapp, and Charles Rex Galloway, both of Mount Ayr, Iowa, assignors to Green Hills, Inc., Mount Ayr, Iowa

Filed Jan. 8, 1976, Ser. No. 647,452

Int. Cl.[2] B08B *9/04*

U.S. Cl. 134—24 **13 Claims**



1. A device for washing a can having lateral sides, a top, and a bottom, said device comprising;
   - a support having a first end and a second end for supporting said can on one of said lateral sides for sliding movement from a pre-punch position to a punch position;
   - a knife positioned adjacent said support and having a cutting edge presented towards said bottom of said can when said can is in said pre-punch position whereby said knife will destructively pierce said bottom of said can whenever said can is manually forced against said knife for movement to said punch position;
   - said knife being shaped to provide a channel for liquid contents to drain from said can whenever said can is pierced by said knife,
   - a spray nozzle positioned within the channel of the knife so as to protrude within the interior of said can;
   - means connecting said spray nozzle to a source of fluid under pressure whereby said spray nozzle will spray said fluid into the interior of said can, and
   - said support being inclined, said first end thereof being lower than said second end, said knife being positioned adjacent said first end of said support whereby the fluid contents of said can will flow towards said knife and outwardly through the hole in said can caused by said knife.

4,058,413

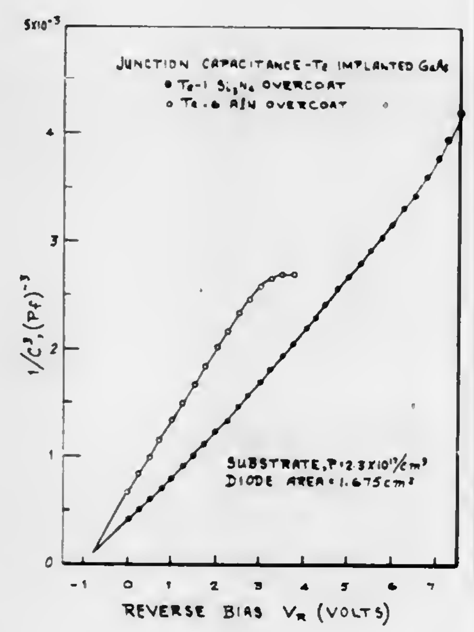
ION IMPLANTATION METHOD FOR THE FABRICATION OF GALLIUM ARSENIDE SEMICONDUCTOR DEVICES UTILIZING AN ALUMINUM NITRIDE PROTECTIVE CAPPING LAYER

Bryant M. Welch, Thousand Oaks, and Richard D. Pashley, San Jose, both of Calif., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed May 13, 1976, Ser. No. 685,841

Int. Cl.[2] H01L *21/265, 21/324*

U.S. Cl. 148—1.5 **1 Claim**



1. A process for fabricating semiconductor devices involving the implantation of tellurium as a submicron N-type layer in the surface of a gallium arsenide substrate comprising the steps of:
   - a. preparing a cadmium doped P-type gallium arsenide substrate;
   - b. implanting a 220 KeV ion dose of tellurium into the surface of said P-type gallium arsenide at 350° C with an incident beam at least 10° from any low-index axis;
   - c. sputtering a coating of aluminum nitride onto said implanted surface and
   - d. heating said coated surface to a temperature of about 900° C for about 10 minutes in flowing hydrogen to effect an anneal of said implanted surface to form a submicron N-type layer therein.

4,058,414

METHOD OF MAKING COLD-ROLLED HIGH STRENGTH STEEL SHEET

Takashi Matsuoka, Osaka, Japan, assignor to Sumitomo Metal Industries, Ltd., Japan

Filed Dec. 30, 1975, Ser. No. 645,330

Int. Cl.[2] C21D *7/02, 7/14, 9/46*

U.S. Cl. 148—12 F **2 Claims**

1. In the process of manufacturing a cold-rolled, high strength steel sheet in which a steel containing, in addition to iron and silicon, 0.03 to 0.2% by weight of carbon, 1.3 to 3.0% by weight of manganese and either (a) 0.01 to 0.25% by weight of niobium, or 0.01 to 0.2% by weight of titanium or (b) 0.01 to 0.3% by weight of niobium and titanium is hot rolled and cold rolled into a steel sheet which sheet is then annealed at a temperature of from 620° C to the A_3 transformation point, the improvement which consists of utilizing from 1.0 to 1.5% by weight of silicon.

4,058,415

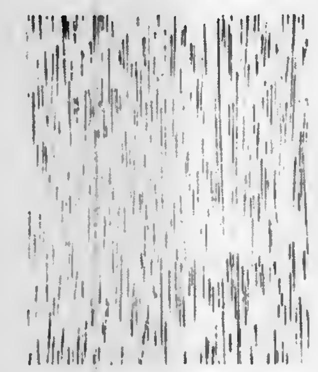
DIRECTIONALLY SOLIDIFIED COBALT-BASE EUTECTIC ALLOYS

John L. Walter, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Oct. 30, 1975, Ser. No. 627,067

Int. Cl.[2] C22C *19/07*

U.S. Cl. 148—32 **12 Claims**



1. An article of manufacture having improved high temperature properties, improved fiber volume fraction and improved fiber density comprising a unidirectionally solidified anisotropic metallic casting comprising
   - a. a matrix of cobalt-base superalloy consisting essentially of, on a weight basis, 10–20% nickel, 8.1–25% tungsten and less than 10% chromium, 10–23% tantalum, 0.1–1.5% carbon and the balance being essentially cobalt; and
   - b. an aligned eutectic predominantly tantalum monocarbide reinforcing fibrous phase embedded in the matrix.

4,058,416

MATRIX-STIFFENED HEAT AND CORROSION RESISTANT WROUGHT PRODUCTS

Herbert Louis Eiselstein; Edward Frederick Clatworthy, and Darrell Franklin Smith, Jr., all of Huntington, W. Va., assignors to Huntington Alloys, Inc., Huntington, W. Va.

Division of Ser. No. 654,595, Feb. 2, 1976, Pat. No. 4,026,699. This application Feb. 9, 1977, Ser. No. 767,217

The portion of the term of this patent subsequent to May 31, 1994, has been disclaimed.

Int. Cl.[2] C22C *38/48*

U.S. Cl. 148—32 **6 Claims**

1. A wrought product consisting essentially of 17% to 22% chromium, nickel in an amount up to 44% and at least sufficient to satisfy the relationship % Ni equal at least 4/3 (% Cr) plus 8.8, 1.75% to 3.0% columbium, up to about 1% manganese, up to about 1% silicon, up to about 0.1% carbon, up to about 0.5% titanium provided the total of % Ti plus 0.216 (% Cb) does not exceed 0.85%, up to about 0.5% aluminum and balance iron with any presence of molybdenum and tungsten not exceeding 0.5% molybdenum and 0.5% tungsten and characterized by a hot-worked austenitic microstructure.

4,058,417

TURBINE BUCKET ALLOY

Richard Thomas Bicicchi, Boxford, and Albert Samuel Melilli, Winchester, both of Mass., assignors to General Electric Company, Schenectady, N.Y.

Continuation of Ser. No. 552,515, Feb. 24, 1975, abandoned. This application Apr. 23, 1976, Ser. No. 679,700

Int. Cl.[2] C22C *38/44*

U.S. Cl. 148—37 **3 Claims**

1. A forged turbine bucket formed from an alloy having a martensitic structure and free from ferrite throughout, said alloy consisting essentially of:

Element	Weight Percent
Carbon	.05 - .07
Manganese	.70 - 1.00
Phosphorus	.020 max.
Sulphur	.020 max.
Silicon	.30 - .50
Nickel	3.50 - 4.25
Chromium	11.20 - 12.25
Molybdenum	.30 - .50
Aluminum	.03 max.
Vanadium	.03 max.
Tin	.03 max.
Iron	Remainder

the forged alloy product being characterized by a yield strength (0.02% — offset) in excess of 100,000 psi and a tensile strength in excess of 130,000 psi.

4,058,418

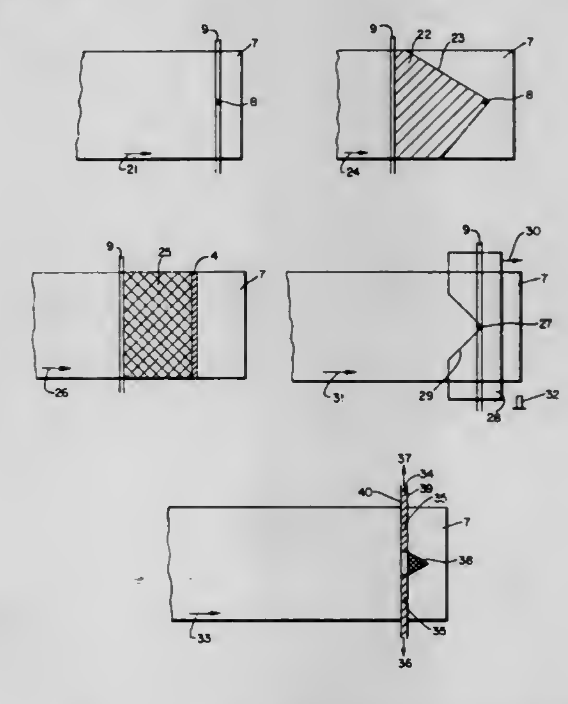
FABRICATION OF THIN FILM SOLAR CELLS UTILIZING EPITAXIAL DEPOSITION ONTO A LIQUID SURFACE TO OBTAIN LATERAL GROWTH

Joseph Lindmayer, Bethesda, Md., assignor to Solarex Corporation, Rockville, Md.

Continuation of Ser. No. 456,727, April 1, 1974, abandoned. This application July 14, 1975, Ser. No. 595,418

Int. Cl.[2] H01L *27/14, 29/04, 31/04*

U.S. Cl. 148—175 **12 Claims**



1. A method of making a thin film of substantially monocrystalline silicon suitable for use in silicon solar cells, comprising
   - a. providing a carrier having a melting point above the temperature at which the silicon is to be deposited.
   - b. applying to the carrier a coating that is maintained in a liquid state at least at the region at which the silicon is to

be deposited, said coating comprising an impurity that acts as a dopant for the silicon,

c. depositing a seed of silicon crystal on the liquid carrier coating.

d. directing the deposition of silicon on said coating by means that limits the area of said coating subject to deposition,

e. effecting relative movement between said silicon deposition limiting means and said carrier so that the silicon seed is expanded in a lateral direction into a film of silicon, and

f. continuing said relative movement at a rate and direction of deposition such that later deposited silicon orients itself to the previously deposited silicon in a lateral and highly ordered form as contrasted with amorphous, epitaxial growth and the dopant in the liquid coating diffuses into the silicon to form a doped layer therein.

4,058,419

METHOD OF MANUFACTURING INTEGRATED INJECTION LOGIC SEMICONDUCTOR DEVICES UTILIZING SELF-ALIGNED DOUBLE-DIFFUSION TECHNIQUES

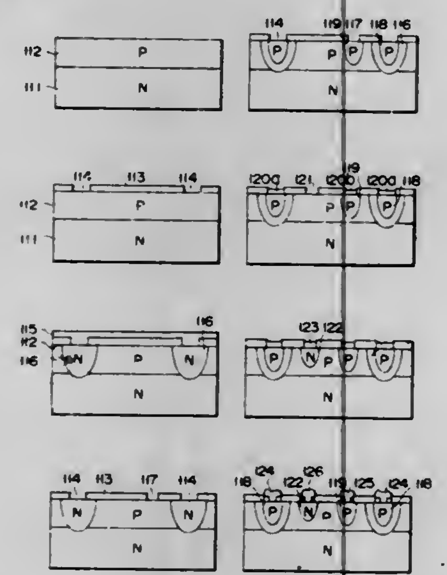
Yukuya Tokumaru; Masanori Nakai; Satoshi Shinozaki; Junichi Nakamura; Shintaro Ito, and Yoshio Nishi, all of Yokohama, Japan, assignors to Tokyo Shibaura Electric, Co., Ltd., Tokyo, Japan

Filed Dec. 24, 1975, Ser. No. 644,294

Claims priority, application Japan, Dec. 27, 1974, 50-148795; Dec. 27, 1974, 50-148796; Dec. 27, 1974, 50-148797; Dec. 27, 1974, 50-1913

Int. Cl.^{2} H01L *21/22, 21/76, 27/04*

U.S. Cl. 148—175 **5 Claims**



1. A method of manufacturing an integrated injection logic semiconductor device in a selected portion of a semiconductor layer comprising the steps of forming said semiconductor layer of the opposite conductivity type on a semiconductor substrate of one conductivity type; forming an insulation film on said selected portion of the semiconductor layer; forming a first opening through said insulation film; doping an impurity of one conductivity type into said selected portion of the semiconductor layer through said first opening thereby forming a first region of said one conductivity type which reaches said semiconductor substrate; forming a second opening through said insulation film doping an impurity of the opposite conductivity type into said first region of the one conductivity type and said semiconductor layer of the opposite conductivity type respectively through said first and second openings in an oxidizing atmosphere thereby forming a first region of the opposite conductivity type completely within said first region of said one conductivity type and a second region of the opposite conductivity type in said selected portion of the layer; semiconductor forming a third opening through said insulation film doping an impurity of one conductivity type into said selected portion of the semiconductor layer through said third opening in an oxidizing atmosphere thereby forming a second region of said one conductivity type in said semiconductor layer of the opposite conductivity type.

4,058,420

AQUEOUS SLURRY EXPLOSIVES WITH COLLOIDAL HYDROUS METAL OXIDE

Phillip Barnhard, IV, Provo, Utah, and Francis John Kieres, Shenandoah, Pa., assignors to IMC Chemical Group, Inc., Terre Haute, Ind.

Filed Dec. 13, 1976, Ser. No. 750,038

Int. Cl.^{2} C06B *45/00*

U.S. Cl. 149—2 **26 Claims**

1. An improved thickened aqueous slurry explosive of the type containing an inorganic oxidizing salt, a fuel, and water, wherein the improvement comprises a thickening amount of a colloidal hydrous metal oxide.

4,058,421

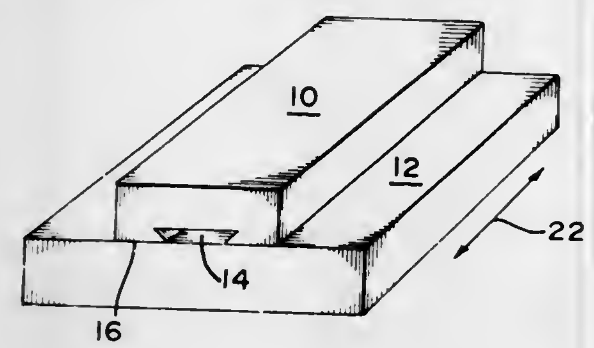
METHOD OF JOINING NON-FUSIBLE WORKPIECES USING FRICTIONAL ENERGY

Arthur M. Summo, Londonderry, N.H., assignor to Branson Ultrasonics Corporation, New Canaan, Conn.

Filed Oct. 7, 1976, Ser. No. 730,305

Int. Cl.^{2} B32B *31/20*

U.S. Cl. 156—73.5 **9 Claims**



1. A method of joining two normally non-fusible polymeric plastic workpieces or two workpieces having different melting points to one another comprising:

placing two workpieces into contact along planar mating surfaces, one of said workpieces having a recess extending from its mating surface into the interior of the respective workpiece and said recess being shaped for trapping material;

applying a static force between said workpieces to urge them into intimate contact with one another along said surfaces;

subjecting said workpieces to relative linear reciprocating motion with respect to one another in the plane of said surfaces for causing resulting from frictional energy softening of the material along the mating surface of said other workpiece and effecting flowing of such softened material into the recess provided in said one workpiece, and

ceasing said relative motion for causing said softened material to solidify whereby said workpieces become joined on account of the trapped solidified material.

4,058,422

APPARATUS FOR BONDING TREADS TO TIRES

Don A. Taylor, Wadsworth, Ohio, assignor to Victor E. Buehrle, Akron, Ohio

Filed Sept. 20, 1976, Ser. No. 724,951

Int. Cl.^{2} B29H *17/36*

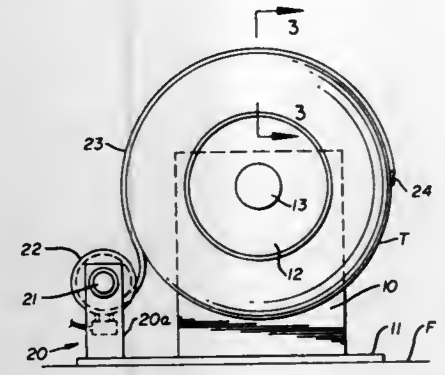
U.S. Cl. 156—96 **17 Claims**

1. Apparatus for bonding tread material to a tire carcass, comprising:

A. a belt windup drum located adjacent to a rotatably mounted tire carcass;

B. an elongate flexible belt carried by said drum with one end secured thereto;

C. electrical resistance heat imparting means carried by said flexible belt;



D. means for removably attaching the opposed end of said belt to the exterior surface of the tread material; and

E. said flexible belt having a length sufficient to encircle the periphery of the tire carcass and said tread material.

4,058,423

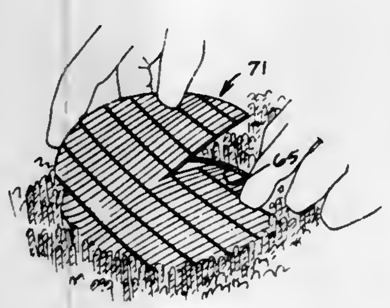
CARPET REPAIR DISK AND TOOL

Hollis H. Bascom, 1247 DePaul Way; John J. Greci, 1442 Third St., both of Livermore, Calif. 94550, and Merle R. Hoopengardner, 879 Mountain View Drive, Lafayette, Calif. 94549

Filed July 16, 1976, Ser. No. 705,911

Int. Cl.^{2} B32B *35/00*

U.S. Cl. 156—98 **10 Claims**



1. A method of repairing a damaged area of a carpet and comprising,

cutting a circular plug which contains the damaged area,

removing the plug to leave a circular opening in the carpet,

cutting a matching patch plug from another portion of carpet,

inserting a unitary carpet repair disk through the opening and into backup position under the opening and the carpet, said disk having a larger diameter than the diameter of the opening cut in the carpet so that the outer periphery of the repair disk engages the back side of the carpet entirely around the opening,

installing the patch plug in the opening,

adhering the patch plug and the repair disk to retain the patch plug in place, and wherein the carpet repair disk comprises a barrier sheet, having a non-woven fabric strand reinforcement adhered to one surface of the sheet and a pressure sensitive adhesive on said one surface for adhering the strand reinforcement to the back surface of the patch plug and the carpet around the patch opening to hold the patch plug in place and wherein the carpet repair disk includes a silicone treated release paper on the pressure sensitive adhesive and including the step of peeling off the silicone treated release paper prior to inserting the carpet repair disk through said opening cut in the carpet.

4,058,424

METHOD OF AND DEVICE FOR PRODUCING IN A CONTINUOUS OPERATION ENDLESS DRIVING BELTS OF ANY DESIRED CIRCUMFERENTIAL LENGTH

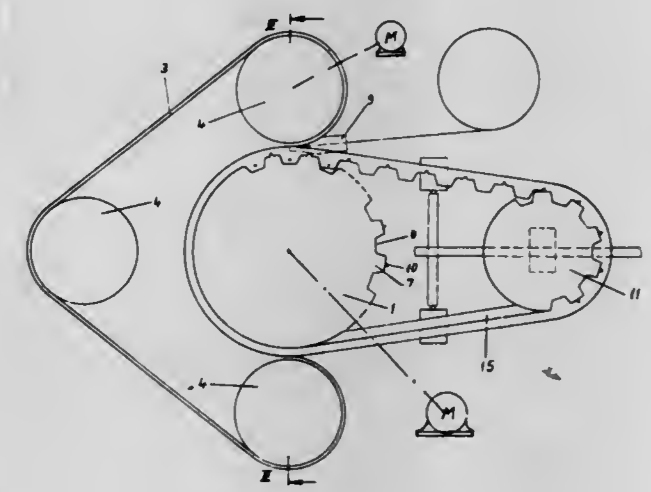
Rudolf Breher, Porta Westfalica, Germany, assignor to BRECO Kunststoffverarbeitungs-GmbH & Co. KG, Porta Westfalica, Germany

Filed June 14, 1976, Ser. No. 695,379

Claims priority, application Germany, June 14, 1975, 2526691

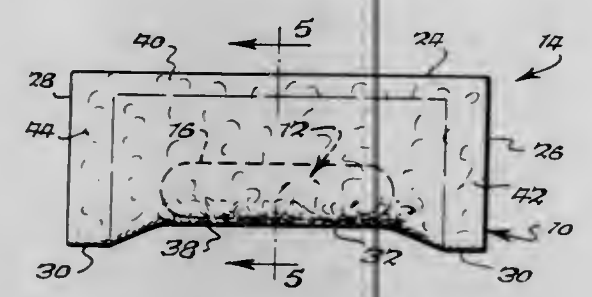
Int. Cl.^{2} B29F *1/10*

U.S. Cl. 156—137 **12 Claims**



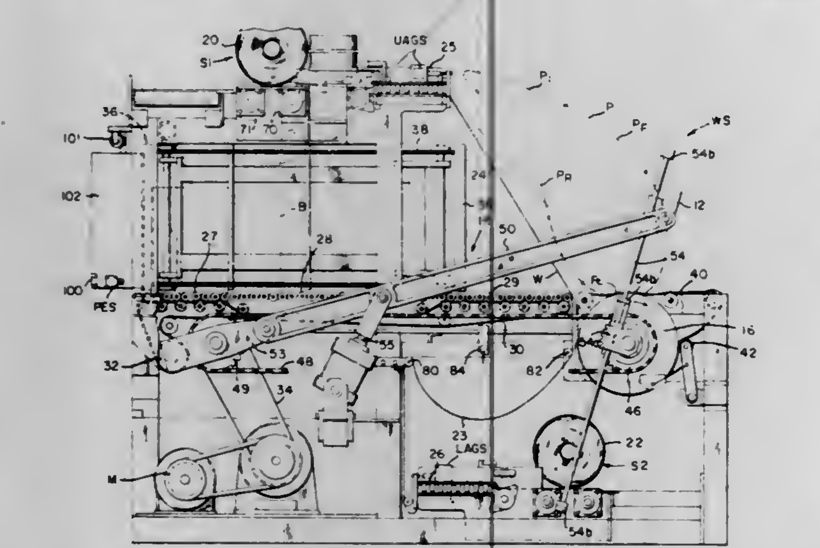
1. A device for producing in a continuous manner endless driving belts of any desired circumferential length and of extrudable synthetic material with a pull-resistant reinforcing insert extending in the longitudinal direction of the belt to be produced, which includes: a rotatable molding drum provided with a cylindrical shoulder arranged at one end of said drum and having a diameter slightly greater than the remainder of said drum, a molding belt movable over a circumferential section of said drum in radially spaced relationship thereto so as to confine therewith arc-shaped molding chamber means with inlet and outlet sections while sealingly engaging the peripheral surface of said shoulder to close only one side of said molding chamber means, the other side of said molding chamber means being open, inlet means for synthetic material and inlet means for the pull-resistant reinforcing insert arranged at said inlet section of said molding chamber means, a tensioning wheel arranged in axis parallel spaced relationship to said molding drum and adjustable relative to said drum, sealing means sealingly engaging at said inlet section said molding drum and said shoulder and said molding belt, said sealing means extending over a portion of said molding chamber means in the axial direction of said drum, deviating means interposed between said drum and said tensioning wheel and operable to laterally displace a belt strip leaving said outlet section and passing from said drum over said tensioning wheel back to said drum and said inlet section so that said belt strip again enters said molding chamber means offset in axial direction of said drum by the width of said sealing means and sealingly engages that side of said sealing means which faces away from said shoulder while the open side of said molding chamber means is sealingly closed by the respective last returned belt strip, said synthetic material and reinforcing insert being formed into a continuous formation of a reinforced strand of synthetic material finally being adapted to be cut into rings by suitable standard cutting means.

4,058,425
INHALANT DISPERSER
James L. Thrun, Orchard Park, N.Y., assignor to A-T-O Inc., Willoughby, Ohio
Division of Ser. No. 379,362, July 16, 1973, Pat. No. 3,881,634. This application Mar. 18, 1974, Ser. No. 452,079
Int. Cl.^{2} B29D *23/00;* **B31F** *1/00*
U.S. Cl. 156—200 **3 Claims**



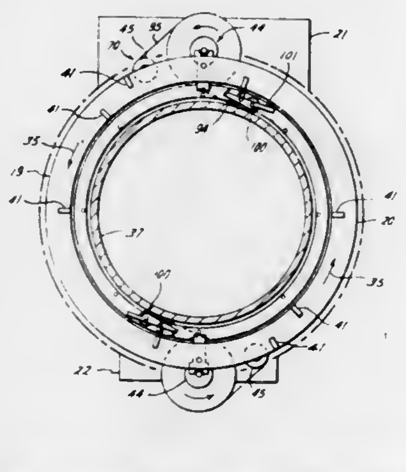
1. A method of forming an inhalant disperser comprising: applying a protective layer of impermeable material on a strip of liquid absorbent paper to form a composite multi-layered strip wherein said protective layer of material is an adhesive applied as a solid coating along the central portions of said strip of paper and as apertured bands on the remaining portions of said strip; folding said composite strip lengthwise to form a trough with said protective layer constituting the inner wall of said trough; placing an ampoule containing a vaporizable liquid in said trough; said trough being shaped to engage a major portion of said ampoule; and sealing said folded composite strip along the open edges thereof to form an enclosure for said ampoule, said adhesive on said strip being meltable under elevated temperatures to effect said sealing of said open edges upon the application of heat thereto in a manner wherein said vaporizable liquid may pass readily through at least portions of said apertured bands.

4,058,426
METHOD AND APPARATUS FOR WRAPPING OBJECTS WITH A SEALABLE WRAP
James A. Pasic, and Marvin I. Berg, both of Montesano, Wash., assignors to Ovalstrapping, Inc., Hoquiam, Wash.
Filed June 9, 1976, Ser. No. 694,081
Int. Cl.^{2} B31F *31/00*
U.S. Cl. 156—212 **16 Claims**



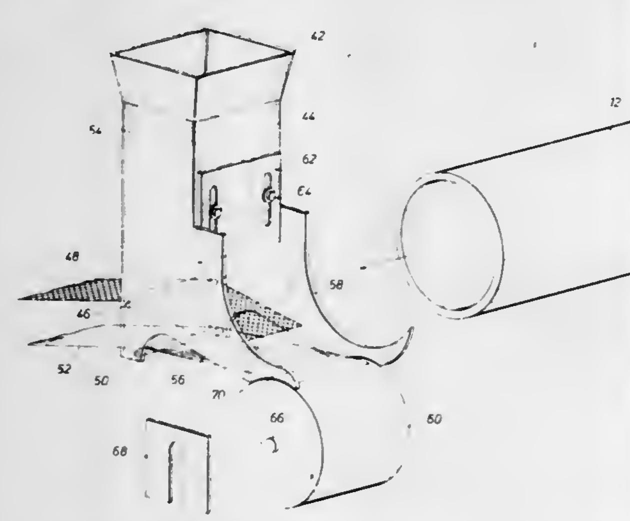
12. The method of delivering two sealable lengths of wrap to a wrapping station to form a web and be wrapped around an object moving along a horizontal path, comprising:
storing the wraps at a storage station on opposite sides of the path, holding the wraps against movement at the storage station,
joining the wraps at a sealing and cutting location,
moving the object into engagement with the web to pull the web along the path,
releasing the held, stored wrap at the storage station and providing a free unrestricted path between the storage station and the object as the object pulls the web to eliminate resistance to movement of the web as the object pulls the web,
cutting the web behind the object and sealing the wraps to form a new web behind the object at a cutting and sealing station, and
tightening and retracting the new web across the path rearwardly from the sealing and cutting station.

4,058,427
PIPE WRAPPING APPARATUS
Daniel F. Wilson, Houston, Tex., assignor to Midcon Pipeline Equipment Co., Houston, Tex.
Filed Dec. 29, 1976, Ser. No. 755,261
Int. Cl.^{2} B65H *81/00;* **B32B** *31/00*
U.S. Cl. 156—392 **14 Claims**



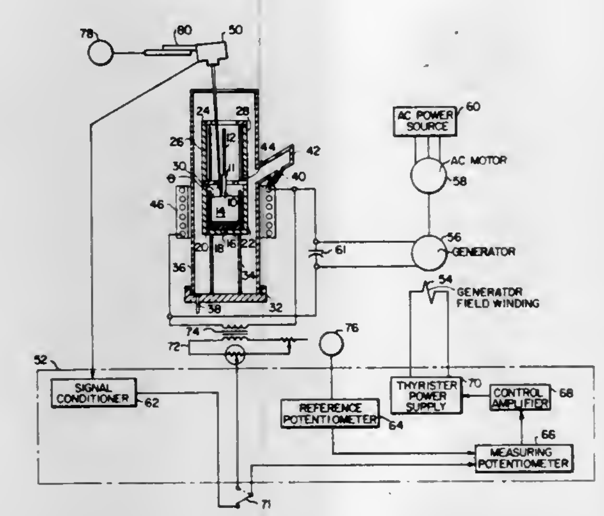
1. Pipe wrapping apparatus, comprising first spindle means adapted to hold a roll of pipe wrapping tape having a strip of backing material removably adhered to one surface thereof, means for supporting said first spindle means adjacent a pipe receiving path provided through said pipe wrapping apparatus, means for moving said supporting means and said first spindle means about a pipe disposed along said path to draw said tape from said roll to be wound around said pipe, second spindle means supported by said supporting means adjacent said first spindle means, means for rotating said second spindle means about its axis whereby said backing strip may be wound thereon and removed from said pipe wrapping tape before said pipe wrapping tape is wound around said pipe.

4,058,428
PIPE COATING MACHINE
Patrick P. Case, and David L. Gardner, both of Conroe, Tex., assignors to Compression Coat Corporation, Houston, Tex.
Filed Feb. 4, 1974, Ser. No. 439,322
Int. Cl.^{2} B65H *81/08;* **F16L** *9/16*
U.S. Cl. 156—429 **6 Claims**



1. An apparatus for applying a cementatious coating to a pipe on the exterior thereof, comprising:
means for advancing a pipe to be coated along its axis, said means moving consecutive sections of pipe along a specified path;
applicator means for applying a cementatious weight material to a pipe moving in a path determined and controlled by said pipe advancing means, said applicator means including a first means for holding and dispensing a supply of cementatious material;
means for storing a supply of pipe wrapping material in the form of an elongate ribbon;
means for guiding the elongate ribbon of pipe wrapping material through said applicator means;
said applicator means further including a second means placing a layer of cementatious material from said first means on an exposed surface of the pipe wrapping material wherein the layer is on the surface thereof facing the pipe prior to application;
third means for rotating the pipe as cementatious material and the pipe wrapping material are placed on the pipe by said applicator means, said third means continuously presenting to said applicator means an uncoated portion of the pipe;
a rotatable drum having an outer cylindrical surface approximately parallel to the axis of the pipe and spaced therefrom; and
said applicator means further including a fourth means which guides the pipe wrapping material after the exposed surface thereof has had a layer of the cementatious material coated thereon into the space between the pipe and said drum in a manner such that said drum, presses against the uncoated surface of the coated pipe wrapping material and squeezes the cementatious material into contact with the pipe, said drum controlling the thickness of the cementatious material applied to the pipe by squeezing the excess, if any, away from the pipe.

4,058,429
INFRARED TEMPERATURE CONTROL OF CZOCHRALSKI CRYSTAL GROWTH
Charles Duncan, Penn Hills Township, Alleghany County, and Richard H. Hopkins, Monroeville, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.
Filed Dec. 4, 1975, Ser. No. 637,550
Int. Cl.^{2} B01J *17/18*
U.S. Cl. 156—601 **16 Claims**



1. A method for controlling the diameter of a crystal grown by withdrawing a seed from a melt, said method comprising:
withdrawing the growing crystal from the melt at a constant rate;
sensing the infrared spectrum of a point on the surface of the melt adjacent to said crystal to determine the instantaneous temperatures of said melt at said point; and
controlling the temperature at the point on the surface of said melt in response to an average of the instanteneous temperatures at the point on the melt determined over a predetermined period of time.

4. Apparatus for growing a crystal of controlled diameter by withdrawing a seed at a constant rate from a melt, said apparatus comprising:
temperature sensing means for providing an output signal in response to the instantaneous melt temperature at a point on the surface of said melt adjacent to the crystal;
means for heating the melt;
means for energizing said heating means; and
temperature control means responsive to the output signal of said temperature sensing means, said temperature control means determining an average of the output signal of said temperature sensing means and controlling said energizing means with respect to the average of the output signal to control the average temperature of the point on the melt adjacent to the crystal.

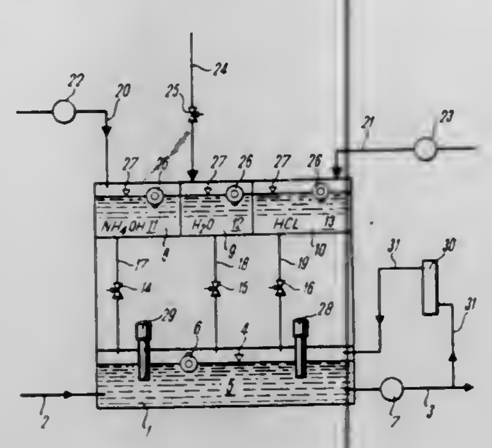
4,058,430
METHOD FOR PRODUCING COMPOUND THIN FILMS
Tuomo Suntola, Riihikallio, 02610 Espoo 61, Finland, and Jorma Antson, Urheilutie 22, 01350, Vantaa 35, Finland
Filed Nov. 25, 1975, Ser. No. 635,233
Claims priority, application Finland, Nov. 29, 1974, 743473
Int. Cl.^{2} B05D *5/00, 5/12*
U.S. Cl. 156—611 **8 Claims**

1. Method of forming and growing a highly oriented thin film of a compound by reaction of the single elements of said compound on a substrate, which comprises subjecting said substrate to the vapor of a first single element which can react with the surface of said substrate at a temperature sufficiently high for such reaction to occur and too high for vapors of said first single element to condense on the surface which is formed, whereby a single atomic layer of said first single element is formed on said surface, subjecting the thus formed surface of said first single element atomic layer to the vapor of a second single element which can react with said first single element at a temperature sufficiently high for such reaction to occur and too high for vapors of said second single element to condense on the surface which is formed, whereby a single atomic layer of said second element is formed on said surface bound to said first single element, and alternately subjecting the thus formed surface under the same conditions to vapors of single elements each of which can react with the surface single element until the formed compound film reaches a desired thickness.

4,058,431
METHOD OF ETCHING COPPER AND COPPER ALLOYS
Rainer Haas, Magstadt, Germany, assignor to Firma Hans Höllmüller, Maschinenbau, Herrenberg, Germany
Division of Ser. No. 386,021, Aug. 6, 1973, Pat. No. 3,933,544, which is a division of Ser. No. 230,871, March 1, 1972, Pat. No. 3,806,393. This application Oct. 20, 1975, Ser. No. 624,776
Claims priority, application Germany, Mar. 8, 1971, 2110950
The portion of the term of this patent subsequent to Jan. 20, 1993, has been disclaimed.
Int. Cl.^{2} C23F *1/00*
U.S. Cl. 156—627 **6 Claims**

1. A method of etching copper and copper alloys, comprising the steps of:
treating copper or a copper alloy with an etching medium consisting of an ammoniacal etching solution containing chloride ions, thereby producing a copper-I compound;
regenerating the copper-I compound by reacting therewith a chloro compound and by the addition of water to said solution at a rate controlled in dependence upon the rate of formation of said copper-I compounds, the regenera-

tion rate being controlled at least in part by monitoring the specific gravity of the solution; and



supplying to said solution as amount of ammoniacal compound such that the pH value of the latter is maintained at about 8.5 to 10.0.

4,058,432

PROCESS FOR PRODUCING A THIN METAL STRUCTURE WITH A SELF-SUPPORTING FRAME

Hans Schuster-Woldan, Woerthsee-Steinebach; Kaspar Weingand, Lochham, and Dirk Koch, Munich, all of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Mar. 17, 1976, Ser. No. 667,531

Claims priority, application Germany, Mar. 19, 1975, 2512086

Int. Cl.² H01L *21/312*

U.S. Cl. 156—659 **10 Claims**

1. A process for producing a thin metal structure, such as a grid, with a self-supporting frame which has a thickness substantially greater than the thickness of the thin metal structure, the process comprising the steps of providing a carrier member having a size and thickness of the self-supporting frame and first and second surfaces, forming a galvanic resistant coating on the first surface of the carrier member, said coating exposing portions of said first surface adjacent each of the edges of the carrier member and portions of the first surface in the configuration of the metal structure to be formed with all portions being interconnected, galvanically depositing a layer of metal on the exposed portions of the first surface to produce the thin metal structure having a continuous border portion, removing the galvanic resistant coating, applying an etch resistant coating on the edges of the carrier member and at least a portion of the second surface adjacent the edges of the carrier member, selectively etching the carrier member to remove all of the carrier members except that portion protected by the etch resistant coating to form the thin metal structure mounted on a self-supporting frame.

4,058,433

CONVERSION OF SULFUR IN BLANK LIQUOR TO ELIMINATE ODOROUS EMISSIONS AND FACILITATE THE COLLECTION OF SULFATE SOAPS

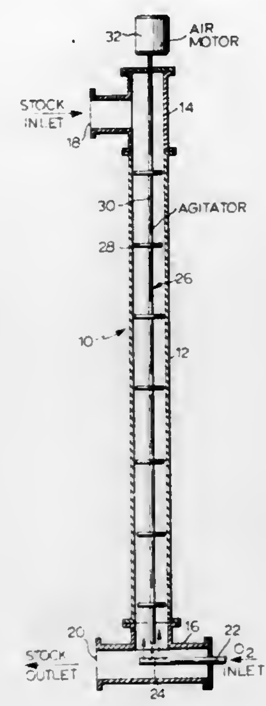
Robert R. Fuller, and Donald Blanton Morris, both of Tuscaloosa, Ala., assignors to Gulf States Paper Corporation, Tuscaloosa, Ala.

Filed Mar. 6, 1975, Ser. No. 555,872

Int. Cl.² D21C *11/08*

U.S. Cl. 162—16 **29 Claims**

1. A method of oxidizing substantially all of the sulfur in weak black liquor from a kraft pulp process which comprises oxidizing sulfur in the weak liquor at a point in the process between the blow tank and the pulp washer by the injection into the liquor of sufficient oxygen-rich gas to oxidize substantially all of the sulfur present in the weak black liquor and until



the sulfide concentration in the weak black liquor is substantially zero.

4,058,434

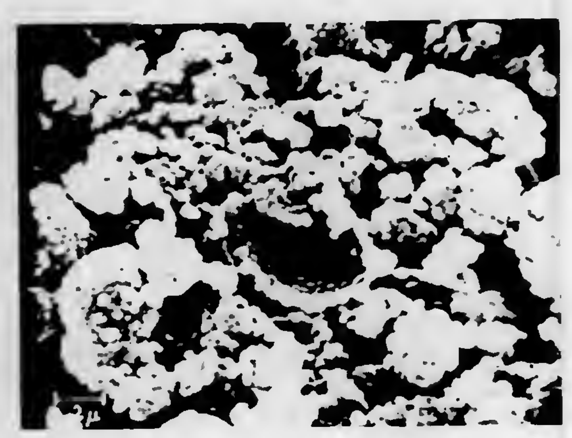
OPACIFIED PAPER SHEET AND METHOD FOR PRODUCTION THEREOF

David N. Vincent, Glenview, and Ronald Golden, Mt. Prospect, both of Ill., assignors to Champion International Corporation, Stamford, Conn.

Division of Ser. No. 508,322, Sept. 23, 1974. This application Aug. 24, 1976, Ser. No. 717,175

Int. Cl.² D21D *3/00;* D21H *3/52, 3/56*

U.S. Cl. 162—165 **24 Claims**



1. A process for the formation of opacified paper sheet, which comprises admixing cellulosic fibers and opacifying agents consisting essentially of substantially spherical aldehyde condensation polymeric super-particles, each of said super-particles having a substantially spherical, discontinuous shell composed of agglomerated, discrete, aldehyde condensation polymeric secondary particles, said shell surrounding a substantially spherical hollow core, said secondary particles being substantially spherical and substantially solid throughout, and forming said admixture into a paper sheet.

9. A paper sheet consisting essentially of cellulosic fibers having opacifying agents incorporated therein, said opacifying agents consisting essentially of substantially spherical aldehyde condensation polymeric super-particles, each of said super-particles having a substantially spherical, discontinuous shell composed of agglomerated, discrete, aldehyde condensation polymeric secondary particles, said shell surrounding a substantially spherical hollow core, said secondary particles being substantially spherical and substantially solid throughout.

4,058,435

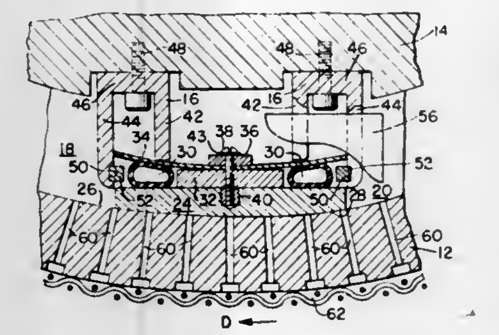
SEAL ASSEMBLY FOR PRESSURE OR VACUUM CHAMBERS

Glenn V. Williams, Jr., Monroe, Ohio, assignor to Diamond International Corporation, New York, N.Y.

Filed July 15, 1976, Ser. No. 705,435

Int. Cl.² D21F *3/10*

U.S. Cl. 162—371 **12 Claims**



1. Seal assembly for use in forming a zone or chamber in which pressure or vacuum may be applied in the interior of a vacuum roll such as is used in the manufacture of paper comprising:

a. a generally elongate sealing element having an arcuate sealing surface conforming generally in curvature to that of the interior of the roll in which it is to be incorporated;

b. a generally flat spring unit disposed radially inwardly of said sealing element and being substantially equal to said sealing element in axial length and in circumferential width;

c. loading means disposed between said sealing element and said spring unit to selectively apply a load for urging said sealing element away from said spring unit to a sealing condition; and

d. means securing said sealing element and said spring unit together with said loading means therebetween and said spring unit urging said sealing element toward a non-sealing position.

4,058,436

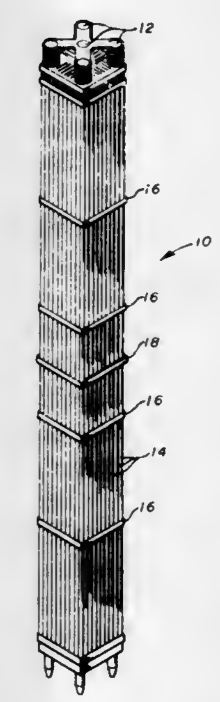
NUCLEAR REACTOR SEISMIC FUEL ASSEMBLY GRID

Andrew J. Anthony, Tariffville, Conn., assignor to Combustion Engineering Inc., Windsor, Conn.

Filed Dec. 5, 1975, Ser. No. 638,100

Int. Cl.² G21C *3/30*

U.S. Cl. 176—78 **13 Claims**



1. A fuel assembly for a nuclear reactor comprising:

at least a first grid for supporting a plurality of elongated fuel elements in a spaced apart substantially parallel relationship, said spacer grid including:

a perimeter strip which defines the periphery of the spacer grid, said parameter strip having a central portion and pair of oppositely disposed integral edge portions, said central portion and edge portions extending along the length of the perimeter strip and completely about the spacer grid, said perimeter strip edge portions being bent inwardly with respect to said control portion at an angle of less than 90° C, said inwardly angled perimeter strip edge portions being terminated so as to provide a clearance between said perimeter strip edge portions and fuel elements received in said spacer grid, said perimeter strip central portion being provided with a plurality of openings therein, said openings being aligned with the fuel elements received in said spacer grid, said perimeter strip central portion further being provided with inwardly extended projections respectively located above and below each of said openings; and

a plurality of divider members positioned within said perimeter strip, said divider members intersecting said perimeter strip intermediate the openings therein and being mechanically joined to said perimeter strip, said divider members being arranged in a crossing pattern to define a grid which receives a fuel element in each grid sector, the outer row of sectors of said grid being in part defined by said perimeter strip, said divider members including:

fuel element locating springs, said springs being positioned so as to extend into the sectors of said grid, one of said locating springs extending from a divider member oriented generally parallelly to said perimeter strip into every second one of the grid sectors of the outer row and toward said perimeter strip; and

back-up arches formed on at least the divider members which are adjacent to and generally parallel with said perimeter strip, said back-up arches being adjacent to the springs which extend into every second grid sector of the outer row, said back-up arches extending toward said perimeter strip a lesser distance when compared to said locating springs whereby said back-up arches limit the compression of said locating springs by limiting the motion of the fuel elements.

4,058,437

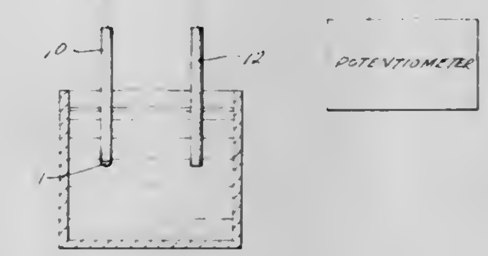
PROCESS FOR SELECTIVELY MEASURING SODIUM IONS IN SOLUTION

Chung Chang Young, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Division of Ser. No. 689,310, May 24, 1976, which is a division of Ser. No. 511,720, Oct. 3, 1974, Pat. No. 3,988,234. This application Oct. 12, 1976, Ser. No. 731,258

Int. Cl.² G01N *27/36*

U.S. Cl. 204—1 T **20 Claims**



1. In a process for selectively measuring sodium ions in an aqueous ionic mixture containing sodium and other monovalent cations including the step of contacting a sodium ion selective glass electrode with said mixture and obtaining a

resulting potentiometric response as a measure of the sodium ion concentration of said mixture, the improvement wherein said sodium ion selective glass electrode is provided with a glass sensing membrane formed from a glass composition consisting essentially of:

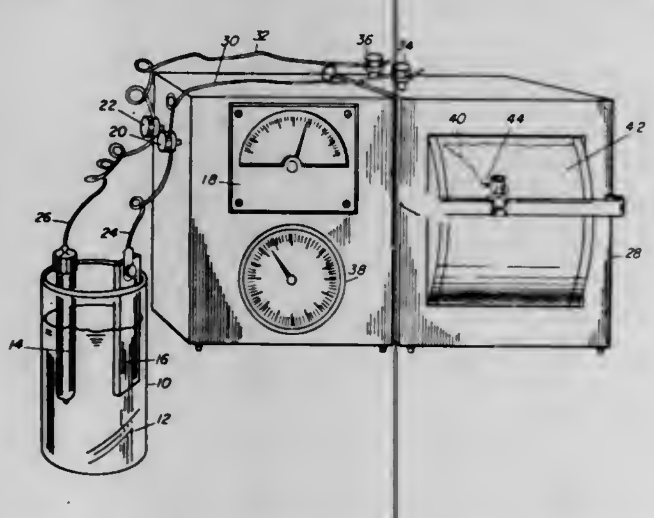
Component	Mole %
Na_2O	5-25
Al_2O_3	0-20
Ta_2O_5	1-10
SiO_2	60-82

wherein $\frac{Ta_2O_5 + Al_2O_3}{Na_2O} \geqq 0.2$.

4,058,438
RAPID UNIVERSAL SENSING CELL

William J. Russell, Sparta, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Continuation-in-part of Ser. No. 597,059, July 18, 1975, abandoned. This application Oct. 28, 1976, Ser. No. 736,614
Int. Cl.² G01N *27/00;* C25F *3/00;* G01N *27/26*
U.S. Cl. 204—1 T **2 Claims**



1. A method for determining etching time for preparing a consistent metal surface for resistance welding and adhesive bonding which comprises:
   electrically coupling a standard half cell and a sample of the material to be etched to the terminals of a potentiometer;
   placing the sample to be etched in an etchant-electrolyte bath;
   placing a standard half cell in said bath;
   monitoring the potential being produced by said etchant-electrolyte bath in combination with said standard half cell and the sample being etched;
   recording the elasped time at which the potential measured by said potentiometer approaches a steady value.

4,058,439
NICKEL ELECTROPLATING BATH FOR SATIN FINISH AND METHOD

Toshio Tamura, Tokyo; Shigeo Oouchi, Yokahama; Kenji Oosawa, Hino, and Shimetomo Fueki, both of Tokyo, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed July 16, 1976, Ser. No. 705,797
Claims priority, application Japan, July 17, 1975, 50-87586
Int. Cl.² C25D *3/12*
U.S. Cl. 204—49 **19 Claims**

1. An acidic nickel electroplating bath composition for obtaining a uniform satin-finish metal plate surface on the material plated which comprises

(1)	nickel	25	to	170 gm/l
(2)	polyamide resin dissolved in a low molecular			

-continued

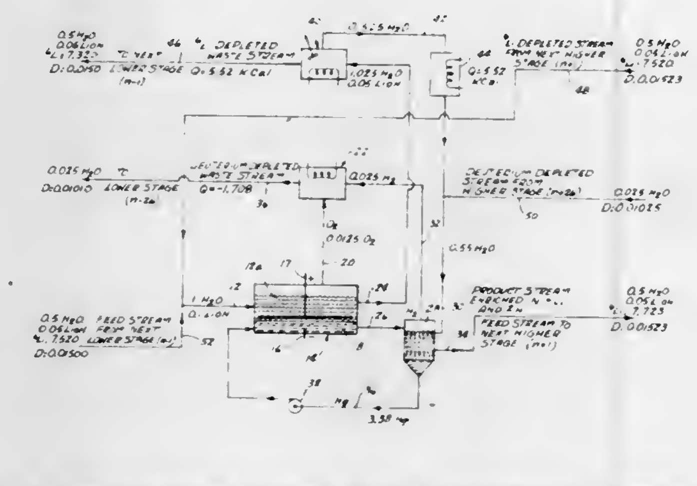
	weight alcohol having 1 to 3 carbon atoms	1	to	10,000 ppm
(3)	polishing agent	0.1	to	40 gm/l

wherein nickel is dissolved and forms a continuous aqueous phase solution and the polyamide resin is dispersed in the aqueous phase to form a stable emulsion.

4,058,440
CONCURRENT SEPARATION OF LITHIUM AND HYDROGEN ISOTOPES

August Valfells, Ames, Iowa, assignor to Iowa State University Research Foundation, Inc., Ames, Iowa

Filed Oct. 17, 1975, Ser. No. 623,361
Int. Cl.² C25B *1/14;* C22B *26/12;* C01B *1/07*
U.S. Cl. 204—101 **13 Claims**



1. A method of separating light hydrogen and deuterium, said method comprising,
   reacting an alkali metal amalgam with water to provide an alkali metal hydroxide solution and hydrogen,
   removing the evolved hydrogen, said solution of alkali metal hydroxide being enriched in deuterium, and
   separating the alkali metal hydroxide or the corresponding alkali metal from said solution to provide deuterium enriched water, and thereafter, reacting repeatedly in the same manner the deuterium enriched water with alkali metal amalgam to provide a continually increasing enrichment of deuterium.

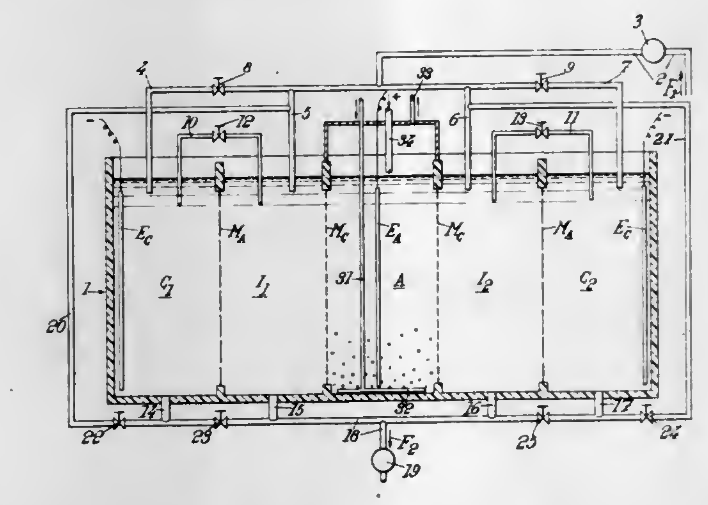
4,058,441
PROCESS FOR THE REGENERATION OF SPENT PICKLING SOLUTIONS

Andrée Bonnemay nee Couture, Boulogne; Jean Royon, La Varenne; Jean Bereau, Chatenay Malabry, and Jean-Claude Catonne, Ivry, all of France, assignors to Societe d'Etude pour la Regeneration de l'Acide Chlorhydrique SEPRAC, France

Filed May 28, 1975, Ser. No. 581,674
Claims priority, application France, May 28, 1974, 74.18478
Int. Cl.² C25B *1/22;* C25C *1/06*
U.S. Cl. 204—103 **5 Claims**

1. A process for the regeneration of spent pickling solutions based upon hydrochloric acid, after use upon ferriferous surfaces and therefore containing iron chlorides, using an electrodialysis cell defining an anodic compartment as well as at least one intermediate compartment adjacent said anodic compartment and a cathodic compartment adjacent each intermediate compartment, each said cathodic compartment having a cathode therein and being separated by an anion-selective membrane from the adjacent intermediate compartment, the anodic compartment having an anode therein and being separated by a cation-selective membrane from each adjacent intermediate compartment, electric circuitry being provided for connecting said anode and each said cathode to a source of direct electric current, comprising the steps of introducing within the anodic compartment of said cell an anolyte with characteristics such

that the overall faradaic yield for oxidation of water is about 1, whereby substantially all the electric current at the anode is used for the oxidation of water; introducing a first and a second portion of the spent pickling solution respectively and simultaneously into the cathodic compartment and into the intermediate compartment of said cell; and subjecting the first and second portions to an electrolytic treatment so as to deplete the first portion within the cathodic compartment with respect to iron by electrodeposition thereof upon the cathode and so as to enrich the second portion within the intermediate compartment with respect to hydrogen chloride by migration of chloride ions from the first portion through the anion-selective membrane to the second portion, the chloride ions originating



in the cathodic compartment as a result of the removal of iron from the first portion by the electrodeposition of iron upon the cathode, and by migration of hydrogen ions from the anolyte through the cation-selective membrane to the second portion, the hydrogen ions originating from the oxidation of water in the anodic compartment, said electrolytic treatment being conducted in such a manner as to establish and maintain (i) a cathodic current density of from 0.1 to 20 A/dm², (ii) an anodic current density corresponding to the water-oxidation reaction, and (iii) a current density at the membranes such that their perm-selectivity is about 1, the arrangement being such that at any time the ionic strength in equivalents of the regenerated solution is equal to the ionic strength in equivalents of the untreated spent pickling solution.

4,058,442
PHOTOPOLYMERIZABLE COMPOSITION FOR FORMED-IN-PLACE ARTIFICIAL NAILS

Henry L. Lee, Jr., Pasadena; Jan A. Orlowski, and Carl H. Fromm, both of Altadena, all of Calif., assignors to Lee Pharmaceuticals, South El Monte, Calif.

Filed Sept. 15, 1975, Ser. No. 613,287
Int. Cl.² C08L *1/32;* C08F *2/46, 8/00*
U.S. Cl. 204—159.12 **16 Claims**

1. A composition that is readily applicable to human nails for cosmetic, protective and other purposes, and that polymerizes upon exposure to ultraviolet radiation, for the production of artificial nails by direct application to human nail tissue and curing by exposure to a controlled source of radiation, consisting essentially of, in admixture:
   i. from about 40% to about 90% by weight of the composition of a monofunctional ester monomer selected from the group consisting of esters of acrylic acid and 1-4 carbon alkyl-substituted acrylic acids with metyl, ethyl, propyl, isopropyl, butyl, isobutyl, furfuryl, tetrahydrofurfuryl and glycidyl alcohols, and mixtures of such esters;
   ii. from about 3% to about 40% by weight of the composition of an ester monomer selected from the group consisting of esters of acrylic acid and 1-4 carbon alkyl-substituted acrylic acids with polyhydric alcohols containing 2 to 4 hydroxyl groups and mixtures of such esters;
   iii. from about 0.1% to about 30% by weight of the composition of an initiator that acts upon exposure to ultraviolet radiation to initiate polymerization, and
   iv. from about 5% to about 25% by weight of the composition of a modifier that is soluble or swellable in the admixture and is selected from the group consisting of particulate cured elastomers up to 300 microns in particle size, and mixtures of such elastomers with a particulate cellulose ester or a particulate cellulose ether-ester having up to 300 micron particle size in the ratio of at least 4.5 parts by weight of the former to each one party by weight of the latter,

said composition being characterized in that the composition after curing exhibits: an in vivo adhesion to natural human nails of at least about 25 pounds per square inch; a flexural modulus of elasticity of at least 50×10^3 pounds/square inch; a flexural strength of at least 3000 pounds/square inch, and an elongation to break under flexural stress of at least 3.5% as measured under ambient pressure and temperature conditions.

4,058,443
RECORDING MATERIAL

Masataka Murata; Keiji Takeda, and Teppei Ikeda, all of Asaka, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Dec. 29, 1975, Ser. No. 644,682
Claims priority, application Japan, Dec. 26, 1974, 49-444
Int. Cl.² C08F *2/50, 4/00*
U.S. Cl. 204—159.17 **10 Claims**

1. A recording material comprising a support having thereon a layer of a photopolymerizable composition comprising (a) a binder combination, (b) a monomer having at least one addition-polymerizable unsaturated bond, and (c) a photopolymerization initiator, wherein the improvement comprises that said binder combination (a) consists of (1) a chlorinated polyolefin having a polymerization degree of from about 300 to about 20,000 and a chlorine content from about 40 to about 75% by weight based on the total resin weight selected from the group consisting of chlorinated polyethylene and chlorinated polypropylene, and (2) a straight-chained polymeric material having sufficient compatibility with said components (1), (b) and (c) and, a molecular weight above about 10,000, the ratio of component (2) to component (1) being from about 10% to about 90% by weight based on the total amount of said binder combination, the ratio of component (2) to the sum of components (1) and (2) being 0.1 to 0.9 by weight, and the ratio of component (b) to the sum of components (1) and (2) being 0.1 to 5 by weight.

4,058,444
PROCESS FOR PREPARING AN INSULATED PRODUCT

Kyoichi Shibayama; Fumihiko Satho, and Mamoru Naitho, all of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 23, 1976, Ser. No. 669,625
Claims priority, application Japan, Mar. 31, 1975, 50-39435; Mar. 31, 1975, 50-39436
Int. Cl.² C25D *13/06, 13/10*
U.S. Cl. 204—181 **8 Claims**

1. A process for preparing an insulative product which comprises: immersing a substrate in an electrodeposition varnish prepared by mixing an inorganic powder having a particle size smaller than 20 mesh with a water dispersion varnish; electrodepositing the inorganic powder from said electrodeposition varnish to form an electrodeposited layer of high inorganic powder content on said substrate; and immersing said varnished substrate in an organic or an inorganic insulation varnish to impregnate the spaces of the electrodeposited layer with said insulation varnish.

4,058,445
METHOD OF PRODUCING A TANTALUM THIN FILM CAPACITOR

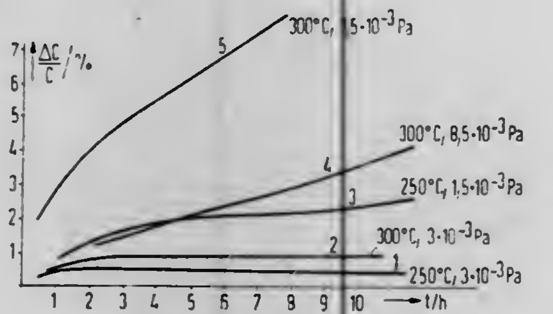
Wilfried Anders, Munich, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Mar. 26, 1976, Ser. No. 670,827

Claims priority, application Germany, Mar. 27, 1975, 2513858

Int. Cl.[2] C23C *15/00;* H01G *4/10*

U.S. Cl. 204—192 SP 4 Claims



1. A method for producing heat-stable, dip-solderable thin film tantalum capacitors comprising the steps of:
- mounting a thin film alpha tantalum electrode on a non-conducting supporting member, the tantalum being doped with nitrogen so as to have a minimum nitrogen content greater than the nitrogen content of beta tantalum and a maximum nitrogen content less than that of tantalum nitride,
- forming a tantalum pentoxide film having dielectric properties on said tantalum electrode,
- tempering at least the tantalum electrode and the dielectric film and
- covering said dielectric film with another electrode of a film conducting material.

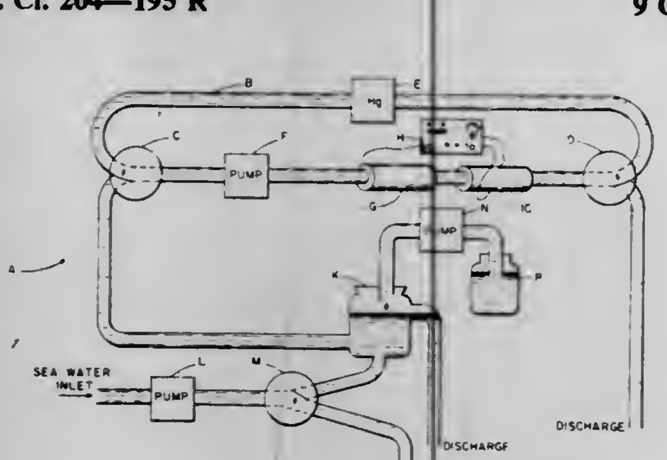
4,058,446
ANODIC STRIPPING VOLTAMMETRY SYSTEM AND COMBINATION ELECTRODE ASSEMBLY THEREFORE

Alberto Zirino; Cesar Clavell, both of San Diego, Calif., and Kent Huey, Anchorage, Alaska, assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Nov. 29, 1976, Ser. No. 745,931

Int. Cl.[2] G01N *27/30, 27/42*

U.S. Cl. 204—195 R 9 Claims



1. In an anodic stripping voltammetry system for measuring the presence and concentration of trace metals in a sample solution having a source of a metal plating solution, a means for sensing trace metals, a means for feeding the sample solution and the plating solution through the sensing means, a means coupled for alternately coupling the sample solution and the plating solution to the sensing means, a means for depositing a metal plating film on the sensing means while the plating solution is coupled to flow through the sensing means and for reducing trace metals on the metal plating film while the sample solution is alternately coupled to flow through the sensing means, and means for indicating the presence and concentration of trace metals in the sample solution, an improvement therefor is provided comprising:
- a combination electrode including a tubularly shaped body member provided with a coaxial bore coupled to receive the flow of the plating solution and the sample solution, a reference electrode disposed on the outer surface of the body member, and a counter electrode disposed in the bore of the body member and reaching to the exterior of the body member both electrodes extending to the indicating means.

6. A combination electrode for receiving a flowing solution therethrough comprising:
- a tubularly shaped body member fashioned from a porous polyethylene tube impregnated with a potassium chloride saturated agar solution and provided with a coaxial bore coupled to receive the flowing solution;
- a reference electrode in the form of a helically extending length of anodized wire covered with silver chloride disposed on the outer surface of the body member and
- a counter electrode disposed in the coaxial bore of the body member and reaching to the exterior of the body member.

4,058,447
ELECTROCHEMICAL MEASURING ELECTRODE

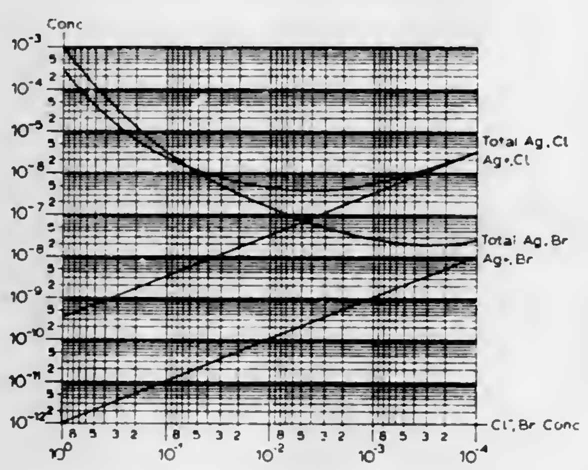
Torben Falch Christiansen, Holte, Denmark, assignor to Radiometer A/S, Copenhagen, Denmark

Filed Feb. 10, 1976, Ser. No. 656,873

Claims priority, application Denmark, Feb. 13, 1975, 532/75

Int. Cl.[2] G01N *27/46*

U.S. Cl. 204—195 P 2 Claims



1. An electrode for polarographic measurement of the partial pressure of oxygen in gases or solutions, comprising a cathode in contact with and outwardly shielded by a gas permeable membrane, a silver/silver bromide half cell serving as anode and a bromide-containing aqueous electrolyte in contact with the cathode and the anode, the bromide ion concentration in the electrolyte being between 10^{-4} and 5×10^{-3}M.

4,058,448
DIAPHRAGMLESS ELECTROLYZER FOR PRODUCING MAGNESIUM AND CHLORINE

Konstantin Dmitrievich Muzhzhavlev, Zheleznovodskaya ulitsa, 48, kv. 30; Sergei Petrovich Kosarev, Nalichnaya ulitsa, 39, korpus 1, kv. 20; Vladimir Ivanovich Schegolev, ulitsa Krasnaya, 50, kv. 30; Andrei Borisovich Ivanov, prospekt Smirnova, 59, kv. 151, all of Leningrad; Oleg Nikolaevich Romanenko, ulitsa Sevastopolskaya, 6, kv. 46, Kalush Ivano-Frankovskoi oblasti; Vladimir Dmitrievich Yazev, ulitsa Mira, 44, kv. 1, Solikamsk Permskoi oblasti, and Alexei Vasilievich Vasiliev, ulitsa Bogdana Khmelnitskogo, 66, kv. 57, Kalush Ivano-Frankovskoi oblasti, all of U.S.S.R.

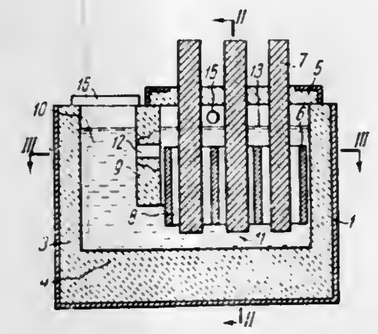
Filed June 23, 1976, Ser. No. 698,936

Int. Cl.[2] C25C *3/04, 3/08*

U.S. Cl. 204—244 8 Claims

1. A diaphragmless electrolyzer for producing magnesium and chlorine, comprising: a refractory-lined shell having a

compartment for electrolyte defined between a bottom, walls and a covering of said shell; a chlorine discharge outlet fixed on said electrolyzer shell; graphite anodes arranged in groups in said electrolyzer shell, each of said anodes being shaped as a rectangular plate; steel cathodes accommodated in said electrolyzer shell, each of said cathodes being shaped as a frame which forms an enclosure around each of said graphite anodes and defines a gap between said cathode and said anode; a group of electrolytic cells, each of said electrolytic cells being confined between the surfaces of an adjacent graphite anode and steel cathode; at least one vertical refractory separator plate adjoining the covering and walls of the electrolyzer but being shorter in height than the walls of said electrolyzer shell, said



separator plate being arranged parallel to said graphite anodes and being adapted to isolate the magnesium collecting cell from the group of electrolytic cells, said separator plate having through perforations situated below the electrolytic level; at least two magnesium conveyance passageways, each of them being arranged at substantially right angles to said graphite anodes and to said separator plate and being confined between the wall of said shell of the diaphragmless electrolyzer and the portion of said steel cathode that faces towards the magnesium collecting cell said passageways having a width which is a maximum of three times the width of said gap between said adjacent graphite anode and steel cathode in each electrolytic cell.

4,058,449
HYDROCRACKING PROCESS

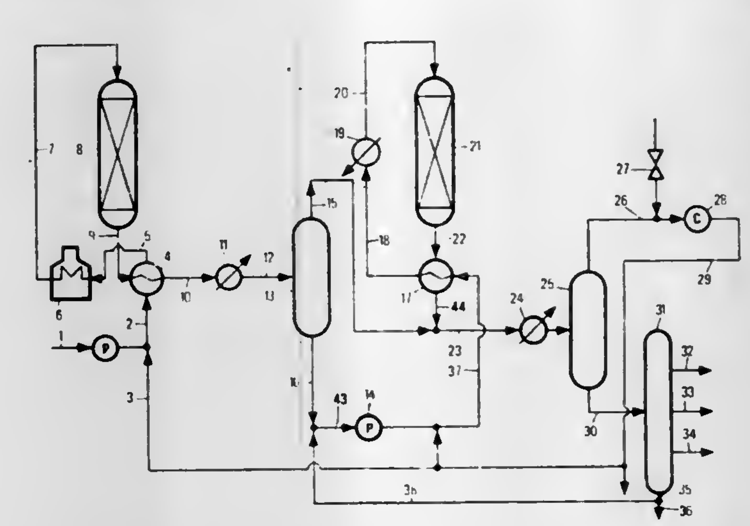
Ortwin Reitz, Heidelberg, Germany, and Jean-Pierre Rétoret, Saint Germain en Laye, France, assignors to Institut Francais du Petrole and BASF Aktiengesellschaft, both of Rueil-Malmaison, France

Filed May 21, 1976, Ser. No. 688,522

Claims priority, application France, May 21, 1975, 75.16048; May 21, 1975, 75.16047; Dec. 30, 1975, 75.40390

Int. Cl.[2] C10G *13/02*

U.S. Cl. 208—59 12 Claims



1. A process for hydrocracking a petroleum hydrocarbon charge contaminated with nitrogenous compounds, in which said charge is treated in a first hydrocracking reaction zone at a temperature from about 300° to 550° C under a pressure from about 15 to 250 atmospheres, in the presence of hydrogen and of a catalyst containing at least one hydrogenating component selected from at least one metal of the groups VI B and VIII of the periodic table of the elements, in the form of the free metal or an oxide or sulfide thereof, said hydrogenating component being deposited on a solid carrier selected from a natural or a synthesis product, said process comprising the steps of feeding the effluent from the first hydrocracking reaction zone to a first separation zone whose pressure is the same as in the first hydrocracking reaction zone and whose temperature is from 200° to 300° C, separating in said separation zone (a), a vapor fraction containing, ammonia and the major part of the products converted in the first hydrocracking reaction zone and (b), a liquid effluent whose ammonia content is lower than about 50 parts by weight per million of parts of said effluent, adding to said effluent at least a portion of the liquid effluent from the bottom of a prefractionation zone as hereunder defined, feeding the resulting mixture of said liquid effluent of the first separation zone and said liquid effluent from the bottom of the prefractionation zone to a second hydrocracking reaction zone where it is heated in the presence of a catalyst containing at least one hydrogenating component selected from at least one metal of the groups VI B and VIII of the periodic table of the elements, in the form of the free metal or an oxide or sulfide thereof, said hydrogenating component being deposited on a solid carrier selected from a natural or a synthesis product, at a temperature from about 300° to 550° C under a pressure from about 15 to 250 atmospheres, admixing the new effluent obtained from the second hydrocracking reaction zone with the vapor fraction withdrawn from the first separation zone, feeding the resulting mixture of said effluent of said second hydrocracking reaction zone with said vapor fraction to a prefractionation zone operated under the same pressure as in the hydrocracking reaction zone from where said effluent has been withdrawn, separating in said prefractionation zone, by stripping with a gas as defined below, the liquid and gaseous phases of said effluent, so as to obtain, at the top of the prefractionation zone, a gaseous fraction containing mainly hydrogen and the major portion of the products converted in at least the hydrocracking reaction zone from where said effluent issues, and, at the bottom of the prefractionation zone, a fraction of heavy or uncoverted products, at least one part of which is recycled to at least the second hydrocracking reaction zone from where said effluent has been withdrawn, said gaseous fraction, withdrawn from the top of said prefractionation zone, being fed, after cooling, to a separation zone from wherein it is recovered, a gas of high hydrogen content and a new liquid effluent which is fed to a fractionation zone in order to separate the desired cuts as final products, in which process the gas used for the stripping step contains hydrogen, the said gas comprised of, at least partly, of the said gas of high hydrogen content obtained after cooling of the said gaseous fraction withdrawn from the top of the prefractionation zone of the said gas comprised of a mixture of fresh hydrogen with at least one portion of the said gas of high hydrogen content obtained after cooling of the said gaseous fraction withdrawn from the top of the prefractionation zone.

4,058,450
PROCESS FOR PRODUCING AROMATIC HYDROCARBONS OF HIGH PURITY

Jean-Francois Le Page; Bernard Juguin, both of Rueil Malmaison, and Jean Miquel, Paris, all of France, assignors to Institut Francais du Petrole, Rueil-Malmaison, France

Filed Mar. 22, 1976, Ser. No. 669,335

Claims priority, application France, Mar. 24, 1975, 75.09391

Int. Cl.[2] C10G *35/04;* C07C *3/58*

U.S. Cl. 208—66 10 Claims

1. A process for producing aromatic hydrocarbons from unsaturated or saturated gasolines, in which these gasolines, after removal of deleterious quantities of diolefins or olefins contained therein, if any, are passed through at least two aromizing reaction zones, arranged in series, in the presence of hydrogen, said hydrogen, except when starting the reaction, being essentially recycled hydrogen, as defined below, and in

the presence of a catalyst containing a) alumina, b) 0.1 to 10% of at least one halogen, expressed by weight with respect to the alumina, and c) at least two metals or metal compounds, at least one of which is selected from the noble metals from the platinum family, the concentration of said metal being from 0.01 to 5% b.w. with respect to the alumina, at a temperature of about 400° to 600° C, the temperature of at least the last reaction zone through which the charge is passed being from 480° to 600° C, under a pressure substantially identical in each of the aromizing zones, said pressure being about 10 kg/cm², with an hourly flow rate by volume of the liquid charge from about 0.1 to 10 times the catalyst volume, the molar ratio hydrogen/hydrocarbon being about 0.5 to 20, in which process the effluent from the last reaction zone through which the charge is passed, is so treated as to remove therefrom a normally gaseous vapor fraction which is subjected to cooling at a temperature from −15 to +15° C, so as to recover a hydrogen stream called "recycled hydrogen" whose purity is higher than 70% by volume, at least a portion of said recycled hydrogen being fed to at least one of the aromizing reaction zones, in which process said effluent, after removal of the vapor fraction is subjected to fractionation at a pressure substantially equal to or lower than that prevailing in the aromizing reaction zones, so as to recover at least one aromatic cut as final product and at least one cut consisting essentially of at least one alkyl aromatic hydrocarbon, the latter cut being fed to at least one hydrodealkylation zone where said cut is treated in the presence of hydrogen, said hydrogen being exclusively at least a portion of the recycled hydrogen, in the presence of a catalyst which includes alumina 0.05 to 20% of cobalt by weight of the catalyst and 0.2 to 20% by weight of the catalyst of a metal selected in the group consisting of zinc, cadmium, gallium, indium, germanium, manganese, copper, silver, gold, niobium and zirconium, the catalyst having a specific surface from about 1 to 100 m²/g, a pore volume from about 0.2 to 1.0 cc/g and a neutralization heat by ammonia adsorption lower than 10 calories per gram of catalyst at 320° C under 300 mm Hg, the hydrodealkylation step being conducted at a temperature from 500° to 620° C, the spatial velocity being from 1 to 10, the ratio hydrogen/hydrocarbon expressed in mole by mole being from 1 to 10, the pressure being about 10 kg/cm².

4,058,451

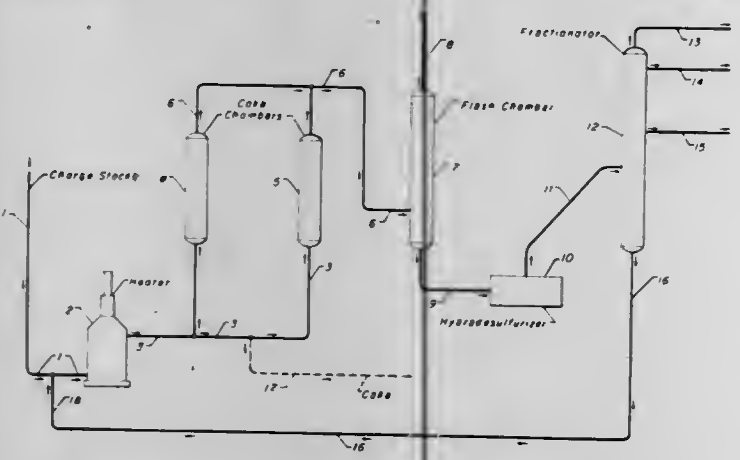
COMBINATION PROCESS FOR PRODUCING HIGH QUALITY METALLURGICAL COKE

Frank Stolfa, Park Ridge, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Aug. 23, 1976, Ser. No. 716,736

Int. Cl.² C10G *9/14, 37/06*

U.S. Cl. 208—97 **3 Claims**



1. A process for producing high quality metallurgical coke from a sulfur-containing reduced crude oil which comprises:

a. admixing said reduced crude oil with a hydrocarbon recycle stream formed as hereinafter set forth;

b. introducing the resulting mixture into a coking zone maintained at coking conditions to produce coke and a hydrocarbon effluent having a reduced level of coke precursors;

c. separating the coke from the hydrocarbon effluent and recovering the same;

d. introducing the hydrocarbon effluent to a flash zone and therein vaporizing hydrocarbons boiling up to about 400° F.;

e. hydrodesulfurizing the remainder of said effluent boiling above about 400° F.;

f. fractionating the resultant desulfurized remainder of the hydrocarbon effluent to separate therefrom hydrocarbons boiling up to about 650° F., leaving a desulfurized hydrocarbon bottoms fraction boiling above about 650° F.; and

g. supplying at least a portion of said desulfurized bottoms fraction boiling above about 650° F., to step (a) as said hydrocarbon recycle stream for admixture with the reduced crude oil therein.

4,058,452

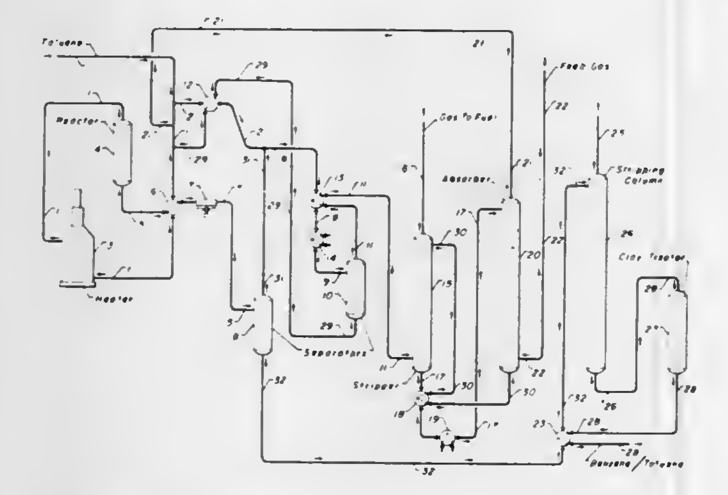
ALKYLAROMATIC HYDROCARBON DEALKYLATION PROCESS

Robert S. Loboda, Hacienda Heights, Calif., assignor to UOP Inc., Des Plaines, Ill.

Filed July 19, 1976, Ser. No. 706,858

Int. Cl.² C10G *35/04*

U.S. Cl. 208—134 **7 Claims**



1. A hydrocarbon conversion process which comprises the steps of:

a. passing a feed gas stream comprising hydrogen and C_2–C_4 paraffins through an absorption zone operated under conditions effective to remove C_2–C_4 paraffins, including countercurrent contact with a stripping zone liquid effluent stream, and thereby forming a hydrogenrich gas stream and an absorption zone liquid effluent stream;

b. passing the absorption zone liquid effluent stream into a stripping zone operated at conditions effective to cause the removal of C_2–C_4 paraffins from absorption zone liquid effluent stream, including countercurrent contact with a gaseous stripping media, and thereby forming the stripping zone liquid effluent stream and an off-gas stream comprising hydrogen and C_2–C_4 paraffins;

c. admixing the hydrogen-rich gas stream with a hydrocarbon feed stream to form a reaction zone feed stream;

d. passing the reaction zone feed stream through a reaction zone as a vapor and thereby forming a reaction zone effluent stream;

e. cooling and effecting a partial condensation of the reaction zone effluent stream and passing the reaction zone effluent stream into a first vapor-liquid separation zone operated at conditions effective to form a first condensate stream and a first separation zone gas stream;

f. passing the first condensate stream into a product recovery zone;

g. cooling and then passing the first separation zone gas stream into a second vapor-liquid separation zone operated at conditions effective to form a second condensate stream and a second separation zone gas stream; and,

h. heating the second separation zone gas stream by indirect heat exchange against the first separation zone gas stream and passing the second separation zone gas stream into a lower portion of the stripping zone as the gaseous stripping media.

2. The process of claim 1 further characterized in that the hydrocarbon feed stream comprises toluene.

7. A process for catalytically reforming a naphtha which comprises the steps of:

a. passing a feed gas stream comprising hydrogen and C_2–C_4 paraffins through an absorption zone operated under conditions effective to remove C_2–C_4 paraffins, including countercurrent contact with a stripping zone liquid effluent stream, and thereby forming a hydrogenrich gas stream and an absorption zone liquid effluent stream;

b. passing the absorption zone liquid effluent stream into a stripping zone operated at conditions effective to cause the removal of C_2–C_4 paraffins from absorption zone liquid effluent stream, including countercurrent contact with a gaseous stripping media, and thereby forming the stripping zone liquid effluent stream and an off-gas stream comprising hydrogen and C_2–C_4 paraffins;

c. admixing the hydrogen-rich gas stream with a naphtha feed stream to form a reaction zone feed stream;

d. passing the reaction zone feed stream through a reaction zone as a vapor and thereby forming a reaction zone effluent stream;

e. cooling and effecting a partial condensation of the reaction zone effluent stream and passing the reaction zone effluent stream into a first vapor-liquid separation zone operated at conditions effective to form a first condensate stream and a first separation zone gas stream;

f. passing the first condensate stream into a product recovery zone;

g. cooling and then passing the first separation zone gas stream into a second vapor-liquid separation zone operated at conditions effective to form a second condensate stream and a second separation zone gas stream; and,

h. heating the second separation zone gas stream by indirect heat exchange against the first separation zone gas stream and passing the second separation zone gas stream into a lower portion of the stripping zone as the gaseous stripping media.

4,058,453

DEMULSIFICATION OF OIL EMULSIONS WITH A MIXTURE OF POLYMERS AND ALKALINE EARTH METAL HALIDE

Mahendra S. Patel, and Aleksy Sacuta, both of Edmonton, Canada, assignors to Texaco Exploration Canada Ltd., Calgary, Canada

Filed Aug. 11, 1976, Ser. No. 713,456

Int. Cl.² C10G *33/04*

U.S. Cl. 208—188 **9 Claims**

1. A process for recovering oil from oil-in-water and water-in-oil emulsions wherein said emulsions contain clay tending to stabilize said emulsions, said process comprising in combination demulsifying said emulsions by adding thereto from 10 to 60 parts per million of non-ionic, water-soluble, polyethylene oxide polymers having a molecular weight in the range of 100,000 to 7,000,000, together with 100 to 20,000 parts per million of an alkaline earth metal halide in an aqueous solution and separating said oil from said water and said clay.

4,058,454

AROMATIC HYDROCARBON SEPARATION VIA SOLVENT EXTRACTION

George F. Asselin, Mount Prospect, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Apr. 22, 1976, Ser. No. 679,272

Int. Cl.² C10G *21/28*

U.S. Cl. 208—321 **8 Claims**

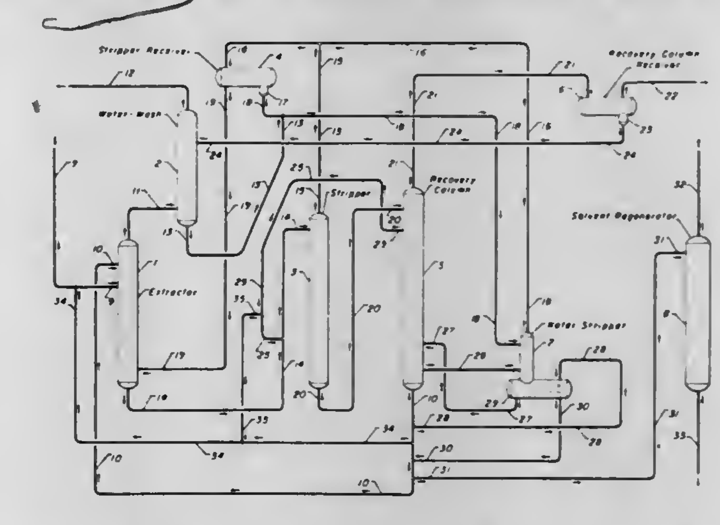
1. A process for the recovery of aromatic hydrocarbons from a mixture thereof with non-aromatic hydrocarbons, which process comprises the steps of:

a. introducing said aromatic/non-aromatic mixture into an extraction zone, and therein contacting said mixture with a solvent having water dissolved therein characteristically selected for absorbing aromatic hydrocarbons, at conditions selected to maintain said mixture and solvent in liquid phase;

b. removing a non-aromatic hydrocarbon raffinate stream fron said zone, through an upper locus thereof;

c. removing an aromatic hydrocarbon, solvent-rich extract stream from said zone, through a lower locus thereof, and introducing said extract stream into a stripper column;

d. removing a non-aromatic hydrocarbon concentrate from said stripper column, through an upper locus thereof, and removing an aromatic hydrocarbon-containing first sol-



vent-rich stream from said stripper column, through a lower locus thereof;

e. introducing said first solvent-rich stream into a solvent recovery column, through a first locus thereof, introducing a vaporous steam stripping medium into a lower, second locus thereof, recovering a substantially solvent-free aromatic hydrocarbon concentrate through an upper third locus thereof, removing a substantially hydrocarbon-free, second solvent-rich stream from a lower fourth locus thereof and removing a third solvent-rich stream, containing hydrocarbons, through an intermediate fifth locus thereof;

f. introducing at least a portion of said third solvent-rich stream into said stripper column; and,

g. commingling a portion of only said third solvent-rich stream with said aromatic-non-aromatic mixture for introduction therewith into said extraction zone.

4,058,455

ROTARY SEPARATOR

Josef Schier, Bergkamen-Oberaden, Germany, assignor to Ruhrkohle AG, Essen, Germany

Filed Feb. 17, 1976, Ser. No. 658,602

Claims priority, application Germany, Feb. 19, 1975, 2507145

Int. Cl.² B07B *7/10*

U.S. Cl. 209—139 R **9 Claims**

1. A rotary separator comprising:

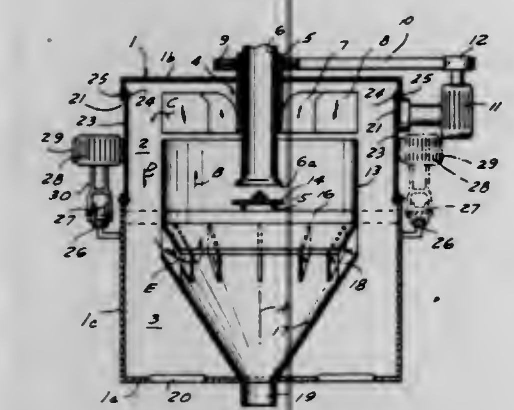
a generally closed housing defining a separation chamber having an upper compartment and a lower compartment, said housing being formed around said upper compartment with a plurality of throughgoing windows;

a lining of flexible sheet material secured in said housing over said windows and substantially blocking gas flow into said compartments through said windows, said lining substantially completely laterally covering said housing in said upper compartment and having an inner surface directly exposed in said upper compartment;

a fan in said upper compartment;

an annular sleeve in said upper compartment below said fan and defining with said inner surface at said windows an annular passage;

a discharge funnel in said lower compartment said below said sleeve and defining with said housing an annular space open to said passage;
means for introducing into said upper compartment below said fan and inside said sleeve particulate material having a heavy fraction and a light fraction;
means for rotating said fan and circulating air in said chamber in a closed path rising inside said sleeve and descending in said passage, whereby said heavy fraction drops



countercurrent to the rising air in said sleeve to land in said funnel and said light fraction is carried by said air over said sleeve and deposits in said space with some of said light fractions adhering to said inner surface; and
means including a striking element displaceable relative to said housing and engageable through said windows with said lining for inwardly deflecting said lining relative to said housing by engagement with said lining through said windows for flexing said lining and loosening particulate material caked on said inner surface of said lining.

4,058,456
EXTERNAL SUPPORTED FILTER
Brian Arthur Head, Maidstone, England, assignor to Whatman Reeve Angel Limited, Maidstonet, England
Filed Jan. 21, 1977, Ser. No. 761,027
Claims priority, application United Kingdom, Dec. 24, 1976, 54165/76
Int. Cl.² B01D *37/00;* **C02B** *3/00;* **C02C** *3/00;* **B07B** *9/00*
U.S. Cl. 210—23 R **27 Claims**

1. A method of manufacturing an inside-to-outside flow filter tube of improved burst strength, which method comprises:
a. forming a wet mat of a desired and generally uniform-depth, randomly disposed, nonwoven, inorganic fibers having interstices therebetween, and having a diameter of from about 0.001 to 10 microns, onto the external surface of a cylindrical, porous, vacuum mandrel to form a porous filter tube;
b. positioning an external, reinforcement, porous, sleeve material, having a selected internal diameter slightly in excess of the external diameter of the wet mat of fibers of the filter tube, about the filter tube and into a concentric arrangement with the filter tube;
c. applying an outwardly directed force to the fibers of the filter tube such that the external diameter of the filter tube expands into intimate contact with the concentric sleeve material;
d. drying the filter tube so formed; and
e. bonding the filter tube and external sleeve material with a bonding agent into an integral filter tube.

4,058,457
RECOVERY OF ACTIVATED CARBON
Milton Manes, 1613 Chadwick Drive, Kent, Ohio 44240
Filed Dec. 1, 1976, Ser. No. 746,624
Int. Cl.² B01D *15/06*
U.S. Cl. 210—32 **17 Claims**

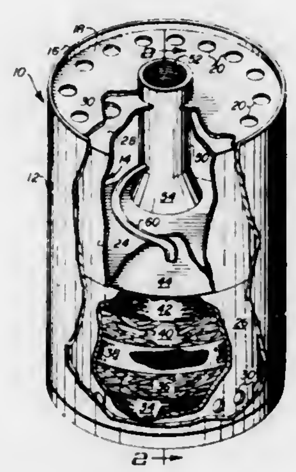
1. A process of recovering or regenerating activated carbon which is at least partially loaded with an organic chemical adsorbed thereon comprising passing a solution of iodine in an aqueous or organic solvent through the carbon to displace the organic chemical by iodine.

11. A process of purifying water comprising passing the water through activated carbon until the carbon is at least partially loaded with adsorbed organic chemicals and then recovering the activated carbon in the manner set forth in claim 1.

4,058,458
REMOVAL OF COLOR FROM PAPER MILL WASTE WATERS
Jerry J. Svarz, La Grange, Ill., assignor to Nalco Chemical Company, Oak Brook, Ill.
Filed Dec. 5, 1975, Ser. No. 637,976
Int. Cl.² C02C *1/40*
U.S. Cl. 210—52 **10 Claims**

1. A process for removing color from cellulose paper pulp waste water wherein color bodies are present due to chemical reaction on or degradation of lignin which consists essentially of adjusting the pH of said waste water to a pH within the range of 2 to 5 and mixing with the resultant waste water a compound from the group consisting of alkylated and acylated amines, quaternized forms of such alkylated and acylated amines, and mixtures thereof, said compound containing at least 4 carbon atoms in a hydrocarbon group linked directly to nitrogen or linked to nitrogen through a carbonyl group and being effective to combine with said color bodies to form solids which can be separated from said waste water, the amount of said compound being within the range of 20 ppm to 2000 ppm of said waste water, and separating the resultant solids.

4,058,459
LIQUID FILTER APPARATUS
John W. Griffin, 310 N. Neel Place, Kennewick, Wash. 99336
Continuation-in-part of Ser. No. 398,948, Sept. 20, 1973, abandoned. This application Apr. 10, 1975, Ser. No. 566,930
Int. Cl.² B01D *27/10*
U.S. Cl. 210—132 **12 Claims**

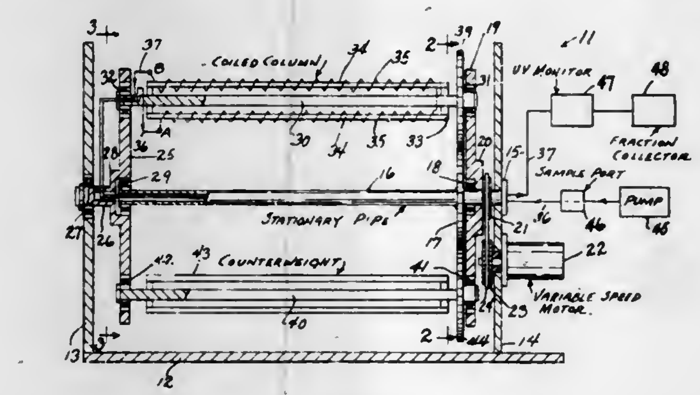


1. Filter apparatus for filtering water and particulate matter from a liquid, comprising, in combination:
first filter means including a layer comprising a plurality of stratified discrete flat strips randomly oriented in planar layers, with the flat portion of adjacent strips generally parallel and disposed against each other, for filtering particulate matter from the liquid,
second filter means including desiccant means for filtering water from the fluid; and
housing means for the first and second filter means.

8. Filter apparatus for filtering particulate matter and water from a liquid, comprising, in combination:
cylinder housing means including means for admitting a flow of liquid into the cylinder housing means;

first inner cylinder means including first filter means for filtering a portion of the flow of liquid;
second inner cylinder means including second filter means for filtering another portion of the flow of liquid, said second inner cylinder means including an impervious housing having a plurality of apertures communicating with a portion of the second filter means disposed within said housing, and said second filter means including a filter layer comprising a plurality of layers of discrete generally flat stratified elements oriented randomly with adjacent elements disposed against each other, and a layer of desiccant means, through which layers the other portion of the liquid sequentially flows;
first conduit means connected to the cylinder housing means and to the first inner cylinder means for providing a flow of liquid out of the inner cylinder means; and
second conduit means connected to and extending between the first conduit means and the second inner cylinder means for providing a flow of liquid from the second inner cylinder means.

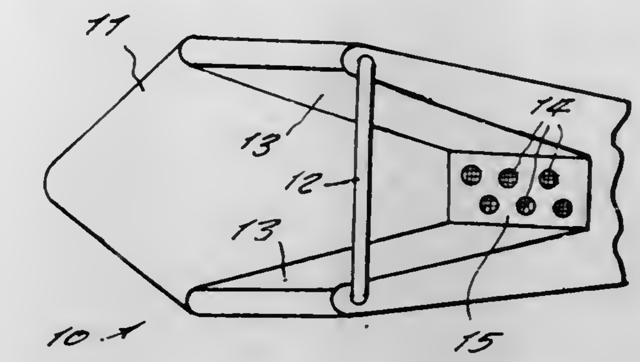
4,058,460
HORIZONTAL FLOW-THROUGH COIL PLANET CENTRIFUGE WITHOUT ROTATING SEALS
Yoichiro Ito, Bethesda, Md., assignor to The United States of America as represented by the Department of Health, Education and Welfare, Washington, D.C.
Filed Mar. 17, 1977, Ser. No. 778,455
Int. Cl.² B01D *15/08*
U.S. Cl. 210—198 C **10 Claims**



1. In an apparatus for continuous countercurrent chromatography, a support, helical separation column means horizontally and rotatably mounted on the support, inlet and outlet flow tubes connected to said column means, fixed, elongated tube guide means on the support extending horizontally substantially parallel to and spaced from said column means and receiving said flow tubes at one end and defining a protective housing for the flow tubes, and means to simultaneously rotate said column means around its rotational axis and revolve said column means around the tube guide means at relative rates avoiding twisting of the flow tubes, whereby to simultaneously develop both gravitational force reversals and centrifugal forces in said column means.

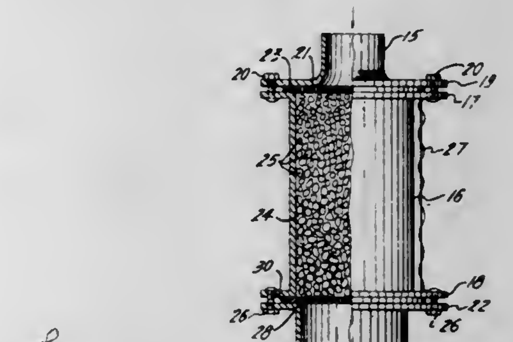
4,058,461
OIL SALVAGE SHIP WITH OCEAN GOING BOW
Thomas I. Gaw, 12 Fuller Place, Brooklyn, N.Y. 11215
Filed Oct. 5, 1976, Ser. No. 729,652
Int. Cl.² E02B *15/04*
U.S. Cl. 210—242 S **3 Claims**

1. An oil salvage ship, comprising in combination, a hull having a doorway at its bow closable by a pair of doors, a rearwardly converging vestibule behind said doorway forming a scoop as part of said ship and having a rear vertical plate, a plurality of selectively openable grid-screened ports at different elevations through said plate, said ports communicating with an oil collection system on said ship; whereby as the draft



of the ship varies, at least one port will be at the water surface to admit surface oil.

4,058,462
SYSTEM FOR SUSTAINED RELEASE OF PHENOLIC MATERIAL FROM POROUS GRANULES OF INSOLUBLE POLYMERIC PHENOLIC COMPLEXES
Marvin M. Fein, Westfield, N.J.; Earl P. Williams, Pen Argyl, Pa., and Nathan D. Field, Wyckoff, N.J., assignors to GAF Corporation, New York, N.Y.
Continuation-in-part of Ser. No. 25,249, April 2, 1970, abandoned, which is a continuation-in-part of Ser. No. 436,609, Jan. 25, 1974, Pat. No. 3,914,187. This application Oct. 17, 1975, Ser. No. 623,382
The portion of the term of this patent subsequent to Oct. 21, 1992, has been disclaimed.
Int. Cl.² B01D *25/06*
U.S. Cl. 210—289 **10 Claims**

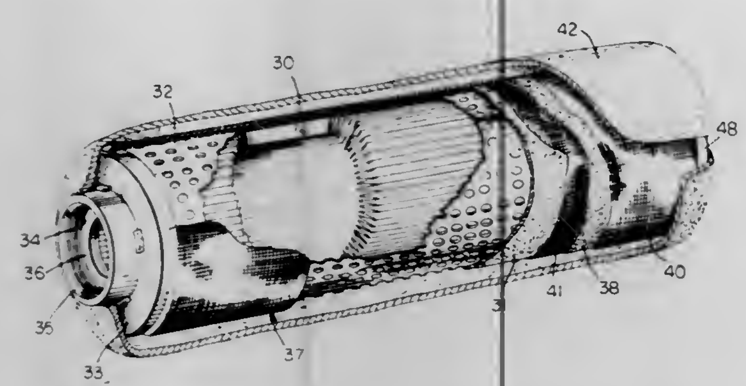


1. A sustained phenolic releasing system which comprises a container containing porous granules or beads comprising a complexed compound of a phenolic material with a water-insoluble, but water swellable crosslinked polymer of a N-vinyllactam or an N-alkyl-N-vinylamide and provided with means permitting continuous flow of a fluid in which said phenolic material is soluble or readily dispersable into said container, contact with said granules or beads contained therein for a time sufficient for said fluid to leach a desired amount of the phenolic material from the porous granules and exit from said container.

4,058,463
ELEMENT FOR FILTERING AND SEPARATING FLUID MIXTURES
Ivan Bartik, Cookeville, Tenn., assignor to Keene Corporation, New York, N.Y.
Filed Sept. 3, 1974, Ser. No. 502,648
Int. Cl.² B01D *29/14*
U.S. Cl. 210—317 **10 Claims**

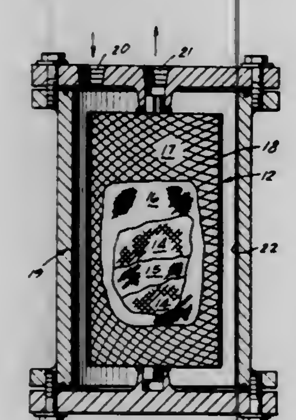
1. In an element for removing particulate material from water and for coalescing oil in the water into droplets of substantial size; a cylindrical pleated inner member, a perforated cylindrical support member surrounding said pleated member

in supporting relation thereto, end caps sealed to opposite ends of the assembly of said pleated member and support member, a fluid inlet in one of said end caps, and a separator element of liquid pervious material loosely surrounding said support member and having the opposite end portions sealed with respect to the support member, said element adapted for being



disposed in a vertical position in a pressure vessel having means for connection to said fluid inlet, said separator element retarding the flow of oil droplets therethrough while freely passing the water droplets whereby the oil droplets migrate upwardly in the separator element and merge into larger droplets and emerge through an upper region of the separator element.

4,058,464
HELICALLY WOUND EXPANDABLE FILTER
Robert N. Rogers, Carpentersville, Ill., assignor to John R. Coffey and Vincent B. Conliff, deceased, part interest to each
Filed Sept. 15, 1976, Ser. No. 723,311
Int. Cl.² B01D *29/06*
U.S. Cl. 210—356 **8 Claims**



1. An expandable filter for fluids, comprising:

a. a rigid core having at least one filtrate passage therein, said core having at least one slot in an external wall thereof in fluid communication with said passage;

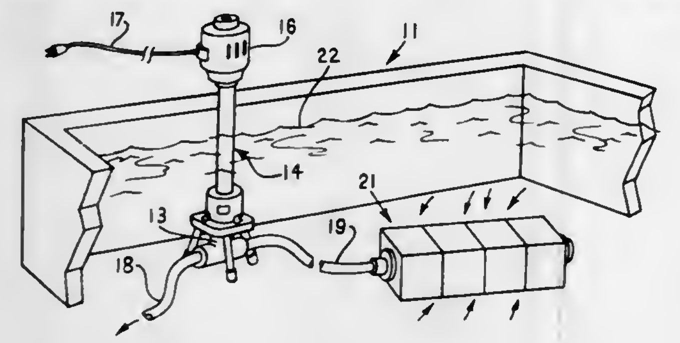
b. at least one elongated tubular porous filter medium of generally flat transverse cross-section having a closed end and an open end, said open end being secured to said core at said slot in fluid communication with said passage, said filter medium extending helically about said core and the outside of said filter medium being adapted to be exposed to the unfiltered fluid;

c. an elongated helical grid disposed within said filter medium and extending substantially between said ends, said grid being resiliently compressible in a radial direction in response to fluid pressure increase on the outside of said filter medium;

d. at least one elongated scrubber screen fixedly secured at one end to said core and extending helically thereabout between successive turns of said filter medium, and against which said filter medium is urged by a force from said resilient grid in response to fluid pressure decrease; and

e. resilient means enclosing the outermost diametrical surfaces of said grid and screen, and being radially outwardly yieldable in response to said force from said resilient grid acting through a build-up of contaminant on said scrubber screen, whereby said filter expands diametrically in increments as contaminant builds up.

4,058,465
FILTER FOR FISH POND
Paul McKee, Grass Valley, Calif., assignor to Lois Enebrad, Stockton, Calif.
Filed Oct. 14, 1976, Ser. No. 732,357
Int. Cl.² B01D *25/00*
U.S. Cl. 210—356 **3 Claims**



1. An improved filtering device comprising

a laterally apertured pipe having one end thereof closed and the other end thereof adapted for connection to the inlet of a suction pump,

a plurality of filter pieces of centrally apertured dimensionally stable and resiliently flexible porous material disposed about said apertured pipe with said pipe extending through the central aperture of each piece and said filter pieces being disposed in contiguous relation about all of the lateral apertures of said pipe,

means retaining said filter pieces in position about said pipe, and

the separation of apertures in said central pipe being related to the dimensions and positions of said filtering pieces about said pipe so that at least some of the contiguous edges of filter pieces are aligned with lateral apertures in said pipe whereby liquid may be drawn into said pipe between said filter pieces as the filter becomes clogged.

4,058,466
BROMINATED CARBAMOYL DERIVATIVES
Daniel J. Scharf, East Amherst, N.Y., assignor to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.
Filed Dec. 30, 1974, Ser. No. 537,526
Int. Cl.² C09K *3/28;* **C07C** *125/04, 125/06*
U.S. Cl. 252—8.1 **18 Claims**

1. Brominated carbamoyl derivatives of the structure:

$$R_2N-C(O)-O-(R^1)_n-CH_2-C(X)_2-CH_2-(R^1)_n-O-C(O)NR_2$$

wherein:

R is independently selected from the group consisting of hydrogen, alkyl, alkanol, cycloalkyl from 5 to 7 carbon atoms, phenyl, alkyl substituted by phenyl, phenyl substituted by alkyl, hydroxy terminated oxyalkylene, hydroxy substituted hydroxy terminated oxyalkylene and halogen substituted hydroxy terminated oxyalkylene;

R^1 is independently selected from the group consisting of alkylene; oxyalkylene; hydroxy substituted oxyalkylene, halogen substituted oxyalkylene and alkylene or oxyalkylene substituted by the group $-O-C(O)NR_2$;

X is selected from the group consisting of halogen and halogen substituted alkyl, wherein the halogen is chlorine or bromine; said alkyl, alkanol and alkylene each independently has from 1 to 4 carbon atoms; said oxyalkylene having from 2 to 4 carbon atoms; *n* is 0 to 20;

provided one of X is a bromo or a bromo substituted alkyl; and that each carbamoyl group has a replaceable hydrogen in the R group.

14. A method of imparting a flame retarding property to a combustible material comprising treating the combustible material by impregnating with an effective flame retarding imparting amount of the composition of claim **1**.

4,058,467
SULFONATE WATER FLOOD ADDITIVES AND METHOD OF USING SAME
Roy C. Sias, Ponca City, Okla., assignor to Continental Oil Company, Ponca City, Okla.
Filed June 28, 1976, Ser. No. 700,695
Int. Cl.² E21B *43/22*
U.S. Cl. 252—8.55 D **4 Claims**

1. In a method for recovering hydrocarbons from a petroliferous formation which comprises injecting an aqueous fluid into the formation through an injection well and recovering displaced hydrocarbons from the formation through a recovery well; the improvement comprising injecting through the injection well an effective amount of aqueous mixture which contains from about 0.5 to about 25 weight percent of a carbon dioxide saturated alkali metal hydrocarbon sulfonate waterflood additive; the hydrocarbon sulfonate waterflood additive having an average equivalent weight of from about 300 to about 600.

4,058,468
LUBRICANT COMPOSITION
Robert E. Malec, Birmingham, Mich., assignor to Ethyl Corporation, Richmond, Va.
Filed June 7, 1976, Ser. No. 693,473
Int. Cl.² C10M *1/48*
U.S. Cl. 252—46.7 **22 Claims**

1. A lubricating oil composition comprising a major amount of lubricating oil and a minor amount, sufficient to improve dispersancy, of an additive made by:

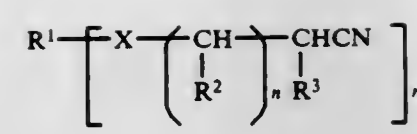
A. reacting one mole part of a poly C_{2-4} olefin substituted phenol wherein said polyolefin substituent has an average molecular weight of from about 650 to 5000 with from about 1–10 mole parts of a C_{1-4} aldehyde and from about 0.1–10 mole parts of a nitrogen compound, said nitrogen compound being selected from the group consisting of ammonia and amines containing at least one HN< group and containing from 1 to about 20 carbon atoms at reaction temperature to form a Mannich condensation product,

B. reacting said condensation product with about 0.1–50 mole parts of an alkylene oxide containing from 2 to about 6 carbon atoms to form an alkoxylated product, and

C. reacting said alkoxylated product with about 0.05 to 1 mole part of P_2S_5 at reaction temperature to form said additive.

4,058,469
LUBRICANTS AND FUNCTIONAL FLUIDS CONTAINING POLYFUNCTIONAL NITRILES
Donald Irvin Hoke, Chagrin Falls, Ohio, assignor to The Lubrizol Corporation, Cleveland, Ohio
Filed Dec. 5, 1975, Ser. No. 637,920
Int. Cl.² C10M *1/32*
U.S. Cl. 252—51.5 R **30 Claims**

1. A composition comprising an oleaginous liquid of lubricating viscosity and about 0.001–20.0 parts by weight, per 100 parts of said oleaginous liquid, of at least one polyfunctional nitrile of the formula



wherein:

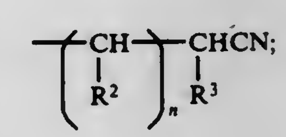
X is O or NR^4;

R^1 is a monovalent or polyvalent saturated aliphatic hydrocarbon radical having about 4–25 carbon atoms;

each R^2 is individually hydrogen or a lower hydrocarbon radical;

R^3 is hydrogen, a lower hydrocarbon radical, halogen, CN or $COOR^5$;

R^4 is hydrogen, a hydrocarbon radical or

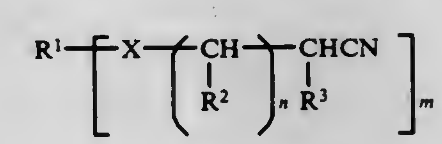


R^5 is hydrogen or a lower alkyl radical;

m is the valence of R^1; and

n is an integer from 0 to 2.

10. An additive concentrate comprising an oleaginous liquid of lubricating viscosity and up to about 90% by weight of at least one polyfunctional nitrile of the formula



wherein:

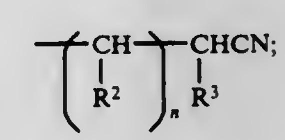
X is O or NR^4;

R^1 is a monovalent or polyvalent saturated aliphatic hydrocarbon radical having about 4–25 carbon atoms;

R^2 is individually hydrogen or a lower hydrocarbon radical;

R^3 is hydrogen, a lower hydrocarbon radical, halogen, CN or $COOR^5$;

R^4 is hydrogen, a hydrocarbon radical or



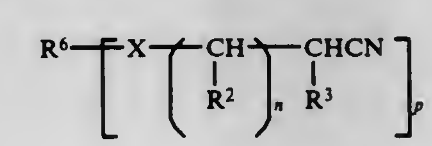
R^5 is hydrogen or a lower alkyl radical;

m is the valence of R^1; and

n is an integer from 0 to 2;

the amount of said polyfunctional nitrile in said concentrate being sufficient to afford, when said concentrate is further diluted with an oleaginous liquid of lubricating viscosity, a composition according to claim **1**.

20. A method of causing swelling of seals in machinery which comprises contacting said seals with a polyfunctional nitrile of the formula



wherein:

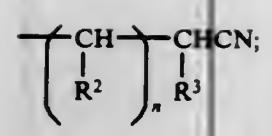
X is O or NR^4;

R^6 is a monovalent or polyvalent hydrocarbon radical having about 4–25 carbon atoms;

R^2 is hydrogen or a lower hydrocarbon radical;

R^3 is hydrogen, a lower hydrocarbon radical, halogen, CN or $COOR^5$;

R^4 is hydrogen, a hydrocarbon radical or



R^5 is hydrogen or a lower alkyl radical;
n is an integer from 0 to 2; and
p is the valence of R^6.

4,058,470
LIQUID DEVELOPER COMPOSITION FOR LITHOGRAPHIC MASTERS
Elia P. Moschovis, and John L. Gilson, both of Morton Grove, Ill., assignors to A. B. Dick Company, Niles, Ill.
Filed Oct. 24, 1975, Ser. No. 625,753
Int. Cl.[2] G03G *9/12*
U.S. Cl. 252—62.1 L **9 Claims**

1. A liquid developer composition for treatment to convert a latent electrostatic image to one that is ink receptive, water repellent and hydrophobic for use in the production of multiple copies by lithographic techique, the improvement which, in addition to the ink receptive, water repellent, oleophilic toner particles and a liquid aliphatic organic solvent having a resistivity in excess of 10^{10} ohms-cm consists essentially of the improvement wherein a resinous binder component is present which consists of a polyvinyl acetate resin and a hydrophobic colloidal silica present in combination with the polyvinyl acetate resin in the ratio of 1 part by weight of the hydrophobic colloidal silica to 1.5 to 4 parts by weight of the polyvinyl acetate.

4,058,471
PLASTICIZED POLYMERIC COMPOSITIONS BASED ON VINYL CHLORIDE POLYMERS
Flaviano Giatti, Mestre (Venice), and Gastone Slongo, Mogliano Veneto (Treviso), both of Italy, assignors to Montedison S.p.A., Milan, Italy
Filed Apr. 8, 1975, Ser. No. 566,630
Claims priority, application Italy, Apr. 9, 1974, 21065/74
Int. Cl.[2] H01B *3/10, 3/44*
U.S. Cl. 252—63.5 **9 Claims**

1. Plasticized vinyl chloride polymeric compositions having good physical-mechanical properties and being particularly useful as sheathings for electric cables, even at high temperatures, and containing by weight, per 100 parts by weight of the polymeric material, as essential constituents,

from 0.05 to 3.0 parts of silica having an average particle size below 0.01 micron and a surface area larger than 200 m^2/g; and from 0.0005 to 1.0 part of a phenol type antioxidant for vinyl chloride polymers selected from the group consisting of derivatives of alkylated phenols, bis-phenols and polyphenols;

said compositions also containing, by weight per 100 parts by weight of the polymeric material,

from 20 to 100 parts of vinyl chloride polymer plasticizers;
from 0.1 to 10 parts of vinyl chloride polymer heat and light stabilizers;
0 to 10 parts of vinyl chloride polymer costabilizers;
from 0 to 1.0 part of vinyl chloride polymer ultraviolet rays absorbers and/or optical blueing agents;
from 0 to 4.0 parts of vinyl chloride polymer lubricants; from 0 to 10 parts of TiO_2 and/or carbon black; and from 0 to 100 parts of vinyl chloride polymer mineral fillers.

4,058,472
DETERGENT COMPOSITION
Mahmoud S. Kablaoui, Wappingers Falls, N.Y., assignor to Texaco Inc., New York, N.Y.
Filed June 28, 1976, Ser. No. 700,623
Int. Cl.[2] C11D *3/395*
U.S. Cl. 252—89 B **4 Claims**

1. A detergent composition containing as the surface active component from about 0.01 to about 10% by weight of the alkali metal or ammonium salts of a sulfonated C_{14}–C_{18} alkyl catechol admixture, said catechol being present in the admixture in a weight ratio of from about 50 to 70 parts of the mono (C_{14}–C_{18}) alkyl catechol and from about 50 to 30 parts of the di (C_{14}–C_{18}) alkyl catechol, from about 40 to about 80–90% of an inorganic builder material, from 0 to 20% of an organic builder material, and from about 0.5 to about 5% of a special purpose component, said special purpose component being at least one member selected from the group consisting of a solubilizing agent, a bleaching agent and a brightener.

4,058,473
LOW TEMPERATURE STABLE COMPOSITIONS
Carl Robert Canter, Bloomfield, N.J., assignor to Lever Brothers Company, New York, N.Y.
Filed June 24, 1976, Ser. No. 699,727
Int. Cl.[2] C11D *9/32*
U.S. Cl. 252—121 **1 Claim**

1. A low temperature, stable detergent composition consisting of:

	Percent by Weight
Potassium tallowate	about 8% to about 12%
C_{11-15} ethoxylated secondary alcohol having about 9 moles of ethylene oxide per mole of alcohol	about 8% to about 12%
C_{11-15} ethoxylated secondary alcohol having about 3 moles of ethylene oxide per mole of alcohol	about 2% to about 4%
Sodium xylene sulfonate	about 1% to about 3%
Sodium toluene sulfonate	0% to about .6%
Glycerine	about 0% to about 1.5%
EDTA	about 0% to about 0.1%
KOH	about 0% to about 0.5%
Adjuvents	0% to about 0.36%
Water	at least 63.93% by weight of the composition up to 100% of the balance by weight.

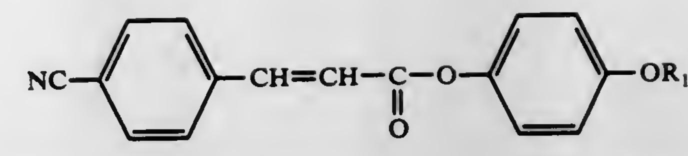
4,058,474
DRAIN CLEANING COMPOSITION
George B. Keyes, Cincinnati, Ohio, and Justin J. Murtaugh, Guilford, Ind., assignors to The Drackett Company, Cincinnati, Ohio
Continuation-in-part of Ser. No. 477,891, June 10, 1974, abandoned. This application Nov. 10, 1975, Ser. No. 630,840
Int. Cl.[2] C11D *7/06, 7/12*
U.S. Cl. 252—160 **6 Claims**

1. A pelletized drain cleaning composition wherein each pellet of said composition consists essentially of:

1. 1.5 to 12 weight percent aluminum;
2. 15 to 51 weight percent of an alkali metal nitrate selected from the group consisting of potassium nitrate, sodium nitrate and mixtures thereof;
3. 0.5 to 10 weight percent of a binding material having a melting point of from about 37° C. to about 67° C. selected from the group consisting of polymers of polyethylene glycol, having a molecular weight of from about 3000 to about 20,000; polymers of ethylene oxide, having a molecular weight of from about 400,000 to about 2,000,000; hydrocarbon oxyethylated straight chain fatty alcohols, having a molecular weight of about 260 to about 265 and containing about 80%, by weight, ethylene oxide; fatty acids, having a carbon chain length of from about 10 to about 18 carbon atoms; alkali metal salts of gluconic acid selected from the group consisting of sodium gluconate, potassium gluconate and sodium glucoheptonate; and mixtures thereof;
4. 1 to 10 percent of an alkali metal hydroxide;
5. 10 to 60 weight percent of an additional compatible alkaline ingredient selected from the group consisting of alkali metal borates, alkali metal silicates, alkali metal bicarbonates, alkali metal carbonates, alkali metal phosphates and mixtures thereof, whereby the total alkaline concentration present, expressed as sodium oxide, is at least about 11%, by weight; wherein
   said alkali metal borates are alkali metal meta-, tetraborates, or hydrates thereof;
   said alkali metal silicates are alkali metal meta-, ortho-silicates, or hydrates thereof having the formula $x(SiO_2)(M_2O)$, where x varies from 0.5 to 3.75 and M is an alkali metal; and
   said alkali metal phosphates are alkali metal monobasic-, dibasic-, tribasic-, meta-, pyrophosphates, or hydrates thereof;
6. up to about 10 weight percent of an oil selected from the group consisting of mineral oils having a viscosity range of about 34 to 360 Saybolt Universal Seconds at 100° F; silicone oils selected from the group consisting of dimethylpolysiloxanes having flash points of not less than about 500° F and having a viscosity range of about 40 to 60 centistokes at 25° C; vegetable oils having a viscosity range of about 40 to 60 centipoises at 25° C; petroleum lubricating oils having a viscosity range of about 100 to 500 centipoises at 25° C; and mixtures thereof; wherein the amount of oil present is sufficient to coat the aluminum; and
7. a salt selected from the group consisting of potassium chloride, sodium chloride and mixtures thereof and said salt is present in an amount up to about 48%, by weight; wherein said composition is prepared by the method consisting essentially of:
   a. reducing the particle size of all of the ingredients to a size between 40 and 710 microns;
   b. coating the aluminum particles with the oil; and draining off the excess oil
   c. adding the excess oil, the alkali metal nitrate, alkaline ingredient, the binder material, and the salt, if any, to the coated aluminum particles of (b) and mixing the ingredients;
   d. adding the alkali metal hydroxide particles to the resulting mixture of (c) and mixing the ingredients;
   e. pelletizing the resulting mixture of (d) at a temperature just above the melting point of the binding material; and
f. cooling the resulting pellets obtained from
   e. said pellets having a size such that they pass through the openings of a U.S. sieve screen having a mesh size of 8 and are retained on a U.S. sieve screen having a mesh size of 20.

4,058,475
LIQUID CRYSTAL COMPOSITIONS CONTAINING CYANOCINNAMIC ACID ESTERS
Toshio Jinnai; Goro Matusmoto, and Kazuhito Iwasaki, all of Odawara, Japan, assignors to Dai Nippon Toryo Co., Ltd., Osaka, Japan
Filed June 3, 1976, Ser. No. 692,561
Claims priority, application Japan, June 5, 1975, 50-68022; June 12, 1975, 50-71278; Aug. 18, 1975, 50-100001; Feb. 12, 1976, 51-14323
Int. Cl.[2] C07C *121/75;* **C09K** *3/34*
U.S. Cl. 252—299 **6 Claims**

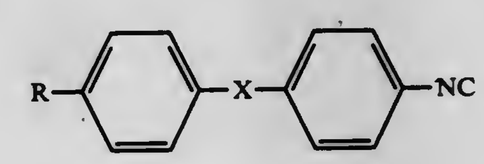
1. A nematic liquid crystal composition comprising at least two cinnamic acid esters of the formula



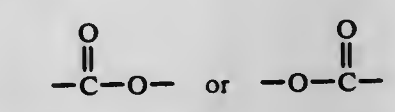
wherein R_1 is straight-chain alkyl of 4 to 8 carbon atoms.

4,058,476
LIQUID CRYSTALLINE ISONITRILES
Arthur Boller, Binningen, and Hanspeter Scherrer, Therwil, both of Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.
Division of Ser. No. 444,923, Feb. 22, 1974, Pat. No. 3,925,444. This application Aug. 18, 1975, Ser. No. 605,788
Claims priority, application Switzerland, Mar. 2, 1973, 3099/73
Int. Cl.[2] C09K *3/34;* **G02F** *1/13*
U.S. Cl. 252—299 **6 Claims**

2. A nematic composition which comprises a compound of the formula



wherein X is

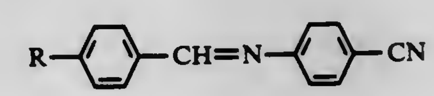


and R is straight-chain alkyl of 1–7 carbon atoms, straight-chain alkoxy of 1–7 carbon atoms, straight-chain alkanoyloxy of 1–7 carbon atoms or p-alkyloxycarbonyloxy wherein the alkyloxy group is straight-chain alkyloxy of 1–7 carbon atoms,

or mixtures thereof and one or more nematic compounds having a positive anisotropy.

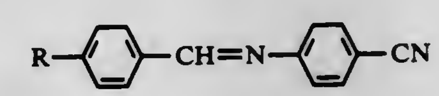
4,058,477
LIQUID CRYSTAL SCHIFFS BASES
Arthur Boller, Binningen, and Hanspeter Scherrer, Therwil, both of Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.
Division of Ser. No. 334,292, Feb. 21, 1973, Pat. No. 3,927,064. This application Sept. 8, 1975, Ser. No. 611,096
Claims priority, application Switzerland, Feb. 23, 1972, 2585/72; Jan. 11, 1973, 355/73
Int. Cl.[2] C09K *3/34;* **C02F** *1/13*
U.S. Cl. 252—299 **22 Claims**

1. A nematic composition which comprises two or more compounds of the formula



wherein R is ethyl, n-propyl, n-butyl, n-pentyl, isohexyl, n-hexyl, n-heptyl or n-octyl.

15. A nematic composition which comprises a Schiffs' base of the formula



wherein R is ethyl, n-propyl, n-butyl, n-pentyl, n-hexyl, isohexyl, n-heptyl or n-octyl,

or mixtures thereof and one or more nematic compounds having a positive anisotropy.

4,058,478
LIQUID CRYSTAL ESTERS

Arthur Boller, Binningen, and Hanspeter Scherrer, Therwil, both of Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 334,291, Feb. 21, 1973, Pat. No. 3,923,857. This application Aug. 20, 1975, Ser. No. 606,156

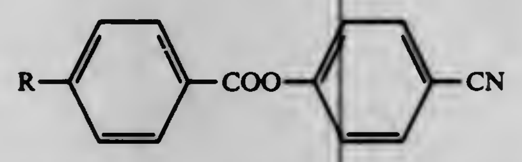
Claims priority, application Switzerland, Feb. 23, 1972, 2586/72; Jan. 23, 1973, 920/73

The portion of the term of this patent subsequent to Sept. 21, 1993, has been disclaimed.

Int. Cl.^{2} C09K *3/34;* G02F *1/13*

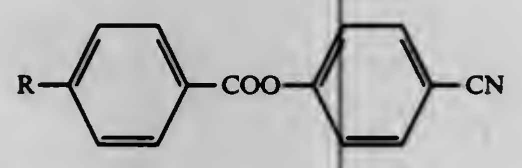
U.S. Cl. 252—299 **10 Claims**

1. A nematic composition which comprises two or more compounds of the formula



wherein R is straight-chain lower alkyl of 4 to 8 carbon atoms.

7. A nematic composition which comprises an ester of the formula



wherein R is straight-chain lower alkyl of 4 to 8 carbon atoms,

or mixtures thereof and one or more nematic compounds having a positive anisotropy.

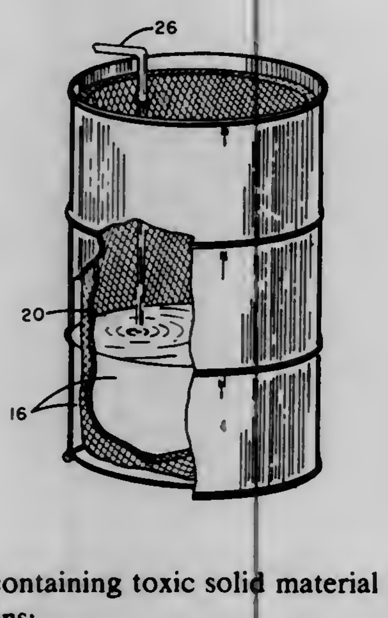
4,058,479
FILTER-LINED CONTAINER FOR HAZARDOUS SOLIDS

Leslie E. White, Folsom, and Charles M. Gracey, Carmichael, both of Calif., assignors to Aerojet-General Corporation, El Monte, Calif.

Filed May 12, 1975, Ser. No. 576,679

Int. Cl.^{2} G21F *9/36*

U.S. Cl. 252—301.1 W **10 Claims**



1. A package containing toxic solid material comprising:

outer wall means;

a layer of a material that is impervious to the solid toxic material but porous to a liquified immobilization material spaced at a predetermined distance from said wall means and substantially encompassing a preselected area within the package;

solid toxic material confined within said encompassed area by said impervious material; and

a liquefiable immobilization material that will penetrate said layer when liquefied disposed both within said encompassed area in mixture with said solid toxic material, and also between said layer and said wall means to isolate said layer and said toxic material from said wall means.

4,058,480
NON-DUSTING, READILY FREE-FLOWING GRANULES OF OPTICAL BRIGHTENERS

Frank Lohmann, Arlesheim; Raymond Lugrin, Basel, both of Sweden, and Hanspeter Baumann, Toms River, N.J., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Sept. 12, 1974, Ser. No. 505,282

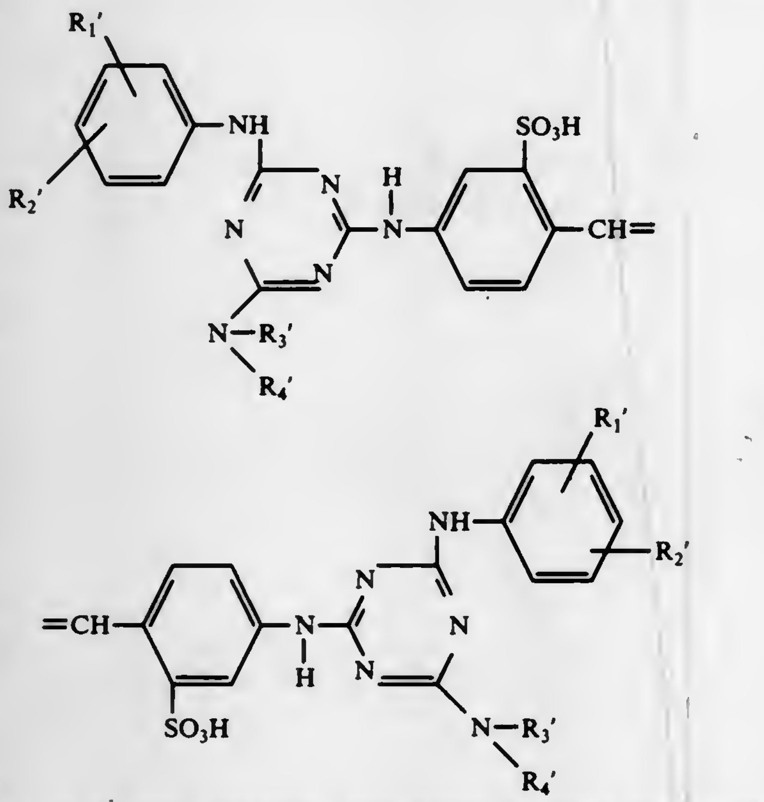
Claims priority, application Switzerland, Sept. 14, 1973, 13275/73

Int. Cl.^{2} D06L *3/12;* C09K *11/00*

U.S. Cl. 252—301.21 **11 Claims**

1. Non-dusting, readily free-flowing, easily soluble granules, consisting of a mixture of

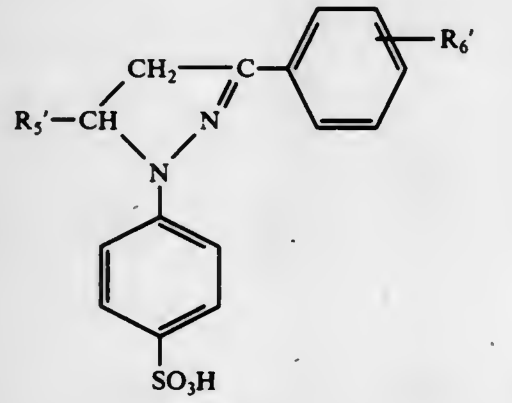
a. 5 to 70 percent by weight of an optical brightener selected from the group consisting of compounds of the formulae



(A)

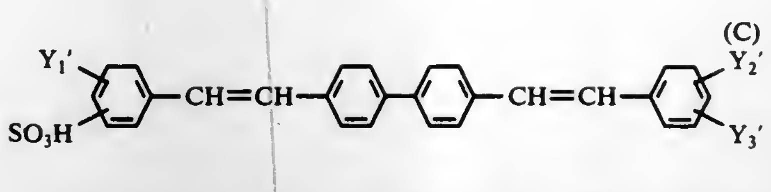
or its sodium, potassium, ammonium or amine salts, wherein R_1' and R_2' independently of one another denote hydrogen or the sulpho group, R_3' denotes hydrogen, alkyl or hydroxyalkyl with 1 to 4 carbon atoms and R_4' denotes alkyl or hydroxyalkyl with 1 to 4 carbon atoms,

(B)



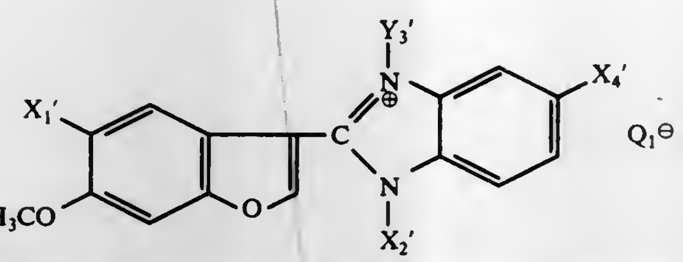
or its sodium, potassium, ammonium or amine salts, wherein R_5' denotes alkyl with 1 to 4 carbon atoms or phenyl and R_6' denotes hydrogen, chlorine or methyl,

(C)



or its sodium or potassium salts, wherein Y_1' denotes hydrogen or chlorine, Y_2' denotes hydrogen, chlorine or the sulpho group and Y_3' denotes hydrogen or chlorine,

(D)



wherein X_1' denotes hydrogen or chlorine, X_2' denotes methyl, phenyl or benzyl, X_3' denotes methyl or benzyl, X_4' denotes hydrogen, chlorine, methyl, methoxy, methylsulphonyl or ethylsulphonyl and Q_1 denotes chlorine, the methosulphate or the p-toluenesulphonic acid radical,

b. 0 to 15 percent by weight of an organic acid,

c. 0 to 15 percent by weight of a complex-forming agent,

d. 0 to 15 percent by weight of an anionic or nonionic surface-active agent except when said surface-active agent is used as carrier material, and

e. 0 to 15 percent by weight of a melting point lowering substance, components (a) - (e) being dissolved in a solid melt of

f. 95 to 30 percent by weight of an organic carrier material which is solid at room temperature and is soluble in water, selected from the group consisting of urea, a urea derivative, an ethylene oxide adduct, a block polymer of polyethylene oxide and polypropylene oxide, a high-molecular weight polyglycol or dimethylsulphone or mixtures thereof.

4,058,481
METHOD OF ELIMINATING FOAM APPEARING ON A LIQUID SURFACE

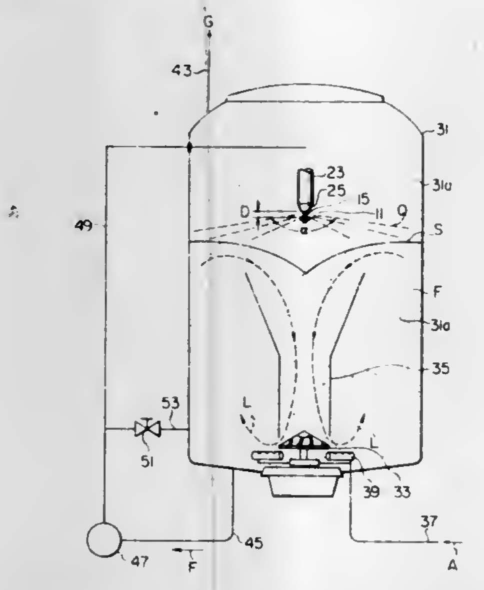
Norio Futai; Toshio Murakami; Yoshimasa Takahara, all of Chiba, and Toshiharu Kumazawa, Fujisawa, all of Japan, assignors to Mitsubishi Precision Co., Ltd. and Director-General of the Agency of Industrial Science and Technology, both of, Japan

Filed July 22, 1976, Ser. No. 707,514

Claims priority, application Japan, July 26, 1975, 50-91469

Int. Cl.^{2} B01D *19/00*

U.S. Cl. 252—321 **6 Claims**



1. A method of eliminating foam appearing on a surface of a fixed amount of liquid content received within a reaction vessel which retains a free inner space left above said surface of said liquid content comprising:

locating a liquid ejecting nozzle member and a subsequent diffusing member at a position within said free inner space of said reaction vessel and away from said surface of said liquid content, said diffusing member being spaced at a preselected distance from said nozzle member such that the liquid particles ejected at a wide angle from said nozzle member impinge upon said diffusing member;

retracting a partial amount of said liquid content from said vessel through a conduit means;

sending said partial amount of said liquid content to said liquid ejecting nozzle member through a second conduit means under a predetermined pressure exerted by a liquid pumping means, and;

diffusing said partial amount of said liquid content through said diffusing member in the form of said liquid particles having therein kinetic energy against said foam thereby causing said foam on said surface of said liquid content to collapse and vanish.

4,058,482
FUEL CELL ELECTRODE

Johannes M. Baris, Durham, Conn.; Charles D. Iacovangelo, Schenectady, N.Y., and Wolfgang M. Vogel, Glastonbury, Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Dec. 20, 1976, Ser. No. 752,417

Int. Cl.^{2} H01M *4/88*

U.S. Cl. 252—425.3 **3 Claims**

1. A method for the manufacture of a fuel cell electrode comprising the steps of:

choosing a polymer, the polymer being selected to be in the form of negatively charged particles having a desired average diameter;

selecting a pore former, the pore former comprising a material which is attacked by an etchant which will not attack the polymer, the pore former being in the form of positively charged particles having an average diameter which is not greater than the average diameter of the polymer particles;

causing the polymer and pore former particles to co-agglomerate;

forming a suspension containing the polymer-pore former co-agglomerates and particles of a fuel cell catalyst;

intimately mixing the co-agglomerates and particles of catalyst;

filtering the suspension to form a layer comprising polymer-pore former co-agglomerates and catalyst;

mounting the layer on a support to define a fuel cell electrode structure;

sintering the electrode structure; and

subjecting the sintered electrode structure to an etchant which will attack the pore former material to thereby produce an electrode having gas channels only in the polymer portions thereof.

4,058,483
ADSORBENT MATERIAL

Richard George Cleveland Henbest, Stockton-on-Tees, England, assignor to Imperial Chemical Industries Limited, London, England

Filed June 14, 1976, Ser. No. 695,415

Claims priority, application United Kingdom, June 13, 1975, 25380/75

Int. Cl.^{2} B01J *21/18*

U.S. Cl. 252—446 **9 Claims**

1. A method of making an adsorptive material which is in shaped discrete pieces comprising mixing active carbon powder with an aqueous solution of sodium silicate to form a moist mixture, forming the moist mixture into shaped discrete pieces, drying the pieces, immersing the pieces in a silicate-insolubiliz-

ing reagent until the silicate-content of the pieces has become insolubilized, washing the pieces with water, and drying the pieces at a temperature of at least 100° C.

4,058,484

AMMONIUM FAUJASITE ZEOLITES

Hamid Alafandi, Woodland Hills, and Dennis Stamires, Newport Beach, both of Calif., assignors to Filtrol Corporation, Los Angeles, Calif.

Filed Sept. 9, 1976, Ser. No. 718,167

Int. Cl.² B01J *29/06, 1/04*

U.S. Cl. 252—455 Z **6 Claims**

1. A method of producing ammonium zeolites of the faujasite type which comprises mixing a zeolite of the faujasite type whose exchange position is substantially entirely occupied by Na cations with a solution of an ammonium salt, the quantity of the zeolite, and the concentration of the ammonium cations, being in quantity sufficient to establish a ratio of the equivalents of NH_4 cation in the solution, per equivalent of Na cation in the zeolite in the mixture in excess of about 25, heating the solution to a temperature above about 300° and less than about 450° F for a period of time to reduce the sodium content of the zeolite, expressed as Na_2O, to less than about 1.5% by weight of the exchanged zeolite, on a volatile free basis, and washing the zeolite substantially free of cations of the salt in solution.

2. In the process of claim 1, in which said solution is acid of a pH being between about 2.5 and 5, and said equivalents of the NH_4 ion to the sodium ion in the zeolite being within the range of above about 30 up to about 40, for a period of time sufficient to reduce the Na in the zeolite, expressed as Na_2O, to less than 1% by weight of the zeolite on a volatile free basis.

4,058,485

POROUS METAL-ALUMINA COMPOSITE

Harry Cheung, Buffalo, N.Y., assignor to Union Carbide Corporation, New York, N.Y.

Continuation of Ser. No. 536,646, Dec. 26, 1974, abandoned. This application June 21, 1976, Ser. No. 698,030

Int. Cl.² B01J *21/04, 23/42, 23/44, 35/02*

U.S. Cl. 252—466 PT **7 Claims**

1. The combination of a support structure for catalytic materials and a catalytic metal or metal compound deposited on the transition alumina in said structure, said support structure comprising the combination of a metal screen material having deposited thereon a sintered mixture of metal particles and alumina particles, characterized by the following parameters:

at least 50 weight percent of the particles in the sintered mixture are metal particles;

at least 5 weight percent of the particles in the sintered mixture are alumina particles having a surface area of at least 25 square meters per gram; and

the inter-particle porosity in the sintered mixture is between 15 volume percent and 60 volume percent.

4,058,486

PRODUCING X-RAYS

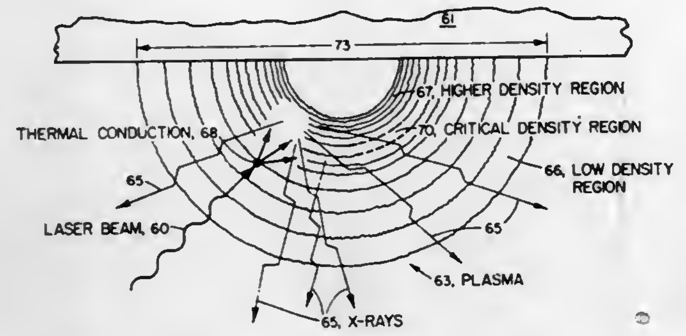
Philip J. Mallozzi; Harold M. Epstein; Richard G. Jung; David C. Applebaum; Barry P. Fairand, all of Columbus, and William J. Gallagher, Worthington, all of Ohio, assignors to Battelle Memorial Institute, Columbus, Ohio

Filed Dec. 29, 1972, Ser. No. 319,756

Int. Cl.² G21G *4/00*

U.S. Cl. 250—493 **20 Claims**

1. A method of producing X-rays that comprises directing radiant energy from a laser onto a target, wherein conversion efficiency of at least about 3 percent is obtained by providing the radiant energy in a low-power precursor pulse of approximately uniform effective intensity focused onto the surface of the target for about 1 to 30 nanoseconds so as to generate an expanding unconfined coronal plasma having less than normal solid density throughout and comprising a low-density (underdense) region wherein the plasma frequency is less than the laser radiation frequency and a higher-density (overdense) region wherein the plasma frequency is greater than the laser radiation frequency and, about 1 to 30 nonoseconds after the precursor pulse strikes the target, a higher-power main pulse focused onto the plasma for about 10^{-3} to 30 nanoseconds and having such power density and total energy that the radiant



energy is absorbed in the underdense region and conducted into the overdense region to heat it and thus to produce X-rays therefrom with the plasma remaining substantially below normal solid density and thus facilitating the substantial emission of X-rays in the form of spectral lines arising from nonequilibrium ionization states.

4,058,487

QUICK LATHERING TOILET BARS AND METHOD OF MAKING SAME

Leon M. Prince, Westfield, N.J., assignor to Lever Brothers Co., New York, N.Y.

Division of Ser. No. 419,558, Nov. 28, 1973, Pat. No. 3,989,647, which is a continuation of Ser. No. 137,288, April 28, 1973, abandoned, which is a continuation-in-part of Ser. No. 54,008, July 10, 1970, abandoned. This application June 14, 1976, Ser. No. 695,708

Int. Cl.² C11D *1/12*

U.S. Cl. 252—552 **8 Claims**

1. A non-mushing high lathering synthetic toilet bar having a pH of about 4.5–9.5 and comprising based on the total weight of the actives:

i. 40 to about 85% of a primary alkane sulfonate or a mixture of alkane sulfonates wherein the carbon chain contains 12 carbon atoms or averages 12 carbon atoms;

ii. 5 to about 35% of a natural or synthetic fatty acid or mixtures thereof wherein the carbon chain contains or averages 12 carbon atoms;

iii. 5 to about 30% of a binder modifier selected from the group consisting of alkali metal, magnesium and ammonium salts of C_{12}–C_{18} primary alkyl sulfates; and

iv. based on the total weight of the bar, 5–25% water.

4,058,488

IMIDAZOLINE OXIDES

Reginald L. Wakeman, Paris, France; Zdzislaw W. Dudzinski, Clifton, and Arnold Lada, Montclair, both of N.J., assignors to Millmaster Onyx Corporation, New York, N.Y.

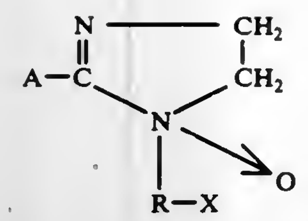
Continuation-in-part of Ser. No. 201,573, Nov. 23, 1971, Pat. No. 3,951,878, which is a continuation-in-part of Ser. No. 804,669, March 5, 1969, abandoned, which is a continuation-in-part of Ser. No. 562,522, July 5, 1966, abandoned. This application Sept. 17, 1975, Ser. No. 614,173

The portion of the term of this patent subsequent to Apr. 20, 1993, has been disclaimed.

Int. Cl.² C11D *1/58*

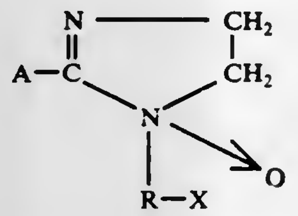
U.S. Cl. 252—542 **4 Claims**

1. A surface-active composition consisting essentially of (a) a surface-actively effective amount of a mixture of compounds having the structure:



wherein A in any one given compound of said mixture represents one of the alkyl groups found in tallow fatty acids, R is either C_2H_4 or C_3H_6 and X is either OH or NH_2, and wherein the arrow indicates a semi-polar bond, (b) a detergently effective amount of a detergent selected from the group consisting of anionic, cationic and non-ionic detergents.

3. A method of cleaning and sanitizing an object which comprises applying to said object a composition consisting essentially of (a) a surface-actively effective amount of a mixture of compounds having the structure:



wherein A in any onegiven compounds of said mixture represents one of the alkyl groups found in tallow fatty acids, R is either C_2H_4 or C_3H_6 and X is either OH or NH_2 and wherein the arrow indicates a semi-polar bond, (b) a detergently effective amount of a detergent selected from the group consisting of anionic, cationic and non-ionic detergents.

4,058,489

DETERGENT COMPOSITION HAVING TEXTILE SOFTENING AND ANTISTATIC EFFECT

Karl Martin Edvin Hellsten, Odsmal, Sweden, assignor to Berol Kemi AB, Stenungsund, Sweden

Filed May 15, 1975, Ser. No. 577,535

Claims priority, application Sweden, May 20, 1974, 7406698

Int. Cl.² C11D *1/38, 3/26, 7/32*

U.S. Cl. 252—547 **16 Claims**

1. A detergent composition imparting a good antistatic effect and a good softening effect, consisting essentially of a mixture of surfactants of which

a. from 30 to 90% by weight is a nonionic surfactant having the formula:

$$RA\,(C_nH_{2n}O)_xH$$

wherein

R is a hydrocarbon group selected from the group consisting of alkyl groups having from about eight to about twenty-two carbon atoms, and mono-alkyl phenyl groups having a total of from about four to about twenty-four carbon atoms in the alkyl groups; and

A is selected from the group consisting of oxygen, sulfur, amido, carboxylic acid, sulfoxide and sulfonic groups;

n is a number from 2 to 4; and

x is a number from 4 to about 40; and

b. from 10 to 70% by weight is a surfactant mixture comprising at least one anionic surfactant and at least one cationic surfactant in a charge ratio anionic surfactant to cationic surfactant within the range from about 0.60 to about 0.98;

the anionic surfactant having the general formula:

$$R(OC_nH_{2n})_pOSO_3H$$

wherein:

R is a hydrocarbon group selected from the group consisting of alkyl groups having from about eight to about twenty-two carbon atoms, and mono-alkyl-substituted phenyl groups having a total from about six to about eighteen carbon atoms in the alkyl groups;

$(OC_nH_{2n})_p$ represents an alkylene glycol chain where n is selected from the group consisting of 2, 3 and 4 and p is a number from 1 to 10; and salts thereof; and the cationic surfactant being a quaternary ammonium surfactant having the formula:

$$R_1R_2N^+(CH_3)_2X^-$$

wherein:

R_1 and R_2 are selected from the group consisting of alkyl and alkoxy-2-hydroxy propylene groups having from about six to about twenty-two carbon atoms; and

X is an anion.

4,058,490

QUICK LATHERING TOILET BARS AND METHOD OF MAKING SAME

Leon M. Prince, Westfield, N.J., assignor to Lever Brothers Company, New York, N.Y.

Division of Ser. No. 419,558, Nov. 28, 1973, Pat. No. 3,989,647, which is a continuation of Ser. No. 137,228, April 28, 1973, abandoned, which is a continuation-in-part of Ser. No. 54,008, July 10, 1970, abandoned. This application June 14, 1976, Ser. No. 695,713

Int. Cl.² C11D *1/12*

U.S. Cl. 252—554 **8 Claims**

1. A non-mushing high lathering synthetic toilet bar having a pH of about 4.5–9.5 and comprising based on the total weight of the actives:

i. 40% to about 85% of a primary alkane sulfonate or a mixture of alkane sulfonates wherein the carbon chain contains 12 carbon atoms or averages 12 carbon atoms;

ii. 5 to about 35% of a natural or synthetic fatty acid or mixtures thereof wherein the carbon chain contains or averages 12 carbon atoms;

iii. 5 to about 3% of a binder modifier selected from the group consisting of alkali metal, magnesium and ammonium salts of C_{16}–C_{20} alkane disulfonate; and

iv. based on the total weight of the bar, 5–25% water.

4,058,491

CATIONIC HYDROGELS BASED ON HETEROCYCLIC N-VINYL MONOMERS

Robert Steckler, San Diego, Calif., assignor to Plastomedical Sciences, Inc., Briarcliff Manor, N.Y.

Filed Feb. 11, 1975, Ser. No. 549,097

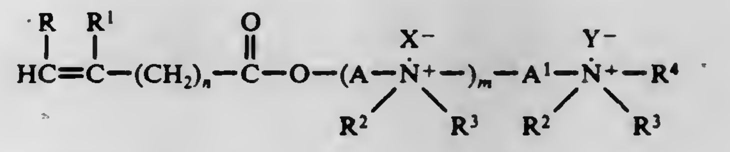
Int. Cl.² C08F *220/20, 26/00*

U.S. Cl. 260—2.2 R **15 Claims**

1. The cationic, polymeric hydrogel produced by simultaneous polymerization and cross-linking in the presence of a free radical polymerization catalyst in an amount of from about 0.05 to about 4 weight percent, based on the total weight of monomers, and at a temperature of from about 20° C. to about 125° C., of a mixture consisting essentially of the following monomers:

a. about 20 to about 95 weight percent, based on the total weight of monomers, of a heterocyclic N-vinyl monomer selected from the group consisting of N-vinyl lactams, N-vinyl succinimide, N-vinyl diglycoylimide, N-vinyl glutarimide, N-vinyl-3-morpholinone, N-vinyl-5-methyl-3-morpholinone and N-vinyl imidazole;

b. about 50 to about 0.05 weight percent, based on the total weight of monomers, of a cationic monoethylenically unsaturated quaternary ammonium monomer, capable of copolymerizing with (a) and having the formula:



wherein:

R represents hydrogen, methyl or aryl;

R^1 represents hydrogen or alkyl of 1 to about 18 carbons;

A and A^1, each of which may be the same or different, each represents an alkylene group of from about 2 to about 8 carbons or an arylene group;
R^2, R^3 and R^4, each of which may be the same or different, each represents alkyl, aryl or alkaryl or the R^2 and R^3 on the same nitrogen atom, taken together represent a divalent aliphatic group of 4 to 5 atoms which jointly with the amino nitrogen forms a 5 or 6 membered heterocyclic amino group;
X and Y, each of which may be the same or different, each represents an anion forming the anionic portion of a quaternary ammonium group;
n represents an integer, including 0, of from 0 to about 10; and
m represents an integer, including 0, of from 0 to about 5.

c. about 0.2 to about 12 weight percent, based on the total weight of monomers, of a polymerizable cross-linking agent capable of copolymerizing with (a) and (b); and having the formula:

$$CH_2{=}\overset{\displaystyle R}{\overset{|}{C}}{-}COO{-}A{-}OOC{-}\overset{\displaystyle R}{\overset{|}{C}}{=}CH_2$$

wherein
R represents a member of the group consisting of hydrogen and alkyl of from 1 to about 4 carbon atoms;
A represents alkylene of from 2 to about 10 carbons or a polyglycol ether group of the formula:

$$-\!\!\left(CH_2{-}\underset{\displaystyle R'}{\underset{|}{CH}}{-}O\right)_{\!n}\!\!-CH_2{-}\underset{\displaystyle R'}{\underset{|}{CH}}{-}$$

R' represents a member of the group consisting of hydrogen and alkyl of 1 to 2 carbon atoms; and
n represents an integer of from 1 to about 20; and

d. from 0 to about 50 weight percent, based on the total weight of monomers, of a monoethylenically unsaturated acrylic monomer capable of copolymerizing with (a), (b) and (c) and capable of polymerizing to a high molecular weight, in excess of 100,000 and selected from the group consisting of acrylamides, methacrylamides, acrylonitrile, methacrylonitrile, alkyl acrylates and methacrylates, hydroxyalkyl acrylates and methacrylates, and monohydroxy and monoalkoxy polyalkylene glycol acrylates and methacrylates; and provided that $(a) \geqq (d)$ and $(a)+(d)$ = about 40 to about 95 weight percent.

4,058,492
PROCESS FOR MOLDING POLYURETHANE FOAMS
Wulf von Bonin; Helmut Kleimann, both of Leverkusen, and Udo Post, Bergisch-Gladbach (Paffrath), all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany
Continuation of Ser. No. 521,427, Nov. 6, 1974, abandoned. This application June 18, 1976, Ser. No. 697,589
Claims priority, application Germany, Jan. 10, 1974, 2404310
Int. Cl.² C08G *18/36*
U.S. Cl. 260—2.5 AM **6 Claims**

1. In a process for producing a foam plastic which readily separates from the mold in which it has been foamed wherein a foamable reaction mixture containing an organic polyisocyanate, an organic compound having a molecular weight of about 62 to about 10,000 which contains reactive hydrogen atoms, a catalyst for the acceleration of the isocyanate/reaction hydrogen reaction, and a blowing agent is charged to the mold and reacted, the improvement which comprises adding to said active hydrogen containing component or to the foamable reaction mixture as a third stream an esterification reaction product of about 0.8 mol to about 4 mols of ricinoleic acid and 1 mol of a long chain fatty acid containing more than 8 carbon atoms which is substantially free of alcoholic hydroxyl groups, in an amount sufficient to improve the mold release properties of the resulting molded product.

4,058,493
POLYESTER URETHANE FOAM PRODUCED WITH CYANO-ETHER POLYSILOXANE-POLYOXYALKYLENE COPOLYMERS
Bela Prokai, Mahopac, and Bernard Kanner, West Nyack, both of N.Y., assignors to Union Carbide Corporation, New York, N.Y.
Division of Ser. No. 536,884, Dec. 27, 1974, Pat. No. 3,979,419. This application May 28, 1976, Ser. No. 691,020
Int. Cl.² C08G *18/42;* **C08K** *5/54*
U.S. Cl. 260—2.5 AH **14 Claims**

1. A process for producing flexible polyurethane foam which comprises simultaneously reacting and foaming a reaction mixture containing: (a) a polyester polyol reactant having an average of at least two hydroxyl groups per molecule; (b) a polyisocyanate reactant containing at least two isocyanato groups per molecule; (c) a blowing agent; (d) a catalyst comprising an amine; and (e) a foam stabilizer comprising polysiloxane-polyoxyalkylene copolymers having the average composition,

$$(R)_{3-(t+u)}\overset{\displaystyle (E)_u}{\underset{\displaystyle (Q)_t}{\mathrm{SiO}}}\Big[\overset{\displaystyle R}{\underset{\displaystyle R}{\mathrm{SiO}}}\Big]_x\Big[\overset{\displaystyle R}{\underset{\displaystyle Q}{\mathrm{SiO}}}\Big]_{y-(t+w)}\Big[\overset{\displaystyle R}{\underset{\displaystyle E}{\mathrm{SiO}}}\Big]_{z-(u+v)}\overset{\displaystyle (E)_v}{\underset{\displaystyle (Q)_w}{\mathrm{Si}}}(R)_{3-(v+w)}$$

wherein: R is alkyl having from one to 10 carbon atoms; Q is a cyano-bearing ether group having the formula, —$(O)_q$R-'OR"CN, wherein *q* is 0 or 1, R' is bivalent alkylene having from 3 to 8 carbon atoms and R" isbivalent alkylene of 2 to 4 carbon atoms; E is a polyoxyalkylene block having the formula, —$(R^{\circ})_p$—$(OC_aH_{2a})_b$—OG, wherein R° comprises a bivalent alkylene group a carbon atom of which is bonded to silicon, G comprises a monovalent hydrocarbon group having from 1 to 12 carbon atoms, *p* is zero or one, —$(OC_aH_{2a})_b$— is a polyoxyalkylene chain constituted of at least 75 weight percent of oxyethylene and wherein *b* has an average value from about 3 to about 30; each of *t, u, v* and *w* is independently 0 or 1 provided each of the sums $b+u$ and $v+w$ is 0 or 1; each of the sums $t+w$ and $u+v$ is independently 0, 1 or 2; *x* is zero or a positive number having an average value up to about 20; *y* has an average value from about 2 to about 20; and *z* has an average value from about 2 to about 30.

7. A solution composition which comprises components (1) and (2) and at least one of components (3) and (4) wherein:
component (1) is a siloxane-polyoxyalkylene copolymer having the average composition,

$$R_3SiO[R_2SiO]_x\Big[R\underset{\substack{|\\ (O)_q\\ |\\ R'OR''-CN}}{\mathrm{Si}}O\Big]_y\Big[R\underset{\substack{|\\ (R^{\circ})_p-(OC_aH_{2a})_b-OG}}{\mathrm{Si}}O\Big]_zSiR_3$$

wherein: R is alkyl having from 1 to 10 carbon atoms, R' is bivalent alkylene of from 3 to 8 carbon atoms, R" is bivalent alkylene of from 2 to 4 carbon atoms, R° comprises a bivalent alkylene group a carbon atom of which is bonded to silicon, G comprises a monovalent hydrocarbon group having from 1 to 12 carbon atoms, —$(OC_aH_{2a})_b$— is a polyoxyalkylene chain constituted of at least 75 weight percent of oxyethylene and wherein the average value of *b* is from about 3 to about 30, *p* is 0 or 1, *q* is 0 or 1, *x* is 0 or a positive number having an average value up to about 20, *y* has an average value from about 2 to about 20, and *z* has an average value from about 2 to about 30;
component (2) is an organic acidic component comprising at least one acid of the group consisting of an aliphatic and a cycloaliphatic monocarboxylic acid having from 15 to 20 carbon atoms and is present in said solution in an amount from about 5 to about 90 parts by weight per 100 parts by weight of said copolymer;
component (3) is a water soluble, silicon-free organic surfactant;
component (4) is a water-soluble glycol; and wherein the weight of component (3) when present, the weight of component (4) when present, and the combined total weight of components (3) and (4) when both are present, ranges from about 5 to about 90 parts by weight per 100 parts by weight of said copolymer.

4,058,494
POLYETHER URETHANE FOAM PRODUCED WITH CYANO-ETHER POLYSILOXANE-POLYOXYALKYLENE COPOLYMERS
Bela Prokai, Mahopac, and Bernard Kanner, West Nyack, both of N.Y., assignors to Union Carbide Corporation, New York, N.Y.
Division of Ser. No. 536,885, Dec. 27, 1974, Pat. No. 3,979,420. This application May 28, 1976, Ser. No. 691,021
Int. Cl.² C08G *18/14;* **C08K** *5/54*
U.S. Cl. 260—2.5 AH **5 Claims**

1. A process for producing flexible polyurethane foam which comprises simultaneously reacting and foaming a reaction mixture containing: (a) a polyether polyol reactant containing an average of at least two hydroxyl groups per molecule; (b) a polyisocyanate reactant containing at least two isocyanato groups per molecule; (c) a blowing agent; (d) a catalyst comprising an amine; and (e) a foam stabilizer comprising polysiloxane-polyoxalkylene copolymers having the average composition,

$$R_{3-(t+u)}\overset{\displaystyle (E)_u}{\underset{\displaystyle (Q)_t}{\mathrm{SiO}}}\Big[\overset{\displaystyle R}{\underset{\displaystyle R}{\mathrm{SiO}}}\Big]_x\Big[\overset{\displaystyle R}{\underset{\displaystyle Q}{\mathrm{SiO}}}\Big]_{y-(t+w)}\Big[\overset{\displaystyle R}{\underset{\displaystyle E}{\mathrm{SiO}}}\Big]_{z-(u+v)}\overset{\displaystyle (E)_v}{\underset{\displaystyle (Q)_w}{\mathrm{Si}}}(R)_{3-(v+w)}$$

wherein: R is alkyl having from 1 to 10 carbon atoms; Q is a cyano-bearing ether group having the formula, —$(O)_q$R-'OR"CN, where *q* is zero or one, R" is bivalent alkylene of 3 to 8 carbon atoms and R" is bivalent alkylene of 2 to 4 carbon atoms; E is a polyoxyalkylene block having the formula, —$(R^{\circ})_p$—$(OC_aH_{2a})_b$—OG, where R° comprises a bivalent alkylene group a carbon atom of which is bonded to silicon, G comprises a monovalent hydrocarbon group having from 1 to 12 carbon atoms, *p* is zero or one, *a* has a value from 2 to 4 provided from about 20 to about 65 weight percent of the polyoxyalkylene chain, —$(OC_aH_{2a})_b$—, is constituted of oxyethylene units, and *b* has an average value such that the average molecular weight of the chain is from about 1000 to about 6000; each of *t, u, v* and *w* is independently zero or one provided each of the sums $t+u$ and $v+w$ is independently zero or one; each of the sums $t+w$ and $u+v$ is independently zero, one or two; *x* has an average value from about 10 to about 200; *y* has an average value from about 2 to about 100; and *z* has an average value from about 2 to about 30.

4,058,495
PREPARATION OF HIGH BULK DENSITY/LOW POROSITY PVC RESINS
Joseph Serratore, Sarnia; Laurence F. King, Mooretown; Thomas H. Sutherland, Sarnia, and James R. Wallace, Camlachie, all of Canada, assignors to Exxon Research & Engineering Co., Linden, N.J.
Continuation of Ser. No. 586,879, June 13, 1975. This application Sept. 27, 1976, Ser. No. 727,043
Int. Cl.² C08L *1/26*
U.S. Cl. 260—17 A **10 Claims**

1. A polyvinyl chloride resin having a bulk density in excess of 0.65 g/ml, a porosity or plasticizer acceptance less than about 15 ml per 100g resin, a median particle size of about 0.01 to about 0.3 mm, wherein each resin particle consists essentially of polyvinyl chloride and a C_{12}–C_{35} aliphatic compound selected from the group consisting of alcohols, acids, esters and waxes.

8. A method of producing a high bulk density/low porosity polyvinyl chloride resin which comprises suspension polymerizing vinyl chloride in the presence of about 0.1 to about 5 parts of C_{12}–C_{35} aliphatic alcohol, aliphatic acid, aliphatic ester or wax, a monomer soluble/water insoluble initiator and about 0.02 to about 0.5 parts of hydroxyethyl cellulose wherein said parts are based on 100 parts of vinyl chloride monomer and wherein said polymerization is performed in an unbaffled reactor under low shear conditions.

4,058,496
POLYESTER-AMINOPLAST BULKING AGENTS
Eugene M. Holda, Glen Ellyn, and John C. Lark, St. Charles, both of Ill., assignors to Standard Oil Company (Indiana), Chicago, Ill.
Division of Ser. No. 534,158, Dec. 19, 1974, Pat. No. 3,975,566. This application Feb. 2, 1976, Ser. No. 654,702
Int. Cl.² C08L *67/02*
U.S. Cl. 260—21 **5 Claims**

1. A composition comprising an aminoplast and a water-soluble polyester resin having a molecular weight of not more than about 4.000 and an acid number of at least 35 which comprises (1) a branched chain three-dimensional polyester core having an acid number less than about 25 comprising the reaction product of a polyhydroxyl compound, dicarboxylic acid compound, monocarboxylic acid compound and polycarboxylic acid compound having at least three acyl moieties and (2) pendant carboxylic acid moieties comprising polycarboxylic acid compounds having at least three acyl moieties, wherein said polyester resin contains no non-benzenoid unsaturation and none of the hydroxyl compounds have secondary hydroxyl groups.

4,058,497
ONE PACKAGE SYSTEM COLD-SETTING COATING COMPOSITIONS
Keiun Ko, Minoo; Naomitsu Takashina, Fujisawa; Senzo Shimizu, Odawara; Masuya Ikegami, Chigasaki, and Yoshinori Iwamoto, Odawara, all of Japan, assignors to Mitsubishi Gas Chemical Company, Inc., Tokyo, Japan
Filed Sept. 2, 1975, Ser. No. 609,516
Claims priority, application Japan, Sept. 10, 1974, 49-104638
Int. Cl.² C09D *3/64, 3/80, 5/08*
U.S. Cl. 260—22 A **7 Claims**

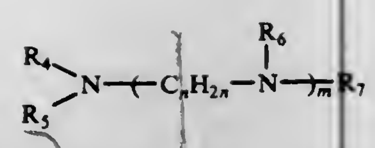
1. A one-package system cold-setting coating composition which consists essentially of (i) an acrylic copolymer having carboxyl groups in its molecule or an alkyd resin as a resin component, (ii) an aluminum alkoxide complex, (iii) a keto-enol tautomeric compound and (iv) a solvent, and (v) from 0.01 to 10 percent by weight of at least one nitrogen compound based on the weight of the composition comprising (i), (ii), (iii) and (iv), said nitrogen compound being selected from the group consisting of

a. a monoamine or a hydroxymonoamine having the formula

$$R_1{-}N{\begin{smallmatrix}\diagup R_2\\ \diagdown R_3\end{smallmatrix}} \qquad \text{I}$$

wherein R_1 is alkyl having from 1 to 12 carbon atoms, alkenyl having from 2 to 12 carbon atoms, cyclohexyl, benzyl or hydroxyalkyl having from 1 to 4 carbon atoms, and each of R_2 and R_3 is hydrogen or the same as R_1;

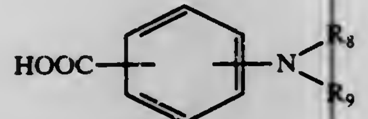
b. a polyamine having the formula



II

wherein n is an integer of 1 - 6, m is an integer of 1 - 3 and each of R_4, R_5, R_6 and R_7 is hydrogen or alkyl having from 1 to 4 carbon atoms, and C_nH_{2n} is alkylene;

c. an aromatic amino compound having the formula



III

wherein each of R_8 and R_9 is hydrogen or alkyl having from 1 to 4 carbon atoms;

d. a heterocyclic compound selected from the group consisting of 1,2,4-triazole, benzotriazole, imidazole and morpholine; and

e. an amine selected from the group consisting of guanidine and hexamethylenetetramine.

4,058,498

PROCESS FOR THE PREPARATION OF TREATING LIQUIDS, STABLE UNDER STORAGE, ESPECIALLY FOR IMPROVING THE WRINKLE-FREE CHARACTERISTICS OF CELLULOSIC FABRICS TREATED WITH THE SOLUTION

Jean Claude Bonnet, 47 avenue de France, Blois (Loir & Cher), France

Filed Aug. 1, 1975, Ser. No. 601,043

Claims priority, application France, Aug. 2, 1974, 74.27658

Int. Cl.² C08L *61/24*

U.S. Cl. 260—29.4 R **9 Claims**

1. A process for preparing a fabric-treatment liquid, especially to reduce wrinkling of cellulosic fabrics and adapted to be stored for long periods, said process comprising:

a. in a first stage condensing urea and formaldehyde in an aqueous solution in the presence of glyoxylic acid at a pH between two and five at a temperature of 20° C to 100° C and with a molar ratio of urea/formaldehyde/glyoxylic acid of substantially 1 : 2 to 10 : 0.03 to 0.6 to produce a precondensate; and

b. in a second stage reacting said precondensate at a pH between 6 and 7, at a temperature between 20° C and 60° C with an additional quantity of urea to produce a final condensation with an overall molar ratio of urea/formaldehyde/glyoxylic acid of 1 : 1.5 to 3.5 : 0.03 to 0.6.

4,058,499

PIGMENTED LATEX PAINTS HAVING SUPERIOR GLOSS PREPARED BY GRINDING A PIGMENT INTO A SOLUTION OF A COPOLYMER OF AN UNSATURATED CARBOXYLIC ACID

Kazys Sekmakas, Chicago, and Kenneth K. Hesler, West Chicago, both of Ill., assignors to DeSoto, Inc., Des Plaines, Ill.

Filed June 24, 1975, Ser. No. 589,876

Int. Cl.² C08L *33/02*

U.S. Cl. 260—29.6 RW **10 Claims**

1. A method of producing a high gloss, air drying water base, pigmented latex paint comprising grinding a pigment into a water-free solution of an at least partially neutralized carboxyl-functional addition copolymer of monoethylenically unsaturated monomers including at least about 3% by weight of monoethylenically unsaturated carboxylic acid in water miscible organic solvent, the major proportion of said pigment being titanium dioxide, and the pigment volume concentration being at least 10%, said copolymer being at least partially neutralized with an hydroxy amine having the formula:

$$R-\overset{\overset{X}{|}}{N}-R'OH$$

in which R is hydrogen or an alkyl group, R' is an alkylene group, and X is either R or R'OH, to render the said copolymer dispersible in water, and thereby form a nonaqueous pigment paste, and then mixing the nonaqueous pigment paste with an aqueous latex consisting essentially of emulsified aqueous emulsion copolymer particles having a T_g below 20° C.

4,058,500

SULPHUR CEMENTS, PROCESS FOR MAKING SAME AND SULPHUR CONCRETES MADE THEREFROM

Alan H. Vroom, 10728 Willowfern Drive S.E., Calgary, Alberta, Canada

Continuation of Ser. No. 581,735, May 29, 1975, abandoned. This application Feb. 20, 1976, Ser. No. 659,659

Int. Cl.² C08F *28/02;* **C08K** *3/06*

U.S. Cl. 260—42.24 **24 Claims**

1. A sulphur cement composition comprising:

a. sulphur;

b. a viscosity increasing surface active finely divided particulate stabilizer;

and c. up to 10 parts by weight of the total amount of sulphur of an olefinic hydrocarbon polymer material derived from petroleum and having a non-volatile content greater than about 50% by weight and a minimum Wijs iodine number of about 100 cg/g; and which is capable of reacting with sulphur to form a sulphur-containing polymer.

4,058,501

POLYMER COMPOSITIONS

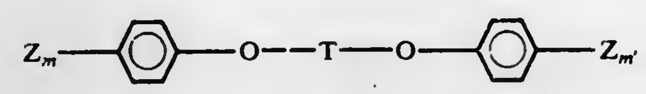
Arnold L. Anderson, Antioch, Ill., assignor to Velsicol Chemical Corporation, Chicago, Ill.

Continuation-in-part of Ser. No. 330,779, Feb. 8, 1973, abandoned. This application July 30, 1976, Ser. No. 710,290

Int. Cl.² C08K *5/06, 3/22*

U.S. Cl. 260—45.75 B **26 Claims**

1. A polymer composition comprising a three component system consisting of (1) elastomer, (2) a bis-phenoxy compound, which functions as a flame retardant for said composition, having the formula



wherein (a) Z is bromine; (b) m and m' are independent and are integers having a value of from 1 to 5 with the proviso that the bromine atom content is from 6 to 10 bromine atoms; and (c) T is a straight or branched chain carbon group having from one to four carbon atoms, and (3) a flame retardant enhancing agent.

4,058,502

STABILIZED COMPOSITIONS CONTAINING HINDERED HYDROXYALKANOATES

Martin Dexter, Briarcliff Manor, and David Herbert Steinberg, Bronx, both of N.Y., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 532,126, Dec. 12, 1974, Pat. No. 3,987,086. This application June 7, 1976, Ser. No. 693,386

Int. Cl.² C08K *5/13*

U.S. Cl. 260—45.85 B **12 Claims**

1. A composition of matter comprising an organic material subject to degradation and from 0.01 to 5% by weight of a stabilizing compound of the formula

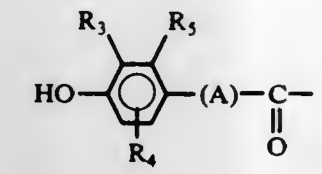
$$R_1Z-CH_2\underset{\underset{OR_2}{|}}{C}HCH_2OR_2$$

wherein

R_1 is alkyl of 1 to 30 carbon atoms, cycloalkyl of 5 to 12 carbon atoms, alkylthioethyl of 4 to 27 atoms in the chain or alkylpolyoxyalkylene of 4 to 27 atoms in the chain,

Z is oxygen or sulfur,

R_2 is the group



R_3 is hydrogen, alkyl of 1 to 8 carbon atoms, cycloalkyl of 5 to 6 carbon atoms or α-methylbenzyl,

R_4 is alkyl of 1 to 8 carbon atoms or cycloalkyl of 5 to 6 carbon atoms,

R_5 is hydrogen or lower alkyl of 1 to 4 carbon atoms, or R_3 and R_5 together form a butylene chain which, together with the phenyl ring, form a tetrahydronaphthyl group, and provided when R_3 is hydrogen, R_5 is alkyl and R_4 is located on the carbon atom ortho to the hydroxyl group, and

A is a covalent carbon bond or a straight or branched lower alkylene having 1 to 8 carbon atoms.

4,058,503

PROCESS FOR PREPARING ORGANIC SOLVENT-SOLUBLE POLY(AMIDE-IMIDE)

Toshio Yukuta, Kodaira; Takashi Ohashi, Iruma; Masumi Saito, Tanashi, and Katsuhiko Arai, Kodaira, all of Japan, assignors to Bridgestone Tire Company Limited, Tokyo, Japan

Filed Feb. 10, 1975, Ser. No. 548,841

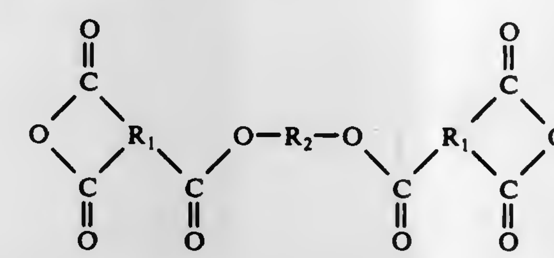
Claims priority, application Japan, Feb. 8, 1974, 49-15399

Int. Cl.² C08G *73/08, 73/14*

U.S. Cl. 260—47 CP **14 Claims**

1. A process for producing poly (amide-imide) elastomer having a number average molecular weight ranging from 10,000 to 100,000, which comprises reacting

(1) an acid anhydride functional polymer represented by the following formula



wherein R_1 represents a trivalent hydrocarbon radical having at least 2 carbon atoms and R_2 represents a hydroxyl functional polymer radical having a number average molecular weight ranging from 700 to 10,000 selected from the group consisting of polyether glycol, polyester glycol, polyester ether glycol, poly olefin glycol radicals, and a polyol radical which is obtained by the ozonization of a poly unsaturated hydrocarbon having unsaturated double bond units in the main or side chain, followed by the reduction of the resulting ozonide product with reducing agent,

with (2) a dicarboxylic acid dihydrazide in the presence of an aprotic dipolar solvent at a temperature ranging from −10° C to 30° C, the equivalent ratio of said acid anhydride functional polymer (1) to said dicarboxylic acid dihydrazide (2) being from 0.95 to 1.05.

4,058,504

PROCESS FOR TERMINATING POLYPHENYLENE ETHERS REACTIONS WITH AMINO CARBOXYLIC ACIDS AND REDUCING AGENTS

Eiichi Yonemitsu, Kashiwa; Akitoshi Sugio, Ohmiya; Atuo Kuramoto, and Hiroyuki Urabe, both of Tokyo, all of Japan, assignors to Mitsubishi Gas Chemical Company, Inc., Japan

Filed Apr. 16, 1976, Ser. No. 677,843

Claims priority, application Japan, Apr. 18, 1975, 50-47259

Int. Cl.² C08G *65/44*

U.S. Cl. 260—47 ET **4 Claims**

1. In a process for producing polyphenylene ethers which comprises reacting phenols with oxygen in the presence of a complex catalyst containing at least one metallic compound selected from the group consisting of copper compound, manganese compound and cobalt compound, the improvement which comprises terminating the polymerization reaction by adding an aminocarboxylic acid derivative and a reducing agent to the polymerization reaction mixture at a stage of the desired degree of polymerization of the resulting polyphenylene ether, said aminocarboxylic acid derivative being at least one member selected from the group consisting of polyalkylene polyamine polycarboxylic acids, cycloalkylene polyamine polycarboxylic acids, polyalkylene ether polyamine polycarboxylic acids, aminopolycarboxylic acids, aminocarboxylic acid, alkali metal or alkaline earth metal salts of these acids, and alkali metal/alkaline earth metal mixed salts of these acids, and said reducing agent being at least one member selected from the group consisting of sulfur suboxides, salts of lower oxyacids of sulfur, salts containing a metal in lower atomic valency of higher oxyacids or hydroacids, nitrogen-containing reducing compounds selected from the group consisting of hydroxylamine and salts thereof and hydrazine and boron hydride

said aminocarboxylic acid derivative being added in an amount of at least 1 mole per mole of the metallic compound in said complex catalyst

said reducing agent being added in an amount of 1.0 to 15.0 moles per mole of the metallic compound in the complex catalyst.

4,058,505

CHAIN-EXTENDING AMINE END-CAPPED POLYIMIDES

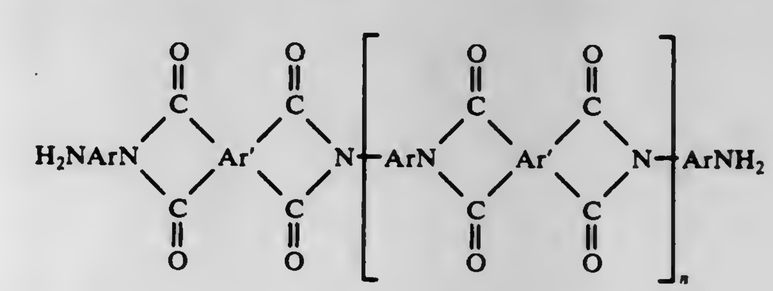
Gaetano Francis D'Alelio, South Bend, Ind., assignor to University of Notre Dame du Lac, Notre Dame, Ind.

Division of Ser. No. 363,801, May 25, 1973, Pat. No. 3,897,395. This application Mar. 14, 1975, Ser. No. 558,448

Int. Cl.² C08G *73/10*

U.S. Cl. 260—47 CP **18 Claims**

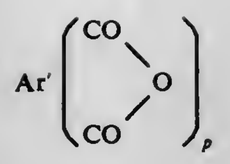
1. A polymeric chain-extending and cross-linking process comprising: reacting, at a temperature of about from ambient temperatures to 300° C, a polyimide of the formula:



wherein

Ar' is a tetravalent aromatic organic radical, the four carbonyl groups being attached directly to separate carbon atoms and each pair of carbonyl groups being attached to adjacent carbon atoms in the Ar' radical,

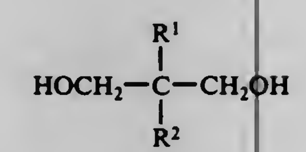
Ar is a divalent aromatic organic radical, and n is a positive integer of at least 1, with an anhydride of the formula:



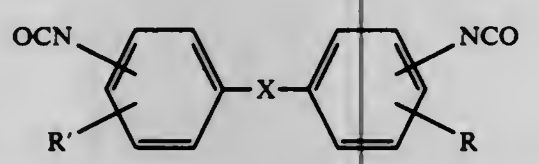
wherein
p is 3, and
Ar' is a hexavalent aromatic organic radical, the six carbonyl groups being attached directly to separate carbon atoms and each pair of carbonyl groups being attached to adjacent carbon atoms in the Ar' radical.

4,058,506
THERMOPLASTIC, ELASTIC POLYURETHANES WHICH ARE SOLUBLE IN ETHERS AND/OR KETONES
Guenter Vaeth, Limburgerhof; Rudolf Bachmann, Frankenthal; Heinrich Hartmann; Herbert Spoor, both of Limburgerhof, and August Lehner, Roedersheim-Gronau, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany
Filed Aug. 25, 1975, Ser. No. 607,099
Claims priority, application Germany, Sept. 6, 1974, 2442763
Int. Cl.² C08G *18/44, 18/48, 18/76*
U.S. Cl. 260—75 NP 9 Claims

1. Thermoplastic, elastic polyurethanes which are soluble in ethers and/or ketones and have a high surface hardness and high modulus of elasticity, which are obtained by reaction of
A. one mole of a lineaar polyester-ol and/or polyether-ol of molecular weight from 600 to 4,000,
B. from 4 to 16 moles of a branched-chain diol of the formula



in which R^1 is alkyl of 1 to 4 carbon atoms and R^2 is hydrogen or alkyl of 1 to 4 carbon atoms and optionally
C. from 0.001 to 1 mole of an aliphatic triol, with
D. from 5 to 18.5 moles of an aromatic diisocyanate of the formula



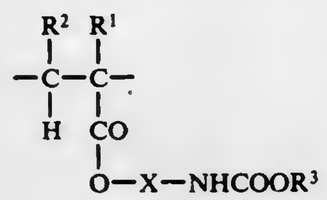
in which X is methylene or a SO_2 group and R and R' are hydrogen, chlorine and/or methyl, the ratio of the number of hydroxyl groups employed to the number of isocyanate groups being from about 1:0.98 to 1:1.08.

4,058,507
PROCESS FOR PREPARING POLYESTERS
Yorihiko Omoto, Ehime; Tadashi Konishi, Matsuyama; Shigehiro Ichihara, Matsuyama, and Hisanori Murai, Matsuyama, all of Japan, assignors to Teijin Limited, Osaka, Japan
Filed Jan. 9, 1976, Ser. No. 647,887
Claims priority, application Japan, Dec. 18, 1975, 50-150128
Int. Cl.² C08G *63/22*
U.S. Cl. 260—75 M 13 Claims

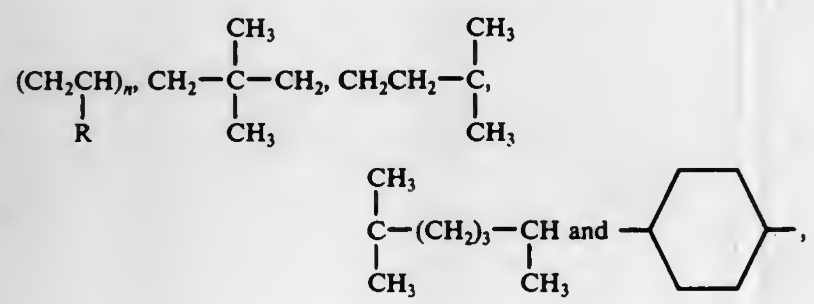
1. A process for preparing a polyester which comprises reacting a di-lower alkyl ester of a difunctional carboxylic acid at least 90 mole% of which consists of terephthalic acid with a polymethylene glycol containing 2 to 10 carbon atoms at least 90 mole% of which consists of ethylene glycol in the presence of an ester-interchange reaction catalyst to form an ester-interchange reaction product, and then polycondensing it in the presence of a polycondensation catalyst, characterized in that a substantially uniform solution in ethylene glycol of (A) 20 to 150 millimole%, based on said di-lower alkyl ester of the difunctional carboxylic acid, of calcium acetate and (B) 2 to 25 millimole%, based on said di-lower alkyl ester, of cobalt acetate is used as the ester-interchange reaction catalyst and the ester-interchange reaction product is filtered through a filter having a size of 200 to 1,000 Tyler's mesh before carrying out the polycondensation of the ester-interchange reaction product.

4,058,508
POLYMERS CONTAINING URETHANE GROUPS
Herbert Naarmann, Wattenheim, and Heinz Pohlemann, Limburgerhof, both of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany
Filed Nov. 17, 1975, Ser. No. 632,641
Claims priority, application Germany, Nov. 30, 1974, 2456737
Int. Cl.² C08F *18/24;* **C08E** *18/22;* **C08G** *63/00;* **C08F** *20/26*
U.S. Cl. 260—77.5 BB 6 Claims

1. A solid polymer which contains structural units of the formula



in which R^1 is H or CH_3, R^2 is H, COOR, COOM, CONHR or COXNH-COOR³, where M is a metal cation, X is CH_2,



n is from 1 to 50 and R is H, alkyl, cycloalkyl or aryl and R^3 is alkyl or cyclohexyl.

4,058,509
PROCESS FOR THE COPOLYMERIZATION OF ACRYLONITRILE AND SULPHONATE MONOMERS
Henri Menand, Saint-Fons, and André Mison, Lyon, both of France, assignors to Rhone-Poulenc S.A., Paris, France
Continuation-in-part of Ser. No. 110,758, Jan. 28, 1971, abandoned. This application Apr. 16, 1975, Ser. No. 568,448
Claims priority, application France, Jan. 30, 1970, 70.03350
Int. Cl.² C08F *28/00;* **C08G** *75/24*
U.S. Cl. 260—79.7 11 Claims

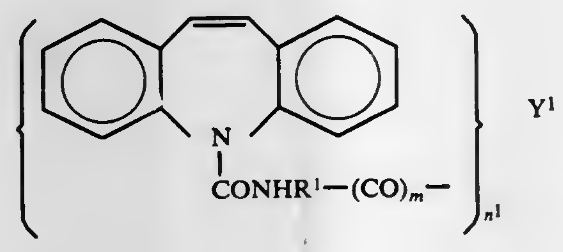
1. A process for the preparation of acrylonitrile unsaturated sulphonate copolymers containing at least 5% by weight of sulphonate units, which comprises polymerising a mixture of monomers consisting of (i) acrylonitrile and (ii) unsaturated sulphonate in an aqueous medium containing 5 to 30% by weight of an inorganic salt selected from halides and nitrates of ammonia or of a metal of Group IA or IIA of the Periodic Table (Handbook of Chemistry and Physics, 45th Edition, B-2).

4,058,510
PROCESS FOR SEPARATING SODIUM LAURYL SULFATE (SLS) FROM A SLS/PROTEIN COMPLEX
Mary C. Concilio-Nolan, New York, and Pei K. Chang, Montrose, both of N.Y., assignors to Stauffer Chemical Company, Westport, Conn.
Filed May 30, 1975, Ser. No. 582,490
Int. Cl.² A23J *1/20*
U.S. Cl. 260—112 R 7 Claims

1. A process for treating a sodium lauryl sulfate-whey protein complex to form an egg white substitute with recovery of the sodium lauryl sulfate which comprises either (a) adjusting the pH and solids content of the solution containing the complex to from about 5.0 to about 6.5 and from about 5% to about 305 by weight, respectively, at a temperature of about 0° C. to about 5° C. or (b) adjusting the pH and solids content of the solution containing the complex to from about 11 to about 13 and from about 2.5% to about 10%, by weight, respectively, at a temperature of from about 0° C. to about 5° C. to thereby form a sodium lauryl sulfate-rich precipitate and a supernatant solution and separating the precipitate and supernatant solution.

4,058,511
TEGRETOL ANTIGENS AND ANTIBODIES
Prithipal Singh, Sunnyvale, Calif., assignor to Syva Company, Palo Alto, Calif.
Filed Jan. 12, 1976, Ser. No. 648,339
Int. Cl.² C07G *7/00*
U.S. Cl. 260—112 B 11 Claims

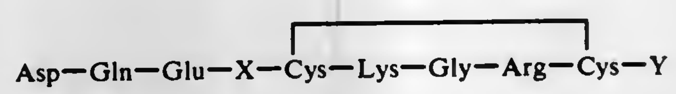
1. A compound of the formula:



wherein:
m is 0 or 1,
R^1 is a bond or an aliphatic radical of from 1 to 8 carbon atoms having from 0 to 1 site of ethylenic unsaturation as the only unsaturation and from 0 to 1 heteroatom of atomic number 7 to 8 bonded solely to carbon with the proviso that R^1 has at least 2 carbon atoms when m is 0;
Y^1 is an antigenic poly(amino acid) of at least 1,000 molecular weight; and
n^1 is at least 1 and not greater than the molecular weight of Y^1 divided by 500, with the proviso that when m is OR^1 is bonded to amino groups of said poly(amino acid) by a single covalent bond to form an alkylamino and when m is 1 the carboxy carbonyl is bonded to amino groups of said poly(amino acid) by a single covalent bond to form an amide.

4,058,512
SYNTHETIC PEPTIDES HAVING GROWTH PROMOTING ACTIVITY
Hans Sievertsson, Sollentuna; Ronny Hugo Loritz Lundin, Stockholm, and Gertrud Elisabeth Westin Sjodahl, Sodertalje, all of Sweden, assignors to AB Kabi, Stockholm, Sweden
Filed Apr. 28, 1975, Ser. No. 571,995
Int. Cl.² C07C *103/52;* **A61K** *37/00;* **C12B** *9/00*
U.S. Cl. 260—112.5 R 7 Claims

1. Synthetic peptides of the general formula



and the corresponding reduced, linear form where the link between the two Cys moieties in the oxidized form represents the dithio group, —S—S—; X = Ser or Lys; and Y = OH or Thr - Glu - Gly -Phe.

4,058,513
PENTAPEPTIDES AND METHODS FOR THEIR PRODUCTION
Francis John Tinney, Ann Arbor, Mich., assignor to Parke, Davis & Company, Detroit, Mich.
Filed June 23, 1976, Ser. No. 699,126
Int. Cl.² C07C *103/52*
U.S. Cl. 260—112.5 LH 10 Claims

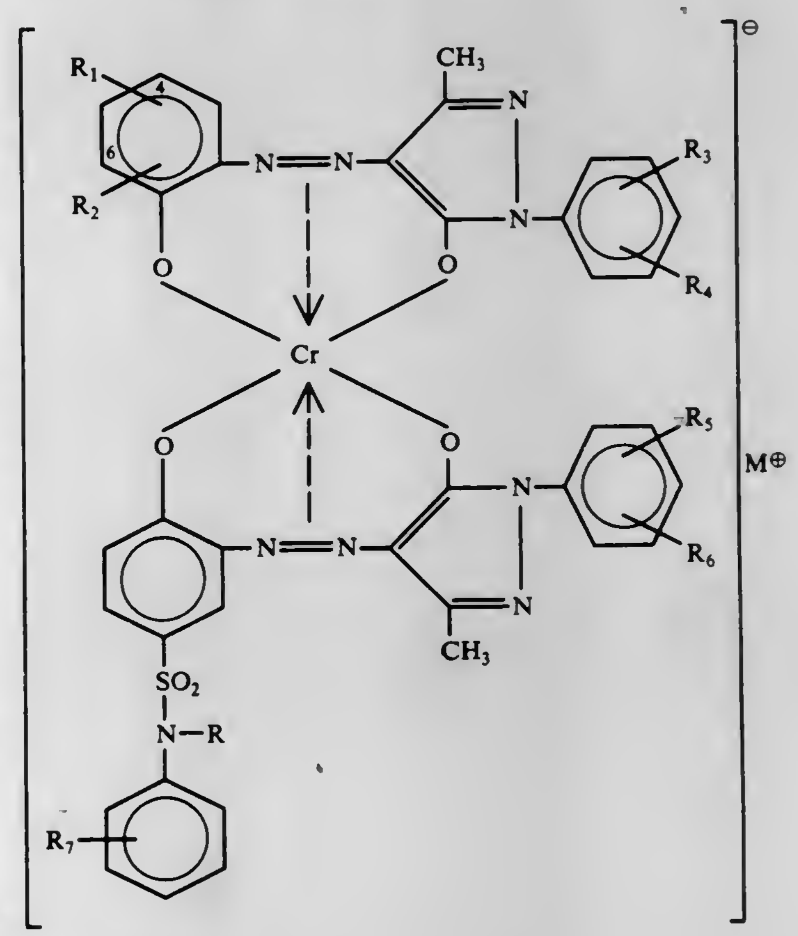
1. A pentapeptide of the formula

X-R-His(benzyl)-His(benzyl)-R¹-Trp-R²-Y

wherein X is t-butoxycarbonyl or benzyloxycarbonyl, R is a single bond or Pro; R^1 is Ser(benzyl) or Tyr(benzyl); R^2 is a single bond or Ala and Y is lower alkoxy, amino, lower alkylamino or di(lower alkyl)amino with the proviso that the total number of amino acid units when R and R^2 are combined is one.

4,058,514
ASYMMETRIC 1:2 CHROMIUM COMPLEXES OF MONOAZO COMPOUNDS HAVING 1-ARYL-3-METHYL-PYRAZOLONE-5 COUPLING COMPONENTS
Hanspeter Uehlinger, Basel, Switzerland, assignor to Sandoz Ltd., Basel, Switzerland
Filed Feb. 24, 1975, Ser. No. 552,241
Claims priority, application Switzerland, Feb. 28, 1974, 2827/74
Int. Cl.² C09B *45/16*
U.S. Cl. 260—145 B 30 Claims

1. A compound of the formula

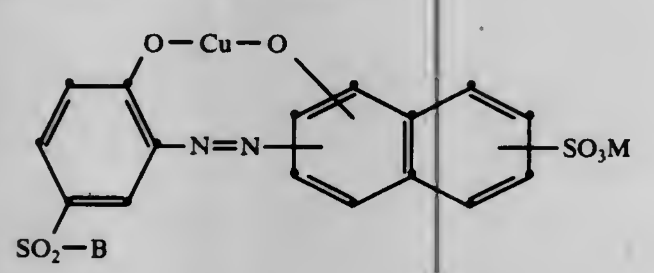


wherein
R is hydrogen or alkyl of 1 to 4 carbon atoms,
R_1 is hydrogen, halo or nitro,
R_2 is hydrogen, halo, nitro or $—SO_3M''$,
R_3 is hydrogen, halo or alkyl of 1 to 4 carbon atoms,

R_4 is hydrogen, halo, alkyl of 1 to 4 carbon atoms or —SO_3M'',
each of R_5, R_6 and R_7 is independently hydrogen, halo or alkyl of 1 to 4 carbon atoms, and
M^+ is a cation,
wherein M″ is hydrogen or a cation, and
each halo is independently fluoro, chloro or bromo, with the proviso that
i. R_1 and R_2 occupy the 4- and 6-positions,
ii. when R_4 is —SO_3M'', one of R_1 and R_2 is halo or nitro in the 4-position, and
iii. the compound contains a single —SO_3M'' group.

4,058,515
METALLIZED PHENYL-AZO-NAPHTHOL COMPOUNDS
Hans Alfred Stingl, Toms River, and John Elliott, Pine Beach, both of N.J., assignors to Toms River Chemical Corporation, Toms River, N.J.
Continuation of Ser. No. 257,645, May 30, 1972, abandoned. This application May 31, 1974, Ser. No. 475,225
Int. Cl.² C09B *45/18*
U.S. Cl. 260—151 **5 Claims**

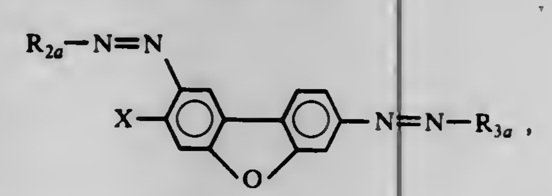
1. A compound of the formula



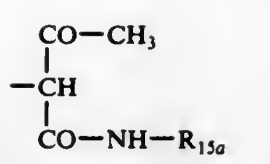
wherein B is benzyl or -NRR_1, wherein R is selected from the group consisting of hydrogen, methyl, ethyl, β-cyanoethyl, β-hydroxyethyl, β-hydroxypropyl and γ-hydroxypropyl; and R_1 is C_{2-8}-alkyl, phenyl or phenyl carrying up to two substituents selected from the group consisting of methyl, methoxy, ethoxy and chlorine; M is hydrogen, NH_4 or sodium; and the positions of the oxygen bridge, the azo linkage and the sulfonic acid group on the naphthol residue is either 1-2-4 or 2-1-6, respectively.

4,058,516
SULFO GROUP-CONTAINING AZO COMPOUNDS HAVING A TETRAZO COMPONENT RADICAL DERIVED FROM AN OPTIONALLY SUBSTITUTED 3,8-DIAMINODIBENZOFURAN
Roland Mislin, Saint-Louis, France, and Hanspeter Uehlinger, Basel, Switzerland, assignors to Sandoz Ltd., Basel, Switzerland
Continuation-in-part of Ser. No. 376,512, July 5, 1973, abandoned. This application June 20, 1974, Ser. No. 481,181
Claims priority, application Netherlands, June 29, 1973, 7309117; Switzerland, July 4, 1972, 10091/72
Int. Cl.² C09B *35/34, 43/00, 43/12, 43/18*
U.S. Cl. 260—152 **44 Claims**

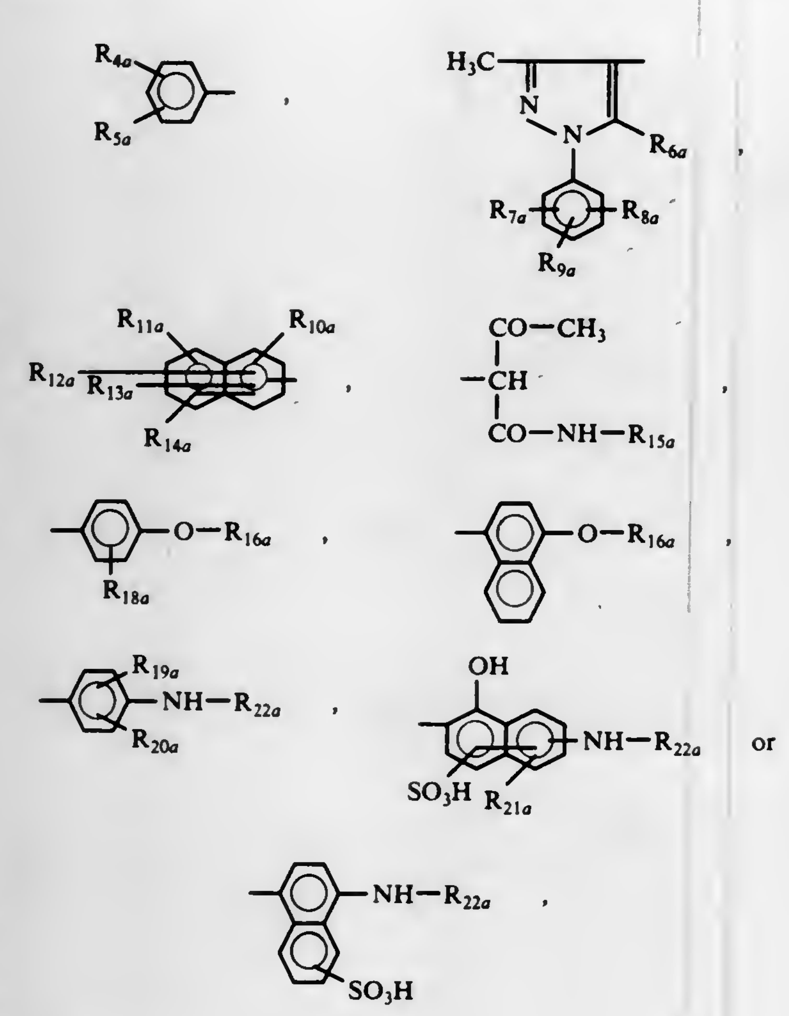
1. A compound of the formula



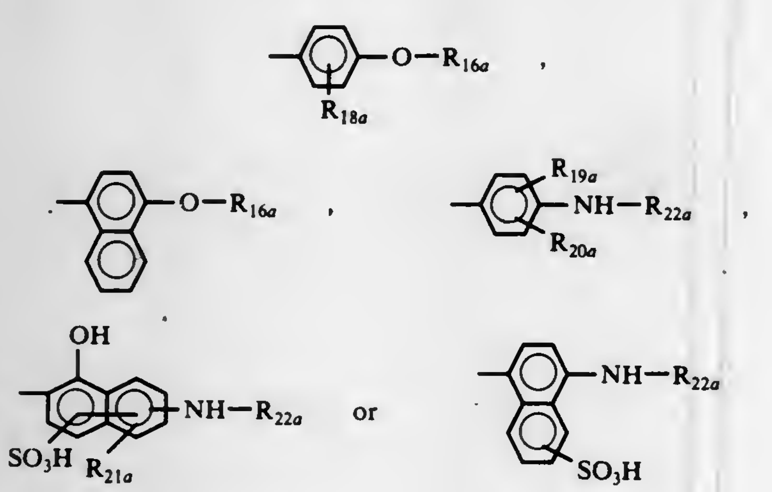
or a salt thereof, wherein (a) one of R_{2a} and R_{3a} is



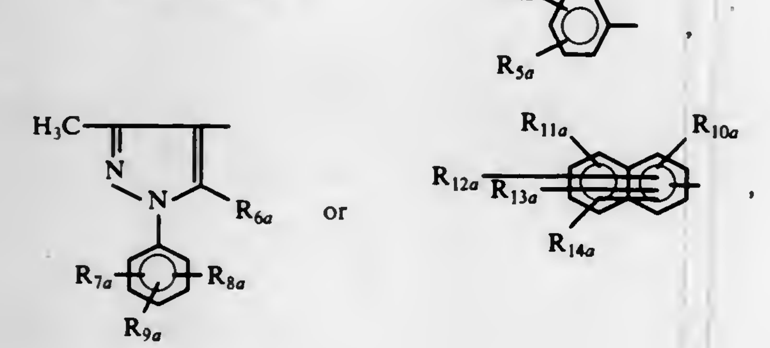
and the other is



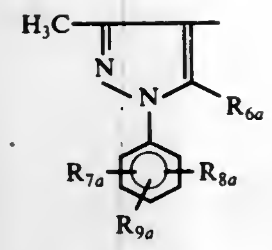
b. one of R_{2a} and R_{3a} is



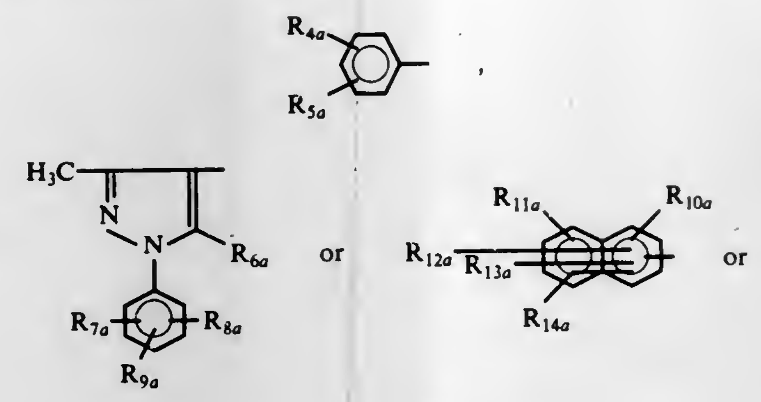
and the other is



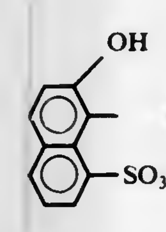
c. one of R_{2a} and R_{3a} is



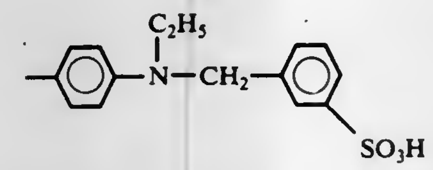
and the other is



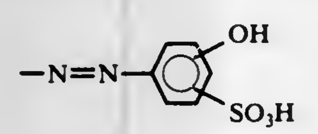
(d) R_{2a} is



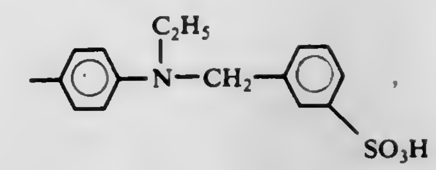
and R_{3a} is



wherein R_{4a} is hydrogen, hydroxy, sulfo or



R_{5a} is hydroxy, carboxy, amino, N-(C_{1-4}alkyl)amino, N-phenylamino, N,N-di-(C_{1-4}alkyl)amino, N-(C_{1-4}alkyl) N-(C_{1-4}alkyl)phenylamino, N-(C_{1-4}alkyl)-N-benzylamino or N-(C_{1-4}alkyl) N-(C_{1-4}alkyl)phenylsulfamoyl,
each R_{6a} is independently amino or hydroxy,
each R_{7a} and R_{8a} is independently hydrogen, C_{1-4}alkyl, halo or sulfo,
each R_{9a} is independently hydrogen, C_{1-4}alkyl, halo or cyano,
R_{10a} is hydroxy, amino or acetamido,
R_{11a} is hydrogen, carboxy or hydroxy,
R_{12a} is hydrogen, sulfo, C_{1-4}alkyl, C_{1-4}alkylsulfonyl, C_{1-4}alkoxy, C_{1-4}alkylamino, phenylamino, (C_{1-4}alkoxy)-phenylamino or trimethylphenylamino,
each of R_{13a} and R_{14a} is independently hydrogen or sulfo,
each R_{15a} is independently 2-ethylhexyl, butyl, phenyl, (C_{1-4}alkyl)phenyl, (C_{1-4}-alkoxy)phenyl, di-(C_{1-4}alkoxy)phenyl or disulfonaphthyl,
R_{16a} is C_{1-4}alkyl, phenylsulfonyl or (C_{1-4}alkyl)phenylsulfonyl,
R_{18a} is hydrogen or C_{1-4}alkyl,
R_{19a} is hydrogen or C_{1-4}alkyl,
R_{20a} is hydrogen, halo, C_{1-4}alkyl or C_{1-4}alkoxy,
R_{21a} is hydrogen or sulfo, and
R_{22a} is 4,6-dichloro-1,3,5-triazinyl-2,2,6-dichloropyrimidyl-4,2,5,6-trichloropyrimidyl-4,4-chloro-6-(4′-sulfo-phenylamino)-1,3,5-triazinyl-2,4-chloro-6-(phenylamino)-1,3,5-triazinyl-2 or 5-chloro-2,6-difluoropyrimidyl-4, and
X is hydrogen or sulfo, with the provisos that (1) the compound contains 1, 2, 3 or 4 sulfo groups, (2) R_{2a} and R_{3a} are different, and (3)
X is hydrogen when R_{3a} is

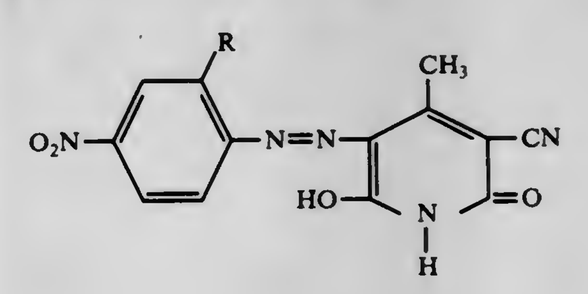


4,058,517
PREPARATION OF A CONCENTRATED SOLUTION OF AN ANIONIC AZO DYE CONTAINING A SULFONIC ACID GROUP
Rudolf Bermes, Ludwigshafen, Germany, assignor to Badische Anilin- & Soda-Fabrik Aktiengesellschaft, Ludwigshafen (Rhine), Germany
Filed Feb. 21, 1973, Ser. No. 334,194
Claims priority, application Germany, Feb. 29, 1972, 2209478
Int. Cl.² C09B *29/06, 29/10, 29/24, 29/38*
U.S. Cl. 260—155 **8 Claims**

1. In a process for the production of an azo dye by diazotization of a diazo component and coupling with a coupling component, the improvement of directly obtaining a concentrated 10 to 65% by weight solution of a water-soluble mono- or disazo dye substituted by 1 to 4 sulfonic acid groups which comprises:
carrying out the diazotization with a nitrous acid ester of a diol of 3 to 6 carbon atoms or a nitrous acid ester of a glycol ether of 3 to 10 carbon atoms, both the diazotization and the subsequent coupling being carried out directly in the solvent required as the solvent of the concentrated solution, with an amount of said diazo and coupling components sufficient to provide an at least about 10% by weight concentrated solution of the azo dye in the solvent, said solvent consisting essentially of water or a mixture of water with a water-soluble organic solvent selected from the group consisting of a low molecular weight aliphatic amide of 1 to 5 carbon atoms, β-hydroxypropionitrile, butyrolactone, methanol, ethanol, propanol, glycols of 2 to 9 carbon atoms, glycol ethers of 3 to 10 carbon atoms and glycol acetate; and adding to the reaction mixture a compound providing an ammonium cation and being selected from the group consisting of ammonia, alkylamines of 1 to 4 carbon atoms, hydroxylalkylamines of 2 to 3 carbon atoms, hydroxyalkoxyalkylamines of 3 or 4 carbon atoms and alkoxyalkylamines of 3 or 4 carbon atoms.

4,058,518
WATER-INSOLUBLE MONOAZO 3-CYANO-4-METHYL-6-HYDROXY-2-PYRIDINE DYESTUFFS
Ernst Heinrich, Frankfurt am Main, and Joachim Ribka, Offenbach, both of Germany, assignors to Cassella Farbwerke Mainkur Aktiengesellschaft, Germany
Continuation-in-part of Ser. No. 483,006, June 25, 1974, abandoned, which is a continuation of Ser. No. 331,477, Feb. 12, 1973, abandoned. This application Feb. 19, 1976, Ser. No. 659,205
Claims priority, application Germany, Feb. 18, 1972, 2207661
Int. Cl.² C09B *29/36*
U.S. Cl. 260—156 **3 Claims**

1. Monoazo dyestuffs of the formula:



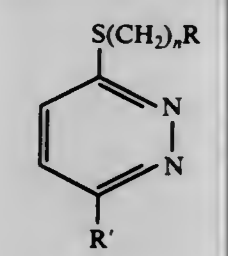
wherein R is alkyl having 1 to 2 carbon atoms.

4,058,519
ADRIAMYCINS AND USES THEREOF
Federico Arcamone; Aurelio Di Marco, and Sergio Penco, all of Milan, Italy, assignors to Societa Farmaceutici Italia S.p.A., Milan, Italy
Filed Mar. 19, 1975, Ser. No. 560,104
Claims priority, application United Kingdom, Mar. 22, 1974, 12783/74
Int. Cl.^{2} A61K *31/70;* C07H *15/24*
U.S. Cl. 424—180 **7 Claims**

5. A method of inhibiting the growth of a tumor selected from the group consisting of Moloney Sarcoma Virus, Sarcoma 180 Ascites, Solid Sacroma 180, gross transplantable leukemia and L1210 leukemia which comprises administering to a host afflicted with said tumor an amount of a compound selected from the group consisting of 4'-epiadriamycin, α-anomer, 4'-epiadriamycin, β-anomer and mixtures thereof sufficient to inhibit the growth of said tumor.

4,058,520
AMINOALKYLTHIOPYRIDAZINE COMPOUNDS
Joseph E. Dunbar, and Louis E. Begin, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.
Filed May 7, 1976, Ser. No. 684,224
Int. Cl.^{2} C07D *237/18*
U.S. Cl. 260—239 B **7 Claims**

1. A compound corresponding to the formula



and the pharmaceutically acceptable salts thereof wherein R is loweralkylamino, diloweralkylamino or a simple heterocyclic amino radical selected from the group consisting of piperidinyl, and hexamethyleneimino;

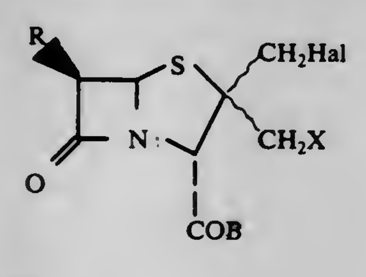
R' is a halogen or an alkylaminoalkylthio group having the formula

$—S(CH_2)_nR;$

where *n* is an integer of from 1 to 5 and R is as defined hereinbefore.

4,058,521
2-HALOMETHYL-2-NUCLEOPHILIC SUBSTITUTED METHYL PENICILLINS
Shoichiro Uyeo, Toyonaka; Tsutomu Aoki, Sennan, and Wataru Nagata, Nishinomiya, all of Japan, assignors to Shionogi & Co., Ltd., Osaka, Japan
Filed Jan. 24, 1977, Ser. No. 762,185
Claims priority, application Japan, Jan. 23, 1976, 51-6960
Int. Cl.^{2} C07D *499/44;* A61K *31/43*
U.S. Cl. 260—239.1 **1 Claim**

1. A compound represented by the formula:

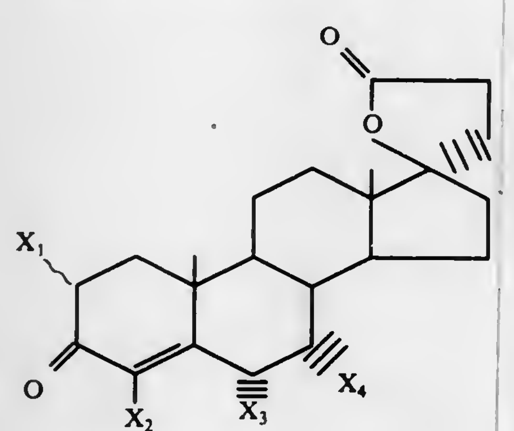


wherein

1. COB = benzhydryloxycarbonyl, Hal = bromo, R = phenoxyacetamido, and X = acetoxy;
2. COB = 2,2,2-trichloroethoxycarbonyl, Hal = bromo, R = phenylacetamido, and X = acetoxy;
3. COB = benzyloxycarbonyl, Hal = bromo, R = phenoxyacetamido, and X = acetoxy;
4. COB = benzhydryloxycarbonyl, Hal = bromo, R = phenoxyacetamido, and X = chloro;
5. COB = p-methoxybenzyloxycarbonyl, Hal = bromo, R = 1-tetrazolacetamido, and X = chloro;
6. COB = diphenylmethoxycarbonyl, Hal = bromo, R = N-phenylacetyl-N-acetylamino, and X = acetoxy; or
7. COB = carboxy, Hal 32 chloro, R = 2-thienylacetamido, and X = 5-methyl-1,3,4-thiadiazol-2-ylthio.

4,058,522
STEROIDS EFFECTIVE AGAINST HEAVY-METAL POISONING
Tibor Kekesy; Szabolcs Szeberenyi; György Beer; Antal Dudas; György Hajos; Laszlo Szporny, and Eva Czajlik, nee Csizer, all of Budapest, Hungary, assignors to Richter Gedeon Vegyeszeti Gyar Rt., Budapest, Hungary
Continuation-in-part of Ser. No. 481,466, June 20, 1974, Pat. No. 3,988,322. This application July 16, 1976, Ser. No. 705,815
Claims priority, application Hungary, July 9, 1973, RI 514
The portion of the term of this patent subsequent to Oct. 26, 1993, has been disclaimed.
Int. Cl.^{2} C07J *71/00*
U.S. Cl. 260—239.57 **6 Claims**

1. A compound of the following formula:

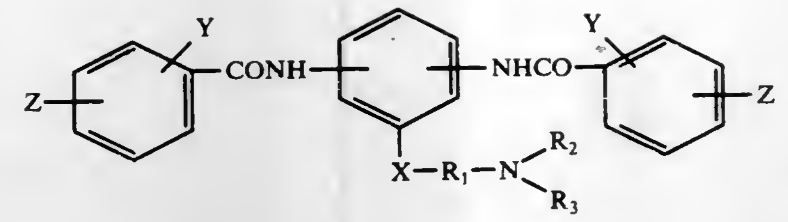


wherein

X_1 is hydrogen or mercapto;
X_2 is mercapto or acetylthio;
X_3 is hydrogen or acetylthio; and
X_4 is hydrogen, acetylthio or X_3 and X_4 together form a valence bond, but if X_3 and X_4 form a valence bond X_2 is mercapto.

4,058,523
BIS(BENZAMIDO)-BENZENE DERIVATIVES
Takashi Mori, Tama; Sakae Takaku, Ageo; Nobuhiro Oi, Hoya; Minoru Shindo, Tokyo; Takeaki Hirano, Fujimi; Shigeyuki Kataoka, Saitama, and Kouji Furuno, Kokubunji, all of Japan, assignors to Chugai Seiyaku Kabushiki Kaisha, Tokyo, Japan
Continuation-in-part of Ser. No. 620,216, Oct. 6, 1975, abandoned. This application Sept. 15, 1976, Ser. No. 723,444
Claims priority, application Japan, Oct. 14, 1974, 49-117123; Mar. 24, 1975, 50-34510
Int. Cl.^{2} C07D *295/10;* C07C *103/78;* A61K *31/535, 31/165*
U.S. Cl. 544—165 **54 Claims**

1. A bis(benzamido)-benzene derivative represented by the formula



wherein X is direct bond, oxygen,

$$-\underset{\displaystyle R_4}{\underset{|}{N}}-,$$

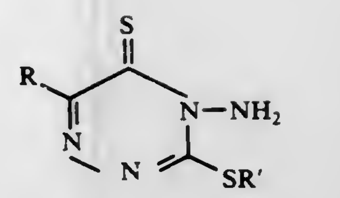
or —CONH— wherein the CO moiety is bonded to the phenylene group, R_1 is straight or branched lower alkylene, R_2 and R_3 are the same or different and each represents lower alkyl or they may be bonded to each other directly or through a hetero atom to form piperidino or morpholino, R_4 is lower alkyl and it may be bonded to R_2 R_3 to form piperazino and Y and Z are same or different and each represents hydrogen, lower alkyl, hydrozy, lower alkoxy, lower alkanoyloxy or halogen, and its acid addition salt.

4,058,524
PROCESS OF PREPARING AN AMINO THIAZOLYL DISULFIDE USING A WATER SOLUBLE SALT IN COMBINATION WITH WET 2,2-DITHIOBIS(BENZOTHIAZOLE)
Richard Leshin, Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio
Continuation-in-part of Ser. No. 470,239, May 15, 1974, abandoned. This application Jan. 12, 1976, Ser. No. 648,085
Int. Cl.^{2} C07D *417/12*
U.S. Cl. 544—136 **10 Claims**

1. A process of preparing 2-(4-morpholinodithio)-benzothiazole comprising combining a mixture of morpholine, sulfur, an inert organic solvent, a water soluble salt, and wet 2,2'-dithiobis(benzothiazole) with an aqueous solution of a water soluble oxidizing agent wherein the wet 2,2'-dithiobis (benzothiazole) contains 25 to 186 parts by weight of water per 100 parts by weight of 2,2'-dithiobis(benzothiazole), with the proviso that the maximum water level in the morpholine, sulfur, solvent 2,2'-dithiobis(benzothiazole) mixture, prior to combining the mixture with the oxidizing agent, is 186 parts by weight of water per 100 parts by weight of 2,2'-dithiobis (benzothiazole), and wherein the water soluble salt is present in an amount sufficient to constitute at least 50 percent of the amount of salt necessary to saturate the water content of the wet 2,2'-dithiobis(benzothiazole) at 25° C., wherein the water soluble salt is soluble to the extent of at least 5 parts by weight per 100 parts by weight of water at 25° C. wherein the water soluble salt is a compound other than the oxidizing agent and is incapable of adversely reacting with the oxidizing agent and the 2-(4-morpholinodithio)-benzothiazole.

4,058,525
4-AMINO-5-THIONE-1,2,4-TRIAZINES
Wolfgang Hofer; Fritz Maurer; Hans-Jochem Riebel; Lothar Rohe, all of Wuppertal; Ludwig Eue, Leverkusen, and Robert R. Schmidt, Cologne, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany
Filed Mar. 26, 1976, Ser. No. 670,911
Claims priority, application Germany, Apr. 22, 1975, 2517654
Int. Cl.^{2} C07D *253/06*
U.S. Cl. 544—182 **14 Claims**

1. 4-Amino-5-thione-1,2,4-triazine (4,5-H) compound of the formula



in which

R is alkyl of up to 8 carbon atoms; cycloalkyl of 5 to 7 carbon atoms; cycloalkenyl of 5 to 7 carbon atoms; phenyl, which can optionally be mono-substituted or polysubstituted by halogen; or alkoxyalkyl of 1 to 4 carbon atoms per alkyl and alkoxy moiety; and
R' is hydrogen or alkyl of up to 4 carbon atoms.

4,058,526
TREATMENT OF WASTE WATER FROM THE PREPARATION OF 6-SUBSTITUTED 3-MERCAPTO-4-AMINO-1,2,4-TRIAZINE-5-ONES
Walter Merz, Leverkusen, and Günter Schümmer, Cologne, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany
Filed May 11, 1976, Ser. No. 685,234
Int. Cl.^{2} C07D *253/06*
U.S. Cl. 544—182 **12 Claims**

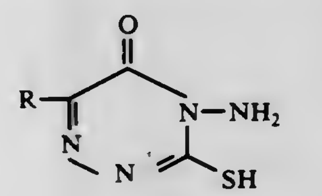
1. In the condensation of thiocarbohydrazide and an aqueous solution of an α-keto carboxylic acid of the formula

R—CO—COOH (I)

in which

R is alkyl of from 1 to 18 carbon atoms, cycloalkyl of from 5 to 6 carbon atoms, aralkyl of from 6 to 10 carbon atoms in the aryl moiety and 1 to 4 carbon atoms in the alkyl moiety, or aryl of from 6 to 10 carbon atoms and such alkyl, cycloalkyl, aralkyl and aryl radical, respectively, which is substituted with at least one substituent selected from the group consisting of halo, nitro, carbo lower alkoxy, lower alkyl, lower alkoxy, aryloxy having 6–10 ring carbon atoms, lower alkylmercapto, arylmercapto having 6–10 ring carbon atoms and aryl-lower alkylmercapto having 6–10 ring carbon atoms in the aryl moiety,

to produce a triazinone of the formula

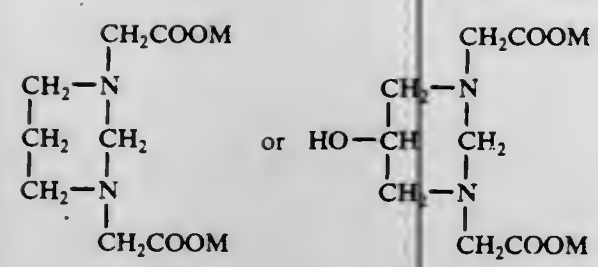


(II

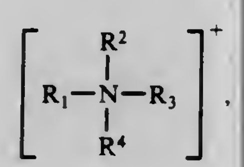
and waste water, and separating the triazinone from the waste water, the improvement which comrpises treating said waste water, said treatment involving mixing said waste water with a water-immiscible ketone solvent, said ketone being employed in an amount sufficient to form an aqueous phase and a ketone phase, and separating the thus purified waste water aqueous phase from the ketone phase.

4,058,527
PREPARATION OF N,N'-DICARBOXYMETHYL-1,3-PROPANEDIAMINES
Roger Robert Gaudette, Hudson, N.H.; John Leonard Ohlson, Bedford, and Patricia Marie Scanlon, Arlington, both of Mass., assignors to W. R. Grace & Co., New York, N.Y.
Division of Ser. No. 630,791, Nov. 11, 1975, Pat. No. 3,988,367. This application July 7, 1976, Ser. No. 703,180
Int. Cl.^{2} C07D *239/04*
U.S. Cl. 260—251 R **2 Claims**

1. A salt having the formula



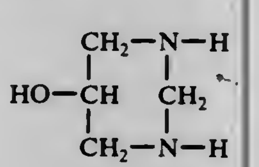
in which M is an alkali metal cation, ½ of an alkaline earth metal cation, or an ammonium ion having the formula



in which each of R_1, R_2, R_3, and R_4 is selected from a group consisting of hydrogen, lower alkyl, or hydroxy lower alkyl.

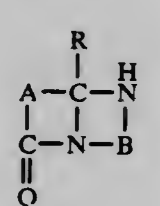
4,058,528
5-HYDROXYHEXAHYDROPYRIMIDINE
Roger Robert Gaudette, Hudson, N.H.; John Leonard Ohlson, Bedford, and Patricia Marie Scanlon, Arlington, both of Mass., assignors to W. R. Grace & Co., New York, N.Y.
Division of Ser. No. 630,791, Nov. 11, 1975, Pat. No. 3,988,367. This application July 7, 1976, Ser. No. 703,184
Int. Cl.^{2} C07D *239/04*
U.S. Cl. 260—251 R **1 Claim**

1. A compound having the formula

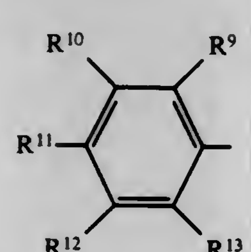


4,058,529
POLYCYCLIC AMINO DERIVATIVES OF PYRROLIDONE AND PIPERIDONE
Wilfried Graf, Binningen, and Erich Schmid, Basel, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.
Filed Feb. 2, 1965, Ser. No. 429,911
Claims priority, application Switzerland, Feb. 11, 1964, 1632/64
Int. Cl.^{2} C07D *239/10, 487/04, 487/12, 487/22*
U.S. Cl. 260—251 A **5 Claims**

1. A compound of the formula



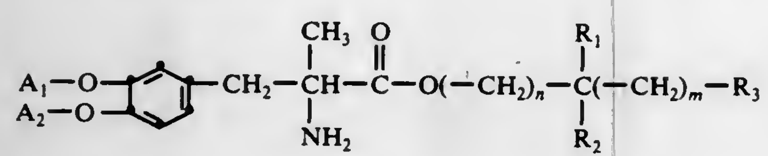
wherein R is aryl of the formula



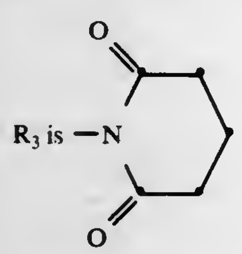
each of R^9, R^{10}, R^{11}, R^{12} and R^{13} is a member selected from the group consisting of a hydrogen atom, a chlorine atom, a fluorine atom, a bromine atom, lower alkyl, lower alkoxy, trifluoromethyl and lower alkylthio; A is trimethylene and B is trimethylene.

4,058,530
AMINO ACID ESTERS
Walfred S. Saari, Lansdale, Pa., assignor to Merck & Co., Inc., Rahway, N.J.
Division of Ser. No. 482,102, June 25, 1974, Pat. No. 3,983,138, which is a continuation-in-part of Ser. No. 400,609, Sept. 25, 1973, abandoned. This application Mar. 18, 1976, Ser. No. 668,021
Int. Cl.^{2} C07D *211/88;* **A61K** *311/445*
U.S. Cl. 260—281 GN **10 Claims**

1. A compound of the formula



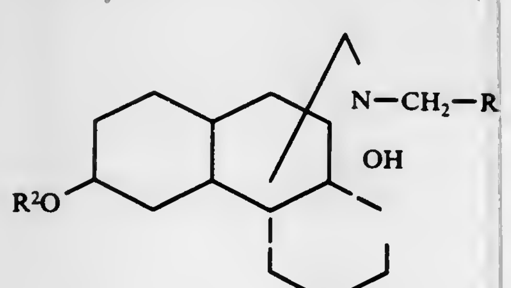
wherein
n is 0, 1, 2 or 3;
m is 0, 1, 2 or 3;
A_1 and A_2 are individually H or a lower alkanoyl group;
R_1 and R_2 are individually H or alkyl of 1 to 3 carbon atoms and;



or a pharmaceutically acceptable acid addition salt thereof.

4,058,531
PROCESS FOR THE PREPARATION OF 14-HYDROXYMORPHINAN DERIVATIVES
Ivo Monkovic, Candiac; Carol Bachand, Cote Ste-Catherine, and Henry Wong, Candiac, all of Canada, assignors to Bristol-Myers Company, New York, N.Y.
Filed Mar. 23, 1976, Ser. No. 669,795
Int. Cl.^{2} C07D *221/28, 217/24, 491/08*
U.S. Cl. 260—285 **3 Claims**

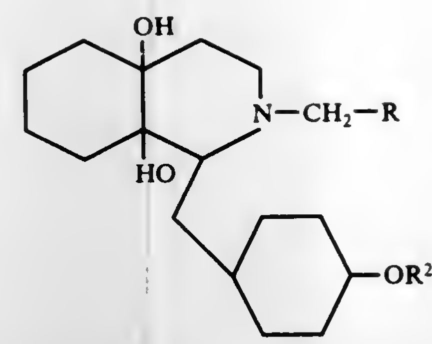
1. The process for the preparation of compounds having the formulas



wherein R^2 is H or (lower)alkyl and R is cyclobutyl or cyclopropyl; which process consists of the consecutive steps of

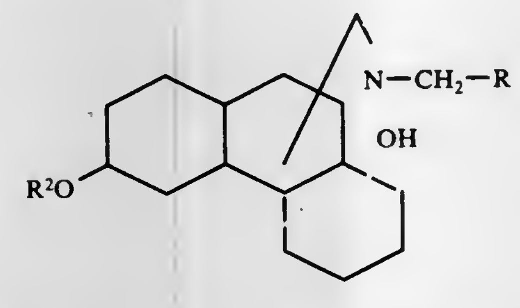
A. treating the compound having the formula

VI



in which R is cyclopropyl or cyclobutyl and R^2 is (lower-)alkyl with borane in a ratio of about one mole of compound VI to 1 to 1.5 moles of borane in the presence of an acid selected from the group consisting of phosphoric, orthophosphoric, pyrophosphoric and polyphosphoric, boron trifluoride etherate and mixtures thereof to produce the compound having the formula

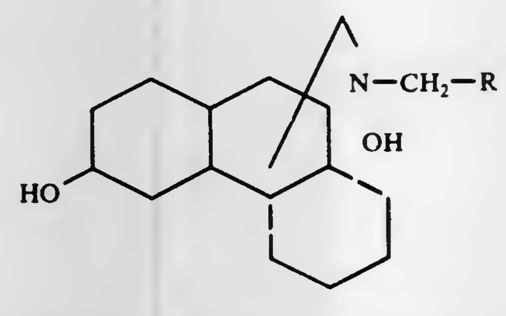
LV



in which R and R^2 are as described above; and

B. cleaving the R^2O-ether function of compound LV by treatment with an agent selected from the group consisting of $NaSC_2H_5$, hydrobromic acid, boron tribromide and pyridine hydrochloride to produce the compound having the formula

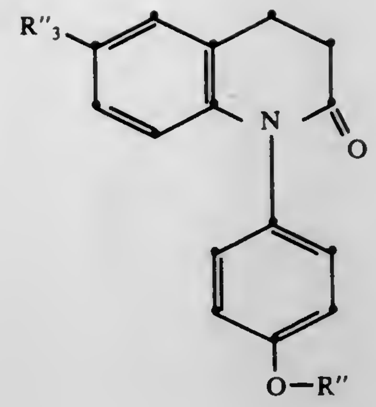
LX



in which R is cyclopropyl or cyclobutyl.

4,058,532
1-PHENYL-3,4-DIHYDROCARBOSTYRILS
Malcolm R. Bell, East Greenbush, N.Y., assignor to Sterling Drug Inc., New York, N.Y.
Division of Ser. No. 593,166, July 3, 1975, which is a continuation-in-part of Ser. No. 402,162, Oct. 1, 1973, Pat. No. 3,994,902, which is a division of Ser. No. 156,070, June 23, 1971, Pat. No. 3,819,637. This application May 13, 1976, Ser. No. 686,074
Int. Cl.^{2} C07D *215/22;* **A61K** *31/47;* **C07D** *279/10, 395/12*
U.S. Cl. 260—288 R **8 Claims**

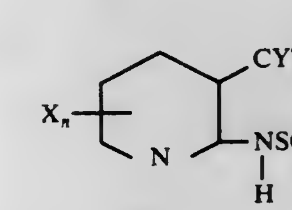
1. A compound of the formula



where
R″ is hydrogen, lower-alkyl, benzyl or $C_nH_{2n}NR_4R_5$, where R_4 and R_5 are lower alkyl and n is an integer from 2 to 4 inclusive; and
R''_3 is hydrogen or lower-alkoxy.

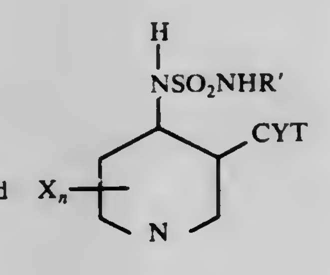
4,058,533
SUBSTITUTED PYRIDINE CARBOXYLIC ACIDS AND DERIVATIVES
Lennon H. McKendry, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.
Division of Ser. No. 676,591, April 13, 1976, Pat. No. 4,014,888, which is a continuation-in-part of Ser. No. 572,024, April 28, 1975, abandoned, which is a division of Ser. No. 412,944, Nov. 5, 1973, Pat. No. 3,920,641. This application Dec. 6, 1976, Ser. No. 747,663
Int. Cl.^{2} C07D *213/55*
U.S. Cl. 260—294.8 F **2 Claims**

1. A compound of the formulae:



III

and



IV

wherein:
each X independently represents loweralkyl, of 1 to 6 carbon atoms, haloloweralkyl of 1 to 6 carbon atoms, cycloalkyl of 3 to 6 carbon atoms, SR^5, OR^5, aryl wherein aryl is phenyl, halophenyl or tolyl, —NR^3R^4, halo or nitro;
n represents an integer of 0 to 3, inclusive;
Y represents oxygen;
T represents a member selected from the group consisting of hydroxy, alkoxy of 1 to 3 carbon atoms;
R′ represents aryl wherein aryl is phenyl, halophenyl, tolyl or benzyl;
each of R^3 and R^4 independently represent hydrogen or loweralkyl of 1 to 6 carbon atoms;
R^5 represents loweralkyl of 1 to 6 carbon atoms.

4,058,534

THERAPEUTICALLY EFFECTIVE NICOTINATES AND N-OXIDE NICOTINATES OF ALIPHATIC AMINES

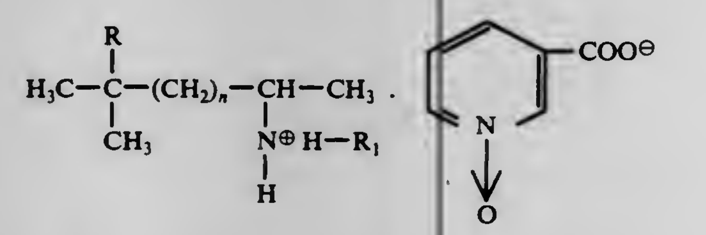
Karl-Heinz Jaeger, Obergeggen, Germany, and Willy Herbrand, deceased, late of Gengenbach, Germany (by Elisabeth Herbrand nee Lauterbach, heiress), assignors to Solco Basel AG, Birsfelden, Switzerland

Continuation of Ser. No. 558,325, March 14, 1975, abandoned, which is a continuation of Ser. No. 359,363, May 11, 1973, abandoned, which is a continuation of Ser. No. 109,980, Jan. 26, 1971, abandoned. This application May 19, 1976, Ser. No. 687,765

Int. Cl.^{2} **C07D** *213/54*

U.S. Cl. 260—295.5 S **3 Claims**

1. A nicotinate N-oxide salt having the following structure



wherein R is hydrogen, or a hydroxyl or thiol group, R_1 is hydrogen or a C_1 or C_2 alkyl group, and n is a whole number from 1 to 4.

4,058,535

PROCESS FOR MANUFACTURING PHOSPHONO IMIDATES

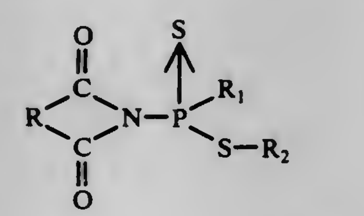
Llewellyn W. Fancher, Orinda, Calif., assignor to Stauffer Chemical Company, Westport, Conn.

Continuation-in-part of Ser. No. 468,333, May 9, 1974, abandoned, which is a continuation of Ser. No. 323,590, Jan. 15, 1973, abandoned. This application July 24, 1975, Ser. No. 598,906

Int. Cl.^{2} **C07D** *209/02, 277/38*; **A01N** *9/36*

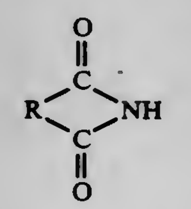
U.S. Cl. 260—326 E **2 Claims**

1. A process for manufacturing a compound having the formula:

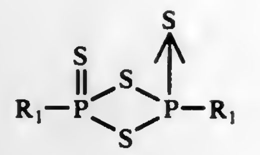


where R is selected from the group consisting of alkylene having 2–3 carbon atoms, alkenylene having 2–3 carbon atoms, cycloalkenylene, arylene, substituted arylene wherein the substituents are selected from halo and nitro; R_1 is alkyl having 1–6 carbon atoms; R_2 is selected from the group consisting of alkyl having 1–8 carbon atoms, alkenyl having 2–8 carbon atoms, alkynyl having 2–8 carbon atoms, cyano alkyl, aralkyl, alkanoyl alkyl, alkylmercapto alkyl, N-thiazoyl acetamido, phthalimido alkyl, arylthioalkyl, haloarylthioalkyl and thiocyanoalkyl; comprising the steps of:

a. reacting a compound having the formula:



wherein R is as defined above; with a compound having the following generic formula:



wherein R_1 is as defined above; said reaction being carried out in the presence of a tertiary amine;

b. reacting the product of a) with an organo halide with the formula

R_2—X

wherein X is selected from chlorine, bromine and iodine, and R_2 is as defined above and in the presence of an inert solvent and at a reaction temperature of between 20° C. and 70° C. to form the end product.

4,058,536

PRODUCTION OF HIGH MOLECULAR WEIGHT α,β-UNSATURATED ALDEHYDES

Norbert Goetz, Bobenheim-Roxheim 1, and Roman Fischer, Ludwigshafen, both of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Division of Ser. No. 302,650, Nov. 1, 1972, Pat. No. 3,965,193. This application Mar. 1, 1976, Ser. No. 662,346

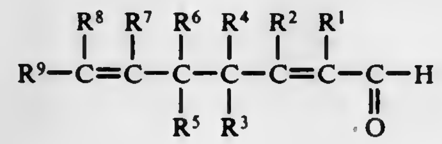
Claims priority, application Germany, Nov. 17, 1971, 2157035; Oct. 9, 1972, 2249398; Oct. 9, 1972, 2249372

The portion of the term of this patent subsequent to June 22, 1993, has been disclaimed.

Int. Cl.^{2} **C07D** *319/04*

U.S. Cl. 260—340.7 **11 Claims**

1. A process for the production of high molecular weight α,'-unsaturated aldehydes of the general formula (I):



(I)

where

R^1 is hydrogen, alkyl of one to four carbon atoms, phenyl or phenyl bearing alkyl of one to four carbon atoms as a substituent;

R^2 is hydrogen, alkyl of one to four carbon atoms, phenyl or phenyl bearing alkyl of one to four carbon atoms as a substituent;

R^3 is hydrogen or alkyl of one to four carbon atoms;

R^5 is hydrogen or alkyl of one to four carbon atoms;

R^6 is hydrogen or alkyl of one to four carbon atoms;

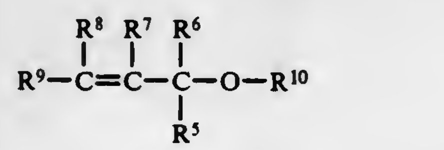
R^7 is hydrogen or alkyl of one to four carbon atoms;

R^4 is hydrogen or a saturated or unsaturated, branched or linear aliphatic or cycloaliphatic hydrocarbon radical of one to twelve carbon atoms;

R^8 is alkyl of one to four carbon atoms or hydrogen; and

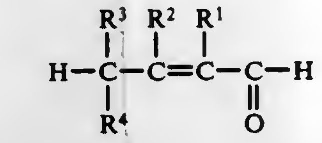
R^9 is ethyleneacetal, 1,3-propylene acetal, 2,2-dimethylpropylene acetal, 1,3-dimethylpropylene acetal, diethylacetal, a straight chain, saturated or unsaturated hydrocarbyl ether group having a total of up to 12 carbon atoms and the ether oxygen between carbon atoms of said group or CH_3COOCH_2—,

wherein an allyl compound of the formula (II):



(II)

in which R^5 to R^9 have the meanings given above and R^{10} is hydrogen or acyl or a carboxylic acid of one to five carbon atoms in reacted in the liquid phase with an α,β-unsaturated aldehyde of the formula (III):



(III)

in which R^1 to R^4 have the meanings given above, at elevated temperature of about 60°-300° C and in the presence of an acid catalyst with a pK value of −9 to 6 in such an amount of such acid catalyst that the reaction mixture has a pH of 1 to 7.

4,058,537

ESTERS OF ANHYDRIDE AROMATIC POLYCARBOXYLIC ACIDS WITH PERFLUOROALKYL ALCOHOLS

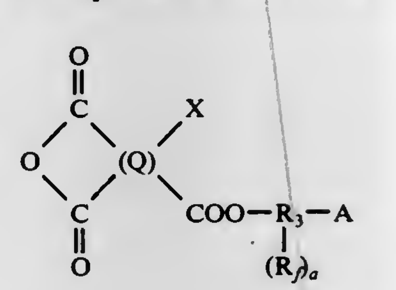
Karl Friedrich Mueller, New York, N.Y., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Jan. 5, 1976, Ser. No. 646,689

Int. Cl.^{2} **C07D** *307/89*

U.S. Cl. 260—346.3 **18 Claims**

1. A compound of the formula I



(I)

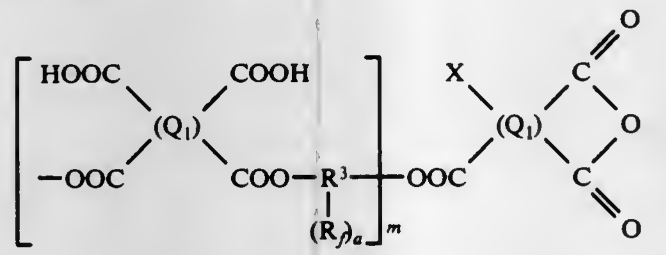
wherein Q is the tetraradical of a tricarboxylic or tetracarboxylic acid selected from the group consisting of trimellitic acid, 3,3',4,4'-benzophenonetetracarboxylic acid and 1,2,4,5-benzenetetracarboxylic acid,

X is hydrogen or carboxy;

R_f is perfluoroalkyl of 6 to 18 carbon atoms;

a is 1 or 2;

A is hydrogen or group II with the proviso that when X is hydrogen, A is group II;



(II);

m is 0;

Q_1 is the same as Q, and

R^3 is the residue of an R_f-substituted aliphatic alcohol or diol of the structure

HO—R^2—CH—S—R^1—R_f
 |
HO—R^2—CH—S—R^1—R_f,

HO—R^2—CH—S—R^1—R_f
 |
HO—R^2—CH_2 *or*

HO—R^2—S—R^1—R_f

where R^1 is a branched or straight chain alkylene of 1 to 12 carbon atoms, alkylenethioalkylene of 4 to 12 carbon atoms, alkyleneoxyalkylene of 4 to 12 carbon atoms or alkyleneiminoalkylene of 4 to 12 carbon atoms where the nitrogen atom contains as the third substituent hydrogen or alkyl of 1 to 6 carbon atoms; and

R^2 is straight or branched chain alkylene of 1 to 12 carbon atoms or an alkylenepolyoxyalkylene of the formula $C_nH_{2n}(OC_kH_{2k})_r$ where n is 1 to 12, k is 2 to 6 and r is 1 to 40.

4,058,538

3α,5α-CYCLO-6β-ALKOXY-α^{22}**-BIS-NOR CHOLESTENE DERIVATIVES**

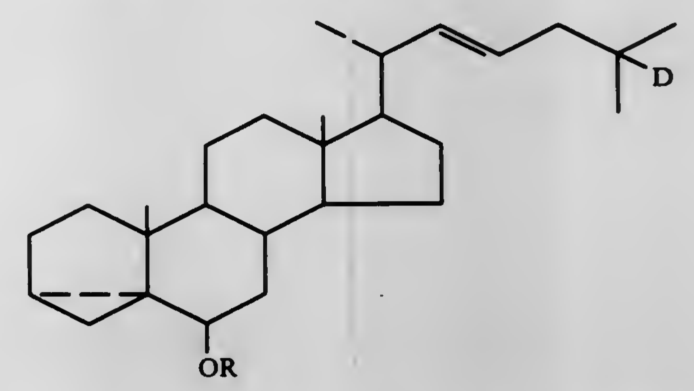
William G. Salmond, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Continuation-in-part of Ser. No. 544,174, Jan. 27, 1975, Pat. No. 3,994,934. This application July 26, 1976, Ser. No. 708,821

Int. Cl.^{2} **C07J** *5/00*

U.S. Cl. 260—397.2 **4 Claims**

1. A compound of the formula



wherein R is alkyl of one to six carbon atoms, inclusive, and **D is selected from the group consisting of** O^- **and**

$$R^4\overset{\overset{\large O}{\|}}{C}O-$$

wherein R^4 is selected from the group consisting of alkyl of one to six carbon atoms, inclusive, phenyl, benzyl and phenethyl.

4,058,539

4,6,8(14)-TRIENE STEROIDS

Gunther Kruger, St. Laurent, Canada, assignor to Steele Chemicals Co. Ltd., Pointe Claire, Canada

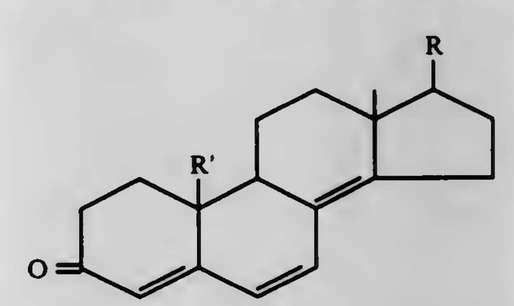
Continuation-in-part of Ser. No. 497,691, Aug. 15, 1974, abandoned, which is a continuation-in-part of Ser. No. 215,669, Jan. 5, 1972, Pat. No. 3,849,402. This application June 16, 1976, Ser. No. 696,616

Claims priority, application Canada, Jan. 6, 1971, 102448

Int. Cl.^{2} **C07J** *1/00, 21/00*

U.S. Cl. 260—397.45 **33 Claims**

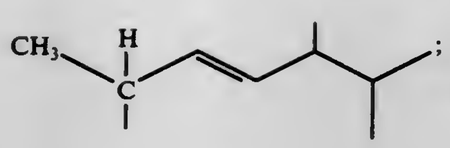
1. A process for preparing a compound of the formula

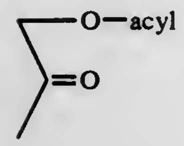


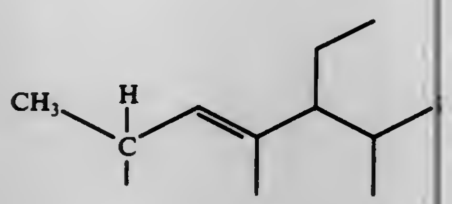
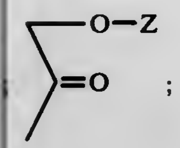
(I)

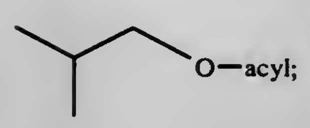
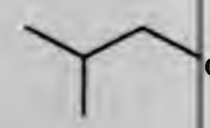
wherein R is selected from the group consisting of: O-acyl;

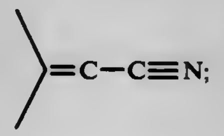
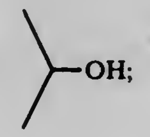
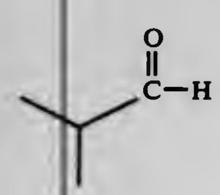
-continued


;

;

;

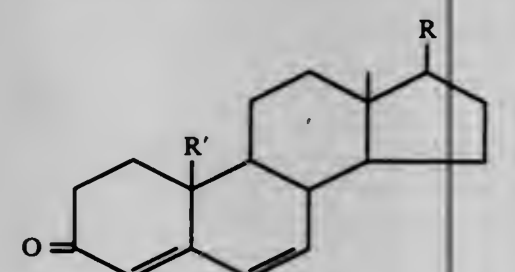

;

;

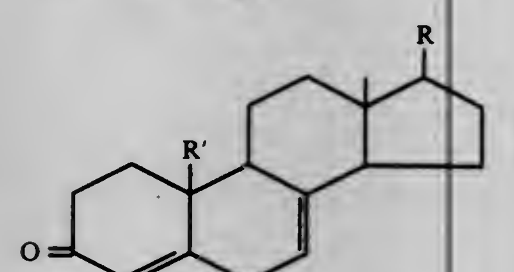

;

; CO_2H; CHO;

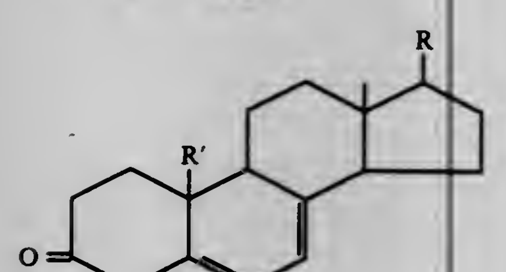

;

;


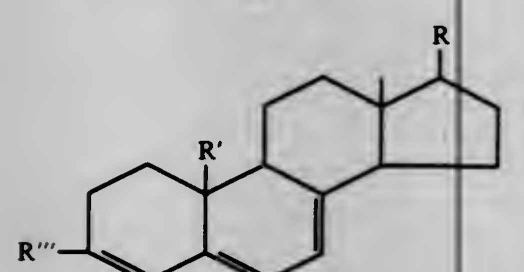
and CN, wherein Z is selected from the group consisting of tetrahydropyranyl, lower alkyl and substituted methyl, wherein the substituent on said methyl is selected from the group consisting of phenyl, $CH_2=CH$ and $HC\equiv C$; and acyl is selected from the group consisting of acetate, tri-lower-alkyl acetate, monohalo acetate and trihalo acetate; and R′ is selected from the group consisting of: CH_3; CH_2OH; CH_2—O—CO—NH—$C(CH_3)_3$; CH_2OCOCH_3; CHO and H, which process is selected from the group consisting of

a. treating, with a base, a compound chosen from


(II);

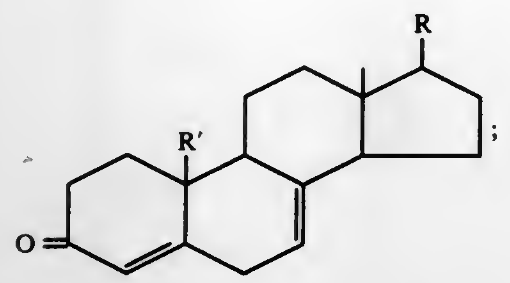

(III);

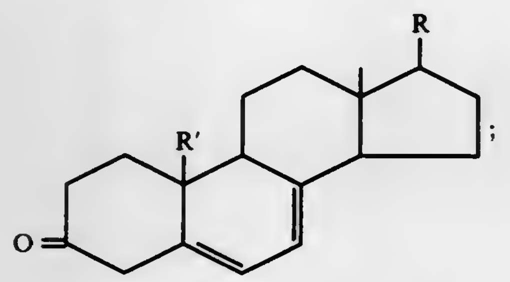

(IV);

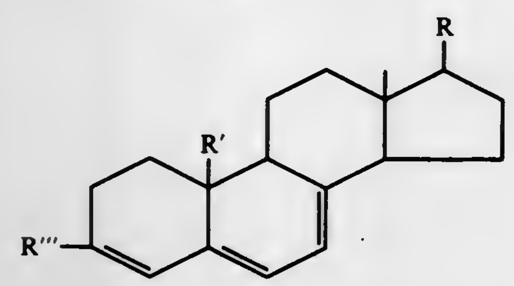

(V):

wherein R and R′ are as defined above and R‴ is AcO; and treating the resulting basic mixture with a dehydrogenating agent and a weak acid;

b. reacting, with a dehydrogenating agent, a compound chosen from

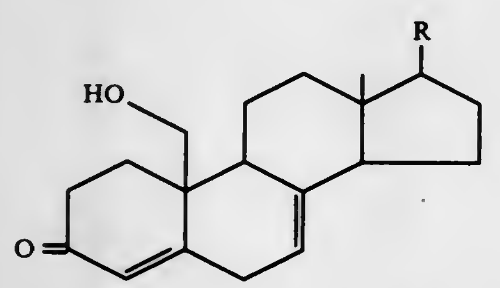
(III)

;

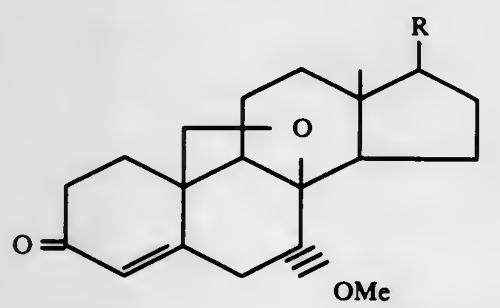
(IV)

;

(V)


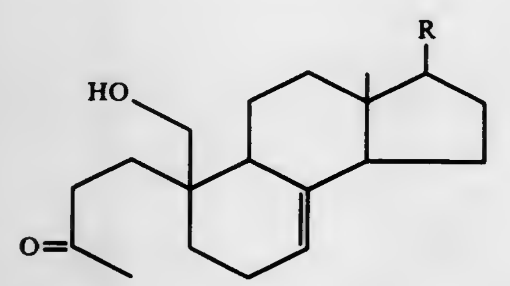
wherein R and R′ are as defined above, and R‴ is AcO or OH;

c. treating, with ferric chloride and methanol, a compound of the formula (VI), and treating the intermediate obtained, of the formula (VII), with a strong mineral acid wherein R is as defined above and said compounds (VI) and (VII) have the formula

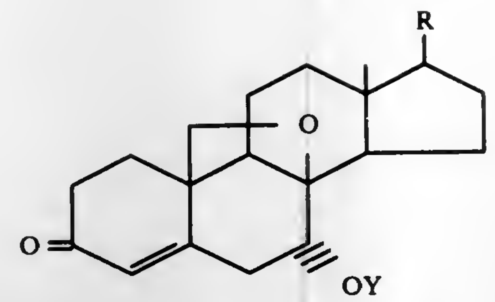
(VI)


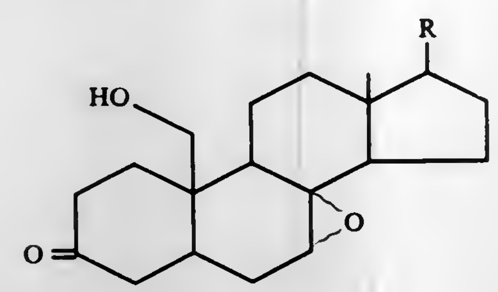
(VII)


d. treating, with a peracid, a compound of the formula

(VI)


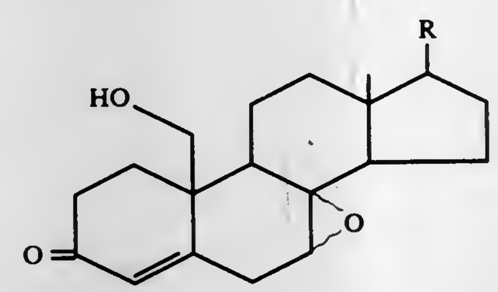
wherein R is as defined above, to form a mixture of compounds having the formula

(VII)


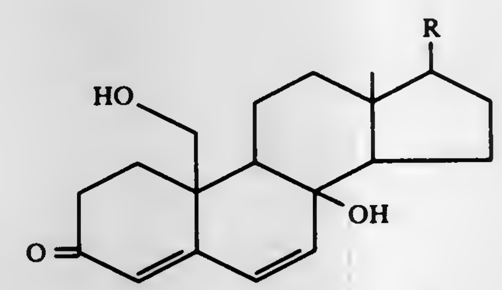
(VIII)


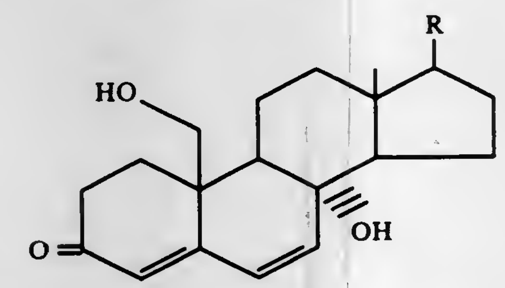
wherein R is as defined above and Y is hydrogen, and if desired separating from said mixture the 7-hydroxy compound and acetylating, if desired, said 7-hydroxy compound to form a corresponding 7-acetoxy compound, reacting said mixture, said 7-hydroxy compound or said 7-acetoxy compound with a strong mineral acid;

e. treating, with a base, a compound of the formula

(VIII)


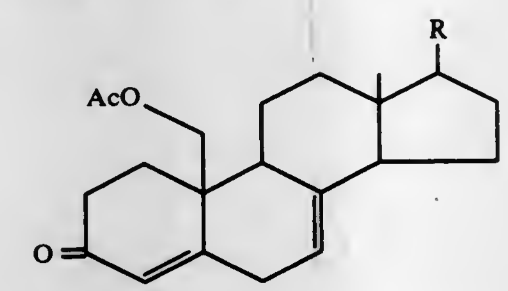
wherein R is as defined above, to form a mixture of compounds of the formula

(IX)


(X)


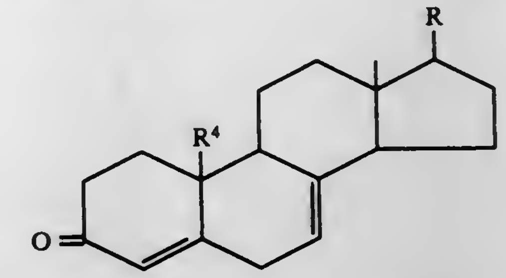
wherein R is as defined above, and treating said mixture with a dehydrating agent;

f. reacting, with a peracid, a compound of the formula

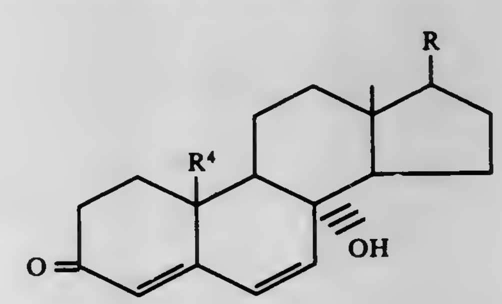
(XI)


wherein R is as defined above, and treating the intermediate obtained with a base, and subsequently dehydrating the resulting compound of formula (X); and

g. reacting, with a peracid, a compound of the formula

(XIII)


wherein R is as defined above and R^4 is chosen from H; CH_3; and CH_2—O—CO—NH—$C(CH_3)_3$, reacting the intermediate obtained with a base to form a compound of the formula

(XV)


wherein R and R^4 are as defined above, and treating the latter compound with a dehydrating agent.

4,058,540

PREPARATION OF 2-ALKANOYLOXYALKANOIC ACIDS

Mahmoud S. Kablaoui, Wappingers Falls, N.Y., assignor to Texaco Inc., New York, N.Y.

Filed Oct. 18, 1976, Ser. No. 733,633
Int. Cl.² C09F *5/00;* C11C *3/00*
U.S. Cl. 260—405 **11 Claims**

1. A method of preparing a 2-alkanoyloxyalkanoic acid which comprises contacting a nitroalkylnitrate or a nitroalcohol or mixtures thereof corresponding to the formula:

$$R-\underset{\displaystyle OX}{\underset{|}{CH}}-CH_2NO_2$$

where X is NO_2 or hydrogen and where R is an alkyl group of from 1 to 50 carbon atoms with an alkanoic acid having from 2 to 20 carbon atoms in the presence of calcium oxide or a calcium carboxylate at a temperature of from above about 100° C. and up to about 200° C. employing mole ratios of nitroalkylnitrate or nitroalcohol to alkanoic acid of between 1:1 and 1:10.

10. A method according to claim **1** wherein said 2-alkanoyloxyalkanoic acid is 2-acetoxydecanoic acid.

4,058,541

PREPARATION OF 2-ALKANOYLOXY-ALKANOIC

Mahmoud S. Kablaoui, Wappingers Falls, N.Y., assignor to Texaco Inc., New York, N.Y.

Filed Oct. 18, 1976, Ser. No. 733,634
Int. Cl.² C09F *5/00;* C11C *3/00*
U.S. Cl. 260—405 **9 Claims**

1. A method of preparing a 2-alkanoyloxyalkanoic acid which comprises contacting a nitroalkylnitrate or a nitroalcohol or mixtures thereof corresponding to the formula:

$$R-\underset{\displaystyle OX}{\underset{|}{CH}}-CH_2NO_2$$

where X is NO_2 or hydrogen and where R is an alkyl group of from 1 to 50 carbon atoms with an alkanoic acid having from

2 to 20 carbon atoms in the presence of sulfuric acid at a temperature of from above about 100° C. and up to about 200° C. employing mole ratios of nitroalkylnitrate or nitroalcohol to alkanoic acid of between 1:1 and 1:10.

8. A method according to claim 1 wherein said 2-alkanoyloxyalkanoic acid is 2-acetoxydecanoic acid.

4,058,542
CONVERSION OF THALLIUM (I) TO THALLIUM (III)
Nabil Rizkalla, River Vale, and Anthony N. Naglieri, Pine Brook, both of N.J., assignors to Halcon International, Inc., New York, N.Y.
Filed Nov. 8, 1976, Ser. No. 740,148
Int. Cl.² C01G *15/00*
U.S. Cl. 260—429 R **5 Claims**

1. A process for converting a thallium (I) compound to a thallium (III) compound which comprises reacting the thallium (I) compound in a liquid medium with molecular oxygen in the presence of a Group VIII noble metal and in the presence of a promoter comprising a heterocyclic tertiary amine.

5. A process as defined in claim 1, wherein the thallium (I) compound is a thallium (I) carboxylate.

4,058,543
ORGANOTIN MERCAPTO DICARBOXYLIC ACID ESTERS AND COMPOSITIONS
Gerry P. Mack, 34-28 86 St., Jackson Heights, N.Y. 11372
Filed Jan. 2, 1976, Ser. No. 646,310
Int. Cl.² C08K *5/58, 5/36*
U.S. Cl. 260—45.75 S **47 Claims**

1. An organotin mercapto dicarboxylic acid mixed monohydric and polyhydric alcohol ester having per tin atom one or two alkyl, cycloalkyl or alkylcycloalkyl groups attached to tin through carbon; the alkyl having from 1 to about 12 carbon atoms, the cycloalkyl having from 3 to about 12 carbon atoms, and the alkyl cycloalkyl having from 4 to about 12 carbon atoms; and 2 or 3 mercapto dicarboxylic acid ester groups attached to tin through sulfur, the mercapto dicarboxylic acid having from about four to about 24 carbon atoms, and having at least one esterifying group selected from the group consisting of alkyl, cycloalkyl, and alkylcycloalkyl, the alkyl having from 1 to about 12 carbon atoms, the cycloalkyl having from 3 to about 12 carbon atoms, and the alkyl cycloalkyl having from 4 to about 12 carbon atoms and at least one esterifying group selected from the group consisting of bivalent alkylene, cycloalkylene and alkylenecycloalkyl, the alkylene having from about 2 to about 12 carbon atoms, the cycloalkylene having from 3 to about 12 carbon atoms, and the alkylenecycloalkylene having from 4 to about 12 carbon atoms, each of the two valences of the bivalent alkylene, cycloalkylene and alkylcycloalkylene being linked to groups selected from the group consisting of one hydroxyl and one carboxylic acid group of mercapto dicarboxylic acid; and two carboxylic acid groups of mercapto dicarboxylic acid.

18. A halogen-containing polymer selected from the group consisting of homopolymers and copolymers of vinyl chloride and chlorinated polymers of vinyl chloride and comprising a stabilizing amount of an organotin mercapto dicarboxylic acid ester of claim 1.

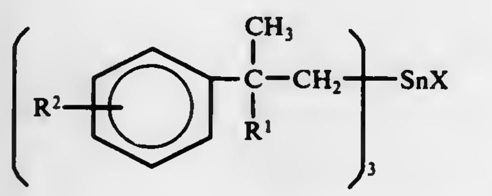
4,058,544
NOVEL METHOD FOR PREPARING ORGANOTIN COMPOUNDS
Bernard G. Kushlefsky, Edison, N.J., assignor to M&T Chemicals Inc., Greenwich, Conn.
Filed Dec. 6, 1974, Ser. No. 530,356
Int. Cl.² C07F *7/22*
U.S. Cl. 260—429.7 **7 Claims**

1. In an improved method for preparing a triorganotin derivative of an ethylenically unsaturated mono- or dicarboxylic acid containing between 3 and 20 atoms, the method consisting essentially of

1. reacting said mono- or dicarboxylic acid with a stoichiometric amount of a triorganotin hydroxide or a bis(triorganotin)oxide;
2. removing the water formed as a by-product of the reaction from the reaction mixture; and
3. isolating said triorganotin derivative, wherein the improvement resides in removing the water by maintaining the triorganotin derivative in contact with an amount of a solid, chemically inert dehydrating agent sufficient to remove all of the water present in the reaction mixture, and separating said triorganotin derivative from the dehydrating agent, said dehydrating agent being selected from the group consisting of the anhydrous forms of sodium sulfate, magnesium sulfate, calcium sulfate, the calcium halides, activated alumina, silica gel and molecular sieves.

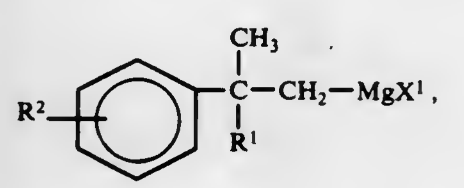
4,058,545
METHOD FOR PREPARING TRI(β-SUBSTITUTED PHENETHYL)TIN HALIDES
Melvin H. Gitlitz, Edison, N.J., assignor to M&T Chemicals Inc., Greenwich, Conn.
Filed Aug. 3, 1976, Ser. No. 711,202
Int. Cl.² C07F *7/22*
U.S. Cl. 260—429.7 **5 Claims**

1. A method for preparing a triorganotin halide of the general formula



wherein R^1 represents hydrogen or methyl, R^2 is selected from the group consisting of hydrogen, alkyl containing from 1 to 6 carbon atoms and X is chlorine or bromine, said method consisting essentially of the following steps:

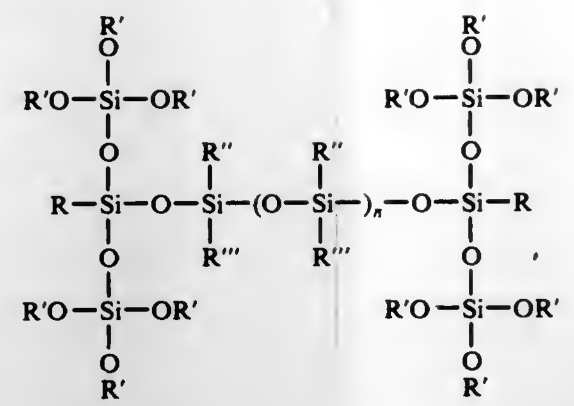
1. Reacting at least three moles of an organomagnesium halide,



with each mole of an alkyltin trihalide, $R^3SnX_3{}^2$ wherein X^1 and X^2 are individually selected from the group consisting of chlorine and bromine and R^3 is phenyl or a linear hydrocarbon group containing from 1 to 8 carbon atoms;
2. Reacting the resultant tetraorganotin compound with an equimolar amount of an anhydrous stannic halide, SnX_4, in a liquid hydrocarbon diluent and isolating said triorganotin compound by combining the reaction mixture with water or a dilute aqueous acid solution.

4,058,546
ALKOXYSILANE DOUBLE CLUSTER COMPOUNDS WITH SILICONE BRIDGES AND THEIR PREPARATION AND USE
Karl O. Knollmueller, Hamden, Conn., assignor to Olin Corporation, New Haven, Conn.
Filed Apr. 28, 1977, Ser. No. 791,671
Int. Cl.² C07F *7/04, 7/18*
U.S. Cl. 260—448.8 R **18 Claims**

1. A compound having the formula:



wherein n is an integer from 0 to 300; R is hydrogen, alkyl, alkenyl, aryl, aralkyl or $—OSi(OR')_3$; each R′ is independently selected from alkyl, alkenyl, aryl or aralkyl with the proviso that at least a majority of R′ radicals are sterically hindered alkyl groups having at least 3 carbon atoms; and R″ and ‴ are independently selected from hydrogen, alkyl, alkenyl, aryl, aralkyl, hydroalkyl, and halo or cyano substituted alkyl, alkenyl, aryl, aralkyl, and hydroalkyl.

4,058,547
CATALYTIC PROCESS FOR THE PRODUCTION OF ACRYLONITRILE
Tatsuo Shiraishi; Shinkichi Shimizu, and Hiroshi Ichihashi, all of Niihama, Japan, assignors to Sumitomo Chemical Company, Limited, Japan
Division of Ser. No. 148,165, May 28, 1971, Pat. No. 3,746,656. This application Nov. 1, 1972, Ser. No. 302,882
Claims priority, application Japan, May 29, 1970, 45-46667
Int. Cl.² C07C *120/14*
U.S. Cl. 260—465.3 **29 Claims**

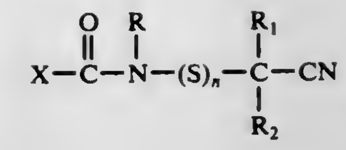
1. A process for producing acrylonitrile by the vapor phase reaction of propylene, ammonia and gaseous oxygen at a temperature from about 300° to about 520° C., which comprises contacting propylene, ammonia and gaseous oxygen with a catalyst composition comprising a catalyst system of the formula: $Tl_aP_bMo_cFe_dBi_eX_fO_g$ wherein X is Ni, Mg or Co or mixtures thereof and a, b, c, d, e, f and g represent respectively, the number of atoms and c is 12, a is 2 or less, but not 0; b is 0 to 5; d is 0.1 to 5; e is 0.1 to 5; f is 2 to 15; and g is from 38.3 to 81.5.

4,058,548
PROCESS FOR PREPARING ACETONITRILE
Gisela Olivé, and Salvador Olivé, both of Zollikerberg, Switzerland, assignors to Monsanto Company, St. Louis, Mo.
Filed June 3, 1976, Ser. No. 692,630
Int. Cl.² C07C *120/00*
U.S. Cl. 260—465.1 **24 Claims**

1. A process for preparing acetonitrile by contacting hydrogen and at least one of methylamine, dimethylamine and trimethylamine molar ratio of hydrogen to amine of at least 0.5 to 1 at an elevated temperature of at least about 300° C and sufficiently high to induce reaction with a catalytically effective amount of catalyst comprising a transition metal in a reduced valence state which renders it effective toward synthesis of acetonitrile, at a space velocity of about 50 to about 2000 reciprocal hours, and recovering acetonitrile.

4,058,549
N-SUBSTITUTED CYANOALKANE-SULFENYL (AND THIOSULFENYL)-N-ALKYL CARBAMOYL HALIDES
Themistocles D. J. D'Silva, South Charleston, W. Va., assignor to Union Carbide Corporation, New York, N.Y.
Filed June 30, 1976, Ser. No. 701,166
Int. Cl.² C07C *121/417, 121/46*
U.S. Cl. 260—465.4 **11 Claims**

1. A compound of the formula:

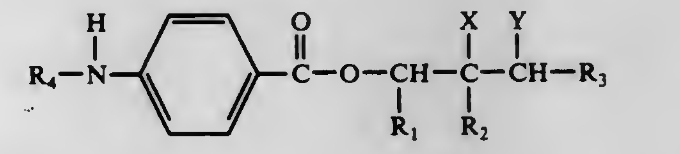


wherein:
- n is 1 or 2;
- X is chlorine or fluorine;
- R is alkyl;
- R_1 and R_2 are individually alkyl or haloalkyl or R_1 and R_2 together may form an alkylene chain completing either a substituted or unsubstituted cyclopentyl, cyclohexyl or either a 6, 7 or 8 membered bicycloalkyl ring wherein the permissible substituents are one or more chloro, fluoro, bromo, alkyl or haloalkyl substituents;

with the proviso that R, R_1, and R_2 substituents individually may not include more than eight aliphatic carbon atoms.

4,058,550
POLYSUBSTITUTED-ALKYL ESTERS OF 4-ALKYLAMINOBENZOIC ACIDS
Robert Gordon Shepherd, South Nyack, and Thomas Gary Miner, Sugar Loaf, both of N.Y., assignors to American Cyanamid Company, Stamford, Conn.
Filed Oct. 28, 1975, Ser. No. 625,989
Int. Cl.² C07C *101/00*
U.S. Cl. 560—43 **9 Claims**

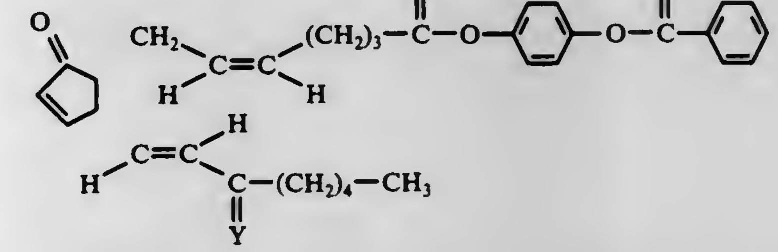
1. A compound of the formula:



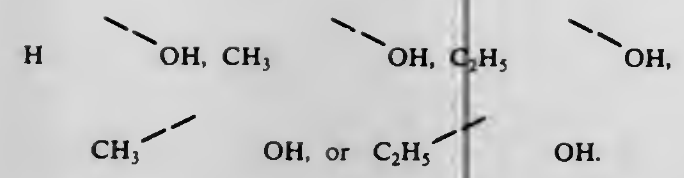
wherein R_4 is an unbranched or branched alkyl group, C_nH_{2n+1} wherein n is 8 to 19; R_1, R_2 and R_3 are selected from the group consisting of hydrogen, C_1–C_3 alkyl, and C_1–C_3 hydroxyalkylene; X and Y, which may be the same or different, are selected from the group consisting of hydrogen, hydroxy, lower alkanoyloxy, hydroxymethyl, and when taken together X and Y can comprise a carbon-carbon bond; wherein the 4-alkylaminobenzoyloxy moiety and X may be interchanged; with the proviso that when R_1, R_2 and R_3 are all hydrogen or C_1–C_3 alkyl, then X and Y may not both be hydrogen; and the pharmaceutically acceptable salts thereof.

4,058,551
SUBSTITUTED PHENYL ESTERS OF PGA_2
Walter Morozowich, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.
Continuation of Ser. No. 531,991, Dec. 12, 1974, abandoned, which is a division of Ser. No. 431,598, Jan. 8, 1974, Pat. No. 3,931,281. This application July 12, 1976, Ser. No. 704,264
Int. Cl.² C07C *177/00*
U.S. Cl. 560—43 **8 Claims**

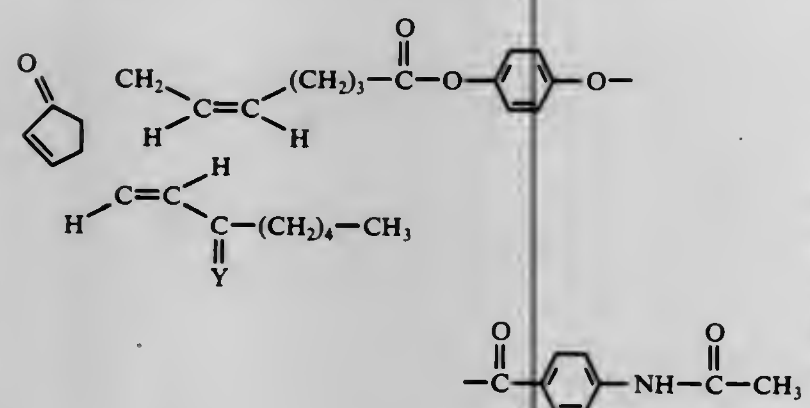
1. An optically active compound of the formula:



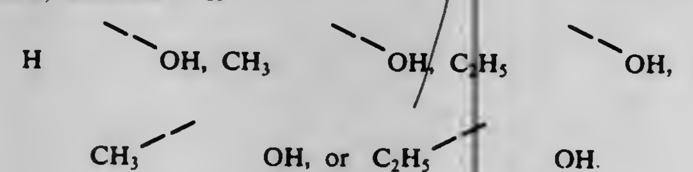
or a racemic compound of that formula and the mirror image thereof, wherein Y is



5. An optically active compound of the formula:

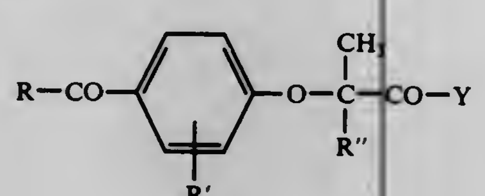


or a racemic compound of that formula and the mirror image thereof, wherein Y is



4,058,552
ESTERS OF P-CARBONYLPHENOXY-ISOBUTYRIC ACIDS
Andre Mieville, Lausanne, Switzerland, assignor to Orchimed SA, Switzerland
Continuation-in-part of Ser. No. 326,188, Jan. 24, 1973, Pat. No. 3,907,792, which is a continuation-in-part of Ser. No. 8,071, Feb. 2, 1970, Pat. No. 3,914,286. This application July 29, 1975, Ser. No. 600,127
Claims priority, application Switzerland, Jan. 31, 1969, 1517/69; Aug. 28, 1969, 13022/69
Int. Cl.² C07C *69/76*
U.S. Cl. 560—52 **6 Claims**

1. A novel ester of p-carbonylphenoxy-isobutyric acid having the formula



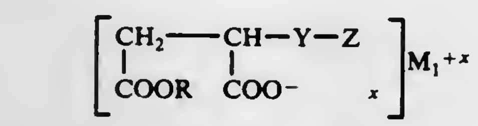
wherein
R is a phenyl group substituted by one or two halogen atoms;
R′ is H, CH_3, C_6H_5, SCH_3, OCH_3, or, SO_2CH_3;
R″ is CH_3 or C_2H_5; and
Y is C_1-C_4 alkoxy, phenoxy, phenoxy substituted by one or two halogen atoms, or, OCH_2O-CO-C $(CH_3)_3$.

4,058,553
METHOD OF PREPARING ALKOXYMETHYLENEMALONIC ACID ESTERS
Otto Ackermann, Troisdorf-Sieglar, Germany; Otto Bleb, deceased, late of Troisdorf-Bergheim, Germany (by Rita Bleb, legal representative), and Walter Rogler, Bonn, Germany, assignors to Dynamit Nobel Aktiengesellschaft, Troisdorf, Germany
Filed May 30, 1975, Ser. No. 582,474
Claims priority, application Germany, June 4, 1974, 2426964
Int. Cl.² C07C *69/66*
U.S. Cl. 560—180 **5 Claims**

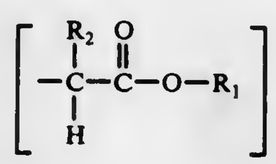
1. Process for the preparation of alkoxymethylene malonic acid ester by the reaction of malonic acid ester with orthoformic acid trialkyl ester, characterized in that malonic acid ester is contacted with the ortho ester in the presence of at least one of carboxylic acid and carboxylic acid anhydride, and a Lewis acid at 100°-160° C for a time sufficient for formation of the alkoxymethylene melonic acid ester, wherein the amount of ortho ester present at the beginning of the reaction is at least 1.4 moles thereof per mol of the malonic acid ester starting material, and wherein alcohol formed during the reaction is removed during the reaction.

4,058,554
NOVEL ESTER DERIVATIVES OF ETHER POLYCARBOXYLIC ACIDS AND PROCESS FOR MAKING SAME
Eddie N. Gutierrez, Fort Lee, and Vincent Lamberti, Upper Saddle River, both of N.J., assignors to Lever Brothers Company, New York, N.Y.
Filed Dec. 22, 1975, Ser. No. 642,838
Int. Cl.² C07C *69/66*
U.S. Cl. 560—180 **3 Claims**

1. A compound of the general formula



wherein R is a primary alkyl group of one to six carbon atoms,
wherein M_1 is H, Ca, Mg, Ba, Sr, Na, K or Li,
wherein x is 1 or 2 and is equivalent to the valency of M_1,
wherein Y is oxygen, and
wherein Z is
1. an ester moiety of the general formula:



wherein R_1 is isopropyl or secondary butyl, and
wherein R_2 is hydrogen, methyl or ethyl.

4,058,555
PROCESS FOR THE PURIFICATION OF MIXED ACIDS
Samuel S. Mims, Odessa, Tex., assignor to El Paso Products Company, Odessa, Tex.
Filed July 18, 1969, Ser. No. 843,028
Int. Cl.² C07C *69/40, 69/42, 69/44*
U.S. Cl. 560—191 **8 Claims**

1. In a process for the separation and recovery of components contained in the reactor effluent resulting from the air oxidation of cyclohexane, said reactor effluent comprising cyclohexanol, cyclohexanone, unreacted cyclohexane, monobasic aliphatic organic acids, dibasic aliphatic organic acids, oxygenated monobasic aliphatic organic acids, lactones, esters and polymeric esters; the improved steps comprising:

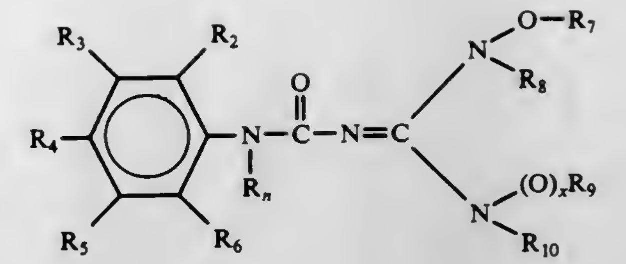
a. extracting said reactor effluent with water and permitting layer separation to form, (1) an organic phase containing a major amount of the cyclohexane, cyclohexanol and cyclohexanone, and (2), an aqueous phase containing the organic acids, lactones, esters and polymeric esters and minor amounts of cyclohexane, cyclohexanol and cyclohexanone;
b. withdrawing said aqueous phase and concentrating to remove the volatile components and provide an aqueous phase concentrate;
c. mixing said aqueous phase concentrate with about 30–60% aqueous nitric acid at a temperature of about 30° to 60° C. to initiate oxidation and hydrolyze any hydrolyzable materials present and provide an aqueous concentrate/nitric acid resulting mixture;
d. reacting the aqueous phase concentrate/nitric acid resulting mixture at a temperature of about 75° to 125° C. to oxidize the remaining oxidizable components present;
e. contacting the resulting mixture in cooled condition with a substantially water-miscible lower alkyl alcohol to form an alcoholic mixture in which esters are formed of the aliphatic organic acids present;
f. simultaneously contacting said alcoholic mixture with a water-immiscible extractant organic solvent under conditions of intimate contact to extract the esters formed into an organic phase with the extractant solvent and form an organic phase and an aqueous phase; said organic solvent comprising an aromatic hydrocarbon, a halogenated aliphatic hydrocarbon, a halogenated aromatic hydrocarbon or mixture thereof;
g. withdrawing and separating said organic phase and said aqueous phase;
h. stripping said aqueous phase to remove any alcohol present, and
i. distilling said organic phase to recover the alkyl esters.

4,058,556
PROCESS FOR THE PREPARATION OF ACETOXYBUTANAL
Christian Rasp, Cologne; Gerhard Scharfe, and Johann Grolig, both of Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany
Filed June 18, 1975, Ser. No. 588,079
Claims priority, application Germany, June 22, 1974, 2430082
Int. Cl.² C07C *67/28*
U.S. Cl. 560—231 **8 Claims**

1. In a process for the preparation of acetoxybutanal by reaction of allyl acetate with carbon monoxide and hydrogen under pressure and at elevated temperature, in the presence of a cobalt carbonyl compound and a solvent, the improvement which comprises, the reaction being carried out at 130° to 180° C and at concentrations of allyl acetate of less than 20% by weight, relative to the liquid phase, substantially throughout the reaction.

4,058,557
AMIDINOUREAS
George Henry Douglas, Malvern; William Lyon Studt, Harleysville, and Stuart Alan Dodson, Lansdale, all of Pa., assignors to William H. Rorer, Inc., Fort Washington, Pa.
Filed Mar. 30, 1976, Ser. No. 671,763
Int. Cl.² C07C *127/19;* **A61K** *31/155, 31/17;* **C07C** *129/12*
U.S. Cl. 260—501.14 **33 Claims**

1. A compound of the formula:



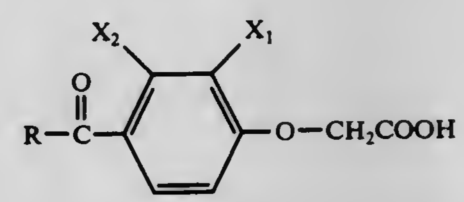
where:
R_2, R_3, R_4, R_5 and R_6 may be the same or different and are: hydrogen, halo, loweralkyl, haloloweralkyl, nitro, amino, acylamino, hydroxy, aralkyloxy or loweralkoxy;
R_n is nitrogen or loweralkyl;
R_7, R_8, R_9 and R_{10} may be the same or different and are: hydrogen, alkyl, alkenyl, alkynyl, cycloalkyl or aralkyl;
px is 0–1;
the sum total of carbon atoms present in R_7, R_8, R_9 and R_{10} together is less than 12; and
the non-toxic acid addition salts thereof.

4,058,558
AROMATIC KETO ACIDS AND DERIVATIVES HAVING ANALGETIC, ANTIINFLAMMATORY, AND HYPOCHOLESTEROLEMIZING ACTION
Henri Cousse; Gilbert Mouzin, and Jean-Pierre Rieu, all of Castres, France, assignors to Pierre Fabre S.A., Paris, France
Filed Mar. 21, 1975, Ser. No. 560,946
Claims priority, application France, Feb. 17, 1975, 75.04912
Int. Cl.² C07C *63/33;* **A61K** *31/19*
U.S. Cl. 260—515 A **1 Claim**

1. 2-methylene 4-oxo 4-(4′-orthochlorophenyl phenyl) butyric acid.

4,058,559
4-AROYL-SUBSTITUTED PHENOXY ACETIC ACIDS
Peter Hadley Jones, Lake Forest, Ill.; Dilbagh Singh Bariana, Cote St. Luc; Anthony Kei Lun Fung, Pierrefonds, both of Canada; Yvonne Connolly Martin, Waukegan, Ill.; Jaroslav Kyncl, Lake Bluff, Ill., and Amrit Lall, Libertyville, Ill., assignors to Abbott Laboratories, North Chicago, Ill.
Filed Sept. 24, 1975, Ser. No. 616,220
Int. Cl.² C07C *63/33, 63/337, 65/14*
U.S. Cl. 260—520 C **14 Claims**

1. A compound of the formula



wherein R is a phenyl ring, naphthyl or a substituted phenyl ring where the substituents are loweralkyl, halogen, loweralkoxy, nitro or hydroxy; R_1 is $—CH_2COOH$; and X_1 and X_2 are each a halogen, or when taken together form with the two attached carbons a phenyl ring.

4,058,560
CHEMICAL PROCESS
Thomas J. Walter, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.
Filed Aug. 30, 1976, Ser. No. 718,954
Int. Cl.² C07C *59/22*
U.S. Cl. 260—535 P **9 Claims**

1. In the method of producing the trialkali metal salt of carboxymethyloxy succinic acid by reacting in an aqueous medium, maleic acid and glycolic acid under basic conditions in the presence of zinc or alkaline earth metal ions to produce

a zinc or alkaline earth metal salt of carboxymethyloxy succinic acid and treating said zinc or alkaline earth metal salt with alkali metal carbonate thereby forming a reaction mixture containing the trialkali metal salt and zinc or alkaline earth metal carbonate, the improvement of gradually adding zinc or alkaline earth metal salt of carboxymethyloxy succinic acid to the alkali metal carbonate.

4,058,561
2-CHLOROMETHYLPHENYLCARBAMIC ACID FLUORIDE

Erich Klauke, Odenthal, and Horst Jäger, Leverkusen, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Jan. 23, 1976, Ser. No. 651,995
Claims priority, application Germany, Feb. 12, 1975, 2505714
Int. Cl.[2] C07C *101/44, 63/52*
U.S. Cl. 260—544 C 1 Claim

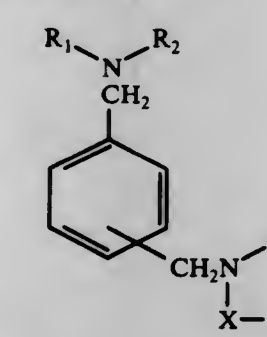
1. 2-chloromethylphenylcarbamic acid fluoride.

4,058,562
ANTIVIRAL SUBSTITUTED (PHENYLENEDIMETHYLENE) DIAMINES

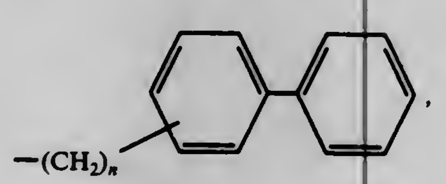
Kenneth Richardson, Canterbury, England, assignor to Pfizer Inc., N.Y.

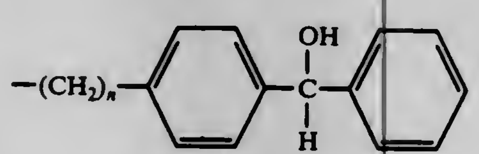
Division of Ser. No. 611,856, Sept. 10, 1975, Pat. No. 4,003,929, which is a continuation-in-part of Ser. No. 543,824, June 11, 1975, abandoned. This application Sept. 3, 1976, Ser. No. 720,146
Int. Cl.[2] C07C *143/79;* A61K *31/18*
U.S. Cl. 260—556 AR 4 Claims

1. A compound of the structure

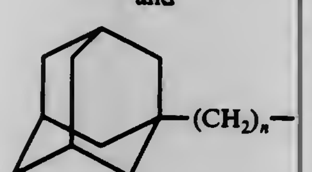


and its acid addition salts wherein:
R_1 is selected from the group consisting of hydrogen, methyl and 2-hydroxyethyl;
R_2 is selected from the group consisting of hydrogen, lower alkyl having 1 to 6 carbon atoms and ω-hydroxyalkyl having 1 to 6 carbon atoms;
R_3 is selected from the group consisting of alkyl having from 12 to 24 carbons, a monovalent aliphatic non-cyclic hydrocarbon having from 12 to 24 carbon atoms and 1 to 2 double bonds therein,





and



wherein
n is an integer from one to six and
X is

and R_4 is selected from the group consisting of phenyl, naphthyl and phenyl-napthyl.

4,058,563
NOVEL SCHIFF BASES

Reinhard H. Richter, North Haven, Conn., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 724,585, Sept. 20, 1976, Pat. No. 4,020,104. This application Mar. 28, 1977, Ser. No. 782,242
Int. Cl.[2] C07C *119/00*
U.S. Cl. 260—566 F 3 Claims

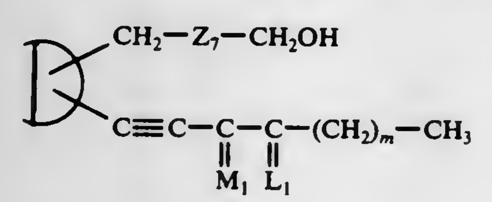
1. The bis-benzaldimine of cis,cis-di-(p-aminocyclohexyl)-methane

4,058,564
ALIPHATIC 2-DECARBOXY-2-HYDROXYMETHYL-13,14-DIDEHYDRO-PG COMPOUNDS

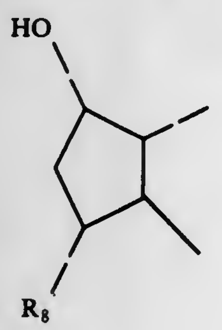
Herman W. Smith, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

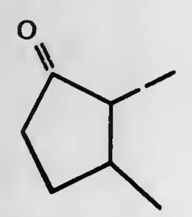
Filed July 26, 1976, Ser. No. 708,752
Int. Cl.[2] C07C *35/06, 43/27, 49/46, 49/58*
U.S. Cl. 260—586 R 154 Claims

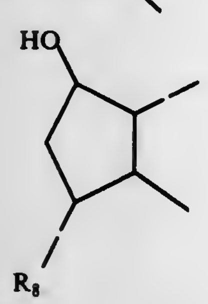
1. A prostaglandin analog of the formula:



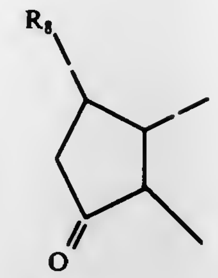
wherein  is

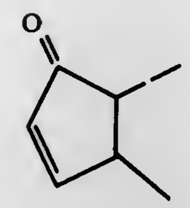




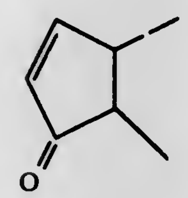


-continued



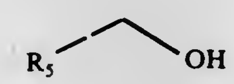


, or

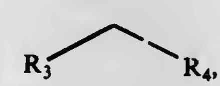


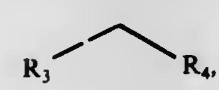
wherein R_8 is hydrogen or hydroxy;
wherein M_1 is

or

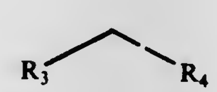


wherein R_5 is hydrogen or methyl;
wherein L_1 is

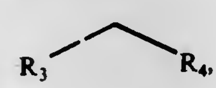




or a mixture of



and



wherein R_3 and R_4 are hydrogen, methyl, or fluoro, being the same or different, with the proviso that one of R_3 and R_4 is fluoro only when the other is hydrogen or fluoro;
wherein Z_7 is
(1) cis-CH═CH—CH₂—(CH₂)$_g$—CH₂—,
(2) cis-CH═CH—CH₂—(CH₂)$_g$—CF₂—,
(3) cis-CH₂—CH═CH—(CH₂)$_g$—CH₂—,
(4) —(CH₂)₃—(CH₂)$_g$—CH₂—,
(5) —(CH₂)₃—(CH₂)$_g$—CF₂—, or
(6) —CH₂—O—CH₂—(CH₂)$_g$—CH₂—,
wherein g is one, 2, or 3; and
wherein m is one to 5, inclusive.

4,058,565
PROCESS FOR OXIDIZING HYDROCARBONS

Reinhard Thiel, and Heinz Jörg Rosenbaum, both of Krefeld, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Continuation of Ser. No. 411,525, Oct. 31, 1973, abandoned. This application Apr. 13, 1976, Ser. No. 676,605
Claims priority, application Germany, Dec. 8, 1972, 2260114
Int. Cl.[2] C07C *27/12, 27/26, 29/00, 45/02*
U.S. Cl. 260—586 AB 7 Claims

1. In a process for oxidizing hydrocarbons wherein
a. saturated C_4–C_{20} hydrocarbons are reacted with a gas comprising molecular oxygen in the presence of a boron compound forming esters with alcohols formed from said hydrocarbons;
b. the resulting reaction mixture containing at least one boric acid ester is hydrolyzed;
c. the hydrolyzate is separated into a substantially organic component, from which the oxidation product is recovered, and into a substantially aqueous component, containing boric acid and water-soluble organic secondary products;
and
d. boric acid from the aqueous component is recycled to (a);
the improvement which comprises
e. crystallizing boric acid from the aqueous phase to deposit therefrom the boric acid which is recycled to (a), thereby leaving a saturated aqueous mother liquor containing boric acid;
f. oxidizing at least part of the residual saturated boric acid-containing mother liquor from (e) in the liquid phase with a gas comprising molecular oxygen at a temperature of at least 200° C and under a pressure sufficient to keep at least some of the water in the liquid phase so that the organic impurities contained in said mother liquor are oxidized to an extent of from about 41 to 94%;
and
g. recycling the resulting aqueous solution containing boric acid from step (f) to the hydrolysis of step (b).

4,058,566
SEPARATION OF ISOMERS OF PHENOLS AND PHENOLIC ETHERS

Michael Martan, Skokie, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Sept. 1, 1976, Ser. No. 719,648
Int. Cl.[2] C07C *45/24*
U.S. Cl. 260—600 R 7 Claims

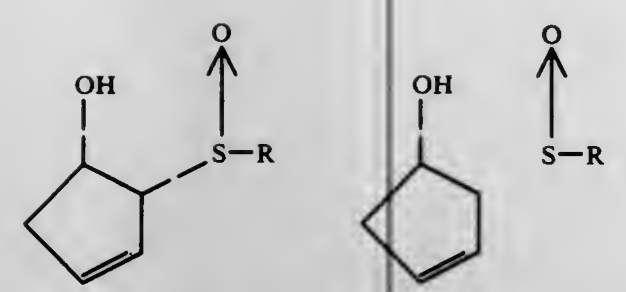
1. A process for the separation by selective reaction of a mixture of ortho-chloromethylanisole and para-chloromethylanisole or a mixture of o-chloromethylphenol and p-chloromethylphenol, which comprises treating the mixture with hexamethylenetetramine in the presence of a protonic solvent at a temperature of from about 0° to about 20° C., and recovering the separated p-anisic aldehyde or p-hydroxybenzenaldehyde.

4,058,567
CYCLOPENTENE SULFOXIDES

David A. Evans, Pasadena, Calif., assignor to The Regents of the University of California, Berkeley, Calif.

Division of Ser. No. 499,287, Aug. 21, 1974, abandoned, which is a continuation-in-part of Ser. No. 349,888, April 10, 1973, abandoned. This application May 17, 1976, Ser. No. 687,422
Int. Cl.[2] C07C *147/14, 69/74, 61/38*
U.S. Cl. 260—607 A 1 Claim

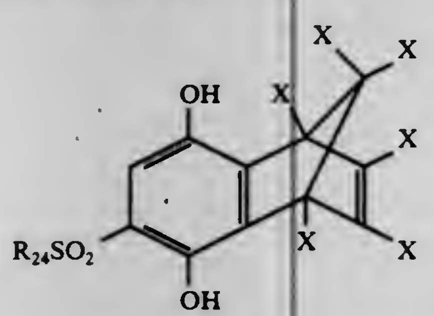
1. A compound selected from the group consisting of



where R is phenyl or alkyl of from 1 to 12 carbon atoms.

4,058,568
HEXAHALO-1,4-DIHYDRO-1,4-METHANONAPHTHALENE-5,8-DIOL PHENYLSULFONES
Julian R. Little, Wayne; Walter Nudenberg, West Caldwell, and Yong S. Rim, Paterson, all of N.J., assignors to Uniroyal, Inc., New York, N.Y.
Division of Ser. No. 486,482, July 8, 1974, Pat. No. 4,009,200, which is a division of Ser. No. 329,177, Feb. 2, 1973, Pat. No. 3,875,236, which is a division of Ser. No. 80,747, Oct. 14, 1970, abandoned. This application Nov. 26, 1976, Ser. No. 745,065
Int. Cl.² C07C *147/10*
U.S. Cl. 260—607 AR **2 Claims**

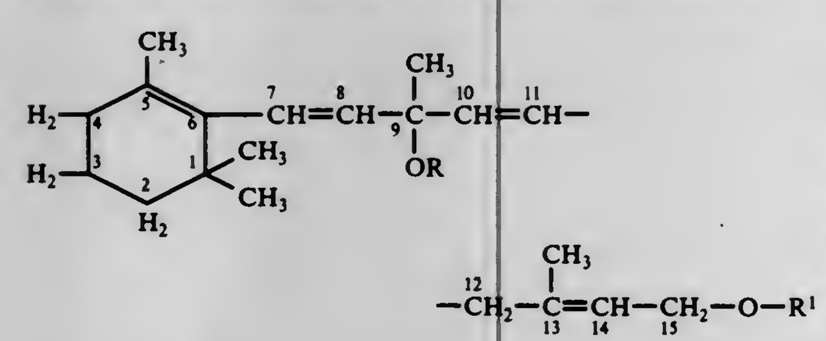
1. A compound having the formula:



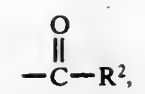
wherein R_{24} is lower alkyl, phenyl, chlorophenyl, or a halogen substituted lower alkyl and X is halogen.

4,058,569
SYNTHESIS OF VITAMIN A, INTERMEDIATES AND CONVERSION THEREOF TO VITAMIN A
William Oroshnik, Plainfield, N.J., assignor to SCM Corporation, New York, N.Y.
Division of Ser. No. 566,981, April 10, 1975, which is a division of Ser. No. 353,215, April 23, 1973, Pat. No. 3,949,006, which is a continuation-in-part of Ser. No. 246,939, April 24, 1972, abandoned. This application Mar. 1, 1976, Ser. No. 662,335
Int. Cl.² C07C *29/00*
U.S. Cl. 260—617 A **1 Claim**

1. A process for making Vitamin A_1 comprising inducing a phototropic reaction with the removal of hydrogen from carbon number 12 and OR from carbon number 9 and rearranging the sites of unsaturation to provide the Vitamin A_1 structure which comprises contacting a compound of the formula



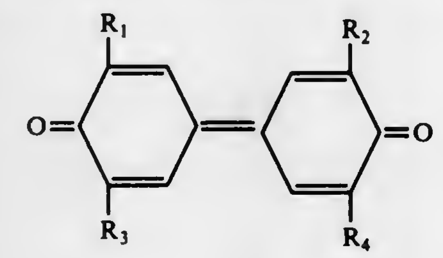
where R is a member of the group consisting of lower alkyl, lower alkenyl, phenyl or aralkyl and R^1 is a member of the group consisting of hydrogen or



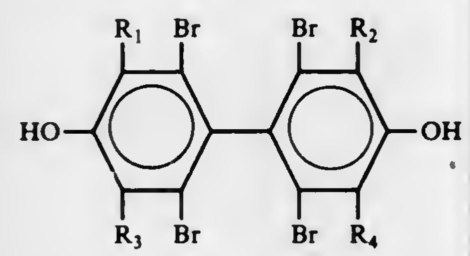
R^2 being a lower alkyl, phenyl, substituted phenyl or aralkyl, with a strong basic medium.

4,058,570
BROMINATED BIPHENOL PROCESS
Philip L. Kinson, Rexford, and Charles M. Orlando, Schenectady, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.
Continuation-in-part of Ser. No. 533,948, Dec. 18, 1974, abandoned. This application May 7, 1976, Ser. No. 684,175
Int. Cl.² C07C *37/00, 41/00, 49/62*
U.S. Cl. 260—620 **9 Claims**

1. An improved bromination process comprising adding at a temperature at least below about +20° C, bromine to 3,3',4,4'-tetrasubstituted diphenoquinone of the formula



wherein independently each R_1, R_2, R_3 and R_4 substituent is selected from the group consisting of primary C_{1-8} alkyl, primary C_{1-8} alkoxy, phenyl and 4-bromophenyl in the presence of a liquid diluent, evolving hydrogen bromide gas at a temperature of at least about +15° C, heating the resulting reaction mixture at elevated temperatures to complete the bromination reaction, and recovering a 2,2',6,6'-tetrabromo- 3,3',5,5'-tetrasubstituted-4,4' -biphenol, of the formula



wherein R_1, R_2, R_3 and R_4 are as defined above, and further wherein the yield of the biphenol is at least about 70%.

4,058,571
CONTINUOUS PROCESS FOR THE PRODUCTION OF D,L'MENTHOL
Wolfgang Biedermann, Krefeld-Bockum, Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Germany
Continuation of Ser. No. 452,592, March 19, 1974, abandoned. This application Oct. 20, 1975, Ser. No. 624,144
Claims priority, application Germany, Mar. 24, 1973, 2314813
Int. Cl.² C07C *27/04, 35/12*
U.S. Cl. 260—631 H **14 Claims**

1. In a process for production of d,l-menthol by contacting a starting material which is a compound having the carbon skeleton of menthol and which is convertible to d,l-menthol by catalytic hydrogenation, and having at least one double bond and being substituted in the 4-position by oxygen, with hydrogen in the presence of a catalyst for hydrogenation of said starting material, in a contacting zone, at a temperature, pressure, and residence time sufficient for the hydrogenation to form said d,l-menthol, the improvement which comprises employing as said catalyst a cobalt-manganese catalyst containing 20 to 25% by weight of manganese, based on the total quantity of cobalt and manganese, and activated with up to 1% by weight of copper based on the total weight of the catalyst, and operating the process continuously by continuously introducing said starting material and hydrogen into the contacting zone and continuously withdrawing the d,l-menthol from the contacting zone.

4,058,572
HYDROGENATION OF CYCLIC UNSATURATED COMPOUNDS
Bernard J. Kane, Atlantic Beach; Karen E. Irving, Orange Park; James O. Bledsoe, Jr., Jacksonville, and Levy A. Canova, Orange Park, all of Fla., assignors to SCM Corporation, New York, N.Y.
Continuation-in-part of Ser. No. 488,487, July 15, 1974, abandoned. This application May 6, 1975, Ser. No. 574,911
Int. Cl.² C07C *29/00, 35/08*
U.S. Cl. 260—631.5 **13 Claims**

1. In a process for hydrogenation, with elemental hydrogen gas in the presence of a hydrogenation catalyst, under hydrogenation conditions, of a cyclic unsaturated compound having a hydroxyl group projecting from an asymmetric center of the ring and an olefinic carbon-to-carbon double bond which when saturated in the hydrogenation process creates in additional asymmetric center in the ring, the improvement for obtaining increased stereoselectivity by increasing the addition of said hydrogen to that side of the olefinic bond on the same side of the compound molecule as said hydroxyl group, wherein said hydrogenation is conducted with a nickel hydrogenation catalyst that has an effective fraction of its reactive surfaces inactivated by treating said catalyst with an effective amount of a modifier selected from the group consisting of: an inorganic salt of a metal from Groups I through VIII, Periods 4 through 7 of the Periodic Table, of the Rare Earths of the Periodic Table, and of aluminum; organic halides; hydrogen halides; and halo compounds or arsenic and boron.

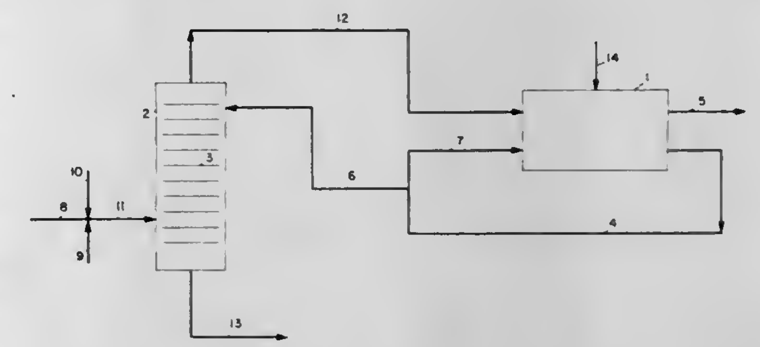
4,058,573
PROCESS FOR THE ADDITION OF GASEOUS NON-HALOGENATED OLEFINS AND ACETYLENES TO PERFLUOROALKYL IODIDES
Martin Knell, Ossining, N.Y., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.
Continuation of Ser. No. 159,515, July 2, 1971, abandoned, which is a continuation-in-part of Ser. No. 4,179, Jan. 14, 1970, abandoned, which is a continuation-in-part of Ser. No. 693,148, Dec. 26, 1967, abandoned. This application Apr. 4, 1974, Ser. No. 457,879
Int. Cl.² C07C *21/20*
U.S. Cl. 260—653.1 T **14 Claims**

1. A process for the addition of perfluoroalkyl iodides of the formula $ZC_nF_{2n}I$, where Z represents F or I, n is an integer of 4 – 18, said iodides are liquid at reaction temperature, to non-halogenated olefins or non-halogenated acetylenes which are gaseous at the employed reaction temperature, which comprises bubbling said olefin or acetylene into said liquid iodide, in the presence of a free-radical generating catalyst, at atmospheric or less than atmospheric pressure, at a reaction temperature of about 40° C to about 220° C, and recovering the reaction addition product which is essentially free of telomers.

4,058,574
PROCESS FOR THE OXYCHLORINATION OF HYDROCARBONS WITH AMMONIUM CHLORIDE
Jean-Claude Daumas, Orsay, France, assignor to Rhone-Progil, Paris, France
Continuation of Ser. No. 378,071, July 11, 1973, abandoned. This application Aug. 22, 1975, Ser. No. 606,885
Claims priority, application France, July 11, 1972, 72.25070
Int. Cl.² C07C *17/15*
U.S. Cl. 260—659 A **12 Claims**

1. A process for the catalytic oxychlorination of hydrocarbons with chlorine derived at least in part from ammonium chloride comprising contacting a gaseous mixture containing a hydrocarbon, ammonium chloride and an oxygen-containing gas with a catalyst of copper chloride and an alkali metal chloride on a support consisting essentially of silica and magnesia at a temperature within the range of 200° to 380° C.

4,058,575
CATALYST PRETREATMENT WITH HYDROCARBON FEEDSTOCK
Robert P. Cahn, Millburn, and John P. Longwell, Westfield, both of N.J., assignors to Exxon Research & Engineering Co., Linden, N.J.
Filed June 12, 1975, Ser. No. 586,177
Int. Cl.² C07C *13/00, 3/56, 5/28;* **B01J** *27/38*
U.S. Cl. 260—666 P **13 Claims**



1. In a hydrocarbon conversion process which comprises contacting a hydrocarbon feedstock with a liquid phase catalyst comprising tantalum pentafluoride, niobium pentafluoride or mixtures thereof in combination with at least an equimolar amount of hydrogen fluoride, thereby forming a partially deactivated catalyst which contains active or potentially active catalyst species and deactivated catalyst species, the improvement which comprises maintaining hydrocarbon conversion activity of the catalyst in said process by the steps comprising

1. passing a purge stream of said partially deactivated catalyst into an extraction zone, the remaining partially deactivated catalyst being returned to said hydrocarbon conversion process;
2. contacting, in said extraction zone, the purge stream of step (1) with said hydrocarbon feedstock prior to introducing said feedstock into said hydrocarbon conversion process, the amount of said feedstock being sufficient to remove at least 25 wt. % of the active or potentially active catalyst species from said purge stream, said contacting occurring substantially in the liquid phase and at a temperature below the critical temperature of the hydrogen fluoride, the volume ratio of said purge stream to said hydrocarbon feedstock ranging from about 1:20 to about 1:100,000;
3. forming an extract phase containing substantially all of the hydrocarbon feedstock employed in step (2) and substantially all of the active or potentially active catalyst species removed in step (2) and a raffinate phase containing at least 50 wt. % of the deactivated catalyst species present in the purge stream of step (1);
4. passing at least a portion of said extract phase from said extraction zone to said hydrocarbon conversion process;
5. withdrawing a raffinate phase containing said deactivated catalyst species from said extraction zone; and
6. adding active catalyst to said hydrocarbon conversion process in an amount sufficient to replace the active or potentially active catalyst species not returned to the hydrocarbon conversion process in step (4) and the deactivated catalyst species withdrawn in step (5).

2. The process of claim 1 wherein hydrogen is present in the extraction zone in an amount sufficient to maintain a hydrogen partial pressure of at least 0.1 atmospheres.

3. The process of claim 1, wherein the hydrocarbon feedstock comprises (1) a component selected from the group consisting of an aliphatic hydrocarbon having at least one

carbon atom, a cycloaliphatic hydrocarbon having at least 5 carbon atoms, an aromatic and alkyl aromatic hydrocarbon having at least 6 carbon atoms and mixtures thereof and (2) olefins containing from 2 to 12 carbon atoms per molecule.

12. In an isomerization process which comprises contacting a hydrocarbon feedstock comprising a saturated acyclic hydrocarbon having at least four carbon atoms, a saturated alicyclic hydrocarbon having at least six carbon atoms or mixtures thereof, with a liquid phase catalyst comprising tantalum pentafluoride, niobium pentafluoride or mixtures thereof in combination with at least an equimolar amount of hydrogen fluoride, thereby forming a partially deactivated catalyst which contains active or potentially active catalyst species and deactivated catalyst species, the improvement which comprises maintaining hydrocarbon conversion activity of the catalyst in said process by the steps comprising:

1. passing a purge stream of said partially deactivated catalyst into an extraction zone, the remaining partially deactivated catalyst being returned to said isomerization process;
2. contacting, in said extraction zone, the purge stream of step (1) with said hydrocarbon feedstock prior to introducing said feedstock into said isomerization process, the amount of said feedstock being sufficient to remove at least 25 wt. % of the active or potentially active catalyst species from said purge stream, said contacting occurring substantially in the liquid phase, at a temperature below the critical temperature of the hydrogen fluoride and at a hydrogen partial pressure of at least 0.1 atmospheres, the volume ratio of said purge stream to said hydrocarbon feedstock ranging from about 1:20 to about 1:100,000;
3. forming an extract phase containing substantially all of the hydrocarbon feedstock employed in step (2) and substantially all of the active or potentially active catalyst species removed in step (2) and a raffinate phase containing at least 50 wt. % of the deactivated catalyst species present in the purge stream of step (1);
4. passing at least a portion of said extract phase from said extraction zone to said isomerization process;
5. withdrawing a raffinate phase containing said deactivated catalyst species from said extraction zone; and
6. adding active catalyst to said isomerization process in an amount sufficient to replace the active or potentially active catalyst species not returned to the isomerization process in step (4) and the deactivated catalyst species withdrawn in step (5).

4,058,576
CONVERSION OF METHANOL TO GASOLINE COMPONENTS

Clarence D. Chang, Princeton, and Shamsher S. Grover, Pennington, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

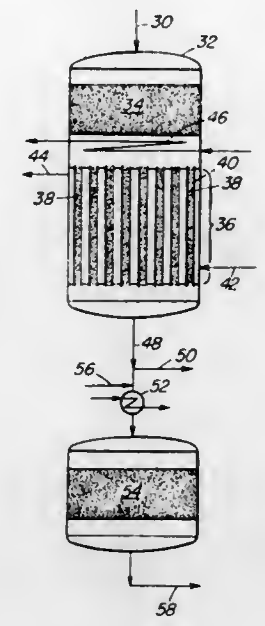
Continuation of Ser. No. 496,434, Aug. 9, 1974, abandoned. This application Sept. 7, 1976, Ser. No. 720,870

Int. Cl.[2] C10G *37/06;* B01J *29/28*

U.S. Cl. 260—673 8 Claims

1. In the process of converting at least one lower aliphatic alcohol having from 1–3 carbon atoms into hydrocarbon products comprising olefins, wherein said alcohol is contacted with a condensation catalyst at elevated temperatures in a first reaction zone in order to obtain a product comprising a mixture of water and at least one ether, and said product from said first reaction zone is therefore contacted with a crystalline aluminosilicate zeolite in a second reaction zone, said zeolite having a pore size greater than about 5 Angstrom Units, a silica to alumina ratio of at least about 12, and a constraint index of about 1 to 12 at elevated temperatures in order to obtain said hydrocarbon product comprising olefins, the improvement which comprises:

a. adjusting the temperature of the first reaction zone product to a temperature within the range of 600° F to about 800° F;
b. introducing said product from step (a) into said second reaction zone, wherein said crystalline aluminosilicate zeolite is confined within a plurality of adjacent elongated confined reaction zones surrounded by a heat exchange fluid; and



c. controlling exothermic reaction conditions within said elongated confined reaction zone in order to obtain said hydrocarbon product comprising olefins.

4,058,577
MODIFIED ZINC FERRITE OXIDATIVE DEHYDROGENATION CATALYSTS

James R. Baker, Fort Worth, Tex., assignor to Petro-Tex Chemical Corporation, Houston, Tex.

Division of Ser. No. 502,775, Sept. 3, 1974, Pat. No. 3,951,869. This application Oct. 16, 1975, Ser. No. 622,826

Int. Cl.[2] C07C *11/12*

U.S. Cl. 260—680 D 7 Claims

1. In the process of oxidative dehydrogenation of organic compounds having from about 2 to 20 carbon atoms and at least one

group in the presence of a catalyst composition at a temperature of from about 500° F to about 1,200° F and in the presence of from about 0.2 to about 2.0 mols of oxygen per mole organic compound to thereby produce a dehydrogenated compound having the same number of carbon atoms, wherein the improvement comprises said catalyst consisting of (1) a zinc ferrite composition having the empirical formula

$$Zn_xFe_yO_z$$

wherein x is from about 0.1 to about 2, y is from 0.3 to about 12, and z is from about 3 to 18 and (2) additionally containing free manganese oxide as a promoter in an amount from about 0.1 to about 10 weight percent based on the weight of the zinc ferrite composition.

4,058,578
PROCESS FOR THE MANUFACTURE OF PASTE-EXTRUDABLE POLYMERS OF TETRAFLUOROETHYLENE

Jürgen Kuhls, Burghausen, Salzach; Thomas Martini, Neuenhain, Taunus, and Alfred Steininger, Burgkirchen Alz, all of Germany, assignors to Hoechst Aktiengesellschaft, Germany

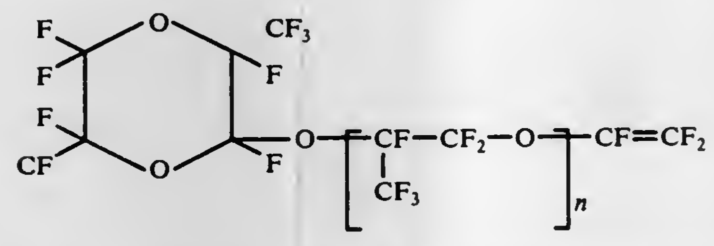
Filed Sept. 29, 1976, Ser. No. 727,643

Claims priority, application Germany, Oct. 2, 1975, 2544040

Int. Cl.[2] C08F *214/26;* C08L *27/18*

U.S. Cl. 260—884 13 Claims

1. In a process for the manufacture of modified tetrafluoroethylene disperion polymers by polymerizing tetrafluoroethylene, subsequently coagulating and drying of the polymer obtained, the improvement comprises carryng out the polymerization of tetrafluoroethylene in the presence of a modifying agent comprising from 0.0005 to 1.5% by weight, calculated on the tetrafluoroethylene used, of a perfluorinated vinyl ether of the formula



(I)

in which n stands for zero to 4, or of a mixture of any two or more of said perfluorinated vinyl ethers.

4,058,579
PROCESS FOR PRODUCING AN IMPROVED BORON NITRIDE CRUCIBLE

Robert William Lashway, Middleburg Heights, Ohio, assignor to Union Carbide Corporation, New York, N.Y.

Division of Ser. No. 553,814, Feb. 27, 1975, Pat. No. 3,986,822. This application Feb. 5, 1976, Ser. No. 655,489

Int. Cl.[2] C23C *11/08*

U.S. Cl. 264—81 14 Claims

1. A process for producing a boron nitride crucible having a multi-walled structure comprising an outer wall and a thinner inner wall weakly bonded to the thicker outer wall, said process comprising: (1) reacting ammonia and a boron halide in vapor phase at a temperature of from about 1850° C. to about 2100° C. under a pressure no greater than about 1 mm. of mercury absolute to produce boron nitride, and depositing a first layer of said boron nitride upon a mandrel having the shape of the desired crucible; (2) interrupting the reaction between the ammonia and boron halide and the further deposition of boron nitride upon the mandrel; (3) lowering the temperature of the boron nitride layer to below 1750° C.; and (4) reacting additional ammonia and boron halide in vapor phase at a temperature of from about 1850° C. to about 2100° C. under a pressure no greater than about 1 mm. of mercury absolute to produce additional boron nitride and depositing a second layer of said boron nitride upon the first boron nitride layer, said second layer of boron nitride having a thickness greater than that of the inner first layer.

4,058,580
PROCESS FOR MAKING A REINFORCED BOARD FROM LIGNOCELLULOSIC PARTICLES

Robert D. Flanders, Rte. 2, Box 666 No. 42, Wilsonville, Oreg. 97070

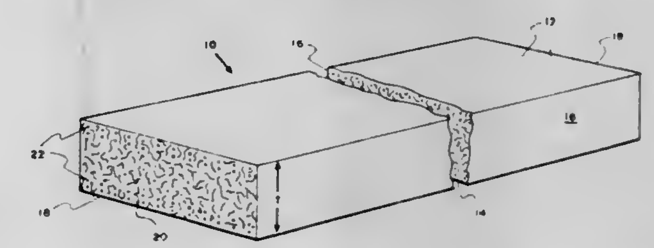
Filed Dec. 2, 1974, Ser. No. 528,705

Int. Cl.[2] B29J *5/00*

U.S. Cl. 264—113 5 Claims

1. A process for making a reinforced particle board comprising:

a. placing on a generally horizontal supporting surface a uniform mixture of lignocellulosic particles and a settable adhesive binder as a first incremental layer, together with a plurality of discontinuous first reinforcing filaments distributed uniformly throughout said mixture, said first reinforcing filaments having discontinuous lengths in the range of about ¼ to 1½ inch and having a tensile strength which exceeds the tensile strength of the mixture of said lignocellulosic particles and binder when the binder is set, the total weight of said lignocellulosic particles in said mixture being greater than the weight of said first reinforcing filaments in said mixture and said first filaments being distributed throughout said mixture in a random orientation so as to extend generally in all directions;
b. depositing atop said first incremental layer a plurality of second reinforcing filaments, each having a continuous length greater than any of said first reinforcing filaments and having a tensile strength which exceeds the tensile strength of the mixture of said lignocellulosic particles and binder when the binder is set;
c. orienting said plurality of second reinforcing filaments substantially straightly and in a predetermined, generally horizontal direction in side-by-side parallel relation to and transversely spaced from one another;



d. depositing atop said plurality of second reinforcing filaments a second incremental layer of said mixture and randomly oriented first reinforcing filaments having the same composition as said first incremental layer;
e. depositing atop said second incremental layer a further plurality of said second reinforcing filaments;
f. orienting said further plurality of second reinforcing filaments substantially straightly and in a predetermined, generally horizontal direction in side-by-side parallel relation to and transversely spaced from one another;
g. depositing atop said further plurality of said second reinforcing filaments a third incremental layer of said mixture and randomly oriented first reinforcing filaments having the same composition as said first incremental layer;
h. compressing said layers to a predetermined thickness by applying pressure thereto in a generally vertical direction; and
i. while said layers are so compressed, setting the binder therein to bond said lignocellulosic particles to one another and to said randomly oriented first filaments and to said second reinforcing filaments substantially throughout the continuous length of said second filaments so as to form said reinforced board.

4,058,581
METHOD OF MAKING THERMOPLASTIC RESIN COMPOSITE

Im K. Park, Summit, N.J., assignor to Exxon Research & Engineering Co., Linden, N.J.

Continuation of Ser. No. 274,497, July 24, 1972, abandoned. This application Oct. 28, 1976, Ser. No. 736,331

Int. Cl.[2] B29D *3/02*

U.S. Cl. 264—136 8 Claims

1. A method for producing a fiber reinforced thermoplastic resin stock having about 10 to 50% by volume of fiber therein comprising continuously passing graphite fiber material as a multiplicity of individual strands through a solution of thermoplastic resin to coat the fiber with resin solution, said resin being an acrylic acid grafted polyolefin and said solution having a viscosity in the range of about 2 to 4000 centipoise while being maintained at a temperature in the range of about 80° C to 145° C; treating the solution coated fibers to remove the

solvent; consolidating said coated fibers into a predetermined cross-sectional shape and size while heating the coated fibers to a temperature sufficient to melt the resin; and, thereafter cooling the shaped resin coated fibers under confining pressures to a temperature below the melting point of the resin whereby a continuous fiber reinforced thermoplastic stock material is obtained having low fiber loadings between about 10 to 50% by volume.

4,058,582

SIMULTANEOUS STRETCHING OF MULTIPLE PLIES OF POLYMERIC FILM

Harvey S. Bierenbaum, Berkley Heights; John A. Penoyer, North Plainfield, and Daniel Zimmerman, East Brunswick, all of N.J., assignors to Celanese Corporation, New York, N.Y.

Filed May 30, 1973, Ser. No. 365,366

Int. Cl.[2] B29D *7/24, 27/00*

U.S. Cl. 264—154 **2 Claims**

1. In a process for forming microporous film in which an elastic, non-open celled film is cold-stretched in the longitudinal direction, said cold-stretched film thereafter hot-stretched in the longitudinal direction to form said microporous film, the improvement which comprises cold-stretching more than two plies of said non-open celled film and hot-stretching more than two plies of said cold-stretched film simultaneously.

2. In a process for forming polymeric film in which film is stretched to produce a final stretched film, the improvement which comprises stretching more than two plies of said film simultaneously by holding the edges of said film plies and moving said edges outwardly whereby said film plies are stretched simultaneously in the transverse direction.

4,058,583

GRAFTING OF SILANE ON THERMOPLASTICS OR ELASTOMERS FOR PURPOSES OF CROSS-LINKING

Fritz Glander, Isernhagen, and Hermann Uwe Voigt, Langenhagen, both of Germany, assignors to Kabel-und Metallwerke Gutehoffnungshutte AG., Vahrenwalder, Germany

Division of Ser. No. 557,108, March 10, 1975. This application Aug. 18, 1975, Ser. No. 605,747

Int. Cl.[2] C08F *255/02, 291/02;* **C08G** *77/42*

U.S. Cl. 264—176 R **12 Claims**

1. In a method for providing a sheathing of cross-linking thermoplastic or elastomeric material, wherein the powdery or granular material is mixed with silane to be diffused into the material under conditions of obtaining a homogenic mixture and wherein the silane is grafted upon the molecules of the material, the improvement of adding water-containing additives to the mixture, and extruding a sheath, the water being released at an elevated temperature pursuant to the extrusion to cause cross-linking of the silane grafted material in the presence of moisture.

4,058,584

METHOD FOR MANUFACTURING LUMINOUS HOLLOW BODIES FOR SIGNS OR THE LIKE

Enrique Ubach Aloy, Avenida Madrid, 12; Pedro Ubach Aloy, Calle La Gleva, 42, both of Barcelona, and José Maria Genovart Aguiló, Calle Victoria, 211, San Baudilio De Llobregat, all of Spain

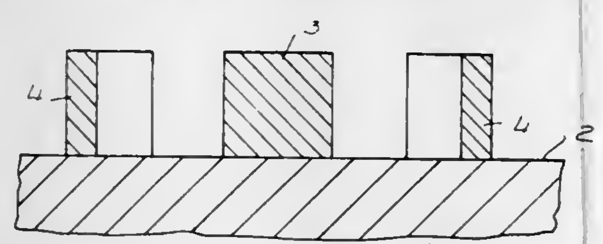
Filed Apr. 1, 1975, Ser. No. 563,959

Claims priority, application Spain, Apr. 5, 1974, 425384

Int. Cl.[2] B29H *9/00*

U.S. Cl. 264—250 **3 Claims**

1. In a method for manufacturing hollow bodies adapted to be used for luminous signs, comprising the steps of first molding an endless wall of predetermined configuration, so that said endless wall will form an open-ended endless side wall of the final hollow body, and then molding at only one end of the space confined within said endless wall an end wall of the hollow body joined to said endless wall along an end region thereof, so that the thus-molded end wall together with the thus-molded endless side wall will define a space adapted to receive light which can travel through said end and side walls of the hollow body to form at least part of a luminous sign, said molding of said endless side wall of the hollow body comprising the steps of situating around an inner mold member on an upper substantially flat surface of a support a plurality of layers of thermosetting synthetic resin which rest at bottom side edges thereof on said upper surface of said support during an interval when said layers of thermosetting synthetic resin are still hardening but have not fully set and are self-sustaining while still being soft enough to be molded to a desired configuration with each of the layers having at least one desired characteristic of strength, light-transmission, and the like which are to be included in the final hollow body, and each layer having a width corresponding to the desired depth of the luminous hollow body which is to be manufactured, and placing on said upper surface of said support around said layers a plurality of sections of an outer mold member which when joined together will surround the inner mold member while defining therewith a cavity of predetermined configuration and thickness corresponding to the desired configuration and thickness of the endless side wall of the hollow body, and then bringing said



sections of said outer mold member together on said upper surface of said support for pressing the innermost of said layers against the exterior surface of said inner mold member fand the outermost of said layers against the inner surface of the outer mold member formed by bringing the sections thereof together, while said layers will engage each other and fuse together during continued setting of said layers, and maintaining said outer mold member with its sections joined to each other in engagement with said outermost layer while said innermost layer remains in engagement with said inner mold member until a sufficient time has elapsed for said layers to have hardened and set sufficiently to remain in the configuration desired for the final hollow body at the side wall thereof, and thereafter removing the outer and inner mold members from the layers so that the side wall of the hollow body produced thereby will have a precisely determined thickness as well as a precisely determined configuration at its inner surface as well as its outer surface and a texture at its inner and outer surfaces determined by the characteristics of the outer surface of the inner mold member and the inner surface of the outer mold member, respectively.

4,058,585

SOLVENT EXTRACTION OF METALS FROM ACIDIC SOLUTIONS WITH QUATERNARY AMMONIUM SALTS OF HYDROGEN ION EXCHANGE AGENTS

Kenneth D. MacKay, Circle Pines, and Edgar R. Rogier, Minnetonka, both of Minn., assignors to General Mills Chemicals, Inc., Minneapolis, Minn.

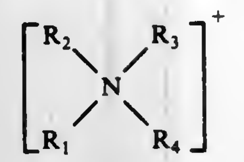
Filed Nov. 10, 1975, Ser. No. 630,600

Int. Cl.[2] C01G *3/00, 9/00, 51/00, 53/00*

U.S. Cl. 423—24 **14 Claims**

1. The process of extracting divalent metal values from an aqueous acidic solution thereof comprising contacting said solution with a solution of a quaternary ammonium salt of a hydrogen ion exchange agent in an essentially water-immiscible organic solvent to extract at least a portion of the said divalent metal values into the organic phase, separating the loaded organic phaase from the aqueous phase and stripping the divalent metal values from the loaded organic phase by contacting same with an aqueous acidic stripping medium, said

divalent metal values being capable of being extracted from an aqueous acidic solution thereof, said quaternary ammonium salt of the hydrogen ion exchange agent having the formula QL where Q is a quaternary ammonium cation and L is the deprotonated moiety or anion of the hydrogen ion exchange agent and said quaternary ammonium cation having the formula



where R_1 is a hydrocarbon radical of 6 to 24 carbon atoms and R_2, R_3 and R_4 are hydrocarbon radicals of 1 to 24 carbon atoms.

13. The process of claim 1 wherein the divalent metal values are selected from copper, nickel, cobalt and zinc.

4,058,586

FORMING AND CRYSTALLIZATION PROCESS FOR MOLECULAR SIEVE MANUFACTURE

Chang Whan Chi, Columbia; Gordon Herman Hoffman, Baltimore, and Emil Eichhorn, Timonium, all of Md., assignors to W. R. Grace & Co., New York, N.Y.

Filed Feb. 25, 1976, Ser. No. 661,457

Int. Cl.[2] C01B *33/28*

U.S. Cl. 423—118 **8 Claims**

1. In a process for preparing formed zeolite particles wherein a powdered zeolite is mixed with amounts of metakaolin, sodium hydroxide and water required to produce additional zeolite, and the resulting mixture is formed to obtain reactive zeolite containing particles which are subsequently reacted at elevated temperatures to convert the metakaolin to zeolite, the improvement which comprises:

a. heating the formed particles which contain about 30 to 45 percent by weight moisture at a temperature of about 200° to 700° F. for a period of 15 to 60 minutes to reduce the moisture content thereof to about 10 to 20 percent by weight and to simultaneously convert said metakaolin to zeolite; and

b. calcining said particles to a temperature of 400° to 1100° F. for 15 to 60 minutes.

4,058,587

PROCESS FOR REMOVING IMPURITIES FROM ACIDIC FLUID SOLUTIONS

Ernest William Nelson, 372 N. Algoma St., Postal Station (P), Thunder Bay, Ontario, Canada

Continuation-in-part of Ser. No. 363,611, May 24, 1973, abandoned, which is a continuation-in-part of Ser. No. 66,878, Aug. 25, 1970, abandoned. This application Dec. 18, 1975, Ser. No. 641,877

Int. Cl.[2] B01D *53/34*

U.S. Cl. 423—220 **17 Claims**

1. A process for removing impurities from an acidic fluid solution, the acidic solution containing as impurities at least one acidic component selected from a group consisting of carbon dioxide and sulfur dioxide, which comprises

forming an admixture of a serpentine material having the formula $Mg_6(Si_4O_{10})(OH)_8$ and water, the serpentine material being a heterogeneous mixture comprising primarily a magnesium hydroxide and silica, and

mixing the acidic fluid solution with the admixture to produce a solid consisting predominately of at least one salt selected from a group consisting of magnesium sulfite and magnesium carbonate and silica and substantially pure water.

4,058,588

PROCESS FOR RECOVERING BORIC ACID

Clifford Gordon Brown, Fetcham, and Brian Robert Sanderson, New Malden, both of England, assignors to United States Borax & Chemical Corporation, Los Angeles, Calif.

Filed Oct. 23, 1975, Ser. No. 625,145

Claims priority, application United Kingdom, Oct. 23, 1974, 45832/74

Int. Cl.[2] C01B *35/10*

U.S. Cl. 423—283 **6 Claims**

1. The process for recovering boric acid from an acidic sodium borate-mineral acid reaction product mixture which comprises extracting said product mixture with a monohydric alcohol-diluent solution at a temperature of about 50° to 80° C., stripping the alcohol-diluent solution with recycled hot dilute boric acid solution, cooling to crystallize said boric acid, and recovering said boric acid from said cooled solution, in which said monohydric alcohol is an aliphatic alcohol containing 6 to about 12 carbon atoms and said diluent is selected from C_{12-17} hydrocarbons, C_{9-11} alcohols and water-immiscible glycol ethers of the formula $XO(CH_2)_nOY$ wherein n is 2 or 3 and X and Y are each selected from hydrogen, lower alkyl and monocyclic aryl.

4,058,589

TREATMENT OF AMMONIA SYNTHESIS PURGE GAS

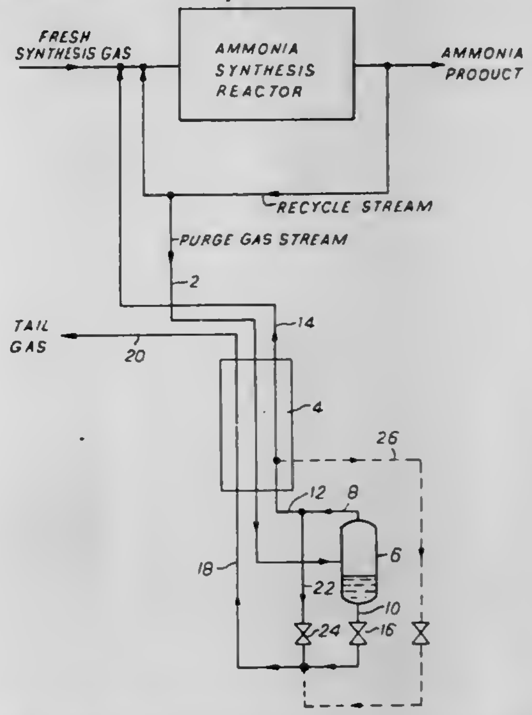
Alan Alfred Haslam, Stockport, England, assignor to Petrocarbon Developments Limited, Manchester, England

Filed Jan. 30, 1976, Ser. No. 653,830

Claims priority, application United Kingdom, Feb. 6, 1975, 5111/75

Int. Cl.[2] C01C *1/04*

U.S. Cl. 423—359 **3 Claims**



1. A method of synthesizing ammonia, comprising the steps of:

i. reacting a synthesis gas comprising nitrogen and hydrogen, and also including methane, argon and helium as contaminants, at superatmospheric pressure in an ammonia synthesis reaction zone and recycling unreacted gas to the reaction zone;

ii. withdrawing a purge gas stream at superatmospheric pressure from the gas being recycled;

iii. removing methane and argon from the purge gas stream by cooling the purge gas stream to a sub-ambient temperature to partially condense it and form a condensate phase containing methane and argon and a hydrogen-enriched gaseous phase containing helium and separating the phases into a gaseous hydrogen-enriched stream containing helium and at least one condensate stream containing methane and argon, and recycling said gaseous hydrogen-enriched stream to said reaction zone;

iv. providing refrigeration for said cooling and partial condensation of the purge gas stream by expanding at least a

part of said at least one condensate stream and evaporating the expanded condensate in indirect heat exchange with the purge gas stream, and then withdrawing the evaporated expanded condensate as tail gas;

v. withdrawing a single bleed stream from the recycling hydrogen enriched stream;

vi. maintaining the concentration of methane, argon and helium in the ammonia synthesis reaction zone substantially constant by withdrawing helium, argon and methane in said bleed stream and said at least one condensate stream at substantially the same rate as they are introduced into the ammonia synthesis reaction zone with fresh synthesis gas; and

vii. recovering the tail gas at a pressure above **18** psig by withdrawing said bleed stream from said hydrogen enriched stream at a temperature not exceeding 30° C above said subambient temperature, expanding at least a part of said bleed stream and injecting said expanded part into said expanded condensate prior to evaporating the latter.

4,058,590

CARBON BLACK REACTOR WITH TURBOFAN

Theodore A. Ruble, Fort Worth, Tex., assignor to Sid Richardson Carbon & Gasoline Co., Forth Worth, Tex.

Filed Apr. 14, 1976, Ser. No. 676,688

Int. Cl.[2] C01B *31/02;* **C09C** *1/48;* **C01B** *49/00*

U.S. Cl. 423—449 **9 Claims**

1. An apparatus for the production of carbon black comprising:

a turbofan engine comprising,

a body,

a rotary compressor and a gas turbine rotatably mounted in said housing and interconnected whereby rotation of said turbine drives said compressor.

means for supplying air to said compressor,

a combustor,

means for conducting compressed air from said compressor to said combustor,

means for supplying hydrocarbon fuel to said combustor for admixture with said compressed air,

means for conducting hot products for combustion from said combustor to said turbine for rotating said turbine to thereby drive said compressor;

an afterburner located downstream of said turbofan engine, axially aligned therewith, contiguous thereto and in open communication therewith for receiving the gases exhausted from said turbine,

said afterburner including means for supplying liquid fuel thereto for additional combustion with the gases exhausted from said turbine to thereby increase the temperature and reduce the free-oxygen content of said exhausted gases; and

a furnace-type carbon black reactor located downstream of said afterburner, axially aligned therewith, contiguous thereto and in open communication therewith for receiving the hot products of combustion from said afterburner,

said reactor including a reaction tunnel,

means for introducing hydrocarbon feedstock radially into said reactor tunnel,

means for quenching the reaction in said reaction tunnel; and

means for collecting the carbon black product.

4,058,591

PROCESS FOR PURIFYING WASTE WATER CONTAINING AMMONIUM SULFATE

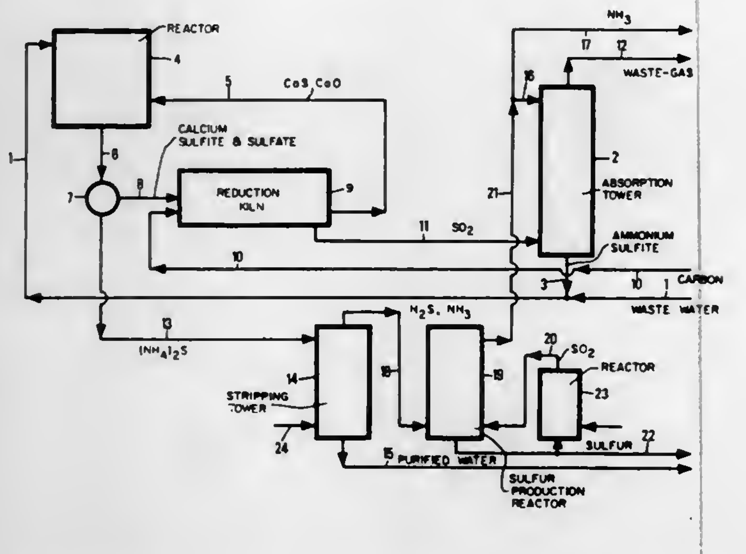
Christian Busson, Rueil-Malmaison; Jacques Alagy, Lyon, and Maurice Cessou, Communay, all of France, assignors to Institut Francais du Petrole, Rueil-Malmaison, France

Filed Aug. 26, 1975, Ser. No. 607,802

Claims priority, application France, Sept. 5, 1974, 74.30412

Int. Cl.[2] C01B *17/02;* **C02B** *1/34;* **C02C** *5/06*

U.S. Cl. 423—574 R **8 Claims**



1. A process for treating waste water containing ammonium sulfate to recover elemental sulfur, which comprises the steps of:

a. reacting said waste water with a mixture of calcium oxide and calcium sulfide and with recycled ammonium sulfite from step (f), the molar ratio CaS/CaO being at least 0.5:1 and the amounts of the reactants being sufficient to form simultaneously insoluble calcium sulfate, insoluble calcium sulfite, and ammonium sulfide dissolved in the aqueous phase and then separating the resulting mixture of insoluble calcium sulfate and calcium sulfite from the aqueous phase,

b. heating the mixture of calcium sulfite and calcium sulfate with carbon to the temperature of reduction of calcium sulfate to obtain a gas containing sulfur dioxide and a mixture of calcium oxide and calcium sulfide, and recycling said mixture to step (a),

c. stripping the aqueous phase obtained in step (a) to separate therefrom a gas containing hydrogen sulfide and ammonia, and discharging resultant residual aqueous phase,

d. reacting the gas separated in step (c) with sulfur dioxide, thereby producing sulfur and ammonia containing gas, and separating said sulfur,

e. dissolving at least a fraction of the ammonia containing gas recovered from step (d) with water together with the gas containing sulfur dioxide recovered from step (b), thereby forming ammonium sulfite,

f. recycling to step (a) at least a fraction of the ammonium sulfite recovered from step (e).

4,058,592

PREPARATION OF SUB-MICRON METAL OXIDE POWDERS FROM CHLORIDE-CONTAINING COMPOUNDS

Jean Marie Louis Joseph Quets, White Plains, N.Y., assignor to Union Carbide Corporation, New York, N.Y.

Filed June 30, 1976, Ser. No. 701,167

Int. Cl.[2] C01G *49/00, 23/00*

U.S. Cl. 423—594 **5 Claims**

1. A process for the preparation of sub-micron metal oxide powders which process comprises the steps of:

a. contacting a carbohydrate material with compounds of at least two metals selected from the group consisting of barium, titanium, iron and strontium, at least one of which compounds contains a chloride ion to form a mixture thereof,

b. charring said mixture,

c. igniting said mixture to produce fragile agglomerates of sub-micron particle size,

d. contacting the agglomerates with an aqueous solution of a soluble ammonium compound to form ammonium chloride,

e. recovering the agglomerates from solution and washing to remove any ammonium chloride,

f. calcining the agglomerates to convert said mixture to the metal oxide, and

g. comminuting the agglomerates to produce finely divided metal oxide powder having a mean particle size below 1 micron.

4,058,593

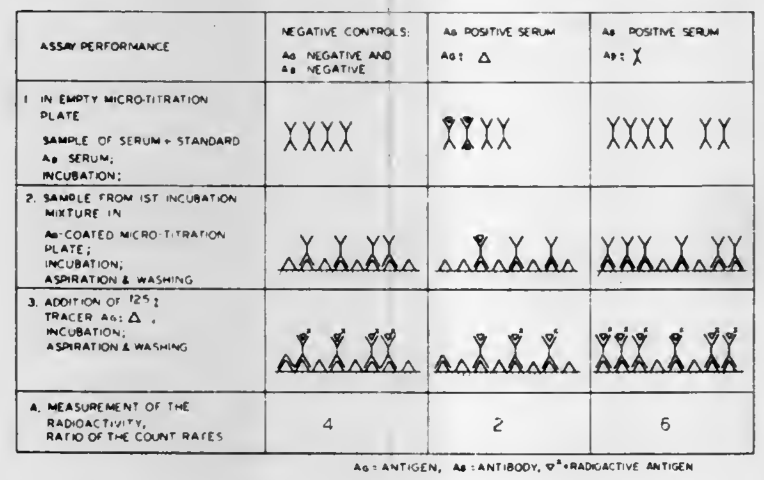
TECHNETIUM-LABELED BONE SCANNING AGENTS

James C. Nora, Forest Lake, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation of Ser. No. 417,612, Jan. 28, 1976, abandoned. This application Jan. 28, 1976, Ser. No. 653,077

Int. Cl.[2] G01N *23/00;* **G21H** *5/02*

U.S. Cl. 424—1 **4 Claims**



1. A composition for use as a bone-specific radiodiagnostic agent which comprises: (1) SnF_2, (2) $MSnF_3$ or (3) MSn_2F_5, where M is either Na or K, containing from about .01 to 500 mCi of Tc-99m for each milligram of metal salt, characterized by a stable binding of the Tc-99m to the salt and distinguishable from its precursors by the following Rf values determined by thin layer chromatography on a 100 micron-thick, unactivated, neutral pH silica gel chromatogram sheet, wherein the silica gel of said chromatogram sheet is bound together with polyvinyl alcohol:

Rf=0, when said chromatogram is developed with anhydrous acetone;

Rf=0.6–0.8, when developed with anhydrous acetone containing concentrated HCl in a volume to volume ratio of 100:0.5.

4,058,594

IMMUNO-SUPPRESSIVE AGENTS

John Williams, 30 Hornby Drive, Nantwich, Cheshire, CW5 6JP, England

Division of Ser. No. 535,143, Dec. 20, 1974, Pat. No. 3,993,775. This application Aug. 10, 1976, Ser. No. 713,242

Claims priority, application United Kingdom, Apr. 25, 1974, 18226/74

Int. Cl.[2] A61K *9/40, 35/78, 31/23, 31/20*

U.S. Cl. 424—37 **8 Claims**

1. A method of providing an immuno-suppressive effect in a patient suffering from multiple sclerosis which comprises administering to said patient a daily dosage of from 25mg to 3g of at least one compound selected from the group consisting of γ-linolenic acid, dihomo-γ-linolenic acid, C_1–C_4 alkyl esters of γ-linolenic and dihomo-γ-linolenic acids and glyceride esters of γ-linolenic and dihomo-γ-linolenic acids.

4. A method as claimed in claim **3** wherein the oil is microencapsulated within the capsules.

4,058,595

STABILIZED TOOTHPASTES CONTAINING AN ENZYME

Daniel Colodney, Green Brook, N.J., assignor to Colgate-Palmolive Company, New York, N.Y.

Continuation of Ser. No. 188,993, Oct. 13, 1971, abandoned. This application Mar. 21, 1974, Ser. No. 453,360

Int. Cl.[2] A61K *7/38*

U.S. Cl. 424—50 **9 Claims**

1. A toothpaste formulation consisting of essentially of about 0.2 to 10 percent by weight of a gelling agent and about 20 to 75 percent by weight of a liquid vehicle proportioned to form a creamy mass, about 0.5 to 5 percent by weight of a water-soluble organic detergent, about 20 to 75 percent by weight of a dentally acceptable polishing agent, at least about 0.05 percent by weight of the neutral protease of Bacillus subtilis, and a stabilizer for retention of protease activity consisting essentially of about 0.1 to 0.5 percent by weight of a protein having an average molecular weight ranging from about 10,000 up to about 300,000 selected from the group consisting of partially hydrolized edible proteins and edible proteins and about 0.1 to 1.0 percent by weight of a group IIA metal ion salt.

4,058,596

STABILIZED TOOTHPASTES CONTAINING AN ENZYME

Julius Harvey Nachtigal, Elizabeth, N.J., assignor to Colgate-Palmolive Company, New York, N.Y.

Continuation of Ser. No. 188,769, Oct. 13, 1971, abandoned. This application Nov. 23, 1973, Ser. No. 418,599

Int. Cl.[2] A61K *7/28*

U.S. Cl. 424—50 **7 Claims**

1. A toothpaste formulation consisting essentially of about 0.2 to 10 percent by weight of a gelling agent and about 20 to 75 percent by weight of liquid vehicle proportioned to form a creamy mass, about 0.05 to 5 percent by weight of a water-soluble organic detergent, about 20 to 75 percent by weight of a dentally acceptable substantially water-insoluble polishing agent, at least about 0.05 percent by weight of the neutral protease of Bacillus subtilis and a stabilizer for retention of protease activity consisting essentially of about 0.1 to 0.5 percent by weight of a protein having an average molecular weight ranging from about 10,000 up to about 300,000 selected from the group consisting of partially hydrolyzed edible proteins and edible proteins.

4,058,597

ALUMINIUM SALTS OF BETAINE CHLORIDE AND COMPOSITIONS CONTAINING THE SAME

André Henri Passedouet, Maisons-Laffite, and Robert Pipon, Melle, both of France, assignors to Rhone-Poulenc Industries, Paris, France

Filed Mar. 9, 1976, Ser. No. 665,242

Claims priority, application France, Mar. 11, 1975, 75.07555

Int. Cl.[2] A61K *7/38;* **C07F** *5/06*

U.S. Cl. 424—68 **6 Claims**

1. An aluminium salt of the formula:

$$\left[(CH_3)_3\underset{Cl^{\ominus}}{\overset{\oplus}{N}}-CH_2-COO\right]_{a} Al_{b}(OH)_{c}$$

wherein *a* is an integer from 1 through 4, *b* is an integer from 1 through 5 and *c* is an integer from 1 through 13, the numbers represented by the indices *a, b* and *c* being connected by the relationships $3b = a + c$ and the ratio *b/a* is equal to or greater than 1 and less than or equal to 2.5.

4,058,598

CYTOMEGALOVIRUS ATTENUATION METHOD AND VACCINE

Harold Stern, St. Georges Hospital, University of London, London, S.W.1, England, and Stephen Dyonis Elek, Av. de Cour 155, Lausanne, Switzerland (1007)

Filed Dec. 17, 1974, Ser. No. 533,502

Claims priority, application United Kingdom, Oct. 18, 1974, 45203/74

Int. Cl.^{2} A61K *39/12;* **C12K** *7/00*

U.S. Cl. 424—89 **16 Claims**

1. A method of preparing an attenuated strain of cytomegalovirus comprising serially passaging at least 40 times a cytomegalovirus isolate in susceptible human fibroblast cell cultures to obtain a virus strain which stimulates the production of complement fixing and neutralising antibodies in susceptible humans, when tested about 10 weeks after the subcutaneous administration of 10^4 T.C.D.$_{50}$ units of the strain, without any significant side effects lasting longer than 1 to 2 weeks, or detectable excretions of the virus from the test subjects.

4,058,599

ETHYLENEIMINE INACTIVATED ORGANISMS

Kurt Bauer; Günther Wittman; Manfred Mussgay, all of Tuebingen; Eckart Irion, Wuppertal, and Horst Geilhausen, Bensberg, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

Continuation-in-part of Ser. No. 444,483, Feb. 21, 1974, abandoned. This application Sept. 26, 1975, Ser. No. 617,037

Claims priority, application Germany, Feb. 24, 1973, 2309329

Int. Cl.^{2} A61K *39/02*

U.S. Cl. 424—92 **22 Claims**

1. A bacteria suspension to which ethyleneimine has been added such that the concentration of ethyleneimine is 0.005 to 2% V/V, the residual unused ethyleneimine thereafter being destroyed, whereby the bacteria are inactivated without impairment to their antigenicity.

4,058,600

FUNGICIDAL TREATMENT AND COMPOSITION

Jean-Claude Debourge, Courbevoie, and Martine Trochme, Lyon, both of France, assignors to Philagro S.A., France

Filed Apr. 28, 1976, Ser. No. 681,116

Int. Cl.^{2} A01N *11/00*

U.S. Cl. 424—128 **16 Claims**

1. A fungicidal composition for use in controlling fungus disease in plants, containing a fungicidally effective amount of hypophophorous acid or its mineral salts in an agriculturally acceptable vehicle suitable for topical application.

4,058,601

METHOD FOR TREATING ALCOHOLISM

Shun-ichi Hata, Yokohama; Koji Mizuno, Tokorozawa; Yasuho Nishii, Niiza; Etsuko Mitsuishi, Tokyo, and Motoharu Shiba, Ohmiya, all of Japan, assignors to Chugai Seiyaku Kabushiki Kaisha, Tokyo, Japan

Filed July 1, 1975, Ser. No. 592,341

Claims priority, application Japan, Nov. 7, 1974, 49-78732

Int. Cl.^{2} A61K *31/70*

U.S. Cl. 424—180 **16 Claims**

1. A method for reducing the alcohol content or slowing the rate of increase thereof in the blood and inhibiting the accumulation of neutral lipid in the liver of human beings, which comprises administering to human beings, orally or parenterally, a pharmaceutical composition comprising an effective amount of a uridine diphosphate as an effective ingredient and a pharmaceutically acceptable carrier.

4,058,602

SYNTHESIS, STRUCTURE, AND ANTITUMOR ACTIVITY OF 5,6-DIHYDRO-5-AZACYTIDINE

John A. Beisler; Mohamed M. Abbasi, both of Bethesda, and John S. Driscoll, Rockville, all of Md., assignors to The United States of America as represented by the Department of Health, Education and Welfare, Washington, D.C.

Filed Aug. 9, 1976, Ser. No. 712,854

Int. Cl.^{2} A61K *31/34, 31/53;* **C07H** *19/12*

U.S. Cl. 424—180 **6 Claims**

4. A method of inhibiting leukemia L1210 and P388 in mice which comprises utilizing an effective amount of 5,6-dihydro-5-azacytidine as an injectable in a dosage regimen of 6 mg/kg – 600 mg/kg of body weight of the compound 5,6-dihydro-5-azacytidine and a non-toxic acid addition salt thereof wherein such salt is selected from a group consisting of non-toxic mineral acid salts and salts of organic acids selected from one member of a group consisting of maleate, tartrate, citrate, acetate, benzoate, and borate.

4,058,603

INSECTICIDAL AND ACARICIDAL O-ETHYL-O-[1,6-DIHYDRO-1-SUBSTITUTED-6-OXO-PYRIDAZIN(3)YL]-THIONOBENZENEPHOSPHONIC ACID ESTERS

Wolfgang Hofer; Fritz Maurer; Hans-Jochem Riebel, all of Wuppertal; Ingeborg Hammann, Cologne, and Wilhelm Stendel, Wuppertal, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

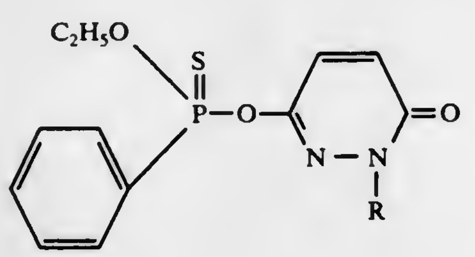
Filed June 24, 1976, Ser. No. 699,542

Claims priority, application Germany, July 12, 1975, 2531340

Int. Cl.^{2} A61K *31/50;* **C07F** *9/65;* **A01N** *9/36*

U.S. Cl. 424—200 **10 Claims**

1. An O-ethyl-O-[1,6-dihydro-1-substituted-6-oxo-pyridazin(3)yl]-thionobenzenephosphonic acid ester of the formula



in which

R is alkyl, hydroxyalkyl, halogenoalkyl, cyanoalkyl, carbalkoxyalkyl or carboalkyl, with 1 to 4 carbon atoms in each alkyl radical, phenyl or phenyl substituted by alkyl with 1 to 4 carbon atoms.

8. An insecticidal or acaricidal composition containing as active ingredient an insecticidally or acaricidally effective amount of a compound according to claim 1 in admixture with a conventional pesticide diluent.

4,058,604

USE OF OXIME-ETHERS AS A SYNERGISTICALLY ACTING ADDITIVE TO INSECTICIDALLY AND/OR ACARICIDALLY ACTIVE SUBSTANCES

Henry Martin, Basel, Switzerland; Georg Pissiotas, Loerrach, Germany, and Volker Dittrich, Basel, Switzerland, assignors to Ciba-Geigy AG, Basel, Switzerland

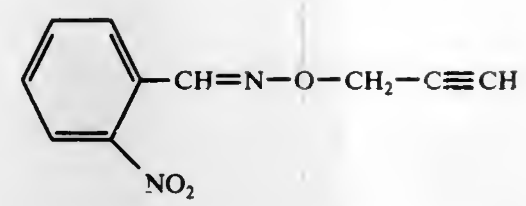
Division of Ser. No. 24,890, April 1, 1970, Pat. No. 3,980,799. This application June 18, 1976, Ser. No. 697,500

Claims priority, application Switzerland, Apr. 14, 1969, 5613/69

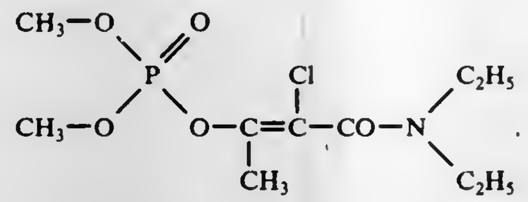
Int. Cl.^{2} A01N *9/02, 9/20, 9/36*

U.S. Cl. 424—211 **3 Claims**

1. An insecticidal and acaricidal composition which comprises substantially equal amounts of (1) the oxime ether of the formula



and (2) the phosphate derivative of the formula



4,058,605

INSECTICIDES FROM DIMETHYLMUCONIC ACID

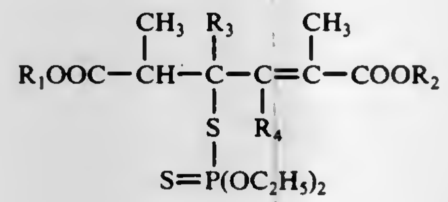
Richard D. Cassar, West Chester, Pa., assignor to Sun Ventures, Inc., St. Davids, Pa.

Filed June 11, 1975, Ser. No. 586,101

Int. Cl.^{2} A01N *9/36;* **C07F** *9/02*

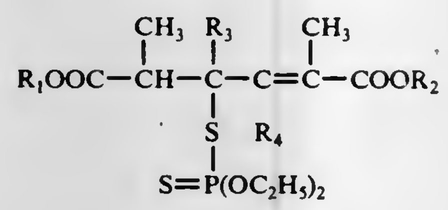
U.S. Cl. 424—212 **6 Claims**

1. A compound having the formula:



wherein R_1 and R_2 are methyl, or ethyl, and may be the same or different, or one of R_1 and R_2 may be hydrogen, and R_3 and R_4 are methyl or hydrogen, and may be the same or different.

4. An insecticidal composition comprising a minor amount of an insecticidal compound having the formula:



wherein R_1 and R_2 are methyl, or ethyl, and may be the same or different, or one of R_1 and R_2 may be hydrogen, and R_3 and R_4 are methyl or hydrogen, and may be the same or different, and a major amount of a suitable carrier.

4,058,606

METHOD OF CONTROLLING INSECTS WITH O,O-DIALKYLPHOSPHONIC ACID ESTERS AND THE O,O-DIALKYLPHOSPHONIC ACID ESTERS

Karl Kiehs, Lampertheim; Heinrich Adolphi, Limburgerhof; Rolf Huber, Ludwigshafen, and Annegrit Baumann, Mannheim, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

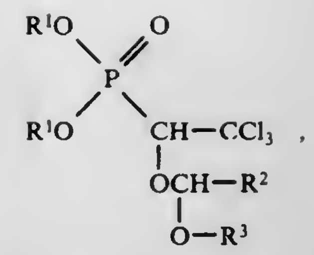
Filed Feb. 26, 1976, Ser. No. 661,797

Claims priority, application Germany, Mar. 25, 1975, 2513126

Int. Cl.^{2} A01N *9/36;* **C07F** *9/32*

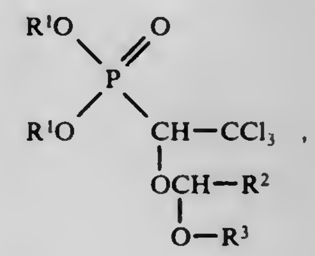
U.S. Cl. 424—217 **10 Claims**

1. A method of combatting insects wherein the insects are treated with a phosphonic acid ester derivative of the formula



wherein R^1 denotes alkyl of from 1 to 3 carbon atoms, R^2 denotes alkyl of from 1 to 3 carbon atoms, R^3 denotes alkyl of from 1 to 4 carbon atoms, phenyl, or haloalkyl of a maximum of 4 carbon atoms.

5. A phosphonic acid ester derivative of the formula



where R^1 denotes alkyl of from 1 to 3 carbon atoms, R^2 denotes alkyl of from 1 to 3 carbon atoms, R^3 denotes alkyl of from 1 to 4 carbon atoms, phenyl, or haloalkyl of a maximum of 4 carbon atoms.

4,058,607

INSECTICIDE EVAPORATOR COMPRISING A STABILIZER

Claude Hennart, Aubervilliers, and Marcel Louis Dulat, Poitiers, both of France, assignors to Airwick Industries, Inc., Carlstadt, N.J.

Continuation-in-part of Ser. No. 380,129, July 17, 1973, Pat. No. 3,962,415, which is a continuation-in-part of Ser. No. 180,507, Sept. 14, 1971, Pat. No. 3,852,439. This application Mar. 30, 1976, Ser. No. 671,982

Int. Cl.^{2} A01N *9/36, 9/28, 9/20*

U.S. Cl. 424—219 **9 Claims**

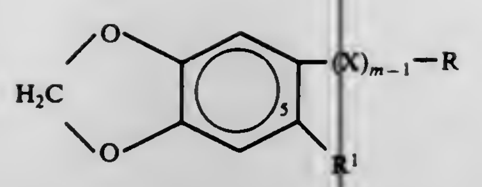
1. An insecticide evaporator comprising:

I. a solid or liquid insecticidal composition containing

A. an insecticidally effective amount of insecticidal phosphate selected from the group consisting of
2,2-dichlorovinyl dimethyl phosphate
2,2-dichlorovinyl diethyl phosphate
2,2-dichlorovinyl dipropyl phosphate
2,2-dibromovinyl dimethyl phosphate
2,2-dibromovinyl diethyl phosphate
2,2-dibromovinyl dipropyl phosphate
2-bromo-2-chlorovinyl dimethyl phosphate
2-bromo-2-chlorovinyl diethyl phosphate
2,2-dichlorovinyl ethyl methyl phosphate
2,2-dichloro-1-methyl-vinyl dimethyl phosphate and
2,2-dichloro-1-methyl-vinyl diethyl phosphate,

wherein on contact with molecules of water at least partial decomposition of the ester takes place by protonization, said vinyl phosphate being or not being admixed with a solid or liquid solvent,

B. about 0.1 to 10%, based on the weight of said volatile phosphate, of a 1,3-benzodioxole capable of stabilizing said phosphate against decomposition by protonization, said benzodioxole having no action as a toxicity synergist for the insecticidal phosphate in said proportions, and selected from the group consisting of at least one compound of the formula



(I)

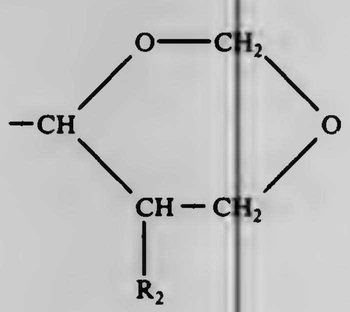
wherein m is 1 or 2, and X is an alkylene bridge of 1 to 2 or an alkylene bridge of 2 carbon atoms, and R′ is

a. hydrogen or
b. lower alkyl and

A. when m represents 1 in formula (I) R represents
a. hydrogen
b. lower alkyl
c. lower alkenyl
d. halogen of atomic number not exceeding 17
e. nitro
f. the group

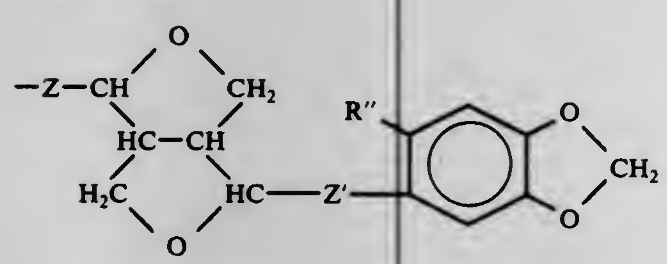
in which each of R_1, R_1' and R_1'', independently of the others, is the same or a different group selected from the group consisting of hydrogen, lower alkyl, lower alkoxy, chloro and bromo;

g. the group



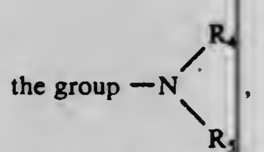
in which R_2 is hydrogen or lower alkyl, or

h. the group



in which Z and Z′ are each independently a C—C bond or an oxygen atom (—O—) and R″ is hydrogen, lower alkyl or lower alkoxy, and

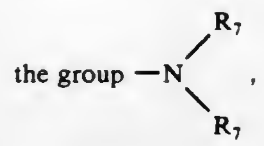
B. when m represents 1 or 2 in formula (I)
R represents
i. cyano
ii. the group



(ii)

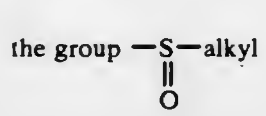
wherein R_4 is hydrogen or lower alkyl and R_5 is hydrogen or lower alkyl,

iii. the group —CO-R_6 in which R_6 is
a. hydrogen
b. —OM in which M is hydrogen or an equivalent metal cation or cation or a guaternary ammonium
c. lower alkyl or
d. lower alkoxy
e. phenyl, unsubstituted or substituted by one or more of the following substituents: lower alkyl, lower alkoxy, chloro, bromo;



(i)

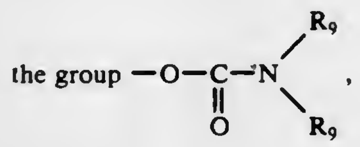
wherein each of R_7 and R_7' is independently selected from hydrogen or lower alkoxy



(iv)

in which the alkyl group has 1 to 8 carbon atoms

v. the group —O—R_8 in which R_8 is lower alkyl or oxa alkyl of at most 15 carbon atoms and 3 oxygen atoms in the chain,

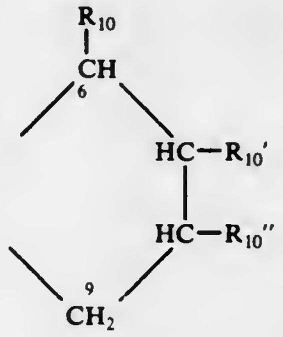


(vi)

in which each of R_9 and R_9'' independently is hydgrogen, lower alkyl or phenyl or

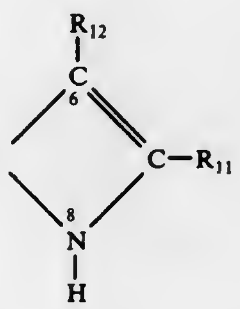
vii. nitro

C. when m represents 1 in formula (I):
R and R′ taken together represent one of the following divalent groups:
a. the group



in which each of R_{10}, $R_{10'}$, and R_{10}'' independently is hydrogen, lower alkyl, alkoxycarbonyl of 2 to 5 carbon atoms, or the group -COOM, M having the meaning given above, or

b. the group



in which R_{11} is
hydrogen, lower alkyl, lower alkoxy or pyrrolidino, and R_{12} represents
hydrogen or lower alkyl,

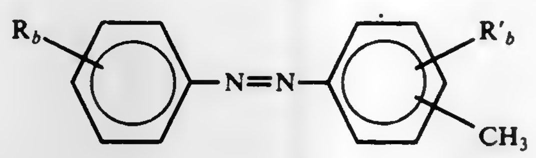
C. about 0.1 to 10% by weight based on the weight of said vinyl phosphate of at least one secondary agent for stabilizing said phosphate against decomposition by protonization selected from the group consisting of at least one diazene compound of the formula

1. monoazo compounds defined by the following formula:

$R_a - N = N - R'_a$

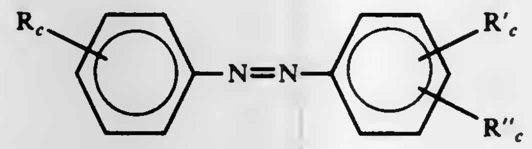
wherein R_a and R'_a are the same or different and each represents phenyl, naphthyl, pyridyl, quinolyl or diphenyl;

2. mono-azo compound defined by the following formula:



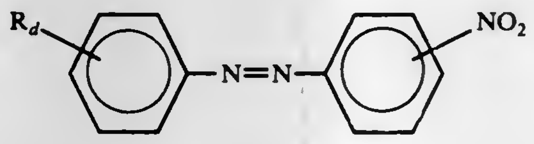
wherein R_b represents hydrogen or one or two methyl radicals, R'_b represents hydrogen or methyl,

3. mono-azo compound defined by the following formula:



wherein R_c represents hydrogen or one or two halogens, R'_c represents halogen, and R''_c represents hydrogen or halogen, halogen being chlorine, bromine, fluorine or iodine,

4. mono-azo compound defined by the following formula:



wherein R_d represents hydrogen or nitro,

5. mono-azo amino compound defined by the following formula or by the tautomeric formula of the corresponding imino-hydrazone compounds:

$R_e - N = N - R'_e$

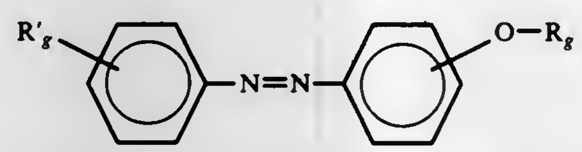
wherein R_e represents a phenyl or naphthyl substituted by one or two amino groups which are unsubstituted or substituted by acetyl or benzoyl, by one or two phenyl or benzyl or by alkyl having 1 to 4 carbon atoms, the radical R_e being unsubstituted or further substituted by one to three substituents selected from the group consisting of alkyl having 1 to 5 carbon atoms, chlorine, nitro, alkoxy having 1 to 3 carbon atoms, alkylsulfonyl having 1 to 4 carbon atoms and sulfamoyl, the latter being unsubstituted or N-substituted by one or two alkyl having 1 to 4 carbon atoms; R'_e represents phenyl, naphthyl or pyrazolyl, unsubstituted or substituted by one to three substituents selected from the group consisting of methoxy, ethoxy, propoxy, methyl, ethyl, phenyl, cyclohexyl, chlorine, nitro and amino, the latter being unsubstituted or substituted by one or two phenyl, benzyl or alkyl having 1 to 4 carbon atoms,

6. mono-azo compounds defined by the following formula or by the tautomeric formula of the corresponding hydrazonoquinone compounds:

$R_f - N = N - R'_f$

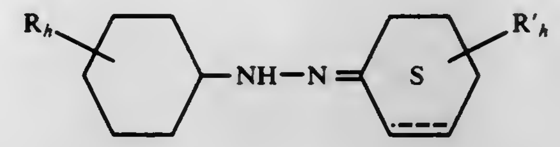
wherein R_f represents phenyl, naphthyl or quinolyl having one or two hydroxy groups and being unsubstituted or substituted by one to three further substituents selected from the group consisting of chlorine, alkyl having 1 to 5 carbon atoms, cyclohexyl, carbamoyl, carboxy and nitro; R'_f represents a phenyl, naphthyl or pyridyl, unsubstituted or substituted by one to four substituents selected from the group consisting of chlorine, cyclohexyl, methyl, hydroxy, nitro, methoxy, benzyloxy, dimethylamino and dimethylaminomethyl,

7. mono-azo compounds defined by the following formula:



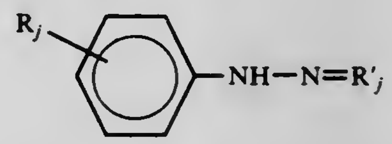
wherein R_g represents alkyl of 1 to 4 carbon atoms or alkanoyl of 2 to 18 carbon atoms, R'_g represents hydrogen or alkoxy of 1 to 4 carbon atoms,

8. phenylhydrazone compound defined by the following formula:



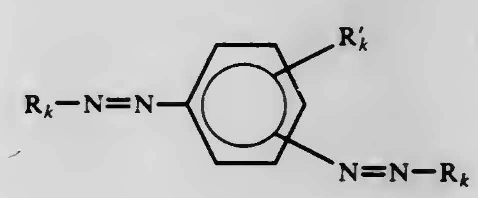
wherein R_h represents hydrogen or one or two substituents selected from the group consisting of chlorine and nitro; R'_h represents hydrogen or one to three alkyl each of 1 to 4 carbon atoms; the dotted line represents an optional second bond,

9. phenylhydrazone compounds defined by the following formula or by the tautomeric formula of the corresponding hydroxyazo compounds:



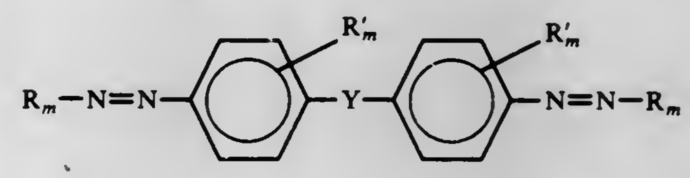
wherein R_j represents one to three substituents selected from the group consisting of alkyl having 1 to 5 carbon atoms, chlorine, nitro, hydroxy, carboxy, sulfo and methylsulfonyl; R'_j represents a 2-indolinon-3-ylidene or a 3,4-dihydro-3-pyrazolon-4-ylidene radical, unsubstituted or substituted by methyl, phenyl, chlorophenyl or sulfophenyl,

10. symmetric compounds defined by the following formula or by the tautomeric formula of the corresponding hydrazonoquinone or iminohydrazone compounds when the disazo compound is described as having hydroxy or amino groups;



wherein R_k represents phenyl unsubstituted or substituted by amino or one or two substituents which are hydroxy or methyl; R'_k represents hydrogen or methyl,

11. symmetric compounds defined by the following formula or by the tautomeric formula of the corresponding hydrazonoquinone or imminohydrazone compounds:



wherein Y represents a direct bond or an oxygen atom or a —CH=CH— group or —CH_2— group or a —CHR″$_m$— group in which R''_m is phenyl or chlorophenyl; R_m represents a phenyl, naphthyl or 5-pyrazolon-4-yl, which is unsubstituted or substituted by one or two substituents selected from the group consisting of methyl, phenyl, hydroxy, amino, sulfo and carboxy; R'_m represents one or two hydrogen or one or two methyl,

12. polyazo compounds defined by the following formula or by the tautomeric formula of the corresponding hydrazonoquinone or iminohydrazone compounds when the disazo compound is defined as having at least one hydroxy or amino group:

$R_n - N = N - R'_n - N = N - R''_n$

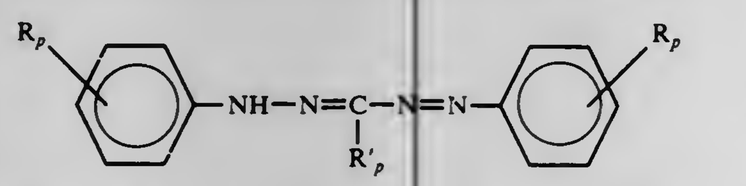
wherein R_n represents phenyl, diphenyl or naphthyl unsubstituted or substituted by one or two substituents selected from the group consisting of methyl, hydroxy, carboxy and sulfo; R'_n represents divalent phenylene or naphthylene, unsubstituted or substituted by one to three substituents selected from the group consisting of methyl, amino, hydroxy, nitro and sulfo; R''_n represents a phenyl, naphthyl, tetrahydronaphthyl or dihydro-pyrimidinyl, unsubstituted or substituted by one to four substituents selected from the group consisting of methyl, hydroxy, sulfo, carboxy and amino, the latter being unsubstituted or substituted by methyl or ethyl, and sulfamoyl unsubstituted or N-substituted by one or two alkyl having 1 to 4 carbon atoms,

13. tris-azo or tetra-azo compounds defined by the following formula or by the tautomeric formula of the corresponding hydrazonoquinone or iminohydrazone compounds when the compound is defined as having at least one hydroxy or amino:

$$R_o - N = N - R'_o - N = N - R''_o - N = N -$$
$$R'''_o$$

wherein R_o represents phenyl or naphthyl, unsubstituted or substituted by one to four substituents selected from the group consisting of hydroxy, carboxy, amino, sulfo, phenylazo and naphthylazo, the latter two being unsubstituted or substituted by one or two substitutents selected from the group consisting of hydroxy, amino, sulfo and nitro; R'_o represents a divalent, unsubstituted phenylene or diphenylene; R''_o represents a divalent phenylene or naphthylene which is unsubstituted or substituted by one to four substitutents selected from the group consisting of amino, hydroxy and sulfo; R'''_o represents a phenyl or naphthyl unsubstituted or substituted by one or two substitutents selected from the group consisting of amino, hydroxy, and sulfo,

14. formazyl compounds defined by the following formula:



wherein R_p represents hydrogen, methyl or ethyl; R'_p represents phenyl, benzyl, alkyl having 1 to 3 carbon atoms or alkenyl having 2 to 4 carbon atoms,

D. a salt of a compound as defined under (C) above having at least one group capable of salt formation or,

E. a metal complex of a compound or salt as defined under (C) or (D) bearing one or two groups capable of metal complex formation selected from the group consisting of hydroxy, carboxy, amino, mono (C_1–C_4 alkyl) amino, phenylamino, phenylsulphonamino and (C_1–C_4 alkyl) sulfonamido, said diazene being soluble in said composition,

II. a solid fibrous support absorbent for the composition (I) formed by a felt of wool, a cellulosic fiber material or a cardboard of glass fibers.

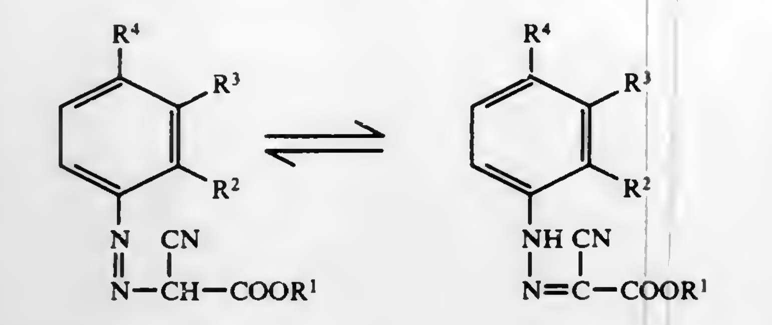
4,058,608

METHOD OF TREATING FUNGUS-INFECTED PLANTS WITH PHENYLAZOCYANOACETIC ESTER DERIVATIVES

Tibor Zsolnai, Debrecen; György Lugosi, Felsogod; István Szepesi, Debrecen; Maria Bakonyi, Budapest; István Rácz, Budapest, and Erzsébet Radvány nee Hegedüs, Budapest, all of Hungary, assignors to Chinoin Gyogyszer es Vegyeszeti Termekek Gyara RT, Budapest, Hungary

Filed Oct. 20, 1975, Ser. No. 624,774
Claims priority, application Hungary, Oct. 24, 1974, CI 1515
Int. Cl.² A01N *9/20*
U.S. Cl. 424—226 **2 Claims**

1. A method of combatting phytopathogenic fungi which comprises applying to a plant infected with the fungi an effective amount of a compound of the formula:



wherein

R^1 is $C_{1\ to\ 12}$ alkyl or chloroethyl

R^2 is hydrogen, halogen, C_1 to C_4 alkyl $C_{1\ to\ 4}$ alkoxy or nitro,

R^3 is hydrogen, halogen, $C_{1\ to\ 4}$ alkyl or nitro, and

R^4 is hydrogen, halogen, $C_{1\ to\ 4}$ alkyl or nitro, or an acid addition salt thereof effective against fungi.

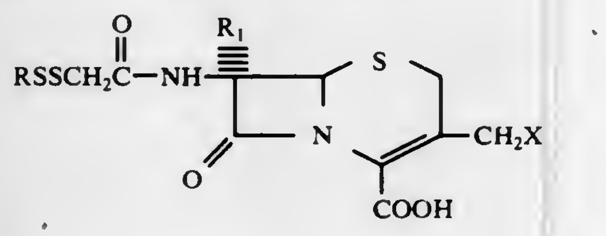
4,058,609

7-DITHIOACETAMIDO CEPHALOSPORINS

Robert M. DeMarinis, King of Prussia, Pa., assignor to Smith-Kline Corporation, Philadelphia, Pa.

Filed June 28, 1976, Ser. No. 700,290
Int. Cl.² A61K *31/545;* **C07D** *501/50, 501/28*
U.S. Cl. 424—246 **10 Claims**

1. A chemical compound of the formula:



or a non-toxic pharmaceutically acceptable salt thereof in which:

R is lower alkyl of from 1–4 carbon atoms, trichloromethyl, trifluoromethyl, cyanomethyl, or trifluoroethyl;

R_1 is hydrogen or methoxy;

X is SHet; and

Het is triazolyl, tetrazolyl, oxazolyl, oxadiazolyl, thiazolyl or thiadiazolyl unsubstituted or substituted with one or two substituents comprising lower alkyl of 1 to 4 carbons, mercapto, trifluoromethyl or $(CH_2)_nCOX$ where n is 0 to 5 and X is OH or NH_2.

7. A pharmaceutical composition in dosage unit form having antibacterial activity comprising a pharmaceutical carrier and a chemical compound as defined in claim 1.

9. The method of producing antibacterial activity which comprises administering parenterally to animals requiring said treatment an amount sufficient to produce said activity a chemical compound as defined in claim 1.

4,058,610

7-D-(α-ACYLAMINO-ARYLACETAMIDO)-CEPHALOSPORANIC ACID DERIVATIVES

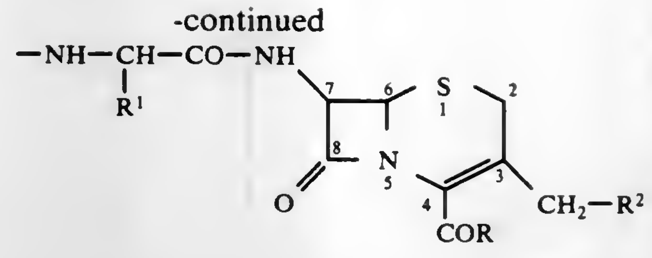
David A. Cox, and Braham Shroot, both of Canterbury, England, assignors to Pfizer Inc., N.Y.

Division of Ser. No. 635,297, Nov. 26, 1975, Pat. No. 4,006,230, which is a continuation-in-part of Ser. No. 504,381, Sept. 9, 1974, abandoned. This application Sept. 3, 1976, Ser. No. 720,101
Claims priority, application United Kingdom, Sept. 13, 1973, 43033/73
Int. Cl.² A61K *31/545;* **C07D** *501/36*
U.S. Cl. 424—246 **13 Claims**

1. A compound of the formula:

R^3—alk²—X—alk¹—CO—

-continued



wherein

R^1 is selected from the group consisting of phenyl and substituted phenyl having up to two substituents selected from the group consisting of halogen, hydroxyl, lower alkyl, lower alkoxy and trifluoromethyl;

R is hydroxyl; and R^2 is selected from the group consisting of 4,6-dimethylpyrimidin-2-ylthio, 4,5-dimethylthiazol-2-ylthio, 1,3,5-triazin-2-ylthio, pyrimidin-2-ylthio, 2-methyl-1,3,4-thiadiazol-5-ylthio and 1-substituted-1,2,3,4-tetrazol-5-ylthio group wherein the 1-substituent is selected from the group consisting of methyl, benzyl, phenyl, chlorophenyl and methoxyphenyl;

R^3 is selected from the group consisting of sulpho, $COR^{4'}$ wherein $R^{4'}$ is selected from the group consisting of hydrogen and R^4 wherein R^4 is selecgted from the group consisting of lower alkyl, 5-indanyl and substituted phenyl wherein the substituent is selected from the group consisting of lower alkyl and lower alkoxy; $CONR^5R^6$, wherein R^5 and R^6 are each lower alkyl;

X is selected from the group consisting of oxygen, sulphur, carbonyl, sulphinyl, sulphonyl, and $—NR^7—$, wherein R^7 is selected from the group consisting of hydrogen, lower alkyl, allyl and benzyl; and alk¹ and alk² each represent a divalent saturated aliphatic hydrocarbon group havng from 1 to 3 carbon atoms; and pharmaceutically acceptable salts thereof.

10. A pharmaceutical composition suitable for treating bacterial infections comprising a compound according to claim 1 and a pharmaceutically acceptable carrier.

13. A method of treating animals to cure them of diseases caused by gram-positive or gram-negative bacteria which comprises administering to the animal an antibacterially effective amount of a compound according to claim 1.

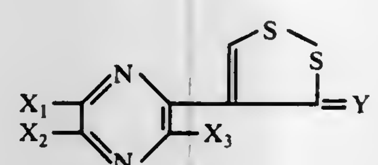
4,058,611

1,2-DITHIOLE DERIVATIVES

Michel Barreau; Claude Cotrel, both of Paris, and Claude Jeanmart, Brunoy, all of France, assignors to Rhone-Poulenc Industries, Paris, France

Filed June 17, 1976, Ser. No. 697,157
Claims priority, application France, June 20, 1975, 75.19408; Apr. 15, 1976, 76.11140
Int. Cl.² C07D *409/04;* **A61K** *31/495*
U.S. Cl. 424—250 **12 Claims**

1. A 1,2-dithiole derivative of the formula:



wherein X_1, X_2 and X_3 represent hydrogen, alkyl of 1 through 4 carbon atoms or alkoxy of 1 through 4 carbon atoms, at least one of X_1, X_2 and X_3 representing hydrogen, and Y represents sulphur or oxygen or the hydroxyimino radical.

12. A pharmaceutical composition useful in the treatment of bilharziasis and amoebiasis which comprises a therapeutically active amount of a 1,2-dithiole derivative as claimed in claim 1 in association with a significant amount of a compatible pharmaceutically acceptable carrier.

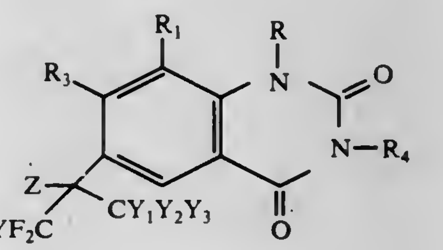
4,058,612

6-(POLYHALOISOPROPYL)QUINAZOLINE-2,4-DIONES

Bernard R. Neustadt, West Orange, N.J., assignor to Schering Corporation, Kenilworth, N.J.

Continuation-in-part of Ser. No. 528,603, Dec. 2, 1974, abandoned. This application May 20, 1976, Ser. No. 688,219
Claims priority, application Switzerland, Nov. 21, 1975, 15164/75
Int. Cl.² A61K *31/505;* **C07D** *239/96*
U.S. Cl. 424—251 **12 Claims**

1. A quinazoline-2,4-dione of the formula:



(I)

wherein

R_4 is a methyl, ethyl, 2-chloroethyl or 2-bromoethyl group;

R_1 and R_3 are independently hydrogen, fluorine, chlorine, bromine, lower alkyl or lower alkoxy;

Y, Y_1, Y_2 and Y_3 are independently hydrogen, fluorine or chlorine;

Z is hydrogen, chlorine, hydroxy or lower alkanoyloxy; and

R is hydrogen, or alkyl having 1 to 4 carbon atoms.

8. A pharmaceutical composition adopted to treat hypertension comprising an oral dosage of an antihypertensively effective amount of a compound of claim 1 in a pharmaceutically acceptable diluent.

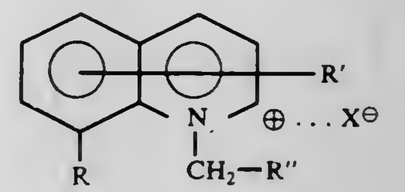
4,058,613

QUINOLINE DERIVATIVES HAVING FUNGICIDAL ACTIVITY

Luigi Abbruzzese, Milan; Franco Gozzo, Saronno (Varese); Giorgio Rossi; Marcella Masoero, both of Milan; Simone Lorusso, San Giuliano Milanese (Milan); Paola Bonola, Milan, and Gino Tamburin, San Donato Milanese (Milan), all of Italy, assignors to Montedison S.p.A., Milan, Italy

Filed Apr. 15, 1976, Ser. No. 677,248
Claims priority, application Italy, Apr. 15, 1975, 22348/75
Int. Cl.² A01N *9/22*
U.S. Cl. 424—258 **6 Claims**

1. A method for combatting or preventing infections of plants by *Botrytis cinerea pers., Plasmopara Viticola* (B. et C), *Berl et de Toni,* and *Sphaerotheca fulginea* (Schlech) Salmon, which comprises sprinkling on the leaves of the plant to be protected an aqueous solution or suspension of an active antifungal agent which is a quinolinic derivative of the general formula



(I)

wherein:

R = OH or H;

R' = H or C_1–C_5alkyl;

R'' = H; C_2H_5; or 4 $Cl—C_6H_4$; and

X = halogen

in such quantities that the amount of the quinolinic derivative deposited on the leaves is equal to or greater than 15 mg/sq cm of leaf.

4,058,614

SUBSTITUTED IMIDAZOLE COMPOUNDS AND THERAPEUTIC COMPOSITIONS THEREWITH

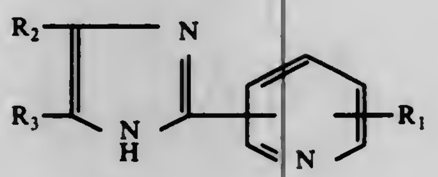
John J. Baldwin, Lansdale, Pa., assignor to Merck & Co., Inc., Rahway, N.J.

Continuation of Ser. No. 421,553, Dec. 4, 1973, abandoned. This application Feb. 18, 1976, Ser. No. 658,955

Int. Cl.^{2} A61K *31/415;* **C07D** *403/02*

U.S. Cl. 424—263 **20 Claims**

1. A compound of the formula



wherein

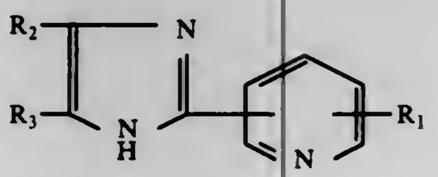
R_1 is hydrogen or alkyl containing 1 to 3 carbon atoms;

R_2 is halogen; and

R_3 is halogen or $—CF_3$

or a pharmaceutically acceptable salt thereof.

7. A pharmaceutical composition for treating hypertension comprising an inert pharmaceutically acceptable diluent and antihypertensive effective compound of the formula



wherein

R_1 is hydrogen or alkyl containing 1 to 3 carbon atoms;

R_2 is halogen; and

R_3 is halogen or $—CF_3$

or a pharmaceutically acceptable salt thereof.

4,058,615

SKELETAL MUSCLE RELAXANT COMPOSITIONS COMPRISING α,α-DIPHENYL-3-TROPIDINEETHANOL AND METHODS OF PRODUCING SKELETAL MUSCLE RELAXATION

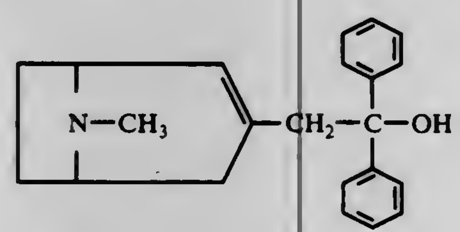
Peter Tone Ridley, Lafayette Hill, and Edwin Frank Weidley, Ridley Park, both of Pa., assignors to SmithKline Corporation, Philadelphia, Pa.

Filed Sept. 28, 1976, Ser. No. 727,553

Int. Cl.^{2} A61K *31/46*

U.S. Cl. 424—265 **2 Claims**

1. The method of producing skeletal muscle relaxant activity in abnormal muscle disorders but having no relaxant activity on normal muscle which comprises administering internally to an animal having said disorder an amount sufficient to produce said activity of a chemical compound of the formula:



or a pharmaceutically acceptable acid addition salt of said compound.

4,058,616

2-[N-(1,3-DIAMINO-ISOPROPYL)-AMINO]-4-PHENYL-2-IMIDAZOLINES AND SALTS THEREOF

Werner Kummer; Helmut Stähle; Herbert Köppe, all of Ingelheim am Rhein; Walter Haarmann, Biberach an der Riss, and Richard Reichl, Ingelheim am Rhein, all of Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Germany

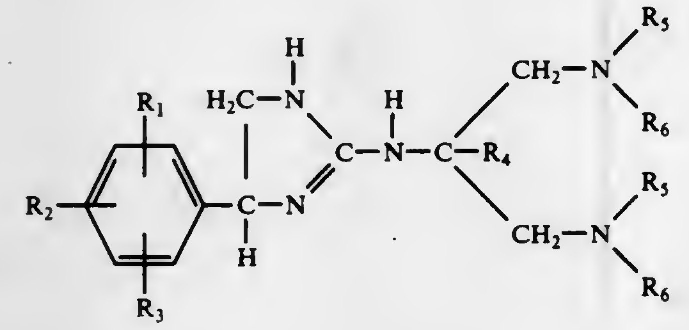
Filed June 3, 1976, Ser. No. 692,325

Claims priority, application Germany, June 10, 1975, 2525725

Int. Cl.^{2} A61K *31/445, 31/415;* **C07D** *233/48, 401/14*

U.S. Cl. 424—267 **8 Claims**

1. A compound of the formula



wherein

R_1 is chlorine, bromine, fluorine or methyl;

R_2 and R_3 are each hydrogen, chlorine or methyl;

R_4 is hydrogen, methyl or ethyl; and

R_5 and R_6 are each methyl, ethyl or alkoxyalkyl of 2 to 4 carbon atoms or, together with each other and the nitrogen atom to which they are attached, pryrolidino, piperidino or hexamethyleneimino; or a non-toxic, pharmaceutically acceptable acid addition salt thereof.

8. The method of inhibiting thrombocyte aggregation in a warm-blooded animal in need of such treatment, which comprises perorally or parenterally administering to said animal an effective antithrombotic amount of a compound of claim 1.

4,058,617

IMIDAZOLES AND PHARMACEUTICAL COMPOSITION

Atso Ilvespää, Neuallschwil, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

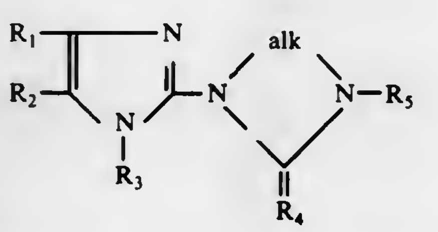
Division of Ser. No. 402,668, Oct. 2, 1973, Pat. No. 3,998,952. This application Aug. 2, 1976, Ser. No. 710,993

Claims priority, application Switzerland, Oct. 4, 1972, 14481/72

Int. Cl.^{2} C07D *403/14, 277/38;* **A61K** *31/38*

U.S. Cl. 424—270 **5 Claims**

1. An imidazole compound of the formula



(I)

wherein one of the radicals R_1 and R_2 denotes hydrogen or lower alkyl and the other denotes a nitro group, R_3 is lower alkyl, hydroxy-lower alkyl, lower alkoxy-lower alkyl, R_4 is oxo, R_5 is thiadiazolyl-(2) and "alk" is ethylene, and the N-oxides and a therapeutically acceptable acid addition salt thereof.

5. An antimicrobial pharmaceutical preparation comprising an antimicrobially effective amount of a compound as claimed in claim 1, together with a pharmaceutically usable excipient.

4,058,618

CERTAIN HYDANTOIN CONTAINING BACTERICIDES WHICH ARE RESISTANT TO SELF-HEATING

Viktor Georgievich Ovchinnikov, ulitsa Bazhova, 10, kv. 61; Nadezhda Petrovna Noritsa, ulitsa Avtozavodskaya, 21a, kv. 26; Maria Mefodievna Grib, ulitsa Bazhova, 10, kv. 30, all of Kiev; Nikolai Alexandrovich Kamennov, ulitsa Kievskaya, 20, kv. 28, and Elena Konstantinovna Skvortsova, ulitsa Molodtsova, 8, korpus 2, kv. 131, both of Moscow, all of U.S.S.R.

Filed Nov. 10, 1975, Ser. No. 630,260

Int. Cl.^{2} A01N *9/22*

U.S. Cl. 424—273 R **9 Claims**

1. A readily water soluble bactericide which is stable to self-heating upon manufacture and storage, said bactercide consisting essentially of 1, 3-dichloro-5,5-dimethylhydantoin in an amount of 19 to 25% by weight; 5,5-dimethylhydantoin in an amount of 10 to 19% by weight; a neutral sodium phosphate in an amount of 7 to 15% by weight; a sodium salt selected from the group consisting of sodium chloride, anhydrous sodium sulphate and a mixture thereof in an amount of 59 to 40% by weight; and a surface-active agent selected from the group consisting of an alkylarylsulphonate, an alkylsulphonate and a mixture thereof in an amount of 5 to 1% by weight.

4,058,619

THIOPHENE DERIVATIVES HAVING ANTILIPOLYTIC ACTIVITY

Hanns Ahrens; Helmut Biere; Clemens Rufer; Ralph Schmiechen; Eberhard Schroeder; Olaf Loge; Wolfgang Losert, and Ekkehard Schillinger, all of Berlin, Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Germany

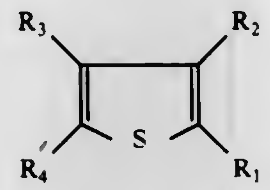
Division of Ser. No. 579,196, May 20, 1975, Pat. No. 4,021,450. This application Sept. 14, 1976, Ser. No. 723,309

Claims priority, application Germany, May 21, 1974, 2424740

Int. Cl.^{2} A61K *31/38*

U.S. Cl. 424—275 **14 Claims**

1. A pharmaceutical composition in dosage unit form, for inhibiting lypolysis comprising a pharmaceutically acceptable oral or parenteral carrier in admixture with 10 mg to 1g of a thiophene derivative of the formula



wherein one of R_1, R_2, R_3 and R_4 is R_x; 1 or 2 thereof are R_y and the remainder thereof are hydrogen atoms, wherein R_y is alkoxy of 1-6 carbon atoms, and wherein R_x is $—S\text{-}CH_2\text{-}COOH$ or $S\text{-}CH(CH_3)\text{-}COOH$, their enantiomers, and their pharmacologically acceptable salts thereof with bases.

4,058,620

THERAPEUTIC AGENTS FOR IMPROVING CARDIOVASCULAR FUNCTION

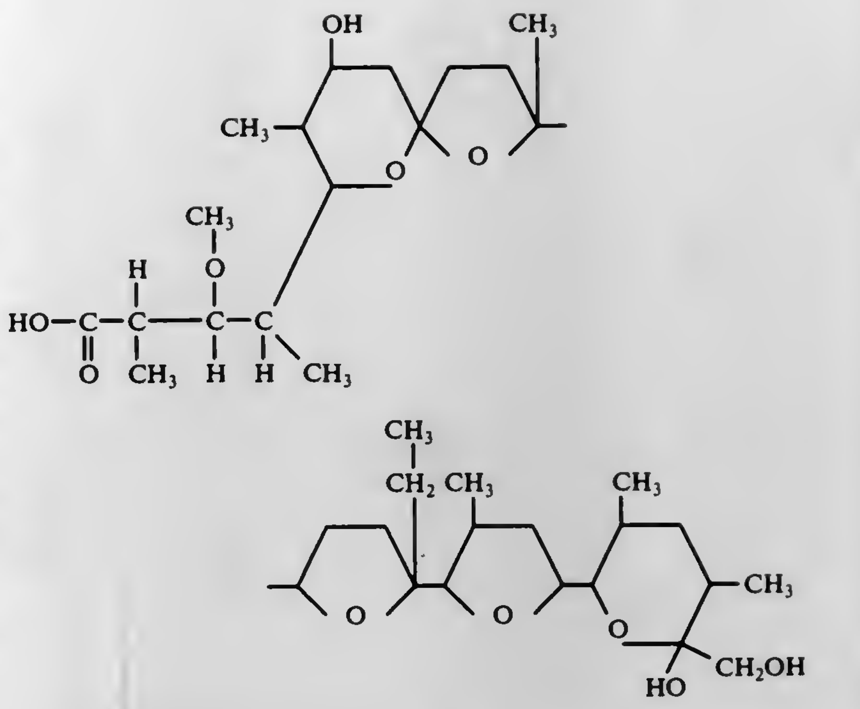
John Westley, Mountain Lakes, N.J., assignor to Hoffmann-La Roche Inc., Nutley, N.J.

Continuation of Ser. No. 489,977, July 19, 1974, abandoned. This application Dec. 19, 1975, Ser. No. 642,227

Int. Cl.^{2} A61K *31/35*

U.S. Cl. 424—283 **1 Claim**

1. A method of therapeutic treatment by producing myocardial stimulation in a patient requiring such an effect which comprises administering to the patient an amount, which is effective in producing myocardial stimulation, of monensin, a compound represented by the formula



or pharmaceutically acceptable salts thereof.

4,058,621

IRON COMPLEXES AND FOODSTUFFS CONTAINING THEM

William W. Hill, St. Paul, Minn., assignor to Peter, Strong & Company, Inc., Port Chester, N.Y.

Continuation-in-part of Ser. No. 552,541, Feb. 24, 1975, abandoned, and Ser. No. 565,811, March 31, 1975, abandoned, each is a continuation of Ser. No. 455,873, March 28, 1974, abandoned, which is a continuation of Ser. No. 417,553, Nov. 20, 1973, Pat. No. 3,901,874, Continuation-in-part of Ser. No. 342,393, March 19, 1973, abandoned, which is a continuation of Ser. No. 260,521, June 7, 1972, abandoned, which is a continuation of Ser. No. 39,601, May 22, 1970, abandoned. This application Nov. 10, 1975, Ser. No. 630,437

Int. Cl.^{2} A01N *9/00*

U.S. Cl. 424—295 **10 Claims**

1. A composition containing bioavailable iron, said composition consisting essentially of the monomeric galacturonate or glucuronate reaction product of the components comprising:

$$M[O\overset{\overset{O}{\|}}{C}(CHOH)_4CHO]_m \text{ and}$$

b. about one, but no more than about four moles of a water soluble iron salt per equivalent of said component (a),

wherein M is a pharmaceutically acceptable cation, and m is the valence of M.

4,058,622

SUBSTITUTED PHENYL ACETATE, INSECTICIDAL COMPOSITION AND METHOD OF USE

Keimei Fujimoto, Kobe; Nobuo Ohno, Toyonaka; Yoshitoshi Okuno, Toyonaka; Toshio Mizutani, Toyonaka; Isao Ohno, Minoo; Masachika Hirano, Toyonaka; Nobushige Itaya, Ikeda, and Takashi Matsuo, Amagasaki, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

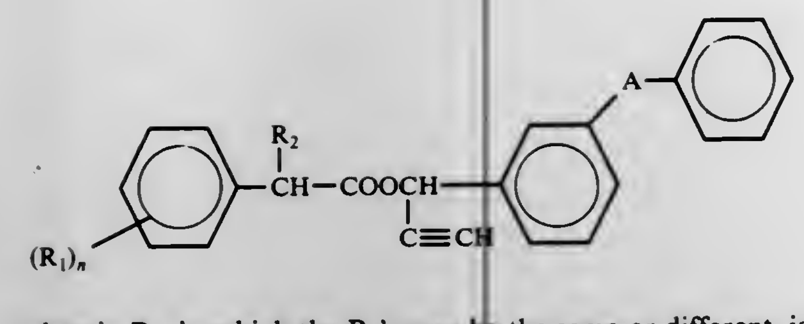
Continuation-in-part of Ser. No. 378,301, July 11, 1973, Pat. No. 3,996,244. This application Mar. 12, 1975, Ser. No. 557,694

Claims priority, application Japan, July 11, 1972, 47-69805; Apr. 19, 1973, 48-44809

Int. Cl.^{2} A01N *9/24;* **C07C** *69/76*

U.S. Cl. 424—308 **5 Claims**

1. A phenylacetate compound of the formula:



wherein R_1, in which the R_1's may be the same or different, is halogen or C_1-C_4 alkyl,; n is 1 or 2; R_2 is C_1-C_4 alkyl; and A is oxygen or $—CH_2—$.

4. A pesticidal composition consisting essentially of a pesticidally effective amount of a phenylacetate compound of claim 1 and an inert carrier.

5. A method for knocking down and killing injurious insects, ticks and mites by contacting a pesticidal composition of claim 4 to their habitats.

4,058,623

PROSTAGLANDIN-CONTAINING LYOPHILIZED POWDERS

Rolf-Rüdiger Hoffmann, and Peter Fuchs, both of Berlin, Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Germany

Filed Mar. 22, 1976, Ser. No. 669,336

Claims priority, application Germany, Apr. 4, 1975, 2515001

Int. Cl.[2] A61K *31/19, 31/215*

U.S. Cl. 424—317 **19 Claims**

1. A storage-stable lyophilized prostaglandin composition comprising a prostaglandin compound and a decomposition-inhibiting quantity of tris (hydroxymethyl) aminomethane acid addition salts, said composition prior to being lyophilized having a pH of about 5–7, and the acid of said acid addition salts being other than said prostaglandin compound.

4,058,624

BROAD SPECTRUM ANTIBACTERIAL COMPOSITIONS CONTAINING TRIS (HYDROXYMETHYL)-AMINOMETHANE AND DIPHENYL AND LOWERALKYL SUBSTITUTED DIPHENYL POLYAMINES

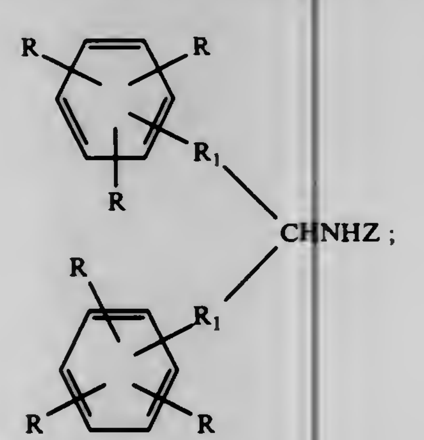
David P. Jacobus, Princeton; Eugene L. Dulaney, Summit, and Nathaniel Grier, Englewood, all of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Filed May 14, 1976, Ser. No. 686,360

Int. Cl.[2] A01N *9/02, 9/20, 9/22*

U.S. Cl. 424—330 **9 Claims**

1. An antibacterial composition comprising an admixture of 1 to 500 parts by weight of tris(hydroxymethyl)aminomethane for each part by weight of a polyamine having the formula:



(2)

where

R is hydrogen or loweralkyl;

each R_1 is alike or different and is C_1 to C_4 alkylene;

Z is

$$—Y—\underset{\substack{|\\R_5}}{N}—R_6,$$

where

Y is

$$—R_2—\underset{\substack{|\\R_3}}{N}—R_4—$$

or Y is $—R_2—$ and

R_2 is 2-hydroxy-1,3-trimethylene, or R_1 as previously defined;

R_3 is hydrogen, C_1 to C_4 alkyl, C_2 to C_4 aminoalkyl, C_1 to C_4 hydroxyalkyl, or C_2 to C_4 dihydroxyalkyl;

R_4 is 2-hydroxy-1,3-trimethylene, or R_1 as previously defined;

R_5 is hydrogen, aminoethyl, aminopropyl, C_1 to C_4 hydroxyalkyl, or C_2 to C_4 dihydroxyalkyl; and

R_6 is hydrogen, C_1 to C_4 hydroxyalkyl or C_2 to C_4 dihydroxyalkyl;

or when R_3 and R_6 taken together are ethylene, R_4 is also ethylene, and R_5 is aminoethyl, aminopropyl, or aminohydroxypropyl or acid addition salts thereof.

4,058,625

BROAD SPECTRUM ANTIMICROBIAL COMPOSITIONS CONTAINING TRIS-(HYDROXYMETHYL)AMINOMETHANE AND POLYAMINES

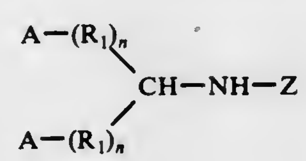
David P. Jacobus, Princeton; Eugene L. Dulaney, Summit, and Nathaniel Grier, Englewood, all of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Filed May 14, 1976, Ser. No. 686,359

Int. Cl.[2] A01N *9/02, 9/20, 9/22*

U.S. Cl. 424—325 **32 Claims**

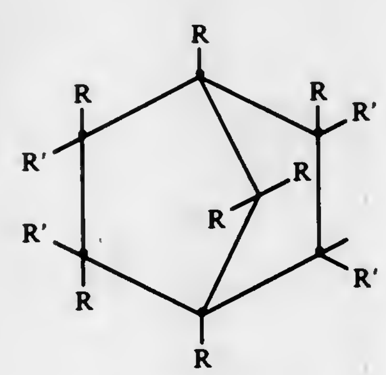
1. An antibacterial composition comprising an admixture of 1 to 500 parts by weight of tris(hydroxymethyl)aminomethane for each part by weight of a polyamine having the formula:



where:

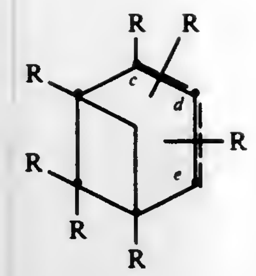
each A is alike or different and is a bicyclic group of the formula:

a.



or a bicyclic group of the formula:

b.



where R is alike or different and is hydrogen or C_1 to C_4 alkyl, R′ is alike or different and is hydrogen or C_1 to C_4 alkyl or R′ on adjacent carbon atoms taken together comprise an olefinic bond, and the dashed line indicates either saturation or c-, d-, e- unsaturation;

each R_1 is alike or different and is C_1 to C_4 alkylene:

each n is alike or different and is the integer 0 to 1;

Z is

$$—Y—\underset{\substack{|\\R_5}}{N}—R_6,$$

where

R_5 is hydrogen, aminoethyl, aminopropyl, C_1 to C_4 hydroxyalkyl or C_2 to C_4 dihydroxyalkyl; and

R_6 is hydrogen, C_1 to C_4 hydroxyalkyl or C_2 to C_4 dihydroxyalkyl;

Y is either

$$—R_2—\underset{\substack{|\\R_3}}{N}—R_4—$$

or -R_2-where

R_2 is 2-hydroxy-1,3-trimethylene, or R_1 as previously defined;

R_3 is hydrogen, C_1 to C_4 alkyl, C_1 to C_4 aminoalkyl, C_1 to C_4 hydroxyalkyl or C_2 to C_4 dihydroxyalkyl;

R_4 is 2-hydroxy-1,3-trimethylene, or R_1 as previously defined;

or when R_3 and R_6 taken together are ethylene, R_4 is also ethylene, and R_5 is aminoethyl, aminopropyl or aminohydroxypropyl, or acid addition salts thereof.

4,058,626

COMPOSITION AND METHOD FOR KILLING SNAILS AND SLUGS

Willy Roth, Strengelbach, Switzerland, assignor to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Sept. 24, 1976, Ser. No. 726,096

Claims priority, application Switzerland, Sept. 29, 1975, 12585/75

Int. Cl.[2] A01N *9/24;* **C07C** *87/68*

U.S. Cl. 424—333 **10 Claims**

1. A composition toxic to snails and slugs which comprises an amount of metaldehyde which is effective as the active toxic ingredient and an amount of benzyldiethyl-(2,6-xylylcarbamoylmethyl)-ammonium benzoate which is effective as the organoleptic denaturant.

4,058,627

COMBATTING INSECTS AND ACARIDS WITH NEW PHENOXYPHENYLALKOXY ESTERS

Friedrich Karrer, Basel, and Saleem Farooq, Aesch, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

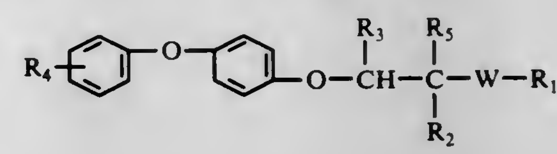
Division of Ser. No. 569,040, April 17, 1975, Pat. No. 3,963,786. This application Apr. 19, 1976, Ser. No. 678,020

Claims priority, application Switzerland, Apr. 18, 1974, 5364/74; Mar. 12, 1975, 3123/75

Int. Cl.[2] A01N *9/24*

U.S. Cl. 424—341 **19 Claims**

1. An insecticidal and acaricidal composition comprising (1) as active ingredient an insecticidally or acaricidally effective amount of a compound of the formula



wherein

W represents oxygen or sulphur;

R_1 represents C_1—C_6 alkyl, C_3—C_6 cycloalkyl, C_5 or C_6 cycloalkenyl, C_2—C_4 haloalkenyl, C_3—C_5 alkinyl, C_2—C_4 alkenyl or benzyl;

R_2 represents hydrogen, methyl or ethyl;

R_3 represents hydrogen or methyl; or

R_2 and R_3 taken together with the chain represent a 5- or 6-membered saturated ring; and

each of R_4 and R_5 represents hydrogen or methyl; and ~~(2) a~~ carrier.

4,058,628

DISINFECTANT COMPOSITION COMPRISING PINANOL

Frank A. Mitch, Jacksonville, Fla., assignor to SCM Corporation, New York, N.Y.

Filed Sept. 30, 1976, Ser. No. 728,259

Int. Cl.[2] A01N *9/24;* **A61L** *13/00*

U.S. Cl. 424—343 **7 Claims**

1. A disinfectant composition for inhibiting enteric microorganisms comprising:

a germicidally effecive amount of pinanol;

a soap; and

an aqueous carrier, said soap being in a proportion for providing a stable aqueous dispersion of said pinanol in said aqueous carrier.

4,058,629

POLYHYDROXYL MONOSULFOXIDE SHAMPOO COMPOSITIONS

Guy Vanlerberghe, Montjay-la-Tour, and Henri Sebag, Paris, both of France, assignors to L'Oreal, Paris, France

Division of Ser. No. 563,459, March 31, 1975, Pat. No. 3,984,480, Continuation of Ser. No. 372,103, June 21, 1973, abandoned, which is a continuation-in-part of Ser. No. 142,410, May 11, 1971, abandoned. This application July 8, 1976, Ser. No. 703,667

Claims priority, application Luxembourg, May 12, 1970, 60899

Int. Cl.[2] A61K *7/50;* **C11D** *1/755*

U.S. Cl. 424—365 **16 Claims**

1. A composition for use as a shampoo or foamable bath composition comprising an aqueous solution of at least one compound having the formula

$$R—\underset{\substack{\downarrow\\O}}{S}—[CH_2—CHOH—CH_2O]_n—H$$

wherein R is selected from the group consisting of linear or branched, saturated or unsaturated hydrocarbon having 8 to 22 carbon atoms, alkylbenzyl having 8 to 22 carbon atoms, and a mixture thereof, and *n* has a statistical mean value of 2 to 10, said compound being present in an amount of 1 to 80 percent by weight of said composition.

4,058,630
MANUFACTURE OF WHITE CHEESE OR YOGURT
Bernadette Corbic Corbic nee Busnel, Carrieres-sur-Seine, France, assignor to Societe: Toscara Anstalt, Vaduz, Liechtenstein
Division of Ser. No. 535,843, Dec. 23, 1974, Pat. No. 4,003,490. This application July 6, 1976, Ser. No. 702,609
Claims priority, application France, Jan. 9, 1974, 74.00718
Int. Cl.² A23C *19/02, 23/00*
U.S. Cl. 426—36 **3 Claims**

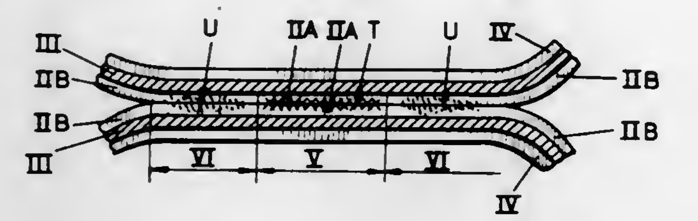
1. A process for the manufacture of soft uncured cheese or yoghurt products from a coagulatable milk composition placed in the final package for the product before the end of the manufacturing process, comprising the steps of:
providing a container having side walls defined at one end thereof a sealable filling and removal opening and a divider mounted therein at least partly engaging the side walls and dividing the interior of the container into a first small chamber and a second larger chamber and wherein the edges of said divider cooperate with said side walls to define passages therebetween providing communication between said two chambers, said passages being of a predetermined size to prevent coagulated milk composition from passing therethrough;
introducing a coagulatable milk composition into said container in an amount at most equal to the volume of the second chamber;
sealing the opening of the container with a liquid tight seal;
placing the container in a first position such that all of the milk composition introduced therein accumulates and remains in the second chamber until the milk composition has coagulated and decomposed into curds and serum, and thereafter draining the serum from said second chamber into said first chamber via said passages, by changing the orientation of the container and placing it in a second position.

4,058,631
ENZYME-TREATED FRIED FOOD
Charles F. Roan, Lake Geneva, Wis., assignor to GB Fermantation Industries, Inc., Kingstree, S.C.
Filed Aug. 31, 1972, Ser. No. 285,289
Int. Cl.² A23B *7/10*
U.S. Cl. 426—52 **2 Claims**

1. A process of reducing the absorption of fat during frying of French fried potatoes and improving the flavor and texture of said potatoes comprising soaking the raw potato pieces prior to frying in an aqueous enzyme solution containing from about 0.1% to about 1% by weight of alpha amylase having an activity equivalent to about 10,000 to about 20,000 Bacterial Amylase Units per gram of enzyme for about 15 minutes to about one hour at ambient room temperatures and thereafter frying said potato pieces.

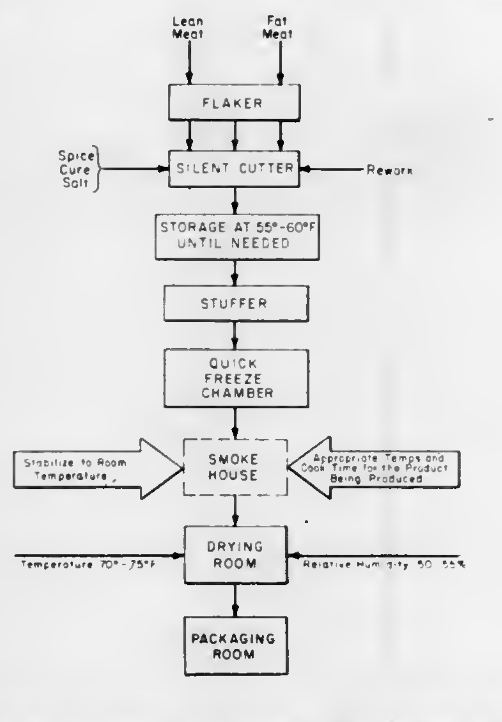
4,058,632
LIGHT-WEIGHT, FLEXIBLE, EASY-OPEN, IMPERMEABLE PACKAGE SYSTEM
Albert E. J. Evans, Levedean, and Peter G. Turner, Bordon, both of England, assignors to Koninklijke Emballage Industrie Van Leer B.V., Amstelveen, Netherlands
Continuation of Ser. No. 533,423, Dec. 16, 1974, abandoned. This application Oct. 12, 1976, Ser. No. 731,164
Int. Cl.² B65D *5/42*
U.S. Cl. 426—126 **2 Claims**

1. A light-weight, flexible, easy-open, impermeable package containing water or air sensitive materials, said package being produced from a porefree metal foil sheet, said sheet having a heat resistant package-supporting plastic film on the outer surface thereof; said sheet being folded upon itself along a median line with the heat resistant film located exteriorly to provide top and bottom wall portions; relatively narrow and continuous peripheral opposed bands of solder on the inner surface of each of said top and bottom wall portions, said opposed bands being located in overlying mating relationship and being spaced inwardly from the peripheral edges of said top and bottom wall portions; thermoplastic film coatings on said facing top and bottom wall portions in a pattern of two concentric rectangles on each of said facing top and bottom wall portions corresponding to areas interiorly and exteriorly



of said peripheral bands of solder; said two concentric rectangles on each of said portions being in overlying mating relationship; said opposed bands of solder being sealed to each other providing a complete metal seal through the top and bottom foil sheets; and said thermoplatstic coatings being sealed to each other providing a thermoplastic peripheral seal through said top and bottom wall portions on each side of said solder bands seal providing an interior open area between said top and bottom wall portions for the reception of the material being packaged, said interior open area being surrounded by a plurality of concentric hermetic seals including a peripheral thermoplastic seal, an intermediate solder seal, and an inner thermoplastic seal.

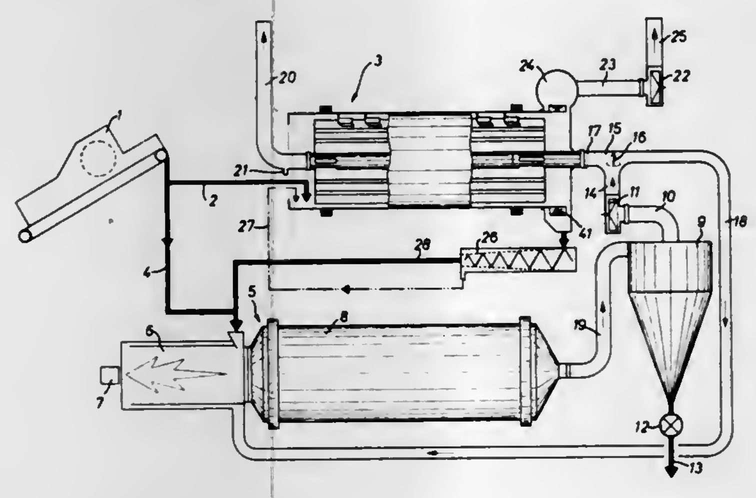
4,058,633
MEAT PRODUCT, AND PROCESS FOR PREPARING SAME
Charles H. Staff, Omaha, Nebr.; Gale F. Kunert, San Ramon, Calif., and Tom A. Christians, Council Bluffs, Iowa, assignors to Fairmont Foods Company, Omaha, Nebr.
Filed Sept. 15, 1976, Ser. No. 723,627
Int. Cl.² A22C *11/00;* **A23B** *4/04*
U.S. Cl. 426—315 **16 Claims**



1. The method for manufacturing a casingless dried meat product that includes the following steps in the specified order:
a. preparing a meat emulsion having a moisture content exceeding 30% by weight;

b. forming said meat emulsion into the desired cross sectional shape;
c. freezing at least the surface of said meat emulsion;
d. allowing said meat emulsion to become stabilized at room temperature; and
e. drying said formed meat emulsion at temperatures above 40° F. until its moisture content is reduced to the range of from about 10% to 15% by weight to prepare a finished dried meat product with a reduced tendency to oil-off and salt-out.

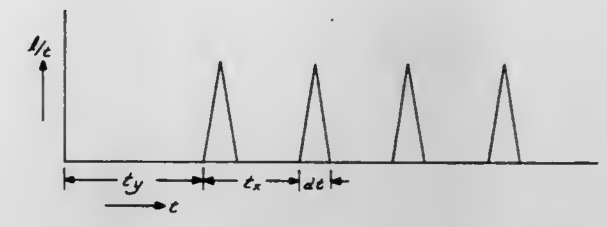
4,058,634
METHOD FOR DRYING AGRICULTURAL FEED MATERIALS, PULP-LIKE MATERIALS
Werner Kunz, Lenzburg, Switzerland, assignor to W. Kunz AG, Dintikon, Switzerland
Filed Mar. 31, 1976, Ser. No. 672,060
Claims priority, application Switzerland, Apr. 1, 1975, 4094/75
Int. Cl.² A23N *1/00;* **A23L** *1/20*
U.S. Cl. 426—456 **3 Claims**



1. A method for drying agricultural feed material in a drying apparatus using the juice of an earlier pressing comprising the steps of:
feeding the material to the input of a predrying heat exchanger;
moistening the material prior to predrying with juice of an earlier pressed material;
passing the premoistened material through said heat exchanger heated with the exhaust aid of a main drying unit;
pressing the juice from said material after said material leaves the heat exchanger; returning the pressed juice to the input side of the heat exchanger; and
feeding the predried and pressed material into a main dryer for final drying.

4,058,635
METHOD OF TREATING A FOODSTUFF IN AN OVEN WITH MOISTURE
Wilfried Durth, Burbach-Wahlbach, Germany, assignor to Buderus'sche Eisenwerke Aktiengesellschaft, Wetzlar, Germany
Continuation-in-part of Ser. No. 376,447, July 5, 1973, abandoned. This application Dec. 5, 1975, Ser. No. 638,158
Claims priority, application Germany, July 12, 1972, 2234107
Int. Cl.² A23L *1/01*
U.S. Cl. 426—509 **2 Claims**

1. A method of treating a foodstuff comprising the steps of:
confining said foodstuff in a substantially closed chamber;
circulating air in said chamber over and into contact with said foodstuff;
heating said air, said foodstuff being heated by said air at a temperature and for a time sufficient to cook said foodstuff; and
intermittently and automatically adding moisture to the heated air in said chamber in pulses spaced apart by intervals said moisture being added periodically by injecting water into said air circulating in said chamber, said air being circulated so as to pass over said foodstuff a plurality of times during the treatment thereof, and said pulse

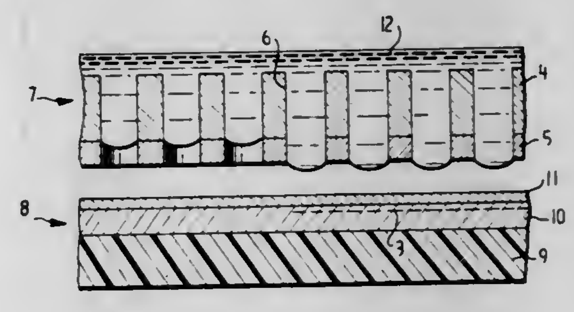


duration being between 0.3 seconds and 1.2 seconds and said intervals being each between 0.25 minutes and 2 minutes.

4,058,636
INSTANT ACIDIFIED MILK GEL
Robert S. Igoe, San Diego, Calif., assignor to Merck & Co., Inc., Rahway, N.J.
Continuation-in-part of Ser. No. 620,899, Oct. 8, 1975, abandoned. This application Oct. 26, 1976, Ser. No. 735,557
Int. Cl.² A23L *1/04, 1/09*
U.S. Cl. 426—573 **7 Claims**

1. A dry composition which contains a thickener composition, a carbohydrate sweetener and a food acidulent for preparing an instant acidified milk gel product, the dry composition consisting essentially of from about 2.5 weight % to about 10 weight % thickener composition, from about 80 weight % to about 93 weight % carbohydrate sweetener, and an amount of food acidulent effective to adjust the pH of the composition to from about 3.8 to about 4.3 when blended with an amount of milk effective to form a gel, the thickener comprising carboxymethyl cellulose, xanthan gum and locust bean gum, the thickener ingredients being present in the following percentages by weight of the thickener: xanthan gum, from about 20% to about 35%; locust bean gum, from about 20% to about 35%; and carboxymethyl cellulose, from about 30% to about 60%.

4,058,637
ELECTROSTATIC DEVELOPING METHOD
Genji Ohno, Yokohama, Japan, assignor to Research and Development Laboratories of Ohno Co., Ltd., Yokohama, Japan
Continuation of Ser. No. 398,962, Sept. 20, 1973, abandoned, Division of Ser. No. 227,025, Feb. 17, 1972, Pat. No. 3,894,512. This application Aug. 13, 1975, Ser. No. 604,098
Claims priority, application Japan, Feb. 18, 1971, 46-7076
Int. Cl.² G03G *13/10*
U.S. Cl. 427—15 **3 Claims**



1. A method of electrostatically printing an original image with a liquid developer onto an image bearing medium which comprises the steps of:
providing a composite assembly having opposite facing first and second surfaces respectively defined by a first layer, which is hydrophilic with respect to said liquid developer, and a second layer which is hydrophobic with respect to said liquid developer and disposed upon said first layer to form said composite assembly, said composite assembly

having a plurality of uniformly distributed fine pores extending therethrough from said first surface to said second surface, the size of said fine pores are in the range of 10μ to 100μ, the thickness of said second layer being in the range of 3μ to 400μ and so selected as to prevent said liquid developer from easily entering into the pores of said second layer;

supplying said liquid developer to said first surface of said composite assembly to flow into the pores of said first layer;

disposing an image bearing medium, having an electrostatic latent image formed thereon, adjacent to said second surface on said composite assembly so that portions of said second surface of said composite assembly are exposed to the electric field emanating from said electrostatic latent image formed on corresponding portions of said image bearing medium thereby causing the liquid developer in pores of said first layer to wet the inside surfaces of corresponding ones of the pores of said second layer in said exposed portions to flow therethrough and to exude onto said exposed portions of second surface thereof; and

contacting said image bearing medium with said composite assembly to transfer the liquid developer on said exposed portions of said second surface of said composite assembly onto said electrostatic latent image formed on corresponding portions of said image bearing medium.

4,058,638

METHOD OF OPTICAL THIN FILM COATING

Dale E. Morton, Farmers Branch, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Division of Ser. No. 534,327, Dec. 19, 1974, Pat. No. 3,955,662. This application Nov. 3, 1975, Ser. No. 628,015

Int. Cl.² B05D *3/06*

U.S. Cl. 427—39 5 Claims

1. A process for depositing an optical thin film coating on a substrate comprising the steps of:

exposing said substrate in an evacuated chamber to an atmosphere containing arsine and a volatile gallium compound, while generating an RF field having an energy sufficient to yield a plasma at the substrate surface, thereby depositing a gallium arsenide coating on said substrate;

then, without breaking said vacuum, exposing said coated sustrate to an atmosphere containing hydrogen sulfide and a zinc compound vapor while generating an RF field at the substrate surface having an energy sufficient to cause deposition of a zinc sulfide layer on said gallium arsenide coating;

then, without breaking said vacuum, exposing said zinc sulfide layer to vapors of thorium flouride thereby forming a thorium flouride layer on said zinc sulfide layer;

then, without breaking said vacuum, exposing said thorium flouride layer to an atmosphere containing a volatile boron compound and ammonia, while generating an RF field at the thorium flouride surface having an energy level sufficient to yield a plasma, and thereby deposit a boron nitride coating on said thorium fluoride layer.

4,058,639

METHOD OF MAKING FLUORESCENT LAMP

Willy P. Schreurs, Danvers, Mass., assignor to GTE Sylvania Incorporated, Danvers, Mass.

Filed Dec. 9, 1975, Ser. No. 639,029

Int. Cl.² B05D *1/36, 5/06, 7/22*

U.S. Cl. 427—67 4 Claims

1. The process of manufacturing a fluorescent lamp of the type having a protective coating on the inner surface of the lamp envelope and a phosphor coating deposited on the protective coating comprising the steps of preparing a dispersion of finely powdered alumina in a solution of nitrocellulose in a highly polar solvent, the dispersion containing no phosphor, applying said dispersion to the inner surface of the lamp envelope to form said protective coating, drying said protective coating and depositing said phosphor coating thereon without first lehring the protective coating.

4,058,640

ELECTRICAL INSULATION OF METALLIC CONDUCTORS

Hans Jung, Ludwigshafen; Jenoe Kovacs, Bobenheim-Roxheim; Wilhelm Düssel, Ludwigshafen, and Helmut Lehmann, Reinbek, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Filed May 7, 1976, Ser. No. 684,308

Claims priority, application Germany, May 24, 1975, 2523099

Int. Cl.² B05D *7/20, 5/12, 3/02, 1/42*

U.S. Cl. 427—118 1 Claim

1. A process for the electrical insulation of metallic conductors by coating wires with aqueous dispersions, of from 10 to 60 percent by weight, of polymeric organic coating materials, which process comprises the following steps which are carried out in a single cycle:

introducing a starting dispersion of the coating material into a storage zone;

continuously withdrawing a part of the dispersion from the storage zone and feeding said part to a dispersing zone where it is homogenized and brought to a mean particle size of less than $10\mu u$, while keeping the temperature of the dispersion below 60° C;

optionally cooling the dispersion to below 40° C in a cooling zone;

feeding the dispersion continuously to a fractionating zone in which it is separated, according to particle size, into a fine fraction having a mean particle size of from 0.2 to $2\mu u$ and containing practically no particles larger than $6\mu u$, and (b) a coarse fraction which contains larger particles and is recycled to the storage zone; and

finally, passing the fine fraction, at below 40° C, continuously through one or more coating zones and then recycled to the storage zone, and at the same time one or more wires of diameter greater than 0.05 mm are drawn through coating zones(s) and provided with a coating which is then baked where one or more wires having a diameter greater than 0.05 mm are drawn through said coating zone(s) and coated therein, which coating is then baked, the excess of the film fraction of the aqueous dispersion being recycled to the storage zone.

4,058,641

PAVEMENT MARKING METHOD

Olexander Hnojewyj, Columbia Heights, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed July 2, 1976, Ser. No. 702,336

Int. Cl.² B05C *1/16;* **B05D** *5/10*

U.S. Cl. 427—137 9 Claims

1. In a method for making a paved roadway surface without first severely cleaning the surface comprising coating onto the surface a thin bonding layer of low-viscosity liquid coating composition which wets the paved surface and then rapidly advances to a nonspreading form, heating the paved surface and the bonding layer, projecting toward the heated layer a topcoat material that comprises a continuous stream of solid individual particles having an organic thermoplastic phase that comprises a polyamide condensation product of dimerized fatty acid and polyamine, and heating the particles so as to cause at least a major portion of the organic thermoplastic phase of the particles to soften before they reach the bonding layer; the improvement which comprises using as the liquid coating composition a material that has a room-temperature viscosity of less than about 1000 centipoises and comprises 100 parts of a thermoplastic polyamide condensation product of a dimerized fatty acid and an amine; and at least 50 parts of volatile solvent in which said condensation product is dissolved; the bonding layer formed by said liquid coating com-

position having an evaporation rate of at least 0.02 gram/square centimeter/hour at a temperature of 24° C and a relative humidity of 50%.

4,058,642

2-AMINO-3-(3'-HYDROXY-PHENYL)-PROPANOLS AND SALTS THEREOF

Ernst-Otto Renth; Anton Mentrüp; Kurt Schromm, and Alexander Walland, all of Ingelheim am Rhein, Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Germany

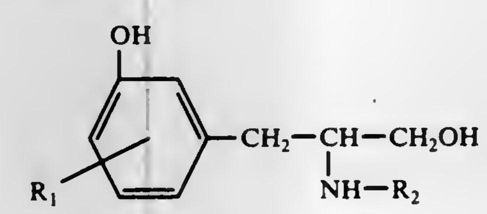
Continuation-in-part of Ser. No. 512,207, Oct. 4, 1974, abandoned. This application Nov. 30, 1976, Ser. No. 746,110

Claims priority, application Germany, Oct. 11, 1973, 2351027

Int. Cl.² A01N *9/20, 9/24;* **C07C** *91.22*

U.S. Cl. 424—330 8 Claims

1. A racemic mixture or optically active antipode of a compound of the formula



wherein

R_1 is hydrogen, chlorine, methyl, methoxy or 5-hydroxyl, and

R_2 is hydrogen, methyl or ethyl,

or a non-toxic, pharmacologically acceptable acid addition salt thereof.

8. The method of increasing the blood pressure of a warm-blooded animal in need thereof, which comprises administering to said animal an effective hypertensive amount of a compound of claim 1.

4,058,643

FIRE RETARDANT LAMINATES HAVING INTUMESCENT ADHESIVE LAYER COMPRISING SHELLAC

Jeffrey D. Marshall, Palmyra, and Milton C. Kuklies, Fairport, both of N.Y., assignors to Mobile Oil Corporation, New York, N.Y.

Filed June 21, 1976, Ser. No. 698,387

Int. Cl.² A62D *1/00;* **B32B** *7/14, 9/02, 17/06;* **C09D** *3/40, 5/18*

U.S. Cl. 428—198 9 Claims

1. A laminate construction comprising a plastic film layer bonded, with an intumescent adhesive coating composition, to an insulation batting layer, said adhesive composition comprising a mixture of shellac, a phosphoric acid salt and a blowing agent said adhesive coating, when exposed to elevated temperatures, swells by foaming to form a protective multicellular char layer.

7. An adhesive coating composition comprising a mixture of shellac, a phosphoric acid salt, and a blowing agent.

4,058,644

SUBLIMATION TRANSFER AND METHOD

Roy F. DeVries, 30 Crosby Lane, Oakland, N.J. 07436, and William H. Snyder, 11 Cannon Blvd., Staten Island, N.Y. 10306

Continuation-in-part of Ser. No. 529,449, Dec. 4, 1974, Pat. No. 4,021,591. This application Apr. 5, 1976, Ser. No. 673,692

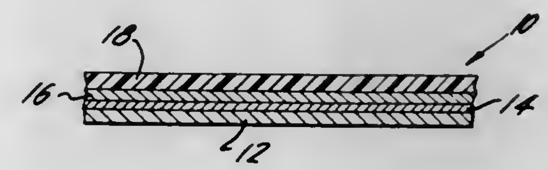
Int. Cl.² B32B *7/12;* **D06P** *3/60, 5/06*

U.S. Cl. 428—200 20 Claims

1. A sublimation transfer for decorating a textile substrate comprising a temporary backing sheet, said backing sheet having deposited thereon a sublimation transfer design layer comprising a sublimation transfer ink having a sublimation point between about 100° and 300° C. and a polymeric layer disposed in contact with said design layer, said polymeric layer having a thickness of between about 0.4 and 4 mils and comprising a polymer having a number average molecular weight of between about 700 and 20,000, and having at least 3 functional groups comprising isocyanates for each polymer chain thereof, whereby upon application of said sublimation transfer to said textile substrate under heat and pressure, said polymeric coating is adapted to soften and penetrate into said textile substrate, and said polymer cross-links, at least a portion of said cross-linking being between said polymer and said textile substrate or moisture associated with said textile substrate.

14. A sublimation transfer for decorating a textile substrate comprising a temporary backing sheet, said backing sheet having deposited thereon a sublimation transfer design layer comprising a sublimation transfer ink having a sublimation point between about 100° and 300° C., and a polymeric layer disposed in contact with said design layer, said polymeric layer having a thickness between about 0.4 and 4 mils and a number average molecular weight of between about 1,200 and 15,000, and having at least 3 functional groups comprising isocyanates for each polymer chain thereof, said polymer comprising a blocked isocyanate functional polyurethane, whereby upon the application of said sublimation transfer to said textile substrate under heat and pressure, said polymeric coating is adapted to soften and penetrate into said textile substrate, and said blocked isocyanate groups unblock or become reactive, so that said polymer cross-links, at least a portion of said cross-linking being between said polymer and said textile substrate or moisture associated with said textile substrate.

17. A method for decorating a textile substrate with a design comprising one or more sublimation inks, which method com-



prises the steps of providing a dry release sublimation transfer comprising a temporary backing sheet, said backing sheet having deposited thereon a sublimation transfer design layer comprising a sublimation transfer ink having a sublimation point between about 100° and 300° C., and a polymeric layer disposed in contact with said design layer, said polymeric layer having a thickness of between about 0.4 and 4 mils and comprising a polymer having a number average molecular weight of between about 700 and 20,000, and having on the average at least 3 blocked functional groups comprising isocyanates for each polymer chain thereof, whereby upon application of said sublimation transfer to said textile substrate, under heat and pressure including a temperature of between about 200° and 450° F. and a pressure of between about 2 and 100 psi said polymeric coating is adapted to soften and penetrate into said textile substrate, and said polymer cross-links, at least of portion of said cross-linking being between said polymer and said textile substrate or moisture associated with said textile substrate, positioning said dry release sublimation transfer on a textile substrate to be decorated with said temporary backing sheet disposed away from said textile substrate, applying heat and pressure to said dry release sublimation transfer, thereby causing said polymeric layer to soften and penetrate into said substrate, while releasing said temporary backing sheet from said design layer, thereby cross-linking said isocyanate functional groups with said textile or said moisture associated with said textile and cooling said design layer and polymeric coating whereby said polymeric coating is securely embedded in said textile substrate.

4,058,645

HEAT SEALABLE THERMOPLASTIC FILMS

Robert Henry Steiner, Rochester, N.Y., assignor to Mobil Oil Corporation, New York, N.Y.

Continuation of Ser. No. 391,177, Aug. 24, 1973, abandoned. This application Mar. 29, 1976, Ser. No. 671,473

Int. Cl.^{2} B32B *5/16, 27/08*

U.S. Cl. 428—331 **5 Claims**

1. A polyolefin film substrate having a surface coating of a heat sealable composition consisting of an interpolymer as the film forming agent of (a) from about 2.5 to about 6 parts by weight of an α-β monoethylenically unsaturated carboxylic acid selected from the group consisting of acrylic acid, methacrylic acid, and mixtures thereof, and (b) from about 97.5 to about 94 parts by weight of neutral monomer esters, said neutral monomer esters comprising (1) methyl acrylate or ethyl acrylate and (2) methyl methacrylate, said interpolymer comprising from about 30% to about 55% by weight of methyl methacrylate when said alkyl acrylate is methyl acrylate, and from about 52.5% to about 69% by weight of methyl methacrylate when said alkyl acrylate is ethyl acrylate; said interpolymer coating being further characterized as containing (1) from about 30% to about 60% by weight based upon the total weight of said interpolymer, of a hot slip agent consisting of a finely-divided, water-insoluble, inorganic solid selected from the group consisting of silica, diatomaceous earth, calcium silicate, bentonite and finely-divided clays, said inorganic solid having a particle size between about 10 and about 200 millimicrons, and (2) said interpolymer coating being further characterized by containing a cold-slip, anti-blocking material comprising finely-divided wax, (3) said coating additionally containing from about 3 to about 15% by weight based on the weight of the acrylic terpolymer coating component of a compound selected from the group consisting of an adduct of rosin and an alpha-beta unsaturated dicarboxylic acid and the partial esters of said adduct and polyhydric alcohol.

4,058,646

MAGNETIC RECORDING MEDIA CONTAINING ELASTOMERIC POLYURETHANE BINDERS IN THE MAGNETIC COATING

Guenter Vaeth, Limburgerhof; Rudolf Bachmann, Frankenthal; Heinrich Hartmann, Limburgerhof; Hans-Joerg Hartmann, Freinsheim; Herbert Spoor, Limburgerhof; Karl Uhl, Frankenthal; August Lehner, Roedersheim-Gronau; Winfried Gutermann, Bad Duerkheim, and Herbert Motz, Ludwigshafen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Filed Sept. 2, 1975, Ser. No. 609,561

Claims priority, application Germany, Sept. 6, 1974, 2442762

Int. Cl.^{2} H01F *10/02*

U.S. Cl. 428—425 **10 Claims**

1. A magnetic recording medium comprising a non-magnetic base and, applied thereto, a firmly adhering magnetic coating consisting essentially of a dispersion of a magnetic pigment in a binder which contains at least 50 percent by weight of a thermoplastic polyurethane which is soluble in tetrahydrofuran, is free from isocyanate groups, has high surface hardness and a high modulus of elasticity and which has been made by reaction of (A) 1 mole of one or more hydroxyl-containing polyesters and/or one or more hydroxyl-containing polyethers having a molecular weight of from 600 to 4,000, wherein said hydroxyl-containing polyester is formed by esterification of aliphatic dicarboxylic acids of 4 to 12 carbon atoms, carboxylic acid esters of 1 to 4 carbon atoms in the alcohol radical, carboxylic acid anhydrides or carboxylic acid chlorides with aliphatic glycols of 2 to 12 carbon atoms which may contain ether groups, or by polymerization of cyclic lactones of 3 to 6 carbon atoms and wherein said hydroxyl-containing polyether is formed by polymerization of cyclic ethers or by reaction of one or more alkylene oxides of 2 to 4 carbon atoms in the alkylene oxide radical with a starter molecule which contains two active hydrogen atoms, in the presence as a chain extender of (B) from 3.5 to 15 moles of a branched-chain aliphatic diol containing from 4 to 10 carbon atoms or a mixture of aliphatic diols containing from 2 to 10 carbon atoms, of which diol mixture at least 50 mole percent is branched-chain and contains from 4 to 10 carbon atoms and (C) from 0 to 1 mole, but not more than 15 mole percent on the basis of the aforesaid aliphatic diol(s) of an aliphatic polyol containing from 3 to 6 hydroxy groups and from 3 to 18 carbon atoms, which (D) from 4.5 to 18 moles of an aromatic diisocyanate containing from 6 to 30 carbon atoms, the amount of isocyanate groups present in the reaction being approximately equivalent to the amount of hydroxy groups in the components A to C.

4,058,647

PROCESS FOR PREPARING LAMINATED RESIN PRODUCT

Takayuki Inoue; Tetsuji Kakizaki, and Masahide Ochiumi, all of Yokkaichi, Japan, assignors to Mitsubishi Petrochemical Co., Ltd., Tokyo, Japan

Filed Feb. 25, 1976, Ser. No. 661,413

Claims priority, application Japan, Feb. 27, 1975, 50-24255; July 25, 1975, 50-90940

Int. Cl.^{2} B32B *27/34, 25/00;* **C09J** *7/00*

U.S. Cl. 428—474 **11 Claims**

1. In a process for preparing a laminated resin product by melt-laminating (1) a modified polyolefin composition with (2) a polyester, a polyamide or a hydrolyzed copolymer of ethylene-vinylacetate, the improvement comprising: laminating a layer of said polyester, polyamide or hydrolyzed copolymer or ethylene-vinyl-acetate with a layer of said modified polyolefin composition comprising a mixture of 60 -97 wt.% of a polyolefin which comprises from 0.1 to 100 wt.% of a polyolefin modified with an unsaturated carboxylic acid or anhydride thereof such that the unsaturated acid or anhydride content is from 0.01 to 10 wt.% of the total polyolefin content and wherein an unmodified polyolefin comprises from 99.9 to 0 wt.% of the total polyolefin content with 40 - 3 wt.% of a rubbery component having a Mooney viscosity (50 $MH_1 + {}_4$ (100° C)) of 40 - 140.

6. A laminated resin product, which comprises: (1) a gas-barrier polymer layer of a polyester, a polyamide or a hydrolyzed copolymer of ethylene-vinylacetate and (2) a modified polyolefin composition layer laminated thereon, wherein said modified polyolefin composition is a mixture of 60 - 97 wt.% of a polyolefin which polyolefin comprises 0.1 to 100 wt.% of a polyolefin modified with an unsaturated carboxylic acid or anhydride thereof such that the unsaturated acid or anhydride content is from 0.01 ot 10 wt.% of the total polyolefin content and wherein an unmodified polyolefin comprises from 99.9 to 0 wt.% of the total polyolefin content with 40 - 3 wt.% of a rubber component having a Mooney viscosity (50 $ML_1 + {}_4$ (100° C)) of 40 - 150.

8. A laminated resin product, which comprises: (1) a gas-barrier polymer layer of a polyester, a polyamide or a hydrolyzed copolymer of ethylene-vinyl acetate and (2) modified polyolefin composition layers which are laminated on both surfaces of said gas-barrier polymer layer and (3) polyolefin layers which are laminated on each of said modified polyolefin composition layers, wherein said modified polyolefin composition is a mixture of 60 - 97 wt.% of a polyolefin which polyolefin comprises from 0.01 to 100 wt.% of a polyolefin modified with an unsaturated carboxylic acid or anhydride thereof such that the unsaturated acid or anhydride content is from 0.01 to 10 wt.% of the total polyolefin content and wherein an unmodified polyolefin comprises from 99.9 to 0 wt.% of the total polyolefin content with 40 - 3 wt.% of a rubber component having a Mooney viscosity (50 $ML_1 + {}_4$ (100°0 C) of 40 - 150.

4,058,648

DENSE PAPER

William G. Louden, Erwinna, Bucks County, Pa. 18920

Division of Ser. No. 564,780, April 3, 1975, Pat. No. 3,989,416, which is a continuation-in-part of Ser. No. 397,220, Sept. 14, 1973, abandoned. This application Aug. 3, 1976, Ser. No. 711,136

Int. Cl.^{2} B05D *3/02;* **B32B** *23/08, 27/10*

U.S. Cl. 428—511 **13 Claims**

1. A dense paper, comprising: a web of cellulosic fibers having an impregnant dispersed throughout the web, said web having a pre-impregnation density in a range of 7–11 lbs./mil and containing after impregnation from about 8.5 to about 50%, by weight, of the impregnant, based on the dry weight of the impregnated web, and said impregnant consisting essentially of from about 35 to about 90% of a rigid polymeric material and from about 10 to about 65% of an inorganic filler, said polymeric material having a glass transition temperature in a range of between about 15° to about 60° C, and said percentages of polymeric material and filler being by weight based on the weight of said impregnant.

4,058,649

COATING COMPOSITIONS AND THERMOPLASTIC FILM SUBSTRATES COATED THEREWITH

Robert Henry Steiner, Rochester, N.Y., assignor to Mobil Oil Corporation, New York, N.Y.

Continuation of Ser. No. 189,743, Oct. 15, 1971, abandoned, which is a continuation-in-part of Ser. No. 16,211, March 3, 1970, abandoned. This application Sept. 23, 1974, Ser. No. 506,075

Int. Cl.^{2} C08J *7/04*

U.S. Cl. 428—518 **4 Claims**

1. A biaxially oriented polypropylene film substrate having a surface coating of a heat sealable composition consisting essentially of an interpolymer of (a) from about 5% to about 15% by weight of a monoethylenically unsaturated acid selected from the group consisting of methacrylic acid and mixtures of methacrylic acid and acrylic acid, (b) from about 50% to about 85% by weight of vinylidene chloride, and (c) from about 5% to about 45% by weight of an alkyl acrylate selected from the group consisting of methyl, ethyl, butyl, isobutyl and octyl acrylates.

4,058,650

BACK MATERIAL OF METAL BAND SAW HIGH IN FATIGUE STRENGTH

Kingo Kiyonaga; Ryousei Ago, and Sei Furuichi, all of Yonago, Japan, assignors to Hitachi Metals, Ltd., Japan

Filed July 9, 1976, Ser. No. 704,085

Claims priority, application Japan, July 11, 1975, 50-84458

Int. Cl.^{2} C22C *38/06*

U.S. Cl. 428—683 **20 Claims**

1. A back material of a metal band saw high in fatigue strength which consists essentially of, by weight, 0.20 - 0.33% C, up to 1.5% Si, up to 1.5% of Mn, 3.5 - 6.5% Cr, 0.05 - 0.40% V, 0.05 - 0.10% Al, 0.02 - 0.30% Nb, at least one of 1.0 - 3.0% Mo and up to 4.0% W and the balance Fe and impurities, the sum of (% Mo) + ½ (% W) being within the range of 1.0 - 3.0%.

4,058,651

RECHARGEABLE AQUEOUS METAL-HALOGEN CELL

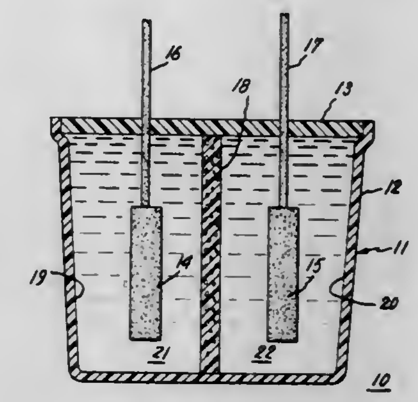
Fritz G. Will, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Oct. 4, 1976, Ser. No. 729,003

Int. Cl.^{2} H01M *10/36*

U.S. Cl. 429—105 **6 Claims**

1. A rechargeable aqueous metal-halogen cell comprising a casing, a pair of spaced apart porous electrode substrates in the casing, a fine-porous separator between the electrode substrates defining a positive and a negative electrode compartment, an electrolytic solution containing a zinc salt selected from the class consisting of zinc bromide, zinc iodide and mixtures thereof in both compartments, and an organic halogen complexing additive in the electrolytic solution of at least the positive compartment, the additive present in an amount from 10 to 50 weight percent of the electrolytic solution, the organic halogen complex additive selected from the class consisting of ethylene glycol, diethylene glycol, triethylene



glycol, propylene glycol, polyethylene glycols having a molecular weight from about 200 to 6000, alkyl ethers and alkyl esters thereof, the alkyl having from one to four carbon atoms, and polypropylene glycol having a molecular weight from about 200 to 6000, alkyl ethers and alkyl esters thereof, the alkyl having from one to four carbon atoms.

4,058,652

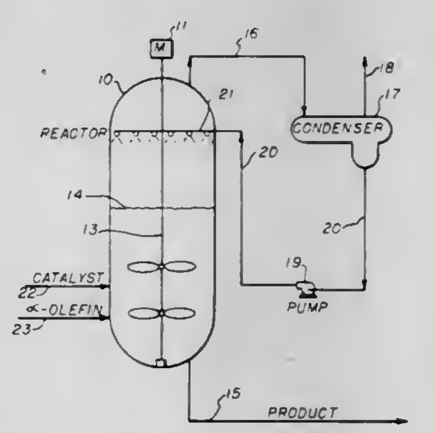
AUTOREFRIGERATION PROCESS AND APPARATUS

Stuart B. Smith; James J. McAlpin, both of Baytown, Tex.; Jose M. A. Peruyero, Morris Plains, N.J.; Ronald L. Hazelton, Mendham, N.J., and Edward F. Upchurch, Chatham, N.J., assignors to Exxon Research & Engineering Co., Linden, N.J.

Filed Feb. 10, 1976, Ser. No. 656,983

Int. Cl.^{2} C08F *2/02, 2/06, 10/00*

U.S. Cl. 526—68 **7 Claims**



1. In an autorefrigeration reaction of alpha-olefins to produce polymers comprising reacting C_2 to C_8 alpha-olefins in the presence of a catalyst at temperatures in the range of 20° to 80° C in a solvent-diluent in liquid phase in a reaction zone, vaporizing a portion of said solvent-diluent from the liquid phase in said reaction zone, said vaporized solvent-diluent containing entrained polymer particles in the range of 3 to 15 microns, removing, condensing said solvent-diluent, and returning a portion of said solvent-diluent to said reaction zone, wherein the improvement comprises eturning condensed, solvent-diluent to said reaction zone as a spray, having a drop average particle size of less than 1000 microns, said vaporized solvent-diluent passing through said spray whereby over50 weight % of said entrained polymer particles of 5 microns and larger are removed from said vaporized solvent-diluent.

4,058,653

PROCESS FOR THE PREPARATION OF POLYMERS OF BUT-1-ENE

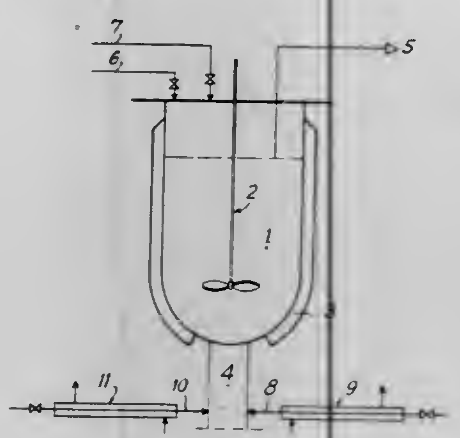
Bernard Boucheron, Bethune, and Emile Gosset, Lillebonne, both of France, assignors to Ethylene Plastique, Courbevoie, France

Filed Sept. 10, 1973, Ser. No. 395,941

Claims priority, application France, Sept. 14, 1972, 72.32647

Int. Cl.² C08F *110/00*

U.S. Cl. 526—159 **5 Claims**



1. In a process for the preparation of a polymer selected from the group consisting of but-1-ene homopolymers and copolymers of but-1-ene containing up to 15% by weight of units derived from at least one other α-olefin by the polymerization or copolymerization of but-1-ene in the presence of a sterospecific Ziegler-Natta catalyst and in a homogeneous reaction mixture, and at a temperature of from 35° to 55° C. the improvement which comprises introducing into the reaction mixture to avoid precipitation of the polymer during the course of the reaction from 1 to 30% by weight of at least one inert hydrocarbon solvent selected from the group consisting of benezene, toluene, xylene, cyclohexane and methylcyclohexane.

5. A process for the preparation of an isotactic polybut-1-ene by polymerizing but-1-ene in the presence of a catalyst comprising an organoaluminium compound and a titanium halogen compound in a homogeneous reaction mixture at a temperature of from 35° to 55° C., the improvement which comprises introducing into the reaction mixture to avoid precipitation of the polymer during the course of the reaction from 2 to 15% by weight of at least one inert hydrocarbon solvent selected from the group consisting of benzene, toluene, xylene, cyclohexane and methylcyclohexane.

4,058,654

PROCESS FOR THE BULK POLYMERIZATION OF α-OLEFINS

Hubert Sutter, Berg. Neukirchen, and Reinhard Peuker, Dormagen, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed July 14, 1975, Ser. No. 595,926

Claims priority, application Germany, July 27, 1974, 2436259

Int. Cl.² C08F *2/02, 10/00, 10/06, 10/08*

U.S. Cl. 526—159 **18 Claims**

1. Process for continuous production of a polymer of an α-olefin monomer by bulk polymerization which comprises continuously introducing the monomer and a catalyst for the polymerization into the feed end portion of a multi-screw conveyor for transport of the monomer and catalyst in admixture through the conveyor and bulk polymerization of the monomer during said transport, the mixture of monomer and catalyst during said transport being under a pressure of 5–200 bars, the temperature of said monomer during said transport following a rising profile with the temperature adjacent the feed end of said multi-screw conveyor being −50° to 30° C and the temperature adjacent the discharge end thereof being 50° to 200° C.

4,058,655

MANUFACTURE OF LOW MOLECULAR WEIGHT POLY-N-VINYLPYRROLIDONE-2

Walter Denzinger, Speyer; Kurt Seelert, and Karl Herrle, both of Ludwigshafen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Filed Mar. 8, 1976, Ser. No. 665,065

Claims priority, application Germany, Mar. 29, 1975, 2514127

Int. Cl.² C08F *2/00, 4/00, 26/08*

U.S. Cl. 526—212 **9 Claims**

1. A process for the manufacture of homopolymers of N-vinylpyrrolidone-2 of low molecular weight having K values of less than 25 as measured by the method of H. Fikentscher, in 5 percent strength aqueous solution at 20° C, and said homopolymers having less than 0.1% residual monomer which comprises polymerizing said vinylpyrrolidone in an organic solvent at above 100° C. in the presence of an organic peroxide which carries an aliphatic or araliphatic radical, respectively of 1 to 8 or of 6 to 8 carbon atoms, on either side of the peroxide group, said vinylpyrrolidone as the monomer being gradually added during the polymerization within a period of 1 to 5 hours.

4,058,656

FREE RADICAL POLYMERIZATION PROCESS EMPLOYING SUBSTITUTED AMINO ACETIC ACID DERIVATIVES

Kenneth H. Markiewitz, and Alfred J. Restaino, both of Wilmington, Del., assignors to ICI United States Inc., Wilmington, Del.

Filed Apr. 5, 1976, Ser. No. 673,938

Int. Cl.² C08F *4/32, 20/06, 20/34, 20/56*

U.S. Cl. 526—215 **15 Claims**

1. A polymerizable system susceptible to free radical polymerization which comprises one or more ethylenically unsaturated compounds and a salt of an initiator consisting essentially of a compound of the formula:

$$B_1-\overset{\overset{R_2}{|}}{N}-CH_2COOH$$

wherein R_1 is a substituted or unsubstituted aryl radical, and R_2 is hydrogen or alkyl, which salt will yield a dissolved initiator compound of the said formula upon acidification, provided that the ethylenically unsaturated compounds to not contain any group with which the acid group of the initiator compound will preferentially react chemically.

4,058,657

CO-CURED COMPOSITIONS OF AMINE-TERMINATED LIQUID POLYMERS AND VINYLIDENE-TERMINATED POLYMERS AND PROCESS FOR PREPARATION THEREOF

Robert William Ireland, Avon Lake, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Continuation-in-part of Ser. No. 593,673, July 7, 1975, abandoned. This application July 29, 1975, Ser. No. 599,990

Int. Cl.² C08F *26/08, 126/06, 26/00;* **C08L** *63/00*

U.S. Cl. 526—263 **12 Claims**

1. A composition comprising
1. 100 parts by weight of at least one amineterminated liquid polymer containing an average from about 1.7 to about 3 amine groups per molecule, said groups being primary, secondary or a mixture thereof, and said polymer having the formula

$$Y-\overset{\overset{O}{\|}}{C}-(B)-\overset{\overset{O}{\|}}{C}-Y$$

wherein Y is a univalent radical obtained by removing

hydrogen from an amine group of a heterocyclic amine containing from 2 to 20 carbon atoms and at least two amine groups, at least two of said amine groups being primary, secondary, or a mixture thereof, and B is a polymeric backbone comprising carbon-carbonlinkages, and
2. from about 80 to about 120 parts by weight of at least one vinylidene-terminated liquid polymer having the formula

$$CH_2=\overset{\overset{R^5}{|}}{C}-A-\underset{\underset{OH}{|}}{\overset{\overset{R^6}{|}}{C}}-CH_2-Z-(G)-Z-CH_2-\underset{\underset{OH}{|}}{\overset{\overset{R^6}{|}}{C}}-A-\overset{\overset{R^5}{|}}{C}=CH_2$$

wherein Z is selected from the group consisting of —S—,

$$-\overset{\overset{H}{|}}{N}-,\quad -\overset{\overset{O}{\|}}{C}-O,$$

and —O—, A is a bivalent radical containing 1 to 10 atoms of at least one atom selected from the group consisting of C, O, S and N, R^5 and R^6 are hydrogen or alkyl radicals containing 1 to 4 carbon atoms, and G is a polymeric backbone comprising carbon-carbon linkages, said vinylidene-terminated polymer containing an average from about 1.7 to about 3

$$CH_2=\overset{\overset{R^5}{|}}{C}-A-\underset{\underset{OH}{|}}{\overset{\overset{R^6}{|}}{C}}-CH_2-Z-$$

groups per molecule,

wherein said backbone comprising carbon-carbon linkages contains polymerized units of at least one vinylidene monomer having at least one terminal $CH_2=C<$ group said monomer being selected from the group consisting of (a) monoolefins containing 2 to 14 carbon atoms, (b) dienes containing 4 to 10 carbon atoms, (c) vinyl and allyl esters of carboxylic acids containing 2 to 8 carbon atoms, (d) vinyl and allyl ethers of alkyl radicals containing 1 to 8 carbon atoms, and (3) acrylic acids and acrylates having the formula

$$CH_2=\overset{\overset{R}{|}}{C}-\overset{\overset{O}{\|}}{C}-O-R^1,$$

said R being hydrogen or an alkyl radical containing 1 to 3 carbon atoms and said R^1 being hydrogen, an alkyl radical containing 1 to 18 carbon atoms, or an alkoxyalkyl, alkylthioalkyl or cyanoalkyl radical containing 2 to 12 carbon atoms.

4,058,658

COPOLYMERS OF ω-BROMOALKYL ESTERS OF ACYCLIC UNSATURATED DICARBOXYLIC ACIDS

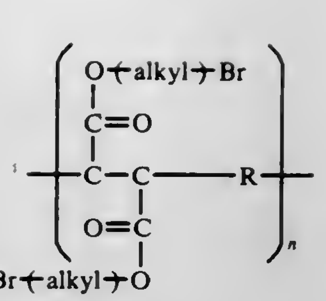
Albert W. Morgan, Collinsville, Ill.; Charles S. Shull, and William Vanderlinde, both of St. Louis, Mo., assignors to Monsanto Company, St. Louis, Mo.

Filed Dec. 22, 1975, Ser. No. 642,929

Int. Cl.² C08F *4/32, 26/06, 126/10, 210/00*

U.S. Cl. 526—261 **8 Claims**

1. Copolymer of the formula



wherein R is the monomeric unit derived from the polymerization of an ethylenically unsaturated comonomer the reactivity value of which, when multiplied by the reactivity value of diethyl fumarate, is less than one and n has a value of from about 10 to about 2,000.

4,058,659

6,8-DISUBSTITUTED PURINE DERIVATIVES OF 9-β-D-RIBOFURANOSYL 3',5'-CYCLIC PHOSPHATE

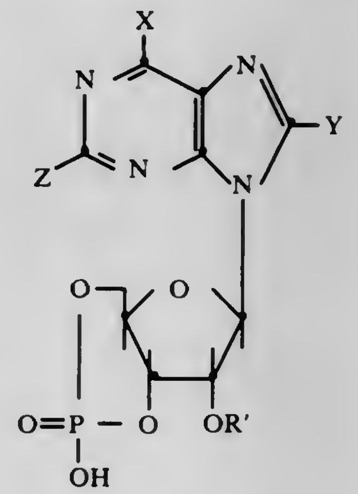
Roland K. Robins, Santa Ana, Calif.; Dennis A. Shuman, El Paso, Tex., and Kay H. Boswell, Mission Viejo, Calif., assignors to ICN Pharmaceuticals, Inc., Irvine, Calif.

Continuation-in-part of Ser. No. 474,923, May 31, 1974, abandoned. This application Sept. 29, 1975, Ser. No. 617,856

Int. Cl.² C07H *19/18, 19/20*

U.S. Cl. 536—27 **17 Claims**

1. A compound of the structure:



wherein Z is hydrogen or $-NH_2$; R' is hydrogen or C_1–C_{18} acyl; X is NR_1R_2, Cl, Br, or SR_3; Y is SR_4; R_1 and R_2 are independently selected from the group consisting of hydrogen, phenyl, C_7 to C_{10} aralkyl, saturated or unsaturated straight or branched chain C_1 to C_7 alkyl, or R_1 and R_2 are lower alkyl joined together to form a pyrrolidino or piperidino ring; R_3 is hydrogen, lower alkyl, phenyl, or benzyl; and R_4 is phenyl, C_7 to C_{10} aralky, or substituted phenyl and substituted C_7 to C_{10} aralkyl wherein the substituents are selected from the group consisting of chloro, bromo, fluoro, methyl, methoxy, or nitro, with the proviso that when one of R_1 or R_2 is hydrogen the other is not.

4,058,660

PROCESS FOR THE CONVERSION OF 6-AMINOPENICILLANIC ACID (6-APA) IN 7-AMINODESACETOXYCEPHALOSPORANIC ACID (7-ADCA)

Antonio Luis Palomo Coll, Maestro Perez Cabrero 7, Barcelona, Spain

Filed Oct. 30, 1975, Ser. No. 627,468

Claims priority, application Spain, Nov. 2, 1974, 431585

Int. Cl.² C07D *501/10*

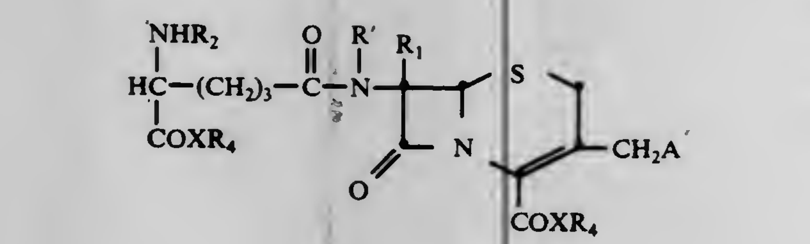
U.S. Cl. 544—18 **2 Claims**

1. In the process for the conversion of 6-aminopenicillanic acid (6-APA) to 7-aminodesacetoxycephalosporanic acid (7-ADCA), the improvement comprises reacting one mole of a compound selected from the group consisting of 2-chloro- and

2-bromobenzyl penicillin-(s)-sulphoxide with from two to four moles of 3-trimethylsilyl-2-oxazolidinone (TMSO) at a temperature of between 60° and 120° C in an inert non-hydroxylic solvent and in the presence of thiourea and a compound selected from the group consisting of triethylamine dimethylaniline, quinoline and picoline p-toluene sulfonate to obtain a solution, thereafter removing the solvent by evaporation, diluting the residue with water, adjusting the pH to 4.2, and isolating 7-aminodesacetoxycephalosporanic acid (7-ADCA).

4,058,661
7-DIACYL CEPHALOSPORINS
Lovji D. Cama, Edison; Burton G. Christensen, Metuchen; Sandor Karady, Mountainside, and Meyer Sletzinger, North Plainfield, all of N.J., assignors to Merck & Co., Inc., Rahway, N.J.
Division of Ser. No. 356,873, May 3, 1973, abandoned, which is a continuation-in-part of Ser. No. 149,364, June 2, 1971, and Ser. No. 223,005, Feb. 2, 1972, abandoned, which is a continuation-in-part of Ser. No. 149,364, June 2, 1971. This application Apr. 7, 1975, Ser. No. 565,495
Int. Cl.² C07D *501/46, 501/44, 501/42, 501/40*
U.S. Cl. 544—21 **5 Claims**

1. A cephalosporin compound of the formula:



wherein R_2 is hydrogen, trichloroethoxycarbonyl, t-butoxycarbonyl, trimethylsilyl, p-methoxybenzyloxy, 2-nitrophenylsulfenyl, 2,4-dinitrophenylsulfenyl, chloroacetyl, or o-nitrophenylthio;

X is oxygen or sulfur;

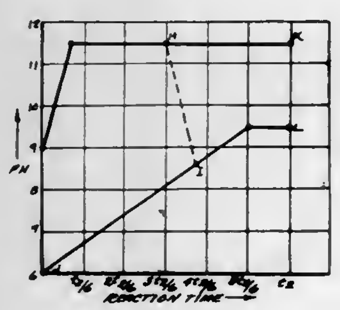
R_4 is hydrogen, methyl, ethyl, t-butyl, phthalimidomethyl, succinimidomethyl, phenacyl, p-bromophenacyl, 2,2,2-trichloroethyl, 2-methylthioethyl, 2-(p-methylphenyl)ethyl, methoxymethyl, 2-(p-methylphenyl)sulfonylethyl, 2-methylaminoethyl, benzyloxymethyl, p-methoxybenzyl, 3,5-dinitrobenzyl, 2-chloroethyl, 2-bromoethyl, benzyl, p-nitrobenzyl, 2,4,6-trimethylbenzyl, 3,5-dichloro-4-hydroxybenzyl, benzhydryl, p-methoxybenzhydryl, acetoxymethyl, pivaloyloxymethyl, methoxymethyl, phenyl, p-nitrophenyl, or 3,5-dinitrophenyl;

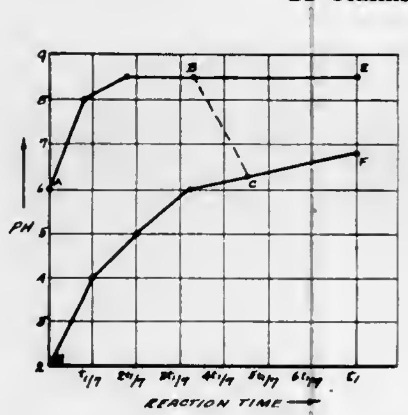
R_1 is hydrogen or methoxy;

R' is phenylacetyl, thienylacetyl, furylacetyl, phenoxyacetyl, phenylthioacetyl, α-azidophenylacetyl or trifluoroacetyl; and

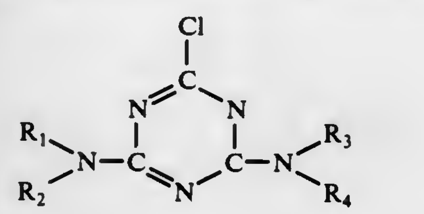
A is carbamoyloxy;

4,058,662
PROCESS FOR THE SUBSTITUTION OF CHLORINE ATOMS OF CYANURIC CHLORIDE
Heinz Haschke, Weissenstein ob der Drau, Austria; Gerd Schreyer, Hanau, Germany; Werner Schwarze, Frankfurt, Germany, and Helmut Suchsland, Rodenbach, Germany, assignors to Deutsche Gold- und Silber-Scheideanstalt Vormals Roessler, Frankfurt, Germany
Filed Feb. 10, 1976, Ser. No. 656,849
Claims priority, application Germany, Feb. 12, 1975, 2505704
The portion of the term of this patent subsequent to Oct. 18, 1994, has been disclaimed.
Int. Cl.² C07D *251/50*
U.S. Cl. 544—208 **21 Claims**



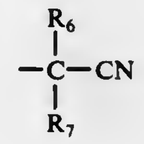


1. A process for the successive substitution of two chlorine atoms of cyanuric chloride comprising reacting the cyanuric chloride with two amines in the presence of an acid acceptor and an organic solvent to produce a triazine of the formula

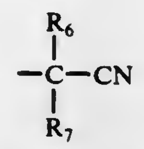


(I)

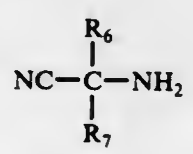
where R_1 and R_2 are lower alkyl, lower alkenyl, cyclo lower alkyl or methylcyclopropyl or such groups substituted by —OH, —OR₅, —SR₅ or CN where R₅ is lower alkyl, with the proviso that one of R_1 and R_2 can be hydrogen, and R_3 is as defined for R_1 or



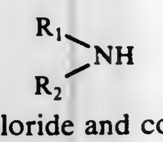
and R_4 is



wherein R_6 and R_7 are alkyl or alkenyl of 1 to 8 carbon atoms, or together with the adjoining carbon atom form a 5 to 7 membered cycloalkyl ring or are cycloalkyl with the proviso that one of R_6 and R_7 can be hydrogen, said process comprising adding 1.00 to 1.05 mole of a first amine of the formula



to a 4.5 to 50 weight % suspension or solution of cyanuric chloride in a mixture of 65 to 85 weight % of a hydrocarbon selected from the group consisting of benzene, toluene, xylene, ethylbenzene, aliphatic hydrocarbons having 5 to 10 carbon atoms, cycloaliphatic hydrocarbons having 5 to 10 carbon atoms and mixtures of such hydrocarbons and 35 to 15 weight % of a ketone having 3 to 8 carbon atoms, maintaining the temperature between about 0° and about 20° C., continuously regulating the pH value of the reaction mixture obtained in accordance with the reaction time by adding alkali that the relationship of pH to reaction time is in the area bonded by ABCD of FIG. 1 of the drawings beginning with the (reaction)time t(step 1) = 0 and containing until a position is reached in the area bounded by BCEF and after reaching a pH of 7.0 maintaining the temperature at about 10° to about 60° C. and after attaining said pH of 7.0 and after there has been added 0.96 ro 1.05 equivalents of alkali per mole of cyanuric chloride adding an at least equimolar amount of a different amine of the formula



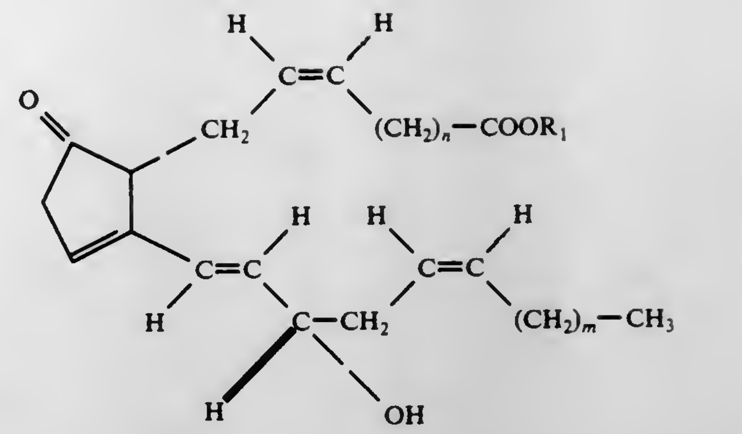
per mole of cyanuric chloride and continuously adjusting the pH value of the reaction mixture according to the reaction time by addition of alkali that the relationship of pH to reaction time is in the area bounded by GHIJ of FIG. 3 beginning with the (reaction)time t(step 2) = 0 until a position is reached in the area bounded by HIKL while maintaining a temperature of 40° to 70° C. and thereafter recovering the triazine product formed, and wherein t_1 is 4 to 10 hours and t_2 is 2 to 8 hours and further wherein the line BC corresponds to the equation pH = $-(12.6/t_1) + 14.35$ and the line HI corresponds the the equation pH = $-(24.857/t_2) + 23.9285$.

4,058,663
STABILIZATION WITH ALKALI METAL COMPOUND MATERIAL OF CERTAIN THERMALLY UNSTABLE DMT
Donald Kirkbright Black, New Castle County, Del., assignor to Hercules Incorporated, Wilmington, Del.
Filed Mar. 2, 1976, Ser. No. 663,165
Int. Cl.² C07C *69/82*
U.S. Cl. 560—3 **8 Claims**

1. A thermally stable composition consisting essentially of (1) thermally unstable fresh dimethyl terephthalate of extremely high purity, free of alkali metal compound material, having no significant concentration of either phosphonic acid moiety or phosphite moity, and produced by the cooxidationesterification process, and (2) dispersed therein at a stabilizing concentration, alkali metal monomethyl terehthalate.

4,058,664
PROSTAGLANDIN C_3
Robert L. Jones, Edinburgh, Scotland, assignor to The University Court of the University of Edinburgh, Edinburgh, Scotland
Continuation of Ser. No. 483,326, June 26, 1974, abandoned, which is a division of Ser. No. 345,347, March 27, 1973, abandoned. This application Jan. 14, 1976, Ser. No. 648,856
Claims priority, application United Kingdom, Mar. 28, 1972, 14520/72; May 17, 1972, 23135/72
Int. Cl.² C07C *177/00*
U.S. Cl. 560—121 **5 Claims**

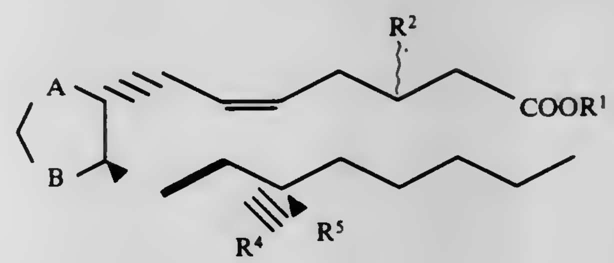
1. An optically active compound of the formula:



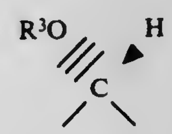
wherein m is 0, 1, 2, or 3 and n is 2, 3, 4 or 5, and wherein R_1 is hydrogen, alkyl of 1 to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, or phenyl substituted with 1, 2, or 3 chloro or alkyl of 1 to 4 carbon atoms, inclusive, and the pharmacologically acceptable salts thereof when R_1 is hydrogen.

4,058,665
NOVEL 3,15-DILOWER ALKYL PGE_2 DERIVATIVES
Noriyoshi Inukai; Masuo Murakami, both of Tokyo; Hidenori Iwamoto, Ageo; Isao Yanagisawa; Toshinari Tamura, both of Tokyo; Yoshio Ishii, Omiya; Tetsuya Shizaoki, Misato; Kenichi Tomioka, Kitamoto, and Tokuichi Takagi, Tokyo, all of Japan, assignors to Yamanouchi Pharmaceutical Co., Ltd., Tokyo, Japan
Filed Nov. 6, 1975, Ser. No. 629,568
Int. Cl.² C07C *177/00*
U.S. Cl. 560—121 **8 Claims**

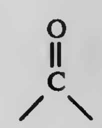
1. 3,15-dilower alkyl prostadienoic acid derivatives represented by the formula



wherein B represents



and A represents



and R^3 represents a hydrogen atom or a protective group selected from the group consisting of a tetrahydropyran-2-yl group, a trilower alkyl silyl group, a triphenylsilyl group, an acetyl group, a propionyl group, and a p-phenylbenzoyl group, R^1 represents a hydrogen atom or a lower alkyl group, R^2 represents a lower alkyl group, and one of R^4 and R^5 represents a free hydroxyl group or a hydroxyl group protected by a protective group as defined with reference to R^3 and the other represents a lower alkyl group.

4,058,666
3,5-LOWER ALKYLENE CARBOXYLIC ESTERS

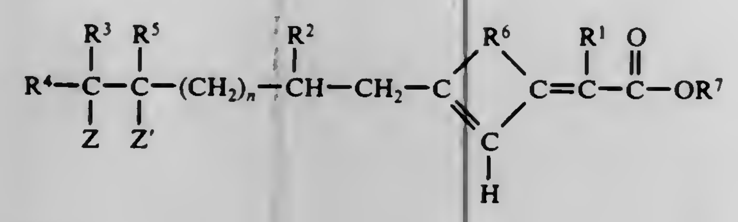
Clive A. Henrick, and Jeffery N. Labovitz, both of Palo Alto, Calif., assignors to Zoecon Corporation, Palo Alto, Calif.

Division of Ser. No. 590,231, June 25, 1975, Pat. No. 4,000,174, which is a continuation-in-part of Ser. No. 464,880, April 29, 1974, abandoned. This application Apr. 30, 1976, Ser. No. 681,967

Int. Cl.^{2} C07C *69/74*

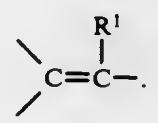
U.S. Cl. 560—126 **13 Claims**

1. A compound selected from those of the following formula:



wherein,

R^1 is hydrogen or lower alkyl;
R^2 is lower alkyl;
R^3 is hydrogen or lower alkyl;
R^4 is lower alkyl;
R^5 is hydrogen or lower alkyl;
Z is hydrogen, chlorine, lower alkyl or one of the groups —OR or —SR in which R is hydrogen or lower alkyl;
Z' is hydrogen or together with Z forms a carbon-carbon bond;
n is one, two or three;
R^6 is methylene, ethylene or trimethylene; and
R^7 is lower alkyl, lower alkenyl, lower alkynyl, cycloalkyl or cycloalkalkyl, said compound having cis/trans isomerism at



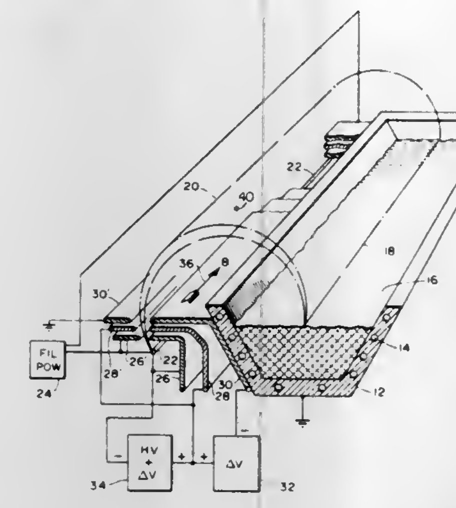
ELECTRICAL

4,058,667
ION PROTECTED LINEAR ELECTRON BEAM METAL EVAPORATOR

Harold K. Forsen, Bellevue, Wash., assignor to Jersey Nuclear-Avco Isotopes, Inc., Bellevue, Wash.

Filed Nov. 10, 1975, Ser. No. 630,706
Int. Cl.^{2} H01J *37/305*

U.S. Cl. 13—31 **14 Claims**



1. An ion protected linear electron beam evaporation system comprising:
a generally trough shaped, elongated crucible containing a supply of a material to be evaporated;
an elongate source of electrons extending in a direction parallel to the long dimension of said crucible;
means for applying an electron accelerating potential over a portion of an arcuate trajectory for the electron beam from said source to said crucible;
means for focusing electrons from said source of electrons on said trajectory onto the surface of the material to be evaporated in said crucible generally in a line along the long dimension of said crucible;
the focused electron beam from said source evaporating the material within said crucible to provide a vapor of said material including a plurality of ions;
means for providing a decelerating electrostatic field over a portion of the trajectory of said focused electron beam beyond said accelerating potential before said crucible and in a potential sufficient to generally impede the motion of the ions in the vapor from penetrating the region of said accelerating potential and striking said source.

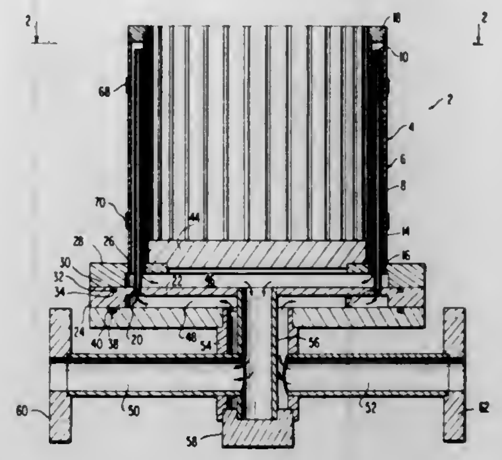
4,058,668
COLD CRUCIBLE

Philip G. Clites, Silverton, Oreg., assignor to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed Mar. 1, 1976, Ser. No. 662,665
Int. Cl.^{2} F27D *1/12*

U.S. Cl. 13—32 **5 Claims**

1. A cold crucible having
a normally vertical side wall formed of a plurality of vertical concentric tube pairs disposed side-by-side, each tube pair being comprised of
an outer tube having a closed upper end and an open lower end and
an inner tube spaced inwardly from the outer tube and having open upper and lower ends,
plural header means respectively connected to the lower ends of each of the tubes in the pairs, and means for con-



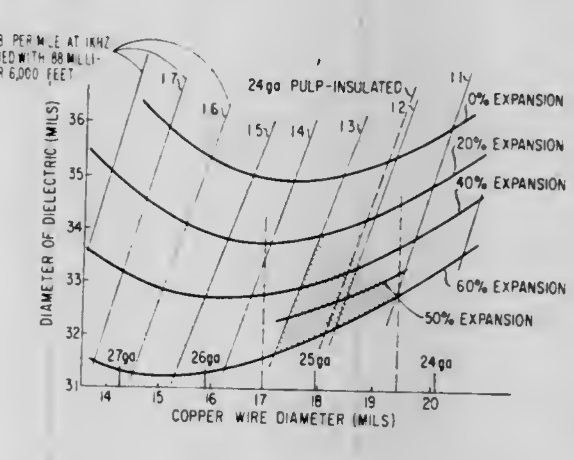
necting water supply and return conduits to the respective header means.

4,058,669
TRANSMISSION PATH BETWEEN NEARBY TELEPHONE CENTRAL OFFICES

Wendell Glenn Nutt, and George Harry Webster, both of Dunwoody, Ga., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Dec. 2, 1975, Ser. No. 637,066
Int. Cl.^{2} H01B *11/04*

U.S. Cl. 174—34 **10 Claims**



1. A telecommunication multipair cable comprising:
one or more units each comprising a plurality of insulated conductors arranged in twisted pairs, each conductor consisting of a copper wire having an insulative dielectric layer comprising a first polyolefin coat expanded with an inert gas, and thereover, a second coat of high density polyethylene, with said first coat constituting the major fraction of the thickness of said dielectric layer, CHARACTERIZED IN THAT:
a. each said copper wire has a diameter of from essentially 17 mils to 19½ mils;
b. the outside diameter of said dielectric layer is in a range of from approximately 31.7 mils to 35.5 mils;
c. and wherein said first coat is expanded by an amount ranging from 20 percent to 60 percent.

4,058,670
BURIED CABLE ENCLOSURE

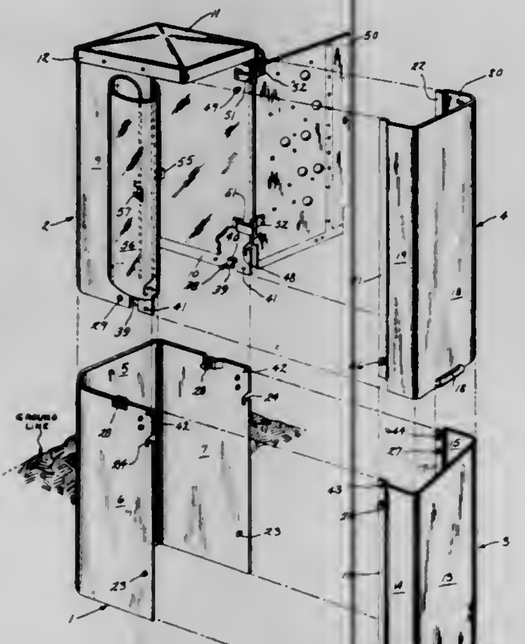
Matthew L. Leschinger, Wauwatosa, Wis., assignor to Utility Products Co., Milwaukee, Wis.

Filed May 10, 1976, Ser. No. 684,750
Int. Cl.^{2} H02G *9/02, 3/08, 15/10;* **H05K** *5/00*

U.S. Cl. 174—38 **10 Claims**

1. An enclosure for electrical apparatus associated with a buried cable installation, comprising:

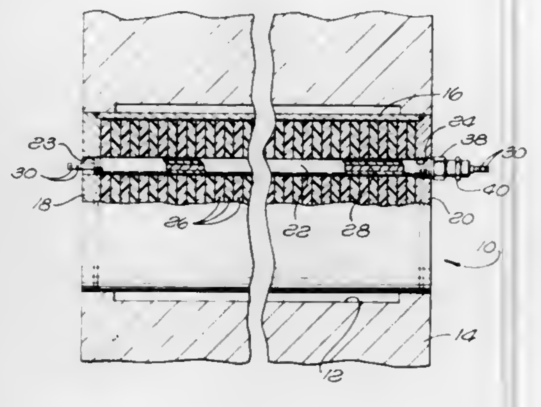
a rear housing assembly including channel-shaped upper and lower housing sections,
both housing sections including a web and a pair of spaced forwardly projecting flanges extending from opposite sides of the web;
the bottom of the web and flanges of the upper housing section overlapping the top of the web and flanges of the lower housing section;
said rear housing assembly further including means for removably joining the upper housing section to the lower housing section;
a lower channel-shaped front cover having a web portion and a pair of spaced flanges extending rearwardly from opposite sides of the web;
the ends of the flanges of the lower housing section overlapping the ends of the flanges of the lower cover,
first means for releasably attaching the flanges of the lower cover to the corresponding flanges of the lower housing section;
a cap fastened to the top of said upper housing section and projecting forwardly therefrom to overlie the top of an upper cover;

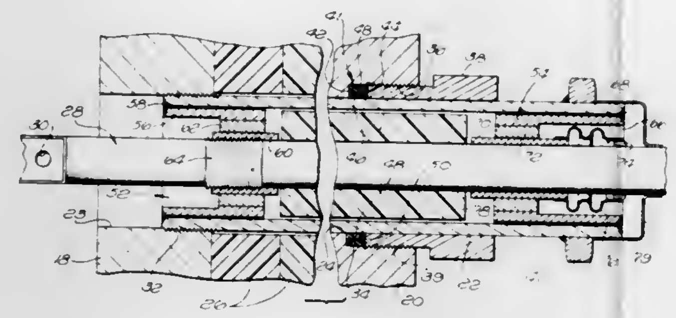


a single upper channel-shaped cover completing the enclosure and having a web and a pair of spaced rearwardly projecting flanges extending from opposite sides of the web;
second means for releasably attaching the upper cover to the upper housing section; and
means for connecting the assembled upper and lower housing sections and lower cover into a subassembly to which the upper cover can be attached, said means for connecting comprising a removable fastener extending through the overlapping flanges of the upper and lower housing sections and the lower cover.

7. In an enclosure for electrical apparatus associated with a buried cable installation including a lower hollow housing, an upper rear housing section and an upper front cover adapted to be mounted to each other and to the top of said lower houusing, and a flexible plastic shield extending along the inner perimeter of said upper rear housing section and having ends extending outwardly therefrom, the improvement wherein:
each end of said shield has an integral T-shaped tab formed adjacent the outer edge and an opening formed at a point spaced inwardly of said edge.

4,058,671
ELECTRICAL PENETRATION ASSEMBLY
George J. Panek, Phoenix; Francis H. Ingham, Scottsdale; Albert R. Sedig, Buckeye, and Gerald R. Nieman, Phoenix, all of Ariz., assignors to International Telephone and Telegraph Corporation, New York, N.Y.
Filed Apr. 7, 1975, Ser. No. 565,479
Int. Cl.² G21C *13/04;* **H01B** *17/30*
U.S. Cl. 174—151 **7 Claims**



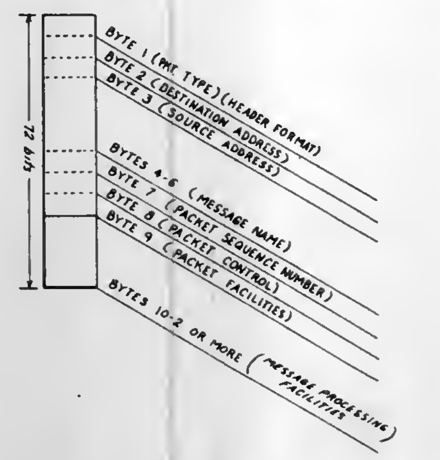


1. An electrical penetration assembly for installation in a containment wall comprising:
a canister adapted to be mounted in an opening extending through the containment wall;
at least one hollow elongated feedthrough pipe extending lengthwise through said canister;
means removably mounting said pipe in said canister;
an elongated conductor extending longitudinally through said pipe;
a first glass-sealed header fixed to one end of said pipe and to one end of said conductor;
a second glass-sealed header fixed to the other end of said pipe and slidably receiving therein the other end of said conductor; and
a flexible bellows surrounding said other end of said conductor and being connected at one end to said conductor and at its other end to said second glass-sealed header whereby said bellows will accommodate any longitudinal expansion of said conductor due to elevated temperatures.

4,058,672
PACKET-SWITCHED DATA COMMUNICATIONS SYSTEM
William C. Crager, West Islip; Sudhindra R. Umarji, New York, both of N.Y.; Robert H. Griffin, Montclair, N.J., and Gerard J. Louit, New Haven, Conn., assignors to International Telephone and Telegraph Corporation, Nutley, N.J.
Filed Nov. 10, 1976, Ser. No. 740,681
Int. Cl.² H04L *11/20;* **H04N** *1/32*
U.S. Cl. 178—3 **31 Claims**

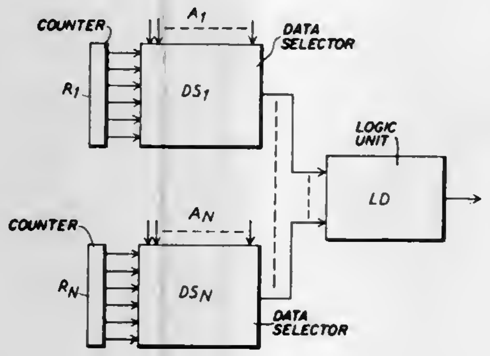
1. A packet-switched data communications system comprising:
means for receiving message information from one or more message sources;
means for subdividing said message information from each of said message sources into a plurality of data packets, each of said packets including at least a portion of said message information;

means for independently transmitting said data packets over said communications system including a network of a plurality of switching nodes for selectively storing and



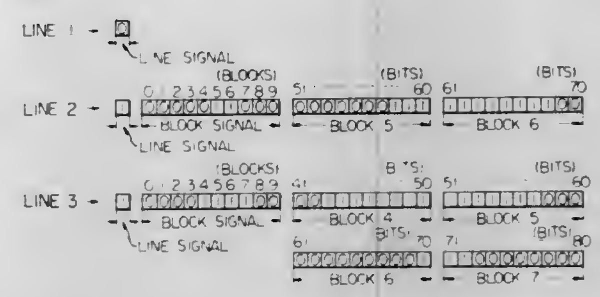
forwarding said packets over said network in accordance with information contained by said packets; and
processing means for storing said data packets for reassembly of said packets into said message information.

4,058,673
ARRANGEMENT FOR CIPHERING AND DECIPHERING OF INFORMATION
Sven Torild Kruse Johansson, Hagersten, Sweden, assignor to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden
Filed Sept. 24, 1975, Ser. No. 616,490
Claims priority, application Sweden, Oct. 17, 1974, 74130873
Int. Cl.² H04L *9/04*
U.S. Cl. 178—22 **2 Claims**



1. Key generator apparatus for producing an internal key for enciphering and deciphering a message, comprising *n* memories each having N memory fields, a number of cycle length counters each counter being associated with all of the memory fields having the same order number in the different memories, each of said counters generating memory addresses for reading out information from the associated memory fields, a plurality of switching means having their inputs connected to said associated memory fields and having outputs and control means operated in response to a received information word for controlling said switching means to forward read out information from only one of said associated memory fields to its output in accordance with said information word, the data at said outputs of said switching means forming a key word which can be used for enciphering.

4,058,674
GRAPHIC INFORMATION COMPRESSION METHOD AND SYSTEM
Yasuyuki Komura, Tokyo, Japan, assignor to Kabushiki Kaisha Ricoh, Tokyo, Japan
Continuation-in-part of Ser. No. 451,161, March 14, 1974, abandoned. This application Feb. 20, 1976, Ser. No. 659,866
Claims priority, application Japan, Mar. 27, 1973, 48-35413
Int. Cl.² H04N *1/40*
U.S. Cl. 358—260 **11 Claims**



1. A method of compressing graphic information for transmission which is encoded in the form of an electrical pulse train in which an original graphic document is scanned in a regular orthogonal pattern having a predetermined number of blocks of equal length and a predetermined number of lines of equal length to produce the electrical pulse train, the number of blocks per line thus being equal to the predetermined number of blocks divided by the predetermined number of lines, comprising the steps of:
a. determining which of the blocks contain pulses and producing electrical block signals indicative thereof;
b. combining in a predetermined arrangement the block signals and only those blocks containing pulses for transmission;
c. determining which of the lines include blocks which contain pulses and producing electrical line signals indicative thereof; and
d. combining the line signals with the block signals and only those blocks containing pulses in a second predetermined arrangement for transmission, the second predetermined arrangement being such that for each line, a line signal is followed by a block signal followed by only those blocks of the line containing pulses when the line contains at least one pulse, and only the line signal is provided when the line is devoid of pulses.

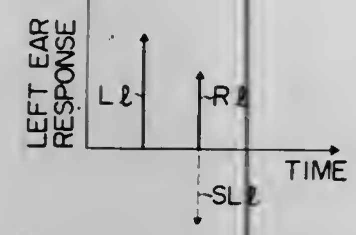
4,058,675
LOUDSPEAKER SYSTEM FOR USE IN A STEREOPHONIC SOUND REPRODUCTION SYSTEM
Fumio Kobayashi, Hino, and Shozo Koshigoe, Sayama, both of Japan, assignors to Sansui Electric Co., Ltd., Japan
Filed June 15, 1976, Ser. No. 696,218
Claims priority, application Japan, June 19, 1975, 50-83940[U]
Int. Cl.² H04R *5/00, 5/02, 5/04*
U.S. Cl. 179—1 G **10 Claims**

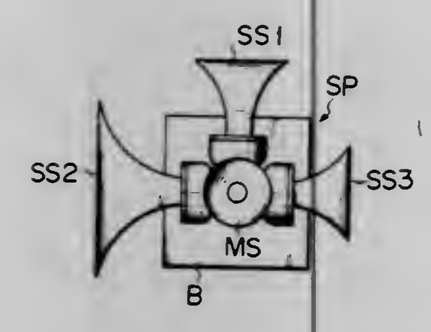
1. A loudspeaker system for use in a stereophonic sound reproduction system for providing a stereophonic sound field using at least one pair of loudspeaker systems placed at equal distances from a listener in a listening room and receiving stereophonically related audio signals, each loudspeaker system comprising:
a main speaker responsive to application of a corresponding one of the stereophonic audio signals thereto to radiate an acoustic energy toward the listener; and
a sub-speaker responsive to application of said corresponding one of the stereophonic audio signals thereto to radiate an acoustic energy which is out of phase with, and smaller in magnitude than the acoustic energy from said main speaker and reaches the listner's corresponding one ear later than the acoustic energy from said main speaker.

7. A loudspeaker system for use in a stereophonic sound

reproduction system for providing a stereophonic sound field using at least one pair of loudspeaker systems placed substantially at equal distances from a listener in a listening room and receiving stereophonically related audio signals, each loudspeaker system comprising:

a main speaker responsive to application of the corresponding one of the stereophonic audio signals thereto for radiating an acoustic energy corresponding to the audio signal; and





first, second and third sub-speakers responsive to application thereto of said corresponding one of the stereophonic audio signals which is smaller in amplitude than, and in an out-of-phase relation to the audio signal applied to said main speaker for radiating acoustic energies respectively in upper, left and right directions with respect to said main speaker.

4,058,676

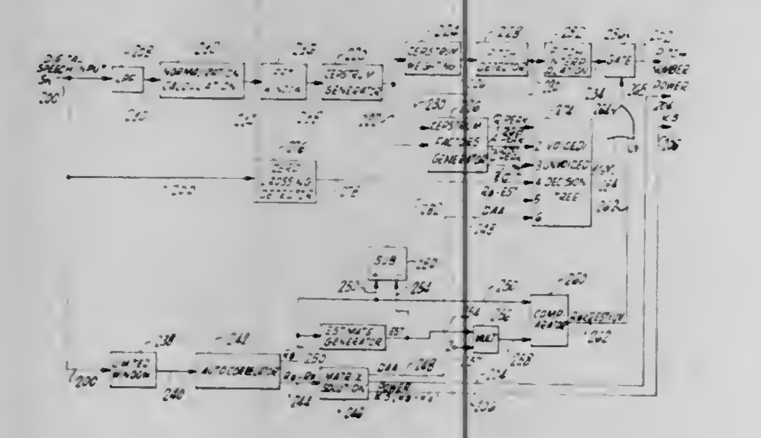
SPEECH ANALYSIS AND SYNTHESIS SYSTEM

Arthur L. Wilkes, Woodland Hills; Fred B. Wade, Ventura, and Robert L. Thompson, Thousand Oaks, all of Calif., assignors to International Communication Sciences, Woodland Hills, Calif.

Filed July 7, 1975, Ser. No. 593,861

Int. Cl.^{2} G10L *1/00*

U.S. Cl. 179—1 SA **92 Claims**



27. A method for analyzing a plurality of speech signals in real time and generating representative control parameters therefor, said method comprising the steps of:

analyzing each of a plurality of speech signals by a Cepstrum technique to generate a pitch period parameter;

analyzing each of said plurality of speech signals to generate a voiced/unvoiced decision parameter; and

analyzing each of said plurality of speech signals by linear prediction technique to generate a predetermined number of coefficient parameters and a power parameter.

67. A pitch pulse generating system for use in a speech synthesizer which receives a pitch period parameter, said pitch pulse generating system comprising:

means responsive to receipt of said pitch period parameter for generating a sequence of control signals; and

means responsive to said sequence of control signals for generating a substantially periodic, amplitude increasing pitch pulse excitation signal.

88. A signal conditioning system for conditioning a Cepstrum signal having as a dimension, in the direction of the ordinate axis, the amplitude of said Cepstrum signal and as a dimension, in the direction of the abscissa, a quantity representing time, said signal conditioning comprising:

means for generating a weighting signal which linearly increases in value with the dimension in the direction of the abscissa corresponding to said quantity representing time of said Cepstrum signal; and

means for adding said weighting signal to said Cepstrum signal along said dimension in the direction of the abscissa thereof to generate a weighted Cepstrum signal.

92. A signal conditioning system for a frame of digital speech data samples, said system comprising:

means for generating a window signal having a characteristic waveshape which is completed in a data sample span which is shorter than said frame of data;

means for centering said window signal data sample span in said frame of speech data samples; and

means for multiplying corresponding sample positions of said frame of speech data and said window signal to generate a limited and windowed frame of speech data.

4,058,677

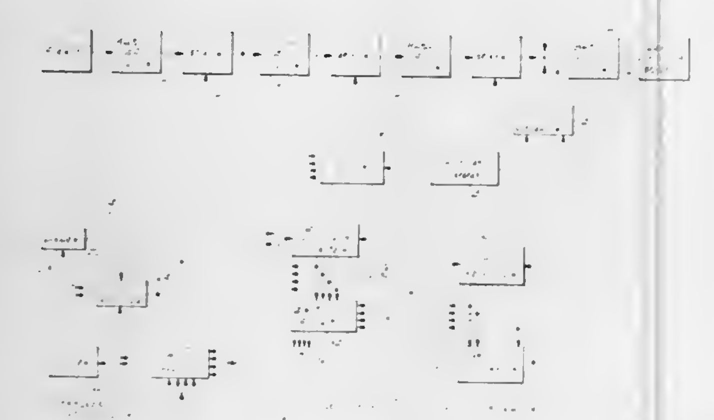
SOUND SCRAMBLING EQUIPMENT

Peter Maitland, Fort Lauderdale, Fla., and William H. Draeger, Corona, Calif., assignors to Lear Siegler, Inc., Santa Monica, Calif.

Continuation-in-part of Ser. No. 464,365, April 26, 1974, abandoned. This application July 30, 1975, Ser. No. 600,133

Int. Cl.^{2} H04K *1/04*

U.S. Cl. 179—1.5 FS **14 Claims**



1. A method of scrambling intelligence within a known frequency spectrum comprising the steps of translating the frequency spectrum of the intelligence by mixing the signals within the known frequency spectrum with a local oscillator signal having a frequency that varies between a plurality of discrete frequencies within a selected band at a selected rate, passing only that portion of the translated frequency spectrum above a selected frequency through a first channel, translating the passed portion to a frequency spectrum at the lower end of the frequency spectrum of the unscrambled intelligence that is not being used by the intelligence translated by the local oscillator signal, passing through a second channel the entire frequency spectrum of the intelligence translated by the local oscillator signal, combining the output of each channel, and limiting the bandwidth of the combined signals to a selected bandwidth.

4,058,678

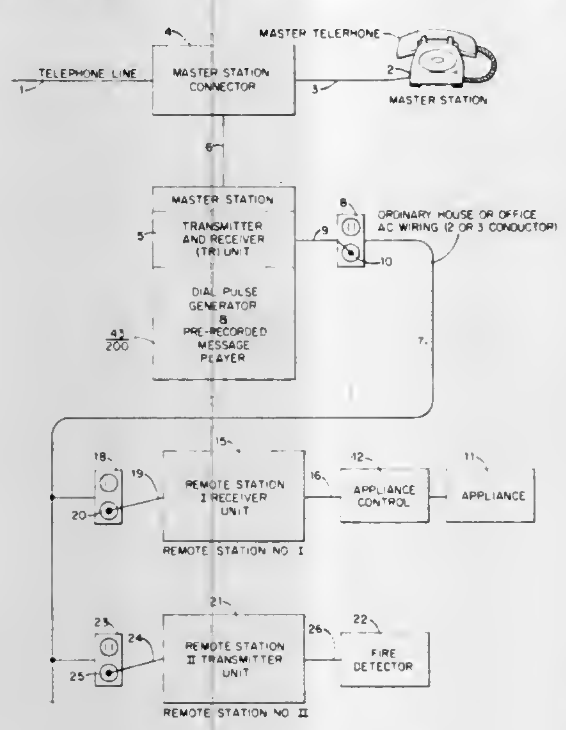
REMOTE SIGNALLING TO A TELEPHONE LINE UTILIZING POWER LINE CARRIER SIGNALS

Robert T. Dunn, Bedford; William M. Brown, Hudson, and John M. Ruddy, Sudbury, all of Mass., assignors to Astech, Inc., Bedford, Mass.

Filed Apr. 7, 1976, Ser. No. 674,557

Int. Cl.^{2} H04M *11/04*

U.S. Cl. 179—2.5 R **8 Claims**



1. A power line telephone extension system for carrying coded signals from (1) a subscriber's telephone line of a conventional telephone communication system wherein a separate telephone line is provided from a central switching system at a central station to each subscriber at the subscriber's premises and each subscriber's telephone line includes at least two wires, the tip line and the ring line to (2) one or more remote locations at the subscriber's premises, over available electric power wires and power wire connector outlets comprising at the subscriber's premises:

a. a subscriber's master location near said subscriber's telephone line and near one of said power wire connector outlets,

b. one or more remote locations each near a power wire connector outlet; and

c. at the master location;

d. a master receiver having its input electrically coupled directly to the telephone line for receiving the coded signals carried on the telephone line,

e. a master transmitter for transmitting the coded signals that are received to the available power wires at the subscriber's premises, and

f. an electrically reactive coupling device for coupling the output of the master transmitter to said available power wires via a power wire connector outlet,

g. whereby, said power wires carry the coded signals including a coded signal addressed to a particular remote location,

h. a coded address signal detector at the particular remote location,

i. a utilization device at said remote location, and

j. means at the remote location responsive to the detector for detecting the particular coded address signals for controlling the utilization device,

k. whereby the utilization device is controlled by the coded telephone line signals.

4,058,679

TELEPHONE ANSWERING DEVICE WITHOUT OUTGOING MESSAGE TAPE

Kazuo Hashimoto, Tokyo, Japan, assignor to Hashimoto Koporeishon Kabushiki Kaisah, Japan

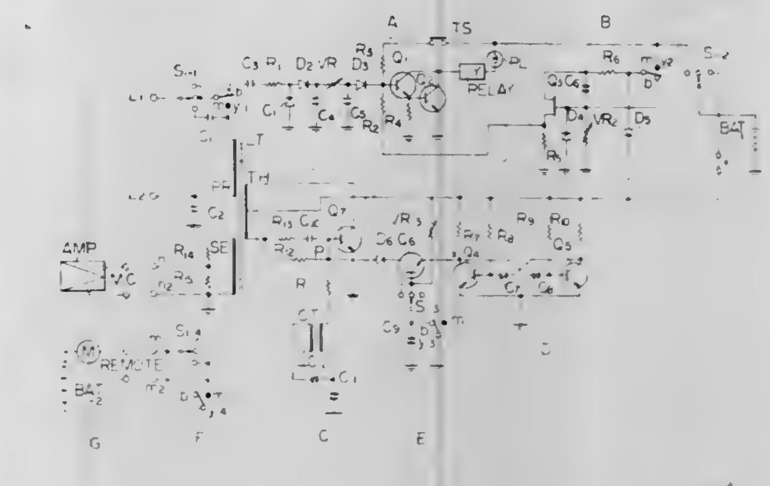
Continuation-in-part of Ser. No. 527,864, Nov. 27, 1974, Pat. No. 3,984,640. This application Apr. 29, 1976, Ser. No. 681,526

Claims priority, application Japan, Jan. 31, 1974, 49-13174

The portion of the term of this patent subsequent to Oct. 5, 1993, has been disclaimed.

Int. Cl.^{2} H04M *1/64*

U.S. Cl. 179—6 R **11 Claims**



1. A telephone answering device with means for controlling an incoming message recorder automatically in response to a calling signal, comprising ringing circuit means for energizing switching means in response to a calling signal; timer means energized through said ringing circuit means for starting the operation of said device and to deenergize the ringing circuit means after a predetermined period of time; a line transformer comprising a plurality of windings with a first winding connected through said switching means to telephone lines of the telephone answering device, a second winding for transmitting an oscillating signal to the telephone lines, and a third winding for introducing a caller's message to an external incoming message recorder; oscillator means with means for energizing said oscillator means through said switching means; said oscillator means being energized at the same time as said timer means to produce a predetermined answering signal; auxiliary switching means with means for setting auxiliary switching means to be off for a substantially short period of time at every preset time interval; and switching gate means connected between said oscillator means and said auxiliary switching means and having means for setting said auxiliary switching means a nonoperative state for substantially a predetermined time interval after energization of the timer means, said auxiliary switching means being switched therafter to an operative state to control thereby the oscillation of said oscillator circuit.

4,058,680

TELEPHONE MESSAGE TIMING SYSTEM

Robert Bartlett Curtis, Columbus, Ohio, assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

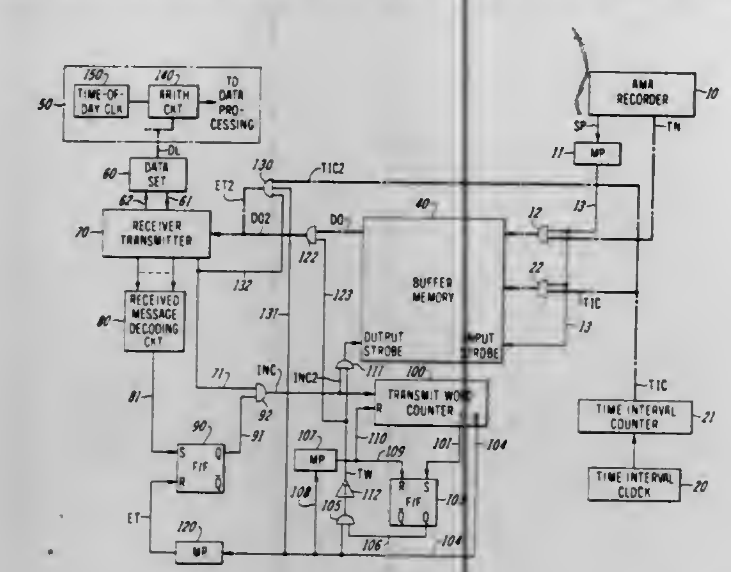
Filed Dec. 6, 1976, Ser. No. 747,509

Int. Cl.^{2} H04M *15/18*

U.S. Cl. 179—7.1 R **12 Claims**

1. In combination in a telephone call billing system, storage means for temporarily storing call data and timing means for determining the delay time of said call data in said storage means comprising means for generating a continuous series of periodic signals, means for counting said signals and for generating successive time interval data representative of particular signal counts, means responsive to the introduction of said call data in said storage means for combining said call data and first particular time interval data to form a first data word in said storage means, means responsive to the subsequent readout from said storage means of said first data word for generating a second data word including second particular time interval

data, and means for comparing said first and second particular time interval data of said first and second data words, respectively, for generating delay signals indicative of said delay time.

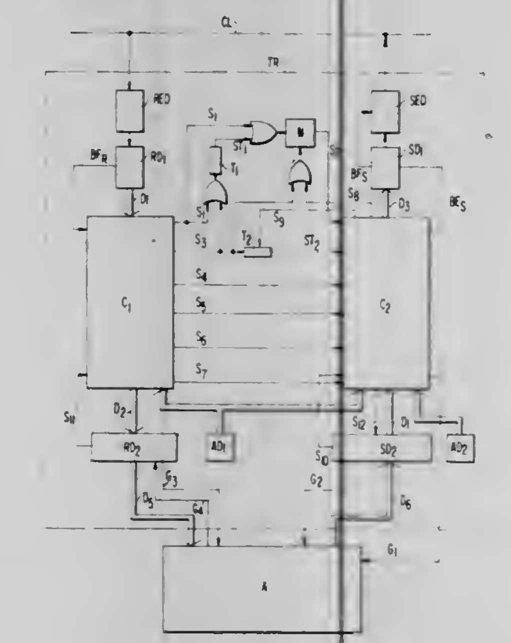


a transfer command signal SEL having a selected address *m* attached thereto to said bus line,

f. receiving at all stations said transfer command signal SEL, and at the station having address *m* establishng command over the bus line, and

g. repeating steps (b) thru (e) with station *m* being the command station, whereby command is continuously transferred from one station to the nest to give all stations command of the bus line consecutively.

4,058,681
INFORMATION TRANSMISSION SYSTEM
Yoshihiro Imaizumi, and Yoshihiko Nishida, both of Kawasaki, Japan, assignors to Fuji Electric Co., Ltd., Kawasaki, Japan
Filed July 23, 1976, Ser. No. 708,442
Claims priority, application Japan, July 26, 1975, 50-91395
Int. Cl.² H04J *6/02*
U.S. Cl. 179—15 AL 4 Claims



1. In an information transmission network of the type comprising a plurality of information processing stations, each having a communications control means and an information processor, linked together by their parallel connection to an information bus line, a method of establishing orderly command over the utilization of said bus line without a special line controlling station, said method comprising,

a. establishing at a given station *i* command over the use of the bus line,

b. transmitting to said bus line from said given station *i* a command established signal ELS indicating that command is established and that said given station *i* has command,

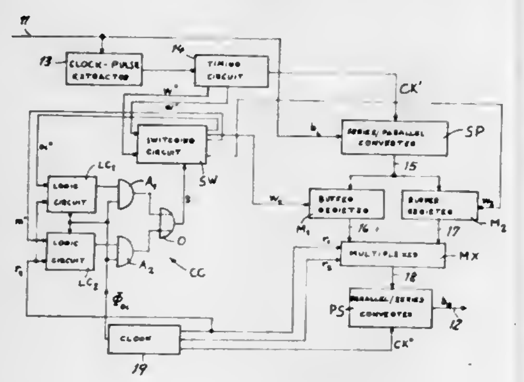
c. receiving at all other stations said command established signal ELS,

d. communicating data between said given station *i* and any other station via said bus line,

e. after said communication or where no communication is required by station *i*, relinquishing command and sending

---

4,058,682
EXPANDABLE MEMORY FOR PCM SIGNAL TRANSMISSION
Roberto Delle Donne, and Luigi Musumeci, both of Milan, Italy, assignors to Societa Italiana Telecomunicazioni Siemens S.p.A., Milan, Italy
Filed June 4, 1976, Ser. No. 692,732
Claims priority, application Italy, June 5, 1975, 24019/75
Int. Cl.² H04J *3/06*
U.S. Cl. 179—15 AF 7 Claims



1. An expandable memory for converting an incoming bit stream of a first bit frequency, divided into a succession of n-bit words where *n* is an integer greater than 2, into an outgoing bit stream of a second bit frequency, comprising:

first timing means controlled by the incoming bit stream for generating on a first pair of outputs a pair of interleaved pulse trains of a cadence ½*n* times said first bit frequency;

second timing means independent of said incoming bit stream for generating on a second pair of outputs a second pair of interleaved pulse trains of a cadence ½*n* times said second bit frequency, the pulses of each train of said second pair being normally spaced from the pulses of corresponding trains of said first pair;

bit-storing means including a pair of n-stage buffer registers, with writing inputs respectively connected to said first pair of outputs and with reading inputs respectively connected to said second pair of outputs;

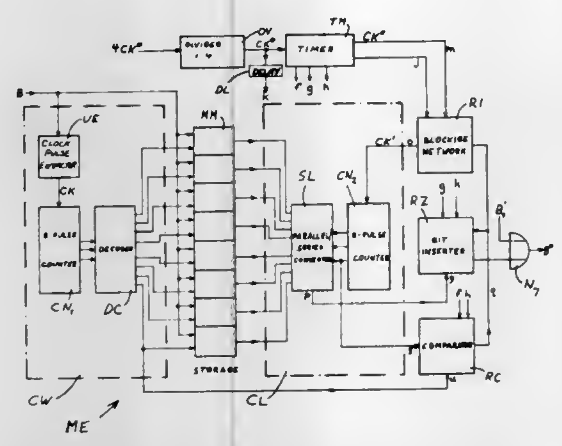
first circuit means for alternately writing the words of said incoming bit stream into said buffer registers under the control of said first pair of pulse trains;

second circuit means for alternately reading the words written in said buffer registers under the control of said second pair of pulse trains;

monitoring means connected to said first and second circuit means for detecting a near-coincidence of a pulse from one of said second pair of pulse trains with a pulse from the corresponding one of said first pair of pulse trains; and

switchover means controlled by said monitoring means for transposing the pulse trains on one of said pairs of outputs, thereby re-establishing a normal spacing between the pulses of corresponding trains of said first and second pairs of pulse trains.

4,058,683
EXPANDABLE MEMORY FOR ASYNCHRONOUS PCM MULTIPLEXER
Francesco Fenoglio, Milan, Italy, assignor to Societa Italiana Telecomunicazioni SIEMENS S.p.A., Milan, Italy
Filed May 7, 1976, Ser. No. 684,012
Claims priority, application Italy, May 9, 1975, 23141/75
Int. Cl.² H04J *3/06*
U.S. Cl. 179—15 AF 10 Claims



1. In a telecommunication system with a transmitting terminal at an input end of a PCM link, a receiving terminal at an output end of said link, a number *z* of incoming lines at said transmitting terminal carrying respective streams of message bits organized in lower-order frames divided into a multiplicity of time slots occurring at a first bit cadence, multiplexing means at said transmitting terminal for the bit-by-bit interleaving of said lower-order frames from said incoming lines into a higher-order frame sent out via said link to said receiving terminal at *z* times a second bit cadence higher than said first bit cadence to provide additional time slots for the inclusion of ancillary bits constituting supervisory signals, a set of first expandable memories respectively inserted between said incoming lines and said multiplexing means for facilitating the introduction of said ancillary bits into said additional time slots, a number *z* of outgoing lines at said receiving terminal respectively paired with said incoming lines, demultiplexing means at said receiving terminal for redistributing the interleaved message bits of said higher-order frame to said outgoing lines, and a set of second expandable memories respectively inserted between said demultiplexing means and said outgoing lines for facilitating the suppression of ancillary bits introduced at said first expandable memories, the improvement wherein each expandable memory of said first set comprises:

register means with *n* stages for the temporary storage of *n* consecutive message bits of an incoming bit stream;

writing-control means for timing the recurrent sequential loading of said stages at a rate corresponding to said first bit cadence;

reading-control means for timing the recurrent sequential unloading of said stages, during intervals of predetermined length representing several subframes of a recurrent higher-order frame, at a rate corresponding to said second bit cadence but with an initial gap at the beginning of each subframe for the insertion of at least one ancillary bit;

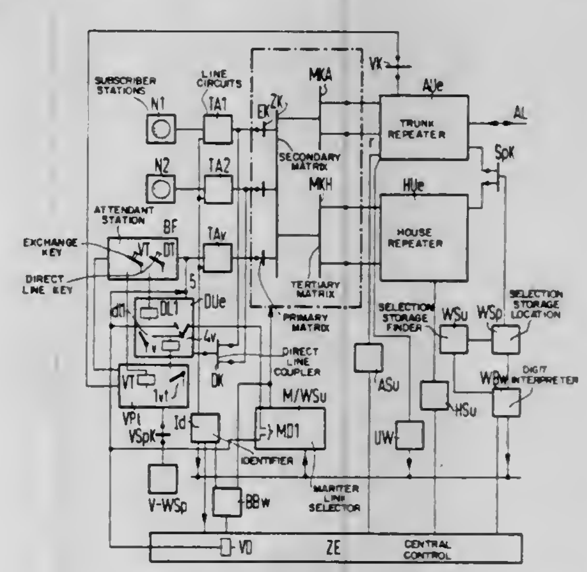
comparison means connected to said writing-control means and to said reading-control means for determining the delay between the loading and the unloading of a given stage of said register means and for generating a preparatory signal upon said delay falling short of a predetermined period equaling less than *n* bit cycles of said first bit cadence;

timing means for generating distinctive control pulses in different subframes, said comparison means including circuitry controlled by said timing means for emitting a stuffing command in response to the generation of said preparatory signal in an early subframe of said higher-order frame;

blocking means responsive to said stuffing command and to a control pulse from said timing means for inhibiting the unloading of a stage of said register means in a predetermined time slot of a later subframe of said higher-order frame, following said early subframe, normally allocated to a message bit; and

insertion means responsive to said stuffing command and to a control pulse from said timing means for generating, in at least one initial gap of a subframe following said early subframe, a discriminating bit informing the corresponding memory of said second set of the absence of a message bit in said predetermined time slot.

4,058,684
APPARATUS FOR DIRECT LINE SWITCHING
Artur Nagel, Deurle, and Roland Wissaert, Drongen, both of Belgium, assignors to Siemens Aktiengesellschaft, Munich, Germany
Filed Oct. 28, 1975, Ser. No. 625,868
Claims priority, application Germany, Oct. 25, 1974, 2450870
Int. Cl.² H04M *3/42*
U.S. Cl. 179—18 BB 1 Claim



1. In a telecommunication system having subscriber stations, an operator station, a central control, identifier means, normal switching network means for completing connections within the system via internal repeater means and without the system via trunk repeater means and a direct line switching network for direct line connections of subscriber stations having the direct connection capability to direct line coupling means, said operator station having exchange key means for connecting said operator station to said trunk repeater and direct line key means for marking and identifying direct line subscriber stations and means responsive thereto for connecting the operator with the corresponding direct line subscriber station via said direct line coupling means, the improvement comprising:

identifying means operable responsive to actuation of said exchange key means and said direct line key means for marking and identifying in said direct line coupling means said direct line subscriber station to which an incoming call from said trunk repeater means is to be connected and

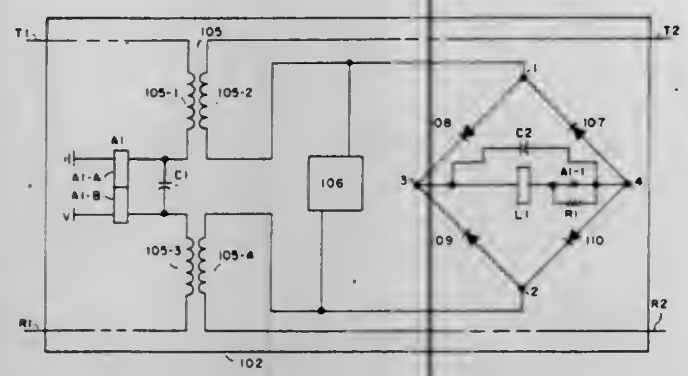
switching means operable responsive to the result of the operation of said identifying means for forming a normal connection path between said trunk repeater means and said direct line subscriber station to which the incoming call is to be connected.

4,058,685
INTEROFFICE LOOP SUPERVISION ARRANGEMENT
William Ferdinand Bowin, Galion, Ohio, assignor to North Electric Company, Galion, Ohio
Filed Nov. 19, 1976, Ser. No. 743,113
Int. Cl.² H04M *7/00*
U.S. Cl. 179—18 AH 6 Claims

1. In a loop signaling interoffice communication trunk cir-

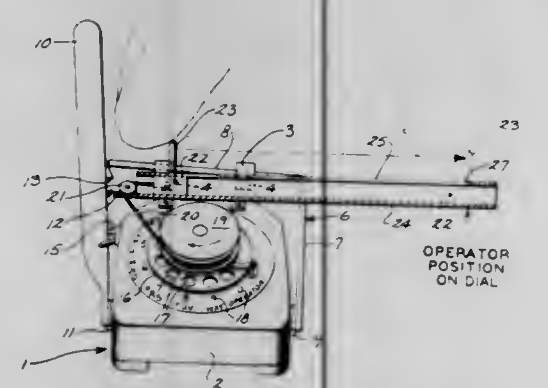
cuit, transformer-coupled to the interoffice transmission facility via a repeat coil, the improvement comprising:

full-wave rectification means having first and second input nodes respectively coupled to one terminal of first and second facility-side windings of said repeat coil and hav-



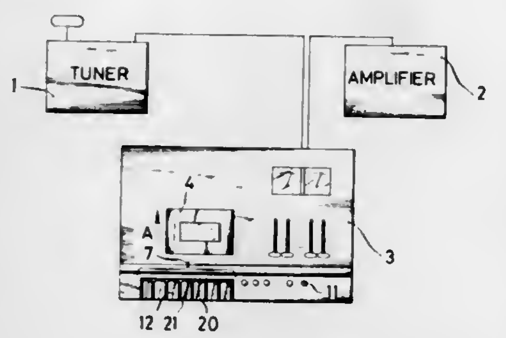
ing first and second output nodes across which is coupled the facility-side midpoint capacitor for said repeat coil, said full-wave rectification means operative as connected to force said facility-side midpoint capacitor to charge with a single predetermined DC polarity.

4,058,686
TELEPHONE ATTACHMENT
John O. Fleming, 1144 N. Main St., Darlington, Wis. 53530
Filed Oct. 6, 1975, Ser. No. 619,942
Int. Cl.² H04M *1/23*
U.S. Cl. 179—90 AT **3 Claims**



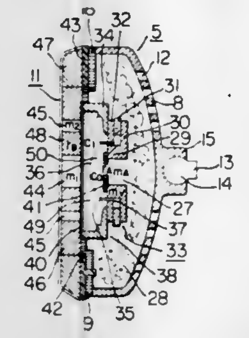
1. In combination with a telephone having a base, a rotatable dial on the base, a cradle associated with the base and from which the telephone receiver has been removed, and an actuating switch button disposed in the cradle, an attachment to be used by a handicapped person to operate the telephone, comprising an arm mounted on the telephone and movable between an operative position wherein the arm overlies the cradle and depresses the switch button and an inoperative position wherein the arm is out of engagement with the switch button, a handle pivoted to the base and projecting upwardly beyond the base to a position where it can be engaged by other than a person's hand, latch means carried by the handle for latching the arm in the operative position, pivotal movement of said handle acting to release said latch means and move said arm to the inoperative position and release said switch button, a drum mounted on the dial, a cable wound around the drum, an elongated tube connected to the base and having a longitudinal slot extending a substantial portion of the length thereof, a slide disposed within the tube for sliding movement therein, said slide being connected to the outer end of said cable, a projection mounted on the slide and extending outwardly through said slot, the outer extremity of said slot forming a stop to limit the sliding movement of said projection in said slot, and linearly spaced indicia on said tube for determining the rotary position of said dial relative to the position of said projection, said projection adapted to be engaged by other than a handicapped person's hand and moved longitudinally of said slot to thereby rotate said dial and enable the person to place a telephone call.

4,058,687
CASSETTE RECORDER WITH SWITCHING FOR A DEVICE FOR NOISE SUPPRESSION
Werner Broghammer, Tennenbronn; Jürgen Krämer, Peterzell, and Helmut Laufer, St. Georgen, all of Germany, assignors to Dual Gebruder Steidinger, St. Georgen, Black Forest, Germany
Filed Aug. 9, 1976, Ser. No. 712,945
Claims priority, application Germany, Aug. 29, 1975, 2538479
Int. Cl.² G11B *31/00*
U.S. Cl. 179—100.11 **6 Claims**



1. A magnetic tape recorder having a means for actuating recording and a means for actuating playback of sounds as well as a noise suppression means, comprising
- switch means for selectively placing the noise suppression means in operation for direct reproduction of radio broadcasts,
- a sound carrier tape cassette having a magnetic tape therein and a rear wall formed with a selectively removable break-through tab in said wall, the presence of said break-through tab constituting an indicia of an absense of a recording being on the tape, and the absense of said break-through tab defining a break-through opening in said wall, constituting an indicia of a presence of a recording on the tape,
- sensor means for sensing said break-through opening and said break-through tab, respectively, of said cassette, when the latter is positioned in an operating position in the tape recorder,
- said sensor means including a first abutment surface on a front side thereof and a relatively rearwardly disposed second abutment surface, said sensor means and said first abutment surface thereof being formed with a recess defined in part by said second abutment surface, said second abutment surface being disposed behind and adjacent said first abutment surface with respect to a sensing movement direction of insertion of said cassette such that three different positions of said sensing means result, namely:
  - a first position wherein said first abutment surface of said sensor means engages against said break-through tab, the latter constituting an unopened wall portion of said cassette;
  - a second position wherein said tab is absent and another portion of said wall of said cassette adjacent said break-through
  - opening of said cassette is inserted in said recess and with said second abutment surface on said sensor means abutting against said another portion of said wall of said cassette adjacent said break-through opening;
  - a third position wherein said sensor means during an absence of said cassette is unabutted by any wall of said cassette;
- locking means for operatively blocking a movement of the means for actuating recording into an operating condition of the latter, said locking means being operatively connected with said sensor means,
- said sensor means for actuating said locking means to be operative for blocking said means for actuating recording when said sensor means is in said second position, and for making said locking means inoperative to block said means for actuating recording when said sensor means is in said first or third positions, respectively.

4,058,688
HEADPHONE
Yasutake Nishimura, Hirakata, and Mitsuhiro Hasegawa, Osaka, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan
Filed Jan. 12, 1976, Ser. No. 648,306
Claims priority, application Japan, May 29, 1975, 50-65055; May 30, 1975, 50-65484; May 27, 1975, 50-71751[U]; May 29, 1975, 50-73205[U]; June 25, 1975, 50-90147[U]
Int. Cl.² H04M *1/05;* H04R *1/28*
U.S. Cl. 179—156 R **5 Claims**



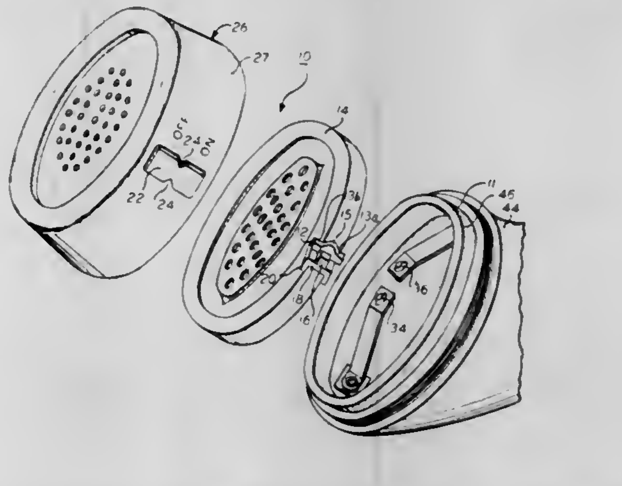
1. Headphone apparatus comprising:
- a head band;
- a pair of headphones, one of said headphones being attached to one end of said head band and the other attached to the opposite end of said head band, each of said headphones including
- a headphone case having a plurality of perforations provided through the rear surface thereof;
- a baffle plate coupled to said headphone case;
- a transducer unit attached to said baffle plate, said transducer unit comprising a vibrator element, a magnetic field producing element including a through hole extending through the center thereof and a first damper material provided between one end of said magnetic field producing element adjacent said through hole and said vibrator element;
- a second damper material located within said headphone case; and
- a cover positioned in the front of said transducer unit, said cover having an air-permeable ear pad including a plurality of through holes therein, the acoustic resistances and inertances of said headphone being so established that the sound pressure versus frequency characteristics of said headphones are such that there are two peaks between 1.5 and 5 KHz and the level differences between the low level area and the peaks are limited within the range of 6 to 17 dB.

4,058,689
VARIABLY ADJUSTABLE SHOULDER TELEPHONE HANDSET SUPPORT
Albert Eugene Stebinger, Santa Monica, Calif., assignor to TSSCO, Santa Monica, Calif.
Filed Sept. 15, 1976, Ser. No. 723,543
Int. Cl.² H04M *1/05*
U.S. Cl. 179—157 **1 Claim**

1. A shoulder support for a telephone handset comprising: a configured frontal member and a configured back member, said frontal and back members being adapted to rest on the chest and shoulder blade of the user, said back member being adapted to make angular contact with the shoulder blade of the user, said frontal and back members being adjustably connected to rest on a shoulder of the user, means for the adjustable connection holding said members in a desired spacing, and means for the adjustable connection holding said back member in varying planes of contact with a shoulder blade of the user, said members being substantially covered on their undersides with a sponge rubber like material; a flexible arm thrusting upwards from the chest portion of said frontal member, said flexible arm being adjustably connected to the chest portion of said frontal member, the means for the adjustable connection holding said flexible arm in an upward or downward adjustment, said flexible arm being firmly and adaptably connected at its other end to a plastic coated, spring actuated handset

holder; comprising a channel of predetermined length and outside diameter, four matched configured springs, means to attach said springs to said channel, said springs being set in opposition at each end of said channel, said springs being set evenly against the outside edge of said channel, said springs being set with the distended side out, said handset holder being adapted to permit the instantaneous insertion or removal of a telephone handset, said handset holder being shorter than the hand held portion of a telephone handset.

4,058,690
TRANSMITTER CUT-OFF DEVICE
Alvin A. Serkez, 26 Tea Place, Tappan, N.Y. 10983
Filed Aug. 11, 1976, Ser. No. 713,395
Int. Cl.² H04M *1/19*
U.S. Cl. 179—167 **5 Claims**



1. In a transmitter cut-off device for use in a conventional hand-held telephone transmitter-receiver unit, said unit including a main body; a transmitter housing having a lip, said housing being disposed in a recess in said body; a pair of spring contacts disposed in said housing; a transmitter cap having a downwardly extending side wall, said cap being removably secured to said main body; and a transmitter having an upper surface in confronting relation with said cap and a bottom surface opposite said upper surface, said transmitter being disposed in the cavity defined between said transmitter housing and said cap, the periphery of said lower surface being seated on said lip, said transmitter having a pair of transmitter

contacts disposed on the bottom surface thereof, each of said transmitter contacts being seated in electrical conducting relation with its corresponding spring contact, said transmitter cut-off device being of the type wherein transmitter cut-off is effectuated by unseating at least one of said transmitter contacts from its corresponding spring contact, the improvement comprising said cap having a vertically extending guideway disposed in said side wall, the interior of said side wall opposite said guideway having a support surface, said support surface being in close confronting relation with the upper surface of said transmitter, and a manually operable actuator extending through said guideway and being secured directly to the body of said transmitter for effectuating movement of said transmitter, said actuator being movable between a first position in which each of said transmitter contacts is held in electrical conducting relation with its corresponding spring contact by the combination of said actuator and said support surface, and a second position in which at least one of said transmitter contacts is unseated form its corresponding spring contact, said lip serving as a fulcrum upon which the body of said transmitter is pivoted.

4,058,691

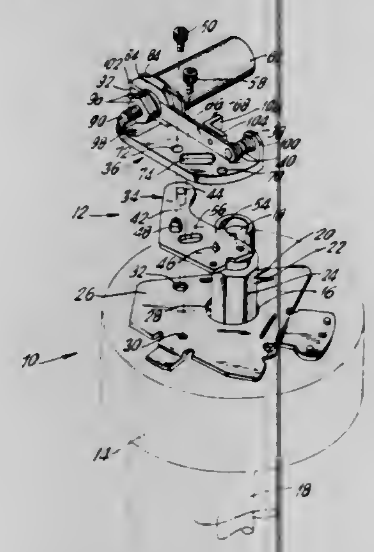
ADAPTOR MOUNTING FOR ADJUSTABLE DISTRIBUTOR CONTACT BREAKER ASSEMBLY MODULE

Milton Wittner, Elmont, N.Y., assignor to Vonsimi Sales Corporation, Great Neck, N.Y.

Filed Aug. 4, 1976, Ser. No. 711,747

Int. Cl.² H01H *19/62;* F02P *7/00;* H01H *9/08*

U.S. Cl. 200—31 R **11 Claims**



1. A tune up device for a distributor of an internal combustion engine wherein the distributor has a cam for opening contact points to provide high tension voltage to each combustion chamber of the engine, comprising:

an adaptor adapted to be adjustably mounted on the distributor adjacent to the cam, and

a replaceable module adapted to be positioned on the distributor adjacent the cam by said adaptor having a pair of preset normally closed contact points, a condensor and a cam follower adapted to be mounted on said adaptor,

wherein once said adaptor is positioned on the distributor upon initial installation of said device said contact points will have the desired gap or dwell angle from module to module without further adjustment.

4,058,692

CONTACT BREAKER ASSEMBLY WITH BREAKER ARM SPACER BLOCK

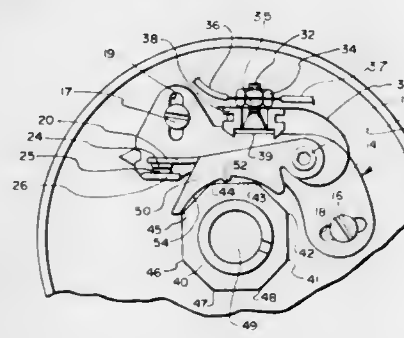
William E. Clark, 246 E. J-12 Ave., Lancaster, Calif. 93534

Filed Nov. 29, 1976, Ser. No. 745,738

Int. Cl.² H01H *19/62*

U.S. Cl. 200—31 A **4 Claims**

1. A breaker point assembly for a distributor of an ignition system for an internal combustion engine, said breaker point assembly being adapted to be adjustably mounted on a movable breaker mounting plate in said distributor, said breaker point assembly being secured in proximity to a cam of said distributor, said breaker point assembly having a cam follower resiliently urged toward said cam and having a breaker arm extending therefrom, the breaker arm terminating in a first breaker contact point, the cam follower being operable between said cam and said breaker arm so as to impart an oscillatory movement to the breaker arm thereby intermittently separating said first contact point from a second contact point coincident with a high point on said cam, the first contact point being electrically isolated from the second contact point; the improvement including a self-adjustable cam follower structure, the structure comprising:



a spacing block mounted on said breaker arm, said spacing block including an arcuate cam abutment surface, the curvature of the arcuate abutment surface corresponding to an arc circumscribed by the cam and adapted to be resiliently urged against said cam; said breaker arm including a cam follower, said cam follower extending a predetermined distance from the arcuate abutment surface, said predetermined distance being proportional to a predetermined gap distance between said first and second contact points, the can follower thereby being adapted to resiliently urge said first contact point away from said second contact point said predetermined gap distance coincident with a high point on said cam, said cam follower being suspended between high points on said cam when said arcuate abutment surface of said spacing block is resiliently urged against said cam thereby permitting the first contact point to touch the second contact point.

4,058,693

ELECTRIC SNAP-ACTION SWITCH

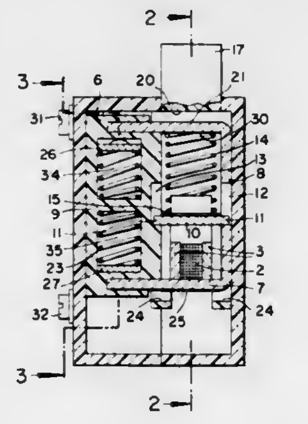
Siegfried Schulz, Wuppertal; Karl G. Eicker, Remscheid, all of Germany, and August Reinke, Radevormwald, assignors to K. A. Schmersal & Co. Schaltgeratefabrik, Wuppertal-Barmen, Germany

Filed Sept. 22, 1975, Ser. No. 615,632

Claims priority, application Germany, Sept. 26, 1974, 2445957

Int. Cl.² H01H *13/28*

U.S. Cl. 200—67 F **9 Claims**



1. An electric snap action switch comprising:

a housing,

a push rod slidable on the housing to be operated for movement in one direction and provided with a spring return,

a jump member on the housing and mounting a contact unit to effect the electric switching, the jump member moving in the direction of the push rod, the jump member and push rod having confronting abutment faces spaced apart to permit movement of the jump member relative to the push rod and to induce movement of the jump member in both directions, the jump member having a pair of magnetic plates confronting each other, and the jump member also having a third plate adjacent one of said magnetic plates and spaced therefrom in the direction of sliding movement of the jump member,

a single stationary retention magnet on the housing and located between and in spaced relation with the magnetic plates of the jump member to attract and alternately engage said adjacent magnetic plates,

a single pre-tensioned compression bias spring oriented endwise of the direction of movement of the rod and having its ends seated on and between the third plate and the adjacent magnetic plate of the jump member, and

the push rod also having spaced spring seats confronting each other adjacent the jump member, the seats also confronting the ends of the compression spring for alternately bearing against and compressing the opposite ends of the spring when the rod is moved in opposite directions to produce accelerated movement of the jump member and contact unit in both directions.

4,058,694

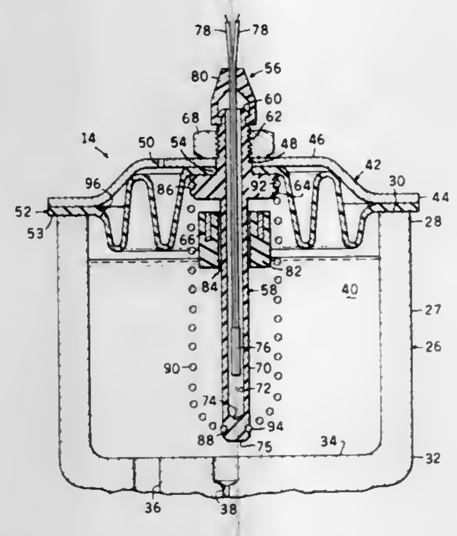
MASTER CYLINDER RESERVOIR WITH VACUUM RELIEF DIAPHRAGM AND GUARDED FLUID LEVEL SENSOR

Robert O. Tuegel, St. Louis County, Mo., assignor to Wagner Electric Corporation, Parsippany, N.J.

Filed Dec. 4, 1975, Ser. No. 637,643

Int. Cl.² H01H *35/18*

U.S. Cl. 200—84 C **11 Claims**



1. A brake fluid reservoir comprising:

a main body portion;

a cap mounted on the main body;

brake fluid level sensor means mounted on the reservoir and protruding thereinto for indicating a predetermined minimum level of brake fluid in the reservoir;

said fluid level sensor including float means for floating on the surface of the brake fluid;

diaphragm means sealingly secured in the reservoir for corresponding movement in response to a decrease in the level of brake fluid containing portion of the reservoir from an air containing portion;

means surrounding the float means for maintaining the movement of the diaphragm from interfering engagement with the movement of the float means;

said brake fluid level sensor means being:

an elongated portion;

said float means being movably mounted on the elongated portion and buoyant in the brake fluid responsive for maintaining a constant position with respect to the level of the brake fluid in the reservoir;

said means surrounding the brake fluid level sensor means being:

coil means mounted on the sensor and concentrically spaced around the elongated portion and the float means for permitting movement of the float relative to the elongated portion and for maintaining the movement of the diaphragm spaced from the elongated portion and from the float means.

4,058,695

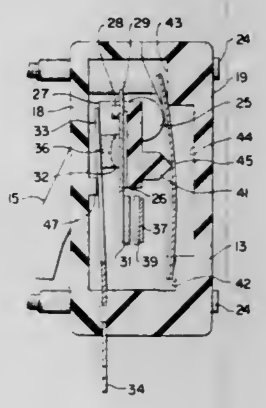
CALIBRATED ELECTRICAL MOTOR SWITCH

Joseph Greenhut, 3333 Warrensville Ctr. Road, Shaker Hts., Ohio 44122

Filed Apr. 1, 1976, Ser. No. 672,666

Int. Cl.² H01H *35/10*

U.S. Cl. 200—153 V **7 Claims**



1. In an electrical switch, the combination of a pivotally movable conductive contact plate carrying a first electrical contact, a single fixed second electrical contact disposed in the path of circuit-closing movement of said plate, a circuit element in the form of a constant-tension cantilever-mounted leaf spring maintaining its free end bearing upon and in electrical contact with said plate and yieldably urging said plate into circuit-closing engagement with said second electrical contact, second spring means yieldably urging said plate into circuit-opening position in opposition to said cantilevered spring, said second spring means having a greater force than said cantilevered spring, movable switch-actuating means interposed between and engaging said plate and said second spring means to selectively isolate said plate from the contact-opening force exerted by said second spring means and cause closing of said contacts by said cantilevered spring in response to closing movement of said switch-actuating means, and terminal connector portions provided for said fixed contact and on said cantilever spring for connecting them into an electrical circuit.

4,058,696

INDUCTION HEATING APPARATUS COMPRISING A STATIC CONVERTER

Georges Antier, and Alain Thiodet, both of Paris, France, assignors to Tocco-Stel, Paris, France

Filed Dec. 15, 1975, Ser. No. 640,562

Claims priority, application France, June 17, 1975, 75.18963

Int. Cl.² H05B *5/04*

U.S. Cl. 219—10.77 **2 Claims**

1. In an induction heating apparatus having an induction heating coil for heating metallic objects coupled thereto, a static converter fed by a d.c. voltage from a rectifier circuit and including:

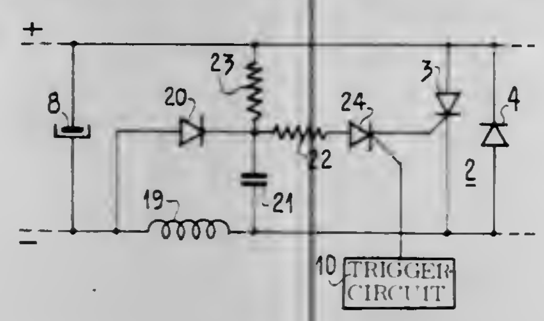
a resonant commutating circuit having a commutating capacitor and a commutating inductor connected in series, said commutating inductor being inductively coupled to said induction heating coil;

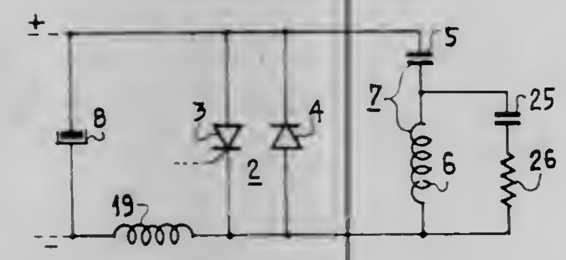
a bidirectional controlled switch having a gate controlled first thyristor and a diode connected in parallel to conduct in opposite directions and connected in parallel to said commutating circuit;

a charging inductor connecting the negative terminal of the rectifier circuit to the junction between said commutating circuit, the cathode of said first thyristor and the anode of said diode, the positive terminal of said rectifier circuit being connected to the junction between said commutating circuit, the anode of said first thyristor and the cathode of said diode, for providing said commutating capacitor with resonant charging to a voltage biasing said first thyristor positively and said diode negatively;

a triggering circuit for recurrently gating said first thyristor to make said bidirectional switch conducting for a full cycle of resonant current through said commutating circuit, the first thyristor conducting during the first half-cycle and the diode during the second half-cycle of said resonant current, whereafter said bidirectional switch ceases to conduct; and

an overshoot protection circuit for providing protection against spurious turning on of said thyristor due to overshoot voltages produced across said charging inductor when said bi-directional switch suddenly ceases to conduct, including a protection diode and a protection capacitor arranged in series and respectively connected by their





free terminals to the terminals of said charging inductor, the anode of the protection diode being connected to the junction between the charging inductor and the negative rectifier output terminal, so that it conducts in a direction opposite the current flow through the charging inductor when the bidirectional switch is conducting, wherein, to utilize the energy stored in the protection capacitor, when said first thyristor is being turned on, said triggering circuit comprising:

an auxiliary thyristor connected in series with a first, current-limiting resistor between the junction of the cathode of said protection diode and said protection capacitor and the gate of said first thyristor, said auxiliary thyristor having a gate fed by recurrent gating pulses for discharging said protection capacitor through itself and the gate-to-cathode junction of said first thyristor; and

a second, starting resistor connected between the positive rectifier output terminal and the junction of said protection capacitor with the cathode of said protection diode and said current limiting resistor for positively charging said protection capacitor when said converter is being switched on.

2. In an induction heating apparatus having an induction heating coil for heating metallic objects coupled thereto, a static converter fed by a d.c. voltage from a rectifier circuit and including:

a resonant commutating circuit having a commutating capacitors and a commutating inductor connected in series, said commutating inductor being inductively coupled to said induction heating coil, a bidirectional controlled switch having a gate controlled thyristor and a diode connected in parallel to conduct in opposite directions and connected in parallel to said commutating circuit;

a charging inductor connecting one of the terminals of said rectifier circuit to one of the junctions between the commutating circuit and the bidirectional switch, the other rectifier terminal being connected to the other junction thereof; and

a rise-rate protection circuit including a series arrangement of a protection capacitor and a protection resistor, wherein the improvement comprises means for connecting said protection capacitor-resistor series arrangement in parallel to said commutating inductor for forming an at least critically damped parallel resonant circuit therewith, whereby, the voltage across said protection capacitor, which follows with a phase lag the one across said commutating inductor while the bidirectional switch conducts, is applied to said thyristor in series with, and with an opposite polarity to the voltage across said commutating capacitor, when said bidirectional switch ceases to conduct, whereafter said commutating capacitor discharges aperiodically across said protection resistor and said commutating inductor in series.

4,058,697

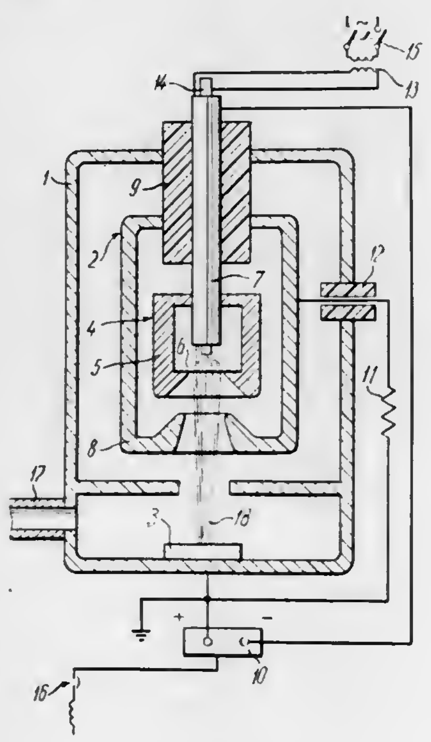
ELECTRON BEAM UNIT FOR HEAT TREATMENT BY ELECTRON BOMBARDMENT TECHNIQUE

Boris Grigorievich Sokolov, Nosovikninskoe shosse, 11, kv. 64, Zheleznodorozhny Moskovskoi oblasti, and Georgy Fomich Zaboronok, pereulok Obukha, 4, kv. 56, Moscow, both of U.S.S.R.

Continuation of Ser. No. 304,828, Nov. 8, 1972, abandoned. This application Nov. 3, 1975, Ser. No. 628,891

Int. Cl.² H01J ***1/11***

U.S. Cl. 219—121 EB **3 Claims**



1. An electron beam unit for heat treatment by the electron bombardment technique comprising a vacuum chamber with the item being processed contained therein; an electron beam gun disposed inside said vacuum chamber; said electron beam gun including an electron-emitting cathode, an accelerating electrode so disposed in relation to said cathode that said accelerating electrode in conjunction with said cathode shapes the emitted electrons to obtain an electron beam; insulator

means electrically insulating said cathode from said accelerating electrode, said insulator means being disposed between said item being processed and said accelerating electrode for also electrically insulating said accelerating electrode from ground; whereby the same electrical insulator strength is provided between the cathode and accelerating electrode and between the item and the accelerating electrode, a power supply disposed in external relationship to said vacuum chamber, the positive pole of said power supply being connected to said item, while the negative pole of the power supply is connected to said cathode of said electron beam gun; a resistor for limiting the discharge current that arises between said cathode and said accelerating electrode, one lead of said resistor being connected to said item and said positive pole of said power supply while the other lead of said resistor is connected directly to said accelerating electrode so that, in the normal operating mode of said electron beam gun, said resistor is shunted by said electron beam whereas the onset of a discharge between said cathode and said accelerating electrode will switch-in said resistor.

4,058,698

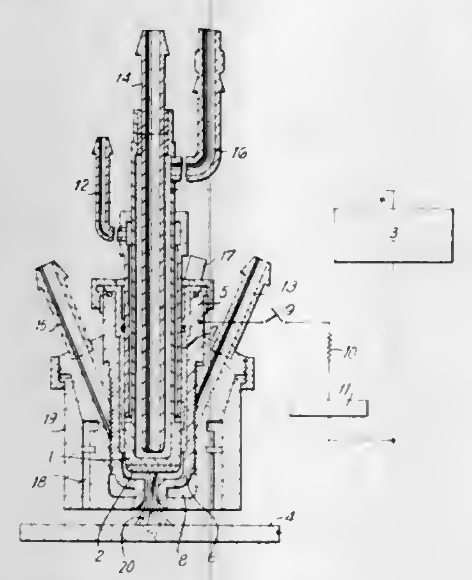
METHOD AND APPARATUS FOR DC REVERSE POLARITY PLASMA-ARC WORKING OF ELECTRICALLY CONDUCTIVE MATERIALS

David Grigorievich Bykhovsky, Konjushenny pereulok, 1/6, kv. 18, and Alexandr Ivanovich Danilov, Vasilievsky Ostrov, I6 linia, 79, kv. 15, both of Leningrad, U.S.S.R.

Continuation of Ser. No. 457,206, April 2, 1974. This application Oct. 30, 1975, Ser. No. 627,035

Int. Cl.² B23K ***9/00***

U.S. Cl. 219—121 P **13 Claims**



1. A method of DC reverse polarity plasma-arc working of electrically conductive materials with the aid of a plasmatron, with a non-consumable electrode having an insert of high-melting material, said method comprising the steps of: coupling the non-consumable electrode of a positive terminal of a DC source; coupling another terminal of the DC source to the material being worked; coupling said other terminal of the DC source via a resistor to the cylindrical channel of a nozzle of the plasmatron; feeding a plasmaforming gas and a cooling agent into the plasmatron; striking a pilot electric arc between the non-consumable electrode and said nozzle of the plasmatron; striking a main arc between the non-consumable electrode and the material to be worked with a simultaneous quenching of the pilot arc; adjusting the operating current, the composition and consumption of the plasmaforming gas so that during the working process the zone of the anode arc near-the-electrode is greater than the diameter of the cylindrical portion of the nozzle channel; and placing at least a portion of the zone of the arc near-the-electrode in electric contact with said high-melting insert of the electrode.

4,058,699

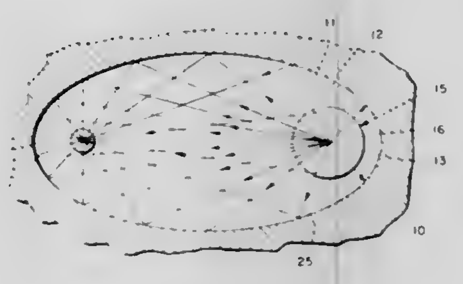
RADIANT ZONE HEATING APPARATUS AND METHOD

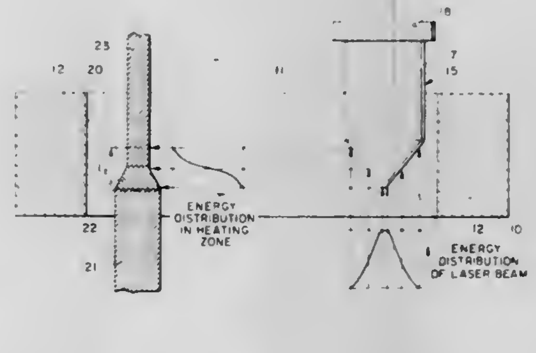
Curtis P. van Vloten, Somerville, Mass., assignor to Arthur D. Little, Inc., Cambridge, Mass.

Filed Aug. 1, 1975, Ser. No. 601,157

Int. Cl.² B23K ***28/00;*** **F21V** ***7/00;*** **B01J** ***17/08;*** **G02B** ***5/10***

U.S. Cl. 219—121 LM **36 Claims**





1. An apparatus for focusing a radiation beam around the surface of at least one body within a relatively narrow band height, comprising in combination

a. means defining an elliptical cavity of predetermined height, said cavity having a first focal axis and a separate second focal axis extending therethrough, the wall of said cavity being optically reflective;

b. conically-configured reflecting means positioned within said elliptical cavity such that the longitudinal axis of said conically-configured reflecting means coincides with said first focal axis of said elliptical cavity whereby radiation from a source of coherent radiant energy can be directed longitudinally toward said conically-configured surface so as to strike the surface of said conically-configured reflecting means to be directed against said wall of said elliptical cavity and to be thereby reflected to form a heating zone of controlled length and of substantially uniform energy distribution at any one level along said length of said heating zone around said second focal axis of said elliptical cavity.

28. A method for forming around the surface of a body a heating zone of radiant energy having a relatively narrow, controllable height, comprising the steps of

a. providing an elliptical cavity of a predetermined height and having two spaced-apart optical axes;

b. positioning within said elliptical cavity a conically-configured reflector so that the longitudinal axis of said reflector coincides with one of the optical axes of said elliptical cavity;

c. directing a beam of radiant energy longitudinally onto said conically-configured surface of said conically-configured reflector whereby said radiant energy is reflected onto the wall of said elliptical cavity and thereby through further reflection is concentrated along the other of said optical axis to form a heating zone of a predetermined length; and

d. positioning the body, which is to be heated in said heating zone, within said elliptical cavity such that its axis coincides with said other of said optical axes.

4,058,700

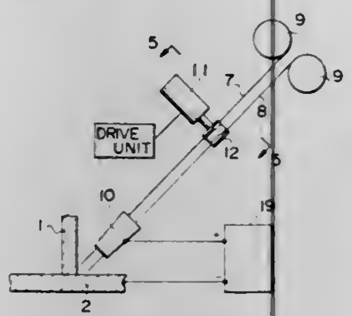
METHOD FOR HORIZONTAL FILLET WELDING OF STEEL PLATES

Yoshinori Ito, Nishinomiya; Masaaki Kawai, Ashiya, and Masahiko Ikeda, Minoo, all of Japan, assignors to Sumitomo Metal Industries Ltd., Osaka, Japan

Filed Feb. 3, 1976, Ser. No. 654,950

Int. Cl.² B23K *9/00*

U.S. Cl. 219—137 R **6 Claims**



1. A method for horizontal fillet welding of a vertically oriented steel plate to a horizontally oriented steel plate which have been butted together to a T-shape, the welding being conducted along the line of intersection therebetween, the method comprising a single pass of the steps of

directing a pair of spaced-apart welding wires in the general direction of said line of intersection, each of said wires having a predetermined diameter, said wires being disposed such that one is directed towards the vertically oriented steel plate and the second is directed toward the horizontally oriented steel plate and such that the centerline therebetween intersects with the line of intersection between said plates; and

alternately feeding during the single pass said wires at predetermined time intervals towards said plates; and when feeding said wires, feeding said wire directed towards said vertically oriented plate at a rate equal to or less than the rate of feeding said wire directed towards said horizontally oriented plate.

4,058,701

GLOW ELEMENT ARRANGEMENT FOR ELECTRIC CIGARETTE LIGHTERS

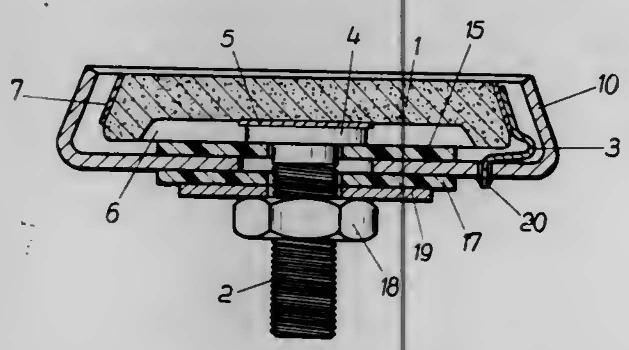
Carl F. Gruber, Frankfurt am Main-Griesheim, and Georg Seibel, Dreieichenhain, both of Germany, assignors to Schoeller & Co. Elektrotechnische Fabrik GmbH & Co., Frankfurt, Germany

Continuation-in-part of Ser. No. 575,079, May 6, 1975, abandoned. This application Dec. 21, 1976, Ser. No. 753,011

Claims priority, application Germany, May 14, 1974, 2423431

Int. Cl.² F23Q *7/22*

U.S. Cl. 219—270 **11 Claims**



1. A glow element arrangement for electric cigarette lighters comprising:

a disk-shaped semiconductor element of predetermined geometric configuration;

first and second electrical contacts being electrically and mechanically secured to the element;

a metallic pan surrounding said disk, said pan being electrically connected to said first contact; and

a metal supporting bolt for supporting said disk and said pan, said bolt passing through a bore in the bottom of the pan and being electrically insulated therefrom, said bolt being electrically connected to said second electrical contact.

4,058,702

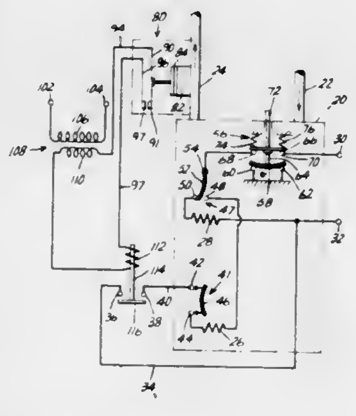
FLUID HEATING APPARATUS

James B. Jerles, Tierra Verde, Fla., assignor to Electro-Thermal Corporation, Pensacola, Fla.

Filed Apr. 26, 1976, Ser. No. 679,881

Int. Cl.² H05B *1/00*

U.S. Cl. 219—321 **9 Claims**



1. Fluid heating apparatus comprising:

a fluid tank having a fluid outlet through which fluid from the tank may flow, said outlet being in heatdissipating relation to a heat energy absorbing medium;

first heating means for heating the fluid in said tank to a first temperature; and

control means for sensing the outlet fluid temperature and for activating said first heating means responsive to fluid temperatures above a predetermined level in said outlet and for deactivating said heating means in response to fluid temperatures in said outlet below said level.

4,058,703

CONTROL SYSTEM FOR FRYING APPARATUS

George M. Price, Shreveport, La., assignor to The Frymaster Corporation, Shreveport, La.

Division of Ser. No. 479,761, June 17, 1974, Pat. No. 3,870,859. This application Feb. 18, 1975, Ser. No. 550,349

Int. Cl.² H05B *1/02*

U.S. Cl. 219—492 **9 Claims**

1. A control circuit for pyrolytic cleaning of heating elements in a cooking system comprising:

a power supply;

actuable relay means in said circuit for connecting and disconnecting the heating elements to the power supply;

timing control means associated with the relay means for cyclically actuating and deactuating the relay means to gradually raise the temperature of the heating elements; and

switching means in thermal communication with the heating elements for sensing the temperature of the elements and for overriding the relay means to disconnect the heating elements from the power supply when the elements reach a predetermined temperature.

4,058,704

COILABLE AND SEVERABLE HEATING ELEMENT

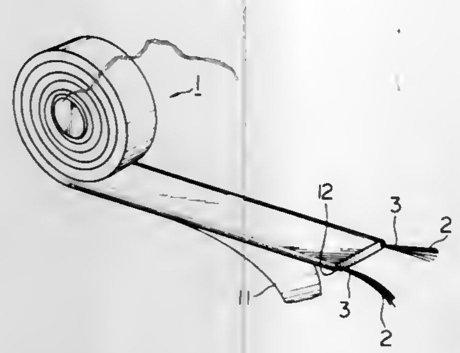
Masao Shimizu, Tokyo, Japan, assignor to Taeo Kim, Fuchu, Japan

Filed Dec. 8, 1975, Ser. No. 638,910

Claims priority, application Japan, Dec. 27, 1974, 49-3820; Dec. 27, 1974, 49-3819

Int. Cl.² H05B *3/34*

U.S. Cl. 219—528 **4 Claims**



1. A heating element comprising a flexible tape rolled into a coil, said tape including an elongate carrier of woven cloth impregnated with a flexible carbon-containing resistance layer enveloped in a flat resinous sheath, a layer of inorganic fibers forming a flexible heat shield on one side of said carrier within said sheath, and two transversely spaced conductors extending adjacent the longitudinal edges of said carrier over the entire length thereof in conductive contact with said resistance layer, said tape being transversely severable into sections with exposure of terminal portions of said conductors by removal of parts of said sheath and said carrier, said sheath having an adhesive-coated surface on the side of said heat shield and a backing strip detachably bonded to said surface.

4,058,705

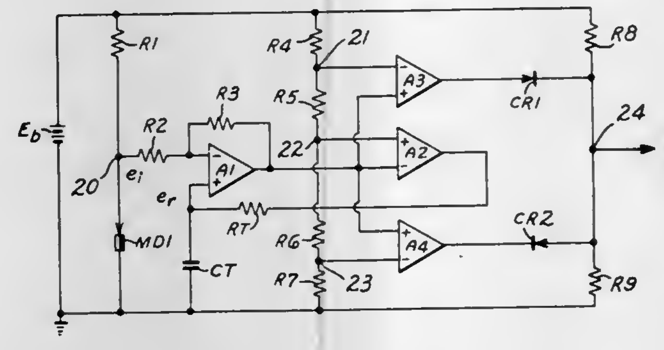
MAGNETIC CARD READER

John W. Cannon, 7129 Gerald Ave., Van Nuys, Calif. 91406

Filed Feb. 5, 1976, Ser. No. 655,388

Int. Cl.² G06K *7/08;* **G06G** *7/14;* **G11B** *5/12*

U.S. Cl. 235—449 **4 Claims**



1. In a reader for a coded card having a plurality of magnetized spots of predetermined polarity, the combination of:

a housing including guide means for receiving a card;

magnetodiode means carried in said housing for motion relative to the magnetized spots of the card;

a voltage source connected across said magnetodiode means whereby a change in magnetic field at said magnetodiode means produces a voltage signal;

a first amplifier having said voltage signal connected as one input thereof;

a second amplifier having the first amplifier output connected as one input thereof;

a time delay circuit connected between the second amplifier output and the second input of said first amplifier providing a variable reference voltage input to said first amplifier forming a self balancing nulling circuit so that the voltage at the second input of said first amplifier tracks the voltage at the first input of said first amplifier with a delay provided by said time delay circuit;

third and fourth amplifiers, each having the first amplifier output connected as one input thereof;

a voltage divider circuit connected across said voltage source and providing separate reference voltages as second inputs to each of said second, third and fourth amplifiers, with said second amplifier intermediate third and fourth amplifiers;

first and second resistors connected in series across said voltage source; and

first and second diodes connecting the outputs of said third and fourth amplifiers respectively to the junction of said first and second resistors, with one diode connected in opposite polarity to the other, with said junction providing a three level voltage pulse stream corresponding to the code of the card with a voltage pulse for each spot and with the voltage level returning to an intermediate level after each pulse.

4,058,706

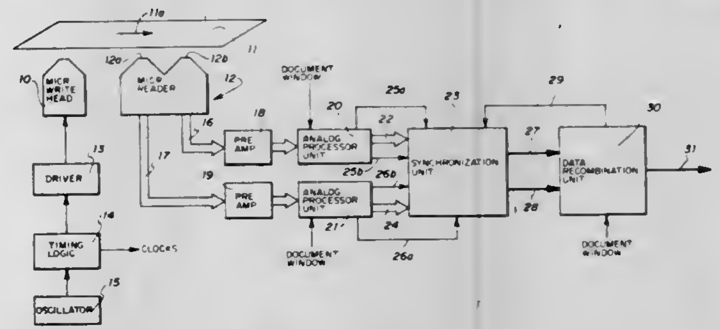
MICR DATA LIFT SYSTEM

Charles T. Kao, Garland; James O. Lafevers, Richardson, and Donny R. Walker, Carrollton, all of Tex., assignors to Recognition Equipment Incorporated, Dallas, Tex.

Filed Apr. 23, 1976, Ser. No. 679,676

Int. Cl.² G06K *7/08, 7/14, 9/18;* **G11B** *5/10*

U.S. Cl. 235—449 **14 Claims**



1. A method of formatting conditioned responses of a pair of asynchronously operating multi-element read heads to accommodate a synchronization to a common fixed frequency, which comprises:

a. selecting at a scan rate a first maximum response of a first of said pair and a second maximum response of a second of said pair;

b. generating a first data peak signal at said scan rate if said first maximum response exceeds a reference width, and a second data peak signal if said second maximum response exceeds said reference width;

c. normalizing said first and said second maximum response, and respectively forming therefrom a first and a second reference threshold;

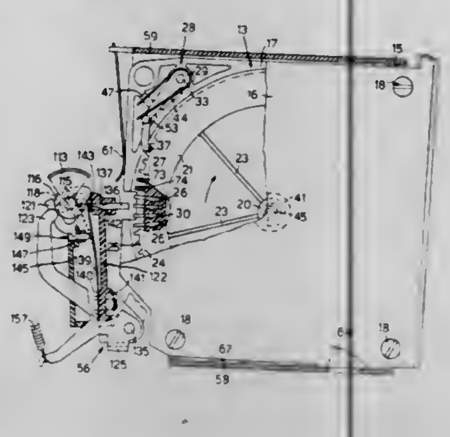
d. normalizing said conditioned responses of said pair;

e. converting normalized responses of said first of said pair to a first discrete logic level signal under the control of said first reference threshold, and converting normalized responses of said second of said pair to a second discrete logic level signal under the control of said second reference threshold;

f. sampling said first and said second discrete logic level signals to form a first and a second NRZ data signal, respectively, in response to said first and said second data peak signals; and

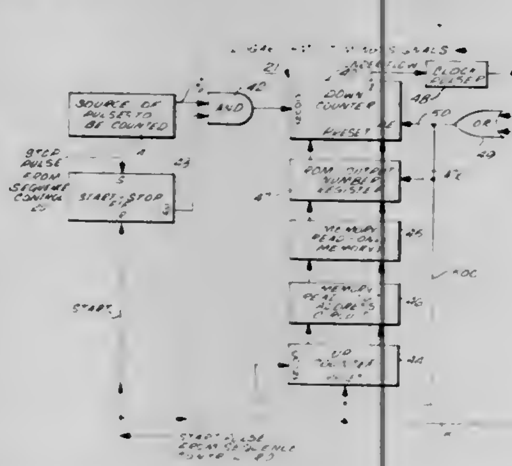
g. synchronizing said first and said second NRZ data signals with said common fixed frequency.

4,058,707
SYSTEM FOR INTRODUCING THE INSTRUCTIONS OF A PROGRAM INTO A PROGRAMMABLE OFFICE MACHINE
Nicolo Giolitti, and Sergio Garberi, both of Ivrea (Turin), Italy, assignors to Ing. C. Olivetti & C., S.p.A., Ivrea (Turin), Italy
Filed Apr. 21, 1976, Ser. No. 679,107
Claims priority, application Italy, May 2, 1975, 68115/75
Int. Cl.^{2} G06K *17/00, 7/04;* **B41J** *5/30*
U.S. Cl. 235—448 **14 Claims**



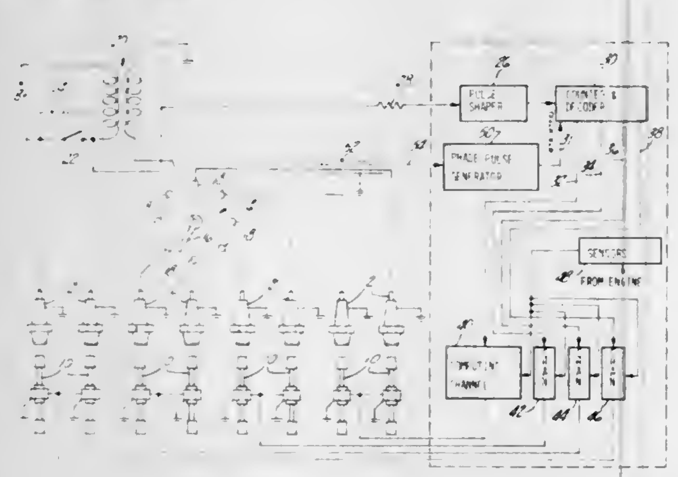
1. In a system for introducing the instructions of a program into an accounting, calculating and similar programmable office machine which performs data-processing operations, comprising in combination: a container, a drum rotatably mounted therein, a series of code information storage elements defining said program, means for removably mounting said elements around the periphery of said drum, a control element mounted on said drum to indicate the end of said program; and
a reading unit mounted on said office machine for reading said storage elements,
mounting means for removably mounting said container with respect to said reading unit,
actuatable feeding means for rotating said drum step by step with respect to said reading unit for the reading of said storage elements,
locking means for locking said container on said office machine during the rotation of said drum, and
means cooperative with said control element for deactivating said feeding means and releasing said locking means at the end of the reading of said program for allowing the removal of said container from said office machine.

4,058,708
BAR CODE READER AND DECODER
Paul Sherer, Costa Mesa, and Gerald Paul Hester, Santa Ana, both of Calif., assignors to MSI Data Corporation, Costa Mesa, Calif.
Filed Dec. 5, 1975, Ser. No. 638,056
Int. Cl.^{2} H03K *21/36*
U.S. Cl. 235—92 CC **21 Claims**



1. A digital-logarithmic timing signal generator for generating successive digital timing signals that are logarithmically related comprising
a binary counter for counting down preselected numbers preset into the counter and providing output signals therefrom at the same preselected count thereby generating the successively logarithmically related digital timing signals,
means coupled to the binary counter for responding to the output signals therefrom to enter a succession of preselected logarithmically related numbers into the binary counter, the preselected numbers being selected on the basis of any predetermined logarithmic base, other than the base two, so that the successive output signals and thereby the timing signals are logarithmically time related,
and a pulse source coupled to the binary counter for counting down the binary counter to the preselected count, the pulses from said source being selected to occur at a continuous preselected rate.

4,058,709
CONTROL COMPUTER FOR FUEL INJECTION SYSTEM
E. David Long, Elmira, N.Y., assignor to Allied Chemical Corporation, Morris Township, N.J.
Filed Nov. 6, 1975, Ser. No. 629,443
Int. Cl.^{2} F02M *51/00;* **G06G** *7/66*
U.S. Cl. 364—424 **11 Claims**

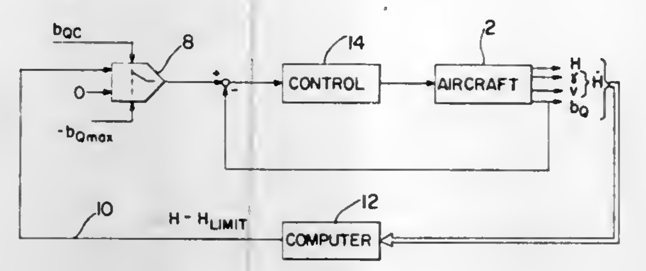


1. A control computer for metering fuel in a fuel injection system for an engine having a plurality of fuel injection means, an ignition system with primary and secondary circuits operative to generate a sequence of ignition pulses, an engine cycle time, a rotating output shaft, and at least one engine parameter sensor, said computer comprising: a plurality of independent computing channels each operatively coupled to at least one common engine parameter sensor and each operatively coupled to at least one separate fuel injector means, each channel having a variable width pulse generator, each channel available for operation for a time duration which is equal to more than fifty percent of an engine cycle, each channel operatively coupled to its separate injector means for substantially the entire cycle; and a common trigger means having a single input connection from the primary of the ignition system and separate output connections to each of the computing channels operative to sequentially trigger each computing channel once per engine cycle during normal operation of the engine in timed relationship to the engine output rotation.

4,058,710
PROCESS FOR PREVENTING UNDESIRED CONTACT WITH LAND OR WATER BY LOW-FLYING AIRCRAFT
Helmut Altmann, Immenstaad, Germany, assignor to Dornier GmbH., Germany
Filed Mar. 1, 1976, Ser. No. 662,971
Claims priority, application Germany, Mar. 14, 1975, 2511233
Int. Cl.^{2} G06G *7/78*
U.S. Cl. 364—433 **6 Claims**

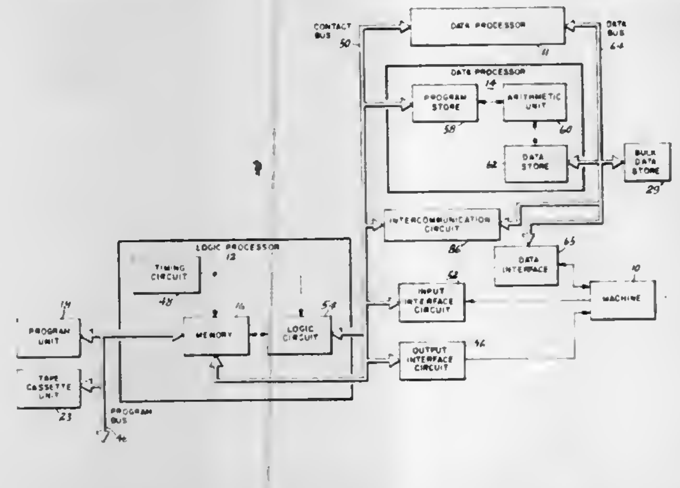
1. A process for preventing undesired contact with land or water by low-flying aircraft which are assigned a minimum altitude and which are provided with instruments for measuring the flight data, i.e., altitude, airspeed, angle of path, and transverse acceleration (b_Q), when gravitational acceleration is eliminated,

comprising measuring the rate of descent (H),
and altitude to (H) compute a limiting altitude (H_{limit}) determined from its ability for transverse acceleration and its other flight data,



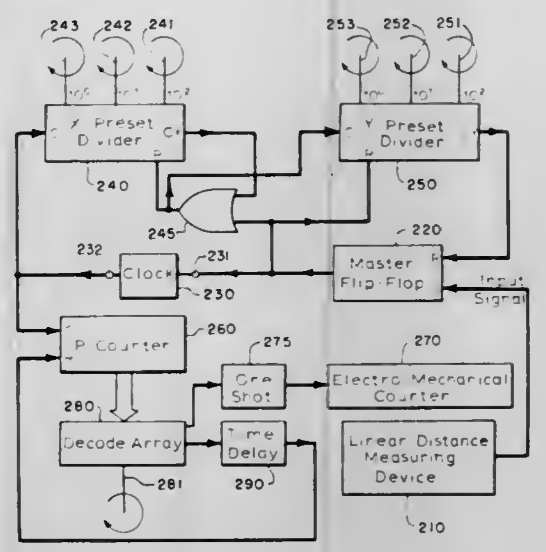
and controlling the aircraft by means of an automatic feedback controller which provides the aircraft with the maximum feasible transverse acceleration (b_{Qmax}) when for a measured value of altitude (H), the altitude is below the limiting altitude (H_{limit}).

4,058,711
ASYNCHRONOUS DUAL FUNCTION MULTIPROCESSOR MACHINE CONTROL
Robert Michael Ondercin, and Paul Stephen Borzcik, both of Cincinnati, Ohio, assignors to Cincinnati Milacron Inc., Cincinnati, Ohio
Filed Apr. 16, 1976, Ser. No. 677,712
Int. Cl.^{2} G06F *15/46, 15/16*
U.S. Cl. 364—101 **16 Claims**



1. An apparatus for controlling a machine, said machine having input devices generating input signals in response to the machine operation and further having output devices for receiving output signals to modify the machine operation, the apparatus comprising:
a. a single data bit contact bus;
b. means connected between the contact bus and the devices on the machine for interfacing the input and output signals between the contact bus and the input and output devices, respectively;
c. a single data bit logic processor means connected to the contact bus and reponsive to the input signals for generating the output signals in response to the machine operating in accordance with a stored set of logic instructions;
d. a data processor means connected to the contact bus for producing a further input signal by executing asynchronously with the logic processor means a stored set of arithmetic instructions in response to one of the output signals; and
e. data communication means connected to the data processor means.

4,058,712
ACRE COUNTER
Wesley J. Bachman, Mount Zion, Ill., assignor to Dickey-john Corporation, Auburn, Ill.
Filed Apr. 8, 1976, Ser. No. 675,150
Int. Cl.^{2} G06F *15/20;* **H03K** *21/36*
U.S. Cl. 364—564 **19 Claims**

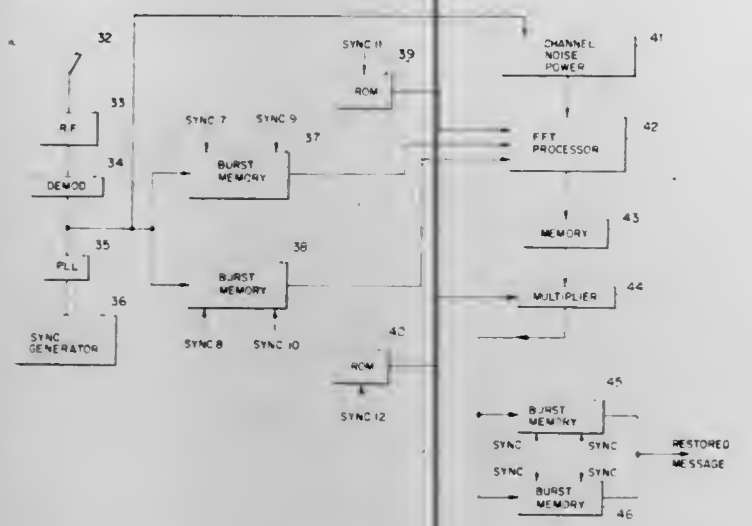


1. A system for measuring the amount of area traversed by a vehicular implement comprising: linear distance measuring means for generating an electrical signal having a characteristic which varies in accordance with the distance traversed by said implement; electronic switch having a first switching state and a second switching state for developing a control signal having a first value when aid switch means is in said first state and a second value when said switch means is in said second state, said electronic switch means being coupled to said electrical signal generating means and responsive to said electrical signal for switching to said first switching state; clock means responsive to said control signal having said first value for generating a timing signal having a predetermined frequency; a first presettable divider coupled to said clock means for counting a preset number of cycles of said timing signal and developing an output signal having a frequency corresponding to the number of times said divider counts said preset number of cycles; a second presettable divider coupled to said first presettable divider for counting said preset number of cycles of said output signal and developing a switching signal which is applied to said electronic switch means to switch it to said second switching state; counter means coupled to said clock means for counting the total number of cycles of said timing signal during the period of time that said electronic switch means is in said first switching state and developing a corresponding area signal; and display means responsive to said area signal for visually displaying the value of said area signal, whereby the total area covered by the implement during a given period of time is visually displayed.

4,058,713
EQUALIZATION BY ADAPTIVE PROCESSING OPERATING IN THE FREQUENCY DOMAIN
Michael J. DiToro, Massapequa, N.Y., assignor to General Signal Corporation, Rochester, N.Y.
Filed Sept. 20, 1976, Ser. No. 724,872
Int. Cl.^{2} G06F *15/34*
U.S. Cl. 364—724 **26 Claims**

1. A signal processor for processing a message signal received over a time-spread or frequency-spread medium to produce an estimate of the transmitted message signal in which a known signal is transmitted along with said message signal and received therewith, comprising:
a. first means for converting all said received signals to the frequency domain;
b. second means for providing a representation of said known signal;

c. processing means responsive to said first and second means to produce an estimate of the transmitted message signal in the frequency domain; and,



d. third means for converting the frequency domain form of the estimate of said transmitted message signal to the time domain.

4,058,714

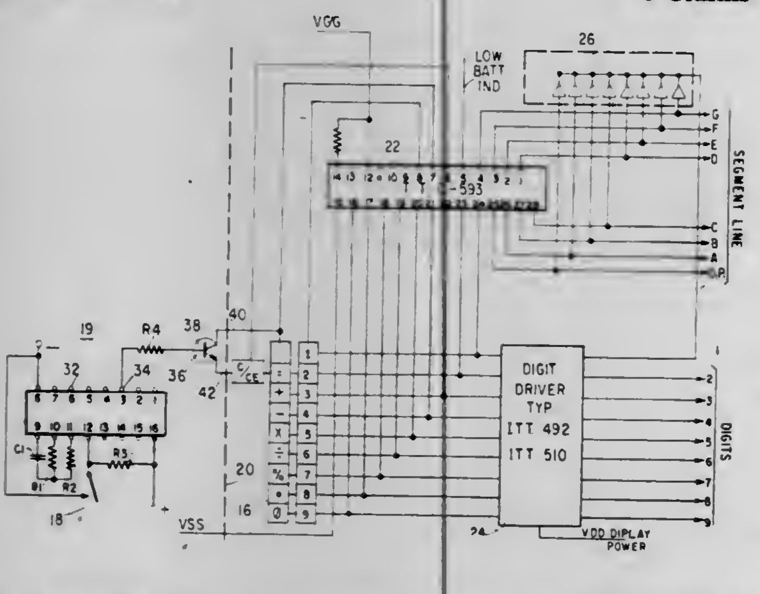
SELECTIVELY OPERATED, CLOCK-CONTROLLED REPETITIVE CALCULATOR

Arthur L. Mostow, 1184 Green Bay Road, Highland Park, Ill. 60035

Filed June 10, 1976, Ser. No. 694,519

Int. Cl.² G06F *7/50, 7/52*

U.S. Cl. 364—754 **8 Claims**



1. A device for performing multiple repetitive mathematical calculations including in combination: a calculator including means to enter a desired number; storage means to store a number representing a total, means for displaying said number representing the total, means for combining said entered number with said number representing a total stored in said storage means to develop a new number representing a total, and a clock circuit coupled to said calculator and operative at predetermined intervals to operate said combining means, said clock circuit including an oscillator selectively operative to repetitively develop pulses at a predetermined repetition rate and switch means coupled to said oscillator and said combining means operative in response to each of said pulses to switch and operate said combining means to combine said entered number with said number representing a total to develop a new number representing a new total.

4,058,715

SERIAL FFT PROCESSING UNIT

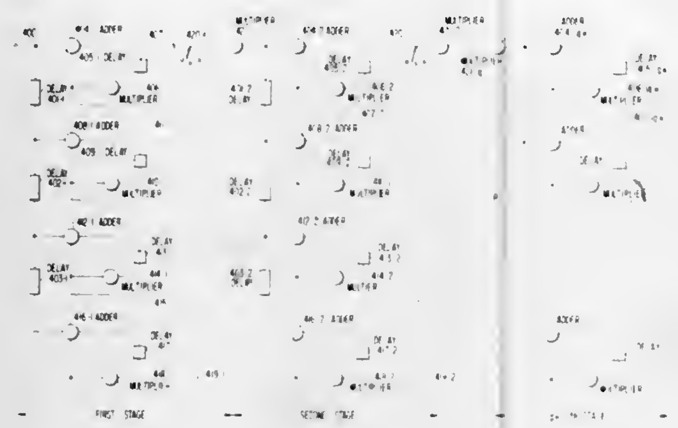
Kunihiko Niwa, Tokyo, Japan, assignor to Nippon Electric Company, Ltd., Tokyo, Japan

Filed June 18, 1976, Ser. No. 697,659

Claims priority, application Japan, June 20, 1975, 50-76216

Int. Cl.² G06F *15/34*

U.S. Cl. 364—726 **12 Claims**



1. An FFT processing unit comprising one or more serially connected arithmetic stages, each arithmetic stage having
   a. a plurality of recursive arithmetic paths, each recursive arithmetic path consisting of
      1. a delay element,
      2. a simplified multiplier means fed with an output signal obtained from said delay element for multiplying said output signal by any one of ± 1 and $\pm j$ where j is equal to $\sqrt{-1}$, and
      3. an adder means fed with a serial input digital data series and an output signal of the simplified multiplier means at its first and second input terminals, respectively, and feeding its output signal to an input terminal of the delay element,

   said recursive arithmetic paths being connected in parallel so that said serial input digital data series are given at their respective input terminals;
   b. a switch means for successively selecting output signals obtained from said plurality of recursive arithmetic paths; and
   c. a second multiplier means for multiplying input signals given through said switch means by predetermined coefficients.

4,058,716

SURFACE CHARGE SIGNAL PROCESSING APPARATUS

Howard S. Goldberg, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed July 6, 1976, Ser. No. 702,942

Int. Cl.² G06G *7/19;* G11C *11/40*

U.S. Cl. 364—824 **8 Claims**

1. Signal correlator apparatus comprising

a substrate of semiconductor material having a major surface,

first means forming a first plurality of charge storage regions adjacent said major surface of said substrate,

second means forming a second plurality of charge storage regions adjacent said major surface of said substrate, each forming with a respective first charge storage region a respective charge storage cell,

said first means including a first plurality of electrodes, each electrode insulatingly overlying a respective charge storage region of said first plurality, said electrodes being interconnected,

said second means including a second plurality of electrodes, each insulatingly overlying a respective charge storage region of said second plurality,

a plurality of intermediate charge storage regions adjacent said major surface of said substrate, each separating first and second storage regions of a respective charge storage cell,

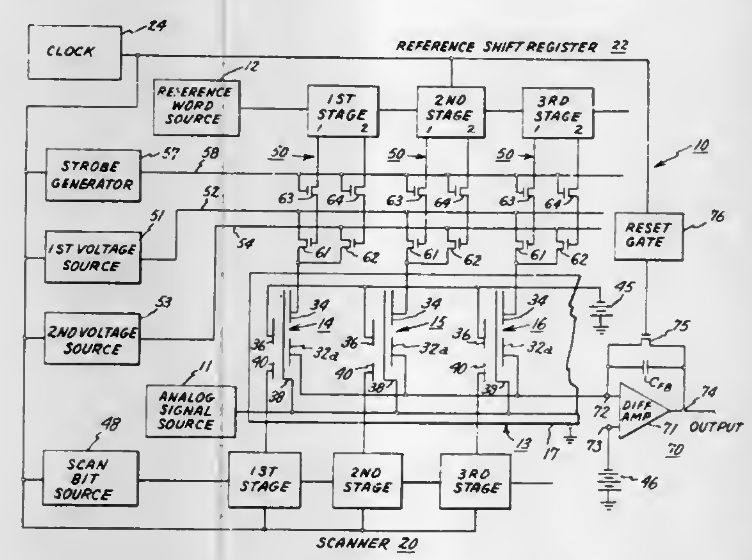
a plurality of first gating electrodes each insulatingly overlying a respective one of said intermediate regions, said gating electrodes being interconnected,

each first storage electrode forming with said substrate a first capacitance, each second storage electrode forming with said substrate a second capacitance, each first gating electrode forming with said substrate a third capacitance, the sum of said first capacitance and said third capacitance being equal to said second capacitance,

means for introducing into each of successive ones of said cells a respective one of successive quantities of charge, each quantity being proportional to a respective sample of a time varying analog signal, each quantity of charge including first and second portions of equal value, each first portion of a quantity of charge being solely contained in the first storage region of a respective cell and each second portion of said quantity of charge being contained in the second storage region of said respective cell,

means for applying to each of said second storage electrodes a voltage waveform selected from a first voltage waveform and a second voltage waveform of the same periodicity in response to a respective one of a series of successive binary bits of a reference word,

a. the bits of a first value in said series of bits forming a first group of bits and providing said first voltage waveform



to the second electrodes associated with a first group of cells, said first voltage waveform enabling said first portions of said quantities of charge to be stored in said first storage regions of said first group of cells and said second portions of said quantities of charge to be stored in the second storage regions of said first group of cells during a first interval of a period thereof, and causing said first portions of said quantities of charge to be transferred to said second storage regions of said first group of cells during a second interval of a period thereof,

b. the bits of a second value in said series of bits forming a second group of bits and providing said second voltage waveform to the second electrodes associated with a second group of cells, said second voltage waveform enabling said first portions of said quantities of charge to be stored in said first storage regions of said second group of cells and said second portions of said quantities of charge to be stored in the second storage regions of said second group of cells during a first interval of a period thereof, and causing said second portions of said quantities of charge to be transferred to said first storage regions of said second group of cells during a second interval of a period thereof,

means connected in circuit with said first storage electrodes for sensing the total net charge transferred to and from said first charge storage regions during said second interval.

4,058,717

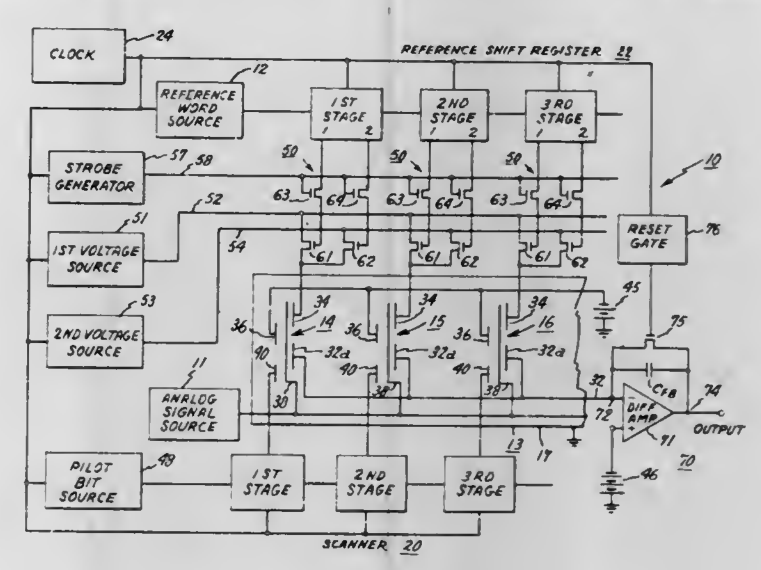
SURFACE CHARGE SIGNAL PROCESSING APPARATUS

William E. Engeler, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed July 6, 1976, Ser. No. 702,943

Int. Cl.² G06G *7/19;* G11C *11/40*

U.S. Cl. 364—824 **8 Claims**



1. Signal correlator apparatus comprising

a substrate of semiconductor material having a major surface,

first means forming a first plurality of charge storage regions adjacent said major surface of said substrate,

second means forming a second plurality of charge storage regions adjacent said major surface of said substrate, each separated from a respective charge storage region of said first plurality by a respective intermediate region and forming a respective charge storage cell therewith,

said first means including a first plurality of electrodes, each electrode insulating overlying a respective charge storage region of said first plurality, said electrodes being interconnected,

said second means including a second plurality of electrodes, each insulatingly overlying a respective charge storage region of said second plurality,

means for introducing into each of successive ones of said first charge storage regions a respective one of successive quantities of charge, each quantity being proportional to a respective sample of a time varying analog signal,

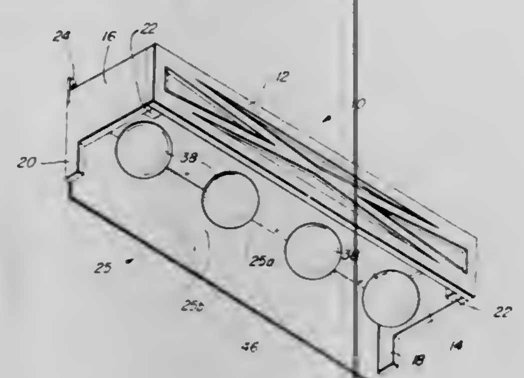
means for applying to each of said second storage electrodes a voltage waveform selected from a first voltage waveform and a second voltage waveform of the same periodicity in response to a respective one of a series of successive binary bits of a reference word,

a. the bits of a first value in said series of bits forming a first group of bits and providing said first voltage waveform to the second electrodes associated with a first group of cells, said first voltage waveform causing charges to be transferred during a first interval of a period thereof from the first charge storage regions of said first group of cells to the second charge storage regions thereof, and causing said transferred charge to be returned during a second interval,

b. the bits of a second value in said series of bits forming a second group of bits and providing said second voltage waveform to the second electrodes associated with a second group of cells, said second voltage waveform causing charge to be transferred from first charge storage regions of said second group of ceils to the second charge storage regions thereof during said second interval,

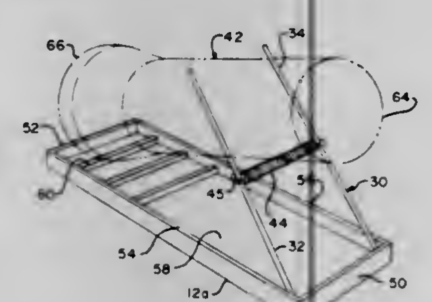
means connected in circuit with said first storage electrodes for sensing the total net charge transferred to and from said first charge storage regions during said second interval.

4,058,718
SOFFIT LIGHTING
James J. Palka, Arlington Heights, Ill., assignor to General Bathroom Products Corporation, Elk Grove Village, Ill.
Filed Aug. 12, 1976, Ser. No. 713,689
Int. Cl.² F21V *33/00;* A47B *97/00*
U.S. Cl. 362—235 3 Claims



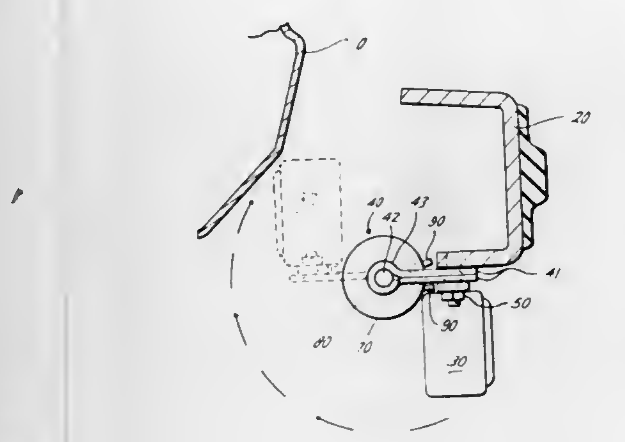
1. A soffit lighting fixture for cabinets comprising an elongated outer housing having side walls and an ornamental front wall, an elongated electrical housing positioned between and anchored to said side walls interiorally of said outer housing, said electrical housing having side, end and top walls, an L-shaped plate, a first leg of said plate anchored to said electrical housing and forming a cover therefor, said first leg having a plurality of spaced lamp sockets secured thereto and extending downwardly, the second leg of said plate depending from said first leg forming a rear wall for said fixture and extending downwardly below said outer housing side walls, both of said legs having reflective properties, means to secure said fixture to a wall surface, and means for electrically connecting said sockets.

4,058,719
ADJUSTABLE FLASHLIGHT HOLDER
Peter G. Chopp, 9001 Golf Road, Des Plaines, Ill. 60016
Filed Mar. 21, 1977, Ser. No. 779,343
Int. Cl.² F21L *15/20*
U.S. Cl. 362—190 12 Claims



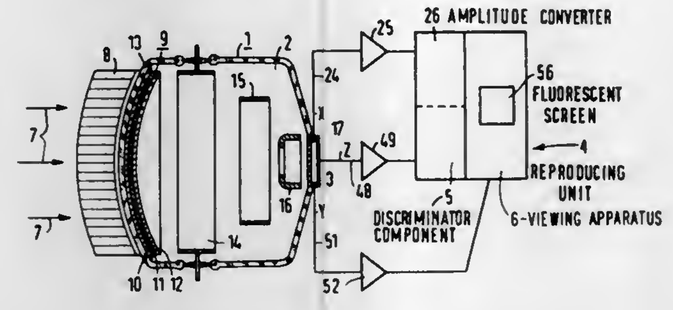
1. A holder for a flashlight and the like comprising:
a base member having a substantially flat upper surface;
said flat surface defining at least one transversely oriented upstanding edge between the ends of said base member;
hinge means at one end of said base member;
a bifurcated support member having extending spaced leg members and a cross member engageable with said hinge means and adapted to be moved to a plurality of angular positions about said hinge means and upwardly from the flat surface of said base member;
at least one elastic member suspended between the bifurcated legs of said support member whereby a flashlight may be placed with one end upon said base and engaging said upstanding edge, with the other end of the flashlight resting on said elastic member.

4,058,720
SUSPENSION MEANS FOR AUTOMOBILE FOG LIGHT
Lonnie C. Renfrow, 3625 N. Terry, Oklahoma City, Okla. 73111
Filed Mar. 1, 1976, Ser. No. 662,468
Int. Cl.² B60Q *1/00;* E05F *1/12*
U.S. Cl. 362—82 1 Claim



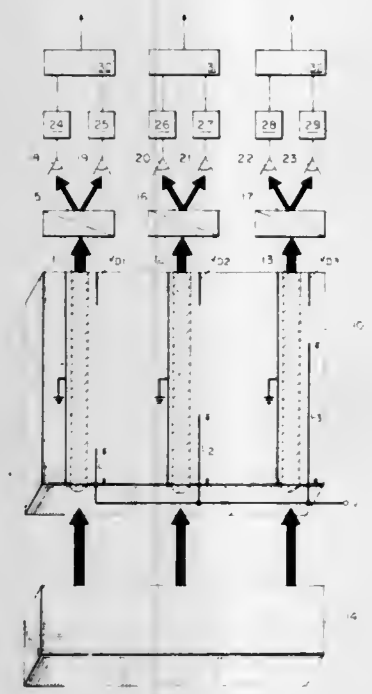
1. In an automobile having a front bumper and a fog light, the improvement comprising:
a hinged bracket comprising:
a pivot pin having the axis thereof extending in a direction parallel to the longitudinal axis of the front bumper and transversely of the automobile;
a first planar, elongated side portion connected to the underside of the front bumper, the first side portion having integral tabs adjacent the ends of the side thereof nearest the automobile curved about the pivot pin and pivotally attaching the first side portion to the pivot pin; and
a second planar, elongated side portion connected to the fog light with the fog light directed forwardly relative to automobile in a normal position of the second side portion, the second side portion having integral tabs adjacent the ends of the side thereof nearest the automobile curved about the axis of the pivot pin in alternating manner with the tabs of the first side portion and pivotally attaching the second side portion to the pivot pin; and
a coil spring assembly comprising:
a coil spring having opposite ends, the coil spring being disposed coaxially around the pivot pin intermediate the ends of the pivot pin and between the tabs of the first and second side portions;
a cylindrical spring housing, open at its ends, surrounding the pivot pin and the coil spring intermediate the ends of the pivot pin and between the connecting tabs, with one end of the coil spring being removably connected to the spring housing and turning therewith;
a pair of collars loosely encircling the pivot pin and journalled on the ends of the spring housing, with the opposite end of the coil spring being removably connected to the one of the collars adjacent thereto and turning therewith; and
means on the one collar and on the spring housing, extending radially outwardly therefrom for abutting engagement with the first and second side portions respectively to yieldably urge the second side portion toward the normal position thereof in response to the action of the coil spring, the tension applied to the coil spring being adjustable, as determined by the relative position of the spring housing.

4,058,721
GAMMA CAMERA
Karl Hans Reiss, Erlangen; Otto Kotschak, Buckenhof, and Bernhard Conrad, Erlangen, all of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany
Filed Feb. 13, 1976, Ser. No. 658,050
Claims priority, application Germany, Feb. 19, 1975, 2507150
Int. Cl.² H01J *31/50;* G01T *1/18*
U.S. Cl. 250—213 VT 10 Claims



1. In a gamma camera within a signal generating system, encompassing a stage for converting an image which is to be produced into an electron image; and including a locating system connected to the output of said stage, said locating system emanating signals facilitating the pictorial reproduction of the incident radiation, the improvement comprising: said converting stage including an electron-transmissive window; and a multi-wire proportioning chamber being connected to said converting stage through intermediary of said window.

4,058,722
ELECTRO-OPTIC ANALOG/DIGITAL CONVERTER
Henry F. Taylor, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.
Filed Sept. 29, 1976, Ser. No. 727,744
Int. Cl.² G02F *7/00*
U.S. Cl. 250—225 7 Claims

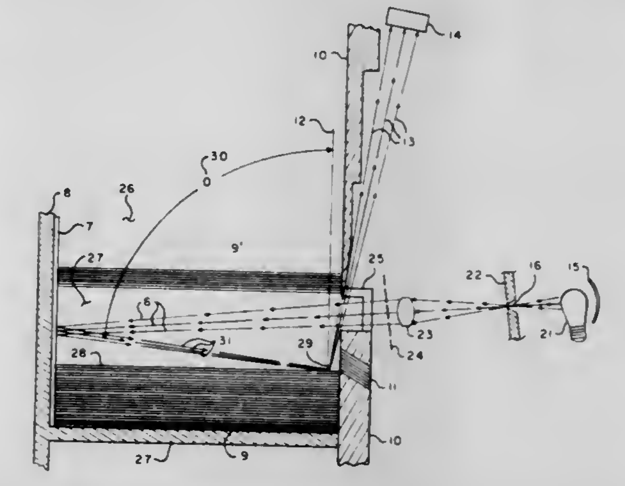


1. An electro-optic analog-to-digital converter for digitizing an analog electrical potential V comprising:
a plurality of identical dielectric channel optical waveguides fabricated in a single-crystal substrate of linear electro-optic material;
a source of linearly polarized light adapted to transmit its output light energy along each of said waveguides;
a plurality of electrodes disposed contiguous to said optical waveguides for impressing electric fields thereacross upon the application of electrical potentials;
means for receiving said analog electrical potential V and applying an electrical potential to each of said electrodes such that the product of the potential applied to the n^{th} electrode of length L_n is

$$V_nL_n = VL_1 \times 2^{n-1}$$

where $n = 1, 2, 3, \ldots$;
a means responsive to light in each said waveguide for producing output light signals indicative of a predetermined condition of polarization;
photodetection means responsive to said output light signals for producing commensurate electrical signals; and
an analog comparator for receiving electrical signals derived from the emergent light of each said waveguide and responsive thereto for producing a binary output representative of the relative amplitudes of its received signals.

4,058,723
ILLUMINATION AND DETECTION SYSTEM FOR MICROFICHE IDENTIFICATION MARKS
Romuald Anthony, Manhattan Beach, Calif., assignor to Cutler-Hammer, Inc., Milwaukee, Wis.
Filed May 26, 1976, Ser. No. 690,352
Int. Cl.² G02F *1/01;* H01J *39/12*
U.S. Cl. 250—235 14 Claims



1. Apparatus for producing a representation of identification marks in an identification area on an exposed card in a stack of transparent cards, comprising:
a. a light source,
b. light polarizing means,
c. means for directing the light from the source to the identification area to impinge on the exposed card at an angle of incidence greater than the polarizing angle of the cards, said means including reflecting means positioned adjacent said transparent cards opposite the identification area to receive the light from the light source and direct it to impinge on the identification area at an angle of incidence greater than the polarizing angle of the cards and said means further including light shielding means to generally confine the light incident on the card to the identification area and means to detect said light.

4,058,724
ION SCATTERING SPECTROMETER WITH TWO ANALYZERS PREFERABLY IN TANDEM
James T. McKinney, Stillwater, and Robert F. Goff, White Bear Lake, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.
Filed June 27, 1975, Ser. No. 591,104
Int. Cl.² H01J *37/26*
U.S. Cl. 250—309 10 Claims

1. In a method for analyzing the surface of a material comprising
generating a primary ion beam,
directing said beam along a preselected path to impinge

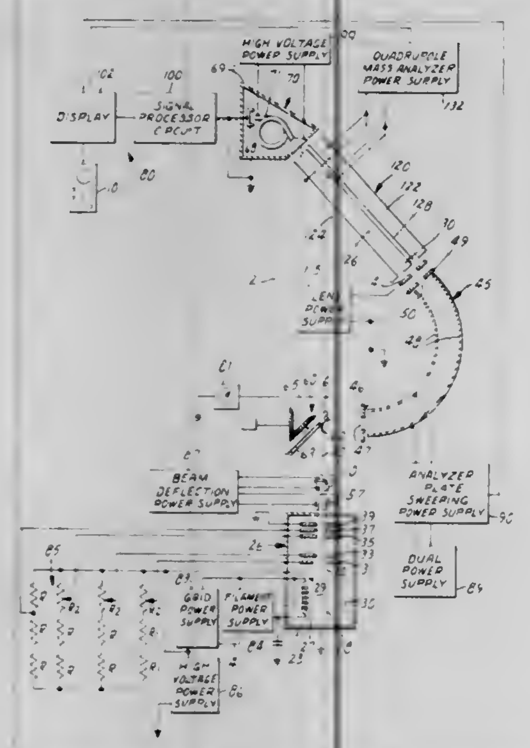
upon and be scattered from a surface of the material to be analyzed,

transmitting ions indicative of surface atoms having a given mass, and

receiving the transmitted ions and converting the received ions into an electronic signal characteristic of said surface atoms,

the improvement wherein the step of transmitting comprises positioning two independent analyzer means in tandem adjacent to said surface for determining a kinetic parameter and the mass of ions, wherein ions scattered from said surface at a predetermined angle are accepted and a portion of accepted ions are passed therethrough,

establishing a time varying predetermined condition definitive of a given kinetic parameter within the first of said



analyzer means through which said accepted ions are directed to allow only ions having a said kinetic parameter to pass therethrough,

establishing another predetermined condition definitive of a given mass within the second of said analyzer means through which said accepted ions are directed to allow only ions having a said given mass therethrough such that the mass and kinetic parameter of the detected ions are both known, thereby enabling the direct inference of the mass of surface atoms from which the ions are scattered, and

detecting the scattered ions passing through both of said analyzer means that have a given kinetic parameter and a given mass to generate a signal characteristic of surface atoms having a given mass.

4,058,725

INFRARED ABSORPTION SPECTROMETER EMPLOYING A DUAL OPTOACOUSTIC DETECTOR

Harry E. Aine, 1804 Stierlin Road, Mountain View, Calif. 94040

Filed Apr. 4, 1975, Ser. No. 565,008

Int. Cl.^{2} G01M *21/26*

U.S. Cl. 250—343 **22 Claims**

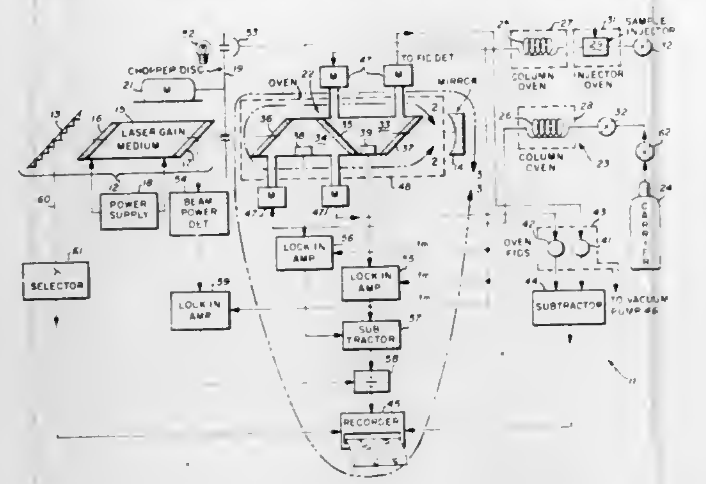
1. In a method of laser absorption detection of spectroscopy of an unknown sample of interest the steps of:

producing a laser beam of coherent infrared radiation;

providing first and second sample regions partitioned from each other and spaced apart serially along the common beam path;

interposing first and second samples in the respective first and second sample regions for absorbing coherent radiation from the laser beam and for converting the absorbed coherent radiation into a second form of energy, one of said samples being the unknown sample of interest for which the absorption from the laser beam is to be detected;

coupling detector means in energy exchanging relation with respective ones of said first and second sample regions for detecting the second form of energy resulting from the absorption of energy, if any, from the coherent infrared beam by the respective first and second samples; and



deriving an output corresponding to the difference between the detected second forms of energy derived from the respective first and second sample regions for detection of the absorption of the laser beam by the unknown sample of interest.

4,058,726

RADIATION DETECTOR

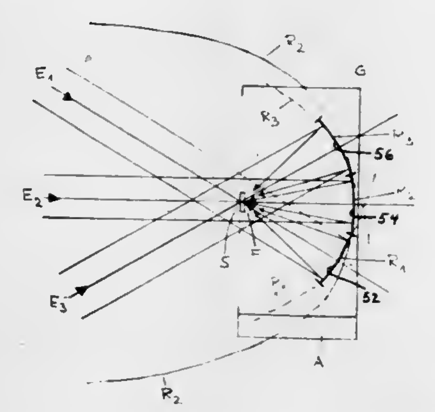
Hansjoachim Paschedag, and Hansjürg Keller, both of Mannedorf, Switzerland, assignors to Cerberus AG, Switzerland, Mannedorf, Switzerland

Filed July 22, 1976, Ser. No. 707,834

Claims priority, application Germany, Aug. 9, 1975, 2535657; May 18, 1976, 7615724[U]; May 25, 1976, 7616715[U]

Int. Cl.^{2} G01J *1/04*

U.S. Cl. 250—353 **11 Claims**



1. A radiation detector for simultaneously detecting electromagnetic radiation from a number of separate receiving regions, comprising a single radiation receiver common to said number of separate receiving regions, a plurality of optical bundling means, each one of said optical bundling means being operatively related to a given one of said separate receiving regions and being arranged such that the radiation emanating from the individual receiving regions is transmitted to the single radiation receiver, each of the optical bundling means comprising an aspherical surface having two different main radii of curvature, and the radiation receiver is arranged at least approximately at one of the main focal points of the individual surfaces, for generating a pattern of spaced apart substantially strip-like receiving regions, each having a lengthwise extent considerably exceeding the width thereof.

4,058,727

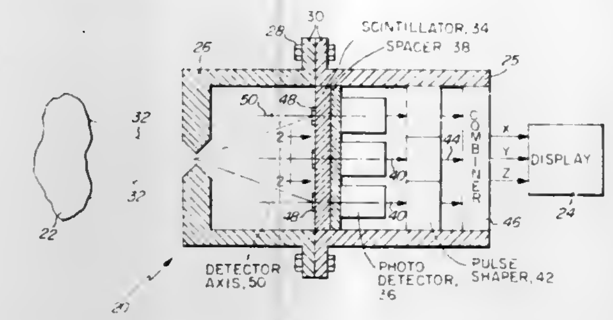
GAMMA CAMERA WITH REFLECTIVITY MASK

Karl J. Stout, Hudson, Mass., assignor to Raytheon Company, Lexington, Mass.

Filed June 28, 1976, Ser. No. 700,283

Int. Cl.^{2} G01T *1/20*

U.S. Cl. 250—363 R **8 Claims**



1. A radiographic camera comprising:

a scintillator;

a plurality of photodetectors positioned to face said scintillator;

a plurality of nonreflective mask regions formed upon the front face of said scintillator opposite said photodetectors and positioned coaxially with respective ones of said photodetectors for decreasing the amount of internal reflection of optical photons generated within said scintillator, an individual one of said mask regions being in line with an axis of an individual one of said photodetectors.

4,058,728

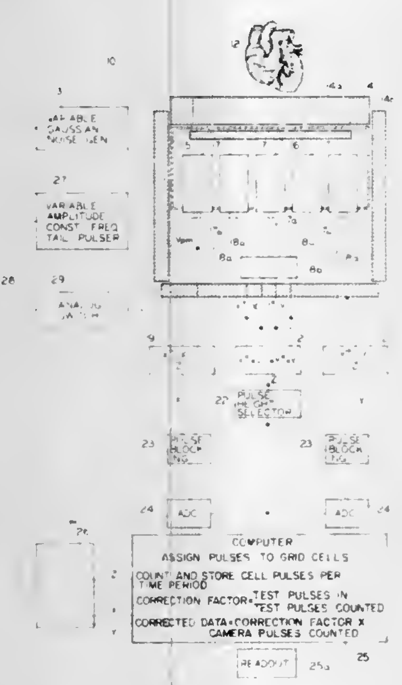
CORRECTION OF DATA LOSS IN GAMMA RAY SCINTILLATION CAMERAS

Robert J. Nickles, Madison, Wis., assignor to Wisconsin Alumni Research Foundation, Madison, Wis.

Filed May 27, 1976, Ser. No. 690,651

Int. Cl.^{2} G01T *1/20*

U.S. Cl. 250—369 **12 Claims**



1. Method of correcting for transmission losses in a measurement system employing a plurality sensor of physical phenomena and circuitry for processing signals produced by each sensor indicative of the number and magnitude of occurrences of the phenomena in a given time period, said method comprising:

a. artificially creating a signal having a fixed-frequency of repetition and a shape similar to the shape of the signals produced by the sensors in response to the physical phenomena and in which the amplitudes of the pulses vary in such a fashion as to have amplitudes which fall in the range of amplitudes and having a statistical distribution of amplitudes that is normally produced by said sensors;

b. applying said artificial signal to the processing circuitry in a manner so as to distinguish said artificial signals from normal data signals produced by said sensors;

c. deriving a signal indicative of the ratio of the number of pulses of said artificial signal transmitted by said processing circuitry to the number of said pulses applied to said processing circuit in said given time period.

d. dividing said signals produced by said sensors by said signal indicative of said ratio to produce a data signal corrected for losses occurring in said processing circuit during said given time period.

4,058,729

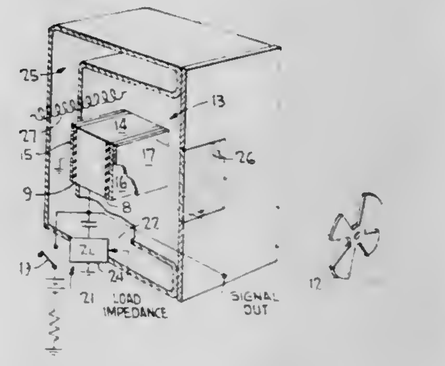
PYROELECTRIC APPARATUS INCLUDING EFFECTIVELY INTRINSIC SEMICONDUCTOR FOR CONVERTING RADIANT ENERGY INTO ELECTRIC ENERGY

Arden Sher, 108 Charles River Landing Road, Williamsburg, Va. 23185

Continuation-in-part of Ser. No. 632,090, Nov. 14, 1975, abandoned. This application July 30, 1976, Ser. No. 710,296

Int. Cl.^{2} G01T *1/24*

U.S. Cl. 250—370 **30 Claims**



1. A device for converting radiant energy into electric energy comprising a capacitor responsive to the radiant energy, said capacitor comprising a layer of an intrinsic semiconductor, first and second insulating layers on the semiconductor layer, first and second metallic contacts respectively on the first and second insulating layers, said contacts, semiconductor layer and insulating layers being such that no junction barrier exists between the contacts; means responsive to the radiant energy for heating the semiconductor to modulate the capacitance between the contacts, and means for connecting a load to be responsive to current derived from the capacitor in response to the capacitance modulation.

4,058,730

IRRADIATING DEVICE WITH AN ELECTRONIC ACCELERATOR

Rudolf Meyer, Erlangen; Wolf-Eberhard Schiegl, Weisendorf, and Leonhard Taumann, Erlangen, all of Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

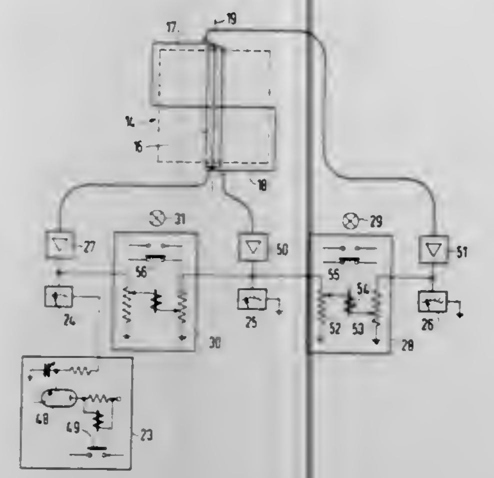
Continuation-in-part of Ser. No. 506,327, Sept. 12, 1974, abandoned. This application Mar. 12, 1976, Ser. No. 666,233

Int. Cl.^{2} G01T *1/29*

U.S. Cl. 250—397 **9 Claims**

1. An irradiating device, comprising an electronic accelerator, an actuating and monitoring device, means for widening the electron beam and homogenizing the electron density thereof, a collimator adjacent said means for laterally limiting the electron beam, a measuring device positioned in the beam direction behind said means and connected with said actuating and monitoring device, said measuring device comprising a plurality of radiation detector means for detecting and indicating an insufficient widening and homogenization of the electron beam to thereby increase the operational safety of the

irradiating device, one of said radiation detector means being disposed within the angular space range of the unscattered



electron beam for measuring the electron beam solely within said range.

4,058,731

SPECIMEN HOLDER FOR A CORPUSCULAR-BEAM APPARATUS

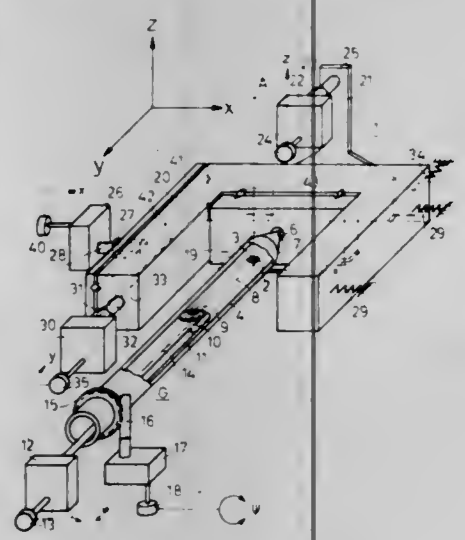
Karl-Heinz Müller; Walter Munchmeyer; Moriz von Rauch, and Norbert Schafer, all of Berlin, Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Germany

Filed Sept. 9, 1976, Ser. No. 721,692

Claims priority, application Germany, Sept. 19, 1975, 2542360

Int. Cl.^{2} G21K *5/06*

U.S. Cl. 250—442 **6 Claims**



1. In a corpuscular-beam apparatus including a specimen holder having at least two degrees of freedom of translation and at least one degree of freedom of rotation, and control means for correcting the translational coordinates of the specimen holder automatically when the specimen holder is rotated and retaining a predetermined specimen point in its position in the apparatus, the improvement comprising said control means comprising,

means for controlling the rotational movement of said specimen holder stepwise in angular increments, said angular increments being chosen small so that the translational movement of the specimen point for each angular increment may be considered linear, and

means for correcting the translational coordinates of the specimen holder stepwise in linear increments prior to each stepwise rotation of said specimen holder, each of said linear increments comprising a linear function of the instantaneous values of said translational coordinates and of said angular increments of said rotational movement of said specimen holder.

4,058,732

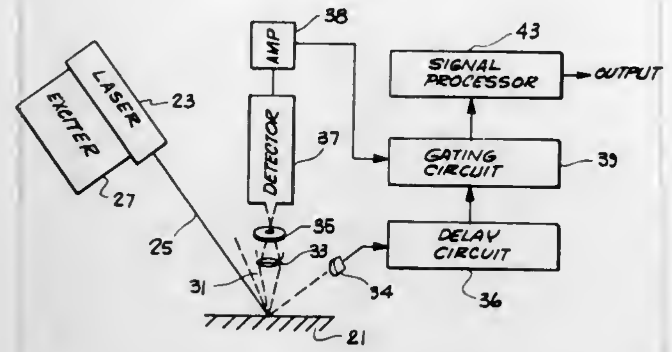
METHOD AND APPARATUS FOR IMPROVED ANALYTICAL FLUORESCENT SPECTROSCOPY

Irwin Wieder, Los Altos, Calif., assignor to Analytical Radiation Corporation, Los Altos, Calif.

Filed June 30, 1975, Ser. No. 591,305

Int. Cl.^{2} G01N *21/38*

U.S. Cl. 250—461 B **25 Claims**



1. A method for fluorescent spectroscopy of a target substance comprising:

isolating a target substance,

tagging said target substance with a fluorescent tag having a long fluorescent decay lifetime compared to the longest of the decay lifetimes of competing untagged ambient substances,

removing excess fluorescent tag,

exciting the tagged target substance with at least one pulse of radiation, said pulse having a pulse duration which is short compared to the fluorescent decay lifetime of said fluorescent tag,

detecting the fluorescence of said excited tagged target substances after the fluorescence of said ambient substances has substantially decayed.

4,058,733

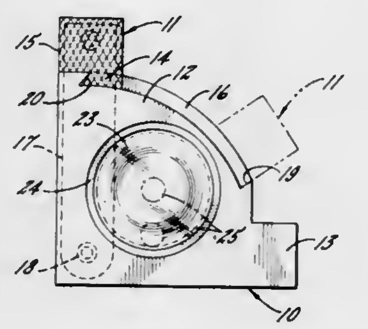
RADIOGRAPH MARKER

Oren G. Stembel, 3132 N. Natchez, Chicago, Ill. 60634

Filed Dec. 22, 1975, Ser. No. 643,183

Int. Cl.^{2} G03B *41/16*

U.S. Cl. 250—476 **15 Claims**



1. A radiograph marker comprising a pair of elements made of a relatively X-ray opaque material and interconnected in a manner to permit relative movement between the two elements, said elements being shaped to form a first letter when in a first position relative to each other and to form a second letter when in a second position relative to each other whereby the same marker can be used to form either of two different letters when placed between an X-ray source and a radiograph film, and gravity responsive means within one of said elements for indicating whether the marker is in a horizontal or vertical position.

4,058,734

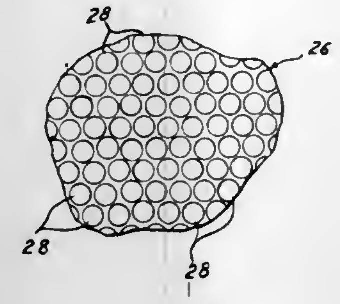
PASSIVE INFRARED RESOLUTION TARGET

Leo O. Vroombout, Greene County, Ohio, assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed July 19, 1976, Ser. No. 706,317

Int. Cl.^{2} G01J *1/00*

U.S. Cl. 250—495 **3 Claims**



1. A passive resolution target array for testing of infrared reconnaissance sets in an area having a substantially normal scene average temperature, comprising: a background pad of heat retaining material; said background pad including means, responsive to solar radiation for providing a pad temperature greater than the scene average temperature; a plurality of perforated aluminum sheets with between 50 and 80 percent open area positioned on said pad in a conventional resolution measurement target configuration.

4,058,735

OPTO-ELECTRONIC CONTACT MECHANISM

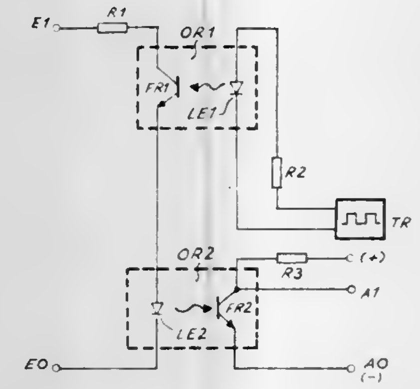
Franz Tippner, Braunschweig, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Apr. 29, 1976, Ser. No. 681,514

Claims priority, application Germany, June 20, 1975, 2527520

Int. Cl.^{2} G02B *27/00*

U.S. Cl. 250—551 **8 Claims**



1. An opto-electronic contact mechanism for coupling between an input and an ouput having different operating potentials comprising:

a. first and second optocoupler means each having a radiation transmitter and a radiation receiver;

b. an input circuit for a direct current electrical signal comprised of the radiation receiver of the first optocoupler connected in series with the radiation transmitter of the second optocoupler;

c. an output circuit comprised of the radiation receiver of the second optocoupler; and

d. a timing generator connected to the radiation transmitter of the first optocoupler for producing a time-varying radiation from said optocoupler radiation transmitter.

4,058,736

METHOD AND APPARATUS FOR INSPECTING EXTRANEOUS SOLID SUBSTANCES CONTAINED IN LIQUID

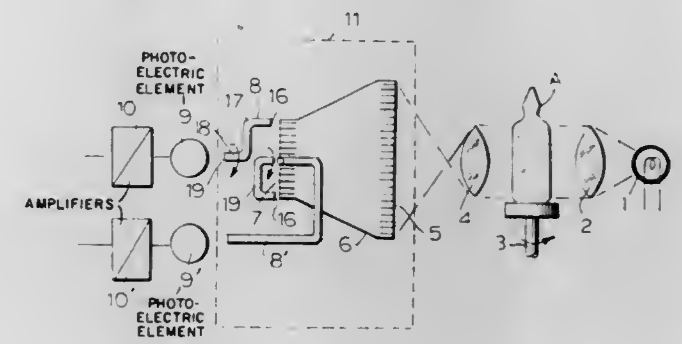
Toshio Takahashi, Honjo; Toshiyasu Ehara, Misato; Ryosaku Tagaya, and Mikio Tagaya, both of Isezaki, all of Japan, assignors to Eisai Co., Ltd., Tokyo, Japan

Filed Mar. 23, 1976, Ser. No. 669,959

Claims priority, application Japan, Mar. 25, 1975, 50-34897

Int. Cl.^{2} G01N *21/26*

U.S. Cl. 250—573 **8 Claims**



5. An apparatus for determining the presence of extraneous solid substances in a liquid in a transparent container, said apparatus comprising:

a rotatable turntable means for supporting and rotating said container thereon;

a light source adjacent said turntable means and said container thereon for projecting light rays toward said container;

a condenser lens between said light source and said container on said turntable means for collimating the light rays from said light source directed toward said container;

a plurality of photoelectric members;

scanning means between said turntable and said photoelectric members for receiving the light rays from said light source passing through said container unobstructed by any of said extraneous solid substances and optically transferring said light rays to said photoelectric members, said scanning means comprised of:

an optical fiber line-circle converter means, the line portion thereof adjacent said container, for receiving said light rays travelling through said container, and

a plurality of rotating scan heads of optical transfer material rotatable about the circle end of said converter, said scan heads having shaft portions coaxially aligned with the longitudinal axial center of the circle end of said converter, and said scan heads being optically connected to said photoelectric members;

focusing lens means between said container and the line end of said converter for focusing the light rays passing through said container onto the line end of said converter; and

amplifying means connected to said photoelectric members for amplifying the output from said photoelectric members.

4,058,737

METHOD AND APPARATUS FOR DETECTING EXTRANEOUS SOLID SUBSTANCES CONTAINED IN LIQUID

Toshio Takahashi, Honjo; Toshiyasu Ehara, Misato; Ryosaku Tagaya, and Mikio Tagaya, both of Isezaki, all of Japan, assignors to Eisai Co., Ltd., Tokyo, Japan

Filed Mar. 23, 1976, Ser. No. 669,958

Claims priority, application Japan, Mar. 25, 1975, 50-34898

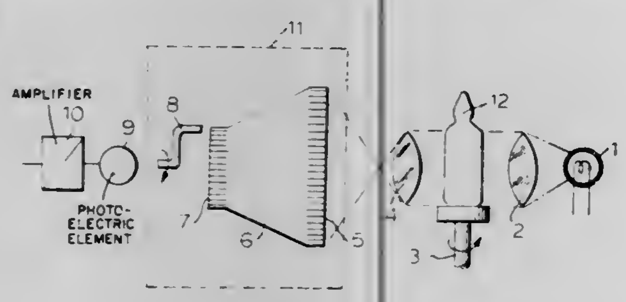
Int. Cl.^{2} G01N *21/26*

U.S. Cl. 250—573 **9 Claims**

5. An apparatus for determining the presence of an extraneous solid substance which may exist in a transparent liquid contained in a clear container, said apparatus comprising:

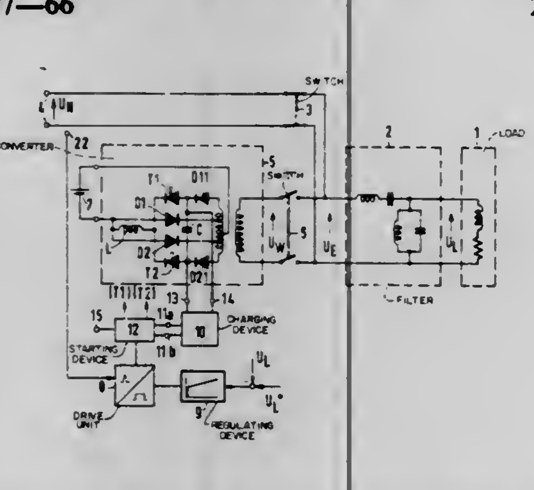
a light source;

rotatable turntable means adjacent said light source for supporting and rotating said container thereon;
first lens means between said light source and said container on said turntable for collimating the light rays from said light source toward said container;
a photoelectric member;
scanning means between said photoelectric member and said container for receiving the light rays passing through said container which are not blocked by said solid substances in said liquid, said scanning means being optically connected to said photoelectric member and comprised of:
an optical fiber line-circle converter having a linear end of a



plurality of parallel, straight linear files of optical fiber directed toward said container and a circular end formed into a single circle from said fibers at the end of said fibers opposite said linear end, and
a rotating scan head means at the circular end of said converter for scanning said fibers, said scan head means being optically connected to said photoelectric member;
an amplifier connected to said photoelectric member; and
a focusing lens means between said container and the linear end of said converter for focusing the light rays passing through said container onto said linear end of said optical fiber converter.

4,058,738
METHOD AND CIRCUIT ARRANGEMENT FOR STARTING UP A CONVERTER HAVING FORCED COMMUTATION WITH THE CORRECT PHASE
Janos Udvardi-Lakos, Erlangen, Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Germany
Filed Sept. 26, 1975, Ser. No. 617,157
Claims priority, application Germany, Sept. 27, 1974, 2446335
Int. Cl.² H02J *9/06*
U.S. Cl. 307—66 **22 Claims**



14. A method for starting up with correct phase a converter having forced commutation, said converter including a power stage having controlled main valves and commutation devices associated therewith and said converter further including a control apparatus for controlling a drive unit for generating firing pulses and being adapted to be responsive to a regulating device, said method comprising the steps of:
in stand-by position; charging at least one energy storage device with an amount of energy required for commutation;
in stand-by position; blocking said firing pulses via said control apparatus which is continuously running;
and, upon a starting command, making available the stored amount of energy for commutating and releasing said firing pulses.

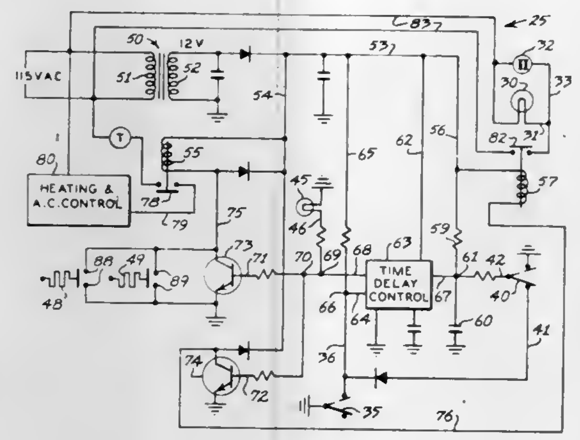
4,058,739
METHOD AND APPARATUS FOR PHASE MATCHING BY ADJUSTMENT OF THE FUNDAMENTAL FREQUENCIES
John Ernst Bjorkholm, Holmdel; Gary Carl Bjorklund, West Windsor, and Paul Foo-Hung Liao, Middletown, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.
Filed Nov. 30, 1976, Ser. No. 746,161
Int. Cl.² H03F *7/00*
U.S. Cl. 307—88.3 **8 Claims**

1. An apparatus for generating an output frequency ω_4 comprising:
first, second, and third lasers for generating input beams having frequencies ω_1, ω_2, and ω_3, respectively, the extremes of which frequencies define a frequency range,
an interaction medium having at least one two-photon resonance coupled to the ground state of said interaction medium and at least one strong one-photon resonance coupled to the ground state of said interaction medium, the frequency of which one-photon resonance is within said frequency range,
means for directing said beams of said first, second and third lasers substantially collinearly onto said interaction medium, and
means for extracting said output frequency ω_4 from said interaction medium,
characterized in that the frequencies of said first, second, and third lasers are adjusted to satisfy three conditions simultaneously: the output frequency ω_4 is equal to a linear combination of ω_1, ω_2 and ω_3; the frequency of said two-photon resonance is nearly equal to a linear combination of ω_1 and ω_2; and the phase-matching equation is substantially satisfied by ω_1, ω_2, ω_3 and ω_4, whereby said first, second and third lasers perform the function of phase-matching the output frequency in addition to performing the function of providing said frequencies ω_1, ω_2 and ω_3 which combine to form said output frequency.

4,058,740
ENTRY-CONTROLLED ENERGY SYSTEM
James H. Dalton, Nashville; S. Dalton Stover, Adamsville, both of Tenn., and Robert M. Roney, Huntsville, Ala., assignors to Lok-A-Wat, Inc., Adamsville, Tenn.
Filed Mar. 12, 1975, Ser. No. 557,797
Int. Cl.² G08B *21/00*
U.S. Cl. 307—116 **8 Claims**

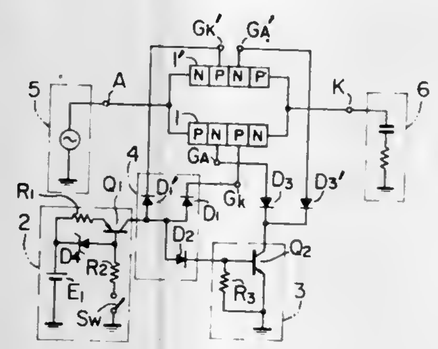
8. In a room having a door to open and close an opening thereto and a lock accessible from inside said room and operable to lock and unlock said door in closed condition,
a. load circuit means for an electrically energized device in said room,
b. switch means operable to open and close the load circuit means, and

c. control system means for operating said switch, comprising
c-1. a first circuit control means operated in response to open and closed conditions of said door,
c-2. a second circuit control means operated in response to door locking and door unlocking condition of said lock, and
c-3. circuit means operated by said first and second circuit



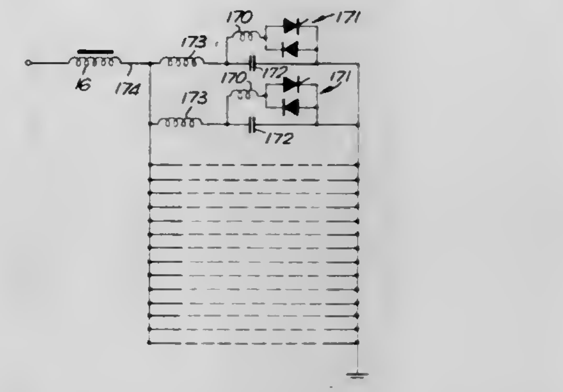
control means for closing said switch means in response to either a door open condition or a door locked condition,
c-3'. said circuit means including time delay means operated jointly by said first and second circuit control means to open said switch means after a predetermined interval during which both said door is in closed condition and said lock is in door unlocking condition.

4,058,741
SEMICONDUCTOR SWITCH CIRCUIT
Michio Tokunaga, Zushi; Ichiro Ohhinata, Yokohama, and Shinzi Okuhara, Fujisawa, all of Japan, assignors to Hitachi, Ltd., Japan
Filed July 13, 1976, Ser. No. 704,981
Claims priority, application Japan, July 14, 1975, 50-85388
Int. Cl.² H03K *17/72*
U.S. Cl. 307—252 G **7 Claims**



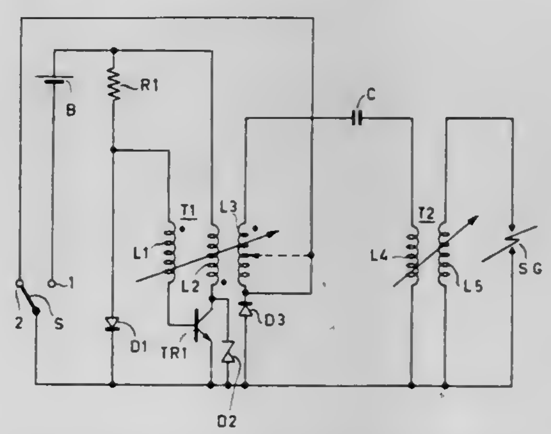
1. A semiconductor switch circuit comprising:
at least a 4-terminal PNPN switch having a cathode gate and an anode gate;
first drive circuit means for feeding a current into the cathode gate of said PNPN switch;
second drive circuit means for taking out a current from the anode gate of said PNPN switch, selected one of said first drive circuit means and said second drive circuit means having a power supply; and
change-over means, connected between said first drive circuit means and said second drive circuit means, for selecting a path of a drive current from said drive circuit means with said power supply to either selected one of the cathode gate and the anode gate of said PNPN switch or said drive circuit means without said power supply in response to a potential of one of the cathode gate and anode gate of said PNPN switch.

4,058,742
RADIO FREQUENCY PULSE TRANSMITTERS
William Joseph O'Brien, London, England, assignor to Decca Record Company Ltd., London, England
Continuation of Ser. No. 502,944, Sept. 4, 1974, abandoned. This application July 19, 1976, Ser. No. 706,271
Int. Cl.² H03K *1/16, 17/72, 3/02*
U.S. Cl. 307—260 **33 Claims**



1. A radio frequency power output device comprising a primary inductance unit including a coil formed of a plurality of similar adjacent windings inductively coupled to constitute a single primary inductance unit, a plurality of solid state current control units, means connecting each control unit directly to the ends of a respective associated winding, the current control units being located adjacent the respective windings with said connecting means disposed in pairs adjacent one another to cancel the fluxes produced by the currents in said connecting means, timing means arranged for operating said current control units simultaneously, capacitor means coupled to each of said adjacent windings by a respective current control unit to make said primary inductance unit resonant at a predetermined frequency when the control units are conductive, and a radio frequency power output circuit including a secondary winding coupled to all the windings of said primary inductance unit and tuned to said predetermined frequency.

4,058,743
PULSE GENERATING CIRCUIT
Desmond Ross Armstrong, Kidlington, England, assignor to U.S. Philips Corporation, New York, N.Y.
Filed Mar. 13, 1975, Ser. No. 558,017
Claims priority, application United Kingdom, Mar. 29, 1974, 13996/74
Int. Cl.² H03K *17/00*
U.S. Cl. 307—275 **13 Claims**



1. A pulse generating circuit comprising a first transformer having a primary winding connected in an oscillator circuit and a secondary winding connected with a diode to a capacitor to provide a charge path for the capacitor, a switch, means connecting the capacitor with the primary winding of a second transformer, and circuit means including at least a part of the secondary winding of the first transformer, the switch and the

primary winding of the second transformer for providing a discharge path for the capacitor such that operation of the switch results in a pulse being generated through a secondary winding of the second transformer upon discharge of the capacitor.

4,058,744

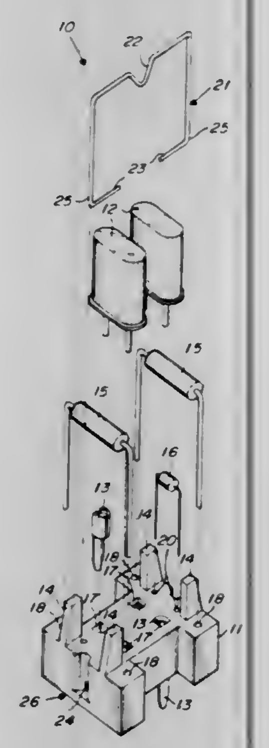
THERMALLY STABILIZED CRYSTAL MOUNTING ASSEMBLY

Arnold Vincent Dano, Park Ridge; Jerry James Tomaszewski, Addison, and Jerome Peter Friedrichs, Des Plaines, all of Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Filed June 7, 1976, Ser. No. 693,470

Int. Cl.² H01L *41/04*

U.S. Cl. 310—343 **11 Claims**



1. A crystal stabilizing assembly for electronic apparatus comprising:

a frequency controlling crystal coupled to a portion of the circuitry of the electronic apparatus for controlling the frequency of said portion;

a hermetically sealed crystal housing for retaining the crystal;

a heating element in contact with the outer surface of the crystal housing and thermally coupled to said housing;

temperature sensing means in contact with said heating element for sensing the temperature of said heating element, and for providing an output in response to said temperature;

control circuitry in said apparatus having an input coupled to the sensing means for receiving said sensing means output and having an output coupled to the heating element for providing a current thereto in response to the received input;

unitary support member for supporting the crystal housing, the heating element and the temperature sensing means; and

spring clip means mounted on the support member and having a first position for biasing the heating element against the crystal housing and for retaining the housing on the support member, and having a second position wherein the clip means is pivotable to allow release of the crystal housing from the support member.

4,058,745

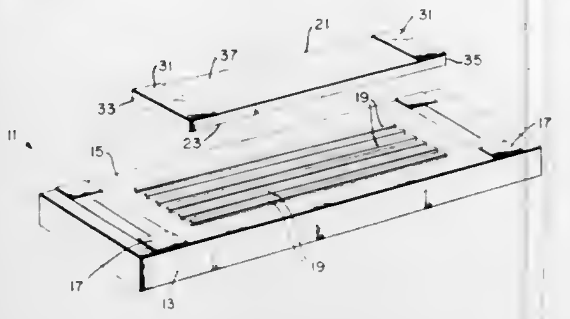
CONTROLLED GAP SURFACE ACOUSTIC WAVE DEVICE

Oberdan W. Otto, Los Angeles, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed July 6, 1976, Ser. No. 702,570

Int. Cl.² H01L *41/04*

U.S. Cl. 310—366 **9 Claims**



1. A surface acoustic wave device incorporating a controlled gap and adaptable for use as a convolver, amplifier, and the like, comprising:

a substrate of piezoelectric material having a polished upper surface capable of propagating surface acoustic wave energy;

transducer means including a pair of spaced electro-acoustic transducers disposed on said substrate for defining a propagation beam path between said transducers;

a semiconductor slab having a lower polished planar surface and an upper planar surface at least partially in contact with a conductive electrode;

support means including a plurality of parallel, spaced elongated rails disposed on said propagation beam path between said transducers and having longitudinal axes aligned with said propagation beam path for separating said upper and lower planar surfaces a predetermined distance to couple surface acoustic wave energy propagating in said beam path to said slab; and

pressure means coupled to said slab and to said substrate for exerting a uniform compressional force thereto forcing said planar surfaces toward each other while contact therebetween being prevented by said rails.

4,058,746

DYNAMOELECTRIC MACHINERY UTILIZING SUPERCONDUCTIVE WINDINGS

Cecil J. Mole, Monroeville, and Robert F. Edwards, Murrysville, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 327,540, Jan. 29, 1973, now Defensive Publication No. T917,006. This application July 17, 1975, Ser. No. 596,775

Int. Cl.² H02K *9/00*

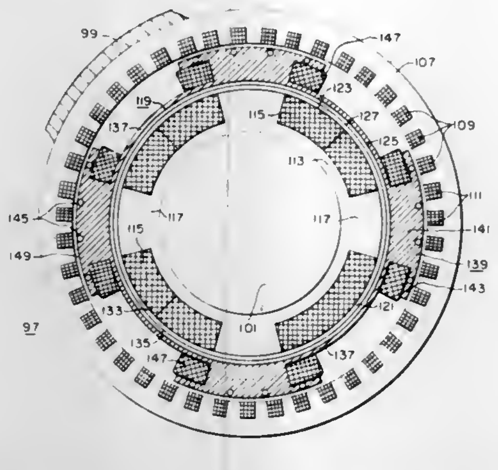
U.S. Cl. 310—10 **38 Claims**

1. In a dynamoelectric machine having a stator and a rotor, an improved field arrangement comprising:

a superconductive field winding to produce magnetic flux;

a salient pole ferromagnetic field structure formed to assist in

distributing the magnetic flux produced by said superconductive field winding; and



insulating means for thermally isolating said superconductive field winding from said salient pole ferromagnetic field structure and ambient conditions.

4,058,747

ROTARY ELECTRICAL MACHINES HAVING A SUPERCONDUCTING FIELD WINDING

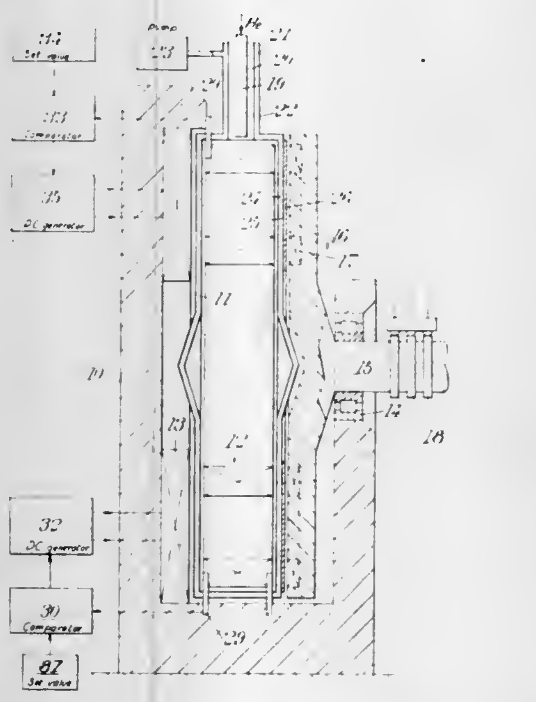
Alain Mailfert, Morsang-sur-Orge, and Lionel Boyer, Alfortville, both of France, assignors to Agence Nationale de Valorisation de la Recherche (ANVAR), Neuilly-sur-Seine, France

Filed Apr. 13, 1976, Ser. No. 676,405

Claims priority, application France, Apr. 17, 1975, 75.11953

Int. Cl.² H02K *9/00*

U.S. Cl. 310—52 **9 Claims**



1. A synchronous rotary electric machine having, in combination: a stationary frame; a super-conducting field winding located in a cryostat enclosure, having an axis and carried by said frame against relative movement thereof with respect to said frame along said axis, said field winding being constructed to deliver a magnetic field having *n* pairs of poles, *n* being an integer, when DC currents circulate therein; a mechanical torque transmission shaft rotatable with respect to said frame about said axis; a normally conducting polyphase winding for providing a rotating field having *n* pairs of poles when AC currents circulate therein, said polyphase winding being carried by said shaft, being located in side by side relation with respect to said superconducting field winding, and being connected to sliding external contacts for exchanging electrical power with an external AC circuit; auxiliary DC windings securely connected to said frame in side by side relation with said field winding, said auxiliary DC windings being constructed to deliver a magnetic field having *n* pairs of poles when DC currents circulate therein; and means for adjusting the currents in said auxiliary windings at a value for which both the torque and axial forces tending to move said field winding with respect to said frame are lower than a predetermined value.

4,058,748

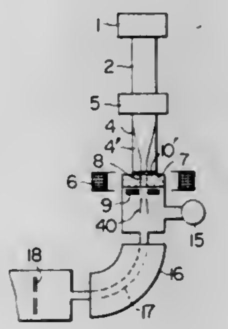
MICROWAVE DISCHARGE ION SOURCE

Noriyuki Sakudo, Ome; Katsumi Tokiguchi, Kokubunji, and Ichiro Kanomata, Fuchu, all of Japan, assignors to Hitachi, Ltd., Japan

Filed May 13, 1976, Ser. No. 686,121

Int. Cl.² H01J *27/00*

U.S. Cl. 313—156 **13 Claims**



1. A microwave discharge ion source comprising a set of conductive members for producing a microwave electric field therebetween, means for generating a magnetic field in a direction perpendicular to said microwave electric field, means for introducing a sample gas or vapor, at least one extraction electrode for taking ions out of a plasma produced by a microwave discharge which occurs in the atmosphere of the introduced sample gas or vapor in cooperation with said microwave electric field and said magnetic field, and a vacuum-sealing insulator provided at an end portion opposite to the end portion at which said extraction electrode is provided, wherein said set of conductive members are a set of electrodes having their surfaces arranged in opposing and substantially parallel relationship; a discharge space defined in the proximity of an electrode gap between said electrodes has a cross section substantially rectangular in a plane perpendicular to a direction along which the ions are extracted; said extraction electrode is provided with a slit having substantially the same pattern as that of said rectangular cross section, an ion beam having a rectangular cross section being extracted through said slit; and said vacuum-sealing insulator is made of a conductor material at a position at which it comes into contact with said electrodes, said conductor material being vacuum-tightly attached to said vacuum-sealing insulator.

4,058,749

FILAMENT SHIELD FOR SEALED HEADLAMP AND MOUNTING METHOD THEREFOR

Nickolas P. Demas, Cranford, N.J.; William E. Duncan, Boyertown, Pa.; Norman S. Gephart, Pottstown, Pa., and William T. S. Waltz, Wescosville, Pa., assignors to Wagner Electric Corporation, Parsippany, N.J.

Filed Apr. 5, 1976, Ser. No. 673,400

Int. Cl.² H01J *1/00*; H01K *1/02*

U.S. Cl. 313—326 **6 Claims**

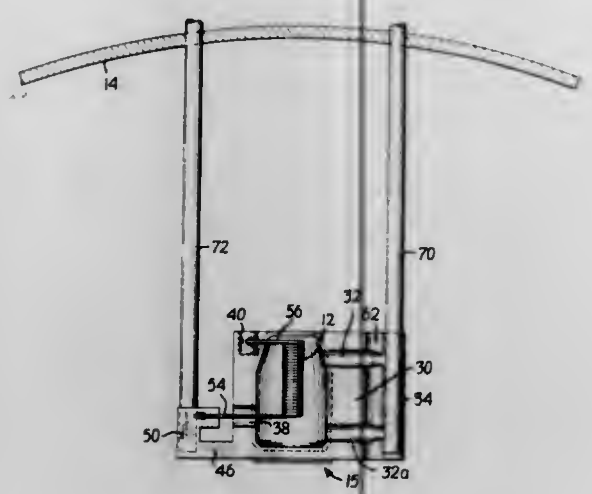
1. A method of assembling the filament and metallic filament shield in a automotive type headlamp comprising:

a. preassembling said filament and filament shield into a rigid subassembly, said filament being welded at each of its two mounting legs to said filament shield whereby an electrical short circuit is formed through said metallic filament shield between the ends of said filament; then

b. welding said subassembly to support pins in a reflector of said headlamp, said support pins also being adapted to providing electrical connection to said filament; and then

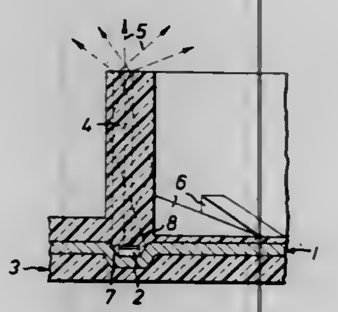
c. cutting away the connecting metal between

i. a portion of said filament shield to which one of said support pins and one end of said filament are welded and



ii. the remainder of said filament shield, whereby the electrical short circuit of said filament previously existing through the body of said filament shield is removed.

4,058,750
LIGHT EMITTING SEMICONDUCTOR INDICATING STRUCTURE WITH LIGHT CONDUCTORS
Werner Schöberl, Massenbachhausen, Germany, assignor to Licentia Patent-Verwaltungs-G.m.b.H., Frankfurt am Main, Germany
Filed Sept. 20, 1976, Ser. No. 725,083
Claims priority, application Germany, Sept. 20, 1975, 2542095
Int. Cl.² H05B *33/02, 33/20*
U.S. Cl. 313—500 **19 Claims**

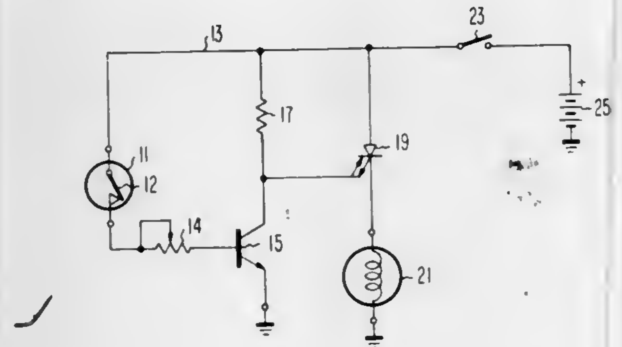


19. A semiconductor arrangement for producing illuminated characters comprising: a structured contact strip; a plurality of liminescent semiconductor elements mounted on the strip for electrical connection therewith by first electrodes; means connecting second electrodes of said semiconductor elements to another part of said strip; a homogeneous plastic material embedding said contact strip and said semiconductor elements, but leaving outer connecting parts protruding, and forming a common base plate and a separate light conductor above each said semiconductor element, with each said light conductor extending substantially perpendicular to said base plate; and a casing hood surrounding said base plate and said light conductors, said casing hood having a plurality of inner webs which extend perpendicular to said base plate between said light conductors to screen same from one another.

4,058,751
LIGHT FLASHER CIRCUIT INCLUDING GTO
Ronald Robert Brooks, Hamilton Square, N.J., assignor to RCA Corporation, New York, N.Y.
Filed Jan. 23, 1976, Ser. No. 651,918
Int. Cl.² H05B *39/09;* **G08B** *5/38;* **H03K** *3/02*
U.S. Cl. 315—200 A **13 Claims**

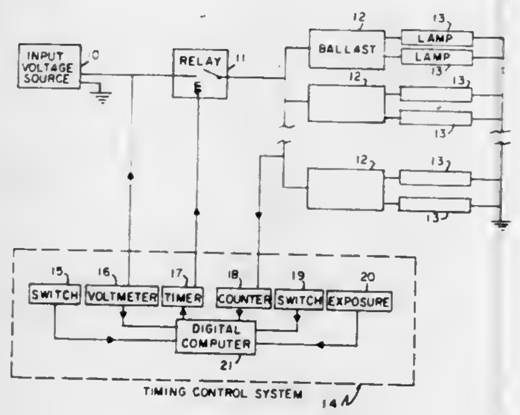
1. A light flasher circuit comprising:

first and second terminals across which a direct current operating potential may be applied;
a gate-turn-off silicon controlled rectifier having a main conduction path between anode and cathode electrodes, and a gate electrode;
a lamp connected in series connection with said conduction path of said rectifier between said first and said second terminals;
resistance means;
a switching transistor having a collector electrode connected both to the gate electrode of said rectifier and via said resistance means to said second terminal, having an



emitter electrode coupled to said first terminal, and having a base electrode; and
a thermal circuit breaker having a pair of normally-closed mechanical contacts, connected respectively to the base electrode of said transistor and to said second terminal, which said contacts open when the current flowing through them sufficiently heats the breaker and which said contacts close upon sufficient subsequent cooling of said breaker, whereby said thermal circuit breaker selectively applies base current to said first transistor according to a repeating cycle to turn said transistor on and off periodically, in turn to turn said rectifier off and on periodically and to cause said lamp to flash.

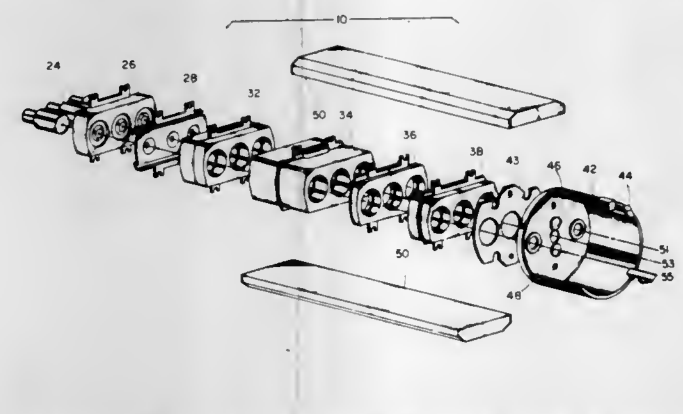
4,058,752
DOSIMETRY CONTROL METHOD
William C. Woods, Lynn; Robert E. Levin, South Hamilton, and Richard H. Hodges, Marblehead, all of Mass., assignors to GTE Sylvania Incorporated, Danvers, Mass.
Filed Sept. 9, 1976, Ser. No. 721,918
Int. Cl.² H05B *41/36, 37/02*
U.S. Cl. 315—360 **1 Claim**



1. The method of operating a photochemotherapy chamber for the irradiation of a patient with long wave ultraviolet light comprising the steps of:
1. selecting a prescribed dosage of long wave ultraviolet radiation;
2. automatically converting said prescribed dosage into the time duration that an ultraviolet source should be energized to deliver said dosage by
a. monitoring the line voltage delivered to said ultraviolet

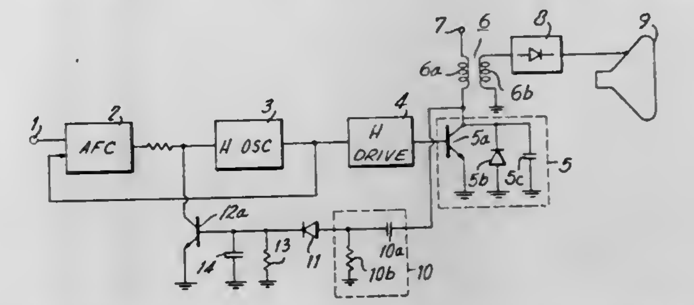
source and establishing said time duration in accordance with the deviation of said line voltage from a predetermined value and
b. monitoring the hours of operation of said ultraviolet source and establishing said time duration in accordance with a nonlinear curve of output versus hours of operation for said ultraviolet source; and
3. exposing the patient to said ultraviolet radiation for said time duration.

4,058,753
ELECTRON GUN HAVING AN EXTENDED FIELD BEAM FOCUSING AND CONVERGING LENS
Allen P. Blacker, Hoffman Estates, and James W. Schwartz, Deerfield, both of Ill., assignors to Zenith Radio Corporation, Glenview, Ill.
Continuation-in-part of Ser. No. 494,123, Aug. 2, 1974, Pat. No. 3,995,194. This application Mar. 15, 1976, Ser. No. 666,858
Int. Cl.² H01J *29/70, 29/76*
U.S. Cl. 315—368 **11 Claims**



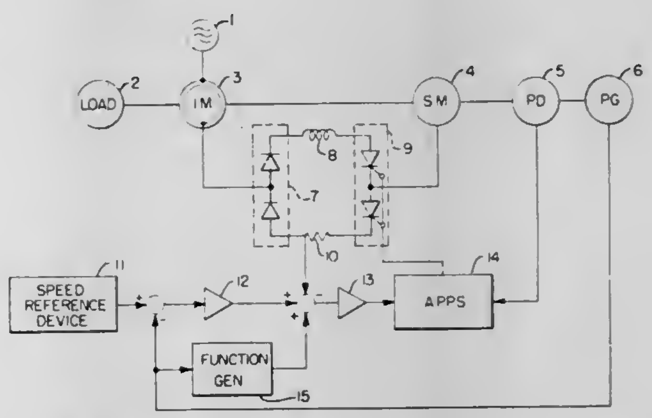
1. An electron gun for a television color cathode ray tube having an extended field lens for producing a focused and diverted beam of electrons, said gun having coaxially arranged electrodes comprising:
associated cathode means and grid means for producing an electron beam crossover;
a main focus lens means for receiving electrons from said beam crossover to form at the screen of the tube a real image of said beam crossover, said main focus lens means having at least three electrodes situated on a common axis including a focus electrode for receiving a variable potential for electrically adjusting the focus of said beam, and in succession down-beam, at least two associated electrodes having potentials thereon which form in the gaps between adjacent electrodes significant main focus field components, the strength of a first of which components is controlled by adjustment of the voltage received by said focus electrode, the strength of a second of which field components spaced down-beam from said first component being relatively less than that of said first component;
said lens means being characterized by having addressing faces on said associated electrodes which define said second field component being so structured and disposed as to cause said second field component to be asymmetrical and effective to significantly divert said beam from its path, whereby due to the relative weakness of said second field component and the separation of said second field component from said first field component, said diverting of said beam is accomplished without any significant distortion of the beam and substantially independently of any beam-focusing adjustments of said first field component.

4,058,754
MALFUNCTION INDICATION APPARATUS FOR USE IN A CRT DEFLECTION CIRCUIT
Toshinobu Ohnishi, Yokohama; Hiroyuki Sumiya, Fussa, and Masao Suzuki, Tokyo, all of Japan, assignors to Sony Corporation, Tokyo, Japan
Filed May 21, 1976, Ser. No. 688,899
Claims priority, application Japan, June 3, 1975, 50-66910
Int. Cl.² H01J *29/70*
U.S. Cl. 315—411 **12 Claims**



1. Apparatus for detecting an error condition in a deflection circuit of a cathode ray tube, said deflection circuit including means for generating a periodic retrace signal, comprising:
filter means coupled to said retrace signal generating means and normally non-responsive to said retrace signal, said retrace signal having higher frequency components in the event of said error condition and said filter means passing said higher frequency components; and
means coupled to said filter means and responsive to signals passed by said filter means to produce an output signal.

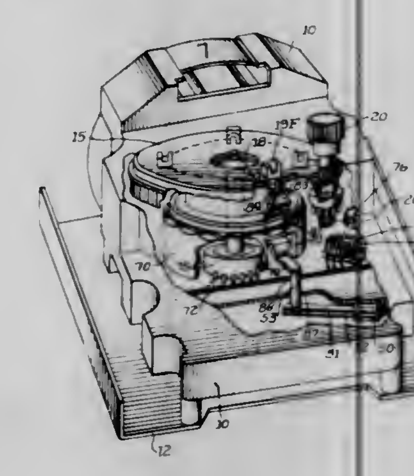
4,058,755
KRAMER SYSTEM UTILIZING A COMMUTATORLESS MOTOR
Mitsuyuki Honbu; Sanshiro Obara, both of Hitachi, and Takamasa Hori, Tohkai, all of Japan, assignors to Hitachi, Ltd., Japan
Filed Jan. 20, 1976, Ser. No. 650,767
Claims priority, application Japan, Jan. 20, 1975, 50-7804
Int. Cl.² H02P *1/54*
U.S. Cl. 318—47 **9 Claims**



1. A speed control system for an induction motor, comprising an induction motor having a winding providing an output, a load driven by the induction motor, a synchronous motor mechanically connected to the induction motor, converting means responsive to the output of the winding of the induction motor for providing a direct current signal and therefrom an alternating current signal for application to the synchronous motor, the converting means including thyristor means, a current signal generating means supplying a current signal to the gates of the thyristor means of the converting means in accordance with a desired speed value and the actual speed value of the synchronous motor, and function generator means for varying the current signal generated by the current signal generating means to maintain the value of the direct current signal of the converting means less than a maximum commutation current value and greater than a minimum load current

value in accordance with the actual speed value of the synchronous motor.

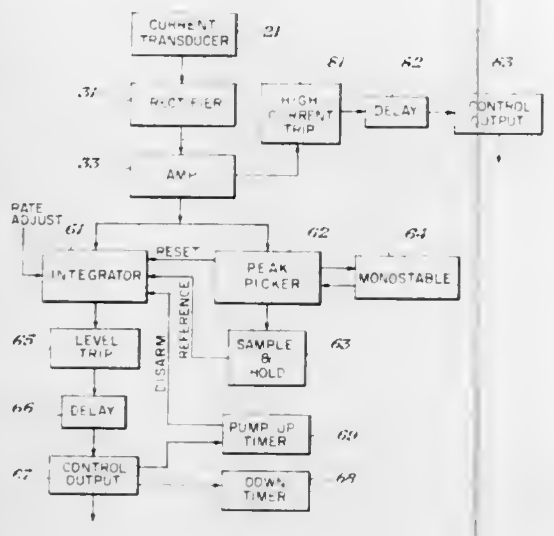
4,058,756
BIDIRECTIONAL CHANNEL SKIPPING TUNER DRIVE SYSTEM WITH SINGLE POLE PROGRAMMING SWITCH
Richard L. Thorne, Elgin, Ill., assignor to Zenith Radio Corporation, Glenview, Ill.
Filed Mar. 5, 1976, Ser. No. 664,139
Int. Cl.² G05B *11/01*
U.S. Cl. 318—265 **6 Claims**



1. For use in a television tuning system in which a tuner channel selector is rotatable between a plurality of positions each corresponding to a broadcast channel, a tuner drive system including a bidirectional electric motor, means mechanically coupling said motor to said channel selector, initiate means responsive to viewer commands initiating channel selector rotation in a selected direction, carryover means activated by channel selector rotation for continuing said rotation in the selected direction until the next broadcast channel position is reached inactivating said carryover means, and skip means, mechanically coupled to said channel selector operative before said carryover means become inactivated causing said channel selector to pass through selected ones of said plurality of broadcast channel positions without stopping, said skip means comprising:
a single pole switch;
a plurality of camming means associated with each of said broadcast channel positions selectively positionable to engage said switch; and
electrical latching means, responsive to said initiate means and said switch, maintaining channel selector rotation in the selected direction during the inactive period of said carryover means.

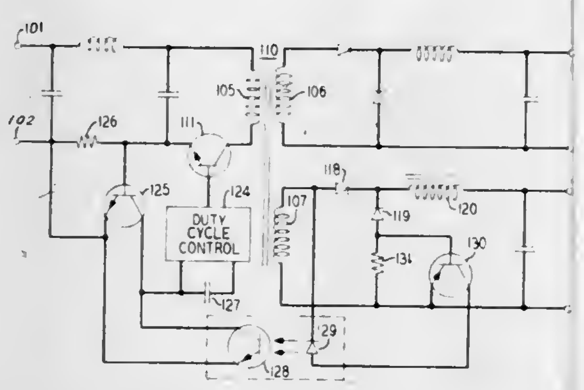
4,058,757
WELL PUMP-OFF CONTROLLER
Barry S. Welton; Granval W. Westerman, and Michael E. Hill, all of Midland, Tex., assignors to End Devices, Inc., Midland, Tex.
Filed Apr. 19, 1976, Ser. No. 678,452
Int. Cl.² G05B *5/00*
U.S. Cl. 318—474 **4 Claims**

1. A system for controlling an electric motor employed for driving a walking beam type pumping unit used for pumping fluid from a well wherein the amplitude of the current drawn by the motor normally has two minimum peak values during each stroke cycle of the walking beam, said system comprising:
measuring means for measuring the amplitude of the current drawn by the motor during each stroke cycle of the walking beam,
detector means coupled to the output of said measuring means for producing a pulse at the minimum peaks of the current amplitude during each stroke cycle,
integrator means having a first input connected to the output of said measuring means for integrating the current measured by said measuring means during each stroke cycle,
pulse generating means coupled to the output of said detector means and responsive to alternate pulses from said detector means for generating a control pulse during each stroke cycle having a time period greater than ½ of the time period of each stroke cycle,
said integrator means having a reset input,
means for applying the output of said detector means to said reset input,



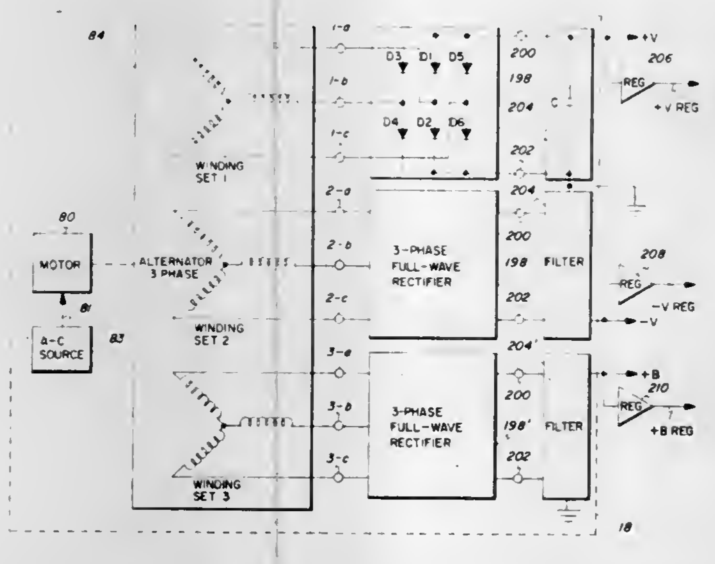
means for applying the output of said pulse generator means to said reset input to allow only alternate ones of said pulses from said detector means to reset said integrator means to allow said integrator means to integrate the current amplitude during each stroke cycle, and
means including threshold means for sensing the output of said integrator means during each stroke cycle and for producing a control signal for shutting off the motor if the integrator output fails to reach a predetermined threshold during each stroke cycle and representative of normal pumping conditions.

4,058,758
COOPERATIVE PRIMARY AND SECONDARY CURRENT LIMITING TO SELECTIVELY LIMIT AGGREGATE AND INDIVIDUAL CURRENT OUTPUTS OF A MULTI OUTPUT CONVERTER
William Anders Peterson, Lake Parsippany, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.
Filed July 2, 1976, Ser. No. 702,039
Int. Cl.² H02M *7/00*
U.S. Cl. 363—80 **16 Claims**



1. In a converter circuit
an input circuit including switching means and means to control the duty cycle of said switching means, said input circuit including current limit means operative through said means to control to limit maximum current in said input circuit by limiting a duty cycle,
at least a first and a second output circuit, said first output circuit including output current limit means operative through said means to control to limit maximum current in said first output circuit comprising means to monitor a current in said first output circuit, current threshold responsive means coupled to said means to monitor and responsive to a threshold of current in said first output circuit, a light emitting diode coupled to said threshold responsive means, said light emitting diode being energized in response thereto,
a phototransistor having a base optically coupled to and responsive to said light emitting diode, the output of said phototransistor being coupled to said means to control and being preferentially operative over said current limit means when energized to limit maximum current in said first output circuit by limiting a duty cycle.

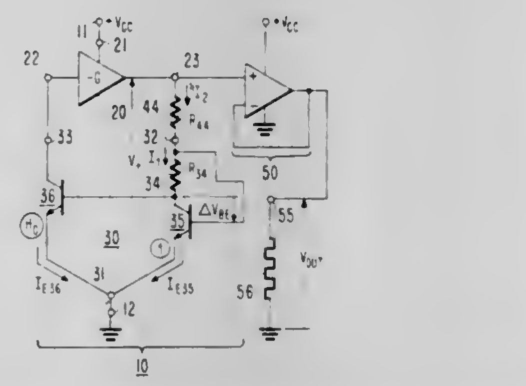
4,058,759
POWER SUPPLY FOR COMPUTER PERIPHERAL DEVICE
Martin O. Halfhill, San Jose, Calif., assignor to Xerox Corporation, Stamford, Conn.
Filed Nov. 19, 1975, Ser. No. 633,516
Int. Cl.² H02K *47/00;* H02M *5/32*
U.S. Cl. 322—13 **15 Claims**



1. In a computer peripheral device having a driven element, a controllable element and control means coupled to said controllable element and operative in responsive to a plurality of different power supply voltages for controlling said controllable element, an improved power supply means coupled to said control means for supplying said plurality of power supply voltages to said control means, said power supply means comprising:
a motor capable of being driven at a predetermined rate of speed; said driven element being coupled to and driven by said motor;
means coupled to said motor and responsive to the motor being driven at said predetermined rate of speed for generating said plurality of power supply voltages, said means for generating comprising an alternator coupled to and driven by said motor for generating a plurality of output signals and means for deriving said plurality of power supply voltages from said plurality of output signals; and
means coupled to said means for generating for supplying said plurality of power supply voltages to said control means.

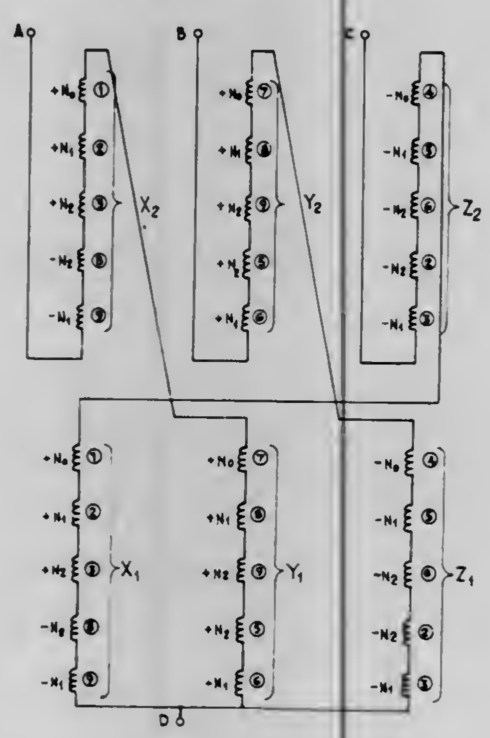
4,058,760
REFERENCE POTENTIAL GENERATORS
Adel Abdel Aziz Ahmed, Annandale, N.J., assignor to RCA Corporation, New York, N.Y.
Filed Aug. 16, 1976, Ser. No. 714,359
Int. Cl.² G05F *1/58*
U.S. Cl. 323—19 **9 Claims**

6. A reference potential generator in combination with means for utilizing the reference potential it supplies, said reference potential generator comprising:
first and second terminals connected to said means for utilizing the reference potential and a third terminal between which first and third terminals energizing potential is applied;
first and second transistors of a first conductivity type operated at the same absolute temperature T as each other, each of said first and said second transistors having respective base and emitter and collector electrodes;
a direct interconnection without substantial intervening impedance between the emitter electrodes of said first and said second transistors; and
a first direct current conductive path between that direct interconnection and said first terminal;
a first resistance having a first end to which the base electrode of said first transistor is connected and having a second end to which the base electrode of said second transistor and the collector electrode of said first transistor are each connected;
a second direct current conductive path between the first end of said first resistance and said first terminal;
further resistance included in at least one of said first and said second direct current conductive paths;
third and fourth transistors of a second conductivity type complementary to said first conductivity type, each of said third and said fourth transistors having first and second and control electrodes and having a principal conduction path between its first and second electrodes the conduction of which is controllable in response to potential applied between its first and control electrodes;



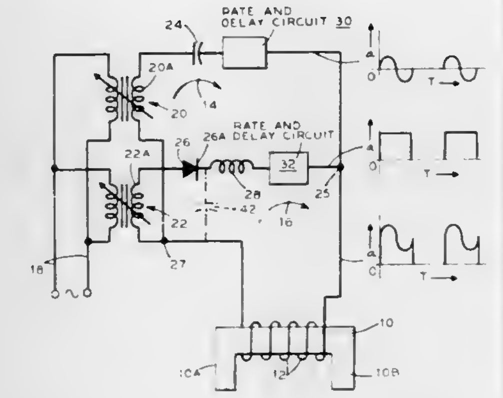
means for adjusting the conduction of the principal conduction path of said third transistor, including
a third direct current conductive path between the first electrode of said third transistor and said second terminal, including
a fourth direct current conductive path between the collector electrode of said second transistor and the second electrode of said third transistor, and including
direct coupling of the collector electrode of said second transistor to the control electrode of said third transistor; and
means for conditioning said fourth transistor for conduction through its principal conduction path which is proportional to the conduction of said third transistor through its principal conduction path, including
means for applying a potential to the control electrode of said fourth transistor equal to that at the control electrode of said third transistor, including
a fifth direct current conductive path between the first electrode of said fourth transistor and said second terminal, and including
a sixth direct current conductive path between the second electrode of said fourth transistor and said third terminal, said reference potential being developed between said first and said second terminals responsive to application of an energizing potential between said first and said third terminals.

4,058,761
SATURATED REACTORS
Erich Siegfried Friedlander, Birmingham, England, assignor to Associated Electrical Industries Limited, London, England
Filed May 4, 1976, Ser. No. 683,089
Claims priority, application United Kingdom, May 13, 1975, 20110/75
Int. Cl.² G05F *3/06*
U.S. Cl. 323—48 **10 Claims**



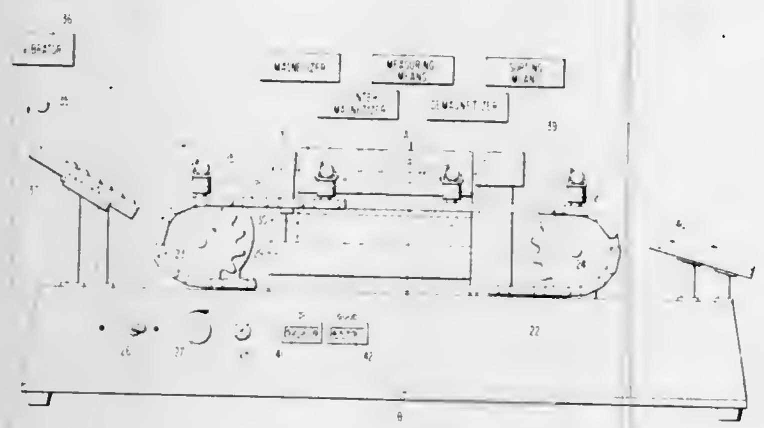
1. A saturated reactor arrangement having three line-terminals and a star-point, for providing a reactive load with negligible zero-sequence reactance and the capability of earthing said star-point without reducing harmonic compensation, said reactor arrangement being of the kind comprising:
A. a core structure having *n* core-limbs,
I. where *n* is at least five,
II. said *n* core-limbs being in *p* groups where *p* is at least one and where *n/p* is an integer,
B. each of said *p* groups having primary windings connected between said three line-terminals and said star-point,
I. the primary windings of each group being connected in series with the primary windings of each other group if any, and in such manner that fluxes in said core-limbs have phases spaced regularly throughout each half cycle for effecting harmonic current cancellation,
C. the reactor arrangement further comprising a secondary winding on each of said *n* core-limbs,
I. each said secondary winding being interconnected with each other secondary winding to form at least one mesh circuit, wherein the improvement comprises:
D. constituting the primary windings of
I. one set of two duplicate sets of primary winding components having said core structure in common,
II. said two duplicate sets being connected in zig-zag star connection between said three line-terminals and said star-point to prevent any net magnetization of said core-limbs by zero-sequence current.

4,058,762
METHOD AND APPARATUS FOR MAGNETIC INSPECTION THROUGH ADJUSTABLE PULSED ALTERNATING AND DIRECT CURRENT MAGNETIC FIELDS
Amos Earl Holt; William Eugene Lawrie, both of Lynchburg, Va., and Albert Stingel Birks, Doylestown, Ohio, assignors to The Babcock & Wilcox Company, New York, N.Y.
Filed June 4, 1976, Ser. No. 693,021
Int. Cl.² G01R *33/12*
U.S. Cl. 324—216 **5 Claims**



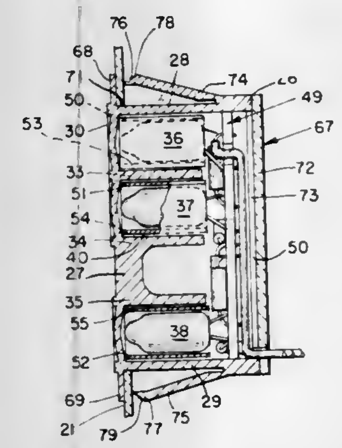
1. A method for detecting flaws in a magnetizable workpiece, comprising the steps of:
depositing magnetic particles on the workpiece,
subjecting the workpiece to pulsed alternating and direct current magnetic fields, and
adjusting the rate and duration of pulsing of the alternating and direct current magnetic fields to improve the detection of flaws in the workpiece.

4,058,763
APPARATUS FOR AUTOMATICALLY MAGNETIZING PERMANENT MAGNET BODIES, MEASURING THEIR MAGNETIC RETENTIVITY AND SORTING THEM
Erich Steingroever, Bonn, Germany, assignor to Elektro-Physik Hans Nix & Dr. -Ing. Erich Steingroever KG, Cologne, Germany
Filed Mar. 6, 1975, Ser. No. 555,899
Claims priority, application Germany, Mar. 11, 1974, 2411485
Int. Cl.² G01R *33/12*
U.S. Cl. 324—205 **27 Claims**



1. In apparatus for automatically testing and selecting permanent magnet bodies having oppositely facing pole surfaces, the combination comprising generally U-shaped ferromagnetic yoke means having opposed inner pole surfaces defining an elongated air gap of uniform width within which gap magnet bodies may be received, circuit means for said yoke means including means for generating a magnetizing flux through a magnet body at at least one position along the length of said air gap and including means for measuring a magnetic value of said magnetized magnet body at another position along the length of said air gap, said circuit means also including comparison means responsive to said measuring means for selecting magnet bodies having predetermined values of said measured magnetic characteristic, and conveyor means for moving a magnet body successively to said one position and to said measuring position.

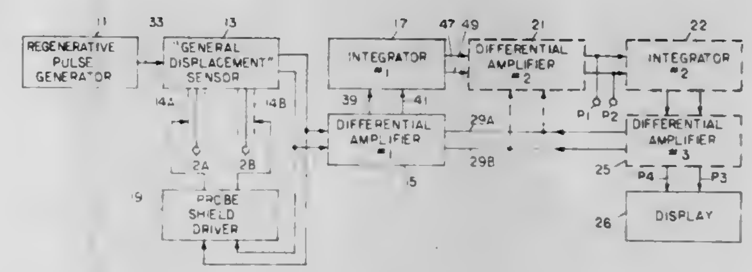
4,058,764
COMBINED PILOT LIGHT AND GROUND TESTING ASSEMBLY
Francis D. Kirchoff, Waban, Mass., assignor to Alco Electronic Products, Inc., North Andover, Mass.
Filed July 8, 1976, Ser. No. 703,575
Int. Cl.² G01R *31/02*
U.S. Cl. 324—51 **4 Claims**



1. A circuit tester for checking a standard grounded three wire electrical outlet to determine if said outlet is properly wired:
said circuit tester being of the type having a hollow, insulating case with a front wall, a pair of side walls, a top wall, a bottom wall, a rear opening and integral partitions extending from front to rear across the interior thereof to form three rectilinearly aligned chambers therewithin;
said tester being characterized by:
said hollow case being of one piece of translucent plastic with three said partitions spaced apart therein to form a pair of juxtaposed said chambers and a third said chamber at a spaced distance therefrom;
said partitions being of less depth than the depth of the said walls of said case to provide a circuit board compartment at the rear of said case;
a circuit board located in said circuit board compartment, said board supporting a pair of juxtaposed lamps, and a third lamp spaced apart therefrom, each said lamp being enclosed within one of said chambers and electrically connected, through said circuit board to a three prong connection in said outlet;
a sleeve of opaque material lining each said chamber to light shield one said chamber from another;
and a rear wall forming a closure to the rear opening of said case.

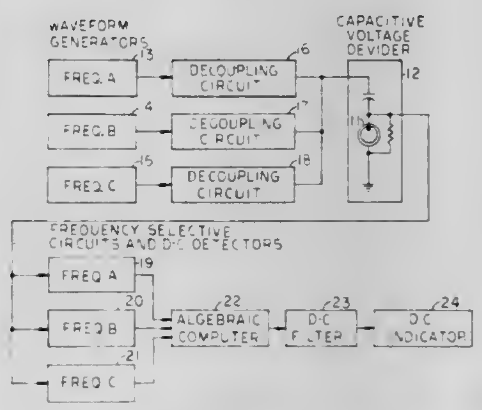
4,058,765
GENERAL DISPLACEMENT SENSOR
David Richardson, 2588 Knights Bridge Lane, Santa Clara, Calif. 95051, and Paul Kageyama, 418 Madera No. 1, Sunnyvale, Calif. 94086
Filed June 7, 1976, Ser. No. 693,886
Int. Cl.² G01R *27/26*
U.S. Cl. 324—61 R **40 Claims**

1. Apparatus for sensing level of pourable material in a container, the apparatus comprising:
pulse generation means for producing a sequence of voltage pulses, spaced in time, of substantially identical magnitude and duration;
resistive-capacitive circuit means, operatively associated with the pulse generation means, and having a probe which includes at least one probe capacitor immersed in the pourable material, for producing a signal indicative of level of pourable material in the container;
second resistive-capacitive circuit means, operatively associated with the pulse generation means, for producing a reference signal indicative of a reference level in the container;
amplification means for amplifying the pourable material level signal and the reference signal, producing an amplified pourable material level signal and an amplified reference signal;
integration means for generating a time-integrated difference signal of the amplified pourable material level signal and the amplified reference signal;
output means, operatively associated with the integration



means, for producing an output signal proportional to a mathematical function of the pourable material level in the container;
shield driver means for reducing the effects of extraneous capacitance developed by the probe of the first resistive-capacitive circuit means, the shield driver being operatively associated with the probe of the first resistive-capacitive circuit means; and
the probe including a three-conductor cable, with one conductor electrically connected to the probe capacitor immersed in the pourable material, with a second conductor surrounding the first conductor and being electrically connected to the shield driver means, and with a third conductor surrounding the second conductor and being electrically grounded.

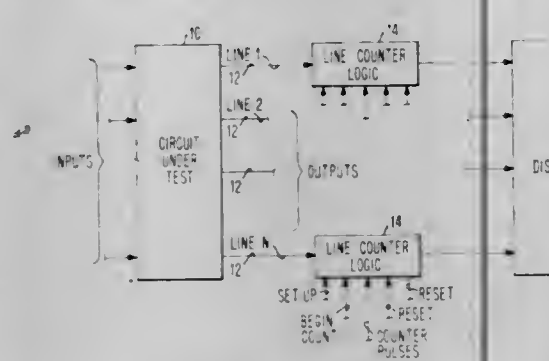
4,058,766
MULTIPLE-FREQUENCY PERMITTIVITY TESTER
Ronald F. Vogel, Bettendorf, Iowa; Robert R. Boldt, Taylor Ridge, Ill.; Kevin D. McKee, Davenport, Iowa; Roy E. Resh, Bettendorf, Iowa, and Paul E. West, Davenport, Iowa, assignors to Agridustrial Electronics, Inc., Bettendorf, Iowa
Filed June 21, 1976, Ser. No. 697,858
Int. Cl.² G01R *27/26*
U.S. Cl. 324—61 R **14 Claims**



1. An electrical testing system having an output that is a function of the permittivity of materials for determining qualities of the materials, comprising: generating means for exciting periodic electrical waves at a plurality of frequencies, said generating means having signal selective circuits for supplying said waves at respective predetermined ones of said frequencies, a capacitive cell to receive materials for testing, the capacitive impedance of said cell being dependent on the complex permittivity of material placed therein, said signal selective circuits of said generating means connected to said capaci-

tive cell to apply thereto said periodic electrical waves at said predetermined frequencies, output selective circuits connected to said capacitive cell for receiving voltages developed thereacross, said output selective circuits having different output circuits responsive to application of voltages at different ones of said predetermined frequencies for developing different output voltages therein in response to application thereto of said voltages developed across said capacitive cell, the magnitudes of said different output voltages varying systematically in accordance with different impedances of said cell at different ones of said predetermined frequencies, computing means connected to said output circuits of said output selective circuits, said output circuits applying said different output voltages to said computing means, and said computing means being programmed to provide in response to application thereto of said different output voltages an output indicative of the amount of a particular quality associated with the material being tested.

4,058,767
APPARATUS AND PROCESS FOR TESTING AC PERFORMANCE OF LSI COMPONENTS
Eugen I. Muehldorf, Potomac, Md., and Robert R. Elam, Manassas, Va., assignors to International Business Machines Corporation, Armonk, N.Y.
Filed Apr. 29, 1975, Ser. No. 572,806
Int. Cl.² G01R *15/12*
U.S. Cl. 324—73 R **11 Claims**

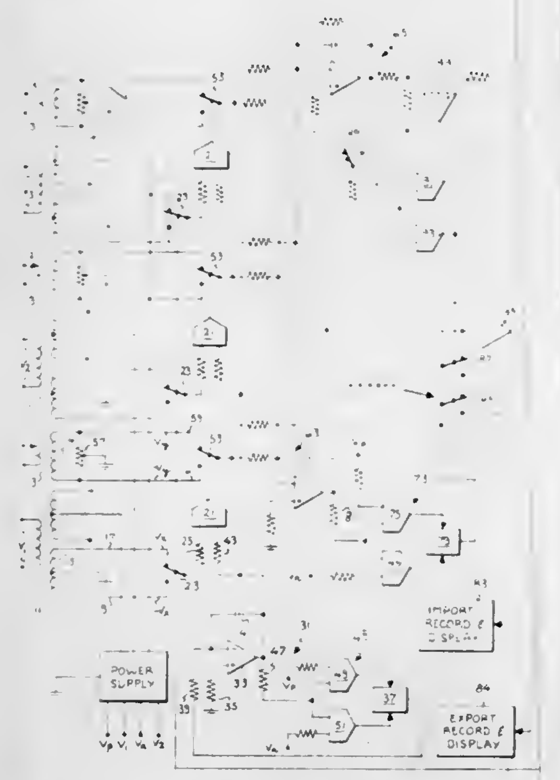


1. A process for testing the AC performance of LSI circuits comprising the steps of

a. providing a test pattern to an LSI circuit under test,
b. sensing a plurality of output signals from the circuit under test by one or more logic elements to translate the plurality of output signals into numerical values indicative of the relative switching performance of the circuit,
c. providing a plurality of different control signals to each logic element, the control signals being correlated with the test pattern to the circuit under test, and
d. displaying the status of each logic element as an indication of the AC performance of the LSI circuit under test.

4,058,768
TWO-WAY ELECTRONIC KWH METER
Miran Milkovic, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.
Filed Jan. 7, 1977, Ser. No. 757,799
Int. Cl.² G01R *11/32*
U.S. Cl. 324—142 **11 Claims**

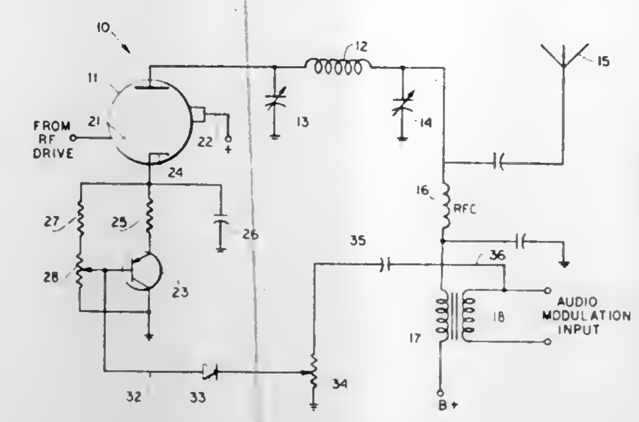
1. A two-way electronic meter for measuring energy consumed in or exported from an electrical system comprising
means for generating first and second analog signals, said signals being proportional to a current in said system, said first analog signal being 180° out of phase with respect to said second analog signal;
means for generating third and fourth analog signals, said signals being proportional to a voltage in said system, said third analog signal being 180° out of phase with respect to said fourth analog signal;
means for generating a relatively high frequency triangular waveform;
a comparator, said relatively high frequency triangular waveform being coupled to one input of said comparator;
switching means for selectively coupling said third or said fourth analog signal to the other input of said comparator, the output of said comparator being a pulse width modulated signal having a pulse width proportional to the amplitude of said voltage in said system;
means for multiplying said pulse width modulated output signal of said comparator with a signal proportional to said first and second current proportional analog signals, the output of said multiplier having an amplitude proportional to the electrical current in said system and having a pulse width proportional to the amplitude of the voltage in said system;



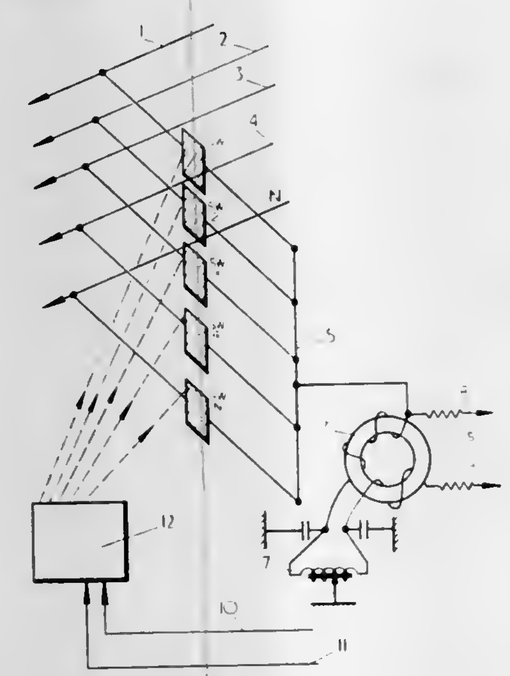
an integrator, said integrator being connected to the output of said multiplier, the output of said integrator being proportional to the energy consumed in said system;
a pulse generating circuit, the input of said circuit being connected to said integrator to thereby convert the output of said integrator to a pulse train having each pulse proportional to the energy consumed in said system;
first means for recording and displaying the energy consumed in said electrical system;
second means for recording and displaying the energy exported from said electrical system;
means for determining whether energy is being consumed by or exported from said electrical system; and
switching means responsive to said determining means for coupling said pulse train to said means for displaying the energy consumed or exported from said electrical system.

4,058,769
MODULATION SYSTEM WITH CARRIER CONTROL
Robert J. Alderman, Rte. 1, Box 205E, Ruskin, Fla. 33570
Filed July 5, 1974, Ser. No. 486,119
Int. Cl.² H04B *1/04*
U.S. Cl. 325—144 **19 Claims**

1. The method of generating a modulated carrier signal, comprising the steps of:
generating a carrier signal;
generating a modulation signal;
modulating said carrier signal with said modulation signal; and
concurrent with said step of modulating, adjusting the power of said carrier signal in proportion to the instantaneous power of said modulating signal so that the instantaneous power of said carrier signal is proportional to the power of said modulation signal which is available to modulate said carrier signal, said instantaneous power of said carrier signal being at least sufficient to avoid overmodulation by said instantaneous power of said modulating signal.

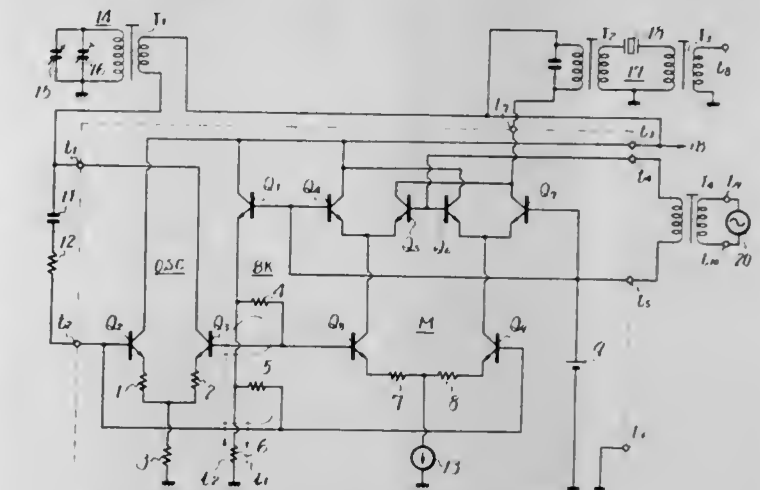


4,058,770
SOLID STATE SUBSCRIBER SELECTION SWITCHES FOR WIRED BROADCASTING SYSTEMS
Eric John Gargini, West Drayton, England, assignor to Communications Patents Limited, London, England
Filed Sept. 17, 1975, Ser. No. 613,981
Claims priority, application United Kingdom, Sept. 21, 1974, 41196/74
Int. Cl.² H04B *3/50*
U.S. Cl. 325—308 **3 Claims**



1. In a wired broadcasting system having a set of programme signal channels, a subscriber station, a selection device for choosing the programme on a single one of said signal channels, and a cable coupling the subscriber station to said selection device, the combination comprising, programme selector means operable by said subscriber station to actuate said selection device for selecting a desired single one of said signal channels, a separate connecting path from the programme selector means for coupling each signal channel to said selection device, a signal conveying circuit between each channel and the subscriber station, a switch in each signal conveying circuit comprising a pair of diodes connected in series with opposed polarities, and means actuating each switch from a corresponding said connecting path comprising a solid state device for each switch connected as an emitter follower with a circuit connecting the emitter to the common connection between said diodes for applying potentials to the connection between the diodes to render the diodes alternatively conductive when the emitter follower passes current and non-conductive when the emitter follower is not passing current in response to the programme selector means.

4,058,771
DOUBLE-BALANCED FREQUENCY CONVERTER
Mitsuo Ohsawa, Fujisawa, and Wataru Yamatani, Hatogaya, both of Japan, assignors to Sony Corporation, Tokyo, Japan
Filed Oct. 22, 1976, Ser. No. 735,042
Claims priority, application Japan, Oct. 27, 1975, 50-129030
Int. Cl.² H04B *1/26*
U.S. Cl. 325—446 **16 Claims**



1. A frequency converter, comprising:
local signal generating means including a first differential circuit having a first pair of differentially-connected transistor means and a positive feedback circuit coupling the collector electrode of one of said first pair of transistor means to the base electrode of the other, said local signal generating means having a pair of output terminals for producing a local oscillating signal thereacross;
double-balanced type mixing means including a second differential circuit having a second pair of differentially-connected transistor means, a third differential circuit having a third pair of differentially-connected transistor means, and a fourth differential circuit having a fourth pair of differentially-connected transistor means, said second differential circuit having a pair of outputs coupled to said third and fourth differential circuits, respectively;
signal input means for supplying an input signal to be frequency-converted across the base electrodes of said third pair of transistors and across the base electrodes of said fourth pair of transistors;
means for applying said local oscillating signal produced across said local signal generating means output terminals to the base electrodes of said second pair of transistor means in opposite phase relation, whereby said input signal and said local oscillating signal are mixed in said double-balanced type mixing means;
selecting means coupled to the collector electrode of one of said third pair of transistor means and to the collector electrode of one of said fourth pair of transistor means to produce a frequency-converted output signal of selected frequency; and
bias means coupled to said first and second differential circuits for applying the same DC bias voltages to both said circuits.

4,058,772

METHOD OF AND APPARATUS FOR CONVERTING A PLURAL-BIT DIGITAL SIGNAL TO A PULSE WIDTH MODULATED SIGNAL

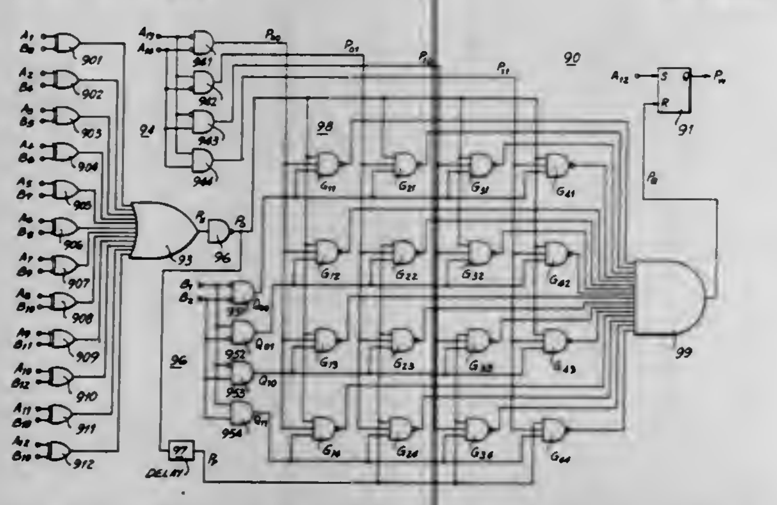
Takao Mogi, Tokyo; Akira Taki, Atsugi, and Hiroshi Yamazaki, Ebina, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Aug. 25, 1976, Ser. No. 717,477

Claims priority, application Japan, Aug. 28, 1975, 50-104446

Int. Cl.^{2} H04B *1/06*

U.S. Cl. 325—464 **9 Claims**



1. A method of converting a plural-bit digital signal to an analog level corresponding to the value of said digital signal, comprising the steps of generating a periodic timing signal; dividing each period of said timing signal into 2^n predetermined sections; dividing said value of said digital signal by the factor 2^n; converting said divided digital signal into a corresponding pulse width modulated signal during each of said 2^n sections; selectively increasing the pulse width modulated signal in selected ones of said sections by a predetermined amount in the event that said divided digital signal value is not an integral number; and filtering the pulse width modulated signal.

4,058,773

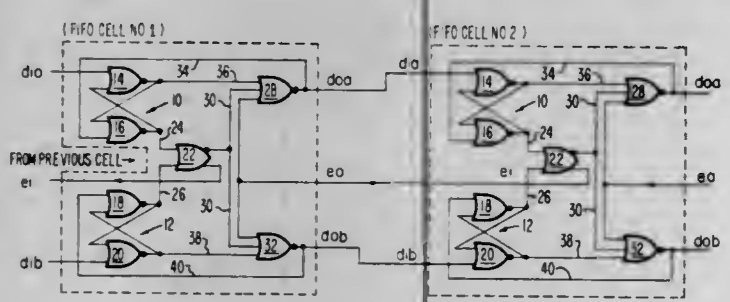
ASYNCHRONOUS SELF TIMED QUEUE

Becky J. Clark, La Jolla, and Charles L. Seitz, Palo Alto, both of Calif., assignors to Burroughs Corporation, Detroit, Mich.

Filed Mar. 15, 1976, Ser. No. 666,609

Int. Cl.^{2} G11C *19/00, 19/28*

U.S. Cl. 328—37 **6 Claims**



1. In an asynchronous system having a plurality of asynchronous cells in series, each cell for the system comprising:

first and second latch means for storing binary data;

a data presence gate having input means and output means for producing an output signal indicative of data stored in either of said first and second latch means, said first and second latch means being coupled to said input means of said data presence gate;

first and second transfer gate means each having input means for transferring data from said first and second latch means to a corresponding one of said first and second latch means of a subsequent cell;

said first latch means, said output means of said data presence gate of the cell, and the output means of a data presence gate from a subsequent cell being coupled to said input means of said first transfer gate means;

said second latch means, said output means of said a data presence gate of the cell, and the output means of a data presence gate from a subsequent cell being coupled to said input means of said second transfer gate means;

whereby data can be transferred to a subsequent cell when there is data stored in either of said first and second latch means of the cell and the signal from the data presence gate of a subsequent cell indicates that it is capable of receiving new data; and

means coupled between the output means of each of said transfer gate means and the respective latch means for clearing the respective latch means upon data transferal to the subsequent cell.

4,058,774

OPTICAL TRANSPONDER

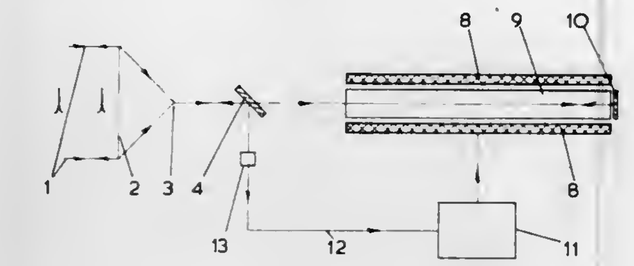
John Leonard Hughes, 34 Nungara Place, Aranda, Canberra A.C.T., Australia (2614)

Filed Oct. 20, 1976, Ser. No. 734,112

Claims priority, application Australia, Oct. 21, 1975, 3665/75

Int. Cl.^{2} H01S *3/02, 3/10;* **G01P** *3/36*

U.S. Cl. 330—4.3 **10 Claims**



1. A remote site optical transponder device powered by a long life power source, having a steerable laser light collector/transmitter system, means for directing collected laser light into a laser amplifier medium whose excitation means is triggered by part of the energy contained in an incident pulse from a laser tracking system, a reflector located behind the laser medium which redirects the amplified incident pulse back through the laser medium and then through the light collector/transmitter back to the source.

4,058,775

OVER-CURRENT PREVENTION CIRCUITRY FOR TRANSISTOR AMPLIFIERS

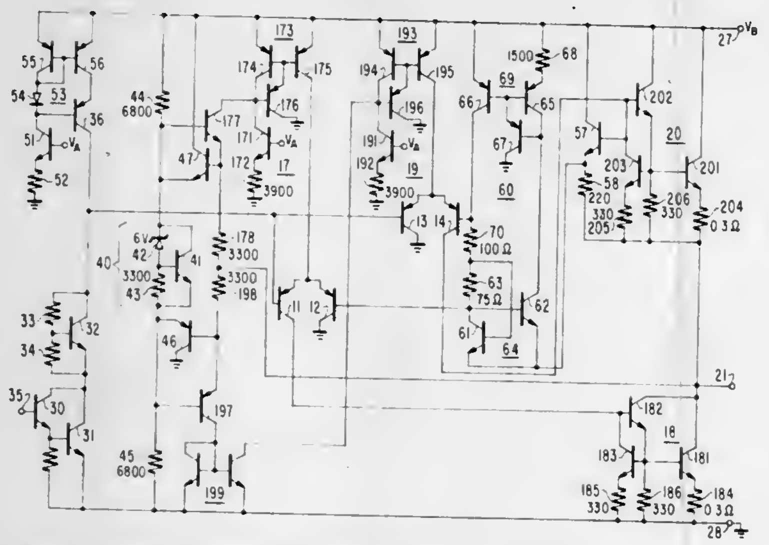
Brian Crowle, Ashford, England, assignor to RCA Corporation, New York, N.Y.

Filed Feb. 17, 1976, Ser. No. 658,724

Claims priority, application United Kingdom, Jan. 27, 1976, 7657/75

Int. Cl.^{2} H03F *3/30*

U.S. Cl. 330—267 **21 Claims**



14. Amplifier circuitry comprising:

first and second terminals for receiving a fixed operating potential therebetween;

a transistor having base and emitter and collector electrodes, having a base-emitter junction between its base and emitter electrodes and having a variable-conduction path between its collector and emitter electrodes the conduction of which is regulated responsive to current through its base electrode;

load means serially connected with the variable conduction path of said transistor between said first and said second terminals;

controlled current source means for supplying a current proportionally responsive to the potential across said load means, said current increasing and decreasing as the potential across said load means respectively increases and decreases, the proportionality between said proportionally responsive current and the potential across said load means so chosen as to avoid operation of said transistor outside its Safe Operating Area Rating; and

means for applying, so long as available from said controlled current source means, a portion of said current linearly related to the potential across said load means, which portion is applied to the base electrode of said transistor and is linearly responsive to swings of an input signal in one polarity.

4,058,776

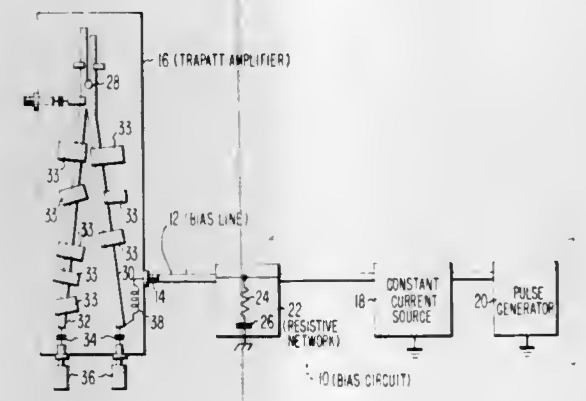
BIAS CIRCUIT FOR AVALANCHE DIODES

Elmer Lawrence Allen, Jr., Philadelphia, Pa., and Hirohisa Kawamoto, Kendall Park, N.J., assignors to RCA Corporation, New York, N.Y.

Filed July 29, 1976, Ser. No. 709,925

Int. Cl.^{2} H03F *3/10*

U.S. Cl. 330—299 **4 Claims**



1. In a bias circuit for a large voltage swing avalanche device, said bias circuit being of the type having a resistance comprising a power supply coupled to a bias line, said bias line being coupled to said diode through an inductor and an impedance network means including a resistor, said device having a negative resistance characteristic at spurious sub-microwave frequencies, the improvement wherein:

said impedance network means is shunted across said bias line and ground, the resistive component of said impedance network means being chosen such that the impedance of said bias circuit is mismatched to said negative resistance of said device at said spurious sub-microwave frequencies, to prevent thereby spurious sub-microwave negative resistance oscillations, and further, such that the resistance of said bias circuit is lowered, to prevent thereby spurious low frequency relaxation oscillation to provide thereby for large voltage swing avalanche operation of said device for periods longer than a substantial portion of one cycle of said spurious oscillations.

4,058,777

OSCILLATING CIRCUIT

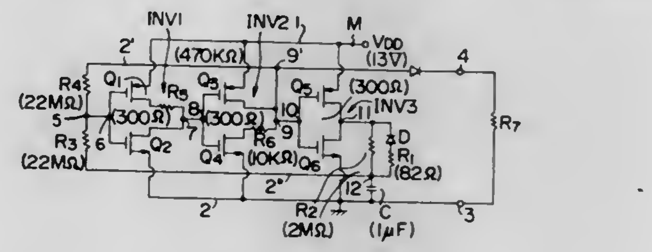
Katsutoshi Kuwabara, Yamato, and Katsuaki Goto, Settsu, both of Japan, assignors to Hochiki Corporation, Japan

Filed July 26, 1976, Ser. No. 708,683

Claims priority, application Japan, July 25, 1975, 50-90055; July 25, 1975, 50-90056

Int. Cl.^{2} H03K *3/282, 3/353*

U.S. Cl. 331—57 **8 Claims**



1. An oscillator circuit, comprising:

first, second and third bistable circuits each having a pair of stable operating states and each having a respective input port for receiving input signals and a respective output port for developing output signals thereat, said bistable circuits being responsive to input signals applied to their respective input ports for operating in states determined by said input signals and for developing respective output signals having values according to the states said bistable circuits are operating in;

connecting means connecting said bistable circuits is cascade in the named order so that a change of state of said first bistable circuit will effectuate successive changes of state of said second and said third bistable circuit, whereby the output signal of said third bistable circuit is representative of the state of said first bistable circuit;

first timing means connected to the output port of said third bistable circuit to recieve the output signals developed thereat for developing a first timing signal effective to change the state of said first bistable circuit from a first state to a second state thereof after a first time interval has elapsed after said third bistable circuit has changed from a state corresponding to the second state of said first bistable circuit to a state corresponding to the first state of said first bistable circuit and for applying said first timing signal to the input port of said first bistable circuit; and

second timing means connected to the output port of said third bistable circuit to receive the output signals developed thereat for developing a second timing signal effective to change the state of said first bistable circuit from the second state to the first state thereof after a second time interval has elapsed after said third bistable circuit has changed from a state corresponding to the first state of said first bistable circuit to a state corresponding to the second state of said first bistable circuit and for applying said second timing signal to the input port of said first bistable circuit, whereby the states of said bistable circuits oscillate between their respective stable operating states with a period equal to the sum of said first time interval and second time interval.

4,058,778

HIGH POWER GAS TRANSPORT LASER

Theodore S. Fahlen, San Jose, and Russell F. Kirk, Sunnyvale, both of Calif., assignors to GTE Sylvania Incorporated, Mountain View, Calif.

Filed June 25, 1976, Ser. No. 699,628

Int. Cl.^{2} H01S *3/00*

U.S. Cl. 331—94.5 G **4 Claims**

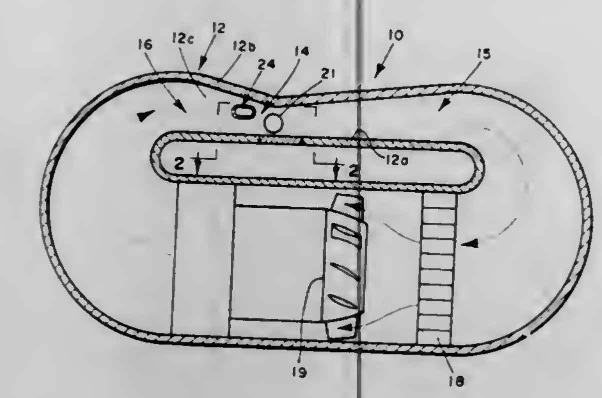
1. High power gas transport laser apparatus comprising

a channel having top and bottom walls and side walls,

a gas mixture comprising carbon dioxide in said channel,

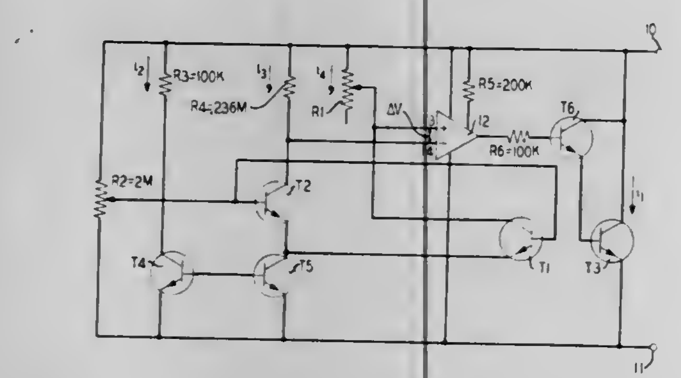
means for moving said gas mixture through said channel at a predetermined velocity,

means for producing an electric discharge in said gas mixture transversely of the direction of flow comprising
a tubular cathode disposed between said top and bottom walls transversely of the direction of said gas flow, said cathode having a cross-sectional shape elongated in the direction of gas flow and rounded leading and trailing edges,



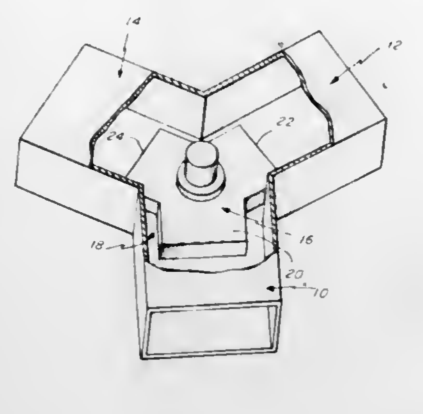
a plane segmented anode adjacent to said bottom wall on the downstream side of said cathode and substantially parallel thereto, and
means for electrically energizing said cathode and anode to establish therebetween a glow mode electric discharge through said flowing gas mixture,
mirror means adjacent the side walls of said channel and optically aligned with said electric discharge for directing a beam of coherent light therethrough.

4,058,779
TRANSISTOR OSCILLATOR CIRCUIT USING THERMAL FEEDBACK FOR OSCILLATION
Phillip Edward Fraley, Reading, Pa., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.
Filed Oct. 28, 1976, Ser. No. 736,375
Int. Cl.[2] H03K *3/28;* **H05B** *41/29*
U.S. Cl. 331—108 R **9 Claims**



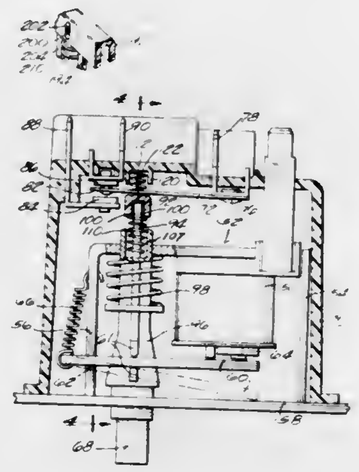
1. An oscillator circuit comprising:
a comparator element having first and second inputs;
first and second transistors coupled respectively to the first and second inputs of said comparator, said transistors being unbalanced so as to create a potential difference at the inputs of said comparator when a potential is supplied to said circuit thereby permitting a current to flow from the output of said comparator; and
a heater element coupled to the output of said comparator, said element being placed sufficiently close to the first transistor and sufficiently distant from said second transistor such that heat generated by the element will affect the output of the first transistor in order to reduce the potential difference sufficiently to shut off any current from the comparator to the heater element.

4,058,780
WAVEGUIDE CIRCULATOR
Gordon Riblet, Wellesley, Mass., assignor to Microwave Development Labs., Inc., Needham Heights, Mass.
Filed Aug. 2, 1976, Ser. No. 710,893
Int. Cl.[2] H01P *1/38*
U.S. Cl. 333—1.1 **12 Claims**



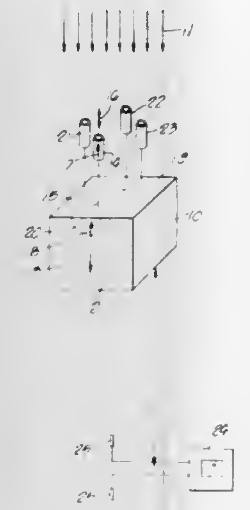
1. A three-port waveguide circulator comprising:
three waveguide arms meeting at a common junction,
a ridge structure mounted on a wall of the waveguide arms at the common junction and having ridge sections extending along each arm with the ridge sections each being narrower than the wider internal dimension of the waveguide arm to thereby define slots between either side of the ridge section and respective narrow walls of each waveguide arm, each said ridge section having a wall segment facing the narrow wall of each waveguide arm and extending substantially parallel to the narrow wall, and a gyromagnetic element disposed at the junction adapted to be biased by a d.c. magnetic field.

4,058,781
DOUBLE POLE CONTACT OPERATING MECHANISM
Spencer C. Schantz, 16608 W. Rogers Drive, New Berlin, Wis. 53151
Filed Jan. 16, 1976, Ser. No. 649,776
Int. Cl.[2] H01H *50/58*
U.S. Cl. 335—186 **13 Claims**



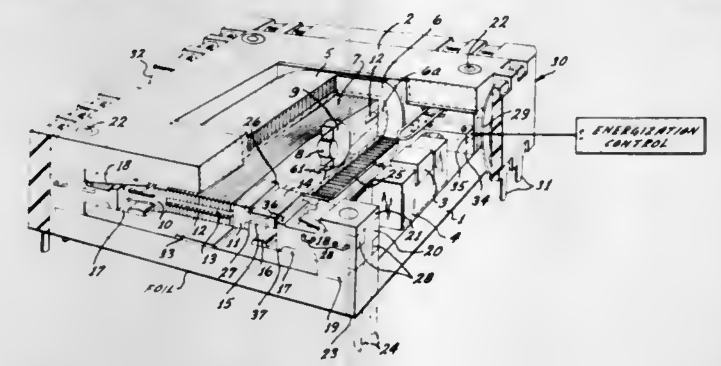
1. In an electrical device having two flexible electrically conductive contact arms, each having a contact portion, said device having cooperating electrical contacts, and there being means for applying pressure to said arms to move the contact portions into closing engagement with said cooperating contacts, the improvement wherein said means for applying said pressure includes a movably mounted actuator mounted on said device reciprocably movable in a direction transversely of said contact arms and toward and away from said arms, and having an end portion movable toward said arms, and a yoke of electrical insulating material having a pivotal connection intermediate its ends with said actuator, said yoke extending transversely of said arms and being long enough to contact both arms and apply contact closing pressure thereto when said actuator is moved a predetermined distance toward said arms, said pivotal connection of said yoke tending to equalize contact closing pressure.

4,058,782
METHOD AND APPARATUS FOR COMPENSATION OF INTERFERENCE MAGNETIC FIELDS
Friedrich M. O. Förster, Grathwohlstrasse 4, D-7410 Reutlingen, Germany
Filed Sept. 2, 1975, Ser. No. 609,583
Claims priority, application Germany, Sept. 12, 1974, 2443672
Int. Cl.[2] H01F *13/00*
U.S. Cl. 335—219 **15 Claims**



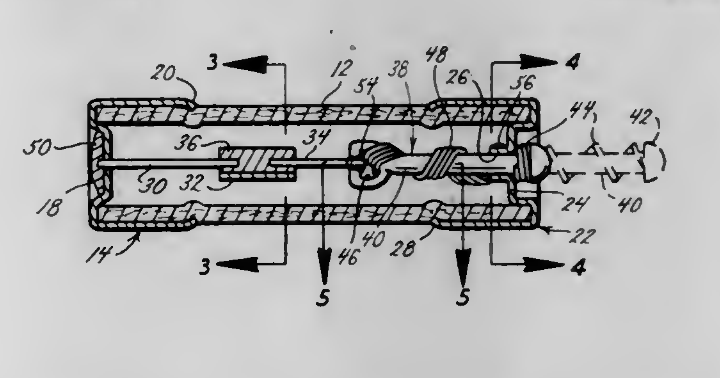
1. A method for stable compensation of the magnetic interference fields produced by the vertical component of the earth's magnetic field in the vicinity of an article including a housing and components therein in which a compensation moment opposite to the magnetic moment induced in the article by the vertical component is produced and the article is also subjected to a vertically directed alternating magnetic field with decaying amplitude, which comprises the steps of:
locating at least one permanent magnet adjacent an outer surface of the article;
adjusting the magnetic moment induced in the article by the permanent magnet to compensate for the effect thereon of the earth's magnetic field vertical component; and
subjecting the article to an alternating magnetic field with decaying amplitude.

4,058,783
RAPID ACTION RELAY
Hans-Werner Reuting, Peine, Germany, assignor to Elmeg Elektro-Mechanik GmbH, Peine, Germany
Division of Ser. No. 485,322, July 3, 1974, Pat. No. 3,949,332. This application Nov. 13, 1975, Ser. No. 631,746
Claims priority, application Germany, July 9, 1973, 2334838
Int. Cl.[2] H01F *7/08*
U.S. Cl. 335—276 **7 Claims**



1. In a relay having a swivel armature, for pivoting about an axis and having two arms extending from the axis, the relay having additionally an enveloping energizing coil on a carrier and a yoke structure providing for abutment with the two arms of the armature, the armature having a shaft; the improvement comprising:
a pair of disks for journalling the shaft inside of the carrier, the disks journalling the axis of the shaft eccentrically to the circular peripheries of the disks, and
the yoke structure establishing two positions of abutment for the armature, whereby the two arms respectively abut the yoke structure in two diagonally opposed dispositions in each of the two positions.

4,058,784
INDICATOR-EQUIPPED, DUAL-ELEMENT FUSE
Aldino J. Gaia, St. Louis, Mo., assignor to McGraw-Edison Company, Elgin, Ill.
Filed Feb. 23, 1976, Ser. No. 660,770
Int. Cl.[2] H01H *85/30*
U.S. Cl. 337—164 **15 Claims**

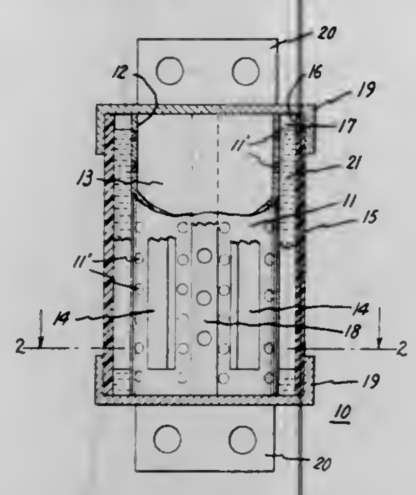


15. An indicator-equipped, dual-element, electric fuse which comprises a casing, a current-conducting member which is disposed within said casing and which will fuse if the temperature thereof is raised to the melting temperature thereof, a second current-conducting member which is disposed within said casing and which will fuse if the temperature thereof is raised to the melting temperature thereof, said second current-conducting member having one end thereof adjacent one end of the first said current-conducting member, heat-softenable alloy which has a melting temperature substantially lower than the melting temperature of either of said current-conducting members and which normally holds said one ends of said current-conducting members in mechanical engagement and in electrically-conducting relation, an indicator which is disposed in an initial retracted position or in a moved, extended position, said indicator being held in said initial, retracted position as long as both of said current-conducting members remain intact and said heat-softenable alloy remains in mechanical engagement and electrically-conducting relation with said one ends of both of said current-conducting members, and a spring which maintains both of said current-conducting members and said heat-softenable material under tension, said spring moving said indicator to said moved, extended position and simultaneously providing relative movement between said two current-conducting members and between one of said current-conducting members and said heat-softenable alloy whether said heat-softenable alloy softens or one or the other of said current-conducting members fuses.

4,058,785
CURRENT LIMITING FUSE
Gerhard Frind, Albany; Robert W. Fisk, Schenectady, and Michael H. McLaughlin, Scotia, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.
Filed Sept. 22, 1976, Ser. No. 725,380
Int. Cl.[2] H01H *85/02*
U.S. Cl. 337—204 **12 Claims**

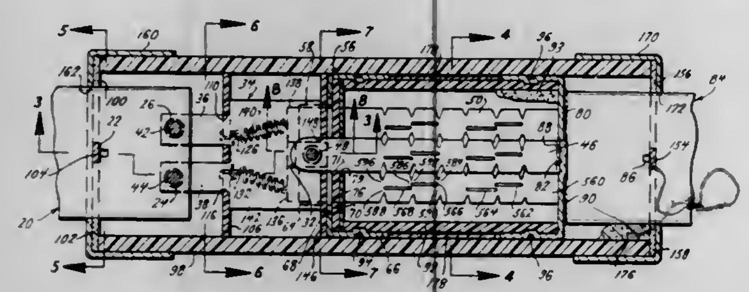
1. A current limiting fuse comprising at least one rigid electrically insulating member having a plurality of rupturable vents defining a narrow space forming an arc constrictor, a dielectric liquid substantially filling the narrow space, the member having opposite open ends, at least one fuse element,

each such fuse element immersed in the dielectric fluid and extending longitudinally adjacent the member, an outer casing having opposite open ends surrounding the member and spaced therefrom, at least the interior portion of the casing being electrically insulating, a pair of metallic end caps with



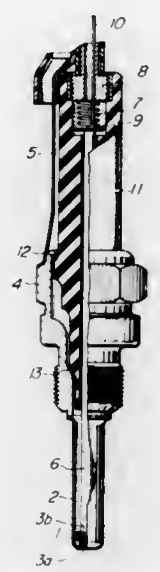
associated electrical terminals, both the member and the casing having opposite open ends fitted tightly within the metallic end caps and associated electrical terminals, the casing insulated electrically from at least one of the electrical terminals, and each opposite end of the fuse element in electrical connection with its associated electrical terminal.

4,058,786
PROTECTOR FOR ELECTRIC CIRCUITS
Aldino J. Gaia, and Angelo Urani, both of St. Louis, Mo., assignors to McGraw-Edison Company, Elgin, Ill.
Filed Nov. 17, 1975, Ser. No. 632,621
Int. Cl.² H01H *85/04*
U.S. Cl. 337—293 **15 Claims**



1. An electric fuse that comprises terminals, a first electrical path between said terminals which has a predetermined current rating and a predetermined current-interrupting characteristic and which includes a fusible element, and a second electrical path between said terminals which is connected in shunting relation with at least part of said first electrical path and which includes a shunt element, said fusible element having at least one fusible electrical path therein which has a predetermined peak current (I_p) and energy (I^2t), said shunt element having at least one fusible electrical path therein which has a given peak current (I_p) and energy (I^2t), said peak current (I_p) and energy (I^2t) of said fusible electrical path in said shunt element being, respectively, two hundred percent or less of said peak current (I_p) and energy (I^2t) of said fusible electrical path in said fusible element when said shunt element and said fusible elements are tested at the current-interrupting rating of said electric fuse, said first electrical path responding to a long-continued potentially-hurtful relatively-low overcurrent to electrically disconnect said fusible element from at least one of said terminals, said second electrical path thereafter responding to said long-continued potentially-hurtful relatively-low overcurrent to open the circuit in which said electric fuse is connected, both said fusible electrical paths in said fusible element and in said shunt element responding to a short circuit to help open said circuit.

4,058,787
TEMPERATURE SENSOR
Norio Ichikawa, Mito, and Sadayasu Ueno, Katsuta, both of Japan, assignors to Hitachi, Ltd., Japan
Filed Mar. 23, 1976, Ser. No. 669,702
Claims priority, application Japan, Apr. 4, 1975, 50-40290
Int. Cl.² H01C *7/04*
U.S. Cl. 338—22 R **6 Claims**

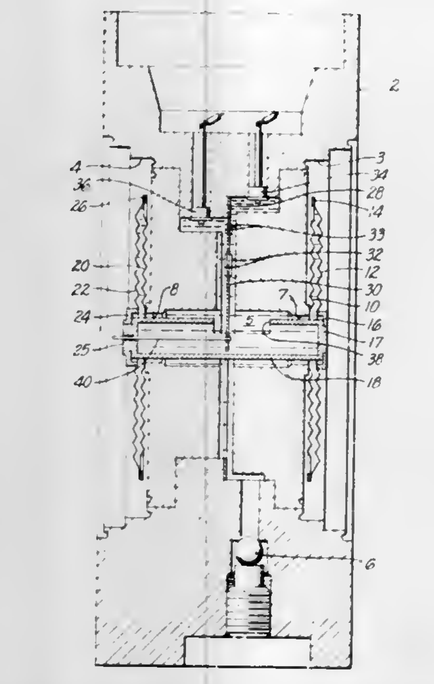


1. A temperature sensor wherein said senser comprises:
an electrically conductive cylindrical sheath closed at one end;
an electrically conductive support member having a hollow portion and solidly secured to the open end of the sheath at one end thereof;
an insulating body having a hollow portion and supported within the support member;
a thermistor disposed inside of the closed end face of said sheath and one of which electrode surfaces is electrically connected to said sheath;
a shaft made of an electrically conductive material whose one end is brought into contact with the other of the electrode surfaces of said thermistor and extending through the hollow portions of the sheath and the insulating body; and
means for providing the contact pressure between the shaft, the thermistor and the sheath;
whereby the variance in resistance value of the thermistor is taken out between the support member and the shaft to carry out temperature sensing;
characterized in that:
a precious metal chip is welded and secured to the end face of the shaft on the side of thermistor.

4,058,788
DIFFERENTIAL PRESSURE TRANSDUCER
Allen Howe Andrews, Riverside; James Norman McPherson, Orange; John Thomas Burns, Jr., Mira Loma, and John Matthew Hendrie, Riverside, all of Calif., assignors to Bourns, Inc., Riverside, Calif.
Filed Apr. 5, 1976, Ser. No. 673,493
Int. Cl.² H01L *10/10*
U.S. Cl. 338—42 **13 Claims**

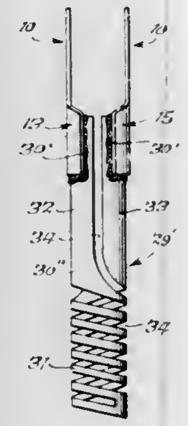
1. A differential pressure transducer, comprising:
a sensing cell,
first and second pressure sensitive diaphragm assemblies, each assembly comprising nested inner and outer diaphragms, held by said cell for longitudinal flexing when exposed to pressures external to said cell,
means rigidly spacing at least portions of said diaphragm assemblies at a substantially constant distance, whereby the flexing positions of said assemblies are determined by the differential between the external pressures to which they are exposed,
a deflectable motion sensing means comprising a cantilever

beam secured near one end to said cell and having at least one strain gage mounted thereon to measure deflections of said beam;
a longitudinally rigid but transversely flexible and resilient coupling means for coupling said diaphragm assemblies with said motion sensing means, comprising a strut wire secured between one of said diaphragm assemblies and said motion sensing means, wherein said beam is secured



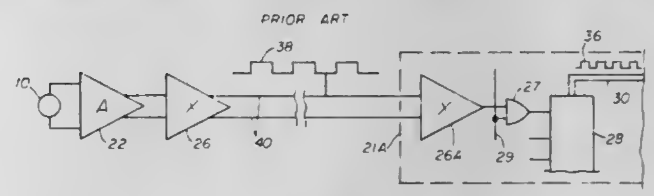
to said coupling means near its other end and said beam has an unflexed position substantially transverse to the unflexed position of said strut wire so as to move along a substantially arcuate path when deflected by said strut wire, and wherein said coupling means is adapted to deflect said motion sensing means in response to longitudinal flexing of said assemblies and to flexingly accommodate to transverse movements of said motion sensing means.

4,058,789
ELECTRICAL CONNECTOR
Robert G. Bavisotto, Buffalo; John E. Reynolds, Kenmore, and Robert S. Sbert, North Tonawanda, all of N.Y., assignors to The Carborundum Company, Niagara Falls, N.Y.
Filed Apr. 5, 1976, Ser. No. 673,834
Int. Cl.² H01C *1/14*
U.S. Cl. 338—322 **8 Claims**



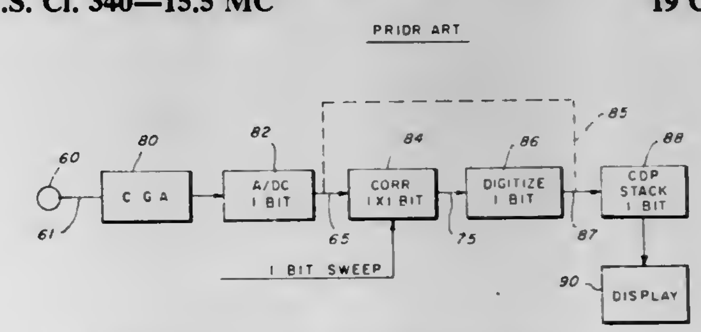
1. An electrical connector manufactured from an electrically conductive material which connector comprises a body portion to which a first electrical conductor may be attached by welding, soldering, an electrical clip or other suitable means; and first, second and third legs outwardly extending in essentially the same direction from said body portion, each of said legs being defined by front and rear faces and right and left edges, the second of said legs being disposed in a position approximately between said first and third legs, said legs being oriented so the right edge of said first leg is proximate the left edge of said second leg, the right edge of said second leg is proximate the left edge of said third leg and the left edge of said first leg and right edge of said third leg each face is approximately opposite directions away from all portions of said electrical connector, said legs being manufactured of a metallic material having a spring resiliency which permits said second leg to be spacially separated by force from said first and third legs thus permitting a second electrical conductor to be placed between said second leg and said first and third legs and permitting said second electrical conductor to be retained by the rear face of said second leg and the front faces of said first and third legs.

4,058,790
METHOD AND APPARATUS FOR TRANSMITTING GEOPHONE SIGNALS OVER CABLES WITH MINIMUM NOISE
Daniel Silverman, Tulsa, Okla., and J. Robert Fort, Altadena, Calif., assignors to Geophysical Systems Corporation, Pasadena, Calif.
Continuation-in-part of Ser. No. 626,129, Oct. 28, 1975, which is a continuation-in-part of Ser. No. 358,077, May 7, 1973, Pat. No. 4,001,768. This application Mar. 10, 1976, Ser. No. 665,808
Int. Cl.² G01V *1/22*
U.S. Cl. 340—15.5 TS **12 Claims**



1. In a 1 bit digital geophone signal acquisition and transmission system having a plurality of array terminals, each of which receives a plurality of analog signals from a plurality of geophones connected respectively to a plurality of different pairs of conductors, and in said array terminals of said system said plurality of analog signals are amplified at constant gain and on command are sampled and digitized to 1 bit, the improvement in the method of transmission of said plurality of analog geophone signals from said geophones to said array terminals, comprising the steps of:
a. at each of said plurality of geophones, amplifying at constant gain and zero crossing coding each of said analog geophone signals to form square wave analog signals; and
b. transmitting each of said square wave analog signals to said array terminals over separate pairs of conductors.

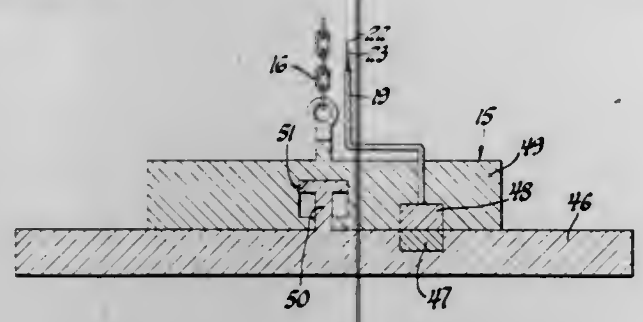
4,058,791
METHOD AND APPARATUS FOR PROCESSING SEISMIC SIGNALS FROM LOW ENERGY SOURCES
Lincoln A. Martin, Altadena, and William Franklin Fenley, Jr., Pasadena, both of Calif., assignors to Geophysical Systems Corporation, Pasadena, Calif.
Filed Sept. 29, 1975, Ser. No. 617,859
Int. Cl.² G01V *1/24, 1/36*
U.S. Cl. 340—15.5 MC **19 Claims**



1. In a seismic prospecting system, having;
a. a low energy seismic source;
b. a plurality of geophones at spaced positions distant from said source;
c. means to amplify and digitize the geophone signals; the

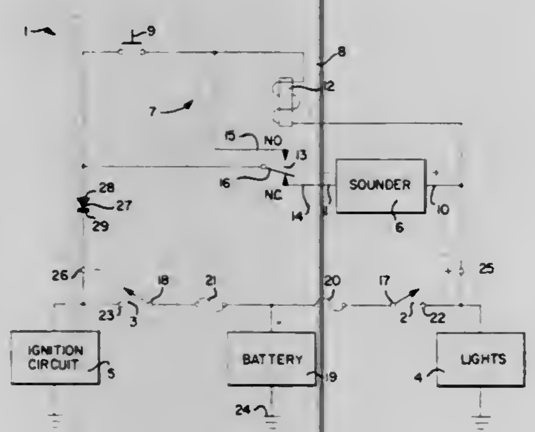
method of operation and processing the seismic data comprising;
1. operating said source in C.D.P. format, whereby each source operation is at a different spaced-apart independent position;
2. amplifying and digitizing the geophone signals to 1 bit;
3. C.D.P. stacking said **1** bit digitized signals; and wherein
4. the C.D.P. fold is at least 40.

4,058,792
SHIP SECURITY SYSTEM
James A. Soltesz, 15042 Garfield, Allen Park, Mich. 48101
Filed Mar. 29, 1976, Ser. No. 671,169
Int. Cl.² G08B *21/00*
U.S. Cl. 340—29 **1 Claim**



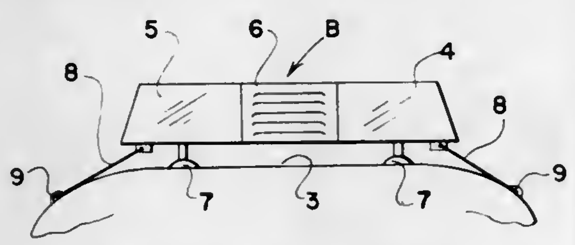
1. A floating structure security system comprising:
a. a sensor circuit means for sensing unanticipated changes of condition of the floating structure;
b. a detector circuit means connected to said sensor circuit to detect loss of continuity in said sensor circuit;
c. an alarm means operated by said detector circuit means;
d. a power supply means connected to said sensor circuit means, detector circuit means, and alarm means to provide operating erergy for said circuit means and alarm means;
e. said sensor circuit means including a submersible sensor to sense unanticipated changes in position of the floating structure; and,
f. said submersible sensor including,
1. a pair of weights;
2. a switch means including a switch member mounted in each of said pair of weights; and,
3. means for movably connecting said weights so that the switch members are connected when the weights are moved into engagement with each other and the switch members are disconnected when the weights are moved apart.

4,058,793
VEHICLE HEADLIGHT WARNING CIRCUIT
William G. Copeland, 8429 Lee Blvd., Leawood, Kans. 66206
Filed May 24, 1976, Ser. No. 689,209
Int. Cl.² B60Q *11/00;* **G08B** *21/00*
U.S. Cl. 340—52 D **3 Claims**



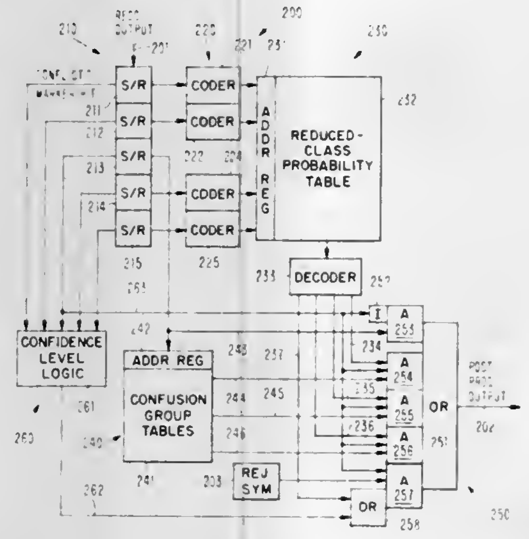
1. A headlight warning circuit for use in a vehicle having a headlight switch, an ignition switch, and a negative ground electrical system, each of said switches having a battery terminal and a non-battery terminal, said non-battery terminals having no direct, non-load intervening path to the vehicle battery, there being a potential difference from said headlight switch non-battery terminal to said ignition switch non-battery terminal when said headlight switch is closed and said ignition switch is open, said potential difference being capable of providing an alarm signal current, said circuit comprising:
a. a positive circuit terminal and a negative circuit terminal, said positive circuit terminal being connected to a headlight switch non-battery terminal and said negative circuit terminal being connected to an ignition switch non-battery terminal;
b. a rectifier diode having an anode and a cathode, said cathode being connected to said negative circuit terminal;
c. an electric sounding means having a positive terminal thereof connected to said positive circuit terminal, said electric sounding means having a negative terminal connectable to said diode anode, said sounding means emitting an audible tone in response to said alarm signal current flow therethrough; and
d. override means in the circuit and including an interrupter switch connected between the negative terminal of said sounding means and said diode anode for selectively interrupting the flow of said alarm signal current through said sounding means when said headlight switch is closed and said ignition switch is open; said override means including:
1. a relay having a coil and a single pole double throw relay switch, said coil having opposite terminals and said relay switch having a normally closed terminal, a normally open terminal, and a common terminal;
2. said relay coil having one terminal connected to said sounding means positive terminal, the other coil terminal being connected to said relay switch normally open terminal;
3. said relay switch normally closed terminal being connected to said sounding means negative terminal;
4. said relay switch common terminal being connected to said diode anode, said interrupter switch being said relay switch normally closed terminal and said common terminal; and
5. a normally open, momentary contact mute switch connected between said relay switch common terminal and said relay switch normally open terminal, whereby closing said mute switch when said sounding means is conducting current causes said relay coil to be energized thereby making and holding a connection between said relay switch common terminal and said relay switch normally open terminal and breaking the connection between said normally closed terminal and said common terminal thereby interrupting the flow of said alarm signal current through said sounding means.

4,058,794
VEHICLE BEACON CONTROL SYSTEM
W. Kenneth Menke, Glendale, Mo., assignor to Public Safety Equipment, Inc., St. Louis, Mo.
Filed Sept. 16, 1976, Ser. No. 723,760
Int. Cl.² B60Q *1/00;* **H02P** *7/00*
U.S. Cl. 340—92 **10 Claims**



1. In a vehicle beacon light: a rotatable pod; at least one lamp carried by said pod; motor means connected to said pod to rotate said pod; a source of electrical power; and electrical circuit connections between said power source, said motor means and said one lamp; said circuit connections including switch means establishing a first circuit path to said one lamp to illuminate the lamp, and a second circuit path responsive to pod rotation for automatically stopping pod rotation, said second circuit path including a contact means rotatable with said pod, a non-conductive portion in said rotatable contact means, and means cooperating with said rotatable contact means and non-conductive portion to determine the position for said automatic stopping of pod rotation.

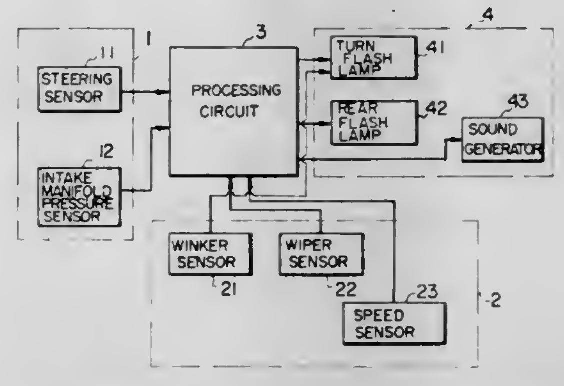
4,058,795
METHOD AND APPARATUS FOR CONTEXT-AIDED RECOGNITION
Gerald John Balm, Rochester, Minn., assignor to International Business Machines Corporation, Armonk, N.Y.
Continuation of Ser. No. 294,706, Oct. 3, 1972, abandoned. This application Dec. 23, 1974, Ser. No. 535,401
Int. Cl.² G06K *9/00*
U.S. Cl. 340—146.3 WD **8 Claims**



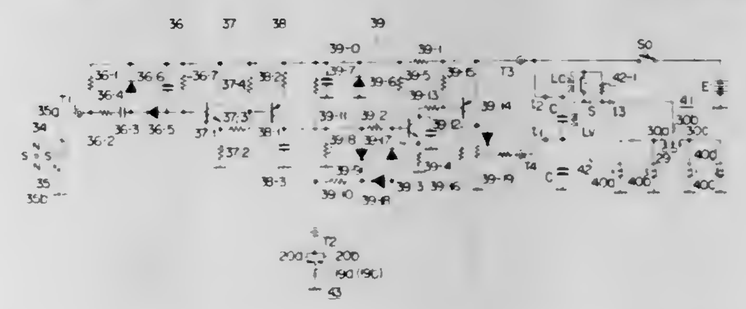
1. A system for enhancing the recognition of characters, comprising:
recognition means responsive to a sequence of character patterns for producing a sequence of character codes identifying said characters with respect to a predetermined plurality of categories;
coding means coupled to said recognition means for translating a plurality of said character codes to a plurality of reduced codes corresponding to a plurality of sets of said categories, the number of said sets being substantially smaller than the number of said categories;
first storage means responsive to said reduced codes for producing a context code representing one set of said categories;
second storage means for holding a plurality of confusion codes associated with a predetermined one of said character codes, each of said confusion codes identifying one of said categories; and
gating means responsive to said context code for selecting one of said confusion codes.

4,058,796
SYSTEM FOR PROVIDING A DRIVING PERSON WITH HELPFUL INFORMATION FOR DRIVING A VEHICLE
Kazuo Oishi, Oobu; Takashi Yamada, Anjo, and Shuzo Yoshida, Okazaki, all of Japan, assignors to Nippon Soken, Inc., Nishio, Japan
Filed Mar. 4, 1975, Ser. No. 555,304
Claims priority, application Japan, Mar. 5, 1974, 49-26091
Int. Cl.² G08B *21/00*
U.S. Cl. 340—52 F **17 Claims**

1. A method for providing a driving person with helpful information for driving a vehicle comprising the steps of:
detecting travelling conditions of a vehicle responding to a driving operation of said vehicle by a driver who is driving said vehicle;
obtaining a variation pattern by calculating the rate of change per unit time of a detection signal generated in the preceding detecting step;
computing a normal pattern always representing the latest average driving operation by said driver by sequentially accumulating data of said variation pattern at every predetermined unit of time, while sequentially cancelling the oldest data accumulated,
further computing a deviation of said variation pattern from said normal pattern; and
in accordance with the result of the computation in the preceding computing step, generating information giving said driver notice anticipated from the degree of the deviation.



4,058,797
TURN SIGNAL SYSTEM
Tomoaki Sekiguchi, Hamamatsu; Hiroyasu Miyao, Iwata, and Hidekazu Shimizu, Hamamatsu, all of Japan, assignors to Yamaha Hatsudoki Kabushiki Kaisha, Japan
Filed June 3, 1976, Ser. No. 692,320
Claims priority, application Japan, June 9, 1975, 50-77761
Int. Cl.² B60Q *1/00;* **H01H** *3/16*
U.S. Cl. 340—56 **21 Claims**



1. A turn signal system for a vehicle comprising:
at least one direction display lamp for indicating a right turn and a left turn of the vehicle, said lamps being respectively provided on the right and left sides of the vehicle;
flasher means coupled to said display lamps for intermittently lighting at least one direction display lamp, said flasher means having a control input for receiving a control signal; and means responsive to a control signal for electrically terminating the operation of said flasher means to extinguish said at least one direction display lamp;
an actuation switch device for mechanically switching the right or left direction display lamp including a self-returning actuating lever and a selectively movable block means moved by the operation of the actuating lever, said selectively movable block means including:
contact means coupled to said flasher means for causing said intermittent lighting of the right or left direction display lamp as a function of the direction of actuation of the actuating lever; and
means for retaining said movable block means in its moved position when the actuating force is released from the

actuating lever and the actuating lever returns to its initial position;

a source of a signal which is a function of the traveling speed of the vehicle;

control means coupled to said control input of said flasher and responsive to the return of said actuating lever after it is actuated and responsive to said signal representing said vehicle traveling speed, for feeding a control signal to said control input of said flasher means for electrically terminating the operation of said flasher means such that when the vehicle speed is below a predetermined speed the control signal is generated when the vehicle finishes running a predetermined distance, and when the vehicle speed is above said predetermined speed the control signal is generated when the vehicle finishes running for a predetermined time; and

means for electrically establishing initial conditions in said control means in response to actuation of the actuating lever of the actuation switch device.

4,058,798

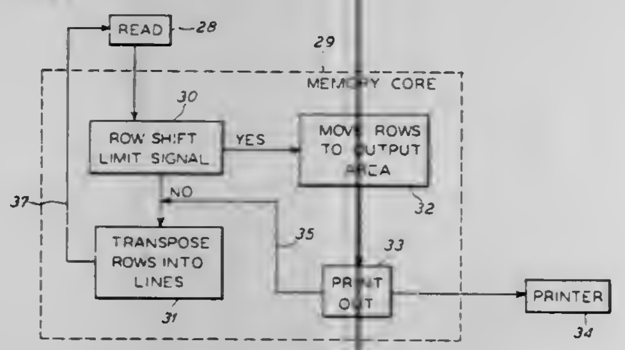
LONGITUDINALLY EXTENDED PRINTING METHOD FOR COMPUTERS

Robert Andrew Nagy, 7786 Woodward Ave., Woodridge, Ill. 60515

Continuation-in-part of Ser. No. 23,630, March 30, 1970, abandoned. This application July 12, 1972, Ser. No. 270,952

Int. Cl.² G06F *3/12;* **G06K** *3/00*

U.S. Cl. 364—900 **3 Claims**



1. In a method of output printing by means of a computer equipped with a printer capable of printing on a print-out form sheet a substantial number of character imprints in rows across the sheet as the sheet is advanced along a longitudinal flow axis in the printer with the rows as printed succeeding one another in parallel relation on the sheet and extending normal to said longitudinal flow axis, the printer being provided with imprintable printing characters which have their upright reading axes oriented normal to said longitudinal flow axis of the sheet, the character imprints of each row being aligned with the character imprints of the other rows to form longitudinal lines of character imprints which extend parallel to said longitudinal flow axis from a leading end portion of the sheet to the trailing end portion of the sheet and provide printed material to be read in a direction parallel to said longitudinal flow axis, the improvement comprising:

printing with said printing characters of said printer a selected plurality of said character imprints across the leading end portion of the sheet in a row extending normal to said longitudinal flow axis of the sheet and with the reading axes of the imprinted characters aligned across the sheet and normal to said longitudinal flow axis;

thereby completing on the sheet the character imprints for the leading extremities of said longitudinal lines of character imprints for forming the printed material to be read in a direction parallel to said longitudinal flow axis of the sheet;

progressively advancing the form sheet one imprint row at a time along said longitudinal flow axis of the sheet in the direction of the leading end portion of the sheet and of the leading extremities of said longitudinal lines of character imprints;

after each imprint row advance of the sheet, imprinting with said printing characters of said printer another row of a selected plurality of said character imprints to extend across the sheet and normal to the longitudinal flow axis of the sheet and with the imprinted characters in said another row being aligned in side-by-side relation to the character imprints of the preceding imprinted row of the character imprints, and thereby adding successive character imprints to said longitudinal lines of character imprints as required for forming said printed material;

continuing to add character imprints to said longitudinal lines of character imprints row-by-row by imprinting successive rows of selected pluralities of the character imprints as the sheet is progressively advanced row-by-row along said longitudinal flow axis, until finally trailing extremities of the longitudinal lines of character imprints are completed at said trailing portion of the sheet;

and thereby completing the printed material of all of said longitudinal lines of character imprints;

whereby after imprinting has been completed as a result of the row-by-row advance of the sheet along said longitudinal flow axis of the sheet, together with the coordinated successive imprinting of the rows of character imprints in row-by-row sequence until the longitudinal lines of character imprints have been completed into intelligible context, said longitudinal lines of character imprints provide printed matter which can be read in said direction parallel to said longitudinal flow axis of the sheet.

4,058,799

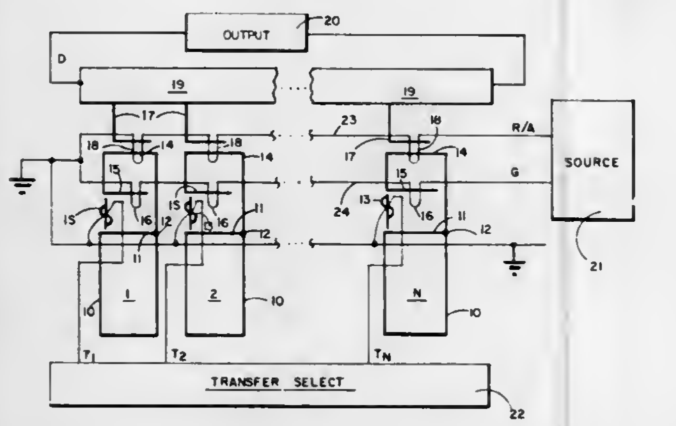
BLOCK ORIENTED RANDOM ACCESS BUBBLE MEMORY

Peter K. George, and Thomas R. Oeffinger, both of Placentia, Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed May 19, 1975, Ser. No. 578,975

Int. Cl.² G11C *19/08*

U.S. Cl. 340—174 TF **20 Claims**



1. In combination,

at least one storage loop,

generator means for producing data,

transfer means interposed between said storage loop and said generator means for selectively transferring data from said generator means to a first location in said storage loop in response to a first signal,

merging means,

propagation path means connected to said generator means and to said merging means which forms a second location in said storage loop,

said transfer means selectively transferring data from said first location in said storage loop to said propagation path means in response to a second signal,

detector means, and

replicate means for selectively nondestructively transferring data from said propagation path means to said detector means.

4,058,800

IMAGE PICKUP ELEMENT AND SYSTEM UTILIZING MAGNETIC BUBBLES

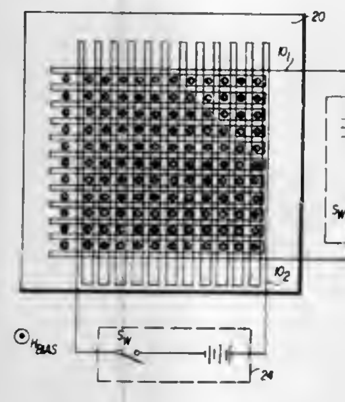
Yoshiki Kikuchi, Ebina, Japan, assignor to Fuji Xerox Co. Ltd., Tokyo, Japan

Filed Dec. 3, 1975, Ser. No. 637,141

Claims priority, application Japan, Dec. 3, 1974, 49-137738

Int. Cl.² G11C *19/08*

U.S. Cl. 365—3 **3 Claims**



1. A photomagnetic image pickup element comprising

a thin film of magnetic material capable of having magnetic bubbles formed therein where the intensity of the magnetic-bubble collapse field varies with temperature;

first conductor set disposed on one side of said thin film; and

a second conductor set disposed either on said one side or on the other side of said thin film, said first and second conductor sets being so disposed with respect to one another as to form a lattice shape on said thin film where said first and second conductor sets are orthogonal with respect to one another and each comprises a plurality of parallel conductor elements disposed in a first direction, the pitch between successive elements alternately being P_1 and P_2 where pitch P_2 is substantially greater than pitch P_1.

4,058,801

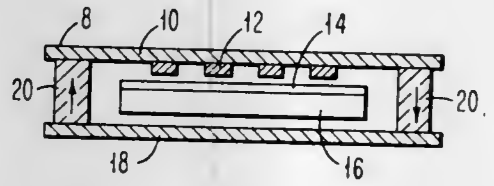
FIELD ACCESS METHOD FOR BUBBLE MEMORIES

Otto Voegeli, San Jose, Calif., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed June 3, 1976, Ser. No. 692,259

Int. Cl.² G11C *11/14, 19/00*

U.S. Cl. 365—39 **14 Claims**



1. A field access system for magnetic bubble domains comprising:

a sheet of magnetic material in which bubble domains can exist,

a drive film of magnetically soft material in spaced relationship with said sheet, and

drive elements of magnetically soft material in contact with said drive film wherein said drive elements are driven through an exchange interaction with said drive film.

4,058,802

CONTAMINATING SPILL DETECTION ARRANGEMENT

Frank Meyers, 317 Calle Mayor, Redondo Beach, Calif. 90277

Filed Feb. 9, 1976, Ser. No. 656,434

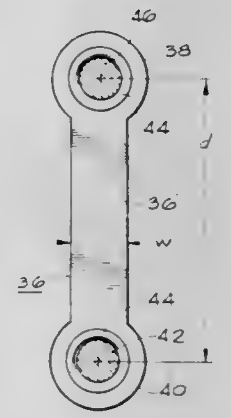
Int. Cl.² G08B *21/00, 1/08*

U.S. Cl. 340—224 **27 Claims**

1. A contamination spill detection arrangement of the type adapted to detect the presense of predetermined contaminants in a body of water and transmit signals to a remotely located receiving station in response to the detected presence of the contaminants, and comprising, in combination:

at least one detector station means positioned at a predetermined location in the body of water, and said at least one detector station comprising:

detector element means comprising at least one contaminant detector element, said at least one contaminant detector element at least partially submerged in the water, and said at least one contaminant detector element having a predetermined characteristic responsive to presence of the predetermined contaminant thereon and varying said predetermined characteristic for the condition of the contaminant impinging on said at least one contaminant detector element:



sensing means coupled to said at least one contaminant detector element for sensing said variation in said predetermined characteristic, and said sensing means further comprising information signal generating means for generating a first information signal in response to said variations; transmitter means for receiving said first information signal and generating a transmission signal responsive thereto, and transmitting said transmission signal to locations remote said detector station means;

means operatively connected to said transmitter means for repetitively providing a predetermined on-time period and a predetermined off-time of said transmitter, and said transmission signal generated during said on-time period;

receiving station means spaced from said predetermined location for receiving said transmission signal and generating at least one output signal in response thereto.

4,058,803

DUPLEX IONIZATION-TYPE FIRE SENSOR

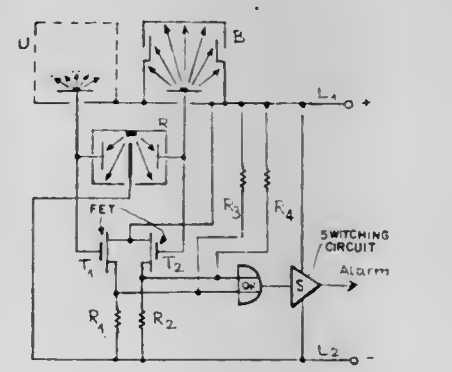
Andreas Scheidweiler, Stafa-Uerikon, Switzerland, assignor to Cerberus AG, Mannedorf, Switzerland

Filed Mar. 15, 1976, Ser. No. 666,645

Claims priority, application Switzerland, Feb. 6, 1976, 1469/76

Int. Cl.² G08B *17/10*

U.S. Cl. 340—237.5 **12 Claims**



1. Ionization-type fire sensor to supervise a predetermined space for the presence of fire or smoke therein comprising

means forming a first, bipolar ionization chamber (B) which changes its electrical resistance upon change of concentration of smoke or fire aerosols in the atmosphere in said space, having

a first pair of spaced electrodes

and bipolar ion generating means in said chamber to ionize the atmosphere in said space which penetrates said chamber,

said bipolar ion generating means being positioned with respect to said first electrode pair to result in ions of both positive and negative polarity in essentially the entire space between said first pair of electrodes to provide an ion current flow between the electrodes of the pair generated essentially by ions of both said polarities upon application of a potential between said first pair of electrodes

said means defining the chamber forming a baffle means (**15, 25**) to prevent direct flow of stream of atmosphere in said space through said chamber and to slow or brake such flow there across;

means forming a second unipolar ion chamber (U) changing its electrical resistance upon change of concentration of smoke or first aerosols in the atmosphere in said space having

a second pair of spaced electrodes

and unipolar ion generating means in said chamber to ionize atmosphere in said space penetrating said chamber, said unipolar ion generating means being positioned with respect to said second spaced pair of electrodes to result in ions of only one polarity in at least a portion of the space between said second pair of electrodes to provide for ion current flow between the electrodes of said second pair of electrodes essentially generated by ions of a single polarity upon application of a potential between said second pair of electrodes,

said means defining said second, unipolar chamber being formed with apertures (**16, 26**) to permit direct flow or stream of atmosphere into and through the space defined by said chamber;

a reference ionization chamber means (R) having two separate inputs, each input being connected to a respective ionization chamber (U, B);

a common support (**11, 21**) for said first, bipolar ionization chamber (B), said second, unipolar ionization chamber (U) and said reference ionization chamber means (R);

and a utilization sensing and threshold circuit means comprising two threshold circuits, each threshold circuit being connected to a respective junction between the respective ionization chamber and the respective reference ionization chamber, the threshold circuits sensing change in resistance of either, or both said chambers and providing an output signal when the resistance of at least one of said chambers rises above a predetermined threshold level.

4,058,804

SIGNAL MONITORING SYSTEM

Fred H. Sawada, Scotia; Frank M. Klementowski, Saratoga Springs, and James S. Bishop, Schenectady, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Mar. 11, 1976, Ser. No. 666,150

Int. Cl.² G08B *21/00*

U.S. Cl. 340—248 A **4 Claims**

1. A generator brush monitor adapted to provide a signal upon the occurrence of generator brush arcing voltages exceeding a predetermined value and comprising:

a. means receiving a voltage signal including high frequency information signals representative of generator brush arcing and low frequency signals representative of the generator voltage and various harmonics thereof as well as possible recurrent high frequency noise spikes in the same frequency band as said information signals;

b. filter means for filtering said low frequency signals from said received voltage signal;

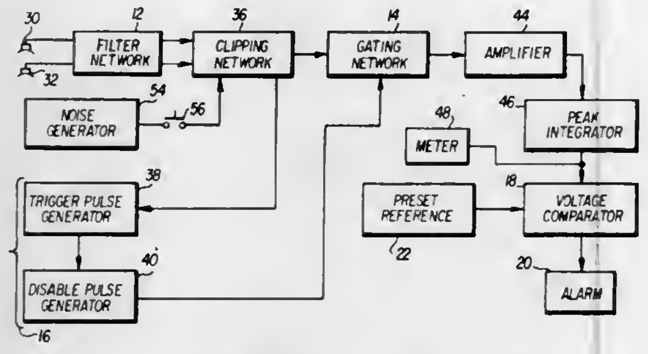
c. clipping means for removing excess positive-going and negative-going peaks of said information signals;

d. means for adjusting the level of said information signals to which said monitor is responsive;

e. gating means receiving the filtered and clipped information signals and adapted to pass said information signals unless said gating means is in receipt of a disabling signal, but only for substantially the duration of said disabling signal and its ringing;

f. means responsive to the output of said gating means to amplify and integrate said gated signal;

g. means responsive to said amplified and gated information signal for comparing the same with an adjustable reference voltage for producing an alarm signal when said information signal exceeds the adjusted value of said reference voltage;



h. means coupled to said clipping means for providing a disable pulse and to maintain the same substantially so long as a noise signal and its ringing is present in said input voltage signal and to supply said disable pulse to said gating means;

i. said gating means being further adapted to gate said information signal so long as said disable pulse is input thereto but only substantially for such period so that said monitor is operative to receive and act in response to said information signals except when it is in receipt of a noise signal in the same frequency band as said information signals.

4,058,805

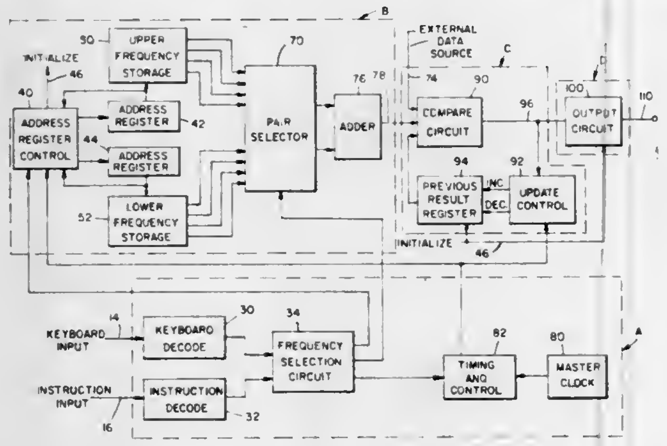
DIGITAL MULTITONE GENERATOR FOR TELEPHONE DIALING

Don W. Lake, Cupertino, Calif., assignor to Comdial Corporation, San Francisco, Calif.

Filed June 16, 1975, Ser. No. 587,453

Int. Cl.² H03K *13/02;* **H04B** *1/00*

U.S. Cl. 340—347 DA **20 Claims**



1. A digital signal generator for selectively constructing an analog waveform approximation from digitally encoded amplitude information representing a number of such waveforms comprising:

data source means for providing said digitally encoded amplitude information in the form of at least one sequence of data words, said data source including storage means for containing said amplitude information and addressing

means associated with said storage means for selectively accessing said amplitude information;

comparator means responsive to said sequence of data words for providing a digital pulse train describing the relative magnitude of successive data words; and

output means responsive to said comparator output for transforming said digital pulse train into said analog waveform approximation.

4,058,806

ANALOG/DIGITAL CONVERTER

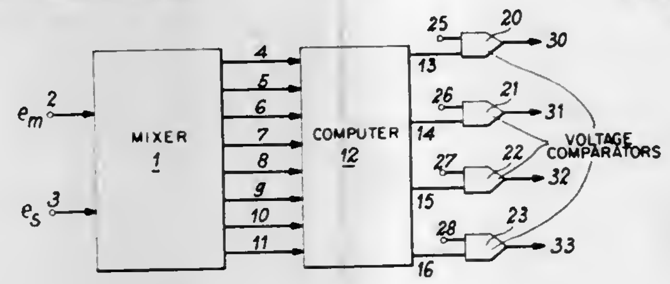
Morton Nadler, 17 Les Huppes 78170 La Celle Saint Cloud, France

Filed Mar. 18, 1976, Ser. No. 668,192

Claims priority, application France, Apr. 2, 1975, 75.10216

Int. Cl.² H03K *13/175*

U.S. Cl. 340—347 AD **9 Claims**



1. A process for analog to digital conversion using a Gray digital code, wherein one at least of the bits of the digital code is obtained by:

supplying to a channel a number p of intermediate signals generated from an analog signal e_s to be converted and a reference signal e_m of fixed value equal to the maximum excursion of said analog signal, with p being a power of 2 and at least equal to 4,

wherein a first half of said intermediate signals are formed by a series of $p/2$ successive direct signals having successive respective values equal to $e_s - ke_m$ with k uniformly increasing from 0 by equal increments of $2/p$, and a second half of said intermediate signals are formed by a series of $p/2$ successive inverse signals having successive respective values equal to $k'e_m - e_s$, with k' gradually increasing from $2/p$ by equal increments of $2/p$,

associating each successive direct signal with each successive inverse signal, thereby forming $p/2$ successive pairs of intermediate signals,

determining in each pair the signal of minimum value,

thereafter determining the signal of maximum value among all signals of minimum value from the various pairs,

and comparing said signal of maximum value with a threshold signal having a fixed value equal to $e_m/2p$.

4,058,807

DIGITAL ANTILOGARITHMIC CONVERTER CIRCUIT

Masaru Yamazaki, Tokyo, Japan, assignor to Copal Company Limited, Tokyo, Japan

Filed Apr. 15, 1976, Ser. No. 677,418

Claims priority, application Japan, June 24, 1975, 50-76539

Int. Cl.² H03K *13/20*

U.S. Cl. 340—347 DA **1 Claim**

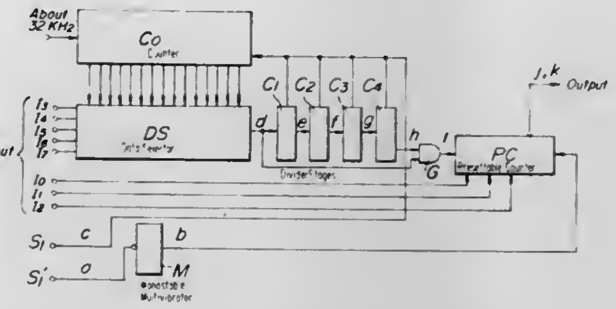
1. A circuit for receiving logarithmically converted digital information and producing a signal having a period in reverse proportion to an antilogarithmic value of said digital information comprising:

a counter for counting a clock pulse of a predetermined frequency to provide various divided frequencies;

a data selector for receiving the number more than decimal point of the digital input information and selecting a particular one of the various divided frequencies from said counter in accordance with the received number;

a divider for dividing the selected frequency from said selector to provide a signal having a period related to the antilogarithmic value of the number more than the decimal point of the input information;

an AND circuit having two inputs connected to the input and output of said divider, respectively; and



a presettable counter which is presetted to the number less than the decimal point of the input information by a start signal and for then receiving as clock pulses the output pulses from said AND circuit to produce an output signal having a period in reverse proportion to the antilogarithmic value of the input information.

4,058,808

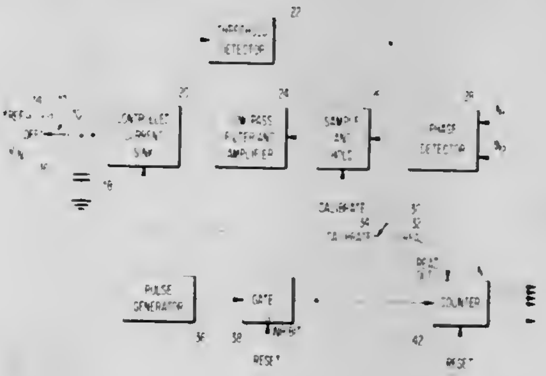
HIGH PERFORMANCE ANALOG TO DIGITAL CONVERTER FOR INTEGRATED CIRCUITS

Shashi D. Malaviya, Fishkill, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 489,024, July 6, 1974, abandoned. This application Mar. 21, 1977, Ser. No. 779,668

Int. Cl.² H03K *13/02*

U.S. Cl. 340—347 AD **15 Claims**



1. An analog to digital converter for converting an unknown analog input voltage into a digital equivalent thereof including a calibration means comprising:

a. storage means,

b. means for applying said input voltage to said storage means,

c. means for altering the charge held by said storage means by discrete equal amounts in response to control pulses applied to said means for altering,

d. means for applying control pulses to said means for altering,

e. threshold means connected to said storage means for detecting when the charge on said storage means reaches a predetermined threshold value,

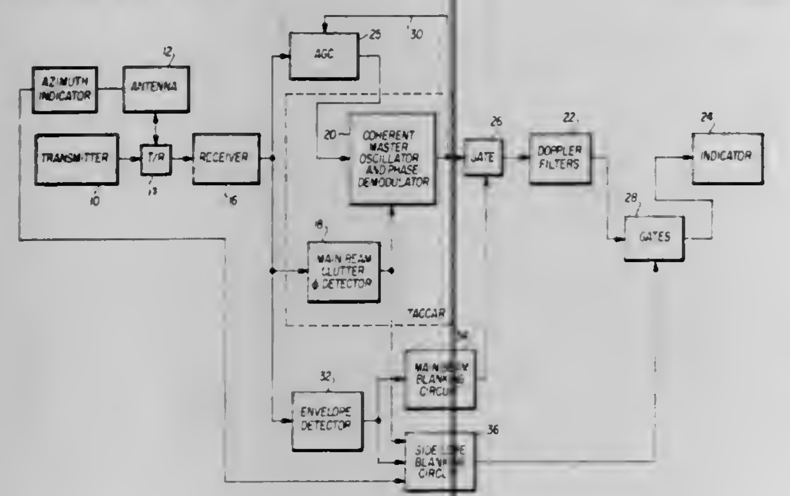
f. accumulator means responsive to the said control pulses for accumulating a number of corresponding to the voltage applied to said storage means,

g. means for applying a reference voltage to said storage means the resulting charge held by said storage means means again being altered in discrete equal amounts by said means for altering, and

h. means, responsive to said threshold means and said accumulator means and connected to said means for altering, for comparing the time of detection of said predetermined threshold by said threshold means with a known time

corresponding to a number of control pulses nominally required for varying the charge held by said storage means from its initial value when said reference voltage is applied thereto to a value corresponding to said predetermined threshold value, and for varying said discrete amount in accordance with the difference between said time of detection and said known time.

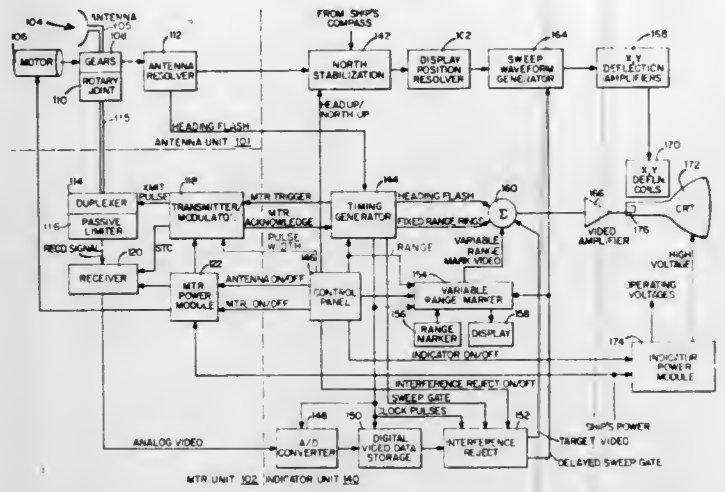
4,058,809
MTI SYSTEM AND METHOD
Walter H. Chudleigh, Jr., Paoli, Pa., assignor to Control Data Corporation, Minneapolis, Minn.
Filed June 26, 1972, Ser. No. 278,478
Int. Cl.² G01S *9/42*
U.S. Cl. 343—7 A **66 Claims**



1. A radar system comprising:
means for transmitting a succession of radar pulses separated by an interpulse period;
means including an amplifier for receiving a return signal from each of said transmitted radar pulses;
means for sampling the amplitude of the return signal from each of the transmitted radar pulses in a plurality of range bins during the interpulse period;
means for varying the gain of said amplifier for the return signal from one of said transmitted radar pulses in each of said plurality of range bins in response to the sampled amplitude in the corresponding range bin of the return signal from a prior one of said transmitted radar pulses;
means for removing the effects of radar platform movement from the main beam targets;
a bank of doppler filters;
an indicator;
means for detecting targets in the main beam having an amplitude exceeding a predetermined value;
means for effectively inhibiting selected ones of said doppler filters in response to said main beam target detecting means;
means for tracking targets detected in the main beam and having sufficient reflective power to override side lobe attenuation;
means for calculating the residual doppler frequency of said targets resulting from side lobe rather than main beam detection; and,
means responsive to said calculating means for inhibiting selected ones of said doppler filters corresponding to the calculated doppler frequency for the range of said targets.

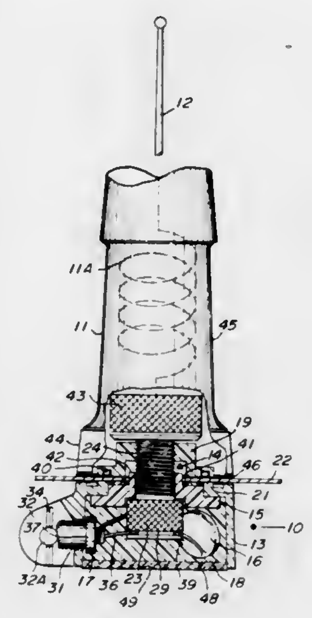
4,058,810
STABILIZED DIGITAL PPI RADAR SYSTEM
Joseph E. Bryden, Framingham, Mass., assignor to Raytheon Company, Lexington, Mass.
Filed Aug. 13, 1976, Ser. No. 714,051
Int. Cl.² G01S *7/28*
U.S. Cl. 343—17.1 R **8 Claims**

1. A radar system comprising in combination:
timing generator means for initiating production of radar pulses;
means for transmitting said radar pulses in response to said initiating means;
means for producing an acknowledge signal having fixed time relationship to said transmitted radar pulses;
means for receiving returned radar signals; and
means for producing a visual display responsive to the received returned radar signals;



said timing generator means initiating a sweep gate signal for synchronizing the start of the visual sweep of said display in response to said acknowledge signal, whereby the acknowledge signal has a fixed time relationship with the commencement of each of said transmitted radar pulses to prevent jitter between the start of the visual sweep and returns of said radar pulses.

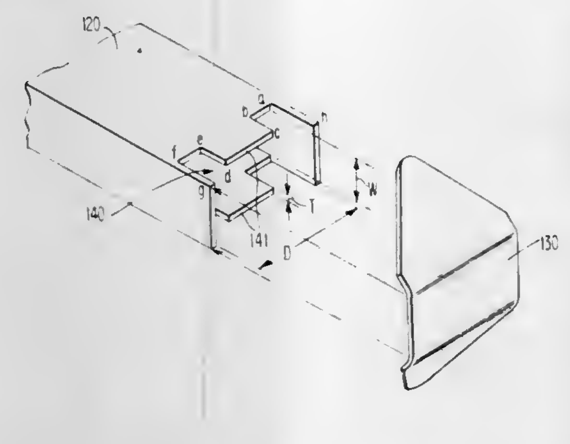
4,058,811
ENCAPSULATED BASE FOR WHIP ANTENNA
Robert C. Gauss, and Lynn D. Wills, both of Schaumburg, Ill., assignors to Motorola, Inc., Schaumburg, Ill.
Filed Mar. 22, 1976, Ser. No. 668,994
Int. Cl.² H01Q *1/32, 1/50*
U.S. Cl. 343—715 **6 Claims**



1. A base member for coupling to an antenna whip comprising, a metallic housing, a contact member having one part extending upwardly from said housing for coupling to said antenna whip and a second part extending into the interior of said housing, an insulating member separating said one part from said housing, a capacitor interiorly of said housing and having one lead connected to the second part of said contact member for impedance matching, said housing having an opening for receiving signal conducting means, signal conducting means having an extension projecting through said opening into said housing and including a ground conductor and a signal conductor, said signal conductor being connected to said second part interiorly of said housing and said ground

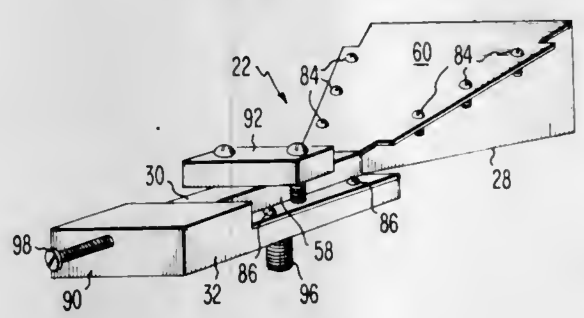
conductor being connected to said housing interiorly thereof, said capacitor having a second lead connected to said housing interiorly thereof, and insulating means encapsulating said capacitor, said second part, said signal conducting extension and the connections interiorly of said casing.

4,058,812
DISH ANTENNA WITH IMPEDANCE MATCHED SPLASH PLATE FEED
David L. Stanislaw, Hatfield, Pa., assignor to Aradar Corporation, Ambler, Pa.
Filed May 3, 1976, Ser. No. 682,766
Int. Cl.² H01Q *19/14*
U.S. Cl. 343—761 **5 Claims**



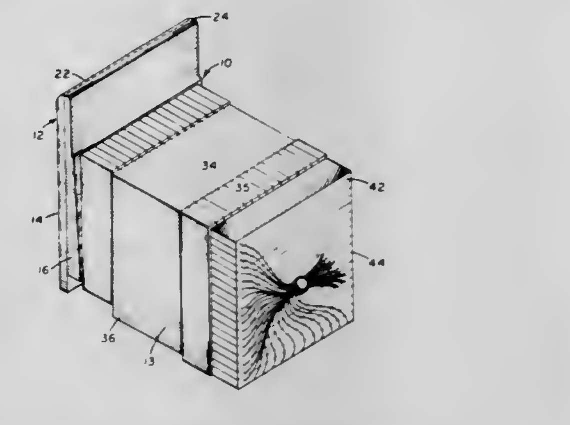
1. A microwave antenna system comprising:
a. a concave reflective antenna member having a finite focus, said member being pivotable through a predetermined angle;
b. means for supplying microwave energy to, and for receiving microwave energy from said reflector, said means being positionally fixed relative to said member and including a splash plate having a pair of oppositely directed wing portions inclined toward said member, and a wave guide of generally rectangular cross section having a first input/output end penetrating said member, and a second end at the focus point of said member, said second end being in connected abutment with said splash plate, said wave guide defining a pair of apertures on opposite surfaces thereof, opening said wave guide toward said wing portions substantially at said abutment, therby forming means for focusing energy between said wave guide and said member via said apertures; and
c. first and second impedance matching means, each being substantially coplanar with a different one of said opposite surfaces and each partially occluding an associated one of said apertures, said impedance matching means promoting the VSWR of said antenna system throughout the pivot range of said member.

4,058,813
SHEET METAL WAVEGUIDE HORN ANTENNA
John Joseph Risko, Cranbury, N.J., assignor to RCA Corporation, New York, N.Y.
Filed Mar. 18, 1976, Ser. No. 667,948
Int. Cl.² H01Q *13/02*
U.S. Cl. 343—786 **5 Claims**



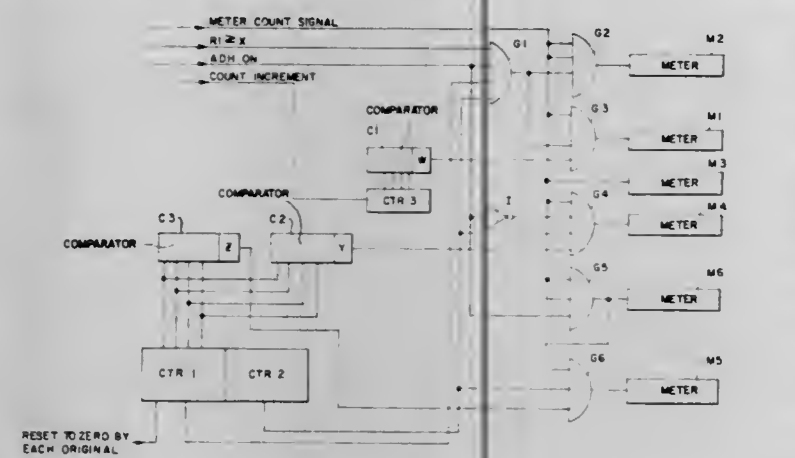
1. A microwave energy waveguide horn antenna having a tapered horn portion of rectangular cross-section attached at its narrower end to a straight waveguide portion of rectangular cross-section, comprising:
a first section defining three walls of said horn portion;
a second section defining three walls of said waveguide portion and the fourth wall of said horn portion;
said first and second sections being formed of folded sheet metal;
a third metallic section defining the fourth wall of said waveguide portion; and
fastening means for attaching together said first, second and third sections to form said waveguide horn antenna having an open-ended horn portion and an open-ended waveguide portion.

4,058,814
ELECTROGRAPHIC WRITING SYSTEM WITH DIODE SWITCHING ASSEMBLY
Arling Dix Brown, Jr., Cleveland Heights, and Edward Justus Reilly, Mayfield Heights, both of Ohio, assignors to Gould, Inc., Cleveland, Ohio
Filed Mar. 29, 1976, Ser. No. 671,427
Int. Cl.² G03G *15/044*
U.S. Cl. 346—154 **14 Claims**



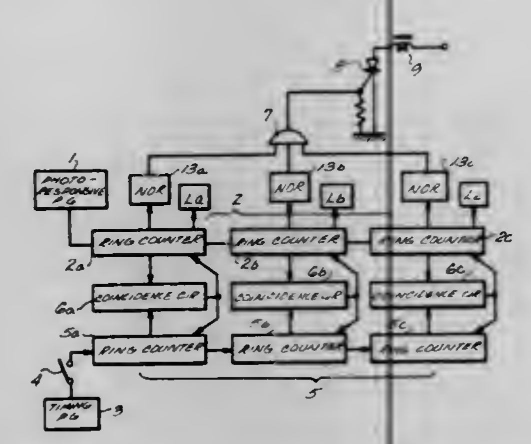
1. An electrographic writing system comprising:
an electrographic writing head including a plurality of styluses operatively connected to a switching system;
the switching system including at least one diode assembly, each diode assembly including a plurality of diode switching circuits controlling the voltage of the plurality of styluses, each of diode switching circuits including a first diode, a charge storage means operatively connected thereto and a stylus operatively connected to the storage means, drive means for generating a forward voltage across the diode assembly which causes a current flow through the first diode if the first diode is in a diode switching circuit that is set up, the drive means subsequently generating a reverse input across the first diode and the charge storage means which causes a reverse current through the first diode which charges the storage means so that the stylus reaches and maintains a voltage for a time sufficient to charge a record medium; and
means for setting up the diode switching circuits in order to determine which diode switching circuits may conduct current.

4,058,815
METERING SYSTEM FOR A COPIER/DUPLICATOR MACHINE
George M. Warner, Cheltenham, and Leif E. Andberg, London, both of England, assignors to Rank Xerox Ltd., London, England
Filed Sept. 30, 1974, Ser. No. 511,844
Claims priority, application United Kingdom, Jan. 25, 1974, 03473/74
Int. Cl.² G03G *15/00*
U.S. Cl. 355—14 **6 Claims**



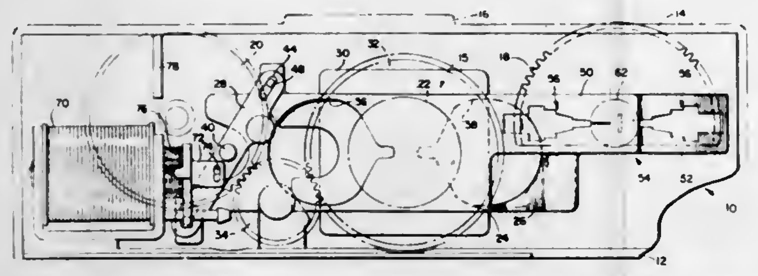
1. An improved metering system for a reproduction machine capable of operating either in an automatic document handling mode in which during a job a required number of prints are automatically made from each one of a stack of originals, or a manual mode, wherein the improved metering system comprises;
  a. means for counting the number of originals per job up to a predetermined first number;
  b. means for counting the total number of originals fed into the machine; and
  c. means for counting the total number of prints made.

4,058,816
CAMERA EXPOSURE CONTROL SYSTEM HAVING DIGITALLY CONTROLLED TIMING CIRCUITRY INCLUDING A DECIMAL COUNT STORING MEMORY
Tsukumo Nobusawa, Oizumi, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Japan
Filed Nov. 17, 1975, Ser. No. 632,195
Claims priority, application Japan, Nov. 26, 1974, 49-136424; Aug. 15, 1975, 50-98479
The portion of the term of this patent subsequent to July 13, 1993, has been disclaimed.
Int. Cl.² G03D *7/08*
U.S. Cl. 354—23 D **1 Claim**



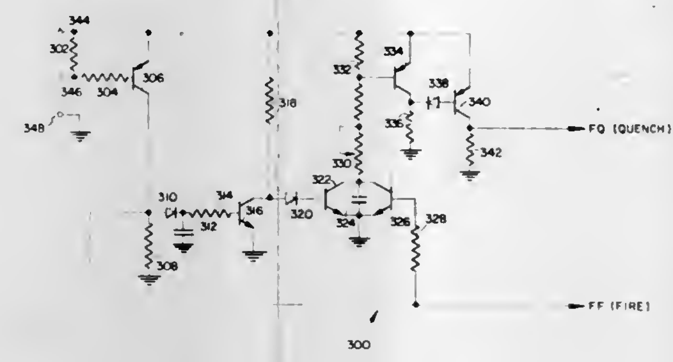
1. Apparatus for automatically controlling a camera exposure operation, the apparatus comprising: means for generating data pulses by the number according to light intensity of an object to be photographed, preset diaphragm value and film sensitivity prior to opening of the camera shutter; digital memory means of decimal type adapted to be applied with and store the data pulses so as to accumulate a decimal count of the number of these data pulses, the digital memory means including a plurality of registers each for storing a respective one of unit and higher decimal place portions of the decimal count; discriminator means adapted to discriminate whether the decimal count stored in said decimal digital memory means is within a predetermined range or not after completion of the data pulse storage in said decimal digital memory means, being further adapted to output a shutter opening signal when said stored decimal count is within said predetermined range, and to output a diaphragm adjusting signal together with a reset signal for said digital memory means when said stored decimal count is out of said predetermined range; means adapted to be applied with the shutter opening signal from said discriminator means and thereby to open the shutter; timing-pulse generating means adapted to begin to apply timing pulses after opening of the shutter; shutter closing means adapted to be activated when the number of pulses generated by said timing-pulse generating means comes in a special relationship with the number of data pulses stored in said digital memory means; means adapted to adjust the diaphragm by a predetermined amount when applied with the diaphragm adjusting signal from said discriminator means, and wherein, when the diaphragm has been adjusted by said diaphragm adjusting means to a predetermined extent, said photo-responsive pulse generating means is activated again after the diaphragm has been stopped and thereby said storage and said discrimination are repeated.

4,058,817
PHOTOGRAPHIC EXPOSURE APPARATUS FOR PROVIDING SMALL APERTURES
Bruce K. Johnson, Andover; Irving Laskin, Sharon, and George D. Whiteside, Lexington, all of Mass., assignors to Polaroid Corporation, Cambridge, Mass.
Filed Jan. 2, 1976, Ser. No. 646,286
Int. Cl.² G03B *7/14*
U.S. Cl. 354—26 **19 Claims**



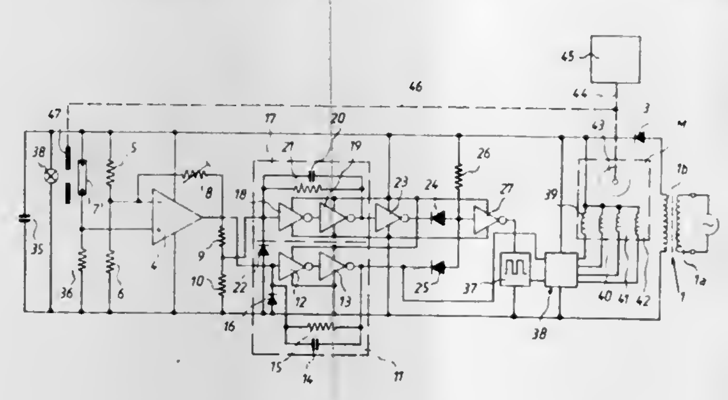
1. In a photographic exposure control system for defining an aperture value in operative relation to a given optical path, a blade mechanism comprising a pair of blade members having a given blade axis, each of said blade members having an open portion therein with at least a main section thereof lying on the axis of its respective blade member, said main sections exceeding at some point a given width as measured transverse to the blade axis, means for mounting said blade members for displacement across said given optical path along a blade path in which said blade axes are maintained in a substantially parallel relation to provide at least partial coincidence of said openings at said given optical path thereby defining an operative aperture value thereat in accordance with the extent of said coincidence, the improvement comprising:
  each of said open portions having a relatively narrow, elongated portion extending from the leading end of its respective open portion toward the other opening as viewed with respect to blade displacement, at least one of said elongated portions extending at an angle to the given axis of its respective blade member such that during initial displacement of said blade members, the elongated portion of one blade member passes across the elongated portion of the other blade member and then out of coincidence therewith at said optical path to define a relatively small initial aperture value thereat as compared to the relatively large aperture value when the main sections of each open portion are brought into increasing coincidence.

4,058,818
FIXED TIME DELAY QUENCH STROBE
Bruce K. Johnson, Andover, and George D. Whiteside, Lexington, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.
Filed Apr. 8, 1976, Ser. No. 674,840
Int. Cl.² G03B *7/16*
U.S. Cl. 354—33 **9 Claims**



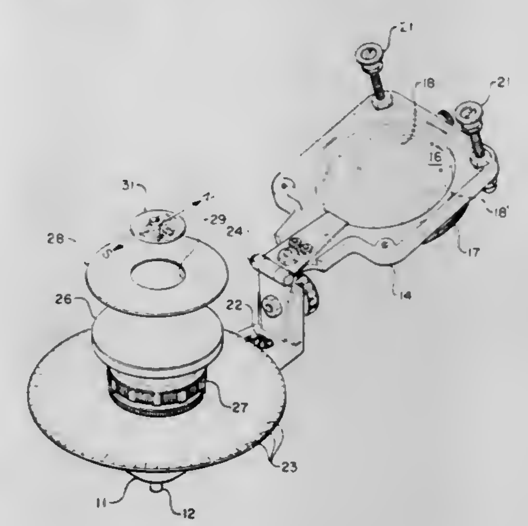
7. Lighting apparatus for use with a photographic camera of the type having means for providing at least two control signals in sequence during the course of a photographic interval, said lighting apparatus comprising:
  a source of artificial illumination;
  means for accommodating at least one electrical connection from said lighting apparatus to the camera in order to facilitate the transmission of the two signals from the camera to said lighting apparatus;
  means for coupling to a source of electrical energy; and
  means energizable by the source of electrical energy, and responsive to the first of the two signals from the camera for initiating the energization of the source of artificial illumination to effect the firing thereof, and then responsive to the second of the two signals from the camera for initiating the deenergization of the source of artificial illumination immediately subsequent to the expiration of a time delay of predetermined duration, said time delay commencing immediately after receipt of the second of the two signals from the camera.

4,058,819
ANALOG/DIGITAL CONTROL ARRANGEMENT FOR PHOTOGRAPHIC APPARATUS
Alois Rieder, Munich, Germany, assignor to AGFA-Gevaert, A.G., Leverkusen, Germany
Division of Ser. No. 537,668, Dec. 30, 1974, Pat. No. 3,972,607. This application June 3, 1975, Ser. No. 583,503
Int. Cl.² G03B *7/08*
U.S. Cl. 354—44 **9 Claims**



1. In a photographic device including an adjustable component, a regulating arrangement for effecting light-dependent regulation of the setting of an adjustable component, the regulating arrangement comprising, in combination, means for generating a light-dependent signal, including a bridge circuit comprised of at least one photosensitive element, the bridge circuit being balanced, imbalanced in one direction or imbalanced in the other direction in dependence upon the light incident upon the photosensitive element, and a difference amplifier having two inputs connected across diagonally opposite junctions of the bridge circuit, the difference amplifier producing at its output a voltage constituting the light-dependent signal; first and second bistable circuit stages each having its input connected to the output of the difference amplifier, each of the bistable circuit stages having a respective threshold voltage, each of the bistable circuit stages assuming a first state when the difference amplifier output voltage applied to its input is below its threshold voltage and a second state when the difference amplifier output voltage applied to its input is above its threshold voltage, the threshold voltages of the two bistable circuit stages having values such that when the bridge circuit is balanced the value of the difference amplifier output voltage is intermediate the values of the threshold voltages of the two bistable circuit stages; electromagnetic adjusting means activatable in a first direction to change the setting of the adjustable component in one direction and activatable in the opposite second direction to change the setting of the adjustable component in the opposite direction; activation-determining means connected to both bistable circuit stages and to the electromagnetic adjusting means, and operative for assuming in dependence upon the combination of the states of the two bistable circuit stages either a state permitting activation of the adjusting means or a state preventing activation of the adjusting means; and direction-selecting means connected to the first bistable circuit stage and to the electromagnetic adjusting means, operative for assuming a state setting the adjusting means for activation in one direction when the first bistable circuit stage is in its first stage and independently of the state of the second bistable circuit stage, and operative for assuming a state setting the adjusting means for activation in the opposite direction when the first bistable circuit stage is in its second state and independently of the state of the second bistable circuit stage.

4,058,820
COINS ORGANIZED IDENTIFICATION NUMBERING SYSTEM APPARATUS AND METHOD
Merritt Leroy Hollen, 1712 Notre Dame Ave., Belmont, Calif. 94002
Filed June 28, 1976, Ser. No. 700,317
Int. Cl.² G07F *3/02;* G03B *29/00*
U.S. Cl. 354—80 **14 Claims**



8. Apparatus for supporting a coin to obtain a photographic record thereof comprising a support base, a table mounted for rotational movement on said support base, means for indicating the angular position of said table relative to said support base, means for mounting the coin on said table, means for providing a predetermined array of reticle lines, a holder for supporting

said predetermined array of reticle lines for rotational movement therein, said holder being disposed for positioning into and out of a position overlying said means for mounting the coin, whereby a mounted coin photographed through said array of reticle lines provides a photoidentification record with the coin oriented in accordance with the rotational movement of said table, and the reticle lines superimposed thereon in accordance with the rotational movement of said means providing the predetermined array of reticle lines.

10. A method of identifying coins for cataloging, comprising the steps of orienting a support platform relative to an angular reference, orienting the coin in predetermined position on the platform, superimposing an identifying reticle display on the coin, rotating the reticle display to a predetermined reticle position, rotating the platform to a predetermined platform position orienting a camera relative to the angular reference to view the coin, photographing the coin, and identifying the photograph with indicia signifying the reticle display rotation, the reticle display identification, and the platform rotation, whereby identifying marks on the coin face are located and recorded for registration.

4,058,821

PHOTO-COUPLER SEMICONDUCTOR DEVICE AND METHOD OF MANUFACTURING THE SAME

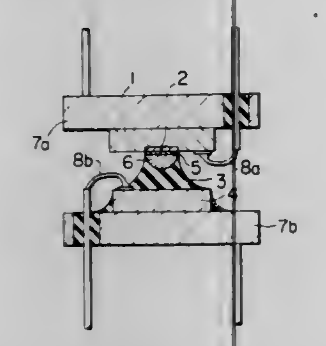
Tadahiko Miyoshi, Hitachi; Yasutoshi Kurihara, Katsuta; Tatsuya Kamei, and Takuzo Ogawa, both of Hitachi, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Mar. 19, 1976, Ser. No. 668,404

Claims priority, application Japan, Apr. 2, 1975, 50-39155

Int. Cl.² H01L *31/12*

U.S. Cl. 357—19 **17 Claims**



1. A photo-coupler semiconductor device comprising:
a semiconductor light emitter;
a semiconductor light detector facing the semiconductor light emitter, the semiconductor light detector having a light sensitive region formed in a part of a surface thereof;
a transparent glass layer formed on the entire surface of the light sensitive region of the semiconductor light detector, the transparent glass layer essentially containing SiO_2; and
a transparent optical guide interposed between the semiconductor light emitter and the semiconductor light detector for directing light from the semiconductor light emitter to the light sensitive region, at least a part of the optical guide close to the light sensitive region including a glass portion one surface of which intimately contacts a surface of the transparent glass layer.

4,058,822

HIGH VOLTAGE, LOW ON-RESISTANCE DIFFUSION-SELF-ALIGNMENT METAL OXIDE SEMICONDUCTOR DEVICE AND MANUFACTURE THEREOF

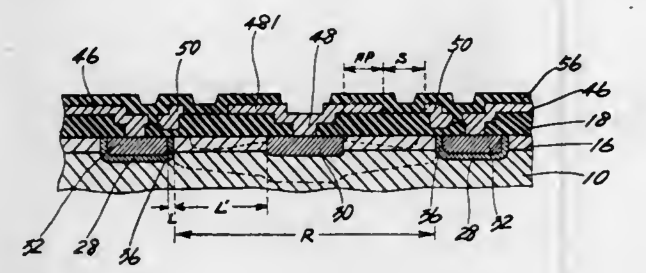
Katunobu Awane, Ikoma; Hironori Hattori, Suita; Tetuo Biwa, and Hiroshi Tamaki, both of Osaka, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed June 1, 1976, Ser. No. 691,874

Claims priority, application Japan, May 30, 1975, 50-66200; June 20, 1975, 50-76134; Jan. 6, 1976, 51-1221

Int. Cl.² H01L *29/78, 27/02, 29/04*

U.S. Cl. 357—23 **5 Claims**



1. A metal oxide semiconductor device of the diffusion-self-alignment type comprising:
a. a semiconductor body having a conductivity of one type;
b. a drain region having a conductivity opposite that of the semiconductor body;
c. a source region having a conductivity opposite that of the semiconductor body;
d. a channel region of the same conductivity type as the semiconductor body, said channel region being formed to surround the source region through the use of a double diffusion technique;
e. a drift channel region of the opposite conductivity type to that of the semiconductor body, said drift channel region being formed on the surface of the semiconductor body to extend between the drain and the channel regions;
f. a drain electrode connected to the drain region;
g. a source electrode connected to the source region;
h. a gate electrode formed above the channel region via a thin insulating layer; and
i. field plate means including a portion of said drain electrode extending toward said gate electrode to cover substantially one-half of said drift channel region via a thick insulating layer.

4,058,823

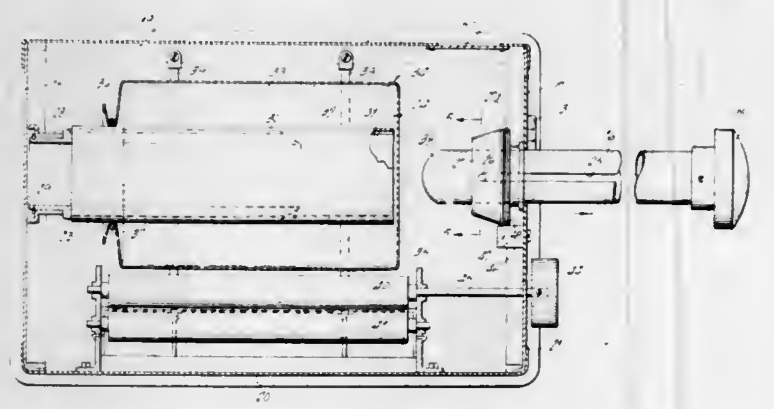
CAMERA ACCESSORY AND CARTRIDGE

Roger Mitchell, Minneapolis, and William H. Strater, Bloomington, both of Minn., assignors to Visual Graphics Corporation, New York, N.Y.

Filed Apr. 8, 1976, Ser. No. 674,824

Int. Cl.² G03B *17/26*

U.S. Cl. 354—354 **8 Claims**



1. A camera accessory and cartridge comprising a light-tight enclosure, an access door on said enclosure, an elongated

plunger carried by the door and slideable therethrough from the exterior to the interior of said enclosure, a hollow mandrel secured within the enclosure and extending in the direction of the access door and coaxial with the plunger, a cartridge comprising a hollow core, a supply of photosensitive material carried upon the core, a light impervious bag having a closed and an open end overlying the said light impervious material, means to secure the open end of the bag to the core in light-tight contact with said core, said cartridge being slideably received upon said mandrel, and means within the housing to advance the photo-sensitive material through an exit slot in the light-tight enclosure.

4,058,824

SEMICONDUCTOR DIODE

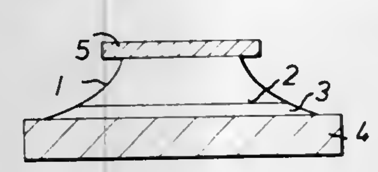
Manfred Claassen, Braunschweig, Germany, assignor to Licentia Patent-Verwaltungs-G.m.b.H., Frankfurt am Main, Germany

Filed May 16, 1973, Ser. No. 361,303

Claims priority, application Germany, May 18, 1972, 2224159

Int. Cl.² H01L *29/48, 29/06, 23/48, 29/44*

U.S. Cl. 357—15 **21 Claims**



1. In a semiconductor delay diode comprising a semiconductor body of a first conductivity type, means, adjacent one surface of said body and including a rectifying junction, for providing a space charge region in said body, and a blocking electrode for minority carriers adjacent the opposite surface of said semiconductor body, the improvement wherein the doping of said semiconductor body and the spacing between said blocking electrode and said junction are such as to extend the space charge region of said diode up to said blocking electrode in the operational state.

4,058,825

COMPLEMENTARY TRANSISTOR STRUCTURE HAVING TWO EPITAXIAL LAYERS AND METHOD OF MANUFACTURING SAME

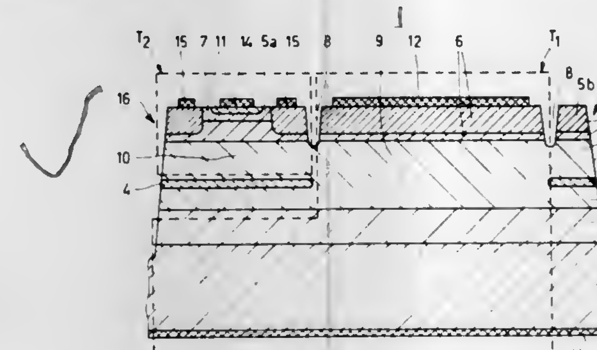
Maurice Bonis, Herouville, and Bernard Roger, Carpiquet, both of France, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Dec. 24, 1975, Ser. No. 644,065

Claims priority, application France, Jan. 10, 1975, 75.00713

Int. Cl.² H01L *27/02, 27/10, 29/06*

U.S. Cl. 357—46 **12 Claims**



1. A semiconductor device having a substantially planar semiconductor body including at least first and second complementary transistors each having emitter, base and collector zones and comprising a substrate of a first conductivity type which is covered with a first epitaxial layer of a second conductivity type opposite to that of the first, at least a part of said substrate comprising the collector zone of the first transistor, the base zone of said first transistor and the collector zone of the second complementary transistor comprising adjacent, electrically connected parts of said first epitaxial layer, and a second epitaxial layer of said first conductivity type provided on the first epitaxial layer and the emitter zone of the first transistor and the base zone of the second transistor comprise portions of said second epitaxial layer, said portions of the second epitaxial layer being separated from each other by at least one groove having a sufficient depth to extend through said second epitaxial layer entirely and to extend only partially into said first epitaxial layer, and an emitter zone of said second transistor formed in that part of said second epitaxial layer constituting the base zone of said second transistor, and means for providing circuit connections to zones of the first and second transistors.

4,058,826

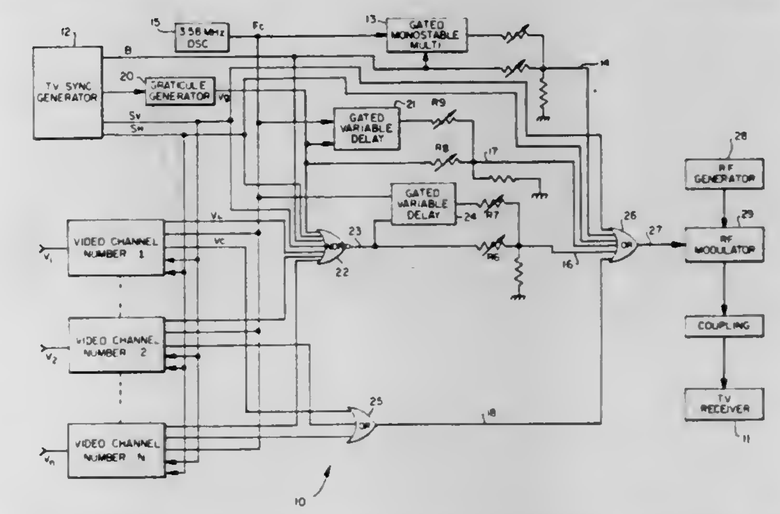
METHOD AND SYSTEM FOR GENERATING OSCILLOGRAPHIC DISPLAYS OF ANALOG SIGNALS UPON A TV

Seymour Schneider, 27 Collamore Terrace, West Orange, N.J. 07052

Filed Apr. 15, 1976, Ser. No. 677,432

Int. Cl.² H04N *9/62*

U.S. Cl. 358—10 **16 Claims**



1. A method for generating an oscillographic display of at least one periodic or aperiodic input signal upon a standard television receiver with said input signal being generated external of said receiver and being independent of the television receiver raster frequency, comprising the steps of:
storing said input signal in a multiplicity of storage elements with each element being responsive to said input signal at a different moment in time;
initiating said storage in synchronism with said input signal;
controlling the rate at which said input signal is stored in said storage elements independent of the input signal rate;
reading the signals stored in said storage elements at a rate in synchronism with the horizontal synchronization frequency of said television receiver;
converting the read signals into corresponding video signals compatible with said television receiver; and
displaying said video signals.

4,058,827

COLOR SEPARATING OPTICAL SYSTEM FOR A TELEVISION CAMERA

Kunio Ando, Warabi; Takemi Saito, Kawagoe, and Takeshi Higuchi, Tokyo, all of Japan, assignors to Fuji Photo Optical Co., Ltd., Omiya, Japan

Filed Mar. 26, 1976, Ser. No. 671,024

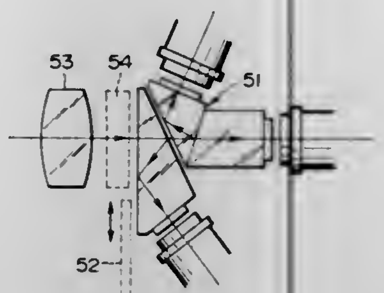
Claims priority, application Japan, Apr. 2, 1975, 50-40075

Int. Cl.² H04N *9/09*

U.S. Cl. 358—55 **4 Claims**

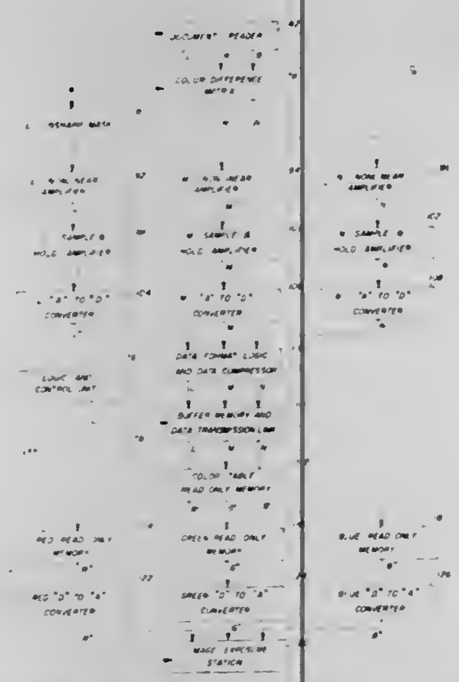
1. In a color separating optical system for a television camera comprising a color separating optical system composed of a plurality of prisms provided between an objective and one or more television image pick-up tubes, the improvement wherein means is provided for inserting between said prism and said objective any one of a plurality of glass elements having paral-

lel flat sides and of different thicknesses, wherein the thickness of each said glass element is determined in relation to a particu-



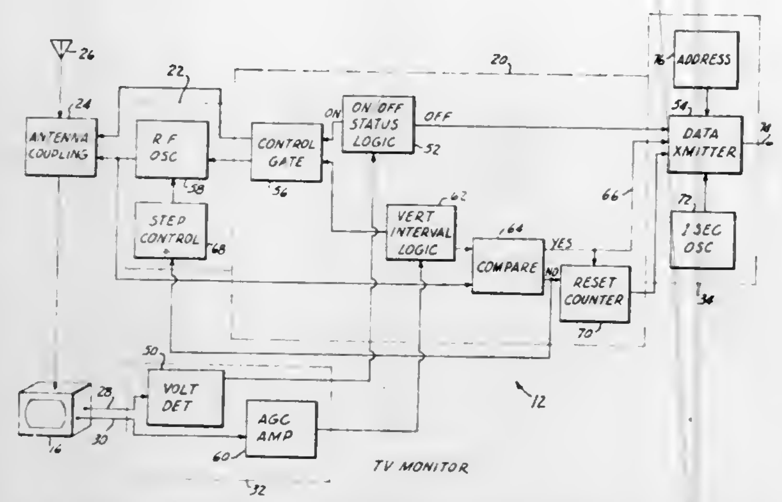
lar type of image pick-up tube, whereby insertion of a glass element adjusts the glass length of the optical system to the requirements of a particular type of pick-up tube.

4,058,828
DOCUMENT COPYING APPARATUS
John H. Ladd, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.
Continuation of Ser. No. 580,632, May 27, 1975, abandoned. This application Nov. 11, 1976, Ser. No. 740,699
Int. Cl.² H04N *1/46, 1/26*
U.S. Cl. 358—80 **20 Claims**



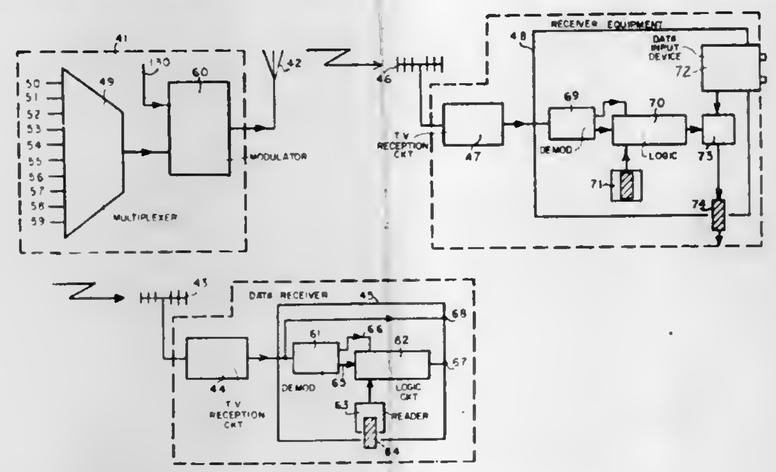
1. In a document copying apparatus of the type including (1) reading means for generating a plurality of electrical signals which are serial measures of imagewise information of successive discrete areas of an original document to be reproduced, (2) image recording means responsive to applied electrical signals for forming discrete image portions on a receiver medium corresponding to the imagewise information contained in said applied electrical signals, and (3) control means associated with said reading means and said recording means for controlling the format of the recording of said discrete image portions so that the relative position of each such image portion on the receiver medium corresponds to the relative position of its respective counterpart area of the original document; the improvement comprising programmed computation means for (1) receiving said generated signals, (2) applying a compensating function to said generated signals to modify the imagewise information contained therein and (3) applying the compensated signals to said image recording means; said computation means including means for enhancing the color information in said generated signals by correcting for characteristics of the colorant set in the original document.

4,058,829
TV MONITOR
John R. Thompson, Los Angeles, Calif., assignor to Control Data Corporation, Minneapolis, Minn.
Filed Aug. 13, 1976, Ser. No. 714,432
Int. Cl.² H04N *7/02*
U.S. Cl. 358—84 **13 Claims**



1. In a system for monitoring the reception status of a television receiver capable of detecting selected ones of a plurality of wave signals, each representing a separate video channel, said receiver including an antenna for receiving said wave signals, a horizontal retrace circuit and a kinescope circuit, monitoring apparatus comprising: first probe means connected to said horizontal retrace circuit for detecting a voltage in said horizontal retrace circuit; second probe means connected to said kinescope circuit for detecting a signal frequency in said kinescope circuit; voltage level detector means connected to said first probe means for detecting a predetermined level of the voltage on said first probe means; first logic means connected to said voltage level detector means for providing a first gate signal when said voltage level detector means detects a voltage on said first probe means less than said predetermined level and providing a second gate signal when said level detector means detects a voltage on said first probe means equal to or greater than said predetermined level; second logic means connected to said second probe means for providing a first signal representative of the signal frequency detected by said second probe means and providing a third gate signal between successive horizontal blanking periods on an active video line of said kinescope circuit; oscillator means for selectively generating one of a plurality of radio frequency signals within the bandwidth of the wave signals representative of separate video channels, antenna coupling means for selectively coupling said television receiver to said antenna and to said oscillator means; gate means connected to said first and second logic means and to said oscillator means and said antenna coupling means and responsive to said second and third gate signals for operating said oscillator means to generate a radio frequency signal within the bandwidth of a channel and for operating said antenna coupling means to couple said television receiver to said oscillator means and decouple said antenna from said television receiver, thereby impressing said radio frequency signal onto the antenna input of said television receiver between horizontal blanking periods on an active video line; compare means connected to said oscillator means and said second logic means for comparing the frequency of the signal generated by said oscillator means with said first signal representative of the signal frequency detected by said second probe means; control means connected to said compare means and to said oscillator means and responsive to a non-coincidence of signals compared by said compare means for controlling said oscillator to generate another radio frequency signal upon the next operation of said gate means; and transmitter means connected to said first logic means and to said compare means and responsive to said first gate signal for transmitting status data indicative that said television receiver is in an "off" condition, and responsive to a coincidence of signals compared by said compare means for transmitting status data indicative that said television receiver is in an "on" condition and indicative of the channel to which said television receiver is tuned.

4,058,830
ONE WAY DATA TRANSMISSION SYSTEM
Yves Maurice Guinet, 31, Rue de Fougeres, Rennes, France (35000), and Yves Maurice Noirel, Le Chesnot-Breteil, Montfort, France (35160)
Filed June 3, 1976, Ser. No. 689,493
Claims priority, application France, June 6, 1975, 75.18319
Int. Cl.² H04N *1/32, 1/34, 1/44*
U.S. Cl. 358—86 **8 Claims**



1. An one-way data transmission system wherein

the transmitter station transmits data in the form of data packs, from a plurality of channels, the data packs from said plurality of channels are time multiplexed, each data pack comprises a prefix coded signal, in addition to the conventional synchronization and service signals, wherein

one channel amongst the plurality of channels is allotted to the transmission of a date information, each receiver equipment comprising means for comparing each pack prefix code with a channel code stored in a dead memory,

each dead memory containing in addition to the channel code, a subscription period information, said receiver equipment comprising means for receiving the date channel information from the date channel and comparing said date channel information with the subscription period information stored in the dead memory and which, when the comparison result is positive, delivers a first validation signal, and

said means for comparing the prefix code to the dead memory channel code and delivering a second validation signal when the second comparison result is positive,

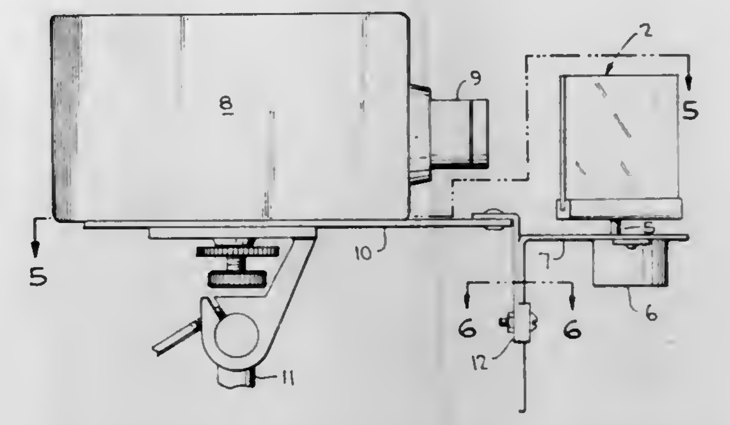
the first and second validation signals being combined for validating the received pack having caused the second validation signal.

4,058,831
PANORAMIC CAMERA SCANNING SYSTEM
William V. Smith, Memphis, Tenn., assignor to Lectrolarm Custom Systems, Inc., Memphis, Tenn.
Filed Sept. 8, 1976, Ser. No. 721,502
Int. Cl.² H04N *5/24*
U.S. Cl. 358—87 **10 Claims**

1. Mirror system for use in a panoramic camera scanning system comprising:

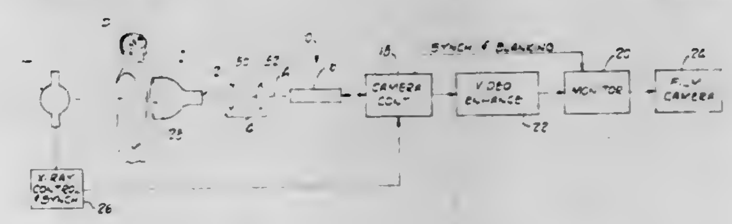
a planar member having reflective coatings on both of its planar surfaces;

means for rotatably mounting said planar member so that its plane lies along an axis extending in a direction substantially perpendicular to the optical axis of a camera utilized in the scanning system; and,



means for rotating said planar member about said mounting axis.

4,058,832
DISPLAY FOR TELEVISION IMAGING SYSTEM
Robert J. Vagi, Broadview Heights, Ohio, assignor to Picker Corporation, Cleveland, Ohio
Filed Mar. 5, 1976, Ser. No. 664,367
Int. Cl.² H04M *7/18*
U.S. Cl. 358—110 **2 Claims**



1. In a system for producing a visible light image corresponding to a pattern of penetrative radiation emergent from a subject, the system including a source for directing penetrative radiation through the subject, means for converting the emergent penetrative radiation pattern to a visible light image, electrical apparatus for converting the visible light image to electrical signals, and a display apparatus including a cathode ray tube having an electron gun for producing an electron beam, an output face and a phosphor layer on the inner surface of the output face, the phosphor layer being disposed for impingement by the electron beam and for emitting light for producing a second visible image representing the pattern of penetrative radiation when the electron beam strikes the phosphor, the improvement comprising:

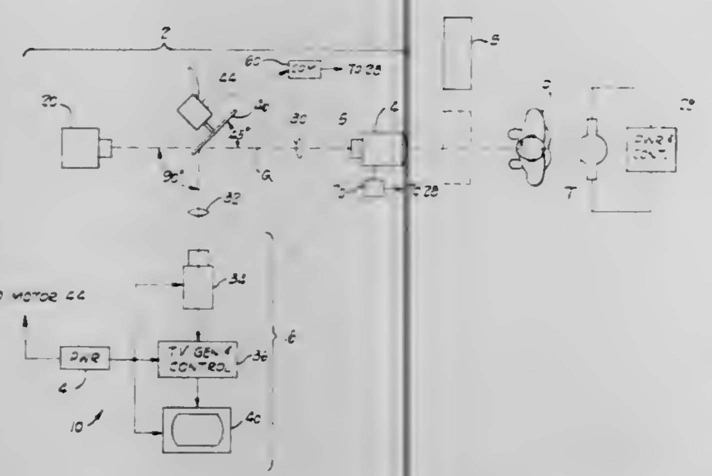
a. the output face of the cathode ray tube having a substantially planar configuration; and
b. the focal spot of the electron beam having a diameter of no more than about 0.0017 inches at an electron beam current of about 4 microamperes.

4,058,833
RADIATION IMAGING APPARATUS AND METHOD
Fred H. Meyer, Newbury, Ohio, assignor to Picker Corporation, Cleveland, Ohio
Filed Dec. 31, 1974, Ser. No. 537,776
Int. Cl.² H04N *5/32*
U.S. Cl. 358—111 **34 Claims**

1. A system for deriving diagnostic information about a subject from a pattern of penetrative radiation, said system comprising:

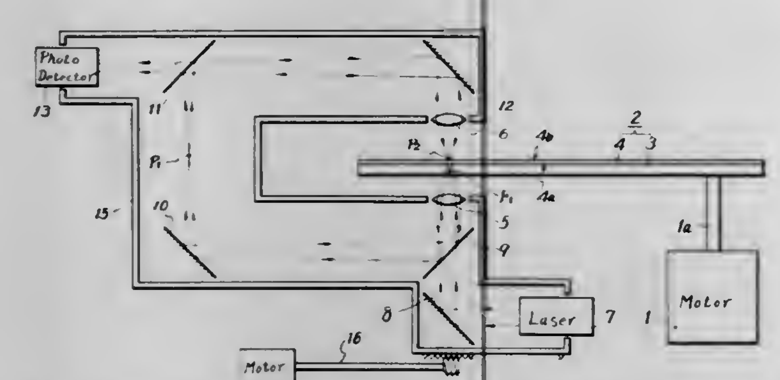
a. a source of directing penetrative radiation at different energy levels along a path through the subject;
b. an image tube for receiving penetrative radiation from the subject and converting such radiation to an output light image representing a pattern of such radiation from said subject;

c. a film camera for receiving said light image for producing photographs thereof;
d. a television apparatus for producing a substantially continuous image of said light image from light received by said television apparatus during each of a plurality of predetermined time intervals; and,
e. a diverter for controlling the selective transmission of light energy from said output image to said film camera and to said television apparatus to direct only said light to



said television apparatus in bursts having a predetermined energy and substantially synchronously with the occurrence of said predetermined time intervals, for limiting the time duration and energy intensity of light energy transmission to the television apparatus to maintain said continuous television image at a substantially constant brightness, and to maximize the time during which said light energy can be utilized with said film camera for producing photographs while still producing the continuous television image.

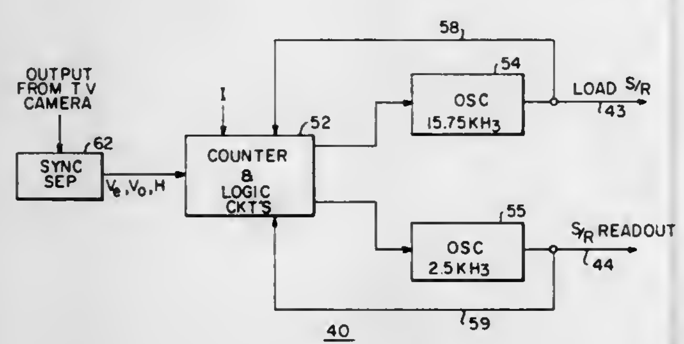
4,058,834
SYSTEM FOR MAKING A LIGHT BEAM SCAN A FLAT CARRIER WITH AUTOFOCUSING
Senri Miyaoka, Zushi, Japan, assignor to Sony Corporation, Tokyo, Japan
Filed Feb. 18, 1976, Ser. No. 658,999
Claims priority, application Japan, Feb. 24, 1975, 50-22590
Int. Cl.^{2} H04N *5/76*
U.S. Cl. 358—128 **6 Claims**



1. In a signal play-back device having a substantially flat record carrier with first and second oppositely facing reflective surfaces and a signal recorded as variations in at least said second surface, a light source emitting a light beam for scanning the recorded signal variations and providing correspondingly varied reflected beam energy, and photo-detecting means for receiving said varied reflected beam energy and providing a corresponding output; an optical system for continuously focussing said light beam at a point on said second surface irrespective of movements of said record carrier in directions normal to said surfaces comprising first lens means directing said light bean from said source in a path extending substantially normal to said first surface for reflection by the latter and focussing the light beam reflected from said first surface at an image point remote from said first surface, second lens means focussing said image point onto said second surface and directing the reflection of said image point from said second surface to said photodetecting means, said light beam, as received by said first lens means from said light source, being a parallel light beam, said first lens means being dimensioned and positioned in respect to said record carrier and said light source for focussing said parallel light beam from the latter at a point which is spaced along said path from said first surface in the direction toward said first lens means for the full range of said movements of the record carrier in sid directions, and said first and second lens means having respective magnification factors N_1 and N_2 satisfying the following relation:

$$N_1 \cdot N_2 = 1/\sqrt{2}.$$

4,058,835
SCAN CONVERSION APPARATUS
Paul G. Kennedy, Monroeville, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.
Filed Nov. 8, 1974, Ser. No. 522,189
Int. Cl.^{2} H04N *7/12*
U.S. Cl. 358—134 **14 Claims**

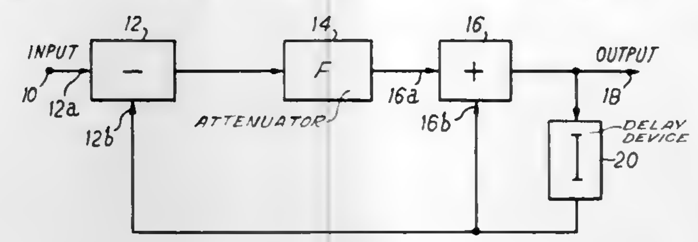


1. A system for transmitting a standard television picture over a relatively narrow bandwidth transmission link, comprising:
A. means providing an information containing television signal scanned in a plurality of television lines each comprised of a plurality of adjacent picture elements;
B. means for sampling picture elements lying along a line substantially orthogonal to the direction of line scan and deriving a reduced bandwidth television signal therefrom;
C. means coupling said reduced bandwidth television signal to said transmission link for transmission thereof;
D. means for receiving and processing transmitted reduced bandwidth television signals and displaying each as a single scanned line.

4,058,836
NOISE REDUCTION IN TELEVISION SIGNALS
John Oliver Drewery, Coulsdon, and Martin Weston, Epsom, both of England, assignors to The Marconi Company Limited and Standard Telephones & Cables Limited, both of London, England
Filed Apr. 26, 1976, Ser. No. 680,054
Claims priority, application United Kingdom, Apr. 25, 1975, 17331/75
Int. Cl.^{2} H04N *5/21*
U.S. Cl. 358—167 **9 Claims**

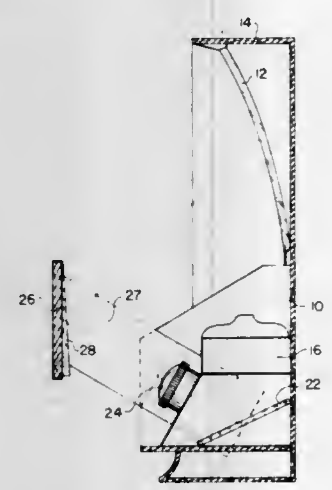
1. A method of reducing the effect of noise in an electrical input signal which is obtained by scanning, to provide an output signal, comprising the steps of subtracting from the input for the current scan the said output signal for a preceding scan to provide a difference signal, attenuating low-amplitude

portions of the difference signal relative to high amplitude portions thereof, and adding the thus-attenuated signal to the



said output signal for the preceding scan to provide an output signal for the current scan.

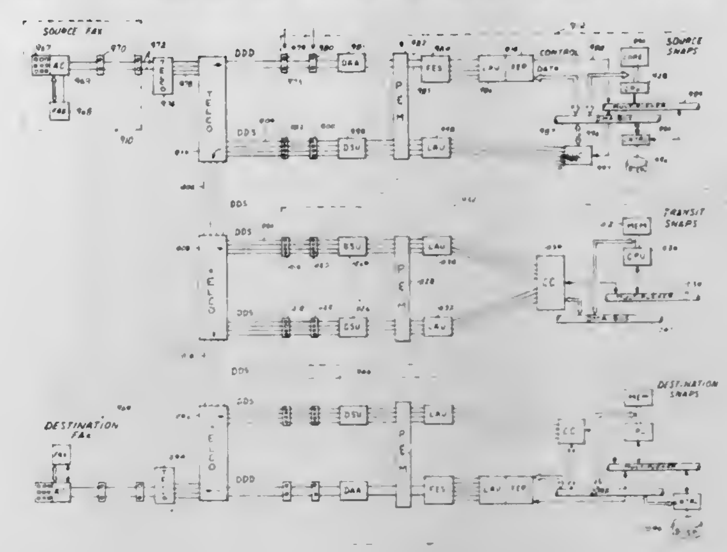
4,058,837
PROJECTION TELEVISION RECEIVER
Earl W. Muntz, 3416 Alana Drive, Sherman Oaks, Calif. 91403
Filed Sept. 7, 1976, Ser. No. 720,681
Int. Cl.^{2} H04N *5/655*
U.S. Cl. 358—237 **3 Claims**



1. Television apparatus including: a cabinet; a display screen mounted in an upright position on top of said cabinet adjacent to the rear side thereof; a television receiver mounted in said cabinet having a downwardly facing viewing screen; first reflector means mounted in said cabinet directly under the viewing screen of the television receiver in an inclined position relative to said viewing screen; a slider mounted in the front of the cabinet and movable to an open position and to a closed position; a projection lens mounted in said cabinet to one side of the television receiver for directing images reflected by said first reflector means from the viewing screen of the television receiver to the surface of said slider; and a second reflector means mounted on the surface of said slider and positioned for directing the images from the viewing screen of the television receiver onto said display screen when the slider is in its open position and with a size corresponding to the size of said display screen.

4,058,838
PACKET-SWITCHED FACSIMILE COMMUNICATIONS SYSTEM
William C. Crager, West Islip; Sudhindra R. Umarji, New York, both of N.Y.; Robert H. Griffin, Montclair, N.J., and Gerard J. Louit, New Haven, Conn., assignors to International Telephone and Telegraph Corporation, Nutley, N.J.
Filed Nov. 10, 1976, Ser. No. 740,682
Int. Cl.^{2} H04N *1/32;* **H04L** *11/20*
U.S. Cl. 358—257 **37 Claims**

1. A packet-switched facsimile data communications system comprising:
means for receiving message information from one or more facsimile terminals;
means for subdividing said message information from each of said facsimile terminals into a plurality of data packets, each of said packets including at least a portion of said message information;
means for independently transmitting said data packets over said communications system including a network of a



plurality of switching nodes for selectively storing and forwarding said packets over said network in accordance with information contained by said packets; and
processing means for storing said data packets for reassembly of said packets into said message information.

4,058,839
MAGNETIC-TYPE INFORMATION CARD AND METHOD AND APPARATUS FOR ENCODING AND READING
John C. Darjany, Signal Hill, Calif., assignor to R. D. Products, Inc., Victor, N.Y.
Continuation-in-part of Ser. No. 499,198, Aug. 21, 1974, Pat. No. 3,946,206. This application Sept. 3, 1974, Ser. No. 502,532
Int. Cl.^{2} G06K *7/08;* **G11B** *15/60, 23/02*
U.S. Cl. 360—2 **27 Claims**

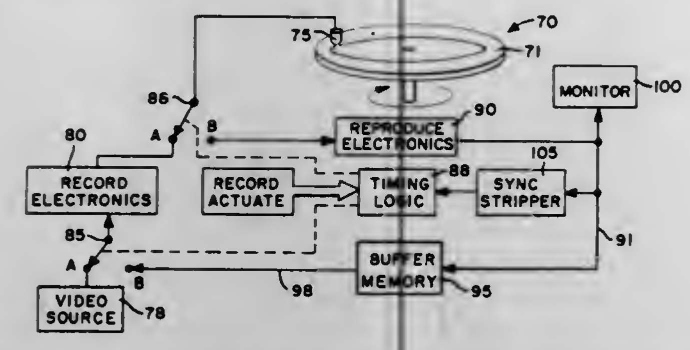
1. A flexible resilient magnetic particle type information card capable of correctly reading information thereon after such card has been bent back double on itself and creased at the region of the card that includes the magnetic particles, said card comprising a flexible base, a layer of uniformly distributed magnetic particles thereon, and a flexible overlayer of nonmagnetic material, said overlayer having a thickness of at least 2 mils, said layer of magnetic particles being magnetically digitally encoded, consecutive equal portions of said layer having one polarity of magnetic flux or the opposite polarity, with abrupt magnetic flux transitions between oppositely polarized portions, the magnetic flux transitions of such encoding being at least 0.02 inch apart and said magnetic particle layer being enclosed between the base layer and overlayer and spaced from the edges of the card.

4,058,840
METHOD AND APPARATUS FOR RECORDING A SINGLE VIDEO FRAME
Vincent D. Kasprzak, Mountain View, Calif., assignor to Arvin Industries, Inc., Columbus, Ind.
Continuation-in-part of Ser. No. 635,671, Nov. 26, 1975, abandoned. This application Mar. 14, 1977, Ser. No. 776,996
Int. Cl.^{2} H04N *5/795*
U.S. Cl. 360—10 **6 Claims**

1. A method of developing a frame signal from a video signal

comprised of a succession of frames, each frame including two interlaced fields, comprising the steps of:

recording a single frame signal on a disc recorder, said disc recorder including a single transducer and a magnetic disc rotating at the rate of one rotation for each frame in said succession of frames,



producing one field signal of the recorded frame signal with said transducer and storing said field signal,

rerecording the stored single field signal on said disc recorder, and

reproducing the two field signals recorded on said disc recorder whereby a frame signal consisting of two identical interlaced fields is provided.

4,058,841

MAGNETIC TAPE RECORDING AND/OR REPRODUCING APPARATUS WITH DEVICE FOR RECORDING AND/OR REPRODUCING CONTROL SIGNALS

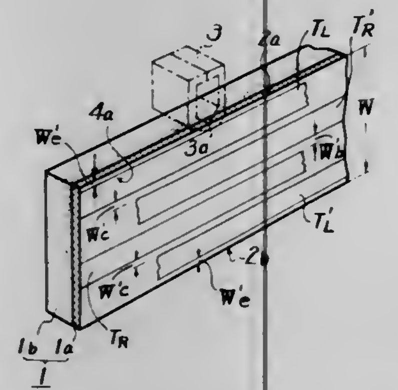
Yoshio Kishi, Tokyo, and Masaru Nagami, Yokohama, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Nov. 25, 1975, Ser. No. 635,249

Claims priority, application Japan, Nov. 27, 1974, 49-136833

Int. Cl.² G11B *5/43, 5/78*

U.S. Cl. 360—27 **8 Claims**



1. In an apparatus for recording and/or reproducing information signals in at least one record track on a face of a magnetic tape as the latter is guided to move longitudinally in a predetermined path; means disposed adjacent said path for recording and/or reproducing a control signal in an edge surface of the tape which edge surface is substantially at right angles to said face of the tape.

4,058,842

CONTROL ASSEMBLY FOR POWER DISTRIBUTION TRANSFORMERS

Ronald E. Benton, Athens, Ga., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Oct. 16, 1975, Ser. No. 622,916

Int. Cl.² H02H *7/04*

U.S. Cl. 361—38 **5 Claims**

1. A control assembly for distribution power transformers containing a circuit breaker, comprising:

a stop plate having first and second openings therein, said stop plate being located on the outside of the transformer enclosure, said stop plate having first and second projections extending therefrom in radial spaced relation from said first opening and third and fourth projections extending therefrom in radial spaced relation from said second opening;

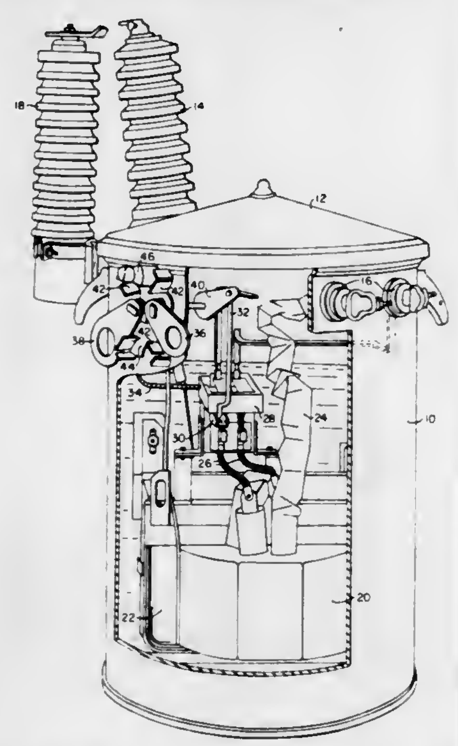
a breaker operating shaft having inner and outer portions and extending through said first opening;

a first sealed bearing surrounding the portion of said operating shaft which passes through said first opening in said stop plate and through an opening in said transformer enclosure;

a breaker overload shaft having inner and outer portions and extending through said second opening;

a second sealed bearing surrounding the portion of said overload shaft which passes through said second opening in said stop plate and through an opening in said transformer enclosure;

an operating handle attached to said outer portion of said operating shaft and aligned for rotation between said first and second projections of said stop plate;



an overload handle attached to said outer portion of said overload shaft and aligned for rotation between said third and fourth projections of said stop plate;

an operating arm attached to said inner portion of said operating shaft;

said circuit breaker having a contact lever;

means for connecting said operating arm to said contact lever such that rotation of said operating handle between said first and second projections will cause said contact lever on the circuit breaker to move;

said circuit breaker having overload means for changing the trip-current characteristics of said circuit breaker;

an overload arm attached to the inner portion of the overload shaft; and

means for connecting said overload arm to said overload means such that rotation of said overload handle between said third and fourth projections will cause said overload means to move.

4,058,843

HEAD AND GIMBAL ASSEMBLY

Ko Ko Gyi, Thousand Oaks, Calif., assignor to Burroughs Corporation, Detroit, Mich.

Filed July 3, 1975, Ser. No. 593,123

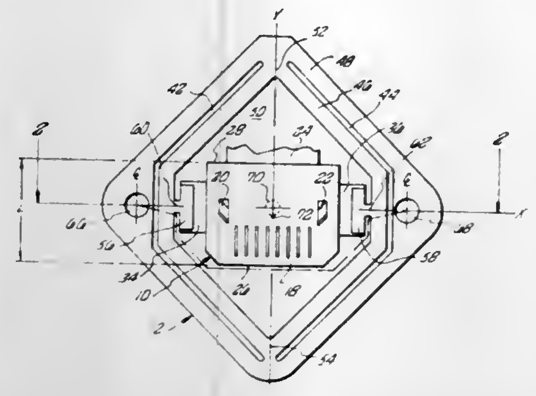
Int. Cl.² G11B *5/60, 17/32, 21/20*

U.S. Cl. 360—103 **7 Claims**

1. In combination:

a transducer head constructed and arranged for flying on a fluid bearing in close proximity to a transducing surface;

gimbal supporting means to which said head is mounted for flyng so as to provide flexural freedom of rotation of said head around predetermined axes parallel to said surface while restraining rotation of said head about an axis perpendicular to said surface and also restraining motion of said head in a direction parallel to said surface; and



head actuating means for applying a loading force to said head to urge said head toward said surface in a direction perpendicular thereto, said actuating means contacting said head in a plane which is coplanar with the center of mass of said head and parallel to said surface.

4,058,844

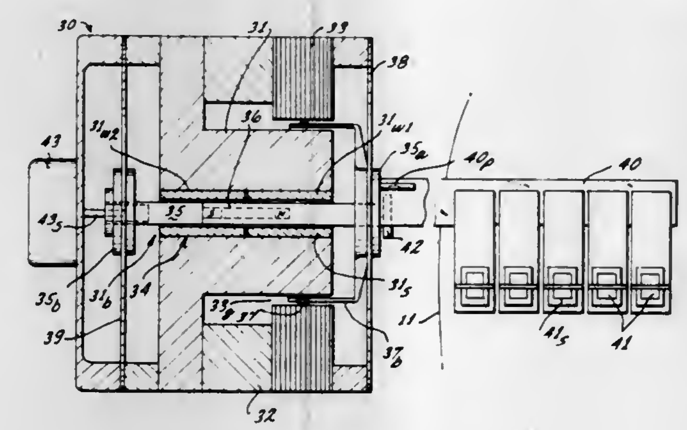
LOW-MASS SHORT-STROKE VOICE-COIL ACTUATOR FOR INTEGRATED DISK FILE MODULE

Wolfgang Gerhard Dirks, Saratoga, Calif., assignor to Burroughs Corporation, Detroit, Mich.

Filed Apr. 2, 1976, Ser. No. 673,157

Int. Cl.² G11B *21/22, 21/08, 5/55;* **H04R** *9/06*

U.S. Cl. 360—106 **14 Claims**



1. A voice-coil actuator system comprising:

a. a main magnetic circuit having a pole shoe and a magnet forming an air gap;

b. a voice-coil residing and moving totally within said air gap;

c. means for supporting said voice-coil;

d. means for developing a signal for sensing motion of, direction of, and velocity of, said voice-coil including:

d-1. means for obviating the effect of changing magnetic fields due to voice-coil motion in said air gap of said main magnetic circuit.

4,058,845

SCANNING DEVICE FOR HELICAL TYPE VIDEO TAPE RECORDER

Heinrich Zahn, Rossdorf, Germany, assignor to Robert Bosch GmbH, Stuttgart, Germany

Filed May 21, 1976, Ser. No. 688,627

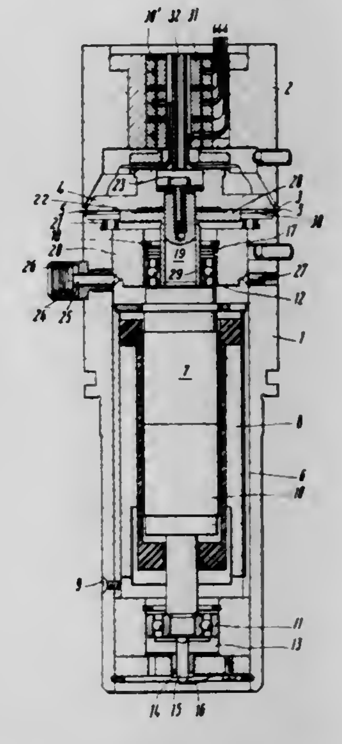
Claims priority, application Germany, May 23, 1975, 2522900

Int. Cl.² G11B *21/18, 21/24, 5/52*

U.S. Cl. 360—107 **2 Claims**

1. In a scanning device, for use in a magnetic tape instrument of the type using magnetic heads and diagonal track scanning with the magnetic tape following a path over the scanning device, and comprising an outer two-part stationary guide drum having a central axis and supporting an inner head assembly revolving about an axis of rotation, and including a head-wheel supporting the magnetic heads and a motor having a driving shaft, the improvement comprising:

transmission means operable to couple said driving shaft with said head-wheel, comprising a sleeve disposed on said driving shaft, and a driving flange connected to said sleeve and defining a surface disposed in a plane substantially perpendicular to said axis of rotation, said head-wheel defining a face normally disposed in a plane substantially perpendicular to the axis of rotation and operable to be aligned in abutment with and frictionally engaged by said surface, both said surface and said head-wheel being substantially circular in shape, said surface having an external diameter of at least one-half the outer diameter of said head-wheel, the magnetic heads being disposed on said face, said transmission means including a ball bearing supporting at least partially said inner head assembly, a rotatably mounted inner ring, said sleeve being supported by said inner ring, an outer threaded ring, and a jacket encompassing said bearing and abutting said threaded ring, said threaded ring and said jacket being located within one of said two-part stationary guide drums whereby said driving flange will drive said head-wheel when the motor is activated.



4,058,846

GROUNDED TRANSDUCER FOR MAGNETIC RECORD DISKS

Gerald Roy Knutson, and Karl Allen Shidler, both of Rochester, Minn., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed June 21, 1976, Ser. No. 698,235

Int. Cl.² G11B *5/27, 5/28*

U.S. Cl. 360—121 **6 Claims**

1. A magnetic head assembly for cooperating with a relatively moving magnetic medium comprising:

a read-write core of electrically insulating and magnetically permeable material having a transducer gap in a contact surface of the head assembly adapted to contact or have a thin air bearing with the magnetic medium,

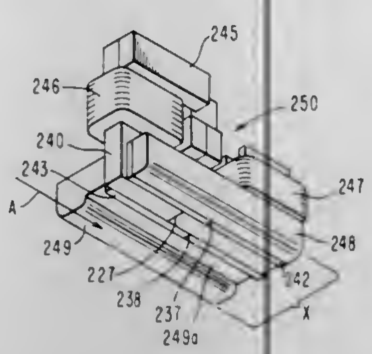
a read-write winding on said core,

an erase core of electrically insulating and magnetically permeable material having first and second opposite sides and bonded on its first side to said read-write core and having a transducer gap in said contact surface,

an erase winding on said erase core, and

a thin layer of electrically conducting material disposed on said second side of said erase core which is remote from

said read-write core and extending away from and terminating on said contact surface of the head assembly so that



static electricity carried by the magnetic medium may be conducted off of the medium through said layer.

4,058,847

MAGNETIC INFORMATION CARRIER HAVING BOTH ENDS FREE AND APPARATUS FOR WRITING ON AND/OR READING IT

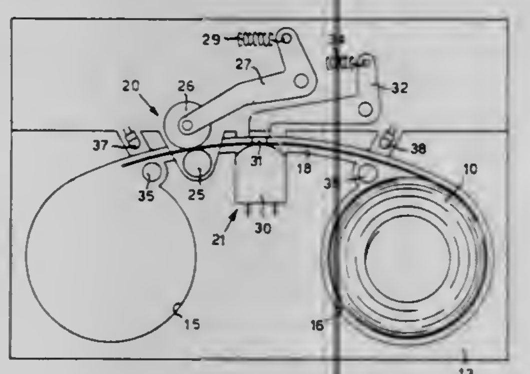
Gian Luigi Ponzano, Ivrea (Turin), Italy, assignor to Ing. C. Olivetti & C., S.p.A., Ivrea (Turin), Italy

Filed Oct. 30, 1975, Ser. No. 627,260

Claims priority, application Italy, Nov. 7, 1974, 70271/74; Aug. 21, 1975, 69113/75

Int. Cl.^{2} G11B *5/78, 23/08, 25/06*

U.S. Cl. 360—132 **11 Claims**



1. A cassette containing a magnetic information strip of the type comprising a base of flexible material pretensioned so as to assume when at rest a stable configuration following a spiral path and a coating layer of magnetizable material coating a surface of said strip, wherein said strip has two free ends, said cassette comprising a container, means defining in said container a cavity wherein said strip is placed and an aperture, guide means for guiding said strip out of said container through said aperture, a feed mechanism mounted on said container along said guide means and means for preventing the passage of both ends of said strip through said guide means.

4,058,848

CUT-OFF CHAMBER OF A LIGHTNING PROTECTOR

Robert Deville, Lyon, France, assignor to Delle-Alsthom, Villeurbanne, France

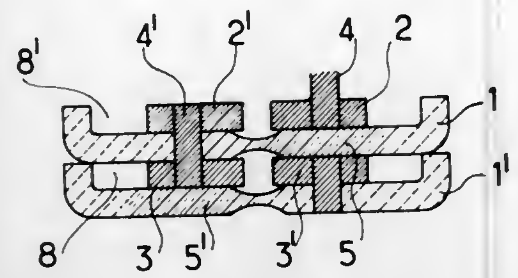
Filed Feb. 11, 1976, Ser. No. 657,333

Claims priority, application France, Feb. 11, 1975, 75.04201

Int. Cl.^{2} H02H *3/22*

U.S. Cl. 361—128 **15 Claims**

1. Cut-off chamber defined by two adjacent walls having a periphery, a central region, electrodes located in said central region, and zones of high potential gradients around said electrodes, characterized in that said walls are made of a porous ceramic material ensuring the discharge and the cooling of the gases at the periphery of the chamber at the time of the flash of an arc between said electrodes, said porous ceramic material



comprising a substance of higher dielectric strength at said zones than at the periphery of said walls.

4,058,849

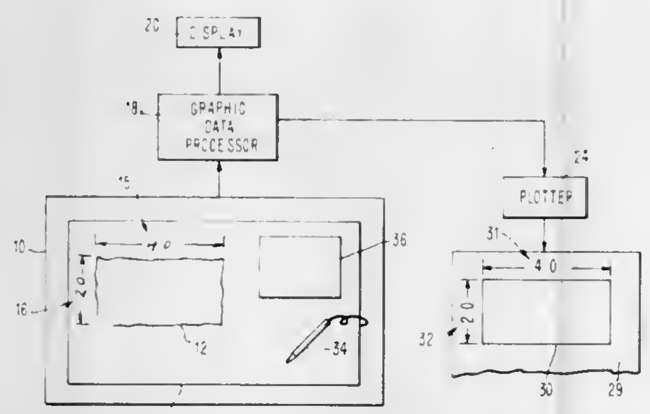
SYSTEM FOR CONVERTING A ROUGH SKETCH TO A FINISHED DRAWING

William Joseph Fitzgerald, Ridgefield, Conn.; Glenmore Lorraine Shelton, Jr., Carmel, and Robert Nolan Wolfe, Peekskill, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Sept. 22, 1975, Ser. No. 615,880

Int. Cl.^{2} G06F *15/00*

U.S. Cl. 364—520 **23 Claims**



1. In a digital data processing system which utilizes a graphic data entry means to form a first pointing sequence list having entries that tentatively specify the respective coordinates of a selected sequence of points defining a first representation of an object, said first object representation being permitted to include at least some points that should be axially alined with each other but which actually are displaced by groosly dissimilar amounts from the related coordinate axis in each instance,

a method of continuously processing the entires in said first list to produce a second list having entries that specify the respective coordinates of a corresponding sequence of points in a revised representation of said object which satisfies axial alinement requirements, said method comprising the following steps:

a. identifying from the data contained in the entries of said first list any set of adjacently ordered points in the first-named sequence whose counterparts in the revised object representation are to be positioned on a common line paralleling either of the coordinate axes regardless of any gross deviation from said parallel relationship that may exist in said first object representation;

b. in response to identification of any such set of points, forming a related set of entires in said second list wherein each of the entries but one in said related set has a pointer portion indicating that the coordinate specified by said one entry is to be a projected coordinate common to all members of that set;

c. repeating steps a and b automaticaly as needed until sets of entries have teen formed in said second list for all sets of axially lined points that are to be included in the revised object representation; and

d. operating a graphic output manifesting means under control of the entries in said second list for producing a visible representation of said object which effectively corrects errors previously made in the placement of points relative to the coordinate axes in said first object representation, including errors of gross magnitudes.

4,058,850

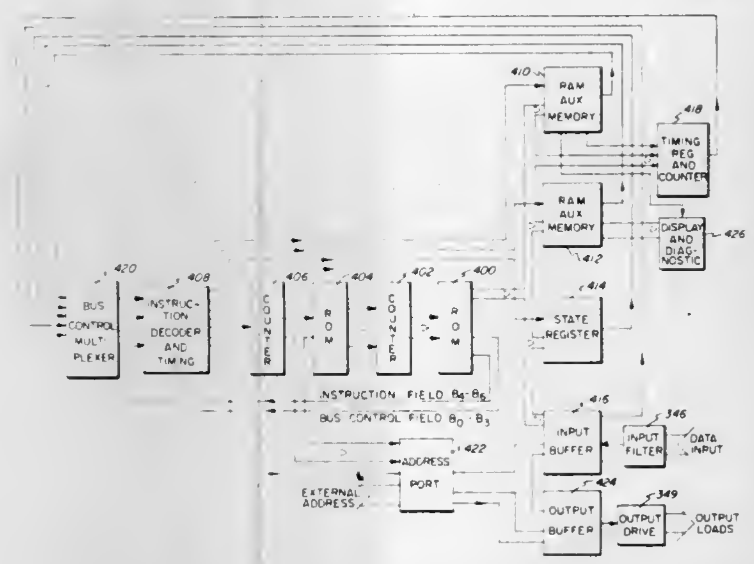
PROGRAMMABLE CONTROLLER

Sikander Sheikh, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Aug. 12, 1974, Ser. No. 496,667

Int. Cl.^{2} G06F *9/06;* **G03G** *15/00*

U.S. Cl. 364—900 **9 Claims**



1. A processor for controlling an apparatus by actuating elements of said apparatus in accordance with a predetermined program and in response to apparatus condition indicators comprising:

a first non-destructive memory which stores an operational program including a multiplicity of instructions at predetermined locations for control of said apparatus;

memory control means, including a second non-destructive memory coupled to said first non-destructive memory, for controlling a sequence of execution of program instructions stored in the first memory;

a buffer memory interface for storing input data to said processor and for storing output data from said processor, said memory control means arranged for simultaneously addressing a memory location in said first memory and at least one location in said buffer memory interface; and,

means for decoding a first memory instruction which is extracted from said first memory and for causing an execution of said first memory instruction as determined by an operation code of said instruction.

4,058,851

CONDITIONAL BYPASS OF ERROR CORRECTION FOR DUAL MEMORY ACCESS TIME SELECTION

James Herman Scheuneman, St. Paul, Minn., assignor to Sperry Rand Corporation, New York, N.Y.

Filed Oct. 18, 1976, Ser. No. 733,687

Int. Cl.^{2} G06F *11/10, 13/00, 11/00, 1/04*

U.S. Cl. 364—900 **5 Claims**

1. A conditional bypass error correction system for an addressable main memory, comprising:

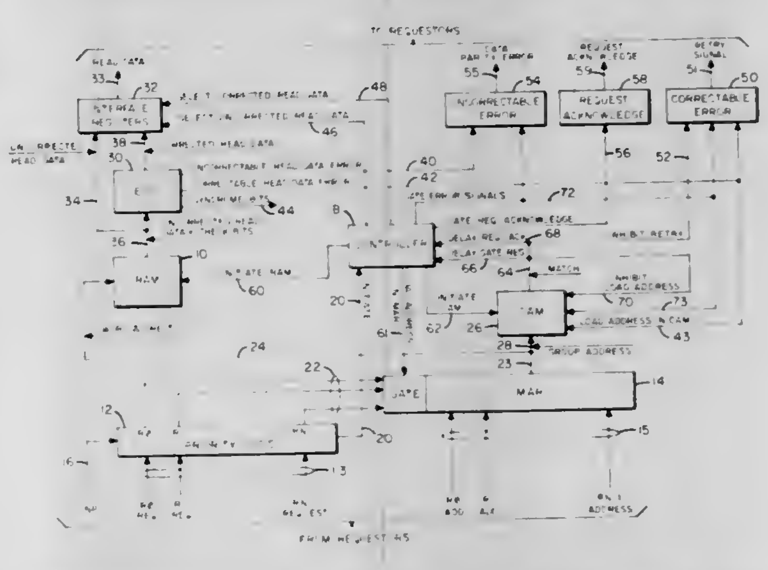
memory address register means adapted to receive and store a multibit address for addressing an associated one of an addressable location of a main memory means;

main memory means responsively coupled to said memory address register means and comprising a plurality of addressable locations each of which addressable locations includes a plurality of memory cells in which are stored a plurality of uncorrected read bits and a plurality of associated check bits;

content addressable memory means responsively coupled to said memory address register means and comprising a plurality of content addressable locations each of which includes a plurality of memory cells and in each of which content addressable locations are stored a plurality of address bits that define an address of an addressable location in said main memory means and means associated with said content addressable locations for providing an indication of the comparison of the address bits stored in said memory address register means and the address bits stored in an associated one of said content addressable locations;

error detection and correction logic means coupled to said main memory means and receiving the read bits and the associated check bits from an addressable location addressed by the address stored in said memory address register means for generating corrected read bits therefrom;

interface register means coupled to said main memory means for receiving the uncorrected read bits from said addressed addressable location in said main memory means and coupled to said error detection and correction logic



means for receiving the corrected read bits from said error detection and correction logic means;

timing means responsively coupled to said content addressable memory means for coupling a relatively early interface register first gate pulse to said interface register means for coupling said uncorrected read bits into said interface register means if said comparison is a Match condition indicating a determination that the address bits stored in said memory address register means are stored in an associated one of the content addressable locations, or, alternatively, coupling a relatively late interface register second gate pulse to said interface register means for coupling said corrected read bits into said interface register means if said comparison is a Match condition indicating a determination that the address bits stored in said memory address register means are not stored in an associated one of the content addressable locations, said first gate pulse bypassing the error detection and correction operation of said error detection and correction logic means providing a first relatively fast memory access time while said second gate pulse does not bypass the error detection and correction operation of said error detection and correction logic means providing a second relatively slow memory access time, all as determined by said comparison.

DESIGN PATENTS

GRANTED NOVEMBER 15, 1977

ERRATA

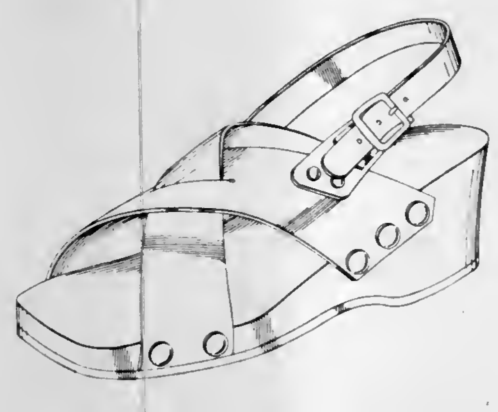
For CLASS	See PATENT NO.
025-010	246,381

DESIGNS

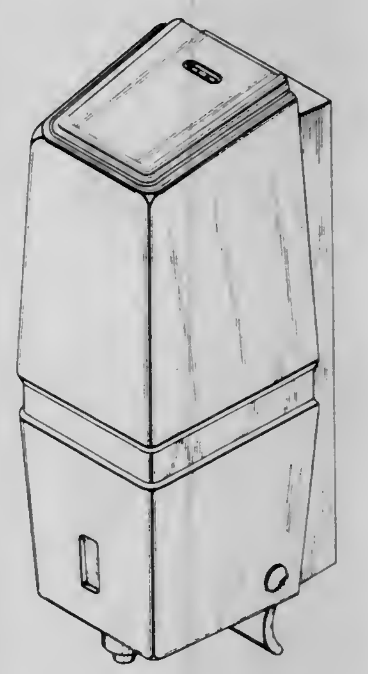
NOVEMBER 15, 1977

246,336
DRESS
Doris Brosk, 150 E. 69th St., New York, N.Y. 10017
Filed Feb. 20, 1976, Ser. No. 660,036
Term of patent 14 years
Int. Cl. D2—*02*
U.S. Cl. D2—146

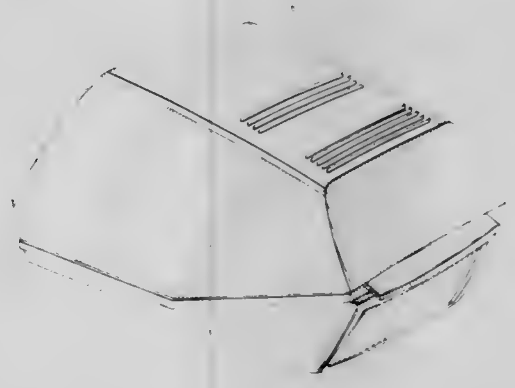
246,337
SANDAL
Stephen Niarhos, 850 Truesdale Road, Youngstown, Ohio 44511
Filed Oct. 23, 1975, Ser. No. 625,063
Term of patent 14 years
Int. Cl. D2—*04*
U.S. Cl. D2—293



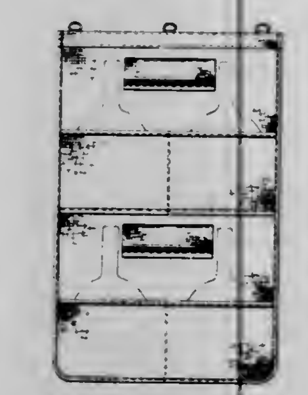
246,338
DISPENSER FOR LIQUIDS
Paul W. Jespersen, Stamford, Conn., assignor to Georgia-Pacific Corporation, Portland, Oreg.
Filed July 5, 1974, Ser. No. 486,078
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D6—95



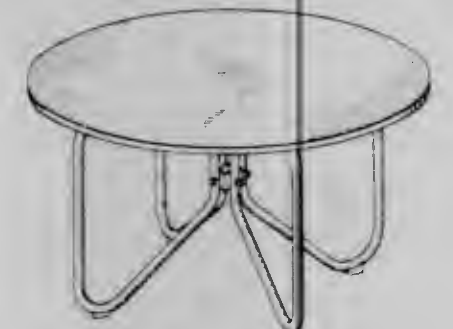
246,339
TISSUE DISPENSING APPARATUS
Gideon S. Tucker, 3434 Nogales, Apt. 104, Dallas, Tex. 75220
Filed Mar. 17, 1976, Ser. No. 667,854
Term of patent 7 years
Int. Cl. D23—*02*
U.S. Cl. D6—96



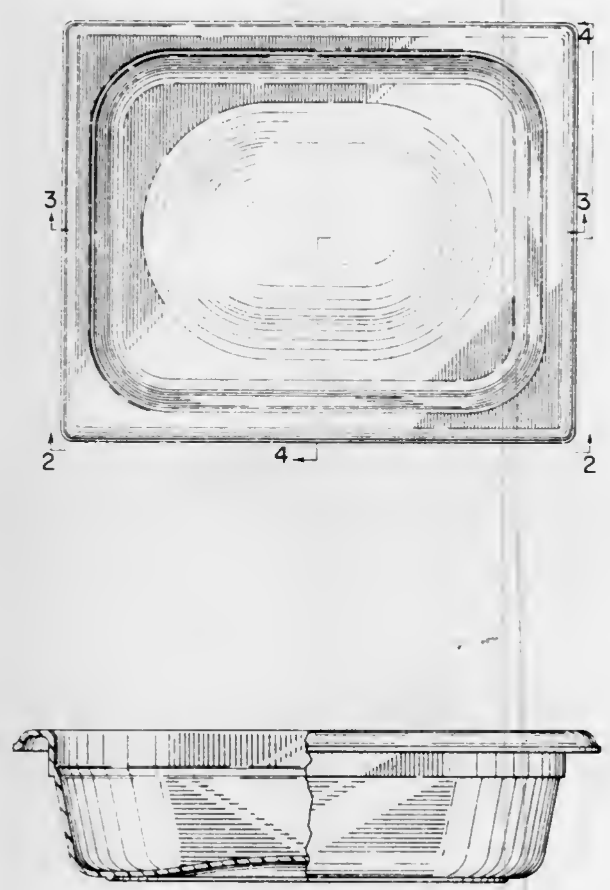
246,340
COMBINED PADDLE AND BALL HOLDER
Arlene Frank, 263 Hastings, Highland Park, Ill. 60035
Filed July 21, 1976, Ser. No. 707,182
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—131



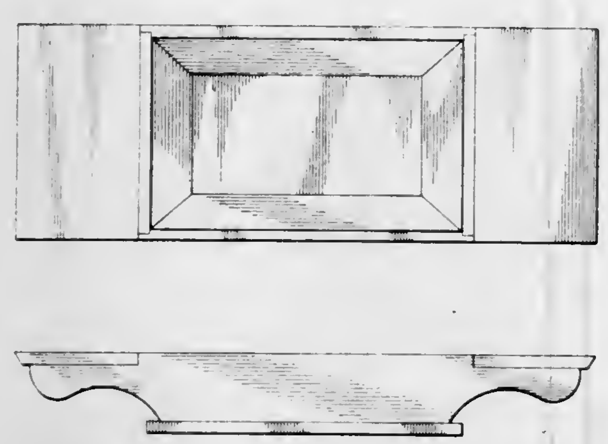
246,341
TABLE
Stephen G. Boughton, Antioch, Tenn., assignor to Samsonite Corporation, Denver, Colo.
Filed May 17, 1976, Ser. No. 687,436
Term of patent 14 years
Int. Cl. D6—*03*
U.S. Cl. D6—146



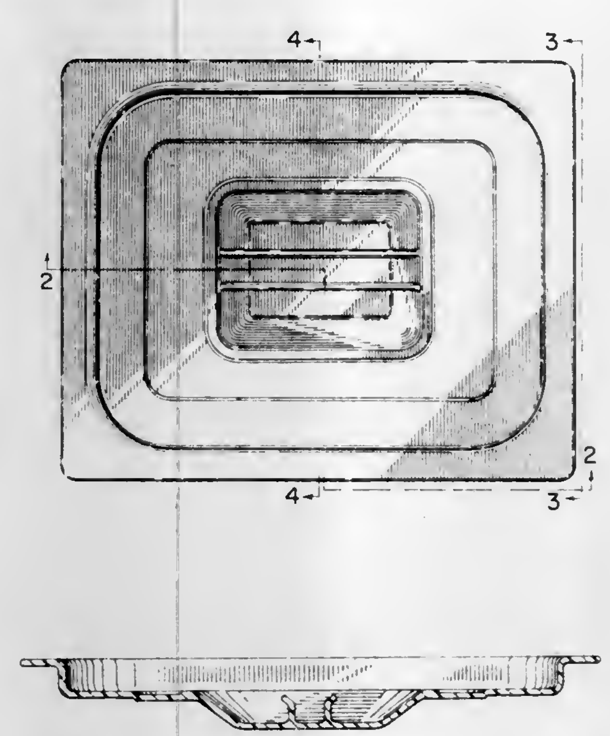
246,342
FOOD SERVICE PAN
Ronald C. Yonkers, Winchester, Va., assignor to Rubbermaid Commercial Products Inc.
Filed Mar. 15, 1976, Ser. No. 666,690
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—1



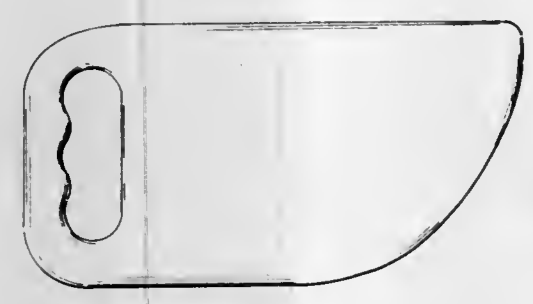
246,343
DOUGH BOX
Frank Morabito, 366 Hamilton Ave., Hewlett, Long Island, N.Y. 11557
Filed Jan. 28, 1976, Ser. No. 653,193
Term of patent 14 years
Int. Cl. D7—*99*
U.S. Cl. D7—21



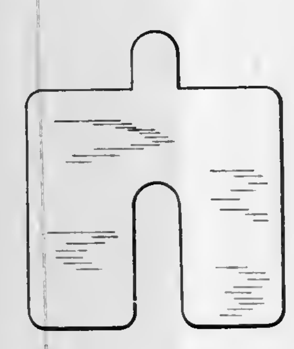
246,344
FOOD SERVICE PAN LID
Ronald C. Yonkers, Winchester, Va., assignor to Rubbermaid Commercial Products Inc.
Filed Mar. 15, 1976, Ser. No. 666,708
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D7—131



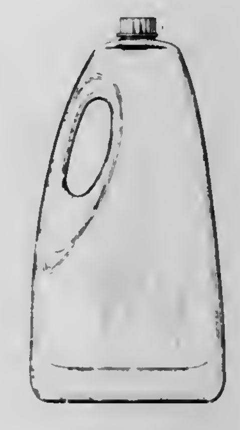
246,345
IMPLEMENT TO TUCK BLANKET IN WATERBEDS
Marcia E. Poncia, 408 Alameda, Redwood City, Calif. 94061
Filed June 16, 1975, Ser. No. 587,061
Term of patent 14 years
Int. Cl. D7—*99*
U.S. Cl. D7—181



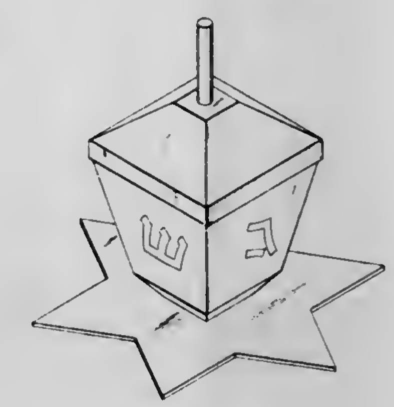
246,346
SHIM FOR MOTOR OR THE LIKE
Fred E. Strunk, 205 Landano St., Vallejo, Calif. 94590
Filed May 8, 1975, Ser. No. 575,789
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—354



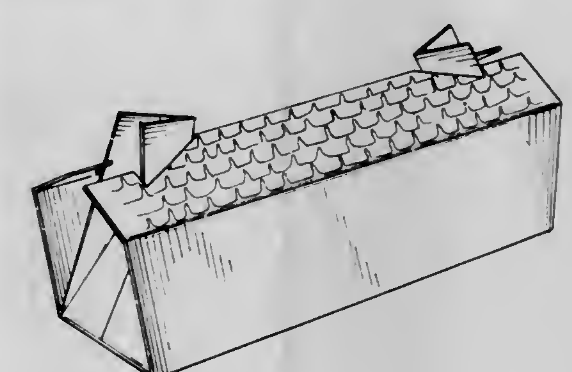
246,347
BOTTLE
William James Britt, Greenville, S.C., assignor to Morton-Norwich Products, Inc., Greenville, S.C.
Filed Mar. 26, 1976, Ser. No. 670,874
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—42



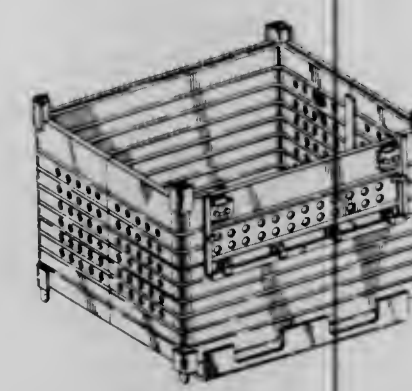
246,348
COMBINED DISPLAY AND PACKAGING CONTAINER
W. Lee Einhorn, 253 Parkside Drive, Suffern, N.Y. 10901
Filed Mar. 29, 1976, Ser. No. 671,256
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—195



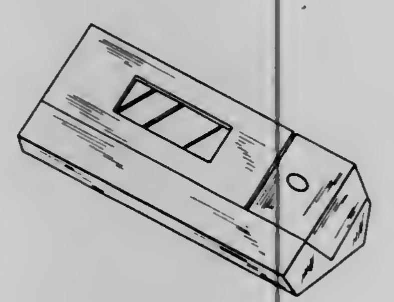
246,349
FOOD CARTON
Carle D. Klupt, Baltimore, Md., assignor to Doughtie's Foods, Inc., Portsmouth, Va.
Filed Apr. 21, 1976, Ser. No. 678,800
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—197



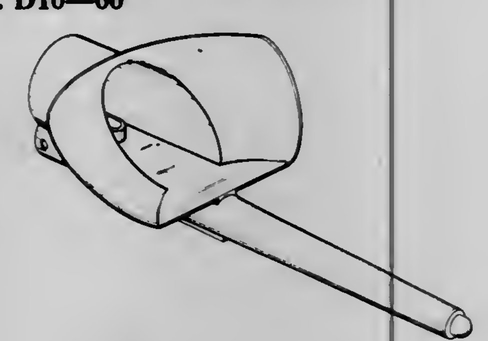
246,350
MATERIAL HANDLING BOX
William R. Powell, Hubbard, Ohio, assignor to The Powell Pressed Steel Company, Hubbard, Ohio
Filed Nov. 13, 1975, Ser. No. 631,492
The portion of the term of this patent subsequent to Apr. 12, 1991, has been disclaimed.
Term of patent 14 years
Int. Cl. D9—*04*
U.S. Cl. D9—246



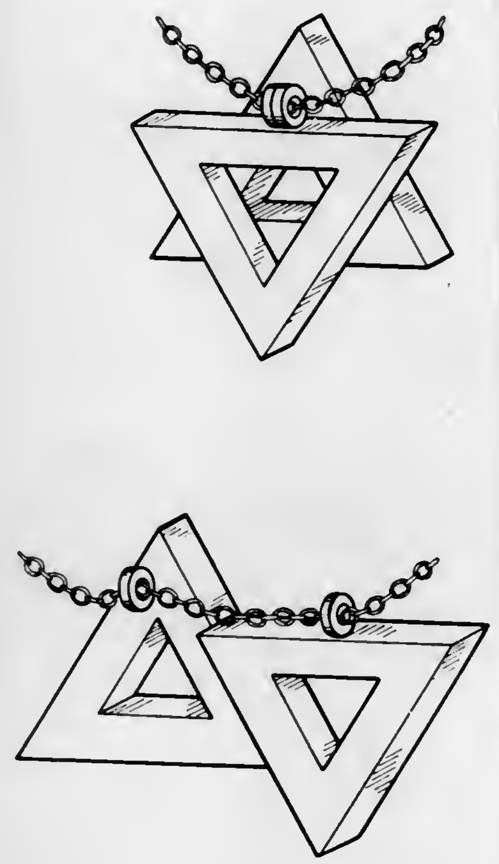
246,351
DIGITAL CLOCK
Yoshisaburo Yoshida, and Seiichiro Nishiguchi, both of Osaka, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan
Filed Mar. 8, 1976, Ser. No. 664,423
Claims priority, application Japan, Mar. 8, 1975, 50-36743
Term of patent 14 years
Int. Cl. D10—*01*
U.S. Cl. D10—15



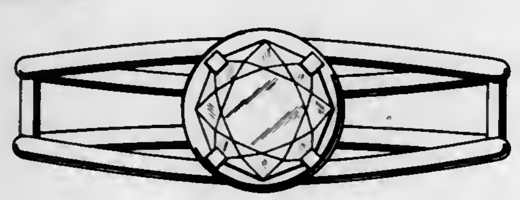
246,352
PROBE COVER
Jerald P. Dykstra, Austin, Tex., assignor to Amsco/Medical Electronics, Inc., Austin, Tex.
Filed May 27, 1976, Ser. No. 690,734
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—60



246,353
COMBINED NECK CHAIN AND PENDANTS
Henri Elkaim, 5 Rue de Quatre Fages, Paris, France (75005)
Filed Dec. 15, 1975, Ser. No. 640,656
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D11—8



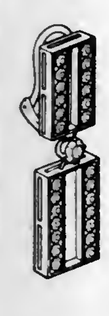
246,354
WIRE AND DIAMOND RING
Alfred Joseph Durante, Forest Hills, N.Y., assignor to Cartier, Inc., New York, N.Y.
Continuation-in-part of Ser. No. 557,126, March 10, 1975, abandoned. This application Sept. 15, 1976, Ser. No. 723,632
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D11—36



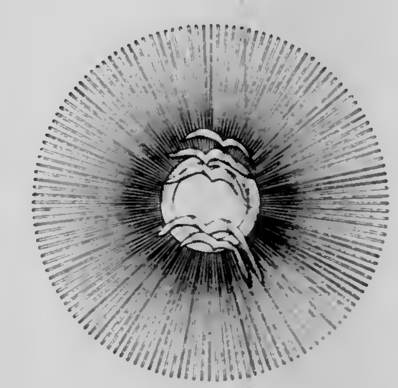
246,355
DIAMOND PENDANT
Alfred Joseph Durante, Forest Hills, N.Y., assignor to Cartier, Inc., New York, N.Y.
Continuation-in-part of Ser. No. 569,769, April 21, 1975, abandoned. This application Sept. 15, 1976, Ser. No. 723,630
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D11—44

246,356
PENDANT DOLL
Douglas A. Fox, 801 Erickson-Apt. 20, Anchorage, Alaska 99501
Filed Jan. 19, 1976, Ser. No. 650,251
Term of patent 7 years
Int. Cl. D11—*01*
U.S. Cl. D11—44

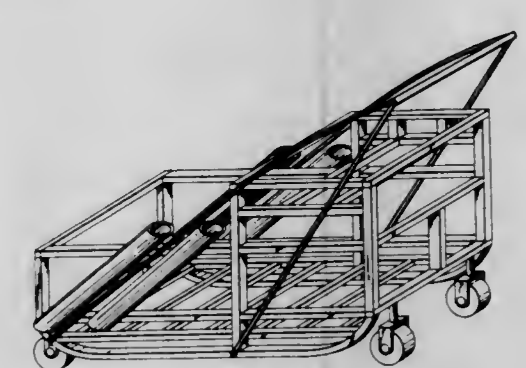
246,357
EARRING
Alfred Joseph Durante, Forest Hills, N.Y., assignor to Cartier, Inc., New York, N.Y.
Filed Oct. 6, 1975, Ser. No. 619,937
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D11—40



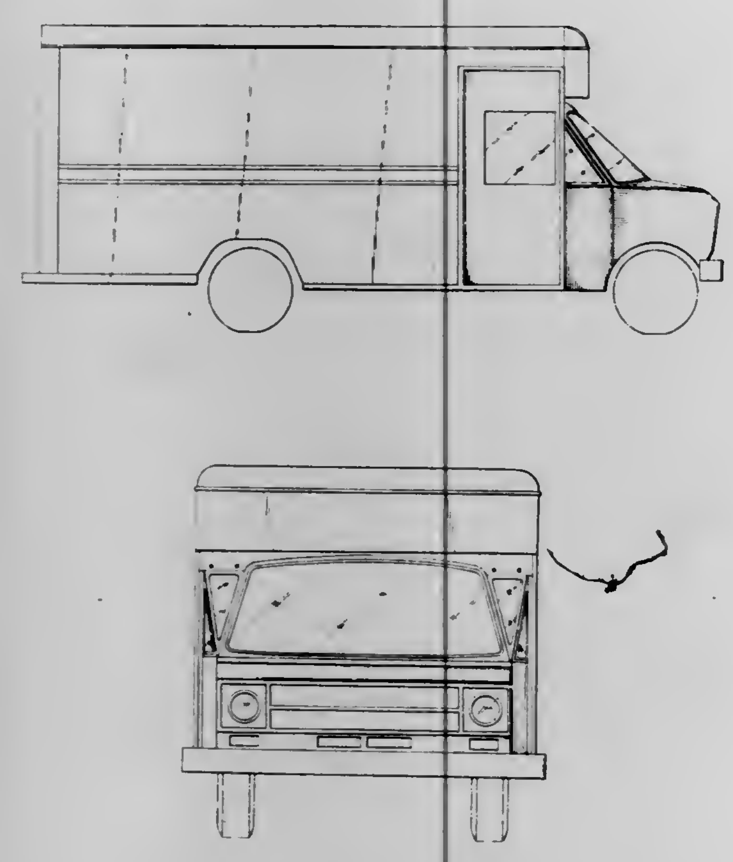
246,358
SUNBURST WALL PLAQUE
Donald R. Ditto, 4938 Sharp St., Dallas, Tex. 75247
Filed Apr. 29, 1976, Ser. No. 681,739
Term of patent 7 years
Int. Cl. D11—*02*
U.S. Cl. D11—137



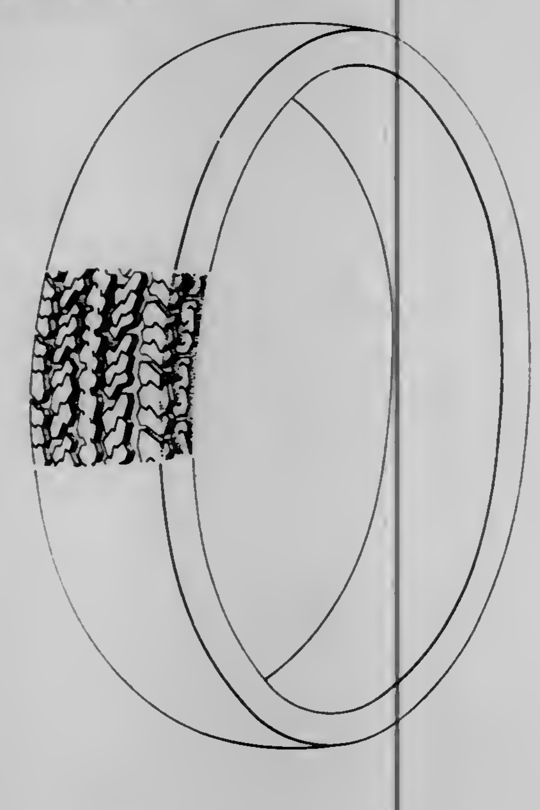
246,359
CART FOR FISHING EQUIPMENT
Harvey B. Powers, and Joan H. Powers, both of 8172 Electric Ave., Vienna, Va. 22180
Filed Sept. 20, 1976, Ser. No. 724,936
Term of patent 14 years
Int. Cl. D12—*02*
U.S. Cl. D12—29



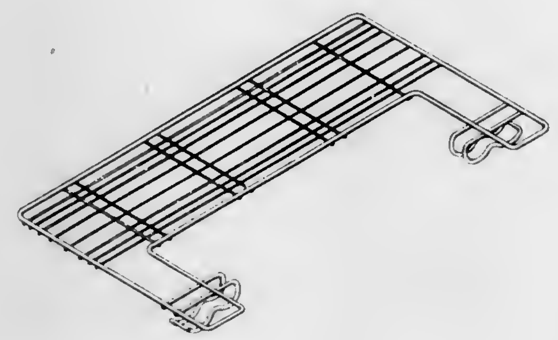
246,360
VAN BODY
Paul R. Hafer, Boyertown, Pa., assignor to Boyertown Auto Body Works, Boyertown, Pa.
Filed Jan. 26, 1976, Ser. No. 652,508
Term of patent 14 years
Int. Cl. D12—*08*
U.S. Cl. D12—99



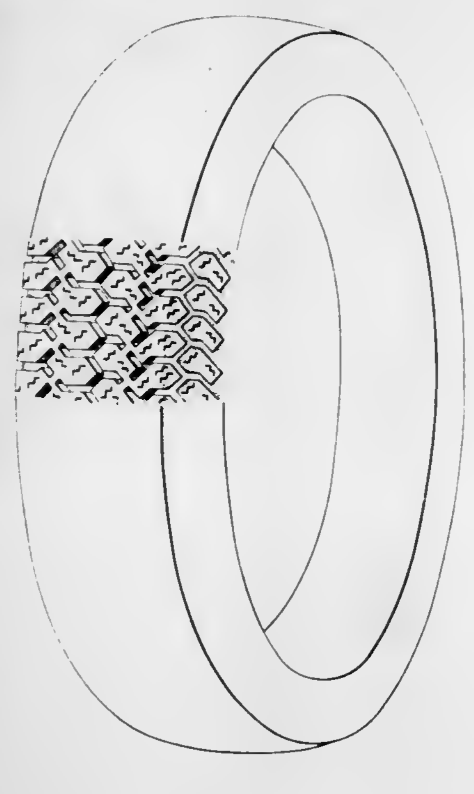
246,361
PNEUMATIC TIRE TREAD AND BUTTRESS
Gerassimos C. Candiliotis, Wilbraham, Mass., assignor to Uniroyal, Inc.
Filed Nov. 24, 1976, Ser. No. 744,537
Term of patent 14 years
Int. Cl. D12—*15*
U.S. Cl. D12—146



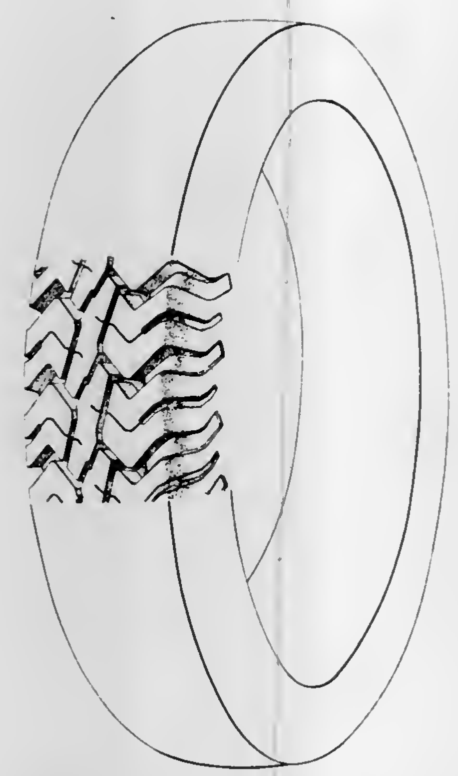
246,362
COMBINED UTILITY AND BOOK HOLDER SUPPORTING TRAY, HOLD OPEN BRACE AND PATIENT RESTRAINT TO BE REMOVABLY MOUNTED ON THE ARMRESTS OF COLLAPSIBLE WHEELCHAIRS
Gus Levin, 4515 N. Braeswood, Apt. 302B, Houston, Tex. 77035
Filed Dec. 2, 1976, Ser. No. 747,231
Term of patent 14 years
Int. Cl. D12—*16*; D6—*06*
U.S. Cl. D12—133



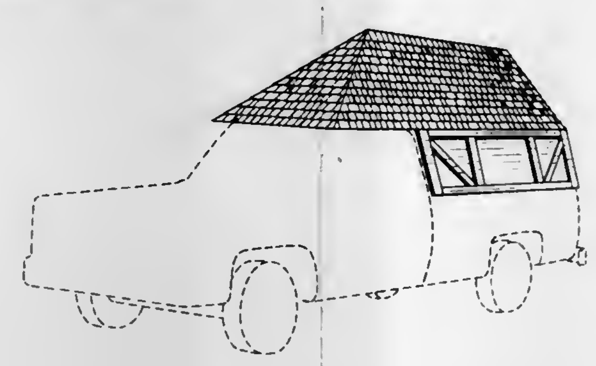
246,363
PNEUMATIC TIRE TREAD AND BUTTRESS
Dionysius J. Poque, Aachen, Germany, assignor to Uniroyal Aktiengesellschaft
Filed Mar. 4, 1977, Ser. No. 774,295
Claims priority, application Germany, Oct. 19, 1976, 203153
Term of patent 14 years
Int. Cl. D12—*15*
U.S. Cl. D12—146



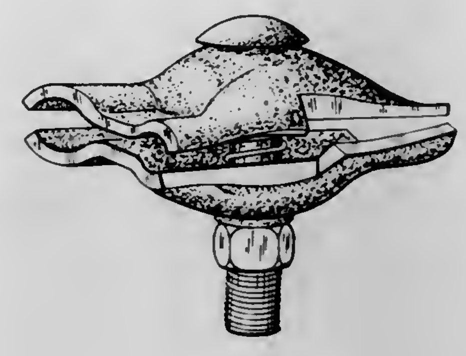
246,364
PNEUMATIC TIRE TREAD AND BUTTRESS
Gerassimos C. Candiliotis, 3 Ruth Drive, Wilbraham, Mass. 01095
Filed Jan. 21, 1977, Ser. No. 761,518
Term of patent 14 years
Int. Cl. D12—*15*
U.S. Cl. D12—151



246,365
PICKUP TRUCK CAMPER UNIT
Gary W. Floyd, No. 149 Highway, Rte. 3, Box 64, Novinger, Mo. 63559
Filed May 24, 1976, Ser. No. 689,636
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—156

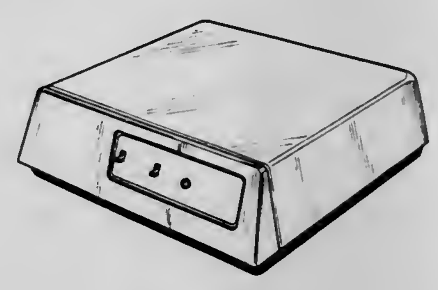


246,366
CLAMP-TYPE ELECTRICAL CONNECTOR
James L. McGrath, Medinah, Ill., assignor to UTM Power Products, Inc.
Filed Mar. 22, 1976, Ser. No. 669,007
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D13—24

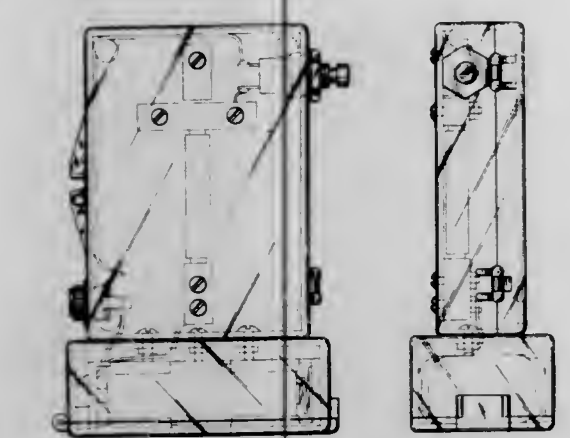


246,367
FILM REEL SPACER
Martin M. Schankler, East Brunswick, N.J., assignor to Microfilm Enterprises Corporation, East Brunswick, N.J.
Filed Oct. 8, 1975, Ser. No. 620,828
Term of patent 14 years
Int. Cl. D16—*05*
U.S. Cl. D14—11

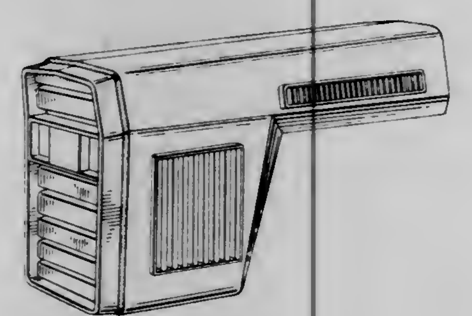
246,368
DESK TOP COMPUTER
Richard G. Barnich, Grand Blanc, and Gary D. Johnson, Brighton, both of Mich., assignors to Process Computer Systems, Inc., Saline, Mich.
Filed July 19, 1976, Ser. No. 706.617
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D14—40



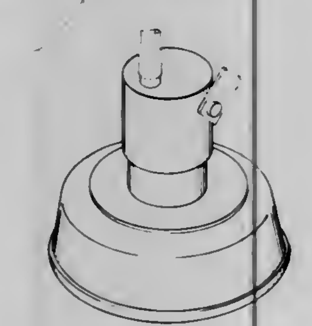
246,369
TAP TRANSDUCER INTERCOM
Gerard J. O'Brien, deceased, late of Jersey City, and by Catherine H. O'Brien, administratrix/executrix, 33 Pamrapo Ave., Jersey City, N.J. 07305
Filed Oct. 8, 1975, Ser. No. 620,631
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—92



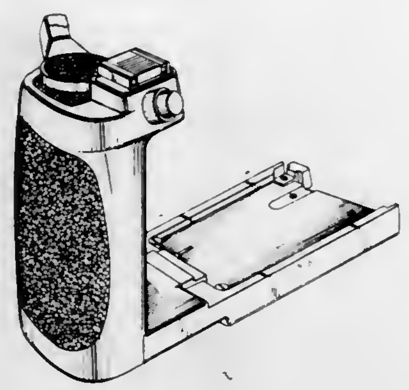
246,370
TRACTOR HOOD
Leo J. Lorenz, Farmington, Mich., assignor to Massey-Ferguson Inc., Detroit, Mich.
Filed Aug. 9, 1976, Ser. No. 713,021
Term of patent 14 years
Int. Cl. D15—*03*
U.S. Cl. D15—31



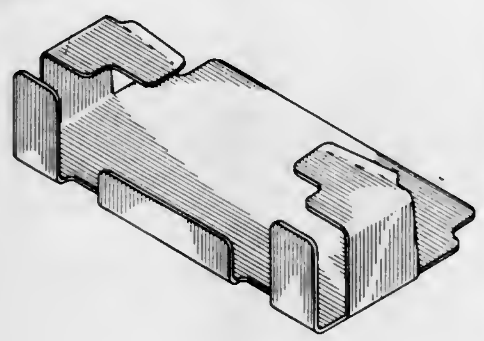
246,371
LIQUID APPLICATOR
Andrew L. Pansini, 200 Golden Gate Ave., Belvedere, Calif. 94920
Filed Feb. 19, 1976, Ser. No. 659,221
Term of patent 14 years
Int. Cl. D15—*99*
U.S. Cl. D15—56



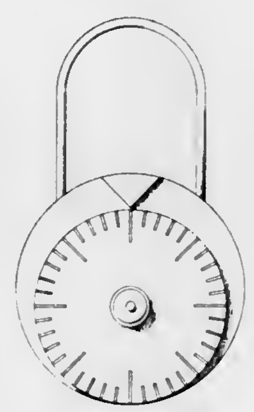
246,372
GRIP FOR A PHOTOGRAPHIC CAMERA
Zenzaburo Yoshino, 3-30-10, Kamikitazawa, Setagaya, Tokyo, Japan
Filed Sept. 8, 1976, Ser. No. 721,302
Claims priority, application Japan, Mar. 9, 1976, 51-8031
Term of patent 14 years
Int. Cl. D16—*99*
U.S. Cl. D16—10



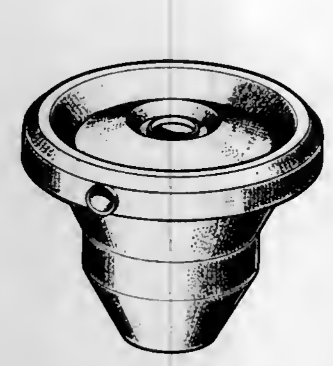
246,373
PAPER OVERFEED TRAY
Melvin G. Crandell, Walworth; Richard E. Reeves, Webster; Leonard Schachner, Pittsford, and David A. Benner, Rochester, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.
Filed June 21, 1976, Ser. No. 698,232
Term of patent 14 years
Int. Cl. D19—*99*; D16—*99*
U.S. Cl. D16—32



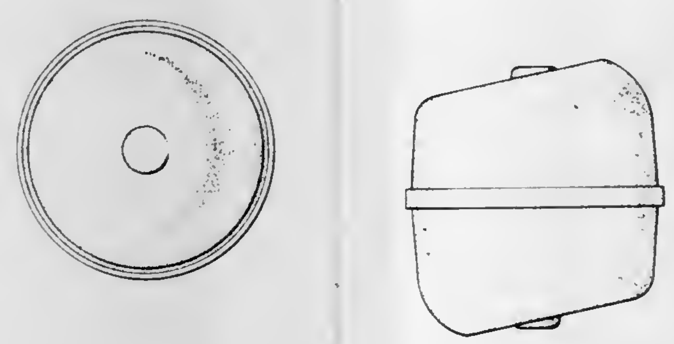
246,374
EDUCATIONAL AID
Dorothy L. Ratcliff, 6508 Grandview Drive, Indianapolis, Ind. 46260, and Ford Ratcliff, Jr., 717 E. 33rd St., Indianapolis, Ind. 46205
Filed Feb. 19, 1976, Ser. No. 659,288
Term of patent 3½ years
Int. Cl. D19—*07*
U.S. Cl. D19—64



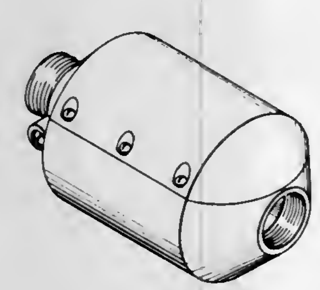
246,375
SEWAGE TANK
Ake Oskar Vilhelm Hellqvist, 130 40 Djurhamn, Sweden
Filed Jan. 30, 1976, Ser. No. 653,863
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—2



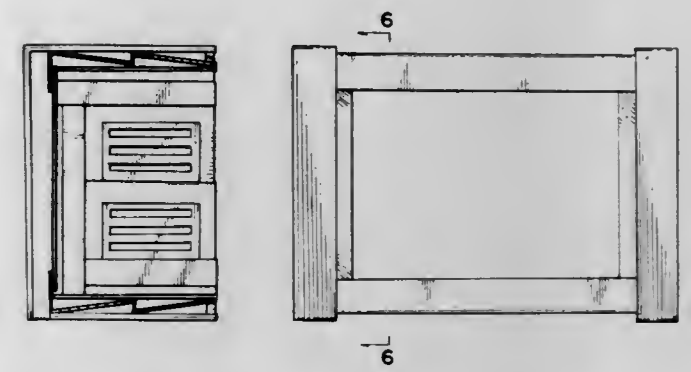
246,376
FILTER
David B. Pall, Roslyn Estates, N.Y., assignor to Pall Corporation, Glen Cove, N.Y.
Continuation-in-part of Ser. No. 668,153, March 18, 1976, Pat. No. D. 243,458. This application Oct. 18, 1976, Ser. No. 733,482
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—4



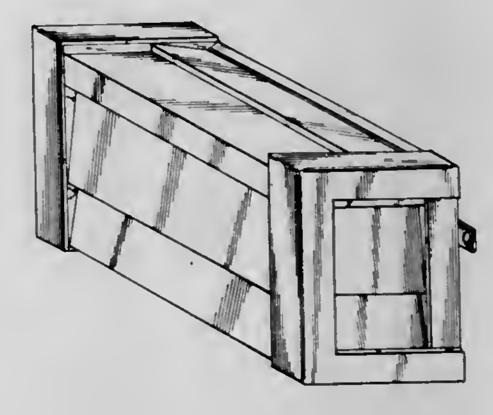
246,377
FLOW CONTROL VALVE
Andrew L. Pansini, 200 Golden Gate Ave., Belvedere, Calif. 94920
Filed Feb. 19, 1976, Ser. No. 659,222
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—19



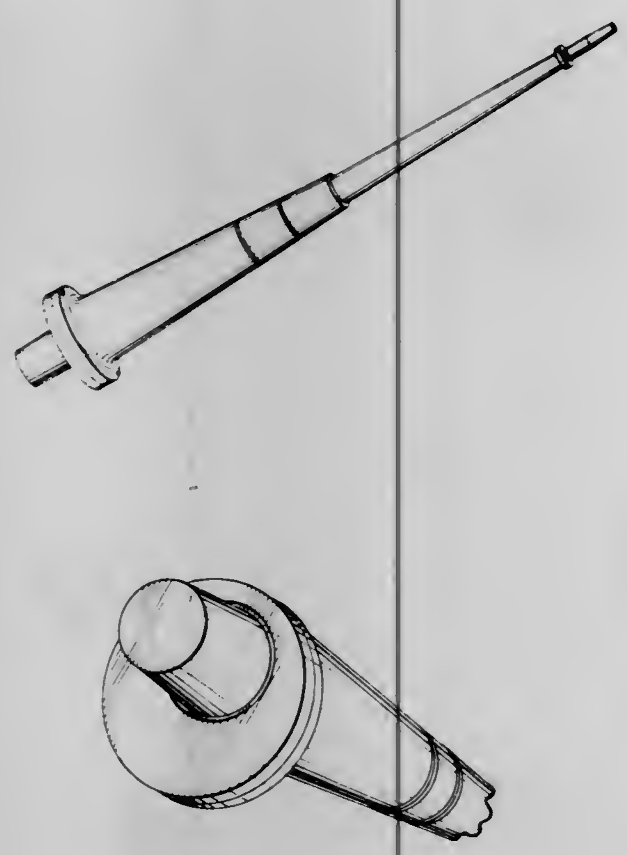
246,378
AIR CONDITIONER COVER
Walter Mueller, 2275 7th St., East Meadow, N.Y. 11554
Filed Oct. 4, 1976, Ser. No. 729,375
Term of patent 14 years
Int. Cl. D23—*04*
U.S. Cl. D23—141



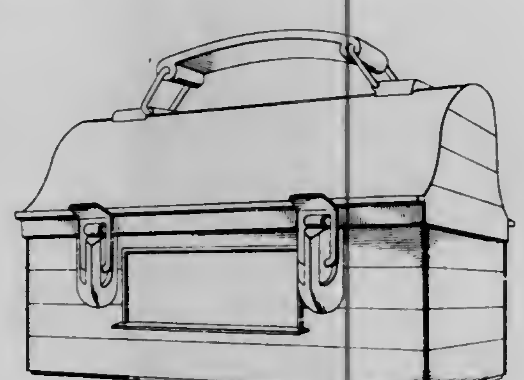
246,379
AIR CONDITIONER COVER
Walter Mueller, 2275 7th St., East Meadow, N.Y. 11554
Filed Feb. 9, 1977, Ser. No. 766,916
Term of patent 14 years
Int. Cl. D23—*04*
U.S. Cl. D23—141



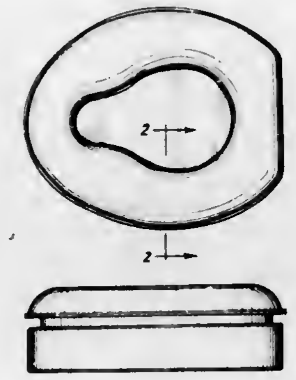
246,380
DEVICE FOR PIPETTING OF LIQUIDS
Alfons Th. Boothby, Pilauer Strasse 11, 2940 Wilhelmshaven, Germany
Filed Sept. 23, 1975, Ser. No. 616,076
Claims priority, application Germany, Mar. 27, 1975, 6610011
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D24—55



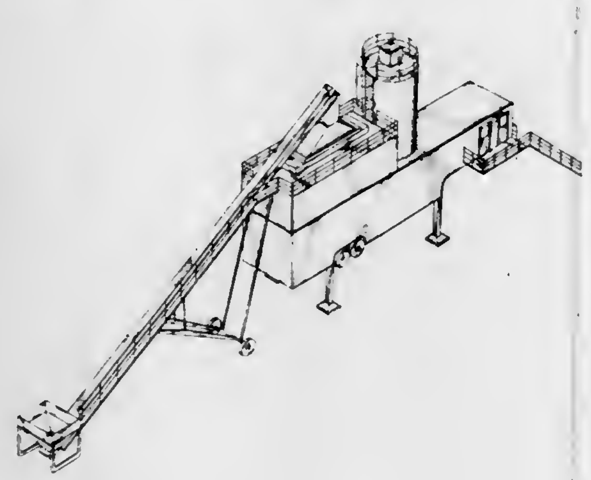
246,381
PORTABLE PREFABRICATED RESTAURANT BUILDING
Robert Barlow, Glendale; Frank Cesare, Palm Springs, and Carmen Miceli, North Hollywood, all of Calif., assignors to Frank J. Cesare
Filed Jan. 21, 1974, Ser. No. 435,308
Term of patent 14 years
Int. Cl. D25—*03*
U.S. Cl. D25—10



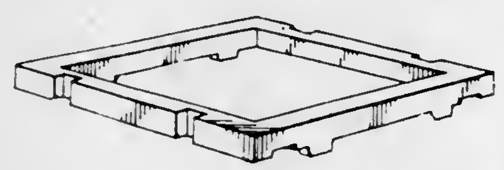
246,382
BEDPAN
John Castlereagh Parker, III, 2127 Philomene, Lincoln Park, Mich. 48146
Filed Nov. 10, 1975, Ser. No. 630,267
Term of patent 7 years
Int. Cl. D24—*04*
U.S. Cl. D24—57



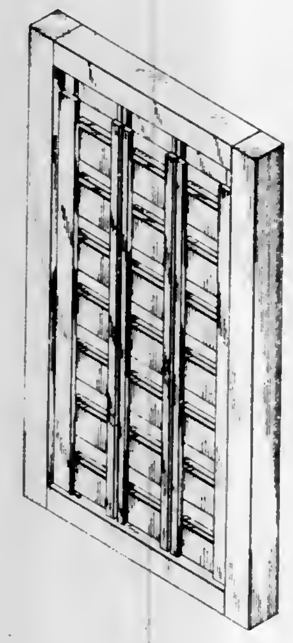
246,383
CONCRETE STATION
Sture Bostrom, Umea, Sweden, assignor to Aktiebolaget Robacks Mekaniska, Umea, Sweden
Filed Oct. 28, 1975, Ser. No. 626,202
Claims priority, application Sweden, Apr. 28, 1975, 898/75
Term of patent 14 years
Int. Cl. D25—*03*
U.S. Cl. D25—3



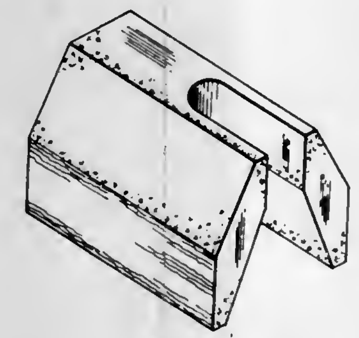
246,384
PRE-CAST CONCRETE UNIT FOR MANHOLES
Brian E. Brown, Burlington, and Alfred G. Hall, London, both of Canada, assignors to Moduloc Concrete Products (London) Ltd., Concorde, Canada
Filed Aug. 9, 1976, Ser. No. 712,761
Claims priority, application Canada, Feb. 9, 1976, 902761
Term of patent 14 years
Int. Cl. D25—*02*
U.S. Cl. D25—36



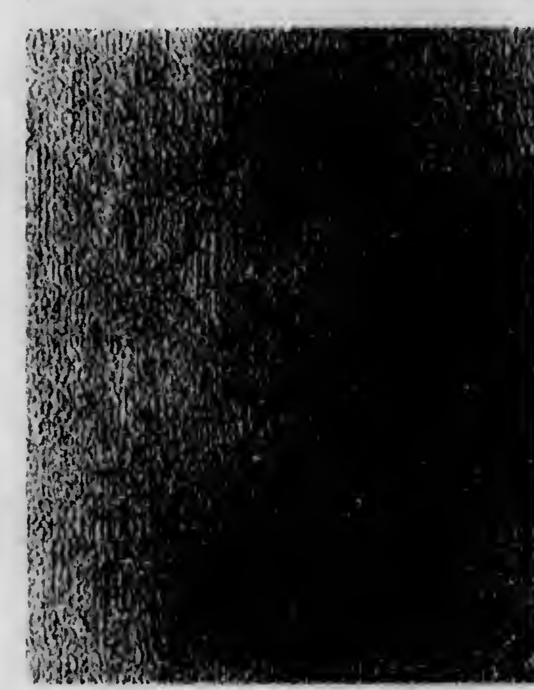
246,385
GRILLE AND THE LIKE
Robert T. Bogan, P.O. Box 26208, Albuquerque, N. Mex. 87125
Filed Jan. 21, 1976, Ser. No. 651,124
Term of patent 14 years
Int. Cl. D25—*01, 02*
U.S. Cl. D25—47



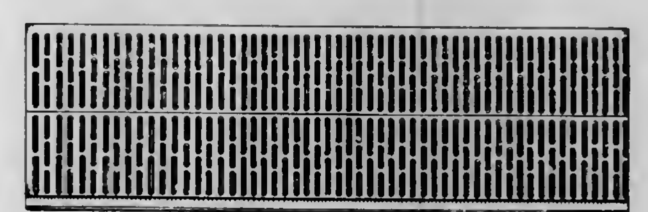
246,386
CONCRETE BLOCK
Edward L. Hardin, 355 Laverne, Mill Valley, Calif. 94941
Filed Nov. 17, 1975, Ser. No. 632,523
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—97



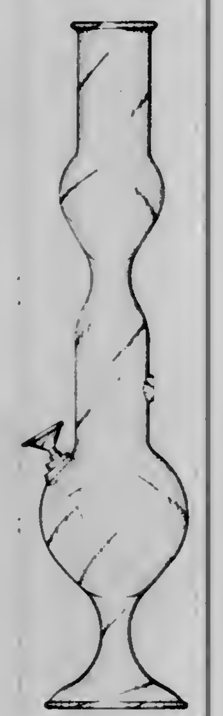
246,387
CEILING TILE
Phillip Schuss, 2942 Dale Ave., Columbus, Ohio 43209
Filed Oct. 1, 1975, Ser. No. 618,726
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—80



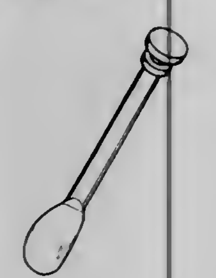
246,388
PERFORATED PLANK FOR THE FLOOR OF A MATERIAL DRYING BIN
Charles C. Shivvers, 614 W. English, Corydon, Iowa 50060
Filed Aug. 12, 1976, Ser. No. 713,669
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—91



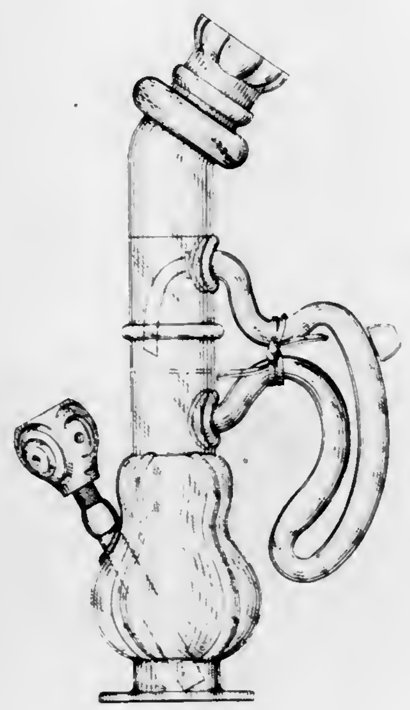
246,389
SMOKING DEVICE
Roger Graham, 931 Selim Road, Silver Spring, Md. 20910
Filed Jan. 16, 1976, Ser. No. 649,699
Term of patent 14 years
Int. Cl. D27—*02*
U.S. Cl. D27—3



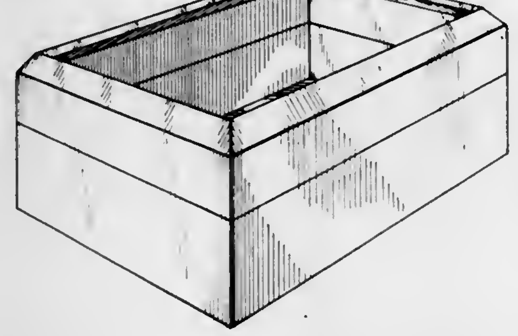
246,390
COMBINED PIPE TAMPER AND SCRAPER
Michael H. Endres, P.O. Box 1722, APO San Francisco, Calif. 96555
Filed July 12, 1976, Ser. No. 704,185
Term of patent 14 years
Int. Cl. D27—*99*
U.S. Cl. D27—51



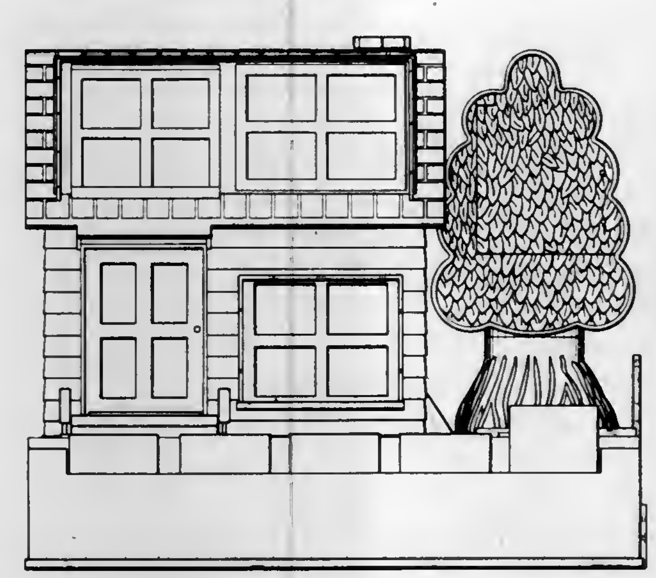
246,391
WATER COOLED SMOKING DEVICE
Robert A. Lefkow, 1602 Strand, and Alan E. Gross, 43 - 18th St., both of Hermosa Beach, Calif. 90254
Filed July 9, 1976, Ser. No. 703,916
Term of patent 14 years
Int. Cl. D27—*02*
U.S. Cl. D27—3



246,392
CAT LITTER BOX
Duaine E. Smith, P.O. Box 19006, Denver, Colo. 80219
Filed July 21, 1975, Ser. No. 597,597
Term of patent 14 years
Int. Cl. D30—*99*
U.S. Cl. D30—99

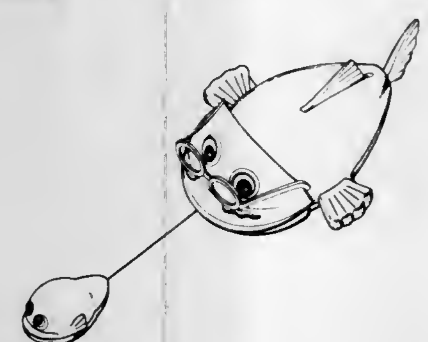


246,393
TOY HOUSE
Michael I. Satten, 15 Spruce Place, Great Neck Estates, N.Y. 11021
Filed Jan. 29, 1976, Ser. No. 653,546
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 LL

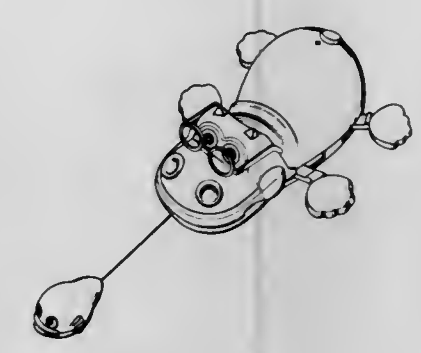


246,394
FIGURE TOY
Shigeru Saito, No. 6-4, 2-chome, Kuramae, Taito Tokyo, Japan
Filed May 12, 1976, Ser. No. 685,536
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 B

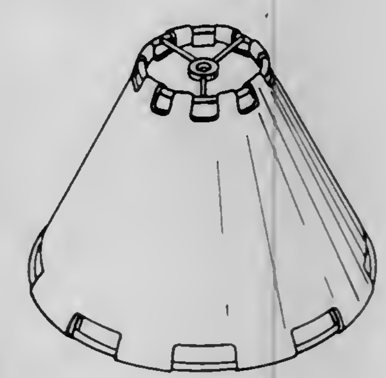
246,395
FIGURE TOY
Shigeru Saito, No. 6-4, 2-chome, Kuramae, Taito Tokyo, Japan
Filed Apr. 20, 1976, Ser. No. 674,847
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 B



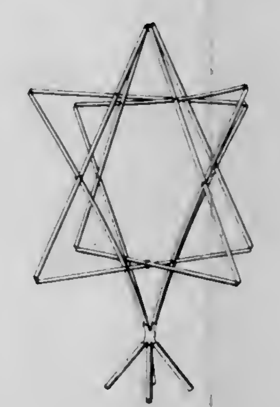
246,396
FIGURE TOY
Shigeru Saito, No. 6-4, 2-chome, Kuramae, Taito Tokyo, Japan
Filed Apr. 20, 1976, Ser. No. 674,848
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 B



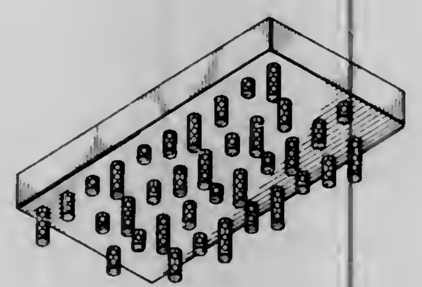
246,397
COLLAPSIBLE LAMP SHADE
Donald J. Booty, Frankfort, Ill., assignor to Keystone Lamp Mfg. Corporation, Slatington, Pa.
Filed Nov. 1, 1976, Ser. No. 737,452
Term of patent 14 years
Int. Cl. D26—*05*
U.S. Cl. D48—16 R



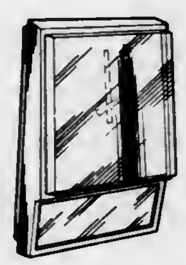
246,398
SUPPORT FOR HANUKKAH LIGHTS
Michael Jay Raulson, 1525 SW. 82nd Place, Miami, Fla. 33144
Filed Feb. 11, 1976, Ser. No. 657,390
Term of patent 14 years
Int. Cl. D26—*05*
U.S. Cl. D48—20 C



246,399
LIGHTING PANEL
Edward H. Harris, 1065 E. Flamingo Road, Apt. 524, Las Vegas, Nev. 89109
Filed Apr. 26, 1976, Ser. No. 680,587
Term of patent 14 years
Int. Cl. D26—05
U.S. Cl. D48—23 R



246,400
COMBINED CLOCK AND SIGN
Donald H. Niehaus, Crestview Hills, Ky.; Nick J. Schwab, Cincinnati, Ohio, and Patrick J. Seggerson, Fort Mitchell, Ky., assignors to American Sign and Advertising Services, Inc., Florence, Ky.
Filed Apr. 7, 1976, Ser. No. 674,609
Term of patent 14 years
Int. Cl. D20—*03;* D10—*01*
U.S. Cl. D96—12 J



LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 15TH DAY OF NOVEMBER, 1977

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. B. Dick Company: *See*—
Moschovis, Elia P.; and Gilson, John L., 4,058,470, Cl. 252-62.10L.
A/S Jotungruppen: *See*—
Winn, Russell Edward, 4,058,082, Cl. 118-9.000.
A-T-O Inc.: *See*—
Thrun, James L., 4,058,425, Cl. 156-200.000.
Aaroe, Kenneth Thomas: *See*—
Jennings, Robert Parry; and Aaroe, Kenneth Thomas, 4,058,045, Cl. 84-1.140.
AB Kabi: *See*—
Sievertsson, Hans; Lundin, Ronny Hugo Loritz; and Sjodahl, Gertrud Elisabeth Westin, 4,058,512, Cl. 260-112.50R.
AB Partner: *See*—
Nagy, Gyorgy; and Morner, Bengt Olof Johan Stellan, 4,057,900, Cl. 30-382.000.
Abbasi, Mohamed M.: *See*—
Beisler, John A.; Abbasi, Mohamed M.; and Driscoll, John S., 4,058,602, Cl. 424-180.000.
Abbey Electronics Limited: *See*—
Pilkington, John Scott, 4,058,008, Cl. 73-144.000.
Abbott Laboratories: *See*—
Jones, Peter Hadley; Bariana, Dilbagh Singh; Fung, Anthony Kei Lun; Martin, Yvonne Connolly; Kyncl, Jaroslav; and Lall, Amrit, 4,058,559, Cl. 260-520.00C.
Abbruzzese, Luigi; Gozzo, Franco; Rossi, Giorgio; Masoero, Marcella; Lorusso, Simone; Bonola, Paola; and Tamburin, Gino, to Montedison S.p.A. Quinoline derivatives having fungicidal activity. 4,058,613, Cl. 424-258.000.
Abe, Mitsunobu: *See*—
Takechi, Hiroshi; Abe, Mitsunobu; Katsutani, Ryoseki; and Saito, Yoshio, 4,057,989, Cl. 72-128.000.
Abe, Seiji. Magnetic sheet the magnetic attraction of which is strengthened. 4,058,335, Cl. 292-251.500.
Abel Morrall Limited: *See*—
Marchbank, Ian, 4,058,215, Cl. 206-574.000.
Abell, Richard S.; and Kropiwnicki, Tadek M., to Carrier Corporation. Refrigerant compressor unit. 4,057,979, Cl. 62-469.000.
Ackermann, Otto; Bleh, Otto, deceased (by Bleh, Rita, legal representative); and Rogler, Walter, to Dynamit Nobel Aktiengesellschaft. Method of preparing alkoxymethylenemalonic acid esters. 4,058,553, Ci. 560-180.000.
Acorn Building Components, Inc.: *See*—
DiFazio, Joseph, 4,058,332, Cl. 292-147.000.
Addressograph-Multigraph Corporation: *See*—
Milan, Otto G.; and Klich, Edward J., 4,058,057, Cl. 101-148.000.
Adolphi, Heinrich: *See*—
Kiehs, Karl; Adolphi, Heinrich; Huber, Rolf; and Baumann, Annegrit, 4,058,606, Cl. 424-217.000.
Aerojet-General Corporation: *See*—
Mansur, Dana L., Jr.; and Murphy, Thomas L., 4,058,061, Cl. 102-8.000.
White, Leslie E.; and Gracey, Charles M., 4,058,479, Cl. 252-301.10W.
Agence Nationale de Valorisation de la Recherche (ANVAR): *See*—
Mailfert, Alain; and Boyer, Lionel, 4,058,747, Cl. 310-52.000.
AGFA-Gevaert, A.G.: *See*—
Rieder, Alois, 4,058,819, Cl. 354-44.000.
Ago, Ryousei: *See*—
Kiyonaga, Kingo; Ago, Ryousei; and Furuichi, Sei, 4,058,650, Cl. 428-683.000.
Agridustrial Electronics, Inc.: *See*—
Vogel, Ronald F.; Boldt, Robert R.; McKee, Kevin D.; Resh, Roy E.; and West, Paul E., 4,058,766, Cl. 324-61.00R.
Aguilo, Jose Maria Genovart: *See*—
Aloy, Enrique Ubach; Aloy, Pedro Ubach; and Aguilo, Jose Maria Genovart, 4,058,584, Cl. 264-250.000.
Ahmed, Adel Abdel Aziz, to RCA Corporation. Reference potential generators. 4,058,760, Cl. 323-19.000.
Ahmed, Osman Saleh Mohamed: *See*—
Hammitt, Frederick G.; Ahmed, Osman Saleh Mohamed; Bhatt, Niranjan Rasik; and Hwang, Jia-Bo Gilbert, 4,058,004, Cl. 73-86.000.
Aho, Yrjo, to Exel Oy. Fixing arrangement for the sealing pad on the ear hood of a hearing protection means. 4,057,856, Cl. 2-209.000.
Ahrens, Hanns; Biere, Helmut; Rufer, Clemens; Schmiechen, Ralph; Schroeder, Eberhard; Loge, Olaf; Losert, Wolfgang; and Schillinger, Ekkehard, to Schering Aktiengesellschaft. Thiophene derivatives having antilipolytic activity. 4,058,619, Cl. 424-275.000.
Ahrens, Stephen Carl: *See*—
Khajezadeh, Heshmat; and Ahrens, Stephen Carl, 4,057,894, Cl. 29-577.00C.
Aine, Harry E. Infrared absorption spectrometer employing a dual optoacoustic detector. 4,058,725, Cl. 250-343.000.
Air Products and Chemicals, Inc.: *See*—
Caparrelli, Frederick; and Leong, Henry, 4,058,120, Cl. 128-188.000.
DeLaMater, George B., 4,058,372, Cl. 55-5.000.
Airflow Aluminum Awning Company: *See*—
Schwartz, Seymour L., 4,057,941, Cl. 52-63.000.
Airwick Industries, Inc.: *See*—
Hennart, Claude; and Dulat, Marcel Louis, 4,058,607, Cl. 424-219.000.
Aisin Seiki Kabushiki Kaisha: *See*—
Ishikawa, Hitoshi; Yamamoto, Kimihiko; Sawada, Toshio; and Kasahara, Takahiko, 4,058,072, Cl. 112-258.000.
Akkerman, Allardus A., to Domtar Limited. Reinforced side carry carton. 4,058,250, Cl. 229-52.00B.
Aktiebolaget Svenska Flaktfabriken: *See*—
Johansson, Leif, 4,058,329, Cl. 285-162.000.
Alafandi, Hamid; and Stamires, Dennis, to Filtrol Corporation. Ammonium faujasite zeolites. 4,058,484, Cl. 252-455.00Z.
Alagy, Jacques: *See*—
Busson, Christian; Alagy, Jacques; and Cessou, Maurice, 4,058,591, Cl. 423-574.00R.
Albert, Karmen D. High vacuum fastener. 4,058,281, Cl. 248-362.000.
Alco Electronic Products, Inc.: *See*—
Kirchoff, Francis D., 4,058,764, Cl. 324-51.000.
Alderman, Robert J. Modulation system with carrier control. 4,058,769, Cl. 325-144.000.
Allen, Elmer Lawrence, Jr.; and Kawamoto, Hirohisa, to RCA Corporation. Bias circuit for avalanche diodes. 4,058,776, Cl. 330-299.000.
Allied Chemical Corporation: *See*—
Long, E. David, 4,058,709, Cl. 364-424.000.
Murphy, Kevin P.; Stahl, Richard F.; and Orfeo, Sabatino R., 4,057,973, Cl. 62-114.000.
Murphy, Kevin P.; Stahl, Richard F.; and Orfeo, Sabatino R., 4,057,974, Cl. 62-114.000.
Sachleben, Harold Gerard, Sr.; and Warren, Jerry Jay, 4,057,910, Cl. 34-227.000.
Aloy, Enrique Ubach; Aloy, Pedro Ubach; and Aguilo, Jose Maria Genovart. Method for manufacturing luminous hollow bodies for signs or the like. 4,058,584, Cl. 264-250.000.
Aloy, Pedro Ubach: *See*—
Aloy, Enrique Ubach; Aloy, Pedro Ubach; and Aguilo, Jose Maria Genovart, 4,058,584, Cl. 264-250.000.
Altman, Nicholas M. Adjustable table. 4,058,066, Cl. 108-9.000.
Altmann, Helmut, to Dornier GmbH. Process for preventing undesired contact with land or water by low-flying aircraft. 4,058,710, Cl. 364-433.000.
Alza Corporation: *See*—
Theeuwes, Felix; and Ayer, Atul D., 4,058,122, Cl. 128-260.000.
Amano, Takashi: *See*—
Hanyu, Susumu; and Amano, Takashi, 4,058,073, Cl. 112-258.000.
Amazonen-Werke H. Dreyer: *See*—
Dreyer, Heinz, 4,058,180, Cl. 180-14.00R.
American Chain & Cable Company, Inc.: *See*—
Drayton, Walker E., 4,057,982, Cl. 70-14.000.
Wilder, Richard J.; and Wurfel, Ivan, 4,058,064, Cl. 104-172.00S.
American Cyanamid Company: *See*—
Cross, Barrington; and Walworth, Bryant Leonidas, 4,058,391, Cl. 71-92.000.
Shepherd, Robert Gordon; and Miner, Thomas Gary, 4,058,550, Cl. 560-43.000.
American Guidance Service, Inc.: *See*—
Sullivan, Peter; and Yackel, John P., 4,058,327, Cl. 281-33.000.
American Hospital Supply Corporation: *See*—
Choksi, Pradip Vinobchandra; Johnston, Donald Leroy; and Seemayer, Walter, 4,058,121, Cl. 128-221.000.
American Screen Printing Equipment Company: *See*—
Bubley, Henry J.; and Krutsch, John R., 4,058,307, Cl. 271-85.000.
Amof, William H., Jr.; and Steffek, Robert J., to Picker Corporation. Telescopic column for X-ray apparatus. 4,057,891, Cl. 29-434.000.
Analytical Radiation Corporation: *See*—
Wieder, Irwin, 4,058,732, Cl. 250-461.00B.
Andberg, Leif E.: *See*—
Warner, George M.; and Andberg, Leif E., 4,058,815, Cl. 355-14.000.
Anders, Wilfried, to Siemens Aktiengesellschaft. Method of producing a tantalum thin film capacitor. 4,058,445, Cl. 204-192.0SP.
Anderson, Arnold L., to Velsicol Chemical Corporation. Polymer compositions. 4,058,501, Cl. 260-45.75B.

Anderson, Dennis C.: *See—*
Stutelberg, Kenneth R.; and Anderson, Dennis C., 4,057,931, Cl. 47-66.000.
Ando, Kunio; Saito, Takemi; and Higuchi, Takeshi, to Fuji Photo Optical Co., Ltd. Color separating optical system for a television camera. 4,058,827, Cl. 358-55.000.
Andrews, Allen Howe; McPherson, James Norman; Burns, John Thomas, Jr.; and Hendrie, John Matthew, to Bourns, Inc. Differential pressure transducer. 4,058,788, Cl. 338-42.000.
Ankenman, Thomas W.; and Brinker, Lee J., to Kent Manufacturing Co., Inc. Farm implement hinge restrictor. 4,058,170, Cl. 172-311.000.
Anthony, Andrew J., to Combustion Engineering Inc. Nuclear reactor seismic fuel assembly grid. 4,058,436, Cl. 176-78.000.
Anthony, Romuald, to Cutler-Hammer, Inc. Illumination and detection system for microfiche identification marks. 4,058,723, Cl. 250-235.000.
Antier, Georges; and Thiodet, Alain, to Tocco-Stel. Induction heating apparatus comprising a static converter. 4,058,696, Cl. 219-10.770.
Antson, Jorma: *See—*
Suntola, Tuomo; and Antson, Jorma, 4,058,430, Cl. 156-611.000.
Aoi, Hiroshi: *See—*
Ubukata, Susumu; Mizutani, Yasukazu; Iyoda, Syozo; and Aoi, Hiroshi, 4,058,271, Cl. 242-107.40B.
Aoki, Tsutomu: *See—*
Uyeo, Shoichiro; Aoki, Tsutomu; and Nagata, Wataru, 4,058,521, Cl. 260-239.100.
Applebaum, David C.: *See—*
Mallozzi, Philip J.; Epstein, Harold M.; Jung, Richard G.; Applebaum, David C.; Fairand, Barry P.; and Gallagher, William J., 4,058,486, Cl. 250-493.000.
Approach Fish: *See—*
Woodhouse, Charles F., 4,058,010, Cl. 73-189.000.
Aqua-Chem, Inc.: *See—*
Rehm, Gustav A., 4,058,087, Cl. 122-235.00R.
Aqua Craft, Inc.: *See—*
McNair, Rhett, 4,058,062, Cl. 102-38.000.
Aradar Corporation: *See—*
Stanislaw, David L., 4,058,812, Cl. 343-761.000.
Arai, Katsuhiko: *See—*
Yukuta, Toshio; Ohashi, Takashi; Saito, Masumi; and Arai, Katsuhiko, 4,058,503, Cl. 260-47.0CP.
Arcamone, Federico; Di Marco, Aurelio; and Penco, Sergio, to Societa Farmaceutici Italia S.p.A. Adriamycins and uses thereof. 4,058,519, Cl. 424-180.000.
Arieh, Simon, to Battelle Memorial Institute. Belt conveyor. 4,058,204, Cl. 198-833.000.
Armstrong, Desmond Ross, to U.S. Philips Corporation. Pulse generating circuit. 4,058,743, Cl. 307-275.000.
Armstrong, James J., III: *See—*
Hutton, Allen H.; and Armstrong, James J., III, 4,058,097, Cl. 123-119.00F.
Arthur D. Little, Inc.: *See—*
van Vloten, Curtis P., 4,058,699, Cl. 219-121.0LM.
Arvey Corporation: *See—*
Stevenson, Mayne B., 4,058,251, Cl. 229-72.000.
Arvin Industries, Inc.: *See—*
Kasprzak, Vincent D., 4,058,840, Cl. 360-10.000.
Asahi Kogaku Kogyo Kabushiki Kaisha: *See—*
Nobusawa, Tsukumo, 4,058,816, Cl. 354-23.00D.
Asanuma, Akira: *See—*
Komatsu, Atsushi; Miyazawa, Kuichiro; Yamaura, Yoshotomo; and Asanuma, Akira, 4,058,134, Cl. 137-38.000.
Asselin, George F., to UOP Inc. Aromatic hydrocarbon separation via solvent extraction. 4,058,454, Cl. 208-321.000.
Associated Electrical Industries Limited: *See—*
Friedlander, Erich Siegfried, 4,058,761, Cl. 323-48.000.
Astech, Inc.: *See—*
Dunn, Robert T.; Brown, William M.; and Ruddy, John M., 4,058,678, Cl. 179-2.50R.
Atherton, Robert Allan; and Cole, Carroll Richard, to Caterpillar Tractor Co. Motor grader with blade support and bearing assembly. 4,058,174, Cl. 172-781.000.
Atkins, Lenard W. Metal frame racket. 4,058,311, Cl. 273-73.00G.
Atkinson, Paul E.: *See—*
Shakshober, MacLean C.; Schorsch, Eugene; and Atkinson, Paul E., 4,058,227, Cl. 214-13.000.
Atwood Vacuum Machine Company: *See—*
White, Donald M., 4,057,892, Cl. 29-526.00R.
Austin, Richard Arnold. Adjustable spindle liner tube or filler tube. 4,058,036, Cl. 82-38.00A.
Autolava Oy: *See—*
Visa, Heikki; Rantala, Ossi; and Risti, Antti, 4,058,231, Cl. 214-516.000.
Automatic Switch Company: *See—*
Fromfield, James P., 4,058,287, Cl. 251-46.000.
Automation Equipment, Inc.: *See—*
Swoager, Jon R., 4,058,104, Cl. 123-193.0CP.
Avaiusini, Mauricio V. Ski lock device with single actuating means. 4,057,984, Cl. 70-58.000.
Awane, Katunobu; Hattori, Hironori; Biwa, Tetuo; and Tamaki, Hiroshi, to Sharp Kabushiki Kaisha. High voltage, low on-resistance diffusion-self-alignment metal oxide semiconductor device and manufacture thereof. 4,058,822, Cl. 357-23.000.
Ayer, Atul D.: *See—*
Theeuwes, Felix; and Ayer, Atul D., 4,058,122, Cl. 128-260.000.
B. F. Goodrich Company, The: *See—*
Gardner, Richard H.; and Kelley, Robert D., 4,058,190, Cl. 188-218.0XL.
Ireland, Robert William, 4,058,657, Cl. 526-263.000.
B.V.S.: *See—*
Denoor, Gaston; and Thillet, Georges, 4,058,278, Cl. 242-7.220.
Babcock & Wilcox Company, The: *See—*
Holt, Amos Earl; Lawrie, William Eugene; and Birks, Albert Stingel, 4,058,762, Cl. 324-216.000.
Jabsen, Felix S., 4,058,224, Cl. 214-1.0CM.
Babcock & Wilcox Limited: *See—*
Traiteur, Rene, 4,058,381, Cl. 55-444.000.
Bachand, Carol: *See—*
Monkovic, Ivo; Bachand, Carol; and Wong, Henry, 4,058,531, Cl. 260-285.000.
Bachman, Wesley J., to Dickey-john Corporation. Acre counter. 4,058,712, Cl. 364-564.000.
Bachmann, Rudolf: *See—*
Vaeth, Guenter; Bachmann, Rudolf; Hartmann, Heinrich; Spoor, Herbert; and Lehner, August, 4,058,506, Cl. 260-75.0NP.
Vaeth, Guenter; Bachmann, Rudolf; Hartmann, Heinrich; Hartmann, Hans-Joerg; Spoor, Herbert; Uhl, Karl; Lehner, August; Gutermann, Winfried; and Motz, Herbert, 4,058,646, Cl. 428-425.000.
Backhaus, Karl: *See—*
Streubel, Hans; Backhaus, Karl; and John, Wolfgang, 4,058,154, Cl. 164-82.000.
Badische Anilin- & Soda-Fabrik Aktiengesellschaft: *See—*
Bermes, Rudolf, 4,058,517, Cl. 260-155.000.
Baing, Helmut; Oberschachtsiek, Gerd; Grenzing, Horst; and Meurer, Peter, to Friedrich Uhde GmbH. Process and apparatus for incinerating substances in a fluidized thermal reaction furnace. 4,058,069, Cl. 110-8.00F.
Baker, James R., to Petro-Tex Chemical Corporation. Modified zinc ferrite oxidative dehydrogenation catalysts. 4,058,577, Cl. 260-680.00D.
Bakonyi, Maria: *See—*
Zsolnai, Tibor; Lugosi, Gyorgy; Szepesi, Istvan; Bakonyi, Maria; Racz, Istvan; and Radvany nee Hegedus, Erzsebet, 4,058,608, Cl. 424-226.000.
Balbo, Anthony M., to Westinghouse Electric Corporation. Elevator system including an elevator car having door operated sealing devices adjacent door opening. 4,058,191, Cl. 187-1.00R.
Baldwin, John J., to Merck & Co., Inc. Substituted imidazole compounds and therapeutic compositions therewith. 4,058,614, Cl. 424-263.000.
Ball, Derek William. Decorative device. 4,057,921, Cl. 40-106.210.
Ball Packaging Products, Inc.: *See—*
Zappia, Anthony T., 4,058,388, Cl. 65-229.000.
Ballin, Gene, to Product Resources International, Inc. Pocket hair brush. 4,057,867, Cl. 15-185.000.
Balm, Gerald John, to International Business Machines Corporation. Method and apparatus for context-aided recognition. 4,058,795, Cl. 340-146.3WD.
Banks, Clarence K.; Crout, Prescott D.; and Homer, Paul B., to United States of America, Navy. Low frequency passive guidance method. 4,058,275, Cl. 244-3.150.
Barbieri, Thomas; and Getz, Edward J., to Westinghouse Electric Corporation. Electric lamp bulb package and sleeve component therefrom. 4,058,211, Cl. 206-422.000.
Barham, Rayford A. Hydroponic method and apparatus. 4,057,930, Cl. 47-61.000.
Bariana, Dilbagh Singh: *See—*
Jones, Peter Hadley; Bariana, Dilbagh Singh; Fung, Anthony Kei Lun; Martin, Yvonne Connolly; Kyncl, Jaroslav; and Lall, Amrit, 4,058,559, Cl. 260-520.00C.
Baris, Johannes M.; Iacovangelo, Charles D.; and Vogel, Wolfgang M., to United Technologies Corporation. Fuel cell electrode. 4,058,482, Cl. 252-425.300.
Barnett, John David. Improvements in or relating to strain transducers. 4,058,005, Cl. 73-88.50R.
Barnhard, Phillip, IV; and Kieres, Francis John, to IMC Chemical Group, Inc. Aqueous slurry explosives with colloidal hydrous metal oxide. 4,058,420, Cl. 149-2.000.
Barr, Dwight L.; and Barr, Leslie A. Self-contained tent assembly. 4,058,133, Cl. 135-4.00A.
Barr, Leslie A.: *See—*
Barr, Dwight L.; and Barr, Leslie A., 4,058,133, Cl. 135-4.00A.
Barreau, Michel; Cotrel, Claude; and Jeanmart, Claude, to Rhone-Poulenc Industries. 1,2-Dithiole derivatives. 4,058,611, Cl. 424-250.000.
Barrett, Charles W. Bottle for building construction. 4,057,946, Cl. 52-436.000.
Barrowcliff, Robert F. Bench holder for a clock. 4,058,302, Cl. 269-76.000.
Bartik, Ivan, to Keene Corporation. Element for filtering and separating fluid mixtures. 4,058,463, Cl. 210-317.000.
Bascom, Hollis H.; Greci, John J.; and Hoopengardner, Merle R. Carpet repair disk and tool. 4,058,423, Cl. 156-98.000.
BASF Aktiengesellschaft: *See—*
Beck, Gilbert; Zuern, Ludwig; and Stahnecker, Erhard, 4,058,152, Cl. 152-310.000.
Denzinger, Walter; Seelert, Kurt; and Herrle, Karl, 4,058,655, Cl. 526-212.000.
Goetz, Norbert; and Fischer, Roman, 4,058,536, Cl. 260-340.700.

Jung, Hans; Kovacs, Jenoe; Dussel, Wilhelm; and Lehmann, Helmut, 4.058,640, Cl. 427-118.000.
Kiehs, Karl; Adolphi, Heinrich; Huber, Rolf; and Baumann, Annegrit, 4,058,606, Cl. 424-217.000.
Naarmann, Herbert; and Pohlemann, Heinz, 4,058,508, Cl. 260-77.5BB.
Reitz, Ortwin; and Retoret, Jean-Pierre, 4,058,449, Cl. 208-59.000.
Vaeth, Guenter; Bachmann, Rudolf; Hartmann, Heinrich; Spoor, Herbert; and Lehner, August, 4,058,506, Cl. 260-75.0NP.
Vaeth, Guenter; Bachmann, Rudolf; Hartmann, Heinrich; Hartmann, Hans-Joerg; Spoor, Herbert; Uhl, Karl; Lehner, August; Gutermann, Winfried; and Motz, Herbert, 4,058,646, Cl. 428-425.000.
Basi, Jagtar S., to International Business Machines Corporation. Silicon wafer polishing. 4,057,939, Cl. 51-281.00R.
Basiulis, Algerd, to Hughes Aircraft Company. Heat pipe capable of operating against gravity and structures utilizing same. 4,057,963, Cl. 60-641.000.
Battelle Memorial Institute: *See—*
Arieh, Simon, 4,058,204, Cl. 198-833.000.
Mallozzi, Philip J.; Epstein, Harold M.; Jung, Richard G.; Applebaum, David C.; Fairand, Barry P.; and Gallagher, William J., 4,058,486, Cl. 250-493.000.
Batza, Willi: *See—*
Schminke, Heinz; Rau, Kurt; and Batza, Willi, 4,058,377, Cl. 55-148.000.
Bauer, Kurt; Wittman, Gunther; Mussgay, Manfred; Irion, Eckart; and Geilhausen, Horst, to Bayer Aktiengesellschaft. Ethyleneimine inactivated organisms. 4,058,599, Cl. 424-92.000.
Baumann, Annegrit: *See—*
Kiehs, Karl; Adolphi, Heinrich; Huber, Rolf; and Baumann, Annegrit, 4,058,606, Cl. 424-217.000.
Baumann, Hanspeter: *See—*
Lohmann, Frank; Lugrin, Raymond; and Baumann, Hanspeter, 4,058,480, Cl. 252-301.210.
Bavisotto, Robert G.; Reynolds, John E.; and Sbert, Robert S., to Carborundum Company, The. Electrical connector. 4,058,789, Cl. 338-322.000.
Bayer Aktiengesellschaft: *See—*
Bauer, Kurt; Wittman, Gunther; Mussgay, Manfred; Irion, Eckart; and Geilhausen, Horst, 4,058,599, Cl. 424-92.000.
Biedermann, Wolfgang, 4,058,571, Cl. 260-631.00H.
Hofer, Wolfgang; Maurer, Fritz; Riebel, Hans-Jochem; Rohe, Lothar; Eue, Ludwig; and Schmidt, Robert R., 4,058,525, Cl. 544-182.000.
Hofer, Wolfgang; Maurer, Fritz; Riebel, Hans-Jochem; Hammann, Ingeborg; and Stendel, Wilhelm, 4,058,603, Cl. 424-200.000.
Klauke, Erich; and Jager, Horst, 4,058,561, Cl. 260-544.00C.
Merz, Walter; and Schummer, Gunter, 4,058,526, Cl. 544-182.000.
Rasp, Christian; Scharfe, Gerhard; and Grolig, Johann, 4,058,556, Cl. 560-231.000.
Sutter, Hubert; and Peuker, Reinhard, 4,058,654, Cl. 526-159.000.
Thiel, Reinhard; and Rosenbaum, Heinz Jorg, 4,058,565, Cl. 260-586.0AB.
Thomas, Rudolf; Kramer, Wolfgang; Eue, Ludwig; Metzger, Carl; and Jager, Gerhard, 4,058,392, Cl. 71-106.000.
von Bonin, Wulf; Kleimann, Helmut; and Post, Udo, 4,058,492, Cl. 260-2.5AM.
Bayerische Motoren Werke Aktiengesellschaft: *See—*
Huber, Manfred, 4,058,182, Cl. 180-68.500.
Bazika, Vladimir; Prazak, Premysl; and Havelkova, Dana, to CKD Praha, Oborovy podnik. Apparatus for testing engine oil. 4,057,999, Cl. 73-53.000.
Bech, Johan H. Anchor rope. 4,058,049, Cl. 87-8.000.
Beck, Gilbert; Zuern, Ludwig; and Stahnecker, Erhard, to BASF Aktiengesellschaft. Automobile safety tires. 4,058,152, Cl. 152-310.000.
Becker, Philip S., to Valex Inc. Automatic drain for compressed air systems. 4,058,240, Cl. 222-368.000.
Beer, Gyorgy: *See—*
Kekesy, Tibor; Szeberenyi, Szabolcs; Beer, Gyorgy; Dudas, Antal; Hajos, Gyorgy; Szporny, Laszlo; and Czajlik, Eva, nee Csizer, 4,058,522, Cl. 260-239.570.
Beery, Jack, to Burroughs Corporation. Strip length monitoring apparatus. 4,058,266, Cl. 242-54.00R.
Begin, Louis E.: *See—*
Dunbar, Joseph E.; and Begin, Louis E., 4,058,520, Cl. 260-239.00B.
Beisler, John A.; Abbasi, Mohamed M.; and Driscoll, John S., to United States of America, Health, Education and Welfare. Synthesis, structure, and antitumor activity of 5,6-dihydro-5-azacytidine. 4,058,602, Cl. 424-180.000.
Belaire, Richard C., to Ford Motor Company. Device for decreasing the start-up time for stirling engines. 4,057,962, Cl. 60-526.000.
Belanger, Inc.: *See—*
Belanger, James A., 4,057,866, Cl. 15-97.00B.
Belanger, James A., to Belanger, Inc. Apparatus for washing and drying motor vehicles. 4,057,866, Cl. 15-97.00B.
Bell, Malcolm R., to Sterling Drug Inc. 1-Phenyl-3,4-dihydrocarbostyrils. 4,058,532, Cl. 260-288.00R.
Bell Telephone Laboratories, Incorporated: *See—*
Bjorkholm, John Ernst; Bjorklund, Gary Carl; and Liao, Paul Foo-Hung, 4,058,739, Cl. 307-88.300.
Curtis, Robert Bartlett, 4,058,680, Cl. 179-7.10R.
Fraley, Phillip Edward, 4,058,779, Cl. 331-108.00R.
Nutt, Wendell Glenn; and Webster, George Harry, 4,058,669, Cl. 174-34.000.
Peterson, William Anders, 4,058,758, Cl. 363-80.000.
Bellamy, Winthrop D.; and Holub, Fred F., to General Electric Company. Decrystallization of cellulose. 4,058,411, Cl. 127-37.000.
Bellenberg, Heinz; Kucharzyk, Werner; Rohde, Wolfgang; and Siebert, Werner, to Bergwerksverband GmbH; and Didier Engineering GmbH. Arrangement for pneumatically regulating the introduction of substances into chambers. 4,058,230, Cl. 214-18.200.
Benefield, Bruce D.: *See—*
Wyatt, William Burk, Jr.; and Benefield, Bruce D., 4,057,936, Cl. 49-61.000.
Wyatt, William Burk, Jr.; and Benefield, Bruce D., 4,057,944, Cl. 52-309.110.
Bentley, Donald J.; and Raible, Donald A., to Bentley Laboratories, Inc. Oxygenator. 4,058,369, Cl. 23-258.50B.
Bentley Laboratories, Inc.: *See—*
Bentley, Donald J.; and Raible, Donald A., 4,058,369, Cl. 23-258.50B.
Benton, Ronald E., to Westinghouse Electric Corporation. Control assembly for power distribution transformers. 4,058,842, Cl. 361-38.000.
Bereau, Jean: *See—*
Bonnemay nee Couture, Andree; Royon, Jean; Bereau, Jean; and Catonne, Jean-Claude, 4,058,441, Cl. 204-103.000.
Berg, Marvin I.: *See—*
Pasic, James A.; and Berg, Marvin I., 4,058,426, Cl. 156-212.000.
Berger, Benjamin. Valve with delayed action closing means. 4,058,286, Cl. 251-15.000.
Bergwerksverband GmbH: *See—*
Bellenberg, Heinz; Kucharzyk, Werner; Rohde, Wolfgang; and Siebert, Werner, 4,058,230, Cl. 214-18.200.
Juntgen, Harald; Klein, Jurgen; and Gappa, Gunther, 4,058,374, Cl. 55-60.000.
Beringer, Monique; and Sporri, Heinz, to Fabriques de Tabac Reunies S.A. Continuous process for the production of a paste with additives which can be formed into a smokable material. 4,058,129, Cl. 131-140.00C.
Bermatov, Mikhail Albertovich: *See—*
Prutkovsky, Evgeny Nikolaevich; Bermatov, Mikhail Albertovich; Tarasov, Evgeny Alexandrovich; Ozerov, Valery Ilich; Fedosjuk, Alexandr Fedorovich; and Krokhin, Vladimir Andreevich, 4,057,966, Cl. 60-678.000.
Bermes, Rudolf, to Badische Anilin- & Soda-Fabrik Aktiengesellschaft. Preparation of a concentrated solution of an anionic azo dye containing a sulfonic acid group. 4,058,517, Cl. 260-155.000.
Berol Kemi AB: *See—*
Hellsten, Karl Martin Edvin, 4,058,489, Cl. 252-547.000.
Besler, Ervin. True cut combination. 4,058,303, Cl. 269-315.000.
Bete Fog Nozzle Inc.: *See—*
Burnham, Richard C., 4,058,262, Cl. 239-545.000.
Bethlehem Steel Corporation: *See—*
Kelsey, Amos P.; Palumbo, John A.; and Thiel, James L., 4,057,990, Cl. 72-166.000.
Bewley, Homer G. Plier assembly. 4,057,863, Cl. 7-5.400.
Bhatt, Niranjan Rasik: *See—*
Hammitt, Frederick G.; Ahmed, Osman Saleh Mohamed; Bhatt, Niranjan Rasik; and Hwang, Jia-Bo Gilbert, 4,058,004, Cl. 73-86.000.
Bicicchi, Richard Thomas; and Melilli, Albert Samuel, to General Electric Company. Turbine bucket alloy. 4,058,417, Cl. 148-37.000.
Biedermann, Wolfgang, to Bayer Aktiengesellschaft. Continuous process for the production of d,l'menthol. 4,058,571, Cl. 260-631.00H.
Biere, Helmut: *See—*
Ahrens, Hanns; Biere, Helmut; Rufer, Clemens; Schmiechen, Ralph; Schroeder, Eberhard; Loge, Olaf; Losert, Wolfgang; and Schillinger, Ekkehard, 4,058,619, Cl. 424-275.000.
Bierenbaum, Harvey S.; Penoyer, John A.; and Zimmerman, Daniel, to Celanese Corporation. Simultaneous stretching of multiple plies of polymeric film. 4,058,582, Cl. 264-154.000.
Birk, James R., to Electric Power Research Institute, Inc. Recovery of lead from batteries. 4,058,396, Cl. 75-77.000.
Birks, Albert Stingel: *See—*
Holt, Amos Earl; Lawrie, William Eugene; and Birks, Albert Stingel, 4,058,762, Cl. 324-216.000.
Bishop, James S.: *See—*
Sawada, Fred H.; Klementowski, Frank M.; and Bishop, James S., 4,058,804, Cl. 340-248.00A.
Biwa, Tetuo: *See—*
Awane, Katunobu; Hattori, Hironori; Biwa, Tetuo; and Tamaki, Hiroshi, 4,058,822, Cl. 357-23.000.
Bjorkholm, John Ernst; Bjorklund, Gary Carl; and Liao, Paul Foo-Hung, to Bell Telephone Laboratories, Incorporated. Method and apparatus for phase matching by adjustment of the fundamental frequencies. 4,058,739, Cl. 307-88.300.
Bjorklund, Gary Carl: *See—*
Bjorkholm, John Ernst; Bjorklund, Gary Carl; and Liao, Paul Foo-Hung, 4,058,739, Cl. 307-88.300.
Black, Donald Kirkbright, to Hercules Incorporated. Stabilization with alkali metal compound material of certain thermally unstable DMT. 4,058,663, Cl. 560-3.000.
Blacker, Allen P.; and Schwartz, James W., to Zenith Radio Corporation. Electron gun having an extended field beam focusing and converging lens. 4,058,753, Cl. 315-368.000.
Blair, Calvin B.; and Hake, Kenneth A., to Kent Manufacturing Co., Inc. Tooth arrangement in rearwardly folding cultivators. 4,058,172, Cl. 172-311.000.

Bledsoe, James O., Jr.: *See—*
Kane, Bernard J.; Irving, Karen E.; Bledsoe, James O., Jr.; and Canova, Levy A., 4,058,572, Cl. 260-631.500.
Bleh, Otto, deceased: *See—*
Ackermann, Otto; Bleh, Otto, deceased; and Rogler, Walter, 4,058,553, Cl. 560-180.000.
Bleh, Rita, legal representative: *See—*
Ackermann, Otto; Bleh, Otto, deceased; and Rogler, Walter, 4,058,553, Cl. 560-180.000.
Bloem, Gary. Wet comb. 4,057,901, Cl. 132-112.000.
Blom, Johannes Cornelis; and Tindall, Colin Edward, to Davidson & Co. Limited. Regenerative air preheaters and seal frame suspension control system therefor. 4,058,158, Cl. 165-9.000.
Bloomquist, Carl R.: *See—*
McNeil, Sharon S.; Bloomquist, Carl R.; and Johnston, Robert C., 4,058,399, Cl. 96-75.000.
Boehringer Ingelheim GmbH: *See—*
Kummer, Werner; Stahle, Helmut; Koppe, Herbert; Haarmann, Walter; and Reichl, Richard, 4,058,616, Cl. 424-267.000.
Renth, Ernst-Otto; Mentrup, Anton; Schromm, Kurt; and Walland, Alexander, 4,058,642, Cl. 424-330.000.
Bogert, Howard Z., Jr.: *See—*
Riddle, John B.; and Bogert, Howard Z., Jr., 4,058,194, Cl. 194-4.00C.
Boldt, Robert R.: *See—*
Vogel, Ronald F.; Boldt, Robert R.; McKee, Kevin D.; Resh, Roy E.; and West, Paul E., 4,058,766, Cl. 324-61.00R.
Boller, Arthur; and Scherrer, Hanspeter, to Hoffmann-La Roche Inc. Liquid crystalline isonitriles. 4,058,476, Cl. 252-299.000.
Boller, Arthur; and Scherrer, Hanspeter, to Hoffmann-La Roche Inc. Liquid crystal Schiffs bases. 4,058,477, Cl. 252-299.000.
Boller, Arthur; and Scherrer, Hanspeter, to Hoffmann-La Roche Inc. Liquid crystal esters. 4,058,478, Cl. 252-299.000.
Bom, Cornelis Johannes Gerardus: *See—*
van der Lely, Ary; and Bom, Cornelis Johannes Gerardus, 4,058,068, Cl. 111-36.000.
Bonis, Maurice; and Roger, Bernard, to U.S. Philips Corporation. Complementary transistor structure having two epitaxial layers and method of manufacturing same. 4,058,825, Cl. 357-46.000.
Bonnemay nee Couture, Andree; Royon, Jean; Bereau, Jean; and Catonne, Jean-Claude, to Societe d'Etude pour la Regeneration de l'Acide Chlorhydrique SEPRAC. Process for the regeneration of spent pickling solutions. 4,058,441, Cl. 204-103.000.
Bonnet, Jean Claude. Process for the preparation of treating liquids, stable under storage, especially for improving the wrinkle-free characteristics of cellulosic fabrics treated with the solution. 4,058,498, Cl. 260-29.40R.
Bonola, Paola: *See—*
Abbruzzese, Luigi; Gozzo, Franco; Rossi, Giorgio; Masoero, Marcella; Lorusso, Simone; Bonola, Paola; and Tamburin, Gino, 4,058,613, Cl. 424-258.000.
Borden, Inc.: *See—*
Torongo, Albert Henry, 4,058,220, Cl. 211-57.100.
Borzcik, Paul Stephen: *See—*
Ondercin, Robert Michael; and Borzcik, Paul Stephen, 4,058,711, Cl. 364-101.000.
Boswell, Kay H.: *See—*
Robins, Roland K.; Shuman, Dennis A.; and Boswell, Kay H., 4,058,659, Cl. 536-27.000.
Boucheron, Bernard; and Gosset, Emile, to Ethylene Plastique. Process for the preparation of polymers of but-1-ene. 4,058,653, Cl. 526-159.000.
Bourns, Inc.: *See—*
Andrews, Allen Howe; McPherson, James Norman; Burns, John Thomas, Jr.; and Hendrie, John Matthew, 4,058,788, Cl. 338-42.000.
Bowin, William Ferdinand, to North Electric Company. Interoffice loop supervision arrangement. 4,058,685, Cl. 179-18.0AH.
Bowmer, Geoffrey Malcolm, to Zeitgeist AG. Apparatus for compressing sleeves onto structural rods. 4,057,882, Cl. 29-283.500.
Box Innards, Inc.: *See—*
Peters, Charles, Jr., 4,058,226, Cl. 214-7.000.
Boyer, Lionel: *See—*
Mailfert, Alain; and Boyer, Lionel, 4,058,747, Cl. 310-52.000.
Branson Ultrasonics Corporation: *See—*
Summo, Arthur M., 4,058,421, Cl. 156-73.500.
Brass, Robert L. Toy construction system having reusable distensible joining members. 4,057,886, Cl. 29-235.000.
Braun, Gunther, to Losenhausen Maschinenbau AG. Unbalance vibration generator. 4,058,019, Cl. 74-87.000.
Braunschweigische Maschinenbauanstalt: *See—*
Dietzel, Walter; and Matusch, Siegfried, 4,058,410, Cl. 127-5.000.
BRECO Kunststoffverarbeitungs-GmbH & Co. KG: *See—*
Breher, Rudolf, 4,058,424, Cl. 156-137.000.
Breher, Rudolf, to BRECO Kunststoffverarbeitungs-GmbH & Co. KG. Method of and device for producing in a continuous operation endless driving belts of any desired circumferential length. 4,058,424, Cl. 156-137.000.
Brennan, Raymond J., to GTE Sylvania Incorporated. Method and apparatus for handling and orientation of fragile articles. 4,058,236, Cl. 221-163.000.
Brewer, Robert A. Connector for camera harnesses. 4,058,242, Cl. 224-5.00V.
Bridgestone Tire Company Limited: *See—*
Yukuta, Toshio; Ohashi, Takashi; Saito, Masumi; and Arai, Katsuhiko, 4,058,503, Cl. 260-47.0CP.
Briggs, Aubrey C., to Dravo Corporation. Bulk material dislodging and gathering apparatus. 4,058,203, Cl. 198-509.000.
Brinker, Lee J.: *See—*
Ankenman, Thomas W.; and Brinker, Lee J., 4,058,170, Cl. 172-311.000.
Bristol-Myers Company: *See—*
Monkovic, Ivo; Bachand, Carol; and Wong, Henry, 4,058,531, Cl. 260-285.000.
British Hydromechanics Research Association, The: *See—*
Fisher, Martin John, 4,058,040, Cl. 83-177.000.
Brocker, Dale C. Electronic ignition unit. 4,058,103, Cl. 123-148.00E.
Broghammer, Werner; Kramer, Jurgen; and Laufer, Helmut, to Dual Gebruder Steidinger. Cassette recorder with switching for a device for noise suppression. 4,058,687, Cl. 179-100.110.
Brokaw, George K. Rotary mower and shredder device. 4,057,952, Cl. 56-16.900.
Bromberg, Louis F.: *See—*
Munk, Michael E.; and Bromberg, Louis F., 4,058,253, Cl. 236-46.00R.
Brooks, Ronald Robert, to RCA Corporation. Light flasher circuit including GTO. 4,058,751, Cl. 315-200.00A.
Brouthers, Paul E., to Dan Wesson Arms, Inc. Gun leveling device. 4,058,050, Cl. 89-14.00C.
Brown, Arling Dix, Jr.; and Reilly, Edward Justus, to Gould, Inc. Electrographic writing system with diode switching assembly. 4,058,814, Cl. 346-154.000.
Brown, Clifford Gordon; and Sanderson, Brian Robert, to United States Borax & Chemical Corporation. Process for recovering boric acid. 4,058,588, Cl. 423-283.000.
Brown, Edward L.: *See—*
Stary, Marvin L.; Brown, Edward L.; and Pridonoff, Eric L., 4,058,147, Cl. 141-45.000.
Brown, Herbert R., to United States of America, Air Force. Pilot chute crown line attachment system. 4,058,276, Cl. 244-152.000.
Brown, Jesse C. Oscillating piston engine. 4,058,088, Cl. 123-18.00R.
Brown, Richard N., to General Electric Company. Handle assembly. 4,058,338, Cl. 294-31.200.
Brown, Stephen Edward. Apparatus and method for increasing the horsepower of an internal combustion engine. 4,058,096, Cl. 123-119.0CG.
Brown, William M.: *See—*
Dunn, Robert T.; Brown, William M.; and Ruddy, John M., 4,058,678, Cl. 179-2.50R.
Brunsch, Klaus: *See—*
Frommlet, Hubert; Mautz, Karl-Heinz; and Brunsch, Klaus, 4,058,353, Cl. 308-1.00A.
Brunswick Corporation: *See—*
Hungerford, Daniel Comstock, 4,058,074, Cl. 114-210.000.
Bryden, Joseph E., to Raytheon Company. Stabilized digital PPL radar system. 4,058,810, Cl. 343-17.10R.
Bubley, Henry J.; and Krutsch, John R., to American Screen Printing Equipment Company. Feed and takeoff assembly. 4,058,307, Cl. 271-85.000.
Bucalo, Louis. Methods, materials, and devices for providing electrical conductivity particularly for living beings. 4,058,116, Cl. 128-2.10E.
Buchalter, Gilbert. Method of applying viscous fluid to a surface. 4,058,127, Cl. 128-417.000.
Buck, Stanley Edward, to Domtar Limited. Stacking tray. 4,058,249, Cl. 229-34.0HW.
Buderus'sche Eisenwerke Aktiengesellschaft: *See—*
Durth, Wilfried, 4,058,635, Cl. 426-509.000.
Budzich, Tadeusz. Load responsive fluid control valves. 4,058,139, Cl. 137-596.130.
Budzich, Tadeusz. Load responsive fluid control valves. 4,058,140, Cl. 137-596.130.
Buehrle, Victor E.: *See—*
Taylor, Don A., 4,058,422, Cl. 156-96.000.
Buell, Donald D. Inflatable core wire reel. 4,058,273, Cl. 242-115.000.
Buell, Erik F. Motorcycle suspension systems. 4,058,181, Cl. 180-32.000.
Bunker Ramo Corporation: *See—*
Stupay, Lawrence John; and Truesdell, Carl Frederick, 4,058,118, Cl. 128-2.05T.
Burch, James B.: *See—*
Stuart, Alistair J.; and Burch, James B., 4,058,184, Cl. 182-128.000.
Burchard, William Boyd, Jr. Pivotal latch for a sucker rod puller. 4,058,339, Cl. 294-91.000.
Burckhardt, Manfred H., to Daimler-Benz Aktiengesellschaft. Master brake cylinder for motor vehicles. 4,058,346, Cl. 303-22.00R.
Burnham, Richard C., to Bete Fog Nozzle Inc. Fluid spray for generating rectangular coverage. 4,058,262, Cl. 239-545.000.
Burns, John Thomas, Jr.: *See—*
Andrews, Allen Howe; McPherson, James Norman; Burns, John Thomas, Jr.; and Hendrie, John Matthew, 4,058,788, Cl. 338-42.000.
Burroughs Corporation: *See—*
Beery, Jack, 4,058,266, Cl. 242-54.00R.
Clark, Becky J.; and Seitz, Charles L., 4,058,773, Cl. 328-37.000.
Dirks, Wolfgang Gerhard, 4,058,844, Cl. 360-106.000.
Gyi, Ko Ko, 4,058,843, Cl. 360-103.000.
Burrows, Norman B. Method of padding pipe. 4,057,917, Cl. 37-195.000.
Bursani, Rudolph. Door hinge coupling device. 4,057,873, Cl. 16-137.000.

Bussjager, Rudy C.: *See—*
del Toro, James J.; and Bussjager, Rudy C., 4,057,975, Cl. 62-324.000.
del Toro, James J.; and Bussjager, Rudy C., 4,057,976, Cl. 62-324.000.
Busson, Christian; Alagy, Jacques; and Cessou, Maurice, to Institut Francais du Petrole. Process for purifying waste water containing ammonium sulfate. 4,058,591, Cl. 423-574.00R.
Butler, Blondie: *See—*
Higgins, Larry; King, John Thomas; Butler, Blondie; and Struewing, Francis R., deceased, 4,057,860, Cl. 5-247.000.
Bykhovsky, David Grigorievich; and Danilov, Alexandr Ivanovich. Method and apparatus for DC reverse polarity plasma-arc working of electrically conductive materials. 4,058,698, Cl. 219-121.00P.
C. van der Lely N. V.: *See—*
van der Lely, Ary; and Bom, Cornelis Johannes Gerardus, 4,058,068, Cl. 111-36.000.
Cabbiness, Dale K., to Continental Oil Company. Determination of flow characteristics of petroliferous formations. 4,058,366, Cl. 23-230.0EP.
Cadillac Gage Company: *See—*
Hobson, James Charles; and Wroble, Arthur John, 4,058,256, Cl. 239-101.000.
Cahn, Robert P.; and Longwell, John P., to Exxon Research & Engineering Co. Catalyst pretreatment with hydrocarbon feedstock. 4,058,575, Cl. 260-666.00P.
Cama, Lovji D.; Christensen, Burton G.; Karady, Sandor; and Sletzinger, Meyer, to Merck & Co., Inc. 7-Diacyl cephalosporins. 4,058,661, Cl. 544-21.000.
Cameron Iron Works, Inc.: *See—*
Jones, Marvin R.; and Helfer, Paul E., 4,057,887, Cl. 29-240 000.
Smith, Jerry D., 4,058,162, Cl. 166-124.000.
Cannan, Terrance M.: *See—*
Wright, John F.; and Cannan, Terrance M., 4,058,067, Cl. 111-1.000.
Cannon, John W. Magnetic card reader. 4,058,705, Cl. 235-449.000.
Canova, Levy A.: *See—*
Kane, Bernard J.; Irving, Karen E.; Bledsoe, James O., Jr.; and Canova, Levy A., 4,058,572, Cl. 260-631.500.
Canter, Carl Robert, to Lever Brothers Company. Low temperature stable compositions. 4,058,473, Cl. 252-121.000.
Cantera, Pasquale. Guide line holder. 4,057,903, Cl. 33-86.000.
Caparrelli, Frederick; and Leong, Henry, to Air Products and Chemicals, Inc. Vaporizer carousel for anesthesia machine. 4,058,120, Cl. 128-188.000.
Carborundum Company, The: *See—*
Bavisotto, Robert G.; Reynolds, John E.; and Sbert, Robert S., 4,058,789, Cl. 338-322.000.
Carlisle, Roger P., to Crouse-Hinds Company. Wet locations cover assembly. 4,058,358, Cl. 339-44.00M.
Carlson, William L., Jr., to General Signal Corporation. Scotch yoke. 4,058,288, Cl. 251-229.000.
Carrier Corporation: *See—*
Abell, Richard S.; and Kropiwnicki, Tadek M., 4,057,979, Cl. 62-469.000.
del Toro, James J.; and Bussjager, Rudy C., 4,057,975, Cl. 62-324.000.
del Toro, James J.; and Bussjager, Rudy C., 4,057,976, Cl. 62-324.000.
Carson, Cyril W. Blade assembly with replaceable cutting edge. 4,058,173, Cl. 172-719.000.
Case, Patrick P.; and Gardner, David L., to Compression Coat Corporation. Pipe coating machine. 4,058,428, Cl. 156-429.000.
Cassar, Richard D., to Sun Ventures, Inc. Insecticides from dimethylmuconic acid. 4,058,605, Cl. 424-212.000.
Cassella Farbwerke Mainkur Aktiengesellschaft: *See—*
Heinrich, Ernst; and Ribka, Joachim, 4,058,518, Cl. 260-156.000.
Cassia, Antonio Macchi, to Steiner American Corporation. Dispenser for interleaved sheets of tissue. 4,058,235, Cl. 221-48.000.
Caterpillar Tractor Co.: *See—*
Atherton, Robert Allan; and Cole, Carroll Richard, 4,058,174, Cl. 172-781.000.
Chamberlain, Monte; Comer, Glen S., Jr.; and Elliott, Fredrick H., 4,058,189, Cl. 188-77.00R.
Durand, James C., 4,058,014, Cl. 73-358.000.
Sogge, John W., 4,058,352, Cl. 305-57.000.
Catonne, Jean-Claude: *See—*
Bonnemay nee Couture, Andree; Royon, Jean; Bereau, Jean; and Catonne, Jean-Claude, 4,058,441, Cl. 204-103.000.
Celanese Corporation: *See—*
Bierenbaum, Harvey S.; Penoyer, John A.; and Zimmerman, Daniel, 4,058,582, Cl. 264-154.000.
Cerberus AG: *See—*
Scheidweiler, Andreas, 4,058,803, Cl. 340-237.500.
Cerberus AG, Switzerland: *See—*
Paschedag, Hansjoachim; and Keller, Hansjurg, 4,058,726, Cl. 250-353.000.
Cerny, Jindrich: *See—*
Henzl, Jindrich; Cerny, Jindrich; and Malasek, Jaromir, 4,058,143, Cl. 139-110.000.
Cessou, Maurice: *See—*
Busson, Christian; Alagy, Jacques; and Cessou, Maurice, 4,058,591, Cl. 423-574.00R.
Chamberlain, Monte; Comer, Glen S., Jr.; and Elliott, Fredrick H., to Caterpillar Tractor Co. Control linkage for a band type brake. 4,058,189, Cl. 188-77.00R.
Chambless, Leo B., to General Electric Company. Reverse cycle heat pump circuit. 4,057,977, Cl. 62-324.000.
Champion International Corporation: *See—*
Vincent, David N.; and Golden, Ronald, 4,058,434, Cl. 162-165.000.
Chandler, Craig S., to Phillips Petroleum Company. Sample preparation. 4,057,997, Cl. 73-23.100.
Chang, Clarence D.; and Grover, Shamsher S., to Mobil Oil Corporation. Conversion of methanol to gasoline components. 4,058,576, Cl. 260-673.000.
Chang, Louis H.: *See—*
Fravel, John C.; Chang, Louis H.; and Yoshikawa, Harunori, 4,058,195, Cl. 197-18.000.
Chang, Pei K.: *See—*
Concilio-Nolan, Mary C.; and Chang, Pei K., 4,058,510, Cl. 260-112.00R.
Chase, Marston. Adhesive picture mount. 4,057,923, Cl. 40-158.00R.
Chemie Linz Aktiengesellschaft: *See—*
Schonbeck, Rupert; Kloimstein, Engelbert; and Wittmann, Erwin, 4,058,390, Cl. 71-92.000.
Cheng, Paul J., to Phillips Petroleum Company. Filtering apparatus. 4,058,379, Cl. 55-302.000.
Cheung, Harry, to Union Carbide Corporation. Porous metal-alumina composite. 4,058,485, Cl. 252-466.0PT.
Chi, Chang Whan; Hoffman, Gordon Herman; and Eichhorn, Emil, to W. R. Grace & Co. Forming and crystallization process for molecular sieve manufacture. 4,058,586, Cl. 423-118.000.
Chiaramonte, Thomas J.: *See—*
Longman, Rodney A.; and Chiaramonte, Thomas J., 4,057,869, Cl. 15-250.320.
Chicago Roller Skate Company: *See—*
Ware, Robert R., Jr., 4,058,323, Cl. 280-11.10R.
Chinoin Gyogyszer es Vegyeszeti Termekek Gyara RT: *See—*
Zsolnai, Tibor; Lugosi, Gyorgy; Szepesi, Istvan; Bakonyi, Maria; Racz, Istvan; and Radvany nee Hegedus, Erzsebet, 4,058,608, Cl. 424-226.000.
Choksi, Pradip Vinobchandra; Johnston, Donald Leroy; and Seemayer, Walter, to American Hospital Supply Corporation. Vented needle for medical liquids. 4,058,121, Cl. 128-221.000.
Chopp, Peter G. Adjustable flashlight holder. 4,058,719, Cl. 362-190.000.
Christensen, Burton G.: *See—*
Cama, Lovji D.; Christensen, Burton G.; Karady, Sandor; and Sletzinger, Meyer, 4,058,661, Cl. 544-21.000.
Christians, Tom A.: *See—*
Staff, Charles H.; Kunert, Gale F.; and Christians, Tom A., 4,058,633, Cl. 426-315.000.
Christiansen, Torbe Falch, to Radiometer A/S. Electrochemical measuring electrode. 4,058,447, Cl. 204-195.00P.
Chudleigh, Walter H., Jr., to Control Data Corporation. MTI system and method. 4,058,809, Cl. 343-7.00A.
Chugai Seiyaku Kabushiki Kaisha: *See—*
Hata, Shun-ichi; Mizuno, Koji; Nishii, Yasuho; Mitsuishi, Etsuko; and Shiba, Motoharu, 4,058,601, Cl. 424-180.000.
Mori, Takashi; Takaku, Sakae; Oi, Nobuhiro; Shindo, Minoru; Hirano, Takeaki; Kataoka, Shigeyuki; and Furuno, Kouji, 4,058,523, Cl. 544-165.000.
Ciba-Geigy AG: *See—*
Martin, Henry; Pissiotas, Georg; and Dittrich, Volker, 4,058,604, Cl. 424-211.000.
Ciba-Geigy Corporation: *See—*
Dexter, Martin; and Steinberg, David Herbert, 4,058,502, Cl. 260-45.85B.
Graf, Wilfried; and Schmid, Erich, 4,058,529, Cl. 260-251.00A.
Ilvespaa, Atso, 4,058,617, Cl. 424-270.000.
Karrer, Friedrich; and Farooq, Saleem, 4,058,627, Cl. 424-341.000.
Knell, Martin, 4,058,573, Cl. 260-653.10T.
Lohmann, Frank; Lugrin, Raymond; and Baumann, Hanspeter, 4,058,480, Cl. 252-301.210.
Meyer, Hans-Rudolf, 4,058,408, Cl. 106-176.000.
Mueller, Karl Friedrich, 4,058,537, Cl. 260-346.300.
Cincinnati Milacron Inc.: *See—*
Ondercin, Robert Michael; and Borzcik, Paul Stephen, 4,058,711, Cl. 364-101.000.
Citrin, Paul Stuart, to Dynatech Laboratories Incorporated. Method and apparatus for transferring liquid. 4,058,146, Cl. 141-1.000.
CKD Praha, Oborovy podnik: *See—*
Bazika, Vladimir; Prazak, Premysl; and Havelkova, Dana, 4,057,999, Cl. 73-53.000.
Claassen, Manfred, to Licentia Patent-Verwaltungs-G.m.b.H. Semiconductor diode. 4,058,824, Cl. 357-15.000.
Clancy, Timothy. Table rail. 4,058,280, Cl. 248-2.000.
Clark, Becky J.; and Seitz, Charles L., to Burroughs Corporation. Asynchronous self timed queue. 4,058.773, Cl. 328-37.000.
Clark, William E. Contact breaker assembly with breaker arm spacer block. 4,058,692, Cl. 200-31.00A.
Clatworthy, Edward Frederick: *See—*
Eiselstein, Herbert Louis; Clatworthy, Edward Frederick; and Smith, Darrell Franklin, Jr., 4,058,416, Cl. 148-32.000.
Clavell, Cesar: *See—*
Zirino, Alberto; Clavell, Cesar; and Huey, Kent, 4,058,446, Cl. 204-195.00R.
Clean Air Engineering, Inc.: *See—*
Stary, Marvin L.; Brown, Edward L.; and Pridonoff, Eric L., 4,058,147, Cl. 141-45.000.
Clites, Philip G., to United States of America, Interior. Cold crucible. 4,058,668, Cl. 13-32.000.

Cluett, Peabody & Co., Inc.: *See—*
Lawrence, Jackson, 4,058,375, Cl. 55-70.000.
Coffey, John R.: *See—*
Rogers, Robert N., 4,058,464, Cl. 210-356.000.
Cole, Carroll Richard: *See—*
Atherton, Robert Allan; and Cole, Carroll Richard, 4,058,174, Cl. 172-781.000.
Cole, Peter Harold: *See—*
Vaughan, Richard; and Cole, Peter Harold, 4,058,217, Cl. 209-74.00M.
Colgate-Palmolive Company: *See—*
Colodney, Daniel, 4,058,595, Cl. 424-50.000.
Crawford, Richard J.; and Robbins, Clarence R., 4,058,131, Cl. 132-7.000.
Nachtigal, Julius Harvey, 4,058,596, Cl. 424-50.000.
Colodney, Daniel, to Colgate-Palmolive Company. Stabilized toothpastes containing an enzyme. 4,058,595, Cl. 424-50.000.
Columbus McKinnon Corporation: *See—*
Schreyer, Kenneth D.; Rohosy, Soma M.; and Manney, Charles J., 4,058,291, Cl. 254-74.000.
Combustion Engineering Inc.: *See—*
Anthony, Andrew J., 4,058,436, Cl. 176-78.000.
Comdial Corporation: *See—*
Lake, Don W., 4,058,805, Cl. 340-347.0DA.
Comer, Glen S., Jr.: *See—*
Chamberlain, Monte; Comer, Glen S., Jr.; and Elliott, Fredrick H., 4,058,189, Cl. 188-77.00R.
Commercial Shearing, Inc.: *See—*
Petro, John D., 4,058,135, Cl. 137-106.000.
Commissariat a l'Energie Atomique: *See—*
Vrillon, Bernard, 4,058,188, Cl. 188-1.00C.
Communications Patents Limited: *See—*
Gargini, Eric John, 4,058,770, Cl. 325-308.000.
Compression Coat Corporation: *See—*
Case, Patrick P.; and Gardner, David L., 4,058,428, Cl. 156-429.000.
Con-Spec Devices Inc.: *See—*
Walski, Stanley, 4,058,285, Cl. 249-216.000.
Concast Incorporated New York: *See—*
Streubel, Hans; Backhaus, Karl; and John, Wolfgang, 4,058,154, Cl. 164-82.000.
Concilio-Nolan, Mary C.; and Chang, Pei K., to Stauffer Chemical Company. Process for separating sodium lauryl sulfate (SLS) from a SLS/protein complex. 4,058,510, Cl. 260-112.00R.
Conliff, Vincent B., deceased: *See—*
Rogers, Robert N., 4,058,464, Cl. 210-356.000.
Conrad, Bernhard: *See—*
Reiss, Karl Hans; Kotschak, Otto; and Conrad, Bernhard, 4,058,721, Cl. 250-213.0VT.
Contant, Claude. Anti-dazzle eye shade. 4,057,852, Cl. 2-12.000.
Continental Oil Company: *See—*
Cabbiness, Dale K., 4,058,366, Cl. 23-230.0EP.
Sias, Roy C., 4,058,467, Cl. 252-8.55D.
Stode, Ralph A., 4,058,015, Cl. 73-395.000.
Control Data Corporation: *See—*
Chudleigh, Walter H., Jr., 4,058,809, Cl. 343-7.00A.
Thompson, John R., 4,058,829, Cl. 358-84.000.
Copal Company Limited: *See—*
Yamazaki, Masaru, 4,058,807, Cl. 340-347.0DA.
Copeland, William G. Vehicle headlight warning circuit. 4,058,793, Cl. 340-52.00D.
Corbic nee Busnel, Bernadette Corbic, to Societe: Toscara Anstalt. Manufacture of white cheese or yogurt. 4,058,630, Cl. 426-36.000.
Cordell, Carl R., Jr. Fishing rod. 4,057,926, Cl. 43-18.0GF.
Corman, James C.; and Walmet, Gunnar E., to General Electric Company. Heat transfer device. 4,058,160, Cl. 165-105.000.
Cotrel, Claude: *See—*
Barreau, Michel; Cotrel, Claude; and Jeanmart, Claude, 4,058,611, Cl. 424-250.000.
Cousse, Henri; Mouzin, Gilbert; and Rieu, Jean-Pierre, to Pierre Fabre S.A. Aromatic keto acids and derivatives having analgetic, antiinflammatory, and hypocholesterolemizing action. 4,058,558, Cl. 260-515.00A.
Cox, David A.; and Shroot, Braham, to Pfizer Inc. 7-D-(α-Acylaminoarylacetamido)-cephalosporanic acid derivatives. 4,058,610, Cl. 424-246.000.
Crager, William C.; Umarji, Sudhindra R.; Griffin, Robert H.; and Louit, Gerard J., to International Telephone and Telegraph Corporation. Packet-switched data communications system. 4,058,672, Cl. 178-3.000.
Crager, William C.; Umarji, Sudhindra R.; Griffin, Robert H.; and Louit, Gerard J., to International Telephone and Telegraph Corporation. Packet-switched facsimile communications system. 4,058,838, Cl. 358-257.000.
Craig, Helen C. Covered garment hanger. 4,058,241, Cl. 223-98.000.
Crawford, Richard J.; and Robbins, Clarence R., to Colgate-Palmolive Company. Improving hair body and manageability with diperisophthalic acid. 4,058,131, Cl. 132-7.000.
Crescent Hosiery Mills: *See—*
Runac, John J., 4,057,981, Cl. 66-185.000.
Crickmer, Charles D., to Otis Engineering Corporation. Well setting tool. 4,058,166, Cl. 166-315.000.
Crimes, Peter B., to Kennecott Copper Corporation. Pyrometallurgical system for solid-liquid contacting. 4,058,394, Cl. 75-61.000.
Crivello, James V., to General Electric Company. Cationically polymerizable compositions containing group VIa onium salts. 4,058,400, Cl. 96-86.00P.
Crivello, James V., to General Electric Company. Photocurable compositions containing group via aromatic onium salts. 4,058,401, Cl. 96-115.00R.
Crocket, James H. Metering device. 4,058,006, Cl. 73-113.000.
Cross, Barrington; and Walworth, Bryant Leonidas, to American Cyanamid Company. 1,2-Dialkyl-3,4,5-trisubstituted pyrazolium salts as herbicidal agents. 4,058,391, Cl. 71-92.000.
Crossbow, Inc.: *See—*
Trott, David H., 4,058,013, Cl. 73-352.000.
Crouse-Hinds Company: *See—*
Carlisle, Roger P., 4,058,358, Cl. 339-44.00M.
Crout, Prescott D.: *See—*
Banks, Clarence K.; Crout, Prescott D.; and Homer, Paul B., 4,058,275, Cl. 244-3.150.
Crowle, Brian, to RCA Corporation. Over-current prevention circuitry for transistor amplifiers. 4,058,775, Cl. 330-267.000.
Crown Manufacturing Company: *See—*
Eash, George, 4,058,155, Cl. 164-152.000.
Cruse, Bernd, to International Business Machines Corporation. Article handling device. 4,058,223, Cl. 214-1.0BB.
Curtis, Robert Bartlett, to Bell Telephone Laboratories, Incorporated. Telephone message timing system. 4,058,680, Cl. 179-7.10R.
Curtiss, George C. Pipe-cigaret. 4,058,130, Cl. 131-192.000.
Curtiss-Wright Corporation: *See—*
Gavrun, Michael T.; and Loyd, Robert W., Jr., 4,058,321, Cl. 277-81.00P.
Cutler-Hammer, Inc.: *See—*
Anthony, Romuald, 4,058,723, Cl. 250-235.000.
Czajlik, Eva, nee Csizer: *See—*
Kekesy, Tibor; Szeberenyi, Szabolcs; Beer, Gyorgy; Dudas, Antal; Hajos, Gyorgy; Szporny, Laszlo; and Czajlik, Eva, nee Csizer, 4,058,522, Cl. 260-239.570.
D. H. Baldwin Company: *See—*
Wade, David R.; and Munch, Walter, Jr., 4,058,042, Cl. 84-1.010.
Dahlmann, Julius: *See—*
Frohlich, Alfons; Dahlmann, Julius; and Volter, Gunter, 4,058,145, Cl. 139-384.00B.
Dahlquist, Emil F., to Radiant Grate, Inc. Grate. 4,058,108, Cl. 126-137.000.
Dai Nippon Toryo Co., Ltd.: *See—*
Jinnai, Toshio; Matusmoto, Goro; and Iwasaki, Kazuhito, 4,058,475, Cl. 252-299.000.
Daimler-Benz Aktiengesellschaft: *See—*
Burckhardt, Manfred H., 4,058,346, Cl. 303-22.00R.
Wiegard, Klaus, 4,058,157, Cl. 165-8.000.
Dal Negro, Ruggero, to Italo Americana Prentice S.p.A. Tape-supported slide-fastener element. 4,058,144, Cl. 139-384.00B.
D'Alelio, Gaetano Francis, to University of Notre Dame du Lac. Chain-extending amine end-capped polyimides. 4,058,505, Cl. 260-47.0CP.
Dallaire, Lucien. Roller skate with maneuverability adjustments. 4,058,324, Cl. 280-11.220.
Dalton, James H.; Stover, S. Dalton; and Roney, Robert M., to Lok-A-Wat, Inc. Entry-controlled energy system. 4,058,740, Cl. 307-116.000.
Dan Wesson Arms, Inc.: *See—*
Brouthers, Paul E., 4,058,050, Cl. 89-14.00C.
Danahy, Philip J. Hull foils with hydrodynamic righting forces. 4,058,076, Cl. 114-281.000.
Danfoss A/S: *See—*
Hallgreen, Knud Julius, 4,058,254, Cl. 236-68.00B.
Danilov, Alexandr Ivanovich: *See—*
Bykhovsky, David Grigorievich; and Danilov, Alexandr Ivanovich, 4,058,698, Cl. 219-121.00P.
Dano, Arnold Vincent; Tomaszewski, Jerry James; and Friedrichs, Jerome Peter, to Motorola, Inc. Thermally stabilized crystal mounting assembly. 4,058,744, Cl. 310-343.000.
Darjany, John C., to R. D. Products, Inc. Magnetic-type information card and method and apparatus for encoding and reading. 4,058,839, Cl. 360-2.000.
Daumas, Jean-Claude, to Rhone-Progil. Process for the oxychlorination of hydrocarbons with ammonium chloride. 4,058,574, Cl. 260-659.00A.
Davidson & Co. Limited: *See—*
Blom, Johannes Cornelis; and Tindall, Colin Edward, 4,058,158, Cl. 165-9.000.
Debourge, Jean-Claude; and Trochme, Martine, to Philagro S.A. Fungicidal treatment and composition. 4,058,600, Cl. 424-128.000.
Decca Record Company Ltd.: *See—*
O'Brien, William Joseph, 4,058,742, Cl. 307-260.000.
DeCesaris, Adolph. Earring with ornament of non-rigid plastic having resilient filler. 4,057,980, Cl. 63-13.000.
Defiance - Azon Corporation: *See—*
McNeil, Sharon S.; Bloomquist, Carl R.; and Johnston, Robert C., 4,058,399, Cl. 96-75.000.
DeFilippo, Louis M.: *See—*
Patterson, Francis J.; and DeFilippo, Louis M., 4,058,053, Cl. 100-26.000.
DeLaMater, George B., to Air Products and Chemicals, Inc. Flue gas conditioning with spiking gas containing sulfur trioxide. 4,058,372, Cl. 55-5.000.
Delle-Alsthom: *See—*
Deville, Robert, 4,058,848, Cl. 361-128.000.
Delle Donne, Roberto; and Musumeci, Luigi, to Societa Italiana

Telecomunicazioni Siemens S.p.A. Expandable memory for PCM signal transmission. 4,058,682, Cl. 179-15.0AF.
del Toro, James J.; and Bussjager, Rudy C., to Carrier Corporation. Heat pump system. 4,057,975, Cl. 62-324.000.
del Toro, James J.; and Bussjager, Rudy C., to Carrier Corporation. Heat exchanger. 4,057,976, Cl. 62-324.000.
DeMarinis, Robert M., to SmithKline Corporation. 7-Dithioacetamido cephalosporins. 4,058,609, Cl. 424-246.000.
Demas, Nickolas P.; Duncan, William E.; Gephart, Norman S.; and Waltz, William T. S., to Wagner Electric Corporation. Filament shield for sealed headlamp and mounting method therefor. 4,058,749, Cl. 313-326.000.
DeMuro, Frank P.: *See—*
Rapino, Norman G.; and DeMuro, Frank P., 4,057,907, Cl. 34-4.000.
Denoor, Gaston; and Thillet, Georges, to B.V.S. Apparatus for winding plural strips under tension. 4,058,278, Cl. 242-7.220.
Denzinger, Walter; Seelert, Kurt; and Herrle, Karl, to BASF Aktiengesellschaft. Manufacture of low molecular weight poly-N-vinylpyrrolidone-2. 4,058,655, Cl. 526-212.000.
de Saint Palais, Jacques; Laffont, Paul; and Mourlevat, Jean, to Societe Nationale Elf Aquitaine (Production). Riser pipe for pivotally attached structure used to extract petroleum from beneath a body of water. 4,058,137, Cl. 137-236.00S.
DeSoto, Inc.: *See—*
Sekmakas, Kazys; and Hesler, Kenneth K., 4,058,499, Cl. 260-29.6RW.
Detroit Autobody Equipment, Inc.: *See—*
Wolgast, Raymond P.; and Lamanna, Joe, 4,057,994, Cl. 72-441.000.
Deutsche Gold- und Silber-Scheideanstalt Vormals Roessler: *See—*
Haschke, Heinz; Schreyer, Gerd; Schwarze, Werner; and Suchsland, Helmut, 4,058,662, Cl. 544-208.000.
Deville, Robert, to Delle-Alsthom. Cut-off chamber of a lightning protector. 4,058,848, Cl. 361-128.000.
DeVries, Roy F.; and Snyder, William H. Sublimation transfer and method. 4,058,644, Cl. 428-200.000.
Dexter, Martin; and Steinberg, David Herbert, to Ciba-Geigy Corporation. Stabilized compositions containing hindered hydroxyalkanoates. 4,058,502, Cl. 260-45.85B.
Diamond International Corporation: *See—*
Williams, Glenn V., Jr., 4,058,435, Cl. 162-371.000.
Dickey-john Corporation: *See—*
Bachman, Wesley J., 4,058,712, Cl. 364-564.000.
Didier Engineering GmbH: *See—*
Bellenberg, Heinz; Kucharzyk, Werner; Rohde, Wolfgang; and Siebert, Werner, 4,058,230, Cl. 214-18.200.
Dietz, Frederick P., to Jacobus, Charles; Jacobus, Josephine; Wiltgen, Leroy; and Wiltgen, Rita, part interest to each. Nail polish bottle opener. 4,058,132, Cl. 132-73.000.
Dietzel, Walter; and Matusch, Siegfried, to Braunschweigische Maschinenbauanstalt. Counter-current leaching tower. 4,058,410, Cl. 127-5.000.
DiFazio, Joseph, to Acorn Building Components, Inc. Astragal and flush bolt assembly. 4,058,332, Cl. 292-147.000.
Di Marco, Aurelio: *See—*
Arcamone, Federico; Di Marco, Aurelio; and Penco, Sergio, 4,058,519, Cl. 424-180.000.
DiMercurio, John S.: *See—*
Paterson, Malcolm M.; DiMercurio, John S.; and Mooradian, Albert H., 4,057,909, Cl. 34-76.000.
Di Noia, Francesco, to Idea Didattica Editrice. Instrument for facilitating the calculation of equivalent values. 4,057,912, Cl. 35-31.00E.
Director-General of the Agency of Industrial Science and Technology: *See—*
Futai, Norio; Murakami, Toshio; Takahara, Yoshimasa; and Kumazawa, Toshiharu, 4,058,481, Cl. 252-321.000.
Dirks, Wolfgang Gerhard, to Burroughs Corporation. Low-mass short-stroke voice-coil actuator for integrated disk file module. 4,058,844, Cl. 360-106.000.
DiToro, Michael J., to General Signal Corporation. Equalization by adaptive processing operating in the frequency domain. 4,058,713, Cl. 364-724.000.
Dittrich, Volker: *See—*
Martin, Henry; Pissiotas, Georg; and Dittrich, Volker, 4,058,604, Cl. 424-211.000.
Dodson, Stuart Alan: *See—*
Douglas, George Henry; Studt, William Lyon; and Dodson, Stuart Alan, 4,058,557, Cl. 260-501.140.
Domtar Limited: *See—*
Akkerman, Allardus A., 4,058,250, Cl. 229-52.00B.
Buck, Stanley Edward, 4,058,249, Cl. 229-34.0HW.
McArdle, James Michael Smith, 4,058,248, Cl. 229-30.000.
Dornier GmbH.: *See—*
Altmann, Helmut, 4,058,710, Cl. 364-433.000.
Kozakiewicz, Hugo; and Reuter, Wolfgang, 4,058,277, Cl. 244-17.170.
Douglas, George Henry; Studt, William Lyon; and Dodson, Stuart Alan, to William H. Rorer, Inc. Amidinoureas. 4,058,557, Cl. 260-501.140.
Douglas, Leon L. Apparatus for applying transfers to fabrics. 4,058,055, Cl. 101-10.000.
Douglas, Patrick Joseph: *See—*
O'Neill, Patrick; Douglas, Patrick Joseph; and Mallaghan, Michael Lee, 4,058,198, Cl. 198-313.000.
Dow Chemical Company, The: *See—*
Dunbar, Joseph E.; and Begin, Louis E., 4,058,520, Cl. 260-239.00B.
McKendry, Lennon H., 4,058,533, Cl. 260-294.80F.
Drackett Company, The: *See—*
Keyes, George B.; and Murtaugh, Justin J., 4,058,474, Cl. 252-160.000.
Draeger, William H.: *See—*
Maitland, Peter; and Draeger, William H., 4,058,677, Cl. 179-1.5FS.
Dravo Corporation: *See—*
Briggs, Aubrey C., 4,058,203, Cl. 198-509.000.
Drayton, Walker E., to American Chain & Cable Company, Inc. Theft-deterrent chain locking device. 4,057,982, Cl. 70-14.000.
Dresser Industries, Inc.: *See—*
Langford, James W., Jr.; and Keller, Wilbur S., 4,058,177, Cl. 175-374.000.
Dressler, Bruno Jean-Marie. Apparatus for hauling a flexible, textile or metal rope, cable or the like. 4,058,294, Cl. 254-167.000.
Drewery, John Oliver; and Weston, Martin, to Marconi Company Limited, The; and Standard Telephones & Cables Limited. Noise reduction in television signals. 4,058,836, Cl. 358-167.000.
Drews, Ulrich; Kraus, Bernd; Singer, Erich; and Schnurle, Hans, to Robert Bosch GmbH. Method and apparatus for RPM limitation in internal combustion engines. 4,058,106, Cl. 123-198.0DB.
Dreyer, Heinz, to Amazonen-Werke H. Dreyer. Attaching device for mounting of a broadcast fertilizer spreader on a tractor. 4,058,180, Cl. 180-14.00R.
Driscoll, John S.: *See—*
Beisler, John A.; Abbasi, Mohamed M.; and Driscoll, John S., 4,058,602, Cl. 424-180.000.
D'Silva, Themistocles D. J., to Union Carbide Corporation. N-substituted cyanoalkane-sulfenyl (and thiosulfenyl)-N-alkyl carbamoyl halides. 4,058,549, Cl. 260-465.400.
Dual Gebruder Steidinger: *See—*
Broghammer, Werner; Kramer, Jurgen; and Laufer, Helmut, 4,058,687, Cl. 179-100.110.
Dudas, Antal: *See—*
Kekesy, Tibor; Szeberenyi, Szabolcs; Beer, Gyorgy; Dudas, Antal; Hajos, Gyorgy; Szporny, Laszlo; and Czajlik, Eva, nee Csizer, 4,058,522, Cl. 260-239.570.
Dudzinski, Zdzislaw W.: *See—*
Wakeman, Reginald L.; Dudzinski, Zdzislaw W.; and Lada, Arnold, 4,058,488, Cl. 252-542.000.
Dukic, Ferdinando V., to United States of America, Army. Gravity-deployed munition with a mechanical gravity-controlled switch. 4,058,060, Cl. 102-8.000.
Dulaney, Eugene L.: *See—*
Jacobus, David P.; Dulaney, Eugene L.; and Grier, Nathaniel, 4,058,624, Cl. 424-330.000.
Jacobus, David P.; Dulaney, Eugene L.; and Grier, Nathaniel, 4,058,625, Cl. 424-325.000.
Dulat, Marcel Louis: *See—*
Hennart, Claude; and Dulat, Marcel Louis, 4,058,607, Cl. 424-219.000.
Dunbar, Joseph E.; and Begin, Louis E., to Dow Chemical Company, The. Aminoalkylthiopyridazine compounds. 4,058,520, Cl. 260-239.00B.
Duncan, Charles; and Hopkins, Richard H., to Westinghouse Electric Corporation. Infrared temperature control of Czochralski crystal growth. 4,058,429, Cl. 156-601.000.
Duncan, William E.: *See—*
Demas, Nickolas P.; Duncan, William E.; Gephart, Norman S.; and Waltz, William T. S., 4,058,749, Cl. 313-326.000.
Dunn, Earl F.; Erskine, Henry; and Hooper, Edward, to Singer Company, The. Sewing machine presser bar mechanism. 4,058,071, Cl. 112-235.000.
Dunn, Robert T.; Brown, William M.; and Ruddy, John M., to Astech, Inc. Remote signalling to a telephone line utilizing power line carrier signals. 4,058,678, Cl. 179-2.50R.
Du Pont de Nemours, E. I., and Company: *See—*
Eigenbrode, George Thomas, 4,057,879, Cl. 24-230.00R.
Durand, James C., to Caterpillar Tractor Co. Maximum temperature range indicator. 4,058,014, Cl. 73-358.000.
Durth, Wilfried, to Buderus'sche Eisenwerke Aktiengesellschaft. Method of treating a foodstuff in an oven with moisture. 4,058,635, Cl. 426-509.000.
Duska, Joseph J.; and McGill, Paul E., to Midland-Ross Corporation. Screw extruder with an enlarged feed section. 4,058,298, Cl. 366-76.000.
Dussel, Wilhelm: *See—*
Jung, Hans; Kovacs, Jenoe; Dussel, Wilhelm; and Lehmann, Helmut, 4,058,640, Cl. 427-118.000.
Dynamit Nobel Aktiengesellschaft: *See—*
Ackermann, Otto; Bleh, Otto, deceased; and Rogler, Walter, 4,058,553, Cl. 560-180.000.
Dynatech Laboratories Incorporated: *See—*
Citrin, Paul Stuart, 4,058,146, Cl. 141-1.000.
Dyson, James, to Kirk-Dyson Designs Ltd. Ground engaging member for movable structures. 4,058,344, Cl. 301-7.000.
Eash, George, to Crown Manufacturing Company. Portable centrifugal casting machine. 4,058,155, Cl. 164-152.000.
Eastman Kodak Company: *See—*
Ladd, John H., 4,058,828, Cl. 358-80.000.
Echlin Manufacturing Company, The: *See—*
Klimek, Boleslaw M., 4,058,345, Cl. 303-6.00M.
Eckman, Ronald E. Dispenser. 4,058,238, Cl. 222-305.000.

Edson Tool and Manufacturing Company, Inc.: *See—*
Prather, Joseph E.; and Khalifa, Ramzi A., 4,058,334, Cl. 292-241.000.
Edwards, Harrison F., to Norwich Laboratory, Inc. Combination isobaric steam-heater and enclosure for use with fireplaces. 4,058,107, Cl. 126-121.000.
Edwards, Robert F.: *See—*
Mole, Cecil J.; and Edwards, Robert F., 4,058,746, Cl. 310-10.000.
Ehara, Toshiyasu: *See—*
Takahashi, Toshio; Ehara, Toshiyasu; Tagaya, Ryosaku; and Tagaya, Mikio, 4,058,736, Cl. 250-573.000.
Takahashi, Toshio; Ehara, Toshiyasu; Tagaya, Ryosaku; and Tagaya, Mikio, 4,058,737, Cl. 250-573.000.
Eichhorn, Emil: *See—*
Chi, Chang Whan; Hoffman, Gordon Herman; and Eichhorn, Emil, 4,058,586, Cl. 423-118.000.
Eicker, Karl G.: *See—*
Schulz, Siegfried; Eicker, Karl G.; and Reinke, August, 4,058,693, Cl. 200-67.00F.
Eigenbrode, George Thomas, to Du Pont de Nemours, E. I., and Company. Headers with insertable latch members. 4,057,879, Cl. 24-230.00R.
Eisai Co., Ltd.: *See—*
Takahashi, Toshio; Ehara, Toshiyasu; Tagaya, Ryosaku; and Tagaya, Mikio, 4,058,736, Cl. 250-573.000.
Takahashi, Toshio; Ehara, Toshiyasu; Tagaya, Ryosaku; and Tagaya, Mikio, 4,058,737, Cl. 250-573.000.
Eiselstein, Herbert Louis; Clatworthy, Edward Frederick; and Smith, Darrell Franklin, Jr., to Huntington Alloys, Inc. Matrix-stiffened heat and corrosion resistant wrought products. 4,058,416, Cl. 148-32.000.
Eisenberg, Robert M., to Singer Company, The. Simulated training system that utilizes operational equipment. 4,057,913, Cl. 35-12.00B.
Eitel, Frederick G.: *See—*
Trenschel, Donald R.; and Eitel, Frederick G., 4,058,263, Cl. 239-551.000.
El Paso Products Company: *See—*
Mims, Samuel S., 4,058,555, Cl. 560-191.000.
Elam, Robert R.: *See—*
Muehldorf, Eugen I.; and Elam, Robert R., 4,058,767, Cl. 324-73.00R.
Electric Power Research Institute: *See—*
Kurz, Robert A.; and Whirlow, Donald K., 4,058,373, Cl. 55-16.000.
Electric Power Research Institute, Inc.: *See—*
Birk, James R., 4,058,396, Cl. 75-77.000.
Gordon, Hayden S., 4,058,024, Cl. 74-572.000.
Electro-Thermal Corporation: *See—*
Jerles, James B., 4,058,702, Cl. 219-321.000.
Elek, Stephen Dyonis: *See—*
Stern, Harold; and Elek, Stephen Dyonis, 4,058,598, Cl. 424-89.000.
Elektro-Physik Hans Nix & Dr. -Ing. Erich Steingroever KG: *See—*
Steingroever, Erich, 4,058,763, Cl. 324-205.000.
Elkins, Johnny C.; and Hanz, Marvin C. Window rack. 4,058,221, Cl. 211-87.000.
Elliott, Fredrick H.: *See—*
Chamberlain, Monte; Comer, Glen S., Jr.; and Elliott, Fredrick H., 4,058,189, Cl. 188-77.00R.
Elliott, John: *See—*
Stingl, Hans Alfred; and Elliott, John, 4,058,515, Cl. 260-151.000.
Elmeg Elektro-Mechanik GmbH: *See—*
Reuting, Hans-Werner, 4,058,783, Cl. 335-276.000.
Elmendorf Research, Inc.: *See—*
Etzold, Roland, 4,058,201, Cl. 198-382.000.
End Devices, Inc.: *See—*
Welton, Barry S.; Westerman, Granval W.; and Hill, Michael E., 4,058,757, Cl. 318-474.000.
Enebrad, Lois: *See—*
McKee, Paul, deceased, 4,058,465, Cl. 210-356.000.
Engeler, William E., to General Electric Company. Surface charge signal processing apparatus. 4,058,717, Cl. 364-824.000.
Enyeart, Lyle F. Apparatus for aerating comminuted matter such as soil. 4,057,933, Cl. 47-79.000.
Epstein, Harold M.: *See—*
Mallozzi, Philip J.; Epstein, Harold M.; Jung, Richard G.; Applebaum, David C.; Fairand, Barry P.; and Gallagher, William J., 4,058,486, Cl. 250-493.000.
Erskine, Henry: *See—*
Dunn, Earl F.; Erskine, Henry; and Hooper, Edward, 4,058,071, Cl. 112-235.000.
ESCO Corporation: *See—*
Smith, Floyd O., 4,058,023, Cl. 74-243.0DR.
Esec Sales S.A.: *See—*
Nicklaus, Karl, 4,058,246, Cl. 228-121.000.
Eskeli, Michael. Thermodynamic machine with step type heat addition. 4,057,965, Cl. 60-650.000.
Estaque, Andre F., to Societe Anonyme Automobiles Citroen. Transmission-regulating device for motor vehicle. 4,058,028, Cl. 74-865.000.
Estaque, Andre F., to Societe Anonyme Automobiles Citroen. Transmission-regulating device for motor vehicle. 4,058,029, Cl. 74-865.000.
Eta A.G. Ebauches-Fabrik: *See—*
Giger, Urs; and Perrot, Friedrich, 4,057,885, Cl. 29-177.000.
Ethyl Corporation: *See—*
Malec, Robert E., 4,058,468, Cl. 252-46.700.
Walter, Thomas J., 4,058,560, Cl. 260-535.00P.
Ethylene Plastique: *See—*
Boucheron, Bernard; and Gosset, Emile, 4,058,653, Cl. 526-159.000.
Etter-Felix, Hansruedi. Arrangement for monitoring pneumatic tire inflation pressure. 4,058,009, Cl. 73-146.800.
Ettridge, John P. Child's car seat. 4,058,342, Cl. 297-250.000.
Etzold, Roland, to Elmendorf Research, Inc. Method and apparatus for orienting wood strands into parallelism. 4,058,201, Cl. 198-382.000.
Eue, Ludwig: *See—*
Hofer, Wolfgang; Maurer, Fritz; Riebel, Hans-Jochem; Rohe, Lothar; Eue, Ludwig; and Schmidt, Robert R., 4,058,525, Cl. 544-182.000.
Thomas, Rudolf; Kramer, Wolfgang; Eue, Ludwig; Metzger, Carl; and Jager, Gerhard, 4,058,392, Cl. 71-106.000.
Eunipp AG.: *See—*
Flisch, Hermann, 4,058,035, Cl. 82-3.000.
Evans, Albert E. J.; and Turner, Peter G., to Koninklijke Emballage Industrie Van Leer B.V. Light-weight, flexible, easy-open, impermeable package system. 4,058,632, Cl. 426-126.000.
Evans, David A., to University of California, The Regents of the. Cyclopentene sulfoxides. 4,058,567, Cl. 260-607.00A.
Exel Oy: *See—*
Aho, Yrjo, 4,057,856, Cl. 2-209.000.
Exner, Rainer, to Sartorius-Werke GmbH. Vibrating wire measuring instrument. 4,058,007, Cl. 73-141.00A.
Exxon Research & Engineering Co.: *See—*
Cahn, Robert P.; and Longwell, John P., 4,058,575, Cl. 260-666.00P.
Ilnyckyj, Stephan, 4,058,371, Cl. 44-62.000.
Park, Im K., 4,058,581, Cl. 264-136.000.
Potter, Gordon C., 4,058,148, Cl. 141-198.000.
Sarsten, Jan A., 4,057,972, Cl. 52-23.000.
Serratore, Joseph; King, Laurence F.; Sutherland, Thomas H.; and Wallace, James R., 4,058,495, Cl. 260-17.00A.
Smith, Stuart B.; McAlpin, James J.; Peruyero, Jose M. A.; Hazelton, Ronald L.; and Upchurch, Edward F., 4,058,652, Cl. 526-68.000.
Fabel, Dolores M.: *See—*
Goodrich, Harold E.; and Fabel, Dolores M., 4,058,292, Cl. 254-88.000.
Fabriques de Tabac Reunies S.A.: *See—*
Beringer, Monique; and Sporri, Heinz, 4,058,129, Cl. 131-140.00C.
Fabritz, Robert E. Fuel economizer for cabureted internal combustion engines. 4,058,102, Cl. 123-141.000.
Fahlen, Theodore S.; and Kirk, Russell F., to GTE Sylvania Incorporated. High power gas transport laser. 4,058,778, Cl. 331-94.50G.
Fairand, Barry P.: *See—*
Mallozzi, Philip J.; Epstein, Harold M.; Jung, Richard G.; Applebaum, David C.; Fairand, Barry P.; and Gallagher, William J., 4,058,486, Cl. 250-493.000.
Fairmont Foods Company: *See—*
Staff, Charles H.; Kunert, Gale F.; and Christians, Tom A., 4,058,633, Cl. 426-315.000.
Fajardo, Raoul J. Cylindrical head joint with acoustic wedging for concert flutes. 4,058,046, Cl. 84-384.000.
Falk, Edward J., to Wagner Electric Corporation. Pressure distribution valve. 4,058,136, Cl. 137-110.000.
Fancher, Llewellyn W., to Stauffer Chemical Company. Process for manufacturing phosphono imidates. 4,058,535, Cl. 260-326.00E.
Far Out Products, Ltd.: *See—*
Stahl, Michael A., 4,057,985, Cl. 70-231.000.
Farooq, Saleem: *See—*
Karrer, Friedrich; and Farooq, Saleem, 4,058,627, Cl. 424-341.000.
Fass, Carl, to Intertrac Viehmann & Co. Bearing seal for endless tracks. 4,058,322, Cl. 277-96.100.
Faulin, Antonio. Ski bindings. 4,058,326, Cl. 280-617.000.
Faulkner, Duane Harold; Smith, Harvell Morton; and Howard, Larry Edward, to Johns-Manville Corporation. Method and apparatus for eliminating external hot gas attenuation in the rotary fiberization of glass. 4,058,386, Cl. 65-6.000.
Fedders Corporation: *See—*
Giurlando, Angelo C.; and Richardson, David, 4,058,361, Cl. 417-312.000.
Fedosjuk, Alexandr Fedorovich: *See—*
Prutkovsky, Evgeny Nikolaevich; Bermatov, Mikhail Albertovich; Tarasov, Evgeny Alexandrovich; Ozerov, Valery Ilich; Fedosjuk, Alexandr Fedorovich; and Krokhin, Vladimir Andreevich, 4,057,966, Cl. 60-678.000.
Feen, Orlin J. Method of removing broken threaded fasteners. 4,057,890, Cl. 29-427.000.
Fein, Marvin M.; Williams, Earl P.; and Field, Nathan D., to GAF Corporation. System for sustained release of phenolic material from porous granules of insoluble polymeric phenolic complexes. 4,058,462, Cl. 210-289.000.
Fenley, William Franklin, Jr.: *See—*
Martin, Lincoln A.; and Fenley, William Franklin, Jr., 4,058,791, Cl. 340-15.5MC.
Fenoglio, Francesco, to Societa Italiana Telecomunicazioni SIEMENS S.p.A. Expandable memory for asynchronous PCM multiplexer. 4,058,683, Cl. 179-15.0AF.
Ferag AG: *See—*
Reist, Walter; Hansch, Egon; and Gosslinghoff, Reinhard, 4,058,202, Cl. 198-482.000.
Ferguson, Marvin D. Engine cylinder sleeve puller and method. 4,057,889, Cl. 29-427.000.
Fettel, Bruce E., to Shiley Laboratories, Inc. Heart valve with arcuate occluder. 4,057,857, Cl. 3-1.500.

Fiat-Allis Construction Machinery, Inc.: *See—*
Murphy, Bernard J., 4,058,351, Cl. 305-54.000.
Field, Nathan D.: *See—*
Fein, Marvin M.; Williams, Earl P.; and Field, Nathan D., 4,058,462, Cl. 210-289.000.
Fields, Louis G. Time perception device. 4,058,113, Cl. 128-2.00N.
Filtrol Corporation: *See—*
Alafandi, Hamid; and Stamires, Dennis, 4,058,484, Cl. 252-455.00Z.
Firth, Jack Graham; Jones, Thomas Alwyn; and Rimmington, Brenda, to National Research Development Corporation. Systems for monitoring the composition of exhaust gases. 4,057,996, Cl. 73-23.000.
Fischer, Artur; and Fischer, Klaus, to Fischer, Artur. Tool and method for drilling a hole with an increased cross-sectional area. 4,058,176, Cl. 175-61.000.
Fischer, Klaus: *See—*
Fischer, Artur; and Fischer, Klaus, 4,058,176, Cl. 175-61.000.
Fischer, Roman: *See—*
Goetz, Norbert; and Fischer, Roman, 4,058,536, Cl. 260-340.700.
Fisher, Martin John, to British Hydromechanics Research Association, The. Slotted worktable. 4,058,040, Cl. 83-177.000.
Fisk, Robert W.: *See—*
Frind, Gerhard; Fisk, Robert W.; and McLaughlin, Michael H., 4,058,785, Cl. 337-204.000.
Fitzgerald, William Joseph; Shelton, Glenmore Lorraine, Jr.; and Wolfe, Robert Nolan, to International Business Machines Corporation. System for converting a rough sketch to a finished drawing. 4,058,849, Cl. 364-520.000.
Flanders, Robert D. Process for making a reinforced board from lignocellulosic particles. 4,058,580, Cl. 264-113.000.
Fleming, John O. Telephone attachment. 4,058,686, Cl. 179-90.0AT.
Fletcher, Gerald M., to Xerox Corporation. Detack and stripping system. 4,058,306, Cl. 271-80.000.
Flisch, Hermann, to Eunipp AG. Automatic lathe. 4,058,035, Cl. 82-3.000.
Florian, John, to Mobil Oil Corporation. Commodity packaging tray. 4,058,247, Cl. 229-2.50R.
FMC Corporation: *See—*
Wright, John F.; and Cannan, Terrance M., 4,058,067, Cl. 111-1.000.
Focke, Heinz. Cardboard container for bottles and the like. 4,057,950, Cl. 53-26.000.
Foley, Richard Gregory, to Harris Corporation. Cylinder folder. 4,058,304, Cl. 270-79.000.
Ford Motor Company: *See—*
Belaire, Richard C., 4,057,962, Cl. 60-526.000.
King, Lamar L., II, 4,058,380, Cl. 55-387.000.
Forsen, Harold K., to Jersey Nuclear-Avco Isotopes, Inc. Ion protected linear electron beam metal evaporator. 4,058,667, Cl. 13-31.000.
Forster, Friedrich M. O. Method and apparatus for examining human periodontal tissues. 4,058,115, Cl. 128-2.00S.
Forster, Friedrich M. O. Method and apparatus for compensation of interference magnetic fields. 4,058,782, Cl. 335-219.000.
Fort, J. Robert: *See—*
Silverman, Daniel; and Fort, J. Robert, 4,058,790, Cl. 340-15.5TS.
Fraley, Phillip Edward, to Bell Telephone Laboratories, Incorporated. Transistor oscillator circuit using thermal feedback for oscillation. 4,058,779, Cl. 331-108.00R.
Frangos, John W. Utensil basket for institutional dishwashing machines. 4,058,233, Cl. 220-19.000.
Frank, Howard A.; and Zoll, Paul M. Electrode. 4,058,128, Cl. 128-418.000.
Frank, Robert G., to PPG Industries, Inc. Orienting and aligning moving glass sheets. 4,058,200, Cl. 198-382.000.
Fravel, John C.; Chang, Louis H.; and Yoshikawa, Harunori, to Xerox Corporation. Increment-decrement logic for serial printer. 4,058,195, Cl. 197-18.000.
Frechtman, Jean. Convertible picture frame stand. 4,058,283, Cl. 248-441.00D.
Freedman Seating Company: *See—*
Wahls, Robert John, 4,058,282, Cl. 248-418.000.
Friedlander, Erich Siegfried, to Associated Electrical Industries Limited. Saturated reactors. 4,058,761, Cl. 323-48.000.
Friedrich Uhde GmbH: *See—*
Baing, Helmut; Oberschachtsiek, Gerd; Grenzing, Horst; and Meurer, Peter, 4,058,069, Cl. 110-8.00F.
Friedrichs, Jerome Peter: *See—*
Dano, Arnold Vincent; Tomaszewski, Jerry James; and Friedrichs, Jerome Peter, 4,058,744, Cl. 310-343.000.
Frielinghaus, Klaus H., to General Signal Corporation. Flat wheel detector. 4,058,279, Cl. 246-169.00R.
Frind, Gerhard; Fisk, Robert W.; and McLaughlin, Michael H., to General Electric Company. Current limiting fuse. 4,058,785, Cl. 337-204.000.
Frohlich, Alfons; Dahlmann, Julius; and Volter, Gunter, to Opti Patent-, Forschungs- und Fabrikations AG. Slide fastener. 4,058,145, Cl. 139-384.00B.
Fromfield, James P., to Automatic Switch Company. Pilot-operated valve having constant closing rate. 4,058,287, Cl. 251-46.000.
Fromm, Carl H.: *See—*
Lee, Henry L., Jr.; Orlowski, Jan A.; and Fromm, Carl H., 4,058,442, Cl. 204-159.120.
Frommlet, Hubert; Mautz, Karl-Heinz; and Brunsch, Klaus, to Messerschmitt-Bolkow-Blohm Gesellschaft mit beschrankter Haftung. Roller bearing assembly with failsafe mechanism. 4,058,353, Cl. 308-1.00A.
Frymaster Corporation, The: *See—*
Price, George M., 4,058,703, Cl. 219-492.000.
Fuchs, Peter: *See—*
Hoffmann, Rolf-Rudiger; and Fuchs, Peter, 4,058,623, Cl. 424-317.000.
Fueki, Shimetomo: *See—*
Tamura, Toshio; Oouchi, Shigeo; Oosawa, Kenji; and Fueki, Shimetomo, 4,058,439, Cl. 204-49.000.
Fuji Electric Co., Ltd.: *See—*
Imaizumi, Yoshihiro; and Nishida, Yoshihiko, 4,058,681, Cl. 179-15.0AL.
Fuji Photo Film Co., Ltd.: *See—*
Murata, Masataka; Takeda, Keiji; and Ikeda, Teppei, 4,058,443, Cl. 204-159.170.
Osada, Chiaki; Hasegawa, Eiichi; and Murata, Masataka, 4,058,398, Cl. 96-27.00R.
Fuji Photo Optical Co., Ltd.: *See—*
Ando, Kunio; Saito, Takemi; and Higuchi, Takeshi, 4,058,827, Cl. 358-55.000.
Fuji Xerox Co. Ltd.: *See—*
Kikuchi, Yoshiki, 4,058,800, Cl. 365-3.000.
Fujimoto, Keimei; Ohno, Nobuo; Okuno, Yoshitoshi; Mizutani, Toshio; Ohno, Isao; Hirano, Masachika; Itaya, Nobushige; and Matsuo, Takashi, to Sumitomo Chemical Company, Limited. Substituted phenyl acetate, insecticidal composition and method of use. 4,058,622, Cl. 424-308.000.
Fujiwara, Shinobu; and Tanaka, Hitoshi, to TDK Electronics Co., Ltd. Sintered ceramic dielectric body. 4,058,404, Cl. 106-73.310.
Fuller, Robert R.; and Morris, Donald Blanton, to Gulf States Paper Corporation. Conversion of sulfur in blank liquor to eliminate odorous emissions and facilitate the collection of sulfate soaps. 4,058,433, Cl. 162-16.000.
Funabiki, Kyohei; and Tokunaga, Tetsuya, to Hooker Chemicals & Plastics Corporation. Refractory compositions. 4,058,403, Cl. 106-56.000.
Fung, Anthony Kei Lun: *See—*
Jones, Peter Hadley; Bariana, Dilbagh Singh; Fung, Anthony Kei Lun; Martin, Yvonne Connolly; Kyncl, Jaroslav; and Lall, Amrit, 4,058,559, Cl. 260-520.00C.
Furuichi, Sei: *See—*
Kiyonaga, Kingo; Ago, Ryousei; and Furuichi, Sei, 4,058,650, Cl. 428-683.000.
Furuno, Kouji: *See—*
Mori, Takashi; Takaku, Sakae; Oi, Nobuhiro; Shindo, Minoru; Hirano, Takeaki; Kataoka, Shigeyuki; and Furuno, Kouji, 4,058,523, Cl. 544-165.000.
Futai, Norio; Murakami, Toshio; Takahara, Yoshimasa; and Kumazawa, Toshiharu, to Mitsubishi Precision Co., Ltd.; and Director-General of the Agency of Industrial Science and Technology. Method of eliminating foam appearing on a liquid surface. 4,058,481, Cl. 252-321.000.
G.A.O. Gesellschaft fur Automation und Organisation mbH: *See—*
Gauch, Wolfgang; Kaule, Wittich; and Pauli, Guenter, 4,057,919, Cl. 40-2.200.
G. D. Searle & Co.: *See—*
Waxman, Albert S., 4,058,001, Cl. 73-620.000.
GAF Corporation: *See—*
Fein, Marvin M.; Williams, Earl P.; and Field, Nathan D., 4,058,462, Cl. 210-289.000.
Gaia, Aldino J., to McGraw-Edison Company. Indicator-equipped, dual-element fuse. 4,058,784, Cl. 337-164.000.
Gaia, Aldino J.; and Urani, Angelo, to McGraw-Edison Company. Protector for electric circuits. 4,058,786, Cl. 337-293.000.
Gallagher, William J.: *See—*
Mallozzi, Philip J.; Epstein, Harold M.; Jung, Richard G.; Applebaum, David C.; Fairand, Barry P.; and Gallagher, William J., 4,058,486, Cl. 250-493.000.
Galloway, Charles Rex: *See—*
Knapp, Merton C.; and Galloway, Charles Rex, 4,058,412, Cl. 134-24.000.
Gappa, Gunther: *See—*
Juntgen, Harald; Klein, Jurgen; and Gappa, Gunther, 4,058,374, Cl. 55-60.000.
Garberi, Sergio: *See—*
Giolitti, Nicolo; and Garberi, Sergio, 4,058,707, Cl. 235-448.000.
Gardner, David L.: *See—*
Case, Patrick P.; and Gardner, David L., 4,058,428, Cl. 156-429.000.
Gardner, Richard H.; and Kelley, Robert D., to B. F. Goodrich Company, The. Brake disc mounting. 4,058,190, Cl. 188-218.0XL.
Gargini, Eric John, to Communications Patents Limited. Solid state subscriber selection switches for wired broadcasting systems. 4,058,770, Cl. 325-308.000.
Gauch, Georg, to Metallgesellschaft Aktiengesellschaft. Apparatus for measuring the flow of fine-grained hot solids. 4,058,012, Cl. 73-228.000.
Gauch, Wolfgang; Kaule, Wittich; and Pauli, Guenter, to G.A.O. Gesellschaft fur Automation und Organisation mbH. Laminated data carrier protected against forgery, particularly identification card. 4,057,919, Cl. 40-2.200.
Gaudette, Roger Robert; Ohlson, John Leonard; and Scanlon, Patricia Marie, to W. R. Grace & Co. Preparation of N,N'-Dicarboxymethyl-1,3-propanediamines. 4,058,527, Cl. 260-251.00R.
Gaudette, Roger Robert; Ohlson, John Leonard; and Scanlon, Patricia Marie, to W. R. Grace & Co. 5-Hydroxyhexahydropyrimidine. 4,058,528, Cl. 260-251.00R.

Gauss, Robert C.; and Wills, Lynn D., to Motorola, Inc. Encapsulated base for whip antenna. 4,058,811, Cl. 343-715.000.
Gavrun, Michael T.; and Loyd, Robert W., Jr., to Curtiss-Wright Corporation. Oil seal construction for rotary mechanisms. 4,058,321, Cl. 277-81.00P.
Gaw, Thomas I. Oil salvage ship with ocean going bow. 4,058,461, Cl. 210-242.00S.
GB Fermentation Industries, Inc.: *See—*
Roan, Charles F., 4,058,631, Cl. 426-52.000.
Gebruder Schmidt Metallwarenfabrik: *See—*
Schmidt, Karl Wilhelm, 4,058,209, Cl. 206-350.000.
Geilhausen, Horst: *See—*
Bauer, Kurt; Wittman, Gunther; Mussgay, Manfred; Irion, Eckart; and Geilhausen, Horst, 4,058,599, Cl. 424-92.000.
General Bathroom Products Corporation: *See—*
Palka, James J., 4,058,718, Cl. 362-235.000.
General Electric Company: *See—*
Bellamy, Winthrop D.; and Holub, Fred F., 4,058,411, Cl. 127-37.000.
Bicicchi, Richard Thomas; and Melilli, Albert Samuel, 4,058,417, Cl. 148-37.000.
Brown, Richard N., 4,058,338, Cl. 294-31.200.
Chambless, Leo B., 4,057,977, Cl. 62-324.000.
Corman, James C.; and Walmet, Gunnar E., 4,058,160, Cl. 165-105.000.
Crivello, James V., 4,058,400, Cl. 96-86.00P.
Crivello, James V., 4,058,401, Cl. 96-115.00R.
Engeler, William E., 4,058,717, Cl. 364-824.000.
Frind, Gerhard; Fisk, Robert W.; and McLaughlin, Michael H., 4,058,785, Cl. 337-204.000.
Ghezzo, Mario, 4,057,895, Cl. 29-591.000.
Goldberg, Howard S., 4,058,716, Cl. 364-824.000.
Insley, Gene L.; and Lewis, Merle J., 4,057,959, Cl. 58-125.00C.
Kinson, Philip L.; and Orlando, Charles M., 4,058,570, Cl. 260-620.000.
Milkovic, Miran, 4,058,768, Cl. 324-142.000.
Sawada, Fred H.; Klementowski, Frank M.; and Bishop, James S., 4,058,804, Cl. 340-248.00A.
Walter, John L., 4,058,415, Cl. 148-32.000.
Will, Fritz G., 4,058,651, Cl. 429-105.000.
General Mills Chemicals, Inc.: *See—*
MacKay, Kenneth D.; and Rogier, Edgar R., 4,058,585, Cl. 423-24.000.
General Signal Corporation: *See—*
Carlson, William L., Jr., 4,058,288, Cl. 251-229.000.
DiToro, Michael J., 4,058,713, Cl. 364-724.000.
Frielinghaus, Klaus H., 4,058,279, Cl. 246-169.00R.
Geophysical Systems Corporation: *See—*
Martin, Lincoln A.; and Fenley, William Franklin, Jr., 4,058,791, Cl. 340-15.5MC.
Silverman, Daniel; and Fort, J. Robert, 4,058,790, Cl. 340-15.5TS.
George Hantscho Company, Inc.: *See—*
Hantscho, Walter G., 4,058,058, Cl. 101-365.000.
George, Peter K.; and Oeffinger, Thomas R., to Rockwell International Corporation. Block oriented random access bubble memory. 4,058,799, Cl. 340-174.0TF.
Geothermal Investment Co.: *See—*
Hutchinson, Arthur J. L., 4,057,964, Cl. 60-641.000.
Gephart, Norman S.: *See—*
Demas, Nickolas P.; Duncan, William E.; Gephart, Norman S.; and Waltz, William T. S., 4,058,749, Cl. 313-326.000.
Getz, Edward J.: *See—*
Barbieri, Thomas; and Getz, Edward J., 4,058,211, Cl. 206-422.000.
Ghezzo, Mario, to General Electric Company. Method of forming sloped members of N-type polycrystalline silicon. 4,057,895, Cl. 29-591.000.
Ghirga, Marcello: *See—*
Piccolo, Luigi; Ghirga, Marcello; Paolinelli, Antonio; and Paganessi, Gian Pietro, 4,058,389, Cl. 71-31.000.
Giger, Urs; and Perrot, Friedrich, to Eta A.G. Ebauches-Fabrik. Method of producing an oscillating weight for automatic timepieces. 4,057,885, Cl. 29-177.000.
Gilford Instrument Laboratories Inc.: *See—*
Gilford, Saul R., 4,058,367, Cl. 23-253.00R.
Gilford, Saul R., to Gilford Instrument Laboratories Inc. Automatic asynchronous fluid processing apparatus. 4,058,367, Cl. 23-253.00R.
Gillette Company, The: *See—*
Trotta, Robert A., 4,057,896, Cl. 30-89.000.
Gilson, John L.: *See—*
Moschovis, Elia P.; and Gilson, John L., 4,058,470, Cl. 252-62.10L.
Giolitti, Nicolo; and Garberi, Sergio, to Ing. C. Olivetti & C., S.p.A. System for introducing the instructions of a program into a programmable office machine. 4,058,707, Cl. 235-448.000.
Gitlitz, Melvin H., to M&T Chemicals Inc. Method for preparing tri(β-substituted phenethyl)tin halides. 4,058,545, Cl. 260-429.700.
Giurlando, Angelo C.; and Richardson, David, to Fedders Corporation. Refrigerant compressor having indirect outlet connection. 4,058,361, Cl. 417-312.000.
GKN Transmissions Limited: *See—*
Webb, Oswald, 4,058,027, Cl. 74-711.000.
Glander, Fritz; and Voigt, Hermann Uwe, to Kabel-und Metallwerke Gutehoffnungshutte AG. Grafting of silane on thermoplastics or elastomers for purposes of cross-linking. 4,058,583, Cl. 264-176.00R.
Glatti, Flaviano; and Slongo, Gastone, to Montedison S.p.A. Plasticized polymeric compositions based on vinyl chloride polymers. 4,058,471, Cl. 252-63.500.
Goetz, Norbert; and Fischer, Roman, to BASF Aktiengesellschaft. Production of high molecular weight α,β-unsaturated aldehydes. 4,058,536, Cl. 260-340.700.
Goff, Robert F.: *See—*
McKinney, James T.; and Goff, Robert F., 4,058,724, Cl. 250-309.000.
Goldberg, Howard S., to General Electric Company. Surface charge signal processing apparatus. 4,058,716, Cl. 364-824.000.
Golden, Ronald: *See—*
Vincent, David N.; and Golden, Ronald, 4,058,434, Cl. 162-165.000.
Goodman, Willard B.: *See—*
Guild, Charles L.; and Goodman, Willard B., 4,057,970, Cl. 61-53.720.
Goodrich, Harold E.; and Fabel, Dolores M. Vehicle leveling system. 4,058,292, Cl. 254-88.000.
Goodyear Tire & Rubber Company, The: *See—*
Leshin, Richard, 4,058,524, Cl. 544-136.000.
Gordon, Hayden S., to Electric Power Research Institute, Inc. Multiple ring inertial energy storage wheel with improved inter-ring connector. 4,058,024, Cl. 74-572.000.
Gosselin, Dennis W.: *See—*
Vrabel, Joseph D.; and Gosselin, Dennis W., 4,057,904, Cl. 33-125.00R.
Gosset, Emile: *See—*
Boucheron, Bernard; and Gosset, Emile, 4,058,653, Cl. 526-159.000.
Gosslinghoff, Reinhard: *See—*
Reist, Walter; Hansch, Egon; and Gosslinghoff, Reinhard, 4,058,202, Cl. 198-482.000.
Goto, Katsuaki: *See—*
Kuwabara, Katsutoshi; and Goto, Katsuaki, 4,058,777, Cl. 331-57.000.
Gottlieb, Robert G., to Lewis Industries, Inc. Nut driving assembly apparatus. 4,057,888, Cl. 29-240.000.
Gould, Inc.: *See—*
Brown, Arling Dix, Jr.; and Reilly, Edward Justus, 4,058,814, Cl. 346-154.000.
Gozzo, Franco: *See—*
Abbruzzese, Luigi; Gozzo, Franco; Rossi, Giorgio; Masoero, Marcella; Lorusso, Simone; Bonola, Paola; and Tamburin, Gino, 4,058,613, Cl. 424-258.000.
Gracey, Charles M.: *See—*
White, Leslie E.; and Gracey, Charles M., 4,058,479, Cl. 252-301.10W.
Graf, Wilfried; and Schmid, Erich, to Ciba-Geigy Corporation. Polycyclic amino derivatives of pyrrolidone and piperidone. 4,058,529, Cl. 260-251.00A.
Gramm, Ronald J., to Sunwall Incorporated. Solar heating and insulating apparatus. 4,058,109, Cl. 126-270.000.
Granek, Gerhard; and Greenan, Clifford Paul Robert, to Greenan, Clifford Paul Robert. Fire protection apparatus. 4,058,167, Cl. 169-61.000.
GRANGES NYBY AB: *See—*
Willimzik, Bernhard Max, 4,057,992, Cl. 72-283.000.
Graymills Inc.: *See—*
Wetherby, Edward M., 4,058,296, Cl. 366-160.000.
Greci, John J.: *See—*
Bascom, Hollis H.; Greci, John J.; and Hoopengardner, Merle R., 4,058,423, Cl. 156-98.000.
Green Hills, Inc.: *See—*
Knapp, Merton C.; and Galloway, Charles Rex, 4,058,412, Cl. 134-24.000.
Greenan, Clifford Paul Robert: *See—*
Granek, Gerhard; and Greenan, Clifford Paul Robert, 4,058,167, Cl. 169-61.000.
Greenhut, Joseph. Calibrated electrical motor switch. 4,058,695, Cl. 200-153.00V.
Grefco, Inc.: *See—*
Mirliss, Melvin J.; and Nielsen, Richard B., 4,057,908, Cl. 34-10.000.
Greffe, Maurice F., to Societe des Brevets Greffe. Bagging methods. 4,057,949, Cl. 53-22.00B.
Grenzing, Horst: *See—*
Baing, Helmut; Oberschachtsiek, Gerd; Grenzing, Horst; and Meurer, Peter, 4,058,069, Cl. 110-8.00F.
Grib, Maria Mefodievna: *See—*
Ovchinnikov, Viktor Georgievich; Noritsa, Nadezhda Petrovna; Grib, Maria Mefodievna; Kamennov, Nikolai Alexandrovich; and Skvortsova, Elena Konstantinovna, 4,058,618, Cl. 424-273.00R.
Grier, Nathaniel: *See—*
Jacobus, David P.; Dulaney, Eugene L.; and Grier, Nathaniel, 4,058,624, Cl. 424-330.000.
Jacobus, David P.; Dulaney, Eugene L.; and Grier, Nathaniel, 4,058,625, Cl. 424-325.000.
Griffin, John W. Liquid filter apparatus. 4,058,459, Cl. 210-132.000.
Griffin, Robert H.: *See—*
Crager, William C.; Umarji, Sudhindra R.; Griffin, Robert H.; and Louit, Gerard J., 4,058,672, Cl. 178-3.000.
Crager, William C.; Umarji, Sudhindra R.; Griffin, Robert H.; and Louit, Gerard J., 4,058,838, Cl. 358-257.000.
Grolig, Johann: *See—*
Rasp, Christian; Scharfe, Gerhard; and Grolig, Johann, 4,058,556, Cl. 560-231.000.
Grout Supply Company: *See—*
Snyder, Joseph T.; and Huffman, Richard E., 4,058,405, Cl. 106-87.000.

Grover, Shamsher S.: *See—*
Chang, Clarence D.; and Grover, Shamsher S., 4,058,576, Cl. 260-673.000.
Gruber, Carl F.; and Siebel, Georg, to Schoeller & Co. Elektrotechnische Fabrik GmbH & Co. Glow element arrangement for electric cigarette lighters. 4,058,701, Cl. 219-270.000.
GTE Sylvania Incorporated: *See—*
Brennan, Raymond J., 4,058,236, Cl. 221-163.000.
Fahlen, Theodore S.; and Kirk, Russell F., 4,058,778, Cl. 331-94.50G.
Schreurs, Willy P., 4,058,639, Cl. 427-67.000.
Woods, William C.; Levin, Robert E.; and Hodges, Richard H., 4,058,752, Cl. 315-360.000.
Gubarev, Georgy Vasilievich: *See—*
Viktorov, Evgeny Vasilievich; Novikov, Igor Ivanovich; Kondratieva, Tatyana Fedorovna; Gubarev, Georgy Vasilievich; Yamschikova, Margarita Sergeevna; Vasiliev, Vasily Dmitrievich; Kontsevich, Georgy Mikhailovich; Gubinsky, Anatoly Sergeevich; Velikasov, Anatoly Alexeevich; Taradonov, Vladimir Ignatievich; and Isakov, Valery Pavlovich, 4,058,138, Cl. 137-512.100.
Gubinsky, Anatoly Sergeevich: *See—*
Viktorov, Evgeny Vasilievich; Novikov, Igor Ivanovich; Kondratieva, Tatyana Fedorovna; Gubarev, Georgy Vasilievich; Yamschikova, Margarita Sergeevna; Vasiliev, Vasily Dmitrievich; Kontsevich, Georgy Mikhailovich; Gubinsky, Anatoly Sergeevich; Velikasov, Anatoly Alexeevich; Taradonov, Vladimir Ignatievich; and Isakov, Valery Pavlovich, 4,058,138, Cl. 137-512.100.
Guild, Charles L.; and Goodman, Willard B. Rotary fluid supply joints for expansible mandrels. 4,057,970, Cl. 61-53.720.
Guinet, Yves Maurice; and Noirel, Yves Maurice. One way data transmission system. 4,058,830, Cl. 358-86.000.
Guise, Arthur A., Jr. Marble shooting game. 4,058,315, Cl. 273-118.00R.
Guito, Ralph M., Jr.: *See—*
Piper, Donald R., Sr., 4,058,075, Cl. 114-222.000.
Gulf States Paper Corporation: *See—*
Fuller, Robert R.; and Morris, Donald Blanton, 4,058,433, Cl. 162-16.000.
Gunderson, Cary A.: *See—*
Rosen, Paul W.; and Gunderson, Cary A., 4,058,258, Cl. 239-165.000.
Gunter & Cooke, Inc.: *See—*
Gunter, Josef K., 4,057,877, Cl. 19-107.000.
Gunter, Josef K., to Gunter & Cooke, Inc. Waste cleaning improvement for carding machines. 4,057,877, Cl. 19-107.000.
Gutbrod, Dieter: *See—*
Lahm, Heinrich; and Gutbrod, Dieter, 4,058,033, Cl. 82-2.00R.
Lahm, Heinrich; and Gutbrod, Dieter, 4,058,034, Cl. 82-2.00R.
Gutermann, Winfried: *See—*
Vaeth, Guenter; Bachmann, Rudolf; Hartmann, Heinrich; Hartmann, Hans-Joerg; Spoor, Herbert; Uhl, Karl; Lehner, August; Gutermann, Winfried; and Motz, Herbert, 4,058,646, Cl. 428-425.000.
Gutierrez, Eddie N.; and Lamberti, Vincent, to Lever Brothers Company. Novel ester derivatives of ether polycarboxylic acids and process for making same. 4,058,554, Cl. 560-180.000.
Gyi, Ko Ko, to Burroughs Corporation. Head and gimbal assembly. 4,058,843, Cl. 360-103.000.
Haarmann, Walter: *See—*
Kummer, Werner; Stahle, Helmut; Koppe, Herbert; Haarmann, Walter; and Reichl, Richard, 4,058,616, Cl. 424-267.000.
Haas, Rainer, to Hans Hollmuller, Maschinenbau, Firma. Method of etching copper and copper alloys. 4,058,431, Cl. 156-627.000.
Habu, Nobuo, to Toyota Jidosha Kogyo Kabushiki Kaisha. Distributor for an internal combustion engine. 4,058,095, Cl. 123-117.00R.
Haigh, Robert, to Lowell Corporation. Uni-directional mechanism. 4,058,192, Cl. 192-46.000.
Hajos, Gyorgy: *See—*
Kekesy, Tibor; Szeberenyi, Szabolcs; Beer, Gyorgy; Dudas, Antal; Hajos, Gyorgy; Szporny, Laszlo; and Czajlik, Eva, nee Csizer, 4,058,522, Cl. 260-239.570.
Hake, Kenneth A.: *See—*
Blair, Calvin B.; and Hake, Kenneth A., 4,058,172, Cl. 172-311.000.
Halcon International, Inc.: *See—*
Rizkalla, Nabil; and Naglieri, Anthony N., 4,058,542, Cl. 260-429.00R.
Halfhill, Martin O., to Xerox Corporation. Power supply for computer peripheral device. 4,058,759, Cl. 322-13.000.
Hall, Edward L. Passenger vehicle access stair and elevator apparatus. 4,058,228, Cl. 214-77.00R.
Hallgreen, Knud Julius, to Danfoss A/S. Temperature-monitoring and control system. 4,058,254, Cl. 236-68.00B.
Halliburton Company: *See—*
Holden, John C.; and Wray, Gary Q., 4,058,165, Cl. 166-314.000.
Hammann, Ingeborg: *See—*
Hofer, Wolfgang; Maurer, Fritz; Riebel, Hans-Jochem; Hammann, Ingeborg; and Stendel, Wilhelm, 4,058,603, Cl. 424-200.000.
Hammitt, Frederick G.; Ahmed, Osman Saleh Mohamed; Bhatt, Niranjan Rasik; and Hwang, Jia-Bo Gilbert. Apparatus for measuring erosion produced by cavitation. 4,058,004, Cl. 73-86.000.
Hannoschock, Kurt: *See—*
Ries, Karl; Hannoschock, Kurt; and Simoneit, Gunter, 4,058,000, Cl. 73-644.000.
Hans Hollmuller, Maschinenbau, Firma: *See—*
Haas, Rainer, 4,058,431, Cl. 156-627.000.
Hansch, Egon: *See—*
Reist, Walter; Hansch, Egon; and Gosslinghoff, Reinhard, 4,058,202, Cl. 198-482.000.
Hansel, William B., to Sun Oil Company of Pennsylvania. Attitude valve for a gasoline dispensing nozzle with a vapor receiving system. 4,058,149, Cl. 141-301.000.
Hantscho, Walter G., to George Hantscho Company, Inc. Ink fountain for printing presses. 4,058,058, Cl. 101-365.000.
Hanyu, Susumu; and Amano, Takashi, to Janome Sewing Machine Co. Ltd. Case for portable sewing machines. 4,058,073, Cl. 112-258.000.
Hanz, Marvin C.: *See—*
Elkins, Johnny C.; and Hanz, Marvin C., 4,058,221, Cl. 211-87.000.
Harada, Masaaki, to Rank Xerox Ltd. Paper feeding device. 4,058,305, Cl. 271-16.000.
Harris Corporation: *See—*
Foley, Richard Gregory, 4,058,304, Cl. 270-79.000.
Hart, James E., to Westinghouse Air Brake Company. Brake apparatus with a combined brake cylinder and reservoir. 4,058,348, Cl. 303-35.000.
Hart, Mark M. Cooking grill and briquettes therefor. 4,058,052, Cl. 99-646.00R.
Hartmann, Hans-Joerg: *See—*
Vaeth, Guenter; Bachmann, Rudolf; Hartmann, Heinrich; Hartmann, Hans-Joerg; Spoor, Herbert; Uhl, Karl; Lehner, August; Gutermann, Winfried; and Motz, Herbert, 4,058,646, Cl. 428-425.000.
Hartmann, Heinrich: *See—*
Vaeth, Guenter; Bachmann, Rudolf; Hartmann, Heinrich; Spoor, Herbert; and Lehner, August, 4,058,506, Cl. 260-75.0NP.
Vaeth, Guenter; Bachmann, Rudolf; Hartmann, Heinrich; Hartmann, Hans-Joerg; Spoor, Herbert; Uhl, Karl; Lehner, August; Gutermann, Winfried; and Motz, Herbert, 4,058,646, Cl. 428-425.000.
Haschke, Heinz; Schreyer, Gerd; Schwarze, Werner; and Suchsland, Helmut, to Deutsche Gold- und Silber-Scheideanstalt Vormals Roessler. Process for the substitution of chlorine atoms of cyanuric chloride. 4,058,662, Cl. 544-208.000.
Hasegawa, Eiichi: *See—*
Osada, Chiaki; Hasegawa, Eiichi; and Murata, Masataka, 4,058,398, Cl. 96-27.00R.
Hasegawa, Mitsuhiro: *See—*
Nishimura, Yasutake; and Hasegawa, Mitsuhiro, 4,058,688, Cl. 179-156.00R.
Hashimoto, Kazuo, to Hashimoto Koporeishon Kabushiki Kaisah. Telephone answering device without outgoing message tape. 4,058,679, Cl. 179-6.00R.
Hashimoto Koporeishon Kabushiki Kaisah: *See—*
Hashimoto, Kazuo, 4,058,679, Cl. 179-6.00R.
Hasinger, Siegfried H.; and Miller, David K., to United States of America, Air Force. Supersonic flow diffuser with energy redistribution. 4,058,141, Cl. 138-39.000.
Haslam, Alan Alfred, to Petrocarbon Developments Limited. Treatment of ammonia synthesis purge gas. 4,058,589, Cl. 423-359.000.
Hata, Shun-ichi; Mizuno, Koji; Nishii, Yasuho; Mitsuishi, Etsuko; and Shiba, Motoharu, to Chugai Seiyaku Kabushiki Kaisha. Method for treating alcoholism. 4,058,601, Cl. 424-180.000.
Hattori, Hironori: *See—*
Awane, Katunobu; Hattori, Hironori; Biwa, Tetuo; and Tamaki, Hiroshi, 4,058,822, Cl. 357-23.000.
Hauer, Werner: *See—*
Hochradel, Ernest; Hauer, Werner; Meyer, Martin R.; and Reuter, Frederick A., 4,058,274, Cl. 243-5.000.
Havelkova, Dana: *See—*
Bazika, Vladimir; Prazak, Premysl; and Havelkova, Dana, 4,057,999, Cl. 73-53.000.
Hazelton, Ronald L.: *See—*
Smith, Stuart B.; McAlpin, James J.; Peruyero, Jose M. A.; Hazelton, Ronald L.; and Upchurch, Edward F., 4,058,652, Cl. 526-68.000.
Head, Brian Arthur, to Whatman Reeve Angel Limited. External supported filter. 4,058,456, Cl. 210-23.00R.
Hedlund, Per Olov; and Hertsius, Lars Olof, to Telefonaktiebolaget L M Ericsson. Cable magazine. 4,058,265, Cl. 242-47.010.
Heinrich, Ernst; and Ribka, Joachim, to Cassella Farbwerke Mainkur Aktiengesellschaft. Water-insoluble monoazo 3-cyano-4-methyl-6-hydroxy-2-pyridine dyestuffs. 4,058,518, Cl. 260-156.000.
Helfer, Paul E.: *See—*
Jones, Marvin R.; and Helfer, Paul E., 4,057,887, Cl. 29-240.000.
Helfet, Arthur Jacob. Elbow prosthesis. 4,057,858, Cl. 3-1.910.
Hellsten, Karl Martin Edvin, to Berol Kemi AB. Detergent composition having textile softening and antistatic effect. 4,058,489, Cl. 252-547.000.
Helmut E. W. Masch: *See—*
Morse, Hugh B.; and Johnson, Robert B., 4,058,206, Cl. 206-44.00R.
Henbest, Richard George Cleveland, to Imperial Chemical Industries Limited. Adsorbent material. 4,058,483, Cl. 252-446.000.
Hendrie, John Matthew: *See—*
Andrews, Allen Howe; McPherson, James Norman; Burns, John Thomas, Jr.; and Hendrie, John Matthew, 4,058,788, Cl. 338-42.000.
Hennart, Claude; and Dulat, Marcel Louis, to Airwick Industries, Inc. Insecticide evaporator comprising a stabilizer. 4,058,607, Cl. 424-219.000.
Henrick, Clive A.; and Labovitz, Jeffery N., to Zoecon Corporation. 3,5-Lower alkylene carboxylic esters. 4,058,666, Cl. 560-126.000.

Henzl, Jindrich; Cerny, Jindrich; and Malasek, Jaromir, to Vyzkumny a vyvojovy ustav Zavodu vseobecneho strojirenstvi. Constant tension regulator of positively unwound flexible material, particularly warp threads in weaving machines. 4,058,143, Cl. 139-110.000.
Herbrand, Willy, deceased: *See—*
  Jaeger, Karl-Heinz; and Herbrand, Willy, deceased, 4,058,534, Cl. 260-295.50S.
Hercules Incorporated: *See—*
  Black, Donald Kirkbright, 4,058,663, Cl. 560-3.000.
Hermann, Otto, to LeBlond Incorporated. English-metric dial assembly. 4,058,080, Cl. 116-115.500.
Herrle, Karl: *See—*
  Denzinger, Walter; Seelert, Kurt; and Herrle, Karl, 4,058,655, Cl. 526-212.000.
Hertfelder, Wilhelm: *See—*
  Linder, Ernst; Hertfelder, Wilhelm; Schnaibel, Eberhard; and Junginger, Erich, 4,058,255, Cl. 237-12.30B.
Hertsius, Lars Olof: *See—*
  Hedlund, Per Olov; and Hertsius, Lars Olof, 4,058,265, Cl. 242-47.010.
Hesler, Kenneth K.: *See—*
  Sekmakas, Kazys; and Hesler, Kenneth K., 4,058,499, Cl. 260-29.6RW.
Hester, Gerald Paul: *See—*
  Sherer, Paul; and Hester, Gerald Paul, 4,058,708, Cl. 235-92.0CC.
Heydorn, Walter Emil Erich, to Ingenjorsfirman R. Ohrnell AB. Cleaning device for cavities preferably in chill moulds for steel ingots. 4,057,871, Cl. 15-56.000.
Hicks, Glenn W. Faucet valve. 4,058,289, Cl. 251-304.000.
Higgins, Larry; King, John Thomas; Butler, Blondie; and Struewing, Francis R., deceased (by Struewing, Barbara C., administratrix), to Leggett & Platt, Incorporated. Box spring assembly. 4,057,860, Cl. 5-247.000.
Higuchi, Takeshi: *See—*
  Ando, Kunio; Saito, Takemi; and Higuchi, Takeshi, 4,058,827, Cl. 358-55.000.
Hikosaka, Noboru; Watanabe, Mitsuo; and Shiozaki, Shoji, to Isuzu Motors Limited. V-Type engines. 4,058,092, Cl. 123-32.0ST.
Hill, Carl J. Feed apparatus for poultry gizzard processing machine. 4,057,875, Cl. 17-43.000.
Hill, Michael E.: *See—*
  Welton, Barry S.; Westerman, Granval W.; and Hill, Michael E., 4,058,757, Cl. 318-474.000.
Hill, William L., to Suntech, Inc. Reinforced ice matrix. 4,057,967, Cl. 61-1.00R.
Hill, William W., to Peter, Strong & Company, Inc. Iron complexes and foodstuffs containing them. 4,058,621, Cl. 424-295.000.
Hirano, Masachika: *See—*
  Fujimoto, Keimei; Ohno, Nobuo; Okuno, Yoshitoshi; Mizutani, Toshio; Ohno, Isao; Hirano, Masachika; Itaya, Nobushige; and Matsuo, Takashi, 4,058,622, Cl. 424-308.000.
Hirano, Takeaki: *See—*
  Mori, Takashi; Takaku, Sakae; Oi, Nobuhiro; Shindo, Minoru; Hirano, Takeaki; Kataoka, Shigeyuki; and Furuno, Kouji, 4,058,523, Cl. 544-165.000.
Hirschberger, Carl R. Self-feathering propeller. 4,058,360, Cl. 416-140.000.
Hitachi, Ltd.: *See—*
  Honbu, Mitsuyuki; Obara, Sanshiro; and Hori, Takamasa, 4,058,755, Cl. 318-47.000.
  Ichikawa, Norio; and Ueno, Sadayasu, 4,058,787, Cl. 338-22.00R.
  Kohno, Takashige; Takamaru, Takeshi; Kuwahara, Akiyasu; and Mori, Michitsugu, 4,058,093, Cl. 123-75.00B.
  Miyoshi, Tadahiko; Kurihara, Yasutoshi; Kamei, Tatsuya; and Ogawa, Takuzo, 4,058,821, Cl. 357-19.000.
  Okubo, Isao; Ito, Takayoshi; and Mitsui, Norihiko, 4,057,934, Cl. 49-28.000.
  Sakudo, Noriyuki; Tokiguchi, Katsumi; and Kanomata, Ichiro, 4,058,748, Cl. 313-156.000.
  Tokunaga, Michio; Ohhinata, Ichiro; and Okuhara, Shinzi, 4,058,741, Cl. 307-252.00G.
Hitachi Metals, Ltd.: *See—*
  Kiyonaga, Kingo; Ago, Ryousei; and Furuichi, Sei, 4,058,650, Cl. 428-683.000.
  Tashiro, Sadaji; and Kuroi, Yasuyuki, 4,058,037, Cl. 83-70.000.
Hnojewyj, Olexander, to Minnesota Mining and Manufacturing Company. Improved pavement marking method. 4,058,641, Cl. 427-137.000.
Hobson, James Charles; and Wroble, Arthur John, to Cadillac Gage Company. Water cannon. 4,058,256, Cl. 239-101.000.
Hochiki Corporation: *See—*
  Kuwabara, Katsutoshi; and Goto, Katsuaki, 4,058,777, Cl. 331-57.000.
Hochradel, Ernest; Hauer, Werner; Meyer, Martin R.; and Reuter, Frederick A. Pneumatic tube system. 4,058,274, Cl. 243-5.000.
Hodges, Richard H.: *See—*
  Woods, William C.; Levin, Robert E.; and Hodges, Richard H., 4,058,752, Cl. 315-360.000.
Hoechst Aktiengesellschaft: *See—*
  Kuhls, Jurgen; Martini, Thomas; and Steininger, Alfred, 4,058,578, Cl. 260-884.000.
Hofer, Wolfgang; Maurer, Fritz; Riebel, Hans-Jochem; Rohe, Lothar; Eue, Ludwig; and Schmidt, Robert R., to Bayer Aktiengesellschaft. 4-Amino-5-thione-1,2,4-triazines. 4,058,525, Cl. 544-182.000.
Hofer, Wolfgang; Maurer, Fritz; Riebel, Hans-Jochem; Hammann, Ingeborg; and Stendel, Wilhelm, to Bayer Aktiengesellschaft. Insecticidal and acaricidal O-ethyl-O-[1,6-dihydro-1-substituted-6-oxo-pyridazin(3)yl]-thionobenzenephosphonic acid esters. 4,058,603, Cl. 424-200.000.
Hoffman, Gordon Herman: *See—*
  Chi, Chang Whan; Hoffman, Gordon Herman; and Eichhorn, Emil, 4,058,586, Cl. 423-118.000.
Hoffmann-La Roche Inc.: *See—*
  Boller, Arthur; and Scherrer, Hanspeter, 4,058,476, Cl. 252-299.000.
  Boller, Arthur; and Scherrer, Hanspeter, 4,058,477, Cl. 252-299.000.
  Boller, Arthur; and Scherrer, Hanspeter, 4,058,478, Cl. 252-299.000.
  Roth, Willy, 4,058,626, Cl. 424-333.000.
  Westley, John, 4,058,620, Cl. 424-283.000.
Hoffmann, Rolf-Rudiger; and Fuchs, Peter, to Schering Aktiengesellschaft. Prostaglandin-containing lyophilized powders. 4,058,623, Cl. 424-317.000.
Hoke, Donald Irvin, to Lubrizol Corporation, The. Lubricants and functional fluids containing polyfunctional nitriles. 4,058,469, Cl. 252-51.50R.
Holda, Eugene M.; and Lark, John C., to Standard Oil Company (Indiana). Polyester-aminoplast bulking agents. 4,058,496, Cl. 260-21.000.
Holden, John C.; and Wray, Gary Q., to Halliburton Company. Wellbore circulating valve. 4,058,165, Cl. 166-314.000.
Holland, Henry A. Nelson, to Raymond International Inc. Method for operating pile driver. 4,058,175, Cl. 173-1.000.
Hollen, Merritt Leroy. Coins organized identification numbering system apparatus and method. 4,058,820, Cl. 354-80.000.
Holt, Amos Earl; Lawrie, William Eugene; and Birks, Albert Stingel, to Babcock & Wilcox Company, The. Method and apparatus for magnetic inspection through adjustable pulsed alternating and direct current magnetic fields. 4,058,762, Cl. 324-216.000.
Holt, F. Sheppard. Wide angle solar heat collection system. 4,058,110, Cl. 126-271.000.
Holub, Fred F.: *See—*
  Bellamy, Winthrop D.; and Holub, Fred F., 4,058,411, Cl. 127-37.000.
Homer, Paul B.: *See—*
  Banks, Clarence K.; Crout, Prescott D.; and Homer, Paul B., 4,058,275, Cl. 244-3.150.
Honbu, Mitsuyuki; Obara, Sanshiro; and Hori, Takamasa, to Hitachi, Ltd. Kramer system utilizing a commutatorless motor. 4,058,755, Cl. 318-47.000.
Hooker Chemicals & Plastics Corporation: *See—*
  Funabiki, Kyohei; and Tokunaga, Tetsuya, 4,058,403, Cl. 106-56.000.
  Scharf, Daniel J., 4,058,466, Cl. 252-8.100.
Hoopengardner, Merle R.: *See—*
  Bascom, Hollis H.; Greci, John J.; and Hoopengardner, Merle R., 4,058,423, Cl. 156-98.000.
Hooper, Edward: *See—*
  Dunn, Earl F.; Erskine, Henry; and Hooper, Edward, 4,058,071, Cl. 112-235.000.
Hooper, Walter L.: *See—*
  Piper, Donald R., Sr., 4,058,075, Cl. 114-222.000.
Hopkins, Richard H.: *See—*
  Duncan, Charles; and Hopkins, Richard H., 4,058,429, Cl. 156-601.000.
Hori, Takamasa: *See—*
  Honbu, Mitsuyuki; Obara, Sanshiro; and Hori, Takamasa, 4,058,755, Cl. 318-47.000.
Horii, Sadashige: *See—*
  Kimura, Rokusaburo; and Horii, Sadashige, 4,057,957, Cl. 58-21.155.
Hovhannessian, Karnig. Adjustable sun hat. 4,057,855, Cl. 2-177.000.
Howard, Larry Edward: *See—*
  Faulkner, Duane Harold; Smith, Harvell Morton; and Howard, Larry Edward, 4,058,386, Cl. 65-6.000.
Howorth Air Engineering Limited: *See—*
  Howorth, Frederick Hugh, 4,057,861, Cl. 5-365.000.
Howorth, Frederick Hugh, to Howorth Air Engineering Limited. Mattress. 4,057,861, Cl. 5-365.000.
Huber, Manfred, to Bayerische Motoren Werke Aktiengesellschaft. Electrically driven vehicle, especially passenger motor vehicle. 4,058,182, Cl. 180-68.500.
Huber, Rolf: *See—*
  Kiehs, Karl; Adolphi, Heinrich; Huber, Rolf; and Baumann, Annegrit, 4,058,606, Cl. 424-217.000.
Hudson Lock, Inc.: *See—*
  Patriquin, George P., 4,057,987, Cl. 70-364.00R.
Huey, Kent: *See—*
  Zirino, Alberto; Clavell, Cesar; and Huey, Kent, 4,058,446, Cl. 204-195.00R.
Huffman, Richard E.: *See—*
  Snyder, Joseph T.; and Huffman, Richard E., 4,058,405, Cl. 106-87.000.
Hugh J. Baker & Company: *See—*
  Stuart, Alistair J.; and Burch, James B., 4,058,184, Cl. 182-128.000.
Hughes Aircraft Company: *See—*
  Basiulis, Algerd, 4,057,963, Cl. 60-641.000.
  Iriarte, Wilfrido R., 4,058,159, Cl. 165-105.000.
  Otto, Oberdan W., 4,058,745, Cl. 310-366.000.
Hughes, John Leonard. Optical transponder. 4,058,774, Cl. 330-4.300.
Hungerford, Daniel Comstock, to Brunswick Corporation. Anchor chock. 4,058,074, Cl. 114-210.000.

Hunley, Walter T. Bowling pin wire guide sleeve. 4,058,309, Cl. 273-43.00D.
Huntington Alloys, Inc.: *See—*
  Eiselstein, Herbert Louis; Clatworthy, Edward Frederick; and Smith, Darrell Franklin, Jr., 4,058,416, Cl. 148-32.000.
Huret, Jacques: *See—*
  Huret, Roger; and Huret, Jacques, 4,058,020, Cl. 74-217.00B.
Huret, Roger; and Huret, Jacques. Device for guiding the chain of derailleur bicycle gear changers. 4,058,020, Cl. 74-217.00B.
Hurst, William M., to United States of America, Navy. Shaped charge rod warhead. 4,058,063, Cl. 102-56.0SC.
Hurt, Francis Neil; Theaker, Reginald; and Plant, David Herbert, to National Research Development Corporation. Yarn control mechanisms and the like. 4,058,245, Cl. 226-174.000.
Hutchinson, Arthur J. L., to Geothermal Investment Co. Working fluids and systems for recovering geothermal or waste heat. 4,057,964, Cl. 60-641.000.
Hutton, Allen H.; and Armstrong, James J., III, to Texas Instruments Incorporated. Choke control. 4,058,097, Cl. 123-119.00F.
Hwang, Jia-Bo Gilbert: *See—*
  Hammitt, Frederick G.; Ahmed, Osman Saleh Mohamed; Bhatt, Niranjan Rasik; and Hwang, Jia-Bo Gilbert, 4,058,004, Cl. 73-86.000.
Iacovangelo, Charles D.: *See—*
  Baris, Johannes M.; Iacovangelo, Charles D.; and Vogel, Wolfgang M., 4,058,482, Cl. 252-425.300.
Ichihara, Shigehiro: *See—*
  Omoto, Yorihiko; Konishi, Tadashi; Ichihara, Shigehiro; and Murai, Hisanori, 4,058,507, Cl. 260-75.00M.
Ichihashi, Hiroshi: *See—*
  Shiraishi, Tatsuo; Shimizu, Shinkichi; and Ichihashi, Hiroshi, 4,058,547, Cl. 260-465.300.
Ichikawa, Norio; and Ueno, Sadayasu, to Hitachi, Ltd. Temperature sensor. 4,058,787, Cl. 338-22.00R.
ICI United States Inc.: *See—*
  Markiewitz, Kenneth H.; and Restaino, Alfred J., 4,058,656, Cl. 526-215.000.
ICN Pharmaceuticals, Inc.: *See—*
  Robins, Roland K.; Shuman, Dennis A.; and Boswell, Kay H., 4,058,659, Cl. 536-27.000.
Idea Didattica Editrice: *See—*
  Di Noia, Francesco, 4,057,912, Cl. 35-31.00E.
Idzutsu, Waichiro; Kuroki, Masaaki; Komukai, Shigeru; Terasaki, Daijiro; and Nakajima, Sachie, to Tokyo Gas Co., Ltd. Gas absorption process. 4,058,376, Cl. 55-70.000.
Igoe, Robert S., to Merck & Co., Inc. Instant acidified milk gel. 4,058,636, Cl. 426-573.000.
Ikeda, Masahiko: *See—*
  Ito, Yoshinori; Kawai, Masaaki; and Ikeda, Masahiko, 4,058,700, Cl. 219-137.00R.
Ikeda, Teppei: *See—*
  Murata, Masataka; Takeda, Keiji; and Ikeda, Teppei, 4,058,443, Cl. 204-159.170.
Ikegami, Masuya: *See—*
  Ko, Keiun; Takashina, Naomitsu; Shimizu, Senzo; Ikegami, Masuya; and Iwamoto, Yoshinori, 4,058,497, Cl. 260-22.00A.
Ikeno, Keiji: *See—*
  Kawashima, Kohei; Ikeno, Keiji; and Nakanishi, Hajime, 4,058,264, Cl. 242-18.0PW.
Ikeuchi, Yoshiharu: *See—*
  Tsujimoto, Kenichi; Ikeuchi, Yoshiharu; and Kuriyama, Akira, 4,058,017, Cl. 73-423.00R.
Iko Trading Co., Ltd.: *See—*
  Ohno, Tetsuo; and Watanabe, Shoji, 4,058,232, Cl. 215-217.000.
Illinois Tool Works Inc.: *See—*
  Schmidt, Bradley J., 4,057,872, Cl. 16-29.000.
Ilnyckyj, Stephan, to Exxon Research & Engineering Co. Polymer combinations useful in distillate hydrocarbon oils to improve cold flow properties. 4,058,371, Cl. 44-62.000.
Ilvespaa, Atso, to Ciba-Geigy Corporation. Imidazoles and pharmaceutical composition. 4,058,617, Cl. 424-270.000.
Imaizumi, Yoshihiro; and Nishida, Yoshihiko, to Fuji Electric Co., Ltd. Information transmission system. 4,058,681, Cl. 179-15.0AL.
IMC Chemical Group, Inc.: *See—*
  Barnhard, Phillip, IV; and Kieres, Francis John, 4,058,420, Cl. 149-2.000.
Imperial Chemical Industries Limited: *See—*
  Henbest, Richard George Cleveland, 4,058,483, Cl. 252-446.000.
Index-Werke KG Hahn & Tessky: *See—*
  Lahm, Heinrich; and Gutbrod, Dieter, 4,058,033, Cl. 82-2.00R.
  Lahm, Heinrich; and Gutbrod, Dieter, 4,058,034, Cl. 82-2.00R.
Ing. Alfred Schmidt GmbH, Firma: *See—*
  Schmidt, Alfred, Jr., 4,057,915, Cl. 37-43.00C.
Ing. C. Olivetti & C., S.p.A.: *See—*
  Giolitti, Nicolo; and Garberi, Sergio, 4,058,707, Cl. 235-448.000.
  Ponzano, Gian Luigi, 4,058,847, Cl. 360-132.000.
Ingenjorsfirman R. Ohrnell AB: *See—*
  Heydorn, Walter Emil Erich, 4,057,871, Cl. 15-56.000.
  Tiberg, Magnus Gustav Georg, 4,058,156, Cl. 164-405.000.
Ingham, Francis H.: *See—*
  Panek, George J.; Ingham, Francis H.; Sedig, Albert R.; and Nieman, Gerald R., 4,058,671, Cl. 174-151.000.
Inoue, Hajime: *See—*
  Sato, Yoshimasa; Tsukuda, Toshio; Inoue, Hajime; and Mutsuta, Akio, 4,057,978, Cl. 62-331.000.
Inoue, Takayuki; Kakizaki, Tetsuji; and Ochiumi, Masahide, to Mitsubishi Petrochemical Co., Ltd. Process for preparing laminated resin product. 4,058,647, Cl. 428-474.000.
Insley, Gene L.; and Lewis, Merle J., to General Electric Company. Digital timer and method of operating such. 4,057,959, Cl. 58-125.00C.
Institut Francais du Petrole: *See—*
  Busson, Christian; Alagy, Jacques; and Cessou, Maurice, 4,058,591, Cl. 423-574.00R.
  Le Page, Jean-Francois; Juguin, Bernard; and Miquel, Jean, 4,058,450, Cl. 208-66.000.
  Reitz, Ortwin; and Retoret, Jean-Pierre, 4,058,449, Cl. 208-59.000.
Interlake, Inc.: *See—*
  Patterson, Francis J.; and DeFilippo, Louis M., 4,058,053, Cl. 100-26.000.
  Simmons, James R.; and Rogowski, Robert P., 4,058,270, Cl. 242-105.000.
International Business Machines Corporation: *See—*
  Balm, Gerald John, 4,058,795, Cl. 340-146.3WD.
  Basi, Jagtar S., 4,057,939, Cl. 51-281.00R.
  Cruse, Bernd, 4,058,223, Cl. 214-1.0BB.
  Fitzgerald, William Joseph; Shelton, Glenmore Lorraine, Jr.; and Wolfe, Robert Nolan, 4,058,849, Cl. 364-520.000.
  Knutson, Gerald Roy; and Shidler, Karl Allen, 4,058,846, Cl. 360-121.000.
  Malaviya, Shashi D., 4,058,808, Cl. 340-347.0AD.
  Muehldorf, Eugen I.; and Elam, Robert R., 4,058,767, Cl. 324-73.00R.
  Voegeli, Otto, 4,058,801, Cl. 365-39.000.
International Communication Sciences: *See—*
  Wilkes, Arthur L.; Wade, Fred B.; and Thompson, Robert L., 4,058,676, Cl. 179-1.0SA.
International Inpak, Inc.: *See—*
  Koltz, Irving Morton, 4,058,207, Cl. 206-45.340.
International Paper Company: *See—*
  May, Edwin A., 4,058,123, Cl. 128-278.000.
International Telephone and Telegraph Corporation: *See—*
  Crager, William C.; Umarji, Sudhindra R.; Griffin, Robert H.; and Louit, Gerard J., 4,058,672, Cl. 178-3.000.
  Crager, William C.; Umarji, Sudhindra R.; Griffin, Robert H.; and Louit, Gerard J., 4,058,838, Cl. 358-257.000.
  Panek, George J.; Ingham, Francis H.; Sedig, Albert R.; and Nieman, Gerald R., 4,058,671, Cl. 174-151.000.
Intertrac Viehmann & Co.: *See—*
  Fass, Carl, 4,058,322, Cl. 277-96.100.
Inukai, Noriyoshi; Murakami, Masuo; Iwamoto, Hidenori; Yanagisawa, Isao; Tamura, Toshinari; Ishii, Yoshio; Shizaoki, Tetsuya; Tomioka, Kenichi; and Takagi, Tokuichi, to Yamanouchi Pharmaceutical Co., Ltd. Novel 3,15-dilower alkyl PGE_2 derivatives. 4,058,665, Cl. 560-121.000.
Iowa State University Research Foundation, Inc.: *See—*
  Valfells, August, 4,058,440, Cl. 204-101.000.
Ireland, Robert William, to B. F. Goodrich Company, The. Co-cured compositions of amine-terminated liquid polymers and vinylidene-terminated polymers and process for preparation thereof. 4,058,657, Cl. 526-263.000.
Iriarte, Wilfrido R., to Hughes Aircraft Company. Heat pipe with capillary groove and floating artery. 4,058,159, Cl. 165-105.000.
Irion, Eckart: *See—*
  Bauer, Kurt; Wittman, Gunther; Mussgay, Manfred; Irion, Eckart; and Geilhausen, Horst, 4,058,599, Cl. 424-92.000.
Irving, Karen E.: *See—*
  Kane, Bernard J.; Irving, Karen E.; Bledsoe, James O., Jr.; and Canova, Levy A., 4,058,572, Cl. 260-631.500.
Isac, Mircea. Animal litter collection unit. 4,058,337, Cl. 294-19.00R.
Isakov, Valery Pavlovich: *See—*
  Viktorov, Evgeny Vasilievich; Novikov, Igor Ivanovich; Kondratieva, Tatyana Fedorovna; Gubarev, Georgy Vasilievich; Yamschikova, Margarita Sergeevna; Vasiliev, Vasily Dmitrievich; Kontsevich, Georgy Mikhailovich; Gubinsky, Anatoly Sergeevich; Velikasov, Anatoly Alexeevich; Taradonov, Vladimir Ignatievich; and Isakov, Valery Pavlovich, 4,058,138, Cl. 137-512.100.
Ishii, Yoshio: *See—*
  Inukai, Noriyoshi; Murakami, Masuo; Iwamoto, Hidenori; Yanagisawa, Isao; Tamura, Toshinari; Ishii, Yoshio; Shizaoki, Tetsuya; Tomioka, Kenichi; and Takagi, Tokuichi, 4,058,665, Cl. 560-121.000.
Ishii, Yoshiya: *See—*
  Taira, Kaoru; Sato, Teruo; Ishii, Yoshiya; Miyata, Yukinori; and Okamoto, Katashi, 4,058,101, Cl. 123-140.0MP.
Ishikawa, Hitoshi; Yamamoto, Kimihiko; Sawada, Toshio; and Kasahara, Takahiko, to Aisin Seiki Kabushiki Kaisha. Extension table for sewing machines. 4,058,072, Cl. 112-258.000.
Isley, John P.: *See—*
  Taylor, Michael J.; and Isley, John P., 4,058,079, Cl. 116-114.00H.
Isuzu Motors Limited: *See—*
  Hikosaka, Noboru; Watanabe, Mitsuo; and Shiozaki, Shoji, 4,058,092, Cl. 123-32.0ST.
Italo Americana Prentice S.p.A.: *See—*
  Dal Negro, Ruggero, 4,058,144, Cl. 139-384.00B.
Itaya, Nobushige: *See—*
  Fujimoto, Keimei; Ohno, Nobuo; Okuno, Yoshitoshi; Mizutani, Toshio; Ohno, Isao; Hirano, Masachika; Itaya, Nobushige; and Matsuo, Takashi, 4,058,622, Cl. 424-308.000.
Ito, Kunihiro, to Kawasaki Jukogyo Kabushiki Kaisha. Rotary drum type flying shear machine. 4,058,041, Cl. 83-305.000.

Ito, Shintaro: *See—*
Tokumaru, Yukuya; Nakai, Masanori; Shinozaki, Satoshi; Nakamura, Junichi; Ito, Shintaro; and Nishi, Yoshio, 4,058,419, Cl. 148-175.000.
Ito, Takayoshi: *See—*
Okubo, Isao; Ito, Takayoshi; and Mitsui, Norihiko, 4,057,934, Cl. 49-28.000.
Ito, Yoichiro, to United States of America, Health, Education and Welfare. Horizontal flow-through coil planet centrifuge without rotating seals. 4,058,460, Cl. 210-198.00C.
Ito, Yoshinori; Kawai, Masaaki; and Ikeda, Masahiko, to Sumitomo Metal Industries Ltd. Method for horizontal fillet welding of steel plates. 4,058,700, Cl. 219-137.00R.
Ivanov, Andrei Borisovich: *See—*
Muzhzhavlev, Konstantin Dmitrievich; Kosarev, Sergei Petrovich; Schegolev, Vladimir Ivanovich; Ivanov, Andrei Borisovich; Romanenko, Oleg Nikolaevich; Yazev, Vladimir Dmitrievich; and Vasiliev, Alexei Vasilievich, 4,058,448, Cl. 204-244.000.
Iwamoto, Hidenori: *See—*
Inukai, Noriyoshi; Murakami, Masuo; Iwamoto, Hidenori; Yanagisawa, Isao; Tamura, Toshinari; Ishii, Yoshio; Shizaoki, Tetsuya; Tomioka, Kenichi; and Takagi, Tokuichi, 4,058,665, Cl. 560-121.000.
Iwamoto, Yoshinori: *See—*
Ko, Keiun; Takashina, Naomitsu; Shimizu, Senzo; Ikegami, Masuya; and Iwamoto, Yoshinori, 4,058,497, Cl. 260-22.00A.
Iwasaki, Kazuhito: *See—*
Jinnai, Toshio; Matusmoto, Goro; and Iwasaki, Kazuhito, 4,058,475, Cl. 252-299.000.
Iyoda, Syozo: *See—*
Ubukata, Susumu; Mizutani, Yasukazu; Iyoda, Syozo; and Aoi, Hiroshi, 4,058,271, Cl. 242-107.40B.
Jabsen, Felix S., to Babcock & Wilcox Company, The. Traversing and vertically swinging strongback. 4,058,224, Cl. 214-1.0CM.
Jacks, Richard Benton. Open-end wrench. 4,058,032, Cl. 81-125.000.
Jacobsson, Lars-Eric. Automatically self-steering plow/harrow combination with release and reset mechanism connecting harrow to plow. 4,058,169, Cl. 172-191.000.
Jacobus, Charles: *See—*
Dietz, Frederick P., 4,058,132, Cl. 132-73.000.
Jacobus, David P.; Dulaney, Eugene L.; and Grier, Nathaniel, to Merck & Co., Inc. Broad spectrum antibacterial compositions containing tris (hydroxymethyl)-aminomethane and diphenyl and loweralkyl substituted diphenyl polyamines. 4,058,624, Cl. 424-330.000.
Jacobus, David P.; Dulaney, Eugene L.; and Grier, Nathaniel, to Merck & Co., Inc. Broad spectrum antimicrobial compositions containing tris-(hydroxymethyl)aminomethane and polyamines. 4,058,625, Cl. 424-325.000.
Jacobus, Josephine: *See—*
Dietz, Frederick P., 4,058,132, Cl. 132-73.000.
Jacoby, Herbert; and Mendelsohn, Arnold, to United Technologies Corporation. Limited stop elevator dispatching system. 4,058,187, Cl. 187-29.00R.
Jaeger, Karl-Heinz; and Herbrand, Willy, deceased (by Lauterbach, Elisabeth Herbrand nee, heiress), to Solco Basel AG. Therapeutically effective nicotinates and N-oxide nicotinates of aliphatic amines. 4,058,534, Cl. 260-295.50S.
Jager, Gerhard: *See—*
Thomas, Rudolf; Kramer, Wolfgang; Eue, Ludwig; Metzger, Carl; and Jager, Gerhard, 4,058,392, Cl. 71-106.000.
Jager, Horst: *See—*
Klauke, Erich; and Jager, Horst, 4,058,561, Cl. 260-544.00C.
Janome Sewing Machine Co. Ltd.: *See—*
Hanyu, Susumu; and Amano, Takashi, 4,058,073, Cl. 112-258.000.
Janson, Bernt Owe. Method for loading a layer of goods on a movable supporting means and a pallet loader for carrying out the method. 4,058,225, Cl. 214-6.00P.
Jeanmart, Claude: *See—*
Barreau, Michel; Cotrel, Claude; and Jeanmart, Claude, 4,058,611, Cl. 424-250.000.
Jennings, Robert Parry; and Aaroe, Kenneth Thomas, to Solosonic. Piano with sound-enhancing system. 4,058,045, Cl. 84-1.140.
Jerles, James B., to Electro-Thermal Corporation. Fluid heating apparatus. 4,058,702, Cl. 219-321.000.
Jersey Nuclear-Avco Isotopes, Inc.: *See—*
Forsen, Harold K., 4,058,667, Cl. 13-31.000.
Jinnai, Toshio; Matusmoto, Goro; and Iwasaki, Kazuhito, to Dai Nippon Toryo Co., Ltd. Liquid crystal compositions containing cyanocinnamic acid esters. 4,058,475, Cl. 252-299.000.
Johansson, Leif, to Aktiebolaget Svenska Flaktfabriken. Connecting piece for mounting a ventilation element in an opening in a ceiling or wall. 4,058,329, Cl. 285-162.000.
Johansson, Sten E. Power boats with hydrodynamic lifting devices. 4,058,077, Cl. 114-283.000.
Johansson, Sven Torild Kruse, to Telefonaktiebolaget L M Ericsson. Arrangement for ciphering and deciphering of information. 4,058,673, Cl. 178-22.000.
John, Wolfgang: *See—*
Streubel, Hans; Backhaus, Karl; and John, Wolfgang, 4,058,154, Cl. 164-82.000.
Johns-Manville Corporation: *See—*
Faulkner, Duane Harold; Smith, Harvell Morton; and Howard, Larry Edward, 4,058,386, Cl. 65-6.000.
Johnson, Bruce K.; Laskin, Irving; and Whiteside, George D., to Polaroid Corporation. Photographic exposure apparatus for providing small apertures. 4,058,817, Cl. 354-26.000.
Johnson, Bruce K.; and Whiteside, George D., to Polaroid Corporation. Fixed time delay quench strobe. 4,058,818, Cl. 354-33.000.
Johnson & Johnson: *See—*
Ness, Irving S., 4,058,125, Cl. 128-287.000.
Johnson, Robert B.: *See—*
Morse, Hugh B.; and Johnson, Robert B., 4,058,206, Cl. 206-44.00R.
Johnson, Robert M. Head positioner and arm rest for eye surgery. 4,058,112, Cl. 128-1.00R.
Johnston, Donald Leroy: *See—*
Choksi, Pradip Vinobchandra; Johnston, Donald Leroy; and Seemayer, Walter, 4,058,121, Cl. 128-221.000.
Johnston, Robert C.: *See—*
McNeil, Sharon S.; Bloomquist, Carl R.; and Johnston, Robert C., 4,058,399, Cl. 96-75.000.
Jones, Edna. See-through sewing gauge. 4,058,070, Cl. 112-153.000.
Jones, Marvin R.; and Helfer, Paul E., to Cameron Iron Works, Inc. Pipe disconnecting apparatus. 4,057,887, Cl. 29-240.000.
Jones, Peter Hadley; Bariana, Dilbagh Singh; Fung, Anthony Kei Lun; Martin, Yvonne Connolly; Kyncl, Jaroslav; and Lall, Amrit, to Abbott Laboratories. 4-Aroyl-substituted phenoxy acetic acids. 4,058,559, Cl. 260-520.00C.
Jones, Robert L., to University of Edinburgh, The University Court of the. Prostaglandin C_3. 4,058,664, Cl. 560-121.000.
Jones, Thomas Alwyn: *See—*
Firth, Jack Graham; Jones, Thomas Alwyn; and Rimmington, Brenda, 4,057,996, Cl. 73-23.000.
Joseph, Robert P. Rifle barrel stabilizer. 4,057,924, Cl. 42-75.00A.
Jossel, Franklin: *See—*
Mammino, Joseph; and Jossel, Franklin, 4,058,397, Cl. 96-15.00D.
Jugle, Don B.; and Lipani, Anthony F., to Xerox Corporation. Emission controller for development apparatus. 4,058,086, Cl. 118-653.000.
Juguin, Bernard: *See—*
Le Page, Jean-Francois; Juguin, Bernard; and Miquel, Jean, 4,058,450, Cl. 208-66.000.
Jung, Hans; Kovacs, Jenoe; Dussel, Wilhelm; and Lehmann, Helmut, to BASF Aktiengesellschaft. Electrical insulation of metallic conductors. 4,058,640, Cl. 427-118.000.
Jung, Richard G.: *See—*
Mallozzi, Philip J.; Epstein, Harold M.; Jung, Richard G.; Applebaum, David C.; Fairand, Barry P.; and Gallagher, William J., 4,058,486, Cl. 250-493.000.
Junginger, Erich: *See—*
Linder, Ernst; Hertfelder, Wilhelm; Schnaibel, Eberhard; and Junginger, Erich, 4,058,255, Cl. 237-12.30B.
Juntgen, Harald; Klein, Jurgen; and Gappa, Gunther, to Bergwerksverband GmbH. Method of regenerating particulate adsorption agents. 4,058,374, Cl. 55-60.000.
K. A. Schmersal & Co. Schaltgeratefabrik: *See—*
Schulz, Siegfried; Eicker, Karl G.; and Reinke, August, 4,058,693, Cl. 200-67.00F.
Kabel-und Metallwerke Gutehoffnungshutte AG.: *See—*
Glander, Fritz; and Voigt, Hermann Uwe, 4,058,583, Cl. 264-176.00R.
Kablaoui, Mahmoud S., to Texaco Inc. Detergent composition. 4,058,472, Cl. 252-89.00B.
Kablaoui, Mahmoud S., to Texaco Inc. Preparation of 2-alkanoyloxyalkanoic acids. 4,058,540, Cl. 260-405.000.
Kablaoui, Mahmoud S., to Texaco Inc. Preparation of 2-alkanoyloxyalkanoic. 4,058,541, Cl. 260-405.000.
Kabushiki Kaisha Ricoh: *See—*
Komura, Yasuyuki, 4,058,674, Cl. 358-260.000.
Kabushiki Kaisha Sato Kenkyusho: *See—*
Sato, Yo, 4,058,051, Cl. 93-88.000.
Kabushiki Kaisha Shinko Seisakusho: *See—*
Komatsu, Atsushi; Miyazawa, Kuichiro; Yamaura, Yoshotomo; and Asanuma, Akira, 4,058,134, Cl. 137-38.000.
Kageyama, Paul: *See—*
Richardson, David; and Kageyama, Paul, 4,058,765, Cl. 324-61.00R.
Kakizaki, Tetsuji: *See—*
Inoue, Takayuki; Kakizaki, Tetsuji; and Ochiumi, Masahide, 4,058,647, Cl. 428-474.000.
Kameda, Tamotsu. Two-masted lifting apparatus. 4,058,293, Cl. 254-89.00H.
Kamei, Tatsuya: *See—*
Miyoshi, Tadahiko; Kurihara, Yasutoshi; Kamei, Tatsuya; and Ogawa, Takuzo, 4,058,821, Cl. 357-19.000.
Kamennov, Nikolai Alexandrovich: *See—*
Ovchinnikov, Viktor Georgievich; Noritsa, Nadezhda Petrovna; Grib, Maria Mefodievna; Kamennov, Nikolai Alexandrovich; and Skvortsova, Elena Konstantinovna, 4,058,618, Cl. 424-273.00R.
Kane, Bernard J.; Irving, Karen E.; Bledsoe, James O., Jr.; and Canova, Levy A., to SCM Corporation. Hydrogenation of cyclic unsaturated compounds. 4,058,572, Cl. 260-631.500.
Kanner, Bernard: *See—*
Prokai, Bela; and Kanner, Bernard, 4,058,493, Cl. 260-2.5AH.
Prokai, Bela; and Kanner, Bernard, 4,058,494, Cl. 260-2.5AH.
Kanomata, Ichiro: *See—*
Sakudo, Noriyuki; Tokiguchi, Katsumi; and Kanomata, Ichiro, 4,058,748, Cl. 313-156.000.
Kao, Charles T.; Lafevers, James O.; and Walker, Donny R., to Recognition Equipment Incorporated. MICR data lift system. 4,058,706, Cl. 235-449.000.

Karady, Sandor: *See—*
Cama, Lovji D.; Christensen, Burton G.; Karady, Sandor; and Sletzinger, Meyer, 4,058,661, Cl. 544-21.000.
Karrer, Friedrich; and Farooq, Saleem, to Ciba-Geigy Corporation. Combatting insects and acarids with new phenoxyphenylalkoxy esters. 4,058,627, Cl. 424-341.000.
Kasahara, Takahiko: *See—*
Ishikawa, Hitoshi; Yamamoto, Kimihiko; Sawada, Toshio; and Kasahara, Takahiko, 4,058,072, Cl. 112-258.000.
Kaspari, William J.; Wong, Herman; and Kirch, Joseph L., to Palo Alto Research Associates. Blood pressure measuring apparatus. 4,058,117, Cl. 128-2.05A.
Kasprzak, Vincent D., to Arvin Industries, Inc. Method and apparatus for recording a single video frame. 4,058,840, Cl. 360-10.000.
Kataoka, Shigeyuki: *See—*
Mori, Takashi; Takaku, Sakae; Oi, Nobuhiro; Shindo, Minoru; Hirano, Takeaki; Kataoka, Shigeyuki; and Furuno, Kouji, 4,058,523, Cl. 544-165.000.
Katsutani, Ryoseki: *See—*
Takechi, Hiroshi; Abe, Mitsunobu; Katsutani, Ryoseki; and Saito, Yoshio, 4,057,989, Cl. 72-128.000.
Kaule, Wittich: *See—*
Gauch, Wolfgang; Kaule, Wittich; and Pauli, Guenter, 4,057,919, Cl. 40-2.200.
Kawaguchi, Hiroshi; and Nishikawa, Kohji, to Toyota Jidosha Kogyo Kabushiki Kaisha. Sealing and adjusting means in a disk brake. 4,058,084, Cl. 188-71.800.
Kawai, Masaaki: *See—*
Ito, Yoshinori; Kawai, Masaaki; and Ikeda, Masahiko, 4,058,700, Cl. 219-137.00R.
Kawamoto, Hirohisa: *See—*
Allen, Elmer Lawrence, Jr.; and Kawamoto, Hirohisa, 4,058,776, Cl. 330-299.000.
Kawasaki Jukogyo Kabushiki Kaisha: *See—*
Ito, Kunihiro, 4,058,041, Cl. 83-305.000.
Kawashima, Kohei; Ikeno, Keiji; and Nakanishi, Hajime, to Teijin Limited. Yarn wound package provided with a transfer tail wind and method for forming the transfer tail wind. 4,058,264, Cl. 242-18.0PW.
Kay-Fries Chemicals, Inc.: *See—*
Kesslin, George, 4,058,409, Cl. 106-271.000.
Kaye, Sidney P., to Tree Island Steel Co. Ltd. Wire connector. 4,057,878, Cl. 24-134.00R.
Keefe, Harry J. Portable refrigerator. 4,058,384, Cl. 62-457.000.
Keene Corporation: *See—*
Bartik, Ivan, 4,058,463, Cl. 210-317.000.
Kekesy, Tibor; Szeberenyi, Szabolcs; Beer, Gyorgy; Dudas, Antal; Hajos, Gyorgy; Szporny, Laszlo; and Czajlik, Eva, nee Csizer, to Richter Gedeon Vegyeszeti Gyar Rt. Steroids effective against heavy-metal poisoning. 4,058,522, Cl. 260-239.570.
Keller, Hansjurg: *See—*
Paschedag, Hansjoachim; and Keller, Hansjurg, 4,058,726, Cl. 250-353.000.
Keller, Wilbur S.: *See—*
Langford, James W., Jr.; and Keller, Wilbur S., 4,058,177, Cl. 175-374.000.
Kelley, Robert D.: *See—*
Gardner, Richard H.; and Kelley, Robert D., 4,058,190, Cl. 188-218.0XL.
Kellwood Company: *See—*
Matthews, Robert M.; and Lawson, William J., 4,057,880, Cl. 28-154.000.
Kelsey, Amos P.; Palumbo, John A.; and Thiel, James L., to Bethlehem Steel Corporation. Bender roll guard. 4,057,990, Cl. 72-166.000.
Kennecott Copper Corporation: *See—*
Crimes, Peter B., 4,058,394, Cl. 75-61.000.
Kennedy, Paul G., to Westinghouse Electric Corporation. Scan conversion apparatus. 4,058,835, Cl. 358-134.000.
Kent Manufacturing Co., Inc.: *See—*
Ankenman, Thomas W.; and Brinker, Lee J., 4,058,170, Cl. 172-311.000.
Blair, Calvin B.; and Hake, Kenneth A., 4,058,172, Cl. 172-311.000.
Kerns, Steven L., to Management Utilities, Inc. Method and device for livestock record keeping. 4,057,922, Cl. 40-124.200.
Kessler, Gerald. Insulating spacer for double insulated glass. 4,057,945, Cl. 52-398.000.
Kesslin, George, to Kay-Fries Chemicals, Inc. Anti-transpirant composition. 4,058,409, Cl. 106-271.000.
Keyes, George B.; and Murtaugh, Justin J., to Drackett Company, The. Drain cleaning composition. 4,058,474, Cl. 252-160.000.
Khajezadeh, Heshmat; and Ahrens, Stephen Carl, to RCA Corporation. Controllably valued resistor. 4,057,894, Cl. 29-577.00C.
Khalifa, Ramzi A.: *See—*
Prather, Joseph E.; and Khalifa, Ramzi A., 4,058,334, Cl. 292-241.000.
Kiehs, Karl; Adolphi, Heinrich; Huber, Rolf; and Baumann, Annegrit, to BASF Aktiengesellschaft. Method of controlling insects with O,O-dialkylphosphonic acid esters and the O,O-dialkylphosphonic acid esters. 4,058,606, Cl. 424-217.000.
Kieres, Francis John: *See—*
Barnhard, Phillip, IV; and Kieres, Francis John, 4,058,420, Cl. 149-2.000.
Kikuchi, Yoshiki, to Fuji Xerox Co. Ltd. Image pickup element and system utilizing magnetic bubbles. 4,058,800, Cl. 365-3.000.
Kim, Taeo: *See—*
Shimizu, Masao, 4,058,704, Cl. 219-528.000.
Kimura, Rokusaburo; and Horii, Sadashige, to Matsushita Electric Works, Ltd. Alarm device of clocks. 4,057,957, Cl. 58-21.155.
King, George: *See—*
Phelps, John H., Sr., 4,057,854, Cl. 2-128.000.
King, John Thomas: *See—*
Higgins, Larry; King, John Thomas; Butler, Blondie; and Struewing, Francis R., deceased, 4,057,860, Cl. 5-247.000.
King, Lamar L., II, to Ford Motor Company. Carbon cell. 4,058,380, Cl. 55-387.000.
King, Laurence F.: *See—*
Serratore, Joseph; King, Laurence F.; Sutherland, Thomas H.; and Wallace, James R., 4,058,495, Cl. 260-17.00A.
King, Peggy: *See—*
Phelps, John H., Sr., 4,057,854, Cl. 2-128.000.
King, Richard Creighton. Navigational instruments. 4,057,906, Cl. 33-278.000.
Kinsinger, William C., to Metagraphic Systems, Inc. Apparatus for removing a sheet from a stack of sheets. 4,058,218, Cl. 209-80.500.
Kinson, Philip L.; and Orlando, Charles M., to General Electric Company. Brominated biphenol process. 4,058,570, Cl. 260-620.000.
Kirch, Joseph L.: *See—*
Kaspari, William J.; Wong, Herman; and Kirch, Joseph L., 4,058,117, Cl. 128-2.05A.
Kirchoff, Francis D., to Alco Electronic Products, Inc. Combined pilot light and ground testing assembly. 4,058,764, Cl. 324-51.000.
Kirk-Dyson Designs Ltd.: *See—*
Dyson, James, 4,058,344, Cl. 301-7.000.
Kirk, Russell F.: *See—*
Fahlen, Theodore S.; and Kirk, Russell F., 4,058,778, Cl. 331-94.50G.
Kishi, Yoshio; and Nagami, Masaru, to Sony Corporation. Magnetic tape recording and/or reproducing apparatus with device for recording and/or reproducing control signals. 4,058,841, Cl. 360-27.000.
Kiyonaga, Kingo; Ago, Ryousei; and Furuichi, Sei, to Hitachi Metals, Ltd. Back material of metal band saw high in fatigue strength. 4,058,650, Cl. 428-683.000.
Klauke, Erich; and Jager, Horst, to Bayer Aktiengesellschaft. 2-Chloromethylphenylcarbamic acid fluoride. 4,058,561, Cl. 260-544.00C.
Kleimann, Helmut: *See—*
von Bonin, Wulf; Kleimann, Helmut; and Post, Udo, 4,058,492, Cl. 260-2.5AM.
Klein, Jurgen: *See—*
Juntgen, Harald; Klein, Jurgen; and Gappa, Gunther, 4,058,374, Cl. 55-60.000.
Kleiss, Louis D., to Phillips Petroleum Company. Apparatus and method for measuring low boiling component contained in relatively high-boiling liquid. 4,057,995, Cl. 73-23.000.
Kleist, Dale, to Owens-Corning Fiberglas Corporation. Method for transporting glass fibers. 4,058,385, Cl. 65-2.000.
Klementowski, Frank M.: *See—*
Sawada, Fred H.; Klementowski, Frank M.; and Bishop, James S., 4,058,804, Cl. 340-248.00A.
Klich, Edward J.: *See—*
Milan, Otto G.; and Klich, Edward J., 4,058,057, Cl. 101-148.000.
Klimek, Boleslaw M., to Echlin Manufacturing Company, The. Brake apparatus including control valve with integral check valve. 4,058,345, Cl. 303-6.00M.
Klockner-Humboldt-Deutz Aktiengesellschaft: *See—*
Werner, Reinhold, 4,057,960, Cl. 60-39.030.
Kloimstein, Engelbert: *See—*
Schonbeck, Rupert; Kloimstein, Engelbert; and Wittmann, Erwin, 4,058,390, Cl. 71-92.000.
Klopfenstein, King L.: *See—*
Puccetti, Ralph P.; and Klopfenstein, King L., 4,058,268, Cl. 242-72.00R.
Knapp, Merton C.; and Galloway, Charles Rex, to Green Hills, Inc. Apparatus for opening and washing cans. 4,058,412, Cl. 134-24.000.
Knell, Martin, to Ciba-Geigy Corporation. Process for the addition of gaseous non-halogenated olefins and acetylenes to perfluoroalkyl iodides. 4,058,573, Cl. 260-653.10T.
Knollmueller, Karl O., to Olin Corporation. Alkoxysilane double cluster compounds with silicone bridges and their preparation and use. 4,058,546, Cl. 260-448.80R.
Knutson, Gerald Roy; and Shidler, Karl Allen, to International Business Machines Corporation. Grounded transducer for magnetic record disks. 4,058,846, Cl. 360-121.000.
Ko, Keiun; Takashina, Naomitsu; Shimizu, Senzo; Ikegami, Masuya; and Iwamoto, Yoshinori, to Mitsubishi Gas Chemical Company, Inc. One package system cold-setting coating compositions. 4,058,497, Cl. 260-22.00A.
Kobayashi, Fumio; and Koshigoe, Shozo, to Sansui Electric Co., Ltd. Loudspeaker system for use in a stereophonic sound reproduction system. 4,058,675, Cl. 179-1.00G.
Koch, Dirk: *See—*
Schuster-Woldan, Hans; Weingand, Kaspar; and Koch, Dirk, 4,058,432, Cl. 156-659.000.
Kohno, Takashige; Takamaru, Takeshi; Kuwahara, Akiyasu; and Mori, Michitsugu, to Hitachi, Ltd. Carburetor for use in internal combustion engine. 4,058,093, Cl. 123-75.00B.
Koltz, Irving Morton, to International Inpak, Inc. Container. 4,058,207, Cl. 206-45.340.
Komatsu, Atsushi; Miyazawa, Kuichiro; Yamaura, Yoshotomo; and Asanuma, Akira, to Kabushiki Kaisha Shinko Seisakusho. Interceptor actuated by seismic vibrations. 4,058,134, Cl. 137-38.000.

Komukai, Shigeru: *See—*

Idzutsu, Waichiro; Kuroki, Masaaki; Komukai, Shigeru; Terasaki, Daijiro; and Nakajima, Sachie, 4,058,376, Cl. 55-70.000.

Komura, Yasuyuki, to Kabushiki Kaisha Ricoh. Graphic information compression method and system. 4,058,674, Cl. 358-260.000.

Kondratieva, Tatyana Fedorovna: *See—*

Viktorov, Evgeny Vasilievich; Novikov, Igor Ivanovich; Kondratieva, Tatyana Fedorovna; Gubarev, Georgy Vasilievich; Yamschikova, Margarita Sergeevna; Vasiliev, Vasily Dmitrievich; Kontsevich, Georgy Mikhailovich; Gubinsky, Anatoly Sergeevich; Velikasov, Anatoly Alexeevich; Taradonov, Vladimir Ignatievich; and Isakov, Valery Pavlovich, 4,058,138, Cl. 137-512.100.

Koninklijke Emballage Industrie Van Leer B.V.: *See—*

Evans, Albert E. J.; and Turner, Peter G., 4,058,632, Cl. 426-126.000.

Konishi, Tadashi: *See—*

Omoto, Yorihiko; Konishi, Tadashi; Ichihara, Shigehiro; and Murai, Hisanori, 4,058,507, Cl. 260-75.00M.

Kontsevich, Georgy Mikhailovich: *See—*

Viktorov, Evgeny Vasilievich; Novikov, Igor Ivanovich; Kondratieva, Tatyana Fedorovna; Gubarev, Georgy Vasilievich; Yamschikova, Margarita Sergeevna; Vasiliev, Vasily Dmitrievich; Kontsevich, Georgy Mikhailovich; Gubinsky, Anatoly Sergeevich; Velikasov, Anatoly Alexeevich; Taradonov, Vladimir Ignatievich; and Isakov, Valery Pavlovich, 4,058,138, Cl. 137-512.100.

Koonce, George W., to United States of America, Air Force. Remotely actuated two stage structural latch. 4,058,331, Cl. 292-97.000.

Koppe, Herbert: *See—*

Kummer, Werner; Stahle, Helmut; Koppe, Herbert; Haarmann, Walter; and Reichl, Richard, 4,058,616, Cl. 424-267.000.

Kosanovich, Nicholas S., to Westinghouse Electric Corporation. Generator seal oil supply system. 4,058,320, Cl. 277-3.000.

Kosarev, Sergei Petrovich: *See—*

Muzhzhavlev, Konstantin Dmitrievich; Kosarev, Sergei Petrovich; Schegolev, Vladimir Ivanovich; Ivanov, Andrei Borisovich; Romanenko, Oleg Nikolaevich; Yazev, Vladimir Dmitrievich; and Vasiliev, Alexei Vasilievich, 4,058,448, Cl. 204-244.000.

Koshigoe, Shozo: *See—*

Kobayashi, Fumio; and Koshigoe, Shozo, 4,058,675, Cl. 179-1.00G.

Kotschak, Otto: *See—*

Reiss, Karl Hans; Kotschak, Otto; and Conrad, Bernhard, 4,058,721, Cl. 250-213.0VT.

Kovacs, Jenoe: *See—*

Jung, Hans; Kovacs, Jenoe; Dussel, Wilhelm; and Lehmann, Helmut, 4,058,640, Cl. 427-118.000.

Kozakiewicz, Hugo; and Reuter, Wolfgang, to Dornier GmbH. Captive remote-controlled helicopter. 4,058,277, Cl. 244-17.170.

Kramer, Francis J.; Rothfuss, Robert G.; and Wise, William C., to Senco Products, Inc. Clamp nail. 4,058,047, Cl. 85-11.000.

Kramer, Jurgen: *See—*

Broghammer, Werner; Kramer, Jurgen; and Laufer, Helmut, 4,058,687, Cl. 179-100.110.

Kramer, Wolfgang: *See—*

Thomas, Rudolf; Kramer, Wolfgang; Eue, Ludwig; Metzger, Carl; and Jager, Gerhard, 4,058,392, Cl. 71-106.000.

Kranefeld, Wilhelm; and Schneider, Helmut, to O & K Orenstein & Koppel Aktiengesellschaft. Telescopic boom with hydraulic actuating mechanism. 4,057,942, Cl. 52-115.000.

Kraus, Bernd: *See—*

Drews, Ulrich; Kraus, Bernd; Singer, Erich; and Schnurle, Hans, 4,058,106, Cl. 123-198.0DB.

Kroger, Keijo Kalevi, to Valmet Oy. Straddle carrier. 4,058,183, Cl. 180-89.100.

Krogh, Soren-Christian, to Radiometer A/S. Process for automatic titration. 4,058,365, Cl. 23-230.00R.

Krokhin, Vladimir Andreevich: *See—*

Prutkovsky, Evgeny Nikolaevich; Bermatov, Mikhail Albertovich; Tarasov, Evgeny Alexandrovich; Ozerov, Valery Ilich; Fedosjuk, Alexandr Fedorovich; and Krokhin, Vladimir Andreevich, 4,057,966, Cl. 60-678.000.

Kropiwnicki, Tadek M.: *See—*

Abell, Richard S.; and Kropiwnicki, Tadek M., 4,057,979, Cl. 62-469.000.

Kruger, Gunther, to Steele Chemicals Co. Ltd. 4,6,8(14)-Triene steroids. 4,058,539, Cl. 260-397.450.

Krutsch, John R.: *See—*

Bubley, Henry J.; and Krutsch, John R., 4,058,307, Cl. 271-85.000.

Kucharzyk, Werner: *See—*

Bellenberg, Heinz; Kucharzyk, Werner; Rohde, Wolfgang; and Siebert, Werner, 4,058,230, Cl. 214-18.200.

Kuhls, Jurgen; Martini, Thomas; and Steininger, Alfred, to Hoechst Aktiengesellschaft. Process for the manufacture of paste-extrudable polymers of tetrafluoroethylene. 4,058,578, Cl. 260-884.000.

Kuklies, Milton C.: *See—*

Marshall, Jeffrey D.; and Kuklies, Milton C., 4,058,643, Cl. 428-198.000.

Kumazawa, Toshiharu: *See—*

Futai, Norio; Murakami, Toshio; Takahara, Yoshimasa; and Kumazawa, Toshiharu, 4,058,481, Cl. 252-321.000.

Kummer, Werner; Stahle, Helmut; Koppe, Herbert; Haarmann, Walter; and Reichl, Richard, to Boehringer Ingelheim GmbH. 2-[N-(1,3-diamino-isopropyl)-amino]-4-phenyl-2-imidazolines and salts thereof. 4,058,616, Cl. 424-267.000.

Kunert, Gale F.: *See—*

Staff, Charles H.; Kunert, Gale F.; and Christians, Tom A., 4,058,633, Cl. 426-315.000.

Kunz, Werner, to W. Kunz AG. Method for drying agricultural feed materials, pulp-like materials. 4,058,634, Cl. 426-456.000.

Kuramoto, Atuo: *See—*

Yonemitsu, Eiichi; Sugio, Akitoshi; Kuramoto, Atuo; and Urabe, Hiroyuki, 4,058,504, Cl. 260-47.0ET.

Kurihara, Yasutoshi: *See—*

Miyoshi, Tadahiko; Kurihara, Yasutoshi; Kamei, Tatsuya; and Ogawa, Takuzo, 4,058,821, Cl. 357-19.000.

Kuriyama, Akira: *See—*

Tsujimoto, Kenichi; Ikeuchi, Yoshiharu; and Kuriyama, Akira, 4,058,017, Cl. 73-423.00R.

Kuroi, Yasuyuki: *See—*

Tashiro, Sadaji; and Kuroi, Yasuyuki, 4,058,037, Cl. 83-70.000.

Kuroki, Masaaki: *See—*

Idzutsu, Waichiro; Kuroki, Masaaki; Komukai, Shigeru; Terasaki, Daijiro; and Nakajima, Sachie, 4,058,376, Cl. 55-70.000.

Kurz, Robert A.; and Whirlow, Donald K., to Electric Power Research Institute. Combustible gas-in-oil detector. 4,058,373, Cl. 55-16.000.

Kushlefsky, Bernard G., to M&T Chemicals Inc. Novel method for preparing organotin compounds. 4,058,544, Cl. 260-429.700.

Kuwabara, Katsutoshi; and Goto, Katsuaki, to Hochiki Corporation. Oscillating circuit. 4,058,777, Cl. 331-57.000.

Kuwahara, Akiyasu: *See—*

Kohno, Takashige; Takamaru, Takeshi; Kuwahara, Akiyasu; and Mori, Michitsugu, 4,058,093, Cl. 123-75.00B.

Kyncl, Jaroslav: *See—*

Jones, Peter Hadley; Bariana, Dilbagh Singh; Fung, Anthony Kei Lun; Martin, Yvonne Connolly; Kyncl, Jaroslav; and Lall, Amrit, 4,058,559, Cl. 260-520.00C.

Kyushima, Tatsuo: *See—*

Morisawa, Kunio; Minemoto, Isamu; and Kyushima, Tatsuo, 4,058,193, Cl. 192-109.00F.

Kyzer, James Alexander: *See—*

Smith, Joe Delano; McCall, David Daniel; and Kyzer, James Alexander, 4,057,893, Cl. 29-560.000.

LaBianco, Richard A. Water bed. 4,057,862, Cl. 5-370.000.

Labovitz, Jeffery N.: *See—*

Henrick, Clive A.; and Labovitz, Jeffery N., 4,058,666, Cl. 560-126.000.

Lada, Arnold: *See—*

Wakeman, Reginald L.; Dudzinski, Zdzislaw W.; and Lada, Arnold, 4,058,488, Cl. 252-542.000.

Ladd, John H., to Eastman Kodak Company. Document copying apparatus. 4,058,828, Cl. 358-80.000.

Lafevers, James O.: *See—*

Kao, Charles T.; Lafevers, James O.; and Walker, Donny R., 4,058,706, Cl. 235-449.000.

Laffont, Paul: *See—*

de Saint Palais, Jacques; Laffont, Paul; and Mourlevat, Jean, 4,058,137, Cl. 137-236.00S.

Lahm, Heinrich; and Gutbrod, Dieter, to Index-Werke KG Hahn & Tessky. Automatic turret lathe. 4,058,033, Cl. 82-2.00R.

Lahm, Heinrich; and Gutbrod, Dieter, to Index-Werke KG Hahn & Tessky. Lathe with multiple tool turret. 4,058,034, Cl. 82-2.00R.

Lake, Don W., to Comdial Corporation. Digital multitone generator for telephone dialing. 4,058,805, Cl. 340-347.0DA.

Lall, Amrit: *See—*

Jones, Peter Hadley; Bariana, Dilbagh Singh; Fung, Anthony Kei Lun; Martin, Yvonne Connolly; Kyncl, Jaroslav; and Lall, Amrit, 4,058,559, Cl. 260-520.00C.

Lamanna, Joe: *See—*

Wolgast, Raymond P.; and Lamanna, Joe, 4,057,994, Cl. 72-441.000.

Lamberti, Vincent: *See—*

Gutierrez, Eddie N.; and Lamberti, Vincent, 4,058,554, Cl. 560-180.000.

Land O'Frost Inc.: *See—*

Schneider, Walter Max, 4,057,951, Cl. 53-55.000.

Langford, James W., Jr.; and Keller, Wilbur S., to Dresser Industries, Inc. Asymmetric gage insert for an earth boring apparatus. 4,058,177, Cl. 175-374.000.

Lantec Industries, Ltd.: *See—*

Morfitt, John B., 4,058,295, Cl. 254-184.000.

Lark, John C.: *See—*

Holda, Eugene M.; and Lark, John C., 4,058,496, Cl. 260-21.000.

Lashway, Robert William, to Union Carbide Corporation. Process for producing an improved boron nitride crucible. 4,058,579, Cl. 264-81.000.

Laskin, Irving: *See—*

Johnson, Bruce K.; Laskin, Irving; and Whiteside, George D., 4,058,817, Cl. 354-26.000.

Latham, Roger D. Collapsible brush. 4,057,868, Cl. 15-203.000.

Laufer, Helmut: *See—*

Broghammer, Werner; Kramer, Jurgen; and Laufer, Helmut, 4,058,687, Cl. 179-100.110.

Lauper, Warner R., to Quadrastat Controls Corporation. Pressure compensated flexible bellows. 4,058,018, Cl. 74-18.200.

Lauterbach, Elisabeth Herbrand nee, heiress: *See—*

Jaeger, Karl-Heinz; and Herbrand, Willy, deceased, 4,058,534, Cl. 260-295.50S.

Lawrence, Jackson, to Cluett, Peabody & Co., Inc. Ammonia recovery by scrubbing and condensing. 4,058,375, Cl. 55-70.000.

Lawrie, William Eugene: *See—*

Holt, Amos Earl; Lawrie, William Eugene; and Birks, Albert Stingel, 4,058,762, Cl. 324-216.000.

Lawson, William J.: *See—*

Matthews, Robert M.; and Lawson, William J., 4,057,880, Cl. 28-154.000.

Lear Siegler, Inc.: *See—*

Maitland, Peter; and Draeger, William H., 4,058,677, Cl. 179-1.5FS.

LeBlond Incorporated: *See—*

Hermann, Otto, 4,058,080, Cl. 116-115.500.

Lectrolarm Custom Systems, Inc.: *See—*

Smith, William V., 4,058,831, Cl. 358-87.000.

Lee, Henry L., Jr.; Orlowski, Jan A.; and Fromm, Carl H., to Lee Pharmaceuticals. Photopolymerizable composition for formed-in-place artificial nails. 4,058,442, Cl. 204-159.120.

Lee Pharmaceuticals: *See—*

Lee, Henry L., Jr.; Orlowski, Jan A.; and Fromm, Carl H., 4,058,442, Cl. 204-159.120.

Leggett & Platt, Incorporated: *See—*

Higgins, Larry; King, John Thomas; Butler, Blondie; and Struewing, Francis R., deceased, 4,057,860, Cl. 5-247.000.

Lehmann, Helmut: *See—*

Jung, Hans; Kovacs, Jenoe; Dussel, Wilhelm; and Lehmann, Helmut, 4,058,640, Cl. 427-118.000.

Lehner, August: *See—*

Vaeth, Guenter; Bachmann, Rudolf; Hartmann, Heinrich; Spoor, Herbert; and Lehner, August, 4,058,506, Cl. 260-75.0NP.

Vaeth, Guenter; Bachmann, Rudolf; Hartmann, Heinrich; Hartmann, Hans-Joerg; Spoor, Herbert; Uhl, Karl; Lehner, August; Gutermann, Winfried; and Motz, Herbert, 4,058,646, Cl. 428-425.000.

Leland Stanford Junior University, The Board of Trustees of the: *See—*

Macovski, Albert, 4,058,003, Cl. 73-609.000.

Leong, Henry: *See—*

Caparrelli, Frederick; and Leong, Henry, 4,058,120, Cl. 128-188.000.

Le Page, Jean-Francois; Juguin, Bernard; and Miquel, Jean, to Institut Francais du Petrole. Process for producing aromatic hydrocarbons of high purity. 4,058,450, Cl. 208-66.000.

Leschinger, Matthew L., to Utility Products Co. Buried cable enclosure. 4,058,670, Cl. 174-38.000.

Leshin, Richard, to Goodyear Tire & Rubber Company, The. Process of preparing an amino thiazolyl disulfide using a water soluble salt in combination with wet 2,2-dithiobis(benzothiazole). 4,058,524, Cl. 544-136.000.

Lestradet, Maurice Cyril. Selectable, anti-leak, nozzle-holder. 4,058,260, Cl. 239-394.000.

Leveen, Harry H. Device for the fracture of the blood vessel lining. 4,058,126, Cl. 128-305.000.

Lever Brothers Company: *See—*

Canter, Carl Robert, 4,058,473, Cl. 252-121.000.

Gutierrez, Eddie N.; and Lamberti, Vincent, 4,058,554, Cl. 560-180.000.

Prince, Leon M., 4,058,487, Cl. 252-552.000.

Prince, Leon M., 4,058,490, Cl. 252-554.000.

Levin, Robert E.: *See—*

Woods, William C.; Levin, Robert E.; and Hodges, Richard H., 4,058,752, Cl. 315-360.000.

Lewis Industries, Inc.: *See—*

Gottlieb, Robert G., 4,057,888, Cl. 29-240.000.

Lewis, Merle J.: *See—*

Insley, Gene L.; and Lewis, Merle J., 4,057,959, Cl. 58-125.00C.

Liao, Paul Foo-Hung: *See—*

Bjorkholm, John Ernst; Bjorklund, Gary Carl; and Liao, Paul Foo-Hung, 4,058,739, Cl. 307-88.300.

Licentia Patent-Verwaltungs-G.m.b.H.: *See—*

Claassen, Manfred, 4,058,824, Cl. 357-15.000.

Schoberl, Werner, 4,058,750, Cl. 313-500.000.

Lienhard, Robert W., to Swiss Fabricating, Inc. Modular scaffolding for assembling the inside of an LNG vessel. 4,057,943, Cl. 52-126.000.

Linder, Ernst; Hertfelder, Wilhelm; Schnaibel, Eberhard; and Junginger, Erich, to Robert Bosch GmbH. Heater control for a motor vehicle. 4,058,255, Cl. 237-12.30B.

Lindkvist, Erik Allan. Apparatus for removing polluting matter arising in flame cutting and like operations. 4,058,299, Cl. 266-48.000.

Lindmayer, Joseph, to Solarex Corporation. Fabrication of thin film solar cells utilizing epitaxial deposition onto a liquid surface to obtain lateral growth. 4,058,418, Cl. 148-175.000.

Lipani, Anthony F.: *See—*

Jugle, Don B.; and Lipani, Anthony F., 4,058,086, Cl. 118-653.000.

Little, Julian R.; Nudenberg, Walter; and Rim, Yong S., to Uniroyal, Inc. Hexahalo-1,4-dihydro-1,4-methanonaphthalene-5,8-diol phenylsulfones. 4,058,568, Cl. 260-607.0AR.

Loboda, Robert S., to UOP Inc. Alkylaromatic hydrocarbon dealkylation process. 4,058,452, Cl. 208-134.000.

Lockwood Manufacturing Company: *See—*

Schmid, Richard R., 4,058,039, Cl. 83-155.000.

Loge, Olaf: *See—*

Ahrens, Hanns; Biere, Helmut; Rufer, Clemens; Schmiechen, Ralph; Schroeder, Eberhard; Loge, Olaf; Losert, Wolfgang; and Schillinger, Ekkehard, 4,058,619, Cl. 424-275.000.

Lohmann, Frank; Lugrin, Raymond; and Baumann, Hanspeter, to Ciba-Geigy Corporation. Non-dusting, readily free-flowing granules of optical brighteners. 4,058,480, Cl. 252-301.210.

Lok-A-Wat, Inc.: *See—*

Dalton, James H.; Stover, S. Dalton; and Roney, Robert M., 4,058,740, Cl. 307-116.000.

Long, E. David, to Allied Chemical Corporation. Control computer for fuel injection system. 4,058,709, Cl. 364-424.000.

Longman, Rodney A.; and Chiaramonte, Thomas J., to Pylon Corporation. Windshield wiper universal connector for bayonet and hook arms. 4,057,869, Cl. 15-250.320.

Longwell, John P.: *See—*

Cahn, Robert P.; and Longwell, John P., 4,058,575, Cl. 260-666.00P.

L'Oreal: *See—*

Vanlerberghe, Guy; and Sebag, Henri, 4,058,629, Cl. 424-365.000.

Lorlin Industries Inc.: *See—*

Quinn, Peter W., 4,058,219, Cl. 209-81.00R.

Lorsch, Johannes. Apparatus for stacking substantially flat articles. 4,058,308, Cl. 271-178.000.

Lorusso, Simone: *See—*

Abbruzzese, Luigi; Gozzo, Franco; Rossi, Giorgio; Masoero, Marcella; Lorusso, Simone; Bonola, Paola; and Tamburin, Gino, 4,058,613, Cl. 424-258.000.

Losenhausen Maschinenbau AG: *See—*

Braun, Gunther, 4,058,019, Cl. 74-87.000.

Losert, Wolfgang: *See—*

Ahrens, Hanns; Biere, Helmut; Rufer, Clemens; Schmiechen, Ralph; Schroeder, Eberhard; Loge, Olaf; Losert, Wolfgang; and Schillinger, Ekkehard, 4,058,619, Cl. 424-275.000.

Louden, William G. Dense paper. 4,058,648, Cl. 428-511.000.

Louit, Gerard J.: *See—*

Crager, William C.; Umarji, Sudhindra R.; Griffin, Robert H.; and Louit, Gerard J., 4,058,672, Cl. 178-3.000.

Crager, William C.; Umarji, Sudhindra R.; Griffin, Robert H.; and Louit, Gerard J., 4,058,838, Cl. 358-257.000.

Lowe, James L.: *See—*

Wendel, I. L., 4,058,111, Cl. 126-271.000.

Lowell Corporation: *See—*

Haigh, Robert, 4,058,192, Cl. 192-46.000.

Loyd, Robert W., Jr.: *See—*

Gavrun, Michael T.; and Loyd, Robert W., Jr., 4,058,321, Cl. 277-81.00P.

Lubrizol Corporation, The: *See—*

Hoke, Donald Irvin, 4,058,469, Cl. 252-51.50R.

Lugosi, Gyorgy: *See—*

Zsolnai, Tibor; Lugosi, Gyorgy; Szepesi, Istvan; Bakonyi, Maria; Racz, Istvan; and Radvany nee Hegedus, Erzsebet, 4,058,608, Cl. 424-226.000.

Lugrin, Raymond: *See—*

Lohmann, Frank; Lugrin, Raymond; and Baumann, Hanspeter, 4,058,480, Cl. 252-301.210.

Luke, Clark. Portable self-protective device. 4,058,237, Cl. 222-78.000.

Lund, Owen H. Book matches with safety lighting features. 4,058,208, Cl. 206-109.000.

Lundberg, John P.: *See—*

Schellin, Carl W.; and Lundberg, John P., 4,058,105, Cl. 123-198.0DC.

Lundin, Ronny Hugo Loritz: *See—*

Sievertsson, Hans; Lundin, Ronny Hugo Loritz; and Sjodahl, Gertrud Elisabeth Westin, 4,058,512, Cl. 260-112.50R.

Lundkvist, Leif Sigurd: *See—*

Svensson, Christer Martinus; Lundkvist, Leif Sigurd; Lundstrom, Kurt Ingemar; and Shivaraman, Madurai Somanathan, 4,058,368, Cl. 23-254.00E.

Lundstrom, Kurt Ingemar: *See—*

Svensson, Christer Martinus; Lundkvist, Leif Sigurd; Lundstrom, Kurt Ingemar; and Shivaraman, Madurai Somanathan, 4,058,368, Cl. 23-254.00E.

Lunkenheimer Company, The: *See—*

Paptzun, George J.; and Monnig, Anthony B., 4,057,883, Cl. 29-157.10R.

M&T Chemicals Inc.: *See—*

Gitlitz, Melvin H., 4,058,545, Cl. 260-429.700.

Kushlefsky, Bernard G., 4,058,544, Cl. 260-429.700.

Mack, Gerry P. Organotin mercapto dicarboxylic acid esters and compositions. 4,058,543, Cl. 260-45.75S.

MacKay, Kenneth D.; and Rogier, Edgar R., to General Mills Chemicals, Inc. Solvent extraction of metals from acidic solutions with quaternary ammonium salts of hydrogen ion exchange agents. 4,058,585, Cl. 423-24.000.

Macovski, Albert, to Leland Stanford Junior University, The Board of Trustees of the. Ultrasonic electronic lens with reduced delay range. 4,058,003, Cl. 73-609.000.

Magarian, Masick C. Wrench for a substantially circular workpiece. 4,058,031, Cl. 81-64.000.

Mailfert, Alain; and Boyer, Lionel, to Agence Nationale de Valorisation de la Recherche (ANVAR). Rotary electrical machines having a superconducting field winding. 4,058,747, Cl. 310-52.000.

Mailliet, Pierre H.; and Metz, Jean, to S.A. des Anciens Etablissements Paul Wurth. Clay gun. 4,058,300, Cl. 266-273.000.

Maitland, Peter; and Draeger, William H., to Lear Siegler, Inc. Sound scrambling equipment. 4,058,677, Cl. 179-1.5FS.

Malasek, Jaromir: *See—*

Henzl, Jindrich; Cerny, Jindrich; and Malasek, Jaromir, 4,058,143, Cl. 139-110.000.

Malaviya, Shashi D., to International Business Machines Corporation. High performance analog to digital converter for integrated circuits. 4,058,808, Cl. 340-347.0AD.

Malec, Robert E., to Ethyl Corporation. Lubricant composition. 4,058,468, Cl. 252-46.700.

Mallaghan, Michael Lee: *See—*
O'Neill, Patrick; Douglas, Patrick Joseph; and Mallaghan, Michael Lee, 4,058,198, Cl. 198-313.000.

Mallozzi, Philip J.; Epstein, Harold M.; Jung, Richard G.; Applebaum, David C.; Fairand, Barry P.; and Gallagher, William J., to Battelle Memorial Institute. Producing X-rays. 4,058,486, Cl. 250-493.000.

Mammino, Joseph; and Jossel, Franklin, to Xerox Corporation. Yellow developer employing a coated carrier. 4,058,397, Cl. 96-15.00D.

Management Utilities, Inc.: *See—*
Kerns, Steven L., 4,057,922, Cl. 40-124.200.

Mancuso, Louis C. Carrying and insulating enclosure for pizza pie containers. 4,058,214, Cl. 206-545.000.

Manes, Milton. Recovery of activated carbon. 4,058,457, Cl. 210-32.000.

Mannesmann Aktiengesellschaft: *See—*
Ries, Karl; Hannoschock, Kurt; and Simoneit, Gunter, 4,058,000, Cl. 73-644.000.

Manney, Charles J.: *See—*
Schreyer, Kenneth D.; Rohosy, Soma M.; and Manney, Charles J., 4,058,291, Cl. 254-74.000.

Mansur, Dana L., Jr.; and Murphy, Thomas L., to Aerojet-General Corporation. Explosive device. 4,058,061, Cl. 102-8.000.

Marchbank, Ian, to Abel Morrall Limited. Framed embroidery assembly. 4,058,215, Cl. 206-574.000.

Marconi Company Limited, The: *See—*
Drewery, John Oliver; and Weston, Martin, 4,058,836, Cl. 358-167.000.

Markiewitz, Kenneth H.; and Restaino, Alfred J., to ICI United States Inc. Free radical polymerization process employing substituted amino acetic acid derivatives. 4,058,656, Cl. 526-215.000.

Markman, Stanley. Can folder and flattener. 4,058,054, Cl. 100-233.000.

Marlowe, Kenneth P., to Raymond Lee Organization Inc., a part interest. Reverse action weedless hook. 4,057,927, Cl. 43-43.600.

Marshall, Jeffrey D.; and Kuklies, Milton C., to Mobile Oil Corporation. Fire retardant laminates having intumescent adhesive layer comprising shellac. 4,058,643, Cl. 428-198.000.

Martan, Michael, to UOP Inc. Separation of isomers of phenols and phenolic ethers. 4,058,566, Cl. 260-600.00R.

Martig, Kenneth W., Jr., to Pro-Tech, Inc. Flow monitoring apparatus. 4,058,011, Cl. 73-194.00R.

Martin, Henry; Pissiotas, Georg; and Dittrich, Volker, to Ciba-Geigy AG. Use of oxime-ethers as a synergistically acting additive to insecticidally and/or acaricidally active substances. 4,058,604, Cl. 424-211.000.

Martin, Lincoln A.; and Fenley, William Franklin, Jr., to Geophysical Systems Corporation. Method and apparatus for processing seismic signals from low energy sources. 4,058,791, Cl. 340-15.5MC.

Martin Marietta Corporation: *See—*
Ray, James A., 4,058,407, Cl. 106-92.000.

Martin, Yvonne Connolly: *See—*
Jones, Peter Hadley; Bariana, Dilbagh Singh; Fung, Anthony Kei Lun; Martin, Yvonne Connolly; Kyncl, Jaroslav; and Lall, Amrit, 4,058,559, Cl. 260-520.00C.

Martini, Thomas: *See—*
Kuhls, Jurgen; Martini, Thomas; and Steininger, Alfred, 4,058,578, Cl. 260-884.000.

Marvin Glass & Associates: *See—*
Terzian, Rouben T., 4,057,928, Cl. 46-120.000.

Maschinenfabrik Stahlkontor Weser Lenze KG: *See—*
Schuttler, Wilhelm, 4,058,267, Cl. 242-56.00A.

Masoero, Marcella: *See—*
Abbruzzese, Luigi; Gozzo, Franco; Rossi, Giorgio; Masoero, Marcella; Lorusso, Simone; Bonola, Paola; and Tamburin, Gino, 4,058,613, Cl. 424-258.000.

Mast, Aquila D., to Sperry Rand Corporation. Material layer diverting means for a crop material roll forming machine. 4,057,954, Cl. 56-341.000.

Matsui, Atsushi. Multipurpose disk protractor. 4,057,902, Cl. 33-1.00N.

Matsuo, Takashi: *See—*
Fujimoto, Keimei; Ohno, Nobuo; Okuno, Yoshitoshi; Mizutani, Toshio; Ohno, Isao; Hirano, Masachika; Itaya, Nobushige; and Matsuo, Takashi, 4,058,622, Cl. 424-308.000.

Matsuoka, Takashi, to Sumitomo Metal Industries, Ltd. Method of making cold-rolled high strength steel sheet. 4,058,414, Cl. 148-12.00F.

Matsushita Electric Industrial Co., Ltd.: *See—*
Nishimura, Yasutake; and Hasegawa, Mitsuhiro, 4,058,688, Cl. 179-156.00R.

Matsushita Electric Works, Ltd.: *See—*
Kimura, Rokusaburo; and Horii, Sadashige, 4,057,957, Cl. 58-21.155.

Matthews, Robert M.; and Lawson, William J., to Kellwood Company. Method of producing snag resistant hosiery article. 4,057,880, Cl. 28-154.000.

Matusch, Siegfried: *See—*
Dietzel, Walter; and Matusch, Siegfried, 4,058,410, Cl. 127-5.000.

Matusmoto, Goro: *See—*
Jinnai, Toshio; Matusmoto, Goro; and Iwasaki, Kazuhito, 4,058,475, Cl. 252-299.000.

Maurer, Fritz: *See—*
Hofer, Wolfgang; Maurer, Fritz; Riebel, Hans-Jochem; Rohe, Lothar; Eue, Ludwig; and Schmidt, Robert R., 4,058,525, Cl. 544-182.000.
Hofer, Wolfgang; Maurer, Fritz; Riebel, Hans-Jochem; Hammann, Ingeborg; and Stendel, Wilhelm, 4,058,603, Cl. 424-200.000.

Mautz, Karl-Heinz: *See—*
Frommlet, Hubert; Mautz, Karl-Heinz; and Brunsch, Klaus, 4,058,353, Cl. 308-1.00A.

Maxfield, Maureen Adele. Full tank marker. 4,058,081, Cl. 116-125.000.

Maxon, Glenway W., III, to Maxon Industries, Inc. Concrete transporting and placing vehicle with laterally shiftable body. 4,058,343, Cl. 298-9.000.

Maxon Industries, Inc.: *See—*
Maxon, Glenway W., III, 4,058,343, Cl. 298-9.000.

May, Edwin A., to International Paper Company. Combined irrigator and evacuator for closed wounds. 4,058,123, Cl. 128-278.000.

McAlpin, James J.: *See—*
Smith, Stuart B.; McAlpin, James J.; Peruyero, Jose M. A.; Hazelton, Ronald L.; and Upchurch, Edward F., 4,058,652, Cl. 526-68.000.

McArdle, James Michael Smith, to Domtar Limited. Produce tray. 4,058,248, Cl. 229-30.000.

McCall, David Daniel: *See—*
Smith, Joe Delano; McCall, David Daniel; and Kyzer, James Alexander, 4,057,893, Cl. 29-560.000.

McCarthy, John Brian. Apparatus for playing a board game. 4,058,317, Cl. 273-130.00R.

McGill, Paul E.: *See—*
Duska, Joseph J.; and McGill, Paul E., 4,058,298, Cl. 366-76.000.

McGraw-Edison Company: *See—*
Gaia, Aldino J., 4,058,784, Cl. 337-164.000.
Gaia, Aldino J.; and Urani, Angelo, 4,058,786, Cl. 337-293.000.

McKee, Kevin D.: *See—*
Vogel, Ronald F.; Boldt, Robert R.; McKee, Kevin D.; Resh, Roy E.; and West, Paul E., 4,058,766, Cl. 324-61.00R.

McKee, Paul, deceased, to Enebrad, Lois. Filter for fish pond. 4,058,465, Cl. 210-356.000.

McKendry, Lennon H., to Dow Chemical Company, The. Substituted pyridine carboxylic acids and derivatives. 4,058,533, Cl. 260-294.80F.

McKinney, James T.; and Goff, Robert F., to Minnesota Mining and Manufacturing Company. Ion Scattering spectrometer with two analyzers preferably in tandem. 4,058,724, Cl. 250-309.000.

McLane, Larry A. Snake leggings. 4,057,853, Cl. 2-22.000.

McLaughlin, Michael H.: *See—*
Frind, Gerhard; Fisk, Robert W.; and McLaughlin, Michael H., 4,058,785, Cl. 337-204.000.

McLaughlin, Robert Joseph William, to University of Melbourne, The. Process for the beneficiation of titaniferous ores. 4,058,393, Cl. 75-1.00T.

McNair, Rhett, to Aqua Craft, Inc. Powerhead cartridge. 4,058,062, Cl. 102-38.000.

McNeil, Sharon S.; Bloomquist, Carl R.; and Johnston, Robert C., to Defiance - Azon Corporation. Photosensitive diazotype material and method of making the same. 4,058,399, Cl. 96-75.000.

McPherson, James Norman: *See—*
Andrews, Allen Howe; McPherson, James Norman; Burns, John Thomas, Jr.; and Hendrie, John Matthew, 4,058,788, Cl. 338-42.000.

Melilli, Albert Samuel: *See—*
Bicicchi, Richard Thomas; and Melilli, Albert Samuel, 4,058,417, Cl. 148-37.000.

Melvold, Robert W.: *See—*
Vrolyk, John J.; and Melvold, Robert W., 4,058,234, Cl. 220-239.000.

Menand, Henri; and Mison, Andre, to Rhone-Poulenc S.A. Process for the copolymerization of acrylonitrile and sulphonate monomers. 4,058,509, Cl. 260-79.700.

Mendelsohn, Arnold: *See—*
Jacoby, Herbert; and Mendelsohn, Arnold, 4,058,187, Cl. 187-29.00R.

Menke, W. Kenneth, to Public Safety Equipment, Inc. Vehicle beacon control system. 4,058,794, Cl. 340-92.000.

Mentrup, Anton: *See—*
Renth, Ernst-Otto; Mentrup, Anton; Schromm, Kurt; and Walland, Alexander, 4,058,642, Cl. 424-330.000.

Menzel, John K.: *See—*
Nickerson, Harvey R.; Rink, Helm A.; and Menzel, John K., 4,058,328, Cl. 285-45.000.

Merck & Co., Inc.: *See—*
Baldwin, John J., 4,058,614, Cl. 424-263.000.
Cama, Lovji D.; Christensen, Burton G.; Karady, Sandor; and Sletzinger, Meyer, 4,058,661, Cl. 544-21.000.
Igoe, Robert S., 4,058,636, Cl. 426-573.000.
Jacobus, David P.; Dulaney, Eugene L.; and Grier, Nathaniel, 4,058,624, Cl. 424-330.000.
Jacobus, David P.; Dulaney, Eugene L.; and Grier, Nathaniel, 4,058,625, Cl. 424-325.000.
Saari, Walfred S., 4,058,530, Cl. 260-281.0GN.

Merz, Walter; and Schummer, Gunter, to Bayer Aktiengesellschaft. Treatment of waste water from the preparation of 6-substituted 3-mercapto-4-amino-1,2,4-triazine-5-ones. 4,058,526, Cl. 544-182.000.

Messerschmitt-Bolkow-Blohm Gesellschaft mit beschrankter Haftung: *See—*
Frommlet, Hubert; Mautz, Karl-Heinz; and Brunsch, Klaus, 4,058,353, Cl. 308-1.00A.

Metagraphic Systems, Inc.: *See—*
Kinsinger, William C., 4,058,218, Cl. 209-80.500.

Metallgesellschaft Aktiengesellschaft: *See—*
Gauch, Georg, 4,058,012, Cl. 73-228.000.
Schminke, Heinz; Rau, Kurt; and Batza, Willi, 4,058,377, Cl. 55-148.000.

Metz, Jean: *See—*
Mailliet, Pierre H.; and Metz, Jean, 4,058,300, Cl. 266-273.000.

Metzger, Carl: *See—*
Thomas, Rudolf; Kramer, Wolfgang; Eue, Ludwig; Metzger, Carl; and Jager, Gerhard, 4,058,392, Cl. 71-106.000.

Meurer, Peter: *See—*
Baing, Helmut; Oberschachtsiek, Gerd; Grenzing, Horst; and Meurer, Peter, 4,058,069, Cl. 110-8.00F.

Meyer, Fred H., to Picker Corporation. Radiation imaging apparatus and method. 4,058,833, Cl. 358-111.000.

Meyer, Hans-Rudolf, to Ciba-Geigy Corporation. Bis-benzoxazolyl-naphthalenes as optical brighteners. 4,058,408, Cl. 106-176.000.

Meyer, Martin R.: *See—*
Hochradel, Ernest; Hauer, Werner; Meyer, Martin R.; and Reuter, Frederick A., 4,058,274, Cl. 243-5.000.

Meyer, Rudolf; Schiegl, Wolf-Eberhard; and Taumann, Leonhard, to Siemens Aktiengesellschaft. Irradiating device with an electronic accelerator. 4,058,730, Cl. 250-397.000.

Meyers, Frank. Contaminating spill detection arrangement. 4,058,802, Cl. 340-224.000.

Michal, Dorothy Hamilton. Jewelry box. 4,058,356, Cl. 312-305.000.

Micro Magnetic Industries, Inc.: *See—*
Riddle, John B.; and Bogert, Howard Z., Jr., 4,058,194, Cl. 194-4.00C.

Microwave Development Labs., Inc.: *See—*
Riblet, Gordon, 4,058,780, Cl. 333-1.100.

Midcon Pipeline Equipment Co.: *See—*
Wilson, Daniel F., 4,058,427, Cl. 156-392.000.

Midland-Ross Corporation: *See—*
Duska, Joseph J.; and McGill, Paul E., 4,058,298, Cl. 366-76.000.

Miettinen, Seppo I., to United States of America, Commerce. Bowling ball including a means for displacing the center of gravity. 4,058,310, Cl. 273-63.00E.

Mieville, Andre, to Orchimed SA. Esters of p-carbonylphenoxy-isobutyric acids. 4,058,552, Cl. 560-52.000.

Milan, Otto G.; and Klich, Edward J., to Addressograph-Multigraph Corporation. Moisture metering control apparatus. 4,058,057, Cl. 101-148.000.

Milkovic, Miran, to General Electric Company. Two-way electronic kWh meter. 4,058,768, Cl. 324-142.000.

Miller, Anthony J., to Seeburg Corporation, The. Electronic control and test circuit for pinball type games. 4,058,316, Cl. 273-121.00A.

Miller, David K.: *See—*
Hasinger, Siegfried H.; and Miller, David K., 4,058,141, Cl. 138-39.000.

Miller, Michael E., to Sam Stein Associates, Inc. Rear batter flow for batter applicator machines. 4,058,083, Cl. 118-16.000.

Millmaster Onyx Corporation: *See—*
Wakeman, Reginald L.; Dudzinski, Zdzislaw W.; and Lada, Arnold, 4,058,488, Cl. 252-542.000.

Mims, Samuel S., to El Paso Products Company. Process for the purification of mixed acids. 4,058,555, Cl. 560-191.000.

Minami Kogyo Kabushiki Kaisha: *See—*
Yonezu, Nobuya, 4,058,151, Cl. 144-246.00E.

Minemoto, Isamu: *See—*
Morisawa, Kunio; Minemoto, Isamu; and Kyushima, Tatsuo, 4,058,193, Cl. 192-109.00F.

Miner, Thomas Gary: *See—*
Shepherd, Robert Gordon; and Miner, Thomas Gary, 4,058,550, Cl. 560-43.000.

Minnesota Mining and Manufacturing Company: *See—*
Hnojewyj, Olexander, 4,058,641, Cl. 427-137.000.
McKinney, James T.; and Goff, Robert F., 4,058,724, Cl. 250-309.000.
Nora, James C., 4,058,593, Cl. 424-1.
Sinclair, Robert A., 4,058,362, Cl. 21-2.50R.

Miquel, Jean: *See—*
Le Page, Jean-Francois; Juguin, Bernard; and Miquel, Jean, 4,058,450, Cl. 208-66.000.

Mirliss, Melvin J.; and Nielsen, Richard B., to Grefco, Inc. Method and apparatus for drying damp powder. 4,057,908, Cl. 34-10.000.

Mislin, Roland; and Uehlinger, Hanspeter, to Sandoz Ltd. Sulfo group-containing azo compounds having a tetrazo component radical derived from an optionally substituted 3,8-diaminodibenzofuran. 4,058,516, Cl. 260-152.000.

Mison, Andre: *See—*
Menand, Henri; and Mison, Andre, 4,058,509, Cl. 260-79.700.

Mitch, Frank A., to SCM Corporation. Disinfectant composition comprising pinanol. 4,058,628, Cl. 424-343.000.

Mitchell, Roger; and Strater, William H., to Visual Graphics Corporation. Camera accessory and cartridge. 4,058,823, Cl. 354-354.000.

Mitchell, William J. Tool case. 4,058,210, Cl. 206-372.000.

Mitsubishi Denki Kabushiki Kaisha: *See—*
Shibayama, Kyoichi; Satho, Fumihiko; and Naitho, Mamoru, 4,058,444, Cl. 204-181.000.

Mitsubishi Gas Chemical Company, Inc.: *See—*
Ko, Keiun; Takashina, Naomitsu; Shimizu, Senzo; Ikegami, Masuya; and Iwamoto, Yoshinori, 4,058,497, Cl. 260-22.00A.
Yonemitsu, Eiichi; Sugio, Akitoshi; Kuramoto, Atuo; and Urabe, Hiroyuki, 4,058,504, Cl. 260-47.0ET.

Mitsubishi Petrochemical Co., Ltd.: *See—*
Inoue, Takayuki; Kakizaki, Tetsuji; and Ochiumi, Masahide, 4,058,647, Cl. 428-474.000.

Mitsubishi Precision Co., Ltd.: *See—*
Futai, Norio; Murakami, Toshio; Takahara, Yoshimasa; and Kumazawa, Toshiharu, 4,058,481, Cl. 252-321.000.

Mitsui, Norihiko: *See—*
Okubo, Isao; Ito, Takayoshi; and Mitsui, Norihiko, 4,057,934, Cl. 49-28.000.

Mitsuishi, Etsuko: *See—*
Hata, Shun-ichi; Mizuno, Koji; Nishii, Yasuho; Mitsuishi, Etsuko; and Shiba, Motoharu, 4,058,601, Cl. 424-180.000.

Miyao, Hiroyasu: *See—*
Sekiguchi, Tomoaki; Miyao, Hiroyasu; and Shimizu, Hidekazu, 4,058,797, Cl. 340-56.000.

Miyaoka, Senri, to Sony Corporation. System for making a light beam scan a flat carrier with autofocusing. 4,058,834, Cl. 358-128.000.

Miyata, Yukinori: *See—*
Taira, Kaoru; Sato, Teruo; Ishii, Yoshiya; Miyata, Yukinori; and Okamoto, Katashi, 4,058,101, Cl. 123-140.0MP.

Miyazawa, Kuichiro: *See—*
Komatsu, Atsushi; Miyazawa, Kuichiro; Yamaura, Yoshotomo; and Asanuma, Akira, 4,058,134, Cl. 137-38.000.

Miyoshi, Tadahiko; Kurihara, Yasutoshi; Kamei, Tatsuya; and Ogawa, Takuzo, to Hitachi, Ltd. Photo-coupler semiconductor device and method of manufacturing the same. 4,058,821, Cl. 357-19.000.

Mizuno, Koji: *See—*
Hata, Shun-ichi; Mizuno, Koji; Nishii, Yasuho; Mitsuishi, Etsuko; and Shiba, Motoharu, 4,058,601, Cl. 424-180.000.

Mizutani, Toshio: *See—*
Fujimoto, Keimei; Ohno, Nobuo; Okuno, Yoshitoshi; Mizutani, Toshio; Ohno, Isao; Hirano, Masachika; Itaya, Nobushige; and Matsuo, Takashi, 4,058,622, Cl. 424-308.000.

Mizutani, Yasukazu: *See—*
Ubukata, Susumu; Mizutani, Yasukazu; Iyoda, Syozo; and Aoi, Hiroshi, 4,058,271, Cl. 242-107.40B.

Mobil Oil Corporation: *See—*
Chang, Clarence D.; and Grover, Shamsher S., 4,058,576, Cl. 260-673.000.
Florian, John, 4,058,247, Cl. 229-2.50R.
Steiner, Robert Henry, 4,058,645, Cl. 428-331.000.
Steiner, Robert Henry, 4,058,649, Cl. 428-518.000.

Mobile Oil Corporation: *See—*
Marshall, Jeffrey D.; and Kuklies, Milton C., 4,058,643, Cl. 428-198.000.

Mochizuki, Hiroshi: *See—*
Tanaka, Eizi; and Mochizuki, Hiroshi, 4,058,100, Cl. 123-139.0AW.

Moestue, Hans Jacob. Mechanism for cleaning a cylinder of a printing press. 4,058,059, Cl. 101-425.000.

Mogi, Takao; Taki, Akira; and Yamazaki, Hiroshi, to Sony Corporation. Method of and apparatus for converting a plural-bit digital signal to a pulse width modulated signal. 4,058,772, Cl. 325-464.000.

Mole, Cecil J.; and Edwards, Robert F., to Westinghouse Electric Corporation. Dynamoelectric machinery utilizing superconductive windings. 4,058,746, Cl. 310-10.000.

Monkovic, Ivo; Bachand, Carol; and Wong, Henry, to Bristol-Myers Company. Process for the preparation of 14-hydroxymorphinan derivatives. 4,058,531, Cl. 260-285.000.

Monnig, Anthony B.: *See—*
Paptzun, George J.; and Monnig, Anthony B., 4,057,883, Cl. 29-157.10R.

Monsanto Company: *See—*
Morgan, Albert W.; Shull, Charles S.; and Vanderlinde, William, 4,058,658, Cl. 526-261.000.
Olive, Gisela; and Olive, Salvador, 4,058,548, Cl. 260-465.100.

Montedison S.p.A.: *See—*
Abbruzzese, Luigi; Gozzo, Franco; Rossi, Giorgio; Masoero, Marcella; Lorusso, Simone; Bonola, Paola; and Tamburin, Gino, 4,058,613, Cl. 424-258.000.
Glatti, Flaviano; and Slongo, Gastone, 4,058,471, Cl. 252-63.500.

Mooradian, Albert H.: *See—*
Paterson, Malcolm M.; DiMercurio, John S.; and Mooradian, Albert H., 4,057,909, Cl. 34-76.000.

Moore, Franklin Eldridge. Speed control device. 4,058,094, Cl. 123-102.000.

Moran, Thomas J., to United States of America, Air Force. Dispersive electromagnetic surface acoustic wave transducer. 4,058,002, Cl. 73-620.000.

Moreaux, Claude, to Societe Anonyme Intersmat. Chromatograph, more particularly for gas phase chromatography. 4,057,998, Cl. 73-23.100.

Morfitt, John B., to Lantec Industries, Ltd. Small, variable-speed yarder. 4,058,295, Cl. 254-184.000.

Morgan, Albert W.; Shull, Charles S.; and Vanderlinde, William, to Monsanto Company. Copolymers of ω-bromoalkyl esters of acyclic unsaturated dicarboxylic acids. 4,058,658, Cl. 526-261.000.

Morgan, Steven J. Lock for skis. 4,057,983, Cl. 70-18.000.

Mori, Michitsugu: *See—*
Kohno, Takashige; Takamaru, Takeshi; Kuwahara, Akiyasu; and Mori, Michitsugu, 4,058,093, Cl. 123-75.00B.

Mori, Takashi; Takaku, Sakae; Oi, Nobuhiro; Shindo, Minoru; Hirano, Takeaki; Kataoka, Shigeyuki; and Furuno, Kouji, to Chugai Seiyaku Kabushiki Kaisha. Bis(benzamido)-benzene derivatives. 4,058,523, Cl. 544-165.000.

Morisawa, Kunio; Minemoto, Isamu; and Kyushima, Tatsuo, to Toyota Jidosha Kogyo Kabushiki Kaisha. Hydraulic control device for use in an automatic transmission. 4,058,193, Cl. 192-109.00F.

Morner, Bengt Olof Johan Stellan: *See—*
Nagy, Gyorgy; and Morner, Bengt Olof Johan Stellan, 4,057,900, Cl. 30-382.000.

Morozowich, Walter, to Upjohn Company, The. Substituted phenyl esters of PGA_2. 4,058,551, Cl. 560-43.000.

Morris, Donald Blanton: *See—*

Fuller, Robert R.; and Morris, Donald Blanton, 4,058,433, Cl. 162-16.000.

Morse, Hugh B.; and Johnson, Robert B., to Helmut E. W. Masch. Display carton and blank therefor. 4,058,206, Cl. 206-44.00R.

Morton, Dale E., to Texas Instruments Incorporated. Method of optical thin film coating. 4,058,638, Cl. 427-39.000.

Moschovis, Elia P.; and Gilson, John L., to A. B. Dick Company. Liquid developer composition for lithographic masters. 4,058,470, Cl. 252-62.10L.

Mostow, Arthur L. Selectively operated, clock-controlled repetitive calculator. 4,058,714, Cl. 364-754.000.

Motorola, Inc.: *See—*

Dano, Arnold Vincent; Tomaszewski, Jerry James; and Friedrichs, Jerome Peter, 4,058,744, Cl. 310-343.000.

Gauss, Robert C.; and Wills, Lynn D., 4,058,811, Cl. 343-715.000.

Motz, Herbert: *See—*

Vaeth, Guenter; Bachmann, Rudolf; Hartmann, Heinrich; Hartmann, Hans-Joerg; Spoor, Herbert; Uhl, Karl; Lehner, August; Gutermann, Winfried; and Motz, Herbert, 4,058,646, Cl. 428-425.000.

Mourlevat, Jean: *See—*

de Saint Palais, Jacques; Laffont, Paul; and Mourlevat, Jean, 4,058,137, Cl. 137-236.00S.

Mouzin, Gilbert: *See—*

Cousse, Henri; Mouzin, Gilbert; and Rieu, Jean-Pierre, 4,058,558, Cl. 260-515.00A.

MSI Data Corporation: *See—*

Sherer, Paul; and Hester, Gerald Paul, 4,058,708, Cl. 235-92.0CC.

Muehldorf, Eugen I.; and Elam, Robert R., to International Business Machines Corporation. Apparatus and process for testing AC performance of LSI components. 4,058,767, Cl. 324-73.00R.

Mueller, Karl Friedrich, to Ciba-Geigy Corporation. Esters of anhydride aromatic polycarboxylic acids with perfluoroalkyl alcohols. 4,058,537, Cl. 260-346.300.

Mulder, Jan, to U.S. Philips Corporation. Hot-gas reciprocating machine with self-centered free piston. 4,058,382, Cl. 62-6.000.

Muller, Karl-Heinz; Munchmeyer, Walter; von Rauch, Moriz; and Schafer, Norbert, to Siemens Aktiengesellschaft. Specimen holder for a corpuscular-beam apparatus. 4,058,731, Cl. 250-442.000.

Mullis, Clyde M., to Westinghouse Electric Corporation. Elevator system with retainer device for plurality of traveling cables. 4,058,186, Cl. 187-1.00R.

Munch, Walter, Jr.: *See—*

Wade, David R.; and Munch, Walter, Jr., 4,058,042, Cl. 84-1.010.

Munchmeyer, Walter: *See—*

Muller, Karl-Heinz; Munchmeyer, Walter; von Rauch, Moriz; and Schafer, Norbert, 4,058,731, Cl. 250-442.000.

Munk, Michael E.; and Bromberg, Louis F., to Munk, Michael E. Method and apparatus for conservation of energy and containment and evacuation of smoke in a high rise building. 4,058,253, Cl. 236-46.00R.

Muntz, Earl W. Projection television receiver. 4,058,837, Cl. 358-237.000.

Murai, Hisanori: *See—*

Omoto, Yorihiko; Konishi, Tadashi; Ichihara, Shigehiro; and Murai, Hisanori, 4,058,507, Cl. 260-75.00M.

Murakami, Kazuo, to Nippon Gakki Seizo Kabushiki Kaisha. Electrical musical instrument. 4,058,044, Cl. 84-1.140.

Murakami, Masuo: *See—*

Inukai, Noriyoshi; Murakami, Masuo; Iwamoto, Hidenori; Yanagisawa, Isao; Tamura, Toshinari; Ishii, Yoshio; Shizaoki, Tetsuya; Tomioka, Kenichi; and Takagi, Tokuichi, 4,058,665, Cl. 560-121.000.

Murakami, Toshio: *See—*

Futai, Norio; Murakami, Toshio; Takahara, Yoshimasa; and Kumazawa, Toshiharu, 4,058,481, Cl. 252-321.000.

Murata, Masataka; Takeda, Keiji; and Ikeda, Teppei, to Fuji Photo Film Co., Ltd. Recording material. 4,058,443, Cl. 204-159.170.

Murata, Masataka: *See—*

Osada, Chiaki; Hasegawa, Eiichi; and Murata, Masataka, 4,058,398, Cl. 96-27.00R.

Murphy, Bernard J., to Fiat-Allis Construction Machinery, Inc. Master link assembly having two-piece links. 4,058,351, Cl. 305-54.000.

Murphy, Kevin P.; Stahl, Richard F.; and Orfeo, Sabatino R., to Allied Chemical Corporation. Constant boiling mixtures of 1-chloro-2,2,2-trifluoroethane and 2-chloroheptafluoropropane. 4,057,973, Cl. 62-114.000.

Murphy, Kevin P.; Stahl, Richard F.; and Orfeo, Sabatino R., to Allied Chemical Corporation. Constant boiling mixtures of 1-chloro-2,2,2-trifluoroethane and octafluorocyclobutane. 4,057,974, Cl. 62-114.000.

Murphy, Thomas L.: *See—*

Mansur, Dana L., Jr.; and Murphy, Thomas L., 4,058,061, Cl. 102-8.000.

Murtaugh, Justin J.: *See—*

Keyes, George B.; and Murtaugh, Justin J., 4,058,474, Cl. 252-160.000.

Mussgay, Manfred: *See—*

Bauer, Kurt; Wittman, Gunther; Mussgay, Manfred; Irion, Eckart; and Geilhausen, Horst, 4,058,599, Cl. 424-92.000.

Musumeci, Luigi: *See—*

Delle Donne, Roberto; and Musumeci, Luigi, 4,058,682, Cl. 179-15.0AF.

Mutsuta, Akio: *See—*

Sato, Yoshimasa; Tsukuda, Toshio; Inoue, Hajime; and Mutsuta, Akio, 4,057,978, Cl. 62-331.000.

Muzhzhavlev, Konstantin Dmitrievich; Kosarev, Sergei Petrovich; Schegolev, Vladimir Ivanovich; Ivanov, Andrei Borisovich; Romanenko, Oleg Nikolaevich; Yazev, Vladimir Dmitrievich; and Vasiliev, Alexei Vasilievich. Diaphragmless electrolyzer for producing magnesium and chlorine. 4,058,448, Cl. 204-244.000.

Naarmann, Herbert; and Pohlemann, Heinz, to BASF Aktiengesellschaft. Polymers containing urethane groups. 4,058,508, Cl. 260-77.5BB.

Nachtigal, Julius Harvey, to Colgate-Palmolive Company. Stabilized toothpastes containing an enzyme. 4,058,596, Cl. 424-50.000.

Nadler, Morton. Analog/digital converter. 4,058,806, Cl. 340-347.0AD.

Nagami, Masaru: *See—*

Kishi, Yoshio; and Nagami, Masaru, 4,058,841, Cl. 360-27.000.

Nagata, Wataru: *See—*

Uyeo, Shoichiro; Aoki, Tsutomu; and Nagata, Wataru, 4,058,521, Cl. 260-239.100.

Nagel, Artur; and Wissaert, Roland, to Siemens Aktiengesellschaft. Apparatus for direct line switching. 4,058,684, Cl. 179-18.0BB.

Naglieri, Anthony N.: *See—*

Rizkalla, Nabil; and Naglieri, Anthony N., 4,058,542, Cl. 260-429.00R.

Nagy, Gyorgy; and Morner, Bengt Olof Johan Stellan, to AB Partner. Power saw. 4,057,900, Cl. 30-382.000.

Nagy, Robert Andrew. Longitudinally extended printing method for computers. 4,058,798, Cl. 364-900.000.

Naitho, Mamoru: *See—*

Shibayama, Kyoichi; Satho, Fumihiko; and Naitho, Mamoru, 4,058,444, Cl. 204-181.000.

Nakai, Masanori: *See—*

Tokumaru, Yukuya; Nakai, Masanori; Shinozaki, Satoshi; Nakamura, Junichi; Ito, Shintaro; and Nishi, Yoshio, 4,058,419, Cl. 148-175.000.

Nakajima, Sachie: *See—*

Idzutsu, Waichiro; Kuroki, Masaaki; Komukai, Shigeru; Terasaki, Daijiro; and Nakajima, Sachie, 4,058,376, Cl. 55-70.000.

Nakamura, Junichi: *See—*

Tokumaru, Yukuya; Nakai, Masanori; Shinozaki, Satoshi; Nakamura, Junichi; Ito, Shintaro; and Nishi, Yoshio, 4,058,419, Cl. 148-175.000.

Nakamura, Yoshihiro, to Riken Keikinzoku Kogyo Kabushiki Kaisha. Window sash assembly. 4,057,937, Cl. 49-372.000.

Nakanishi, Hajime: *See—*

Kawashima, Kohei; Ikeno, Keiji; and Nakanishi, Hajime, 4,058,264, Cl. 242-18.0PW.

Nalco Chemical Company: *See—*

Svarz, Jerry J., 4,058,458, Cl. 210-52.000.

National Polymers, Inc.: *See—*

Stutelberg, Kenneth R.; and Anderson, Dennis C., 4,057,931, Cl. 47-66.000.

National Research Development Corporation: *See—*

Firth, Jack Graham; Jones, Thomas Alwyn; and Rimmington, Brenda, 4,057,996, Cl. 73-23.000.

Hurt, Francis Neil; Theaker, Reginald; and Plant, David Herbert, 4,058,245, Cl. 226-174.000.

Neles Oy: *See—*

Nelimarkka, Juha Antti Elia, 4,058,290, Cl. 251-306.000.

Nelimarkka, Juha Antti Elia, to Neles Oy. Gate valve. 4,058,290, Cl. 251-306.000.

Nelson, Ernest William. Process for removing impurities from acidic fluid solutions. 4,058,587, Cl. 423-220.000.

Ness, Irving S., to Johnson & Johnson. Force distributing adhesive tape tab for disposable diapers. 4,058,125, Cl. 128-287.000.

Neustadt, Bernard R., to Schering Corporation. 6-(Polyhaloisopropyl)-quinazoline-2,4-diones. 4,058,612, Cl. 424-251.000.

Nickerson, Harvey R.; Rink, Helm A.; and Menzel, John K., to Resistoflex Corporation. Heat-responsively self-sealing protective jacket for expansion joints. 4,058,328, Cl. 285-45.000.

Nicklaus, Karl, to Esec Sales S.A. Suction pipette and method of manufacture for receiving of semiconductor crystal plates. 4,058,246, Cl. 228-121.000.

Nickles, Robert J., to Wisconsin Alumni Research Foundation. Correction of data loss in gamma ray scintillation cameras. 4,058,728, Cl. 250-369.000.

Nielsen, Richard B.: *See—*

Mirliss, Melvin J.; and Nielsen, Richard B., 4,057,908, Cl. 34-10.000.

Nieman, Gerald R.: *See—*

Panek, George J.; Ingham, Francis H.; Sedig, Albert R.; and Nieman, Gerald R., 4,058,671, Cl. 174-151.000.

Nihon Hammond Kabushiki Kaisha: *See—*

Shibahara, Masashi, 4,058,043, Cl. 84-1.030.

Nippon Electric Company, Ltd.: *See—*

Niwa, Kunihiko, 4,058,715, Cl. 364-726.000.

Nippon Gakki Seizo Kabushiki Kaisha: *See—*

Murakami, Kazuo, 4,058,044, Cl. 84-1.140.

Nippon Soken, Inc.: *See—*

Oishi, Kazuo; Yamada, Takashi; and Yoshida Shuzo, 4,058,796, Cl. 340-52.00F.

Tanaka, Eizi; and Mochizuki, Hiroshi, 4,058,100, Cl. 123-139.0AW.

Nippon Steel Corporation: *See—*

Takechi, Hiroshi; Abe, Mitsunobu; Katsutani, Ryoseki; and Saito, Yoshio, 4,057,989, Cl. 72-128.000.

Nippondenso Co., Ltd.: *See—*

Taira, Kaoru; Sato, Teruo; Ishii, Yoshiya; Miyata, Yukinori; and Okamoto, Katashi, 4,058,101, Cl. 123-140.0MP.

Nishi, Yoshio: *See—*

Tokumaru, Yukuya; Nakai, Masanori; Shinozaki, Satoshi; Nakamura, Junichi; Ito, Shintaro; and Nishi, Yoshio, 4,058,419, Cl. 148-175.000.

Nishida, Yoshihiko: *See—*

Imaizumi, Yoshihiro; and Nishida, Yoshihiko, 4,058,681, Cl. 179-15.0AL.

Nishii, Yasuho: *See—*

Hata, Shun-ichi; Mizuno, Koji; Nishii, Yasuho; Mitsuishi, Etsuko; and Shiba, Motoharu, 4,058,601, Cl. 424-180.000.

Nishikawa, Kohji: *See—*

Kawaguchi, Hiroshi; and Nishikawa, Kohji, 4,058,084, Cl. 188-71.800.

Nishimura, Yasutake; and Hasegawa, Mitsuhiro, to Matsushita Electric Industrial Co., Ltd. Headphone. 4,058,688, Cl. 179-156.00R.

Niwa, Kunihiko, to Nippon Electric Company, Ltd. Serial FFT processing unit. 4,058,715, Cl. 364-726.000.

Nobusawa, Tsukumo, to Asahi Kogaku Kogyo Kabushiki Kaisha. Camera exposure control system having digitally controlled timing circuitry including a decimal count storing memory. 4,058,816, Cl. 354-23.00D.

Nofziger, Neil B., to Owens-Illinois, Inc. Simultaneously baking and sealing a faceplate assembly. 4,058,387, Cl. 65-32.000.

Noirel, Yves Maurice: *See—*

Guinet, Yves Maurice; and Noirel, Yves Maurice, 4,058,830, Cl. 358-86.000.

Nora, James C., to Minnesota Mining and Manufacturing Company. Technetium-labeled bone scanning agents. 4,058,593, Cl. 424-1.

Nordisk Kartro Aktiebolag: *See—*

Sundberg, Borje Erling Ingvar, 4,058,048, Cl. 85-31.000.

Noritsa, Nadezhda Petrovna: *See—*

Ovchinnikov, Viktor Georgievich; Noritsa, Nadezhda Petrovna; Grib, Maria Mefodievna; Kamennov, Nikolai Alexandrovich; and Skvortsova, Elena Konstantinovna, 4,058,618, Cl. 424-273.00R.

North Electric Company: *See—*

Bowin, William Ferdinand, 4,058,685, Cl. 179-18.0AH.

Norwich Laboratory, Inc.: *See—*

Edwards, Harrison F., 4,058,107, Cl. 126-121.000.

Novikov, Igor Ivanovich: *See—*

Viktorov, Evgeny Vasilievich; Novikov, Igor Ivanovich; Kondratieva, Tatyana Fedorovna; Gubarev, Georgy Vasilievich; Yamschikova, Margarita Sergeevna; Vasiliev, Vasily Dmitrievich; Kontsevich, Georgy Mikhailovich; Gubinsky, Anatoly Sergeevich; Velikasov, Anatoly Alexeevich; Taradonov, Vladimir Ignatievich; and Isakov, Valery Pavlovich, 4,058,138, Cl. 137-512.100.

Nudenberg, Walter: *See—*

Little, Julian R.; Nudenberg, Walter; and Rim, Yong S., 4,058,568, Cl. 260-607.0AR.

Nuova San Giorgio S.p.A.: *See—*

Roehrich, Christian, 4,057,955, Cl. 57-56.000.

Nurmse, Karl. Line protecting elements for use in fishing reels. 4,058,269, Cl. 242-84.10K.

Nutt, Wendell Glenn; and Webster, George Harry, to Bell Telephone Laboratories, Incorporated. Transmission path between nearby telephone central offices. 4,058,669, Cl. 174-34.000.

O & K Orenstein & Koppel Aktiengesellschaft: *See—*

Kranefeld, Wilhelm; and Schneider, Helmut, 4,057,942, Cl. 52-115.000.

Obara, Sanshiro: *See—*

Honbu, Mitsuyuki; Obara, Sanshiro; and Hori, Takamasa, 4,058,755, Cl. 318-47.000.

Oberschachtsiek, Gerd: *See—*

Baing, Helmut; Oberschachtsiek, Gerd; Grenzing, Horst; and Meurer, Peter, 4,058,069, Cl. 110-8.00F.

O'Brien, William Joseph, to Decca Record Company Ltd. Radio frequency pulse transmitters. 4,058,742, Cl. 307-260.000.

Oce-van der Grinten N.V.: *See—*

Urselmann, Godefridus H., 4,058,359, Cl. 355-109.000.

Ochiumi, Masahide: *See—*

Inoue, Takayuki; Kakizaki, Tetsuji; and Ochiumi, Masahide, 4,058,647, Cl. 428-474.000.

Oeffinger, Thomas R.: *See—*

George, Peter K.; and Oeffinger, Thomas R., 4,058,799, Cl. 340-174.0TF.

Ogawa, Iwakichi, to Takara Co., Ltd. Mobile reconfigurable spherical toy. 4,057,929, Cl. 46-201.000.

Ogawa, Takuzo: *See—*

Miyoshi, Tadahiko; Kurihara, Yasutoshi; Kamei, Tatsuya; and Ogawa, Takuzo, 4,058,821, Cl. 357-19.000.

Ogita, Hiroshi: *See—*

Suzuki, Takao; and Ogita, Hiroshi, 4,058,090, Cl. 123-32.0SP.

Ohashi, Takashi: *See—*

Yukuta, Toshio; Ohashi, Takashi; Saito, Masumi; and Arai, Katsuhiko, 4,058,503, Cl. 260-47.0CP.

Ohhinata, Ichiro: *See—*

Tokunaga, Michio; Ohhinata, Ichiro; and Okuhara, Shinzi, 4,058,741, Cl. 307-252.00G.

Ohlson, John Leonard: *See—*

Gaudette, Roger Robert; Ohlson, John Leonard; and Scanlon, Patricia Marie, 4,058,527, Cl. 260-251.00R.

Gaudette, Roger Robert; Ohlson, John Leonard; and Scanlon, Patricia Marie, 4,058,528, Cl. 260-251.00R.

Ohnishi, Toshinobu; Sumiya, Hiroyuki; and Suzuki, Masao, to Sony Corporation. Malfunction indication apparatus for use in a CRT deflection circuit. 4,058,754, Cl. 315-411.000.

Ohno, Genji, to Research and Development Laboratories of Ohno Co., Ltd. Electrostatic developing method. 4,058,637, Cl. 427-15.000.

Ohno, Isao: *See—*

Fujimoto, Keimei; Ohno, Nobuo; Okuno, Yoshitoshi; Mizutani, Toshio; Ohno, Isao; Hirano, Masachika; Itaya, Nobushige; and Matsuo, Takashi, 4,058,622, Cl. 424-308.000.

Ohno, Nobuo: *See—*

Fujimoto, Keimei; Ohno, Nobuo; Okuno, Yoshitoshi; Mizutani, Toshio; Ohno, Isao; Hirano, Masachika; Itaya, Nobushige; and Matsuo, Takashi, 4,058,622, Cl. 424-308.000.

Ohno, Tetsuo; and Watanabe, Shoji, to Iko Trading Co., Ltd. Safety cap. 4,058,232, Cl. 215-217.000.

Ohsawa, Mitsuo; and Yamatani, Wataru, to Sony Corporation. Double-balanced frequency converter. 4,058,771, Cl. 325-446.000.

Oi, Nobuhiro: *See—*

Mori, Takashi; Takaku, Sakae; Oi, Nobuhiro; Shindo, Minoru; Hirano, Takeaki; Kataoka, Shigeyuki; and Furuno, Kouji, 4,058,523, Cl. 544-165.000.

Oide, Kunimasa. Joining and fixing structure for ceiling boards and panelling. 4,057,947, Cl. 52-496.000.

Oishi, Kazuo; Yamada, Takashi; and Yoshida Shuzo, to Nippon Soken, Inc. System for providing a driving person with helpful information for driving a vehicle. 4,058,796, Cl. 340-52.00F.

Okamoto, Katashi: *See—*

Taira, Kaoru; Sato, Teruo; Ishii, Yoshiya; Miyata, Yukinori; and Okamoto, Katashi, 4,058,101, Cl. 123-140.0MP.

Okubo, Isao; Ito, Takayoshi; and Mitsui, Norihiko, to Hitachi, Ltd. Protection system for automatically openable and closable door. 4,057,934, Cl. 49-28.000.

Okuhara, Shinzi: *See—*

Tokunaga, Michio; Ohhinata, Ichiro; and Okuhara, Shinzi, 4,058,741, Cl. 307-252.00G.

Okuno, Yoshitoshi: *See—*

Fujimoto, Keimei; Ohno, Nobuo; Okuno, Yoshitoshi; Mizutani, Toshio; Ohno, Isao; Hirano, Masachika; Itaya, Nobushige; and Matsuo, Takashi, 4,058,622, Cl. 424-308.000.

Olin Corporation: *See—*

Knollmueller, Karl O., 4,058,546, Cl. 260-448.80R.

Olive, Gisela; and Olive, Salvador, to Monsanto Company. Process for preparing acetonitrile. 4,058,548, Cl. 260-465.100.

Olive, Salvador: *See—*

Olive, Gisela; and Olive, Salvador, 4,058,548, Cl. 260-465.100.

Omoto, Yorihiko; Konishi, Tadashi; Ichihara, Shigehiro; and Murai, Hisanori, to Teijin Limited. Process for preparing polyesters. 4,058,507, Cl. 260-75.00M.

Onaka, Hidemi, to Toyota Jidosha Kogyo Kabushiki Kaisha. Control system for use in exhaust gas recirculation system. 4,058,098, Cl. 123-119.00A.

Ondercin, Robert Michael; and Borzcik, Paul Stephen, to Cincinnati Milacron Inc. Asynchronous dual function multiprocessor machine control. 4,058,711, Cl. 364-101.000.

O'Neill, Patrick; Douglas, Patrick Joseph; and Mallaghan, Michael Lee, to Powerscreen International Limited. Conveyor assembly. 4,058,198, Cl. 198-313.000.

Oosawa, Kenji: *See—*

Tamura, Toshio; Oouchi, Shigeo; Oosawa, Kenji; and Fueki, Shimetomo, 4,058,439, Cl. 204-49.000.

Oouchi, Shigeo: *See—*

Tamura, Toshio; Oouchi, Shigeo; Oosawa, Kenji; and Fueki, Shimetomo, 4,058,439, Cl. 204-49.000.

Opti Patent-, Forschungs- und Fabrikations AG: *See—*

Frohlich, Alfons; Dahlmann, Julius; and Volter, Gunter, 4,058,145, Cl. 139-384.00B.

Orbitran Company, Inc.: *See—*

Price, Robert John, 4,058,179, Cl. 177-156.000.

Orchimed SA: *See—*

Mieville, Andre, 4,058,552, Cl. 560-52.000.

Orfeo, Sabatino R.: *See—*

Murphy, Kevin P.; Stahl, Richard F.; and Orfeo, Sabatino R., 4,057,973, Cl. 62-114.000.

Murphy, Kevin P.; Stahl, Richard F.; and Orfeo, Sabatino R., 4,057,974, Cl. 62-114.000.

Orlando, Charles M.: *See—*

Kinson, Philip L.; and Orlando, Charles M., 4,058,570, Cl. 260-620.000.

Orlowski, Jan A.: *See—*

Lee, Henry L., Jr.; Orlowski, Jan A.; and Fromm, Carl H., 4,058,442, Cl. 204-159.120.

Oroshnik, William, to SCM Corporation. Synthesis of Vitamin A, intermediates and conversion thereof to Vitamin A. 4,058,569, Cl. 260-617.00A.

Osada, Chiaki; Hasegawa, Eiichi; and Murata, Masataka, to Fuji Photo Film Co., Ltd. Image recording material and method for forming an image using the same. 4,058,398, Cl. 96-27.00R.

Ostendorf, Edward M., to United States of America, Air Force. Staked bearing cutter. 4,057,899, Cl. 30-296.00R.

Osterholtz, Frederick D.: *See—*

Yen, Steven N.; and Osterholtz, Frederick D., 4,058,124, Cl. 128-284.000.

Otis Engineering Corporation: *See—*

Crickmer, Charles D., 4,058,166, Cl. 166-315.000.

Otto, Oberdan W., to Hughes Aircraft Company. Controlled gap surface acoustic wave device. 4,058,745, Cl. 310-366.000.

Ovalstrapping, Inc.: *See—*

Pasic, James A.; and Berg, Marvin I., 4,058,426, Cl. 156-212.000.

Ovchinnikov, Viktor Georgievich; Noritsa, Nadezhda Petrovna; Grib,

Maria Mefodievna; Kamennov, Nikolai Alexandrovich; and Skvortsova, Elena Konstantinovna. Certain hydantoin containing bactericides which are resistant to self-heating. 4,058,618, Cl. 424-273.00R.

Owens-Corning Fiberglas Corporation: *See—*
Kleist, Dale, 4,058,385, Cl. 65-2.000.

Owens-Illinois, Inc.: *See—*
Nofziger, Neil B., 4,058,387, Cl. 65-32.000.
Young, Chung Chang, 4,058,437, Cl. 204-1.00T.

Oxendine, Ozmer Lee. Orthopedic boots. 4,057,914, Cl. 36-81.000.

Ozerov, Valery Ilich: *See—*
Prutkovsky, Evgeny Nikolaevich; Bermatov, Mikhail Albertovich; Tarasov, Evgeny Alexandrovich; Ozerov, Valery Ilich; Fedosjuk, Alexandr Fedorovich; and Krokhin, Vladimir Andreevich, 4,057,966, Cl. 60-678.000.

Paganessi, Gian Pietro: *See—*
Piccolo, Luigi; Ghirga, Marcello; Paolinelli, Antonio; and Paganessi, Gian Pietro, 4,058,389, Cl. 71-31.000.

Palka, James J., to General Bathroom Products Corporation. Soffit lighting. 4,058,718, Cl. 362-235.000.

Palo Alto Research Associates: *See—*
Kaspari, William J.; Wong, Herman; and Kirch, Joseph L., 4,058,117, Cl. 128-2.05A.

Palomo Coll, Antonio Luis. Process for the conversion of 6-aminopenicillanic acid (6-APA) in 7-aminodesacetoxycephalosporanic acid (7-ADCA). 4,058,660, Cl. 544-18.000.

Palumbo, John A.: *See—*
Kelsey, Amos P.; Palumbo, John A.; and Thiel, James L., 4,057,990, Cl. 72-166.000.

Panek, George J.; Ingham, Francis H.; Sedig, Albert R.; and Nieman, Gerald R., to International Telephone and Telegraph Corporation. Electrical penetration assembly. 4,058,671, Cl. 174-151.000.

Paolinelli, Antonio: *See—*
Piccolo, Luigi; Ghirga, Marcello; Paolinelli, Antonio; and Paganessi, Gian Pietro, 4,058,389, Cl. 71-31.000.

Paptzun, George J.; and Monnig, Anthony B., to Lunkenheimer Company, The. Method of assembling rotary ball valve. 4,057,883, Cl. 29-157.10R.

Park, Im K., to Exxon Research & Engineering Co. Method of making thermoplastic resin composite. 4,058,581, Cl. 264-136.000.

Parke, Davis & Company: *See—*
Tinney, Francis John, 4,058,513, Cl. 260-112.5LH.

Parkinson, Sydney. Devices for picking up balls. 4,058,336, Cl. 294-19.00A.

Paschedag, Hansjoachim; and Keller, Hansjurg, to Cerberus AG, Switzerland. Radiation detector. 4,058,726, Cl. 250-353.000.

Pashley, Richard D.: *See—*
Welch, Bryant M.; and Pashley, Richard D., 4,058,413, Cl. 148-1.500.

Pasic, James A.; and Berg, Marvin I., to Ovalstrapping, Inc. Method and apparatus for wrapping objects with a sealable wrap. 4,058,426, Cl. 156-212.000.

Passedouet, Andre Henri; and Pipon, Robert, to Rhone-Poulenc Industries. Aluminium salts of betaine chloride and compositions containing the same. 4,058,597, Cl. 424-68.000.

Patel, Mahendra S.; and Sacuta, Aleksy, to Texaco Exploration Canada Ltd. Demulsification of oil emulsions with a mixture of polymers and alkaline earth metal halide. 4,058,453, Cl. 208-188.000.

Paterson, Malcolm M.; DiMercurio, John S.; and Mooradian, Albert H., to Raytheon Company. Continuous drying hoods. 4,057,909, Cl. 34-76.000.

Patriquin, George P., to Hudson Lock, Inc. Key controlled security apparatus. 4,057,987, Cl. 70-364.00R.

Patterson, Francis J.; and DeFilippo, Louis M., to Interlake, Inc. Strap guide for strapping machine. 4,058,053, Cl. 100-26.000.

Pauli, Guenter: *See—*
Gauch, Wolfgang; Kaule, Wittich; and Pauli, Guenter, 4,057,919, Cl. 40-2.200.

Payne, Peter R. Pulse-jet water propulsor. 4,057,961, Cl. 60-221.000.

Pellizzi, Anthony: *See—*
Stuff, Alfred; and Pellizzi, Anthony, 4,058,312, Cl. 273-77.00A.

Penco, Sergio: *See—*
Arcamone, Federico; Di Marco, Aurelio; and Penco, Sergio, 4,058,519, Cl. 424-180.000.

Pennington, Charles A. Wood cutting apparatus. 4,058,150, Cl. 144-1.00R.

Penoyer, John A.: *See—*
Bierenbaum, Harvey S.; Penoyer, John A.; and Zimmerman, Daniel, 4,058,582, Cl. 264-154.000.

Perma Bilt Industries: *See—*
Roe, Forrest D.; and Simon, Sidney, 4,058,333, Cl. 292-172.000.

Perrot, Friedrich: *See—*
Giger, Urs; and Perrot, Friedrich, 4,057,885, Cl. 29-177.000.

Peruyero, Jose M. A.: *See—*
Smith, Stuart B.; McAlpin, James J.; Peruyero, Jose M. A.; Hazelton, Ronald L.; and Upchurch, Edward F., 4,058,652, Cl. 526-68.000.

Peter, Strong & Company, Inc.: *See—*
Hill, William W., 4,058,621, Cl. 424-295.000.

Peters, Charles, Jr., to Box Innards, Inc. High speed automatic stacker for partitions and the like. 4,058,226, Cl. 214-7.000.

Peterson, LeRoy, to Reynolds Products Inc. Method of and apparatus for cleaning the icemaker of a carbonated beverage dispensing machine. 4,058,383, Cl. 62-85.000.

Peterson, William Anders, to Bell Telephone Laboratories, Incorporated. Cooperative primary and secondary current limiting to selectively limit aggregate and individual current outputs of a multi output converter. 4,058,758, Cl. 363-80.000.

Petrisko, Edwin M., to United States of America, Navy. Load limiter coupling. 4,058,301, Cl. 267-124.000.

Petro, John D., to Commercial Shearing, Inc. Compensated work port fluid valves and work port compensators. 4,058,135, Cl. 137-106.000.

Petro-Tex Chemical Corporation: *See—*
Baker, James R., 4,058,577, Cl. 260-680.00D.

Petrocarbon Developments Limited: *See—*
Haslam, Alan Alfred, 4,058,589, Cl. 423-359.000.

Peuker, Reinhard: *See—*
Sutter, Hubert; and Peuker, Reinhard, 4,058,654, Cl. 526-159.000.

Pfizer Inc.: *See—*
Cox, David A.; and Shroot, Braham, 4,058,610, Cl. 424-246.000.
Richardson, Kenneth, 4,058,562, Cl. 260-556.0AR.

Phelps, John H., Sr., to King, George; and King, Peggy. Convertible garment. 4,057,854, Cl. 2-128.000.

Philagro S.A.: *See—*
Debourge, Jean-Claude; and Trochme, Martine, 4,058,600, Cl. 424-128.000.

Phillips Petroleum Company: *See—*
Chandler, Craig S., 4,057,997, Cl. 73-23.100.
Cheng, Paul J., 4,058,379, Cl. 55-302.000.
Kleiss, Louis D., 4,057,995, Cl. 73-23.000.
Stansbury, Roy E.; and Shotton, James A., 4,058,402, Cl. 106-16.000.

Piaja, Joseph. Device for the securement of a sighting instrument within the bore of a shotgun. 4,057,905, Cl. 33-234.000.

Piccolo, Luigi; Ghirga, Marcello; Paolinelli, Antonio; and Paganessi, Gian Pietro, to Societa' Italiana Resine S.I.R. S.p.A. Process for the preparation of fertilizers and soil modifiers. 4,058,389, Cl. 71-31.000.

Pickburn, A. Harry S. Mobius drive belt fastener. 4,058,022, Cl. 74-231.0MB.

Picker Corporation: *See—*
Amor, William H., Jr.; and Steffek, Robert J., 4,057,891, Cl. 29-434.000.
Meyer, Fred H., 4,058,833, Cl. 358-111.000.
Vagi, Robert J., 4,058,832, Cl. 358-110.000.

Pierre Fabre S.A.: *See—*
Cousse, Henri; Mouzin, Gilbert; and Rieu, Jean-Pierre, 4,058,558, Cl. 260-515.00A.

Pierrel, Michel, to Pont-A-Mousson S.A. Process for centrifugally casting spheroidal graphite cast iron pipes. 4,058,153, Cl. 164-58.000.

Pilkington, John Scott, to Abbey Electronics Limited. Yarn tension transducer. 4,058,008, Cl. 73-144.000.

Pinkas, David. Retainer for sun visor extension. 4,058,340, Cl. 296-97.00G.

Piosky, Dennis E. Repair template for carpets or the like. 4,057,898, Cl. 30-289.000.

Piper, Donald R., Sr., to Guito, Ralph M., Jr.; and Hooper, Walter L. Marine life growth inhibitor device. 4,058,075, Cl. 114-222.000.

Pipon, Robert: *See—*
Passedouet, Andre Henri; and Pipon, Robert, 4,058,597, Cl. 424-68.000.

Pissiotas, Georg: *See—*
Martin, Henry; Pissiotas, Georg; and Dittrich, Volker, 4,058,604, Cl. 424-211.000.

Plant, David Herbert: *See—*
Hurt, Francis Neil; Theaker, Reginald; and Plant, David Herbert, 4,058,245, Cl. 226-174.000.

Plastomedical Sciences, Inc.: *See—*
Steckler, Robert, 4,058,491, Cl. 260-2.20R.

Ploeger, Kenneth C. Automatic wheel bearing lubricator. 4,058,185, Cl. 184-1.00D.

Pohlemann, Heinz: *See—*
Naarmann, Herbert; and Pohlemann, Heinz, 4,058,508, Cl. 260-77.5BB.

Polaroid Corporation: *See—*
Johnson, Bruce K.; Laskin, Irving; and Whiteside, George D., 4,058,817, Cl. 354-26.000.
Johnson, Bruce K.; and Whiteside, George D., 4,058,818, Cl. 354-33.000.

Pollart, Gary M. Aeration tube. 4,058,261, Cl. 239-542.000.

Pont-A-Mousson S.A.: *See—*
Pierrel, Michel, 4,058,153, Cl. 164-58.000.

Ponzano, Gian Luigi, to Ing. C. Olivetti & C., S.p.A. Magnetic information carrier having both ends free and apparatus for writing on and/or reading it. 4,058,847, Cl. 360-132.000.

Post, Udo: *See—*
von Bonin, Wulf; Kleimann, Helmut; and Post, Udo, 4,058,492, Cl. 260-2.5AM.

Potter, Gordon C., to Exxon Research & Engineering Co. Vapor hose hookup assurance. 4,058,148, Cl. 141-198.000.

Powaska, Tadeusz. Storage container for rolls of toilet tissues. 4,058,354, Cl. 312-45.000.

Powerscreen International Limited: *See—*
O'Neill, Patrick; Douglas, Patrick Joseph; and Mallaghan, Michael Lee, 4,058,198, Cl. 198-313.000.

PPG Industries, Inc.: *See—*
Frank, Robert G., 4,058,200, Cl. 198-382.000.

Prather, Joseph E.; and Khalifa, Ramzi A., to Edson Tool and Manufacturing Company, Inc. Self-locking devices. 4,058,334, Cl. 292-241.000.

Prazak, Premysl: *See—*
Bazika, Vladimir; Prazak, Premysl; and Havelkova, Dana, 4,057,999, Cl. 73-53.000.

Pressmaster, Ltd.: *See—*
Undin, Hans, 4,057,993, Cl. 72-410.000.

Price, George M., to Frymaster Corporation, The. Control system for frying apparatus. 4,058,703, Cl. 219-492.000.

Price, Robert John, to Orbitran Company, Inc. Load cell scale. 4,058,179, Cl. 177-156.000.

Pridonoff, Eric L.: *See—*
Stary, Marvin L.; Brown, Edward L.; and Pridonoff, Eric L., 4,058,147, Cl. 141-45.000.

Priesemuth, Wolfgang. Windshield wiper blade. 4,057,870, Cl. 15-250.410.

Prince, Leon M., to Lever Brothers Co. Quick lathering toilet bars and method of making same. 4,058,487, Cl. 252-552.000.

Prince, Leon M., to Lever Brothers Company. Quick lathering toilet bars and method of making same. 4,058,490, Cl. 252-554.000.

Prins, Johannes. Collapsible chairs. 4,058,341, Cl. 297-39.000.

Pro-Tech, Inc.: *See—*
Martig, Kenneth W., Jr., 4,058,011, Cl. 73-194.00R.

Product Resources International, Inc.: *See—*
Ballin, Gene, 4,057,867, Cl. 15-185.000.

Prokai, Bela; and Kanner, Bernard, to Union Carbide Corporation. Polyester urethane foam produced with cyano-ether polysiloxane-polyoxyalkylene copolymers. 4,058,493, Cl. 260-2.5AH.

Prokai, Bela; and Kanner, Bernard, to Union Carbide Corporation. Polyether urethane foam produced with cyano-ether polysiloxane-polyoxyalkylene copolymers. 4,058,494, Cl. 260-2.5AH.

Prutkovsky, Evgeny Nikolaevich; Bermatov, Mikhail Albertovich; Tarasov, Evgeny Alexandrovich; Ozerov, Valery Ilich; Fedosjuk, Alexandr Fedorovich; and Krokhin, Vladimir Andreevich. Steam-gas power plant. 4,057,966, Cl. 60-678.000.

Public Safety Equipment, Inc.: *See—*
Menke, W. Kenneth, 4,058,794, Cl. 340-92.000.

Puccetti, Ralph P.; and Klopfenstein, King L., to Triangle Package Machinery Company. Self-locking support for tubular members. 4,058,268, Cl. 242-72.00R.

Pylon Corporation: *See—*
Longman, Rodney A.; and Chiaramonte, Thomas J., 4,057,869, Cl. 15-250.320.

Q. P Corporation: *See—*
Terumoto, Masahiro, 4,058,364, Cl. 21-80.000.

Quadrastat Controls Corporation: *See—*
Lauper, Warner R., 4,058,018, Cl. 74-18.200.

Quets, Jean Marie Louis Joseph, to Union Carbide Corporation. Preparation of sub-micron metal oxide powders from chloride-containing compounds. 4,058,592, Cl. 423-594.000.

Quinn, Peter W., to Lorlin Industries Inc. Method and apparatus for automatically testing reeled axial-lead electrical devices under environmental conditions. 4,058,219, Cl. 209-81.00R.

R. D. Products, Inc.: *See—*
Darjany, John C., 4,058,839, Cl. 360-2.000.

Racz, Istvan: *See—*
Zsolnai, Tibor; Lugosi, Gyorgy; Szepesi, Istvan; Bakonyi, Maria; Racz, Istvan; and Radvany nee Hegedus, Erzsebet, 4,058,608, Cl. 424-226.000.

Radiant Grate, Inc.: *See—*
Dahlquist, Emil F., 4,058,108, Cl. 126-137.000.

Radiometer A/S: *See—*
Christiansen, Torbe Falch, 4,058,447, Cl. 204-195.00P.
Krogh, Soren-Christian, 4,058,365, Cl. 23-230.00R.

Radvany nee Hegedus, Erzsebet: *See—*
Zsolnai, Tibor; Lugosi, Gyorgy; Szepesi, Istvan; Bakonyi, Maria; Racz, Istvan; and Radvany nee Hegedus, Erzsebet, 4,058,608, Cl. 424-226.000.

Raible, Donald A.: *See—*
Bentley, Donald J.; and Raible, Donald A., 4,058,369, Cl. 23-258.50B.

Rank Xerox Ltd.: *See—*
Harada, Masaaki, 4,058,305, Cl. 271-16.000.
Warner, George M.; and Andberg, Leif E., 4,058,815, Cl. 355-14.000.

Rankin, William J., to T. D. Williamson, Inc. Pipeline fitting. 4,058,142, Cl. 138-89.000.

Rantala, Ossi: *See—*
Visa, Heikki; Rantala, Ossi; and Risti, Antti, 4,058,231, Cl. 214-516.000.

Rapino, Norman G.; and DeMuro, Frank P. Method and apparatus for drying clothes. 4,057,907, Cl. 34-4.000.

Raponi, Dante A. Cementitious composition. 4,058,406, Cl. 106-90.000.

Rasp, Christian; Scharfe, Gerhard; and Grolig, Johann, to Bayer Aktiengesellschaft. Process for the preparation of acetoxybutanal. 4,058,556, Cl. 560-231.000.

Rath, Johann. Insert receiving and securing device. 4,058,284, Cl. 249-163.000.

Rau, Kurt: *See—*
Schminke, Heinz; Rau, Kurt; and Batza, Willi, 4,058,377, Cl. 55-148.000.

Ray, James A., to Martin Marietta Corporation. Hydraulic cement mixes and process for improving hydraulic cement mixes. 4,058,407, Cl. 106-92.000.

Raymond International Inc.: *See—*
Holland, Henry A. Nelson, 4,058,175, Cl. 173-1.000.

Raymond Lee Organization Inc.: *See—*
Marlowe, Kenneth P., 4,057,927, Cl. 43-43.600.

Raytheon Company: *See—*
Bryden, Joseph E., 4,058,810, Cl. 343-17.10R.
Paterson, Malcolm M.; DiMercurio, John S.; and Mooradian, Albert H., 4,057,909, Cl. 34-76.000.
Stout, Karl J., 4,058,727, Cl. 250-363.00R.

RCA Corporation: *See—*
Ahmed, Adel Abdel Aziz, 4,058,760, Cl. 323-19.000.
Allen, Elmer Lawrence, Jr.; and Kawamoto, Hirohisa, 4,058,776, Cl. 330-299.000.
Brooks, Ronald Robert, 4,058,751, Cl. 315-200.00A.
Crowle, Brian, 4,058,775, Cl. 330-267.000.
Khajezadeh, Heshmat; and Ahrens, Stephen Carl, 4,057,894, Cl. 29-577.00C.
Risko, John Joseph, 4,058,813, Cl. 343-786.000.

Recognition Equipment Incorporated: *See—*
Kao, Charles T.; Lafevers, James O.; and Walker, Donny R., 4,058,706, Cl. 235-449.000.

Reed, Thomas G., Jr. Apparatus for treating oil shale. 4,058,205, Cl. 202-86.000.

Rehm, Gustav A., to Aqua-Chem, Inc. Boiler. 4,058,087, Cl. 122-235.00R.

Reichl, Richard: *See—*
Kummer, Werner; Stahle, Helmut; Koppe, Herbert; Haarmann, Walter; and Reichl, Richard, 4,058,616, Cl. 424-267.000.

Reilly, Edward Justus: *See—*
Brown, Arling Dix, Jr.; and Reilly, Edward Justus, 4,058,814, Cl. 346-154.000.

Reinecke, Erich, to WABCO Westinghouse GmbH. Load-responsive linking device for vehicle brake pressure regulators. 4,058,347, Cl. 303-22.00R.

Reinke, August: *See—*
Schulz, Siegfried; Eicker, Karl G.; and Reinke, August, 4,058,693, Cl. 200-67.00F.

Reiss, Karl Hans; Kotschak, Otto; and Conrad, Bernhard, to Siemens Aktiengesellschaft. Gamma camera. 4,058,721, Cl. 250-213.0VT.

Reist, Walter; Hansch, Egon; and Gosslinghoff, Reinhard, to Ferag AG. Apparatus for processing products especially printed products. 4,058,202, Cl. 198-482.000.

Reitz, Ortwin; and Retoret, Jean-Pierre, to Institut Francais du Petrole; and BASF Aktiengesellschaft. Hydrocracking process. 4,058,449, Cl. 208-59.000.

Rempel, William D., to Sycor, Inc. Printer with interchangeable paper-feed modules. 4,058,196, Cl. 197-133.00R.

Renfrow, Lonnie C. Suspension means for automobile fog light. 4,058,720, Cl. 362-82.000.

Renold Limited: *See—*
Wood, Peter, 4,058,021, Cl. 74-229.000.

Renth, Ernst-Otto; Mentrup, Anton; Schromm, Kurt; and Walland, Alexander, to Boehringer Ingelheim GmbH. 2-Amino-3-(3'-hydroxyphenyl)-propanols and salts thereof. 4,058,642, Cl. 424-330.000.

Research and Development Laboratories of Ohno Co., Ltd.: *See—*
Ohno, Genji, 4,058,637, Cl. 427-15.000.

Resh, Roy E.: *See—*
Vogel, Ronald F.; Boldt, Robert R.; McKee, Kevin D.; Resh, Roy E.; and West, Paul E., 4,058,766, Cl. 324-61.00R.

Resistoflex Corporation: *See—*
Nickerson, Harvey R.; Rink, Helm A.; and Menzel, John K., 4,058,328, Cl. 285-45.000.

Restaino, Alfred J.: *See—*
Markiewitz, Kenneth H.; and Restaino, Alfred J., 4,058,656, Cl. 526-215.000.

Retoret, Jean-Pierre: *See—*
Reitz, Ortwin; and Retoret, Jean-Pierre, 4,058,449, Cl. 208-59.000.

Reuter, Frederick A.: *See—*
Hochradel, Ernest; Hauer, Werner; Meyer, Martin R.; and Reuter, Frederick A., 4,058,274, Cl. 243-5.000.

Reuter, Wolfgang: *See—*
Kozakiewicz, Hugo; and Reuter, Wolfgang, 4,058,277, Cl. 244-17.170.

Reuting, Hans-Werner, to Elmeg Elektro-Mechanik GmbH. Rapid action relay. 4,058,783, Cl. 335-276.000.

Reynolds, John E.: *See—*
Bavisotto, Robert G.; Reynolds, John E.; and Sbert, Robert S., 4,058,789, Cl. 338-322.000.

Reynolds Products Inc.: *See—*
Peterson, LeRoy, 4,058,383, Cl. 62-85.000.

Rhone-Poulenc Industries: *See—*
Barreau, Michel; Cotrel, Claude; and Jeanmart, Claude, 4,058,611, Cl. 424-250.000.
Passedouet, Andre Henri; and Pipon, Robert, 4,058,597, Cl. 424-68.000.

Rhone-Poulenc S.A.: *See—*
Menand, Henri; and Mison, Andre, 4,058,509, Cl. 260-79.700.

Rhone-Progil: *See—*
Daumas, Jean-Claude, 4,058,574, Cl. 260-659.00A.

Ribka, Joachim: *See—*
Heinrich, Ernst; and Ribka, Joachim, 4,058,518, Cl. 260-156.000.

Riblet, Gordon, to Microwave Development Labs., Inc. Waveguide circulator. 4,058,780, Cl. 333-1.100.

Richardson, David; and Kageyama, Paul. General displacement sensor. 4,058,765, Cl. 324-61.00R.

Richardson, David: *See—*
Giurlando, Angelo C.; and Richardson, David, 4,058,361, Cl. 417-312.000.

Richardson, Kenneth, to Pfizer Inc. Antiviral substituted (phenylenedimethylene) diamines. 4,058,562, Cl. 260-556.0AR.

Richter Gedeon Vegyeszeti Gyar Rt.: *See—*
Kekesy, Tibor; Szeberenyi, Szabolcs; Beer, Gyorgy; Dudas, Antal; Hajos, Gyorgy; Szporny, Laszlo; and Czajlik, Eva, nee Csizer, 4,058,522, Cl. 260-239.570.
Richter, Reinhard H., to Upjohn Company, The. Novel schiff bases. 4,058,563, Cl. 260-566.00F.
Riddle, John B.; and Bogert, Howard Z., Jr., to Micro Magnetic Industries, Inc. Multiple document recognition apparatus. 4,058,194, Cl. 194-4.00C.
Ridley, Peter Tone; and Weidley, Edwin Frank, to SmithKline Corporation. Skeletal muscle relaxant compositions comprising α,α-diphenyl-3-tropidineethanol and methods of producing skeletal muscle relaxation. 4,058,615, Cl. 424-265.000.
Riebel, Hans-Jochem: *See—*
Hofer, Wolfgang; Maurer, Fritz; Riebel, Hans-Jochem; Rohe, Lothar; Eue, Ludwig; and Schmidt, Robert R., 4,058,525, Cl. 544-182.000.
Hofer, Wolfgang; Maurer, Fritz; Riebel, Hans-Jochem; Hammann, Ingeborg; and Stendel, Wilhelm, 4,058,603, Cl. 424-200.000.
Rieder, Alois, to AGFA-Gevaert, A.G. Analog/digital control arrangement for photographic apparatus. 4,058,819, Cl. 354-44.000.
Ries, Karl; Hannoschock, Kurt; and Simoneit, Gunter, to Mannesmann Aktiengesellschaft. Ultrasonic immersion type testing. 4,058,000, Cl. 73-644.000.
Rieu, Jean-Pierre: *See—*
Cousse, Henri; Mouzin, Gilbert; and Rieu, Jean-Pierre, 4,058,558, Cl. 260-515.00A.
Riken Keikinzoku Kogyo Kabushiki Kaisha: *See—*
Nakamura, Yoshihiro, 4,057,937, Cl. 49-372.000.
Rim, Yong S.: *See—*
Little, Julian R.; Nudenberg, Walter; and Rim, Yong S., 4,058,568, Cl. 260-607.0AR.
Rimmington, Brenda: *See—*
Firth, Jack Graham; Jones, Thomas Alwyn; and Rimmington, Brenda, 4,057,996, Cl. 73-23.000.
Rink, Helm A.: *See—*
Nickerson, Harvey R.; Rink, Helm A.; and Menzel, John K., 4,058,328, Cl. 285-45.000.
Risko, John Joseph, to RCA Corporation. Sheet metal waveguide horn antenna. 4,058,813, Cl. 343-786.000.
Risti, Antti: *See—*
Visa, Heikki; Rantala, Ossi; and Risti, Antti, 4,058,231, Cl. 214-516.000.
Rite Autotronics Corporation: *See—*
Schwartz, Edwin L., 4,058,016, Cl. 73-419.000.
Rizkalla, Nabil; and Naglieri, Anthony N., to Halcon International, Inc. Conversion of thallium (I) to thallium (III). 4,058,542, Cl. 260-429.00R.
Roan, Charles F., to GB Fermentation Industries, Inc. Enzyme-treated fried food. 4,058,631, Cl. 426-52.000.
Robbins, Clarence R.: *See—*
Crawford, Richard J.; and Robbins, Clarence R., 4,058,131, Cl. 132-7.000.
Robert Bosch GmbH: *See—*
Drews, Ulrich; Kraus, Bernd; Singer, Erich; and Schnurle, Hans, 4,058,106, Cl. 123-198.0DB.
Linder, Ernst; Hertfelder, Wilhelm; Schnaibel, Eberhard; and Junginger, Erich, 4,058,255, Cl. 237-12.30B.
Schmidt, Peter; and Worz, Helmut, 4,058,089, Cl. 123-32.0ED.
Zahn, Heinrich, 4,058,845, Cl. 360-107.000.
Robins, Roland K.; Shuman, Dennis A.; and Boswell, Kay H., to ICN Pharmaceuticals, Inc. 6,8-Disubstituted purine derivatives of 9-β-D-ribofuranosyl 3',5'-cyclic phosphate. 4,058,659, Cl. 536-27.000.
Rochmann, Jacques, to Soletanche. Method and device for obtaining a water-tight shield in the soil with the use of nozzles. 4,057,969, Cl. 61-35.000.
Rockwell International Corporation: *See—*
George, Peter K.; and Oeffinger, Thomas R., 4,058,799, Cl. 340-174.0TF.
Roe, Forrest D.; and Simon, Sidney, to Perma Bilt Industries. Door latch for recreational vehicle and other applications. 4,058,333, Cl. 292-172.000.
Roehrich, Christian, to Nuova San Giorgio S.p.A. Cleaning device for open-end spinning units. 4,057,955, Cl. 57-56.000.
Roemer, Benjamin C. Snowmobile trail leveler. 4,057,916, Cl. 37-43.00R.
Roger, Bernard: *See—*
Bonis, Maurice; and Roger, Bernard, 4,058,825, Cl. 357-46.000.
Rogers, Robert N., to Coffey, John R.; and Conliff, Vincent B., deceased, part interest to each. Helically wound expandable filter. 4,058,464, Cl. 210-356.000.
Rogier, Edgar R.: *See—*
MacKay, Kenneth D.; and Rogier, Edgar R., 4,058,585, Cl. 423-24.000.
Rogler, Walter: *See—*
Ackermann, Otto; Bleh, Otto, deceased; and Rogler, Walter, 4,058,553, Cl. 560-180.000.
Rogowski, Robert P.: *See—*
Simmons, James R.; and Rogowski, Robert P., 4,058,270, Cl. 242-105.000.
Rohde, Wolfgang: *See—*
Bellenberg, Heinz; Kucharzyk, Werner; Rohde, Wolfgang; and Siebert, Werner, 4,058,230, Cl. 214-18.200.
Rohe, Lothar: *See—*
Hofer, Wolfgang; Maurer, Fritz; Riebel, Hans-Jochem; Rohe, Lothar; Eue, Ludwig; and Schmidt, Robert R., 4,058,525, Cl. 544-182.000.
Rohlfs, John H. Portable sand blasting device. 4,057,938, Cl. 51-429.000.
Rohosy, Soma M.: *See—*
Schreyer, Kenneth D.; Rohosy, Soma M.; and Manney, Charles J., 4,058,291, Cl. 254-74.000.
Rohrberg, Rod G.; Trentz, Henry Patrick; and Ziegler, Victor Herbert, to Rohrberg, Rod G.; and Trentz, Henry P. Quick release mechanism for window guard or the like. 4,057,935, Cl. 49-56.000.
Romanenko, Oleg Nikolaevich: *See—*
Muzhzhavlev, Konstantin Dmitrievich; Kosarev, Sergei Petrovich; Schegolev, Vladimir Ivanovich; Ivanov, Andrei Borisovich; Romanenko, Oleg Nikolaevich; Yazev, Vladimir Dmitrievich; and Vasiliev, Alexei Vasilievich, 4,058,448, Cl. 204-244.000.
Roney, Robert M.: *See—*
Dalton, James H.; Stover, S. Dalton; and Roney, Robert M., 4,058,740, Cl. 307-116.000.
Rosen, Paul W.; and Gunderson, Cary A. Interior pipe coating apparatus. 4,058,258, Cl. 239-165.000.
Rosenbaum, Heinz Jorg: *See—*
Thiel, Reinhard; and Rosenbaum, Heinz Jorg, 4,058,565, Cl. 260-586.0AB.
Rosequist, Craig D. Walking device. 4,058,119, Cl. 128-80.00R.
Rossi, Giorgio: *See—*
Abbruzzese, Luigi; Gozzo, Franco; Rossi, Giorgio; Masoero, Marcella; Lorusso, Simone; Bonola, Paola; and Tamburin, Gino, 4,058,613, Cl. 424-258.000.
Roth, Willy, to Hoffmann-La Roche Inc. Composition and method for killing snails and slugs. 4,058,626, Cl. 424-333.000.
Rothfuss, Robert G.: *See—*
Kramer, Francis J.; Rothfuss, Robert G.; and Wise, William C., 4,058,047, Cl. 85-11.000.
Royon, Jean: *See—*
Bonnemay nee Couture, Andree; Royon, Jean; Bereau, Jean; and Catonne, Jean-Claude, 4,058,441, Cl. 204-103.000.
Rubin, Irwin, to Sensor Technology, Inc. Microprocessor controlled card reader/printer. 4,058,056, Cl. 101-93.190.
Ruble, Theodore A., to Sid Richardson Carbon & Gasoline Co. Carbon black reactor with turbofan. 4,058,590, Cl. 423-449.000.
Ruddy, John M.: *See—*
Dunn, Robert T.; Brown, William M.; and Ruddy, John M., 4,058,678, Cl. 179-2.50R.
Rufer, Clemens: *See—*
Ahrens, Hanns; Biere, Helmut; Rufer, Clemens; Schmiechen, Ralph; Schroeder, Eberhard; Loge, Olaf; Losert, Wolfgang; and Schillinger, Ekkehard, 4,058,619, Cl. 424-275.000.
Rugg Manufacturing Company: *See—*
Rugg, William P., 4,057,953, Cl. 56-400.170.
Rugg, William P., to Rugg Manufacturing Company. Triangular lawn rake. 4,057,953, Cl. 56-400.170.
Ruhrkohle AG: *See—*
Schier, Josef, 4,058,455, Cl. 209-139.00R.
Runac, John J., to Crescent Hosiery Mills. Ventilated cushion foot sock and method. 4,057,981, Cl. 66-185.000.
Russell, William J., to United States of America, Army. Rapid universal sensing cell. 4,058,438, Cl. 204-1.00T.
Russo, Evangelista. Track for crawler type vehicles. 4,058,350, Cl. 305-54.000.
Saari, Walfred S., to Merck & Co., Inc. Amino acid esters. 4,058,530, Cl. 260-281.0GN.
Sachleben, Harold Gerard, Sr.; and Warren, Jerry Jay, to Allied Chemical Corporation. Exhaust quench air diffuser. 4,057,910, Cl. 34-227.000.
Sack, Thomas F. Portable psycho-physical automobile driver testing device. 4,057,911, Cl. 35-11.00R.
Sacuta, Aleksy: *See—*
Patel, Mahendra S.; and Sacuta, Aleksy, 4,058,453, Cl. 208-188.000.
Saito, Masumi: *See—*
Yukuta, Toshio; Ohashi, Takashi; Saito, Masumi; and Arai, Katsuhiko, 4,058,503, Cl. 260-47.0CP.
Saito, Taiji, to Toyota Jidosha Kogyo Kabushiki Kaisha. Air cleaner assembly. 4,058,099, Cl. 123-122.00D.
Saito, Takemi: *See—*
Ando, Kunio; Saito, Takemi; and Higuchi, Takeshi, 4,058,827, Cl. 358-55.000.
Saito, Yoshio: *See—*
Takechi, Hiroshi; Abe, Mitsunobu; Katsutani, Ryoseki; and Saito, Yoshio, 4,057,989, Cl. 72-128.000.
Sakudo, Noriyuki; Tokiguchi, Katsumi; and Kanomata, Ichiro, to Hitachi, Ltd. Microwave discharge ion source. 4,058,748, Cl. 313-156.000.
Salmond, William G., to Upjohn Company, The. $3\alpha,5\alpha$-Cyclo-6β-alkoxy-α^{22}-bis-nor cholestene derivatives. 4,058,538, Cl. 260-397.200.
Sam Stein Associates, Inc.: *See—*
Miller, Michael E., 4,058,083, Cl. 118-16.000.
Sanderson, Brian Robert: *See—*
Brown, Clifford Gordon; and Sanderson, Brian Robert, 4,058,588, Cl. 423-283.000.
Sandoz Ltd.: *See—*
Mislin, Roland; and Uehlinger, Hanspeter, 4,058,516, Cl. 260-152.000.
Uehlinger, Hanspeter, 4,058,514, Cl. 260-145.00B.
Sansui Electric Co., Ltd.: *See—*
Kobayashi, Fumio; and Koshigoe, Shozo, 4,058,675, Cl. 179-1.00G.

Sarsten, Jan A., to Exxon Research & Engineering Co. Fractional condensation of an NG feed with two independent refrigeration cycles. 4,057,972, Cl. 62-23.000.
Sartorius-Werke GmbH: *See—*
Exner, Rainer, 4,058,007, Cl. 73-141.00A.
Satho, Fumihiko: *See—*
Shibayama, Kyoichi; Satho, Fumihiko; and Naitho, Mamoru, 4,058,444, Cl. 204-181.000.
Sato, Teruo: *See—*
Taira, Kaoru; Sato, Teruo; Ishii, Yoshiya; Miyata, Yukinori; and Okamoto, Katashi, 4,058,101, Cl. 123-140.0MP.
Sato, Yo, to Kabushiki Kaisha Sato Kenkyusho. Portable tagging machine. 4,058,051, Cl. 93-88.000.
Sato, Yoshimasa; Tsukuda, Toshio; Inoue, Hajime; and Mutsuta, Akio, to Sumitomo Heavy Industries, Ltd.; and Sumitomo Metal Industries, Ltd. Apparatus for cooling pellets. 4,057,978, Cl. 62-331.000.
Sawada, Fred H.; Klementowski, Frank M.; and Bishop, James S., to General Electric Company. Signal monitoring system. 4,058,804, Cl. 340-248.00A.
Sawada, Toshio: *See—*
Ishikawa, Hitoshi; Yamamoto, Kimihiko; Sawada, Toshio; and Kasahara, Takahiko, 4,058,072, Cl. 112-258.000.
Sawyer, Joe F. Method and apparatus for conveying and breaking apart fiber modules. 4,057,876, Cl. 19-80.00R.
Saxton, Forest J. Heat transfer device. 4,058,378, Cl. 55-257.00R.
Sbert, Robert S.: *See—*
Bavisotto, Robert G.; Reynolds, John E.; and Sbert, Robert S., 4,058,789, Cl. 338-322.000.
Scanlon, Patricia Marie: *See—*
Gaudette, Roger Robert; Ohlson, John Leonard; and Scanlon, Patricia Marie, 4,058,527, Cl. 260-251.00R.
Gaudette, Roger Robert; Ohlson, John Leonard; and Scanlon, Patricia Marie, 4,058,528, Cl. 260-251.00R.
Schafer, Norbert: *See—*
Muller, Karl-Heinz; Munchmeyer, Walter; von Rauch, Moriz; and Schafer, Norbert, 4,058,731, Cl. 250-442.000.
Schantz, John S.: *See—*
Schantz, Socrates J., 4,058,259, Cl. 239-276.000.
Schantz, Raymond G.: *See—*
Schantz, Socrates J., 4,058,259, Cl. 239-276.000.
Schantz, Socrates J., to Schantz, John S.; and Schantz, Raymond G., part interest to each. Handle and stand for pressure spraying. 4,058,259, Cl. 239-276.000.
Schantz, Spencer C. Double pole contact operating mechanism. 4,058,781, Cl. 335-186.000.
Scharf, Daniel J., to Hooker Chemicals & Plastics Corporation. Brominated carbamoyl derivatives. 4,058,466, Cl. 252-8.100.
Scharfe, Gerhard: *See—*
Rasp, Christian; Scharfe, Gerhard; and Grolig, Johann, 4,058,556, Cl. 560-231.000.
Schegolev, Vladimir Ivanovich: *See—*
Muzhzhavlev, Konstantin Dmitrievich; Kosarev, Sergei Petrovich; Schegolev, Vladimir Ivanovich; Ivanov, Andrei Borisovich; Romanenko, Oleg Nikolaevich; Yazev, Vladimir Dmitrievich; and Vasiliev, Alexei Vasilievich, 4,058,448, Cl. 204-244.000.
Scheidweiler, Andreas, to Cerberus AG. Duplex ionization-type fire sensor. 4,058,803, Cl. 340-237.500.
Schellin, Carl W.; and Lundberg, John P., to Scorpion, Inc. Snowmobile safety switch system. 4,058,105, Cl. 123-198.0DC.
Schering Aktiengesellschaft: *See—*
Ahrens, Hanns; Biere, Helmut; Rufer, Clemens; Schmiechen, Ralph; Schroeder, Eberhard; Loge, Olaf; Losert, Wolfgang; and Schillinger, Ekkehard, 4,058,619, Cl. 424-275.000.
Hoffmann, Rolf-Rudiger; and Fuchs, Peter, 4,058,623, Cl. 424-317.000.
Schering Corporation: *See—*
Neustadt, Bernard R., 4,058,612, Cl. 424-251.000.
Scherrer, Hanspeter: *See—*
Boller, Arthur; and Scherrer, Hanspeter, 4,058,476, Cl. 252-299.000.
Boller, Arthur; and Scherrer, Hanspeter, 4,058,477, Cl. 252-299.000.
Boller, Arthur; and Scherrer, Hanspeter, 4,058,478, Cl. 252-299.000.
Scheuneman, James Herman, to Sperry Rand Corporation. Conditional bypass of error correction for dual memory access time selection. 4,058,851, Cl. 364-900.000.
Schiegl, Wolf-Eberhard: *See—*
Meyer, Rudolf; Schiegl, Wolf-Eberhard; and Taumann, Leonhard, 4,058,730, Cl. 250-397.000.
Schier, Josef, to Ruhrkohle AG. Rotary separator. 4,058,455, Cl. 209-139.00R.
Schillinger, Ekkehard: *See—*
Ahrens, Hanns; Biere, Helmut; Rufer, Clemens; Schmiechen, Ralph; Schroeder, Eberhard; Loge, Olaf; Losert, Wolfgang; and Schillinger, Ekkehard, 4,058,619, Cl. 424-275.000.
Schlagel, Inc.: *See—*
Schlagel, William A., 4,058,199, Cl. 198-370.000.
Schlagel, William A., to Schlagel, Inc. In-mass conveyor with intermediate discharge. 4,058,199, Cl. 198-370.000.
Schmid, Erich: *See—*
Graf, Wilfried; and Schmid, Erich, 4,058,529, Cl. 260-251.00A.
Schmid, Richard R., to Lockwood Manufacturing Company. Waffle transfer machine. 4,058,039, Cl. 83-155.000.
Schmidt, Alfred, Jr., to Ing. Alfred Schmidt GmbH, Firma. Ring structure for preventing blade damage. 4,057,915, Cl. 37-43.00C.
Schmidt, Bradley J., to Illinois Tool Works Inc. Roller mount. 4,057,872, Cl. 16-29.000.
Schmidt, Karl Wilhelm, to Gebruder Schmidt Metallwarenfabrik. Paper-clip dispenser. 4,058,209, Cl. 206-350.000.
Schmidt, Peter; and Worz, Helmut, to Robert Bosch GmbH. Electrically controlled fuel injection system. 4,058,089, Cl. 123-32.0ED.
Schmidt, Robert R.: *See—*
Hofer, Wolfgang; Maurer, Fritz; Riebel, Hans-Jochem; Rohe, Lothar; Eue, Ludwig; and Schmidt, Robert R., 4,058,525, Cl. 544-182.000.
Schmiechen, Ralph: *See—*
Ahrens, Hanns; Biere, Helmut; Rufer, Clemens; Schmiechen, Ralph; Schroeder, Eberhard; Loge, Olaf; Losert, Wolfgang; and Schillinger, Ekkehard, 4,058,619, Cl. 424-275.000.
Schminke, Heinz; Rau, Kurt; and Batza, Willi, to Metallgesellschaft Aktiengesellschaft. Dust collecting electrostatic precipitator. 4,058,377, Cl. 55-148.000.
Schnaibel, Eberhard: *See—*
Linder, Ernst; Hertfelder, Wilhelm; Schnaibel, Eberhard; and Junginger, Erich, 4,058,255, Cl. 237-12.30B.
Schneider, Helmut: *See—*
Kranefeld, Wilhelm; and Schneider, Helmut, 4,057,942, Cl. 52-115.000.
Schneider, Seymour. Method and system for generating oscillographic displays of analog signals upon a TV. 4,058,826, Cl. 358-10.000.
Schneider, Walter Max, to Land O'Frost Inc. Packaging machine. 4,057,951, Cl. 53-55.000.
Schnurle, Hans: *See—*
Drews, Ulrich; Kraus, Bernd; Singer, Erich; and Schnurle, Hans, 4,058,106, Cl. 123-198.0DB.
Schoberl, Werner, to Licentia Patent-Verwaltungs-G.m.b.H. Light emitting semiconductor indicating structure with light conductors. 4,058,750, Cl. 313-500.000.
Schoeller & Co. Elektrotechnische Fabrik GmbH & Co.: *See—*
Gruber, Carl F.; and Siebel, Georg, 4,058,701, Cl. 219-270.000.
Schonbeck, Rupert; Kloimstein, Engelbert; and Wittmann, Erwin, to Chemie Linz Aktiengesellschaft. Amine salts of phenyl-4-hydroxypyridazines and the preparation and herbicidal compositions thereof. 4,058,390, Cl. 71-92.000.
Schorsch, Eugene: *See—*
Shakshober, MacLean C.; Schorsch, Eugene; and Atkinson, Paul E., 4,058,227, Cl. 214-13.000.
Schramm, Arthur G. Elevating trailer. 4,058,325, Cl. 280-43.180.
Schreurs, Willy P., to GTE Sylvania Incorporated. Method of making fluorescent lamp. 4,058,639, Cl. 427-67.000.
Schreyer, Gerd: *See—*
Haschke, Heinz; Schreyer, Gerd; Schwarze, Werner; and Suchsland, Helmut, 4,058,662, Cl. 544-208.000.
Schreyer, Kenneth D.; Rohosy, Soma M.; and Manney, Charles J., to Columbus McKinnon Corporation. Load binder. 4,058,291, Cl. 254-74.000.
Schroeder, Eberhard: *See—*
Ahrens, Hanns; Biere, Helmut; Rufer, Clemens; Schmiechen, Ralph; Schroeder, Eberhard; Loge, Olaf; Losert, Wolfgang; and Schillinger, Ekkehard, 4,058,619, Cl. 424-275.000.
Schromm, Kurt: *See—*
Renth, Ernst-Otto; Mentrup, Anton; Schromm, Kurt; and Walland, Alexander, 4,058,642, Cl. 424-330.000.
Schulz, Siegfried; Eicker, Karl G.; and Reinke, August, to K. A. Schmersal & Co. Schaltgeratefabrik. Electric snap-action switch. 4,058,693, Cl. 200-67.00F.
Schummer, Gunter: *See—*
Merz, Walter; and Schummer, Gunter, 4,058,526, Cl. 544-182.000.
Schuster-Woldan, Hans; Weingand, Kaspar; and Koch, Dirk, to Siemens Aktiengesellschaft. Process for producing a thin metal structure with a self-supporting frame. 4,058,432, Cl. 156-659.000.
Schuttler, Wilhelm, to Maschinenfabrik Stahlkontor Weser Lenze KG. Web spooling machine. 4,058,267, Cl. 242-56.00A.
Schwartz, Edwin L., to Rite Autotronics Corporation. Combination vacuum/pressure gauge and dual purpose casing construction. 4,058,016, Cl. 73-419.000.
Schwartz, James W.: *See—*
Blacker, Allen P.; and Schwartz, James W., 4,058,753, Cl. 315-368.000.
Schwartz, Seymour L., to Airflow Aluminum Awning Company. Modular green house construction. 4,057,941, Cl. 52-63.000.
Schwarze, Werner: *See—*
Haschke, Heinz; Schreyer, Gerd; Schwarze, Werner; and Suchsland, Helmut, 4,058,662, Cl. 544-208.000.
SCM Corporation: *See—*
Kane, Bernard J.; Irving, Karen E.; Bledsoe, James O., Jr.; and Canova, Levy A., 4,058,572, Cl. 260-631.500.
Mitch, Frank A., 4,058,628, Cl. 424-343.000.
Oroshnik, William, 4,058,569, Cl. 260-617.00A.
Scorpion, Inc.: *See—*
Schellin, Carl W.; and Lundberg, John P., 4,058,105, Cl. 123-198.0DC.
Scott, Robert A. Irrigation gravel guard. 4,057,968, Cl. 61-12.000.
Sebag, Henri: *See—*
Vanlerberghe, Guy; and Sebag, Henri, 4,058,629, Cl. 424-365.000.
Sedig, Albert R.: *See—*
Panek, George J.; Ingham, Francis H.; Sedig, Albert R.; and Nieman, Gerald R., 4,058,671, Cl. 174-151.000.
Seeburg Corporation, The: *See—*
Miller, Anthony J., 4,058,316, Cl. 273-121.00A.

Seelert, Kurt: *See—*
Denzinger, Walter; Seelert, Kurt; and Herrle, Karl, 4,058,655, Cl. 526-212.000.
Seemayer, Walter: *See—*
Choksi, Pradip Vinobchandra; Johnston, Donald Leroy; and Seemayer, Walter, 4,058,121, Cl. 128-221.000.
Seifert, Arthur. Spring stub axle railway vehicle. 4,058,065, Cl. 105-180.000.
Seitz, Charles L.: *See—*
Clark, Becky J.; and Seitz, Charles L., 4,058,773, Cl. 328-37.000.
Sekiguchi, Tomoaki; Miyao, Hiroyasu; and Shimizu, Hidekazu, to Yamaha Hatsudoki Kabushiki Kaisha. Turn signal system. 4,058,797, Cl. 340-56.000.
Sekmakas, Kazys; and Hesler, Kenneth K., to DeSoto, Inc. Pigmented latex paints having superior gloss prepared by grinding a pigment into a solution of a copolymer of an unsaturated carboxylic acid. 4,058,499, Cl. 260-29.6RW.
Semiconductor Sensors, Inc.: *See—*
Svensson, Christer Martinus; Lundkvist, Leif Sigurd; Lundstrom, Kurt Ingemar; and Shivaraman, Madurai Somanathan, 4,058,368, Cl. 23-254.00E.
Senco Products, Inc.: *See—*
Kramer, Francis J.; Rothfuss, Robert G.; and Wise, William C., 4,058,047, Cl. 85-11.000.
Sensor Technology, Inc.: *See—*
Rubin, Irwin, 4,058,056, Cl. 101-93.190.
Serkez, Alvin A. Transmitter cut-off device. 4,058,690, Cl. 179-167.000.
Serratore, Joseph; King, Laurence F.; Sutherland, Thomas H.; and Wallace, James R., to Exxon Research & Engineering Co. Preparation of high bulk density/low porosity PVC resins. 4,058,495, Cl. 260-17.00A.
Setterholm, Jeffrey M. Suspendible sleeping surface and tent. 4,057,859, Cl. 5-121.000.
Seufert, Wilhelm, to Werner & Pfleiderer. Internal mixer. 4,058,297, Cl. 366-81.000.
Seymour, Charles Mitchell. Portable hydraulic tool useful for cutting nuts. 4,057,897, Cl. 30-272.00R.
Shakshober, MacLean C.; Schorsch, Eugene; and Atkinson, Paul E., to Sun Shipbuilding & Dry Dock Company. Pneumatic conveying of granular materials from a nonpressurized environment. 4,058,227, Cl. 214-13.000.
Sharp Kabushiki Kaisha: *See—*
Awane, Katunobu; Hattori, Hironori; Iiwa, Tetuo; and Tamaki, Hiroshi, 4,058,822, Cl. 357-23.000.
Sheikh, Sikander, to Xerox Corporation. Programmable controller. 4,058,850, Cl. 364-900.000.
Shelton, Glenmore Lorraine, Jr.: *See—*
Fitzgerald, William Joseph; Shelton, Glenmore Lorraine, Jr.; and Wolfe, Robert Nolan, 4,058,849, Cl. 364-520.000.
Shepherd, Robert Gordon; and Miner, Thomas Gary, to American Cyanamid Company. Polysubstituted alkyl esters of 4-alkylaminobenzoic acids. 4,058,550, Cl. 560-43.000.
Sher, Arden. Pyroelectric apparatus including effectively intrinsic semiconductor for converting radiant energy into electric energy. 4,058,729, Cl. 250-370.000.
Sherer, Paul; and Hester, Gerald Paul, to MSI Data Corporation. Bar code reader and decoder. 4,058,708, Cl. 235-92.0CC.
Shiba, Motoharu: *See—*
Hata, Shun-ichi; Mizuno, Koji; Nishii, Yasuho; Mitsuishi, Etsuko; and Shiba, Motoharu, 4,058,601, Cl. 424-180.000.
Shibahara, Masashi, to Nihon Hammond Kabushiki Kaisha. Programmable rhythm apparatus. 4,058,043, Cl. 84-1.030.
Shibayama, Kyoichi; Satho, Fumihiko; and Naitho, Mamoru, to Mitsubishi Denki Kabushiki Kaisha. Process for preparing an insulated product. 4,058,444, Cl. 204-181.000.
Shidler, Karl Allen: *See—*
Knutson, Gerald Roy; and Shidler, Karl Allen, 4,058,846, Cl. 360-121.000.
Shiley Laboratories, Inc.: *See—*
Fettel, Bruce E., 4,057,857, Cl. 3-1.500.
Shimizu, Hidekazu: *See—*
Sekiguchi, Tomoaki; Miyao, Hiroyasu; and Shimizu, Hidekazu, 4,058,797, Cl. 340-56.000.
Shimizu, Masao, to Kim, Taeo. Coilable and severable heating element. 4,058,704, Cl. 219-528.000.
Shimizu, Senzo: *See—*
Ko, Keiun; Takashina, Naomitsu; Shimizu, Senzo; Ikegami, Masuya; and Iwamoto, Yoshinori, 4,058,497, Cl. 260-22.00A.
Shimizu, Shinkichi: *See—*
Shiraishi, Tatsuo; Shimizu, Shinkichi; and Ichihashi, Hiroshi, 4,058,547, Cl. 260-465.300.
Shindo, Minoru: *See—*
Mori, Takashi; Takaku, Sakae; Oi, Nobuhiro; Shindo, Minoru; Hirano, Takeaki; Kataoka, Shigeyuki; and Furuno, Kouji, 4,058,523, Cl. 544-165.000.
Shinohara, Shinitsu; Uchino, Hisanori; and Yamaji, Hiroyuki, to Tadano Ironworks Co., Ltd. Hydraulic cylinder unit. 4,058,178, Cl. 177-146.000.
Shinozaki, Satoshi: *See—*
Tokumaru, Yukuya; Nakai, Masanori; Shinozaki, Satoshi; Nakamura, Junichi; Ito, Shintaro; and Nishi, Yoshio, 4,058,419, Cl. 148-175.000.
Shionogi & Co., Ltd.: *See—*
Uyeo, Shoichiro; Aoki, Tsutomu; and Nagata, Wataru, 4,058,521, Cl. 260-239.100.
Shiozaki, Shoji: *See—*
Hikosaka, Noboru; Watanabe, Mitsuo; and Shiozaki, Shoji, 4,058,092, Cl. 123-32.0ST.
Shiraishi, Tatsuo; Shimizu, Shinkichi; and Ichihashi, Hiroshi, to Sumitomo Chemical Company, Limited. Catalytic process for the production of acrylonitrile. 4,058,547, Cl. 260-465.300.
Shivaraman, Madurai Somanathan: *See—*
Svensson, Christer Martinus; Lundkvist, Leif Sigurd; Lundstrom, Kurt Ingemar; and Shivaraman, Madurai Somanathan, 4,058,368, Cl. 23-254.00E.
Shizaoki, Tetsuya: *See—*
Inukai, Noriyoshi; Murakami, Masuo; Iwamoto, Hidenori; Yanagisawa, Isao; Tamura, Toshinari; Ishii, Yoshio; Shizaoki, Tetsuya; Tomioka, Kenichi; and Takagi, Tokuichi, 4,058,665, Cl. 560-121.000.
Shotton, James A.: *See—*
Stansbury, Roy E.; and Shotton, James A., 4,058,402, Cl. 106-16.000.
Shroot, Braham: *See—*
Cox, David A.; and Shroot, Braham, 4,058,610, Cl. 424-246.000.
Shull, Charles S.: *See—*
Morgan, Albert W.; Shull, Charles S.; and Vanderlinde, William, 4,058,658, Cl. 526-261.000.
Shuman, Dennis A.: *See—*
Robins, Roland K.; Shuman, Dennis A.; and Boswell, Kay H., 4,058,659, Cl. 536-27.000.
Sias, Roy C., to Continental Oil Company. Sulfonate water flood additives and method of using same. 4,058,467, Cl. 252-8.55D.
Sid Richardson Carbon & Gasoline Co.: *See—*
Ruble, Theodore A., 4,058,590, Cl. 423-449.000.
Siebel, Georg: *See—*
Gruber, Carl F.; and Siebel, Georg, 4,058,701, Cl. 219-270.000.
Siebert, Werner: *See—*
Bellenberg, Heinz; Kucharzyk, Werner; Rohde, Wolfgang; and Siebert, Werner, 4,058,230, Cl. 214-18.200.
Siemens Aktiengesellschaft: *See—*
Anders, Wilfried, 4,058,445, Cl. 204-192.0SP.
Meyer, Rudolf; Schiegl, Wolf-Eberhard; and Taumann, Leonhard, 4,058,730, Cl. 250-397.000.
Muller, Karl-Heinz; Munchmeyer, Walter; von Rauch, Moriz; and Schafer, Norbert, 4,058,731, Cl. 250-442.000.
Nagel, Artur; and Wissaert, Roland, 4,058,684, Cl. 179-18.0BB.
Reiss, Karl Hans; Kotschak, Otto; and Conrad, Bernhard, 4,058,721, Cl. 250-213.0VT.
Schuster-Woldan, Hans; Weingand, Kaspar; and Koch, Dirk, 4,058,432, Cl. 156-659.000.
Soldner, Richard, 4,058,114, Cl. 128-2.00V.
Stahl, Horst; and Thorand, Franz, 4,058,355, Cl. 312-241.000.
Tippner, Franz, 4,058,735, Cl. 250-551.000.
Udvardi-Lakos, Janos, 4,058,738, Cl. 307-66.000.
Sievertsson, Hans; Lundin, Ronny Hugo Loritz; and Sjodahl, Gertrud Elisabeth Westin, to AB Kabi. Synthetic peptides having growth promoting activity. 4,058,512, Cl. 260-112.50R.
Silbert, Jerome A. Method and apparatus for sterile handling of fluids. 4,058,363, Cl. 21-58.000.
Silverman, Daniel; and Fort, J. Robert, to Geophysical Systems Corporation. Method and apparatus for transmitting geophone signals over cables with minimum noise. 4,058,790, Cl. 340-15.5TS.
Simmons, James R.; and Rogowski, Robert P., to Interlake, Inc. Strap dispensing system. 4,058,270, Cl. 242-105.000.
Simmons, Willis H. Water faucet tool means. 4,058,030, Cl. 81-53.00R.
Simon, Sidney: *See—*
Roe, Forrest D.; and Simon, Sidney, 4,058,333, Cl. 292-172.000.
Simoneit, Gunter: *See—*
Ries, Karl; Hannoschock, Kurt; and Simoneit, Gunter, 4,058,000, Cl. 73-644.000.
Simpson, Norman K. Mechanical actuation simulator. 4,058,026, Cl. 74-577.00R.
Sinclair, Robert A., to Minnesota Mining and Manufacturing Company. Protection of metals or metal containing articles. 4,058,362, Cl. 21-2.50R.
Singer Company, The: *See—*
Dunn, Earl F.; Erskine, Henry; and Hooper, Edward, 4,058,071, Cl. 112-235.000.
Eisenberg, Robert M., 4,057,913, Cl. 35-12.00B.
Singer, Erich: *See—*
Drews, Ulrich; Kraus, Bernd; Singer, Erich; and Schnurle, Hans, 4,058,106, Cl. 123-198.0DB.
Singer, Evelyn R. Multiple clothes hanging device. 4,058,222, Cl. 211-118.000.
Singh, Prithipal, to Syva Company. Tegretol antigens and antibodies. 4,058,511, Cl. 260-112.00B.
Sjodahl, Gertrud Elisabeth Westin: *See—*
Sievertsson, Hans; Lundin, Ronny Hugo Loritz; and Sjodahl, Gertrud Elisabeth Westin, 4,058,512, Cl. 260-112.50R.
Skvortsova, Elena Konstantinovna: *See—*
Ovchinnikov, Viktor Georgievich; Noritsa, Nadezhda Petrovna; Grib, Maria Mefodievna; Kamennov, Nikolai Alexandrovich; and Skvortsova, Elena Konstantinovna, 4,058,618, Cl. 424-273.00R.
Sletzinger, Meyer: *See—*
Cama, Lovji D.; Christensen, Burton G.; Karady, Sandor; and Sletzinger, Meyer, 4,058,661, Cl. 544-21.000.
Slongo, Gastone: *See—*
Glatti, Flaviano; and Slongo, Gastone, 4,058,471, Cl. 252-63.500.

Smith, Darrell Franklin, Jr.: *See—*
Eiselstein, Herbert Louis; Clatworthy, Edward Frederick; and Smith, Darrell Franklin, Jr., 4,058,416, Cl. 148-32.000.
Smith, Floyd O., to ESCO Corporation. Rotating assembly for material handling equipment. 4,058,023, Cl. 74-243.0DR.
Smith, Harvell Morton: *See—*
Faulkner, Duane Harold; Smith, Harvell Morton; and Howard, Larry Edward, 4,058,386, Cl. 65-6.000.
Smith, Herman W., to Upjohn Company, The. Aliphatic 2-decarboxy-2-hydroxymethyl-13,14-didehydro-PG compounds. 4,058,564, Cl. 260-586.00R.
Smith, Jerry D., to Cameron Iron Works, Inc. Well tool adapted to be locked within and sealed with respect to the bore of the well conduit. 4,058,162, Cl. 166-124.000.
Smith, Joe Delano; McCall, David Daniel; and Kyzer, James Alexander, to Still-Walter Tool & Manufacturing Company. Milling table lathe. 4,057,893, Cl. 29-560.000.
Smith, Stuart B.; McAlpin, James J.; Peruyero, Jose M. A.; Hazelton, Ronald L.; and Upchurch, Edward F., to Exxon Research & Engineering Co. Autorefrigeration process and apparatus. 4,058,652, Cl. 526-68.000.
Smith, William V., to Lectrolarm Custom Systems, Inc. Panoramic camera scanning system. 4,058,831, Cl. 358-87.000.
SmithKline Corporation: *See—*
DeMarinis, Robert M., 4,058,609, Cl. 424-246.000.
Ridley, Peter Tone; and Weidley, Edwin Frank, 4,058,615, Cl. 424-265.000.
Snyder, Joseph T.; and Huffman, Richard E., to Grout Supply Company. Pumpable cement grout and additive. 4,058,405, Cl. 106-87.000.
Snyder, William H.: *See—*
DeVries, Roy F.; and Snyder, William H., 4,058,644, Cl. 428-200.000.
Societa Farmaceutici Italia S.p.A.: *See—*
Arcamone, Federico; Di Marco, Aurelio; and Penco, Sergio, 4,058,519, Cl. 424-180.000.
Societa' Italiana Resine S.I.R. S.p.A.: *See—*
Piccolo, Luigi; Ghirga, Marcello; Paolinelli, Antonio; and Paganessi, Gian Pietro, 4,058,389, Cl. 71-31.000.
Societa Italiana Telecomunicazioni Siemens S.p.A.: *See—*
Delle Donne, Roberto; and Musumeci, Luigi, 4,058,682, Cl. 179-15.0AF.
Fenoglio, Francesco, 4,058,683, Cl. 179-15.0AF.
Societe Anonyme Automobiles Citroen: *See—*
Estaque, Andre F., 4,058,028, Cl. 74-865.000.
Estaque, Andre F., 4,058,029, Cl. 74-865.000.
S.A. des Anciens Etablissements Paul Wurth: *See—*
Mailliet, Pierre H.; and Metz, Jean, 4,058,300, Cl. 266-273.000.
Societe Anonyme Intersmat: *See—*
Moreaux, Claude, 4,057,998, Cl. 73-23.100.
Societe des Brevets Greffe: *See—*
Greffe, Maurice F., 4,057,949, Cl. 53-22.00B.
Societe d'Etude pour la Regeneration de l'Acide Chlorhydrique SEPRAC: *See—*
Bonnemay nee Couture, Andree; Royon, Jean; Bereau, Jean; and Catonne, Jean-Claude, 4,058,441, Cl. 204-103.000.
Societe Nationale Elf Aquitaine (Production): *See—*
de Saint Palais, Jacques; Laffont, Paul; and Mourlevat, Jean, 4,058,137, Cl. 137-236.00S.
Societe: Toscara Anstalt: *See—*
Corbic nee Busnel, Bernadette Corbic, 4,058,630, Cl. 426-36.000.
Sogge, John W., to Caterpillar Tractor Co. Track-type vehicle wheel having impact resistance means. 4,058,352, Cl. 305-57.000.
Sokolov, Boris Grigorievich; and Zaboronok, Georgy Fomich. Electron beam unit for heat treatment by electron bombardment technique. 4,058,697, Cl. 219-121.0EB.
Solarex Corporation: *See—*
Lindmayer, Joseph, 4,058,418, Cl. 148-175.000.
Solco Basel AG: *See—*
Jaeger, Karl-Heinz; and Herbrand, Willy, deceased, 4,058,534, Cl. 260-295.50S.
Soldner, Richard, to Siemens Aktiengesellschaft. Ultrasonic arrangement for puncturing internal body organs, vessels and the like. 4,058,114, Cl. 128-2.00V.
Sole, Michael John. Extracting copper from sulphide concentrates. 4,058,395, Cl. 75-72.000.
Soletanche: *See—*
Rochmann, Jacques, 4,057,969, Cl. 61-35.000.
Solosonic: *See—*
Jennings, Robert Parry; and Aaroe, Kenneth Thomas, 4,058,045, Cl. 84-1.140.
Soltesz, James A. Ship security system. 4,058,792, Cl. 340-29.000.
Sony Corporation: *See—*
Kishi, Yoshio; and Nagami, Masaru, 4,058,841, Cl. 360-27.000.
Miyaoka, Senri, 4,058,834, Cl. 358-128.000.
Mogi, Takao; Taki, Akira; and Yamazaki, Hiroshi, 4,058,772, Cl. 325-464.000.
Ohnishi, Toshinobu; Sumiya, Hiroyuki; and Suzuki, Masao, 4,058,754, Cl. 315-411.000.
Ohsawa, Mitsuo; and Yamatani, Wataru, 4,058,771, Cl. 325-446.000.
Tamura, Toshio; Oouchi, Shigeo; Oosawa, Kenji; and Fueki, Shimetomo, 4,058,439, Cl. 204-49.000.
Soto, William: *See—*
Zolke, Sarah; and Soto, William, 4,057,986, Cl. 70-233.000.
Spencer, Henry Anderson. Container for seedlings. 4,057,932, Cl. 47-77.000.
Spencer, Lloyd. Irrigation emitter. 4,058,257, Cl. 239-107.000.
Sperry Rand Corporation: *See—*
Mast, Aquila D., 4,057,954, Cl. 56-341.000.
Scheuneman, James Herman, 4,058,851, Cl. 364-900.000.
Spoor, Herbert: *See—*
Vaeth, Guenter; Bachmann, Rudolf; Hartmann, Heinrich; Spoor, Herbert; and Lehner, August, 4,058,506, Cl. 260-75.0NP.
Vaeth, Guenter; Bachmann, Rudolf; Hartmann, Heinrich; Hartmann, Hans-Joerg; Spoor, Herbert; Uhl, Karl; Lehner, August; Gutermann, Winfried; and Motz, Herbert, 4,058,646, Cl. 428-425.000.
Sporri, Heinz: *See—*
Beringer, Monique; and Sporri, Heinz, 4,058,129, Cl. 131-140.00C.
Spradlin, Fred. Golf game. 4,058,313, Cl. 273-87.400.
Square Two Golf Corporation, The: *See—*
Stuff, Alfred; and Pellizzi, Anthony, 4,058,312, Cl. 273-77.00A.
Staff, Charles H.; Kunert, Gale F.; and Christians, Tom A., to Fairmont Foods Company. Meat product, and process for preparing same. 4,058,633, Cl. 426-315.000.
Stahl, Horst; and Thorand, Franz, to Siemens Aktiengesellschaft. Teleprinter console. 4,058,355, Cl. 312-241.000.
Stahl, Michael A., to Far Out Products, Ltd. Locking nut assembly. 4,057,985, Cl. 70-231.000.
Stahl, Richard F.: *See—*
Murphy, Kevin P.; Stahl, Richard F.; and Orfeo, Sabatino R., 4,057,973, Cl. 62-114.000.
Murphy, Kevin P.; Stahl, Richard F.; and Orfeo, Sabatino R., 4,057,974, Cl. 62-114.000.
Stahle, Helmut: *See—*
Kummer, Werner; Stahle, Helmut; Koppe, Herbert; Haarmann, Walter; and Reichl, Richard, 4,058,616, Cl. 424-267.000.
Stahnecker, Erhard: *See—*
Beck, Gilbert; Zuern, Ludwig; and Stahnecker, Erhard, 4,058,152, Cl. 152-310.000.
Stamires, Dennis: *See—*
Alafandi, Hamid; and Stamires, Dennis, 4,058,484, Cl. 252-455.00Z.
Standard Oil Company (Indiana): *See—*
Holda, Eugene M.; and Lark, John C., 4,058,496, Cl. 260-21.000.
Standard Telephones & Cables Limited: *See—*
Drewery, John Oliver; and Weston, Martin, 4,058,836, Cl. 358-167.000.
Stanislaw, David L., to Aradar Corporation. Dish antenna with impedance matched splash plate feed. 4,058,812, Cl. 343-761.000.
Stansbury, Roy E.; and Shotton, James A., to Phillips Petroleum Company. Water soluble rodent repellent composition for protecting a buried material such as a cable. 4,058,402, Cl. 106-16.000.
Stary, Marvin L.; Brown, Edward L.; and Pridonoff, Eric L., to Clean Air Engineering, Inc. Flammable vapor recovery system. 4,058,147, Cl. 141-45.000.
Stauffer Chemical Company: *See—*
Concilio-Nolan, Mary C.; and Chang, Pei K., 4,058,510, Cl. 260-112.00R.
Fancher, Llewellyn W., 4,058,535, Cl. 260-326.00E.
Stebinger, Albert Eugene, to TSSCO. Variably adjustable shoulder telephone handset support. 4,058,689, Cl. 179-157.000.
Steckler, Robert, to Plastomedical Sciences, Inc. Cationic hydrogels based on heterocyclic N-vinyl monomers. 4,058,491, Cl. 260-2.20R.
Steele Chemicals Co. Ltd.: *See—*
Kruger, Gunther, 4,058,539, Cl. 260-397.450.
Steffek, Robert J.: *See—*
Amor, William H., Jr.; and Steffek, Robert J., 4,057,891, Cl. 29-434.000.
Steinberg, David Herbert: *See—*
Dexter, Martin; and Steinberg, David Herbert, 4,058,502, Cl. 260-45.85B.
Steiner American Corporation: *See—*
Cassia, Antonio Macchi, 4,058,235, Cl. 221-48.000.
Steiner, Robert Henry, to Mobil Oil Corporation. Heat sealable thermoplastic films. 4,058,645, Cl. 428-331.000.
Steiner, Robert Henry, to Mobil Oil Corporation. Coating compositions and thermoplastic film substrates coated therewith. 4,058,649, Cl. 428-518.000.
Steingroever, Erich, to Elektro-Physik Hans Nix & Dr. -Ing. Erich Steingroever KG. Apparatus for automatically magnetizing permanent magnet bodies, measuring their magnetic retentivity and sorting them. 4,058,763, Cl. 324-205.000.
Steininger, Alfred: *See—*
Kuhls, Jurgen; Martini, Thomas; and Steininger, Alfred, 4,058,578, Cl. 260-884.000.
Stelling, William. Anchor assembly. 4,058,078, Cl. 114-303.000.
Stembel, Oren G. Radiograph marker. 4,058,733, Cl. 250-476.000.
Stendel, Wilhelm: *See—*
Hofer, Wolfgang; Maurer, Fritz; Riebel, Hans-Jochem; Hammann, Ingeborg; and Stendel, Wilhelm, 4,058,603, Cl. 424-200.000.
Stephens, Richard G. Machine tool apparatus. 4,057,881, Cl. 29-27.00C.
Sterling Drug Inc.: *See—*
Bell, Malcolm R., 4,058,532, Cl. 260-288.00R.
Stern, Harold; and Elek, Stephen Dyonis. Cytomegalovirus attenuation method and vaccine. 4,058,598, Cl. 424-89.000.
Stevenson, Mayne B., to Arvey Corporation. Folded money pack envelope. 4,058,251, Cl. 229-72.000.
Still-Walter Tool & Manufacturing Company: *See—*
Smith, Joe Delano; McCall, David Daniel; and Kyzer, James Alexander, 4,057,893, Cl. 29-560.000.
Stingl, Hans Alfred; and Elliott, John, to Toms River Chemical Corporation. Metallized phenyl-azo-naphthol compounds. 4,058,515, Cl. 260-151.000.

Stoddard, Xerxes T.; and Terry, Ruel C. Heating mine water for recovery of immobile hydrocarbons. 4,058,164, Cl. 166-303.000.
Stode, Ralph A., to Continental Oil Company. Contamination trap for pressure gauges. 4,058,015, Cl. 73-395.000.
Stolfa, Frank, to UOP Inc. Combination process for producing high quality metallurgical coke. 4,058,451, Cl. 208-97.000.
Stone, Irwin. Low temperature vapor phase sterilization and storage of biologically active injectable materials. 4,058,213, Cl. 206-524.400.
Stout, Karl J., to Raytheon Company. Gamma camera with reflectivity mask. 4,058,727, Cl. 250-363.00R.
Stover, S. Dalton: *See—*
  Dalton, James H.; Stover, S. Dalton; and Roney, Robert M., 4,058,740, Cl. 307-116.000.
Strater, William H.: *See—*
  Mitchell, Roger; and Strater, William H., 4,058,823, Cl. 354-354.000.
Streubel, Hans; Backhaus, Karl; and John, Wolfgang, to Concast Incorporated New York. Guiding and supporting means for continuously cast metal strand. 4,058,154, Cl. 164-82.000.
Struewing, Barbara C., administratrix: *See—*
  Higgins, Larry; King, John Thomas; Butler, Blondie; and Struewing, Francis R., deceased, 4,057,860, Cl. 5-247.000.
Struewing, Francis R., deceased: *See—*
  Higgins, Larry; King, John Thomas; Butler, Blondie; and Struewing, Francis R., deceased, 4,057,860, Cl. 5-247.000.
Stuart, Alistair J.; and Burch, James B., to Hugh J. Baker & Company. Scaffold. 4,058,184, Cl. 182-128.000.
Studt, William Lyon: *See—*
  Douglas, George Henry; Studt, William Lyon; and Dodson, Stuart Alan, 4,058,557, Cl. 260-501.140.
Stuff, Alfred; and Pellizzi, Anthony, to Square Two Golf Corporation, The. Golf club. 4,058,312, Cl. 273-77.00A.
Stupay, Lawrence John; and Truesdell, Carl Frederick, to Bunker Ramo Corporation. Pulse counter. 4,058,118, Cl. 128-2.05T.
Stutelberg, Kenneth R.; and Anderson, Dennis C., to National Polymers, Inc. Stackable flower pot. 4,057,931, Cl. 47-66.000.
Suchsland, Helmut: *See—*
  Haschke, Heinz; Schreyer, Gerd; Schwarze, Werner; and Suchsland, Helmut, 4,058,662, Cl. 544-208.000.
Sugio, Akitoshi: *See—*
  Yonemitsu, Eiichi; Sugio, Akitoshi; Kuramoto, Atuo; and Urabe, Hiroyuki, 4,058,504, Cl. 260-47.0ET.
Sullivan, Peter; and Yackel, John P., to American Guidance Service, Inc. Display device. 4,058,327, Cl. 281-33.000.
Sumitomo Chemical Company, Limited: *See—*
  Fujimoto, Keimei; Ohno, Nobuo; Okuno, Yoshitoshi; Mizutani, Toshio; Ohno, Isao; Hirano, Masachika; Itaya, Nobushige; and Matsuo, Takashi, 4,058,622, Cl. 424-308.000.
  Shiraishi, Tatsuo; Shimizu, Shinkichi; and Ichihashi, Hiroshi, 4,058,547, Cl. 260-465.300.
Sumitomo Heavy Industries, Ltd.: *See—*
  Sato, Yoshimasa; Tsukuda, Toshio; Inoue, Hajime; and Mutsuta, Akio, 4,057,978, Cl. 62-331.000.
Sumitomo Metal Industries Ltd.: *See—*
  Ito, Yoshinori; Kawai, Masaaki; and Ikeda, Masahiko, 4,058,700, Cl. 219-137.00R.
  Matsuoka, Takashi, 4,058,414, Cl. 148-12.00F.
  Sato, Yoshimasa; Tsukuda, Toshio; Inoue, Hajime; and Mutsuta, Akio, 4,057,978, Cl. 62-331.000.
  Tsujimoto, Kenichi; Ikeuchi, Yoshiharu; and Kuriyama, Akira, 4,058,017, Cl. 73-423.00R.
Sumiya, Hiroyuki: *See—*
  Ohnishi, Toshinobu; Sumiya, Hiroyuki; and Suzuki, Masao, 4,058,754, Cl. 315-411.000.
Summo, Arthur M., to Branson Ultrasonics Corporation. Method of joining non-fusible workpieces using frictional energy. 4,058,421, Cl. 156-73.500.
Sun Oil Company of Pennsylvania: *See—*
  Hansel, William B., 4,058,149, Cl. 141-301.000.
Sun Shipbuilding & Dry Dock Company: *See—*
  Shakshober, MacLean C.; Schorsch, Eugene; and Atkinson, Paul E., 4,058,227, Cl. 214-13.000.
Sun Ventures, Inc.: *See—*
  Cassar, Richard D., 4,058,605, Cl. 424-212.000.
Sundberg, Borje Erling Ingvar, to Nordisk Kartro Aktiebolag. Clinchnail. 4,058,048, Cl. 85-31.000.
Suntech, Inc.: *See—*
  Hill, William L., 4,057,967, Cl. 61-1.00R.
Suntola, Tuomo; and Antson, Jorma. Method for producing compound thin films. 4,058,430, Cl. 156-611.000.
Sunwall Incorporated: *See—*
  Gramm, Ronald J., 4,058,109, Cl. 126-270.000.
Suovaniemi, Osmo Antero. Apparatus for accurate pipetting of small liquid volumes. 4,058,370, Cl. 23-259.000.
Sutherland, Thomas H.: *See—*
  Serratore, Joseph; King, Laurence F.; Sutherland, Thomas H.; and Wallace, James R., 4,058,495, Cl. 260-17.00A.
Sutter, Hubert; and Peuker, Reinhard, to Bayer Aktiengesellschaft. Process for the bulk polymerization of α-olefins. 4,058,654, Cl. 526-159.000.
Suzuki Iron Works Co., Ltd.: *See—*
  Suzuki, Masakazu, 4,057,884, Cl. 407-89.000.
Suzuki, Masakazu, to Suzuki Iron Works Co., Ltd. Tool holder. 4,057,884, Cl. 407-89.000.
Suzuki, Masao: *See—*
  Ohnishi, Toshinobu; Sumiya, Hiroyuki; and Suzuki, Masao, 4,058,754, Cl. 315-411.000.
Suzuki, Takao; and Ogita, Hiroshi, to Toyota Jidosha Kogyo Kabushiki Kaisha. Internal combuston engine with auxiliary combustion chamber. 4,058,090, Cl. 123-32.0SP.
Svarz, Jerry J., to Nalco Chemical Company. Removal of color from paper mill waste waters. 4,058,458, Cl. 210-52.000.
Svensson, Christer Martinus; Lundkvist, Leif Sigurd; Lundstrom, Kurt Ingemar; and Shivaraman, Madurai Somanathan, to Semiconductor Sensors, Inc. Hydrogen detector. 4,058,368, Cl. 23-254.00E.
Swiss Fabricating, Inc.: *See—*
  Lienhard, Robert W., 4,057,943, Cl. 52-126.000.
Swoager, Jon R., to Automation Equipment, Inc. Hydrostatic bearing piston for a two-cycle engine. 4,058,104, Cl. 123-193.0CP.
Sycor, Inc.: *See—*
  Rempel, William D., 4,058,196, Cl. 197-133.00R.
Syva Company: *See—*
  Singh, Prithipal, 4,058,511, Cl. 260-112.00B.
Szeberenyi, Szabolcs: *See—*
  Kekesy, Tibor; Szeberenyi, Szabolcs; Beer, Gyorgy; Dudas, Antal; Hajos, Gyorgy; Szporny, Laszlo; and Czajlik, Eva, nee Csizer, 4,058,522, Cl. 260-239.570.
Szepesi, Istvan: *See—*
  Zsolnai, Tibor; Lugosi, Gyorgy; Szepesi, Istvan; Bakonyi, Maria; Racz, Istvan; and Radvany nee Hegedus, Erzsebet, 4,058,608, Cl. 424-226.000.
Szporny, Laszlo: *See—*
  Kekesy, Tibor; Szeberenyi, Szabolcs; Beer, Gyorgy; Dudas, Antal; Hajos, Gyorgy; Szporny, Laszlo; and Czajlik, Eva, nee Csizer, 4,058,522, Cl. 260-239.570.
T. D. Williamson, Inc.: *See—*
  Rankin, William J., 4,058,142, Cl. 138-89.000.
Tadano Ironworks Co., Ltd.: *See—*
  Shinohara, Shinitsu; Uchino, Hisanori; and Yamaji, Hiroyuki, 4,058,178, Cl. 177-146.000.
Tagaya, Mikio: *See—*
  Takahashi, Toshio; Ehara, Toshiyasu; Tagaya, Ryosaku; and Tagaya, Mikio, 4,058,736, Cl. 250-573.000.
  Takahashi, Toshio; Ehara, Toshiyasu; Tagaya, Ryosaku; and Tagaya, Mikio, 4,058,737, Cl. 250-573.000.
Tagaya, Ryosaku: *See—*
  Takahashi, Toshio; Ehara, Toshiyasu; Tagaya, Ryosaku; and Tagaya, Mikio, 4,058,736, Cl. 250-573.000.
  Takahashi, Toshio; Ehara, Toshiyasu; Tagaya, Ryosaku; and Tagaya, Mikio, 4,058,737, Cl. 250-573.000.
Taira, Kaoru; Sato, Teruo; Ishii, Yoshiya; Miyata, Yukinori; and Okamoto, Katashi, to Nippondenso Co., Ltd.; and Toyota Jidosha Kogyo Kabushiki Kaisha. Control apparatus for diesel engine. 4,058,101, Cl. 123-140.0MP.
Takada, Takezo, to Takata Kojyo Co., Ltd. Inertia locked safety belt take-up reel. 4,058,272, Cl. 242-107.40B.
Takagi, Tokuichi: *See—*
  Inukai, Noriyoshi; Murakami, Masuo; Iwamoto, Hidenori; Yanagisawa, Isao; Tamura, Toshinari; Ishii, Yoshio; Shizaoki, Tetsuya; Tomioka, Kenichi; and Takagi, Tokuichi, 4,058,665, Cl. 560-121.000.
Takahara, Yoshimasa: *See—*
  Futai, Norio; Murakami, Toshio; Takahara, Yoshimasa; and Kumazawa, Toshiharu, 4,058,481, Cl. 252-321.000.
Takahashi, Toshio; Ehara, Toshiyasu; Tagaya, Ryosaku; and Tagaya, Mikio, to Eisai Co., Ltd. Method and apparatus for inspecting extraneous solid substances contained in liquid. 4,058,736, Cl. 250-573.000.
Takahashi, Toshio; Ehara, Toshiyasu; Tagaya, Ryosaku; and Tagaya, Mikio, to Eisai Co., Ltd. Method and apparatus for detecting extraneous solid substances contained in liquid. 4,058,737, Cl. 250-573.000.
Takaku, Sakae: *See—*
  Mori, Takashi; Takaku, Sakae; Oi, Nobuhiro; Shindo, Minoru; Hirano, Takeaki; Kataoka, Shigeyuki; and Furuno, Kouji, 4,058,523, Cl. 544-165.000.
Takamaru, Takeshi: *See—*
  Kohno, Takashige; Takamaru, Takeshi; Kuwahara, Akiyasu; and Mori, Michitsugu, 4,058,093, Cl. 123-75.00B.
Takara Co., Ltd.: *See—*
  Ogawa, Iwakichi, 4,057,929, Cl. 46-201.000.
Takashina, Naomitsu: *See—*
  Ko, Keiun; Takashina, Naomitsu; Shimizu, Senzo; Ikegami, Masuya; and Iwamoto, Yoshinori, 4,058,497, Cl. 260-22.00A.
Takata Kojyo Co., Ltd.: *See—*
  Takada, Takezo, 4,058,272, Cl. 242-107.40B.
Takechi, Hiroshi; Abe, Mitsunobu; Katsutani, Ryoseki; and Saito, Yoshio, to Nippon Steel Corporation. Method for levelling a metal strip or sheet. 4,057,989, Cl. 72-128.000.
Takeda, Keiji: *See—*
  Murata, Masataka; Takeda, Keiji; and Ikeda, Teppei, 4,058,443, Cl. 204-159.170.
Taki, Akira: *See—*
  Mogi, Takao; Taki, Akira; and Yamazaki, Hiroshi, 4,058,772, Cl. 325-464.000.
Tamaki, Hiroshi: *See—*
  Awane, Katunobu; Hattori, Hironori; Biwa, Tetuo; and Tamaki, Hiroshi, 4,058,822, Cl. 357-23.000.
Tamburin, Gino: *See—*
  Abbruzzese, Luigi; Gozzo, Franco; Rossi, Giorgio; Masoero, Marcella; Lorusso, Simone; Bonola, Paola; and Tamburin, Gino, 4,058,613, Cl. 424-258.000.

Tamura, Toshinari: *See—*
  Inukai, Noriyoshi; Murakami, Masuo; Iwamoto, Hidenori; Yanagisawa, Isao; Tamura, Toshinari; Ishii, Yoshio; Shizaoki, Tetsuya; Tomioka, Kenichi; and Takagi, Tokuichi, 4,058,665, Cl. 560-121.000.
Tamura, Toshio; Oouchi, Shigeo; Oosawa, Kenji; and Fueki, Shimetomo, to Sony Corporation. Nickel electroplating bath for satin finish and method. 4,058,439, Cl. 204-49.000.
Tanahashi, Toshio, to Toyota Jidosha Kogyo Kabushiki Kaisha. Internal combustion engine of a lean air-fuel mixture combustion type. 4,058,091, Cl. 123-32.0VN.
Tanaka, Eizi; and Mochizuki, Hiroshi, to Nippon Soken, Inc. Intake air flow rate measuring device for internal combustion engine. 4,058,100, Cl. 123-139.0AW.
Tanaka, Hitoshi: *See—*
  Fujiwara, Shinobu; and Tanaka, Hitoshi, 4,058,404, Cl. 106-73.310.
Tappan, Leonard E. Car top load carrier. 4,058,243, Cl. 224-42.10H.
Taradonov, Vladimir Ignatievich: *See—*
  Viktorov, Evgeny Vasilievich; Novikov, Igor Ivanovich; Kondratieva, Tatyana Fedorovna; Gubarev, Georgy Vasilievich; Yamschikova, Margarita Sergeevna; Vasiliev, Vasily Dmitrievich; Kontsevich, Georgy Mikhailovich; Gubinsky, Anatoly Sergeevich; Velikasov, Anatoly Alexeevich; Taradonov, Vladimir Ignatievich; and Isakov, Valery Pavlovich, 4,058,138, Cl. 137-512.100.
Tarasov, Evgeny Alexandrovich: *See—*
  Prutkovsky, Evgeny Nikolaevich; Bermatov, Mikhail Albertovich; Tarasov, Evgeny Alexandrovich; Ozerov, Valery Ilich; Fedosjuk, Alexandr Fedorovich; and Krokhin, Vladimir Andreevich, 4,057,966, Cl. 60-678.000.
Tashiro, Sadaji; and Kuroi, Yasuyuki, to Hitachi Metals, Ltd. Full rotation type, sheet web shearing machine. 4,058,037, Cl. 83-70.000.
Taumann, Leonhard: *See—*
  Meyer, Rudolf; Schiegl, Wolf-Eberhard; and Taumann, Leonhard, 4,058,730, Cl. 250-397.000.
Taylor, Don A., to Buehrle, Victor E. Apparatus for bonding treads to tires. 4,058,422, Cl. 156-96.000.
Taylor, Henry F., to United States of America, Navy. Electro-optic analog/digital converter. 4,058,722, Cl. 250-225.000.
Taylor, Michael J.; and Isley, John P. Movement indicator. 4,058,079, Cl. 116-114.00H.
TDK Electronics Co., Ltd.: *See—*
  Fujiwara, Shinobu; and Tanaka, Hitoshi, 4,058,404, Cl. 106-73.310.
Teijin Limited: *See—*
  Kawashima, Kohei; Ikeno, Keiji; and Nakanishi, Hajime, 4,058,264, Cl. 242-18.0PW.
  Omoto, Yorihiko; Konishi, Tadashi; Ichihara, Shigehiro; and Murai, Hisanori, 4,058,507, Cl. 260-75.00M.
  Tsuyuguchi, Tadao, 4,058,216, Cl. 206-597.000.
Tekken Kensetu Co. Ltd.: *See—*
  Yamazaki, Hironobu, 4,057,971, Cl. 61-84.000.
Telefonaktiebolaget L M Ericsson: *See—*
  Hedlund, Per Olov; and Hertsius, Lars Olof, 4,058,265, Cl. 242-47.010.
  Johansson, Sven Torild Kruse, 4,058,673, Cl. 178-22.000.
Tenhunen, Lauri Alarik. Apparatus for detaching a portion of a body of material such as hay. 4,058,038, Cl. 83-109.000.
Terasaki, Daijiro: *See—*
  Idzutsu, Waichiro; Kuroki, Masaaki; Komukai, Shigeru; Terasaki, Daijiro; and Nakajima, Sachie, 4,058,376, Cl. 55-70.000.
Terry, Ruel C.: *See—*
  Stoddard, Xerxes T.; and Terry, Ruel C., 4,058,164, Cl. 166-303.000.
Terumoto, Masahiro, to Q. P Corporation. High-pressure thermal sterilizer having liquid recirculating means. 4,058,364, Cl. 21-80.000.
Terzian, Rouben T., to Marvin Glass & Associates. Articulated doll. 4,057,928, Cl. 46-120.000.
Texaco Exploration Canada Ltd.: *See—*
  Patel, Mahendra S.; and Sacuta, Aleksy, 4,058,453, Cl. 208-188.000.
Texaco Inc.: *See—*
  Kablaoui, Mahmoud S., 4,058,472, Cl. 252-89.00B.
  Kablaoui, Mahmoud S., 4,058,540, Cl. 260-405.000.
  Kablaoui, Mahmoud S., 4,058,541, Cl. 260-405.000.
Texas Instruments Incorporated: *See—*
  Hutton, Allen H.; and Armstrong, James J., III, 4,058,097, Cl. 123-119.00F.
  Morton, Dale E., 4,058,638, Cl. 427-39.000.
Theaker, Reginald: *See—*
  Hurt, Francis Neil; Theaker, Reginald; and Plant, David Herbert, 4,058,245, Cl. 226-174.000.
Theeuwes, Felix; and Ayer, Atul D., to Alza Corporation. Osmotic system with laminated wall formed of different materials. 4,058,122, Cl. 128-260.000.
Thiel, James L.: *See—*
  Kelsey, Amos P.; Palumbo, John A.; and Thiel, James L., 4,057,990, Cl. 72-166.000.
Thiel, Reinhard; and Rosenbaum, Heinz Jorg, to Bayer Aktiengesellschaft. Process for oxidizing hydrocarbons. 4,058,565, Cl. 260-586.0AB.
Thillet, Georges: *See—*
  Denoor, Gaston; and Thillet, Georges, 4,058,278, Cl. 242-7.220.
Thiodet, Alain: *See—*
  Antier, Georges; and Thiodet, Alain, 4,058,696, Cl. 219-10.770.
Thomas, Robert Edward: *See—*
  Thomas, Robert Melvin; and Thomas, Robert Edward, 4,058,318, Cl. 273-134.0AD.
  Thomas, Robert Melvin; and Thomas, Robert Edward, 4,058,319, Cl. 273-134.0AD.
Thomas, Robert Melvin; and Thomas, Robert Edward. Multi-player backgammon. 4,058,318, Cl. 273-134.0AD.
Thomas, Robert Melvin; and Thomas, Robert Edward. Multi-player backgammon. 4,058,319, Cl. 273-134.0AD.
Thomas, Rudolf; Kramer, Wolfgang; Eue, Ludwig; Metzger, Carl; and Jager, Gerhard, to Bayer Aktiengesellschaft. Tetrasubstituted urea compounds and herbicidal compositions. 4,058,392, Cl. 71-106.000.
Thompson, John R., to Control Data Corporation. TV monitor. 4,058,829, Cl. 358-84.000.
Thompson, Robert L.: *See—*
  Wilkes, Arthur L.; Wade, Fred B.; and Thompson, Robert L., 4,058,676, Cl. 179-1.0SA.
Thorand, Franz: *See—*
  Stahl, Horst; and Thorand, Franz, 4,058,355, Cl. 312-241.000.
Thorne, Richard L., to Zenith Radio Corporation. Bidirectional channel skipping tuner drive system with single pole programming switch. 4,058,756, Cl. 318-265.000.
Thrun, James L., to A-T-O Inc. Inhalant disperser. 4,058,425, Cl. 156-200.000.
Tiberg, Magnus Gustav Georg, to Ingenjorsfirman R. Ohrnell AB. Device for the removal of castings from chill moulds. 4,058,156, Cl. 164-405.000.
Tindall, Colin Edward: *See—*
  Blom, Johannes Cornelis; and Tindall, Colin Edward, 4,058,158, Cl. 165-9.000.
Tinney, Francis John, to Parke, Davis & Company. Pentapeptides and methods for their production. 4,058,513, Cl. 260-112.5LH.
Tippner, Franz, to Siemens Aktiengesellschaft. Opto-electronic contact mechanism. 4,058,735, Cl. 250-551.000.
Tocco-Stel: *See—*
  Antier, Georges; and Thiodet, Alain, 4,058,696, Cl. 219-10.770.
Tokiguchi, Katsumi: *See—*
  Sakudo, Noriyuki; Tokiguchi, Katsumi; and Kanomata, Ichiro, 4,058,748, Cl. 313-156.000.
Tokumaru, Yukuya; Nakai, Masanori; Shinozaki, Satoshi; Nakamura, Junichi; Ito, Shintaro; and Nishi, Yoshio, to Tokyo Shibaura Electric, Co., Ltd. Method of manufacturing integrated injection logic semiconductor devices utilizing self-aligned double-diffusion techniques. 4,058,419, Cl. 148-175.000.
Tokunaga, Michio; Ohhinata, Ichiro; and Okuhara, Shinzi, to Hitachi, Ltd. Semiconductor switch circuit. 4,058,741, Cl. 307-252.00G.
Tokunaga, Tetsuya: *See—*
  Funabiki, Kyohei; and Tokunaga, Tetsuya, 4,058,403, Cl. 106-56.000.
Tokyo Gas Co., Ltd.: *See—*
  Idzutsu, Waichiro; Kuroki, Masaaki; Komukai, Shigeru; Terasaki, Daijiro; and Nakajima, Sachie, 4,058,376, Cl. 55-70.000.
Tokyo Shibaura Electric, Co., Ltd.: *See—*
  Tokumaru, Yukuya; Nakai, Masanori; Shinozaki, Satoshi; Nakamura, Junichi; Ito, Shintaro; and Nishi, Yoshio, 4,058,419, Cl. 148-175.000.
Tolle, Russell W. Rubber covered cable. 4,057,956, Cl. 57-164.000.
Tomaszewski, Jerry James: *See—*
  Dano, Arnold Vincent; Tomaszewski, Jerry James; and Friedrichs, Jerome Peter, 4,058,744, Cl. 310-343.000.
Tomioka, Kenichi: *See—*
  Inukai, Noriyoshi; Murakami, Masuo; Iwamoto, Hidenori; Yanagisawa, Isao; Tamura, Toshinari; Ishii, Yoshio; Shizaoki, Tetsuya; Tomioka, Kenichi; and Takagi, Tokuichi, 4,058,665, Cl. 560-121.000.
Toms River Chemical Corporation: *See—*
  Stingl, Hans Alfred; and Elliott, John, 4,058,515, Cl. 260-151.000.
Tootal Limited: *See—*
  Wild, Kenneth, 4,057,864, Cl. 8-2.50R.
Torongo, Albert Henry, to Borden, Inc. Display device with overlapping cards. 4,058,220, Cl. 211-57.100.
Toyota Jidosha Kogyo Kabushiki Kaisha: *See—*
  Habu, Nobuo, 4,058,095, Cl. 123-117.00R.
  Kawaguchi, Hiroshi; and Nishikawa, Kohji, 4,058,084, Cl. 188-71.800.
  Morisawa, Kunio; Minemoto, Isamu; and Kyushima, Tatsuo, 4,058,193, Cl. 192-109.00F.
  Onaka, Hidemi, 4,058,098, Cl. 123-119.00A.
  Saito, Taiji, 4,058,099, Cl. 123-122.00D.
  Suzuki, Takao; and Ogita, Hiroshi, 4,058,090, Cl. 123-32.0SP.
  Taira, Kaoru; Sato, Teruo; Ishii, Yoshiya; Miyata, Yukinori; and Okamoto, Katashi, 4,058,101, Cl. 123-140.0MP.
  Tanahashi, Toshio, 4,058,091, Cl. 123-32.0VN.
Traiteur, Rene, to Babcock & Wilcox Limited. Steam dryers. 4,058,381, Cl. 55-444.000.
Trautwein, Robert. Foldable kayak. 4,057,865, Cl. 9-2.00F.
Tree Island Steel Co. Ltd.: *See—*
  Kaye, Sidney P., 4,057,878, Cl. 24-134.00R.
Trenschel, Donald R.; and Eitel, Frederick G., to United States of America, Air Force. Adjustable pintle spray manifold assembly. 4,058,263, Cl. 239-551.000.
Trentz, Henry P.: *See—*
  Rohrberg, Rod G.; Trentz, Henry Patrick; and Ziegler, Victor Herbert, 4,057,935, Cl. 49-56.000.
Trentz, Henry Patrick: *See—*
  Rohrberg, Rod G.; Trentz, Henry Patrick; and Ziegler, Victor Herbert, 4,057,935, Cl. 49-56.000.
Trepaud, Georges. Heat exchanger. 4,058,161, Cl. 165-158.000.

Triangle Package Machinery Company: *See*—
Puccetti, Ralph P.; and Klopfenstein, King L., 4,058,268, Cl. 242-72.00R.
Triplett, James Thomas. Lifting mechanism for trucks. 4,058,229, Cl. 214-77.00R.
Trochme, Martine: *See*—
Debourge, Jean-Claude; and Trochme, Martine, 4,058,600, Cl. 424-128.000.
Trott, David H., to Crossbow, Inc. Meat thermometer. 4,058,013, Cl. 73-352.000.
Trotta, Robert A., to Gillette Company, The. Razor handle. 4,057,896, Cl. 30-89.000.
Truesdell, Carl Frederick: *See*—
Stupay, Lawrence John; and Truesdell, Carl Frederick, 4,058,118, Cl. 128-2.05T.
TSSCO: *See*—
Stebinger, Albert Eugene, 4,058,689, Cl. 179-157.000.
Tsujimoto, Kenichi; Ikeuchi, Yoshiharu; and Kuriyama, Akira, to Sumitomo Metal Industries Ltd. Automatic probe feeding, setting and withdrawing apparatus. 4,058,017, Cl. 73-423.00R.
Tsukamoto, Kotaro. Rectifying equipment of bar material. 4,057,988, Cl. 72-98.000.
Tsukuda, Toshio: *See*—
Sato, Yoshimasa; Tsukuda, Toshio; Inoue, Hajime; and Mutsuta, Akio, 4,057,978, Cl. 62-331.000.
Tsuyuguchi, Tadao, to Teijin Limited. Device for packing roll-like articles. 4,058,216, Cl. 206-597.000.
Tuegel, Robert O., to Wagner Electric Corporation. Master cylinder reservoir with vacuum relief diaphragm and guarded fluid level sensor. 4,058,694, Cl. 200-84.00C.
Turner, Peter G.: *See*—
Evans, Albert E. J.; and Turner, Peter G., 4,058,632, Cl. 426-126.000.
Ubukata, Susumu; Mizutani, Yasukazu; Iyoda, Syozo; and Aoi, Hiroshi, to Ubukata, Susumu. Emergency locking retractor for seat belt assemblies. 4,058,271, Cl. 242-107.40B.
Uchino, Hisanori: *See*—
Shinohara, Shinitsu; Uchino, Hisanori; and Yamaji, Hiroyuki, 4,058,178, Cl. 177-146.000.
Udvardi-Lakos, Janos, to Siemens Aktiengesellschaft. Method and circuit arrangement for starting up a converter having forced commutation with the correct phase. 4,058,738, Cl. 307-66.000.
Uehlinger, Hanspeter, to Sandoz Ltd. Asymmetric 1:2 chromium complexes of monoazo compounds having 1-aryl-3-methyl-pyrazolone-5 coupling components. 4,058,514, Cl. 260-145.00B.
Uehlinger, Hanspeter: *See*—
Mislin, Roland; and Uehlinger, Hanspeter, 4,058,516, Cl. 260-152.000.
Ueno, Sadayasu: *See*—
Ichikawa, Norio; and Ueno, Sadayasu, 4,058,787, Cl. 338-22.00R.
Uhl, Karl: *See*—
Vaeth, Guenter; Bachmann, Rudolf; Hartmann, Heinrich; Hartmann, Hans-Joerg; Spoor, Herbert; Uhl, Karl; Lehner, August; Gutermann, Winfried; and Motz, Herbert, 4,058,646, Cl. 428-425.000.
Umarji, Sudhindra R.: *See*—
Crager, William C.; Umarji, Sudhindra R.; Griffin, Robert H.; and Louit, Gerard J., 4,058,672, Cl. 178-3.000.
Crager, William C.; Umarji, Sudhindra R.; Griffin, Robert H.; and Louit, Gerard J., 4,058,838, Cl. 358-257.000.
Undin, Hans, to Pressmaster, Ltd. Hand operated gripping apparatus. 4,057,993, Cl. 72-410.000.
Union Carbide Corporation: *See*—
Cheung, Harry, 4,058,485, Cl. 252-466.0PT.
D'Silva, Themistocles D. J., 4,058,549, Cl. 260-465.400.
Lashway, Robert William, 4,058,579, Cl. 264-81.000.
Prokai, Bela; and Kanner, Bernard, 4,058,493, Cl. 260-2.5AH.
Prokai, Bela; and Kanner, Bernard, 4,058,494, Cl. 260-2.5AH.
Quets, Jean Marie Louis Joseph, 4,058,592, Cl. 423-594.000.
Yen, Steven N.; and Osterholtz, Frederick D., 4,058,124, Cl. 128-284.000.
Uniroyal, Inc.: *See*—
Little, Julian R.; Nudenberg, Walter; and Rim, Yong S., 4,058,568, Cl. 260-607.0AR.
Unisearch Limited: *See*—
Vaughan, Richard; and Cole, Peter Harold, 4,058,217, Cl. 209-74.00M.
United States Borax & Chemical Corporation: *See*—
Brown, Clifford Gordon; and Sanderson, Brian Robert, 4,058,588, Cl. 423-283.000.
United States of America
Administrator, Environmental Protection Agency: *See*—
Vrolyk, John J.; and Melvold, Robert W., 4,058,234, Cl. 220-239.000.
Air Force: *See*—
Brown, Herbert R., 4,058,276, Cl. 244-152.000.
Hasinger, Siegfried H.; and Miller, David K., 4,058,141, Cl. 138-39.000.
Koonce, George W., 4,058,331, Cl. 292-97.000.
Moran, Thomas J., 4,058,002, Cl. 73-620.000.
Ostendorf, Edward M., 4,057,899, Cl. 30-296.00R.
Trenschel, Donald R.; and Eitel, Frederick G., 4,058,263, Cl. 239-551.000.
Vroombout, Leo O., 4,058,734, Cl. 250-495.000.
Welch, Bryant M.; and Pashley, Richard D., 4,058,413, Cl. 148-1.500.
Army: *See*—
Dukic, Ferdinando V., 4,058,060, Cl. 102-8.000.
Russell, William J., 4,058,438, Cl. 204-1.00T.
Commerce: *See*—
Miettinen, Seppo I., 4,058,310, Cl. 273-63.00E.
Health, Education and Welfare: *See*—
Beisler, John A.; Abbasi, Mohamed M.; and Driscoll, John S., 4,058,602, Cl. 424-180.000.
Ito, Yoichiro, 4,058,460, Cl. 210-198.00C.
Interior: *See*—
Clites, Philip G., 4,058,668, Cl. 13-32.000.
Navy: *See*—
Banks, Clarence K.; Crout, Prescott D.; and Homer, Paul B., 4,058,275, Cl. 244-3.150.
Hurst, William M., 4,058,063, Cl. 102-56.0SC.
Petrisko, Edwin M., 4,058,301, Cl. 267-124.000.
Taylor, Henry F., 4,058,722, Cl. 250-225.000.
Zirino, Alberto; Clavell, Cesar; and Huey, Kent, 4,058,446, Cl. 204-195.00R.
Transportation: *See*—
Vrabel, Joseph D.; and Gosselin, Dennis W., 4,057,904, Cl. 33-125.00R.
U.S. Philips Corporation: *See*—
Armstrong, Desmond Ross, 4,058,743, Cl. 307-275.000.
Bonis, Maurice; and Roger, Bernard, 4,058,825, Cl. 357-46.000.
Mulder, Jan, 4,058,382, Cl. 62-6.000.
United Technologies Corporation: *See*—
Baris, Johannes M.; Iacovangelo, Charles D.; and Vogel, Wolfgang M., 4,058,482, Cl. 252-425.300.
Jacoby, Herbert; and Mendelsohn, Arnold, 4,058,187, Cl. 187-29.00R.
University of California, The Regents of the: *See*—
Evans, David A., 4,058,567, Cl. 260-607.00A.
University of Edinburgh, The University Court of the: *See*—
Jones, Robert L., 4,058,664, Cl. 560-121.000.
University of Melbourne, The: *See*—
McLaughlin, Robert Joseph William, 4,058,393, Cl. 75-1.00T.
University of Notre Dame du Lac: *See*—
D'Alelio, Gaetano Francis, 4,058,505, Cl. 260-47.0CP.
UOP Inc.: *See*—
Asselin, George F., 4,058,454, Cl. 208-321.000.
Loboda, Robert S., 4,058,452, Cl. 208-134.000.
Martan, Michael, 4,058,566, Cl. 260-600.00R.
Stolfa, Frank, 4,058,451, Cl. 208-97.000.
Upchurch, Edward F.: *See*—
Smith, Stuart B.; McAlpin, James J.; Peruyero, Jose M. A.; Hazelton, Ronald L.; and Upchurch, Edward F., 4,058,652, Cl. 526-68.000.
Upjohn Company, The: *See*—
Morozowich, Walter, 4,058,551, Cl. 560-43.000.
Richter, Reinhard H., 4,058,563, Cl. 260-566.00F.
Salmond, William G., 4,058,538, Cl. 260-397.200.
Smith, Herman W., 4,058,564, Cl. 260-586.00R.
Urabe, Hiroyuki: *See*—
Yonemitsu, Eiichi; Sugio, Akitoshi; Kuramoto, Atuo; and Urabe, Hiroyuki, 4,058,504, Cl. 260-47.0ET.
Urani, Angelo: *See*—
Gaia, Aldino J.; and Urani, Angelo, 4,058,786, Cl. 337-293.000.
Urselmann, Godefridus H., to Oce-van der Grinten N.V. Apparatus for copying sheet originals. 4,058,359, Cl. 355-109.000.
Ury, John M., to Wagner Electric Corporation. Pressure holding valve. 4,058,349, Cl. 303-69.000.
Utility Products Co.: *See*—
Leschinger, Matthew L., 4,058,670, Cl. 174-38.000.
Uyeo, Shoichiro; Aoki, Tsutomu; and Nagata, Wataru, to Shionogi & Co., Ltd. 2-Halomethyl-2-nucleophilic substituted methyl penicillins. 4,058,521, Cl. 260-239.100.
Vaeth, Guenter; Bachmann, Rudolf; Hartmann, Heinrich; Spoor, Herbert; and Lehner, August, to BASF Aktiengesellschaft. Thermoplastic, elastic polyurethanes which are soluble in ethers and/or ketones. 4,058,506, Cl. 260-75.0NP.
Vaeth, Guenter; Bachmann, Rudolf; Hartmann, Heinrich; Hartmann, Hans-Joerg; Spoor, Herbert; Uhl, Karl; Lehner, August; Gutermann, Winfried; and Motz, Herbert, to BASF Aktiengesellschaft. Magnetic recording media containing elastomeric polyurethane binders in the magnetic coating. 4,058,646, Cl. 428-425.000.
Vagi, Robert J., to Picker Corporation. Display for television imaging system. 4,058,832, Cl. 358-110.000.
Valex Inc.: *See*—
Becker, Philip S., 4,058,240, Cl. 222-368.000.
Valfells, August, to Iowa State University Research Foundation, Inc. Concurrent separation of lithium and hydrogen isotopes. 4,058,440, Cl. 204-101.000.
Valmet Oy: *See*—
Kroger, Keijo Kalevi, 4,058,183, Cl. 180-89.100.
van der Lely, Ary; and Bom, Cornelis Johannes Gerardus, to C. van der Lely N. V. Soil cultivating and sowing implement. 4,058,068, Cl. 111-36.000.
van der Lely, Cornelis. Rotary harrows. 4,058,168, Cl. 172-59.000.
van der Lely, Cornelis. Mounting of soil working tines. 4,058,171, Cl. 172-713.000.
Vanderlinde, William: *See*—
Morgan, Albert W.; Shull, Charles S.; and Vanderlinde, William, 4,058,658, Cl. 526-261.000.
Vanlerberghe, Guy; and Sebag, Henri, to L'Oreal. Polyhydroxyl monosulfoxide shampoo compositions. 4,058,629, Cl. 424-365.000.

Van Mill, Michael D., to Work Horse Manufacturing Co. Gravity feed box. 4,058,239, Cl. 222-462.000.
van Vloten, Curtis P., to Arthur D. Little, Inc. Radiant zone heating apparatus and method. 4,058,699, Cl. 219-121.0LM.
Vasiliev, Alexei Vasilievich: *See*—
Muzhzhavlev, Konstantin Dmitrievich; Kosarev, Sergei Petrovich; Schegolev, Vladimir Ivanovich; Ivanov, Andrei Borisovich; Romanenko, Oleg Nikolaevich; Yazev, Vladimir Dmitrievich; and Vasiliev, Alexei Vasilievich, 4,058,448, Cl. 204-244.000.
Vasiliev, Vasily Dmitrievich: *See*—
Viktorov, Evgeny Vasilievich; Novikov, Igor Ivanovich; Kondratieva, Tatyana Fedorovna; Gubarev, Georgy Vasilievich; Yamschikova, Margarita Sergeevna; Vasiliev, Vasily Dmitrievich; Kontsevich, Georgy Mikhailovich; Gubinsky, Anatoly Sergeevich; Velikasov, Anatoly Alexeevich; Taradonov, Vladimir Ignatievich; and Isakov, Valery Pavlovich, 4,058,138, Cl. 137-512.100.
Vaughan, Richard; and Cole, Peter Harold, to Unisearch Limited. Automatic article sorting system. 4,058,217, Cl. 209-74.00M.
Velikasov, Anatoly Alexeevich: *See*—
Viktorov, Evgeny Vasilievich; Novikov, Igor Ivanovich; Kondratieva, Tatyana Fedorovna; Gubarev, Georgy Vasilievich; Yamschikova, Margarita Sergeevna; Vasiliev, Vasily Dmitrievich; Kontsevich, Georgy Mikhailovich; Gubinsky, Anatoly Sergeevich; Velikasov, Anatoly Alexeevich; Taradonov, Vladimir Ignatievich; and Isakov, Valery Pavlovich, 4,058,138, Cl. 137-512.100.
Velsicol Chemical Corporation: *See*—
Anderson, Arnold L., 4,058,501, Cl. 260-45.75B.
Videre Corporation: *See*—
Wyatt, William Burk, Jr.; and Benefield, Bruce D., 4,057,936, Cl. 49-61.000.
Wyatt, William Burk, Jr.; and Benefield, Bruce D., 4,057,944, Cl. 52-309.110.
Viktorov, Evgeny Vasilievich; Novikov, Igor Ivanovich; Kondratieva, Tatyana Fedorovna; Gubarev, Georgy Vasilievich; Yamschikova, Margarita Sergeevna; Vasiliev, Vasily Dmitrievich; Kontsevich, Georgy Mikhailovich; Gubinsky, Anatoly Sergeevich; Velikasov, Anatoly Alexeevich; Taradonov, Vladimir Ignatievich; and Isakov, Valery Pavlovich. Straightway valve. 4,058,138, Cl. 137-512.100.
Vincent, David N.; and Golden, Ronald, to Champion International Corporation. Opacified paper sheet and method for production thereof. 4,058,434, Cl. 162-165.000.
Visa, Heikki; Rantala, Ossi; and Risti, Antti, to Autolava Oy. Apparatus for moving an exchangeable platform or a container on to and off of a tipping frame of a lorry, trailer, or the like. 4,058,231, Cl. 214-516.000.
Visual Graphics Corporation: *See*—
Mitchell, Roger; and Strater, William H., 4,058,823, Cl. 354-354.000.
Vits, Hilmar, to Vits-Maschinenbau GmbH. Air cushion nozzle. 4,058,244, Cl. 226-97.000.
Vits-Maschinenbau GmbH: *See*—
Vits, Hilmar, 4,058,244, Cl. 226-97.000.
Voegeli, Otto, to International Business Machines Corporation. Field access method for bubble memories. 4,058,801, Cl. 365-39.000.
Vogel, Ronald F.; Boldt, Robert R.; McKee, Kevin D.; Resh, Roy E.; and West, Paul E., to Agridustrial Electronics, Inc. Multiple-frequency permittivity tester. 4,058,766, Cl. 324-61.00R.
Vogel, Wolfgang M.: *See*—
Baris, Johannes M.; Iacovangelo, Charles D.; and Vogel, Wolfgang M., 4,058,482, Cl. 252-425.300.
Voigt, Hermann Uwe: *See*—
Glander, Fritz; and Voigt, Hermann Uwe, 4,058,583, Cl. 264-176.00R.
Volter, Gunter: *See*—
Frohlich, Alfons; Dahlmann, Julius; and Volter, Gunter, 4,058,145, Cl. 139-384.00B.
von Bonin, Wulf; Kleimann, Helmut; and Post, Udo, to Bayer Aktiengesellschaft. Process for molding polyurethane foams. 4,058,492, Cl. 260-2.5AM.
von Rauch, Moriz: *See*—
Muller, Karl-Heinz; Munchmeyer, Walter; von Rauch, Moriz; and Schafer, Norbert, 4,058,731, Cl. 250-442.000.
Vonsimi Sales Corporation: *See*—
Wittner, Milton, 4,058,691, Cl. 200-31.00R.
Vrabel, Joseph D.; and Gosselin, Dennis W., to United States of America, Transportation. Self-adjusting string extensiometer. 4,057,904, Cl. 33-125.00R.
Vrillon, Bernard, to Commissariat a l'Energie Atomique. Mechanical shock-absorbing device. 4,058,188, Cl. 188-1.00C.
Vrolyk, John J.; and Melvold, Robert W., to United States of America, Administrator, Environmental Protection Agency. System for sealing and repairing leaks in ruptured containers. 4,058,234, Cl. 220-239.000.
Vroom, Alan H. Sulphur cements, process for making same and sulphur concretes made therefrom. 4,058,500, Cl. 260-42.240.
Vroombout, Leo O., to United States of America, Air Force. Passive infrared resolution target. 4,058,734, Cl. 250-495.000.
Vyzkumny a vyvojovy ustav Zavodu vseobecneho strojirenstvi: *See*—
Henzl, Jindrich; Cerny, Jindrich; and Malasek, Jaromir, 4,058,143, Cl. 139-110.000.
W. Kunz AG: *See*—
Kunz, Werner, 4,058,634, Cl. 426-456.000.
W. R. Grace & Co.: *See*—
Chi, Chang Whan; Hoffman, Gordon Herman; and Eichhorn, Emil, 4,058,586, Cl. 423-118.000.
Gaudette, Roger Robert; Ohlson, John Leonard; and Scanlon, Patricia Marie, 4,058,527, Cl. 260-251.00R.
Gaudette, Roger Robert; Ohlson, John Leonard; and Scanlon, Patricia Marie, 4,058,528, Cl. 260-251.00R.
WABCO Westinghouse GmbH: *See*—
Reinecke, Erich, 4,058,347, Cl. 303-22.00R.
Wade, David R.; and Munch, Walter, Jr., to D. H. Baldwin Company. Key transposing electronic organ. 4,058,042, Cl. 84-1.010.
Wade, Fred B.: *See*—
Wilkes, Arthur L.; Wade, Fred B.; and Thompson, Robert L., 4,058,676, Cl. 179-1.0SA.
Wagner Electric Corporation: *See*—
Demas, Nickolas P.; Duncan, William E.; Gephart, Norman S.; and Waltz, William T. S., 4,058,749, Cl. 313-326.000.
Falk, Edward J., 4,058,136, Cl. 137-110.000.
Tuegel, Robert O., 4,058,694, Cl. 200-84.00C.
Ury, John M., 4,058,349, Cl. 303-69.000.
Wahls, Robert John, to Freedman Seating Company. Rotating seat pedestal. 4,058,282, Cl. 248-418.000.
Wakeman, Reginald L.; Dudzinski, Zdzislaw W.; and Lada, Arnold, to Millmaster Onyx Corporation. Imidazoline oxides. 4,058,488, Cl. 252-542.000.
Walker, Donny R.: *See*—
Kao, Charles T.; Lafevers, James O.; and Walker, Donny R., 4,058,706, Cl. 235-449.000.
Walker, Fred T., Jr. Food pattie molding tool. 4,057,874, Cl. 17-32.000.
Wallace, Dewey K. Magnetic radio mounting bracket. 4,058,357, Cl. 339-12.00R.
Wallace, James R.: *See*—
Serratore, Joseph; King, Laurence F.; Sutherland, Thomas H.; and Wallace, James R., 4,058,495, Cl. 260-17.00A.
Walland, Alexander: *See*—
Renth, Ernst-Otto; Mentrup, Anton; Schromm, Kurt; and Walland, Alexander, 4,058,642, Cl. 424-330.000.
Walmet, Gunnar E.: *See*—
Corman, James C.; and Walmet, Gunnar E., 4,058,160, Cl. 165-105.000.
Walski, Stanley, to Con-Spec Devices Inc. Apparatus to adjust and maintain the distance between wall forms. 4,058,285, Cl. 249-216.000.
Walter, John L., to General Electric Company. Directionally solidified cobalt-base eutectic alloys. 4,058,415, Cl. 148-32.000.
Walter, Thomas J., to Ethyl Corporation. Chemical process. 4,058,560, Cl. 260-535.00P.
Waltz, William T. S.: *See*—
Demas, Nickolas P.; Duncan, William E.; Gephart, Norman S.; and Waltz, William T. S., 4,058,749, Cl. 313-326.000.
Walworth, Bryant Leonidas: *See*—
Cross, Barrington; and Walworth, Bryant Leonidas, 4,058,391, Cl. 71-92.000.
Ware, Robert R., Jr., to Chicago Roller Skate Company. Die cast roller skate sole plate. 4,058,323, Cl. 280-11.10R.
Warner, George M.; and Andberg, Leif E., to Rank Xerox Ltd. Metering system for a copier/duplicator machine. 4,058,815, Cl. 355-14.000.
Warren, Jerry Jay: *See*—
Sachleben, Harold Gerard, Sr.; and Warren, Jerry Jay, 4,057,910, Cl. 34-227.000.
Watanabe, Mitsuo: *See*—
Fikosaka, Noboru; Watanabe, Mitsuo; and Shiozaki, Shoji, 4,058,092, Cl. 123-32.0ST.
Watanabe, Shoji: *See*—
Ohno, Tetsuo; and Watanabe, Shoji, 4,058,232, Cl. 215-217.000.
Waxman, Albert S., to G. D. Searle & Co. Ultrasound imaging system with improved scan conversion. 4,058,001, Cl. 73-620.000.
Webb, Oswald, to GKN Transmissions Limited. Control couplings. 4,058,027, Cl. 74-711.000.
Webster, George Harry: *See*—
Nutt, Wendell Glenn; and Webster, George Harry, 4,058,669, Cl. 174-34.000.
Weggeland, John H. Picture viewer with successive feed means. 4,057,920, Cl. 40-79.000.
Weidley, Edwin Frank: *See*—
Ridley, Peter Tone; and Weidley, Edwin Frank, 4,058,615, Cl. 424-265.000.
Weingand, Kaspar: *See*—
Schuster-Woldan, Hans; Weingand, Kaspar; and Koch, Dirk, 4,058,432, Cl. 156-659.000.
Welch, Bryant M.; and Pashley, Richard D., to United States of America, Air Force. Ion implantation method for the fabrication of gallium arsenide semiconductor devices utilizing an aluminum nitride protective capping layer. 4,058,413, Cl. 148-1.500.
Welton, Barry S.; Westerman, Granval W.; and Hill, Michael E., to End Devices, Inc. Well pump-off controller. 4,058,757, Cl. 318-474.000.
Wemmer, Otto. Control for sand blasting nozzle. 4,057,940, Cl. 51-438.000.
Wendel, I. L., to Lowe, James L. Solar collector. 4,058,111, Cl. 126-271.000.
Werner & Pfleiderer: *See*—
Seufert, Wilhelm, 4,058,297, Cl. 366-81.000.
Werner, Reinhold, to Klockner-Humboldt-Deutz Aktiengesellschaft. Control system for gas turbines. 4,057,960, Cl. 60-39.030.
West, Donald P., to Xerox Corporation. Ribbon tension control for a ribbon cartridge. 4,058,197, Cl. 197-151.000.

West, Paul E.: *See—*
  Vogel, Ronald F.; Boldt, Robert R.; McKee, Kevin D.; Resh, Roy E.; and West, Paul E., 4,058,766, Cl. 324-61.00R.
Westerman, Granval W.: *See—*
  Welton, Barry S.; Westerman, Granval W.; and Hill, Michael E., 4,058,757, Cl. 318-474.000.
Westinghouse Air Brake Company: *See—*
  Hart, James E., 4,058,348, Cl. 303-35.000.
Westinghouse Electric Corporation: *See—*
  Balbo, Anthony M., 4,058,191, Cl. 187-1.00R.
  Barbieri, Thomas; and Getz, Edward J., 4,058,211, Cl. 206-422.000.
  Benton, Ronald E., 4,058,842, Cl. 361-38.000.
  Duncan, Charles; and Hopkins, Richard H., 4,058,429, Cl. 156-601.000.
  Kennedy, Paul G., 4,058,835, Cl. 358-114.000.
  Kosanovich, Nicholas S., 4,058,320, Cl. 277-3.000.
  Mole, Cecil J.; and Edwards, Robert F., 4,058,746, Cl. 310-10.000.
  Mullis, Clyde M., 4,058,186, Cl. 187-1.00R.
Westley, John, to Hoffmann-La Roche Inc. Therapeutic agents for improving cardiovascular function. 4,058,620, Cl. 424-283.000.
Weston, Martin: *See—*
  Drewery, John Oliver; and Weston, Martin, 4,058,836, Cl. 358-167.000.
Wetherby, Edward M., to Graymills Inc. Mixing apparatus. 4,058,296, Cl. 366-160.000.
Whatman Reeve Angel Limited: *See—*
  Head, Brian Arthur, 4,058,456, Cl. 210-23.00R.
Whirlow, Donald K.: *See—*
  Kurz, Robert A.; and Whirlow, Donald K., 4,058,373, Cl. 55-16.000.
White, Donald M., to Atwood Vacuum Machine Company. Method of installing a water heater in a recreational vehicles. 4,057,892, Cl. 29-526.00R.
White, Leslie E.; and Gracey, Charles M., to Aerojet-General Corporation. Filter-lined container for hazardous solids. 4,058,479, Cl. 252-301.10W.
Whiteside, George D.: *See—*
  Johnson, Bruce K.; Laskin, Irving; and Whiteside, George D., 4,058,817, Cl. 354-26.000.
  Johnson, Bruce K.; and Whiteside, George D., 4,058,818, Cl. 354-33.000.
Wieder, Irwin, to Analytical Radiation Corporation. Method and apparatus for improved analytical fluorescent spectroscopy. 4,058,732, Cl. 250-461.00B.
Wiegard, Klaus, to Daimler-Benz Aktiengesellschaft. Bearing support of the heat-exchanger disk of regenerative heat-exchanger. 4,058,157, Cl. 165-8.000.
Wild, Kenneth, to Tootal Limited. Wet transfer printing process and apparatus. 4,057,864, Cl. 8-2.50R.
Wilder, Richard J.; and Wurfel, Ivan, to American Chain & Cable Company, Inc. Power and free conveyor system with spaced apart actuation and engagement means. 4,058,064, Cl. 104-172.00S.
Wilkes, Arthur L.; Wade, Fred B.; and Thompson, Robert L., to International Communication Sciences. Speech analysis and synthesis system. 4,058,676, Cl. 179-1.0SA.
Will, Fritz G., to General Electric Company. Rechargeable aqueous metal-halogen cell. 4,058,651, Cl. 429-105.000.
William H. Rorer, Inc.: *See—*
  Douglas, George Henry; Studt, William Lyon; and Dodson, Stuart Alan, 4,058,557, Cl. 260-501.140.
Williams, Earl P.: *See—*
  Fein, Marvin M.; Williams, Earl P.; and Field, Nathan D., 4,058,462, Cl. 210-289.000.
Williams, Glenn V., Jr., to Diamond International Corporation. Seal assembly for pressure or vacuum chambers. 4,058,435, Cl. 162-371.000.
Williams, John. Immuno-suppressive agents. 4,058,594, Cl. 424-37.000.
Williams, Melvin. Automatic sample processing apparatus. 4,058,252, Cl. 233-14.00R.
Willimzik, Bernhard Max, to GRANGES NYBY AB. Mandrel for cold drawing and/or sizing tubes. 4,057,992, Cl. 72-283.000.
Wills, Lynn D.: *See—*
  Gauss, Robert C.; and Wills, Lynn D., 4,058,811, Cl. 343-715.000.
Wilson, Daniel F., to Midcon Pipeline Equipment Co. Pipe wrapping apparatus. 4,058,427, Cl. 156-392.000.
Wiltgen, Leroy: *See—*
  Dietz, Frederick P., 4,058,132, Cl. 132-73.000.
Wiltgen, Rita: *See—*
  Dietz, Frederick P., 4,058,132, Cl. 132-73.000.
Winn, Russell Edward, to A/S Jotungruppen. Submersible painting apparatus. 4,058,082, Cl. 118-9.000.
Wisconsin Alumni Research Foundation: *See—*
  Nickles, Robert J., 4,058,728, Cl. 250-369.000.
Wise, Edward; and Wise, Mary G. Apparatus for offsetting wear in chain saw bar guide rails. 4,057,991, Cl. 72-211.000.
Wise, Mary G.: *See—*
  Wise, Edward; and Wise, Mary G., 4,057,991, Cl. 72-211.000.
Wise, William C.: *See—*
  Kramer, Francis J.; Rothfuss, Robert G.; and Wise, William C., 4,058,047, Cl. 85-11.000.
Wise, William D. Locking device. 4,057,948, Cl. 52-582.000.
Wissaert, Roland: *See—*
  Nagel, Artur; and Wissaert, Roland, 4,058,684, Cl. 179-18.0BB.
Wittman, Gunther: *See—*
  Bauer, Kurt; Wittman, Gunther; Mussgay, Manfred; Irion, Eckart; and Geilhausen, Horst, 4,058,599, Cl. 424-92.000.
Wittmann, Erwin: *See—*
  Schonbeck, Rupert; Kloimstein, Engelbert; and Wittmann, Erwin, 4,058,390, Cl. 71-92.000.
Wittner, Milton, to Vonsimi Sales Corporation. Adaptor mounting for adjustable distributor contact breaker assembly module. 4,058,691, Cl. 200-31.00R.
Wolf, Frank K. Hoop and disc with sounders. 4,058,314, Cl. 273-106.00B.
Wolf, Franz-Josef. Coupling arrangement. 4,058,330, Cl. 285-174.000.
Wolfe, Robert Nolan: *See—*
  Fitzgerald, William Joseph; Shelton, Glenmore Lorraine, Jr.; and Wolfe, Robert Nolan, 4,058,849, Cl. 364-520.000.
Wolgast, Raymond P.; and Lamanna, Joe, to Detroit Autobody Equipment, Inc. Automobile body pulling tool. 4,057,994, Cl. 72-441.000.
Wong, Henry: *See—*
  Monkovic, Ivo; Bachand, Carol; and Wong, Henry, 4,058,531, Cl. 260-285.000.
Wong, Herman: *See—*
  Kaspari, William J.; Wong, Herman; and Kirch, Joseph L., 4,058,117, Cl. 128-2.05A.
Wong, Yen Bak. Fishing lure retriever. 4,057,925, Cl. 43-17.200.
Wood, Charles A. Counterweight assembly. 4,058,025, Cl. 74-573.00R.
Wood, Peter, to Renold Limited. Leaf chain and to driving arrangements employing same. 4,058,021, Cl. 74-229.000.
Woodhouse, Charles F., to Approach Fish. Airport wind shear monitoring method and apparatus. 4,058,010, Cl. 73-189.000.
Woods, William C.; Levin, Robert E.; and Hodges, Richard H., to GTE Sylvania Incorporated. Dosimetry control method. 4,058,752, Cl. 315-360.000.
Work Horse Manufacturing Co.: *See—*
  Van Mill, Michael D., 4,058,239, Cl. 222-462.000.
Worz, Helmut: *See—*
  Schmidt, Peter; and Worz, Helmut, 4,058,089, Cl. 123-32.0ED.
Wray, Gary Q.: *See—*
  Holden, John C.; and Wray, Gary Q., 4,058,165, Cl. 166-314.000.
Wright, John F.; and Cannan, Terrance M., to FMC Corporation. Treatment of seedlings. 4,058,067, Cl. 111-1.000.
Wroble, Arthur John: *See—*
  Hobson, James Charles; and Wroble, Arthur John, 4,058,256, Cl. 239-101.000.
Wuntch, Thomas. Watch winder. 4,057,958, Cl. 58-82.00R.
Wurfel, Ivan: *See—*
  Wilder, Richard J.; and Wurfel, Ivan, 4,058,064, Cl. 104-172.00S.
Wyatt, William Burk, Jr.; and Benefield, Bruce D., to Videre Corporation. Thermally insulated window system. 4,057,936, Cl. 49-61.000.
Wyatt, William Burk, Jr.; and Benefield, Bruce D., to Videre Corporation. Thermally insulated panel. 4,057,944, Cl. 52-309.110.
Wyslotsky, Ihor. Package for containing products. 4,058,212, Cl. 206-470.000.
Xerox Corporation: *See—*
  Fletcher, Gerald M., 4,058,306, Cl. 271-80.000.
  Fravel, John C.; Chang, Louis H.; and Yoshikawa, Harunori, 4,058,195, Cl. 197-18.000.
  Halfhill, Martin O., 4,058,759, Cl. 322-13.000.
  Jugle, Don B.; and Lipani, Anthony F., 4,058,086, Cl. 118-653.000.
  Mammino, Joseph; and Jossel, Franklin, 4,058,397, Cl. 96-15.00D.
  Sheikh, Sikander, 4,058,850, Cl. 364-900.000.
  West, Donald P., 4,058,197, Cl. 197-151.000.
Yackel, John P.: *See—*
  Sullivan, Peter; and Yackel, John P., 4,058,327, Cl. 281-33.000.
Yamada, Takashi: *See—*
  Oishi, Kazuo; Yamada, Takashi; and Yoshida Shuzo, 4,058,796, Cl. 340-52.00F.
Yamaha Hatsudoki Kabushiki Kaisha: *See—*
  Sekiguchi, Tomoaki; Miyao, Hiroyasu; and Shimizu, Hidekazu, 4,058,797, Cl. 340-56.000.
Yamaji, Hiroyuki: *See—*
  Shinohara, Shinitsu; Uchino, Hisanori; and Yamaji, Hiroyuki, 4,058,178, Cl. 177-146.000.
Yamamoto, Kimihiko: *See—*
  Ishikawa, Hitoshi; Yamamoto, Kimihiko; Sawada, Toshio; and Kasahara, Takahiko, 4,058,072, Cl. 112-258.000.
Yamanouchi Pharmaceutical Co., Ltd.: *See—*
  Inukai, Noriyoshi; Murakami, Masuo; Iwamoto, Hidenori; Yanagisawa, Isao; Tamura, Toshinari; Ishii, Yoshio; Shizaoki, Tetsuya; Tomioka, Kenichi; and Takagi, Tokuichi, 4,058,665, Cl. 560-121.000.
Yamatani, Wataru: *See—*
  Ohsawa, Mitsuo; and Yamatani, Wataru, 4,058,771, Cl. 325-446.000.
Yamaura, Yoshotomo: *See—*
  Komatsu, Atsushi; Miyazawa, Kuichiro; Yamaura, Yoshotomo; and Asanuma, Akira, 4,058,134, Cl. 137-38.000.
Yamazaki, Hironobu, to Tekken Kensetu Co. Ltd. Brush-type packing means for shield excavator. 4,057,971, Cl. 61-84.000.
Yamāzaki, Hiroshi: *See—*
  Mogi, Takao; Taki, Akira; and Yamazaki, Hiroshi, 4,058,772, Cl. 325-464.000.
Yamazaki, Masaru, to Copal Company Limited. Digital antilogarithmic converter circuit. 4,058,807, Cl. 340-347.0DA.
Yamschikova, Margarita Sergeevna: *See—*
  Viktorov, Evgeny Vasilievich; Novikov, Igor Ivanovich; Kondratieva, Tatyana Fedorovna; Gubarev, Georgy Vasilievich; Yamschikova, Margarita Sergeevna; Vasiliev, Vasily Dmitrievich; Kontsevich, Georgy Mikhailovich; Gubinsky, Anatoly Sergeevich; Velikasov, Anatoly Alexeevich; Taradonov, Vladimir Ignatievich; and Isakov, Valery Pavlovich, 4,058,138, Cl. 137-512.100.

Yanagisawa, Isao: *See—*
  Inukai, Noriyoshi; Murakami, Masuo; Iwamoto, Hidenori; Yanagisawa, Isao; Tamura, Toshinari; Ishii, Yoshio; Shizaoki, Tetsuya; Tomioka, Kenichi; and Takagi, Tokuichi, 4,058,665, Cl. 560-121.000.
Yandell, James L. Selectively actuated vibrating apparatus connected with well bore member. 4,058,163, Cl. 166-177.000.
Yang, Teh-Tsao. Stamp pad. 4,058,085, Cl. 118-264.000.
Yazev, Vladimir Dmitrievich: *See—*
  Muzhzhavlev, Konstantin Dmitrievich; Kosarev, Sergei Petrovich; Schegolev, Vladimir Ivanovich; Ivanov, Andrei Borisovich; Romanenko, Oleg Nikolaevich; Yazev, Vladimir Dmitrievich; and Vasiliev, Alexei Vasilievich, 4,058,448, Cl. 204-244.000.
Yen, Steven N.; and Osterholtz, Frederick D., to Union Carbide Corporation. Disposable absorbent articles containing particulate, free-flowing, insoluble swellable polymers. 4,058,124, Cl. 128-284.000.
Yonemitsu, Eiichi; Sugio, Akitoshi; Kuramoto, Atuo; and Urabe, Hiroyuki, to Mitsubishi Gas Chemical Company, Inc. Process for terminating polyphenylene ethers reactions with amino carboxylic acids and reducing agents. 4,058,504, Cl. 260-47.0ET.
Yonezu, Nobuya, to Minami Kogyo Kabushiki Kaisha. Automatic lumber feeding device in combination with a wood working machine. 4,058,151, Cl. 144-246.00E.
Yoshida Shuzo: *See—*
  Oishi, Kazuo; Yamada, Takashi; and Yoshida Shuzo, 4,058,796, Cl. 340-52.00F.
Yoshikawa, Harunori: *See—*
  Fravel, John C.; Chang, Louis H.; and Yoshikawa, Harunori, 4,058,195, Cl. 197-18.000.
Young, Chung Chang, to Owens-Illinois, Inc. Process for selectively measuring sodium ions in solution. 4,058,437, Cl. 204-1.00T.
Yukuta, Toshio; Ohashi, Takashi; Saito, Masumi; and Arai, Katsuhiko, to Bridgestone Tire Company Limited. Process for preparing organic solvent-soluble poly(amide-imide). 4,058,503, Cl. 260-47.0CP.
Zaboronok, Georgy Fomich: *See—*
  Sokolov, Boris Grigorievich; and Zaboronok, Georgy Fomich, 4,058,697, Cl. 219-121.0EB.
Zahn, Heinrich, to Robert Bosch GmbH. Scanning device for helical type video tape recorder. 4,058,845, Cl. 360-107.000.
Zappia, Anthony T., to Ball Packaging Products, Inc. Apparatus for forming glassware with shifting invert and revert mechanism. 4,058,388, Cl. 65-229.000.
Zeier, Hans. Steam iron. 4,057,918, Cl. 38-77.300.
Zeitgeist AG.: *See—*
  Bowmer, Geoffrey Malcolm, 4,057,882, Cl. 29-283.500.
Zenith Radio Corporation: *See—*
  Blacker, Allen P.; and Schwartz, James W., 4,058,753, Cl. 315-368.000.
  Thorne, Richard L., 4,058,756, Cl. 318-265.000.
Ziegler, Victor Herbert: *See—*
  Rohrberg, Rod G.; Trentz, Henry Patrick; and Ziegler, Victor Herbert, 4,057,935, Cl. 49-56.000.
Zimmerman, Daniel: *See—*
  Bierenbaum, Harvey S.; Penoyer, John A.; and Zimmerman, Daniel, 4,058,582, Cl. 264-154.000.
Zirino, Alberto; Clavell, Cesar; and Huey, Kent, to United States of America, Navy. Anodic stripping voltammetry system and combination electrode assembly therefore. 4,058,446, Cl. 204-195.00R.
Zoecon Corporation: *See—*
  Henrick, Clive A.; and Labovitz, Jeffery N., 4,058,666, Cl. 560-126.000.
Zolke, Sarah; and Soto, William. Self-contained alarm lock. 4,057,986, Cl. 70-233.000.
Zoll, Paul M.: *See—*
  Frank, Howard A.; and Zoll, Paul M., 4,058,128, Cl. 128-418.000.
Zsolnai, Tibor; Lugosi, Gyorgy; Szepesi, Istvan; Bakonyi, Maria; Racz, Istvan; and Radvany nee Hegedus, Erzsebet, to Chinoin Gyogyszer es Vegyeszeti Termekek Gyara RT. Method of treating fungus-infected plants with phenylazocyanoacetic ester derivatives. 4,058,608, Cl. 424-226.000.
Zuern, Ludwig: *See—*
  Beck, Gilbert; Zuern, Ludwig; and Stahnecker, Erhard, 4,058,152, Cl. 152-310.000.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 15TH DAY OF NOVEMBER, 1977

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Axen, Rolf E. A. V.; Porath, Jerker O.; and Wide, Leif Edvin, to Pharmacia AB. Method for the determination of proteins and polypeptides. Re. 29,474, Cl. 424-1.000.
Clark & Vicario Corporation: *See*—
Kaiser, Robert G., Re. 29,472, Cl. 162-343.000.
DHP Corporation: *See*—
Fitzgerald, Walter P., Jr., Re. 29,473, Cl. 252-95.000.
Fitzgerald, Walter P., Jr., to DHP Corporation. Chemical composition. Re. 29,473, Cl. 252-95.000.
Giroux, Richard L., to Halliburton Company. Oil well testing apparatus. Re. 29,471, Cl. 166-334.000.
Halliburton Company: *See*—
Giroux, Richard L., Re. 29,471, Cl. 166-334.000.
Honeywell Inc.: *See*—
Jensen, James Lee, Re. 29,475, Cl. 322-28.000.
Jensen, James Lee, to Honeywell Inc. Battery charging circuit responsive to generator output voltage and current. Re. 29,475, Cl. 322-28.000.
Kaiser, Robert G., to Clark & Vicario Corporation. Conduit system for conveying fibrous stock from deaerator chamber to headbox in papermaking machine. Re. 29,472, Cl. 162-343.000.
Pharmacia AB: *See*—
Axen, Rolf E. A. V.; Porath, Jerker O.; and Wide, Leif Edvin, Re. 29,474, Cl. 424-1.000.
Porath, Jerker O.: *See*—
Axen, Rolf E. A. V.; Porath, Jerker O.; and Wide, Leif Edvin, Re. 29,474, Cl. 424-1.000.
Wide, Leif Edvin: *See*—
Axen, Rolf E. A. V.; Porath, Jerker O.; and Wide, Leif Edvin, Re. 29,474, Cl. 424-1.000.

LIST OF PLANT PATENTEES

Cordy, Clifford B., to Naumes of Oregon, Inc. Pear tree. 4,148, 11-15-77, Cl. 36.000.
E. G. Hill Co., Inc.: *See*—
Jelly, Robert G., 4,151, Cl. 20.000.
Jelly, Robert G., 4,152, Cl. 14.000.
Jelly, Robert G., to E. G. Hill Co., Inc. Rose plant seedling. 4,151, 11-15-77, Cl. 20.000.
Jelly, Robert G., to E. G. Hill Co., Inc. White rose plant seedling. 4,152, 11-15-77, Cl. 14.000.
L. E. Cooke Co.: *See*—
Moore, Ralph S., 4,150, Cl. 37.000.
Moore, Ralph S., to L. E. Cooke Co. Cherry tree. 4,150, 11-15-77, Cl. 37.000.
Naumes of Oregon, Inc.: *See*—
Cordy, Clifford B., 4,148, Cl. 36.000.
Schmidt, J. Frank, III. Oak tree. 4,149, 11-15-77, Cl. 51.000.

LIST OF DESIGN PATENTEES

Aktiebolaget Robacks Mekaniska: *See*—
Bostrom, Sture, 246,383, Cl. D25-3.000.
American Sign and Advertising Services, Inc.: *See*—
Niehaus, Donald H.; Schwab, Nick J.; and Seggerson, Patrick J., 246,400, Cl. D96-12.00J.
Amsco/Medical Electronics, Inc.: *See*—
Dykstra, Jerald P., 246,352, Cl. D10-60.000.
Barlow, Robert; Cesare, Frank; and Miceli, Carmen, to Cesare, Frank J. Portable prefabricated restaurant building. 246,381, 11-15-77, Cl. D25-10.000.
Barnich, Richard G.; and Johnson, Gary D., to Process Computer Systems, Inc. Desk top computer. 246,368, 11-15-77, Cl. D14-40.000.
Benner, David A.: *See*—
Crandell, Melvin G.; Reeves, Richard E.; Schachner, Leonard; and Benner, David A., 246,373, Cl. D16-32.000.
Bogan, Robert T. Grille and the like. 246,385, 11-15-77, Cl. D25-47.000.
Boothby, Alfons Th. Device for pipetting of liquids. 246,380, 11-15-77, Cl. D24-55.000.
Booty, Donald J., to Keystone Lamp Mfg. Corporation. Collapsible lamp shade. 246,397, 11-15-77, Cl. D48-16.00R.
Bostrom, Sture, to Aktiebolaget Robacks Mekaniska. Concrete station. 246,383, 11-15-77, Cl. D25-3.000.
Boughton, Stephen G., to Samsonite Corporation. Table. 246,341, 11-15-77, Cl. D6-146.000.
Boyertown Auto Body Works: *See*—
Hafer, Paul R., 246,360, Cl. D12-99.000.
Britt, William James, to Morton-Norwich Products, Inc. Bottle. 246,347, 11-15-77, Cl. D9-42.000.
Brosk, Doris. Dress. 246,336, 11-15-77, Cl. D2-146.000.
Brown, Brian E.; and Hall, Alfred G., to Moduloc Concrete Products (London) Ltd. Pre-cast concrete unit for manholes. 246,384, 11-15-77, Cl. D25-36.000.
Candiliotis, Gerassimos C., to Uniroyal, Inc. Pneumatic tire tread and buttress. 246,361, 11-15-77, Cl. D12-146.000.
Candiliotis, Gerassimos C. Pneumatic tire tread and buttress. 246,364, 11-15-77, Cl. D12-151.000.
Cartier, Inc.: *See*—
Durante, Alfred Joseph, 246,354, Cl. D11-36.000.
Durante, Alfred Joseph, 246,355, Cl. D11-44.000.
Durante, Alfred Joseph, 246,357, Cl. D11-40.000.
Cesare, Frank: *See*—
Barlow, Robert; Cesare, Frank; and Miceli, Carmen, 246,381, Cl. D25-10.000.
Cesare, Frank J.: *See*—
Barlow, Robert; Cesare, Frank; and Miceli, Carmen, 246,381, Cl. D25-10.000.
Crandell, Melvin G.; Reeves, Richard E.; Schachner, Leonard; and Benner, David A., to Xerox Corporation. Paper overfeed tray. 246,373, 11-15-77, Cl. D16-32.000.
Ditto, Donald R. Sunburst wall plaque. 246,358, 11-15-77, Cl. D11-137.000.
Doughtie's Foods, Inc.: *See*—
Klupt, Carle D., 246,349, Cl. D9-197.000.
Durante, Alfred Joseph, to Cartier, Inc. Wire and diamond ring. 246,354, 11-15-77, Cl. D11-36.000.
Durante, Alfred Joseph, to Cartier, Inc. Diamond pendant. 246,355, 11-15-77, Cl. D11-44.000.
Durante, Alfred Joseph, to Cartier, Inc. Earring. 246,357, 11-15-77, Cl. D11-40.000.
Dykstra, Jerald P., to Amsco/Medical Electronics, Inc. Probe cover. 246,352, 11-15-77, Cl. D10-60.000.
Einhorn, W. Lee. Combined display and packaging container. 246,348, 11-15-77, Cl. D9-195.000.
Elkaim, Henri. Combined neck chain and pendants. 246,353, 11-15-77, Cl. D11-8.000.
Endres, Michael H. Combined pipe tamper and scraper. 246,390, 11-15-77, Cl. D27-51.000.
Floyd, Gary W. Pickup truck camper unit. 246,365, 11-15-77, Cl. D12-156.000.
Fox, Douglas A. Pendant doll. 246,356, 11-15-77, Cl. D11-44.000.
Frank, Arlene. Combined paddle and ball holder. 246,340, 11-15-77, Cl. D6-131.000.

Georgia-Pacific Corporation: *See—*
Jespersen, Paul W., 246,338, Cl. D6-95.000.
Graham, Roger. Smoking device. 246,389, 11-15-77, Cl. D27-3.000.
Gross, Alan E.: *See—*
Lefkow, Robert A.; and Gross, Alan E., 246,391, Cl. D27-3.000.
Hafer, Paul R., to Boyertown Auto Body Works. Van body. 246,360, 11-15-77, Cl. D12-99.000.
Hall, Alfred G.: *See—*
Brown, Brian E.; and Hall, Alfred G., 246,384, Cl. D25-36.000.
Hardin, Edward L. Concrete block. 246,386, 11-15-77, Cl. D25-97.000.
Harris, Edward H. Lighting panel. 246,399, 11-15-77, Cl. D48-23.00R.
Hellqvist, Ake Oskar Vilhelm. Sewage tank. 246,375, 11-15-77, Cl. D23-2.000.
Jespersen, Paul W., to Georgia-Pacific Corporation. Dispenser for liquids. 246,338, 11-15-77, Cl. D6-95.000.
Johnson, Gary D.: *See—*
Barnich, Richard G.; and Johnson, Gary D., 246,368, Cl. D14-40.000.
Keystone Lamp Mfg. Corporation: *See—*
Booty, Donald J., 246,397, Cl. D48-16.00R.
Klupt, Carle D., to Doughtie's Foods, Inc. Food carton. 246,349, 11-15-77, Cl. D9-197.000.
Lefkow, Robert A.; and Gross, Alan E. Water cooled smoking device. 246,391, 11-15-77, Cl. D27-3.000.
Levin, Gus. Combined utility and book holder supporting tray, hold open brace and patient restraint to be removably mounted on the armrests of collapsible wheelchairs. 246,362, 11-15-77, Cl. D12-133.000.
Lorenz, Leo J., to Massey-Ferguson Inc. Tractor hood. 246,370, 11-15-77, Cl. D15-31.000.
Massey-Ferguson Inc.: *See—*
Lorenz, Leo J., 246,370, Cl. D15-31.000.
McGrath, James L., to UTM Power Products, Inc. Clamp-type electrical connector. 246,366, 11-15-77, Cl. D13-24.000.
Miceli, Carmen: *See—*
Barlow, Robert; Cesare, Frank; and Miceli, Carmen, 246,381, Cl. D25-10.000.
Microfilm Enterprises Corporation: *See—*
Schankler, Martin M., 246,367, Cl. D14-11.000.
Moduloc Concrete Products (London) Ltd.: *See—*
Brown, Brian E.; and Hall, Alfred G., 246,384, Cl. D25-36.000.
Morabito, Frank. Dough box. 246,343, 11-15-77, Cl. D7-21.000.
Morton-Norwich Products, Inc.: *See—*
Britt, William James, 246,347, Cl. D9-42.000.
Mueller, Walter. Air conditioner cover. 246,378, 11-15-77, Cl. D23-141.000.
Mueller, Walter. Air conditioner cover. 246,379, 11-15-77, Cl. D23-141.000.
Niarhos, Stephen. Sandal. 246,337, 11-15-77, Cl. D2-293.000.
Niehaus, Donald H.; Schwab, Nick J.; and Seggerson, Patrick J., to American Sign and Advertising Services, Inc. Combined clock and sign. 246,400, 11-15-77, Cl. D96-12.00J.
Nishiguchi, Seiichiro: *See—*
Yoshida, Yoshisaburo; and Nishiguchi, Seiichiro, 246,351, Cl. D10-15.000.
O'Brien, Catherine H., administratrix/executrix: *See—*
O'Brien, Gerard J., deceased; and O'Brien, Catherine H., administratrix/executrix, 246,369, Cl. D14-92.000.
O'Brien, Gerard J., deceased; and by O'Brien, Catherine H., administratrix/executrix. Tap transducer intercom. 246,369, 11-15-77, Cl. D14-92.000.
Pall Corporation: *See—*
Pall, David B., 246,376, Cl. D23-4.000.
Pall, David B., to Pall Corporation. Filter. 246,376, 11-15-77, Cl. D23-4.000.
Pansini, Andrew L. Liquid applicator. 246,371, 11-15-77, Cl. D15-56.000.
Pansini, Andrew L. Flow control valve. 246,377, 11-15-77, Cl. D23-19.000.
Parker, John Castlereagh, III. Bedpan. 246,382, 11-15-77, Cl. D24-57.000.
Poncia, Marcia E. Implement to tuck blanket in waterbeds. 246,345, 11-15-77, Cl. D7-181.000.
Poque, Dionysius J., to Uniroyal Aktiengesellschaft. Pneumatic tire tread and buttress. 246,363, 11-15-77, Cl. D12-146.000.
Powell Pressed Steel Company, The: *See—*
Powell, William R., 246,350, Cl. D9-246.000.
Powell, William R., to Powell Pressed Steel Company, The. Material handling box. 246,350, 11-15-77, Cl. D9-246.000.
Powers, Harvey B.; and Powers, Joan H. Cart for fishing equipment. 246,359, 11-15-77, Cl. D12-29.000.
Powers, Joan H.: *See—*
Powers, Harvey B.; and Powers, Joan H., 246,359, Cl. D12-29.000.
Process Computer Systems, Inc.: *See—*
Barnich, Richard G.; and Johnson, Gary D., 246,368, Cl. D14-40.000.
Ratcliff, Dorothy L.; and Ratcliff, Ford, Jr. Educational aid. 246,374, 11-15-77, Cl. D19-64.000.
Ratcliff, Ford, Jr.: *See—*
Ratcliff, Dorothy L.; and Ratcliff, Ford, Jr., 246,374, Cl. D19-64.000.
Raulson, Michael Jay. Support for hanukkah lights. 246,398, 11-15-77, Cl. D48-20.00C.
Reeves, Richard E.: *See—*
Crandell, Melvin G.; Reeves, Richard E.; Schachner, Leonard; and Benner, David A., 246,373, Cl. D16-32.000.
Rubbermaid Commercial Products Inc.: *See—*
Yonkers, Ronald C., 246,342, Cl. D7-1.000.
Yonkers, Ronald C., 246,344, Cl. D7-131.000.
Saito, Shigeru. Figure toy. 246,394, 11-15-77, Cl. D34-15.00B.
Saito, Shigeru. Figure toy. 246,395, 11-15-77, Cl. D34-15.00B.
Saito, Shigeru. Figure toy. 246,396, 11-15-77, Cl. D34-15.00B.
Samsonite Corporation: *See—*
Boughton, Stephen G., 246,341, Cl. D6-146.000.
Satten, Michael I. Toy house. 246,393, 11-15-77, Cl. D34-15.0LL.
Schachner, Leonard: *See—*
Crandell, Melvin G.; Reeves, Richard E.; Schachner, Leonard; and Benner, David A., 246,373, Cl. D16-32.000.
Schankler, Martin M., to Microfilm Enterprises Corporation. Film reel spacer. 246,367, 11-15-77, Cl. D14-11.000.
Schuss, Phillip. Ceiling tile. 246,387, 11-15-77, Cl. D25-80.000.
Schwab, Nick J.: *See—*
Niehaus, Donald H.; Schwab, Nick J.; and Seggerson, Patrick J., 246,400, Cl. D96-12.00J.
Seggerson, Patrick J.: *See—*
Niehaus, Donald H.; Schwab, Nick J.; and Seggerson, Patrick J., 246,400, Cl. D96-12.00J.
Sharp Kabushiki Kaisha: *See—*
Yoshida, Yoshisaburo; and Nishiguchi, Seiichiro, 246,351, Cl. D10-15.000.
Shivvers, Charles C. Perforated plank for the floor of a material drying bin. 246,388, 11-15-77, Cl. D25-91.000.
Smith, Duaine E. Cat litter box. 246,392, 11-15-77, Cl. D30-99.000.
Strunk, Fred E. Shim for motor or the like. 246,346, 11-15-77, Cl. D8-354.000.
Tucker, Gideon S. Tissue dispensing apparatus. 246,339, 11-15-77, Cl. D6-96.000.
Uniroyal Aktiengesellschaft: *See—*
Poque, Dionysius J., 246,363, Cl. D12-146.000.
Uniroyal, Inc.: *See—*
Candiliotis, Gerassimos C., 246,361, Cl. D12-146.000.
UTM Power Products, Inc.: *See—*
McGrath, James L., 246,366, Cl. D13-24.000.
Xerox Corporation: *See—*
Crandell, Melvin G.; Reeves, Richard E.; Schachner, Leonard; and Benner, David A., 246,373, Cl. D16-32.000.
Yonkers, Ronald C., to Rubbermaid Commercial Products Inc. Food service pan. 246,342, 11-15-77, Cl. D7-1.000.
Yonkers, Ronald C., to Rubbermaid Commercial Products Inc. Food service pan lid. 246,344, 11-15-77, Cl. D7-131.000.
Yoshida, Yoshisaburo; and Nishiguchi, Seiichiro, to Sharp Kabushiki Kaisha. Digital clock. 246,351, 11-15-77, Cl. D10-15.000.
Yoshino, Zenzaburo. Grip for a photographic camera. 246,372, 11-15-77, Cl. D16-10.000.

CLASSIFICATION OF PATENTS

ISSUED NOVEMBER 15, 1977

NOTE.—First number, class; second number, subclass; third number, patent number

CLASS 2	
12	4,057,852
22	4,057,853
128	4,057,854
177	4,057,855
209	4,057,856
CLASS 3	
1.5	4,057,857
1.91	4,057,858
CLASS 5	
121	4,057,859
247	4,057,860
365	4,057,861
370	4,057,862
CLASS 7	
5.4	4,057,863
CLASS 8	
2.5 R	4,057,864
CLASS 9	
2 F	4,057,865
CLASS 13	
31	4,058,667
32	4,058,668
CLASS 15	
56	4,057,871
97 B	4,057,866
185	4,057,867
203	4,057,868
250.32	4,057,869
250.41	4,057,870
CLASS 16	
29	4,057,872
137	4,057,873
CLASS 17	
32	4,057,874
43	4,057,875
CLASS 19	
80 R	4,057,876
107	4,057,877
CLASS 21	
2.5 R	4,058,362
58	4,058,363
80	4,058,364
CLASS 23	
230 EP	4,058,366
230 R	4,058,365
253 R	4,058,367
254 E	4,058,368
258.5 B	4,058,369
259	4,058,370
CLASS 24	
134 R	4,057,878
230 R	4,057,879
CLASS 28	
154	4,057,880
CLASS 29	
27 C	4,057,881
157.1 R	4,057,883
177	4,057,885
235	4,057,886
240	4,057,887
	4,057,888
283.5	4,057,882
427	4,057,889
	4,057,890
434	4,057,891
526 R	4,057,892
560	4,057,893
577 C	4,057,894
591	4,057,895
CLASS 30	
89	4,057,896
272 R	4,057,897
289	4,057,898
296 R	4,057,899
382	4,057,900
CLASS 33	
1 N	4,057,902
86	4,057,903
125 R	4,057,904
234	4,057,905
278	4,057,906
CLASS 34	
4	4,057,907
10	4,057,908
76	4,057,909
227	4,057,910
CLASS 35	
11 R	4,057,911
12 B	4,057,913
31 E	4,057,912
CLASS 36	
81	4,057,914
CLASS 37	
43 C	4,057,915
43 R	4,057,916
195	4,057,917
CLASS 38	
77.3	4,057,918
CLASS 40	
2.2	4,057,919
79	4,057,920
106.21	4,057,921
124.2	4,057,922
158 R	4,057,923
CLASS 42	
75 A	4,057,924
CLASS 43	
17.2	4,057,925
18 GF	4,057,926
43.6	4,057,927
CLASS 44	
62	4,058,371
CLASS 46	
120	4,057,928
201	4,057,929
CLASS 47	
61	4,057,930
66	4,057,931
77	4,057,932
79	4,057,933
CLASS 49	
28	4,057,934
56	4,057,935
61	4,057,936
372	4,057,937
CLASS 51	
281 R	4,057,939
429	4,057,938
438	4,057,940
CLASS 52	
63	4,057,941
115	4,057,942
126	4,057,943
309.11	4,057,944
398	4,057,945
436	4,057,946
496	4,057,947
582	4,057,948
CLASS 53	
22 B	4,057,949
26	4,057,950
55	4,057,951
CLASS 55	
5	4,058,372
16	4,058,373
60	4,058,374
70	4,058,375
	4,058,376
148	4,058,377
257 R	4,058,378
302	4,058,379
387	4,058,380
444	4,058,381
CLASS 56	
16.9	4,057,952
341	4,057,954
400.17	4,057,953
CLASS 57	
56	4,057,955
164	4,057,956
CLASS 58	
21.155	4,057,957
82 R	4,057,958
125 C	4,057,959
CLASS 60	
39.03	4,057,960
221	4,057,961
526	4,057,962
641	4,057,963
	4,057,964
650	4,057,965
678	4,057,966
CLASS 61	
1 R	4,057,967
12	4,057,968
35	4,057,969
53.72	4,057,970
84	4,057,971
CLASS 62	
6	4,058,382
23	4,057,972
85	4,058,383
114	4,057,973
	4,057,974
324	4,057,975
	4,057,976
	4,057,977
331	4,057,978
457	4,058,384
469	4,057,979
CLASS 63	
13	4,057,980
CLASS 65	
2	4,058,385
6	4,058,386
32	4,058,387
229	4,058,388
CLASS 66	
185	4,057,981
CLASS 70	
14	4,057,982
18	4,057,983
58	4,057,984
231	4,057,985
233	4,057,986
364 R	4,057,987
CLASS 71	
31	4,058,389
92	4,058,390
	4,058,391
106	4,058,392
CLASS 72	
98	4,057,988
128	4,057,989
166	4,057,990
211	4,057,991
283	4,057,992
410	4,057,993
441	4,057,994
CLASS 73	
23	4,057,995
	4,057,996
23.1	4,057,997
	4,057,998
53	4,057,999
86	4,058,004
88.5 R	4,058,005
113	4,058,006
141 A	4,058,007
144	4,058,008
146.8	4,058,009
189	4,058,010
194 R	4,058,011
228	4,058,012
352	4,058,013
358	4,058,014
395	4,058,015
419	4,058,016
423 R	4,058,017
609	4,058,003
620	4,058,001
	4,058,002
644	4,058,000
CLASS 74	
18.2	4,058,018
87	4,058,019
217 B	4,058,020
229	4,058,021
231 MB	4,058,022
243 DR	4,058,023
572	4,058,024
573 R	4,058,025
577 R	4,058,026
711	4,058,027
865	4,058,028
	4,058,029
CLASS 75	
1 T	4,058,393
61	4,058,394
72	4,058,395
77	4,058,396
CLASS 81	
53 R	4,058,030
64	4,058,031
125	4,058,032
CLASS 82	
2 R	4,058,033
	4,058,034
3	4,058,035
38 A	4,058,036
CLASS 83	
70	4,058,037
109	4,058,038
155	4,058,039
177	4,058,040
305	4,058,041
CLASS 84	
1.01	4,058,042
1.03	4,058,043
1.14	4,058,044
	4,058,045
384	4,058,046
CLASS 85	
11	4,058,047
31	4,058,048
CLASS 87	
8	4,058,049
CLASS 89	
14 C	4,058,050
CLASS 93	
88	4,058,051
CLASS 96	
15 D	4,058,397
27 R	4,058,398
75	4,058,399
86 P	4,058,400
115 R	4,058,401
CLASS 99	
646 R	4,058,052
CLASS 100	
26	4,058,053
233	4,058,054
CLASS 101	
10	4,058,055
93.19	4,058,056
148	4,058,057
365	4,058,058
425	4,058,059
CLASS 102	
8	4,058,060
	4,058,061
38	4,058,062
56 SC	4,058,063
CLASS 104	
172 S	4,058,064
CLASS 105	
180	4,058,065
CLASS 106	
16	4,058,402
56	4,058,403
73.31	4,058,404
87	4,058,405
90	4,058,406
92	4,058,407
176	4,058,408
271	4,058,409
CLASS 108	
9	4,058,066
CLASS 110	
8 F	4,058,069
CLASS 111	
1	4,058,067
36	4,058,068
CLASS 112	
153	4,058,070
235	4,058,071
258	4,058,072
	4,058,073
CLASS 114	
210	4,058,074
222	4,058,075
281	4,058,076
283	4,058,077
303	4,058,078
CLASS 116	
114 H	4,058,079
115.5	4,058,080
125	4,058,081
CLASS 118	
9	4,058,082
16	4,058,083
264	4,058,085
653	4,058,086
CLASS 122	
235 R	4,058,087
CLASS 123	
18 R	4,058,088
32 ED	4,058,089
32 SP	4,058,090
32 ST	4,058,092
32 VN	4,058,091
75 B	4,058,093
102	4,058,094
117 R	4,058,095
119 A	4,058,098
119 CG	4,058,096
119 F	4,058,097
122 D	4,058,099
139 AW	4,058,100
140 MP	4,058,101
141	4,058,102
148 E	4,058,103
193 CP	4,058,104
198 DB	4,058,106
198 DC	4,058,105
CLASS 126	
121	4,058,107
137	4,058,108
270	4,058,109
271	4,058,110
	4,058,111
CLASS 127	
5	4,058,410
37	4,058,411
CLASS 128	
1 R	4,058,112
2 N	4,058,113
2 S	4,058,115
2 V	4,058,114
2.05 A	4,058,117
2.05 T	4,058,118
2.1 E	4,058,116
80 R	4,058,119
188	4,058,120
221	4,058,121
260	4,058,122
278	4,058,123
284	4,058,124
287	4,058,125
305	4,058,126
417	4,058,127
418	4,058,128
CLASS 131	
140 C	4,058,129
192	4,058,130
CLASS 132	
7	4,058,131
73	4,058,132
112	4,057,901
CLASS 134	
24	4,058,412
CLASS 135	
4 A	4,058,133
CLASS 137	
38	4,058,134
106	4,058,135
110	4,058,136
236 S	4,058,137
512.1	4,058,138
596.13	4,058,139
	4,058,140
CLASS 138	
39	4,058,141
89	4,058,142
CLASS 139	
110	4,058,143
384 B	4,058,144
	4,058,145
CLASS 141	
1	4,058,146
45	4,058,147
198	4,058,148
301	4,058,149
CLASS 144	
1 R	4,058,150
246 E	4,058,151
CLASS 148	
1.5	4,058,413
12 F	4,058,414
32	4,058,415
	4,058,416
37	4,058,417
175	4,058,418
	4,058,419
CLASS 149	
2	4,058,420
CLASS 152	
310	4,058,152
CLASS 156	
73.5	4,058,421
96	4,058,422
98	4,058,423
137	4,058,424
200	4,058,425
212	4,058,426
392	4,058,427
429	4,058,428
601	4,058,429
611	4,058,430
627	4,058,431
659	4,058,432
CLASS 162	
16	4,058,433
165	4,058,434
343	Re.29,472
371	4,058,435
CLASS 164	
58	4,058,153
82	4,058,154
152	4,058,155
405	4,058,156
CLASS 165	
8	4,058,157
9	4,058,158
105	4,058,159

	4,058,160
158	4,058,161
CLASS 166	
124	4,058,162
177	4,058,163
303	4,058,164
314	4,058,165
315	4,058,166
334	Re.29,471
CLASS 169	
61	4,058,167
CLASS 172	
59	4,058,168
191	4,058,169
311	4,058,170
	4,058,172
713	4,058,171
719	4,058,173
781	4,058,174
CLASS 173	
1	4,058,175
CLASS 174	
34	4,058,669
38	4,058,670
151	4,058,671
CLASS 175	
61	4,058,176
374	4,058,177
CLASS 176	
78	4,058,436
CLASS 177	
146	4,058,178
156	4,058,179
CLASS 178	
3	4,058,672
22	4,058,673
CLASS 179	
1 G	4,058,675
1 SA	4,058,676
1.5 FS	4,058,677
2.5 R	4,058,678
6 R	4,058,679
7.1 R	4,058,680
15 AF	4,058,682
	4,058,683
15 AL	4,058,681
18 AH	4,058,685
18 BB	4,058,684
90 AT	4,058,686
100.11	4,058,687
156 R	4,058,688
157	4,058,689
167	4,058,690
CLASS 180	
14 R	4,058,180
32	4,058,181
68.5	4,058,182
89.1	4,058,183
CLASS 182	
128	4,058,184
CLASS 184	
1 D	4,058,185
CLASS 187	
1 R	4,058,186
	4,058,191
29 R	4,058,187
CLASS 188	
1 C	4,058,188
71.8	4,058,084
77 R	4,058,189
218 XL	4,058,190
CLASS 192	
46	4,058,192
109 F	4,058,193
CLASS 194	
4 C	4,058,194
CLASS 197	
18	4,058,195
133 R	4,058,196
151	4,058,197
CLASS 198	
313	4,058,198
370	4,058,199
382	4,058,200
	4,058,201
482	4,058,202
509	4,058,203
833	4,058,204
CLASS 200	
31 A	4,058,692

31 R	4,058,691
67 F	4,058,693
84 C	4,058,694
153 V	4,058,695
CLASS 202	
86	4,058,205
CLASS 204	
1 T	4,058,437
	4,058,438
49	4,058,439
101	4,058,440
103	4,058,441
159.12	4,058,442
159.17	4,058,443
181	4,058,444
192 SP	4,058,445
195 P	4,058,447
195 R	4,058,446
244	4,058,448
CLASS 206	
44 R	4,058,206
45.34	4,058,207
109	4,058,208
350	4,058,209
372	4,058,210
422	4,058,211
470	4,058,212
524.4	4,058,213
545	4,058,214
574	4,058,215
597	4,058,216
CLASS 208	
59	4,058,449
66	4,058,450
97	4,058,451
134	4,058,452
188	4,058,453
321	4,058,454
CLASS 209	
74 M	4,058,217
80.5	4,058,218
81 R	4,058,219
139 R	4,058,455
CLASS 210	
23 R	4,058,456
32	4,058,457
52	4,058,458
132	4,058,459
198 C	4,058,460
242 S	4,058,461
289	4,058,462
317	4,058,463
356	4,058,464
	4,058,465
CLASS 211	
57.1	4,058,220
87	4,058,221
118	4,058,222
CLASS 214	
1 BB	4,058,223
1 CM	4,058,224
6 P	4,058,225
7	4,058,226
13	4,058,227
18.2	4,058,230
77 R	4,058,228
	4,058,229
516	4,058,231
CLASS 215	
217	4,058,232
CLASS 219	
10.77	4,058,696
121 EB	4,058,697
121 LM	4,058,699
121 P	4,058,698
137 R	4,058,700
270	4,058,701
321	4,058,702
492	4,058,703
528	4,058,704
CLASS 220	
19	4,058,233
239	4,058,234
CLASS 221	
48	4,058,235
163	4,058,236
CLASS 222	
78	4,058,237
305	4,058,238
368	4,058,240
462	4,058,239
CLASS 223	
98	4,058,241

CLASS 224	
5 V	4,058,242
42.1 H	4,058,243
CLASS 226	
97	4,058,244
174	4,058,245
CLASS 228	
121	4,058,246
CLASS 229	
2.5 R	4,058,247
30	4,058,248
34 HW	4,058,249
52 B	4,058,250
72	4,058,251
CLASS 233	
14 R	4,058,252
CLASS 235	
92 CC	4,058,708
448	4,058,707
449	4,058,705
	4,058,706
CLASS 236	
46 R	4,058,253
68 B	4,058,254
CLASS 237	
12.3 B	4,058,255
CLASS 239	
101	4,058,256
107	4,058,257
165	4,058,258
276	4,058,259
394	4,058,260
542	4,058,261
545	4,058,262
551	4,058,263
CLASS 242	
7.22	4,058,278
18 PW	4,058,264
47.01	4,058,265
54 R	4,058,266
56 A	4,058,267
72 R	4,058,268
84.1 K	4,058,269
105	4,058,270
107.4 B	4,058,271
	4,058,272
115	4,058,273
CLASS 243	
5	4,058,274
CLASS 244	
3.15	4,058,275
17.17	4,058,277
152	4,058,276
CLASS 246	
169 R	4,058,279
CLASS 248	
2	4,058,280
362	4,058,281
418	4,058,282
441 D	4,058,283
CLASS 249	
163	4,058,284
216	4,058,285
CLASS 250	
213 VT	4,058,721
225	4,058,722
235	4,058,723
309	4,058,724
343	4,058,725
353	4,058,726
363 R	4,058,727
369	4,058,728
370	4,058,729
397	4,058,730
442	4,058,731
461 B	4,058,732
476	4,058,733
493	4,058,486
495	4,058,734
551	4,058,735
573	4,058,736
	4,058,737
CLASS 251	
15	4,058,286
46	4,058,287
229	4,058,288
304	4,058,289
306	4,058,290
CLASS 252	
8.1	4,058,466
8.55 D	4,058,467

46.7	4,058,468
51.5 R	4,058,469
62.1 L	4,058,470
63.5	4,058,471
89 B	4,058,472
95	Re.29,473
121	4,058,473
160	4,058,474
299	4,058,475
	4,058,476
	4,058,477
	4,058,478
301.1 W	4,058,479
301.21	4,058,480
321	4,058,481
425.3	4,058,482
446	4,058,483
455 Z	4,058,484
466 PT	4,058,485
542	4,058,488
547	4,058,489
552	4,058,487
554	4,058,490
CLASS 254	
74	4,058,291
88	4,058,292
89 H	4,058,293
167	4,058,294
184	4,058,295
CLASS 260	
2.2 R	4,058,491
2.5 AH	4,058,493
	4,058,494
2.5 AM	4,058,492
17 A	4,058,495
21	4,058,496
22 A	4,058,497
29.4 R	4,058,498
29.6 RW	4,058,499
42.24	4,058,500
45.75 B	4,058,501
45.75 S	4,058,543
45.85 B	4,058,502
47 CP	4,058,503
	4,058,505
47 ET	4,058,504
75 M	4,058,507
75 NP	4,058,506
77.5 BB	4,058,508
79.7	4,058,509
112 B	4,058,511
112 R	4,058,510
112.5 LH	4,058,513
112.5 R	4,058,512
145 B	4,058,514
151	4,058,515
152	4,058,516
155	4,058,517
156	4,058,518
239 B	4,058,520
239.1	4,058,521
239.57	4,058,522
251 A	4,058,529
251 R	4,058,527
	4,058,528
281 GN	4,058,530
285	4,058,531
288 R	4,058,532
294.8 F	4,058,533
295.5 S	4,058,534
326 E	4,058,535
340.7	4,058,536
346.3	4,058,537
397.2	4,058,538
397.45	4,058,539
405	4,058,540
	4,058,541
429 R	4,058,542
429.7	4,058,544
	4,058,545
448.8 R	4,058,546
465.1	4,058,548
465.3	4,058,547
465.4	4,058,549
501.14	4,058,557
515 A	4,058,558
520 C	4,058,559
535 P	4,058,560
544 C	4,058,561
556 AR	4,058,562
566 F	4,058,563
586 AB	4,058,565
586 R	4,058,564
600 R	4,058,566
607 A	4,058,567
607 AR	4,058,568
617 A	4,058,569
620	4,058,570
631 H	4,058,571
631.5	4,058,572
653.1 T	4,058,573
659 A	4,058,574
666 P	4,058,575
673	4,058,576
680 D	4,058,577

884	4,058,578
CLASS 264	
81	4,058,579
113	4,058,580
136	4,058,581
154	4,058,582
176 R	4,058,583
250	4,058,584
CLASS 266	
48	4,058,299
273	4,058,300
CLASS 267	
124	4,058,301
CLASS 269	
76	4,058,302
315	4,058,303
CLASS 270	
79	4,058,304
CLASS 271	
16	4,058,305
80	4,058,306
85	4,058,307
178	4,058,308
CLASS 273	
43 D	4,058,309
63 E	4,058,310
73 G	4,058,311
77 A	4,058,312
87.4	4,058,313
106 B	4,058,314
118 R	4,058,315
121 A	4,058,316
130 R	4,058,317
134 AD	4,058,318
	4,058,319
CLASS 277	
3	4,058,320
81 P	4,058,321
96.1	4,058,322
CLASS 280	
11.1 R	4,058,323
11.22	4,058,324
43.18	4,058,325
617	4,058,326
CLASS 281	
33	4,058,327
CLASS 285	
45	4,058,328
162	4,058,329
174	4,058,330
CLASS 292	
97	4,058,331
147	4,058,332
172	4,058,333
241	4,058,334
251.5	4,058,335
CLASS 294	
19 A	4,058,336
19 R	4,058,337
31.2	4,058,338
91	4,058,339
CLASS 296	
97 G	4,058,340
CLASS 297	
39	4,058,341
250	4,058,342
CLASS 298	
9	4,058,343
CLASS 301	
7	4,058,344
CLASS 303	
6 M	4,058,345
22 R	4,058,346
	4,058,347
35	4,058,348
69	4,058,349
CLASS 305	
54	4,058,350
	4,058,351
57	4,058,352
CLASS 307	
66	4,058,738
88.3	4,058,739
116	4,058,740
252 G	4,058,741
260	4,058,742
275	4,058,743

CLASS 308	
1 A	4,058,353
CLASS 310	
10	4,058,746
52	4,058,747
343	4,058,744
366	4,058,745
CLASS 312	
45	4,058,354
241	4,058,355
305	4,058,356
CLASS 313	
156	4,058,748
326	4,058,749
500	4,058,750
CLASS 315	
200 A	4,058,751
360	4,058,752
368	4,058,753
411	4,058,754
CLASS 318	
47	4,058,755
265	4,058,756
474	4,058,757
CLASS 322	
13	4,058,759
28	Re.29,475
CLASS 323	
19	4,058,760
48	4,058,761
CLASS 324	
51	4,058,764
61 R	4,058,765
	4,058,766
73 R	4,058,767
142	4,058,768
205	4,058,763
216	4,058,762
CLASS 325	
144	4,058,769
308	4,058,770
446	4,058,771
464	4,058,772
CLASS 328	
37	4,058,773
CLASS 330	
4.3	4,058,774
267	4,058,775
299	4,058,776
CLASS 331	
57	4,058,777
94.5 G	4,058,778
108 R	4,058,779
CLASS 333	
1.1	4,058,780
CLASS 335	
186	4,058,781
219	4,058,782
276	4,058,783
CLASS 337	
164	4,058,784
204	4,058,785
293	4,058,786
CLASS 338	
22 R	4,058,787
42	4,058,788
322	4,058,789
CLASS 339	
12 R	4,058,357
44 M	4,058,358
CLASS 340	
15.5 MC	4,058,791
15.5 TS	4,058,790
29	4,058,792
52 D	4,058,793
52 F	4,058,796
56	4,058,797
92	4,058,794
146.3 WD	4,058,795
174 TF	4,058,799
224	4,058,802
237.5	4,058,803
248 A	4,058,804
347 AD	4,058,806
	4,058,808
347 DA	4,058,805
	4,058,807
CLASS 343	
7 A	4,058,809

17.1 R	4,058,810
715	4,058,811
761	4,058,812
786	4,058,813
CLASS 346	
154	4,058,814
CLASS 354	
23 D	4,058,816
26	4,058,817
33	4,058,818
44	4,058,819
80	4,058,820
354	4,058,823
CLASS 355	
14	4,058,815
109	4,058,359
CLASS 357	
15	4,058,824
19	4,058,821
23	4,058,822
46	4,058,825
CLASS 358	
10	4,058,826
55	4,058,827
80	4,058,828
84	4,058,829
86	4,058,830
87	4,058,831
110	4,058,832
111	4,058,833
128	4,058,834

134	4,058,835
167	4,058,836
237	4,058,837
257	4,058,838
260	4,058,674
CLASS 360	
2	4,058,839
10	4,058,840
27	4,058,841
103	4,058,843
106	4,058,844
107	4,058,845
121	4,058,846
132	4,058,847
CLASS 361	
38	4,058,842
128	4,058,848
CLASS 362	
82	4,058,720
190	4,058,719
235	4,058,718
CLASS 363	
80	4,058,758
CLASS 364	
101	4,058,711
424	4,058,709
433	4,058,710
520	4,058,849
564	4,058,712
724	4,058,713

726	4,058,715
754	4,058,714
824	4,058,716
	4,058,717
900	4,058,798
	4,058,850
	4,058,851
CLASS 365	
3	4,058,800
39	4,058,801
CLASS 366	
76	4,058,298
81	4,058,297
160	4,058,296
CLASS 407	
89	4,057,884
CLASS 416	
140	4,058,360
CLASS 417	
312	4,058,361
CLASS 423	
24	4,058,585
118	4,058,586
220	4,058,587
283	4,058,588
359	4,058,589
449	4,058,590
574 R	4,058,591
594	4,058,592

CLASS 424	
1	Re.29,474
37	4,058,594
50	4,058,595
	4,058,596
68	4,058,597
89	4,058,598
92	4,058,599
128	4,058,600
180	4,058,519
	4,058,601
	4,058,602
200	4,058,603
211	4,058,604
212	4,058,605
217	4,058,606
219	4,058,607
226	4,058,608
246	4,058,609
	4,058,610
250	4,058,611
251	4,058,612
258	4,058,613
263	4,058,614
265	4,058,615
267	4,058,616
270	4,058,617
273 R	4,058,618
275	4,058,619
283	4,058,620
295	4,058,621
308	4,058,622
317	4,058,623
325	4,058,625

330	4,058,624
	4,058,642
333	4,058,626
341	4,058,627
343	4,058,628
365	4,058,629
CLASS 426	
36	4,058,630
52	4,058,631
126	4,058,632
315	4,058,633
456	4,058,634
509	4,058,635
573	4,058,636
CLASS 427	
15	4,058,637
39	4,058,638
67	4,058,639
118	4,058,640
137	4,058,641
CLASS 428	
198	4,058,643
200	4,058,644
331	4,058,645
425	4,058,646
474	4,058,647
511	4,058,648
518	4,058,649
683	4,058,650

CLASS 429	
105	4,058,651
CLASS 526	
68	4,058,652
159	4,058,653
	4,058,654
212	4,058,655
215	4,058,656
261	4,058,658
263	4,058,657
CLASS 536	
27	4,058,659
CLASS 544	
18	4,058,660
21	4,058,661
136	4,058,524
165	4,058,523
182	4,058,525
	4,058,526
208	4,058,662
CLASS 560	
3	4,058,663
43	4,058,550
	4,058,551
52	4,058,552
121	4,058,664
	4,058,665
126	4,058,666
180	4,058,553
	4,058,554
191	4,058,555
231	4,058,556

CLASSIFICATION OF DESIGNS

D2—	146	246,336
	293	246,337
D6—	95	246,338
	96	246,339
	131	246,340
	146	246,341
D7—	1	246,342
	21	246,343
	131	246,344
	181	246,345
D8—	354	246,346
D9—	42	246,347
	195	246,348
	197	246,349
	246	246,350
D10—	15	246,351
	60	246,352
D11—	8	246,353
	36	246,354
	40	246,357
	44	246,355
		246,356
	137	246,358
D12—	29	246,359
	99	246,360
	133	246,362
	146	246,361
		246,363
	151	246,364
	156	246,365
D13—	24	246,366
D14—	11	246,367
	40	246,368
	92	246,369
D15—	31	246,370
	56	246,371
D16—	10	246,372
	32	246,373
D19—	64	246,374
D23—	2	246,375
	4	246,376
	19	246,377
	141	246,378
		246,379
D24—	55	246,380
	57	246,382
D25—	3	246,383
	10	246,381
	36	246,384
	47	246,385
	80	246,387
	91	246,388
	97	246,386
D27—	3	246,389
		246,391
	51	246,390
D30—	99	246,392
D34—	15 B	246,394
		246,395
		246,396
	15 LL	246,393
D48—	16 R	246,397
	20 C	246,398
	23 R	246,399
D96—	12 J	246,400

CLASSIFICATION OF PLANTS

P.—	14	4,152
	20	4,151
	36	4,148
	37	4,150
	51	4,149

GEOGRAPHICAL INDEX OF RESIDENCE OF INVENTORS

(U.S. States, Territories and Armed Forces, the Commonwealth of Puerto Rico, and the Canal Zone)

Alabama	1	Kentucky	21	Oregon	41
Alaska	2	Louisiana	22	Pennsylvania	42
American Samoa	3	Maine	23	Puerto Rico	43
Arizona	4	Maryland	24	Rhode Island	44
Arkansas	5	Massachusetts	25	South Carolina	45
California	6	Michigan	26	South Dakota	46
Canal Zone	7	Minnesota	27	Tennessee	47
Colorado	8	Mississippi	28	Texas	48
Connecticut	9	Missouri	29	Utah	49
Delaware	10	Montana	30	Vermont	50
District of Columbia	11	Nebraska	31	Virginia	51
Florida	12	Nevada	32	Virgin Islands	52
Georgia	13	New Hampshire	33	Washington	53
Guam	14	New Jersey	34	West Virginia	54
Hawaii	15	New Mexico	35	Wisconsin	55
Idaho	16	New York	36	Wyoming	56
Illinois	17	North Carolina	37	U.S. Air Force	57
Indiana	18	North Dakota	38	U.S. Army	58
Iowa	19	Ohio	39	U.S. Navy	59
Kansas	20	Oklahoma	40		

(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

PATENTS

1 :	4,058,433		4,058,247		4,058,108		4,058,268		4,058,309		4,058,332
4 :	4,058,325		4,058,257		4,058,146		4,058,270		4,058,315		4,058,380
	4,058,340		4,058,275		4,058,219		4,058,282		4,058,560		4,058,468
	4,058,459		4,058,292		4,058,384		4,058,296		4,058,703		4,058,513
	4,058,671		4,058,302		4,058,436		4,058,307	24 :	4,057,913		4,058,520
5 :	4,057,926		4,058,333		4,058,482		4,058,314		4,057,961		4,058,533
6 :	Re.29,473		4,058,369		4,058,546		4,058,316		4,058,076		4,058,538
	4,057,855		4,058,378		4,058,563		4,058,323		4,058,102		4,058,551
	4,057,857		4,058,396		4,058,849		4,058,345		4,058,301		4,058,564
	4,057,862		4,058,413	10 :	4,058,656		4,058,351		4,058,418		4,058,792
	4,057,897		4,058,423		4,058,663		4,058,356		4,058,460	27 :	Re.29,475
	4,057,901		4,058,442	11 :	4,057,923		4,058,383		4,058,491		4,057,931
	4,057,908		4,058,446	12 :	Re.29,472		4,058,434		4,058,586		4,058,105
	4,057,925		4,058,452		4,057,869		4,058,451		4,058,602		4,058,199
	4,057,935		4,058,465		4,057,873		4,058,454		4,058,767		4,058,288
	4,057,941		4,058,479		4,057,920		4,058,458	25 :	4,057,896		4,058,362
	4,057,952		4,058,484		4,057,985		4,058,464		4,057,903		4,058,585
	4,057,963		4,058,511		4,058,074		4,058,470		4,057,904		4,058,621
	4,057,964		4,058,535		4,058,075		4,058,496		4,057,953		4,058,641
	4,057,991		4,058,567		4,058,111		4,058,499		4,057,987		4,058,724
	4,058,001		4,058,636		4,058,130		4,058,501		4,058,036		4,058,795
	4,058,003		4,058,659		4,058,237		4,058,559		4,058,050		4,058,823
	4,058,006		4,058,666		4,058,263		4,058,566		4,058,097		4,058,846
	4,058,016		4,058,676		4,058,313		4,058,658		4,058,110		4,058,851
	4,058,018		4,058,689		4,058,406		4,058,712		4,058,128	29 :	4,057,859
	4,058,024		4,058,692		4,058,572		4,058,714		4,058,192		4,057,860
	4,058,031		4,058,705		4,058,628		4,058,718		4,058,233		4,057,899
	4,058,032		4,058,708		4,058,677		4,058,719		4,058,262		4,058,052
	4,058,045		4,058,722		4,058,702		4,058,733		4,058,394		4,058,136
	4,058,046		4,058,723		4,058,769		4,058,744		4,058,417		4,058,185
	4,058,056		4,058,725	13 :	4,057,875		4,058,753		4,058,639		4,058,694
	4,058,061		4,058,732		4,058,669		4,058,756		4,058,678		4,058,784
	4,058,094		4,058,745		4,058,842		4,058,798		4,058,699		4,058,786
	4,058,103		4,058,759	15 :	4,058,062		4,058,811		4,058,727		4,058,794
	4,058,113		4,058,765		4,058,273	18 :	4,057,889		4,058,752	30 :	4,057,853
	4,058,117		4,058,773	16 :	4,057,863		4,058,184		4,058,764	31 :	4,057,933
	4,058,121		4,058,778	17 :	4,057,872		4,058,386		4,058,780		4,057,968
	4,058,122		4,058,788		4,057,892		4,058,388		4,058,810		4,058,633
	4,058,133		4,058,791		4,057,928		4,058,505		4,058,817	32 :	4,057,948
	4,058,147		4,058,799		4,057,951	19 :	4,057,922		4,058,818		4,058,026
	4,058,150		4,058,801		4,057,959		4,058,239	26 :	4,057,866	33 :	4,057,909
	4,058,155		4,058,802		4,057,986		4,058,352		4,057,890		4,058,421
	4,058,159		4,058,805		4,058,014		4,058,412		4,057,946		4,058,527
	4,058,179		4,058,820		4,058,053		4,058,440		4,057,962		4,058,528
	4,058,194		4,058,829		4,058,057		4,058,766		4,057,994	34 :	4,057,894
	4,058,195		4,058,837		4,058,132	20 :	4,057,888		4,058,004		4,057,905
	4,058,201		4,058,839		4,058,174		4,057,956		4,058,064		4,057,910
	4,058,206		4,058,840		4,058,189		4,058,170		4,058,070		4,057,972
	4,058,213		4,058,843		4,058,212		4,058,172		4,058,173		4,058,054
	4,058,222		4,058,844		4,058,251		4,058,793		4,058,196		4,058,060
	4,058,226	8 :	4,058,164		4,058,252	21 :	4,058,047		4,058,243		4,058,066
	4,058,234	9 :	4,057,886		4,058,258		4,058,238		4,058,256		4,058,071
	4,058,242		4,057,938		4,058,259	22 :	4,057,927		4,058,266		4,058,088

	4,058,123		4,058,826		4,058,425		4,058,140		4,058,096		4,057,977
	4,058,125	35 :	4,057,930		4,058,461		4,058,141		4,058,104		4,057,995
	4,058,127		4,058,063		4,058,466		4,058,190		4,058,109		4,058,025
	4,058,131		4,058,339		4,058,472		4,058,280		4,058,149		4,058,148
	4,058,186	36 :	4,057,867		4,058,485		4,058,304		4,058,181		4,058,162
	4,058,191		4,057,881		4,058,493		4,058,367		4,058,200		4,058,166
	4,058,211		4,057,895		4,058,494		4,058,385		4,058,203		4,058,175
	4,058,214		4.057,898		4,058,502		4,058,387		4,058,220		4,058,177
	4,058,274		4,057,939		4,058,510		4,058,405		4,058,227		4,058,197
	4,058,287		4,057,973		4,058,532		4,058,407		4,058,236		4,058,205
	4,058,298		4,057,974		4,058,537		4,058,422		4,058,240		4,058,221
	4,058,312		4,057,975		4,058,540		4,058,435		4,058,285		4,058,331
	4,058,318		4,057,976		4,058,541		4,058,437		4,058,320		4,058,357
	4,058,319		4,057,979		4,058,543		4,058,457		4,058,338		4,058,427
	4,058,321		4,057,981		4,058,550		4,058,469		4,058,348		4,058,428
	4,058,328		4,057,990		4,058,570		4,058,474		4,058,372		4,058,555
	4,058,334		4,058,022		4,058,573		4,058,486		4,058,373		4,058,577
	4,058,360		4,058,058		4,058,592		4,058,524		4,058,429		4,058,590
	4,058,361		4,058,065		4,058,643		4,058,579		4,058,530		4,058,638
	4,058,371		4,058,067		4,058,645		4,058,657		4,058,557		4,058,652
	4,058,391		4,058,078		4,058,649		4,058,680		4,058,605		4,058,706
	4,058,409		4,058,081		4,058,651		4,058,685		4,058,609		4,058,757
	4,058,438		4,058,086		4,058,672		4,058,695		4,058,614	49 :	4,058,420
	4,058,462		4,058,107		4,058,690		4,058,711		4,058,615	51 :	4,058,010
	4,058,473		4,058,116		4,058,691		4,058,734		4,058,648		4,058,210
	4,058,487		4,058,118		4,058,709		4,058,814		4,058,746		4,058,224
	4,058,490		4,058,120		4,058,713		4,058,832		4,058,776		4,058,729
	4,058,515		4,058,124		4,058,716		4,058,833		4,058,779		4,058,762
	4,058,542		4,058,126		4,058,717	40 :	Re.29,471		4,058,809	53 :	4,057,854
	4,058,544		4,058,160		4,058,768		4,057,997		4,058,812		4,057,984
	4,058,545		4,058,187		4,058,785		4,058,015		4,058,835		4,058,011
	4,058,554		4,058,208		4,058,789		4,058,142	44 :	4,057,970		4,058,077
	4,058,568		4,058,218		4,058,804		4,058,165		4,057,980		4,058,112
	4,058,569		4,058,223		4,058,808		4,058,261	45 :	4,057,893		4,058,119
	4,058,575		4,058,253		4,058,828		4,058,366		4,057,940		4,058,228
	4,058,576		4,058,276		4,058,838		4,058,379		4,058,229		4,058,426
	4,058,581		4,058,279		4,058,850		4,058,402		4,058,241		4,058,667
	4,058,582		4,058,281	37 :	4,057,877		4,058,467	46 :	4,057,868	54 :	4,058,416
	4,058,595		4,058,283		4,057,880		4,058,720	47 :	4,057,936		4,058,549
	4,058,596		4,058,291		4,057,914		4,058,790		4,057,944	55 :	4,057,865
	4,058,612		4,058,306	39 :	4,057,883	41 :	4,057,983		4,058,030		4,057,874
	4,058,620		4,058,337		4,057,891		4,058,023		4,058,463		4,057,916
	4,058,624		4,058,354		4,057,907		4,058,303		4,058,740		4,058,087
	4,058,625		4,058,358		4,057,945		4,058,580		4,058,831		4,058,289
	4,058,644		4,058,363		4,058,002		4,058,668	48 :	4,057,876		4,058,343
	4,058,661		4,058,375		4,058,013	42 :	4,057,879		4,057,887		4,058,349
	4,058,739		4,058,397		4,058,039		4,057,911		4,057,917		4,058,631
	4,058,749		4,058,399		4,058,042		4,057,943		4,057,924		4,058,670
	4,058,751		4,058,400		4,058,080		4,057,954		4,057,958		4,058,686
	4,058,758		4,058,401		4,058,083		4,057,982		4,057,965		4,058,728
	4,058,760		4,058,411		4,058,135		4,058,055		4,057,967		4,058,781
	4,058,813		4,058,415		4,058,139		4,058,079				

DESIGN PATENTS

2 :	246,356	8 :	246,392	24 :	246,349		246,369		246,373	45 :	246,347
6 :	246,345	9 :	246,338		246,389	35 :	246,385		246,376	47 :	246,341
	246,346	12 :	246,398	25 :	246,361		246,399		246,378	48 :	246,339
	246,371	17 :	246,340		246,364	36 :	246,336		246,379		246,352
	246,377		246,366	26 :	246,368		246,343		246,393		246,358
	246,381		246,397		246,370		246,348	39 :	246,337		246,362
	246,386	18 :	246,374		246,382		246,354		246,350	51 :	246,342
	246,390	19 :	246,388	29 :	246,365		246,355		246,387		246,344
	246,391	21 :	246,400	34 :	246,367		246,357	42 :	246,360		246,359

PLANT PATENTS

6 :	4,150	18 :	4,151		4,152	41 :	4,148		4,149		

U. S. GOVERNMENT PRINTING OFFICE : O - 1977

CHANGE OF ADDRESS FORM

NAME—FIRST, LAST

COMPANY NAME OR ADDITIONAL ADDRESS LINE

STREET ADDRESS

CITY | STATE | ZIP CODE

PLEASE PRINT OR TYPE

(or) COUNTRY

Mail this form to: NEW ADDRESS

Superintendent of Documents
Government Printing Office SSOM
Washington, D.C. 20402

Attach last subscription label here.

SUBSCRIPTION ORDER FORM

SUBSCRIPTION ORDER FORM

ENTER MY SUBSCRIPTION TO:

@ $ Domestic; @ $ Foreign.

NAME—FIRST, LAST

COMPANY NAME OR ADDITIONAL ADDRESS LINE

STREET ADDRESS

CITY | STATE | ZIP CODE

PLEASE PRINT OR TYPE

(or) COUNTRY

☐ Remittance Enclosed (Make checks payable to Superintendent of Documents)

☐ Charge to my Deposit Account No. ....

MAIL ORDER FORM TO:
Superintendent of Documents
Government Printing Office
Washington, D.C. 20402

OFFICIAL GAZETTE of the
UNITED STATES PATENT and TRADEMARK OFFICE

November 22, 1977 Volume 964 Number 4

CONTENTS

The following are mailed under direction of the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, to whom all subscriptions should be made payable and all communications addressed:

THE OFFICIAL GAZETTE (PATENTS SECTION), issued weekly, subscription $342.20 per annum for first class mailing, also available as fourth-class mail at $250.00; foreign mailing $85.55 additional: single copies $6.60 each.

THE OFFICIAL GAZETTE (TRADEMARK SECTION), issued weekly, subscription $88.40 per annum, foreign mailing $22.10 additional; single copies $1.70 each.

CIRCULARS OF GENERAL INFORMATION concerning PATENTS, price 60 cents each.

CIRCULARS OF GENERAL INFORMATION concerning TRADEMARKS, price 50 cents each.

PRINTED COPIES OF PATENTS are furnished by the Patent and Trademark Office at 50 cents each; PLANT PATENTS in color, $1.00 each; copies of TRADEMARKS AND DESIGN PATENTS at 20 cents each. Address orders to the Commissioner of Patents and Trademarks. Washington, D.C., 20231.

Printing authorized by Section 11(a)3 of Title 35, U.S. Code P.T.O.

PATENT AND TRADEMARK OFFICE NOTICES

Translations of Foreign Language References

Frequently, Office actions cite references that are in a foreign language. In the event a translation of the entire text or portion of the text of the reference is readily available in the examiners' search files, a copy of the translation will normally be included with the Office action. However, applicants are cautioned that the inclusion of a translation with a foreign language reference should not be construed to mean that the examiner used or relied on the translation, or that it is accurate or an official translation made by the Patent and Trademark Office.

While this service may be infrequent, it could be increased by the submission of translations by the applicant to the Office. Accordingly, it is requested that translations of foreign language references be transmitted to the Office, and in particular be transmitted with the response to the Office action or in a separate envelope addressed to: Commissioner of Patents and Trademarks, Washington, D.C. 20231. In addition, it would be of great assistance to the Office in filing the translation, if the translation carried the following: 1. an identification of the foreign language reference and, where possible, 2. its location in the examiners' search files (e.g. location should be known if reference was cited in Office action). If identifying information is not available, the incoming translation should carry the name "Scientific Library" thereon so that it can be processed by the Library.

WILLIAM FELDMAN,
Deputy Assistant Commissioner for Patents.

Date: Oct. 26, 1977.

Entry Into Force of the Patent Cooperation Treaty

The Patent and Trademark Office has received notification that the United Kingdom deposited its instrument of ratification for the Patent Cooperation Treaty (PCT) with the World Intellectual Property Organization (WIPO) in Geneva, Switzerland on October 24, 1977. This ratification fulfilled the requirements for entry into force of the PCT under Article 63 of the Treaty. Article 63 provides that the Treaty shall enter into force three months after eight States have deposited their instruments of ratification or accession, provided that at least four of the States have major patent activity as defined therein. The four countries with major patent activity which have ratified the Treaty are:

Federal Republic of Germany
Switzerland
United Kingdom
United States of America.

Ratifications or accessions to the PCT have also been deposited by:

Cameroon	Madagascar
Central African Empire	Malawi
Chad	Senegal
Congo	Togo.
Gabon	

Since the last required ratification was deposited on October 24, 1977, the Treaty will enter into force three months later, on January 24, 1978. It should be noted that the national PCT implementing legislation, Public Law 94–131 of November 14, 1975 (89 Stat. 685; 942 O.G. 177; and page 108 of the August 1976 issue of "Patent Laws") comes into force on the same day as the entry into force of the PCT. Therefore, Public Law 94–131 will also enter into force on January 24, 1978.

The date from which international applications under the PCT may be filed is currently expected to be in July of 1978; the exact date will be fixed by the Assembly of the PCT. The first meeting of the Assembly is currently expected to take place during April 1978. A copy of the PCT was published in the Official Gazette on July 14, 1970 at 876 O.G. 341–388.

In view of the entry into force of the Patent Cooperation Treaty (PCT) on January 24, 1978 and the European Patent Convention (EPC) on October 7, 1977, applicants may now wish to prepare their national patent application papers for filing in the United States in the format required by the PCT and the EPC so that the application need not be later retyped and reformatted for PCT or EPC filing. The format requirements for applications under these two Treaties are identical. In the PCT most of these requirements appear in PCT Rule 11 while in the EPC the major requirements are found in EPC Rules 32 and 35.

Shortly after the PCT and Public Law 94–131 come into force, rule changes along the lines of those proposed in the Official Gazette of February 8, 1977 (955 O.G. 350–363) will be promulgated which will make patent applications prepared in the PCT-EPC format completely acceptable as United States national patent applications.

Since applications may be filed and given a filing date under the EPC beginning June 1, 1978 and the PCT will be operational for the filing of international applications soon thereafter, applications which are currently being filed as U.S. national applications may serve as the basis for priority claims under these Treaties.

Preparation of United States national patent applications in PCT-EPC format is substantially possible today and may eliminate the need for reformatting and retyping the case if it is later filed as a PCT International application or an EPC European application.

There are only a few areas where present U.S. national format requirements conflict with PCT-EPC format requirements. The major differences are the sheet margins; page numbering, which, under PCT-EPC, is at the top; typing, which must be 1½ spaced under PCT-EPC; the location of the title and the abstract; and the drawing sheet size, which must be A4 (21 cm x 29.7 cm) under PCT-EPC. The Office will presently accept applications prepared on A4 size paper, with 1½ spacing between typed lines, page numbering at the top, and the title at the beginning of the abstract and description. In addition, if application papers are filed with the PCT-EPC margins, the margins requirements of 37 CFR 1.52(b) will not be enforced.

The only remaining format problems are the location of the abstract and the drawing sheet size. Under the PCT-EPC, the abstract must be on a separate sheet which follows the claims. For current filing the title and abstract can be placed on a separate sheet without a number, with the first page of the description also containing the title and being numbered as page 1. For a later PCT-EPC application the abstract can be placed last and numbered in sequence. Drawings may be prepared to comply with the present U.S. national drawing size requirements (8½ x 14 inch sheets) but with a PCT-EPC sight size so that the sheets can later be cut down to A4 size.

Nov. 1, 1977. LUTRELLE F. PARKER,
Acting Commissioner of Patents and Trademarks.

Patent Suits

Notices under 35 U.S.C. 290; Patent Act of 1952

2,515,754, Wolfe and Kessler, PANEL FOR USE AS A GATE, **filed** Aug. 4, 1976, D.C. Colo. (Denver), Doc. 76–W–770, *Moncrief-Lenoir Manufacturing Co.* v. *Life-Time, Inc., Life-Time Gate Co., R. B. Block and T. B. Shreve.* Motion and order of injunction and dismissal entered by court, June 20, 1977.

3,063,457, Bittner and Gnass, FOOT EXERCISER SANDALS, **filed** Mar. 21, 1977, D.C., E.D. Mo. (St. Louis), Doc. 77–301C(1), *Scholl, Inc.* v. *Modern Shoe Co., H. A. Waltuch, Robert J. Gamm and Michael Mathis.* Writ of injunction filed enjoining defendants from making, etc. articles of footwear referred to as "Olympus Exercise Sandals," May 12, 1977.

3,066,382, Zweigle and Humbert, STRANDED ALKENYL AROMATIC POLYMER FOAM FOR LOOSE-FILL PACKAGING, **filed** May 13, 1975, D.C.N.J. (Newark), Doc. 75–815, *The Dow Chemical Company* v. *Creative Displays Inc., Ampco Division.* Dismissed, June 27, 1977.

3,107,613, Armstrong, England, Parshall and Thatcher, BORON COMPOUND; **3,126,305,** R. K. Armstrong, IGNITION COMPOSITIONS COMPRISING BORON CONTAINING SALTS; **3,148,938,** W. H. Knoth, Jr., AMMONIA AND HYDRAZINE SALTS OF THE $B_{10}H_{10}^{-2}$ ANION; **3,149,163,** same, AMINE AND ORGANO-SUBSTITUTED HYDRAZINE SALTS OF THE $B_{10}H_{10}^{-2}$ ANION AND PROCESS FOR PREPARING SAME; **3,149,939,** B. W. Larsen, CENTRIFUGAL SEPARATOR; **3,184,286,** D. C. England, $Cs_2B_{12}H_{12}CsNO_3$ PRODUCT AND PROCESS FOR MAKING SAME; **3,365,275,** E. L. Muettertles, POLYHYDROPOLYBORATES AND PROCESSES FOR PREPARING THEM; **3,431,089,** V. A. Engelhardt, REACTION PRODUCTS AND PROCESSES; **3,446,604,** E. L. Muettertles, ACID AND SALTS OF $B_{20}H_{18}^{-2}$ ION, **filed** Sept. 3, 1976, D.C., N.D. Calif. (San Francisco), Doc. C76–1892–CBR, *Teledyne McCormich Selph* v. *Robert C. Allen.* Action dismissed without prejudice, June 17, 1977.

3,126,305. (See 3,107,613.)

3,148,938. (See 3,107,613.)

3,149,163. (See 3,107,613.)

3,149,939. (See 3,107,613.)

3,173,583, E. A. Wahl, BIN ACTIVATOR, **filed** July 23, 1976, D.C.N.J. (Newark), Doc. 76–1412, *Eugene A. Wahl and Vibra Screw Incorporated* v. *Solids Flow Control Corporation.* Order granting defendant's motion for summary judgment, July 27, 1976.

3,184,286. (See 3,107,613.)

3,364,976, Reding and Bothwell, METHOD OF CASTING EMPLOYING SELF–GENERATED VACUUM, **filed** June 20, 1977, D.C., W.D. Okla. (Oklahoma City), Doc. 77–0584–D, *CMI Corporation* v. *Barco Manufacturing Company.*

3,365,275. (See 3,107,613.)

3,371,455, G. C. Fox, SWIMMING POOL STRUCTURE, **filed** Nov. 23, 1976, D.C., S.D.N.Y., Doc. 76–CV–494, *Fox Pool Corporation* v. *Imperial Pools, Inc.* Stipulated dismissal without prejudice pursuant to Rule 41(a)(1)(ii), F.R.C.P., filed June 21, 1977.

3,396,342, A. E. Feinberg, POWER SUPPLY CIRCUIT FOR CONTINUOUS WAVE MAGNETRON OPERATED BY PULSED DIRECT CURRENT, **filed** June 20, 1977, D.C.N.J. (Newark), Doc. C–77–1210, *Advance Transformer Company* v. *Mevlin L. Levinson.*

3,412,062, Johnson, Phillips and Watt, PRODUCTION OF CARBON FIBRES AND COMPOSITIONS CONTAINING SAID FIBERS, **filed** Mar. 15, 1972, D.C. Del. (Wilmington), Doc. 4347, *National Research Development Corporation* v. *Great Lakes Carbon Corporation and Great Lakes Research Corporation.* Stipulation of dismissal, pursuant to the provisions of Rule 41(a)(1) FRCP, it is hereby stipulated that the above action shall be dismissed with prejudice, June 3, 1977.

3,431,089. (See 3,107,613.)

3,446,604. (See 3,107,613.)

3,510,162, Smith and Binns, SELF-ADJUSTING LOCK; **3,642,314,** same, GRAVITY-ACTUATED LOCK, **filed** Aug. 8, 1974, D.C., E.D. Tex. (Texarkana), Doc. TX–74–96–CA, *Overhead Door Corporation* v. *Newcourt, Inc.* Judgment was entered showing that defendant has not infringed the above patents, nor induced infringement and judgment entered against plaintiff, June 9, 1977.

3,519,441, Ferrara and Snodgrass, PROCESS FOR TREATING FLOUR AND STARCH TO ELIMINATE FREE SH GROUPS, **filed** July 7, 1977, D.C., N.D. Tex. (Dallas), Doc. CA3–77–921–G, *Peter J. Ferrara* v. *Cargill Incorporated.*

3,642,314. (See 3,510,162.)

3,717,963, J. T. Sauriol, METER HOUSING; **Re. 28,640,** same, **filed** Sept. 29, 1975, D.C., N.D. Tex. (Dallas), Doc. CA–3–75–1195–D, *Roby Industries, Inc.* v. *Bass & Hayes Foundry, Inc. and Polyfoam Industries, Inc.* Pursuant to 35 U.S.C. 256, the Commissioner of Patents and Trademarks is directed to issue an appropriate certificate adding Walter H. Gross as joint inventor of said patents, June 11, 1977.

3,822,520, J. M. Crom, Jr., PRESTRESSED TANK AND METHOD OF PRODUCING SAME, **filed** June 9, 1977, D.C. Nev. (Reno), Doc. 77–0100, *The Crom Corp.* v. *John Crom, Jr.*

3,829,935, J. G. Critchfield, BUTTON COLLET, **filed** Oct. 22, 1976, D.C., W.D.N.C. (Statesville), Doc. ST–C–76–44, *Handy Button Machine Company* v. *Yarborough & Company.* Judgment and decree, effective Sept. 1, 1977, defendant is permanently enjoined from making, using or otherwise infringing said patent. The defenses and claims raised by the defendant are dismissed with prejudice, May 31, 1977. **Same, filed** Oct. 22, 1976, D.C., W.D.N.C. (Statesville), Doc. ST–C–76–45, *Handy Button Machine Company* v. *Graulin Enterprises Limited.* Judgment and decree, the defenses and the counterclaim of defendant are hereby dismissed with prejudice. Defendant is permanently enjoined from infringing said patent, June 20, 1977.

3,835,292, Walter, Kroheim and Levine, STEAM CURLING IRON, **filed** June 20, 1977, D.C. Del. (Wilmington), Doc. 77–230, *Clairol* v. *Conair.*

3,853,217, Scordato and Cohen, PIPETTE TIP PACKAGE, **filed** June 3, 1977, D.C., N.D. Ill. (Chicago), Doc. 77c1999, *Medical Laboratory Automation, Inc.* v. *Labcon, Inc.*

3,932,696, Fork, Lindner, Kelly and Albrecht, UNDERFLOOR ACCESS HOUSING UTILIZING A TROUGH SPACE OF A CELLULAR FLOORING UNIT, **filed** May 6, 1976, D.C.N.J. (Newark), Doc. 76–840, *Raceway Components, Inc. et al.* v. *H. H. Robertson Company.* Action dismissed, June 22, 1977.

3,935,322, Weiss, Campbell and Wilson, CHIP SEPARATING FROM A FRIED RIBBON; **3,937,848,** Campbell and Liedman, CHIP FRACTURING FROM A FRIED RIBBON, **filed** May 17, 1976, D.C., E.D. Tenn. (Chattanooga), Doc. 1–76–90, *General Mills, Inc.* v. *Standard Brands, Inc.* Patent 3,935,322 declared invalid, Apr. 26, 1977; stipulation and order of dismissal without prejudice as to the amended complaint and the counterclaim entered May 16, 1977.

3,937,848. (See 3,935,322.)

3,938,602, Sly and Salmans, SLICING SYSTEM WITH AUTOMATIC PORTION WEIGHT CONTROL, **filed** June 1, 1977, D.C., N.D. Ill. (Chicago), Doc. 77c1949, *Eugene L. Sly* v. *Portion Systems Inc.*

3,954,124, R. E. Self, HIGH ENERGY LOSS NESTED SLEEVE FLUID CONTROL DEVICE, **filed** June 9, 1977, D.C., C.D. Calif. (Los Angeles), Doc. CV77–2102–F, *Control Components, Inc.* v. *Atlantic Richfield Co. et al.*

4,026,037, A. Buchholz, APPARATUS FOR STEAM DRYING, **filed** June 13, 1977, D.C. Oreg. (Portland), Doc. 77–448, *Champion International Corporation, Inc.* v. *Adolf Buchholz, also known as Al Buchholz and Buchholz Industries, Inc.*

Re. 25,570, J. H. Lemelson, EXTRUSION APPARATUS, **filed** Aug. 12, 1976, D.C.N.J. (Newark), Doc. 76–1583, *Jerome H. Lemelson* v. *Kautex-Werke, Reinold Hagen GmbH and Kautex Machines Inc.* Action dismissed, June 21, 1977.

Re. 28,640. (See 3,717,963.)

D. 227,722, M. A. Mendlin, COMBINED BED AND STORAGE UNIT; **D. 227,723,** same, COMBINED BUNK BED AND STORAGE UNIT; **D. 227,725,** same, **filed** June 7, 1977, D.C.N.J. (Newark), Doc. C–77–1106, *Bunk Trunk Distributors* v. *Unique Headboard Company, Inc.*

D. 227,723. (See D. 227,722.)

D. 227,725. (See D. 227,722.)

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b)).

3,913,512, Re. S.N. 837,167, Filed Sept. 27, 1977, Cl. 114/260, VESSEL FOR FLOTATION LOADING AND UNLOADING AND PARTIAL BUOYANCY SUPPORT OF BARGES AND OTHER FLOATING CARGOES, William Everett Kirby, et al., Owner of Record: *Wharton Shipping Corporation, Edificio Vallarino, Panama,* Attorney or Agent: Robert E. Wickersham, et al., Ex. Gp.: 315

3,940,125, Re. S.N. 831,771, Filed Sept. 9, 1977, Cl. 271/10, PICKING AND TRANSPORTING MEANS FOR FABRIC SECTIONS AND THE LIKE, Kenneth O. Morton, Owner of Record: *Cluett, Peabody & Company, Inc., New York, N.Y.,* Attorney or Agent: Hubert T. Mandeville, et al., Ex. Gp.: 313

3,943,930, Re. S.N. 836,405, Filed Sept. 26, 1977, Cl. 128/287, DISPOSABLE DIAPER, Charles H. Schaar, Owner of Record: *Colgate-Palmolive Company, New York, N.Y.,* Attorney or Agent: Martin Kirkpatrick, Ex. Gp.: 335

3,969,148, Re. S.N. 833,831, Filed Sept. 16, 1977, Cl. 136/173, ADAPTER FOR DRY CELL BATTERIES, Burton C. Trattner, Owner of Record: *Inventor,* Attorney or Agent: Albert C. Nolte, Jr., et al., Ex. Gp.: 114

3,976,247, Re. S.N. 829,112, Filed Aug. 30, 1977, Cl. 239/135, LOW-TEMPERATURE MELTING METALS SPRAY-GUN, Carmelo Maniglia, Owner of Record: *Tinning Sprayer S.r.l., Genoa, Italy,* Attorney or Agent: None, Ex. Gp.: 313

3,977,058, Re. S.N. 837,233, Filed Sept. 27, 1977, Cl. 28/1.7, METHOD AND APPARATUS FOR CONTROLLING YARN PLUG LENGTH, David E. Borenstein, et al., Owner of Record: *Phillips Petroleum Company, Bartlesville, Okla.,* Attorney or Agent: Donald J. Quigg, et al., Ex. Gp.: 352

3,978,806, Re. S.N. 837,145, Filed Sept. 27, 1977, Cl. 114/260, VESSEL WITH FLOODED HOLD FOR TRANSPORT OF BARGES, William Everett Kirby, et al., Owner of Record: *Wharton Shipping Corporation, Edificio Vallarino, Panama,* Attorney or Agent: Robert E. Wickersham, et al., Ex. Gp.: 315

3,998,374, Re. S.N. 838,442, Filed Sept. 30, 1977, Cl. 228/107, METHOD OF FORMING A LAMINATE, Benjamin Howell Cranston, et al., Owner of Record: *Western Electric Company, Incorporated, New York, N.Y.,* Attorney or Agent: S. I. Rosen, et al., Ex. Gp.: 323

4,016,971, Re. S.N. 836,384, Filed Sept. 26, 1977, Cl. 198/850, CONVEYOR FOR USE IN TOBACCO SHREDDING APPARATUS, Werner Komossa, et al., Owner of Record: *Hauni-Werke Korber & Co. KG, Hamburg, Germany,* Attorney or Agent: David S. Kane, et al., Ex. Gp.: 313

4,022,352, Re. S.N. 837,916, Filed Sept. 29, 1977, Cl. 222/153, CONTAINER COVER AND SAFETY CLOSURE, Harold T. Pehr, Owner of Record: *Inventor,* Attorney or Agent: Claude A. Fishburn, et al., Ex. Gp.: 311

4,039,478, Re. S.N. 834,528, Filed Sept. 19, 1977, Cl. 252/455, FLUE GAS DESULFURIZATION SORBENT, Neville L. Cull, et al., Owner of Record: *Exxon Research and Engineering Company, Linden, N.J.,* Attorney or Agent: Jerome E. Luecke, Ex. Gp.: 115

4,039,954, Re. S.N. 838,990, Filed Oct. 3, 1977, Cl. 325/308, SIGNAL DISTRIBUTION DEVICE FOR A CABLE TELEVISION, Pieter Den Toonder, Owner of Record: *Oak Holland B.V., Emmen, The Netherlands,* Attorney or Agent: James B. Kinzer, et al., Ex. Gp.: 233

XEROX LICENSE OFFER

This notice is published pursuant to a CONSENT ORDER TO CEASE AND DESIST dated July 29, 1975 between Xerox Corporation and the Federal Trade Commission.

TERMS *contained in this notice are defined in the Consent Order. All interested parties should refer to that document for the definitions and additional details of Xerox' patent and know-how licensing obligations thereunder.* A copy of the Consent Order and a list of PATENTS licensed to Xerox which are subject to the provisions of paragraphs II and IV (C) (9) of the Order, if any, are available from Xerox upon written request. All such requests and any request relating to the licensing of PATENTS and the licensing and disclosure of KNOW-HOW pursuant to the Consent Order should be made in writing and addressed to:

The Manager of Patent Licensing
Xerox Corporation
Stamford, Connecticut 06904

Xerox shall in accordance with the terms of the Consent Order:

(1) Grant licenses under
  (a) its ORDER PATENTS to make, have made, use and vend OFFICE COPIER PRODUCTS under the terms of the Consent Order, and
  (b) patents which are required to be licensed pursuant to the terms of paragraph X of the Consent Order, if any, and

(2) Disclose certain written materials as provided in the Consent Order [KNOW-HOW] to any LICENSEE of its United States ORDER PATENTS for use in connection with the manufacture of OFFICE COPIER PRODUCTS in the United States upon payment of the cost of collection and duplication of the requested materials.

The following is a list of patents which is believed to include all of the PATENTS available for licensing in accordance with the terms of the Consent Order. Fuji Xerox, Ltd. patents which also make up part of the list are grouped separately. There also follows a classification index for use in conjunction with the classification data appearing in the patent list to identify the category of the patent and a schedule of foreign countries and their corresponding key letters which are used in identifying corresponding foreign patents in the list. Since the classification system is not restricted solely to OFFICE COPIER PRODUCTS there are several patents included in the list to which the Consent Order is not applicable.

LIST CLASSIFICATION

The Patents are listed in numerical order according to their class assignment. For example, all U.S. patents classified as 1(A) appear at the beginning followed by those classified as 1A1, 1A1A, 1A1B, etc. The left-hand column shows the U.S. patent number. To the right of the U.S. patent number is its title followed by its issue date. Following the U.S. patent issue date is a list of the foreign patents based on the U.S. patents. An example of how the list should be used is as follows:

Under Class 1A which is entitled "Electrostatographic Systems, Imaging Systems—Distinctive Photosensitive Members Imaged", two U.S. patents are listed—2,573,881 which issued November 6, 1951 with corresponding patents in Australia, Canada, Germany, Great Britain, ~~Switzerland~~ and Sweden, and 3,877,936 which issued April 15, 1975 with a corresponding patent in Belgium.

XEROX PATENT CLASSIFICATION INDEX

TABLE OF CONTENTS

964 OG 29

TABLE OF CONTENTS

9. Transfer From Intermediate Insulating Member
D. Charging Across a Liquid Layer
E. Charging a Semiconductive Photoconductor
F. Charging Including Illumination of Photoconductor

4. OPTICAL IMAGE FORMATION AND PROJECTION
A. Illumination of Original
1. Light Sources and Method of Illumination
2. Document Holders
a. Platen Covers
3. Illumination Control Systems
B. Projection of Optical Image onto Photoresponsive Member
1. Scanning Systems—In General
a. Distinctive Optical Scanning Systems
(1) Lens Strip
(2) Fiber Optics
(3) Half Tone Projection Systems
(4) Fresnel Lens
2. Simultaneous Charging and Projection of Optical Image
3. Distortion of Optical Image (e.g., for Coding Purposes)
4. Full Frame Exposure
5. Reflex Exposure
6. Projection with Variable Magnification
a. Magnification with Fixed Optical Path Length
7. Projection of Composite Image
C. Control of Image Contrast

5. LATENT IMAGE DEVELOPMENT SYSTEMS AND COMPOSITIONS
A. Powder Cloud Development
1. Aerosol Development Methods and Apparatus in General
a. Plate Development Apparatus
2. Cloud Charging Methods and Devices
3. Specific Toner and/or Gas Supply Devices and Methods
a. Belt and Porous Material Toner Supply Device
b. Cloud Directing Devices and Methods
4. Induction Development
5. Cleaning Devices
6. Charcoal Development Method
B. Fibrous Brush Development Devices and Methods
C. Magnetic Brush Development (Dry)
1. Magnetic Brush Development Methods and Devices
a. Magnetic Belt Devices
b. Loading Devices
2. Color Producing Development
3. Single Component Magnetic Developer
D. Cascade Development
1. Gravitational Developer Handling Methods and Devices
a. Incremental (e.g., Bucket Devices)
b. Continuous (e.g., Wheel)
c. Magnetic
d. Non-Linear Developer Flow
2. Impact Developing Methods and Devices
3. Developer Contact and Concentration Control Apparatus
4. Background Suppression Apparatus
5. Flat Plate Development
E. Liquid Development
1. Liquid Aerosol Development
2. Emulsion Development
3. Encapsulated Liquid Development
4. Electrophoretic Development
5. Polar Ink Development
F. Donor Development Methods and Apparatus
G. Dense Bed Development Methods and Apparatus
H. Fluidized Bed Development Methods and Apparatus
I. Toner and Developer Dispensing Methods and Apparatus
1. Developer Dispensing
2. Toner Dispensing
a. Powdered Toner Containers
b. Solid Toner Containers
c. Dispensing Apparatus
(1) Without Concentration Control
(2) With Concentration Control
J. Development Electrodes
1. Electrode Types in General
2. Segmented Electrodes
3. Flexible Electrodes
4. Self-Cleaning Electrodes
5. With Variation of Potential
K. Contrast and Large Area Development Enhancement
L. Simultaneous Positive-Negative Formation
M. Reversal Development
N. Developer, Toner and Carrier Compositions
1. Three Component Developer-Carrier, Toner and Additive
a. Inorganic Additive
b. Organic Additive
2. Two Component Developer
a. Distinctive Toner
(1) Polystyrene-Containing
(2) Phenol-Formaldehyde Containing
b. Distinctive Carrier
3. One Component
4. New Carriers
5. New Toners
a. Distinctive Pigment
b. Encapsulated Liquids
6. Developer Manufacture
a. Carrier Preparation
b. Toner Preparation
O. Miscellaneous
P. Simultaneous Development and Cleaning

6. COPY SUBSTRATE HANDLING SYSTEMS
A. Paper Holding Trays
1. With Stack Height Control
B. Seriatim Stack Feeding Devices
1. Mechanical
2. Aeriform
C. Non-Seriatim Stack Feeding Devices
D. Sheet Tracking, Registration, Aligning, Conveying Devices
1. Belt Conveyors
2. Clutch Mechanisms
E. Sheet Holding Devices (During Image Transfer)
F. Mispuff and Multiple Sheet Detecting Devices

G. Counter Devices
H. Sheet Stripping Devices
I. Sheet Cutting Devices
J. Sheet Inverting Devices
K. Copy Distribution, Collection and Sorting Devices

7. DEVELOPED IMAGE TRANSFER AND DISPLAY
A. Image Display Systems
1. Reflective Projection
2. Transmittive Projection
B. Chemical Treatment to Enhance Transfer
C. Electrostatic Transfer of Toner
1. Corona Charging Systems
a. With Conductive Transfer Web
2. A.C. Field Transfer
3. Multiple Transfer
4. Selective Transfer
D. Magnetic Transfer of Toner
E. Pressure Transfer of Toner
1. With Heat
2. With Solvent
3. With Tackified Copy Substrate
a. Gelatin Coated Substrate

8. IMAGE FIXING SYSTEMS
A. Heat Fixation
1. Radiation
a. Flash Heating
b. Control Systems
c. Glass Panel Heating
2. Conduction
a. With Pressure Means
3. Convection
4. Induction
B. Fixation with Vapor Fixative
1. Fixative Removal
C. Fixation with Liquid Fixative
D. Fixation with Solid Fixative
E. Fixation with Pressure
1. Gelatin Coated Copy Substrate

9. CLEANING OF IMAGING SURFACE
A. Frictional
1. Web
2. Brush
a. With Brush Scraper
b. With Electrostatic Assist
(1) Within a Liquid
c. Filter Bag For Use with
B. Non-Frictional
1. Magnetic Brush
2. Cleaning Beads
3. Liquid

10. DOCUMENT HANDLING
A. Document Feed Apparatus
B. Microfiche Handling Systems
C. Stack Feeding Apparatus
D. Facsimile Feeding Apparatus
E. Document Registration Systems
F. Document Inverting Apparatus
G. Stacking and/or Imbricating Apparatus
H. Collating Apparatus
I. Document Jamming Detection Devices

12. PHOTOELECTROPHORESIS
A. Basic Process and Materials
B. Basic Apparatus
C. Machines
D. Air Breakdown
E. Blocking Electrode
F. Camera Apparatus
G. Cleaning
H. Apparatus Components
I. Composite Particle
J. Fixing
K. Inking
L. Masking
M. Pigments (Including PEP Use of Particular Pigment)
N. Process Variation
O. Sensitizors
P. Shear
Q. Transfer
R. Use of Image

15. IMAGING SYSTEMS OTHER THAN ELECTROSTATOGRAPHIC
A. Deformation Imaging
B. Polymerization Imaging
1. Photopolymerization Imaging
2. Charge Injection Polymerization Imaging
C. Ferromagnetic Imaging
D. Photochromic Imaging
E. Vesicular Imaging
F. Exposure Only Imaging

17. OPTICAL SYSTEMS
A. Radiation Sensing
1. X-ray, Ultraviolet
2. Solar Cell
3. Spectral Response Junctions
4. Photocell Circuits
B. Optical Projection and Modulation
1. Image Projection
2. Lenses, Transparencies
3. Kerr Cell
4. Modulators
C. Image Conversion and Intensification
1. Emission
2. Infrared
3. Passive
4. Active (Semiconductor)
D. Character Generation and Display Devices
1. Deflection Generated Display
2. Character Mask
3. Translation and Function Generation
4. Justifier
5. Optical Lens Arrangements
E. Optical Imaging and Scanning
1. Photosensitive Scanners and Spot Scanning Systems
2. Field Effect Scanners
3. Lenticular
4. Scanning Lens Strip and Rotating Mirror Mechanisms
5. Thermotropic, Thermal, Deformation
6. Optical Stabilizing Devices
F. Electron Beam Devices

1. Tubes
2. Circuits

G. Electroluminescent Devices
1. Storage with Field Effect Device
2. Storage Panels—Construction
3. Display, Actuation
4. Enhancement, Amplifications, Conversion

H. Stimulated Emission Devices
1. Laser Structure and Materials
2. Laser Structures
3. Laser Optical Systems and Applications

I. Optical Devices
1. Pressure Gauge
2. Density Measuring
3. Fiber Optics

J. Miscellaneous

18. CHEMICAL COMPOSITIONS AND PREPARATION THEREOF
A. Photosensitive
1. With a Liquid Vehicle
2. Phthalocyanine
a. X-Form
3. Carboxamides
4. Naphthols

B. Polymers

C. Developer, Toner and Carrier Compositions
1. Three Component Developer-Carrier, Toner and Additive
a. Inorganic Additive
b. Organic Additive
2. Two Component Developer
a. Distinctive Toner
(1) Polystyrene-Containing
(2) Phenol-Formaldehyde Containing
b. Distinctive Carrier
3. One Component Developer
4. New Carriers
5. New Toners
a. Distinctive Pigment
b. Encapsulated Liquids
6. Developer Manufacture
a. Carrier Manufacture
b. Toner Preparation

D. Brazing Compositions

20. MECHANICAL COMPONENTS
A. Mechanical Reaction Devices
1. Belts
2. Drives
3. Pulleys and Rollers
4. Load Movers
→ 5. Clutch
6. Transport Motor and Speed Controls

B. Dispensing and Filtering Devices
1. Powder Cloud
2. Particulate Material Dispensing, Distribution
3. Filtering

C. Sensing Devices
1. Powder Level
2. Temperature
3. Quality (Web)
4. Pressure Gauge
5. Wind
6. Weight
7. Thickness

D. Work Devices (Mechanical)
1. Holding, Forming, Feeding
2. Bonding and Fastening
3. Coupling (Pipe)
4. Testing
5. Molding
6. Valves
7. Sizing

E. Antenna Structure

F. Fluid Amplifiers and Magnetically Controllable Switching Devices

G. Miscellaneous

21. METAL WORKING, FORMING AND TREATING
A. Electroforming and Plating
1. Methods
2. Structure
3. Apparatus

B. Metal Treating

24. GRAPHIC ARTS
A. Liquid Ink Recording
1. Electrically Responsive System
2. Electromechanically Responsive System
3. Magnetically Responsive System
4. Photoresponsive System

B. Photographic Copying
1. Transparency Formation
a. Document Support
b. Projection and Exposure
(1) Simultaneous Exposure and Development of Different Frames
(2) Image Reversal Optics
(3) Automatic Masking
c. Transparency Identification
d. Frame Counting and Locating
e. Miscellaneous
2. Contact Printing From a Transparency
a. Transparency Feed
b. Establishing and Maintaining Contact Between Transparency and Copy Material
c. Exposure Control
d. Transfer Imaging
(1) Image Layer Support Strip
3. Processing
a. Material Purification
b. Transparency Transport
4. Viewing

C. Duplicating
1. Method and Apparatus
a. Thermographic
b. Pressure Applied to Sandwich of Original, Transfer and Receiving Sheet
c. Transfer of Electrostatic Charge Through Stencil
d. Condensation Imaging
e. Spirit and Dry Duplicating Systems (Including ELCAR)
(1) Means for Rotably Mounting a Transfer Sheet
(2) Means for Establishing Pressure Between Transfer Sheet and Copy Substrate
(3) Copy Substrate Handling
(4) Program Control
(5) Formation of a Spirit Duplicating Transfer Sheet
(6) Formation of a Stencil Transfer Sheet

(7) Composition of a Transfer Sheet, Receiving Sheets and Printing Inks

D. Planographic Imaging (Including Lithography)

E. Relief Imaging

F. Gravure Printing

G. Miscellaneous

25. ELECTRONIC COMPONENTS
A. Passive Components
1. Printed Circuit Boards
2. Semiconductor Devices
3. Thin Film Components
4. Connectors

B. Active Components
1. Space Charge Devices
2. Junction Devices
3. Thermionic Conversion Devices
4. Thyratrons

C. Circuits
1. Amplifiers
2. Switching
3. Oscillators and Generators
4. Pulse Circuitry, Including Signal Storage and Delay
5. Power Supply
6. Miscellaneous

26. DESIGN PATENTS
A. Reproduction Apparatus
1. In General
2. Document Feeding Apparatus
3. Transfer and Fusing Apparatus
4. Printer
5. Camera

B. Sorting and/or Storing Apparatus

C. Containers for Xerographic Powder

D. Labeling Apparatus

E. Facsimile Transmission Apparatus
1. In General
2. Transceiver Paper Feed Apparatus
3. Adapter for Facsimile Computer System

F. Microform Apparatus
1. Viewer and/or Copier

G. Educational Devices
1. Scales

H. Miscellaneous
1. Housing For Electronic Apparatus
2. Computer Keyboard
3. Send/Receive Data Printer Terminal
4. Telephone Acoustic Coupler
5. Prism
6. Paper Shredder
7. Other

27. PHOTOGRAPHY
A. Direct Printout Members
B. Direct Printout Processes
C. Imaging Member Fabrication
D. Photographic Processes Generally

30. MANIFOLD
A. Basic Process
B. Apparatus
C. Process Variations
D. Activation
E. Image Transfer and Fixing
F. Duplication Masters
G. Image Reversal
H. Reflex Imaging
I. Color Processes

31. MIGRATION IMAGING (XDM)
A. Basic Process
B. Apparatus
C. Process Variation
D. Imaging Members
E. Imaging Member Fabrication
F. Imaged Members
G. Stripping and Splitting
H. Reversal
I. Fixing
J. Duplicating Masters
K. Color
L. Use of Image

32. MISCELLANEOUS
A. Energy Cells
B. Miscellaneous

FOREIGN COUNTRY KEY LETTER CODE

COUNTRY KEY	COUNTRY NAME
AAA	NO FOREIGN FILING
ALB	ALBANIA
ALG	ALGERIA
ARG	ARGENTINA
ATR	AUSTRIA
AUS	AUSTRALIA
BAH	BAHAMAS
BAR	BAHRAIN
BEL	BELGIUM
BOL	BOLIVIA
BRA	BRAZIL
BRS	BR. SOLOMON ISL.
BRU	BRUNEI
BUL	BULGARIA
BUR	BURUNDI
CAM	CAMBODIA
CAN	CANADA
CEY	CEYLON
CHL	CHILE
CHN	CHINA
CLB	COLOMBIA
COR	CONGO REP. (ZAIRE)
COS	COSTA RICA
CUB	CUBA
CZC	CZECHOSLOVAKIA
DNK	DENMARK
DOR	DOMINICAN REP.
ECD	ECUADOR
EGP	EGYPT
EGR	E. GERMANY
EIR	EIRE
ELS	EL SALVADOR
FIJ	FIJI
FIN	FINLAND
FOM	FORMOSA
FRA	FRANCE
GER	GERMANY
GHA	GHANA
GIB	GIBRALTAR
GIE	GIBERT & ELLICE
GNR	GUINEA REP.
GRB	GR. BRITAIN
GRK	GREECE
GUA	GUATEMELA
GUR	GUERNSEY
HGK	HONG KONG
HOL	HOLLAND
HON	HONDURAS
HUN	HUNGARY
ICE	ICELAND
IDS	INDONESIA
IND	INDIA
IRL	IRELAND
IRN	IRAN
ISR	ISRAEL
ITL	ITALY
JAM	JAMAICA
JAP	JAPAN

COUNTRY KEY	COUNTRY NAME
JER	JERSEY
KEN	KENYA
KOR	KOREA
KUW	KUWAIT
LAS	LAOS
LEB	LEBANON
LIB	LIBERIA
LXB	LUXEMBOURG
MAU	MAURITIUS
MEX	MEXICO
MLI	MALI
MLS	MALASIA
MLT	MALTA
MLW	MALAWI
MNC	MONACO
MRC	MOROCCO
NIG	NIGERIA
NOR	NORWAY
NZL	NEW ZEALAND
PAK	PAKISTAN
PLD	POLAND
PLP	PHILIPPINES
PNM	PANAMA
PRU	PERU
PTG	PORTUGAL
RHD	RHODESIA
RMN	RUMANIA
RWD	RWANDA
SAB	SAUDI ARABIA
SAF	SOUTH AFRICA
SBH	SABAH
SGP	SINGAPORE
SHL	ST. HELENA
SLN	SIERRA LEONE
SPN	SPAIN
SRK	SARAWAK
STZ	SWITZERLAND
SWA	SO. WEST AFRICA
SWD	SWEDEN
SYA	SYRIA
TGR	TANGIER
THL	THAILAND
TIW	TAIWAN
TNS	TUNIS
TRD	TRINIDAD
TRK	TURKEY
TZN	TANZANIA
UGD	UGANDA
UK	UNITED KINGDOM (Fuji Xerox list only)
URG	URUGUAY
USA	USA
USR	USSR
UAR	UNITED ARAB REP.
VTM	VIETNAM
VZL	VENEZUELA
YGS	YUGOSLAVIA
ZMB	ZAMBIA
ZZZ	

FUJI XEROX PATENTS

Class 1A1C

3,569,803.—ELECTROPHOTOGRAPHIC PROCESS UTILIZING FRICTION CHARGING. MAR. 9, 1971. BEL. 719365, CAN. 925561, FRA. 1577647, U.K. 1232470.

3,573,905.—METHOD OF PRODUCING ELECTROPHOTOSENSITIVE CADMIUM SULFIDE WITH CRYSTALS OF A HEXAGONALITY OF LESS THAN 80%. APR. 6, 1971. BEL. 682886, CAN. 814845, FRA. 1526846, JAP. 43-16195, MEX. 93082, U.K. 1148487.

3,775,103.—ELECTROPHOTOGRAPHIC MATERIAL AND PROCESS FOR PRODUCING SAME. NOV. 27, 1973. BEL. 693919, FRA. 1511300, GER. 1,522,612, ITL. 798303, NOR. 122730, U.K. 1,183,762.

3,775,106.—ELECTROPHOTOGRAPHIC PROCESS. NOV. 27, 1973. BEL. 771855, CAN. 946465, JAP. 49-17531, U.K. 1328318.

Class 1A1F

3,705,032.—ELECTROPHOTOGRAPHIC MATERIALS. DEC. 5, 1972. AUS. 432027, BEL. 737701, CAN. 918984, FRA. 6928605, GER. 1942383, ITL. 872749, JAP. 48-2966, U.K. 1237036.

Class 1A2C

3,660,086.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS EMPLOYING INORGANIC PHOTOCONDUCTIVE MATERIAL WITH A PHOTOCHROMIC SENSITIZING AGENT. MAY 2, 1972. U.K. 1290441.

3,799,773.—ELECTROPHOTOGRAPHIC PROCESS EMPLOYING A PHOTOCHROMIC COMPOUND AND TRANSPARENT TONER. MAR. 26, 1974.

Class 1A6

3,787,235.—METHOD OF ELECTROPHOTOGRAPHIC SENSITIVE PAPER. JAN. 22, 1974. JAP. 48-1330.

Class 1C4B

3,563,733.—METHODS OF PREPARING RELIEF IMAGES BY ENZYMATIC DIGESTION. FEB. 16, 1971. BEL. 709856, CAN. 830395, FRA. 1564578, JAP. 46-11628, U.K. 1217087.

3,630,728.—ELECTROPHOTOGRAPHIC METHOD OF FORMING RELIEF IMAGES. DEC. 28, 1971. BEL. 728693, CAN. 877883, FRA. 2002.362, JAP. 46-41348, U.K, 1228509.

Class 1E

3,549,359.—COLOR ELECTROPHOTOGRAPHY EMPLOYING DYE TRANSFER FROM A DYE-CONTAINING PHOTOSENSITIVE LAYER TO AN IMAGE RECEIVING SHEET. DEC. 22, 1970. FRA. 1524473, GER. 1,572,341, JAP. 45-40159, U.K. 1,183,532.

3,615,391.—ELECTROPHOTOGRAPHIC COLOR DEVELOPING METHOD. OCT. 26, 1971. AUS. 435735, CAN. 842157, FRA. 1572518, JAP. 46-21996, U.K. 1231846, U.K. 1257609.

3,615,392.—ELECTROPHOTOGRAPHIC REPRODUCTION OF ORIGINALS CONTAINING BOTH MULTICOLOR AND LINE AREAS. OCT. 26, 1971. CAN. 902986, JAP. 46-43951.

3,654,865.—METHOD FOR FORMING DYE IMAGE USING AN ELECTROPHOTOGRAPHIC DEVELOPER CONTAINING A GELATIN TONER. APR. 11, 1972. AUS. 435812, BEL. 745534, CAN. 924.951, FRA. 7004034, ITL. 888.447, JAP. 48-9017, U.K. 1257296.

3,656,947.—CODING OF ORIGINALS AND SENSITIVE PAPER IN A MULTI-COLOR ELECTROPHOTOGRAPHIC PROCESS. APR. 18, 1972. BEL. 748591, CAN. 902987, FRA. 7012518, JAP. 48-26778, U.K. 1309644.

3,672,887.—ELECTROPHOTOGRAPHIC PROCESS FOR MULTICOLOR REPRODUCTION. JUNE 27, 1972. JAP. 47-19395.

3,687,661.—COLOR ELECTROPHOTOGRAPHIC PROCESS. AUG. 29, 1972. CAN. 925929, JAP. 48-28697.

3,689,260.—COLOR ELECTROPHOTOGRAPHIC PROCESS WITH RESIN DEPOSITION FOR STABILIZATION OF TONER IMAGE. SEPT. 5, 1972. AUS. 437666, BEL. 7531555, CAN. 927649, FRA. 7025295, ITL. 910210, JAP. 48-26779, U.K. 1279506.

3,705,767.—ELECTROPHOTOGRAPHIC DEVICE. DEC. 12, 1972. BEL. 753687, CAN. 947357, FRA. 7026800, GER. 2036140, ITL. 902477, JAP. 48-11054, U.K. 1266112.

3,779,639.—COLOR ELECTROPHOTOGRAPHIC APPARATUS. DEC. 18, 1973. U.K. 1331870.

3,785,812.—METHOD OF EXPOSURE IN MULTI-COLOR ELECTROPHOTOGRAPHY. JAN. 15, 1974. ARG. 185812, AUS. 417288, BEL. 759392, CAN. 945619, FRA. 7042329, ITL. 914549, JAP. 49-23905, U.K. 1322847.

3,806,340.—COLOR ELECTROPHOTOGRAPHIC PROCESS EMPLOYING A POLAR ORGANIC SOLVENT VAPOR. APR. 23, 1974. BEL. 774765, CAN. 946671, FRA. 7138742, JAP. 49-23905, U.K. 1322847.

Class 1F

3,473,923.—REPRODUCTION PROCESS INCLUDING TRANSFER AND REDEVELOPMENT OF ELECTROSTATICALLY FORMED IMAGES. OCT. 21, 1969. BEL. 679506, FRA. 1479592, GER. 1,522,597. JAP. 43-07586, U.K. 1152832.

3,745,002.—METHOD OF PREPARING A PRINTING MASTER BY XEROGRAPHY. JULY 10, 1973. ARG. 120543, AUS. 432568, BEL. 756.595, CAN. 903014, FRA. 2068748, JAP. 48-27362, MEX. 119463, U.K. 1314109.

3,788,845.—PROCESS FOR FORMING DYE IMAGES. JAN. 29, 1974.

Class 1G

3,764,309.—COLOR PRINTING METHOD. OCT. 9, 1973. BEL. 724581, CAN. 877884, FRA. 1595848, ITL. 848192, JAP. 46-33541, U.K. 1223020.

Class 1I

3,762,811.—METHOD AND APPARATUS FOR ELECTROPHOTOGRAPHY. OCT. 2, 1973.

3,784,301.—ELECTROPHOTOGRAPHIC BORDER APPARATUS. JAN. 8, 1974. JAP. 49-26590.

Class 1J6

3,796,187.—APPARATUS FOR DEVELOPING CONTINUOUS ELECTROPHOTOGRAPHIC PHOTOSENSITIVE WEB MATERIAL. MAR. 12, 1974. BEL. 769412, CAN. 934541, FRA. 7123852, ITL. 934462, U.K. 1332534.

Class 1K

3,408,217.—FINGERPRINT RECORDING. OCT. 29, 1968. JAP. 41-21520, U.K. 1095572.

3,492,140.—METHOD OF RECORDING FINGERPRINTS OF HUMAN BODY. JAN. 7, 1970. FRA. 1386116, JAP. 39-27575, U.K. 1063635.

Class 1K3

3,745,002.—METHOD OF PREPARING A PRINTING MASTER BY XEROGRAPHY. JULY 10, 1973. ARG. 120543, AUS. 432568, BEL. 756.595, CAN. 903014, FRA. 2068748, JAP. 48-27362, MEX. 119463, U.K. 1314109.

Class 2A1E

3,506,595.—PHOTOCONDUCTIVE INSULATING MATERIALS. APR. 14, 1970. FRA. 1498064, GER. 1,522,606, JAP. 43-24394, U.K. 1148537.

3,615,401.—PROCESS FOR THE PREPARATION OF PHOTOCONDUCTIVE LIGHT-SENSITIVE MATERIALS COMPRISING CdS OR CdS.N $CdCo_3$. OCT. 26, 1971. FRA. 2001257, JAP. 47-40819, U.K. 1239129.

3,615,410.—ELECTROPHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL CONTAINING A PROTEASE ENZYME. OCT. 26, 1971. BEL. 730415, CAN. 885386, FRA. 2004.940, U.K. 1224711.

Class 2A1E1

3,385,699.—PROCESS FOR PROCESSING ELECTROPHOTOSENSITIVE LAYERS. MAY 28, 1968. BEL. 651039, FRA. 1402385, HOL. 130806, SWD. 310458, U.K. 1072476.

3,494,766.—LIGHT SENSITIVE LAYER FOR ELECTROPHOTOGRAPHY. FEB. 10. 1970. CAN. 791648, FRA. 1460449, NOR. 112288, SWD. 226000, U.K. 1085939.

3,494,789.—PHOTOCONDUCTIVE INSULATING MATERIAL. FEB. 10, 1970. CAN. 813830, FRA. 1564467, ITL. 788829, JAP. 44-10631, MEX. 88112, U.K. 1120091.

3,615,410.—ELECTROPHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL CONTAINING A PROTEASE ENZYME. OCT. 26, 1971. BEL. 730415, CAN. 885386, FRA. 2004.940, U.K. 1224711.

3,634,333.—PROCESS FOR COATING ZINC OXIDE POWDER WITH CADMIUM SULFIDE. JAN. 11, 1972. BEL. 731056, CAN. 882.627, FRA. 2.005.849, GER. 1916761, JAP. 47-49616, U.K. 1215685.

3,660,086.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS EMPLOYING INORGANIC PHOTOCONDUCTIVE MATERIAL WITH A PHOTOCHROMIC SENSITIZING AGENT. MAY 2, 1972. U.K. 1290441.

3,674,476.—PROCESS FOR PRODUCING PHOTOCONDUCTIVE LAYER FOR ELECTROPHOTOGRAPHY. JULY 4, 1972. BEL. 751.676, CAN. 918481, FRA. 2051030, U.K. 1264719.

3,689,260.—COLOR ELECTROPHOTOGRAPHIC PROCESS WITH RESIN DEPOSITION FOR STABILIZATION OF TONER IMAGE. SEPT. 5, 1972. AUS. 437666, BEL. 753155, CAN. 927649, FRA. 7025295, ITL. 910210, JAP. 48-26779, U.K. 1279506.

3,707,392.—METHOD OF SENSITIZATION OF AN ELECTROPHOTOGRAPHIC MATERIAL. DEC. 26, 1972. AUS. 444836, BEL. 744600, CAN. 888125, FRA. 7001955, GER. 2002607, ITL. 892368, JAP. 48-7814, U.K. 1257154.

3,725,060.—HEMATEIN OR HEMATOXYLIN-CONTAINING ZINC OXIDE PHOTOCONDUCTIVE LAYERS. APR. 3, 1973. JAP. 49-4340.

3,761,261.—PHTHALOCYANINE DYE SENSITIZERS FOR ZINC OXIDE. SEPT. 25, 1973. JAP. 45-990335.

Class 2A1F

3,394,001.—ELECTROPHOTOGRAPHIC SENSITIVE CONTAINING ELECTRON DONOR DYE LAYERS. JULY 23, 1968. JAP. 44-15758, U.K. 1,106,562.

3,476,659.—ELECTROPHOTOGRAPHIC IMAGING AND COPYING PROCESS. NOV. 4, 1969. BEL. 684406, FRA. 1489929, ITL. 773333, JAP. 43-27579, U.K. 1159394.

3,654,865.—METHOD FOR FORMING DYE IMAGE USING AN ELECTROPHOTOGRAPHIC DEVELOPER CONTAINING A GELATIN TONER. APR. 11, 1972. AUS. 435812, BEL. 745534, CAN. 924.951, FRA. 7004034, ITL. 888.447, JAP. 48-9017, U.K. 1257296.

3,704,123.—DYE SENSITIZED PHOTOCONDUCTIVE MATERIAL. NOV. 28, 1972. AUS. 424510, BEL. 720260, CZC. 142206, FRA. 1568416, GER. 1772210, ITL. 831114, JAP. 47-20753, U.K. 1190676, USR. 374866.

3,705,032.—ELECTROPHOTOGRAPHIC MATERIALS. DEC. 5, 1972. AUS. 432027, BEL. 737701, CAN. 918984, FRA. 6928605, GER. 1942383, ITL. 872749, JAP. 48-2966, U.K. 1237036.

3,707,392.—METHOD OF SENSITIZATION OF AN ELECTROPHOTOGRAPHIC MATERIAL. DEC. 26, 1972. AUS. 444836, BEL. 744600, CAN. 888125, FRA. 7001955, GER. 2002607, ITL. 892368, JAP. 48-7814, U.K. 1257154.

Class 2A1G

3,541,028.—PHOTOCONDUCTIVE INSULATING MATERIALS. NOV. 17, 1970. FRA. 1494699, GER. 1,522,605, JAP. 43-14494, U.K. 1128417.

Class 2A2

3,647,428.—PHOTOCONDUCTIVE MATERIAL FOR ELECTROPHOTOGRAPHY. MAR. 7, 1972. AUS. 429949, BEL. 759550, CAN. 924162, FRA. 2072521, ITL. 923181, JAP. 48-4316, U.K. 1269429.

3,704,119.—ELECTROPHOTOGRAPHIC PROCESS USING TONER OF SAME REFRACTIVE INDEX AS ORGANIC PHOTOCONDUCTIVE LAYER. NOV. 28, 1972. AUS. 433360, BEL. 754544, FRA. 7028556, ITL. 902771, JAP. 48-21054, U.K. 1321065.

Class 2A2A

3,707,369.—PHOTOCONDUCTIVE ELEMENTS CONTAINING 2-METHYL-3, 3-DIMETHYL INDOLE DERIVATIVES. DEC. 26, 1972. BEL. 754969, CAN. 898823, FRA. 703049, GER. 2041490, U.K. 1268889.

Class 2B

3,394,001.—ELECTROPHOTOGRAPHIC SENSITIVE MATERIAL CONTAINING ELECTRON-DONOR DYE LAYERS. JULY 23, 1968. JAP. 44-15758, U.K. 1,106,562.

3,656,949.—METHOD OF PRODUCING AN ELECTROPHOTOGRAPHIC AND ELECTROGRAPHIC RECORDING MEMBER. APR. 18, 1972. BEL. 734288, CAN. 890875, FRA. 6919148, GER. 1929162, JAP. 48-787, U.K. 1259158.

3,704,121.—ELECTROPHOTOGRAPHIC REPRODUCTION PROCESS USING A DUAL LAYERED PHOTORECEPTOR. NOV. 28, 1972. BEL. 739153, FRA. 6932116, ITL. 890989, JAP. 49-25218, SPN. 371685, STZ. 519188, U.K. 1272131.

4,023,181.—RECORDING MEDIUM CONDUCTIVE ELECTRODE. MAY 10, 1977. JAP. 49-91720.

Class 2B1

3,574,682.—ELECTROSTATIC RECORDING MATERIALS. APR. 13, 1971. U.K. 1213395.

3,787,235.—METHOD OF ELECTROPHOTOGRAPHIC SENSITIVE PAPER. JAN. 22, 1974. JAP. 48-1330.

Class 2B2

3,552,956.—METHOD FOR TREATING ELECTROPHOTOGRAPHIC RECORDING MATERIALS WITH PROTECTIVE OVERCOATINGS. JAN. 5, 1971. BEL. 693184, FRA. 1508918, SWD. 326372, U.K. 1155665.

3,717,461.—REMOVAL OF PROTECTIVE RESIN LAYER BY LIQUID DEVELOPER IN ELECTROPHOTOGRAPHIC IMAGING. FEB. 20, 1973. ARG. 182091, AUS. 428797, BEL. 762.808, CAN. 929016, FRA. 2078511, ITL. 919801, MEX. 120941, U.K. 1326300.

Class 2B4

3,428,453.—IMAGING FORMING PROCESS UTILIZING XEROGRAPHY. FEB. 18, 1969. FRA. 1,428,775, ITL. 754,825, JAP. 43-02622, U.K. 1,085,151.

Class 2E

3,417,733.—APPARATUS FOR VACUUM COATING. DEC. 24, 1968. FRA. 1,415,251, GER. 1,521,238, JAP. 40-26402, U.K. 1,081,324.

3,573,905.—METHOD OF PRODUCING ELECTROPHOTOSENSITIVE CADMIUM SULFIDE WITH CRYSTALS OF A HEXAGONALITY OF LESS THAN 80% APR. 6, 1971. BEL. 682886, CAN. 814845, FRA. 1526846, JAP. 43-16195, MEX. 93082, U.K. 1148487.

3,656,949.—METHOD OF PRODUCING AN ELECTROPHOTOGRAPHIC AND ELECTOGRAPHIC RECORDING MEMBER. APR. 18, 1972. BEL. 734288, CAN. 890875, FRA. 6919148, GER. 1929162, JAP. 48-787, U.K. 1259158.

3,672,988.—METHOD OF MANUFACTURING BASES FOR ELECTROSTATIC RECORDING MATERIAL OR ELECTROPHOTOGRAPHIC MATERIAL. JUNE 27, 1972. AUS. 437336, BEL. 746420, CAN. 898621, GER. 2008636, ITL. 888758, JAP. 47-45549, U.K. 1301926.

3,674,476.—PROCESS FOR PRODUCING PHOTOCONDUCTIVE LAYER FOR ELECTROPHOTOGRAPHY. JULY 4, 1972. BEL. 751.676, CAN. 918481, FRA. 2051030, U.K. 1264719.

3,772,173.—ELECTROCONDUCTIVE PAPER. NOV. 13, 1973. CAN. 930693, JAP. 48-15037, U.K. 1329569.

3,775,103.—ELECTROPHOTOGRAPHIC MATERIAL AND PROCESS FOR PRODUCING SAME. NOV. 27, 1973. BEL. 693919, FRA. 1511300, GER. 1522612, ITL. 798303, NOR. 122730, U.K. 1183762.

3,927,638.—VACUUM EVAPORATION PLATING APPARATUS. DEC. 23, 1975.

3,984,585.—VACUUM EVAPORATION PLATING METHOD. MAY 5, 1976. FRA. 7422500, GER. P-2430653.4, JAP. 48-72263, U.K. 1,214,698.

Class 2F

3,998,548.—SENSITIVE DRUM RECEIVING DEVICE FOR USE IN ELECTROPHOTOGRAPHIC REPRODUCING MACHINE. DEC. 21, 1976. JAP. 49-94060, U.K. 32984/75.

Class 3

3,764,207.—ELECTROPHOTOGRAPHIC PROCESS UTILIZING SINGLE CHARGING MEANS FOR EFFECTING SIMULTANEOUS FUNCTIONS OF CHARGING AND FACILITATING TONER IMAGE TRANSFER. OCT. 9, 1973.

Class 3C

3,612,864.—IMAGING SYSTEM UTILIZING AN ELECTRODE TREATED WITH A MIXTURE OF A HYGROSCOPIC MATERIAL AND A HYDROPHILIC BINDER. OCT. 12, 1971. BEL. 726690, CAN. 885615, JAP. 47-12440.

3,775,106.—ELECTROPHOTOGRAPHIC PROCESS. NOV. 27, 1973. BEL. 771855, CAN. 946465, JAP. 49-17531, U.K. 1328318.

Class 3C1

3,772,173.—ELECTROCONDUCTIVE PAPER. NOV. 13, 1973. CAN. 930693, JAP. 48-15037, U.K. 1329569.

Class 3C3

3,649,830.—UNIFORM CHARGING METHOD AND APPARATUS USING AN ARRAY OF NEEDLE ELECTRODES. MAR. 14, 1972. CAN. 940590, JAP. 48-28301, U.K. 1279758.

3,655,966.—ELECTRIC CHARGING DEVICE FOR ELECTROPHOTOGRAPHY. APR. 11, 1972. CAN. 922359, JAP. 48-25942, U.K. 1323599.

Class 3C4

3,719,481.—ELECTROSTATOGRAPHIC IMAGING PROCESS. MAR. 6, 1973. CAN. 948693, FRA. 7108391, ITL. 921208, U.K. 1281149.

Class 3C5

3,715,640.—CORONA CHARGING PROCESS AND APPARATUS IN ELECTROPHOTOGRAPHY. FEB. 6, 1973. AUS. 425637, BEL. 765716, CAN. 927473, FRA. 71131128, ITL. 923947, JAP. 49-17379, U.K. 1338691.

3,779,749.—METHOD OF CHARGING IN ELECTROPHOTOGRAPHY. DEC. 18, 1973. BEL. 772412, CAN. 9481495, FRA. 7132246, ITL. 942080, JAP. 49-17532, U.K. 1359182.

3,788,844.—CHARGING METHOD FOR ELECTROPHOTOGRAPHY. JAN. 29, 1974. JAP. 49-13025, U.K. 1344908.

3,789,222.—CORONA CHARGE METHOD. JAN. 29, 1974. BEL. 771311, CAN. 943180, FRA. 7129655, ITL. 933902, JAP. 49-17530.

3,789,224.—PROCESS FOR CHARGING ELECTROPHOTOGRAPHIC MATERIALS. JAN. 29, 1974. AUS. 435928, BEL. 772465, CAN. 945834, FRA. 7132445, ITL. 938023, JAP. 49-23902, U.K. 1359181.

Class 3C9

3,582,731.—CHARGING SYSTEM. JUNE 1, 1971. CAN. 906045, JAP. 46-30636.

Class 3D

3,546,545.—METHOD OF CHARGING A PHOTOCONDUCTIVE INSULATING LAYER. DEC. 8, 1970. BEL. 721040, FRA. 1586221, U.K. 1205297.

3,569,803.—ELECTROPHOTOGRAPHIC PROCESS UTILIZING FRICTION CHARGING. MAR. 9, 1971. BEL. 719365, CAN. 925561, FRA. 1577647, U.K. 1232470.

Class 3E

3,704,121.—ELECTROPHOTOGRAPHIC REPRODUCTION PROCESS USING A DUAL LAYERED PHOTORECEPTOR. NOV. 28, 1972. BEL. 739153, FRA. 6932116, ITL. 890989, JAP. 49-25218, SPAN. 371685, STZ. 519188, U.K. 1272131.

3,715,640.—CORONA CHARGING PROCESS AND APPARATUS IN ELECTROPHOTOGRAPHY. FEB. 6, 1973. AUS. 425637, BEL. 765716, CAN. 927473, FRA. 71131128, ITL. 923947, JAP. 49-17379, U.K. 1338691.

Class 3F

3,749,927.—ELECTROSTATIC CHARGING PROCESS FOR ELECTROPHOTOSENSITIVE MATERIAL. JULY 31, 1973. AUS. 435008, BEL. 469413, FRA. 7123717, ITL. 934461, JAP. 49-16060, U.K. 1316047.

3,778,148.—APPARATUS AND METHOD FOR SELECTIVELY DISCHARGING THE PHOTOCONDUCTIVE SURFACE OF AN ELECTROSTATIC DRUM COPIER TO FACILITATE THE CLEANING THEREOF. DEC. 11, 1973.

3,778,623.—CHARGING METHOD OF ELECTROPHOTOGRAPHIC MATERIALS. DEC. 11, 1973. FRA. 7229549.

3,789,223.—CHARGING METHOD FOR RELATIVELY MOVABLE ELECTROPHOTOGRAPHIC MEANS AND CORONA MEANS. JAN. 29, 1974. AUS. 431512, BEL. 771143, FRA. 7129349, ITL. 935108, JAP. 49-17529, U.K. 1347100.

3,789,224.—PROCESS FOR CHARGING ELECTROPHOTOGRAPHIC MATERIALS. JAN. 29, 1974. AUS. 435928, BEL. 772465, CAN. 945834, FRA. 7132445, ITL. 938023, JAP. 49-23902, U.K. 1359181.

Class 4A

3,741,644.—ORIGINAL POSITION CONFIRMING MEANS FOR DUPLICATING APPARATUS. JUNE 26, 1973.

Class 4A1

3,771,082.—COPYING APPARATUS WITH AUXILIARY LIGHT SOURCE FOR ILLUMINATING AN ORIGINAL TO BE REPRODUCED. NOV. 6, 1973. U.K. 1350616.

3,841,752.—LIGHT SOURCE FOR COPYING MACHINE. OCT. 15, 1974.

Class 4A2

3,737,223.—PLATEN DRIVING DEVICE IN AN ELECTROPHOTOGRAPHIC COPYING MACHINE. JUNE 5, 1973. U.K. 1341619.

Class 4B

3,687,661.—COLOR ELECTROPHOTOGRAPHIC PROCESS. AUG. 29, 1972. ARG. 182081, BEL. 759454, CAN. 932785, FRA. 7043828, ITL. 909538, JAP. 49-18265, U.K. 1327486.

3,784,301.—ELECTROPHOTOGRAPHIC BORDER APPARATUS. JAN. 8, 1974. JAP. 49-26590.

3,785,812.—METHOD OF EXPOSURE IN MULTI-COLOR ELECTROPHOTOGRAPHY. JAN. 15, 1974. ARG. 185812, AUS. 417288, BEL. 759392, CAN. 945619, FRA. 7042329, ITL. 914549, JAP. 49-11573, U.K. 1326580.

Class 4B1

3,927,940.—MANUSCRIPT SCANNING DEVICE FOR COPYING MACHINES AND THE LIKE. DEC. 23, 1975.

3,955,048.—SCANNING METHOD AND APPARATUS. MAY 4, 1976.

Class 4B1A

3,778,153.—OPTICAL IMAGING SYSTEM. DEC. 11, 1973.

Class 4B7

3,313,883.—SYSTEMS FOR RECORDING CHARACTERS ON LIGHT SENSITIVE RECORDING SURFACES. AUG. 25, 1964. CAN. 693,055, FRA. 1,246,197, GER. 1,449,634, JAP. 318,009.

3,615,391.—ELECTROPHOTOGRAPHIC COLOR DEVELOPING METHOD. OCT. 26, 1971. AUS. 435735, CAN. 842157, FRA. 1572518, JAP. 46-21996, U.K. 1231846, U.K. 1257609.

3,656,947.—CODING OF ORIGINALS AND SENSITIVE PAPER IN A MULTI-COLOR ELECTROPHOTOGRAPHIC PROCESS. APR. 18, 1972. BEL. 748591, CAN. 902987, FRA. 7012518, JAP. 48-26778, U.K. 1309644.

Class 5A1A

3,451,376.—DEVELOPING DEVICE FOR ELECTROPHOTOGRAPHY. JUNE 24, 1969. AUS. 410555, FRA. 1556520, SWD. 319382, U.K. 1173377.

Class 5A2

3,418,972.—POWDER DUSTING DEVICE FOR ELECTROPHOTOGRAPHY. DEC. 31, 1968. FRA. 1544620, JAP. 45-8838, U.K. 1169410.

Class 5A3B

3,418,972.—POWDER DUSTING DEVICE FOR ELECTROPHOTOGRAPHY. DEC. 31, 1968. FRA. 1544620, JAP. 45-8838, U.K. 1169410.

Class 5A4

3,681,065.—DYE TRANSFER COLOR ELECTROPHOTOGRAPHY. AUG. 1, 1972. CAN. 884,227, JAP. 44-32208.

Class 5A5

3,620,800.—CLEANING LIQUID DEVELOPED ELECTROSTATIC IMAGES BY CONTACT WITH VAPORIZED CLEANING FLUID. NOV. 16, 1971. CAN. 915753, CAN. 933997, JAP. 48-13454.

Class 5C

3,927,641.—DEVELOPING MECHANISM USING MAGNETIC BRUSH. DEC. 23, 1975.
3,937,181.—MAGNETIC BRUSH TYPE DEVELOPING MECHANISM IN ELECTROPHOTOGRAPHIC COPYING MACHINE. FEB. 10, 1976.

Class 5C1

3,545,968.—DEVELOPING A LATENT ELECTROSTATIC IMAGE WITH FERROMAGNETIC CARRIER AND TONER BY EMPLOYING A VARYING MAGNETIC FIELD. DEC. 8, 1970. BEL. 710692, FRA. 1561470, U.K. 1205175.
3,908,595.—MAGNETIC BRUSH DEVELOPMENT APPARATUS UTILIZING MAGNETIC MEANS. SEPT. 30, 1975.
3,977,361.—MAGNETIC BRUSH DEVELOPMENT DEVICE. AUG. 31, 1976. GER. P2521275.3, JAP. 49-52302, KOR. 3670, TIW. 6410622, U.K. 19955-75.
3,981,271.—MAGNETIC BRUSH TYPE DEVELOPER FOR USE IN AN ELECTROPHOTOGRAPHIC MACHINE. SEPT. 21, 1976. GER. P25073910, JAP. 49-19615, U.K. 6841-75.
3,985,099.—MAGNETIC BRUSH DEVELOPING DEVICE. OCT. 12, 1976. GER. P2521291.3 JAP. 52303, KOR. 3669, TIW. 6410736, U.K. 19951-75.

Class 5C2

3,672,887.—ELECTROPHOTOGRAPHIC PROCESS FOR MULTICOLOR REPRODUCTION. JUNE 27, 1972. JAP. 47-19395.
3,764,309.—COLOR PRINTING METHOD. OCT. 9, 1973. BEL. 724581, CAN. 877884, FRA. 1595848, ITL. 848192, JAP. 46-33541, U.K. 1223020.

Class 5D1

3,783,818.—ELECTROPHOTOGRAPHIC DEVELOPING PROCESS. JAN. 8, 1974. BEL. 781515, FRA. 7211409, ITL. 950927, U.K. 1358450.

Class 5D2

3,336,904.—XEROGRAPHIC DEVELOPING APPARATUS. AUG. 22, 1967. BEL. 651786, GER. 1,472,946, HOL. 132649, JAP. 40-23755, U.K. 1068575.

Class 5D3

3,804,659.—ELECTROPHOTOGRAPHIC REVERSAL DEVELOPMENT PROCESS FOR ENHANCING THE QUALITY OF THE DEVELOPED IMAGE. APR. 16, 1974. FRA. 7144069, JAP. 49-26901.

Class 5E

3,540,885.—REDUCTION OF FOG FORMATION IN AN ELECTROPHOTOGRAPHIC LIGHT SENSITIVE SHEET. NOV. 17, 1970. BEL. 693302, FRA. 1509571, JAP. 44-2551, U.K. 1176001.
3,560,203.—ELECTROPHOTOGRAPHIC DEVELOPING PROCESS. FEB. 2, 1971. FRA. 1604137, U.K. 1165038.
3,566,834.—ELECTROPHOTOGRAPHIC DEVELOPING DEVICE. MAR. 2, 1971. AUS. 417201, BEL. 718329, FRA. 1578391, JAP. 48-31853, U.K. 1194789.
3,622,515.—ELECTROPHOTOGRAPHIC LIQUID DEVELOPER HAVING A PROTEOLYTIC ENZYME. NOV. 23, 1971. AUS. 436813, BEL. 732273, CAN. 896948, FRA. 2007.520, ITL. 867188, JAP. 47-17879, U.K. 1231544.
3,627,557.—LIQUID DEVELOPMENT BY REDUCING THE VISCOSITY OF THE DEVELOPER ON A ROLLER APPLICATION PRIOR TO DEVELOPMENT. DEC. 14, 1971. CAN. 905230, U.K. 1303499.
3,628,981.—LIQUID TONER DEVELOPMENT. DEC. 21, 1971. BEL. 751669, CAN. 902982, FRA. 7021033, ITL. 893939, JAP. 48-18859, U.K. 1284477.
3,642,515.—LIQUID DEVELOPMENT UTILIZING A CURVILINEAR DEVELOPMENT ELECTRODE. FEB. 15, 1972. CAN. 867698.
3,668,126.—METHOD OF PRODUCING ELECTROPHOTOGRAPHIC LIQUID DEVELOPERS HAVING VERY FINE COLORING MATERIAL. JUNE 6, 1972. BEL. 709625, FRA. 1562934, U.K. 1218064.
3,671,290.—IMAGING SYSTEM. JUNE 20, 1972. CAN. 917486, JAP. 48-8134, U.K. 1278858.
3,685,907.—ELECTROPHOTOGRAPHIC PROCESS. AUG. 22, 1972. ARG. 181932, AUS. 442703, BEL. 752387, CAN. 910132, FRA. 2-51297, ITL. 902170, MEX. 116451, U.K. 1292200.
3,692,523.—PROCESS FOR DEVELOPING ELECTROSTATIC LATENT IMAGE AND LIQUID DEVELOPER USED THEREFOR. SEPT. 19, 1972. AUS. 437065, BEL. 745533, CAN. 924.167, FRA. 7040233, GER. 20052680, ITL. 888.449, JAP. 48-7821, U.K. 1255445.
3,703,400.—DEVELOPING METHOD FOR ELECTROPHOTOGRAPHY. NOV. 21, 1972. AUS. 435816, BEL. 748.590, CAN. 898073, FRA. 7012445, GER. 2016586, ITL. 903950, U.K. 1251623.
3,705,032.—ELECTROPHOTOGRAPHIC MATERIALS. DEC. 5, 1972. AUS. 432027, BEL. 737701, CAN. 918984, FRA. 6928605, GER. 1942383, ITL. 872749, JAP. 48-2966, U.K. 1237036.
3,705,767.—ELECTROPHOTOGRAPHIC DEVICE. DEC. 12, 1972. BEL. 753687, CAN. 947357, FRA. 7026800, GER. 2036140, ITL. 902477, JAP. 48-11054, U.K. 1266112.
3,707,139.—LIQUID TYPE ELECTROPHOTOGRAPHY DEVELOPING APPARATUS. DEC. 26, 1972. BEL. 756409, CAN. 918413, FRA. 7034577, GER. 1314865.
3,713,422.—APPARATUS FOR DEVELOPING AN ELECTROSTATIC LATENT IMAGE BY LIQUID DEVELOPMENT. JAN. 30, 1973. BEL. 764267, CAN. 932954, FRA. 7109086, GER. 763,992, U.K. 1341631.
3,716,360.—MOLTEN IMAGE TRANSFER IN ELECTROPHOTOGRAPHY. FEB. 13, 1973. BEL. 763191, FRA. 7105717, GER. 2108080, ITL. 919905, U.K. 1313059.
3,717,461.—REMOVAL OF PROTECTIVE RESIN LAYER BY LIQUID DEVELOPER IN ELECTROPHOTOGRAPHIC IMAGING. FEB. 20, 1973. ARG. 182091, AUS. 428797, BEL. 762808, CAN. 929016, FRA. 2078511, ITL. 919801, MEX. 120941, U.K. 1326300.
3,718,593.—PROCESS FOR THE PRODUCTION OF AN ELECTROPHOTOGRAPHIC LIQUID DEVELOPER CONTAINING GELATIN. FEB. 27, 1973. AUS. 438586, BEL. 745535, CAN. 924166, FRA. 7004034, ITL. 888743, JAP. 48-7822, U.K. 1255763.
3,738,832.—COLOR ELECTROPHOTOGRAPHIC PROCESS EMPLOYING LIQUID DEVELOPER CONTAINING GELATIN. JUNE 12, 1973. CAN. 921746, JAP. 47-30858, U.K. 1277723.
3,749,059.—APPARATUS FOR DEVELOPING ELECTROSTATIC LATENT IMAGE. JULY 31, 1973. AUS. 445683, BEL. 755061, CAN. 903579, FRA. 7029636, JAP. 48-25936, U.K. 1267888.
3,750,624.—APPARATUS FOR DEVELOPING ELECTROPHOTOGRAPHIC CONTINUOUS WEB MATERIAL. AUG. 7, 1973. AUS. 433381, BEL. 770250, CAN. 948843, FRA. 7126524, ITL. 948843, U.K. 1328313.
3,753,419.—ELECTROPHOTOGRAPHIC LIQUID DEVELOPING APPARATUS. AUG. 21, 1973. AUS. 430772, BEL. 768788, CAN. 334540, FRA. 7122426, ITL. 928531, U.K. 1337485.

3,766,887.—DEVELOPING DEVICE FOR ELECTROSTATIC LATENT IMAGE. OCT. 28, 1973. AUS. 429869, BEL. 761227, CAN. 102437, FRA. 2075270, ITL. 919235, U.K. 1310092.
3,774,574.—DEVELOPMENT DEVICE FOR ELECTROPHOTOGRAPHY. NOV. 27, 1973. FRA. 7143873.
3,783,827.—LIQUID DEVELOPMENT APPARATUS FOR ELECTROPHOTOGRAPHY. JAN. 8, 1974. BEL. 777528, CAN. 949309, FRA. 7147339, ITL. 945720.
3,784,397.—IMAGING SYSTEM. JAN. 8, 1974. ARG. 185194, JAP. 1348667, MEX. 120938.
3,788,930.—METHOD OF FIXING IMAGES OBTAINED BY LIQUID DEVELOPMENT IN ELECTROPHOTOGRAPHY. JAN. 29, 1974. BEL. 774763.
3,796,187.—APPARATUS FOR DEVELOPING CONTINUOUS ELECTROPHOTOGRAPHIC PHOTOSENSITIVE WEB MATERIAL. MAR. 12, 1974. BEL. 769412, CAN. 934541, FRA. 7123852, ITL. 934462, U.K. 1332534.
3,804,659.—ELECTROPHOTOGRAPHIC REVERSAL DEVELOPMENT PROCESS FOR ENHANCING THE QUALITY OF THE DEVELOPED IMAGE. APR. 16, 1974. FRA. 7144069, JAP. 49-26901.
3,817,212.—ELECTROSTATOGRAPHIC LIQUID DEVELOPMENT APPARATUS. JUNE 18, 1974. U.K. 1310448.
3,836,384.—IMAGING SYSTEMS. SEPT. 17, 1974. JAP. 46-43198.
3,991,711.—ELECTROSTATIC DUPLICATING METHOD AND APPARATUS UTILIZING WET DEVELOPING. NOV. 16, 1976. FRA. 733636, GER. 2350429, JAP. 47-101120, U.K. 1,443,209.
4,029,826.—ELECTROSTATIC PRINTING METHOD. JUNE 14, 1977. FRA. 7434015, GER. P2448211.9, JAP. 48-112875, U.K. 43016-74.

Class 5E4

3,577,259.—LIQUID DEVELOPMENT OF ELECTROSTATIC LATENT IMAGES UTILIZING A TOWER-FREE ZONE. MAY 4, 1971. AUS. 418640, CAN. 871081, FRA. 1592038, JAP. 46-11633, U.K. 1252917.
3,592,678.—LIQUID DONOR DEVELOPMENT WITH ELECTROPHORETIC CLEANING. JULY 13, 1971. CAN. 939733, JAP. 48-34774, U.K. 1261752.
3,597,368.—LIQUID DEVELOPER FOR ELECTROPHOTOGRAPHY CONTAINING YELLOW PIGMENT. AUG. 3, 1971. BEL. 719289, CAN. 846.122, FRA. 1578390, JAP. 46-10480, U.K. 1201134.

Class 5I1

3,537,427.—ELECTROSTATIC LATENT IMAGE DEVELOPING DEVICE. NOV. 3, 1930. BEL. 722040, JAP. 46-14440, U.K. 1239635.
3,607,342.—METHOD OF DEVELOPMENT OF ELECTROSTATIC IMAGES. SEPT. 21, 1971. BEL. 707253, FRA. 1555753, JAP. 44-9878, U.K. 1204548.
3,627,557.—LIQUID DEVELOPMENT BY REDUCING THE VISCOSITY OF THE DEVELOPER ON A ROLLER APPLICATION PRIOR TO DEVELOPMENT. DEC. 14, 1971. CAN. 905230, U.K. 1303499.

Class 5J

3,713,422.—APPARATUS FOR DEVELOPING AN ELECTROSTATIC LATENT IMAGE BY LIQUID DEVELOPMENT. JAN. 30, 1973. BEL. 764267, CAN. 932954, FRA. 7109086, GER. 763,992, U.K. 1341631.
3,750,624.—APPARATUS FOR DEVELOPING ELECTROPHOTOGRAPHIC CONTINUOUS WEB MATERIAL. AUG. 7, 1973. AUS. 433381, BEL. 770250, CAN. 948843, FRA. 7126524, ITL. 937783, U.K. 1328313.

Class 5J1

3,620,798.—DEVELOPMENT OF LATENT ELECTROSTATIC IMAGE EMPLOYING NOVEM DEVELOPMENT ELECTRODE. NOV. 16, 1971. BEL. 709410, FRA. 1552425, U.K. 1186841.
3,642,515.—LIQUID DEVELOPMENT UTILIZING A CURVILINEAR DEVELOPMENT ELECTRODE. FEB. 15, 1972. CAN. 867698.
3,655,419.—ELECTROPHOTOGRAPHIC REVERSAL DEVELOPING PROCESS. APR. 11, 1972. AUS. 432643, BEL. 741.440, CAN. 914.518, FRA. 6938659, ITL. 880.593, U.K. 1287.903.
3,685,907.—ELECTROPHOTOGRAPHIC PROCESS. AUG. 22, 1972. AUS. 442703, BEL. 752387, CAN. 910132, FRA. 2-51297, ITL. 902170, U.K. 1292200.

3,783,827.—LIQUID DEVELOPMENT APPARATUS FOR ELECTROPHOTOGRAPHY. JAN. 8, 1974. BEL. 777528, CAN. 949309, FRA. 7147339, ITL. 945720.
3,836,384.—IMAGING SYSTEMS. SEPT. 17, 1974. JAP. 46-43198.

Class 5J2

3,774,574.—DEVELOPMENT DEVICE FOR ELECTROPHOTOGRAPHY. NOV. 27, 1973. FRA. 7143873.
3,784,397.—IMAGING SYSTEM. JAN. 8, 1974. ARG. 185194, MEX. 120938, U.K. 1348667.

Class 5J3

3,566,834.—ELECTROPHOTOGRAPHIC DEVELOPING DEVICE. MAR. 2, 1971. AUS. 417201, BEL. 718329, FRA. 1578391, JAP. 48-31853, U.K. 1194789.
3,672,330.—APPARATUS FOR DEVELOPING A LATENT ELECTROSTATIC IMAGE. JUNE 27, 1972. BEL. 708760, FRA. 149128, U.K. 1192600.

Class 5J5

3,560,203.—ELECTROPHOTOGRAPHIC DEVELOPING PROCESS. FEB. 2, 1971. FRA. 1604137, U.K. 1165038.
3,783,818.—ELECTROPHOTOGRAPHIC DEVELOPING PROCESS. JAN. 8, 1974. BEL. 781515, FRA. 7211409, ITL. 950927, U.K. 1358450.
3,784,397.—IMAGING SYSTEM. JAN. 8, 1974. ARG. 185194, MEX. 120938, U.K. 1348667.
3,981,268.—DEVICE FOR CONTROLLING ELECTRIC POTENTIAL APPLIED TO DEVELOPING ELECTRODE IN AN ELECTROPHOTOGRAPHIC DUPLICATOR. SEPT. 21, 1976. GER. P2526802.4, JAP. 49-47554, KOR. 3672, TIW. 6410621, U.K. 24745-75.

Class 5K

3,724,941.—ELECTROPHOTOGRAPHIC APPARATUS. APR. 3, 1973.
3,762,811.—METHOD AND APPARATUS FOR ELECTROPHOTOGRAPHY. OCT. 2, 1973.

Class 5M

3,620,798.—DEVELOPMENT OF LATENT ELECTROSTATIC IMAGE EMPLOYING NOVEM DEVELOPMENT ELECTRODE. NOV. 16, 1971. BEL. 709410, FRA. 1552425, U.K. 1186841.
3,655,419.—ELECTROPHOTOGRAPHIC REVERSAL DEVELOPING PROCESS. APR. 11, 1972. AUS. 432643, BEL. 471.440, CAN. 914.518, FRA. 6938659, ITL. 880.593, U.K. 1287.903.
3,773,507.—ELECTROPHOTOGRAPHIC REVERSAL DEVELOPMENT PROCESS EMPLOYING A PRETONER. NOV. 20, 1973. AUS. 426720, BEL. 769893, CAN. 947812, FRA. 7124853, ITL. 934605, JAP. 49-5465, U.K. 1340947.

Class 5N

3,764,312.—ELECTROPHOTOGRAPHIC PROCESS. OCT. 9, 1973. FRA. 7146405, JAP. 49-26903.

Class 5N2B

4,020,192.—XEROGRAPHIC REPRODUCTION PROCESS AND TONER CARRIER FOR USE THEREIN. APR. 26, 1977. FRA. 7430644, GER. P2443013.1, JAP. 48-101085, U.K. 39509.

Class 5N5

3,941,898.—DEVELOPING METHOD UTILIZING PULVERIZED, COLORED, CROSSLINKED, VINYLIC POLYMER RESIN AS TONER. MAR. 2, 1976.

Class 5O

3,476,659.—ELECTROPHOTOGRAPHIC IMAGING AND COPYING PROCESS. NOV. 4, 1969. BEL. 684406, FRA. 1489929, ITL. 773333, JAP. 43-27579, U.K. 1159394.
3,565,613.—ELECTROLYTIC ELECTROPHOTOGRAPHY. FEB. 23, 1971. GER. 1597849, JAP. 44-13679, U.K. 1202409.

Class 6B1

3,791,643.—CHAIN DELIVERY PAPER FEEDING DEVICE. FEB. 12, 1974. JAP. 48-20232.

3,927,877.—PAPER FEED TRAY FOR USE WITH COPYING MACHINE AND THE LIKE. DEC. 23, 1975.

Class 6C

3,901,427.—COPY PAPER FEEDER. AUG. 26, 1975.

Class 6D

3,924,848.—PAPER FEED APPARATUS FOR GRIPPER-TYPE PAPER TRANSPORT DEVICE. DEC. 9, 1975.
3,924,849.—PAPER GRIPPING DEVICE FOR USE WITH A CHAIN DRIVEN PAPER CARRIAGE. DEC. 9, 1975.

Class 6H

3,704,881.—TRANSFER SHEET PEELING DEVICE FOR XEROGRAPHIC APPARATUS. DEC. 5, 1972. CAN. 940546, U.K. 1275888.

Class 7C

3,764,207.—ELECTROPHOTOGRAPHIC PROCESS UTILIZING SINGLE CHARGING MEANS FOR EFFECTING SIMULTANEOUS FUNCTIONS OF CHARGING AND FACILITATING TONER IMAGE TRANSFER. OCT. 9, 1973.

Class 7E1

3,716,360.—MOLTEN IMAGE TRANSFER IN ELECTROPHOTOGRAPHY. FEB. 13, 1973. BEL. 763191, FRA. 7105717, GER. 2108080, ITL. 919905, U.K. 1313059.

Class 7E3A

3,549,359.—COLOR ELECTROPHOTOGRAPHY EMPLOYING DYE TRANSFER FROM A DYE-CONTAINING PHOTOSENSITIVE LAYER TO AN IMAGE RECEIVING SHEET. DEC. 22, 1970. FRA. 1524473, GER. 1,572,341, JAP. 45-40159, U.K. 1,183,532.
3,654,865.—METHOD FOR FORMING DYE IMAGE USING AN ELECTROPHOTOGRAPHIC DEVELOPER CONTAINING A GELATIN TONER. APR. 11, 1972. AUS. 435812, BEL. 745534, CAN. 924951, FRA. 7004034, ITL. 888.447, JAP. 48-9017, U.K. 1257296.

Class 8A

3,825,407.—HEATER HOLDING BRACKET FOR A HEAT FIXER IN A COPYING MACHINE OR THE LIKE. JULY 23, 1974.

Class 8AB

3,806,314.—FIXING APPARATUS FOR THERMOPLASTIC RECORDING. APR. 23, 1974.

Class 8A1B

3,818,185.—HEAT FUSION-BONDING APPARATUS FOR ELECTROPHOTOGRAPHY. JUNE 18, 1974.
3,916,256.—PROTECTIVE CIRCUIT IN A TEMPERATURE REGULATOR FOR THE THERMAL FIXING DEVICE OF A DUPLICATOR. NOV. 4, 1975.

Class 8A2

3,904,786.—PROCESS FOR FIXING IMAGES BY CONTACT HEATING IN A DUPLICATOR. SEPT. 9, 1975.
3,981,269.—FIXING DEVICE FOR ELECTROPHOTOGRAPHIC DUPLICATING MACHINES. SEPT. 21, 1976. GER. P2507365.8, JAP. 31159, KOR. 3389, U.K. 5395-75.

Class 8A2A

3,788,930.—METHOD OF FIXING IMAGES OBTAINED BY LIQUID DEVELOPMENT IN ELECTROPHOTOGRAPHY. JAN. 29, 1974. BEL. 774763.

Class 8B

3,647,773.—SUSPENSION POLYMERIZATION IN THE PRESENCE OF A METHYL STYRENE. MAR. 7, 1972. BEL. 727179, FRA. 2000527, JAP. 47-909, U.K. 1251434.

Class 8C

3,385,699.—PROCESS FOR PROCESSING ELECTROPHOTOSENSITIVE LAYERS. MAY 28, 1968. BEL. 651039, FRA. 1402385, HOL. 130806, SWD. 310458, U.K. 1072476.
3,740,249.—SOLVENT FIXING PROCESS. JUNE 19, 1973. JAP. 49-26591.

Class 9A

3,488,896.—PROCESS OF PUMICING A SURFACE. JAN. 13, 1970. FRA. 1,474,687, ITL. 782,665, JAP. 44-12197, U.K. 1,143,923.
3,936,183.—ELECTROPHOTOGRAPHIC COPYING MACHINE WITH IMPROVED CLEANING BLADE. FEB. 3, 1976.

Class 9A1

3,766,592.—DRUM CLEANING DEVICE FOR AN ELECTROPHOTOGRAPHIC DUPLICATOR. OCT. 23, 1973.

Class 9B3

3,671,290.—IMAGING SYSTEM. JUNE 20, 1972. CAN. 917486, JAP. 48-8134, U.K. 1278858.
3,703,400.—DEVELOPING METHOD FOR ELECTROPHOTOGRAPHY. NOV. 21, 1972. AUS. 435816, BEL. 748.590, CAN. 898073, FRA. 7012445, GER. 2016586, ITL. 903950, U.K. 1251623.

Class 10A, 10E

3,922,662.—DETECTOR FOR USE WITH A DUPLICATOR OR THE LIKE FOR DETECTING INCORRECTLY ALIGNED DOCUMENTS. NOV. 25, 1975.

Class 14A5

3,937,883.—BRAKING CIRCUIT FOR USE WITH PHASE SYNCHRONIZING CIRCUITRY. FEB. 10, 1976.

Class 15

3,795,187.—IMPELLERS FOR IMPACT PRINTERS. MAR. 5, 1974.

Class 17B1

3,687,538.—APPARATUS FOR EXPOSING LATENT IMAGE MARGINS IN ELECTROPHOTOGRAPHIC COPYING APPARATUS. AUG. 29, 1972. CAN. 931204, U.K. 1350795.

Class 17D3

3,936,664.—METHOD AND APPARATUS FOR GENERATING CHARACTER PATTERNS. FEB. 3, 1976.

Class 18A

3,417,733.—APPARATUS FOR VACUUM COATING. DEC. 24, 1968. FRA. 1,415,251, GER. 1,521,238. JAP. 40-26402, U.K. 1,081,324.
3,730,711.—PHOTOCONDUCTIVE MATERIAL FOR ELECTROPHOTOGRAPHY. MAY 1, 1973. BEL. 754699, CAN. 925087, FRA. 754699, GER. 2040152, JAP. 48-32381, U.K. 1272720.
3,799,340.—REFINING PHOTOCONDUCTIVE PARTICLE. MAR. 26, 1974. BEL. 776110, CAN. 944204, FRA. 714325.

Class 18A1

3,589,928.—PROCESS FOR THE PRODUCTION OF A LIGHT SENSITIVE MATERIAL FOR ELECTROPHOTOGRAPHY. JUNE 29, 1971. BEL. 685072, FRA. 1500187, GER. 1,522,603, JAP. 44-23775, U.K. 1139532.
3,607,363.—PROCESS FOR PRODUCING PHOTOCONDUCTIVE MATERIAL. SEPT. 21, 1971. U.K. 1210071.
3,625,747.—PHOTOCONDUCTIVE POWDERS AND A METHOD FOR PRODUCING THE SAME. DEC. 7, 1971.
3,634,333.—PROCESS FOR COATING ZINC OXIDE POWDER WITH CADMIUM SULFIDE. JAN. 11, 1972. BEL. 731056, CAN. 882.627, FRA. 2.005.849, GER. 1916761, JAP. 47-49616, U.K. 1215685.

3,682,825.—PROCESS FOR THE PRODUCTION OF ELECTROPHOTOGRAPHIC LIQUID DEVELOPER CONTAINING GELATIN. AUG. 8, 1972. AUS. 424258, BEL. 745390, CAN. 924165, FRA. 7003324, GER. 2004817, ITL. 887410, JAP. 48-7819, U.K. 1255762.
3,729,419.—LIQUID DEVELOPER. APR. 24, 1973. AUS. 451254, FRA. 71.09434, JAP. 48-43157, U.K. 1341627.
3,743,537.—METHOD OF MAKING ELECTROPHOTOGRAPHIC RECORDING MEMBER. JULY 3, 1973. AUS. 430736, ATR. 305766, BEL. 757.393, CAN. 928165, FRA. 7037234, ITL. 917004, JAP. 49-3846, U.K. 1269306.
3,755,177.—PROCESS OF MAKING LIQUID ELECTROSTATIC DEVELOPERS CONTAINING GELATIN. AUG. 28, 1973. AUS. 443292, CAN. 925743, JAP. 48-7820, U.K. 1284646.
3,803,011.—PROCESS FOR PREPARING 2, 3-DIHYDRO-1H,6H-1,5-BENZODIAZOCINE-2-ONE DERIVATIVE. APR. 9, 1974.

Class 18A2

3,761,261.—PHTHALOCYANINE DYE SENSITIZERS FOR ZINC OXIDE. SEPT. 25, 1973.

Class 18AB

3,806,314.—FIXING APPARATUS FOR THERMOPLASTIC RECORDING. APR. 23, 1974.

Class 18A3

3,661,572.—MANUFACTURING PROCESS FOR MANUFACTURING ELECTROPHOTOGRAPHIC SENSITIVE MATERIAL. MAY 9, 1972. AUS. 429948, BEL. 754323, CAN. 754323, FRA. 7028557, GER. 2038762, ITL. 902691, U.K. 1305298.

Class 18B

3,548,035.—SUSPENSION POLYMERIZATION PROCESS. DEC. 15, 1970. FRA. 1559138, GER. 1720782, JAP. 45-40052, U.K. 1185775.
3,625,747.—PHOTOCONDUCTIVE POWDERS AND A METHOD FOR PRODUCING THE SAME. DEC. 7, 1971.
3,647,773.—SUSPENSION POLYMERIZATION IN THE PRESENCE OF METHYL STYRENE. MAR. 7, 1972. BEL. 727179, FRA. 2000527, JAP. 47-909, U.K. 1251434.
3,668,126.—METHOD OF PRODUCING ELECTROPHOTOGRAPHIC LIQUID DEVELOPERS HAVING VERY FINE COLORING MATERIAL. JUNE 6, 1972. BEL. 709625, FRA. 1562934, U.K. 1218064.
3,697,266.—ORGANIC PHOTOCONDUCTIVE MATERIALS FOR ELECTROPHOTOGRAPHY. OCT. 10, 1972. BEL. 761043, CAN. 915493, FRA. 2074451, ITL. 913992, JAP. 48-38429, U.K. 1323109.
3,716,505.—PROCESS FOR SUSPENSION POLYMERIZATION. FEB. 13, 1973. FRA. 2048682, GER. 2025104, JAP. 47-23406, U.K. 1316693.

Class 18C

3,622,515.—ELECTROPHOTOGRAPHIC LIQUID DEVELOPER HAVING A PROTEOLYTIC ENZYME. NOV. 23, 1971. AUS. 436813, BEL. 732273, CAN. 896948, FRA. 2007.520, ITL. 867188, JAP. 47-17879, U.K. 1231544.
3,718,593.—PROCESS FOR THE PRODUCTION OF AN ELECTROPHOTOGRAPHIC LIQUID DEVELOPER CONTAINING GELATIN. FEB. 27, 1973. AUS. 438586, BEL. 745535, CAN. 924166, FRA. 7004034, ITL. 888743, JAP. 48-7822, U.K. 1255763.
3,740,249.—SOLVENT FIXING PROCESS. JUNE 19, 1973. JAP. 49-26591.

Class 18C2A1

3,704,119.—ELECTROPHOTOGRAPHIC PROCESS USING TONER OF SAME REFRACTIVE INDEX AS ORGANIC PHOTOCONDUCTIVE LAYER. NOV. 28, 1972. AUS. 433360, BEL. 754544, FRA. 7028556, ITL. 902771, JAP. 48-21054, U.K. 1321065.

Class 18C2A2

3,668,126.—METHOD OF PRODUCING ELECTROPHOTOGRAPHIC LIQUID DEVELOPERS HAVING VERY FINE COLORING MATERIAL. JUNE 6, 1972. BEL. 709625, FRA. 1562934, U.K. 1218064.

3,682,825.—PROCESS FOR THE PRODUCTION OF ELECTROPHOTOGRAPHIC LIQUID DEVELOPER CONTAINING GELATIN. AUG. 8, 1972. AUS. 424258, BEL. 745390, CAN. 924165, FRA. 7003324, GER. 2004817, ITL. 887410, JAP. 48-7819, U.K. 1255762.

Class 18C5A

3,597,368.—LIQUID DEVELOPER FOR ELECTROPHOTOGRAPHY CONTAINING YELLOW PIGMENT. AUG. 3, 1971. BEL. 719289, CAN. 846.122, FRA. 1578390, JAP. 46-10480, U.K. 1201134.
3,738,832.—COLOR ELECTROPHOTOGRAPHIC PROCESS EMPLOYING LIQUID DEVELOPER CONTAINING GELATIN. JUNE 12, 1973. CAN. 921746, JAP. 47-30858, U.K. 1277723.

Class 20A3

3,753,419.—ELECTROPHOTOGRAPHIC LIQUID DEVELOPING APPARATUS. AUG. 21, 1973. AUS. 430722, BEL. 768788, CAN. 334540, FRA. 7122426, ITL. 928531, U.K. 1337485.
3,817,212.—ELECTROSTATOGRAPHIC LIQUID DEVELOPMENT APPARATUS. JUNE 18, 1974. U.K. 1310448.

Class 20B3

3,544,458.—METHOD OF FILTERING. DEC. 1, 1970. BEL. 732578, CAN. 888335.

Class 20C

3,707,139.—LIQUID TYPE ELECTROPHOTOGRAPHY DEVELOPING APPARATUS. DEC. 26, 1972. BEL. 756409, CAN. 918413, FRA. 7034577, GER. 1314865.

Class 20C2

3,753,466.—AUTOMATIC FIRE EXTINGUISHER IN ELECTROPHOTOGRAPHIC COPYING MACHINE OR THE LIKE. AUG. 21, 1973. U.K. 1334579.

Class 10C4

3,704,881.—TRANSFER SHEET PEELING DEVICE FOR XEROGRAPHIC APPARATUS. DEC. 5, 1972. CAN. 940546, U.K. 1275888.

Class 20D

3,653,292.—AUTOMATIC CONTOUR TRACING DEVICE. APR. 4, 1972. FRA. 7204547, GER. 2033094, U.K. 1295128.
3,825,407.—HEATER HOLDING BRACKET FOR A HEAT FIXER IN A COPYING MACHINE OR THE LIKE. JULY 23, 1974.

Class 20D1

3,791,643.—CHAIN DELIVERY PAPER FEEDING DEVICE. FEB. 12, 1974. JAP. 48-20232.

Class 20G

3,795,187.—IMPELLERS FOR IMPACT PRINTERS. MAR. 5, 1974.

Class 20I

3,341,664.—METAL DRAWING APPARATUS. APR. 24, 1974.

Class 25A4

3,952,167.—ELECTROMAGNETIC COUPLER FOR USE WITH A TELEPHONE SET. APR. 20, 1976.

Class 25C2

3,341,631.—CIRCUIT INTERRUPTER. APR. 24, 1974. BEL. 764267, CAN. 932954, FRA. 7109086.
3,846,647.—TRIGGER CIRCUIT FOR USE WITH MULTIVIBRATORS. NOV. 5, 1974.

Class 25C4

3,838,344.—FREQUENCY MULTIPLYING CIRCUIT. SEPT. 24, 1974.

Class 25C5

3,936,675.—REFERENCE POINT POTENTIAL COMPENSATING CIRCUIT FOR USE WITH PHASE CONTROLLER. FEB. 3, 1976.

Class 27D

3,779,206.—APPARATUS FOR SCRAPING LIQUID OFF OF SHEET MATERIAL. DEC. 18, 1973.

Class 32

3,813,262.—RESIN-IMPREGNATED TISSUE OVERLAYS. MAY 28, 1974. BEL. 777312, FRA. 7146406, ITL. 945655.

Class 32B

3,273,450.—DATA PROCESSING APPARATUS. NOV. 15, 1963. FRA. 1384061, GER. 1449563, GRB. 1048048, JAP. 629392.

Xerox Patents

Class 1A

2,573,881.—METHOD AND APPARATUS FOR DEVELOPING ELECTROSTATIC IMAGES WITH ELECTROSCOPIC POWDER. NOV. 6, 1951. AUS. 0149247, CAN. 0479868, GER. 0903414, GRB. 0693905, STZ. 0286142, SWD. 0171735.
3,877,936.—PHOTOCONDUCTIVE COPOLYMER OF N-VINYLCARBAZOLE AND N-VINYLPHTHALIMIDE. APR. 15, 1975. BEL. 0812436, FRA. 7409307, GRB. 1444048, ITL. 1010697, SPN. 0424411.
3,954,951.—PREPARATION OF RED AMORPHOUS SELENIUM. MAY 4, 1976.
3,961,954.—ACID SENSITIZED CHARGE TRANSFER COMPLEXES AND CYCLIC ELECTRSTATOGRAPHC IMAGNG METH-ACID SENSITIZATN. JUNE 8, 1976. CAN. 1002366.
4,009,249.—PREPARATION OF RED AMORPHOUS SELENIUM. FEB. 22, 1977.

Class 1A 1

3,607,261.—INORGANIC CRYSTALLINE BINDERS FOR ELECTROPHOTOGRAPHIC PLATES. SEPT. 21, 1971.
3,850,631.—PHOTOCONDUCTIVE ELEMENT WITH A POLYVINVLIDENE FLUORIDE BINDER. NOV. 26, 1974.
3,928,036.—FLEXIBLE XEROGRAPHIC PHOTORECEPTOR ELEMENT. DEC. 23, 1975.
3,981,728.—XEROGRAPHIC IMAGING MEMBER HAVING HEXAGONAL SELENIUM IN INTER-LOCKING CONTINUOUS PATHS. SEPT. 21, 1971.

Class 1A 1A

2,886,434.—PROTECTED PHOTOCONDUCTIVE ELEMENT AND METHOD OF MAKING SAME— HORIZONS. MAY 12, 1959. CAN. 0621931.
2,970,906.—XEROGRAPHIC PLATE AND A PROCESS OF COPY MAKING. FEB. 7, 1961. CAN. 0576158.
3,011,474.—XEROGRAPHIC DEVELOPMENT ELECTRODE APPARATUS. DEC. 5, 1961. CAN. 0701149, GRB. 0948138.
3,041,166.—XEROGRAPHIC PLATE AND METHOD. JUNE 26, 1962. CAN. 0617821, GRB. 0936649.
3,174,855.—METHOD FOR A PRODUCTION OF A XEROGRAPHIC PLATE. MAR. 23, 1965.
3,251,686.—XEROGRAPHIC PROCESS. MAY 17, 1966. FRA. 1292831, GER. 1243979, GRB. 0996972, JAP. 0416023.
3,312,547.—XEROGRAPHIC PLATE AND PROCESSES OF MAKING AND USING SAME. APR. 4, 1967.
3,341,326.—DARK DECAY CONTROLLED XEROGRAPHY. SEPT. 12, 1967. AUS. 0285843, CAN. 0729829, FRA. 1377592, GRB. 1029199, ITL. 0706101.
3,352,669.—PHOTOCONDUCTIVE MEMBER AND PROCESSES OF PREPARING AND USING SAME. NOV. 14, 1967. AUS. 0405164, CAN. 0834670, FRA. 1422625, GER. 1497194, GRB. 1052970, HOL. 0137891, ITL. 0749420, JAP. 0501912.
3,508,918.—XEROGRAPHIC PLATE CONTAINING ALUMINUM SELENIDE BARRIER LAYER. APR. 28, 1970. CAN. 0872175.
3,532,496.—XRGRPHC PLTS AND PROCS EMPLYNG HMGNUS DISPRSNS OF VTREOUS SLNIUM AND SNSTZNG DYES AS PHTCNDCTV LAYER. OCT. 6, 1970.
3,621,248.—METHOD USING XERORADIOGRAPHIC PLATE INSENSITIVE TO VISIBLE LIGHT. NOV. 16, 1971.
3,645,729.—METHOD OF TRANSFERRING ELECTROSTATIC LATENT IMAGES USING MULTIPLE PHOTOCONDUCTIVE LAYERS. FEB. 29, 1972.
3,690,252.—LITHOGRAPHIC INKING APPARATUS. SEPT. 12, 1972. CAN. 0919006.
3,930,853.—ACCELERATING AGING METHOD FOR SELENIUM ARSENIC PHOTOCONDUCTORS. JAN. 6, 1976.
4,013,463.—PHOTORECEPTOR FABRICATION UTILIZING AC ION PLATING. MAR. 22, 1977.
4,150,029.—SELENIUM AND SELENIUM ALLOY EVAPORATION TECHNIQUE. MAR. 29, 1977.
4,016,310.—COATR HRDWR AND METH FOR OBTNG UNFRM PHROCNDTV LAYR ON A XEROGRAPHIC PHOTORECEPTOR. APR. 5, 1977.
4,109,902.—PHOTORECEPTOR FABRICATION. APR. 26, 1977.
4,023,523.—COATING HARDWARE AND METHOD FOR OBTAINING UNIFORM PHOTOCONDUCTIVE LAYERS ON A XEROGRAPHIC PHOTO. MAY 17, 1977.

Class 1A 1B

2,745,327.—ELECTROPHOTOGRAPHIC PROCESS. MAY 15, 1956.
2,803,542.—XEROGRAPHIC PLATE. AUG. 20, 1957. CAN. 0603581, FRA. 1181499, GRB. 0876569.
2,863,768.—XEROGRAPHIC PLATE. DEC. 9, 1958.
3,312,548.—XEROGRAPHIC PLATES. APR. 4, 1967. BEL. 0691217, CAN. 0819658, FRA. 1505803, GRB. 1165579, JAP. 0650232.
3,355,289.—CYCLICAL XEROGRAPHIC PROCESSD UTILIZING A SELENIUM-TELLURIUM XEROGRAPHIC PLATE. NOV. 28, 1967.
3,427,157.—XEROGRAPHIC PROCESS UTILIZING A PHOTOCONDUCTIVE ALLOY OF THALLIUM IN SELNIUM. FEB. 11, 1969. CAN. 0834085, FRA. 1461161, GRB. 1132993, HOL. 0150924, ITL. 0749553, JAP. 0534762, MEX. 0085232.
3,489,560.—PHOTOCONDUCTIVE LAYR COMPRISN SELENIUM COMPOUND AND SOLID HYDROPHOBIC METL SALT OF A FATTY ACID. JAN. 13, 1970. BEL. 0711297, CAN. 0871632, FRA. 1544448, GRB. 1203237, ITL. 0815227, JAP. 0632160.
3,490,903.—ALLOYS OF ANTIMONY AND SELENIUM USED IN PHOTOCONDUCTIVE ELEMENTS. JAN. 20, 1970. AUS. 0412949, CAN. 0871074, FRA. 1533536, GRB. 1185389, ITL. 0805955, JAP. 0626127, SWD. 0318193.
3,511,649.—PROCESS OF REDUCING FATIGUE IN PHOTOCONDUCTIVE GLASSES. MAY 12, 1970. GRB. 1193472, JAP. 0604152.
3,524,745.—PHOTOCONDUCTIVE ALLOY OF ARSENIC ANTIMONY AND SELENIUM. AUG. 18, 1970. ARG. 0164055, AUS. 0410443, BEL. 0709132, CAN. 0884810, CHL. 0024255, FRA. 1550902, GRB. 1209971, IND. 0113988, ITL. 0833508, JAP. 9124370, LXB. 0055231, MEX. 0108993, NOR. 0127943, NZL. 0151243, PRU. 0009904, PTG. 0048919, SAF. 0680228, SPN. 0349235, STZ. 0495573, SWD. 0328189, URG. 0009683.
3,645,729.—METHOD OF TRANSFERRING ELECTROSTATIC LATENT IMAGES USING MULTIPLE PHOTOCONDUCTIVE LAYERS. FEB. 29, 1972.
3,690,252.—LITHOGRAPHIC INKING APPARATUS. SEPT. 12, 1972. CAN. 0919006.
3,709,683.—INFRARED SENSITIVE IMAGE RETENTION PHOTORECEPTOR. JAN. 9, 1973.
3,874,917.—METHOD OF FORMING VITREOUS SEMICONDUCTORS BY VAPOR DEPOSITING BISMUTH AND SELENIUM. APR. 1, 1975.
4,015,029.—SELENIUM AND SELENIUM ALLOY EVAPORATION TECHNIQUE. MAR. 29, 1977.
4,016,310.—COATR HRDWR AND METH FOR OBTNG UNFRM PHROCNDTV LAYR ON A XEROGRAPHIC PHOTORECEPTOR. APR. 5, 1977.
4,019,902.—PHOTORECEPTOR FABRICATION. APR. 26, 1977.
4,023,523.—COATING HARDWARE AND METHOD FOR OBTAINING UNIFORM PHOTOCONDUCTIVE LAYERS ON A XEROGRAPHIC PHOTO. MAY 17, 1977.

Class 1A 1C

2,937,944.—XEROGRAPHIC LIGHT-SENSITIVE MEMBER AND PROCESS THEREFOR. MAY 24, 1960. AUS. 0242066, BEL. 0586070, CAN. 0610194, FRA. 1243723, GER. 1165408, GRB. 0894371, ITL. 0620746, JAP. 0318674, STZ. 0394806.
3,008,825.—XEROGRAPHIC LIGHT-SENSITIVE MEMBER AND PROCESS THEREFOR. NOV. 14, 1961. CAN. 0610195.
3,077,398.—XEROGRAPHIC PLATE MADE BY CAST COATING. FEB. 12, 1963.
3,080,251.—METHOD OF XEROGRAPHIC DEVELOPMENT. MAR. 5, 1963.
3,121,006.—PHOTO-ACTIVE MEMBER FOR XEROGRAPHY. FEB. 11, 1964. ARG. 0147758, BEL. 0656892, CAN. 0674311, CHL. 0020455, CLB. 0014118, ECD. 0000029, GUA. 0001696, PRU. 0009656, TRK. 0012835, URG. 0006526, VZL. 0016353.
3,121,007.—PHOTO-ACTIVE MEMBER FOR XEROGRAPHY. FEB. 11, 1964.
3,140,174.—PROCESS FOR OVERCOATING A XEROGRAPHIC PLATE. JULY 7, 1964. GRB. 0960871.

3,151,982.—XEROGRAPHIC PLATE. OCT. 6, 1964. ARG. 0149584, ATR. 0247148, AUS. 0275834, BEL. 0630478, BRA. 0088013, CAN. 0879017, DNK. 0116787, FRA. 1359402, GER. 1497054, GRB. 1049872, GRK. 0026268, HOL. 0139212, IND. 0086999, ISR. 0018877, ITL. 0701505, JAP. 0489512, LXB. 0043461, MEX. 0081663, NOR. 0108058, NZL. 0134420, PTG. 0040700, SAF. 0001331, SPN. 0286492, STZ. 0450173, SWD. 0313998.
3,251,686.—XEROGRAPHIC PROCESS. MAY 17, 1966. FRA. 1292831, GER. 1243979, GRB. 0996972, JAP. 0416023.
3,379,527.—PHOTOCONDUCTIVE INSULATORS COMPRISING ACTIVATED SULFIDES SELENIDES AND SULFOSELENIDES OF CADMIUM. APR. 23, 1968. CAN. 0907921, GRB. 1079065.
3,519,420.—METHOD OF CHARGING A ZINC OXIDE PHOTOCONDUCTIVE LAYER WITH A POSITIVE CHARGE. JULY 7, 1970.
3,522,040.—PHOTOSENSITIVE INSULATING MATERIAL. JULY 28, 1970. CAN. 0884808, GRB. 1171910, JAP. 0552966.
3,941,594.—ELECTROPHOTOGRAPHIC ELEMENT WITH ZNO AND TIO2. MAR. 2, 1976.
3,969,113.—PHOTOSENSITIVE BINDER LAYER FOR XEROGRAPHY CONTAINING TITANIUM OXIDE AND A CADMIUM PIGMENT. JULY 13, 1976.
3,975,306.—METHOD FOR IMPROVING THE PHOTOINDUCED DISCHARGE CHARACTERISTICS OF CERTAIN CADMIUM CHALOCOGENIDE. AUG. 17, 1976.

Class 1A 1E

3,469,978.—PHOTOSENSITIVE ELEMENT. SEPT. 30, 1969. CAN. 0872173, GRB. 1171909, JAP. 0552967.

Class 1A 1F

3,288,604.—IMAGING METHOD USING AN ELEMENT HAVING A GLASS OVERCOATING. NOV. 29, 1966. CAN. 0815735.
3,397,982.—XIC PLATE W/INORGANIC GLASS BINDER HAVING OVERCCATING CONSISTING ESSENTIALLY OF ALUMINUM OXIDE. AUG. 20, 1968. ARG. 0150690, AUS. 0407349, BEL. 0674140, CAN. 0866142, FRA. 1460232, GER. 1497230, GRB. 1129674, ITL. 0822914, JAP. 0531894, MEX. 0085270, SWD. 0319976.
3,507,646.—ELECTROPHOTOGRAPHIC PROCESS USING A SINGLE PHASE PHOTOCONDUCTIVE GLASS IMAGING LAYER. APR. 21, 1970. ARG. 0164449, AUS. 0416137, BEL. 0691757, CAN. 0818383, FRA. 1511172, GER. 1522713, GRB. 1167520, ITL. 0787661, JAP. 0567233, MEX. 0105237, SPN. 0334896, STZ. 0472707, SWD. 0331793, VZL. 0024006.
3,565,713.—METHOD OF FORMING A CERAMIC IMAGE ON A CERAMIC SUBSTRATE. FEB. 23, 1971.

Class 1A 2

3,738,831.—CHALCOGEN ORGANIC COMPOUNDS USED IN ELECTROPHOTOGRAPHIC PLATES AND PROCESS. JUNE 12, 1973.
3,758,301.—ELECTROPHOTOGRAPHIC USE OF SELENIUM CONTAINING POLYMERS. SEPT. 11, 1973.
3,770,428.—ORGANIC PHOTOCONDUCTIVE MATERIAL. NOV. 6, 1973.
3,850,631.—PHOTOCONDUCTIVE ELEMENT WITH A POLYVINVLIDENE FLUORIDE BINDER. NOV. 26, 1974.
3,864,144.—PROCESS FOR PREPARATION OF PHOTOCONDUCTIVE FILMS FROM INTRACTABLE MATERIALS. FEB. 4, 1975. FRA. 740836, GRB. 1414158, ITL. 1010695, TIW. 0008534.
3,879,198.—ELECTROPHOTOGRAPHIC AMBIPOLAR PHOTOCONDUCTIVE COMPOSITION AND IMAGING METHOD. APR. 22, 1975.
3,882,087.—ORGANIC PHOTOCONDUCTIVE MATERIAL. MAY 6, 1975.
3,903,107.—DIRECT ALPHA TO X PHASE CONVERSION OF METAL CONTAINING PHTHALOCYANINE. SEPT. 2, 1975. BEL. 0815632, SAF. 0743536.
3,915,704.—PHOTOINDUCED ACID CATALYZED DEGRADATION OF DEGRADABLE POLYMERS. OCT. 28, 1975.
3,917,483.—PHOTOINDUCED ACID CATALIZED DEPOLYMERIZATION OF DEGRADABLE POLYMERS. NOV. 4, 1975.
3,923,762.—PROCESS FOR PREPARATION OF 2-ANTHRYL AND SUBSTITUTED 2-ANTHRYL FUNCTIONAL MONOMERS AND P. DEC. 2, 1975. BEL. 0822305, STZ. 0032598.
3,932,180.—DIRECT ALPHA TO X PHASE CONVERSION OF METAL-FREE PHTHALOCYANINE. JAN. 13, 1976. BEL. 0815632, SAF. 0743536.
3,943,108.—PHOTOCONDUCTIVE COMPOSITION OF AN ALDEHYDE CONDENSATE. MAR. 9, 1976.
3,951,658.—COLOR MODIFYING IMAGING METHOD AND ARTICLE. APR. 20, 1976.
3,954,906.—AMBIPOLAR PHOTOCONDUCTIVE COMPOSITION AND IMAGING METHOD. MAY 4, 1976. FRA. 7403086, GRB. 1446966.
3,978,029.—PHOTOCONDUCTIVE COMPOSITIONS AND IMAGING MEMBERS AND METHODS EMPLOYING SAME. AUG. 31, 1976. ARG. 0206212, BEL. 0816552, FRA. 7422479, SAF. 0744129.
3,981,848.—PHOTOCONDUCTIVE COMPOSITION AND IMAGING METHODS EMPLOYING SAME. SEPT. 21, 1976. ARG. 0206211, ATR. 0332734, FRA. 7422484.

Class 1A 2A

3,081165.—XEROGRAPHIC CHEMOGRAPHY. MAR. 12, 1963. CAN. 0618594, GRB. 0977904.
3,357,989.—METAL FREE PHTHALOCYANINE IN THE NEW X-FORM-SEE D2167 FOR RE27117. DEC. 12, 1967. CAN. 0860929, FRA. 1508173, GRB. 1169901, ITL. 0787592, JAP. 0560090, MEX. 0101543.
3,432,415.—ELECTROPHORETIC IMG. PROCESS USING PHOTOSENSITIVE XANTHENONIUM SALTS. MAR. 11, 1969. AUS. 0439502, BEL. 0743895, CAN. 0851118, GER. 1522701, GRB. 1155747, JAP. 0650631, MEX. 0104632.
3,442,781.—PHOTOELECTROPHORETIC AND XEROGRAPHIC IMG. PROC. EMPL. TRIPHENODIOXAZINES AS ELECTRIC. PHOTOSENSIT. MAY 6, 1969. AUS. 0445582, BEL. 0743894, CAN. 0855152, GRB. 0175452, JAP. 0611634.
3,445,225.—ELECTROPHOTOGRAPHIC IMAGING PROCESS. MAY 20, 1969. CAN. 0846121.
3,445,227.—ELECTROPHOTOGRAPHIC IMAGING PROCESSES EMPLOYING 2,4 DIAMINOTRIAZINES AS ELCTRCLY PHOTOSNSTV PRT. MAY 20, 1969. BEL. 0743891, CAN. 0852681, GER. 1522687, GRB. 1146019, JAP. 0617789.
3,448,028.—N-SBSTUD-8,13-DIOXODINAPHTHO-2-1-B,2,3-D-FURAN-6-CARBOXAMIDES AS ELCTLY PTOSNSTV MTLS IN ELCPHG. JUNE 3, 1969.
3,448,029.—ELECTROPHORETIC IMAGING PROCESS USING 8,13-DIOXODINAPTHO-2,1-B,2,3-D-FURAN-6-CARBOXAMIDE PIGMEN. JUNE 3, 1969.
3,448,030.—ELECTRICALLY PHOTOSENSITIVE PART. USEFUL IN PHOTOELECTROPHORETIC AND XEROGRAPHIC IMAGING PROCESSE. JUNE 3, 1969. AUS. 0445639, BEL. 0743893, CAN. 0943830, GRB. 1155554, JAP. 0686735.
3,482,970.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS USING NAPHTHYLAZO COMPOUNDS AS THE PRIMARY PHOTOCONDUCTOR. DEC. 9, 1969. ATR. 0279351, AUS. 0453397, BEL. 0742978, CAN. 0869486, GRB. 1296390, ITL. 0878843, JAP. 0725059.
3,607,261.—INORGANIC CRYSTALLINE BINDERS FOR ELECTROPHOTOGRAPHIC PLATES. SEPT. 21, 1971.
3,615,409.—ELCTROPHOTOGRPHC PLATE AND PROCESS EMPLOYING A PHOTODNDCTV PIGMNT OF GENERAL FORMULA R2 N4 S3. OCT. 26, 1971.
3,640,710.—PHTHALOCYANINE PHOTOCONDUCTIVE ELEMENTS CONTAINING MULTIPLE BINDER MATERIALS. FEB. 8, 1972. ARG. 0184666, ATR. 0328861, AUS. 0456430, BEL. 0760751, CAN. 0933012, FRA. 7047636, GRB. 1333605, ITL. 0913999, PNM. 0002243, STZ. 0554550, SWD. 0365878, TIW. 0006738, USR. 0450420, VZL. 0032928.
3,672,979.—METHOD OF PRODUCING A PHTHALOCYANINE PHOTOCONDUCTIVE LAYER. JUNE 27, 1972. ARG. 0184673, AUS. 0457271, BEL. 0761135, CAN. 0951697, FRA. 7047702, GRB. 1334060, ITL. 0914074, JAP. 0753795, MEX. 0119529, PNM. 0002191, SPN. 0386759, STZ. 0571731, TIW. 0007180, VZL. 0032789.
3,708,292.—PI-FORM METAL PHTHALOCYANINE. JAN. 2, 1973. ARG. 0194234, BEL. 0783793, CAN. 0996931, GRB. 1396922, ITL. 0955644, MEX. 0128928.
3,789,216.—PHOTODETECTION DEVICE AND METHOD COMPRISING PHTHALOCYANINE. JAN. 29, 1974.
3,865,798.—PHOTOACTIVE POLYMERS INDUCED EXOCYCLIC QUARTET CONCEPT. FEB. 11, 1975. AUS. 0462805, BEL. 0790689, FRA. 7237458, GRB. 1411998, ITL. 0969902, MEX. 0133728, SPN. 0407984, STZ. 0028515, VZL. 003956.
3,895,945.—PROCESS FOR PREPARATION OF A DYESTUFF SENSITIZED PHOTOCONDUCTIVE COMPOSITION. JULY 22, 1975.

3,923,762.—PROCESS FOR PREPARATION OF 2-ANTHRYL AND SUBSTITUTED 2-ANTHRYL FUNCTIONAL MONOMERS AND P. DEC. 2, 1975. BEL. 0822305, STZ. 0032598.
3,951,654.—MTHD ENHNCMT RATE AND EFFICIENCY OF PHOTODSCHG OF ELCTRPHGRIC IMAGING MEMBERS COMPRSNG PHTHALOCYA. APR. 20, 1976.
3,970,602.—COPOLYMERS OF N-VINYLCARBAZOLE AND N-VINYLPHTHALIMIDE AND DERIVATIVES THEREOF. JULY 20, 1976. BEL. 0812436. FRA. 7409307, GRB. 1444048, ITL. 1010697, SPN. 0424411.
3,989,860.—REPAIR TECHNIQUE FOR PHOTORECEPTOR. NOV. 2, 1976.
4,006,017.—PHOTOCONDUCTIVE COMPOSITION ARTICLE AND PROCESS. FEB. 1, 1977.
4,012,122.—LIQUID CRYSTALLINE PLATEN FOR A ELECTROPHOTOGRAPHIC PRINTING MACHINE. MAR. 15, 1977.

Class 1A 2B

3,408,182.—ELECTROPHOTOGRAPHIC MATERIALS AND METHODS EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRANSFER COMP. OCT. 29, 1968. CAN. 0847805, FRA. 1463743, GER. 1522679, GRB. 1137665, ITL. 0755290, JAP. 0572185, MEX. 0107318.
3,408,183.—ELECTROPHOTOGRAPHIC MATERIALS AND METHODS EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRANSFER COMP. OCT. 29, 1968. CAN. 0819066, FRA. 1463745, GER. 1522676, GRB. 1126048, ITL. 0755287, JAP. 0727091, MEX. 0106758.
3,408,184.—ELECTROPHOTOGRAPHIC MATERIALS AND METHODS EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRNSFR COMPLE. OCT. 29, 1968. CAN. 0818382, FRA. 1463727, GRB. 1137664, ITL. 0755289, JAP. 0726382, MEX. 0105835.
3,408,185.—ELECTROPHOTOGRAPHIC MATERIALS AND METHOD EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRANSFER COMP. OCT. 29, 1968. CAN. 0848383, FRA. 1463728, GER. 1645192, GRB. 1137476, ITL. 0755291, MEX. 0106763.
3,408,186.—ELECTROPHOTOGRAPHIC MATERIALS AND METHODS EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRNSFR COMPLE. OCT.29,1968. CAN. 0846736, FRA. 1463746, GRB. 1138629, ITL. 0755288, JAP. 0569483, MEX. 0106589.
3,408,187.—ELECTROPHOTOGRAPHIC MATER AND METH EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRANSFER COMPLEXES. OCT. 29, 1968. CAN. 0867298, GER. 1522721, GRB. 1163097, JAP. 0797719.
3,408,188.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS COMPRISING PHOTOCONDUCTIVE CHARGE TRANSFER COMPLEXES. OCT. 29, 1968. CAN. 0869485, GRB. 1183516, JAP. 0797720.
3,408,189.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS EMPLOYING PHOTOCONDUCTIVE CHARGE TRANSFER COMPLEXES. OCT. 29, 1968.
3,408,190.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS EMPLOYING PHOTOCONDUCTIVE CHARGE TRANSFER COMPLEXES. OCT. 29, 1968. CAN. 0850019, GER. 1302772, GRB. 1182172.
3,536,482.—ELECTROPHOTOGRPHC IMG SYS INCL A HALOGEN TREATMENT STOP FOR MAKING BCKGRND AREAS TRANSPARENT. OCT. 27, 1970.
3,607,258.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS. SEPT. 21, 1971. CAN. 0871634, GRB. 1174171.
3,865,798.—PHOTOACTIVE POLYMERS INDUCED EXOCYCLIC QUARTET CONCEPT. FEB. 11, 1975. AUS. 0462805, BEL. 0790689, FRA. 7237458, GRB. 1411998, ITL. 0969902, MEX. 0133728, SPN. 0407984, STZ. 0028515, VZL. 0033956.
3,879,201.—PERSISTENT PHOTOCONDUCTIVE COMPOSITIONS. APR. 22, 1975.
3,899,328.—ACTIVE MATRIX AND INTRINSIC PHOTOCONDUCTIVE POLYMER OF A LINEAR POLYSILOXANE. AUG. 12, 1975.
3,923,762.—PROCESS FOR PREPARATION OF 2-ANTHRYL AND SUBSTITUTED 2-ANTHRYL FUNCTIONAL MONOMERS AND P. DEC. 2, 1975. BEL. 0822305, STZ. 0032598.
3,957,725.—AN ACTIVE MATRIX AND INTRINSIC PHOTOCONDUCTIVE POLYMER. MAY 18, 1976. ITL. 1010430.
4,007,043.—PHOTOCONDUCTIVE ELEMENTS WITH COPOLYMER CHARGE TRANSPORT LAYERS. FEB. 8, 1977.
4,013,623.—INTRACHAIN CHARGE TRANSFER COMPLEXES. MAR. 22, 1977.
4,025,710.—INTRACHAIN CHARGE TRANSFER COMPLEXES. MAY 24, 1977.
4,033,769.—PERSISTENT PHOTOCONDUCTIVE COMPOSITIONS. JULY 5, 1977.

Class 1A 2C

3,451,811.—ELECTROPHOTOGRAPHIC IMAGING PROCESSES USING ELECTRICALLY PHOTOSENSITIVE PHOTOCHROMIC MATERIALS. JUNE 24, 1969. CAN. 0828692, JAP. 0573734.
3,660,086.—ELCTRPHTGRPC PLATE AND PROCS EMPLYNG INORGNC PHOTCNDCTV MATRL W/PHOTOCHROMIC SENSITIVE AGENT. MAY 2, 1972.
3,961,948.—PHOTOCHROMIC IMAGING METHOD. JUNE 8, 1976.

Class 1A 2D

3,518,081.—IMAGE FORMATION AND DEVELOPMENT - REISSUED D 857R. JUNE 30, 1970. CAN. 0801270, GRB. 1085573.

Class 1A 3

3,041,166.—XEROGRAPHIC PLATE AND METHOD. JUNE 26, 1962. CAN. 0617821, GRB. 0936649.
3,312,547.—XEROGRAPHIC PLATE AND PROCESSES OF MAKING AND USING SAME. APR. 4, 1967.
3,341,326.—DARK DECAY CONTROLLED XEROGRAPHY. SEPT. 12, 1967. AUS. 0285843, CAN. 0729829, FRA. 1377592, GRB. 1029199, ITL. 0706101.
3,352,669.—PHOTOCONDUCTIVE MEMBER AND PROCESSES OF PREPARING AND USING SAME. NOV. 14, 1967. AUS. 0405164, CAN. 0834670, FRA. 1422625, GER. 1497194, GRB. 1052970, HOL. 0137891, ITL. 0749420, JAP. 0501912.
3,393,070.—XEROGRAPHIC PLATE WITH ELECTRIC FIELD REGULATING LAYER. JULY 16, 1968. CAN. 0871308, GER. 1490987, GRB. 1141452, JAP. 0764435, MEX. 0105660.
3,508,918.—XEROGRAPHIC PLATE CONTAINING ALUMINUM SELENIDE BARRIER LAYER. APR. 28, 1970. CAN. 0872175.
3,573,906.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS. APR. 6, 1971. ARG. 0177890, AUS. 0441534, BEL. 0725173, BRA. 0088092, CAN. 0906801, CZC. 0157053, FRA. 1594981, GRB. 1217726, ITL. 0852743, SPN. 0379204, SWD. 0335063, USR. 0448658, VZL. 0029780.
3,723,110.—ELECTROPHOTOGRAPHIC PROCESS. MAR. 27, 1973.
3,765,757.—TRANSPORT ARRANGEMENT FOR THIN SHEET MATERIAL. OCT. 16, 1973. BEL. 0793551, CAN. 1004289, GRB. 1419978, ITL. 0972846, SPN. 0410107.
3,867,027.—TRANSPORT ARRANGEMENT FOR THIN SHEET MATERIAL. FEB. 18, 1975. BEL. 0793551, CAN. 1004289, GRB. 1419978, ITL. 0972846, SPN. 0410107.
3,907,650.—PHOTOSENSITIVE BINDER LAYER FOR XEROGRAPHY. SEPT. 23, 1975.
3,914,126.—NICKEL OXIDE INTERLAYERS FOR PHOTOCONDUCTIVE ELEMENTS. OCT. 21, 1975.

Class 1A 4

2,886,434.—PROTECTED PHOTOCONDUCTIVE ELEMENT AND METHOD OF MAKING SAME - HORIZONS. MAY 12, 1959. CAN. 0621931.
3,251,686.—XEROGRAPHIC PROCESS. MAY 17, 1966. FRA. 1292831, GER. 1243979, GRB. 0996972, JAP. 0416023.
3,256,089.—MASKED PLATE XEROGRAPHY. JUNE 14, 1966.
3,288,604.—IMAGING METHOD USING AN ELEMENT HAVING A GLASS OVERCOATING. NOV. 29, 1966. CAN. 0815735.
3,397,982.—XIC PLATE W/INORGANIC GLASS BINDER HAVING OVERCOATING CONSISTING ESSENTIALLY OF ALUMINUM OXIDE. AUG. 20, 1968. ARG. 0150690, AUS. 0407349, BEL. 0674140, CAN. 0866142, FRA. 1460232, GER. 1497230, GRB. 1129674, ITL. 0822914, JAP. 0531894, MEX. 0085270, SWD. 0319976.
3,434,832.—XEROGRAPHIC PLATE COMPRISING A PROTECTIVE COATING OF A RESIN MIXED WITH A METALLIC STEARATE. MAR. 25, 1969. CAN. 0835883, FRA. 1454672, GER. 1497223, GRB. 1128156, ITL. 0772535, JAP. 0545757, MEX. 0085603.

3,488,189.—ELECTROPHOTOGRAPHIC RECORDING MEMBER HAVING SOLID CRYSTALLINE PLASTICIZR AVAILBL AT IMGNG SURFA. JAN. 6, 1970. CAN. 0866700, FRA. 1506810, GRB. 1183205, ITL. 0788976, JAP. 0570734, MEX. 0108241.
3,607,258.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS. SEPT. 21, 1971. CAN. 0871634, GRB. 1174171.
3,816,115.—METHOD FOR FORMING A PLURALITY OF ELECTROSTATIC LATENT IMAGES ON AN ELECTROPHOTOGRAPHIC PLATE. JUNE 11, 1974.
3,860,421.—N-ALKYL MORPHOLINE TREATMENT OF A SELENIUM-CONTAINING PHOTOCONDUCTIVE LAYER. JAN. 14, 1975.
3,865,798.—PHOTOACTIVE POLYMERS INDUCED EXOCYCLIC QUARTET CONCEPT. FEB. 11, 1975. AUS. 0462805, BEL. 0790689, FRA. 7237458, GRB. 1411998, ITL. 0969902, MEX. 0133728, SPN. 0407984, STZ. 0028515.
3,884,690.—POLYESTER PHOTOCONDUCTORS AND MATRIX MATERIALS. MAY 20, 1975.
3,896,184.—POLYMERS OF BENZANTHRACENE AS ACTIVE MATRIX MATERIALS. JULY 22, 1975.
3,899,328.—ACTIVE MATRIX AND INTRINSIC PHOTOCONDUCTIVE POLYMER OF A LINEAR POLYSILOXANE. AUG. 12, 1975.
3,957,725.—AN ACTIVE MATRIX AND INTRINSIC PHOTOCONDUCTIVE POLYMER. MAY 18, 1976. ITL. 1,010,430.
4,022,956.—POLYMERS OF BENZANTHRACENE AS ACTIVE MATRIX MATERIALS. MAY 10, 1977.
4,027,964.—IMAGING METHOD AND APPARATUS. JUNE 7, 1977. ARG. 0190535, BEL. 0777714, CAN. 0949825, FRA. 7201000, GRB. 1374501, ITL. 0946355, MEX. 0124981.

Class 1A 5

3,411,903.—XEROGRAPHIC METHOD AND PLATE COMPRISING PHOTOCONDUCTIVE INSULATING FIBERS. NOV. 19, 1968. ARG. 0149620, ATR. 0270379, AUS. 0410718, BEL. 0672668, BRA. 0084119, CAN. 0834669, CHL. 0023648, CLB. 0014943, DNK. 0120577, EGR. 0055545, FRA. 1464792, GER. 1497224, GRB. 1084024, GRK. 0031509, IND. 0102560, ISR. 0024632, ITL. 0734376, JAP. 0724233, LXB. 0049849, MEX. 0098487, NOR. 0122817, NZL. 0143432, PLO. 0067959, PLP. 0004547, PNM. 0001533, PRU. 0008384, PTG. 0044879, SAF. 0656280, SPN. 0319795, STZ. 0458076, SWD. 0308250, THL. 1084024, TIW. 0003735, URG. 0006624, VZL. 0023996.
3,947,184.—IMAGING METHOD. MAR. 30, 1976.
3,972,718.—ELECTROSTATOGRAPHIC GRAVURE MEMBER. AUG. 3, 1976.

Class 1A 6

3,003,869.—XEROGRAPHIC PLATE OF HIGH QUANTUM EFFICIENCY. OCT. 10, 1961.
3,288,602.—XEROGRAPHIC PLATE AND METHOD. NOV. 29, 1966. CAN. 0795978, GER. 1237902, GRB. 1029181, ITL. 0690835, JAP. 0578399.
3,621,248.—METHOD USING XERORADIOGRAPHIC PLATE INSENSITIVE TO VISIBLE LIGHT. NOV. 16, 1971.
3,684,500.—METHOD OF FORMING PERMANENT ELECTROSTATIC IMAGE WITH TWO-LAYERED PHOTORECEPTOR. AUG. 15, 1972.
3,843,407.—BLADE CLEANING WITH REVERSE MOVEMENT. OCT. 22, 1974.
3,907,650.—PHOTOSENSITIVE BINDER LAYER FOR XEROGRAPHY. SEPT. 23, 1975.
3,914,126.—NICKEL OXIDE INTERLAYERS FOR PHOTOCONDUCTIVE ELEMENTS. OCT. 21, 1975.
3,994,791.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. NOV. 30, 1976.

Class 1B

3,730,453.—EARLY END-OF-TAPE DETECTION. MAY 1, 1973. CAN. 0939052, GRB. 1354581.
3,889,292.—APPARATUS FOR MAKING MULTIPLE ALPHANURMIC COPIES OF A BINARY CODED MESSAGE. JUNE 10, 1975. CAN. 0986572.
4,032,746.—CONTROL SYSTEM FOR A FUSING APPARATUS. JUNE 28, 1977.

Class 1B 1

2,917,385.—REFLEX XEROGRAPHY. DEC. 15, 1959. CAN. 0577137.
3,244,546.—ELECTROSTATIC IMAGE REPRODUCTION. APR. 5, 1966. CAN. 0847532, GRB. 1040371, JAP. 0477223.
3,484,162.—ELECTROVISCOUS RECORDING. DEC. 16, 1969.
3,518,698.—IMAGING SYSTEM. JUNE 30, 1970. CAN. 0905481, FRA. 1542838, GRB. 1200804, JAP. 0604154, MEX. 0099911.
3,561,957.—ELECTROPHOTOGRAPHIC PROCESS USING A HIGH INTENSITY ELECTROMAGNETIC RADIATION SOURCE. FEB. 9, 1971. CAN. 0914266, GRB. 1207361.
3,631,507.—METHOD OF REDISTRIBUTING CHARGE ON A DIELECTRIC MEDIUM. DEC. 28, 1971.
3,677,750.—PHOTOELECTROSOLOGRAPHIC IMAGING. JULY 18, 1972. GRB. 1326934.
3,686,678.—DUAL MODE ELECTROSTATIC PRINTING. AUG. 22, 1972. BEL. 0747125, CAN. 0952574, FRA. 7007650, GRB. 1297996, JAP. 0753534.
3,693,185.—ELECTROSTATIC RECORDING HEAD AND METHOD OF MANUFACTURE. SEPT. 19, 1972.
3,719,481.—ELECTROSTATOGRAPHIC IMAGING PROCESS. MAR. 6, 1973.
3,729,123.—PRINTING MACHINE AND METHOD. APR. 24, 1973. CAN. 0959532, FRA. 7142517, GRB. 1348014.
3,729,334.—IMAGING PROCESS. APR. 24, 1973.
3,793,107.—ELECTROSTATIC RECORDING HEAD AND METHOD OF MANUFACTURE. FEB. 19, 1974.
3,829,185.—HOUSING ASSEMBLY FOR ELECTROSTATIC PRINTING MACHINE. AUG. 13, 1974.
3,854,942.—TRANSPARENCY FOR MULTI-COLOR ELECTROSTATIC COPYING. DEC. 17, 1974.
3,859,960.—PRINTING MACHINE WITH ELECTROSTATIC WEB DEVELOPING APPARATUS. JAN. 14, 1975. CAN. 0959532, FRA. 7142517, GRB. 1348014.
3,937,177.—ELECTROSTATIC PRINTING MACHINE WITH IMPROVED TONER FOUNTAIN AND RECOVERY, FEB. 10, 1976 .
3,985,666.—PLASTIC MATERIALS MIXED WITH POLAR GROUP CONTAINING MATERIALS. OCT. 12, 1976. ARG. 0195541, BEL. 0781970, CAN. 0976742, FRA. 7213873, GRB. 1396141, ITL. 0951326, MEX. 0126158, VZL. 0032937.

Class 1B 2

2,817,277.—ELECTROPHOTOGRAPHIC CAMERA. DEC. 24, 1957.
3,057,719.—PROCESS FOR FORMING ELECTROSTATIC IMAGES. OCT. 9, 1962. GRB. 0947039.
3,084,061.—METHOD FOR FORMATION OF ELECTROSTATIC IMAGE. APR. 2, 1963. CAN. 0607290.
3,196,013.—XEROGRAPHIC INDUCTION RECORDING WITH MECHANICALLY DEFORMABLE IMAGEFORMATION IN A DEFORMABLE LAY. JULY 20, 1965. CAN. 0778520, FRA. 1360084, GER. 1253581, ITL. 0711488, JAP. 0649672.
3,321,308.—XEROGRAPHIC INDUCTION RECORDING. MAY 23, 1967. CAN. 0778521, FRA. 1393821, GRB. 1049903, ITL. 0801906, JAP. 0537660.
3,551,146.—INDUCTION IMAGING SYSTEM. DEC. 29, 1970.
3,703,376.—INDUCTION SYSTEM. NOV. 21, 1972. ARG. 0190247, MEX. 0123032.
3,738,855.—INDUCTION IMAGING SYSTEM. JUNE 12, 1973.
3,778,841.—INDUCTION IMAGING SYSTEM. DEC. 11, 1973. ARG. 0190247, MEX. 0123032.
3,953,206.—IMAGING METHOD. APR. 27, 1976.

Class 1B 3

2,576,047.—METHOD AND APPARATUS FOR PRINTING ELECTRICALLY. NOV. 20, 1951. AUS. 0150449, CAN. 0485073, GER. 0919891, GRB. 0675398, STZ. 0286141, SWD. 0163889.
3,043,217.—ELECTROSTATIC PRINTING APPARATUS. JULY 10, 1962.
3,145,655.—EQUIPOTENTIAL XEROPRINTING MEMBER AND PROCESS OF PRINTING THERE WITH. AUG. 25, 1964. CAN. 0784647, GER. 1287095, GRB. 0958964, JAP. 0591209.
3,160,091.—HIGH SPEED XEROPRINTER AND METHOD THEREFOR. DEC. 8, 1964. GRB. 0978349.
3,318,698.—XEROPRINTING REPRODUCTION. MAY 9, 1967. CAN. 0790236, FRA. 1394421, GRB. 1055323, ITL. 0801547, JAP. 0504497.

3,515,584.—XEROPRINTING MASTER. JUNE 2, 1970. CAN. 0882600, GRB. 1204246, JAP. 0659019.
3,547,627.—LITHOGRPHC PRINTG MASTER AND METHOD EMPLOYING A CRYSTALLINE PHOTOCONDUCTIVE IMAGING LAYER. DEC. 15, 1970.
3,574,614.—PROCESS OF PREPARING MULTIPLE COPIES FROM A XEROPRINTING MASTER. APR. 13, 1971. ATR. 0305769, AUS. 0448396, BEL. 0743660, CAN. 0882599, FRA. 6944513, GRB. 1209060, ITL. 0879118, JAP. 0713808.
3,967,818.—DUPLICATING SYSTEM. JULY 6, 1976.

Class 1B 4A

2,825,814.—XEROGRAPHIC IMAGE FORMATION. MAR. 4, 1958. ARG. 0105238, AUS. 0203970, BRA. 0052412, CAN. 0564673, SAF. 0021814, SWD. 0200906.
2,937,943.—TRANSFER OF ELECTROSTATIC CHARGE PATTERN. MAY 24, 1960. CAN. 0680751.
2,982,647.—ELECTROSTATIC IMAGE REPRODUCTION. MAY 2, 1961.
3,015,304.—ELECTROSTATIC IMAGE REPRODUCTION. JAN. 2, 1962. CAN. 0713395.
3,653,891.—FORMS OVERLAY TECHNIQUE USING TESI. APR. 4, 1972. ARG. 0184314, AUS. 0459354, BEL. 0761030, CAN. 0946912, FRA. 7047635, GRB. 1339714, ITL. 0913996, MEX. 0119467.
4,023,895.—ELECTROSTATOGRAPHIC APPARATUS. MAY 17, 1977.

Class 1B 4B

2,919,967.—HIGH-SPEED ELECTROSTATIC ALPHANUMERICAL PRINTER. JAN.. 5, 1960. CAN. 0682116, GER. 1199033, GRB. 0889663.
2,978,968.—RECORDING APPARATUS AND METHOD. APR. 11, 1961.
3,023,731.—ELECTROSTATIC ALPHANUMERICAL PRINTER WITH IMAGE TRANSFER MECHANISM. MAR. 6, 1962. CAN. 0622350, GRB. 0889664.
3,045,587.—ELECTROSTATIC PRINTING APPARATUS FOR FORMING MULTIPLE COPIES. JULY 24, 1962. CAN. 0682115, GRB. 0888867.
3,045,644.—TWO-COLOR ELECTROSTATIC PRINTING APPARATUS. JULY 24, 1962. CAN. 0634187, GRB. 0886766.
3,060,432.—ELECTROSTATIC RECORDING OF INFORMATION. OCT. 23, 1962.
3,064,259.—ELECTROSTATIC RECORDING OF INFORMATION. NOV. 13, 1962. CAN. 0736628.
3,068,481.—PROCESS AND APPARATUS FOR TESI-PRINTING. DEC. 11, 1962. CAN. 0709093, GRB. 0987234, JAP. 0446814.
3,091,762.—ELECTROSTATIC APPARATUS FOR MEASURING AND RECORDING TIME INTERVALS. MAY 28, 1963. CAN. 0620988, FRA. 1202341, GER. 1252149, GRB. 0880725, ITL. 0585388.
3,182,591.—IMAGE FORMING APPARATUS AND METHOD. MAY 11, 1965.
3,208,076.—ELECTROSTATIC PRINTER. SEPT. 21, 1965. GRB. 0999260.
3,217,330.—ELECTROSTATIC PRINTING UTILIZING PRINT-THROUGH RECORDING. NOV. 9, 1965. CAN. 0773752, GRB. 1001152.
3,234,359.—RECORD CARD SCANNING APPARATUS. FEB. 8, 1966.
3,234,904.—DEVICE FOR TESIPRINTING. FEB. 15, 1966. AUS. 0277492, CAN. 0804878, FRA. 1367728, GRB. 1024635, ITL. 0697883.
3,257,222.—ELECTROSTATIC RECORDING METHOD AND APPARATUS USING SHAPED ELECTRODES. JUNE 21, 1966. CAN. 0736231, GRB. 1027438, JAP. 0451019.
3,289,209.—ELECTROSTATIC MATRIX PRINTER. NOV. 29, 1966. CAN. 0707049, FRA. 1357858, GER. 1447873, GRB. 1018513, ITL. 0694321, JAP. 0440456.
3,342,126.—MULTIPLE ELECTROGRAPHIC PRINTER HAVING PLURAL UNITS CONNECTED TO COMMON DRIVE MEANS. SEPT. 19, 1967. CAN. 0825341, GRB. 1182685, JAP. 0648073.
3,348,232.—ASYNCHRONOUS PAGE-AT-A-TIME PRINTER. OCT. 17, 1967. CAN. 0709971, GRB. 1025487, JAP. 0462803.
3,358,592.—ELECTROGRAPHIC PRINTING. DEC. 19, 1967. CAN. 0896701, FRA. 1514749, GER. 1512401, GRB. 1182686, ITL. 0793834, MEX. 0098070.
3,430,254.—TESI PRINTING WITH FLEXIBLE ELECTRODE ON ENDLESS BELT. FEB. 25, 1969.
3,438,052.—AIR-SUPPORTED HOUSING CONTAINING TESI PRINTING DRUM. APR. 8, 1969. CAN. 0827330, GRB. 1149349.
3,495,269.—ELECTROGRAPHIC RECORDG METH AND APPRTS W/INERT GASEOUS DISCHARGE IONIZATION AND ACCELERATION GAPS. FEB. 10, 1970. ARG. 0174765, ATR. 0309208, AUS. 0413341, BEL. 0707986, CAN. 0865837, CZC. 0164808, FRA. 1551296, GRB. 1205790, ITL. 0819587, JAP. 0587936, MEX. 0103538, SPN. 0348328, SWD. 0346867, USR. 0291520.
3,599,225.—ELECTROSTATIC RECORDING APPARATUS - AIR GAP APERTURE BELT COMMUNICATIONS PRINTER. AUG. 10, 1971. CAN. 0882319, GRB. 1226436, JAP. 0675796.
3,644,930.—MULTI-STYLUS RECORDER. FEB. 22, 1972. ARG. 0181835, AUS. 0457379, BEL. 0751150, CAN. 0944812, CHL. 0025752, FRA. 7019463, GRB. 1297110, ITL. 0893693, MEX. 0119071, SPN. 0380273, SWD. 0368289, TIW. 0005822, VZL. 0027516.
3,673,600.—ELECTROGRAPHIC RECORDING METHOD AND APPARATUS. JUNE 27, 1972. CAN. 0947361, GRB. 1318605.
3,673,603.—RECIPROCATING CARRIAGE FOR ELECTROGRAPHIC PRINTING. JUNE 27, 1972. CAN. 0937629, GRB. 1346647.
3,686,676.—DUAL MODE ELECTROGRAPHIC RECORDER. AUG. 22, 1972. CAN. 0954293.
3,686,679.—MULTI-STYLUS RECORDING ASSEMBLY. AUG. 22, 1972.
3,714,665.—ELECTROSTATIC RECORDING WITH IMPROVED ELECTROSTATIC CHARGE RETENTION. JAN. 30, 1973.
3,717,880.—DUAL MODE ELECTROGRAPHIC RECORDING. FEB. 20, 1973. BEL. 0774564, CAN. 0948271, FRA. 7139638, GRB. 1366129, ITL. 0937674.
3,766,850.—DEVELOPING MEANS FOR ELECTROSTATIC PRINTING APPARATUS. OCT. 23, 1973. CAN. 0972551, FRA. 7246855, GRB. 1415325, ITL. 0973310, SWD. 7216975.
3,771,184.—PRINTING APPARATUS. NOV. 13, 1973. CAN. 0973704, FRA. 7246858, GRB. 1415200, ITL. 0973321, SWD. 7216973.
3,795,010.—WRITING APPARATUS AND METHOD OF MANUFACTURE. FEB. 26, 1974.
3,806,238.—FORMS OVERLAY TECHNIQUE USING TEST. APR. 23, 1974.
3,811,766.—DEVELOPING APPARATUS. MAY 21, 1974. ARG. 0183333, AUS. 0446187, BEL. 0747127, CAN. 0879412, EGR. 0084803, FRA. 7008249, GRB. 1296417, ITL. 0898245, JAP. 0770134, MEX. 0112930, SPN. 0377301, STZ. 0521614, SWD. 0361749, TIW. 0006826, USR. 0352484.
3,875,578.—ENVELOPED STYLUS RECORDER. APR. 1, 1975. CAN. 0947360, FRA. 7008242, GRB. 1296416.
3,971,042.—WRITING APPARATUS AND METHOD OF MANUFACTURE. JULY 20, 1976.

Class 1C 1

3,236,165.—XEROGRAPHIC REPRODUCING APPARATUS. FEB. 22, 1966. CAN. 0771829, JAP. 0547196.
3,343,142.—XEROGRAPHIC CODING AND INFORMATION STORAGE ON A SPECULAR BUSINESS MACHINE CARD. SEPT. 19, 1967. CAN. 0844786, GRB. 1047261, JAP. 0701182.
3,437,020.—MICROFILM TITLING APPARATUS. APR. 8, 1969. CAN. 0837780, GRB. 1191019, JAP. 0572188.
3,499,374.—XEROGRAPHIC PRINTER. MAR. 10, 1970. AUS. 0415164, BEL. 0677146, CAN. 0846424, FRA. 1470069, GRB. 1135603, ITL. 0762255, MEX. 0091183, SWD. 0327142.
3,521,950.—XEROGRAPHIC REPRODUCING APPARATUS. JULY 28, 1970. ARG. 0184148, ATR. 0317675, AUS. 0441739, BEL. 0713876, CAN. 0877511, CHL. 0024535, DNK. 0129304, FRA. 1558225, GRB. 1231622, GRK. 0037839, IND. 0124668, ISR. 0029824, ITL. 0831700, JAM. 0001853, JAP. 0774498, LXB. 0055912, MEX. 0102085, NOR. 0131313, NZL. 0159801, PRU. 0009366, PTG. 0049474, SAF. 6872518, SPN. 0352885, STZ. 0505015, SWD. 7012263, UAR. 0008668, URG. 0009239, VZL. 0025077.
3,689,143.—REPRODUCING MACHINE. SEPT. 5, 1972.

Class 1C 2

2,816,493.—ELECTROPHOTOGRAPHIC MICROFILM ENLARGER. DEC. 17, 1957.
3,094,036.—IMAGE SELECTOR APPARATUS. JUNE 18, 1963. CAN. 0683832.
3,236,165.—XEROGRAPHIC REPRODUCING APPARATUS. FEB. 22, 1966. CAN. 0771829, JAP. 0547196.
3,379,106.—XEROGRAPHIC REPRODUCTION APPARATUS. APR. 23, 1968. ATR. 0300567, AUS.

0416116, BEL. 0674602, CAN. 0821718, DNK. 0117045, FRA. 1475712, GRB. 1135742, ITL. 0750206, MEX. 0095580, SPN. 0321099, STZ. 0509924, SWD. 6912065.

3,480,360.—XEROGRAPHIC COPYING APPARATUS. NOV. 25, 1969. ARG. 0180571, ATR. 0301344, AUS. 0310556, BEL. 0704978, CAN. 0870794, CHL. 0023569, FRA. 1540839, GRB. 1206964, GRK. 0035147, HUN. 0158496, IND. 0112715, ITL. 0827017, LXB. 0054635, MEX. 0102269, NZL. 0156632, PRU. 0009341, PTG. 0048460, SAF. 0676065, SPN. 0345998, STZ. 0487439, SWD. 0337743, URG. 0008847, VZL. 0023675.

3,592,539.—RECORDING APPARATUS. JULY 13, 1971. CAN. 0917230.

3,689,143.—REPRODUCING MACHINE. SEPT. 5, 1972.

Class 1C 3

3,130,411.—ELECTRONIC RECORDER. APR. 21, 1964. CAN. 0729326.

3,212,888.—METHOD FOR DEVELOPING LATENT ELECTROSTATIC CHARGE HALFTONE IMAGES. OCT. 19, 1965. GER. 1284302, GRB. 1017683, JAP. 0470423.

3,281,857.—XEROGRAPHIC TRANSFER PLATEN. OCT. 25, 1966. CAN. 0733683, GRB. 1025199.

3,535,036.—APPARATUS FOR FORMING HALF-TONE LINE SCREEN WITH A LENS. OCT. 20, 1970. CAN. 0909309, GRB. 1253887.

3,698,893.—METHODS OF ORGANIZED THERMOPLASTIC XEROGRAPHY AND PHOTORECEPTOR STRUCTURE THEREFOR. OCT. 17, 1972.

3,873,310.—METHOD OF CONTROLLING THE BRIGHTNESS ACCEPTANCE RANGE AND TONAL CONTRAST OF XEROGRAPHIC PLATE. MAR. 25, 1975. GRB. 1414951.

3,905,822.—COMPOUND SCREEN FOR OBJECT SCREENING. SEPT. 16, 1975. GRB. 1459558.

3,912,510.—ELECTROPHOTOGRAPHIC PROCESS EMPLOYING A COMPOUND DOCUMENT SCREEN. OCT. 14, 1975. GRB. 1459558.

4,013,355.—NOTCH FILTER FOR COLOR TRANSPARENCY COPYING MACHINES. MAR. 22, 1977.

4,014,607.—REMOVABLE SCREENING SYSTEM FOR A TRANSPARENCY REPRODUCTION MACHINE. MAR. 29, 1977.

4,025,181.—A SCREEN CLEANING DEVICE. MAY 24, 1977.

Class 1C 4

3,196,009.—ELECTROSTATIC IMAGE LIQUID DEFORMATION DEVELOPMENT. JULY 20, 1965. ATR. 0267320, AUS. 0273895, BEL. 0631984, CAN. 0768329, DNK. 0129676, FRA. 1408156, GER. 1497058, GRB. 1043981, HOL. 0134043, ISR. 0019144, ITL. 0695213, JAP. 0620918, LXB. 0043704, MEX. 0080571, NOR. 0123260, SAF. 0001947, STZ. 0448745, SWD. 0315502.

3,196,010.—ELECTROPHOTOGRAPHIC PROCESS FOR FORMATION OF DEFORMATION IMAGES IN DEFORMABLE INTERFERENCE FILM. JULY 20, 1965. CAN. 0790232, FRA. 1364100, GRB. 1036738, ITL. 0695214, JAP. 0510166.

3,196,012.—HALF-TONE XEROGRAPHY WITH THERMOPLASTIC DEFORMATION OF THE IMAGE. JULY 20, 1965. CAN. 0760623, FRA. 1359565, GER. 1497060, GRB. 1040836, ITL. 0697483, JAP. 0478444.

3,196,013.—XEROGRAPHIC INDUCTION RECORDING WITH MECHANICALLY DEFORMABLE IMAGE FORMATION IN A DEFORMABLE LAY. JULY 20, 1965. CAN. 0778520, FRA. 1360084, GER. 1253581, ITL. 0711488, JAP. 0649672.

3,307,941.—PLASTIC DEFORMATION IMAGING FILM AND PROCESS. MAR. 7, 1967. CAN. 0801262.

3,419,885.—IMAGE DEVELOPMENT OF THERMOPLASTIC LAYERS. DEC. 31, 1968. CAN. 0785985, GRB. 1117644, JAP. 0537663.

3,436,216.—IMAGE STORAGE COMPRISING A THERMOPLASTIC DEFORMATION PATTERN. APR. 1, 1969. CAN. 0807326, FRA. 1488094, GRB. 1160731, ITL. 0774940.

3,445,227.—ELECTROPHOTOGRAPHIC IMAGING PROCESSES EMPLOYING 2,4 DIAMINOTRIAZINES AS ELCTRCLY PHOTOSNSTV PRT. MAY 20, 1969. BEL. 0743891, CAN. 0852681, GER. 1522687, GRB. 1146019, JAP. 0617789.

3,448,028.—N-SBSTUD-8,13-DIOXODINAPHTHO-2-1-B,2,3-D-FURAN-6-CARBOXAMIDES AS ELCTLY PTOSNSTV MTLS IN ELCPHG. JUNE 3, 1969.

3,448,029.—ELECTROPHORETIC IMAGING PROCESS USING 8,13-DIOXODINAPTHO-2,1-B,2,3-D-FURAN-6-CARBOXAMIDE PIGMEN. JUNE 3, 1969.

3,448,030.—ELECTRICALLY PHOTOSENSITIVE PART. USEFUL IN PHOTOELECTROPHORETIC AND XEROGRAPHIC IMAGING PROCESSE. JUNE 3, 1969. BEL. 0743893, CAN. 0943830, GRB. 1155554, JAP. 0686735.

3,698,892.—METHODS OF THERMOPLASTIC XEROGRAPHY AND APPARATUS THEREFOR. OCT. 17, 1972. CAN. 0949117, GRB. 1343191.

3,698,893.—METHODS OF ORGANIZED THERMOPLASTIC XEROGRAPHY AND PHOTORECEPTOR STRUCTURE THEREFOR. OCT. 17, 1972.

3,716,359.—CYCLIC RECORDING SYSTEM BY THE USE OF AN ELASTOMER IN AN ELECTRIC FIELD. FEB. 13, 1973. ARG. 0196734, AUS. 0461213, BEL. 0777320, CAN. 0953990, FRA. 7147891, GRB. 1380057, ITL. 0944392, MEX. 0131400, SPN. 0398306.

3,719,483.—METHODS OF ORGANIZED THERMOPLASTIC XEROGRAPHY AND PHOTORECEPTOR STRUCTURE THEREFOR. MAR. 6, 1973.

3,730,621.—CONTROL OF ELECTROSTATIC DEFORMATION OF THERMOPLASTIC FILM. MAY 1, 1973.

3,795,514.—DEFORMATION IMAGING METHOD. MAR. 5, 1974.

3,842,406.—CYCLIC RECORDING SYSTEM BY THE USE OF AN ELASTOMER IN AN ELECTRIC FIELD. OCT. 15, 1974. ARG. 0196734, AUS. 0461213, BEL. 0777320, CAN. 0953990, FRA. 7147891, GRB. 1380057, ITL. 0944392, MEX. 0131400, SPN. 0398306.

3,858,973.—METHODS OF THERMOPLASTIC XEROGRAPHY AND APPARATUS THEREFOR. JAN. 7, 1975. CAN. 0949117, GRB. 1343191.

3,888,591.—IMAGE SUBTRACTION APPARATUS. JUNE 10, 1975.

3,932,025.—IMAGING SYSTEM. JAN. 13, 1976.

3,944,358.—COLOR IMAGE REPRODUCTION SYSTEMS. MAR. 16, 1976.

3,946,433.—PHASE IMAGE SCANNING METHOD. MAR. 23, 1976. BEL. 0835551.

3,951,533.—COLOR IMAGE REPRODUCTION SYSTEM. APR. 20, 1976.

3,961,950.—IMAGING SYSTEM. JUNE 8, 1976.

3,980,476.—IMAGING SYSTEM. SEPT. 14, 1976.

3,997,243.—COLOR IMAGE REPRODUCTION SYSTEM. DEC. 14, 1976.

3,999,988.—METHOD FOR REAL-TIME COLOR MASKING. DEC. 28, 1976.

4,018,603.—DEFORMATION IMAGING SYSTEM USING THERMOPLASTIC AND ELASTOMERIC LAYERS. APR. 19, 1977.

4,021,236.—IMAGING SYSTEM. MAY 3, 1977.

4,023,969.—DEFORMABLE ELASTOMER IMAGING MEMBER EMPLOYING AN INTERNAL OPAQUE DEFORMABLE METALLIC LAYER. MAY 17, 1977.

Class 1C 4A

3,196,008.—ELECTROPC PRCS FOR FRMTN OF FRST LIKE DEFRMTN IMGS IN MECHANICALLY DEFRMBL PHOTOCONDUCTIVE LAYER. JULY 20, 1965. CAN. 0844221.

3,196,011.—ELECTROSTATIC FROSTING. JULY 20, 1965. ARG. 0150575, ATR. 0256625, AUS. 0275848, BEL. 0631983, BRA. 0082433, CAN. 0918226, CHL. 0019655, EIR. 0027268, FIN. 0044982, FRA. 1364101, GER. 1295371, GRB. 1039881, GRK. 0026981, HOL. 0140635, IND. 0087685, ISR. 0019143, ITL. 0695215, LXR. 0043693, MEX. 0102124, NOR. 0118346, NZL. 0134799, PAK. 0114430, PLP. 0003269, PTG. 0040894, SAF. 0001948, SPN. 0292129, STZ. 0425467, SWD. 0315201, TRK. 0011937, UAR. 0004997, VTM. 0000992, VZL. 0014488.

3,213,429.—HIGH SPEED INFORMATION RECORDER. OCT. 19, 1965.

3,258,336.—STRIPPABLE LAYER FROST PRINTING. JUNE 28, 1966. CAN. 0815184.

3,322,034.—FROST COLOR DISPLAY. MAY 30, 1967.

3,329,500.—ELECTROSTATIC FROSTING. JULY 4, 1967.

3,482,969.—FIXING OF DEFORMATION IMAGES. DEC. 9, 1969. CAN. 0801883, FRA. 1399003, GRB. 1061235, ITL. 0726200, SWD. 0315806.

3,485,623.—CONTINUOUS TONE THERMOPLASTIC PHOTOGRAPHY. DEC. 23, 1969. CAN. 0810834, GRB. 1181093, JAP. 0565795.

3,526,879.—INTERNAL FROST RECORDING APPARATUS USING A DEFORMABLE PHOTOCONDUCTOR. SEPT. 1, 1970.

3,542,545.—FROST OR RELIEF WRNKLNG OF AN IMGNG ARTCL COMPRSNG AN ELCTRCLY PHOTSNSTV LAYER AND DEFORMABLE LAY. NOV. 24, 1970. ARG. 0174588, ATR. 0300563, AUS. 0424162, BEL. 0726280, CAN. 0928764, CHL. 0025764, DNK. 0126400, FRA. 1604336, GER. 1817226, GRB. 1234600, GUA. 0002531, ITL. 0864015, JAP. 0693385, LXB. 0057697, MEX. 0107799, NZL. 0154931, PNM. 0001803, PRU. 0010480, SAF. 0688517, SPN. 0362039, STZ. 0518578, SWD. 0354132, URG. 0009690.

3,560,205.—METHOD OF FORMING A PHASE MODULATING HOLOGRAM ON A DEFORMABLE THERMOPLASTIC. FEB. 2, 1971. CAN. 0949793, GRB. 1162853.

3,560,206.—PRODUCTION OF LATENT PERODIC MEMORY PATTERNS IN FROSTABLE FILMS. FEB. 2, 1971.

3,561,958.—INDUCING FROST DEFORMATION IMAGING BY ELECTROLYTIC DEPOSITION. FEB. 9, 1971.

3,672,883.—CRYSTALLINE POLYMERS FOR FROST. JUNE 27, 1972.

3,672,886.—NOVOLAR RESINS IN DEFORMATION IMAGING. JUNE 27, 1972.

3,764,311.—IMAGING SYSTEM. OCT. 9, 1973.

3,819,369.—SURFACE DEFORMABLE IMAGING MEMBER OF IMPROVED DARK DECAY CHARACTERISTICS. JUNE 25, 1974.

3,923,504.—MIGRATION IMAGING MEMBER AND METHOD. DEC. 2, 1975. GRB. 1461872.

3,926,626.—CIRCULATION IMAGING METHOD. DEC. 16, 1975.

Class 1C 4B

3,238,041.—RELIEF IMAGING OF PHOTORESPONSIVE MEMBER AND PRODUCT. MAR. 1, 1966. CAN. 0850841, GRB. 1043983, MEX. 0080410.

3,321,308.—XEROGRAPHIC INDUCTION RECORDING. MAY 23, 1967. CAN. 0778521, FRA. 1393821, GRB. 1049903, ITL. 0801906, JAP. 0537660.

3,542,545.—FROST OR RELIEF WRNKLNG OF AN IMGNG ARTCL COMPRSNG AN ELCTRCLY PHOTSNSTV LAYER AND DEFORMABLE LAY. NOV. 24, 1970. ARG. 0174588, ATR. 0300563, AUS. 0424162, BEL. 0726280, CAN. 0928764, CHL. 0025764, DNK. 0126400, FRA. 1604336, GER. 1817226, GRB. 1234600, GUA. 0002531, ITL. 0864015, JAP. 0693385, LXB. 0057697, MEX. 0107799, NZL. 0154931, PNM. 0001803, PRU. 0010480, SAF. 0688517, SPN. 0362039, STZ. 0518578, SWD. 0354132, URG. 0009690.

3,615,388.—DEFORMATION IMAGING PROCESS AND ELEMENT. OCT. 26, 1971. CAN. 0941877, MEX. 0101539.

3,923,504.—MIGRATION IMAGING MEMBER AND METHOD. DEC. 2, 1975. GRB 1461872.

3,926,626.—CIRCULATION IMAGING METHOD. DEC. 16, 1975.

Class 1C 5

2,817,765.—XEROGRAPHIC METHOD. DEC. 24, 1957.

2,968,553.—XEROGRAPHIC APPARATUS AND METHOD. JAN. 17, 1961. CAN. 0624329.

3,519,818.—METHOD OF PREPARING A NEGATIVE XEROGRAPHIC REPRODUCTION FROM A POSITIVE LINE COPY IMAGE. JULY 7, 1970. CAN. 0829037, GRB. 1191159, JAP. 0589516.

Class 1D

3,318,212.—DUPLEX XEROGRAPHIC REPRODUCTION. MAY 9, 1967.

3,506,347.—DUPLEX XEROGRAPHIC REPRODUCTION APPARATUS. APR. 14, 1970.

3,536,398.—REPRODUCTION APPARATUS. OCT. 27, 1970. AUS. 0442047, BEL. 0737274, CAN. 0899443, EGR. 0091200, FRA. 6927759, GRB. 1246226, ITL. 0883645, SPN. 0370416, STZ. 0500517, SWD. 0356144, TIW. 0005358, USR. 0359871.

3,580,670.—APPARATUS FOR DUPLEXING. MAY 25, 1971. CAN. 0929581.

3,615,129.—DUPLEXING XEROGRAPHIC REPRODUCING MACHINE WITH COPY SHEET REVERSING STATION. OCT. 26, 1971. ARG. 0172601, AUS. 0432830, BEL. 0737341, CAN. 0909853, CZC. 0158650, EGR. 0083299, FRA. 6927784, GRB. 1256767, ITL. 0883644, JAP. 0774495, MEX. 0108784, SPN. 0370415, STZ. 0500518, SWD. 0356143, TIW. 0006822, USR. 0371736, VZL. 0032923.

3,671,118.—APPARATUS FOR CREATING DUPLEX REPRODUCTIONS. JUNE 20, 1972. ARG. 0186265, AUS. 0445064, BEL. 0760746, CAN. 0922768, EGR. 0088254, FRA. 7047143, GRB. 1282808, ITL. 0913849, JAP. 0773214, MEX. 0116655, SPN. 0386707, STZ. 0526137, SWD. 0366403.

3,674,475.—ENCLOSED MIGRATION IMAGING SYSTEM. JULY 4, 1972.

3,694,073.—METHOD FOR DUPLEXING. SEPT. 26, 1972.

3,754,822.—SCANNING SYSTEM. AUG. 28, 1973.

3,844,653.—ROOF MIRROR COPYING SYSTEM. OCT. 29, 1974.

3,844,654.—DUPLEX COPYING SYSTEM. OCT. 29, 1974. FRA. 7340246.

3,847,478.—SEGMENTED BIAS ROLL. NOV. 12, 1974.

3,936,171.—ELECTROSTATOGRAPHIC METHODS AND APPARATUS. FEB. 3, 1976.

3,940,210.—PROGRAMMABLE CONTROLLER FOR CONTROLLING REPRODUCTION MACHINES. FEB. 24, 1976. BEL. 0832356, IRN. 0013436.

3,944,359.—PROGRAMMABLE CONTROLLER FOR CONTROLLING REPRODUCTION MACHINES. MAR. 16, 1976.

4,014,609.—PROGRAMMABLE CONTROLLER FOR CONTROLLING REPRODUCTION MACHINE. MAR. 29, 1977.

4,035,073.—DUPLEX REPRODUCTION MACHINE. JULY 12, 1977. BEL. 0832115, SPN. 0440012.

Class 1E

2,962,374.—COLOR XEROGRAPHY. NOV. 29, 1960.

2,962,375.—COLOR XEROGRAPHY. NOV. 29, 1960.

3,043,686.—XEROGRAPHIC COLOR MASKING. JULY 10, 1962. CAN. 0663888.

3,057,720.—XEROGRAPHIC COLOR REPRODUCTION. OCT. 9, 1962. GRB. 0956772.

3,227,549.—MULTIPLE IMAGE FORMING XEROGRAPHIC REPRODUCTION PROCESS. JAN. 4, 1966.

3,313,623.—LINE SEQUENTIAL COLOR XEROGRAPHY. APR. 11, 1967. CAN. 0880483, GRB. 1019974.

3,316,805.—COLOR DISPLAY. MAY 2, 1967.

3,357,830.—DYED IMAGE XEROGRAPHY. DEC. 12, 1967. CAN. 0821484, GER. 1277018, GRB. 1016581, ITL. 0679720, JAP. 0477809.

3,373,091.—DATA STORAGE DEVICE AND METHOD. MAR. 12, 1968.

3,386,379.—DUPLICATING WITH COLOR PRODUCING REAGENTS. JUNE 4, 1968. AUS. 0294747, CAN. 0842445, FRA. 1390006, GER. 1249089, GRB. 1043875, ITL. 0801548, JAP. 0611643.

3,468,705.—METHOD OF PREPARING LEAD OXIDE FILMS. SEPT. 23, 1969. CAN. 0806134, FRA. 1501511, GER. 1521942, GRB. 1170428, ITL. 0787638, JAP. 0634868, MEX. 0093335.

3,508,823.—DUPLICATING APPARATUS. APR. 28, 1970.

3,583,806.—DYED IMAGE XEROGRAPHY. JUNE 8, 1971.

3,615,392.—ELECTROPHORETIC REPRODUCTION ORIGINAL CONTAINING BOTH MULTI-COLOR AND LINE AREAS. OCT. 26, 1971.

3,672,887.—ELECTROPHOTOGRAPHIC PROCESS FOR MULTICOLOR REPRODUCTION. JUNE 27, 1972.

3,687,661.—COLOR ELECTROPHOTOGRAPHIC PROCESS. AUG. 29, 1972. CAN. 0932785.

3,690,756.—COLOR XEROGRAPHY. SEPT. 12, 1972. BEL. 0781001, CAN. 0963522, FRA. 7210584, GRB. 1365753, ITL. 0950399.

3,702,483.—COLOR RENDITION METHOD. NOV. 7, 1972. BEL. 0777015, CAN. 0935334, FRA. 7146255, GRB. 1361647, ITL. 0944210.

3,719,482.—IMAGING SYSTEM. MAR. 6, 1973.

3,724,943.—COLOR REPRODUCTION APPARATUS. APR. 3, 1973. CAN. 0946463.

3,734,607.—COLOR REPRODUCTION APPARATUS. MAY 22, 1973. ARG. 0184654, ATR. 0314352, AUS. 0459724, BEL. 0751490, CAN. 0946462, CHL. 0026265, DNK. 0130156, EGR. 0085001, FRA. 7020455, GRB. 1316499, ITL. 0893863, MEX. 0120285, NZL. 0160302, PNM. 0002259, PTG. 0053890, SAF. 0703775, SPN. 0380376, STZ. 0514164, SWD. 0359176.

3,799,668.—COLOR STANDARD AND METHOD OF CALIBRATING A MULTI-COLOR ELECTROPHOTGRAPHIC PRINTING MACHINE. MAR. 26, 1974. BEL. 0812179, SAF. 0741562.

3,799,774.—MULTI COLOR ELECTROPHOTOGRAPHIC MASKING PROCESS. MAR. 26, 1974.

3,805,283.—CHART CREATION APPARATUS. APR. 16, 1974.

3,869,203.—COLOR ELECTROPHOTOGRAPHIC PRINTING MACHINE. MAR. 4, 1975. BEL. 0820041.

3,884,686.—COLOR CORRECTION METHOD. MAY 20, 1975.

3,909,127.—MULTI-COLOR ORIGINAL FOR AN ELECTROPHOTOGRAPHIC PRINTING SYSTEM. SEPT. 30, 1975.

3,914,043.—COLOR ACCENTING COPYING MACHINE. OCT. 21, 1975.

3,936,182.—CONTROL ARRANGEMENT FOR AN ELECTROSTATOGRAPHIC REPRODUCTION APPARATUS. FEB. 3, 1976.
3,944,711.—TRANSPARENCY. MAR. 16, 1976.
3,958,990.—TRANSFERRING TONER TO AN AMINE COATED SHEET. MAY 25, 1976.
3,960,445.—COLOR HIGHLIGHTING ELECTROPHOTOGRAPHIC PRINTING MACHINE. JUNE 1, 1976.
3,963,341.—A COLOR ELECTROPHOTOGRAPHIC PRINTING MACHINE. JUNE 15, 1976.
3,970,042.—COLOR DEVELOPMENT APPARATUS. JULY 20, 1976.
3,999,987.—COLOR REPRODUCTION METHOD. DEC. 28, 1976.
4,013,355.—NOTCH FILTER FOR COLOR TRANSPARENCY COPYING MACHINES. MAR. 22, 1977.
4,014,696.—MULTICOLORED XEROGRAPHIC TRANSPARENCY UTILIZING AN APIPHATIC ESTER COATING. MAR. 29, 1977.
4,027,962.—COLOR TRANSPARENCY REPRODUCING MACHINE. JUNE 7, 1977. BEL. 0830321, IRN. 0013435, SPN. 0437814.

Class 1F

2,637,651.—METHOD OF PRODUCING IMAGES ON RIGID SURFACES. MAY 5, 1953. CAN. 0508329.
2,885,955.—XEROGRAPHIC MACHINE. MAY 12, 1959.
2,949,848.—STENCIL MAKING. AUG. 23, 1960. CAN. 0571449.
2,952,536.—METHOD OF PREPARING A LITHOGRAPHIC PRINTING PLATE. SEPT. 13, 1960.
2,954,291.—METHOD FOR PREPARING A SPIRIT DUPLICATING MASTER. SEPT. 27, 1960. CAN. 0583832.
2,955,035.—RAISED XEROGRAPHIC IMAGES. OCT. 4, 1960.
2,955,052.—METHOD OF FORMING A RAISED IMAGE. OCT. 4, 1960.
2,955,531.—STENCIL MASTER FORMATION. OCT. 11, 1960.
3,109,366.—METHOD FOR PATTERN REPRODUCTION. NOV. 5, 1963. CAN. 0624372.
3,109,367.—METHOD FOR PATTERN REPRODUCTION. NOV. 5, 1963. CAN. 0624374, FRA. 1146623, GER. 1029837, GRB. 0813637.
3,143,066.—PRODUCTION OF DUPLICATING MASTERS. AUG. 4, 1964. CAN. 0722954.
3,428,453.—IMAGE FORMING PROCESS UTILIZING XEROGRAPHY-ETCHING PROCESS. FEB. 18, 1969. CAN. 0856722, FRA. 1428775, GRB. 1085151, ITL. 0754825.
3,455,240.—IMAGING SYSTEM. JULY 15, 1969. CAN. 0823599, GER. 1571913, GRB. 1165676, JAP. 0594700.
3,460,476.—IMAGING PROCESS. AUG. 12, 1969. ARG. 0164839, AUS. 0418783, BEL. 0691755, CAN. 0882050, FRA. 1511173, GRB. 1168268, ITL. 0787662, JAP. 0562388, MEX. 0108240, SPN. 0346128, STZ. 0480672, SWD. 0331794, VZL. 0024009.
3,490,368.—PRINTING BY PARTICULATE IMAGES. JAN. 20, 1970. ARG. 0152222, ATR. 0281875, AUS. 0403243, BEL. 0674293, BRA. 0086720, CAN. 0824922, DNK. 0117303, FIN. 0047145, FRA. 1464987, GER. 1496169, GRB. 1128173, GRK. 0031516, HOL. 0145056, ITL. 0750153, JAP. 0547199, MEX. 0101075, NOR. 0130551, SAF. 0656968, SPN. 0321274, STZ. 0446906, SWD. 0355681, VZL. 0023998.
3,549,447.—IMAGING SYSTEM. DEC. 22, 1970.
3,559,570.—METHOD OF PREPARING AND USING A GRAVURE PRINTING PLATE. FEB. 2, 1971. CAN. 0844544, GRB. 1198142.
3,589,290.—RELIEF IMAGING PLATES MADE BY REPETITIVE XEROGRAPHIC PROCESSES. JUNE 29, 1971. CAN. 0896949.
3,615,128.—APPARATUS FOR ELECTROSTATIC PRINTING. OCT. 26, 1971. CAN. 0910956.
3,638,567.—METHOD OF PREPARING AND UTILIZING A GRAVURE PRINTING MASTER. FEB. 1, 1972.
3,806,354.—METHOD OF DEVELOPING ELECTROSTATIC LATENT IMAGES. APR. 23, 1974.
3,884,686.—COLOR CORRECTION METHOD. MAY 20, 1975.
3,919,938.—PERMANENT ELECTROSTATIC MASTER. NOV. 18, 1975.
4,006,267.—COLOR HIGHLIGHTING PROCESS. FEB. 1, 1977.

Class 1G 1

3,043,685.—XEROGRAPHIC AND MAGNETIC IMAGE RECORDING AND REPRODUCING. JULY 10, 1962. CAN. 0611005, FRA. 1207840, GRB. 0902481.
3,093,039.—APPARATUS FOR TRANSFERRING POWDER IMAGES AND METHOD THEREFOR. JUNE 11, 1963. CAN. 0744873.
3,124,457.—DIFFERENTIAL IMAGE TRANSFER SYSTEM. MAR. 10, 1964. CAN. 0800184, GRB. 1031986, JAP. 0477375.
3,185,777.—MAGNETIC RECORDING. MAY 25, 1965.
3,485,621.—RECORDING BY PARTICLE ORIENTATION. DEC. 23, 1969. CAN. 0916777, GRB. 1188982, JAP. 0582501.
3,526,191.—DUPLICATING PROCESS EMPLOYING MAGNETIC DEVELOPER MATERIAL. SEPT. 1, 1970. CAN. 0903830, GRB. 1208307.
3,803,638.—RECORDING SYSTEM USING MAGNETIC CORE MATRIX. APR. 9, 1974.
3,875,576.—ELECTROSTATIC IMAGING SYSTEM WITH MAGNETIC TONER. APR. 1, 1975.

Class 1G 2

2,756,676.—METHOD FOR THE PRODUCTION OF ELECTROPHOTOGRAPHIC PRINTS. JULY 31, 1956. CAN. 0564672.
2,868,642.—ELECTROPHOTOGRAPHIC METHOD. JAN. 13, 1959. CAN. 0569364, FRA. 1146633, GER. 1050189, GRB. 0812419.
2,919,179.—RESIST FORMING METHOD. DEC. 29, 1959. CAN. 0616771.
3,592,642.—DUPL METH PAPR SHT HTS MELTG PT TONR IMG SIMUL CAUSE TRANSF TNR FRPHOTOCNDCR AND FSG TNR IMG ON PAP. JULY 13, 1971. BEL. 0706852, FRA. 1547828, GRB. 1198306, HUN. 0157321, ITL. 0815498.

Class 1G 3

3,275,436.—METHOD OF IMAGE REPRODUCTION UTILIZING A UNIFORM RELEASABLE SURFACE FILM. SEPT. 27, 1966. AUS. 0296158, CAN. 0811877, FRA. 1371894, GRB. 1033523, ITL. 0702168, JAP. 0508402.
3,438,772.—IMG RPDCTN INVLVNG ELCTROSTC TRSF OF RELESBL DONR FILM FRM PTOCNDTV INSLTNG LAYER TO ADHSV TRS. APR. 15, 1969. CAN. 0838044, GRB. 1124954, JAP. 0542587.
3,446,616.—XEROGRAPHIC IMAGING EMPLOYING A SELECTIVELY REMOVABLE LAYER. MAY 27, 1969.

Class 1G 4

2,968,552.—XEROGRAPHIC APPARATUS AND METHOD. JAN. 17, 1961. AUS. 0222058, CAN. 0624328, FRA. 1197798, GER. 1197326, GRB. 0876577.
3,166,418.—IMAGE DEVELOPMENT. JAN. 19, 1965. CAN. 0747566, FRA. 1259438, GER. 1190334, GRB. 0952609, JAP. 0418117.
3,619,054.—OIL FILM IMAGING APPARATUS. NOV. 9, 1971.

Class 1G 5

3,234,019.—METHOD FOR FORMATION OF AN ELECTROSTATIC IMAGE RESISTANT TO DETERIORATION ON STORAGE. FEB. 8, 1966. ATR. 0248873, AUS. 0266424, BEL. 0618720, FRA. 1325903, GER. 1295374, GRB. 1006231, IND. 0081730, ISR. 0017057, ITL. 0667262, SAF. 0001489, STZ. 0407176, SWD. 0307733.

Class 1G 6

3,084,043.—LIQUID DEVELOPMENT OF ELECTROSTATIC LATENT IMAGES. APR. 2, 1963. CAN. 0678365, GRB. 0880597.
3,869,896.—ROLLING PROCESS. MAR. 11, 1975. GRB. 1434131.
3,924,945.—APPARATUS FOR INDUCTIVE IMAGING WITH SIMULTANEOUS POLAR INK DEVELOPMENT. DEC. 9, 1975.
3,974,554.—QUANDRANGULAR TRIPETICORD GRAVURE ROLL. AUG. 17, 1976.
3,980,404.—XEROGRAPHIC APPARATUS HAVING IMPROVED FLUID DISPENSING MEMBER. SEPT. 14, 1976.
3,994,726.—LAMINATED FLEXIBLE PHOTORECEPTOR. NOV. 30, 1976. GRB. 1429517.

4,002,476.—METHOD OF DEVELOPING RESILIENT PHOTOCONDUCTIVE ELEMENT. JAN. 11, 1977. GRB. 1429517.
4,017,174.—DEVELOPER ASSEMBLY SUPPORT. APR. 12, 1977.
4,020,788.—DOCTORING MEANS. MAY 3, 1977.
4,023,967.—ELECTROPHOTOGRAPHIC LIQUID DEVELOPMENT METHOD IN WHICH A UNIFORM SUBSTANTIAL INTERFACE CONTACT. MAY 17, 1977. BEL. 0819537.
4,024,838.—DEVELOPER LIQUID SUPPLY DEVICE. MAY 24, 1977.

Class 1H 1

3,100,427.—PROJECTION DEVICE. AUG. 13, 1963.
3,166,419.—IMAGE PROJECTION. JAN. 19, 1965. CAN. 0699802, FRA. 1260843, GRB. 0955994.
3,166,420.—SIMULTANEOUS IMAGE FORMATION. JAN. 19, 1965. CAN. 0756267, GRB. 0955142.
3,185,050.—XEROGRAPHIC IMAGE PROCESSOR PROJECTOR. MAY 25, 1965.
3,196,765.—IMAGE DEVELOPMENT AND PROJECTION. JULY 27, 1965.
3,220,012.—SIMULTANEOUS RECORDING AND DISPLAY SYSTEM. NOV. 23, 1965. CAN. 0809339, FRA. 1373673, GER. 1303156, GRB. 1019900, ITL. 0695895, JAP. 0470425.
3,317,317.—XEROGRAPHIC METHOD OF MAKING A PARTICLE TRANSPARENCY PROJECTIBLE IMAGE. MAY 2, 1967.
3,320,061.—MASKING BY TOTAL INTERNAL REFLECTION FOR IMAGE REPRODUCTION AND DISPLAY. MAY 16, 1967. CAN. 0847533, FRA. 1401615, GER. 1497081, GRB. 1065986, ITL. 0729029, JAP. 0471308.
3,343,142.—XEROGRAPHIC CODING AND INFORMATION STORAGE ON A SPECULAR BUSINESS MACHINE CARD. SEPT. 19, 1967. CAN. 0844786, GRB. 1047261, JAP. 0701182.
3,519,344.—IMAGE PROJECTION. JULY 7, 1970.
3,543,031.—DEVICE AND PROCESS FOR IMAGE STORAGE. NOV. 24, 1970. ARG. 0161299, AUS. 0432468, BEL. 0703461, CAN. 0862332, FRA. 1543309, GER. 1549142, GRB. 1201374, ITL. 0811521, JAP. 0742514, MEX. 0100142, SPN. 0344004, STZ. 0497022, SWD. 0354169, VZL. 0023663.
3,593,832.—KEYBOARD INPUT DISPLAY DEVICE. JULY 20, 1971.
3,619,049.—XEROGRAPHIC IMAGERY USING A LONG PERSISTENCE PHOSPHOR INTERMEDIATE. NOV. 9, 1971.
3,955,977.—ELECTROSTATOGRAPHIC PROCESS. MAY 11, 1976.

Class 1H 2

3,437,408.—MULTIPLE COPY ELECTROSTATIC IMAGING APPARATUS. APR. 8, 1969. ARG. 0164840, ATR. 0283115, AUS. 0410817, BEL. 0704323, CAN. 0831674, CZC. 0156411, EGR. 0065587, FRA. 1538197, GRB. 1202583, HUN. 0161168, ITL. 0822157, JAP. 0582502, MEX. 0099950, SPN. 0345482, STZ. 0484459, SWD. 0331795, USR. 0353450, VZL. 0023662.
3,512,038.—PIN SYSTEM. MAY 12, 1970. CAN. 0873507, GRB. 1201497, JAP. 0623001.

Class 1I

3,011,473.—XEROGRAPHIC APPARATUS. DEC. 5, 1961. CAN. 0675698, GRB. 0971972.
3,041,167.—XEROGRAPHIC PROCESS. JUNE 26, 1962.
3,414,409.—PARTICLE TRANSFER. DEC. 3, 1968. BEL. 0713399, CAN. 0822324, FRA. 1568374, GRB. 1145026, ITL. 0829803.
3,543,022.—METH AND APPARATUS CHARG DISCRETE SMALL AREAS XEROGRAPHIC PLATES TO DIF POTENT CONT TONE PRINTG. NOV. 24, 1970. CAN. 0921971, GRB. 1186599.
3,682,677.—BACKGROUND REMOVAL. AUG. 8, 1972.
3,784,301.—ELECTROPHOTOGRAPHIC METHOD. JAN. 8, 1974.
3,883,349.—ELECTROPHOTOGRAPHIC CHARGING METHOD. MAY 13, 1975.
3,973,846.—ELECTROSTATIC MASTER MAKING APPARATUS. AUG. 10, 1976.
4,021,112.—PHOTORECEPTOR DARK CURRENT LEAKAGE DETECTING APP FOP XEROGRAPHIC MACHINES. May 3, 1977.

Class 1J

2,221,776.—ELECTRON PHOTOGRAPHY. NOV. 19, 1940.
2,588,699.—ELECTROPHOTOGRAPHIC APPARATUS. MAR. 11, 1952.
2,598,732.—ELECTROPHOTOGRAPHY. JUNE 3, 1952.
3,652,156.—LINEAR-TO-DRUM OPTICAL SCAN CONVERTER SYSTEM. MAR. 28, 1972.
3,766,850.—DEVELOPING MEANS FOR ELECTROSTATIC PRINTING APPARATUS. OCT. 23, 1973. CAN. 0972551, FRA. 7246855, GRB. 1415325, ITL. 0973310, SWC. 7216975.
3,954,463.—METHOD FOR ELECTROSTATIC PRINTING. MAY 4, 1976.

Class 1J 1

2,297,691.—ELECTROPHOTOGRAPHY. OCT. 6, 1942.
2,357,809.—ELECTROPHOTOGRAPHIC APPARATUS. SEPT. 12, 1944.
3,013,346.—XEROGRAPHIC APPARATUS. DEC. 19, 1961.
3,062,108.—ELECTROPHOTOGRAPHIC COPYING APPARATUS. NOV. 6, 1962.
3,062,109.—XEROGRAPHIC REPRODUCING APPARATUS. NOV. 6, 1962. ARG. 0149705, CAN. 0683779, CHL. 0024545, CLB. 0014851, COS. 0001435, FRA. 1291840, GER. 1290817, GRB. 0995414, GUA. 0001694, HGK. 0022168, ITL. 0646249, JAP. 0444672, KEN. 0167268, PNM. 0002135, PRU. 0008376, URG. 0007955, VZL. 0017266.
3,078,770.—XEROGRAPHIC REPRODUCING APPARATUS. FEB. 26, 1963. CAN. 0701741.
3,099,943.—XEROGRAPHIC REPRODUCING APPARATUS. AUG. 6, 1963. ADN. 0000468, ARG. 0169828, ATR. 0251420, AUS. 0270773, BEL. 0629050, BRA. 0082981, BRS. 00J3736, BRU. 0000369, CAN. 0738132, CHL. 0023724, CLB. 0015207, COS. 0001436, ECD. 0000022, FIJ. 0000340, FRA. 1346575, GHA. 0000997, GIB. 1032951, GIE. 0006569, GRB. 1032951, GRK. 0025939, GUA. 0001740, GUR. 1032951, HGK. 0008969, IND. 0086614, ISR. 0018757, ITL. 0752146, JAP. 0491155, JER. 0000P97, KEN. 0001743, LXB. 0043231, MAU. 1897571, MEX. 0074814, MLS. 0014969, NIG. 0001617, NOR. 0124476, NZL. 0134238, PRU. 0008375, PTG. 0040583, SAF. 0063737, SBH. 0005169, SGP. 0008069, SHL. 0000016, SLN. 1677286, SPN. 0286059, SRK. 0000387, STZ. 0425469, SWD. 0323285, UGD. 0000169, URG. 0007713, VZL. 0017049.
3,131,617.—XEROGRAPHIC REPRODUCING APPARATUS. MAY 5, 1964.
3,135,179.—XEROGRAPHIC APPARATUS. JUNE 2, 1964.
3,135,180.—XEROGRAPHIC APPARATUS. JUNE 2, 1964.
3,139,013.—DOCUMENT REPRODUCING APPARATUS. JUNE 30, 1964. CAN. 0727819, FRA. 1346596, GRB. 1016265, JAP. 0442652.
3,146,688.—XEROGRAPHIC MACHINE. SEPT. 1, 1964. ATR. 0249503, AUS. 0272158, BEL. 0616948, CAN. 0712269, FRA. 1324504, GER. 1295372, GRB. 1009867, JAP. 0464921.
3,182,573.—MASKED PLATE XEROGRAPHY. MAY 11, 1965. CAN. 0859657, FRA. 1353685, GRB. 1021882, ITL. 0694073, JAP. 0470242.
3,205,484.—ELECTROSTATIC MEMORY SYSTEM. SEPT. 7, 1965.
3,355,983.—CARD HANDLING MECHANISM. DEC. 5, 1967. CAN. 0814086, MEX. 0113373.
3,514,201.—RECORDING APPARATUS. MAY 26, 1970. CAN. 0880484.
3,520,602.—GRAPHIC DISPLAY DEVICE. JULY 14, 1970. CAN. 0838312.
3,536,395.—TRANSACTION RECORDING APPARATUS AND SYSTEM. OCT. 27, 1970. CAN. 0870184, GRB. 1213825.
3,580,671.—EXPOSURE APPARATUS. MAY 25, 1971. CAN. 0912104, GRB. 1276010.
3,677,633.—PORTABLE DOCUMENT ABSTRACTOR. JULY 18, 1972.
3,770,430.—PHOTOELECTROSCLOGRAPHIC IMAGING PROCESS. NOV. 6, 1973.
3,865,482.—ELECTROSTATOGRAPHIC COPYING MACHINE. FEB. 11, 1975.
3,917,396.—CONTROL SYSTEM. NOV. 4, 1975.
3,955,977.—ELECTROSTATOGRAPHIC PROCESS. MAY 11, 1976.
3,976,374.—ELIMINATION OF REDUNDANT IMAGE. AUG. 24, 1976. GRB. 1419725.
3,977,780.—ELECTROSTATIC REPRODUCTION METHOD AND APPARATUS. AUG. 31, 1976.

Class 1J 2

2,701,764.—ELECTROPHOTOGRAPHIC APPARATUS AND METHODS. FEB. 8, 1955.
2,892,391.—ELECTROPHOTOGRAPHIC CAMERA APPARATUS. JUNE 30, 1959.
3,057,275.—IMAGE KEEPING. OCT. 9, 1962.
3,185,051.—XEROGRAPHIC METHOD. MAY 25, 1965. CAN. 0740113, FRA. 1385444, GRB. 1026557, ITL. 0712017.
3,237,197.—IMAGE METHOD FOR ELECTROSTATIC RETENTION IN PHOTOCONDUCTIVE LAYERS. FEB. 22, 1966.

Class 1J 3

2,878,120.—INTERMITTENT ELECTROPHOTOGRAPHIC RECORDER—HORIZONS. MAR. 17, 1959. CAN. 0614984.
3,105,426.—XEROGRAPHIC APPARATUS. OCT. 1, 1963. CAN. 0689214, FRA. 1290414, GER. 1297476, GRB. 0989487, JAP. 0626117.
3,132,206.—HIGH SPEED PRINTING APPARATUS. MAY 5, 1964. GRB. 0999043.
3,649,114.—MULTIPLE OUTPUT ELECTROSTATIC RECORDING SYSTEM. MAR. 14, 1972. ARG. 0200567, AUS. 0447901, CAN. 0923542, NZL. 0160104..

Class 1J 4

3,148,601.—XEROGRAPHIC REPRODUCING APPARATUS. SEPT. 15, 1964.
3,187,651.—XEROGRAPHIC REPRODUCING APPARATUS. JUNE 8, 1965. FRA. 1338861, GER. 1797533, GRB. 1015633, HGK. 0013368, JAP. 0441423, KEN. 0167368.
3,196,767.—DOCUMENT COPY MECHANISM. JULY 27, 1965. CAN. 0731929, GRB. 1032953, JAP. 0651995.
3,399,610.—XEROGRAPHIC APPARATUS. SEPT. 3, 1968. CAN. 0819923.
3,788,203.—JUSTIFICATION APPARATUS. JAN. 29, 1974. CAN. 0989929, GRB. 1380831.
3,982,831.—ELECTROSTATOGRAPHIC REPRODUCTION APP & DRIVE THEREFOR. SEPT. 28, 1976.
4,002,409.—CHAIN-FEED CONTROL LOGIC FOR A MULTI-MODE COPIER/DUPLICATOR. JAN. 11, 1977. BEL. 0840300.
4,027,963.—MULTI-MODE REPRODUCING APPARATUS. JUNE 7, 1977. BEL. 0843154, HAT. 0001534.

Class 1J 5

2,600,580.—ELECTROPHOTOGRAPHIC APPARATUS. JUNE 17, 1952.
2,647,464.—ELECTROGRAPHY. AUG. 4, 1953.
2,791,949.—XEROGRAPHIC COPYING DEVICE. MAY 14, 1957. CAN. 0577962.
2,878,732.—XEROGRAPHIC COPIER. MAR. 24, 1959. CAN. 0596022.
3,009,402.—XEROGRAPHIC PROCESSING APPARATUS. NOV. 21, 1961.
3,040,621.—XEROGRAPHIC PLATE SUPPORTING APPARATUS. JUNE 26, 1962.
3,083,869.—XEROGRAPHIC PLATE MAGAZINE AND FEEDING APPARATUS. APR. 2, 1963.
3,091,160.—XEROGRAPHIC PLATE FEEDING AND SUPPORTING APPARATUS. MAY 28, 1963.
3,160,057.—XEROGRAPHIC PROCESSING APPARATUS. DEC. 8, 1964.
3,272,101.—XEROGRAPHIC APPARATUS. SEPT. 13, 1966.
3,520,605.—DOCUMENT SCAN DRIVE AND RETURN APPARATUS. JULY 14, 1970. CAN. 0858848.
3,697,160.—CONTINUOUS IMAGING APPARATUS. OCT. 10, 1972.

Class 1J 6

RE.27,776.—ROLLER ASSEMBLY FR BELT-TYPE PHOTORECEPTR IN ELECTROSTATC PRNTNG MACHINES—RE OF D1480—3,536. OCT. 9, 1973.
2,624,652.—GRAPHIC RECORDING. JAN. 6, 1953.
3,190,199.—XEROGRAPHIC COPYING APPARATUS. JUNE 22, 1965. CAN. 0709970, GRB. 1033834, JAP. 0477813.
3,435,693.—BELT TRACKING DEVICE. APR. 1, 1969. ARG. 0168295, ATR. 0283116, AUS. 0421893, BEL. 0705641, CAN. 0853440, CHL. 0023084, CLB. 0017528, DNK. 0117047, FRA. 1543079, GRB. 1180659, ITL. 0827782, MEX. 0100320, NOR. 0124530, PRU. 0009336, SAF. 0676414, SPN. 0346430, STZ. 0471736, URG. 0009729, VZL. 0023676.
3,536,323.—BELT ASSEMBLY—REISSUED D3492—27,776. OCT. 27, 1970. ARG. 0181307, AUS. 0437364, BEL. 0733405, BRA. 6909127, CAN. 0943179, FRA. 6917082, GRB. 1275135, HUN. 0157763, ITL. 0869475, JAP. 0700616, MEX. 0112302, PNM. 0001817, SPN. 0367615, STZ. 0506819, TIW. 0UM5646, USR. 0406385, VZL. 0025831.
3,661,452.—XEROGRAPHIC REPRODUCTION MACHINE. MAY 9, 1972. ARG. 0169621, AUS. 0442749, BEL. 0733407, CAN. 0910959, CHL. 0024800, DNK. 0125257, FRA. 6917084, GRB. 1264406, ITL. 0877771, MEX. 0115542, PNM. 0001759, PRU. 0010640, SPN. 0367613, STZ. 0491418, TIW. 0006498, USR. 0358875, VZL. 0026279.
3,664,204.—BELT ASSEMBLY FOR USE IN AN ELECTROSTATIC PRINTING MACHINE. MAY 23, 1972. ARG. 0193980, BEL. 0777322, CAN. 0939735, FRA. 7147893, GRB. 1372389, ITL. 0944437, MEX. 0128274, VZL. 0032791.
3,730,623.—VACUUM HOLDDOWN DEVICE FOR MOVING BELTS. MAY 1, 1973. ARG. 0191239, BEL. 0777323, CAN. 0940591, FRA. 7147894, GRB. 1372390, ITL. 0944436, MEX. 0127634.
3,765,757.—TRANSPORT ARRANGEMENT FOR THIN SHEET MATERIAL. OCT. 16, 1973. BEL. 0793551, GRB. 1419978, ITL. 0972846, SPN. 0410107.
3,790,271.—PROCESSING CONTROL SYSTEM FOR PRINTING MACHINES. FEB. 5, 1974. CAN. 0986173, SPN. 0418256.
3,801,092.—VACUUM HOLD-DOWN DEVICE FOR MOVING BELTS. APR. 2, 1974. ARG. 0191239, BEL. 0777323, CAN. 0940591, FRA. 7147894, GRB. 1372390, ITL. 0944436, MEX. 0127634.
3,860,340.—OPTICAL ALIGNMENT ON VACUUM PLENUM. JAN. 14, 1975. BEL. 0784630, FRA. 7220686, GRB. 1379674, ITL. 0956164.
3,867,027.—TRANSPORT ARRANGEMENT FOR THIN SHEET MATERIAL. FEB. 18, 1975. BEL. 0793551, GRB. 1419978, ITL. 0972846, SPN. 0410107.
3,907,650.—PHOTOSENSITIVE BINDER LAYER FOR XEROGRAPHY. SEPT. 23, 1975.
3,914,126.—NICKEL OXIDE INTERLAYERS FOR PHOTOCONDUCTIVE ELEMENTS. OCT. 21, 1975.
3,921,179.—FLUID PEN ASSEMBLY. NOV. 18, 1975.
3,961,849.—ELECTROSTATIC PRINTING MACHINE. JUNE 8, 1976. ARG. 0200108, ATR. 0323556, AUS. 0458405, BEL. 0776599, CAN. 0948274, FRA. 7145342, GRB. 1374799, ITL. 0943875, MEX. 0127493, PNM. 0718307, SAF. 0718307, SPN. 0397851, STZ. 0554009, SWD. 7115731, VZL. 0032936.

Class 1J 7

3,099,944.—XEROGRAPHIC CONTROL APPARATUS. AUG. 6, 1963. CAN. 0738131, IND. 0096308, JAP. 0491992.
3,512,885.—ACCOUNTING DEVICE FOR XEROGRAPHIC REPRODUCING APPARATUS. MAY 19, 1970. ARG. 0152214, ATR. 0285324, AUS. 0409894, BEL. 0670170, BRA. 0086686, CAN. 0763624, CHL. 0022095, CLB. 0015661, COS. 0001881, DNK. 0125559, ECD. 0000019, EGR. 0050203, EIR. 0029756, ELS. 0000939, FRA. 1459931, GER. 1522804, GRB. 1122622, GRK. 0030861, GUA. 0001741, HOL. 0146300, IND. 0096570, ISR. 0024363, ITL. 0729658, JAP. 0513607, LXB. 0049537, MEX. 0079047, NOR. 0124392, NZL. 0142991, PAK. 0116058, PLP. 0005074, PNM. 0002079, PRU. 0008106, PTG. 0044651, SAF. 0655276, SPN. 0318011, STZ. 0438031, SWD. 0358037, TRK. 0013473, UAR. 0007497, URG. 0006622, VZL. 0023997.
3,588,472.—LOGIC CONTROL APPARATUS. JUNE 28, 1971. ARG. 0181590. ATR. 0279353, BEL. 0706629, BRA. 6793350, CAN. 0834957, FRA. 1567082, GRB. 1204719, ITL. 0815466, JAP. 0645591, LXB. 0054882, MEX. 0101675, VZL. 0023684.
3,734,610.—MICROFICHE VIEWER-COPIER WITH BILLING DATA STORAGE. MAY 22, 1973.
3,813,157.—CONTROL LOGIC FOR TROUBLE DETECTION AND RECOVERY. MAY 28, 1974.

Class 1J 8

3,094,049.—XEROGRAPHIC DEVELOPER MEASURING APPARATUS. JUNE 18, 1963.
3,301,152.—XEROGRAPHIC COPYING APPARATUS. JAN. 31, 1967.
3,348,521.—AUTOMATIC TONER CONTROL SYSTEM. OCT. 24, 1967. CAN. 0799398.
3,453,045.—XEROGRAPHIC DEVELOPMENT APPARATUS. JULY 1, 1969. CAN. 0852125, FRA. 1559973, GRB. 1213493, HUN. 0156188, ITL. 0832847, JAP. 0602169, USR. 0371739.

3,542,466.—DEVELOPMENT APPARATUS. NOV. 24, 1970. AUS. 0428620, BEL. 0725611, CAN. 0884213, FRA. 1598505, GRB. 1203167, ITL. 0870661, JAP. 0641479, SPN. 0361653, SWD. 0343694.
3,695,224.—CASCADE DEVELOPMENT. OCT. 3, 1972.
3,816,756.—AUTOMATIC BIAS CONTROL. JUNE 11, 1974.
3,851,966.—REPRODUCTION APPARATUS. DEC. 3, 1974. BEL. 808482.
3,869,896.—ROLLING PROCESS. MAR. 11, 1975. GRB. 1434131.
3,931,792.—ABRASIVE LIQUID DEVELOPING APPARATUS. JAN. 13, 1976.
3,994,726.—LAMINATED FLEXIBLE PHOTORECEPTOR. GRB. 1429517.
4,002,476.—METHOD OF DEVELOPING RESILIENT PHOTOCONDUCTIVE ELEMENT. JAN. 11,, 1977. GRB. 1429517.
4,023,967.—ELECTROPHOTOGRAPHIC LIQUID DEVELOPMENT METHOD IN WHICH A UNIFORM SUBSTANTIAL INTERFACE CONTACT. BEL. 0819537, GRB. 1429518.

Class 1K

T.940,022.—PRESSURIZED AND FILTERED XEROGRAPHIC SYSTEM. NOV. 4, 1975.
3,638,110.—DEVC FOR MEASRNG CHRG ON MATRIAL BY CONVRTNG INTO ELCTRCL SGNLS FRICTNL FORCS CAUSD BY CHARGE. JAN. 25, 1972. AUS. 0161306, BEL. 0746479, FRA. 7007991, GRB. 1280803, HUN. 0161306, ITL. 0892329, JAP. 0681943, PLD. 0069581, SPN. 0376910, STZ. 0519185, SWD. 0364418, USR. 0412696.
3,661,453.—ELECTROSTATIC LABEL PRINTER. MAY 9, 1972. CAN. 0927471, FRA. 7122950, GRB. 1345800, ITL. 0927543.
3,893,175.—RECORDER FOR MONITORING COPIERS. JULY 1, 1975. GRB. 1427292.
4,007,326.—ELECTRONIC COPY ANALYSIS. FEB. 8, 1977.
4,016,310.—COATR HRDWR & METH FOR OBTNG UNFRM PHROCNDTV LAYR ON A XEROGRAPHIC PHOTORECEPTOR. APR. 5, 1977.
4,023,523.—COATING HARDWARE AND METHOD FOR OBTAINING UNIFORM PHOTOCONDUCTIVE LAYERS ON A XEROGRAPHIC PHOTO. MAY 17, 1977.
4,023,901.—REPRODUCTION MACHINE SERVICE CONTROL. MAY 17, 1977.
4,025,188.—PHOTOACTIVE DEVICE FOR XEROGRAPHY. MAY 24, 1977.
4,026,397.—CONTROL KNOB CLUTCHES WITH LOCK. MAY 31, 1977.

Class 1K 1

3,013,203.—XEROGRAPHIC ELECTROMETER APPARATUS. DEC. 12, 1961.
3,835,380.—ELECTROMETER SYSTEM. SEPT. 10, 1974.
3,852,668.—ELECTROMETER SYSTEM. DEC. 3, 1974.
3,887,845.—COPIER PHOTORECEPTOR CHARGE CONTROL. JUNE 3, 1975. GRB. 1465969.
3,891,316.—MULTI-PROCESS CONTROL SYSTEM FOR AN ELECTROPHOTOGRAPHIC PRINTING MACHINE. JUNE 24, 1975.
3,898,001.—ELCTROMETR SYSTM FOR NON-CNTCT DETCTN OF ELCTRSTATC CHRGE ON A MVNG ELCTRSTGRPHC IMAGNG SURFACE. AUG. 5, 1975.
3,909,126.—MULTI-PROCESS CONTROL SYSTEM FOR AN ELECTROPHOTOGRAPHIC PRINTING MACHINE. SEPT. 30, 1975.
3,934,141.—APPARATUS FOR AUTOMATICALLY REGULATING THE AMOUNT OF CHARGE APPLIED TO AN INSULATING SURFACE. JAN. 20, 1976.
3,935,531.—ELECTROMETER WITH LOW VOLTAGE INDICATOR. JAN. 27, 1976.
3,935,532.—AUTOMATIC ZEROING ELECTROMETER. JAN. 27, 1976.
3,998,538.—ELECTROMETER APPARATUS FOR REPRODUCTION MACHINES. DEC. 21, 1976.
4,000,944.—PHOTORECEPTOR FOR ELECTROSTATIC REPRODUCTION MACHINES WITH BUILT IN ELECTRODE. JAN. 4, 1977.
4,003,650.—CONTROLLER FOR REPRODUCTION APPARATUS. JAN. 18, 1977.

Class 1K 2

2,588,675.—ELECTROCOPY APPARATUS. MAR. 11, 1952. CAN. 0489580, FRA. 1017568, GRB. 0695450.
2,917,385.—REFLEX XEROGRAPHY. DEC. 15, 1959. CAN. 0577137.
3,335,003.—REFLEX XEROGRAPHIC PROCESS. AUG. 8, 1967. CAN. 0764912, FRA. 1415836, GER. 1261398, GRB. 1059657, ITL. 0741353, JAP. 0511404.
3,337,339.—SCREEN XEROGRAPHY. AUG. 22, 1967. AUS. 0291558, BEL. 0638029, CAN. 0729824, DNK. 0114045, FRA. 1404424, GER. 0114045, GRB. 1027354, HOL. 0130250, ITL. 0706191, JAP. 0489562, LXB. 0044538, NOR. 0109228, SWD. 0321859.
3,676,118.—REFLEX XEROGRAPHY IMAGING SYSTEM. JULY 11, 1972.

Class 1K 3

3,926,626.—CIRCULATION IMAGING METHOD. DEC. 16, 1975.

Class 2A

2,666,144.—ELECTRORADIOGRAPHY. JAN. 12, 1954. AUS. 0160250, CAN. 0513474, FRA. 1043156, GRB. 0721944, ITL. 0477981, SAF. 0012711, STZ. 0300623, SWD. 0149520.
2,863,767.—XEROGRAPHIC METHOD. DEC. 9, 1958. CAN. 0580777, FRA. 1147979, GER. 1029673, GRB. 0804695.
3,856,461.—REPRODUCTION MACHINE FUSER. DEC. 24, 1974.
3,856,462.—REPRODUCTION MACHINE FUSER. DEC. 24, 1974. BEL. 0821050.
3,877,936.—PHOTOCONDUCTIVE COPOLYMER OF N-VINYLCARBAZOLF AND N-VINYLPHTHALIMIDE. APR. 15, 1975. BEL. 0812436.
3,883,921.—CLEANING ROLL APPARATUS HAVING REJUVENATED CLEANING SURFACE. MAY 20, 1975.
3,944,358.—COLOR IMAGE REPRODUCTION SYSTEMS. MAR. 16, 1976.
3,951,533.—COLOR IMAGE REPRODUCTION SYSTEM. APR. 20, 1976.
3,984,183.—SHEET STRIPPING FROM IMAGING SURFACE. OCT. 5, 1976. BEL. 0836791.
3,997,243.—COLOR IMAGE REPRODUCTION SYSTEM. DEC. 14, 1976.
4,004,549.—ROLL FUSER. JAN. 25, 1977.
4,022,956.—POLYMERS OF BENZANTHRACENE AS ACTIVE MATRIX MATERIALS. MAY 10, 1977.
4,027,138.—A FUSER RELEASE MATERIAL DISPENSER. MAY 31, 1977.
4,035,140.—FIXING DEVICE IN AN ELECTROPHOTOGRAPHIC COPYING MACHINE. JULY 12, 1977.

Class 2A 1

3,764,315.—AMBIPOLAR ELECTROPHOTOGRAPHIC PLATE. OCT. 9, 1973. BEL. 0802608, GRB. 1421948.
3,948,656.—IMPROVED METHOD FOR THE PREPARATION OF CDSSE. APR. 6, 1976.

Class 2A 1A

2,657,152.—PROCESS OF PRODUCING AN ELECTROPHOTOGRAPHIC PLATE. OCT. 27, 1953. AUS. 0152887, CAN. 0516075, FRA. 1039677, GER. 0893010, GRB. 0687704, HOL. 0082956, SAF. 0012307, STZ. 0296692, SWD. 0148967.
2,663,636.—ELECTROPHOTOGRAPHIC PLATE AND METHOD OF PRODUCING SAME. DEC. 22, 1953. CAN. 0512461, GER. 0872427, GRB. 0693112, HOL. 0095533, SAF. 0012644, STZ. 0290324, SWD. 0148966.
2,753,278.—METHOD FOR THE PRODUCTION OF A XEROGRAPHIC PLATE. JULY 3, 1956. CAN. 0543309.
2,862,817.—CRYSTALLINE SELENIUM PLATE. DEC. 2, 1958.
2,919,119.—XEROGRAPHIC PLATE CONDITIONING APPARATUS. DEC. 29, 1959. CAN. 0616780.
2,970,906.—XEROGRAPHIC PLATE AND A PROCESS OF COPY MAKING. FEB. 7, 1961. CAN. 0576158.
3,011,474.—XEROGRAPHIC DEVELOPMENT ELECTRODE APPARATUS. DEC. 5, 1961. CAN. 0701149, GRB. 0948138.
3,077,386.—PROCESS FOR TREATING SELENIUM. FEB. 12, 1963. CAN. 0705359.
3,170,790.—RED SENSITIVE XEROGRAPHIC PLATE AND PROCESS THEREFOR. FEB. 23, 1965.
3,174,855.—METHOD FOR A PRODUCTION OF A XEROGRAPHIC PLATE. MAR. 23, 1965.
3,234,020.—PLATE FOR ELECTROSTATIC ELECTROPHOTOGRAPHY. FEB. 8, 1966.
3,460,296.—METAL WORKING. AUG. 12, 1969. BEL. 0705574, CAN. 0853918, GRB. 1196684.
3,488,896.—PROCESS OF PUMICING A SURFACE. JAN. 13, 1970.

3,489,560.—PHOTOCONDUCTIVE LAYR COMPRISN SELENIUM COMPOUND AND SOLID HYDROPHOBIC METL SALT OF A FATTY ACID. JAN. 13, 1970. BEL. 0711297, CAN. 0871632, FRA. 1544448, GRB. 1203237.

3,517,995.—METHOD & APPARATUS FOR INCREASING THE EFFICIENCY OF CORONA CHARGNG. JUNE 30, 1970. ARG. 0172471, BEL. 0721553, CAN. 0856714, FRA. 1585283, GRB. 1247034, ITL. 0844214, JAP. 0708414, MEX. 0103113, VZL. 0023701.

3,552,848.—XEROGRAPHIC PLATE. JAN. 5, 1971.

3,621,248.—METHOD USING XERORADIOGRAPHIC PLATE INSENSITIVE TO VISIBLE LIGHT. NOV. 16, 1971.

3,954,464.—METHOD OF FABRICATING A COMPOSITE TRIGONAL SELENIUM PHOTORECEPTOR. MAY 4, 1976.

3,961,953.—METHOD OF FABRICATING COMPOSITES TRIGONAL SELENIUM PHOTORECEPTORS. JUNE 8, 1976.

4,007,255.—PREPARATION OF RED AMORPHOUS SELENIUM. FEB. 8, 1977.

4,009,249.—PREPARATION OF RED AMORPHOUS SELENIUM. FEB. 22, 1977.

4,019,014.—METHOD FOR HEAT WELDING SELENIUM. APR. 19, 1977.

Class 2A 1B

2,822,300.—PHOTOCONDUCTIVE MATERIAL HORIZONS. FEB. 4, 1958. CAN. 0665880.

3,312,548.—XEROGRAPHIC PLATES. APR. 4, 1967. BEL. 0691217, CAN. 0819658, FRA. 1505803, GRB. 1165579, JAP. 0650232.

3,467,548.—METHOD OF MAKING XEROGRAPHIC PLATE BY VACUUM EVAPORATION OF SELENIUM ALLOY. SEPT. 16, 1969.

3,490,903.—ALLOYS OF ANTIMONY AND SELENIUM USED IN PHOTOCONDUCTIVE ELEMENTS. JAN. 20, 1970. AUS. 0412949, CAN. 0871074, FRA. 1533536, GRB. 1185389, ITL. 0805955, JAP. 0626127, SWD. 0318193.

3,511,649.—PROCESS OF REDUCING FATIGUE IN PHOTOCONDUCTIVE GLASSES. MAY 12, 1970. GRB. 1193472, JAP. 0604152.

3,524,745.—PHOTOCONDUCTIVE ALLOY OF ARSENIC ANTIMONY AND SELENIUM. AUG. 18, 1970. ARG. 0164055, AUS. 0410443, BEL. 0709132, CAN. 0884810, CHL. 0024255, FRA. 1550902, GRB. 1209971, IND. 0113988, ITL. 0833508, JAP. 9124370, LXB. 0055231, MEX. 0108993, NOR. 0127943, NZL. 0151243, PRU. 0009904, PTG. 0048919, SAF. 0680228, SPN. 0349235, STZ. 0495573, SWD. 0328189, URG. 0009683.

3,615,413.—INDIUM DOPING OF A SE-AS PHOTOCONDUCTIVE ALLOYS. OCT. 26, 1971. CAN. 0917981, GRB. 1309312, JAP. 0739528.

3,655,377.—TRI-LAYERED SELENIUM DOPED PHOTORECEPTOR. APR. 11, 1972.

3,660,086.—ELCTRPHTGRPC PLATE AND PROCS EMPLYNG INORGNC PHOTCNDCTV MATRL W/PHOTOCHROMIC SENSITIVE AGENT. MAY 2, 1972.

3,685,989.—AMBIPOLAR PHOTORECEPTOR AND METHOD OF IMAGING. AUG. 22, 1972. CAN. 0971800, GRB. 1360078.

3,697,265.—VTRS SELNUM ALLY MTRX CNTNING ISLTD PRTCLS/PRTCL NETWKS OF RSN. OCT. 10, 1972. ARG. 0183560, ATR. 0299699, AUS. 0449439, BEL. 0752439, CAN. 0933014, EGR. 0090944, FRA. 7023472, GRB. 1319341, ITL. 0894623, MEX. 0116409, PNM. 0002539, SPN. 0409740, STZ. 0000000, SWD. 7216008, TIW. 0006838, USR. 0374867, VZL. 0031909.

3,879,199.—SURFACE TREATMENT OF ARSENIC-SELENIUM PHOTOCONDUCTORS. APR. 22, 1975.

3,884,688.—PHOTOSENSITIVE ELEMENT EMPLOYING A VITREOUS BISMUTH-SELENIUM FILM. MAY 20, 1975.

3,887,368.—COMPOSITION. JUNE 3, 1975.

3,898,083.—HIGH SENSITIVITY VISIBLE INFRARED PHOTOCONDUCTOR. AUG. 5, 1975.

3,909,458.—PHOTOSENSITIVE VITREOUS LAYER COMPRISING BISMUTH AND SELENIUM. SEPT. 30, 1975.

4,015,029.—SELENIUM & SELENIUM ALLOY EVAPORATION TECHNIQUE. MAR. 29, 1977.

Class 2A 1C

2,844,493.—HIGH RESISTANCE PHOTOCONDUCTOR HORIZONS. JULY 22, 1958.

2,844,543.—TRANSPARENT PHOTOCONDUCTIVE COMPOSITION - HORIZONS. MAR. 18, 1955.

2,863,768.—XEROGRAPHIC PLATE. DEC. 9, 1958.

2,901,349.—XEROGRAPHIC PLATE - SELENIUM PLATE WITH ARSENIC TRISULFIDE INTERFACE. AUG. 25, 1959.

3,140,174.—PROCESS FOR OVERCOATING A XEROGRAPHIC PLATE. JULY. 7, 1964. FRA. 1260498, GRB. 0960871.

3,379,527.—PHOTOCONDUCTIVE INSULATORS COMPRISING ACTIVATED SULFIDES SELENIDES AND SULFOSELENIDES OF CADMIUM. APR. 23, 1968. CAN. 0907921, GRB. 1079065.

3,682,631.—METHOD OF FORMING AN ELECTROPHOTOGRAPHIC LAYER CONTAINING A BENZOQUANAMINE RESIN BINDER. AUG. 8, 1972.

3,867,145.—METHANOL AND HEAT TREATED ZINC OXIDE. FEB. 18, 1975.

3,971,742.—ORGANO-CHALCOGEN COMPOSITIONS. JULY 27, 1976.

Class 2A 1D

3,469,978.—PHOTOSENSITIVE ELEMENT. SEPT. 30, 1969. CAN. 0872173, GRB. 1171909, JAP. 0552967.

3,522,040.—PHOTOSENSITIVE INSULATING MATERIAL. JULY 28, 1970. CAN. 0884808, GRB. 1171910, JAP. 0552966.

3,627,573.—COMPOSITION AND METHOD. DEC. 14, 1971. ARG. 0176480, AUS. 0441224, BEL. 0721965. CAN. 0892493, FRA. 0095985, GRB. 1251630, ITL. 0889828, MEX. 0124897, SPN. 0358960, STZ. 0517359, VZL. 0030358.

Class 2A 1E

2,277,013.—ELECTRIC RECORDING AND TRANSMISSION OF PICTURES. MAR. 17, 1942.

2,662,832.—PROCESS OF PRODUCING AN ELECTROPHOTOGRAPHIC PLATE. DEC. 15, 1953.

2,803,541.—XEROGRAPHIC PLATE. AUG. 20, 1957. CAN. 0563401, FRA. 1105562, GER. 0941767, GRB. 0755683.

2,962,376.—XEROGRAPHIC MEMBER. NOV. 29, 1960.

3,238,150.—PHOTOCONDUCTIVE CADMIUM SULFIDE POWDER AND METHOD FOR THE PREPARATION THEREOF. MAR. 1, 1966. CAN. 0712516, GRB. 1062022, JAP. 0486530.

3,879,200.—NOVEL XEROGRAPHIC PLATE CONTAINING PHOTOINJECTING BIX-BENZIMIDAZOLE PIGMENTS. APR. 22, 1975. ARG. 0188392, AUS. 0465970, BEL. 0763545, BRA. 0088118, CAN. 0928125, CHL. 0027130, EGR. 0093279, FRA. 7107565, GRB. 1337222, ITL. 0919105, MEX. 0122169, PNM. 0002460, SAF. 0711225, SPN. 0388590, TIW. 0008178, USR. 0449515.

3,909,261.—XEROGRAPHIC IMAGING MEMBER HAVING PHOTOCONDUCTIVE MATERIAL IN INTERLOCKING CONTINUOUS PATHS. SEPT. 30, 1975. ARG. 0186443, ATR. 0451252, BEL. 0763544, CAN. 0925741, CHL. 0026794, FRA. 7107567, GRB. 1296291, ITL. 0918909, MEX. 0122096, NZL. 0162891, PLP. 0009378, PNM. 0002396, SAF. 0711227, SPN. 0388639, STZ. 0568591, SWD. 0367259, TIW. 0007844, USR. 0398062.

Class 2A 1E 1

2,937,944.—XEROGRAPHIC LIGHT-SENSITIVE MEMBER AND PROCESS THEREFOR. MAY 24, 1960. AUS. 0242066, BEL. 0586070, CAN. 0610194, FRA. 1243723, GER. 1165408, GRB. 0894371, ITL. 0620746, JAP. 0318674, STZ. 0394806.

3,077,398.—XEROGRAPHIC PLATE MADE BY CAST COATING. FEB. 12, 1963.

Class 2A 1E 2

3,008,825.—XEROGRAPHIC LIGHT-SENSITIVE MEMBER AND PROCESS THEREFOR. NOV. 14, 1961. CAN. 0610195.

Class 2A 1F

3,394,001.—ELECTROPHOTOGRAPHIC SENSITIVE MATERIAL CONTAINING ELECTRON-DONOR DYE LAYERS. JULY 23, 1968. GRB. 1106562.

3,498,835.—METHOD FOR MAKING XEROGRAPHIC PLATES. MAR. 3, 1970. ARG. 0154134, AUS. 0418468, BEL. 0700454, CAN. 0872174, FRA. 1529285, GRB. 1189504, ITL. 0807717, JAP. 0567234, MEX. 0096199, SPN. 0342303, STZ. 0479093, SWD. 0332346, VZL. 0024014.

3,532,496.—XRGRPHC PLTS AND PROCS EMPLYNG HMGNUS DISPRSNS OF VTREOUS SLNIUM AND SNSTZNG DYES AS PHTCNDCTV LAYER. OCT. 6, 1970.

Class 2A 1G

3,288,603.—METHOD OF RESTORING XEROGRAPHIC PROPERTIES TO A GLASS BINDER PLATE. NOV. 29, 1966. CAN. 0800955, FRA. 1432127, GER. 1497201, GRB. 1088473, ITL. 0802168, JAP. 0519677.

3,397,982.—XIC PLATE W/INORGANIC GLASS BINDER HAVING OVERCOATING CONSISTING ESSENTIALLY OF ALUMINUM OXIDE. AUG. 20, 1968. ARG. 0150690, AUS. 0407349, BEL. 0674140, CAN. 0866142, FRA. 1460232, GER. 1497230, GRB. 1129674, ITL. 0822914, JAP. 0531894, MEX. 0085270, SWD. 0319976.

3,451,846.—PROCESS OF MAKING XEROGRAPHIC PLATE. JUNE 24, 1969. CAN. 0818384, GRB. 1183961, JAP. 0598621.

3,510,298.—PROCESS OF ACTIVATING PHOTOCONDUCTIVE MATERIAL IN GLASS BINDER. MAY 5, 1970. CAN. 0834668, GER. 1572366, GRB. 1189822, JAP. 0552968.

3,537,848.—PROCESS OF TREATING A XEROGRAPHIC GLASS BINDER PLATE AND PRODUCT. NOV. 3, 1970. ARG. 0180580.

3,655,376.—ELECTROPHOTOGRAPHIC DENITRIFIED GLASS BINDER PLATE. APR. 11, 1972.

3,885,962.—PHOTOGRAPHIC AND ELECTROPHOTOGRAPHIC MEMBERS WITH GLASS FIBER CONTAINING PAPER SUBSTRATES. MAY 27, 1975.

Class 2A 2

3,657,272.—PROCESS FOR PREPARING X-FORM METAL FREE PHTHALOCYANINE. APR. 18, 1972.

3,738,831.—CHALCOGEN ORGANIC COMPOUNDS USED IN ELECTROPHOTOGRAPHIC PLATES AND PROCESS. JUNE 12, 1973.

3,758,301.—ELECTROPHOTOGRAPHIC USE OF SELENIUM CONTAINING POLYMERS. SEPT. 11, 1973.

3,770,428.—ORGANIC PHOTOCONDUCTIVE MATERIAL. NOV. 6, 1973.

3,864,144.—PROCESS FOR PREPARATION OF PHOTOCONDUCTIVE FILMS FROM INTRACTABLE MATERIALS. FEB. 4, 1975. GRB. 1414158, TIW. 0008534.

3,870,516.—METHOD OF IMAGING PHOTOCONDUCTOR IN CHARGE TRANSPORT BINDER. MAR. 11, 1975. AUS. 0466028, BEL. 0763541, CAN. 0931413, CHL. 0026797, EGR. 0094762, FRA. 7107559, GRB. 1343671, ITL. 0919108, MEX. 0122098, NZL. 0162883, PNM. 0002450, SAF. 0711219, SPN. 0388584, STZ. 0567744.

3,877,936.—PHOTOCONDUCTIVE COPOLYMER OF N-VINYLCARBAZOLE AND N-VINYLPHTHALIMIDE. APR. 15, 1975. BEL. 0812436.

3,879,198.—ELECTROPHOTOGRAPHIC AMBIPOLAR PHOTOCONDUCTIVE COMPOSITION AND IMAGING METHOD. APR. 22, 1975.

3,882,087.—ORGANIC PHOTOCONDUCTIVE MATERIAL. MAY 6, 1975.

3,903,107.—DIRECT ALPHA TO X PHASE CONVERSION OF METAL CONTAINING PHTHALOCYANINE. SEPT. 2, 1975. BEL. 0815632, SAF. 0743536.

3,915,702.—PHTOELCTRC & ELCTRPHTGRPHC PGMNTS COMPRISING DERIVATIVES OF CONDENSED PLYCYLC ARMATC HYDRCABN A. OCT. 28, 1975.

3,915,704.—PHOTOINDUCED ACID CATALYZED DEGRADATION OF DEGRADABLE POLYMERS. OCT. 28, 1975.

3,917,483.—PHOTOINDUCED ACID CATALTZED DEPOLYMERIZATION OF DEGRADABLE POLYMERS. NOV. 4, 1975.

3,923,762.—PROCESS FOR PREPARATION OF 2-ANTHRYL AND SUBSTITUTED 2-ANTHRYL FUNCTIONAL MONOMERS AND P. DEC. 2, 1975. BEL. 0822305, STZ. 0032598.

3,926,629.—ELECTROPHOTOGRAPHIC METHOD AND PLATE EMPLOYING A PHTHALOCYANINE POLYMER. DEC. 16, 1975.

3,932,180.—DIRECT ALPHA TO X PHASE CONVERSION OF METAL-FREE PHTHALOCYANINE. JAN. 13, 1976. BEL. 0815632, SAF. 0743536.

3,943,108.—PHOTOCONDUCTIVE COMPOSITION OF AN ALDEHYDE CONDENSATE. MAR. 9, 1976.

3,954,906.—AMBIPOLAR PHOTOCONDUCTIVE COMPOSITION AND IMAGING METHOD. MAY 4, 1976.

3,970,602.—COPOLYMERS OF N-VINYLCARBAZOLE AND N-VINYLPHTHALIMIDE AND DERIVATIVES THEREOF. JULY 20, 1976. BEL. 0812436.

3,978,029.—PHOTOCONDUCTIVE COMPOSITIONS AND IMAGING MEMBERS AND METHODS EMPLOYING SAME. AUG. 31, 1976. ARG. 0206212, BEL. 0816552, FRA. 7422479, SAF. 0744129.

3,981,848.—PHOTOCONDUCTIVE COMPOSITION AND IMAGING METHODS EMPLOYING SAME. SEPT. 21, 1976. ARG. 0206211, ATR. 0332734, FRA. 7422484.

Class 2A 2A

3,408,181.—HEAT DEFORMABLE RECORDING MATERIALS CONTAINING PHOTOCONDUCTIVE RESINOUS CHARGE TRANSFER COMPLE. OCT. 29, 1968. CAN. 0843620, FRA. 1463744, GER. 1522677, GRB. 1138552, ITL. 0755286, MEX. 0109927.

3,432,415.—ELECTROPHORETIC IMG. PROCESS USING PHOTOSENSITIVE XANTHENONIUM SALTS. MAR. 11, 1969. AUS. 0439502, BEL. 0743895, CAN. 0851118, GER. 1522701, GRB. 1155747, JAP. 0650631, MEX. 0104632.

3,445,227.—ELECTROPHOTOGRAPHIC IMAGING PROCESSES EMPLOYING 2,4 DIAMINOTRIAZINES AS ELCTRCLY PHOTOSNSTV PRT. MAY 20, 1969. BEL. 0743891, CAN. 0852681, GER. 1522687, GRB. 1146019, JAP. 0617789.

3,447,922.—ELECTRICALLY PHOTOSENSITIVE PARTICLES USEFUL IN PHOTOELECTROPHORETIC AND XEROGRAPHIC IMAGING PROC. JUNE 3, 1969.

3,448,029.—ELECTROPHORETIC IMAGING PROCESS USING 8,13-DIOXODINAPTHO-2,1-B,2,3-D-FURAN-6-CARBOXAMIDE PIGMEN. JUNE 3, 1969.

3,448,030.—ELECTRICALLY PHOTOSENSITIVE PART. USEFUL IN PHOTOELECTROPHORETIC AND XEROGRAPHIC IMAGING PROCESSE. JUNE 3, 1969. BEL. 0743893, CAN. 0943830, GRB. 1155554, JAP. 0686735.

3,482,970.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS USING NAPHTHYLAZO COMPOUNDS AS THE PRIMARY PHOTOCONDUCTOR. DEC. 9, 1969. AUS. 0453397, BEL. 0742978, CAN. 0869486, GRB. 1296390, ITL. 0878843, JAP. 0725059.

3,553,009.—PROCESS OF PREPARING AN ELECTROPHOTOGRAPHIC MATERIAL. JAN. 5, 1971.

3,594,163.—METHOD OF CONVERTING ALPHA PHTHALOCYANINE TO THE X FORM. JULY 20, 1971.

3,640,710.—PHTHALOCYANINE PHOTOCONDUCTIVE ELEMENTS CONTAINING MULTIPLE BINDER MATERIALS. FEB. 8, 1972. ARG. 0184666, ATR. 0328861, AUS. 0456430, BEL. 0760751, CAN. 0933012, FRA. 7047636, GRB. 1333605, ITL. 0913999, PNM. 0002243, STZ. 0554550, SWD. 0365878, TIW. 0006738, USR. 0450420, VZL. 0032928.

3,667,943.—QUINACRIDONE PIGMENTS IN ELECTROPHOTOGRAPHIC IMAGING. JUNE 6, 1972. ARG. 0184823, AUS. 0452663, BEL. 0737810, CAN. 0877882, EGR. 0077411, FRA. 6928700, GRB. 1278702, ITL. 0888005, SPN. 0370720, STZ. 0519183, SWD. 0346396, TIW. 0005517, USR. 0351396.

3,667,944.—QUINACRIDONE PIGMENTS IN ELECTROPHOTOGRAPHIC RECORDING. JUNE 6, 1972. ARG. 0177369, AUS. 0452031, BEL. 0741159, CAN. 0884807, FRA. 6937223, GRB. 1286079, ITL. 0879710, JAP. 0693421, MEX. 0115407.

3,667,945.—QUINACRIDONE PIGMENTS IN ELECTROPHOTOGRAPHIC IMAGING. JUNE 6, 1972.

3,708,292.—PI-FORM METAL PHTHALOCYANINE. JAN. 2, 1973. ARG. 0194234, BEL. 0783793, GRB. 1396922, ITL. 0955644, MEX. 0128928.

3,708,293.—PI-FORM METAL-FREE PHTHALOCYANINE. JAN. 2, 1973. ARG. 0195167, BEL. 0783792, GRB. 1395769, ITL. 0955643, MEX. 0131970.

3,761,261.—PHTHALOCYANINE DYE SENSITIZERS FOR ZINC OXIDE. SEPT. 25, 1973.

3,816,118.—ELECTROPHOTOGRAPHIC ELEMENT CONTAINING PHTHALOCYANINE. JUNE 11, 1974. ARG. 0156316, CAN. 0890855, FRA. 0091579, GRB. 1175451, ITL. 0809972, MEX. 0115884, VZL. 0024012.

3,850,630.—XEROGRAPHIC PLATE CONTAINING PHOTOINJECTING INDIGOLD PIGMENTS. NOV. 26, 1974. ARG. 0188393, AUS. 0465971, BEL. 0763391, CAN. 0932198, CHL. 0027129, EGR. 0093923, FRA. 7107566, GRB. 1337221, ITL. 0919106, MEX. 0122099, NZL. 0162890, PNM. 0002480, SAF. 0711226, SPN. 0388591, TIW. 0006740, USR. 0463276.

3,865,798.—PHOTOACTIVE POLYMERS INDUCED EXOCYCLIC QUARTET CONCEPT. FEB. 11, 1975. AUS. 0462805, BEL. 0790689, FRA. 7237458, GRB. 1411998, ITL. 0969902, MEX. 0133728, SPN. 0407984, STZ. 0028515.

3,877,935.—NOVEL XEROGRAPHIC PLATE CONTAINING PHOTOINJECTING POLYNUCLEAR QUINONE PIGMENTS. APR. 15, 1975. ARG. 0002614, AUS. 0452620, BEL. 0763389, CAN. 0932197, CHL. 0027120, FRA. 7107563, GRB. 1337224, GUA. 0002614, ITL. 0919103, MEX. 0122100, NZL. 0162887, PNM. 0002467, SAF. 0711223, SPN. 0388588, TIW. 0006741.

3,884,689.—POLYCYCLIC AROMATIC POLYMER AS A PHOTO-CONDUCTOR OR OVERLAYER. MAY 20, 1975.

3,895,945.—PROCESS FOR PREPARATION OF A DYESTUFF SENSITIZED PHOTOCONDUCTIVE COMPOSITION. JULY 22, 1975.

3,899,328.—ACTIVE MATRIX AND INTRINSIC PHOTOCONDUCTIVE POLYMER OF A LINEAR POLYSILOXANE. AUG. 12, 1975.

3,899,329.—MIXTURE OF PHOTOCONDUCTORS IN AN ACTIVE MATRIX. AUG. 12, 1975. ARG. 0187047, ATR. 327000, AUS. 0450862, BEL. 0775968, CAN. 0971797, CHL. 0027272, FRA. 7143179, GRB. 1348138, GUA. 0002724, ITL. 0941822, MEX. 1328040, PNM. 0002602, SAF. 0718022, SPN. 397403, STZ. 0026771.

3,904,407.—XEROGRAPHIC PLATE CONTAINING PHOTOINJECTING PERYLENE PIGMENTS. SEPT. 9, 1975. ARG. 0189747, AUS. 0465811, BEL. 0763388, CAN. 0933010, CHL. 0026796, EGR. 0093458, FRA. 7107562, GRB. 1337225, GUA. 0002799, ITL. 0919102, MEX. 0126620, PNM. 0002468, SAF. 0711222, SPN. 0388587, SWD. 0362509, TIW. 0007210, USR. 0473381.

3,923,762.—PROCESS FOR PREPARATION OF 2-ANTHRYL AND SUBSTITUTED 2-ANTHRYL FUNCTIONAL MONOMERS AND P. DEC. 2, 1975. BEL. 0822305, STZ. 0032598.

3,927,026.—PROCESS OF MAKING X-FORM METAL PHTHALOCYANINE. DEC. 16, 1975. CAN. 0916703, GRB. 1312946, JAP. 0693981.

3,932,454.—PROCESS OF MAKING HEXAGONAL ALPHA METAL-FREE PHTHALOCYANINE. JAN. 13, 1976. CAN. 0918152, GRB. 1327084, JAP. 0752724.

3,941,085.—RELEASE MATERIAL APPLICATOR. MAR. 2, 1976.

Class 2A 2a

3,941,750.—POLYVINYL PYREMAL-AN INTRINSIC PHOTOCONDUCTOR AND ACTIVE MATRIX POLYMER. MAR. 2, 1976.

3,951,654.—MTHD ENHNCMT RATE AND EFFICIENCY OF PHOTODSCHG OF ELCTRPHGRIC IMAGING MEMBERS COMPRSNG PHTHALOCYA. APR. 20, 1976.

4,006,017.—PHOTOCONDUCTIVE COMPOSITION ARTICLE & PROESS. FEB. 1, 1977.

4,031,109.—METHOD FOR THE PREPARATION OF X-FORM METAL PHTHALOCYANINE AND X-FORM METAL FREE COMPOUNDS. JUNE 21, 1977. ARG. 0188048.

Class 2A 2B

3,408,182.—ELECTROPHOTOGRAPHIC MATERIALS AND METHODS EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRANSFER COMP. OCT. 29, 1968. CAN. 0847805, FRA. 1463743, GRB. 1137665, ITL. 0755290, JAP. 0572185, MEX. 0107318.

3,408,183.—ELECTROPHOTOGRAPHIC MATERIALS AND METHODS EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRANSFER COMP. OCT. 29, 1968. CAN. 0819066, FRA. 1463745, GER. 1522676, GRB. 1126048, ITL. 0755287, JAP. 0727091, MEX. 0106758.

3,408,184.—ELECTROPHOTOGRAPHIC MATERIALS AND METHODS EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRNSFR COMPLE. OCT. 29, 1968. CAN. 0818382, FRA. 1463727, GRB. 1137664, ITL. 0755289, JAP. 0726382, MEX. 0105835.

3,408,185.—ELECTROPHOTOGRAPHIC MATERIALS AND METHOD EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRANSFER COMP. OCT. 29, 1968. CAN. 0848383, FRA. 1463728, GER. 1645192, GRB. 1137476, ITL. 0755291, MEX. 0106763.

3,408,186.—ELECTROPHOTOGRAPHIC MATERIALS AND METHODS EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRNSFR COMPLE. OCT. 29, 1968. CAN. 0846736, FRA. 1463746, GRB. 1138629, ITL. 0755288, JAP. 0569483, MEX. 0106589.

3,408,187.—ELECTROPHOTOGRAPHIC MATER AND METH EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRANSFER COMPLEXES. OCT. 29, 1968. CAN. 0867298, GER. 1522721, GRB. 1163097, JAP. 0797719.

3,408,188.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS COMPRISING PHOTOCONDUCTIVE CHARGE TRANSFER COMPLEXES. OCT. 29, 1968. CAN. 0869485, GRB. 1183516, JAP. 0797720.

3,408,189.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS EMPLOYING PHOTOCONDUCTIVE CHARGE TRANSFER COMPLEXES. OCT. 29, 1968.

3,408,190.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS EMPLOYING PHOTOCONDUCTIVE CHARGE TRANSFER COMPLEXES. OCT. 29, 1968. CAN. 0850019, GER. 1302772, GRB. 1182172.

3,879,201.—PERSISTENT PHOTOCONDUCTIVE COMPOSITIONS. APR. 22, 1975.

3,896,184.—POLYMERS OF BENZANTHRACENE AS ACTIVE MATRIX MATERIALS. JULY 22, 1975.

3,923,762.—PROCESS FOR PREPARATION OF 2-ANTHRYL AND SUBSTITUTED 2-ANTHRYL FUNCTIONAL MONOMERS AND P. DEC. 2, 1975. BEL. 0822305, STZ. 0032598.

4,033,769.—PERSISTENT PHOTOCONDUCTIVE COMPOSITIONS. JULY 5, 1977.

Class 2A 2C

4,019,902.—PHOTORECEPTOR FABRICATION. APR. 26, 1977.

Class 2B

2,666,144.—ELECTRORADIOGRAPHY. JAN. 12, 1954. AUS. 0160250, CAN. 0513474, FRA. 1043156, GRB. 0721944, ITL. 0477981, SAF. 0012711, STZ. 0300623, SWD. 0149520.

3,617,265.—METHOD FOR PREPARING A RESIN OVERCOATED ELECTROPHOTOGRAPHIC PLATE. NOV. 2, 1971.

3,635,705.—MULTI-LAYERED HALOGEN-DOPED SELENIUM PHOTOCONDUCTIVE ELEMENT. JAN. 18, 1972. GRB. 1311329, ITL. 0901916, JAP. 0739531.

3,639,120.—2-LAYERED PHOTOCONDUCTIVE ELEMNT CONTNG A HALOGEN DOPED STORG LAYER AND SELENIUM ALLOY CNTRL LAYER. FEB. 1, 1972. CAN. 0870535, GRB. 1193876, JAP. 0558440.

3,655,377.—TRI-LAYERED SELENIUM DOPED PHOTORECEPTOR. APR. 11, 1972.

3,712,810.—AMBIPOLAR PHOTORECEPTOR AND METHOD. JAN. 23, 1973. CAN. 0971025, GRB. 1363266.

3,843,407.—BLADE CLEANING WITH REVERSE MOVEMENT. OCT. 22, 1974.

3,848,994.—LINE CHARGE TONER CLEANING. NOV. 19, 1974.

3,928,034.—ELECTRON TRANSPORT LAYER OVER AN INORGANIC PHOTOCONDUCTIVE LAYER. DEC. 23, 1975. AUS. 0453265, BEL. 0763542, CAN. 0932199, CHL. 0026802, EGR. 0093924, FRA. 7107560, GRB. 1337227, GUA. 0002423, ITL. 0919109, MEX. 0121682, NZL. 0162884, PNM. 0002473, SAF. 0711220, SPN. 0388585, STZ. 0576659, SWD. 0363176, TIW.00 07181.

3,953,207.—A COMPOSITE LAYERED PHOTORECEPTOR. APR. 27, 1976.

4,007,043.—PHOTOCONDUCTIVE ELEMENTS WITH COPOLYMER CHARGE TRANSPORT LAYERS. FEB. 8, 1977.

4,007,100.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. FEB. 8, 1977.

4,007,101.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. FEB. 8, 1977.

4,012,251.—MULTI-LAYERED PHOTOCONDUCTIVE MEMBER. MAR. 15, 1977.

4,013,528.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATRIALS. MAR. 22, 1977.

4,013,529.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. MAR. 22, 1977.

4,013,530.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. MAR. 22, 1977.

4,013,623.—INTRACHAIN CHARGE TRANSFER COMPLEXES. MAR. 22, 1977.

4,014,768.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. MAR. 29, 1977.

4,016,058.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. APR. 5, 1977.

4,018,602.—METHOD FOR IN-SITU FABRICATION OF PHOTOCONDUCTIVE COMPOSITE. APR. 19, 1977.

4,022,956.—POLYMERS OF BENZANTHRACENE AS ACTIVE MATRIX MATERIALS. MAY 10, 1977.

4,023,969.—DEFORMABLE ELASTOMER IMAGING MEMBER EMPLOYING AN INTERNAL OPAQUE DEFORMABLE METALLIC LAYER. MAY 17, 1977.

4,025,710.—INTRACHAIN CHARGE TRANSFER COMPLEXES. MAY 24, 1977.

4,028,203.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. JUNE 7, 1977.

4,030,991.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. JUNE 21, 1977.

4,030,992.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. JUNE 21, 1977.

4,030,993.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. JUNE 21, 1977.

Class 2B 1

2,901,348.—RADIATION SENSITIVE PHOTOCONDUCTIVE MEMBER. AUG. 25, 1959. CAN. 0575600, FRA. 1099631, GER. 1032669, GRB. 0789802.

2,917,385.—REFLEX XEROGRAPHY. DEC. 15, 1959. CAN. 0577137.

3,041,166.—XEROGRAPHIC PLATE AND METHOD. JUNE 26, 1962. CAN. 0617821, GRB. 0936649.

3,243,293.—PLATE FOR ELECTROSTATIC ELECTROPHOTOGRAPHY. MAR. 29, 1966. CAN. 0830430.

3,288,602.—XEROGRAPHIC PLATE AND METHOD. NOV. 29, 1966. CAN. 0795978, GER. 1237902, GRB. 1029181, ITL. 0690835. JAP. 0578399.

3,312,547.—XEROGRAPHIC PLATE AND PROCESSES OF MAKING AND USING SAME. APR. 4, 1967.

3,341,326.—DARK DECAY CONTROLLED XEROGRAPHY. SEPT. 12, 1967. AUS. 0285843, CAN. 0729829, FRA. 1377592, GRB. 1029199, ITL. 0706101.

3,352,669.—PHOTOCONDUCTIVE MEMBER AND PROCESSES OF PREPARING AND USING SAME. NOV. 14, 1967. AUS. 0405164, CAN. 0834670, FRA. 1422625, GER. 1497194, GRB. 1052970, HOL. 0137891, ITL. 0749420, JAP. 0501912.

3,393,070.—XEROGRAPHIC PLATE WITH ELECTRIC FIELD REGULATING LAYER. JULY 16, 1968. CAN. 0871308, GER. 1490987, GRB. 1141452, JAP. 0764435, MEX. 0105660.

3,508,918.—XEROGRAPHIC PLATE CONTAINING ALUMINUM SELENIDE BARRIER LAYER. APR. 28, 1970. CAN. 0872175.

3,539,255.—XEROGRAPHIC RECORDING APPARATUS - LIGHT-CONTROLLED-CHARGE STORAGE LAYER. NOV. 10, 1970.

3,573,906.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS. APR. 6, 1971. ARG. 0177890, AUS. 0441534, BEL. 0725173, BRA. 0088092, CAN. 0906801, CZC. 0157053, FRA. 1594981, GRB. 1217726, ITL. 0852743, SPN. 0379204, SWD. 0335063, USR. 0448658, VZL. 0029780.

3,619,153.—PHOTOCONDUCTIVE ELMNT AND PROCESS EMPLYNG SBSTUTD SILYLISOBUTYLETHYLENEDIAMINE ADHESIVE INTERLAYE. NOV. 9, 1971. ARG. 0180118, ATR. 0305764, AUS. 0434739, BEL. 0733402, BUL. 0017353, CAN. 0898034, DNK. 0131833, EGR. 0078900, FRA. 6917079, GRB. 1229559, GRK. 0040058, IND. 0121424, ISR. 0032250, ITL. 0864983, JAP. 0702563, LXB. 0058678, MEX. 0109385, NOR. 0125557, NZL. 0156506, PAK. 0121226, PLP. 0008481, PNM. 0001683, PTG. 0051754, RHD. 2236953, RMN. 0054256, SAF. 0693687, SPN. 0367618, STZ. 0511461, SWD. 0341926, TIW. 0006442, TRK. 0015647, USR. 0300036, VTM. 0001865.

3,713,821.—PHOTORECEPTOR INTERFACE. JAN. 30, 1973. ARG. 0194731, ATR. 0322357, AUS. 0464711, BEL. 0784453, CAN. 0964916, EGR. 0099870, FRA. 7220691, GRB. 1393612, ISR. 0039655, ITL. 0959793, SAF. 0723958, SPN. 0403454, STZ. 0554007, SWD. 0367491, VZL. 0032939.

3,720,514.—ELECTROPHOTOGRAPHIC PAPER HAVING AN IMONGANIC COLLOIDAL OXIDE COATING. MAR. 13, 1973.

3,738,831.—CHALCOGEN ORGANIC COMPOUNDS USED IN ELECTROPHOTOGRAPHIC PLATES AND PROCESS. JUNE 12, 1973.

3,758,301.—ELECTROPHOTOGRAPHIC USE OF SELENIUM CONTAINING POLYMERS. SEPT. 11, 1973.

3,795,513.—METHOD OF STORING AN ELECTROSTATIC IMAGE IN A MULTILAYERED PHOTORECEPTOR. MAR. 5, 1974. BEL. 0788303, CAN. 976018, FRA. 7230831, GRB. 1388934, ITL. 0964410, SWD. 7211341.

3,799,775.—XEROGRAPHIC SYSTEM. MAR. 26, 1974. ARG. 0172053, ATR. 0300559, AUS. 0423123, BEL. 0720940, BRA. 6800650, BUR. 0000043, CAM. 00043/3, CAN. 0895805, CHL. 0024257, EIR. 0032903, FRA. 1586238, GNR. 0000039, GRB. 1243384, GRK. 0039223, IND. 0119625, ISR. 0031543, ITL. 0844307, LEB. 0002816, LIB. P102693, LXB. 0056890, MEX. 0105163, MLG. 0003058, MLW. 00MW569, MNC. 8126975, MRC. 0014727, NOR. 0128132, NZL. 0153781, PAK. 0120895, PLP. 0009065, PNM. 0002053, PTG. 0050322, RHD. 5369487, SAF. 0681107, SPN. 0358355, STZ. 0506102, SWD. 0345530, TGR. 0000547, URG. 0009361, VTM. 0001830, VZL. 0023696, ZMB. 0156971.

3,816,288.—GLOW DISCHARGE TECHNIQUE FOR THE PREPARATION OF ELECTROPHOTOGRAPHIC PLATES. JUNE 11, 1974.

3,888,667.—HETROPHASE ADHESIVE COMPOSITIONS CONTAINING POLYSULFONE FOR METAL-SELENIUM COMPOSITIES. JUNE 10, 1975.

3,891,435.—HETEROPHASE ADHESIVE COMPOSITIONS CONTAINING CHLOROSULFONATED POLYETHLENE FOR METAL-SELENIUM CO. JUNE 24, 1975.

3,895,131.—ELECTROLESS COATING METHOD. JULY 15, 1975.

3,907,650.—PHOTOSENSITIVE BINDER LAYER FOR XEROGRAPHY. SEPT. 23, 1975.

3,914,126.—NICKEL OXIDE INTERLAYERS FOR PHOTOCONDUCTIVE ELEMENTS. OCT. 21, 1975.

3,958,207.—INJECTION CURRENT DEVICE AND METHOD. MAY 18, 1976.

4,011,078.—PHOTOSENSITIVE MEMBER AND METHOD OF IMAGING. MAR. 8, 1977.

Class 2B 2

2,860,048.—XEROGRAPHIC PLATE. NOV. 11, 1958.

2,886,434.—PROTECTED PHOTOCONDUCTIVE ELEMENT AND METHOD OF MAKING SAME—HORIZONS. MAY 12, 1959. CAN. 0621931.

3,092,493.—PROTECTED XEROGRAPHIC PLATE. JUNE 4, 1963.

3,146,145.—PROCESS FOR ADHERING PLASTIC TO VITREOUS SELENIUM. AUG. 25, 1964.

3,256,089.—MASKED PLATE XEROGRAPHY. JUNE 14, 1966.

3,397,982.—XIC PLATE W/INORGANIC GLASS BINDER HAVING OVERCOATING CONSISTING ESSENTIALLY OF ALUMINUM OXIDE. AUG. 20, 1968. ARG. 0150690, AUS. 0407349, BEL. 0674140, CAN. 0866142, FRA. 1460232, GER. 1497230, GRB. 1129674, ITL. 0822914, JAP. 0531894, MEX. 0085270, SWD. 0319976.

3,434,832.—XEROGRAPHIC PLATE COMPRISING A PROTECTIVE COATING OF A RESIN MIXED WITH A METALLIC STEARATE. MAR. 25, 1969. CAN. 0835883, FRA. 1454672, GER. 1497223, GRB. 1128156, ITL. 0772535, JAP. 0545757, MEX. 0085603.

3,488,189.—ELECTROPHOTOGRAPHIC RECORDING MEMBER HAVING SOLID CRYSTALLINE PLASTICIZR AVAILBL AT IMGNG SURFA. JAN. 6, 1970. CAN. 0866700, FRA. 1506810, GRB. 1183205, ITL. 0788976, JAP. 0570734, MEX. 0108241.

3,720,514.—ELECTROPHOTOGRAPHIC PAPER HAVING AN IMONGANIC COLLOIDAL OXIDE COATING. MAR. 13, 1973.

3,738,831.—CHALCOGEN ORGANIC COMPOUNDS USED IN ELECTROPHOTOGRAPHIC PLATES AND PROCESS. JUNE 12, 1973.

3,758,301.—ELECTROPHOTOGRAPHIC USE OF SELENIUM CONTAINING POLYMERS. SEPT. 11, 1973.

3,837,849.—MULTILAYERED VARIABLE SPEED PHOTORECEPTOR AND METHOD OF USING SAME. SEPT. 24, 1974. BEL. 0788302, CAN. 0978007, FRA. 7230830, GRB. 1401040, ITL. 0964409, SWD. 7211342.

3,850,630.—XEROGRAPHIC PLATE CONTAINING PHOTOINJECTING INDIGOLD PIGMENTS. NOV. 26, 1974. ARG. 0188393, AUS. 0465971, BEL. 0763391, CAN. 0932198, CHL. 0027129, EGR. 0093923, FRA. 7107566. GRB. 1337221, ITL. 0919106, MEX. 0122099, NZL. 0162890, PNM. 0002480, SAF. 0711226, SPN. 0388591, TIW. 0006740, USR. 0463276.

3,856,548.—STRIPPABLE OVERCOATING FOR IMPROVED XEROGRAPHIC PLATES. DEC. 24, 1974. GRB. 1426030.

3,860,421.—N-ALKYL MORPHOLINE TREATMENT OF A SELENIUM-CONTAINING PHOTOCONDUCTIVE LAYER. JAN. 14, 1975..

3,868,983.—HAND TOOL. MAR. 4, 1975.

3,877,935.—NOVEL XEROGRAPHIC PLATE CONTAINING PHOTOINJECTING POLYNUCLEAR QUINONE PIGMENTS. APR. 15, 1975. ARG. 0002614, AUS. 0452620, BEL. 0763389, CAN. 0932197, CHL. 0027120, FRA. 7107563, GRB. 1337224, GUA. 0002614, ITL. 0919103, MEX. 0122100, NZL. 0162887, PNM. 0002467, SAF. 0711223, SPN. 0388588, TIW. 0006741.

3,884,690.—POLYESTER PHOTOCONDUCTORS AND MATRIX MATERIALS. MAY 20, 1975.

3,884,825.—IMAGING COMPOSITION. MAY 20, 1975. AUS. 0467835, BEL. 0802879, CAN. 0995963, FRA. 7328589, GRB. 1437041, ITL. 0991465, SPN. 0417382.

3,896,184.—POLYMERS OF BENZANTHRACENE AS ACTIVE MATRIX MATERIALS. JULY 22, 1975.

3,900,589.—AN ELECTROSTATOGRAPHIC IMAGING PROCESS. AUG. 19, 1975. AUS. 0467835, BEL. 0802879, GRB. 1437041.

3,904,407.—XEROGRAPHIC PLATE CONTAINING PHOTOINJECTING PERYLENE PIGMENTS. SEPT. 9, 1975. ARG. 0189747, AUS. 0465811, BEL. 0763388, CAN. 0933010, CHL. 0026796, EGR. 0093458, FRA. 7107562, GRB. 1337225, GUA. 0002799, ITL. 0919102, MEX. 0126620, PNM. 0002468, SAF. 0711222, SPN. 0388587, SWD. 0362509, TIW. 0007210, USR. 0473381.

3,912,511.—MULTICOMPONENT ORGANIC COATING OF POLYESTER POLYURETHAND AND HUMIDITY. OCT. 14, 1975. ARG. 0182692, BEL. 0767325, CAN. 0938143, FRA. 7118948, GRB. 1350476, ITL. 0926822, MEX. 0121668.

3,954,464.—METHOD OF FABRICATING A COMPOSITE TRIGONAL SELENIUM PHOTORECEPTOR. MAY 4, 1976.

3,961,953.—METHOD OF FABRICATING COMPOSITES TRIGONAL SELENIUM PHOTORECEPTORS. JUNE 8, 1976.

3,973,843.—ELECTROSTATOGRAPHIC IMAGING APPARATUS. AUG. 10, 1976. AUS. 0467835, BEL. 0802879, GRB. 1437041.

4,006,019.—METHOD FOR PREPARATION OF AN ELECTROSTATOGRAPHIC PHOTORECEPTOR. FEB. 1, 1977.

4,006,020.—OVERCOATED ELECTROSTATOGRAPHIC PHOTORECEPTOR. FEB. 1, 1977.

4,012,255.—OVERCOATED ELECTROSTATOGRAPHIC PHOTORECEPTOR. MAR. 15, 1977.

4,022,956.—POLYMERS OF BENZANTHRACENE AS ACTIVE MATRIX MATERIALS. MAY 10, 1977.

Class 2B 3

3,510,660.—METHOD FOR VISUAL COMPARISON OF INFORMATION. MAY 5, 1970. CAN. 0848611, GRB. 1201376, JAP. 0595641.

3,543,031.—DEVICE AND PROCESS FOR IMAGE STORAGE. NOV. 24, 1970. ARG. 0161299, AUS. 0432468, BEL. 0703461, CAN. 0862332, FRA. 1543309, GER. 1549142, GRB. 1201374, ITL. 0811521, JAP. 0742514, MEX. 0100142, SPN. 0344004, STZ. 0497022, SWD. 0354169, VZL. 0023663.

Class 2B 4

3,428,453.—IMAGE FORMING PROCESS UTILIZING XEROGRAPHY-ETCHING PROCESS. FEB. 18, 1969. CAN. 0856722, FRA. 1428775, GRB. 1085151, ITL. 0754825.

3,446,616.—XEROGRAPHIC IMAGING EMPLOYING A SELECTIVELY REMOVABLE LAYER. MAY 27, 1969.

3,926,626.—CIRCULATION IMAGING METHOD. DEC. 16, 1975.

4,007,372.—IMPROVED METHOD & ARTICLE FOR IMAGE REPRODUCTION. FEB. 8, 1977.

4,011,078.—PHOTOSENSITIVE MEMBER AND METHOD OF IMAGING. MAR. 8, 1977.

Class 2C

3,307,941.—PLASTIC DEFORMATION IMAGING FILM AND PROCESS. MAR. 7, 1967. CAN. 0801262.

3,317,316.—INTERNAL FROST RECORDING. MAY 2, 1967. ATR. 0272830, AUS. 0292886, BEL. 0648043, CAN. 0882890, FRA. 1399017, GER. 1243018, GRB. 1069741, ITL. 0725002, JAP. 0521009, LXB. 0046101, NOR. 0122729, STZ. 0469292, SWD. 0319083.

3,408,181.—HEAT DEFORMABLE RECORDING MATERIALS CONTAINING PHOTOCONDUCTIVE RESINOUS CHARGE TRANSFER COMPLE. OCT. 29, 1968. CAN. 0843620, FRA. 1463744, GER. 1522677, GRB. 1138552, ITL. 0755286, MEX. 0109927.

3,443,937.—IMAGE RESOLUTION. MAY 13, 1969. CAN. 0824316, GRB. 1137766, JAP. 0544235.

3,443,938.—FROST IMAGING EMPLOYING A DEFORMABLE ELECTRODE. MAY 13, 1969. CAN. 0801263, FRA. 1441806, GRB. 1073097, JAP. 0573732.

3,526,879.—INTERNAL FROST RECORDING APPARATUS USING A DEFORMABLE PHOTOCONDUCTOR. SEPT. 1, 1970.

3,672,883.—CRYSTALLINE POLYMERS FOR FROST. JUNE 27, 1972.

3,672,886.—NOVOLAR RESINS IN DEFORMATION IMAGING. JUNE 27, 1972.

3,707,391.—IMAGING PROCESS. DEC. 26, 1972.

3,873,197.—APPARATUS FOR REGULATING THE TONER CONCENTRATION IN A ELECTROPHOTOGRAPHIC DEVICE. MAR. 25, 1975.

3,892,567.—ELECTROSTATICALLY DEFORMABLE MATERIALS. JULY 1, 1975. ARG. 0196065, BEL. 0781973, CAN. 9814520, FRA. 7213876, GRB. 1394286, ITL. 0951328, MEX. 0124825.

3,944,358.—COLOR IMAGE REPRODUCTION SYSTEMS. MAR. 16, 1976.

3,951,533.—COLOR IMAGE REPRODUCTION SYSTEM. APR. 20, 1976.

3,980,476.—IMAGING SYSTEM. SEPT. 14, 1976.

3,997,243.—COLOR IMAGE REPRODUCTION SYSTEM. DEC. 14, 1976.

4,023,969.—DEFORMABLE ELASTOMER IMAGING MEMBER EMPLOYING AN INTERNAL OPAQUE DEFORMABLE METALLIC LAYER. MAY 17, 1977.

Class 2D

3,411,903.—XEROGRAPHIC METHOD AND PLATE COMPRISING PHOTOCONDUCTIVE INSULATING FIBERS. NOV. 19, 1968. ARG. 0149620, ATR. 0270379, AUS. 0410718, BEL. 0672668, BRA. 0084119, CAN. 0834669, CHL. 0023648, CLB. 0014943, DNK. 0120577, EGR. 0055545, FRA. 1464792, GER. 1497224, GRB. 1084024, GRK. 0031509, IND. 0102560, ISR. 0024632, ITL. 0734376, JAP. 0724233, LXB. 0049849, MEX. 0098487, NOR. 0122817, NZL. 0143432, PLD. 0067959, PLP. 0004547, PNM. 0001533, PRU. 0008384, PTG. 0044879, SAF. 0656280, SPN. 0319795, STZ. 0458076, SWD. 0308250, THL. 1084024, TIW. 0003735, URG. 0006624, VZL. 0023996.

3,787,235.—METHOD OF ELECTROPHOTOGRAPHIC SENSITIVE PAPER. JAN. 22, 1974.

3,951,658.—COLOR MODIFYING IMAGING METHOD AND ARTICLE. APR. 20, 1976.

Class 2E

2,599,542.—ELECTROPHOTOGRAPHIC PLATE. JUNE 10, 1952.

2,657,152.—PROCESS OF PRODUCING AN ELECTROPHOTOGRAPHIC PLATE. OCT. 27, 1953. AUS. 0152887, CAN. 0516075, FRA. 1039677, GER. 0893010, GRB. 0687704, HOL. 0082956, SAF. 0012307, STZ. 0296692, SWD. 0148967.

2,662,832.—PROCESS OF PRODUCING AN ELECTROPHOTOGRAPHIC PLATE. DEC. 15, 1953.

2,663,636.—ELECTROPHOTOGRAPHIC PLATE AND METHOD OF PRODUCING SAME. DEC. 22, 1953. CAN. 0512461, GER. 0872427, GRB. 0693112, HOL. 0095533, SAF. 0012644, STZ. 0290324, SWD. 0148966.

3,341,681.—XEROGRAPHIC PLATE FABRICATION. SEPT. 12, 1967. CAN. 0780598, FRA. 1415795, GRB. 1070555, HOL. 0144068, IND. 0094992, ITL. 0738063.

3,350,203.—XEROGRAPHIC PLATE. OCT. 31, 1967. CAN. 0715017, FRA. 1421950, GER. 1270400, GRB. 1085989, ITL. 0750417, JAP. 0511420.

3,447,957.—METHOD OF MAKING A SMOOTH SURFACED ADHESIVE BINDER XEROGRAPHIC PLATE. JUNE 3, 1969. CAN. 0788947.

3,468,705.—METHOD OF PREPARING LEAD OXIDE FILMS. SEPT. 23, 1969. CAN. 0806134, FRA. 1501511, GER. 1521942, GRB. 1170428, ITL. 0787638, JAP. 0634868, MEX. 0093335.

3,472,679.—COATING SURFACES. OCT. 14, 1969. CAN. 0896992.

3,536,397.—XEROGRAPHIC APPARATUS. OCT. 27, 1970. CAN. 0917231.

3,536,481.—ELECTROLYTIC PROCESS OF FORMING A XEROGRAPHIC BELT. OCT. 27, 1970. ARG. 0175659, AUS. 0416583, BEL. 0716410, CAN. 0865080, FRA. 1572605, GRB. 1200670, ITL. 0859021, MEX. 0103043, SWD. 0345698.

3,536,485.—XEROGRAPHIC PLATE SUPPORTED BY A MANDREL. OCT. 27, 1970.

3,578,445.—XEROGRAPHIC PLATE FABRICATION. MAY 11, 1971.

3,634,134.—METHOD OF MAKING A PHOTOCONDUCTIVE COMPOSITION AND DEVICE. JAN. 11, 1972. ARG. 0184074, ATR. 0307226, AUS. 449514, BEL. 0752440, CAN. 0904111, EGR. 0083703, FRA. 7023473, GRB. 1319342, ITL. 0894622, MEX. 0117839, PNM. 0002547, SPN. 0381111, STZ. 0548624, SWD. 0351734, TIW. 0007153.

3,695,757.—XEROGRAPHIC PLATE. OCT. 3, 1972.

3,746,571.—METHOD OF VACUUM EVAPORATION. JULY 17, 1973.

3,752,691.—METHOD OF VACUUM EVAPORATION. AUG. 14, 1973.

3,756,811.—ELECTROPHOTOGRAPHIC PROCESS EMPLOYING PHOTOCONDUCTIVE MATERIALS OF DIFFERENT DYNAMIC RANGES. SEPT. 4, 1973. CAN. 0894715, GRB. 1226578.

3,787,208.—XEROGRAPHIC IMAGE MEMBER HAVING PHOTOCONDUCTIVE MATERIAL IN INTERLOCKING CONTINUOUS PATHS. JAN. 22, 1974. ARG. 0186443, ATR. 0451252, BEL. 0763544, CAN. 0925741, CHL. 0026794, FRA. 7107567, GRB. 1296291, ITL. 0918909, MEX. 0122096, NZL. 0162891, PLP. 0009378, PNM. 0002396, SAF. 0711227, SPN. 0388639, STZ. 0568591, SWD. 0367259, TIW. 0007844, USR. 0398062.

3,788,889.—METHOD OF PREPARING BINDER LAYERS. JAN. 29, 1974.

3,837,906.—METHOD OF MAKING A XEROGRAPHIC BINDER LAYER AND LAYER SO PREPARED. SEPT. 24, 1974. ARG. 0186444, ATR. 0319750, AUS. 0448147, BEL. 0763392, CAN. 0939204, CHL. 0027098, FRA. 7107568, GRB. 1292425, ITL. 0918910, NZL. 0162892, PNM. 0002439, SAF. 0711228, SPN. 0388640, STZ. 0558554, SWD. 0036479, TIW. 0007713.

3,856,548.—STRIPPABLE OVERCOATING FOR IMPROVED XEROGRAPHIC PLATES. DEC. 24, 1974. GRB. 1426030.

3,894,868.—ELECTRON TRANSPORT BINDER STRUCTURE. JULY 15, 1975. AUS. 0461951, BEL. 0763543, CAN. 0932196, CHL. 0026795, EGR. 0096346, FRA. 7107561, GRB. 1337226, GUA. 0002467, ITL. 0919110, MEX. 0120807, NZL. 0162885, PNM. 0002481, SAF. 0711221, SPN. 0388586, TIW. 0007182, USR. 0444380.

3,911,091.—MILLING TRIGONAL SELENIUM PARTICLES TO IMPROVED XEROGRAPHIC PERFORMANCE. OCT. 7, 1975.

3,911,162.—SYSTEM FOR VAPOR DEPOSITION OF THIN FILMS. OCT. 7, 1975. BEL 0798324.

3,926,762.—R F SPUTTERING OF TRIGONAL SELENIUM FILM. DEC. 16, 1975.

3,944,682.—METHOD OF PROVIDING AN ELECTROPHOTOGRAPHIC COATING AND COMPOSITIONS FOR METHOD. MAR. 16, 1976.

3,945,723.—RESILIENT ROLLERS. MAR. 23, 1976. ARG. 0205448.

3,954,466.—ELECTROSTATOGRAPHIC PHOTORECEPTOR. MAY 4, 1976.

3,979,495.—METHOD OF MAKING A PHOTORECPTOR. SEPT. 7, 1976.

3,984,183.—SHEET STRIPPING FROM IMAGING SURFACE. OCT. 5, 1976. BEL. 0836791.

3,992,091.—ROUGHENED IMAGING SURFACE FOR CLEANING. NOV. 16, 1976.

4,014,697.—ELECTROSTATOGRAPHIC IMAGING MEMBER. MAR. 29, 1977.

4,014,728.—METHOD OF MAKING AN IMAGING MEMBER. MAR. 29, 1977.

4,015,985.—COMPOSITE XEROGRAPHIC PHOTORECPTOR WITH INJECTING CONTACT LAYER. APRIL 5, 1977. BEL. 0840221.

4,016,310.—COATR HRDWR AND METH FOR OBTNG UNFRM PHROCNDTV LAYR ON A XEROGRAPHIC PHOTORECEPTOR. APR. 5, 1977.

4,023,523.—COATING HARDWARE AND METHOD FOR OBTAINING UNIFORM PHOTOCONDUCTIVE LAYERS ON A XEROGRAPHIC PHOTO. MAY 17, 1977.

4,025,188.—PHOTOACTIVE DEVICE FOR XEROGRAPHY. MAY 24, 1977.

4,033,768.—METHOD FOR THE PREPARATION OF AN ELECTROSTATOGRAPHIC PHOTOSENSITIVE DEVICE. JULY 5, 1977.

Class 2F

2,619,418.—XEROGRAPHIC PLATE HOLDER. NOV. 25, 1952.

3,143,044.—XEROGRAPHIC PLATE HOLDER. AUG. 4, 1964.

3,592,071.—BELT TRACKING APPARATUS. JULY 13, 1971. ARG. 0179666, BEL. 0751117, CAN. 0925118, FRA. 7019040, GRB. 1298926, ITL. 0893540, JAP. 0770135, MEX. 0118981, SPN. 0380136.

3,765,757.—TRANSPORT ARRANGEMENT FOR THIN SHEET MATERIAL. OCT. 16, 1973. BEL. 0793551, GRB. 1419978, ITL. 0972846, SPN. 0410107.

3,820,888.—MISTRACK INTERLOCK FOR SELENIUM BELT. JUNE 28, 1974.

3,867,027.—TRANSPORT ARRANGEMENT FOR THIN SHEET MATERIAL. FEB. 18, 1975. BEL. 0793551, CAN. 1004289, GRB. 1419978, ITL. 0972846, SPN. 0410107.

3,874,790.—FAIL-SAF MECH STPNG MVMNT PHTCNDCTV BLT ELTRSTC REPRDCTN MACH WHEN TRCKNG BECOMES IREGULAR AND UN. APR. 1, 1975.

3,888,577.—APPARATUS FOR PACKAGING AND SUBSEQUENTLY INSTALLING A BELT ONTO A ROLLER ASSEMBLY. JUNE 10, 1975. BEL. 0810900.

3,994,053.—DRUM SUPPORT APPARATUS. NOV. 30, 1976.

4,005,285.—OPTICAL SYSTEM FOR EXTENDING PHOTOSENSOR ARRAY RESOLUTION. JAN. 25, 1977.

4,009,388.—ARRANGEMENT FOR EXTENDING PHOTOSENSOR ARRAY SOLUTION. FEB. 22, 1977.

4,027,966.—TRACKING ASSEMBLY FOR AN ENDLESS BELT ELECTROSTATIC REPRODUCTION MACHINE. JUNE 7, 1977.

Class 3

3,935,517.—CONSTANT CURRENT CHARGING DEVICE. JAN. 27, 1976.

Class 3A

2,833,648.—TRANSFER OF ELECTROSTATIC CHARGE PATTERN. MAY 6, 1958. BEL. 0530462, FRA. 1110794, GER. 1063899, GRB. 0773604, HOL. 0130249, JAP. 0238843, STZ. 0330512.

2,833,930.—ELECTROSTATIC CHARGING METHOD AND APPARATUS. MAY 6, 1958. CAN. 0564954.

2,934,649.—INDUCTION CHARGING. APR. 26, 1960. CAN. 0616346.

3,172,024.—CHARGE INDUCTION. MAR. 2, 1965. CAN. 0809341, FRA. 1294161, GER. 1414991, GRB. 0958663, JAP. 0455338.

3,254,998.—INDUCTION IMAGE FORMATION. JUNE 7, 1966. CAN. 0740576, FRA. 1357220, GER. 1276445, GRB. 1024985, JAP. 0451689.

3,288,602.—XEROGRAPHIC PLATE AND METHOD. NOV. 29, 1966. CAN. 0795978, GER. 1237902, GRB. 1029181, ITL. 0690835, JAP. 0578399.

3,684,364.—LIFTOFF ELECTRODE. AUG. 15, 1972.

3,842,273.—CORONA GENERATOR CLEANING APPARATUS. OCT. 15, 1974. AUS. 0480142, BEL. 0817485. GRB. 1458088, SPN. 0428358.

3,884,181.—CAPILLARY BAFFLE-CONSTANT OIL HEIGHT INDEPENDENT TO OIL LEVEL. MAY 20, 1975.

3,893,800.—BACKSIDE HEATING AND FIXING APP IN AN ELECTRONIC PHOTOGRAPH DUPLICATOR. JULY 8, 1975.

3,957,423.—STRIPPER FINGER DESIGN. MAY 18, 1976.

Class 3B

2,912,586.—XEROGRAPHIC CHARGING. NOV. 10, 1959.

3,160,746.—CORONA CHARGING APPARATUS FOR NON-UNIFORMLY CHARGING A XEROGRAPHIC PLATE IN A PREDETERMINED MAN. DEC. 8, 1964. GER. 1197475, GRB. 1011793, JAP. 0484759.

3,288,602.—XEROGRAPHIC PLATE AND METHOD. NOV. 29, 1966. CAN. 0795978, GER. 1237902, GRB. 1029181, ITL. 0690835, JAP. 0578399.

3,449,568.—CORONA DISCHARGE APPARATUS FOR CREATING AN ELECTROSTATIC CHARGE PATTERN ON A XEROGRAPHIC SURFAC. JUNE 10, 1969. CAN. 0858664.

3,532,494.—SOLID AREA DEVELOPMENT IN XEROGRAPHY EMPLOYING AN INSULATING SCREEN IN THE CHARGING STEP. OCT. 6, 1970.

3,543,022.—METH AND APPARATUS CHARG DISCRETE SMALL AREAS XEROGRAPHIC PLATES TO DIF POTENT CONT TONE PRINTG. NOV. 24, 1970. CAN. 0921971, GRB. 1186599.

3,784,299.—DARK DECAY RETARDATION. JAN. 8, 1974.

3,981,498.—NON-UNIFORM CHARGING OF SHEET MATERIAL. SEPT. 21, 1976.

Class 3C

2,543,051.—METHOD OF CHARGING AND EXPOSING ELECTROPHOTOGRAPHIC PLATES. FEB. 27, 1951.

2,705,675.—PLATE CHARGING CIRCUIT FOR ELECTROPHOTOGRAPHY. APR. 5, 1955.

2,741,959.—ELECTROPHOTOGRAPHY. APR. 17, 1956. CAN. 0533763.

2,836,725.—CORONA CHARGING DEVICE. MAY 27, 1958. CAN. 0571450, FRA. 1188606, GER. 1787078, GRB. 0826088.

2,868,989.—ELECTROSTATIC CHARGING METHOD AND DEVICE. JAN. 13, 1959. CAN. 0584243.

2,965,756.—ELECTROSTATIC CHARGING APPARATUS. DEC. 20, 1960.

3,017,509.—XEROGRAPHIC PLATE FEEDING AND CHARGING APPARATUS. JAN. 16, 1962.

3,122,634.—CONTROLLED CHARGING IN XEROGRAPHIC COPYING APPARATUS. FEB. 25, 1964. CAN. 0706543, FRA. 1352624, GER. 1210323, GRB. 1026262, JAP. 0446815.

3,160,746.—CORONA CHARGING APPARATUS FOR NON-UNIFORMLY CHARGING A XEROGRAPHIC PLATE IN A PREDETERMINED MAN. DEC. 8, 1964. GER. 1197475, GRB. 1011793, JAP. 0484759.

3,335,274.—XIC CHARGING APPARATUS WITH MEANS TO AUTOMATICALLY CONTROL THE POT ENTAIL APPLIED TO THE CORONA. AUG. 8, 1967. CAN. 0801834, FRA. 1459487, GRB. 1121498, ITL. 0734870, MEX. 0085777.

3,382,360.—XIC CHARGING SYSTEM HAVING MEANS FOR PROVIDING AN AIR CUSHION BETWEEN CHARGING DEVICE AND XIC DR. MAY 7, 1968.

3,457,405.—CORONA WIRE MOUNTING MEANS WHICH COMPENSATES FOR WIRE EXPANSION DUE TO HEAT. JULY 22, 1969. CAN. 0857406, GRB. 1196927.

3,471,695.—CORONA CHGNG APPTS W/MEANS TO URGE A FLOW OF AERIFORM FLUID ACROSS THE CORONA WIRES. OCT. 7, 1969. CAN. 0856355, GRB. 1220745.

3,483,372.—CORONA CHARGING DEVICE WITH CONDUCTIVE SHIELD AND INSULATING MEANS ON SAID SHIELD. DEC. 9, 1969. CAN. 0840508, GRB. 1169632, JAP. 0770817.

3,517,995.—METHOD AND APPARATUS FOR INCREASING THE EFFICIENCY OF CORONA CHARGNG. JUNE 30, 1970. ARG. 0172471, BEL. 0721553, CAN. 0856714, FRA. 1585283, GRB. 1247034, ITL. 0844214, JAP. 0708414, MEX. 0103113, VZL. 0023701.

3,566,108.—CORONA GENERATING ELECTRODE STRUCTURE FOR USE IN A XEROGRAPHIC CHARGING METHOD. FEB. 23, 1971.

3,598,991.—ELCTRSTC CHRGNG DEV HAVNG SPRK GAP VOLTG REGULTR BETWEEN A CORONA SOURCE AND VOLTG SOURCE. AUG. 10, 1971. AUS. 0457211, BEL. 0754426, CAN. 0916233, CZC. 0163219, EGR. 0084558, FRA. 7029148, GRB. 1322378, ITL. 0901159, JAP. 0715800, PLD. 0070053, SPN. 0382404, STZ. 0513436, SWD. 0359663, TIW. 0007173, USR. 0442617.

3,604,925.—APPARATUS FOR CONTROLLING THE AMOUNT OF CHARGE APPLIED TO SURFACE. SEPT. 14, 1971.

3,612,864.—IMAGING SYSTEM UTILIZING AN ELECTRODE TREATED W/MIXTURE OF HYDROSCOPIC MATERIAL AND HYDROPHILIC B. OCT. 21, 1971.

3,675,011.—METHODS AND APPARATUS FOR OPERATING RAISED COROTRONS OF OPPOSITE POLARITY. JULY 4, 1972.

3,723,793.—COATED CORONA GENERATING ELECTRODE. MAR. 27, 1973.

3,742,237.—AC CORONA CHARGING APPARATUS. JUNE 26, 1973. CAN. 0955299, GRB. 1387209.

3,760,229.—A C COROTRON. SEPT. 18, 1973. GRB. 1410671.

3,769,506.—CORONA GENERATING METHOD AND APPARATUS THEREFOR. OCT. 30, 1973.

3,790,999.—CORONA WIRE APPARATUS. FEB. 12, 1974.

3,800,153.—ELECTROPHOTOGRAPHY CHARGING DEVICE. MAR. 26, 1974.

3,813,547.—CORONA GENERATING APPARATUS. MAY 28, 1974.

3,813,548.—CORONA GENERATING METHODS AND APPARATUS THEREFOR. MAY 28, 1974.

3,816,749.—EXPOSURE CONTROLLED CORONA DEVICE. JUNE 11, 1974.

3,851,229.—CURRENT MEASURING DEVICE. NOV. 26, 1974.

3,870,883.—ELECTROSTATIC PRINTING MACHINE WITH SELF-CLEANING CORONAL GENERATING DEVICE. MAR. 11, 1975.

3,901,189.—MAGNETIC BRUSH DEVELOPING APPARATUS. AUG. 26, 1975.

3,919,605.—CORONA DISCHARGE APPARATUS. NOV. 11, 1975.

3,922,548.—CORONA CHARGING DEVICE AND SUPPORT ARRANGEMENT. NOV. 25, 1975.

3,937,960.—CHARGING DEVICE FOR ELECTROPHOTOGRAPHY. FEB. 10, 1976.

3,939,386.—TECHNIQUE FOR CHARGING DIELECTRIC SURFACES TO HIGH VOLTAGE. FEB. 17, 1976.

3,950,680.—ELECTROSTATOGRAPHIC DIAGNOSTIC SYSTEM. APR. 13, 1976.

3,976,880.—CORONA STABILIZATION ARRANGEMENT. AUG. 24, 1976.

3,976,881.—ARRANGEMENT FOR STABILIZING CORONA DEVICES. AUG. 24, 1976.

3,978,379.—CORONA GENERATING DEVICE WITH AN IMPROVED CLEANING MECHANISM. AUG. 31, 1976.

3,983,393.—CORONA DEVICE WITH REDUCED OZONE EMISSION. SEPT. 28, 1976.

3,996,466.—TRANSFER CORONA DEVICE WITH ADJUSTABLE SHIELD BIAS. DEC. 7, 1976.

4,027,960.—TRANSFER SYSTEM FOR ELECTROSTATIC REPRODUCTION MACHINE. JUNE 7, 1977.

4,038,544.—IMPROVED APPARATUS AND METHOD FOR DEVELOPING AN ELECTROSTATIC LATENT IMAGE. JULY 26, 1977.

4,038,546.—AN IMPROVED APPARATUS FOR A CORONA GENERATING DEVICE. JULY 26, 1977.

Class 3C 1

2,790,082.—XEROGRAPHIC CHARGING DEVICE. APR. 23, 1957.

2,879,395.—CHARGING DEVICE. MAR. 24, 1959. CAN 0604246.

2,885,556.—SIMULTANEOUS CHARGING DEVICE AND METHOD. MAY 5, 1959. CAN. 0638188.

2,932,742.—XEROGRAPHIC CHARGING DEVICE AND METHOD. APR. 12, 1960. CAN. 0606202, FRA. 1150711, GER. 1099848, GRB. 0822555.

2,965,481.—ELECTROSTATIC CHARGING AND IMAGE FORMATION. DEC. 20, 1960. CAN. 0746571.

3,076,092.—XEROGRAPHIC CHARGING APPARATUS. JAN. 29, 1963.

3,275,837.—XEROGRAPHIC CHARGING APPARATUS. SEPT. 27, 1966. ARG. 0158430, ATR. 0242511, AUS. 0276177, BEL. 0642095, CAN. 0753356, FRA. 1385736, GER. 1488286, GRB. 1040264, ITL. 0712888, JAP. 0477814, MEX. 0075819, STZ. 0460930, SWD. 0314133.

3,307,034.—TWO-WIRE CORONA DISCHARGE SYSTEM FOR SINGLE-STEP ELECTROSTATIC IMAGE FORMATION. FEB. 28, 1967. CAN. 0768802, FRA. 1416275, GER. 1275864, GRB. 1055416, ITL. 0744235, JAP. 0491997.

3,492,476.—ELECTROSTATIC CHARGING DEVICE UTILIZING BOTH AC AND DC FIELDS. JAN. 27, 1970. ARG. 0175174, ATR. 0300573, AUS. 0425768, BEL. 0729976, CAN. 0862232, CHL. 0024600, CZC. 0158639, DNK. 0126728, EGR. 0081574, EIR. 0032976, FRA. 6907701, GRB. 1255998, GRK. 0039915, IND. 0120218, ISR. 0031765, ITL. 0860063, LXB. 0058234, MEX. 0108894, NOR. 0129709, NZL. 0155636, PAK. 0120995, PLD. 0017649, PLP. 0007523, PNM. 0001813, PTG. 0051315, RHD. 1096947, RMN. 0055216, SAF. 0691730, SPN. 0364888, STZ. 0493014, SWD. 0341528, UAR. 0009212, USR. 0318248, VTM. 0001845, VZL. 0023731.

3,873,895.—TECHNIQUE FOR CHARGING DIELECTRIC SURFACES TO HIGH VOLTAGE. MAR. 25, 1975.

3,886,416.—METHOD AND APPARATUS FOR ADJUSTING COROTRON CURRENTS. MAY 27, 1975.

3,908,164.—CORONA CURRENT MEASUREMENT AND CONTROL ARRANGEMENT. SEPT. 23, 1975.

3,921,042.—ELECTROSTATIC REPRODUCTION MACHINE WITH IMPROVED CORONA GENERATING DEVICE. NOV. 18, 1975.

3,961,193.—SELF ADJUSTING CORONA DEVICE. JUNE 1, 1976.

3,984,182.—PRETRANSFER CONDITIONING FOR ELECTROSTATIC PRINTING. OCT. 5, 1976.

4,038,593.—REGULATED HIGH VOLTAGE AC POWER SUPPLY WITH REGULATED DC BIAS CURRENT. JULY 26, 1977. BEL. 0846572.

Class 3C 2

2,856,533.—MOVING WIRE CORONA. OCT. 14, 1958.

3,304,476.—TRANSFER SWITCH FOR A XEROGRAPHIC APPARATUS. FEB. 14, 1967.

3,433,948.—NEGATIVE CORONA DISCHARGE SYSTEM USING ALTERNATING ELECTRIC FIELDS ACROSS THE AIR GAP. MAR. 18, 1969. CAN. 0855811, FRA. 1564157, GRB. 1211442, ITL. 0829718, JAP. 0655407.

3,541,329.—NEGATIVE CORONA DEVICE WITH MEANS FOR PRODUCING A REPELLING ELECTROSTATIC FIELD. NOV. 17, 1970. CAN. 0841136, FRA. 1546256, GRB. 1205040, JAP. 0634886.

Class 3C 3

2,774,921.—APPARATUS FOR ELECTROSTATICALLY CHARGING INSULATING IMAGE SURFACES FOR ELECTROPHOTOGRAPHY. DEC. 18, 1956.

2,934,650.—CHARGING APPARATUS. APR. 26, 1960. CAN. 0596221.

3,146,385.—XEROGRAPHIC PLATE CHARGING METHOD AND APPARATUS. AUG. 25, 1964. GRB. 1013924.

3,649,830.—UNIFORM CHARGING METHOD AND APPARATUS USING AN ARRAY OF NEEDLE ELECTRODES. MAR. 14, 1972.

3,655,966.—ELECTRIC CHARGING DEVICE FOR ELECTROPHOTOGRAPHY. APR. 11, 1972.

3,689,767.—METHOD AND APPARATUS FOR UNIFORMLY CHARGING THE SURFACE OF AN INSULATING MEMBER. SEPT. 5, 1972.

3,709,595.—PRINTER SYSTEM. JAN. 9, 1973.

Class 3C 4

2,777,957.—CORONA DISCHARGE DEVICE. JAN. 15, 1957. AUS. 0153841, CAN. 0558592, FRA. 1041698, GER. 0924420, GRB. 0696515, PNM. 0001841, SAF. 0012801, STZ. 0296687, SWD. 0159714.

2,778,946.—CORONA DISCHARGE DEVICE AND METHOD OF XEROGRAPHIC CHARGING. JAN. 22, 1957. CAN. 0558259.

2,965,754.—DOUBLE SCREEN CORONA DEVICE. DEC. 20, 1960. CAN. 0622926.

3,062,956.—XEROGRAPHIC CHARGING APPARATUS - SCOROTRON CONTROL CIRCUIT - PHILCO PRINTER PROCESSOR. JUNE 11, 1962. CAN. 0686702.

3,068,356.—XEROGRAPHIC CHARGING APPARATUS. DEC. 11, 1962. CAN. 0681400, GER. 1214996, GRB. 0990114.

3,220,324.—PHOTOCONDUCTIVELY CONTROLLED CORONA CHARGING. NOV. 30, 1965. CAN. 0710976, GER. 1243967, GRB. 1034009, JAP. 0651092.

3,307,034.—TWO-WIRE CORONA DISCHARGE SYSTEM FOR SINGLE-STEP ELECTROSTATIC IMAGE FORMATION. FEB. 28, 1967. CAN. 0768802, FRA. 1416275, GER. 1275864, GRB. 1055416, ITL. 0744235, JAP. 0491997.

3,492,476.—ELECTROSTATIC CHARGING DEVICE UTILIZING BOTH AC AND DC FIELDS. JAN. 27, 1970. ARG. 0175174, ATR. 0300573, AUS. 0425768, BEL. 0729976, CAN. 0862232, CHL. 0024600, CZC. 0158639, DNK. 0126728, EGR. 0081574, EIR. 0032976, FRA. 6907701, GRB. 1255998, GRK. 0039915, IND. 0120218, ISR. 0031765, ITL. 0860063, LXB. 0058234, MEX. 0108894, NOR. 0129709, NZL. 0155636, PAK. 0120995, PLD. 0017649, PLP. 0007523, PNM. 0001813, PTG. 0051315, RHD. 1096947, RMN. 0055216, SAF. 0691730, SPN. 0364888, STZ. 0493014, SWD. 0341528, UAR. 0009212, USR. 0318248, VTM. 0001845, VZL. 0023731.

3,496,351.—CORONA CONTROL CIRCUIT FOR STEPPING XEROGRAPHIC RECORDNG APPARATUS. FEB. 17, 1970. CAN. 0834978, FRA. 1512919, GRB. 1170472, ITL. 0793742, JAP. 0923309.

3,688,107.—ELECTROSTATOGRAPHIC CHARGING APPARATUS. AUG. 29, 1972. CAN. 0938660, GRB. 1365130.

3,875,407.—CORONA GENERATOR CLEANING APPARATUS. APR. 1, 1975.

3,908,127.—CORONA GENERATING DEVICES. SEPT. 23, 1975.

3,909,614.—SCOROTRON POWER SUPPLY CIRCUIT. SEPT. 30, 1975.

3,936,635.—CORONA GENERATING DEVICE. FEB. 3, 1976.

Class 3C 5

2,885,556.—SIMULTANEOUS CHARGING DEVICE AND METHOD. MAY 5, 1959. CAN. 0638188.

2,965,481.—ELECTROSTATIC CHARGING AND IMAGE FORMATION. DEC. 20, 1960. CAN. 0746571.

3,970,381.—METHOD AND APPARATUS FOR XEROGRAPHIC REPRODUCTION. JULY 20, 1976. BEL. 0811188.

Class 3C 6

2,701,764.—ELECTROPHOTOGRAPHIC APPARATUS AND METHODS. FEB. 8, 1955.

3,549,962.—UNIFORM ELECTROSTATIC CHARGING. DEC. 22, 1970. CAN. 0897757, GRB. 1189578.

3,648,133.—UNIFORM ELECTROSTATIC CHARGING OF A PHOTOCONDUCTIVE INSULATING SURFACE. MAR. 7, 1972.

3,743,830.—DEVICE FOR UNIFORMLY CHARGING A NON PLANAR ELECTROPHOTOGRAPHIC PLATE. JULY 3, 1973.

3,764,866.—CORONA GENERATOR. OCT. 9, 1973. ARG. 0198185, ATR. 0325420, AUS. 0467386, BEL. 0793227, CZC. 0168018, DNK. 0131699, FRA. 7245484, GRB. 1402739, ITL. 0972692, MEX. 0128581, NZL. 0169420, PTG. 0058386, SAF. 0729029, STZ. 0553435, SWD. 7216596.

3,792,913.—XEROGRAPHIC ERASE MECHANISM. FEB. 19, 1974. GRB. 1422175.

3,811,048.—ELECTROPHOTOGRAPHIC CHARGING APPARATUS. MAY 14, 1974.

3,967,119.—CORONA CHARGING DEVICE. JUNE 29, 1976.

3,967,891.—IMAGING SYSTEM FOR ELECTROSTATIC REPRODUCTION MACHINE. JULY 6, 1976.

Class 3C 7

3,323,373.—ESCAPEMENT MECHANISM. JUNE 6, 1967. CAN. 0841310.

3,324,291.—CORONA GENERATING DEVICE W/MEANS TO CAUSE AIR FLOW THERE-THROUGH TO MAINTN PARTS FREE OF DUST. JUNE 6, 1967. CAN. 0794904, GRB. 1070615, JAP. 0512648.

3,339,069.—CORONA CHARGING DEVICE W/MEANS TO PREVENT TONER DUST CONTAMINATION. AUG. 29, 1967. CAN. 0788539, FRA. 1450010, GRB. 1116687, ITL. 0730715, JAP. 0875339, MEX. 0089459.

3,496,352.—SELF-CLEANING CORONA GENERATING APPARATUS. FEB. 17, 1970. CAN. 0856356, GRB. 1227987, JAP. 0641478.

3,743,540.—SURFACE CLEANING BY IONIZED FLOW. JULY 3, 1973.

3,794,839.—CORONA GENERATING APPARATUS. FEB. 26, 1974. GRB. 1434863.

3,942,006.—CORONA GENERATOR CLEANING APPARATUS. MAR. 2, 1976.

3,965,400.—CORONA GENERATING DEVICE WITH IMPROVED BUILT IN CLEANING MECHANISM. JUNE 22, 1976.

4,019,055.—CORONA CLEANING ASSEMBLY. APR. 19, 1977. BEL. 0795870, GRB. 1416480.

Class 3C 8

3,335,273.—XIC CHARGING APPARATUS W/MEANS TO TERMINATE CHARGING CYCLE WHEN A PREDETERMINED CHARGE IS OBTAI. AUG. 8, 1967. CAN. 0794905, FRA. 1462556, GRB. 1128618, ITL. 0743940, JAP. 0632530, MEX. 0087314.

3,335,275.—XIC CHARGNG APPTS W/ADJSTBL MEANS TO TERMINATE CHRGNG CYCLE WHEN PREDETERMINED CHARGE IS OBTAI. AUG. 8, 1967. CAN. 0801833.

3,667,036.—ELECTROMETER AMPLIFIER CIRCUITS. MAY 30, 1972.

3,678,350.—ELECTRIC CHARGING METHOD. JULY 18, 1972.

3,805,069.—REGULATED CORONA GENERATOR. APR. 16, 1974.

3,934,141.—APPARATUS FOR AUTOMATICALLY REGULATING THE AMOUNT OF CHARGE APPLIED TO AN INSULATING SURFACE. JAN. 20. 1976.

3,944,356.—A CHARGING APPARATUS. MAR. 16, 1976.

3,980,929.—CORONA CURRENT INTERRUPTER. SEPT. 14, 1976.

Class 3C 9

2,934,650.—CHARGING APPARATUS. APR. 26, 1960. CAN. 0596221.

3,557,367.—METHOD AND APPARATUS FOR INCREASING THE EFFICIENCY OF CORONA CHARGING OF A PHOTOCONDUCTOR. JAN. 19, 1971. ARG. 0170822, BEL. 0720017, BRA. 6800368, CAN. 0879279, FRA. 1597512, GRB. 1244378, ITL. 0840366, JAP. 0628391, MEX. 0105427, VZL. 0023699.

3,582,731.—CHARGING SYSTEM. JUNE 1, 1971. CAN. 0906045.

3,765,026.—ELECTROGRAPHIC RECORDING SYSTEM. OCT. 9, 1973. CAN. 0948272, GRB. 1365346.

Class 3D

2,987,660.—XEROGRAPHIC CHARGING. JUNE 6, 1961.

3,394,002.—CHARGE TRANSFER WITH LIQUID LAYERS. JULY 23, 1968. CAN. 0840028, GRB. 1126048, JAP. 0524527.

3,398,336.—ELECTRICAL CHARGING UTILIZING TWO PHASE LIQUID MEDIUM. AUG. 20, 1968. CAN. 0815738, GRB. 1149074, JAP. 0562387.

3,687,106.—DONOR APPARATUS AND METHOD. AUG. 29, 1972. ARG. 0185079, BEL. 0753207, CAN. 0911706, FRA. 7027124, GRB. 1314862, ITL. 0900444, JAP. 0733285, MEX. 0117318, PNM. 0002237, VZL 0027517

3,907,559.—IMGNG PRCS EMPLYNG FRCTN CHRGNG IN THE PRESENCE OF AN ELECTRICALLY INSULATING DEVELOPER LIQUID. SEPT. 23, 1975.

3,971,658.—IMAGING PROCESS EMPLOYING FRICTION CHARGING IN THE PRESENCE OF AN ELECTRICALLY INSULATING LIQUID. JULY 27, 1976.

Class 3E

3,172,024.—CHARGE INDUCTION. MAR. 2, 1965. CAN. 0809341, FRA. 1294161, GER. 1414991, GRB. 0958663, JAP. 0455338.
3,254,998.—INDUCTION IMAGE FORMATION. JUNE 7, 1966. CAN. 0740576, FRA. 1357220, GER. 1276445, GRB. 1024985, JAP. 0451689.

Class 3F

2,833,648.—TRANSFER OF ELECTROSTATIC CHARGE PATTERN. MAY 6, 1958. BEL. 0530462, FRA. 1110794, GER. 1063899, GRB. 0773604, HOL. 0130249, JAP. 0238843, STZ. 0330512.
2,833,930.—ELECTROSTATIC CHARGING METHOD AND APPARATUS. MAY 6, 1958. CAN. 0564954.
2,955,938.—XEROGRAPHY - CHARGING PHOTOCONDUCTOR IN INSULATING. OCT. 11, 1960. CAN. 0603124.
3,307,034.—TWO-WIRE CORONA DISCHARGE SYSTEM FOR SINGLE-STEP ELECTROSTATIC IMAGE FORMATION. FEB. 28, 1967. CAN. 0768802, FRA. 1416275, GER. 1275864, GRB. 1055416, ITL. 0744235, JAP. 0491997.
3,453,427.—ELEC LAMP FOR UNIFRMLY CHRGNG THE PHOTOCNDCTIVE INSULATNG LAYER OF A XEROGRAPHIC PLATE. JULY 1, 1969.
3,481,669.—PHOTO-CHARGING OF XEROGRAPHIC PLATES. DEC. 2, 1969. AUS. 0420860, BEL. 0705167, CAN. 0814631, FRA. 1541297, GER. 1522683, GRB. 1088073, JAP. 0517512.
3,687,538.—APPARATUS FOR EXPOSING LATENT IMAGE MARGINS IN ELECTROPHOTOGRAPHIC COPYING APPARATUS. AUG. 29, 1972.
3,751,155.—PRE-DEVELOPMENT EXPOSURE ASSEMBLY. AUG. 7, 1973.
3,809,472.—PRE-DEVELOPMENT EXPOSURE ASSEMBLY. MAY 7, 1974. ARG. 0196103, AUS. 0466757, BEL. 0793559, CHL. 0027991, FRA. 7246234, GRB. 1415170, ITL. 0973319, JAP. 0552841, MEX. 0131207, NZL. 0169421, PRU. 0013334, PTG. 0058769, SAF. 0729132, SPN. 0410172, STZ. 0552841, SWD. 7216970.
3,845,307.—COMBINED CORONA AND LUMINESCENT DISCHARGE. OCT. 29, 1974. BEL. 0811310, GRB. 1433663.
3,860,338.—ADJUSTABLE FADEOUT. JAN. 14, 1975. BEL. 0809655.
3,893,419.—BACKGROUND REDUCTION TECHNIQUE. JULY 8, 1975.
3,984,842.—DEVICE FOR CONTINOUS ELECTROSTATIC REPRODUCTION OF AN OPTICAL IMAGE. OCT. 5, 1976.
3,994,000.—DEVICE FOR ELECTROSTATOGRAPHIC REPRODUCTION OF AN OPTICAL IMAGE USING A CHARGE STORAGE GRID. NOV. 23, 1976.
4,005,438.—DEVICE WITH CONTROL GRID FOR ELECTROSTATOGRAPHIC REPRODUCTION OF AN OPTICAL IMAGE. JAN. 25, 1977.

Class 4A

3,811,764.—APPARATUS FOR PHOTOELECTROPHORETIC IMAGING USING A PERIODIC ELECTRIC FIELD. MAY 21, 1974.

Class 4A 1

2,781,704.—XEROGRAPHIC COPIER CAMERA UNIT. FEB. 19, 1957. CAN. 0581458.
2,808,023.—APPARATUS FOR DEVELOPING ELECTROSTATIC LATENT IMAGE. OCT. 1, 1957.
2,812,883.—ELECTROPHOTOGRAPHIC DEVELOPING POWDER CLOUD GENERATING PROCESS AND APPARATUS. NOV. 12, 1957.
3,330,180.—ILLUMINATION CONTROL SYSTEM. JULY 11, 1967. ARG. 0151653, BRA. 0084295, CAN. 0785137, FRA. 1450157, GER. 1264239, GRB. 1122629, ITL. 0730678, JAP. 0508404, MEX. 0078870.
3,432,231.—EXPOSURE CONTROL DEVICE. MAR. 11, 1969.
3,432,232.—ILLUMINATION SYSTEM. MAR. 11, 1969. CAN. 0846423, JAP. 0534763.
3,487,252.—CESIUM LIGHT SOURCE. DEC. 30, 1969.
3,504,969.—IMAGING APPARATUS. APR. 7, 1970.
3,512,886.—DUAL CARRIAGE SCANNING SYS. MAY 19, 1970. CAN. 0875712, GRB. 1235136.
3,586,849.—ILLUMINATION SYSTEM. JUNE 22, 1971. ARG. 0183139, ATR. 0303522, AUS. 0428629, BEL. 0733400, BRA. 6908480, CAN. 0903730, CHL. 0024870, FRA. 6917011, GRB. 1260688, ITL. 0864185, MEX. 0111515, NOR. 0125954, NZL. 0156507, PNM. 0001430, PRU. 0010320, PTG. 0051752, SAF. 0693689, SPN. 0367616, STZ. 0758269, SWD. 0354924, VZL. 0025067.
3,622,217.—LIGHT PRODUCING SYSTEM. NOV. 23, 1971.
3,733,599.—TRIGGERING APPARATUS FOR A FLASH LAMP. MAY 15, 1973. CAN. 0937281, GRB. 1361073.
3,746,442.—ELECTROPHOTOGRAPHIC IMAGING APPARATUS. JULY 17, 1973.
3,767,956.—APERTURE FLUORESCENT LAMP FOR COPYING MACHINES. OCT. 23, 1973.
3,777,135.—ILLUMINATION SYSTEM. DEC. 4, 1973.
3,779,640.—HEATING APPARATUS FOR SCAN LAMP. DEC. 18, 1973. ITL. 0995677.
3,781,585.—LIGHT PRODUCING SYSTEM. DEC. 25, 1973.
3,824,013.—LIGHT SOURCE ALIGNMENT DEVICE. JULY 16, 1974.
3,851,201.—LAMP ASSEMBLY. NOV. 26, 1974.
3,868,182.—LAMP ASSEMBLY. FEB. 25, 1975.
3,869,205.—ILLUMINATION SOURCE FOR XEROGRAPHIC EXPOSURE. MAR. 4, 1975.
3,881,817.—OPTICAL ALIGNMENT SYSTEM FOR AN ORIGINAL DOCUMENT. MAY 6, 1975. CAN. 3881817.
3,893,754.—COMBINATION PARABOLOID-ELLIPSOID MIRROR SYSTEM. JULY 8, 1975.
3,904,290.—OPTICAL SYSTEM ALIGNMENT APPARATUS. SEPT. 9, 1975.
3,909,254.—LASER RECORDING METHOD. SEPT. 30, 1975.
3,914,649.—PULSED METAL OR METAL HALIDE LAMPS FOR PHOTOCOPYING APPLICATIONS. OCT. 21, 1975.
3,961,222.—SODIUM VAPOR LAMP CONFIGURATION. JUNE 1, 1976.
3,967,893.—AN ILLUMINATING APPARATUS. JULY 6, 1976.
3,983,441.—MULTIPLE PINCH INCANDESCENT LAMP. SEPT. 28, 1976.
3,992,108.—OPTICAL SYSTEM ALIGNMENT APPARATUS. NOV. 16, 1976.
3,998,539.—AN ILLUMINATION SYSTEM. DEC. 21, 1976.
4,005,332.—EFFICIENT DC OPERATED FLUORESCENT LAMPS. JAN. 25, 1977.
4,005,940.—OPTICAL SYSTEM ALIGNMENT APPARATUS. FEB. 1, 1977.

Class 4A 2

2,738,705.—FILE-HOLDING DEVICE FOR CAMERA COPY SUPPORT. MAR. 20, 1956.
2,758,503.—COPY-HOLDING APPARATUS. AUG. 14, 1956.
3,381,573.—SCANNING ATTACHMENT. MAY 7, 1968. CAN. 0820036, GER. 1945460, GRB. 1134645, JAP. 0524529.
3,524,704.—MULTI-LENGTH DOCUMENT RECORDING APPARATUS. AUG. 18, 1970.
3,888,581.—SEMI-AUTOMATIC DOCUMENT HANDLER. JUNE 10, 1975.
3,888,582.—SEMI-AUTOMATIC DOCUMENT HANDLER. JUNE 10, 1975.
3,888,584.—SEMI-AUTOMATIC DOCUMENT HANDLER. JUNE 10, 1975.
3,888,585.—SEMI-AUTOMATIC DOCUMENT HANDLER. JUNE 10, 1975.
3,901,594.—SEMI-AUTOMATIC DOCUMENT HANDLER. AUG. 26, 1975.
3,930,724.—MASKING APPARATUS FOR A MULTI-COLOR ELECTROPHOTOGRAPHIC PRINTING MACHINE. JAN. 6, 1976.

Class 4A 2A

3,062,110.—EXPOSURE STATION APPARATUS. NOV. 6, 1962. CAN. 0701636, JAP. 0318676.
3,560,089.—PLATEN COVER. FEB. 2, 1971. BEL. 0736415, CAN. 0910104, FRA. 0024759, GRB. 1245543, ITL. 8691460, JAP. 0674392.
3,560,090.—PLATEN COVER. FEB. 2, 1971. CAN. 0910103.
3,615,134.—COUNTERBALANCED AND SELF-CLOSING PLATEN COVER. OCT. 26, 1971. ARG. 0185533, AUS. 0449673, BEL. 0756482, CAN. 0921744, CHL. 0025836, EGR. 0084323, FRA. 7035445, GRB. 1318753, GUA. 0002610, ITL. 0908279, MEX. 0116804, PLD. P143518, PNM. 0002181, SPN. 0384046, STZ. 0515525, TIW. 0006830, USR. 0439097.
3,642,371.—PLATEN COVER FOR COPYING MACHINE. FEB. 15, 1972. ARG. 0189873, BEL. 0768991, CAN. 0938485, FRA. 7124554, ITL. 0932443.
3,642,376.—REMOVABLE PLATEN COVER. FEB. 15, 1972. CAN. 0926919.

3,685,905.—COMBINED DOCUMENT FEED AND BOOK COPYING APPARATUS. AUG. 22, 1972. ARG. 0189167, BEL. 0782370, CAN. 0954579, FRA. 7214327, GRB. 1382646, ITL. 0959701, MEX. 0127002, VZL. 30688.
3,788,737.—LUMINESCENT COVER. JAN. 29, 1974. FRA. 7336535.
3,813,161.—PLATEN COVER. MAY 28, 1974.
3,860,338.—ADJUSTABLE FADEOUT. JAN. 14, 1975. BEL. 0809655.
3,914,043.—COLOR ACCENTING COPYING MACHINE. OCT. 21, 1975.
3,914,049.—OPTICAL SCANNING SYSTEM. OCT. 21, 1975. BEL. 0815416.
3,930,466.—SEGMENTED GATE DEVELOPER FLOW CONTROLLER. JAN. 6, 1976.
3,936,172.—LIQUID CRYSTALLINE PLATEN FOR AN ELECTROPHOTOGRAPHIC PRINTING MACHINE. FEB. 3, 1976.
3,997,265.—PLATEN COVER. DEC. 14, 1976.

Class 4A 3

3,432,232.—ILLUMINATION SYSTEM. MAR. 11, 1969. CAN. 0846423, JAP. 0534763.
3,600,610.—TIME DELAY CIRCUIT FOR A RADIANT ENERGY PROTECTIVE APPARATUS. AUG. 17, 1971.
3,672,759.—ILLUMINATION CONTROL SYSTEM. JUNE 27, 1972.
3,775,008.—OPTICAL SCANNING APPARATUS. NOV. 27, 1973.
3,829,209.—IMAGE REGISTRATION IN A MULTIPLE MAGNIFICATION PHOTOCOPY INH SYSTEM. AUG. 13, 1974. ARG. 0194481, BEL. 0784522, CAN. 0988146, FRA. 7220688, GRB. 1397446, ITL. 0956415, MEX. 0128160, SPN. 403.700, STZ. 0563605, SWD. 7207535.
3,926,518.—OPTICAL SCANNING SYSTEM. DEC. 16, 1975.
3,947,117.—EXPOSURE CONTROL SYSTEM. MAR. 30, 1976.
3,975,289.—CHARGE TRANSFER COMPLEXE OF FERRONCENES HAVING LIGHT FILLING PROPERTIES. AUG. 17, 1976.
3,995,954.—EXPOSURE SYSTEM. DEC. 7, 1976.
4,025,541.—CHARGE TRANSFER OF FERROCENES HAVING LIGHT FILTERING PROPERTIES. MAY 24, 1977.

Class 4B

2,689,179.—XEROGRAPHIC CONTACT COPYING DEVICE. SEPT. 14, 1954.
3,912,387.—ELECTROSTATOGRAPHY. OCT. 14, 1975.
3,967,894.—A SCREENED OPTICAL SYSTEM. JULY 6, 1976.
3,967,895.—ILLUMINATION CONTROL SYSTEM. JULY 6, 1976.
3,981,577.—AN OPTICAL SYSTEM FOR AN ELECTROPHOTOGRAPHIC PRINTING MACHINE. SEPT. 21, 1976.
3,994,723.—ELECTROPHOTOGRAPHIC PROCESS INVOLVING STEP OF SUBSEQUENT DISCHARGE OF AREAS RECEIVING INSUFFICIENT. NOV. 30, 1976.

Class 4B 1

2,583,546.—ELECTROPHOTOGRAPHIC RECORDING. JAN. 29, 1952.
3,062,094.—ELECTROPHOTOGRAPHIC COPYING APPARATUS. NOV. 6, 1962. JAP. 0286655.
3,062,095.—PROJECTOR OPTICAL SCANNING SYSTEM. NOV. 6, 1962. CAN. 0706050.
3,062,108.—ELECTROPHOTOGRAPHIC COPYING APPARATUS. NOV. 6, 1962.
3,076,392.—XEROGRAPHIC REPRODUCING APPARATUS. FEB. 5, 1963. CAN. 0689623, FRA. 1271754, GER. 1209418, GRB. 0962654.
3,137,202.—OPTICAL SCANNING APPARATUS FOR XEROGRAPHIC PRINTERS. JUNE 16, 1964. CAN. 0685880.
3,221,622.—OPTICAL SCANNING SYSTEM. DEC. 7, 1965. ADN. 0000471, ARG. 0150818, ATR. 0267325, AUS. 0402541, BEL. 0657557, BRS. 00J3737, BRU. 0000469, CAN. 0756354, EIR. 0028649, FIJ. 0000342, FIN. 0045258, FRA. 1420763, GER. 1497089, GHA. 0000994, GIB. 1089536, GIE. 0006969, GRB. 1089536, GRK. 0029663, GUR. 1089536, HGK. 0009169, HOL. 0146615, ISR. 0022618, ITL. 0742392, JAP. 0599246, JER. 0000P96, KEN. 0001744, LXB. 0047657, MAU. 1927571, MLS. 0015069, NIG. 0001619, NOR. 0118726, NZL. 0140371, PTG. 0043364, SAF. 0646113, SBH. 0005269, SGP. 0008269, SHL. 0000017, SLN. 2677286, SPN: 0307501, SRK. 0000389, STZ. 0450920, SWD. 0338716, UGD. 0000269.
3,318,186.—OPTICAL SYSTEM FOR REPRODUCTION MACHINES. MAY 9, 1967. CAN. 0798356, FRA. 1467332, GRB. 1139231, ITL. 0758313, JAP. 0512656, MEX. 0085288, SWD: 6912062.
3,381,573.—SCANNING ATTACHMENT. MAY 7, 1968. CAN. 0820036, GER. 1945460, GRB. 1134645, JAP. 0524529.
3,405,564.—PULLEY. OCT. 15, 1968. CAN. 0850353.
3,454,335.—SCANNING SYSTEM. JULY 8, 1969. BEL. 0708647, CAN. 0853453, FRA. 1549127, GRB. 1207850, ITL. 0819656, JAP. 0591210.
3,484,163.—SCANNING SYSTEM. DEC. 16, 1969. CAN. 0840630.
3,504,969.—IMAGING APPARATUS. APR. 7, 1970.
3,512,886.—DUAL CARRIAGE SCANNING SYS. MAY 19, 1970. CAN. 0875712, GRB. 1235136.
3,523,725.—XEROGRAPHIC REPRODUCING APPARATUS. AUG. 11, 1970. CAN. 0917730, GRB. 1271862.
3,532,425.—GRAPHIC DISTORTION APPARATUS. OCT. 6, 1970.
3,552,221.—SPEED CONVERTING MECHANISM. JAN. 5, 1971.
3,591,277.—XEROGRAPHIC REPRODUCING APPARATUS. JULY 6, 1971. AUS. 0428584, BEL. 0723949, CAN. 0869628, CZC. 0157352, FRA. 1591801, GER. 0989774, GRB. 1223429, ITL. 0856815, SWD. 0348060, USR. 0465805.
3,612,679.—SCANNING APPARATUS. OCT. 12, 1971. GRB. 1307918.
3,671,237.—METHOD FOR PRODUCING IMAGES. JUNE 20, 1972. CAN. 0886492, GRB. 1317043.
3,794,418.—IMAGING SYSTEM. FEB. 26, 1974.
3,832,057.—SCANNING APPARATUS. AUG. 27, 1974. GRB. 1417255.
3,858,976.—OPTICAL SCANNING SYSTEM. JAN. 7, 1975.
3,869,204.—SCANNING OPTICAL SYSTEM. MAR. 4, 1975. BEL. 0815215.
3,905,247.—CLUTCHES. SEPT. 16, 1975.
3,918,806.—DASHPOT FOR COPIER OPTICAL SCANNING. NOV. 11, 1975.
3,936,173.—OPTICAL SYSTEM. FEB. 3, 1976.
3,948,374.—CLUTCHES. APR. 6, 1976.
3,950,091.—APPARATUS FOR CONTROLLING MOVEMENT OF A CARRIAGE. APR. 13, 1976.
3,973,825.—FLAT FIELD SCANNING SYSTEM. AUG. 10, 1976. BEL. 0836735.
3,989,369.—SCANNING MECHANISM FOR A COPYING APPARATUS. NOV. 2, 1976.
4,027,961.—COPIER/RASTER SCAN APPARATUS. JUNE 7, 1977.
4,032,231.—MULTIPLE RANGE VARIABLE MAGNIFICATION REPRODUCTION MACHINE USING THREE-DIMENSIONAL CAM. JUNE 28, 1977. BEL. 0843419.

Class 4B 1A

3,139,013.—DOCUMENT REPRODUCING APPARATUS. JUNE 30, 1964. CAN. 0727819, FRA. 1346596, GRB. 1016265, JAP. 0442652.
3,330,190.—PRINTING APPARATUS. JULY 11, 1967. CAN. 0758791, GER. 1280282, GRB. 1102419, JAP. 0529726.
3,438,704.—ILLUMINATION CONTROL SYSTEM. APR. 15, 1969. CAN. 0865838, GRB. 1209473, JAP. 1002842.
3,485,546.—FIELD FLATTENER SCANNING MEANS. DEC. 23, 1969. CAN. 0850916, GRB. 1196373, JAP. 0667705.
3,504,960.—SAGITTAL RAY APERTURE STOP. APR. 7, 1970. AUS. 0413558, BEL. 0704924, CAN. 0849815, FRA. 1540700, GRB. 1209472, ITL. 0814606, JAP. 0972613.
3,524,704.—MULTI-LENGTH DOCUMENT RECORDING APPARATUS. AUG. 18, 1970.
3,542,467.—XEROGRAPHIC REPRODUCING APPARATUS. NOV. 24, 1970. ARG. 0180116, AUS. 0442029, BEL. 0731552, BRA. 6908056, CAN. 0877451, FRA. 6911558, GRB. 1257103, ITL. 0857659, JAP. 0668806, MEX. 0108892, SPN. 0366056, SWD. 0346397, VZL. 0023746.
3,592,531.—SPLIT DAGOR-TYPE OF SYMMETRICAL COPYING LENS SYSTEM. JULY 13, 1971. CAN. 0929389.
3,640,615.—XEROGRAPHIC REPRODUCING APPARATUS. FEB. 8, 1972. ARG. 0174792, AUS. 0428440, BEL. 0723948, CAN. 0884439, FRA. 1596660, GRB. 1223428, ITL. 0847541, JAP. 0992414, MEX.. 0108966, PNM. 0001806, SPN. 0360210, SWD. 0352456, VZL. 0023711.
3,652,157.—MICROFILM PROJECTION APPARATUS. MAR. 28, 1972. CAN. 0937797, GRB. 1324097.
3,655,284.—LONGITUDINALLY INSENSITIVE LENS STRIP IMAGING DEVICE. APR. 11, 1972.
3,670,633.—RECORDING APPARATUS. JUNE 20, 1972.

3,778,147.—ELECTROSTATIC REPRODUCTION MACHINE HAVING SLEECTSBLE MAGNIFICATIONRATIOS. DEC. 11, 1973. CAN. 989464.
3,788,740.—IMAGING SYSTEM. JAN. 29, 1974.
3,975,289.—CHARGE TRANSFER COMPLEXEX OF FERRONCENES HAVING LIGHT FILLING PROPERTIES. AUG. 17, 1976.
3,994,580.—OPTICAL SYSTEM FOR SCANNING DURING RECIPROCAL MOTION. NOV. 30, 1976.
4,008,958.—OPTICAL SYSTEM FOR EFFECTED IMAGE ROTATION. FEB. 22, 1977.
4,025,541.—CHARGE TRANSFER OF FERROCENES HAVING LIGHT FILTERING PROPERTIES. MAY 24, 1977.
4,029,409.—MULTI-MODE OPTICAL SCANNING SYSTEM. JUNE 14, 1977. BEL. 0843153, HAT. 0001524.

Class 4B 1A 1

3,544,190.—LENS STRIP OPTICAL SCANNING SYSTEM. DEC. 1, 1970. CAN. 0904070, GRB. 1278336.
3,584,950.—LENS STRIP OPTICAL SCANNING SYSTEM. JUNE 15, 1971.
3,584,952.—LENS STRIP OPTICAL SCANNING SYSTEM - REISSUED D 2074R. JUNE 15, 1971.
3,584,953.—SHORT FOCAL OPTICAL LENGTH SCANNING SYSTEM. JUNE 15, 1971.
3,650,621.—OPTICAL IMAGING SYSTEM. MAR. 21, 1972. BEL. 0747978, CAN. 0927470, FRA. 7011548, GRB. 1297907, ITL. 0898936, JAP. 0731225.
3,881,369.—BI-AXIAL POSITIONER. MAY 6, 1975.
3,912,392.—SHORT FOCAL LENGTH OPTICAL SCANNING SYSTEM. OCT. 14, 1975.

Class 4B 1A 2

3,496,846.—SCRIPTWRITER USING FIBER OPTIC BUNDLE. FEB. 24, 1970.
3,560,085.—APPARATUS FOR GRAPHIC DISTORATION. FEB. 2, 1971.
3,681,777.—RECORDING APPARATUS. AUG. 1, 1972.

Class 4B 1A 3

3,120,790.—XEROGRAPHIC EXPOSURE APPARATUS. FEB. 11, 1964. AUS. 0270483, FRA. 1333280, GER. 1204066, GRB. 1019291, ITL. 0674895, JAP. 0468454.
3,497,296.—XEROGRAPHIC EXPOSURE APPARATUS. FEB. 24, 1970.
3,535,036.—APPARATUS FOR FORMING HALF-TONE LINE SCREEN WITH A LENS. OCT. 20, 1970. CAN. 0909309, GRB. 1253887.
3,540,806.—HALF TONING METH AND APPARATUS FOR SOLID AREA COVERAG. NOV. 17, 1970. CAN. 0892754, GRB. 1253888.
3,580,671.—EXPOSURE APPARATUS. MAY 25, 1971. CAN. 0912104, GRB. 1276010.
3,905,822.—COMPOUND SCREEN FOR OBJECT SCREENING. SEPT. 16, 1975.
3,912,510.—ELECTROPHOTOGRAPHIC PROCESS EMPLOYING A COMPOUND DOCUMENT SCREEN. OCT. 14, 1975.
3,914,040.—REVERSIBLE SCREEN FOR ELECTROPHOTOGRAPHIC PRINTING. OCT. 21, 1975.
3,958,877.—HALF-TONE SCREEN WITH CLEANING MEANS FOR AN ELECTROPHOTOGRAPHIC PRINTING MACHINE. MAY 25, 1976.
3,961,847.—AN ARCUATE SCREEN FOR AN ELECTROPHOTOGRAPHIC PRINTING MACHINE. JUNE 8, 1976
3,961,848.—AN ELECTROPHOTOGRAPHIC PRINTING MACHINE WITH HALFTONE SCREEN CLEANING. JUNE 8, 1976.
3,963,342.—CURVED SCREEN. JUNE 15, 1976.
3,973,953.—IMAGING METHOD INCLUDING EXPOSURE OF PHOTOCONDUCTIVE IMAGING MEMBER THROUGH LENTICULAR LENS ELE. AUG. 10, 1976. STZ. 0557051.
3,973,954.—IMAGING METHOD INCLUDING EXPOSURE OF PHOTOCONDUCTIVE IMAGING MEMBER THROUGH LENTICULAR LENS ELE. AUG. 10, 1976. STZ. 0557051.
3,973,957.—IMAGING METHOD INCLUDING EXPOSURE OF DEFORMATION IMAGING MEMBER THROUGH LENTICULAR LENS ELEMENT. AUG. 10, 1976.
3,973,958.—IMAGING METHOD INCLUDING EXPOSURE OF DEFORMATION IMAGING MEMBER THROUGH LENTICULAR ELEMENT. AUG. 10, 1976.
4,003,649.—ELECTROPHOTOGRAPHIC HALFTONE PRINTING MACHINE EMPLOYING A PHASE SCREEN. JAN. 18, 1977.
4,007,981.—DUAL MODE ELECTROSTATOGRAPHIC PRINTING MACHINE. FEB. 15, 1977.
4,012,137.—AN OPTICAL SYSTEM HAVING A ROTATING SCREEN. MAR. 15, 1977.
4,013,355.—NOTCH FILTER FOR COLOR TRANSPARENCY COPYING MACHINES. MAR. 22, 1977.
4,014,030.—HALF-TONE IMAGING WITH FLYING SPOT SCANNER SYSTEM. MAR. 22, 1977.
4,014,607.—REMOVABLE SCREENING SYSTEM FOR A TRANSPARENCY REPRODUCTION MACHINE. MAR. 29, 1977.
4,025,181.—A SCREEN CLEANING DEVICE. MAY 24, 1977.
4,035,070.—APPARATUS AND METHOD FOR OPTICAL GENERATION OF A STRUCTURED CHARGE-DISCHARGE PATTERN ON A PHOTO. JULY 12, 1977.

Class 4B 1A 4

3,424,525.—MICROFILM COPIER ATTACHMENT. JAN. 28, 1969.
3,542,468.—MICROFILM ENLARGER-COPIER - MICROFILM ATTACHMENT. NOV. 24, 1970. CAN. 0858250.
3,547,533.—MICROFILM REPRODUCTION MACHINE. DEC. 15, 1970. BEL. 0689227, CAN. 0891072, FRA. 1498788, GRB. 1160904, ITL. 0794772, MEX. 0095144.

Class 4B 2

3,220,324.—PHOTOCONDUCTIVELY. CONTROLLED CORONA CHARGING. NOV. 30, 1965. CAN. 0710976, GER. 1243967, GRB. 1034009, JAP. 0651092.
3,254,998.—INDUCTION IMAGE FORMATION. JUNE 7, 1966. CAN. 0740576, FRA. 1357220, GER. 1276445, GRB. 1024985, JAP. 0451689.
3,307,034.—TWO-WIRE CORONA DISCHARGE SYSTEM FOR SINGLE-STEP ELECTROSTATIC IMAGE FORMATION. FEB. 28, 1967. CAN. 0768802, FRA. 1416275, GER. 1275864, GRB. 1055416, ITL. 0744235, JAP. 0491997.
3,394,002.—CHARGE TRANSFER WITH LIQUID LAYERS. JULY 23, 1968. CAN. 0840028, GRB. 1126048, JAP. 0524527.
3,698,807.—DISPLAYING AND PRINTING APPARATUS. OCT. 17, 1972. CAN. 0963521, GRB. 1376814.

Class 4B 3

3,283,651.—INFORMATION ENCODING DEVICE. NOV. 8, 1966. CAN. 0859923, GRB. 1096645, JAP. 0547197.
3,532,425.—GRAPHIC DISTORTION APPARATUS. OCT. 6, 1970.
3,560,085.—APPARATUS FOR GRAPHIC DISTORATION. FEB. 2, 1971.
3,584,950.—LENS STRIP OPTICAL SCANNING SYSTEM. JUNE 15, 1971.
3,584,953.—SHORT FOCAL OPTICAL LENGTH SCANNING SYSTEM. JUNE 15, 1971.
3,725,059.—METHOD OF CLEANING AN ELECTROSTATOGRAPHIC SURFACE. APR. 3, 1973. GRB. 1337282.
3,862,801.—METHOD OF CLEANING AN ELECTROSTATOGRAPHIC IMAGING SURFACE. JAN. 28, 1975. GRB. 1337282.

Class 4B 4

2,781,704.—XEROGRAPHIC COPIER CAMERA UNIT. FEB. 19, 1957. CAN. 0581458.
2,962,374.—COLOR XEROGRAPHY. NOV. 29, 1960.
2,965,483.—XEROGRAPHIC CONTRAST. DEC. 20, 1960. CAN. 0616969.
3,283,651.—INFORMATION ENCODING DEVICE. NOV. 8, 1966. CAN. 0859923, GRB. 1096645, JAP. 0547197.
3,432,231.—EXPOSURE CONTROL DEVICE. MAR. 11, 1969.
3,473,455.—EXPOSURE REGISTRATION APPARATUS. OCT. 21, 1969.
3,521,950.—XEROGRAPHIC REPRODUCING APPARATUS. JULY 28, 1970. ARG. 0184148, ATR. 0317675, AUS. 0441739, BEL. 0713876, CAN. 0877511, CHL. 0024535, DNK. 0129304, FRA. 1558225, GRB. 1231622, GRK. 0037839, IND. 0124668, ISR. 0029824, ITL. 0831700, JAM. 0001853, JAP. 0774498, LXB. 0055912, MEX. 0102085, NOR. 0131313, NZL. 0159801, PRU. 0009366, PTG. 0049474, SAF. 68/2518, SPN. 0352885, STZ. 0505015, SWD. 7012263, UAR. 0008668, URG. 0009239, VZL. 0025077.

3,586,849.—ILLUMINATION SYSTEM. JUNE 22, 1971. ARG. 0183139, ATR. 0303522, AUS. 0428629, BEL. 0733400, BRA. 6908480, CAN. 0903730, CHL. 0024870, FRA. 6917011, GRB. 1260688, ITL. 0864185, MEX. 0111515, NOR. 0125954, NZL. 0156507, PNM. 0001430, PRU. 0010320, PTG. 0051752, SAF. 0693689, SPN. 0367616, STZ. 0758269, SWD. 0354924, VZL. 0025067.
3,697,160.—CONTINUOUS IMAGING APPARATUS. OCT. 10, 1972.
3,995,950.—EXPOSURE SYSTEM FOR ELECTROSTATIC MACHINES. DEC. 7, 1976.

Class 4B 5

3,094,910.—REFLEX XEROGRAPHIC APPARATUS. JUNE 25, 1963. CAN. 0704293, GRB. 0997415.
3,212,417.—REFLEX EXPOSURE SYSTEM. OCT. 19, 1965. CAN. 0733682, GRB. 1052783, JAP. 0487026.
3,278,302.—PHOSPHORESCENT SCREEN REFLEX. OCT. 11, 1966. CAN. 0748828.

Class 4B 6

3,076,392.—XEROGRAPHIC REPRODUCING APPARATUS. FEB. 5, 1963. CAN. 0689623, FRA. 1271754, GER. 1209418, GRB. 0962654.
3,355,236.—AUTOMATIC OPTICAL CONTROL APPARATUS. NOV. 28, 1967. CAN. 0771917.
3,542,467.—XEROGRAPHIC REPRODUCING APPARATUS. NOV. 24, 1970. ARG. 0180116, AUS. 0442029, BEL. 0731552, BRA. 6908056, CAN. 0877451, FRA. 6911558, GRB. 1257103, ITL. 0857659, JAP. 0668806, MEX. 0108892, SPN. 0366056, SWD. 0346397, VZL. 0023746.
3,765,027.—ION LENS RECORDING SYSTEM. OCT. 9, 1973.
3,848,996.—PHOTOCOMPOSING APPARATUS. NOV. 19, 1974. BEL. 0815043.
3,901,585.—ZOOM LENS ASSEMBLY. AUG. 26, 1975. GRB. 1443481.
3,909,103.—LENS SCAN MECHANISM. SEPT. 30, 1975.
3,947,188.—VARIABLE CONJUGATE OPTICAL SYSTEM. MAR. 30, 1976.
3,967,896.—VARIABLE EDGE FADEOUT APP FOR ELECTROSTATIC REPRODUCTION MACHINE. JULY 6, 1976.
3,998,540.—REPOSITIONING SYSTEM FOR VIEWING AND PROJECTION ELEMENTS OF A REPRODUCING APPARATUS. DEC. 21, 1976.
4,013,361.—OPTICAL APP AND REPRODUCING MACHINE. MAR. 22, 1977. BEL. 0843158.
4,027,963.—MULTI-MODE REPRODUCING APPARATUS. JUNE 7, 1977. BEL. 0843154, HAT. 0001534.
4,029,411.—VARIABLE MAGNIFICATION COPIER. JUNE 14, 1977. BEL. 0839792, SPN. 0445641.
4,033,691.—VARIABLE MAGNIFICATION REPRODUCING APPARATUS. JULY 5, 1977.
4,033,692.—MULTI-MODE REPRODUCING MACHINE. JULY 5, 1977. HAT. 0001504.

Class 4B 6A

3,318,186.—OPTICAL SYSTEM FOR REPRODUCTION MACHINES. MAY 9, 1967. CAN. 0798056, FRA. 1467332, GRB. 1139231, ITL. 0758313, JAP. 0512656, MEX. 0085288, SWD. 6912062.
3,454,335.—SCANNING SYSTEM. JULY 8, 1969. BEL. 0708647, CAN. 0853453, FRA. 1549127, GRB. 1207850, ITL. 0819656, JAP. 0591210.
3,476,478.—APPARATUS FOR CHANGING MAGNIFICATION OF PHOTOCOPIER W/O CHANGING CONJUGATE LENGTH OF OPTICAL SY. NOV. 4, 1969. ARG. 0172460, AUS. 0415808, BEL. 0708650, BRA. 6795668, CAN. 0845405, FRA. 1552364, GER. 1297981, GRB. 1223427, ITL. 0821929, MEX. 0100019, VZL. 0023689.
3,510,219.—OPTICAL ALIGNMENT SYSTEM. MAY 5, 1970. ARG. 0172455, BRA. 6793791, CAN. 0881018, CHL. 0023570, GRB. 1206966, MEX. 0101166, PRU. 0009329, SPN. 0360896, STZ. 0501233, SWD. 0359168, URG. 0008831, VZL. 0025783.
3,521,950.—XEROGRAPHIC REPRODUCING APPARATUS. JULY 28, 1970. ARG. 0184148, ATR. 0317675, AUS. 0441739, BEL. 0713876, CAN. 0877511, CHL. 0024535, DNK. 0129304, FRA. 1558225, GRB. 1231622, GRK. 0037839, IND. 0124668, ISR. 0029824, ITL. 0831700, JAM. 0001853, JAP. 0774498, LXB. 0055912, MEX. 0102085, NOR. 0131313, NZL. 0159801, PRU. 0009366, PTG. 0049474, SAF. 68/2518, SPN. 0352885, STZ. 0505015, SWD. 7012263, UAR. 0008668, URG. 0009239, VZL. 0025077.
3,524,704.—MULTI-LENGTH DOCUMENT RECORDING APPARATUS. AUG. 18, 1970.
3,591,256.—VARIABLE MAGNIFICATION LENS SYSTEM. JULY 6, 1971. BEL. 0731553, CAN. 0881019, FRA. 6911559, GRB. 1234515, ITL. 0857660.
3,591,277.—XEROGRAPHIC REPRODUCING APPARATUS. JULY 6, 1971. AUS. 0428584, BEL. 0723949, CAN. 0869628, CZC. 0157052, FRA. 1591801, GER. 0989774, GRB. 1223429, ITL. 0856815, SWD. 0348060, USR. 0465805.
3,600,066.—OPTICAL ASSEMBLY WITH SUPPLEMENTAL LENS MEANS. AUG. 17, 1971. CAN. 0943792, GRB. 1261159, JAP. 0728824.
3,817,599.—PROJECTION LENS WITH ADD LENS ELEMENTS. JUNE 18, 1974.
3,912,374.—SIX COMPONENT ZOOM LENS. OCT. 14, 1975.

Class 4B 7

3,470,797.—DISPLAY DEVICE. OCT. 7, 1969.
3,472,136.—CHARACTER GENERATOR. OCT. 14, 1969. CAN. 0884500, GRB. 1191881.
3,473,455.—EXPOSURE REGISTRATION APPARATUS. OCT. 21, 1969.
3,523,725.—XEROGRAPHIC REPRODUCING APPARATUS. AUG. 11, 1970. CAN. 0917730, GRB. 1271862.
3,615,132.—METHOD OF PRINTING MULTIPLE COPIES OF COMPOSITE INFORMATION ON STANDARD SIZE COPY SHEETS. OCT. 26, 1971.
3,620,618.—MULTIPLE INPUT COPYING APPARATUS. NOV. 16, 1971.
3,775,007.—FORMS REPRODUCTION APPARATUS. NOV. 27, 1973.
3,827,062.—OPTICAL ARRANGEMENT FOR HIGH SPEED PRINTOUT SYSTEM. JULY 30, 1974.

Class 4C

2,965,483.—XEROGRAPHIC CONTRAST. DEC. 20, 1960. CAN. 0616969.
3,188,208.—SPECTRAL CONTRAST CONTROL IN XEROGRAPHY. JUNE 8, 1965.
3,432,232.—ILLUMINATION SYSTEM. MAR. 11, 1969. CAN. 0846423, JAP. 0534763.
3,438,705.—AUTOMATIC XEROGRAPHIC DEVELOPMENT CONTROL. APR. 15, 1969. GRB. 1207830.
3,852,782.—IMAGING SYSTEM. DEC. 3, 1974.
3,901,189.—MAGNETIC BRUSH DEVELOPING APPARATUS. AUG. 26, 1975.
3,917,393.—VARIOSLIT. NOV. 4, 1975. BEL. 0820132.
3,970,382.—A SPATIALLY SELECTIVE OPTICAL SYSTEM. JULY 20, 1976. FRA. 7421348.
3,975,289.—CHARGE TRANSFER COMPLEXE OF FERRONCENES HAVING LIGHT FILLING PROPERTIES. AUG. 17, 1976.
3,997,259.—APPARATUS FOR REDUCING IMAGE BACKGROUND IN ELECTROSTATIC REPRODUCTION MACHINES. DEC. 14, 1976.
4,007,326.—ELECTRONIC COPY ANALYSIS. FEB. 8, 1977.
4,025,541.—CHARGE TRANSFER OF FERROCENES HAVING LIGHT FILTERING PROPERTIES. MAY 24, 1977.

Class 5

3,942.266.—METHOD AND APPARATUS FOR FIXING TONER IMAGES. MAR. 9, 1976.

Class 5A 1

2,221,776.—ELECTRON PHOTOGRAPHY. NOV. 19, 1940.
2,725,304.—PROCESS FOR DEVELOPING AN ELECTROSTATIC LATENT IMAGE. NOV. 29, 1955. CAN. 0557666.
2,792,971.—PARTICLE AEROSOL GENERATION. MAY 21, 1957.
2,815,330.—GENERATOR OF AEROSOL OF POWDER IN GAS. DEC. 3, 1957.
2,815,734.—APPARATUS FOR DEVELOPING XEROGRAPHIC IMAGE. DEC. 10, 1957.
2,859,127.—PROCESS FOR DEVELOPING ELECTROSTATIC IMAGES. NOV. 4, 1958. CAN. 0557667.
2,859,129.—PROCESS FOR DEVELOPING ELECTROSTATIC IMAGES AND APPARATUS THEREFOR. NOV. 4, 1958.
2,861,543.—APPARATUS FOR DEVELOPMENT OF ELECTROSTATIC IMAGE. NOV. 25, 1958. CAN. 0597655.
2,862,472.—ELECTROSTATIC IMAGE DEVELOPMENT APPARATUS. DEC. 2, 1958. CAN. 0619384, FRA. 1210178, GER. 1121473, GRB. 0895777, ITL. 0594503.
2,862,646.—POWDER PARTICLE AEROSOL GENERATOR. DEC. 2, 1958.

2,876,737.—APPARATUS FOR DEVELOPING ELECTROSTATIC IMAGES ON SHEET MATERIAL. MAR. 10, 1959.
2,878,972.—ROUGH SURFACE POWDER CLOUD GENERATION. MAR. 24, 1959.
2,943,950.—ELECTROSTATIC DEVELOPING APPARATUS AND METHOD. JULY 5, 1960. CAN. 0564395.
3,008,826.—XEROGRAPHIC DEVELOPMENT. NOV. 14, 1961.
3,094,248.—XEROGRAPHIC DEVELOPING APPARATUS. JUNE 18, 1963. CAN. 0678004, GRB. 0985306.
3,276,426.—CLOSED AEROSOL DEVELOPMENT. OCT. 4, 1966.
3,518,969.—DEVELOPMENT APPARATUS. JULY 7, 1970. CAN. 0852127, GRB. 1259879.
3,791,730.—APPARATUS FOR DEVELOPING ELECTROSTATIC LATENT IMAGES. FEB. 12, 1974.
3,795,443.—XEROGRAPHIC DEVELOPMENT. MAR. 5, 1974. GRB. 1255568, JAP. 0721852.

Class 5A 1A

2,824,545.—APPARATUS FOR DEVELOPING XEROGRAPHIC IMAGES. FEB. 25, 1958.
2,831,409.—XEROGRAPHIC CAMERA. APR. 22, 1958. CAN. 0575071.
3,060,131.—POWDER CLOUD GENERATING APPARATUS. OCT. 23, 1962.
3,129,113.—AUTOMATIC POWDER APPLICATOR APPARATUS. APR. 14, 1964.
3,640,246.—DEVELOPMENT APPARATUS FOR LATENT ELECTROSTATIC IMAGE. FEB. 8, 1972. ATR. 0319044, AUS. 0457007, BEL. 0758632, CAN. 0917404, FRA. 7042231, GRB. 1336741, ITL. 0909113, JAP. 0815548, SPN. 0385187, STZ. 0527453, SWD. 0363411, USR. 0505386.
3,646,910.—DEVELOPMENT APPARATUS FOR LATENT ELECTROSTATIC IMAGES. MAR. 7, 1972.
3,924,568.—APPARATUS FOR DEVELOPING LATENT ELECTROSTATIC IMAGES. DEC. 9, 1975. BEL. 0809747, GRB. 1434673.
3,974,796.—DUAL MODE APPARATUS FOR DEVELOPING LATENT ELECTROSTATIC IMAGES. AUG. 17, 1976.
4,033,292.—APPARATUS FOR DEVELOPING LATENT ELECTROSTATIC IMAGES. JULY 5, 1977.

Class 5A 2

2,784,109.—METHOD FOR DEVELOPING ELECTROSTATIC IMAGES. MAR. 5, 1957. CAN. 0558593, GRB. 0698994.
2,811,135.—POWDER CHARGING DEVICE. OCT. 29, 1957.
2,873,721.—MICRO-MANIFOLD FOR POWDER CLOUD DEVELOPMENT. FEB. 17, 1959.
2,894,486.—APPARATUS FOR XEROGRAPHIC DEVELOPMENT. JULY 14, 1959.
3,160,524.—APPARATUS FOR CHARGING POWDER PARTICLES AND APPLYING THE CHARGED PARTICLES TO A RECEIVING MEMBER. DEC. 8, 1964. CAN. 0779861, GRB. 1026457.
3,257,223.—ELECTROSTATIC POWDER CLOUD XEROGRAPHIC DEVELOPMENT METHOD AND APPARATUS. JUNE 21, 1966. CAN. 0756559, GRB. 1028900, JAP. 0460474.
3,284,224.—CONTROLLED XEROGRAPHIC DEVELOPMENT. NOV. 8, 1966. CAN. 0751349, GRB. 1038801, JAP. 0640353.
3,357,403.—POWDER CLOUD DEVELOPMENT APPARATUS. DEC. 12, 1967.
3,470,009.—POWDER CLOUD DEVELOPMENT OF ELECTROSTATIC IMAGES. SEPT. 30, 1969. CAN. 0820240, FRA. 1461941, GRB. 1130452, HOL. 0142253, ITL. 0750148, JAP. 0512653, MEX. 0085176.
3,707,390.—METHOD FOR DEVELOPING ELECTROSTATIC LATENT IMAGES. DEC. 26, 1972.
3,767,446.—DEVELOPMENT METHOD WITH OSCILLATING BRUSH PAD. OCT. 23, 1973.

Class 5A 3

RE.28,183.—POWDER CLOUD. OCT. 1, 1974. ARG. 0119221, BEL. 0764300, CAN. 0939137, FRA. 7110037, GRB. 1351471, ITL. 0921294, MEX. 0119823, VZL. 0032790.
RE.28,193.—POWDER CLOUD XEROGRAPHIC DEVELOPMENT APPARATUS. OCT. 8, 1974. ARG. 0119221, BEL. 0764300, CAN. 0939137, FRA. 7110037, GRB. 1351471, ITL. 0921294, MEX. 0119823, VZL. 0032790.
2,842,456.—PROCESS FOR DEVELOPING AN ELECTROSTATIC IMAGE. JULY 8, 1958.
2,911,945.—APPARATUS FOR DEVELOPING ELECTROSTATIC IMAGES. NOV. 10, 1959.
2,914,221.—AEROSOL BOMB DEVELOPMENT. NOV. 24, 1959.
2,918,900.—APPARATUS FOR XEROGRAPHIC DEVELOPMENT. DEC. 29, 1959.
2,935,234.—POWDER CLOUD GENERATING APPARATUS. MAY 3, 1960. CAN. 0655160, GRB. 0957862.
2,965,069.—XEROGRAPHIC DEVELOPING APPARATUS. DEC. 20, 1960.
2,992,758.—POWDER CLOUD GENERATING APPARATUS. JULY 18, 1961. CAN. 0678816.
3,129,850.—POWDER CLOUD GENERATING APPARATUS. APR. 21, 1964. CAN. 0693933, GER. 1497044, GRB. 1001237, JAP. 0436042.
3,648,901.—POWDER CLOUD XEROGRAPHIC DVLMNT APP-REISSUED AS 28183 AND 28193 10/74. MAR. 14, 1972. ARG. 0119221, BEL. 0764300, CAN. 0939137, FRA. 7110037, GRB. 1351471, ITL. 0921294, MEX. 0119823, VZL. 0032790.
3,799,113.—HYBRID DEVELOPMENT OF ELECTROSTATIC LATENT IMAGE. MAR. 26, 1974. CAN. 0980634, GRB. 1411708.

Class 5A 3A

2,832,511.—GENERATOR OF AN AEROSOL OF POWDER PARTICLES. APR. 29, 1958. CAN. 0705239, GER. 1170782, GRB. 0830780.
2,837,441.—XEROGRAPHIC WET BELT LOADING. JUNE 3, 1958.
2,843,084.—XEROGRAPHIC APPARATUS WITH ENDLESS DEVELOPMENT ELECTRODE. JULY 15, 1958.
2,843,295.—POWDER CLOUD GENERATOR. JULY 15, 1958.
2,859,128.—METHOD OF DEVELOPING XEROGRAPHIC IMAGE. NOV. 4, 1958. CAN. 0612193, FRA. 1148569, GER. 1063898.
3,060,131.—POWDER CLOUD GENERATING APPARATUS. OCT. 23, 1962.

Class 5A 3B

2,759,450.—XEROGRAPHIC DEVELOPING APPARATUS. AUG. 21, 1956. GRB. 0821337.
2,872,338.—ELECTROPHOTOGRAPHIC DEVELOPING PROCESS. FEB. 3, 1959.
2,877,132.—METHOD FOR DEVELOPMENT OF ELECTROSTATIC IMAGES. MAR. 10, 1959.
2,928,575.—ELECTROSTATIC IMAGE DEVELOPMENT. MAR. 15, 1960. CAN. 0634369.
3,599,604.—XEROGRAPHIC DEVELOPMENT APPARATUS. AUG. 17, 1971. ARG. 0187552, ATR. 0300574, AUS. 0427548, BEL. 0726572, BUL. 0017289, CAN. 0882577, DNK. 0122194, EGR. 0074431, EIR. 0032989, FRA. 1597322, GRB. 1248671, GRK. 0039920, IND. 0120485, ISR. 0031892, ITL. 0854007, LXB. 0058261, MEX. 0108936, NZL. 0155879, PAK. 0121035, PLP. 0006856, PNM. 0001804, PTG. 0051418, RHD. 1406967, RMN. 0054927, SAF. 0069181, SPN. 0362359, STZ. 0493015, UAR. 0009253, VTM. 0001857, VZL. 0023728.
3,633,544.—TURBO-CLOUD DEVELOPMENT. JAN. 11, 1972. CAN. 0934959, GRB. 1322363, JAP. 0741518.
3,670,701.—TWO STEP ORBITAL PAD DEVELOPMENT. JUNE 20, 1972. CAN. 0092849, GRB. 1313870, JAP. 0743834.
3,882,822.—APPARATUS FOR DEVELOPING ELECTROSTATIC LATENT IMAGE. MAY 13, 1975.

Class 5A 4

2,573,881.—METHOD AND APPARATUS FOR DEVELOPING ELECTROSTATIC IMAGES WITH ELECTROSCOPIC POWDER. NOV. 6, 1951. AUS. 0149247, CAN. 0479868, GER. 0903414, GRB. 0693905, STZ. 0286142, SWD. 0171735.
2,824,813.—METHOD FOR DEVELOPING ELECTROSTATIC LATENT IMAGES. FEB. 25, 1958.

Class 5A 5

2,965,136.—XEROGRAPHIC DEVELOPING APPARATUS. DEC. 20, 1960.
2,965,136.—XEROGRAPHIC DEVELOPING APPARATUS. DEC. 20, 1960.
3,345,293.—COLORED ELECTROSTATOGRAPHIC TONERS CONTAINING ORGANIC DYE PIGMENTS. CAN. 0834674, GRB. 107147, JAP. 0788652.
3,483,679.—FILTER APPARATUS. DEC. 16, 1969. BEL. 0708648, CAN. 0853503, FRA. 1552363, ITL. 0837050.

3,697,263.—METHOD OF CLEANING RESIDUAL LIQUID DEVELOPER FROM ELECTROPHOTOGRAPHIC PLATES. OCT. 10, 1972. ARG. 0181940, AUS. 0455091, BEL. 0758060, CAN. 0906334, EGR. 0087483, FRA. 7041623, GRB. 1328406, ITL. 0916264, JAP. 0749381, MEX. 0116862, SPN. 0385000, STZ. 0519186, SWD. 0365624, TIW. 0006850, USR. 0349206, VZL. 0032211.
3,924,568.—APPARATUS FOR DEVELOPING LATENT ELECTROSTATIC IMAGES. DEC. 9, 1975. BEL. 0809747, FRA. 7401161, GRB. 1434673, ITL. 1003370.
3,937,570.—CLOUD SUPPRESSION IN AN ELECTROSTATIC COPYING APPARATUS. FEB. 10, 1976. CAN. 0974751, GRB. 1396922.

Class 5A 6

2,899,331.—PROCESS OF DEVELOPING ELECTROSTATIC IMAGE WITH CHARCOAL. AUG. 11, 1959.

Class 5B

3,103,445.—METHOD OF DEVELOPING AN ELECTROSTATIC LATENT IMAGE ON A XEROGRAPHIC PLATE. SEPT. 10, 1963, GRB. CAN. 0705363, GRB. 0956358.
3,251,706.—XEROGRAPHIC DEVELOPMENT METHOD AND APPARATUS. MAY 17, 1966. CAN. 0629542, FRA. 1120534, GER. 1020234, GRB. 0774433.
3,357,402.—ROTARY BRUSH DEVELOPMENT. DEC. 12, 1967. ARG. 0167329, ATR. 0279354, AUS. 0416581, BEL. 0708497, BRA. 0088306, CAN. 0859029, FRA. 1548189, GER. 1597901, GRB. 1200068, HUN. 0156541, ITL. 0819626, JAP. 0608703, MEX. 0106260, PLD. 0071357, SPN. 0348633, SWD. 0328190, VZL. 0023686.
3,542,466.—DEVELOPMENT APPARATUS. NOV. 24, 1970. AUS. 0428620, BEL. 0725611, CAN. 0884213, FRA. 1598505, GRB. 1203167, ITL. 0870661, JAP. 0641479, SPN. 0361653, SWD. 0343694.
3,558,339.—METHOD OF AND APPARATUS FOR STIPPLING. JAN. 26, 1971. CAN. 0871649, GRB. 1266969.
3,574,301.—DEVELOPING APPARATUS. APR. 13, 1971. AUS. 0449350, BEL. 0748073, CAN. 0873249, FRA. 7011549 GRB. 1303493, ITL. 0899146, JAP. 0715126, STZ. 0518579, SWD. 0356379, USR. 0331581.
3,592,167.—APPARATUS FOR LOADING TONER ON A DEVELOPING BRUSH. JULY 13, 1971.
3,613,638.—MATERIALS FOR FIBROUS DEVELOPMENT. OCT. 19, 1971. CAN. 0910736.
3,632,370.—MULTIPLE BRUSH DEVELOPMENT. JAN. 4, 1972.
3,636,924.—FUR BRUSH DEVELOPING APPARATUS. JAN. 25, 1972. CAN. 0912811, GRB. 1340060, JAP. 0751882.
3,638,613.—TONER DEVELOPER SYSTEM. FEB. 1, 1972. AUS. 0445403, BEL. 0747124, CAN. 0889762, EGR. 0081783, FRA. 7007651, GRB. 1294603, ITL. 0898243, SPN. 0377302, STZ. 0520960, SWD. 0354363, TIW. 0006827.
3,687,106.—DONOR APPARATUS AND METHOD. AUG. 29, 1972. ARG. 0185079, BEL. 0753207, CAN. 0911706, FRA. 7027124, GRB. 1314862, ITL. 0900444, JAP. 0733285, MEX. 0117318, PNM. 0002237, VZL. 0027517.
3,692,402.—MATERIALS FOR FIBROUS DEVELOPMENT AND CLEANING MEMBER. SEPT. 19, 1972.
3,847,306.—DEVELOPING APPARATUS. NOV. 12, 1974. CAN. 0966998, GRB. 1353651.

Class 5C

3,648,657.—ELECTROSTATIC IMAGE DEVELOPMENT APPARATUS. MAR. 14, 1972.
3,805,739.—CONTROLLING MULTIPLE VOLTAGE LEVELS FOR ELECTROSTATIC PRINTING. APR. 23, 1974. CAN. 0972552, GRB. 1382710.
3,854,449.—DEVELOPMENT APPARATUS. DEC. 17, 1974. ARG. 0195893, BEL. 0797447, CAN. 0982886, FRA. 7243003, GRB. 1435761, ITL. 0987768, MEX. 0130638, SAF. 0733407, SPN. 0414805, STZ. 0551030, SWD. 7307101, VZL. 0032067.
3,967,892.—A DEVELOPMENT SYSTEM. JULY 6, 1976.
3,981,272.—MAG BRUSH HOUSING WITH DETACHABLE SUMP SECTION. BEL. 0835755. SEPT. 21, 1976.
3,998,537.—SPLIT DEVELOPER HOUSING WITH INTERLOCKED FLOW GATE & CATCH. DEC. 21, 1976. BEL. 0835370.
4,027,621.—DEVELOPING SYSTEM FOR ELECTROSTATIC REPRODUCTION MACHINES. JUNE 7, 1977.

Class 5C 1

2,975,758.—APPARATUS FOR DEVELOPING ELECTROSTATIC IMAGES. MAR. 21, 1961. CAN. 0622422, GER. 1186746. GRB. 0944654, JAP. 0319308.
3,015,305.—DEVELOPMENT OF ELECTROSTATIC IMAGES. JAN. 2, 1962.
3,113,042.—XEROGRAPHIC APPARATUS WITH MAGNETIC CONVEYOR. DEC. 3, 1963. CAN. 0738917, GRB. 0987985.
3,176,652.—XEROGRAPHIC DEVELOPING APPARATUS. APR. 6, 1965. CAN. 0737851, GRB. 1018787, JAP. 0627140.
3,570,453.—DEVELOPMENT APPARATUS. MAR. 16, 1971. ARG. 0181813, AUS. 0429322, BEL. 0737102, CAN. 0885918, CZC. 0161861, EGR. 0081317, FRA. 6927184, GRB. 1256282, ITL. 0869726, JAP. 0716364, SPN. 0370289, STZ. 0496263, SWD. 0353165, TIW. 0005357, USR. 0380031.
3,572,288.—DEVELOPMENT APPARATUS. MAR. 23, 1971. CAN. 0885917.
3,572,289.—MAGNETIC BRUSH DEVELOPMENT APPARATUS. MAR. 3, 1971.
3,575,139.—ELECTROSTATIC MAGNETIC DEVELOPER UNIT GATING APPARATUS. APR. 20, 1971. CAN. 0930538.
3,583,364.—DEVELOPMENT APPARATUS. JUNE 8, 1971. BEL. 0738574, CAN. 0883725, FRA. 6930427, GRB. 1273187, ITL. 0871550, JAP. 0674394.
3,608,522.—XEROGRAPHIC DEVELOPMENT CONTROL APPARATUS. SEPT. 28, 1971. CAN. 0911704.
3,640,248.—ELECTROSTATIC MAGNETIC DEVELOPING APPARATUS—MULTIPLE MAGNETIC BRUSH UNIT. FEB. 8, 1972. ARG. 0184080, ATR. 0312419, AUS. 0437486, BEL. 0751486, BRA. 0088030, CAN. 0929337, CHL. 0026193, EGR. 0084331, FRA. 7020260, GRB. 1251477, ITL. 0893838, MEX. 0117951, NOR. 0133049, PNM. 0002537, SAF. 0703774, SPN. 0380378, STZ. 0509614, SWD. 0359664, TIW. 0007168. USR. 0419061, VZL. 0025834.
3,641,980.—DEVELOPMENT APPARATUS. FEB. 15, 1972. ARG. 0185081, AUS. 0445430, BEL. 0757698, CAN. 0913354, EGR. 0085713, FRA. 7038237, GRB. 1273456, ITL. 0909031, JAP. 0720627, MEX. 0118187, SPN. 0384576, STZ. 0516183, SWD. 0362510, TIW. 0006205.
3,665,891.—MAGNETIC BRUSH DEVELOPMENT APPARATUS. MAY 30, 1972. CAN. 0914904, GRB. 1347138, JAP. 783770.
3,683,406.—MAGNETIC INCREMENTAL CASCADE DEVELOPMENT SYSTEM. AUG. 8, 1972. CAN. 0945200, GRB. 1335995, JAP. 0752521.
3,690,912.—METHOD FOR MAGNETIC DEVELOPMENT OF LATENT ELECTROSTATIC IMAGE. SEPT. 12, 1972.
3,697,050.—CROSS MIXING BAFFLE. OCT. 10, 1972. CAN. 0951110.
3,709,713.—METHOD FOR MAGNETIC DEVELOPMENT. JAN. 9, 1973.
3,724,422.—MAGNETIC BRUSH DEVELOPING APPARATUS. APR. 3, 1973. ARG. 0190744, AUS. 0457858, BEL. 0776598, CAN. 0951111, EGR. 0097962, FRA. 7145341, GRB. 1373010, ITL. 0943877, MEX. 0124647, SPN. 0397854, SWD. 0365880, USR. 0459904.
3,788,275.—MAGNETIC SHIELDING APPARATUS. JAN. 29, 1974. BEL. 0801242, CAN. 0973703, GRB. 1438332, ITL. 0990692.
3,828,728.—XEROGRAPHIC DEVELOPMENT SYSTEM. AUG. 13, 1974. BEL. 0791193, CAN. 0980635, FRA. 7240058, GRB. 1413337, ITL. 0970350, SWD. 7214311.
3,866,564.—MAGNETIC BRUSH DEVELOPING APPARATUS FOR COPIERS. FEB. 18, 1975.
3,872,830.—MAGNETIC BRUSH DEVELOPING APPARATUS. MAR. 25, 1975.
3,880,517.—REPRODUCTION MACHINE DEVELOPER APPARATUS. APR. 29, 1975.
3,880,518.—FLOATING DEVELOPER PLATEN FOR REPRODUCTION APPARATUS. APR. 29, 1975.
3,887,367.—METHOD FOR TEMPERATURE STABLIZING PHOTORECEPTORS. JUNE 3, 1975.
3,893,815.—MAGNETIC BRUSH SUPPORT MEMBER. JULY 8, 1975.
3,906,121.—ELECTROSTATIC DEVELOPMENT METHOD USING MAGNETIC BUSH CONFIGURATION TRANSPORT. SEPT. 16, 1975. CAN. 0970631, GRB. 1381049.
3,906,898.—MAGNETIC BRUSH DEVELOPING APPARATUS. SEPT. 23, 1975.
3,911,864.—TONER PRELOADED MAGNETIC BRUSH DEVELOPMENT SYSTEM. OCT. 14, 1975. BEL. 0809859, STZ. 0568594.
3,915,121.—DEVELOPMENT APPARATUS. OCT. 28, 1975.
3,920,329.—BACKGROUND REMOVAL . APPARATUS. NOV. 18, 1975.

3,921,577.—MAGNETIC DEVELOPMENT UNIT. NOV. 25, 1975.
3,926,516.—DEVELOPMENT APPARATUS FOR AN ELECTROSTATOGRAPHIC PRINTING MACHINE. DEC. 16, 1975.
3,927,640.—DEVELOPER SHUT-OFF APPARATUS. DEC. 23, 1975.
3,934,549.—TRANSFER APPARATUS. JAN. 27, 1976.
3,945,342.—MAGNETIC BRUSH SUPPORT MEMBER. MAR. 23, 1976.
3,948,217.—MAGNETIC BRUSH DEVELOPMENT SYSTEM WITH FLOATING DEVELOPMENT ROLLS. APR. 6, 1976. BEL. 0835370.
3,949,704.—MAGNETIC BRUSH DEVELOPING APPARATUS. APR. 13, 1976.
3,950,089.—COATED ROLL FOR MAGNETIC BRUSH DEVELOPMENT & CLEANING SYSTEMS. APR. 13, 1976.
3,953,121.—ARTICULATED DEVELOPMENT APPARATUS. APR. 27, 1976. IRN. 0013434.
3,962,003.—METHOD OF FORMING MAGNETIC BRUSH SUPPORT MEMBER. JUNE 8, 1976.
3,968,773. JULY 13, 1976.
3,982,498.—DEVELOPMENT APPARATUS. SEPT. 28, 1976. FRA. 7436713.
3,991,713.—DEVELOPMENT APPARATUS FOR AN ELECTROSTATOGRAPHIC PRINTING MACHINE. NOV. 16, 1976.
3,996,892.—SPATIALLY PROGRAMMABLE ELECTRODE TYPE ROLL FOR ELECTROSTATOGRAPHIC PROCESSORS AND THE LIKE. DEC. 14, 1976.
4,033,293.—A DEVELOPING DEVICE OF AN ELECTROPHOTOGRAPHIC COPYING MACHINE. JULY 5, 1977.
4,033,294.—DEVELOPER MIXING AND TRANSPORTING AUGER FOR MAGNETIC BRUSH DEVELOPING APPARATUS. JULY 5, 1977.
4,034,709.—AN IMPROVED DEVELOPER ROLL. JULY 12, 1977.

Class 5C 1A

2,832,311.—APPARATUS FOR DEVELOPMENT OF ELECTROSTATIC IMAGES. APR. 29, 1958. CAN. 0605908, GRB. 0889202.
3,584,601.—MAGNETIC BRUSH BELT DEVELOPMENT. JUNE 15, 1971. CAN. 0884799, GRB. 1238277.
3,592,166.—APPARATUS FOR DEVELOPING ELECTROSTATIC IMAGES. JULY 13, 1971. CAN. 0887598, GRB. 1275822, JAP. 1162298.
3,638,614.—ELECTROSTATIC LATENT IMAGE DEVELOPMENT APPARATUS. FEB. 1, 1972. CAN. 0929338, GRB. 1304236, JAP. 0808219.
3,741,790.—METHOD FOR MAGNETICALLY DEVELOPING ELECTROSTATIC IMAGES. JUNE 26, 1973.
3,823,688.—MAGNETIC BRUSH ASSEMBLY. JULY 16, 1974. BEL. 0794507, CAN. 0989607, FRA. 7302247, GRB. 1394502, SWD. 7301014.
3,965,862.—XEROGRAPHIC DEVELOPMENT SYSTEM. JUNE 29, 1976.

Class 5C 1B

3,532,071.—DEVELOPMENT APPARATUS. OCT. 6, 1970. CAN. 0883763, GRB. 1227549, JAP. 0650630.
3,552,355.—DEVELOPMENT APPARATUS. JAN. 5, 1971. ARG. 0175330, ATR. 0300575, AUS. 0441519, BEL. 0730371, CAN. 0914005, CZC. 0161850, DNK. 0129880, EGR. 0077412, EIR. 0032786, FRA. 6909741, GRB. 1263566, GRK. 0039919, IND. 0120212, ISR. 0031757, ITL. 0860255, LXB. 0058295, MEX. 0111374, NOR. 0128037, NZL. 0155695, PAK. 0120989, PLD. 0017651, PLP. 0006606, PNM. 0001723, PTG. 0051392, RHD. 1156947, SAF. 0691728, SPN. 0365439, STZ. 0499140, SWD. 0341530, TIW. 0006602, UAR. 0009242, USR. 0383338, VTM. 0001829, VZL. 0023745.
3,645,770.—METHOD FOR DEVELOPING XEROGRAPHIC IMAGES. FEB. 29, 1972.
3,893,414.—METHOD AND APP FOR VARYING DEVELOPER BANDWIDTH. JULY 8, 1975.
3,908,596.—SEGMENTED GATE DEVELOPER FLOW CONTROLLER. SEPT. 30, 1975.
3,930,466.—SEGMENTED GATE DEVELOPER FLOW CONTROLLER. JAN. 6, 1976.
3,990,393.—APPARATUS FOR DEPOSITING MAGNETIC MATERIAL ON AN IMAGE BEARING MEMBER. NOV. 9, 1976.
3,998,184.—A DEVELOPMENT APPARATUS. DEC. 21, 1976.
4,025,179.—PASSIVE CROSS MIXING SYSTEM. MAY 24, 1977.

Class 5C 2

3,508,823.—DUPLICATING APPARATUS. APR. 28, 1970.
3,836,244.—COLOR XEROGRAPHY. SEPT. 17, 1974.
3,941,280.—APPARATUS FOR CONTROLLING DEVELOPER EFFICIENCY. MAR. 2, 1976.
3,965,862.—XEROGRAPHIC DEVELOPMENT SYSTEM. JUNE 29, 1976.

Class 5C 3

2,846,333.—METHOD OF DEVELOPING ELECTROSTATIC IMAGES. AUG. 5, 1958. CAN. 0609146.
3,906,897.—DEVELOPMENT APPARATUS. SEPT. 23, 1975. ARG. 0195893, BEL. 0797447, CAN. 0982886, FRA. 7243003, GRB. 1435761, ITL. 0987768, MEX. 0130638, SAF. 0733407, SPN. 0414905, STZ. 0551030, SWD. 7307101, VZL. 0032067.
3,940,272.—METHOD OF DEVELOPING AN ELECTROSTATIC LATENT IMAGE. FEB. 24, 1976. ARG. 0195893, BEL. 0797447, CAN. 0982886, FRA. 7243003, GRB. 1435761, ITL. 0987768, MEX. 0130638, SAF. 0733407, SPN. 0414905, STZ. 0551030, SWD. 7307101, VZL. 0032067.

Class 5D

2,618,551.—DEVELOPER FOR ELECTROSTATIC IMAGES. NOV. 18, 1952. AUS. 0148642, CAN. 0495360, GER. 0926587, GRB. 0686466, STZ. 0292431, SWD. 0161100.
3,768,904.—PRINTING APPARATUS INCLUDING REGISTRATION CONTROL. OCT. 30, 1973.
3,793,985.—IMAGING SYSTEM. FEB. 26, 1974.
3,924,944.—SPLIT DEVELOPER HOUSING. DEC. 9, 1975.
4,015,561.—ANTI-GRAVITATIONAL CASCADE DEVELOPMENT FOR ELECTROSTATIC PROCESSOR. APR. 5, 1977.

Class 5D 1

3,219,014.—MECHANICAL SHIELD TO PROTECT MAGNETIC CORE IN XEROGRAPHIC DEVELOPING APPARATUS. NOV. 23, 1965. CAN. 0757573, FRA. 1393298, GER. 1497076, GRB. 1034099, ITL. 0710188, JAP. 0477812.
3,685,488.—XEROGRAPHIC DEVELOPMENT. AUG. 22, 1972.
3,884,571.—LEAKAGE DEVELOPER RECIRCULATION. MAY 20, 1975. HOL. 3884571.
3,999,512.—ELECTROSTATIC DEVELOPMENT SYSTEM WITH PASSIVE STORAGE CAPACITY. DEC. 28, 1976. BEL. 0823656.
4,033,293.—A DEVELOPING DEVICE OF AN ELECTROPHOTOGRAPHIC COPYING MACHINE. JULY 5, 1977.

Class 5D 1A

2,705,199.—METHOD OF DEVELOPING AN ELECTROSTATIC LATENT IMAGE. MAR. 29, 1955. CAN. 0525077.
3,067,720.—XEROGRAPHIC DEVELOPING APPARATUS. DEC. 11, 1962. ARG. 0175377, BEL. 0750689, PNM. 0002011, VZL. 0025828.
3,095,325.—TONER DISPENSER DRIVE MECHANISMS. JUNE 25, 1963.
3,190,264.—XEROGRAPHIC DEVELOPING APPARATUS. JUNE 22, 1965. CAN. 0733036.
3,303,817.—XEROGRAPHIC DEVELOPING APPARATUS. FEB. 14, 1967.
3,472,657.—XEROGRAPHIC DEVELOPMENT METHOD AND APPARATUS. OCT. 14, 1969. AUS. 0418178, BEL. 0680374, CAN. 0813843, FRA. 1477370, GRB. 1141167, ITL. 0766858, JAP. 0537665, MEX. 0091119, SWD. 0330833.
3,593,838.—CONVEYOR BELT. JULY 20, 1971. CAN. 0883720.
3,635,553.—CASCADE DEVELOPING APPARATUS UTILIZING A ROTARY WHEEL WITH SCOOPS. JAN. 18, 1972.
3,649,262.—SIMULTANEOUS DEVELOPMENT-CLEANING OF SAME AREA OF AN ELECTROSTATOGRAPHIC IMAGE SUPPORT SURFACE. MAR. 14, 1972. AUS. 0445365, BEL. 0743661, CAN. 0916232, FRA. 6944511, GRB. 1296997, ITL. 0882670, USR. 0358873.
3,662,711.—DEVELOPMENT APPARATUS. MAY 16, 1972. CAN. 0945757, GRB. 1345253.
3,663,291.—CASCADE DEVELOPMENT. MAY 16, 1972.
3,678,896.—CONVEYOR SYSTEM. JULY 25, 1972. CAN. 0952465, GRB. 1325831.

Class 5D 1B

3,122,454.—XEROGRAPHIC DEVELOPING APPARATUS. FEB. 25, 1964.
3,435,803.—LIFTING APPARATUS. APR. 1, 1969. CAN. 0937394, FRA. 1511169, GER. 1456806, GRB. 1165378, ITL. 0788954, JAP. 0542586, MEX. 0095039.
3,448,724.—DEVELOPING APPARATUS. JUNE 10, 1969. ARG. 0174576, AUS. 0430081, BEL. 0726573, CAN. 0884214, CZC. 0157054, EGR. 0077413, FRA. 1598024, GRB. 1258781, ITL. 0854008, JAP. 0665972, MEX. 0107603, PNM. 0001429, RMN. 0054735, SAF. 0069179, SPN. 0362358, STZ. 0486057, SWD. 0338507, USR. 0410595, VZL. 0023716.
3,472,657.—XEROGRAPHIC DEVELOPMENT METHOD AND APPARATUS. OCT. 14, 1969. AUS. 0418178, BEL. 0680374, CAN. 0813843, FRA. 1477370, GRB. 1141167, ITL. 0766858, JAP. 0537665, MEX. 0091119, SWD. 0330833.
3,606,533.—XEROGRAPHIC DEVELOPMENT. SEPT. 20, 1971.
3,661,118.—ELECTROSTATIC DEVELOPMENT. MAY 9, 1972. CAN. 0951107, GRB. 1359234.
3,695,224.—CASCADE DEVELOPMENT. OCT. 3, 1972.
3,835,811.—DEVELOPMENT APPARATUS FOR ELECTROPHOTOGRAPHIC PRINTING MACHINE. SEPT. 17, 1974.
3,888,578.—DEVELOPMENT APPARATUS FOR ELECTROPHOTOGRAPHIC PRINTING MACHINE. JUNE 10, 1975.
3,900,255.—PADDLE-WHEEL DEVELOPMENT SYSTEM. AUG. 19, 1975.

Class 5D 1C

2,880,696.—APPARATUS FOR DEVELOPING AN ELECTROSTATIC LATENT IMAGE. APR. 7, 1959. CAN. 0698394.
3,117,891.—XEROGRAPHIC APPARATUS. JAN. 14, 1964. CAN. 0740394, GRB. 1006078.
3,287,150.—CASCADE DEVELOPMENT PROCESS W/TWO-COMPONENT DEVELOPER. NOV. 22, 1966.
3,415,224.—MAGNETIC CASCADE DEV APPARATUS. DEC. 10, 1968. AUS. 0423497, BEL. 0725943, CAN. 0852660, COR. 000948A, EGR. 0074432, FRA. 1603904, GRB. 1217281, ITL. 0849521, LXB. 0057873, MRC. 0014726, PTG. 0051108, SAF. 0688440, SPN. 0361840. STZ. 0493872, SWD. 0345753, SYA. 0002440, ZMB. 0166972.
3,667,427.—CASCADE APPARATUS. JUNE 6, 1972. CAN. 0951112, GRB. 1377152.
3,678,897.—DEVELOPER MIXING APPARATUS. JULY 25, 1972. BEL. 0778426, CAN. 0951113, FRA. 7203212, GRB. 1377151, ITL. 0946909.
3,741,372.—CONVEYOR FOR DEVELOPER APPARATUS. JUNE 26, 1973.

Class 5D 1D

2,889,234.—XEROGRAPHIC DEVELOPMENT PROCESS. JUNE 2, 1959.
3,550,555.—XEROGRAPHIC DEVELOPER SEPARATION. DEC. 29, 1970. CAN. 0855652, GRB. 1238032.

Class 5D 2

3,105,770.—CASCADE DEVELOPMENT IMPROVEMENT. OCT. 1, 1963. AUS. 0252867, BEL. 0749545, CAN. 0746453, FRA. 1286397, GER. 1278244, GRB. 0986844, ITL. 0648862, JAP. 0517396.
3,375,807.—XEROGRAPHIC DEVELOPER. APR. 2, 1968. CAN. 0819049, MEX. 0092092, VZL. 0024448.
3,542,579.—ELECTROSTATIC IMAGE DEVELOPMENT. NOV. 24, 1970.
3,973,517.—DEVELOPMENT DEVICE AND METHOD. AUG. 10, 1976.

Class 5D 3

3,057,324.—XEROGRAPHIC DEVELOPING APPARATUS. OCT. 9, 1962.
3,336,905.—XEROGRAPHIC DEVELOPER APPARATUS. AUG. 22, 1967. CAN. 0793223, GRB. 1123059, JAP. 0508405.
3,428,025.—XEROGRAPHIC DEVELOPMENT APPARATUS-POWDER CLOUD BY CHARGE BREAKDOWN. DEC. 18, 1969.
3,638,610.—DEVELOPMENT APPARATUS. FEB. 1, 1972. CAN. 0916432, FRA. 7041622.
3,638,611.—ELECTRODED DEVELOPMENT DEVICE. FEB. 1, 1972. ARG. 0184658, ATR. 0308537, AUS. 0446323, BEL. 0752936, CAN. 0913893, CHL. 0025914, DNK. 0129305, EGR. 0084129, FRA. 7024067, GRB. 1258738, GUA. 0002615, IND. 0127311, ITL. 0900196, JAP. 0719143, MEX. 0115403, NOR. 0130134, NZL. 0160644, PLD. 0081287, PLP. 0006288, PNM. 0002266, PTG. 0054072, SAF. 0704532, SPN. 0381383, STZ. 0520961, SWD. 0359386, TIW. 0005923, USR. 0414818.
3,682,132.—AUTOMATIC DEVELOPER CONTROLLER. AUG. 8, 1972.

Class 5D 4

3,347,691.—XEROGRAPHIC DEVELOPMENT. OCT. 17, 1967. ARG. 0168482, CAN. 0827608, FRA. 1497061, GRB. 1166464, ITL. 0788454, JAP. 0589492, MEX. 0093822, VZL. 0032595.
3,412,710.—CLEAN UP ELECTRODE. NOV. 26, 1968. BEL. 0704923, CAN. 0867283, FRA. 1540699, GRB. 1196637, ITL. 0814605, JAP. 0585018.
3,620,191.—BIASED INPUT CHUTE. NOV. 16, 1971. ARG. 0199542, ATR. 0324837, AUS. 0446250, BEL. 0752943, CAN. 0918411, CHL. 0025871, DNK. 0128800, EGR. 0083704, FRA. 7024665, GRB. 1310444, GUA. 0002727, IND. 0127313, ITL. 0900192, JAP. 0731612, MEX. 0114979, NOR. 0132115, NZL. 0160647, PLP. 0008638, PNM. 0002269, PTG. 0054075, SAF. 70/4534, SPN. 0381382, STZ. 0528761, SWD. 0359387, TIW. 0007164, USR. 0358874.
3,669,072.—DEVELOPER APPARATUS. JUNE 13, 1972. CAN. 0930539, GRB. 1343141.
3,682,538.—XEROGRAPHIC PICK-OFF PLATE. AUG. 8, 1972. ARG. 0186267, BEL. 0764562, CAN. 0935635, FRA. 7110750, GRB. 1349272, ITL. 0922348, MEX. 0119677, USR. 0426387.
3,682,677.—BACKGROUND REMOVAL. AUG. 8, 1972.
3,795,222.—DEVELOPMENT ELECTRODE SYSTEM. MAR. 5, 1974.
3,807,997.—PLURAL ELECTRODE DEVELOPMENT METHODS FOR LATENT ELECTROSTATIC IMAGES. APR. 30, 1974. CAN. 0979299, GRB. 1381910.
3,808,026.—LIQUID DEVELOPMENT OF ELECTROSTATIC LATENT IMAGE. APR. 30, 1974.
3,834,930.—METHOD OF DEVELOPING ELECTROSTATOGRAPHIC IMAGE. SEPT. 10, 1974.
3,907,695.—LIQUID DEVELOPER. SEPT. 23, 1975.

Class 5D 5

2,550,724.—APPARATUS FOR APPLYING POWDER TO AN ELECTROPHOTOGRAPHIC PLATE. MAY 1, 1951.
2,550,738.—APPARATUS FOR APPLYING POWDER TO AN ELECTROPHOTOGRAPHIC PLATE - TRAY WITH GATES. MAY 2, 1951.
2,635,046.—DEVELOPING DEVICE FOR ELECTROSTATIC IMAGES. APR. 14, 1953.
2,827,013.—ELECTROPHOTOGRAPHIC DEVELOPING DEVICE. MAR. 18, 1958.
3,223,548.—XEROGRAPHIC DEVELOPING MACHINE AND METHOD. DEC. 14, 1965.
3,316,878.—CASCADE DEVELOPING APPARATUS. MAY 2, 1967.

Class 5E

3,357,399.—COMBINED FLUIDIZED BED AND INVERTED CASCADE DEVELOPMENT APPARATUS. DEC. 12, 1967. ARG. 0171121, CAN. 0821473, CHL. 0022944, MEX. 0096075, PRU. 0009332, URG. 0008548, VZL. 0021060.
3,677,633.—PORTABLE DOCUMENT ABSTRACTOR. JULY 18, 1972.
3,738,832.—COLOR ELECTROPHOTOGRAPHIC PROCESS EMPLOYING LIQUID DEVELOPER CONTAINING GELATINAIN. JUNE 12, 1973.
3,748,126.—MULTIPLE COPY SELECTIVE RE-WETTING PRINTING. JULY 24, 1973.
3,748,127.—TREATMENT OF REUSABLE PHOTOCONDUCTIVE SURFACES WITH LEWIS ACIDS OR BASES. JULY 24, 1973.
3,776,631.—LIQUID DEVELOPER CLEANING SYSTEM. DEC. 4, 1973.
3,865,611.—METHOD FOR ELECTROSTATIC IMAGE DEVELOPMENT EMPLOYING TONER AND CARRIER SUPPORTED BY CONDUCTIVE. FEB. 11, 1975.
3,893,854.—PHOTOGRAPHIC ARTICLES WITH GAPS FOR PROCESSING FLUIDS. JULY 8, 1975.
3,918,809.—APPARATUS FOR CLEANING A SURFACE SUPPORT. NOV. 11, 1975, GRB. 1438660.

3,927,934.—ELECTROSTATOGRAPHIC REPRODUCTION MACHINES. DEC. 23, 1975.
3,940,282.—BLADE CLEANING OF SURFACE WITH REVERSE MOVEMENT. FEB. 24, 1976.
3,951,653.—METHOD OF PREVENTING TONER BUILD-UP ON ELECTRODES DURING LIQUID DEVELOPMENT. APR. 20, 1976.
3,973,699.—LIQUID DISPENSING APPARATUS UTILIZING DOUBLE ACTING PISTON. AUG. 10, 1976, GRB. 1455885.
3,974,554.—QUANDRANGULAR TRIHETICORD GRAVURE ROLL. AUG. 17, 1976, BEL. 0841855.
3,978,817.—PATTERNED GRAVURE & DOCTORING MEANS THEREFOR. SEPT. 7, 1976, BEL. 0841855.
3,980,404.—XEROGRAPHIC APPARATUS HAVING IMPROVED FLUID DISPENSING MEMBER. SEPT. 14, 1976.
4,017,174.—DEVELOPER ASSEMBLY SUPPORT. APR. 12, 1977.
4,020,788.—DOCTORING MEANS. MAY 3, 1977.
4,023,900.—VARIABLE SPEED LIQUID DEVELOPMENT ELECTROSTATOGRAPHIC APPARATUS. MAY 17, 1977.
4,024,834.—TEMPERATURE COMPENSATED DOCTOR BLADE. MAY 24, 1977. GRB. 1430518.
4,037,952.—METHOD OF PREVENTING TONER BUILD-UP ON ELECTRODES DURING LIQUID DEVELOPMENT. JULY 26, 1977.

Class 5E 1

2,551,582.—METHOD OF PRINTING AND DEVELOPING SOLVENT IMAGES - ELECTROPHOTOGRAPHY. MAY 8, 1951.
2,965,482.—METHOD FOR FIXING XEROGRAPHIC IMAGES. DEC. 20, 1960.
3,005,726.—PROCESS OF DEVELOPING ELECTROSTATIC IMAGES. OCT. 24, 1961.

Class 5E 2

3,068,115.—ELECTROSTATIC EMULSION DEVELOPMENT. DEC. 11, 1962. GER. 1302344, GRB. 1006230, JAP. 0466442.
3,730,708.—ELECTROPHOTOGRAPHIC MULTI-COLOR PROCESS EMPLOYING LIQUID DEVELOPER. MAY 1, 1973.
3,776,723.—LIQUID TRANSFER ELECTROPHOTOGRAPHIC DEVELOPMENT PROCESS. DEC. 4, 1973.
3,862,618.—LIQUID DEVELOPING APPARATUS DEVELOPING AN ELECTROSTATIC IMAGE. JAN. 28, 1975.
3,960,444.—ELECTROPHOTOGRAPHIC PRINTING MACHINE. JUNE 1, 1976.
4,007,401.—ELECTROPHOTOGRAPHIC PRINTING METHOD. FEB. 8, 1977.

Class 5E 3

3,080,251.—METHOD OF XEROGRAPHIC DEVELOPMENT. MAR. 5, 1963.

Class 5E 4

3,010,842.—DEVELOPMENT OF ELECTROSTATIC IMAGES. NOV. 28, 1961. CAN. 0704604.
3,064,622.—IMMERSION DEVELOPMENT. NOV. 20, 1962. CAN. 0729544, FRA. 1296944, GER. 1190787, GRB. 0990968, JAP. 0451638.
3,129,115.—XEROGRAPHIC DEVELOPING APPARATUS. APR. 14, 1964. GRB. 1008004.
3,251,688.—LIQUID TRANSFER DEVELOPMENT. MAY 17, 1966. CAN. 0765523, FRA. 1362253, GRB. 1032013.
3,270,637.—ELECTROVISCOUS RECORDING. SEPT. 6, 1966. AUS. 0403009, CAN. 0740112, FRA. 1414126, GER. 1497109, GRB. 1086197, HOL. 0141644, ITL. 0738077, JAP. 0508403, NOR. 0127882, STZ. 0472710, SWD. 0331032.
3,281,241.—METHOD OF FORMING A VISUAL RECORD OF A LATENT IMAGE RECEIVING WEB. OCT. 25, 1966. AUS. 0275028, CAN. 0766420, FRA. 1362254, GER. 1303008, GRB. 1035236, ITL. 0699412, JAP. 0470426.
3,284,224.—CONTROLLED XEROGRAPHIC DEVELOPMENT. NOV. 8, 1966. CAN. 0751349, GRB. 1038801, JAP. 0640353.
3,334,613.—XEROGRAPHIC DEVELOPMENT APPARATUS. AUG. 8, 1967. CAN. 0787870, GRB. 1125628, JAP. 0546654.
3,369,918.—DEV OF LATENT ELECTROSTATIC IMGS W/ CREATED WAVES OF LIQUID DEVELOPER. FEB. 20, 1968.
3,576,623.—DEVELOPMENT SYSTEM EMPLOYING A CORONODE IMMERSED IN A LIQUID DEVELOPER. APR. 27, 1971. AUS. 0434437, CAN. 0872191, GER. 1908292, GRB. 1259880, JAP. 0675662.
3,577,259.—LIQUID DEVELOPMENT OF ELECTROSTATIC LATENT IMAGES UTILIZING A TONER-FREE ZONE. MAY 4, 1971.
3,592,678.—LIQUID DONOR DEVELOPMENT WITH ELECTROPHORETIC CLEANING. JULY 13, 1971.
3,620,800.—CLEANING LIQUID DEVELOPED ELECTROSTATIC IMAGES BY CONTACT WITH VAPORIZED CLEANING FLUID. NOV. 16, 1971. CAN. 0933997.
3,627,410.—REPRODUCTION APPARATUS WITH LIQUID. DEC. 14, 1971. CAN. 0886508.
3,627,557.—LIQUID DVLPMNT BY REDUCING VISCOSITY OF DVLPR ON ROLLER APPLICATION PRIOR TO DEVELOPMENT. DEC. 14, 1971.
3,628,981.—LIQUID TONER DEVELOPMENT. DEC. 21, 1971. ARG. 0181932, MEX. 0116451.
3,642,471.—LIQUID DEVELOPING PROCESS IN AN ELECTROSTATOGRAPHIC IMAGING SYSTEM. FEB. 15, 1972.
3,642,515.—LIQUID DEVELOPMENT UTILIZING A CURVILINEAR DEVELOPMENT ELECTRODE. FEB. 15, 1972.
3,652,319.—CYCLIC IMAGING SYSTEM. MAR. 28, 1972. AUS. 0441527, BEL. 0761029, CAN. 0944010, FRA. 7047634, GRB. 1336739, ITL. 0913957, JAP. 0771819, SWD. 0363175.
3,656,948.—SELECTED REMOVAL OF LIQUID DVLPR IN CYCLICAL ELECTROPHOTOGRAPHIC PROCESS. APR. 18, 1972. CAN. 0906335, GRB. 1335054, JAP. 0760503.
3,671,290.—IMAGING SYSTEM. JUNE 20, 1972.
3,672,884.—ELECTROSTATIC PRINTING. JUNE 27, 1972.
3,692,520.—DVLPNG ELCTRSTIC IMGS EMPLYNG FATTY ACD ESTRS INHBT DVLPR BUILD-UP. SEPT. 19, 1972. CAN. 0940361, GRB. 1332674.
3,784,397.—IMAGING SYSTEM. JAN. 8, 1974.
3,800,744.—ELECTROSTATIC LATENT IMAGE DEVELOPING APPARATUS. APR. 2, 1974.
3,804,510.—IMAGING DEVELOPING SYSTEM. APR. 16, 1974.
3,808,025.—LIQUID DEVELOPING METHOD FOR ELECTROPHOTOGRAPHY. APR. 30, 1974.
3,816,114.—ELECTRO-PHOTOGRAPHIC METHOD. JUNE 11, 1974.
3,817,212.—ELECTROSTATOGRAPHIC LIQUID DEVELOPMENT APPARATUS. JUNE 18, 1974.
3,832,975.—ELECTROPHOTOGRAPHIC APPARATUS. SEPT. 3, 1974.
3,836,384.—IMAGING SYSTEMS. SEPT. 17, 1974.
3,841,893.—CHARGE CONTROL AGENTS FOR LIQUID DEVELOPERS. OCT. 15, 1974.
3,849,171.—METHOD FOR CLEANING BACKGROUND AREAS FROM DEVELOPED RECORDING SURFACES. NOV. 19, 1974. CAN. 0941882.
3,862,619.—ELECTRO-PHOTOGRAPHIC APPARATUS. JAN. 28, 1975.
3,864,125.—ELECTROPHOTOGRAPHIC METHOD OF MAKING AN IMAGING MASTER. FEB. 4, 1975.
3,870,514.—LIQUID DEVELOPMENT FOR THE ELECTRONIC PHOTOGRAPHY. MAR. 11, 1975.
3,877,934.—INDUCTION IMAGING WITH IN-PLACE DEVELOPMENT. APR. 15, 1975.
3,890,040.—INDUCTION IMAGING APPARATUS. JUNE 17, 1975.
3,913,524.—LIQUID DEVELOPING APPARATUS FOR ELECTROPHOTOGRAPHY. OCT. 21, 1975.
3,926,825.—LIQUID DEVELOPER COMPOSITION AND PROCESS FOR PREPARING SAME. DEC. 16, 1975.
3,931,792.—ABRASIVE LIQUID DEVELOPING APPARATUS. JAN. 13, 1976.
3,942,474.—DEVELOPING SYSTEMS. MAR. 9, 1976. ARG. 0181931, ATR. 0311971, AUS. 0457519, BEL. 0752802, CAN. 0904108, CHL. 0026275, EGR. 0084325, FRA. 7024068, GRB. 1320509, ITL. 0894828, JAP. 0815361, MEX. 0116454, SAF. 0704474, SPN. 0381297, STZ. 0513437, SWD. 0357269, TIW. 0006614, 0033335.
3,943,268.—LIQUID DEVELOPER PROCESS AND APP FOR ELECTROSTATOGRAPHY. MAR. 9, 1976. CAN. 0904683.
3,965,861.—SEPARATED ROLLER LIQUID DEVELOPMENT. JUNE 29, 1976.
3,968,044.—MILLED LIQUID DEVELOPER. JULY 6, 1976.
3,970,043.—ELECTROPHOTOGRAPHIC DEVICE FOR LIQUID DEVELOPMENT. AUG. 20, 1976.

3,971,659.—COLOR ELECTROPHOTOGRAPHIC PROCESS USING PHOTO CONDUCTIVE PARTICLES IN LIQUID DEVELOPER. JULY 27, 1976.
3,972,305.—IMAGING SYSTEM. AUG. 3, 1976. CAN. 0904683.
3,976,808.—IMAGING SYSTEMS. AUG. 24, 1976.
3,986,968.—MILLED AND POLAR SOLVENT EXTRACTED LIQUID DEVELOPER. OCT. 19, 1976.

Class 5E 5

3,084,043.—LIQUID DEVELOPMENT OF ELECTROSTATIC LATENT IMAGES. APR. 2, 1963. CAN. 0678365, GRB. 0880597.
3,372,027.—XEROGRAPHIC LIQUID DEVELOPMENT. MAR. 5, 1968. CAN. 0800963, GRB. 1091169, ITL. 0760712, JAP. 0571175.
3,652,319.—CYCLIC IMAGING SYSTEM. MAR. 28, 1972. AUS. 0441527, BEL. 0761029, CAN. 0944010, FRA. 7047634, GRB. 1336739, ITL. 0913957, JAP. 0771819, SWD. 0363175.
3,667,428.—DEVELOPING SYSTEMS. JUNE 6, 1972. ARG. 0195534, ATR. 0312420, AUS. 0456202, BEL. 0752805, CAN. 0904107, CHL. 0026274, CZC. 0164275, DNK. 0126528, EGR. 0083514, FRA. 7024066, GRB. 1320232, ITL. 0894827, JAP. 0745765, MEX. 0114978, PNM. 0002541, SAF. 0704475, SPN. 0194607, STZ. 0543753, SWD. 0366126, TIW. 0006616, USR. 0420196.
3,676,215.—IMAGING SYSTEM. JULY 11, 1972. ARG. 0182525, AUS. 0430692, BEL. 0732139, CAN. 0900770, FRA. 6913232, GRB. 1272306, ITL. 0857440, JAP. 0698292, MEX. 0109289, PNM. 0001433, SPN. 0386902, SWD. 0352117, USR. 0309549.
3,692,520.—DVLPNG ELCTRSTIC IMGS EMPLYNG FATTY ACD ESTRS INHBT DVLPR BUILD-UP. SEPT. 19, 1972. CAN. 0940361, GRB. 1332674.
3,712,728.—REVERSAL DEVELOPMENT. JAN. 23, 1973. BEL. 0777718, CAN. 0949826, FRA. 7201004, GRB. 1374831, ITL. 0946351.
3,729,419.—LIQUID DEVELOPER. APR. 24, 1973.
3,772,012.—REVERSAL DEVELOPMENT USING POLAR LIQUID DEVELOPERS. NOV. 13, 1973. BEL. 0777718, CAN. 0949826, FRA. 7201004, GRB. 1374831, ITL. 0946351.
3,776,723.—LIQUID TRANSFER ELECTROPHOTOGRAPHIC DEVELOPMENT PROCESS. DEC. 4, 1973.
3,795,530.—ELECTROSTATIC LATENT IMAGE DEVELOPMENT. MAR. 5, 1974.
3,806,354.—METHOD OF DEVELOPING ELECTROSTATIC LATENT IMAGES. APR. 23, 1974.
3,817,748.—CONTRAST CONTROL IN ELECTROSTATIC COPYING UTILIZING LIQUID DEVELOPMENT. JUNE 18, 1974. GRB. 1406794.
3,834,930.—METHOD OF DEVELOPING ELECTROSTATOGRAPHIC IMAGE. SEPT. 10, 1974.
3,856,519.—TRANSFER OF TONER USING A VOLATILE INSULATING LIQUID. DEC. 24, 1974.
3,900,405.—CASSETTE OPENING MECHANISM. AUG. 19, 1975. CAN. 0926460, GRB. 1362697.
3,907,694.—NON-VOLATILE CONDUCTIVE INKS. SEPT. 23, 1975.
3,907,695.—LIQUID DEVELOPER. SEPT. 23, 1975.
3,918,400.—BLADE MOUNTING ASSEMBLIES. NOV. 11, 1975. BEL. 0816534, FRA. 7421752, GRB. 1419417.
3,918,807.—CLEANING BLADE FOR PHOTOCOPIER. NOV. 11, 1975.
3,942,349.—CROWN DIE FOR THREAD ROLLING OF APPLICATOR ROLLS. MAR. 9, 1976.
3,942,474.—DEVELOPING SYSTEMS. MAR. 9, 1976. ARG. 0181931, ATR. 0311971, AUS. 0457519, BEL. 0752802, CAN. 0904108, CHL. 0026275, EGR. 0084325, FRA. 7024068, GRB. 1320509, ITL. 0894828, JAP. 0815361, MEX. 0116454, SAF. 0704474, SPN. 0381297, STZ. 0513437, SWD. 0357269, TIW. 0006614, VZL. 0033335.
3,954,640.—ELECTROSTATIC PRINTING INKS. MAY 4, 1976. BEL. 0816553, GRB. 1452556.
3,978,817.—PATTERNED GRAVURE AND DOCTORING MEANS THEREFOR. SEPT. 7, 1976. BEL. 0841855.
3,980,404.—XEROGRAPHIC APPARATUS HAVING IMPROVED FLUID DISPENSING MEMBER. SEPT. 14, 1976.
3,985,663.—CONDUCTIVE INKS CONTAINING QUATERNARY AMMONIUM COMPOUNDS. OCT. 12, 1976.
3,993,023.—COATED FILAMENT WOUND INK APPLICATOR ROLL. NOV. 23, 1976.
3,993,024.—FILAMENT WOUND INK APPLICATOR ROLL. NOV. 23, 1976.
3,994,726.—LAMINATED FLEXIBLE PHOTORECEPTOR. NOV. 30, 1976. GRB. 1429517.
4,002,476.—METHOD OF DEVELOPING RESILIENT PHOTOCONDUCTIVE ELEMENT. JAN. 11, 1977. GRB. 1429517.
4,004,931.—CONSTANT VISCOSITY INKS. JAN. 25, 1977.
4,007,983.—IMPROVED LIQUID DEVELOPER CLEANING MEANS. FEB. 15, 1977.
4,017,174.—DEVELOPER ASSEMBLY SUPPORT. APR. 12, 1977.
4,023,967.—ELECTROPHOTOGRAPHIC LIQUID DEVELOPMENT METHOD IN WHICH A UNIFORM SUBSTANTIAL INTERFACE CONTACT. BEL. 0819537, GRB. 1429518.
4,024,292.—PROCESS FOR DEVELOPING LATENT ELECTROSTATIC IMAGES WITH INK. MAY 17, 1977. BEL. 0816553, GRB. 1452556.
4,024,838.—DEVELOPER LIQUID SUPPLY DEVICE. MAY 24, 1977.
4,027,964.—IMAGING METHOD AND APPARATUS. JUNE 7, 1977. ARG. 0190535, BEL. 0777714, CAN. 0949825, FRA. 7201000, GRB. 1374501, ITL. 0946355, MEX. 0124981.

Class 5F

2,843,084.—XEROGRAPHIC APPARATUS WITH ENDLESS DEVELOPMENT ELECTRODE. JULY 15, 1958.
2,844,123.—BELT DEVELOPMENT ELECTRODE. JULY 22, 1958.
2,880,699.—XEROGRAPHIC DEVELOPMENT. APR. 7, 1959.
2,895,847.—ELECTRIC IMAGE DEVELOPMENT. JULY 21, 1959. CAN. 0558894.
2,918,898.—XEROGRAPHIC BELT LOADING APPARATUS. DEC. 29, 1959. CAN. 0611529.
3,124,483.—APPARATUS FOR TRANSFERRING POWDER IMAGES AND METHOD THEREFOR. MAR. 10, 1964. CAN. 0843622.
3,166,432.—IMAGE DEVELOPMENT. JAN. 19, 1965. CAN. 0675704, FRA. 1260844, GER. 1185062, GRB. 0959668, JAP. 0401040.
3,203,394.—XEROGRAPHIC DEVELOPMENT APPARATUS. AUG. 31, 1965. CAN. 0757572, GER. 1497070, GRB. 1026704, JAP. 0464922.
3,216,844.—METHOD OF DEVELOPING ELECTROSTATIC IMAGES WITH PHOTOCONDUCTIBLE DONOR MEMBER. NOV. 9, 1965. CAN. 0794035, GRB. 1024983.
3,301,152.—XEROGRAPHIC COPYING APPARATUS. JAN. 31, 1967.
3,332,396.—XEROGRAPHIC DEVELOPING APPARATUS WITH CONTROLLED CORONA MEANS. JULY 25, 1967. AUS. 0287695, BEL. 0656893, CAN. 0775061, FRA. 1419973, GER. 1288915, GRB. 1060679, ITL. 0745583.
3,375,806.—XEROGRAPHIC DONOR DEVELOPMENT APPARATUS. APR. 2, 1968.
3,376,852.—DIELECTRIC BELT DEVELOPING. APR. 9, 1968. CAN. 0859028, GRB. 1214512, JAP. 0919364.
3,405,682.—XEROGRAPHIC DEVELOPMENT APPTS WITH WEB LOADING MEANS TO REMOVE RESIDUAL DEVELOPER. OCT. 15, 1968. GRB. 1102282.
3,606,864.--DONOR ASSEMBLY. SEPT. 21, 1971. CAN. 0903461, GRB. 1280951, MEX. 0116025.
3,613,636.—ELECTROGRAPHIC DEVELOPER. OCT. 19, 1971. GRB. 1282991.
3,635,196.—PNEUMATICALLY CONTROLLED SEAL. JAN. 18, 1972.
3,645,618.—VACUUM NOZZLE TO REMOVE AGGLOMERATES ON A TONER APPLICATOR. FEB. 29, 1972. CAN. 0949823.
3,696,783.—AUTOMATED TOUCHDOWN DEVELOPMENT SYSTEM. OCT. 10, 1972. CAN. 0949822, GRB. 1373666.
3,696,785.—DEVELOPMENT APPARATUS. OCT. 10, 1972. CAN. 0949824, GRB. 1373665.
3,697,169.—ELECTROSTATIC RECORDING APPARATUS AND METHOD. OCT. 10, 1972. CAN. 0954292, GRB. 1322681.
3,703,157.—MTHD/APPRTS FOR FRMNG UNFRM LYR OF PWDR DVELPR ON A SURFACE. NOV. 21, 1972.
3,707,389.—LATENT ELECTROSTATIC IMAGE DEVELOPMENT. DEC. 26, 1972. AUS. 0457281, BEL. 0777721, CAN. 0949827, FRA. 7201007, GRB. 1375048, ITL. 0946354.
3,729,334.—IMAGING PROCESS. APR. 24, 1973.
3,739,748.—DONOR FOR TOUCHDOWN DEVELOPMENT. JUNE 19, 1973.
3,759,222.—MICROFIELD DONOR WITH CONTINUOUSLY REVERSING MICROFIELDS. SEPT. 18, 1973. BEL. 0780091, CAN. 0951596, FRA. 7208102, GRB. 1385966, ITL. 0949779.
3,848,566.—DONOR APPARATUS. NOV. 19, 1974.

3,866,574.—XEROGRAPHIC DEVELOPING APPARATUS. FEB. 18, 1975, FRA. 7405248, GRB. 1458766.
3,881,927.—HALF TONE DEVELOPMENT PROCESS FOR TOUCHDOWN SYSTEM IN ELECTROSTATIC IMAGING. MAY 6, 1975. GRB. 1419926.
3,884,185.—COATED WIRE DEVELOPER BRUSH. MAY 20, 1975.
3,890,929.—XEROGRAPHIC DEVELOPING APPARATUS. JUNE 24, 1975.
3,893,418.—XEROGRAPHIC DEVELOPING APPARATUS. JULY 8, 1975.
3,900,002.—DONOR APPARATUS. AUG. 19. 1975.
3,914,460.—DEVELOPMENT UTILIZING ELECTRIC FIELDS. OCT. 21, 1975.
3,929,098.—TONER LOADING FOR TOUCHDOWN DONOR. DEC. 30, 1975.
3,970,042.—COLOR DEVELOPMENT APPARATUS. JULY 20, 1976.
3,997,688.—DEVELOPING AN ELECTRICAL IMAGE. DEC. 14, 1976.
3,998,185.—MICROFIELD DONORS WITH TONER AGITATION AND THE METHODS OF THEIR MANUFACTURE. DEC. 21, 1976.
3,999,515.—SELF SPACING MICROFIELD DONORS. DEC. 28, 1976.
3,999,849.—TOUCHDOWN AMBIPOLAR DEVELOPMENT. DEC. 28, 1976.
4,003,333.—DEVELOPMENT SYSTEM. JAN. 18, 1977.
4,006,981.—HALF TONE DEVELOPMENT FOR TOUCHDOWN SYSTEM. FEB. 8, 1977. GRB. 1419926.
4,011,834.—TOUCHDOWN ELECTROSTATIC DEVELOPMENT APPARATUS. MAR. 15, 1977.
4,017,648.—TONER AGITATION THROUGH MICROFIELD DONOR. APR. 12, 1977.
4,025,185.—APPLICATOR MEMBER. MAY 24, 1977. GRB. 1436098.

Class 5G

3,380,437.—TRANSVERSELY RECIPROCATING FLUIDIZED BED DEVELOPMENT APPARATUS. APR. 30, 1968. ARG. 0179553, BRA. 0088502, CAN. 0821491, CHL. 0022941, CLB. 0016330, MEX. 0095936, PRU. 0009315, URG. 0008636, VZL. 0020996.
3,393,663.—FLUIDIZING ELECTRODE DEVELOPMENT APPARATUS. JULY 23, 1968. ARG. 0171118, AUS. 0411962, BEL. 0701467, CAN. 0821472, CHL. 0024009, CLB. 0017645, CZC. 0157025, DNK. 0123998, EGR. 0072982, FRA. 1531274, GRB. 1193443, ISR. 0028298, ITL. 0805956, LXB. 0054062, MEX. 0095697, NOR. 0127834, NZL. 0149432, PLD. 0069038, PTG. 0048069, SAF. 0674268, SPN. 0343103, STZ. 0481406, SWD. 0322414, USR. 0353449, VZL. 0021059.
3,396,700.—XEROGRAPHIC TONER DISPENSING APPARATUS. AUG. 13, 1968. CAN. 0852126, GRB. 1231868, JAP. 0752503.
3,574,660.—ORBITAL DEVELOPER STREAM DEVELOPMENT. APR. 13, 1971. CAN. 0845076, GRB. 1193277.
3,641,977.—APPARATUS FOR AGITATING DEVELOPER MATERIAL WITHIN A HOUSING. FEB. 15, 1972. CAN. 0917405, GRB. 1342684.
3,682,137.—J-SHELL DEVELOPER HOUSING. AUG. 8, 1972. CAN. 0949820, GRB. 1342782.
3,900,001.—DEVELOPING APPARATUS. AUG. 19, 1975. CAN. 0970631, GRB. 1381049.

Class 5H

2,761,416.—DEVELOPMENT MECHANISM FOR ELECTROSTATIC IMAGES. SEPT. 4, 1956.
3,015,304.—ELECTROSTATIC IMAGE REPRODUCTION. JAN. 2, 1962. CAN. 0713395.
3,484,265.—TRANSVERSELY RECIPROCATING FLUIDIZED BED DEVELOPMENT METH. DEC. 16, 1969.
3,503,776.—XEROGRAPHIC DEVELOPMENT. MAR. 31, 1970. CAN. 0828694, FRA. 1511809, GRB. 1182291, ITL. 0793692, MEX. 0098765.
3,611,991.—VIBRATING BED DEVELOPING APPARATUS WITH ELECTROMAGNETIC DEVELOPER AGITATOR. OCT. 12, 1971. AUS. 0445409, BEL. 0755605, CAN. 0911707, EGR. 0083516, FRA. 7032503, GRB. 1264780, ITL. 0907435, JAP. 0745766, SPN. 0383333, STZ. 0521615, SWD. 0361956, TIW. 0007201, USR. 0371738.
3,613,637.—DEVELOPER FOR ELECTROSTATIC IMAGES. OCT. 19, 1971. AUS. 0448238, BEL. 0752034, CAN. 0911702, FRA. 7021987, GRB. 1301157, ITL. 0894180, SWD. 0358975.
3,621,816.—INTERLACED VIBRATING ELECTRODE. NOV. 23, 1971. CAN. 0914397, GRB. 1316614, JAP. 0835102.
3,623,454.—FLUIDIZED BED DEVELOPMENT APPARATUS. NOV. 30, 1971. CAN. 0895208, GRB. 1272373, JAP. 0731616.
3,654,900.—FLUIDIZED DEVELOPMENT OF ELECTROSTATIC IMAGES. APR. 11, 1972. CAN. 0949821, GRB. 1357149.
3,685,486.—FLUIDIZED DEVELOPMENT APPARATUS. AUG. 22, 1972. CAN. 0921693, GRB. 1316306, JAP. 0746925.
3,754,531.—FLUIDIZED DEVELOPMENT APPARATUS. AUG. 28, 1973.
3,844,252.—SHEET REMOVAL DEVICE. OCT. 29, 1974. BEL. 0814943, CAN. 1000749, FRA. 7415957, ITL. 1012669, PNM. 0003193, PTG. 0061701, SPN. 0426423, SWD. 7406337.

Class 5I

3,838,922.—APPARATUS FOR SENSING THE QUANTITY OF RECLAIMED DEVELOPER MATERIAL. OCT. 1, 1974. CAN. 0992600, GRB. 1414319.
3,841,265.—DEVELOPER ASSEMBLY FOR ELECTROSTATIC COPIER. OCT. 15, 1974.
3,844,252.—SHEET REMOVAL DEVICE. OCT. 29, 1974. BEL. 0814943, CAN. 1000749, FRA. 7415957, ITL. 1012669, PNM. 0003193, PTG. 0061701, SPN. 0426423, SWD. 7406337.
3,873,197.—APPARATUS FOR REGULATING THE TONER CONCENTRATION IN A ELECTROPHOTOGRAPHIC DEVICE. MAR. 25, 1975.
3,926,338.—THERMALLY INSENSITIVE PARTICLE CONCENTRATION CONTROLLER. DEC. 16, 1975.

Class 5I 1

3,316,875.—XEROGRAPHIC DEVELOPING APPARATUS. MAY 2, 1967.
3,331,355.—XEROGRAPHIC DEVELOPING APPARATUS. JULY 18, 1967. CAN. 0793224, FRA. 1465811, GRB. 1069351, ITL. 0778708.
3,349,750.—XEROGRAPHIC DEVELOPMENT APPARATUS. OCT. 31, 1967. CAN. 0819050, FRA. 1516053, GRB. 1165377, ITL. 0788953, JAP. 0547202, MEX. 0093862.
3,356,248.—CONTAINER WITH A ROTATABLE CLOSURE. DEC. 5, 1967. CAN. 0825091, GRB. 1166618.
3,550,556.—DEVELOPMENT APPARATUS. DEC. 29, 1970. ARG. 0180677, AUS. 0442279, BEL. 0726571, BRA. 6905449, CAN. 0882576, CZC. 0157055, EGR. 0076888, FRA. 1604314, GRB. 1252494, ITL. 0854006, JAP. 0731247, MEX. 0109983, PNM. 0001770, RMN. 0054558, SAF. 0069180, SPN. 0362037, STZ. 0498431, SWD. 0351059, USR. 0372851, VZL. 0023724.
3,661,118.—ELECTROSTATIC DEVELOPMENT. MAY 9, 1972. CAN. 0951107, GRB. 1359234.
3,662,711.—DEVELOPMENT APPARATUS. MAY 16, 1972. CAN. 0945757, GRB. 1345253.
3,663,291.—CASCADE DEVELOPMENT. MAY 16, 1972.
3,687,270.—CONVEYOR ASSEMBLY. AUG. 29, 1972. CAN. 0952464, GRB. 1376231.
3,717,122.—MAGNETIC GATE. FEB. 20, 1973. CAN. 0960031, GRB. 1377023.
3,943,887.—HYBRID CROSSMIXER. MAR. 16, 1976.
3,947,107.—PARTIALLY SUBMERGED ACTIVE CROSSMIXER. MAR. 30, 1976. BEL. 0835370.
3,973,518.—CROSS MIXING BLENDING CHAMBER FOR ELECTROSTATIC PROCESSORS AND THE LIKE. AUG. 10, 1976.
3,995,590.—BLENDING CHAMBER FOR ELECTROSTATIC PROCESSORS. DEC. 7, 1976.
3,999,512.—ELECTROSTATIC DEVELOPMENT SYSTEM WITH PASSIVE STORAGE CAPACITY. DEC. 28, 1976. BEL. 0823656.

Class 5I 2

3,941,280.—APPARATUS FOR CONTROLLING DEVELOPER EFFICIENCY. MAR. 2, 1976.
3,983,841.—TONER RECLAIM CONVEYOR. OCT. 5, 1976.
4,011,835.—TONER CONVEYOR. MAR. 15, 1977.

Class 5I 2A

2,750,922.—APPARATUS FOR DEVELOPING ELECTROPHOTOGRAPHIC PLATES. JUNE 19, 1956.
2,965,266.—XEROGRAPHIC TONER DISPENSER. DEC. 20, 1960, GRB. 0881609.
3,122,455.—XEROGRAPHIC TONER DISPENSER. FEB. 25, 1964.
3,135,433.—XEROGRAPHIC TONER DISPENSING APPARATUS. JUNE 2, 1964. CAN. 0701240.

3,149,760.—POWDER DISPENSING APPARATUS. SEPT. 22, 1964.
3,250,439.—XEROGRAPHIC TONER DISPENSER. MAY 10, 1966. CAN. 0815453, GRB. 1126197, JAP. 0512654.
3,337,072.—LOADER. AUG. 22, 1967. CAN. 0825092, GRB. 1166619, JAP. 0605648.
3,385,500.—TONER PACKAGE. MAY 28, 1968. CAN. 0864337, GRB. 1189147, JAP. 0931680.
3,619,279.—TONER RECEIVING MEMBER. NOV. 9, 1971.
3,622,054.—TONER DISPENSER IMPROVEMENT. NOV. 23, 1971. CAN. 0911705.
3,722,471.—TONER METER DEVICE. MAR. 27, 1973. CAN. 0951108, GRB. 1370009.
3,740,288.—METHOD OF PREPARING A TONER DISPENSER. JUNE 19, 1973.
3,920,155.—PARTICLE LEVEL INDICATOR. NOV. 18, 1975.
3,924,566.—REPRODUCTION MACHINE WITH MEANS FOR SOLIDIFYING THE RECLAIM TONER. DEC. 9, 1975.
3,941,470.—A TONER PARTICLE DISPENSER. MAR. 2, 1976.
3,951,539.—ELECTROSTATIC REPRODUCTION MACHINE WITH IMPROVED TONER DISPENSING APPARATUS. APR. 20, 1976.
3,954,331.—TONER DISPENSER. MAY 4, 1976.
3,979,022.—MONITORING DEVICE—MAGNETIC POWERED ALARM DEVICE. SEPT. 7, 1976. BEL. 0801607, CAN. 0982841, FRA. 7300103, GRB. 1431574, ITL. 0990693, SWD 7308931.
4,034,701.—PARTICLE DISPENSEROTONER DISPENSER—EPIC. JULY 12, 1977. BEL. 0801243, CAN. 0979209, FRA. 7323735, GRB. 1,438,799, ITL. 0990691, SWD. 7,308,929.

Class 5I 2B

2,974,632.—DEVELOPER OF ELECTROSTATIC PHOTOGRAPHY. MAR. 14, 1961. CAN. 0704147.
3,389,863.—XEROGRAPHIC TONER DISPENSER. JUNE 25, 1968. CAN. 0835862, FRA. 1497062, GRB. 1171303, ITL. 0787552, JAP. 0589523, MEX. 0093821, VZL. 0024004.
3,390,664.—XEROGRAPHIC TONER DISPENSING APPARATUS. JULY 2, 1968. CAN. 0852124, GRB. 1208593, JAP. 0608323.
3,619,279.—TONER RECEIVING MEMBER. NOV. 9, 1971.

Class 5I 2C

3,951,539.—ELECTROSTATIC REPRODUCTION MACHINE WITH IMPROVED TONER DISPENSING APPARATUS. APR. 20, 1976.
3,956,108.—ANTI-PLUGGING DEVICE FOR AUTOMATIC DEVELOPABILITY CONTROL SYSTEMS. MAY 11, 1976.
3,958,878.—ELECTROSTATIC PROCESSOR HOUSING INTERCHANGABLE RESERVOIRS FOR SUPPING & RECLAIMING TONER. MAY 25, 1976.
3,974,944.—TONER DISPENSER. AUG. 17, 1976.

Class 5I 2C 1

RE.27,876.—DISPENSING APPARATUS. JAN. 8, 1974. CAN. 0868818.
3,013,703.—POWDER DISPENSING APPARATUS. DEC. 19, 1961. CAN. 0677935, GRB. 0938501, JAP. 0300276.
3,300,101.—TONER DISPENSER. JAN. 24, 1967. CAN. 0800856, GRB. 1152671, JAP. 0524530.
3,339,807.—TONER CONTAINER AND DISPENSER. SEPT. 5, 1967. CAN. 0842133, GRB. 1165953, JAP. 0547201.
3,396,700.—XEROGRAPHIC TONER DISPENSING APPARATUS. AUG. 13, 1968. CAN. 0852126, GRB. 1231868, JAP. 0752503.
3,453,045.—XEROGRAPHIC DEVELOPMENT APPARATUS. JULY 1, 1969. CAN. 0852125, FRA. 1559973, GRB. 1213493, HUN. 0156188, ITL. 0832847, JAP. 0602169, USR. 0371739.
3,538,887.—ELECTROSCOPIC TONER POWDER DISPENSER. NOV. 10, 1970.
3,542,089.—TONER DISPENSER. NOV. 24, 1970. CAN. 0885916.
3,596,807.—DISPENSING APPARATUS—REISSUED D2184R RE27876. AUG. 3, 1971. CAN 0868818.
3,608,792.—APPARATUS FOR DISPENSING FINELY DIVIDED PARTICULATE MATERIAL. SEPT. 28, 1971. ARG. 0182132, ATR. 0311790, AUS. 0456817, BEL. 0745602, CAN. 0869923, CHL. 0025844, DNK. 0128336, FRA. 7003984, GRB. 1302401, GUA. 0002512, ITL. 0886722, MEX. 0119828, NZL. 0159117, PNM. 0002240, SAF. 0700806, SPN. 0376265, STZ. 0526801, SWD. 7001426, TIW. 0005927, VZL. 0032924.
3,654,900.—FLUIDIZED DEVELOPMENT OF ELECTROSTATIC IMAGES. APR. 11, 1972. CAN. 0949821, GRB. 1357149.
3,655,033.—VIBRATORY BOWL—TONER DISPENSER. APR. 11, 1972.
3,752,576.—TRANSPORT FOR PARTICULATE MATERIAL. AUG. 14, 1973.
3,896,279.—TNE LVL DETCTR ASSEMBLY INC MAGNETICLY RESPONSIVE SWITCH ACTUATD BY DFERENTL LOADED BLADE TYPE. JULY 22, 1975.
3,901,187.—DEVELOPER RETONING APPARATUS. AUG. 26, 1975.
3,920,154.—TONER LEVEL DETECTOR. NOV. 18, 1975.
3,951,539.—ELECTROSTATIC REPRODUCTION MACHINE WITH IMPROVED TONER DISPENSING APPARATUS. APR. 20, 1976.

Class 5I 2C 2

3,094,049.—XEROGRAPHIC DEVELOPER MEASURING APPARATUS. JUNE 18, 1963.
3,348,522.—AUTOMATIC TONER CONTROL SYSTEM. OCT. 24, 1967. CAN. 0799397, GRB. 1135743, JAP. 0942998, MEX. 0089292.
3,348,523.—AUTOMATIC TONER CONTROL SYSTEM. OCT. 24, 1967. CAN. 0799399, GRB. 1139299, JAP. 5371200.
3,376,853.—ELECTROSTATIC TONER CONTROL. APR. 9, 1968. CAN. 0819051, GRB. 1177232, JAP. 0568731.
3,376,854.—AUTOMATIC TONER DISPENSING CONTROL—SEE D2425 FOR RE27480. APR. 9, 1968. ARG. 0164003, ATR. 0279352, AUS. 0416453, BEL. 0699115, CAN. 0866349, CHL. 0022942, CLB. 0016441, CZC. 0160633, DNK. 0116114, EGR. 0067870, EIR. 0031100, FRA. 1524678, GRB. 1186775, GRK. 0033692, IND. 0110760, ISR. 0028022, ITL. 0796438, JAP. 0800113, LXB. 0053713, MEX. 0099990, NOR. 0128039, NZL. 0148850, PAK. 0118694, PLD. 0069794, PLP. 0005554, PRU. 0009348, PTG. 0047758, SAF. 0673111, SPN. 0340983, STZ. 0473409, SWD. 6707266, TRK. 0014624, UAR. 0008620, URG. 0008538, USR. 0494887, VZL. 0023661.
3,430,606.—ELECTROSCOPIC PARTICLE SENSOR. MAR. 4, 1969. BEL. 0726274, BRA. 6805010, CAN. 0891683, FRA. 1597321, ITL. 0866513, MEX. 0107599, PNM. 0001400, USR. 0336895, VZL. 0023727.
3,498,500.—LEVEL SENSOR. MAR. 3, 1970. CAN. 0912851, GRB. 1251128, JAP. 0663856.
3,520,445.—DIELECTRIC LEVEL SENSOR. JULY 14, 1970. CAN. 0895527, GRB. 1239856, JAP. 0663857.
3,526,338.—METHOD AND CONTROLLER FOR DISPENSING ELECTROSCOPIC MATERIAL—AUTOMATIC TONER DISPENSER CONTROL—24. SEPT. 1, 1970. ARG. 0181603, AUS. 0436922, BEL. 0726274, BRA. 6804852, CAN. 0895526, GRB. 1216690, ITL. 0866513, JAP. 0752505, MEX. 0107687, PNM. 0001419, SPN. 0362036, SWD. 0355090, USR. 0336895, VZL. 0023723.
3,527,387.—DEVELOPER REPLENISHING PROGRAMMING SYSTEM. SEPT. 8, 1970. CAN. 0922772, GRB. 1233814, JAP. 0758340.
3,536,042.—XEROGRAPHIC DEVELOPMENT APPARATUS. OCT. 27, 1970.
3,604,939.—TONER SENSING APPARATUS—TONER SENSOR ASSEMBLY-GENIE. SEPT. 14, 1971. CAN. 0915751, GRB. 1260379, JAP. 0752502.
3,635,373.—AUTOMATIC DEVELOPABILITY CONTROL APPARATUS. JAN. 18, 1972. ARG. 0190708, AUS. 0445334, BEL. 0760748, CAN. 0923546, CHL. 0025916, EGR. 0091983, FRA. 7047630, GRB. 1336590, GUA. 0002624, ITL. 0913903, JAP. 0795149, MEX. 0116721, PNM. 0002092, SPN. 0386750, STZ. 0524843, SWD. 0362511, TIW. 0007197.
3,659,556.—PROGRAMMABLE TONER DISPENSER. MAY 2, 1972. BEL. 0771423, CAN. 0936681, FRA. 7130743, GRB. 1358448, ITL. 0934010.
3,692,403.—AUTOMATIC CONTROL OF TONER CONCENTRATIONS. SEPT. 19, 1972. CAN. 0979635, GRB. 1409578.
3,693,581.—TONER DISPENSER CIRCUIT FOR ELECTROSTATOGRAPHIC APPARATUS. SEPT. 26, 1972.
3,727,065.—AUTOMATIC DEVELOPABILITY CONTROL SYSTEM. APR. 10, 1973. ARG. 0185080, AUS. 0440458, BEL. 0757430, CAN. 0934806, CHL. 0025915, CZC. 0169811, FGR. 0086755, FRA. 7038235, GRB. 1318895, ITL. 0908953, JAP. 0795148, MEX. 0116873, PNM. 0002179, SPN. 0384593, STZ. 0514168, SWD. 0369114, TIW. 0007196, VZL. 0032004.
3,754,821.—AUTOMATIC DEVELOPMENT CONTROL. AUG. 28, 1973. ARG. 0195188, AUS. 0467463, BEL.

0793425, CAN. 1004725, FRA. 7246724, GRB. 1411448, ITL. 0972845, JAP. 0552838, MEX. 0128209, NZL. 0169419, SAF. 7219030, SPN. 0410096, STZ. 0552838, SWD. 7216891, VZL. 0032066.

3,757,999.—AUTOMATIC DEVELOPABILITY CONTROL SYSTEM FOR ELECTROSTATIC RECORDING APPARATUS. SEPT. 11, 1973. ARG. 0185080, AUS. 0440458, BEL. 0757430, CAN. 0934806, CHL. 0025915, CZC. 0169811, EGR. 0086755, FRA. 7038235, GRB. 1318895, ITL. 0908953, JAP. 0795148, MEX. 0116873, PNM. 0002179, SPN. 0384593, STZ. 0514168, SWD. 0369114, TIW. 0007196, VZL. 0032004.

3,778,146.—ILLUMINATING APPARATUS. DEC. 11, 1973.

3,801,196.—TONER CONCENTRATION REGULATING APPARATUS. APR. 2, 1974.

3,814,516.—HUMIDITY COMPENSATED CONTROL DEVICE. JUNE 4, 1974. CAN. 1012202, GRB. 1458558.

3,825,337.—COLOR BALANCE DISPLAY. JULY 23, 1974. CAN. 1006766.

3,834,806.—PARTICLE LEVEL INDICATOR. SEPT. 10, 1974.

3,872,825.—PARTICLE CONCENTRATION DETECTOR. MAR. 25, 1975. CAN. 1014598.

3,873,002.—TONER DISPENSER LOGIC CONTROL. MAR. 25, 1975. BEL. 0813798, CAN. 1008915, GRB. 1457565, ITL. 1009837.

3,893,408.—TONER DISPENSER SYSTEM. JULY 8, 1975.

3,894,799.—APPARATUS FOR MONITORING COPY QUALITY. JULY 15, 1975.

3,931,792.—ABRASIVE LIQUID DEVELOPING APPARATUS. JAN. 13, 1976.

3,936,176.—DEVICE FOR MAINTAINING A DEVELOPABILITY REGULATING APPARATUS CONTAMINANT FREE. FEB. 3, 1976.

3,960,444.—ELECTROPHOTOGRAPHIC PRINTING MACHINE. JUNE 1, 1976.

3,969,114.—METHOD FOR MONITORING COPY QUALITY. JULY 13, 1976.

3,999,119.—MEASURING TONER CONCENTRATION. DEC. 21, 1976.

4,026,643.—APP & MTHD FOR MEASUREMENT OF THE RTO OF TNR PRTLCS ELCTRSTATC CHRGE TO TNR PRTLE MASS IN ELCTSTC. MAY 31, 1977.

4,032,225.—COPYING MACHINES. JUNE 28, 1977.

Class 5J

3,804,510.—IMAGING DEVELOPING SYSTEM. APR. 16, 1974.

3,889,637.—SELF-BIASED DEVELOPMENT ELECTRODE AND REPRODUCING MACHINE EMPLOYING SAME. JUNE 17, 1975. FRA. 7422700, GRB. 1464886.

3,893,415.—DEVELOPING APPARATUS. JULY 8, 1975. ARG. 0204387, BEL. 0789238, BRA. 0088405, CAN. 0991394, FRA. 7232380, GRB. 1409815, ITL. 0970948, MEX. 0128578, SPN. 0408654, STZ. 0554551, SWD. 7214863, VZL. 0033578.

3,908,037.—IMAGE DEVELOPING TECHNIQUES. SEPT. 23, 1975. CAN. 0980181, GRB. 1406292.

3,965,861.—SEPARATED ROLLER LIQUID DEVELOPMENT. JUNE 29, 1976.

Class 5J 1

2,690,394.—ELECTROPHOTOGRAPHY. SEPT. 28, 1954.

2,777,418.—METHOD AND APPARATUS FOR DEVELOPING AN IMAGE ON A XEROGRAPHIC PLATE. JAN. 15, 1957. CAN. 0587719.

2,876,737.—APPARATUS FOR DEVELOPING ELECTROSTATIC IMAGES ON SHEET MATERIAL. MAR. 10, 1959.

3,011,473.—XEROGRAPHIC APPARATUS. DEC. 5, 1961. CAN. 0675698, GRB. 0971972.

3,091,219.—XEROGRAPHIC DEVELOPING APPARATUS. MAY 28, 1963.

3,147,147.—XEROGRAPHIC DEVELOPING APPARATUS AND ELECTRODE. SEPT. 1, 1964. CAN. 0738918, GRB. 1007167.

3,241,466.—ELECTROSTATIC PHOTOGRAPHY. MAR. 22, 1966.

3,424,131.—ELECTRODED CASCADE DEVELOPMENT SYSTEM. JAN. 28, 1969. CAN. 0848084, FRA. 1463050, GER. 1497214, GRB. 1123618, ITL. 0729637, JAP. 0499007.

3,606,863.—DEVELOPMENT ELECTRODE. SEPT. 21, 1971. CAN. 0905099, GRB. 1296756, JAP. 0774497.

3,611,992.—CLEANUP ELECTRODE. OCT. 12, 1971. CAN. 0916431.

3,642,515.—LIQUID DEVELOPMENT UTILIZING A CURVILINEAR DEVELOPMENT ELECTRODE. FEB. 15, 1972.

3,648,658.—DEVELOPING APPARATUS. MAR. 14, 1972.

3,651,784.—LOW POTENTIAL DEVELOPMENT ELECTRODE. MAR. 28, 1972. CAN. 0917900.

3,670,700.—DEVELOPMENT ELECTRODE. JUNE 20, 1972. ARG. 0185528, ATR. 0324836, AUS. 0445848, BEL. 0752935, CAN. 0916430, CHL. 0025837, DNK. 0126729, EGR. 0085926, FRA. 7024671, GRB. 1304065, IND. 0127310, ITL. 0900194, JAP. 0731613, MEX. 0115164, NOR. 0131437, NZL. 0160642, PLP. 0006295, PNM. 0001951, PTG. 0054071, SAF. 0704531, SPN. 0381380, STZ. 0513439, SWD. 0358976, TIW. 0007161, USR. 0503555, VZL. 30684.

3,741,156.—XEROGRAPHIC DEVELOPMENT APPARATUS. JUNE 26, 1973.

3,778,144.—XEROGRAPHIC DEVELOPMENT ELECTRODE APPARATUS. DEC. 11, 1973. CAN. 0972550, GRB. 1393144.

3,784,299.—DARK DECAY RETARDATION. JAN. 8, 1974.

3,790,397.—RETONING CARRIER BEADS IN THE DEVELOPMENT ZONE. FEB. 5, 1974.

3,795,222.—DEVELOPMENT ELECTRODE SYSTEM. MAR. 5, 1974.

3,816,114.—ELECTRO-PHOTOGRAPHIC METHOD. JUNE 11, 1974.

3,817,212.—ELECTROSTATOGRAPHIC LIQUID DEVELOPMENT APPARATUS. JUNE 18, 1974.

3,832,975.—ELECTROPHOTOGRAPHIC APPARATUS. SEPT. 3, 1974.

3,955,976.—DEVELOPING METHOD IN ELECTROPHOTOGRAPHY-DEVELOPING METHOD IN ELECTROPHOTOGRAPHY. MAY 11, 1976. GRB. 1329143.

Class 5J 2

2,784,694.—SEGMENTED DEVELOPMENT ELECTRODE. MAR. 12, 1957. CAN. 0564484.

3,416,494.—XEROGRAPHIC DEVELOPMENT ELECTRODE. DEC. 17, 1968. CAN. 0882575, GER. 1816690, GRB. 1249664, JAP. 0653014.

3,621,816.—INTERLACED VIBRATING ELECTRODE. NOV. 23, 1971. CAN. 0914397, GRB. 1316614, JAP. 0835102.

Class 5J 3

2,952,241.—DEVELOPER ELECTRODE FOR ELECTROPHOTOGRAPHIC APPARATUS. SEPT. 13, 1960.

3,349,676.—XEROGRAPHIC DEVELOPMENT ELECTRODE APPARATUS. OCT. 31, 1967. CAN. 0814087, FRA. 1473662, GER. 1522685, GRB. 1144766, ITL. 0764006, JAP. 0513609, MEX. 0090133.

3,866,572.—FORAMINOUS ELECTROSTATOGRAPHIC TRANSFER SYSTEM. BEL. 0815546, CAN. 1009503, FRA. 7418641, GRB. 1448386, ITL. 1012842, SPN. 0426760.

Class 5J 4

2,911,944.—XEROGRAPHIC DEVELOPMENT APPARATUS. NOV. 10, 1959. CAN. 0603099.

2,942,573.—XEROGRAPHIC DEVELOPING APPARATUS. JUNE 28, 1960. CAN. 0701146, GRB. 0930072.

3,062,178.—XEROGRAPHIC DEVELOPING APPARATUS. NOV. 6, 1962.

3,105,777.—XEROGRAPHIC DEVELOPING APPARATUS. OCT. 1, 1963. CAN. 0700762.

Class 5J 5

2,784,109.—METHOD FOR DEVELOPING ELECTROSTATIC IMAGES. MAR. 5, 1957. CAN. 0558593, GRB. 0698994.

2,873,721.—MICRO-MANIFOLD FOR POWDER CLOUD DEVELOPMENT. FEB. 17, 1959.

3,284,224.—CONTROLLED XEROGRAPHIC DEVELOPMENT. NOV. 8, 1966. CAN. 0751349, GRB. 1038801, JAP. 0640353.

3,438,705.—AUTOMATIC XEROGRAPHIC DEVELOPMENT CONTROL. APR. 15, 1969. GRB. 1207830.

3,611,982.—DEVELOPMENT ELECTRODE CONTROL APPARATUS. OCT. 12, 1971. ARG. 0185532, AUS. 0450067, BEL. 0755383, BRA. 0088402, CAN. 0913353, CHL. 0025834, EGR. 0090283, FRA. 7032350, GRB. 1303148, ITL. 0901777, JAP. 0758461, MEX. 0117918, PLD. 80986, PNM. 0002245, SPN. 0383058, STZ. 0523526, SWD. 0361750, TIW. 0007514, USR. 0473382, VZL. 0032598.

3,696,784.—XEROGRAPHIC DEVELOPMENT APPARATUS. OCT. 10, 1972. BEL. 0776601, CAN. 0951109, FRA. 7146241, GRB. 1369648, ITL. 0943905.

3,719,169.—PLURAL ELECTRODE DEVELOPMENT APPARATUS. MAR. 6, 1973. CAN. 0979299, GRB. 1381910.

3,784,397.—IMAGING SYSTEM. JAN. 8, 1974.

3,788,739.—IMAGE COMPENSATION METHOD AND APPARATUS FOR ELECTROPHOTOGRAPHIC DEVICES. JAN. 29, 1974.

3,805,739.—CONTROLLING MULTIPLE VOLTAGE LEVELS FOR ELECTROSTATIC PRINTING. APR. 23, 1974. CAN. 0972552, GRB. 1382710.

3,810,165.—ELECTRONIC DISPLAY DEVICE. MAY 7, 1974.

3,815,988.—IMAGE DENSITY CONTROL APPARATUS. JUNE 11, 1974. ARG. 0205710, BEL. 0815209, FRA. 7416693, GRB. 1458707, ITL. 1012346, SAF. 0743132.

3,818,864.—IMAGE DEVELOPING APPARATUS. JUNE 25, 1974. CAN. 0980181, GRB. 1406292.

3,888,666.—REVERSAL DEVELOPING METHOD USING PHOTOCONDUCTIVE DEVELOPING ELECTRODE. JUNE 10, 1975.

3,889,637.—SELF-BIASED DEVELOPMENT ELECTRODE AND REPRODUCING MACHINE EMPLOYING SAME. JUNE 17, 1975. FRA. 7422700, GRB. 1464886.

Class 5K

2,598,732.—ELECTROPHOTOGRAPHY. JUNE 3, 1952.

3,212,889.—XEROGRAPHIC CONTRAST CONTROL. OCT. 19, 1965. GRB. 1008897.

3,251,685.—METHOD OF CONTROLLING CONTRAST IN A XEROGRAPHIC REPRODUCTION PROCESS. MAY 17, 1966. CAN. 0707047, GER. 1265583, JAP. 0446813.

3,540,806.—HALF TONING METH AND APPARATUS FOR SOLID AREA COVERAG. NOV. 17, 1970. CAN. 0892754, GRB. 1253888.

3,669,072.—DEVELOPER APPARATUS. JUNE 13, 1972. CAN. 0930539, GRB. 1343141.

3,707,947.—CROSS-CHANNEL MIXER. JAN. 2, 1973. ARG. 0200109, ATR. 0322982, AUS. 0457444, BEL. 0776661, CAN. 0946145, CHL. 0027259, DNK. 0132048, EGR. 0099026, FRA. 7145340, GRB. 1372731, ITL. 0943876, MEX. 0127352, PNM. 0002585, SAF. 0718308, SPN. 0397852, STZ. 0557554, TIW. 0005832, USR. 0402245.

3,808,026.—LIQUID DEVELOPMENT OF ELECTROSTATIC LATENT IMAGE. APR. 30, 1974.

3,817,748.—CONTRAST CONTROL IN ELECTROSTATIC COPYING UTILIZING LIQUID DEVELOPMENT. JUNE 18, 1974. CAN. 0991246, GRB. 1406794.

3,865,080.—TONER PICKOFF APPARATUS. FEB. 11, 1975. GRB. 1430876.

3,865,612.—XEROGRAPHIC DEVELOPMENT METHOD. FEB. 11, 1975.

3,887,367.—METHOD FOR TEMPERATURE STABILIZING PHOTORECEPTORS. JUNE 3, 1975.

3,889,637.—SELF-BIASED DEVELOPMENT ELECTRODE AND REPRODUCING MACHINE EMPLOYING SAME. JUNE 17, 1975. FRA. 7422700, GRB. 1464886.

3,893,413.—XEROGRAPHIC DEVELOPING APPARATUS. JULY 8, 1975.

3,911,865.—TONER PICKOFF APPARATUS. OCT. 14, 1975.

3,946,920.—VACUUM SYSTEM CONTROL. MAR. 30, 1976.

3,960,444.—ELECTROPHOTOGRAPHIC PRINTING MACHINE. JUNE 1, 1976.

3,965,861.—SEPARATED ROLLER LIQUID DEVELOPMENT. JUNE 29, 1976.

3,994,725.—MEANS FOR ENHANCING REMOVAL OF BACKGROUND TONER PARTICLE. NOV. 30, 1976.

3,997,259.—APPARATUS FOR REDUCING IMAGE BACKGROUND IN ELECTROSTATIC REPRODUCTION MACHINES. DEC. 14, 1976.

4,023,900.—VARIABLE SPEED LIQUID DEVELOPMENT ELECTROSTATOGRAPHIC APPARATUS. MAY 17, 1977.

Class 5L

2,901,374.—DEVELOPMENT OF ELECTROSTATIC IMAGE AND APPARATUS THEREFOR. AUG. 25, 1959. CAN. 0565027.

3,245,823.—ELECTROSTATIC IMAGE DEVELOPMENT APPARATUS. APR. 12, 1966.

3,926,824.—ELECTROSTATOGRAPHIC DEVELOPER COMPOSITION. DEC. 16, 1975. ARG. 0192480, AUS. 0466319, BEL. 0793098, CAN. 0985552, FRA. 7245403, GRB. 1417179, ITL. 0973327, SPN. 0410171, STZ. 0028663, SWD. 7216977.

Class 5M

2,817,598.—CONTINUOUS TONE REVERSAL DEVELOPMENT PROCESS. DEC. 24, 1957. CAN. 0574108, FRA. 1146729, GER. 1026620, GRB. 0813915, JAP. 0247824.

3,712,728.—REVERSAL DEVELOPMENT. JAN. 23, 1973. BEL. 0777718, CAN. 0949826, FRA. 7201004, GRB. 1374831, ITL. 0946351.

3,772,012.—REVERSAL DEVELOPMENT USING POLAR LIQUID DEVELOPERS. NOV. 13, 1973. BEL. 0777718, CAN. 0949826, FRA. 7201004, GRB. 1374831, ITL. 0946351.

3,800,744.—ELECTROSTATIC LATENT IMAGE DEVELOPING APPARATUS. APR. 2, 1974.

3,877,963.—REVERSAL LIQUID DEVELOPING USING A DEVELOPMENT ELECTRODE AND CORONA CHARGING. APR. 15, 1975.

3,888,666.—REVERSAL DEVELOPING METHOD USING PHOTOCONDUCTIVE DEVELOPING ELECTRODE. JUNE 10, 1975.

3,901,698.—METHOD OF REVERSAL DEVELOPMENT USING TWO ELECTROSTATIC DEVELOPERS. AUG. 26, 1975.

Class 5N

2,822,779.—DEVELOPER FOR ELECTROSTATIC PHOTOGRAPHY. FEB. 11, 1958. CAN. 0560056.

3,907,693.—LIQUID DEVELOPER FOR ELECTROPHOTOGRAPHY. SEPT. 23, 1975.

3,907,694.—NON-VOLATILE CONDUCTIVE INKS. SEPT. 23, 1975.

3,954,640.—ELECTROSTATIC PRINTING INKS. MAY 4, 1976. BEL. 0816553, GRB. 1452556.

3,963,486.—ELECTROPHOTOGRAPHIC IMAGING PROCESS EMPLOYING EPOXY-ESTER CONTAINING LIQUID DEVELOPER. JUNE 15, 1976.

4,024,292.—PROCESS FOR DEVELOPING LATENT ELECTROSTATIC IMAGES WITH INK. MAY 17, 1977. BEL. 0816553, GRB. 1452556.

Class 5N 1A

2,919,247.—TRIPARTITE DEVELOPER FOR ELECTROSTATIC IMAGES. DEC. 29, 1959. CAN. 0565006.

2,965,573.—XEROGRAPHIC DEVELOPER. DEC. 20, 1960. CAN. 0612918, GRB. 0934406.

3,609,082.—ELECTROSTATIC DEV PARTICLS CONTAING RESIN, COLORANT, METAL SALT AND PHTHALATE. SEPT. 28, 1971. ARG. 0165457, BAH. 0000094, BOL. 3389B, CAN. 0902985, CHL. 0023567, CLB. 0017680, DOR. 0001462, ECD. 0000168, ELS. 0001065. JAM. 0001897, MEX. 0100808, PNM. 0002016, PRU. 0009862, TRK. 0015594, URG. 0009288.

3,720,617.—AN ELECTROSTATIC DEVELOPER CONTAINING MODIFIED SILICON DIOXIDE PARTICLES. MAR. 13, 1973. ARG. 0189666, ATR. 0321104, AUS. 0463862, BEL. 0767359, CAN. 0941212, CHL. 0026780, EGR. 0093928, FRA. 7118950, GRB. 1347318, ITL. 0926884, MEX. 2131403, NZL. 0163670, PNM. 0002393, PRU. 0011824, STZ. 0567746, SWD. 0366402, TIW. 0006149, USR. 0460634, VZL. 0032423.

3,819,367.—IMAGING SYSTEM. JUNE 25, 1974. ARG. 0189666, ATR. 0321104, AUS. 0463862, BEL. 0767359, CAN. 0941212, CHL. 0026780, EGR. 0093928, FRA. 7118950, GRB. 1347318, ITL. 0926884, MEX. 0131403, NZL. 0163670, PNM. 0002393, PRU. 0011824, STZ. 0567746, SWD. 0366402, TIW. 0006149, USR. 0460634, VZL. 0032423.

3,820,986.—LIQUID DEVELOPMENT METHOD AND MATERIALS. JUNE 28, 1974.

3,833,364.—METHOD OF DEVELOPING ELECTROSTATIC IMAGE CHARGE. SEPT. 3, 1974.

3,850,830.—LIQUID DEVELOPER CONTAINING EXTENDER BODY PARTICLES. NOV. 26, 1974.

3,900,588.—NON-FILMING DUAL ADDITIVE DEVELOPER. AUG. 19, 1975. BEL. 0825924.

Class 5N 1B

3,013,890.—PROCESS OF DEVELOPING ELECTROSTATIC IMAGES AND COMPOSITION THEREFOR. DEC. 19, 1961. AUS. 0243022, CAN. 0812526, FRA. 1251476, GER. 1129511, GRB. 0944401, ITL. 0620433, JAP. 0313573.

3,577,345.—SOLID XEROGRAPHIC DEVELOPER. MAY 4, 1971. ARG. 0172448, ATR. 0325417, AUS. 0424173, BAH. 0000095, BEL. 0716084, BOL. 003270B, CAN. 0902983, CHL. 0025923, CLB. 0017674, DOR. 0001461, ELS. 0001064, FRA. 1567731, GRB. 1232117, GRK. 0037628, GUA. 0002003, HOL. 0148714, IND. 0116209, ISR. 0030116, ITL. 0851653, JAM. 0001848, JAP. 0623002, LXB. 0056197, MEX. 0119320, NOR. 0131653, NZL. 0164353, PNM. 0002062, PRU. 0009911, PTG. 0049749, SPN. 0354686, STZ. 0516180, SWD. 0338238,

TIW. 0005096, TRD. 0000057, TRK. 0015620, URG. 0009286, VZL. 0023666.

3,590,000.—SOLID DEVELOPER FOR LATENT ELECTROSTATIC IMAGES. JUNE 29, 1971. ARG. 0172453, ATR. 0288860, AUS. 0480033, BAH. 0000093, BEL. 0716083, BOL. 3399B, CAN. 0902984, CHL. 0024050, DOR. 0001460, ECD. 0000198, ELS. 0001062, FRA. 1567721, GER. 1772570, GRB. 1232118, GRK. 0037629, GUA. 0002095, HOL. 0151523. IND. 0116210, ISR. 0030117, ITL. 0851651, JAM. 0002094, JAP. 0655407, LXB. 0056196, MEX. 0104566, NZL. 0164356, PLP. 0007690, PNM. 0002083, PRU. 0009495, PTG. 0049748, SPN. 0354685, STZ. 0519737, SWD. 0357071, TIW. 0004940, TRD. 0000058, TRK. 0015606, URG. 0009287, VZL. 0032392.

3,609,082.—ELECTROSTATIC DEV PARTICLS CONTAING RESIN, COLORANT, METAL SALT AND PHTHALATE. SEPT. 28, 1971. ARG. 0165457, BAH. 0000094. BOL. 3389B, CAN. 0902985, CHL. 0023567, CLB. 0017680, DOR. 0001462, ECD. 0000168, ELS. 0001065, JAM. 0001897, MEX. 0100808, PNM. 0002016, PRU. 0009862, TRK. 0015594, URG. 0009288.

3,635,704.—IMAGING SYSTEM. JAN. 18, 1972. ALB. 0004133, ARG. 0176978, ATR. 0303521, AUS. 0440759, BEL. 0727560, BRA. 0088093, BUR. 0000042, CAM. 0000463, CAN. 0867697, CHL. 0026254, COR. 000949A, DNK. 0131403, EGR. 0078899, EIR. 0032632, FRA. 6902174, GNR. 0000042, GRB. 1259514, GRK. 0039240, IND. 0119583, ISR. 0031503, ITL. 0871510, LAS. 0000199, LIB. 00P7269, LXB. 0057849, MEX. 0106332, MLG. 0003056, MLW. 00MW869, MNC. 8156975, MRC. 0014724, NZL. 0155208, PAK. 0120859, PLP. 0008511, PNM. 0001676, PRU. 0010443, PTG. 0051063, RHD. 4169529, RMN. 0055464, SAF. 0069995, SPN. 0363127, STZ. 0513431, SWD. 0342921, SYA. 0002477, TGR. 0000551, TIW. 0005257, UAR. 0009525, USR. 0396887, VTM. 0001805, VZL. 0023744, ZMB. 0186974.

3,652,319.—CYCLIC IMAGING SYSTEM. MAR. 28, 1972. AUS. 0441527, BEL. 0761029, CAN. 0944010, FRA. 7047634, GRB. 1336739, ITL. 0913957, JAP. 0771819, SWD. 0363175.

3,653,893.—IMAGING SYSTEM. APR. 4, 1972.

3,655,374.—IMAGING PROCESS EMPLOYING NOVEL SOLID DEVELOPER MATERIAL. APR. 11, 1972.

3,681,107.—DEVELOPMENT OF ELECTROSTATOGRAPHIC IMAGES. AUG. 1, 1972.

3,748,127.—TREATMENT OF REUSABLE PHOTOCONDUCTIVE SURFACES WITH LEWIS ACIDS OR BASES. JULY 24, 1973.

3,820,778.—VACUUM STRIPPING ROLL WITH ROTARY PICKUP SLOTS. JUNE 28, 1974. CAN. 1010081, GRB. 1430856.

3,856,692.—LIQUID ELECTROSTOGRAPHIC DEVELOPER COMPOSITIONS. DEC. 24, 1974. CAN. 0940361, GRB. 1332674.

3,900,588.—NON-FILMING DUAL ADDITIVE DEVELOPER. AUG. 19, 1975. BEL. 0825924, SPN. 0435074.

3,900,589.—AN ELECTROSTATOGRAPHIC IMAGING PROCESS. AUG. 19, 1975. AUS. 0467835, BEL. 0802879, FRA. 7328589, GRB. 1437041, ITL. 0991465, SPN. 0417382.

3,948,654.—ELECTROSTATOGRAPHIC PROCESS. APR. 6, 1976.

3,983,045.—THREE COMPONENT DEVELOPER COMPOSITION. SEPT. 28, 1976. ARG. 0194232, ATR. 0334199, AUS. 0462045, BEL. 0789987, CHL. 0027625, FRA. 7236617, GRB. 1402009, ITL. 0968815, MEX. 0125231, NZL. 0168638, PNM. 0002796, SAF. 0727225, SPN. 0407564, STZ. 0028096, SWD. 7213035, TIW. 0007666, VZL. 0012802.

4,002,570.—ELECTROPHOTOGRAPHIC DEVELOPER WITH POLYVINYLLIDENE FLUORIDE ADDITIVE. JAN. 11, 1977.

Class 5N 2

2,618,551.—DEVELOPER FOR ELECTROSTATIC IMAGES. NOV. 18, 1952. AUS. 0148642, CAN. 0495360, GER. 0926587, GRB. 0686466, STZ. 0292431, SWD. 0161100.

2,618,552.—DEVELOPMENT OF ELECTROPHOTOGRAPHIC IMAGES. NOV. 18, 1952.

2,638,416.—DEVELOPER COMPOSITION FOR DEVELOPING AN ELECTROSTATIC LATENT IMAGE. MAY 12, 1953. AUS. 0149163, BEL. 0488778, CAN. 0507733, FRA. 0985322, GER. 0833608, GRB. 0679715, HOL. 0084987, ITL. 0453731, JAP. 0191247, SAF. 0007764, STZ. 0286147, SWD. 0150223.

3,844,815.—FORON YELLOW AS A TONER COLORANT. OCT. 29, 1974. BEL. 808754, CAN. 1003264, FRA. 7345058, ITL. 1000870.

Class 5N 2A

3,723,114.—THERMOSETTING ELCTRSTGRPHC DVLPR OF CARRIER/PREPOLYMER OF DIALLYL PHTHALATE ISOPHTHALATE AND MXTR. MAR. 27, 1973. ARG. 0185089, BEL. 0762507, CAN. 0970195, FRA. 7104349, GRB. 1344197, ITL. 0918244, MEX. 0122234.

3,806,339.—LIQUID DEVELOPER COMPOSITION. APR. 23, 1974.

3,900,800.—HIGH VOLTAGE AMPLIFIER. AUG. 19, 1975.

3,903,320.—ELECTROSTATOGRAPHIC DEVELOPMENT METHOD FOR PRESSURE FIXABLE TONERS. SEPT. 2, 1975.

3,909,259.—COLOR ELECTROPHOTOGRAPHIC IMAGING PROCESS UTILIZING SPECIFIC CARRIER-TOWER COMBINATIONS. SEPT. 30, 1975. CAN. 1005678, FRA. 7345057, GRB. 1435218.

3,942,979.—IMAGING SYSTEM. MAR. 9, 1976.

3,965,021.—ELECTROSTATOGRAPHIC DEVELOPMENT-POLYBLEND TONERS. JUNE 22, 1976.

3,967,962.—DEVELOPING WITH TONER POLYMER HAVING CRYSTALLINE AND AMORPHOUS SEGMENTS. JULY 6, 1976.

3,969,251.—DEVELOPER MIXTURE. JULY 13, 1976.

4,013,572.—HYBRID FIX SYSTEM INCORPORATING PHOTOGRADABLE POLYMERS. MAR. 22, 1977.

Class 5N 2A 1

RE.25,136.—ELECTROSTATIC DEVELOPER COMPOSITION AND METHOD THEREFOR-RE OF 2,940,934-D432. MAR. 13, 1962.

2,788,288.—RHEINFRANK JJ JONES WD. APR. 9, 1957. CAN. 0550574, GRB. 0768293.

2,892,794.—ELECTROSTATIC DEVELOPER AND TONER. JUNE 30, 1959.

2,940,934.—ELECTROSTATIC DEVELOPER COMPOSITION & METHOD THEREFOR—SEE D670 FOR RE25136. JUNE 14, 1960.

3,079,342.—ELECTROSTATIC DEVELOPER COMPOSITION AND METHOD THEREFOR. FEB. 26, 1963. ARG. 0157131, CAN. 0726134, GUA. 0001817.

3,239,465.—XEROGRAPHIC DEVELOPER. MAR. 8, 1966. CAN. 0630295, GRB. 0952166.

Class 5N 2A 2

2,659,670.—METHOD OF DEVELOPING ELECTROSTATIC IMAGES. NOV. 17, 1953.

2,753,308.—XEROGRAPHY DEVELOPER COMPOSITION. JULY 3, 1956.

3,239,465.—XEROGRAPHIC DEVELOPER. MAR. 8, 1966. CAN. 0630295, GRB. 0952166.

Class 5N 2B

3,533,835.—ELECTROSTATOGRAPHIC DEVELOPER MIXTURE. OCT. 13, 1970. ARG. 0181296, AUS. 0417746, BEL. 0704918, CAN. 0900769, CHL. 0024909, CLB. 0017825, FRA. 1540695, GRB. 1211865, IND. 0112449, ITL. 0814857, MEX. 0100137, PRU. 0009323, SWD. 0323583, URG. 0009011, VZL. 0023668.

3,591,503.—ELECTROSTATOGRAPHIC DEVELOPER. JULY 6, 1971. ARG. 0172143, ATR. 0287491, AUS. 0418556, BEL. 0713751, CAN. 0879020, CHL. 0024256, CLB. 0017933, FRA. 1560849, GRB. 1225980, GRK. 0038397, IND. 0115457, ITL. 0833710, LXB. 0055904, MEX. 0111625, NOR. 0128297, NZL. 0152196, PLP. 0008847, PRU. 0009319, PTG. 0049455, SAF. 0682386, SPN. 0352810, STZ. 0508903, SWD. 0333868, URG. 0009139, VZL. 0023688.

3,595,794.—ELECTROSTATOGRAPHIC DEVELOPER. JULY 27, 1971. ARG. 0169109, ATR. 0290986, AUS. 0418156, BEL. 0713752, CAN. 0879021, CHL. 0024482, FRA. 1582855, GRB. 1227471, IND. 0115458, ITL. 0883043, LXB. 0055894, MEX. 0115899, NOR. 0128036, NZL. 0152195, PLP. 0007966, PRU. 0009335, PTG. 0049154, SAF. 0682358, SPN. 0352811, STZ. 0505410, SWD. 0331633, URG. 0009283, VZL. 0023687.

3,627,522.—DEVELOPER COMPOSITION AND METHOD OF USE. DEC. 14, 1971.

3,672,928.—ELECTROSTATOGRAPHIC DEVELOPERS HAVING CARRIERS COMPRISING POLYSTER COATED CORES. JUNE 27, 1972. ARG. 0184669, BEL. 0762415, CAN. 0941209, FRA. 7103845, GRB. 1344365, ITL. 0918191, JAP. 0764506.

3,704,066.—REFLEX ESPOSURE MEDIUM. NOV. 28, 1972.

3,725,283.—ELECTROSTATOGRAPHIC DEVELOPER CONTAINING UNCOATED GLASS CERAMIC CARRIER PARTICLES. APR. 3, 1973. BEL. 0777720, CAN. 0973745, FRA. 7201006, GRB. 1376457, ITL. 0946358.

3,767,578.—CARRIER MATERIAL FOR ELECTROSTATOGRAPHIC. OCT. 23, 1973. ARG. 0198052, ATR. 0322978, AUS. 0461667, BEL. 0784452, CAN. 0986351, CHL. 0027640, FRA. 7220690, GRB. 1397445, ITL. 0959791, MEX. 0127643, SPN. 0403664, STZ. 0546969, SWD. 7207389, TIW. 0006042, VZL. 0032064.

3,847,604.—ELECTROSTATIC IMAGING PROCESS USING MODULAR CARRIERS. NOV. 12, 1974. ARG. 0198052, ATR. 0322978, AUS. 0461667, BEL. 0784452, CAN. 0986351, CHL. 0027640, FRA. 7220690, GRB. 1397445, ITL. 0959791, MEX. 0127643, SPN. 0403664, STZ. 0546969, SWD. 7207389, TIW. 0006042, VZL. 0032064.

3,849,127.—AN ELECTROSTATOGRAPHIC PROCESS IN WHICH COATED CARRIER PARTICLES ARE USED. NOV. 19, 1974.

3,857,792.—ELECTROSTATIC DEVELOPER MIXTURE WITH A COATED CARRIER. DEC. 31, 1974.

3,914,181.—ELECTROSTATOGRAPHIC DEVELOPER MIXTURES COMPRISING FERRITE CARRIER BEADS. OCT. 21, 1975. ARG. 0194244, AUS. 0471676, BEL. 0785913, CAN. 1000477, GRB. 1398871, ITL. 0962400, MEX. 0126285, SPN. 0404423, VZL. 0032940.

3,923,503.—ELECTROSTATIC LATEN IMAGE DEVELOPMENT EMPLOYING STEEL CARRIER PARTICLES. DEC. 2, 1975. ARG. 0181848, ATR. 0316987, AUS. 0456820, BAH. 0000162, BEL. 0752230, CAN. 0940360, CHL. 0025833, EGR. 0095180, FRA. 7021985, GRB. 1312806, ITL. 0894287, JAP. 0728825, MEX. 0121681, NOR. 0131364, NZL. 0160479, PLD. 0081013, PNM. 0002264, PTG. 0053978, SAF. 0704155, SPN. 0380913, STZ. 0548625, SWD. 0351058, TIW. 0006837, USR. 0457235.

3,926,824.—ELECTROSTATOGRAPHIC DEVELOPER COMPOSITION. DEC. 16, 1975. ARG. 0192480, AUS. 0466319, BEL. 0793098, CAN. 0985552, FRA. 7245403, GRB. 1417179, ITL. 0973327, SPN. 0410171, STZ. 0028663, SWD. 7216977.

3,939,086.—HIGHLY CLASSIFIED OXIDIZED DEVELOPER MATERIAL. FEB. 17, 1976. ARG. 0181848, ATR. 0316987, AUS. 0456820, BAH. 0000162, BEL. 0752230, CAN. 0940360, CHL. 0025833, EGR. 0095180, FRA. 7021985, GRB. 1312806, ITL. 0894287, JAP. 0728825, MEX. 0121681, NOR. 0131364, NZL. 0160479, PLD. 0081013, PNM. 0002264, PTG. 0053978, SAF. 0704155, SPN. 0380913, STZ. 0548625, SWD. 0351058, TIW. 0006837, USR. 0457235.

3,942,979.—IMAGING SYSTEM. MAR. 9, 1976.

3,969,251.—DEVELOPER MIXTURE. JULY 13, 1976.

4,018,601.—ELECTROSTATOGRAPHIC MAGNETIC BRUSH IMAGING PROCESS EMPLOYING CARRIER BEADS COMPRISING HIGH NICK. APR. 19, 1977.

Class 5N 3

2,891,011.—DEVELOPER FOR ELECTROSTATIC IMAGES. JUNE 16, 1959.

Class 5N 4

3,467,634.—ORGANOSILICON TERPOLYMERS AND PROCESS. SEPT. 16, 1969. ARG. 0165758, AUS. 0417109, BEL. 0702403, BRA. 6790950, CAN. 0857389, FRA. 1534183, GRB. 1200756, HOL. 0826202, ITL. 0826202, JAP. 0671041, MEX. 0100136, NOR. 0125392, SPN. 0343902, STZ. 0484210, SWD. 0339752, VZL. 0025437.

3,526,533.—COATED CARRIER PARTICLES. SEPT. 1, 1970. ARG. 0161341, AUS. 0418867, BEL. 0702404, CAN. 0878413, FRA. 1534184, GRB. 1205051, ITL. 0826203, JAP. 0578401, MEX. 0120334, NOR. 0122818, SPN. 0343903, STZ. 0486054, SWD. 0308987, VZL. 0032393.

3,533,835.—ELECTROSTATOGRAPHIC DEVELOPER MIXTURE. OCT. 13, 1970. ARG. 0181296, AUS. 0417746, BEL. 0704918, CAN. 0900769, CHL. 0024909, CLB. 0017825, FRA. 1540695, GRB. 1211865, IND. 0112449, ITL. 0814857, MEX. 0100137, PRU. 0009323, SWD. 0323583, URG. 0009011, VZL. 0023668.

3,713,819.—XEROGRAPHIC IMAGING AND DEVELOPMENT USING METAL OXIDE CARRIER PART. JAN. 30, 1973.

3,730,707.—METHOD OF DEVELOPING LATENT IMAGES. MAY 1, 1973.

3,752,666.—ELECTROSTATIC IMAGING PROCESS USING CARRIER BEADS CONTAINING CONDUCTIVE PARTICLES. AUG. 14, 1973.

3,833,366.—CARRIER COMPOSITIONS. SEPT. 3, 1974. BEL. 0748633, CAN. 0904641, FRA. 7012584, GRB. 1319787, ITL. 0899337, JAP. 0709043.

3,839,029.—ELECTROSTATOGRAPHIC DEVELOPMENT WITH FERRITE DEVELOPER MATERIALS. OCT. 1, 1974. ARG. 0194244, AUS. 0471676, BEL. 0785913, CAN. 1000477, GRB. 1398871, ITL. 0962400, MEX. 0126285, SPN. 0404423, VZL. 0032940.

3,849,182.—HIGHLY SHAPE-CLASSIFIED OXIDIZED LOW CARBON HYPEREUTECTOID ELECTROSTATOGRAPHIC STEEL CARRIER PA. NOV. 19, 1974. ARG. 0181848, ATR. 0316987, AUS. 0456820, BAH. 0000162, BEL. 0752230, CAN. 0940360, CHL. 0025833, EGR. 0095180, FRA. 7021985, GRB. 1312806, ITL. 0894287, JAP. 0728825, MEX. 0121681, NOR. 0131364, NZL. 0160479, PLD. 0081013, PNM. 0002264, PTG. 0053978, SAF. 0704155, SPN. 0380913, STZ. 0548625, SWD. 0351058, TIW. 0006837, USR. 0457235.

3,850,663.—CELLULOSE COATED CARRIERS. NOV. 26, 1974. ARG. 0183677, AUS. 0458322, BEL. 0763987, CAN. 0941210, EGR. 0091603, FRA. 7108585, GRB. 1345027, ITL. 0922292, MEX. 0120027, PNM. 0002440, SAF. 0711547, STZ. 0557050, SWD. 0359940, TIW. 0008177, VZL. 0032931.

3,850,676.—COATED CARRIER PARTICLES FOR ELECTROSTATOGRAPHIC DEVELOPMENT. NOV. 26, 1974.

3,900,587.—IMAGING PROCESS EMPLOYING TREATED CARRIERS PARTICLES. AUG. 19, 1975.

3,903,320.—ELECTROSTATOGRAPHIC DEVELOPMENT METHOD FOR PRESSURE FIXABLE TONERS. SEPT. 2, 1975.

3,916,064.—DEVELOPER MATERIAL. OCT. 28, 1975.

3,916,065.—ELECTROSTATOGRAPHIC CARRIER PARTICLES. OCT. 28, 1975.

3,929,657.—STOICHIOMETRIC FERRITE CARRIERS. DEC. 30, 1975. BEL. 0819535.

3,945,823.—ELECTROSTATOGRAPHIC REVERSAL DEVELOPMENT WITH DEVELOPER COMPRISING POLY(P-XYLYLENE) COATED CARR. MAR. 23, 1976. BEL. 0807597, CAN. 1003262, GRB. 1453595, MEX. 0133543, SPN. 0420696.

3,947,371.—DEVELOPER MATERIAL WITH POLYPXYLYLENE-COATED CARRIER. MAR. 30, 1976. BEL. 0807597, CAN. 1003262, GRB. 1453595, MEX. 0133543, SPN. 0420696.

3,989,648.—IMAGING SYSTEM. NOV. 2, 1976. CAN. 1007923.

3,996,392.—HUMIDITY-INSENSIVE FERRITE DEVELOPER MATERIALS. DEC. 7, 1976. BEL. 0847571.

4,007,293.—MECHANICALLY VIABLE DEVELOPER MATERIALS. FEB. 8, 1977.

4.019,903.—ELECTROSTATIC DEVELOPMENT. APR. 26, 1977. BEL. 0777715, CAN. 0973746, FRA. 7201001, GRB. 1376456, ITL. 0946359.

4,035,520.—IMAGING SYSTEMS. JULY 12, 1977.

Class 5N 5

3,788,994.—PRESSURE FIXABLE ELECTROSTATOGRAPHIC TONER. JAN. 29, 1974. ARG. 0200575, BEL. 0793247, CAN. 0985943, FRA. 7244381, GRB. 1406687, ITL. 0973323, SPN. 0410212, STZ. 0028529, VZL. 0032608.

3,804,764.—ELECTROSTATOGRAPHIC PRESSURE SENSITIVE POLYMERIC TONER. APR. 16, 1974. ARG. 0196320, AUS. 0464392, BEL. 0793554, CAN. 1011149, FRA. 7246575, GRB. 1417409, ITL. 0973325, SPN. 0410211, STZ. 0028568.

3,853,778.—TONER COMPOSITION EMPLOYING POLYMER WITH SIDE CHAIN CRYSTALLINITY. DEC. 10, 1974. AUS. 0465653, BEL. 0793639, CAN. 0998869, FRA. 7246888, GRB. 1423291, ITL. 0973330, SPN. 0410267, SWD. 7300003.

3,893,932.—PRESSURE FIXABLE TONER. JULY 8, 1975.

3,893,934.—SOLID DEVELOPER FOR ELECTROSTATIC LATENT IMAGES. JULY 8, 1975.

4,002,776.—IMAGING PROCESS EMPLOYING TONER PARTICLES CONTAINING ARYLSULPONAMIDE FORMALDEHYDE ADDUCT. JAN. 11, 1977.

4,027,048.—ELECTROSTRATOGRAPHIC DEVELOPMENT. ARG. 0196318, AUS. 0467046, BEL. 0792115, CAN. 1001884, FRA. 7239134, ITL. 0973326, MEX. 0128788, SPN. 0410205, STZ. 0028567, VZL. 0033139.

Class 5N 5A

3,729,419.—LIQUID DEVELOPER. APR. 24, 1973.

3,804,619.—COLOR ELECTROPHOTOGRAPHIC IMAGING PROCESS. APR. 16, 1974. CAN. 1005678, FRA. 7345057, GRB. 1435218.

3,836,244.—COLOR XEROGRAPHY. SEPT. 17, 1974.

3,841,893.—CHARGE CONTROL AGENTS FOR LIQUID DEVELOPERS. OCT. 15, 1974.

3,897,249.—TONERS FOR PHTHALOCYANINE PHOTORECEPTORS. JULY 29, 1975.

3,900,800.—HIGH VOLTAGE AMPLIFIER. AUG. 19, 1975.

3,909,259.—COLOR ELECTROPHOTOGRAPHIC IMAGING PROCESS UTILIZING SPECIFIC CARRIER-TONER COMBINATIONS. SEPT. 30, 1975. CAN. 1005678, FRA. 7345057, GRB. 1435218.

4,035,310.—YELLOW DEVELOPER. JULY 12, 1977.

Class 5N 5B

3,080,250.—SELF-TACKIFYING XEROGRAPHIC TONER. MAR. 5, 1963.

3,080,318.—THREE-COMPONENT XEROGRAPHIC TONER. MAR. 5, 1963.

Class 5N 6

3,755,177.—PROCESS OF MAKING LIQUID ELECTROSTATIC DEVELOPERS CONTAINING GELATIN. AUG. 28, 1973.

3,908,046.—P-XYLYENE VAPOR PHASE POLYMERIZATION COATING OF ELECTROSTATOGRAPHIC PARTICLES. SEPT. 23, 1975.

3,986,968.—MILLED AND POLAR SOLVENT EXTRACTED LIQUID DEVELOPER. OCT. 19, 1976.

Class 5N 6A

3,507,686.—METHOD OF COATING CARRIER BEADS. APR. 21, 1970. CAN. 0872190, GRB. 1239621, JAP. 0675782.

3,658,500.—METHOD OF PRODUCING GLASS BEADS FOR ELECTROSTATOGRAPHIC DEVELOPERS. APR. 25, 1972. CAN. 0916536, GRB. 1331485.

3,685,113.—DEVELOPER SYSTEM. AUG. 22, 1972. ARG. 0183679, BEL. 0764635, CAN. 0941211, FRA. 7110751, GRB. 1347568, ITL. 0922132, MEX. 0122432.

3,764,310.—METHOD OF PRODUCING ELECTROSTATOGRAPHIC DEVELOPER. OCT. 9, 1973.

3,789,796.—APPARATUS FOR PRODUCING DEVELOPER MATERIALS. FEB. 5, 1974.

3,989,435.—APPARATUS FOR FABRICATING SPHERICALLY SHAPED PARTICLES OF SMALL DIAMETER. NOV. 2, 1976.

4,019,842.—APPARATUS FOR FORMING MAGNETITE ELECTROSTATOGRAPHIC CARRIERS. APR. 26, 1977.

Class 5N 6B

2,862,889.—DEAGGLOMERATOR. DEC. 2, 1958.

3,326,848.—SPRAY DRIED LATEX TONERS. JUNE 20, 1967. AUS. 0409084, BEL. 0666056, CAN. 0866260, FRA. 1451366, GRB. 1115683, ITL. 0717377, MEX. 0088140, SWD. 0340046.

3,338,991.—METHOD OF FORMING ELECTROSTATIC TONER PARTICLES. AUG. 29, 1967. FRA. 1450642, GRB. 1115634, HOL. 0142251, ITL. 0717378, JAP. 0539572.

3,502,582.—IMAGING SYSTEMS. MAR. 24, 1970. ARG. 0171952, BEL. 0726571, CAN. 0873934, FRA. 1569382, GRB. 1237095, ITL. 0835554, MEX. 0100704, VZL. 0032414.

3,740,334.—PROCESS OF PREPARING SOLID DEVELOPERS FOR ELECTROSTATIC LATENT IMAGES. JUNE 19, 1973.

3,830,750.—ENCPSLING SBSTNLY SLUBL PRTN OF CORE MATL IN SBSTNLY SLBLE SHELL MATL OF DFRNT SOLUBLTY. AUG. 20, 1974. AUS. 0466018, BEL. 0793246, CAN. 0983328, GRB. 1411954, ITL. 0973317, SPN. 0410224, STZ. 0028527.

3,893,933.—PROCESS FOR PRODUCING ENCAPSULATED TONER COMPOSITION. JULY 8, 1975.

3,968,044.—MILLED LIQUID DEVELOPER. JULY 6, 1976.

3,990,797.—DIFFRACTION MONITORING OF RAYLEIGH MODE JETS. NOV. 9, 1976.

4,016,099.—METHOD OF FORMING ENCAPSULATED TONER PARTICLES. APR. 5, 1977.

Class 5O

3,641,981.—APPARATUS FOR CONTROLLING DEVELOPER CHARGE LEVEL. FEB. 15, 1972. CAN. 0914006, GRB. 1338417.

3,654,901.—TONER RECLAIMING SYSTEM. APR. 11, 1972. ATR. 0321720, AUS. 0459286, BEL. 0754425, CAN. 0941881, DNK. 0130262, EGR. 0085711, FRA. 7029147, GRB. 1325455, IND. 0127847, ITL. 0901160, JAP. 1143014, NOR. 0130609, PLD. 0080951, PLP. 0008671, PTG. 0054272, SAF. 0705408, SPN. 0382437, STZ. 0513441, SWD. 0361533, TIW. 0006725, USR. 0373974.

3,664,297.—CENTRIFUGAL DEVELOPMENT APPARATUS AND METHOD. MAY 23, 1972. GRB. 1315565, JAP. 0719144.

3,809,012.—DEVELOPER SEAL. MAY 7, 1974. CAN. 0984133.

3,872,826.—DEVELOPMENT SYSTEM SEAL. MAR. 25, 1975.

3,893,415.—DEVELOPING APPARATUS. JULY 8, 1975. ARG. 0204387, BEL. 0789238, BRA. 0088405, CAN. 0991394, FRA. 7232380, GRB. 1409815, ITL. 0970948, MEX. 0128578, SPN. 0408654, STZ. 0554551, SWD. 7214863, VZL. 0033578.

3,906,899.—DEVELOPER SEAL. SEPT. 23, 1975.

3,915,121.—DEVELOPMENT APPARATUS. OCT. 28, 1975.

3,924,566.—REPRODUCTION MACHINE WITH MEANS FOR SOLIDIFYING THE RECLAIM TONER. DEC. 9, 1975.

3,982,498.—DEVELOPMENT APPARATUS. SEPT. 28, 1976. FRA. 7436713.

4,029,047.—IMPROVED TONER HANDLING SYSTEM. JUNE 14, 1977.

Class 5P

3,649,262.—SIMULTANEOUS DEVELOPMENT-CLEANING OF SAME AREA OF AN ELECTROSTATOGRAPHIC IMAGE SUPPORT SURFACE. MAR. 14, 1972. AUS. 0445365, BEL. 0743661, CAN. 0916232, FRA. 6944511, GRB. 1296997, ITL. 0882670, USR. 0358873.

4,029,047.—IMPROVED TONER HANDLING SYSTEM. JUNE 14, 1977.

Class 6

3,753,560.—AUXILIARY SHEET FEEDER-MULTI STATION AUXILIARY PAPER FEEDER-2400. AUG. 21, 1973. AUS. 0466179, BEL. 0793641, CAN. 1000750, FRA. 7300150, GRB. 1402971, ITL. 0973328, SPN. 0410322.

3,833,790.—HEATED PRESSURE FUSING SYSTEM. SEPT. 3, 1974, FRA. 7422884.

Class 6A

3,104,873.—PAPER SUPPLY TRAY. SEPT. 24, 1963. CAN. 0699129, GRB. 1016553.

3,153,534.—PAPER SUPPLY TRAY. OCT. 20, 1964.

3,154,356.—PAPER CATCH TRAY. OCT. 27, 1964. CAN. 0726574, GRB. 1032952, JAP. 0497185.

3,405,635.—PAPER SUPPORT TRAY FOR REPRODUCTION MACHINES. OCT. 15, 1968.

3,406,964.—ADJUSTABLE PACK HOLDER. OCT. 22, 1968. CAN. 0848822, GER. 1270049, GRB. 1158671, JAP. 0914623.

3,415,510.—AUXILIARY SHEET FEEDER. DEC. 10, 1968. CAN. 0831412, GRB. 1235158.

3,458,187.—SHEET HOLDER. JULY 29, 1969. CAN. 0879560, GRB. 1199947.

3,599,966.—SHEET HANDLING APPARATUS. AUG. 17, 1971. CAN. 0921504, JAP. 783765.

3,601,394.—SHEET RETAINING APPARATUS. AUG. 24, 1971. ARG. 0195162, AUS. 0437722, BEL. 0752940, CAN. 0966521, CHL. 0026165, CZC. 0164276, EGR. 0085710, FRA. 7024668, GRB. 1312304, ITL. 0900198, JAP. 0803409, MEX. 0116509, PLD. 0082760, PNM. 0002170, SPN. 0381385, STZ. 0547747, SWD. 0361648, TIW. 0005745, USR. 0493985.

3,651,933.—COPY SHEET PACKAGE. MAR. 28, 1972.

3,687,448.—SHEET FEEDING APPARATUS. AUG. 29, 1972. CAN. 9782161, GRB. 1373810.

3,847,385.—SHEET CONTAINER. NOV. 12, 1974. CAN. 0991208.

3,847,388.—SHEET STACKING METHOD AND APPARATUS. NOV. 12, 1974. CAN. 0996145, FRA. 7344220, GRB. 1440489, MEX. 0134934.

3,848,988.—MOISTURE CONTROL DEVICE. NOV. 19, 1974.

3,857,558.—PAPER CASSETTE DESIGN WITH IRREGULAR BOTTOM. DEC. 31, 1974, CAN. 1010083.

3,883,133.—MOVABLE PACK ADVANCER. MAY 13, 1975.

3,907,283.—SENSING SHEETS ON A SUPPORT SURFACE. SEPT. 23, 1975.

3,921,972.—SHEET STACK RECEPTACLE. NOV. 25, 1975.

3,926,519.—CONTROL DEVICE FOR AN ELECTROPHOTOGRAPHIC PRINTING MACHINE. DEC. 16, 1975.

3,934,870.—SHEET FEEDING DEVICES. JAN. 27, 1976.

3,936,044.—ADJUSTABLE SHEET GUIDE. FEB. 3, 1976.

3,957,366.—SHEET FEEDING APPARATUS. MAY 18, 1976.

3,995,951.—SHEET FEEDING APPARATUS & REPRODUCING MACHINE. DEC. 7, 1976.

4,008,957.—REPRODUCTION MACHINE CONTROL. FEB. 22, 1977.

4,014,537.—AIR FLOATATION BOTTOM FEEDER. MAR. 29, 1977.

Class 6A 1

3,100,111.—SHEET FEED MECHANISM. AUG. 6, 1963. ARG. 0162642, CAN. 0683564, GRB. 1032956, IND. 0096309, JAP. 0478677.

3,301,551.—SHEET FEED MECHANISM. JAN. 31, 1967. CAN. 0811029, JAP. 0639312.

3,378,254.—PACK ADVANCER. APR. 16, 1968. CAN. 0815409, GER. 1289850, GRB. 1129872, JAP. 0615872.

3,402,928.—SHEET HANDLING APPARATUS. SEPT. 24, 1968. CAN. 0871575, GRB. 1203615, JAP. 0602168.

3,558,127.—SHEET HANDLING APPARATUS. JAN. 26, 1971. ARG. 0180315, AUS. 0443480, BEL. 0741889, CAN. 0928826, FRA. 6939710, GRB. 1282910, ITL. 0878226, JAP. 0791733, MEX. 0112773, SPN. 0373541, SWD. 6915742.

3,630,517.—COUNTER STACKER. DEC. 28, 1971.

3,768,806.—BI-DIRECTIONALLY MOVABLE PLATFORM CONTROL. OCT. 30, 1973. CAN. 0992113, GRB. 1403040.

3,820,777.—ELEVATOR ASSEMBLY POSITIONING CONTROL. JUNE 28, 1974. BEL. 0802196, CAN. 0999334, GRB. 1416470.

3,898,425.—FUSING APPARATUS. AUG. 5, 1975.

4,004,127.—IMPROVED ON LINE FUSING SYSTEM. JAN. 18, 1977.

4,033,578.—STACK ELEVATING APPARATUS. MAY 7, 1977.

Class 6B

3,847,388.—SHEET STACKING METHOD AND APPARATUS. NOV. 12, 1974. CAN. 0996145, FRA. 7344220, GRB. 1440489, MEX. 0134934.

3,958,989.—TRANSPARENCY SUPPORT MATERIAL FOR ELECTROPHOTOGRAPHIC PROCESS. MAY 25, 1976. BEL. 0815634, CAN. 1006012.

Class 6B 1

2,945,434.—SHEET FEED MECHANISM. JULY 19, 1960. CAN. 0693829.

3,062,533.—PAPER FEED APPARATUS. NOV. 6, 1962. CAN. 0712936.

3,062,534.—SHEET FEED MECHANISM. NOV. 6, 1962. GRB. 1016700.

3,083,962.—SHEET STRIPPER. APR. 2, 1963. ARG. 0165468, CAN. 0712935, GRB. 1032958, IND. 0096311, JAP. 0484728.

3,104,872.—EDGE DRAG DEVICE. SEPT. 24, 1963. CAN. 0699594.

3,241,830.—SHEET FEED MECHANISM. MAR. 22, 1966. ATR. 0276087, AUS. 0295720, CAN. 0765301, DNK. 0126493, EIR. 0028650, GER. 1197326, GRB. 1089538, ISR. 0030228, NZL. 0148732, STZ. 0457511.

3,251,594.—SHEET FEED MECHANISM. MAY 17, 1966. AUS. 0416589, CAN. 0785164, DNK. 131.557, EIR. 0029758, GRB. 1122623, ISR. 0034134, JAP. 0499006, NOR. 0125806, SWD. 0358480.

3,276,770.—SHEET FEEDING APPARATUS. OCT. 4, 1966. CAN. 0788346, FRA. 1459041, GER. 1237587, GRB. 1055215, ITL. 0726800, JAP. 0537118.

3,288,460.—PAPER FEED MECHANISM. NOV. 29, 1966. ATR. 0300566, CAN. 0792617, GRB. 1135746, JAP. 0630911, STZ. 0509924.

3,288,461.—SHEET FEEDING APPARATUS. NOV. 29, 1966. CAN. 0856098, GER. 1249887, GRB. 1123260, JAP. 0562385.

3,300,206.—ELECTRICALLY ENERGIZED CLUTCH FOR SHEET FEED CONTROL MECHANISM. JAN. 24, 1967. CAN. 0788344, GRB. 1135745, MEX. 0112221, STZ. 0513063.

3,406,960.—PAPER HANDLING APPARATUS. OCT. 22, 1968. CAN. 0907683, GRB. 1202218.

3,425,685.—PAPER FEED MECHANISM. FEB. 4, 1969. BEL. 0708498, CAN. 0847744, FRA. 1552327, GRB. 1165279, ITL. 0819625, JAP. 0972609, MEX. 0105134.

3,469,834.—SHEET FEEDER AND SEPARATOR APPARATUS. SEPT. 30, 1969. ARG. 0168907, CAN. 0847743, CHL. 0023614, CLB. 0017683, JAM. 0001852, MEX. 0102646, PRU. 0009339, URG. 0008981, VZL. 0023673.

3,524,639.—AUTOMATIC FEEDING DEVICE. AUG. 18, 1970. CAN. 0895184, FRA. 6906418, GRB. 1254784, ITL. 0875431, JAP. 0713806.

3,537,703.—MANIFOLD SHEET SEPARATING DEVICE. NOV. 3, 1970. CAN. 0923351, GRB. 1261077.

3,556,516.—SELF-ALIGNING FEED ROLLER. JAN. 19, 1971. CAN. 0899392, GRB. 1256265.

3,565,421.—FEEDING SYSTEM. FEB. 23, 1971.

3,567,214.—SHEET FEEDING AND SEPARATING APPARATUS. MAR. 2, 1971. BEL. 0734128, CAN. 0902124, FRA. 6919122, GER. 1929105, GRB. 1263193, HOL. 0144551, ITL. 0866188, SPN. 0368173, STZ. 0501501, SWD. 6908176.

3,578,317.—SHEET CONVEYOR APPARATUS FOR AUTOMATIC COPYING MACHINE. MAY 11, 1971. ARG. 0193800, ATR. 0307233, AUS. 0446229, BEL. 0750390, CAN. 0907682, EGR. 0082423, FRA. 7017317, GRB. 1284832, ITL. 0893096, JAP. 783766, MEX. 0117916, NZL. 0160102, SPN. 0379652, STZ. 0516404, SWD. 0361952, TIW. 0006833, VZL. 0025781.

3,580,565.—SHEET FEEDING APPARATUS. MAY 25, 1971.

3,592,462.—GATED PAPER SNUBBER. JULY 13, 1971. CAN. 0923922.

3,601,389.—SHEET FEEDING APPARATUS. AUG. 24, 1971. ARG. 0184657, BEL. 0752939, CAN. 0912055, CHL. 0026164, FRA. 7024666, GRB. 1306595, GUA. 0002508, ITL. 0907152, MEX. 0114977, PNM. 0002212, TIW. 0006720, VZL. 0032784.

3,618,752.—STACK OF IMAGE RECEIVING MEMBERS. NOV. 9, 1971.

3,655,183.—SHEET FEED APPARATUS. APR. 11, 1972.

3,664,663.—PAPER CASSETTE LOADING DEVICE. MAY 23, 1972. CAN. 0951342, GRB. 1351766.

3,713,645.—SHEET SEPARATING APPARATUS. JAN. 30, 1973. CAN. 0957392.

3,727,910.—SHEET SEPARATOR APPARATUS. APR. 17, 1973. CAN. 0956660, GRB. 1391198.

3,731,915.—FEED ROLL ABRASION ROLLER. MAY 8, 1973. ARG. 0194272, BEL. 0791064, CAN. 0966518, FRA. 7239549, GRB. 1389426, ITL. 0970223.

3,768,803.—SHEET FEEDER. OCT. 30, 1973. ARG. 0197314, BEL. 0795206, CAN. 0966158, FRA. 7304740, GRB. 1413541, ITL. 0978938, MEX. 0130347, SPN. 0411475, STZ. 5656860, SWD. 7301809, VZL. 0033780.

3,773,316.—SHEET FEEDER DRIVE MECHANISM. NOV. 20, 1973. CAN. 0994376, GRB. 1424580.

3,861,670.—SHEET FEEDING APPARATUS. JAN. 21, 1975. CAN. 1010080, GRB. 1435762.

3,866,901.—REVERSE BUCKLE FEEDER. FEB. 18, 1975, CAN. 1008893.

3,873,084.—PAPER FEEDER. MAR. 25, 1975.

3,893,663.—REVERSE BUCKLE SHEET FEEDING APPARATUS. JULY 8, 1975, CAN. 1005090, GRB. 1447909, MEX. 0135280.

3,895,791.—BOTTOM SHEET FEEDER USING SEPARATION BELT AND RETARD PAD. JULY 22, 1975, CAN. 1007255, GRB. 1443089.

3,934,869.—SHEET SEPARATING AND FEEDING APPARATUS. JAN. 27, 1976. GER. 7439833.

3,936,046.—FRONT AND SIDE SHEET REGISTERING APPARATUS. FEB. 3, 1976.

3,941,373.—FLOATING GATE SHEET SEPARATOR. MAR. 2, 1976.

3,947,018.—UNIVERSAL FEEDER-STACKER. MAR. 30, 1976. BEL. 0836262.

3,949,979.—SINGLE LONGITUDINAL MODE GAAS/GAALAS DOUBLE HETEROSTRUCTURE LASER. APR. 13, 1976.

3,966,189.—TOGGLING RETARD PAD. JUNE 29, 1976.

3,995,952.—SHEET FEEDING APPARATUS. DEC. 7, 1976.

4,023,792.—SHEET FEEDING APPARATUS. MAY 17, 1977. ARG. 0195877, AUS. 0462397, BEL. 0792370, CAN. 0978556, FRA. 7239132, GRB. 1410799, ITL. 0990513, MEX. 0128127, SPN. 0437744, STZ. 0546689.

4,030,725.—PAPER TRAY FOR COPYING MACHINES. JUNE 21, 1977.

Class 6B 2

3,378,255.—PAPER HANDLING APPARATUS. APR. 16, 1968. CAN. 0836939, FRA. 1527333, GRB. 1181271, ITL. 0804517, JAP. 1052342, MEX. 0099951.

3,547,431.—PNEUMATIC CUT SHEET FEEDER. DEC. 15, 1970.

Class 6C

3,120,446.—METHOD OF TRANSFERRING A DEVELOPED SOLID PARTICULATE IMAGE. FEB. 4, 1964.

3,519,124.—ARTICLE TO FACILITATE FEEDING OF IMAGE RECEIVING SHEETS. JULY 7, 1970. CAN. 0941879, FRA. 1568821, GRB. 1216347, ITL. 0870563.

3,589,809.—FEEDING SYSTEM. JUNE 29, 1971.

3,630,514.—SHEET FEEDING APPARATUS. DEC. 28, 1971. ARG. 0186214, AUS. 0452075, BEL. 0751309, CAN. 0921948, EGR. 0090063, FRA. 7019460, GRB. 1253503, ITL. 0893690, JAP. 783764, MEX. 0117507, SPN. 0380270, STZ. 0511759, SWD. 0363621, TIW. 0006836, USR. 0466680.

3,645,615.—COPYING APPARATUS. FEB. 29, 1972. ARG. 0185529, AUS. 0445849, BEL. 0752941, CAN. 0925927, CHL. 0025888, FRA. 7024670, GRB. 1312305, GUA. 0002324, ITL. 0900200, MEX. 0115165, PNM. 0002260, SPN. 0381387, STZ. 0525778, SWD. 7009063, TIW. 0007163, USR. 0535033, VZL. 0032783.
3,902,421.—METHOD FOR FORMING A PICTURE IMAGE. SEPT. 2, 1975.

Class 6D

2,065,383.—PHOTOCOPY MACHINE. DEC. 22, 1936.
2,265,975.—PHOTO-COPY MACHINE. DEC. 9, 1941.
2,684.902.—IMAGE TRANSFER MECHANISM FOR ELECTROSTATICALLY ADHERING IMAGES. JULY 27, 1954. CAN. 0532395.
2,781,705 —PAPER HANDLING MECHANISM FOR XEROGRAPHIC COPYING MACHINE. FEB. 19, 1957. CAN. 0547484.
2,871,819.—XEROGRAPHIC REGISTRATION GUIDE. FEB. 3, 1959.
3,062,538.—SHEET FEEDING APPARATUS. NOV. 6, 1962. CAN. 0701742.
3,071,370.—SHEET FEEDING APPARATUS. JAN. 1. 1963. CAN. 0683900, GRB. 0999435.
3,071,374.—PAPER GRIPPER MECHANISM. JAN. 1, 1963.
3,078,770.—XEROGRAPHIC REPRODUCING APPARATUS. FEB. 26, 1963. CAN. 0701741.
3,095,194.—SHEET GUIDING APPARATUS. JUNE 25, 1963. CAN. 0713451, FRA. 1355072, GER. 1174334, GRB. 1026214, ITL. 0688494, JAP. 0457839.
3,100,109.—PAPER GRIPPER MECHANISM. AUG. 6, 1963. GRB. 1015634, JAP. 0471314.
3,100,112.—DOCUMENT FEED MECHANISM. AUG. 6, 1963. GRB. 1015635, JAP. 0478676.
3,137,495.—SHEET FEED MECHANISM. JUNE 16, 1964. GRB. 1015636, JAP. 0471315.
3,179,407.—SHEET FEED GUIDE. APR. 20, 1965. CAN. 0719606, FRA. 1355071, GER. 1179562, GRB. 1023036, ITL. 0688495, JAP. 0457850.
3,190,643.—SHEET GUIDING APPARATUS. JUNE 22, 1965.
3,199,866.—SHEET FEED MECHANISM. AUG. 10, 1965. CAN. 0742591, GRB. 1043646.
3,206,193.—XEROGRAPHIC REPRODUCING MACHINE CONTROL. SEPT. 14, 1965.
3,239,215.—DOCUMENT FEED MECHANISM. MAR. 8, 1966 CAN. 0741548, GRB. 1052820, JAP. 0497188.
3,239,220.—DOCUMENT CONVEYOR. MAR. 8, 1966. CAN. 0770495, FRA. 1434188, GRB. 1094188, ITL. 0742434.
3,245,311.—DOCUMENT CONVEYOR. APR. 12, 1966.
3,256,009.—SHEET REGISTRATION DEVICE. JUNE 14, 1966. CAN. 0777667.
3,281,144.—SHEET REGISTRATION DEVICE. OCT. 25. 1966. ARG. 0152212, AUS. 0423243, CAN. 0803888, DNK. 0122597, EIR. 0029757, GRB. 1122621, ISR. 0034133, JAP. 0512650, MEX. 0078899, NOR. 0126565, SWD. 0358034.
3,357,347.—PAPER FEEDING AND BREAKING MEANS FOR ELECTROGRAPHIC DEVICE. DEC. 12, 1967. CAN. 0863520, GRB. 1182684, JAP. 0582500.
3,374,732.—SELF-ALIGNING COPY DRUM STRIPOUT MECHANISM FOR REPRODUCTION MACH. MAR. 26, 1968.
3,375,781.—REGISTRATION MECHANISM FOR A REPRODUCTION MACHINE. APR. 2, 1968.
3,389,907.—DOCUMENT HANDLING APPARATUS. JUNE 25, 1968.
3,411,771.—SHEET TRANSPORT. NOV. 19, 1968. ARG. 0177552, ATR. 0284168, AUS. 0455833, CAN. 0869421, CHL. 0023101, CLB. 0016775, DNK. 0126100, EIR. 0031308, FIN. 0047867, GRB. 1193515, IND. 0112002, ISR. 0028520, JAP. 0604153, MEX. 0099909, NOR. 0127531, NZL. 0149790, PAK. 0119259, PLP. 0005199, PRU. 0009331, SAF. 0674988, SPN. 0344351, STZ. 0478048, SWD. 0343829, TRK. 0015345, URG. 0008858, VZL. 0026277.
3,422,756.—PAPER SUPPORT AND REGISTRATION MEANS FOR REPRODUCTION MACHINE. JAN. 21, 1969.
3,434,710.—SHEET HANDLING APPARATUS. MAR. 25, 1969. ARG. 0166613, CAN. 0830328, CHL. 0023568, CLB. 0017530, DNK. 0120163, GRB. 1206965, MEX. 0100814, PRU. 0009338, SPN. 0360895, STZ. 0502942. URG. 0008977, USR. 0433696, VZL. 0023674.
3,502,325.—CARD HANDLING APPARATUS. MAR. 24, 1970. ARG. 0168398, CAN. 0850515, CHL. 0024133, JAM. 0001890, MEX. 0105082, PRU. 0009337, URG. 0009016, VZL. 0027509.
3,509,780.—DOUBLE-ACTION ROTARY SOLENOID DRIVE MECHANISM. MAY 5, 1970.
3,517,923.—SHEET REGISTRATION APPARATUS. JUNE 30, 1970.
3,518,739.—TRACKING ROLLER. JULY 7, 1970. ARG. 0177437, AUS. 0437287, BEL. 0733662, BRA. 6908481, CAN. 0884215, FRA. 6917189, GRB. 1206750, ITL. 0865847, JAP. 0677424, MEX. 0111433, SPN. 0367807, SWD. 0356022, VZL. 0025065.
3,521,060.—METHOD FOR DETECTING MISROUTING OF TRANSPARENCIES DURING PROCESS OF IMAGING THEREON. JULY 21, 1970.
3,531,109.—SHEET MATERIAL TRANSPORT SYSTEM. SEPT. 29, 1970. ARG. 0177190, ATR. 0288161, AUS. 0446394, BEL. 0733197, CAN. 0899923, DNK. 0122717, FRA. 6916409, GER. 1925039, GRB. 1269100, ITL. 0863848, JAP. 0656986, MEX. 0110288, PNM. 0001431, SAF. 0693497, SPN. 0367408, SWD. 0355870.
3,536,320.—SHEET REGISTRATION DEVICE. OCT. 27, 1970.
3,556,511.—DOCUMENT FEED APPARATUS. JAN. 19, 1971. ARG. 0185791, BEL. 0741891, CAN. 0905439, FRA. 6939711, GER. 1957780, GRB. 1279129, HOL. 0144227, ITL. 0878272, JAP. 0854601, MEX. 0112825.
3,556,512.—DOCUMENT FEED APPARATUS. JAN. 19, 1971. CAN. 0905438, SWD. 6915838.
3,556,513.—DOCUMENT FEED APPARATUS. JAN. 19. 1971. CAN. 0905437.
3,601,392.—SHEET REGISTERING APPARATUS. AUG. 24, 1971. ARG. 0190238, AUS. 0446147, BEL. 0752933, CAN. 0923512, CHL. 0025789, EGR. 0084327, FRA. 7024672, GRB. 1262444, ITL. 0900199, JAP. 0803410, MEX. 0115310, PLD. 0002183, PNM. 0002050, SPN. 0381386, STZ. 0525780, SWD. 0356375, TIW. 0007194, USR. 0406343.
3,603,680.—ULTRASONIC PAPER DETACTION. SEPT. 7, 1971. CAN. 0915715, GRB. 1331457.
3,614,221.—IMAGING SYSTEM. OCT. 19, 1971. CAN. 0930540, GRB. 1343603, JAP. 0728865.
3,622,238.—COPIER MACHINE FEEDING MULTIPLE SIZE COPY SHEETS. NOV. 23, 1971. ARG. 0194337, AUS. 0451241, CAN. 0902127, JAP. 0512383, NZL. 0160105.
3,647,207.—SHEET FEEDING MECHANISM CENTERING DEVICE. MAR. 7, 1972. CAN. 0959934, GRB. 1351765.
3,694,712.—SPEED CONTROL APPARATUS. SEPT. 26, 1972. CAN. 0976641, GRB. 1339506.
3,796,486.—PROGRAMMING CONTROL SYSTEM FOR PRINTING MACHINE. MAR. 12, 1974.
3,804,516.—FIRE DETECTING DEVICE FOR A PHOTOGRAPHIC PRINTING MACHINE. APR. 16, 1974.
3,809,475.—COPIER FUSER PROTECTOR. MAY 7, 1974. FRA. 7343567.
3,815,380.—SHAFT COUPLING APPARATUS. JUNE 11, 1974, CAN. 0994121.
3,819,266.—COPIER JAM PROTECTION. JUNE 25, 1974, CAN. 1005510.
3,845,951.—FORAMINOUS SHEET REGISTRATION SYSTEM. NOV. 5, 1974, CAN. 0999316.
3,858,777.—PRINTING APPARATUS INCLUDING REGISTRATION CONTROL. JAN. 7, 1975.
3,861,673.—BI-DIRECTIONAL SHEET TRANSPORT. JAN. 21, 1975, CAN. 1004240.
3,876,317.—LATCH MECHANISM. APR. 8, 1975, CAN. 1005486.
3,888,579.—DIGITAL CONTROLLED DOCUMENT FEEDER. JUNE 10, 1975.
3,893,662.—SHEET FEEDING DEVICE. JULY 8, 1975.
3,902,421.—METHOD FOR FORMING A PICTURE IMAGE. SEPT. 2, 1975.
3,934,182.—SYNCHRONIZING APPARATUS. JAN. 20, 1976. CAN. 0957735, GRB. 1372568.
3,936,042.—SHEET FEEDING DEVICES. FEB. 3, 1976.
3,947,270.—REPRODUCING APPARATUS AND PROCESS FOR DUPLEX IMAGING IN A SINGLE PASS. MAR. 30, 1976.
3,948,511.—SHEET FEEDING DEVICES. APR. 6, 1976.
3,949,979.—SINGLE LONGITUDINAL MODE GAAS/GAALAS DOUBLE HETEROSTRUCTURE LASER. APR. 13, 1976
3,963,339.—SHEET FEEDING APPARATUS. JUNE 15, 1976.
3,984,098.—PNEUMATIC REGISTRATION AND CLAMPING APPARATUS. OCT. 5, 1976. BEL. 0848824.
4,003,568.—FLUID CONVEYER. JAN. 18, 1977.
4,025,187.—BUCKLE CONTROL SYSTEM. MAY 24, 1977.
4,036,421.—WEIGHTED PINCH ROLLS. JULY 19, 1977.

Class 6D 1

RE.29,124.—SHEET TRANSPORT SYSTEM. JAN. 25, 1977. CAN. 1001104.
2,444,170.—PHOTOGRAPHIC PRINT CONVEYING MECHANISM. JUNE 29, 1948.
2,446,246.—PHOTOCOPY MACHINE. AUG. 3, 1948.

2,547,979.—PHOTOCOPY MACHINE. APR. 10, 1951.
3,148,878.—SHEET FEED MECHANISM. SEPT. 15, 1964. CAN. 0715431, GER. 1222083, GRB. 1020933, JAP. 0481251.
3,240,486.—PAPER TRANSPORT MECHANISM. MAR. 15, 1966. CAN. 0766647.
3,275,318.—SHEET CONVEYING APPARATUS. SEPT. 27, 1966. MEX. 0085657.
3,408,633.—HIGH SPEED PRINTER SYSTEM. OCT. 29, 1968.
3,482,676.—DOCUMENT FEED BELT. DEC. 9, 1969. CAN. 0890297, GRB. 1253415.
3,642,362.—APPARATUS FOR CONVEYING SHEET MATERIAL. FEB. 15, 1972. GRB. 1307117.
3,719,951.—WRAP ADJUST DEVICE FOR CONTROLLING ENGAGEMENT BETWEEN A WEB AND ROLLER IN AN IMAGING SYSTEM. MAR. 6, 1973. CAN. 0995295, GRB. 1406047.
3,743,403.—TRANSPORT ASSEMBLY. JULY 3, 1973. CAN. 0983305, GRB. 1417018.
3,781,004.—CONVEYING SYSTEM FOR ELECTROSTATIC PRINTING MACHINES. DEC. 25, 1973. CAN. 1007287.
3,790,270.—REGISTRATION RESET SYSTEM. FEB. 5, 1974. GRB. 1439772, ITL. 0993064, SPN. 0418253.
3,804,507.—PROCESSING CONTROL DEVICE FOR PRINTING MACHINES. APR. 16, 1974.
3,808,658.—SNAP ROLLER. MAY 7, 1974, CAN. 1000637.
3,826,568.—SHEET TRANSPORT SYSTEM. JULY 30, 1974, CAN. 1001104.
3,832,053.—BELT TRANSFER SYSTEM. AUG. 27, 1974.
3,846,020.—ELECTROSTATIC SHEET TRANSPORT SYSTEM. NOV. 5, 1974.
3,854,566.—PHOTOELECTRIC TABULATING APPARATUS. DEC. 17, 1974. BEL. 0815420, CAN. 0982969, GRB. 1442450, ITL. 1012805, SWD. 7406400.
3,902,715.—SHEET REGISTRATION FOR PAPER HANDLING APPARATUS. SEPT. 2, 1975, CAN. 1003867, ITL. 0993066, SPN. 0418255.
3,918,705.—PROCESSING CONTROL DEVICE FOR PRINTING MACHINES. NOV. 11, 1975.
3,930,725.—MULTIPLE SHEET FEEDING SYSTEM FOR ELECTROSTATOGRAPHIC PRINTING MACHINES. JAN. 6, 1976. GRB. 1436457.

Class 6D 2

3,112,819.—CLUTCH MECHANISM—914. DEC. 3, 1963. CAN. 0688810.
3,337,015.—LATCH OPERATED AND ONE WAY COIL CLUTCHES. AUG. 22, 1967. CAN. 0810494, JAP. 0914622.
3,840,100.—UNIDIRECTIONAL COUPLING APPARATUS. OCT. 8, 1974. CAN. 1006706.

Class 6E

RE29124.—SHEET TRANSPORT SYSTEM. JAN. 25, 1977. CAN. 1001104.
3,348,288.—DRUM CLAMP. OCT. 24, 1967. CAN. 0838542, GRB. 1123459.
3,357,325.—XEROGRAPHIC TRANSFER APPARATUS. DEC. 12, 1967. CAN. 0812525.
3,375,782.—PROGRAMMING MECHANISM FOR A REPRODUCTION MACHINE. APR. 2, 1968.
3,567,213.—CONTROL APPARATUS FOR REGISTER STOPS AND GRIPPER FINGERS. MAR. 2, 1971.
3,685,898.—PAPER FLIP CONTROL APPARATUS. AUG. 22, 1972.
3,717,801.—METHODS AND APPARATUS FOR ELCLRSTCLY PRFMNG A TCKING OPERATION. FEB. 20, 1973.
3,826,568.—SHEET TRANSPORT SYSTEM. JULY 30, 1974. CAN. 1001104.
3,841,751.—ELECTROSTATIC COLOR REPRODUCTION METHOD. OCT. 15, 1974. CAN. 0946463.
3,845,951.—FORAMINOUS SHEET REGISTRATION SYSTEM. NOV. 5, 1974. CAN. 0999316.
3,976,370.—BELT TRANSFER AND FUSING SYSTEM. AUG. 24, 1976.
3,993,124.—METH&APPRTS FOR SUSR ASSMBLY CLING IN ELCTROSTATOGRPC MACHNE-GAMMA METH&APPRTS FOR FUSER END CO. NOV. 23, 1976. BEL. 0793560, FRA. 7246728, ITL. 0973322, SWD. 7216976.
3,995,951.—SHEET FEEDING APPARATUS & REPRODUCING MACHINE. DEC. 7, 1976.

Class 6F

3,249,354.—MULTIPLE SHEET DETECTING DEVICE. MAY 3, 1966. CAN. 0770494.
3,281,145.—PAPER REJECT MECHANISM. OCT. 25, 1966. CAN. 0770493.
3,288,462.—APPARATUS FOR HANDLING SUPERPOSED SHEETS. NOV. 29, 1966. AUS. 0422882, CAN. 0786210, EIR. 0029759, GRB. 1122625, ISR. 0034135, JAP. 0894757, NOR. 0124531.
3,301,975.—SENSING DEVICE FOR DETECTING A SHEET ON A TRANSPORT OR DRUM. JAN. 31, 1967. CAN. 0800094, FRA. 1487581, GER. 1522699, GRB. 1077117, ITL. 0774188, JAP. 0923304.
3,360,652.—FAIL SAFE PHOTOELECTRIC SHEET SENSING MACHINE CONTROL CIRCUIT. DEC. 26, 1967. CAN. 0775268, FRA. 1455478, GER. 1522805, GRB. 1121099, ITL. 0732531, JAP. 0503244, MEX. 0078869.
3,396,965.—SENSOR GAUGE. AUG. 13, 1968. CAN. 0822218, GRB. 1152538, JAP. 0587326.
3,504,911.—VACUUM POWERED MULTIPLE DOCUMENT DETECTOR. APR. 7, 1970. CAN. 0861362, FRA. 1589986, GER. 1804476, GRB. 1241968, ITL. 0845395, JAP. 0656984.
3,593,065.—SHEET DETECTION APPARATUS. JULY 13, 1971. CAN. 0923544, CZC. 0151559, EGR. 0100567, GRB. 1322794, JAP. 1162030, USR. 0365085.
3,614,419.—MULTIPLE SHEET DETECTION SYSTEM. OCT. 19, 1971. ARG. 0186441, BEL. 0765366, CAN. 0930052, FRA. 7113404, GRB. 1342656, ITL. 0922694, MEX. 0119754, VZL. 0021933.
3,627,311.—SHEET SENSOR. DEC. 14, 1971. CAN. 0871371, GRB. 1322258.
3,628,785.—GRIP FORCE DETECTION APPARATUS. DEC. 21, 1971. ARG. 0185946, AUS. 0455882, BEL. 0760750, CAN. 0923158, FRA. 7047695, GRB. 1340206, ITL. 0913997, MEX. 0117505, STZ. 0518227, SWD. 7017384, VZL. 0032788.
3,650,616.—MISPUFF DETECTOR. MAR. 21, 1972. BEL. 0778739, CAN. 0954181, FRA. 7203548, GRB. 1374923, ITL. 0947120.
3,650,617.—SWITCHING DETECTOR—A. MAR. 21, 1972.
3,650.618.—SWITCHING DETECTOR—B. MAR. 21, 1972.
3,650,619.—SWITCHING DETECTOR—C. MAR. 21. 1972.
3,684,890.—PHOTOSENSITIVE MISFEED DETECTOR. AUG. 15, 1972. CAN. 0929631, GRB. 1335444.
3,778,051.—SUPERPOSED SHEET DETECTOR. DEC. 11, 1973. CAN. 0975067.
3,791,729.—APPARATUS FOR MONITORING A SHEET TRANSPORT MECHANISM. FEB. 12, 1974. CAN. 0991244, GRB. 1413069.
3,882,308.—DETECTION SYSTEM FOR SUPERPOSED SHEETS. MAY 6, 1975. CAN. 0929632, GRB. 1342838.
3,932,755.—DEVICE FOR DETECTING DOUBLE SHEET FEEDING. JAN. 13, 1976.
3,948,508.—SHEET DETECTING APPARATUS. APR. 6, 1976.
4,025,187.—BUCKLE CONTROL SYSTEM. MAY 24, 1977.

Class 6G

3,152,757.—XEROGRAPHIC CONTROL APPARATUS. OCT. 13, 1964. JAP. 0494168.
3,260,455.—STEPPED COUNTING APPARATUS. JULY 12, 1966. ARG. 0157223, BRA. 0083779, CAN. 0760825, FRA. 1459930, GER. 1513422, GRB. 1113420, ITL. 0729650, MEX. 0094217.
3,301,126.—REPRODUCING APPARATUS. JAN. 31, 1967. CAN. 0777413, EIR. 0029760, GRB. 1122626, ISR. 0034136, JAP. 0669365, NOR. 0128732.
3,358.570.—COPY COUNTING SYSTEM. DEC. 19, 1967. CAN. 0842444, FRA. 1508192, GER. 1283855, GRB. 1165943, ITL. 0787991, JAP. 0572187.
3,375,780.—SHEET COUNTING MECHANISM FOR REPRODUCTION MACHINES. APR. 2, 1968.
3,375,783.—COPY INDICATING MECHANISM FOR A REPRODUCTION MACHINE. APR. 2, 1968.
3,588,472.—LOGIC CONTROL APPARATUS. JUNE 28, 1971. ARG. 0181590, ATR. 0279353, BEL. 0706629, BRA. 6793350, CAN. 0834957, FRA. 1567082, GRB. 1204719, ITL. 0815466, JAP. 0645591, LXB. 0054882, MEX. 0101675, VZL. 0023684.
3,655,281.—BILLING APPARATUS. APR. 11, 1972. BEL. 0760911, CAN. 0929013, FRA. 7047633, GRB. 1329579, ITL. 0913956, JAP. 0766713.
3,813,157.—CONTROL LOGIC FOR TROUBLE DETECTION AND RECOVERY. MAY 28, 1974. GRB. 1457781, ITL. 1009725, SPN. 0425049.
3,831,933.—TAMPER DETECTION AND RECOVERY. AUG. 27, 1974. GRB. 1457781, ITL. 1009725, SPN. 0425049.
3,909,128.—CONTROL LOGIC FOR CHARGING A MULTI-MODE COPIER DUPLICATOR FROM ONE MODE TO ANOTHER. SEPT. 30, 1975. BEL. 0819383.
3,916,171.—COUNTING CIRCUIT. OCT. 28, 1975.

3,989,368.—DUAL MODE CONTROL LOGIC FOR A MULTI-MODE COPIER DUPLICATOR. NOV. 2, 1976. BEL. 0819384.

4,019,028.—PRINTING MACHINE WITH VARIABLE COUNTER CONTROL SYSTEM. APR. 19, 1977. BEL. 0812560, GRB. 1451992, ITL. 1010688, SPN. 0424462.

Class 6H

3,062,536.—SHEET STRIPPING APPARATUS. NOV. 6, 1962. ARG. 0174781, CAN. 0736834, PNM. 0001999, VZL. 0023703.

3,090,616.—SHEET HANDLING CONTROL APPARATUS. MAY 21, 1963. CAN. 0683777.

3,339,069.—CORONA CHARGING DEVICE W/MEANS TO PREVENT TONER DUST CONTAMINATION. AUG. 29, 1967. CAN. 0788539, FRA. 1450010, GRB. 1116687, ITL. 0730715, JAP. 0875339, MEX. 0089459.

3,357,400.—ELECTROSTATIC APPARATUS FOR PAPER DETACKING. DEC. 12, 1967. CAN. 0841229, MEX. 0100315.

3,450,402.—SHEET STRIPPER APPARATUS. JUNE 17, 1969.

3,506,259.—ELECTROSTATIC SHEET DETACKING APPARATUS. APR. 14, 1970. ARG. 0177881, AUS. 0418161, BEL. 0721966, CAN. 0848612, FRA. 1585343, GRB. 1230113, ITL. 0895052, MEX. 0104231.

3,578,859.—MECHANICAL STRIPPING APPARATUS. MAY 18, 1971. ARG. 0185526, AUS. 0445289, BEL. 0752938, CAN. 0922771, CHL. 0025913, EGR. 0085002, FRA. 7024669, GRB. 1296763, GUA. 0002611, ITL. 0900197, MEX. 0117139, PLD. 0081340, PNM. 0002049, SPN. 0381384, STZ. 0523150, SWD. 0366849, TIW. 0007785, USR. 0443525, VZL. 0032781.

3,620,615.—SHEET STRIPPING APPARATUS. NOV. 16, 1971. CAN. 0927472, GRB. 1290518.

3,704,881.—TRANSFER SHEET PEELING DEVICE FOR XEROGRAPHIC APPARATUS. DEC. 5, 1972.

3,774,907.—VACUUM SHEET STRIPPING APPARATUS. NOV. 27, 1973. CAN. 0966519.

3,804,401.—PNEUMATIC STRIPPING APPARATUS. APR. 16, 1974. CAN. 0998705.

3,811,670.—ELECTROSTATOGRAPHIC APPARATUS WITH AIR BAFFLE. MAY 21, 1974.

3,819,175.—VACUUM STRIPPING ROLL WITH STATIONARY PICKUP SLOTS. JUNE 25, 1974.

3,820,778.—VACUUM STRIPPING ROLL WITH ROTARY PICKUP SLOTS. JUNE 28, 1974. CAN. 1010081, GRB. 1430856.

3,826,568.—SHEET TRANSPORT SYSTEM. JULY 30, 1974. CAN. 1001104.

3,837,640.—STRIPPER FINGER WITH AIR CUSHION. SEPT. 24, 1974. CAN. 1002077, FRA. 7338663, GRB. 1427058, ITL. 998964.

3,857,560.—ADHESIVE PAPER PICK-OFF SYSTEM. DEC. 31, 1974.

3,885,785.—VACUUM TRANSPORT. MAY 27, 1975. CAN. 1008892, FRA. 7437717.

3,885,786.—STRIPPER FINGER. MAY 27, 1975. GRB. 1402956.

3,891,206.—SHEET STRIPPING APPARATUS. JUNE 24, 1975. CAN. 1003868, GRB. 1449754.

3,895,793.—VACUUM SHEET STRIPPER. JULY 22, 1975. CAN. 1014179.

3,907,280.—FLEXIBLE SHEET HANDING DEVICE. SEPT. 23, 1975. FRA. 7322885.

3,940,126.—SHEET HANDLING MECHANISM. FEB. 24, 1976. GRB. 1450219.

3,948,507.—COPYING STRIPPER. APR. 6, 1976.

3,970,381.—METHOD AND APPARATUS FOR XEROGRAPHIC REPRODUCTION. JULY 20, 1976. BEL. 0811188, FRA. 7406478, GRB. 1451288, ITL. 1008269, SPN. 0423529, STZ. 5672880.

3,991,999.—REVOLVING STRIPPER FINGER. NOV. 16, 1976.

3,992,000.—SHEET STRIPPER. NOV. 16, 1976.

3,998,536.—METHOD & APPARATUS FOR ELECTROSTATIC PAPER STRIPPING. DEC. 21, 1976.

4,004,802.—SHEET STRIPPING DEVICE. JAN. 25, 1977.

4,017,065.—TRANSFER FUSING SPEED COMPENSATION. APR. 12, 1977.

4,017,067.—TRANSFER-FUSING SPEED COMPENSATION. APR. 12, 1977.

4,026,541.—SHEET STRIPPING DEVICE. MAY 31, 1977.

Class 6I

RE.27,720.—SIGNAL STORAGE DEVICE - RE OF 3,416,861-D1593. AUG. 7, 1973.

1,976,156.—PAPER CUTTING MACHINE. OCT. 9, 1934.

2,043,004.—PHOTOCOPY MACHINE. JUNE 2, 1936.

2,047,478.—PAPER FEEDING AND CUTTING MECHANISM. JULY 14, 1936.

2,216,629.—SLITTING AND CUTOFF MECHANISM FOR SHEET MATERIAL. OCT. 1, 1940.

3,075,493.—XEROGRAPHIC APPARATUS WITH WEB CUTTING MEANS. JAN. 29, 1963. CAN. 0682231, FRA. 1280975, GER. 1177487, GRB. 0979161, JAP. 0502929.

3,105,425.—WEB MARKING AND CUTTING APPARATUS FOR XEROGRAPHIC REPRODUCING DEVICES. OCT. 1, 1963. CAN. 0701949.

3,135,179.—XEROGRAPHIC APPARATUS. JUNE 2, 1964.

3,135,180.—XEROGRAPHIC APPARATUS. JUNE 2, 1964.

3,244,084.—WEB MARKING DEVICE FOR XEROGRAPHIC REPRODUCING APPARATUS. APR. 5, 1966.

3,401,613.—WEB CUTTER CONTROL DEVICE FOR XEROGRAPHIC REPRODUCING APPARATUS. SEPT. 17, 1968. CAN. 0786141, GRB. 1118217, JAP. 0517506.

3,402,628.—CUTTING APPARATUS. SEPT. 24, 1968. CAN. 0847666, GRB. 1137800.

3,416,061.—SIGNAL STORAGE DEVICE—REISSUED D72104—27,720. DEC. 17, 1968. CAN. 0824770, GER. 1524998, GRB. 1184579, JAP. 0571176.

3,418,046.—SIGNAL STORAGE DEVICE. DEC. 24, 1968. CAN. 0852814, GER. 1524999, GRB. 1190084, JAP. 0589515.

3,466,959.—WEB MATERIAL HANDLING APPARATUS. SEPT. 16, 1969.

3,485,622.—PRINTING OF TIMING MARKS IN XEROGRAPHIC PROCESS. DEC. 23, 1969. FRA. 1488142, GER. 1522700, GRB. 1047451, JAP. 0608701.

3,504,586.—ROLL CONVERTER CONTROL. APR. 7, 1970.

3,506,175.—ROLL STOCK CONVERTING APPARATUS. APR. 14, 1970.

3,585,289.—FACSIMILE RECORDING APPARATUS WITH CAM OPERATED PAPER CUTTER. JUNE 15, 1971.

3,591,279.—CUT AND DEFLECT WEB DRIVE APPARATUS. JULY 6, 1971. CAN. 0924635, FRA. 7019910, GRB. 1307549, ITL. 0893691.

3,639,053.—WEB CUTTING AND FEEDING APPARATUS. FEB. 1, 1972. ARG. 0192554, AUS. 0461657, BEL. 0749786, CAN. 0917974, FRA. 7015812, GRB. 1314727, ITL. 0900026, MEX. 0116866, SAF. 0703019, SPN. 0379248, STZ. 0516181, SWD. 7006081.

3,728,920.—CUT AND DEFLECT WEB DRIVE APPARATUS. APR. 24, 1973.

3,743,409.—CUTTER ASSEMBLY. JULY 3, 1973. BEL. 0784635, CAN. 0974447, FRA. 7220418, GRB. 1400465, ITL. 0956414.

3,855,890.—SLITTER/PERFORATOR APPARATUS. DEC. 24, 1974. BEL. 808873, CAN. 0996462, FRA. 7345296, GRB. 1423770, ITL. 1001152, USR. 0546267.

3,882,744.—ELECTROSTATOGRAPHIC WEB FEEDING APPARATUS. MAY 13, 1975. FRA. 7417339.

3,931,090.—RUBBER COMPOSITIONS FOR FLEXIBLE BELTS. JAN. 6, 1976.

Class 6J

3,380,733.—SHEET STRIPPING APPARATUS. APR. 30, 1968. ATR. 0268045, AUS. 0413138, BEL. 0689067, CAN. 0819593, DNK. 0112289, FRA. 1499560, GER. 1522704, GRB. 1157342, HOL. 0151191, ITL. 0788572, JAP. 0560087, LXB. 0052213, MEX. 0101989, NOR. 0122220, NZL. 0146848, PTG. 0046633, SAF. 0666572, SPN. 0332819, STZ. 0468661, SWD. 0326103, USR. 0261292.

3,416,791.—DOCUMENT INVERTING APPARATUS. DEC. 17, 1968. CAN. 0853562, GRB. 1210564, JAP. 0648074.

3,548,783.—PAPER TRANSPORT - SHEET TURNER - PAPER TRANSPORT-90 DEG TURN. DEC. 22, 1970.

3,627,312.—RESTACKING APPARATUS. DEC. 14, 1971. AUS. 0447183, BEL. 0752942, CAN. 0922747, CHL. 0025830, EGR. 0084128, FRA. 7024663, GRB. 1312303, GUA. 0002616, ITL. 0900193, JAP. 791920, MEX. 0114980, PLD. 0081346, PNM. 0001953, SPN. 0381379, STZ. 0525779, SWD. 0359381, TIW. 0022313, VZL. 0032782.

3,856,295.—INVERTER-REVERSER FOR A REPRODUCTION MACHINE. DEC. 24, 1974.

3,862,802.—SHEET REVERSING APPARATUS AND A DUPLEX REPRODUCING APPARATUS EMPLOYING SAME. JAN. 28, 1975. BEL. 0818894.

3,942,785.—SELF-ACTUATING SHEET INVERTER-REVERSER. MAR. 9, 1976.

3,944,212.—SHEET REVERSING MECHANISM. MAR. 16, 1976.

3,947,270.—REPRODUCING APPARATUS AND PROCESS FOR DUPLEX IMAGING IN A SINGLE PASS. MAR. 30, 1976.

Class 6K

D.227,933.—SORTER. JULY 24, 1973.

D.230,515.—DOCUMENT REPRODUCING AND SORTING MACHINE. FEB. 26, 1974.

D.233,937.—SORTER. DEC. 17, 1974.

D.236,030.—PAPER TRAY. JULY 22, 1975.

3,395,913.—SHEET MATERIAL DISTRIBUTION SYSTEM. AUG. 6, 1968. AUS. 0409539, BEL. 0704922, CAN. 0832159, FRA. 1543565, GRB. 1193517, ITL. 0823413, JAP. 0645590, MEX. 0101165, USR. 0343419.

3,460,824.—MODULAR SHEET DISTRIBUTOR. AUG. 12, 1969. ARG. 0175858, ATR. 0304588, AUS. 0443802, CAN. 0871013, CHL. 0023362, CLB. 0016672, EIR. 0031307, FIN. 0047868, GRB. 1193514, IND. 0112001, ISR. 0028521, JAP. 0645589, MEX. 0099178, NOR. 0125174, NZL. 0149789, PAK. 0119258. PLP. 0006159, PRU. 0009362, SAF. 0674987, SPN. 0344350, STZ. 0478049, SWD. 0342203, TRK. 0014721, URG. 0008514, VZL. 0016672.

3,484,101.—SORTING APPARATUS FOR DOCUMENTS. DEC. 16, 1969. CAN. 0889441, GRB. 1246033.

3,552,739.—SHEET HANDLING APPARATUS. JAN. 5, 1971. BEL. 0738575, CAN. 0921945, FRA. 6930567, GRB. 1274277, ITL. 0871023.

3,565,420.—DOCUMENT FEEDING APPARATUS. FEB. 23, 1971. ARG. 0184075, AUS. 0453309, BEL. 0750391, CAN. 0922328, EGR. 0082941, FRA. 7017112, GRB. 1305825, ITL. 0893198, MEX. 0117914, PLD. 0082841, SPN. 0379694, STZ. 0513435, SWD. 0368797, USR. 0476767.

3,589,808.—REPRODUCING APPARATUS. JUNE 29, 1971. CAN. 0917482.

3,618,936.—JAM DETECTION SYSTEM FOR SORTING APPARATUS. NOV. 9, 1971. AUS. 0445492, BEL. 0758059, CAN. 0949671, EGR. 0088009, FRA. 7041622, GRB. 1324119, ITL. 0909902, PLD. 0081147, SPN. 0385034, STZ. 0525723, TIW. 0007648.

3,622,061.—STAPLE FEED AND FASTENING APPARATUS. NOV. 23, 1971.

3,630,607.—SET SEPARATION COPIER SYSTEM. DEC. 28, 1971.

3,649,006.—SHEET HANDLING APPARATUS. MAR. 14, 1972. BEL. 0762643, CAN. 0944310, FRA. 7104922, GRB. 1341286, ITL. 0918344, JAP. 0795150.

3,652,875.—CONTROL CIRCUIT FOR DRIVING STAPLING MECHANISM. MAR. 28, 1972.

3,669,447.—SHEET PROPELLING APPARATUS. JUNE 13, 1972. CAN. 0938624.

3,671,094.—COVER APPARATUS. JUNE 20, 1972.

3,682,328.—TRAY APPARATUS. AUG. 8, 1972.

3,685,712.—STAPLING APPARATUS. AUG. 22, 1972. CAN. 0953851.

3,690,537.—STAPLE FORMING AND FASTENING APPARATUS. SEPT. 12, 1972.

3,695,756.—SHEET STRIPPING APPARATUS. OCT. 3, 1972. BEL. 0774563, CAN. 0950931, FRA. 7139637, GRB. 1366909, ITL. 0937673.

3,707,418.—METHOD OF BINDING. DEC. 26, 1972. CAN. 0974723, EGR. 0094346, GRB. 1359338.

3,709,485.—CONTROL CIRCUIT FOR SORTING SYSTEM. JAN. 9, 1973.

3,709,492.—SORTING APPARATUS. JAN. 9, 1973. ARG. 0194366, AUS. 0457968, BEL. 0783854, CAN. 0968300, FRA. 7218317, GRB. 1365399, ITL. 0955692, MEX. 0127721, SPN. 0403108, STZ. 0555198.

3,719,266.—SHEET STACKING APPARATUS. MAR. 6, 1973.

3,735,978.—METHOD AND APPARATUS FOR STACKING COPY SHEETS. MAY 29, 1973. ARG. 0190825, BEL. 0772406, CAN. 0951340, FRA. 7133309, GRB. 1358420, ITL. 0936377, MEX. 0125745.

3,788,640.—MOVING BIN SORTING APPARATUS. JAN. 29, 1974. CAN. 0996495, FRA. 7346312, GRB. 1429726.

3,793,016.—ELECTROPHOTOGRAPHIC SHEET BINDING PROCESS. FEB. 19, 1974.

3,794,550.—SHEET BINDING. FEB. 26, 1974. CAN. 1012583, GRB. 1431286.

3,833,911.—REPRODUCTION SYSTEM AND METHOD WITH SIMPLEX AND DUPLEX MODES OF OPERATION. SEPT. 3, 1974.

3,841,754.—DUPLEX REPRODUCTION SYSTEM. OCT. 15, 1974.

3,841,827.—DUPLEX REPRODUCTION SYSTEM. OCT. 15, 1974. BEL. 0816155, FRA. 7419739, GER. 7409422, GRB. 1441370.

3,845,949.—SORTER CONTROL TO PREVENT OVERSTACKING IN THE SORTER TRAYS. NOV. 5, 1974. BEL. 808173, CAN. 1005511, FRA. 7342816, GRB. 1436599, ITL. 1002130, SPN. 0421148.

3,848,995.—COPIER/DUPLICATOR SYSTEM. NOV. 19, 1974. BEL. 0815548, GRB. 1450847, ITL. 1012907, SPN. 0426782.

3,861,219.—METHOD FOR MEASURING HEAT AND PRESSURE CHARACTERISTICS OF FUSING APP. JAN. 21, 1975. CAN. 1013807.

3,861,861.—FUSER ROLL CLEANING APPARATUS. JAN. 21, 1975.

3,866,904.—MULTIPLE FEED SORTING APPARATUS. FEB. 18, 1975. CAN. 1001109, GRB. 1432790.

3,868,019.—TRAY APPARATUS. FEB. 25, 1975. FRA. 7346312, CAN. 0996495, FRA. 7346912, GRB. 1429726.

3,870,295.—SORTER SUPPLEMENT CONTROL. MAR. 11, 1975. CAN. 1007283.

3,871,643.—SORTER CONTROL. MAR. 18, 1975. BEL. 808172, CAN. 1000647, GRB. 1422029, ITL. 1002129, SPN. 0421116.

3,878,818.—CLEANING APPARATUS FOR DRY FUSER ROLLS. APR. 22, 1975. FRA. 7427783, GRB. 1464759.

3,880,119.—DEVELOPMENT APPARATUS. APR. 29, 1975.

3,902,709.—BINLESS SORTER. SEPT. 2, 1975. FRA. 7436985.

3,907,276.—WOBBLE JOGGER. SEPT. 23, 1975.

3,908,978.—BINLESS SORTING APPARATUS. SEPT. 30, 1975. CAN. 0996586, GRB. 1426020.

3,917,256.—DUAL PURPOSE SHEET HANDLING APPARATUS. NOV. 4, 1975. CAN. 1014098.

3,917,257.—SHEET INVERTER APPARATUS. NOV. 4, 1975. CAN. 1005009, FRA. 7346309, GRB. 1430620.

3,938,802.—SHEET STACKING APPARATUS. FEB. 17, 1976. CAN. 1010462, GRB. 1431605.

3,941,369.—SHEET DISTRIBUTING APPARATUS. MAR. 2, 1976.

3,947,018.—UNIVERSAL FEEDER-STACKER. MAR. 30, 1976. BEL. 0836262.

3,953,023.—BIN INDICATOR DEVICE. APR. 27, 1976.

3,971,554.—SHEET STACKER. JULY 27, 1976.

3,973,769.—COMPACT SORTING APPARATUS. AUG. 10, 1976. BEL. 0836261.

3,977,667.—SORTING APPARATUS. AUG. 31, 1976.

3,988,817.—PRESSURE ROLL FOR FUSER APPARATUS. NOV. 2, 1976.

3,990,695.—SORTING APPARATUS. NOV. 9, 1976.

3,995,748.—SORTER APPARATUS. DEC. 7, 1976. BEL. 0844420.

4,011,952.—MANUAL SORTER. MAR. 15, 1977.

4,012,034.—MULTIPLE MODULAR SORTER ASSEMBLY. MAR. 15, 1977.

4,012,035.—SORTER CONTROL SYSTEM. MAR. 15, 1977.

4,015.841.—SORTER. APR. 5, 1977.

4,022,458.—SHEET DISTRIBUTION APPARATUS. MAY 10, 1977.

4,029,309.—SET TRANSPORT AND STACKER. JUNE 14, 1977. BEL. 0847844.

4,033,579.—AN OFFSET STACKER. JULY 5, 1977.

4,037,832.—IMPROVED SORTER APPARATUS. JULY 26, 1977.

4,038,594.—DISTORTIONLESS LINE WAVE AMPLIFICATION. JULY 26, 1977.

Class 7

3,784,300.—PRE-TRANSFER STATION. JAN. 8, 1974. AUS. 0465154, BEL. 0789340, CAN. 1000782, EGR. 0106095, FRA. 7234200, GRB. 1379826, ITL. 0972691, MEX. 0128584, SPN. 0409975, STZ. 0557051, SWD. 7215168.

3,809,471.—PHOTOELECTROPHORETIC IMAGING APPARATUS WITH CORRECTION. FOR PARALLAX. MAY 7, 1974.

3,819,263.—CLEANING APPARATUS. JUNE 25, 1974. ARG. 0200252, AUS. 0469469, BEL. 0796984, EGR. 0104374, FRA. 2177733, GRB. 1421929, ISR. 0041829, ITL. 0983618, MEX. 131438, SAF. 0732067, SPN. 0439774, STZ. 0556047, SWD. 7304022.

Class 7A

3,850,517.—HIGH SPEED PRINTOUT SYSTEM. NOV. 26, 1974.

Class 7A I

3,051,041.—IMAGE PROJECTION. AUG. 28, 1962. CAN. 0734194, GRB. 0956359.

3,148,581.—CYLINDRICAL SURFACE PROJECTION APPARATUS. SEPT. 15, 1964.

3,273,999.—IMAGE DEFORMATION UTILIZING A PRISM. SEPT. 20, 1966. AUS. 0274351, CAN. 0840628, FRA. 1367772, GRB. 1034097, ITL. 0699466, SAF. 0002971, SWD. 0306232.

3,320,061.—MASKING BY TOTAL INTERNAL REFLECTION FOR IMAGE REPRODUCTION AND DISPLAY. MAY 16, 1967. CAN. 0847533, FRA. 1401615, GER. 1497081, GRB. 1065986, ITL. 0729029, JAP. 0471308.

3,481,668.—IMAGE PROJECTION APPARATUS. DEC. 2, 1969.

3,510,660.—METHOD FOR VISUAL COMPARISON OF INFORMATION. MAY 5, 1970. CAN. 0848611, GRB. 1201376, JAP. 0595641.

3,519,344.—IMAGE PROJECTION. JULY 7, 1970.

3,622,217.—LIGHT PRODUCING SYSTEM. NOV. 23, 1971.

Class 7A 2

3,196,765.—IMAGE DEVELOPMENT AND PROJECTION. JULY 27, 1965.

3,355,308.—PROJECTION TRANSPARENCY HAVING A TRANSPARENT POWDER IMGE. NOV. 28, 1967.

3,607,256.—FULLY-ENCLOSED ELECTROPHORETIC IMAGING SYSTEM. SEPT. 21, 1971.

Class 7A 2A

3,999,038.—FLARED FUSER ROLLL. DEC. 21, 1976.

Class 7B

3,501,294.—METH OF TREATNG SURFACE OF XIC PLATE W/METAL SALT OF A FATTY ACID TO IMPROVE IMAGE TRANSFER. MAR. 17, 1970. ARG. 0168294, AUS. 0419434, BEL. 0706369, CAN. 0880230, CHL. 0027764, FRA. 1544449, GRB. 1209644, ITL. 0822799, MEX. 0102265, PNM. 0002797, SWD. 0340047, VZL. 0023670.

3,690,754.—CONTROL SYSTEM FOR AN OPTICAL IMAGING SYSTEM. SEPT. 12, 1972. CAN. 0949797, GRB. 1337420.

3,884,825.—IMAGING COMPOSITION. MAY 20, 1975. AUS. 0467835, BEL. 0802879, CAN. 0995963, FRA. 7328589, GRB. 1437041, ITL. 0991465, SPN. 0417382.

3,973,843.—ELECTROSTATOGRAPHIC IMAGING APPARATUS. AUG. 10, 1976. AUS. 0467835, BEL. 0802879, CAN. 0995963, FRA. 7328589, GRB. 1437041, ITL. 0991465, SPN. 0417382.

Class 7C

2,576,047.—METHOD AND APPARATUS FOR PRINTING ELECTRICALLY. NOV. 20, 1951. AUS. 0150449, CAN. 0485073, GER. 0919891, GRB. 0675398, STZ. 0286141, SWD. 0163889.

2,681,473.—MANUFACTURE OF PLAQUES AND THE LIKE. JUNE 22, 1954.

2,684,901.—IMAGE TRANSFER DEVICE. JULY 27, 1954.

2,847,305.—XEROGRAPHIC TRANSFER PROCESS. AUG. 12, 1958.

2,919,191.—XEROGRAPHIC TRANSFER METHOD. DEC. 29, 1959.

2,951,443.—IMAGE REPRODUCTION. SEPT. 6, 1960. AUS. 0243878, FRA. 1247806, GRB. 0887232, ITL. 0622716, JAP. 0320090.

3,063,859.—METHOD AND APPARATUS FOR TRANSFERRING IMAGES FROM XEROGRAPHIC TO METALLIC PLATES. NOV. 13, 1962.

3,071,070.—METHOD AND APPARATUS FOR TRANSFERRING IMAGES FROM XEROGRAPHIC TO METALLIC PLATES. JAN. 1, 1963. CAN. 0638821.

3,620,616.—TRANSFER DRUM WITHDRAWAL APPARATUS. NOV. 16, 1971. BEL. 0751487, CAN. 0923543, FRA. 7020458, GRB. 1300267, ITL. 0893835.

3,633,543.—BIASED ELECTRODE TRANSFER APPARATUS. JAN. 11, 1972. CAN. 0914398, GRB. 1337123, JAP. 783769.

3,781,105.—CONSTANT CURRENT BIASING TRANSFER SYSTEM. DEC. 25, 1973. FRA. 7341869, GRB. 1448385.

3,795,441.—TRANSFER ROLLER. MAR. 5, 1974.

3,822,093.—TRANSFER REGULATING APPARATUS. JULY 2, 1974. FRA. 7428422.

3,830,589.—CONDUCTIVE BLOCK TRANSFER SYSTEM. AUG. 20, 1974.

3,832,053.—BELT TRANSFER SYSTEM. AUG. 27, 1974.

3,832,055.—FORAMINOUS VACUUM BIAS ROLL TRANSFER SYSTEM. AUG. 27, 1974. CAN. 0999316.

3,837,741.—CONTROL ARRANGEMENT FOR TRANSFER ROLL POWER SUPPLY. SEPT. 24, 1974.

3,837,883.—IMAGE TRANSFER PROCESS. SEPT. 24, 1974. ARG. 0203811, AUS. 0461437, BEL. 0760456, CAN. 0947368, FRA. 7047140, GRB. 1339577, ITL. 0913634, MEX. 0119591, SWD. 7017139.

3,842,800.—TRANSFER ROLLER ASSEMBLY. OCT. 22, 1974. BEL. 0793553, CAN. 9780221, FRA. 7237770, GRB. 1412454, ITL. 0973320, SPN. 0410173, SWD. 7216978.

3,846,020.—ELECTROSTATIC SHEET TRANSPORT SYSTEM. NOV. 5, 1974.

3,847,119.—TRANSFER ROLLER ASSEMBLY. NOV. 12, 1974. ARG. 0196224, ATR. 327002, AUS. 0464751, BEL. 0796983, CAN. 0977206, EGR. 0103979, FRA. 7305277, GER. 0103979, GRB. 1413711, ISR. 0041830, ITL. 0983617, MEX. 131018, SAF. 0722068, SPN. 0413018, STZ. 0558033, SWD. 7304021.

3,847,478.—SEGMENTED BIAS ROLL. NOV. 12, 1974.

3,848,204.—PRESSURE ADJUSTABLE ELECTROPHOTOGRAPHIC PRINTING MACHINE TRANSFER APPARATUS. NOV. 12, 1974.

3,860,436.—CONSTANT CURRENT BIASING TRANSFER SYSTEM. JAN. 14, 1975. FRA. 7341869, GRB. 1448385.

3,866,572.—FORAMINOUS ELECTROSTATOGRAPHIC TRANSFER SYSTEM. FEB. 18, 1975. BEL. 0815546, CAN. 1009503, FRA. 7418641, GRB. 1448386, ITL. 1012842, SPN. 0426760.

3,877,416.—HUMIDITY CORRECTED TRANSFER APPARATUS. APR. 15, 1975. BEL. 0814054, GRB. 1445671, ITL. 1009955, STZ. 0573612.

3,888,208.—IMAGE TRANSFER PROCESS. JUNE 10, 1975.

3,901,186.—TRANSFER ROLLER ASSEMBLY. AUG. 26, 1975. BEL. 0816848, FRA. 7423024.

3,924,943.—SEGEMENTED BIASED TRANSFER MEMBER. DEC. 9, 1975.

3,936,175.—INTERNALLY SHIELDED TRANSFER ROLLER. FEB. 3, 1976.

3,942,888.—STEPPED TRANSFER ROLLER. MAR. 9, 1976.

3,957,367.—A COLOR ELECTROSTATOGRAPHIC PRINTING MACHINE. MAY 18, 1976.

3,959,574.—BIASABLE MEMBER AND METHOD FOR MAKING. MAY 25, 1976.

3,994,579.—TRANSFER SYSTEM FOR ELECTROPHOTOGRAPHIC PRINTING. NOV. 30, 1976.

4,014,605.—TRANSFER SYSTEM WITH TAILORED ILLUMINATION. MAR. 29, 1977.

4,023,894.—TRANSFER APPARATUS. MAY 17, 1977.

4,025,182.—A TRANSFER APPARATUS FOR A COLOR ELECTROPHOGRAPHIC PRINTING MACHINE. MAY 24, 1977.

Class 7C 1

2,626,865.—PORTABLE ELECTROPHOTOGRAPHIC POWDER-IMAGE TRANSFER MECHANISM. JAN. 27, 1953.

2,684,902.—IMAGE TRANSFER MECHANISM FOR ELECTROSTATICALLY ADHERING IMAGES. JULY 27, 1954. CAN. 0532395.

2,807,232.—XEROGRAPHIC POWDER-IMAGE TRANSFER SQUEEGEE. SEPT. 24, 1957.

2,812,709.—MULTIPLE COPY TRANSFER PROCESS AND APPARATUS. NOV. 12, 1957. CAN. 0603435.

2,995,108.—XEROGRAPHIC POWDER IMAGE TRANSFER APPARATUS. AUG. 8, 1961.

3,150,003.—APPARATUS FOR TRANSFERRING XEROGRAPHIC IMAGES. SEPT. 22, 1964.

3,150,004.—XEROGRAPHIC TRANSFER APPARATUS. SEPT. 22, 1964.

3,244,083.—XEROGRAPHIC DEVICE. APR. 5, 1966. AUS. 0284069, CAN. 0710975, FRA. 1379820, GRB. 1030449, JAP. 0654006.

3,339,069.—CORONA CHARGING DEVICE W/MEANS TO PREVENT TONER DUST CONTAMINATION. AUG. 29, 1967. CAN. 0788539, FRA. 1450010, GRB. 1116687, ITL. 0730715, JAP. 0875339, MEX. 0089459.

3,357,325.—XEROGRAPHIC TRANSFER APPARATUS. DEC. 12, 1967. CAN. 0812525.

3,444,369.—METHOD AND APPARATUS FOR SELECTIVE CORONA TREATMENT OF TONER PARTICLES. MAY 13, 1969. ARG. 0167581, ATR. 0288863, AUS. 0415969; BEL. 0704919, BRA. 6791610, CAN. 0845871, DNK. 0119094, FRA. 1540696, GER. 1597884, GRB. 1203811, HOL. 0152375, ITL. 0853627, JAP. 0587935, MEX. 0099470, SPN. 0345918, STZ. 0487438, SWD. 0337986, VZL. 0023669.

3,765,330.—XEROPRINTING EMPLOYING LETTER PRESS SURFACE COVERED WITH A LAYER OF RESISTIVE MATERIAL. OCT. 16, 1973. CAN. 0949806, GRB. 1374651.

3,850,519.—XEROGRAPHIC IMAGE TRANSFER APPARATUS. NOV. 26, 1974. ARG. 0202116, BEL. 0809579, GRB. 1446252, ITL. 1006786, MEX. 0135278, SPN, 0422230, STZ. 0567748, SWD. 7400197, VZL. 0033340.

3,870,515.—METHOD FOR ELECTROSTATIC PAPER STRIPPING BY NEUTRALIZATION OF TRANSFER CHARGE. MAR. 11, 1975.

3,877,417.—TRANSFER CORONA GENERATING DEVICE WITH SUPPORT BRUSHES. APR. 15, 1975.

3,918,403.—CORONA TRANSFER MECHANISM. NOV. 11, 1975.

3,920,325.—MOISTURE STABLE BIAS TRANSFER ROLL. NOV. 18, 1975.

3,966,199.—BELT TRANSFER LOADING SYSTEM. JUNE 29, 1976.

4,014,606.—REPRODUCTION MACHINE WITH TEXTURED TRANSFER ROLLER. MAR. 29, 1977.

4,017,065.—TRANSFER FUSING SPEED COMPENSATION. APR. 12, 1977.

4,017,067.—TRANSFER-FUSING SPEED COMPENSATION. APR. 12, 1977.

Class 7C 1A

2,892,708.—XEROGRAPHIC TRANSFER PROCESS. JUNE 30, 1959.

3,004,860.—INDUCTION POWDER TRANSFER. OCT. 17, 1961. AUS. 0222781, CAN. 0647848, FRA. 1205569, GER. 1131707, GRB. 0886730, ITL. 0599628, JAP. 0318804.

3,319,604.—XEROGRAPHIC TRANSFER APPARATUS. MAY 16, 1967.

Class 7C 2

3,132,037.—XEROGRAPHIC TRANSFER METHOD. MAY 5, 1964. CAN. 0727919.

3,132,050.—XEROGRAPHIC TRANSFER APPARATUS. MAY 5, 1964.

3,795,441.—TRANSFER ROLLER. MAR. 5, 1974.

3,817,616.—THERMAL CHAMBER FOR DEVELOPABILITY REGULATING APPARATUS. JUNE 18, 1974. CAN. 0991247, GRB. 1439527.

3,838,918.—TRANSFER APPARATUS. OCT. 1, 1974. BEL. 0811434, GRB. 1445243, ITL. 1008903.

3,892,962.—THERMAL CHAMBER FOR A DEVELOPABILITY REGULATING APPARATUS. JULY 1, 1975. CAN. 0991247, GRB. 1439527.

Class 7C 3

2,812,709.—MULTIPLE COPY TRANSFER PROCESS AND APPARATUS. NOV. 12, 1957. CAN. 0603435.

2,951,443.—IMAGE REPRODUCTION. SEPT. 6, 1960. AUS. 0243878, FRA. 1247806, GRB. 0887232, ITL. 0622716, JAP. 0320090.

3,004,860.—INDUCTION POWDER TRANSFER. OCT. 17, 1961. AUS. 0222781, CAN. 0647848, FRA. 1205569, GER. 1131707, GRB. 0886730, ITL. 0599628, JAP. 0318804.

3,244,083.—XEROGRAPHIC DEVICE. APR. 5, 1966. AUS. 0284069, CAN. 0710975, FRA. 1379820, GRB. 1030449, JAP. 0654006.

3,612,677.—ELECTROSTATIC TRANSFER APPARATUS. OCT. 12, 1971. CAN. 0941220, GRB. 1296742.

3,697,170.—AUTOMATIC DUPLEXING APPARATUS. OCT. 10, 1972. CAN. 0948269.

3,697,171.—SIMULTANEOUS IMAGE TRANSFER. OCT. 10, 1972. ARG. 0192330, AUS. 0461728, BEL. 0777016, CAN. 0948267, FRA. 7146256, GRB. 1368456, ITL. 0944212, MEX. 0124562, SWD. 0366123, VZL. 32765.

3,702,482.—BIAS ROLL TRANSFER. NOV. 7, 1972. ARG. 0191238, BEL. 0777017, CAN. 0962890, FRA. 7146257, GRB. 1368500, ITL. 0944209, MEX. 0126775.

3,734,015.—SINGLE PASS DUPLEXING BY SEQUENTIAL TRANSFER. MAY 22, 1973. ARG. 0192332, BEL. 7777018, CAN. 0948691, FRA. 7146258, GRB. 1368496, ITL. 0944211, MEX. 0124992.

3,902,801.—COLOR CORRECTED PRINTING SYSTEM. SEPT. 2, 1975. GRB. 1465590.

Class 7C 4

2,812,709.—MULTIPLE COPY TRANSFER PROCESS AND APPARATUS. NOV. 12, 1957. CAN. 0603435.

3,004,860.—INDUCTION POWDER TRANSFER. OCT. 17, 1961. AUS. 0222781, CAN. 0647848, FRA. 1205569, GER. 1131707, GRB. 0886730, ITL. 0599628, JAP. 0318804.

3,444,369.—METHOD AND APPARATUS FOR SELECTIVE CORONA TREATMENT OF TONER PARTICLES. MAY 13, 1969. ARG. 0167581, ATR. 0288863, AUS. 0415969, BEL. 0704919, BRA. 6791610, CAN. 0845871, DNK. 0119094, FRA. 1540696, FRA. 1540696, GRB. 1203811, HOL. 0152375, ITL. 0853627, JAP. 0587935, MEX. 0099470, SPN. 0345918, STZ. 0487438, SWD. 0337986, VZL. 0023669.

3,640,249.—TRANSFER APPARATUS. FEB. 8, 1972. BEL. 0758058.

3,647,292.—TRANSFER APPARATUS. MAR 7, 1972. AUS. 0450919, BEL. 0759452, CAN. 0919004, FGR. 0086978, FRA. 7043065, GRB. 1319148, ITL. 0909441, JAP. 0773213, SPN. 0385845, STZ. 0519187, SWD. 7015876.

3,650,617.—SWITCHING DETECTOR-A. MAR. 21, 1972.

3,650,618.—SWITCHING DETECTOR-B. MAR. 21, 1972.

3,687,545.—SHORT FOCAL LENTH OPTICAL IMAGING SYSTEM. AUG. 29, 1972. BEL. 0747977, CAN. 0913438, FRA. 7011547, GRB. 1300156, ITL. 0898935, JAP. 0731226.

3,729,311.—ELECTROSTATIC TRANSFER METHOD. APR. 24, 1973.

3,854,974.—METHOD FOR TRANSFERRING A TONER IMAGE. DEC. 17, 1974.

3,926,824.—ELECTROSTATOGRAPHIC DEVELOPER COMPOSITION. DEC. 16, 1975. ARG. 0192480, AUS. 0466319, BEL. 0793098, CAN. 0985552, FRA. 7245403, GRB. 1417179, ITL. 0973327, SPN. 0410171, STZ. 0028663, SWD. 7216977.

3,932,035.—APPARATUS FOR TRANSFERRING A TONER IMAGE. JAN. 13, 1976.

3,994,726.—LAMINATED FLEXIBLE PHOTORECEPTOR. NOV. 30, 1976. GRB. 1429517.

4,002,476.—METHOD OF DEVELOPING RESILIENT PHOTOCONDUCTIVE ELEMENT. JAN. 11, 1977. GRB. 1429517.

4,023,967.—ELECTROPHOTOGRAPHIC LIQUID DEVELOPMENT METHOD IN WHICH A UNIFORM SUBSTANTIAL INTERFACE CONTACT. MAY 17, 1977. BEL. 0819537, GRB. 1429518.

Class 7D

3,093,039.—APPARATUS FOR TRANSFERRING POWDER IMAGES AND METHOD THEREFOR. JUNE 11, 1963 CAN. 0744873.

Class 7E

3,013,526.—XEROGRAPHIC IMAGE TRANSFER APPARATUS. DEC. 19, 1961.

3,063,351.—XEROGRAPHIC POWDER IMAGE TRANSFER APPARATUS. NOV. 13, 1962. CAN. 0706541.

3,132,050.—XEROGRAPHIC TRANSFER APPARATUS. MAY 5, 1964.

3,375,781.—REGISTRATION MECHANISM FOR A REPRODUCTION MACHINE. APR. 2, 1968.

3,375,782.—PROGRAMMING MECHANISM FOR A REPRODUCTION MACHINE. APR. 2, 1968.

3,422,756.—PAPER SUPPORT AND REGISTRATION MEANS FOR REPRODUCTION MACHINE. JAN. 21, 1969.

3,499,374.—XEROGRAPHIC PRINTER. MAR. 10, 1970. AUS. 0415164, BEL. 0677146, CAN. 0846424, FRA. 1470069, GRB. 1135603, ITL. 0762255, MEX. 0091183, SWD. 0327142.

3,687,541.—XEROGRAPHIC DUPLEX TECHNIQUE. AUG. 29, 1972. CAN. 0948268.

3,847,642.—METHOD FOR TRANSFERRING ELECTROSTATOGRAPHICALLY FORMED IMAGES. NOV. 12, 1974.

3,848,204.—PRESSURE ADJUSTABLE ELECTROPHOTOGRAPHIC PRINTING MACHINE TRANSFER APPARATUS. NOV. 12, 1974.

3,854,974.—METHOD FOR TRANSFERRING A TONER IMAGE. DEC. 17, 1974.

3,867,168.—TRANSPARENCY. FEB. 18, 1975

3,888,208.—IMAGE TRANSFER PROCESS. JUNE 10, 1975.

3,932,035.—APPARATUS FOR TRANSFERRING A TONER IMAGE. JAN. 13, 1976.

3,936,174.—TRANSFER ROLLER WITH STATIONARY INTERNAL ELECTRODE. FEB. 3, 1976.

3,954,332.—REPRODUCTION MACHINE WITH IMPROVED TRANSFER ROLL. MAY 4, 1976.

3,954,333.—TRANSFER ROLL HAVING MEANS FOR MONITORING AND CONTROLLING THE RESITIVITY THEREOF. MAY 4, 1976.

3,977,779.—ELECTROSTATOGRAPHIC TRANSFER WITH AIR. AUG. 31, 1976. GRB. 1459450.

Class 7E 1

2,992,758.—POWDER CLOUD GENERATING APPARATUS. JULY 18, 1961. CAN. 0678816.

3,013,878.—METHOD AND APPARATUS FOR TRANSFERRING AND FIXING XEROGRAPHIC IMAGES. DEC. 19, 1961.
3,063,859.—METHOD AND APPARATUS FOR TRANSFERRING IMAGES FROM XEROGRAPHIC TO METALLIC PLATES. NOV. 13, 1962.
3,071,070.—METHOD AND APPARATUS FOR TRANSFERRING IMAGES FROM XEROGRAPHIC TO METALLIC PLATES. JAN. 1, 1963. CAN. 0638821.
3,374,769.—TONER FUSING APPARATUS. MAR. 26, 1968. CAN. 0819836, FRA. 1396610, GER. 1522709, GRB. 1152067, JAP. 0534764.
3,685,896.—DUPLICATING METHOD AND APPARATUS. AUG. 22, 1972.
3,845,742.—FUSER ROLL CONSTRUCTION. NOV. 5, 1974. GRB. 1450882.
3,849,062.—REINFORCED FUSER ROLL CONSTRUCTION. NOV. 19, 1974.

Class 7E 2

2,995,085.—TRANSFER AND FIXING METHOD. AUG. 8, 1961. CAN. 0622688.
3,083,684.—APPARATUS FOR PATTERN REPRODUCTION. APR. 2, 1963.

Class 7E 3

2,661,289.—ADHESIVE TRANSFER AND FIXING APPARATUS. DEC. 1, 1953.
2,855,324.—CONTACT TRANSFER FOR XEROGRAPHY. OCT. 7, 1958. CAN. 0665467, FRA. 1170805, GER. 1036279, GRB. 0843502.
2,886,464.—CONTACT TRANSFER FOR XEROGRAPHY. MAY 12, 1959.
3,157,546.—IMAGE TRANSFER. NOV. 17, 1964. ATR. 0225034, BEL. 0602721 FRA. 1287124, GER. 1271547, GRB. 0985176, ITL. 0647042, JAP. 0414127, STZ. 0383417.
3,591,276.—METHOD AND APPARATUS FOR OFFSET XEROGRAPHIC REPRODUCTION. JULY 6, 1971. CAN. 0894931, GER. 1811893, GRB. 1245426, JAP. 0648075.
3,682,677.—BACKGROUND REMOVAL. AUG. 8, 1972.
3,690,252.—LITHOGRAPHIC INKING APPARATUS. SEPT. 12, 1972. CAN. 0919006.

Class 7E 3A

2,843,499.—PRESSURE TRANSFER OF XEROGRAPHIC IMAGES. JULY 15, 1958.
2,995,085.—TRANSFER AND FIXING METHOD. AUG. 8, 1961. CAN. 0622688.
3,003,891.—UNMOTTLED DYE TRANSFER. OCT. 10, 1961.
3,060,052.—TRANSFER OF XEROGRAPHIC DYE IMAGES. OCT. 23, 1962. AUS. 0242307, CAN. 0678380, FRA. 1246634, GRB. 0946761.

Class 8

3,961,236.—CONSTANT POWER REGULATOR FOR XEROGRAPHIC FUSING SYSTEM. JUNE 1, 1976.
4,027,138.—A FUSER RELEASE MATERIAL DISPENSER. MAY 31, 1977.

Class 8A

D.233,414.—TONER BOTTLE OR THE LIKE. OCT. 29, 1974.
2,990,278.—METHOD AND APPARATUS FOR TRANSFERRING AND FIXING XEROGRAPHIC IMAGES. JUNE 27, 1961.
3,130,064.—METHOD OF FORMING RESIN PATTERN ON A PAPER RECORD CARD. APR. 21, 1964.
3,778,222.—FIRE PREVENTION APPARATUS. DEC. 11, 1973.
3,830,590.—SORTER APPARATUS OF PRINTER SYSTEM. AUG. 20, 1974. AUS. 0466096, BEL. 0791361, CAN. 0998425, CHL. 0027890, EGR. 0102488, FRA. 7240557, GRB. 1400619, IND. 0137843, ISR. 0040831, ITL. 0970911, MEX. 0128646, NOR. 0135210, NZL. 0168971, PLP. 0008722, PTG. 0058789, SAF. 0728101, SPN. 0408628, STZ. 0560108.
3,834,861.—PRESSURE HEATED FUSER ASSEMBLY. SEPT. 10, 1974. GRB. 1424307.
3,847,391.—STACKING CONTROL APPARATUS. NOV. 12, 1974. ARG. 0194365, AUS. 0454812, BEL. 0783855, CAN. 0969205, FRA. 7218318, GRB. 1365400, ITL. 0955693, MEX. 0128712, SPN. 0403109, STZ. 0557242.
3,848,868.—SHEET SORTING APPARATUS. NOV. 19, 1974. CAN. 1005387, GRB. 1440557.
3,856,461.—REPRODUCTION MACHINE FUSER. DEC. 24, 1974.
3,856,462.—REPRODUCTION MACHINE FUSER. DEC 24, 1974. BEL. 0821050, FRA. 7435222.
3,868,744.—CLEANING APPARATUS FOR HEATED PRESSURE ROLL FUSER. MAR. 4, 1975. AUS. 0466542, BEL. 0794569, CAN. 1007407, FRA. 7302888, GRB. 1424132, ITL. 0978560, SPN. 0410976, SWD. 7301015.
3,883,921.—CLEANING ROLL APPARATUS HAVING REJUVENATED CLEANING SURFACE. MAY 20, 1975.
3,936,658.—FUSER APPARATUS FOR ELECTROSTATIC REPRODUCING MACHINES. FEB. 3, 1976. BEL. 0844831.
3,998,450.—IMPROVED SORTING APPARATUS. DEC. 21, 1976. GRB. 1433088.
4,004,549.—ROLL FUSER. JAN. 25, 1977.
4,006,985.—XEROGRAPHIC APPARATUS HAVING TIME CONTROLLED FUSING. FEB. 8, 1977.
4,032,746.—CONTROL SYSTEM FOR A FUSING APPARATUS. JUNE 28, 1977.
4,035,140.—FIXING DEVICE IN AN ELECTROPHOTOGRAPHIC COPYING MACHINE. JULY 12, 1977.

Class 8A 1

RE.28,802.—FUSING APPARATUS. MAY 4, 1976. CAN. 0990779, FRA. 7338110, GRB. 1436563.
2,586,484.—FUSING DEVICE. FEB. 19, 1952.
2,965,868.—RESISTANCE TYPE HEATING ELEMENTS. DEC. 20, 1960. CAN. 0643795, GER. 1810418, GRB. 0948916, JAP. 0319003.
3,079,483.—XEROGRAPHIC FIXING APPARATUS. FEB. 26, 1963. ARG. 0155449, CAN. 0682500, GRB. 1032955, IND. 0096312.
3,083,623.—TRANSFERRED IMAGE APPARATUS. APR. 2, 1963. CAN. 0701631.
3,219,326.—XEROGRAPHIC FUSING APPARATUS. NOV. 23, 1965. CAN. 0716212.
3,374,769.—TONER FUSING APPARATUS. MAR. 26, 1968. CAN. 0819836, FRA. 1396610, GER. 1522709, GRB. 1152067, JAP. 0534764.
3,396,401.—APPARATUS AND METHOD FOR MARKING OF INTELLIGENCE ON A RECORD MEDIUM. AUG. 6, 1968.
3,409,280.—POROUS DRUM FUSER. NOV. 5, 1968.
3,411,932.—QUALITY XEROGRAPHIC REPRODUCTIONS. NOV. 19, 1968. CAN. 0788948, FRA. 1459094, GER. 1497213, GRB. 1112000, ITL. 0725763, MEX. 0078900.
3,498,592.—HEAT FIXING APPARATUS FOR FUSIBLE MATERIAL. MAR. 3, 1970. ARG. 0180584, AUS. 0432632, BEL. 0733403, CAN. 0878082, CZC. 0164830, FRA. 6917080, GRB. 1269716, ITL. 0864984, MEX. 0111516, PNM. 0001417, SPN. 0367614, STZ. 0506821, SWD. 0345328, TIW. 0006603, USR. 0340215.
3,519,253.—SELECTIVE XEROGRAPHIC FUSER. JULY 7, 1970. ARG. 0168753, ATR. 0293871, AUS. 0416089, BEL. 0704925, CAN. 0843377, CHL. 0023289, CLB. 0017682, DNK. 0123893, FRA. 1540701, GRB. 1193355, GUA. 0002145, HUN. 0157550, ITL. 0830722, JAM. 0001850, MEX. 0107890, PRU. 0009344, SAF. 0676018, SPN. 0345919, STZ. 0470698, SWD. 0322690, TRD. 0000113, URG. 0008846, USR. 0372852, VZL. 0026101.
3,535,492.—FUSING APPARATUS. OCT. 20, 1970. ARG. 0181204, BEL. 0733663, CAN. 0872978, FRA. 6917190, GRB. 1266932, HOL. 149013, ITL. 0865914, MEX. 0110755.
3,623,710.—FIXING ARRANGEMENT. NOV. 30, 1971.
3,648,991.—METHOD AND APPARATUS FOR SELECTIVE FUSING. MAR. 14, 1972.
3,667,742.—FIXING ARRANGEMENT. JUNE 6, 1972. BEL. 0777318, CAN. 0928766, FRA. 7147890, GRB. 1368307, ITL. 0944393.
3,765,828.—FUSING APPARATUS. OCT. 16, 1973. CAN. 0991256, GRB. 1428800.
3,770,346.—METHOD AND APPARATUS FOR FUSER ASSEMBLY COOLING IN AN ELECTROSTATOGRAPHIC MACHINE. NOV. 6, 1973. CAN. 1002582, GRB. 1421863.
3,781,517.—FUSER THERMAL PROTECTOR. DEC. 25, 1973. GRB. 1441702.
3,792,227.—FUSER APPARATUS. FEB. 12, 1974.
3,819,259.—LIGHT ATTENUATOR. JUNE 25, 1974. GRB. 1428799.
3,826,892.—FUSING APPARATUS. JULY 30, 1974. CAN. 0990779, FRA. 7338110, GRB. 1436563.
3,849,905.—FUSING APPARATUS. NOV. 26, 1974.
3,849,907.—FUSING APPARATUS. NOV. 26, 1974.
3,869,696.—FUSER APPARATUS. MAR. 4, 1975.
3,874,892.—ELECTROSTATOGRAPHIC FUSING PROCESS EMPLOYING REPLACEABLE LINER. APR. 1, 1975. CAN. 0980405, GRB. 1374652.
3,898,424.—RADIANT FUSER XEROGRAPHIC REPRODUCING APPARATUS. AUG. 5, 1975.

3,907,492.—FUSING APPARATUS. SEPT. 23, 1975. CAN. 0990779, GRB. 1436563.
3,939,326.—DUAL RIBBON FUSER. FEB. 17, 1976.
3,944,784.—DUAL RIBBON FUSER. MAR. 16, 1976.
3,953,709.—TWO SOURCE RADIANT FUSER FOR XEROGRAPHIC REPRODUCING APPARATUS. APR 27, 1976.
3,987,757.—PAPER HANDLING IMPROVEMENTS IN RADIANT FUSER VIA CORRUGATION OF PAPER. OCT. 26, 1976.
4,001,622.—DIRECTIONAL SOURCES OF ELECTROMAGNETIC RADIATION. JAN. 4, 1977. GRB. 1443340.
4,015,103.—A FUSER CONVEYOR BELT. MAR. 29, 1977.
4,021,641.—RADIANT FUSER FOR FIXING TONER IMAGES. MAY 3, 1977.

Class 8A 1A

3,445,626.—FUSING APPARATUS WITH FLASH LAMP CIRCUIT. MAY 20, 1969. CAN. 0843525, GRB. 1180604, JAP. 1075585.
3,465,203.—FLASH LAMP FOR ELECTROSCOPIC TONER. SEPT. 2, 1969. CAN. 0843526, GER. 1589315, GRB. 1185687, JAP. 0758339.
3,474,223.—SELECTIVE FLASH FUSING. OCT. 21, 1969. CAN. 0851811, FRA. 1546257, GRB. 1208770, JAP. 0558445.
3,529,129.—REFLECTION TYPE FLASH FUSER. SEPT. 15, 1970. ARG. 0180678, BEL. 0728716, CAN. 0855311, FRA. 6004567, GRB. 1252465, ITL. 0866971, JAP. 0661180, MEX. 0107835.
3,566,076.—TONER FIXING APPARATUS. FEB. 23, 1971. CAN. 0913164, GRB. 1256471.
3,655,280.—XEROGRAPHIC FUSING METHOD AND APPARATUS. APR. 11, 1972.
3,765,828.—FUSING APPARATUS. OCT. 16. 1973. CAN. 0991256, GRB. 1428800.
3,792,227.—FUSER APPARATUS. FEB. 12, 1974.
3,819,259.—LIGHT ATTENUATOR. JUNE 25, 1974. GRB. 1428799.
3,865,081.—MAGNETIC BRUSH DEVELOPING APPARATUS. FEB. 11, 1975.
3,869,696.—FUSER APPARATUS. MAR. 4, 1975.
3,903,394.—READ/WRITE APPARATUS FOR MAGNETIC RECORDERS. SEPT. 2, 1975.
3,920,952.—DUPLEX FUSING APPARATUS AND METHOD. NOV. 18, 1975.
3,935,424.—FLASH FUSING APPARATUS. JAN. 27, 1976.
3,944,783.—HIGH EFFICIENCY NON CAVITY RADIANT METHOD AND APPARATUS. MAR. 16, 1976.
3,980,424.—FUSER CLEANING ROLLER. SEPT. 14, 1976.
4,001,541.—FLASH FUSING SYSTEM WITH ENERGY CONTROL. JAN. 4, 1977.
4,027,199.—FLASH LAMP MODULATOR SYSTEM. MAY 31, 1977.

Class 8A 1B

2,852,651.—FUSING MECHANISM FOR A XEROGRAPHIC COPYING MACHINE. SEPT. 16, 1958. CAN. 0619281.
3,053,962.—XEROGRAPHIC FUSING APPARATUS. SEPT. 11, 1962. CAN. 0657396, GER. 1165413, GRB. 0999763.
3,357,401.—XEROGRAPHIC FUSER MONITORING APPARATUS. DEC. 12, 1967.
3,432,639.—FUSING APPARATUS. MAR. 11, 1969. CAN. 0851810, GRB. 1194234, JAP. 0608702.
3,437,407.—XEROGRAPHIC FUSING SYSTEM. APR. 8, 1969. CAN. 0842370, JAP. 0758338.
3,445,626.—FUSING APPARATUS WITH FLASH LAMP CIRCUIT. MAY 20, 1969. CAN. 0843525, GRB. 1180604, JAP. 1075585.
3,449,546.—INFRA-RED HEATER. JUNE 10, 1969. ARG. 0170237, ATR. 0303518, AUS. 0402657, BEL. 0700101, BRA. 6788714, CAN. 0852819, CHL. 0023085, DNK. 0118703, FRA. 1527629, GRB. 1187481, ITL. 0805313, MEX. 0101251, NOR. 0123480, PLD. 0068551, PRU. 0009320, SAF. 0673601, SPN. 0341906, STZ. 0499143, SWD. 0332936, URG. 0008615, VZL. 0026103.
3,507,333.—FIRE PREVENTION SYSTEM. APR. 21, 1970. BEL. 0722599, CAN. 0910255, FRA. 1589864, GRB 1229495, ITL. 0845253, JAP. 0752504.
3,558,853.—FUSER SYSTEM FOR COPYING MACHINE. JAN. 26, 1971. ARG. 0186145, ATR. 0309984, AUS. 0446113, BEL. 0750389, BRA. 7019023, CAN. 0874013, CZC. 0168526, EGR. 0083065, FRA. 7017316, GRB. 1309129, ITL. 0893097, JAP. 0836943, MEX. 0117915, NZL. 0160101, SPN. 0379651, STZ. 0506817, SWD. 0357840, TIW. 0006834, VZL. 0032597.
3,588,445.—FUSER CONTROL CIRCUIT. JUNE 28, 1971.
3,735,092.—FUSER CONTROL CIRCUIT FOR COPYING APPARATUS. MAY 22, 1973. CAN. 0991254, GRB. 1406655.
3,781,516.—FUSER CONTROL SYSTEM. DEC. 25, 1973. MEX. 0135422.
3,790,747.—REGULATOR FOR XEROGRAPHIC FUSING APPARATUS. FEB. 5. 1974. ARG. 0200245, AUS. 0467385, BEL. 0789339, CAN. 0991252, FRA. 7234199, GRB. 1397586, ITL. 0972690, MEX. 0129168, SPN. 0409974, STZ. 0554008, SWD. 7215167, VZL. 0032607.
3,833,794.—FIXING UNIT FOR USE IN A DUPLICATING APPARATUS. SEPT. 3, 1974.
3,851,144.—FEEDBACK FUSER FOR 730S. NOV. 26, 1974.
3,989,370.—ADAPTIVE FUSER CONTROLLER. NOV. 2, 1976.
3,989,926.—DEVICE FOR PREVENTING OVERHEATING OF ELECTROPHOTOGRAPHIC FIXING DEVICE. NOV. 2, 1976.
4,032,746.—CONTROL SYSTEM FOR A FUSING APPARATUS. JUNE 28, 1977.

Class 8A 1C

3,076,083.—XEROGRAPHIC FIXING APPARATUS. JAN. 29, 1963.

Class 8A 2

2,701,765.—XEROGRAPHIC FUSING APPARATUS. FEB 8, 1955. CAN. 0530525.
3,349,702.—FUSER HAVING HEATED AND UNHEATED PORTIONS FOR PRINT FIXING PURPOSES. OCT. 31, 1967. CAN. 0833789, MEX. 0096468.
3,356,831.—XEROGRAPHIC FUSING APPARATUS. DEC. 5, 1967. CAN. 0798466, FRA. 1465786, GER. 1497228, GRB. 1117339, ITL. 0749552, JAP. 0512652.
3,584,195.—HEAT FIXING APPARATUS. JUNE 8, 1971. GRB. 1322354.
3,718,390.—MICROFICHE INDEXER. FEB. 27, 1973. ARG. 0190620, BEL. 0768712, CAN. 0946659, GRB. 1350656, ITL. 0927453, MEX. 0121626, SWD. 7107727.
3,788,873.—FIXING METHOD UTILIZING INTERMEDIATE HEAT TRANSFER. JAN. 29, 1974
3,810,735.—HEAT FIXING APPARATUS FOR FUSIBLE MATERIAL. MAY 14, 1974.
3,849,628.—NON-CONTACT TEMPERATURE SENSOR FOR ROLL FUSER OF A XEROGRAPHIC REPRODUCTION APPARATUS. NOV. 19, 1974. CAN. 1002583, GRB. 1322612.
3,881,859.—STRIPPER FINGER DESIGN TO PREVENT OIL-ON-THE-COPY. MAY 6, 1975.
3,900,590.—XEROGRAPHIC FUSING APPARATUS. AUG. 19, 1975. CAN. 0992614, GRB. 1192444.
3,904,354.—RESILIENT STRIPPER MEMBERS FORMING A PART OF A FUSER ROLL. SEPT. 9, 1975.
3,937,637.—ROLL CONTACT FUSER. FEB. 10, 1976.
3,940,235.—IMMERSIONS FUSING. FEB. 24, 1976.
3,965,855.—IMMERSION FUSING. JUNE 29, 1976.
3,976,814.—FUSING DEVICE & METHOD. AUG. 24, 1976.
3,997,691.—FUSING SURFACE AND METHOD FOR FIXING TONER. DEC. 14, 1976.
4,000,339.—FUSING SURFACE & METHOD FOR FIXING XEROGRAPHIC TONER. DEC. 28, 1976.
4,015,103.—A FUSER CONVEYOR BELT. MAR. 29, 1977.
4,029,827.—MERCAPTO FUNCTIONAL POLYORGANOSILOKANE RELEASE AGENTS FOR FUSERS IN ELECTROSTATIC COPIERS. JUNE 14, 1977. SPN. 0439743.

Class 8A 2A

3,256,002.—XEROGRAPHIC FIXING DEVICE. JUNE 14, 1966. ADN. 0000470, AUS. 0295646, BRS. 00J3738, BRU. 0000569, CAN. 0796441, FIJ. 0000343, GHA. 0000995, GIB. 1089537, GIE. 0006669. GRB. 1089537, GUR. 1089537, HGK. 0009269, ISR. 0030229, JAP. 0537119, JER. 0000P98, KEN. 0001745, MAU. 1917571, MLS. 0015169, NIG. 0001618, NZL. 0148733. SBH. 0005369, SGP. 0008369, SHL. 0000018, SLN 3677286, SRK. 0000386, STZ. 0458077, UGD. 0000369.
3,268,351.—XEROGRAPHIC FIXING METHOD AND APPARATUS. AUG. 23, 1966. JAP. 0489660.
3,291,466.—XEROGRAPHIC FIXING DEVICE. DEC. 13, 1966. CAN. 0800935, FRA. 1458647, GRB. 1122628, ITL. 0729649, JAP. 0524526, MEX 0090836.
3,324,791.—XEROGRAPHIC ROLLER FUSER DRIVE APPARATUS. JUNE 13, 1967. CAN. 0825903, GRB. 1135744, JAP. 0512655, STZ. 0520889.
3,327,096.—TEMPERATURE CONTROL CIRCUIT. JUNE 20, 1967. CAN. 0797970, FRA. 1448641, GRB. 1113451, ITL. 0729649, JAP. 0572184, MEX. 0085994.

3,331,592.—XEROGRAPHIC FUSING APPARATUS. JULY 18, 1967. CAN. 0823589, JAP. 0512657, MEX. 0108575.
3,357,249.—TEMPERATURE SENSOR. DEC. 12, 1967. CAN. 0810332, GER. 1690654, GRB. 1171381.
3,435,500.—PRESSURE ROLL AND METHOD OF MANUFACTURING. APR. 1, 1969. ARG. 0153406, AUS. 0408490, BEL. 0670480, BRA. 0083780, CAN. 0832922, FRA. 1450156, GER. 1546792, GRB. 1124036, ITL. 0730679, JAP. 0669366, MEX. 0107366, VZL. 0024008.
3,437,032.—HEATED FUSER ROLL. APR. 8, 1969. ARG. 0155221, AUS. 0043081, BEL. 0683308, CAN. 0800936, FRA. 1484969, GRB. 1137227, ITL. 0773369, JAP. 1071499, MEX. 0093105, SPN. 0328427, STZ. 0467476, SWD. 0321410, VZL. 0023990.
3,449,548.—FUSING DEVICE. JUNE 10, 1969.
3,498,596.—HEAT FIXING APPARATUS FOR FUSIBLE MATERIAL. MAR. 3, 1970. ARG. 0181805, AUS. 0428652, BEL. 0733408, BRA. 6909134, CAN. 0860450, CZC. 0150764, FRA. 6917085, GRB. 1258152, ITL. 0865073, MEX. 0111517, PLD. 0079991, PNM. 0002166, SPN. 0367312, STZ. 0505411, SWD. 0345229, TIW. 0006194, USR. 0230669, VZL. 0025073.
3,539,161.—HEAT FIXING APPARATUS FOR FUSIBLE MATERIALS. NOV. 10, 1970. CAN. 0889987.
3,612,820.—HEAT FIXING APPARATUS FOR LENGTHY FUSIBLE MATERIALS. OCT. 12, 1971.
3,649,992.—CLEANING APPARATUS FOR FUSING SYSTEM. MAR. 21, 1972. CAN. 0980517, GRB. 1340684.
3,667,742.—FIXING ARRANGEMENT. JUNE 6, 1972. BEL. 0777318, CAN. 0928766, FRA. 7147890, GRB. 1368307, ITL. 0944393.
3,690,176.—TEMPERATURE SENSING APPARATUS. SEPT. 12, 1972. GRB. 1383087.
3,718,116.—OIL DISPENSING APPARATUS. FEB. 27, 1973. CAN. 0984895.
3,745,972.—WICKING APPARATUS. JULY 17, 1973. CAN. 0991251, GRB. 1397626.
3,751,216.—FUSER ROLL ASSEMBLY. AUG. 7, 1973.
3,754,819.—APPARATUS FOR PLACING ROLLERS IN CONTACT IN A PRESSURE FUSER ASSEMBLY. AUG. 28, 1973.
3,776,760.—METHOD FOR MANUFACTURING A TETRAFLUOPOETHLENE POLYMER-COATED ROLL. DEC. 4, 1973. ARG. 0199302, ATR. 0335842, AUS 0165141, BEL. 0789728, CAN. 0990149, GRB. 1410025, NZL. 0168554, SAF. 0727133, STZ. 0028514.
3,796,183.—FREE FLOATING PRESSURE BIASING APPARATUS FOR CLEANING ROLL FUSER. MAR. 12, 1974.
3,799,401.—SILICONE OIL CAPACITY CONTROL USING POLYURETHANE BELT. MAR. 26, 1974.
3,820,591.—APPARATUS FOR SENSING DIMENSION OF SHEETS OF MATERL TO BE TRNPRTD THROUGH ELCTRSTIC REPRDCTN M. JUNE 28, 1974. CAN. 1004290.
3,831,553.—WICK FOR OIL DISPENSING APPARATUS. AUG. 27, 1974. CAN. 0984895.
3,852,861.—SURFACES WITH FLUOROCARBON PROCESS FOR MULTIPLE COATING RESINS. DEC. 10, 1974. ARG. 0199302, ATR. 0335842, AUS. 0165141, BEL. 0789728, CAN. 0990149, GRB. 1410025, NZL. 0168554, SAF. 0727133, STZ. 0028514.
3,861,860.—DRY FUSER ROLL CLEANING APPARATUS. JAN. 21, 1975.
3,881,085.—FUSER CONTROL CIRCUIT FOR COPYING APPARATUS. APR. 29, 1975. BEL. 0808310, GRB. 1447679.
3,883,291.—OIL APPLICATOR FOR REPRODUCTION MACHINE FUSER. MAY 13, 1975. BEL. 0822048, FRA. 7438048, SPN. 0432090.
3,883,292.—SLEEVELESS PRESSURE ROLL CLEANER. MAY 13, 1975.
3,883,293.—PRESSURE ROLL CONSTRUCTION. MAY 13, 1975.
3,902,845.—METAL FOAM UNDER CONFORMABLE SURFACE REPLACEABLE. SEPT. 2, 1975.
3,906,800.—REUSABLE NIP MEASURING DEVICE AND METHOD. SEPT. 23, 1975.
3,907,493.—VISCO-ELASTIC DAMPENER MECHANISM FOR FUSER ASSEMBLY. SEPT. 23, 1975.
3,908,589.—STRUCTURE FOR APPLYING RELEASE AGENT TO A HEATED FUSER ROLL STRUCTURE. SEPT. 30, 1975.
3,912,901.—PFA TEFLON SLEEVED CHOW PRESSURE ROLL. OCT. 14, 1975.
3,913,521.—COMPOSITE DOCTORING BLADE FOR A HEATED FUSER ROLL UTILIZED FOR FIXING TONER. OCT. 21, 1975.
3,918,397.—CONTACT FUSING APP FOR FIXING TONER IMAGES TO A SUPPORT MEMBER. NOV. 11, 1975.
3,918,804.—APP FOR APPLYING RELEASE MATERIAL TO A CONTACT FUSER ROLL MEMBER UTILIZED IN FIXNG TNR IMGS TO. NOV. 11, 1975.
3,921,573.—CLEANING SYSTEM FOR ELECTROSTATIC REPRODUCING APPARATUS. NOV. 25, 1975.
3,924,564.—FUSER APPARATUS HAVING AN ARTICULATED RELEASE MATERIAL DISPENSER. DEC. 9, 1975.
3,926,058.—CONTACT ARC REPLICATION DEVICE. DEC. 16, 1975.
3,929,094.—ROLL FUSER. DEC. 30, 1975.
3,929,095.—ROLL FUSER. DEC. 30, 1975.
3,929,096.—ROLL FUSER. DEC. 30, 1975.
3,934,113.—ROLL FUSER APPARATUS AND MOUNTING ARRANGEMENT THEREFOR. JAN. 20, 1976.
3,934,547.—RENEWABLE CHOW FUSER COATING. JAN. 27, 1976.
3,935,836.—METERING BLADE FOR A FUSER ROLL. FEB. 3, 1976.
3,938,950.—STRIPPING APPARATUS. FEB. 17, 1976.
3,940,238.—CLEANING STRUCTURE FOR AN ELASTOMERIC FUSER MEMBER. FEB. 24, 1976.
3,940,518.—BAKE TECHNIQUE FOR MANUFACTURING TETRAFLUOROETHYLENE COATED ROLLS. FEB. 24, 1976. GRB. 1452718.
3,941,558.—A CONTACT AND HEATING FIXING DEVICE FOR ELECTROPHOTOGRAPHY. MAR. 2, 1976.
3,942,887.—DRIVE MECHANISM FOR A ROLL FUSER EMPLOYED IN A COPIER APPARATUS. MAR. 9. 1976.
3,948,214.—INSTANT START FUSING APPARATUS. APR. 6, 1976.
3,951,538.—A PERMANENTLY NIPPED CONTACT IMAGE FUSER SYSTEM INCORPORATING A ONE-WAY CLUTCH. APR. 20, 1976.
3,955,916.—FUSER ROLL SHEET STRIPPING APPARATUS. MAY 11, 1976.
3,965,331.—DUAL MODE ROLL FUSER. JUNE 22, 1976.
3,965,332.—SELECTIVE FUSING APPARATUS. JUNE 22, 1976.
3,965,853.—CONTACT FUSER ASSEMBLY. JUNE 29, 1976.
3,965,973.—TEMPERATURE SENSING DEVICE. JUNE 29, 1976.
3,966,394.—PLURAL CLEANING ROLLS ASSEMBLY. JUNE 29, 1976.
3,968,343.—FUSER ROLL TEMPERATURE REGULATOR PROBE. JULY 6, 1976.
3,970,038.—ROLL FUSER. JULY 20, 1976.
3,973,844.—LATCHING MECHANISM FOR THE BACK-UP ROLL OF A ROLL FUSER EMPLOYED IN A COPIER APPARATUS. AUG. 10, 1976.
3,976,370.—BELT TRANSFER AND FUSING SYSTEM. AUG. 24, 1976.
3,980,423.—FUSER CLEANING ROLLER ASSEMBLY. SEPT. 14, 1976.
3,981,085.—AIR STRIPPING DEVICE FOR ELASTOMERIC SURFACE. SEPT. 21, 1976.
3,989,005.—IMPROVED OIL METERING BLADE DEVICE. NOV. 2, 1976.
3,993,124.—METH&APPRTS FOR SUSR ASSMBLY CLING IN ELCTROSTATOGRPC MACHNE-GAMMA METH&APPRTS FOR FUSER END CO. NOV. 23, 1976. BEL. 0793560, FRA. 7246728, ITL. 0973322, SWD. 7216976.
3,996,886.—IMPROVED OIL METERING BLADE HOLDER ASSEMBLY. DEC. 14, 1976.
3,996,887.—IMPROVED OIL METERING BLADE HOLDING DEVICE. DEC. 14, 1976.
3,999,510.—HIGH SURFACE ENERGY CLEANING ROLL. DEC. 28, 1976.
4,000,394.—FUSER THERMAL DETECTOR. DEC. 28, 1976.
4,000,957.—CONTACT FUSER AND RELEASE AGENT APPLICATOR THEREFOR. JAN. 4, 1977.
4,000,963.—CLEANING APPARATUS FOR A HEAT & PRESSURE FUSER. JAN. 4, 1977.
4,004,549.—ROLL FUSER. JAN. 25, 1977.
4,008,955.—FUSER ASSEMBLY FOR AN ELECTROPHOTOGRAPHIC COPYING MACHINE. FEB. 22, 1977.
4,011,831.—IMPROVED OIL METERING BLADE LOADING ASSEMBLY. MAR. 15, 1977.
4,013,400.—CLEANING APPARATUS FOR A HEAT & PRESSURE FUSER. MAR. 22, 1977.
4,018,555.—CLEANING APPARATUS FOR ROLL FUSER. APR. 19, 1977.
4,025,751.—FUSER ROLL SLEEVE. MAY 24, 1977.
4,026,238.—APP FOR APPLYING RELEASE MATERIAL TO A CONTACT FUSER ROLL MEMBER UTILIZED IN FIXING TONER IMAGE. MAY 31, 1977.
4,028,050—STRIPPER FINGER COMBINATION MOUNTING MEANS THEREFOR. JUNE 7, 1977.
4,034,183.—HEAT FIXING DEVICE FOR COPYING MACHINE. JULY 5, 1977.

4,034,706.—DUAL RELEASE AGENT CU-VITON FUSER. JULY 12, 1977.

Class 8A 3

3,180,971.—XEROGRAPHIC FUSING APPARATUS. APR. 27, 1965. CAN. 0734734, GRB. 1027904, JAP. 0524355.
3,219,799.—XEROGRAPHIC FUSING APPARATUS. NOV. 23, 1965.
3,604,892.—FUSING APPARATUS. SEPT. 14, 1971.
3,856,460.—DEVELOPING SYSTEM FOR FILM BY ADIABACTIC HEAT FLOW. DEC. 24, 1974.

Class 8A 4

3,093,039.—APPARATUS FOR TRANSFERRING POWDER IMAGES AND METHOD THEREFOR. JUNE 11, 1963. CAN. 0744873.

Class 8B

2,684,301.—DEVICE FOR FUSING XEROGRAPHIC IMAGES. JULY 20, 1954.
2,776,907.—METHOD OF FIXING ELECTROSTATIC POWDER IMAGE. JAN. 8, 1957. CAN. 0574197.
2,922,230.—XEROGRAPHIC POWDER FIXING APPARATUS. JAN. 26, 1960.
2,995,464.—METHOD AND APPARATUS FOR FIXING XEROGRAPHIC POWDER IMAGES. AUG. 8, 1961. CAN. 0705852, FRA. 1243780, GER. 1106780, GRB. 0890911.
3,013,342.—XEROGRAPHIC FIXING APPARATUS. DEC. 19, 1961. CAN. 0616923.
3,049,810.—XEROGRAPHIC FUSING APPARATUS. AUG. 21, 1962. CAN. 0740393.
3,117,847.—XEROGRAPHIC POWDER IMAGE FIXING APPARATUS. JAN. 14, 1964.
3,132,047.—XEROGRAPHIC FIXING APPARATUS. MAY 5, 1964. AUS. 0266991, CAN. 0713996, FRA. 1332228, GER. 1571130, GRB. 1012444, JAP. 0835352.
3,148,078.—XEROGRAPHIC FUSING METHOD. SEPT. 8, 1964.
3,149,931.—XEROGRAPHIC VAPOR FUSING APPARATUS. SEPT. 22, 1964. CAN. 0758518.
3,158,509.—XEROGRAPHIC FIXING APPARATUS. NOV. 24, 1964. CAN. 0762382, GRB. 1023052, JAP. 0456309.
3,215,116.—VAPOR FUSING APPARATUS. NOV. 2, 1965.
3,704,524.—APPARATUS FOR DEVELOPING LATENT ELECTROSTATIC IMAGES. DEC. 5, 1972. ARG. 0188616, BEL. 0779806, CAN. 0950655, FRA. 7208101, GRB. 1385328, MEX. 0126261.
3,884,690.—POLYESTER PHOTOCONDUCTORS AND MATRIX MATERIALS. MAY 20, 1975.
3,884,825.—IMAGING COMPOSITION. MAY 20, 1975. AUS. 0467835, BEL. 0802879, CAN. 0995963, FRA. 7328589, GRB. 1437041, ITL. 0991465, SPN. 0417382.
3,934,546.—APPARATUS FOR FIXING WITH SOLVENT VAPORS. JAN. 27, 1976.
3,940,518.—BAKE TECHNIQUE FOR MANUFACTURING TETRAFLUOROETHYLENE COATED ROLLS. FEB. 24, 1976. GRB. 1452718.

Class 8B 1

3,070,900.—XEROGRAPHIC FIXING APPARATUS. JAN. 1, 1963. CAN. 0686166.
3,078,589.—XEROGRAPHIC FUSING APPARATUS. FEB 26, 1963. CAN. 0609621, GRB. 0859788.
3,140,159.—XEROGRAPHIC FUSING AND DRYING APPARATUS. JULY 7, 1964.
3,140,160.—XEROGRAPHIC FUSING AND DRYING APPARATUS. JULY 7, 1964.
3,199,223.—XEROGRAPHIC FUSING AND DRYING APPARATUS. AUG. 10, 1965.
3,288,624.—VAPOR FUSING METHOD FOR XEROGRAPHIC POWDER IMAGES. NOV. 29, 1966.

Class 8C

2,894,840.—METHOD FOR FIXING XEROGRAPHIC IMAGES. JULY 14, 1959.
2,995,085.—TRANSFER AND FIXING METHOD. AUG. 8, 1961. CAN. 0622688.
3,158,509.—XEROGRAPHIC FIXING APPARATUS. NOV. 24, 1964. CAN. 0762382, GRB. 1023052, JAP. 0456309.
3,386,822.—SOLVENT CAPSULE FIXING OF POWDER IMAGES. JUNE 4, 1968. CAN. 0712993, FRA. 1430471. GER. 1497196, GRB. 1087201, HOL. 0132775, ITL. 0745341, JAP. 0741995.
3,893,760.—TRANSFER APPARATUS. JULY 8, 1975.
3,926,824.—ELECTROSTATOGRAPHIC DEVELOPER COMPOSITION. DEC. 16, 1975. ARG. 0192480, AUS. 0466319, BEL. 0793098, CAN. 0985552, FRA. 7245403, GRB. 1417179, ITL. 0973327, SPN. 0410171, STZ. 0028663, SWD. 7216977.
3,940,235.—IMMERSIONS FUSING. FEB. 24, 1976.
3,965,855.—IMMERSION FUSING. JUNE 29, 1976.

Class 8D

2,894,840.—METHOD FOR FIXING XEROGRAPHIC IMAGES. JULY 14, 1959.
3,493,412.—TRANSFERRING XEROGRAPHIC TONER IMAGES TO A SOLID CRYSTALLINE PLASTICIZER COATED RECEIVING SURFA. FEB. 3, 1970. CAN. 0880837, MEX. 0096609.
3,640,746.—ADHESIVE CONTACT ELECTRIFICATION IMAGING. FEB. 8, 1972.
3,861,911.—IMAGING FIXING METHOD. JAN. 21. 1975.

Class 8E

2,681,473.—MANUFACTURE OF PLAQUES AND THE LIKE. JUNE 22, 1954.
2,855,324.—CONTACT TRANSFER FOR XEROGRAPHY. OCT. 7, 1958. CAN. 0665467, FRA. 1170805, GER. 1036279, GRB. 0843502.
2,886,464.—CONTACT TRANSFER FOR XEROGRAPHY. MAY 12, 1959.
3,157,546.—IMAGE TRANSFER. NOV. 17, 1964. ATR. 0225034, BEL. 0602721, FRA. 1287124, GER. 1271547, GRB. 0985176, ITL. 0647042, JAP. 0414127, STZ. 0383417.
3,591,276.—METHOD AND APPARATUS FOR OFFSET XEROGRAPHIC REPRODUCTION. JULY 6, 1971. CAN. 0894931, GER. 1811893, GRB. 1245426, JAP. 0648075.
3,799,827.—PROCESS FOR PROTECTING THE SURFACE OF AN IMAGE. MAR. 26, 1974.
3,816,066.—XEROGRAPHIC FIXING DEVICE. JUNE 11, 1974.
3,861,219.—METHOD FOR MEASURING HEAT AND PRESSURE CHARACTERISTICS OF FUSING APP. JAN. 21, 1975. CAN. 1013807.
3,888,622.—TEMPERATURE SENSING DEVICE. JUNE 10, 1975.
3,928,656.—METHOD OF DEVELOPING ELECTROSTATIC LATENT IMAGES WITH PRESSURE SENSITIVE TONER. DEC. 23, 1975. ARG. 0196320, AUS. 0464392, BEL. 0793554, CAN. 1011149, FRA. 7246575, GRB. 1417409, ITL. 0973325, SPN. 0410211, STZ. 0028568.
3,934,477.—TEMPERATURE SENSING DEVICE. JAN. 27, 1976.
3,936,658.—FUSER APPARATUS FOR ELECTROSTATIC REPRODUCING MACHINES. FEB. 3, 1976. BEL. 0844831.

Class 8E 1

2,843,499.—PRESSURE TRANSFER OF XEROGRAPHIC IMAGES. JULY 15, 1958.
2,995,085.—TRANSFER AND FIXING METHOD. AUG. 8, 1961. CAN. 0622688.
3,003,891.—UNMOTTLED DYE TRANSFER. OCT. 10, 1961.
3,060,052.—TRANSFER OF XEROGRAPHIC DYE IMAGES. OCT. 23, 1962. AUS. 0242307, CAN. 0678380, FRA. 1246634, GRB. 0946761.

Class 9

3,836,244.—COLOR XEROGRAPHY. SEPT. 17, 1974.
3,958,878.—ELECTROSTATIC PROCESSOR HOUSING INTERCHANGABLE RESERVOIRS FOR SUPPING AND RECLAIMING TONER. MAY 25, 1976.
3,980,494.—METHOD OF REDUCING FRICTION IN BLADE CLEANING OF IMAGING SURFACES. SEPT. 14, 1976.
3,983,841.—TONER RECLAIM CONVEYOR. OCT. 5, 1976.

Class 9A

T.940,022.—PRESSURIZED AND FILTERED XEROGRAPHIC SYSTEM. NOV. 4, 1975.
3,552,850.—LUBRICATED BLADE CLEANING OF IMAGING PHOTOCONDUCTIVE MEMBERS. JAN. 5, 1971 ALB. 0003931, ARG. 0172544, ATR. 0300568, AUS. 0438884, BEL. 0727561, BRA. 6898275, BUR. 0000041, CAM. 0000453, CAN. 0869669, CHL. 0024409, CLB 0017926, COR. 000947A, DNK. 0122738, EGR. 0075946, EIR. 0032784, FRA. 6902175, GNR 0000043, GRB 1259513, GRK 0039239, IND. 0119582, ISR 0031502, ITL. 0854622, LIB. P272693, LXB. 0057856, MEX

0106799, MLG. 0003059, MLW. 00MW769, MNC. 8146975, MRC. 0014725, NOR. 0128683, NZL. 0155207, PAK. 0120897, PLD. 0017650, PLP. 0006639, PNM. 0001979, PRU. 0009588, PTG. 0051062, RHD. 5569489, SAF. 6970696, SPN. 0363130, STZ. 0493016, SWD. 0346398, TGR. 0000550, URG. 0009736, USR. 0385466, VTM. 0001840, VZL. 0023692, ZMB. 0176973.

3,635,704.—IMAGING SYSTEM. JAN. 18, 1972. ALB. 0004133, ARG. 0176978, ATR. 0303521, AUS. 0440759, BEL. 0727560, BRA. 0088093, BUR. 0000042, CAM. 0000463, CAN. 0867697, CHL. 0026254, COR. 000949A, DNK. 0131403, EGR. 0078899, EIR. 0032632, FRA. 6902174, GNR. 0000042, GRB. 1259514, GRK. 0039240, IND. 0119583, ISR. 0031503, ITL. 0871510, LAS. 0000199, LIB. 00P7269, LXB. 0057849, MEX. 0106332, MLG. 0003056, MLW. 00MW869, MNC. 8156975, MRC. 0014724, NZL. 0155208. PAK. 0120859, PLP. 0008511, PNM. 0001676, PRU. 0010443, PTG. 0051063, RHD. 4169529, RMN. 0055464, SAF. 0069995, SPN. 0363127, STZ. 0513431, SWD. 0342921, SYA. 0002477, TGR. 0000551, TIW. 0005257, UAR. 0009525, USR. 0396887, VTM. 0001805, VZL. 0023744, ZMB. 0186974.

3,717,409.—CLEANING OF ELECTROSTATOGRAPHIC SURFACES. FEB. 20, 1973.

3,724,019.—WIPER BLADE CLEANING APPARATUS FOR XEROGRAPHIC MACHINES. APR. 3. 1973. CAN. 991248.

3,724,020.—WIPER BLADE CLEANER FOR XEROGRAPHIC MACHINES. APR. 3, 1973. ARG. 0194951, BEL. 0783490, CAN. 0991249, FRA. 7216778, GER. 2220821, GRB. 1399156, ITL. 0955404, MEX. 0127875.

3,838,472.—TONER CLEANING APPARATUS. OCT. 1, 1974. BEL. 0789325, CAN. 0991694, FRA. 7233424, GER. 2239441, GRB. 1403439, ITL. 0967797, SWD. 7212456.

3,847,480.—CONTINOUS BLADE CLEANER. NOV. 12, 1974.

3,848,992.—DEVELOPER BLADE CLEANING. NOV. 19, 1974. FRA. 7415394, GRB. 1443128, ITL. 0010212.

3,848,993.—SUPPORTED DEVELOPER BLADE CLEANING. NOV. 19, 1974.

3,848,994.—LINE CHARGE TONER CLEANING. NOV. 19, 1974.

3,854,814.—TRANSLATING DWELL CLEANING SYSTEM. DEC. 17, 1974.

3,871,762.—BLADE CLEANING SYSTEM. MAR. 18, 1975.

3,918,807.—CLEANING BLADE FOR PHOTOCOPIER. NOV. 11, 1975.

3,918,809.—APPARATUS FOR CLEANING A SURFACE SUPPORT. NOV. 11, 1975.

3,927,937.—CLEANING ASSEMBLY FOR AN ELECTROSTATOGRAPHIC DEVICE. DEC. 23, 1975. SPN. 0420425.

3,940,282.—BLADE CLEANING OF SURFACE WITH REVERSE MOVEMENT. FEB. 24, 1976.

3,947,108.—CLEANING SYSTEM. MAR. 30, 1976.

3,950,092.—CLEANING TRANSPORTING & SORTING APPARATUS & REPRODUCING MACHINE. APR. 13, 1976.

3,957,509.—METHOD AND APPARATUS FOR REMOVING CONTAMINANTS FROM AN ELECTROSTATIC IMAGING SURFACE. MAY 18, 1976.

3,973,845.—METHOD OF REDUCING FRICTION IN BLADE CLEANING OF IMAGING SURFACES. AUG. 10, 1976.

3,977,898.—METHOD FOR CLEANING A SURFACE SUPPORT. AUG. 31, 1976. GRB. 1438660.

3,992,091.—ROUGHENED IMAGING SURFACE FOR CLEANING. NOV. 16, 1976.

4,002,570.—ELECTROPHOTOGRAPHIC DEVELOPER WITH POLYVINYLIDENE FLUORIDE ADDITIVE. JAN. 11, 1977.

4,007,982.—METHOD AND APPARATUS FOR ULTRASONICALLY CLEANING A PHOTOCONDUCTIVE SURFACE. FEB. 15, 1977.

4,030,824.—A REPRODUCING APPARATUS HAVING AN IMPROVED IMAGING SURFACE CLEANING SYSTEM. JUNE 21, 1977.

Class 9A 1

3,099,856.—WEB CLEANER APPARATUS. AUG. 6, 1963. ARG. 0146853. CAN. 0760369, GRB. 1032957, IND. 0096310, JAP. 0481944.

3,149,356.—XEROGRAPHIC PLATE CLEANING APPARATUS. SEPT. 22, 1964.

3,186,838.—XEROGRAPHIC PLATE CLEANING METHOD UTILIZING THE RELATIVE MOVEMENT OF A CLEANING WEB. JUNE 1, 1965. CAN. 0858757, FRA. 1435510, GER. 1497242, GRB. 1094224, ITL. 0761145.

3,190,198.—XEROGRAPHIC CLEANING APPARATUS. JUNE 22, 1965.

3,337,891.—PLATE CLEANING AND TRANSPORTING APPARATUS. AUG. 29, 1967.

3,380,355.—XEROGRAPHIC CLEANING APPARATUS. APR. 30, 1968. CAN. 0819048.

3,405,682.—XEROGRAPHIC DEVELOPMENT APPTS WITH WEB LOADING MEANS TO REMOVE RESIDUAL DEVELOPER. OCT. 15, 1968. GRB. 1102282.

3,492,732.—WEB QUANTITY INDICATOR. FEB. 3, 1970. CAN. 0887178.

3,526,457.—CLEANING APPARATUS FOR ELECTROSTATIC COPYING MACHINES. SEPT. 1, 1970. CAN. 0880402, GRB. 1225287.

3,615,397.—METHOD OF CLEANING ELECTROSTATIC COPYING MACHINES. OCT. 26, 1971.

3,624,858.—CLEANING APPARATUS. DEC. 7, 1971.

3,664,300.—APPARATUS FOR TREATING THE SURFACE OF AN ELECTROSTATOGRAPHIC IMAGING PLATE. MAY 23, 1972.

3,725,059.—METHOD OF CLEANING AN ELECTROSTATOGRAPHIC SURFACE. APR. 3. 1973. GRB. 1337282.

3,781,107.—CLEANING APPARATUS. DEC. 25, 1973.

3,867,170.—METHOD FOR CLEANING LIQUID DEVELOPERS. FEB. 18, 1975. CAN. 0906336, GRB. 1339904.

3,879,785.—CLEANING APPARATUS. APR. 29, 1975.

4,007,983.—IMPROVED LIQUID DEVELOPER CLEANING MEANS. FEB. 15, 1977.

Class 9A 2

3,477,450.—BRUSH RECLAIMING. NOV. 11, 1969. GRB. 1206539.

3,489,463.—BRUSH SIZING APPARATUS. JAN. 13, 1970. GRB. 1243233, JAP. 0810578.

3,493,269.—LOADING HEAD. FEB. 3, 1970. CAN. 0864392.

3,610,693.—METHOD OF MAKING A CYLINDRICAL BRUSH. OCT. 5, 1971. CAN. 0944415, GRB. 1332920, JAP. 0758464.

3,617,123.—XEROGRAPHIC CLEANING APPARATUS. NOV. 2, 1971.

3,634,077 —METHOD AND APPARATUS FOR REMOVING A RESIDUAL IMAGE IN AN ELECTROSTATIC COPYING SYSTEM. JAN. 11, 1972. BEL. 0737956, CAN. 0896611, FRA. 6929217, GRB. 1259960, ITL. 0870232, JAP. 0742513.

3,664,300.—APPARATUS FOR TREATING THE SURFACE OF AN ELECTROSTATOGRAPHIC IMAGING PLATE. MAY 23, 1972.

3,766,593.—CLEANING APPARATUS FOR INSULATING SURFACES. OCT. 23, 1973. ARG. 0194956, AUS. 0460978, BEL. 0784898, CAN. 0990017, FRA. 7219012, GRB. 1399900, ITL. 0960138, MEX. 0127720. SPN. 404266, STZ. 0538310, SWD. 7208414, VZL. 0032065

3,947,108.—CLEANING SYSTEM. MAR. 30, 1976.

3,957,509.—METHOD AND APPARATUS FOR REMOVING CONTAMINANTS FROM AN ELECTROSTATIC IMAGING SURFACE. MAY 18, 1976.

4,025,188.—PHOTOACTIVE DEVICE FOR XEROGRAPHY. MAY 24, 1977.

Class 9A 2A

2,751,616.—BRUSH CLEANING DEVICE. JUNE 26, 1956.

3,278,972.—XEROGRAPHIC PLATE CLEANING APPARATUS. OCT. 18, 1966. CAN. 0774795, FRA. 1458646, GER. 1497218, GRB. 1122624, ITL. 0729648, JAP. 0512649.

3,534,427.—CLEANING APPARATUS FOR ELECTROSTATIC PRINTING MACHINES. OCT. 20, 1970. AUS. 0425369, BEL. 0729977, CAN. 0873426, CZC. 0157666, FRA. 6907700, GRB. 1238117, HUN. 0158312, ITL. 0876795, JAP. 0645593, SPN. 0364889, SWD. 0345533, USR. 0372853.

3,590,412.—BRUSH CLEANING DEVICE FOR ELECTROSTATIC MACHINES. JULY 6, 1971. CAN. 0930107, GRB. 1248521, JAP. 0832526.

3,660,863.—CLEANING APPARATUS. MAY 9, 1972. ARG. 0188292, ATR. 0324838, AUS. 0445312, BEL. 0752937, CAN. 0925659, CHL. 0027132, DNK. 0129483, EGR. 0084130, FRA. 7024664. GRB. 1259446, GUA. 0002676, IND. 0127312, ITL. 0900201, MEX. 0115163, NOR. 0133164, NZL. 0160666, PLD. 0081341, PLP. 0007492, PNM. 0002014, PTG. 0054074, SAF 0704533, SPN. 0381388, STZ. 0514165, SWD. 0359942, TIW. 0007784, USR. 0384250, VZL. 0032417.

3,692,402.—MATERIALS FOR FIBROUS DEVELOPMENT AND CLEANING MEMBER. SEPT. 19, 1972.

3,740,789.—XEROGRAPHIC ROLLER OSCILLATING CLEANING BLADE WITH DRIVE MECHANISM THEREFOR. JUNE 26, 1973. BEL. 0789327, CAN. 0991250, FRA. 7233724, GER. 2243491, GRB. 1403440, ITL. 0967796, SWD. 7212455.

3,742,551.—TONER CLEANING AND STORAGE APPARATUS. JULY 3, 1973. BEL. 0789325, CAN. 0991694, FRA. 7233424, GER. 2239441, GRB. 1403439, ITL. 0967797, SWD. 7212456.

3,788,454.—CHAIN BEAD DRIVE APPARATUS. JAN. 29, 1974. GRB. 1430379.

3,795,025.—ELECTROPHOTOGRAPHIC PHOTORECEPTOR CLEANING APPARATUS. MAR. 5, 1974.

3,807,853.—ELECTROPHOTOGRAPHIC CLEANING APPARATUS. APR. 30, 1974. GRB. 1439229.

4,032,228.—FOREIGN OBJECT DETECTOR BRUSH CLEANER. JUNE 28, 1977.

Class 9A 2B

2,484,782.—METHOD OF REMOVING ELECTROSCOPIC POWDER FROM AN ELECTROPHOTOGRAPHIC PLATE. OCT. 11, 1949.

2,752,271.—ELECTROSTATIC CLEANING OF XEROGRAPHIC PLATES. JUNE 26, 1956.

2,832,977.—ELECTROSTATIC CLEANING DEVICE. MAY 6, 1958.

3,404,418.—SHEET TRANSPORT APPARATUS. OCT. 8, 1968. CAN. 0859327.

3,572,923.—CLEANING METHOD AND APPARATUS FOR ELECTROSTATIC COPYING MACHINES. MAR. 30, 1971. ARG. 0172603, AUS. 0429490, BEL. 0737957, CAN. 0884822, FRA. 6929174, GRB. 1259890, ITL. 0870233, JAP. 0819708, MEX. 0113040, SPN. 0370878, SWD. 0348851.

3,655,373.—CLEANING METHOD FOR ELECTROSTATIC COPYING MACHINE. APR. 11, 1972.

3,668,008.—IONIZED AIR CLEANING DEVICE. JUNE 6, 1972. CAN. 0956406, GRB. 1310836.

3,722,018.—CLEANING APPARATUS. MAR. 27, 1973.

3,738,745.—FUR BRUSH ERASER. JUNE 12, 1973. CAN. 0970554, GRB. 1418036.

Class 9A 2B 1

2,987,660.—XEROGRAPHIC CHARGING. JUNE 6, 1961.

3,128,683.—XEROGRAPHIC APPARATUS. APR. 14, 1964.

Class 9A 2C

3,252,274.—XEROGRAPHIC POWDER FILTER. MAY 24, 1966. CAN. 0712876, GER. 1278245, GRB. 1031634, JAP. 0502993.

3,410,060.—XEROGRAPHIC FILTER APPARATUS. NOV. 12, 1968. CAN. 0810976, FRA. 1458648, GRB. 1114505, ITL. 0729638, JAP. 0724232.

3,570,224.—FILTER FOR ELECTROSTATOGRAPHIC DEVELOPER. MAR. 16, 1971.

3,641,979.—TONER RECLAIMING SYSTEM. FEB. 15, 1972. CAN. 0913351.

3,793,986.—TONER RECLAIMING SYSTEM FOR ELECTROSTATIC PRINTING MACHINES. FEB. 26, 1974. ARG. 0194370, AUS. 0464194, BEL. 0784636, GER. 0978341, GRB. 1373721, ITL. 0956416, MEX. 0128265, SPN. 403.704, STZ. 0546970, VZL. 0033339.

3,816,157.—TONER RECLAIMING METHOD. JUNE 11, 1974.

Class 9B

2,772,991.—PROCESS OF CLEANING A RESIDUAL POWDER IMAGE FROM AN ELECTROPHOTOGRAPHIC PLATE. DEC. 4, 1956.

2,874,064.—XEROGRAPHIC CLEANER. FEB. 17, 1959.

3,332,328.—XEROGRAPHIC DEVELOPER SEAL AND PROCESS. JULY 25, 1967. CAN. 0792684, GRB. 1138394, JAP. 0512658, MEX. 0091318.

3,607,160.—LIGRCIN CONTAINING PUMICING COMPOSITION. SEPT. 21, 1971.

3,610,749.—IMAGING SYSTEM. OCT. 5, 1971. CAN. 0923541, GRB. 1339905, JAP. 0745767.

3,646,910.—DEVELOPMENT APPARATUS FOR LATENT ELECTROSTATIC IMAGES. MAR. 7, 1972.

3,668,008.—IONIZED AIR CLEANING DEVICE. JUNE 6, 1972. CAN. 0956406, GRB. 1310836.

3,697,263.—METHOD OF CLEANING RESIDUAL LIQUID DEVELOPER FROM ELECTROPHOTOGRAPHIC PLATES. OCT. 10, 1972. ARG. 0181940, AUS. 0455091, BEL. 0758060, CAN. 0906334, EGR. 0087483, FRA. 7041623, GRB. 1328406, ITL. 0916264, JAP. 0749381, MEX. 0116862, SPN. 0385000, STZ. 0519186, SWD. 0365624, TIW. 0006850, USR. 0349206, VZL. 0032211.

3,834,804.—COPYING MACHINE WITH MEANS FOR MOUNTING CARRIER BEAD PICKOFF ROLLER THEREIN. SEPT. 10, 1974.

4,026,701.—GAS IMPINGMENT & SUCTION CLEANING APPARATUS. MAY 31, 1977.

Class 9B 1

2,911,330.—MAGNETIC BRUSH CLEANING. NOV. 3, 1959.

3,920,329.—BACKGROUND REMOVAL APPARATUS. NOV. 18, 1975.

Class 9B 2

RE.28,566.—CLEANING APPARATUS. OCT. 7, 1975. CAN. 0913310, MEX. 0113698.

3,424,615.—METHOD AND APPARATUS FOR CLEANING XEROGRAPHIC PLATES. JAN. 28, 1969. CAN. 0842022, GRB. 1158521, JAP. 0561239.

3,580,673.—CLEANING APPARATUS-REISSUED AS RE28566-D2266R. MAY 25, 1971. CAN. 0913310, MEX. 0113698.

3,615,398.—METHOD FOR ELECTROSTATIC COPYING INCLUDING AN IMPROVED PROCESS OF CLEANING PHOTOCONDUCTV SRFACE. OCT. 26, 1971.

3,625,683.—PROCESS FOR CLEANING A PHOTO-CONDUCTIVE DRUM OF RESIDUAL TONER PARTICLES AND REUSE OF THE SAME. DEC. 7, 1971. CAN. 0937800, GRB. 1329982.

3,628,950.—METHOD OF REMOVING THE RESIDUAL TONER PARTICLES FROM A PHOTOCONDUCTIVE SURFACE. DEC. 21, 1971.

3,640,707.—IMAGING SYSTEM. FEB. 8, 1972.

3,655,375.—INTERMITTENT GRIT REMOVAL PROCESS. APR. 11, 1972. CAN. 0924493, GRB. 1341404, JAP. 0746926.

3,656,948.—SELECTED REMOVAL OF LIQUID DVLPR IN CYCLICAL ELECTROPHOTOGRAPHIC PROCESS. APR. 18, 1972. CAN. 0906335, GRB. 1335054, JAP. 0760503.

3,776,631.—LIQUID DEVELOPER CLEANING SYSTEM. DEC. 4, 1973.

Class 9B 3

2,987,660.—XEROGRAPHIC CHARGING. JUNE 6, 1961.

3,128,683.—XEROGRAPHIC APPARATUS. APR. 14, 1964.

3,483,034.—PROCESS OF CLEANING XEROGRAPHIC PLATES. DEC. 9, 1969. CAN. 0800825, FRA. 1463257, GER. 1497235, GRB. 1125594, ITL. 0750154.

3,592,678.—LIQUID DONOR DEVELOPMENT WITH ELECTROPHORETIC CLEANING. JULY 13, 1971.

3,620,800.—CLEANING LIQUID DEVELOPED ELECTROSTATIC IMAGES BY CONTACT WITH VAPORIZED CLEANING FLUID. NOV. 16, 1971. CAN. 0933997.

3,628,981.—LIQUID TONER DEVELOPMENT. DEC. 21, 1971. ARG. 0181932, MEX. 0116451.

3,671,290.—IMAGING SYSTEM. JUNE 20, 1972.

3,702,303.—CLEANING OF PHOTOCONDUCTIVE INSULATING SURFACES. NOV. 7, 1972. CAN. 0944650, GRB. 1369451.

3,762,950.—CLEANING OF PARTICLES FROM A SURFACE. OCT. 2, 1973. ARG. 0195076, AUS. 0464713, BEL. 7916681, CAN. 0974009, FRA. 7241538, GRB. 1400238, ITL. 0971072, MEX. 0128580, SPN. 0408837, STZ. 0553433, SWD. 7215089, VZL. 0032005.

3,849,171.—METHOD FOR CLEANING BACKGROUND AREAS FROM DEVELOPED RECORDING SURFACES. NOV. 19, 1974. CAN. 0941882.

3,862,801.—METHOD OF CLEANING AN ELECTROSTATOGRAPHIC IMAGING SURFACE. JAN. 28, 1975. GRB. 1337282.

3,937,665.—PHOTORECEPTOR SOLVENT CLEANER. FEB. 10, 1976.

3,979,317.—VOLATILE CLEANING SOLUTION FOR PHOTORECEPTOR. SEPT. 7, 1976.

Class 10

3,945,728.—AN ALARM FOR AN ELECTROPHOTOGRAPHIC PRINTING MACHINE. MAR. 23, 1976.

Class 10A

D.230,085.—COPY PAPER CASSETTE. JAN. 22, 1974.

2,738,705.—FILE-HOLDING DEVICE FOR CAMERA COPY SUPPORT. MAR. 20, 1956.

2,758,503.—COPY-HOLDING APPARATUS. AUG. 14, 1956.

2,822,172.—SHEET HANDLING MACHINE. FEB. 4, 1958. CAN. 0570493.

3,100,112.—DOCUMENT FEED MECHANISM. AUG. 6, 1963. GRB. 1015635, JAP. 0478676.
3,152,528.—DOCUMENT CARRIER. OCT. 13, 1964. CAN. 0707048, FRA. 1414049, GER. 1197744, GRB. 1032954, ITL. 0737307, JAP. 0471310.
3,220,275.—DOCUMENT DRIVE TRANSMISSION. NOV. 30, 1965.
3,239,215.—DOCUMENT FEED MECHANISM. MAR. 8, 1966. CAN. 0741548, GRB. 1052820, JAP. 0497188.
3,239,220.—DOCUMENT CONVEYOR. MAR. 8, 1966. CAN. 0770495, FRA. 1434188, GRB. 1094188, ITL. 0742434.
3,326,548.—CARD CONVEYING APPARATUS HAVING A ROTARY FRONT GAUGE. JUNE 20, 1967. CAN. 0793702, MEX. 0086197.
3,370,844.—CARD HANDLING-SCANNING DEVICE. FEB. 27, 1968.
3,409,356.—CONVEYOR FOR DOCUMENTS. NOV. 5, 1968. FRA. 1500227, GRB. 1162982, ITL. 0776597.
3,409,357.—APPARATUS FOR AN ELECTROSTATIC MACHINE. NOV. 5, 1968. CAN. 0816416, GRB. 1151104, JAP. 0542588.
3,419,264.—DOCUMENT HANDLING SYSTEM. DEC. 31, 1968. ARG. 0168399, CAN. 0831413, CHL. 0024536, JAM. 0002459, MEX. 0101167, PRU. 0009340, URG. 0009205, VZL. 0023735.
3,424,528.—DOCUMENT CONVEYOR UNIT. JAN. 28, 1969. CAN. 0842644, GRB. 1175596.
3,446,554.—XEROGRAPHIC REPRODUCING APPARATUS. MAY 27, 1969. ARG. 0171943, ATR. 0302040, AUS. 0451715, BEL. 0708649, CAN. 0880187, FRA. 1567148, GRB. 1223426, HUN. 0158170, ITL. 0823019, JAP. 0657008, LXB. 0055166, MEX. 0101029, NOR. 0127833, PLD. 0069795, SPN. 0348801, STZ. 0485581, SWD. 0354529, USR. 0259733, VZL. 0023685.
3,504,908.—DOCUMENT FEEDING APPARATUS CONTROL. APR. 7, 1970.
3,520,605.—DOCUMENT SCAN DRIVE AND RETURN APPARATUS. JULY 14, 1970. CAN. 0858848.
3,578,316.—DRIVING APPARATUS FOR ARTICLE FEEDERS. MAY 11, 1971. CAN. 0907653.
3,614,090.—DOCUMENT CONVEYOR. OCT. 19, 1971. ARG. 0183554, AUS. 0451766, BEL. 0751308, CAN. 0922330, EGR. 0081784, FRA. 7019911, GRB. 1311766, ITL. 0893688, MEX. 0118182, SPN. 0380271, STZ. 0512751, SWD. 0362150, TIW. 0007678, USR. 0349152, VZL. 0032780.
3,628,408.—STAMP DISPENSER. DEC. 21, 1971. CAN. 0931918, GRB. 1324699, JAP. 0755787.
3,628,786.—DOCUMENT HANDLING APPARATUS. DEC. 21, 1971. CAN. 0942552, GRB. 1329989.
3,630,515.—DOCUMENT HANDLING APPARATUS. DEC. 28, 1971.
3,630,519.—DOCUMENT FEED APPARATUS. DEC. 28, 1971. CAN. 0903779, GRB. 1329747.
3,649,447.—APPARATUS FOR DECURLING A PAPER WEB. MAR. 14, 1972. CAN. 0916185, GRB. 1288846.
3,674,363.—SHEET FEEDING APPARATUS. JULY 4, 1972. ARG. 0176106, ATR. 0307230, AUS. 0447387, BEL. 0734129, DNK. 0131336, FRA. 6919121, GRB. 1263192, ITL. 0866189, MEX. 0112842, SPN. 0368216, STZ. 0501500, SWD. 0356136, TIW. 0006604.
3,804,514.—DUAL FUNCTION DOCUMENT STOP FOR A COPYING DEVICE. APR. 16, 1974. FRA. 7334456, GRB. 1424060.
3,846,020.—ELECTROSTATIC SHEET TRANSPORT SYSTEM. NOV. 5, 1974.
3,860,339.—COPYING MACHINE. JAN. 14, 1975.
3,861,673.—BI-DIRECTIONAL SHEET TRANSPORT. JAN. 21, 1975.
3,874,651.—REGISTRATION EDGE FOR AUTOMATIC DOCUMENT HANDLER. APR. 1, 1975. GRB. 1467791.
3,884,408.—APPARATUS FOR EJECTING A STAPLED SET OF SHEETS SIDEWISE FROM THE COLLATING BINS. MAY 20, 1975.
3,885,782.—SHEET FEEDER. MAY 27, 1975. CAN. 3885782.
3,888,581.—SEMI-AUTOMATIC DOCUMENT HANDLER. JUNE 10, 1975.
3,888,582.—SEMI-AUTOMATIC DOCUMENT HANDLER. JUNE 10, 1975.
3,888,584.—SEMI-AUTOMATIC DOCUMENT HANDLER. JUNE 10, 1975.
3,888,585.—SEMI-AUTOMATIC DOCUMENT HANDLER. JUNE 10, 1975.
3,889,943.—PLATEN TRANSPORT FOR AUTOMATIC DOCUMENT HANDLER. JUNE 17, 1975.
3,900,258.—EXPOSURE APPARATUS. AUG. 19, 1975. AUS. 0474469, CAN. 1004724, GRB. 1424242, ITL. 0993030, SPN. 0418138, SWD. 7311579.
3,901,594.—SEMI-AUTOMATIC DOCUMENT HANDLER. AUG. 26, 1975.
3,909,129.—DOCUMENT FEEDING APPARATUS. SEPT. 30, 1975.
3,915,447.—HORIZONTAL PLATEN BELT TRANSPORT. OCT. 28, 1975.
3,941,376.—AUTOMATIC DOCUMENT HANDLER-ARDRI ADH PLATEN TRANSPORT MOUNTING. MAR. 2, 1976. BEL. 0799234, CAN. 0993906, FRA. 7316540, GRB. 1421427, ITL. 0987317, SPN. 0414541.
3,941,473.—MANUAL ASSIST DOCUMENT FEEDER. MAR. 2, 1976.
3,944,365.—DOCUMENT FEEDING APPARATUS AND LATCHING MECHANISM. MAR. 16, 1976.
3,944,794.—COPYING SYSTEM CONTROL. MAR. 16, 1976. ARG. 0204710, BEL. 0808230, CAN. 1007289, FRA. 7343289, GRB. 1450707, ITL. 1002162, MEX. 0135679, SPN. 0421150, STZ. 0577391, USR. 0543364.
3,947,111.—DOCUMENT FEEDING APPARATUS. MAR. 30, 1976.
3,953,122.—DOCUMENT ORIGINAL HANDLING SYSTEM. APR. 27, 1976.
3,954,259.—DOUBLE BAR SEPARATOR FOR A SHEET RECEIVING TRAY. MAY 4, 1976.
3,959,573.—COMPOSITIONS AND METHODS FOR MAKING BIASABLE MEMBERS. MAY 25, 1976.
3,963,345.—PRE-COLLATION COPYING. JUNE 15, 1976.
3,977,780.—ELECTROSTATIC REPRODUCTION METHOD AND APPARATUS. AUG. 31, 1976.
3,981,498.—NON-UNIFORM CHARGING OF SHEET MATERIAL. SEPT. 21, 1976.
3,982,832.—ELECTROSTATOGRAPHIC COPYING MACHINES. SEPT. 28, 1976.
3,984,099.—AN IMPROVED DOCUMENT FEEDING SYSTEM. OCT. 5, 1976.
3,988,065.—REFLECTIVE DOCUMENT FEEDER. OCT. 26, 1976.
3,997,263.—BI-DIRECTIONAL COPIER OUTPUT. DEC. 14, 1976. BEL. 0839792, SPN. 0445641.
4,000,943.—DUAL PURPOSE DOCUMENT HANDLING SYSTEM. JAN. 4, 1977. BEL. 0837235.
4,004,941.—CLEANING METHOD FOR AUTOMATIC DOCUMENT HANDLER. JAN. 25, 1977.
4,008,956.—DOCUMENT HANDLING SYSTEM FOR PRE-COLLATION COPYING. FEB. 22, 1977. BEL. 0839792, SPN. 0445641.
4,012,140.—COPIER DOCUMENT LOADING SYSTEM. MAR. 15, 1977. BEL. 0839792, SPN. 0445641.
4,017,172.—DOCUMENT FEEDING APPARATUS. APR. 12, 1977.
4,018,523.—REPRODUCING APPARATUS AND PROCESS FOR FORMING MULTIPLE COPIES OF A DOCUMENT. APR. 19, 1977. BEL. 0842928.
4,030,721.—AUTOMATIC MANUSCRIPT DISCHARGING DEVICE FOR COPYING MACHINES. JUNE 21, 1977.
4,033,694.—COPIER DOCUMENT EJECTOR. JULY 5, 1977.
4,034,869.—FLUID MEANS TO LOAD AND UNLOAD A VERTICALLY MOVABLE DOCUMENT STORAGE RACK. JULY 12, 1977.

Class 10B

3,094,036.—IMAGE SELECTOR APPARATUS. JUNE 18, 1963. CAN. 0683832.
3,139,279.—RECORD CARD MAGAZINE. JUNE 30, 1964. CAN. 0717868.
3,180,637.—RECORD CARD FEEDING APPARATUS. APR. 27, 1965. CAN. 0806932.
3,357,574.—SEQUENTIAL CONTROL SYSTEM. DEC. 12, 1967. CAN. 0824898.
3,383,105.—CARD PICK-OFF APPARATUS. MAY 14, 1968. CAN. 0820743, GRB. 1193512, JAP. 0610154.
3,482,917.—CARD TRANSPORT APPARATUS. DEC. 9, 1969. CAN. 0842646, GRB. 1193516.
3,784,303.—AUTOMATIC MICROFICHE COPIER. JAN. 8, 1974. CAN. 1000779, GRB. 1412221.

Class 10C

2,956,804.—VACUUM FEED ASSEMBLY FOR FLAT PIECES. OCT. 18, 1960.
3,239,213.—DOCUMENT FEEDER. MAR. 8, 1966. CAN. 0766646, FRA. 1447269, GER. 1243698, GRB. 1087786, ITL. 0761046, JAP. 0497197.
3,506,257.—DOCUMENT FEEDING APPARATUS. APR. 14, 1970. CAN. 0885333, GRB. 1253416.
3,567,214.—SHEET FEEDING AND SEPARATING APPARATUS. MAR. 2, 1971. BEL. 0734128, CAN. 0902124, FRA. 6919122, GER. 1929105, GRB. 1263193, HOL. 0144551, ITL. 0866188, SPN. 0368173, STZ. 0501501, SWD. 6908176.

3,861,671.—LIFTABLE BAIL BAR FOR ALLOWING RETURN OF MULTIPLY SEPARATED SHEETS TO STACK. JAN. 21, 1975.
3,895,790.—MOVABLE BAIL BAR. JULY 22, 1975. BEL. 0815050, CAN. 1009267.
3,936,180.—XEROGRAPHIC APPARATUS WITH SAMPLE PRINT CAPABILITIES. FEB. 3, 1976. BEL. 0809398, ITL. 1006708.
3,968,364.—HEIGHT SENSING DEVICE. JULY 6, 1976.
3,993,300.—AUTOMATIC FEEDER FOR COMPOSITE COPYING. NOV. 23, 1976. BEL. 0815215, GRB. 1467996, STZ. 0561917.
4,025,068.—SHEET FEEDER. MAY 24, 1977.

Class 10D

3,239,213.—DOCUMENT FEEDER. MAR. 8, 1966. CAN. 0766646, FRA. 1447269, GER. 1243698, GRB. 1087786, ITL. 0761046, JAP. 0497197.
3,495,904.—RADIANT ENERGY PROTECTIVE APPARATUS. FEB. 17, 1970.
3,581,000.—INCREMENTAL STEPPING PAPER DRIVE. MAY 25, 1971.
3,618,123.—FACSIMILE DRUM CONVEYOR. NOV. 2, 1971. ARG. 0181314, BEL. 0743659, CAN. 0918186, FRA. 6944287, GER. 1963786, GRB. 1280340, ITL. 0880304, JAP. 0852728, MEX. 0122967, SPN. 0374915, SWD. 0363457, VZL. 0025438.
3,790,159.—AUTOMATIC DOCUMENT HANDLING DEVICE. FEB. 5, 1974. CAN. 1013377, GRB. 1417793.
3,815,899.—SHEET DELIVERY DEVICE. JUNE 11, 1974. CAN. 0994377, FRA. 7409303, GRB. 1456422.
3,854,715.—CAM. DEC. 17, 1974. CAN. 1007256, GRB. 1456576.

Class 10E

3,288,459.—DOCUMENT FEEDING APPARATUS. NOV. 29, 1966. CAN. 0788345, JAP. 0632541, MEX. 0086958.
3,300,208.—COPY POSITIONING APPARATUS AND METHOD. JAN. 24, 1967. CAN. 0817270, JAP. 0605646, MEX. 0090842.
3,473,035.—DOCUMENT TRANSPORT AND REGISTRATION SYS USING PHOTOCELLS. OCT. 14, 1969. ARG. 0170131, CAN. 0858983, CHL. 0024005, JAM. 0001926, MEX. 0101674, PRU. 0009301, URG. 0009238, VZL. 0023677.
3,510,125.—DOCUMENT REGISTRATION SYSTEM. MAY 5, 1970. BEL. 0726865, CAN. 0897195, FRA. 2000318, GER. 1902112, GRB. 1253417, ITL. 0854755, JAP. 0783473.
3,558,223.—DOCUMENT CENTERING APPARATUS. JAN. 26, 1971.
3,630,611.—DOCUMENT REGISTRATION APPARATUS. DEC. 28, 1971.
3,630,620.—PLATEN COVER FOR COPYING MACHINES. DEC. 28, 1971. CAN. 0921307, GRB. 1309313.
3,642,370.—DOCUMENT PRESENTATION DEVICE. FEB. 15, 1972. GRB. 1206633.
3,724,941.—ELECTROPHOTOGRAPHIC APPARATUS. APR. 3, 1973.
3,741,644.—ORIGINAL POSITION CONFIRMING MEANS FOR DUPLICATING APPARATUS. JUNE 26, 1973.
3,771,082.—COPYING APPARATUS WITH AUXILIARY LIGHT SOURCE FOR ILLUMINATING AN ORIGINAL TO BE REPRODUCED. NOV. 6, 1973.
3,829,082.—AUTOMATIC DOCUMENT HANDLER. AUG. 13, 1974. CAN. 0986958, GRB. 1421425.
3,854,715.—CAM. DEC. 17, 1974, CAN. 1007256, GRB. 1456576.
3,861,673.—BI-DIRECTIONAL SHEET TRANSPORT. JAN. 21, 1975. CAN. 1004240.
3,877,804.—CORNER REGISTRATION DEVICE FOR DOCUMENT FEEDER. APR. 15, 1975.
3,883,134.—DETECTING AND REMOVING APPARATUS FOR SKEW FED SHEETS. MAY 13, 1975.
3,915,447.—HORIZONTAL PLATEN BELT TRANSPORT. OCT. 28, 1975.
3,984,098.—PNEUMATIC REGISTRATION AND CLAMPING APPARATUS. OCT. 5, 1976. BEL. 0848824.
3,984,099.—AN IMPROVED DOCUMENT FEEDING SYSTEM. OCT. 5, 1976.
3,990,794.—COPYING MACHINE. NOV. 9, 1976. STZ. 0587508.
4,026,542.—DUAL REGISTRATION APPARATUS. MAY 31, 1977.
4,029,411.—VARIABLE MAGNIFICATION COPIER. JUNE 14, 1977. BEL. 0839792, SPN. 0445641.
4,033,574.—DOCUMENT HANDLING APPARATUS. JULY 5, 1977.
4,033,694.—COPIER DOCUMENT EJECTOR. JULY 5, 1977.

Class 10F

3,288,464.—CARD INVERTING APPARATUS. NOV. 29, 1966. CAN. 0803316, JAP. 0547200.
3,408,140.—DOCUMENT HANDLING APPARATUS. OCT. 29, 1968. CAN. 0842643, GRB. 1143062.
3,416,791.—DOCUMENT INVERTING APPARATUS. DEC. 17, 1968. CAN. 0853562, GRB. 1210564, JAP. 0648074.
3,844,654.—DUPLEX COPYING SYSTEM. OCT. 29, 1974. FRA. 7340246, GRB. 1445854.
3,862,802.—SHEET REVERSING APPARATUS AND A DUPLEX REPRODUCING APPARATUS EMPLOYING SAME. JAN. 28, 1975. BEL. 0818894.
3,926,338.—THERMALLY INSENSITIVE PARTICLE CONCENTRATION CONTROLLER. DEC. 16, 1975.
3,980,406.—DUPLEX IMAGING SYSTEM. SEPT. 14, 1976.

Class 10G

2,889,029.—LABEL APPLYING MACHINE. JUNE 2, 1959.
2,925,167.—CONVEYOR FOR ARTICLES IN IMBRICATING. FEB. 16, 1960.
3,419,265.—DOCUMENT STACKER APPARATUS. DEC. 31, 1968. ARG. 0171423, CAN. 0833415, CHL. 0024006, JAM. 0001859, MEX. 0100967, PRU. 0001930, URG. 0009140, VZL. 0023736.
3,460,825.—FAN FOLD STACKING APPARATUS. AUG. 12, 1969. CAN. 0855586, GRB. 1205418.
3,497,207.—SORTING APPARATUS FOR DOCUMENTS. FEB. 24, 1970. BEL. 0727203, CAN. 0895731, FRA. 6900957, GRB. 1245841, HOL. 0148006, ITL. 0854588.
3,630,517.—COUNTER STACKER. DEC. 28, 1971.
3,729,188.—DOCUMENT STACKER APPARATUS. APR. 24, 1973. CAN. 1000311, FRA. 0701711, GRB. 1303165, ITL. 0893040.
3,865,480.—ELECTROSTATIC CONTROL OF FAN FOLD PAPER STACKING. FEB. 11, 1975.
4,017,066.—SET SEPARATOR. APR. 12, 1977.
4,033,579.—AN OFFSET STACKER. JULY 5, 1977.

Class 10H

3,467,371 —SHEET DISTRIBUTOR. SEPT. 16, 1969. ARG. 0168293, ATR. 0294140, AUS. 0423257, BEL. 0702898, CAN. 0925803, CHL. 0023102, CLB. 0017542, DNK. 0124250, EIR. 0031306, FIN. 0047869, FRA. 1541084, GRB. 1193513, GRK. 0038675, IND. 0112000, ISR. 0028519, ITL. 0813836, JAP. 0645588, LXB. 0054335, MEX. 0099952, NOR. 0124920, NZL. 0149788, PAK. 0118964, PLP. 0006507, PRU. 0009477, PTG. 0048210, SAF. 0674986, SPN. 0344349, STZ. 0480253, SWD. 0337384, TRK. 0015492, URG. 0008974, VZL. 0026276.
3,815,896.—AUTOMATIC DOCUMENT HANDLER. JUNE 11, 1974. BEL. 0797889, CAN. 0984863, FRA. 7316287, GRB. 1421426, ITL. 0987316, SPN. 0414486.
3,884,408.—APPARATUS FOR EJECTING A STAPLED SET OF SHEETS SIDEWISE FROM THE COLLATING BINS. MAY 20, 1975.
3,907,277.—METHOD AND DEVICE FOR REMOVING DOCUMENTS FROM A PLATEN. SEPT. 23, 1975.
3,913,467.—COLLATING APPARATUS. OCT. 21, 1975.
3,944,207.—LIMITLESS SORTER. MAR. 16, 1976.
3,944,366.—SLIDING PLATEN COVER APPARATUS. MAR. 16, 1976.
3,963,345.—PRE-COLLATION COPYING. JUNE 15, 1976. BEL. 0839792, SPN. 0445641.
3,997,263.—BI-DIRECTIONAL COPIER OUTPUT. DEC. 14, 1976. BEL. 0839792, SPN. 0445641.
4,008,956.—DOCUMENT HANDLING SYSTEM FOR PRE-COLLATION COPYING. FEB. 22, 1977. BEL. 0839792, SPN. 0445641.
4,012,140.—COPIER DOCUMENT LOADING SYSTEM MAR. 15, 1977. BEL. 0839792, SPN. 0445641.

Class 10I

3,495,904.—RADIANT ENERGY PROTECTIVE APPARATUS. FEB. 17, 1970.
3,600,610.—TIME DELAY CIRCUIT FOR A RADIANT ENERGY PROTECTIVE APPARATUS. AUG. 17, 1971.
3,609,737.—METHOD AND APPARATUS FOR ARTICLE DETECTION UTILIZING CORONA DISCHARG. SEPT. 28, 1971. CAN. 0872468, GER. 1932248, GRB. 1259998, JAP. 0657911.
3,672,760.—XEROGRAPHIC PLATE TRANSPORTING MECHANISM. JUNE 27, 1972. CAN. 0939555, GRB. 1359888.
3,674,363.—SHEET FEEDING APPARATUS. JULY 4, 1972. ARG. 0176106, ATR. 0307230, AUS. 0447387, BEL. 0734129, DNK. 0131336, FRA. 6919121, GRB. 1263192,

ITL. 0866189, MEX. 0112842, SPN. 0368216, STZ. 0501500, SWD. 0356136, TIW. 0006604.
3,697,063.—DOCUMENT HANDLING APPARATUS. OCT. 10, 1972. GRB. 1369618.
3,744,047.—SUPERPOSED SHEET DETECTION. JULY 3, 1973. CAN. 0985762, FRA. 7231694, GRB. 1396560, ITL. 0967501.
3,748,088.—FUSER CONTROL APPARATUS. JULY 24, 1973.
3,778,618.—PHOTODETECTION OF NON-OPAQUE OBJECTS TRANSPRTD ALONG A CONVEYOR BY USE OF A LIGHT BLCKING OPAQU. DEC. 11, 1973. GRB. 1406170.
3,790,158.—AUTOMATIC DOCUMENT HANDLER. FEB. 5, 1974. GRB. 1421428.
3,894,513.—COPYING MACHINE WITH BEAD PICKOFF ROLLER. JULY 15, 1975. FRA. 7342586, GRB. 1441288.
3,945,546.—ZIG ZAG FOLDED STRIP BOTTOM FEEDER. MAR. 23, 1976.

Class 12

4,027,138.—A FUSER RELEASE MATERIAL DISPENSER. MAY 31, 1977.

Class 12A

3,384,488.—POLYCHROMATIC PHOTOELECTROPHORETIC IMAGING COMPOSITION. MAY 21, 1968.
3,384,565.—PROCESS OF PHOTOELECTROPHORETIC COLOR IMAGING. MAY 21, 1968. ARG. 0149921, ATR. 0304268, AUS. 0414156, BEL. 0667116, BRA. 0087920, CAN. 0867678, CHL. 0021697, CLB. 0014706, FRA. 1450843, GER. 1497243, GRB. 1124626, GRK. 0030605, IND. 0119647, ISR. 0023973, ITL. 0744030, JAP. 681941, LXB. 0049058, MEX. 0091899, NOR. 0128733, NZL. 0142323, PPU. 0009538, PTG. 0044324, SAF. 653922, SPN. 0321858, STZ. 0481409, SWD. 6509579, URG. 0009540. VZL. 0017273.
3,384,566.—METHOD OF PHOTOELECTROPHORETIC IMAGING. MAY 21, 1968.
3,734,610.—MICROFICHE VIEWER-COPIER WITH BILLING DATA STORAGE. MAY 22, 1973. CAN. 1003025.
3,759,611.—MICROIMAGE RANSOM ACCESS AND RETRIEVAL PRINTER. SEPT. 18, 1973. CAN. 0987156, GRB. 1427017.

Class 12B

3,383,993.—PHOTOELECTROPHORETIC IMAGING APPARATUS. MAY 21, 1968. ARG. 0165160, AUS. 0419734, BEL. 0692048, CAN. 0866143, FRA. 1507051, GRB. 1158301, GRK. 0033285, HOL. 0150926, ITL. 0862555, LXB. 0052738, MEX. 0096357, PTG. 0044324, SAF. 0067022, SPN. 0335121, STZ. 0510901, VZL. 0024450.
3,610,748.—PHOTOELECTROPHORETIC IMAGING SYSTEM. OCT. 5, 1971. BEL. 0752438, CAN. 0922569, FRA. 7023045, GRB. 1319532, ITL. 0894621, JAP. 0739527.
3,656,847.—ELEVATOR MECHANISM. APR. 18, 1972.
3,663,396.—KINESCOPE PHOTOELECTROPHORETIC IMAGING METHODS AND SYSTEMS. MAY 16, 1972. ARG. 0196858, BEL. 0762417, CAN. 0935965, FRA. 7104350, GRB. 1345571, ITL. 0918121, JAP. 0743838, MEX. 0131834.
3,697,409.—BELT ELECTRODE IMAGING SYSTEM. OCT. 10, 1972. ARG. 0183572, BEL. 0760077, BRA. 7023343, CAN. 0937803, FRA. 7045072, GRB. 1339734, ITL. 0913368, JAP. 0752721, MEX. 0119368, VZL. 0032930.
3,844,779.—PHOTOELECTROPHORETIC IMAGING METHOD EMPLOYING A BELT ELECTRODE. OCT. 29, 1974.

Class 12C

3,427,242.—APPARATUS FOR CONTINUOUS PHOTOELECTROPHORETIC IMAGING. FEB. 11, 1969. BEL. 0743902, CAN. 0851701, FRA. 1521727, GER. 1572385, GRB. 1185932, ITL. 0794269, JAP. 0580245, MEX. 0097005.
3,474,019.—PHOTOELECTROPHORETIC IMAGING MTD INC. CONTACTNG IMGNG SUSPNSN W/ ALG SFC OF FLEXIBLE ELECTRODE. OCT. 21, 1969. AUS. 0418224, BEL. 0692912, BRA. 6678842, CAN. 0834679, GRK. 0033301, LXB. 0052730, MEX. 0090286, PTG. 0046984, SAF. 0670024, SPN. 0335454.
3,551,320.—IMAGING APPARATUS. DEC. 29, 1970.
3,600,081.—IMAGING APPARATUS. AUG. 17, 1971. ARG. 0192211, ATR. 0324839, AUS. 0455820, BEL. 0758903, CAN. 0936732, CZC. 0164288, EGR. 0090482. FRA. 7041652, GRB. 1335990, ITL. 0909307, JAP. 0751878, MEX. 0122272, PNM. 0002094, SPN. 0385453, STZ. 0518582, SWD. 0362717, TIW. 0008461, USR. 0412697, VZL. 0032926.
3,609,028.—IMAGING APPARATUS. SEPT. 28, 1971. ARG. 0186570, ATR. 0319749, AUS. 0455572, BEL. 0758806, CAN. 0935012, EGR. 0086977, FRA. 7041648, GRB. 1335988, ITL. 0909306, MEX. 0121331, PLD. 0082852, PNM. 0002167, SPN. 0385452, STZ. 0518580, SWD. 0361753, TIW. 0007385, USR. 0465806, VZL. 30683.
3,622,691.—HIGH SPEED LIGHT RESPONSIVE TRANSFORM COMPUTER FOR A LIGHT-SENSITIVE PRINTING SYSTEM. NOV. 23, 1971. CAN. 0915813, GRB. 1335222, JAP. 0774709.
3,642,365.—AUTOMATED IMAGING MACHINE. FEB. 15, 1972. ARG. 0183571, ATR. 0324123, AUS. 0456428, BEL. 0758902, CAN. 0937440, EGR. 0091986, FRA. 7041647, GRB. 1337145, ITL. 0909311, JAP. 0758463, MEX. 0120289, PLD. 0082861, PNM. 0002255, SPN. 0385457. STZ. 0544327, SWD. 0367493, TIW. 0007386.
3,642,606.—APPARATUS FOR IMAGE FORMATION ON THE INSIDE OF A CYLINDER. FEB. 15, 1972. ARG. 0183573, BEL. 0760749, BRA. 7022094, CAN. 0938490, FRA. 7047632, GRB. 1339578, ITL. 0913902, JAP. 0752722, MEX. 0119589, VZL. 0032929.
3,644,035.—FLAT PLATE TRAVELING ROLLER IMAGING. FEB. 22, 1972. ARG. 0183670, AUS. 0456429, BEL. 0758904, BRA. 7023406, CAN. 0923356, EGR. 0090280, FRA. 7041653, GRB. 1335051, ITL. 0909308, JAP. 0751879, MEX. 0119530, PLD. 0082860, SPN. 0385454, STZ. 0528763, SWD. 0367074, TIW. 0008460, USR. 0404290, VZL. 30682.
3,645,616.—PHOTOELECTROPHORETIC IMAGE TRANSFER APPARATUS. FEB. 29, 1972. CAN. 0949049, GRB. 1337417, JAP. 783768.
3,647,290.—PHOTOELECTROPHORETIC IMAGING SYSTEM. MAR. 7, 1972. ARG. 0184762, AUS. 0454820, BEL. 0058902, CAN. 0939954, EGR. 0090483, FRA. 7061651, GER. 1337416, GRB. 1337416, ITL. 0909312, JAP. 0751880, MEX. 0119752, SPN. 0385458, STZ. 0530662, SWD. 0366850, TIW. 0007384, USR. 0419062, VZL. 30685.
3,667,842.—IMAGING APPARATUS. JUNE 6, 1972. ARG. 0193347, BEL. 0768538, CAN. 0953559, FRA. 7122750, GRB. 1350395, ITL. 0927384, MEX. 0123298.
3,703,335.—MULTIPLE EXPOSURE IMAGING APPARATUS. NOV. 21, 1972. BEL. 0760457, CAN. 0968605, FRA. 7047141, GRB. 1339550, ITL. 0913636, JAP. 0759479.
3,719,484.—PHOTOELECTROPHORETIC IMAGING METHOD. MAR. 6, 1973. CAN. 0957890, GRB. 1369701.
3,728,018.—IMAGING APPARATUS. APR. 17, 1973. CAN. 0924156, GRB. 1335697.
3,800,743.—MATERIALS APPLICATION APPARATUS. APR. 2, 1974.
3,860,336.—PHOTOELECTROPHORETIC IMAGING MACHINE AND APPTS FOR CONTACTING A ROLLER TO A SURFACE TO BE CONTACT. JAN. 14, 1975.
3,860,337.—MULTIPLE EXPOSURE METHOD AND APPARATUS. JAN. 14, 1975. CAN. 0957890, GRB. 1369701.
3,990,043.—CHARACTER CODING AND RECOGNITION SYSTEM. NOV. 2, 1976.
4,006,982.—PHOTOELECTROPHORETIC CONCURRENT PROCESS CYCLING. FEB. 8, 1977. BEL. 0841077.
4,009,466.—CHARACTER CODING AND RECOGNITION SYSTEM. FEB. 22, 1977.

Class 12D

3,448,025.—PHOTOELECTROPHORETIC IMAGING SYSTEM UTILIZING A PROGRAMMED POTENTIAL APPLICATION. JUNE 3, 1969. ARG. 0167580, AUS. 0417981. BEL. 0719188, CAN. 0875492, FRA. 0095530, GER. 1797123, GRB. 1149666, ITL. 0890086, MEX. 0100805, VZL. 0025946.
3,485,738.—PHOTOELECTROPHORETIC IMG PROCESS EMPLOYNG LAYER OF INSULATNG LIQUID TO IMPROVE IMAGE QUALITY. DEC. 23, 1969. AUS. 0431891, BEL. 0743640, CAN. 0850591, GER. 1522751, GRB. 1174831, JAP. 0578397.
3,565,614.—IMAGE TRANSFER. FEB. 23, 1971. ARG. 0157773, AUS. 0413930, BEL. 0696853, CAN. 0890362, FRA. 1520919, GER. 1572384, GRB. 1185931, ITL. 0801198, JAP. 0586922, MEX. 0099070, SPN. 0349966, STZ. 0482230, SWD. 0332754, VZL. 0024013.
3,582,205.—IMAGING APPARATUS. JUNE 1, 1971.

3,616,398.—PHOTOELECTROPHORETIC IMAGING COMPOSITION CONTAINING B-CAROTENE. OCT. 26, 1971.
3,657,103.—ELECTRODE IMAGING SYSTEM. APR. 18, 1972. CAN. 0890360, GRB. 1309663, JAP. 0731609.
3,697,407.—PREVENTION OF ARCING IN AN ELECTRODE IMAGING SYSTEM. OCT. 10, 1972. CAN. 0884225, GRB. 1309127, JAP. 0731608.
3,697,408.—IMAGING SYSTEM. OCT. 10, 1972. CAN. 0890361, GRB. 1312733, JAP. 0731610.
3,708,286.—PHOTOELECTROPHORETIC IMAGING WITH ULTRASONIC VIBRATION DURING IMAGING. JAN. 2, 1973. ARG. 0174613, ATR. 0293874, AUS. 0455712, BEL. 0739747, CAN. 0922141, FRA. 6933738, GER. 1949416, GRB. 1279285, HOL. 0146950, ITL. 0877873, JAP. 0709042, MEX. 0108820.
3,853,556.—METHOD FOR ELIMINATING ELECTRICAL ARCING DURING PHOTOELECTROPHORETIC IMAGING. DEC. 10, 1974.

Class 12E

3,535,221.—PHOTOELECTROPHORETIC IMAGING SYSTEM EMPLOYING A PHOTOCONDUCTOR COATING FOR THE BLOCKING ELECTRO. OCT. 20, 1970. ARG. 0176485, AUS. 0448560, BEL. 0722301, CAN. 0891971, FRA. 1587938, GER. 1802988, GRB. 1236619, ITL. 0845022, JAP. 0693378, MEX. 0108364, VZL. 0023742.
3,595,771.—METHOD OF REMOVING ACCUMULATED CHARGES IN PHOTOELECTROPHORETIC IMAGING. JULY 27, 1971. ARG. 0198476, ATR. 0302041, AUS. 0448837, BEL. 0737549, CAN. 0922955, FRA. 6927969, GER. 1941463, GRB. 1267255, ITL. 0869935, JAP. 0704156, SWD. 0341726.
3,639,224.—PHOTOELECTROPHORETIC IMAGING SYSTEM. FEB. 1, 1972. CAN. 0922568, GRB. 1313683, JAP. 0739526.
3,657,103.—ELECTRODE IMAGING SYSTEM. APR. 18, 1972. CAN. 0890360, GRB. 1309663, JAP. 0731609.
3,669,872.—IMAGING SYSTEM. JUNE 13, 1972.
3,775,107.—IMAGING SYSTEM. NOV. 27, 1973.
3,859,576.—HIGH PERFORMANCE BLOCKING ELECTRODE FOR ELECTROPHOTOPHORESIS. JAN. 7, 1975. BEL. 0810802, ITL. 1006354.
3,866,572.—FORAMINOUS ELECTROSTATOGRAPHIC TRANSFER SYSTEM. FEB. 18, 1975. BEL. 0815546, CAN. 1009503, FRA. 7418641, GRB. 1448386, ITL. 1012842, SPN. 0426760.
3,956,524.—METHOD FOR THE PREPARATION OF ELECTROSTATOGRAPHIC AND PHOTORECEPTORS. MAY 11, 1976.
3,966,466.—PHOTOELECTROPHORETIC IMAGING PROCESS USING DARK CHARGE INJECTING AGENT ON BLOCKING ELECTRODE. JUNE 29, 1976.
3,967,961.—PHOTOELECTROPHORETIC IMAGING PROCESS EMPLOYING A DARK CHARGE INJECTING AGENT-AKLYD RESIN COATING. JULY 6, 1976.
3,980,477.—PHOTOELECTROPHORESIS WITH DARK CHARGE INJECTING ELEMENT. SEPT. 14, 1976.

Class 12F

3,695,755.—PHOTOELECTROPHORETIC CAMERA. OCT. 3, 1972. CAN. 0958580, GRB. 1359694.
3,702,289.—PHOTOELECTROPHORETIC PROC-ESS AND APPARATUS. NOV. 7, 1972. CAN. 0958579, GRB. 1359695.
3,705,766.—PHOTOELECTROPHORETIC APPARATUS. DEC. 12, 1972. CAN. 0955100, GRB. 1359862.

Class 12G

3,655,550.—ELECTROSTATIC PIGMENT FILTER. APR. 11, 1972.
3,656,200.—CLEANING APPARATUS. APR. 18, 1972.
3,658,687.—APPARATUS FOR FORMING IMAGES WITH APPLICATOR SHEARING SMOOTHING AND CLEANING MEANS. APR. 25, 1972. CAN. 0916433, GRB. 1337149, JAP. 0751881.
3,659,302.—CLEANING APPARATUS. MAY 2, 1972.
3,673,632.—CLEANING APPARATUS. JULY 4, 1972.
3,686,035.—CLEANING APPARATUS. AUG. 22, 1972. CAN. 0925660, GRB. 1335989.
3,821,027.—METHOD OF CLEANING ACCUMULATED MATERIAL FROM A SLOT. JUNE 28, 1974.
3,919,737.—CLEANING APPARATUS. NOV. 18, 1975.
3,945,724.—VELOCITY COMPOSITION FOR BEAD BYPASS. MAR. 23, 1976.
3,950,088.—VELOCITY COMPENSATION FOR BEAD BYPASS WITH SPEED REDUCTION. APR. 13, 1976.
3,986,772.—BEAD BYPASS. OCT. 19, 1976.
3,988,060.—BEAD BYPASS SPEED REDUCTION. OCT. 26, 1976.
3,989,365.—MOTION COMPENSATION FOR BEAD BYPASS. NOV. 2, 1976.

Class 12H

3,505,131.—PROCESS FOR THE PREPARATION OF A CUPROUS IODIDE CONDUCTIVE FILM. APR. 7, 1970. CAN. 0876074, GER. 1800653, GRB. 1244012, JAP. 0615874.
3,623,680.—CLUTCH/BRAKE MECHANISM. NOV. 30, 1971.
3,623,805.—DRIVE MECHANISM FOR IMAGING APPARATUS. NOV. 30, 1971.
3,628,859.—IMAGING MACHINE IMPROVEMENT. DEC. 21, 1971. BEL. 0760455, CAN. 0937436, FRA. 7047139, GRB. 1339549, ITL. 0913635, JAP. 0764505.
3,630,615.—METHOD AND APPARATUS FOR TRANSPORTING SUPPORT MATERIAL. DEC. 28, 1971.
3,630,884.—TRANSPARENT ELECTRODE IMAGING IMPROVEMENT. DEC. 28, 1971. CAN. 0890359, GRB. 1313696, JAP. 0739525.
3,639,049.—COPY SYSTEM. FEB. 1, 1972.
3,640,616.—OPAQUE ILLUMINATION AND SCANNING SYSTEM. FEB. 8, 1972. CAN. 0926674, GRB. 1337418, JAP. 0731615.
3,647,294.—MATERIALS APPLICATION AND CLEANING APPARATUS FOR XEROGRAPHIC APPARATUS. MAR. 7, 1972. CAN. 0913355, GRB. 1337146, JAP. 0759478.
3,654,654.—CLEANING APPARATUS. APR. 11, 1972. CAN. 0925257, GRB. 1335850, JAP. 0791054.
3,673,632.—CLEANING APPARATUS. JULY 4, 1972.
3,681,064.—PHOTELCTROPHRTC IMNG PROCS EMPLYNG MULTI-COMPNT ELCTRCLY PHOTOSNTV PARTICLE. AUG. 1, 1972.
3,685,897.—PHOTOELECTROPHORETIC APPARATUS USING PYRAMID GEARS. AUG. 22, 1972. CAN. 0957542.
3,687,109.—MATERIALS APPLICATION APPARATUS. AUG. 29, 1972. CAN. 0915907, GRB. 1337148.
3,697,167.—OPTICAL PROJECTION APPARATUS. OCT. 10, 1972. BEL. 0772913, CAN. 0955090. FRA. 7134731, GRB. 1316023, ITL. 0936735.
3,703,459.—LIQUID APPLICATOR. NOV. 21, 1972.
3,718,393.—IMAGING APPARATUS. FEB. 27, 1973.
3,722,993.—MATERIALS APPLICATION APPARATUS. MAR. 27, 1973.
3,730,620.—FOCUSING METHOD. MAY 1, 1973.
3,737,221.—ROTATIONAL DRIVE MECHANISM. JUNE 5, 1973.
3,744,897.—TRANSPARENT ELECTRODE FOR ELECTROPHORETIC IMAGING. JULY 10, 1973.
3,769,850.—PHOTOELECTROPHORETIC APPARATUS USING PYRAMID GEARS. NOV. 6, 1973.
3,776,628.—PHOTOELECTROPHORETIC IMAGING SYSTEM. DEC. 4, 1973.
3,784,294.—IMAGE DENSITY CONTROL. JAN. 8, 1974.
3,840,299.—PHOTOELECTROPHORETIC IMAGING APP FOR VARYING ADVANCING RATE OF VELOCITY OF ROLLER ELECTRODES. OCT. 8, 1974.
3,844,651.—PHOTELCTRPHRTC IMG APP FOR CONTRLNG TIME INTRVL OF SUCSSV ROLLR ELCTRDS LEAVNG AND ENTERNG IMG RE. OCT. 29, 1974.
3,920,330.—ELECTROPHORETIC IMAGING APPARATUS. NOV. 18, 1975. BEL. 0777719, CAN. 0961334, FRA. 7201005, GRB. 1376241, ITL. 0946357.
3,944,353.—BACKGROUND REDUCTION. MAR. 16, 1976.
3,950,640.—LAMP CONTROL AND LAMP SWITCH CIRCUIT FOR CONTROLLING LIGHT BALANCE. APR. 13, 1976.
3,952,700.—LIQUID APPLICATOR. APR. 27, 1976.
3,954,465.—ELECTROPHORETIC IMAGING METHODS. MAY 4, 1976. BEL. 0777719, CAN. 0961334, FRA. 7201005, GRB. 1376241, ITL. 0946357.
3,957,510.—OVERFLOW PREVENTION FOR LIQUID BETWEEN FLEXIBLE LAYERS ON A SOLID SURFACE. MAY 18, 1976.
3,981,459.—PHOTOELECTROPHORETIC ELECTROSTATIC TACKING CAPSTAN WEB TENSION SYS. SEPT. 21, 1976.
3,982,710.—PHOTOELECTROPHORETIC WEB TENSION SYSTEM. SEPT. 28, 1976.
3,985,434.—PHOTOELECTROPHORETIC PIGMENT DISCHARGING WITH AC COROTRON OR UV ILLUMINATION. OCT. 12, 1976.
3,989,366.—PHOTOELECTROPHORETIC IMAGING APPARATUS HAVING A DEVICE FOR INCREASING THE FRICTION FORCE BETWEE. NOV. 2, 1976. BEL. 0841080.

3,989,367.—APPARATUS FOR CONTACTING A ROLLER TO A SURFACE TO BE CONTACTED. NOV. 2, 1976.
3,991,992.—PHOTOELECTROPHORETIC WEB MACHINE SERVO DRIVE SYSTEM. NOV. 16, 1976. BEL. 0841079.

Class 12I

3,681,064.—PHOTELCTROPHRTC IMNG PROCS EMPLYNG MULTI-COMPNT ELCTRCLY PHOTOSNTV PARTICLE. AUG. 1, 1972.
3,820,987.—PHOTOELECTROPHORETIC IMAGING WITH FIXING ON A SEPARATE ELECTRODE. JUNE 28, 1974.

Class 12J

3,642,364.—TRANSFER APPARATUS. FEB. 15, 1972. AUS. 0455718, BEL. 0758808, CAN. 0918412, CZC. 0164906, EGR. 0087486, FRA. 7041650, GRB. 1336720, HUN. 0169308, ITL. 0909310, PLD. 0082862, SPN. 0385456, STZ. 0518581, USR. 0406387.
3,791,823.—PHOTOELECTROPHORETIC IMAGING TRANSFER METHOD. FEB. 12, 1974.
3,861,911.—IMAGING FIXING METHOD. JAN. 21, 1975.
3,897,143.—IMAGING SYSTEM. JULY 29, 1975.

Class 12K

3,510,419.—PHOTOELECTROPHORETIC IMAGING METHOD. MAY 5, 1970. ARG. 0165519, AUS. 0425666, BEL. 0717829. CAN. 0876044, FRA. 0095234, GRB. 1242262, ITL. 0896927, JAP. 0657876, MEX. 0102064, PNM. 0001975, PRU. 0010174, VZL. 0023693.
3,561,864.—ELECTROPHORETIC COATING DEVICE. FEB. 9, 1971. ARG. 0174608, ATR. 0302815, AUS. 0447649, BEL. 0739544, CAN. 0890357, FRA. 6933095, GER. 1949861, GRB. 1277806, ITL. 0873705, JAP. 0686763. MEX. 0113013.
3,609,029.—MATERIALS APPLICATION APPARATUS. SEPT. 28, 1971. BEL. 0772565, CAN. 0953097, FRA. 7133987, GRB. 1366382, ITL. 0936510.
3,619,053.—PHOTOELECTROPHORETIC IMAGING SYSTEM. NOV. 9, 1971. GRB. 1324102, JAP. 0759477.
3,620,948.—PHOTOELECTROPHORETIC IMAGING SYSTEM EMPLOYING PRELIMINARY ELECTROPHRIC DSPSTN OF IMAGNG SUSPENS. NOV. 16, 1971. ATR. 0326480, AUS. 0447819, BEL. 0739754, CAN. 0899137, FRA. 6933734, GRB. 1280027, HOL. 0146951, ITL. 0877872, JAP. 0709041, MEX. 0114889, SPN. 0372065, STZ. 0508232, SWD. 0341929, VZL. 0015070.
3,645,874.—IMAGE DENSITY CONTROL IN PHOTOELECTROPHORETIC IMAGING. FEB. 29, 1972. BEL. 0756899, CAN. 0922957, FRA. 7035803, GRB. 1331621, ITL. 0908434, JAP. 0743836.
3,658,687.—APPARATUS FOR FORMING IMAGES WITH APPLICATOR SHEARING SMOOTHING AND CLEANING MEANS. APR. 25, 1972. CAN. 0916433, GRB. 1337149, JAP. 0751881.
3,695,755.—PHOTOELECTROPHORETIC CAMERA. OCT. 3, 1972. CAN. 0958580, GRB. 1359694.
3,744,896.—IMAGING SYSTEM. JULY 10, 1973.
3,769,009.—INKING SYSTEM FOR LIQUID PARTICLE MIGRATION ON AUTOMATIC MACHINE. OCT. 30, 1973. HOL. 7216013.
3,938,088.—CHARACTER CODING AND RECOGNITION SYSTEM. FEB. 10, 1976.
3,944,353.—BACKGROUND REDUCTION. MAR. 16, 1976.
3,968,271.—COATING APPARATUS AND USE THEREOF. JULY 6, 1976.
3,993,020.—BLADE APPLICATOR ASSEMBLY. NOV. 23, 1976.
4,019,816.—COATING SYSTEM HAVING A COMPOSITE APPLICATOR ASSEMBLY PROVIDED WITH A RECIPROCATING BLADE. APR. 26, 1977.

Class 12L

3,622,691.—HIGH SPEED LIGHT RESPONSIVE TRANSFORM COMPUTER FOR A LIGHT-SENSITIVE PRINTING SYSTEM. NOV. 23, 1971. CAN. 0915813, GRB. 1335222, JAP. 0774709.
3,649,515.—PHOTOGRAPHIC MASKING SYSTEM. MAR. 14, 1972. CAN. 0936733, GRB. 1349610, JAP. 0774711.
3,715,209.—ELECTRICAL COLOR MASKING FOR A PHOTOELECTROPHORETIC IMAGING PROCESS. FEB. 6, 1973. BEL. 0763539, CAN. 0938491, FRA. 7107557. GRB. 1347139, ITL. 0918979, JAP. 0752723, MEX. 0120935.
3,810,758.—PHOTOGRAPHIC MASKING SYSTEM. MAY 14, 1974.

Class 12M

RE.27,117.—METAL FREE PHTHALOCYANINE IN THE NEW X-FORM-RE OF 3,357,989-D1170. APR. 20, 1971.
3,384,632.—ARYLAZO-4-ISOPROPOXY-1-NAPHTHOL COMPOUNDS. MAY 21, 1968. BEL. 0743897, CAN. 0787920, FRA. 1473703, GER. 1644400, GRB. 1145374, ITL. 0764015, JAP. 0578398.
3,402,177.—SUBSTITUTED 1-CYANO-2, 3-PHTHALOYL-7, 8-BENZOPYRROCOLINES. SEPT. 17, 1968. AUS. 0435189, BEL. 0743896, CAN. 0812820, GRB. 1145373.
3,432,415.—ELECTROPHORETIC IMG. PROCESS USING PHOTOSENSITIVE XANTHENONIUM SALTS. MAR. 11, 1969. AUS. 0439502, BEL. 0743895, CAN. 0851118, GER. 1522701, GRB. 1155747, JAP. 0650631, MEX. 0104632.
3,442,781.—PHOTOELECTROPHORETIC AND XEROGRAPHIC IMG. PROC. EMPL. TRIPHENODLOXAZINES AS ELECTRIC. PHOTOSENSIT. MAY 6, 1969. AUS. 0445582, BEL. 0743894, CAN. 0855152, GRB. 0175452, JAP. 0611634.
3,445,227.—ELECTROPHOTOGRAPHIC IMAGING PROCESSES EMPLOYING 2,4 DIAMINOTRIAZINES AS ELCTRCLY PHOTOSNSTV PRT. MAY 20, 1969. BEL. 0743891, CAN. 0852681, GER. 1522687, GRB. 1146019, JAP. 0617789.
3,447.922.—ELECTRICALLY PHOTOSENSITIVE PARTICLES USEFUL IN PHOTOELECTROPHORETIC AND XEROGRAPHIC IMAGING PROC. JUNE 3, 1969.
3,448,028.—N-SBSTUD-8,13-DIOXODINAPHTHO-2-1-B,2,3-D-FURAN-6-CARBOXAMIDES AS ELCTLY PTOSNSTV MTLS IN ELCPHG. JUNE 3, 1969.
3,448,029.—ELECTROPHORETIC IMAGING PROCESS USING 8,13-DIOXODINAPHTO-2,1-B,2,3-D-FURAN-6-CARBOXAMIDE PIGMEN. JUNE 3, 1969.
3,448,030.—ELECTRICALLY PHOTOSENSITIVE PART. USEFUL IN PHOTOELECTROPHORETIC AND XEROGRAPHIC IMAGING PROCESSE. JUNE 3, 1969. AUS. 0445639, BEL. 0743893, CAN. 0943830, GRB. 1155554, JAP. 0686735.
3,474,020.—PHOTOELECTROPHORETIC IMAGING PROCESS USING QUINACRIDONES. OCT. 21, 1969. ARG. 0154377, AUS. 0414491, BEL. 0683405, CAN. 0834673, FRA. 0090574, GRB. 1155403, ITL. 0842587. JAP. 0601872, MEX. 0088935, SPN. 0328503, SWD. 6608734, VZL. 0023989.
3,478,064.—1,5-BIS-SUBSTITUTED ALKYLAMINO-ANTHRAQUINONES. NOV. 11, 1969. ARG. 0145636, AUS. 0419687, BEL. 0683222, CAN. 0880309, FRA 1484968, GRB. 0155985, ITL. 0771955, JAP. 0581828, MEX. 0092775, SPN. 0328428, STZ. 0461273, SWD. 0328188, VZL. 0021224.
3,485,633.—ELECTROPHORETIC IMG PROC EMPL METALLIC LAKES OF FLUORESCEIN DERIVATIVES AS ELECTRICLY PHOTOSENS. DEC. 23, 1969. AUS. 0444394, BEL. 0743641, CAN. 0848386, GER. 1572387, GRB. 1190965, JAP. 0586923.
3,492,308.—PROCESS FOR PREPARING METAL FREE PHTHALOCYANINES - SYNTHESIS OF METAL-FREE PHTHALOCYANINE. JAN. 27, 1970. CAN. 0922708, GRB. 1216887, JAP. 0586926.
3,492,309.—SYNTHESIS OF ALPHA METAL-FREE PHTHALOCYANINE. JAN. 27, 1970. CAN. 0894803, GRB. 1206306, JAP. 0604155.
3,531,309.—COMPOSITIONS COMPRISING 1-CYANO-2,3-PHTHALOYL-7,8-BENZOPYRROCOLINES AND A CARRIER. SEPT. 29, 1970.
3,546,085.—PHOTOELECTROPHORETIC IMAGING PROCESS AND SUSPENSION. DEC. 8, 1970. BEL. 0710052, CAN. 0875493, FRA. 1568088, GER. 1622380, GRB. 1208812, ITL. 0823929, JAP. 0594741.
3,560,360.—PHOTOELECTROPHORETIC IMAGING PROCESS AND ANTHRAQUINONES AS THE ELECTRICALLY PHOTOSENSITIVE PARTIC. FEB. 2, 1971. CAN. 0850590, MEX. 0096584.
3,562,248.—BISAZO PGMTS DRVD CPLRS OBTD CONDG 8-AMINO-2-NAPHTHOLS W/ DICARBOXYLIC ACID CHLORIDES. FEB. 9, 1971. ATR. 0302037, AUS. 0435392, BEL. 0743422, CAN. 0889836, FRA. 6944290, GER. 1717183, GRB. 1217905, ITL. 0879047, JAP. 0608727.
3,574,182.—CALCIUM SALT OF 6-BROMO-1-1-SULFO-2-NAPHTHYLAZO-2-NAPHTHOL. APR. 6, 1971. ARG. 0168131, ATR. 0302812, AUS. 0429649, BEL. 0710053, CAN. 0878483, CHL. 0024254, CLB. 0018785, DNK. 0128493, FIN. 0049711, FRA. 1556484. GRB. 1197374, GRK. 0036648, IND. 0114221, ISR. 0029376, ITL. 0823989, JAP. 0605213, LXB. 0055364, MEX. 0099564, NOR. 0129593, NZL. 0151403, PRU. 0009483, PTG. 0049036, SAF. 0068559, SPN. 0349965, STZ. 0524844, SWD. 0351737, URG. 0008893, VZL. 0032776.

3,594,163.—METHOD OF CONVERTING ALPHA PHTHALOCYANINE TO THE X FORM. JULY 20, 1971.
3,615,558.—PHOTOLECTROPHORETIC IMAGING PROCESS EMPLOYING A FINELY-DIVIDED PHTHALOCYANINE PIGMENT. OCT. 26, 1971. CAN. 0850022.
3,616,393.—PHOTOELECTROPHORETIC IMAGING PROCESS EMPLOYING A PIGMENT HAVING THE FORMULA RNS. OCT. 26, 1971.
3,634,221.—PIGMENT RECLAIMING. JAN. 11, 1972. BEL. 0744760, CAN. 0921427, FRA. 7001822, GRB. 1301382, ITL. 0886625.
3,635,981.—PHOTOELECTROPHORETIC IMAGING PIGMENT COMPOSITION AND PROCESS. JAN. 18, 1972. ARG. 0193337, ATR. 0305459, AUS. 0448778, BEL. 0741064, CAN. 0953143, FRA. 6937772, GER. 1955001, GRB. 1285610, ITL. 0879711, JAP. 0685461, MEX. 0114879.
3,645,883.—PHTELCTRPHRTC IMGNG APRTUS EMPLYNG PHTSNSTV PRTCLS EXHBTG FATIGUE CHARACTERISTICS. FEB. 29, 1972.
3,652,438.—PHTELCTRPHRTC IMGNG PROCS USNG DIVLNT HVY MTL SLT OR 1-1-SULFO-2-NAPHYLZO-2-NAPHLS AS IMGNG MAT. MAR. 28, 1972.
3,658,675.—PHOTOELECTROPHORETIC IMAGING PROCESS USING BISAZO PIGMENTS. APR. 25, 1972.
3,692,517.—PHOTOELECTROPHORETIC IMAGING PROCESS EMPLOYING AN INSULATING CARRIER LQD CNTNG UNSATURATED COMP. SEPT. 19, 1972. ARG. 0164485, AUS. 0430397, BEL. 0715670, CAN. 0913968, FRA. 1563583, GER. 1772522, GRB. 1225316, ITL. 0834948, JAP. 0641521, MEX. 0100255, VZL. 0032921.
3,705,901.—PHOTOELECTROPHORETIC IMAGING COMPOSTION. DEC. 12, 1972.
3,753,708.—PHOTOELECTROPHORETIC IMAGING PROCESS EMPLOYING QUINACRIDONE PIGMENTS. AUG. 21, 1973.
3,758,305.—PHOTOELECTROPHORETIC IMAGING PROCESS. SEPT. 11, 1973.
3,825,422.—IMAGING PROCESS. JULY 23, 1974. CAN. 0984201, GRB. 1442667.
3,867,141.—PHOTOELCTRC AND ELCTRPHOTGRPHC PGMNTS COMPRISNG DERIVATIVS OF CNDNSD PLYCLC AROMTC HYDROCRBN ALDE. FEB. 18, 1975.
3,922,169.—PHOTOELECTRIC AND ELECTROPHOTOGRAPHIC PIGMENTS COMPRISING DERIVATIVES OF CONDENSED POLYCYCLIC A. NOV. 25, 1975.
3,923,506.—PHOTOELECTRIC AND ELECTROPHOTOGRAPHIC PIGMENTS COMPRISING DERIVATIVES OF CONDENSED POLYCYCLIC A. DEC. 2, 1975.
3,953,462.—IMAGING PROCESS. APR. 27, 1976. ARG. 0202139, BEL. 0821400, GRB. 1467999.
3,957,829.—CERTAIN DINAPHTHO (1,2-B;2',3'-D)-FURAN-7,12 DIONES. MAY 18, 1976.
4,012,252.—IMAGING PROCESS UTILIZING 3-BROMO-N-2''-PYRIDYL-8,13-DIOXODIMAPHTHO-(2,1-; 3',3'-)-FURON-6-CARBO. MAR. 15, 1977. ARG. 0202139, BEL. 0821400, GRB. 1467999.
4,017,311.—PHOTOELECTROPHORETIC IMAGING SUSPENSION. APR. 12, 1977.
4,032,339.—PHOTOSENSITIVE COMPOSITION CONTAINING VANADYL PHTHALOCYANINE FOR PHOTOELECTROPHORECTIC IMAGING. JUNE 28, 1977.

Class 12N

3,446,722.—ELECTROPHORETIC REFINING OF PHOTOSENSITIVE PARTICLES. MAY 27, 1969. AUS 0424699, BEL. 0743903, CAN. 0840368. GER. 1622376, GRB. 1189636.
3,473,940.—PREPARATION OF PHOTOELECTROPHORETIC IMAGING SUSPENSION. OCT. 21, 1969. BEL. 0743899, CAN. 0847808, FRA. 1524448, GER. 1572386, GRB. 1161780, ITL. 0794432, JAP. 0594583, MEX. 0097623.
3,477,934.—IMAGING PROCESS. NOV. 11, 1969. ARG. 0158372, AUS. 0416251, BEL. 0700645, CAN. 0850023, FRA. 1550998, GRB. 1196044, ITL. 0804665, JAP. 0725097, MEX. 0098737, SPN. 0342376, STZ. 0481408, SWD. 0336525, VZL. 0021263.
3,551,313.—IMAGE CONTRAST CONTROL IN PHOTOELECTROPHORETIC IMAGING - PHAROS CONTRAST CONTROL. DEC. 29, 1970. ATR. 0302814, AUS. 0448317, BEL. 0738218, CAN. 0899689, FRA. 6929449, GER. 1944510, GRB. 1274525, ITL. 0871538, JAP. 0708365, SWD. 0341130.
3,553,093.—COLOR PHOTOELECTROPHORETIC IMAGING PROCESS. JAN. 5, 1971. ATR. 0286783, AUS. 0416331, BEL. 0692911, CAN. 0818388, FRA. 1471745, GER. 1522743, GRB. 1149665, IND. 0104183, ISR. 0025304. ITL. 0762674, JAP. 0608337, MEX. 0089790, NOR. 0123368, NZL. 0144531, STZ. 0479099, SWD. 0334540.
3,586,615.—PHOTOELECTROPHORETIC IMAGING PROCESS INCLUDING THE USE OF AN ELECTRICALLY CHRGD SUSPNSN COATNG. JUNE 22, 1971. BEL. 0743921, CAN. 0891972, FRA. 6945567, GER. 1965460, GRB. 1284429, HOL. 1284429, ITL. 0880418, JAP. 0729281.
3,595,770.—SEQUENTIAL PHOTOELECTROPHORETIC IMAGING SYSTEM. JULY 27, 1971. ARG. 0176384, ATR. 0299697, AUS. 0429715, BEL. 0722300, BRA. 0087996, CAN. 0891970, CHL. 0024332, DNK. 0126879, FRA. 1589548, GRB. 1239259, ITL. 0845021, LXB. 0057101, MEX. 0103850, NZL. 0154114, PNM. 0001418, PTG. 0050485, SAF. 0686705, SPN. 0359239, STZ. 0496265, SWD. 0339172, URG. 0009317, VZL. 0023705.
3,601,483.—IMAGING APPARATUS. AUG. 24, 1971.
3,607,256.—FULLY-ENCLOSED ELECTROPHORETIC IMAGING SYSTEM. SEPT. 21, 1971.
3,616,390.—ELECTROPHORETIC IMAGING METHOD CHARACTERIZED BY EXPOSURE OF ELECTRCLY PHOTSNSTV PRTCLS AT LIQUI. OCT. 26, 1971. ATR. 0322980, AUS. 0448380. BEL. 0743423, CAN. 0890356, FRA. 6944288, GER. 1947105, GRB. 1249546, ITL. 0879048, JAP. 0688351.
3,616,395.—PHOTOELECTROPHORETIC IMAGING WITH CORONA FIELD APPLICATION. OCT. 26, 1971. CAN. 0922142, GRB. 1318565, JAP. 0756962.
3,620,950.—ELECTROPHORETIC IMAGING EMPLOYING PERIODIC ELECTROMAGNETIC RADIATION. NOV. 16, 1971. ATR. 0302045, AUS. 0449606, BEL. 0739750, CAN. 0887022, FRA. 5934262, GRB. 1283384, ITL. 0877875, JAP. 0718339.
3,634,221.—PIGMENT RECLAIMING. JAN. 11, 1972. BEL. 0744760, CAN. 0921427, FRA. 7001822, GRB. 1301382, ITL. 0886625.
3,642,598.—PHOTOELECTROPHORETIC IMAGING METHOD AND APPARATUS. FEB. 15, 1972. ARG. 0188632, BEL. 0756481, CAN. 0922144, FRA. 7034709, GRB. 1324105, ITL. 0908073, JAP. 0740359, MEX. 0115601, VZL. 0032786.
3,645,874.—IMAGE DENSITY CONTROL IN PHOTOELECTROPHORETIC IMAGING. FEB. 29, 1972. BEL. 0756899, CAN. 0922957, FRA. 7035803, GRB. 1331621, ITL. 0908434, JAP. 0743836.
3,645,883.—PHTELCTRPHRTC IMGNG APRTUS EMPLYNG PHTSNSTV PRTCLS EXHBTG FATIGUE CHARACTERISTICS. FEB. 29, 1972.
3,647,659.—PHTELCTRPHRTC IMGNG PRCS WHEREIN IMGNG ELCTRCL FLD APPLD SUBSEQUENT TO IMAGE WISE EXPOSURE. MAR. 7, 1972. BEL. 0772912, CAN. 0958581, FRA. 7134730, GRB. 1354798, ITL. 0936734.
3,657,091.—ELECTROPHORETIC IMAGING METHOD EMPLOYING A PERIODIC ELECTRIC FIELD. APR. 18, 1972. ARG. 0174612, ATR. 0302816, AUS. 0448524, BEL. 0739752, CAN. 0913970, FRA. 6933735, GRB. 1282469, ITL. 0889439, JAP. 0709039, MEX. 0114739.
3,663,396.—KINESCOPE PHOTOELECTROPHORETIC IMAGING METHODS AND SYSTEMS. MAY 16, 1972. ARG. 0196858, BEL. 0762417, CAN. 0935965, FRA. 7104350, GRB. 1345571, ITL. 0918121, JAP. 0743838, MEX. 0131834.
3,664,941.—PHTELCTRPHRTC REVERSAL IMGNG USNG SUSPENSION CONTAINING VITAMIN PRECURSOR. B-CAROTENE. MAY 23, 1972.
3,666,472.—ELECTROPHORETIC IMAGING COMPOSITION - IMPROVEMENT OF PHAROS POLYCHROME IMAGING SYSTEM. MAY 30, 1972. ATR. 0302042, AUS. 0455711, BEL. 0739753, CAN. 0899138, FRA. 6933736, GRB. 1279284, HOL. 0147548, ITL. 0889440, JAP. 0709040, MEX. 0116450.
3,669,872.—IMAGING SYSTEM. JUNE 13, 1972.
3,676,313.—REMOVING UNDESIRED POTENTIAL FROM BLOCKING ELECTRODE IN A PHOTOELECTROPHORETIC IMAGING SYSTEM. JULY 11, 1972.
3,681,221.—PHOTOELECTROPHORETIC IMAGING BY PHOSPHORESCENCE. AUG. 1, 1972. CAN. 0935013, GRB. 1348121.
3,696,020.—ELECTROPHORETIC IMGNG APRTS INCLUDING MEANS TO COAT AND ELCTRFY IMGNG ELCTRODE. OCT. 3, 1972.
3,723,288.—ELECTROPHORETIC IMAGING APPARATUS INCLUDING MEANS TO PROJECT AN IMAGE AT A LIQUID NIP. MAR. 27, 1973.
3,737,310.—BACKGROUND REDUCTION. JUNE 5, 1973.

3,741,639.—PHOTOELECTROPHORETIC IMAGING BY PHOSPHORESCENCE. JUNE 26, 1973.

3,741,760.—IMAGING SYSTEM. JUNE 26, 1973.

3,748,035.—METHOD FOR SEQUENTIAL ILLUMINATION IN A POLYCHROME PROCESS. JULY 24, 1973. CAN. 0960288, GRB. 1416328.

3,772,013.—PHOTOELECTROPHORETIC IMAGING PROCESS EMPLOYING ELECTRICALLY PHOTOSENSITIVE PARTICLES AND INERT PA. NOV. 13, 1973. ARG. 0196295, ATR. 0327682, BEL. 0777724, CAN. 0957543, FRA. 7200998, GRB. 1370026, ITL. 0946356, JAP. 0759477, MEX. 0124561, SPN. 0398586, SWD. 0367075, VZL. 30687.

3,782,932.—ELECTROPHORETIC IMAGING PROCESS USING TRANSPARENT PARTICLES. JAN. 1, 1974. ATR. 0302043, AUS. 0446066, BEL. 0743424, CAN. 0913441, FRA. 6944289, GER. 1949149, GRB. 1280900, ITL. 0897053. JAP. 0699518.

3,785,816.—ELIMINATING CORONA ARCING IN PHOTOELECTROPHORETIC IMAGING. JAN. 15, 1974.

3,787,206.—PHOTOELECTROPHORETIC IMAGING METHOD INCLUDING AT LEAST ONE ELECTRODE CARRYING A PATTERN. JAN. 22, 1974.

3,801,195.—ELECTROPHORETIC IMAGING. APR. 2, 1974. ARG. 0174613, ATR. 0293874, AUS. 0455712, BEL. 0739747, CAN. 0922141, FRA. 6933738, GER. 1949416, GRB. 1279285, HOL. 0146950, ITL. 0877873, JAP. 0709042, MEX. 0108820.

3,804,620.—METHOD OF PRODUCING PLANOGRAPHIC PLATES BY PHOTOELECTROPHORETIC IMAGING. APR. 16, 1974.

3,811,764.—APPARATUS FOR PHOTOELECTROPHORETIC IMAGING USING A PERIODIC ELECTRIC FIELD. MAY 21, 1974.

3,850,627.—ELECTROPHORETIC IMAGING METHOD. NOV. 26, 1974. BEL. 0777719, FRA. 7201005, GRB. 1376241, ITL. 0946357.

3,857,549.—PHOTOELECTROPHORETIC IMAGING APPARATUS. DEC. 31, 1974.

3,857,707.—PHOTOELECTROPHORETIC IMAGING PROCESS USING DRY PIGMENT COATED SUBSTRATE. DEC. 31, 1974.

3,881,920.—PHOTOELECTROPHORETIC IMAGING PROCESS. MAY 6, 1975.

3,901,701.—PHOTOELECTROPHORETIC IMAGING PROCESS USING PHOTOCONDUCTIVE ELECTRODE WHICH ALTERS SPECTRAL RESPONSE. AUG. 26, 1975.

3,905,812.—IMAGING PROCESS. SEPT. 16, 1975. FRA. 7413994, GRB. 1443121.

3,920,330.—ELECTROPHORETIC IMAGING APPARATUS. NOV. 18, 1975. BEL. 0777719, CAN. 0961334, FRA. 7201005, GRB. 1376241, ITL. 0946357.

3,933,487.—IMAGING COMPOSITION FOR PHOTOELECTROPHORETIC IMAGING SYSTEM. JAN. 20, 1976. CAN. 0973005, GRB. 1375941.

3,954,465.—ELECTROPHORETIC IMAGING METHODS. MAY 4, 1976. BEL. 0777719, FRA. 7201005, GRB. 1376241, ITL. 0946357.

3,961,949.—PHOTOELECTROPHORETIC IMAGING METHOD PRODUCING A DESIRED IMAGE BORDER. JUNE 8, 1976.

3,967,960.—PHOTOELECTROPHORETIC IMAGING PROCESS EMPLOYING DARK CHARGE INJECTING ELEMENT. JULY 6, 1976.

4,023,968.—PHOTOELECTROPHORETIC COLOOR IMAGING PROCESS IN WHICH BACK MIGRATION IS ELIMINATED. MAY 17, 1977.

Class 12O

3,647,660.—PHOTOELECTROPHORETIC IMAGING METHOD EMPLOYING A HALOGEN CONTAINING SUSPENSION. MAR. 7, 1972.

3,869,286.—PHOTOELECTROPHORETIC IMAGING WITH COPPER-FREE CHLOROPHYLL IN THE CARRIER LIQUID. MAR. 4, 1975.

Class 12P

RE.28,260.—ELECTROPHORETIC IMAGING PROCESS INCLUDING APPL OF DYNAMIC STRESS ON THE PARTICLE SUSPENSION. DEC. 3, 1974. ARG. 0174614, ATR. 0302044, AUS. 0448318, BEL. 0739748, CAN. 0890358, FRA. 6934260, GER. 1949148, GRB. 1282736, HOL. 0146301, ITL. 0877874, JAP. 0718340, MEX. 0108886.

3,595,772.—METHOD OF BREAKING PARTICLE AGGLOMERATES IN THE PHOTO-ELECTROPHORETIC IMAGING SYSTEM. JULY 27, 1971. ARG. 0176808, ATR. 0293875, AUS. 0445175, BEL. 0739749, CAN. 0912398, FRA. 6934261, GRB. 1290370, ITL. 0887503, JAP. 0712831, MEX. 0127747.

3,616,391.—ELECTROPHRTC IMGNG PRCSS INC APPLCTN OF DYNAMIC STRESS ON PARTCL SUSPSN-REISSUED D 2177R. OCT. 26, 1971. ARG. 0174614, ATR. 0302044, AUS. 0448318, BEL. 0739748, CAN. 0890358, FRA. 6934260, GER. 1949148, GRB. 1282736, HOL. 0146301, ITL. 0877874, JAP. 0718340, MEX. 0108886.

3,666,472.—ELECTROPHORETIC IMAGING COMPOSITION - IMPROVEMENT OF PHAROS POLYCHROME IMAGING SYSTEM. MAY 30, 1972. ATR. 0302042, AUS. 0455711, BEL. 0739753, CAN. 0899138, FRA. 6933736, GRB. 1279284, HOL. 0147548, ITL. 0889440, JAP. 0709040, MEX. 0116450.

3,743,404.—PHTOELECTROPHORETIC IMGNG APPTS INCNG MEANS TO SIMULTNUSLY APPLY COMPRSVE STRESS AND SHEAR TO IMGNG. JULY 3, 1973.

3,784,302.—ELECTROPHORETIC IMAGE APPARATUS INCLUDING APPLICATION OF DYNAMIC STRESS ON THE PARTICLE SUSPENS. JAN. 8, 1974.

3,833,493.—IMAGING PROCESS. SEPT. 3, 1974.

3,943,049.—APPARATUS FOR SEPARATING AGGLOMERATED PARTICLES WITH SUSPENSION. MAR. 9, 1976.

Class 12Q

3,642,364.—TRANSFER APPARATUS. FEB. 15, 1972. AUS. 0455718, BEL. 0758808, CAN. 0918412, CZC. 0164906, EGR. 0087486, FRA. 7041650, GRB. 1336720, HUN. 0169308, ITL. 0909310, PLD. 0082862, SPN. 0385456, STZ. 0518581, USR. 0406387.

3,655,370.—PHOTOELECTROPHORETIC IMAGE TRANSFER. APR. 11, 1972.

3,705,797.—FIXING PROCESS FOR PHOTOELECTROPHORETIC IMAGING. DEC. 12, 1972.

3,711,196.—IMAGE TRANSFER. JAN. 16, 1973.

3,791,823.—PHOTOELECTROPHORETIC IMAGING TRANSFER METHOD. FEB. 12, 1974.

3,804,508.—PHOTOELECTROPHORETIC APPARATUS FOR HEAT FACING AN IMAGE. APR. 16, 1974.

3,897,143.—IMAGING SYSTEM. JULY 29, 1975.

Class 12R

3,574,614.—PROCESS OF PREPARING MULTIPLE COPIES FROM A XEROPRINTING MASTER. APR. 13, 1971. ATR. 0305769, AUS. 0448396, BEL. 0743660, CAN. 0882599, FRA. 6944513, GRB. 1209060, ITL. 0899118, JAP. 0710908.

3,607,256.—FULLY-ENCLOSED ELECTROPHORETIC IMAGING SYSTEM. SEPT. 21, 1971.

3,682,628.—PHOTOELECTROPHORETIC FACSIMILE TRANSMISSION. AUG. 8, 1972. CAN. 0957889, GRB. 1365163.

3,800,302.—RECORDING OSCILLOGRAPH UTILIZING PHOTOELECTROPHORETIC TECHNIQUES. MAR. 26, 1974.

3,849,132.—PHOTOELECTROPHORETIC IMAGING METHOD EMPLOYING A CHROMOGENIC REACTION. NOV. 19, 1974. BEL. 0809399, GRB. 1447104.

3,938,088.—CHARACTER CODING AND RECOGNITION SYSTEM. FEB. 10, 1976.

Class 15

3,693,517.—PRINTING APPARATUS—KALEIDOSCOPE PRINTER WITH CIRCUMFERENTIAL STRIPS. SEPT. 26, 1972. CAN. 0948265, GRB. 1330327.

3,801,319.—IMAGING METHOD UTILIZING CHEMICAL REACTIVITIES OF PHOTOEXCITED STATES OF AROMATIC HYDROXY COMPO. APR. 2, 1974. CAN. 1000549, GRB. 1429501.

3,847,644.—IMAGING BY PHASE AGGREGATION FROM BLOCK COPOLYMERS. NOV. 12, 1974.

3,851,584.—CHEMICAL REPRODUCTION SYSTEMS. DEC. 3, 1974.

3,888,670.—IMAGING METHOD. JUNE 10, 1975.

3,915,706.—IMAGING SYSTEM BASED ON PHOTODEGRADABLE POLYALDEHYDES. OCT. 28, 1975.

3,923,514.—METHOD FOR THE PREPARATION OF RELIEF PRINTING MASTERS. DEC. 2, 1975.

3,929,477.—IMAGE PRODUCING TECHNIQUES OF SUPERCONDUCTING MATERIAL IN A MAGNETIC FIELD. DEC. 30, 1975.

3,930,858.—HEAT DEVELOPMENT PROCESS UTILIZING A PHOTOSENSITIVE COMPOSITION CONTAINING A HALOGENATED POLYME. JAN. 6, 1976.

3,963,491.—IMAGING METHOD. JUNE 15, 1976.

3,986,874.—DRIOGRAPHIC IMAGING METHOD. OCT. 19, 1976.

3,990,043.—CHARACTER CODING AND RECOGNITION SYSTEM. NOV. 2, 1976.

4,009,466.—CHARACTER CODING AND RECOGNITION SYSTEM. FEB. 22, 1977.

4,032,980.—RECORDED MAGNETIC MEMBER VIEWING APPARATUS. JUNE 28, 1977.

Class 15A

3,320,060.—DEFORMATION IMAGE REPRODUCTION PROCESS UTILIZING A VOLTAGE THRESHOLD REDUCING SURFACTANT. MAY 16, 1967. CAN. 0807325, FRA. 1416119, GER. 1261867, GRB. 1097919, ITL. 0739830, JAP. 0519668.

3,338,710.—FROST THERMOGRAPHY. AUG. 29, 1967.

3,404,001.—THERMOPLASTIC DEFORMATION IMAGING WITH COLOR REAGENTS. OCT. 1, 1968. CAN. 0801265, FRA. 1459100, GER. 1497214, GRB. 1124925, ITL. 0725974, JAP. 0529727.

3,615,387.—STRIPPABLE LAYER RELIEF IMAGING PROCESS. OCT. 26, 1971. CAN. 0887033.

3,697,184.—APPARATUS FOR EVALUTING THE RECORDING CHARACTERISTICS OF A THERMOPLASTIC PHOTORECEPTOR. OCT. 10, 1972. CAN. 1083484, GRB. 1389471.

3,715,207.—ELCTRSTCLY DEFORMABLE THERMOPLASTIC LAYER CONTAINING A 1,4-DIALKYLAMINO-9, 10-ANTHRAQUINONE DYE. FEB. 6, 1973.

3,729,310.—SURFACE DEFORMABLE IMAGING PROCESS AND MEMBER. APR. 24, 1973.

3,741,759.—FROST IMAGING PROCESS. JUNE 26, 1973.

3,795,514.—DEFORMATION IMAGING METHOD. MAR. 5, 1974.

3,869,612.—COPY APPARATUS WITH MEANS TO EFFECT VISIBLE RAY IMAGING AND INFRARED RAY TRANSFIXING. MAR. 4, 1975. STZ. 0032775.

3,893,416.—DEVELOPMENT AND CLEANING APP FOR REVERSE PATH MACHINE. JULY 8, 1975.

3,902,062.—REVERSE PATH IMAGING AND TRANSFIXING COPYING METHOD. AUG. 26, 1975. BEL. 0823656.

3,904,875.—SINGLE RADIATION RAY PATH FOR THERMOGRAPHIC IMAGING & TRANSFIXING OR FUSING. SEPT. 9, 1975. ARG. 0207128.

3,906,896.—INK APPLICATOR. SEPT. 23, 1975. CAN. 0974753.

3,908,125.—REVERSE PATH IMAGING AND TRANSFIXING COPYING MACHINE. SEPT. 23, 1975.

3,909,613.—COPYING METHOD AND APP WITH MEANS TO EFFECT VISIBLE RAY IMAGING AND INFRARED RAY TRANSFIXING OR FUS. SEPT. 30, 1975.

3,923,004.—DEVELOPMENT AND CLEANING APPARATUS FOR REVERSE PATH MACHINE. DEC. 2, 1975. BEL. 0823656.

3,932,025.—IMAGING SYSTEM. JAN. 13, 1976.

3,944,358.—COLOR IMAGE REPRODUCTION SYSTEMS. MAR. 16, 1976.

3,946,230.—COPY METHOD UTILIZING SINGLE RADIANT RAY PATH FOR IMAGING AND TRANSFIXING. MAR. 23, 1976.

3,949,160.—ELECTRO-OPTIC READ OUT OF THERMOPLASTIC DEFORMATION PATTERNS. APR. 6, 1976.

3,951,533.—COLOR IMAGE REPRODUCTION SYSTEM. APR. 20, 1976.

3,984,262.—METHOD OF MAKING A SUBSTRATE STRIPED PLANAR LASER. OCT. 5, 1976.

3,997,243.—COLOR IMAGE REPRODUCTION SYSTEM. DEC. 14, 1976.

4,023,969.—DEFORMABLE ELASTOMER IMAGING MEMBER EMPLOYING AN INTERNAL OPAQUE DEFORMABLE METALLIC LAYER. MAY 17, 1977.

Class 15B

3,350,205.—METHOD OF IMAGE REPRODUCTION BY PHOTOPOLYMERIZATION AND BLUSHING. OCT. 31, 1967. CAN. 0717934, GRB. 1095174, JAP. 0561238.

3,561,962.—METHOD OF IMAGE REPRODUCTION BY PHOTOPOLYMERIZATION AND BLUSHING. FEB. 9, 1971.

3,834,906.—LIGHT ACTIVATING IMAGING PROCESS. SEPT. 10, 1974.

3,885,963.—LIGHT ACTIVATING IMAGING PROCESS. MAY 27, 1975.

3,890,147.—LIGHT ACTIVATING IMAGING PROCESS. JUNE 17, 1975.

3,892,180.—LIGHT ACTIVATING IMAGING PROCESS. JULY 1, 1975.

3,892,570.—LIGHT ACTIVATING IMAGING PROCESS. JULY 1, 1975.

Class 15B 2

3,862,841.—POLYMERIZATION IMAGING BY CHARGE INJECTION FROM A PHOTOCONDUCTIVE LAYER. JAN. 28, 1975.

Class 15C

3,250,636.—MTD AND APTS IMAGE REPRODCTN W/USE OF REUSABLE HEAT DEMAGNETIZABLE FERROMAGNETIC IMAGING LAYER. MAY 10, 1966. CAN. 0711404, GRB. 1070986, JAP. 0487336.

3,526,191.—DUPLICATING PROCESS EMPLOYING MAGNETIC DEVELOPER MATERIAL. SEPT. 1, 1970. CAN. 0903830, GER. 1671576, GRB. 1208307.

4,014,065.—MAGNETIC DEVELOPER REMOVAL SYSTEM MAR. 29, 1977.

4,030,104.—THERMO-MAGNETIC IMAGE TRANSFER APPARATUS. JUNE 14, 1977.

4,032,923.—THERMOMAGNETIC IMAGING APPARATUS. JUNE 28, 1977.

4,035,810.—MAGNETIC INTERPOSITIVE METHOD WITH ELECTROSTATIC IMAGING. JULY 12, 1977.

4,038,665.—DONOR TRANSFER OF MAGNETIC TONER. JULY 26, 1977.

Class 15D

3,441,410.—DEFORMATION IMAGING PROCESSES USING ELECTRICALLY PHOTOSENSITIVE PHOTOCHROMIC MATERIALS. APR. 29, 1969. CAN. 0801267, FRA. 1485348, GER. 1522696, GRB. 1156151, JAP. 0545759.

3,441,411.—IMAGE FORMATION THROUGH CHEMICAL REACTION OF PHOTOCHROMIC MATER. APR. 29, 1969. CAN. 0834676, GRB. 1165215.

3,442,646.—FRMATION OF LIGHT SCATTERING IMGS IN LAYERS COMPRSNG ORGANIC PHOTOCHROMIC MATERIALS. MAY 6, 1969. GRB. 1164484.

3,450,530.—PHOTOGRAPHIC IMAGING BY MEANS THE SURFACE TENSION CREATED BY PHOTOCHROMIC MATERIALS. JUNE 17, 1969.

3,450,531.—ADHESIVE IMAGING ON PHOTOCHROMIC LAYERS. JUNE 17, 1969.

3,450,533.—FORMATION OF LIGHT SCATTERING IMAGES IN PHOTOCHROMIC LAYERS. JUNE 17, 1969. CAN. 0875500.

3,451,811.—ELECTROPHOTOGRAPHIC IMAGING PROCESSES USING ELECTRICALLY PHOTOSENSITIVE PHOTOCHROMIC MATERIALS. JUNE 24, 1969. CAN. 0828692, JAP. 0573734.

3,471,290.—PHOTOCHROMIC PHOTORESIST IMAGING. OCT. 7, 1969.

3,482,973.—IMAGING SYSTEM. DEC. 9, 1969.

3,967,964.—PHOTOSENSITIVE FILM COPRINSING AN ORGANOSELENIUM AND AN ORGANSMERCURY. JULY 6, 1976.

3,973,966.—PHOTOCHROMIC COMPOSITION CONTAINING A DIPHENYL DIBENZOCHRON-3-ENE. AUG. 10, 1976.

4,007,372.—IMPROVED METHOD & ARTICLE FOR IMAGE REPRODUCTION. FEB. 8, 1977.

Class 15E

3,635,708.—VESICULAR IMAGING PROCESS. JAN. 18, 1972.

3,847,644.—IMAGING BY PHASE AGGREGATION FROM BLOCK COPOLYMERS. NOV. 12, 1974.

Class 15F

3,396,401.—APPARATUS AND METHOD FOR MARKING OF INTELLIGENCE ON A RECORD MEDIUM. AUG. 6, 1968.

3,671,237.—METHOD FOR PRODUCING IMAGES. JUNE 20, 1972. CAN. 0886492, GRB. 1317043.

3,753,705.—AGGLOMERATION IMAGING PROCESS USING HARDENABLE MATERIAL. AUG. 21, 1973. CAN. 0929350, GRB. 1330518

4,029,502.—IMAGING SYSTEM CONTAINING AGGLOMERABLE MATERIAL. JUNE 14, 1977. ARG.

0172317, BEL. 0737813, CAN. 0884217, FRA. 6928725, GER. 1942380, GRB. 1286501, ITL. 0870234, SWD. 0340954.

Class 17A

3,909,609.—LIGHT SOURCE MEASURING APPARATUS. SEPT. 30, 1975.

Class 17A 1

2,774,887.—RADIATION SENSING DEVICE. DEC. 18, 1956.
3,445,660.—METHOD FOR DETECTION OF ULTRAVIOLET RADIATION. MAY 20, 1969.

Class 17A 2

3,330,700.—SOLAR-CELL PANELS. JULY 11, 1967.
3,359,137.—SOLAR CELL CONFIGURATION. DEC. 19, 1967.
3,513,040.—RADIATION RESISTANT SOLAR CELL. MAY 19, 1970.

Class 17A 3

3,351,493.—DIFFUSED RADIATION TRACKING TRANSDUCER HAVING A LATERAL PHOTO VOLTAGE JUNCTION. NOV. 7, 1967.
3,443,102.—SEMICONDUCTOR PHOTOCELL DETECTOR WITH VARIABLE SPECTRAL RESPONSE. MAY 6, 1969.

Class 17A 4

3,013,158.—LINEARIZATION OF LATERAL PHOTOCELLS. DEC. 12, 1961.
3,901,607.—HIGH APERTURE REFLECTION PHOTODETECTOR APPARATUS. AUG. 26, 1975.

Class 17B

2,021,884.—PHOTOGRAPHING APPARATUS. NOV. 26, 1935.
3,650,604.—INTER-FERAMETRIC SCANNING APPARATUS AND METHOD. MAR. 21, 1972. CAN. 0954354, GRB. 1363263.
3,650,605.—INTERFERAMETRIC APPARATUS WITH CONTROLLED SCANNING MEANS. MAR. 21, 1972. CAN. 0952749.
3,902,061.—DIGITAL OPTICAL COMPUTER TECHNIQUES. AUG. 26, 1975.
3,978,342.—DUAL MODE RADIATION TRANSMITTING APPARATUS. AUG. 31, 1976.
3,987,685.—CURSOR POSITION DEVICE. OCT. 26, 1976.

Class 17B 1

3,476,473.—FONT INDICATOR. NOV. 4, 1969.
3,481,668.—IMAGE PROJECTION APPARATUS. DEC. 2, 1969.
3,501,838.—PANTOGRAPHIC IMPLEMENTED OVERHEAD PROJECTOR. MAR. 24, 1970.
3,670,633.—RECORDING APPARATUS. JUNE 20, 1972.
3,677,148.—OPTICAL RECORDER. JULY 18, 1972.
3,678,820.—OPTICAL SYSTEM FOR PROJECTION RECORDING APPARATUS. JULY 25, 1972.
3,685,406.—OPTICAL RECORDER. AUG. 22, 1972. BEL. 0777014, CAN. 0960743, FRA. 7146254, GRB. 1372379, ITL. 0944111.
3,695,161.—ALPHANUMERIC PROJECTION DISC ASSEMBLY. OCT. 3, 1972.
3,700,325.—OPTICAL SYSTEM FOR PHOTOCOPYING APPARATUS. OCT. 24, 1972. BEL. 0764830, CAN. 0931409, FRA. 7111622, GRB. 1337447, ITL. 0922162.
3,705,543.—OPTICAL RECORDER. DEC. 12, 1972. CAN. 0948266, GRB. 1372378.
3,759,149.—MULTIPLE FLASH LAMP ALPHANUMERIC PROJECTION DISC ASSEMBLY. SEPT. 18, 1973. CAN. 1002363.
3,759,612.—OPTICAL SYSTEM. SEPT 18, 1973. BEL. 0792669, CAN. 0972193, FRA. 7243897, GRB. 1395580, ITL. 0984616, SWD. 7216146.
3,768,384.—PROJECTION ASSEMBLY. OCT. 30, 1973.
3,873,207.—POLARIZING INTERFEROMETER. MAR. 25, 1975.
3,880,497.—METHOD OF STORING OPTICAL INFORMATION ON A RANDOM CARRIER. APR. 29, 1975. CAN. 1004887, FRA. 7408054.
3,883,244.—APERTURE ADJUSTMENT IN OPTICAL ASSEMBLY. MAY 13, 1975.
3,897,136.—POLARIZATION-GRATING MOIRE. JULY 29, 1975.
3,909,103.—LENS SCAN MECHANISM. SEPT. 30, 1975.
4,035,068.—SPECKLE MINIMIZATION IN PROJECTION DISPLAYS BY REDUCING SPATIAL COHERENCE OF IMAGE LIGHT. JULY 12, 1977.

Class 17B 2

3,355,308.—PROJECTION TRANSPARENCY HAVING A TRANSPARENT POWDER IMGE. NOV. 28, 1967.
3,476,478.—APPARATUS FOR CHANGING MAGNIFICATION OF PHOTOCOPIER W/O CHANGING CONJUGATE LENGTH OF OPTICAL SY. NOV. 4, 1969. ARG. 0172460, AUS. 0415808, BEL. 0708650, BRA. 6795668, CAN. 0845405, FRA. 1552364, GER. 1297981, GRB. 1223427. ITL. 0821929, MEX. 0100019, VZL. 0023689.
3,508,812.—HIGHLY CORRECTED SIX ELEMENT GAUSS TYPE LENS. APR. 28, 1970.
3,510,219.—OPTICAL ALIGNMENT SYSTEM. MAY 5, 1970. ARG. 0172455, BRA. 6793791, CAN. 0881018, CHL. 0023570, GRB. 1206966, MEX. 0101166, PRU. 0009329, SPN. 0360896, STZ. 0501233, SWD. 0359168, URG. 0008831, VZL. 0025783.
3,591,256.—VARIABLE MAGNIFICATION LENS SYSTEM. JULY 6, 1971. BEL. 0731553, CAN. 0881019, FRA. 6911559, GRB. 1234515, ITL. 0857660, JAP. 0857539.
3,592,531.—SPLIT DAGOR-TYPE OF SYMMETRICAL COPYING LENS SYSTEM. JULY 13, 1971. CAN. 0929389.
3,600,066.—OPTICAL ASSEMBLY WITH SUPPLEMENTAL LENS MEANS. AUG. 17, 1971. CAN. 0943792, GRB. 1261159, JAP. 0728824.
3,612,662.—EYEPIECE HAVING A WIDE FIELD OF VIEW AND A LARGE EYE RELIEF. OCT. 12, 1971.
3,620,603.—OFF-CENTER FOCUSING SYSTEM. NOV. 16, 1971.
3,630,599.—MECHANICALLY COMPENSATED ZOOM LENS SYSTEM. DEC. 28, 1971. CAN. 0960891, GRB. 1363113.
3,640,605.—MECHANICALLY COMPENSATED ZOOM LENS SYSTEM. FEB. 8, 1972.
3,659,922.—SYMMETRICAL HALF-LENS OPTICAL SYSTEM. MAY 2, 1972.
3,672,748.—SPLIT DAGOR-TYPE OF SYMMETRICAL COPYING LENS SYSTEM. JUNE 27, 1972. ATR. 0322874, AUS. 0467299, BEL. 0783478, CAN. 0960495, GRB. 1358349, ITL. 0955474, SPN. 0402705, STZ. 0544315, SWD. 7206274.
3,741,621.—ADD LENS PROJECTION SYSTEM WITH BALANCED PERFORMANCE. JUNE 26, 1973. BEL. 0781514, CAN. 0963300, FRA. 7208375, GRB. 1393151, ITL. 0950848.
3,817,599.—PROJECTION LENS WITH ADD LENS ELEMENTS. JUNE 18, 1974. CAN. 1008710.
3,865,470.—VARIABLE MAGNIFICATION LENS SYSTEM. FEB. 11, 1975. BEL. 0819497, FRA. 7429827, SPN. 0429431.
3,865,471.—LENS SYSTEM FOR PHOTOELECTROPHORETIC COPYING MACHINE. FEB. 11, 1975.
3,880,498.—ZOOM LENS ASSEMBLY. APR. 29, 1975.
3,907,401.—HIGH PERFORMANCE OPTICAL OBJECTIVE. SEPT. 23, 1975.
3,975,289.—CHARGE TRANSFER COMPLEXEX OF FERRONCENES HAVING LIGHT FILLING PROPERTIES. AUG. 17, 1976.
4,025,541.—CHARGE TRANSFER OF FERROCENES HAVING LIGHT FILTERING PROPERTIES. MAY 24, 1977.

Class 17B 3

3,393,956.—UNIFORM-FIELD KERR CELL. JULY 23, 1968.
3,408,133.—KERR-CELL CAMERA SHUTTER. OCT. 29, 1968.

Class 17B 4

3,358,081.—FACSIMILE PRINTER WITH FERROELECTRIC MODULATOR. DEC. 12, 1967. CAN. 0898336, GRB. 1128973.
3,360,323.—TRANSVERSE MAGNETO-OPTICAL ROTATOR WITH COMPENSATION OF PHASE BETA RDATION. DEC. 26, 1967.
3,601,468.—OPTICAL LIGHT WAVE MODULATOR FOR REPRESENTING A FIRST COLOR LIGHT WAVE AS SECOND COLOR LIGHT WA. AUG. 24, 1971.
3,938,881.—ACOUSTO-OPTIC MODULATION DEVICE. FEB. 17, 1976.
4,011,009.—REFLECTION DIFFRACTION GRATING HAVING A CONTROLLABLE BLAZE ANGLE. MAR. 8, 1977.

Class 17C

3,870,921.—IMAGE INTENSIFIER TUBE WITH IMPROVED PHOTOEMITTER SURFACE. MAR. 11, 1975.

Class 17C 1

3,277,297.—ION IMAGE TO ELECTRON IMAGE CONVERTER. OCT. 4, 1966.
3,322,999.—IMAGE-INTENSIFIER TUBE. MAY 30, 1967.
3,519,870.—SPIRLD STRIP MATRL HAVNG PRLEL GROVS FRMNG PLURALITY OF ELCTRN MULTIPLIER CHANNELS. JULY 7, 1970.
3,983,045.—THREE COMPONENT DEVELOPER COMPOSITION. ARG. 0194232, ATR 0334199, AUS. 0462045, BEL. 0789987, CHL. 0027625, FRA. 7236617, GRB. 1402009, ITL. 0968815, MEX. 0125231, NZL. 0168638, PNM. 0002796, SAF 0727225, SPN. 0407564, STZ. 0028096, SWD. 7213035, TIW. 0007666, VZL. 0012802.

Class 17C 2

3,368,077.—INFRA-RED IMAGE INTENSIFIER HAVING A TUNNEL-EMISSION CATHODE HAVING A CONDUCTIVE MOSAIC. FEB. 6, 1968.
3,949,225.—INFRARED IMAGING APPARATUS. APR. 6, 1976.

Class 17C 3

3,446,561.—PASSIVE BRIGHT PATTERN RETICLE. MAY 27, 1969.
3,837,732.—PARTIALLY TRANSPARENT PLATED FOR INCREASED IMAGE CONTRAST. SEPT. 24, 1974. CAN. 0893234, GRB. 1237697, JAP. 0645592.

Class 17C 4

3,441,736.—IMAGE INTENSIFIER INCLUDING SEMI-CONDUCTOR AMPLIFIER LAYER. APR. 29, 1969.

Class 17D

D.235,655.—DISPLAY DEVICE. JULY 1, 1975.
3,987,413—DETECTION SYSTEM. OCT. 19, 1976.
4,035,061.—HONEYCOMB DISPLAY DEVICES. JULY 12, 1977.

Class 17D 1

3,422,737.—VARIABLE FONT CHARACTER GENERATOR. JAN. 21, 1969. ARG. 0157019, BRA. 0087922, CAN. 0788611, CHL. 0022222, FRA. 1506176, GRB. 1162840, ITL. 0788951, JAP. 0590133, MEX. 0094427.
3,519,867.—ELECTRIC DISCHARGE TUBE FOR DISPLAYING ALPHNUMERIC CHARACTER SYMBOLS. JULY 7, 1970.
3,564,319.—CATHOD RAY TUBE W/MATRIX FRMG ELEMNTL ELECTRN BEAMS AND MEANS SELECTVLY FRMG INTO CHAR AT FACE PLA. FEB 16, 1971.
3,587,083.—CHARACTER GENERATION AND DISPLAY SYSTEM. JUNE 22, 1971. CAN. 0858092, FRA. 1582728, GER. 1774884, GRB. 1234580, ITL. 0846528, JAP. 0678504.
3,641,557.—CIRCUIT ARRANGEMENT FOR AN ELECTRIC DISCHARGE TUBE. FEB. 8, 1972.
3,742,484.—CHARACTER GENERATING APPARATUS EMPLOYING BIT STEAM LENGTH CORRECTION. JUNE 26, 1973.
3,781,848.—DISPLAY SYSTEM - CHARACTER GENERATOR SYSTEM A. DEC. 25, 1973.
3,810,165.—ELECTRONIC DISPLAY DEVICE. MAY 7, 1974.
3,830,646.—IMAGE REGISTRATION CORRECTION FOR NON-IMPACT PRINTERS. AUG. 20, 1974. CAN. 0986764, FRA. 7339099, GRB. 1440507.
3,911,419.—CONTROLLER FOR CURSOR POSITIONING ON A DISPLAY MEDIUM. OCT. 7, 1975.
3,952,296.—VIDEO SIGNAL GENERATING APPARATUS WITH SEPARATES PROCESSING OF ODD AND EVEN VIDEO BITS. APR. 20, 1976.

Class 17D 2

RE.28,360.—ELECTROPHORETIC COLOR DISPLAY DEVICE. MAR. 4, 1975.
3,524,022.—ELECTRO-OPTICAL DISPLAY SYSTEM. AUG. 11, 1970.
3,588,584.—APPARATUS FOR POSITIONING A LIGHT SPOT ONTO A CHARACTER MASK. JUNE 28, 1971.
3,612,758.—COLOR DISPLAY DEVICE - REISSUED D 2717R. OCT. 12, 1971.

Class 17D 3

3,198,976.—ELECTRIC DISCHARGE TUBES AND APPLICATIONS THEREOF. AUG. 3, 1965.
3,264,638.—ELECTRONIC CODE TRANSLATION. AUG. 2, 1966. CAN. 0740559.
3,349,677.—ALPHA NUMERIC CHARACTER PRINTER. OCT. 31, 1967.
3,403,390.—MESSAGE STORAGE. SEPT. 24, 1968. GRB. 1078401.
3,861,804.—INFEROMETRY READOUT OF PHASE INFORMATION. JAN. 21, 1975. CAN. 0980745, GRB. 1387905.
3,898,377.—VIDEO MIXER. AUG. 5, 1975.

Class 17D 4

3,478,659.—APPARATUS FOR JUSTIFYING A REPRODUCED LINE OF CHARACTERS. NOV. 18, 1969.

Class 17D 5

3,330,190.—PRINTING APPARATUS. JULY 11, 1967. CAN. 0758791, GER. 1280282, GRB 1102419, JAP. 0529726.

Class 17E

3,852,775.—MOVING BELT SCANNING PRINTER. DEC 3, 1974.
4,027,961.—COPIER/PASTER SCAN APPARATUS. JUNE 7, 1977.

Class 17E 1

3,337,718.—LIGHT SCAN RECORDING AND READOUT. AUG. 22, 1967. CAN. 0794443, GRB. 1070030.
3,426,144.—TRANSCEIVER APPARATUS FOR TRANSMITTING AND RECORDING OPTICAL INFORMATION. FEB. 4, 1969. CAN. 0810757, GRB. 1158568, JAP. 0579399.
3,426,354.—ELECTROSTATIC CHARGE IMAGE RECORDER. FEB. 4, 1969. AUS. 0295167, BEL. 0664729, CAN. 0739120, DNK 0115269, FRA. 1455131, GER. 1280281, GRB. 1084494, HOL. 0136720, ITL. 0761085, JAP. 0492014, STZ. 0444906, SWD. 0338117.
3,548,195.—RADIATION SENSITIVE DOCUMENT SCANNING MEANS. DEC. 15, 1970. CAN 0901968, FRA. 1592840, GER. 1809854, GRB. 1230836, ITL. 0848026, JAP. 0587941.
3,553,463.—RADIATION SENSITIVE DOCUMENT SCANNING APPARATUS USING HELICAL SCANNER. JAN. 5, 1971.
3,775,559.—APERTURE DESIGNS FOR FACSIMILE SCANNING APPARATUS. NOV. 27, 1973. CAN. 0960770, GRB. 1376189.
3,820,900.—INSTRUMENT FOR SCANNING DOCUMENT FOR QUALITY. JUNE 28, 1974.
3,867,571.—FLYING SPOT SCANNER. FEB. 18, 1975. CAN. 0995351.
3,898,470.—SCANNING ARRANGEMENT FOR MULTIFUNCTION OPERATION. AUG. 5, 1975.
3,922,485.—FLYING SPOT SCANNER WITH SCAN DETECTION. NOV. 25, 1975.
3,944,323.—VARIABLE SPOT SIZE SCANNING. MAR. 16, 1976. BEL. 0835552.
3,946,150.—OPTICAL SCANNER. MAR. 23, 1976.
3,962,538.—FLYING SPOT SCANNING SYSTEM WITH VIRTUAL SCANNERS. JUNE 8, 1976.
3,966,319.—FLAT FIELD SCREENING MIRROR. JUNE 29, 1976.
3,970,359.—FLYING SPOT FLAT FIELD SCANNER. JULY 20, 1976.
3,973,825.—FLAT FIELD SCANNING SYSTEM. AUG. 10, 1976. BEL. 0836735.
3,974,506.—SCANNING SYSTEM FOR IMAGING CHARACTERS COMBINED WITH GRAPHIC CURVES AUG. 10, 1976.
3,997,721.—FLYING SPOT SCANNING SYSTEM WITH REDUCED SCAN ANGLE. DEC. 14, 1976.
4,006,299.—FLAT FIELD SCANNING SYSTEM. FEB. 1, 1977. BEL. 0836543.
4,012,585.—INPUT AND OUTPUT FLYING SPOT SCANNING SYSTEM. MAR. 15, 1977.
4,015,081.—MULTIFUNCTION SCANNING SYSTEM. MAR. 29, 1977. BEL. 0836790.
4,021,897.—A PROCESS FOR PROVIDING CEMENTED GLASS FLATS TO PROVIDE HIGH SPEED MULTIFACETED POLYGONAL SCAN APR 10, 1977.

4,034,408.—FLYING SPOT SCANNER. JULY 5, 1977. GRB. 1452300.

Class 17E 2

3,407,329.—SCANNED CONVERSION TUBE. OCT. 22, 1968. CAN. 0836783, GER 1639461, GRB. 1190967, JAP. 0565840.
3,437,408.—MULTIPLE COPY ELECTROSTATIC IMAGING APPARATUS. APR. 8, 1969. ARG. 0164840, ATR. 0283115, AUS. 0410817, BEL. 0704323, CAN. 0831674, CZC. 0156411, EGR. 0065587, FRA. 1538197, GER. 1597879, GRB. 1202583, HUN. 0161168, ITL. 0822157, JAP. 0582502, MEX. 0099950, SPN. 0345482, STZ. 0484459, SWD. 0331795, USR. 0353450, VZL. 0023662.
3,474,417.—FIELD EFFECT SOLID STATE IMAGE PICKUP AND STORAGE DEVICE. OCT. 21, 1969. CAN. 0869188, GER. 1549144, GRB. 1203095, JAP. 0568732.
3,523,188.—SEMICONDUCTOR CURRENT CONTROL DEVICE AND METHOD. AUG. 4, 1970.

Class 17E 3

3,485,945.—ELECTRONIC LENTICULAR RECORDING SYSTEM. DEC. 23, 1969.
3,510,570.—ELECTRONIC LENTICULAR DISPLAY SYS. MAY 5, 1970.
3,650,621.—OPTICAL IMAGING SYSTEM. MAR. 21, 1972. BEL. 0747978, CAN. 0927470, FRA. 7011548, GRB. 1297907, ITL. 0898936, JAP. 0731225.
3,655,284.—LONGITUDINALLY INSENSITIVE LENS STRIP IMAGING DEVICE. APR. 11, 1972.
3,827,062.—OPTICAL ARRANGEMENT FOR HIGH SPEED PRINTOUT SYSTEM. JULY 30, 1974.
3,853,387.—VARIABLE MAGNIFICATION LENS ASSEMBLY HAVING TWO ADD LENSES. DEC. 10, 1974.
3,865,470.—VARIABLE MAGNIFICATION LENS SYSTEM. FEB. 11, 1975. BEL. 0819497, FRA. 7429827, SPN. 0429431.

Class 17E 4

3,279,342.—COMMUNICATION PRINTER. OCT. 18, 1966. CAN. 0767902, GRB. 1120446, JAP. 0698291.
3,481,668.—IMAGE PROJECTION APPARATUS. DEC. 2, 1969.
3,485,546.—FIELD FLATTENER SCANNING MEANS. DEC. 23, 1969. CAN. 0850916, GRB. 1196373, JAP. 0667705.
3,504,960.—SAGITTAL RAY APERTURE STOP. APR. 7, 1970. AUS. 0413558, BEL. 0704924, CAN. 0849815, FRA. 1540700, GRB. 1209472, ITL. 0814606, JAP. 0972613.
3,532,425.—GRAPHIC DISTORTION APPARATUS. OCT. 6, 1970.
3,544,190.—LENS STRIP OPTICAL SCANNING SYSTEM. DEC. 1, 1970. CAN. 0904070, GRB. 1278336.
3,584,950.—LENS STRIP OPTICAL SCANNING SYSTEM. JUNE 15, 1971.
3,584,952.—LENS STRIP OPTICAL SCANNING SYSTEM - REISSUED D 2074R. JUNE 15, 1971.
3,584,953.—SHORT FOCAL OPTICAL LENGTH SCANNING SYSTEM JUNE 15, 1971.
3,963,343.—CAMMING SYSTEMS. JUNE 15, 1976. BEL. 0824049.
4,006,648.—CAMMING SYSTEM. FEB. 8, 1977. BEL. 0824049.

Class 17E 5

3,155,022.—BUFFER FOR ELECTRONIC DISPLAY READOUT. NOV. 3, 1964. CAN. 0773751, GRB. 1056114, JAP. 0542586.
3,219,993.—IMAGE FORMATION AND DISPLAY UTILIZING A THERMOTROPICALLY COLOR REVERSIBLE MATERIAL. NOV. 23, 1965. CAN. 0762159, GER. 1222795, ITL. 0753655, JAP. 0474129.
3,249,757.—THERMAL IMAGING DEVICE. MAY 3, 1966.
3,995,278.—SUPERCONDUCTIVE MAGNETOSTATIC PRINTER. NOV. 30, 1976.

Class 17E 6

3,456,074.—IMAGE STABILIZATION OF OPTICAL IMAGING SYSTEMS. JULY 15, 1969
3,461,227.—MECHANICAL JITTER EQUALIZER. AUG. 12, 1969. CAN. 0824819, GRB. 1198303.
3,873,189.—ADJUSTABLE-POSITION OPTICAL SYSTEM MAR. 25, 1975.

Class 17F 1

3,325,674.—MOVING TARGET DISPLAY INDICATOR. JUNE 13, 1967.
3,340,419.—ELECTRIC DISCHARGE TUBES. SEPT. 5, 1967. CAN. 0773690.
3,447,026.—CRT SCAN STABILIZER. MAY 27, 1969. GER. 1490986.
3,483,414.—STORG TUBE HVG FLD EFF LAYR W/ CONDCTG PINS EXT TO LAYR THAT READOUT NOT ERASE CHG PATTERN. DEC. 9, 1969. CAN. 0850846, GER. 1537566, GRB. 1203432, JAP. 0565841.

Class 17F 2

3,153,785.—TIME COMPRESSED DISPLAY. OCT. 20, 1964. CAN. 0708306, GRB. 1008993.
3,579,024.—SELECTIVE BLANKING CONTROL CIRCUIT. MAY 18, 1971.

Class 17G

3,619,714.—PANEL DISPLAY DEVICE. NOV. 9, 1971.
4,003,742.—VELOCITY COMPENSATION FOR BEAD BYPASS WITH SPEED REDUCTION. JAN. 18, 1977.

Class 17G 1

3,459,946.—SOLID STATE STORAGE DEVICE. AUG. 5, 1969.
3,510,660.—METHOD FOR VISUAL COMPARISON OF INFORMATION. MAY 5, 1970. CAN. 0848611, GRB. 1201376, JAP. 0595641.
3,539,862.—DUAL CONDUCTOR STORAGE PANEL. NOV. 10, 1970. ARG. 0175067, AUS. 0414034, BEL. 0723721, CAN. 0878168, FRA. 1591040, GER. 1808238, GRB. 1235310, HOL. 0150616, ITL. 0847618, JAP. 0742515, MEX. 0111871, SPN. 0360366, STZ. 0493930, SWD. 0345341, VZL. 0023718.
4,002,998.—EXTERNALLY CONTROLLABLE MINIATURE LASERS. JAN. 11, 1977.

Class 17G 2

3,531,647.—DEVICE AND PROCESS FOR REDUCTION OF BACKGROUND LIGHT IN SOLID STATE STORAGE PANELS. SEPT. 29, 1970. CAN. 0862333, FRA. 1540063, GER. 1549143, GRB. 1201375, ITL. 0818126, MEX. 0101197.
3,531,648.—SOLID STATE STORAGE PANEL FOR COLOR REPRODUCTION. SEPT. 29, 1970. CAN. 0846433, GRB. 1201377.
3,540,008.—SOLID STATE STORAGE DEVICES HAVING NON-CORONA EXTINCTION CAPABILITY. NOV. 10, 1970. ARG. 0166245, AUS. 0424286, BEL. 0725616, CAN. 0897827, FRA. 1599275, GER. 1815243, GRB. 1250023. ITL. 0849327, JAP. 0742516, MEX. 0106020, SPN. 0361652, STZ. 0504755, SWD. 0361123, VZL. 0023729.
3,561,964.—METHOD FOR PRODUCTION OF SOLID STATE STORAGE PANELS. FEB. 9, 1971. ARG. 0184633, AUS. 0427883, BEL. 0736077, CAN. 0866994, FRA. 6924001, GER. 1935763, GRB. 1270845, HOL. 0150271, ITL. 0870080, JAP. 0681942, MEX. 0113574, SPN. 0369656, STZ. 0513430, SWD. 0358991, VZL. 0023743.
3,594,610.—DISPLAY PANEL WITH CORONA DISCHARGE CONTROL. JULY 20, 1971.

Class 17G 3

3,154,636.—THREE DIMENSIONAL DISPLAY DEVICE. OCT. 27, 1964. CAN. 0794989, GRB. 1029611, JAP. 0462394.
3,205,403.—ELECTROLUMINESCENT DISPLAY SYSTEMS. SEPT. 7, 1965.
3,221,335.—ELECTRO-OPTICAL RECORDING AND VISUAL DISPLAY SYSTEMS. NOV. 30, 1965. AUS. 0226551, CAN. 0801882, FRA. 1202340, GER. 1107705, GRB. 0880692, JAP. 0306714.
3,989,355.—ELECTRO-OPTIC DISPLAY SYSTEM. NOV. 2, 1976.

Class 17G 4

3,293,441.—IMAGE INTENSIFIER WITH FERRO-ELECTRIC LAYER AND BALANCED IMPEDANCES. DEC. 20, 1966.
3,300,645.—FERROELECTRIC IMAGE INTENSIFIER INCLUDING INVERSE FEEDBACK MEANS. JAN. 24, 1967.

3,440,428.—IMAGE CONVERTER USING CHARGED PHOTOEMISSIVE LAYER. APR. 22, 1969. CAN. 0858119, GER. 1639462, GRB. 1202049, JAP. 0565839.
3,441,736.—IMAGE INTENSIFIER INCLUDING SEMI-CONDUCTOR AMPLIFIER LAYER. APR. 29, 1969.
3,531,646.—ENHANCEMENT OF ELECTROSTATIC IMAGES. SEPT. 29, 1970. CAN. 0892186, GRB. 1199462, JAP. 0641476.
3,543,032.—DEVICE AND PROCESS FOR AMPLIFYING AND STORING AN IMAGE. NOV. 24, 1970. ARG. 0177440, CAN. 0880586, MEX. 0111518, PNM. 0001809, VZL. 0027508.

Class 17H

3,742,281.—CONTROLLED SPECTRUM FLASH LAMP. JUNE 26, 1973.
3,949,979.—SINGLE LONGITUDINAL MODE GAAS/GAALAS DOUBLE HETEROSTRUCTURE LASER. APR. 13, 1976.
3,995,110.—FLYING SPOT SCANNER WITH PLURAL LENS CORRECTION. NOV. 30, 1976.
4,021,845.—A LASER FOR GENERATING WHITE LIGHT. MAY 3, 1977. BEL. 0846954.

Class 17H 1

3,427,564.—HIGH-POWER IONIZED GAS LASER STRUCTURE. FEB. 11, 1969.
3,437,950.—ION LASER HAVING A METAL TUBE SHRINK-FITTED ONTO THE CERAMIC DISCHARGE TUBE. APR. 8, 1969.
3,523,256.—HEAT PUMPED LASER. AUG. 4, 1970.
3,529,261.—LASR HVNG ACTV MEDIUM WHCH IS AN EXCTD HALOGN WHSE LOWR ENRGY ST IS DEPLETD BY REACTNG W/ALKAL. SEPT. 15, 1970. CAN. 0816276, FRA. 1446601, GER. 1299367, GRB. 1124346, ITL. 0726918.
3,562,173.—LASER MATERIALS. FEB. 9, 1971.
3,860,888.—TIME-SHARING TWO FREQUENCY LASER. JAN. 14, 1975.
3,954,534.—LIGHT EMITTING DIODE ARRAY WITH DOME GEOMETRY. MAY 4, 1976.
3,969,686.—BEAM COLUMNATION USING MULTIPLE COUPLED ELEMENTS. JULY 13, 1976.
3,970,958.—ELECTRICALLY PUMPED SOLID-STATE DISTRIBUTED FEEDBACK LASER WITH PATICULAR GRATING SPACING. JULY 20, 1976. BEL. 0834484.
3,978,428.—BURIED-HETEROSTRUCTURE DIODE INJECTION LASER. AUG. 31, 1976.
4,006,432.—INTEGRATED GRATING OUTPUT COUPLER IN DIODE LASERS. FEB. 1, 1977. BEL. 0834480.
4,023,993.—METHOD OF MAKING AN ELECTRICALLY PUMPED SOLID STATE DISTRIBUTED FEEDBACK LASER. MAY 17, 1977. BEL. 0832000, SPN. 0440361.
4,033,796.—METHOD OF MAKING BURIED-HETEROSTRUCTURE DIODE INJECTION LASER. JULY 5, 1977.

Class 17H 2

3,296,541.—BROADBND TRVLNG WAVE MASER W/BOTH MASER AND ISOLATOR CRYSTALS CUT ATDFRNT ANGLES TO OPTICAL AXIS. JAN. 3, 1967.
3,983,509.—DISTRIBUTED FEEDBACK DIODE LASER. SEPT. 28, 1976.

Class 17H 3

3,258,597.—LASER HETERODYNE COMMUNICATION SYSTEM. JUNE 28, 1966.
3,465,166.—FAR INFRA-RED COHERENT LIGHT GENERATOR. SEPT. 2, 1969.
3,499,159.—POLYCHROMATIC LASER AEROSOL SIZING AND RANGING-PLASAR-TECHNIQUE. MAR. 3, 1970.
3,500,236.—LASER STABILIZING SYSTEM. MAR. 10, 1970.
3,534,289.—LASER SYSTEM WITH OPTICAL DISCRIMINATOR. OCT. 13, 1970.
3,753,144.—GAS LASER STRUCTURE. AUG. 14, 1973.
3,909,254.—LASER RECORDING METHOD. SEPT. 30, 1975.
4,012,776.—LUMINESCENT SCREEN LASER SCANNING TECHNIQUE. MAR. 15, 1977.

Class 17I

3,630,598.—OPTICAL DEMODULATION FILTER. DEC. 28, 1971. BEL. 0761134, CAN. 0904628, GRB. 1330709, ITL. 0914073, JAP. 0770139.
3,650,605.—INTERFERAMETRIC APPARATUS WITH CONTROLLED SCANNING MEANS. MAR. 21, 1972. CAN. 0952749.
3,687,535.—OPTICAL DEMODULATION SYSTEM. AUG. 29, 1972. BEL. 0762859, CAN. 0944075, FRA. 7105649, GRB. 1343483, ITL. 0918450.
3,689,267.—SCREEN MAKING PROCESS UTILIZING ROTATION OF OPTICAL PLATE. SEPT. 5, 1972. CAN. 0950736.
3,697,184.—APPARATUS FOR EVALUATING THE RECORDING CHARACTERISTICS OF A THERMOPLASTIC PHOTORECEPTOR. OCT. 10, 1972. CAN. 1003484, GRB. 1389471.
3,776,995.—METHOD OF PRODUCING X-RAY DIFFRACTION GRATING. DEC. 4, 1973. CAN. 0944871, GRB. 1363262.

Class 17I 1

3,191,440.—PRESSURE GAUGE INSTRUMENT. JUNE 29, 1965.
3,249,760.—PRESSURE GAUGE INSTRUMENT. MAY 3, 1966.

Class 17I 2

3,416,865.—OPTICAL DENSITY MEASURING SYSTEM. DEC. 17, 1968.
3,609,047.—SINGLE BEAM PHOTOMETER SYSTEM WHEREIN THE ABSORBANCE OF A SAMPLE IS DETERMINED RELATIVE TO REFE. SEPT. 28, 1971.

Class 17I 3

3,560,085.—APPARATUS FOR GRAPHIC DISTORATION. FEB. 2, 1971.
3,697,063.—DOCUMENT HANDLING APPARATUS. OCT. 10, 1972. GRB. 1369618.

Class 17J

D.236,733.—CURSOR POSITION CONTROLLER. SEPT. 9, 1975.
3,447,030.—COLD SEAL LAMP PRESSURE REGULATION. MAY 27, 1969.
3,642,377.—COLOR PRINTING SYSTEM. FEB. 15, 1972.
3,733,123.—METHOD AND APPARATUS FOR ENCLOSING A LAMP. MAY 15, 1973. ARG. 0198292, AUS. 0466394, BEL. 0789338, FRA. 7234198, GRB. 1410046, ITL. 0967625, MEX. 0128585, SPN. 0409972, STZ. 0549825, SWD. 0360935.
3,775,006.—APPARATUS FOR OPTICAL COLOR SEPARATION. NOV. 27, 1973.
3,795,805.—APPARATUS FOR TESTING A CREDIT CARD. MAR. 5, 1974.
3,873,813.—CREDIT CARD. MAR. 25, 1975.
3,892,963.—TRANSDUCER FOR A DISPLAY-ORIENTED POINTING DEVICE. JULY 1, 1975. FRA. 7440265.
3,915,553.—ELECTROOPTIC COLOR FILTER SYSTEM. OCT. 28, 1975.
3,936,179.—SUPPORT STRUCTURE FOR A DUPLICATOR OPTICAL SYSTEM. FEB. 3, 1976.
3,951,521.—REVERSIBLE RADIANT ENERGY FILTER AND PROCESS OF USING SAME. APR. 20, 1976.
3,9?7,785.—METHOD & APP FOR INHIBITING THE OPERATION OF A COPYING MACHINE. AUG. 31, 1976.

Class 18

2,578,677.—METHOD OF MAKING PHOTOGRAPHIC SENSITIZING DYES. DEC. 18, 1951.
3,736,133.—TRANSPARENT INK - ABSORBENT LAQUERS. MAY 29, 1973. ARG. 0193996, CAN. 0985583. GRB. 1390137, MEX. 0127276. VZL. 0033577.
3,738,832.—COLOR ELECTROPHOTOGRAPHIC PROCESS EMPLOYING LIQUID DEVELOPER CONTAINING GELATINAIN. JUNE 12, 1973.
3,860,484.—ENZYME STABILIZATION. JAN. 14, 1975.
3,985,666.—PLASTIC MATERIALS MIXED WITH POLAR GROUP CONTAINING MATERIALS. OCT. 12, 1976. ARG. 0195541, BEL. 0781970, CAN. 0976742, FRA. 7213873, GRB. 1396141, ITL. 0951326, MEX. 0126158, VZL. 0032937.

Class 18A

2,653,152.—CYANINE DYE AND PROCESS OF MAKING SAME. SEPT. 22, 1953.
3,238,150.—PHOTOCONDUCTIVE CADMIUM SULFIDE POWDER AND METHOD FOR THE PREPARATION THEREOF. MAR. 1, 1966. CAN. 0712516. GRB 1062022, JAP. 0486530.

3,402,177.—SUBSTITUTED 1-CYANO-2,3-PHTHALOYL-7,8-BENZOPYRPOCOLINES. SEPT. 17, 1968. AUS. 0435189, BEL. 0743896, CAN. 0812820, GRB. 1145373.

3,471,290.—PHOTOCHROMIC PHOTORESIST IMAGING. OCT. 7, 1969.

3,478,064.—1,5-BIS-SUBSTITUTED ALKYLAMINO-ANTHRAQUINONES. NOV. 11, 1969. ARG. 0145636, AUS. 0419687, BEL. 0683222, CAN. 0880309, FRA. 1484968, GRB. 1155986, ITL. 0771955, JAP. 0581828, MEX. 0092775, SPN. 0328428, STZ. 0461273, SWD. 0328188, VZL. 0021224.

3,482,973.—IMAGING SYSTEM. DEC. 9, 1969.

3,485,633.—ELECTROPHORETIC IMG PROC EMPL METALLIC LAKES OF FLUCRESCEIN DERIVATIVES AS ELECTRICLY PHOTOSENS. DEC. 23, 1969. AUS. 0444394, BEL. 0743641, CAN. 0848386, GER. 1572387. GRB. 1190965. JAP. 0586923.

3,562,248.—BISAZC FGMTS DRVD CPLRS CBTC CONDG 8-AMINO-2-NAPHTHOLS W/ DICARBOXYLIC ACID CHLORIDES. FEB. 9, 1971. ATR. 0302037, AUS. 0435392, BEL. 0743422, CAN. 0889836, FRA. 6944290, GER. 1717183, GRB. 1217905, ITL. 0879047, JAP. 0608727.

3,667,943.—QUINACRIDONE PIGMENTS IN ELECTROPHOTOGRAPHIC IMAGING. JUNE 6, 1972. ARG. 0184823, AUS. 0452663, BEL. 0737810, CAN. 0877882, EGR. 0077411, FRA. 6928700, GRB. 1278702, ITL. 0888005, JAP. 0683893, SPN. 0370720, STZ. 0519183, SWD. 0346396, TIW. 0005517, USR. 0351396.

3,667,944.—QUINACRIDONE PIGMENTS IN ELECTROPHOTOGRAPHIC RECORDING. JUNE 6, 1972. ARG. 0177369, AUS. 0452031, BEL. 0741159, CAN. 0884807, FRA. 6937223. GRB. 1286079, ITL. 0879710, JAF. 0693421, MEX. 0115407.

3,667,945.—QUINACRIDONE PIGMENTS IN ELECTROPHOTOGRAPHIC IMAGING. JUNE 6, 1972.

3,671,467.—SELENIUM CONTAINING POLYMERS. JUNE 20, 1972. ARG. 0190619, BEL. 0770689, CAN. 0941544, FRA. 7128500, GRB. 1364297, ITL. 9308410, SPN. 0393651. VZL. 0029342.

3,694,201.—METHOD FOR PHOTOCONDUCTIVE POWDER. SEPT. 26, 1972. BEL. 0777717, CAN. 0982808, FRA. 7201003, GRB. 1381162, ITL. 0946352.

3,708,292.—PI-FORM METAL PHTHALOCYANINE. JAN. 2, 1973. ARG. 0194234, BEL. 0783793, CAN. 0996931, GRB. 1396922, ITL. 0955644. MEX. 0128928.

3,708,293.—PI-FORM METAL-FREE PHTHALOCYANINE. JAN. 2, 1973. ARG. 0195167, BEL. 0783792, CAN. 0995211, GRB. 1395769, ITL. 0955643, MEX. 0131970, VZL. 0034272.

3,837,850.—PHOTOCONDUCTIVE BUTILE TITANIUM DIOXIDE. SEPT. 24, 1974.

3,867,145.—METHANOL AND HEAT TREATED ZINC OXIDE. FEB. 18, 1975.

3,905,958.—SELENIUM COMPOUNDS. SEPT. 16, 1975.

3,965,049.—ONE-STEP SYNTHESIS OF AROMATIC ORGANIC DISELENIDES. JUNE 22, 1976.

4,007,043.—PHOTOCONDUCTIVE ELEMENTS WITH COPOLYMER CHARGE TRANSPORT LAYERS. FEB. 8, 1977.

4,007,100.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. FEB. 8, 1977.

4,007,101.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. FEB. 8, 1977.

4,013,528.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. MAR. 22, 1977.

4,013,529.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. MAR. 22, 1977.

4,013,530.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. MAR. 22, 1977.

4,014,768.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. MAR. 29, 1977.

4,016,058.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. APR. 5, 1977.

4,028,203.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. JUNE 7, 1977.

4,030,991.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. JUNE 21, 1977.

4,030,992.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. JUNE 21, 1977.

4,030,993.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. JUNE 21, 1977.

Class 18A 1

3,384,488.—POLYCHROMATIC PHOTOELECTROPHORETIC IMAGING COMPOSITION. MAY 21, 1968.

3,447,922.—ELECTRICALLY PHOTOSENSITIVE PARTICLES USEFUL IN PHOTOELECTROPHORETIC AND XEROGRAPHIC IMAGING PROC. JUNE 3, 1969.

3,448,028.—N-SBSTUD-8,13-DIOXODINAPHTHO-2-1-B,2,3-D-FURAN-6-CARBOXAMIDES AS ELCTLY PTOSNSTV MITS IN ELCPHG. JUNE 3, 1969.

3,531,309.—COMPOSITIONS COMPRISING 1-CYANO-2,3-PHTHALOYL-7,8-BENZOPYRROCOLINES AND A CARRIER. SEPT. 29, 1970.

3,546,085.—PHOTOELECTROPHORETIC IMAGING PROCESS AND SUSPENSION. DEC. 8, 1970. BEL. 0710052, CAN. 0875493, FRA. 1568088, GER. 1622380, GRB. 1208812, ITL. 0823929, JAP. 0594741.

Class 18A 2

3,492,308.—PROCESS FOR PREPARING METAL FREE PHTHALOCYANINES - SYNTHESIS OF METAL-FREE PHTHALOCYANINE. JAN. 27, 1970. CAN. 0922708, GRB. 1216887, JAP. 0586926.

3,492,309.—SYNTHESIS OF ALPHA METAL-FREE PHTHALOCYANINE. JAN. 27, 1970. CAN. 0894803, GRB. 1206306, JAP. 0604155.

3,509,146.—PROCESS OF PREPARING PHTHALOCYANINE AND HETEROCYCLIC ANALOGUES. APR. 28, 1970. CAN. 0865117, GRB. 1232241, JAP. 0587395.

3,672,979.—METHOD OF PRODUCING A PHTHALOCYANINE PHOTOCONDUCTIVE LAYER. JUNE 27, 1972. ARG. 0184673, AUS. 0457271, BEL. 0761135, CAN. 0951697, FRA. 7047702, GRB. 1334060, ITL. 0914074, JAP. 0753795, MEX. 0119529, PLD. 0082204, PNM. 0002191, SPN. 0386759, STZ. 0571731, TIW. 0007180, VZL. 0032789.

3,761,261.—PHTHALOCYANINE DYE SENSITIZERS FOR ZINC OXIDE. SEPT. 25, 1973.

Class 18A 2A

RE.27,117.—METAL FREE PHTHALOCYANINE IN THE NEW X-FORM-RE OF 3,357,989-D1170. APR. 20, 1971.

3,594,163.—METHOD OF CONVERTING ALPHA PHTHALOCYANINE TO THE X FORM. JULY 20, 1971.

3,657,272.—PROCESS FOR PREPARING X-FORM METAL FREE PHTHALOCYANINE. APR. 18, 1972.

3,816,118.—ELECTROPHOTOGRAPHIC ELEMENT CONTAINING PHTHALOCYANINE. JUNE 11, 1974. ARG. 0156316, CAN. 0890855, FRA. 0091579, GRB. 1175451, ITL. 0809972, JAP. 0820183, MEX. 0115884, VZL. 0024012.

3,862,127.—PROCESS. JAN. 21, 1975. AUS. 0453518, BEL. 0754407, FRA. 7028418, GRB. 1268574, ITL. 0929169, JAP. 0727963, SPN. 0382366.

3,903,107.—DIRECT ALPHA TO X PHASE CONVERSION OF METAL CONTAINING PHTHALOCYANINE. SEPT 2. 1975. BEL. 0815632, SAF. 0743536.

3,927,026.—PROCESS OF MAKING X-FORM METAL PHTHALOCYANINE. DEC. 16, 1975. CAN. 0916703, GRB. 1312946, JAP. 0693981.

3,932,180.—DIRECT ALPHA TO X PHASE CONVERSION OF METAL-FREE PHTHALOCYANINE. JAN. 13, 1976. BEL. 0815632, SAF. 0743536.

3,932,454.—PROCESS OF MAKING HEXAGONAL ALPHA METAL-FREE PHTHALOCYANINE. JAN. 13, 1976. CAN. 0918152, GRB. 1327084, JAP. 0752724.

4,031,109.—METHOD FOR THE PREPARATION OF X-FORM METAL PHTHALOCYANINE AND X-FORM METAL FREE COMPOUNDS. JUNE 21, 1977. ARG. 0188048.

Class 18A 3

3,447,922.—ELECTRICALLY PHOTOSENSITIVE PARTICLES USEFUL IN PHOTOELECTROPHORETIC AND XEROGRAPHIC IMAGING PROC. JUNE 3, 1969.

3,448,028.—N-SBSTUD-8,13-DIOXODINAPHTHO-2-1-B,2,3-D-FURAN-6-CARBOXAMIDES AS ELCTLY PTOSNSTV MTLS IN ELCPHG. JUNE 3, 1969.

Class 18A 4

3,384,632.—ARYLAZO-4-ISOPROPOXY-1-NAPHTHOL COMPOUNDS. MAY 21, 1968. BEL. 0743897, CAN. 0787920, FRA. 1473703, GER. 1644400, GRB. 1145374, ITL. 0764015, JAP. 0578398.

3,574,182.—CALCIUM SALT OF 6-BROMO-1-1-SULFO-2-NAPHTHYLAZO-2-NAPHTHOL. APR. 6, 1971. ARG. 0168131, ATR. 0302812, AUS. 0429649, BEL. 0710053, CAN. 0878483, CHL. 0024254, CLB. 0018785, DNK. 0128493, FIN. 0049711, FRA. 1556484, GRB. 1197374, GRK. 0036648, IND. 0114221, ISR. 0029376, ITL. 0823989, JAP. 0605213, LXB. 0055364, MEX. 0099564, NOR. 0129593, NZL. 0151403, PRU. 0009483, PTG. 0049036, SAF. 0068559, SPN. 0349965, STZ. 0524844, SWD. 0351737, URG. 0008893, VZL. 0032776.

Class 18B

3,467,634.—ORGANOSILICON TERPOLYMERS AND PROCESS. SEPT. 16, 1969. ARG. 0165758, AUS. 0417109, BEL. 0702403, BRA. 6790950, CAN. 0857389, FRA. 1534183, GRB. 1200756, HOL. 0826202, ITL. 0826202, JAP. 0671041. MEX. 0100136, NOR. 0125392, SPN. 0343902, STZ. 0484210, SWD. 0339752, VZL. 0025437.

3,671,467.—SELENIUM CONTAINING POLYMERS. JUNE 20, 1972. ARG. 0190619. BEL. 0770689, CAN. 0941544, FRA. 7128500, GRB. 1364297, ITL. 9308410, SPN. 0393651, VZL. 0029342.

3,725,505.—PYRENE CONTAINING POLYMERS PREPARED BY ANIONIC POLYMERIZATION. APR. 3, 1973. ARG. 0183776, AUS. 0459733, BEL. 0770501, CAN. 0986650, FRA. 7127963, GRB. 1359045, ITL. 0930707, MEX. 0120152, SPN. 0393582, VZL. 0031959.

3,776,760.—METHOD FOR MANUFACTURING A TETRAFLUOROETHLENE POLYMER-COATED ROLL. DEC. 4, 1973. ARG. 0199302, ATR. 0335842, AUS. 0165141, BEL. 0789728, CAN. 0990149, GRB. 1410025, NZL. 0168554, SAF. 0727133, STZ. 0028514.

3,852,861.—SURFACES WITH FLUOROCARBON PROCESS FOR MULTIPLE COATING RESINS. DEC. 10, 1974. ARG. 0199302, ATR. 0335842, AUS. 0165141, BEL. 0789728, CAN. 0990149, GRB. 1410025, NZL. 0168554, SAF. 0727133, STZ. 0028514.

3,860,484.—ENZYME STABILIZATION. JAN. 14, 1975.

3,864,144.—PROCESS FOR PREPARATION OF PHOTOCONDUCTIVE FILMS FROM INTRACTABLE MATERIALS. FEB. 4, 1975. FRA. 7408936, GRB. 1414158, ITL. 1010695, TIW. 0008534.

3,877,936.—PHOTOCONDUCTIVE COPOLYMER OF N-VINYLCARBAZOLE AND N-VINYLPHTHALIMIDE. APR. 15, 1975. BEL. 0812436, FRA. 7409307, GRB. 1444048, ITL. 1010697, SPN. 0424411.

3,879,198.—ELECTROPHOTOGRAPHIC AMBIPOLAR PHOTOCONDUCTIVE COMPOSITION AND IMAGING METHOD. APR. 22, 1975. FRA. 7403086, GRB. 1446966.

3,882,087.—ORGANIC PHOTOCONDUCTIVE MATERIAL. MAY 6, 1975.

3,883,488.—2-VINYL-9-DICYANOMETHYLENE-FLUORENE AND DERIVATIVES THEREOF. MAY 13, 1975.

3,884,825.—IMAGING COMPOSITION. MAY 20, 1975. AUS. 0467835, BEL. 0802879, CAN. 099593, FRA. 7328589, GRB. 1437041, ITL. 0991465, SPN. 0417382..

3,895,945.—PROCESS FOR PREPARATION OF A DYESTUFF SENSITIZED PHOTOCONDUCTIVE COMPOSITION. JULY 22, 1975.

3,899,328.—ACTIVE MATRIX AND INTRINSIC PHOTOCONDUCTIVE POLYMER OF A LINEAR POLYSILOXANE. AUG. 12, 1975. ITL. 1010430.

3,943,108.—PHOTOCONDUCTIVE COMPOSITION OF AN ALDEHYDE CONDENSATE. MAR. 9, 1976.

3,950,168.—FIXING POWDER IMAGES-FUSING AIDES FOR HYBRID FIX. APR. 13, 1976.

3,951,658.—COLOR MODIFYING IMAGING METHOD AND ARTICLE. APR. 20, 1976.

3,954,906.—AMBIPOLAR PHOTOCONDUCTIVE COMPOSITION AND IMAGING METHOD. MAY 4, 1976. FRA. 7403086, GRB. 1446966.

3,965,049.—ONE-STEP SYNTHESIS OF AROMATIC ORGANIC DISELENIDES. JUNE 22, 1976.

3,967,962.—DEVELOPING WITH TONER POLYMER HAVING CRYSTALLINE AND AMORPHOUS SEGMENTS. JULY 6, 1976.

3,970,602.—COPOLYMERS OF N-VINYLCARBAZOLE AND N-VINYLPHTHALIMIDE AND DERIVATIVES THEREOF. JULY 20, 1976. BEL. 0812436. FRA. 7409307, GRB. 1444048, ITL. 1010697, SPN. 0424411.

3,994,994.—IMPROVED PROCESS FOR PREPARATION OF BLOCK COPOLYMERS FROM VINYLCARBOZOLES & OTHER ADDITION MONO. NOV. 30, 1976.

4,007,043.—PHOTOCONDUCTIVE ELEMENTS WITH COPOLYMER CHARGE TRANSPORT LAYERS. FEB. 8, 1977.

4,009,151.—POLYMERS OF 2-VINLYFLUORENONE AND DERIVATIVES THEREOF. FEB. 22, 1977.

4,011,266.—2-VINYL-FLUORENONE AND DERIVATIVES THEREOF. MAR. 8, 1977.

Class 18C 1

RE.27,480.—AUTOMATIC DEVELOPMENT CONTROLLER -RE OF 3,376,854-D986. SEPT. 19, 1972.

3,884,825.—IMAGING COMPOSITION. MAY 20, 1975. AUS. 0467835. BEL. 0802879, FRA. 7328589, GRB. 1437041, ITL. 0991465, SPN. 0417382.

Class 18C 1A

2,919,247.—TRIPARTITE DEVELOPER FOR ELECTROSTATIC IMAGES. DEC. 29, 1959. CAN. 0565006.

2,965,573.—XEROGRAPHIC DEVELOPER. DEC. 20, 1960. CAN. 0612918, GRB. 0934406.

3,720,617.—AN ELECTROSTATIC DEVELOPER CONTAINING MODIFIED SILICON DIOXIDE PARTICLES. MAR. 13, 1973. ARG. 0189666, ATR. 0321104, AUS. 0463862, BEL. 0767359, CAN. 0941212, CHL. 0026780, EGR. 0093928, FRA. 7118950, GRB. 1347318, ITL. 0926884, MEX. 0131403, NZL. 0163670, PNM. 0002393, PRU. 0011824, STZ. 0567746, SWD. 0366402, TIW. 0006149, USR. 0460634, VZL. 0032423.

3,819,367.—IMAGING SYSTEM. JUNE 25, 1974. ARG. 0189666, ATR. 0321104, AUS. 0463862, BEL. 0767359, CAN. 0941212, CHL. 0026780, EGR. 0093928, FRA. 7118950, GRB. 1347318, ITL. 0926884, MEX. 0131403, NZL. 0163670, PNM. 0002393, PRU. 0011824, STZ. 0567746, SWD. 0366402, TIW. 0006149. USR. 0460634, VZL. 0032423.

3,820,986.—LIQUID DEVELOPMENT METHOD AND MATERIALS. JUNE 28, 1974.

3,833,364.—METHOD OF DEVELOPING ELECTROSTATIC IMAGE CHARGE. SEPT. 3, 1974.

3,850,830.—LIQUID DEVELOPER CONTAINING EXTENDER BODY PARTICLES. NOV. 26, 1974.

3,900,588.—NON-FILMING DUAL ADDITIVE DEVELOPER. AUG. 19, 1975. BEL. 0825924, SPN. 0435074.

Class 18C 1B

3,013,890.—PROCESS OF DEVELOPING ELECTROSTATIC IMAGES AND COMPOSITION THEREFOR. DEC. 19, 1961. AUS. 0243022, CAN. 0812526, FRA. 1251476, GER. 1129511, GRB. 0944401, ITL. 0620433, JAP. 0313573.

3,577,345.—SOLID XEROGRAPHIC DEVELOPER. MAY 4, 1971. ARG. 0172448, ATR. 0325417, AUS. 0424173, BAH. 0000095, BEL. 0716084, BOL. 0032708, CAN. 0902983, CHL. 0025923, CLB. 0017674, DOR. 0001461, ELS. 0001064, FRA. 1567731, GRB. 1232117, GRK. 0037628, GUA. 0002003, HOL. 0148714, IND. 0116209, ISR. 0030116, ITL. 0851653, JAM. 0001848, JAP. 0623002, LXB. 0056197, MEX. 0119320, NOR. 0131653, NZL. 0164353, PNM. 0002062. PRU. 0009911, PTG. 0049749, SPN. 0354686, STZ. 0516180, SWD. 0338238, TIW. 0005096, TRD. 0000057, TRK. 0015620, URG. 0009286, VZL. 0023666.

3,590,000.—SOLID DEVELOPER FOR LATENT ELECTROSTATIC IMAGES. JUNE 29, 1971. ARG. 0172453, ATR. 0288860, BAH. 0000093, BEL. 0716083, BOL. 33998, CAN. 0902984, CHL. 0024050, DOR. 0001460, ECD. 0000198, ELS. 0001062, FRA. 1567721, GER. 1772570, GRB. 1232118, GRK. 0037629, GUA. 0002095, HOL. 0151523, IND. 0116210, ISR. 0030117, ITL. 0851651, JAM. 0002094, JAP. 0655407, LXB. 0056196, MEX. 0104566, NZL. 0164356, PLP. 0007690, PNM. 0002083, PRU. 0009495, PTG. 0049748, SPN. 0354685, STZ. 0519737, SWD. 0357071, TIW. 0004940, TRD. 0000058, TRK. 0015606, URG. 0009287, VZL. 0032392.

3,653,893.—IMAGING SYSTEM. APR. 4, 1972.

3,655,374.—IMAGING PROCESS EMPLOYING NOVEL SOLID DEVELOPER MATERIAL. APR. 11, 1972.

3,681,107.—DEVELOPMENT OF ELECTROSTATOGRAPHIC IMAGES. AUG. 1, 1972.

3,856,692.—LIQUID ELECTROSTOGRAPHIC DEVELOPER COMPOSITIONS. DEC. 24, 1974. CAN. 0940361, GRB. 1332674.

3,900,588.—NON-FILMING DUAL ADDITIVE DEVELOPER. AUG. 19, 1975. BEL. 0825924, SPN. 0435074.

3,900,589.—AN ELECTROSTATOGRAPHIC IMAGING PROCESS. AUG. 19, 1975. AUS. 0467835, BEL. 0802879, CAN. 0995963, FRA. 7328589, GRB. 1437041, ITL. 0991465, SPN. 0417382.

4,002,570.—ELECTROPHOTOGRAPHIC DEVELOPER WITH POLYVINYLIDENE FLUORIDE ADDITIVE. JAN. 11, 1977

Class 18C 2

4,038,076.—ELECTROSTATOGRAPHIC DEVELOPMENT. JULY 26, 1977. ARG. 0192480, AUS. 0466319, BEL. 0793098, CAN. 0985552, FRA. 7245403, GRB. 1417179, ITL. 0973327, SPN. 0410171, STZ. 0028663, SWD 7216977.

Class 18C 2A

3,723,114.—THERMOSETTING ELCTRSTGRPHC DVLPR OF CARRIER/PREPOLYMER OF DIALLYL PHTHALATE ISOPHTHALATE AND MXTR. MAR. 27, 1973. ARG. 0185089, BEL. 0762507, CAN. 0970195, FRA. 7104349, GRB. 1344197, ITL. 0918244, MEX. 0122234.

3,806,339.—LIQUID DEVELOPER COMPOSITION. APR. 23, 1974.

3,942,979.—IMAGING SYSTEM. MAR. 9, 1976.

3,965,021.—ELECTROSTATOGRAPHIC DEVELOPMENT-POLYBLEND TONERS. JUNE 22, 1976.

3,967,962.—DEVELOPING WITH TONER POLYMER HAVING CRYSTALLINE AND AMORPHOUS SEGMENTS. JULY 6, 1976.

3,969,251.—DEVELOPER MIXTURE. JULY 13, 1976.

Class 18C 2A 1

RE.25,136.—ELECTROSTATIC DEVELOPER COMPOSITION AND METHOD THEREFOR-RE OF 2,940,934-D432. MAR. 13, 1962.

2,788,288.—RHEINFRANK 0000 JJ 0000 JONES 0000 WD. APR. 9, 1957. CAN. 0550574, GRB. 0768293.

2,892,794.—ELECTROSTATIC DEVELOPER AND TONER. JUNE 30, 1959.

2,940,934.—ELECTROSTATIC DEVELOPER COMPOSITION & METHOD THEREFOR — SEE D670 FOR RE25136. JUNE 14, 1960.

3,079,342.—ELECTROSTATIC DEVELOPER COMPOSITION AND METHOD THEREFOR. FEB. 26, 1963. ARG. 0157131, CAN. 0726134, GUA. 0001817.

3,239,465.—XEROGRAPHIC DEVELOPER. MAR. 8, 1966. CAN. 0630295, GRB. 0952166.

Class 18C 2A 2

2,753,308.—XEROGRAPHY DEVELOPER COMPOSITION. JULY 3, 1956.

3,239,465.—XEROGRAPHIC DEVELOPER. MAR. 8, 1966. CAN. 0630295, GRB. 0952166.

Class 18C 2B

3,533,835.—ELECTROSTATOGRAPHIC DEVELOPER MIXTURE. OCT. 13, 1970. ARG. 0181296, AUS. 0417746, BEL. 0704918, CAN. 0900769, CHL. 0024909, CLB. 0017825, FRA. 1540695, GRB. 1211865, IND. 0112449, ITL. 0814857, MEX. 0100137, PRU. 0009323, SWD. 0323583, URG. 0009011, VZL. 0023668.

3,591,503.—ELECTROSTATOGRAPHIC DEVELOPER. JULY 6, 1971. ARG. 0172143, ATR. 0287491, AUS. 0418556, BEL. 0713751, CAN. 0879020, CHL. 0024256, CLB. 0017933, FRA. 1560849, GRB. 1225980, GRK. 0038397, IND. 0115457, ITL. 0833710. LXB. 0055904, MEX. 0111625, NOR. 0128297, NZL. 0152196, PLP. 0008847, PRU. 0009319, PTG. 0049455, SAF. 0682386, SPN. 0352810, STZ. 0508903, SWD. 0333868, URG. 0009139, VZL. 0023688.

3,595,794.—ELECTROSTATOGRAPHIC DEVELOPER. JULY 27, 1971. ARG. 0169109, ATR. 0290986, AUS. 0418156, BEL. 0713752, CAN. 0879021, CHL. 0024482, FRA. 1582855, GRB. 1227471, IND. 0115458, ITL. 0883043, LXB. 0055894, MEX. 0115899, NOR. 0128036, NZL. 0152195, PLP. 0007966, PRU. 0009335, PTG. 0049154, SAF. 0682358, SPN. 0352811, STZ. 0505410, SWD. 0331633, URG. 0009283, VZL. 0023687.

3,627,522.—DEVELOPER COMPOSITION AND METHOD OF USE. DEC. 14, 1971.

3,672,928.—ELECTROSTATOGRAPHIC DEVELOPERS HAVING CARRIERS COMPRISING POLYSTER COATED CORES. JUNE 27, 1972. ARG. 0184669, BEL. 0762415, CAN. 0941209, FRA. 7103845, GRB. 1344365, ITL. 0918191, JAP. 0764506.

3,704,066.—REFLEX EXPOSURE MEDIUM. NOV. 28, 1972.

3,725,283.—ELECTROSTATOGRAPHIC DEVELOPER CONTAINING UNCOATED GLASS CERAMIC CARRIER PARTICLES. APR. 3, 1973. BEL. 0777720, CAN. 0973745, FRA. 7201006, GRB. 1376457, ITL. 0946358.

3,767,578.—CARRIER MATERIAL FOR ELECTROSTATOGRAPHIC. OCT. 23, 1973. ARG. 0198052, ATR. 0322978, AUS. 0461667, BEL. 0784452, CAN. 0986351, CHL. 0027640, FRA. 7220690, GRB. 1397445, ITL. 0959791, MEX. 0127643, SPN. 0403664, STZ. 0546969, SWD. 7207389, TIW. 0006042, VZL. 0032064.

3,847,604.—ELECTROSTATIC IMAGING PROCESS USING MODULAR CARRIERS. NOV. 12, 1974. ARG. 0198052, ATR. 0322978, AUS. 0461667, BEL. 0784452, CAN. 0986351, CHL. 0027640, FRA. 7220690, GRB. 1397445, ITL. 0959791, MEX. 0127643, SPN. 0403664, STZ. 0546969,.SWD. 7207389, TIW. 0006042, VZL. 0032064.

3,849,127.—AN ELECTROSTATOGRAPHIC PROCESS IN WHICH COATED CARRIER PARTICLES ARE USED. NOV. 19, 1974.

3,857,792.—ELECTROSTATIC DEVELOPER MIXTURE WITH A COATED CARRIER. DEC. 31, 1974.

3,914,181.—ELECTROSTATOGRAPHIC DEVELOPER MIXTURES COMPRISING FERRITE CARRIER BEADS. OCT. 21, 1975. ARG. 0194244, AUS. 0471676, BEL. 0785913, CAN. 1000477, GRB. 1398871, ITL. 0962400, MEX. 0126285, SPN. 0404423, VZL. 0032940.

3,923,503.—ELECTROSTATIC LATENT IMAGE DEVELOPMENT EMPLOYING STEEL CARRIER PARTICLES. DEC. 2, 1975. ARG. 0181848, ATR. 0316987, AUS. 0456820, BAH. 0000162, BEL. 0752230, CAN. 0940360, CHL. 0025833, EGR. 0095180, FRA. 7021985, GRB. 1312806, ITL. 0894287, JAP. 0728825, MEX. 0121681, NOR. 0131364, NZL. 0160479, PLD. 0081013, PNM. 0002264, PTG. 0053978, SAF. 0704155, SPN. 0380913, STZ. 0548625, SWD. 0351058, TIW. 0006837, USR. 0457235.

3,939,086.—HIGHLY CLASSIFIED OXIDIZED DEVELOPER MATERIAL. FEB. 17, 1976. ARG. 0181848, ATR. 0316987, AUS. 0456820, BAH. 0000162, BEL. 0752230, CAN. 0940360, CHL. 0025833, EGR. 0095180, FRA. 7021985, GRB. 1312806, ITL. 0894287, JAP. 0728825, MEX. 0121681, NOR. 0131364, NZL. 0160479, PLD. 0081013, PNM. 0002264, PTG. 0053978, SAF. 0704155. SPN. 0380913, STZ. 0548625, SWD. 0351058, TIW. 0006837, USR. 0457235.

3,942,979.—IMAGING SYSTEM. MAR. 9, 1976.

3,969,251.—DEVELOPER MIXTURE. JULY 13, 1976.

4,018,601.—ELECTROSTATOGRAPHIC MAGNETIC BRUSH IMAGING PROCESS EMPLOYING CARRIER BEADS COMPRISING HIGH NICK. APR. 19, 1977.

Class 18C 3

2,891,011.—DEVELOPER FOR ELECTROSTATIC IMAGES. JUNE 16, 1959.

Class 18C 4

3,467,634.—ORGANOSILICON TERPOLYMERS AND PROCESS. SEPT. 16, 1969. ARG. 0165758, AUS. 0417109, BEL. 0702403, BRA. 6790950, CAN. 0857389, FRA. 1534183, GRB. 1200756, HOL. 0826202, ITL. 0826202, JAP. 0671041, MEX. 0100136, NOR. 0125392, SPN. 0343902, STZ. 0484210, SWD. 0339752, VZL. 0025437.

3,526,533.—COATED CARRIER PARTICLES. SEPT. 1, 1970. ARG. 0161341, AUS. 0418867, BEL. 0702404, CAN. 0878413, FRA. 1534184, GRB. 1205051, ITL. 0826203, JAP. 0578401, MEX. 0120334, NOR. 0122818, SPN. 0343903, STZ. 0486054, SWD. 0308987, VZL. 0032393.

3,533,835.—ELECTROSTATOGRAPHIC DEVELOPER MIXTURE. OCT. 13, 1970. ARG. 0181296, AUS. 0417746, BEL. 0704918, CAN. 0900769, CHL. 0024909, CLB. 0017825, FRA. 1540695, GRB. 1211865, IND. 0112449, ITL. 0814857, MEX. 0100137, PRU. 0009323, SWD. 0323583, URG. 0009011, VZL. 0023668.

3,713,819.—XEROGRAPHIC IMAGING AND DEVELOPMENT USING METAL OXIDE CARRIER PART. JAN. 30, 1973.

3,730,707.—METHOD OF DEVELOPING LATENT IMAGES. MAY 1, 1973.

3,752,666.—ELECTROSTATIC IMAGING PROCESS USING CARRIER BEADS CONTAINING CONDUCTIVE PARTICLES. AUG. 14, 1973.

3,839,029.—ELECTROSTATOGRAPHIC DEVELOPMENT WITH FERRITE DEVELOPER MATERIALS. OCT. 1, 1974. ARG. 0194244, AUS. 0471676, BEL. 0785913, CAN. 1000477, GRB. 1398871, ITL. 0962400, MEX. 0126285, SPN. 0404423, VZL. 0032940.

3,849,182.—HIGHLY SHAPE-CLASSIFIED OXIDIZED LOW CARBON HYPEREUTECTOID ELECTROSTATOGRAPHIC STEEL CARRIER PA. NOV. 19, 1974. ARG. 0181848, ATR. 0316987, AUS. 0456820, BAH. 0000162, BEL. 0752230, CAN. 0940360, CHL. 0025833, EGR. 0095180, FRA. 7021985, GRB. 1312806. ITL. 0894287, JAP. 0728825, MEX. 0121681, NOR. 0131364, NZL. 0160479, PLD. 0081013, PNM. 0002264, PTG. 0053978. SAF. 0704155, SPN. 0380913. STZ. 0548625, SWD. 0351058, TIW. 0006837, USR. 0457235.

3,850,663.—CELLULOSE COATED CARRIERS. NOV. 26, 1974. ARG. 0183677, AUS. 0458322, BEL. 0763987, CAN. 0941210, EGR. 0091603, FRA. 7108585, GRB. 1345027, ITL. 0922292, MEX. 0120027, PNM. 0002440, SAF. 0711547, STZ. 0557050, SWD. 0359940, TIW. 0008177, VZL. 0032931.

3,850,676.—COATED CARRIER PARTICLES FOR ELECTROSTATOGRAPHIC DEVELOPMENT. NOV. 26, 1974.

3,856,519.—TRANSFER OF TONER USING A VOLATILE INSULATING LIQUID. DEC. 24, 1974.

3,900,587.—IMAGING PROCESS EMPLOYING TREATED CARRIER PARTICLES. AUG. 19, 1975. CAN. 1007923.

3,916,064.—DEVELOPER MATERIAL. OCT. 28, 1975.

3,916,065.—ELECTROSTATOGRAPHIC CARRIER PARTICLES. OCT. 28, 1975.

3,989,648.—IMAGING SYSTEM. NOV. 2, 1976. CAN. 1007923.

4,019,903.—ELECTROSTATIC DEVELOPMENT. APR. 26, 1977. BEL. 0777715, CAN. 0973746, FRA. 7201001, GRB. 1376456, ITL. 0946359.

4,035,520.—IMAGING SYSTEMS. JULY 12, 1977

Class 18C 5

3,788,994.—PRESSURE FIXABLE ELECTROSTATOGRAPHIC TONER. JAN. 29, 1974. ARG. 0200575, BEL. 0793247, CAN. 0985943, FRA. 7244381, GRB. 1406687, ITL. 0973323, SPN. 0410212, STZ. 0028529, VZL. 0032608.

3,804,764.—ELECTROSTATOGRAPHIC PRESSURE SENSITIVE POLYMERIC TONER. APR. 16, 1974. ARG. 0196320, AUS. 0464392, BEL. 0793554, CAN. 1011149, FRA. 7246575, GRB. 1417409, ITL. 0973325, SPN. 0410211, STZ. 0028568.

3,853,778.—TONER COMPOSITION EMPLOYING POLYMER WITH SIDE CHAIN CRYSTALLINITY. DEC. 10, 1974. AUS. 0465653, BEL. 0793639, CAN. 0998869, FRA. 7246888, GRB. 1423291, ITL. 0973330, SPN. 0410267, SWD. 7300003.

3,893,932.—PRESSURE FIXABLE TONER. JULY 8, 1975.

3,893,934.—SOLID DEVELOPER FOR ELECTROSTATIC LATENT IMAGES. JULY 8, 1975.

3,910,846.—METHOD OF PREPARING ELECTROSCOPIC TONER PARTICLES. OCT. 7, 1975. CAN. 0984074.

3,974,078.—AN ELECTROSTATE GRAPHIC DEVELOPMENT OF ENCAPSULATED MATERIALS. AUG. 10, 1976. ARG. 0196318, AUS. 0467046, BEL. 0792115, CAN. 1001884, FRA. 7239134, ITL. 0973326, MEX. 0128788, SPN. 0410205, STZ. 0028567, VZL. 0033139.

4,002,776.—IMAGING PROCESS EMPLOYING TONER PARTICLES CONTAINING ARYLSULPONAMIDE FORMALDEHYDE ADDUCT. JAN. 11, 1977.

Class 18C 5A

3,345,293.—COLORED ELECTROSTATOGRAPHIC TONERS CONTAINING ORGANIC DYE PIGMENTS. OCT. 3, 1967. CAN. 0834674, GRB. 1074147, JAP. 0788652.

3,864,125.—ELECTROPHOTOGRAPHIC METHOD OF MAKING AN IMAGING MASTER. FEB. 4, 1975.

3,897,249.—TONERS FOR PHTHALOCYANINE PHOTORECEPTORS. JULY 29, 1975.

Class 18C 5B

3,080,250.—SELF-TACKIFYING XEROGRAPHIC TONER. MAR. 5, 1963.

3,080,318.—THREE-COMPONENT XEROGRAPHIC TONER. MAR. 5, 1963.

Class 18C 6

3,755,177.—PROCESS OF MAKING LIQUID ELECTROSTATIC DEVELOPERS CONTAINING GELATIN. AUG. 28, 1973.

3,790,485.—PROCESS FOR PRODUCING ELECTROPHOTOGRAPHIC LIQUID DEVELOPER. FEB. 5, 1974.

3,812,037.—LIQUID DEVELOPER COMPOSITION. MAY 21, 1974.

Class 18C 6A

3,507,686.—METHOD OF COATING CARRIER BEADS. APR. 21, 1970. CAN. 0872190, GRB. 1239621, JAP. 0675782.

3,658,500.—METHOD OF PRODUCING GLASS BEADS FOR ELECTROSTATOGRAPHIC DEVELOPERS. APR. 25, 1972. CAN. 0916536, GRB. 1331485.

3,685,113.—DEVELOPER SYSTEM. AUG. 22, 1972. ARG. 0183679, BEL. 0764635, CAN. 0941211, FRA. 7110751, GRB. 1347568, ITL. 0922132, MEX. 0122432.

3,764,310.—METHOD OF PRODUCING ELECTROSTATOGRAPHIC DEVELOPER. OCT. 9, 1973.

3,789,796.—APPARATUS FOR PRODUCING DEVELOPER MATERIALS. FEB. 5, 1974.

3,908,046.—P-XYLYENE VAPOR PHASE POLYMERIZATION COATING OF ELECTROSTATOGRAPHIC PARTICLES. SEPT. 23, 1975.

3,940,514.—METHOD OF COATING ELECTROSTATOGRAPHIC CARRIER PARTICLES. FEB. 24, 1976.

Class 18C 6B

3,326,848.—SPRAY DRIED LATEX TONERS. JUNE 20, 1967. AUS. 0409084, BEL. 0666056, CAN. 0866260. FRA. 1451366, GRB. 1115653, ITL. 0717377, MEX. 0088140, SWD. 0340046.

3,338,991.—METHOD OF FORMING ELECTROSTATIC TONER PARTICLES. AUG. 29, 1967. FRA. 1450642, GRB. 1115634, HOL. 0142251, ITL. 0717378, JAP. 0539572.

3,502,582.—IMAGING SYSTEMS. MAR. 24, 1970. ARG 0171952, BEL. 0726571, CAN. 0873934, FRA. 1569382. GRB. 1237095, ITL. 0835554, MEX. 0100704, VZL. 0032414.

3,740,334.—PROCESS OF PREPARING SOLID DEVELOPERS FOR ELECTROSTATIC LATENT IMAGES. JUNE 19, 1973.

3,830,750.—ENCPSLTNG SBSTNLY SLUBL PRTN OF CORE MATL IN SBSTNLY SLBLE SHELL MATL OF DFRNT SOLUBLTY. AUG. 20, 1974. AUS. 0466018, BEL. 0793246, CAN. 0983328, GRB. 1411954, ITL. 0973317, SPN. 0410224, STZ. 0028527.

3,936,517.—METHOD FOR REDUCING PARTICLE SIZE. FEB. 3, 1976.

4,016,099.—METHOD OF FORMING ENCAPSULATED TONER PARTICLES. APR. 5, 1977.

Class 18D

3,150,446.—BRAZING METHOD AND COMPOSITION. SEPT 29, 1964.

3,666,429.—MATALLIZED AND BRAZED CERAMICS. MAY 30, 1972.

3,959,934.—COMPOSITION AND METHOD FOR REPAIRING SELENIUM PHOTORECEPTOR. JUNE 1, 1976.

3,971,169.—A METHOD FOR REPAIRING SELENIUM PHOTOCONDUCTORS. JULY 27, 1976.

Class 18E

3,950,168.—FIXING POWDER IMAGES-FUSING AIDES FOR HYBRID FIX. APR. 13, 1976.

4,025,541.—CHARGE TRANSFER OF FERROCENES HAVING LIGHT FILTERING PROPERTIES. MAY 24, 1977.

Class 20

3,916,167.—COUNTERS. OCT. 28, 1975.

Class 20A

3,751,693.—MOVING COIL MOTOR WITH NO SPRAY FLUX. AUG. 7, 1973. AUS. 3467604, BEL. 0795400, CAN. 0980395, GRB. 1424622, ITL. 0979062, SPN. 0411470.

3,769,467.—VIBRATION DAMPED TRANSDUCER HEAD ASSEMBLY. OCT. 30, 1973. ARG. 0195905, AUS. 0476996, BEL. 0795401, CAN. 0995355, GRB. 1417764, ITL. 0979063, MEX. 0135598, SPN. 0411538, STZ. 0558582, SWD. 7301915.

Class 20A 1

RE.27,313.—BELT TRACKING SYSTEM - RE OF 3,500,694-D2586. MAR. 21, 1972.

3,435,693.—BELT TRACKING DEVICE. APR. 1, 1969. ARG. 0168295, ATR 0283116, AUS. 0421893, BEL. 0705641, CAN. 0853440, CHL. 0023084, CLB. 0017528, DNK. 0117047, FRA. 1543079, GRB. 1180659, ITL. 0827782,

MEX. 010032C, NOR. 0124530, PRU. 0009336, SAF. 0676414, SPN. 0346430, STZ. 0471736, URG. 0009729, USR. 0321984, VZL. 0023676.
3,500,694.—BELT TRACKING SYSTEM — SEE D3286 FOR RE27313. MAR. 17, 1970.
3,592,071.—BELT TRACKING APPARATUS. JULY 13, 1971. ARG. 0179666, BEL. 0751117, CAN. 0925118, FRA. 7019040, GRB. 1298926, ITL. 0893540, JAP. 0770135, MEX. 0118981, SPN. 0380136.
3,593,838.—CONVEYOR BELT. JULY 20, 1971. CAN. 0883720.

Class 20A 2

2,022,891.—PHOTOCOPY MACHINE. DEC. 3, 1935.
3,498,148.—CHAIN TRAIN. MAR. 3, 1970.
3,509,780.—DOUBLE-ACTION ROTARY SOLENOID DRIVE MECHANISM. MAY 5, 1970.
3,844,179.—GEAR DRIVE FOR ELECTROPHOTOGRAPHIC PRINTING MACHINE. OCT. 29, 1974. ARG. 203483, BEL. 0816382, CAN. 1007075, GRB. 1467714, STZ. 5786990, VZL. 0033061.
3,982,831.—ELECTROSTATOGRAPHIC REPRODUCTION APP & DRIVE THEREFOR. SEPT. 28, 1976
3,985,277.—WEB HANDLING DEVICE. OCT. 12, 1976.

Class 20A 3

2,069,318.—PHOTOCOPY MACHINE. FEB. 2, 1937.
3,405,564.—PULLEY. OCT. 15, 1968. CAN. 0850353.
3,505,716.—ROLL APPARATUS. APR. 14, 1970.
3,791,243.—METHOD AND APPARATUS FOR FORMING EDGES OF AN ENDLESS BELT. FEB. 12, 1974.
3,932,177.—COLLAR AND METHOD OF MAKING SAME. JAN. 13, 1976.

Class 20A 4

3,329,029.—OFF-CENTER LOAD MOVING ASSEMBLY. JULY 4, 1967.
3,337,072.—LOADER. AUG. 22, 1967. CAN. 0825092, GRB. 1166619, JAP. 0605648.
3,493,269.—LOADING HEAD. FEB. 3, 1970. CAN. 0864392.
3,777,578.—LINEAR ACTUATOR. DEC. 11, 1973. CAN. 9783901.

Class 20A 5

2,025,371.—APPARATUS FOR TREATING PHOTOGRAPHIC FILM. DEC. 24, 1935.
3,112,819.—CLUTCH MECHANISM - 914. DEC. 3, 1963. CAN. 0688810.
3,213,645.—TORQUE LIMITING MECHANISM. OCT. 26, 1965. CAN. 0729978, GRB. 1035547, JAP. 0548690.
3,623,680.—CLUTCH/BRAKE MECHANISM. NOV. 30, 1971.
3,686,974.—MECHANICAL DRIVE ARRANGEMENT. AUG. 29, 1972.

Class 20A 6

3,351,831.—MOTOR SPEED CONTROL UTILIZING LIGHT SENSITIVE CONDUCTIVE AND RESISTIVE ELEMENTS. NOV. 7, 1967.
3,388,875.—WEB TRANSPORT CONTROL ASSEMBLY. JUNE 18, 1968.
3,418,046.—SIGNAL STORAGE DEVICE. DEC. 24, 1968. CAN. 0852814, GER. 1524999, GRB. 1190084, JAP. 0589515.
3,552,221.—SPEED CONVERTING MECHANISM. JAN. 5, 1971.
3,858,777.—PRINTING APPARATUS INCLUDING REGISTRATION CONTROL. JAN. 7, 1975.
3,870,934.—WEB TENSION CONTROLLER. MAR. 11, 1975.
3,909,125.—STEPPER MOTOR CONTROL. SEPT. 30, 1975.
3,917,400.—METHOD & APPARATUS FOR MAINTAINING A PREDETERMINED PHASE RELATIONSHIP BETWEEN TWO SIGNALS. NOV. 4, 1975.
3,921,043.—METHOD & APPARATUS FOR MAINTAINING SUBSTANTIALLY CONSTANT TORQUE IN A WEB TRANSPORT APPARATUS. NOV. 18, 1975.
3,944,896.—PHASE SYNCHRONIZATION SYSTEM WITH START-UP SEQUENCING AND AUTOMATIC SHUTDOWN. MAR. 16, 1976.
3,991,355.—STEPPER MOTOR CONTROL NOV. 9, 1976.

Class 20B

3,869,896.—ROLLING PROCESS. MAR. 11, 1975. GRB. 1434131.
3,942,349.—CROWN DIE FOR THREAD ROLLING OF APPLICATOR ROLLS. MAR. 9, 1976.
3,965,861.—SEPARATED ROLLER LIQUID DEVELOPMENT. JUNE 29, 1976.

Class 20B 1

2,843,295.—POWDER CLOUD GENERATOR. JULY 15, 1958.
2,862,646.—POWDER PARTICLE AEROSOL GENERATOR. DEC. 2, 1958.
2,878,972.—ROUGH SURFACE POWDER CLOUD GENERATION. MAR. 24, 1959.
2,935,234.—POWDER CLOUD GENERATING APPARATUS. MAY 3, 1960. CAN. 0655160, GRB. 0957862.
3,094,248.—XEROGRAPHIC DEVELOPING APPARATUS. JUNE 18, 1963. CAN. 0678004, GRB. 0985306.
3,129,850.—POWDER CLOUD GENERATING APPARATUS. APR. 21, 1964. CAN. 0693933, GER. 1497044, GRB. 1001237, JAP. 0436042.

Class 20B 2

2,859,129.—PROCESS FOR DEVELOPING ELECTROSTATIC IMAGES AND APPARATUS THEREFOR. NOV. 4, 1958.
3,094,248.—XEROGRAPHIC DEVELOPING APPARATUS. JUNE 18, 1963. CAN. 0678004, GRB. 0985306.
3,122,455.—XEROGRAPHIC TONER DISPENSER. FEB. 25, 1964.
3,356,248.—CONTAINER WITH A ROTATABLE CLOSURE. DEC. 5, 1967. CAN. 0825091, GRB. 1166618.
3,477,568.—ELECTROSTATIC SEPARATION OF ROUND AND NONROUND PARTICLES. NOV. 11, 1969.
3,478,600.—PARTICLE SIZE AND DISTRIBUTION ANALYZING APPARATUS. NOV. 18, 1969. CAN. 0871819, GRB. 1196449, JAP. 0667702.
3,694,068.—ROLLER RETRACTION MECHANISM IN A MULTIPLE ROLLER BELT ASSEMBLY. SEPT. 26, 1972. CAN. 0946322, GRB. 1370798.
3,698,540.—WEB SENSING MECHANISM FOR TRACKING SYSTEM. OCT. 17, 1972. CAN. 0946926.
3,702,131.—BELT TRACKING SYSTEM. NOV. 7, 1972. ARG. 1949380, AUS. 0459379, BEL. 0777321, CAN. 0953673, FRA. 7147892, GRB. 1381720, ITL. 0944435, MEX. 0126336, PNM. 0002633, SPN. 0398380.
3,740,288.—METHOD OF PREPARING A TONER DISPENSER. JUNE 19, 1973.
3,840,879.—EXCESS TONER SHIELD FOR ELECTROGRAPHIC APPARATUS. OCT. 8, 1974.
3,931,792.—ABRASIVE LIQUID DEVELOPING APPARATUS. JAN. 13, 1976.

Class 20B 3

3,410,060.—XEROGRAPHIC FILTER APPARATUS NOV. 12, 1968. CAN. 0810976, FRA. 1458648, GRB. 1114505, ITL. 0729638, JAP. 0724232.
3,570,224.—FILTER FOR ELECTROSTATOGRAPHIC DEVELOPER. MAR. 16, 1971.
3,662,884.—METHOD AND APPARATUS FOR ELECTROSTATICALLY CLASSIFYING TONER PARTICLES. MAY 16, 1972. CAN. 0956273, GRB. 1327942.
3,740,735.—AIR CIRCULATION APPARATUS. JUNE 19, 1973. CAN. 1014265, GRB. 1322612. JAP. 0840915.
3,909,383.—CLEANING PROCESS. SEPT. 30, 1975. CAN. 0905883.

Class 20 C

1,928,106.—SPRING TENSION DEVICE. SEPT. 26, 1933.
3,698,540.—WEB SENSING MECHANISM FOR TRACKING SYSTEM. OCT. 17, 1972. CAN. 0946926.

Class 20C 1

3,498,500.—LEVEL SENSOR. MAR. 3, 1970. CAN. 0912851, GRB. 1251128, JAP. 0663856.
3,520,445.—DIELECTRIC LEVEL SENSOR. JULY 14, 1970. CAN. 0895527, GRB. 1239856, JAP. 0663857.

Class 20C 2

3,357,249.—TEMPERATURE SENSOR. DEC. 12, 1967. CAN. 0810332, GER. 1690654, GRB. 1171381.
3,723,980.—TEMPERATURE COMPENSATION SYSTEM FOR MAGNETIC DISK MEMORY UNIT. MAR. 27, 1973. ARG. 0195985, AUS. 0471633, BEL. 0791363, FRA. 7240560, GRB. 1408778, ITL. 0970913, MEX. 0129694, SPN. 0408629, STZ. 0028456, SWD. 7214693, VZL. 0032424.

Class 20C 3

3,492,732.—WEB QUANTITY INDICATOR. FEB. 3, 1970. CAN. 0887178.

Class 20C 4

3,191,440.—PRESSURE GAUGE INSTRUMENT. JUNE 29, 1965.
3,249,760.—PRESSURE GAUGE INSTRUMENT. MAY 3, 1966.
3,907,421.—TRANSFER APPARATUS FOR ELECTROSTATIC REPRODUCING MACHINES. SEPT. 23, 1975.

Class 20C 5

3,216,247.—WIND-MEASURING METER DEVICE. NOV. 9, 1965.

Class 20C 6

3,502,163.—EQUAL ARM BALANCE WITH C-SHAPED FULCRUM SLEEVE FORMED ON BEAM. MAR. 24, 1970.
3,583,505.—SPRING SCALE. JUNE 8, 1971. CAN. 0902123, GRB. 1295477.
3,878,358.—DIGITAL POWER CONTROL. APR. 15, 1975.

Class 20C 7

2,558,773.—APPARATUS FOR CONTROLLING THE THICKNESS OF A COATING ON A TRAVELING WEB. JULY 3, 1951.
3,396,965.—SENSOR GAUGE. AUG. 13, 1968. CAN. 0822218, GRB. 1152538, JAP. 0587326.

Class 20D

2,179,164.—ATTACHMENT FOR PHOTOCOPY MACHINES. NOV. 7, 1939.
2,429,896.—LENS ADJUSTING MEANS FOR PHOTOCOPY MACHINES. NOV. 11, 1947.
3,746,502.—EVAPORATION CRUCIBLE. JULY 17, 1973. GRB. 1411236.
3,765,638.—SUCTION MOUNT. OCT. 16, 1973.
3,765,757.—TRANSPORT ARRANGEMENT FOR THIN SHEET MATERIAL. OCT. 16, 1973. BEL. 0793551, CAN. 1004289, GRB. 1419978, ITL. 0972846, SPN. 0410107.

Class 20D 1

1,962,050.—ATTACHMENT FOR PHOTOGRAPHIC PRINT TREATING APPARATUS. JUNE 5, 1934.
1,977,753.—FILM TREATING APPARATUS. OCT. 23, 1934.
1,992,492.—PHOTOCOPY MACHINE. FEB. 26, 1935.
1,998,324.—PHOTOCOPY MACHINE. APR. 16, 1935
2,019,788.—PHOTOCOPY MACHINE. NOV. 5, 1935.
2,035,558.—PHOTOCOPY MACHINE. MAR. 31, 1936.
2,050,956.—PHOTOCOPY MACHINE. AUG. 11, 1936.
2,163,451.—COPY HOLDER FOR PHOTOCOPY MACHINES. JUNE 20, 1939.
2,223,767.—MACHINE FOR FEEDING PHOTOGRAPHIC PAPER. DEC. 3, 1940.
2,430,687.—PAPER FEEDING MECHANISM FOR PHOTOCOPY MACHINES. NOV. 11, 1947.
2,956,804.—VACUUM FEED ASSEMBLY FOR FLAT PIECES. OCT. 18, 1960.
3,379,855.—FLUID FEED SYSTEM. APR. 23, 1968.
3,407,018.—TWO-AXIS ANGULAR POSITIONING APPARATUS FOR ADJUSTING THE POSITION OF AN OPTICAL ELEMENT. OCT. 22, 1968.
3,436,071.—WORK HOLDER. APR. 1, 1969. CAN. 0856095, GRB. 1174795, JAP. 0642773.
3,440,859.—CORNER FORMING APPARATUS. APR. 29, 1969. CAN. 0866532.
3,475,936.—TRANSPORT SYSTEM. NOV. 4, 1969. GRB. 1179749.
3,867,027.—TRANSPORT ARRANGEMENT FOR THIN SHEET MATERIAL. FEB. 18, 1975. BEL. 0793551, CAN. 1004289, GRB. 1419978, ITL. 0972846, SPN. 0410107.
3,869,896.—ROLLING PROCESS. MAR. 11, 1975. GRB. 1434131.
3,901,647.—LOW RADIATION OPEN-BOAT CRUCIBLES. AUG. 26, 1975.
4,016,470.—TRANSDUCER BORING SYSTEM. APR. 5, 1977.
4,018,414.—HOLDING FIXTURES. APR. 19, 1977.

Class 20D 2

3,056,967.—FASTENER DRIVING TOOL. OCT. 9, 1962.
3,091,578.—MECHANICAL BONDING LOCK. MAY 28, 1963.
3,341,681.—XEROGRAPHIC PLATE FABRICATION. SEPT. 12, 1967. CAN. 0780598, FRA. 1415795, GRB 1070555, HOL. 0144068, IND. 0094992, ITL. 0738063.
3,876,317.—LATCH MECHANISM. APR. 8, 1975. CAN. 1005486.

Class 20D 3

3,258,281.—HERMETIC SEALED COUPLING FOR CONDUITS. JUNE 28, 1966
3,317,224.—FLANGED PIPE COUPLING HAVING METALLIC SEAL MEANS. MAY 2, 1967.
3,366,343.—DEVICE FOR FASTENING A SHAFT TO A REEL. JAN. 30, 1968.
3,604,727.—METHOD OF JOINING MATERIALS. SEPT. 14, 1971.

Class 20D 4

3,532,863.—DYNAMIC CAM TESTER. OCT. 6, 1970. CAN. 0835529.
3,843,233.—ALIGNING AGENT FOR LOWRNG THRSHLD VOLTG REQUIRD TO EFFECT OPTCLY NEQTV TO OPTCLY POSITIVE PHASE. OCT. 22, 1974

Class 20D 5

3,596,316.—BLOW MOLDING APPARATUS. AUG. 3, 1971

Class 20D 6

3,384,107.—BAKEABLE VACUUM VALVE. MAY 21, 1968.

Class 20D 7

3,489,463.—BRUSH SIZING APPARATUS. JAN. 13, 1970. GRB. 1243233, JAP. 0810578.

Class 20E

3,217,328.—ANTENNA WITH WIRE MESH REFLECTOR COLLAPSING IN A PINWHEEL MANNER. NOV. 9, 1965.

Class 20F

3,390,693.—PURE FLUID AMPLIFIER. JULY 2, 1968.
3,413,993.—FLUID DEVICE. DEC. 3, 1968.
3,417,770.—FLUID AMPLIFIER SYSTEM DEC. 24, 1968
3,459,205.—MAGNETICALLY CONTROLLED FLUID AMPLIFIER. AUG. 5, 1969.
3,496,955.—ELECTRICALLY ACTUATED BISTABLE FLUID AMPLIFIER. FEB. 24, 1970.
3,726,588.—WEB TRACKING SYSTEM. APR. 10, 1973.

Class 20 G

3,217,328.—ANTENNA WITH WIRE MESH REFLECTOR COLLAPSING IN A PINWHEEL MANNER. NOV. 9, 1965.
3,549,059.—TRIGGERING APPARATUS AND WORK LOCATING MEANS FOR AEROSOL SPRAY CANS. DEC. 22, 1970.
3,555,725.—SELF-TRAVELLING WHEEL. JAN. 19, 1971. CAN. 0900718, GRB. 1289331, JAP. 0713807.
3,688,415.—VIBRATION DEMONSTRATION. SEPT. 5, 1972.
3,747,589.—REACTION TIME TESTING APPARATUS. JULY 24, 1973.
3,818,391.—TRACKING ASSEMBLY FOR AN ENDLESS BELT ELECTROSTATOGRAPHIC MACHINE. JUNE 18, 1974. CAN. 1010107.
3,840,879.—EXCESS TONER SHIELD FOR ELECTROGRAPHIC APPARATUS. OCT. 8, 1974.
3,907,421.—TRANSFER APPARATUS FOR ELECTROSTATIC REPRODUCING MACHINES. SEPT. 23, 1975.
3,941,006.—FREE FLOATING BELT TENSIONER. MAR. 2, 1976.
3,946,920.—VACUUM SYSTEM CONTROL. MAR. 30, 1976.
3,982,753.—COMBINED BACKSTOP & BRAKE-COMBINED BACKSTOP & BRAKE FOR ALBERT. SEPT. 28, 1976. BEL. 0812180, CAN. 1004161, FRA. 7407806, GRB. 1443088.
3,994,053.—DRUM SUPPORT APPARATUS. NOV. 30, 1976.

Class 21

D.240,557.—TRAY RACK. JULY 13, 1976.
3,942,349.—CROWN DIE FOR THREAD ROLLING OF APPLICATOR ROLLS. MAR. 9, 1976.

Class 21A

3,905,400.—ELECTROFORMING MANDREL. SEPT. 16, 1975.

Class 21A 1

3,316,158.—FOAM METAL CONSTRUCTION AND A METHOD FOR MAKING IT. APR. 25, 1967.
3,378,469.—ELECTROFORMING TECHNIQUE AND STRUCTURE FOR REFLECTING MIRRORS. APR. 16, 1968.
3,428,533.—HIGH QUALITY SUB-MASTERS AND METHOD FOR PRODUCING THEM. FEB. 18, 1969.
3,472,679.—COATING SURFACES. OCT. 14, 1969. CAN. 0896992.
3,505,177.—ELECTROFORMING PROCESS. APR. 7, 1970.
3,520,780.—MAGNESIUM ELECTRODEPOSITION. JULY 14, 1970.
3,844,906.—DYNAMIC BATH CONTROL PROCESS. OCT. 29, 1974. BEL. 0799236, FRA. 7316539, GRB. 1421818.
3,853,614.—CYCLIC RECORDING SYSTEM BY THE USE OF AN ELASTOMER IN AN ELECTRIC FIELD. DEC. 10, 1974. ARG. 0196734, AUS. 0461213, BEL. 0777320. CAN. 0953990, FRA. 7147891, GRB. 1380057, ITL. 0944392, MEX. 0131400, SPN. 0398306.
3,876,510.—PROCESS FOR ELECTROFORMING A FLEXIBLE BELT. APR. 8, 1975.
3,905,685.—ZOOM LENS FOR FIXED CONJUGATES. SEPT. 16, 1975. CAN. 0995039, GRB. 1451781.
3,954,568.—ELECTROFORMING AN ENDLESS FLEXIBLE SEAMLESS XEROGRAPHIC BELT. MAY 4, 1976. ARG. 0185811, AUS. 0449005, BEL. 0762249. CAN. 0889781, EGR. 0094306, FRA. 7103844, GRB. 1288717, HUN. 0169866, ITL. 0918048, MEX. 0119465, PLD. 0081712, PNM. 0002384, SPN. 0387636, STZ. 0521612, SWD. 0360753, TIW. 0007843, VZL. 0027666.
3,959,109.—METHOD AND APPARATUS FOR ELECTROFORMING. MAY 25, 1976.
3,963,587.—PROCESS FOR ELECTROFORMING NICKEL FOILS. JUNE 15, 1976.

Class 21A 2

3,316,158.—FOAM METAL CONSTRUCTION AND A METHOD FOR MAKING IT. APR. 25, 1967.
3,378,469.—ELECTROFORMING TECHNIQUE AND STRUCTURE FOR REFLECTING MIRRORS. APR. 16, 1968.
3,428,533.—HIGH QUALITY SUB-MASTERS AND METHOD FOR PRODUCING THEM. FEB. 18, 1969.
3,577,323.—HIGH QUALITY SUBMASTERS. MAY 4, 1971.
3,927,463.—METHOD OF MAKING A CYLINDRICALLY SHAPED, HOLLOW ELECTROFORMING MANDREL. DEC. 23, 1975.
3,950,839.—ELECTROFORMING MANDREL. APR. 20, 1976.

Class 21A 3

3,352,482.—ION SPUTTER PUMPING COLLECTOR. NOV. 14, 1967.
3,437,568.—APPARATUS AND METHOD FOR DETERMINING AND CONTROLLING STRESS IN AN ELECTROFORMED PART. APR. 8, 1969.
3,799,859.—ELECTROFORMING SYSTEM. MAR. 26, 1974. GRB. 1427544.

Class 21B

3,223,878.—METHOD OF FABRICATING FINE GRIDS. DEC. 14, 1965.
3,276,919.—PROCESS FOR FORMING METAL STRUCTURES HAVING VERY FINE PORES. OCT. 4, 1966.
3,360,347.—PRODUCTION OF POUROUS MATERIALS. DEC. 26, 1967.
3,494,748.—OXIDATION RESISTANT COATING AND ARTICLE. FEB. 10, 1970.
3,666,429.—MATALLIZED AND BRAZED CERAMICS. MAY 30, 1972.
3,703,306.—METHOD OF HERMETICALLY SEALING SILICON TO A LOW EXPANSION ALLOY. NOV. 21, 1972.
3,740,830.—BRAZING CERAMICS. JUNE 26, 1973.
3,825,724.—WRAP ADJUST DEVICE FOR CONTROLLING ENGAGEMENT BETWEEN A WEB AND ROLLER. JULY 23, 1974. CAN. 0995295, GRB. 1406047.
3,851,985.—COLLAR AND METHOD OF MAKING SAME. DEC. 3, 1974.
3,885,923.—GENERATION OF CURVED SURFACES ON A WORKPIECE. MAY 27, 1975.
3,911,163.—SOLDER COATING PROCESS AND APPARATUS. OCT. 7, 1975.

Class 21C

3,653,885.—PROCESS OF STABILIZING A MIGRATION IMAGE COMPRISING SELENIUM PARTICLES. APR. 4, 1972. CAN. 0937437.

Class 22

D244,280.—SORTER WITH BIN INDICATOR. MAY 10, 1977.

Class 22A

2,771,002.—APPARATUS FOR USE WITH XEROGRAPHIC X-RAY POWDER IMAGES. NOV. 20, 1956. CAN. 0545947.
3,473,388.—ISOKINETIC PARTICLE SAMPLER. OCT. 21, 1969. CAN. 0852475, GRB. 1194569.
3,478,600.—PARTICLE SIZE AND DISTRIBUTION ANALYZING APPARATUS. NOV. 18, 1969. CAN 0871819, GRB. 1196449, JAP. 0667702.
3,544,458.—METHOD OF FILTERING. DEC. 1, 1970. CAN. 0888335.
3,940,997.—APPARATUS AND METHOD FOR MEASURING ANGLE OF REPOSE. MAR. 2, 1976.

Class 22B

3,938,993.—XEROGRAPHIC METHOD FOR MAKING A RESPONSIVE ANSWER SYSTEM. FEB. 17, 1976. CAN. 0858780, GRB. 1235941, JAP. 0688426.
3,972,715.—PARTICLE ORIENTATION IMAGING SYSTEM. AUG. 3, 1976.

Class 22B 1

3,497,320.—AUTOMATED CHEMICAL ANALYZER - FLEXIBLE POD SYSTEM. FEB. 24, 1970. ARG. 0182336, ATR. 0308052, AUS. 0419707, BEL. 0722723, CAN. 0917546, FIN. 0050909, FRA. 1578476, GER 1673342, GRB. 1218748, IND. 0113632, ITL. 0856573, LXB. 0057970, MEX. 0112299, NOR. 0131258, NZL. 0164681, PNM. 0001771, SAF. 0069935, SPN 0348326, STZ. 0516798, SWD. 0345909, VZL. 0025948.
3,504,376.—AUTOMATED CHEMICAL ANALYZER. MAR. 31, 1970. ARG. 0177588, ATR. 0300733, AUS. 0441839, BEL. 0722721, CAN. 0921812, FIN. 0050908, FRA. 1584398, GRB. 1218750, IND. 0113631, ITL. 0856574, LXB. 0057969, MEX. 0112300, NOR. 0131259, NZL. 0155344, PNM. 0001667, SAF. 0690934, SPN. 0362595, STZ. 0526109, SWD. 0365310, VZL. 0027510.
3,508,879.—ALIQUOTTING DEVICE. APR. 28, 1970. ATR. 0280666, AUS. 0429344, BEL. 0722722, CAN 0883952, FRA. 1578475, GER. 1673343, GRB. 1218747, ITL. 0862567, LXB 0057971, MEX. 0101480, NOR. 0131257, NZL. 0155346, SAF. 0069936, SPN. 0363624, STZ. 0494403, SWD. 0342699.
3,526,480.—AUTOMATED CHEMICAL ANALYZER. SEPT. 1, 1970. ARG. 0174584, AUS. 0452281, BEL. 0728248, CAN. 0950341, FRA. 1584397, GER. 1673340, GRB. 1218749, HOL. 1467250, ITL. 0865002, MEX. 0118203, PNM. 0001668, SPN. 0381340, STZ. 0501922, SWD 0359925, VZL. 0025782.
3,582,283.—CHEMICAL PACKAGE. JUNE 1, 1971.

Class 22B 1A

3,477,821.—CHEMICAL PACKAGE. NOV. 11, 1969. ARG. 0169582, AUS. 0433117, BEL 0725955, CAN. 0876261, FRA. 1596338, GER. 1816225, GRB. 1245780, HOL. 0141402, ITL. 0852626, JAP. 0805178, MEX. 0108467. PNM. 0001764, SPN. 0361841, STZ. 0531895, SWD. 0345742, VZL. 0023719.
3,477,822.—CHEMICAL PACKAGE. NOV. 11, 1969. ARG. 0169541, AUS. 0433116, BEL. 0725958, CAN. 0904725, FRA. 1596340, GRB. 1251680, HOL. 0141098, ITL. 0852625, JAP. 0802751, MEX. 0108998, PNM. 0001662, SPN. 0361844, STZ. 0530223, SWD. 0346384, VZL. 0023725.

3,480,398.—CHEMICAL PACKAGE. NOV. 25, 1969. ARG. 0169487, AUS. 0433114, BEL. 0725956, CAN. 0885006, FRA. 1596337, GER. 1816228, GRB. 1257336, HOL. 0141797, ITL. 0856875, JAP. 0805177, MEX. 0108468, PNM. 0001663, SPN. 0361842, STZ. 0530637, SWD. 0345012, VZL. 0023722.
3,480,399.—CHEMICAL PACKAGE. NOV. 25, 1969. ARG. 0169540, AUS. 0433115, BEL. 0725957, CAN. 0906891, FRA. 1596339, GER. 1816227, GRB. 1251679, HOL. 0141099, ITL. 0852624, JAP. 0802750. MEX. 0108997, PNM. 0001669, SPN. 0361843, STZ. 0526106, VZL. 0023720.
3,497,320.—AUTOMATED CHEMICAL ANALYZER - FLEXIBLE POD SYSTEM. FEB. 24, 1970. ARG. 0182336, ATR. 0308052, AUS. 0419707, BEL. 0722723, CAN. 0917546. FIN. 0050909, FRA. 1578476, GER. 1673342, GRB. 1218748, IND. 0113632, ITL. 0856573, LXB. 0057970, MEX. 0112299, NOR. 0131258, NZL. 0164681, PNM. 0001771, SAF. 0069935, SPN. 0348326, STZ. 0516798, SWD. 0345909, VZL. 0025948.
3,504,376.—AUTOMATED CHEMICAL ANALYZER. MAR. 31, 1970. ARG. 0177588, ATR. 0300733, AUS. 0441839, BEL. 0722721, CAN. 0921812, FIN. 0050908, FRA. 1584398, GRB. 1218750, IND. 0113631, ITL. 0856574, LXB. 0057969, MEX. 0112300, NOR. 0131259, NZL. 0155344, PNM. 0001667, SAF. 0690934, SPN. 0362595, STZ. 0526109, SWD. 0365310, VZL. 0027510.
3,545,934.—CHEMICAL PACKAGE. DEC. 8, 1970. BEL. 0739751, CAN. 0887759. FRA. 6933737, GER. 1950067, GRB. 1257337, HOL. 150690, ITL. 0873750.
3,545,935.—DISPOSABLE REACTION CONTAINER FOR AN AUTOMATIC CHEMICAL ANALYZER. DEC. 8, 1970. ARG. 0179456, AUS. 0447958, BEL. 0741890, CAN. 0933494, FRA. 6939709, GER. 1957735, GRB. 1257338, HOL. 0145773, ITL. 0878322, MEX. 0113681, SPN. 0373794, STZ. 0500010, SWD. 0353399.
3,554,705.—CHEMICAL PACKAGE. JAN. 12, 1971.
3,582,283.—CHEMICAL PACKAGE. JUNE 1, 1971.
3,582,285.—CHEMICAL PACKAGE. JUNE 1, 1971.

Class 22B 1B

3,497,320.—AUTOMATED CHEMICAL ANALYZER - FLEXIBLE POD SYSTEM. FEB. 24, 1970. ARG. 0182336, ATR. 0308052, AUS. 0419707, BEL. 0722723, CAN. 0917546, FIN. 0050909, FRA. 1578476, GER. 1673342, GRB. 1218748, IND. 0113632, ITL. 0856573, LXB. 0057970, MEX. 0112299, NOR. 0131258, NZL. 0164681, PNM. 0001771, SAF. 0069935, SPN. 0348326, STZ. 0516798, SWD. 0345909, VZL. 0025948.
3,508,879.—ALIQUOTTING DEVICE. APR. 28, 1970. ATR. 0280666, AUS. 0429344, BEL. 0722722, CAN. 0883952, FRA. 1578475, GER. 1673343, GRB. 1218747, ITL. 0862567, LXB. 0057971, MEX. 0101480, NOR. 0131257, NZL. 0155346, SAF. 0069936, SPN. 0363624, STZ. 0494403, SWD. 0342699.
3,526,480.—AUTOMATED CHEMICAL ANALYZER. SEPT. 1, 1970. ARG. 0174584, AUS. 0452281, BEL. 0728248, CAN. 0950341, FRA. 1584397, GER. 1673340, GRB. 1218749, HOL. 1467250, ITL. 0865002, MEX. 0118203, PNM. 0001668, SPN. 0381340, STZ. 0501922, SWD. 0359925, VZL. 0025782.
3,586,446.—FLAME PHOTOMETER. JUNE 22, 1971. ARG. 0183956, BEL. 0720577, CAN. 0876239, FRA. 1581844, GER. 1798234, GRB. 1246633, ITL. 0864506, JAP. 0835088, MEX. 0103300, SWD. 0342326, VZL. 0023659.

Class 22B 2

3,497,320.—AUTOMATED CHEMICAL ANALYZER - FLEXIBLE POD SYSTEM. FEB. 24, 1970. ARG. 0182336. ATR. 0308052, AUS. 0419707, BEL. 0722723, CAN. 0917546, FIN. 0050909, FRA. 1578476, GER. 1673342, GRB. 1218748, IND. 0113632, ITL. 0856573, LXB. 0057970, MEX. 0112299, NOR. 0131258, NZL. 0164681, PNM. 0001771, SAF. 0069935, SPN. 0348326, STZ. 0516798, SWD. 0345909, VZL. 0025948.
3,504,376.—AUTOMATED CHEMICAL ANALYZER. MAR. 31, 1970. ARG. 0177588, ATR. 0300733, AUS. 0441839, BEL. 0722721, CAN. 0921812, FIN. 0050908, FRA. 1584398, GRB. 1218750, IND. 0113631, ITL. 0856574, LXB. 0057969, MEX. 0112300, NOR. 0131259, NZL. 0155344, PNM. 0001667, SAF. 0690934, SPN. 0362595, STZ. 0526109, SWD. 0365310, VZL. 0027510.
3,520,659.—METHOD AND APPARATUS FOR USE IN DETERMINING PROTHROMBIN TIME OF A BLOOD SAMPLE. JULY 14, 1970. ARG. 0176972, AUS. 0421560, BEL. 0722360, CAN. 0892696, FRA. 1588701, GER. 1804292, GRB. 1244355, HOL. 0142783, ITL. 0862597, MEX. 0105611, SPN. 0359312, SWD. 0345744, VZL. 0023706.
3,705,013.—ANALYTICAL PROCEDURES AND COMPOSITIONS THEREFOR. DEC. 5, 1972.

Class 24

3,888,892.—LIQUID CRYSTALLINE COMPOUNDS. JUNE 10, 1975.

Class 24A 1

3,289,211.—ELECTRICAL RECORDING PEN. NOV. 29, 1966. ARG. 0144972, AUS. 0283737, BEL. 0663614, CAN. 0755964. FRA. 1444045, GER. 1498264, GRB. 1064344, HOL. 0145955, ITL. 0760432, JAP. 0704598, MEX. 0084384, NOR. 0121120, NZL. 0141445, SPN. 0312594, STZ. 0430241, SWD. 0336857, VZL. 0017268.
3,308,475.—ELECTROVISCOUSLY CONTROLLED RECORDER. MAR. 7, 1967.
3,359,566.—MOTOR ACTION CAPILLARY. DEC. 19, 1967. CAN. 0831673, GER. 1537562, GRB. 1196932, JAP. 0583415.
3,375,528.—RECORDING PEN HAVING A PLURALITY OF CLOSELY SPACED WIRES. MAR. 26, 1968. AUS. 0284067, BEL. 0680693, CAN. 0834975, FRA. 0089948, GER. 1548876, GRB. 1148771, HOL. 0150907, ITL. 0809504, JAP. 0773176, MEX. 0091261, SPN. 0326324, STZ. 0457888, SWD. 0325719.
3,484,162.—ELECTROVISCOUS RECORDING. DEC. 16, 1969.
3,512,173.—ALPHANUMERIC INK DROPLET RECORDER. MAY 12, 1970. ARG. 0180676, BEL. 0725960, CAN. 0879917, FRA. 1603645, GER. 1816194, GRB. 1227600, ITL. 0849703, JAP. 0770832, MEX. 0109982.
3,512,177.—INK RECORDING SYSTEM. MAY 12, 1970.
3,848,258.—MULTI-JET INK PRINTER. NOV. 12, 1974. BEL. 0819105, CAN. 1000778, FRA. 7419592.
3,893,131.—INK PRINTER. JULY 1, 1975. BEL. 0819105, CAN. 1000778, FRA. 7419592.
4,014,693.—ELECTROVISCOUS RECORDING. MAR. 29, 1977.

Class 24A 2

3,329,964.—FACSIMILE RECORDING APPARATUS. JULY 4, 1967. CAN. 0809338, GRB. 1095098.
3,334,354.—DOTTING INK RECORDER. AUG. 1, 1967. CAN. 0792422.
3,627,908.—HIGH-SPEED COLOR CORRECTING SCANNER FOR MAKING COLOR PRINTING PLATES. DEC. 14, 1971. CAN. 0923428, GRB. 1335980, JAP. 0774708.
4,024,544.—MENISCUS DAMPENING DROP GENERATOR. MAY 17, 1977.
4,032,929.—HIGH DENSITY LINEAR ARRAY INK JET ASSSEMBLY. JUNE 28, 1977.

Class 24A 3

3,287,734.—MAGNETIC INK RECORDING. NOV. 22, 1966. CAN. 0808834, FRA. 1490442, GRB. 1102505, HOL. 0150643, ITL. 0784569, JAP. 0571140.
3,334,000.—METHOD FOR SIMULTANEOUS PRODUCTION OF A PLURALITY OF MICROCIRCUIT WAFERS. AUG. 1, 1967.

Class 24A 4

3,480,962.—FACSIMILE RECORDING SYS. NOV. 25, 1969.
3,484,162.—ELECTROVISCOUS RECORDING. DEC. 16, 1969.
3,484,793.—IMAGE RECORDING APPARATUS INK DROPLET RECORDER WITH OPTICAL INPUT. DEC. 16, 1969.
3,553,708.—APPARATUS AND METHOD EMPLOYING PHOTOELECTROVISCOUS INK. JAN. 5, 1971.

Class 24B

3,951,658.—COLOR MODIFYING IMAGING METHOD AND ARTICLE. APR. 20, 1976.

Class 24B 1

3,833,293.—METHOD OF CREATING COLOR TRANSPARENCIES. SEPT. 3, 1974.

Class 24B 1A

2,738,705.—FILE-HOLDING DEVICE FOR CAMERA COPY SUPPORT. MAR. 20, 1956.
2,758,503.—COPY-HOLDING APPARATUS. AUG. 14, 1956.

Class 24B 1B 1

3,528,355.—CAMERA-PROCESSOR. SEPT. 15, 1970. ARG. 0184627, ATR. 0303513, AUS. 0426557, BEL. 0720022, BRA. 6800654, CAN. 0864811, CHL. 0024251, CLB. 0018453, FRA. 1586179, GER. 1797177, GRB. 1244641, IND. 0117458. ITL. 0839895, LXB. 0056774, MEX. 0103737, NOR. 0128296, NZL. 0153587, PLP. 0006313, PNM. 0001980, PRU. 0010212, PTG. 0050229, SPN. 0357651, STZ. 0516171, SWD. 0338503, URG. 0009309, VZL. 0023698.

Class 24B 1B 2

2,940,358.—IMAGE REVERSING OPTICAL SYSTEM. JUNE 14, 1960.

Class 24B 1B 3

3,459,888.—SELECTIVE PHOTOCOPIER. AUG. 5, 1969.
3,537,788.—AUTOMATIC DISCRIMINATION TECHNIQUE FOR SELECTIVE PHOTOCOPYING. NOV. 3, 1970.

Class 24B 1C

2,978,968.—RECORDING APPARATUS AND METHOD. APR. 11, 1961.
3,393,362.—PROCESS FOR DETECTING IRREGULARITIES IN A METALLIC SURFACE. JULY 16, 1968.
3,480,965.—APPARATUS FOR PYROGENICALLY RECORDING ON TRANSPARENCIES. NOV. 25, 1969.

Class 24B 1D

2,752,443.—SIGNALING DEVICE FOR PHOTOCOPY MACHINE. JUNE 26, 1956.
3,435,243.—FILM FRAME DETECTION SYSTEM. MAR. 25, 1969.

Class 24B 2A

3,349,980.—VACUUM TRANSPORT DEVICE. OCT. 31, 1967.
3,388,875.—WEB TRANSPORT CONTROL ASSEMBLY. JUNE 18, 1968.

Class 24B 2B

3,409,364.—GATE ASSEMBLY. NOV. 5, 1968.
3,409,365.—CONTACT PRINTER. NOV. 5, 1968. AUS. 0425973, JAP. 0613746.

Class 24B 2C

3,379,110.—EXPOSURE CONTROL SYSTEM. APR. 23, 1968.
3,479,119.—EXPOSURE CONTROL APPARATUS. NOV. 18, 1969.

Class 24B 2D 1

2,740,716.—PHOTOGRAPHIC STRIPPING TISSUE. APR. 3, 1956.

Class 24B 3A

2,827,428.—PHOTOGRAPHIC EMULSION PURIFICATION-IONICS. MAR. 18, 1958.

Class 24B 3B

2,913,973.—PHOTOGRAPHIC MATERIAL CONVEYING APPARATUS. NOV. 24, 1959.
2,913,974.—PHOTOGRAPHIC MATERIAL PROCESSING. NOV. 24, 1959.

Class 24B 4

3,510,216.—PROJECTION APPARATUS. MAY 5, 1970.

Class 24C

4,007,682.—REVERSE ANGLE MOUNTED INK-SPLITTING DOCTOR BLADE. FEB. 15, 1977.

Class 24C 1

3,843,407.—BLADE CLEANING WITH REVERSE MOVEMENT. OCT. 22, 1974.

Class 24C 1A

3,170,395.—DUPLICATING. FEB. 23, 1965. AUS. 0410880, CAN. 0768079, FRA. 1414985, GRB. 1059659, ITL. 0740682, JAP. 0511405.
3,332,347.—DUPLICATING. JULY 25, 1967. AUS. 0271226, CAN. 0761868, FRA. 1367474, GER. 1471696, GRB. 1029997, ITL. 0730203.
3,357,353.—VAPOR THERMOGRAPHY RECORDING PROCESS AND RECORDING MEMBER USED THEREIN. DEC. 12, 1967.

Class 24C 1B

3,336,867.—DUPLICATING PROCESS. AUG. 22, 1967. CAN. 0796971, GRB. 1149056.

Class 24C 1C

3,487,775.—IMAGING SYSTEM. JAN. 6, 1970. CAN. 0873983.

Class 24C 1D

3,408,216.—IMAGE REPRODUCTION. OCT. 29, 1968. CAN. 0806942, GRB. 1127218, JAP. 0742511.
3,792,266.—THERMOGRAPHIC RECORDING USING VAPORIZED MATERIAL AND COLORED PARTICLE DEVELOPMENT. FEB. 12, 1974.

Class 24C 1E 1

3,402,660.—DRUM SUPPORT AND DRIVE SYSTEM FOR REPRODUCTION MACHINES. SEPT. 24, 1968.
3,427,965.—SHEET GRIPPER MEANS FOR REPRODUCTION MACHINE OF THE PRESSURE TRANSFER TYPE. FEB. 18, 1969.
3,429,259.—PRESSURE TRANSFER REPRODUCTION MACHINE. FEB. 25, 1969.
3,460,472.—TRANSFER SHEET CLAMPING MECHANISM FOR A REPRODUCTION MACHINE. AUG. 12, 1969.

Class 24C 1E 2

3,433,154.—PRESSURE PRODUCING MEANS FOR REPRODUCTION MACHINE. MAR. 18, 1969.

Class 24C 1E 3

3,374,732.—SELF-ALIGNING COPY DRUM STRIPOUT MECHANISM FOR REPRODUCTION MACH. MAR. 26, 1968.
3,375,780.—SHEET COUNTING MECHANISM FOR REPRODUCTION MACHINES. APR. 2, 1968.
3,380,379.—SHEET GUIDING MECHANISM FOR A REPRODUCTION MACHINE. APR. 30, 1968.
3,405,635.—PAPER SUPPORT TRAY FOR REPRODUCTION MACHINES. OCT. 15, 1968.
3,427,966.—PRESSURE TRANSFER TYPE REPRODUCTION MACHINE. FEB. 18, 1969.
3,430,558.—SHEET COUNTING SYSTEM IN A REPRODUCTION MACHINE. MAR. 4, 1969.

Class 24C 1E 4

3,375,779.—PROGRAMMING CONTROL FOR REPRODUCTION MACHINES. APR. 2, 1968.

Class 24C 1E 5

2,949,849.—STENCIL MASTER MAKING. AUG. 23, 1960.
3,083,684.—APPARATUS FOR PATTERN REPRODUCTION. APR. 2, 1963.
3,093,068.—METHOD AND APPARATUS FOR PATTERN REPRODUCTION. JUNE 11, 1963. CAN. 0624373.
3,548,748.—DUPLICATING METHOD EMPLOYING SIMULTANEOUS APPLICATION OF ELECTRIC FIELD AND EXPOSURE TO RADIATION. DEC. 22, 1970. CAN. 0882051, GRB. 1227394, JAP. 0752522.
3,565,612.—DUPLICATING MASTERS BY THE MANIFOLD PROCESS. FEB. 23, 1971. ARG. 0193797, AUS. 0411612, BEL. 0708974, CAN. 0873277, FRA. 1549964, GER. 1671590, GRB. 1215956, ITL. 0823464, MEX. 0106608, VZL. 0023681.
3,681,065.—DYE TRANSFER COLOR PHOTOGRAPHY. AUG. 1, 1972.

Class 24C 1E 6

3,527,163.—SILK SCREEN MASTER. SEPT. 8, 1970.

Class 24C 1E 7

3,357,354.—REPRODUCTION METHOD. DEC. 12, 1967.
3,406,137.—IMAGING MATERIAL. OCT. 15, 1968. AUS. 0409415, BEL. 0680375, CAN. 0815085, FRA. 1477912, GER. 1571874, GRB. 1149055, ITL. 0766799, JAP. 0594685, MEX. 0090845, SWD. 0336860.
3,415,186.—DUPLICATING SYSTEM. DEC. 10, 1968.
3,436,234.—DUPLICATING INK. APR. 1, 1969. AUS. 0408998, BEL. 0680377, CAN. 0806568, FRA. 1477914, GER. 1571875, GRB. 1151495, ITL. 0765635, JAP. 0594687, MEX. 0090362, SWD. 0336421.
3,446,646.—PRESSURE SENSITIVE RECEIVING AND TRANSFER SHEET. MAY 27, 1969. AUS. 0417562, BEL. 0680376, CAN. 0865673, FRA. 1477913, GER. 1571922, GRB. 0115076, ITL. 0765634, JAP. 0575982, MEX. 0090589, SWD. 0333578.

Class 24D

2,952,536.—METHOD OF PREPARING A LITHOGRAPHIC PRINGING PLATE. SEPT. 13, 1960.
2,988,988.—METHOD OF ETCHING AND DAMPENING PLANOGRAPHIC PRINTING PLATES AND FOUNTAIN SOLUTION THEREFOR. JUNE 20, 1961.
3,001,872.—PREPARING PLANOGRAPHIC PLATES AND SOLUTION THEREFOR. SEPT. 26, 1961. CAN. 0610997, GRB. 0879990.
3,275,436.—METHOD OF IMAGE REPRODUCTION UTILIZING A UNIFORM RELEASABLE SURFACE FILM. SEPT. 27, 1966. AUS. 0296158, CAN. 0811877, FRA. 1371894, GRB. 1033523, ITL. 0702168, JAP. 0508402.
3,422,759.—LITHOGRAPHIC IMAGING SYSTEM USING PHOTOCHROMIC AND THERMOCHROMIC MATERIALS. JAN. 21, 1969. CAN. 0855648, GRB. 1190102.
3,460,476.—IMAGING PROCESS. AUG. 12, 1969. ARG. 0164839, AUS. 0418783, BEL. 0691755, CAN. 0882050, FRA. 1511173, GRB. 1168268, ITL. 0787662, JAP. 0562388, MEX. 0108240, SPN. 0346128, STZ. 0480672, SWD. 0331794. VZL. 0024009.
3,547,627.—LITHOGRPHC PRINTG MASTER AND METHOD EMPLOYING A CRYSTALLINE PHOTOCONDUCTIVE IMAGING LAYER. DEC. 15, 1970.
3,554,125.—METHOD OF MAKING A LITHOGRAPHIC MASTER AND METHOD OF PRINTING THEREWITH. JAN. 12, 1971. CAN. 0882052, GER. 1772302, GRB. 1219849.
3,718,087.—APPARATUS FOR APPLYING INK AND IMMISSIBLE FLUID TO A PRINTING SURFACE. FEB. 27, 1973. ARG. 0185945, AUS. 0449639, BEL. 0759110, CAN. 0919007, FRA. 7042608, GRB. 1330183, ITL. 0912865, MEX. 0120782.
3,878,168.—SILICONE ELASTOMERS. APR. 15, 1975.
3,901,151.—PROCESS FOR PREPARING WATERLESS LITHOGRAPHIC MASTERS. AUG. 26, 1975.
3,907,562.—PROCESS FOR PREPARING WATERLESS LITHOGRAPHIC MASTERS. SEPT. 23, 1975.
3,909,256.—ELECTROSTATOGRAPHIC PROCESS FOR PREPARING SCREEN PRINTING MEMBER. SEPT. 30, 1975.
3,923,504.—MIGRATION IMAGING MEMBER AND METHOD. DEC. 2, 1975. GRB. 1461872.
3,948,655.—ELECTROSTATOGRAPHIC PROCESS FOR PREPARING GRAVURE PRINTING MEMBER. APR. 5, 1976.
3,951,060.—PROCESS FOR PREPARING WATERLESS LITHOGRAPHIC MASTERS. APR. 20, 1976.
3,951,063.—PROCESS FOR PREPARING REVERSIBLE CURE WATERLESS LITHOGRAPHIC MASTERS. APR. 20, 1976.
3,957,349.—IMAGING METHOD. MAY 18, 1976.
3,961,947.—PROCESS FOR PREPARING WATERLESS LITHOGRAPHIC MASTERS. JUNE 8, 1976.
3,968,278.—IMAGING METHOD. JULY 6, 1976.
3,971,316.—PROCESS FOR SMOOTHING WATERLESS LITHOGRAPHIC MASTERS. JULY 27, 1976.
3,995,554.—PROCESS FOR PREPARING RESILIENT IMAGED PRINTINGS MASTERS. DEC. 7, 1976.
3,999,481.—METHOD OF MAKING A MASTER. DEC. 28, 1976.
4,003,312.—PROCESS FOR PREPARING WATERLESS LITHOGRAPHIC PRINTING MASTERS BY INK JET PRINTING MEANS. JAN. 18, 1977.
4,005,654.—PROCESS FOR SHALLOW RELIEF PRINTING. FEB. 1, 1977. BEL. 0792620, FRA. 7244602, GRB. 1416158, ITL. 0971749.
4,007,041.—ELECTROPHOTOGRAPHIC PRINTING METHOD. FEB. 8, 1977.
4,009,032.—PROCESS FOR PREPARING WATERLESS PRINTING MASTERS COMPRISING COPOLYMER OF SILOXANE AND THERMOPLA. FEB. 22, 1977.
4,009,660.—INKING IN LITHO PRINTING THROUGH A NON-IMAGED SCREEN. MAR. 1, 1977.
4,010,687.—PLANOGRAPHIC PRINTING MASTER-MULTI PHASE TONERS & MULTI PHASE ADHESIVE LAYERS. MAR. 8, 1977. BEL. 0813293, CAN. 0988364, GRB. 1458725, ITL. 1006438, PTG. 61726.
4,012,254.—NOVEL PHOTOCONDUCTIVE WATERLESS LITHOGRAPHIC PRINTING MASTERS & PROCESS OF PREPARATION. MAR. 15, 1977.
4,016,814.—PLANOGRAPHIC PRINTING MASTER — SPONGY IMAGE PATTERNS. APR. 12, 1977. CAN. 0985952, ITL. 1006441.
4,019,437.—PLANOGRAPHIC PRINTING MASTER TONER INDUCED POROUS SPONGE IMAGES TIPSI. APR. 26, 1977. BEL. 0813159, CAN. 1014416, GRB. 1458723, ITL. 1006440, NZL. 0173942.
4,030,416.—WATERLESS PRINTING MASTER. JUNE 21, 1977.

Class 24E

3,315,602.—FORMING OF PRINTING PLATES. APR. 25, 1967. CAN. 0852683, GER. 1267227, GRB. 1132071, JAP. 0532965.
3,443,517.—ELECTROSTATIC DUPLICATION SYSTEM EMPLOYING RELIEF PRINTING PLATE. MAY 13, 1969. CAN. 0873982, GRB. 1212370, JAP. 0641477.
3,456,586.—PROCESS FOR MAKING AND USING A RELIEF PRINTING MASTER. JULY 22, 1969.
3,589,290.—RELIEF IMAGING PLATES MADE BY REPETITIVE XEROGRAPHIC PROCESSES. JUNE 29, 1971. CAN. 0896949.
3,957,348.—METHOD FOR ALTERING ELLIPTICALLY POLARIZED LIGHT. MAY 18, 1976.
3,964,907.—METHOD FOR THE PREPARATION OF RELIEF PRINTING MASTERS. JUNE 22, 1976.
4,017,581.—PROCESS FOR PREPARING PRINTING MASTERS & MOLDS. APR. 12, 1977.

Class 24F

3,445,226.—FROST GRAVURE PRINT MASTER. MAY 20, 1969. CAN. 0842443, FRA. 1480896, GRB. 1136029, ITL. 0771305, JAP. 0605647, MEX. 0093298.
3,559,570.—METHOD OF PREPARING AND USING A GRAVURE PRINTING PLATE. FEB. 2, 1971. CAN. 0844544, GRB. 1198142.
3,561,358.—GRAVURE IMAGING SYSTEM. FEB. 9, 1971. CAN. 0908257, GRB. 1201819, JAP. 0594737.
3,638,567.—METHOD OF PREPARING AND UTILIZING A GRAVURE PRINTING MASTER. FEB. 1, 1972.
3,801,315.—GRAVURE IMAGING SYSTEM. APR. 2, 1974. CAN. 0991245, GRB. 1411237.
3,918,400.—BLADE MOUNTING ASSEMBLIES. NOV. 11, 1975. BEL. 0816534, FRA. 7421752, GRB. 1419417.
3,980,404.—XEROGRAPHIC APPARATUS HAVING IMPROVED FLUID DISPENSING MEMBER. SEPT. 14, 1976.
4,024,838.—DEVELOPER LIQUID SUPPLY DEVICE. MAY 24, 1977.

Class 24G

3,565,978.—REPLICATION OF SURFACE DEFORMATION IMAGES. FEB. 23, 1971. AUS. 0417038, BEL. 0710829, CAN. 0879916, FRA. 1583418, GER. 1621783, GRB. 1221342, ITL. 0863054, MEX. 0096672.
3,592,114.—APPARATUS FOR JUSTIFYING A REPRODUCED LINE OF CHARACTERS. JULY 13, 1971.
3,678,850.—POROUS PRINTING PLATE PREPARED FROM PARTICULATE PHOTOSENSITIVE RESINOUS MATERIAL. JULY 25, 1972. CAN. 0844327, GRB. 1188376, JAP. 0635879.

Class 25

3,692,659.—ELECTROLYTIC REVERSIBLE COLOR DISPLAY DEVICE. SEPT. 19, 1972. CAN. 0932427, GRB 1356187.

Class 25A

3,692,404.—STRIPPABLE LAYER RELIEF PRINTING. SEPT. 19, 1972.
3,900,817.—SPHERICAL POTENTIOMETER WITH BALL CONTACT MEANS. AUG. 19, 1975.
3,990,072.—ACOUSTIC RESIDUE ALGEBRA DECORDER NOV. 2, 1976.

Class 25A 1

3,061,911.—METHOD OF MAKING PRINTED CIRCUITS. NOV. 6, 1962.

3,075,866.—METHOD OF MAKING PRINTED CIRCUITS. JAN. 29, 1963.

3,207,127.—APPARATUS FOR FORMING COATINGS ON PRINTED CIRCUIT BOARDS. SEPT. 21, 1965. CAN. 0733463, FRA. 1374360, GER. 1490985, GRB. 1053284, ITL. 0696974.

3,217,209.—PRINTED CIRCUITS WITH RESISTIVE AND CAPACITIVE ELEMENTS. NOV 9, 1965. CAN. 0782178, FRA. 1300771, GER. 1202853, GRB. 0978571, ITL. 0647493, JAP. 0430795.

3,219,509.—AN APPARATUS FOR AUTOMATIC FABRICATION OF MICROCIRCUITRY. NOV. 23, 1965. CAN. 0785448, GRB. 1031288, JAP. 0477810.

3,288,639.—METHOD FOR MAKING A PLURAL LAYERED PRINTED CIRCUIT BOARD. NOV. 29, 1966.

3,485,934.—CIRCUIT BOARD. DEC. 23, 1969.

3,893,409.—APPARATUS FOR SOLDER COATING PRINTED CIRCUIT. JULY 8, 1975.

3,990,024.—MICROSTRIP STRIPLINE IMPEDANCE TRANSFORMER. NOV. 2, 1976.

4,018,414.—HOLDING FIXTURES. APR. 19, 1977.

4,024,631.—PRINTED CIRCUIT BOARD PLATING PROCESS. MAY 24, 1977.

4,029,373.—MEANS FOR WIRING INTO A SEALED ENCLOSURE. JUNE 14, 1977. CAN. 0995367, GRB. 1444032.

3,134,930.—MICROMINIATURE CIRCUITRY. MAY 26, 1964.

Class 25A 2

3,134,930.—MICROMINIATURE CIRCUITRY. MAY 26, 1964.

3,164,750.—ELECTRONIC PACKAGING APPARATUS. JAN. 5, 1965.

3,445,926.—PRODUCTION OF SEMICONDUCTOR DEVICES BY USE OF ION BEAM IMPLANTATION. MAY 27, 1969.

3,906,537.—SOLID STE ELMNT CMPRSNG SMI-CNDCTVE GLS CMPSTN EXHBING NGTVE INCRMNTL RSISTNCE AND TRSHLD SWTCHNG. SEPT. 16, 1975. BEL. 0820772, CAN. 1005929.

3,956,042.—SELECTIVE ETCHANTS FOR THIN FILM DEVICES. MAY 11, 1976.

Class 25A 3

3,244,556.—ABRASION FOR THIN FILM RESISTANCE CONTROL. APR. 5, 1966. CAN. 0788954, FRA. 1385420, GER 1490986, GRB. 1054076, ITL. 0705899, JAP. 0453904.

3,274,372.—SOLID VAPORIZATION. SEPT. 20, 1966.

3,287,161.—METHOD FOR FORMING A THIN FILM RESISTOR. NOV. 22, 1966. CAN. 0819895, ITL. 0705900, JAP. 0499787.

3,352,731.—THIN FILM PRINTED CIRCUIT. NOV. 14, 1967. AUS. 0296168, CAN. 0790796, FRA. 1419084, GER. 1490987, GRB. 1077686, ITL. 0739442, JAP. 0537661.

3,413,716.—THIN FILM INDUCTOR ELEMENTS. DEC. 3, 1968. CAN. 0841245, FRA. 1476476, GRB. 1149759.

3,832,766.—APPARATUS FOR ASSEMBLING A PLATED WIRE MEMORY PLANE. SEPT. 3, 1974. CAN. 0942420, GRB. 1376654.

Class 25A 4

3,317,656.—ELECTRICAL CONNECTION FOR SHEATHED CONDUCTORS. MAY 2, 1967.

3,603,357.—BACKWIRING. SEPT. 7, 1971.

3,644,659.—CABLE CONSTRUCTION. FEB. 22, 1972.

3,792,227.—FUSER APPARATUS. FEB. 12, 1974.

3,847,479.—COVER FOR WIRE WRAPPED CARD CHASSIS. NOV. 12, 1974.

3,861,775.—MULTIPLE CIRCUIT BOARD CONNECTOR. JAN. 21, 1975. GRB. 1419580.

3,869,696.—FUSER APPARATUS. MAR. 4, 1975.

3,903,937.—BACK WIRING. SEPT. 9, 1975.

Class 25B

3,688,127.—DIGITAL CIRCUIT LOGIC. AUG. 29, 1972.

3,937,986.—LINEAR WAVEFORM GENERATOR. FEB. 10, 1976.

3,975,755.—STABLE NON-CRYSTALLINE MATERIAL FOR SWITCHING DEVICES. AUG. 17, 1976.

Class 25B 1

3,384,792.—STACKED ELECTRODE FIELD EFFECT TRIODE. MAY 21, 1968.

3,584,268.—INVERTED SPACE CHARGE LIMITED TRIODE. JUNE 8, 1971.

3,599,321.—INVERTED SPACE CHARGE LIMITED TRIODE. AUG. 17, 1971.

Class 25B 2

3,510,735.—HIGH SPEED SEMICONDUCTOR. MAY 5, 1970.

3,673,572.—ELECTROLUMINESCENT DEVICE. JUNE 27, 1972. CAN. 0919286.

3,697,163.—PLUG-IN VACUUM AND CIRCUIT SYSTEM FOR ELECTROSTATIC PRINTING MACHINES. OCT. 10, 1972. CAN. 0941883.

Class 25B 3

3,551,727.—THERMIONIC CONVERTER HAVING A LOW FUNCTION COLLECTOR ELECTRODE. DEC. 29, 1970.

3,928,812.—PROGRAMMABLE BIT CLOCK OSCILLATOR FOR CONTROLLING THE PROCESSING OF BINARY DIGITS. DEC. 23, 1975. CAN. 0997434.

Class 25B 4

3,579,031.—ZERO ARC DROP THYRATRON. MAY 18, 1971.

Class 25C

3,911,420.—DISPLAY SYSTEM INCLUDING A HIGH-RESOLUTION CHARACTER GENERATOR. OCT. 7, 1975.

3,937,937.—PRIMARY POWER FAULT DETECTOR. FEB. 10, 1976. CAN. 1011818.

Class 25C 1

3,296,483.—WIDEBND AMPLER UTLZNG COMN ELCTRN BEAM FR INTRACTN W/HIFRQCY TRVLGWAVE LINE AND W/LOWFRQCY ELCTRN M. JAN. 3, 1967.

3,299,367.—FEEDBACK AMPLIFIER. JAN. 17, 1967.

3,404,341.—ELECTROMETER UTILIZING A DUAL PURPOSE FIELD-EFFECT TRANSISTOR. OCT. 1, 1968.

3,457,520.—FIELD EFFECT TRANSISTOR BUFFER AMPLIFIER. JULY 22, 1969. CAN. 0830628, FRA. 1541017, GER. 1562109, GRB. 1189515, ITL. 0806188, JAP. 0573712.

3,525,948.—SEISMIC AMPLIFIERS. AUG. 25, 1970.

3,594,654.—DIRECT COUPLED DIFFERENTIAL AMPLIFIER. JULY 20, 1971.

3,790,288.—PHOTOMETER INCLUDING VARIABLE AMPLIFICATION AND DARK CURRENT COMPENSATION. FEB. 5, 1974.

Class 25C 2

2,475,722.—WEB FEED CONTROL. JULY 12, 1949.

3,316,495.—LOW LEVEL COMMUTATOR. APR. 25, 1967.

3,426,259.—ELECTRIC CONTROL CIRCUITS FOR SEQUENTIAL OPERATION OF MOTIVE MEANS. FEB. 4, 1969.

3,454,884.—DUTY CYCLE CONTROL CIRCUIT. JULY 8, 1969. CAN. 0859886, GRB. 1195983, JAP. 0576017.

3,612,907.—SELF-CHECKING FLIP-FLOP. OCT. 12, 1971.

3,668,414.—TRANSITION INTEGRATION SWITCHING AMPLIFIER. JUNE 6, 1972. ARG. 0183473, AUS. 0460647, BEL. 0765005, CAN. 0930432, FRA. 7111626, GRB. 1334407, ITL. 0921529, MEX. 0119755, USR. 0420197, VZL. 0027511.

3,795,857.—ELECTRICAL CONNECTOR TESTING APPARATUS HAVING A PLURALITY OF AND GATES. MAR. 5, 1974.

3,806,242.—APPARATUS FOR REGULATING OPERATION OF DEV IN ACCORDANCE W SUPPLY OF MATERIAL UPON WHICH DEV OPER. APR. 23, 1974. CAN. 1004288, GRB. 1387190.

3,828,222.—FLASH LAMP CIRCUIT. AUG. 6, 1974.

3,856,997.—INDICATING AND SWITCHING APPARATUS. DEC. 24, 1974. BEL. 0809124, CAN. 1004261, ITL. 1002375, MEX. 0135820, SPN. 0421710.

3,866,051.—DIGITAL INTERFACE MODULE. FEB. 11, 1975. BEL. 0810490, GBR. 1455213.

3,932,770.—CONTROL CIRCUIT FOR SWITCHING TRIACS. JAN. 13, 1976.

Class 25C 3

3,311,810.—STATIC FREQUENCY MULTIPLIER UTILIZING A PLURALITY OF SATURABLE MAGNETIC CORES. MAR. 28, 1967.

3,340,416.—RADIATION GENERATOR HVNG A CONDCTV COATNG ON A PIEZO-ELCTRC DIFFRCTN GRATING FOR VARYNG OTPT FR. SEPT. 5, 1967.

3,373,377.—SELF-ADJUSTING VARIABLE FREQUENCY SAWTOOTH GENERATOR. MAR. 12, 1968.

3,543,080.—CRT PINCUSHION DISTORTION CORRECTION APPARATUS. NOV. 24, 1970.

3,659,207.—MULTI-WAVE FORM GENERATION FROM A SINGLE TAPPED DELAY LINE. APR. 25, 1972.

Class 25C 4

RE.27,720.—SIGNAL STORAGE DEVICE - RE OF 3416,861-D1593. AUG. 7, 1973.

3,280,309.—LOGARITHMIC PULSE COUNTER. OCT. 18, 1966.

3,416,861.—SIGNAL STORAGE DEVICE—REISSUED D72104-27,720. DEC. 17, 1968. CAN. 0824770, GER. 1524998, GRB. 1184579, JAP. 0571176.

3,422,287.—PULSE STRETCHING CIRCUIT FOR GENERATING PULSES OF MINIMUM WIDTH. JAN. 14, 1969. AUS. 0408950, CAN. 0814593, GRB. 1087749, ITL. 0773401, SWD. 0337041.

3,593,043.—PULSE SHAPING CIRCUIT. JULY 13, 1971.

3,600,610.—TIME DELAY CIRCUIT FOR A RADIANT ENERGY PROTECTIVE APPARATUS. AUG. 17, 1971.

3,757,032.—METHOD AND APPARATUS FOR SELECTIVELY ENABLING A REMOTE RECEIVER. SEPT. 4, 1973.

3,781,548.—CONTROL SYSTEM. DEC. 25, 1973.

3,816,727.—ECHO CHECK CIRCUIT. JUNE 11, 1974. CAN. 0999463, FRA. 7341866, GRB. 1422835.

3,839,665.—APP MEASRNG RELTV VELCTY MOVBL MEMBR INCLDNG MEANS TO DETECT VELCTY FROM POSITION ENCODER. OCT. 1, 1974. CAN. 0980409, GRB. 1290090, JAP. 0832378.

3,863,143.—APP FOR RECORDING THE OCCURRENCE OF A PREDETERMINED OPERATION BY SENSING MAGNETIC FIELD OPERATION. JAN. 28, 1975.

3,875,387.—MAGNETIC OPERATIONS MONITOR. APR. 1, 1975.

3,931,580.—DIGITAL LINE RECEIVER CIRCUIT. JAN. 6, 1976.

3,953,708.—THERMAL PRINTER USING AMORPHOUS SEMICONDUCTOR DEVICES. APR. 27, 1976.

3,971,919.—PROGRAMMABLE BILLING SYSTEM. JULY 27, 1976. BEL. 0812673, FRA. 7409746, GRB. 1451993, ITL. 1007663, SPN. 0424543.

3,983,315.—ELECTROMAGENTIC COUNTER CIRCUIT. SEPT. 28, 1976.

3,987,311.—SHIFT REGISTER UTILIZING AMORPHOUS SEMICONDUCTOR THRESHOLD SWITCHE. OCT. 19, 1976.

3,989,930.—MULTI-MODE BILLING SYSTEM CONTROLLED BY COPY SIZE AND DOCUMENT ORIGINAL SIZE. NOV. 2, 1976.

Class 25C 5

3,275,837.—XEROGRAPHIC CHARGING APPARATUS. SEPT. 27, 1966. ARG. 0158430, ATR. 0242511, AUS. 0276177, BEL. 0642095, CAN. 0753356, FRA. 1385736, GER. 1488286, GRB. 1040264, ITL. 0712888, JAP. 0477814, MEX. 0075819, STZ. 0460930, SWD. 0314133.

3,496,385.—HIGH VOLTAGE COMPENSATED TRANSISTORIZED SWITCHING APPARATUS. FEB. 17, 1970. CAN. 0853862, FRA. 1521443, GRB. 1181718, ITL. 0793728, JAP. 0592682.

3,522,509.—FLOATING POWER SUPPLY. AUG. 4, 1970.

3,809,916.—DUAL CORD INTERLOCK. MAY 7, 1974. CAN. 1004283, GRB. 1423758.

3,870,903.—PHASE CONTROLLED POWER SUPPLY. MAR. 11, 1975.

3,922,595.—HIGH POWER REGULATED D C SUPPLY. NOV. 25, 1975.

3,961,236.—CONSTANT POWER REGULATOR FOR XEROGRAPHIC FUSING SYSTEM. JUNE 1, 1976.

4,004,209.—WIDE RANGE POWER CONVERSION SYSTEM. JAN. 18, 1977.

Class 25C 6

3,192,519.—DIGITAL TRANSIENT ANALYZER. JUNE 29, 1965.

3,376,490.—SYNTHESIZED WAVE STATIC INVERTERS. APR. 2, 1968.

3,508,080.—BRIDGE GATING NETWORK HAVING POWER GAIN. APR. 21, 1970.

3,555,540.—DIGITAL TO ANALOG CONVERTER WITH SMOOTHED RECOVERY. JAN. 12, 1971.

3,599,037.—GAS LAMP LEAD BALLAST CIRCUIT HAVING FEED CONTROL. AUG. 10, 1971. ARG. 0182960, BEL. 0749784, CAN. 0907126, FRA. 7015813, GRB. 1308525, ITL. 0900023, MEX. 0116550.

3,638,089.—SPEED CONTROL SYSTEM HAVING HIGH AND LOW LEVEL SPEED MEANS. JAN. 25, 1972. GRB. 1322611.

3,670,269.—AUTOMATIC TRANSVERSAL EQUALIZER. JUNE 13, 1972. CAN. 0932412, GRB. 1353018.

3,689,915.—ENCODING SYSTEM. SEPT. 5, 1972. CAN. 0870252, GER. 1562051, GRB. 1207701, JAP. 0675600.

3,691,542.—MAGNETIC MEMORY DISK DRIVE APPARATUS WITH REDUCED R.F. NOISE. SEPT. 12, 1972. GRB. 1328717, JAP. 0840914.

3,699,555.—APPARATUS FOR RAPID ACTION DISPLACEMENT CONTROL. OCT. 17, 1972. CAN. 985413, GRB. 1366124.

3,737,569.—TRANSMISSION DEVICE. JUNE 5, 1973.

3,742,374.—TRANSDUCER DEVICE. JUNE 26, 1973.

3,761,799.—CURRENT STABILIZING CIRCUIT HAVING MINIMAL LEAKAGE CURRENT EFFECTS. SEPT. 25, 1973. BEL. 0792285. FRA. 7243406, GRB. 1395600, ITL. 0971515, MEX. 131737.

3,778,817.—OUTPUT KEYBOARD APPARATUS AND SIGNAL TRANSLATING METHODS THEREFOR. DEC. 11, 1973.

3,795,857.—ELECTRICAL CONNECTOR TESTING APPARATUS HAVING A PLURALITY OF AND GATES. MAR. 5, 1974.

3,818,297.—MOTOR CONTROL APPARATUS. JUNE 18, 1974. CAN 1004296, GRB. 1454269.

3,832,065.—DRUM TRACK DETECTOR. AUG. 27, 1974. GRB. 1458283.

3,880,516.—DIAGNOSTIC CIRCUIT BOARD. APR. 29, 1975. BEL. 0808231, FRA. 7342590, GRB. 1447394, ITL. 1002163, SPN. 421149.

3,904,922.—LAMP CONTROL AND LAMP SWITCH CIRCUIT. SEPT. 9, 1975.

3,906,194.—SIGNAL PROCESSOR. SEPT. 16, 1975.

3,909,125.—STEPPER MOTOR CONTROL. SEPT. 30, 1975.

3,918,046.—DIGITAL TO ANALOG CONVERTER. NOV. 4, 1975. ARG. 0197211, BEL. 0795801, FRA. 7305890, GRB. 1417772, ITL. 0979289, MEX. 131264, SPN. 0411883, STZ. 0564887.

3,922,595.—HIGH POWER REGULATED D C SUPPLY. NOV. 25, 1975.

3,928,772.—TIME DEPENDENT FAULT DETECTOR. DEC. 23, 1975. BEL. 0826690.

3,989,371.—CYCLE-OUT LOGIC FOR A MULTI-MODE COPIER/DUPLICATOR. NOV. 2, 1976.

3,991,355.—STEPPER MOTOR CONTROL. NOV. 9, 1976.

4,002,409.—CHAIN-FEED CONTROL LOGIC FOR A MULTI-MODE COPIER/DUPLICATOR. JAN. 11, 1977. BEL. 0840300.

Class 26

D.225,572.—BOOK STACKING UNIT FOR XEROGRAPHIC REPRODUCTION MACHINE. DEC. 19, 1972.

D.231,127.—COPYING MACHINE-LARGE DOCUMENT COPYING FRAME-DECOY. APR. 2, 1974.

D.231,128.—COPYING MACHINE. APR. 2, 1974.

D.231,129.—COPYING MACHINE. APR. 2, 1974.

D.231,564.—COPYING MACHINE. APR. 30, 1974.

D.236,030.—PAPER TRAY. JULY 22, 1975.

D.236,446.—CART. AUG. 26, 1975.

D.236,491.—COMPUTER CABINET. AUG. 26, 1975.

D.236,897.—COMPUTER CABINET. SEPT. 23, 1975.

D.236,961.—BALANCE SCALE. SEPT. 30, 1975.

D.238,450.—PAPER CASSETTE. JAN. 13, 1976.

D.238,966.—COPIER EVENT RECORDER. FEB. 24, 1976.

D.239,063.—STORAGE UNIT. MAR. 9, 1976.

D.239,064.—STORAGE UNIT. MAR. 9, 1976.

D.239,065.—STORAGE UNIT. MAR. 9, 1976.

D.239,066.—STORAGE UNIT. MAR. 9, 1976.

D.239,067.—STORAGE AND DISPLAY UNIT. MAR. 9, 1976.

D.239,106.—SEMICONDUCTOR EDUCATIONAL BOARD. MAR. 9, 1976.

D.239,107.—PARALLEL RL/RC CIRCUITS EDUCATIONAL BOARD. MAR. 9, 1976.

D.239,108.—RLC CIRCUITS EDUCATIONAL BOARD. MAR. 9, 1976.

D.239,109.—SERIES RL AND RC CIRCUITS EDUCATIONAL BOARD. MAR. 9, 1976.

D.239,110.—EDUCATIONAL DEVICE FOR LEARNING ABOUT RECTIFIERS AND FILTERS. MAR. 9, 1976.

D.239,351.—STORAGE AND DISPLAY UNIT. MAR. 30, 1976.
D.239,392.—COMPUTER CABINET. MAR. 30, 1976.
D.239,750.—STORAGE UNIT. MAY 4, 1976.
D.239,995.—STORAGE UNIT. MAY 25, 1976.
D.240,192.—DESIGN FOR MICROFILM REEL. JUNE 8, 1976.
D.240,540.—COMPUTER TERMINAL. JULY 13, 1976.
D.240,554.—DUPLICATING MACHINE WITH SORTER. JULY 13, 1976.
D.240,555.—SORTER. JULY 13, 1976.
D.240,557.—TRAY RACK. JULY 13, 1976.
D.240,965.—COIN OPERATED REPRODUCTION MACHINE. AUG. 10, 1976.
D.241,982.—ADAPTER FOR COMPRESSING HUMAN BODY ORGANS FOR X-RAY TREATMENT OR THE LIKE. OCT. 19, 1976.

Class 26A

D.200,130.—XEROGRAPHIC CAMERA. JAN. 19, 1965.
D.200,448.—DOCUMENT REPRODUCING APPARATUS. FEB. 23, 1965.
D.205,806.—REPRODUCTION MACHINE. SEPT. 20, 1966.
D.227,933.—SORTER. JULY 24, 1973.
D.236,850.—CONTROL PANEL FOR A COPIER. SEPT. 16, 1975.
D.237,905.—CONTROL PANEL OF A COLOR ELECTROPHOTOGRAPHIC PRINTING MACHINE. DEC. 2, 1975.
D.238,779.—DOCUMENT TRAY. FEB. 10, 1976.
D.238,818.—PLATEN COVER FOR COPIER. FEB. 10, 1976.
D.239,138.—XEROGRAPHIC COPIER. MAR. 9, 1976.

Class 26A 1

D.163,640.—XEROGRAPHIC COPYING DEVICE. JUNE 12, 1951.
D.165,993.—PAPER REGISTRATION GUIDE FOR ELECTROPHOTOGRAPHIC COPYING MACHINE. FEB. 19, 1952.
D.172,906.—A XEROGRAPHIC PROCESSOR. AUG. 24, 1954.
D.186,832.—DOCUMENT REPRODUCING APPARATUS. DEC. 8, 1959.
D.188,633.—DOCUMENT REPRODUCING APPARATUS. AUG. 16, 1960.
D.193,450.—DOCUMENT REPRODUCING APPARATUS. AUG. 21, 1962.
D.194,815.—DOCUMENT REPRODUCING APPARATUS. MAR. 12, 1963.
D.200,272.—DOCUMENT REPRODUCING APPARATUS. FEB. 9, 1965. CAN. 2092730.
D.200,448.—DOCUMENT REPRODUCING APPARATUS. FEB. 23, 1965.
D.205,558.—REPRODUCTION MACHINE. AUG. 16, 1966.
D.205,806.—REPRODUCTION MACHINE. SEPT. 20, 1966.
D.208,337.—XEROGRAPHIC DOCUMENT REPRODUCING APPARATUS OR SIMILAR ARTICLE. AUG. 15, 1967.
D.210,558.—DOCUMENT REPRODUCING MACHINE. MAR. 19, 1968.
D.210,630.—DOCUMENT REPRODUCING APPARATUS. MAR. 26, 1968.
D.210,856.—DOCUMENT REPRODUCING APPARATUS. APR. 23, 1968.
D.214,699.—DOCUMENT REPRODUCING MACHINE. JULY 15, 1969. ARG. 0011028, CAN. 2543184, MEX. 0011135.
D.218,199.—DOCUMENT REPRODUCING MACHINE. JULY 28, 1970. CAN. 0033011, GRB. 0946459.
D.218,201.—REPRODUCTION MACHINE. JULY 28, 1970. ARG. 0014313, BEL. 0017005, CAN. 0033518, CHL. 0000996, GRB. 0946818, JAP. 0363075, MEX. 0011194, PNM. 0002073, VZL. 0000744.
D.219,889.—XEROGRAPHIC PROCESSOR HOUSING. FEB. 9, 1971.
D.221,694.—XEROGRAPHIC PROCESS HOUSING. AUG. 31, 1971.
D.227,931.—ELECTROPHOTOGRAPHIC PRINTING MACHINE. JULY 24, 1973.
D.230,513.—REPRODUCTION MACHINE. FEB. 26, 1974.
D.238,737.—COPYING MACHINE STAND. FEB. 10, 1976.
D.243,008.—COIN OPERATED REPRODUCTION MACHINE. JAN. 11, 1977.

Class 26A 2

D.214,959.—AUTOMATIC DOCUMENT FEEDING APPARATUS FOR XEROGRAPHIC REPRODUCING MACHINES OR THE LIKE. AUG. 12, 1969. CAN. 0032540, GER. DES5715, GRB. 0942720.
D.227,034.—DOCUMENT FEEDER FOR A XEROGRAPHIC REPRODUCTION. MAY 29, 1973.

Class 26A 3

D.200,129.—XEROGRAPHIC TRANSFER AND FUSING APPARATUS. JAN. 19, 1965.
D.233,481.—XEROGRAPHIC VAPOR FUSING APPARATUS. OCT. 29, 1974.

Class 26A 4

D.201,405.—XEROGRAPHIC PRINTER. JUNE 15, 1965.
D.220,188.—MOBILE PRINTER. MAR. 16, 1971. CAN. 0033207, GER. 0MR6294, GRB. 0946460, JAP. 0443861.
D.230,517.—COMPUTER OUTPUT PRINTER. FEB. 26, 1974.
D.232,125.—CHARACTER PRINT MEMBER. JULY 16, 1974.
D.237,010.—COMBINED RIBBON AND CARTRIDGE THEREFOR. SEPT. 30, 1975. FRA. 0073134, GRB. 0967791, ITL. 0010845.
D.238,904.—CHARACTER PRINT MEMBER. FEB. 17, 1976.
D.238,968.—CHARACTER PRINT MEMBER. FEB. 24, 1976. FRA. 0073135, GER. 0009989, GRB. 0967792, ITL. 0010846.

Class 26A 5

D.200,130.—XEROGRAPHIC CAMERA. JAN. 19, 1965.

Class 26B

D.209,408.—CABINET FOR SORTING AND HOLDING SHEETS OF PRINTED MATERIAL. NOV. 28, 1967.
D.209,409.—MODULAR CABINET FOR SORTING AND HOLDING SHEETS OF PRINTED MATERIAL. NOV. 28, 1967.
D.209,872.—DOCUMENT REPRODUCING AND SORTING MACHINE. JAN. 9, 1968.
D.212,227.—A TAPE CONTRL UNIT FOR AN AUTOMATIC SORTER OR THE LIKE. SEPT. 17, 1968.
D.224,054.—XEROGRAPHIC REPRODUCTION MACHINE OR THE LIKE. JUNE 27, 1972.
D.230,515.—DOCUMENT REPRODUCING AND SORTING MACHINE. FEB. 26, 1974.
D.236,330.—REPRODUCTION MACHINE STACKING CART. AUG. 19, 1975.
D.236,924.—PAPER HANDLING STAND. SEPT. 30, 1975.
D.237,871.—REPRODUCTION MACHINE STACKING CART. DEC. 2, 1975.
D.238,779.—DOCUMENT TRAY. FEB. 10, 1976.

Class 26C

D.205,910.—A CAN. OCT. 4, 1966.
D.208,377.—CONTAINER FOR XEROGRAPHIC TONER POWDER. AUG. 22, 1967.
D.211,928.—BOTTLE. AUG. 13, 1968.
D.218,152.—CONTAINER FOR XEROGRAPHIC POWDER. JULY 28, 1970. CAN. 0032629, GRB. 0944047.
D.236,694.—DEVELOPER MIX STORAGE CONTAINER. SEPT. 9, 1975.
D.240,201.—TONER PARTICLE STORAGE CONTAINER-DESIGN FOR TONER CARTRIDGE. JUNE 8, 1976.
D.244,007.—TONER BOTTLES. APR. 12, 1977.

Class 26D

D.216,647.—SPRING SCALE. FEB. 24, 1970. CAN. 0032577, GRB. 0943939.
D.220,011.—ARTICLE ADDRESSING MACHINE. FEB. 23, 1971.
3,666,948.—LIQUID CRYSTAL INFRARED IMAGING SYSTEM HAVING AN UNDISTURBED IMAGE ON A DISTURBED BACKGROUND. MAY 30, 1972. CAN. 0964455, GRB. 1387276.
3,737,896.—APPARATUS FOR RECOVERY OF RECORDED BIT INFORMATION IN A MAGNETIC RECORDING MEDIUM. JUNE 5, 1973. AUS. 0471989, BEL. 0790688, CAN. 1008967, STZ. 0563642.

Class 26E

D.200,128.—FACSIMILE RECEIVER. JAN. 19, 1965.

Class 26E 1

D.200,127.—FACSIMILE TRANSMITTER. JAN. 19, 1965.
D.200,128.—FACSIMILE RECEIVER. JAN. 19, 1965.

D.215,218.—FACSIMILE TRANSCEIVER. SEPT. 16, 1969. ARG. 0010244, BEL. 0016600, CAN. 2493134, FRA. 0096592, GER. 0005411, GRB. 0939330, ITL. 0134198. MEX. 0010900.
D.218,170.—FACSIMILE TRANSCEIVER. JULY 28, 1970. GRB. 0944047.
D.225,860.—HOUSING FOR ELECTRONIC APPARATUS. JAN. 9, 1973.
D.225,861.—HOUSING FOR ELECTRONIC APPARATUS. JAN. 9, 1973.
D.225,867.—UNATTENDED TELEPHONE ANSWERING APPARATUS OR SIMILAR ARTICLE. JAN. 9, 1973.
D.227,121.—FACSIMILE TRANSCEIVER APPARATUS. JUNE 5, 1973.
D.227,122.—FACSIMILE TRANSCEIVER APPARATUS. JUNE 5, 1973.

Class 26E 2

D.215,849.—A ROLL-FEED APPARATUS FOR A FACSIMILE TRANSCEIVER. NOV. 4, 1969. ARG. 0011067, BEL. 0016764, CAN. 0032344, GER. DES5719, GRB. 0942723, ITL. 0138774, MEX. 0010975, PNM. 0001983, VZL. 0000663.
D.216,123.—FLEXIBLE SHEET MATERIAL GUIDE FOR A FACSIMILE TRANSCEIVER OR SIMILAR ARTICLE. NOV. 25, 1969. GRB. 0942748.
D.216,564.—GUIDE FOR FLEXIBLE SHEET MATERIAL FOR FACSIMILE TRANSCEIVER OR SIMILAR ARTICLE. FEB. 10, 1970. ARG. 0011068, BEL. 0016763, GER. DES5716, GRB. 0942723, ITL. 0138775, MEX. 0011018, PNM. 0001401, VZL. 0000662.

Class 26E 3

D.210,589.—ELECTRONIC ADAPTER FOR FACSIMILE COMPUTER SYSTEM. MAR. 26, 1968.

Class 26F

D.203,012.—DESIGN FOR A MACHINE FOR APPLYING INTELLIGENCE TO A MOVING ARTICLE. NOV. 23, 1965.
D.244,943.—FILM REEL (DESIGN). JULY 5, 1977.

Class 26F 1

D.202,746.—MICROFICHE PRINTER. NOV. 2, 1965.
D.217,739.—COMBINED MICROFILM VIEWER AND REPRODUCING MACHINE ACCESSORY. JUNE 2, 1970. CAN. 0032698.
D.218,782.—PROJECTION VIEWER. SEPT. 22, 1970. CAN. 0033031, GER. OMR6147, GRB. 0945494, JAP. 413894.
D.218,783.—COMBINATION FILM VIEWING AND REPRODUCING MACHINE. SEPT. 22, 1970. CAN. 0033032, GER. OMR6146, GRB. 0945495, JAP. 0377263.
D.233,369.—MICROFILM XEROGRAPHIC MACHINE. OCT. 22, 1974.
D.236,544.—MICROFORM VIEWER. AUG. 26, 1975.
D.239,055.—HAND-HELD VIEWER FOR MICROFORMS. MAR. 2, 1976.
D.239,056.—HAND-HELD VIEWER FOR MICROFORMS. MAR. 2, 1976.

Class 26G

D.225,643.—REACTION TESTING DEVICE. DEC. 26, 1972.
D.225,681.—SUCTION MOUNTING DEVICE DEC. 26, 1972.
D.226,662.—EDUCATIONAL DEVICE FOR DEMONSTRATING MOMENTUM. APR. 10, 1973.
D.232,030.—EDUCATIONAL AID FOR DEMONSTRATING PRINCIPLES IN PHYSICS. JULY 9, 1974.
D.232,031.—COLLISION DEMONSTRATION TEACHING AID. JULY 9, 1974.
D.232,098.—TEACHING AID FOR DEMONSTRATING PRINCIPLES IN PHYSICS. JULY 16, 1974.
D.232,698.—CLAMP. SEPT. 10, 1974.
D.233,432.—TEACHING AID FOR DEMONSTRATING PRINCIPLES OF PHYSICS. OCT. 29, 1974.
D.233,654.—CONTAINER FOR BOOKLETS OR THE LIKE. NOV. 19, 1974.
D.233,658.—BALANCE SCALE. NOV. 19, 1974.
D.233,935.—EDUCATIONAL DEVICE FOR TEACHING ARITHMETIC. DEC. 17, 1974.
D.234,546.—CARRYING CASE. MAR. 18, 1975.
D.235,440.—EDUCATIONAL PLUG-IN BOARD. JUNE 17, 1975.
D.235,441.—BASIC MEASUREMENT EDUCATIONAL BOARD. JUNE 17, 1975.
D.236,028.—MAGNIFIER. JULY 22, 1975.
D.236,729.—EDUCATIONAL PLUG-ON BOARD. SEPT. 9, 1975.
D.236,730.—EDUCATIONAL PLUG-ON BOARD. SEPT. 9, 1975.
D.236,978.—SWITCHING EDUCATIONAL BOARD. SEPT. 30, 1975.
D.236,979.—EDUCATIONAL MEASURING DEVICE BOARD. SEPT. 30, 1975.
D.237,020.—COMBINED SUPPORT AND STORAGE TRAY FOR AN EDUCATIONAL KIT OR SIMILAR ARTICLE. SEPT. 30, 1975.
D.237,877.—MOTOR AND GENERATOR EDUCATIONAL BOARD. DEC. 2, 1975.
D.237,878.—MULTI-METER EDUCATIONAL BOARD. DEC. 2, 1975.
D.237,879.—EDUCATIONAL DEVICE FOR LEARNING MAGNETISM & INDUCTION. DEC. 2, 1975.
D.237,880.—EDUCATIONAL DEVICE FOR LEARNING BASIC HAND TOOLS. DEC. 2, 1975.
D.242,787.—AN EDUCATIONAL AIDE FOR MEASURING MASS. DEC. 21, 1976.
D.242,793.—EDUCATIONAL AIDE FOR TEACHING PHYSICAL PROPERTIES OF LIGHT. DEC. 21, 1976.

Class 26G 1

D.216,157.—BALANCE SCALE. NOV. 25, 1969. BEL. 0016761, CAN. 0032611, GER. DES5718, GRB. 0942720, ITL. 0138772, JAP. 0337548.
D.236,731.—CURCUIT TESTING EDUCATIONAL BOARD. SEPT. 9, 1975.

Class 26H

D.236,556.—CARRYING CASE FOR COLORISTS MATERIALS OR THE LIKE. AUG. 26, 1975.

Class 26H 1

D.215,294.—HOUSING FOR ELECTRONIC APPARATUS. SEPT. 23, 1969. ARG. 0011066, BEL. 0016760, GER. 0005765, GRB. 0942725, ITL. 0138776, MEX. 0010934, PNM. 0001839, VZL. 0000664.
D.215,660.—HOUSING FOR ELECTRONIC APPARATUS. OCT. 21, 1969.
D.234,700.—DISC DRIVE CABINET. APR. 1, 1975.
D.238,494.—CONTROL PANEL FOR DISK FILE. JAN. 20, 1976.
D.238,495.—DISK MEMORY MODULE FRONT PANEL. JAN. 20, 1976.
D.240,632.—CABINET FOR ELECTRONIC EQUIPMENT. JULY 20, 1976.
D.241,446.—SINGLE MAGNETIC CARD CONSOLE UNIT FOR ELECTRONIC TYPING SYSTEM. SEPT. 14, 1976.
D.241,447.—SINGLE MAGNETIC TAPE CONSOLE UNIT FOR ELECTRONIC TYPING SYSTEM. SEPT. 14, 1976.
D.241,448.—DUAL MAGNETIC TAPE CONSOLE UNIT FOR ELECTRONIC TYPING SYSTEM. SEPT. 14, 1976.
D.241,449.—DUAL MAGNETIC CARD CONSOLE UNIT FOR ELECTRONIC TYPING SYSTEM. SEPT. 14, 1976.

Class 26H 2

D.221,228.—KEYBOARD FOR A COMPUTER OR THE LIKE. JULY 20, 1971.

Class 26H 3

D.221,229.—SEND/RECEIVE DATA PRINTER TERMINAL. JULY 20, 1971.
D.224,019.—XEND/RECEIVE DATA PRINTER TERMINAL. JUNE 27, 1972.
D.236,129.—INPUT/OUTPUT TERMINAL. JULY 29, 1975.

Class 26H 4

D.212,692.—TELEPHONE ACOUSTIC COUPLER. NOV. 12, 1968. ARG. 0010245, BEL. 0016601, CAN. 2503147, FRA. 0096593. GER. 0005410, GRB. 0939331, ITL. 1341991, MEX. 0010845.
D.224,025.—ACOUSTIC COUPLER. JUNE 27, 1972.

Class 26H 5

D.204,319.—HOLLOW CORNER PRISM. APR. 5, 1966.
D.206,956.—HOLLOW CORNER PRISM. FEB. 14, 1967.
D.237,849.—COOLING RACK. DEC. 2, 1975.

Class 26H 6

D.221,108.—PAPER SHREDDER. JULY 6, 1971. CAN. 0033939.

Class 26H 7

D.221,901.—OVERHEAD PROJECTOR. SEPT. 14, 1971. CAN. 0033920.
D.231,800.—RIBBON CARTRIDGE. JUNE 11, 1974.
D.236,787.—BOOKCASE OR SIMILAR ARTICLE. SEPT. 16, 1975.
D.239,419.—TAPE CASSETTE STORAGE UNIT. MAR. 30, 1976.
D.239,472.—MAGNETIC CARD STORAGE TRAY. APR. 6, 1976.
D.239,531.—COPY HOLDER. APR. 13, 1976.
D.239,872.—CAMERA/PROJECTOR. MAY 11, 1976.
D.241,774.—PRINTER/KEYBOARD APPARATUS FOR ELECTRONIC TYPING SYSTEM OR SIMILAR ARTICLE. OCT. 5, 1976.
D.242,101.—FILE UNIT OR SIMILAR ARTICLE. NOV. 2, 1976.
D.242,102.—TABLE OR SIMILAR ARTICLE. NOV. 2, 1976.

Class 27A

3,615,614.—LIGHT DEV DIRCT PRINT SILVER HALIDE EMULSION SENSITIZD W/ COMBINTN OF COPPER, LEAD, BROMIDE AND THIOU. OCT. 26, 1971.
3,660,100.—DIRECT-PRINT LIGHT DEVELOPABLE EMULSION. MAY 2, 1972.
3,725,073.—LIGHT DEVELOPABLE DIRECT WRITING, SILVER HALIDE EMULSIONS CONTAINING GOLD, IODINE, LEAD AND COP. APR. 3, 1973. CAN. 0882613.
3,782,960.—DRCT-PRNT LIGHT-DVLPBL EMULSN CNTAING SILVER HALIDE GRAINS SNSTZD SENSTZD ON THE SURFACES W/SI. JAN. 1, 1974. BEL. 0780680, CAN. 0994590, GRB. 1384081, ITL. 0950280.
3,849,146.—DIRECT-PRINT LIGHT-DEVELOPBL SILVER HALIDE EMULSION CONTAINING CYCLIC DIOXIDE OR SELENONE AS SEN. NOV. 19, 1974.

Class 27B

3,631,232.—APPARATUS FOR SIMULATING THE ELECTRICAL CHARACTERISTICS OF A NETWORK. DEC. 28, 1971. CAN. 0951429, GRB. 1267785.

Class 27C

2,298,997.—PHOTOGRAPHIC FILM. OCT. 13, 1942.
2,317,257.—METHOD OF DYEING PHOTOGRAPHIC SILVER HALIDE EMULSIONS. APR. 20, 1943.
2,320,693.—DUPLEX PHOTOGRAPHIC MATERIAL. JUNE 1, 1943.
2,352,822.—PHOTOGRAPHIC COATING. JULY 4, 1944.
2,653,152.—CYANINE DYE AND PROCESS OF MAKING SAME. SEPT. 22, 1953.
2,827,428.—PHOTOGRAPHIC EMULSION PURIFICATION-IONICS. MAR. 18, 1958.
3,736,133.—TRANSPARENT INK—ABSORBENT LACQUERS. MAY 29, 1973. ARG. 0193996, CAN. 0985583, GRB. 1390137, MEX. 0127276, VZL. 0033577.
3,773,513.—DIMENSIONALLY STABLE PHOTOGRAPHIC PAPER CONTAINING GLASS FIBERS. NOV. 20, 1973.

Class 27D

RE.22,654.—PHOTOGRAPHIC DEVELOPING MACHINE—RE OF 2,347,189-D3946. JULY 3, 1945.
2,347,189.—PHOTOGRAPHIC DEVELOPING MACHINE—REISSUED D348-22,654. APR. 25, 1944.
3,393,362.—PROCESS FOR DETECTING IRREGULARITIES IN A METALLIC SURFACE. JULY 16, 1968.

Class 30

3,861,911.—IMAGING FIXING METHOD. JAN. 21, 1975.

Class 30A

3,573,904.—COMBINATION OF ELECTROGRAPHY AND MANIFOLD IMAGING. APR. 6, 1971. ARG. 0188621, AUS. 0408972, BEL. 0708975, CAN. 0883746, FRA. 1563782, GER. 1671591, GRB. 1215957, ITL. 0822303, JAP. 0620886, MEX. 0100810, VZL. 0023682.
3,707,368.—MANIFOLD IMAGING PROCESS. DEC. 26, 1972.
3,741,762.—MANIFOLD IMAGING MEMBER AND PROCESS. JUNE 26, 1973. CAN. 0961909, GRB. 1376391.
3,955,975.—MANIFOLD IMAGING MEMBER AND PROCESS EMPLOYING A METAL SOAP. MAY 11, 1976.

Class 30B

3,642,363.—MANIFOLD IMAGING SYSTEM. FEB. 15, 1972. CAN. 0960289, GRB. 1328405, JAP. 0770137.
3,661,454.—COMBINATION OF ELECTROGRAPHY AND MANIFOLD IMAGING. MAY 9, 1972.
3,684,362.—TRANSPARENT ELECTRODE. AUG. 15, 1972. CAN. 0932378, GRB. 1340685, JAP. 0758465.
3,741,641.—MANIFOLD IMAGING APPARATUS. JUNE 26, 1973.
3,748,034.—MANIFOLD IMAGING MACHINE. JULY 24, 1973. BEL. 0777713, CAN. 0948694, FRA. 7200999, GRB. 1376661, ITL. 0946353, SPN. 0398585, SWD. 7200573.
3,761,174.—MANIFOLD WEB HANDLING. SEPT. 25, 1973.
3,768,902.—MANIFOLD IMAGING. OCT. 30, 1973.
3,876,937.—LAYER TRANSFER IMAGING SYSTEM. APR. 8, 1975. CAN. 0933996, GRB. 1282725, JAP. 0726369.
3,963,340.—IMAGING APPARATUS. JUNE 15, 1976.

Class 30C

3,615,393.—MANIFOLD IMAGING PROCESS EMPLOYING STATIC CHARGE FIELD APPLICATION. OCT. 26, 1971. BEL. 0746582, CAN. 0965829, FRA. 7007627, GRB. 1295533, ITL. 0886478, JAP. 0727962.
3,653,892.—MANIFOLD IMAGING PROCESS WHEREIN THE IMAGED ELEMENTS MAY BE RECOMBINED AND REUSED. APR. 4, 1972. CAN. 0916967, GRB. 1320407, JAP. 0731611.
3,676,116.—IMAGE REVERSAL IN MANIFOLD IMAGING USING ELECTRICALLY CONDUCTIVE RECEIVER SHEET. JULY 11, 1972.
3,684,362.—TRANSPARENT ELECTRODE. AUG. 15, 1972. CAN. 0932378. GRB. 1340685, JAP. 0758465.
3,692,516.—MANIFOLD IMAGING METHOD - PHAROS MANIFOLD IMAGING REVERSAL. AUG. 19, 1972. CAN. 0929204, GRB. 1320012, JAP. 0759476.
3,692,518.—MANIFOLD IMAGING PROCESS. SEPT. 19, 1972. ARG. 0191965, BEL. 0749174, CAN. 0916496, FRA. 7013872, GRB. 1309649, ITL. 0899700, JAP. 0731228, MEX. 0116175.
3,718,462.—MANIFOLD ELECTRIFICATION PROCESS. FEB. 27, 1973. CAN. 0947366, GRB. 1313712, JAP. 0739530.
3,737,311.—ELECTROSTATIC PARTICLES TRANSFER IMAGING PROCESS. JUNE 5, 1973.
3,756,812.—MANIFOLD IMAGING PROCESS. SEPT. 4, 1973.
3,761,258.—IMAGING PROCESS EMPLOYING CHARGED DONOR AND RECEIVER SHEETS. SEPT. 25, 1973.
3,776,721.—MANIFOLD IMAGING. DEC. 4, 1973.
3,844,780.—IMAGING PROCESS. OCT. 29, 1974.
3,846,127.—IMAGING SYSTEM. NOV. 5, 1974.
3,850,626.—IMAGING MEMBER AND METHOD. NOV. 26, 1974. GRB. 1464653.
3,854,943.—MANIFOLD IMAGING METH AND MEMBR EMPLOYING FUNDAMENTAL PARTICLES OF ALPHA METAL FREE PHTHALOCYANINE. DEC. 17, 1974. CAN. 0988766, GRB. 1424234.
3,861,910.—MANIFOLD IMAGING PROCESS. JAN. 21, 1975. ARG. 0198477, BEL. 0744343, CAN. 0947363, FRA. 7001127, GRB. 1284521, ITL. 0885940, JAP. 0727960, MEX. 0111440.
3,909,257.—MANIFOLD IMAGING PROCESS WITH SPOOL ELECTRODE. SEPT. 30, 1975.

Class 30D

3,598,581.—MANIFOLD IMAGING METHOD. AUG. 10, 1971. ARG. 0198157, AUS. 0413154, BEL. 0713100, BRA. 6795099, CAN. 0889250, CHL. 0024249, CLB. 0017928, FRA. 1560020, GER. 1772114, GRB. 1200712, HOL. 0149611, ITL. 0829693, JAP. 0626106, LXB. 0055806, MEX. 0100797, NOR. 0128040, PRU. 0009737, SPN. 0352316, STZ. 0474097, SWD. 0340404, URG. 0009203, VZL. 0023690.
3,723,112.—MANIFOLD IMAGING METHOD WHEREIN THE ACTIVATOR CARRIES A PLASTIC COATING MATERIAL. MAR. 27, 1973.
3,741,762.—MANIFOLD IMAGING MEMBER AND PROCESS. JUNE 26, 1973. CAN. 0961909, GRB. 1376391.

3,907,558.—MANIFOLD IMAGING UTILIZING SILICA GEL ACTIVATING LAYER. SEPT. 23, 1975.
3,912,504.—MANIFOLD IMAGING WITH THERMAL ACTIVATOR CONTAINED IN A SILICA GEL LAYER. OCT. 14, 1975.
3,955,975.—MANIFOLD IMAGING MEMBER AND PROCESS EMPLOYING A METAL SOAP. MAY 11, 1976.
3,964,904.—MANIFOLD IMAGING MEMBER AND PROCESS EMPLOYING A DARK CHARGE INJECTING LAYER. JUNE 22, 1976. BEL. 0832405.
4,015,983.—A METHOD OF ERASING MANIFOLD IMAGES. APR. 5, 1977.

Class 30E

3,653,889.—METHOD OF FIXING MANIFOLD IMAGES. APR. 4, 1972. BEL. 0754024, CAN. 0921745, FRA. 7028279, GRB. 1322772, ITL. 0900939, JAP. 0739529.
3,658,519.—IMAGE TRANSFER PROCESS FROM CONDUCTIVE SUBSTRATES. APR. 25, 1972. ARG. 0195536, AUS. 0456406, BEL. 0760747, BRA. 7022093, CAN. 0960290, FRA. 7047144, GRB. 1337590, ITL. 0913848, MEX. 0119590, SWD. 7017293.
3,706,553.—TRANSFER OF IMAGES TO A NON-CONDUCTIVE SUBSTRATE. DEC. 19, 1972. ARG. 0203811, AUS. 0461437, BEL. 0760456, CAN. 0947368, FRA. 7047140, GRB. 1339577, ITL. 0913634, MEX. 0119591, SWD. 7017139.
3,708,288.—IMAGE TRANSFER PROCESS. JAN. 2, 1973. CAN. 0882053, GRB. 1298922, JAP. 0757867.
3,723,112.—MANIFOLD IMAGING METHOD WHEREIN THE ACTIVATOR CARRIES A PLASTIC COATING MATERIAL. MAR. 27, 1973.
3,746,538.—IMAGE TRANSFER PROCESS. JULY 17, 1973. CAN. 0951781, GRB. 1374841.
3,793,017.—IMAGING FIXING METHOD. FEB. 19, 1974.
3,819,368.—MANIFOLD IMAGING MEMBER EMPLOYING A FIXATIVE LAYER. JUNE 25, 1974.
3,825,423.—IMAGE TRANSFER PROCESS. JULY 23, 1974.
3,888,208.—IMAGE TRANSFER PROCESS. JUNE 10, 1975.

Class 30F

3,548,748.—DUPLICATING METHOD EMPLOYING SIMULTANEOUS APPLICATION OF ELECTRIC FIELD AND EXPOSURE TO RADIATION. DEC. 22, 1970. CAN. 0882051, GRB. 1227394, JAP. 0752522.
3,554,125.—METHOD OF MAKING A LITHOGRAPHIC MASTER AND METHOD OF PRINTING THEREWITH. JAN. 12, 1971. CAN. 0882052, GER. 1772302, GRB. 1219849.
3,565,612.—DUPLICATING MASTERS BY THE MANIFOLD PROCESS. FEB. 23, 1971. ARG. 0193797, AUS. 0411612, BEL. 0708974, CAN. 0873277, FRA. 1549964, GER. 1671590, GRB. 1215956, ITL. 0823464, MEX. 0106608, VZL. 0023681.
3,573,904.—COMBINATION OF ELECTROGRAPHY AND MANIFOLD IMAGING. APR. 6, 1971. ARG. 0188621, AUS. 0408972, BEL. 0708975, CAN. 0883746, FRA. 1563782, GER. 1671591, GRB. 1215957, ITL. 0822303, JAP. 0620886, MEX. 0100810, VZL. 0023682.

Class 30G

3,655,372.—IMAGE REVERSAL IN MANIFOLD IMAGING. APR. 11, 1972.
3,901,697.—MANIFOLD IMAGING PROCESSUSING ELECTRONICS PHOTOSENSITIVE MATERIAL SUBJECT TO LIGHT FATIGUE. AUG. 26, 1975.

Class 30H

3,649,117.—IMAGING PROCESS. MAR. 14, 1972. BEL. 0761133, CAN. 0985732, FRA. 7047700, GRB. 1340679, ITL. 0914070, JAP. 0759480.
3,918,967.—CONTACT REFLEX MANIFOLD IMAGING PROCESS. NOV. 11, 1975. ARG. 0183676, BEL. 0761132, CAN. 0949120, FRA. 7047699, GRB. 1340207, ITL. 0914069, JAP. 0770143, MEX. 0119757, VZL. 0032600.

Class 30I

3,556,783.—COLOR MANIFOLD IMAGING PROCESS. JAN. 19, 1971.
3,853,555.—METHOD OF COLOR IMAGING A LAYER OF ELECTRICALLY PHOTOSENSITIVE AGGLOMERATES. DEC. 10, 1974.
3,854,943.—MANIFOLD IMAGING METH AND MEMBR EMPLOYING FUNDAMENTAL PARTICLES OF ALPHA METAL FREE PHTHALOCYANINE. DEC. 17, 1974. CAN. 0988766, GRB. 1424234.

Class 31

3,719,951.—WRAP ADJUST DEVICE FOR CONTROLLING ENGAGEMENT BETWEEN A WEB AND ROLLER IN AN IMAGING SYSTEM. MAR. 6, 1973. CAN. 0995295, GRB. 1406047.

Class 31A

3,520,681.—PHOTOELECTROSOLOGRAPHY. JULY 14, 1970. BRA. 0084241, CAN. 0852692, MEX. 0085656.
3,801,314.—IMAGING SYSTEM. APR. 2, 1974.
3,975,195.—MIGRATION IMAGING SYSTEM. AUG. 17, 1976.
4,009,028.—REVERSE MIGRATION IMAGING SYSTEM. FEB. 22, 1977. BEL. 0827065.
4,013,462.—MIGRATION IMAGING SYSTEM. MAR. 22, 1977.

Class 31B

3,528,355.—CAMERA-PROCESSOR. SEPT. 15, 1970. ARG. 0184627, ATR. 0303513, AUS. 0426557, BEL. 0720022, BRA. 6800654, CAN. 0864811, CHL. 0024251, CLB. 0018453, FRA. 1586179, GER. 1797177, GRB. 1244641, IND. 0117458, ITL. 0839895, LXB. 0056774, MEX. 0103737, NOR. 0128296, NZL. 0153587, PLP. 0006313, PNM. 0001980, PRU. 0010212, PTG. 0050229, SPN. 0357651, STZ. 0516171, SWD. 0338503, URG. 0009309, VZL. 0023698.
3,542,465.—CAMERA WITH DEVELOPMENT MEANS. NOV. 24, 1970. CAN. 0918739, GRB. 1241846, JAP. 0650672.
3,719,951.—WRAP ADJUST DEVICE FOR CONTROLLING ENGAGEMENT BETWEEN A WEB AND ROLLER IN AN IMAGING SYSTEM. MAR. 6, 1973. CAN. 0995295, GRB. 1406047.
3,770,554.—APPARATUS FOR SPLITTING A SOFTENABLE FILM COMPRISING BITE ROLLERS. NOV. 6, 1973.
3,878,816.—IMAGING SYSTEM. APR. 22, 1975.
3,910,475.—SYSTEM FOR ELECTRICALLY GROUNDING OR BIASING A MEMBER. OCT. 7, 1975. FRA. 7404995, ITL. 1007663.
3,951,324.—CAMERA/PROCESSOR/PROJECTOR & SUBSYSTEMS. APR. 20, 1976. FRA. 7439865.
4,025,183.—CAMERA/PROCESSOR/PROJECTOR & SUBSYSTEMS. MAY. 24, 1977. FRA. 7439865.

Class 31C

3,556,781.—MIGRATION IMAGING PROCESS. JAN. 19, 1971. ARG. 0175887, AUS. 0425096, BEL. 0722718, CAN. 0874909, CHL. 0024333, FRA. 1587222, GER. 1804475, GRB. 1250526, GUA. 0002124, ITL. 0855511, MEX. 0103409, PNM. 0001949, PRU. 0010349, SPN. 0359501, STZ. 0506818, SWD. 0340750, URG. 0009365, VZL. 0023713.
3,615,400.—MIGRATION IMAGING SYSTEM EMPLOYING CARBON LAYER BETWEEN SOLVENT SOLUBLE LAYR AND CONDUCTIVE LAYER. OCT. 26, 1971. ATR. 0306509, AUS. 0433959, BEL. 0726279, CAN. 0874906, DNK. 0129015, FRA. 1598889, GRB. 1261360, ITL. 0850165, LXB. 0057703, NOR. 0127265, NZL. 0154928, SAF. 0688514, SPN. 0380191, STZ. 0512755, SWD. 7210413.
3,653,885.—PROCESS OF STABILIZING A MIGRATION IMAGE COMPRISING SELENIUM PARTICLES. APR. 4, 1972. CAN. 0937437.
3,656,990.—ELECTROSOLOGRAPHY. APR. 18, 1972. ARG. 0152723, BRA. 0084169, CAN. 0800550, CHL. 0025766. CLB. 0014944, MEX. 0086246, PNM. 0002518, PRU. 0009465, URG. 0008153, VZL. 0023999.
3,664,834.—MIGRATION IMAGING METHOD EMPLOYING ADHESIVE TRANSFER MEMBER. MAY 23, 1972. CAN. 0890353, GER. 1964201, GRB. 1291848, JAP. 0726370.
3,713,818.—MIGRATION IMAGING SYSTEM WITH MOLTEN LIQUID DEVELOPMENT. JAN. 30, 1973. CAN. 0933580, GRB. 1358566, USR. 0463275.
3,719,482.—IMAGING SYSTEM. MAR. 6, 1973.
3,720,513.—MIGRATION IMAGING METHOD INVOLVING SOLVENT WASH-AWAY OF UNMIGRATED PARTICLES. MAR. 13, 1973.
3,723,113.—POLYCHROMATIC ELECTROSOLOGRAPHIC. MAR. 27, 1973.

3,740,216.—PHOTOELECTROCOLOGRAPHIC IMAGING EMPLOYING A RELEASABLE IMAGING LAYER. JUNE 19, 1973.
3,741,757.—MIGRATION IMAGE DEVELOPMENT BY SPLITTING OR ABRADING SOFTENABLE LAYER. JUNE 26, 1973. ATR. 0306510, AUS. 0441768, BEL. 0743209, CAN. 0915960, FRA. 6943268, GER. 1961754, GRB. 1297129, ITL. 0879120, JAP. 0725058, PNM. 0001554, SPN. 0374618, SWD. 0358750, VZL. 0032779.
3,753,706.—PHOTOELECTROSOLOGRAPHIC IMAGING METHOD WHEREIN AN ABSORBENT MATERIAL IS USED. AUG. 21, 1973. CAN. 0945796, GRB. 1334141, JAP. 0766711.
3,791,822.—REMOVAL OF BACKGROUND FROM AN IMAGED MIGRATION LAYER. FEB. 12, 1974. ATR. 0306510, AUS. 0441768, BEL. 0743209, CAN. 0915960, FRA. 6943268, GER. 1961754, GRB. 1297129, ITL. 0879120, JAP. 0725058, PNM. 0001554, SPN. 0374618, SWD. 0358750, VZL. 0032779.
3,795,512.—IMAGING SYSTEM. MAR. 5, 1974. ARG. 0188187, ATR. 0301340, AUS. 0429441, BEL. 0725617, BRA. 0088091, CAN. 0883747, DNK. 0131212, FRA. 1599277, GER. 1815217, GRB. 1257189, ITL. 0849328, JAP. 0686721, LXB. 0057585, MEX. 0101986, NOR. 0128084, NZL. 0154842, PTG. 0050858, SAF. 0688365, SPN. 0361650, STZ. 0523523, SWD. 0341128, VZL. 0023715.
3,798,030.—PHOTOELECTROSOLOGRAPHIC IMAGING METHOD UTILIZING POWDER PARTICLES. MAR. 19, 1974.
3,820,984.—PHOTOELECTROSOLOGRAPHIC IMAGING METHOD USING FUSIBLE PARTICLES. JUNE 28, 1974.
3,836,362.—IMAGING METHOD. SEPT. 17, 1974.
3,839,030.—MIGRATION IMAGING PROCESS WITH UNIFORM EXPOSURE BEFORE OR DURING THE SOFTENING STEP. OCT. 1, 1974. BEL. 0715790. CAN. 0890853, FRA. 1572571, GER. 1772523, GRB. 1234652, ITL. 0834777, JAP. 0620888.
3,839,031.—ELECTRODE DEVELOPMENT MIGRATION IMAGING METHOD. OCT. 1, 1974. ARG. 0184241, AUS. 0456843, BEL. 0755599, CAN. 0947367, FRA. 7032000, GRB. 1326950, ITL. 0907387, JAP. 0766709, MEX. 0120156, SPN. 0383314, SWD. 0369115.
3,840,397.—PARTICLE PLACING SYSTEM. OCT. 8, 1974. ARG. 0175888, ATR. 0300561, AUS. 0427473, BEL. 0724135, CAN. 0868305, DNK. 0126727, FRA. 1593258, GER. 1810079, GRB. 1254448, ITL. 0948025, JAP. 0708364, LXB. 0057367, MEX. 0107468, NOR. 0127216, NZL. 0154542, PNM. 0002048, PTG. 0050687, SAF. 0687633, SPN. 0360458, STZ. 0501251, SWD. 0341724, VZL. 0023710.
3,866,236.—IMAGING PROCESS USING VERTICAL PARTICLE MIGRATION. FEB. 11, 1975. CAN. 0936735, GRB. 1360623.
3,873,309.—IMAGING METHOD USING MIGRATION MATERIAL. MAR. 25, 1975. CAN. 978008, GRB. 1357143.
3,878,816.—IMAGING SYSTEM. APR. 22, 1975.
3,894,869.—A POLYCHROMATIC MIGRATION IMAGING SYSTEM. JULY 15, 1975.
3,901,699.—MIGRATION AND AGGLOMERATION IMAGING METHOD. AUG. 26, 1975.
3,910,475.—SYSTEM FOR ELECTRICALLY GROUNDING OR BIASING A MEMBER. OCT. 7, 1975. FRA. 7404995, ITL. 1007663.
3,912,505.—COLOR IMAGING METHOD EMPLOYING A MONOLAYER OF BEADS. OCT. 14, 1975. ARG. 0179561, AUS. 0426600, BEL. 0723097, CAN. 0890354, CHL. 0024276, FRA. 1587252, GRB. 1248744, GUA. 0002327, HOL. 0151526, ITL. 0845607, JAP. 0731223, MEX. 0107801, PNM. 0001814, PRU. 0010425, SPN. 0377583, STZ. 0526138, SWD. 0351501, URG. 0009366, VZL. 0023708.
3,917,880.—ELECTROPHOTETIC IMAGING SYSTEM. NOV. 4, 1975. GRB. 1459468.
3,918,969.—MIGRATION IMAGING METHOD EMPLOYING A UNIFORM EXPOSURE STEP. NOV. 11, 1975. ARG. 0172557, ATR. 0300565, AUS. 0430615, BEL. 0726282, CAN. 0883748, DNK. 0124046, FRA. 1598888, GER. 1817222, GRB. 1257030, ITL. 0850166, JAP. 0665999, LXB. 0057692, MEX. 0107941, NOR. 0127264, NZL. 0154930. PNM. 0001958, SAF. 0688516, SPN. 0362041, STZ. 0506822, SWD. 0340953, VZL. 0023721.
3,933,491.—IMAGING SYSTEM. JAN. 20, 1976.
3,950,167.—IMAGING SYSTEM. APR. 13, 1976. FRA. 7432507.
3,960,555.—PROCESS-PESO WITH CONDUCTORLESS BASE. JUNE 1, 1976. BEL. 0713103, BRA. 0088021, CAN. 0890858, CHL. 0023981, FRA. 1576403, IND. 0115236, ITL. 0829694, LXB. 0055807, MEX. 0096676, PRU. 0009941, SAF. 68/2105, SPN. 0352317, URG. 0009135, VZL. 0023691.
3,966,465.—MULTIPLE LAYER MIGRATION IMAGING SYSTEM. JUNE 29, 1976. BEL. 0773383, CAN. 0960286, FRA. 7135575, GRB. 1370146, ITL. 0938874.
3,967,959.—MIGRATION IMAGING SYSTEM. JULY 6, 1976.
3,970,453.—IMAGING BY SELECTIVE STRIPPING OUT AREAS OF LAYER. JULY 20, 1976.
3,975,739.—MIGRATION IMAGING SYSTEM USING SHAPED ELECTRODE. AUGUST 17, 1976.
3,976,483.—FRASING PROCESS - XDM LATENT IMAGE ERASING. AUG. 24, 1976. ARG. 0184682, AUS. 0458164, BEL. 0761130, CAN. 0946911, FRA. 7047697, GRB. 1339715, ITL. 0914071, JAP. 0770138, MEX. 0119758, VZL. 0032932.
3,979,210.—MIGRATION IMAGING MEMBER EMPLOYING A SURFACE SKIN. SEPT. 7, 1976.
3,982,936.—DEFORMATION IMAGING SYSTEM. SEPT. 28, 1976.
3,982,939.—MULTIPLE LAYER MIGRATION IMAGING SYSTEM. SEPT. 28, 1976. BEL. 0773383, CAN. 0946672, FRA. 7135575, GRB. 1370146, ITL. 0938874.
3,985,560.—IMAGING SYSTEM. OCT. 12, 1976.
4,007,042.—MIGRATION IMAGING METHOD. FEB. 8, 1977.
4,012,250.—IMAGING SYSTEM-MIGRATION IMAGE CONVERSION BY DYE TRANSFER. MAR. 15, 1977. CAN. 0972208, GRB. 1341405, JAP. 0770142.
4,014,695.—IMAGING SYSTEM. MAR. 29, 1977.
4,021,110.—PHOTOCOPYING CAMERA AND PROCESSING DEVICE. MAY 3, 1977.
4,028,101.—MIGRATION IMAGING MEMBER EMPLOYING A SURFACE SKIN. JUNE 7, 1977.

Class 31D

3,573,906.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS. APR. 6, 1971. ARG. 0177890, AUS. 0441534, BEL. 0725173, BRA. 0088092, CAN. 0906801, CZC. 0157053, FRA. 1594981, GRB. 1217726, ITL. 0852743, MEX. 0106441, SPN. 0379204, SWD. 0335063, USR. 0448658. VZL. 0029780.
3,615,400.—MIGRATION IMAGING SYSTEM EMPLOYING CARBON LAYER BETWEEN SOLVENT SOLUBLE LAYER AND CONDUCTIVE LAYER. OCT. 26, 1971. ATR. 0306509, AUS. 0433959, BEL. 0726279. CAN. 0874906, DNK. 0129015, FRA. 1598889, GRB. 1261360, ITL. 0850165, LXB. 0057703, NOR. 0127265, NZL. 0154928, SAF. 0688514, SPN. 0380191, STZ. 0512755, SWD. 7210413.
3,740,216.—PHOTOELECTROCOLOGRAPHIC IMAGING EMPLOYING A RELEASABLE IMAGING LAYER. JUNE 19, 1973.
3,740,223.—MIGRATION IMAGING STRUCTURE. JUNE 19, 1973. BRA. 6897135, CAN. 0855151, MEX. 0100800, PNM. 0002192, PRU. 0009484, VZL. 0032425.
3,753,706.—PHOTOELECTROSOLOGRAPHIC IMAGING METHOD WHEREIN AN ABSORBENT MATERIAL IS USED. AUG. 21, 1973. CAN. 0945796, GRB. 1334141, JAP. 0766711.
3,801,314.—IMAGING SYSTEM. APR. 2, 1974.
3,820,984.—PHOTOELECTROSOLOGRAPHIC IMAGING METHOD USING FUSIBLE PARTICLES. JUNE 28, 1974.
3,836,364.—PHOTOELECTROSOLOGRAPHIC PROCESS FOR MAKING MULTIPLE IMAGES. SEPT. 17, 1974. CAN. 0914519, GRB. 1344482, JAP. 0770140.
3,839,031.—ELECTRODE DEVELOPMENT MIGRATION IMAGING METHOD. OCT. 1, 1974. ARG. 0184241, AUS. 0456843. BEL. 0755599, CAN. 0947367, FRA. 7032000, GRB. 1326950, ITL. 0907387, JAP. 0756709, MEX. 0120156, SPN. 0383314, SWD. 0369115.
3,873,309.—IMAGING METHOD USING MIGRATION MATERIAL. MAR. 25, 1975. CAN. 978008, GRB. 1357143.
3,901,702.—MIGRATION IMAGING ELEMENT WITH ABSORBENT BLOTTER OVERLAYER. AUG. 26, 1975. CAN. 0945796, GRB. 1334141, JAP. 0766711.
3,933,491.—IMAGING SYSTEM. JAN. 20, 1976.
3,966,465.—MULTIPLE LAYER MIGRATION IMAGING SYSTEM. JUNE 29, 1976. BEL. 0773383, CAN. 0960286, FRA. 7135575, GRB. 1370146, ITL. 0938874.
3,975,195.—MIGRATION IMAGING SYSTEM. AUG. 17, 1976.
3,982,939.—MULTIPLE LAYER MIGRATION IMAGING SYSTEM. SEPT. 28, 1976. BEL. 0773383, CAN. 0946672, FRA. 7135575, GRB. 1370146, ITL. 0938874.
3,985,560.—IMAGING SYSTEM. OCT. 12, 1976.
3,998,635.—IMAGING SYSTEM. DEC. 21, 1976.
4,007,042.—MIGRATION IMAGING METHOD. FEB. 8, 1977.
4,009,028.—REVERSE MIGRATION IMAGING SYSTEM. FEB. 22, 1977. BEL. 0827065.

4,012,250.—IMAGING SYSTEM-MIGRATION IMAGE CONVERSION BY DYE TRANSFER. MAR. 15, 1977. CAN. 0972208, GRB. 1341405, JAP. 0770142.
4,013,462.—MIGRATION IMAGING SYSTEM. MAR. 22, 1977.

Class 31E

3,598,644.—IMAGING MEMBER FABRICATION. AUG. 10, 1971.
3,671,282.—METHOD OF MAKING AN IMAGING MEMBER. JUNE 20, 1972. BEL. 0755384, FRA. 7031999, GRB. 1326056, ITL. 0901735.
3,971,334.—COATING DEVICE. JULY 27, 1976.
4,009,028.—REVERSE MIGRATION IMAGING SYSTEM. FEB. 22, 1977. BEL. 0827065.

Class 31F

3,520,681.—PHOTOELECTROSOLOGRAPHY. JULY 14, 1970. BRA. 0084241, CAN. 0852692, MEX. 0085656.
3,780,307.—LIQUID CRYSTALLINE COMPOSITIONS HAVING INDUCED OPTICAL ACTIVITY. DEC. 18, 1973. CAN. 1000484, GRB. 1408059.
3,909,262.—IMAGING MIGRATION MEMBER EMPLOYING A GELATIN OVERCOATING. SEPT. 30, 1975.
3,933,491.—IMAGING SYSTEM. JAN. 20, 1976.
3,966,465.—MULTIPLE LAYER MIGRATION IMAGING SYSTEM. JUNE 29, 1976. BEL. 0773383, CAN. 0960286, FRA. 7135575, GRB. 1370146, ITL. 0938874.

Class 31G

3,664,834.—MIGRATION IMAGING METHOD EMPLOYING ADHESIVE TRANSFER MEMBER. MAY 23, 1972. CAN. 0890353, GER. 1964201, GRB. 1291848, JAP. 0726370.
3,723,113.—POLYCHROMATIC ELECTROSOLOGRAPHIC. MAR. 27, 1973.
3,740,216.—PHOTOELECTROCOLOGRAPHIC IMAGING EMPLOYING A RELEASABLE IMAGING LAYER. JUNE 19, 1973.
3,741,757.—MIGRATION IMAGE DEVELOPMENT BY SPLITTING OR ABRADING SOFTENABLE LAYER. JUNE 26, 1973. ATR. 0306510, AUS. 0441768, BEL. 0743209, CAN. 0915960, FRA. 6943268, GER. 1961754, GRB. 1297129, ITL. 0879120, JAP. 0725058, PNM. 0001554, SPN. 0374618, SWD. 0358750, VZL. 0032779.
3,741,758.—MIGRATION IMAGING EMPLOYING PRESSURE NIP DEVELOPMENT. JUNE 26, 1973.
3,753,706.—PHOTOELECTROSOLOGRAPHIC IMAGING METHOD WHEREIN AN ABSORBENT MATERIAL IS USED. AUG. 21, 1973. CAN. 0945796, GRB. 1334141. JAP. 0766711.
3,770,554.—APPARATUS FOR SPLITTING A SOFTENABLE FILM COMPRISING BITE ROLLERS. NOV. 6, 1973.
3,791,822.—REMOVAL OF BACKGROUND FROM AN IMAGED MIGRATION LAYER. FEB. 12, 1974. ATR. 0306510, AUS. 0441768, BEL. 0743209, CAN. 0915960, FRA. 6943268, GER. 1961754, GRB. 1297129, ITL. 0879120, JAP. 0725058, PNM. 0001554, SPN. 0374618, SWD. 0358750, VZL. 0032779.
3,836,364.—PHOTOELECTROSOLOGRAPHIC PROCESS FOR MAKING MULTIPLE IMAGES. SEPT. 17, 1974. CAN. 0914519, GRB. 1344482, JAP. 0770140.
3,876,445.—MIGRATION IMAGING BY SPLITTING A SOFTENABLE MATERIAL. APR. 8, 1975. ATR. 0306510, AUS. 0441768, BEL. 0743209, CAN. 0915960, FRA. 6943268, GER. 1961754, GRB. 1297129, ITL. 0879120, JAP. 0725058, PNM. 0001554, SPN. 0374618, SWD. 0358750, VZL. 0032779.
3,979,210.—MIGRATION IMAGING MEMBER EMPLOYING A SURFACE SKIN. SEPT. 7, 1976.
4,014,695.—IMAGING SYSTEM. MAR. 29, 1977.
4,028,101.—MIGRATION IMAGING MEMBER EMPLOYING A SURFACE SKIN. JUNE 7, 1977.

Class 31H

3,795,512.—IMAGING SYSTEM. MAR. 5, 1974. ARG. 0188187, ATR. 0301340, AUS. 0429441, BEL. 0725617, BRA. 0088091, CAN. 0883747, DNK. 0131212, FRA. 1599277. GER. 1815217, GRB. 1257189, ITL. 0849328, JAP. 0686721, LXB. 0057585, MEX. 0101986, NOR. 0128084, NZL. 0154842, PTG. 0050858, SAF. 0688365, SPN. 0361650, STZ. 0523523, SWD. 0341128, VZL. 0023715.
3,839,031.—ELECTRODE DEVELOPMENT MIGRATION IMAGING METHOD. OCT. 1, 1974. ARG. 0184241, AUS. 0456843, BEL. 0755599, CAN. 0947367, FRA. 7032000, GRB. 1326950, ITL. 0907387, JAP. 0766709, MEX. 0120156, SPN. 0383314, SWD. 0369115.

Class 31I

3,861,911.—IMAGING FIXING METHOD. JAN. 21, 1975.

Class 31J

3,648,607.—IMAGING SYSTEM-MASTER MAKING BY BINDER PESO. MAR. 14, 1972. CAN. 0920410, GRB. 1322946, JAP. 0770136.
3,664,834.—MIGRATION IMAGING METHOD EMPLOYING ADHESIVE TRANSFER MEMBER. MAY 23, 1972. CAN. 0890353, GER. 1964201, GRB. 1291848, JAP. 0726370.
3,723,113.—POLYCHROMATIC ELECTROSOLOGRAPHIC. MAR. 27, 1973.
3,740,216.—PHOTOELECTROCOLOGRAPHIC IMAGING EMPLOYING A RELEASABLE IMAGING LAYER. JUNE 19, 1973.
3,820,984.—PHOTOELECTROSOLOGRAPHIC IMAGING METHOD USING FUSIBLE PARTICLES. JUNE 28, 1974.
3,923,504.—MIGRATION IMAGING MEMBER AND METHOD. DEC. 2, 1975.
3,985,560.—IMAGING SYSTEM. OCT. 12, 1976.

Class 31K

3,873,309.—IMAGING METHOD USING MIGRATION MATERIAL. MAR. 25, 1975. CAN. 978008, GRB. 1357143.
3,894,869.—A POLYCHROMATIC MIGRATION IMAGING SYSTEM. JULY 15, 1975.
3,912,505.—COLOR IMAGING METHOD EMPLOYING A MONOLAYER OF BEADS. OCT. 14, 1975. ARG. 0179561, AUS. 0426600, BEL. 0723097, CAN. 0890354, CHL. 0024276, FRA. 1587252, GRB. 1248744, GUA. 0002327, HOL. 0151526, ITL. 0845607, JAP. 0731223, MEX. 0107801, PNM. 0001814, PRU. 0010425, SPN. 0377583, STZ. 0526138, SWD. 0351501, URG. 0009366, VZL. 0023708.
3,966,465.—MULTIPLE LAYER MIGRATION IMAGING SYSTEM. JUNE 29, 1976. BEL. 0773383, CAN. 0960286, FRA. 7135575, GRB. 1370146, ITL. 0938874.
4,012,250.—IMAGING SYSTEM-MIGRATION IMAGE CONVERSION BY DYE TRANSFER. MAR. 15, 1977. CAN. 0972208, GRB. 1431405, JAP. 0770142.

Class 31L

3,615,394.—METHOD OF FORMING A PIGMENT IMAGE FROM A PIGMENT-RESIN TONER IMAGE. OCT. 26, 1971.
3,615,400.—MIGRATION IMAGING SYSTEM EMPLOYING CARBON LAYER BETWEEN SOLVENT SOLUBLE LAYER AND CONDUCTIVE LAYER. OCT. 26, 1971. ATR. 0306509, AUS. 0433959, BEL. 0726279, CAN. 0874906, DNK. 0129015, FRA. 1598889, GRB. 1261360. ITL. 0850165, LXB. 0057703, NOR. 0127265, NZL. 0154928, SAF. 0688514, SPN. 0380191, STZ. 0512755, SWD. 7210413.
4,012,250.—IMAGING SYSTEM-MIGRATION IMAGE CONVERSION BY DYE TRANSFER. MAR. 15, 1977. CAN. 0972208, GRB. 1431405, JAP. 0770142.

Class 32

3,719,951.—WRAP ADJUST DEVICE FOR CONTROLLING ENGAGEMENT BETWEEN A WEB AND ROLLER IN AN IMAGING SYSTEM. MAR. 6, 1973. CAN. 0995295, GRB. 1406047.
3,746,622.—COMPOSITION AND PROCESS. JULY 17, 1973. BEL. 0783439, CAN. 0986046, FRA. 7216331, MEX. 0132353, GRB. 1388725, ITL. 0965051, SAF. 7213163, STZ. 0590297.
3,774,592.—METHOD FOR PROVIDING AN IMPROVED BODY ELECTRODE ELECTRICAL CONNECTION. NOV. 27, 1973.
3,884,685.—LOW DENSITY PAPER USED IN TRANSFER ELECTROPHOTOGRAPHY. MAY 20, 1975. ARG. 0185573, ATR. 0314353, AUS. 0463544, BEL. 0768990, CAN. 9780051, CHL. 0027015, FRA. 7124553, GRB. 1353372, ITL. 0931092, MEX. 0124810, NOR. 0134805, NZL. 0164088, PNM. 0002462, SPN. 0392720, SWD. 0368995.
3,891,990.—IMAGING PROCESS USING DONOR MATERIAL. JUNE 24, 1975. GRB. 1459468.
3,946,172.—A LATCHING APPARATUS. MAR. 23, 1976. GRB. 1429530.
3,946,401.—ELECTROTHERMOGRAPHIC IMAGE PRODUCING TECHNIQUES. MAR. 23, 1976.
3,952,798.—INTERNALLY HEATED HEAT PIPE ROLLER-INTERNALLY HEATED HEAT PIPE. APR. 27, 1976. CAN. 0968341. GRB. 1368100.

3,971,950.—INDEPENDENT COMPRESSION AND POSITIONING DEVICE FOR USE IN MAMMOGRAPHY. JULY 27, 1976.
3,975,681.—ELECTRODE FOR MEASURING THICKNESS OF DIELECTRIC LAYERS ON CONDUCTIVE SUBSTRATES. AUG. 17, 1976.
3,978,342.—DUAL MODE RADIATION TRANSMITTING APPARATUS. AUG. 31, 1976.
3,997,498.—NON-SMUDGE CORRECTION FLUID. DEC. 14, 1976.
4,010,366.—MEASUREMENT OF THE MASS & CHARGE OF CHARGED CIRCUITS. MAR. 1, 1977.
4,018,953.—COATING METHOD. APR. 19, 1977.
4,020,210.—ENCAPSULATED WATER. APR. 26, 1977.
4,020,268.—AGAROSE CONTAINING AFFINITY MATRIX MATERIALS. APR. 26, 1977. BEL. 0783439, CAN. 0986046, FRA. 7216331, GRB. 1388725, ITL. 0965051, MEX. 0132353, SAF. 7213163, STZ. 0590297.

Class 32A

3,132,972.—ENERGY CONVERSION CELL. MAY 12, 1964.
3,231,426.—CONTINUOUS CONCENTRATION CELL. JAN. 25, 1966.
3,379,527.—PHOTOCONDUCTIVE INSULATORS COMPRISING ACTIVATED SULFIDES SELENIDES AND SULFOSELENIDES OF CADMIUM. APR. 23, 1968. CAN. 0907921, GRB. 1079065.

Class 32B

3,150,446.—BRAZING METHOD AND COMPOSITION. SEPT. 29, 1964.
3,354,644.—LIQUID PROTECTION OF ELECTRODES. NOV. 28, 1967.
3,372,860.—CORRESPONDENCE PIECE. MAR. 12, 1968.
3,453,752.—ANSWER COMPARISON DEVICE. JULY 8, 1969.
3,483,777.—INFORMATION STORAGE AND RETRIEVAL EMPLOYING THERMAL PERFORATION OF THE RECORD MEMBER. DEC. 16, 1969. CAN. 0811566.
3,507,333.—FIRE PREVENTION SYSTEM. APR. 21, 1970. BEL. 0722599, CAN. 0910255, FRA. 1589864, GRB. 1229495, ITL. 0845253, JAP. 0752504.
3,510,210.—COMPUTER PROCESS CHARACTER ANIMATION. MAY 5, 1970.
3,552,562.—RANDOM ACCESS RETRIEVAL SYSTEM. JAN. 5, 1971.
3,577,203.—CHARACTER RECORDING AND RECOGNITION SYS. MAY 4, 1971.
3,635,789.—DRINKING OF WASTE XEROGRAPHIC COPY PAPER - REMOVAL OF XEROX TONER FROM COPY PAPER. JAN. 18, 1972.
3,645,048.—ERASER FOR VELLUM XEROGRAPHIC COPY PAPER. FEB. 29, 1972. AUS. 0449216, CAN. 0933707, GRB. 1329835.
3,647,713.—NONAGGLOMERATING BLENDING PROCESS. MAR. 7, 1972. FRA. 7004722, GRB. 1302409, JAP. 0661186.
3,648,387.—EDUCATIONAL AID. MAR. 14, 1972.
3,655,379.—PRINTING BY VAPOR PROPULSION. APR. 11, 1972. BEL. 0758057, CAN. 0929351, FRA. 7041621, GRB. 1333783, ITL. 0916693.
3,708,287.—OIL FILM IMAGING. JAN. 2, 1973.
3,713,861.—INHIBITOR DEVICE. JAN. 30, 1973. CAN. 0917701, GRB. 1338893, JAP. 0727989.
3,748,090.—EVAPORATION CRUCIBLE. JULY 24, 1973.
3,771,084.—MAGNETIC RETRIEVAL DEVICE. NOV. 6, 1973.
3,772,173.—ELECTROCONDUCTIVE PAPER. NOV. 13, 1973. CAN. 0930693.
3,793,016.—ELECTROPHOTOGRAPHIC SHEET BINDING PROCESS. FEB. 19, 1974.
3,794,550.—SHEET BINDING. FEB. 26, 1974. CAN. 1012583, GRB. 1431286.
3,812,905.—DYNAMIC BARRIER FOR HEAT PIPE. MAY 28, 1974.
3,842,273.—CORONA GENERATOR CLEANING APPARATUS. OCT. 15, 1974. AUS. 0480142, BEL. 0817485. GRB. 1458088, SPN. 0428358.
3,845,739.—SYSTEM FOR VAPOR DEPOSITION OF THIN FILMS. NOV. 5, 1974. BEL. 0798324, GRB. 1428703.
3,861,202.—METHOD OF DETECTING PRESSURE UNIFORMITY. JAN. 21, 1975.
3,861,353.—SYSTEM FOR VAPOR DEPOSITION OF THIN FILMS. JAN. 21, 1975. BEL. 0798324, GRB. 1428703.
3,862,841.—POLYMERIZATION IMAGING BY CHARGE INJECTION FROM A PHOTOCONDUCTIVE LAYER. JAN. 28, 1975.
3,869,910.—DIAGNOSTIC TEST DEVICE FOR DEVELOPER MATERIALS. MAR. 11, 1975. CAN. 1006012, FRA. 7421111.
3,873,813.—CREDIT CARD. MAR. 25, 1975.
3,877,155.—RESPONSIVE ANSWER SYSTEM. APR. 15, 1975. CAN. 0858780, GRB. 1235941, JAP. 0688426.
3,879,275.—POLYMERIZATION. APR. 22, 1975.
3,901,591.—MECHANISM FOR COOLING PHOTOSENSITIVE MATERIALS IN AN ELECTROPHOTOGRAPHIC COPYING MACHINE. AUG. 26, 1975.
3,918,337.—CUTTING DEVICE FOR ELASTOMERIC SHEET MATERIAL. NOV. 11, 1975.
3,921,179.—FLUID PEN ASSEMBLY. NOV. 18, 1975.
3,921,896.—RESEALABLE CONTAINER. NOV. 25, 1975.
3,923,512.—IMAGING RECORDING PROCESS. DEC. 2, 1975. CAN. 1007097, GRB. 1387177.
3,929,477.—IMAGE PRODUCING TECHNIQUES OF SUPERCONDUCTING MATERIAL IN A MAGNETIC FIELD. DEC. 30, 1975.
3,944,710.—TRANSPARENCY. MAR. 16, 1976.
3,949,853.—PROPORTIONAL-SPACED CHARACTER PRINT WHEEL. APR. 13, 1976. BEL. 0825109, CAN. 1011276, GER. 7502932, STZ. 579989.
3,965,276.—POLYMERIZATION IMAGING. JUNE 22, 1976.
3,966,467.—TRANSFERRING TONER TO AN HYDROCARBON COATED SHEET. JUNE 29, 1976.
3,969,618.—ON LINE PROM HANDLING SYSTEM. JULY 13, 1976.
3,970,186.—DAMPER FOR A COMPOSITE PRINT WHEEL. JULY 20, 1976. BEL. 0825110, CAN. 1010805, STZ. 579990.
3,974,363.—PROGRAMMABLE BILLING SYSTEM. AUG. 10, 1976. BEL. 0813449, FRA. 7412151, GRB. 1448508, ITL. 1007793.
3,978,737.—CHAIN TENSIONING DEVICE. SEPT. 7, 1976.
3,989,865.—A TRANSPARENCY. NOV. 2, 1976.
3,992,511.—RECOVERY OF SELENIUM-SELENIUM RECOVERY PROCESS. NOV. 16, 1976.
4,000,460.—DIGITAL CIRCUIT MODULE TEST SYSTEM. DEC. 28, 1976.
4,013,362.—ADJUSTABLE FORMS GUIDE. MAR. 22, 1977.
4,037,706.—COMPOSITE PRINT WHEEL. JULY 26, 1977. BEL. 0825108, CAN. 1010806.

PATENT NOTICES

Certificates of Correction for the Week of Nov. 22, 1977

P.P. 4,039	4,022,740	4,036,394	4,041,004
P.P. 4,040	4,022,748	4,036,396	4,041,009
Re. 29,390	4,023,004	4,036,430	4,041,567
D. 243,443	4,023,671	4,036,564	4,041,580
D. 243,661	4,023,982	4,036,751	4,041,591
D. 244,556	4,024,228	4,036,786	4,041,612
D. 244,609	4,024,498	4,036,789	4,041,746
D. 244,789	4,024,872	4,036,829	4,041,752
D. 244,864	4,025,144	4,036,935	4,041,822
D. 244,912	4,025,356	4,037,027	4,042,002
D. 244,958	4,025,484	4,037,053	4,042,096
3,616,114	4,025,504	4,037,080	4,042,317
3,728,400	4,025,730	4,037,092	4,042,326
3,856,521	4,025,830	4,037,117	4,042,484
3,882,188	4,026,440	4,037,151	4,042,623
3,893,013	4,026,742	4,037,154	4,042,706
3,896,156	4,026,853	4,037,193	4,042,750
3,900,564	4,026,946	4,037,252	4,042,961
3,923,808	4,027,065	4,037,265	4,042,986
3,940,295	4,027,403	4,037,670	4,043,058
3,946,021	4,027,594	4,037,840	4,043,094
3,953,382	4,028,598	4,037,868	4,043,265
3,955,032	4,029,552	4,038,063	4,043,419
3,961,916	4,029,741	4,038,103	4,043,473
3,962,073	4,030,747	4,038,162	4,043,597
3,965,939	4,031,348	4,038,210	4,043,662
3,967,283	4,031,761	4,038,271	4,043,715
3,983,305	4,031,798	4,038,274	4,043,889
3,985,730	4,031,960	4,038,374	4,043,930
3,993,061	4,031,993	4,038,427	4,043,933
3,996,912	4,032,368	4,038,482	4,043,944
3,997,017	4,032,466	4,038,503	4,043,983
3,997,100	4,032,615	4,038,532	4,043,997
3,997,399	4,032,744	4,038,711	4,044,064
3,997,474	4,033,026	4,038,751	4,044,222
4,001,996	4,033,379	4,038,775	4,044,226
4,004,140	4,033,403	4,039,260	4,044,246
4,005,755	4,033,495	4,039,299	4,044,309
4,005,995	4,033,767	4,039,301	4,044,440
4,008,334	4,033,915	4,039,472	4,044,458
4,008,680	4,034,052	4,039,477	4,044,812
4,009,071	4,034,110	4,039,543	4,044,870
4,009,574	4,034,117	4,039,562	4,045,098
4,010,400	4,034,341	4,039,668	4,045,146
4,014,535	4,034,560	4,039,743	4,045,188
4,015,319	4,034,865	4,039,818	4,045,597
4,016,211	4,035,190	4,039,944	4,045,612
4,017,284	4,035,303	4,039,950	4,045,788
4,018,191	4,035,320	4,039,955	4,046,061
4,019,336	4,035,357	4,039,967	4,046,077
4,019,689	4,035,416	4,040,027	4,046,107
4,019,904	4,035,656	4,040,124	4,046,549
4,020,223	4,035,725	4,040,166	4,046,556
4,020,364	4,035,735	4,040,177	4,046,709
4,020,939	4,035,812	4,040,221	4,046,758
4,021,266	4,035,956	4,040,363	4,046,802
4,021,407	4,035,994	4,040,510	4,047,062
4,021,542	4,036,151	4,040,527	
4,021,920	4,036,159	4,040,585	
4,022,215	4,036,374	4,040,655	

Manual Subscriptions and Rule and Statute Booklets

All subscriptions to various manuals and rules and the sale of various individual booklets which emanate from the Patent and Trademark Office, are handled by the Government Printing Office. Orders for new subscriptions or for the purchase of individual booklets should be addressed to the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Inquiries concerning subscriptions previously placed or concerning revision material issued under a subscription should be addressed to the Superintendent of Documents, U.S. Government Printing Office, Customer Service Section SSOS, Washington, D.C. 20402.

However, as a service to patent and trademark practitioners and other interested parties, the following information is being published regarding revision schedules and rates for manual subscriptions, and rule and statute booklets. This information should be helpful in determining the currency of manuals and rules.

The Manual of Patent Examining Procedure (M.P.E.P.) is revised quarterly, the revisions being numbered consecutively and dated January, April, July and October of each year. The current subscription price for the M.P.E.P. is $19.65 (plus $4.95 for foreign mailing).

Revisions of the Manual of Classification for patents are presently published irregularly. However, beginning in 1978 it will be revised on a regular basis. These revisions will be published quarterly, dated January, April, July and October. The current subscription price for this manual is $44.00 (plus $11.00 for foreign mailing).

The Trademark Manual of Examining Procedure is normally revised anually, the revisions being numbered consecutively and dated January of each year. The current subscription price for the T.M.E.P. is $8.10 (plus $2.05 for foreign mailing).

The Trademark Rules of Practice (including the trademark statute) is revised from time to time whenever changes are made in the rules or the statute. The current Trademark Rules of Practice is the Ninth Edition, dated December 1976, and the current subscription price is $5.00 (plus $1.25 for foreign mailing).

The foregoing publications are available only by subscription. When revisions are issued, they are a part of the subscription and are mailed to subscribers automatically by the Superintendent of Documents of the Government Printing Office without additional charge. The original subscription price covers revisions until the Government Printing Office mails a notice of expiration of the subscrption with a statement of the renewal fee necessary for continuing the subscription to the subscriber.

Both the patent rules and trademark rules are contained in an annual publication entitled 37 Code of Federal Regulations which is revised July 1 of each year. The price for the 1977 edition is $3.00 per copy.

The Patent Laws booklet is revised on an as-needed basis. The current edition is dated August 1976 and the current price is $2.10.

Due to the requirements of the printing process, these publications and revisions are generally not available until several months after the date which is printed on the revision or the booklet.

Date Oct. 12, 1977. LUTRELLE F. PARKER,
Acting Commissioner of Patents and Trademarks.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF OCTOBER 8, 1977

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	6-22-76
GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	1-3-77
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	2-1-77
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	10-22-76
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	10-27-76
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales.	8-18-76
SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	6-15-76
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	1-7-77
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating.	10-12-76
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	7-9-76
DESIGNS, GROUP 290—C. D. QUARFORTH, Director Industrial Arts; Household, Personal and Fine Arts.	3-24-76
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—D. J. STOCKING, Director Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	9-1-76
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus: Plastics Working Apparatus; Plastic Block and Earthenware Apparatus: Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks.	3-17-77
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—G. M. FORLENZA, Director Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	11-1-76
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GAY, Director Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication.	11-1-76
GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director Joints; Fasteners; Rod, Pipe and Electrical Connectors: Miscellaneous Hardware; Locks; Building Structures: Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines.	2-3-77

Expiration of patents: The patents within the range of numbers indicated below expire during October 1977, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents .... Numbers 2,954,560 to 2,958,080, inclusive
Plant Patents .... Numbers 1,974 to 1,977, inclusive

REISSUES

NOVEMBER 22, 1977

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 29,476

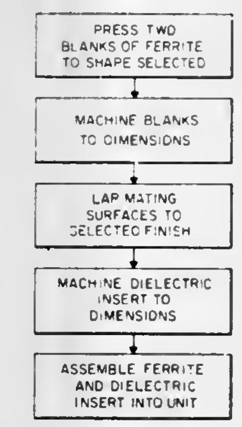
METHOD FOR FABRICATING A DIELECTRIC FILLED FERRITE TOROID FOR USE IN MICROWAVE DEVICES

Frank R. Monforte, Los Altos, and Giltan M. Argentina, San Jose, both of Calif., assignors to Ampex Corporation, Redwood City, Calif.

Original No. 4,007,541, dated Feb. 15, 1977, Ser. No. 567,757, Apr. 14, 1975. Application for reissue Apr. 8, 1977, Ser. No. 785,898

Int. Cl.² H01P *11/00;* H01F *41/02*

U.S. Cl. 29—600 **9 Claims**



1. A method for fabricating a two-piece toroid having a dielectric material insert, which two-piece toroid exhibits the hystersis loop characteristics of a one-piece toroid, comprising the steps of:

pressing selected quantities of a magnetic material into a pair of selected complementary blanks of substantially uniform density over their entire cross-sections;

machining the pair of blanks to define confronting mating surfaces commensurate with complementary cross-sectional shapes and lengths of given dimensions within selected tolerances;

lapping the confronting mating surfaces of the pair of machined shapes to a finish sufficient to maintain the hystersis loop characteristics inherent in a similar one-piece configuration formed of the same magnetic material;

machining a single dielectric material insert to outside dimensions which allow the insert to fit snugly within the complementary pair of magnetic machined shapes along the entire length thereof; and

assembling the complementary pair of machined shapes about the dielectric material insert with intimate contact between all surfaces of the insert facing respective confronting surfaces of the machined shapes, wherein the lapped confronting surfaces of the machined shapes are in such intimate contact that the hysteresis loop characteristics are similar to those of a one-piece toroid.

Re. 29,477

FOOD PRODUCT FREEZING APPARATUS

Edward M. Wight, Austin, Tex., assignor to Glacier Industries, Inc., Austin, Tex.

Original No. 3,857,252, dated Dec. 31, 1974, Ser. No. 324,432, Jan. 17, 1973. Application for reissue Jan. 13, 1977, Ser. No. 759,051

Int. Cl.² F25D *23/02*

U.S. Cl. 62—266 **32 Claims**

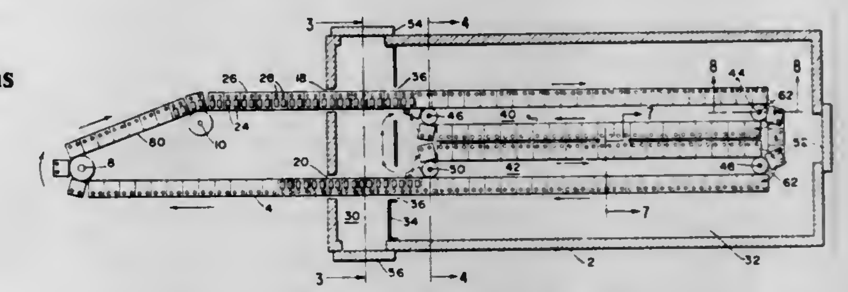
1. A food freezing apparatus comprising:

a vault;

a continuous conveying means for transporting food products into, through and out of said vault, said conveying means traveling primarily in at least one network along *vertical* substantially parallel planes within said vault;

a refrigeration coil;

means for circulating air in heat exchange with said coil and over said products in a direction substantially parallel to a plane perpendicular to the primary planes of travel of said conveying means within said vault; and a bulkhead within



said vault forming a first and second chamber within said vault, said food products passing into and out of said vault through said first chamber, said second chamber containing said means for circulating air, said coil and said networks, wherein said bulkhead is positioned substantially perpendicular to the primary planes of travel of said conveying means and parallel to said air circulation direction.

Re. 29,478

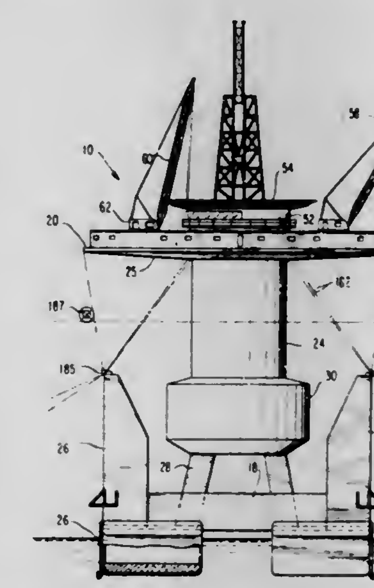
SINGLE COLUMN SEMISUBMERSIBLE DRILLING VESSEL

Yoram Goren, Los Angeles, Calif., and Samuel H. Lloyd, III, Houston, Tex., assignors to Santa Fe International Corporation, Orange, Calif.

Original No. 3,771,481, dated Nov. 13, 1973, Ser. No. 139,765, May 3, 1971. Application for reissue Nov. 10, 1975, Ser. No. 630,752

Int. Cl.² B63B *35/44*

U.S. Cl. 114—265 **45 Claims**



1. A variable draft vessel comprising:

a pair of elongated flotation members disposed in spaced side-by-side substantially parallel relation one to the other, said flotation members having a combined displacement sufficient to float the vessel in a low draft condition with the flotation members having freeboard and constituting substantially the entirety of the flotational support for said vessel in said low draft condition;

a working platform;

means connected between said working platform and said flotation members to support said working platform in fixed spaced relation above said flotation members;

a plurality of elements carried by said vessel between said flotation members and said platform with at least one of said elements comprising at least part of said connecting means;

said elements including a central, substantially vertically disposed, column *located substantially at the vessel's central vertical axis* and a plurality of stabilizing members spaced laterally outwardly of said central column and one from the other;

the upper portions of said stabilizing members being spaced below said platform;

means for ballasting and deballasting the vessel to respectively submerge the flotation members, stabilizing members and a portion of said central column thereby to provide a high draft floating condition with the water line located intermediate the height of said central column and to return the vessel to the low draft condition, said *stabilizing* members being located and having waterplane areas sufficient to provide stability to the vessel during at least a portion of its transition between low and high draft conditions, the displacement of the submerged flotation members, stabilizing members and said portion of the central column being sufficient to maintain the vessel buoyant in the high draft condition;

the vertical spacing between said platform and said flotation members being identical in both said high and low draft conditions of said vessel; and

means carried by said platform for conducting drilling operations external to said vessel when said vessel lies in said high draft floating condition.

Re. 29,479

TENNIS BALL PITCHING APPARATUS WITH ANTI-JAMMING BALL FEED MECHANISM

Joseph J. Mohr, 1200 Cardiff Drive, Encinitas, Calif. 92024

Original No. 3,844,267, dated Oct. 29, 1974, Ser. No. 357,907, May 7, 1973. Continuation-in-part of Ser. No. 133,070, April 12, 1971, abandoned. Application for reissue Aug. 5, 1976, Ser. No. 712,097

Int. Cl.² F41B *15/00*

U.S. Cl. 124—1 **7 Claims**

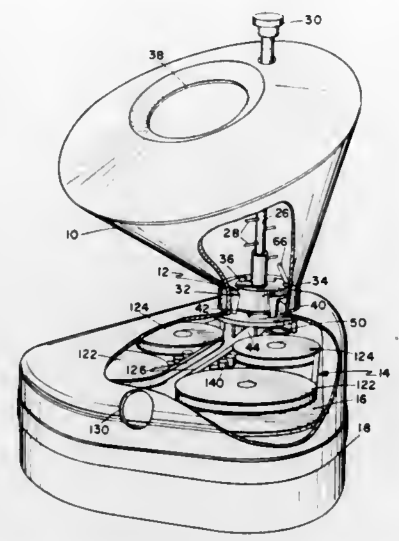
5. Apparatus for propelling individual balls comprising:

a hopper for storing a quantity of balls,

a rotating ball selector means for removing a single ball from said quantity of balls at periodic intervals,

drive means for rotating said selector,

and clutch means for disengaging said drive means from said ball selector means at a pre-determined torque, and for subsequently imparting a reverse rotation to said selector



means and a re-engaging of said drive means with said selector means.

Re. 29,480

METHOD FOR DETERMINING VITAMIN B_{12} AND REAGENT THEREFOR

Rolf E. A. V. Axen, Upplands Balinge; Jerker O. Porath, and Leif Edvin Wide, both of Uppsala, all of Sweden, assignors to Pharmacia AB, Uppsala, Sweden

Original No. 3,505,019, dated Apr. 7, 1970, Ser. No. 675,323, Oct. 16, 1967. Application for reissue July 23, 1975, Ser. No. 598,142

Claims priority, application Sweden, Oct. 21, 1966, 14397/66

Int. Cl.² G01N *23/00, 33/16;* **G01T** *1/16*

U.S. Cl. 424—1.5 **31 Claims**

1. A method for determining vitamin B_{12} in an aqueous sample, which comprises contacting particles of water-insoluble polymers to which a substance capable of binding vitamin B_{12} has been bound, by covalent bonds, with the sample and with a certain amount of vitamin B_{12} labelled with a radioisotope, and subsequent to the reaction between vitamin B_{12} and the substance capable of binding vitamin B_{12} attached to the particles having taken place, separating the particles from the sample liquid and determining the radioactivity of the particle material.

17. A method according to claim 1, wherein said covalent bonds are formed through a group of the formula —NH·CS·NH—, —NH·CO·NH—, or —N=N—.

22. A method according to claim 1, wherein said polymer is obtained by cross-linking a material selected from the group consisting of carbohydrates, sugar alcohols, and polyvinyl alcohol, with a bifunctional compound of the formula X—R—Z, wherein X and Z are each independently halogen or epoxy, and R is an aliphatic radical containing from 3 to 10 carbon atoms.

PLANT PATENTS

GRANTED NOVEMBER 22, 1977

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

4,153

CHRYSANTHEMUM PLANT

Walter H. Jessel, Jr., Grantsville, W. Va., and William E. Duffett, Salinas, Calif., assignors to Yoder Brothers, Inc., Barberton, Ohio

Filed Aug. 23, 1976, Ser. No. 716,440

Int. Cl.² A01H *5/00*

U.S. Cl. Plt.—74 **1 Claim**

1. A new and distinct cultivar of *Chrysanthemum morifolium,* Ramat., plant known by the cultivar name Joy and particularly characterized as to uniqueness by the combined characteristics of flat inflorescence form; anenome inflorescence type; medium yellow ray floret color, tinging light bronze with cool (below 60° F) finishes; minimal inflorescence color oxidation during high temperature periods; uniform 8 week flowering response to photoperiodic short-day control; short plant height; semi-upright branching pattern; and diameter across face of inflorescence up to 95 mm. at maturity.

4,154

AFRICAN VIOLET PLANT

Hermann Holtkamp, Sr., Kueningsmuehle, 2-Dingden, 4236 Hamminkeln, Germany

Filed Oct. 7, 1976, Ser. No. 730,356

Int. Cl.² A01H *5/00*

U.S. Cl. Plt.—69 **1 Claim**

1. A new and distinct cultivar of African Violet plant referred to by the cultivar name Evelyn and particularly characterized as to uniqueness by the combined characteristics of violet-blue flower color, relatively large flower size on strong stems, profuse flowering and long blooming period, foliage color, and fast and vigorous growth.

4,155

NECTARINE TREE

Chris Floyd Zaiger, 537 Rosemore Ave., Modesto, Calif. 95351

Filed Oct. 12, 1976, Ser. No. 731,557

Int. Cl.² A01H *5/03*

U.S. Cl. Plt.—41 **1 Claim**

1. A new and distinct variety of nectarine tree, characterized by its dwarf size and heavy production, bearing medium size, highly colored, clingstone fruit of good eating quality.

4,156

CHRYSANTHEMUM PLANT

Walter H. Jessel, Jr., Grantsville, W. Va., and William E. Duffett, Salinas, Calif., assignors to Yoder Brothers, Inc., Barberton, Ohio

Filed Nov. 18, 1976, Ser. No. 743,060

Int. Cl.² A01H *5/00*

U.S. Cl. Plt.—74 **1 Claim**

1. A new and distinct cultivar of *Chrysanthemum morifolium,* Ramat., plant known by the cultivar name Jamboree and particularly characterized as to uniqueness by the combined characteristics of spooned daisy inflorescence type; flat inflorescence form; orange-bronze to yellow-bronze ray floret color; medium green disc floret color at immature, unopened state; diameter across face of inflorescence up to 110 mm. at maturity; uniform nine week photoperiodic flowering response to short day control; medium plant height; semi-upright branching pattern, and minimal pollen development.

4,157

MOUNTAIN ASH TREE

John Frank Schmidt, Jr., 19343 NE. Halsey St., Portland, Oreg. 97230

Filed Dec. 27, 1976, Ser. No. 754,521

Int. Cl.² A01H *5/12*

U.S. Cl. Plt.—51 **1 Claim**

1. A new and distinct variety of mountain ash tree substantially as herein shown and described, characterized particularly as to novelty by a unique combination of its rapid rate of growth, a trunk which for a tree of a given height is straighter than the trunk of a tree of an ordinary variety of similar height, large foliage with dark green leaflets, a large proportion of the surface area of young petioles and newly formed branches is reddish color, and fall changes which occur approximately 2 to 3 weeks later than similar changes in ordinary varieties.

PATENTS

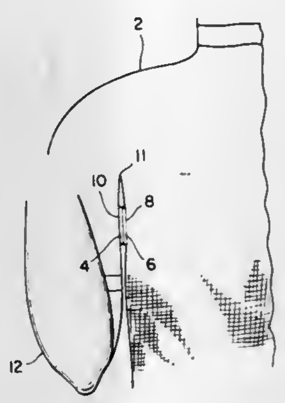
GRANTED NOVEMBER 22, 1977

ERRATA

For CLASS	See PATENT NO.
128-022.05	4,059,169
356-222	4,059,359
062-049	4,059,424
264-046.4	4,059,564
542-426	4,059,577
544-021	4,059,578
544-172	4,059,579
544-073	4,059,580
544-069	4,059,581
544-193	4,059,610
560-026	4,059,613
560-053	4,059,614
560-132	4,059,615
560-066	4,059,616
560-222	4,059,617
560-221	4,059,618
364-108	4,059,745
364-107	4,059,746
364-493	4,059,747
235-303.1	4,059,748
235-302	4,059,749
364-715	4,059,750
364-829	4,059,751
362-098	4,059,752
362-267	4,059,753
362-217	4,059,754
362-224	4,059,755
363-037	4,059,791
363-135	4,059,792
365-104	4,059,826
365-126	4,059,827
365-032	4,059,828
365-019	4,059,829
343-006.8 R	4,059,831

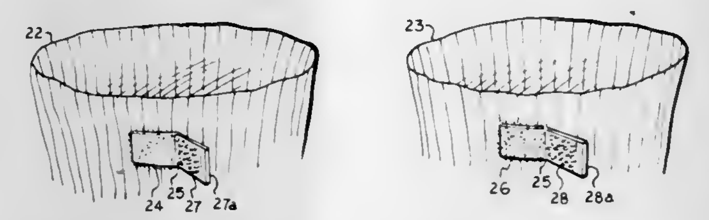
GENERAL AND MECHANICAL

4,058,852
SHIRT TYPE GARMENT INCLUDING BUILT IN ARM POSITIONING MEANS
Louis Aragona, 11 Scheiber Terrace, Cedar Grove, N.J. 07009
Filed Aug. 31, 1976, Ser. No. 719,198
Int. Cl.² A41B *1/00*
U.S. Cl. 2—115 **5 Claims**



1. A shirt type garment for assisting a wearer to maintain an arm in intimate contact with a side chest, comprising:
first means secured to an upper side chest portion of the garment near the armpit of the wearer;
second means secured to the corresponding upper side arm portion of the garment near the armpit of the wearer;
said first and second means being in clinging engagement when the upper arm of the wearer is pressed into intimate contact with the upper side chest;
a physical and audible warning being provided when the intimate contact is broken: and
third means disposed intermediate the first and second means to neutralize the clinging engagement of the first and second means when the upper arm of the wearer is pressed into intimate contact with the upper side chest.

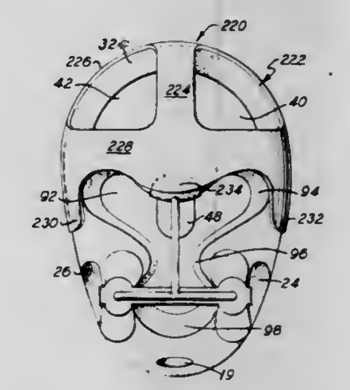
4,058,853
SOCKS WITH FLEXIBLE SELF-CONTAINED FASTENER PATCHES
Rubin Boxer, and Robert Keith Boxer, both of 564 Ricardo Ave., Santa Barbara, Calif. 93109
Continuation-in-part of Ser. No. 617,969, Sept. 29, 1975, abandoned. This application Nov. 17, 1975, Ser. No. 632,818
Int. Cl.² A41B *11/00*
U.S. Cl. 2—239 **8 Claims**



1. In the combination of a pair of flexible clothing items and self-contained fasteners secured to each item of the clothing pair, the improved fasteners comprising:
a strip having cooperating adjacent pair of flexible hook-and-pile patches for each item of the clothing pair, one of said patches having said hooks and the other of said patches having said pile, wherein one of the patches is secured to its associated clothing item and the other joined patch is free from said securement and is selectively; and movable to close over the one patch when the clothing item is being worn by the user to prevent clothing of the wearer from catching on the hooks,
said hook-and-pile pair of patches being manually openable so that the patch pair hook-and-pile pair of patches of one clothing item can join with the hook-and-pile pair of patches of the other clothing item of the clothing pair, to hold the items together when they are not being worn.

3. In the combination of a pair of fabric socks and a self-contained fastener secured to each sock to engage each other to hold a sock pair together when not in use, an improved fastener of the flexible type in the form of a flexible patch of hooks secured to the fabric of one of the socks and a flexible patch of pile secured to the other sock, and the two patches adhere to each other when manually pressed together, whereby said flexible fastener will keep a matched pair of socks together during washing and will bend and flex with the socks during washing and thereby prevent stretching and tearing of the fabric of the socks, characterized by a flexible patch secured to the sock having the hooks to selectively cover the hooks when said socks are being worn, so that the clothing of the user will not catch on the hooks and to selectively uncover the hooks when said socks are to be held together for washing.

4,058,854
PROTECTIVE HELMET
Jhoon Goo Rhee, 4068 Rosamora Court, Arlington, Va. 22207
Continuation-in-part of Ser. No. 598,818, July 24, 1975, Pat. No. 3,992,722, which is a continuation-in-part of Ser. No. 527,910, Nov. 27, 1974, Pat. No. 3,934,271. This application Dec. 9, 1975, Ser. No. 639,060
The portion of the term of this patent subsequent to Jan. 27, 1993, has been disclaimed.
Int. Cl.² A42B *1/08*
U.S. Cl. 2—412 **10 Claims**

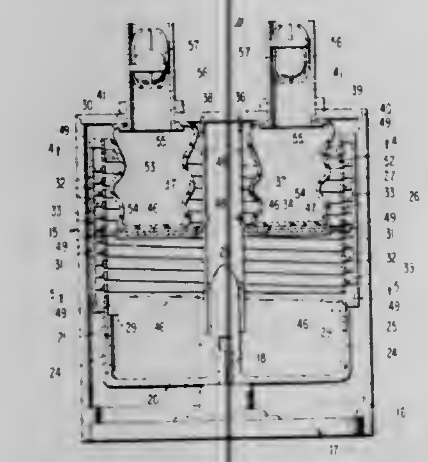


1. A protective helmet adapted to be worn on a person's head and capable of absorbing energy and generally conforming to the shape of the person's head, said helmet constructed entirely of resilient foam means covered with a tough, pliable surface casing completely enclosing said foam means, said helmet comprising openings in said helmet which are generally contoured in shape to conform to the periphery of the person's ears and chin, a single opening which is generally contoured in shape to conform to the periphery of the person's eyes, nose and mouth, the rear of said helmet being generally open and including a flap member adapted to protect the rear of the head and to aid in the putting on and taking off of said helmet, the upper outer portion of said helmet having secured thereto a liner of a hard impact-resistant material.

4,058,855
CARDIAC PUMPING DEVICE
Thomas M. Runge, 2501 Galewood Place, Austin, Tex. 78701
Continuation-in-part of Ser. No. 657,703, Feb. 12, 1976, Pat. No. 4,004,299. This application Jan. 18, 1977, Ser. No. 760,322
Int. Cl.² A61F *1/24;* **A61M** *1/03*
U.S. Cl. 3—1.7 **12 Claims**

1. A cardiac pumping unit or the like comprising a housing, a driving motor coupled to the housing and having an output

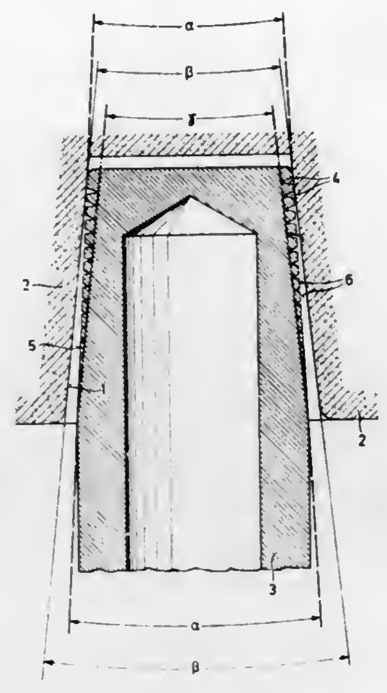
rotary shaft within the housing, a slitted sleeve coupled to the output shaft and rotating therewith and having a continuous spiral slit with widened slit sections near opposite ends of the sleeve, a translatable drive disc for movement axially of the sleeve and housing, radially shiftable drive arms on the drive disc and engageable drivingly with the spiral slit of the rotary sleeve, the drive arms having outer end head elements of a form resisting passage through said slit but being able to pass through said widened slit sections, camming means for said drive arms on the sleeve near the widened slit sections at one end of the sleeve and operable to force said head elements to



the interior of the sleeve, a camming means near the other end of the sleeve engageable with the drive arms during movement of the drive disc away from the last-named end of the sleeve and shifting the head elements through the widened slit sections at said other end to the exterior of the sleeve, means continually coupled with said disc and resisting rotation of the disc with said sleeve, pliable fluid chamber means disposed within the housing between the disc and one end of the housing, and one-way opening and one-way closing check valve means connected with said pliable fluid chamber means to control the outflow and inflow of fluid from and to the pumping unit.

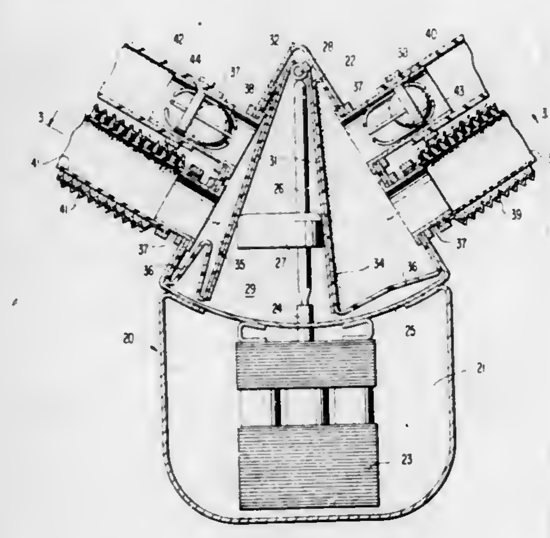
4,058,856
JOINT ENDOPROSTHESIS
Erhard Doerre, Plochingen, Germany; Manfred Semlitsch, and Otto Frey, both of Winterthur, Switzerland, assignors to Sulzer Brothers Limited, Winterthur, Switzerland
Filed Oct. 12, 1976, Ser. No. 731,224
Claims priority, application Switzerland, Oct. 27, 1975, 13876/75
Int. Cl.² A61F *1/24*
U.S. Cl. 3—1.91 10 Claims

10. A joint endoprosthesis comprising
- a female joint part of oxide ceramic material having a cone shaped cavity; and
- a male joint part of metal material secured in said female joint part in self-locking relation, said male joint part having a core and a surface layer about said core disposed on a taper smaller than said taper of said cavity and having



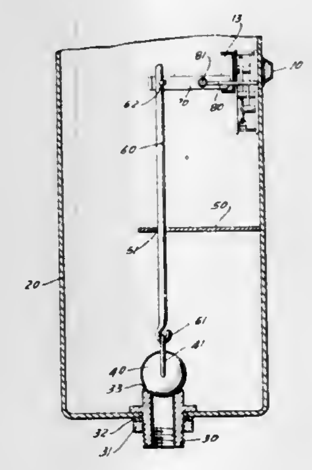
a resistance to deformation less than the resistance to deformation of said core.

4,058,857
CARDIAC REPLACEMENT PUMPING DEVICES
Thomas M. Runge, 2501 Galewood Place, Austin, Tex. 78703; John E. Burkhalter, 551 E. University Drive, Auburn, Ala. 36830, and Spiros George Pallas, 130 Tenth Ave., Shalimar, Fla. 32579
Filed Feb. 12, 1976, Ser. No. 657,702
Int. Cl.² A61F *1/24;* A61M *1/03*
U.S. Cl. 3—1.7 8 Claims



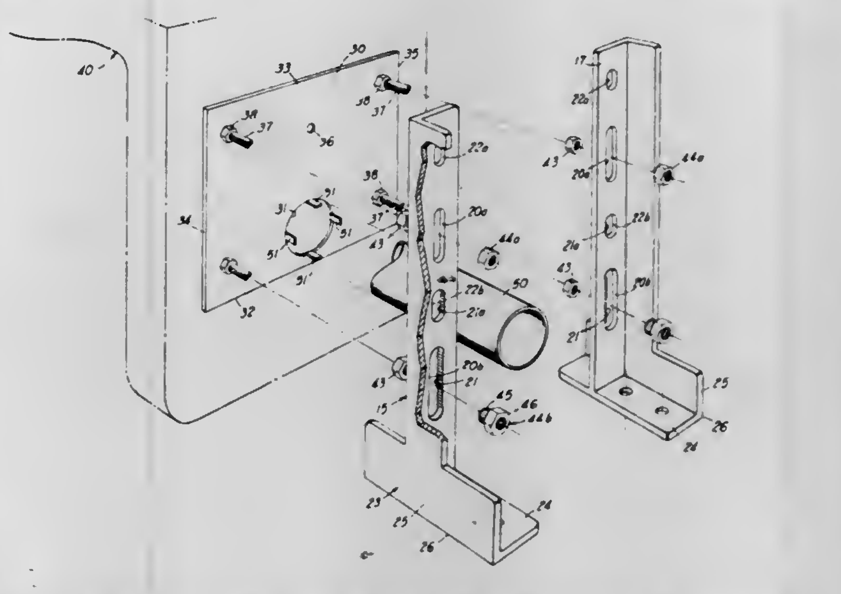
1. A pumping unit adapted for use as a total cardiac replacement device comprising a housing having a wedge-like pumping chamber, a drive motor on the housing externally of the wedge-like pumping chamber and having an output rotary shaft extending through said pumping chamber centrally with the axis of the shaft substantially intersecting the apex of said wedge-like pumping chamber, an eccentric cam element on said shaft within said pumping chamber and turning with said shaft, a support shaft extending within the pumping chamber near and parallel to the apex thereof and substantially perpendicular to the axis of said output rotary shaft, a pair of pumping vanes within the wedge-like pumping chamber on opposite sides of said output rotary shaft and being in contact with said eccentric cam element, corresponding ends of said pumping vanes being independently pivotally connected to said support shaft and supported thereby for independent swinging through the pumping chamber around the axis of the support shaft in response to rotation of the eccentric cam element with said output rotary shaft, a pair of wedge-like pliable compressible sacs in the pumping chamber between said pumping vanes and the converging walls of the wedge-like pumping chamber and being compressed alternately and cyclically by the pumping vanes during rotation of the eccentric cam element, outlet and return conduit means connected in corresponding walls of said pliable compressible sacs and in the converging walls of the pumping chamber, and pairs of oppositely opening and closing check valves connected in said outlet and return conduit means.

4,058,858
WATER STORAGE TANK FOR FLUSH TOILETS
Liao Che-Wei, No. 115, Chung-Yuan Road, Chung-li, Taiwan, China
Filed Sept. 13, 1976, Ser. No. 722,664
Int. Cl.² E03D *1/34*
U.S. Cl. 4—67 R 10 Claims



1. Apparatus for controlling the quantity of water dispensed from a water storage tank to a flush toilet, comprising:
- a water storage tank having a water discharge opening and a closure therefor;
- a manually operable adjustable timer for setting a predetermined flush time related to said water discharge opening to dispense a predetermined required quantity to flush water from said water storage tank to the flush toilet, said predetermined required quantity of water being related to the item and quantity thereof to be removed from the flush toilet;
- said manually operable timer including a rotatable shaft internal said tank and having a portion thereof extending external of said tank, a cam in said tank positioned on said shaft operatively connected with said connecting means, setting means connected with said shaft for setting the predetermined flush time, said setting means including settable spring means coupled with said shaft and means external of said tank coupled with said shaft for rotation thereof to set said spring for a predetermined flush time, transmission mechanism operatively connected between said settable spring means and said cam, and speed control means operatively connected with said transmission mechanism to control the rotating speed of said cam, and thereby to control the predetermined flush time; and,
- connecting means operatively associated with said timer and connected with said closure to remove said closure from said discharge opening to permit the water from said storage tank to enter the flush toilet for said predetermined flush time.

4,058,859
WATER CLOSET CARRIER
Gordon W. Arrowood, Palmetto, Ga., assignor to McKenney's, Inc., Atlanta, Ga.
Filed Feb. 11, 1976, Ser. No. 657,074
Int. Cl.² E03D *11/14*
U.S. Cl. 4—252 R 6 Claims



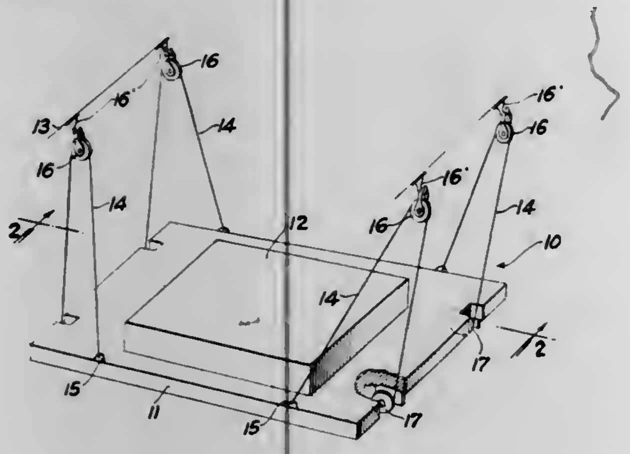
1. A water closet carrier of the type which supports in cantilever fashion adjacent a vertical wall, an off-the-floor water closet, comprising:
- a. an upstanding bracket member;
- b. a plurality of studs projecting laterally from said bracket member for projecting outwardly through said vertical wall;
- c. means on said studs for securing the rear portion of said water closet thereto; and
- d. adjustment means interconnected between said bracket member and one of said studs for positively and incrementally adjusting the position of said one of said studs with respect to said bracket member while said adjustment means continuously is interconnected between said bracket member and said one of said studs and while said one of said studs remain projecting laterally wherein said certain of said studs projects through a vertically disposed slot in said bracket member and wherein said adjustment means includes a rack with the teeth of the rack projecting into said slot and disposed along one side portion of said slot, said adjustment means also including a pinion disposed on said stud, said pinion being received in said slot and being of a width approximately equal to the width of said slot so that the teeth of said pinion mesh with the teeth of said rack and the width of the slot is sufficient for rotation of said pinion in said slot but is not sufficiently wide to permit slippage of said pinion along said rack; including a nut threadably carried by certain of said studs and wherein said pinion is connected to and rotated by said nut.

4,058,860
SUSPENDED BED WITH HEIGHT CONTROL
Kenneth Daidone, 317 - 100th St., Brooklyn, N.Y. 11209
Filed Mar. 1, 1976, Ser. No. 662,586
Int. Cl.² A47C *13/18*
U.S. Cl. 5—10 R 4 Claims

1. A suspended article of furniture comprising
- a bed platform including resilient support means located on one side thereof for supporting a load thereon;
- a suspension line connected to said bed platform at a first point, and to a ceiling at a second suspension point, for freely suspending said platform from the ceiling;
- guiding means located on the underside of said platform with respect to the ceiling comprising cut-outs in said platform for receiving said suspension line, and pulleys, each of said pulleys located adjacent a respective one of

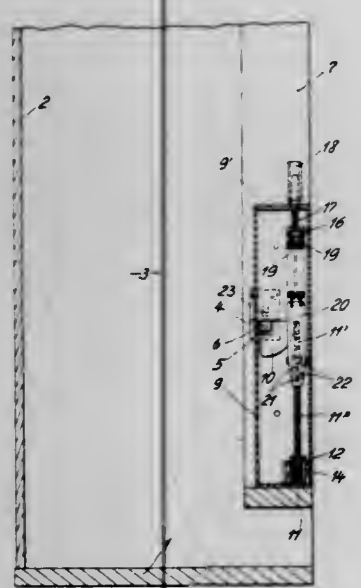
said cut-outs for rotatably engaging said suspension line extending through said respective one cut-out and guiding said suspension line along the underside of said platform parallel one side thereof, at least two of said pulleys being located adjacent one side of said platform, and two of said pulleys located adjacent the opposite side of said one side of said platform;

a suspending pulley releasibly attached to said second suspension point, said suspension line rotatably engaging said suspending pulley for suspending said bed platform therefrom; and



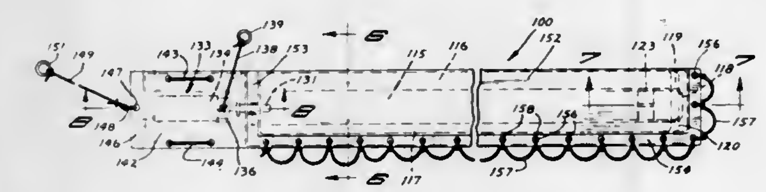
means connected to said bed platform for changing the length of said suspension line between said first point and said second point for changing the relative height of said platform with respect to the ceiling, comprising a drive motor fixedly secured to the underside of said bed platform with respect to the ceiling, rotatably engaging said suspension line and actuatable for drawing said suspension line with respect to said second point, thereby changing the length of said suspension line between said bed platform and said second point.

4,058,861
CABINET
Eckart Kruse, Hirzlistrasse, Uznach (Kt. St. Gallen), Switzerland (8730)
Filed Feb. 13, 1976, Ser. No. 658,106
Claims priority, application Switzerland, Sept. 18, 1975, 12133/75
Int. Cl.² A47C *19/00*
U.S. Cl. 5—164 R **3 Claims**



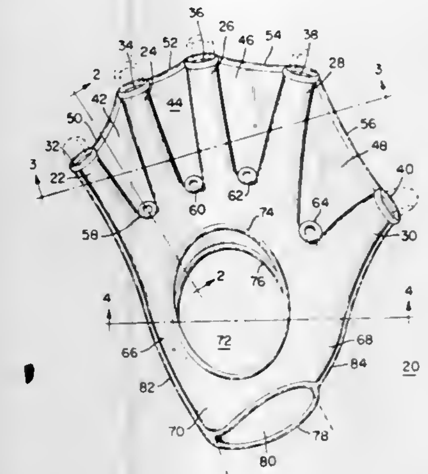
1. A cabinet-type bed assembly which comprises:
a cabinet formed with a pair of sidewalls flanking an opening;
a bed frame pivotally mounted on said sidewalls and swingable relative to said cabinet between an upright position wherein said bed frame is received in said cabinet and a prone position wherein said bed frame extends from said cabinet through said opening;
a housing received in said bed frame;
a pivot swingably supporting said bed frame on one of said sidewalls and including a nonrotatable pin extending into said housing;
a segment fixed on said pin in said housing and having an arcuate surface therein;
means on said cabinet securing said pin and said segment against rotation;
an elongated traction member in the form of a chain anchored to said segment and adapted to be taken up and paid out from said surface, said traction member having an end remote from said segment;
a holder affixed to said end of said elongated traction member in said housing;
At least one first tension spring anchored at one end to said holder and at another end to said housing;
at least one second tension spring having one end engageable with said holder upon takeup of said elongated traction member by said segment to tension said second spring, said second spring having another end affixed to said housing, said housing having a pair of spaced-apart walls; and a pulley mounted on one of said walls, said elongated traction member extending around said pulley, said other ends of said springs being anchored to the other of said walls.

4,058,862
WATER SAFETY DEVICE
Daryl A. Stevens, 610 N. 10th St., and Russell D. Wicktor, Rte. 3, both of Princeton, Minn. 55371
Continuation-in-part of Ser. No. 580,903, May 27, 1975, Pat. No. 3,992,739. This application Nov. 23, 1976, Ser. No. 744,234
Int. Cl.² B63C *9/00*
U.S. Cl. 9—14 **22 Claims**



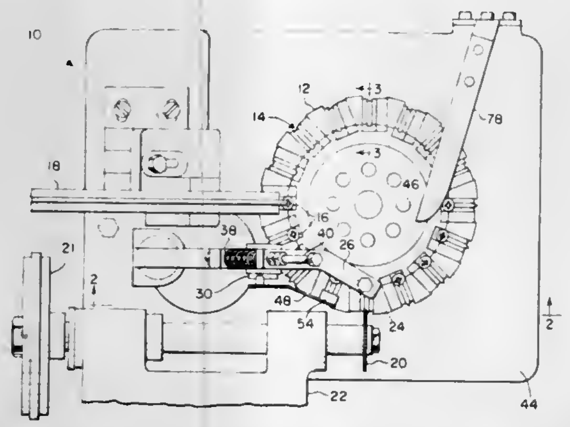
1. A safety device to enable a rescuer person to lend assistance to a remote imperiled victim comprising: elongate tubular means inflatable to form a substantially linear semi-rigid elongate, floatable unit having a first end that, when inflated, can be maneuvered toward an imperiled victim, and a second end that can be manipulated by a rescuer person for maneuvering the first end, and deflatable for folding into a compact bundle, said tubular means having at least a first tubular member and a second tubular member, and means having a restricted orifice connecting the first tubular member with the second tubular member to allow gas to flow from the first tubular member to the second tubular member to inflate the second tubular member after the first tubular member has been inflated and elongated by gas, gas supply means for storing a supply of gas, and releasable valve means connecting the gas supply means with the first tubular member and operable for selective rapid release of gas from the gas supply means to the first tubular member, said means having a restricted orifice defining an orifice of a size to restrict flow of gas from the first tubular member to the second tubular member such that rapid release of gas from the gas supply means first inflates the first tubular member to a semi-rigid elongate shape and then inflates the second tubular member.

4,058,863
SWIMMING GLOVE
Vincent Ferdico, 85 Maplewood St., West Hempstead, N.Y. 11552
Filed Jan. 19, 1977, Ser. No. 760,671
Int. Cl.² A63B *31/02*
U.S. Cl. 9—308 **5 Claims**



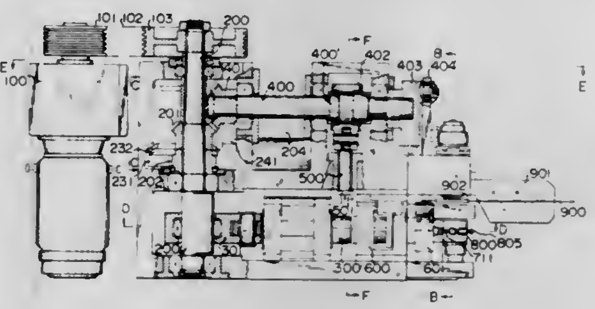
1. A swimming glove for placement over the hand, comprising: an integral elastic member having hollow elongate finger receiving portions and a hollow elongate thumb receiving portion, each of said portions being joined to one another by web portions, said elastic member having an integral extended palm and wrist receiving portion with an enlarged transverse opening therein for exposing the palm and the back of the hand of the wearer while encircling and grasping the outer perimeter of the hand and wrist of the wearer, there being a thickened first rib portion extending about the periphery of said elastic member to provide reinforcing means therefor, each adjacent pair of said finger receiving portions converging together at a juncture remote from the free end of said finger receiving portions, each of said junctures having located thereat a thickened second rib portion having an annular contour in the plane of said swimming glove for maintaining said finger receiving portions in spread apart relationship.

4,058,864
SCREW SHANK SLOTTING MECHANISM
Richard Harlon Morland, Elgin, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.
Filed Dec. 20, 1976, Ser. No. 752,043
Int. Cl.² B23G *9/00*
U.S. Cl. 10—2 **4 Claims**



1. A machine for slotting fastener devices having a head and shank with wings extending radially from the shank, including a rotatable turret for conveying the fastener devices about a predetermined path of travel and having, at its periphery, a plurality of circumferentially spaced pockets opening outwardly from the periphery, each of the pockets including an elongated seat portion positioned therein with the longitudinal dimension of the seat traversing the path of travel, said seat portions adapted to receive and support one side of a fastener device shank throughout its length with its other side exposed for facilitating an operation performed at a work station adjacent the path of travel, means for supporting a rotary slotting tool mounted at a work station for generally back and forth movement in a predetermined direction adjacent a predetermined portion of the path of travel, the rotary slotting tool adapted to engage a region of the exposed side of the fastener device, means for inducing rotation of the fastener device about its axis, comprising an abrasive element mounted adjacent the path of travel so as to create a drag force on a fastener as it travels along said path past said abrasive element, said means for inducing rotation being located adjacent a predetermined portion of the path of travel in a position in advance of the means for supporting the rotary slotting tool, the seat portion including a longitudinal recess and intersecting lateral recess formed therein so that the longitudinal recess will accommodate the shank of the fastener device with the lateral recess accommodating the wings extending radially from the shaft, abutment means located in and interrupting the lateral recess in a region adjacent one extremity of said lateral recess thereby precluding further movement of the wings through said lateral recess and limiting the rotation of the fastener device about its axis to expose a predetermined region of the fastener device shank which is intermediate a pair of oppositely disposed wings to the rotary slotting tool as a result of engagement of the radially extending wings with the abutment means.

4,058,865
AUTOMATIC HIGH-SPEED COLD HEADING MACHINE
Yuan Ho Lee, 85, Jen Ho Road, Tainan, China /Taiwan
Continuation-in-part of Ser. No. 733,898, Oct. 19, 1976, which is a continuation of Ser. No. 525,091, Nov. 19, 1974, abandoned. This application Jan. 14, 1977, Ser. No. 759,371
Int. Cl.² B21K *1/46*
U.S. Cl. 10—13 **11 Claims**



1. An automatic high speed cold heading machine comprising the combination of:
a main shaft which includes an eccentric portion thereon;
punching means, including a ram operably connected to said main shaft so that said ram reciprocates upon rotation of said main shaft, for punching blanks in a die to form a finished product;
a second shaft which includes an eccentric portion, said second shaft being operably geared to said main shaft;
blank cutting means operably connected to said second shaft so that said blank cutting means reciprocates upon rotation of said second shaft for cutting blanks;
means for receiving cut blanks from said blank cutting means;
a rotary die head having a plurality of dies respectively positioned in alignment with said ram, said rotary die head being operably connected for rotation to said second shaft;
a third shaft operably geared at about one end thereof to said main shaft;
a fourth shaft operably geared to the other end of said third shaft, said fourth shaft including an eccentric portion thereof;
ejecting means, including a rocker arm pivotably connected to the eccentric portion of said fourth shaft and coacting

with rod means on said rotary die head, for ejecting blanks from said die head; and

means for rotating said main shaft so that the main shaft imparts a compressive force against the rotary die head while the second shaft simultaneously drives the blank cutting means to cut a blank and feed a blank to the cut blank receiving means at the same time that the fourth shaft simultaneously drives the rocker arm to engage with and apply a force against a rod of said rod means causing said rod to cause a blank disposed in a die to be ejected therefrom, said blank cutting means, said punching means and said ejecting means being driven simultaneously and independently by said second shaft, said main shaft and fourth shaft respectively in a synchronized harmonious motion without significant pause or dwell.

4,058,866

MACHINES FOR HANDLING AND ASSEMBLING FASTENERS AND WASHERS

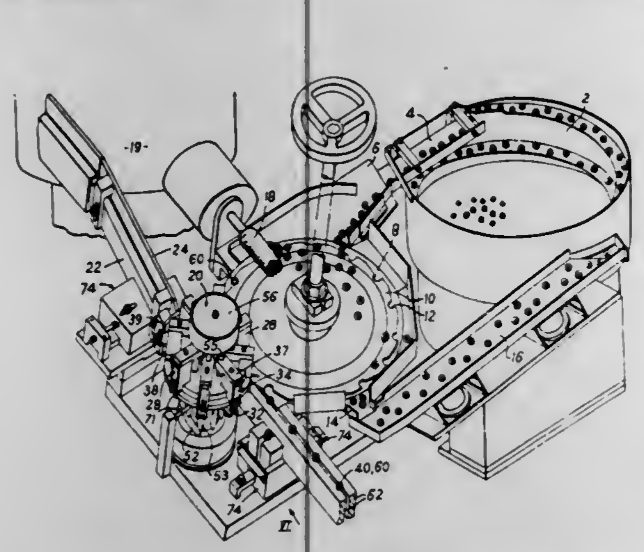
Graham Terence Foster, Birmingham, England, assignor to Linread Limited, Birmingham, England

Filed May 17, 1976, Ser. No. 687,373

Claims priority, application United Kingdom, June 10, 1975, 24916/75

Int. Cl.² B23P *19/08*

U.S. Cl. 10—155 A **12 Claims**



1. A machine for assembling screw blanks and washers, said machine comprising:

a rotatable feed disc means for continuously feeding washers in succession along a first path, said feed disc means having a plurality of notches formed around the periphery thereof, each notch being adapted to receive a single washer;

rotatable turret means for continuously conveying screw blanks in succession along a second path in a plane parallel to and vertically above said first path;

drive means for continuously rotating said turret means and said feed disc means respectively in opposite directions and in timed relationship such that said screw blanks are conveyed in timed relationship to the feed of washers along the first path such that each screw blank is in turn brought into axial alignment with a respective washer;

said turret means including a plurality of circumferentially spaced clamping heads each of which heads is adapted to receive and clamp an individual screw blank therein, each said clamping head comprising a relatively fixed jaw member having an open-ended slot adapted to recieve the shank of a screw blank and a cooperating relatively movable jaw member resiliently biased towards the respective said fixed jaw member to engage the head of a screw blank the shank of which is received within said slot in said respective fixed jaw member, means mounting each clamping head in said turret means for movement parallel to the axis of rotation of the turret means, and means for moving each said clamping head containing a screw blank downwardly as said clamping head approaches a line containing the centers of rotation of said turret means and said feed disc means at a position above said feed disc means and substantially in axial alignment with a washer approaching said line and moving along said first path and thereby moving and inserting the screw blank into the washer, thereby assembling the screw blank and the washer; and

means for withdrawing from said clamping head the blank having the washer assembled thereto.

4,058,867

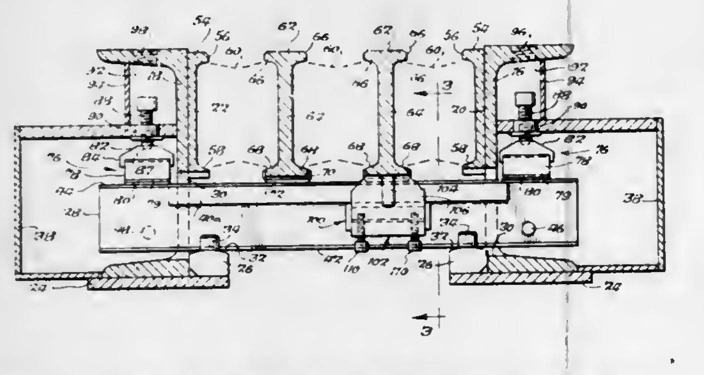
UPLIFT RESTRAINT FOR COMPOSITE EXPANSION JOINT ASSEMBLY

Guy S. Puccio, Snyder, N.Y., assignor to Acme Highway Products Corporation, Buffalo, N.Y.

Filed Jan. 21, 1977, Ser. No. 760,908

Int. Cl.² E01D *19/06*

U.S. Cl. 14—16.5 **5 Claims**



1. In a composite expansion joint assembly comprising:

a pair of edge members adapted to define the opposite sides of an expansion groove between bridge deck sections;

said edge members having corresponding, elongated openings extending lengthwise of said edge members; laterally spaced support bars extending transversely of said groove with the opposite ends of said bars extending through said openings beyond the opposite sides of said groove;

a plurality of elongated resiliently yieldable sealing elements in a side-by-side relation extending longitudinally of said groove;

elongated rigid structural members interposed between said sealing elements and extending lengthwise thereof;

said structural members being supported above said support bars for lateral sliding movement relative thereto; and uplift restraint means on at least one of said structural members and said support bars for limiting vertical displacement of the former relative to the latter, said uplift restraint means including bracket means affixed to said structural member and extending beneath a portion of said support bar, a pad means supported by said bracket means for engagement beneath and against a portion of said support bar, and adjustment means associated with said bracket means and operable with said bracket means and said pad means for selectively varying in a vertical direction the degree of engagement of said pad means against said support bar, said adjustment means being vertically located beneath said portion of said support bar engaged by said pad means.

4,058,868

CAPSULE CLEANING AND POLISHING

Robert J. Champion, Greenville, S.C., assignor to Perry Industries, Inc., Hicksville, N.Y.

Filed June 10, 1976, Ser. No. 694,789

Int. Cl.² B08B *7/04*

U.S. Cl. 15—4 **14 Claims**

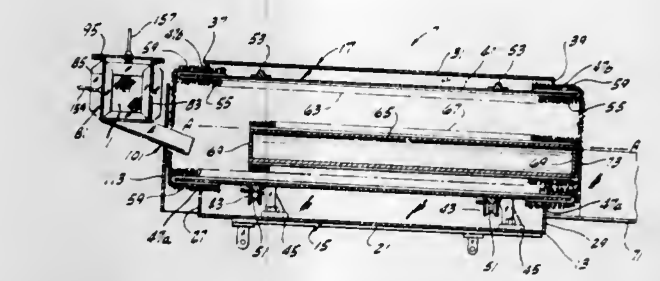
1. Capsule cleaning and polishing apparatus comprising:

means providing a delivery passage for capsules;

a screen;

means mounting the screen at a level above the delivery passage with one side of the screen facing in the direction toward the delivery passage and with the screen positioned relative to the delivery passage to have capsules impelled against said one side thereof for dislodging dust from the capsules and to have the capsules drop down from the screen through the delivery passage after impacting against the screen;

means for electrically charging the screen;



means for impelling capsules against said one side of the screen;

means for drawing air through the screen from the other side thereof to draw off dust through the screen; and means for receiving capsules dropping down from the screen through the delivery passage and buffing the capsules after they have impacted against the screen for removing any residual dust from the capsules and polishing them.

4,058,869

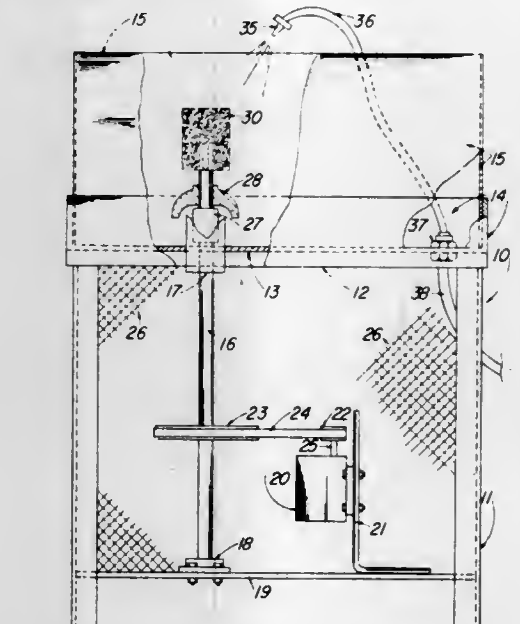
SCRUBBING APPARATUS FOR POTTERY GREENWARE

Howard R. Wheeler, Crooksville, Ohio, assignor to Nelson McCoy Pottery Company, Roseville, Ohio

Filed Jan. 22, 1976, Ser. No. 651,459

Int. Cl.² A47L *15/38*

U.S. Cl. 15—101 **5 Claims**



1. Apparatus for internal cleaning of pottery greenware comprising an upstanding spindle mounted for rotation about a vertical axis and including drive means mechanically coupled therewith for revolving the spindle at a predetermined speed, surface abrading means secured to said spindle at the upper end to be revolved therewith, said spindle formed with an axially extending slot opening transversely of said spindle and at the upper end thereof, said abrading means being a body formed from a resiliently flexible material which is relatively porous with said body projecting radially outward from opposed sides of said spindle and having a body thickness substantially greater than the width of said slot so as to project a distance above the upper end of said spindle and compressible in the central region to frictionally interfit in said slot.

4,058,870

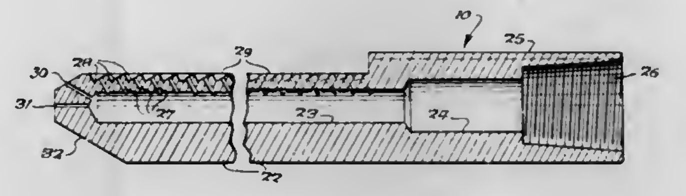
LANCE TIP CONSTRUCTION

Robert J. Goodwin, Hendersonville, N.C., assignor to C. H. Heist Corporation, Clearwater, Fla.

Filed July 9, 1976, Ser. No. 704,113

Int. Cl.² B08B *9/02*

U.S. Cl. 15—104.1 R **30 Claims**



1. A tube cleaning lance tip construction for rotation within a tube comprising a body portion having a longitudinal axis and an outer surface, first bore means in said body portion for receiving high pressure liquid, second bore means in communication with said first bore means and extending through said body portion to said outer surface for causing liquid to be ejected with a lateral component creating a reactive force for biasing said body portion toward the inside of said tube, blade means on the opposite side of said body portion from said second bore means for removing incrustations from the inside of said tube, said second bore means being positioned relative to said longitudinal axis of said body portion for causing said reactive force to be in the direction of rotation of said body portion.

4,058,871

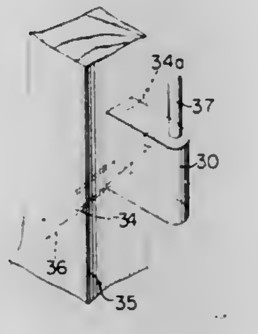
HINGE ASSEMBLY FOR KNOCK DOWN FURNITURE

Takeshi Shimizu, 6-24-22, Kami-soshigaya, Setagaya, Tokyo, Japan

Filed Nov. 24, 1975, Ser. No. 634,733

Int. Cl.² F05D *1/06*

U.S. Cl. 16—172 **3 Claims**



1. A hinge for knock-down furniture, comprising:

at least two base blocks, at least one first base block associated with a stationary portion of said furniture and at least one second base block associated with a movable portion of said furniture;

hinge pin means between said base blocks for pivotally joining said base blocks;

at least one first tenon member obliquely extending from said first base block into said stationary furniture portion; and

at least one second tenon member obliquely extending from said second base block into said movable furniture portion.

4,058,872

SHEEP AND LAMB MECHANICAL TOE-BREAKER

J. R. Henry, and Willis E. Teague, both of San Angelo, Tex., assignors to Armour and Company, Phoenix, Ariz.

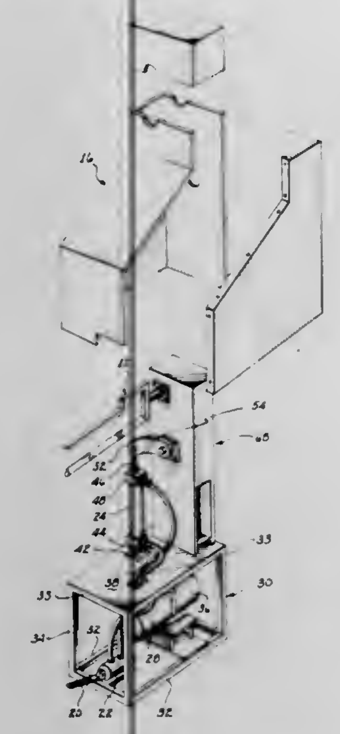
Filed May 4, 1976, Ser. No. 683,607

Int. Cl.² A22B *5/00*

U.S. Cl. 17—1 R **6 Claims**

1. An apparatus for mechanically breaking the toes of sheep

carcasses as said carcasses are presented by a killing chain comprising: a frame, a pair of cooperating guide members carried by said frame having means defining a slot for tempo-



rarily engaging and subsequently releasing said toes, and means carried by said frame and operatively connected to said guide members for rotating said guide members while the toes are temporarily engaged.

4,058,873

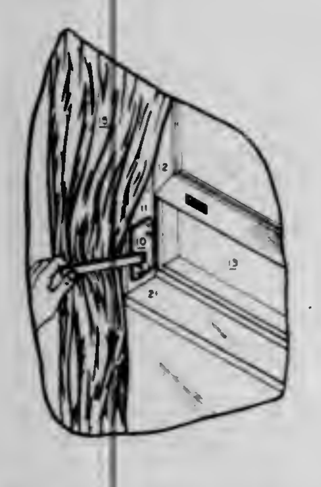
CURTAIN AND DRAPE HOLDER

Edward T. Fischer, McKee Rocks, Pa., assignor to The Raymond Lee Organization, Inc., New York, N.Y.

Filed July 26, 1976, Ser. No. 708,496

Int. Cl.² A44B *21/00*

U.S. Cl. 24—73 CH **2 Claims**



1. An assembly adaptable for mounting to a side panel of a window opening for the purpose of gathering a hung curtain, comprising

a flat base plate pivotably mounted by a rivet to an arm member of generally rectangular cross-section, with said plate fitted with rotational stop means to limit the travel of the arm member in each of two directions, with

said rotational stop means comprising two spaced pins fixed to the plate that project from the external face of the plate, said pins located with respect to the rivet so that in the installed position of the plate against a window opening side panel, the arm member may be rotated to a first position in which a first straight edge of the arm member rests on a first pin, with the axis of the arm member extending along a generally horizontal axis or alternately the arm member may be rotated to a second position in which a second straight edge of the arm member rests against the second pin with the axis of the arm member extending along a generally vertical axis,

said base plate formed with a plurality of holes for use in fastening the plate to a window opening panel.

4,058,874

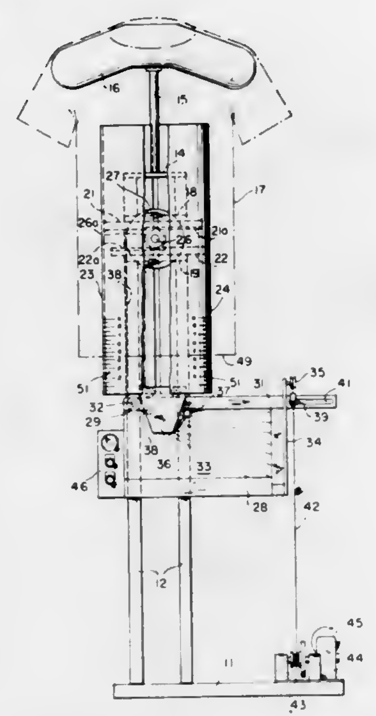
METHOD FOR KNITTING AND PRE-SHRINKING KNIT FABRICS IN ACCORDANCE WITH PRE-DETERMINED COMFORT LEVELS

Franz Hausner, Reading, Pa., assignor to Cluett, Peabody & Co., Inc., New York, N.Y.

Continuation of Ser. No. 295,866, Oct. 10, 1972, abandoned, which is a continuation-in-part of Ser. No. 129,813, March 31, 1971, abandoned. This application May 7, 1975, Ser. No. 575,571

Int. Cl.² D04B *1/24;* D06C *21/00;* G01L *5/06*

U.S. Cl. 28—153 **6 Claims**



1. A process for making tubular knit garment products having desired stitch and resiliency characteristics, comprising:

a. knitting a first greige fabric with known predetermined knit variables including stitch density and stitch length;

b. pre-treating the first greige fabric and converting the same into an elongated first tubular garment;

c. testing the stretch and resiliency characteristics of the first tubular garment by radially outwardly distending beyond its relaxed condition a predetermined substantial length of the first garment and determining the distending force per unit of length of garment distended required to distend the garment to a predetermined extent corresponding generally to the expected distinsion of the said first garment when worn in use;

d. repeating steps a), b) and c) with a series of n greige fabrics and n tubular garments made therefrom, the series of greige fabrics being knitted with the same knit variables and pre-treated in the same manner as the said first greige fabric except that stitch density and stitch length are altered in each fabric in the series;

e. observing and recording the relationship between said distending force per unit length of garment distended and stitch density and stitch length of greige fabric for each garment tested;

f. selecting from the relationships observed and recorded from step e) a stitch density and stitch length yielding a garment having a resistance to distension force in its worn condition of between 8 and 40 grams per inch;

g. knitting a final tubular knitted greige fabric in the same manner and having the same predetermined knit variables as said first greige fabric except for stitch density and stitch length, and with a stitch density and stitch length determined by step f) to yield a garment having a resistance to distension force in its worn condition of between 8 and 40 grams per inch;

h. pre-treating the final greige fabric in the same manner as the first greige fabric and converting same into tubular knit garment products, said products having desired stretch and resiliency characteristics derived from the above-recited process.

4. In a process for making a tubular, knit garment having a desired comfort fit, and which process comprises: knitting a fabric, said knit fabric being knit with a predetermined stitch length and stitch density; converting said knit fabric to a tubular garment; testing said tubular garment; repeatedly reknitting said fabric with adjusted stitch lengths and stitch densities; converting said reknit fabrics into other similar tubular garments; and converting a final reknit fabric into a final similar tubular garment; the improved procedure for testing and reknitting said tubular garments to determine stitch density and stitch length required to provide a comfort fit for the wearer of the final tubular garment, comprising the steps of:

a. testing the stretch and resilience of said tubular garments along a substantial length of the garments by determining the forces per lineal dimension of garment required to outwardly distend said knit and reknit fabrics to their condition of stress as said knit and reknit fabrics are used in similar tubular garments;

b. obtaining the relationship between the tested stretch and resilience of the tubular garments with a predetermined range of stretch and resilience required for a comfort fit for the wearer of a similar tubular garment of between 8 and 40 grams per inch of length when the similar tubular garment is stretched to actual wear conditions, said predetermined range of stretch and resilience being the range of force per lineal dimension of garment required to distend the similar tubular garment consistent with the comfort of the wearer of said tubular garment; and

c. adjusting stitch length and stitch density in accordance with the relationships between stitch length and stitch density and comfort fit as determined in step (b), and reknitting the final reknit fabric with the adjusted stitch length and stitch density, the final reknit fabric having a stretch and resilience within said predetermined range of stretch and resilience required for a comfort fit for the wearer of a similar tubular garment made from the final reknit fabric of between 8 and 40 grams per inch when the last-said tubular garment is stretched to actual wear conditions.

4,058,875

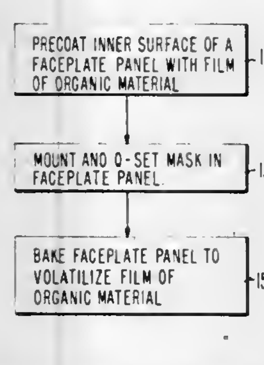
METHOD OF ASSEMBLING A MASK-PANEL ASSEMBLY OF A SHADOW-MASK CATHODE-RAY TUBE

Jawdat Ibrahim Nubani, Clarks Summit, and Walter Robert Rysz, Moosic, both of Pa., assignors to RCA Corporation, New York, N.Y.

Filed Aug. 18, 1976, Ser. No. 715,372

Int. Cl.² H01J *9/18*

U.S. Cl. 29—25.15 **10 Claims**



1. In a method for assembling a mask-panel assembly for a shadow-mask cathode-ray tube, the steps in the following order:

a. precoating the inner surface of the panel of said assembly with a film of organic material, which film is volatilizable when heated in air at temperatures up to about 400° C,

b. mounting the mask of said assembly in said panel at a predetermined spaced position relative to said inner surface,

c. and then baking said panel in air at temperatures sufficient to volatilize said film.

4,058,876

SUPPORT ARRANGEMENTS FOR ROTARY SCRAPERS

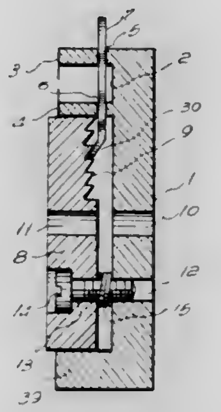
Pedro Carlos Segismundo Clamans, P.O. Box 400, 1000 Buenos Aires, Argentina

Filed Aug. 18, 1976, Ser. No. 715,475

Claims priority, application Argentina, Sept. 1, 1975, 260212

Int. Cl.² B23D *71/00*

U.S. Cl. 29—78 **6 Claims**



1. A rotary scraper, comprising a plurality of scraper rods, an annular support member formed with a plurality of radial openings through which the scraper rods extend respectively, a position-maintaining member, and releasable clamping means for urging the position-maintaining member into contact with the support member, one of said members having non-slip surface portions against which said rods engage for securing the rods against radial movement with respect to the support member when the position-maintaining member is urged into contact with the support member, and the rods being displaceable radially outwards with respect to the support member on release of the clamping means.

4,058,877

DEFLECTION-CONTROLLED ROLL FOR THE PRESSURE TREATMENT OF MATERIALS IN WEB FORM

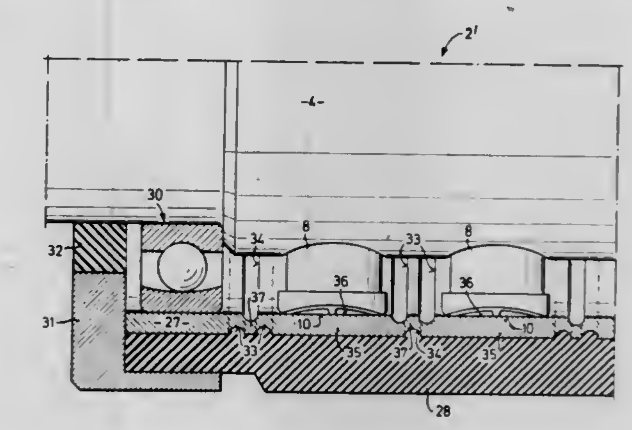
Rolf Lehmann, Mutschellen AG, Switzerland, assignor to Escher Wyss Limited, Zurich, Switzerland

Filed Apr. 6, 1976, Ser. No. 674,236

Claims priority, application Switzerland, Apr. 15, 1975, 4778/75

Int. Cl.² B21B *13/02*

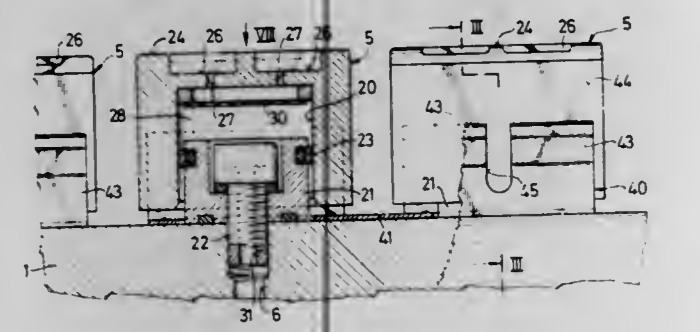
U.S. Cl. 29—116 AD **11 Claims**



1. A deflection-controlled roll for the pressure treatment of

materials in web form comprising a fixed beam, a continuous cylindrical roll shell rotatable about the beam, an elastomeric covering on the roll shell and a plurality of hydraulic piston support devices positioned along the length of the roll for exerting support forces between the beam and the roll shell at respective operating surfaces of the devices, said roll shell having annular portions with smooth inner surfaces aligned with and forming runways for said operating surfaces of said support devices and circumferential zones spaced along the length thereof between said annular portions of greater flexibility than said annular portions for reducing the stiffness of the shell to lateral forces imposed thereon during operation.

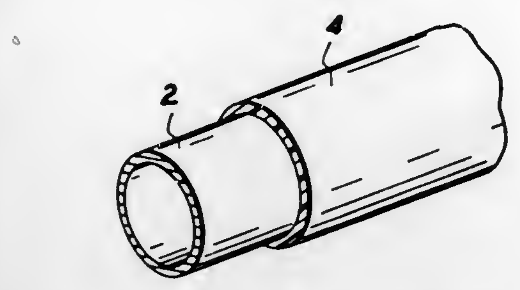
4,058,878
CONTROLLED DEFLECTION ROLL
Rolf Lehmann, Mutschellen AG, Switzerland, assignor to Escher Wyss Limited, Zurich, Switzerland
Filed Feb. 14, 1977, Ser. No. 768,473
Claims priority, application Switzerland, Mar. 1, 1976, 2492/76
Int. Cl.² B21B *13/02*
U.S. Cl. 29—116 AD **11 Claims**



1. A controlled deflection roll comprising:
a stationary support;
a substantially tubular-shaped roll shell;
means for mounting said substantially tubular-shaped roll shell to be rotatable about said stationary support;
a plurality of movable substantially piston-like hydrostatic pressure elements located between said stationary support and said roll shell;
said pressure elements including contact surface means which serve to support the roll shell;
said pressure elements having substantially flat side surfaces extending in the direction of movement of said pressure elements;
said side surfaces of neighboring pressure elements being located in substantially a common plane;
connection means for connecting neighboring pressure elements;
said connection means comprising resilient flaps which bear against the flat side surfaces of at least two neighboring pressure elements.

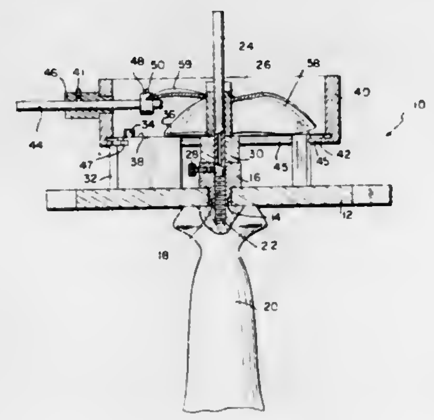
4,058,879
COMPOSITIONS AND METHOD FOR ENHANCING ELECTRICAL LIFE OF POLYMERS USED IN XEROGRAPHIC DEVICES
James A. Lentz, Penfield, and George J. Safford, Webster, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.
Filed July 1, 1976, Ser. No. 701,710
Int. Cl.² B60B *5/00;* **G03G** *13/14;* **B32B** *27/40*
U.S. Cl. 29—132 **28 Claims**

1. A transfer roll having improved electrical life for electrically cooperating with a photoconductive plate when brought into contact therewith to attract charged toner particles from the plate toward the roll comprising a rigid cylindrical core of electrically conductive material having at least one coating thereon of a resilient elastomeric material comprising a copolymer of about 1.0 percent to about 12.0 percent terminally unsaturated hydrocarbon nitrile and the balance butadiene, said copolymer containing a sufficient amount of conductivity control agent to produce a copolymer having the desired



resistivity, the conductivity control agent being solubilized in the copolymer.

4,058,880
PROPELLER MAKING APPARATUS AND METHOD
Emerson Dee Hughey, 840 E. 64th St., Indianapolis, Ind. 46240
Division of Ser. No. 679,984, April 26, 1976, Pat. No. 4,009,874. This application Oct. 18, 1976, Ser. No. 733,345
Int. Cl.² B23P *15/04*
U.S. Cl. 29—156.8 P **6 Claims**

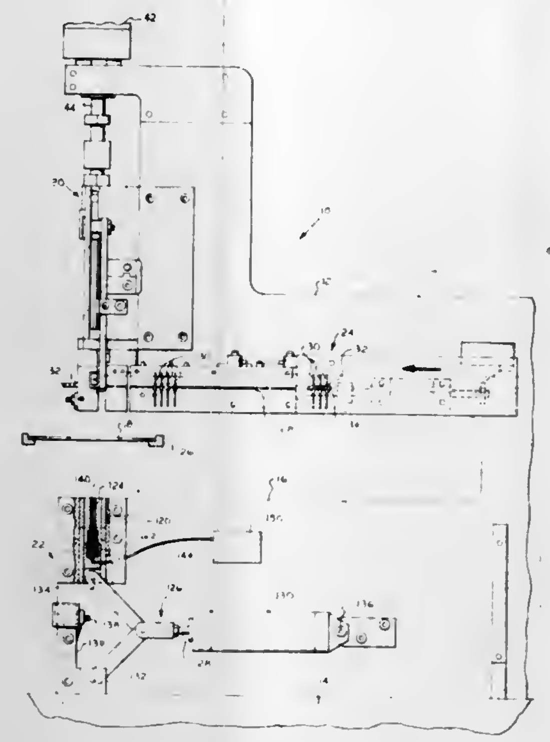


1. A method of making a propeller from a propeller hub and a plurality of propeller blade blanks, comprising the steps of receiving the propeller hub over a vertically extending shaft fixed to a base; positioning the blade blanks in contact with said hub and with a plurality of support means corresponding in number to the number of blade blanks and equiangularly arranged on said base radially outwardly from said hub; receiving one edge of each blade blank in holding means disposed above said support means whereby each blade blank is supported by contact with said hub, one of said support means, and said holding means; rotating said holding means with respect to said support means to selectively alter the pitch angle of the blade blanks with respect to said hub; and connecting each of the blade blank to the hub.

4,058,881
APPLICATION MACHINE FOR MOUNTING CIRCUIT BOARD PINS WITH AN IMPROVED CONTROL SYSTEM
John Henry Gavin, Lancaster, and John Martin Spickler, Marietta, both of Pa., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.
Filed Jan. 21, 1976, Ser. No. 651,115
Int. Cl.² H05K *13/04*
U.S. Cl. 29—715 **1 Claim**

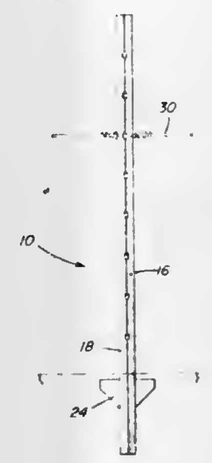
1. In an application machine for staking a contact in a hole in a circuit board comprising a base, a mounting plate extending from the base, a support mounted between the mounting plate and the base for receiving a circuit board and positioning a hole in the circuit board for receiving a contact, a punch assembly mounted on the mounting plate for staking a contact in the hole in the circuit board, an extendable anvil mounted on the base for supporting the circuit board during staking of a contact in the hole in the circuit board; said anvil including a bore in alignment with the punch assembly, the improvement

comprising a fluidic sensor in communication with the bore in the extendable anvil for sensing the presence of a clear hole in the circuit board for receiving the circuit board contact before said punch stakes the contact in the hole in the circuit board, and control means responsive to the fluidic sensor for prevent-



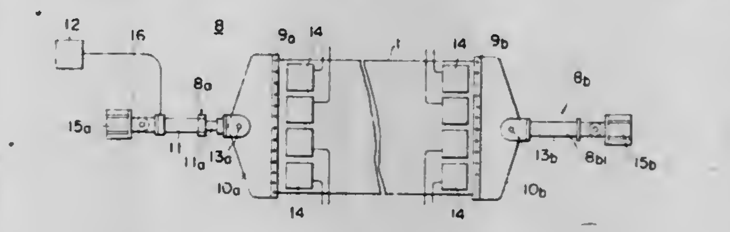
ing actuation of said punch when a clear hole in the circuit board is not in alignment with the bore in said extendable anvil, said control means including a limit switch responsive to extension of said anvil and means to retract said extendable anvil and prevent actuation of said punch when a clear circuit board hole is not present for receiving a contact.

4,058,882
METAL FENCE POST AND METHOD OF MAKING
Ernest R. Muckelrath, Tioga, N. Dak., assignor to Tioga Air Heaters, Co., Tioga, N. Dak.
Filed Oct. 15, 1975, Ser. No. 622,426
Int. Cl.² B23Q *17/00*
U.S. Cl. 29—407 **1 Claim**



1. A method of making a fence post comprising; the step of marking a long rectangular strip of metal at points therealong to be metal worked, then the step of punching holes at appropriate points along the center line of said strip, the further step of bending the strip along the center line to an approximately 100° included angle, next the step of bending inwardly each of the edges of the partially formed post at approximately a 110° included angle to form a post of generally polygon shape with one open side portion so that said post will resist twisting and bending when driven and erected, the additional step of providing a small rectangular strip of metal, cutting two corners of said rectangular member from the lengthwise side thereof to form a basic triangular anchoring plate, welding said anchoring plate to the open side portion of the polygon shaped post, and the further step of sharpening the lower slanted edges of the anchoring plate as well as the lower edges of the post itself to make the force necessary for driving same even less.

4,058,883
FABRICATION OF PANEL STRUCTURES HAVING THIN SKIN PLATE IN VEHICLES, WATER CRAFT, BUILDINGS, AND THE LIKE
Toshio Yoshida, Kobe; Kiyoshi Terai, Ashiya; Shigetomo Matsui; Tsuneo Kinoshita, both of Kobe; Akira Hoshi, Ashiya, and Toru Tohmoto, Nishinomiya, all of Japan, assignors to Kawasaki Jukogyo Kabushiki Kaisha, Kobe, Japan
Filed Jan. 22, 1976, Ser. No. 651,282
Claims priority, application Japan, Jan. 27, 1975, 50-11641; Jan. 27, 1975, 50-11642
Int. Cl.² B23P *11/02;* **B23K** *28/02*
U.S. Cl. 29—448 **8 Claims**

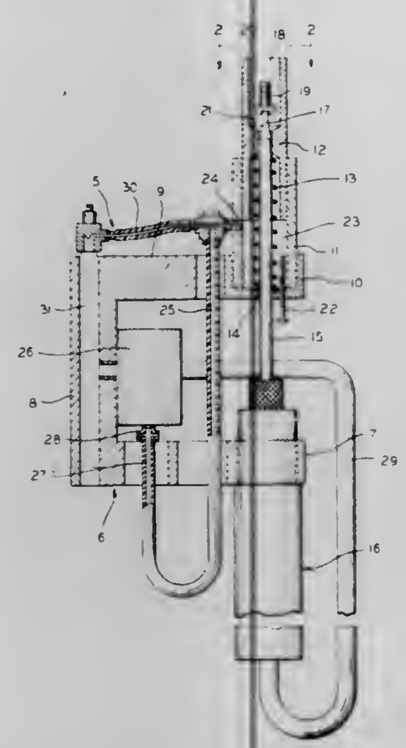


1. A method of fabricating a panel structure of the type having a skeletal framework and a skin plate secured to the framework comprising the steps of:
subjecting the skin plate to tensile stretching within the geometric surface thereof to produce a constraining tensile stress in the skin plate not exceeding the tensile elastic limit of the skin plate, the tensile stress being adequately applicable to at least a portion thereof;
concurrently heating the skin plate locally at portions thereof to which the constraining tension cannot be adequately applied to a temperature above room temperature to induce thermal expansion of the skin plate within its geometric surface;
welding the stressed and locally heated skin plate to the framework;
simultaneously maintaining the stressed and heated condition of the skin plate; and
thereafter releasing the skin plate from the tensile stretching and from the heating so as to leave a tensile residual stress in the skin plate to prevent undesirable deformation thereof in the fabricated panel structure.

4,058,884
AUTOMATIC SCREW DRIVER SYSTEM AND METHOD FOR UTILIZING SAME
Ralph P. Lydon, 2616 N. 75th St., Wauwatosa, Wis. 53213, and Weismueller, Sr. William A., Rte. 1, Box 29, Oostburg, Wis. 53070
Filed Oct. 18, 1976, Ser. No. 733,287
Int. Cl.² B25B *23/08;* **B23P** *19/06*
U.S. Cl. 29—526 R **11 Claims**

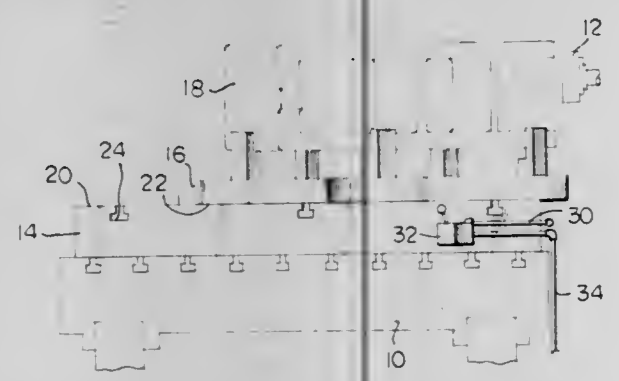
11. A method for automatically prepositioning screw devices and for screwing said screw devices into objects through the use of an inverted automatic air-operated screw driving system having a spring-loaded screw device locator, said locator having means for distributing the torque applied to said object, a locator guide, and a pneumatically powered driver and activation system for initiating the rotation of said driver and said screw device comprising the steps of:
a. positioning said screw device in said locator in an inverted fashion,
b. aligning said object up to and in contact with said locator at the desired location of screw device at fixation,
c. preliminarily activating and rotating said pneumatically powered driver for rotation of said screw device by de-

pressing said locator which in turn blocks said pneumatic activation system to route air into said driver;
d. depressing said locator further with said object thereby drawing said screw device into contact with said object;
e. driving said screw device into said object to a desired depth;



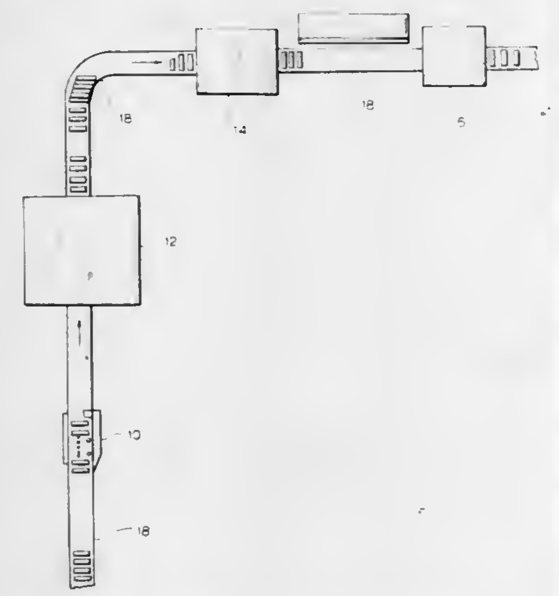
f. distributing the torque applied to said object through said locator after driving said screw device into said object to a desired depth;
g. removing said object and affixed screw device from said automatic screw driver thereby separating said screw from said driver.

4,058,885
METHOD FOR LOCATING AND CLAMPING A WORK MEMBER SUPPORTING FIXTURE
Raymond A. Bergman, 107 E. Second St., Minster, Ohio 45865
Filed May 10, 1976, Ser. No. 684,725
Int. Cl.² B23Q *7/00*
U.S. Cl. 29—559 **7 Claims**



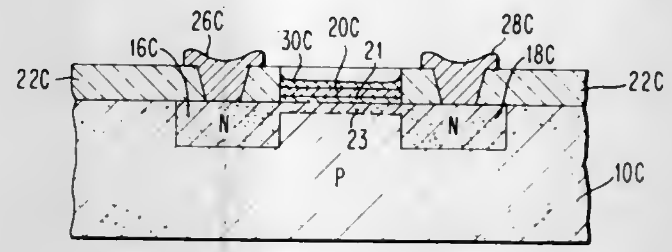
1. The method of locating a work member fixture having a downwardly facing bottom surface in a machine tool having a table with an upwardly facing upper surface for supporting the fixture during machining of the work member and which defines a work station for the machine tool, said method comprising: supplying a fluid under pressure between the upwardly facing surface of the table and the downwardly facing surface of the fixture to provide substantially friction free support of the fixture on the table, moving the fixture to a desired predetermined first position on the table, causing cooperating pairs of elements of locating means on the table and fixture surfaces to interengage in the said predetermined first position of the fixture on the table, clamping the fixture in said predetermined first position to the table for machining, subsequently unclamping the fixture, again supplying fluid under pressure between the fixture and table surfaces, and, while always maintaining the fixture on the table within the work station and maintaining at least one pair of locating means engaged, moving the fixture to a predetermined new and distinct second position on the table through translation and rotation, causing cooperating pairs of elements of locating means on the table and fixture surfaces to interengage in the said predetermined second position, and clamping the fixture in said predetermined second position to the table.

4,058,886
BATTERY CASE SALVAGE MACHINE
Oscar E. Alvarez, 5700 Mariner South, Apt. 701 E., Tampa, Fla. 33609
Continuation-in-part of Ser. No. 551,523, Feb. 21, 1975, abandoned. This application Jan. 12, 1976, Ser. No. 648,047
Int. Cl.² H01M *6/52;* **B23Q** *7/00*
U.S. Cl. 29—563 **19 Claims**



1. A battery casing salvage machine comprising a conveyor means mounted on a support frame, a first and second station mounted on said support frame, and an automatic feed means mounted on said support frame, said conveyor means disposed relative to said automatic feed means to receive battery casings therefrom at predetermined intervals, said first station arranged in operative communication with said conveyor means to receive battery casings therefrom at predetermined intervals, said first station comprising a first battery support means, a first cutting means arranged above said first battery support means and a battery movement means movably mounted on said support frame, said battery movement means disposed relative to said conveyor means to engage the battery casing thereon and move the battery casing on said first battery support means through said first cutting means to cut at least a portion of the battery casing from the remainder thereof, said second station arranged in operative communication with said conveyor means to receive battery casings therefrom at predetermined intervals from said first station, said second station comprising a second battery support means and a second cutting means arranged above said second battery support means, said second cutting means including a cutting element movably mounted on said second station to permit movement thereof perpendicular to the axis of said second battery support means, said cutting element disposed to engage battery casings on said second battery support means.

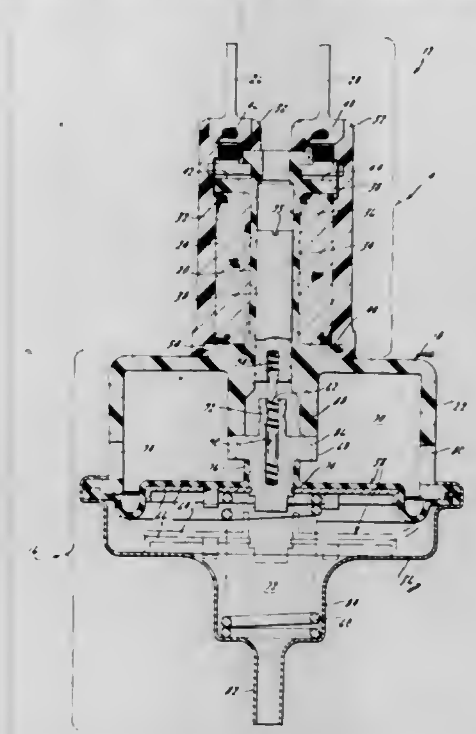
4,058,887
METHOD FOR FORMING A TRANSISTOR COMPRISING LAYERS OF SILICON DIOXIDE AND SILICON NITRIDE
David Dewitt, Poughkeepsie, N.Y., assignor to IBM Corporation, Armonk, N.Y.
Division of Ser. No. 117,077, Feb. 19, 1971, Pat. No. 3,707,656, which is a continuation-in-part of Ser. No. 572,119, Aug. 12, 1966, abandoned. This application Oct. 13, 1972, Ser. No. 298,311
Int. Cl.² B01J *17/00*
U.S. Cl. 29—571 **17 Claims**



1. A method of field effect transistor fabrication comprising applying layer of silicon dioxide on surface of monocrystalline semiconductor substrate of one type conductivity;
applying a layer of silicon nitride over said layer of silicon dioxide;
etching away coincident portions of the composite layers of silicon dioxide and silicon nitride to leave a defined portion of said composite representing the gate insulation of said transistor;
using said defined gas insulation composite as a mask in the formation of two spaced regions of another type conductivity in said substrate respectively extending from said surface on opposite sides of said gate insulation, said two regions representing the source and drain region of said transistor;
forming a layer of silicon dioxide having a greater thickness than said gate insulation composite over said two regions;
depositing a gate electrode over the gate insulation composite; and
forming a current carrying conductive metal land pattern on said thicker silicon dioxide layer, said pattern being connected respectively to said gate electrode and said source and drain regions, thereby providing a high capacitive effect on the portion of the semiconductor substrate beneath the gate insulation and a low capacitive effect on the portion of the substrate beneath the thicker oxide layer.

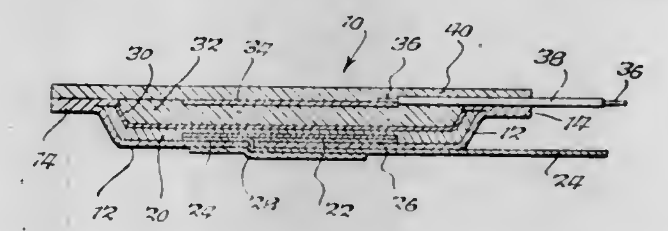
4,058,888
METHOD OF CALIBRATING VARIABLE INDUCTANCE TRANSDUCERS
Lawrence William Tomczak, Sterling Heights; Frederick William Crall, Farmington; LaVerne Andrew Caron, Sterling Heights, and Walter Joseph Campau, Grosse Pointe Woods, all of Mich., assignors to Chrysler Corporation, Highland Park, Mich.
Division of Ser. No. 665,999, March 11, 1976, which is a division of Ser. No. 559,204, March 17, 1975, Pat. No. 4,024,483. This application Feb. 2, 1977, Ser. No. 765,038
Int. Cl.² H01F *41/00*
U.S. Cl. 29—593 **1 Claim**

1. A method of calibrating a vacuum-servo-actuated variable inductance transducer during assembly thereof, said transducer being of the type comprising a vacuum servo having a diaphragm which is positionable according to the intensity of a vacuum signal applied to the servo, an inductance coil, a core movable axially of the coil to vary the inductance thereof, and a pair of telescopically engaged connecting members, one of which is affixed to the core and the other of which is affixed to the diaphragm, said method comprising:
providing said servo, core, and coil in assembled relationship but with said two telescopically engaged connecting members relatively movable with respect to each other so that their mutual telescopic engagement may be set to a desired amount;
providing tool access opening means in said servo;
providing a given vacuum signal to the servo;
positioning the core relative to the diaphragm, and in so



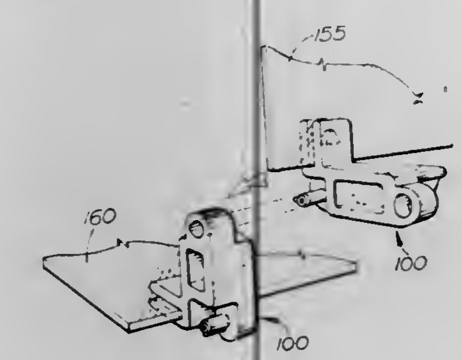
doing setting the amount of telescopic engagement of said two connecting members, to obtain a desired inductance of the coil for the given vacuum signal;
and inserting assembly tool means through said access opening means and uniting the two connecting members in fixed telescopic engagement with each other by means of said tool means.

4,058,889
METHOD OF MAKING A LITHIUM-BROMINE CELL
Wilson Greatbatch, Clarence; Ralph T. Mead, Kenmore; Robert L. McLean, Clarence; Frank W. Rudolph, Depew, and Norbert W. Frenz, North Tonawanda, all of N.Y., assignors to Eleanor & Wilson Greatbatch Foundation, Akron, N.Y.
Division of Ser. No. 617,280, Sept. 29, 1975, Pat. No. 3,994,747. This application July 26, 1976, Ser. No. 708,362
Int. Cl.² H01M *6/00*
U.S. Cl. 29—623.5 **4 Claims**



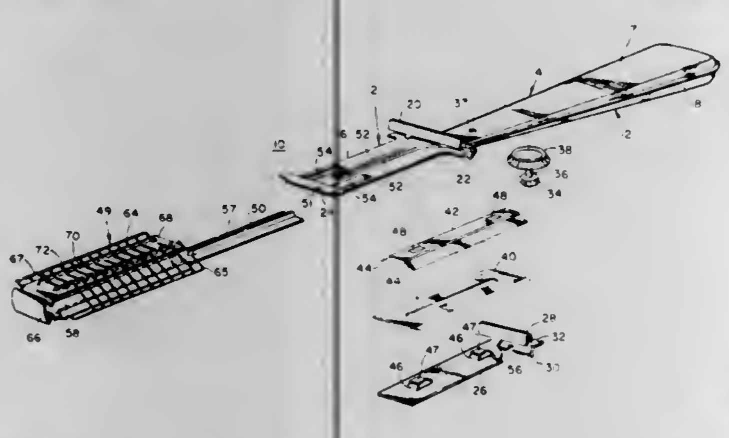
1. A method of making a lithium-bromine cell wherein the cathode comprises bromine comprising the steps of:
a. providing an anode including a lithium element having a surface adapted to be operatively associated with the cathode in the cell;
b. applying a coating to said anode surface, said coating including an organic electron donor material; and
c. introducing a cathode comprising bromine into operative contact with the coated surface of said anode in a housing to form a solid electrolyte comprising solid lithium-bromide.

4,058,890
METHOD FOR MOUNTING PRINTED CIRCUIT BOARDS
Perry H. Pierce, and Dan L. Prendergast, both of Loveland, Colo., assignors to Hewlett-Packard Company, Palo Alto, Calif.
Filed Oct. 15, 1975, Ser. No. 622,792
Int. Cl.^{2} H05K *3/36*
U.S. Cl. 29—625 **4 Claims**



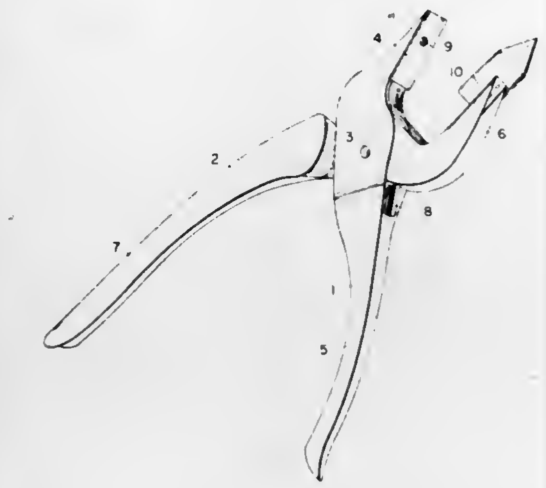
1. A method of mounting a plurality of printed circuit boards, the method comprising the steps of:
providing at least one slot in each of said printed circuit boards;
providing hinges having two lateral extensions which are essentially parallel planar structures having force-fitting means therebetween, said force-fitting means comprising an essentially arrow-shaped structure for force-fitting into said slot in one of said printed circuit boards;
attaching said hinges to said plurality of printed circuit boards; and
interlocking the hinges together to form a stack of printed circuit boards.

4,058,891
HAIR CUTTERS
Abram N. Spanel, 344 Stockton St., Princeton, N.J. 08540
Continuation of Ser. No. 484,566, July 1, 1974, Pat. No. 3,996,663. This application Dec. 13, 1976, Ser. No. 750,247
Int. Cl.^{2} B26B *21/12*
U.S. Cl. 30—30 **3 Claims**



1. A hair cutter comprising:
a handle;
a blade carrier adjacent to the handle for supporting a hair cutting blade including means for laterally driving said blade carrier and said blade to selectable hair cutting positions;
means for longitudinally sliding a cage to expose said blade including an extension receivable in said handle;
a first portion of interlocking structure on said extension;
a second portion of interlocking structure on said blade carrier; and
a notch on said blade carrier wherein said blade carrier can be adjusted to permit passage of said first portion of interlocking structure through said notch.

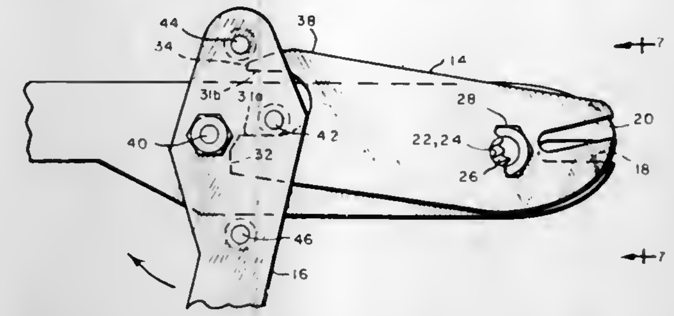
4,058,892
FOOD DECORATING INSTRUMENT
Edward W. Adamko, Brooklyn, N.Y., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest
Filed Nov. 1, 1976, Ser. No. 737,592
Int. Cl.^{2} B26B *17/04*
U.S. Cl. 30—178 **1 Claim**



1. A food decorating instrument for cutting pieces of fruit, vegetables, and the like, in a predetermined pattern, said food decorating instrument comprising
first and second arms pivotally affixed to each other by a pivot pin in the manner of a pair of pliers, each of said arms having a jaw end in the area of the pivot pin and a handle end spaced from the pivot pin;
spring means mounted on the arms urging the jaw ends of the first and second arms apart;
an internally threaded bore formed in the jaw end of the first arm, said bore opening from a surface of said first arm facing the second arm and extending a predetermined distance into said first arm;
a plate-like member affixed to the jaw end of the second arm at a surface facing the first arm; and
a mold member having a base plate with spaced opposite surfaces, an externally threaded pin extending substantially perpendicularly from one of the surfaces of the base plate and a cutting edge having a predetermined pattern extending substantially perpendicularly from the opposite surface of the base plate whereby when the mold member is removably affixed to the first arm by removably threadedly coupling the pin thereof in the bore of the first arm and a slice of fruit, vegetable, and the like, is interposed between the jaw ends and manual pressure is applied to the handle ends to force the jaw ends together the cutting edge cuts out a piece of said fruit, vegetable, and the like in the predetermined pattern.

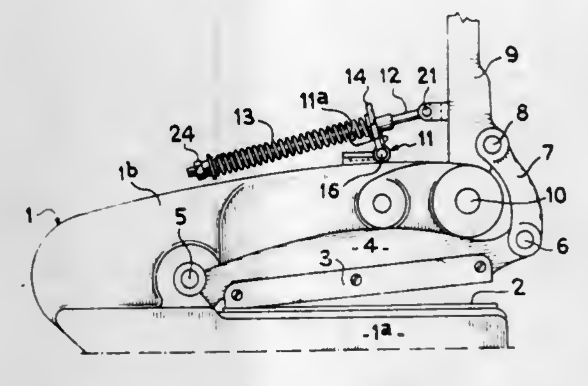
4,058,893
BOLT CUTTER
Alfred Z. Boyajian, P.O. Box 811, Manhattan Beach, Calif. 90268
Filed June 25, 1976, Ser. No. 699,664
Int. Cl.^{2} B26B *13/26*
U.S. Cl. 30—250 **8 Claims**

1. A cutter comprising a rigid bar having at one end a cutting edge intermediate its opposite longitudinal edges facing in a predetermined direction, a second rigid bar having at one end a cutting edge intermediate its opposite longitudinal edges facing in a direction opposite said first cutting edge and at its other end a recess, pivot means pivotally connecting the two bars for pivotal movement relative to each other to move the cutting edges toward and from each other, means for effecting pivotal movement of the bars relative to each other from a position in which the edges are separated for receiving the part to be sheared to a position in which they overlap comprising a lever arm pivotally mounted on the first bar on a pivot spaced from the pivot connecting the second bar to the first bar and with a portion of the lever arm situated between the pivots such as to overlap said other end of the second bar, and first and second force-producing elements fixed to the lever arm forwardly of its pivot axis at different radial distances from the pivot axis arranged to be brought into engagement with the



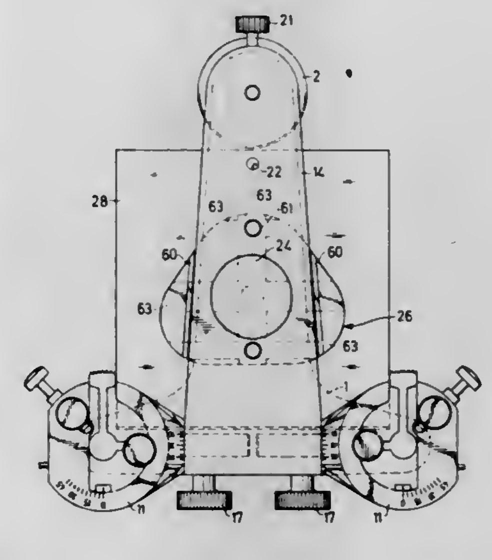
other end of the second bar at outer sides of the recess and within the recess to effect relative movement of the cutting edges toward each other at a relatively slow speed at the beginning of the blade movement to apply a high cutting pressure and thereafter a lower cutting pressure at a relatively high speed throughout the remainder of the blade movement.

4,058,894
LEVER-OPERATED SHEARS
Georges Joseph Leturgez, Loison sous Lens, France, assignor to Laminoirs Trefileries Cableries de Lens (Anciens Etablissements Gaillard-Stievenart), Lens, France
Filed May 14, 1976, Ser. No. 686,663
Claims priority, application France, May 14, 1975, 75.15024
Int. Cl.^{2} B26B *13/16, 13/26*
U.S. Cl. 30—251 **6 Claims**



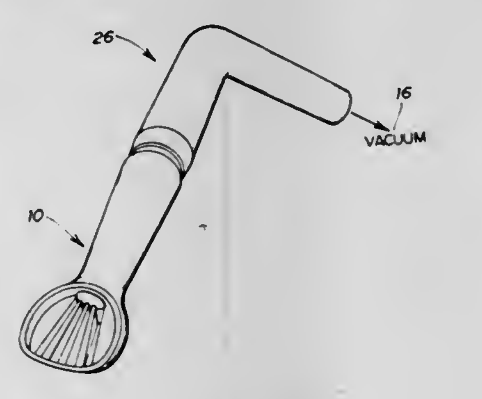
1. A lever-operated shears comprising a frame, a first jaw integral with the frame and carrying a first cutting blade, a second jaw pivotable relative to the first jaw and carrying a second cutting blade, an operating lever pivotally connected to the frame by a first pivot pin, a link for pivotally connecting said lever to said second jaw, said link being located beyond said first pivot pin with respect to said connection of said second jaw on said first jaw, said lever having a rest position, said shears further comprising a device for authomatically returning said lever to and maintaining it in said rest position, said device comprising a first member pivotally connected to said frame by means of a second pivot pin, a second member pivotally connected to said lever by means of a third pivot pin and slidably mounted through said first member on one hand and in the plane thereof, in a direction perpendicular to said second pivot pin on the other hand, said first, second and third pivot pins being parallel one to another, a first elastically yieldable means having a rotary action, and mounted between the frame and said first member, and a second elastically yieldable means having a rectilinear action and mounted on said second member between one end thereof and said first member, said first and second elastically yieldable means being capable of acting in a direction for biasing the lever to its rest position.

4,058,895
DENTAL ARTICULATOR
Heinz Mack, and Günter Singer, both of Munich, Germany, assignors to Heinz Mack, Munich, Germany
Filed Mar. 12, 1976, Ser. No. 666,395
Claims priority, application Germany, Mar. 15, 1975, 2511388; Nov. 15, 1975, 2551189
Int. Cl.^{2} A61C *19/02*
U.S. Cl. 32—32 **13 Claims**



1. A dental articulator comprising a lower frame portion with means for securing a mounting plate for the lower jaw model and a supporting platform or the incisor guide pin, a vertical frame portion rigidly connected to the lower frame portion and having two balls serving as condyles which are mounted on two supporting stems, and an upper frame portion with the two radially rotatable ball sockets serving as fossae and including a rear ball guiding means, and an inner ball guiding means which is angularly adjustable relative to the rear ball guiding means, a bearing shaft, means for securing a mounting plate for the upper jaw model to said upper frame portion, and an adjustable incisor guide pin, characterized in that the inner ball guiding means which is angularly adjustable relative to the rear ball guiding means comprises an exchangeable, optionally grindable segment of a circle bearing against a circular inner wall of the ball, and a lockable slide is provided which serves to lock the ball in the corner formed by the rear ball guiding means, the angularly adjustable inner ball guiding means, and an upper ball guiding surface, said slide being arranged opposite, or diagonally opposite, the corner formed by the rear ball guiding means and the angularly adjustable inner ball guiding means such that, after locking, one end of the slide rests on the lower half of the ball.

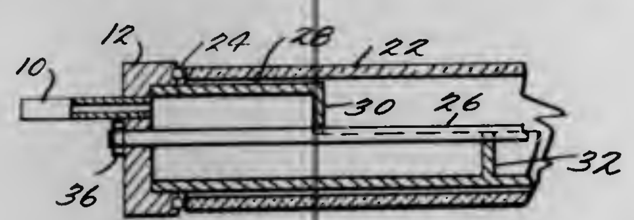
4,058,896
DENTAL ASPIRATOR TIP
Roland E. Moore, 2700 Tibbets No. 103, Bedford, Tex. 76021
Filed Jan. 15, 1976, Ser. No. 649,211
Int. Cl.^{2} A61C *17/04*
U.S. Cl. 32—33 **13 Claims**



1. An oral aspirator tip, comprising:

a. a rigid shank having a longitudinal bore adapted to be connected to a source of vacuum;
b. a firm and relatively large tissue-contacting member being generally spoon-shaped and having an open face and a closed back, and having a width appreciably larger than the diameter of the shank, with the tissue-contacting member being affixed to the forward end of the shank in such a way as to permit the passage of liquids through the open face and into the bore entrance; and
c. rigid blocking means lying internally of the spoon-shaped member and ahead of the entrance to said bore, for permitting the passage of all liquids but blocking the passage of certain solids into said bore, and the blocking means including at least two elevated ridges integrally formed with and extending forwardly from the enclosed back of the spoon-shaped member, with said ridges being oriented in the same general direction as the longitudinal bore, and the ends of the ridges which are near the bore entrance being closer together than their remote ends, such that solid particles passing internally of the spoon-shaped member may become wedged between the converging walls of the ridges, and the near end of at least one of the ridges partially blocking the entrance to said bore in such a way as to provide at least two flowpaths for liquids passing into said bore, whereby the collection of any one solid particle between the ridges will not block the entrance to the longitudinal bore.

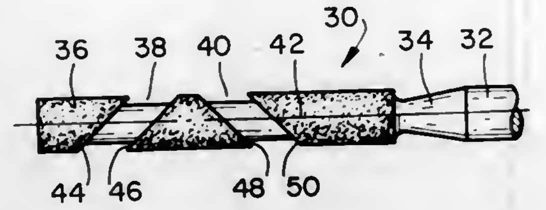
4,058,897
AMALGAM RETRIEVER
Frank E. Edwards, 5937 Birchwood Drive, Great Bend, Kans. 67530
Filed Aug. 10, 1976, Ser. No. 713,184
Int. Cl.² A61C *17/00*
U.S. Cl. 32—40 R **11 Claims**



1. An amalgam recovery device for use in dental offices or the like for separating fine particles of precious metal and amalgam from debris carried in a flushing fluid comprising a downwardly sloping trough element having a floor; an inlet end cap at the upper end of said trough; said inlet cap having an inlet therethrough for the infeed into the trough of the flow of flushing fluid and debris from which the particles and amalgam are to be recovered; means to divide said trough into a plurality of compartments to receive the particles and amalgam depositing out of said flow; an outlet cap at the lower end of said trough having an outlet opening therethrough to pass the flushing fluid and any debris floating therein from the trough element after the particles and amalgam have been separated therefrom; a housing element situated between said end caps for enclosing said trough element; and means to hold said housing, caps and trough elements assembled in fluid tight relation whereby said device may be disassembled to be cleaned and sterilized and the particles and amalgam may be recovered from said compartments.

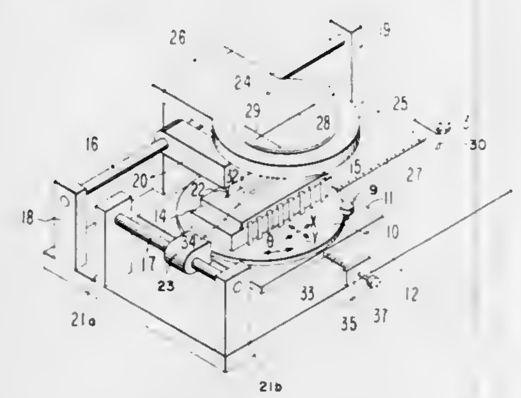
4,058,898
DENTAL BURR
John E. Nash, Downington, Pa., assignor to Star Dental Manufacturing Co., Inc., Conshohocken, Pa.
Filed Mar. 19, 1976, Ser. No. 668,334
Int. Cl.² A61C *3/06*
U.S. Cl. 32—59 **7 Claims**

1. A dental burr comprising a shank terminating, at the operative end thereof, in a cutting surface, said cutting surface having a plurality of non-intersecting grooves therein, said non-intersecting grooves being the only grooves in said cutting surface, each of said non-intersecting grooves being defined by a plane which completely encircles said cutting surface at a



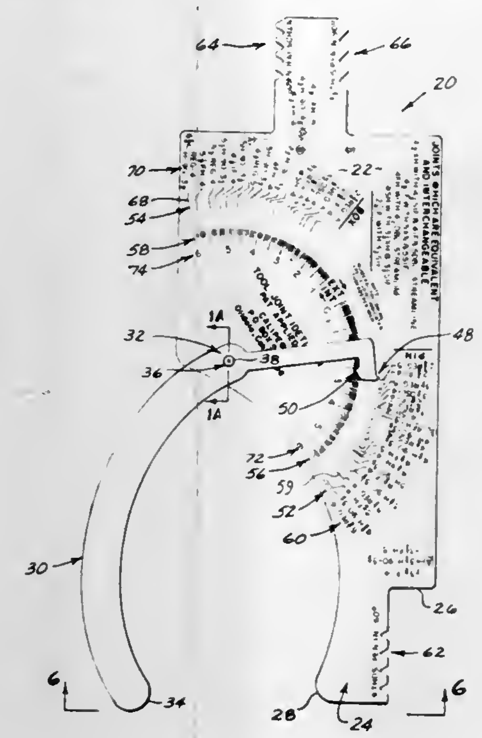
skewed angle with respect to the axis of rotation of said burr, one of said planes defining one of said non-intersecting grooves being at an angle with respect to the plane defining another of said non-intersecting grooves.

4,058,899
DEVICE FOR FORMING REFERENCE AXES ON AN IMAGE SENSOR ARRAY PACKAGE
William S. Phy, Los Altos, Calif., assignor to Fairchild Camera and Instrument Corporation, Mountain View, Calif.
Filed Aug. 23, 1976, Ser. No. 716,915
Int. Cl.² B43L *11/00*
U.S. Cl. 33—26 **2 Claims**



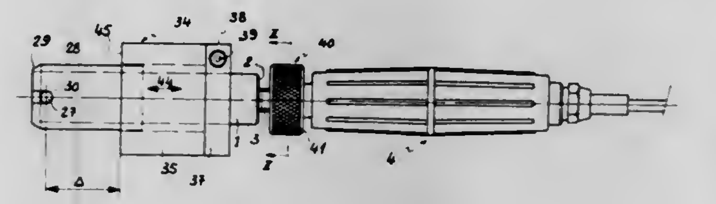
1. A device for forming reference axes on a package containing an image sensor array, comprising:
a stable platform;
optical magnifying means having two orthogonal reticles formed therein, said optical means being fixedly attached to said stable platform in a plane parallel to the plane of said platform;
a first table movably mounted on said stable platform, said first table having means to produce movement in two linear mutually orthogonal directions, said directions being parallel to said orthogonal reticles, said first table being mounted in a plane parallel to the plane of said platform;
a second able rotatably mounted on said first table, said second table being mounted in a plane parallel to the plane of said platform, said second table being adapted to receive said image sensor array;
first and second guide means mounted on said stable platform, said guide means being parallel to said orthogonal reticles; and,
first and second scribe means slidably mounted on respective ones of said guide means projecting from said guide means for overlying said second table for inscription of orthogonal reference axes on an image sensor array.

4,058,900
INSIDE AND OUTSIDE CALIPER AND TOOL-JOINT IDENTIFIER
James L. Yandell, 706 Shenandoah, Conroe, Tex. 77302
Filed Mar. 1, 1976, Ser. No. 662,865
Int. Cl.² G01B *5/08, 5/12*
U.S. Cl. 33—148 E **1 Claim**



1. A tool joint caliper and identifier comprising a first caliper arm, a second caliper arm, pivotal connecting means adjacent to one end of said arms, the other end of each of said arms including a contact point for engagement with a pin or box tool joint, said one end of said second caliper arm including an extension having a pointer thereon movable in a circular path about an axis defined by the pivotal connecting means, said pointer including oppositely facing points disposed along angularly spaced radii extending from said axis, said one end of said first caliper arm including a panel member forming an extension thereof, said panel member including a pair of arcuate, concentrically spaced graduated scales thereon associated with said points on said second caliper arm, and indicia disposed adjacent to each of said scales for respectively indicating the diameter of and identifying a tool joint engaged by the contact points to facilitate making up a drill string, each of said concentrically spaced graduated scales including a pair of arcuate scales spaced circumferentially along the arc of movement of the pointer, the inner of the concentrically spaced scales being associated with the radially inward point with the inner pair of arcuate scales and indicia associated therewith designating the internal diameter of a box tool joint or the external diameter of a pin tool joint engaged by said contact points, the outer point and outer pair of arcuate scales and indicia associated therewith identifying a box tool joint or a pin tool joint engaged by said contact points, said second caliper arm being in the form of an arcuate member with the contact point being at the outer end of the concave edge thereof, said first caliper arm including a concave arcuate edge having a contact point at the outer end thereof, said contact points engaging opposite external surfaces of a pin tool joint when disposed in spaced opposed relation, said caliper arms being disposed in two separate planes to enable the contact points to cross over and engage opposite internal surfaces of a box tool joint, said pivotal connecting means being located at the end of the arms remote from the contact points, the end of the panel member having the concave edge and contact point including a notch in the edge thereof adjacent the contact point to reduce the overall width of the end of the panel member having the contact point thereon to facilitate insertion into box joints having a relatively small internal diameter, said notch including an outwardly facing edge provided with thread-shaped recesses therein to serve as a thread gauge with the inner edge of the notch serving as a limit for the longitudinal movement of the end of the panel member in relation to a tool joint, said panel member including an end edge remote from the contact point at the outer end of the concave outer edge, an extension on said end edge of substantially less width than the end edge to facilitate manipulation of the panel member, said extension including thread-shaped recesses in each longitudinal edge thereof forming thread gauges with the adjacent edge portions of the panel member at the inner end of the extension defining means limiting the longitudinal movement of the extension in relation to a tool joint.

4,058,901
PLUG GAGE
Georges Lendi, Crissier; Bruno Hardegger, Monaltorf, and René De Trey, Bussigny, all of Switzerland, assignors to Tesa S.A., Vaud, Switzerland
Continuation of Ser. No. 531,663, Dec. 11, 1974, abandoned. This application June 22, 1976, Ser. No. 698,770
Claims priority, application Switzerland, Jan. 9, 1974, 219/74
Int. Cl.² G01B *5/12*
U.S. Cl. 33—178 R **9 Claims**



1. A plug gauge comprising:
a. a tubular body;
b. a rod housed in said body, said rod axially movable within said tubular body;
c. a conical element mounted on one end of said rod, coaxially thereto;
d. said tubular body formed with at least two guide channels, said guide channels transverse to the longitudinal axis of said tubular body;
e. a radially movable feeler ball housed in each of said guide channels, said feeler balls resting against the side surface of said conical element;
f. wall means integral with said tubular body to retain said feeler balls within said guide channels; and
g. coaxial centering sleeve means detachably engaged over said tubular body and said wall means to surround said tubular body over at least a portion of the length thereof, said sleeve means provided with transverse openings to permit passage of said feeler balls, whereby said centering sleeve means may be removed and replaced by another centering sleeve means detachably engaged over said tubular body and said wall means to surround said tubular body over at least a portion of the length thereof and provided with transverse openings to permit passage of said feeler balls.

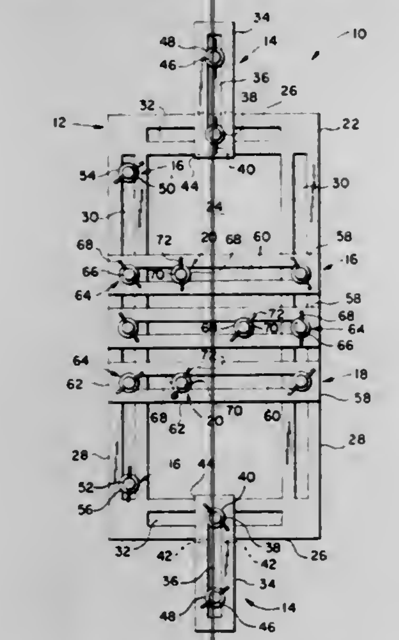
4,058,902
DOOR HINGE TEMPLATE
Roy W. Hall, 1813 Beth Drive, Longview, Tex. 75601
Filed Dec. 30, 1975, Ser. No. 645,375
Int. Cl.² G01B *3/00;* **E06B** *3/00*
U.S. Cl. 33—189 **5 Claims**

1. A hole locating template for use on frames and the like and comprising:
a substantially symmetrical, rectangular base member having at least one planar face, and having a central, elongated opening, and peripheral opposite longitudinally extending sides and peripheral opposite transversely extending ends that are mutually perpendicular to and integral with said sides, each said side and each said end having an elongated central opening defined by parallel edge elements such that each said peripheral side and end

central opening extends parallel to the corresponding edge of said base member;

first locating means for locating a point in the longitudinal direction and comprising first and second elongated frames, each frame slidably mountable at one end thereof for movement in a transverse direction at a corresponding end of said base plate in the end central opening thereof and having at least one depending boss integral with said frame for engagement with one of said transverse edges of the corresponding said peripheral end for maintaining said frame substantially perpendicular to said peripheral end; means for removably, rigidly attaching said one end of each said frames through said end central opening of the corresponding peripheral end; and a first alignment means for each said frame which comprises an elongate first element adjustably, rigidly mountable to the other end of said frame such that said first element extends substantially perpendicular to said planar face of said base member;

second locating means for locating a point in the transverse direction, said second locating means comprising an elongate, second alignment means for gauging transverse distance from one of said longitudinal sides of said frame, said second alignment means comprising an elongate, second element extending substantially perpendicular to said planar face of said base member, means for slidably mounting said second element in said peripheral side central opening perpendicularly to said face of said base member and for removably rigidly attaching said second element to said peripheral side;



at least one elongated adjustable member extending transversely across said base member central opening and slidably mounted at each end thereof to the corresponding base member side; and

adjustable indicating member mounted on said adjustable member for indicating within said base member central opening the desired location of the hole, said indicating member comprising an elongate marking pointer having a pointed one end and means for removably, rigidly attaching said pointer at the other end to said adjustable member such that said pointer extends substantially perpendicular to said planar face of said base member.

4,058,903

WHEEL BASE, TRACKING AND FRAME ANALYZER

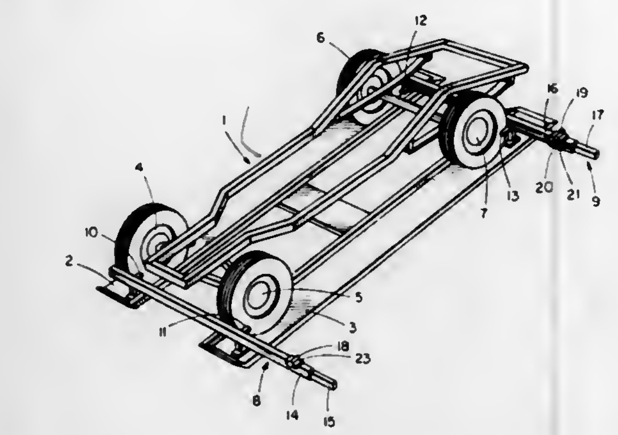
Edward D. Wilkerson, P.O. Box 755 South Court, Normandy Beach, N.J. 08739

Filed Jan. 15, 1976, Ser. No. 649,473

Int. Cl.² G01B ***5/255, 11/275***

U.S. Cl. 33—288 **12 Claims**

12. A frame analyzer for a four wheel and tire vehicle of the tracking type, comprising; a pair of gauges each having a pair of telescopic elements, a wheel engaging member attached to each of the telescopic elements adapted to extend approximately the width of each set of wheels, said elements having portions extending outside the space between the wheel engaging members, an indicia scale carried by each telescopic element with one element having ascending indicia juxtaposing descending indicia on the other element, an adjustable member slideable on one of the telescopic elements of each gauge and



movable to a position outside the space between the wheel engaging members, and means supported on each of said adjustable members for comparing the relative position of the adjustable members relative to each other when each adjustable member is positioned at a particular reading of said indicia to indicate the relative alignment between the two sets of wheels.

4,058,904

PROCESS FOR DRYING WET PARTICLES OF HYDROLYZED ETHYLENE-VINYL ACETATE COPOLYMER

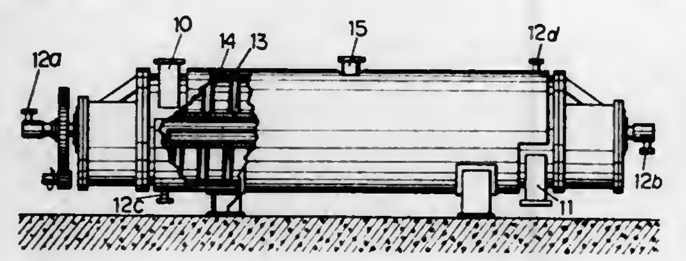
Hiroshi Takida, Takatsuki; Akio Kido, Ogaki, and Masazumi Takahashi, Itami, all of Japan, assignors to Nippon Gohsei Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Mar. 24, 1976, Ser. No. 669,964

Claims priority, application Japan, Apr. 1, 1975, 50-40020

Int. Cl.² F26B ***7/00***

U.S. Cl. 34—12 **1 Claim**



1. In a process for drying wet particles of hydrolyzed ethylene-vinyl acetate copolymer having an ethylene content of 20 to 50% by mole, a vinyl acetate content of 80 to 50% by mole and a degree of hydrolysis in vinyl acetate component of at least 90% by mole obtained by hydrolyzing ethylene-vinyl acetate copolymer in a medium, the improvement which comprises carrying out the drying under a pressure in a dryer of up to 120 mmHg, a temperature of the heating surface of the dryer of up to 100° C., and such that $T \times \theta^{0.6} \leqq 320$ wherein T is a temperature (°C.) of the heating surface and θ is a residence time of the particles in the dryer.

4,058,905

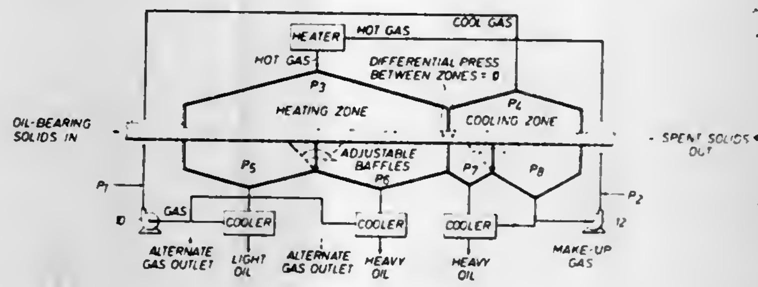
METHOD FOR REDUCING RESIDENCE TIME AND ELIMINATING GAS LEAKAGE BETWEEN ZONES IN A CROSS-FLOW DEVICE FOR HEATING AND COOLING SOLIDS

John H. Knight, Aurora, Colo., assignor to The Superior Oil Company, Houston, Tex.

Filed Dec. 19, 1974, Ser. No. 534,461

Int. Cl.² F26B ***3/06***

U.S. Cl. 34—15 **8 Claims**



1. A method for improved operation of a cross-flow device for heat transfer between a moving bed of solid particles and a plurality of gas streams, comprising the steps of:

moving a gas-permeable bed of solid particles through adjacent first and second heat transfer zones wherein the particles are heated in one of the zones and cooled in the adjacent zone;

passing a first gas stream through the bed in the first zone, the gas being passed through the bed in a direction normal to the direction of movement of the bed to achieve a first heat transfer between the particles and the first gas stream;

passing a second gas stream through the bed in the second zone, the second gas stream being passed through the bed in the same direction as the first gas stream, and

maintaining the first and second gas streams at the same inlet and outlet pressures respectively to reduce the lateral gas flow through the bed between the first and second heat transfer zones.

4,058,906

PROCESS FOR DRYING LARGE PIECES OF WOOD AT SUBATMOSPHERIC PRESSURE OR IN VACUO, PARTICULARLY FOR DRYING DELICATE WOOD AND/OR WOOD WHICH IS EASILY SPLIT

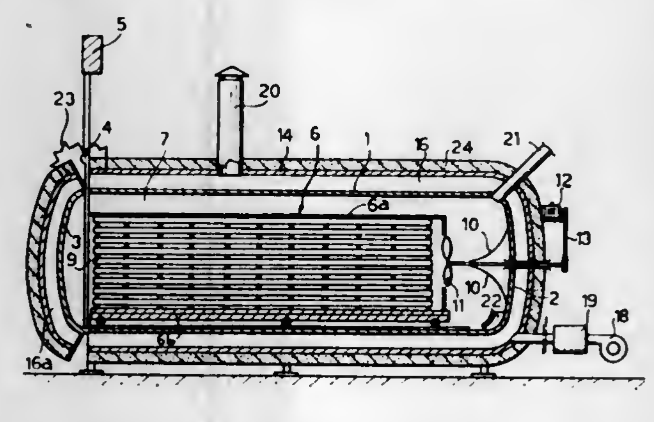
Vincenzo Pagnozzi, Rocchetta di Cairo (Savona), Italy, assignor to Ernesto Guglielmo Pagnozzi, Cairo Montenotte (Savona), Italy

Filed May 18, 1976, Ser. No. 687,495

Claims priority, application Italy, May 19, 1975, 68291/75

Int. Cl.² F26B ***5/04***

U.S. Cl. 34—16.5 **11 Claims**



1. A process of drying large pieces of wood comprising a step of heating a drying gas and a pile of said pieces of wood in a sealed container to accumulate heat in the wood under inherently increasing pressure of said gas, followed by a step of connecting the container to a vacuum source to produce evaporation of moisture from the wood by the heat accumulated in the latter,

wherein the heating step comprises:

circulating within said sealed container the said gas in humid condition in a closed circuit such that at every turn the gas is compelled to pass through the pile and then return along a distinct path which does not pass through the pile and is in heat-exchange relation with the walls of the container,

heating the container as a whole from the outside to heat said gas on its return path by inflow of heat from the walls of the container to the gas, whereby the thermal content of the gas increases at each subsequent turn by a diminishing amount until the gas reaches a substantially steady state at which there is no overall increase of its thermal content at each subsequent turn while at the same time the absolute humidity of the gas remains substantially constant, both on passage through the pile and on return, and

continuing the circulating and heating of the humid gas under said steady state conditions until the temperature drop of the gas between its entrance to and exit from the pile is less than 3° C.

4,058,907

DEVICE FOR THE HEAT TREATMENT OF BULK MATERIAL

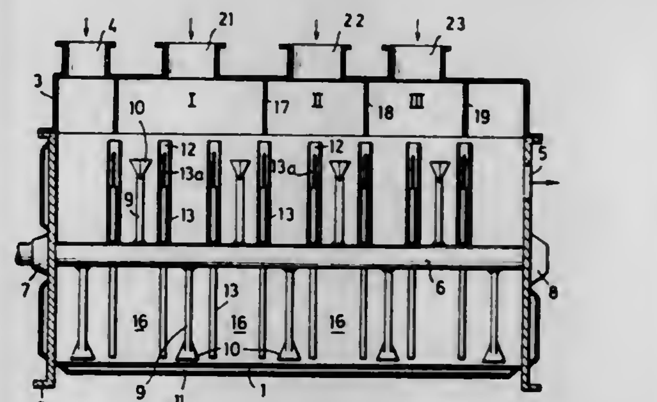
Eberhard Lipp, Paderborn, and Hans-Hermann Jurgens, Schloss Neuhaus, both of Germany, assignors to Firma Gebr. Lodige Maschinenbau-Gesellschaft mbH, Paderborn, Germany

Filed Oct. 22, 1975, Ser. No. 625,010

Claims priority, application Germany, Nov. 15, 1974, 2454208

Int. Cl.² F26B ***17/20***

U.S. Cl. 34—61 **14 Claims**



1. Apparatus for the heat treatment of bulk material, comprising: a generally horizontally extending trough-shaped container; a driven shaft extending longitudinally through and being mounted for rotation with respect to said container; a plurality of arms operatively secured to and extending generally radially outwardly from said shaft for rotation therewith, said arms having means for mixing bulk material within said container; a plurality of separate heat exchanger plates positioned within said container between said radially extending arms, and means mounted on side walls of said container for mounting each of said plates so that each plate is individually removable independently of each other and of said shaft, the cross-sectional configuration of said heat exchanger plates generally conforming to the internal configuration of said trough-shaped container, with each plate being formed with cutouts aligned with interfering parts within said container, including said shaft.

4,058,908

APPARATUS FOR DRYING FLAT PRINTED MATERIAL

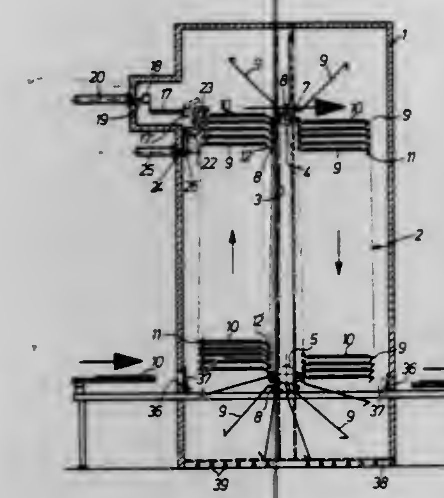
Erich Weber, 9a, Bertha Koempelstrasse, Feldafing, Germany

Division of Ser. No. 472,461, May 22, 1974, abandoned. This application May 13, 1976, Ser. No. 686,102

Claims priority, application Germany, May 22, 1973, 2326012; May 9, 1974, 2422492

Int. Cl.² F26B *15/22*

U.S. Cl. 34—149 **19 Claims**



1. Apparatus for drying flat printed material such as paper and card sheets, plastic film or panels of board, timber, sheet metal or other material with printed material supports mounted on chain links connected to conveyor chains provided on a substantially upright chain conveyor means defining rising and falling conveyer stringers, an upper portion of said chain conveyor means provides a transfer path for said material wherein the material is transferred laterally from a rising conveyer stringer to a falling conveyer stringer, said transfer path including conveying means which comprise pull elements which can be reciprocated in the conveying plane for acting on the leading ends of the printed material so as to pull the printed material over the conveying path from said rising to said falling conveyer stringer.

4,058,909

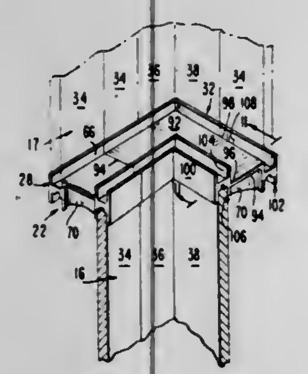
CONSTRUCTION KIT

Victor Joseph Poleri, 207 E. 15 St., New York, N.Y. 10003

Filed Oct. 18, 1976, Ser. No. 733,097

Int. Cl.² G09B *19/00;* **A63H** *33/10*

U.S. Cl. 35—16 **16 Claims**



1. A bracket for use in a model building to create a supporting ledge in generally vertical structural walls forming the outer shell of said building, said bracket comprising:

a generally horizontal main wall having bounding inner and outer edges and lateral edges each extending between said inner and outer edges;

means disposed at, at least, one of said inner and outer edges for securing said bracket at the top of a fist of said structural walls; and

means disposed at, at least, the other of said inner and outer edges for supporting a second of said structural walls, said supporting means being constructed and arranged to receive the bottom of said second structural wall;

said supporting ledge being formed by securing a plurality of said brackets to the top of said first structural wall with the lateral edges of adjacent brackets abutted and with the outer and inner edges of each bracket aligned with at least a portion of the corresponding edge of each bracket adjacent thereto.

4,058,910

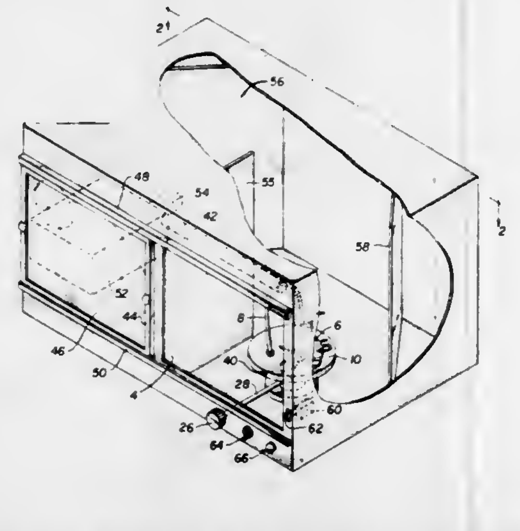
APPARATUS FOR TEACHING THE STRUCTURES AND PROJECTION OF ARTERIAL SYSTEMS

David C. Funk, Iowa City, Iowa, assignor to University of Iowa Research Foundation, Iowa City, Iowa

Filed Nov. 18, 1976, Ser. No. 743,202

Int. Cl.² G09B *23/28*

U.S. Cl. 35—17 **10 Claims**



1. Apparatus for teaching the structures and projections of arterial system in preparation for making and studying arteriograms, said apparatus comprising,

a substantially closed housing having an observation opening,

a three dimensional model of an arterial system located in said housing at a position which is visible through said observation opening,

a rear-lighted projection screen movable from an inoperative position removed from said observation opening to an operative position which lies across said observation opening,

rear-lighting means in said housing for directing a beam of light first against said model and then against said projection screen when said projection screen is in its operative position, to cast a two dimensional shadow of said model on said projection screen,

means for actuating said rear-lighting means when said projection screen is in its operative position, and for deactivating said rear-lighting means when said projection screen is in its inoperative position to permit direct observation of the three dimensional model.

4,058,911

ROAD-RUNNER ALCOHOL SAFETY INTERLOCK SYSTEM

Anne W. Story, Cambridge, Mass., assignor to The United States of America as represented by the Secretary of the Department of Transportation, Washington, D.C.

Filed Aug. 18, 1976, Ser. No. 715,424

Int. Cl.² G09B *19/00*

U.S. Cl. 35—22 R **7 Claims**

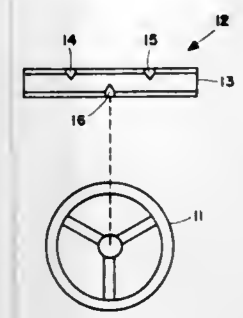
1. An intoxication testing apparatus comprising:

display means for producing a display visible to a test subject;

first test means for producing a first moving object in said display;

second test means for producing a second moving object in said display;

computer means for dynamically determining the changing locations of the midpoint of given positions between said moving objects and having a constant spatial relationship thereto;



actuator means operable by the subject to dynamically select particular positions between said moving objects; and

comparator means for dynamically comparing the locations of said given and particular positions.

4,058,912

DIDACTIC APPARATUS

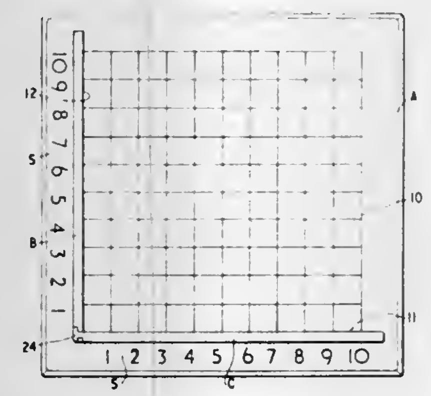
Charles Arthur Tacey, Andover, England, assignor to Philograph Publications Limited, England

Filed Feb. 18, 1976, Ser. No. 658,966

Claims priority, application United Kingdom, Feb. 19, 1975, 7028/75

Int. Cl.² G09B *23/04*

U.S. Cl. 35—34 **1 Claim**



1. Didactic apparatus for the purpose specified, and for use with lcm. unit cubes, comprising:

i. a rectangular base plate having an upper face marked with a grid defining lcm. squares, said grid having its boundaries spaced by a first edge portion from a first edge of the base plate, and by a second edge portion from a second adjoining edge of the base plate, said base including slots,

ii. a first transparent rectangular wall mounted on said base normal to the plane of said upper face and positioned along the boundary of the grid spaced from the first edge of the base plate, said first wall including a tongue for engagement in a respective slot of the base to locate and connect the wall to the base, said tongue including a shoulder for abutment against the base to retain the tongue in engagement in said slot,

iii. a second transparent rectangular wall mounted on said base plate normal to the plane of said upper face and positioned along the boundary of the grid spaced from the second edge of the base plate, said second wall being joined at a right angle to said first wall, said second wall including a tongue for engagement in a respective slot of the base to locate and connect said wall to the base, said tongue including a shoulder for abutment against the base to retain the tongue in engagement in said slot, one of said first and second walls includng a T-piece tenon formation remote from the base and the other of said first and second walls including a corresponding recess formation remote from the base for interengegement to connect said first and second walls together, said first and second walls being marked with grid lines defining 1cm. squares commencing from the line of juncture of the walls with the base plate, and the line of junctureof the walls with each other, the grid lines of the base plate being numbered consecutively on said edge portions starting from the juncture of said walls, and the horizontal grid lines marked on said walls being numbered consecutively starting from the juncture of each wall with the base.

4,058,913

LIGHTWEIGHT TRAIL GROOMER

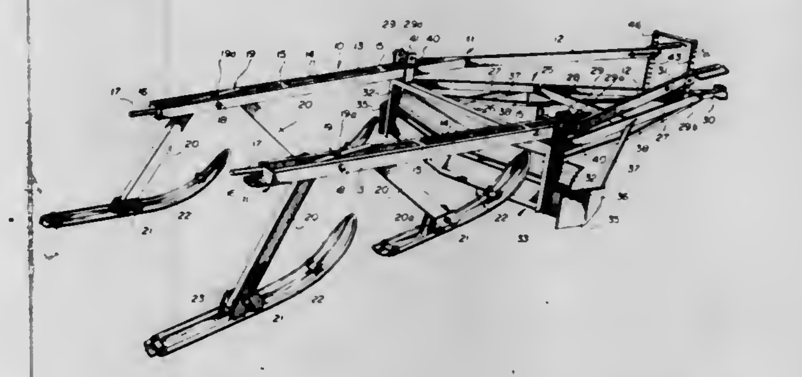
Georges Esquilat, Valcourt, Canada, assignor to Bombardier Limited, Canada

Filed Mar. 29, 1976, Ser. No. 671,036

Claims priority, application Canada, Jan. 2, 1976, 242919

Int. Cl.² E01H *5/06;* **A01B** *15/10*

U.S. Cl. 37—50 **9 Claims**



1. A trail groomer comprising an elongate generally horizontal frame, means at a forward end of the frame for attachment to a towing vehicle, a transverse scraper blade positioned beneath the frame at an intermediate location in the length thereof, said frame having a rear end supported on ski means for sliding engagement with a snow surface, said ski means comprising a pair of laterally spaced brackets each of which has an intermediate portion pivoted on a common transverse axis at the rear of the frame and each having longitudinally spaced front and rear arms extending generally downwardly with respect to the frame, each arm being connected to a ski such that the skis are positioned in pairs longitudinally aligned at opposite sides of the frame, said frame including a main frame structure supporting said laterally spaced brackets, and an auxiliary frame structure pivoted on a second transverse axis on the main frame structure at said intermediate location and having dependent arm means supporting said scraper blade, said auxiliary frame structure extending forwardly from said location and having a forward portion which carries said attachment means, adjustable connector means linking said auxiliary frame structure to said main frame structure at a selectively variable angular relationship with respect to said second transverse axis whereby in use to provide means to vary the height of said scraper blade with respect to a snow surface upon which the trail groomer is to be towed.

4,058,914

ALTERNATE FLOW SUCTION DREDGE

Sandor G. Kiss, 236 E. Sunset Ave., Lombard, Ill. 60148

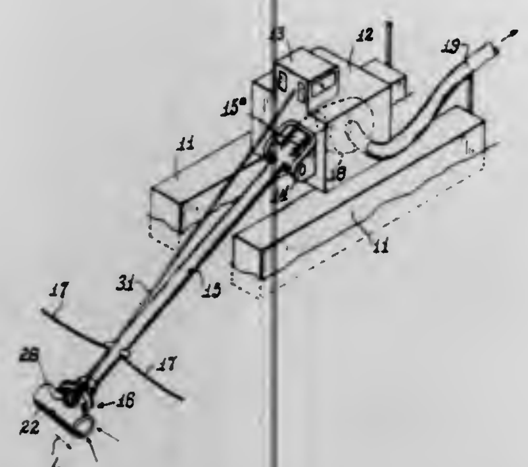
Filed Dec. 15, 1975, Ser. No. 640,395

Int. Cl.² E02F *3/92*

U.S. Cl. 37—66 **9 Claims**

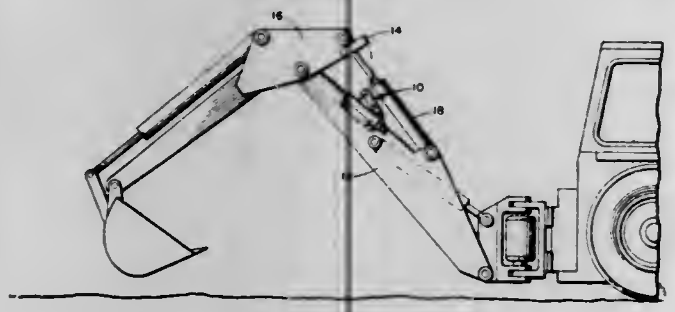
1. In a hydraulic suction dredge, the combination of a suction tube ladder, a suction motor in said dredge, a suction head, said suction head having a neck at one end connected to said suction tube ladder and a tubular cross-head on the other end, said cross-head having an unrestricted opening at each end, a wall separating the cross-head from the neck, a central partition dividing said cross-head into two portions, passageways in said wall, one connecting each portion with the neck, an oscil-

latably rotatable T-shaped gate valve in said neck to manually selectively close either one of said passageways, said suction tube ladder and said cross-head converting suction developed by the suction motor into a linear force propelling the cross-



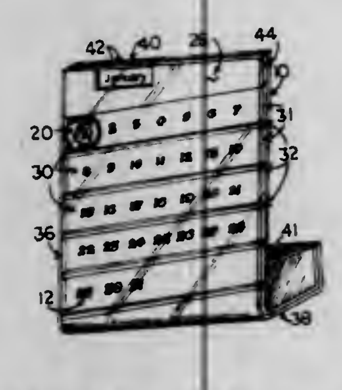
head in a direction toward the open passageway, and a rotary cutter head, including augur means to advance the cross-head toward a work area, arranged on each open end of the cross-head.

4,058,915
BACKHOE-MOUNTED SHEAR
Leon M. Hake, Perry, Okla., assignor to Wittwer Construction Company, Oskaloosa, Kans.
Filed June 8, 1976, Ser. No. 693,743
Int. Cl.² B26D *7/00;* E02F *3/76*
U.S. Cl. 37—117.5 **8 Claims**



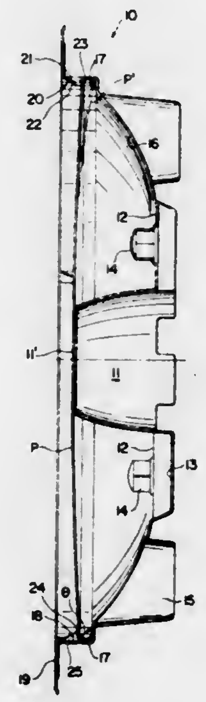
1. A shearing apparatus, comprising, in combination:
a. a shear having a cutting head; and
b. a backhoe having a backhoe dipstick on a backhoe boom, said shear being mounted on one of said boom and dipstick and said cutter head being actuated by the other of said boom and dipstick.

4,058,916
OBJECT RETAINING AND DISPLAY CALENDAR
Roy Whyatt, 105 Bellvue St., Newton, Mass. 02158
Filed Sept. 2, 1976, Ser. No. 719,941
Int. Cl.² G09D *3/00*
U.S. Cl. 40—107 **7 Claims**



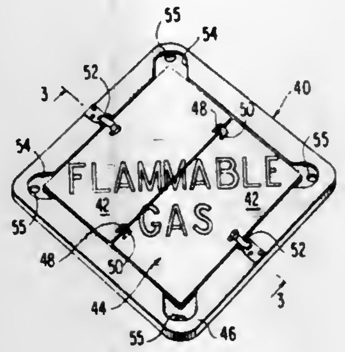
1. An object retaining and display calendar comprising:
a back support member;
a plurality of parallel dividers, sloped downward to the horizontal, affixed to said back support member to form a plurality of parallel channels each having an upper and lower end;
a plurality of date areas associated with calendar indicia in sequential order, arranged in a plurality of parallel rows sloped downward to the horizontal, each of said rows proximately and correspondingly positioned in relation to one of said channels, said date areas being in an overlying relationship to said back support member;
means for blocking the lower end of said channels; and
a substantially transparent front support member affixed at its top and bottom in a face-to-face relationship with said back support member, said channel dividers and said channel end blocking means interposed therebetween.

4,058,917
WHEEL DISK DISPLAY AND PLACARD HOLDER
James I. Tallon, Cuyahoga Falls, Ohio, assignor to McNeil Corporation, Akron, Ohio
Filed Nov. 3, 1975, Ser. No. 628,548
Int. Cl.² G09F *7/00*
U.S. Cl. 40—125 M **9 Claims**



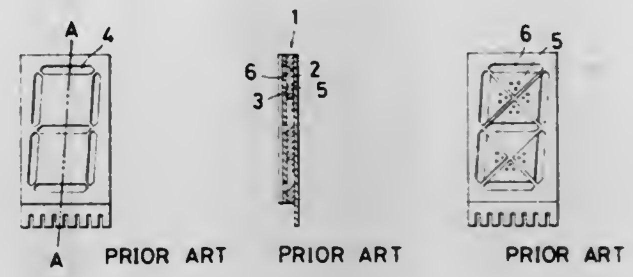
7. A wheel disk for mounting on a pneumatic tire for display purposes and adapted to selectively retain a generally flat placard comprising, disk like surface means curving generally radially and axially outwardly, circumferential flange means positioned radially outwardly of said surface, retaining means on said circumferential flange means to restrain the placard from axially outward travel after its insertion into the confines of said circumferential flange means, said retaining means being circumferentially spaced lugs each having a substantially radial stop leg to limit the axially outward travel of a placard when positioned in said circumferential flange means in the wheel disk and having an axially and radially inwardly tapered surface extending from said circumferential flange means to said stop leg to facilitate the insertion of the placard in the wheel disk, and lateral offset means interposed between said circumferential flange means and said surface means and spaced from said retaining means to limit the axially inward travel of the placard when positioned in the wheel disk.

4,058,918
VEHICLE PLACARDING APPARATUS
Harry Fund, Chicago, Ill., assignor to Modular Products Corporations (Labelmaster Division), Chicago, Ill.
Filed Aug. 16, 1976, Ser. No. 714,840
Int. Cl.² G09F *21/04*
U.S. Cl. 40—129 C **2 Claims**



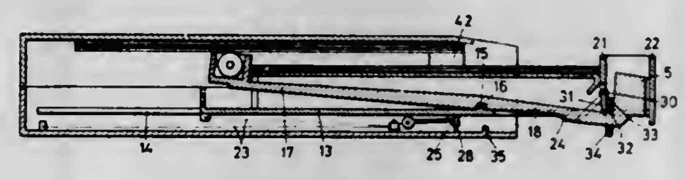
1. An apparatus for placarding a vehicle with a plurality of selectively exposable inscriptions on diamond-shaped backgrounds comprising:
a base member comprising an equilateral, diamond-shaped central portion and a framing section raised from the square central portion and lying along substantially the entire perimeter of the central portion of the base member, said base member being attachable to the vehicle so that the framing section extends outwardly from the vehicle and from the central portion, and so that diagonally opposite vertices of the central portion lie on a vertical axis;
a plurality of rectangular plates having longitudinal edges of approximately the same length as a side of the central portion and having transverse edges of approximately half the length of the central portion;
means for pivotally attaching each of the rectangular plates to the base member so that the plates are pivotable about a common axis approximately parallel to a longitudinal edge of each plate, which axis approximately bisects two parallel sides of said framing section;
manually operable means mounted on the other two sides of said framing section for clipping the rectangular plates to the base member to selectively retain the plates in parallel contact with the central portion;
said plates being located and having indicia so that the surfaces of any two of the plates facing outwardly simultaneously collectively define a diamond-shaped area displaying an inscription, split along the common pivoting axis and framed by the framing section; and,
said framing section being raised from the central portion a sufficient amount so that the plurality rectangular plates lay in the recess formed by said framing section and are thereby protected from being moved and damaged by stationary projections along the path of the vehicle which would otherwise catch edges of the rectangular plates as the vehicle is driven by the stationary projections
cutouts are formed in the framing section about the vertices of the central portion to provide access for selection and manual grasping of the rectangular plates; and, said framing section comprises:
wall portions projecting perpendicularly to the central portion and located about the perimeter of the central portions; a frame wall portion attached to the wall portion and disposed in a plane parallel to the plane of the central portion; and
a frame skirt portion depending from said frame.

4,058,919
SEGMENT TYPE, ELECTRIC LIGHT ALPHA-NUMERIC FIGURE INDICATOR
Yasuo Wakabayashi, 17-7, Hisaki 8-chome, Zushi, Kanagawa, Japan
Filed Oct. 29, 1976, Ser. No. 737,005
Int. Cl.² G09F *13/00*
U.S. Cl. 40—130 E **4 Claims**



1. A segment type, electric light figure indicator, comprising:
a casing for housing the indicator.
a cover plate disposed over said casing and having a plurality of light-transmissive slots arranged to collectively form the desired figure;
a plurality of compartments disposed within said casing and positioned behind at least one of said slots, each of said compartments having a triangular cross section in a plane parallel to said cover plate with a base side and an apex angle opposite said base side, the base sides of said plurality of compartments being linearly aligned and coextensive with said one slot;
each of said compartments having a reflecting wall inclined to said cover plate at an angle of about 15° to 75° and being disposed immediately behind said one slot; and
at least one light source housed in each of said compartments and positioned adjacent to the apex angle.

4,058,920
TELEPHONE NUMBER REGISTER
Reinhold Moltrecht, Klosterbergenstrasse 20a, 2057 Reinbek, Germany
Filed June 11, 1976, Ser. No. 694,941
Claims priority, application Germany, July 5, 1975, 2530106; Sept. 20, 1975, 2542046
Int. Cl.² H04M *1/04;* A47B *88/00*
U.S. Cl. 40—336 **11 Claims**



1. In combination with a telephone number register having a shallow casing,
a drawer guidedly operative therein for supporting register cards and adapted for moving out of the front side of said casing, and
a plurality of double levers supported on the drawer, each supporting on its rear end a projection selector for raising those registered cards associated therewith when the respective front lever end thereof is lowered,
the improvement in each of said levers comprising:
locking means for holding said front lever end lowered upon actuation, and
releasing means connected to at least one of said drawer and casing for releasing said locking means upon insertion of said drawer.

4,058,921

PISTOL ADAPTED FOR DISPENSING DEBILITATING CHEMICAL REPELLANTS

Neil E. Mason, 36004 Salisbury Drive, Newark, Calif. 94560

Filed Jan. 21, 1977, Ser. No. 761,104

Int. Cl.² F41C *27/00*

U.S. Cl. 42—1 G **9 Claims**

1. A combination weapon comprising a pistol having a barrel and a shank with a butt end, a cylindrical cannister containing a pressurized debilitating chemical substance mounted in said shank, a valve for releasing said chemical substance, a digitally operable actuator for operating said valve, and a nozzle coupled to said cannister and mounted in the butt end of said shank transversely to the barrel for directing said chemical substance transverse to said barrel.

8. A kit for modifying a firearm to additionally discharge a disabling chemical, said firearm having a barrel and a generally hollow shank with a butt end with a pair of hand grips enclosing said hollow shank to form a cavity, said kit comprising a cannister adapted to fit within said cavity, valve means mounted to said cannister for releasing said chemical, actuator means for operating said valve means in response to digital compression of a firearm gripping hand, and a nozzle mountable in said butt end to direct a discharge of said chemical from said butt end in an ostensibly non-threatening and safe direction transverse of said barrel.

4,058,922

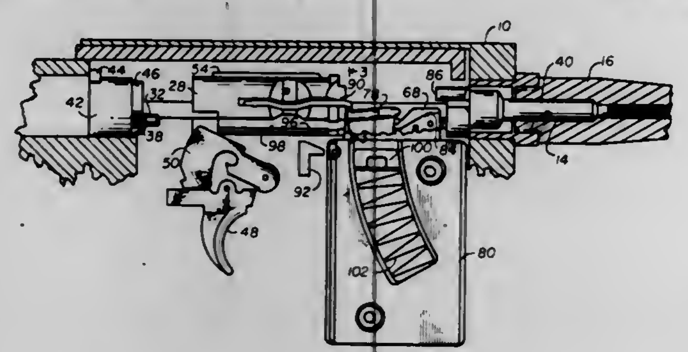
RIFLE ADAPTER ASSEMBLY

Ronald E. Elbe, Davenport, Iowa; Donald W. Krolak, Rock Island, and Philip L. Vernon, Milan, both of Ill., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Sept. 26, 1975, Ser. No. 617,203

Int. Cl.² F41C *11/00, 21/10, 25/00*

U.S. Cl. 42—16 **6 Claims**



1. A rifle adapter system for converting a rifle having a rifle receiver to fire ammunition other than for which it was designed to fire, said adapter system comprising:

an adapter magazine attachable to said rifle for conveying adapter cartridges to said rifle receiver, said magazine having feed lips extending approximately the length of an adapter cartridge and an angularly disposed integral ramp extending forwardly therefrom, with side guides adjacent said ramp to guide said adapter cartridges when moved forwardly to battery position,

an assembly having a rear retainer and forward adapter chamber held in fixed spaced relationship by a bolt supporting means,

a bolt slidably moveable along said supporting means and between said retainer and said adapter chamber,

said bolt having means thereon for moving an adapter cartridge into said chamber and extract the casing after said adapter cartridge has been fired,

said bolt having a firing pin slidably mounted thereon for striking said adapter cartridge when in said chamber to fire the same,

spring means on said bolt supporting means urging said bolt forwardly to a battery position,

said rifle having a hammer and trigger for searing said hammer in cocked position,

said bolt being operable on recoil to move said hammer to said cocked position,

said hammer, bolt and magazine being so positioned, arranged and disposed that said bolt cocks said hammer on recoil before recoiling back far enough to feed a fresh adapter cartridge toward said chamber as said bolt advances to said battery position and thereby prevent double firing.

4,058,923

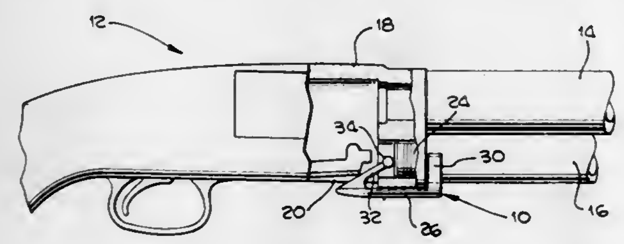
SHOTGUN SAFETY DEVICE

Forrest D. Smith, P.O. Box 222, Orleans, Calif. 95556

Filed Dec. 6, 1976, Ser. No. 747,597

Int. Cl.² F41C *27/00*

U.S. Cl. 42—17 **8 Claims**



1. A detachable safety clip for repeating gun which gun includes a receiver, a barrel and a tubular magazine operably connected to said receiver, said detachable safety clip comprising:

an elongated base member;

means for releasably grasping said tubular magazine adjacent said receiver, said means for releasably grasping including arms projecting outwardly from said base member;

means for contacting a center primed cartridge to prevent said cartridge from moving out of said tubular magazine into said receiver, said means for contacting including a member projecting outwardly from said base member generally toward said arms.

4,058,924

PRETRIGGERABLE TRIGGER MECHANISM FOR SPORTING RIFLES

Franz Mullner, Steyr, Austria, assignor to Steyr-Daimler-Puch Aktiengesellschaft, Vienna, Austria

Filed Sept. 27, 1976, Ser. No. 727,139

Int. Cl.² F41C *19/02*

U.S. Cl. 42—69 R **3 Claims**

1. A pretriggerable trigger mechanism for sporting rifles, which comprises

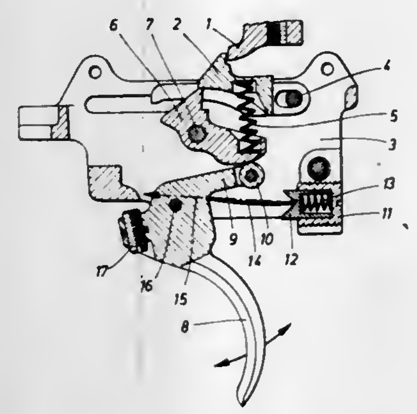
a sear, which is pivotally movable between an intercepting position and a non-intercepting position,

a sear spring urging said sear toward said intercepting position,

an intermediate lever pivoted on a stationary axis and

adapted to assume a locking position, in which said intermediate lever backs said sear in said intercepting position,

a trigger, which is adapted to assume an intermediate position and pivotally movable on a pivotal axis from said intermediate position forwardly to a defined set position and rearwardly to a triggered position, said trigger having an extension, which is arranged directly to engage said intermediate lever in said locking position when said trigger is in said intermediate position, to be clear of said intermediate lever when said trigger is in said preset position, and to cause said intermediate lever to move out of said locking position to release said sear for a movement out of said intercepting position toward said non-intercepting position against the action of said sear spring in response to a movement of said trigger from said intermediate position to said triggered position



an abutment, and

a compression spring retained between said abutment and said trigger and opposing a movement of said trigger to said preset position, said spring being arranged to have a line of action extending through said pivotal axis when, and only when, said trigger is in said preset position, said compression spring being arranged to cause said trigger to move beyond said intermediate position to said triggered position when said trigger has been slightly moved from said preset position toward said intermediate position.

4,058,925

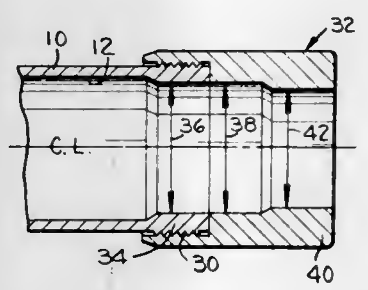
CONCEPTS OF REMINGTON SUPER TRAP CHOKE

John P. Linde, Richfield Springs, and Douglas E. Bullis, Ilion, both of N.Y., assignors to Remington Arms Company, Inc., Bridgeport, Conn.

Filed Sept. 1, 1976, Ser. No. 719,406

Int. Cl.² F41C *21/18*

U.S. Cl. 42—79 **6 Claims**



1. A pattern control means for a shotgun having a barrel with a bore therein through which a shot charge is explosively propelled, said pattern control means comprising at least two separate choke means that are progressively reduced in the direction of shot movement and through which the shot charge is constricted to control the pattern pellet density at a predetermined distance from the muzzle of the shotgun barrel, at least one of the choke means comprising a choke tube attachment with inner wall surfaces formed at the same time as the shotgun bore, means detachably mounting said attachment to the end of said barrel, said attachment wall surfaces including a bore with a rear cylindrical section adjacent the end of the barrel whose diameter is essentially the same as the exit bore of the barrel muzzle, an intermediate section which tapers inwardly to form a smaller diameter bore, and a forward cylindrical section, having a diameter essentially the same as the smaller diameter bore of the intermediate section.

4,058,926

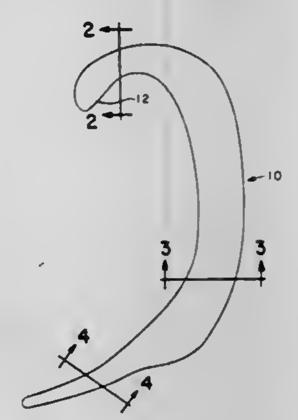
WEIGHT FOR SPIN CASTING

Roy M. Harrigan, Bromley Mountain Road, Manchester, Vt. 05254

Filed Dec. 19, 1975, Ser. No. 642,565

Int. Cl.² A01K *95/00*

U.S. Cl. 43—43.12 **3 Claims**



1. A weight for casting with fishing tackle which comprises: a quantity of material and means for selectively disengaging said material from an associated fishing line, said means for disengaging being responsive to forces associated with casting said weight, said quantity of material comprises a generally arcuate member having an axis disposed in a first plane and said means for selectively disengaging comprises a hook disposed at one axial extermity of said arcuate member, said hook and said axis being disposed in the same plane.

4,058,927

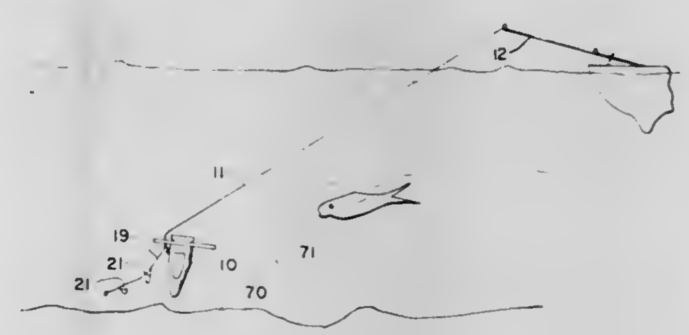
SNAG-FREE HYDRODYNAMIC FISHING SINKER CONTAINER

Virginia L. Hershey, and George P. Hershey, both of McDermott, Ohio, assignors to The Raymond Lee Organization, Inc., New York, N.Y.

Filed Aug. 11, 1976, Ser. No. 713,342

Int. Cl.² A01K *95/00*

U.S. Cl. 43—43.13 **1 Claim**



1. A sinker for fishing purposes comprising

a flat shaped plate,

a conical unit fastened to the plate and projecting from a surface of the flat plate,

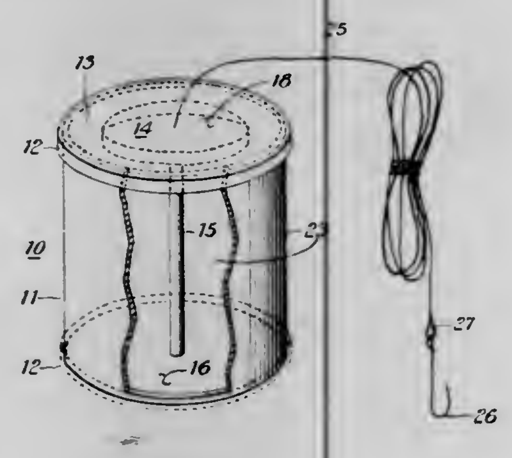
a weight located in the conical unit, and

fastening means to join the weight to the fishing line that extends through a hole in the plate,

said conical unit fastened to the plate at a distance from the mid-line of the plate with a shorter section of the plate extending in one direction from the conical unit and a longer section of the plate extending in the opposed direction from the conical unit with the said hole in the plate

located in the said shorter section of the plate, so that the longer section of the plate serves as a tail surface that orients in water along an upward plane when the plate is pulled by a fishing line extending through the hole in the shorter section.

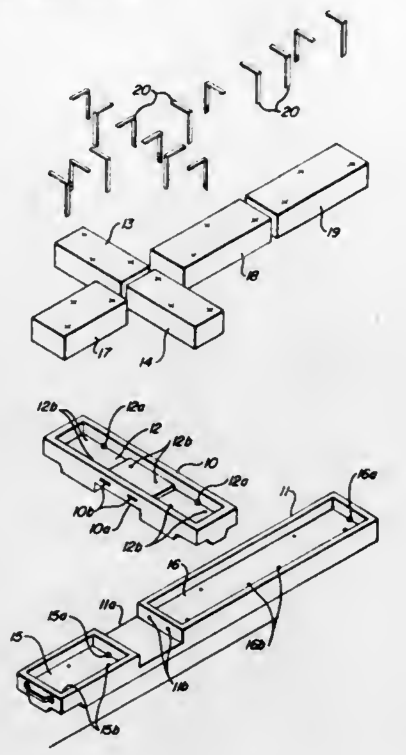
4,058,928
DISPOSABLE FLY KILLER CONTAINER
Robert Howard Digman, Sr., Desert Hot Springs, Calif., assignor to The Raymond Lee Organization, Inc., New York, N.Y.
Filed Aug. 18, 1976, Ser. No. 715,454
Int. Cl.² A01M *1/20*
U.S. Cl. 43—131 **1 Claim**



1. An insect trap in the form of a hollow box fitted with a removable cover, said box formed with an internal support member fixed to a contact member,
said contact member located by spaced distances from the inside surfaces of the box and cover, with the contact member in the form of a circular disc, formed with a convex surface located to face the removable cover, with the said convex surface of the contact member coated with an insecticide.

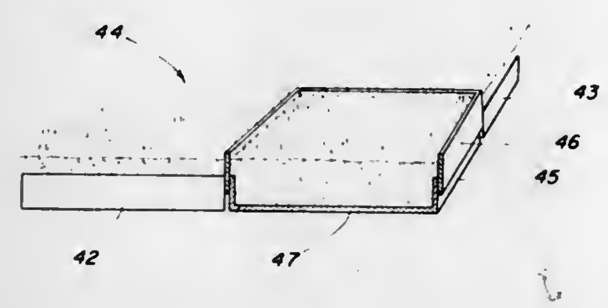
4,058,929
HOLDER FOR A FOAM BLOCK FOR SUPPORTING FLOWER ARRANGEMENTS
Donald L. O'Connell, Port Chester, N.Y., assignor to Floral Innovations, Inc., Port Chester, N.Y.
Filed Feb. 25, 1976, Ser. No. 661,096
The portion of the term of this patent subsequent to June 15, 1993, has been disclaimed.
Int. Cl.² A01G *5/04*
U.S. Cl. 47—41.12 **6 Claims**

1. A holder for at least one foam block for supporting flower arrangements for use in association with a support for mounting the holder substantially vertically comprising:
at least one hollow tray-like base member having outer side walls, substantially vertical inner side walls, and upper and lower bottom walls forming a water-confining receptacle having a compartment for supporting a foam block;
at least one aperture at the junction of the upper bottom wall and the lowermost side wall of said compartment, when mounted substantially vertically, for draining excess water from the foam block;



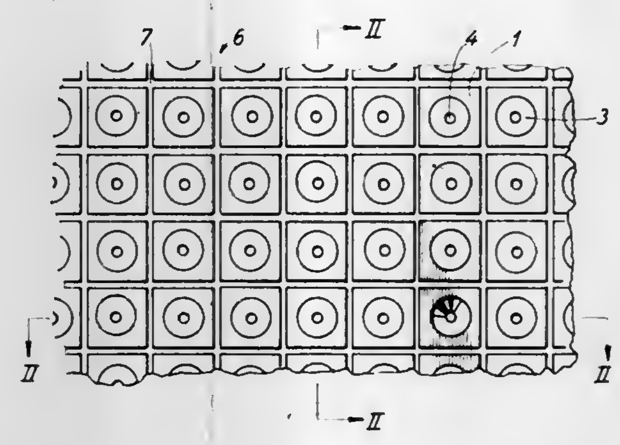
and at least one elongated fastening member adapted to engage and laterally support the foam block and detachably engageable with said compartment.

4,058,930
TURF GROWING APPARATUS
Oscar L. Miles, 7845 Sunset Lane, Indianapolis, Ind. 46260
Filed Dec. 30, 1975, Ser. No. 645,341
Int. Cl.² A01G *9/02*
U.S. Cl. 47—58 **7 Claims**



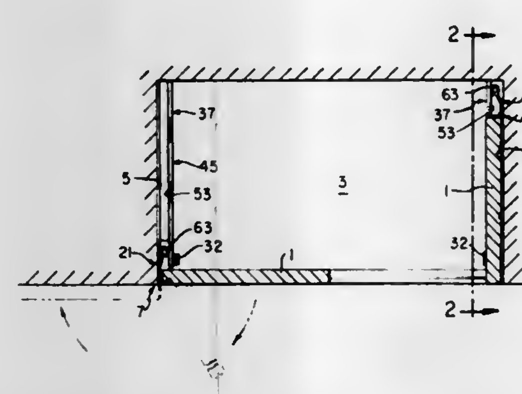
1. A method for providing an uninterrupted turf surface composed of a plurality of independent sections of turf which comprises the steps of:
a. growing the turf in containers, each container having a bottom wall and side walls extending upwardly therefrom, at least a portion of each container being water permeable;
b. providing each container with a collar having a portion overlapping and removably attached to the exterior of the side walls of the container and a portion extending above the top of the side walls, and grass-growing medium filling each container and extending above the top of the side walls and substantially to the top of the collar;
c. positioning a container and attached collar in the ground adjacent growing turf, the grass-growing medium within the container being level with the top of the medium in which the adjacent turf is growing;
d. removing the collar from the container to provide an uninterrupted grass surface between the turf in the container and the adjacent turf; and
e. repeating steps *c* and *d*.

4,058,931
CULTIVATION BLOCK AND A METHOD FOR THE MANUFACTURING OF SAME
Bent Vestergaard, Taastrup, Denmark, assignor to Kosan A/S, Copenhagen, Denmark
Filed May 24, 1976, Ser. No. 688,996
Claims priority, application Denmark, May 28, 1975, 2357/75
Int. Cl.² A01G *9/02*
U.S. Cl. 47—87 **12 Claims**



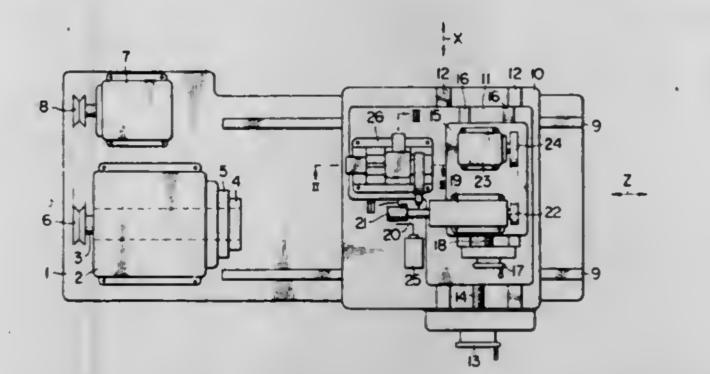
1. A plant cultivation and support structure adapted for germinating and growing a plant from a seed or from a cutting, the structure comprising a hygroscopic, root penetrable block having a flat base, a top spaced above the base, an indentation located in the top, the indentation being large enough to hold a seed or a seed pellet, an open bore leading from the bottom of the indentation of the base, the bore being small enough to prevent passage of a seed while permitting unhindered passage of roots therethrough, and at least one transverse channel extending clear through the block at the base, whereby the base of the block is adapted to rest without tipping on a flat planar support over which passes nutrient-bearing liquid, with the liquid passing unhindered through the channel so that there is no need for drainage means in the planar support.

4,058,932
MOUNTING APPARATUS FOR SWINGING AND SLIDING DOORS
James H. Peterson, and James A. Peterson, both of 73 Leroy Ave., Darien, Conn. 06820
Filed Mar. 11, 1976, Ser. No. 665,899
Int. Cl.² E05D *15/22*
U.S. Cl. 49—177 **8 Claims**



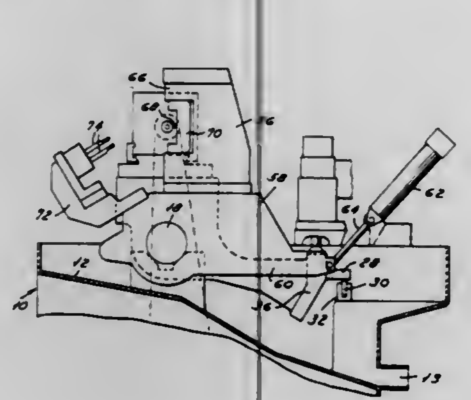
1. Apparatus for mounting a swinging door for sliding into and out of an enclosure having an opening and at least one side wall comprising:
means forming an upper guide way adapted to be mounted to said enclosure adjacent to the top of said door,
means forming a lower guide way adapted to be mounted to said enclosure adjacent the bottom of said door, each of said guide way means having a longitudinal axis parallel to the direction in which said door is to be slid inwardly and outwardly of said enclosure and including a rack extending along an axis parallel to said longitudinal axis of said guide way means,
a shaft with an axis substantially transverse to the longitudinal axes of said guide way means,
an upper gear fixedly mounted adjacent the upper end of said shaft for rotation therewith,
a lower gear fixedly mounted adjacent the lower end of said shaft for rotation therewith, the teeth of each said gear meshing with the teeth of said respective racks causing said shaft to rotate in response to rectilinear movement of said shaft along said guide way means,
hinge means having a first member with a shaft connecting portion rotatably mounted on said shaft for rotation of said shaft with respect thereto and a pivot connecting portion in angular relationship with said shaft connecting portion and disposed in a plane parallel and immediately adjacent to said one side wall, and a second member rotatably mounted on said pivot connecting portion of said first member and adapted to be fixedly mounted to said door whereby said door and said second member can be moved rectilinearly in and out of said enclosure with said hinge means, and said door and second member, when out of said enclosure, can be rotated through an arc of substantially more than ninety degrees with respect to said first member between respective open and closed positions, said second member of said hinge means being in a plane immediately parallel and adjacent to said side wall when said door is in said closed position.

4,058,933
INTERNAL GRINDER
Takashi Ishida, 8-21, Gokiso-2-chome, Showa, Nagoya, Japan
Filed Sept. 3, 1976, Ser. No. 720,155
Claims priority, application Japan, Oct. 31, 1975, 50-149215[U]
Int. Cl.² B24B *53/02, 49/04, 5/10*
U.S. Cl. 51—5 D **4 Claims**



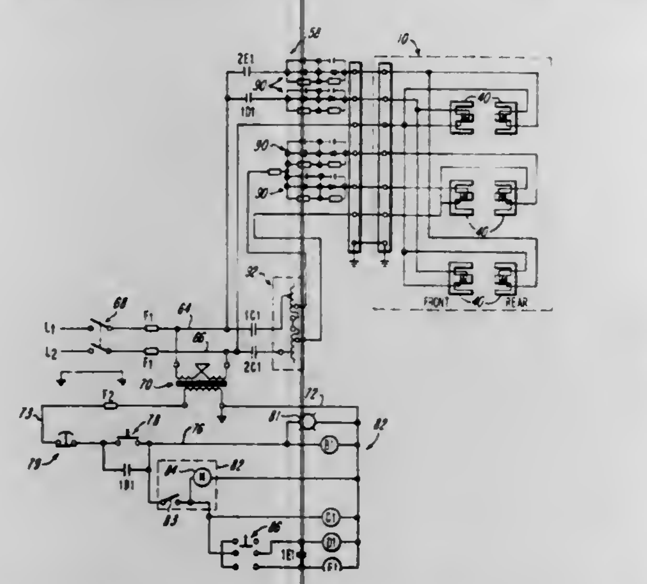
1. In an internal grinder comprising a head stock supporting a spindle adapted to mount a workpiece and rotate the same, and a grinding wheel head having a rotary shaft oriented parallel to the axis of said spindle in the face of said head stock and adapted to rotatably support a grinding wheel so as to effect grinding of the inner peripheral surface of a workpiece, the improvement comprising a grinding wheel dressing correcting carriage supporting the grinding wheel head and capable of moving in sliding motion in a direction which is at right angles to the axis of said spindle, and a cut feed carriage supporting said grinding wheel dressing correcting carriage and a grinding wheel dressing device and capable of moving in sliding motion in a direction which is at right angles to the axis of said spindle, said grinding wheel head and said grinding wheel dressing device forming a group which is movable in the axial direction of the spindle with respect to the head stock, whereby the internal surface of the workpiece can be ground.

4,058,934
INTERFORM GRINDING MACHINE
John W. Lovely, and Robert N. Hobbs, both of Springfield, Vt., assignors to Bryant Grinder Corporation, Springfield, Vt. Division of Ser. No. 645,257, Dec. 29, 1975, Pat. No. 4,023,310. This application Dec. 15, 1976, Ser. No. 750,660
Int. Cl.² B24B *53/04*
U.S. Cl. 51—5 D **1 Claim**



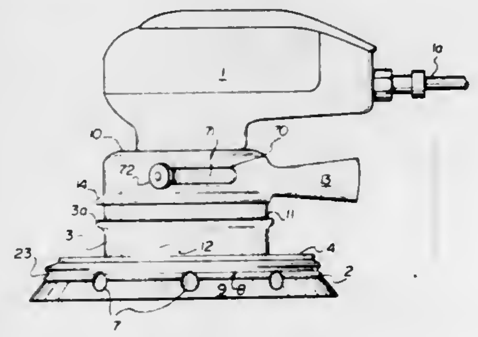
1. A grinding machine comprising a base, a slidebar mounted on the base, a wheelhead fixed on the base over the bar, a dresser base pivotally mounted on the bar for rotation thereabout, power means for rotating the dresser base about the bar, a dresser housing for receiving a dresser implement mounted on the dresser base on one side of the wheelhead and a gagehead mounted on the dresser base on the other side of the wheelhead whereby pivotal rotation of the dresser base about the bar in one direction causes the gagehead to be displaced toward the wheelhead and rotation of the dresser base about the bar in the opposite direction causes the dresser housing to be advanced toward the wheelhead.

4,058,935
VIBRATORY APPARATUS WITH ELECTROMAGNET CONTROL SYSTEM
Benjamin Smilg, and Milton S. Isaacson, both of Dayton, Ohio, assignors to Vibrodyne, Inc., Dayton, Ohio
Filed Oct. 29, 1975, Ser. No. 626,626
Int. Cl.² B24B *31/06*
U.S. Cl. 51—163.1 **5 Claims**



1. In vibratory apparatus including a frame, an elongated container adapted to receive a load of media and parts to be treated, spring means mounted on said frame and supporting said container for vibration, power operated means cooperating with said spring means for vibrating said container to produce orbital movement of the load within said container, said power operated means including a plurality of electromagnets spaced along the length of said container, and an armature member connected to said container and disposed adjacent each of said electromagnets, an improved system for controlling said electromagnets from an electrical power supply, comprising first control means consisting of an on-off switch for simultaneously connecting a first set of at least two longitudinally spaced said electromagnets directly to said electrical power supply to provide for only selecting either a non-variable predetermined power or zero power to said electromagnets, second control means including a variable power controller for simultaneously connecting a second set of at least two said electromagnets to said electrical power supply and providing for variably adjusting the electrical power supplied to said second set of electromagnets between zero and maximum power of said power controller, each said set of electromagnets being disposed substantially symmetrically with respect to a center plane extending laterally across said container, and said second set of electromagnets is arranged between said electromagnets of said first set.

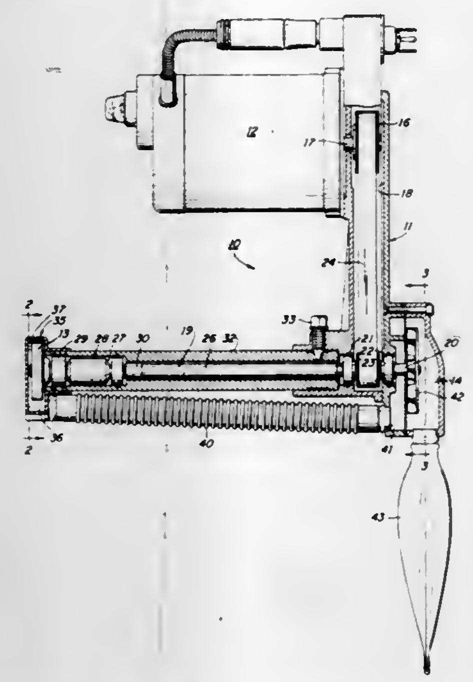
4,058,936
VACUUM SANDER
Miksa Marton, R.R. No. 1, Old Castle, Windsor, Ontario, Canada
Filed Jan. 20, 1976, Ser. No. 650,729
Int. Cl.² B24B *23/00*
U.S. Cl. 51—170 T **15 Claims**



1. A vacuum sanding apparatus comprising in combination, a disc shaped backup pad for connection to driving means and having an abrasive sanding disc detachably secured thereto, a vacuum housing mounted on the upper surface of the backup pad; a plurality of apertures in the operative surface of the abrasive disc and being in registry with apertures in the bottom surface of the backup pad, all said apertures being in communication with the interior of said vacuum housing; means on the housing for adjusting the amount of vacuum created therein; said housing being connectable to the driving means and being adapted to receive the same centrally in the housing; and a resilient collar intermediate the peripheral lower edge of the housing and the upper surface of the backup pad whereby the housing may flex relative to the plane of the backup pad.

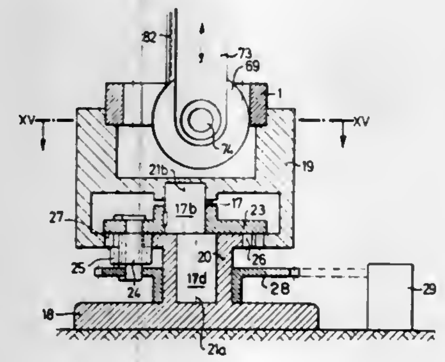
4,058,937
GRINDER ATTACHMENT FOR A LATHE
Wallace F. Mitchell, Libertyville, Ill., assignor to Ammco Tools, Inc., North Chicago, Ill.
Filed Jan. 26, 1976, Ser. No. 652,496
Int. Cl.² B24B *19/26*
U.S. Cl. 51—259 **6 Claims**

1. Grinding apparatus, comprising
a rigid housing,
a driven shaft having a first shaft portion and a second shaft portion,
spaced apart bearing means journaling said first shaft portion in said housing,
said second shaft portion being of tubular construction,
said first shaft portion extending onto said second shaft portion
resilient annular means compressed between said first and second shaft portions,
a grinding wheel fixedly mounted on said shaft,
a plurality of elastomeric rings respectively surrounding said bearing means and compressed between said housing and said bearing means,
said rings providing the sole connection between said bearing means and said housing,
a third driven shaft portion to which said grinding wheel is connected,
said third driven shaft portion extending into said second shaft portion,



other resilient annular means compressed between said second and third shaft portions,
a driven pulley mounted to said first portion of said driven shaft,
an electric motor mounted to said housing and having an output shaft,
a drive pulley disposed on said output shaft, and
a flexible, resilient belt drivingly connected between said pulleys.

4,058,938
METHOD AND APPARATUS FOR GRINDING THE TOOTH FLANKS OF INTERNALLY-TOOTHED GEAR WHEELS
Hermann Härle, and Siegfried Eisenmann, both of Aulendorf, Germany, assignors to Furstlich Hohenzollernsche Huttenver Waltung Laucherthal, Germany
Continuation-in-part of Ser. No. 173,110, Aug. 19, 1971, Pat. No. 3,782,040. This application Aug. 29, 1973, Ser. No. 392,501
Claims priority, application Germany, Aug. 30, 1972, 2242610
Int. Cl.² B23F *5/08, 5/10*
U.S. Cl. 51—287 **40 Claims**



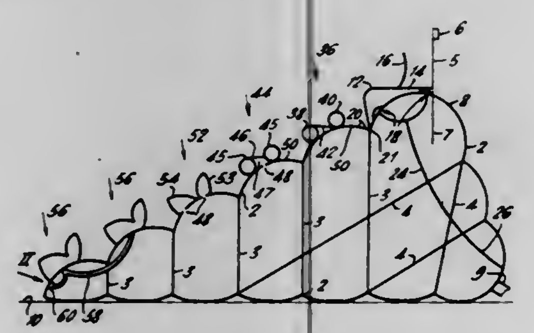
1. An apparatus for grinding the tooth flanks of a roughed-out, annular, internally-toothed gear wheel, comprising, a stationary base means; an eccentric shaft means having a driving portion, rotatably mounted in said base means, and a driven portion; a table means adapted to support said roughed-out gear wheel concentrically with respect to said driven portion of said eccentric shaft means, rotatably mounted on said driven portion of said eccentric shaft means; grinding wheel means mounted adjacent said table means, rotatable about an axis parallel to the plane of said roughed-out gear wheel, reciprocatable through the interior of said roughed-out gear wheel along an axis parallel to the axes of said driving portion and said driven portion of said eccentric shaft means, having a circumferentially-disposed grinding surface whose cross-sectional profile through its axis of rotation is equivalent to at least a part of the profile of at least one tooth of an externally-toothed pinion, adapted to mesh with the finished gear wheel, and adapted to grind said tooth flanks of said roughed-out gear wheel; and a plurality of gears meshing with each other, one of said gears being operatively coupled to said driven portion of said eccentric shaft means and said table means to drive said table means and the other of said gears being operatively coupled to said driven portion of said eccentric shaft means to drive said table means and said driven portion of said eccentric shaft means at different speeds of rotation.

36. A method for grinding the tooth flanks of a roughed-out, annular, internally-toothed gear wheel; comprising rolling one of the pitch circle of said roughed-out gear wheel and a fixed circle, having a diameter equal to the pitch circle of an externally-toothed pinion and adapted to mesh with the finished internally-toothed gear wheel formed from said roughed-out gear wheel, off the other; and, simultaneously with said rolling-off, rotating a grinding wheel on an axis parallel to the plane of said roughed-out gear wheel and reciprocating said grinding wheel through the interior of said roughed-out gear wheel along an axis parallel to the axis of said pitch circle of said roughed-out gear wheel and the axis of said fixed circle, while maintaining said axis of reciprocation of said grinding wheel a fixed distance from said axis of said fixed circle during the actual grinding of said tooth flanks, except for normal infeed of said grinding wheel; said grinding wheel having a circumferentially-disposed grinding surface whose cross-sectional profile has a shape equivalent to the profile of at least a part of at least one tooth of said pinion; the transverse thickness of the profile of the grinding wheel being smaller than the pitch of one tooth of the pinion, all of one of the right hand tooth flanks of the roughed-out gear wheel and the left hand tooth flanks of said gear wheel being ground first, said gear wheel being indexed an amount sufficient to bring the other of said right hand and left hand tooth flanks in contact with the grinding surface of said grinding wheel and thereafter grinding all of said other right hand and left hand tooth flanks; and the ratio of the diameter of said fixed circle to the diameter of said pitch circle of said gear wheel being an aliquant fraction whose denominator is equal to the number of teeth of said gear wheel and whose numerator is at least 2 and not more than said number of teeth of said gear wheel minus 2.

37. A method for grinding the tooth flanks of a roughed-out, externally-toothed pinion; comprising rolling one of the pitch circle of said roughed-out pinion and a fixed circle, having a diameter equal to the pitch circle of an annular, internally-toothed gear wheel, adapted to mesh with the finished pinion formed from said roughed-out pinion, off the other to produce a first rotation; simultaneously with said first rotation, rotating a grinding wheel on an axis parallel to the plane of said roughed-out pinion and reciprocating said grinding wheel through the exterior of said roughed-out pinion along an axis parallel to the axis of said pitch circle of said roughed-out pinion and the axis of said fixed circle along a circular arc in a plane normal to the axis of the pinion, said arc enveloping and approximating the contours of the two outermost flanks of a group of at least two adjacent teeth of the gear wheel, the center of the internal contour of said pinion coinciding with the center of the second axis, the radius line from said center of said arc through said grinding wheel always passing through a point on the pitch circle of said pinion, and said point always lying on a radius line of said center of said second axis through said axis of said pinion; said grinding wheel having a circumferentially-disposed grinding surface; and superimposing a second rotation about a second axis, parallel to the axis of said first rotation, on said first rotation, the distance between said axis of

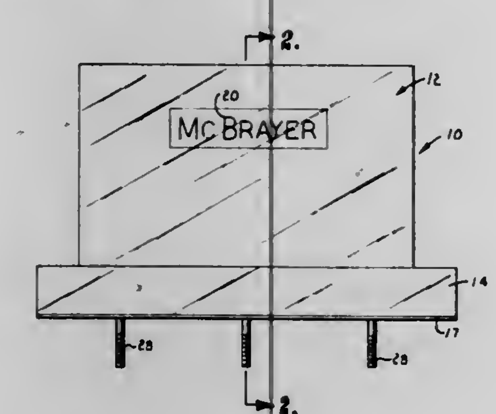
said first rotation and said second axis being substantially equal to the difference between the radius of the fixed circle and the radius of the pitch circle of said roughed-out pinion and the ratio of the speed of rotation about said second axis to the speed of said first rotation about its axis being substantially equal to the radius of said pitch circle of said roughed-out pinion to said difference between the radius of the fixed circle and the radius of the pitch circle of said roughed-out pinion, said first and second rotation being in opposite directions.

4,058,939
TIERED GRANDSTAND
Gerard R. Camusot, Residence des Tours 23T, Glin-Mons, Belgium (B-7410)
Filed Sept. 23, 1975, Ser. No. 615,906
Claims priority, application Belgium, Sept. 27, 1974, 16198; Aug. 1, 1975, 645123
Int. Cl.² E04H *3/12*
U.S. Cl. 52—2 **23 Claims**



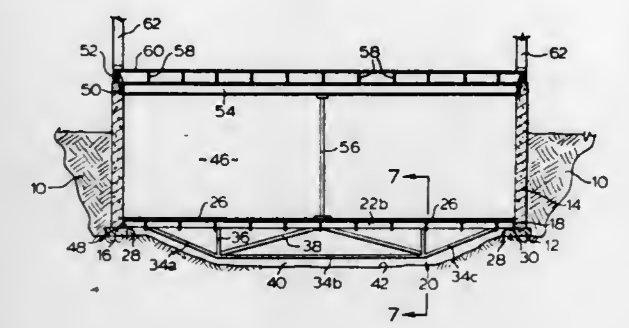
1. A completely self-supporting tiered grandstand, comprising at least one collapsible fluid-tight casing having walls erectable by being filled with a fluid and/or solid substance and having a base portion which is adapted, in the erected condition of the casing, to rest on a substantially flat horizontal support surface, and having a top portion which in the erected condition of the casing defines a plurality of tiers, each tier having a portion defining a flat surface dimensioned and structured for walking thereupon.

4,058,940
SYNTHETIC MONUMENT MARKER
Doyle C. McBrayer, Kansas City, Mo., assignor to Max Von Erdmannsdorff, Gladstone, Mo.
Filed Mar. 15, 1976, Ser. No. 666,643
Int. Cl.² E04H *13/00*
U.S. Cl. 52—104 **3 Claims**



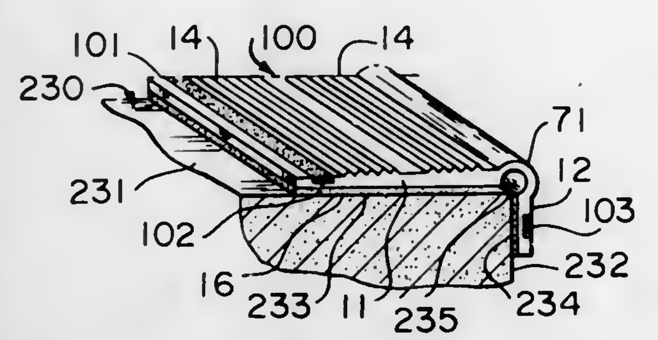
1. Structure for displaying a name or message comprising:
a concrete core;
an outer laminate of moldable plastic;
a layer of rigid foam between said concrete core and said outer laminate;
indicia means adjacent said laminate of moldable plastic for presenting a name or message; and
anchor means embedded in said concrete and projecting from the bottom of said core for securing said structure.

4,058,941
BUILDING CONSTRUCTION
Andrew Steven Zakrzewski, Burlington; Douglas Mel Clarkson, Brantford, and Gordon A. Webster, Dundas, all of Canada, assignors to Dominion Foundries and Steel, Limited, Hamilton, Canada
Filed June 8, 1976, Ser. No. 693,853
Int. Cl.² E04H *1/02*
U.S. Cl. 52—169.1 **12 Claims**



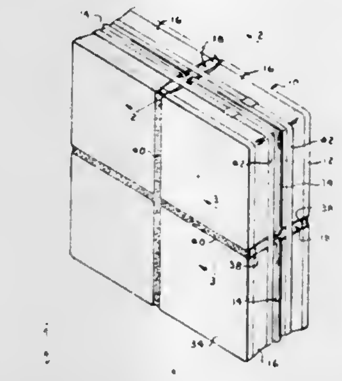
1. A building construction consisting of:
a footing on the soil delineating the building perimeter;
vertically-extending building walls mounted on the footing;
a main support member extending between and supported at its ends by opposite portions of the footing with the said ends slidable freely lengthwise of the support member upon the said footing portions; and
a lowermost floor structure supported by the said main support member, the lowermost floor structure extending between and engaging the said building walls to oppose horizontal forces applied thereto by movements of the soil.

4,058,942
FLEXIBLE NON-SKID STRIP WITH FLUORESCENT SURFACE PORTIONS
Hiromitsu Naka, No. 39, Oaza Shinmachi, Yashio, Saitama, Japan
Division of Ser. No. 483,005, June 25, 1974, abandoned. This application June 1, 1976, Ser. No. 692,017
Claims priority, application Japan, July 6, 1973, 48-79785[U]; July 6, 1973, 48-79786[U]; July 6, 1973, 48-79787[U]; Aug. 11, 1973, 48-94004[U]; Aug. 17, 1973, 48-96158[U]; Oct. 24, 1973, 48-122792[U]
Int. Cl.² B44D *5/08;* **E04F** *11/16;* **B44C** *1/26;* **B32B** *3/04*
U.S. Cl. 52—179 **3 Claims**



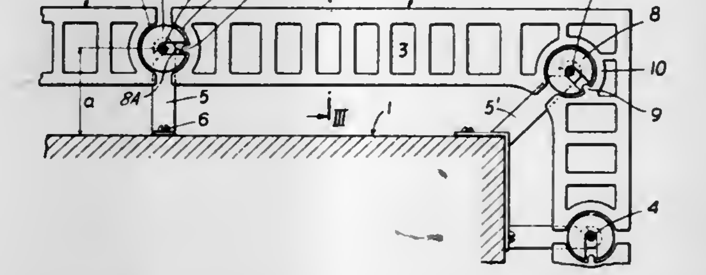
1. A flexible non-skid strip comprising:
a main body portion extending along the length of said strip and adapted to be secured to the tread of a stair;
a forward edge anchoring portion coextending with said main body portion parallel to and spaced from said main body portion and adapted to be secured to the riser of said stair;
an arcuate cross-section connection portion integrally connected to the upper surfaces of said main body portion and said anchoring portion, projecting above the upper surfaces of said main body portion and said anchoring portion, having a thickness smaller than that of the main body and anchoring portions connected thereby, and adapted to bend about the stair edge of said stair so as to cover the stair edge; and
a fluorescent material layer being integrally embedded in said main body portion so as to expose the upper surface of said layer to the upper surface of said main body portion.

4,058,943
GLASS BLOCK PANEL
Lawrence W. Sturgill, Rte. No. 1, Box 111A, Schererville, Ind.
Filed June 3, 1976, Ser. No. 692,324
Int. Cl.² B32B *1/04*
U.S. Cl. 52—227 **6 Claims**



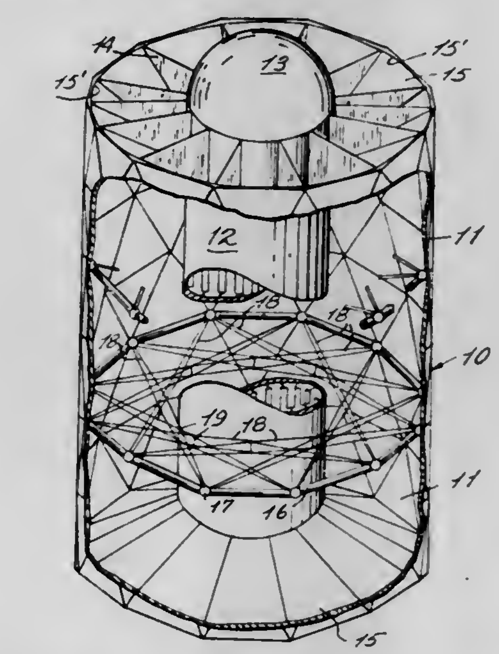
1. A prefabricated glass block panel comprising: a plurality of glass blocks having an upstanding rib circumferentially around the edge of each of said glass blocks; a plurality of rigid elongated members having a longitudinal center groove in each side thereof, said rigid members laterally spanning the edge of said glass blocks, one longitudinal part of said member being laterally slotted to the center groove thereof, said elongated members being interlocked together in said slotted openings forming a rigid reticular frame between said glass blocks and spacing said glass blocks in a width and breadth direction; and tie means circumferentially around the edge of said glass blocks.

4,058,944
BUILDING STRUCTURE WALL
Walter Rieger, Gmunden, Austria, assignor to Bauhutte Leitl-Werke Rieger-Anlagentechnik GmbH, Linz, Austria
Filed July 7, 1976, Ser. No. 703,224
Claims priority, application Austria, July 7, 1975, 5199/75
Int. Cl.² E04H *1/00*
U.S. Cl. 52—235 **17 Claims**



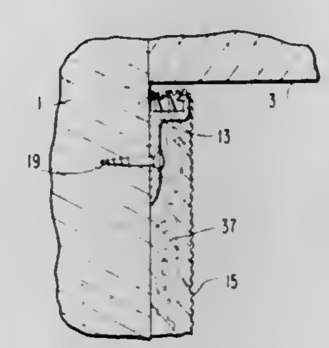
1. A facade construction for connection over the carcase wall of a building, said facade construction including a plurality of plate-like elements arranged beside and above one another in front of the carcase wall and secured to elongate members, the latter being supported by the carcase wall, and connecting means for connecting said plate-like elements to said elongate members, the improvement wherein said connecting means comprises a holding element associated with a plate-like element, said holding element including slot means sized to receive an elongate member, said slot means being outwardly open enabling said holding element to be inserted onto said elongate member at substantially any location along the latter and to be capable of longitudinal movement along said elongate member; said slot being oriented to render said holding element immovable in a direction away from the carcase wall; said plate-like element having a recess for receiving a portion of said holding element; said recess including surface means arranged to block movement of said plate-like element in a lateral direction away from the carcase wall.

4,058,945
PRESSURE AND BUCKLING RESISTING UNDULATED POLYHEDRAL SHELL STRUCTURE
Ronald H. Knapp, 1629 Hoopai Place, Pearl City, Hawaii 96782
Filed Apr. 4, 1974, Ser. No. 458,037
Int. Cl.² E04B *1/32*
U.S. Cl. 52—244 **21 Claims**



1. A pressure and buckling resisting shell structure comprising
a. a plurality of flat polyhedral plates,
b. means for sealing said plates together along their edges to form a cylindrical shell with an undulating surface,
c. means for providing axial structural restraint and
d. means for sealing each end of said shell structure.

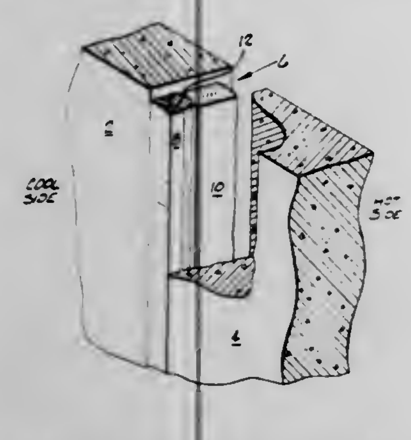
4,058,946
WALLCOVERING
Yvon Habrant, 20 Square des Laminees, 63100 Clermont-Ferrand, France
Filed Sept. 3, 1976, Ser. No. 720,207
Int. Cl.² E04B *1/00*
U.S. Cl. 52—273 **2 Claims**



1. In a room having a wall to be covered, and side walls and a ceiling adjacent said wall to be covered, said side walls and ceiling forming a plurality of corners with said wall to be covered; the improvement comprising a wallcovering comprised by a plurality of molding strips on said wall to be covered next to at least said ceiling and said side walls and extending in closely spaced parallel relationship to said corners, and

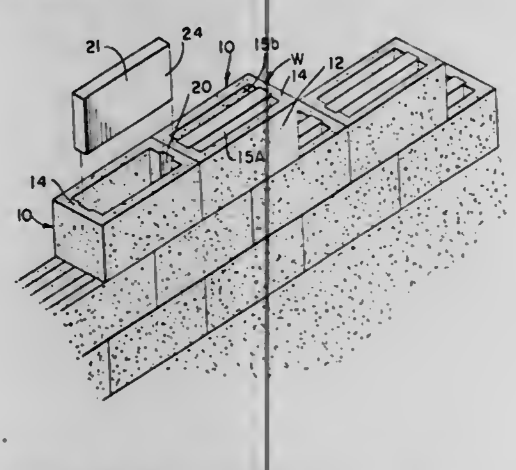
fabric parallel to and spaced from said wall to be covered, the edges of the fabric being clasped between said molding strips and the ceiling and side walls, said molding strips each comprising a base secured to said wall to be covered and an upstanding flange that extends along one of said ceiling and side walls, said flange having thereon a plurality of sharp points that are inclined in the direction of the adjacent said corner, whereby fabric may be forced in the direction of said corner between said flange and said ceiling or side wall with which said wall to be covered forms said corner toward which said points are inclined, the fabric then being retained in said corner by said points.

4,058,947
FIRE RESISTANT JOINT SYSTEM FOR CONCRETE STRUCTURES
Paul Lewis Earle, Denver, Colo., and George William Snider, Chagrin Falls, Ohio, assignors to Johns-Manville Corporation, Denver, Colo.
Filed Sept. 17, 1975, Ser. No. 614,113
Int. Cl.^{2} E04F *15/14;* **E04B** *1/68*
U.S. Cl. 52—396 **8 Claims**



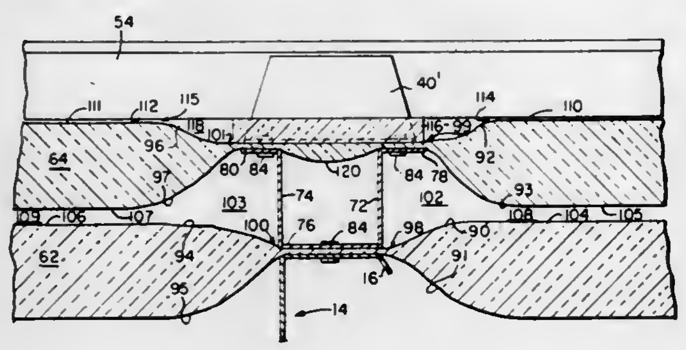
1. An improved fire resistive joint system for concrete panel building members which comprises an elastomeric joint sealant completely sealing the joint on the cold side of the panels and a compressible resilient mass of synthetic inorganic refractory fiber filling at least the external portion of the joint on the hot side of the panels, said fiber mass having sufficient resilience to maintain continuous operative contact with both sides of the joint during movements of the joint.

4,058,948
INSULATED MASONRY BLOCK
Millard R. Warren, Knoxville, Tenn., assignor to Warren Insulated Bloc, Inc., Knoxville, Tenn.
Continuation-in-part of Ser. No. 606,934, Aug. 22, 1975. This application Jan. 16, 1976, Ser. No. 649,795
Int. Cl.^{2} E04B *2/00, 5/30*
U.S. Cl. 52—405 **12 Claims**



1. A masonry block comprising:
pairs of spaced opposed side walls and spaced opposed web walls of integral construction forming cavity means therebetween which is open at opposite ends;
at least one of said web walls extending between terminal ends of said side walls defining an outer peripheral portion of said block; and
a substantially rectangular insulative plate means of thermally insulative material disposed in said cavity means;
said insulative plate means extending across said cavity means from one to another of said web walls and terminating at said web walls;
said insulative plate means including essentially flat side faces disposed parallel to said side walls;
said side walls each including:
a portion spaced from a respective side face of said insulative plate means so as to define an air cell therebetween extending from one to another of said web walls, and
another portion projecting toward said respective side face of said plate means;
said other portions of said side walls having ends which are spaced apart by a distance substantially equal to the thickness of said plate means so that said other portions engage said plate means to form air barriers extending across both air cells from one to another of said web walls.

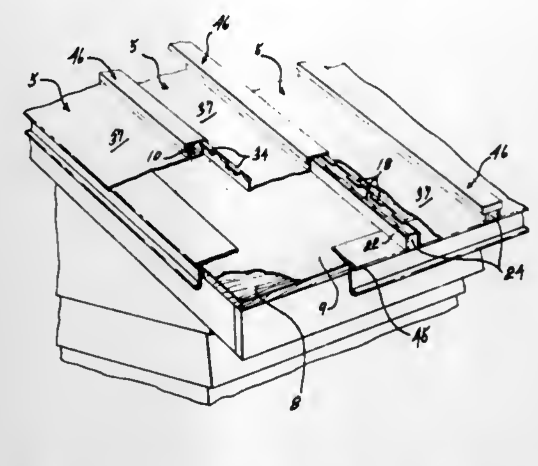
4,058,949
BUILDING ROOF INSULATION
Norman A. Bellem, Kansas City, Mo., assignor to Butler Manufacturing Company, Kansas City, Mo.
Filed Aug. 24, 1976, Ser. No. 717,348
Int. Cl.^{2} E04B *2/00*
U.S. Cl. 52—407 **15 Claims**



1. An insulated roof for a building, comprising:
a roof purlin supporting a roof panel;
a plurality of discrete insulation blankets layered one on top of the other and positioned between said roof purlin and said roof panel, said layers forming a plurality of surfaces to increase the thermal resistance of a heat transfer path between the building interior and said roof panel; and
a spacer member interpositioned between a pair of contiguous ones of said layered insulation blankets to separate said pair of blankets from each other, said spacer member being connected to both said roof panel and said roof purlin.

4,058,950
INTEGRATED SHEET METAL ROOFING SYSTEM
Louis Léoncé Vallee, 6392 Maubourg, Montreal, Quebec, Canada
Filed Oct. 19, 1976, Ser. No. 733,778
Claims priority, application Canada, Jan. 29, 1976, 244714
Int. Cl.^{2} E04B *1/02*
U.S. Cl. 52—461 **8 Claims**

1. A metal roof structure of the batten type covering an underlying wooden roof structure comprising a series of battens of channel form having a bottom wall and a pair of side walls, the said side walls of the battens having a series of extensions at their upper edges, the said extensions being folded inwardly at right angles to the side walls, the said battens being disposed in spaced apart parallel arrangement on the said wooden roof structure, means to secure the bottom wall of the battens to said wooden roof structure, pan sections disposed between the said battens, the said pan sections having oppositely disposed side walls in contact with the side walls of the said battens and said pan sections having extension portions foldable to interlock with the extensions of the side walls of the



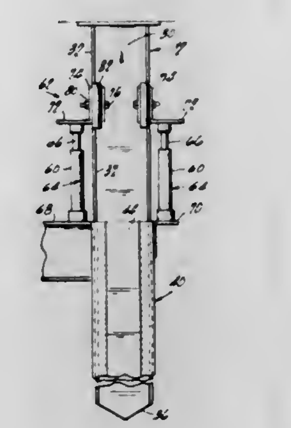
battens so as to lock the pan sections to the battens, and a batten closure cap slidably engaged with each of said interlocked batten and pan sections.

4,058,951
FRAMES FOR BUILDINGS
Rudy Dean, 560 Hawthorn Road, Caulfield South, Victoria 3162, Australia
Filed May 21, 1976, Ser. No. 688,549
Int. Cl.^{2} E04C *2/38;* **E06B** *1/04*
U.S. Cl. 52—656 **2 Claims**

1. For a building, a rectangular frame of which the peripheral members are formed from sheet material and consist of two identical open channels of rectangular cross section extending parallel side by side facing the same way with the adjacent edges of the channels joined together by a flat web having formed in it at regular intervals along its junctions with the channels slots of length less than half the depth of the channels, the slots formed in one side of the web being longitudinally displaced with respect to the slots formed in the other side of the web and the greatest longitudinal distance between an end of a slot and the end of the closest slot on the other side of the web being equal to the depth of the channels.

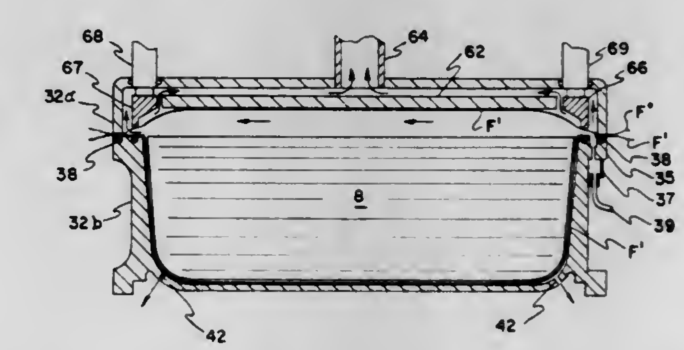
4,058,952
EXPANSION OF BUILDING STRUCTURE
Frank R. Donnelly, P.O. Box 218, Dover, N.J. 07801
Filed Sept. 13, 1976, Ser. No. 722,693
Int. Cl.^{2} E04B *1/00*
U.S. Cl. 52—741 **16 Claims**

1. A method of extending the height of a building structure, formed from support means including columns which are vertically oriented with respect to ground level and a roof structure supported on said columns, comprising the steps of:
cutting through each of said columns to form a transverse break;
surrounding said columns with guiding means for maintaining said columns in a vertical orientation with respect to said ground level;
raising said columns and said roof structure upwardly above



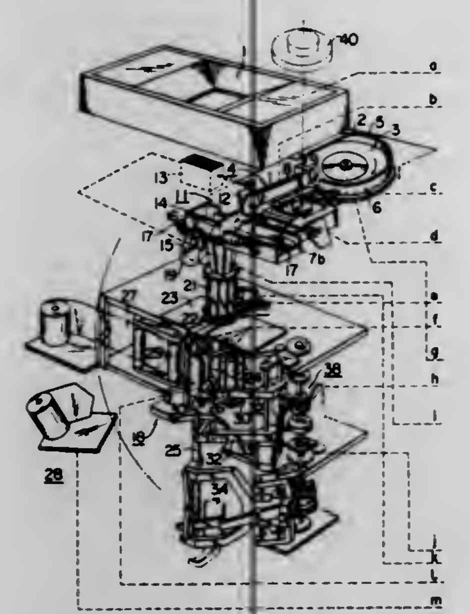
said transverse break such that the height of said building structure is substantially extended; and
fastening said vertical columns which have been raised to said guiding means, whereby a floor structure is capable of being mounted to said support members in a position which is substantially intermediate said ground level and the raised roof level.

4,058,953
GAS FLUSHING OR FILLING PACKAGING MACHINE
Philip A. Sanborn, Jr., Spartanburg, S.C.; Shelby F. Westbrook, Chicago, and Donald A. Sullivan, Brookfield, both of Ill., assignors to W. R. Grace & Co., Duncan, S.C. and Hooper, Inc., Elmhurst, Ill.
Filed July 26, 1976, Ser. No. 708,809
Int. Cl.^{2} B65B *31/02*
U.S. Cl. 53—22 A **24 Claims**



1. In the method of preparing a gas filled or flushed package from two sheets of polymeric material, one sheet having an opening formed therein and the other having an aperture formed therein, the improvement which comprises:
a. sealing said sheets together in a continuous peripheral seal to enclose a product therebetween thereby forming a package, said aperture and opening being on opposed sides of said product and within said peripheral seal;
b. withdrawing air from the package through an opening in one sheet;
c. introducing gas into said package through an aperture in the other sheet; and,
d. sealing said aperture and said opening.

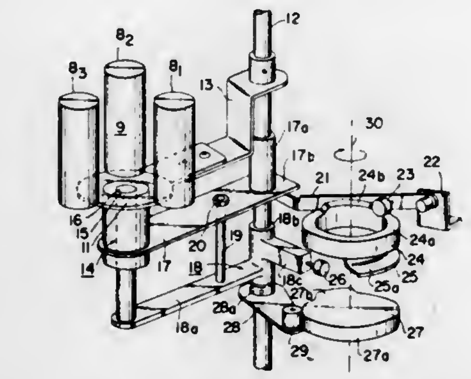
4,058,954
COIN PACKAGING MACHINE
Kazuto Asami, Himeji, Japan, assignor to Glory Kogyo Kabushiki Kaisha, Japan
Filed Oct. 12, 1976, Ser. No. 731,823
Int. Cl.² B65B *57/14, 57/20, 11/04*
U.S. Cl. 53—54 **3 Claims**



1. A coin packaging machine for repeatedly packaging a predetermined number of coins separated according to denominations thereof, which comprises:
 a. coin feeding means for feeding coins to be packaged;
 b. coin counting means for counting the number of coins fed by said coin feeding means and for producing, when the number of coins counted coincides with a predetermined number, a coincidence signal;
 c. coin stacking means for temporarily stacking coins fed by said coin feeding means until the coincidence signal is produced;
 d. coin packaging means for packaging a stack of coins with packaging paper; and
 e. control means for controlling said coin feeding means, coin counting means, coin stacking means and coin packaging means, said control means including:
  1. abnormality detecting means for detecting whether the conditions of a stack of coins temporarily stacked in said coin stacking means is normal or abnormal when said coin packaging means is at a predetermined position prior to the start of packaging of the temporarily stacked coins;
  2. coin rejecting means for, rejecting, when the state of the stack of coins temporarily stacked in said coin stacking means is detected as being abnormal by said abnormality detecting means, said coins in said coin stacking means; and
  3. restart commanding means for operating said coin counting means again after said coin rejecting means has operated,
 whereby whenever coins are stacked in an abnormal state in the coin stacking means, these coins are rejected from said coin stacking means, and the following packaging operation is automatically started.

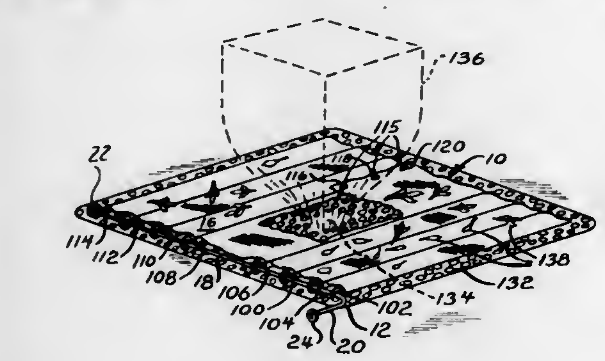
4,058,955
COIN STACK SUPPORTING DEVICE IN COIN WRAPPING MACHINE
Shiro Nakai, and Minoru Nakamura, both of Himeji, Japan, assignors to Glory Kogyo Kabushiki Kaisha, Japan
Filed Oct. 18, 1976, Ser. No. 733,191
Claims priority, application Japan, Oct. 18, 1975, 50-125531
Int. Cl.² B65B *11/04*
U.S. Cl. 53—212 **1 Claim**

1. In a coin wrapping machine the combination of a plurality of at least three vertically disposed wrapping rollers movable toward and away from each other to define a cylindrical stacking space having a diameter varying from the diameter of the smallest coins to be stacked and the largest coins to be stacked and into which coins are caused to drop one by one to be stacked in said cylindrical space and a sheet of wrapping paper is wrapped around the coin stack when a preselected number of coins have been stacked in said cylindrical space; a coin stack supporting device at the lower end of said cylindrical space having a closing disk with an outside periphery lying outside the periphery of the cylindrical space defined when said rollers are moved far enough apart to accommodate the largest size coins, said closing disk closing the bottom of said cylindrical space and having an opening in the central portion thereof, and a coin stack supporting member slidably received in said opening of said closing disk for raising the coin stack to



a level higher than that of said closing disk so as to enable crimping hooks to be inserted into the space thus formed between the lowermost end of the coin stack and the closing disk thereby to crimp the upper and lower projecting edges of said wrapping sheet wrapped around the cylindrical surface of the coin stack; and an operating mechanism connected to said coin stack supporting member for positioning the upper surface of said coin stack supporting member in the same plane as that of said closing disk or raising the coin stack supporting member so that the upper surface of said supporting member is at a level higher than that of said closing disk during the wrapping by the wrapping rollers and fold-crimping by the crimping hooks, and for moving said closing disk and said coin stack supporting member from the position at the bottom of said cylindrical space where they close the bottom of said cylindrical space to respective withdrawn positions.

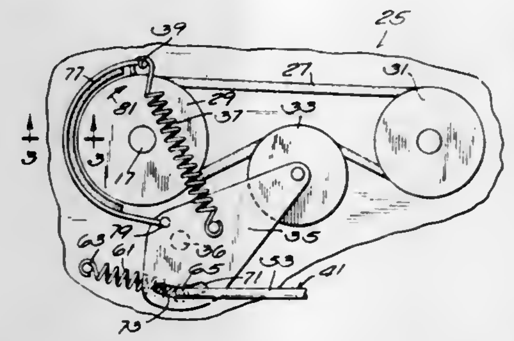
4,058,956
VEGETATION CLIPPING CATCHER
Wayne J. Skonieczny, 8820 S. 51st Ave., Oak Lawn, Ill. 60453
Filed Feb. 4, 1976, Ser. No. 655,054
Int. Cl.² A01D *75/00;* A01G *3/04*
U.S. Cl. 56—1 **4 Claims**



1. A vegetation clipping catcher comprising: a support rail, said support rail having a work track and a storage neck formed integral with and substantially perpendicular to said work track; a plurality of ribs each slideably connected to said support rail by a slideable ring, said plurality of ribs being adapted to be positioned in a stored attitude on said storage neck substantially parallel to said work track; and an apron connected to said plurality of ribs, said apron having a slot and

a flap positioned adjacent said slot, said apron slot being adapted to receive a stem of a shrub to be trimmed, said apron also being adapted to cover a ground cover surrounding said shrub to receive a plurality of clippings of said shrub, said ribs extending from one edge of the apron adjacent to the support rail to the opposite edge of the apron for supporting said apron, and a plurality of loops each holding said apron to each said ring in proximity with said support rail.

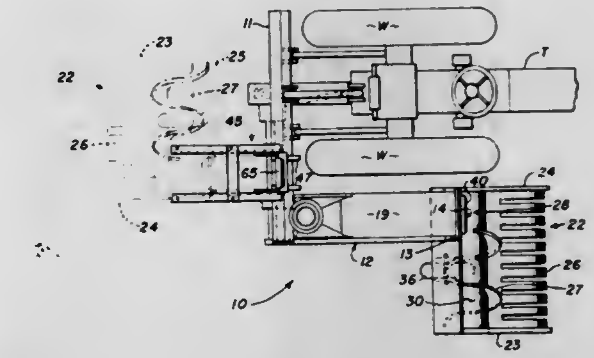
4,058,957
DEADMAN CONTROL AND BLADE CLUTCH FOR POWER ROTARY LAWN MOWERS
Ward A. Roseberry, Galesburg, Ill., assignor to Outboard Marine Corporation, Waukegan, Ill.
Filed July 28, 1976, Ser. No. 709,540
Int. Cl.² A01D *35/26*
U.S. Cl. 56—11.3 **8 Claims**



1. A lawn mower comprising a blade housing, a cutter blade supported for rotation by and within said blade housing, a driven pulley drivingly connected to said cutter blade for rotation of the latter in response to rotation of the former, a drive pulley adapted to be rotatably driven by a source of power, an endless belt reeved around said drive pulley and said driven pulley, an arm, an idler pulley mounted for rotation on said arm, means mounting said arm for movement relative to a neutral position with said idler pulley disengaged from said belt, means resiliently urging said arm from said neutral position so as to engage said idler pulley with said belt to remove slack therefrom, a control linkage movable between a drive position and a neutral position, means biasing said control linkage toward said neutral position, and means connecting said linkage and said arm for displacing said arm to said neutral position against the action of said arm urging means when said control linkage is in said neutral position and for permitting movement of said arm, under the influence of said arm urging means and independently of said control linkage biasing means, from said arm neutral position so as to engage said belt to remove slack therefrom when said control linkage is in said drive position.

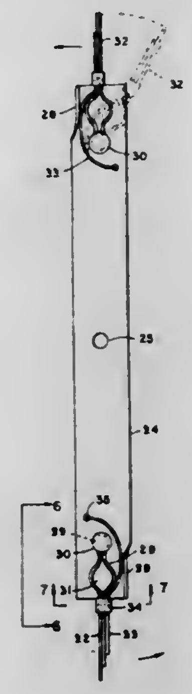
4,058,958
METHOD AND MEANS FOR CONVERTING A CROP PICKUP ON A CROP PROCESSING MACHINE BETWEEN FIELD AND TRANSPORT MODES
Loren G. Sadler, Stevens, and Aquila D. Mast, Lancaster, both of Pa., assignors to Sperry Rand Corporation, New Holland, Pa.
Filed Mar. 24, 1976, Ser. No. 670,191
Int. Cl.² A01D *75/22*
U.S. Cl. 56—228 **12 Claims**

1. In a mobile agricultural machine adapted to be moved by a vehicle, such as a tractor, forwardly over a field and being of the type including a frame detachably secured to said tractor, means mounted on said frame for processing crop material and delivering means releasably coupled to said crop processing means forwardly thereof and being disposed adjacent a side said tractor for delivering crop material to said crop processing means when said machine is in a field operating mode, the improvement comprising means for coupling said delivery means rearwardly of said processing means and said tractor for converting said machine to a transport mode whereby the width of said machine in said transport mode is less than the width of said machine in said operating mode, said coupling means including a support member extending rearwardly from said processing means and means on said delivery means adapted to register with said support member in a coupling



relationship for supporting said delivery means in said transport mode, said coupling means further including a subframe mounted on said frame for movement between a storage position and a coupling position, said support member being mounted on said subframe for movement therewith.

4,058,959
GRASS CUTTING BLADES
Robert J. Moss, 6319 S. Inwood Road, Shreveport, La. 71119, and Forrest G. Hurst, 417 Town South Drive, Shreveport, La. 71115
Filed Oct. 6, 1975, Ser. No. 620,152
Int. Cl.² A01D *55/18*
U.S. Cl. 56—295 **3 Claims**



1. A grass cutting blade comprising a main bar of thin flat metal, a grass cutting element one on each end of said main bar, each of said cutting elements being both removably and pivotably attached to said main bar, each of said cutting elements being made of a spring wire material having preformed loops in the wire, said cutting elements being also provided with legs extended in a plane parallel to the plane of said main bar and said loop section said legs having end sections which are bent substantially 90° away from the plane of said main bar, an anchoring rivet on each end of said bar one for each of said cutting elements, each of said elements being rotatable around its anchoring rivet from a folded non-operative position to an operative position with the legs of each element extending beyond the extreme ends of said main bar.

4,058,960

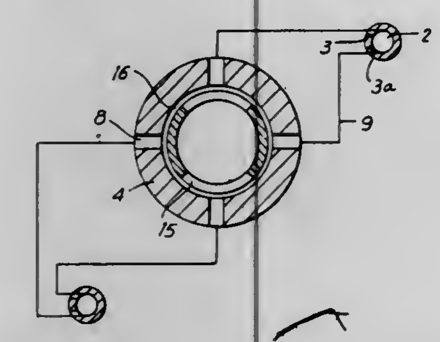
DISTRIBUTING DEVICE FOR SUPPLYING COMPRESSED AIR TO CHAMBERS OF APPARATUS FOR MAKING SELF-TWISTED PRODUCT

Pavel Mikhailovich Movshovich, Pechatnikov pereulok, 3, kv. 8, Moscow; Viktor Pavlovich Khavkin, ulitsa Vatutina, 11, kv. 4, Moskovskaya oblast, Khimki; Gennady Konstantinovich Maximov, Kaspiiskaya ulitsa, 20, korpus 3, kv. 137, Moscow; Natalya Borisovna Babushkina, Chasovaya ulitsa, 5b, kv. 15, Moscow; Alexandr Anatolievich Baranov, Proletarsky prospekt, 62, korpus 1, kv. 38, Moscow; Lev Nikolaevich Ivanov, Kotelnicheskaya naberezhnaya, 25/8, kv. 74, Moscow; Sergei Vladimirovich Nezelenov, Kineshemskoe shosse, 8ᵃ, kv. 6, Kostroma; Gennady Nikolaevich Shutov, ulitsa Sovetskaya, 119, kv. 101, Kostroma; Leonid Nikiforovich Tsygulev, Prospekt textilschikov, 94ᵃ, kv. 103, Kostroma, and Vadim Sergeevich Ilin, ulitsa 8 Okruzhnaya, 11, kv. 11, Kostroma, all of U.S.S.R.

Filed Aug. 17, 1976, Ser. No. 715,166

Int. Cl.² D01H *7/90*

U.S. Cl. 57—34 AT **5 Claims**



1. A distributing device for supplying compressed air to the jet nozzles of the swirl chambers of an apparatus for making a self-twisted product, comprising: a stationary hollow housing; a compressed air supply passageway in said housing; apertures in said housing and communicating with the jet nozzles of the swirl chambers; a rotary cylindrical distributing member accommodated in the internal space of said hollow housing; a gap defined between said housing and a cylindrical surface of said distributing member, permanently communicating with said compressed air supply passageway; said cylindrical distributing member being shaped as a sleeve with a bottom, a cylindrical wall and an open end facing said compressed air supply passageway; passages in the cylindrical wall of said distributing member, adapted, with said cylindrical distributing member rotating in operation, to communicate periodically with the jet nozzles of the swirl chambers through said apertures in said housing, to supply compressed air to the jet nozzles of the swirl chambers.

4,058,961

FALSE TWIST-CRIMPING MACHINE

Hermann Kubler, Remscheid-Luttringhausen, Germany, assignor to Barmag Barmer Maschinenfabrik Aktiengesellschaft, Remscheid-Lennep, Germany

Filed June 30, 1976, Ser. No. 701,155

Claims priority, application Germany, July 5, 1975, 2530125; Oct. 4, 1975, 7531545[U]

Int. Cl.² D02G *1/02*

U.S. Cl. 57—34 HS **5 Claims**

1. A false-twist crimping machine for processing filament yarn, said machine comprising:

a side frame having a bobbin located thereon for supplying the filament yarn,

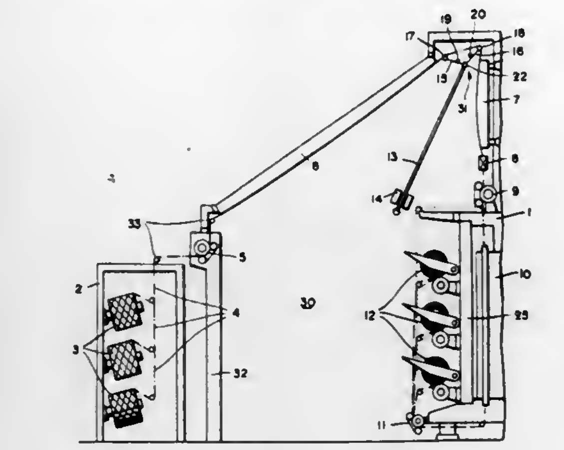
a delivery means for guiding said yarn to an upwardly inclined heating zone,

a middle frame carrying a downwardly disposed cooling zone which receives said yarn as it feeds from said heating zone,

a false-twisting means for receiving said yarn as it feeds from said cooling zone,

a take-off for supplying said yarn emitting from said false-twisting means to a winding device located at said middle frame,

said heating zone sloping at an oblique angle between said side frame and said middle frame, and



a yarn guide means positioned at the angle formed between said heating zone and cooling zone in a manner so that said yarn may run over it along a line substantially tangent from the outlet of said heating zone and along a line substantially tangent to the inlet of said cooling zone.

4,058,962

METHOD AND APPARATUS FOR DETECTING PERIODIC YARN IRREGULARITIES IN A YARN BETWEEN A YARN FORMING STAGE AND A YARN WINDING STAGE

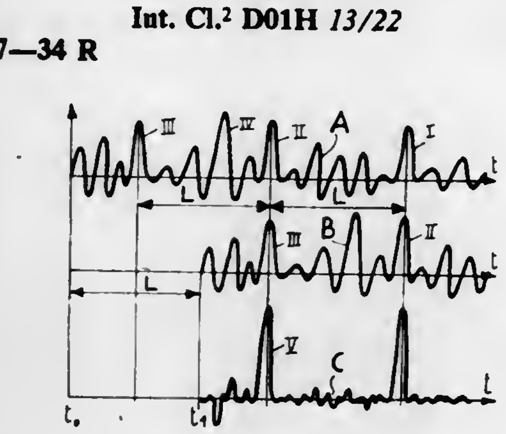
Gelli Spescha, and André Lattion, both of Winterthur, Switzerland, assignors to Rieter Machine Works, Ltd., Winterthur, Switzerland

Filed Jan. 19, 1977, Ser. No. 760,575

Claims priority, application Switzerland, Jan. 26, 1976, 888/76

Int. Cl.² D01H *13/22*

U.S. Cl. 57—34 R **24 Claims**



1. A method of detecting periodic yarn irregularities occurring at predetermined intervals of length in a yarn passing between a yarn forming stage and a yarn winding stage of a yarn producing machine, said method comprising the steps of

continuously measuring a predetermined characteristic of the yarn at a first station during movement of the yarn from the forming stage to the winding stage and generating a first continuous electrical signal proportional to variations in the measured characteristic;

generating a second signal identical to said first signal after a time lag corresponding to a multiple of the periodic interval of yarn length; and

continuously multiplying said first signal with said second signal to detect periodic yarn irregularities in the yarn.

4,058,963

OPEN-END SPINNING MACHINE WITH A PLURALITY OF SPINNING UNITS AND WITH AT LEAST ONE SERVICING DEVICE

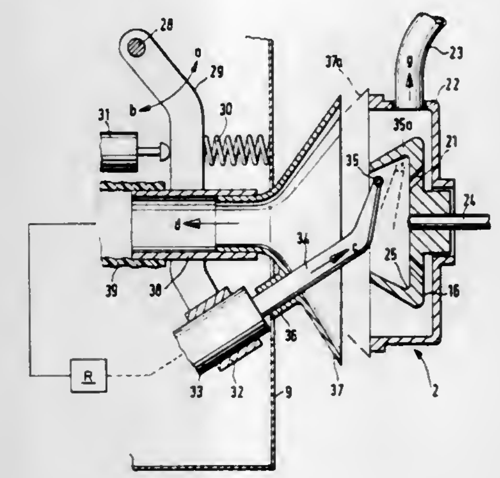
Fritz Stahlecker, Bad Uberkingen, Germany, assignor to Fritz Stahlecker and Hans Stahlecker, Germany

Filed Mar. 4, 1977, Ser. No. 774,539

Claims priority, application Germany, Mar. 27, 1976, 2613180

Int. Cl.² D01H *11/00, 1/12*

U.S. Cl. 57—56 **21 Claims**



1. Open-end spinning apparatus including a servicng device for servicing individual spinning units of an open-end spinning machine of the type having a spinning unit with a spinning rotor disposed in a housing; said servicing device including:

a suction device,

and suction device moving means for moving said suction device toward a spinning rotor to a servicing position where said suction device can remove fiber residues and the like from the spinning rotor by applying suction thereto.

wherein a suction portion of said suction device includes a flange which contacts the housing surrounding the spinning rotor in the manner of a lid when in said servicing position.

4,058,964

OPEN-END ROTOR FOR A SPINNING MACHINE

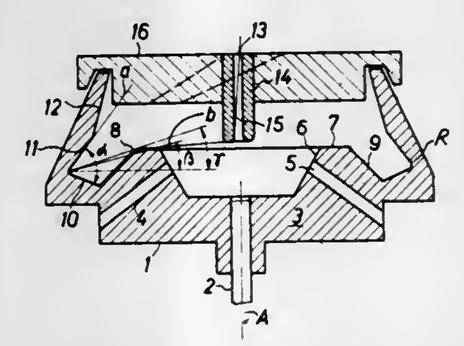
Herbert Stalder, Winterthur, Switzerland, assignor to Rieter Machine Works, Ltd., Winterthur, Switzerland

Filed Apr. 5, 1976, Ser. No. 673,355

Claims priority, application Switzerland, Apr. 11, 1975, 4636/75

Int. Cl.² D01H *1/12*

U.S. Cl. 57—58.89 **13 Claims**



1. A rotor for an open-end spinning machine having

a cavity concentrically disposed about a rotational axis;

a pair of annular intersecting surfaces within said cavity defining a fiber collecting groove at the largest inside diameter of said cavity;

a first angle of aperture between said surfaces of from 45° to 90°;

a rounded groove bottom of a radius from 0.1 to 0.5 millimeters between said surfaces;

a second angle between a straight line bisecting said first angle and a plane of rotation of said groove of a value from 0° to 45°;

a third angle between said plane of rotation and a yarn take-off direction from said groove of a value from 0° to 25°; and

an annular edge sufficient to deflect a taken-off yarn between said fiber collecting groove and a yarn take-off tube.

4,058,965

OPEN-END SPINNING MACHINES

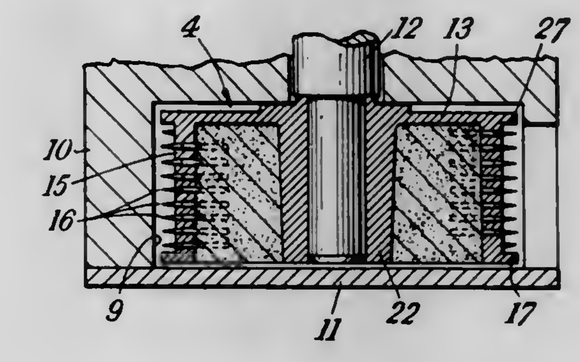
Jack Shaw, Read near Burnley, and Bruce Ellingham, Brierfield, both of England, assignors to Platt Saco Lowell Limited, Rossendale, England

Filed June 27, 1975, Ser. No. 590,859

Claims priority, application United Kingdom, July 3, 1974, 29500/74

Int. Cl.² D01N *1/12*

U.S. Cl. 57—58.91 **15 Claims**



1. In an open end spinning machine for the open end spinning of textile fibres, comprising, a spinning element, a rotatable fibre opening roller, means for feeding fibres in the form of a sliver to said opening roller, fibre conveying means for conveying in discrete form to said spinning element fibres opened by said opening roller, said opening roller comprising a boss portion, an end wall portion extending radially outwardly from said boss portion at one end thereof, a cylindrical shell portion extending from said wall portion over and in coaxial relation to said boss portion to form an annular cavity between an outer surface of said boss portion, an inner surface of said wall portion and an inner surface of said shell portion, said shell portion having a plurality of holes therein and a plurality of fibre engaging pins located in the holes, said pins passing from within the annular cavity and having end portions terminating in points protruding from the outer surface of the shell portion, wherein a plastic filler material fills the cavity in the roller and forms a planar end face to the roller.

4,058,966

DEVICE FOR PROTECTING TANGENTIAL DRIVES OF A TEXTILE MACHINE

Hans Raasch, Monchengladbach, Germany, assignor to W. Schlafhorst & Co., Monchengladbach, Germany

Filed Aug. 6, 1976, Ser. No. 712,196

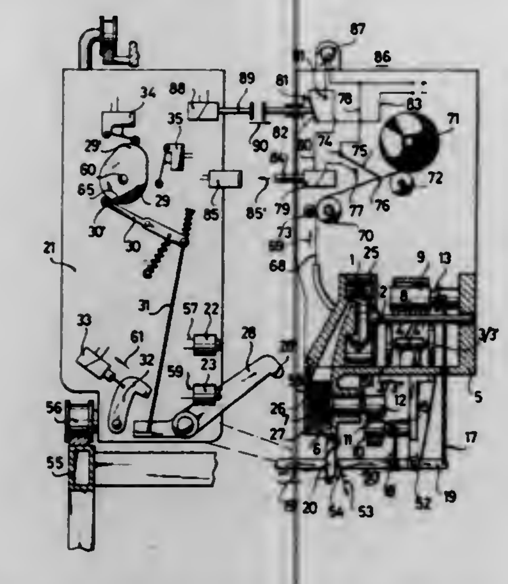
Claims priority, application Germany, Aug. 7, 1975, 2535254

Int. Cl.² D01H *13/20, 13/14*

U.S. Cl. 57—78 **8 Claims**

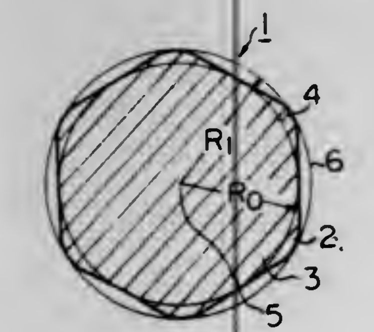
1. Device for protecting against destruction of or damage to tangential strands and rotatable members of a textile machine having a plurality of individual work stations and operating with traveling threads, comprising monitoring means capable of traveling along the textile machine for successively monitoring rotation of the rotatable members driven by the tangential strands at each of the plurality of individual work stations, said monitoring means comprising at least one signal receiver, and at least one signal transmitter associated with the rotatable

members at the respective work stations being monitored with respect to the rotation thereof, coupling means at each of the work stations for removing a faulty tangential strand from the rotatable members associated therewith and for simultaneously



securing the tangential strand against renewed engagement with the rotatable members, and means associated with said traveling monitoring means for actuating said coupling means, said actuating means being controllable by said signal receiver.

4,058,967
TEXTURED POLYESTER MULTIFILAMENT YARN
Hiroyuki Iimuro; Takumi Horiuchi; Yoji Kuroda; Kikuo Hori, all of Matsuyama, and Tatumi Kawano, Iyo-gun, all of Japan, assignors to Teijin Limited, Osaka, Japan
Filed Apr. 22, 1976, Ser. No. 679,323
Claims priority, application Japan, May 8, 1975, 50-54247; Oct. 20, 1975, 50-125341; Oct. 20, 1975, 50-125342
Int. Cl.² D02G *3/34*
U.S. Cl. 57—140 J **14 Claims**

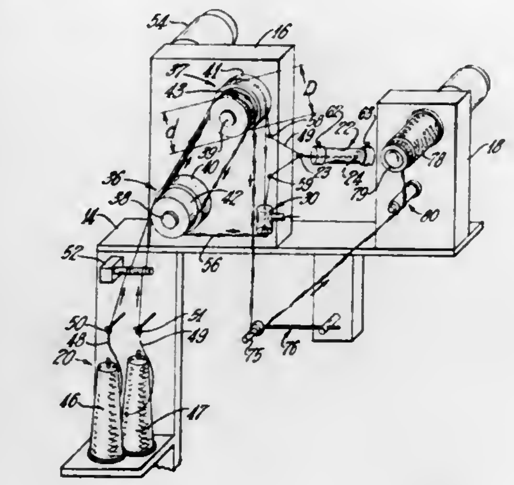


1. A polyester multifilament feed yarn, comprising a plurality of undrawn polyester filaments each having a multilobal cross sectional profile having 5 to 10 lobes projected radially with substantially equal angular intervals therebetween about the center of the filament, said cross sectional profile satisfying the following relationship (1):

$$1.05 \leq R_1/R_0 \leq 1.16 \qquad 1$$

wherein R_0 represents the radius of an imaginary circle inscribed within said cross section around the center of the filament, R_1 represents the radius of another imaginary circle circumscribed about the tips of at least half the total number of said lobes around the center of the filament.

4,058,968
BULKED YARN AND METHOD OF FORMING A BULKED YARN
Gustav E. Benson, Newark, Ohio, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio
Filed Sept. 3, 1976, Ser. No. 720,321
Int. Cl.² D02G *3/34, 1/16, 3/24*
U.S. Cl. 57—140 R **22 Claims**

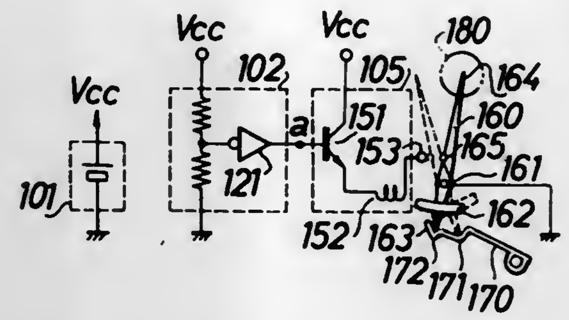


1. A bulked yarn comprising:
a continuous nucleus portion of tightly grouped and substantially parallel continuous filaments, and a surface portion having slub regions and generally uniformly bulked regions along the length of the yarn, the uniformly bulked regions having selected groups of said nucleus filaments which extend outwardly from said nucleus in undulatory waves having less filament density than the nucleus, the slub regions having selected groups of said nucleus filaments which extend outwardly from said nucleus in undulatory waves having less filaments density than the nucleus, the amplitude of the exterior waves of the slub regions being substantially larger than the amplitude of the exterior waves of the uniformly bulked region.

4,058,969
ELECTRIC TIMEPIECE FOR DISPLAYING THE OPERATING CONDITION THEREOF
Munetaka Tamaru, Tokyo; Kazunari Kume, Tokorozawa; Hideshi Oono, Sayama; Minoru Watanabe, Tokorozawa; Hideo Sato, Sayama, and Shigeru Morokawa, Higashiyamato, all of Japan, assignors to Citizen Watch Co., Ltd., Tokyo, Japan
Division of Ser. No. 526,980, Nov. 25, 1974, Pat. No. 3,998,043. This application Sept. 8, 1976, Ser. No. 721,439
Claims priority, application Japan, Dec. 26, 1973, 49-3258; Dec. 26, 1974, 50-22537
Int. Cl.² G04C *3/00*
U.S. Cl. 58—23 BA **8 Claims**

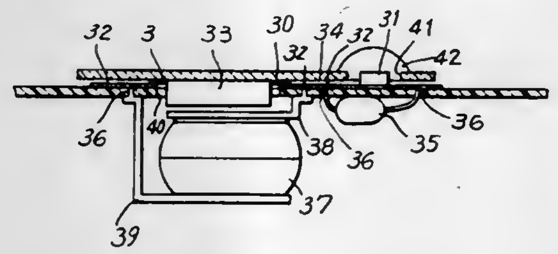
1. In a timepiece which is powered by voltage from a battery, an alarm system also powered by said battery indicating that the voltage of the battery has dropped below a predetermined level, said alarm system comprising:
indicating means for indicating that the voltage has dropped below the predetermined value by changing from a normal condition to an alarm condition;
means energized by the battery means operating the indicating means;
a detecting circuit for generating an alarm signal when the

voltage of the battery drops below the predetermined level;
switch means connected between the battery and the operating means and connected to the detecting circuit for allowing the battery to energize the operating means upon the generation of the alarm signal, said switch means including means for deenergizing the operating means



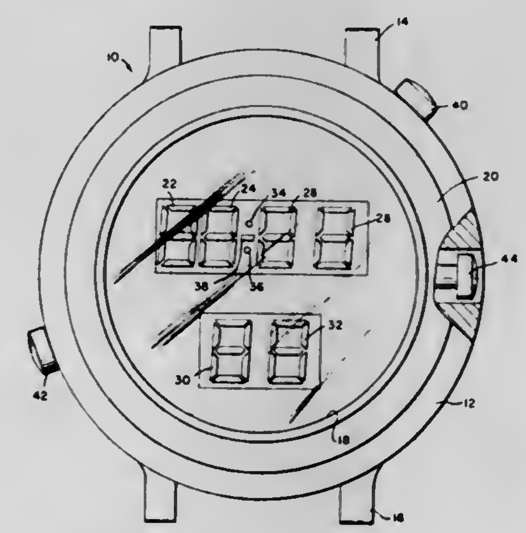
after the operating means has changed the condition of the indicating means from the normal condition to the alarm condition;
means for retaining the indicating means in the alarm condition after the operating means is energized; and
the indicating means including a mechanical member which is moved to change from a normal position to an alarm position.

4,058,970
DIGITAL DISPLAY ELECTRONIC TIMEPIECE
Matzuo Ichinose, Suwa, Japan, assignor to Kabushiki Kaisha Suwa Seikosha, Tokyo, Japan
Filed Mar. 12, 1976, Ser. No. 666,298
Claims priority, application Japan, Mar. 12, 1975, 50-29844
Int. Cl.² G04C *3/00*
U.S. Cl. 58—23 R **7 Claims**



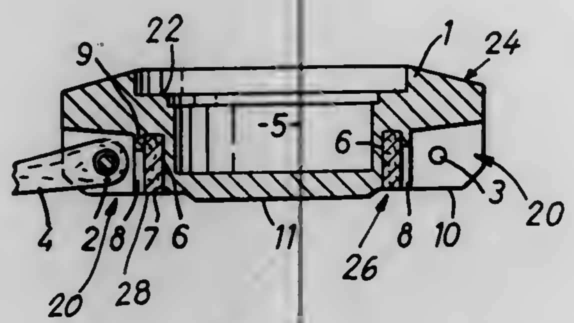
1. A digital display electronic timepiece circuit assembly comprising in combination battery means, timekeeping circuitry coupled to said battery means for being energized thereby and for producing low frequency timekeeping signals representative of actual time, said timekeeping circuitry being formed in at least one intergrated circuit chip, a digital display panel for receiving said timekeeping signals and digitally displaying time in response thereto, and an organic film substrate, said film substrate, including an electric wiring pattern formed on a first surface thereof, said substrate supporting said display panel and each said integrated circuit chip on said first surface to thereby electrically couple said display panel and each said chip together by said wire pattern, the surface of said film substrate not supporting said display panel being adapted to secure said battery means, said substrate having a first through-hole for receiving a portion of said display panel, said digital display panel including a front glass panel of substantially larger widthwise and lengthwise dimension then said portion of the display panel received in the through-hole of said substrate, the back surface of said front panel having segment electrode leads disposed thereon and coupled to said electrode wiring pattern formed on said first surface of said film substrate, said back surface of said glass panel being dimensioned to structurally support said organic film substrate and certain of said elements supported on the back surface thereof, said front glass panel further including an opening therein for permitting said integrated circuit chip to be supported on said organic film to extend through said opening.

4,058,971
DIGITAL WRISTWATCH AND STOPWATCH
Ronald D. Epperson, Newport Beach, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.
Filed Apr. 26, 1976, Ser. No. 679,953
Int. Cl.² G04F *7/04;* **G04B** *19/30*
U.S. Cl. 58—39.5 **2 Claims**



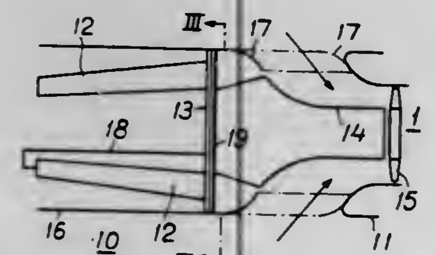
1. A resettable interval timer in combination with, but functioning independently from a digital watch which provides horological information comprising:
a plurality of push buttons;
a crystal oscillator;
a first and second divider connected to said oscillator for dividing the pulses from said oscillator;
first counting means for providing inputed coded horological information;
second counting means for providing inputed coded interval timing information;
a plurality of display devices for displaying said horological and said interval timing information;
watch control logic means connected to said first divider for multiplexing said horological information to predetermined display device depending upon the sequence in which said push buttons are depressed;
stopwatch control logic means connected to said second divider for multiplexing said interval timing information to predetermined display devices depending upon the sequence in which said push buttons are depressed;
pulse detection means connected between said push buttons and said watch and stopwatch control logic means for detecting a predetermined number of push button depressions within a predetermined time period;
watch counter select logic means connected between said watch control logic means and said first counting means for slewing and advancing said horological information in said first counting means;
stopwatch counter select logic means connected between said stopwatch control logic means and said second counting means for controlling the starting, stopping and resetting of said interval timing information;
a seven-segment decoder connected between said watch control logic, stopwatch control logic, first and second counting means and said display devices for converting the inputed coded information into seven-segment information which is delivered to said display devices.

4,058,972
WRISTWATCH HAVING A PERFUME CHAMBER
Heinz Hermann Weick, 94, rue de la Servette, 1202 Genf, Switzerland
Filed Jan. 22, 1976, Ser. No. 651,244
Claims priority, application Switzerland, Jan. 24, 1975, 964/75; Mar. 10, 1975, 3037/75
Int. Cl.² A45C *11/10;* **G04B** *37/12*
U.S. Cl. 58—88 E **7 Claims**



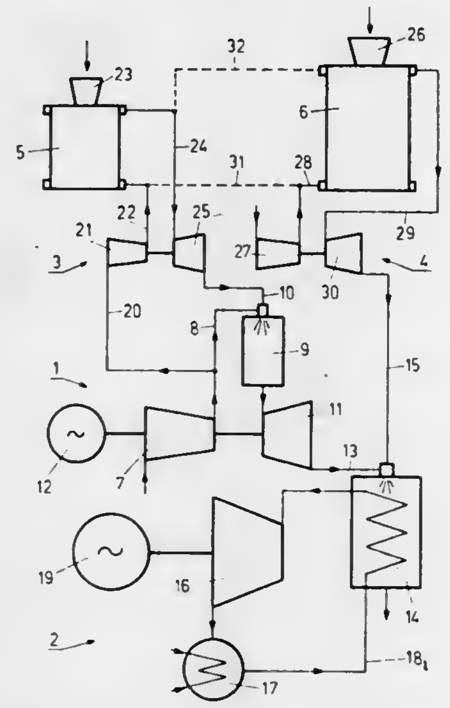
1. A wrist watch comprising: a main body portion having a front surface for associating with a watch glass and a rear surface for associating with the wrist of a wearer; at least two connection zones on said main body portion, and including strap connection means whereby a wrist strap can be connected thereto, each said connection zone defining a recess within which said strap connection means is disposed; a perfume chamber extending into the main body portion from an outer portion thereof, said outer portion being situated more rearwardly than said front surface; and at least one evaporation orifice or aperture defined by the walls of said perfume chamber, adjacent one of said connection zones and opening at said rear surface.

4,058,973
APPARATUS FOR STARTING TURBINE PLANTS
Stig Ferm, and Ragnar Torstenfelt, both of Finspong, Sweden, assignors to Stal-Laval Turbin AB, Finspong, Sweden
Filed Mar. 3, 1976, Ser. No. 663,589
Claims priority, application Sweden, Mar. 5, 1975, 7502426
Int. Cl.² F02C *7/26*
U.S. Cl. 60—39.09 R **4 Claims**



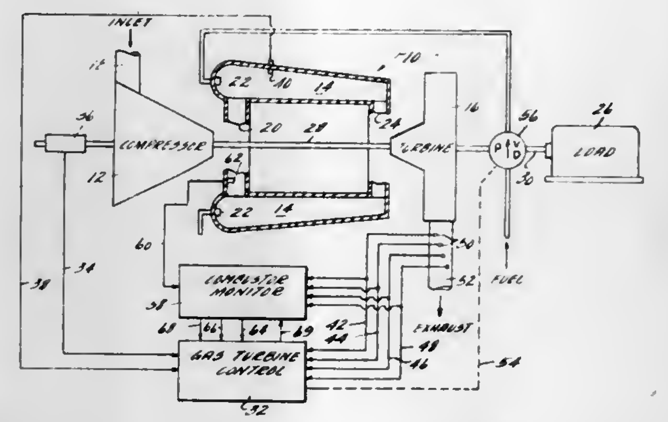
1. A starting appratus for a turbine, said turbine having a compressor with an inlet opening, comprising:
means for supplying compressed air to said compressor to start said turbine, said means being positioned in front of and spaced from said inlet opening;
a selectively displaceable cover means surrounding said means for supplying compressed air, for providing a closed air channel between said means for supplying compressed air and said compressor when said cover means is displaced into sealing contact with said inlet opening during turbine starting;
means connected in parallel with said means for supplying compressed air, for supplying dry air to said turbine to minimize formation of condensation and collection of foreign material in said turbine during shutdown periods; and
means for selectively admitting either said compressed air to said compressor to start said turbine or said dry air to said compressor to protect said turbine during said shutdown periods.

4,058,974
COMBINED GAS/STEAM POWER PLANT WITH PRESSURIZED-GAS GENERATOR
Hans Pfenninger, Baden, Switzerland, assignor to BBC Brown Boveri & Company Limited, Baden, Switzerland
Filed Mar. 11, 1976, Ser. No. 665,796
Claims priority, application Switzerland, May 14, 1975, 6182/75
Int. Cl.² F02B *43/08;* **F02C** *3/22*
U.S. Cl. 60—39.12 **4 Claims**



1. A combined gas-steam power plant comprising a gas turbine power set which includes a combustion chamber, a gas turbine for delivering power and a compressor driven thereby for delivering air to said combustion chamber, a steam turbine power set including a non-supercharged steam generator connected directly to the outlet from said gas turbine, and a steam turbine for delivering power, at least two pressurized gas generators for producing fuel gas for firing said combustion chamber and steam generator, respectively at least two separate and independent charging groups each comprising a gas turbine and a compressor driven thereby the gasification air required for generation of that portion of the fuel gas supplied to said combustion chamber being taken from the combustion air conveyed by the compressor of said gas turbine power set and compressed further in the compressor of one of said charging groups up to the pressure prevailing in one of said fuel generators, the gasification air required for generation of that portion of the fuel gas supplied to said steam generator being compressed in the compressor of the other charging group from ambient pressure to the pressure prevailing in the other fuel gas generator, and the said two proportions of the fuel gas produced respectively by said fuel gas generators being passed through the gas turbine of their respective charging groups and thence to said combustion chamber and steam generator, respectively.

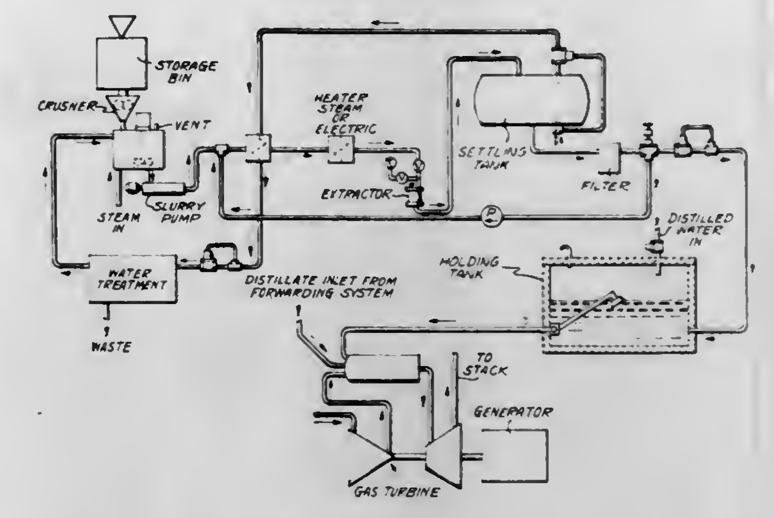
4,058,975
GAS TURBINE TEMPERATURE SENSOR VALIDATION APPARATUS AND METHOD
Kendall E. Gilbert, Schenectady; Daniel Johnson, Rexford, and Robert Raymond Macier, Saratoga Springs, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.
Filed Dec. 8, 1975, Ser. No. 638,852
Int. Cl.² F02C *9/08*
U.S. Cl. 60—39.28 T **1 Claim**



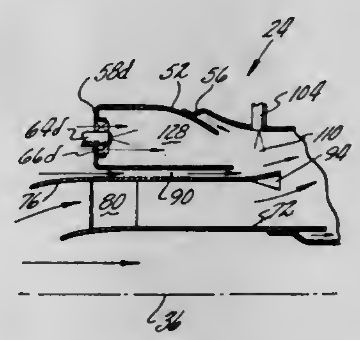
1. A gas turbine system having a compressor, a combustion system for receiving fuel and pressurized air from said compressor and for generating an annular hot gas stream, a turbine driven by the hot gas stream and operative to drive said compressor, an exhaust duct for exhausting said hot gas stream, means for controlling the operation of the gas turbine in response to various parameters of gas turbine operation including the temperature of the hot gas stream as sensed by a plurality of temperature sensors, said temperature sensors disposed in an annular array in said exhaust duct with the spacing between adjacent temperature sensors being generally equal and selected such that a temperature streak caused by a combustion system malfunction would affect at least two adjacent temperature sensors, and means for determining the validity of each temperature sensor reading prior to use by said controlling means, said validity determining means being operative to examine the temperature readings of temperature sensors that are adjacent to a particular temperature sensor having a reading which is outside of first predetermined bounds and for rejecting the reading from said particular temperature sensor when each said adjacent temperature sensor is within second predetermined bounds.

4,058,976
METHOD AND APPARATUS FOR REMOVAL OF LAST TRACES OF SOLUBLE ASH AND ELEMENTS FROM SOLVENT REFINED COAL
Fred Henry Kindl, Schenectady, N.Y., assignor to Encotech, Inc., Schenectady, N.Y.
Filed Nov. 21, 1975, Ser. No. 634,283
Int. Cl.² F02C *3/26;* **C10L** *9/00*
U.S. Cl. 60—39.46 S **7 Claims**

1. Apparatus for the removal of the last traces of sodium and potassium salts and other soluble ash from solvent refined coal at a power generation site comprising:
a. crushing and feeding means for feeding finely divided solvent refined coal and water in the form of a slurry into an initial mixing and dearating chamber;
b. proportioning means to control the proportion of water to solvent refined coal;
c. an initial mixing and deaerating chamber for receiving the controlled proportions of solvent refined coal and water;
d. mixing means for stirring;
e. steam supply and proportioning means to properly control the amount of steam and thereby to achieve heating of the mixture to the steam-water saturation temperature at a chamber internal pressure of about 1 atmosphere;
f. second feeding means for feeding the coal slurry into a pressure tight vessel;
g. a pressure-tight vessel into which the aforementioned second feeding means discharges the coal slurry; and,
h. heating means to heat the contents of said pressure-tight vessel and maintain the contents thereof at a temperature of about 500° to 600° F and at the corresponding water-steam saturation pressure for a time ranging from approximately ½ to 2 hours.



4,058,977
LOW EMISSION COMBUSTION CHAMBER
Stanley J. Markowski, East Hartford, and James J. Nolan, Glastonbury, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.
Division of Ser. No. 533,922, Dec. 18, 1974, Pat. No. 3,973,395. This application Mar. 26, 1976, Ser. No. 670,915
Int. Cl.² F02C *7/22*
U.S. Cl. 60—39.65 **4 Claims**



3. A combustion chamber concentric about an axis and having outer wall means and inner wall means supported in spaced relation to define an annular combustion chamber cavity therebetween and wherein said outer wall means and inner wall means are shaped so as to define:
A. an annular pilot combustion zone positioned at the combustion chamber forward end and having a forward wall,
B. means to establish combustion in said pilot combustion zone in swirling fashion about said axis and so that the pilot products of combustion depart the pilot combustion zone in swirling flow fashion about said axis,
C. an annular primary combustion zone located downstream of said pilot zone and shaped to increase in cross-sectional area in a downstream direction so as to be in the form of a diffuser,
D. a primary combustion zone trigger mechanism in the form of a corrugated ring mounted concentrically about the axis and having corrugations canted with respect to the axis and increasing in amplitude in a downstream direction and supported to be located at the entrance of the primary combustion zone so that the swirling pilot zone products of combustion will pass over the convolutions of the trigger,
E. means to pass combustion air over the opposite corrugation surface of the trigger to produce accelerated mixing

between the fluids passed over opposite surfaces of the trigger,

F. means to introduce fuel droplets into the combustion chamber and circumferentially thereabout at an axial station upstream of said trigger to mix with and be flash vaporized by the swirling pilot products of combustion to produce a vaporized, vitiated, fuel-air mixture flowing over said trigger to mix with said combustion air in swirling fashion for controlled autoignition and lean and rapid combustion therein in said primary combustion zone,

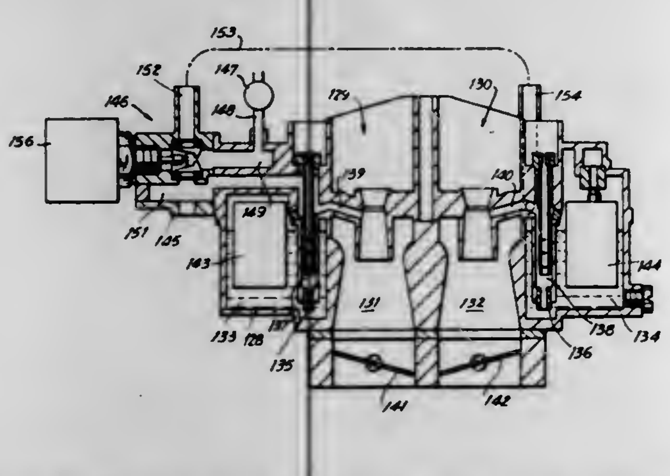
G. means to provide dilution air to the interior of the combustion chamber downstream of the primary combustion zone, and

H. wherein said swirl burning establishing means in said pilot combustion chamber are:

1. a plurality of circumferentially disposed and spaced and axially extending fuel nozzles extending through said forward wall,
2. combustion air admission means enveloping said fuel nozzles and supporting them axially from said forward wall, and
3. a plurality of circumferentially oriented and spaced deflector vanes projecting into said pilot combustion chamber from said forward wall and supported therefrom one such vane positioned between adjacent fuel nozzles, each deflector vane being hollow and extending for substantially the full radial dimension of the pilot combustion chamber and having an axially directed forward end communicating with the exterior of the combustion chamber to receive cooling air therefrom and having an afterend supported from said forward end and smoothly changing shape so as to define a substantial angle with respect to the combustion chamber axis, and further defining an open downstream end so that cooling air flows through the interior of each deflection vane and into the pilot combustion zone and so that the fuel is injected between adjacent deflector vanes and the pilot combustion chamber products of combustion are caused to flow in swirling fashion about the combustion chamber axis due to the shape of the deflector vanes.

4,058,978
REGULATING DEVICE FOR METERING A SUPPLEMENTARY AIR QUANTITY TO IMPROVE COMBUSTION IN COMBUSTION ENGINES

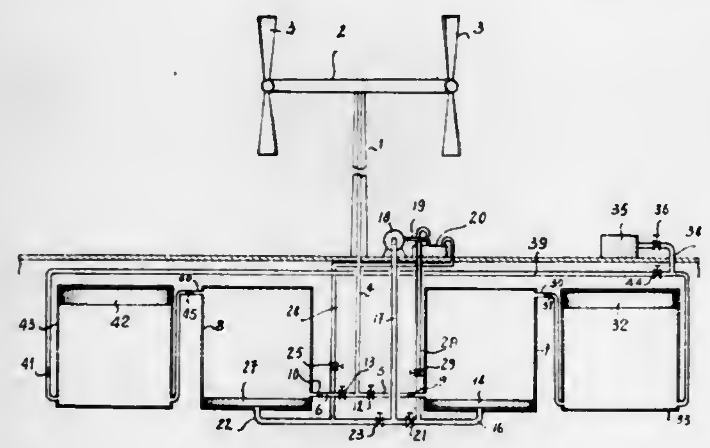
Wilfried Bockelmann, An der Kapelle 1, 4046 Buttgen 3; Martin W. Veigel, Stingesbachstrasse 28, 4040 Neuss; Dietrich Grossmann, Einsteinstrasse 25, 4040 Neuss; Hans Grözinger, Corneliusweg 3, 4040 Neuss, and Dieter Schwander, Alter Kirchweg 23, 4030 Ratingen, all of Germany
Filed May 12, 1975, Ser. No. 576,422
Claims priority, application Germany, Mar. 31, 1974, 2426594
Int. Cl.^{2} F02B *75/10*
U.S. Cl. 60—277 **3 Claims**



1. In an auxiliary arrangement for the protection of an afterburner installation for the exhaust gases of an internal combustion engine having a regulating arrangement for the metering of a secondary air quantity, the improvement comprising: a source of fluid under pressure equal to or greater than atmospheric pressure; a switching installation instantaneously responsive to an emergency signal for switching off the fuel, said emergency signal representing an electrical impulse; means for initiating said electrical impulse upon exceeding a predetermined amount of unburned hydrocarbons; in the exhaust fuel reservoir means; fuel-air mixture forming means; and fuel conducting means between said fuel reservoir means and said fuel-air mixture forming means; control means linked to said source of pressure and actuatable by said emergency signal for releasing said fluid to contact the fuel and move the fuel by applying pressure thereto from said fuel conducting means and into said fuel reservoir means when said emergency signal is initiated; main jet means; said control means comprising a valve in a line connecting said source with a region of said mixture forming means, said region being downstream from said main jet means and being upstream from the exit point of the fuel-air mixture to said source of pressure; said valve comprising further means for synchronous connection of at least two units of said fuel-air mixture forming means to said source of pressure; said valve having facing springloaded valve flaps; bell cranks on said valve flaps; outlet sealing rings; and actuating plunger means for synchronously actuating said valve flaps, said actuating plunger means moving said valve flaps in direction for releasing said sealing rings so that said source of pressure communicates with the fuel at said region.

4,058,979
ENERGY STORAGE AND CONVERSION TECHNIQUE AND APPARATUS

Fernand Germain, Bois-Thibault-Balata, 97200 Fort de France, Martinique, British W. Indies
Filed Oct. 1, 1976, Ser. No. 728,857
Claims priority, application France, Feb. 10, 1975, 75.30155
Int. Cl.^{2} F15B *11/06*
U.S. Cl. 60—327 **4 Claims**



1. Apparatus for the production of electrical energy comprising:

wind driven compressor means, said compressor means including at least a first wind responsive rotor and producing pressurized air in response to rotation of said rotor;

first air storage reservoir means, said first reservoir means including a first piston;

first conduit means for selectively delivering pressurized air from said wind driven compressor means to the interior of said first reservoir means, said first conduit means being connected to said first reservoir means at a point located to a first side of said first piston when said first piston is in a deenergized state;

a source of pressurized liquid;

second conduit means for selectively coupling said source of pressurized liquid to the interior of said first reservoir means at the second side of said first piston to energize said first piston;

second air storage reservoir means, said second storage reservoir means including a second piston;

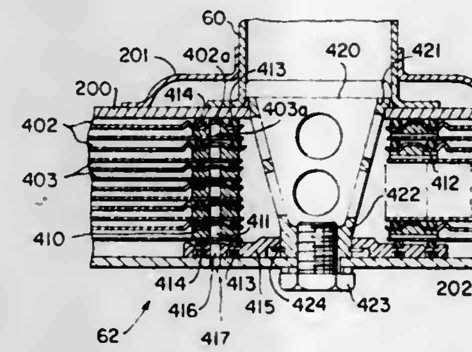
third conduit means for coupling the interior of said first reservoir means at said first side of said first piston to the interior of said second reservoir means at a first side of said second reservoir means piston;

generator means, said generator means including a pneumatic motor coupled to an electrical power generator; and

fourth conduit means for selectively coupling the interior of said second reservoir means at said first side of said second piston to said generator means.

4,058,980
HEAT EXCHANGERS

Karl Gustav Ahlen, Stockholm, Sweden, assignor to S.R.M. Hydromekanik Aktiebolag, Stockholm-Vallingby, Sweden
Continuation-in-part of Ser. No. 549,359, Feb. 12, 1975, abandoned. This application July 16, 1976, Ser. No. 705,899
Claims priority, application United Kingdom, Dec. 18, 1974, 54771/74
Int. Cl.^{2} F16D *33/00;* **F28D** *7/02*
U.S. Cl. 60—337 **27 Claims**



1. A heat exchanger comprising:

a plurality of generally flat cooling cells arranged in stacked relationship to each other,

each cell including a pair of plates of heat conducting material sealed together around their outer peripheries and forming between the plates a fluid flow space, each cell further including an inlet and an outlet opening, each of which openings pass completely through the cell in a direction perpendicular to the main plane of the generally flat cells and each said opening communicating with the said flow space within its respective cell,

said cells being stacked with their respective inlet openings in fluid communication with each other to form an inlet passage and with their respective outlet openings in communication with each other to form an outlet passage, and including sealing means encircling each of said inlet and outlet passages between each cell to block off the space outside of the cells from said passages, whereby a fluid flows into the inlet passage and through the inlet openings into the said flow spaces within the cells and through the outlet openings to the outlet passage while another fluid contacts the exterior surface of each cell,

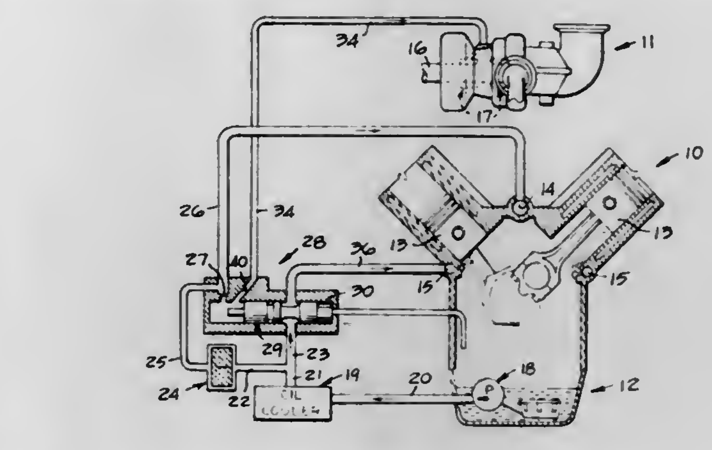
said cells being formed of only two plates which are shaped to form

a. the sealed outer periphery of the cell, and

b. a spacing structure surrounding at least one of the inlet and outlet openings and urging the two plates apart in the vicinity of the openings while concurrently providing openings therepast for communication between the openings and the interior flow space of the cell.

4,058,981
LUBRICATING SYSTEM AND METHOD FOR TURBOCHARGED ENGINES

Ralph B. Henson, Creve Coeur, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.
Filed June 4, 1976, Ser. No. 693,235
Int. Cl.^{2} F02B *33/40*
U.S. Cl. 60—605 **9 Claims**



1. A lubricating system in combination with a turbocharged engine having crankshaft and rod bearings and pistons comprising,

first manifold means for communicating lubricant to crankshaft and rod bearings of said engine,

second manifold means for communicating lubricant to pistons of said engine,

a turbocharger mounted on said engine and having bearing means rotatably mounting a shaft therein,

pump means for communicating lubricant to said first and second manifold means and to said bearing means,

first conduit means for communicating lubricant from said pump means to said first manifold means,

second conduit means for communicating lubricant from said pump means to said second manifold means,

third conduit means for communicating lubricant from said pump means to said bearing means, and

direction control valve means, including expansible chamber means communicating with said first conduit means, connected to each of said first, second and third conduit means for automatically (a) communicating lubicant from said pump means to said first manifold means via said first conduit means and to said bearing means via said third conduit means upon start-up of said engine and for thereafter (b) communicating lubricant from said pump means to said first and second manifold means via said first and second conduit means, respectively, and to said bearing means via said third conduit means when the pressure of said lubricant exceeds a predetermined level in said expansible chamber means.

4,058,982
MODULAR HEATING SECTION

Ralph Wallace Wright, 118 Cedar Ave., Hudson, Quebec, Canada
Filed Sept. 15, 1975, Ser. No. 613,583
Int. Cl.^{2} E02B *15/02*
U.S. Cl. 61—1 R **10 Claims**

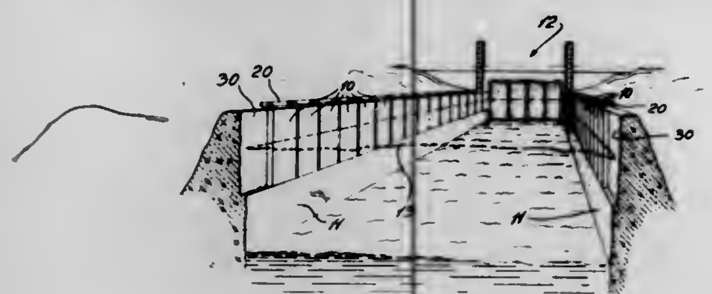
1. A modular heating section for use in association with navigation lock walls, loading docks, ferry slips, or the like, said modular heating section comprising:

a rigid panel having means for securing the section to a navigation lock wall, loading dock, or the like, at a location where ice formation occurs, the panel made from a heat conducting mortar mix;

the panel including heater means situated therein, the heater means adapted to distribute heat throughout the modular heating sections, the mortar mix providing a suitable bonding to the heater means while providing increased compressive strength to the modular heating section,

connector means operatively connected with the heater means, said connector means adapted to connect the heater means to an energy supply;

a rear surface of the modular heating section provided with a layer of heat insulating material, whereby heat transfer through the rear surface of the panel to the lock wall, loading dock, or the like is limited, the layer of heat insulating material provided on both sides thereof with a bonding layer in order to increase adhesion of the layer of heat insulating material to the modular heating section, said modular heating section adapted to prevent the accumulation of ice on lock walls, loading docks, ferry slips, or



the like by providing heat to an outer surface of the modular heating section by means of the heater means, the outer surface of the section being provided with a smooth resistant surface to limit adherence of ice thereto, and to reduce wear thereof, said section including structural steel within the section intermediate the outer surface and the heater means, the structural steel adapted to strengthen the section and distribute heat generated by the heater means across the outer surface of the section, the modular heating section further including screening of conducting material intermediate the heater means and outer surface thereof, the heat conducting screening adapted to distribute heat to the outer surface of the section.

4,058,983

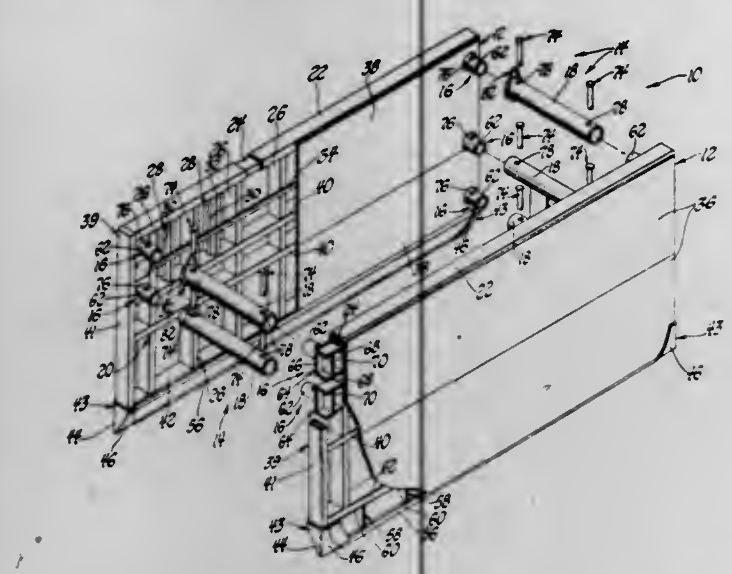
TRENCH SHORING ASSEMBLY WITH LIFTING ATTACHMENT

James L. Griswold, 513 Morningside Drive, Battle Creek, Mich. 49015

Filed Feb. 9, 1976, Ser. No. 656,148

Int. Cl.² E21D *5/00*

U.S. Cl. 61—41 A **4 Claims**



1. A trench shoring assembly comprising: a pair of spaced wall means, connecting means interconnecting said wall means including support means extending from said wall means and spreader means extending between said support means and connecting means removably connecting said spreader means to said support means, and lifting means supported by said connecting means for lifting said assembly upon being connected to a raising means, said lifting means including a plurality of closed-looped ring members surrounding said connecting means with at least a lifting portion thereof in spaced relation to said connecting means for connection to the raising means, said spreader means including at least one spreader pipe extending between said support means of said spaced wall means, said connecting means including pins connecting said spreader pipes to said support means and limiting movement of said ring members longitudinally of said spreader pipe when in engagement therewith.

4,058,984

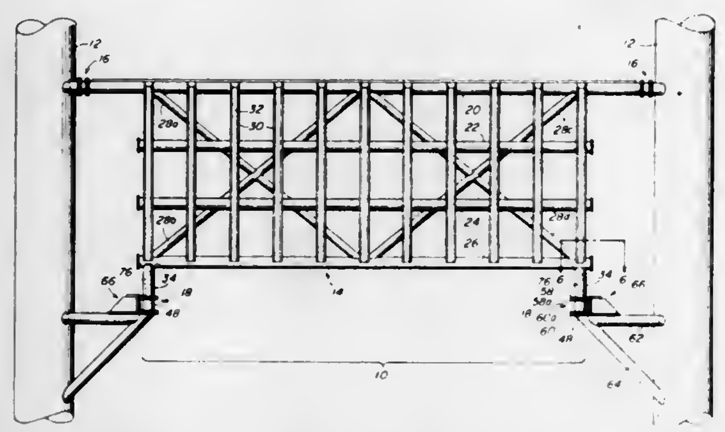
MARINE CUSHIONING UNIT

Jay B. Weidler, Jr., Houston, and Charles Warren Stelly, Kingwood, both of Tex., assignors to Brown & Root, Inc., Houston, Tex.

Filed June 18, 1976, Ser. No. 697,411

Int. Cl.² E02B *3/22*

U.S. Cl. 61—48 **15 Claims**



1. Apparatus for cushioning the impact between a marine means and a structure to which the apparatus is securable, the apparatus comprising

an upright frame,

laterally spaced apart upper shock mounts securing said frame to said structure, each shock mount including a shear-like shock-absorbing resiliently-deformable member disposed intermediate said frame and said structure in an orientation in which it provides shear resistance to horizontal loading on the frame,

laterally spaced lower shock mounts securing said frame to said structure, each shock mount including a shear-type shock-absorbing resiliently-deformable member disposed to support at least a major portion of the vertical weight of said frame with compressive resistance and to provide shear resistance to horizontal loading on the frame.

4,058,985

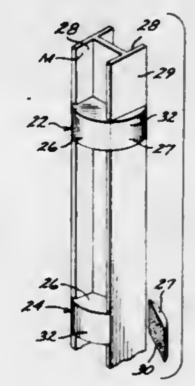
PROTECTION OF METALLIC STRUCTURAL ELEMENTS AGAINST CORROSION

Orval E. Liddell, 333 Descanso Ave., Avalon, Calif. 90704

Filed July 19, 1976, Ser. No. 706,741

Int. Cl.² E02D *5/60*

U.S. Cl. 61—54 **2 Claims**



1. Apparatus for protectively encasing an installed metallic columnar structural element of irregular horizontal cross-section against corrosion from water, air or a combination of water and air, comprising:

top and bottom filler block assemblies secured to vertically spaced portions of said structural element to fill the cavities thereof;

a split cylindrical back-up sheet means encircling said structural element in abutment with the exterior surface of said filler block assemblies and covering the edges of said elements, said back-up sheet means bring formulated so as to have a relaxed diameter less than the diameter defined by the outer diameter of said filler block assemblies;

a generally rectangular, synthetic plastic, pliable water and airtight encasement sheet of a length at least as great as the length of the portion of said structural element to be protected, said encasement sheet being wrapped about said back-up sheet means with its edges overlapping;

a pair of vertically extending, abutting pole pieces secured to the edges of said encasement sheet in a rolled-together water and airtight relationship with respect to the edges of said encasement sheet whereby said sheet is held against said back-up sheet means;

upper and lower sealing bands of compressible foam interposed between the outer edges of said filler block assemblies, the upper and lower ends of said back-up sheet means, and the upper and lower portions of said encasement sheet, with the upper and lower ends of said pole pieces terminating below and above said upper and lower sealing bands, respectively; and

upper and lower wrapping bands extending around the upper and lower portions of said encasement sheet and said pole pieces to compress said sealing bands into a water and airtight sealing relationship with the upper and lower ends of said encasement sheet, the upper and lower ends of said back-up sheet means, and said filler block assemblies, said wrapping bands also retaining said encasement sheet and said pole pieces firmly upon said structural element, with said sealing bands and rolled-together pole pieces cooperating with said encasement sheet, said back-up sheet means and said filler block assemblies to prevent the entry of air and water into the space between said sheet and the portion of said structural element to be protected.

4,058,986

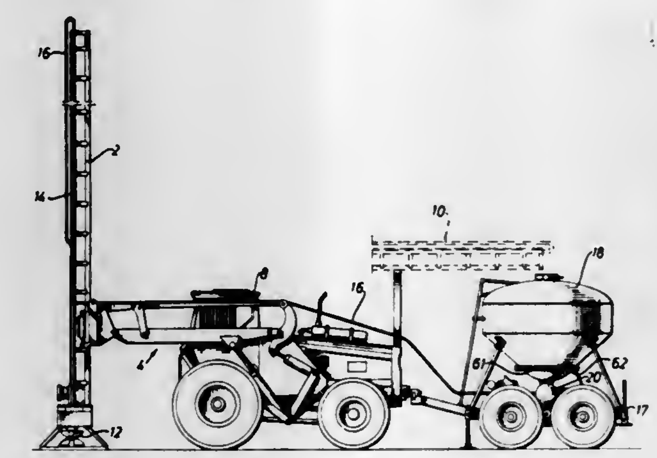
GROUND STABILIZING AGENT FEEDING DEVICE

Sven Granholm, Skelleftea, Sweden, assignor to Linden-Alimak AB, Skelleftea, Sweden

Filed May 21, 1975, Ser. No. 579,430

Int. Cl.² E02D *3/12*

U.S. Cl. 61—63 **13 Claims**



1. A ground stabilizing equipment comprising

a ground drilling assembly for injecting and mixing a pulverulent ground stabilizing agent into ground material,

a storage container for storing said ground stabilizing agent,

conduit means for said agent extending from said container to said ground drilling assembly,

feeding means associated with said container for feeding and portioning said agent into said conduit means,

said feeding means comprising a housing defining an essentially cylinder-shaped chamber,

said housing having two end walls,

a shaft rotatably journalled in said end walls coaxially within said chamber,

said shaft carrying a plurality of radially and axially extending vane members extending between said end walls,

said vane members each having a radial peripheral edge remote from said shaft and two axial end edges,

said radial edge being slidably associated with the internal cylindrical wall of said chamber and said end edges being slidably associated with said end walls,

said vane members being substantially equally spaced around said shaft and thereby dividing said chamber into a plurality of substantially equal compartments rotatable with said shaft,

said chamber housing further defining a stabilizing agent inlet communicating with the interior of said storage container and a stabilizing agent outlet communicating with said conduit means and at least two pressure fluid inlets,

each of said compartments during a first part of one revolution of said shaft communicating exclusively with said stabilizing agent inlet,

and each of said compartments during a second part of the same revolution communicating exclusively with said outlet and said pressure fluid inlets,

said stabilizing agent inlet spanning a sector of the cylindrical surface of said chamber substantially exceeding the peripheral distance between two adjacent vane members and being of the same order of magnitude as the axial length of said chamber,

said outlet being located diametrically opposite said stabilizing agent inlet and being smaller than said peripheral distance between two adjacent vane members,

said two pressure fluid inlets being completely separate from said outlet and including at least one pressure fluid inlet located on each side of said outlet as seen when viewed in the axial direction of the chamber to provide a stirring and exhaust of the contents of the compartment in communication with said outlet by fluid passing from said pressure fluid inlets and through said compartment to said outlet.

4,058,987

METHOD AND DEVICE FOR CONNECTING SUB-MARINE PIPELINES TO A WEIGHT PLATFORM

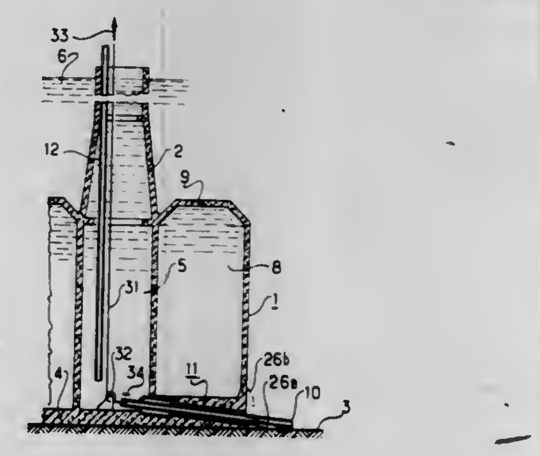
Marcel Gerbault, Paris, France, and Robert Gair, London, England, assignors to Sea Tank Co. S.A., Chevilly Larue, France and Oceanic Contractors Inc., Panama City, Panama

Filed Feb. 9, 1976, Ser. No. 656,273

Claims priority, application France, Feb. 14, 1975, 75.04661

Int. Cl.² F16L *1/04;* **E02D** *27/38*

U.S. Cl. 61—86 **8 Claims**



1. A method for connecting a sub-marine pipeline to a riser pipe in a hollow concrete base of an offshore structure, said riser pipe extending along a substantially vertical hollow col-

umn and being connected to a work platform mounted on the base by means of one or more of said columns, the method comprising the steps of:
- inserting the pipeline into the base through a submerged passage communicating with the interior and exterior of the hollow base up to the foot of said hollow column,
- sealing the passage by means of annular inflatable seals located around the pipeline in the passage,
- draining the water from said column and an associated cell portion of the base,
- joining the pipeline to the riser pipe while both are in air,
- refilling said column said associated cell portion of the base for ensuring a balance of pressures on either side of the passage;
- breaking the sealing of the passage;
- releasing the pipeline in the passage for permitting relatively free movement of the pipeline in the passage without stress.

4,058,988

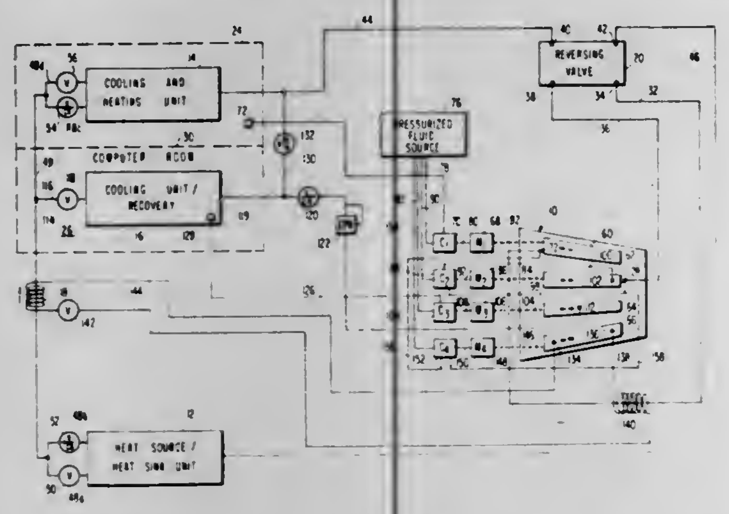
HEAT PUMP SYSTEM WITH HIGH EFFICIENCY REVERSIBLE HELICAL SCREW ROTARY COMPRESSOR

David N. Shaw, Unionville, Conn., assignor to Dunham-Bush, Inc., West Hartford, Conn.

Filed Jan. 29, 1976, Ser. No. 653,568

Int. Cl.² F25B *29/00*

U.S. Cl. 62—160 **25 Claims**



1. In a heat pump system including: a positive displacement rotary compressor including a casing having axially spaced end walls and axially spaced suction and discharge ports within said casing open to the casing interior, rotor means mounted for rotation within said casing and forming during rotation closed threads sealed from said ports, and said heat pump system further including a first coil mounted within an enclosure to be conditioned for selective heating and cooling of said enclosure, a second coil external of said enclosure and within the ambient and acting either as a heat sink or heat source, and conduit means for fluid series connecting said compressor and said first and second coils in a closed loop with said conduit means carrying a mass of refrigerant working fluid for circulation therein and expansion valve means intermediate of said coils for operating a selected coil as a refrigerant evaporator, motor means for driving said rotor means for causing refrigerant gas to enter said suction port, to compress said gas within said closed threads and to discharge compressed refrigerant gas under high pressure at said discharge port, and a reversing valve for reversing connections between the compressor ports and said first and second coils respectively, the improvement comprising:
- a pair of axially extending recesses within the casing in open communication with the rotor means closed threads,
- a first slide valve axially slidable relative to said casing and sealably covering one recess with the interface of the slide valve being complementary to the casing confronted by the opening of said one recess,
- a second slide valve axially slidable relative to said casing for sealably covering the opening of the other recess with the interface of the second slide valve being complementary to the casing confronted by the opening of said other recess,
- said first slide valve being movable between extreme positions, in one of which said suction port is fully open and the other of which said suction port is closed, and said second slide valve being movable between extreme positions, in one of while the discharge port is fully open and the other in which the discharge port is closed.
- means for axially shifting said first slide valve for varying the capacity of the compressor to meet heat pump system load variation,
- said second slide valve carrying a port opening to the closed threads for sensing the compressed gas pressure within a closed thread immediately adjacent said discharge port, and
- means for comparing the closed thread pressure just before opening to said discharge port with said compressor discharge pressure at the compressor discharge port and for shifting said second slide valve axially to equalize these pressures and to prevent undercompression or overcompression of the compressor working fluid within the closed thread prior to discharge.

4,058,989

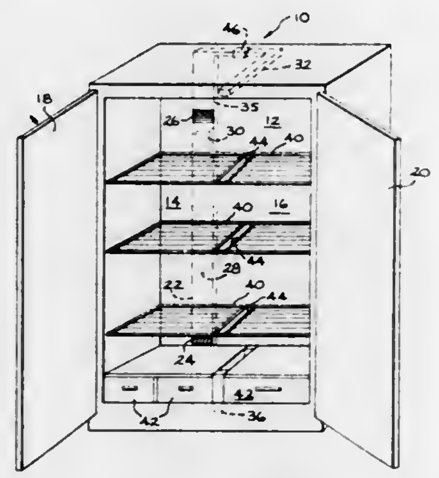
REFRIGERATOR INCLUDING AIR WALL SEPARATING THE FREEZER AND FRESH FOOD PORTIONS

Julius B. Horvay, and Robert J. Alvarez, both of Louisville, Ky., assignors to General Electric Company, Louisville, Ky.

Filed Dec. 22, 1975, Ser. No. 642,683

Int. Cl.² A47F *3/04;* **F25D** *11/02;* **F24F** *9/00*

U.S. Cl. 62—256 **7 Claims**



1. A household refrigerator of the side-by-side type comprising:
- a. a food compartment including a freezer portion and a fresh food portion, said compartment being defined by a solid insulated box having a solid insulated access door and constructed so that the interior thereof is physically isolated from ambient air when the door is closed;
- b. means for cooling said freezer portion; and
- c. means for passing a first substantially laminar stream of air through said compartment to form an invisible planar boundary between said portions, said means including:
  - a first air conduit extending substantially across one of the walls of said compartment to define an interface between the planar boundary and said one of the walls, said first air conduit having at least one opening for directing the first laminar stream of air across said compartment to an opposed wall of said compartment,
  - a first air-receiving element extending substantially across said opposed wall to define an interface between the planar boundary and said opposed wall, said first receiving element serving to receive said first laminar stream of air, and
  - means for recirculating air from said first receiving element to said first air conduit.

4,058,990

DEVICE FOR SUPPORTING THE DRIVE SHAFT OF AN AGRICULTURAL MACHINE FOR COUPLING TO A POWER TAKE-OFF SHAFT

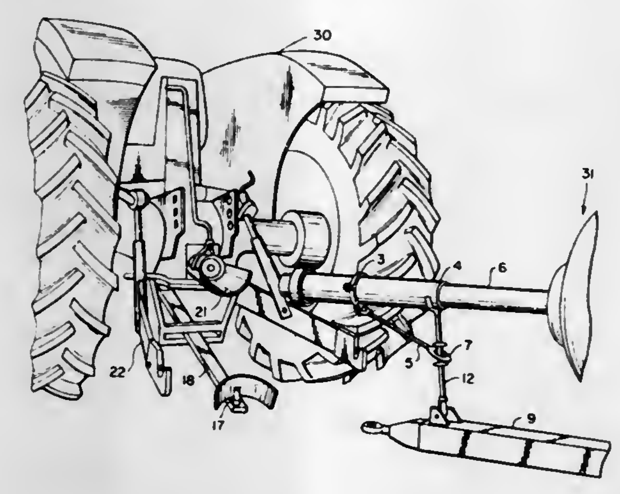
Wilhelm von Allwörden, Lohmar, Germany, assignor to Jean Walterscheid GmbH, Lohmar, Germany

Filed Aug. 26, 1976, Ser. No. 717,609

Claims priority, application Germany, Aug. 26, 1975, 2537841

Int. Cl. F16d *3/00*

U.S. Cl. 64—1 S **7 Claims**



1. A device for supporting the drive shaft of an agricultural machine for coupling to the power take-off shaft of a tractor comprising a drive shaft on an agricultural machine and a tubular casing enclosing said drive shaft, means on said drive shaft and a power take-off shaft of a tractor for aligning and coupling the shafts with respect to each other, a hitch bar on the agricultural machine, a strut having one end pivotally mounted on said hitch bar to pivot upon said hitch bar in the axial direction thereof, means on the other end of said strut for engaging and supporting the drive shaft, and a guide member having one end pivotally connected to said tubular casing and the other end pivotally connected to said strut.

4,058,991

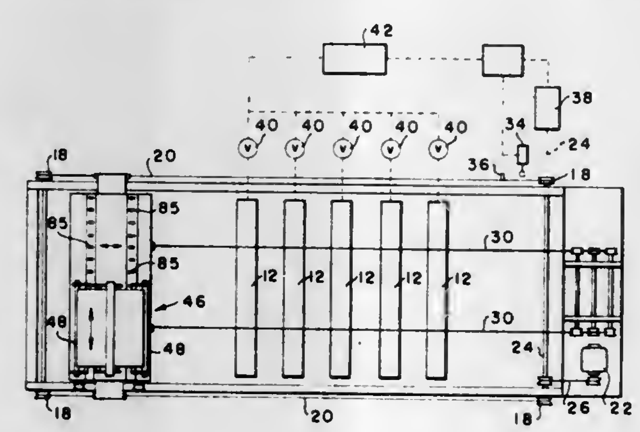
DYEING MACHINE

John K. McCollough, Spartanburg, S.C., assignor to Milliken Research Corporation, Spartanburg, S.C.

Filed Nov. 29, 1976, Ser. No. 745,657

Int. Cl.² D06B *1/02, 11/00*

U.S. Cl. 68—205 R **9 Claims**



1. Apparatus for applying dyestuff to a sample fabric to dye a portion of same comprising: a frame, a dye jet gun bar having a row of dye emitting orifices therein mounted transverse to said frame, means to supply liquid dyestuff to said dye emitting orifices to direct the dye downwardly in plural streams toward a fabric moved thereunder and a carrier means movably mounted in said frame under said gun bar adapted to support the sample fabric, said carrier means having a carrier member and a carrier carriage mounted thereon and movable transverse to said carrier member and means on said carrier carriage to position said carrier carriage on said carrier member.

4,058,992

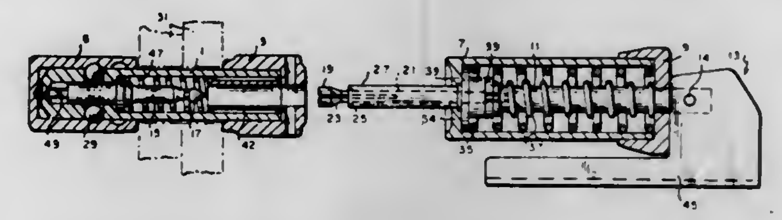
BARREL TYPE LOCK AND KEY

Anker J. Nielsen, Jr., 410 Bailey Road, Holden, Mass. 01520

Filed July 26, 1976, Ser. No. 708,837

Int. Cl.² E05B *67/36*

U.S. Cl. 70—34 **8 Claims**



1. The combination in a barrel type lock and key therefor of a lock barrel, locking elements protrudible laterally therefrom, a plunger therein for extruding such elements and having a knob on its end, a key having a relatively movable plunger to enter axially into the barrel, means on the latter plunger to make positive contracting gripping engagement with the knob on the plunger which extrudes the locking elements, and cam means for actuating the gripping plunger.

4,058,993

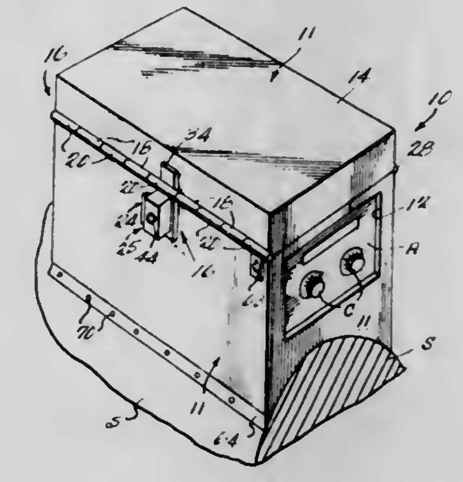
LOCK BOX

James H. Stubbings, Rockville, Md., assignor to Potomac Applied Mechanics, Inc., Bethesda, Md.

Filed Jan. 21, 1977, Ser. No. 760,955

Int. Cl.² E05B *73/00*

U.S. Cl. 70—58 **14 Claims**

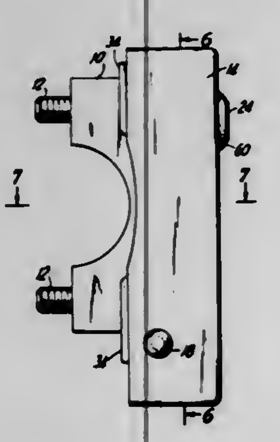


1. A theft-preventing container for an appliance comprising
- a. a metal box for receipt of an appliance therein, said box having (i) a plurality of walls, at least one wall having an access opening formed therein allowing access to controls of an appliance within said box, and (ii) one of said box walls being movable to allow removal of an appliance within the box from said box,
- b. means for latching said movable box wall to the rest of said box to prevent unauthorized movement of said movable box wall, said latching means comprising (i) a first plurality of spaced tubular members having aligned bores and extending from said movable wall, (ii) a second plurality of spaced tubular members having aligned bores and extending from a wall of said box distinct from said movable wall, said second plurality of tubular members being

spaced apart in a manner to receive said first plurality of spaced tubular members therebetween with bores of said first and second plurality of members aligned, (iii) a removable hardened metal latching bolt having cross-sectional dimensions generally corresponding in shape to the shape of said bores in said first and second plurality of spaced tubular members for receipt thereby to hold said first and second plurality of bores in alignment, and (iv) a locking means for holding said latching bolt in place received by said first and second plurality of tubular members to prevent relative movement between said tubular members, said locking means including a key-release means, and

c. means for attaching said box to a stationary support, having a larger area than said box, so that said box may not be removed from said support from a location exterior of said box except by destruction of said box or said support.

4,058,994
LOCKING DEVICE FOR SECURING AN OUTBOARD MOTOR TO A BOAT
Louis Coppola, 2023 Neptune Ave., Brooklyn, N.Y. 11224
Filed Dec. 31, 1975, Ser. No. 645,879
Int. Cl.² F16B *41/00*
U.S. Cl. 70—232 **3 Claims**



1. A locking device for locking an outboard motor against removal from a boat wherein the motor is secured to the boat by a clamp and bolts, the clamp having holes therein and the bolts having boltheads thereon whereby the bolts pass through the holes and into a mounting on the boat so that the boltheads firmly hold the clamp in place, said locking device comprising:

a casing having a rear wall, top and bottom walls, and two side walls, said rear wall having holes therein for alignment with the holes in the clamp and adapted to receive the bolts prior to their passing into the clamp such that said rear wall is secured in abutting relationship with the clamp and the boltheads are situated internally of said casing, said casing having a length greater than length of the clamp to substantially enclose the clamp;

a cover having a front wall, top and bottom walls, and two side walls to define an open box, said cover being larger than said casing to receive said casing in said cover, said rear wall of said casing being spaced from said front wall of said cover by said top, bottom and side walls of said casing in a closed position of said cover;

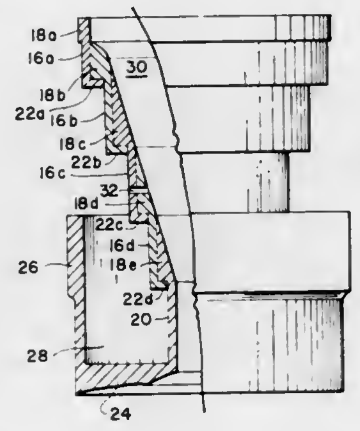
pin means disposed between said side walls of said casing and said cover for pivotally connecting said cover to said casing for moving said cover between said closed position and an opened position, the clamp and the boltheads being accessible when said cover is in said opened position, said pin means being located at end portions of said casing and said cover adjacent to said bottom walls of said casing and said cover;

said top wall of said cover closely fitting said top wall of said casing in said closed position, said bottom wall of said cover being spaced apart from said bottom wall of said casing in said closed position for permitting pivotal movement of said cover to said opened position;

a pair of aligned substantially identical longitudinal slots, one of said slots being provided in each of said side walls of said casing at an opposite end portion thereof remote from said pin means; and

locking means for securing said cover to said casing when said cover is in said closed position, said locking means including a rotatable bar for transversely extending through both of said slots to provide a locked position.

4,058,995
LOCK DE-ICER
Cecil Greaves, 168-42 127th Ave., Jamaica, N.Y. 11434
Filed Aug. 24, 1976, Ser. No. 717,036
Int. Cl.² E05B *17/00*
U.S. Cl. 70—431 **1 Claim**



1. A lock de-icer comprising:

a. a plurality of telescoping annular segments;

b. said segments, when extended forming a hollow generally conical channel;

c. one of the end segments of said plurality of annular segments having an outward directed flange of resilient material attached at the outer extremity thereof, said outward directed flange being deformable whereby it may be deformed to sealingly abut the curved surface of a vehicle surrounding the vehicle door lock;

d. an air release hole providing open communication for air from the inside to the outside of one of said telescoping annular segments;

e. an outer ring attached to the perimeter of said outward directed flange, said outer ring being coaxial with said one of the end segments and forming between itself and said one of the end segments an annular cavity in which all others of the telescoping annular segments may be contained;

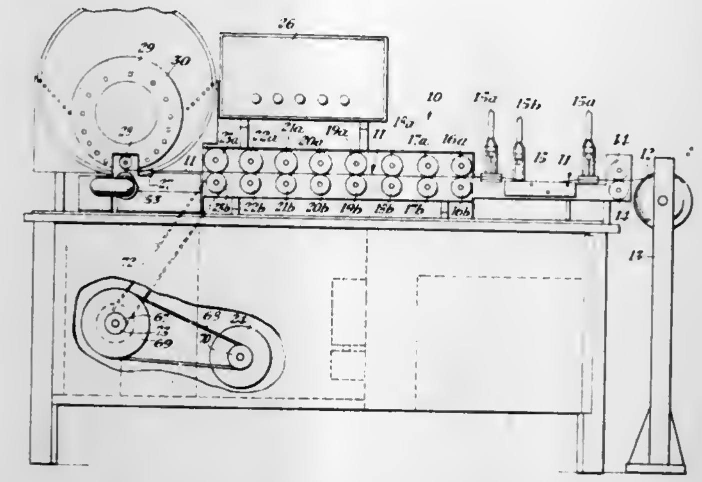
f. a cover adapted to sealingly fit over the end of said outer ring remote from said outward directed flange and to hold said all others of the telescoping annular segments within said annular cavity, and

g. said cover being flexiby hinged to said outer ring.

4,058,996
MACHINE FOR THE MANUFACTURE OF HELICALLY WOUND METAL DUCT OR PIPE
Claude W. Schaeffer, 461 Holly Lane, Plantation, Fla. 33317, and Martin T. Baker, 1507 SE. 14th St., Fort Lauderdale, Fla. 33316
Filed May 17, 1976, Ser. No. 687,309
Int. Cl.² B21C *37/12*
U.S. Cl. 72—49 **2 Claims**

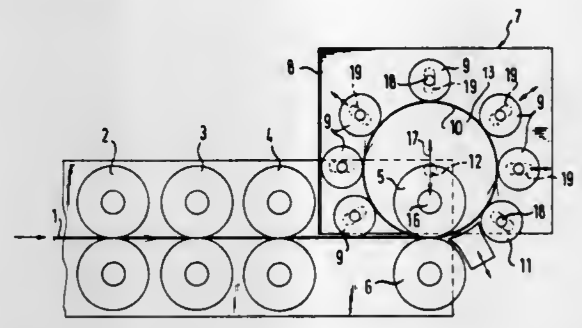
1. An apparatus for manufacturing bendable duct from a ductile strip wherein:

a plurality of strip guide rollers mounted upon a removeable plate disposed in a circular array define the diameter of the formed duct, and whereby duct of different diameters can be formed by interchanging said removeable plates with strip guide rollers having a grooved surface for receiving corrugations in the strip, the grooves in each roller being spaced relative to adjacent roller to guide said strip in a helical path and whereby all stages of fabrication are synchronously driven together from a common drive means, the improvement comprising a plurality of different increasing adjacent diameter pairs of strip corrugating roller dies mounted adjacent each other and being disposed in an array which receives a ductile strip for corrugating said strip longitudinally, said pairs of corrugating roller dies being synchronously drive at a constant angular rotational rate; and



means for overlapping and interlocking leading edge of said strip with the trailing edge of a formed duct including a strip edge tucking finger and a trailing edge tucking finger disposed adjacent each other, said strip edge tucking finger having a deforming wall disposed angularly with respect to said first edge to deform said strip edge at an angle relative to the strip edge plane and a vertical wall disposed below said deforming wall to provide a space between said deforming wall and the strip mounting surface, said overlapped and interlocked edges thereafter being compressed into a tight duct seam.

4,058,997
APPARATUS FOR MANUFACTURING TUBES
Emil Siegwart, 6 Michael Blatter Strasse, Sulzbach-Neuweiler, Germany
Continuation-in-part of Ser. No. 630,256, Nov. 10, 1975, abandoned. This application Apr. 4, 1977, Ser. No. 784,521
Claims priority, application Germany, Nov. 13, 1974, 2453876
Int. Cl.² B21C *37/12*
U.S. Cl. 72—50 **11 Claims**



2. In an apparatus for producing a tube from a continuous strip travelling at a first velocity by helically coiling said strip into a continuous plurality of convolutions comprising,

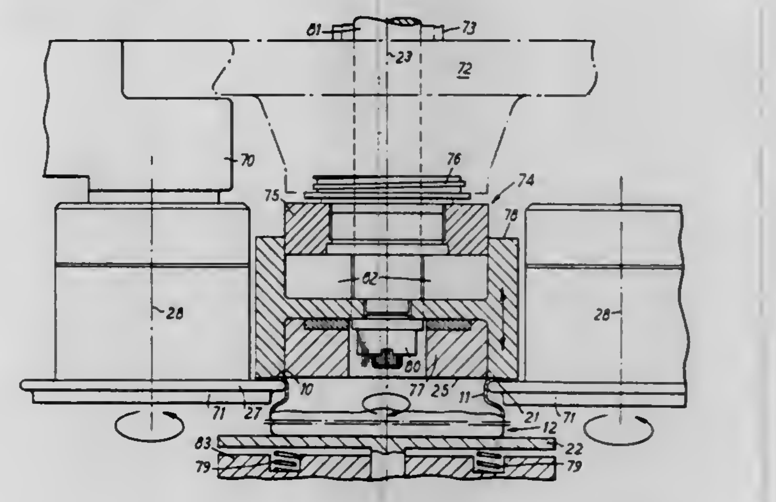
a. an apparatus body,

b. connecting means adapted to receive said continuous strip and join an edge portion thereof with an adjacent edge portion of a just formed convolution into a joint, said means including an inner and outer connecting roller rotatively carried by said body to intersect tangentially with an inner and outer peripheral surface of said tube, and

c. driving means connected to said connecting rollers to drive said rollers at peripheral velocities differing from said first velocity of said strip and a rotational velocity of said convolutions.

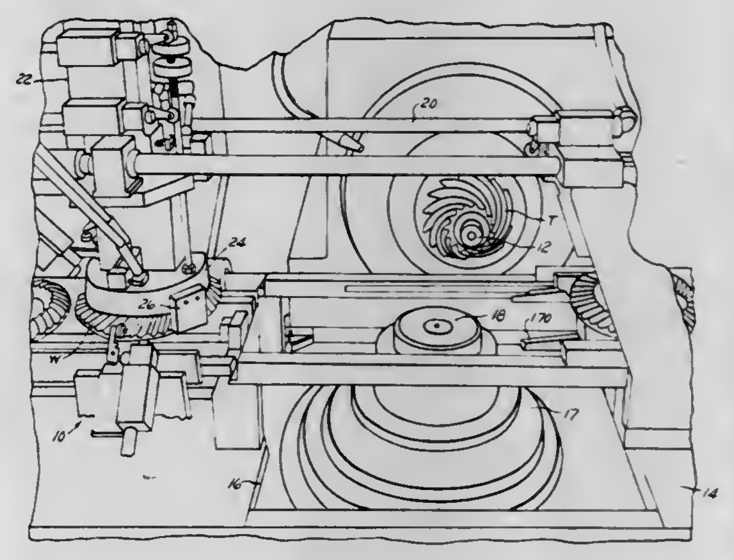
wherein characteristics of said joint are controlled in relation to a magnitude of said velocity differences.

4,058,998
CONTAINERS
Jozef Tadeusz Franek, Chorleywood, and Peter Henry Doncaster, Harrow, both of England, assignors to Metal Box Limited, England
Filed Aug. 31, 1976, Ser. No. 719,251
Int. Cl.² B21D *19/06*
U.S. Cl. 72—84 **19 Claims**



1. A method of forming a cylindrical metal can body of the type having an open end with a peripheral end flange about the open end of the can body and a neck portion of reduced diameter merging with said flange, said method comprising the steps of supporting the can body in axial compression and then while so holding the can body in axial compression applying a radial force inwardly on the can body deforming the can body radially inwardly adjacent the can body open end to thereby simultaneously inwardly neck the can body and axially shorten the can body.

4,058,999
GEAR ROLLING EQUIPMENT
Leonard A. Gabriele, Warren, Mich., assignor to Lear Siegler, Inc., Santa Monica, Calif.
Filed Feb. 9, 1976, Ser. No. 656,255
Int. Cl.² B21D *43/00*
U.S. Cl. 72—102 **44 Claims**

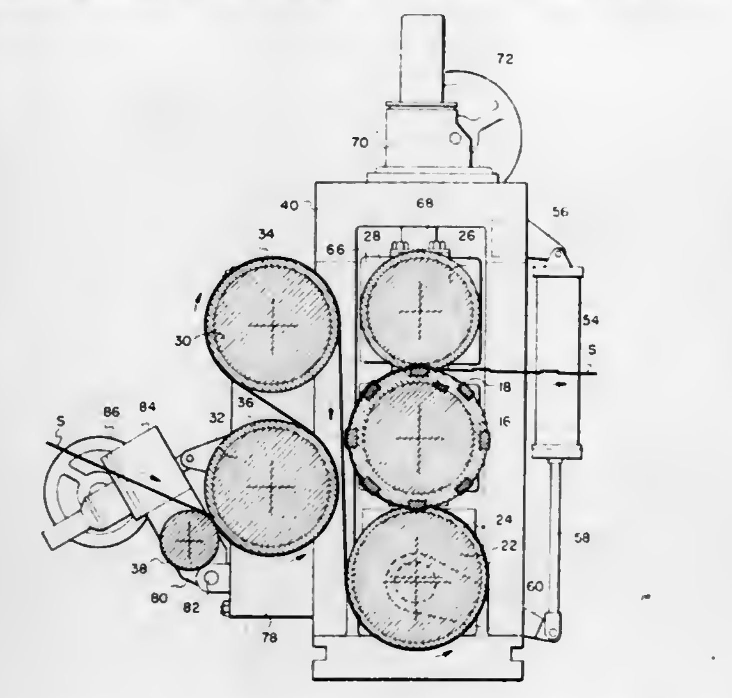


1. Apparatus for roll finishing an annular toothed work gear having an axis of rotation and a central opening coaxial therewith by rolling in tight mesh with a toothed tool gear conjugate to the work gear, which apparatus comprises

a rotary tool spindle having an axis of rotation and means on said tool spindle for mounting a tool gear thereon in fixed angular position relative to said tool spindle,
mounting means for said tool spindle mounting said tool spindle for rotation about its axis while maintaining the direction of its axis fixed in space,
selectively operable means for fixing said tool spindle against rotation relative to its mounting means in a predetermined angular position,
a rotary work spindle having an axis of rotation and a work support portion having a part receivable in the central opening of a work gear and adapted to retain a work gear against rotation on said work spindle and to sustain forces developed by rolling the work gear and tool gear in tight mesh under high pressure,
mounting means for said work spindle mounting said work spindle for rotation about its axis while maintaining the direction of its axis fixed in space,
the direction of the axis of said work spindle being related to the direction of the axis of said tool spindle such that upon relative movement between said work and tool spindle mounting means resulting in direct approach without rotation between a tool gear and work gear carried respectively by said tool and work spindles, the gears may move into a fully meshed relation,
selectively operable means for fixing said work spindle relative to its mounting means against rotation in a random angular position in loading position,
means for locating successive work gears in spaced relation to the work support portion of said work spindle while said work spindle is in loading position, and with the axes of rotation of each work gear in alignment with the axis of rotation of said work spindle and in a predetermined angular rotational position such that the teeth of the work gear and tool gear will mesh upon direct approach therebetween,
means for effecting relative movement between a work gear and said work spindle while maintaining both said work spindle and the work gear against rotation about their axes to position the work gear on said work spindle in the aforesaid angular rotational position,
selectively operable means for fixing the work gear on said work spindle against rotation thereon to maintain its predetermined angular position,
means for effecting relative movement between said work and tool spindle mounting means while both of said spindles are maintained against rotation to cause direct approach between the work and tool gears to bring the gears into tight mesh,
means for thereafter releasing both of said spindles for rotation,
the means for effecting relative movement between said work and tool spindle mounting means being operable to provide additional relative movement therebetween to establish rolling pressure between the teeth of the gears, and means for driving one of said spindles in rotation.

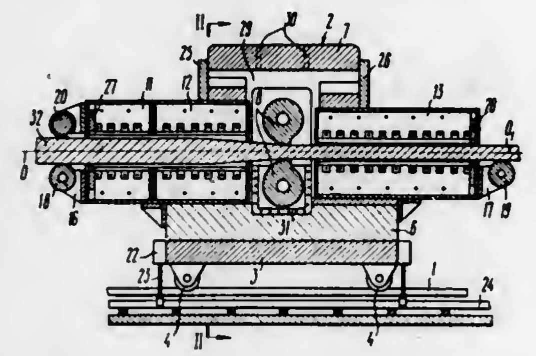
4,059,000
ROTARY EMBOSSER AND PROCESS OF EMBOSSING STRIP SHEET METAL
Ernest Robert Bodnar, R.R. 1, Kingsworth Road, Kingcross Estates, King City, Ontario, Canada
Filed Aug. 25, 1976, Ser. No. 717,659
Claims priority, application Canada, Aug. 29, 1975, 234609
Int. Cl.² B21D *22/08*
U.S. Cl. 72—197 **13 Claims**

1. Apparatus for the continuous formation of transverse indentations in strip sheet material, such as strip sheet steel or the like said apparatus comprising;
male die roll means having a plurality of transverse upstanding male die formations thereon and adapted to be driven at a predetermined speed;
a first female roll member engaging said male die roll means under pressure and having a resilient surface deformable by indentation of said male die formations of said male die roll means into said resilient surface, said strip material passing between said male die roll means and said first female roll member and being thereby indented into said resilient surface;
a second female roll member having a resilient surface which is in pressurized contact with said male die roll means at a point thereon spaced from said first female roll member downstream with respect thereto, said resilient surface being deformed by pressure between said second female



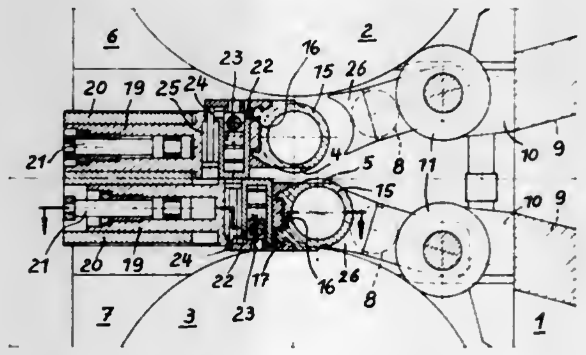
roll member and said male die roll means, and said strip material passing therebetween, said resilient surface applying pressure to said strip material, thereby holding the strip material in position against said male die roll means, around a predetermined arc thereof, and maintain said male die formations in contact therewith all around said arc, and,
upstream tension roll means for engaging said strip material prior to passage between said male die roll means and said first female roll member.

4,059,001
MILL FOR ROLLING CONTINUOUSLY CAST INGOT
Evgeny Alexeevich Korshunov, pereulok Otdelny, 5a, kv. 29, Sverdlovsk, U.S.S.R.
Filed Oct. 7, 1976, Ser. No. 730,648
Claims priority, application U.S.S.R., Oct. 15, 1975, 2177701; Oct. 15, 1975, 2177702
Int. Cl.² B21B *31/00, 35/00*
U.S. Cl. 72—214 **4 Claims**



1. A mill for rolling a continuously cast ingot, said mill rolling a casting intermittently, said mill having a movable mill stand set up on a stage and travelling along slideways mounted on a foundation, said mill stand comprising: a bottom-mill separator installed on said stage; two housings, each of which incorporating braces, said housing being fastened on said bottom-mill separator; a top-mill separator holding said housings together; grooved mill rolls disposed intermediate of said housings and having roll necks mounted in chock bearings, said chock bearings being located in apertures of said housings; hydraulic drives connected to the necks of said grooved rolls; gear wheels meshed with each other and connected to the necks of said grooved rolls; and at least two pairs of inductors mounted between the braces of said housings on said bottom-mill separator of said mill stand, said inductors being arranged such that in each pair one inductor is above and the other inductor is below the casting being rolled, the inductors being on both sides of said mill rolls, said pair of inductors inducing in said casting to be rolled inductive currents, which heat said casting being rolled, and electromagnetic forces, which create in said inductors pulling and pushing forces which are applied to said mill stand.

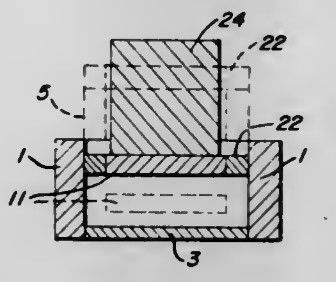
4,059,002
MULTI-ROLL ROLLING MILL STAND
Hans Rommen, and Erich Stoy, both of Dusseldorf, Germany, assignors to Schloemann- Siemag Aktiengesellschaft, Dusseldorf, Germany
Filed Oct. 20, 1976, Ser. No. 734,040
Int. Cl.² B21B *13/02, 31/08*
U.S. Cl. 72—238 **6 Claims**



1. A multi-roll rolling mill stand comprising:
a housing;
two driven back-up rolls;
two work rolls each driven by frictional engagement with a respective one of the back-up rolls and which are offset from the perpendicular axial plane of the back-up rolls;
a roll gap formed between the work rolls;
bearings mounting the ends of the work rolls;
intermediate rolls and support rollers supporting the work rolls on one side of the work roll gap;
thrust devices supporting the work roll bearings on the other side of the roll gap; and
a sliding guide arrangement by means of which the bearings are connected to the thrust devices so that the work roll bearings can slide both vertically relative to the back-up rolls and horizontally parallel to the back-up roll axes and so that the work rolls can be moved horizontally by the thrust devices towards and away from the intermediate rolls.

4,059,003
PROCESS FOR PRODUCING HEAVY-DUTY HIGH-PRESSURE FERROUS METAL CUP-SHAPED PRODUCTS HAVING A CYLINDRICAL BARREL
Charles H. Moore, 645 Matanzas Court, Fort Myers Beach, Fla. 33931
Continuation-in-part of Ser. No. 519,044, Oct. 29, 1974, abandoned. This application Dec. 29, 1975, Ser. No. 644,862
Int. Cl.² B21C *23/18, 23/20*
U.S. Cl. 72—256 **1 Claim**

1. The process of forging a large heavy-duty, seamless high-pressure resistant, self-reinforcing cup-shaped ferrous-metal product with a cylindrical barrel of substantial wall-thickness, in a forging press possessing the usual lower stationary element and the usual upper vertically movable element, said process including
a. placing on the lower stationary element of the forging press a vertically disposed cylindrical female forging die member having a closed bottom,
b. placing within the vertically disposed cylindrical female forging die member a steel billet heated to forging temperature,
c. placing on top of the heated steel billet an annular billet-contacting metal-working and metal-displacing ring having an external diameter which is slightly less than the diameter of the bore of the cylindrical female forging die member,
d. positioning within the open center of the annular billet-contacting metal-working and metal-displacing ring a billet-contacting metal-working and metal-displacing metallic disc which is fairly closely fitting and of substantially the same thickness as that of the annular billet-contacting metal-working and metal-displacing ring,
e. disposing atop the annular billet-contacting metal-working and metal-displacing ring and the billet-contacting metal-working and metal-displacing metallic disc a round forging press follower of a diameter which is less than the diameter of the die cavity of the cylindrical female forging die member but sufficient to cover both the billet-contacting metal-working and metal-displacing disc and most of the billet-contacting metal-working and metal-displacing annular ring,
f. moving the upper and vertically movable element of the forging press downwardly to thereby press the round forging press follower onto the round billet-contacting



metal-working and metal-displacing metallic disc and the billet-contacting metal-working and metal-displacing annular ring and, through said metallic disc and said annular ring, exert forging pressure onto the top of the heated billet, whereby the billet spreads out until the outer periphery thereof makes contact with the inner surface of the die cavity of the cylindrical female forging die member,
g. arresting the downward movement of the upper and vertically movable element of the forging press when the immediately aforementioned condition takes place,
h. removing the aforementioned round forging press follower and replacing it with a second round forging press follower having a diameter that is less than that of the billet-contacting metal-working and metal-displacing disc and which is concentric therewith,
i. applying pressure through the upper and vertically movable element of the forging press to the top of the second-named round forging press follower, whereupon the latter depresses the billet-contacting metal-working and metal-displacing metallic disc, and the metal of the heated billet is caused to move upwardly into the space between the periphery of the billet-contacting metal-working and metal-displacing metallic disc and the inner surface of the die cavity of the cylindrical forging die member during which the billet-contacting annular metal-working and metal-displacing annular ring moves upwardly on top of the back-extruded metal,
j. continuing the immediately aforementioned movements until the metal of the heated work-piece below the billet-contacting metal-working and metal-displacing metallic

disc is no less than approximately three inches thick and at which time the bottom of the round metal-working and metal-displacing disc will have become welded to the metal of the highly heated billet with which it is in contact,

k. removing the billet-contacting metal-working and metal-displacing annular ring from the top of the back-extruded work-piece formed of said heated billet and,

l. removing the work-piece formed from the vertically disposed cylindrical female forging die member.

4,059,004

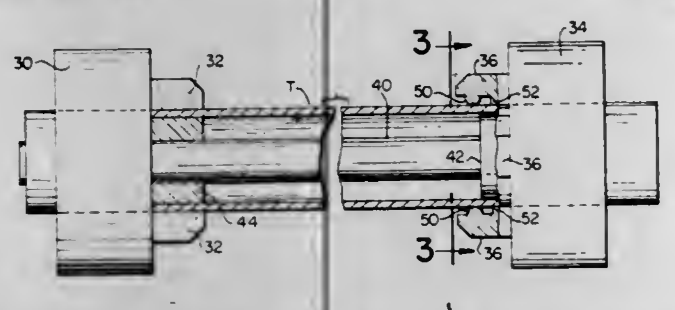
METHOD OF FORMING HELICALLY CORRUGATED TUBING

Robert W. Perkins, Hamden, Conn., assignor to Spiral Tubing Corporation, New Britain, Conn.

Filed Feb. 20, 1976, Ser. No. 659,845

Int. Cl.² B21D *11/14*

U.S. Cl. 72—299 17 Claims



1. A method of helically corrugating a section of deformable tube comprising the steps of:

providing a section of deformable tube having a cylindrical wall without deformations between the axial tube ends;

twisting one axial end of the tube section about the tube axis relative to the other axial end of the section;

generating localized pressure radially of the cylindrical wall at areas of the wall which are unsupported and which are distributed around the otherwise cylindrical tube while twisting the one axial end of the tube section relative to the other axial end to reduce the resistance to torsion and initiate radial deformation of the tube wall at the pressurized areas in conjunction with the step of twisting; and

controlling the axial length of the tube section during the step of twisting to cause the radial deformations to grow from the pressurized areas axially along a selected helical path in the cylindrical tube wall.

4,059,005

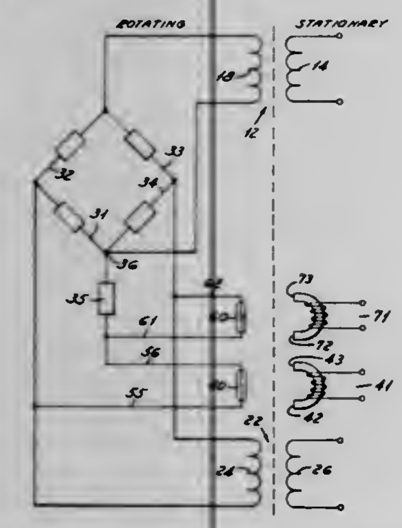
ROTARY TRANSFORMER SHUNT CALIBRATION

Albert E. Brendel, Lake Orion, and Myron P. Sedman, Troy, both of Mich., assignors to Lebow Associates, Inc., Troy, Mich.

Filed June 24, 1976, Ser. No. 699,553

Int. Cl.² G01L *25/00*

U.S. Cl. 73—1 B 7 Claims



1. In a rotary transformer transducer system or the like including a rotatable shaft having a transducer and a rotor member each secured thereto for rotation therewith and a stationary member including a stator member, said rotor member and said stator member for coupling electrical energy therebetween without physical contact, the improvement of a selectively operable shunt calibration system comprising:

impedance means secured to said rotatable shaft for rotation therewith;

magnetically actuated switch means mounted on said rotatable shaft for rotation therewith, said magnetically actuated switch means operable for coupling said impedance means across at least a first part of said transducer; and

switch actuating means including at least one magnet mounted on said stationary member for operating said magnetically actuated switch means, said actuating means being free of physical contact with said switch means.

4,059,006

LIQUID QUALITY-EVALUATING APPARATUS

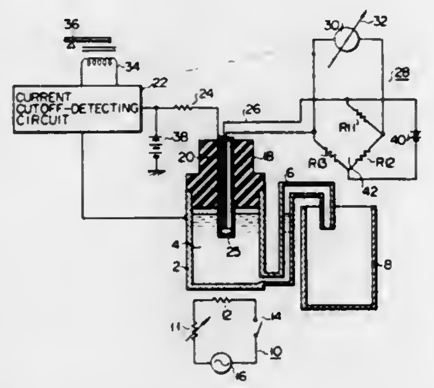
Masumi Mizutani, Gifu; Hiromichi Hata, and Masasuke Shimazaki, both of Yokohama, all of Japan, assignors to Showa Industries Co., Ltd., Gifu; Fujisoku Electric Co., Ltd., Kawasaki and Kitoku Co., Ltd., Tokyo, all of, Japan

Filed Dec. 16, 1976, Ser. No. 751,040

Claims priority, application Japan, Dec. 22, 1975, 50-171939[U]; Dec. 22, 1975, 50-171940[U]

Int. Cl.² G01N *25/08*

U.S. Cl. 73—17 A 9 Claims



1. A liquid quality-evaluating apparatus for determining the boiling point or vapor lock point of a liquid, comprising:

a vessel made of heat-conductive and electrically conductive material and having an opening to receive a prescribed amount of a sample liquid whose boiling point or vapor lock point is to be determined;

a discharge siphon, one end of which is disposed at the bottom of the vessel for communication with the liquid in the vessel and the other end of which extends outside of the vessel, for removing the liquid from the vessel after its quality has been evaluated;

a removable cover made of heat-insulating material to substantially airtightly close the opening of the vessel;

heating means for heating the vessel and the liquid in the vessel;

an electrode, one end of which is removably received in the vessel for contact with the sample liquid whose boiling point is to be determined and the other end of which is fixed to the removable cover;

a current cutoff-detecting circuit including at least the electrode, the vessel and the sample liquid received in the vessel to form a closed electrical circuit and adapted to issue an output signal when the sample liquid ceases to contact the electrode, thereby detecting a predetermined level of the liquid in the vessel;

means for detecting the temperature of the sample liquid in the vessel and for generating electrical signals corresponding to the detected temperature; and

display means coupled to the temperature detecting means for indicating in response to said electrical signals whether the sample liquid in the vessel has a higher or lower boiling point than a reference temperature.

4,059,007

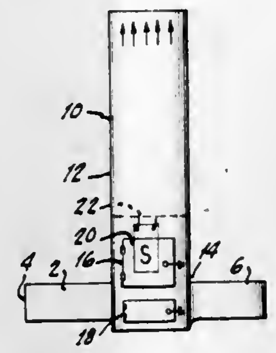
CONVECTIVE AIR FLOW DYNAMIC CALORIMETER

Bernard Miller, Princeton, N.J.; J. Ronald Martin, Easton; Charles H. Meiser, Jr., Yardley, both of Pa.; Harold W. Lambert, Pennington, and Harry Buvel, Trenton, both of N.J., assignors to Textile Research Institute, Princeton, N.J.

Filed Feb. 11, 1977, Ser. No. 767,730

Int. Cl.² G01K *17/00*

U.S. Cl. 73—190 R 12 Claims



1. A convective air flow dynamic calorimeter, for measuring the heat emission of a burning sample, comprising:

a. a combustion chamber for holding therein a sample to be tested for burning characteristics thereof;

b. an air inlet opening positioned at the external ambient environment;

c. an air inlet duct extending to said combustion chamber from said air inlet opening to provide a supply of air to said combustion chamber;

d. air outlet means extending from said combustion chamber to provide a path of exhaust therefrom; and

e. anemometer sensing means positioned between said air inlet opening and the location of the test sample in said combustion chamber to sense the air flow therethrough said flowrate being a measure of the heat emission of the burning sample.

4,059,008

METHOD AND DEVICE FOR PORE PRESSURE SOUNDING

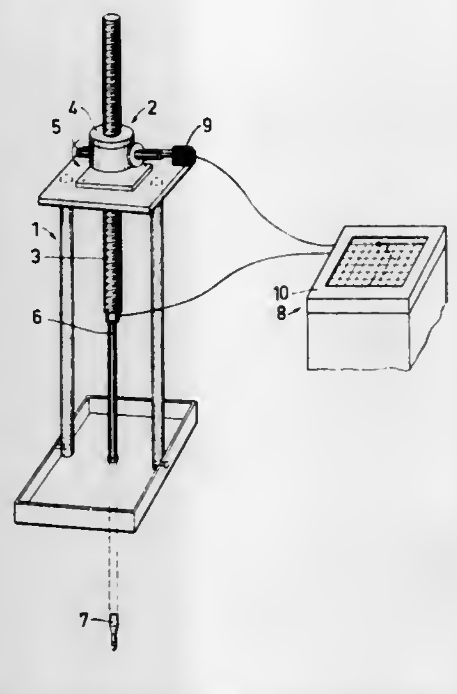
Bengt-Arne Torstensson, 34 Hojdvagen, Vallentuna, Sweden (S-186 00)

Filed May 28, 1976, Ser. No. 691,104

Claims priority, application Sweden, May 30, 1975, 7506205

Int. Cl.² G01N *3/00*

U.S. Cl. 73—38 5 Claims



1. A method of determining the characteristics of succesive layers of soil using a sounding probe of the type having a pressure transducer, a filter separating the transducer from soil layers surrounding the sounding probe and means for monitoring the output of the pressure transducer, comprising the steps of: driving said sound probe through a body of soil at a speed sufficient to produce transient variations in the transducer output corresponding to transient variations in the generated pore pressure of the soil encountered by the probe during movement; simultaneously with said driving, recording the output of said pressure transducer as a function of the depth of said sounding probe in said soil.

4,059,009

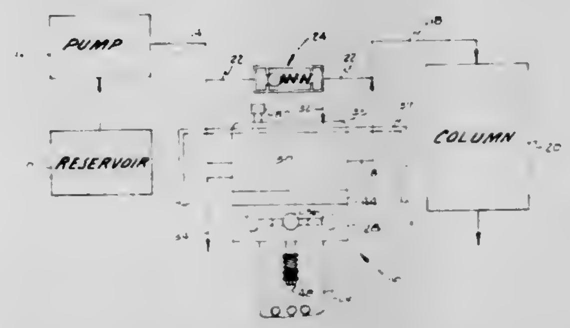
LIQUID CHROMATOGRAPHY SYSTEM

Dean M. Ball, Norcross, and Warren P. Hendrix, Lawrenceville, both of Ga., assignors to Micromeritics Instrument Corporation, Norcross, Ga.

Filed Sept. 10, 1976, Ser. No. 722,163

Int. Cl.² G01N *31/08*

U.S. Cl. 73—61.1 C 9 Claims



1. In liquid chromatography apparatus for analyzing liquid samples including a liquid-separation column, pump means and conduit means for continuously delivering a carrier liquid to said column under a predetermined high pressure, and means positioned in said conduit means between said pump means and column for introducing a predetermined amount of liquid sample into the pressurized carrier liquid for passage into the column; the improvement wherein said sample introducing means comprises means for storing a determined amount of liquid sample; a sample injection valve connected to said sample storing means and to said conduit means and including means positionable for alternatively communicating (1) said storing means with a source of liquid sample and a discharge to waste, (2) said pump means with said column through said sample storing means, and (3) said pump means to a discharge to waste through said sample storing means; and pressure-actuated means positioned in said conduit means in parallel with said sample injection valve for passing carrier liquid directly from said pump means to said column only upon a predetermined small pressure increase above said predetermined high pressure occurring in said conduit means upstream of said pressure-actuated valve to thereby maintain substantially constant high pressure flow of carrier liquid to said column..

4,059,010

ULTRASONIC INSPECTION AND DIAGNOSIS SYSTEM

Thomas D. Sachs, 34 S. Williams St., Burlington, Vt. 05401

Continuation-in-part of Ser. No. 402,163, Oct. 1, 1973, which is a continuation-in-part of Ser. No. 185,306, Sept. 30, 1971, Pat. No. 3,771,355. This application June 23, 1975, Ser. No. 589,031

The portion of the term of this patent subsequent to Nov. 13, 1990, has been disclaimed.

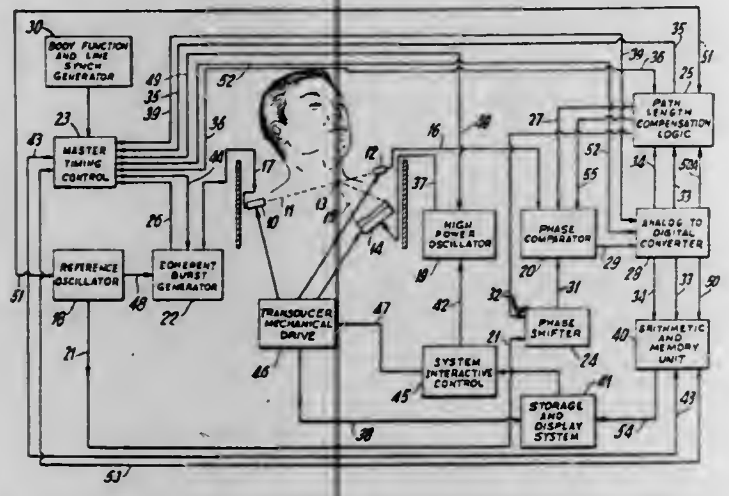
Int. Cl.² G01N *29/04*

U.S. Cl. 73—596 8 Claims

1. A system for ultrasonic inspection of non-moving substance such as a log, said system including

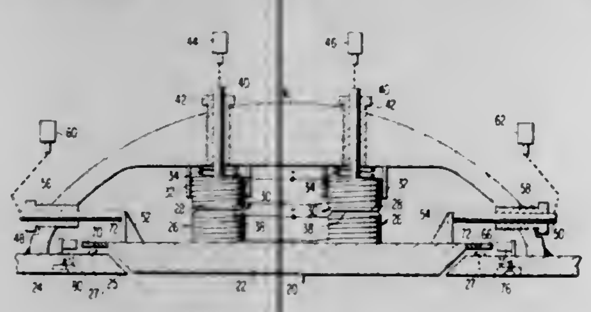
means to produce a collimated ultrasonic sensing beam directed through said substance, said sensing beam means including an ultrasonic transmitting transducer to produce said collimated beam, an oscillator which is a reference source of continuous waves of ultrasonic frequency, and gating means connected between said source and said

beam transmitting transducer to produce coherent bursts of oscillations which are discrete trains of oscillations at ultrasonic frequency to be fed to said beam transmitting transducer from said oscillator,
an ultrasonic receiving transducer positioned to receive said sensing beam,
a phase comparison means connected to said receiving transducer and to said reference oscillator to respond to phase changes in the sensing beam caused by transmission through said substance,



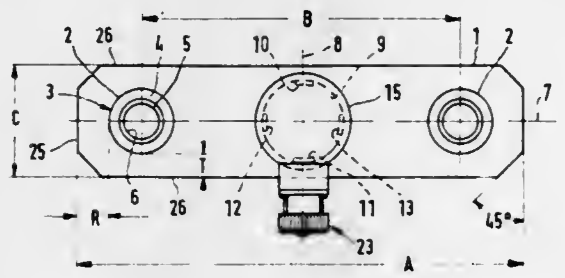
a second ultrasonic transmitting transducer and a second oscillator connected to said second ultrasonic transmitting transducer, said second transmitting transducer positioned to heat said substance along the path of said sensing beam through said substance; and
timing means to control said sensing beam means and said second transmitting transducer so that they are activated in sequence and not simultaneously to compare the phase changes in the sensing beam through said substance before and after said ultrasonic heating.

4,059,011
METHOD AND FORCE DETERMINING APPARATUS FOR ICE BREAKING VESSELS
Joseph M. Reiss, 1757 Harvard St., NW., Washington, D.C. 20009
Filed Aug. 18, 1975, Ser. No. 605,552
Int. Cl.² G01L *5/16;* **G01N** *19/02*
U.S. Cl. 73—133 R **18 Claims**



1. Apparatus for providing data related to frictional forces experienced on the hull of a vessel as the vessel passes through ice comprising:
a generally planar plate;
means for suspending said plate in an aperture in the hull of the vessel generally flush therewith and at a location on the hull which contacts the ice through which the vessel passes, said plate being maintained at a reference position by said suspending means in the absence of forces applied to said plate and being displaceable from said reference position generally in the plane of the hull in response to the application of forces to said plate; and,
means responsive to displacement of said plate for generating a signal related to the displacement of said plate from said reference position, wherein said plate suspending means comprises:
first and second electromagnets carried by the hull of the vessel and having pole faces of one magnetic polarity facing outboard of the hull of the vessel; and,
third and fourth electromagnets having pole faces of a polarity opposite said one polarity, said third and fourth electromagnets being secured to said plate with the pole faces thereof aligned with and in contact with the pole faces of said first and second electromagnets, said plate thereby being movably suspended by magnetic attraction between the pole faces of said electromagnets.

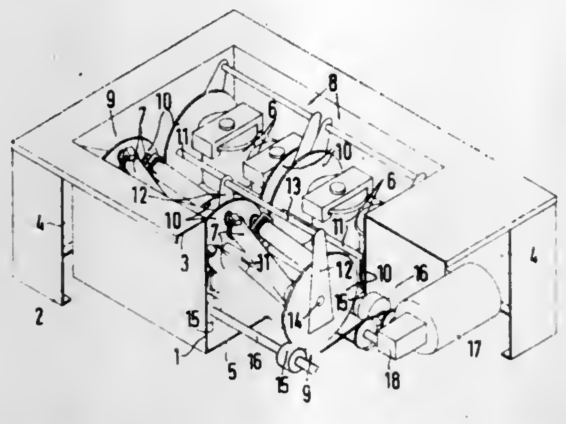
4,059,012
FORCE SENSING DEVICE
Ludwig Pietzsch, and Knud Overlach, both of Karlsruhe, Germany, assignors to Dr. -Ing. Ludwig Pietzsch, Ettlingen, Germany
Filed Sept. 21, 1976, Ser. No. 725,347
Claims priority, application Germany, Apr. 27, 1976, 2618359
Int. Cl.² B01L *1/22*
U.S. Cl. 73—141 A **11 Claims**



1. A force sensing device, which is to be inserted in a force transmitting structural member like a rope and is itself designed as a force transmitting member, the device comprising a flat body having between two connection openings at opposed ends of the body a central through hole of greater diameter than the connection openings, said through hole being closed at both ends and having fixed on its inner wall at least one strain measuring element, wherein
the flat body has a constant small thickness over its total length and a constant width at least in the body portion extending along the distance of the centers of the connection openings,
the diameter of the central through hole and thickness and width of the flat body are dimensioned such that the stress produced by nominal load at the weakest section of the body between the control hole and the longitudinal rim is lower than the proportional limit and amounts at most to $\frac{1}{3}$ of the yield stress of the body material, and
spherical bearings are inserted in the connection openings, said bearings accomodating usual connection elements like shackles or the like for connecting the sensing device to the structural member.

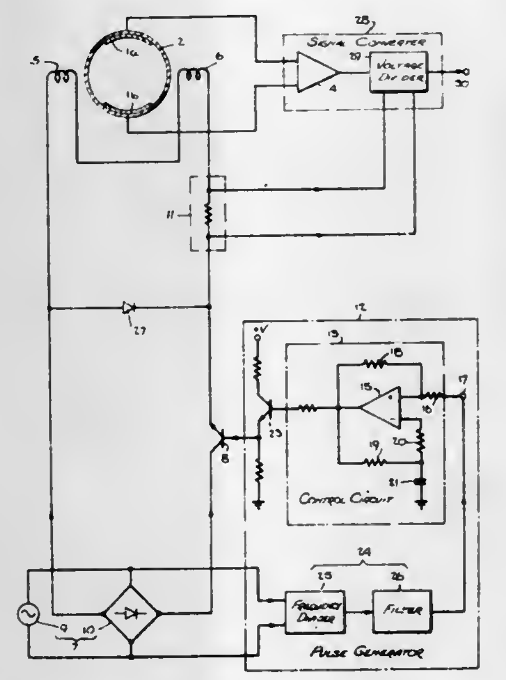
4,059,013
LABORATORY TEST DEVICE FOR TEXTILE SAMPLES
Roland Dietrich, Liestal, Switzerland, assignor to Ahiba AG, Switzerland
Filed Sept. 3, 1976, Ser. No. 720,477
Claims priority, application Switzerland, Sept. 5, 1975, 11512/75
Int. Cl.² B01F *8/10;* **D06B** *5/22*
U.S. Cl. 73—159 **2 Claims**

1. In a laboratory test device for textile samples in a testing liquid of the type for carrying out reproducible fastness tests and dyeing tests, having a tank for accommodating a heating liquid and a plurality of liquid impermeable test containers for holding the textile samples, said containers are detachably secured to at least one support member and are movably disposed in the heating liquid whereby the test containers are continuously tumbled within the heating liquid, wherein the improvement comprises the test containers being attached in groups to the support member which includes two parallel, coaxial drive wheels of the same diameter positioned a certain distance apart and means for rigidly linking the two drive wheels to each other, driving means cooperating with said support member being located in the tank, said driving means



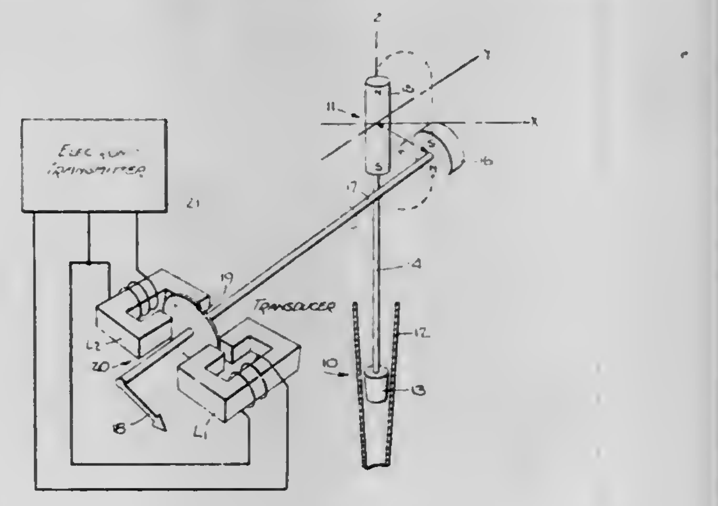
including at least one pair of horizontal, parallel shafts which are simultaneously driven to rotate at the same speed and which have a plurality of roll bodies disposed thereon, the peripheries of which rotate at the same speed, and the outer surfaces of said roll bodies being positioned on said at least one pair of shafts to engage the perpheries of said drive wheels.

4,059,014
ELECTROMAGNETIC FLOWMETER
Takashi Torimaru, Musashino, Japan, assignor to Hokushin Electric Works, Ltd., Tokyo, Japan
Filed Nov. 18, 1976, Ser. No. 742,831
Claims priority, application Japan, Nov. 28, 1975, 50-142605
Int. Cl.² G01F *1/60*
U.S. Cl. 73—194 EM **7 Claims**



1. In an electromagnetic flowmeter comprising:
A. a flow tube through which a fluid to be metered is conducted to intersect a magnetic field therein which is transverse to the direction of flow and is produced by an electromagnet having excitation coils;
B. a pair of electrodes mounted at diametrically-opposed positions in said tube, said electrodes each having a relatively large surface area whereby the electromotive force induced in the fluid intersecting the field and detected by the electrodes is averaged to minimize the effect of a non-uniform flow velocity on the accuracy of the meter; and
C. an excitation system for supply current to said coils, said system being constituted by:
a. a power source energized by a commercial a-c power line having a predetermined frequency and providing a direct voltage;
b. electronic switching means interposed between said direct voltage source and said coils;
c. control means to effect an on-off operation of said switching means at a pulse rate which is higher than the frequency of said a-c line; and
d. means gradually changing the duty cycle of said control means at a low-frequency rate which is less than said line frequency.

4,059,015
ANGLE-TO-CURRENT CONVERTER
Toshio Satori, Yokohama, Japan, assignor to Fischer & Porter Co., Warminster, Pa.
Filed Oct. 5, 1976, Ser. No. 729,822
Int. Cl.² G01F *1/24;* **G08C** *19/08*
U.S. Cl. 73—209 **6 Claims**

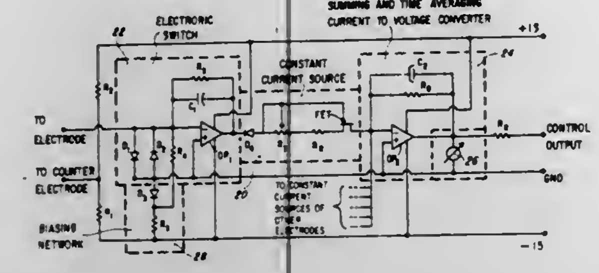


1. An angle-to-current converter for generating an electrical current in direct proportion to the degree of angular displacement of an input shaft, said converter comprising:
A. a differential-inductance transducer constituted by a pair of inductors, each having a core defining an air gap, and variable permeability disc means mounted on said input shaft and so cooperating with said air gaps as to increase the region of the disc means lying within one gap with a change in angle as the region lying within the other gap decreases, said disc means being constituted by an edge-contoured disc, said air gaps being diametrically-opposed with respect to the edge of said disc, whereby the inductance ratio of said inductance pair varies in accordance with said angular displacement; and
B. a transmitter coupled to said pair of inductors and responsive to said varying inductance ratio to generate a corresponding current.

4,059,016
FROTH LEVEL MONITOR
Frank Kitzinger, Montreal, and Frank Rosenblum, Ville St. Laurent, both of Canada, assignors to Noranda Mines Limited, Toronto, Canada
Filed Sept. 9, 1976, Ser. No. 721,770
Claims priority, application Canada, May 6, 1976, 251933
Int. Cl.² G01F *23/24*
U.S. Cl. 73—304 R **7 Claims**

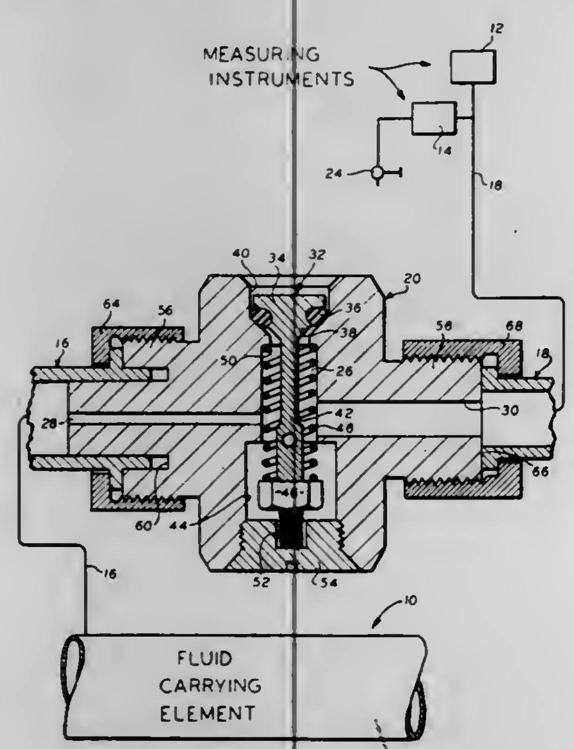
1. A froth level monitor comprising:
a. a plurality of electrically conductive electrodes spaced in the vertical direction and adapted to contact the top of the froth in sequence as the level of the froth rises;
b. a constant current source connected to each electrode and capable of generating a constant current when its associated electrode is in contact with the froth; and
c. a summing and time averaging current to voltage converter connected to the outputs of all said constant current sources for summing up the currents as an indication of

the total number of electrodes in contact with the froth and for averaging with respect to time the current varia-



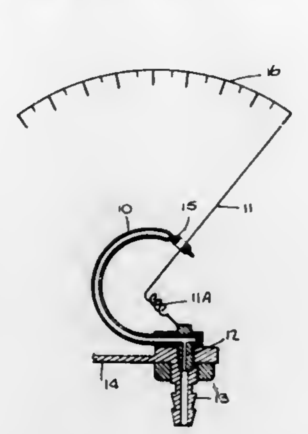
tions so as to provide an indication of the mean level of the froth.

4,059,017
DETECTING APPARATUS WITH EXCESS PRESSURE PROTECTORS
Bernard W. Settlemyer, Longmont; Clifford W. Knappenberger, Broomfield, and Alfred Bader, Boulder, all of Colo., assignors to General Cable Corporation, Greenwich, Conn.
Filed July 2, 1976, Ser. No. 702,061
Int. Cl.² F16K *17/02*
U.S. Cl. 73—395 **13 Claims**



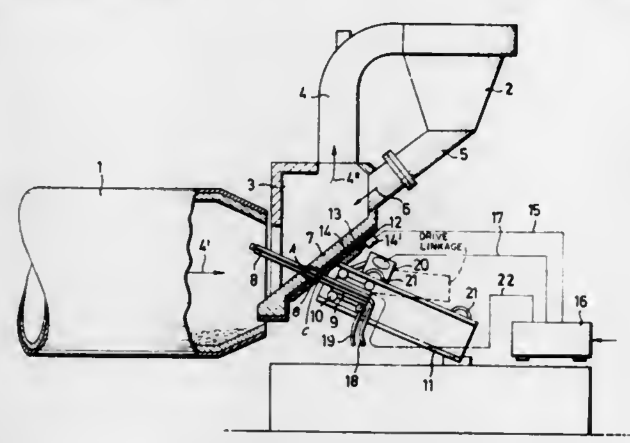
1. Apparatus for detecting characteristics of a fluid, including in combination, an element in which the fluid is contained under pressure, a detector for sensing a particular characteristic of the fluid, a passage leading from said element and another passage leading to said detector, means for protecting the detector from excess pressure in said element in which the fluid is contained, said means comprising a pressure relief valve including a housing enclosing a chamber, inlet and outlet ports of said chamber connecting with the passages leading from the element and to the detector, respectively, a third port for exhaust of fluid from the chamber, the pressure relief valve controlling flow of fluid from said third port, the inlet port being of substantially smaller diameter than the outlet port for throttling the flow of fluid into the chamber of the relief valve to limit the maximum rate of flow that can reach the relief valve so that said maximum rate of flow can be discharged from the apparatus by a relief valve of smaller size, less weight and lower cost, while the larger outlet port limits any flow throttling upstream of the relief valve, and the third port of the relief valve being of a cross-section sufficient to exhaust fluid from the chamber at a rate equal to the throttled flow through the inlet port.

4,059,018
DIRECT-ACTING LOW PRESSURE SENSOR
Franklin G. Reick, Westwood, N.J., assignor to Michael Ebert, Mamaroneck, N.Y., a part interest
Filed Nov. 5, 1976, Ser. No. 739,314
Int. Cl.² G01L *7/04*
U.S. Cl. 73—418 **10 Claims**



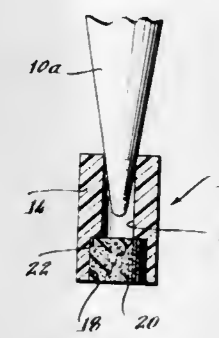
1. A fluid-pressure gauge adapted to measure pressure in a range below about 350 mm Hg, said gauge comprising:
A a fixed fluid input socket mounted on a frame element and coupled to a source of fluid whose pressure is to be metered;
B a flexible, non-dilatable bladder anchored at one end on said socket and communicating therewith, the other end of said bladder being sealed and being provided with an eyelet, said bladder being fabricated of non-metallic material and normally having a C-shaped formation; and
C a spring wire anchored at one end on said input socket and extending through said eyelet to form a pointer movable along a scale, the tip of said pointer being at a low end of said scale in the absence of applied fluid pressure, said bladder uncoiling in response to applied pressure to deflect said pointer along said scale to an extent depending on the magnitude of pressure.

4,059,019
METHOD AND APPARATUS FOR EXTRACTING GAS SAMPLES OF HIGH TEMPERATURE GASES, PARTICULARLY FOR CEMENT ROTARY KILN FURNACE EXHAUST GASES
Winfried Wurster, Bensberg; Jochen Kühne, Horrem, and Gerd Frodermann, Solingen, all of Germany, assignors to Klockner-Humboldt-Deutz Aktiengesellschaft, Germany
Filed Aug. 9, 1976, Ser. No. 712,746
Claims priority, application Germany, Aug. 9, 1975, 2535646
Int. Cl.² G01N *1/22*
U.S. Cl. 73—421.5 A **8 Claims**



1. Apparatus for obtaining gas samples from the exhaust gases of a rotary kiln furnace having an exhaust gas outlet, comprising:
gas sampling means including a gas sample pick-up device which comprises an elongate gas sampling probe;
guide means mounting said pick-up device for movement in the longitudinal direction of said probe for disposition of said probe within and without of the exhaust gas outlet of the furnace;
drive means connected to said pick-up device for driving the same along said guide means;
remote control means connected to operate said drive means; and
means for sensing at least one operating parameter and independently operating said drive means to withdraw said probe upon sensing a predetermined value of that parameter.

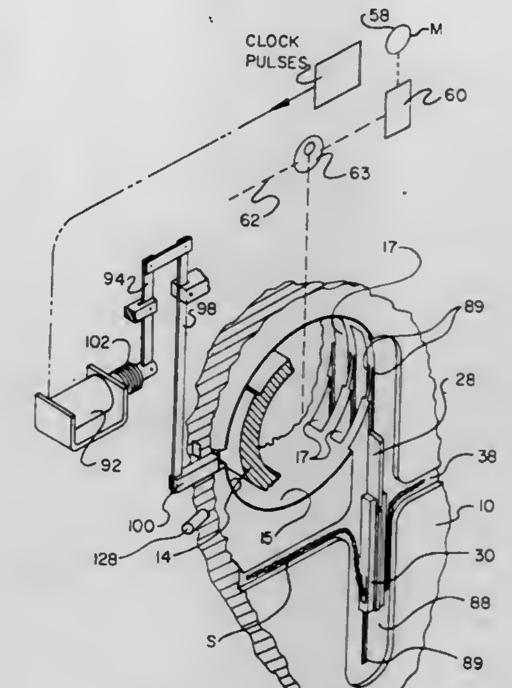
4,059,020
FILTER FOR MICROPIPETTES
Souren Avakian, Westport, Conn., assignor to Centaur Chemical Co., Stamford, Conn.
Filed Sept. 9, 1976, Ser. No. 721,874
Int. Cl.² B01L *3/02*
U.S. Cl. 73—425.4 P **5 Claims**



1. Filter apparatus for use with a liquid sampling pipette having a detachable tip member in the form of a truncated hollow cone defining an axial reservoir therethrough and an opening defined by the truncated tip and communicating with the reservoir to receive a liquid sample therethrough which comprises: a liquid impervious body member defining a liquid passage therethrough, said passage being dimensioned to frictionally solely by friction engage said tip; and a porous filter plug retained by said body member in alignment with said liquid passage.

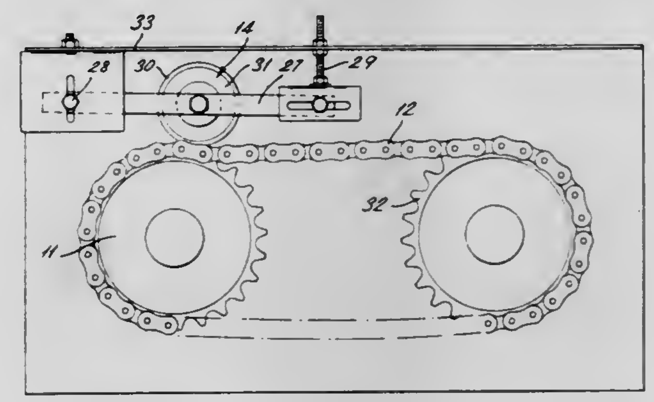
4,059,021
APPARATUS FOR CONVERTING OSCILLATORY MOTION TO RECIPROCATING MOTION
Abram N. Spanel, Princeton, N.J.; P. Frank Eiland, Stamford, and David R. Jacobs, New Canaan, both of Conn., assignors to Abram N. Spanel, Princeton, N.J.
Filed June 25, 1976, Ser. No. 699,905
Int. Cl.² F16H *27/02, 21/16;* **D05C** *15/00*
U.S. Cl. 74—89.2 **17 Claims**

1. A means of converting oscillating motion to reciprocating motion, comprising:
an oscillatory member;
structure adjacent to said oscillatory member forming a peripheral track around at least a portion of said oscillatory member;
structure forming a track extending from said oscillatory member;
a band-like member selectively engageable with said oscillatory member and extendable within said extending track from said oscillatory member, said extending track preventing unwanted flexing of said band-like member within said extending track, a work end of said band-like member being away from said oscillatory member and reciprocable when said band-like member is engaged by said oscillatory member; and,



means for causing said band-like member to become engaged with said oscillatory member.

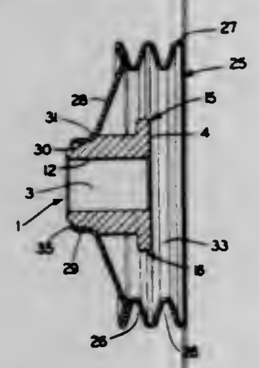
4,059,022
DRIVE ASSEMBLY
John Neville Fawcett, Newcastle-upon-Tyne, and Stuart William Nicol, Tow Law, both of England, assignors to National Research Development Corporation, London, England
Filed Nov. 29, 1976, Ser. No. 745,969
Claims priority, application United Kingdom, Nov. 27, 1975, 48829/75
Int. Cl.² F16H *7/00, 7/12, 7/10*
U.S. Cl. 74—226 **15 Claims**



1. A drive assembly comprising:
an elongated endless drive member;
a rotary drive member, said endless drive member being engaged on said rotary drive member for being driven by the rotary drive member and having a strand extending from said rotary drive member which in operation of the drive assembly is tensioned by the drive of the rotary drive member;
a guide member defining a guide surface; and
mounting means for mounting said guide member and for urging said guide member against the endless drive member on said tensioned strand of the endless drive member and on the side of said tensioned strand of the endless drive member which is opposite that engaged by the rotary drive member;
the guide surface of the guide member being positioned in contact with the endless drive member at the region of initial engagement of the endless drive member on the

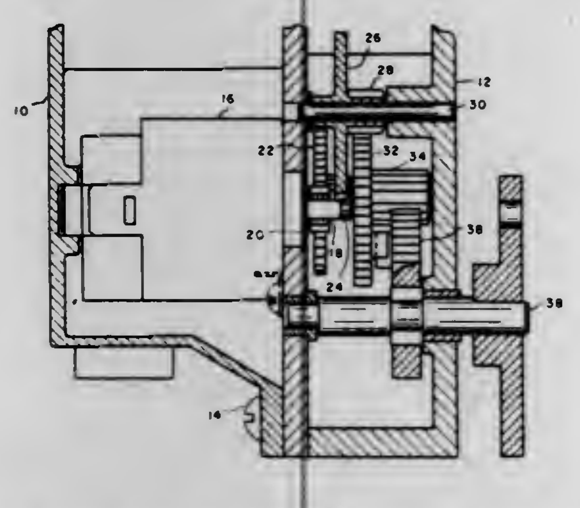
rotary drive member for guiding the endless drive member on to the rotary drive member, and for eliminating or inhibiting any radial component of velocity of the endless drive member relative to the rotary drive member during engagement of the endless drive member by the rotary drive member.

4,059,023
ONE-PIECE SINTERED PULLEY HUB CONSTRUCTION
Nolte V. Sproul, Canton, Ohio, assignor to Aspro, Inc., Canton, Ohio
Filed May 6, 1976, Ser. No. 683,740
Int. Cl.² F16H *55/36*
U.S. Cl. 74—230.3 **11 Claims**



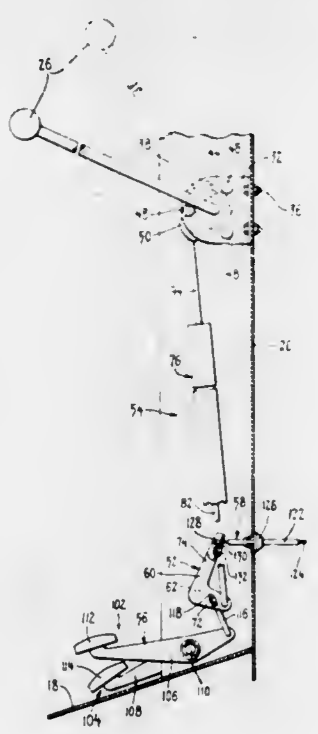
1. A one-piece pulley hub construction including:
a. a generally tubular-shaped body formed of sintered steel and having front and rear end faces, and a cylindrical bore extending axially between said end faces;
b. said body having first and second cylindrical outer surfaces extending axially between the front and rear end faces, with the first cylindrical surface having a greater axial length and diameter than the second cylindrical surface, and with said first cylindrical surface being adjacent the front end face;
c. a first conical surface, concavely-shaped in cross section, extending between and joining the first and second cylindrical surfaces;
d. a second conical surface extending rearwardly inwardly from the second cylindrical surface and joined with the rear end face of the tubular body; and
e. a pair of pulling lug means formed integral with the tubular-shaped body and extending radially outwardly in diametrically opposite directions from the first cylindrical surface.

4,059,024
GEAR TRAIN WITH INTEGRAL STOP
Elmer W. Madsen, Bristol, and George B. Soden, Wolcott, both of Conn., assignors to North American Philips Corporation, New York, N.Y.
Filed Nov. 12, 1976, Ser. No. 741,374
Int. Cl.² F16H *1/12, 55/04*
U.S. Cl. 74—421 R **7 Claims**



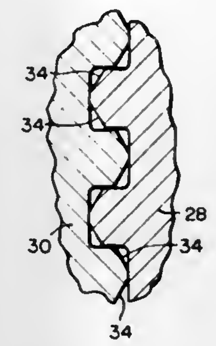
1. A gear train having an integral stop which comprises:
a plurality of gears in cooperating meshed relationship with cooperation with an associated means for driving, each of said gears in said plurality of gears being meshed with at least one of said other gears; at least first and second gears of said plurality of gears each having at least one surface extending in a direction generally the same as the direction of the axis of said gear, said surfaces interfering and preventing further movement of said train in one direction when said gear train is in one angular position.

4,059,025
SPEED CONTROL
Carl L. Waack, and Alador J. Giss, both of Livonia, Mich., assignors to Massey-Ferguson Inc., Detroit, Mich.
Filed June 21, 1976, Ser. No. 698,239
Int. Cl.² G05G *1/14, 11/00*
U.S. Cl. 74—482 **9 Claims**



1. In combination with a vehicle having an engine speed regulator, an operator's station having a lower wall portion or platform, and an upwardly extending wall portion or bulkhead forward of the platform, the improvement comprising a position responsive acceleration and deceleration control means for the engine speed regulator, said control means including:
hand positionable means mounted entirely above the platform and behind said bulkhead, said hand positionable means including a hand lever moveable between first and second positions, and maintaining means for maintaining the hand lever in a given position;
motion transmitting means mounted below the hand positionable means and entirely above the platform and behind the bulkhead;
linkage means mounted entirely above the platform and behind the bulkhead and extending between the hand positionable means and the motion transmitting means and operable to move the motion transmitting means in response to movement of the hand positionable means;
foot control means mounted entirely above the platform and behind the bulkhead and interconnected with said motion transmitting means and operable against spring bias to cause movement of the motion transmitting means without affecting movement of the hand positionable means; and
moveable means interconnecting said motion transmitting means and said engine speed regulator, said moveable means including an intermediate portion passing through a wall portion.

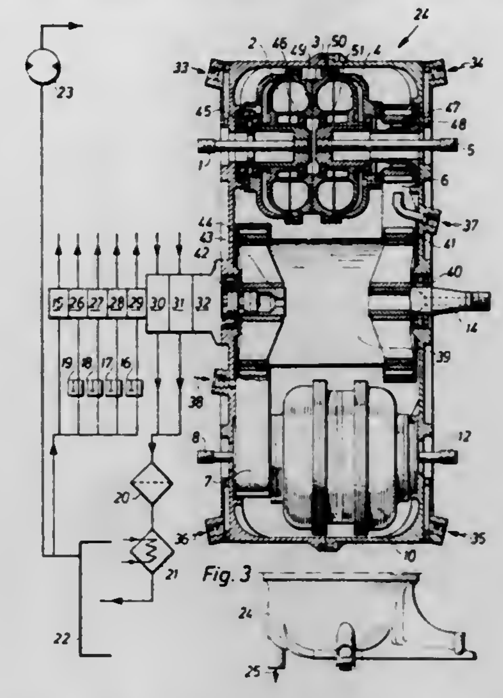
4,059,026
TWO STAGE LIMITED SLIP DIFFERENTIAL
Gene A. Stritzel, Webster, N.Y., assignor to The Gleason Works, Rochester, N.Y.
Filed Nov. 4, 1974, Ser. No. 520,596
Int. Cl.² F16H *1/44*
U.S. Cl. 74—711 **12 Claims**



1. In a differential unit for controlling relative rotation between first and second axle shafts through a known system of side gears operatively connected to said axle shafts and arranged to mesh with at least one pinion gear mounted to receive a driving moment from a prime mover, the improvement comprising
a face coupling assembly operatively connected with a selected one of said side gears for transmitting a driving moment from said pinion gear and said selected side gear to one of said axle shafts, said face coupling being assembled form two mating sections which can be moved axially relative to each other so as to provide (a) a first position of mating contact in which there is substantially no tendency for the mating sections of the face coupling assembly to move axially away from each other within a range of relative rotation of one of said axle shafts compared to the other of said axle shafts and (b) a second position of mating contact in which there is developed an axial thrust between said mating sections of said face coupling when the relative rate of rotation of one of said axle shafts compared to the other of the axle shafts exceeds said range,
control means for effecting relative axial shifting of mating sections of said face coupling assembly from said first position of mating contact to said second position of mating contact, and
locking means engageable by said face coupling assembly when said mating sections of the assembly are moved axially to said second position of mating contact, said locking means being arranged to limit differential rates of rotation between said axle shafts.

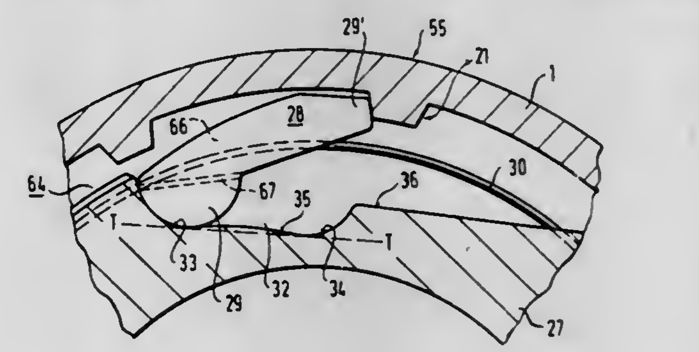
4,059,027
MULTI-ENGINE ASSEMBLY
Bengt Olof Henrik Wallander, Stockholm, Sweden, assignor to Conort Engineering AB, Stockholm, Sweden
Continuation of Ser. No. 451,015, March 14, 1974. This application Apr. 14, 1976, Ser. No. 676,868
Claims priority, application Sweden, Mar. 14, 1973, 7303907
Int. Cl.² F16H *47/00*
U.S. Cl. 74—718 **9 Claims**

1. In a multi-engine assembly of the type having a plurality of internal combustion engines each having a drive shaft, a common output shaft, and selective power transfer means for coupling said drive shaft to said output shaft; the improvement wherein said power transfer means comprises hydro-dynamic transmission means having a rotatable housing, a pair of separate output turbines fixedly mounted in said housing, a pair of input impellers rotatably mounted in said housing in alignment with said separate turbines for fluid coupling therebetween, means coupling each input impeller to the output shaft of a separate engine, a mechanical interconnection direct drive means coupled between said housing and said output shaft for continuously coupling said output turbines to said output shaft, a corresponding plurality of fluid pumps directly and continuously coupled to and driven by said output shaft, separate valve means for connecting each of said fluid pumps to an



associated power transfer means for selectively providing fluid coupling between corresponding impellers and turbines, and at least one starting motor for one of said internal combustion engines.

4,059,028
MULTIPLE SPEED HUB WITH COASTER BRAKE
Horst Schulz, Friedrichshafen; Josef Flösser, Schweinfurt am Main; Reinhard Kessler, Schwebheim; Karl-Heinz Schmidt, Schweinfurt am Main; Ewald Eisend, Grafenrheinfeld; Erich Hild, Schweinfurt am Main; Karl-Heinz Löffler, Hassfurt, and Werner Steuer, Oerlenbach, all of Germany, assignors to Fichtel & Sachs AG, Schweinfurt am Main, Germany
Filed Mar. 25, 1976, Ser. No. 670,521
Claims priority, application Germany, Apr. 2, 1975, 2514418
Int. Cl.² F16H *3/44*
U.S. Cl. 74—781 B **10 Claims**



1. In a multiple-speed hub for a bicycle and like vehicle including a shaft defining an axis of rotation; a tubular driver mounted on said shaft for rotation about said axis; a hub shell having two axially terminal portions mounted on said shaft and on said driver respectively for rotation about said axis; a multiple-shaped planetary transmission drivingly interposed in said hub shell between said driver and said hub shell, said transmission including a sun gear fixed on said shaft, a planet carrier member and an internally toothed ring gear member rotatable about said axis, a planet gear rotatably mounted on said planet carrier member in simultaneous meshing engagement with said sun gear and with said ring gear member, a coupling element secured to said driver for joint rotation, shifting means for shifting said coupling element between positions of driving engagement with said members respectively, and two clutches drivingly interposed between said hub shell and said members respectively, one of said clutches including: a driven portion

and a driving portion respectively secured to a first one of said members and to said hub shell for simultaneous rotation about said axis, said portions being radially offset, one of said portions being formed with a recess radially open toward the other portion, a pawl having a pivot part and an engagement part, said pivot part being received in said recess for pivoting movement of said pawl toward and away from a position of engagement of said engagement part with said other portion; a brake actuating element supported on one of said members for threaded movement about said axis toward and away from an axial position of braking action on said hub shell; and yieldable means impeding rotation of said brake actuating element relative to said shaft, whereby axial movement of said brake actuating element relative to said supporting member is caused when said supporting member rotates about said axis; the improvement in said one clutch which comprises:

a. two circumferentially spaced end faces of said one portion bounding said recess in two opposite circumferential directions,
   1. said end faces being cylindrically arcuate about respective axes of curvature,
   2. a cylindrically convex face of said pivot part being shaped for conforming, movable engagement with each of said end faces;
b. a convexly arcuate bottom face of said one portion bounding said recess in a radially inward direction,
   1. one of said axes of curvature being nearer said axis of rotation than the other axis of curvature, whereby said bottom face slopes from one of said end faces toward the other end face in a radially inward direction,
   2. the length of said bottom face being sufficient for permitting circumferential movement of said pawl in said recess between respective positions of engagement of said pivot part with said end faces.

4,059,029

TRANSMISSION FOR DRIVING A MOVABLE ELEMENT, PARTICULARLY A COMPONENT IN A MACHINE TOOL, AT HIGH SPEED OR CREEP SPEED

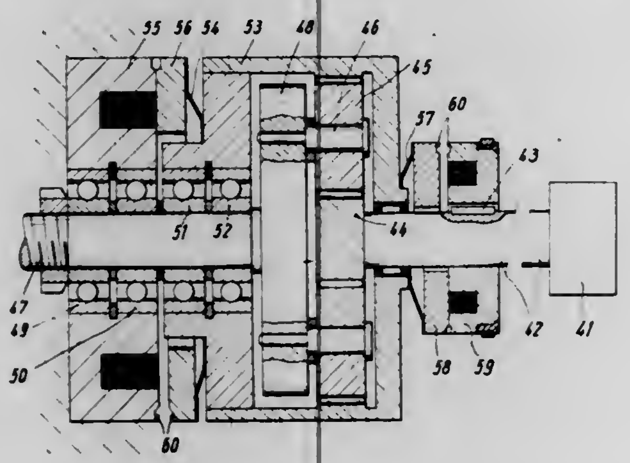
Ingo M. Cawi, Ritterstr. 15, 1 Berlin 45, Germany

Continuation of Ser. No. 485,078, July 2, 1974, abandoned. This application July 27, 1976, Ser. No. 709,238

Claims priority, application Germany, July 6, 1973, 2335132

Int. Cl.² F16H *57/10;* **B23Q** *17/00*

U.S. Cl. 74—785 **2 Claims**



1. A driving and positioning device for driving a movable element, particularly a component in a machine tool at high speed or creep speed through a specified cycle and for positioning it in required positions corresponding to the desired positions of a stepping motor forming part of the device said device comprising a stepping motor providing a single input, a drive shaft connected to said stepping motor, an epicyclic drive connected to the drive shaft and comprising a driven shaft for driving the externally geared movable element, said epicyclic drive having one branch for the transmission of high speed to the driven shaft and one branch for the transmission of creep speed to the driven shaft, the branch for the transmission of the high speed to the driven shaft comprising a clutch for connecting and disconnecting the drive shaft to an internally geared part of the epicylic drive and a brake to keep said internally geared part in a fixed position when it is disconnected from the drive shaft by the clutch during creep speed motions, the brake being disconnected from said internally geared part during high speed motions and upon completion of the high speed motion serving as an indexing means wherein the mating brake elements are engageable and disengageable thereby eliminating the deviation of the drive shaft from its desired position within the range between two steps of the stepping motor.

4,059,030

MECHANICAL GEARING

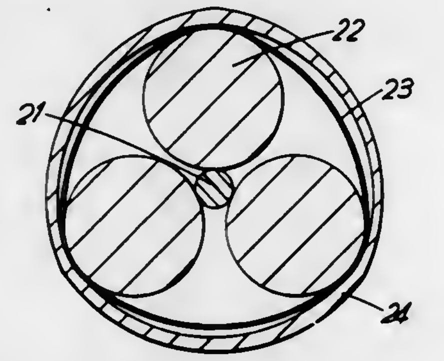
Alexander Bennett Gosling, Cambridge; Dexter Robert Plummer, Ongar, and Colin Howard Stanwell-Smith, Cambridge, all of England, assignors to Strathearn Audio Limited, Belfast, Northern Ireland

Filed Nov. 25, 1975, Ser. No. 635,071

Claims priority, application United Kingdom, Nov. 27, 1974, 51444/74

Int. Cl.² F16H *13/06*

U.S. Cl. 74—798 **3 Claims**



1. A gearing arrangement including a first rotatable member, a planetary element in contact with the first member, the said planetary element being caused to rotate by the rotation of the first member, a second relatively flexible rotatable member in contact with the planetary element and a third member which is rigid and fixed relative to the second member and against which the second member is urged by the planetary element, said second and third members being substantially hemispherical and hollow.

4,059,031

METHOD AND APPARATUS FOR THE PRODUCTION OF MACHINE TOOLS

Frank F. Erdelyi, 313 Foxhall St., Raleigh, N.C. 27609

Continuation of Ser. No. 455,632, March 28, 1974, abandoned. This application Feb. 17, 1976, Ser. No. 658,271

Int. Cl.² B21K *5/02;* **B21D** *19/00;* **B21C** *23/04*

U.S. Cl. 76—108 R **20 Claims**

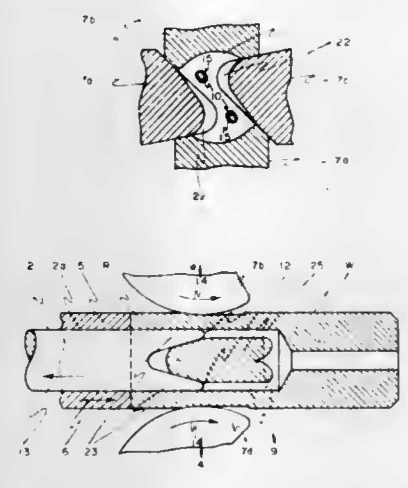
1. A method for chipless production of twist drills having inside, open cooling channels, comprising the steps of:

providing an elongate blank having at least one bore formed therein,

maintaining said bore free of filling metal while forging at least one spirally shaped flute in the outer surface of said blank by engaging said outer surface with forging tool means at a forging plane and producing relative longitudinal movement between said blank and said forging plane, and

simultaneously providing core matrix means within said at least one bore, said core matrix means having an outer core forming area, and positioning said core forming area at said forging plane during the forging of said at least one spirally shaped flute whereby at least one continuous elongate open channel is formed within said drill simultaneous with the formation of said at least one spirally shaped flute.

16. An apparatus for forming from an elongate blank having at least one longitudinal bore twist drills having a plurality of longitudinal cooling channels in the interior thereof and at least one spirally arranged flute on the outer surface thereof, said apparatus including forging means for engaging the outer surface of an elongate blank member and for forging said at least one flute therein, means for moving said blank axially relative to said forging means, and core matrix means extending axially into the at least one bore formed in said blank, said core matrix means including a plurality of projecting means having portions lying in the forging plane of said forging means, said projecting means being spaced apart from each other to provide a plurality of longitudinally extending cooling passages in said drill as said blank is moved relative to said forging plane, the outer surfaces of said core matrix portions conforming to the cross-sectional configuration of said passages.



4,059,032

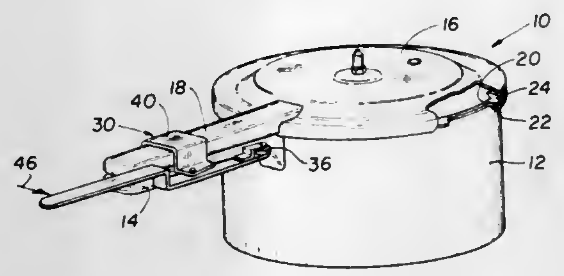
DEVICE FOR PRYING LOOSE A PRESSURE COOKER COVER

Charles B. Tornell, 46 Bradbury Road., New Castle, Del. 19720

Filed Sept. 17, 1976, Ser. No. 724,699

Int. Cl.² B25B *27/00*

U.S. Cl. 81—3 R **1 Claim**



1. A convenience device for a pressure cooker of the type having a cylindrical cooking member and a circular cover for same, each with a laterally extending handle, said device being adapted to removingly release said cover from its sealed engagement with said cooking member and comprising an elongated body operatively arranged in a horizontal plane adjacent said cooking member handle, said elongated body having a gripping handle at its proximal end and a bearing member at its distal end in contact with said cooking member handle, and a positioning and pulling member adapted to be mounted on said cover handle with a depending leg thereof pivotally connected to said elongated body, whereby urging said elongated body through a pivotal traverse pries said cover from said cooking member by causing rotative movement of said cover relative to said cooking member, wherein said positioning member is in the specific form of a closed loop body adapted to accommodate the cover handle in projected relation therethrough.

4,059,033

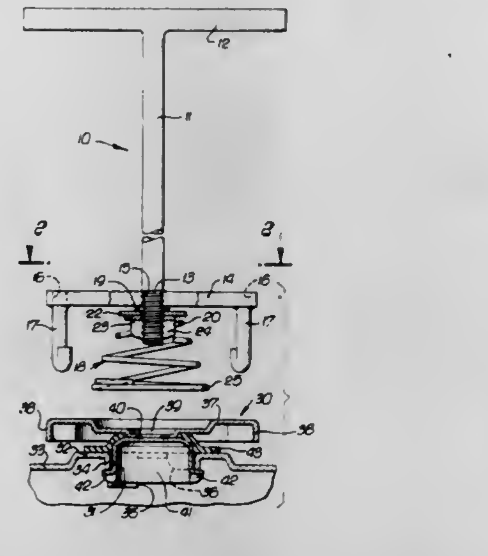
OIL CAP REMOVER

Dennis G. Johnson, 6930 San Francisco St., Highland, Calif. 92346

Filed Apr. 23, 1976, Ser. No. 679,726

Int. Cl.² B67B *7/18;* **B25B** *13/48*

U.S. Cl. 81—3.1 B **2 Claims**



1. In a tool for removing screw oil cap from an automobile engine, said cap having a pair of diametrally opposed downwardly hollowed peripherally protruding ears, the combination of:

a rod having a handle at one end;

a crosshead fixed at its center to the opposite end of said rod;

a pair of "J" shaped hooks extending downwardly from opposite ends of said crosshead, said hooks trailing from their connections with said crosshead approximately in a counter clockwise relation with said rod and turning up sharply at their lower ends; and

spring means mounted on said tool between said hooks for compression between said cap and said tool when the tool is co-axially lowered compressively onto said cap with said hooks respectively closely facing said hollow ears, to thereby lower said hooks below the level of said ears, and facilitate counterclockwise rotation of said tool to bring said hooks under said ears, and when the pressure applied on said tool is relaxed, to upwardly spring bias said hooks with said tool to interlock said hooks with said ears, said tool thus capturing said cap, thereby permitting the cap to be unscrewed and removed and then screwed back in place by torque transmitted from said handle through said hooks to said ears optionally in clockwise or counterclockwise directions and without disturbing the captive relation between said hooks and said cap until the cap has been replaced and it is deliberately released from said hooks by depressing the tool to shift said hooks entirely below the lower level of said ears and then rotating the tool clockwise to shift said hooks out from under said ears.

4,059,034

SCREW-DRIVING DEVICES

Ewald Hornung, Rinteln, Germany, assignor to Feinwerkbau Helfer & Co. KG, Mollenbeck, Germany

Filed July 23, 1976, Ser. No. 707,959

Claims priority, application Germany, Sept. 15, 1975, 2541046

Int. Cl.² B25B *23/02*

U.S. Cl. 81—57.37 **9 Claims**

1. In a device for driving screws,

means defining a screw-holding magazine,

a casing,

a screw-driving member mounted for rotation in the casing,

drive means,

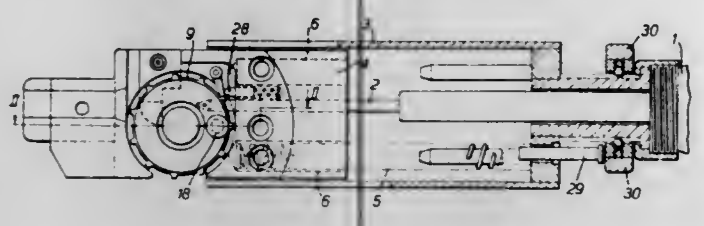
coupling means for coupling said drive means to the screw-driving member,

means for indexing successive screws from the magazine

into a screw-driving station in which each successive screw is aligned with the screw-driving member,

a slide member slidable in the casing and carrying the indexing means,

means operable by exertion of an applied force between the slide member and a workpiece about to receive a screw, to actuate the indexing means and thus index a screw in the



magazine to the screw-driving station, to bring the screw-driving member into engagement with the indexed screw and to actuate the drive means to drive the screw by the screw-driving member through the coupling means, and

resilient means effective to resist said force exerted between the slide member and the workpiece and to return the device to its initial configuration.

4,059,035

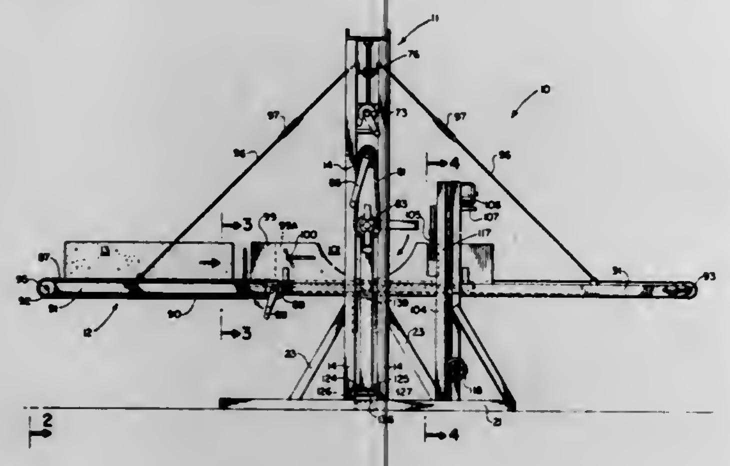
APPARATUS FOR CUTTING PIPE INSULATION

William Lawrence Davis, 1166 Tara Blvd., Baton Rouge, La. 70806

Continuation-in-part of Ser. No. 643,903, Dec. 23, 1975, abandoned, which is a continuation-in-part of Ser. No. 512,365, Oct. 4, 1974, abandoned. This application Aug. 11, 1976, Ser. No. 713,528

Int. Cl.² B23D *57/00;* B26D *1/34, 3/00;* B27B *19/00*

U.S. Cl. 83—1 **3 Claims**



1. An apparatus for cutting semi-circular segments of foamed glass or like insulation material from a block of foamed glass or like insulation material, said apparatus comprising a stationary vertically extending framework including pairs of spaced apart supports, a conveyor belt assembly having a conveyor belt traveling between said pairs of spaced apart supports for supporting a block thereon, a rigid reciprocating framework mounted for movement between said pairs of spaced apart supports, parallel saw carrying elements mounted above and on each side of said block for simultaneous, some directional movement with said reciprocating framework, two or more rigid, straight saw blades adjustably parallelly mounted between said saw carrying elements, wherein one of said saw carrying elements comprises pairs of parallel rods and a brace member adjacent one of said rods, said rods and said brace perpendicularly attached to end plates to form a slot between said rods and a second slot between said brace and said adjacent slot, and said saw blades each having one end mounted in a different slot then said other blade, and means for rotating said saw carrying elements to cut semi-circular segments from said stationary block of insulation material when said reciprocating framework is reciprocated.

4,059,036

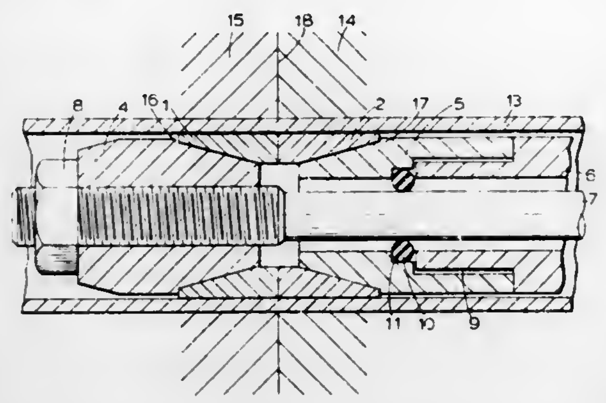
SHEARING HOLLOW STOCK

John Edward Hartley, Swavesey, England, assignor to T.I. (Group Services) Limited, Birmingham, England

Filed July 6, 1976, Ser. No. 702,463

Int. Cl.² B23D *21/00*

U.S. Cl. 83—188 **4 Claims**



1. An assembly for shearing a hollow body comprising a pair of external shear blades, each of said shear blades having an aperture therein to receive said body, said blades meeting in a common shearing plane and being relatively movable in a direction parallel to said plane to shear said body, an internal shearing member lying within said apertures, said member comprising a first expandable portion lying on one side of said plane and a second expandable portion lying on the other side of said plane, said portions being independently movable and each of said portions comprising a circumferentially extending surface having therein only a single gap, and means for expanding said portions simultaneously to substantially fill a hollow body placed in said apertures, said portions being relatively movable in a direction parallel to said plane on relative movement of said external shear blades.

4,059,037

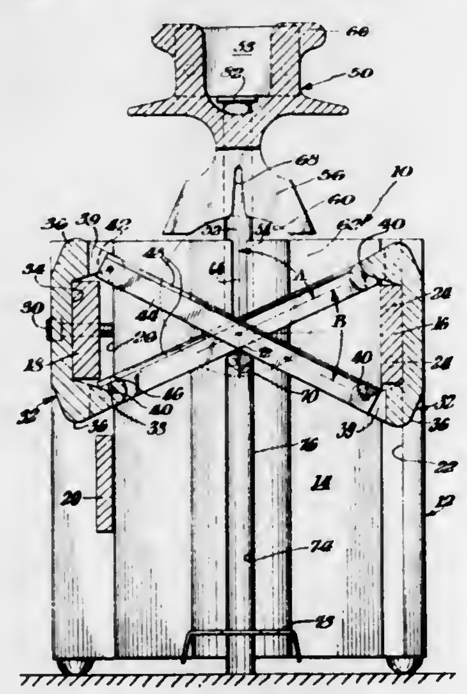
SLICING DEVICE

Samuel L. Gerson, and Frank W. Jones, both of Wilmington, Del., assignors to Fasline Food Equipment Co., Wilmington, Del.

Filed Apr. 26, 1976, Ser. No. 680,033

Int. Cl.² B26D *7/06*

U.S. Cl. 83—407 **14 Claims**



1. A slicing device comprising a pair of racks of substantially parallel sharp thin blades having a substantially uniform spacing for obtaining slices of predetermined thickness, the spacings in each rack being substantially twice the thickness of the ultimate slices obtained from the slicer, a base frame, the pair of racks being mounted on the base frame in an intermeshed configuration in which the racks cross each other at junctions at intermediate portions, the intermeshed spacing of the blades in the racks being substantially uniform and substantially half the spacing in each individual rack of blades in the extremities of the racks away from the crossed junctions, a pusher, movable means mounting the pusher on the base frame to provide movement of the pusher towards and away from the crossed racks of blades along an axis of movement, and the axis of movement going through the crossed junctions of the blades whereby an object is first contacted with the more widely spaced extremities of the blades disposed outside of the cross junctions and ultimately pushed through the cross junctions of the blades whereby initial cutting is facilitated by the contact with more widely spaced blades to facilitate initial cutting and the object is gradually introduced into the narrower spacing at the junctions of the blades to complete their slicing.

4,059,038

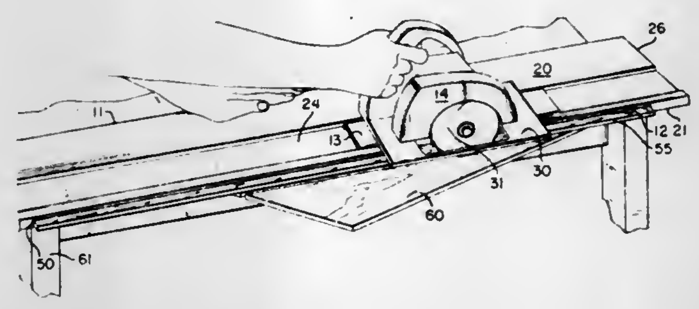
ASSEMBLY AND METHOD FOR GUIDING A PORTABLE POWER SAW

Simon Petrus Rietema, 638 N. Crestview Drive, Glendora, Calif. 91740

Division of Ser. No. 571,140, April 24, 1975, abandoned. This application May 10, 1976, Ser. No. 684,697

Int. Cl.² B27B *9/04*

U.S. Cl. 83—745 **13 Claims**



1. A saw guide assembly, comprising:

housing structure;

means associated with said housing structure for guiding an associated power saw along said housing structure in a straight path with the saw blade of said power saw moving along a predetermined straight cutting path alongside said housing structure;

a guidepiece having a longitudinal dimension for alignment along said straight cutting path, said guidepiece being made of a material cuttable by said power saw to define a reference edge;

said housing structure having a slot for slidably receiving said guidepiece, with said guidepiece extending transversely from said housing structure; and

means associated with said housing structure for holding said guidepiece in a fixed position on said housing structure with the longitudinal dimension of said guidepiece substantially aligned with said cutting path, said holding means being adjustable to selectively position said guidepiece across said cutting path whereby by making a cut along said cutting path with said power saw said guidepiece may be trimmed along its longitudinal dimension to define a reference edge aligned with said cutting path usable for positioning said saw guide assembly on a workpiece.

4,059,039

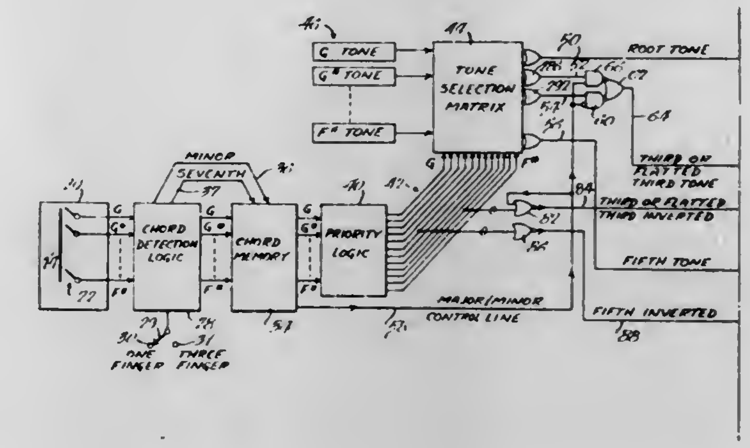
ELECTRICAL MUSICAL INSTRUMENT WITH CHORD GENERATION

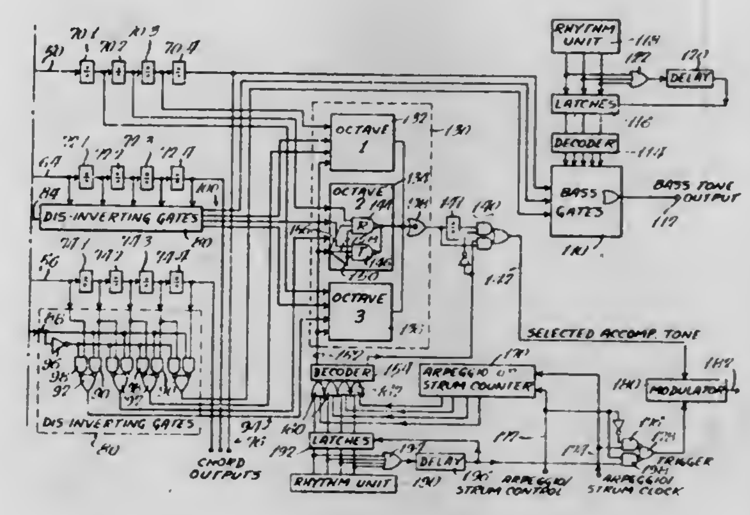
Alden J. Carlson, Edmonds, Wash., assignor to Warwick Electronics Inc., Chicago, Ill.

Division of Ser. No. 482,064, July 24, 1976, Pat. No. 4,019,417. This application July 22, 1976, Ser. No. 707,815

Int. Cl.² G10H *1/00*

U.S. Cl. 84—1.01 **7 Claims**





1. An electrical musical instrument comprising:

a plurality of tone generators for generating a plurality of tone signals, some of said tone signals being displaced by an octave from the frequency necessary to produce a noninverted chord;

chord selection means for developing chord signals each representative of a chord composed of a different plurality of tone signals;

a chord matrix for passing selected ones of the different plurality of tone signals from the tone generators in response to the chord signals from the chord selection means;

inverted chord detection means coupled to the chord selection means to determine that at least one of the tone signals passed by the chord matrix is displaced by said octave; and

a plurality of disinverting gates responsive to the inverted chord detection means for clamping the octave of the tone signal which is displaced by said octave.

4,059,040

TONE-SOURCE APPARATUS FOR ELECTRONIC MUSICAL INSTRUMENT

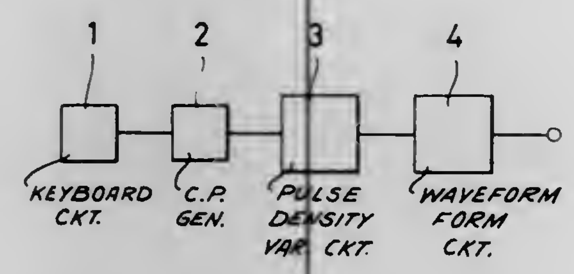
Nobuharu Obayashi; Hikaru Hashizume; Noriji Sakashita; Seiji Kameyama; Sadaaki Ezawa; Toshio Kugisawa; Yutaka Washiyama; Tatsunori Kondo, and Hironori Watanabe, all of Hamamatsu, Japan, assignors to Kabushiki Kaisha Kawai Gakki Seisakusho, Hamamatsu, Japan

Filed Sept. 10, 1975, Ser. No. 612,174

Claims priority, application Japan, Sept. 11, 1974, 49-104729; Sept. 12, 1974, 49-105861

Int. Cl.^{2} G10H *1/06*; **G10F** *1/00*

U.S. Cl. 84—1.03 **7 Claims**



1. A tone-source apparatus for an electronic musical instrument wherein at least one cycle of a musical tone waveform which is to be produced is depicted by a plurality of sections lines, each charaterized by degrees of inclination and length, said apparatus comprising means to generate a series of pulses having regular intervals, pulse-density varying means for varying the pulse-density of the pulses in accordance with the degrees of inclination of the respective of the section lines whereby a resultant series of pulses having a varied pulse density is formed, said pulse-density varying means including a memory circuit including a plurality of pulse-density setting portions for selecting pulse densities and a plurality of section range setting portions for selecting output time intervals, and waveform forming means for forming the resultant series into said musical tone waveform.

4,059,041

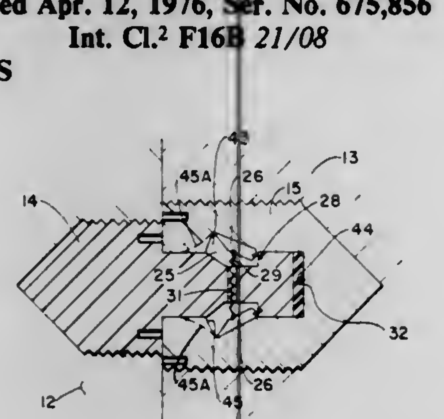
SNAP-ON SCREW

Edward Hassan, Montreal, Canada, assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Apr. 12, 1976, Ser. No. 675,856

Int. Cl.^{2} F16B *21/08*

U.S. Cl. 85—3 S **1 Claim**



1. A pair of fasteners which may be joined together, with each of the pair of fasteners shaped to individually fasten to one of a pair of members that are to be joined together by the engaged pair of fasteners, in which said fasteners are each formed with an external screw thread, in which

a first unit of the pair of fasteners is formed with a cylindrical axial socket hole and a second unit of the pair of fasteners is formed with a cylindrical plug that extends axially from said second unit, said plug of a size to fit into the socket hole of the said first unit, in which

the socket hole of the first unit is formed with a concentric recess of a size to engage a pivoted leaf member fitted to the side of the plug, and in which the plug is fitted with a concentric recess of a size to retain a pivoted leaf member, said leaf member being pivotally mounted in said plug recess, said plug fitted with spring means to bias the leaf member to extend out of said plug recess and away from the axis of the plug,

said recess of the socket hole of the first unit shaped, in axial cross-section of the first unit, with a convex curved recess wall extending from the wall of the axial socket hole, as viewed from the center of rotation of the pivoted leaf member of the second unit, in the assembled state of the fasteners,

said convex curved recess wall located so as to bear against an end of the leaf member in the assembled state of the fasteners, so that an axial force applied between the two units, in the direction of separating the two units, biases the leaf member against the spring means and biases the leaf member away from the recess of the socket hole so as to permit disengagement of the two assembled units.

4,059,042

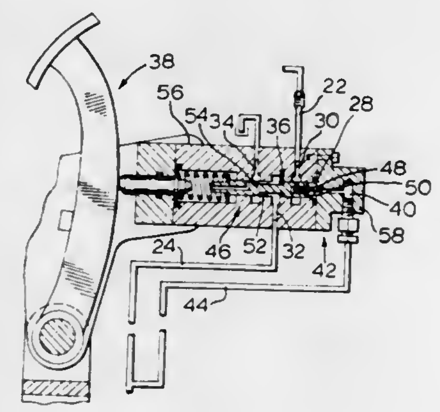
HYDRAULIC SYSTEM FOR EXTREMELY COLD ENVIRONMENTS

John W. Bridwell, Peoria, and George H. Meiner, III, Morton, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Oct. 4, 1976, Ser. No. 729,542

Int. Cl.^{2} F15B *13/04, 11/08*

U.S. Cl. 91—469 **5 Claims**



1. In a hydraulic system serving a hydraulically actuated cylinder of a work element that is expected to be utilized in an extremely cold environment, said hydraulic system having a fluid reservoir, a pump, a hydraulic cylinder, a control valve connected between the pump and the hydraulic cylinder and being positioned at a location spaced a relatively great distance from said cylinder, a conduit connected to the pump for passing fluid from the reservoir to the pump, first means for passing fluid from the pump to the control valve, second means for passing fluid from the control valve to the hydraulic cylinder, and third means for returning hydraulic fluid from the control valve to the reservoir, said control valve having a chamber and first, second, and third ports in fluid communication with the chamber and each being connected to a respective one of the first, second, and third means, a spool slidably positioned within the housing chamber and being movable between a first position at which a fluid pathway is open from the pump, through the control valve and to the reservoir and a second position at which a fluid pathway is open from the pump, through the control valve and to the hydraulic cylinder and of a magnitude sufficient for actuating said cylinder by fluid passing through said pathway to the cylinder, the improvement comprising:

a fourth port opening into the control valve chamber;

a circulating conduit connected at one end to the fourth port and at the other end to the second means at a location immediately adjacent the hydraulic cylinder; and

fourth means for providing a fluid pathway from the pump, through the control valve, through the circulating conduit, through a portion of the second means, back through the control valve, and through the third means to the reservoir at the first position of the spool and, at the second position of the spool, for blocking the fluid pathway from the pump to the circulating conduit and providing a fluid pathway from the pump, through the control valve and through the second means and to the hydraulic cylinder for the actuation thereof.

4,059,043

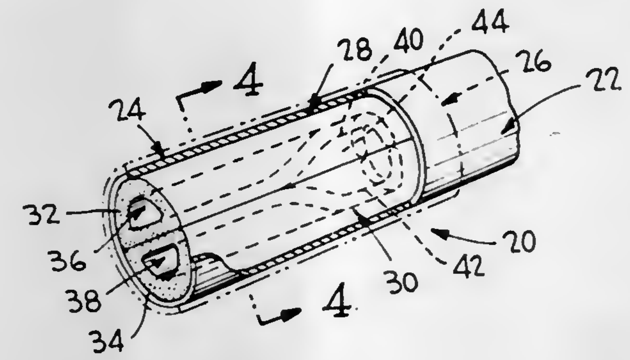
METHOD AND APPARATUS FOR MAKING TOBACCO SMOKE FILTERS

Richard M. Berger, Richmond, Va., assignor to American Filtrona Corporation, Richmond, Va.

Division of Ser. No. 644,144, Dec. 24, 1975, Pat. No. 3,994,306. This application June 22, 1976, Ser. No. 698,684

Int. Cl.^{2} A24C *5/50*

U.S. Cl. 93—1 C **8 Claims**



1. A method of making smoke filters comprising the steps of:

a. providing a first filtering material including a multiplicity of fibrous members;

b. defining a first elongated substantially cylindrical, annular bonding zone;

c. continuously passing said first filtering material through said first bonding zone and during passage of said first filtering material through said first bonding zone contacting same with a bond activating agent to bond said fibrous members of said first filtering material to each other at spaced contact points thereby forming a first elongated, smoke-permeable, cylindrical inner element having an axial bore and an annular wall defining a tortuous path for passage for smoke therethrough;

d. subjecting an arcuate section of the annular wall of said first cylindrical inner element to alternating axially spaced flattening and depressing actions to thereby reform said first cylindrical inner element into a first semi-cylindrical inner element having alternating axially spaced externally flattened portions and externally depressed portions, with said externally depressed portions forming axially spaced sections extending across the interior of said first semi-cylindrical inner element which offer at least as much resistance to passage of smoke as the material of said first semi-cylindrical inner element and which define together with said externally flattened portions a multiplicity of axially spaced, discrete, first cavities within said first semi-cylindrical inner element;

e. providing a second filtering material including a multiplicity of fibrous elements;

f. defining a second elongated substantially cylindrical, annular bonding zone;

g. continuously passing said second filtering material through said second bonding zone and during passage of said second filtering material through said second bonding zone contacting the same with a bond activating agent to bond said fibrous members of said second filtering material to each other at spaced contact points thereby forming a second elongated, smoke-permeable, cylindrical inner element having an axial bore and an annular wall defining a tortuous path for passage of smoke therethrough;

h. subjecting an arcuate section of the annular wall of said second cylindrical inner element to alternating axially spaced flattening and depressing actions to thereby reform said second cylindrical inner element into a second semi-cylindrical inner element having alternating axially spaced externally flattened portions and externally depressed portions, with said externally depressed portions forming axially spaced sections extending across the interior of said second semi-cylindrical inner element which offer at least as much resistance to passage of smoke as the material of said second semi-cylindrical inner element and which define together with said externally flattened portions a multiplicity of axially spaced, discrete, first cavities within said second semi-cylindrical inner element;

i. continuously juxtaposing said first and second semi-cylindrical inner elements to each other with said externally depressed portions of said semi-cylindrical inner elements facing each other to form a composite cylindrical inner member having alternating discrete first cavities and composite second cavities defined by said depressed portions of said semi-cylindrical inner elements;

j. overwrapping said composite cylindrical inner member with an overwrapping material so as to juxtapose portions of the inner surface of said overwrapping material with the outer surface of said composite cylindrical inner member to form sealed areas precluding axial passage of smoke thereacross; and

k. transversely severing the resulting product at selected locations to form filter elements each having at least a portion of two discrete first cavities and at least a portion of one composite second cavity.

4,059,044

APPARATUS FOR FORMING AND TAKING AWAY PACKETS OF BAGS

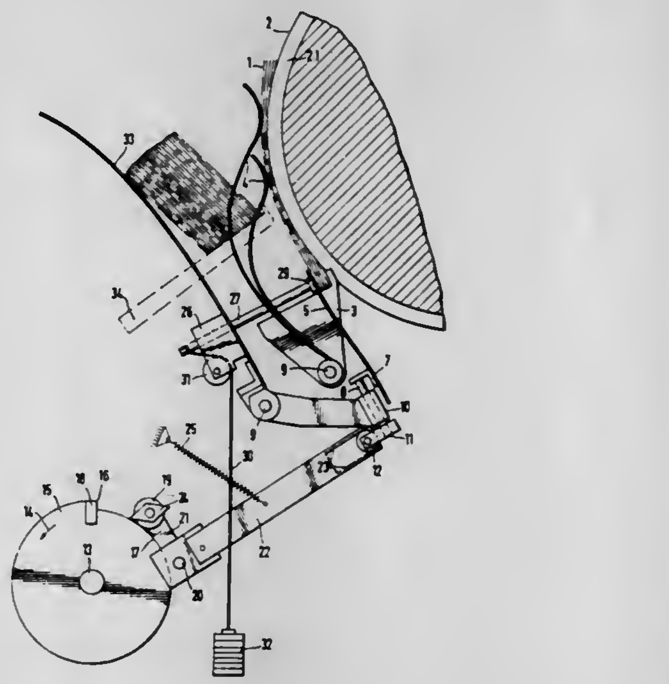
Günter Schliek, Hendschiken, AG, Switzerland, and Erwin Tirp, Lengerich, Germany, assignors to Windmoller & Holscher, Lengerich, Germany

Filed Mar. 26, 1976, Ser. No. 670,558

Claims priority, application Germany, Mar. 27, 1975, 2513776

Int. Cl.^{2} F01B *19/00*

U.S. Cl. 93—93 HT **5 Claims**



1. Apparatus for forming and taking away packets of bags deposited by a rotary depositing cylinder of a bag-making machine, in which the bags are deposited on a stationary collecting table extending substantially radially to the depositing cylinder and the packets of bags are withdrawn and transported away in a direction opposite to the direction of rotation of the depositing cylinder by gripper units which pass through the plane of the collecting table and lift the packets of bags off the collecting table, wherein the improvement comprises long and short holding fingers each having one end positioned below the collecting table, said holding fingers extending through recesses of the collecting table from below and pro-

jecting beyond the collecting table, the other end of said long holding fingers projecting away from the depositing cylinder periphery, said holding fingers being flexible so they can move longitudinally of the collecting table, and can be flexed towards the depositing cylinder, mounting means for mounting said short holding fingers for reciprocating sliding motion substantially tangentially to the depositing cylinder between a retaining position where said short holding fingers retain bags on the depositing cylinder and a lowered position below the plane of the collecting table, control means for moving said short holding fingers substantially tangentially to the depositing cylinder to the retaining position after the lifting of an entire packet of bags by the gripper unit has commenced, and to the lowered position after collection of the first bags a new packet.

4,059,045

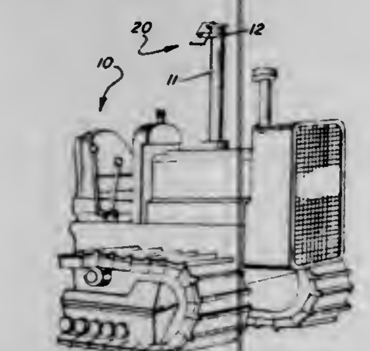
ENGINE EXHAUST RAIN CAP WITH EXTRUDED BEARING SUPPORT MEANS

Richard D. McClain, Schaumburg, Ill., assignor to Mercury Metal Products, Inc., Schaumburg, Ill.

Filed May 12, 1976, Ser. No. 685,513

Int. Cl.² F23L ***17/02***

U.S. Cl. 98—122 **3 Claims**



1. In a gravity actuated protective cover device adapted to be secured upon the upstanding exhaust conduit of an internal combustion engine to prevent the entry of extraneous matter therein during the inoperative stage of said engine, said protective cover device comprising a clamp member having a looped band portion and a bracket portion integral therewith, the looped band portion adapted to substantially encircle the peripheral surface of said conduit, the bracket portion carrying means thereon for tightening said looped band portion, pivot support means carried by said bracket portion at a point spaced outwardly from said tightening means, an elongate relatively flat balance member journalled upon said pivot support means in a vertical plane relative to said clamp member, a dish-shaped cover member secured to the upper portion of said balance member and adapted when the device is installed to be seated over the mouth of said conduit in overhanging relation thereto, the point of pivot of said balance member being chosen relative to the size and weight of the balance member so that when the plane of the looped band portion is horizontal the weight of the cover member will tend to lower said cover member toward the looped band and raise the other end of the balance member, but normal pressure of exhaust gases from said internal combustion engine will tend to blow the cover off the conduit easily during operation of the engine with immediate dropping of the cover member when the engine stops, the invention herein which comprises:

the bracket portion including a pair of spaced apart ears, the balance member being straddled by said ears, the pivot support means comprising a cylindrical bearing member mounted between the ears, the balance member having an integral, laterally protruding annular flange coaxial with a passageway therethrough a cylindrical bushing, said flange being permanently fixedly secured to said cylindrical bushing, the bushing being journalled and supported upon the bearing member and limited in axial movement thereon by the spaced apart ears.

4,059,046

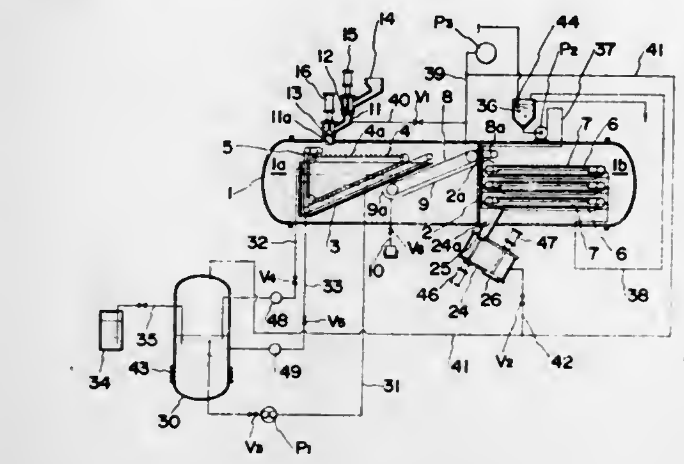
APPARATUS FOR MANUFACTURING A SNACK FOOD WHOSE RAW MATERIAL IS FRUITAGE OR VEGETABLES

Tatsuo Yamazaki, Hikari; Takemi Hayashida, Hino, and Masatoshi Sakuma, Nagareyama, all of Japan, assignors to Kanro Co. Ltd., Tokyo, Japan

Filed July 2, 1976, Ser. No. 702,187

Int. Cl.² A47J ***37/12;*** **F25D** ***25/04;*** **A23B** ***1/00***

U.S. Cl. 99—355 **3 Claims**



1. Food processing apparatus comprising:

a. a tank;

b. means for evacuating the interior of said tank;

c. a vessel in said interior adapted to hold oil;

d. means for heating the oil in said vessel to a frying temperature;

e. first air lock means for introducing the material to be fried into said interior;

f. first conveyor means movable in said interior for receiving the introduced material and for conveying the same through said oil, said conveyor means having a portion descending inward of said vessel and another portion rising outward of said vessel, whereby the conveyed material is fried in said oil;

g. second conveyor means movable in said interior subjacent said rising portion of the first conveyor means for receiving said fried material from said first conveyor means and for carrying the same out of said vessel;

h. a plurality of cooling panels spaced from said vessel, said panels extending horizontally in vertically spaced relationship, each panel having a top surface;

i. third conveyor means for receiving said fried material from said second conveyor means and for moving the same toward said panels;

j. fourth conveyor means associated with each of said panels for moving the fried material along the top surface of the associated panel, whereby said fried material is cooled, said fourth conveyor means including one conveyor associated with the topmost panel and another conveyor associated with the lowermost panel, said third conveyor means transferring the fried material to said one conveyor;

k. second air lock means for releasing the cooled material from said interior, said first and second air lock means limiting entry of atmospheric air into said interior, said other conveyor discharging the cooled material to said second air lock means.

4,059,047

CONDITIONING MACHINE FOR CHOCOLATE MASSES

Helmut Sollich, Albernbere, Germany, assignor to Sollich KG, Germany

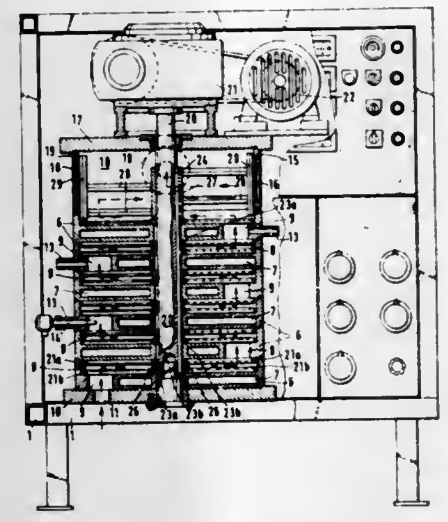
Filed July 20, 1976, Ser. No. 707,094

Claims priority, application Germany, Aug. 13, 1975, 2536063

Int. Cl.² A23C ***3/04;*** **F25C** ***1/14***

U.S. Cl. 99—455 **4 Claims**

1. In a conditioning machine for chocolate masses, the machine comprising a stack of cooling stages forming a cylinder, each having cooled top and bottom walls connected to a coolant recirculating system, a pump forcing the mass through all the stages, each stage containing scrapers revolving about the cylinder axis for continuously detaching the mass from the cooling surfaces, the improvement wherein each stage contains two rotating scraper devices which are urged axially apart by an interposed spring, and which are provided with scrapers



sweeping top and bottom surfaces of their associated one stage of said plurality of stages, said rotating scraper devices comprising arms radiating from a hub mounted on a drive shaft, each arm carrying or forming a scraper, wherein said hubs of the scraper devices are axially slidable on the drive shaft and wherein the respective spring of each stage is interposed between hubs of two scraper devices associated with the same stage.

4,059,048

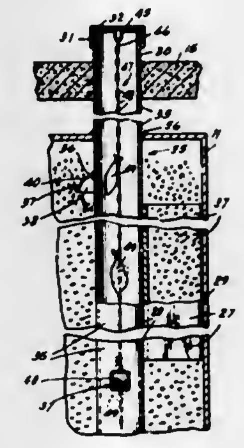
MEANS OF FUMIGATING RAW AND FINISHED AGRICULTURAL PRODUCTS

Robert Daniel Dickson, 2110 S. Prairie, Stuttgart, Ark. 72160

Filed May 7, 1976, Ser. No. 684,084

Int. Cl.² A23L ***3/34***

U.S. Cl. 99—482 **14 Claims**



1. A fumigating apparatus comprising:

container means for confining a coherent aggregate mass of particulate agricultural materials,

an elongated member extending the depth of the container means and forming a passage-like gas chamber extending vertically through the interior of the coherent aggregate mass confined within the container means,

a closure sealing said elongated member at its bottom end;

said member having a top end extending out of said container means;

said top end having an upwardly directed opening formed therein for said gas chamber disposed at an accessible exterior location relative to said container means,

cap means for selectively closing said access opening and including support means within said chamber at said opening when the cap means are in closed position,

fumigant suspension means connected to said support means and gravitationally insertable into and suspendable within said gas chamber through said access opening whereby selected quantities of solid gas generating fumigant are suspended at different selected levels in said gas chamber,

said cap means have sealing means for closing and sealing said gas chamber at said access opening so that pressure build up will occur when said fumigant in said chamber changes to a gaseous form, and

spaced ports in said elongated member for directing the pressurized gas outwardly into the coherent mass to permeate and saturate the agricultural products,

said cap means being removable from the access opening, whereby said support means together with said fumigation means and any residual fumigant may then be removed from the gas chamber through said access opening.

4,059,049

METHOD AND A DEVICE FOR A BALE PRESS

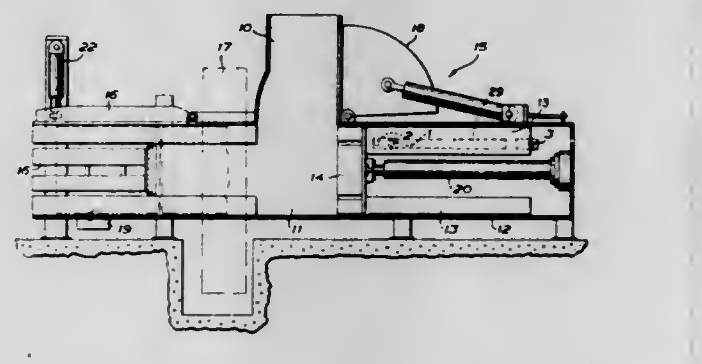
Gunnar Kurt Arne Tillgren, Ystad, Sweden, assignor to Personer Verkstad, AB, Ystad, Sweden

Filed May 18, 1976, Ser. No. 687,482

Claims priority, application Sweden, May 28, 1975, 7506082

Int. Cl.² B30B ***15/14***

U.S. Cl. 100—41 **6 Claims**



1. In a method in pressing in a bale press material which after compacting tends to expand due to stored inherent resiliency when relieved from stresses, said material being compacted in a channel during application of equally large but opposite pressing forces from on one hand a movable plunger means and on the other hand the rear surface of the bale last produced, said surface serving as an abutment, which last-produced bale is fixed in position by a tightening means until a predetermined pressing force has been obtained when the compacted material together with the bales ahead is displaced by a force exerted by said plunger means, which force exceeds the force exerted on the material by said abutment, the improvement comprising fixing the abutment once more by further action of said tightening means when said plunger means is located at a predetermined distance from its forward end position, the reexpansion taking place in said material during the pushing forward of the material being compensated for in the final movement of said plunger means towards its forward end position.

4,059,050

CAN CRUSHER

Charles McRea Davis, Jr., 5209 Nannette St., Bonita, Calif. 92002

Filed Mar. 26, 1976, Ser. No. 670,855

Int. Cl.² B30B ***3/04, 9/32***

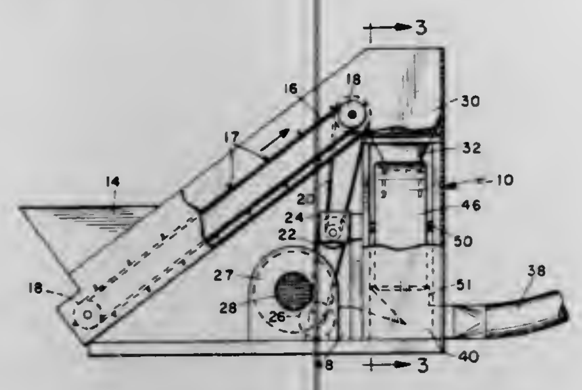
U.S. Cl. 100—91 **9 Claims**

1. A can crusher comprising:

a pair of wheels with one of said wheels having a resilient tire and the other wheel being non-resilient,

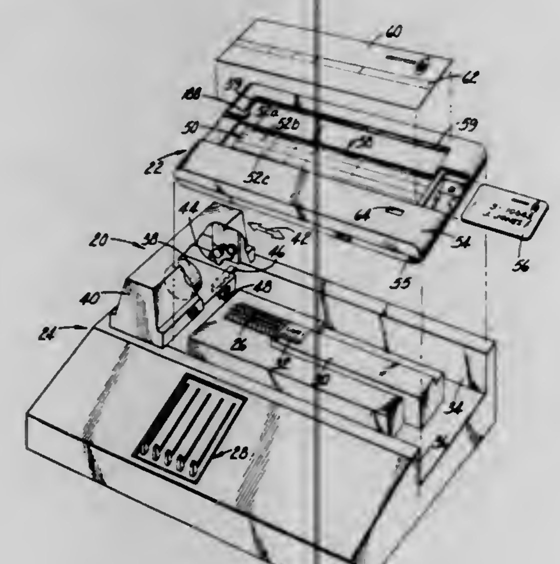
frame means for holding said wheels in abutting alignment with the outer circumferential surfaces touching,

said frame means including axles for supporting said wheels for relatively in line rotational movement,
motor means for rotating one of said wheels,
chute means for directing cans to be crushed into the intersecting contact of said wheels,



and said non-resilient wheel having outer projecting means on the outer surface thereof for being contacted by the outer circumferential surface of the resilient tire.

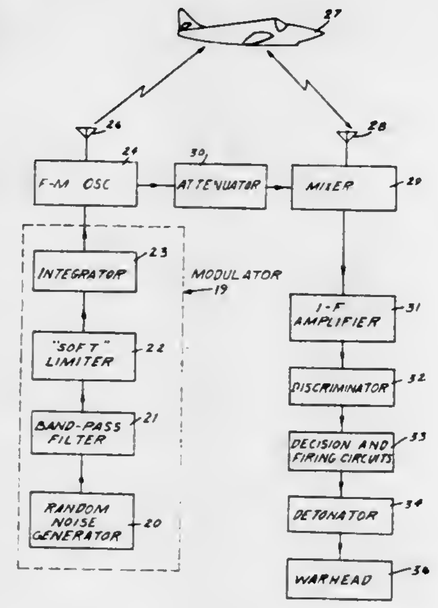
4,059,051
DATA RECORDER WITH PORTABLE CARTRIDGE
John A. Maul, Lyndhurst, and Richard E. Valentine, Mentor, both of Ohio, assignors to Addressograph Multigraph Corporation, Cleveland, Ohio
Filed Aug. 2, 1974, Ser. No. 494,071
Int. Cl.² B41F *3/04*
U.S. Cl. 101—45 **26 Claims**



2. A device for carrying an elongated record sheet having a plurality of transversely extending record areas, each adapted to receive printed information when brought into alignment with a print area, said device comprising:
a housing,
a take-up spool mounted for rotation in said housing to advance the record sheet,
means for fastening the record sheet to said take-up spool,
index stop means associated with said housing for preventing advance rotation of said take-up spool beyond a predetermined angular position whereby one of the record areas is brought into general alignment with the print area,
means for selectively releasing said index stop means to allow further rotation of said take-up spool beyond said predetermined angular position whereby another of the record areas may be brought into general alignment with the print area, said housing including a lid movable between an open position for loading the record sheet and a closed position, said release means being responsive to movement of said lid toward said closed position to release said index stop means.

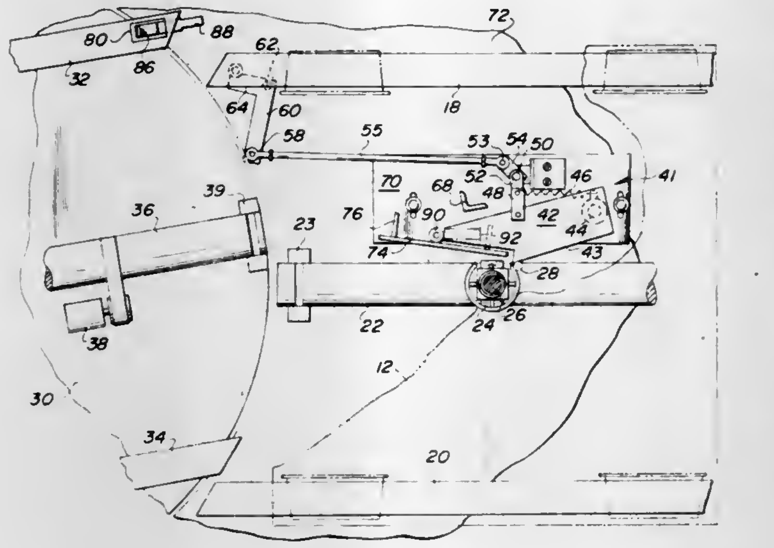
19. A transaction data recording apparatus for printing data along a print area, said apparatus comprising:
housing means,
imprint means including a carriage connected to said housing means and reciprocally movable in forward and reverse directions along a path from a home position and back to effect an imprint operation along the print area,
means for retaining a card bearing embossed data in a print position whereby the embossed data is in said print area, and
release means for releasing said retaining means from holding the card in said print position, said release means including first means responsive to movement of said carriage for causing release of said retaining means after imprinting of said embossed data during an imprint operation, said release means including second means for manually releasing said retaining means independently of said carriage operation.

4,059,052
FUZE MODULATION SYSTEM
Philip R. Karr, Torrance, Calif., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.
Filed Feb. 21, 1957, Ser. No. 641,783
Int. Cl.² F42C *13/04*
U.S. Cl. 102—70.2 P **3 Claims**



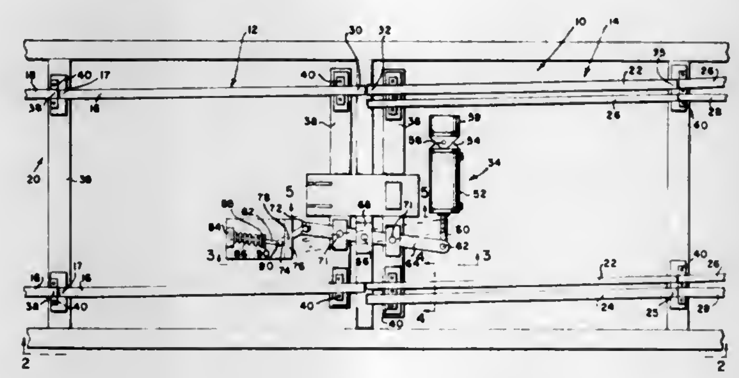
1. An improved noise-modulated distance-measuring fuze comprising in combination: an oscillator; a transmitting antenna coupled to said oscillator for radiating a signal towards a target; a modulator coupled to said oscillator to cause frequency modulation thereof, said modulator comprising a random noise generator, a band-pass shaper connected to the output of said noise generator for frequency shaping the random noise output thereof, a limiter coupled to said band-pass shaper for amplitude shaping the frequency-shaped noise output thereof, an integrator coupled to said limiter for integrating the frequency-shaped and amplitude-shaped output thereof, and means connecting the output of said integrator to said oscillator in such a manner as to frequency modulate said oscillator; a receiving antenna adapted to receive a portion of the signal radiated from said transmitting antenna after reflection from a target; mixer means for mixing the received signal from said receiving antenna with a local signal taken from said oscillator to produce a difference-frequency mixer output signal, said mixer output signal having a frequency spectrum peaked at a frequency greater than zero that decreases with decrease of fuze-to-target distance, the frequency at which the mixer output signal is peaked and the broadness of the spectrum in the vicinity thereof for a given fuze-to-target distance being dependent upon the characteristics of said band-pass shaper and said limiter; and means coupled to said mixer and responsive to the frequency at which said mixer output signal is peaked for functioning the fuze at a predetermined fuze-to-target distance.

4,059,053
DRIVERLESS VEHICLE TRAFFIC CONTROL SYSTEM
Vercoe C. Jones, Easton, Pa., assignor to S I Handling Systems, Inc., Easton, Pa.
Filed Aug. 27, 1975, Ser. No. 608,132
Int. Cl.² B60S *13/00;* **B61B** *13/00*
U.S. Cl. 104—35 **15 Claims**



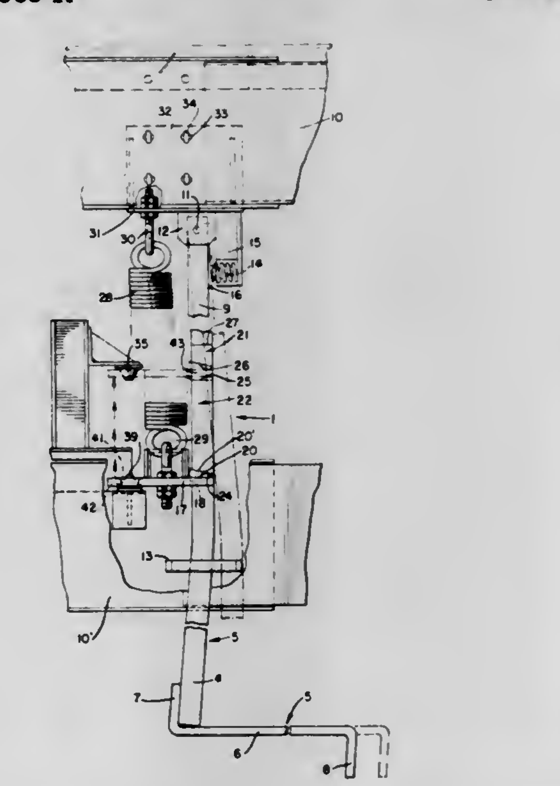
14. Apparatus for use in a driverless vehicle traffic control system comprising a table mounted for movement from a receiving position to a non-receiving position, a pair of tracks on said table for receiving a vehicle, a drive shaft on said table between said tracks, a motor means on said table for rotating said drive shaft about its longitudinal axis, and an actuator for initiating release of a vehicle stop means when said table is in its vehicle receiving position to receive a vehicle on said tracks, said actuator being supported by said table and projecting beyond the periphery of said table, a portion of said actuator being positioned for actuation by a portion of a vehicle passing said actuator portion to move said actuator from its release initiating position thereby to allow said stop means to return to its normally biased stopping position.

4,059,054
RAILROAD TYPE SWITCH
Mihai Alimanestianu, and Nicholas M. Alimanestianu, both of Upper Nyack, N.Y., assignors to Mihai Alimanestianu, Upper Nyack, N.Y.
Division of Ser. No. 438,021, Jan. 30, 1974, Pat. No. 3,918,665. This application Nov. 10, 1975, Ser. No. 630,329
Int. Cl.² B61J *3/00;* **B61L** *11/02;* **E01B** *7/00*
U.S. Cl. 104—88 **6 Claims**



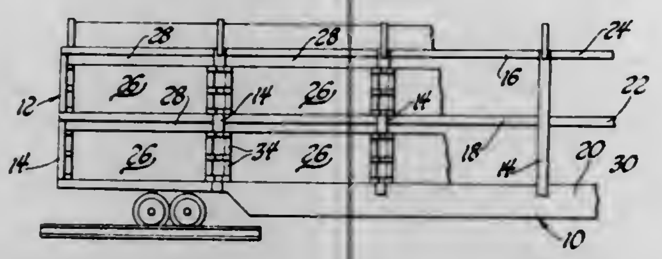
1. A tracked vehicle switch assembly operatively connected between a single main track and a pair of diverging tracks for directing a vehicle from said main track to one of said diverging tracks, said switch including, means on said vehicle for storing and displaying a destination representing one of said diverging tracks; means for detecting said destination on the vehicle as it approaches said switch assembly, at least one track section between said main track and said pair of diverging tracks; means for mounting said one track section for movement between two positions for selectively directing a vehicle on said main track to one of said diverging tracks; means responsive to said detecting means for moving said one track section into position corresponding to the detected destination, and means for locking said one track section in the position towards which it is moved while the vehicle is on said switch assembly; said detecting means including means for storing the detected destination of a vehicle while the rear wheels of a prior vehicle are still on said one track section to prevent operation of said moving means until said prior vehicle is off said at least one track section; and second means for moving said at least one track section independently of the first mentioned moving means and means on the vehicle for operating said second moving means to properly position said tracks before the front wheels of the vehicle pass from said track section.

4,059,055
RAILWAY CAR HINGE-DECK LOCK
Chandrakant D. Ravani, Farmington, and James C. Robertson, Ypsilanti, both of Mich., assignors to Portec, Inc., Oak Brook, Ill.
Filed Sept. 13, 1976, Ser. No. 722,821
Int. Cl.² B61D *3/02*
U.S. Cl. 105—368 R **10 Claims**



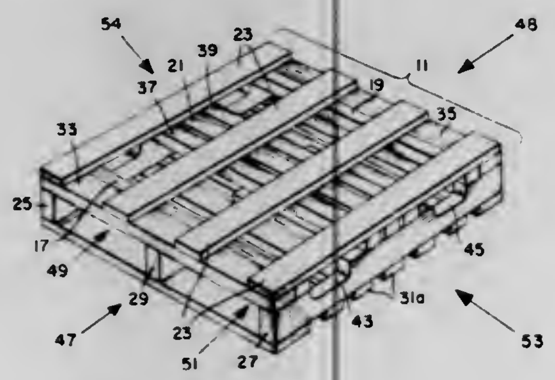
1. In a multi-level auto rack railway car having a hinge-deck section, the improvement comprising, a deck section lock mechanism including, a locking lever having an upper portion pivotally attached to said car and a lower portion depending to a point below said deck section, a catch plate on said deck section having an outer edge juxtaposed said lever, an upper and lower wedge bar on said lever spaced apart from one another to provide an opening therebetween, a wedge plate on said catch plate adjacent said outer edge, fixed upper and lower seat elements on said car disposed above and below said catch plate defining respectively upper and lower limits of displacement of said deck section whereby, when said deck section is lowered to engage said lower seat element said lever may be pivoted to position said lower wedge bar in overlying relationship with said wedge plate and when said deck section is raised to engage said upper seat element said lever may be pivoted to position said wedge plate within said opening between said upper and lower wedge bars.

4,059,056
RAILWAY SIDE PARCEL INSTALLATION
Angus L. Berryman, Dearborn Heights; Gene R. Hooper, Livonia, and Richard E. Hague, Franklin, all of Mich., assignors to Rax, Incorporated, Waterford, Mich.
Filed Jan. 26, 1976, Ser. No. 652,561
Int. Cl.² B60P *3/10;* **B61D** *3/02, 17/08;* **B62D** *25/02*
U.S. Cl. 105—368 R **10 Claims**



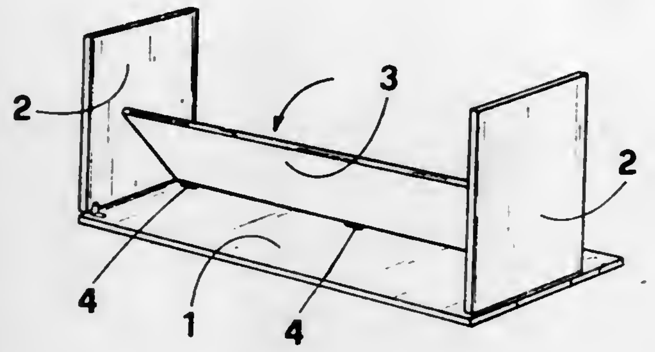
1. Means for providing protective cover walls on the sides of carrier racks used by the railroads to transport automotive and other vehicles, and comprising; panel wall sections of sufficient width for spanning the distance between next adjacent vertical frame members of the carrier racks, channel sectioned members having the ends of said panel wall sections received in relatively adjustable frictional engagement there within, and means for clamping and relatively securely fastening said channel sectioned members to the vertical frame members and for thereby in turn relatively retaining said panel wall sections relatively self and otherwise adjustably engaged thereto in general use.

4,059,057
PALLET ASSEMBLY
Joseph W. Carnwath, Pipersville, Pa., assignor to Pennsylvania Pacific Corporation, Warminster, Pa.
Filed July 12, 1976, Ser. No. 704,400
Int. Cl.² B65D *19/00*
U.S. Cl. 108—51.1 **2 Claims**



1. A pallet comprising
deckboards with runners depending therefrom,
positioning means on said pallet for positioning and locating an expendable skid on the pallet,
said positioning means comprising a pair of deckboards spaced apart to form a position-location groove adapted to receive an alignment runner of said expendable skid, and an expendable skid placed on said pallet,
said skid having a deckboard and runners depending therefrom,
said skid runners including an alignment runner depending from the skid deckboard,
said skid alignment runner being placed in said pallet position-location groove to properly position said skid on said pallet, whereby said groove confines the alignment runner on both sides from movement in either direction transverse to said groove.

4,059,058
REDUCIBLE VOLUME DESK
Takahama Kazuhide, Bologna, Italy, assignor to Simon Internationl S.p.A., Bologna, Italy
Filed Aug. 23, 1976, Ser. No. 716,935
Claims priority, application Italy, Apr. 9, 1976, 3396/76
Int. Cl.² A47B *3/08*
U.S. Cl. 108—129 **1 Claim**

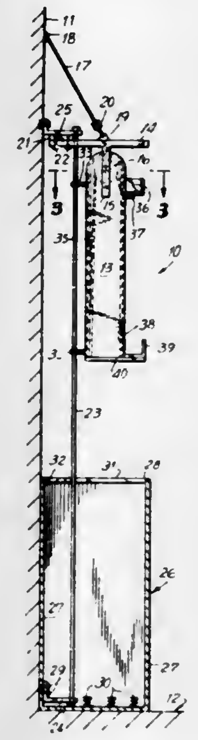


1. A reducible volume desk comprising a first member (1) which acts as a support platform; two second members (2) connected perpendicularly to the aforementioned first member to define two parallel walls supporting the first member; and a third member (3) which acts as a wall and is connected to the lower surface of the support platform and, perpendicularly, to the above-mentioned second members; said second and third members being foldable, one on the other, in parcel form, on the lower surface of the support platform; and
wherein said third and the said second members are connected by hinges to the lower surface of the support platform in such a way that said third member can be folded, in parcel form, on the lower surface of the support platform and that said second members can be folded onto the previously folded third member, the connection between said third and said second members being removable; and
wherein each said hinge connecting the second members to the support platform includes: a first body (11), virtually of "L" shape, a first flange (13) of which is fixed integrally to the lower surface of the support platform of the desk; and a second body (12), virtually of "L" shape, a first flange (14) of which is fixed integrally in a notch provided for this purpose in the upper border of one of said second members, said first flanges of said first and second body being arranged parallel to one another and second free flanges (15) and (16), respectively, being parallel and adjacent; said second body being provided, at a point corresponding to where the first flange (14) joins with the second free flange (16), with a slot (17) inside which is inserted, in a complementary fashion, an extremity of the free flange (15) of said first body; a hinge connection pin (18), the axis of which is parallel both to the plane of said first member and to that defined by said second member, passing through the first flange (14) of the second body (12) in a direction toward the second flange thereof and into a vertex of said extremity of the free second flange (15) of the first body and through said slot (17), the distance the axis of said pin is away from the lower surface of the support platform being no less than the thickness of said third member.

4,059,059
PROTECTIVE SYSTEM
Bernard J. Hughes, 6 E. 37th St., New York, N.Y. 10016
Filed Sept. 26, 1975, Ser. No. 616,956
Int. Cl.² E05G *1/00*
U.S. Cl. 109—1 R **1 Claim**

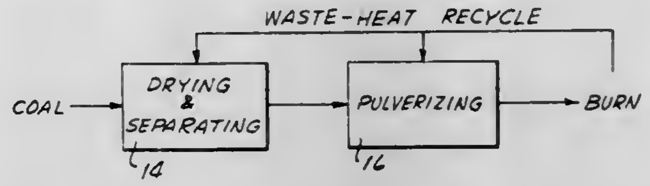
1. An aesthetically pleasing system for use in protecting articles of value, such as originally framed paintings or the like, from an undesirable environment, comprising, in combination: a protective enclosure capable of isolating its contents from water, fire and heat, said enclosure having five substantially

sealed walls joined with one another and an upper cover hinged along one edge, said cover being movable between sealing and open positions, said enclosure further including cushioning spring means disposed at an inner base thereof, said enclosure also including an anchor bracket located within said five walls, an article support assembly secured by means of a fuse retainer at an exhibiting elevation above said protective enclosure, said article support assembly including a substantially flat plate member integral with a pair of depending strut members which carry the weight of an article of value supported therebetween, said plate member being of a predetermined size and shape conforming to the size and shape of an enclosure opening normally sealed by said cover, said fuse retainer releasably holding said article support assembly at said exhibiting elevation and being responsive to an emergency signal which will cause the release of said plate and strut members thereby enabling their descent under the influence of gravity, and guide means interconnected between said support assembly and said protective enclosure for guiding the path of said article of value upon said release by the fuse retainer in response to said emergency signal, said path terminating with said article and article support assembly coming to cushioned rest against said cushioned spring means within said protective enclosure that is sealed shut by sealing contact between said



flat plate member and enclosure surfaces defining said enclosure opening, said article support assembly further including movable curtain means resistant to said undesirable environment for protecting an article of value, means for guiding the path of said movable curtain means, weight means for influencing the movement of said curtain means, stop means for limiting the movement of said curtain means, and retaining means responsive to heat for initially retaining said curtain means in an initial position, said movable curtain means including a pulley assembly supported by said article support assembly, at least one curtain supported by said pulley assembly in an initial position and movable with portions within track recesses to an emergency position, said weight means comprising a relatively heavy member integral with a forward portion of said curtain, said retaining means comprising a fuse which is responsive to heat disposed with portions thereof in the gravitational path of said heavy member, said stop means comprising a bracket member of a shape adapted to receive and obstruct the path of said heavy member, whereupon at a predetermined environmental temperature said fuse and said fuse retainer will respond, thereby causing both the curtain to fall under the influence of said heavy member into an emergency position covering the article of value and the entire article support assembly and covered article to descend into the protective enclosure.

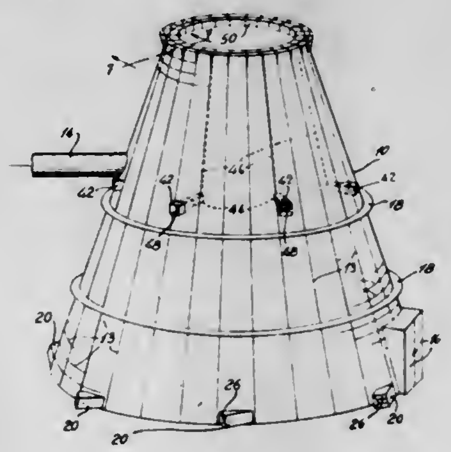
4,059,060
METHOD AND APPARATUS FOR COAL TREATMENT
Gerard C. Gambs, New York, N.Y., and Horace P. Morgan, Plainfield, N.J., assignors to Ford, Bacon & Davis, Incorporated, New York, N.Y.
Filed Mar. 29, 1976, Ser. No. 671,111
Int. Cl.² F23K *1/04*
U.S. Cl. 110—1 J **12 Claims**



1. The method of upgrading subbituminous coal and/or lignite fuel product non-complying with an applicable SO_x:Btu standard during the combustion thereof, comprising drying said fuel product at the combustion site to lower the total moisture content thereof from between about 15 and 45 percent to between about 4 and 7 percent to concomitantly raise the heating value of said fuel product sufficiently so that said SO_x:Btu standard will be met during the combustion of said fuel product, and thereafter burning said fuel product while it is in the latter total moisture content range.

6. Apparatus for upgrading solid particle subbituminous coal and/or lignite fuel product non-complying with an applicable SO_x:Btu standard during the combustion thereof, comprising means for drying said fuel product at the combustion site, and including separating means for removing heavier weight ash particles from said fuel product prior to the burning thereof to lower the sulfur content thereof.

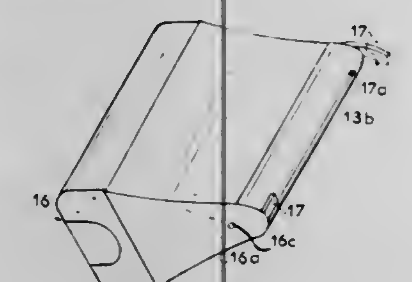
4,059,061
WASTE BURNER OVERFIRE DRAFT SYSTEM
George Kahlert; Lawrence Pommer, both of Prince George; John Davis, and Bert Whebell, both of Houston, all of Canada, assignors to Northwood Pulp and Timber Limited, Prince George, Canada
Filed Dec. 3, 1975, Ser. No. 637,401
Int. Cl.² F23G *7/00;* **F23H** *9/00*
U.S. Cl. 110—7 A **21 Claims**



1. For use with a waste burner which burns wastes at a base in the interior thereof, an overfire draft system comprising:
a. air vents arranged circumferentially around the base of the burner for communicating the interior of said burner to the atmosphere; and
b. a draft modulated damper plate located in each air vent for automatically regulating the volume of overfire air delivered to the interior of the burner, said draft modulated damper plate being provided with a lower lip which is deflected by a predetermined angle with respect to the plate to create an aerodynamic lift effect with a large opening moment to assist the damper plate in its response under low air velocity conditions, and an oppositely deflected upper lip with proportionally less bent surface to

avoid hunting of the damper plate as it approaches the maximum open position and to provide added dynamic opening force.

4,059,062
SEWING MACHINE HAVING A DUAL-PURPOSE COMPLEMENTARY CASE
Georges Drevet, 24 Rue Francisque Vovtier, 42100 Saint-Etienne, Loire, France
Division of Ser. No. 368,686, June 11, 1973. This application Dec. 2, 1975, Ser. No. 636,952
Claims priority, application France, June 12, 1972, 72.21520; Mar. 14, 1973, 73.09815
Int. Cl.² D05B *75/00*
U.S. Cl. 112—258 **11 Claims**

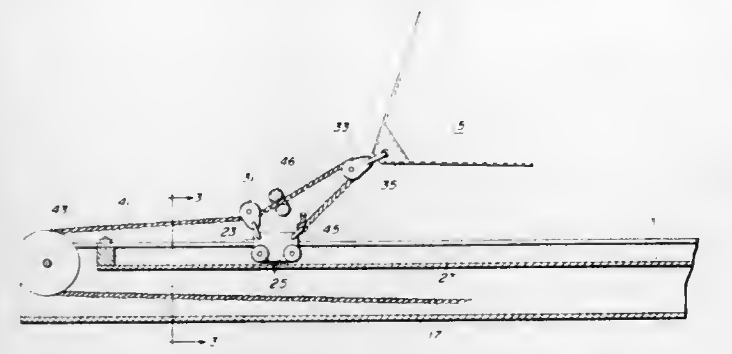


1. The combination of a sewing machine and a dual-purpose complementary case, said machine comprising components including a pedestal, a cantilever arm projecting horizontally from said pedestal, a vertical body extending upwardly from said pedestal, an upper arm extending horizontally from said vertical body at a level above said pedestal, and a head on said upper arm disposed above said cantilever arm, said components having generally curvedly and largely rounded portions, said pedestal having a transverse cross-sectional shape which is symmetrical in thickness relative to a horizontal median plane therethrough, said cantilever arm extending from said pedestal in the lengthwise direction thereof and being of reduced width relative to said pedestal, said cantilever arm and head being symmetrically located with respect to a common vertical plane, said cantilever arm having an upper planar surface forming a substantially coplanar extension with the upper surface of said pedestal, said case comprising a base defining an enclosure having an open mouth, said base being shaped in correspondence with said pedestal to fittingly receive the same and said cantilever arm therein, a plurality of flap means hingedly connected to said base at said open mouth for undergoing inward pivotal movement to engage said upper arm and head and substantially enclose the same and said vertical body to form a protective closure therefor for transport of said machine, said case being removable from said machine and said flap means being foldable to a position within said enclosure, said case having aperture means for penetration of said cantilever arm therein with the case inverted from the position in which said case fittingly receives said pedestal, said base in said inverted position forming an extension of said upper surface of said cantilever arm and of said pedestal to provide a large work surface.

4,059,063
ROLL-FURLING MAINSAIL
Frederick E. Hood; Donald K. Mitchell, and Gary S. Uhring, all of Marblehead, Mass., assignors to Hood Sailmakers, Inc., Marblehead, Mass.
Filed Aug. 30, 1976, Ser. No. 718,870
Int. Cl.² B63H *9/10*
U.S. Cl. 114—106 **6 Claims**

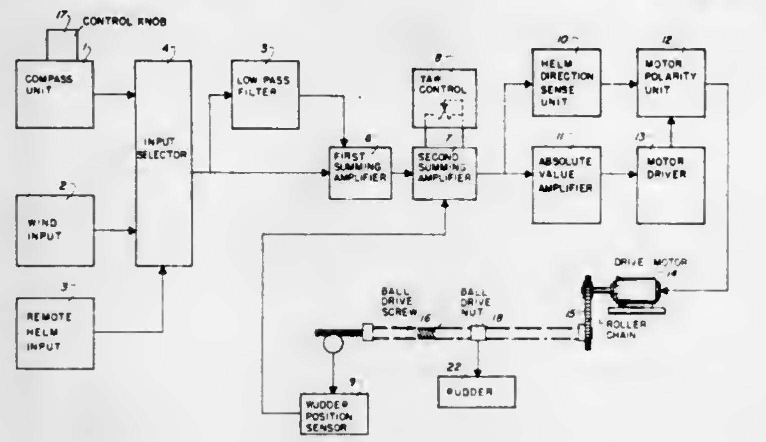
1. In a sailboat having a mainsail which is roll-furling at the luff edge thereof, outhaul apparatus for securing the clew of the mainsail to a boom at varying stages of partial furling, said apparatus comprising:

a car which is freely slidable along the boom in dynamic response to forces exerted on said car;
a block carried by said car;
a block at the clew of said mainsail; an outhaul line rigged to pull aft from the tip of the boom, said line passing from the



tip of the boom forward through the block on said car, thence through the block on the sail and then back to the car where it is secured to the car, whereby the balance of forces exerted on said car by said line bias said car to a position along said boom providing an advantageous drawing angle for shaping said mainsail.

4,059,064
MARINE AUTO PILOT
Baron Christian Dickey, Palo Alto, Calif., assignor to Alpha Marine Systems, Inc., Sunnyvale, Calif.
Filed Apr. 5, 1976, Ser. No. 673,798
Int. Cl.² B63H *25/02*
U.S. Cl. 114—144 E **10 Claims**



1. Apparatus for producing a voltage correlated in magnitude and polarity to the relative rotative position between a first member and a second member rotatable relative to said first member on a rotational axis, comprising:

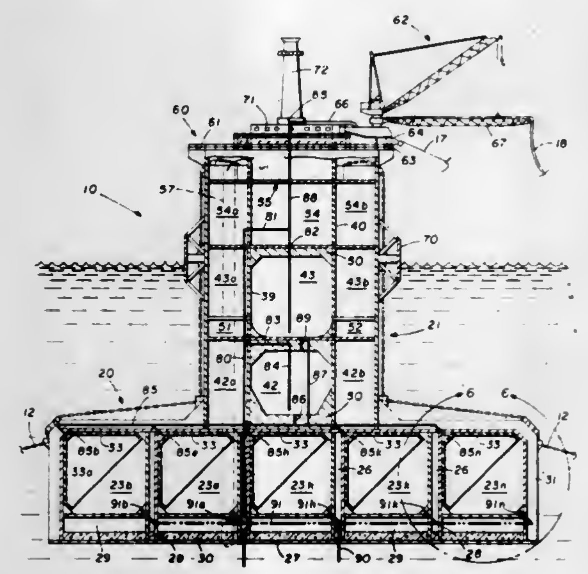
a. A Hall-effect element fixed to said first member and positioned on said rotational axis.
b. First and second permanent magnets producing individual magnetic fields and fixed to said second member symmetrical to said rotational axis, said magnets each having north and south poles, the north pole of said first magnet and the south pole of said second magnet being diametrically spaced apart and of large diameter relative to the space between them, to form a high intensity, additive and homogeneous magnetic field there between for the purpose of driving said Hall-effect element and being disposed so that said Hall-effect device is located substantially centrally within said high intensity additive and homogeneous magnetic field, senses and high intensity, additive and homogeneous magnetic field and is substantially non-responsive to the earth's magnetic field, the south pole of said first magnet and the north pole of said second magnet being sufficiently remote from said additive and homogeneous magnetic field to avoid substantial influence upon said Hall-effect element.

10. In an auto pilot for a marine vessel sailing in the presence

of perturbing frequencies, and producing a signal having a magnitude and polarity correlated to the deviation of the actual heading from the desired headings, a method for processing said signal to minimize the effect of perturbing frequencies comprising the steps of;

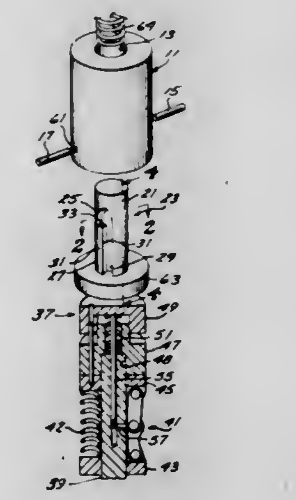
a. attenuating relatively high frequency portions of said signal to produce an attenuated signal;
b. summing the signal and the attenuated signal;
c. determining the absolute value of said summed signal;
d. determining the polarity of said summed signal;
e. steering the vessel in a direction dictated by the polarity and at a rate dictated by the absolute value of said signal.

4,059,065
SEMISUBMERSIBLE LOADING MOORING AND STORAGE FACILITY
Robert L. Clark, Greenlawn, N.Y., and Paul C. Dahan, Pittstown, N.J., assignors to Mobil Oil Corporation, New York, N.Y.
Filed Feb. 7, 1977, Ser. No. 766,163
Int. Cl.² B65D *89/10*
U.S. Cl. 114—256 **13 Claims**



1. A semisubmersible storage facility comprising:
a submerged storage section comprising:
a plurality of dual crude/water tanks;
a flexible diaphragm installed internally in each of said plurality of dual crude/water tanks, said diaphragm being postioned to continuously separate crude from water as the fluids in each dual crude/water tank charges from substantially one hundred per cent crude to substantially one hundred per cent water or from one hundred per cent water to one hundred per cent crude; and
means for spacing and connecting said dual crude/water tanks together to form said submerged storage section having void spaces defined between adjacent dual crude/water tanks, said void spaces adapted to be flooded with water;
a central tower section affixed at its lower end to said submerged storage section and extending to a point substantially above the waterline when said facility is in an operable position;
a plurality of crude only tanks positioned in said central tower section;
means adapted to be connected to a crude supply source for filling said crude only tanks with crude;
means for fluidly connecting said crude only tanks to the upper side of said diaphragm in each of said dual crude/water tanks in said submerged storage section for moving crude to or from each of said dual crude/water tanks whereby said dual crude/water tanks can be filled with or emptied of crude from said crude only tanks; and
means adapted to be connected to a water supply source for supplying or draining water to or from the lower side of said diaphragm in each of said dual crude/water tanks.

4,059,066
MECHANICAL MOTION SENSOR
Reinhold Grassl, 142 S. Miraleste Drive, Apt. No. 203, Miraleste, Calif. 90732
Filed May 28, 1976, Ser. No. 690,950
Int. Cl.² G01P *13/00*
U.S. Cl. 116—115 **10 Claims**

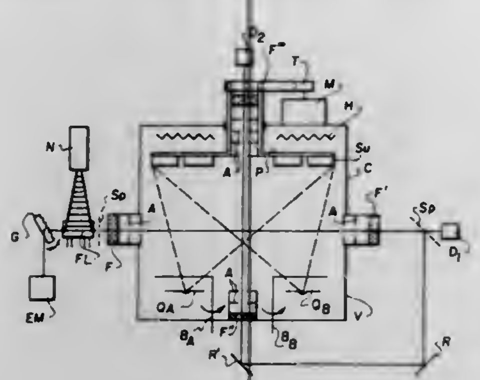


1. A motion sensor comprising:
a housing formed with an elongated float chamber and including stop means projecting into said chamber and formed with a stop face facing longitudinally in one direction;
an elongated float telescoped into said chamber, said float being sized for free rotation about its longitudinal axis and longitudinal travel in said chamber and having a first position at one end of its longitudinal travel, a second position at the opposite end thereof and an intermediate sensing position;
abutment means on said float and including an abutment surface facing said stop when said float is in its first position for engaging said stop;
passage means in said float extending longitudinally past one side of said abutment means; and
alignment means normally aligning said abutment surface longitudinally with said stop face when said float is in its first position whereby rotational and longitudinal travel of said float in said chamber from said first position to proximate said sensing position will cause said surface to clear said stop face thus causing said stop means to be received in said passage means for further longitudinal travel of said float relative to said housing thus indicating such rotation has occurred.

4,059,067
APPARATUS FOR DETERMINING THE RATE OF FLOW OF PARTICLES IN A VACUUM DEPOSITION DEVICE
Marcel Lardon, Maienfeld, Switzerland, and Hans Pulker, Triesen, Liechtenstein, assignors to Balzers Patent-Und Beteiligungs-Aktiengesellschaft, Liechtenstein
Division of Ser. No. 619,528, Oct. 3, 1975. This application June 15, 1976, Ser. No. 696,410
Claims priority, application Switzerland, Oct. 9, 1974, 13668/74
Int. Cl.² C23C *13/00;* **G01N** *21/22*
U.S. Cl. 118—7 **2 Claims**

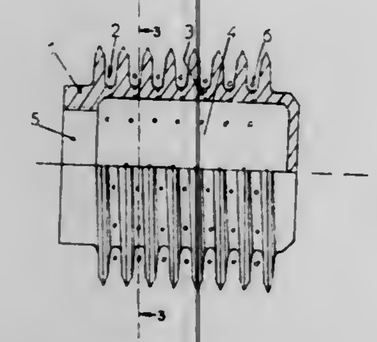
1. A vacuum deposition device comprising a housing having a vacuum chamber, means for holding a substrate to be coated in said vacuum chamber, means for holding the coating material and for establishing a current of particles from the material across the chamber to the substrate holding means, means for directing a first laser beam through the particle current, further

means for directing a second laser beam through the particle current at an angle from the first laser beam and receivers for



measuring the intensity of first and second laser beams after their passage through said particle current.

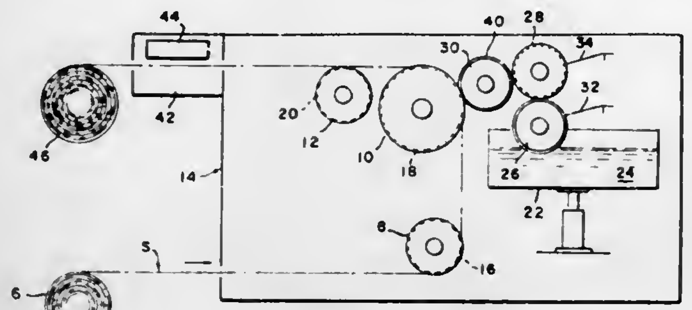
4,059,068
APPARATUS FOR TREATING FILAMENTARY PRODUCTS
René Guillermin, Bron; Jean Joly, Craponne, and Sylvio Sangalli, Caluire, all of France, assignors to Rhone-Poulenc-Textile, Paris, France
Division of Ser. No. 583,914, June 5, 1975, Pat. No. 4,020,196. This application Sept. 30, 1976, Ser. No. 728,381
Claims priority, application France, June 10, 1974, 74.20253
Int. Cl.² B05C *3/15*
U.S. Cl. 118—420 **4 Claims**



1. Apparatus for treating and advancing a textile yarn with minimal friction comprising
a static cylindrical body having
an internal chamber, and
an external surface, said external surface having
at least one groove therein, said groove having a depth at least equal to the diameter of the yarn to be treated,
suspension means for suspending a yarn in a treating fluid in said groove and for advancing the yarn along said grooves, said suspension means including
pressurized fluid supply means communicating with said internal chamber, and
a channel in communication with said orifice and said chamber, said channel being substantially parallel to a tangent to said cylinder to deliver pressurized fluid from said chamber through said orifice at an angle having a component in the direction of advancement of said yarn.

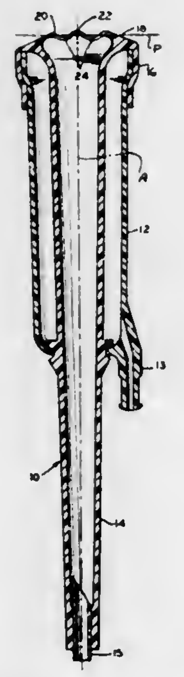
4,059,069
COATING APPARATUS
Donald T. Ford, Mountain View, Calif., assignor to The Arnold Engineering Company, Marengo, Ill.
Filed Aug. 30, 1976, Ser. No. 718,738
Int. Cl.² B05C *1/00*
U.S. Cl. 118—642 **1 Claim**

1. Apparatus for depositing a coating material on preselected areas of an elongated strip which in a continuous system comprises coating material depositing means, means for passing said strip through said coating material depositing means to deposit coating material on the surface of one side of said strip, ink depositing means, means for passing said strip with said coating thereon through said ink depositing means to deposit ink only on said preselected areas, ink curing means, means for passing said strip with ink deposited thereon through said ink curing means to cure said deposited ink, strip etching means, means for passing said strip with said cured ink thereon through said strip etching means to remove coating material from that portion of the strip not covered by said cured ink, ink



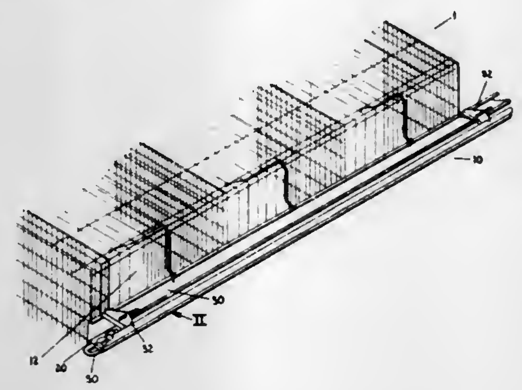
removing means, and means for passing said strip from said strip etching means through said ink removing means to remove the ink therefrom, said ink depositing means including a reservoir having said ink therein, an inking wheel above and extending downwardly into said ink and a rotagravure wheel having its periphery in contact with said inking wheel and with an applicator roll and said applicator roll having a peripheral groove of slightly larger width than said strip, indexing projections adapted to operatively associate with indexing holes in said strip and coating projections corresponding to said preselected areas on said strip.

4,059,070
MILKING INFLATIONS
Don F. Siddall, Bath, and Vincent L. Hoffman, Akron, both of Ohio, assignors to Hi-Life Rubber Co., Inc., Johnson Creek, Wis.
Continuation-in-part of Ser. No. 9,197, Feb. 6, 1970, Pat. No. 3,661,120. This application Nov. 29, 1971, Ser. No. 202,853
The portion of the term of this patent subsequent to May 9, 1989, has been disclaimed.
Int. Cl.² A01J *5/04*
U.S. Cl. 119—14.47 **3 Claims**



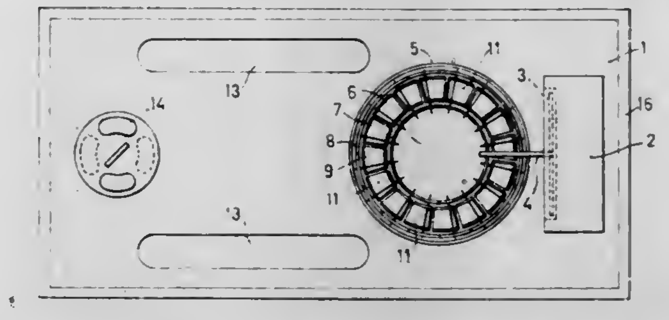
1. A milking inflation comprising an elongated, tubular body portion, a generally cylindrical cuff portion merged with one end of said body portion and a teat-receiving collar extending inwardly from generally the point of merger of said body and cuff portions, and extending conically upwardly beyond the end of said body portion when said cuff portion is folded down over the former, the inner periphery of said collar (a) being of generally uniform thickness, (b) having a generally circular configuration about its perimeter and (c) being formed of a series of contiguous wave forms free of sharp corners representing periodic oscillations above and below a plane passed through the center of said inner periphery perpendicularly to the major axis of said body portion, so that a portion of the true length of said inner periphery lies above said plane and a portion lies below said plane, said true length of said inner periphery along said wave forms exceeding the finite length of said periphery projected onto said plane, the portion of said true length of said inner periphery lying above said plane being unequal to the portion lying below said plane.

4,059,071
POULTRY CAGE SYSTEM WITH CONTROLLED FEEDER
Robert L. Van Huis, Zeeland, and Charles T. Carten, Grand Rapids, both of Mich., assignors to U.S. Industries, Inc., New York, N.Y.
Continuation of Ser. No. 590,695, June 26, 1975, abandoned, which is a continuation-in-part of Ser. No. 477,698, June 26, 1974, abandoned. This application July 26, 1976, Ser. No. 708,359
Int. Cl.² A01K *39/00*
U.S. Cl. 119—18 **8 Claims**



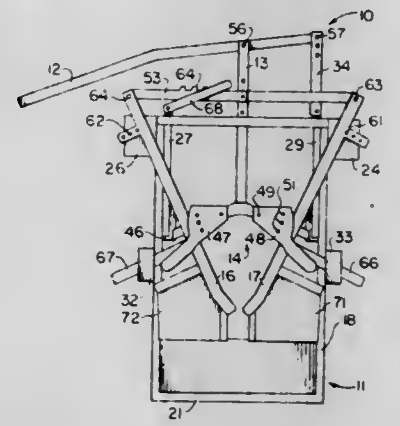
1. A poultry cage system having controlled feeding apparatus including:
a series of cages having at least portions thereof constructed of material constructed to permit poultry within said cage to reach and feed therethrough;
a feeding trough mounted on and along said cages adjacent said portions;
a feed carrier in said trough and having drive means therefor;
a movable cover means movable to a closed position to prevent access by poultry within said cage to feed within said trough and movable to an open position to permit poultry to feed from said trough through said portions;
a cable means for actuating said cover means causing said cover means to move from closed to open position;
said cable means running in a direction along said series of cages;
guide means mounted on said portions of said cages at spaced intervals along said series of cages for directing and guiding portions of cable means to said cover; and
actuating means for pulling said cable means in a direction along said series of cages and for releasing the same to effect closing and opening of said cover means; and control means for causing timed operation of said drive means for said feed carrier and of said actuating means for said cable means.

4,059,072
AUTOMATIC AQUARIUM LIGHTING AND FISH FEEDING DEVICE
Emmanuel Vassallo, and Helen I. Vassallo, both of No. 8855 Wyandotte St., East, Windsor, Ontario, Canada
Filed June 2, 1976, Ser. No. 692,130
Int. Cl.² A01K *61/02*
U.S. Cl. 119—51.13 **3 Claims**



1. An automatic aquarium lighting and fish feeding device comprising in combination a flat plate of dimensions to fit the top of an aquarium; a timer of the type having a revolving face and "ON" and "OFF" tabs; at least one rod attached to said "ON" tab and at right angles to said rotating face; a circular turntable located in front of said timer, rotating on a center pin which is fixed to said plate; a wall attached to the periphery of the turntable provided with equally spaced notches in its upper edge by means of which the said timer rod engages the turntable to cause it to rotate; a ring of the same width as the turntable wall concentric with said turntable and spaced from it equipped with notches which correspond with those in the wall of the turntable also for engaging the timer rod; a plurality of equally and radially spaced pins which join the said ring to the wall of the turntable; a plurality of consecutive open end food carrying scoops located in the space between said ring and said turntable; the scoops being pivotally supported by the said radially spaced pins; a single hole through said plate located in the path of said scoops and just large enough to permit the passage through it the open end of a single pivoted scoop; openings in said plate for the passage of light to the aquarium water; and a cover equipped opening in the plate for alternative manual feeding.

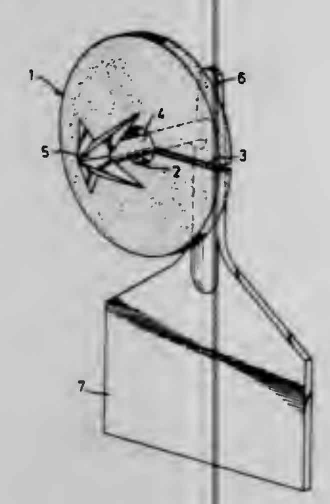
4,059,073
HEAD GATE
Thomas A. Roark, 221 N. Alexander St., Clay Center, Nebr. 68933
Filed Nov. 5, 1976, Ser. No. 739,229
Int. Cl.² A61D *3/00*
U.S. Cl. 119—98 **10 Claims**



1. A head gate comprising:
a. an upright main frame having a pair of transversely spaced side members and a horizontal member affixed at its ends to said side members;
b. a vertical slide member vertically slidably engaged with said horizontal member, said slide member having a first end below said horizontal member and a second end thereabove;

c. an ear block affixed to, and depending from, said first end of said vertical slide member, said ear block including a curved surface for engaging the back of the neck of an animal;
d. a pair of elongate jaw locks pivotally connected, respectively, to said side members such that the lower ends thereof are between said side members;
e. a pair of pivot arms pivotally connected, respectively, to said elongate jaw locks, above the pivot point thereof with said side members, and said vertical slide member, above said horizontal member; and
f. means for moving said vertical slide member in a vertical direction whereby said ear block and jaw locks may be selectively moved together to substantially close the opening therebetween or moved apart to increase the opening.

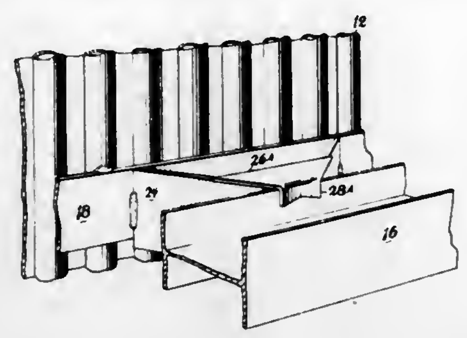
4,059,074
DEVICE AND PROCESS FOR THE CONTROL OF EAR TICKS
Richard Fürer, Basel; Paul Halter, Bottmingen, and Klaus Wettstein, Runenberg, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.
Filed June 14, 1976, Ser. No. 695,690
Int. Cl.² A01K *13/00*
U.S. Cl. 119—156 **6 Claims**



1. Device for the control of ear ticks on productive and domestic animals, which device comprises an active-substance carrier and a holding arrangement therefor said holding arrangement comprising a pin made from thermoplastic material, which has at one end a point provided with a barb and at the other end an extension; whereby said active-substance carrier is in the form of a disk made from sintered thermoplastic material, in the surface of which is an opening for the location of said pin, which opening is connected with the rim of the disk by a slot, by means of which said pin can be inserted into said opening.

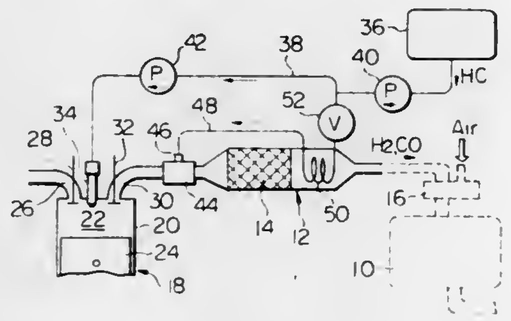
4,059,075
BUCKSTAY ARRANGEMENT
Eugen Ssinegurski, Simsbury, and Donald Wilkinson, West Hartford, both of Conn., assignors to Combustion Engineering, Inc., Windsor, Conn.
Filed Nov. 8, 1976, Ser. No. 739,898
Int. Cl.² F22B *37/24*
U.S. Cl. 122—6 A **6 Claims**

1. A steam generating unit having a rectangular furnace comprised of vertical walls formed by a series of adjacent upright tubes, a buckstay arrangement of horizontal beams extending transversely around the vertical walls of said furnace in spaced arrangement to provide a support therefor, means slidably connecting the vertical tubes of said wall to the buckstay arrangement comprising a tie plate secured to said tube wall including a first flange extending horizontally outward therefrom toward the adjacent buckstay, and an angular retainer having a horizontal flange thereof secured to the first horizontal flange and a vertical flange thereof arranged to slidably embrace an outer surface of said buckstay, said verti-



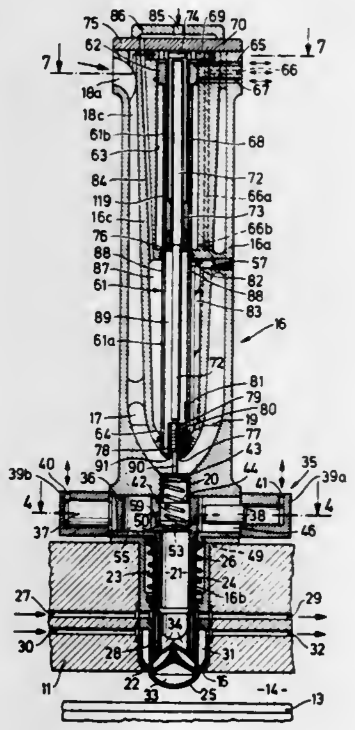
cal flange being bent to present a convex surface that slidably abuts said buckstay to permit pivotal movement therebetween.

4,059,076
METHOD AND APPARATUS FOR GENERATING REFORMED GAS CONTAINING HYDROGEN AND CARBON MONOXIDE FROM HYDROCARBON FUEL
Katuaki Kosaka, Hidaka, and Zene Ueno, Tokyo, both of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan
Filed Apr. 13, 1976, Ser. No. 676,479
Claims priority, application Japan, Apr. 21, 1975, 50-48323
Int. Cl.² F02B *43/08, 75/20;* **C10J** *3/00*
U.S. Cl. 123—3 **12 Claims**



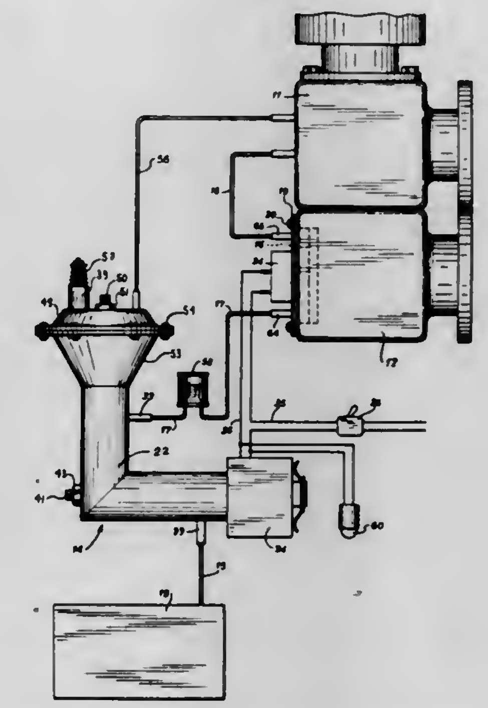
1. A fuel system of an internal combustion engine, comprising:
an auxiliary internal combustion engine of a smaller displacement than the firstly recited internal combustion engine;
first means for supplying a hydrocarbon fuel to said auxiliary internal combustion engine at such a rate that said hydrocarbon fuel is subjected to combustion in said auxiliary internal combustion engine in the presence of excess air;
a reformer forming therein a reaction chamber adapted to cause partial oxidation reactions of said hydrocarbon fuel to give a gaseous reformed fuel containing as combustible components essentially hydrogen and carbon monoxide;
a first conduit connecting said auxiliary internal combustion engine to said reformer for supplying the exhaust gas of said auxiliary internal combustion engine to said reformer while said exhaust gas is at an elevated temperature;
second means for supplying said hydrocarbon fuel to said reformer at a controlled rate such that said exhaust gas and said hydrocarbon fuel are supplied to said reaction chamber in a predetermined proportion; and
a second conduit connecting said reformer to the firstly recited internal combustion engine for passing therethrough a gas which is discharged from said reaction chamber and includes said reformed fuel.

4,059,077
RECIPROCATING INTERNAL COMBUSTION ENGINE FOR OPERATION WITH FUEL IN POWDER FORM
Anton Steiger, Illnau, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland
Filed Aug. 16, 1976, Ser. No. 714,812
Claims priority, application Switzerland, Apr. 7, 1976, 4355/76
Int. Cl.² F02B *45/00*
U.S. Cl. 123—23 **14 Claims**



1. In a reciprocating internal combustion engine for operation with fuel in powder form, the combination comprising
an engine cylinder head having a combustion chamber and a piston movably mounted in said combustion chamber;
a valve piston slidably mounted in said cylinder head for movement into and out of said combustion chamber, said valve piston having outlets therein for expelling fuel into said combustion chamber;
a housing mounted on said cylinder head;
a fuel collecting chamber in said housing;
a fuel transfer channel communicating said fuel collecting chamber with said valve piston to deliver fuel into said valve piston;
a closing means disposed intermediately of said fuel transfer channel, said means including a slider block movably transversely of said transfer channel and having a passage therein for selective alignment in said fuel transfer channel, a recess for selective alignment with said fuel transfer channel, a piston movably mounted in said recess, and spring means for biasing said latter piston out of said recess towards said fuel collecting chamber;
a dosing and ejecting member aligned with said transfer channel for expelling a charge of fuel from said fuel collecting chamber through said slider block passage and said transfer channel into said valve piston;
adjusting means for adjusting the position of said dosing and ejecting member relative to said piston in said slider block to vary the charge of fuel therebetween; and
control means for cyclically moving said dosing and ejecting member, said slider block and said valve piston in timed sequence to eject a charge of fuel into said combustion chamber.

4,059,078
STEAM INJECTION APPARATUS
Raul Ramiro de la Rosa, Retorno 805 No. 23, Colonia Centinela, Mexico City 21, Mexico
Continuation of Ser. No. 504,614, Sept. 9, 1976, abandoned. This application July 1, 1976, Ser. No. 701,933
Int. Cl.² F02D *19/00*
U.S. Cl. 123—25 K **1 Claim**



1. In an internal combustion engine having an accelerator control, an exhaust manifold and an intake manifold, a steam injection apparatus comprising:
a source of water,
a temperature-sensitive switch arranged to operate at a predetermined engine temperative;
a control valve responsive to operation of said temperative-sensitive switch and adapted for connection to a said accelerator control to control the rate of flow of water from said source,
an evaporator arranged to receive water from said control valve and to receive heat from exhaust gases of said engine thereby to evaporate water passing therethrough to produce steam, and
means adapted to transmit steam so produced into a said intake manifold;
said control valve comprising:
a housing,
a water inlet conduit formed in said housing and adapted for connection to said source,
a solenoid actuated valve having a valve member spring biased to close said inlet conduit and a solenoid connected to be energized upon operation of said temperative-sensitive switch to move said valve member against said spring bias thereby to open said inlet conduit to permit flow of water therethrough,
a water passage conduit formed in said housing to receive water from said inlet conduit when said solenoid actuated valve is energized,
a needle valve means to preset maximum flow rate through said water passage conduit and comprising a needle valve member having a conical portion disposed in said water passage conduit,
said needle valve member being adjustable by screw means to cause said conical portion to restrict said conduit to an extent which is in accordance with a desired maximum water flow rate,
a water flow rate control valve having a cylindrical valve member disposed for reciprocal movement in a bore in said housing to receive and control water flowing in said water passage conduit through said needle valve means;
said cylindrical valve member having a flow regulating slot, of varying cross-section, in and axially extending

along its periphery, linkage means adapted for connection to said accelerator control to reciprocally move said valve member in said bore in dependence upon movement of said accelerator control, wherein said slot cooperates with an outlet from said housing to vary the flow rate of water from said control valve to said evaporator in dependence on the position of said valve member in said bore so that the greater the opening of the accelerator control the greater the flow rate; and

said housing outlet being adapted for connection to a conduit to said evaporator to supply water thereto.

4,059,079
INTERNAL COMBUSTION ENGINE

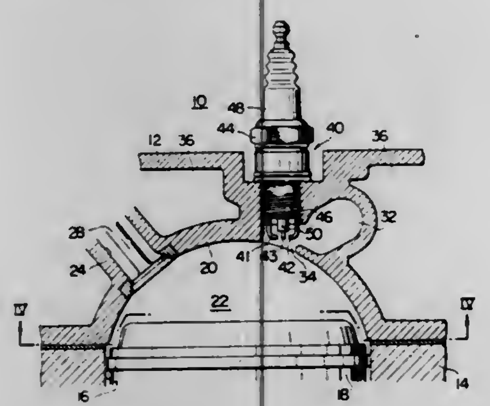
Osamu Kasima, Kariya, and Shougo Sanda, Okazaki, both of Japan, assignors to Nippondenso Co., Ltd., Kariya and Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, both of, Japan

Filed Oct. 7, 1975, Ser. No. 620,506

Claims priority, application Japan, Oct. 8, 1974, 49-122531[U]

Int. Cl.² F02B *3/00*

U.S. Cl. 123—30 D **5 Claims**



1. An internal combustion engine comprising a cylinder block defining therein a cylinder, a cylinder head mounted on the top of said cylinder block, a piston reciprocally mounted in said cylinder and cooperating with said cylinder and cylinder head to define a main combustion chamber, a precombustion chamber adapted to be supplied with a charge of an air-fuel mixture, a passage communicating said precombustion chamber with said main combustion chamber, means for supplying a charge of the air-fuel mixture to said main combustion chamber on an intake stroke of said engine, a part of said charge to said main combustion chamber being forced therefrom through said passage into said precombustion chamber on the succeeding compression stroke of said engine to form a substantial part of said charge to said precombustion chamber, and a spark plug so mounted on said cylinder head as to ignite the air-fuel mixture in said precombustion chamber so that the ignited air-fuel mixture is burnt in said precombustion chamber to produce a torch jet which runs along a path through said passage into said combustion chamber for thereby igniting the air-fuel mixture therein, where said spark plug comprises a generally tubular shell of an electrically conductive material, at least one grounded electrode connected to and extending from one of the end faces of said shell, an insulator axially extending through said shell and having a nose portion extending axially beyond said one end face of said shell, and a center electrode supported by said nose portion of said insulator and extending axially beyond said nose portion, said grounded electrode having a bent end portion extending toward said center electrode to cooperate with the peripheral surface thereof to define a spark gap therebetween, and wherein said center and grounded electrodes extend into said passage to an extent where said electrodes and said nose portion of said insulator are exposed to the rim of a torch jet through said passage.

4,059,080
ENGINE COMPARTMENT VENTILATING ARRANGEMENT

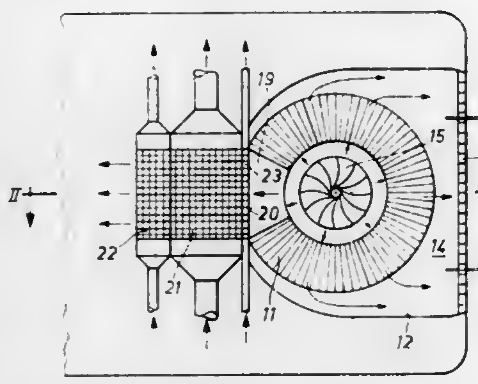
Wolfgang Rudert, Langenargen, Germany, assignor to Motoren- und Turbinen-Union Friedrichshafen GmbH, Germany

Filed Jan. 23, 1976, Ser. No. 651,910

Claims priority, application Germany, Jan. 23, 1975, 2502633

Int. Cl.² F01P *11/08*

U.S. Cl. 123—41.33 **10 Claims**



1. A ventilating arrangement for an engine compartment of a liquid-cooled, supercharged internal combustion engine, the cooling fluid of the internal combustion engine being cooled in a return flow by ambient air, the arrangement comprising: an air guiding housing means having a wall separating said housing means from the engine compartment, means provided in said wall for communicating said air guiding housing means with the engine compartment, a blower means for supplying a predetermined volume of cooling air from said air guiding housing means through said communicating means to the engine compartment to maintain a slight over pressure in the engine compartment, said blower means includes an air impeller means, and a plurality of spaced cooling fins annularly disposed about said air impeller means, said cooling fins being arranged at said communicating means such that a sector shaped area free of any cooling fins is defined at the communicating means whereby said predetermined volume of cooling air from said impeller means flows directly from said impeller means to said communicating means, and wherein a charging air cooler means is arranged directly at said communicating means whereby said predetermined volume of cooling air from said impeller means flows from said air guiding housing means through said communicating means and said air charging cooler means to the engine compartment.

4,059,081
EVAP SYSTEM-PROVIDED THROTTLE VALVE CONTROL UNIT

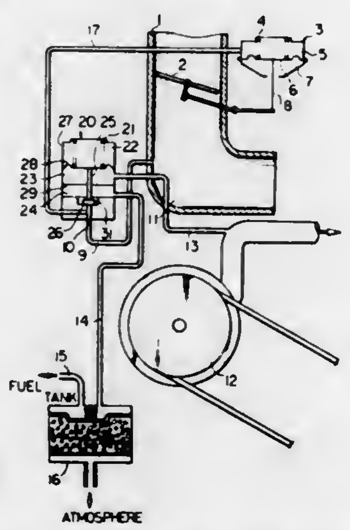
Nobuaki Kayanuma, Toyota, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Japan

Filed Jan. 26, 1976, Ser. No. 652,320

Claims priority, application Japan, Oct. 7, 1975, 50-120250

Int. Cl.² F02M *59/00*

U.S. Cl. 123—136 **5 Claims**



1. A throttle valve control unit having a fuel evaporative emission control system comprising a pressure operative throttle positioner having pressure-operated chamber for opening and closing a throttle valve; a conduit connecting the throttle positioner to an intake pipe or manifold; an air pump for recombustion of the exhaust gas, driven by the engine; a pressure control valve connected to open and close according to the discharge pressure of the air pump; a charcoal canister; a purge hose connecting the canister to the throttle positioner through the pressure control valve device, said pressure control device being opened to connect said pressure-operated chamber to the pressure in the purge hose when the discharge pressure is lower than a prescribed value, whereby the throttle positioner is actuated to open the throttle valve and discharge purge air into the intake pipe or manifold.

4,059,082
FUEL CONSERVATION MEANS FOR INTERNAL COMBUSTION ENGINES AND THE LIKE

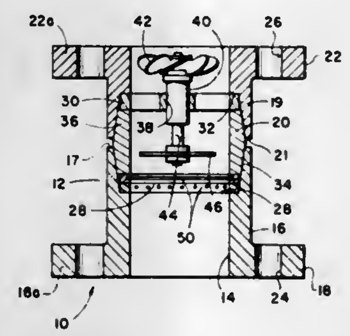
Roger A. McCauley, 3178 E. 26th, Tulsa, Okla. 74114

Continuation of Ser. No. 482,269, June 24, 1974, Pat. No. 3,952,716. This application Apr. 2, 1976, Ser. No. 673,277

The portion of the term of this patent subsequent to Apr. 27, 1993, has been disclaimed.

Int. Cl.² F02M *29/00*

U.S. Cl. 123—141 **14 Claims**



1. A fuel conservation device adapted to be interposed in a flow stream for receiving a fuel-air mixture therethrough and comprising rotor means initially intercepting the fuel-air mixture and being rotated thereby, sonic reed means disposed downstream of the rotor means for impressing sonic vibrations on said fuel-air mixture to facilitate mixing of the fuel and air components thereof, and heated grid means disposed downstream of the sonic reed means for substantial vaporization of the fuel-air mixture.

4,059,083
METHOD AND APPARATUS FOR OBTAINING AN AUTOMATIC IGNITION ADVANCE IN AUTOMOBILE INTERNAL COMBUSTION ENGINE

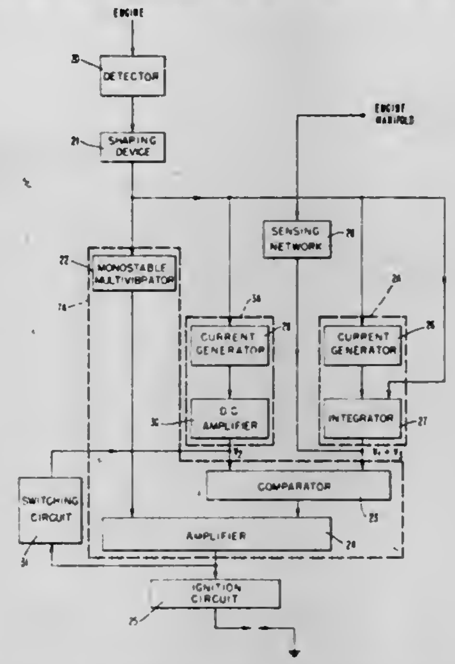
Roger J. Habert, Epinay, France, assignor to Ducellier & Cie, Paris, France

Continuation-in-part of Ser. No. 406,273, Oct. 15, 1973, abandoned, which is a continuation-in-part of Ser. No. 223,627, Feb. 4, 1972, Pat. No. 3,783,850, which is a continuation-in-part of Ser. No. 835,661, June 23, 1969, abandoned. This application Apr. 9, 1976, Ser. No. 675,279

Int. Cl.² F02P *3/02, 1/08*

U.S. Cl. 123—146.5 A **1 Claim**

1. In combination with an internal combustion engine, apparatus comprising a current generator having a current output proportional to speed of rotation of the engine, said current generator supplying an integrator which produces a sawtooth output signal V_1, means for providing an output signal V_3 dependent on at least one of the internal combustion engine operation parameter, means adding signals V_1 and V_3 to produce a voltage $V_1 + V_3$ proportional to angular offset α, means feeding voltage $V_1 + V_3$ to one input of a pulse generator, a tachometric generator supplying a voltage V_2 proportional to the speed of rotation of the engine to another input of the pulse generator, said pulse generator producing a pulse controlling engine ignition when the voltage $V_1 + V_3$ coincides with voltage V_2 consideration being given to a proportionality constant, said pulse generator comprising comparator means having input terminals connected to receive voltages $V_1 + V_3$ and V_2 for delivering a signal to the ignition device when said voltages are coincident by means of an amplifier; and further comprising a monostable multivibrator connected to apply an output signal thereof to the ignition device directly by means of the



amplifier, and a switching circuit connected on one hand to the output of the amplifier and on the other hand to at least one of the inputs of the comparator, said switching circuit being responsive to the triggering of ignition pulses to reinforce said pulses thereby isolating the circuit from the effects of spurious signals.

4,059,084
IGNITION SYSTEM FOR INTERNAL COMBUSTION ENGINES USING AN IGNITION COIL

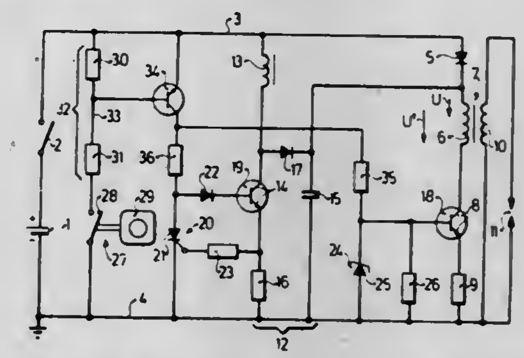
Werner Jundt, Ludwigsburg, Germany, assignor to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Oct. 1, 1975, Ser. No. 618,573

Claims priority, application Germany, Oct. 12, 1974, 2448675

Int. Cl.² F02P *3/02*

U.S. Cl. 123—148 E **11 Claims**



1. Ignition system for internal combustion engines having a source of electrical energy (1),

and comprising means cyclically timing and commanding generation of ignition energy at an ignition instant,

an ignition coil (7) connected to the source of energy (1) and a blocking circuit (8) forming a switching current path and interrupting current flow from the source (1) through the primary (6) of the coil (7), at the ignition instant;

voltage generating means (12) including a voltage converter, or transformer, connected to said source (1) generating an auxiliary voltage (U') having the same polarity as the voltage applied by said source (1) to said coil, and a voltage level which is higher than the voltage applied to the primary of the ignition coil (7) by said source, (1);

said voltage converter or transformer (12) including an induction coil (13) and an auxiliary switching path (14) connected in series therewith, said coil (13) and switching path (14) series circuit being connected to the current source (1);

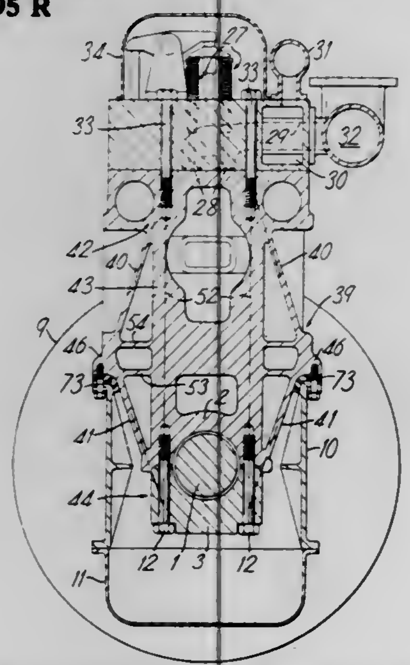
a storage capacitor (15) connected across the switching path

(14) and in parallel to the primary winding (6) of the ignition coil and the main switching path (8) to store energy being transferred from said inductance coil and apply said stored energy to the primary winding (6) of the ignition coil,

current sensing means (16) connected in series with the auxiliary switching path (14); control means (20, 21, 22, 23) connected to and controlling the switching state of said auxiliary switching path (14) in dependence on current flow through the inductance coil (13); and means (16, 17, 23, 21) connecting the voltage generating means to the primary winding (6) of said ignition coil (7) at a time instant is earlier than the occurrence of said ignition instant to apply said auxiliary voltage (U') to the ignition coil (7) supplementary to the energy supplied to the ignition coil (7) by said source (1) to increase the rate of rise of current therethrough.

4,059,085
ENGINE STRUCTURE

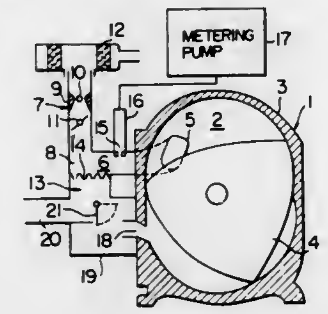
Wilfred Percival Mansfield, Eastleigh, and Theodor Priede, Southampton, both of England, assignors to National Research Development Corporation, London, England
Filed Apr. 27, 1976, Ser. No. 680,677
Int. Cl.² F02F *7/00*
U.S. Cl. 123—195 R **11 Claims**



1. An internal combustion engine having an engine body including:
- a cylinder structure including cylinders;
- a cylinder head structure;
- main bearings;
- said cylinder structure having parts constituting a first direct load-bearing linkage between said cylinder head structure and said main bearings, whereby to resist without bending the load set up by the firing forces in said cylinders and rending to separate said cylinder head structure and said main bearings;
- a crankshaft lying lengthwise of said engine body and supported by said main bearings, and
- a second direct load-bearing linkage to afford further resistance to the separation of said cylinder head structure from said main bearings by the firing forces set up in said cylinders, in which
- said second linkage comprises at least one pair of straight-line links, strong in tension;
- a first connection between a first end of a first said link of said pair and said cylinder head structure;
- a second connection between a first end of a second said link of said pair and said main bearings;
- both said links are angled obliquely to the direct line lying between said first and second connections and to each other, so that unobstructed space is left between said links and said direct line, said first and second ends of each said link thus being transversely spaced from each other;
- a third connection is provided between said second ends of said first and second links, and
- a stabilising member supports said third connection and stabilises it against movement transverse relative to said engine body.

4,059,086
FUEL AND LUBRICATING OIL SUPPLY DEVICE

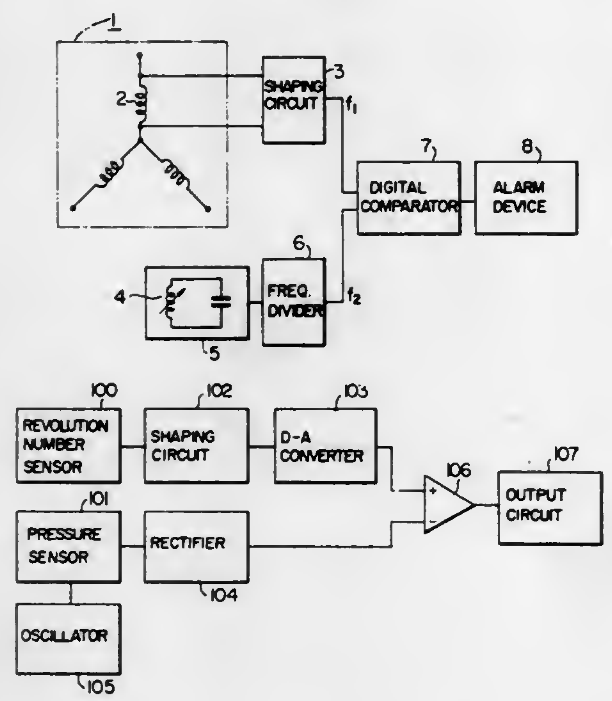
Haruyoshi Tsubouchi, Katsuta, Japan, assignor to Hitachi, Ltd., Japan
Filed Feb. 3, 1976, Ser. No. 654,753
Claims priority, application Japan, Mar. 5, 1975, 50-25950
Int. Cl.² F01M *1/00*
U.S. Cl. 123—196 R **6 Claims**



1. In a fuel and lubricating oil supply device wherein lubricating oil for lubrication of the wall surfaces of a combustion chamber is fed, together with fuel, through an intake passage to said combustion chamber of an engine, the improvements comprising:
- heating means having a heating surface for gasifying fuel in a mixture charge provided midway in the intake passage through which a fuel and air mixture charge passes; and
- lubricating oil supply means for mixing lubricating oil with said fuel and air mixture charge, said lubricating oil supply means being provided in the downstream side of said heating surface so that the lubricating oil is supplied free from contact with said heating surface.

4,059,087
OIL PRESSURE DETECTING APPARATUS FOR INTERNAL COMBUSTION ENGINES

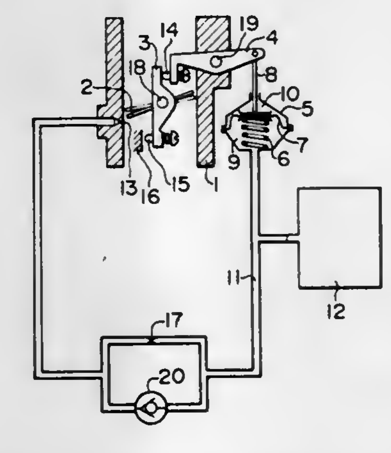
Takahiko Tanigami, Mito; Akira Hasegawa, and Shigeru Horikoshi, both of Katsuta, all of Japan, assignors to Hitachi, Ltd., Japan
Filed Mar. 31, 1976, Ser. No. 672,144
Claims priority, application Japan, Apr. 4, 1975, 50-40291
Int. Cl.² F01M *1/00, 1/04*
U.S. Cl. 123—196 S **4 Claims**



1. An apparatus for detecting an oil pressure in an internal combustion engine, comprising:
- first means for detecting the number of revolutions of the engine and producing a first signal representative of a critical value of the oil pressure in accordance with the detected number of revolutions;
- second means for detecting the oil pressure and producing a second signal representative of an actual oil pressure in accordance with the detected oil pressure; and
- third means for comparing the first signal with the second signal and producing an output when the second signal is smaller than a predetermined level.

4,059,088
THROTTLE POSITIONER

Hidenori Tateno, Nagoya, and Tetsuomi Tamura, Toyota, both of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Japan
Filed Dec. 13, 1974, Ser. No. 532,510
Claims priority, application Japan, May 28, 1974, 49-059918
Int. Cl.² F02D *11/08*
U.S. Cl. 123—103 R **4 Claims**



1. A throttle positioner to ensure a predetermined minimum opening for a throttle valve in an internal combustion engine when the engine is abruptly decelerated from a relatively high-speed condition, comprising a throttle arm connected with a shaft of the throttle valve, a member movable between a first position where it traverses a trace of movement of the throttle arm and a second position where it is held out of said trace, a diaphragm means adapted to operate with the intake vacuum of the engine so as to bias said member toward said second position when the intake vacuum is applied thereto, a port which opens to an intake passage of the engine at a position which is downstream of the throttle valve when it is closed until said throttle arm engages said movable member, and is upstream of the throttle valve when it is opened with said throttle arm not being in engagement with said movable member, and a conduit means which connects said port with said diaphragm means, said port and conduit means including a buffering air chamber and a parallel assembly of a check valve and a constricting orifice means disposed therein, said check valve being oriented to allow fluid to flow only toward said diaphragm means.

4,059,089
FLYING SAUCER LAUNCHING PISTOL

James A. Lehman, El Cajon, Calif., assignor to Warner-Lehman Corporation, El Cajon, Calif.
Filed Sept. 13, 1976, Ser. No. 722,707
Int. Cl.² F41B *7/00*
U.S. Cl. 124—27 **7 Claims**

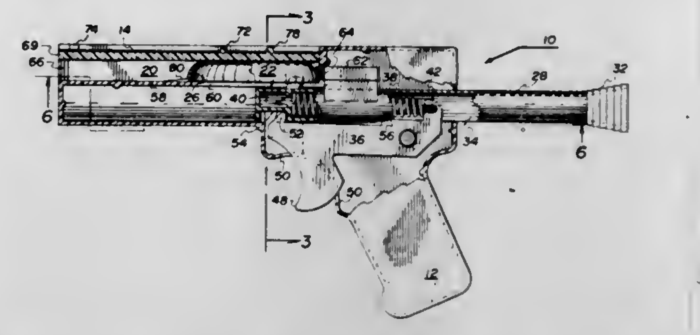
1. A pistol for firing concave disks comprising:

a. a body having a handle and a barrel defining a firing chamber.

b. a spring-loaded plunger in said body operable throughout a firing stroke to eject an inverted concave disk positioned in said firing chamber;

c. trigger means mounted to said body operable to selectively restrain said plunger in a cocked position and release said plunger to eject a disk;

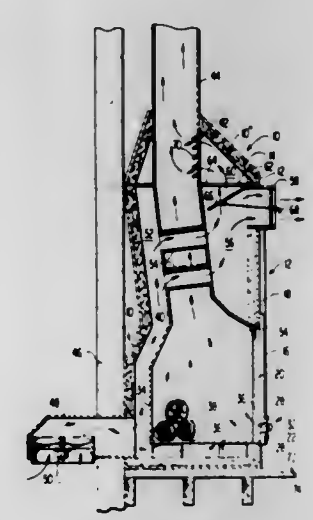
d. said firing chamber being generally rectangular in transverse cross section and having structure defining ramps in the rear lower edges thereof, said ramps having surfaces



which are diagonal in cross section relative to said rectangular firing chamber and progressively incroach on the volume of said firing chamber toward the rear such that an inverted concave disk dropped into said chamber will be self centering between said ramps under the action of gravity.

4,059,090
FIREPLACE HEATING UNIT

William Stuart Shaw, Prince George, Canada, assignor to Humboldt Holdings, Inc., Georgetown, British W. Indies
Filed Aug. 6, 1975, Ser. No. 602,226
Claims priority, application Canada, June 10, 1975, 226443
Int. Cl.² F24B *7/04*
U.S. Cl. 126—121 **13 Claims**



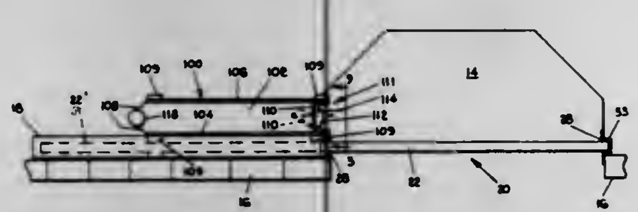
1. A fireplace heating unit comprising:
- a flue;
- a housing having a base, upstanding walls and a roof, and having a front opening therein for receiving fuel to be burned, a front vent disposed over the opening for expelling heated air from said housing, and a rear vent for admitting cool, outside air to the interior of said housing;
- a firebox mounted within said housing and adapted to contain a fire therein, said firebox having a front opening for admitting fuel to said fire disposed in alignment with and immediately adjacent the front opening of said housing, the rear wall of said firebox being spaced away from the rear wall of said housing to define a first chamber;
- hood means mounted on the upper portion of said firebox within said housing for collecting the hot combustion gases from a fire therein said hood means including a front wall portion spaced away from the front wall of said housing to define a second chamber immediately adjacent said front vent;
- flue vent means carried by said hood means for venting hot combustion gases collected by said hood means through said housing and into said flue;

heating means carried by said housing for circulating cool outside air, admitted to said first chamber through said rear vent, from said first chamber, through said hood means and into said second chamber, and for expelling at least a portion of said heated air through said front vent whereby said outside air is heated by the combustion gases in said hood means when fuel is consumed in said firebox;

a divider wall extending across the interior of said housing and disposed above the front vent and said first and second chambers, to define, with the upper portion of said housing, a third chamber; bypass means carried by said unit for selectively venting heated air from said second chamber into said third chamber and from said third chamber into said flue;

said flue vent means comprising conduit means extending through the upper portion of said hood, through said third chamber and into said flue for communication between the interior of said hood and said flue therethrough said bypass means comprising one-way valve means carried by said conduit means and disposed within said third chamber for admitting heated air from said chamber into said flue through said conduit means without diverting combustion gases therefrom into said chamber.

4,059,091
HEAT SAVING CONCEALED FIREPLACE FRONT
Lawrence R. Cobb, 827-6th Ave., Lake Odessa, Mich. 48849
Filed June 1, 1976, Ser. No. 691,858
Int. Cl.² F24C *15/10*
U.S. Cl. 126—140 **11 Claims**



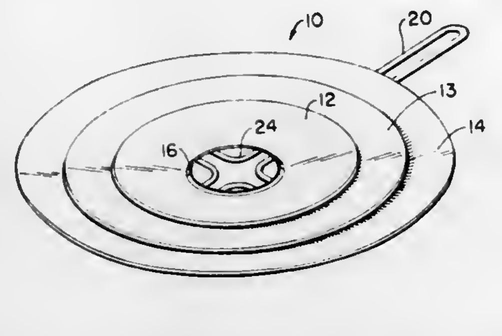
1. A fireplace front for a fireplace positioned in a room of an enclosure comprising:

a concealed door pocket formed at the side of the fireplace adjacent the front thereof;

a fireplace door slidably mounted for movement into and out of the door pocket from an open position, wherein the door is concealed in the door pocket, to a closed position, wherein the door covers the fireplace opening at the front of the fireplace, the door being formed such that when the fireplace door is closed and a fire is burning in the fireplace, the fireplace opening is sealed so as to substantially prevent air flow from the room into the fireplace; and

vent means for providing fresh air from outside the enclosure to the interior of the fireplace, said vent means being capable of providing an independent supply of air to the fireplace to keep a fire burning even when the fireplace door is sealed closed, said vent means comprising a vent pocket in the fireplace front and a vent conduit leading from an inlet outside the enclosure to the vent pocket, said vent pocket being formed adjacent and behind the door pocket, an air-tight shield separating the two pockets, the vent pocket having outlet means at the edge of the fireplace for admitting fresh air into the fireplace behind the fireplace door, said vent means further comprising damper means in the outlet means of the vent pocket for opening and closing the vent means, the vent pocket and concealed door pocket being formed as a single integral unit which can be mounted as an assembly into a fireplace during construction of the fireplace.

4,059,092
HEAT DEFLECTOR
Cedric D. Bourboulis, 34 Fountainhead Court, Martinez, Calif. 94533
Filed Oct. 29, 1976, Ser. No. 736,981
Int. Cl.² F24C *15/10*
U.S. Cl. 126—215 **7 Claims**

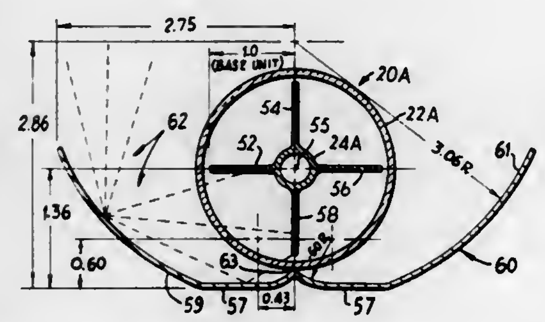


1. Apparatus for distributing the heat from a heat source relatively uniformly over the lower surface of a cooking utensil, said apparatus comprising:

a plurality of concentric annular elements each including an upwardly concave dish-shaped annulus circumscribing a hollow center, each said element being constructed of heat conductive material; and

a wire having a plurality of convolutions in a generally planar array, the interior edges of the annular elements being fixed to the convolutions of the wire to mount the annular elements in a concentric configuration to the wire so that the wire together with the annular elements can be laid over a heat source with the wire down to distribute the heat therefrom evenly over the lower surface of a cooking utensil which is large relative to the heat source and is placed on top of the annular elements, or the wire together with the annular elements can be laid over a heat source with the wire up to concentrate the heat therefrom evenly over the lower surface of a cooking utensil which is small relative to the heat source and is placed on top of the annular elements.

4,059,093
SOLAR ENERGY COLLECTOR
Gregory W. Knowles, Huntington; Odd E. Sangesland, Plainview; Henry J. Vroom, Commack, and Robert W. Madey, Huntington Station, all of N.Y., assignors to Grumman Aerospace Corporation, Bethpage, N.Y.
Filed Sept. 22, 1975, Ser. No. 615,461
Int. Cl.² F24J *3/02*
U.S. Cl. 126—271 **5 Claims**



1. A solar energy collection system comprising:

a. an elongated, evacuated, substantially cylindrical envelope of transparent material having an orifice at one end thereof;

b. an elongated, substantially cylindrical, sealed container mounted within said envelope, one end of said container projecting through said orifice via an air-tight seal, said container being disposed at an angle with respect to horizontal, said end projecting through said envelope being located at the higher elevation;

c. a vaporizeable liquid located within said container and concentrated at the lower elevation thereof, said fluid, upon vaporization, progressing toward the higher elevation of said container where said vapor gives up heat and condensation takes place;

d. a plurality of axially-aligned, fin-like structures attached to and projecting from said container for enhancing the heat absorption of said container;

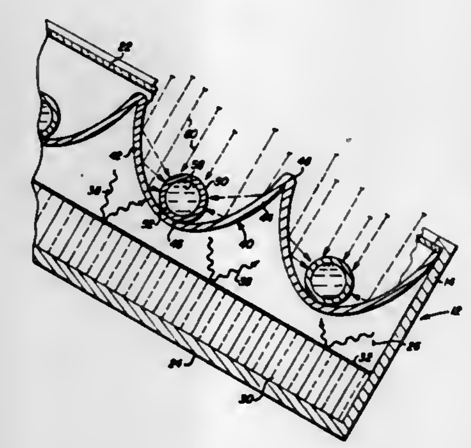
e. an inverted, elongate, substantially bilaterially symmetrical, gull-wing shaped reflector located below and external to said envelope and extending for a substantial portion of the length of said envelope for receiving and reflecting incident solar radiation from an area wider than said envelope and for concentrating said radiation on said envelope;

f. a first substantially planar conductive member affixed to the emergent portion of said container for conducting therefrom heat given off by the condensation of said vaporized liquid;

g. a second substantially planar conductive member removably fastened to said first conductive member for conducting heat therefrom; and

h. a fluid-carrying conduit affixed to said second conductive member for removing heat therefrom and transporting the extracted heat.

4,059,094
SOLAR ENERGY COLLECTOR APPARATUS
Cayo Petronio Barrio de Mendoza, 2402 N. 39th Place, Phoenix, Ariz. 85008
Filed Dec. 4, 1975, Ser. No. 637,714
Int. Cl.² F24J *3/02*
U.S. Cl. 126—271 **13 Claims**



1. Apparatus for collecting solar energy comprising, in combination:

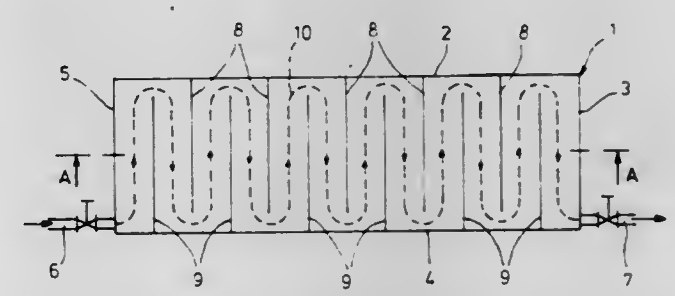
parabolic mirror means for collecting and reflecting solar energy, including a vertex and a focus spaced apart from the vertex;

fluid conduit means disposed on the parabolic mirror means over a predetermined arcuate length adjacent the vertex for absorbing energy from the parabolic mirror means and extending from the vertex to the focus;

heat chamber means disposed adjacent the parabolic mirror means for containing heat energy and for providing the contained heat energy for the parabolic mirror means for transmittal to the fluid conduit means; and

a fluid disposed in the fluid conduit for absorbing heat energy from the fluid conduit means.

4,059,095
DEVICE FOR UTILIZING THE HEAT ENERGY OF SOLAR RADIATION
Edgard Grundmann, Fallersleben; Herbert Heitland, Wolfsburg, and Rudolf Kroll, Vorsfelde, all of Germany, assignors to Volkswagenwerk Aktiengesellschaft, Wolfsburg, Germany
Filed Apr. 9, 1976, Ser. No. 675,594
Claims priority, application Germany, Apr. 9, 1975, 2515398; Sept. 11, 1975, 2540495; Sept. 11, 1975, 2540497
Int. Cl.² F24J *3/02*
U.S. Cl. 126—271 **27 Claims**



1. A device for producing usable heat from solar radiation and which is coilable into a roll comprising in combination:

a first elongated flexible foil having at least one black surface;

a first fluid flow conduit formed by a second flexible foil of a material which is pervious to solar energy positioned adjacent said one surface of said first foil with said first foil and said second foil being connected together in a fluid tight manner, along the outer edges to define a first closed space therebetween, first inlet means and a first outlet means, each communicating with said first closed space, for permitting the flow of a fluid heat carrier medium through said first space, and further sealing connections of said first foil to said second foil positioned to define an extended fluid flow path, within said first closed space, between said first inlet means and said first outlet means; and

a second fluid flow conduit formed by a third flexible foil positioned adjacent the surface of said first foil opposite said one surface with said first foil and said third foil being connected together, in a fluid tight manner, along their outer edges to define a second closed space therebetween, second inlet means and second outlet means, each communicating with said second closed space, for permitting the flow of a separate fluid heat carrier medium through said second space, and further sealing connections of said first foil to said third foil positioned to define an extended fluid flow path, within said second space, between said second inlet means and said second outlet means.

4,059,096
UNITIZED SERVING BASE WITH IMPERFORATE PELLET
Irwin Schneider, Chicago, Ill., assignor to Imperial Arts Corporation, Elk Grove Village, Ill.
Filed May 19, 1976, Ser. No. 687,769
Int. Cl.² F24H *7/06*
U.S. Cl. 126—375 **3 Claims**

1. A food-warming serving base comprising:

a shaped upper wall having a radially outward periphery, and outwardly-upwardly inclined side portion just inwardly thereof, and a generally flat central recessed portion;

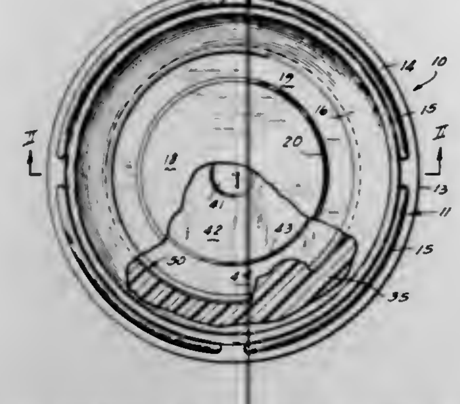
a lower wall sealingly joined to said upper wall about said periphery of said base and spaced vertically from said upper wall at said side and central portions thereof;

a layer of heat-insulating material placed between said upper and lower walls;

a solid, radially-continuous pellet of high heat-absorbency

between said insulating material and said upper wall to contact said upper wall and release heat thereto; and

a thin, raised peripheral flange about said pellet adapted to



contact an undersurface of said inclined side portion of said upper wall adjacent said central portion of said wall, said flange centering said pellet in said base upon said central portion.

4,059,097

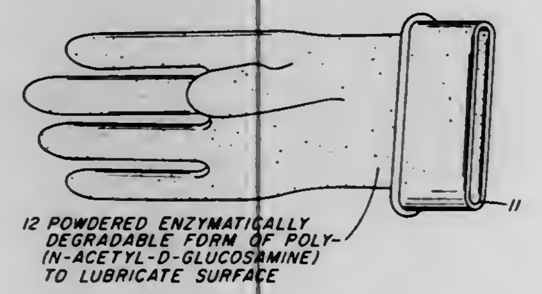
METHOD OF MINIMIZING TISSUE REACTION DURING SURGERY WITH CHITIN

Donald James Casey, Ridgefield, Conn., assignor to American Cyanamid Company, Stamford, Conn.

Filed Nov. 3, 1976, Ser. No. 738,502

Int. Cl.² A61B *19/04*

U.S. Cl. 128—1 R **6 Claims**



1. A method of minimizing tissue reaction in a surgical procedure which comprises contacting living tissue with a natural or synthetic rubber surgical element having on the surface thereof a lubricity imparting quantity of
- a finely divided biodegradable powder consisting essentially of
- an enzymatically degradable form of poly(N-acetyl-D-glucosamine) selected from the group consisting of poly[N-acetyl-6-O-(carboxymethyl)-D-glucosamine], poly[N-acetyl-6-O-(2'-hydroxyethyl)-D-glucosamine, poly[N-acetyl-6-O-(ethyl)-D-glucosamine], and poly(N-acetyl-D-glucosamine) itself

which form of poly(N-acetyl-D-glucosamine) is slowly enzymatically degraded by contact with body tissues.

4,059,098

FLEXIBLE ULTRASOUND COUPLING SYSTEM

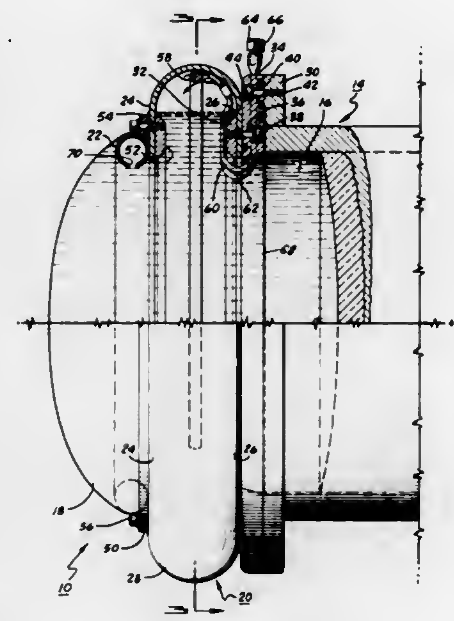
David M. Murdock, Palo Alto, Calif., assignor to Stanford Research Institute, Menlo Park, Calif.

Filed July 21, 1975, Ser. No. 597,413

Int. Cl.² A61B *10/00*

U.S. Cl. 128—2 V **14 Claims**

1. A coupling and closing system for coupling ultrasonic waves even through substantially horizontal coupling paths between a fluid medium contained in a rigid container and a specimen and for confining the fluid medium, said system comprising a flexible supporting bellows system to be fixed at one end over a fluid opening to the rigid container and including:
- a first toroidal member of relatively firm but flexible material having first and second opposing side wall portions and an outer peripheral joining and sealing wall portion and being vented to provide fluid communication inside the coupling and closing system;
- means for securing one of the side wall portions of said first toroidal member over a fluid opening to the rigid container;
- a second flexible ztoroidal member also of relatively firm but flexible material juxtaposed to the first toroidal member and having first and second opposing side wall portions and at least one joining sealing wall portion and being vented to provide fluid communication inside the coupling and closing system;



- a thin flexible membrane transparent to ultrasonic waves for closing the supportive bellows system; and
- means for securing said flexible membrane over said second toroidal member in fluid-tight relation to the outside of the said second one of the said side wall portions of said first toroidal member;
- said thin, flexible membrane being stretched over at least the joining sealing wall portion and the one of said sidewalls of the second flexible toroidal member adjoining the first toroidal member for securely holding the second flexible toroidal member in juxtaposed relation to said first toroidal member and for forming a fluid tight closure for the said supportive bellows system.

4,059,099

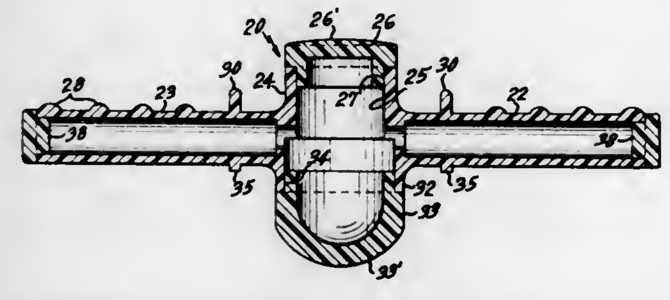
RESUSCITATIVE DEVICE

Belford L. Davis, 4428 Worth Drive, West, Jacksonville, Fla. 32207

Continuation-in-part of Ser. No. 676,419, April 13, 1976, abandoned. This application Sept. 15, 1976, Ser. No. 723,580

Int. Cl.² A61H *31/00*

U.S. Cl. 128—28 **19 Claims**



1. A resuscitative device comprising an elongated member having opposite end portions, each of said end portions constituting handles for grasping by the hands of a person, a pressure pad attached to said member generally medially between said opposite end portions, said pressure pad having a body engageable surface spaced laterally of said end portions to provide sufficient clearance between the hands of a person and a patient's body in contact with said pressure pad during reciprocating relative movement between said device and a patient's body, and laterally extending stops affixed to respective said end portions spaced outwardly from said pad for limiting the hand positioning with respect to said pad, said stops being equidistant from said pad so that equal pressure from the hands of a person may be applied.

4,059,100

MASSAGING APPARATUS

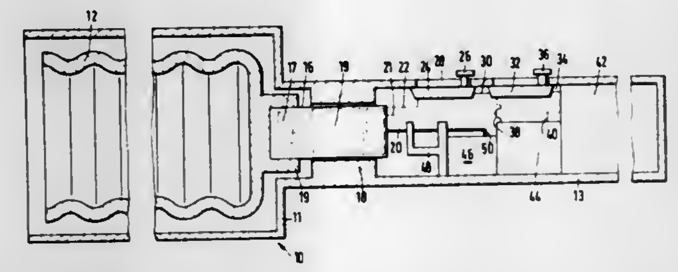
Ulrich Glage, Hamburg, Germany, assignor to Gisela Glage nee Moller, Hamburg, Germany

Filed June 18, 1976, Ser. No. 697,475

Claims priority, application Germany, June 20, 1975, 2528093

Int. Cl.² A61H *1/00, 19/00*

U.S. Cl. 128—36 **10 Claims**



1. A massaging apparatus comprising an elongated hollow sheath having a first end and a second end opposite to each other, said first end being open, means for simultaneously generating two different mechanical vibrations, coupling means for connecting said vibration generating means with said sheath.

4,059,101

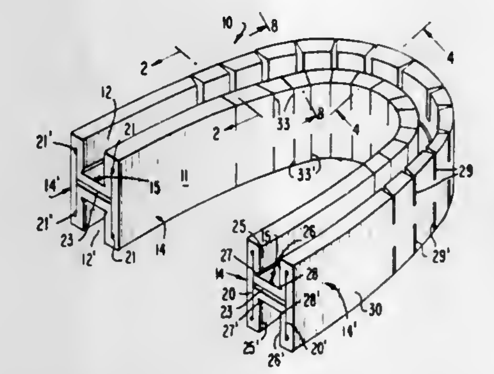
THERAPEUTIC DEVICE FOR MASSAGING GINGIVAL TISSUE

Martin Richmond, 2505 S. Ocean Blvd., Palm Beach, Fla. 33480

Filed Mar. 22, 1976, Ser. No. 669,317

Int. Cl.² A61H *7/00*

U.S. Cl. 128—62 A **6 Claims**



1. A therapeutic device for, inter alia, massaging gingival tissue comprising a body member having an arcuate longitudinal conformation so as to fit the mouth from front to rear, said body member including first and second longitudinally extending webs, and a transverse web bridging between said first and second longitudinally extending webs, said first and second longitudinally extending webs each respectively issuing upwardly and downwardly from substantially opposite ends of said transverse bridging web, said first and second longitudinally extending webs and said transverse web defining upper and lower generally superposed channels in said body member, said upper and said lower channels respectively accomodating teeth in the upper and lower jaws of a user of said device; said transverse bridging web comprising first and second overlying webs of predetermined thickness, said first and second overlying webs defining therebetween an interiorly located continuous transverse slot, said first and second overlying webs being compressible through the area of said transverse slot for elastically impermanently deforming said first and second longitudinally extending webs inwardly towards the clinical crowns of teeth and into the gingivae of a user of said device; said first and said second longitudinally extending webs each carrying at least one interiorly located substantially linear slit extending continuously therethrough, said at least one slit in each of said webs terminating in at least one graduated notch of predetermined configuration, said first and second longitudinally extending webs being respectively expansible about its at least one slit in opposite correspondence to a compressive force exerted upon said transverse bridging web, and each of said first and second longitudinally extending webs including a corresponding pair of interior surfaces, each pair of said interior surfaces issuing incipiently oppositely from said transverse bridging web through a corresponding pairs of chamfers, said chamfers having a continuous emphasis throughout said device; said first longitudinally extending web having an upper and a lower end, each of said upper and said lower ends having a discretely aligned plurality of slots therein, each of said slots opening outwardly into a corresponding upper and lower channel, and said second longitudinally extending web having an upper and a lower end, each of said upper and lower ends having a discretely aligned plurality of slits therein, each of said slits in said second longitudinally extending web corresponding to a slot in said first longitudinally extending web, said first and second longitudinally extending webs being respectively contractable through the areas of their respective slots and slits as a compressive force is exerted through said transverse bridging web for thereby overfitting the clinical crowns of teeth and abutting the gingivae of a user of said device.

4,059,102

BONE SECURING DEVICES

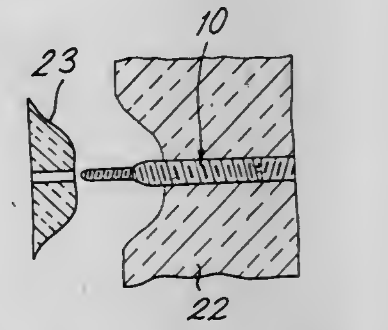
Michael Bertrand Devas, Bexhill-on-Sea, England, assignor to National Research Development Corporation, London, England

Continuation of Ser. No. 599,074, July 25, 1975, abandoned. This application Sept. 30, 1976, Ser. No. 727,995

Claims priority, application United Kingdom, Aug. 1, 1974, 34014/74

Int. Cl.² A61F *5/04*

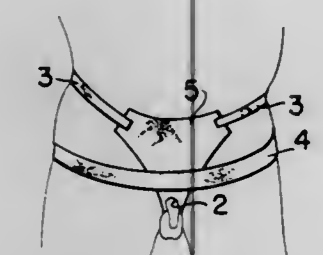
U.S. Cl. 128—92 B **2 Claims**



1. A new use for a screw of the type which has a leading end portion with a thread of one hand therearound and a trailing end portion with a thread of opposite hand therearound,
- said new use being to connect together two mutually nonrotatable component parts, each of which is one of a fragment of a fractured bone and a fracture fixation device for disposition against said bone and said new use comprising the method of:
- screwing one of said end portions of said screw into one of said component parts, and
- then screwing the other of said screw end portions into the other of said component parts while partially unscrewing said screw from said one component part to locate said

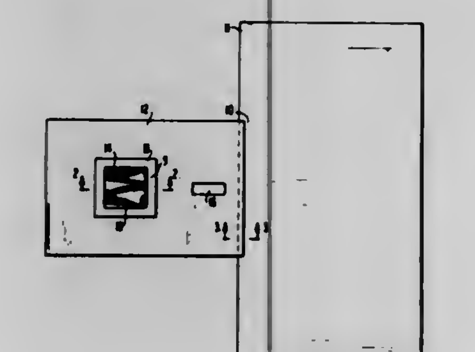
screw through said bone and to effect compressive force on said bone between said component parts.

4,059,103
ABDOMINAL AND HERNIA SUPPORT
Ralph P. Glaser, 2709 Kirkwood Place, Hyattsville, Md. 20782
Filed June 2, 1976, Ser. No. 692,216
Int. Cl.² A61F *5/24*
U.S. Cl. 128—96 **6 Claims**



3. An abdominal and hernia support comprising a crotch section shaped so as to be adapted to fit next to a wearer's crotch; a front section having left and right sides and shaped so as to be adapted to fit next to a wearer's abdomen; a rear section having left and right sides and shaped so as to be adapted to fit next to a wearer's buttocks; said crotch, front and rear sections being continuous and being constructed of a plurality of layers of non-elastic fabric; a first elastic band stitched to the left side of the front section and the left side of the rear section and adapted to rest above the left hip of a wearer; a second elastic band stitched to the right side of the front section and the right side of the rear section and adapted to rest above the right hip of a wearer; a third elastic band stitched to the left and right sides of said rear section and adapted for passing around said front section without attachment thereto; a flat flexible stiffener inserted in said front section between said layers of fabric; said crotch section being centrally set with respect to said front and rear sections; said front section being adapted for male wearers by means of an opening to allow passage of the wearer's penis and scrotum, and said flexible stiffener being centrally placed in said front section; whereby said support is used as a two-sided abdominal and hernia support for males.

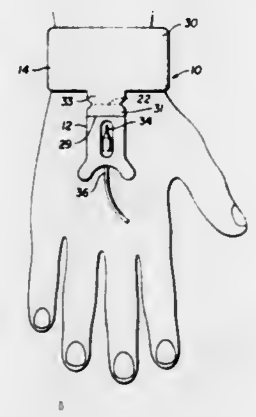
4,059,104
APPARATUS, PROCESS AND PRODUCT
Donald R. DePriest; Bobby C. Brandon, and Connell M. Buie, all of Columbus, Miss., assignors to Humboldt Products Corporation, Columbus, Miss.
Division of Ser. No. 549,892, Feb. 14, 1975, abandoned, which is a division of Ser. No. 362,451, May 21, 1973, Pat. No. 3,892,617. This application Feb. 3, 1976, Ser. No. 654,869
Int. Cl.² A61B *19/06*
U.S. Cl. 128—132 D **15 Claims**



1. A complex disposable specialty drape comprising:

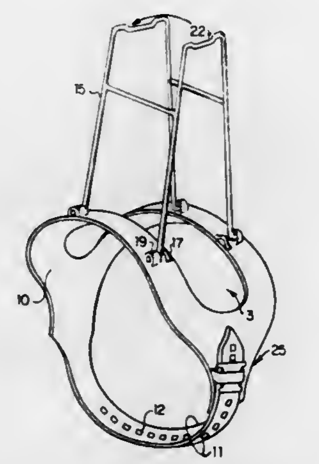
a. an abdominal cover section formed of a medical non-woven material rendered substantially fluid repellant;
b. a T section formed of a medical non-woven material rendered substantially fluid repellant and having laminated thereto a fluid impermeable layer, said T section having a fenestration therein;
c. adhesive means joining an edge of said T section to an edge of said abdominal cover section;
d. a filter; and
e. a filter reinforcement frame affixing said filter over said fenestration.

4,059,105
CANNULA SECURING DEVICE
Jeffrey F. Cutruzzula, Pittsburgh, Pa., and Robert L. Schattner, Baltimore, Md., assignors to Omnimed, Inc., Burlington, N.J.
Filed Mar. 24, 1976, Ser. No. 669,782
Int. Cl.² A61M *5/00*
U.S. Cl. 128—133 **16 Claims**



1. A securing device comprising a generally T-shaped lamina having a head and a body portion, said body portion having an opening means confined therein for permitting viewing of a portion of the skin of a subject surrounded by said body portion, said body portion also having adhesive on a first surface to adhere to said subject and said head portion having adhesive on a second surface opposite said first surface and being sufficiently wider than said body portion on both sides to adhere to said subject when superimposed on said body portion.

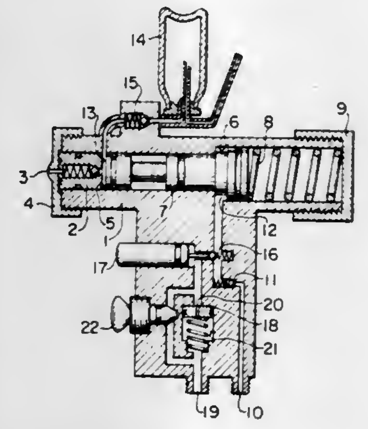
4,059,106
EAR RACK FOR VETERINARY PURPOSES
Richard D. Shannon, 10510 Barnhart Court, Cupertino, Calif. 95014
Filed Aug. 5, 1976, Ser. No. 711,737
Int. Cl.² A61F *13/00*
U.S. Cl. 128—133 **5 Claims**



1. A veterinary apparatus for use in supporting the ears of an animal, said apparatus comprising:

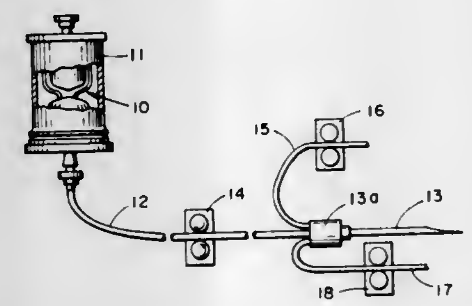
a flexible base having a strap-like portion extending therefrom;
a rigid frame coupled to the flexible base for coupling to the animal's ears;
latching means coupled to said base for engaging said strap-like portion and for resisting disengagement therewith; and
means coupled to said latching means for allowing a predetermined amount of movement of said strap-like portion when it is engaged with said latching means.

4,059,107
TWO STEP TYPE PRESSURIZED INJECTOR
Norio Iriguchi, Oak Park, Israel; Toru Kuroda; Naoya Kominami, and Kenji Inagaki, all of Fuji, Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan
Filed May 7, 1976, Ser. No. 684,314
Claims priority, application Japan, May 8, 1975, 50-54226
Int. Cl.² A61M *5/30*
U.S. Cl. 128—173 H **7 Claims**



1. A two step type pressurized liquid injector comprising a medicine chamber for holding an injecting liquid, a nozzle hole communicating with the medicine chamber through which the injecting liquid is ejected, a piston slidably positioned within the medicine chamber, a power means connected with the piston, the power means for operating said piston within said chamber whereby liquid therein is ejected under a pressure of at least 120 kg/cm² for a finite time up to 0.05 seconds, and a regulating means for regulating the transfer of the pressure imparted by the power means to the injecting liquid, the regulating means regulating the pressure such that the injection pressure of the injecting liquid is 100 kg/cm² or lower subsequent to said finite time and within 0.05 seconds from the initiation of the injecting of the liquid.

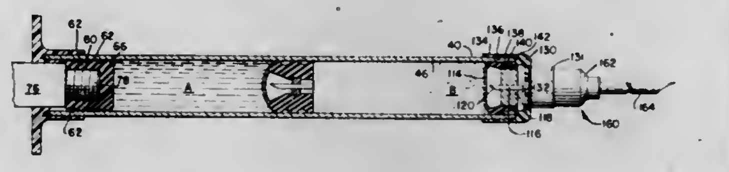
4,059,108
PROCESS FOR PHERESIS PROCEDURE AND DISPOSABLE PHERESIS BOWL THEREFOR
Allen Latham, Jr., Jamaica Plain, Mass., assignor to Haemonetics Corporation, Natick, Mass.
Continuation-in-part of Ser. No. 497,558, Aug. 15, 1974, abandoned. This application July 15, 1975, Ser. No. 596,148
Int. Cl.² A61M *5/00;* **B04B** *11/00*
U.S. Cl. 128—214 R **31 Claims**



1. A unitary plasmapheresis centrifuge rotor, comprising, in combination:

a. a red cell reservoir in the shape of a centrifuge bowl, said reservoir having a bottom wall which defines a drainage angle of at least 5° and having a whole blood inlet and a plasma outlet;
b. a plasma reservoir in axial alignment with said red cell reservoir;
c. plasma duct means providing fluid communication between the plasma outlet of said red cell reservoir and said plasma reservoir;
d. air vent means communicating with said plasma reservoir; and,
e. means for engaging a centrifuge drive system whereby said centrifuge rotor can be spun to separate whole blood entering said red cell reservoir into a plasma component and a red cell component.

4,059,109
MIXING AND DISPENSING DISPOSABLE MEDICAMENT INJECTOR
Edward A. Tischlinger, 7 Froghollow Road, East Lyme, Conn. 06333
Filed July 27, 1976, Ser. No. 709,239
Int. Cl.² A61M *5/00*
U.S. Cl. 128—218 M **10 Claims**



1. A mixing and dispensing disposable medicament injector adapted to mix a liquid and a dry medicament and have means for injecting said mixed medicament, said injector comprising:

a cylindrical barrel,
a slidable plunger fitted within and closing the rearward end of the barrel,
a first diaphragm assembly positioned within and closing off the forward end of the barrel,
a second diaphragm assembly sealingly and slidably fitted within the barrel intermediate the ends thereof dividing the barrel into a rearward chamber and a forward chamber, the rearward chamber being adapted to contain the liquid diluent and the forward chamber being adapted to contain the dry medicament, each diaphragm assembly including a flexible wall on its rearward side with a needle mounted so that its one end is closely adjacent said flexible wall, the other needle end establishing fluid communication through the forward side of the diaphragm assembly, whereby when the flexible walls are flexed said walls will be pierced by the respective adjacent needle to allow flow forwardly through the needle, and
said plunger comprises a body portion having its periphery in sealing contact with the barrel, said body portion having a central opening longitudinally therethrough, a flexible member connected to the body portion and closing off the opening, said flexible member being adapted to move forwardly and apply a fluid pressure to the flexible wall of the second diaphragm assembly moving it into piercing contact with the needle of said assembly to establish flow between the rear and forward chambers.

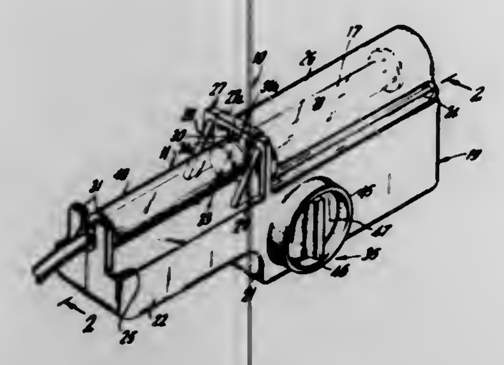
4,059,110
CLOCKWORK DRIVEN HYPODERMIC SYRINGE
Paul Wuthrich, Watertown, and Paul Flumm, Oakville, both of Conn., assignors to Timex Corporation, Waterbury, Conn.
Filed Oct. 7, 1976, Ser. No. 730,557
Int. Cl.² A61M *5/20*
U.S. Cl. 128—218 A **6 Claims**

1. A clockwork device adapted for driving a syringe, wherein said syringe includes an elongated container for fluid and a plunger extending outwardly from the container and slideable therein, said clockwork device comprising:

a housing,

a clockwork mechanism having an escapement controlled gear train mounted within the housing adjacent to the plunger in an extended condition,

a syringe driving mechanism adapted to be coupled to said clockwork mechanism and including a winding shaft with a mainspring mounted thereto and a pinion thereon engaging a rack adapted to drive the syringe plunger, and



means coupling the clockwork mechanism to the syringe driving mechanism to drive the plunger at a predetermined rate controlled by the clockwork mechanism comprising a spring clutch mounted about the winding shaft to permit free rotation in one direction while restraining mainspring torque in the opposite direction.

4,059,111

APPARATUS AND METHOD FOR ORAL DOSING

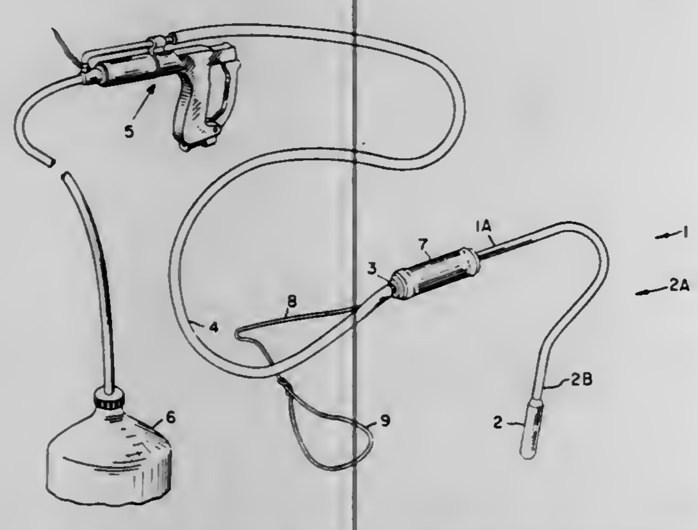
Frans P. G. Erasmus, Kempton Park, South Africa, assignor to Smith Kline & French (Proprietary) Limited, Isando, South Africa

Filed May 25, 1976, Ser. No. 689,754

Claims priority, application South Africa, May 28, 1975, 75/3459

Int. Cl.² A61D *7/00*

U.S. Cl. 128—223 14 Claims



1. A method for the oral dosing of an animal with a suitable substance including the steps of locating a substantially rigid U-shaped conduit having an offset leg portion in the mouth of the animal so that the leading end thereof points in the direction of the animal's throat and the rear end thereof projects from the side of the animal's mouth and said offset leg portion points in the direction of the animal's rear to allow for the person administering the dose to be in a position next to the animal to facilitate handling the animal; and passing the substance via the conduit into the animal's mouth.

4,059,112

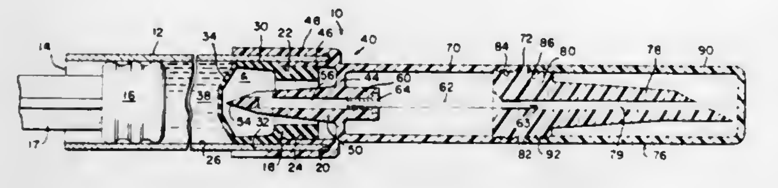
DISPOSABLE ADDITIVE SYRINGE

Edward A. Tischlinger, 7 Froghollow Road, East Lyme, Conn. 06333

Filed Nov. 19, 1976, Ser. No. 743,219

Int. Cl.² A61J *1/00*

U.S. Cl. 128—272.3 6 Claims



1. A disposable additive syringe having a cylindrical barrel closed at the rear end by a slidable plunger and at the front end by a diaphragm including: a flexible wall facing rearwardly in a convex manner, a medicament chamber formed between the slidable plunger and the flexible wall, a cap and spike assembly mounted on the forward end portion of the cylindrical barrel, said spike being positioned within the cylindrical barrel with its pointed end spaced from and outside the flexible wall, said spike having a passage therethrough, a cannula extending forwardly from the cap and spike assembly in fluid communication with the spike passage, a cylindrical safety guide surrounding the cannula in a spaced manner, a spike mounted on the forward end portion of the safety guide, said spike having a throughbore aligned with the cannula whereby the forward end portion of the cannula fits within said throughbore, and a sheath covering the spike.

4,059,113

ASPIRATORS FOR MEDICAL PURPOSES

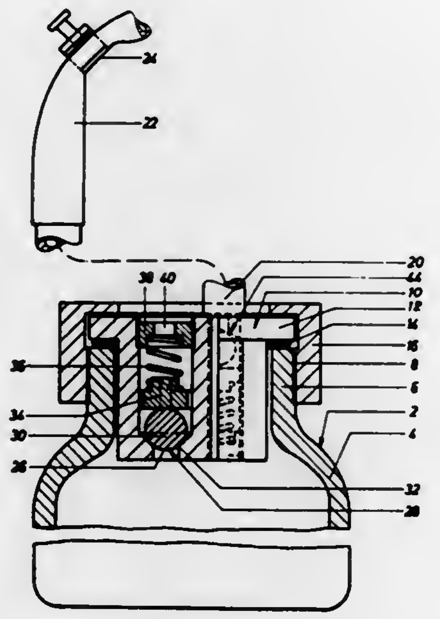
Dieter Beinsen, Geschw. Schollstr. 12, Salzgitter 1, and Otto Kribitzneck, Dierkinkstr. 14, Walsrode, both of Germany

Filed Sept. 29, 1975, Ser. No. 617,915

Claims priority, application Germany, Nov. 23, 1974, 2456067; Sept. 28, 1974, 2446470

Int. Cl.² A61L *1/00;* **A61M** *1/00;* **B65B** *31/04;* **B65D** *51/16*

U.S. Cl. 128—276 6 Claims



1. A vacuum aspirator for removing fluids from body cavities comprising a container for receipt of such fluids, a closure for closing said container, means supported by said closure for receiving and thereafter directing said fluids through said closure into said container, combined valve means operatively associated with said closure for sequentially admitting pressurized steam to interior portions of said container and thereafter evacuating the same, said valve means including a first one-way inwardly opening inlet valve portion normally biased in a closed position to admit steam above a predetermined relative pressure therepast and a second one-way outwardly opening outlet valve portion normally biased in a closed position to permit the passage of gas within said container outwardly thereof during evacuation of said container, said receiving means and said valve means operable to maintain said container under vacuum until use of said aspirator.

4,059,114

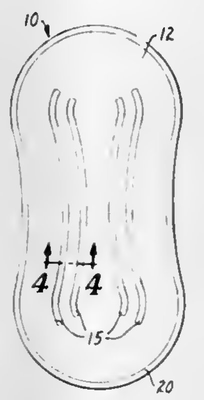
GARMENT SHIELD

Shirley T. Richards, Brooklyn Park, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation-in-part of Ser. No. 685,769, May 12, 1976, abandoned. This application Oct. 22, 1976, Ser. No. 734,747

Int. Cl.² A61F *13/16*

U.S. Cl. 128—287 20 Claims



1. A disposable shield for everyday feminine hygiene and garment protection comprising a thin, elongate, highly absorbent pad having (a) a porous, substantially planar hydrophobic polymeric body-contacting surface having a soft, doe-skin like hand, (b) an absorptive portion having differential wetting characteristics from one surface to the other to thus provide for controlled movement of fluid away from the bodycontacting surface, (c) a soft, pliable, rattle-free, body fluid-impermeable barrier and (d) an adhesive positioner means comprising substantially the entire garment-contacting surface, said shield being adapted for attachment to a garment such that the shield will not dislodge, shift or move during wear but is removable from the garment without fabric damage or adhesive residue.

4,059,115

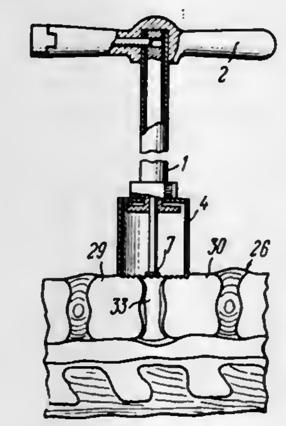
SURGICAL INSTRUMENT FOR OPERATION OF ANTERIOR FENESTRATED SPONDYLODESSIS IN VERTEBRAL OSTEOCHONDROSIS

Georgy Stepanovich Jumashev, Kutuzovsky prospekt. 21/1, kv. 86, and Motel Khaimovich Furman, ulitsa Svobody, 93, kv. 393, both of Moscow, U.S.S.R.

Filed June 14, 1976, Ser. No. 695,407

Int. Cl.² A61B *17/14, 17/16*

U.S. Cl. 128—317 7 Claims



1. A surgical instrument for the operation of anterior fenestral spondylodesis in vertebral osteochondrosis, comprising: a hollow elongated cylindrical body; a hollow cylindrical cutter, having a cavity and a cutting edge in a given plane, secured on a distal end of said body coaxially therewith and intended for the simultaneous excision of two transplants in the shape of cylindrical segments from two adjacent vertebrae separated by an intervertebral slit; a shaft situated in said body coaxially therewith and freely rotatable therein and movable longitudinally with respect thereto; a knife situated in the cavity of said cutter and secured on said shaft for movement jointly therewith, said knife having blades situated in a plane parallel to said given plane, and said blades having a size small enough for introduction of the knife into the intervertebral slit following the removal of an intervertebral disk, said knife being adapted completely to undercut said transplants, after their excision by said cutter, upon subsequent rotation of the knife; a device for securing said shaft relative to the aforementioned body in a position where the cutting edge of the cutter and the blades of the knife lie in approximately the same plane, while preventing the shaft's rotation relative to the body; a limit flange, secured on said shaft and situated within the cavity of said cutter at a distance from the blades of said knife, equal to a predetermined height of the transplants being excised and intended for coming in contact with the surface of said adjacent vertebrae and thereby restricting the depth of the knife's descent into the intervertebral slit; a stop situated at the proximal end of said body, interacting with a proximal end of said shaft during its longitudinal movement towards the proximal end of the body and ensuring thereby, together with said limit flange, a present depth of penetration of the cutter into adjacent vertebrae.

4,059,116

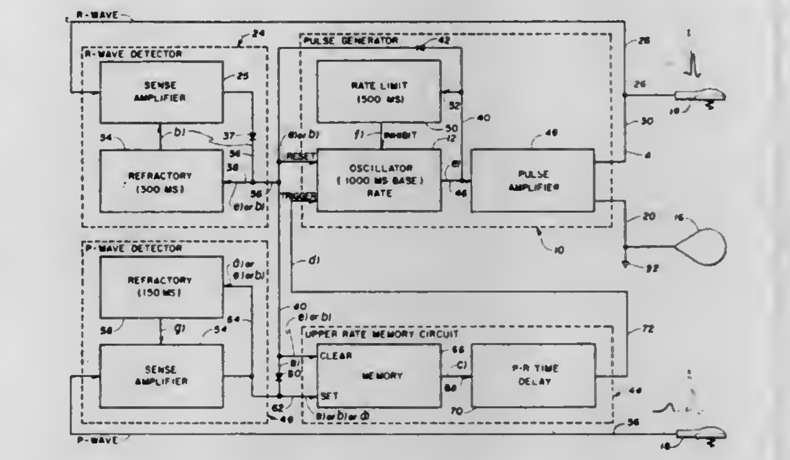
SYNCHRONOUS PACEMAKER WITH UPPER RATE STABILIZATION AND METHOD OF USE

John M. Adams, Minneapolis, Minn., assignor to Medtronic, Inc., Minneapolis, Minn.

Continuation of Ser. No. 530,799, Dec. 9, 1974, abandoned. This application Jan. 12, 1976, Ser. No. 648,352

Int. Cl.² A61N *1/36*

U.S. Cl. 128—419 PG 17 Claims



15. An atrial synchronous cardiac pacemaker for pacing the ventricle portion of the heart at a rate in synchronism with the natural contraction of the atrium portion of the heart, but at a rate above a lower rate limit and below an upper rate limit, said pacemaker comprising:

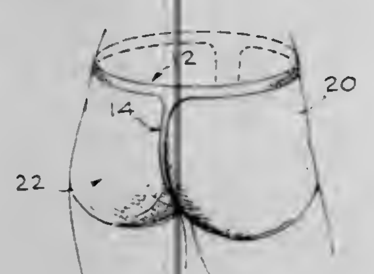
an oscillator responsive to a trigger signal for generating an electrical pulse signal adapted to be applied over a lead to the ventricle portion of the heart to elicit a responsive heart beat, said oscillator further being operable to generate said pulse signal upon the absence of any trigger signal for a designated time period, said oscillator including rate limit means for preventing said pulse signals from being generated at a rate exceeding an upper rate limit;

sensing means responsive to the occurrence of a cardiac signal caused by the contraction of the atrium of the heart for providing a signal each time said atrium contracts, said sensing means further including means for inhibiting the response by said sensing means to an atrium contraction

caused signal which occurs during a fixed time, less than said designated time, after the provision of each pulse signal; and

memory means, which in response to said sensing means signal, provides said trigger signal to said oscillator until said pulse signal is generated, said memory means being reset each time a pulse signal is generated and set each time a sensing means signal is provided.

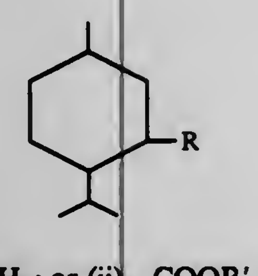
4,059,117
GIRDLE ACCESSORY
Pnina Rosenfeld, 7635 W. Hampton Ave., Los Angeles, Calif. 90046
Filed June 23, 1976, Ser. No. 699,033
Int. Cl.² A41C *1/00*
U.S. Cl. 128—531 **3 Claims**



1. In an accessory for and placeable over a girdle, or the like, comprising
a. a first band length encompassing the girdle horizontally,
b. a second band length branching off a first sector on the first band length, extending vertically downward therefrom substantially along the center front of the girdle at a relatively broad uniform width, decreasingjust prior to reaching the crotch of the girdle to a narrower width passing at said narrower width under the crotch, then vertically upward along the center back of the girdle and terminating at a second sector, located diametrically opposite said first sector on the first band length, so as to form a loop therewith.

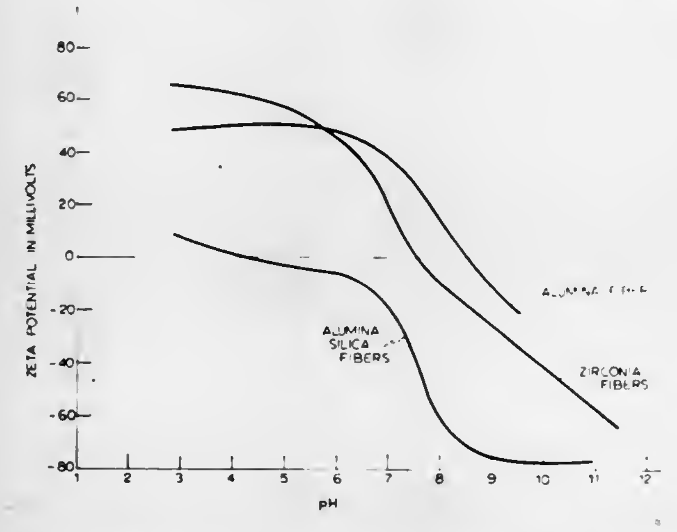
4,059,118
TOBACCO AND TOBACCO-CONTAINING MANUFACTURES CONTAINING AN INGREDIENT HAVING PHYSIOLOGICAL COOLING ACTIVITY
Hugh R. Watson, Wargrave; David G. Rowsell, Staines, and John H. D. Browning, Wokingham, all of England, assignors to Wilkinson Sword Limited, London, England
Continuation-in-part of Ser. No. 221,753, Jan. 28, 1972, abandoned. This application July 8, 1974, Ser. No. 486,651
Int. Cl.² A24B *3/12*
U.S. Cl. 131—8 R **7 Claims**

1. A tobacco or tobacco-containing manufacture comprising tobacco and an agent capable of stimulating the cold receptors of the nervous system of the nasal or oral mucosa when brought into contact therewith upon use of the manufacture, wherein said agent comprises an effective amount of a cold receptor stimulating substituted p-menthane of the formula:



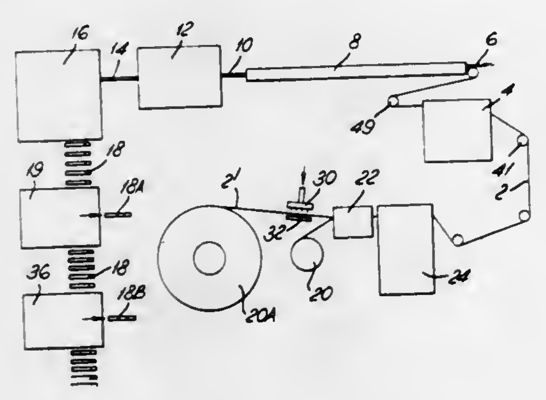
where: R is (i)—$CONH_2$; or (ii)—COOR', where R' is hydrogen; an alkali or alkaline earth metal atom, or an ammonium or substituted ammonium radical; or a radical containing from 2 to 10 carbon atoms and selected from hydroxyaliphatic radicals having a hydroxyl substituent in a 2- or 3-position and a hydrogen atom in the 1-position; a ketal derivative of such a hydroxyalophatic radical with a lower ketone; a lower acyl derivative of such a hydroxyaliphatic radical; a hydroxyaryl radical having a hydroxyl substituent in a 2- or 3-position relative to the ester grouping; a carboxyaliphatic radical having a carboxyl group in a 1-, 2- or 3-position; an alkali metal, alkaline earth metal, ammonium or substituted ammonium salt of such a carboxyaliphatic radical; a lower alkyl ester of such a carboxyaliphatic radical; and a lower alkylene oxide adduct of a hydroxyaliphatic radical having a hydroxyl substituent in a 2- or 3-position and a hydrogen atom in the 1-position.

4,059,119
CIGARETTE AND FILTER
Harold Grossman, Upper Montclair, N.J., assignor to Montclair Research Corporation, Silver Spring, Md.
Continuation of Ser. No. 479,104, June 13, 1974, abandoned. This application May 17, 1976, Ser. No. 687,110
Int. Cl.² A24B *15/00, 15/02, 15/027*
U.S. Cl. 131—9 **24 Claims**



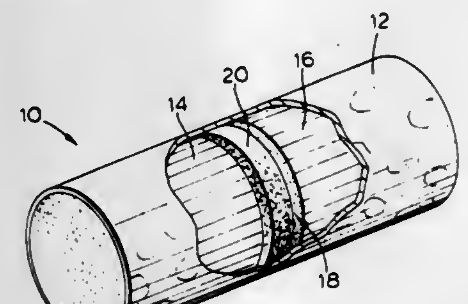
1. In combination, a body of divided tobacco to be burned, a filter for the tobacco smoke resulting from the burning, the tobacco being mixed with a system of particles of a water-insoluble, hydrophobic, moisture-laden, negative charge-imparting substance which releases moisture upon burning of the tobacco, the filter comprising synthetic, inorganic, water-insoluble, anhydrous fibers having a positive zeta potential at the pH of tobacco smoke.

4,059,120
MANUFACTURE OF CIGARETTES
Desmond Walter Molins; John Alfred Mills, and Eryk Stefan Doerman, all of London, England, assignors to Molins Limited, England
Filed Feb. 3, 1975, Ser. No. 546,673
Int. Cl.² G01M *3/26;* G08B *29/00*
U.S. Cl. 131—23 R **13 Claims**



1. A cigarette making system comprising a continuous rod cigarette making machine for producing cigarette portions, means for combining the cigarette portions with lengths of filter material to form filter tipped cigarettes, a first testing device for detecting leaks in the wrapper of the filter tipped cigarettes, means for feeding the cigarettes to the testing device, and first means associated with the testing device for ejecting faulty cigarettes, in which the cigarette making system includes, upstream of the position at which the cigarettes are tested, means for deliberately producing leaks of predetermined size in the wrapper of selected cigarettes, and monitoring means for detecting whether the cigarettes containing the deliberate leaks are ejected by the first ejection means comprising a second testing device having second ejection means positioned downstream of the first ejection means associated with the first cigarette testing device and arranged automatically to test and eject any of the cigarettes containing the deliberately make leaks which were not ejected by the first ejection means.

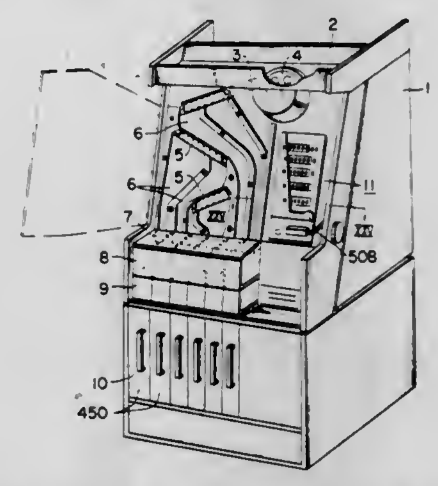
4,059,121
FILTER FOR TOBACCO SMOKE
Warren A. Brackmann, Cooksville, and Daniel Di Ianni, Toronto, both of Canada, assignors to Rothmans of Pall Mall Canada Limited, Toronto, Canada
Continuation-in-part of Ser. No. 352,868, April 20, 1973, Pat. No. 3,882,877. This application Jan. 27, 1975, Ser. No. 544,292
Int. Cl.² A24D *1/04*
U.S. Cl. 131—269 **16 Claims**



1. A filter for tobacco smoke comprising a single filter element consisting wholly of a plurality of randomly-oriented non-crimped smooth-surfaced solid fibers of thermoplastic polymeric non-absorbent material, each of said fibers having a uniform diameter less than 5 microns, said filter element having a generally circular cross-section taken across an intended flow path of tobacco smoke and a diameter substantially equal to the diameter of said tobacco smoke flow path, the weight of polymeric material in said filter element exceeding about 6 mg, said filter element having a pressure drop thereacross of from 1 to 10 inches of water at a flow rate of 17.5 ml/sec.

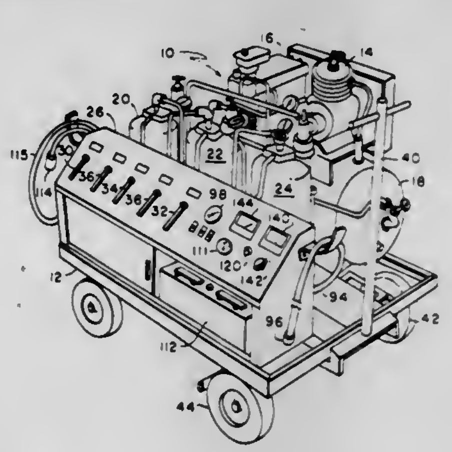
4,059,122
COIN CLASSIFYING AND COUNTING MACHINE
Yoshio Kinoshita, Himeji, Japan, assignor to Glory Kogyo Kabushiki Kaisha, Japan
Filed Feb. 5, 1974, Ser. No. 439,837
Claims priority, application Japan, Feb. 10, 1973, 48-17690; Feb. 12, 1973, 48-17618
Int. Cl.² G07D *3/04*
U.S. Cl. 133—3 D **3 Claims**

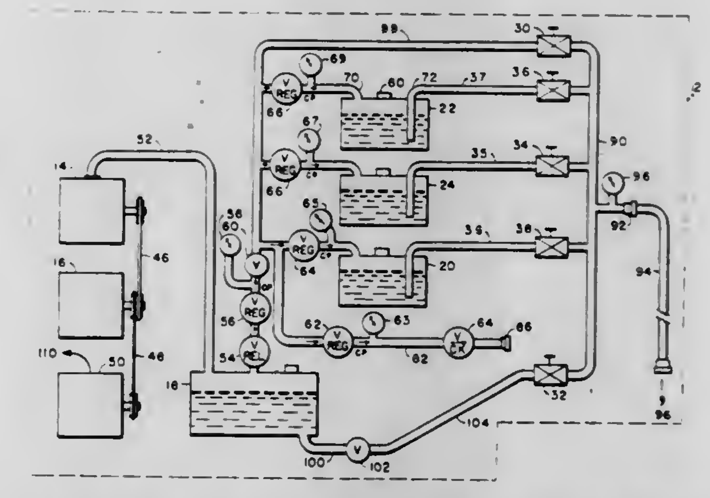
1. In a coin classifying and counting machine including a mixed coin hopper means for collecting and reserving mixed coins of a plurality of denominations, coin delivery means including a revolving disc for conveying coins from said hopper means, a delivery passageway for aligning and delivering in orderly sequence the coins thus conveyed, sorting means positioned at intermediate parts of said delivery passageway for sorting the coins therein by denomination, sorting passageways for conveying by denomination the coins thus sorted, coin counting devices installed in respective sorting passageways to count coins of respective denominations, and a coin receiver section for accommodating in groups by denomination the coins thus counted, the improvement which comprises said coin receiver section being comprised of coin receiving chamber means for storing coins therein in accordance with coin denomination and disposed respectively under said sorting passageways, and a coin collecting means positioned beneath said coin receiving chamber means for receiving coins stored in said chamber means, said coin collecting means and



said chamber means defining a space therebetween, said space comprising means to selectively receive therein further means to selectively allow passage of coins to said coin collecting means from said chamber means or block such passage and remove coins from said chamber means without reaching said coin collecting means.

4,059,123
CLEANING AND PRESERVATION UNIT FOR TURBINE ENGINE
Joseph S. Bartos, and Robert J. St. Onge, both of Trumbull, Conn., assignors to Avco Corporation, Stratford, Conn.
Filed Oct. 18, 1976, Ser. No. 733,627
Int. Cl.² B08B *3/02, 3/10;* F04B *21/00*
U.S. Cl. 134—102 **6 Claims**

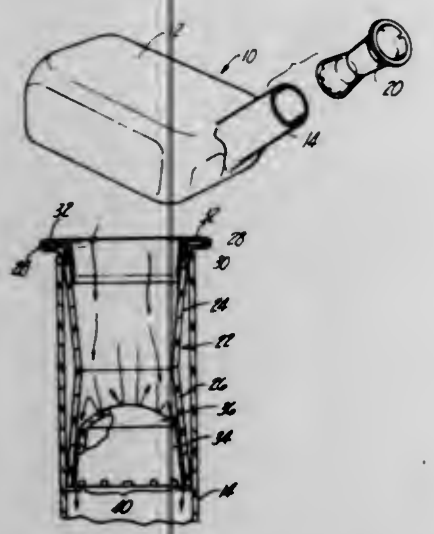




1. Apparatus for cleaning and preservation of a gas turbine engine, said engine having a starting motor for cranking the rotary compressor stages thereof, comprising in combination:

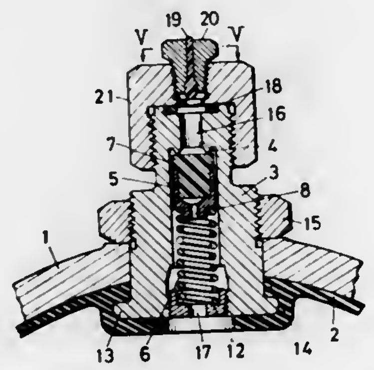
a frame structure having supporting wheels journaled for rotation;
a first reservoir mounted on said frame, said first reservoir being partially filled with water;
additional reservoirs for cleaner, solvent and preservative solutions mounted on said frame;
an internal combustion engine, a control console, a rotary air compressor and an alternator also mounted on said frame, said internal combustion engine being drivingly coupled to both said air compressor and said alternator;
an electric storage battery mounted in a compartment of said control console;
electrical connections between said alternator and said battery for charging said battery, said electrical connections including operator-manipulated control means for controlling the energy transfer from said alternator to said battery;
fluid connection means between said air compressor and said first reservoir for pressurizing said first reservoir with a volume of compressed air;
fluid connections between said volume of air and each of said additional reservoirs for pressurizing said additional reservoirs;
manually operable controll means in each of said connections for controlling the pressurization of each of said reservoirs;
nozzle apparatus mountable on said gas turbine engine for spraying the inside thereof with fluids;
means for connecting each of said reservoirs to said nozzle apparatus, said means including a high pressure hose selectively connected to said reservoirs; and
encircuiting means including a two-conductor electrical cable connecting said battery to said starting motor for cranking said rotary compressor stages.

4,059,124
VALVED STOPPER FOR A URINE BOTTLE
Edward J. Hill, 1660 Lochridge Road, Bloomfield Hills, Mich. 48013
Filed Jan. 26, 1976, Ser. No. 652,241
Int. Cl.² F16K *17/36*
U.S. Cl. 137—38 **12 Claims**



1. A valved stopper for a urine bottle of the type having a container body and an inlet extending from the container body and in communication therewith, comprising:
a tubular body having an upper segment adjoining a lower segment,
the upper segment being dimensioned at its uppermost portion to be closely received in the inlet opening to provide a close fit therein,
the lower segment being tapered outwardly from the point of juncture with the upper segment;
means for retaining the tubular body within the bottle inlet; and
a gravity controlled valve member, having a hollow tapered shape complementary to the lower segment and open at its lower end, freely disposed within the lower segment and retained therein by stop means on the lower segment, the valve member being adapted to sealingly engage the inner surface of the lower segment when directed toward the inlet opening and thereby block flow from the bottle,
whereby the open lower end of said valve member is adapted to receive liquid escaping from within said bottle to urge said valve member into sealing engagement with said inner surface and act to trap said liquid and prevent escape thereof.

4,059,125
PRESSURE CONTAINER WITH AN INJECTION VALVE PROVIDED WITH A FUSIBLE VALVE MEMBER
Nobuyuki Sugimura, and Kazuo Sugimura, both of 1416 Sodeshicho, Shizuoka, Shimizu, Japan
Filed Nov. 9, 1973, Ser. No. 414,502
Int. Cl.² F16K *17/38*
U.S. Cl. 137—73 **7 Claims**

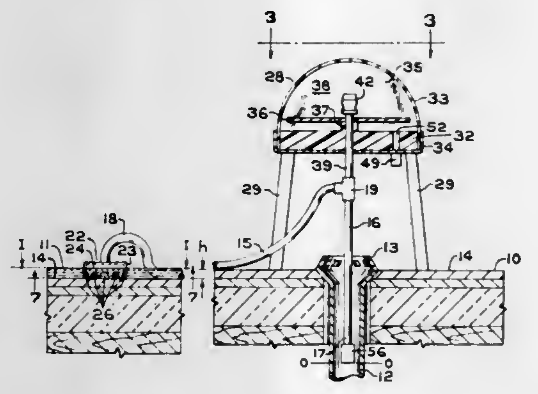


1. A fluid pressure container provided with an injection valve and valve seat for communicating the exterior of said container with the interior of it, characterized by the provision of relief of internal pressure upon ambient temperature rise including:
a. a hollow valve stem slidably disposed within said injection valve and having at least one passageway extended therethrough, said passageway providing the only path for escape of fluid from within the container to the exterior of the container, and
b. a fusible valve member filling said hollow valve stem and having a portion of the fusible member in contact with the valve seat of said injection valve providing the sole valve closing function by such contact with the valve seat to retain pressurized fluid in the container, said fusible valve member closing said passageway in said valve stem by said filling the hollow thereof, the injection valve having a fluid passage beyond said seat to the exterior of said container for flow of said fusible valve member under conditions of elevated ambient temperature to open both the passage through the hollow valve stem and said injection valve by removal of the fusible material to the exterior of the container.

4,059,126
SOLAR ACTUATED SIPHON DRAIN
Malcolm Horace Nickerson, Chagrin Falls, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio
Filed Aug. 16, 1976, Ser. No. 714,867
Int. Cl.² F16L *43/00*
U.S. Cl. 137—142 **8 Claims**

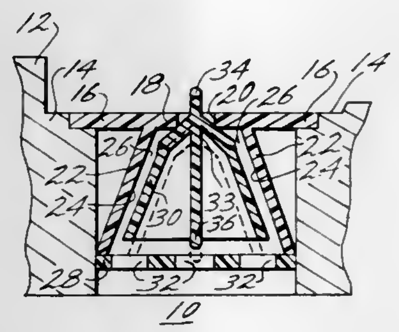
1. A solar actuated siphon for transferring liquid from an upper level to a lower level, said siphon having an inlet for immersion in said liquid at said upper level and an outlet at said lower level, an enclosed container having a chamber in communication with said siphon, first valve means between said siphon and said chamber, said first valve means being responsive to open when gaseous fluid pressure in said chamber is less

than the fluid pressure in said siphon and to close when the fluid pressure in said chamber is greater than the fluid pressure in said siphon, second valve means between said chamber and the space at atmospheric pressure outside said container, said second valve means being responsive to open when the gaseous fluid pressure in said chamber is greater than atmospheric pressure by a predetermined amount and to close at lower fluid pressures, a third valve means at said outlet being responsive to open when the fluid pressure in said siphon exceeds atmospheric pressure by a predetermined amount and to close at lower fluid pressure, means associated with said chamber for absorbing radiant solar energy to heat and thereby increase the pressure of gaseous fluid within said chamber, said second



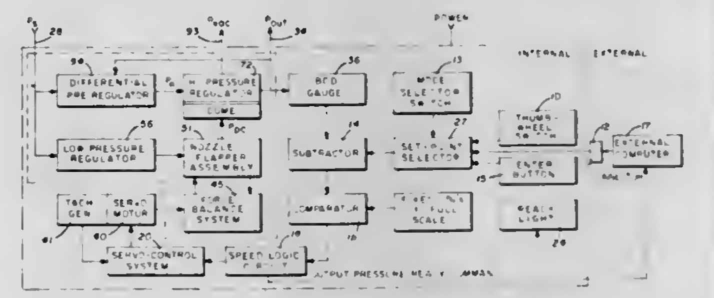
valve means being responsive to the increased pressure of said gaseous fluid to permit ejection of a portion of said gaseous fluid from said chamber, and said first valve means being responsive to a reduction in pressure of the remaining portion of gaseous fluid within said chamber on cooling causing said first valve means to open and communicate the resulting subatmospheric pressure in said chamber to said siphon, said third valve means maintaining a closed outlet and said subatmospheric pressure being communicated to said siphon and said inlet causing said liquid from said upper level to flow into said siphon and towards said outlet, said third valve means opening upon filling of said siphon with said liquid whereby said liquid is transferred from said upper level to said lower level.

4,059,127
SELF-CLEANING NON-RETURN DRAINAGE VALVE
Leonard J. Olson, R.R. 1, Topeka, Ill. 61567
Filed Feb. 27, 1976, Ser. No. 662,024
Int. Cl.² E04H *13/00;* **F16K** *51/00*
U.S. Cl. 137—244 **9 Claims**



1. A non-return drainage valve adapted for use with a container to allow the drainage of fluids from the container through said valve and to prevent the passage of liquids through said valve into the container, comprising:
a drain port having a seating surface,
a bouyant plug member movable towards said port and against the port seating surface for closing the valve in response to the bouyant force of backflowing liquids on the discharge side of the port;
plug member retaining means for guiding and retaining said plug member in alignment with said port defining a plurality of apertures therein for allowing the flow of fluids therethrough and for restricting the passage of debris thereinto, said retaining means having a peripheral clearance around said plug member to allow lateral movement and reduce friction between the plug member and retaining means;
a port probe means movable with said plug member and extending through said port for clearing debris from the port and precluding blockage of the port in response to movement of said plug member into said port, the exterior cross-sectional dimensions of said port probe means being less than the corresponding internal cross-sectional dimensions of said port by an amount sufficient to allow lateral movement of said port probe means within said port to reduce friction when said port probe means moves into and out of said port; and
an additional probe means movable with said plug member and extending through selected ones of said apertures for clearing debris from said selected ones of said apertures and precluding blockage thereof in response to movement of said plug member away from said port, the exterior cross-sectional dimensions of said additional probe means being less than the corresponding internal cross-sectional dimensions of said apertures by an amount sufficient to allow lateral movement of said additional probe means within said apertures to reduce friction when said additional probe means moves into and out of said apertures.

4,059,128
DIGITAL PRESSURE STANDARD
William Albert Heske, Fairfield, and Christopher Peter Grudzien, Milford, both of Conn., assignors to Dresser Industries, Inc., Dallas, Tex.
Filed Mar. 12, 1976, Ser. No. 666,288
Int. Cl.² G05D *16/20*
U.S. Cl. 137—487.5 **14 Claims**



1. Pressure regulating apparatus comprising in combination:
a. variably settable first regulator means in which to receive a pressure fluid supply from a pressure source and emit the received fluid at a controlled pressure differential from that at which it is received;
b. variably settable second regulator means receiving the emitted fluid from said first regulator means and operative for emitting a controlled differential pressure output of received fluid for supply as a control pressure to said first regulator means for controllably setting the controlled pressure differential emitted by said first regulator means;
c. sensing means for measuring the pressure of fluid discharge emitted from said second regulator means and to emit a BCD signal corresponding to the pressure value thereof;
d. input means operative for establishing a BCD set point pressure command signal for the value of fluid discharge from said second regulator means; and
e. logic means receiving said BCD signals from said sensing means and said input means and operatively effective in response to the signal differential therebetween to repetitively reset said second regulator means for reducing said signal differential until the value of output pressure from said second regulator means corresponds to the set point pressure command signal of said input means.

4,059,129

CYLINDRICAL BODY PROVIDED WITH MEANS FOR COUNTERACTING VIBRATIONS RESULTING FROM A TRANSVERSELY FLOWING FLUID

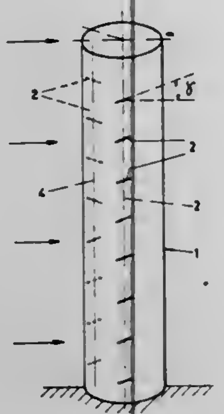
Nikolaas Feis, Apeldoorn, Netherlands, assignor to Nederlandsche Organisatie Voor Toegepast-Natuurwetenschappelijk Onderzoek Ten Behoeve Van Nijverheid, The Hague, Netherlands

Filed Feb. 6, 1976, Ser. No. 655,829

Claims priority, application Netherlands, Feb. 18, 1975, 7501866

Int. Cl.² F15D *1/00*

U.S. Cl. 138—37 **8 Claims**



1. A cylindrical body that at the outer periphery is provided with means for counteracting vibrations of said body resulting from a transverse flow against the outside of said body, wherein said means comprise a plurality of small planes which extend on substantially a perpendicular direction from the outer surface of said cylindrical body and which form an angle of 5°–25° with a cross-section of said cylindrical body which is perpendicular to the axis of said body and have a greater length than width which are mounted substantially perpendicular to the outer surface of said cylindrical body.

4,059,130

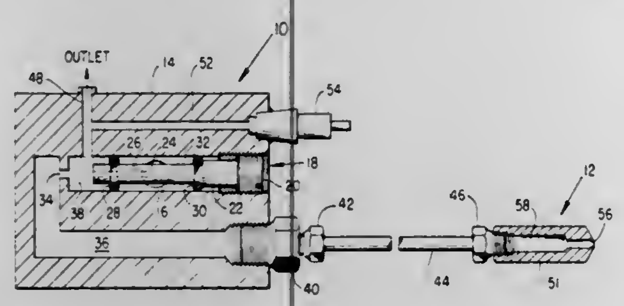
PROXIMITY SENSOR WITH ZERO ADJUSTMENT

Kenneth W. Cohen, Chesterland, Ohio, assignor to Bailey Meter Company, Wickliffe, Ohio

Continuation of Ser. No. 397,537, Sept. 14, 1973, abandoned, which is a continuation of Ser. No. 208,143, Dec. 15, 1971, abandoned. This application Sept. 26, 1974, Ser. No. 509,456

Int. Cl.² F15B *5/00;* **G01B** *13/00*

U.S. Cl. 137—82 **2 Claims**



1. In a proximity sensor, the combination comprising an emitter assembly having a cylindrical passageway, a fixed orifice disposed in said passageway dividing the passageway into an output chamber and a back pressure chamber, a sensing nozzle connected to said back pressure chamber for wasting pressure fluid from the back pressure chamber in inverse proportion to the proximity of an object to the sensing nozzle, an orifice tube located within said output chamber axially aligned with said fixed orifice adapted to be connected to a source of pressure fluid and discharge a jet of pressure fluid through said fixed orifice into said back pressure chamber, and means for axially positioning said orifice tube to thereby vary the pressure in said output chamber for a given pressure in said back pressure chamber.

4,059,131

JACQUARD SELECTION SYSTEM

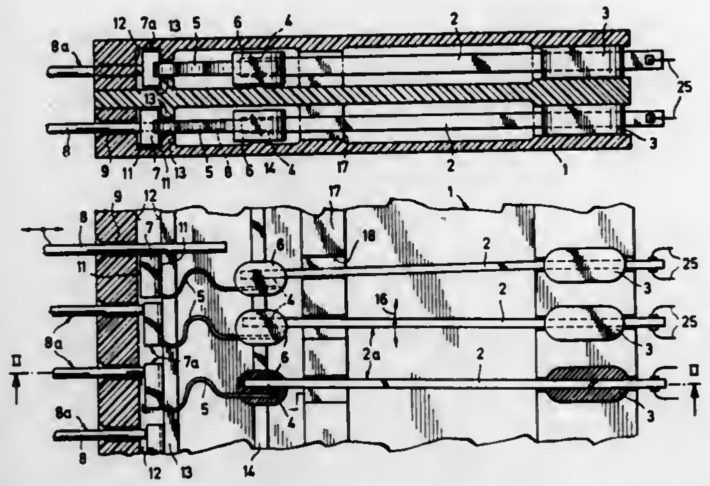
Robert R. Bucher, Winterthur, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

Filed Feb. 3, 1976, Ser. No. 654,784

Claims priority, application Switzerland, Feb. 7, 1975, 1518/75

Int. Cl.² D03C *3/20*

U.S. Cl. 139—59 **14 Claims**



1. A jacquard selection system for selecting warp yarns of a weaving machine, said system comprising:

a plurality of multimorphous bending elements,

a plurality of jacquard needles, each said needle being disposed to move between a non-sensing position and a sensing position to sense the position of a respective bending element;

a guide including a wall opposite said needles; and

a plurality of sliders, each said slider being separably mounted from a respective bending element and being reciprocally mounted within said guide between each bending element and a respective jacquard needle to selectively inhibit a sensing movement of said respective needle, each said slider being disposed in abutment with said wall in a sensing position of said respective needle without stressing of a respective bending element.

4,059,132

BOBBIN RETAINER ON A SHUTTLE

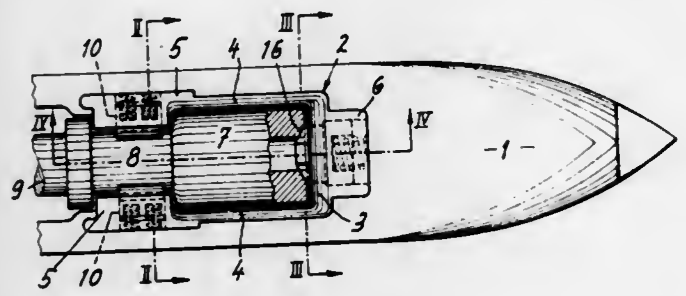
Theodor Kenk, Karlsruhe, and Erhard Kenk, Vaihingen, both of Germany, assignors to Leder & Co., AG, Kt. St. Gallen, Switzerland

Filed May 17, 1976, Ser. No. 687,030

Claims priority, application Germany, May 17, 1975, 2522146; Feb. 4, 1976, 2604153

Int. Cl.² D03J *5/16*

U.S. Cl. 139—207 **5 Claims**



1. In an automatic weaving shuttle having a body formed with a recess for receiving a bobbin, the provision of piercings in the body and extending into said recess, a substantially U-shaped bobbin retaining insert located by frictional engagement in said recess and having anchoring pegs corresponding to and engaging the piercings also to retain the insert within the recess, said insert being formed with two legs and a crosspiece connecting said legs, sliding guides formed in said legs and arranged in pairs on both sides of the central longitudinal plane of the bobbin. Bobbin retaining dogs movable within said sliding guides, helical springs urging the dogs into engagement with the bobbin for retaining the bobbin in the recess, a projection on the crosspiece, a spigot slidably mounted in the projection and extending through the crosspiece and a helical spring arranged within the projection to urge the spigot into engagement with the bobbin for centering the bobbin within the recess.

4,059,133

WEFT INSERT APPARATUS FOR RIBBON LOOMS

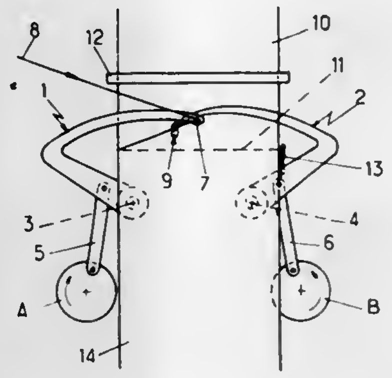
Ferdinand Diesner, Spittelweg 1, D-8998 Murg-Hanner, Germany, and Robert Bucher, Frickbergstrasse, CH-5262 Frick, Switzerland

Filed Apr. 5, 1976, Ser. No. 673,819

Claims priority, application Switzerland, Apr. 4, 1975, 4275/75

Int. Cl.² D03D *47/02*

U.S. Cl. 139—440 **5 Claims**



1. A weft insert apparatus for a shuttleless loom, especially a ribbon loom, comprising two cooperating weft insert elements each having a free end, means mounting said weft insert elements for movement towards and away from one another such that their free ends describe curves, drive means cooperating with said weft insert elements for pivotably driving said weft insert elements towards and away from one another, one of said weft insert elements being provided at its free end with means for the infeed of the weft thread, the other weft insert element being provided at its free end with means for seizing the weft thread, said seizing means comprises a hook, the means mounting the weft insert element possessing a hook includes a pivot shaft, the hook of said weft insert element possessing a web directed approximately radially with respect to the free end of the weft insert element mounted at said pivot shaft, an enlarged portion formed at one end of said web and pointing in the direction of a loop of the weft thread, said enlarged portion containing a shoulder which extends approximately transversely with respect to the web.

4,059,134

MOBILE DRUM FILLING ASSEMBLY

Theodore T. Violette, 2603 Wall St., Long Beach, Calif. 90804

Filed June 21, 1976, Ser. No. 697,988

Int. Cl.² B65B *31/00;* **B67D** *5/00*

U.S. Cl. 141—59 **6 Claims**

1. A portable device that may be moved adjacent a bulk liquid holding tank having a liquid inlet and liquid outlet to sequentially dispense predetermined weighted quantities of said liquid into a plurality of drums, each of said drums being of the type that includes a bottom and an upwardly disposed head that has a bung hole therein that may be removably closed by a stopper, said device including:

a. an elongate rectangular portable bed having a first forwardly disposed end and a second rearwardly disposed end, and first and second longitudinal sides;

b. a frame work extending upwardly from said bed;

c. first, second and third elongate conveyors having first forward ends and second rearward ends, said conveyors supported from said frame work in elevated positions above said bed and extending longitudinally relative to the latter, said first conveyor adjacently disposed to said first side of said bed, said second ends of said conveyors adjacently disposed to said second end of said bed, said first conveyor angularly disposed to the extent that drums placed on said second end thereof move by gravity to said first end thereof, and said second and third conveyors angularly disposed to the extent that drums placed on said first ends thereof move by gravity to said second ends thereof;

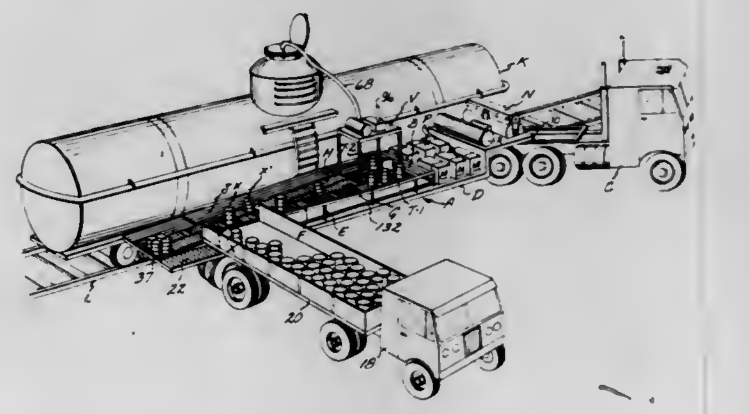
d. a first conduit removably connectable to said liquid outlet of said tank;

e. power-operated means for establishing a sufficient differential in pressure between liquid in the interior of said tank and the interior of said first conduit that liquid in said tank will flow into said first conduit;

f. an engine on said bed for driving said power-operated means;

g. first and second laterally spaced scales that have first and second laterally spaced weighing platforms that are supported from said bed adjacent said first end thereof, said first and second weighing platforms longitudinally aligned with said second and third conveyors and disposed adjacent said first ends thereof;

h. a horizontal floor supported from said frame work adjacent said first and second scales on which an operator may



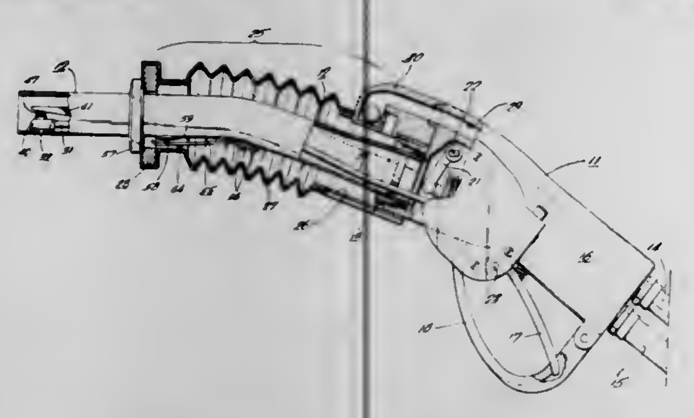
stand to sequentially remove drums from said first end of said first conveyor and place them on said first and second weighing platforms to be filled with said predetermined weighed quantities of said liquid, with said drums on said first and second weighing platforms after having said predetermined weighed quantities of said liquid dispensed therein having said stoppers disposed in said bung holes, and said operator moving filled drums from said weighing platforms onto said second and third conveyors to permit said filled drums to coast by gravity to said second ends of said second and third conveyors;

i. a horizontal platform supported by said frame work adjacent said second end of said first conveyor on which a person may stand to move empty drums onto said first conveyor and to tighten the stoppers in bung holes of filled drums that move towards said second end of said bed on said second and third conveyors;

j. an elevated valved dual hose assembly above said first and second weighing platforms that receives liquid from said first conduit, said dual hose assembly including first and second tubular valved portions that extend into said bung holes of first and second drums on said first and second weighing platforms to permit said first and second drums to have said liquid concurrently dispensed thereinto from said first conduit; and

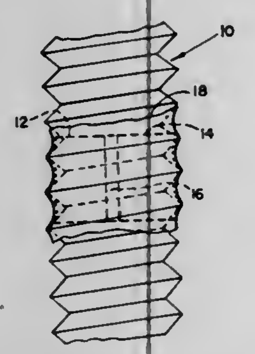
k. second means operatively associated with said dual hose assembly for preventing fumes from said liquid being dispensed into said drums on said first and second weighing platforms escaping to the ambient atmosphere.

4,059,135
INTERLOCK SYSTEM FOR A FUEL DISPENSING NOZZLE
William B. Hansel, Media, Pa., assignor to Suntech, Inc., St. Davids, Pa.
Continuation-in-part of Ser. No. 635,189, Nov. 25, 1975, Pat. No. 4,011,897. This application July 12, 1976, Ser. No. 704,212
The portion of the term of this patent subsequent to Mar. 15, 1994, has been disclaimed.
Int. Cl.² B65B *57/06*
U.S. Cl. 141—207 **6 Claims**



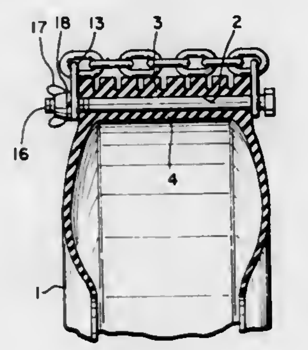
1. A nozzle for dispensing fuel into a fillpipe of a motor vehicle fuel tank and comprising:
a. a discharge spout for insertion into a fillpipe of a motor vehicle fuel tank;
b. a shut-off valve for shutting off fuel being dispensed by the nozzle;
c. actuating means for closing said shut-off valve in response to fuel backed up into a fillpipe and including a vent line having an open end at the discharge end of the discharge spout, said vent line being supplied with a vacuum such that when gasoline covers the open end of the vent line, the pressure in the vent line drops and the pressure drop may be sensed to actuate said shut-off valve; and
d. interlock means for preventing the dispensing of fuel through the nozzle until the discharge spout of the nozzle is properly inserted in a fillpipe and including a valve means located at the outlet of the vent line at the end of the discharge spout, said valve means having an open position wherein the vent line is open to the atmosphere and a closed position wherein the end of the vent line is sealed closed, and means, responsive to the nozzle being inserted in the fillpipe a predetermined distance and the lower side of the discharge spout being urged against the inside of a fillpipe inlet, for actuating the valve means so that the valve is placed into its open position, thereby permitting the dispensing of fuel.

4,059,136
THREAD LOCK
Richard B. Wallace, Bloomfield Hills, Mich., assignor to The Oakland Corporation, Troy, Mich.
Continuation-in-part of Ser. No. 550,831, Feb. 18, 1975, abandoned. This application June 30, 1976, Ser. No. 701,107
Int. Cl.² F16B *39/02*
U.S. Cl. 151—14.5 **14 Claims**



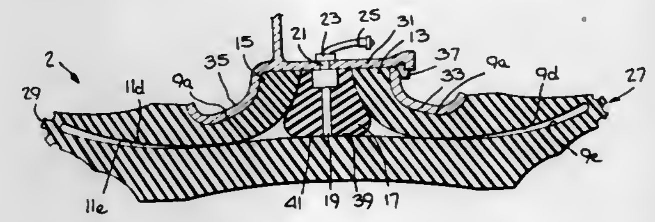
1. A thread lock construction comprising a body having threads formed thereon provided with two physically separated deposits of fluid components which when reacted together form a solid locking material in the thread grooves at a circumferentially extending zone on said body comprising a plurality of consecutive thread convolutions extending around said body, one of said deposits extending only partly around said body within said zone, the other deposit being located on substantially the same consecutive thread convolutions within said zone and extending around said body in position to bring one of the circumferentially separated edges of said other deposit initially into contact with the adjacent one of the circumferentially separated edges of the said one deposit, said deposits being fluid and capable of being spread and intermixed by engagement with a mating threaded body, a thin barrier of solid material formed by reaction between the two deposits at the initially contacting edges thereof constituting a barrier between said deposits which limits reaction therebetween, a rupturable thin film of dry non-tacky protective material overlying both deposits and barrier, the solid barrier between said zones forming mechanical mixing elements to improve the intermixing of the materials of said deposits when said body is threadedly engaged with a mating threaded body.

4,059,137
TIRE-CHAIN DEVICE
Edmund T. Green, Golfview Drive - Box 69 - 1B, Hadley, N.Y. 12835
Filed July 28, 1975, Ser. No. 599,501
Int. Cl.² B60C *27/02*
U.S. Cl. 152—232 **1 Claim**



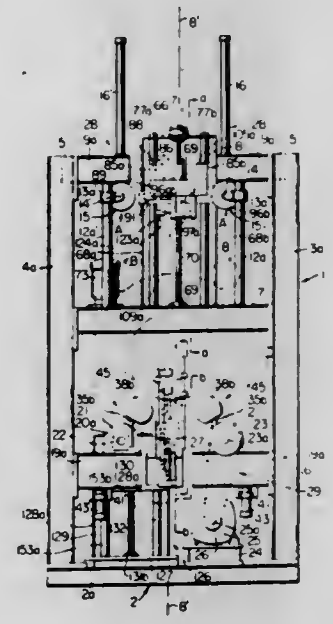
1. A combination pneumatic tire-chain device comprising:
a tire having a crown, including treads and a crown core below said treads, said crown core being provided with a plurality of openings extending parallel to the axis of the tire and uniformly spaced around the tire extending through the crown core from one side wall thereof to another side wall thereof;
a plurality of bolts, each having a length larger than each of said openings and complementary in cross-secton to that of said openings and threaded at one free end, and having a hexagonal-shaped bolt head at the other end;
a chain comprising a plurality of links, including end links, one end link of which is coupled to said other end of each of said bolts adjacent said bolt head, said chain being adapted to be placed over the outer periphery of the tire on said treads when the bolt is inserted in said opening, said chains being uniformly spaced along said treads, leaving a major portion of said treads exposed;
a first-connecting member having a bolt opening substantially complementary to said one free end of the bolt and connected to the other end link of said chain and having a flat surface for abutting a side wall of the tire adjacent the opening;
locking bolt means releaseably threadably engaging the threaded free end of said bolt and securing said bolt thereto and pressing said flat surface of said first connecting member against said side wall of the tire, said locking bolt means comprising a wing nut and a spring-biased annular lock washer secured to said wing nut; and
a second-connecting member for connecting the said one end link of said chain at said bolt head of said bolt to said bolt, said second-connecting member being permanently secured to said bolt, and having a flat surface adapted to abut the other side wall of said tire when said bolt means secures said bolt, said first and second-connecting members constituting discs, each having a chain opening receiving end links of said chain, said chain openings of said first- and second-connecting members and said bolt opening of said first-connecting member being radially offset relative to the center of the respective disc, with the bolt opening of said first-connecting member being larger than said chain openings.

4,059,138
RUN-FLAT TIRE AND HUB THEREFOR
Henri J. Mirtain, and Andre M. Devienne, both of Compiegne, France, assignors to Uniroyal, S.A., Clairoix, France
Continuation of Ser. No. 376,983, July 6, 1973, abandoned. This application Sept. 16, 1976, Ser. No. 724,047
Claims priority, application France, Aug. 11, 1972, 72.29183
Int. Cl.² B60C *17/04, 15/00, 13/00*
U.S. Cl. 152—330 RF **14 Claims**



1. A vehicle wheel constituted by a pneumatic tire having a run-flat capability and a hub on which said tire is mounted comprising:
a carcass;
a tread overlying the crown region of said carcass in circumferentially surrounding relation to the latter;
first and second sidewalls overlying the lateral portions of said carcass,
said first and second sidewalls terminating in first and second beads respectively at their radially inwardmost ends and merging into said tread at their radially outwardmost ends,
the axially outwardmost portions of said sidewalls being generally intermediate the radially inwardmost and outwardmost ends thereof and extending axially outwardly of the axially outwardmost portions of said tread,
each of said sidewalls having an annular groove formed therein generally intermediate its radially inwardmost and outwardmost ends for folding each of said sidewalls axially outwardly along sharply defined annular lines upon deflation of the tire,
said grooves being formed at locations in said sidewalls corresponding to the axially outwardmost portions of said sidewalls when the tire is deflated under load,
said grooves dividing said sidewalls along said sharply defined annular line each into a radially inner portion and a radially outer portion that in a predetermined contour are mutually engageable with one another when the tire is deflated under load;
stabilizing means interposed between the bead portions of said sidewalls for preventing inadvertent axial displacement of said bead portions of said sidewalls relative to one another and said hub when the tire is deflated under load,
said stabilizing means bridging said bead portions of said sidewalls and cooperating therewith to provide for an axially stable unit that serves to minimize axial displacement of said radially outer portions of said sidewalls relative thereto and lateral oscillation of the tire when it is deflated under load and run flat,
each of said sidewalls having an annular recess formed therein, said recesses extending axially and radially outward from the bead regions of the tire;
a rigid annulus;
a first annular flange extending from one side of said annulus; and
a second annular flange extending from the second side of said annulus,
one surface of each of said first and second flanges being contoured to conform to the first and second beads, respectively, of said tire and to substantially conform to the annular recesses formed in the first and second sidewalls, respectively, of said tire only upon deflation of said tire.

4,059,139
TIRE FINISHING APPARATUS
Kichinosuke Nishimoto, Higashimurayama, and Seiichiro Nishimura, Shakujii, both of Japan, assignors to Bridgestone Tire Company Limited, Tokyo, Japan
Filed Mar. 30, 1976, Ser. No. 671,813
Claims priority, application Japan, Apr. 4, 1975, 50-41539; May 22, 1975, 50-61276; June 10, 1975, 50-69959
Int. Cl.² B29H *17/40*
U.S. Cl. 157—13 **15 Claims**



1. A tire finishing apparatus for trimming and removing spews formed on the outer peripheral wall of a cured time during a vulcanizing process, comprising:
a tire holding mechanism including at least three rollers adapted to be in contact with the outer peripheral wall of said tire with its rotational axis substantially horizontal to prevent said tire from being vibrated during rotation thereof;
a tire rotating mechanism driving at least one of said rollers of said tire holding mechansim to rotate said tire about its rotational axis while being held by said tire holding mechanism;
a stationary frame structure;
a movable frame structure vertically movably mounted on said stationary frame structure;
a driving mechanism for vertically moving said movable frame structure;
an additional movable frame structure disposed below said movable frame structure and vertically movably mounted on said stationary frame structure;
an additional driving mechanism for vertically moving said additional movable frame structure; and
a spew trimming cutter mechanism comprising a tread spew trimming cutter arrangement disposed opposite the tread surface of said tire, said tread spew trimming cutter arrangement including a rockable arm having one end pivotally connected to and supported by said stationary frame structure, a trimming cutter holder rotatably mounted on the other end of said rockable arm, a tread spew trimming cutter substantially in the form of a comb held by said

trimming cutter holder, and actuator means mounted on said stationary frame structure to cause said rockable arm to be swung about its one end so that said tread spew trimming cutter is contactable with the tread surface of said tire for trimming said spews projected from the tread surface of said tire, an additional tread spew trimming cutter arrangement disposed opposite the tread surface of said tire, said additional tread spew trimming cutter arrangement including a movable bracket mounted on the underside of said movable frame structure to be movable in a direction substantially parallel to the rotational axis of said tire, a bracket moving device including an air cylinder, mounted on said movable frame structure, including a piston rod pivotally connected to said movable bracket for moving said movable bracket in a direction substantially parallel to the rotational axis of said tire and which is filled with an incompressible liquid, an additional rockable arm located beneath said movable frame structure and having one end pivotally connected to and supported by said movable bracket, an additional trimming cutter holder rotatably mounted on the other end of said additional rockable arm, an additional tread spew trimming cutter substantially in the form of a comb held by said additional trimming cutter holder, and additional actuator means for swinging said additional rockable arm about its one end so that said additional tread spew trimming cutter is contactable with the tread surface of said tire for trimming said spews projected from the tread surface of said tire upon downward movement of said movable frame structure by said driving mechanism and is axially moved along the tread surface of said tire upon movement of said movable bracket by the action of said bracket moving device for trimming said spews projected from the tread surface of said tire along its entire axial extent, said additional actuator means including an air cylinder, mounted on said movable bracket, including a piston rod pivotally connected to a longitudinally intermediate portion of said additional rockable arm and which is filled with an incompressible liquid, and a pair of side wall spew trimming cutter arrangements disposed opposite and spaced from each other, each of said side wall spew trimming cutter arrangements including a further additional rockable arm having a longitudinally intermediate portion pivotally connected to and supported by said additional movable frame structure, a further additional trimming cutter holder pivotally mounted on one end of said further additional rockable arm by a pivotal pin substantially parallel to the equatorial plane of said tire, a side wall spew trimming cutter substantially in the form of a comb held by said further additional trimming cutter holder, and further additional actuator means for swinging said further additional rockable arm about its intermediate portion so that said side wall spew trimming cutter is contactable with the side wall surface of said tire for trimming said spews projected from the side wall surface of said tire and is radially moved along the side wall surface of said tire upon vertical movement of said additional movable frame structure by the action of said additional driving mechanism for trimming said spews projected from the side wall of said tire along its entire radial extent, said further additional actuator means including an air cylinder, pivotally mounted on said additional movable frame structure, including a piston rod pivotally connected to the other end of said further additional rockable arm and which is filled with an incompressible liquid, said tread spew trimming cutter, said additional tread spew trimming cutter and said side wall spew trimming cutter each including a number of sharp point edges and a stepped portion formed on the reverse side of said trimming cutter rearwardly of said sharp point edges so as to produce a small gap between said sharp point edges and said tread surface of said tire.

4,059,140

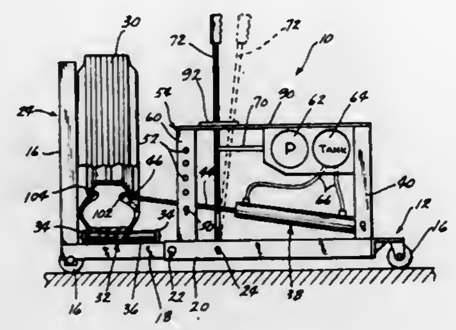
TIRE CHANGING MACHINE

Jarvis D. Sedgwick, Coon Rapids, Iowa, assignor to James Sumrall, Bay Spring, Miss.

Filed Dec. 15, 1975, Ser. No. 640,632

Int. Cl.² B60C *25/08*

U.S. Cl. 157—1.17 **5 Claims**



1. A tire changing machine comprising,

a T-shaped frame including a standard and a cross member and said standard having a pair of telescopically extendable portions,

ground-engaging casters at opposite ends of said cross member and at the free end of said standard,

an upstanding tire engaging post at the free end of said standard,

a tire support cradle on one of said telescopic standard portions adjacent said post, said cradle extending parallel to said cross member and having rollers at opposite ends,

a hydraulic cylinder pivotally connected to said other telescopic frame portion and positioned to extend at an angle to the horizontal;

and a bead-engaging tool on the outer free end of said cylinder for engaging the bead of a tire on said cradle support,

a second upstanding post, said second post being on said other telescopic frame portion adjacent said tire support cradle, and

adjustment support means on said second post for selectively vertically pivotally adjusting said cylinder in the desired angular position, said adjustment means including said second upstanding post having a pair of spaced apart plate members, said tool extending between said plate members and a bolt means being selectively vertically positioned between said plate members to support said tool to allow the tool to freely pivot upwardly relative to the bolt means as the tool moves along the curvature of the tire.

4,059,141

INTRUSION BARRIER AND GUIDE FOR SLIDING WINDOWS, DOORS AND THE LIKE

James L. Hutton, P.O. Box 1282, Victorville, Calif. 92392

Filed Oct. 12, 1976, Ser. No. 731,856

Int. Cl.² E06B *9/01*

U.S. Cl. 160—90 **2 Claims**

1. A device for association with a closure member,

said closure member being slideable across an opening in a frame, comprising

a cross member on the side of said opening opposite said closure member,

a first pair of spaced parallel links pivotally connected at ones of their ends to said closure member,

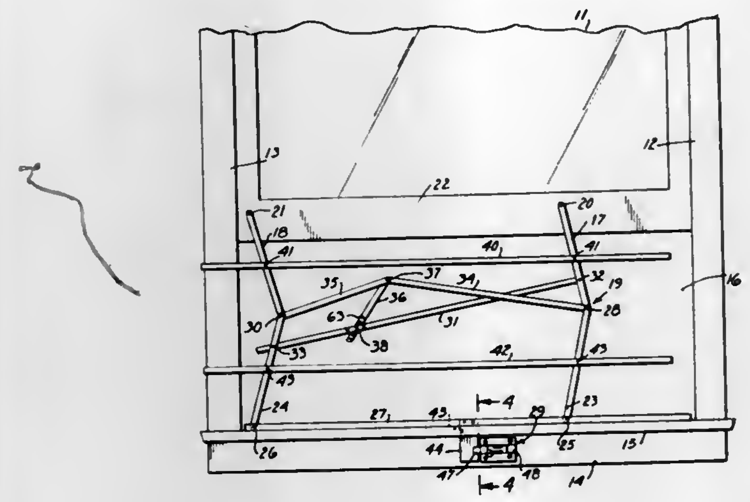
a second pair of spaced parallel links pivotally connected at ones of their ends to said cross member, one of said parallel links of

the links of said first pair being pivotally connected at their opposite ends to the opposite ends of respective ones of the links of said second pair, and

enforcing means for enforcing parallel swinging movement of the parallel links of each of the pairs upon sliding movement of said closure member, said enforcing means comprising:

a cross link pivotally connected between one of said parallel links of one of said pairs and one of said parallel links of the other of said pairs,

a pair of equalizer links pivotally connected together at ones of their ends and pivotally connected at the opposite ends thereof to respective ones of said opposite ends of said links of said first and second pairs, and



a third equalizer link pivotally connected at one end to said cross link and pivotally connected at the opposite end thereof to the pivotal connection between said pair of equalizer links.

4,059,142

CONTINUOUS CASTING OF A METALLIC PRODUCT BY ELECTROMAGNETIC CENTRIFUGING

Robert Alberny; Jean Pierre Birat, both of Metz, and Roger Ventavoli, Algrange, all of France, assignors to Institut de Recherches de la Siderurgie Francaise (IRSID), St. Germain-en-Laye, France

Filed Jan. 18, 1977, Ser. No. 760,428

Claims priority, application France, Jan. 20, 1976, 76.01347

Int. Cl.² B22D *11/10, 27/02*

U.S. Cl. 164—49 **7 Claims**

1. In a process of continuously casting a metallic product by electromagnetic centrifuging, wherein a liquid metal is injected into a cooled ingot mold having an axis, the metal is rotated by applying thereto a magnetic field turning about the axis of the mold, the magnetic field being produced by a polyphase inductor placed in the immediate proximity of the cast product, and the metal is extracted from the mold in partially solidified condition, the step of obtaining a maximal stirring intensity of the liquid metal in the mold by

a. rotating the magnetic field at a frequency of rotation of 4 to 15 Hertz,

b. using a copper alloy of structural rigidity for the mold wall, and

c. keeping the thickness of the mold wall below a value calculated by the formula

$$\frac{\log\left(\frac{d-2e}{d}\right)}{1-\left(\frac{d-2e}{d}\right)^2} = \frac{0.6 \times Re \times \lambda(1-\mu)}{E\,\alpha\,\phi} - \frac{1}{2}$$

wherein e = the thickness of the wall;

d = the diameter of the mold;

α = linear expansion coefficient,

λ = thermal conductivity in cal/cm/sec. °C,

E = Young's modulus in kg/mm²,

μ = Poisson's coefficient and

Re = elastic limit in kg/mm² of the wall material; and

Φ = thermal flux at the level of the meniscus in cal/cm²/sec.

4,059,143

METHOD OF AND A MEANS FOR POURING MOLTEN METAL IN A DIE CASTING DEVICE

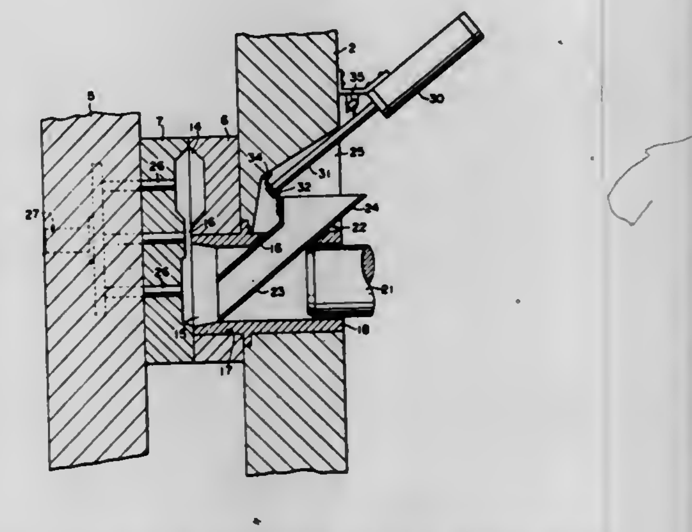
Akiyoshi Morita; Tamio Hayasaka; Kunio Shimizu, and Tokiharu Fukuda, all of Toyota, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Dec. 22, 1975, Ser. No. 643,168

Claims priority, application Japan, Sept. 3, 1975, 50-106705

Int. Cl.² B22D *17/30*

U.S. Cl. 164—113 **14 Claims**



1. A method for pouring molten metal in a die casting device wherein a shot sleeve for supplying molten metal to a die cast mold is substantially horizontally disposed in the die casting device, comprising the steps of obliquely inserting an inclined guide means into said shot sleeve through an opening provided in a top portion of said shot sleeve to the extent that the lower outlet end of said guide means contacts a bottom portion of said shot sleeve, and pouring molten metal along said guide means toward the inside of said shot sleeve as a quiet flow.

4,059,144

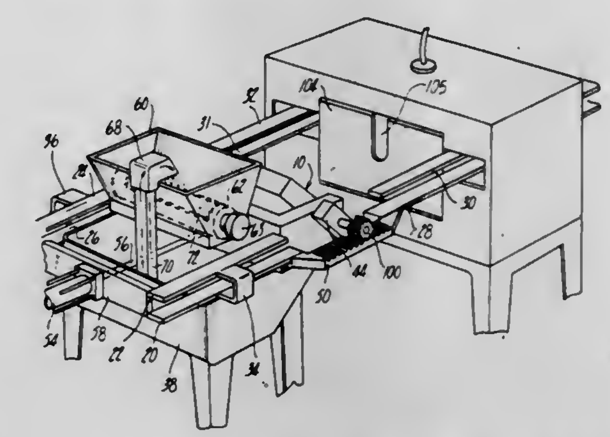
APPARATUS FOR FORMING SHELL MOLDS

Delbert Eugene Esche, 34446 Marquette, Westland, Mich. 48185

Filed Sept. 24, 1976, Ser. No. 726,176

Int. Cl.² B22D *11/08*

U.S. Cl. 164—166 **21 Claims**



1. Apparatus for forming molded shapes such as shell molds including:

a pattern;

a pattern carrier assembly including means for supporting said pattern;

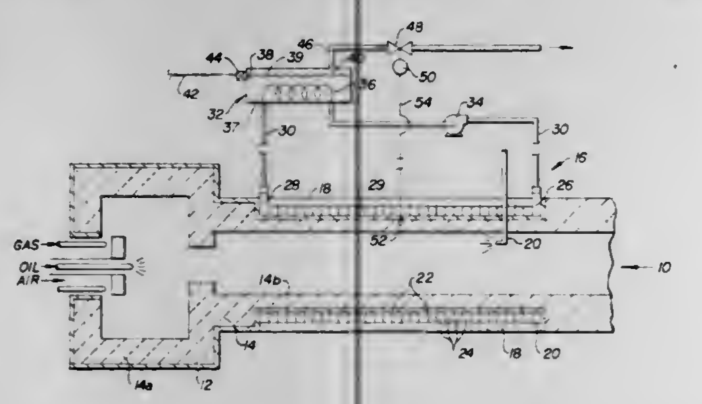
a molding mix dispensing station including means for dispensing a quantity of molding mix;

a heat oven;

a discharge station intermediate said dispensing station and said heating oven and also including means for inverting said pattern at said discharge station to discharge excess molding mix from said pattern, said means inverting said

pattern including means rotatably mounting said pattern relative to said pattern carrier assembly;
transport means including means for advancing said pattern carrier assembly from an initial position at said mix dispensing station so that said pattern receives said quantity of molding mix dispensed at said dispensing station, through a position at said discharge station, said transport means including (A) means rotating said pattern therein by said transport means advancing said carrier assembly from said initial position through said discharge station to a position within said heating oven to cure said mold, and advanced thence to a position beyond said heating oven for mold unloading, said transport means also including means for subsequently retracting said pattern carrier assembly into said heating oven to preheat said pattern, and retracting said pattern carrier assembly to the initial position after said preheating of said pattern.

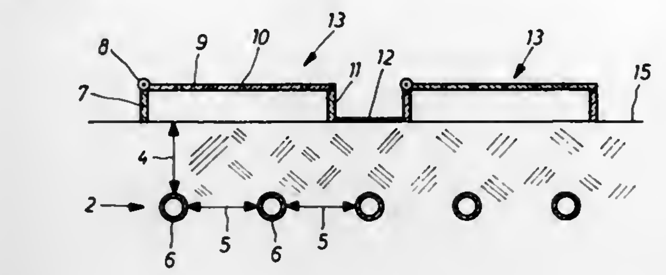
4,059,145
METHOD AND APPARATUS FOR CONTROLLING SURFACE TEMPERATURE
Theodore A. Ruble, Fort Worth, Tex., assignor to Sid Richardson Carbon & Gasoline Co., Fort Worth, Tex.
Division of Ser. No. 584,190, June 5, 1975, Pat. No. 3,982,586. This application July 15, 1976, Ser. No. 705,463
Int. Cl.² F25B *29/00;* **F28F** *27/00*
U.S. Cl. 165—1 **2 Claims**



1. A method for automatically controlling the temperature of a body while removing heat therefrom comprising:
removing heat from said body with a first heat exchange liquid circulating between a first heat exchanger in contact with said body and a second heat exchanger spaced from said body;
removing heat from said first heat exchange liquid by partial vaporization of a second heat exchange liquid in said second heat exchanger;
controlling the pressure in said second heat exchanger by restricting the escape therefrom of the vapor of said second heat exchange liquid;
sensing the temperature of said body; and
adjusting the pressure of said vapor in said second heat exchanger in inverse relationship to changes in the temperature of said body to thereby maintain said body within a predetermined temperature range.

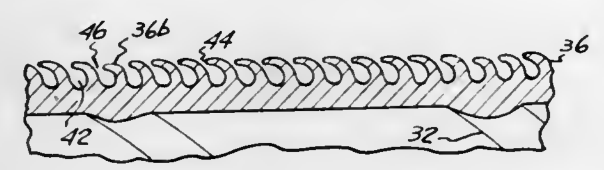
4,059,146
HEATING SYSTEM WITH A THERMAL PUMP
Emil Grüniger, Altendorf, Switzerland, assignor to IDC Chemie AG, Rapperswil, Switzerland
Filed Nov. 26, 1975, Ser. No. 635,356
Claims priority, application Switzerland, Nov. 28, 1974, 15818/74
Int. Cl.² B22C *7/00;* **F25B** *27/02;* **F25D** *23/12;* **F24J** *3/02*
U.S. Cl. 165—45 **3 Claims**

1. In a heating system with a thermal pump, including an evaporator section consisting of a piping network buried in the ground, a compressor for compressing the evaporated working fluid, a condensing section operating as heating plant, and a translucent screen for shielding the ground against the atmosphere, such that a heat storage of the heat radiated from the sun and penetrated through the screen is provided and the space defined between the ground surface and the screen forms an insulation against heat loss to the atmosphere, said screen



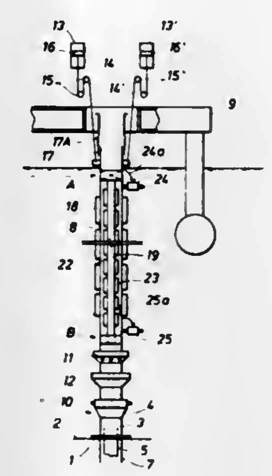
being a sheet-like material with perforations for discharging any accumulated water thereon, the improvement comprising that the distance between adjacent buried pipes of said piping network is less than 80 centimeters and the depth of the buried pipes of said piping network is less than 80 centimeters.

4,059,147
INTEGRAL FINNED TUBE FOR SUBMERGED BOILING APPLICATIONS HAVING SPECIAL O.D. AND/OR I.D. ENHANCEMENT
John K. Thorne, Decatur, Ala., assignor to Universal Oil Products Company, Des Plaines, Ill.
Continuation-in-part of Ser. No. 271,835, July 14, 1972, abandoned. This application Jan. 9, 1974, Ser. No. 432,042
Int. Cl.² F28F *13/18, 1/42, 1/36, 1/26*
U.S. Cl. 165—133 **9 Claims**



1. Heat transfer tubing modified for the enhancement of heat transfer to liquid in contact with the exterior surface thereof in submerged boiling applications, said tubing having a multiplicity of helically extending axially spaced fin convolutions extending around said tubing, said tubing having a continuous cylindrical wall, said fin convolutions having inner base portions extending generally radially outwardly from said wall and having outer portions inclined towards the side of the adjacent convolutions to define therewith partially enclosed spaces of substantially uniform cross-section extending around the tubing, the transverse dimensions of said fin convolutions measured from the base to the tips thereof being substantially uniform except for a plurality of uniformly circumferentially spaced recesses extending inwardly from the tips of said convolutions, said recesses in total occupying 10–30% of the circumferential extent of said fin convolutions, the outer tips of said convolutions being closely spaced from the sides of adjacent convolutions to define therewith effectively continuous circumferentially extending elongated restricted openings communicating with said spaces, said openings having an average substantially uniform width intermediate said recesses of not more than 0.007 inches, said recesses defining with the side walls of adjacent fin convolutions enlargements in said continuous openings having a width at least 50% greater than the average width of opening intermediate said enlargements.

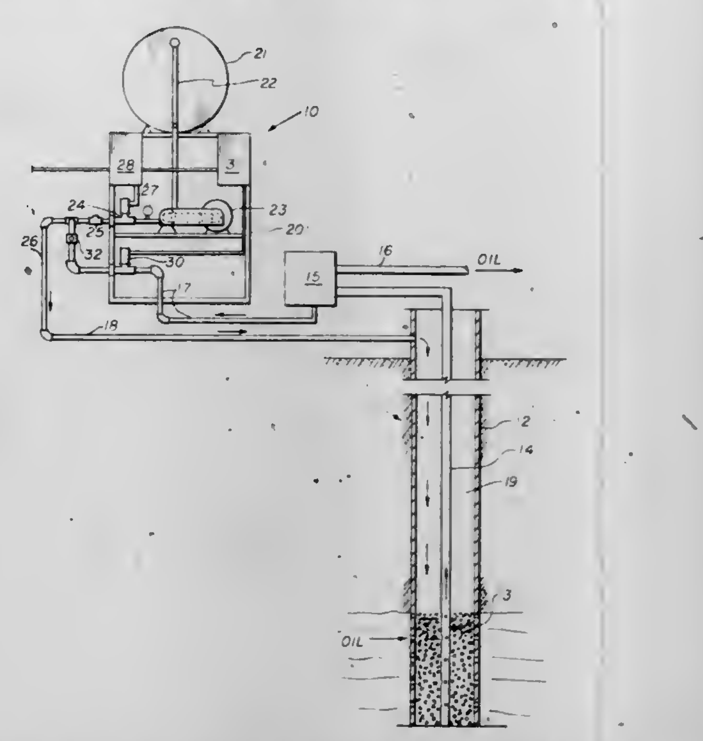
4,059,148
PRESSURE-COMPENSATED DUAL MARINE RISER
Everhard C. Blomsma, Rijswijk, Netherlands, assignor to Shell Oil Company, Houston, Tex.
Filed Oct. 18, 1976, Ser. No. 733,553
Claims priority, application United Kingdom, Dec. 30, 1975, 53144/75
Int. Cl.² E21B *7/12*
U.S. Cl. 166—.5 **13 Claims**



1. Marine riser system for use in offshore well drilling operations, said system comprising two risers that are adapted to be vertically arranged with a substantially annular space therebetween, each riser consisting of a plurality of sections that are sealingly interconnected in end-to-end relationship, the outer riser comprising connecting means at the lower end thereof, said connecting means being adapted for connecting and sealing the lower end of the outer riser to a wellhead, said outer riser further comprising supporting means near the upper end thereof, said supporting means being adapted for being connected to a heave compensator system carried by a floating drilling means, sealing means being arranged for sealing off the annular space at, at least, the lower end thereof, and closeable fluid pressure equalizing means arranged in the wall of the outer riser, said means being adapted for equalizing the fluid pressures prevailing in the annular space and in the space outside the outer riser.

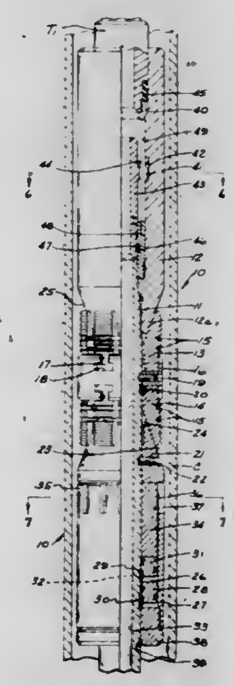
4,059,149
SELF-OPERATING CHEMICAL FEEDER FOR AN OIL WELL
Robert J. Harrison, Hominy, Okla., assignor to Texaco Inc., New York, N.Y.
Filed Oct. 18, 1976, Ser. No. 733,660
Int. Cl.² E21B *43/00*
U.S. Cl. 166—64 **21 Claims**

1. A self-operating chemical feeder for an oil well having a tube with a casing therearound forming an annulus in the well comprising,
a. pump means on a chemical feeder housing for pumping a chemical into an injection line for passing down into the well,
b. first valve means on said injection line for ejecting a slug of said chemical into the injection line and well,
c. first timer means for controlling said first valve means,
d. flush line means for supplying a high pressure flush liquid to said injection line for circulating said chemical throughout the well,
e. second valve means for controlling the flow of said flush liquid in said injection line,
f. second timer means for controlling said second valve means,
g. said first valve means being responsive to said first timer means for being opened for a predetermined period of time for ejecting a precise slug of said chemical to said injection line for delivery to the well, and
h. said second valve means being responsive to said second timer means for supplying a predetermined slug of flush



liquid to said injection line for circulating said chemical slug throughout the well for insuring well treatment on a regular basis as scheduled and for eliminating personnel time required for manually flushing slugs of the chemical throughout the well for an extended period of time.

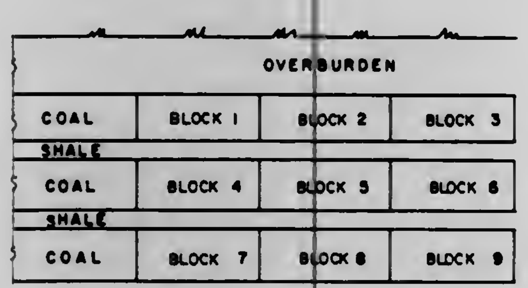
4,059,150
ANCHORING ASSEMBLY
Phillip H. Manderscheid, Cypress, Tex., assignor to Brown Oil Tools, Inc., Houston, Tex.
Filed Feb. 9, 1976, Ser. No. 656,093
Int. Cl.² E21B *33/129*
U.S. Cl. 166—120 **34 Claims**



1. An anchoring assembly for use in a well conduit comprising:
a. a longitudinally extending mandrel assembly;
b. laterally movable gripping means carried by said mandrel assembly for lateral movement into anchoring engagement with said well conduit;
c. setting means carried by said mandrel assembly and movable relative to said gripping means for moving said gripping means into anchoring engagement with said well conduit;
d. locking means for retaining said gripping means in an-

choring engagement with said well conduit, said locking means including:
i. a first lock member movable longitudinally relative to said mandrel assembly;
ii. a second lock member releasably fixed against longitudinal movement relative to said mandrel assembly; and
iii. ratchet means connecting said first and second lock members together for permitting relative longitudinal movement between said first and second lock members in only one direction;
iv. one of said lock members being radially resiliently biased toward the other of said lock members.

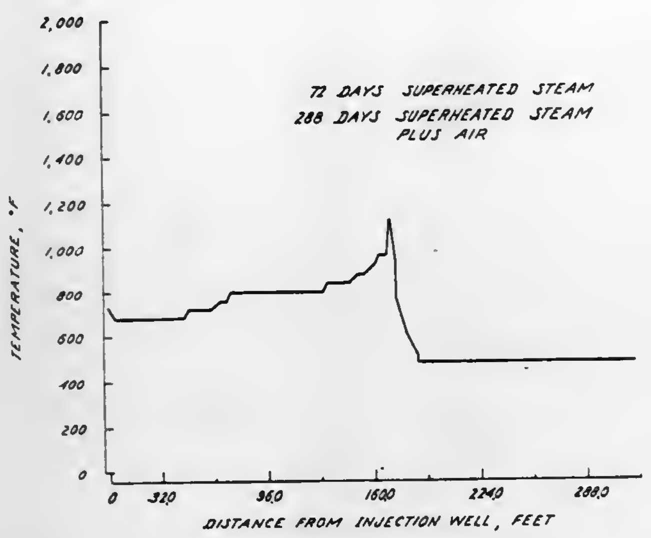
4,059,151
METHODS OF FLUIDIZED PRODUCTION OF COAL IN SITU
Ruel C. Terry, Denver, Colo., assignor to In Situ Technology, Inc., Denver, Colo.
Division of Ser. No. 595,335, July 14, 1975. This application Mar. 4, 1976, Ser. No. 663,708
The portion of the term of this patent subsequent to Apr. 6, 1993, has been disclaimed.
Int. Cl.[2] E21B *43/22, 43/24*
U.S. Cl. 166—258 **3 Claims**



2. A method of producing coal in situ comprising the steps of:
gasifying in situ one block in the coal formation,
introducing a solvent material into a second block in the formation separated from said one block to liquefy the second block in situ wherein said second block has previously been gasified then cooled-down by the introduction of water, and
recovering at the surface the products of gasification and liquefaction.

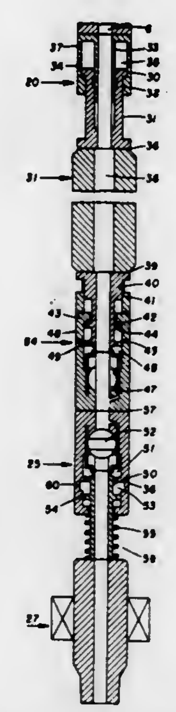
4,059,152
THERMAL RECOVERY METHOD
Joseph C. Allen, Bellaire, and Yick-Mow Shum, Houston, both of Tex., assignors to Texaco Inc., New York, N.Y.
Division of Ser. No. 508,378, Sept. 23, 1974, Pat. No. 3,991,828. This application July 30, 1976, Ser. No. 710,077
Int. Cl.[2] E21B *43/24*
U.S. Cl. 166—261 **4 Claims**

1. A method for recovering hydrocarbons such as low gravity crude oil or bitumen from a subterranean reservoir penetrated by at least one injection well and one production well comprising:
a. initiating an in situ combustion operation in the reservoir by injecting air into the injection well,
b. following the air with super heated steam and



c. following the super heated steam with air and water so as to initiate an in situ combustion front in the reservoir.

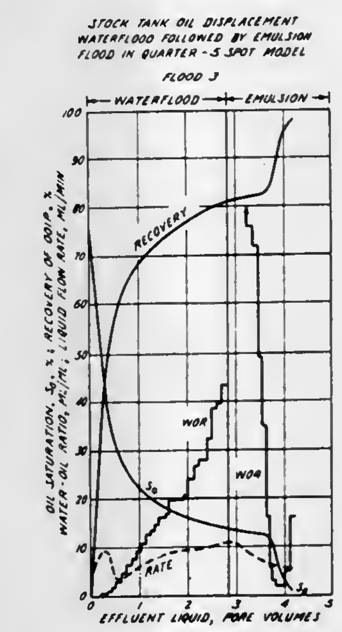
4,059,153
WEIGHT AND PRESSURE OPERATED WELL TESTING APPARATUS AND ITS METHOD OF OPERATION
George J. Nix, London, England; Burchus Q. Barrington; David L. Farley, both of Duncan, Okla., and Norman G. Hortman, Laurel, Miss., assignors to Halliburton Company, Duncan, Okla.
Division of Ser. No. 595,648, July 14, 1975. This application Dec. 2, 1976, Ser. No. 746,913
Int. Cl.[2] E21B *43/12*
U.S. Cl. 166—264 **4 Claims**



1. In the testing of an underground formation intersected by a fluid filled well bore extending from the earth's surface to the formation, wherein the formulation is tested with a testing string having a flow passage therethrough, a normally closed valve in the lower portion of the testing string for opening and closing the flow passage, and a weight and pressure responsive valve located in the testing string adjacent said normally closed valve for closing the flow passage responsive to weight and opening the flow passage responsive to pressure, a method comprising the steps of:
lowering the testing string into the well bore to the formation depth;
isolating the formation from the fluid pressure in the well bore above the formation;

applying weight to the weight and pressure responsive valve, thereby closing the flow passage adjacent said normally closed valve;
opening the normally closed valve subsequent to the closing of said weight and pressure responsive valve; and,
increasing the fluid pressure in the well bore above the formation, thereby opening said weight and pressure responsive valve to provide fluid communication between the surface and the formation.

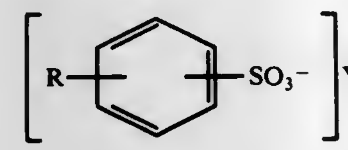
4,059,154
MICELLAR DISPERSIONS WITH TOLERANCE FOR EXTREME WATER HARDNESS FOR USE IN PETROLEUM RECOVERY
William B. Braden, Jr., and Kenoth H. Flourny, both of Houston, Tex., assignors to Texaco Inc., New York, N.Y.
Division of Ser. No. 421,296, Dec. 3, 1973. This application May 24, 1976, Ser. No. 657,808
Int. Cl.[2] E21B *43/22*
U.S. Cl. 166—274 **8 Claims**



1. A process for recovering petroleum from a subterranean reservoir wherein a first fluid is driven through the reservoir from an injection well to a production well by a second fluid where petroleum is produced the first fluid comprising a hydrocarbon, an aqueous fluid containing from about 1500 to 12,000 parts per million ions of calcium and/or magnesium and a surfactant system wherein the surfactant system comprises
a first anionic surfactant having one of the following general formulas:

$R-SO_3{}^-Y^+$

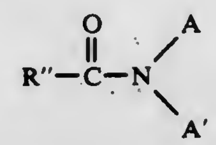
wherein R is an alkyl radical, linear or branched, having from 5 to 25 carbon atoms, and Y is a monovalent cation such as sodium, potassium or ammonium; or



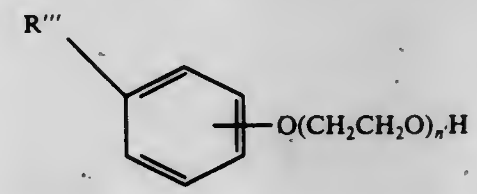
wherein R and Y have the same meaning as above and
a second anionic surfactant having the following general formula:

$[R'-(OCH_2CH_2)_n-SO_4]^-Y^+$

wherein R' is an alkyl or alkylaryl radical, linear or branched, having from 7 to 20 carbon atoms, n is an integer from 1 to 10 and Y is a monovalent cation such as sodium, potassium or ammonium and
a nonionic surfactant having one of the following structures:



wherein R'' is an alkyl radical, linear or branched, having from 5 to 20 carbon atoms, A and A' are independently selected from the group consisting of hydrogen and alkanols having from 1 to 10 carbon atoms; or

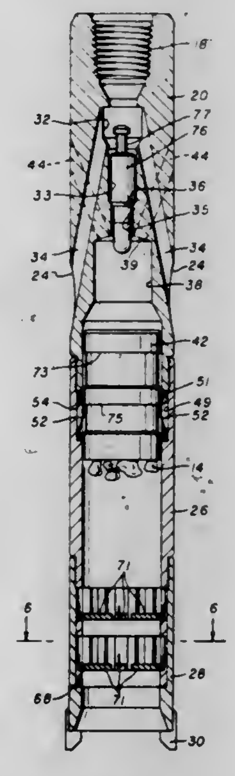


wherein R''' is an alkyl radical having from 5 to 20 carbon atoms, and n' is an integer from 6 to 20 or

$R'''' O(CH_2CH_2O)_{n''}H$

wherein R'''' is an alkyl chain having from 5 to 20 carbon atoms and n'' is an integer from 6 to 20.

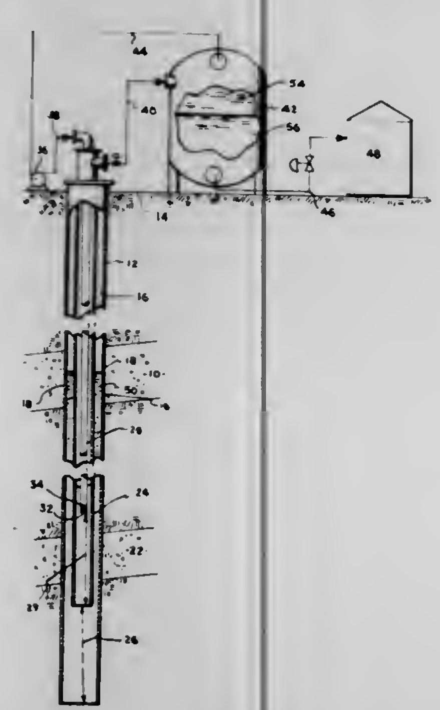
4,059,155
JUNK BASKET AND METHOD OF REMOVING FOREIGN MATERIAL FROM A WELL
Tom R. Greer, Houston, Tex., assignor to International Enterprises, Inc., Houston, Tex.
Filed July 19, 1976, Ser. No. 706,387
Int. Cl.[2] E21B *31/06, 31/08*
U.S. Cl. 166—301 **27 Claims**



4. A junk basket comprising:
a tool body having a longitudinally extending passageway therethrough and a system of flowways therein for providing reverse circulation of fluid through said tool body;
a magnet assembly disposed in said passageway;
retainer means cooperative between said magnet assembly and said tool body to retain said magnet assembly in a lower position in said passageway and selectively releasable to permit longitudinal movement of said magnet assembly to an upper position in said passageway.
16. A method of removing foreign material from a well including the steps of:

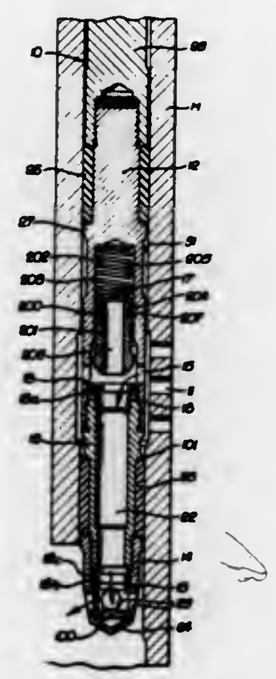
a. lowering a tubular tool body having a magnet assembly therein into said well to the site of said foreign material;
b. retaining said magnet assembly in a lower position adjacent the lower end of said tool body to attract at least a portion of said foreign material;
c. releasing said magnet assembly for longitudinal movement within said tool body;
d. moving said magnet assembly upwardly within said tool body to an upper position while moving said foreign material into said tool body beneath said magnet assembly by circulating fluid downwardly along the exterior of said tool body and upwardly within said tool body adjacent the lower end of said tool body;
e. removing said tool body from said well while retaining said foreign material within said tool body.

4,059,156
GEOTHERMAL BRINE PRODUCTION
Clyde H. Berg, 3655 E. Ocean Blvd., 2-H, Long Beach, Calif. 90803
Filed Apr. 29, 1976, Ser. No. 681,565
Int. Cl.² E21C *43/28*
U.S. Cl. 166—314 **11 Claims**



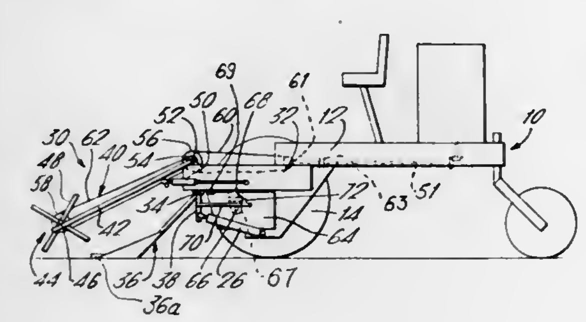
1. A method for the recovery of energy from a high temperature geothermal brine present in a subterranean interval at superatmospheric pressure and subject to deposition of calcium carbonate upon a substantial reduction of its pressure which comprises:
forming a column of said brine extending a depth to said interval;
positioning a first tubing string in said column of said brine and a second tubing string therein terminating above the lower end of said first tubing string and in fluid communication therewith;
injecting into said second tubing string a lift fluid immiscible with and of substantially lesser density than said brine to discharge from said second into said first tubing string and form an intimate admixture with said brine having a density sufficiently less than the density of said brine whereby said column of brine surrounding said first tubing string exerts a sufficient hydrostatic head on said mixture to lift said mixture to the surface through said first tubing string; and
withdrawing said mixture of brine and lift fluid from said first tubing string while maintaining the mixture under superatmospheric pressure sufficient to prevent the release of gases therefrom and thereby preventing the precipitation of calcium carbonate scale within said tubing string.

4,059,157
WELL CONTROL VALVE APPARATUS
Talmadge L. Crowe, Houston, Tex., assignor to Baker International Corporation, Orange, Calif.
Continuation-in-part of Ser. No. 652,483, Jan. 26, 1976. This application Aug. 23, 1976, Ser. No. 716,431
Int. Cl.² E21B *43/00*
U.S. Cl. 166—317 **34 Claims**



1. Control valve apparatus for use in a tubular string disposed in a well bore having a producing formation: comprising a metallic valve body structure having an inlet opening, an outlet opening, and a fluid passage between said openings, first metallic closure means in said body structure to one side of said inlet opening closing said passage and movable to open position when subjected to a predetermined fluid pressure in said inlet opening, second metallic closure means in said body structure to one side of said outlet opening and spaced from said first closure means to provide a confined portion of said passage between said first and second closure means into which fluid internally and externally of the tubing string cannot enter, said first and second closure means being fixed to said body structure by fluid impervious means forming metal seals therewith, subjecting said first closure means to said predetermined fluid pressure effecting opening of said confined portion of said passage to permit said fluid pressure to enter said confined portion and shift said second closure means to open position permitting fluid flow through said inlet opening, confined portion, and outlet opening.

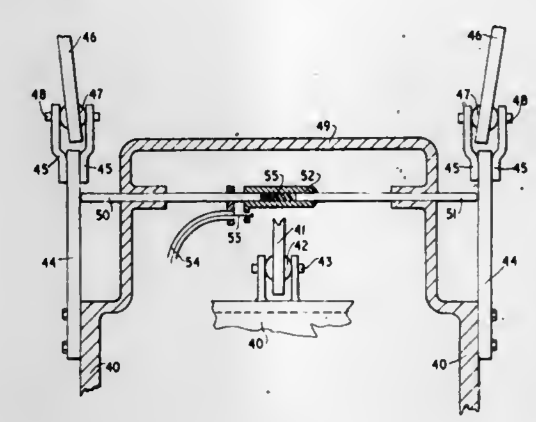
4,059,158
ROCK AND ROOT PICKER
Clifford A. Ranger, R.R. No. 1, Lloydminster, Alberta, Canada
Filed Apr. 3, 1974, Ser. No. 457,653
Claims priority, application Canada, Nov. 16, 1973, 185971
Int. Cl.² A01B *43/00*
U.S. Cl. 171—63 **2 Claims**



1. A rock picker comprising:

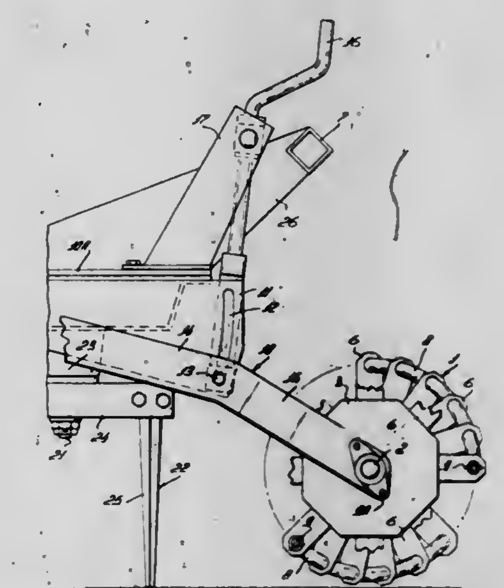
a. a mobile vehicle;
b. a fork scoop-like table swingably mounted on said vehicle and projecting forwardly therefrom to skim rocks from a surface on which said vehicle is supported and collect the rocks on such table when said vehicle is moving in a forward direction over said surface;
c. power means connected to said table to swing the same from a rock collecting position to a raised rock dumping position;
d. a reel mounted on said vehicle and located at a position forwardly of the leading end of said fork scoop-like table, said reel being mounted for movement in a vertical plane to raise and lower the same and journalled for rotation about an axis transverse to the direction of travel of said vehicle, said reel having a plurality of individual fingers projecting outwardly from said axis at positions spaced circumferentially around and longitudinally therealong;
e. power means drivingly connected to said reel for rotating the same so as to sweep said fingers rearwardly over said surface to individually engage rocks on said surface and roll said rocks rearwardly onto said fork table;
f. a rock receiving bucket pivotally mounted on said vehicle and located at a position rearwardly of the scoop-like table to receive rocks discharged therefrom when said table is in its raised dumping position; and
g. means interconnecting said swingably mounted table and bucket for moving the latter from a normal rock receiving position to a dumping position in response to swinging of said table to its raised position.

4,059,159
AGRICULTURAL TRACTOR WITH DRAFT LOAD SENSING SPRINGS FOR POWER LIFT CONTROL
Stephen Moorhouse; Harry Horsfall, both of Huddersfield, and Alan Rangeley Dean, Brighouse, all of England, assignors to David Brown Tractors Limited, Huddersfield, England
Filed Sept. 22, 1975, Ser. No. 615,298
Claims priority, application United Kingdom, Oct. 2, 1974, 42671/74
Int. Cl.² A01B *63/112*
U.S. Cl. 172—7 **11 Claims**



1. An agricultural tractor having means for sensing implement draft load and a power lift mechanism controllable by said means, wherein the means for sensing implement draft load comprise two parallel leaf springs which are spaced apart in a lateral direction relative to the tractor, said spring being rigidly anchored at their spaced apart front ends to the frame of the tractor and having flexible portions adapted to flex in said direction, two connector means each of which is fixed to the rear end of one of the springs, two hitch links each of which is connected to one of the connector means, the arrangement being such that a draft load applied to a link causes flexing of the associated spring in said direction, and means for transmitting to the power lift mechanism a signal derived from any variation in the distance between the flexible portions of the springs.

4,059,160
ROTARY HARROWS
Ary van der Lely, Maasland, and Cornelis Johannes Gerardus Bom, Rozenburg, both of Netherlands, assignors to C. van der Lely N. V., Maasland, Netherlands
Division of Ser. No. 394,279, Sept. 4, 1973, which is a continuation of Ser. No. 208,698, Dec. 16, 1971, abandoned. This application May 29, 1975, Ser. No. 581,855
Claims priority, application Netherlands, Dec. 18, 1970, 7018468
Int. Cl.² A01B *49/06*
U.S. Cl. 172—47 **7 Claims**

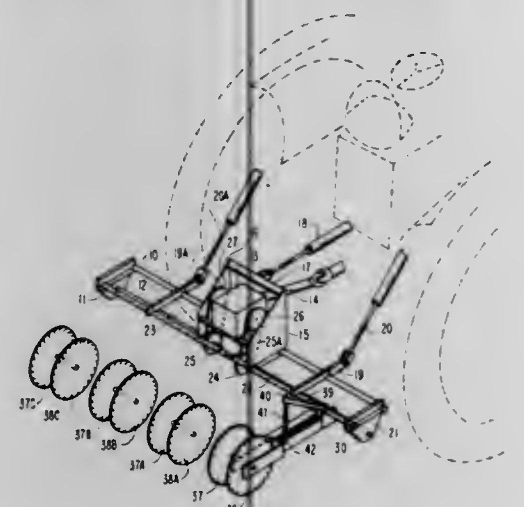


1. A rotary harrow having a transverse frame and a plurality of rotatable soil working members, said soil working members being supported on shafts journalled in said transverse frame and rotatable about upwardly extending axes defined by said shafts, said soil working members comprising downwardly extending tines and drive means being connected to rotate said members, a roller connected to said frame and being rotatable about a substantially horizontal axis extending transverse to the direction of travel of the harrow, said roller having a periphery comprised by helical ground-engaging rods and being located at the rear of said frame, coupling means on the front side of said frame and said coupling means comprising connecting points for a multi-point linkage of a prime mover, arms pivotally interconnecting the roller to said frame and adjusting means associating at least one of said arms with said frame to adjust the position of said roller with respect to said frame, said coupling means and said roller affording the main support for the harrow during operation, an elongated tool bar being fixed to said frame by arm means and said tool bar being interconnected to said coupling means by at least on strut bar, said tool bar extending horizontally and across the working width of said harrow at the rear of said members and above said roller, said arm means extending upwardly and rearwardly from the frame with respect to the direction of travel.

4,059,161
TILLAGE APPARATUS AND IMPROVED BLADE THEREFOR
Edward M. Smith; James H. Casada, and Timothy H. Taylor, all of Lexington, Ky., assignors to Deere & Company, Moline, Ill.
Continuation of Ser. No. 427,912, Dec. 26, 1973, abandoned. This application Aug. 26, 1975, Ser. No. 607,801
Int. Cl.² A01B *35/16*
U.S. Cl. 172—60 **9 Claims**

1. A tillage apparatus for use with a towing vehicle for cutting a plurality of continuous narrow spaced furrows, comprising an elongated transverse tool bar supporting a transverse drive shaft, said tool bar being attachable to said vehicle and supporting a power means connected to said drive shaft, a plurality of tillage unit assemblies detachably mounted side by side on said drive shaft, each of said assemblies comprising an

arm pivotally journalled at one end upon said transverse drive shaft and carrying a rotatable short transverse shaft at its other end, at least one tillage blade affixed to said short transverse shaft and rotatable therewith, each said tillage blade constituting a generally planar disc-like plate in substantial alignment with the direction of towing and having a generally circular cutting periphery with a plurality of substantially U-shaped circumferentially-spaced furrow-opening wear-resisting metallic elements astraddle said periphery, the two leg portions of each of said U-shaped elements being permanently affixed to



respective sides of said blade adjacent its periphery, with the bight portion of each of said U-shaped elements extending transversely over said periphery, means biasing said arm downwardly to bring said blade into cutting contact with the ground and independently of the biasing of adjacent assemblies, and blade driving means interconnecting said drive shaft and said short shaft and providing for rotation of said blade upon actuation of said power means, whereby each said tillage blade cuts a continuous discreet narrow furrow as the apparatus is towed over the ground.

4,059,162

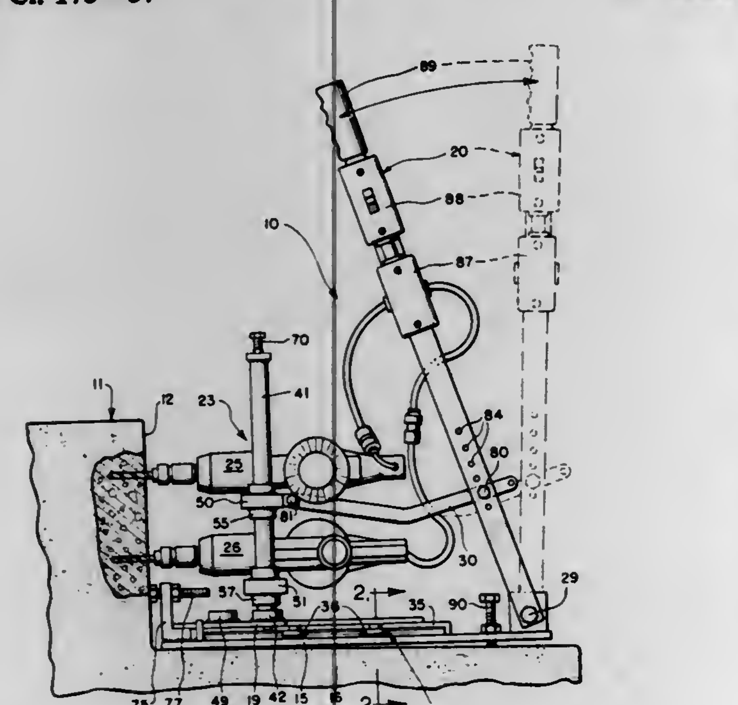
DRILLING UNIT FOR STADIUM SEATS

James Zbinden, and George W. Ries, both of Sterling, Ill., assignors to Lawrence Brothers, Inc., Sterling, Ill.

Filed June 14, 1976, Ser. No. 696,047

Int. Cl.² E21C *9/00*

U.S. Cl. 173—37 **17 Claims**



1. A device for drilling a plurality of holes in a vertical face such as a stadium step riser, comprising, in combination, a base plate, drill mounting means including a movable foot plate, guide means interconnecting the base plate and foot plate to permit the foot plate to be slid over the base plate toward and away from the vertical face along a predetermined path, at least one upright standard, standard mounting means on the foot plate permitting the upright standard to be selectively affixed to and detached from the foot plate, a platform carried by the upright standard for linear vertical motion thereupon, means for affixing the platform relative to the standard in any one of a vertical range of positions, and means carried on the platform for selectively affixing to the platform a drill motor and carried drill, and lever means connected to the drill mounting means for urging the drill mounting means along the base plate toward the vertical face.

4,059,163

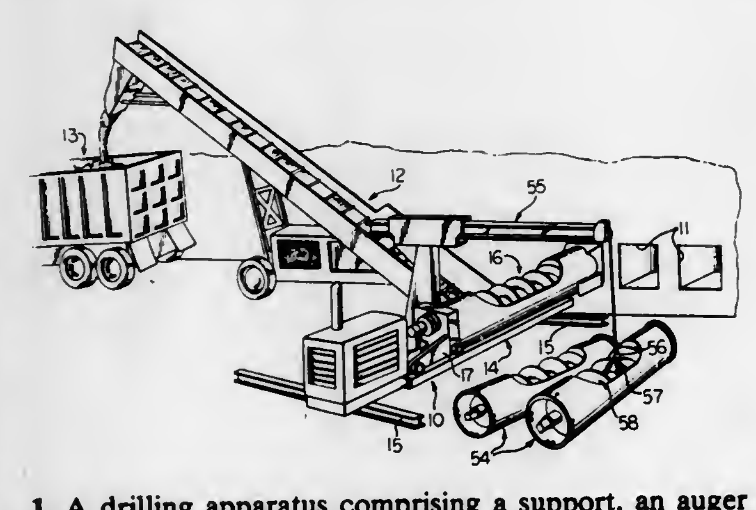
MINE DRILLING APPARATUS AND METHOD

Robert N. Stedman, Chillicothe, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Aug. 16, 1976, Ser. No. 714,423

Int. Cl.² E21C *25/58*

U.S. Cl. 175—73 **23 Claims**



1. A drilling apparatus comprising a support, an auger assembly including a carriage mounted on said support for longitudinal movements thereon, a rotatable auger, first motor means for selectively rotating said auger, a cutting edge disposed adjacent to a forward end of said auger to cooperate therewith for drilling purposes, a tubular shroud disposed around said auger, a plurality of circumferentially disposed fastening means releasably connecting a rearward end of said shroud to said carriage and an annular collar means adjustably mounted on said carriage for movement between a first position for permitting removal of said fastening means and a second position for preventing removal of said fastening means, and second motor means interconnected between said support and the carriage of said drilling assembly for selectively moving said drilling assembly longitudinally on said support.

4,059,164

SELF-STABILIZING DRILLING TOOL

Ralph J. Farris, 601 Edwin St., New Iberia, La. 70560

Filed May 19, 1976, Ser. No. 687,737

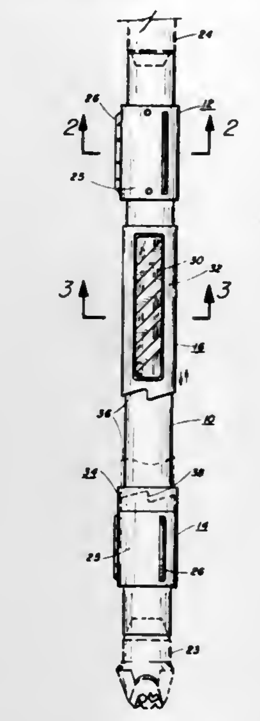
Int. Cl.² E21B *41/00, 17/10*

U.S. Cl. 175—73 **1 Claim**

1. A self-stabilizing drilling tool, having a tool body and fixed blade assemblies vertically spaced apart and rigidly secured to said tool body, for connecting in a vertically rotational drill string lubricated with pressure drill mud when drilling a vertical well bore, comprising in combination:

a. a hub mounted for rotation and vertical linear movement on said tool body and intermediate said fixed blade assemblies vertically spaced apart; and

b. a plurality of diagonal blades, parallelly positioned to define a single vertical row thereof, fixed to and projecting radially from said hub for vertically lifting and randomly rotating said hub on said tool body, by means of said pressure mud, with said single row of parallel diagonal blades just clearing sides defining said vertical well bore, whereby any deviation from vertical by said drill



string engages said row of diagonal blades with a near side of said well bore and pry said drill string back to vertical.

4,059,165

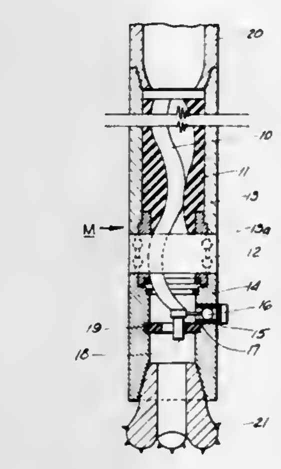
VERSATILE FLUID MOTOR AND PUMP

Wallace Clark, 1830 S. German Church Road, Indianapolis, Ind. 46239

Continuation-in-part of Ser. No. 638,639, Dec. 8, 1975, Pat. No. 4,051,910. This application July 14, 1976, Ser. No. 705,043

Int. Cl.² E21B *3/12*

U.S. Cl. 175—107 **37 Claims**



1. First and second fluid motors coupled together in generally axial tandem relation, each of said motors comprising a helical gear pair including an inner member having one or more external helical threads, a cooperating outer member having one or more internal helical threads, the number of helical threads on said inner and outer members differing by one and a swivel having relatively rotatable sections;

a. the outer member of each of said gear pairs being fixed in a tubular casing secured to one of the sections of their associated swivel;

b. means associated with the end of the inner member of each of said gear pairs and with the other section of their associated swivel to prevent contrary rotation whle permitting gyration with oscillation of said inner member relative to said outer member;

c. the helical gear pair of said first motor having left-hand threads, and the tubular casing of said first motor being threaded onto the end of a string of drill pipe;

d. said first motor having its inner member connected to the inner member of said second motor, the helical gear pair of said second motor having right-hand threads; and

e. a drill bit secured to the tubular casing of said lower motor.

4,059,166

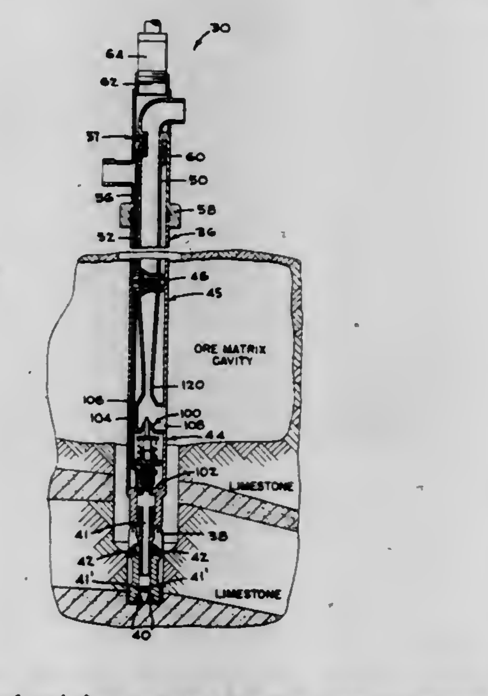
SUBTERRANEAN DRILLING AND SLURRY MINING

Philip R. Bunnelle, Santa Clara, Calif., assignor to FMC Corporation, San Jose, Calif.

Filed July 12, 1976, Ser. No. 704,278

Int. Cl.² E21C *37/12*

U.S. Cl. 175—232 **42 Claims**



1. In a drilling and mining apparatus for slurry mining of granular ore from a deep well cavity, the combination comprising: a tool string in said well cavity; flow inducing means for directing a liquid into said tool string at variable system pressures and capacities which vary between relatively low drilling conditions and relatively high mining conditions; a mining nozzle included in and extending transversely of said tool string and including a mining nozzle cylinder and resilient means tending to maintain the mining nozzle in a closed position; an eductor pump section in said tool string including an eductor nozzle provided with an eductor nozzle cylinder and resilient means tending to maintain said eductor nozzle closed; and a foot valve in said eductor pump section operable independently of said eductor nozzle and including resilient means tending to hold said foot valve open; first hydraulic control means cooperating with said foot valve resilient means for maintaining said foot valve open in response to said system pressure and capacity being at drilling conditions, and for closing the foot valve in response to said system pressure and capacity being between drilling conditions and mining conditions; and second hydraulic control means for moving said mining nozzle and said eductor nozzle between closed and open positions.

4,059,167

HYDRAULIC FISHING JAR HAVING TANDEM PISTON ARRANGEMENT

William O. Berryman, Houston, Tex., assignor to Baker International Corporation, Orange, Calif.

Filed Feb. 4, 1977, Ser. No. 765,766

Int. Cl.² E21B *1/10*

U.S. Cl. 175—297 **17 Claims**

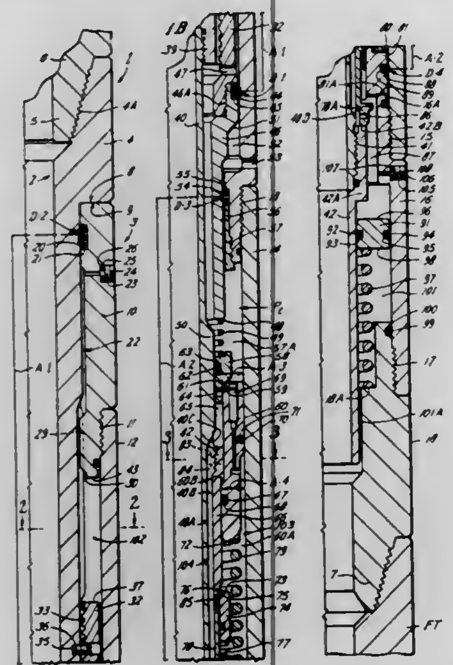
6. In a hydraulic fishing jar adapted to be run into a well on a fishing string and connected to a fishing tool in the well bore:

a. Inner and outer telescopically interengaged bodies;

b. A plurality of diametrically defined pressure areas, each of said areas having upper and lower sealed ends;

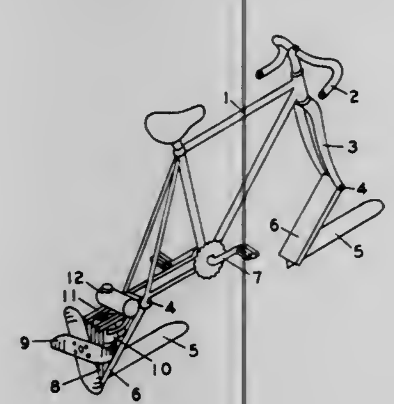
c. Tandem piston means immediate one of said upper and lower sealed ends of each of said pressure areas;

d. Seal means carried by one of said inner and outer interengagable bodies and engagable by the other of said inner and outer interengagable bodies and defining one of the upper and lower sealed ends of said pressure areas; and
e. Seal means between said piston means and one of said



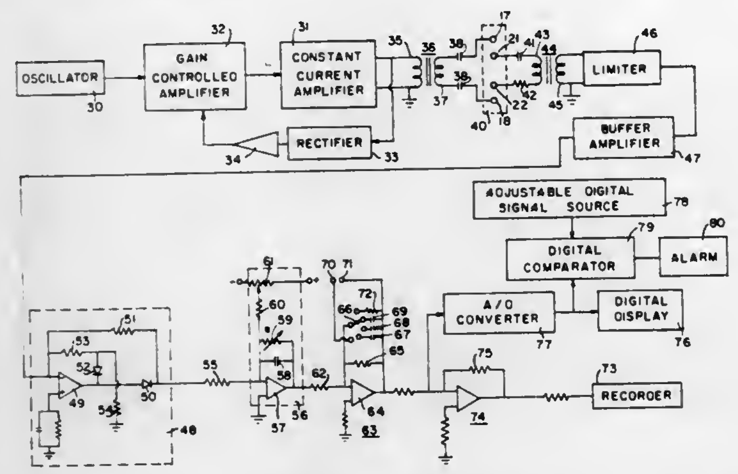
inner and outer telescopically interengaged bodies and defining one of the upper and lower sealed ends of said pressure ends.
said fluid pressure areas being in fluid communication with one another and defining a chamber for receipt of lubricant therewithin.

4,059,168
RUNNER ATTACHMENT FOR BICYCLES WITH A REACTION THRUST DEVICE
Herbert Douglas House, 3111 Edgewood Drive, Wonder Lake, Ill. 60097
Filed Feb. 4, 1976, Ser. No. 655,281
Int. Cl.[2] B62D *57/04*
U.S. Cl. 180—1 P **1 Claim**



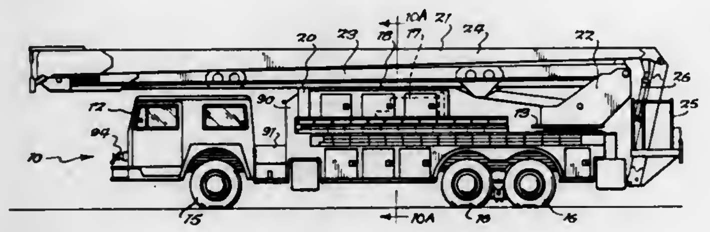
1. In a runner attachment for bicycles having front and rear axles; a runner having a "T" shape in lateral cross section comprised of longitudinally extending angle members, a link attached to the runner to incline from the rear of the runner to a point located directly above midspan of the runner at which point are mounted bearings for attachment to the front and rear bicycle axles, a self-contained reaction thrust device, support member means attached to the inclined link for supporting the reaction thrust device so as to act toward the rear.

4,059,169
MONITOR FOR BIOLOGICAL VOLUME CHANGES
Winston H. Hagen, 36 Husted Lane, Greenwich, Conn. 06830
Filed Feb. 9, 1976, Ser. No. 656,399
Int. Cl.[2] A61B *5/02*
U.S. Cl. 128—2.05 V **12 Claims**



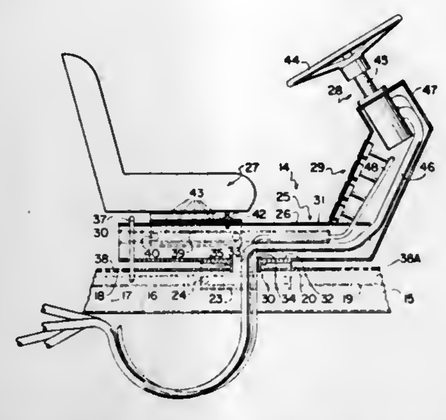
1. In a monitor for measuring biological volume changes having means for applying constant A.C. current in a biological volume of a subject, receiver means including means for sensing voltage across said biological volume resulting from said A.C. current, means for rectifying said sensed voltage, display means, and means for applying said rectified voltage to said diplay means to display a value representing the electrical impedance of said biological volume, the improvement wherein said means for applying said rectified voltage to said display means comprises filter means for inhibiting variations of said displayed value due to respiration and movement of said subject, said filter means having a time constant between 2 seconds and 15 minutes, said filter means comprising substantially the only signal modifying means between said rectifying means and display means.

4,059,170
FIRE ENGINE CONSTRUCTION
Richard E. Young, Lancaster, N.Y., assignor to Young Fire Equipment Corporation, Lancaster, N.Y.
Filed Apr. 1, 1976, Ser. No. 672,777
Int. Cl.[2] B60K *1/00*
U.S. Cl. 180—54 R **16 Claims**



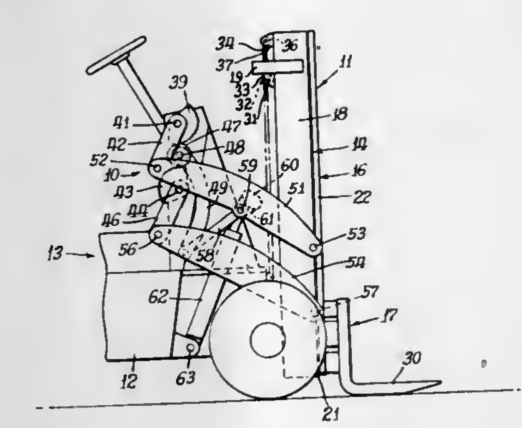
1. A boom-carrying vehicle such as a fire engine or the like comprising an elongated chassis for mounting a boom and having front and rear ends, a cab mounted proximate said front end, a turntable mounted proximate said rear end, a boom mounted on said turntable, front wheel means secured to said chassis proximate said front end, rear wheel means secured to said chassis proximate said rear end, an engine mounted on said chassis between said cab and said rear wheels, drive means coupled between said engine and said rear wheels, said elongated chassis between said turntable and an area between said engine and said cab being formed of a plurality of joined box sections extending lengthwise of said chassis to provide high rigidity to said chassis against twisting.

4,059,171
REVERSIBLE SEAT AND STEERING CONSOLE FOR TRACTORS
Daniel Pakosh, 261 Knowles Avenue, Winnipeg, Canada
Filed Dec. 23, 1975, Ser. No. 643,680
Claims priority, application Canada, June 17, 1975, 229569
Int. Cl.[2] B60N *1/08, 1/02*
U.S. Cl. 180—77 S **6 Claims**



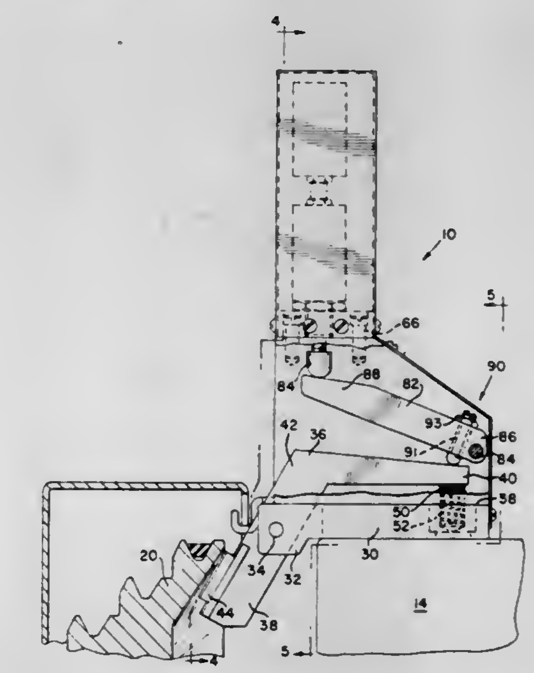
1. In a tractor which includes a frame a source of power in the frame and a cab on the frame behind the source of power and a hitch connection at the rear of the frame; a one-piece seat and steering console, means to mount said console on said frame for rotation from a forwardly facing position to a rearwardly facing position and vice versa, means to detachably lock said console in either of the aforesaid positions, means to move said console forwardly and rearwardly on said frame and to detachably lock said console in any one of a plurality of positions, said means to detachably lock said console in the forwardly or rearwardly facing position also detachably locking said console in any one of said plurality of positions forwardly and rearwardly of said frame and means to adjust the fore and aft position of the seat portion of said console relative to the steering portion of said console.

4,059,172
LIFT TRUCK MAST POSITIONING MECHANISM
Robert N. Stedman, Chillicothe, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.
Filed July 16, 1976, Ser. No. 705,846
Int. Cl.[2] B66F *9/06*
U.S. Cl. 187—9 E **12 Claims**



1. A mast positioning mechanism in combination with a lift truck of the type having a longitudinally extending main frame and a mounting tower secured to and extending upwardly from a forward end of the main frame, comprising:
an upwardly extending mast disposed adjacent the forward ends of the main frame;
means for pivotally connecting the mast to the mounting tower and for pivotally moving the mast between a lowered position and a raised position, said means including
a pair of longitudinally extending, vertically spaced parallel arms having their forward ends pivotally connected to the mast, and
a pair of sector gear means rotatably mounted on the mounting tower in spaced relation and individually pivotally connected to the rearward ends of the arms;
gear means rotatably mounted to the mounting tower in meshing engagement with both of the sector gear means and including a crank arm extending therefrom;
a guide link having one end pivotally connected to the distal end of the crank arm and its other end pivotally connected to one arm of the pair of arms.

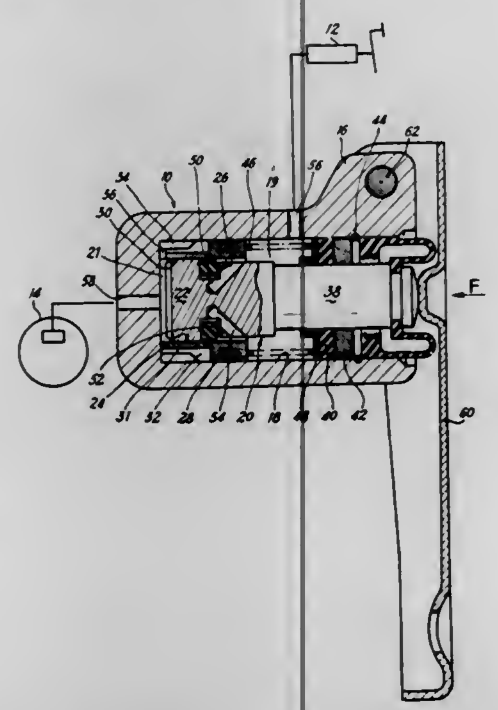
4,059,173
AUTOMATIC BRAKE MECHANISM FOR MILLING MACHINES
Thomas F. Specht, Arlington Heights; Juergen W. Trodler, Wheaton, and Pavel Vanecek, Lyons, all of Ill., assignors to Union Special Corporation, Chicago, Ill.
Filed Dec. 9, 1976, Ser. No. 749,146
Int. Cl.[2] B60T *7/12*
U.S. Cl. 188—110 **4 Claims**



1. An automatic brake mechanism for a milling machine having a motor means and a drive pulley means driven thereby for rotating a tool, operator controlled switch means shiftable between an on position whereby energizing said motor means and an off position whereby de-energizing said motor means, said brake mechanism comprising:
a rotatably mounted member means having a first end portion means closely adjacent said pulley means, a second end portion means remote from said pulley means, and a medial portion means therebetween, said medial portion means serving to rotatably mount said member means to said milling machine;
a generally planar friction brake element means secured to the first end portion means of said member means;
means operable when actuated to rotate said member means to bring said friction brake element means into frictional braking engagement with said drive pulley means;
solenoid valve means having a constant supply of fluid under pressure thereto, said solenoid valve means being connected to and controlled by said operator controlled switch means, one position of said controlled switch means de-energizing said solenoid valve means to allow said fluid under pressure to actuate said operable means and the other position of said controlled switch means energizing said solenoid valve means to remove said fluid under pressure from said operable means and to de-actuate said operable means whereby engagement of said brake element means with said drive pulley means is responsive to the position of said operator controlled switch means; and
means for biasing the first end portion means of said member means away from said drive pulley means upon energization of said motor means and said solenoid valve means

whereby removing the frictional braking element means from drive pulley means, said biasing means constantly applying a force against said member means independent of the action of said solenoid valve means.

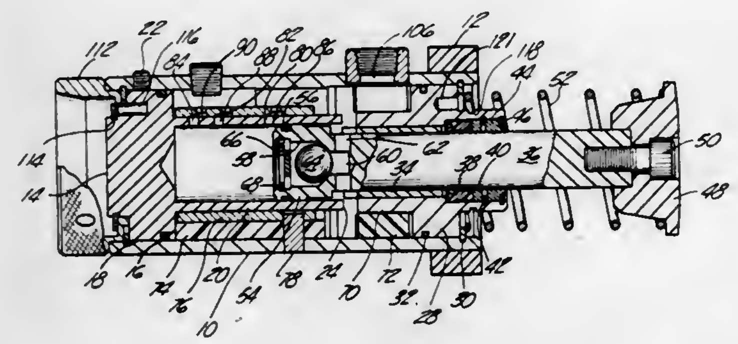
4,059,174
BRAKING CORRECTION DEVICE
Jean-Jacques Carré, Montreuil, France, assignor to Societe Anonyme D.B.A., Paris, France
Filed Feb. 7, 1977, Ser. No. 766,322
Claims priority, application France, Feb. 18, 1976, 76.04422
Int. Cl.² B60T *8/18*
U.S. Cl. 188—195 **2 Claims**



1. In a braking correction device having a housing which movably supports and encloses a stepped piston in a bore, the piston having a head which cooperates with the housing bore to substantially define an inlet chamber and an outlet chamber and the piston head carrying an elastomeric member which opens communication between the inlet chamber and the outlet chamber when the piston is in an idle position and closes communication between the inlet chamber and the outlet chamber when the piston is moved from its idle position, the improvement wherein said piston head is slidably disposed within a sleeve and a ring adjacent thereto, said sleeve being porous and disposed within the housing bore to adjoin the outlet chamber, said ring being disposed within the housing bore in fluid tight relation therewith and adjoining the inlet chamber, said sleeve and said ring being formed as elements separate from each other and said bore the elastomeric member cooperating with the porous sleeve to communicate the inlet chamber with the outlet chamber via the porous sleeve in the idle position and engaging the ring to close communication between the inlet chamber and the outlet chamber when the elastomeric member is moved with the head away from the idle position.

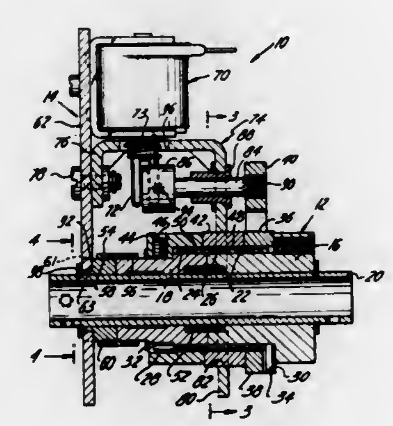
4,059,175
LINEAR FORCE SHOCK ABSORBER
Richard G. Dressell, Jr., 14609 Stonehouse, Livonia, Mich. 48154, and Robert J. Heideman, 37780 Westwood Circle, Apt. 101, Westland, Mich. 48185
Continuation-in-part of Ser. No. 574,885, May 6, 1975, abandoned. This application Apr. 28, 1976, Ser. No. 681,287
Int. Cl.² F16F *9/48*
U.S. Cl. 188—285 **8 Claims**

1. A device for absorbing the kinetic energy of a moving member so as to decelerate the member, comprising:
a tubular cylinder having a plurality of holes formed in its wall which are spaced relative to one another along the longitudinal axis of the cylinder;
a piston slidable within the cylinder;
a sleeve having an interior wall surrounding the cylinder and having a number of holes formed in it equal to the number of holes formed through the cylinder and spaced relative to one another longitudinally along the length of the sleeve at the same spacing as the holes in the cylinder, and further having a plurality of annular grooves formed in the interior wall of the sleeve, each groove being in substantial alignment with one of the holes in the sleeve, and, having a width at the surface of the interior wall of the sleeve which varies over the length of the groove;
a volume exterior to said sleeve, the holes in said sleeve providing fluid communication with the grooves and the exterior volume;



means for positioning the sleeve over the cylinder so that the grooves overlie the holes in the cylinder and a fluid orifice is formed by the interface of each of the holes in the cylinder and a respective overlying surface of the overlying groove;
each of the grooves being of such configuration that at any point along the length of the groove, the cross-sectional area of the groove is greater than the area of the fluid orifice formable by the interface of the hole and groove at that point, where the area of the orifice so formed is a function of the rotational position of the sleeve relative to the cylinder, whereby said grooves are at relatively low pressure relative to the pressure in said cylinder to thereby minimize leakage flow between said cylinder and said sleeve.

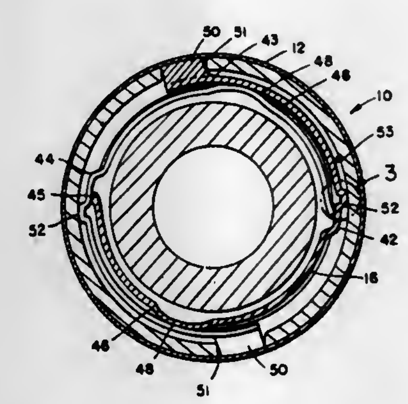
4,059,176
UNITARY SPRING CLUTCH BRAKE AND ACTUATOR ASSEMBLY
Robert D. Lowery, Willowick; Donald J. Baxter, South Euclid, and Joseph R. Lawn, Brecksville, all of Ohio, assignors to Marquette Metal Products Company, Cleveland, Ohio
Filed May 24, 1976, Ser. No. 689,035
Int. Cl.² F16D *67/02, 41/02*
U.S. Cl. 192—12 BA **4 Claims**



1. A unitary spring clutch and actuator assembly comprising:
a. an actuator subassembly having

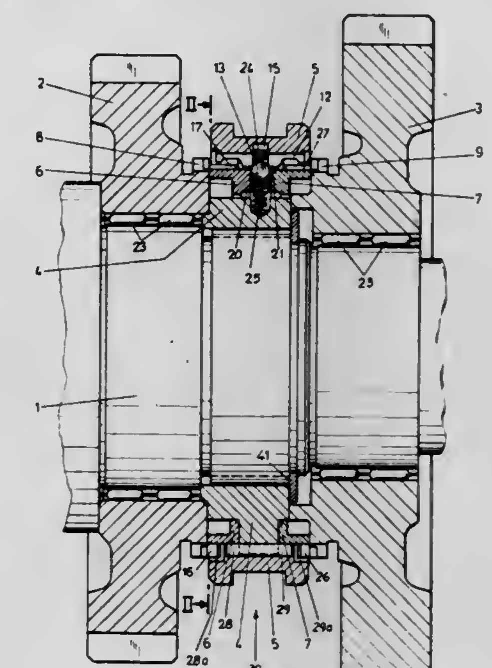
a-1. a frame;
a-2. a power actuator means including a movable stop member mounted on said frame;
a-3. said frame having a first and second opening therein;
b. a spring clutch subassembly having
b-1. a rotatable shaft;
b-2. input and output drums mounted for rotation about the axis of said shaft and with one of said drums being connected to said rotatable shaft;
b-3. a helically wound mainspring coaxial with said input and output drums to transmit torque from the input drum to the output drum;
b-4. a control collar connected to said mainspring and having a stop element to be selectively engaged and disengaged from said stop member;
b-5. a brake collar surrounding the mainspring and disposed adjacent the control collar and having an inner peripheral surface against which the mainspring bears for braking;
b-6. said brake collar having an outer peripheral surface of irregular contour;
b-7. said second opening having a peripheral contour complementary to said peripheral brake surface and of a size to slidably receive said brake collar therein and hold the latter against rotation;
b-8. said shaft having a portion thereof extending axially beyond the end of at least one of the drums and receivable in said first opening in the frame; and
c. detachable retaining means coacting with said shaft and the frame for securing the spring clutch subassembly to the frame and thus provide a unitary assembly.

4,059,177
BAND CLUTCH ASSEMBLY
Ernest U. Lang, Niles, Mich., assignor to National-Standard Company, Niles, Mich.
Filed June 17, 1976, Ser. No. 697,020
Int. Cl.² F16D *41/20*
U.S. Cl. 192—41 S **4 Claims**



1. A clutch band for an overrunning band clutch assembly having an inner clutch member coaxially disposed with respect to an outer clutch member and band clutch engaging means for transmitting a torque between the inner and outer clutch members, said clutch band having an unbalanced condition tending to cause said band to shift eccentrically during overrunning of said band clutch, and restricting means associated with said clutch band for direct contact with the adjacent clutch member limiting eccentric movement of said clutch band.

4,059,178
GEAR-SHIFTING JAW CLUTCH FOR SPEED-CHANGING VEHICULAR TRANSMISSION
Alfred Magg, Tettnang, and Günther Thurau, Friedrichshafen, both of Germany, assignors to Zahnradfabrik Friedrichshafen Aktiengesellschaft, Friedrichshafen, Germany
Filed July 16, 1976, Ser. No. 705,814
Int. Cl.² F16D *23/06*
U.S. Cl. 192—53 F **10 Claims**

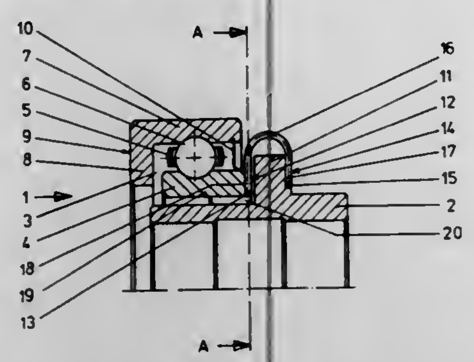


1. In a transmission including a shaft, a rotary member freely rotatable about the axis of said shaft, said member being provided with a set of jaw teeth, a clutch on said shaft operable to couple said member with said shaft, said clutch having a central body secured to said shaft and an annular tooth carrier nonrotatable on said body but axially shiftable thereon for selective engagement with said jaw teeth, and actuating means for so shifting said tooth carrier,
the improvement wherein said clutch is provided with a blocking ring coaxial with said tooth carrier and interposed between the latter and said member, said blocking ring being carried on said body with freedom of limited relative angular displacement by frictional contact with said member between two extreme positions in which said blocking ring prevents engagement of said tooth carrier with said jaw teeth, said blocking ring being frictionally entrainable by said member into a nonblocking intermediate angular position facilitating said engagement upon a passage of said member and said body through a condition of synchronous rotation; said tooth carrier being provided with radially movable weight means mounted for co-operation with coacting formations on said blocking ring, at shaft speeds less than a predetermined limit beyond which said weight means is centrifugally moved out of alignment with said coacting formations, to rotate said blocking ring into said intermediate position.

4,059,179
SELF-CENTERING CLUTCH BEARING
Horst Manfred Ernst, Eltinghausen; Armin Olschewski, Schweinfurt; Rainer Schürger, Schwanfeld; Lothar Walter, Schweinfurt; Manfred Brandenstein, Aschfeld, and Erich Burkl, Stammheim, all of Germany, assignors to SKF Industrial Trading and Development Company B.V., Nieuwegein, Netherlands
Filed Oct. 29, 1975, Ser. No. 626,647
Claims priority, application Germany, Dec. 6, 1974, 2457682
Int. Cl.² F16D *23/14*
U.S. Cl. 192—98 **7 Claims**

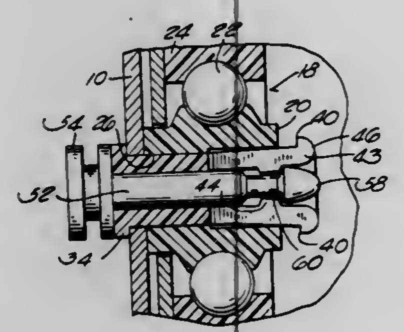
1. In a clutch bearing assembly having a bearing with first and second rings defining races for rolling bearing elements, a

sliding sleeve, and means coupling said sliding sleeve to said second ring, the improvement wherein said coupling means comprises permanently deformable holding means intercoupling said second ring and sliding sleeve for permitting dis-



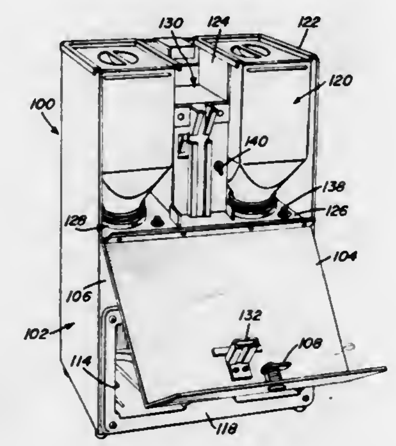
placement of said second ring with respect to said sleeve in all radial directions while inhibiting relative rotation therebetween, said deformable holding means being positively connected to at least one of said second ring and sliding sleeve.

4,059,180
ROLLER ASSEMBLY WITH IMPROVED MOUNTING MEANS
Bert Krivec, Brookfield; Elwood B. Brown, Cedarburg, both of Wis., and Warren S. Raynor, Danville, Ky., assignors to Rexnord Inc., Milwaukee, Wis.
Filed Dec. 2, 1976, Ser. No. 746,916
Int. Cl.² B65G *39/00*
U.S. Cl. 193—37 **4 Claims**



1. In combination, a roller conveyor apparatus having an improved mounting means for attaching the rollers to support structures comprising:
a. Spaced support structures having a non-circular support shaft holes;
b. a plurality of spaced rollers positioned between the support structures;
c. hub means attached to and associated with each roller end for providing a hub about which each roller can rotate, each hub means having a shaft opening having a non-circular cross-section along at least a first portion adjacent said support structures;
d. mounting means associated with each hub means for supporting each hub to adjacent support structure comprising:
1. an elongated tubular member of elastomeric material having a head end and a body portion which extends through said shaft hole, said body portion having a plurality of essentially longitudinal slots extending from the remote end thereof into said shaft opening and a plurality of inwardly and outwardly extending knobs between the longitudinal slots, said body portion having an outside diameter sufficiently large to provide for a flattening of the outer surface against the flat walls of said shaft hole and first portion of said shaft opening when said tubular member is inserted into the shaft opening; and
2. a pin means member of elastomeric material having a head portion and a shank portion which extends through said support hole and said tubular member, said shank portion having a groove which when the pin means is fully inserted is adapted to accept the inwardly extending knobs and is constrained against longitudinal movement relative to the tubular member by virtue of said knobs, said groove having a depth less than the length of said inwardly extending knobs to cause the walls of the tubular member abut the hub means along points around the remote end of said shaft opening thereby providing support to said hub means over substantially the entire inserted length of said tubular member.

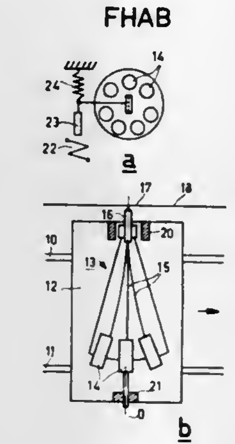
4,059,181
MEAL-SERVICE POWDERED FOODS DISPENSER
Irving E. Greenfield, Jr., and Ronald C. Jacobson, both of Miami, Fla., assignors to Food Systems, Inc., Miami, Fla.
Continuation of Ser. No. 498,243, Aug. 16, 1974, abandoned. This application Jan. 5, 1976, Ser. No. 646,554
Int. Cl.² G07F *13/06*
U.S. Cl. 194—13 **10 Claims**



1. A powdered foods dispenser comprising a supply container for powdered food product, electrically operated means dispensing a quantity of powdered food product from the container, said electrically operated means being oriented at the bottom of the supply container for a gravity discharge of the food product only into an underlying user receptacle without mixing, and means varying the quantity of product discharged upon actuation of the electrically operated means, said supply container and electrically operated means being disposed in a cabinet with the electrically operated means including a pushbutton exposed to the exterior of the cabinet for enabling operation of the dispenser, at least one additional supply container and electrically operated means disposed in the cabinet to enable dispensing of multiple powdered foods with each electrically operated means including a pushbutton disposed exteriorly of the cabinet, said means for varying the quantity of product dispensed including an adjustable timer forming part of the electrically operated means for varying the time of operation thereof, said supply container being in the form of a canister removably mounted in said cabinet, said canister having a closure member at the upper end thereof for enabling refilling of the canister, said canister including an upper edge having outwardly projecting flange means thereon supported on the upper cabinet edges to prevent spillage of powdered foods in the interior of the cabinet.

4,059,182
MOSAIC PRINTER
Lars Ake Olof Gustafsson, and Carl-Otto Ulin, both of Jarfalla, Sweden, assignors to U.S. Philips Corporation, New York, N.Y.
Continuation of Ser. No. 535,134, Dec. 20, 1974, abandoned. This application July 7, 1976, Ser. No. 703,177
Claims priority, application Sweden, Dec. 20, 1973, 73172017
Int. Cl.² B41J *3/04*
U.S. Cl. 197—1 R **4 Claims**

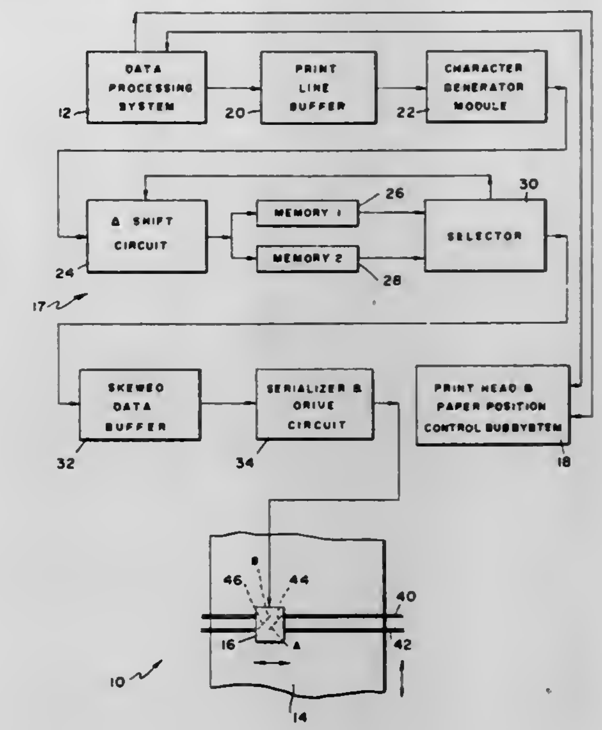
FHAB



1. A mosaic printer which comprises a printing head mounted for movement along a first rectilinear line proximate to an associated printing sheet to produce a plurality of signs arrayed in a second rectilinear line parallel to said first rectilinear line, said printing head being provided with a number of printing wires, each of said wires including means which upon preselected axial travel produce a printing mark on the associated printing sheet, a plurality of said marks producing said signs said wires extending from a first part of said printing head in the vicinity of the associated printing sheet substantially along a third rectilinear line, said third rectilinear line and said second rectilinear line having an included angle, at least said first part of said printing head being rotatable about an axis which is substantially perpendicular to the associated printing sheet, and a setting mechanism to position said first part of said printing head to at least two discrete angular positions, in which said third rectilinear line is disposed at different included angles with respect to said first and second rectilinear lines for producing signs with different heights and inclination by said setting mechanism before printing any individual sign and without change of said elements, said included angles being less than 100 degrees and said included angle not varying during the printing of any one sign.

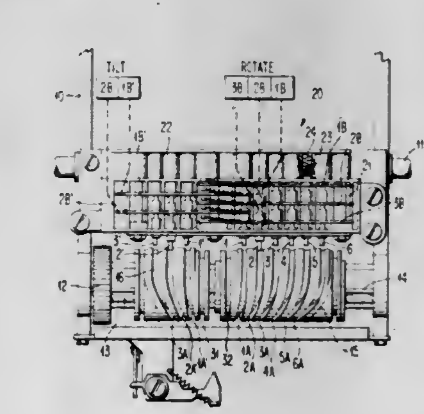
4,059,183
DOT MATRIX PRINTER WITH SLANTED PRINT HEAD AND MODULAR SKEWING OF DOT PATTERN INFORMATION
Phillip Keith Hoskins, San Jose, Calif., assignor to International Business Machines Corporation, Armonk, N.Y.
Filed Dec. 30, 1976, Ser. No. 755,867
Int. Cl.² B41J *3/04*
U.S. Cl. 197—1 R **22 Claims**

1. A printing system comprising:
a source of data to be printed;
a character generator module storing dot pattern information defining a plurality of characters to be printed;
addressing circuitry responsive to data from the source and coupled to obtain from the character generator, a sequence of information bytes forming a dot pattern module which defines a dot pattern for a portion less than the whole of a character to be printed, each printed character being defined by a plurality of dot pattern modules;
a skewing circuit coupled to receive from the character generator module sequences of dot pattern bytes and to skew the information of each sequence to produce a skewed dot pattern compensating for a skew of a print head to permit desired character formats to be printed by the print head, the skewing circuit operating on each dot pattern module in a repetitive pattern; and



a dot matrix printer having print elements that are skewed relative to a line perpendicular to a direction of print element motion, the printer being coupled to print character defining dot patterns in response to information received from the skewing circuit.

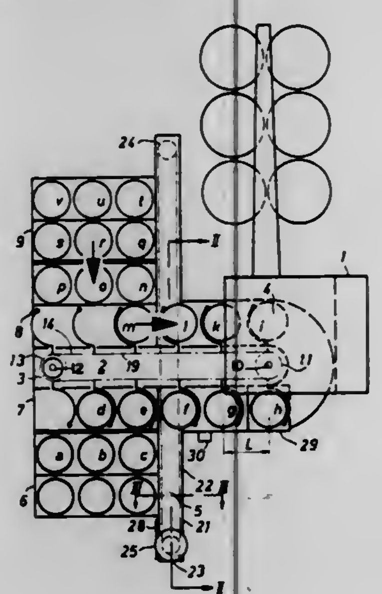
4,059,184
SINGLE PRINT ELEMENT SELECTION APPARATUS WITH MULTIPLE SELECTION INHIBITING MEANS
Robert Caldwell Redding, Versailles, and Joe Larry Vaughan, Lexington, both of Ky., assignors to International Business Machines Corporation, Armonk, N.Y.
Filed Jan. 3, 1977, Ser. No. 756,308
Int. Cl.² B41J *1/60*
U.S. Cl. 197—18 **10 Claims**



5. A selection apparatus for a printer of the single element type, having a single print element carried by a print carrier, comprising:
a cam and cam follower, a plurality of cam means on said cam to effect different axial motion of said cam and thus said follower upon engagement of said cam means with a selection pin;
a plurality of selection pins each selectively engageable with one of said cam means to impart said predetermined differing axial motion of the cam upon engagement of selected ones of said pins with an associated cam means and upon rotation of said cylinder;
pin selection means to effect propulsion of each of said pins into engagement with an associated cam means;
pin motion inhibiting means comprising a plurality of slides, and electromagnet engageable with each of said slides,

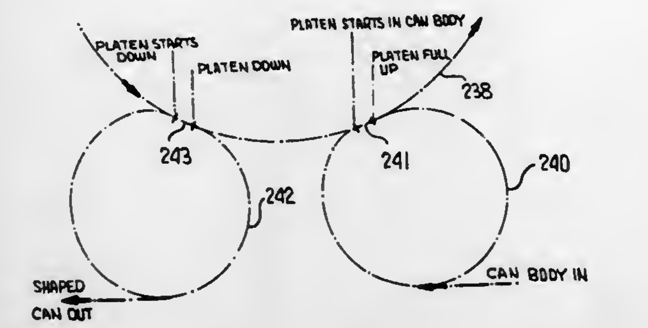
each slide being movable between first and second positions and having code means thereon for engaging first selected ones of said pins when in said first position, and second selected ones of said pins when in said second position, said code means comprising a means defining a plurality of apertures in said slides, said slides dimensioned to permit passage of pins therethrough, and said pins including recessed portions dimensioned to permit engagement of said aperture defining means in said recess, said code means on said slides arranged so that upon movement of at least one of said slides from said first to said second position, the engagement of more than one pin with one of said cam means is inhibited.

4,059,185
APPARATUS FOR SUPPLYING SPINNING PREPARATORY MACHINES WITH CANS OR THE LIKE
Kurt Weber, Elgg, Switzerland, assignor to Rieter Machine Works, Ltd., Winterthur, Switzerland
Filed Dec. 8, 1975, Ser. No. 638,922
Claims priority, application Switzerland, Dec. 24, 1974, 17268/74
Int. Cl.² B23Q *7/00*
U.S. Cl. 198—339 **4 Claims**



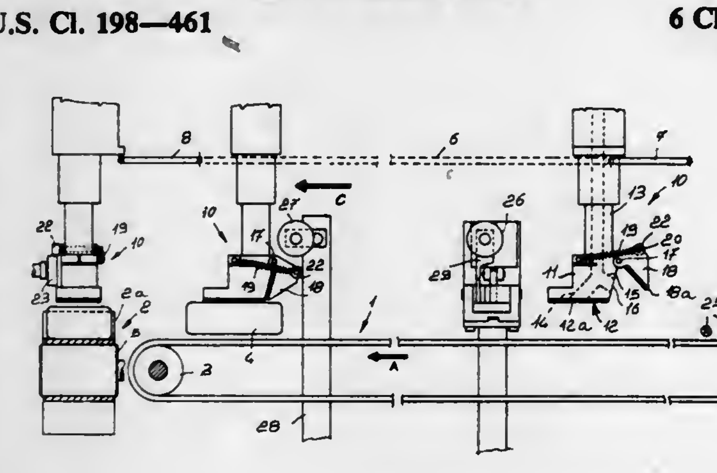
1. Apparatus for supplying a spinning preparatory machine with sliver cans, comprising transporting dollies for supporting and transporting the cans, an endless revolving can transporting means having a plurality of substantially equally spaced can entrainment members for engaging empty silver can disposed upon the transporting dollies, for urging said empty cans from said transporting dollies, for moving said empty cans into said spinning preparatory machine and for moving said empty cans into said spinning preparatory machine and for moving full sliver cans from said spinning preparatory machine back onto one of said transporting dollies, means for stepwise driving said can transporting means along a path of travel, dolly shifting means arranged transversely of and beneath the path of travel of the can transporting means for successively individually engaging ones of said transporting dollies, moving said transporting dollies to said can transporting means, across the path of travel thereof and into a position for receiving said full sliver cans from said spinning preparatory machine and means for driving said dolly shifting means in coordinated sequence with the movement of said can transporting means.

4,059,186
CAN BODY SHAPER
Anton A. Aschberger, Oak Lawn; Jack L. Avery, Park Forest; William J. Cartwright, Palos Park; Geoffrey J. Dean, Rockton; Oliver J. Tysver, Chicago Heights; Robert W. Wolfe, Oak Lawn, and Frederick H. Bautz, Hazel Crest, all of Ill., assignors to The Continental Group, Inc., New York, N.Y.
Division of Ser. No. 221,587, Jan. 28, 1972, Pat. No. 3,807,209. This application Sept. 25, 1973, Ser. No. 400,499
Int. Cl.² B65G *47/00*
U.S. Cl. 198—481 **2 Claims**



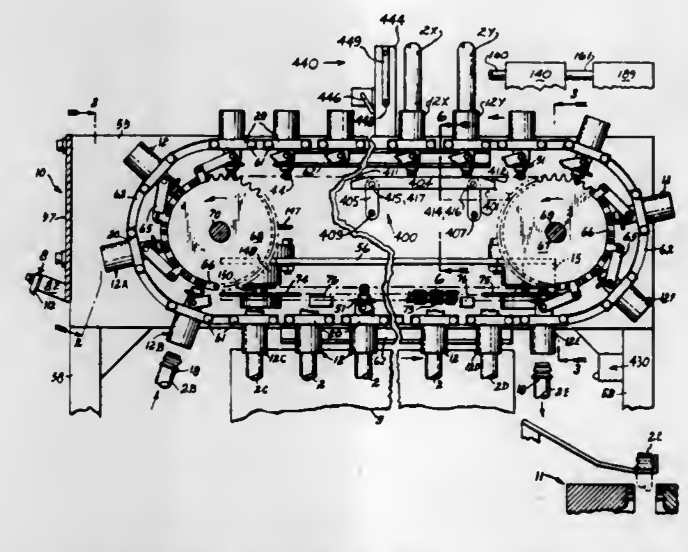
1. A transfer device for transferring members to and from supports moving in an arcuate path, said transfer device comprising a turret member mounted for rotation about a fixed axis, a plurality of article carriers pivotally carried by said turret member for movement therewith in a generally circular path, and control means for controlling the contour of a portion of said generally circular path to correspond to the contour of said arcuate path, said control means including a fixed cam, spring loaded control arms connected to said articles carriers for positioning the same, cam follower means carried by said control arms riding on said cam to position said arms, control arms of opposite ones of said article carriers being interconnected by a connector, and said connectors being disposed in crossing relation and slidably mounted in said turret.

4,059,187
APPARATUS FOR TRANSFERRING AT A PREDETERMINED SPACING ON TO A RECEPTION CONVEYOR OBJECTS FED AT AN IRREGULAR SPACING FROM A DELIVERY CONVEYOR
Herbert Richard Rueff, Via Anna Frank, 10, Croce di Casalecchio (Bologna), and Franco Aiuola, Via Ranzani, 17, Bologna, both of Italy
Filed Oct. 12, 1976, Ser. No. 731,487
Claims priority, application Italy, Dec. 19, 1975, 3625/75.
Int. Cl.² B65G *47/04*
U.S. Cl. 198—461 **6 Claims**



1. An apparatus for transferring at a predetermined spacing on to a reception conveyor objects fed at an irregular spacing from a delivery conveyor driven with continuous motion, consisting of a transfer conveyor which moves with continuous motion and at a speed different from that of the delivery conveyor from the delivery conveyor to the reception conveyor and comprises a first portion parallel to the delivery conveyor and a second portion parallel to the reception conveyor, object take-up suckers disposed at regular distances apart on the transfer conveyor for transferring the objects from the delivery conveyor and for depositing them at regular distances on the reception conveyor, and at least one sensor stationarily disposed in front of the first portion of the transfer conveyor and sensing the position of the objects on the delivery conveyor, characterized in that a valve is associated with each sucker and arranged to assume two stable positions relative thereto, namely a position of activation and a position of deactivation of the sucker, at least two control devices disposed in a fixed position along the first portion of the transfer conveyor and which by means of a selective control by the sensor assume a position of engagement with the sucker valves to move them into the activation position, and a further control device disposed in a fixed position on the second portion of the transfer conveyor such as to be able to engage with the sucker valves to move them into the deactivation position.

4,059,188
MANUAL PREFORM REMOVAL DEVICE
David Ian McDonald, Cincinnati, Ohio, assignor to Cincinnati Milacron Inc., Cincinnati, Ohio
Continuation-in-part of Ser. No. 668,323, March 18, 1976. This application June 21, 1976, Ser. No. 697,861
Int. Cl.² B65G *15/00*
U.S. Cl. 198—477 **6 Claims**

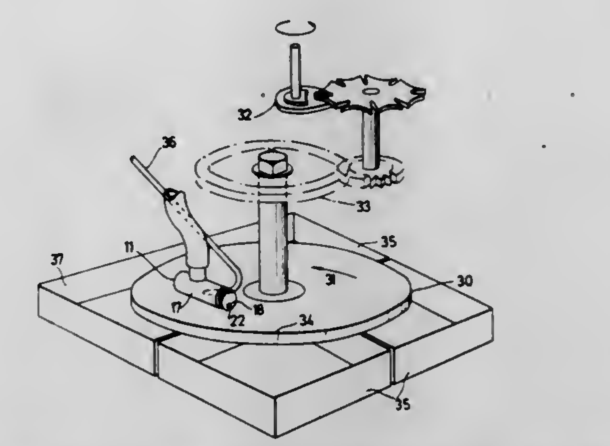


1. In combination with an endless conveyor for carrying in a coupling an elongated workpiece with its axis substantially normal to the direction of conveying from a loading station to an unloading station and return, the coupling having follower actuated means to grasp the workpiece which means is normally biased to a workpiece engaging condition and upon movement of the follower is actuated to a nongrasping condition by a follower motion substantially parallel to said workpiece axis thereby to release a workpiece therein or to receive a workpiece, the improvement for selectively removing on the return run of the conveyor a workpiece that has been accidentally retained in the coupling at said unloading station comprising:

means for engaging said follower on the return run before the coupling arrives at said loading station responsive to which engagement the follower is moved to a non-grasping condition and includes a four bar linkage having a cam track mounted on a pair of crank arms one at eaoh end of said track, said cam track being movable by said means for moving into and out of engagement with said coupling follower; and

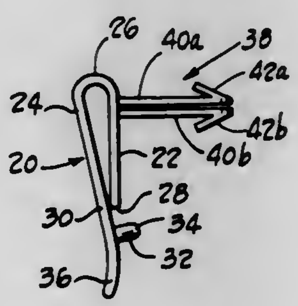
means to selectively move said means for engaging into and out of engagement with said follower.

4,059,189
CLASSIFICATION OF PARTICLES
Ronald John, High Wycombe, England, assignor to Vacu-Blast Limited, Slough, England
Filed Apr. 1, 1976, Ser. No. 672,743
Claims priority, application United Kingdom, Apr. 3, 1975, 13734/75
Int. Cl.² B07C *9/00*
U.S. Cl. 209—112 **20 Claims**



1. A method of classifying particles according to their sphericity which comprises placing the particles on an upper region of a smooth surface which rotates about a vertical axis and slopes downwardly from said axis, and introducing a cyclic component into the rotation of said surface effecting shaking of the particles in a circumferential direction parallel to said surface, whereby the particles are carried along on said surface in said circumferential direction and simultaneously migrate radially down the slope at rates dependent on the sphericity of the individual particles, the particles which have migrated leaving said surface respectively at different positions spaced in said direction, at least one of said positions being at a lower region of the surface.

4,059,190
CLIP FOR DISPENSING ADVERTISING LITERATURE
Gerald A. Conway, Cleveland Heights, Ohio, assignor to Gerald Conway & Co., Inc., Cleveland, Ohio
Filed July 8, 1976, Ser. No. 703,469
Int. Cl.² A47F *7/00*
U.S. Cl. 211—57.1 **5 Claims**



1. A one-piece, card-supporting clip adapted for use with an upright support having a clip-engageable edge comprising

front and rear downwardly extending legs;

a loop portion having a diameter approximately the same as or greater than the thickness of the support clip-engageable edge connecting said legs, the loop portion resiliently biasing the front leg so that it converges on the rear leg to become at its free end contiguous with the rear leg whereby the legs are adapted to press against opposite sides of said support adjacent the clip-engageable edge;

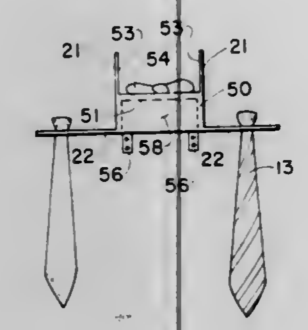
means projecting forwardly from the front leg to support a plurality of cards;

said rear leg being longer than the front leg and having a lower rear leg free end which curves rearwardly from the

plane of the leg, the legs being essentially straight except for the rear leg curved free end, said rear leg free end terminating in approximately the same plane as the front leg; and

means projecting forwardly from said rear leg spaced from the front leg free end adapted to pierce the support rear side.

4,059,191
TIE RACK
Maurice J. Chaisson, Athol, Mass., assignor to The Raymond Lee Organization, Inc., New York, N.Y.
Filed Jan. 21, 1976, Ser. No. 650,947
Int. Cl.² A47F *7/12*
U.S. Cl. 211—90 **1 Claim**



1. A tie rack assembly for supporting both neckties preformed with knots and conventional neck ties, comprising a rack formed of

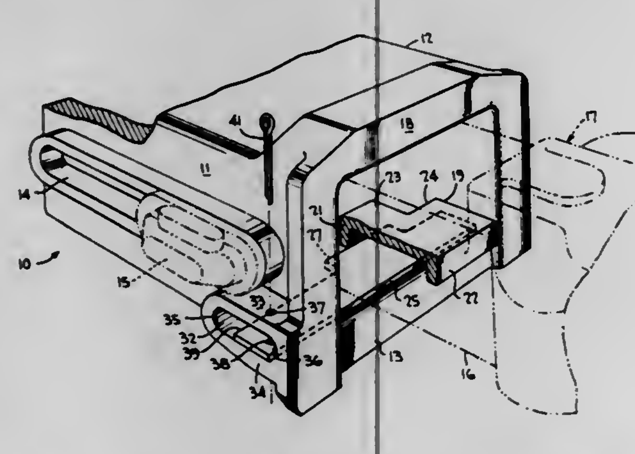
a first shelf member fitted to a support member, said first shelf member fitted with a plurality of pairs of first slots from an edge of the said shelf member, with a pair of said first slots separated by a second slot.

said second slot of a greater width and depth than the said first slots, said first and second slots bounded by generally parallel walls, with said first slots of a width and spacing suitable for looping a necktie through two adjacent first slots, with the necktie hung by the finger of the shelf member between the two said adjacent first slots, with said

second slots each of a size to engage a knotted necktie under the necktie knot, in which

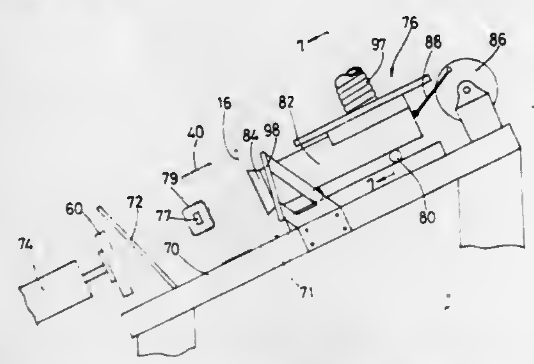
two such racks are joined together back-to-back, and separated by a second shelf member of a size to support a bow tie.

4,059,192
COUPLER HEIGHT ADJUSTER FOR RAILWAY CARS
Glen D. Larsen, Upper Marlboro, Md., assignor to Southern Railway Company, Washington, D.C.
Filed Jan. 21, 1977, Ser. No. 761,382
Int. Cl.² B61G *9/22*
U.S. Cl. 213—61 **10 Claims**



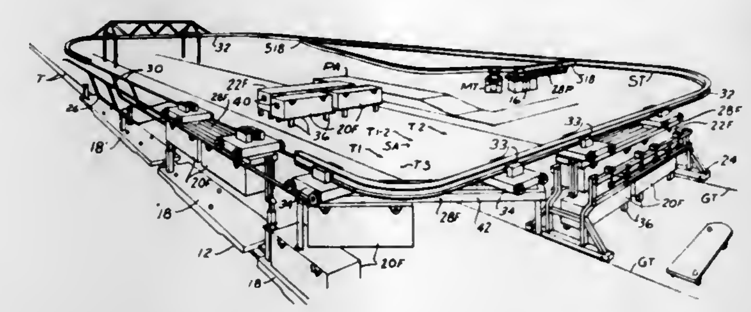
1. In combination, a striking casting having transversely spaced sidewalls with draft keyways formed therein and a coupler carrier member extending between and connected to said sidewalls, said carrier member having an upper surface for supporting a longitudinally extending coupler, a wear plate extending over said surface and having side flanges embracing said carrier member, and a shim disposed between said surface and said wear plate, the improvement wherein one of said sidewalls has a transversely extending opening through which said shim is adapted to be inserted, said opening being defined by spaced upper and lower walls and concavely curved end walls all extending transversely outwardly of said one sidewall, said upper wall having a predetermined thickness and said lower wall having a thickness greater than said predetermined thickness, whereby a support structure is defined for said opening wherein said end walls function to reduce stress concentration at said opening, said outwardly extending walls defining said opening serve to resist bending stresses of said striking casting, and said lower wall serves to further reduce stress concentration at said opening from torsional and other loads to which said striking casting is subjected.

4,059,193
PANEL FEEDER
Yutaka Ryumon; Naomichi Yano, and Shinsuke Yukimachi, all of Osaka, Japan, assignors to Kubota, Ltd., Osaka, Japan
Filed Mar. 12, 1976, Ser. No. 666,568
Claims priority, application Japan, Mar. 14, 1975, 50-35195[U]; Mar. 19, 1975, 50-37814[U]
Int. Cl.² B65G *59/04*
U.S. Cl. 214—8.5 A **6 Claims**



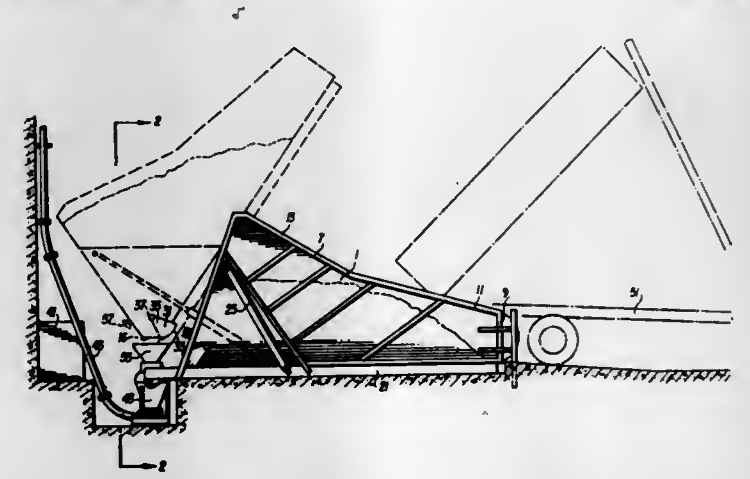
1. A panel feeder comprising a vacuum case provided at its front end with a vacuum suction opening and supported for reciprocal movement relative to a block of panels arranged substantially vertically side by side, reciprocating means coupled to the case to bring the suction opening toward or away from the panel block, a slanting panel support plate extending obliquely upward, the vacuum case being slidable in parallel to the support plate, the support plate being formed in its upper portion with a panel discharge opening immediately in front of the retracted position of the vacuum case, blocking members disposed above the discharge opening to impede the panel by contact therewith, and panel block pushing means disposed on a lower portion of the slanting support plate to push the panel block to the advanced position of the vacuum case, the vacuum case having a closure slidably engaging a stationary cover, the stationary cover having an inlet connected to a duct in communication with vacuum means, the closure being formed with an air aperture always in communication with the inlet of the stationary cover over the range of reciprocal movement of the vacuum case so as to maintain a vacuum within the vacuum case and to cause the vacuum suction opening to perform a vacuum sucking action, whereby the panels are fed one by one to an apparatus subsequent to the feeder.

4,059,194
CONTAINER OVERHEAD TRANSFER AND STORAGE SYSTEM
Leonard D. Barry, 19300 Pennington Drive, Detroit, Mich. 48221
Division of Ser. No. 269,239, July 5, 1972, Pat. No. 3,956,994. This application May 17, 1976, Ser. No. 687,180
Int. Cl.² B61J *3/00*
U.S. Cl. 214—38 CA **5 Claims**



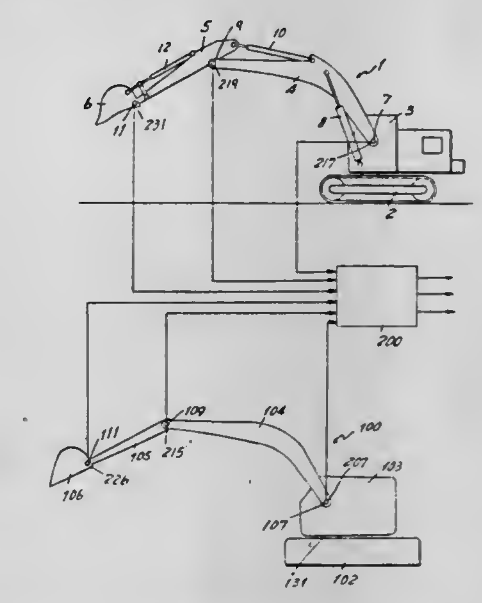
1. A container storage and transfer system having, containers, a stretch of railway track, a train thereon having transfer container cars therein, a container storage station along said track and including a gantry track having rails spaced apart, berths for storing containers in said station arranged in transverse rows each for at least one container between said rails, at least one gantry on said gantry track, said gantry having lift means for handling at least a container, a suspended station track run over said railway track for a transfer run and over said gantry, one or more container carriers on said station track for transfer of said containers between said gantry and said cars, said gantry having a bridge-like frame spanning said containers endwise when on said storage berths and having sides between which said carriers with containers can move lengthwise, means on said carriers for engaging supporting and releasing said containers, said gantry lift means being designed for lifting and moving said containers between said storage berths and said carriers thereabove.

4,059,195
MATERIAL HANDLING DEVICE
Eric John Christopher MacDonald, Rotherham, and Brian Snowdon, Doncaster, both of England, assignors to Macawber Engineering Limited, Great Britain
Filed Apr. 22, 1976, Ser. No. 679,163
Claims priority, application United Kingdom, Apr. 25, 1975, 17247/75
Int. Cl.² B65G *67/24*
U.S. Cl. 214—44 R **4 Claims**



1. A material handling device for receiving a bulk delivery of granular or lumpy material from a tipper delivery vehicle and for transferring said material to a reception hopper of pneumatic material conveying apparatus, the device comprising a container in the form of an open-topped trough having a base substantially at ground level and having a first open end through which said tipper vehicle may be backed to unload its entire bulk delivery along the length of the container during subsequent forward movement of the vehicle, and a second, substantially funnel-shaped end, opposite said first end, having an apical opening, and a pivotally mounted closure member over said apical opening, the container being mounted for pivotal movement about an axis located a short distance beyond said second end; means connected to the device for moving said container pivotally about said axis between a first position for the reception of said tipper vehicle and its bulk delivery and a second, raised position in which the opening of said apical opening lies just above said reception hopper of the pneumatic conveying means, the pneumatic conveying means being located at least partially below ground level, the device further including means for causing said closure member to open during the latter stage of movement of the container from the first to the second position, the closure member being arranged to return to its original position under the influence of gravity when the container moves from the second to the first position.

4,059,196
SYSTEM FOR CONTROLLING A POWER SHOVEL
Hisanori Uchino; Masamichi Takada, both of Tokyo; Takahiro Shimizu, Kawasaki; Masamitsu Shibayama, and Fumiya Furuno, both of Yokohama, all of Japan, assignors to Hokushin Electric Works, Ltd., Tokyo, Japan
Filed Mar. 12, 1976, Ser. No. 666,381
Claims priority, application Japan, Oct. 15, 1975, 50-123196
Int. Cl.² E02F *3/32*
U.S. Cl. 214—138 R **18 Claims**



1. A system for controlling a power shovel consisting of an upper swivel turret section, a lower chassis section, a boom attached to said upper swivel turret section so as to be vertically turned by a first hydraulic actuator, an arm attached to one end of said boom so as to be turned by a second hydraulic actuator, a bucket attached to one end of said arm so as to turned by a third hydraulic actuator, a fourth hydraulic actuator for turning horizontally said upper swivel turret section, piping for feeding hydraulic fluid to said hydraulic actuators, and flow rate limiters provided in the piping so that said hydraulic actuators can be actuated for a given period of time from their starting time, said control system comprising:

A. a manual control lever consisting of a control boom, a control arm and a control bucket which are miniatures of said boom, arm and bucket of the power shovel, said manual control lever being capable of turning horizontally with respect to a base by hand and of taking up a neutral position in free,

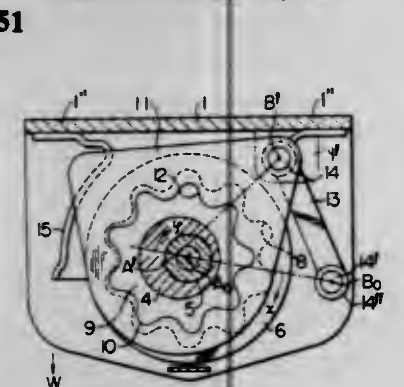
B. means for generating a detected boom angle signal proportional to the turn angle of said boom,

C. means for generating a detected arm angle signal proportional to the turn angle of said arm,

D. means for generating a detected bucket angle signal proportional to the turn angle of said bucket,

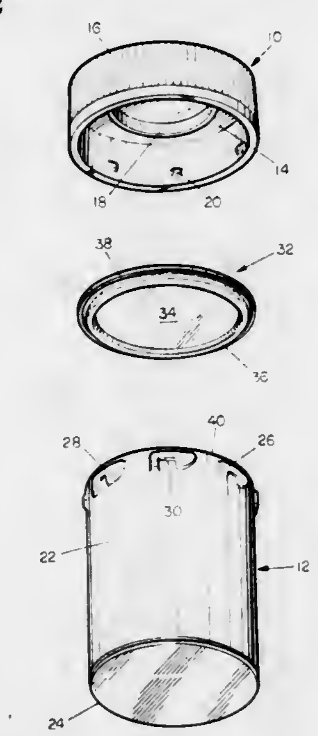
E. means for generating a boom angle setting signal proportional to the turn angle of the control boom of said control lever,
F. means for generating an arm angle setting signal proportional to the turn angle of the control arm of said control lever,
G. means for generating a bucket angle setting signal proportional to the turn angle of the control bucket of said control lever,
H. a circuit for communicating said detected boom, arm and bucket angle signal generators with said control boom, arm and bucket reference signal generators, said circuit including:
i. a first comparator for comparing said detected boom angle signal with said boom reference signal and for generating a differential signal therebetween,
ii. a second comparator for comparing said detected arm angle signal with said arm reference signal and for generating a differential signal therebetween,
iii. a third comparator for comparing said detected bucket angle signal with said bucket reference signal and generating a differential signal therebetween,
iv. a circuit for transmitting a control signal to said first hydraulic actuator according to the differential signal received from said first comparator,
v. a circuit for transmitting a control signal to said second hydraulic actuator according to the differential signal received from said second comparator, and
vi. a circuit for transmitting a control signal to said third hydraulic actuator according to the differential signal received from said third comparator; and
I. means for applying a control signal to said fourth hydraulic actuator for turning said upper swivel turret section to the left or right when said combined control lever is manually turned to the left or right.

4,059,197
SPARE TIRE CARRIER
Hiroshi Iida, Kariya, Japan, assignor to Manno Kogyo Company, Limited, Japan
Filed Nov. 4, 1975, Ser. No. 628,784
Claims priority, application Japan, Feb. 1, 1975, 50-13762; May 20, 1975, 50-60066; Feb. 8, 1975, 50-16546; May 17, 1975, 50-58841
Int. Cl.² B62D *43/04*
U.S. Cl. 214—451 **6 Claims**



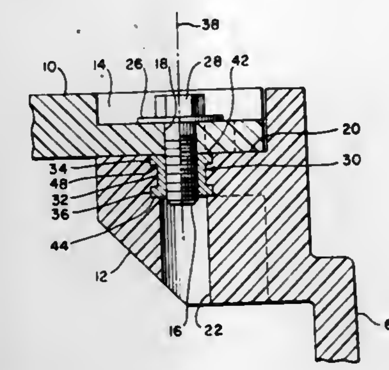
1. A spare tire carrier for vehicles comprising
a casing,
a shaft having a handle engaging portion at one end thereof and rotatably carried by said casing,
an eccentric cam fastened to said shaft,
an external gear rotatably fitted over said eccentric cam, said external gear being not only rotatable about its axis but also revolvable about the center of said shaft,
an internal gear rotatably mounted on said shaft and in mesh with said external gear,
means for restricting the motion of said external gear such that as said shaft is rotated said external gear causes the pilgrim-step motion of said internal gear, means operatively connected to said internal gear for hoisting a spare tire into an abutting relationship against an abutment surface on said vehicle,
said pilgrim-step motion being defined by such a motion that while said shaft is being rotated in one direction, said internal gear after it has been rotated through a predetermined angle is temporarily rotated in the direction opposite to that in which it has been rotated, thereby providing the locking effect between said tire and said abutment surface.

4,059,198
VAPOR-SEAL SAFETY CAP AND CONTAINER
George V. Mumford, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio
Filed Jan. 26, 1977, Ser. No. 762,611
Int. Cl.² B65D *55/02, 85/56*
U.S. Cl. 215—222 **1 Claim**



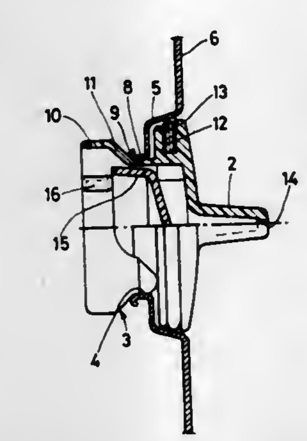
1. A vapor-sealing, child-resistant closure and container combination comprising: an open-mouthed container having a plurality of circumferentially spaced projections extending radially outwardly adjacent the open end thereof, an annular rim portion on the open end thereof, said projections having a downwardly facing notch therein; a closure having a top panel and an annular skirt depending from the periphery of the top panel, a plurality of radially inwardly extending and circumferentially spaced lugs on the inner surface of said skirt, said lugs being adapted to engage the notches in the projections on the skirt of said container, an integral annular abutment formed on, and depending from, the inner surface of the top panel of said closure; and a one-piece liner formed from a flexible, resilient material and freely interposed between the free edge of the annular abutment and the lugs on the skirt of the closure, said liner including a central panel, a downwardly depending annular, W-shaped plug portion, and an outer peripheral margin, said annular abutment adapted to bias the central panel of the liner downwardly to force said plug portion into vaporsealing engagement with an interior surface of said container and the outer peripheral margin into sealing engagement with the annular rim on the container when the lugs on said closure are engaged within the notches in the projections on the skirt of the container.

4,059,199
UTILITY BOX FASTENER
Patrick E. Quaney, Fountain Valley, Calif., assignor to Associated Concrete Products, Inc., Santa Ana, Calif.
Filed June 28, 1976, Ser. No. 700,629
Int. Cl.² H02G *3/08*
U.S. Cl. 220—3.8 **6 Claims**



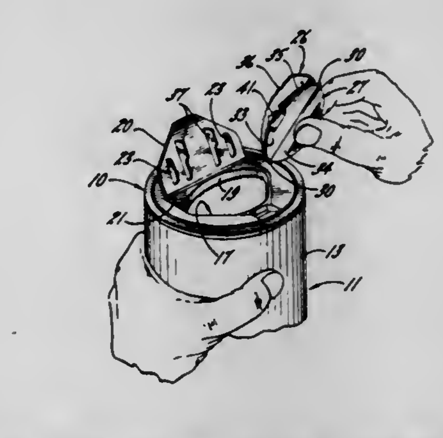
1. A hold-down device for affixing a cover to a plastic box comprising:
a female fastener having a central shank portion with a threaded bore through its axis and top and bottom flanges at its opposite ends normal to the axis of the bore;
each said flange having a substantial thickness parallel to the axis of said bore to define a blunt peripheral bearing surface;
the bottom flange extending beyond the periphery of said central shank portion to form an upwardly facing shoulder entirely around the lower end of said shank;
a box composed of plastic material which undergoes significant compression under load;
a portion of said plastic box being molded tightly around said fastener and bearing against the peripheral bearing surfaces of the flanges and against the upwardly facing shoulder of the lower flange, said plastic extending in between the two flanges;
a cover on said box;
the upper surface of said upper flange bearing on said cover; and
a threaded bolt extending through said cover and threaded into said fastener.

4,059,200
PLASTIC FILLER CAP
Michele Aimar, Turin, Italy, assignor to ITW Fastex Italia, S.p.A., Turin, Italy
Filed Nov. 5, 1976, Ser. No. 739,227
Claims priority, application Italy, Nov. 10, 1975, 29127/75
Int. Cl.² B65D *53/00, 51/16*
U.S. Cl. 220—233 **4 Claims**



1. A plastic filler cap for tanks characterized in that the tank filler cap comprises a flange provided at the periphery thereof with a seal and at the center with an operating handgrip, and a hollow stem of a square shape in cross-section intended to engage a tank opening of corresponding shape in cross-section, said stem being formed of a pair of substantially co-axial squared sections angularly offset relative to each other by 45° and connected to each other by inclined walls so that by introducing the first section of said stem in the tank opening and rotating said cap by means of said handgrip for ⅛ of a turn, the edges of said first stem section will deflect and by sliding said inclined walls connecting said pair of sections on the inner edges of said tank opening, said filler cap locks in the closed position when the second stem section engages in the opening and said first stem section projects from said opening to the inner portion of said tank.

4,059,201
CONTAINER CLOSURE WITH FOIL SEAL
John A. Foster, Rockford, Ill., assignor to J. L. Clark Manufacturing Co., Rockford, Ill.
Filed Mar. 14, 1977, Ser. No. 777,068
Int. Cl.² B65D *51/22*
U.S. Cl. 220—258 **15 Claims**



1. A container closure comprising a cover having a dispensing opening extending vertically therethrough, a tearable film covering the lower side of said opening and sealed to said cover, a generally horizontal door located within said opening and positioned above said film, said door having first and second sections with at least said first door section corresponding substantially in shape to the shape of that portion of the opening within which said first door section is located, two pivots made of breakable material and alined with one another along an axis defining the dividing line between said first and second door sections, said pivots connecting said door to the wall of said opening and permitting said door to swing vertically within said opening, said film having a first portion which underlies and is sealed to the first door section and having a second portion which underlies and is free of said door section, and means depending from said first door section for puncturing a hole in said first film portion when finger pressure is initially applied to said first door section in a direction to swing the latter downwardly whereby such downward swinging causes said first door section to tear the punctured first film portion away from the margins of said opening, said second door section swinging upwardly as said first door section swings downwardly and defining a finger grip which may be held and pulled upwardly to break said pivots and enable removal of said door from said opening, said first film portion remaining sealed to said first door section and causing said second film portion to tear away from the margins of said opening as said door is removed from said opening.

4,059,202
COVER PLATE HAVING ADJUSTABLE LATCH MEANS
John P. Jones, Jr., Greenwich, Conn., assignor to Mobil Oil Corporation, New York, N.Y.
Filed Mar. 9, 1977, Ser. No. 776,086
Int. Cl.² B65D *45/16*
U.S. Cl. 220—325 **10 Claims**

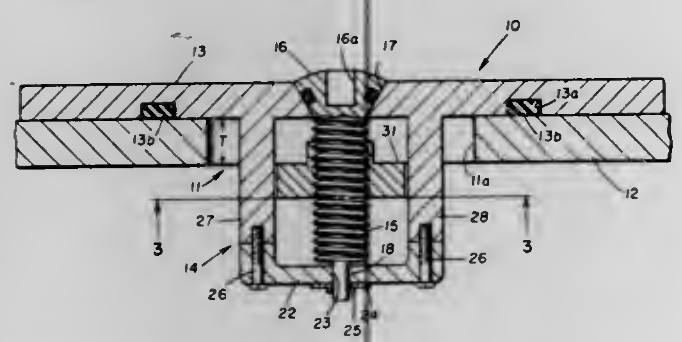
1. A cover plate for closing an opening through a deck or the like, said cover plate comprising:
a plate element slightly larger than said opening to be closed;

a seal means on the underside of said plate element for cooperating with said deck or the like around said opening to prevent leakage around said cover plate when said cover plate is in an operable position; and

a plurality of adjustable latch means spaced around and near the outer periphery of said plate element, each of said latch means comprising:

a shaft extending through and journaled to said plate element and having a threaded portion extending from the underside of said plate element;

a lock member threaded onto said threaded portion of said shaft, the periphery of said lock means having a substantially circular portion and a flattened side;



a lug attached to said lock member;

stop means extending from the underside of said plate element adjacent said threaded portion of said shaft whereby said lug will contact said stop means when rotated in one direction to hold said lock member in an open position and to allow said lock member to move downward on said shaft and whereby said lug will contact said stop means when rotated in an opposite direction to hold said lock means in an closed position and to allow said lock member to move upward on said shaft.

4,059,203

DISPENSING OF LABELS

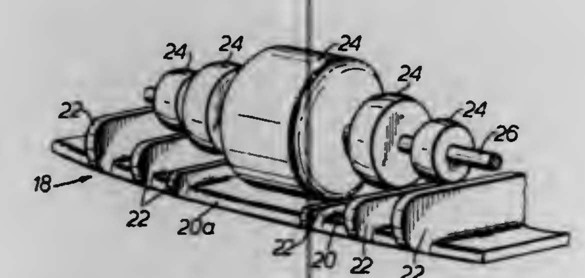
Maurice J. Wright, Rutland, England, assignor to Norprint Limited, Boston, England

Filed May 14, 1976, Ser. No. 686,532

Claims priority, application United Kingdom, May 15, 1975, 20525/75

Int. Cl.² B65H *5/28*

U.S. Cl. 221—73 **13 Claims**



1. A method of dispensing a pressure-sensitive adhesive label carried by a backing strip such that the label can be peeled from the strip, said strip having a central portion and lateral portions at each side of the central portion, said method comprising providing a dispense edge having a central portion in contact with the central portion of the strip, and lateral portions in contact with the lateral portions of the strip, with the central portion of the edge being located in front on the lateral portions of the edge, passing a strip over the dispense edge to peel the strip from a said label with peeling commencing at the central portion, providing the label and strip with a curvature transversely to the direction of dispense during peeling of the strip, and providing the curved strip with a constant path length across its width during passage of the strip over the dispense edge.

4,059,204

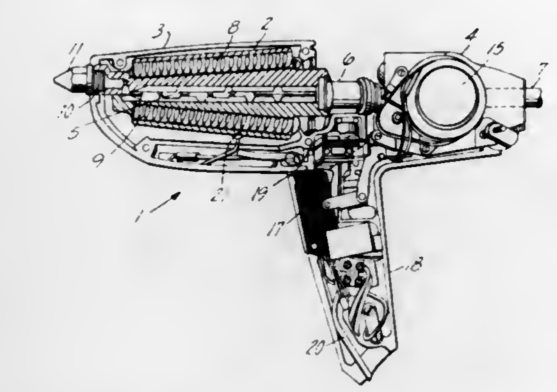
SYSTEM FOR DISPENSING AND CONTROLLING THE TEMPERATURE OF HOT MELT ADHESIVE

Robert John Duncan, Magnolia, and Richard Montgomery Elliott, Beverly, both of Mass., assignors to USM Corporation, Boston, Mass.

Filed Oct. 26, 1976, Ser. No. 735,191

Int. Cl.² B67D *5/62*

U.S. Cl. 222—146 HE **8 Claims**



1. In a hot melt material dispensing appliance having means to intermittently feed a rod of material through a heated melt body having a material retaining chamber constructed therein in order to cause a flow of hot fluid material therefrom, a system to control the temperature of the material comprising:

A. a first control circuit connected to regulate the energization of the melt body heaters in response to the temperature of the melt body to provide heat sufficent to raise the material in the chamber to a predetermined temperature; and

B. a second control circuit connected to increase the temperature at which the melt body heaters are regulated during the introduction of fresh material to the chamber in order to compensate for the drop in output material temperature caused thereby.

4,059,205

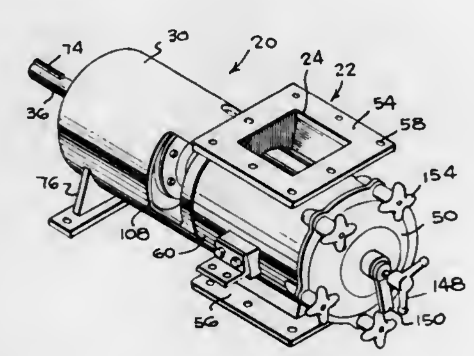
ROTARY VALVE

Robert D. Heyl, Williamsport, Pa., assignor to The Young Industries, Inc., Muncy, Pa.

Filed Apr. 16, 1976, Ser. No. 677,862

Int. Cl.² G01F *11/00*

U.S. Cl. 222—368 **23 Claims**



1. A valve comprising a housing including an inlet, an outlet and an access open end, a detachable closure means mounted on said housing for closing said open end, a drive shaft journalled in said housing having a free end disposed between said inlet and outlet, adjacent said closure means, a rotor mounted on the free end of said shaft and having an annular surface engageable with said housing, said rotor being axially removable from the free end of said drive shaft, said annular surface having at least one recess communicable with said inlet and outlet by rotating the drive shaft for conveying material from said inlet to said outlet, a first axial seal disposed between said housing and said rotor, and a second axial seal disposed between said rotor and said closure means, in substantial longitudinal alignment with said first axial seal thereby providing a

valve which is easily disassembled without removing the drive shaft to facilitate replacement of seals and cleaning.

4,059,206

EXTRUSION MACHINE HAVING COLLAR FOR SEAL

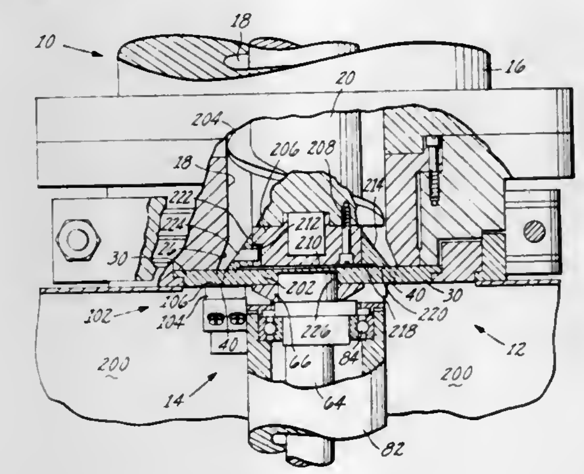
Henry Ellwood, Rochdale, England, assignor to USM Corporation, Boston, Mass.

Filed July 28, 1975, Ser. No. 599,380

Claims priority, application United Kingdom, Aug. 17, 1974, 36315/74

Int. Cl.² B29F *3/04*

U.S. Cl. 222—413 **2 Claims**



1. A plastic extrusion machine having a screw rotatable in a chamber for plasticating and transporting plastic material, an annularly perforated wall at one end of the chamber through which material is extruded, a collar slidable on the end of the screw against a central portion of the wall in response to movement of material in the chamber toward said wall forming a seal to prevent ingress of the material into a stagnant area between the end of the screw and the wall.

4,059,207

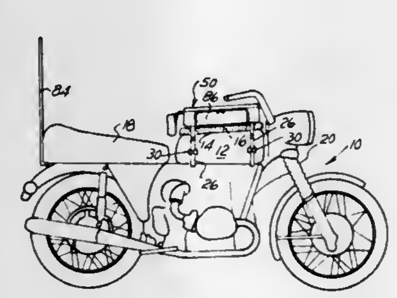
MOTORCYCLE TANK BAG

W. Shaun Jackson, 809 Sycamore, Ann Arbor, Mich. 48104, and Leslie Eric Bohm, 29560 Rutherland, North, Southfield, Mich. 48076

Filed Mar. 26, 1975, Ser. No. 562,262

Int. Cl.² B62J *7/02*

U.S. Cl. 224—31 **6 Claims**



1. In an article retaining system adapted to be supported on the upper surface of a motorcycle fuel tank, in combination: a pair of elongated flexible straps; fastener means affixed to said straps so that they may be arranged in loops adapted to surround the tank and thereby be secured to the tank; a flat resilient pad adapted to be secured to the top of the tank beneath the elongated straps to act as a supporting surface for a flexible bag; said flexible bag having a flat side adapted to be supported on the top of the pad and having an opening flap for providing access to the interior of the bag; separable closure means adapted to releasably secure the flap to the bag to close the bag; and quick release fastener means including fastener elements secured to each of said elongated straps and to said bag and adapted to be engaged to releasably retain said bag on said motorcycle fuel tank independently of the securement of the straps to the motorcycle fuel tank by the fastener means, whereby said bag may be quickly installed and released from the motorcycle fuel tank without removal of said straps and pad from said motorcycle fuel tank.

4,059,208

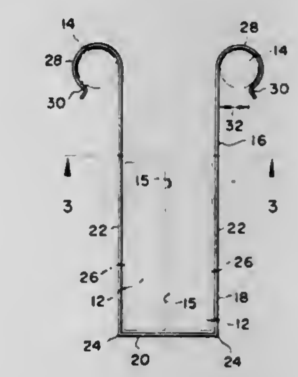
SKI AND POLE TOTE

Robert L. Koepcke, Onalaska, Wis., assignor to Arro Corporation, La Crosse, Wis.

Filed Mar. 15, 1976, Ser. No. 666,896

Int. Cl.² A44B *21/00*

U.S. Cl. 224—45 S **9 Claims**



1. A ski and ski pole tote for simultaneously hand carrying a pair of skis arranged in generally parallel and horizontal, longitudinally coextensive relationship and along their minor transverse axis in bottom-to-bottom facing relationship and with their major transverse axis extending upwardly and a pair of generally parallel ski poles each spaced about the same distance above the pajr of skis along said major transverse axis in longitudinally coextensive relationship with said pair of skis comprising: a pair of U-shaped clasps for connecting the skis and poles to be spaced longitudinally along the skis and ski poles and each clasp including a base portion positioned to extend along said minor transverse axis below the pair of skis, a first leg connected to one end of said base portion and positioned to extend adjacent the top face of one of the skis along said major transverse axis, to the one of said poles closest to said one ski, said first leg including a portion spanning the vertical spatial distance adjacent said first leg between the uppermost edge of said one ski and the lowermost edge of said one pole, and a second leg connected to the other end of said base portion and positioned to extend adjacent the top face of the other of the skis along said major transverse axis, to the other of said poles closest to said other ski, said second leg including a portion spanning the vertical spatial distance adjacent said other leg between the uppermost edge of said other ski and the lowermost edge of said other pole, each of said legs terminating in a partially closed single loop positioned to extend partially over and about the pole adjacent thereto, whereby said skis and ski poles may be toted as an assembly by hand grasping said ski poles intermediate said clasps.

4,059,209

CARRIER AND LOCK FOR SKI EQUIPMENT

Byron Lynn Grisel, Wasilla, Alaska, assignor to Grizzley Ski Lock Corporation, Salt Lake City, Utah

Filed July 1, 1976, Ser. No. 701,590

Int. Cl.² B65D *69/00*

U.S. Cl. 224—45 S **10 Claims**

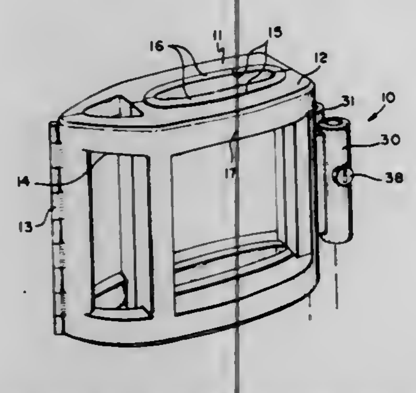
1. A carrier and lock for ski equipment comprising

a pair of side frames, each having opposite ends;

hinge means connecting said side frames to open and close in clamshell fashion;

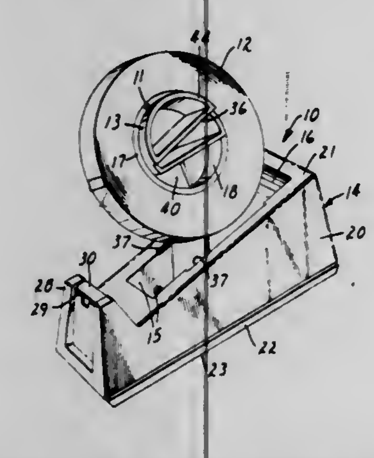
an elongate handle formed by said side frames, said handle being at the same end of said side frames as the hinge means;

opposed recesses in the side frames, said recesses being arranged to receive a pair of skis and a pair of ski poles therein when said skis and poles are clamped between said side frames;
means to releasably latch the side frames together, with a pair of skis and a pair of ski poles clamped therebetween;
a locking member on each side frame, at the end thereof opposite to the hinge, said locking members being ar-



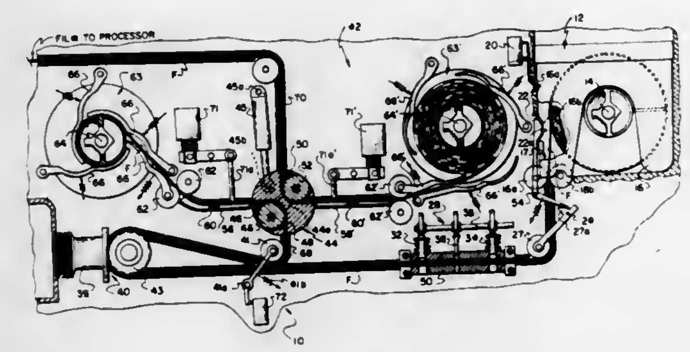
ranged to slidably engage first and second receiving members, respectively; and
a lock means carried by the locking member on one said side frame for securing said last mentioned locking member to said first receiving member, whereby the other said side frame is held clamped to said one side frame by the engagement of its locking member with said second receiving member.

4,059,210
TAPE DISPENSER
Hartland W. Deering, Jr., St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.
Filed Jan. 10, 1977, Ser. No. 757,937
Int. Cl.² B26F *3/02*
U.S. Cl. 225—47 **5 Claims**



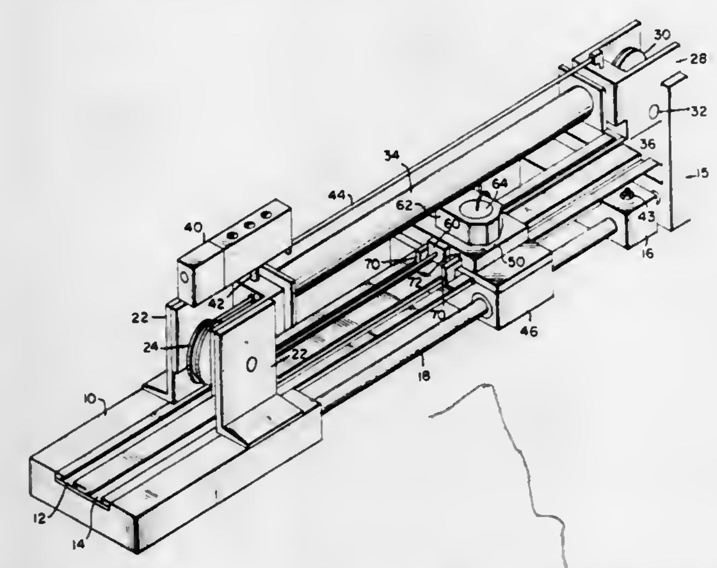
1. In a dispenser for a roll of tape comprising a length of tape helically wound on a core which core has a central opening defined by a cylindrical inner surface, said dispenser being of the type comprising a base having walls defining a cavity adapted to receive a portion of a said roll of tape, means mounted on said base adapted for rotatably supporting the roll of tape in a dispense position with a portion of the tape roll in said cavity and means mounted on said base for severing tape pulled from said roll, the improvement wherein said means adapted for rotatably supporting the roll of tape is a core support having an arcuate peripheral surface with a radius which is smaller than the radius of the inner surface of a said core to afford free rotation of the core about said peripheral surface, a slide member fixed at one end of said core support and slidably mounted on said base to prevent rotation of said core support relative to said base, to restrict separation of said core support from said base, and to afford movement of said core support between said dispense position at which surfaces of the walls defining said cavity limit axial movement of the roll of tape about the core support and a load position at which the core support is spaced away from the base in a position affording installation or removal of a roll of tape over an end of said core support.

4,059,211
WEB MATERIAL STORAGE DEVICE
Ernest E. Brizzolara, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.
Filed Jan. 21, 1977, Ser. No. 761,179
Int. Cl.² B65H *25/00*
U.S. Cl. 226—11 **2 Claims**



1. A film handling and directing device intended to be interposed between a first guide track and a second guide track; said device comprising:
a plurality of storage means, each of said storage means being adapted to receive and store film and then to supply the previously stored film; and
a rotatable turret having a first and a second track, one of said tracks directing web material into one of said storage means while the other of said tracks simultaneously directs web material out of another of said storage means.

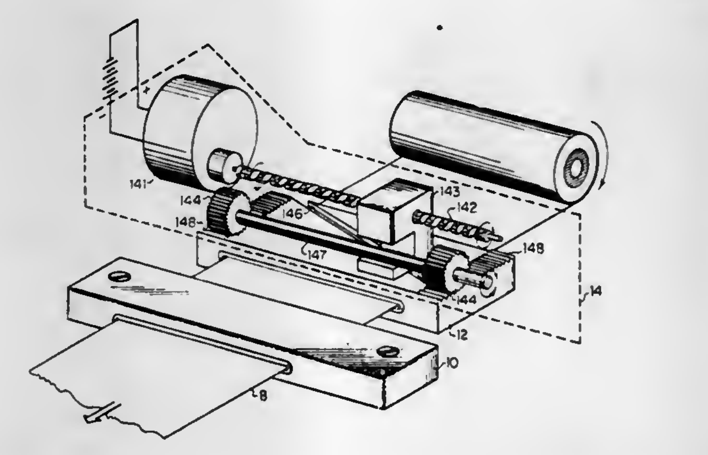
4,059,212
STOCK FEEDER FOR PUNCHED STOCK
Harry James Ledgerwood, Conway, Mo., assignor to Plessey Incorporated, Mellville, N.Y.
Filed Feb. 3, 1977, Ser. No. 765,358
Int. Cl.² B65H *17/36*
U.S. Cl. 226—141 **8 Claims**



1. A stock feeder for moving indexed or pre-punched stock comprising:
track means for supporting said stock as it moves through said feeder;
a mounting block at the forward end of said track;
a rear block and stabilizer bar at the rear end of said track;
guide rails supported between said mounting and rear blocks;
a feed block assembly movably supported on said guide rails; and including feed pilot means for engaging index holes from one side of said stock;

holding pilot means in said mounting block adapted to engage index holes from the other side of said stock;
fluid-actuated piston and cylinder means spaced from and parallel to said guide rails, and including pulley and cable means operably secured to said feed block assembly and said piston means; and
actuating means to (a) engage said feed pilot means and disengage said holding pilot means at the beginning of a stroke. (b) actuate said piston means to move said feed block assembly along said rails, advancing said stock, (c) disengage said feed pilot means and engage said hold pilot means at the end of a stroke, and (d) actuate said piston means to return said feed block assembly to said starting position.

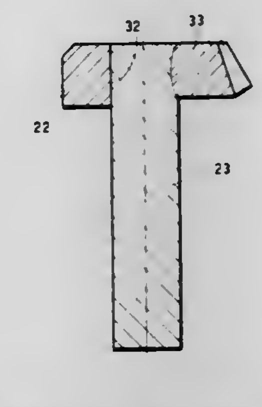
4,059,213
CLUTCHLESS PAPER ADVANCE MECHANISM
Timothy L. Toomay, Palo Alto, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.
Continuation of Ser. No. 515,729, Oct. 17, 1974, abandoned. This application June 7, 1976, Ser. No. 693,565
Int. Cl.² B65H *17/44*
U.S. Cl. 226—151 **10 Claims**



1. Apparatus for advancing paper along a guide path, said apparatus comprising:
first paper-engaging means, non-rotatably mounted for translation along the guide path including a roller, said roller being responsive to movement of the means in a first direction relative to the paper for non-slidably gripping the paper and for advancing the paper in the first direction, and to movement of the means in a second direction relative to the paper for rollably engaging the paper;
drive means coupled to the first paper-engaging device for moving that device in the first and second directions; and
second paper-engaging means non-rotatably and fixedly mounted in the guide path and including a roller, said roller being responsive to movement of the paper in the first direction for rollably engaging the paper, and to movement of the paper in the second direction for non-slidably gripping the paper and for preventing movement of the paper in the second direction when the first paper-engaging means is moving in that direction;
said second paper-engaging means including means for releasing its non-slidable grip with the paper when the force tending to cause the paper to move in the second direction exceeds a first value.

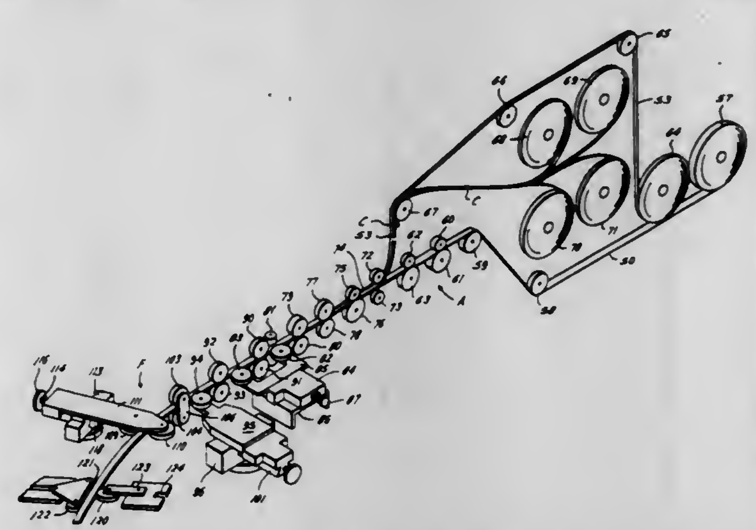
4,059,214
FORGING PROCESS
Gerd Weissmann, Munich, Germany, assignor to Bayerisches Leichtmetallwerk Graf Blucher von Wahlstatt KG, Munich, Germany
Filed Dec. 4, 1975, Ser. No. 637,837
Claims priority, application Germany, Dec. 10, 1974, 2458291
Int. Cl.² B23K *19/00*
U.S. Cl. 228—265 **10 Claims**

1. A method of producing a unitary workpiece from at least two components of different materials comprising the steps of forming one of said components as a body made of a smelt-metallurgical material, forming the other of said components as a pressed and presintered forming member made of a powder-metallurgical material, one of said members having a conically tapering hole and the other of said members having a conformingly tapered plug adapted to fit in said hole in close contact therewith, thereafter locating said components in respective die-halves of a forging press in a hole and plur interconnecting



arrangement, said die-halves having both radial and axial restriction surfaces for each of said components and thereafter forging said components into a desired shape by relative axial movement of said die-halves to compress the axial distance therebetween and under such conditions of heat and pressure as to upset the material of each of said components at least along the juncture of their interconnection in both the radial and axial direction to simultaneously form a welded bond therebetween.

4,059,215
CIRCULAR DOUBLE-JACKETED GASKET WITH SINGLE JOINT
Alfred B. Owen, and Bruce M. Gifford, both of Houston, Tex., assignors to Lamons Metal Gasket Company
Continuation-in-part of Ser. No. 534,436, Dec. 19, 1974, abandoned. This application Sept. 5, 1975, Ser. No. 610,561
Int. Cl.² F16J *15/12*
U.S. Cl. 228—173 C **41 Claims**



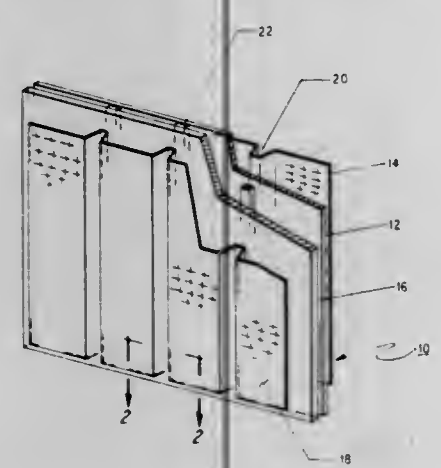
1. The method of forming a circular double-jacketed gasket from a substantially linear double-jacketed gasket assembly having a substantially rectangular cross-section including a first metal strip forming a shell having a base portion and side portions with the width dimension of the base portion being greater than the dimension of the side portions, a filler strip of resilient core material confined between said side portions and a second metal strip forming a liner having a base portion overlying the core and substantially the same width dimension as the base portion of the first metal strip with the outer edges of the second metal strip confined by the side portions of the first metal strip, comprising:
compressing the base portions of the linear double-jacketed

gasket assembly with a substantially even compression between compression rolls;

curving the linear double-jacketed gasket assembly edgewise in a plane parallel to said base portions a predetermined amount at the nip between the compression rolls to form a uniform, circular gasket assembly having a predetermined radius of curvature with the metal shell and liner being free of undesired buckling or wrinkling;

severing a circular gasket unit from the gasket assembly; and securing together the severed ends of the circular gasket unit to form a circular double-jacketed gasket having a single joint connection about its entire circumference.

4,059,216
METAL LAMINATE STRIP CONSTRUCTION OF BIPOLAR ELECTRODE BACKPLATES
Lewis M. Meyer, Painesville, Ohio, assignor to Diamond Shamrock Corporation, Cleveland, Ohio
Filed Dec. 15, 1975, Ser. No. 640,646
Int. Cl.² B23K *31/00;* **C25B** *11/10*
U.S. Cl. 228—179 7 Claims



1. A method for mechanically and electrically connecting the anode and cathode backplates of a bipolar electrode for use in an electrolytic cell comprising the steps of: placing a spaced series of metal laminate strips having surfaces of identical and corresponding metallic makeup to the metallic makeup of the corresponding backplates upon one of said backplates; placing the other backplate in direct alignment on top of the spaced series of metal laminate strips such that the cathode backplate and anode backplate present two parallel planes in a spaced relation with respect to each other; and effecting a weldment between the spaced series of metal laminate strips and each of the backplates so that less than 50% of the total surface area of the anode and cathode backplates is in direct bonded contact to provide electrical current transmission therethrough while the remaining area is an air space to allow the venting of hydrogen to prevent the hydrogen embrittlement of the anode backplate.

4,059,217
SUPERALLOY LIQUID INTERFACE DIFFUSION BONDING
James R. Woodward, La Jolla, Calif., assignor to Rohr Industries, Incorporated, Chula Vista, Calif.
Filed Dec. 30, 1975, Ser. No. 645,381
Int. Cl.² B23K *19/00*
U.S. Cl. 228—181 38 Claims

1. A process for joining nickel and/or cobalt based on superalloys which comprises the steps of:

a. providing and masking elements to be joined together, said elements being formed of material taken from the class consisting of nickel based and cobalt based alloys,

b. simultaneously applying to the faying surface of at least one of said elements by plating directly thereon from a single chemical bath of a layer taken from the class consisting of nickel, cobalt and a combination thereof and from about 4 to about 12 weight percent boron,

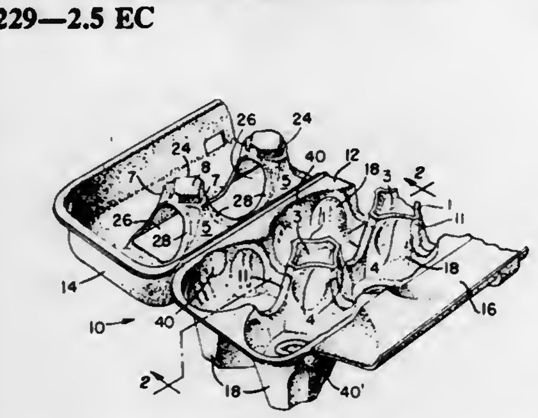
c. demasking said elements and holding the elements together at their faying surfaces with sufficient force to maintain contact at the faying surfaces, and

d. heating the elements to a temperature in the range of 1950° to 2150° F for more than one hour to cause the deposit to melt and form a metallurgical joint.

4,059,218
METHOD OF SOLDERING WITH PHOSPHORIC ACID SOLDERING FLUX
Edward G. Choby, Jr., Pittsburgh, Pa., assignor to Allegheny Ludlum Industries, Inc., Pittsburgh, Pa.
Division of Ser. No. 535,765, Dec. 23, 1974, Pat. No. 3,985,587. This application June 25, 1976, Ser. No. 699,832
Int. Cl.² B23K *1/00, 35/24*
U.S. Cl. 228—207 11 Claims

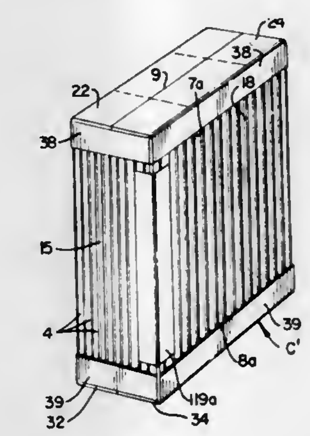
1. In the soldering of copper, stainless steel and copper-plated stainless steel wherein metal selected from the group consisting of copper, stainless steel and copper-plated stainless steel is placed in close proximity with other metal, solder and soldering flux, and wherein said solder is melted and applied to said metals in such a way that it solidifies and effects a bond therebetween; the improvement which comprises utilizing a soldering flux comprised of a viscous fluid; said fluid consisting essentially of, in weight percent, 25 to 80% phosphoric acid (based on a concentration of 75 to 95%), 15 to 65% of organic material selected from the group consisting of polyethers and polyimines and mixtures thereof having an atomic ratio of carbon to ether oxygen plus imine nitrogen between 1.5 and 3.1, from 0.1 to 15% of copper containing material, from 0 to 40% of ammonium salt, and from 0 to 30% water; said organic material having a molecular weight between 4,000 and 20,000.

4,059,219
EGG CARTON
Richard F. Reifers, New Canaan, Conn.; Kenneth D. Bixler, Huntington, N.Y., and Henry A. Lord, Cape Elizabeth, Maine, assignors to Diamond International Corporation, New York, N.Y.
and a continuation-in-part of Ser. No. 654,017, Jan. 30, 1976, Continuation-in-part of Ser. No. 609,078, Aug. 29, 1975. This application May 19, 1976, Ser. No. 688,000
The portion of the term of this patent subsequent to May 24, 1994, has been disclaimed.
Int. Cl.² B65D *1/24, 5/48*
U.S. Cl. 229—2.5 EC 10 Claims



1. In an egg carton comprising a tray, a cover and a lock flap hinged thereto on opposite sides thereof and having one or more downposts in the cover and one or more up posts with cells extending therearound in the tray, apertures formed on each side of a downpost, "eye lids" about the aperture formations, said "eye lids" extending from relatively steep walls in the cover, said downposts having a stepped in shoulder on a plug-like formation with a tip extending therefrom at its extremity, each tray up post having a recess or crater-like formation at its upper extremity adapted to receive the tip of each downpost with said shoulder seated on the upper extremity of an up post when said cover is closed, the upper portions of the side walls of the up posts including generally concave yieldable areas facing into each cell extending therearound, the tip of each downpost and the bottom of the crater of each up post associated therewith being spaced apart from each other a distinct distance when the cover is initially closed with the distinct distance disappearing when a load of such magnitude as that of a plurality of loaded egg cartons are stacked thereon.

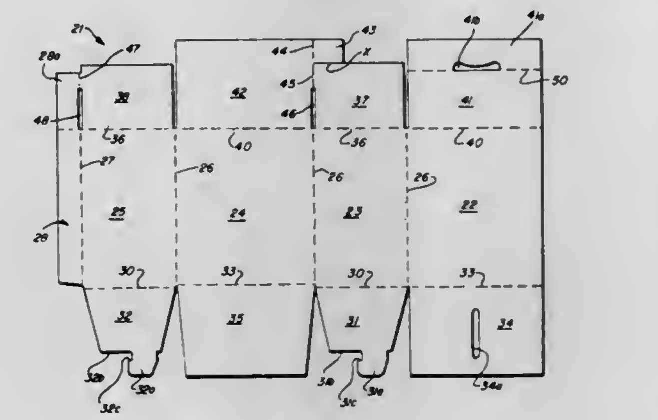
4,059,220
REINFORCED SINGLE-FACE CORRUGATED CONTAINERS
Achim R. Lorenz, Atlanta, Ga., assignor to MacMillan Bloedel Containers, Inc., Cleveland, Ohio
Filed July 14, 1976, Ser. No. 705,053
Int. Cl.² B65D *5/02*
U.S. Cl. 229—37 R 4 Claims



1. A slotted box blank comprising a two-piece laminated board having a generally rectangular corrugated core with transverse corrugations extending between the opposite sides of the core and having a single facing sheet with a width substantially greater than that of said core, said facing sheet having main central portion that is secured to and covers one face of the core and a pair of overturned fly portions that are secured to and cover outer side portions only of the opposite face of the core, each of said fly portions having a length several times its width and extending along said opposite sides of the core to provide reinforced side edges, said box blank having a first set of parallel fold lines transverse to said fly portions which divide the blank into a series of wall panels including rectangular front and back wall panels of the same width and a pair of side wall panels of the same width located on opposite sides of said front wall panel, a major portion of the corrugated core of each wall panel being exposed between the outer edges of said fly portions, said box blank having a second set of fold lines on said fly portions which extend lengthwise over said fly portions to define a plurality of double-faced corrugated end flaps, each of which is hingedly connected to one of said wall panels along a fold line of said second set, and a series of slots extending from the fold lines of said second set to the outer edges of the blank to separate said end flaps, said flaps having a width at least about half the width of said side wall panels for closing opposite ends of the assembled box.

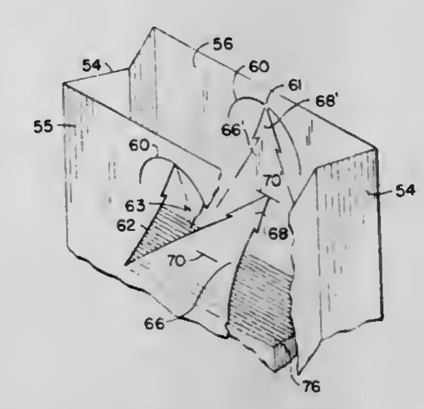
4,059,221
SHIPPING CONTAINER AND BLANK THEREFOR
Gregory J. Olson, and Wayne A. Chapman, both of Burlington, Wis., assignors to Packaging Corporation of America, Evanston, Ill.
Filed Aug. 4, 1976, Ser. No. 711,493
Int. Cl.² B65D *5/10*
U.S. Cl. 229—39 R 9 Claims

1. A blank of foldable sheet material for a shipping container, comprising at least four side panels arranged in side by side relation, first foldlines interconnecting adjacent panels; a first set of end closure flaps connected by second foldlines to corresponding peripheral segments of said side panels and including a first pair of alternate closure flaps, each being provided with a complemental locking tab projecting outwardly from an outer peripheral edge of the flap and disposed off-center with respect to said outer peripheral edge, and a second pair of alternate end closure flaps, one flap of said second pair being provided with an elongated slot disposed substantially transversely of said second foldlines and being substantially aligned with the center of the outer peripheral edges of the first pair of alternate closure flaps and being sized to interlockingly accommodate said complemental locking tabs, when the blank is set



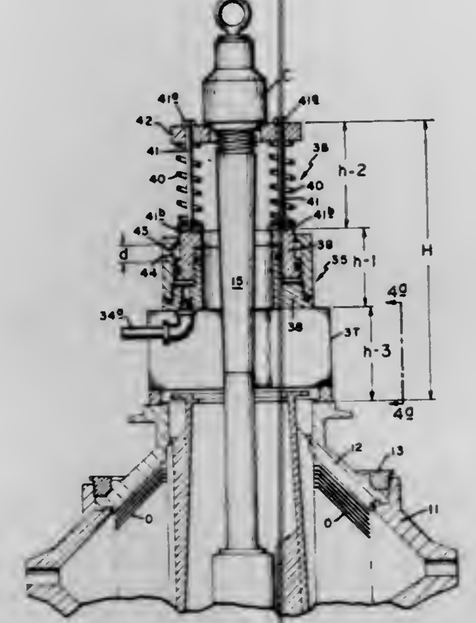
up to form the shipping container, the second flap of said second pair of end closure flaps being sized to conform substantially to the area delimited by the side panels when the blank is set up to form the container and being adapted to be disposed inwardly of the said one flap; and a second set of closure flaps connected by third foldlines to second corresponding peripheral segments of said side panels.

4,059,222
NEWSPAPER RECYCLING APPARATUS AND METHOD
Bruce Gamble, 815 Rosedale Ave., Lafayette, Calif. 94549
Continuation-in-part of Ser. No. 506,090, Sept. 16, 1974, Pat. No. 3,977,596. This application July 14, 1976, Ser. No. 705,196
Int. Cl.² B65D *33/12, 33/24*
U.S. Cl. 229—54 R 12 Claims



1. Apparatus for bailing newspapers so that they can easily be transported for recycling, said apparatus comprising a paper bag having an interior volume adapted to receive a stack of newspapers through a normally open end of said bag, said bag including mirror image juxtaposed patterns of slits on opposite sides of the bag generally near said open end, each said pattern of slits including a first generally transverse slit adapted to define a handle element, a pair of slits depending from proximate said first transverse slit to define a flap element, the distance between said depending slits being less at the upper end of said flap element than at a lower portion thereof, and a second transverse slit located between the depending slits at said lower portion of the flap element to provide a slot, the flap elements defined on said opposite sides of the bag adapted to fold over the stack of newspapers within the bag and each other and the upper ends of each said flap element adapted to fit into the slot of the other respective flap element to encapsulate the newspapers in the bag for carrying with the handle elements.

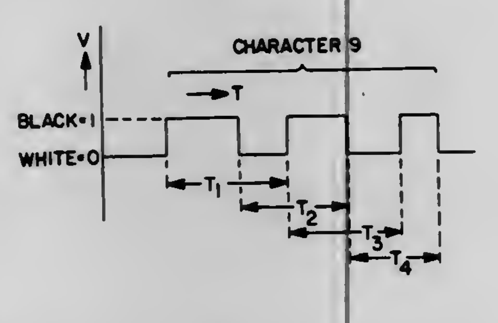
4,059,223
CENTRIFUGE PRESSURE RELIEF DEVICE
Kenneth Dan Lewis, Wilton, Conn., assignor to Dorr-Oliver Incorporated, Stamford, Conn.
Filed Aug. 16, 1976, Ser. No. 714,645
Int. Cl.² B04B *7/00*
U.S. Cl. 233—1 R **24 Claims**



1. A pressure relief device for use in combination with the rotor of a nozzle type centrifugal machine having a threaded locking ring securing the cover section to the main body section of the rotor bowl against internal compression pressure exerted by a stack of separating discs confined between the top and bottom of the rotor bowl, and concentrically surrounding the rotor shaft, said shaft extending from said main body section through the open end of said cover section,

said pressure relief device being located within the area surrounded by said locking ring, comprising force imparting means cooperatively associated with the upwardly exposed end portion of said shaft and with said cover section, said force imparting means being constructed and arranged to be operable so that said force imparting means impose a tension force upon said shaft and a corresponding reaction pressure force upon said cover section, said interacting forces forcing said sections towards each other and against the internal pressure of said separating discs, thereby relieving said locking ring from said internal pressure during assembly or disassembly of the rotor bowl.

4,059,224
CODE RECOGNITION RECORD MEDIUM AND TECHNIQUE
Lawrence Seligman, Shirley, Mass., assignor to Data General Corporation, Westboro, Mass.
Division of Ser. No. 421,884, Dec. 5, 1973, Pat. No. 3,979,577. This application May 19, 1976, Ser. No. 687,738
Int. Cl.² G06K *7/14, 9/10, 19/06*
U.S. Cl. 235—462 **2 Claims**



1. The method of reading on a record medium a two level code representing at least one character of a set of characters, each of said characters being depicted as a group of substantially parallel bars with spaces therebetween, collectively positioned on a surface adapted to be informationally scanned along said surface in a generally linear direction generally perpendicular to all of said bars, wherein no one character has more than seven modules of information represented by said code and each character is arranged in a configuration so that two consecutive modules of a first level are not immediately followed by two consecutive modules of a second level, the code for each character defined by at least six consecutive transitional occurrences between the two levels of the code, said method comprising the steps of:

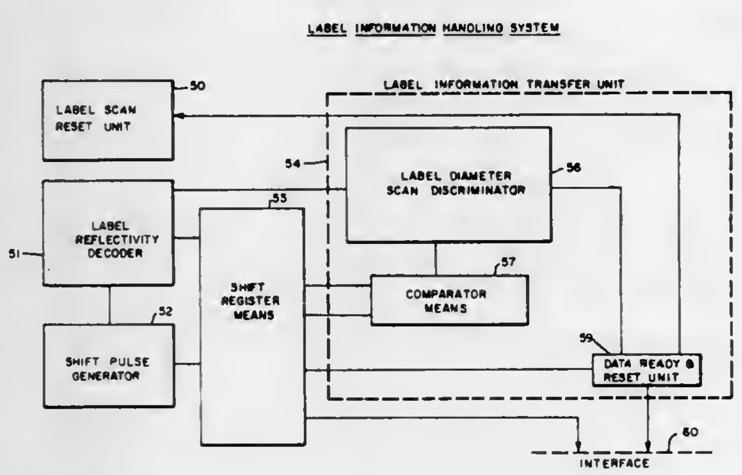
scanning the record medium to derive a time based electrical signal denoting said transitional occurrences;

measuring from said electrical signal at least the first four periods between alternate ones of said transitional occurrences;

comparing the measurements of each two overlapping periods to generate three ratios, each ratio representing not more than one of three possible values, said values being approximately one, two-thirds and three-halves, and;

decoding the values arrived at for said three ratios to define a character.

4,059,225
LABELS AND LABEL READERS
James A. Maddox, 41 France St., Norwalk, Conn. 06851
Filed Aug. 27, 1971, Ser. No. 175,672
Int. Cl.² C06K *7/10;* **G08C** *9/06*
U.S. Cl. 235—437 **30 Claims**



1. A code identification system comprising:

A. an encoded label comprising a plurality of concentric curved bands of contrasting radiation reflectivity levels representing between one and a plurality of bits depending upon its radial width, wherein only a scan substantially along the diameter of the concentric curved bands provides a complete reading of the code with the first half of the scan being substantially identical to the second half of the scan;

B. a source of radiation for impingement upon the coded label;

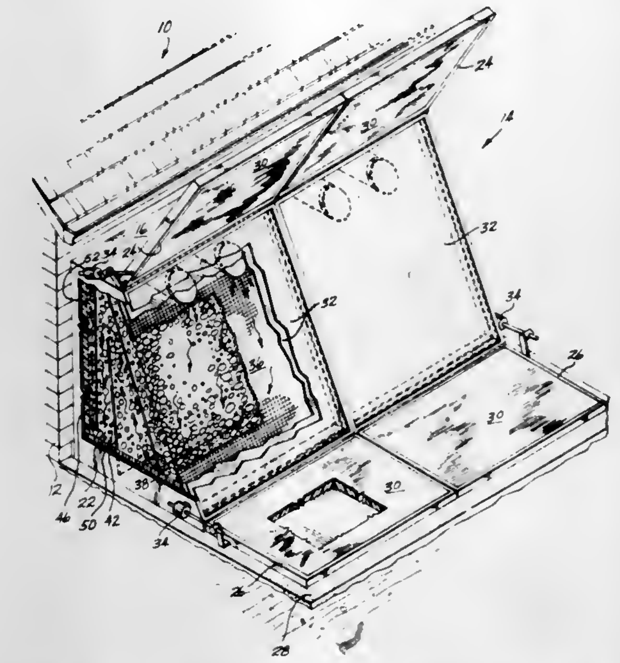
C. a movable beam redirecting surface adapted for projecting and sweeping the projected radiation beam across the coded label;

D. a label information assembly comprising

a. means for translating the reflected radiation into an output signal incorporating clock means for providing a signal corresponding to successive bits, when said band comprises a width greater than one bit, and

b. a label reading sub-assembly for providing a data ready signal when the first half of a first scan is substantially identical to the second half of the first scan.

4,059,226
HEAT COLLECTOR AND STORAGE CHAMBER
David L. Atkinson, 23608 48 West, Mountlake Terrace, Wash. 98043
Filed Sept. 2, 1976, Ser. No. 719,365
Int. Cl.² F24J *3/02*
U.S. Cl. 237—1 A **9 Claims**



1. A heat collector and storage chamber having top and bottom walls forming vertically, spaced apart, horizontally extending walls, comprising a front, glass wall extending forwardly and downwardly in said chamber and disposed in the path of rays emanating from the sun; a front rock retaining mesh screen wall disposed in said chamber and in spaced relation to said glass wall; a first baffle wall disposed in said chamber, and in spaced relation to said screen wall and extending generally vertically from one of said horizontal walls toward but terminating short of the other wall thereof, thereby forming a first rock chamber with an adjacent one of said horizontal walls; a second baffle wall disposed in said chamber and in spaced relation to said first baffle wall and extending generally vertically from the other of said horizontal walls toward but terminating short of the one of said horizontal walls with an entrance adjacent the other of said horizontal walls, thereby forming a second rock chamber; a plurality of dark surfaces, irregular shaped pieces of rock disposed in said first and second rock chambers with spaces between pieces of rock; and air circulation means causing the air to pass in one direction in said first rock chamber, in the opposite direction in said second rock chamber, and to return to the entrance of the first rock chamber.

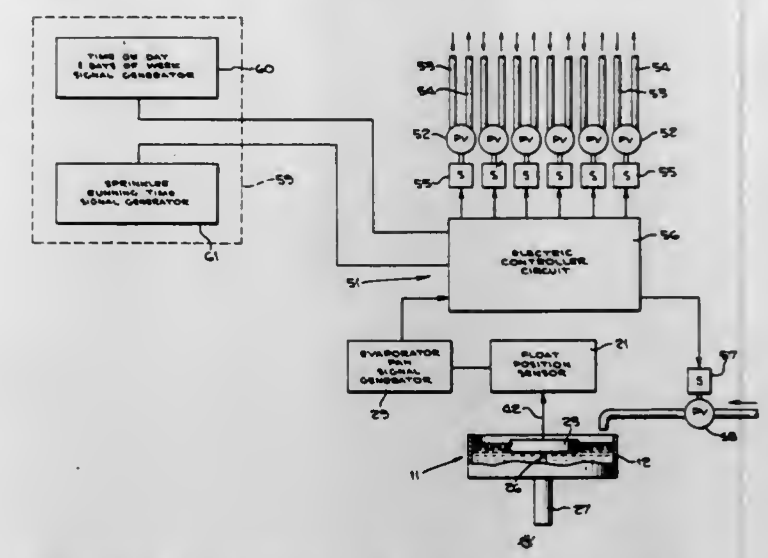
4,059,227
MOISTURE SENSING APPARATUS AND METHOD
Edwin J. Hunter, Rancho Santa Fe, Calif., assignor to The Toro Company, San Marcos, Calif.
Filed May 17, 1976, Ser. No. 687,356
Int. Cl.² B05B *12/12;* **A01G** *25/16;* **G01F** *23/06*
U.S. Cl. 239—1 **16 Claims**

1. A method of controlling the operation of a plurality of pilot valves associated with water lines of an irrigation system for watering a desired soil area comprising the steps of:

providing a body of water in a container adjacent said soil area and exposing said water to the combined evaporative effects of the ambient weather conditions at the location of said irrigation system;

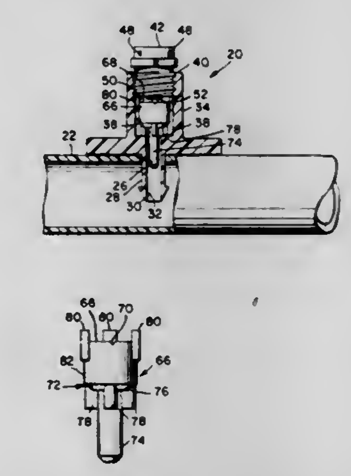
continually sensing the change in volume of water of said body of water as it occurs in response to evaporation thereof at all times and at all levels thereof;

generating an electrical signal responsive to the change in water volume continually being sensed in response to said combined evaporative effects occurring prior to the initiation of watering without physically measuring the amount of moisture present in the soil of the area being watered; and



modifying the operation of an electrically operated controller mechanism by said signal to vary the duration of the controller mechanism operation of said pilot valves.

4,059,228
SELF CLEANING, PRESSURE RESPONSIVE EMITTER VALVE FOR SOIL IRRIGATION
David Werner, Los Angeles, Calif., assignor to Salco Products, Inc., Hawthorne, Calif.
Filed Sept. 3, 1974, Ser. No. 502,549
Int. Cl.² B05B *1/30*
U.S. Cl. 239—106 **44 Claims**



25. An emitter valve for irrigation of soil from a supply of water comprising:

an enclosure having means therein for defining a cavity with surrounding side walls, and walls terminating said cavity means and having therein means for defining an outlet to the soil and means for defining an inlet coupled to the supply of water for enabling flow of the water to the soil;

an element positioned in said cavity means and having means for acting as a valve with said outlet means; and

means positioned between said terminating wall of said outlet means and said element for generally spacing said element from said cavity side walls, while normally spacing said element from contact with and at least partial closure of said outlet means for impeding movement of said element towards said outlet means when the water is first caused to flow and for impelling said element away from said outlet means when the water is first caused to cease flowing, for thereby enabling a surging and rapid flow of the water from said cavity means.

4,059,229

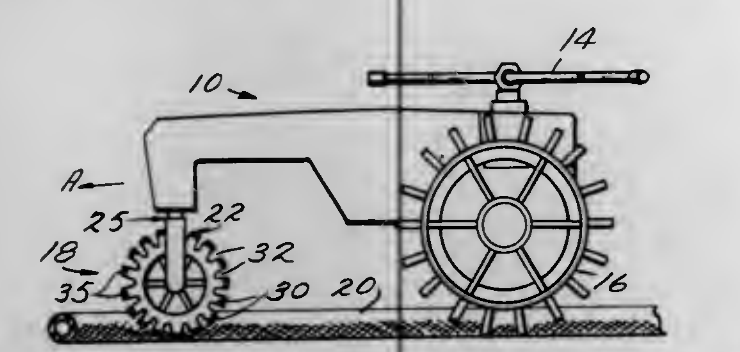
TRAVELING SPRINKLER GUIDE WHEEL ASSEMBLY

James R. Pescetto, Peoria, Ill., assignor to L. R. Nelson Corporation, Peoria, Ill.

Filed Apr. 16, 1976, Ser. No. 677,853

Int. Cl.^{2} B05B *3/00*

U.S. Cl. 239—183 **1 Claim**



1. A traveling lawn sprinkler comprising a sprinkler body having a water distributing apparatus thereon adapted to be connected with an elongated hose for communicating a supply of water under pressure therewith,
   - a pair of transversely spaced drive wheels on said sprinkler body for driving said sprinkler body along a lawn to be sprinkled on which the hose is deployed to define a path of driving movement,
   - a bracket carried by said sprinkler in a transverse position between said drive wheels for pivotal movement about an upright axis,
   - a horizontally extending shaft carried by said bracket and
   - a pair of symmetrically-shaped wheel halves carried by said shaft for independent rotational movement with respect to one another about the horizontal axis of said shaft and having complementary exterior peripheries shaped to straddle the hose deployed in the lawn to be sprinkled and to follow the path defined thereby so as to cause the sprinkler body to be guided for driving movement along said path, the improvement which comprises:
   - each of said pair of wheel halves comprising an annular hub portion adapted to move over a corresponding half of the hose and a marginal periphery having a plurality of annularly spaced slots therein defining a plurality of circumferentially spaced radially extending portions adapted to roll in contact with the lawn to be sprinkled alongside the corresponding half of the hose,
   - each of said radially extending portions having a tip portion extending axially outwardly therefrom beyond the plane defined by the associated radially extending portion in a direction away from the corresponding hose half so that when the latter constitutes the outer half of a curve in the hose the tip portions will engage beneath the lawn grass and resist upward movement occasioned by the engagement of the other inner wheel half with the curved inside half of the hose.

4,059,230

FLUID FLOW CONTROL DEVICE AND FLUID DISTRIBUTION SYSTEM INCLUDING A PLURALITY OF SUCH DEVICES

Peretz Rosenberg, Moshav Beit Shearim, Israel

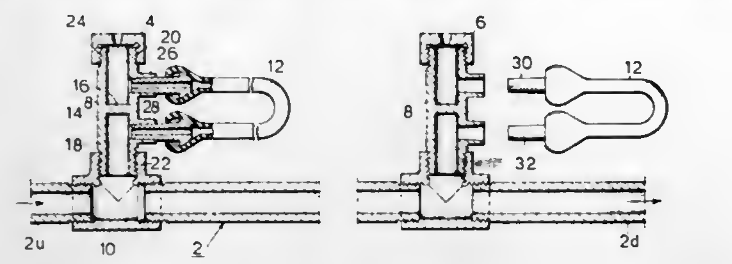
Continuation of Ser. No. 654,910, Feb. 3, 1976, abandoned. This application Feb. 7, 1977, Ser. No. 766,409

Claims priority, application Israel, Feb. 7, 1975, 46586

Int. Cl.^{2} B05B *15/00*

U.S. Cl. 239—542 **9 Claims**

1. A fluid-flow control device, comprising: a fitting including an inlet connectable to a supply line; an outlet connectable to an outlet device; and a flow-deviating member having a first tap establishing communication between said inlet and a first fixed external point on said fitting, a second tap establishing communication between said outlet and a second fixed external point on said fitting, a tube disposed externally of said fitting and connected between said two external points thereof, and means constraining the fluid to flow through said tube from said inlet to said outlet; said tube having a predetermined length, substantially greater than the distance between said



fixed external points on said fitting, to thereby produce a predetermined pressure drop in the fluid flowing therethrough from said inlet to said outlet.

4,059,231

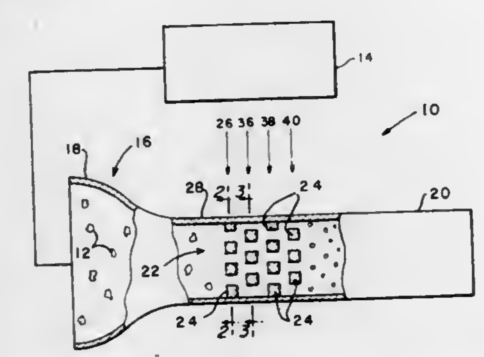
METHOD AND APPARATUS FOR SELECTIVELY COMMINUTING PARTICLES OF A FRANGIBLE MATERIAL

Ernest L. Neu, Redondo Beach, Calif., assignor to Grefco, Inc., Bala Cynwyd, Pa.

Filed July 16, 1976, Ser. No. 705,997

Int. Cl.^{2} B02C *19/06*

U.S. Cl. 241—5 **16 Claims**



11. A method for selectively comminuting particles of frangible material being carried by an airconveying system, said method comprising the steps of:
   - a. accelerating said particles in a substantially linear air stream;
   - b. classifying said particles within said linear air stream into a plurality of first fractions and second fractions, said first fractions including substantially all particles having a mass greater than a predetermined value, and said second fractions including the rest of said particles, wherein the step of classifying said particles includes the further steps of
   - i. spacing stationary impact bars each having a substantially flat impact surface in at least one row substantially perpendicular to said air stream, extending each of said bars across substantially an entire width of said air stream, and orienting each of said impact bars with said flat impact surface facing in a direction to oppose the flow in said accelerated air stream;
     - ii. directing said air stream with said entrained particles toward said impact bars, a pressure head building up on said impact surfaces, and said pressure heads creating adverse pressure fields deflecting particles in said second fractions around said bars;
   - c. impacting said particles in said first fractions against said stationary impact surfaces, wherein said step of impacting includes the further steps of
   - i. penetrating said pressure heads with said particles in said first fractions; and
     - ii. continuing the flow of said particles in said first fractions against said stationary impact surfaces with sufficient particle energy to effect fragmentation; and
   - d. re-combining in said linear air stream said impacted and fragmented particles in said first fractions with said bypassed particles in said second fractions.

4,059,232

STIRRING OR AGITATING MILLS

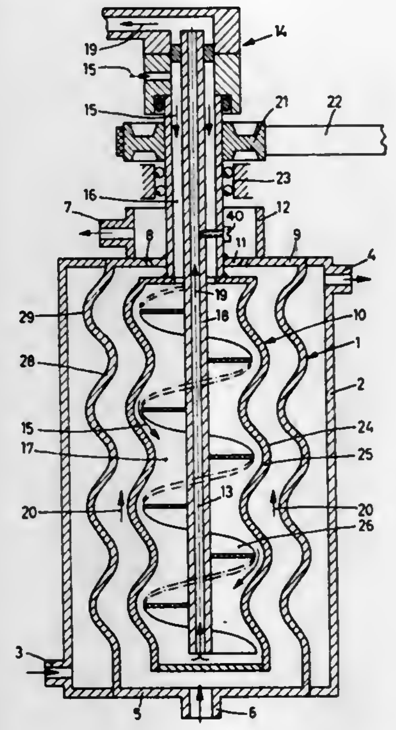
Kaspar Engels, Mannheim, Germany, assignor to Draiswerke GmbH, Mannheim, Germany

Filed Dec. 11, 1975, Ser. No. 639,889

Claims priority, application Germany, Dec. 12, 1974, 2458841

Int. Cl.^{2} B02C *23/36*

U.S. Cl. 241—46.17 **16 Claims**



1. A stirring or agitating mill using grinding bodies, for stirring or grinding material, comprising:
   - a grinding vessel adapted to be partly filled with the grinding bodies and having an inlet and an outlet for the material to be ground;
   - an external cooling jacket substantially surrounding said grinding vessel; and
   - a rotationally drivable, coolable agitator disposed within said grinding vessel,
   - wherein each of the inner wall of said grinding vessel and the outer wall of said agitator is provided with at least one helically extending heat-dissipating projection.

4,059,233

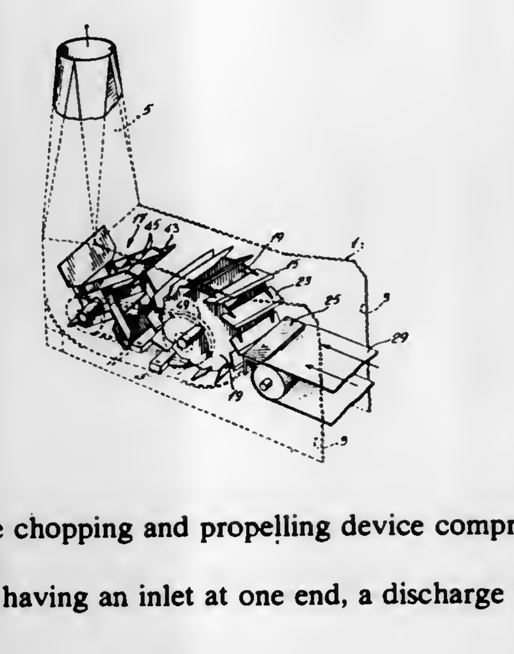
FORAGE HARVESTER

Narcisse Dion, Ste-Therese Ouest, Canada, assignor to B. & R. Choiniere Ltee, Canada

Continuation-in-part of Ser. No. 559,305, March 17, 1975, abandoned. This application Aug. 23, 1976, Ser. No. 716,562

Int. Cl.^{2} B02C *9/02, 18/06*

U.S. Cl. 241—47 **11 Claims**



1. A forage chopping and propelling device comprising, in combination:
   - a. a casing having an inlet at one end, a discharge chute at the other end and a bottom section that is inclined from the discharge chute to the inlet;
   - b. means for feeding the forage into the inlet of the casing;
   - c. a chopper rotor having a first axis of rotation disposed within the casing for chopping the forage fed into the inlet thereof;
   - d. means disposed between the feeding means and chopper rotor for cooperation with the chopper rotor in chopping the forage;
   - e. a booster impeller disposed within the casing adjacent the chopper rotor for receiving the chopped forage directly from the chopper rotor and propelling the chopped forage through the discharge chute, said impeller having a second axis of rotation spaced from and parallel to the first axis of rotation to provide rectilinear movement of the forage from the inlet of the casing to the discharge chute; and
   - f. at least one recutting bar adjustably mounted to the casing and disposed between the first and second axes of rotation for further cutting the forage chopped by the chopper rotor.

4,059,234

FIELD CHOPPER

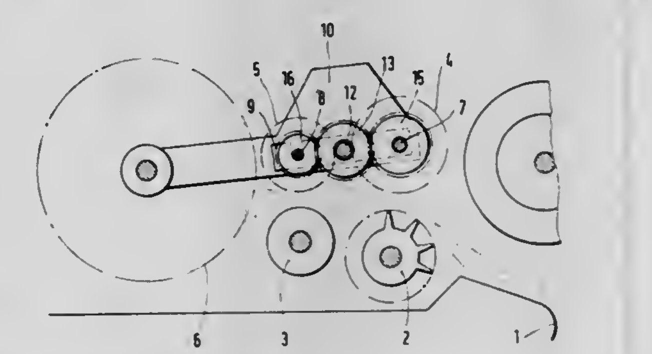
Josef Pürrer, Modling, Austria, assignor to Maschinenfabrik Fahr Aktiengesellschaft Gottmadingen, Gottmadingen, Germany

Filed June 22, 1976, Ser. No. 698,493

Claims priority, application Germany, June 27, 1975, 2528829

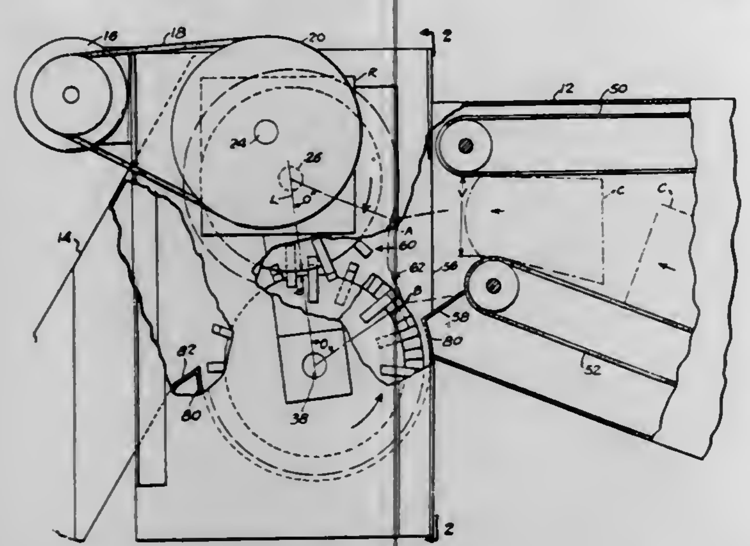
Int. Cl.^{2} B02C *23/02*

U.S. Cl. 241—222 **2 Claims**



1. A field chopper comprising:
   - a machine support;
   - a blade drum rotatably mounted on said support;
   - crop-intake means on said support forwardly of and spaced from said blade drum for drawing crop material toward said blade drum;
   - a pair of crop-feed rollers between said crop-intake means and said blade drum for advancing crop material towrds said drum;
   - a pair of pressing rollers each associated with and disposed above one of said crop-feed rollers for holding crop material thereagainst;
   - a pair of arms swingably mounted on said support;
   - respective compensating bars pivotally mounted on said arms for swinging movement about an axis, said pressing rollers being rotatable on said compensating bars on opposite sides of said axis;
   - a central pinion jounaled on one of said bars for rotation about said axis;
   - respective pinions on said pressing rollers meshing with said central pinion; and
   - means for releasably mounting the pressing roller proximal to said drum on said bars, said central pinion being driven to rotate said pressing rollers, said central pinion being provided with a shaft traversing said one of said bars and swingably mounting same on a respective one of said arms for pivotal movement about said axis, said one of said arms being formed with a bearing sleeve, said shaft traversing said bearing sleeve.

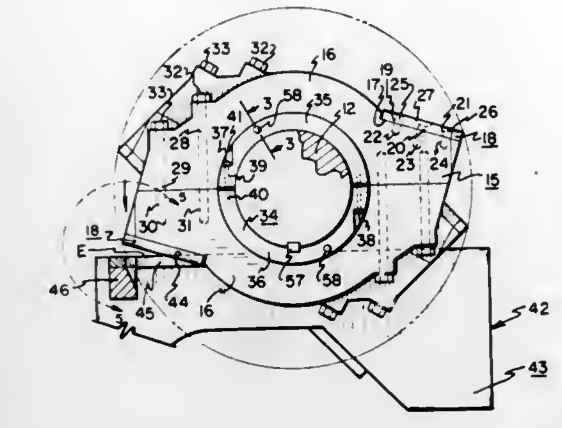
4,059,235
SHREDDING DEVICE
James G. Bryant, Greencastle, Ind., assignor to Bryant-Poff, Inc., Coatesville, Ind.
Filed May 28, 1976, Ser. No. 690,946
Int. Cl.² B02C *18/18, 18/22*
U.S. Cl. 241—223 **3 Claims**



1. A shredding device comprising means forming a shredding chamber having an inlet lying in a generally vertical plane and an outlet, two rotors journalled in said chamber directly adjacent said inlet on vertically spaced, horizontally extending axes so that a carton entering said chamber through said inlet is immediately engaged by said two rotors, said rotors each comprising a central shaft having a plurality of circular discs fixed thereon at regularly spaced intervals along the axis of the shaft, the discs on one rotor being staggered axially between the discs on the other rotor, each of said discs having a plurality of regularly spaced tooth members projecting radially from the periphery thereof, the tooth members on one rotor projecting radially into the space between the tooth members on the other rotor at the circumferentially adjacent portions of the two rotors so that the teeth radially overlap, means for rotating the rotors at different speeds and in opposite directions so that at the side of the rotors adjacent said inlet the teeth on the two rotors rotate toward each other, each disc being provided with a central opening through which the shaft extends, each disc being secured to its respective shaft by a series of short circumferentially extending arc welds, the successive discs also having a plurality of axially aligned openings therein spaced radially outwardly from said shaft, a rod extending through each row of aligned openings, spacers on said rods between the adjacent discs and means on said rod axially clamping the spacers and discs together.

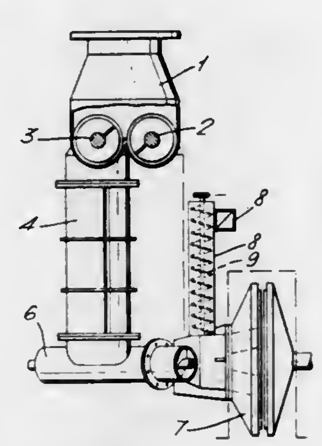
4,059,236
SHEARING STRUCTURE IN MATERIALS REDUCTION MACHINERY
John C. Brewer, Salt Lake City, Utah, assignor to Garbalizer Corporation of America, Salt Lake City, Utah
Filed Dec. 6, 1976, Ser. No. 747,482
Int. Cl.² B02C *18/06*
U.S. Cl. 241—243 **1 Claim**

1. In combination, an anvil structure provided with blade travel passageways comprising elongate, rectilinear, mutually parallel slots terminating in outer extremity apexes, a shaft, and plural blades mounted upon said shaft, registered with said passageways for travel therethrough, and having elongate shearing portions aligned with and entering said slots and provided with apex-configured ends registering with said passageways proximate said slot extremity apexes, and wherein said anvil structure has an upper reaction surface, said blades having elongate shearing portions constructed to pass in angu-



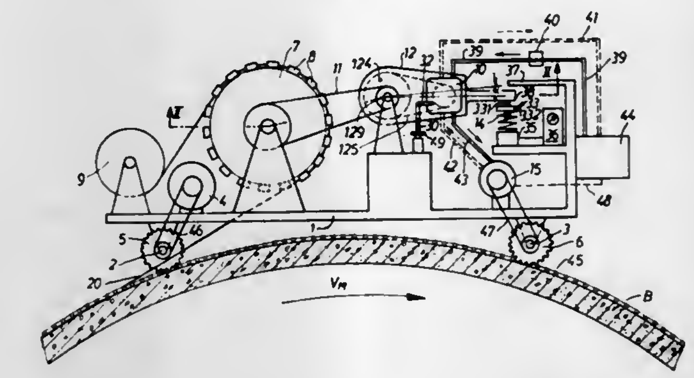
lated, scissor-type shear, beginning nearest said shaft, relative to said upper reaction surface of said anvil structure.

4,059,237
SYSTEM FOR FEEDING A DOUBLE DISC REFINER
Bo Knut Mannstrom, Kauniainen, Finland, assignor to Oy Keskuslaboratorio - Centrallaboratorium, Ab, Helsinki, Finland
Continuation of Ser. No. 548,579, Feb. 10, 1975, abandoned. This application Aug. 11, 1976, Ser. No. 713,427
Claims priority, application Finland, Feb. 15, 1974, 74452
Int. Cl.² B02C *23/02*
U.S. Cl. 241—246 **14 Claims**



1. In a double disc refiner which comprises a housing with an exit opening and in the housing a rotatable feed end disc spaced from a rotatable second disc to form a refining space between said discs and with the feed end disc having a plurality of openings therethrough to accommodate passage of wood materials into the refining space and a drive shaft for rotating said feed end disc, a material inlet passage within the housing and connected to the plurality of openings in the feed end disc and material feed channel means for feeding the wood materials through the inlet passage from an end of said inlet passage opposite the feed end disc and into the plurality of openings in the rotatable feed end disc and into the refining space wherein the improvement comprises a separate steam removal channel in direct connection with the rotatable feed end disc and the plurality of openings in said feed end disc by way of said inlet passage, said steam removal channel being connected to said inlet passage and located a spaced distance from said material feed channel means for feeding the wood materials.

4,059,238
MACHINE FOR WINDING CONTAINERS
Kurt Vogt, Beinwil am See, Switzerland
Continuation-in-part of Ser. No. 505,872, Sept. 13, 1974, abandoned, which is a continuation of Ser. No. 288,238, Sept. 11, 1972, abandoned. This application Sept. 11, 1975, Ser. No. 612,506
Claims priority, application Switzerland, Mar. 13, 1972, 3617/72
Int. Cl.² B21F *17/00*
U.S. Cl. 242—7.21 **15 Claims**



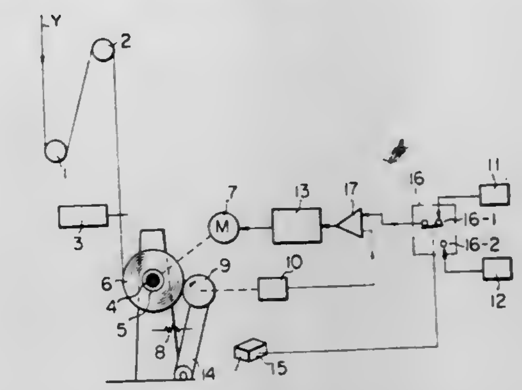
1. A machine for winding a body such as containers, tubular members and the like with a tension cable which is tensioned with an adjustable force, comprising a machine carriage movable at a predetermined speed about the body to be wound, said carriage having at least one drive shaft, a main drive motor for driving said drive shaft, a clamping wheel mounted for rotation on said carriage for tensioning the cable, and a mechanism for maintaining substantially constant the force in the cable, said mechanism incorporating braking means driven by said clamping wheel and mounted to pivot in one direction about a fixed pivot axis upon being driven by said clamping wheel, at least one auxiliary motor for auxiliary drive of said carriage, said braking means being connected to said at least one auxiliary motor to transmit the energy taken-up during braking from said braking means to said at least one auxiliary motor, a spring resisting pivotal movement of said braking means in said one direction about said fixed pivot axis whereby said braking means assume a pivotal position about the pivot axis dependent on the rotational moment transmitted to said braking means by said clamping wheel, and control means for regulating as a function of the pivotal position of the braking means about the pivot axis the energy transmitted from said braking means to said at least one auxiliary motor so as to change the relationship of the speed of the machine carriage to the rotational speed of the clamping wheel in such a manner that the force in the tension cable strives to approach a desired value.

4,059,239
METHOD AND APPARATUS FOR WINDING A THREAD ON A BOBBIN AT A HIGH WINDING SPEED
Kikuo Hori; Takumi Horiuchi; Mikio Nishikawa; Shiro Ryugo; Akira Ishizuka, and Yoshisuke Takenaka, all of Matsuyama, Japan, assignors to Teijin Limited, Osaka, Japan
Filed Nov. 3, 1975, Ser. No. 628,152
Claims priority, application Japan, Nov. 6, 1974, 49-127814
Int. Cl.² B65H *54/38*
U.S. Cl. 242—18.1 **18 Claims**

1. In an operation for winding a synthetic thread on a cylindrical bobbin for producing a full size yarn package at a winding speed of more than **2500** m/min. an improvement comprising increasing the tightness of winding said thread on previously formed thread layers of said yarn package in at least one stepwise increment during a period of said winding operation when $1.20\times10^{-6}\leq(dw/dt)/D\leq3.0\times10^{-6}$, wherein w represents number of bobbin rotations per one reciprocal traverse motion, t represents time in minutes, and D represents the thickness of said thread in denier.

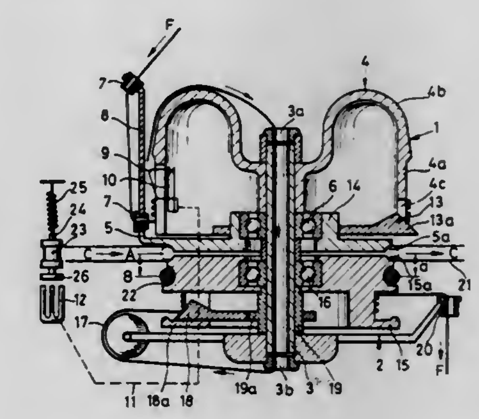
6. In a winding apparatus for winding a synthetic thread on a cylindrical bobbin for producing a full size yarn package, the apparatus including a traverse motion mechanism and a take-up device, an improvement comprising,

means for producing a stepwise increase in the winding tightness of said thread on a previously formed thread layer of said yarn package and



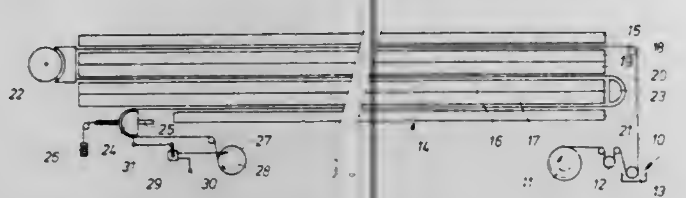
means for actuating said means for producing a stepwise increase in the winding tightness at least once during a period of said winding operation when $1.20\times10^{-6}\leq(dw/dt)/D\leq3.0\times10^{-6}$, wherein w represents number of bobbin rotations per one reciprocal traverse motion, t represents time in minutes, and D represents the thickness of said thread in denier.

4,059,240
THREAD STORAGE AND SUPPLY DEVICE
Ove Laursen, Dalum, Sweden, assignor to AB IRO, Ulricehamn, Sweden
Filed Sept. 13, 1976, Ser. No. 722,963
Claims priority, application Germany, Sept. 12, 1975, 2540746
Int. Cl.² B65H *51/20*
U.S. Cl. 242—47.01 **11 Claims**



1. In a thread storage and supply device, preferably for textile machines, having first storage means for positive thread supply preceded by second storage means for intermittent thread supply, comprising the improvement wherein the second storage means has a stationary storage drum provided with a hollow shaft and onto which a thread issuing from a thread supply can be wound by a winding element which can be driven to rotate coaxially of the stationary storage drum in order to form an intermediate thread supply thereon, and from which the thread can be removed from this intermediate thread supply over the end of the stationary storage drum and through the hollow shaft, wherein said first storage means has a thread drum which can be rotatably driven and upon which the thread issuing from the stationary storage drum can be wound tangentially and from which it can be unwound tangentially at an unwinding speed equal to the winding speed, the rotatable thread drum being located on an extension of the hollow shaft, and the stationary storage drum with its thread supply area being located closely adjacent the thread drum.

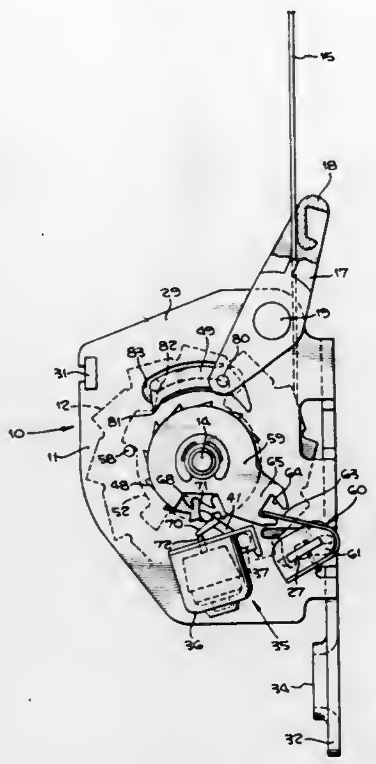
4,059,241
AIR FLOTATION TURNER BAR
Joseph Irma De Roeck, St. Katelijne-Waver, and Francois Jean Pira, Edegem, both of Belgium, assignors to AGFA-GEVAERT N.V., Mortsel, Belgium
Filed Nov. 27, 1974, Ser. No. 527,521
Claims priority, application United Kingdom, Nov. 29, 1973, 55390/73
Int. Cl.² B65H *59/00*
U.S. Cl. 242—75.5 **8 Claims**



1. A turner device for providing support for a travelling web within a zone along its path where it undergoes an arcuately curved directional change, said device comprising means defining an air plenum including two opposed spaced apart generally solid side walls extending perpendicularly to the plane of the web in adjacent spaced relation to the extreme web edges, opposed arcuately curved flanges each formed integrally with one such side wall and projecting inwardly therefrom for underlying limited overlapping relation with the corresponding marginal strips of the web passing between the planes of said side walls, said flanges being coaxially arranged with their curvature corresponding to the curvature of the web directional change, the mutually facing edges of said flanges being spaced apart a distance equal to the transverse width of said web less said marginal strips and the intervening space being substantially open and unobstructed to leave the web substantially unsupported in said intervening space, means for supplying air to said plenum under pressure sufficient to provide during travel of the web an air cushion below the curved web portion to support the web while undergoing said directional change, and web constraining means within said plenum for preventing the web from being accidentally drawn as far as the center of curvature of said curved flanges.

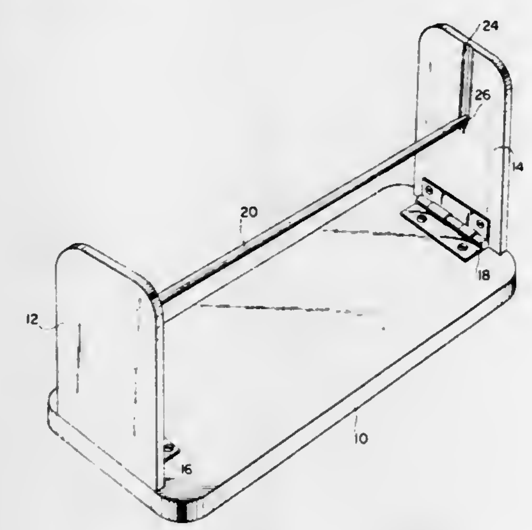
4,059,242
SAFETY BELT RETRACTOR
Akira Tanaka, Northridge, Calif., assignor to American Safety Equipment Corporation, Encino, Calif.
Filed May 20, 1976, Ser. No. 688,188
Int. Cl.² A62B *35/02;* **B65H** *75/48*
U.S. Cl. 242—107.4 A **8 Claims**

1. In an emergency locking safety belt retractor including a belt storage reel having at least one associated locking ratchet, locking pawl means for engaging said ratchet to lock said reel against belt unwinding movement and emergency sensing means including a movable actuator movable in response to an emergency condition, the improvement comprising the provision of:
- actuating pawl means associated with said emergency sensing means for movement from a first to a second position in response to movement of said actuator produced by said emergency sensing means in an emergency condition warranting reel lockup;
- drive means driven off of reel rotation for engaging said actuating pawl means when the latter is in said second position, said drive means then driving said actuating pawl means toward a third position; and
- an intermediate actuating member and means for movably mounting it operably between said actuating pawl means and said locking pawl means for moving the latter into reel locking engagement with said ratchet on movement of said actuating pawl means under the action of said drive means from said third position wherein it engages said intermediate actuating member to a fourth position wherein it has moved said intermediate actuating member



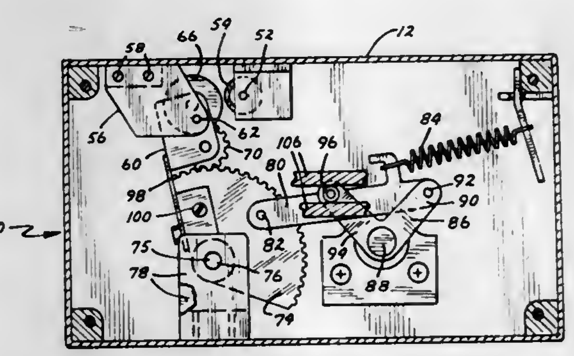
to a position wherein the latter has caused said locking pawl means to engage said ratchet to lock said reel.

4,059,243
SKEIN DISPENSER
Kenneth H. Hartley, 1206 W. Main St., Williamston, N.C. 27892
Filed Apr. 14, 1976, Ser. No. 676,954
Int. Cl.² B65H *49/00*
U.S. Cl. 242—129.6 **1 Claim**



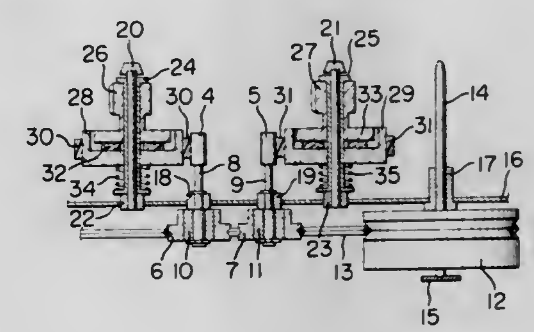
1. A device for holding and dispensing a skein of textile material such as yarn or the like, comprising in combination
a. a base member having a generally planar and rectangular configuration,
b. two spaced apart planar and generally rectangular end members positioned adjacent opposite ends of said base member and which in their operative positions are parallel to each other and perpendicular to said base member,
c. two spaced apart hinge members, one hinge member connecting one end member to the upper surface of said base member and the other hinge member connecting the other end member to the upper surface of said base member, said hinge members interconnecting said end members to said base member in such a way that the end members can pivot toward and away from each other through an angle of approximately 90°,
d. rod seating means located in both of said end members in the sides of the end members that face each other when the end members are in their operative position,
e. an elongated rod member extending between said end members when the end members are in their upright operative position, the ends of said rod member being seated in said rod seating means so that the rod member is disposed essentially parallel to said base member and spaced thereabove, said rod member being adapted to hold a skein of textile material, and
f. an elongated vertical groove in the facing surface of one of said end members, said elongated vertical groove extending between the upper periphery of said end member and the rod seating means located immediately beneath it on said facing surface, said elongated vertical groove facilitating the seating and unseating of one end of said rod member in said rod seating means.

4,059,244
TAPE CASSETTE PHRASE RETRIEVER
Noel M. Payant, 325 W. 5th St., Shakopee, Minn. 55379
Filed Aug. 19, 1976, Ser. No. 715,906
Int. Cl.² G03B *1/04;* **G11B** *15/32, 23/04*
U.S. Cl. 242—200 **9 Claims**



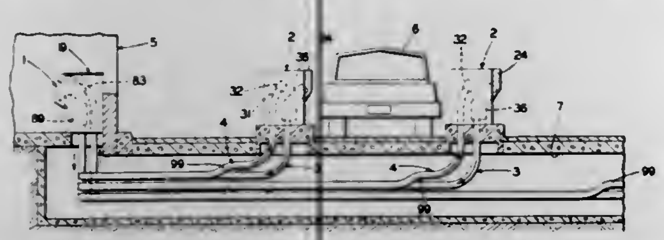
1. A tape cassette phrase retriever for use with a tape cassette playback machine and a tape cassette in which tape cassette, tape containing intelligence is entrained on a forward tape takeup reel and a reverse tape takeup reel, the reverse tape takeup reel having sprocket means which, when rotated in a first direction, will cause the tape to be wound from the forward tape takeup reel onto the reverse tape takeup reel and in which the tape cassette playback machine has means for receiving said cassette, means for driving said tape from said reverse tape takeup reel towards forward tape takeup reel, means for playing out the intelligence on said tape as it moves from said reverse takeup reel to said forward takeup reel, and means for stopping said tape drive means when a phrase on said tape to be repeated has just been played out by said machine; said tape cassette phrase retriever including:
A. a case having an outer face plate, and means cooperating with said cassette playback machine and cassette for fixedly positioning said case with respect to the cassette and playback machine;
B. pinion means rotatably mounted with respect to said case and extending outwardly therefrom in position to be in operative driving relationship to said cassette reverse reel sprocket means so that rotation of said pinion means in a first direction will cause said sprocket means to rotate in said first direction to cause tape to be wound from said forward reel onto said reverse reel;
C. manually operable means mounted with respect to said retriever case for positively rotating said retriever pinion means in said first direction; and
D. means to limit the amount of movement of said manually operable means to the end that precisely the proper length of tape will be retrieved onto the reverse tape takeup reel to cause a phrase which is to be repeated to be played back beginning specifically with the start of such phrase.

4,059,245
MAGNETIC RECORDING-REPRODUCING DEVICE
Huminori Hirose, Hirakata, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Japan
Filed May 17, 1976, Ser. No. 686,830
Claims priority, application Japan, May 20, 1975, 50-60795; May 20, 1975, 50-60796; June 2, 1975, 50-66820; June 2, 1975, 50-66821
Int. Cl.² G03B *1/04;* **G11B** *15/32*
U.S. Cl. 242—201 **3 Claims**



1. A magnetic recording and reproducing apparatus comprising:
- a reversible motor;
- first and second rotatable reel shafts upon which corresponding reels containing a magnetic recording medium may be disposed;
- a capstan shaft for transporting said medium at a constant speed;
- first and second one-way rotary clutches each having an inner race and an outer race, one race of said first clutch being coupled for rotation with said first reel shaft, one race of said second clutch being coupled for rotation with said second reel shaft, said first clutch engaging when the other race thereof is rotated in a given direction and said second clutch engaging when the other race thereof is rotated in the opposite direction
- means for coupling said motor to said capstan and said other races for rotation therewith, said other races rotating in said given direction to drive said first reel shaft through said first clutch when said motor is driven in one direction, said other races rotating in said opposite direction to drive said second reel shaft through said second clutch when the driving direction of said motor is reversed;
- each of said clutches having the inner and outer race thereof disposed in coaxial relationship to define an annular space therebetween, a plurality of regularly angularly spaced apart spring members integrally formed with one of said inner and outer races thereof and radially extending into said annular space to define a corresponding plurality of cages in said annular space, the portions of the peripheral surfaces of said races forming walls of each cage converging toward each other adjacent a spring member at the end of the cage corresponding to a first rotational direction to form a roller engaging region, and diverging from each other adjacent another spring member at the other end of the cage corresponding to the opposite rotational direction to form a roller idling region, and a spherical or cylindrical roller disposed in each cage and having a diameter greater than the distance between said races in said roller engaging region and less than the distance between said races in said roller idling region, whereby said clutch is engaged when the races thereof are rotated to drive said rollers into said engaging regions, and said clutch is disengaged when the races thereof are rotated to drive said rollers into said idling regions.

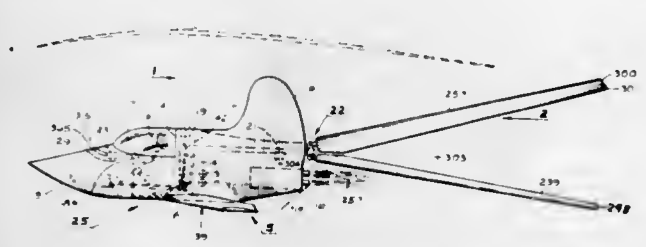
4,059,246
PNEUMATIC TUBE BANKING SYSTEM
Walter G. Anders; Michael A. Cole; James C. Duncan, and Paul A. Leipelt, all of Canton, Ohio, assignors to Diebold, Incorporated, Canton, Ohio
Filed Sept. 8, 1976, Ser. No. 721,552
Int. Cl.² B65G *51/34*
U.S. Cl. 243—7 **6 Claims**



1. A two-tube, non-captive carrier pneumatic tube banking system including a teller terminal and a remote customer terminal; first and second tubes forming a two-tube carrier conveyor systems connecting the terminals; blower means having inlet and outlet means mounted in the customer terminal supplying air to the two-tube system for pressure or vacuum movement of the carrier in tubes of the two-tube system; means connecting the first tube with the blower inlet means; the first tube acting as a carrier-receive tube for the customer terminal; means connecting the second tube with the blower output means; the second tube acting as a send tube for the customer terminal; the blower thereby supplying air under vacuum at the customer terminal to the first tube and air under pressure at the customer terminal to the second tube; muffler means mounted in line each with the means connecting the first and second tubes with the blower inlet and outlet means respectively to reduce noise emanating from air currents passing through the system; the first and second tubes having ends at the customer terminal; first blower control means for stopping blower means operation mounted adjacent the first tube customer terminal end; second blower control means for starting blower means operation mounted adjacent the second tube customer terminal end; said first blower control means being actuated by a carrier discharged from said first tube customer terminal end to stop blower means operation; said second blower control means being actuated by a carrier delivered to the second tube customer terminal end to start blower means operation; valve housing means mounted in the customer terminal surrounding the first tube customer terminal end; there being a carrier arrival opening formed in the valve housing; valve means pivotally mounted in the customer terminal normally closing said arrival opening; said first blower control means being mounted on the valve housing means; movement of the valve means when the valve means is engaged by a carrier discharged from said first tube customer terminal end actuating said first blower control means; means connecting the valve housing and the first tube customer terminal end with the muffler means that is connected with the blower inlet; the customer terminal arrival opening valve means including flexible flap means; the flexible flap means having a main flap member and a secondary flap member; the main flap member being pivotally mounted in the customer terminal; the secondary flap member being pivotally mounted on the valve housing; the flexible flap means members being moved by a carrier discharged from said first tube customer terminal end to open position and falling by gravity thereafter to closed position; and said valve means actuation of said first blower control means occurring during movement of the secondary flap member to open position when engaged by a carrier discharged from said first tube customer terminal end, thereby stopping blower means operation.

6. A two-tube, non-captive carrier pneumatic tube banking system including a teller terminal and a remote customer terminal; first and second tubes forming a two-tube carrier conveyor system connecting the terminals; blower means having inlet and outlet means mounted in the customer terminal supplying air to the two-tube system for pressure or vacuum movement of the carrier in tubes of the two-tube system; means connecting the first tube with the blower inlet means; the first tube acting as a carrier-receive tube for the customer terminal; means connecting the second tube with the blower outlet means; the second tube acting as a send tube for the customer terminal; the blower thereby supplying air vacuum at the customer terminal to the first tube and air under pressure at the customer terminal to the second tube; first and second muffler means mounted in line respectively with the means connecting the first and second tubes with the blower inlet and outlet means to reduce noise emanating from air currents passing through the system; the first and second tubes having tube ends at the teller terminal; arrival station means having a discharge opening mounted in the teller terminal; third muffler means mounted in the teller terminal connecting the arrival station means with the second tube teller terminal end; dispatch station means mounted in the teller terminal; means connecting the dispatch station means with the first tube teller terminal end; the third muffler means includes an inner perforate tube section, foam air-current noise reducing means surrounding the inner perforate tube section, the plastic sleeve means surrounding and enclosing the foam means; and a carrier arriving at the teller terminal moving from the second tube teller terminal end through the third muffler means inner perforate tube section and then into the arrival station means connected with the third muffler means.

4,059,247
CONVERTIBLADE
Richard H. Prewitt, R.R. No. 3. 3585 Paris Pike, Lexington, Ky. 40511
Filed Sept. 15, 1976, Ser. No. 723,661
Int. Cl.² B64C *27/02, 27/26*
U.S. Cl. 244—7 R **22 Claims**



21. In an aircraft, an airframe, pitch controlled blades, support means to rotatably support said blades on said airframe, means to move said blades from an autogiro configuration to an airplane configuration and vice versa, means to change the pitch of said blades, and means responsive to said blades being moved from the airplane configuration to shift said pitch change means from one of the pilot's controls to another.

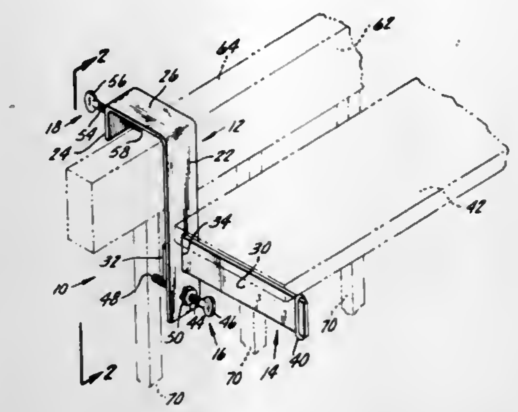
4,059,248
SHELF SUPPORT BRACKET FOR MOUNTING ON RAILINGS AND THE LIKE
Gregg R. Kuntz, 1005 E. La Veta, Orange, Calif. 92666
Filed July 30, 1976, Ser. No. 710,258
Int. Cl.² E04G *3/00*
U.S. Cl. 248—214 **5 Claims**

1. A shelf support bracket for mounting onto railings or the like, which comprises:

a. a one piece railing attaching member formed in a general inverted U-shape adapted for fitting downwardly over a railing or the like and including first and second rigid legs of unequal lengths from a rigid transverse segment, said first leg being substantially shorter than said second leg, said second leg having mounted thereto rail clamping means adapted both for accommodating the member to railings narrower than the length of the transverse segment and for clamping the member to the railing.

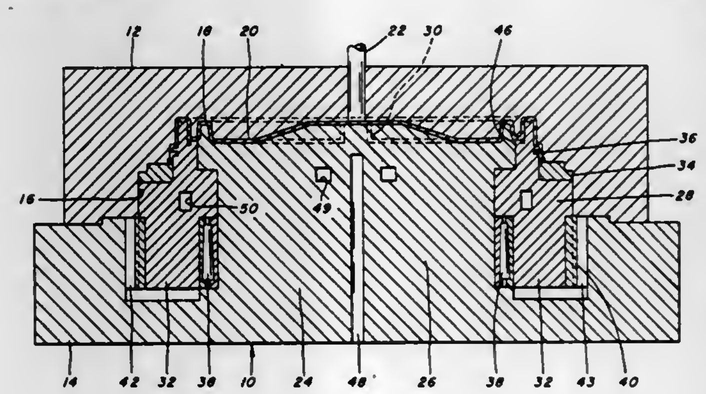
b. an elongate rigid shelf supporting member fixed to said first leg below the lower end of the second leg and projecting generally perpendicularly therto and away from the second leg,

c. adjusting means mounted on the first leg for enabling leveling of the shelf supporting member, said adjusting means including a manually movable element having an inner end portion adapted to engage a member or surface supporting the railing upon which the bracket is mounted, and



d. shelf stop including an elastomeric ring slidingly installed over said shelf supporting member and positioned to engage an outer edge of a shelf supported by the bracket, positioning of the ring on the shelf supporting member corresponding to the width of the shelf.

4,059,249
INJECTION MOLD FOR MOLDING INTERNALLY THREADED PLASTIC ARTICLE
Herbert W. Galer, Newnan, Ga., assignor to United States Steel Corporation, Pittsburgh, Pa.
Filed Dec. 30, 1976, Ser. No. 755,512
Int. Cl.² B29D *15/00;* B29F *1/14*
U.S. Cl. 249—58 **2 Claims**



1. Apparatus for the injection molding of plastic articles having a threaded hollow therein, including means for the ready release of said article when the plastic has been set, said apparatus including,

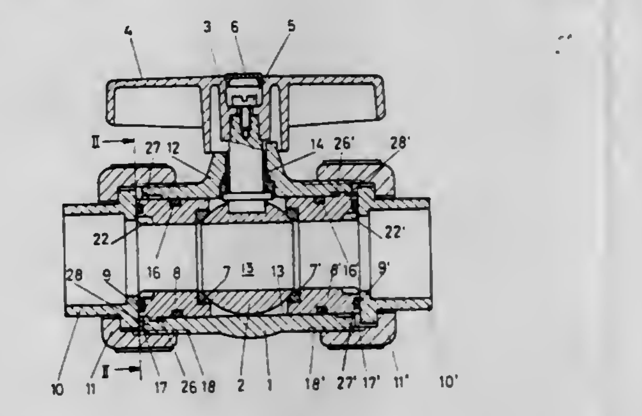
a. a housing having a cavity therein, said cavity being formed by matable upper housing and lower housing elements which provide a substantially liquid tight enclosure at the matable surfaces thereof, said upper housing element having (i) a sprue therein for the admission of plastic feed into the cavity, (ii) an approximately planar central bottom surface serving as the boundary forming the central part of the top surface of said article, and (iii) a rim bottom surface serving as the boundary forming the rim part of the top surface of said article,

b. said lower housing element having a cylindrical core member fixably connected thereto, said core member having a top surface the vertical axis of said core member intersecting the midpoint of said upper housing element central bottom surface, the top surface of the core member serving as the boundary forming a central part of the bottom surface of said article, said core member top surface having a horizontally disposed, rod-like protrusion (i) affixed thereto, perpendicular to the core vertical axis and (ii) lying approximately within the bounds of said upper housing element central bottom surface, said rod-like protrusion acting to form a handle-like portion of said article,

c. contiguous to and surrounding circular portion of the core member, an annular element journaled for rotation about the core member, at least a portion of the top surface of said annular element serving as the boundary forming the rim portion of the bottom surface of said article; the vertical, outer surface of said annular element (i) serving as the boundary forming a vertical portion of the hollow of said article, and (ii) having depressions therein acting to form the threads of the hollow,

d. means for rotating said annular member.

4,059,250
STOP VALVE WITH A SPHERICAL STOPCOCK
Erich Guldener, Uhwiesen, and Paul Trösch, Schaffhausen, both of Switzerland, assignors to Georg Fischer Aktiengesellschaft, Schaffhausen, Germany
Filed Dec. 19, 1975, Ser. No. 642,385
Claims priority, application Switzerland, Dec. 24, 1974, 17262/74
Int. Cl.² F16K *5/00*
U.S. Cl. 251—304 **4 Claims**



1. A stop valve comprising:

a housing having two ends with a continuous cylindrical bore extending between the ends;

a connecting sleeve positioned at and located outwardly of each housing end;

coupling-nut means for connecting said connecting sleeves to said housing, said coupling-nut means being displaceably attachable to said housing and slidably displaceable along said connecting sleeve,

a stopcock disposed in the bore in said housing and spaced from the ends thereof;

two sealing rings located within said bore one on each side of said stopcock, each of said sealing rings being arranged to contact said stopcock on an annular part of the sealing ring surface;

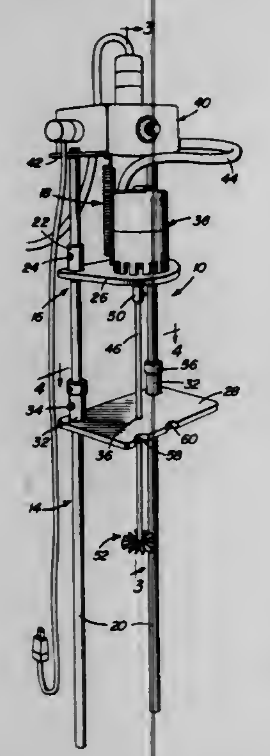
a shaft coupled to said stopcock and extending transversely of the cylindrical bore in said housing;

two axially extending insert rings located within and in coaxial relation with said bore one on each side of said stopcock and in contact with another annular part of the surface of the adjacent said sealing ring spaced from the annular part in contact with said stopcock, said insert rings having a coaxial length so that in combination with said sealing rings and said stopcock the axial dimension of the combination is greater than the axial length between the ends of said housing with the ends of said insert rings spaced outwardly from said sealing rings extending outwardly from the ends of said housing and disposed in displaceable contact with the adjacent said connecting sleeve and said connecting sleeves being in axially spaced relation to the adjacent end of said housing said insert rings being in slidable and rotatable engaging contact with the surface of the bore in said housing, uniformly angularly spaced recesses formed in said housing at each end

thereof and opening into said bore, an annular groove formed in said bore adjacent each end thereof and each said recess opening into the adjacent said annular groove, lips formed on the bore at each end of said housing and extending radially inwardly toward the axis of said bore with each lip extending between a pair of said recesses;

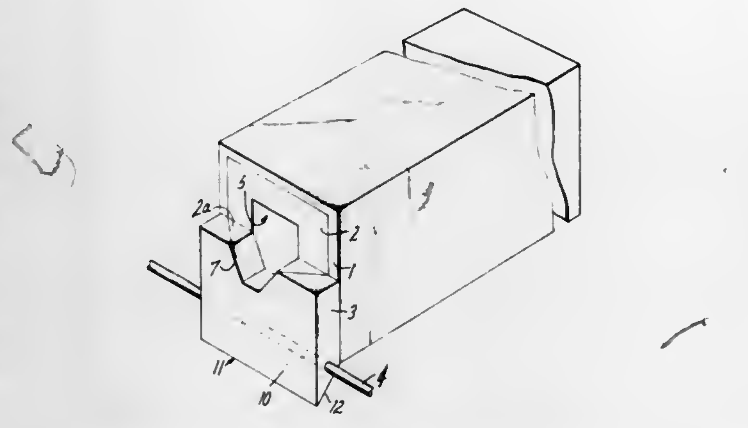
uniformly angularly spaced guide-type dogs formed on the radially outer surface of each of said insert rings adjacent and spaced from the opposite end thereof from said sealing ring, each of said insert rings being axially slidable into said bore from an opposite end of said housing and each said guide-type dog being slidable through one of said recesses into said annular groove and being rotatable with said insert ring through said annular groove into position behind one of said lips for retaining said insert ring within said housing, and each of said insert rings with said guide dogs thereon being axially displaceable within the corresponding said annular groove, whereby said insert rings are retained in said housing when said coupling-nut means are displaced from attachment on said housing, said housing and insert rings being radially displaceable relative to the axis of the housing bore from said connecting sleeves and said sealing rings being adjustable from the extension of said stop valve without requiring disassembly of said stop valve and without causing axial displacement of said stopcock.

4,059,251
AGITATOR FOR MELTING FURNACE
Paul Huzyak, 1227 Pennsylvania Ave., Monaca, Pa. 15061
Filed Nov. 4, 1976, Ser. No. 739,721
Int. Cl.² C22B *9/00*
U.S. Cl. 266—235 **6 Claims**



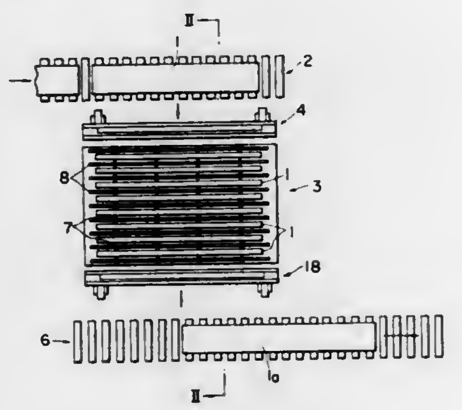
1. An agitator assembly for use with a melting furnace, comprising, in combination:
a. a support arrangement disposed extending from a melting furnace whose contents are to be agitated:
b. a motor mount disposed on the support arrangement for movement toward and away from the furnace;
c. agitator means mounted on the motor mount for movement therewith and selectively insertable into the furnace for agitating the contents thereof;
d. clamp means provided on the motor mount for releasably engaging the support arrangement and retaining the motor mount at a desired location on the support arrangement; and
e. a cover mounted on the support arrangement for movement toward and away from the furnace independently of the motor mount for selectively covering an intake opening of the furnace and preventing splash of the contents of the furnace during agitation of the contents by the agitator means.

4,059,252
SLAG TAP
John Erling Anderson, Katonah, N.Y., assignor to Union Carbide Corporation, New York, N.Y.
Filed May 26, 1976, Ser. No. 690,186
Int. Cl.² C21C *1/00*
U.S. Cl. 266—236 **5 Claims**



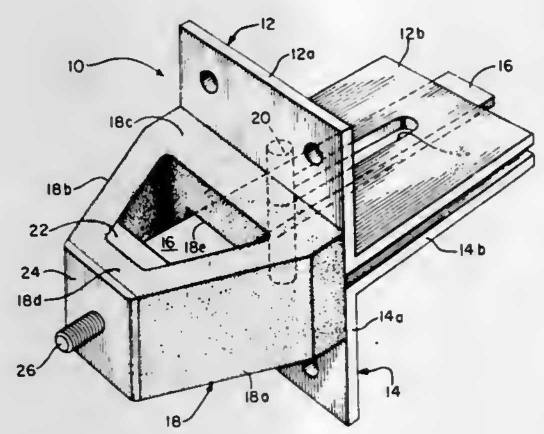
1. A device for tapping molten slag comprising:
a. a refractory lined metal duct provided with cooling means, said duct having an inlet port at one end, and a discharge port at the other end, the lower portion of the face of the discharge port being sealed against the leakage of molten slag by being abutted against
b. a highly heat-conductive, water-cooled metal weir, said weir having a surface sloped up and away from the face of said discharge port and terminating in an edge which extends across the face of said discharge port, said surface being covered with refractory material such that only said edge is able to come in contact with molten slag, said edge constituting the forward most portion of said device.

4,059,253
APPARATUS FOR COOLING STEEL BLOOMS, SLABS, AND THE LIKE
Yutaka Takahashi, and Toshiji Kobayashi, both of Kobe, Japan, assignors to Kawasaki Jukogyo Kabushiki Kaisha, Kobe, Japan
Filed May 18, 1976, Ser. No. 687,604
Claims priority, application Japan, May 22, 1975, 50-61572
Int. Cl.² C21D *1/62*
U.S. Cl. 266—259 **5 Claims**



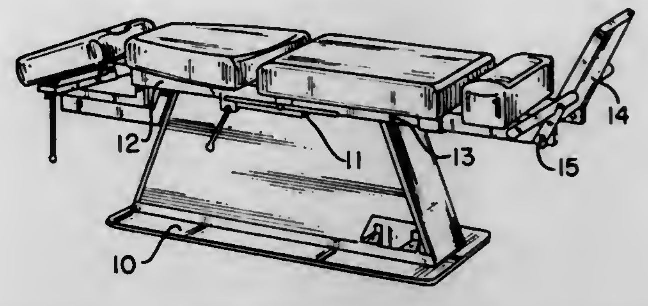
1. A steel slab cooling apparatus comprising:
a base floor structure;
a plurality of vertical cooling walls erected on said floor structure in mutually parallel and spaced arrangement to form a slab-receiving space between adjacent cooling walls, each of said cooling walls having an inlet and an outlet and including means for passage of cooling water therethrough from said inlet to said outlet;
upright slab holding posts fixedly mounted on said floor structure in each of said slab receiving spaces, said posts in each slab receiving space being disposed in two parallel rows parallel to said cooling walls to position and hold a steel slab in upright position between the rows;
first conveying means for conveying hot steel slabs at high temperature to a first position adjacent said cooling walls;
lifting and carrying means for transferring each of the steel slabs from said first position into a selected one of said slab receiving spaces to place the slab between the respective said two rows of the slab holding posts in the upright position and for transferring each of the slabs after cooling to a second position alongside said cooling walls;
second conveying means for conveying the slabs away from said second conveying means for conveying the slabs away from said second position;
means for supplying cooling water to the inlet of each cooling wall;
means for conducting from the outlet of each cooling wall a mixture of hot water and steam produced in each of said cooling walls by heat absorbed by the cooling water by radiation of heat from the hot steel slabs; and
a steam drum connected to the conducting means for receiving the mixture of hot water and steam from said conducting means and sending the steam to means for utilizing recovered heat.

4,059,254
ENERGY ABSORBING UNIT
George Samuel Fielding-Russel, and Alan N. Gent, both of Stow, Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio
Filed Oct. 28, 1976, Ser. No. 736,618
Int. Cl.² B60R *19/08;* **F16F** *7/12*
U.S. Cl. 267—140 **6 Claims**



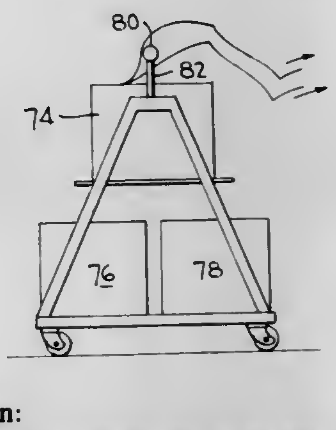
1. An energy absorber comprising:
A. an elastomeric member having forward and rearward ends interconnected by inclined columns terminating in a base member at its rearward end and in an apex member at its forward end;
B. a piston attached to the apex member and slidably received through the base member, extending rearwardly of the base member;
C. mounting means positioned to abut the base of the elastomer member for receiving the rearwardly extending portion of the piston such that the piston is restricted to motion in a substantially horizontal plane; and
D. pin means fastened to the piston in a manner to limit its forward horizontal excursion by reason of the pin's interaction with the mounting means while also providing a pivot for the piston during an angular excursion in the horizontal plane.

4,059,255
ADJUSTABLE TABLE FOR PHYSICAL THERAPY
Helmuth Conny Perold, Reseda, Calif., assignor to Adjusting Tables Inc., N. Hollywood, Calif.
Filed June 9, 1977, Ser. No. 804,886
Int. Cl.² A61G *13/00*
U.S. Cl. 269—323 **7 Claims**



1. An adjustable table movable between a first normal position to a second raised position and between said first normal position and a third tilted position; a foot rest on said table movable between a folded out-of-the-way position and an extended usable position; and an intercoupling means between said foot rest and said table such that when said foot rest is in said folded out of the way position said table is constrained to movement only between said first normal position and said second raised position and when said foot rest is in its extended usable position said table is constrained to movement only between said first normal position and said third tilted position.

4,059,256
LOADING RACK FOR MINICOMPUTER
Sherwin Palmer, 3401 E. Court St., Flint, Mich. 48501
Continuation of Ser. No. 598,279, July 23, 1975, abandoned. This application July 6, 1976, Ser. No. 703,019
Int. Cl.² B65H *39/00*
U.S. Cl. 270—52 **3 Claims**



1. In combination:
a business machine including an elongate web intake member having a longitudinal axis, and means for advancing multiple ply, prefolded web to said machine, said machine including means for printing data onto the multiple ply, prefolded web; and rack means providing a generally triangular storage web configuration for feeding multiple ply, prefolded web between a plurality of sources of multiple ply, prefolded web and said machine, including a pair of A-shaped frame members supporting first and second planar, horizontal shelves, said first shelf having a first width and supporting first and second receptacles containing multiple ply, prefolded web, said first and second receptacles substantially abutting each other along a vertical plane parallel to the axis of the web intake member of said business machine; said second shelf having a second width that is less than said first width and located above said first shelf at a height sufficient to permit fan out of the multiple ply, prefolded web from said first and second receptacles, said second shelf supporting a third receptacle containing multiple ply, prefolded web symmetrically about said vertical plane; and a horizontal member attached to said rack means, said member being spaced apart

from said second shelf and having a body portion for separating individual plies of multiple ply, prefolded web from each other by passing the individual plies past opposite sides of the body portion while guiding said multiple ply, prefolded webs from each of the three receptacles to the intake member of said business machine.

3. A method of successively supplying prefolded recording web without obstruction to a business machine from first, second and third receptacles containing webs, said business machine including an elongate intake member having a longitudinal axis and means for advancing the web to said machine, comprising the steps of:

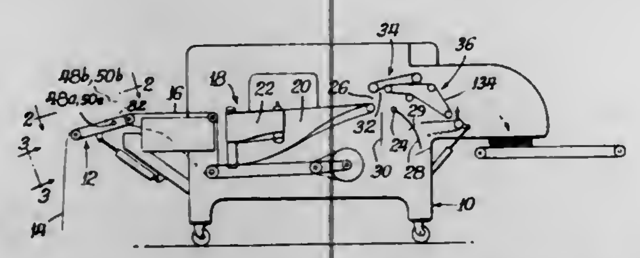
orienting first, second and third receptacles containing prefolded recording webs into a triangular storage configuration having a low center of gravity by positioning the first and second receptacles on a common lower horizontal plane in substantial abutment to each other along a vertical plane parallel to the axis of the web intake member of said machine, and with said second receptacle substantially abutting said machine, and positioning the third receptacle containing prefolded recording web on an upper horizontal plane and substantially symmetrically about said vertical plane above said first and second receptacles at a height sufficient to permit unobstructed fan out of the prefolded webs from said first and second receptacles to said machine; and

feeding the prefolded webs successively from said first, second and third receptacles along unobstructed flow paths to the web intake member of said machine, including feeding the prefolded recording web from said first receptacle to said intake member along a first path passing between said upper and lower horizontal planes with only said web from said first receptacle passing through said vertical plane and over a full width of said second receptacle, and feeding the prefolded recording web from said second receptacle to said intake member along a second path between said upper and lower horizontal planes.

4,059,257
LAUNDRY FOLDER

Frederick W. Grantham, 152 W. Pico Blvd., Los Angeles, Calif. 90015
Division of Ser. No. 47,188, June 18, 1970, Pat. No. 3,920,237. This application Sept. 23, 1975, Ser. No. 615,925
Int. Cl.² B65H *45/22*

U.S. Cl. 270—66 **16 Claims**



1. In a laundry folder including conveyor means for receiving laundry pieces at an entrance end and carrying them through the folder and folding them and placing them on a supporting means at an exit end, and in which the conveyor means includes a feedboard at the entrance end on which the laundry pieces are placed, the feedboard including a belt member means forming a segment of the conveyor means, the conveyor means being so positioned and arranged for most effectively conveying the laundry pieces when they are placed on the feedboard in a transversely central position, the combination comprising:

means responsive to the position of a laundry piece on the feedboard out of its said transversely central position for shifting it into its said transversely central position, whereby the piece then is conveyed in such position by the conveyor means through the folder,

folding means including a french folder which includes a pair of main folding blades and a pair of auxiliary folding blades associated therewith, each pair having outside and inside edges, the main folding blades extending longitudinally and being spaced apart laterally, the pair of auxiliary folding blades being mounted on the main folding blades and extending generally longitudinally and pivoted for movement between an inner position in which their outer edges are coincident with the outer edges of the main folding blades and an outer position in which their outer edges diverge in direction along the line of progress of the pieces being folded, means for moving the auxiliary blades between their inner and outer positions, and means controlled by the movement of the piece being folded along the main folding blades for actuating the means for moving the auxiliary folding blades to their inner position at a predetermined point in the progress of the piece being folded along the french folding means whereby a portion of the piece is spread widely and the remainder of the piece is spread less widely, means for stacking folded pieces including a final supporting surface at the exit end of the folder, a wicket for receiving the pieces conveyed through the folder and movable for placing the pieces on a supporting surface, the supporting surface being vertically movable, clutch means for supporting the supporting surface normally in a fixed position but yieldable in response to predetermined pressure applied to the supporting surface for enabling it to be lowered by an extent in proportion to the pressure so applied, and operative for maintaining the supporting surface at each new position as thus moved, means for raising the supporting surface, and means responsive to the pieces being stacked to a predetermined extent on the supporting surface for actuating the means for raising the supporting surface.

11. A laundry folder having an entrance end and an exit end and conveyor means for receiving a piece to be folded and conveying it through the folder and including means for folding the piece in its progress through the folder, comprising a supporting member for receiving the folded pieces as delivered through the exit end, the folder also including wicket means for receiving the folded pieces and placing them on the supporting member, the wicket means including a transverse shaft and a plurality of rods movable between a retracted position adjacent the conveyor means in which the folded laundry pieces are placed thereon and an advanced position in which it is generally horizontal and operative for placing the laundry piece on a supporting member top surface, and a friction clutch normally holding the supporting surface in an elevated starting position and enabling movement thereof downwardly in increments in response to the wicket means operating to stack the laundry pieces onto the supporting surface; and means driving the friction clutch for elevating the supporting surface back to it starting position after the accumulation of a predetermined number of said pieces thereon thereby positioning the stack of laundry pieces for removal from the support member.

4,059,258
DOUBLE FOLD AUTOMATIC FOLDING APPARATUS

Frederick W. Grantham, 12055 Goshen Ave., Los Angeles, Calif. 90066
Filed July 7, 1975, Ser. No. 593,206
Int. Cl.² B65H *45/18*

U.S. Cl. 270—67 **20 Claims**

1. In combination with a machine for folding a sequence of articles and having an actuatable article folding knife, an article delivering conveyor belt driven by a first roller rotated in a first direction, an article receiving conveyor belt positioned in receiving relationship with respect to said delivering belt and driven by a second roller rotated in a second direction, said second roller being disposed generally above said first roller, and a receiving element disposed generally beneath and adjacent to said receiving belt, an apparatus for selectively making an additional fold in articles sequentially delivered by said delivering belt, which comprises:

a. an added roller,

said added roller being rotatable about a longitudinal axis thereof and being disposed parallel and adjacent to said first roller in a position to intercept leading edges of articles delivered by said delivering belt;

b. drive means connected to said added roller for causing said added roller to be rotated in either of said first and second directions;

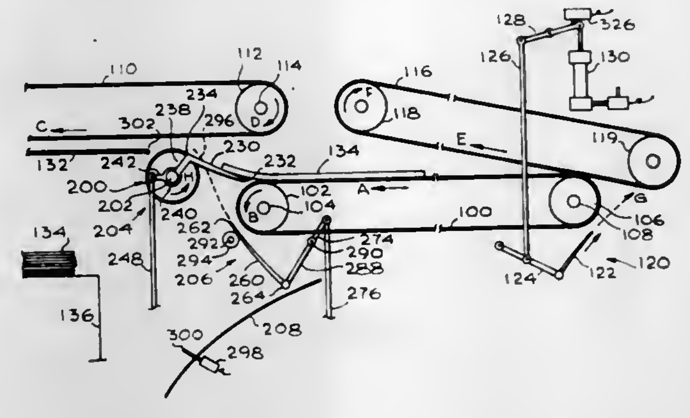
c. an added article folding knife means, said knife means including a blade having an article contacting edge;

d. restraining means for causing said blade to move along a predetermined path, portions of which extend between said first and said added rollers and toward said receiving belt;

e. actuating means connected to said added folding knife means for causing movement of said blade along said path; and

f. control means coooperating with said drive means and said actuating means for causing, in sequence,

1. said added roller to be rotating in said second direction when said leading edge of an article from said deliver-



ing belt contacts said periphery thereof, whereby to cause said leading edge to be deflected from its initial path of travel, away from said receiving belt and toward said added knife means,

2. said blade to be advanced across said path when a predetermined portion of said article has passed said added roller, whereby said edge of said blade is caused to contact a proximate portion of said article and advance said contacted portion toward said added roller to cause the additional folding of said article back upon itself,

3. said added roller to reverse and be again rotating in said first direction when said contacted portion of said article advanced by said blade contacts the periphery thereof, whereby the newly-folded portion of said article is carried around portions of said added roller towards said receiving belt, and

4. said added blade to be retracted in its path as said newly-folded portion is picked up by said receiving belt and said added roller.

4,059,259
SHEET CARTRIDGE FOR REPROGRAPHIC MACHINE

Nicola Cosmo, Ivrea (Turin), Italy, assignor to Ing. C. Olivetti & C., S.p.A., Italy
Continuation of Ser. No. 607,868, Aug. 26, 1975, Pat. No. 3,971,553. This application May 14, 1976, Ser. No. 686,340
Claims priority, application Italy, Sept. 2, 1974, 69662/74
Int. Cl.² B65H *5/22*

U.S. Cl. 271—3 **3 Claims**

1. A cartridge for containing and serially feeding fresh sheets and for recovering used sheets respectively to and from a reporgraphic machine having a fresh sheet entry member and a used sheet exit, the cartridge comprising:

a container having means defining a first and a second chamber and means defining a corresponding opening for each chamber,

means connected to said container for removably positionifng the cartridge in the reprographic machine with said first opening adjacent to said fresh sheet entry and said second opening adjacent to said used sheet exit,

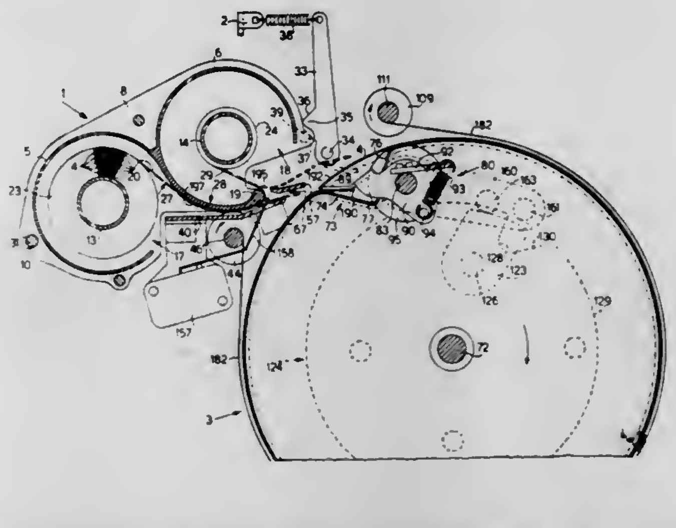
a feed reel in said first chamber,

a take-up reel in said second chamber,

a flexible support wound on said feed reel and having an end portion wound on said take-up reel,

a plurality of fresh sheets disposed in regularly spaced positions on said support, and interwound with said support on said feed reel,

first guiding means for guiding said support from said feed reel to said take-up reel along a predetermined path going out from said first chamber through said first opening and entering into said second chamber through said second opening,



means connected to said reels and operable when the cartridge is positioned in the reprographic machine for advancing said flexible support and a fresh sheet positioned thereon from said feed reel along said path,

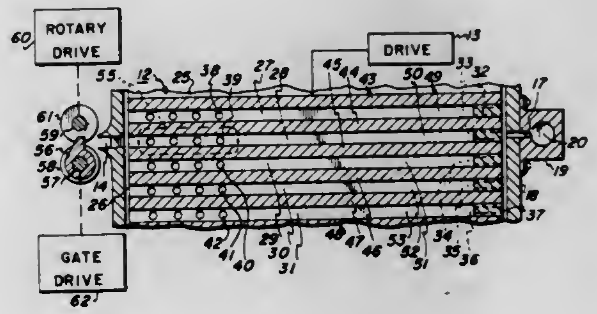
means adjacent to said first opening for separating a fresh sheet advancing along said path from said flexible support to deflect it towards the fresh sheet entry, and

second guiding means in said second chamber for guiding, during the advancing of said flexible support, a used sheet entering into said second chamber through said second opening to wind the used sheet with said flexible support on said take-up reel.

4,059,260
DOCUMENT HANDLING APPARATUS

Klaus K. Stange, Pittsford; Richard E. Smith, Webster; Thomas J. Hamlin, Macedon, and James R. Cassano, Penfield, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.
Filed Dec. 8, 1975, Ser. No. 638,590
Int. Cl.² B65H *5/22*

U.S. Cl. 271—3 **8 Claims**



1. Document handling apparatus, comprising:

a. an exposure station having a gate;

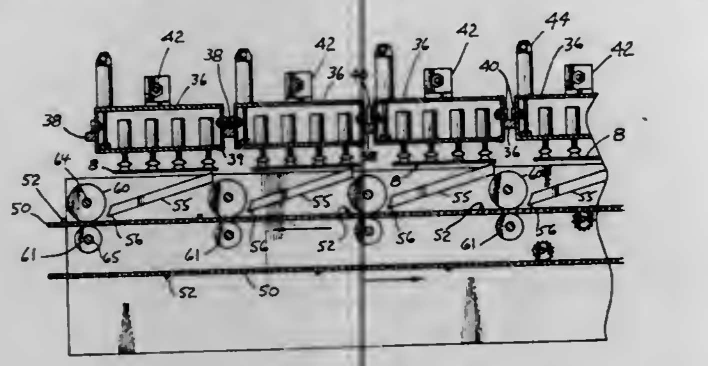
b. a rack having a plurality of parallel pockets for storing documents;

c. means for moving the rack to sequentially align each of the pockets with the exposure station;

d. fluidic means for moving documents in aligned pockets into orthogonal registration with an aligned pocket and said gate;

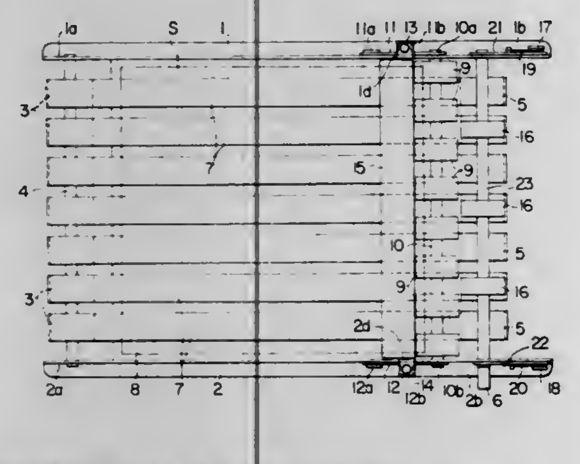
e. means for moving a registered document into the exposure station; and
f. means for receiving documents from the exposure station.

4,059,261
MACHINE AND METHOD FOR SUCCESSIVELY FEEDING STACKED BLANKS
Robert L. Brown, 4055 Stoneview Circle, Stone Mountain, Ga. 30083
Filed June 10, 1976, Ser. No. 694,723
Int. Cl.^{2} B65H *3/44, 5/16, 9/06*
U.S. Cl. 271—9 **1 Claim**



1. A machine for successively feeding blanks from stacks of blanks comprising a conveyor mounted for movement along a conveyor path passing through a receiving station where blanks may be deposited thereon; a plurality of chutes mounted successively above said conveyor path at the receiving station with each chute having an exit lip positioned in spaced relation adjacent said conveyor; means for extracting blanks from the stacks and for depositing them upon said chutes; means for holding blanks deposited upon said chutes comprising stops movably mounted adjacent said chute exit lips; means for substantially simultaneously releasing blanks held on said chutes thereby enabling the blanks to be simultaneously placed upon the conveyor and successively conveyed from the receiving station which includes means for reciprocally cycling said stops between a position for holding blanks on said chutes and a position for releasing blanks from said chutes in timed sequence with movement of said conveyor through the receiving station and means for pushing blanks down said chutes in time relation with cyclic movements of said stops with said pushing means comprising an endless chain having a push lug mounted thereto coupled with and driven by said stops reciprocal cycling means.

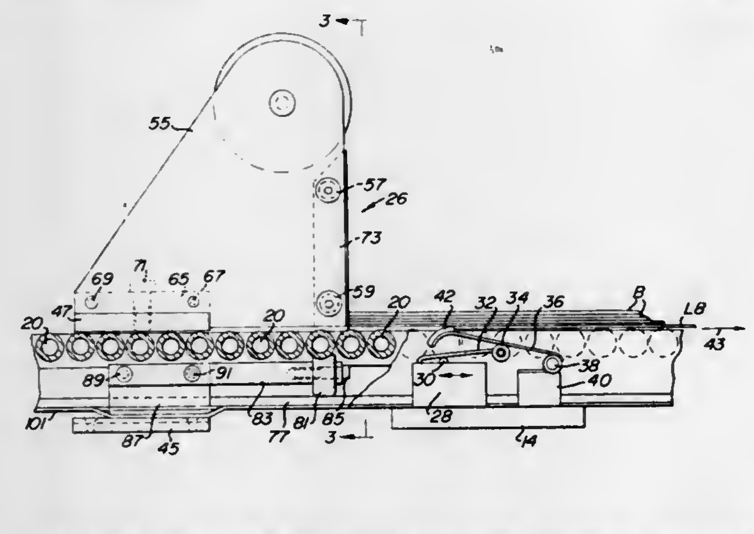
4,059,262
SHEET DELIVERY APPARATUS
Sakae Fujimoto, Chofu, Japan, assignor to Ricoh Co., Ltd., Tokyo, Japan
Filed Aug. 25, 1976, Ser. No. 717,671
Claims priority, application Japan, Aug. 25, 1975, 50-102684
Int. Cl.^{2} B65H *3/04, 3/06, 3/52*
U.S. Cl. 271—35 **6 Claims**



1. A sheet delivery apparatus comprising:
a moving, sheet delivering means, on which at least the leading end portion of a stack of sheets is placed, for delivering the lowermost sheet in said stack; said delivering means comprising a plurality of spaced, parallel-running endless belts; and
a stationary, sheet separating means, disposed in abutting relationship with the moving sheet delivering means to form a nip therewith, for separating the lowermost sheet from said stack; said sheet separating means having a surface against which the forward edge faces of sheets disposed in said stack bear, said surface being inclined with respect to the sheet delivering means in a manner such that a lower sheet has its forward end advanced relative to the forward end of an upper sheet, and the separating means comprising a plurality of spaced surfaces, respectively spanning the spaces between the endless belts and bearing against the respective sheet-engaging surfaces of adjacent endless belts only at the edge portions thereof, and having a coefficient of friction with respect to the sheets in the region at the nip which is less than the coefficient of friction of the delivering means with respect to the sheets.

4. A sheet delivery apparatus comprising:
a moving, sheet delivering means, on which at least the leading end portion of a stack of sheets is placed, for delivering the lowermost sheet in said stack, said delivering means comprising a rotating cylinder and a plurality of wheels of a frictional material disposed on and around said cylinder at spaced intervals from each other; and
a stationary, sheet separating means, disposed in abutting relationship with the moving sheet delivering means to form a nip therewith, for separating the lowermost sheet from said stack, said sheet separating means having a surface against which the forward edge faces of sheets disposed in said stack bear, said surface being inclined with respect to the sheet delivery means in a manner such that a lower sheet has its forward end advanced relative to the forward end of an upper sheet, and the separating means comprising a plurality of spaced surfaces which respectively span the spaces between the wheels and bear against the respective sheet-engaging surfaces of adjacent wheels only at the edge portions thereof, and having a coefficient of friction with respect to the sheets in the region at the nip which is less than the coefficient of friction of the delivering means with respect to the sheets.

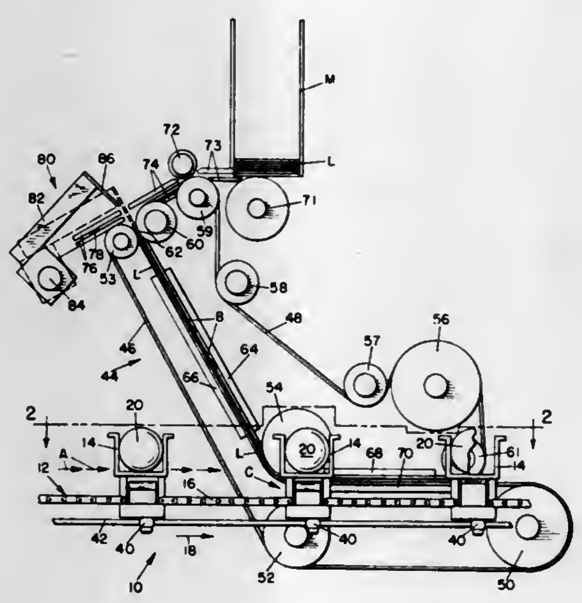
4,059,263
VACUUM FEED
Edward V. Henc, Promisedale Farms R.D. No. 2, Malvern, Pa. 19355
Continuation-in-part of Ser. No. 507,494, Sept. 19, 1974, Pat. No. 3,994,489. This application June 7, 1976, Ser. No. 693,825
Int. Cl.^{2} B65H *1/06*
U.S. Cl. 271—171 **7 Claims**



1. Apparatus for feeding blanks of sheet material to processing machinery comprising:
a feed bed for supporting a stack of blanks;

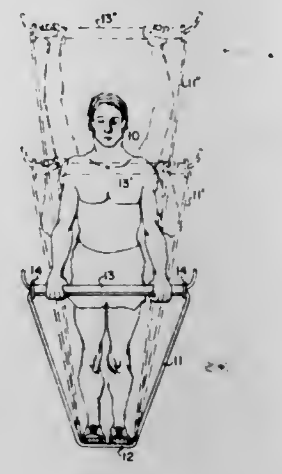
means to drive the lowermost blank of said stack to said processing machinery;
vacuum means to control alignment of the lowermost blank, said vacuum means being positioned beneath said feed bed and including a vacuum chamber of fixed size; and
an adjustable backstop member to be adjusted according to the size of blanks being processed including means adjustable along with said backstop member to create a seal between said feed bed and adjacent structure of said chamber, said adjustable sealing means serving to partition said chamber at different intervals as determined by the size of blanks being processed.

4,059,264
METHOD OF FEEDING A LEAFLET AND THE APPARATUS THEREFOR
Walter H. Vogel, Hoffman Estates, Ill., assignor to Redington, Incorporated, Bellwood, Ill.
Filed May 3, 1976, Ser. No. 682,248
Int. Cl.^{2} B65H *39/06*
U.S. Cl. 271—270 **6 Claims**



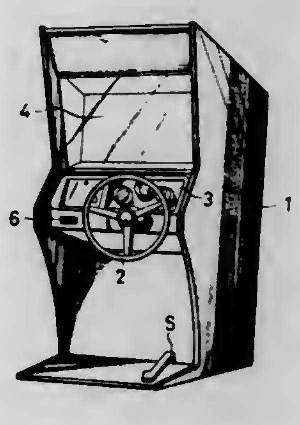
5. The method of transferring leaflets to leaflet clamps having at least two clamping surfaces, said clamps having an open position for insertion of leaflets between said clamping surfaces and a closed position for clamping a leaflet which has been inserted between said clamping surfaces, said method comprising the following steps:
a. conveying said leaflet clamps in spaced relationship along a first path;
b. conveying spaced leaflets along a second path which converges with said first path, said second path having a first portion which intersects said first path and a second portion which is substantially coincident with said first path, so that said leaflets arrive at the point of convergence of said first and second paths in an interlaced relationship with said leaflet clamps;
c. opening each of said clamps before said point of convergence;
d. advancing said leaflets at a greater linear speed than said leaflet clamps so that each leaflet becomes aligned between the clamping surfaces of its respective leaflet clamp; and
e. closing each of said clamps after its respective leaflet has become aligned between the clamping surfaces thereof.

4,059,265
ELASTIC PULL-TYPE EXERCISER
Horst K. Wieder, 1207 Riverview Lane, Watertown, Wis. 53094, and Klaus A. Wieder, Rte. No. 1, Helenville, Wis. 53137
Filed Jan. 22, 1976, Ser. No. 651,271
Int. Cl.^{2} A63B *21/04*
U.S. Cl. 272—137 **4 Claims**



1. In an exercise device comprising an elongated elastomeric member or cable for exercising, the combination comprising:
a bar means for removably securing a grip member in each of its respective ends,
an elongated elastic member or cable,
a grip member adapted to be inserted in the ends of said bar means,
said grip member being elongated to provide a first end and a second end,
said grip member having two cylindrical passages each communicating from said first end to said second end and each having an axis,
each of said passages having a diameter only slightly greater than the diameter of said cable to thereby slidingly receive said cable in said passage,
said passages being contiguous and separated only by a web portion of said grip member,
said axes of said passages being parallel,
said grip member having an outer surface with portions of said outer surface conforming in shape to portions of said passages contained in said grip member,
said grip member having an enlarged portion at one end for limiting the extent of travel of each grip member within the bar means.

4,059,266
GAME MACHINE
Masaya Nakamura, Tokyo, Japan, assignor to Kabushiki Kaisha Nakamura Seisakusho, Tokyo, Japan
Filed Nov. 18, 1976, Ser. No. 743,065
Claims priority, application Japan, June 3, 1976, 51-64059; June 7, 1976, 51-65610
Int. Cl.^{2} A63F *9/14*
U.S. Cl. 273—1 E **10 Claims**



3. A game machine wherein images of a road and motor

vehicles running thereover can be formed on a screen, comprising:

a rotary body including a rotary member and motor vehicle model support members incapable of rotation relative to said rotary member and movable radially of the center of rotation thereof;

a background scenery disk arranged coaxially with said rotary body and spaced axially therefrom for rotation independently thereof;

a transparent road image forming means represented on said background scenery disk and surrounding the center of rotation of said disk in a cloud loop;

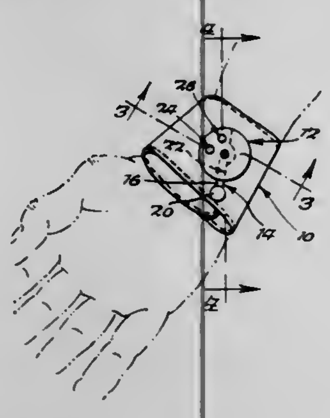
means for moving the motor vehicle models relative to one another widthwise of the road image forming means within the widthwise spacing thereof;

a screen;

a light source for projecting on said screen the images of road represented on said disk and of the motor vehicle models; and

drive means for rotating said disk and said rotary body.

4,059,267
FOLLOW THROUGH INDICATOR FOR BOWLERS
Howard E. Noble, 30 Stoneleigh, Apt. 1, Buffalo, N.Y. 14223
Filed June 28, 1976, Ser. No. 700,306
Int. Cl.² A63B *71/06*
U.S. Cl. 273—54 B **6 Claims**



1. A follow through indicator for bowlers comprising:

a. a generally planar base element;

b. means for fastening said base element to the arm of a bowler in a manner such that said base element is in a plane generally parallel to the path through which the bowler's arm will move during delivery and throw of the ball;

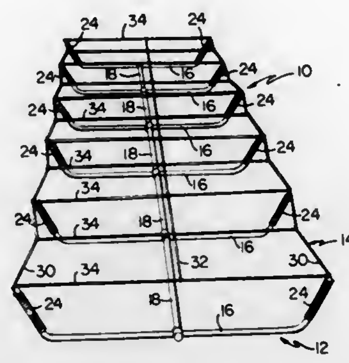
c. an indicator element movably mounted on said base for movement in a direction against the force of gravity from an initial or rest position to a position indicating that a proper follow through has been made;

d. said base element having means for guiding said indicator element for movement along a path generally parallel to the path through which the bowler's arm will move during delivery and throw of the ball; and

e. holding means for holding said indicator element in said position indicating proper follow through is reached for maintaining the indication for visual inspection by the bowler.

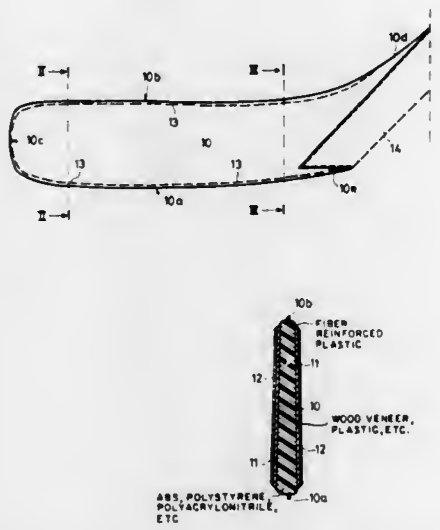
4,059,268
AGILITY RUNNING OBSTACLE DEVICE
Charles P. Forrest, 1306 St. Stephens Road, Mobile, Ala. 36603
Filed May 10, 1977, Ser. No. 795,500
Int. Cl.² A63B *67/00*
U.S. Cl. 273—55 R **7 Claims**

1. A portable running rope device for use by a runner to practice running on a generally flat surface comprising an elongated framework including a plurality of U-shaped cross members each having a ground engaging center portion and a pair of outwardly inclined upstanding legs, a coil spring connected to and projecting upwardly from each of said upstanding legs and capable of flexing in the direction of an applied force, a plurality of longitudinally extending center bars con-



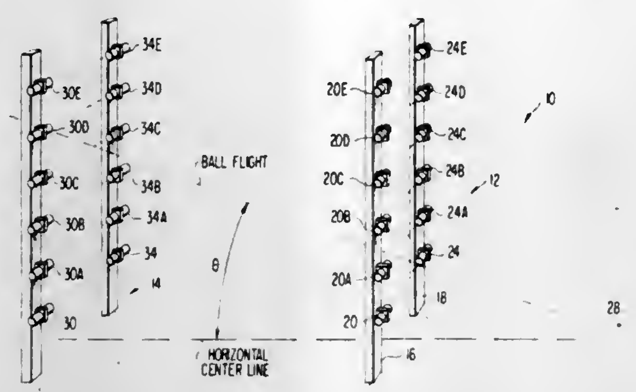
necting the U-shaped cross members together in a spaced relationship and a latticework of running ropes attached to the upper ends of said coil springs.

4,059,269
HOCKEY STICK OR THE LIKE, PARTICULARLY BLADE STRUCTURE THEREOF
Antti-Jussi Tiitola, Tampere, Finland, assignor to Karhu-Titan Oy, Finland
Continuation-in-part of Ser. No. 527,448, Nov. 26, 1974, Pat. No. 3,982,760. This application Feb. 13, 1976, Ser. No. 658,098
Claims priority, application Finland, Feb. 18, 1975, 750454
Int. Cl.² A63B *59/12*
U.S. Cl. 273—67 A **12 Claims**



1. In a stick to be used in ice hockey or the like, a lower blade structure having a core consisting in its entirety of a single body of wear-resistant material extending all the way from a front tip of the blade structure to a rear end thereof as well as all the way from a lower edge of the blade structure to a top edge thereof, said body having opposed side surfaces, a pair of opposed strengthening layer respectively joined to and almost but not entirely covering said opposed side surfaces of said core body, the latter having an elongated bottom edge region extending along the entire length of the blade structure and extending downwardly beyond said strengthening layers and said core body also having an upper elongated edge region extending along the entire length of the blade structure upwardly beyond said strengthening layers, whereby said wear-resistant core body is exposed at its elongated bottom and upper edge regions for providing the blade structure with wear and impact resistant regions at least along the lower and upper edges of the blade structure.

4,059,270
METHOD FOR CUSTOM FITTING GOLF CLUBS
Bernard Sayers, Box 423, Newport, N.J. 08345
Filed Nov. 18, 1975, Ser. No. 632,950
Int. Cl.² A63B *69/36*
U.S. Cl. 273—77 R **5 Claims**



1. A method of custom designing a golf club for a particular individual golfer which will give the maximum distance of ball travel, said method comprising the steps of:

a. providing means for adjusting the club head weight, lie angle, and golf club shaft length used by the particular individual golfer during the practicing of this method;

b. providing means for measuring the velocity and loft angle of golf balls hit by the particular individual golfer during the practicing of this method;

c. hitting a series of golf balls with a golf club the club head weight of which is a predetermined minimum and calculating the average velocity of said golf balls;

d. hitting another series of golf balls with a golf club the club head weight of which is incrementally greater than in the previous step and calculating the average velocity of said golf balls;

e. continuing to hit further series of golf balls with golf clubs having club head weights which are incrementally greater than in the previous step and calculating the average velocity of each series until a first maximum velocity is established;

f. calculating the swing weight of the golf club which produced said first maximum velocity;

g. hitting a series of golf balls with a golf club having a swing weight producing said first maximum velocity and a shaft the length of which is a predetermined minimum and calculating the average velocity of said golf balls;

h. hitting another series of golf balls with a golf club having a swing weight producing said first maximum velocity and a shaft length of which is incrementally longer than in the previous step and calculating the average velocity of said golf balls;

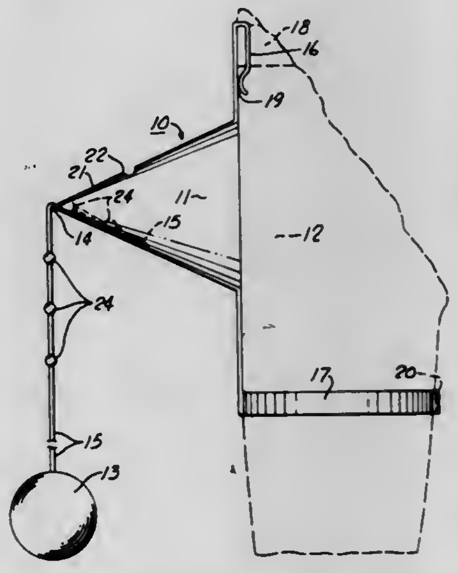
i. continuing to hit further series of golf balls using golf clubs having a swing weight producing said first maximum velocity and shafts the lengths of which are incrementally larger than in the previous step and calculating the average velocity of each series until a second maximum velocity is established;

j. hitting a series of golf balls with a golf club having a swing weight producing said first maximum velocity and a shaft length producing said second maximum velocity and a predetermined lie angle and calculating the average velocity of said golf balls;

k. continuing to hit further series of golf balls using golf clubs having a swing weight producing said first maximum velocity and a shaft length producing said second maximum velocity and a lie angle which is incrementally different than in the previous step and calculating the average velocity of each series until a third maximum velocity is established; and

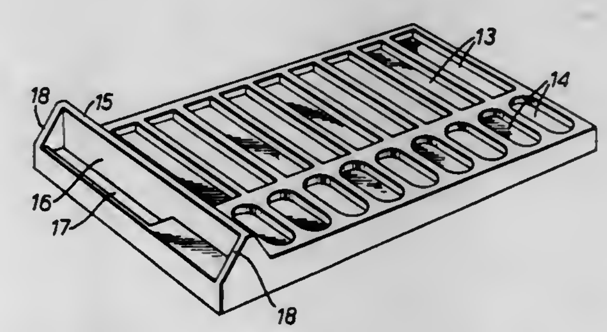
l. calculating the average lift-off angle of a series of balls hit with a golf club having a swing weight producing said first maximum velocity, a shaft length producing said second maximum velocity, and a lie angle producing said third maximum velocity and determining from said average lift-off angle the optimum loft angle for the particular individual golfer.

4,059,271
HIP MOUNTED TETHERED BALL GAME
Herman K. Dupre, Seven Springs, Champion, Pa. 15622
Filed July 23, 1976, Ser. No. 708,089
Int. Cl.² A63B *67/10, 67/16*
U.S. Cl. 273—95 A **5 Claims**



1. A hip mounted tethered ball game comprising a bracket having means to attach the same to a person at the hip region, said bracket having an extended portion to extend outwardly from a person's hip region, and a ball tethered to the extended end of said bracket by a tether, said bracket consisting of a horizontally positioned cone having a slot therethrough extending upwardly from the cone tip, at least one stop on said tether being larger in cross section than said tether, said slot being sized to pass said tether therethrough but too narrow to pass said stop, and an opening at the upward end of said slot sufficiently large to pass said stop therethrough.

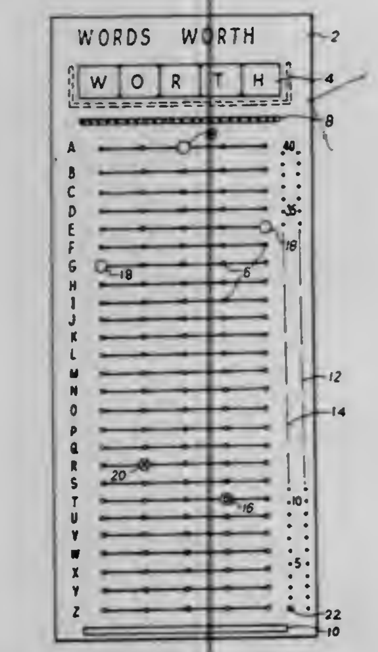
4,059,272
GAMES AND EDUCATIONAL DEVICES
Burke Cole Pullman, 14 St. Leonard's Terrace, London, S.W.3., England
Filed Jan. 12, 1976, Ser. No. 648,156
Claims priority, application United Kingdom, Jan. 10, 1975, 1054/75; Jan. 28, 1975, 3586/75; Apr. 5, 1975, 14070/75; Dec. 11, 1975, 50931/75
Int. Cl.² A63F *3/00*
U.S. Cl. 273—130 E **8 Claims**



1. Amusement or educational apparatus comprising a plurality of playing pieces carrying various different markings, a plurality of scoring pieces, different from said playing pieces, and a base having a plurality of transverse rows of locating formations or markings to locate and display a group of selected individual playing pieces, the said base also having additional locating formations or markings to locate and display at least one scoring piece in association with each row of

playing pieces, and including means for mounting a further row of selected playing pieces, and means for concealing said further row of playing pieces from a player observing the first mentioned group of playing pieces.

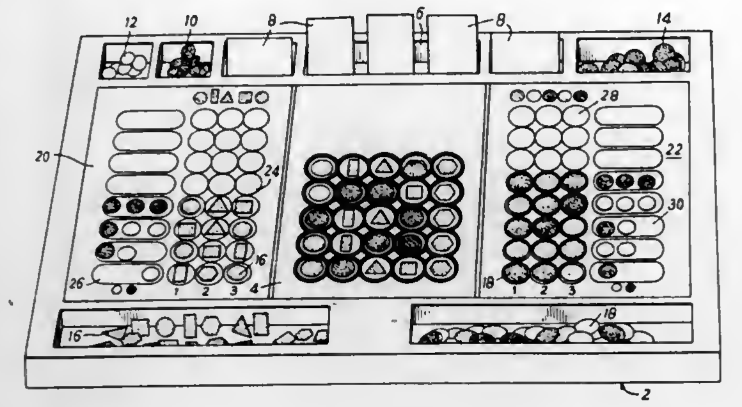
4,059,273
WORD GAME HAVING A BOARD AND A PLURALITY OF PIECES
Michael Kindred, Bilborough, England, assignor to Invicta Plastics Limited, England
Filed Dec. 20, 1976, Ser. No. 752,512
Int. Cl.[2] A63F *3/00*
U.S. Cl. 273—130 R **5 Claims**



1. A board game comprising a board having a reserved area adapted to display a target word selected by a first player, a shield capable of hiding the target word from the view of a second player, said board being further provided with a playing area composed of a plurality of rows and columns of playing positions, the number of the rows corresponding to the number of letters in the alphabet being used and each row being identified by a letter of that alphabet, the end portion of the playing area bearing the first part of said alphabet having an identifying characteristic and the end portion of the playing area bearing the last part of the alphabet having a contrasting characteristic, a plurality of test playing pieces each identical with one another, a plurality of first marker pieces having said first identifying characteristic and a plurality of second marker pieces having said second characteristic.

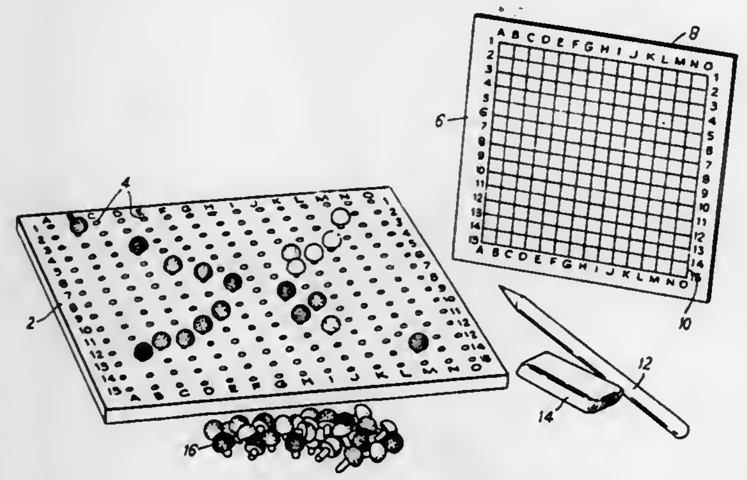
4,059,274
BOARD GAME INCLUDING CODE DEFINING PLAYING PIECES
Ronald Samson, Harborough Road, Oadby, Leicester LE2 4LB, and Derrick Botterill, 17, Lincoln Close, Tupsley, Hereford, both of England
Filed Jan. 19, 1976, Ser. No. 650,417
Int. Cl.[2] A63F *3/00*
U.S. Cl. 273—130 D **6 Claims**

1. A board game comprising a board, said board having a reserved area and two areas defining designated positions, a plurality of key playing pieces having two characteristics, one of which is from a first series of contrasted characteristics and the second of which is from a second series of contrasted characteristics, said playing pieces being adapted to be mounted on said reserved area of the board in a pattern chosen at will by a player to serve as a target code, means for shielding the chosen code of playing pieces when so mounted, a plurality of first test playing pieces conforming with the key playing pieces in respect of the first of said series of characteristics, a plurality of second test playing pieces conforming with the key playing pieces in respect of the second of said series of characteristics, each plurality of test playing pieces being mountable in one of said two designated positions on the board in successive groups with the object of simulating the respective characteristics of the key playing pieces in the code pattern, and



marker elements for mounting on said board to indicate the correctness of the characteristics and relative position of the test playing pieces in each successive group.

4,059,275
BOARD GAME
William Laurence Price, Harborough Road, Oadby, Leicester LE2 4LB, England
Filed Jan. 19, 1976, Ser. No. 650,301
Int. Cl.[2] A63F *3/00*
U.S. Cl. 273—130 D **1 Claim**

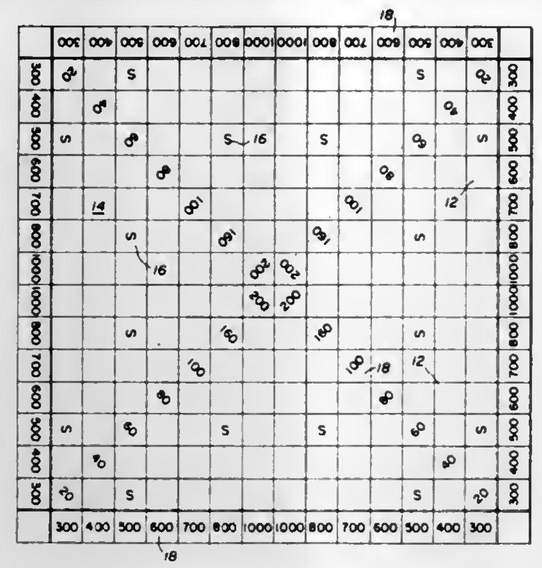


1. A game set comprising a board having means thereon identifying grid positions, a plan having means thereon for identifying like grid positions, said plan having two lines dividing said plan into at least four identifiable regions with said lines intersecting in at least one target point and said four regions all converging on said target point, and test pieces for placement on said board for identifying on said board selected test positions among said grid positions, said test pieces including at least five identifiable groups of pieces, the pieces of four of said groups corresponding to said four regions and the pieces of a fifth of said group corresponding to said lines whereby a player using said test pieces and said board may determine said target point.

4,059,276
BOARD GAME
Robert W. Wenlger, 401 Maryland Ave., Havertown, Pa. 19083
Filed Feb. 11, 1976, Ser. No. 657,090
Int. Cl.[2] A63F *3/00*
U.S. Cl. 273—134 D **6 Claims**

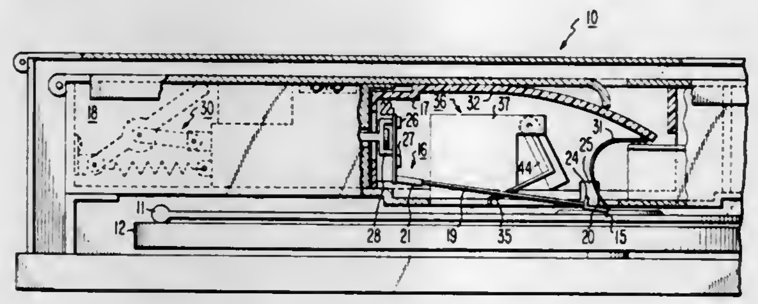
1. a game comprising:
a square flat board including thereon four playing sides,
a central area within said four playing sides containing a multitude of squares, each corner of said board being blank, squares along the sides of said central area being

marked with different values, squares within the central area being marked with different values,
said marked squares each having numerals designating the value of said square, four sets of manually movable play-



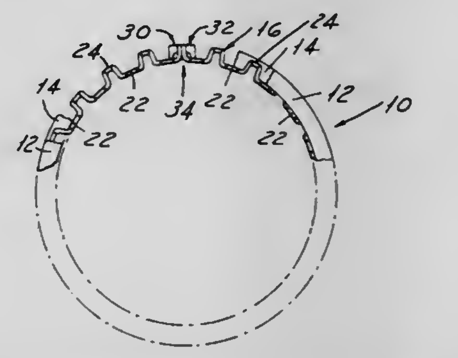
ing pieces used in the central area, each set containing as many pieces as there are squares in each board line between the blank corner squares, means to determine the number of spaces a player's piece may be moved.

4,059,277
STYLUS ARM LIFTING/LOWERING APPARATUS FOR A VIDEO DISC PLAYER SYSTEM
Ralph DeStephanis, Middlesex, N.J., assignor to RCA Corporation, New York, N.Y.
Filed Mar. 16, 1976, Ser. No. 667,387
Claims priority, application United Kingdom, Sept. 15, 1975, 37849/75
Int. Cl.[2] G11B *9/06, 3/02*
U.S. Cl. 274—23 A **5 Claims**



1. In a system for playing back prerecorded signals from a spirally grooved record disposed on a turntable rotatably mounted with respect to a base of said playback system; said system including a support member and a stylus arm; said stylus arm carrying a groove-riding stylus at one end thereof and being pivotally secured at the end thereof, remote from said one end, to said support member; an apparatus comprising:
1. a movable element secured to said support member for movement between a first location and a second location; said movable element including a permanent magnet;
2. a stylus arm rest secured to said movable element subject to engagement with said stylus arm in a region thereof remote from said pivoted end of said stylus arm;
the configuration of said stylus arm rest being such that said stylus arm rest occupies (a) an elevated position when said movable element is in said first location, and (b) a depressed position when said movable element is in said second location;
said stylus arm rest in said elevated position supporting said stylus arm in a manner precluding stylus/record contact;
said stylus arm rest in said depressed position permitting said stylus arm to establish said stylus/record contact when said stylus overlies said record for playback;
3. a stationary element secured to said support member; said stationary element including means for generating magnetic flux;
the location of said stationary element being such that said permanent magnet is located in proximity to said magnetic flux generating means when said stylus arm rest is in said elevated position; and
4. selectively operated means for providing a given polarity of energization of said magnetic flux generating means; and
wherein the orientation of said permanent magnet relative to said magnetic flux generating means is such that said permanent magnet is repelled away from said magnetic flux generating means during said energization of said given polarity; the repulsion of said permanent magnet causing motion of said stylus arm rest from said elevated position to said depressed position.

4,059,278
PISTON RING SPACER-EXPANDER WITH OVERLAP-PREVENTING EXPANDER JOINT
Lee H. Saylor, Muskegon, and Roy E. Overway, Grand Haven, both of Mich., assignors to Sealed Power Corporation, Muskegon, Mich.
Filed Aug. 5, 1976, Ser. No. 711,850
Int. Cl.[2] F02F *5/00*
U.S. Cl. 277—139 **10 Claims**

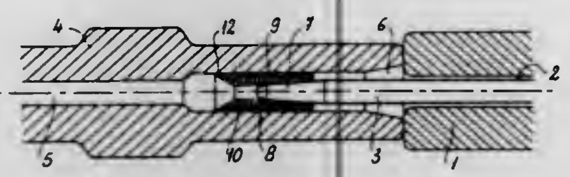


1. In a parted circular spacer-expander for use in a piston oil control ring and including a plurality of alternating concentric circumferentially spaced radially outer and inner crowns integrally interconnected by generally diverging legs, the improvement wherein each end crown at the parting of the ring has an end tab extending therefrom comprising a plurality of successive contiguous portions formed at substantially right angles with respect to each other, the first said tab portion being contiguous with an edge of said end crown and extending radially therefrom, other of said end tab portions extending back toward the corresponding end crown such that an edge of another of said tab portions is disposed at substantially the radius of said corresponding end crown, said end tabs being substantially self-supporting under stress from both the circumferential and radial directions.

4,059,279
HOLLOW PERCUSSION DRILL ROD WITH SEAL FOR CLEANING FLUID INLET TUBE
Roger Montabert, 19, Avenue des Colonnes, Bron (Rhone), France
Filed June 22, 1976, Ser. No. 698,495
Claims priority, application France, July 4, 1975, 75.21786
Int. Cl.[2] F16K *41/14;* B25D *17/02, 17/22*
U.S. Cl. 277—166 **7 Claims**

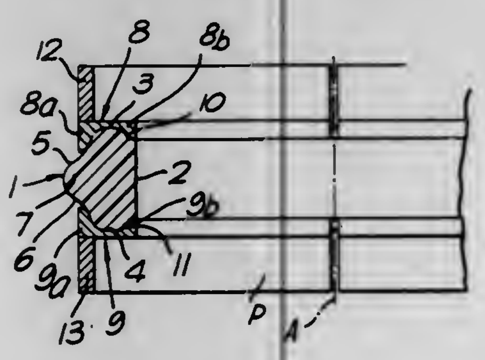
1. A percussion drill comprising a sealing device in a fluid injection circuit between a fluid inlet tube and a drill rod, the sealing device comprising a sealing socket which is engageable at one end on an end of the fluid inlet tube and has a bore complementary in shape to said one end of the fluid inlet tube, the sealing socket having an outer metal casing locatable in a bore in the drill rod, and a resilient member which is secured in

the casing and defines, at the other end of the socket, a flared part forming an annular lip which, when in a normal condition,



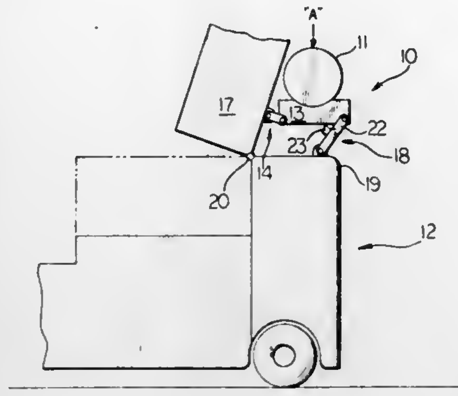
has a diameter larger than the diameter of the bore of the drill rod.

4,059,280
SEAL RING ASSEMBLY
Brian Geoffrey Eastwood, Woking, England, assignor to Hall & Hall Limited, Hampton, England
Filed July 2, 1975, Ser. No. 592,541
Int. Cl.² F16J *15/24*
U.S. Cl. 277—188 A **10 Claims**



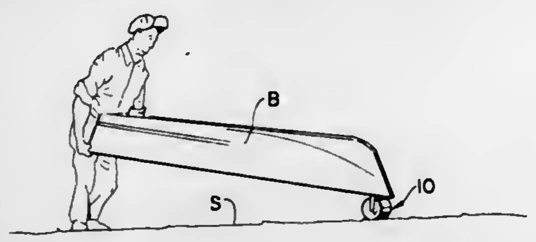
1. A seal ring assembly comprising
a. a sealing ring which is an annulus about a central axis, the sealing ring
i. having a radially inner and a radially outer periphery
ii. having a working surface at one of the radially inner and radially outer peripheries
b. a supporting ring which is an annulus about a central axis and of generally the same radius as the sealing ring, the supporting ring
i. being harder than the sealing ring and
ii. having a radially inner and a radially outer periphery and
iii. having a lip extending axially in one axial direction at the radially inner periphery and
iv. having a lip extending axially in the one axial direction at the radially outer periphery, the lip at the one of the radially inner and outer peripheries which corresponds to that periphery of the sealing ring which has the said working surface extending axially further than the other said lip, and
v. being separate from the sealing ring; and
c. a bearing ring separate from the supporting ring and being harder than the sealing ring and having one radial periphery of substantially the same radius as the periphery of the sealing ring which provides the working surface whereby the rings may be placed axially side by side in a seal ring assembly with the sealing ring adjacent to the supporting ring and the supporting ring adjacent the bearing ring, the sealing ring being overlapped and supported at its radially inner and outer peripheries by the lips of the supporting ring, the working surface being supported by the lip of greater axial extension.

4,059,281
MOUNTING ASSEMBLY FOR A CONTROLLABLY MOVABLE FLUID TANK
Dafydd W. Evans, Euclid, Ohio, assignor to Towmotor Corporation, Mentor, Ohio
Filed June 28, 1976, Ser. No. 700,241
Int. Cl.² B60K *15/08*
U.S. Cl. 280—5 A **10 Claims**



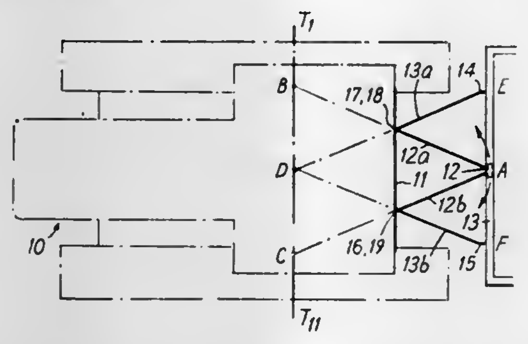
1. In a fluid tank mounting apparatus for connecting the fluid tank to a vehicle, the improvement comprising:
a vehicle frame;
a structure pivotally movable relative to the frame from a closed position in a direction towards said fluid tank to an open position;
first means for pivotally connecting a first preselected portion of the fluid tank to the pivotally movable structure of the vehicle; and
second means for pivotally connecting a second preselected portion of the fluid tank to the frame of the vehicle for moving the fluid tank between a first position at which said fluid tank is at a first position generally superjacent said pivotally movable structure and a second position at which said fluid tank is displaced from the first position rearwardly, in a direction generally away from the pivotally movable structure, in response to pivotal movement of said structure and maintaining the fluid tank at substantially a preselected attitude at and between said first and second fluid tank positions at which a preselected portion of the fluid tank is maintained at a higher elevation than other tank portions.

4,059,282
BOAT BOW DOLLY
Ervin Prickett, 11331 Kumquat St., Coon Rapids, Minn. 55433
Filed Sept. 8, 1976, Ser. No. 721,394
Int. Cl.² B60P *3/10*
U.S. Cl. 280—47.13 B **4 Claims**



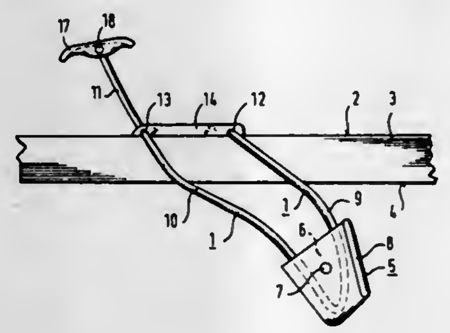
1. A dolly for transporting a boat over a surface comprising:
a substantially planar mounting plate adapted to be secured to the bow of a boat, and
a wheel bracket including a wheel rotatably mounted thereon removably secured to said mounting plate, said mounting plate including
depending flange means forming a slot for receiving said wheel bracket, and
means for removably locking said wheel bracket on said plate in said slot, said removable locking means including a substantially U-shaped resilient clip on said mounting plate in front and back of said slot, said clips including a free leg and a bight portion facing each other and said slot.

4,059,283
THREE-POINT TRACTOR LINKAGE
Peter Alfred Shelton, Capdella, Spain, assignor to Fiat Trattori S.p.A., Modena, Italy
Continuation of Ser. No. 418,041, Nov. 29, 1973, abandoned. This application Nov. 10, 1975, Ser. No. 630,783
Claims priority, application United Kingdom, Nov. 22, 1972, 53937/72; June 25, 1973, 30095/73
Int. Cl.² B60D *1/16*
U.S. Cl. 280—461 A **17 Claims**



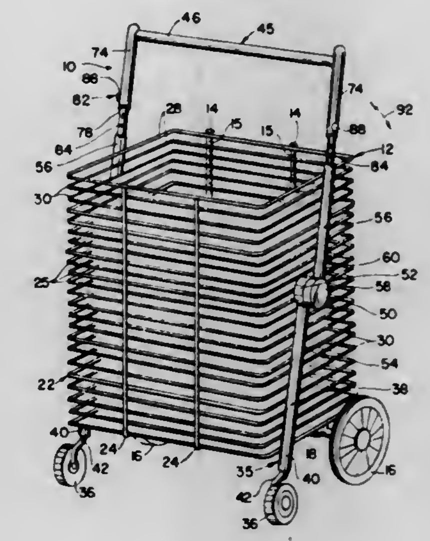
1. A three-point linkage for use in coupling farm implements to a tractor, comprising two lower links from the tractor to the lower points of the linkage, upper link means from the tractor to the upper point of the linkage in the form of two upper links each containing a hydraulic ram, the two upper links diverging from pivots at the upper point to pivots on the tractor, and control means including a valve mechanism interconnecting the cavities of the rams such that the lengths of the two upper links can be caused or permitted to vary by control of the rams such that (a) the upper links can float in unison in the fore and aft direction and (b) the upper point of the linkage can move laterally spontaneously.

4,059,284
SKI BRAKE MECHANISM
Günter Schwarz, Steinacherstr. 67, 8804 Au, Switzerland
Filed Mar. 17, 1976, Ser. No. 667,689
Claims priority, application Switzerland, Mar. 21, 1975, 3847/75; Sept. 9, 1975, 11759/75; Jan. 7, 1976, 188/76
Int. Cl.² A63C *7/10*
U.S. Cl. 280—605 **15 Claims**



1. A ski brake mechanism for use with a ski having a running surface, comprising a brake arm and an actuation portion which can be depressed by the ski boot, the brake arm and actuation portion being formed integrally from a common spring wire, the brake arm comprising essentially a substantially loop-shaped section of the spring wire providing two legs, means defining two transversely extending mutually spaced pivot shafts and means mounting said means defining the pivot shafts upon the ski, said two legs being connected with said means defining the pivot shafts, said actuation portion essentially comprising a lever-like wire section operatively connected with one of said legs.

4,059,285
HOME SHOPPING CART
Willie McCoy, P.O. Box 108, Wakefield Station, Bronx, N.Y. 10466
Filed Sept. 8, 1976, Ser. No. 721,335
Int. Cl.² B62B *11/00*
U.S. Cl. 280—651 **8 Claims**



1. A shopping cart, comprising:
a. a substantially vertically extending main frame,
b. laterally spaced main wheels rotatably mounted at the lower end of said main frame for movement of the cart along a supporting surface,
c. auxiliary frame means articulately connected to said main frame for movement relative thereto between a closed position substantially coplanar with said main frame to an open position where said auxiliary frame projects forwardly from said main frame,
d. an auxiliary wheel frame having a pair of auxiliary wheels at one end thereof and articulately connected to said auxiliary frame means and being adapted, in said extended position of the latter, to engage the supporting surface along which the cart is movable at locations spaced forwardly from said main wheels,
e. handle means adapted to be gripped by the user,
f. mounting means for removably coupling said handle means to said auxiliary wheel frame so as to obtain angular adjustment thereof for the convenience of the user of the cart, such that the relative angular relationship of said handle means to said auxiliary wheel frame may vary,
g. extension means operatively associated with said handle means to vary the length thereof between said mounting means and the free end thereof, and
h. said handle means includes:
i. a pair of legs removably secured to said mounting means at substantially one end thereof,
ii. a handle bar extending transversely across said auxiliary frame and adapted to be gripped by the user of the cart,
iii. a pair of arms having a bore therein and connected to said handle bar in spaced relationship with each other, said legs adapted to extend in telescopic relationship to said arms and within said bores,
iv. a spring in each said bore to apply a force between said arms and said legs, and
v. coupling means adapted to retain said handle bar in different extended positions relative to said legs.

4,059,286

WHEEL SUSPENSION FOR MOTOR VEHICLES

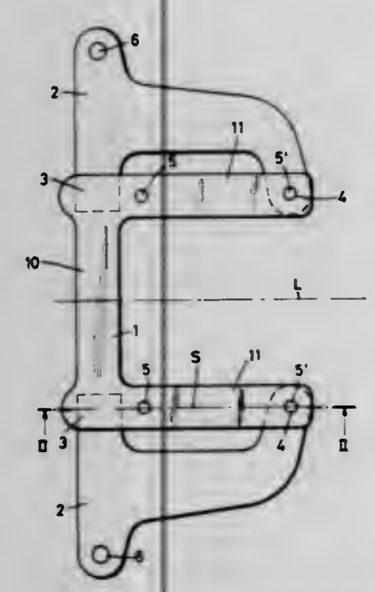
Heinz Otto, Wolfsburg, and Bernhard Ilsemann, Weddel, both of Germany, assignors to Volkswagenwerk Aktiengesellschaft, Wolfsburg, Germany

Filed July 14, 1976, Ser. No. 705,003

Claims priority, application Germany, Aug. 18, 1975, 2536060

Int. Cl.² B60G *3/20*

U.S. Cl. 280—673 **8 Claims**



1. In a wheel suspension for a motor vehicle in which transverse, longitudinal or oblique control arms in communication with the wheel supports of the vehicle wheels are articulated to a subframe by linkage bearings which include bearing bolts, and said subframe is releasably fastened to the vehicle chassis; the improvement wherein:

the bearing bolt of at least one said linkage bearing of each said control arm articulated to said subframe simultaneously serves to fasten said subframe to the vehicle chassis.

4,059,287

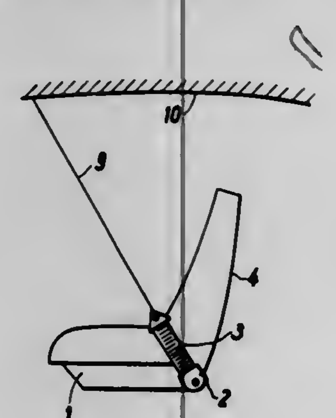
SAFETY BELT FOR MOTOR VEHICLES

Per Olaf Weman, Hashman, Germany, assignor to Sigmatex, A.G., Basel, Switzerland

Division of Ser. No. 550,098, Feb. 14, 1975, Pat. No. 3,977,701, which is a division of Ser. No. 316,953, Dec. 20, 1972, Pat. No. 3,887,212. This application May 13, 1976, Ser. No. 685,954

Int. Cl.² B60N *21/02*

U.S. Cl. 280—745 **3 Claims**



1. A safety belt apparatus for a motor vehicle comprising: a hip belt adapted to be fastened across the hips of an occupant in the vehicle, said hip belt having two ends, said hip belt secured permanently at the two ends adjacent to the vehicle floor, at least one belt roller attached to an end of said hip belt, and at least one traction means which unrolls the hip belt from the belt roller when the car door is opened and releases the belt so that it can be rolled up by the belt roller to bear tightly on the body of the occupant when he is seated in a seat of the vehicle; and wherein said traction means comprises at least one rope, one end of which is connected to an intermediate portion of said hip belt, means for mounting the other end of said hip belt to the roof of said vehicle, further means for displacing said other end of said hip belt in a fore and aft longitudinal direction of said vehicle.

4,059,288

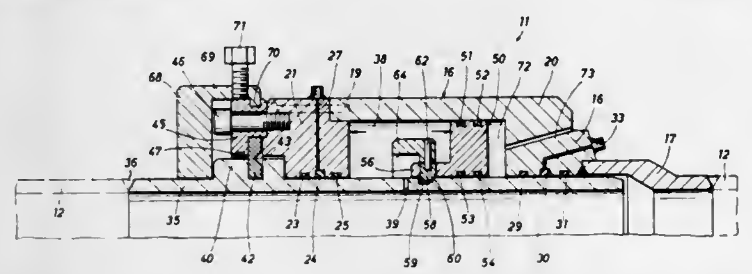
PRESSURE BALANCED SAFETY PIPELINE CONNECTOR

Harvey O. Mohr, Houston, Tex., assignor to HydroTech International, Inc., Houston, Tex.

Filed Sept. 1, 1976, Ser. No. 719,437

Int. Cl.² F16L *35/00, 37/00*

U.S. Cl. 285—2 **4 Claims**



1. A separable at least partially pressure balanced safety pipeline connector, comprising:

a housing having one axial end adapted for connection to said pipeline, and having the other axial end open;

a pipe extension member having one axial end adapted for connection to said pipeline for transmission of line fluid therethrough and with the other axial end arranged for being telescopically received coaxially in said housing in sealable relationship therewith;

shear means for restraining said housing and extension member against axial separation in response to axial tension forces applied thereto below a predetermined level and shearable above said to permit axial separation of said housing and extension member;

an annular piston supported between said housing and said extension member forming an annular pressure chamber about said extension member;

means for releasably attaching said piston to one of said housing and said extension member and being releasable after shearing of said shear means;

and conduit means for communicating line pressure to said annular chamber, whereby the effect of line pressure in said pipeline normally urging axial separation of said housing and said extension member is at least partially balanced by the pressure within said annular chamber.

4,059,289

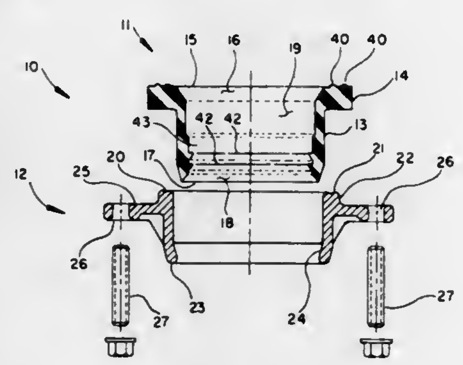
WASTE DRAIN CONNECTION

Earl Lavern Morris, Whittier, and Larry Fields, La Puente, both of Calif., assignors to Acorn Engineering Company, City of Industry, Calif.

Filed Sept. 10, 1976, Ser. No. 722,104

Int. Cl.² F16L *21/04*

U.S. Cl. 285—56 **13 Claims**



1. Apparatus for coupling the waste outlet of a plumbing fixture to a plumbing drain pipe in fluid communication and for effecting a fluid sealing relationship therewith, wherein the waste outlet of said plumbing fixture has an annular gasket-receiving receptacle thereabout, comprising:

a. a fluid sealing member of elastic material having a tubular portion adapted to form a sleeve for intimate engagement about the exterior of said drain pipe and further having an outwardly-extending flange adapted to form a gasket for fluid sealing disposition within said gasket receptacle; and

b. a sleeve and gasket compression member of non-elastic material having a through bore wherein said tubular portion of said fluid sealing member is mounted and one end of sleeve and gasket compression member is disposed in abutting relationship to said gasket of said fluid sealing member; and

c. means on said sleeve and gasket compression member for mounting said sleeve and gasket compression member to said plumbing fixture and for cooperatively effecting a corresponding alignment of said bore with said waste outlet of said plumbing fixture;

d. means on said sleeve and gasket compression member for adjusting the axial displacement of said sleeve and gasket compression member relative to said fluid sealing member after said sleeve and gasket compression member has been mounted to said plumbing fixture to adjustingly effect fluid sealing engagement between said one end of said sleeve and gasket compression member and said flange of said fluid sealing member and said gasket receptacle of said plumbing fixture; and

e. means about said through bore and the other end of said sleeve and gasket compression member for deforming said sleeve into gripping and sealing engagement with said plumbing drain pipe in response to axial displacement of said sleeve and gasket compression member with said fluid sealing member.

4,059,290

JOINT FOR CONNECTION OF GAS COCK TO METAL PIPE

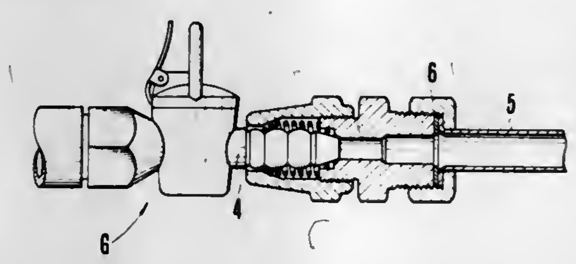
Hideo Ichimi, No. 33, Aza-Idogo, Ohaza-Tomiyoshishinden, Kiracho Hazu, Aichi, Japan

Filed Nov. 19, 1975, Ser. No. 633,337

Claims priority, application Japan, Dec. 4, 1974, 49-147230[U]

Int. Cl.² F16L *19/00, 55/00*

U.S. Cl. 285—169 **1 Claim**



1. A joint assembly for connecting a metal pipe to a gas cock comprising in combination

1. a connection cylinder having a mid portion, a right end portion, a left end portion and an open passageway extending centrally therethrough,
   a. said right end portion being externally threaded, and
   b. said left end portion
      having an externally threaded surface, and
      having an annular stepped portion located between said open passageway and said externally threaded surface,
2. a cap nut
   having an open passageway therethrough,
   having a right end portion that is internally threaded and which engages the externally threaded left hand portion of said connection cylinder, and
   having an inwardly tapered surface towards the left end of said cap nut
3. a gas cock hose fitting extending through the left end of said cap nut and inwardly thereof to a point adjacent to the left end of said connection cylinder, said gas cock hose fitting having a plurality of annular preformed constrictions and an externally tapered end portion,
4. a volute spring positioned between the exterior of said gas cock hose fitting and the interior of said cap nut, and
5. an O-ring disposed between the exterior inner end of said gas cock hose fitting and the said annular stepped portion of said connection cylinder, said O-ring engaging said externally tapered end portion of said gas cock hose fitting, whereby, when the externally threaded left hand portion of said connection cylinder and the internally threaded portion of said cap nut are screwed together the left end of the volute spring seats in a constricted portion of said hose fitting to thereby keep the fitting from being pulled to the left and the right end of the gas cock hose fitting abuts against the left end of said connection cylinder in a sealing relationship with the aid of said O-ring.

4,059,291

BRANCH CONNECTION

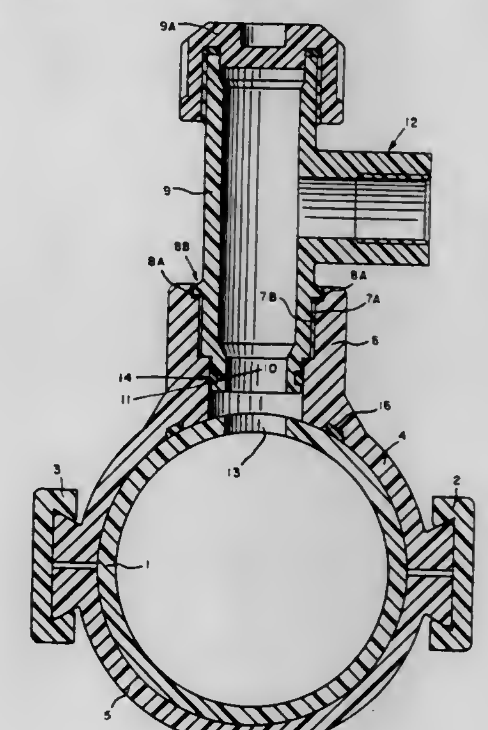
Petrus Marinus Acda, Enkhuizen, and Hans Edward Guitoneau, Bovenkarspel, both of Netherlands, assignors to Polva Nederland B. V., Netherlands

Continuation of Ser. No. 610,568, Sept. 5, 1975, abandoned. This application Feb. 1, 1977, Ser. No. 764,590

Claims priority, application Netherlands, Sept. 13, 1974, 7412153

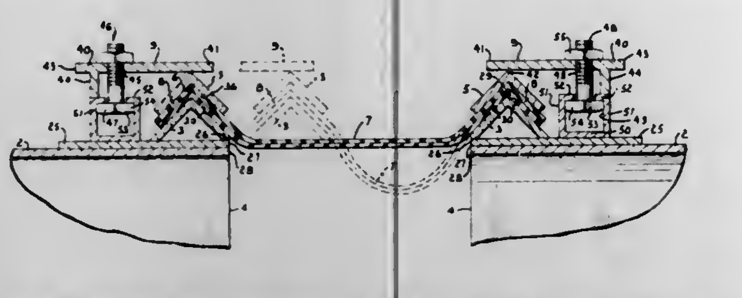
Int. Cl.² F16L *5/00*

U.S. Cl. 285—197 **6 Claims**



1. Branch connection for a pipe, which comprises a saddle-shaped part having an internally screw-threaded tubular member integral with said part a tee piece having an external screw thread which engages with the aforementioned screw thread and has the same pitch, and a sealing member which in the mounted condition is positioned between the inner surface of the tubular member and the outer surface of the tee piece, characterized in that the sealing member is located between concentric circular cylindrical wall portions of the tubular member and the tee piece which lie between the screw threads present thereon and those ends of the member and of the tee piece which are nearer to the pipe.

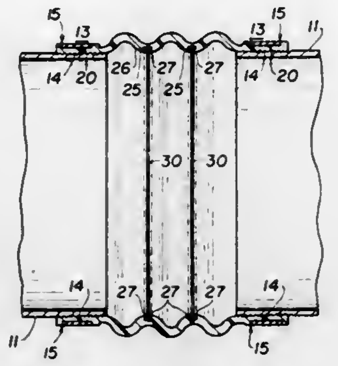
4,059,292
EXPANSIBLE COUPLING
Raymond E. Skates, 1612 Grand Ave., Kansas City, Mo. 64106
Filed July 12, 1976, Ser. No. 704,189
Int. Cl.² F16L *51/02*
U.S. Cl. 285—229 **9 Claims**



1. An expansible coupling for sealingly joining first and second duct ends, said coupling comprising:
a. first and second elongate rim members adapted for attachment to said first and second duct ends respectively, and having an outer surface;
b. first and second elongate clamping members, each of said clamping members having an inner surface thereof cooperatively mating with the outer surface of said first and second rim members respectively, one of said surfaces of said first rim and clamping members being a channel disposed longitudinally therein and one of said surfaces of said second rim and clamping members being a channel disposed longitudinally therein;
c. a flexible seal member having a pair of opposing marginal edge portions respectively clamped between the outer and inner surfaces of said first and second rim and clamping members;
d. means urging said rim and clamping members together;
e. said first and second rim members have an inverted V-shaped configuration;
f. said channel in said first and second clamping members is V-shaped;
g. said urging means comprises a plurality of clamps for positioning intermittently about each of said duct ends, said clamps being divided into first and second sets associated with said first and second duct end respectively;
h. each of the clamps of said first set includes:
1. a bar having a first end thereof engaging an outer portion of said first clamping member and a second end thereof being positioned rearwardly of said first clamping member, having a leg portion depending therefrom for engaging said first duct end, and supporting said bar second end in a spaced apart relation with said first duct segment, each of said bars having a transverse aperture therethrough disposed between the first and second ends thereof; and
2. fastening means positioned through said aperture and having a first end thereof for connection with said first duct end and a second end thereof engaging said bar and pulling inwardly thereon; and
i. said clamps of said second set being substantially similar to the clamps of said first set.

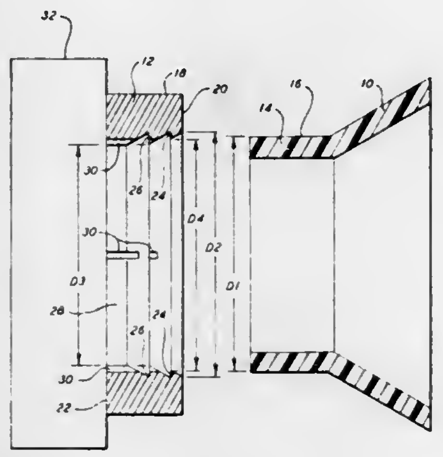
4,059,293
CONNECTOR
Clarence L. Sipler, Edgehill Road, Box 611, R.R. 1, Furlong, Pa. 18925
Filed Dec. 1, 1975, Ser. No. 636,438
Int. Cl.² F16L *21/00*
U.S. Cl. 285—236 **6 Claims**

1. A connector for joining together two rigid hollow tubular members which comprises
a flexible casing with tubular end portions for engagement with the tubular members and having a wall portion therebetween with exterior and interior surfaces,
said wall portion having
at least one integral reinforcement member extending around the circumference of the wall portion and disposed intermediate said end portions,
a circumferential groove in said member between the exterior and interior faces of said wall portion of said casing and communicating with the interior of the wall portion through said interior surface,



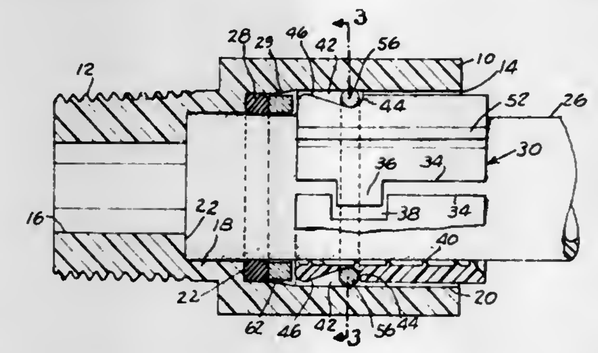
said groove having interior integral marginal flaps extending toward each other along each edge thereof, and
a rigid O-ring carried in said groove and retained therein by said flaps.

4,059,294
ANNULAR METAL FITTING FOR RIGID PLASTIC PART
Joseph R. Falcone, DeWitt, N.Y., assignor to Syracuse Plastics, Inc., Fayetteville, N.Y.
Filed May 10, 1976, Ser. No. 684,765
Int. Cl.² F16L *47/02*
U.S. Cl. 285—238 **5 Claims**



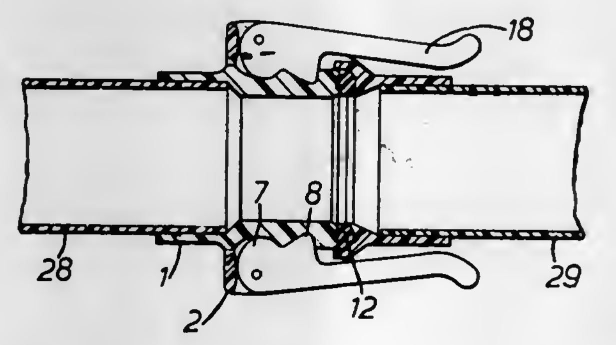
1. The combination comprising:
a. a rigid plastic part having an end portion with a cylindrical external surface of a first diameter;
b. an annular metal fitting having first and second ends and an internal bore extending therethrough to define an internal surface;
c. said fitting being of a second diameter at said first end and a third diameter at said second end;
d. said internal surface sloping inwardly from said first end, around the entire periphery thereof, at a predetermined angle of between 8° and 18° to a fourth diameter, said first diameter being smaller than said second diameter and larger than said third and fourth diameters, said fourth diameter being larger than said third diameter;
e. said internal surface extending radially outward from said fourth diameter to a diameter equal to said second diameter, thence sloping inwardly at substantially said predetermined angle to said third diameter, thence extending radially outward to said second diameter, thence sloping inwardly at substantially said predetermined angle to said third diameter, thence extending axially at said third diameter to said second end, thereby forming a plurality of teeth and grooves; and
f. ultrasonic welding means for permanently joining said plastic part and metal fitting with said external surface opposing said internal surface over the entire area of the latter, whereby high frequency vibrations causes friction between the metal fitting and the plastic part which generates sufficient heat to soften the plastic part to flow around the teeth and into the grooves.

4,059,295
TUBE COUPLING
Homer E. Helm, Troy, Mich., assignor to Gordon H. Cork, Birmingham, Mich.
Filed Nov. 12, 1976, Ser. No. 741,235
Int. Cl.² F16L *21/06*
U.S. Cl. 285—305 **10 Claims**



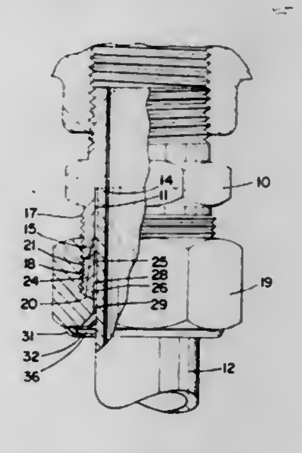
1. A releasable tube coupling comprising a body having a bore extending axially therethrough, said bore having an open end for receiving said tube, a resilient, annular tube clamping sleeve in said bore, said sleeve having a central bore through which the tube is adapted to be inserted, said sleeve being circumferentially contractible to cause the bore thereof to tightly grip the outer cylindrical surface of the tube, said body having a pair of apertures extending therethrough in a direction transversely of the axis of the bore, said apertures intersecting said bore and being spaced apart symmetrically with respect to the axis of the bore, the outer surface of said sleeve having a pair of diametrically opposed, radially outwardly inclined cam surfaces thereon, said cam surfaces being aligned one with each of said apertures and clamp means extending through said apertures and engaging said cam surfaces such that the inner periphery of the sleeve at least frictionally engages the tube inserted therethrough, said apertures restraining movement of said clamp means in a direction axially of the bore and radially outwardly of the bore, whereby, when an axially outward force is applied to the tube, said clamp means bear against said cam surfaces and exert radially inwardly directed force against said sleeve to more firmly grip the tube.

4,059,296
QUICK-ACTION COUPLING FOR PIPES OR TUBES
Constantin George Panourgias, Moschaton, Piraeus, Greece, assignor to Hellenic Plastics and Rubber Industry, Moschaton, Piraeus, Greece
Filed Nov. 11, 1975, Ser. No. 630,895
Claims priority, application Greece, Nov. 12, 1974, 239
Int. Cl.² F16L *37/18*
U.S. Cl. 285—312 **1 Claim**



1. A quick-action pipe or hose coupling comprising a male plastics sleeve member and a female plastics sleeve member said members having free ends for attachment to respective free ends of first and second pipes or hoses to be coupled together and said male sleeve member having an opposite end for engagement with an internal annular sealing surface on said female sleeve member, said female sleeve member being shaped to receive said male sleeve member and having pivotally attached thereto a pair of diametrically opposed levers which can swing between locking and unlocking positions, the exterior of said male sleeve member having an annular recess of arcuate cross-section and an annular V-shaped groove axially spaced from said recess and disposed between the latter and said opposite end of said male sleeve member, one wall of said groove providing a planar generally upright abutment surface which faces toward said recess, each of said levers including a first projection shaped to cooperate with said recess in said male sleeve member so that upon swinging movement of said levers toward their locking positions the sleeve members are urged toward each other, each of said levers including a V-shaped projection having a planar surface which engages said abutment surface when the lever is in its locking position to prevent axial separation of the sleeve members.

4,059,297
TUBE COUPLING
Darwin R. Grahl, and Cary Haramoto, both of Newark, N.Y., assignors to Parker-Hannifin Corporation, Cleveland, Ohio
Filed Mar. 8, 1976, Ser. No. 664,532
Int. Cl.² F16L *19/08*
U.S. Cl. 285—340 **1 Claim**

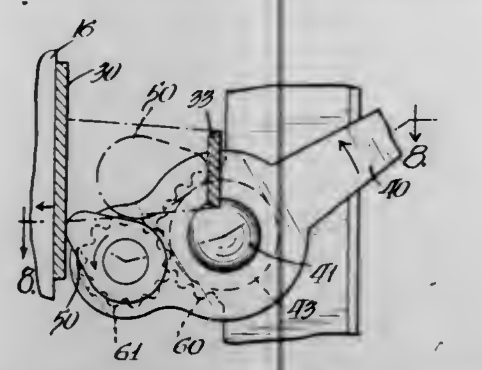


1. A coupling for tubes comprising a body having a bore for receiving a tube, a nut, adjustable interengaging means on the nut and body operable for moving the nut toward the body, said nut and body when interengaged forming a chamber closed at its axially outward end, a deformable sleeve within said chamber, said nut and sleeve each having a bore for receiving the tube, said sleeve being engageable with the nut and body so as to be actuated and deformed thereby into gripping engagement with the tube, and a metal member carried by the nut axially outwardly of said chamber and being operable independently of actuation of the sleeve for engaging and holding the tube within the nut and sleeve prior to actuation and deformation of the sleeve into gripping engagement with the tube, said sleeve providing the main grip upon the tube when deformed by the nut as aforesaid said member being spaced from said sleeve and at all times out of contact therewith.

4,059,298
WINDOW LOCK
Marlo G. Van Klompenburg, Owatonna, Minn., assignor to Truth Incorporated, Owatonna, Minn.
Filed Sept. 27, 1976, Ser. No. 727,257
Int. Cl.² E05C *3/08*
U.S. Cl. 292—199 **10 Claims**

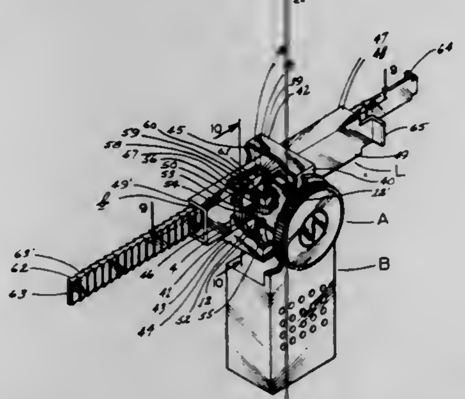
1. A lock having a casing and a separate keeper with spaced-apart members for locking to the casing, a cam finger engageable with one of said keeper members to draw said keeper

toward the casing and lock the keeper to the casing and engageable with the other keeper member to initiate movement of the keeper from the casing, a handle mounted on said casing for pivotal movement about a pivot axis and having means thereon defining a second axis movable by handle pivoting to and from a position between said spaced-apart members, means



mounting said cam finger on said handle for rotation about said second axis remote from said pivot axis, and means operable during pivoting of said handle and bodily movement of said cam finger to cause rotation of the cam finger about said second axis from a position pointing toward one keeper member to a position pointing toward the other keeper member.

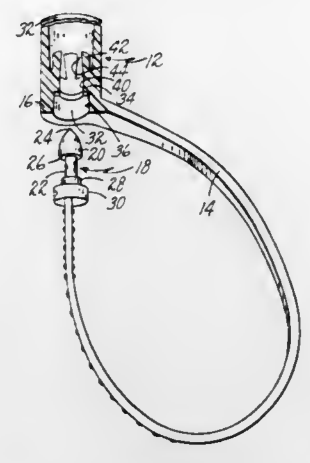
4,059,299
AUXILIARY PORTABLE LOCK
Orville P. Huntley, 15254 Calle Juanita, San Diego, Calif. 92129
Filed Mar. 3, 1976, Ser. No. 663,542
Int. Cl.^{2} E05C *19/18*
U.S. Cl. 292—294 **14 Claims**



1. An auxiliary door lock comprising a lock body having means defining a casing, means defining a housing receiving said lock body casing for rotational movement of the latter within the former, means latchably interengaging said casing and said housing in selected relative position, an elongated element engaged to said casing for axially linear movement responsive to rotation of said casing, means defining a sleeve rigid with said housing and having its major axis normal to the longitudinal axis of said lock body, a toothed member freely extending through said sleeve for projection at its ends therebeyond, and cooperating means comprising a component carried on said elongated element interengageable with said toothed member for maintaining same in selected relative position in said sleeve, and means provided on one end of said toothed member engageable with the door to be locked.

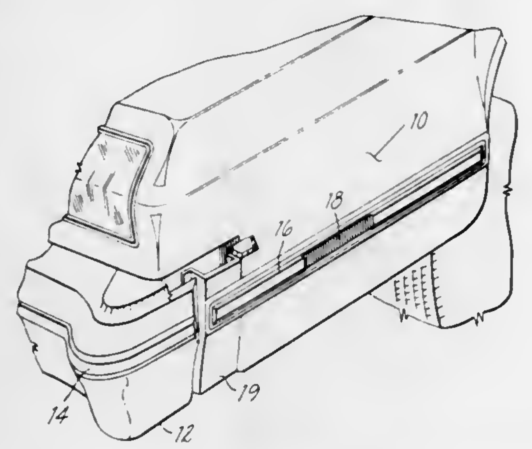
4,059,300
SEAL
Sigurd Manfred Moberg, Orange, and George A. Lundberg, Pompton Lakes, both of N.J., assignors to E. J. Brooks Company, Newark, N.J.
Filed Nov. 12, 1975, Ser. No. 630,965
Int. Cl.^{2} B65D *63/00*
U.S. Cl. 292—322 **3 Claims**

1. The method of making a locking seal, comprising the steps of molding a seal blank having an elongated housing open at both ends and an integral shackel extending therefrom, said shackle having a stud on the remote end with an enlarged head forming a rearwardly facing shoulder, said housing having a series of fingers disposed therein having free ends spaced from the internal surface of the housing and extending toward one end of the housing, assembling into said one end of the housing



a stud centering collar, said collar having a central opening adapted to receive the enlarged head of an assembled stud, and closing said one end of the housing to confine the collar between the free ends of the fingers and the closed end.

4,059,301
MOLDING RETAINER
Engelbert Anthony Meyer, Bloomfield Hills, Mich., assignor to USM Corporation, Boston, Mass.
Filed June 1, 1976, Ser. No. 691,283
Int. Cl.^{2} B60R *19/00*
U.S. Cl. 293—62 **11 Claims**



1. In an automobile body and bumper assembly wherein relative movement takes place between a body panel and bumper, each of which carries a portion of an aligned molding thereon, the improvement comprising;

a resilient member for receiving the molding on the body panel in engagement therewith near the body molding end adjacent the aligned molding portion on the bumper, and means affixing said resilient member to the automobile body panel whereby movement of the bumper relative to the body is effective to cause the body molding to move away from the body by causing flexure of said member.

4,059,302
METAL CHAIN SLING
George Barthule, Wheeling, Ill., assignor to Liftex Slings, Inc., Libertyville, Ill.
Filed Apr. 19, 1976, Ser. No. 678,227
Int. Cl.^{2} B66C *1/18*
U.S. Cl. 294—74 **12 Claims**

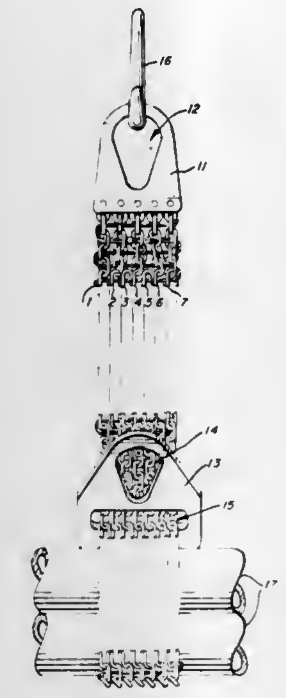
1. A sling comprising:

a plurality of metal chains placed in side-by-side parallel arrangement,

a metal terminal at each end of the sling, with both ends of at least some of the chains being connected thereto,

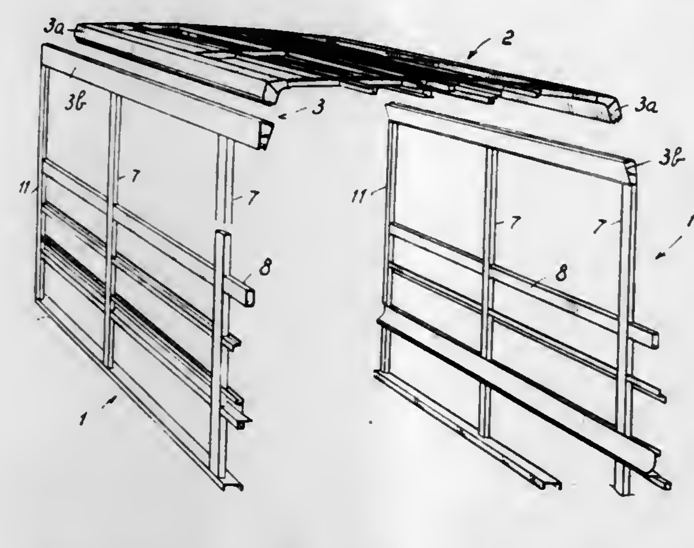
the metal chains being positioned with the links in a plurality of rows lateral to the length of the sling,

the links in even-numbered rows being at an angle of approximately 45°, and the links in the odd-numbered rows being at an angle of approximately 135°, from the top bearing surface of the sling, and with the links in each row being at an angle of approximately 90° with respect to the links in each adjoining row, and



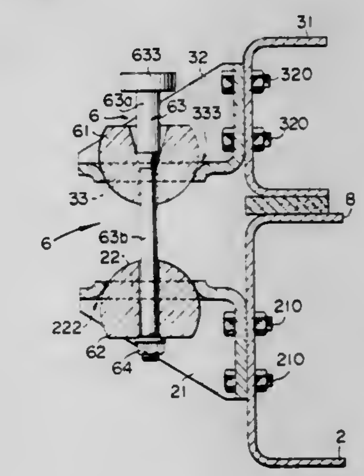
a flexible metal cable threaded in a serpentine manner through the center of all the links in an odd-numbered row, looped back and threaded through the center of all the links in the adjoining even-numbered row, then looped back and threaded through the center of all the links in the adjoining next highest odd-numbered row, then looped back and threaded through the center of all the links in the adjoining next highest even-numbered row, and then looped and threaded back and forth through the adjoining rows of links in the described serpentine manner for most of the length of the sling.

4,059,303
LIGHT ALLOY BODY STRUCTURE, PARTICULARLY FOR TRANSPORT VEHICLES, AND A PROCESS FOR ITS FORMATION
Ambrogio Mauri, Via Garibaldi, 254, Desio, (Milan), Italy
Filed Mar. 2, 1976, Ser. No. 663,163
Int. Cl.^{2} B62D *33/00*
U.S. Cl. 296—28 M **2 Claims**



1. A light alloy body structure having a longitudinal extension, a widthwise extension and an upward extension, particularly for transport vehicles, including a top structure having opposite composite longitudinal side edge longeron members, opposite side wall structures fixed respectively on said composite longitudinal side edge longeron members, a front wall structure and a rear wall structure, wherein said composite side edge longeron members comprise each a first and a second elongated shaped hollow box section member having each a reinforcing inner cross-piece like web, a mating longitudinal edge surface on each of said box section members facing each other and having longitudinally extending mating tongue and groove formations for rapid assembling and for rigid mutual connecting therewith, said first shaped hollow box section member having a generally arcuated cross-section with an upper and a lower portion, said upper portion extending in alignment with said top structure and being rigidly connected therewith thereby to form a rigid unit therewith, said lower portion extending in alignment with the respective side wall structure and being rigidly connected therewith thereby to form a rigid unit therewith and means for rigidly connecting said front wall structure and said rear wall structure with said opposite side wall structures.

4,059,304
ENERGY ABSORBING APPARATUS FOR VEHICLES
Akira Yamanaka, Yokohama, Japan, assignor to Mitsubishi Jidosha Kogyo Kabushiki Kaisha, Japan
Filed Jan. 9, 1976, Ser. No. 647,913
Claims priority, application Japan, Jan. 14, 1975, 50-7894[U]
Int. Cl.^{2} B62D *1/00;* F16F *7/12*
U.S. Cl. 296—35 R **16 Claims**



1. Impact force absorbing apparatus for vehicles, comprising:

a die-supporting bracket member disposed to be rigidly mounted on a first portion of a vehicle, the bracket member having means defining a die bearing surface;

a die element having a die hole and having a curved die body surface which constitutes a surface of rotation of a generatrix, the die element being swingably supported by the die bearing surface and that surface being similar to a portion of the die body surface;

a guide-supporting bracket member disposed to be rigidly mounted on a second portion of the vehicle, the latter member having means defining a guide bearing surface;

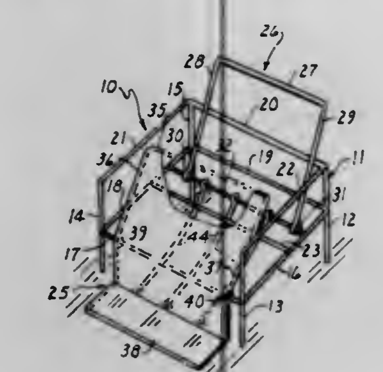
a guide element having a guide hole and having a curved guide body surface similar to the die bearing surface; and

an elongate, drawable and plastically-deformable member having, in axial succession, a large-diameter portion extending from one end of the die hole and a small-diameter portion extending through the die hole and into, through and from the guide hole, the deformable member being fastened to the guide element, remotely from the die element;

whereby, when an impact force exceeding a given value moves the first portion relative to the second portion of the vehicle, both elements turn on their respective bearing surfaces and subject the deformable member to plastic

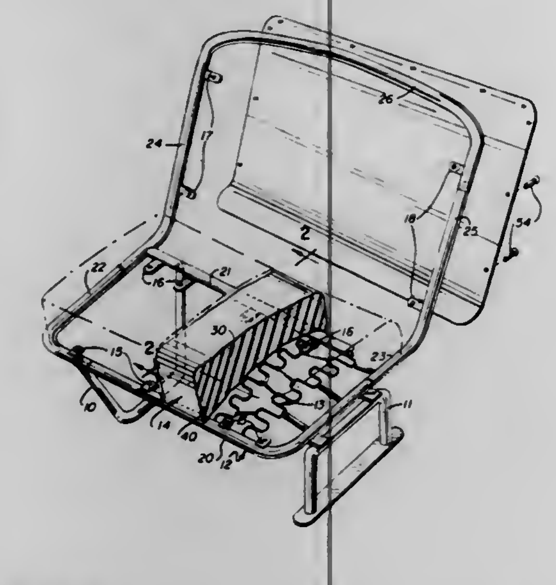
deformation by drawing the large-diameter portion into the die hole to absorb the impact force.

4,059,305
SEAT AND FOOT REST TILTING CHAIR
Vincent T. Ammirata, 7 The Terrace, Middletown, N.J. 07748
Filed Dec. 30, 1975, Ser. No. 645,466
Int. Cl.^{2} A47C *1/02*
U.S. Cl. 297—338 **3 Claims**



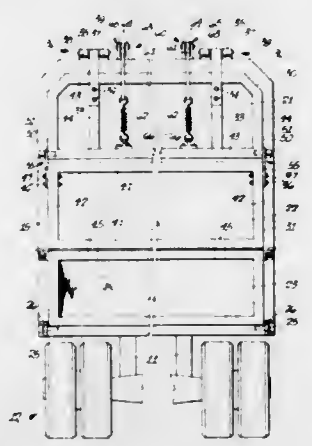
1. An invalid chair for holding a patient in a sitting position comprising a single rigidly connected chair base frame formed with four upright supports joined in a square relationship by side, front and back rails and provided with a seat support rail, two side arm support rails connected to said four upright supports as a part of said single rigid frame, a cross bar extending between said side rails adjacent said seat support rail and a back rest frame pivotally connected to said crossbar, a single rigidly formed footrest and seat supporting frame pivotally mounted to said front rail, and resilient straps connected at one end to the footrest portion of said footrest and seat supporting frame and connected at the other end to said cross bar, whereby said straps resist the backward and downward movement of said seat portion of said footrest and seat supporting frame.

4,059,306
SEAT WITH REMOVABLE SEAT CUSHION
Arthur J. Harder, Jr., Franklin Park, Ill., assignor to Coach and Car Equipment Corporation, Elk Grove Village, Ill.
Filed July 26, 1976, Ser. No. 708,480
Int. Cl.^{2} A47C *5/06*
U.S. Cl. 297—452 **7 Claims**



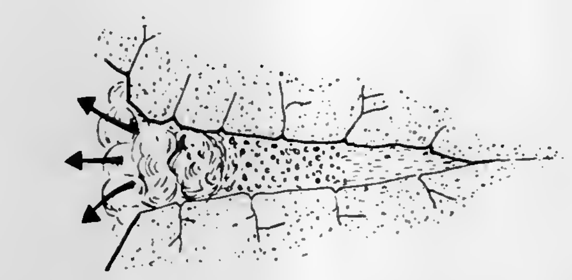
1. In a seat;
a seat frame including front and rear frame members;
serpentine spring means located between said front and rear frame members;
a plurality of brackets extending rearwardly from said front frame member;
an elastically deformable seat cushion resting atop and supported by said serpentine spring means;
a narrow, rigid, non-elastic strip attached to the bottom of said seat cushion at the front end thereof and overlying said brackets;
a plurality of threaded fastener means fixedly mounted on said rigid strip;
a removable fabric cover completely enclosing said cushion;
said fabric cover comprising a bottom underlying the entire bottom of said cushion and having a front end portion underlying said rigid strip;
a plurality of openings in the bottom of said cover at the front end portion thereof, there being an opening for, and in registry with, each fastener means on the rigid strip;
threaded means for securing each of said fastener means to a respective one of said rearwardly extending brackets;
and zipper means on the bottom of said cover, said zipper means extending coextensive with said rigid strip;
said rigid strip having a rear edge located substantially no further rearwardly than said rearwardly extending brackets;
said rigid strip being narrow (a) enough to permit removal of the elastically deformable cushion from within it cover when said zipper means is open and (b) wide enough to mount said threaded fastener means thereon.

4,059,307
VEHICLE TAILGATE ASSEMBLY
Jacob J. Neufeldt, Box 597, Lethbridge, Alberta, Canada (T1J 3Z4)
Filed Sept. 16, 1976, Ser. No. 723,910
Claims priority, application Canada, Oct. 1, 1975, 236797
Int. Cl.^{2} B60P *1/26*
U.S. Cl. 298—23 R **8 Claims**



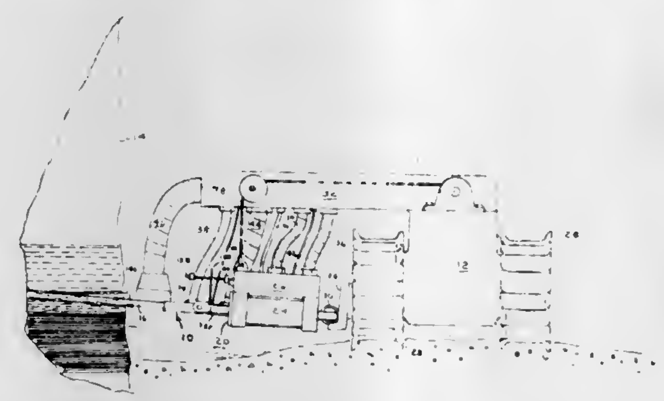
1. A tailgate assembly, for a tiltable body of a truck, movable between opened and closed positions, comprising first and second gate members, means connecting at least one of said members to said body, means normally locking said assembly in a closed position, means biasing said assembly towards an opened position, said locking means being responsive to tilting of said body to permit said biasing means to move said assembly to said opened position and wherein said assembly further includes a third gate member pivotally connected at its lower edge to said body, said third gate member having its upper edge abutting the lower edge of said second gate member, and means for maintaining said third gate in a closed position.

4,059,308
PRESSURE SWING RECOVERY SYSTEM FOR OIL SHALE DEPOSITS
Durk J. Pearson, Palos Verdes Estates, and Jack R. Bohn, Rancho Palos Verdes, both of Calif., assignors to TRW Inc., Redondo Beach, Calif.
Filed Nov. 15, 1976, Ser. No. 741,637
Int. Cl.^{2} E21C *41/10*
U.S. Cl. 299—5 **18 Claims**



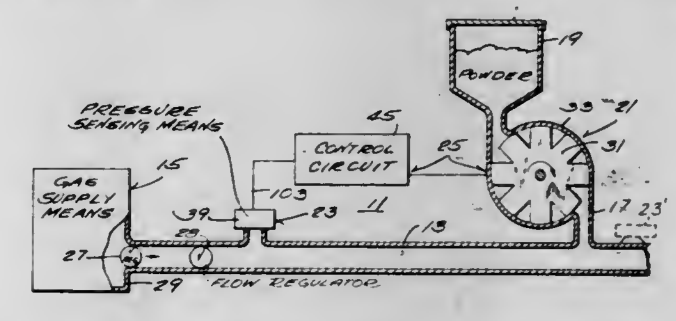
1. A process for the in-situ recovery of hydrocarbon values and associated minerals from subsurface oil shale deposits in which a gas-tight retort chamber can be produced comprising the steps of:
a. drilling into said oil shale deposits;
b. injecting steam into said shale deposits at varying pressures cycled over a predetermined time to dissolve and extract said associated minerals which are water soluble thereby forming a substantially gas-tight chamber;
c. injecting hot, non-oxidizing gas into said shale deposit at varying pressures cycled over a predetermined time in said chamber whereby said associated minerals are decomposed and hydrocarbon fluids extracted;
d. injecting a solvent-surfactant into said deposit at varying pressures cycled over a predetermined time and extracting said decomposed minerals and hydrocarbon fluids;
e. removing said solvent-surfactant from said deposit;
f. instituting a flame front and injecting air and water at varying pressures cycled over a predetermined time to combust hydrocarbon residue to produce liquid and gaseous hydrocarbons, CO, and H_2; and
g. filling said chamber with a fluid selected from the group consisting of water, aqueous solutions, and aqueous slurries.

4,059,309
APPARATUS AND METHOD FOR CUTTING ELONGATED SLOTS IN EARTH FORMATIONS
James M. Cleary, 92 McCallum Drive, Falmouth, Mass. 02541
Continuation-in-part of Ser. No. 461,301, April 16, 1974, Pat. No. 3,917,349, and Ser. No. 519,648, Oct. 31, 1974, abandoned, which is a continuation-in-part of Ser. No. 461,301,. This application Aug. 12, 1975, Ser. No. 604,055
Int. Cl.^{2} E21C *47/00*
U.S. Cl. 299—18 **11 Claims**



1. Apparatus for cutting in earth formations a deep slot having a large depth to thickness ratio comprising; a long support means disposed adjacent the advancing edge of the slot and extending from outside the slot to its full depth; cutting means guided on the forward side of said support; a passage extending the full length of the support adapted to discharge a fluid into said forward clearance to flush material from the slot; a second passage extending from outside the slot along the support to an intermediate depth for discharging paste mixture into the excavated region at the rear under pressure which acts on the sides of the slot preventing the slot from closing on the support and which acts on the rearward facing area of thes support providing the force required to move the support forward against the advancing edge of the slot; projections on the forward portion of said support making close contact with both sides of the slot to its full depth so as to prevent the flow of paste mixture from the excavated region at the rear of the support into the forward clearance; and motive means coupled to the outer end of said support supplying guidance and control to the support, supplying paste and fluid under pressure to said passages, and supplying energy to said cutting means.

4,059,310
APPARATUS AND METHOD FOR UNIFORM POWDER FEED
John J. Waskiewicz, Wauwatosa, and John H. Winston, Menomonee Falls, both of Wis., assignors to Outboard Marine Corporation, Waukegan, Ill.
Filed July 16, 1973, Ser. No. 379,361
Int. Cl.^{2} B65G *53/66*
U.S. Cl. 302—42 **12 Claims**

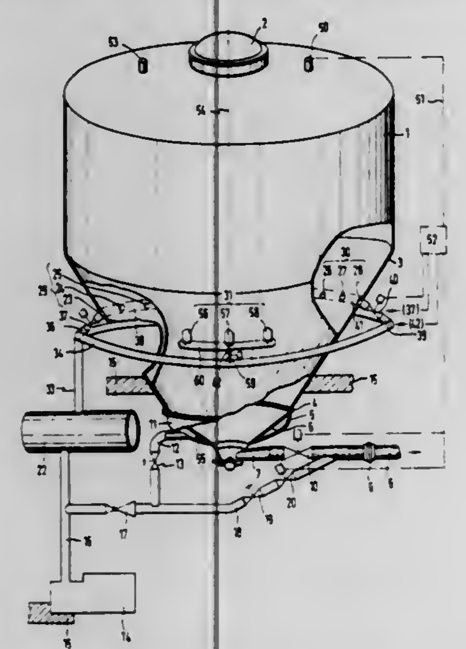


12. Apparatus for uniformly feeding a substance into a carrier gas, said apparatus including a carrier gas conduit, a duct communicating with said conduit for feeding the substance into the conduit, means for supplying into said conduit upstream of said duct, a flow of carrier gas which is maintained under a constant pressure condition above atmospheric prior to supply into said duct, a feed device communicating with said duct and operable at a variable feed rate to supply the substance through said duct to said conduit for delivery in said conduit solely in response to the introduction of carrier gas, means for sensing one of the conditions in said conduit, and means connected to said condition sensing means for maintaining a uniform feed of the substance into the carrier gas flowing in said conduit by varying the feed rate of said feed device in accordance with variation of said one condition in said conduit.

4,059,311
PROCESS FOR DISCHARGING BULK MATERIAL FROM A SILO
Artur Spitzer, Mosbach, Baden; Hartmut Biedert, Sulzbach, both of Germany, and Fritz Gramlich, deceased, late of Mosbach, Baden, Germany (by Ute Gramlich, legal representative), assignors to Spitzer Silo-Fahrzeugwerk KG, Mosbach, Baden, Germany
Filed Apr. 27, 1976, Ser. No. 680,663
Claims priority, application Luxembourg, Apr. 30, 1975, 72387
Int. Cl.^{2} B65G *53/66, 53/38*
U.S. Cl. 302—53 **8 Claims**

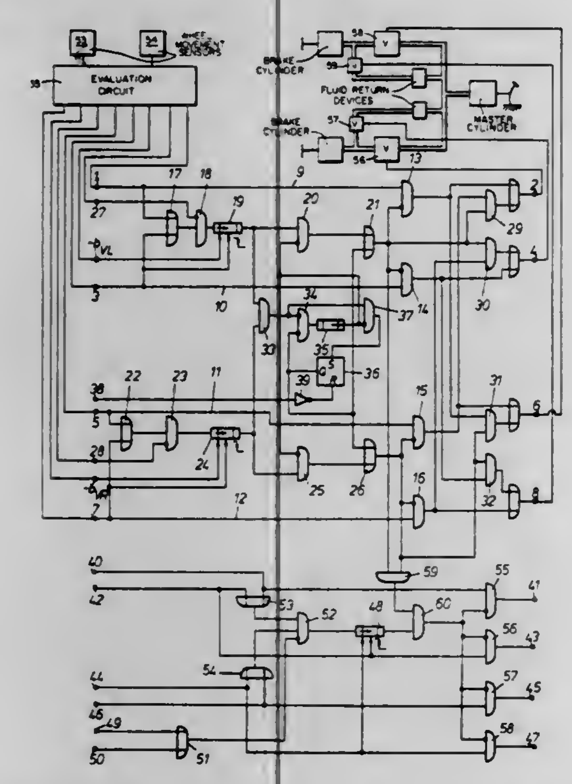
1. A process for evacuating pneumatically conveyable bulk material from the downwardly tapering hopper of a silo into a pneumatic conveyor line whose capacity to effectively convey material from the silo is limited by a predetermined maximum

quantity of air flowing therethrough per unit of time and which communicates with a foraminous portion of the hopper, comprising the steps of continuously admitting compressed air through the foraminous portion of the hopper at a first rate per volume to loosen the material in the hopper and to effect the entry of material into and the evacuation of material through the conveyor line as long as the pressure in the silo is between a predetermined maximum and a predetermined minimum value; closing the conveyor line when the pressure in the silo



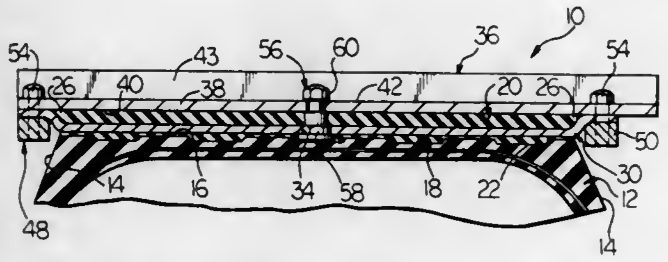
drops below said minimum value, particularly as a result of bridging of material in the silo and/or the formation of chimneys; admitting into the silo compressed air at least at one location above the foraminous portion of the hopper for an interval of 0.5 to 1 second and at a second rate which is between ten and twenty times said first rate, the maximum quantity of air which is admitted into the silo on the time average basis being at most equal to said predetermined quantity; and opening the conveyor line when the pressure in the silo rises above said minimum value.

4,059,312
ANTI-LOCKING CONTROL SYSTEM
Wolf-Dieter Jonner, Sandhausen, Germany, assignor to Teldix GmbH, Heidelberg, Germany
Filed Sept. 24, 1976, Ser. No. 726,276
Claims priority, application Germany, Sept. 27, 1975, 2543178
Int. Cl.² B60T *8/00*
U.S. Cl. 303—92 **7 Claims**



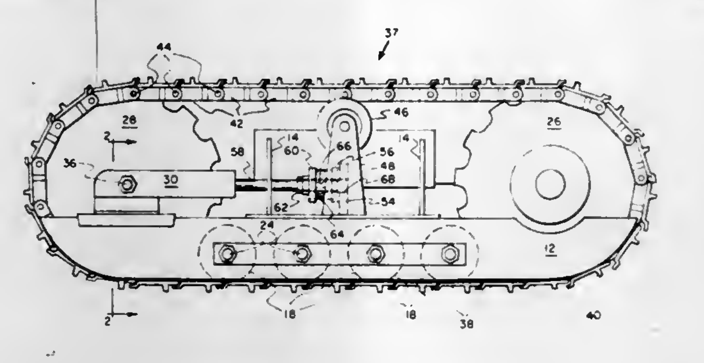
1. In an anti-locking control system for independently regulating the brake pressure to the brakes of two wheels on one axle, which system includes wheel movement sensors for determining the movement behavior of each of these wheels and for generating corresponding signals, an evaluation circuit connected to process these signals and to generate control signals, two brake pressure control devices each arranged to receive these control signals for the individual regulation of the brake pressure at a respective one of the two wheel brakes, and a monitoring device which independently monitors the response periods of the brake pressure control devices and interrupts their regulation when a predetermined response period is exceeded by the one of the brake pressure control device, to thereafter cause both brake pressure control devices to be influenced identically, the improvement wherein said monitoring device comprises first switching means connected to respond when the response time of one brake pressure control device exceeds the predetermined period for supplying the control signals destined for the other brake pressure control device to the corresponding inputs of the first brake pressure control device, and second switching means including: a timer connected to be actuated, to produce an output signal having a preselected duration, when both brake pressure control devices have responded for longer than the predetermined response period; and means connected to the output of said timer for causing the control signals generated by the evaluation circuit to be applied to their respective control devices for the preselected duration of the output signal from said timer and for blocking the delivery of control signals to the brake pressure control device after termination of the output signal from said timer.

4,059,313
TRACK BELT ASSEMBLY
Marvin E. Beyers, and Floyd S. Dadds, both of Peoria, Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.
Filed Sept. 27, 1976, Ser. No. 727,189
Int. Cl.² B62D *55/28*
U.S. Cl. 305—19 **5 Claims**



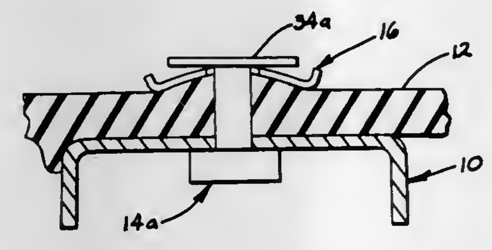
1. A track belt assembly comprising:
an elastomeric belt having an opening therethrough;
a shoe having an opening therethrough, said shoe being externally mounted on said belt;
a keeper member having an aperture therethrough, said keeper being connected to said belt;
a threaded bolt extending through said opening in said shoe; and
an internally threaded retaining element removably connected to said keeper member, said retaining element being nonrotatably disposed in said aperture, screw threadably receiving said bolt therein, and allowing said shoe and said keeper member to be drawn clampingly together and tightly to said belt, said retaining element extending through said opening in said belt and maintaining a preselected spacing between said shoe and said keeper member.

4,059,314
TRACK ASSEMBLY FOR TRACKED VEHICLES
Jacob Amstutz, P.O. Box 320, Canby, Oreg. 97013
Filed Feb. 27, 1976, Ser. No. 662,212
Int. Cl.² B62D *55/30*
U.S. Cl. 305—31 **2 Claims**



1. A track assembly for a tracked vehicle comprising:
a. a vehicle frame extending longitudinally of said vehicle;
b. first and second track sprockets journaled at longitudinally-spaced positions on said frame so as to rotate about respective axes transverse to said frame;
c. an endless track trained about said track sprockets;
d. journaling means having said first track sprocket journaled therein, said journaling means being movably attached to said frame for permitting said first track sprocket to reciprocate in a longitudinal direction;
e. an elastomeric bushing of resilient elastomeric material compressively interposed between said journaling means and said vehicle frame for permitting the movement of said first track sprocket longitudinally in a direction toward said second track sprocket while resisting said movement by a reactive compressive force of said elastomeric material variable in response to the degree of said longitudinal movement;
f. said journaling means having a compression member extending therefrom toward said second sprocket, said compression member having first bushing engagement means mounted adjacent its extended end facing said second sprocket for engaging one side of said elastomeric bushing and threaded means for adjusting the longitudinal position of said first bushing engagement means on said extended end of said compression member, said vehicle frame having a mating bushing engagement means mounted thereon facing said first bushing engagement means for engaging the opposite side of said bushing, said elastomeric bushing being located between said two bushing engagement means.

4,059,315
CLEAT ANCHOR FOR FLEXIBLE VEHICLE TRACK
James D. Jolliffe, 4844 Kimball, S.E., Grand Rapids, Mich. 49508, and Allen D. Sessions, 919 Arhana Crest Drive, Middleville, Mich. 49333
Filed Jan. 2, 1976, Ser. No. 646,236
Int. Cl.² B62D *55/28*
U.S. Cl. 305—35 EB **4 Claims**



2. A flexible track for a snowmobile, said track having an endless flexible web and a traction providing cleat, at least one anchor plate for attaching said cleat to said flexible web, said anchor plate being rectangular and having a main body and flanges along at least two opposite side edges of said plate, said flanges being arranged normal to the direction of movement of said web and extending substantially normal to the plane of said plate; the juncture between said flanges and said body being smoothly rounded to provide a rolling contact with the flexible web when said plate is rocked relative to the flexible web; an opening for a fastener at the approximate geometric center of said plate, said body surrounding said opening being offset in the direction of extension of said flanges to form a concave pocket in the face of said plate opposite from said flanges, said plate being seated against the face of said flexible web opposite from said cleat with said pocket facing said web; a fastener passing through said cleat, web and said plate and squeezing said cleat and plate together to compress said web between said cleat and said plate sufficiently to deform said web to fill said pocket and press the web firmly against the portion of the fastener passing therethrough.

4,059,316
BEARING RETAINING PIN FOR EARTH BORING DRILL
Joseph A. Alvarez, San Antonio, and Robert J. Mills, Houston, both of Tex., assignors to Reed Tool Company, Houston, Tex.
Filed June 21, 1976, Ser. No. 697,810
Int. Cl.² F16C *19/00*
U.S. Cl. 308—8.2 **4 Claims**

1. A roller cutter earth boring bit comprising:
a bearing shaft arranged on said bit,
a roller cutter mounted on said shaft,
a peripheral bearing race on said shaft,
a peripheral bearing race on the inner surface of said cutter and cooperating with said first named bearing race,
a plurality of ball bearings positioned between said bearing races,
a passageway in said shaft extending to said first named bearing race for introduction of ball bearings thereto,
a bearing retaining pin secured in said passageway and having an end portion with a symmetrical surface curvature fitting the curvature of said first named bearing race to secure said ball bearings therein.

4,059,317

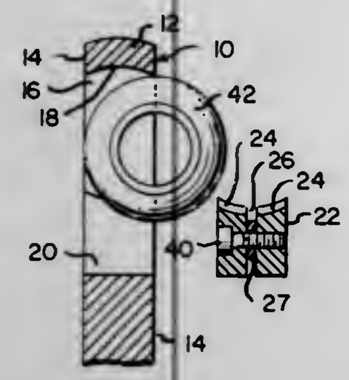
SPHERICAL BEARING WITH SLOTTED KEY

Albert R. McCloskey, Fairfield, Conn., assignor to The Heim Universal Corporation, Fairfield, Conn.

Continuation of Ser. No. 531,899, Dec. 12, 1974, abandoned. This application Nov. 17, 1975, Ser. No. 632,560

Int. Cl.² F16C *23/00*

U.S. Cl. 308—72 **8 Claims**



1. A spherical bearing comprising an outer member having a hole extending from side to side, the surface of the hole being concave and spherical so that the outer member has constricted portions at each side, the outer member also having a walled keyway extending downward from the hole and extending axially from side to side of the outer member substantially perpendicular to the sides of the outer member; a walled key in the keyway co-extensive with the keyway, the key also having a concave and spherical top surface corresponding to the surface of the hole so that the key has shoulder portions corresponding to the constricted portions of the outer member; and a partially spherical inner member havng flat sides, the inner member being held in the outer member by impingement of the spherical surface of the inner member against the constricted portions of the outer member and the key being held in the outer member by impingement of the shoulder portions of the key against the spherical surface of the inner member the improvement comprising the provision of a radial slot extending entirely through the walled key, a resilient member disposed in said slot and abutting the inner surface of each of the walls, adjusting means in the wall of the key to vary the width of the slot thereby varying the bearing tolerance between the inner and outer member and varying the degree of compression of said resilient member and therefore the degree of the preloading force exerted by the key member on the spherical surface of the inner member.

4,059,318

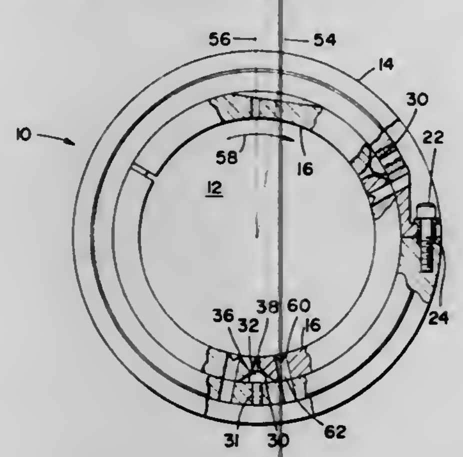
HYDROSTATICALLY SUPPORTED TILTING PAD JOURNAL BEARING IMPROVEMENTS

Leon W. Hollingsworth, La Habra, Calif., assignor to Pioneer Motor Bearing Co., South San Francisco, Calif.

Filed Sept. 2, 1976, Ser. No. 719,755

Int. Cl.² F16C *17/06*

U.S. Cl. 308—73 **9 Claims**



1. An improved tilting pad journal bearing for supporting a rotatable shaft and having a plurality of bearing pad segments that are hydrostatically supported by a hydrodynamically generated oil film and carrier means for supporting the bearing pad segments in surrounding relation to the shaft, the improvement comprising:

a bearing pad having a pair of opposed ends, an inner face, an outer face, an elongated circumferentially extending cavity in the outer face, the radial center line of the cavity being located in the range of 0°–12° of the radial center line of the bearing pad in a direction downstream of the latter with reference to the direction of rotation of the shaft, and a conduit that communicates the hydrodynamically generated oil film to the cavity to provide hydrostatic, pivotal support of the bearing pad when the shaft is rotating, thereby allowing the bearing pad to raise and rock about its center.

4,059,319

VENDING MACHINE

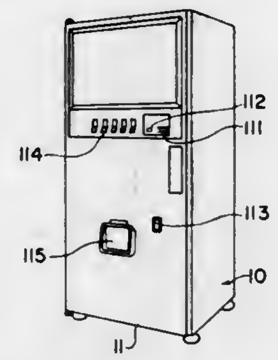
Kunitake Hatori, Maebashi, Japan, assignor to Sankyo Electric Company Limited, Isesaki, Japan

Filed Aug. 23, 1976, Ser. No. 716,834

Claims priority, application Japan, Aug. 23, 1975, 50-116423[U]; Mar. 16, 1976, 51-30700[U]

Int. Cl.² A47B *88/00, 95/00*

U.S. Cl. 312—319 **11 Claims**



1. In a vending machine including a cabinet with a front door and article storage means mounted within said cabinet, the improvement comprising:

at least one housing unit having a top end plate, a front end plate, and a rear end plate for storing articles to be vended,

an upper elongated guide member fixed on the top end plate of said housing unit and extending from a front end to a rear end thereof,

guide rail means mounted on an upper inside surface of said cabinet and extending from a front end to a rear end of said cabinet,

slidable guide means being slidably supported along said guide rail means, said slidable guide means slidably supporting and guiding said upper elongated guide member to permit the movement of said housing unit into and out from said cabinet,

guide groove means, mounted on a lower frame portion of said cabinet, extending from a front end to a rear end of said cabinet and positioned to receive and slidably guide said lower elongated guide member,

stopper means for preventing said housing unit from being withdrawn from a loaded condition within said cabinet, said stopper means comprising a hooked lever means pivotally mounted in said cabinet above said housing unit when said housing unit is loaded therein and a hooked end of said hooked lever means being movable in a vertical plane about a horizontal axis to be freely pendant by gravity force, said hooked end being arranged to fall into and to be received in a hole formed in said top plate of said housing unit to prevent the withdrawal of said housing unit from a loaded condition within said cabinet,

means for limiting the downward pendant movement of said hooked end of said hooked lever means to position a cammed surface of said hooked end for engagement with and for riding upon a top end plate of said housing unit in response to a loading operation of said housing unit into said cabinet,

stopper releasing means provided in said housing unit for pushing said hooked end of said hooked lever means upwardly and out from said hole of said top end plate and said housing to release said stopper means, said stopper releasing means comprising a rod member mounted for free movement in the vertical direction between a lower rest position and an upper raised position, and a plate member provided at the upper end of said rod member, said plate member being disposed beneath said hole to urge said hooked end of said hooked lever means upwardly and out from said hole upon raising said plate member; and

manually operated lever means coupled with said rod member of said stopper releasing means, said manually operated lever being exposed through the front end plate of said housing unit for operation from outside said housing means.

4,059,320

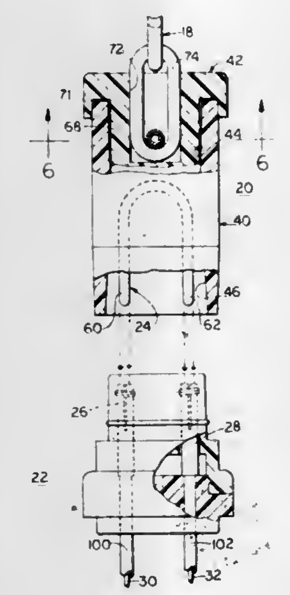
SAFETY PLUG UNIT

Robert E. Piaget, 11563 Grooms Road, Cincinnati, Ohio 45242

Filed Feb. 24, 1977, Ser. No. 771,545

Int. Cl.² H01R *31/08;* **F16P** *3/00*

U.S. Cl. 339—19 **7 Claims**



4. A safety plug unit which comprises a body, there being sockets in end portions of the body, there being a pair of bores connecting the sockets, a U-shaped connector member having arms which extend through the bores and a central portion exposed in a first one of the sockets, end portions of the arms being exposed in the second socket, there being aligned transverse openings in walls of said first socket, and end cap mounted in said first socket and engageable with the central portion of the U-shaped connector member to hold the U-shaped connector member in position, there being a transverse opening in the end cap and fastener means extending through the transverse opening in walls of the first socket and the transverse opening in the end cap to hold the body, the end cap, and the U-shaped connector member in assembled relation.

4,059,321

PULL-OUT RECEPTACLE FOR FLOOR DUCTS

Harry R. Rasmussen, Tacoma, and Kenneth D. Topel, Puyallup, both of Wash., assignors to Crest Industries, Inc., Puyallup, Wash.

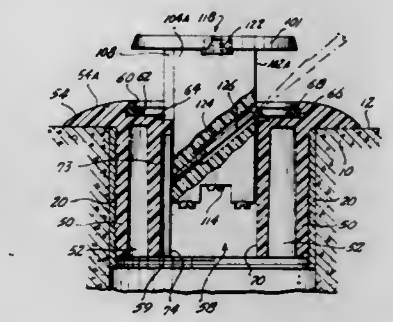
Filed Oct. 18, 1976, Ser. No. 733,207

Int. Cl.² H01R *13/44;* **H02G** *3/22*

U.S. Cl. 339—34 **27 Claims**

1. A pull-out receptacle for floor ducts, said receptacle being adapted to be mounted in a floor aperture extending from a floor surface to and into the floor duct and being adapted when so mounted to permit access to be made to the floor duct and to electrical cables therein from the floor surface, said receptacle comprising:

a. sleeve means including an upper flange for overlying portions of the floor surface which are adjacent to the floor aperture; a lower wall means integral with and dependent from said flange and configured to be received within the floor aperture; a first recess being defined in said flange and extending inwardly into said sleeve means; a first aperture having a cross-sectional area which is less than the cross-sectional area of said first recess and being defined in said flange and in said wall means and extending



through said sleeve means, said first aperture communicating at one end thereof with said first recess; and, means for securing said sleeve means to the floor when mounted in the floor aperture; and

b. a closure member including a cap configured to be received in said first recess of said sleeve means; a core, integral with and dependent from said cap, which is configured to be received in said first aperture of said sleeve means with a reciprocative, sliding fit; a first passageway for electrical cables extending through said core and a second passageway for electrical cables extending through said cap and communicating with said first passageway.

4,059,322

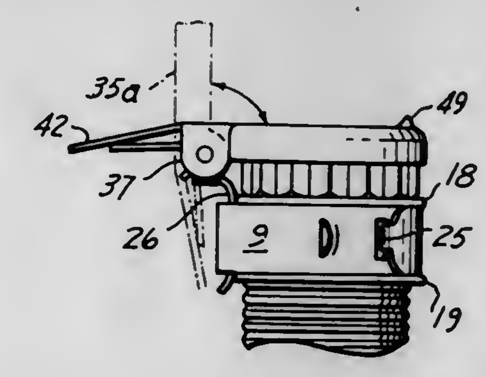
DUST PROTECTIVE ASSEMBLY FOR BREAKAWAY CONNECTORS

Erwin J. Fellner, LaCrescenta, Calif., assignor to Sierra Engineering Co., Sierra Madre, Calif.

Filed Feb. 6, 1976, Ser. No. 655,869

Int. Cl.² H01R *13/44*

U.S. Cl. 339—44 R **1 Claim**



1. In combination: an electrical connector of the type having a hollow cylindrical peripheral wall terminating at an open end and containing electric contact means within said wall near said open end, adapted to engage mating contact means of an electric equipment; and a cover at said open end; said cover comprising:

a cylindrical band of elastomeric material around the peripheral wall adjacent said end;

a clamp comprising a cylindrical strip compressed around the exterior surface of said elastomeric band,

a string-loaded lid; and means pivotally attaching the lid to the clamp;

said lid having a notch at an angular position remote from said means pivotally attaching the lid to the clamp, which

registers with a keying tab protruding from the open end of the peripheral wall;

said lid being positioned so that it is held by the spring against said open end when the contact means of the connector is not engaged with any mating contact means, thereby preventing dust and dirt from entering said open end, but permitting said connector contact means to be engaged with such mating contact means by pivoting the lid against the force of the spring sufficient to uncover said open end.

4,059,323

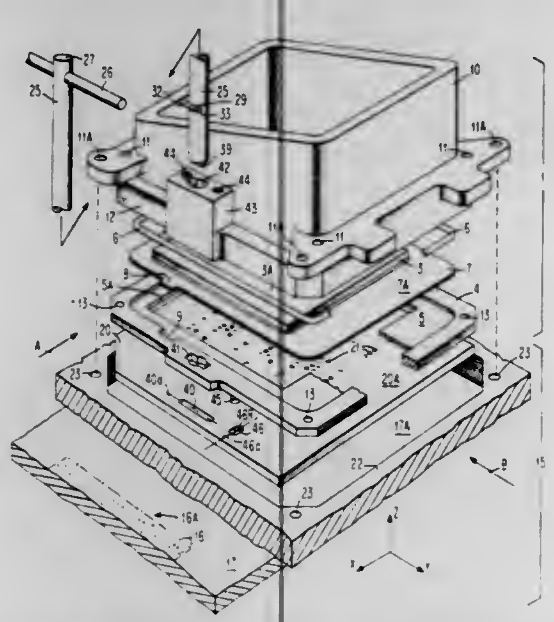
APPARATUS FOR INTERCONNECTING PLURAL MATING MEMBERS

Robert Babuka, Vestal, and John Bernard Harris, Endicott, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed May 13, 1976, Ser. No. 685,951

Int. Cl.² H01R *13/54*

U.S. Cl. 339—75 M **10 Claims**



1. Apparatus for simultaneously interconnecting plural first mating member means with plural second mating member means in mutually exclusive pairs, said apparatus comprising:

first assembly means for supporting said plural first member means in a predetermined array,

second assembly means for supporting said second member means in a corresponding array, said first and second assembly means being juxtaposed with respect to each other to provide relative linear motion therebetween, and

cam means for effecting said linear motion in a bidirectional manner in response to a rotational force applied thereto about a predetermined axis of rotation, said rotational force being applied in a given direction about said axis between first and second predetermined angular positions to provide said linear motion in a first linear direction to effect said interconnecting of said plural first and second mating member means, said rotational force being further applied in said given direction about said axis between said second angular position and a third predetermined angular position to provide said relative linear motion in an opposite second linear direction to relieve undesirable stresses when present in at least one of said first and second assembly means of said apparatus caused by the interconnection of said first and second plural member means.

4,059,324

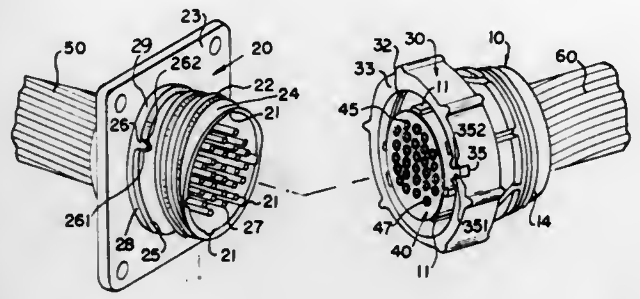
ELECTRICAL CONNECTOR

Gene L. Snyder, Bainbridge, and Walter F. Hennessey, Jr., Sidney, both of N.Y., assignors to The Bendix Corporation, Southfield, Mich.

Filed Sept. 15, 1976, Ser. No. 723,410

Int. Cl.² H01R *13/54*

U.S. Cl. 339—89 M **9 Claims**



1. An electrical connector assembly comprising:

a first shell;

a first insulating insert mounted in said first shell, said insert having a plurality of axial passages therethrough;

a second shell having a forward and rearward portion, thread means on the forward portion of the outside of said second shell, and a forwardly facing shoulder located intermediate of said second shell adjacent the termination of said thread means, said forwardly facing shoulder including a forwardly extending projection;

a plurality of first electrical contacts, each mounted in a respective axial passage in said insert;

a plurality of second electrical contacts mounted in said second shell and adapted to mate with said first contacts; and

means for connecting said first and second shells together and holding said pin and socket type contacts together in mated position, said means comprising:

a sleeve rotatably mounted on said first shell, said sleeve having thread means connectable to the thread means on said second shell and a rearwardly extending notch that is adapted to mate with the projection on the forwardly facing shoulder of said second shell, said sleeve being formed of a plastic material which is resiliently deformable to the extent that the sleeve allows the projection on the second shell to mate with the notch in the sleeve, whereby when said first and second electrical contacts are placed in axial alignment and thrust towards each other and said sleeve is rotated in one direction, the threads in said sleeve connect to the threads on said second shell drawing the pin and socket contacts into mated relationship until said projection on said second shell engages the notch in said first shell.

4,059,325

TERMINAL PROTECTION SHIELD

Edward A. Diminnie, and Patrick J. Dellario, both of Louisville, Ky., assignors to General Electric Company, Louisville, Ky.

Filed Dec. 13, 1976, Ser. No. 749,726

Int. Cl.² H01B *17/26;* H01R *5/04;* H02H *7/08*

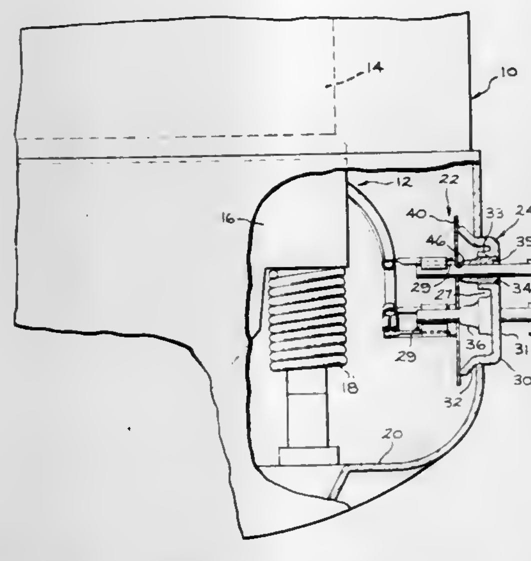
U.S. Cl. 339—94 A **3 Claims**

1. In a hermetically enclosed motor compressor assembly having a housing provided with an opening, an electric terminal having a cup-shaped metal body member including an area formed by an end wall and a circumferentially arranged side wall extending axially therefrom, said terminal being disposed in said opening with said area exposed to said housing, said end wall being provided with a plurality of spaced apertures, metal conductor pins arranged in said apertures substantially perpendicular to said end wall, one end portion of said conductor pin extending through said area to a position past the free end of said side wall, insulating seals hermetically sealing said pins to

adjacent portions of said end wall, the improvement comprising:

connector means including tabs secured on said conductor pins being dimensioned so that one end of said tab is adjacent the free end of said pin and having their other end spaced from said area a predetermined distance relative to a plane defined by the free end of said side wall,

a flexible shield member of dielectic material having a surface area at least equal to the area of said metal body member defined by said circumferentially disposed side wall;



a plurality of connector means receiving apertures arranged in said flexible shield member being equal in number and spacing to said connector means;

resilient latch means formed on said shield means adjacent said receiving apertures and being in alignment with said tabs for allowing passage of said shield member over said connector means including said tabs, and for latching under the other end of said tabs when said shield contacts the free end of said side wall for maintaining said shield against the free end of said side wall so that said area is isolated from said housing.

4,059,326

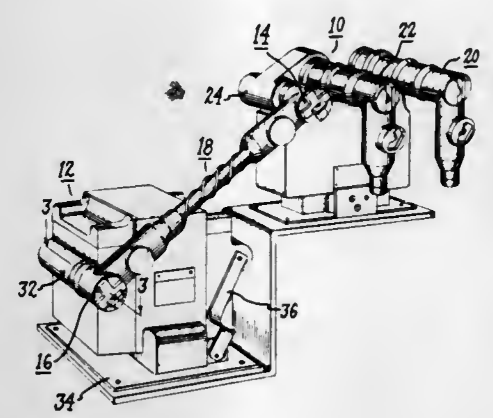
DRY-TYPE INSTRUMENT TRANSFORMER WITH POTENTIAL TAP AND CONNECTOR THEREFOR

Ronald J. Ouelette, Derry, N.H.; Robert S. Canney, Berwick, Maine, and Ralph B. Stetson, Exeter, N.H., assignors to General Electric Company, Somersworth, N.H.

Division of Ser. No. 458,704, April 8, 1974, Pat. No. 3,959,760. This application Mar. 1, 1976, Ser. No. 662,782

Int. Cl.² H01R *3/00*

U.S. Cl. 339—113 R **3 Claims**



1. An elbow module for use with an instrument transformer having a potential tap recess mounted in a well of the instrument transformer to provide a dead-front electrical connection which eliminates dangerous potentials at the point of connection, said elbow comprising:

a. a length of conductor for connection to the potential tap; and

b. an elongated insulating male member for insertion into the well of said instrument transformer, said insulating male member surrounding the length of said conductor except for a portion of said conductor which extends beyond one end of said insulating male member whereby said conductor is insulated from said transformer except at the point of connection of said conductor to the potential tap when said insulating male member is inserted into the well.

4,059,327

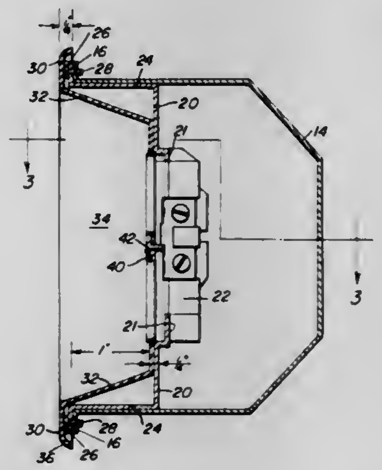
RECESSED ELECTRICAL OUTLET

Donald S. Vann, 1601 Karen Circle, Magnolia, Ark. 71753

Filed Apr. 1, 1976, Ser. No. 672,625

Int. Cl.² H01R *13/60*

U.S. Cl. 339—122 R **1 Claim**



1. A recessed electric outlet comprising; means for substantially improving both the appearance and the safety factor of electrical receptacles and wall mounts therefor including, an electric box mounted in a wall of a building and including top and bottom flanges at the front edge thereof for reception of electric house wiring, an electrical receptacle mounted within said electric box for permanent connection to said wiring, said box including generally parallel top and bottom walls, said receptacle being vertically elongated and disposed in perpendicular relation to the top and bottom walls and generally centrally between the front and rear edges of the top and bottom walls, mounting means for supporting said electric receptacle deep within the electric box, and cover and protecting means attached to the electrical receptacle for covering the open portion of said electrical box to prevent access to the wiring contained therein, said mounting means for the electric receptacle including a deep offset bracket mounted on the electrical receptacle, said bracket being in the form of a narrow rigid strap having portions perpendicular to the top and bottom walls of the box, forwardly extending portions in surface-to-surface engagement with the top and bottom walls of the box and outwardly extending flanges overlying and attached to the flanges on the box by screws, said cover and protecting means including a rectangular dish-like structure having a deep recessed center portion attachable to the electrical receptacle by a center screw provided therewith and having the outer circumferential edge of the structure overlying the front edge of the electric box, the flanges thereon and the adjacent wall surface.

4,059,328

MOUNTINGS FOR ELECTRICAL FIXTURES IN JUNCTION BOXES

Larry E. Rigo, P.O. Box 805, Marietta, Ga. 30061

Filed July 19, 1976, Ser. No. 706,725

Int. Cl.² H01R *13/60*

U.S. Cl. 339—122 R **8 Claims**

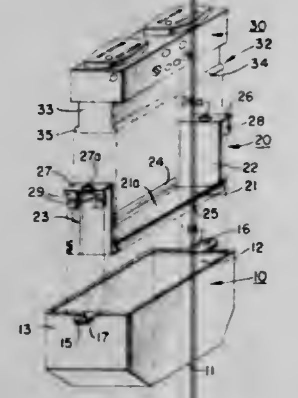
1. An improved mounting for electrical fixtures to be wired

into junction boxes having side walls joining at their inner ends a bottom wall, comprising:

a. a fixture holder bracket having a bottom portion and having leg portions joining at their inner ends said bottom portion and mutually spaced apart by a separation such that when the bracket is inserted into a box, said leg portions will lie adjacent to opposed side walls of the box when the bottom portion lies parallel to the bottom wall of the box;

b. means for attaching the outer ends of the leg portions to the box near the outer ends of its side walls;

c. the bottom portion of the holder bracket having two spaced parallel free edges extending longitudinally be-



tween said leg portions, each of these free edges being turned along the full length of the bracket to extend outwardly from the bottom portion then convergently toward each other and then divergently from each other to form between the edges a fixture receiving clip; and

d. an electrical fixture having an outer portion comprising an electrical unit to be wired, and having an inner mounting portion receivable into the bottom portion of the bracket at any longitudinal location along said bottom portion between its legs and its clip edges, the inner mounting portion of the fixture having longitudinal ridges extending in mutually opposite directions therefrom and located to snap into and precisely fit said clip edges when the electrical fixture is against said bottom portion.

4,059,329

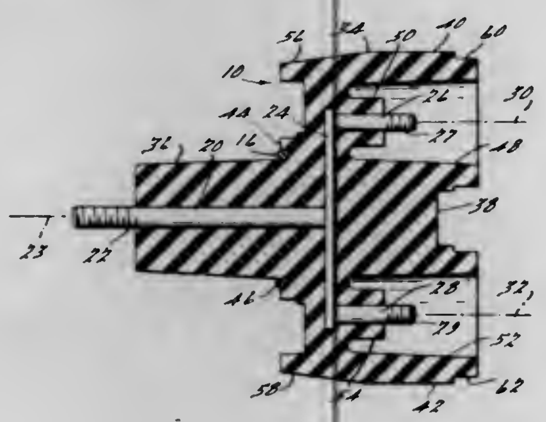
DOUBLE BUSHING WELL WITH CANTILEVER LOAD SUPPORTING LEGS

Herbert J. Macemon, Versailles, Ky., assignor to Kuhlman Corporation, Troy, Mich.

Filed Jan. 13, 1976, Ser. No. 648,635

Int. Cl.² H01R *13/50*

U.S. Cl. 339—60 R **6 Claims**



1. For a transformer having an enclosure, a bushing well comprising:

conductor means having a first portion extending into said transformer enclosure, second and third portions extending away from said transformer enclosure, said first, second and third conductor portions being substantially parallel and spaced apart, and a portion interconnecting said first, second and third conductor portions;

insulating means surrounding and supporting said conductor means;

a first leg disposed adjacent to and laterally outboard from said second conductor portion and extending toward said transformer enclosure;

a second leg disposed adjacent to and laterally outboard said third conductor portion and extending toward said transformer enclosure;

an annular shoulder surrounding said first conductor portion; and

said first and second legs extending beyond a plane defined by said shoulder.

4,059,330

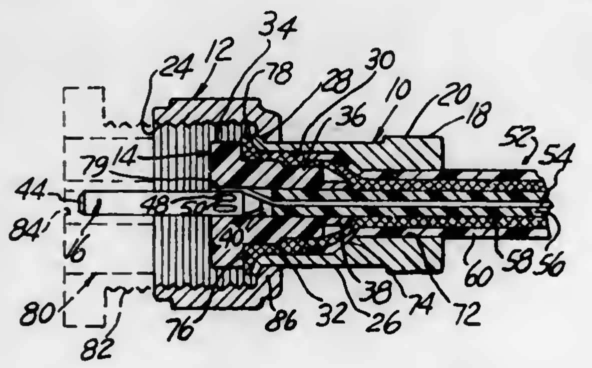
SOLDERLESS PRONG CONNECTOR FOR COAXIAL CABLE

James W. Shirey, Lakeland, Mich., assignor to John Schroder, Howell, Mich., a part interest

Filed Aug. 9, 1976, Ser. No. 712,955

Int. Cl.² H01R *17/04*

U.S. Cl. 339—177 R **8 Claims**



1. A connector for mounting on the end of a coaxial shielded cable of the type having an inner conductor surrounded by an inner dialectric sleeve in turn surrounded by a tubular braided conductor in turn syrrounded by an outer dielectric sleeve, said connector comprising:

an electrically conductive tubular body member having a first longitudinal bore accepting the coaxial cable, a second longitudinal bore of enlarged diameter and an end portion at the end of said second bore provided with an enlarged outer diameter and inner diameter portion;

a dielectric tubular plug having a longitudinal bore accepting the inner dielectric sleeve of said cable, said tubular plug being inserted in said second bore of said tubular body member with the tubular braided conductor and the outer dielectric sleeve of said cable compressibly secured between the peripheral surface of said plug and the inner surface of said second bore with an exposed end portion of said tubular braided conductor engaged with said inner surface of said second bore, said dielectric tubular plug having an enlarged outer diameter end portion disposed in the enlarged inner diameter portion of the end portion of said tubular body member and compressibly securing the exposed end portion of said tubular braided conductor between the enlarged outer diameter end portion of said tubular plug and the enlarged inner diameter portion at the end of said tubular body member;

an electrically conductive prong member partially inserted in the longitudinal bore of said dielectric tubular plug, an exposed end portion of said inner conductor being secured between a cylindrical portion of the peripheral surface of said prong and the inner surface of said bore in said tubular plug; and

an electrically conductive collar member having a rearwardly disposed inwardly extending shoulder portion for engagement with the enlarged outer diameter portion of said tubular body member, said collar member having an internal thread for engagement with the external thread of a receptacle for said prong member.

4,059,331

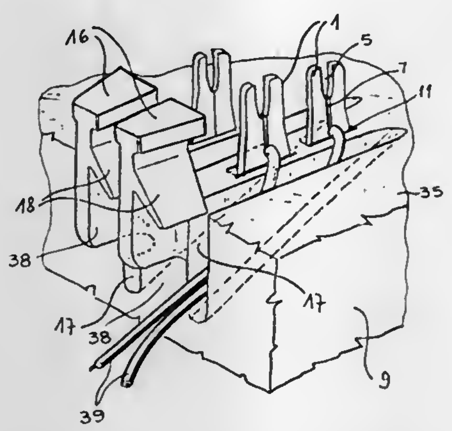
TERMINAL BLOCK

William S. Sedlacek, Chicago, Ill., and Louis Reffay, Igny, France, assignors to Reliable Electric Company, Franklin Park, Ill.

Filed Feb. 20, 1976, Ser. No. 659,796

Int. Cl.² H01R *9/06*

U.S. Cl. 339—198 R **7 Claims**



1. A terminal block comprising a body of dielectric material having top and lower faces and a row of openings in at least one of said faces for receiving electrically conductive terminals to position a series of said terminals in spaced relation to each other, said block having a recess adjacent to said row of openings and running generally parallel thereto, said recess being exposed to said top face at each of said openings, a fanning strip adjacent to said top face and an end of said recess and running substantially at right angles to said row, said fanning strip having a series of slots at least one of which is presented to said recess, said recess having a depth, at least adjacent to said fanning strip, sufficient to accommodate a multiplicity of wires connected to the terminals and extending through said one slot in the fanning strip, and a retaining finger forming part of said fanning strip and extending substantially across said one slot to retain said wires therein, said finger being resilient and angling toward said lower face so as to allow wires in said one slot to snap past the free end of said finger when the wires are moved toward said lower face, the angularity of said finger providing a substantial region in said one slot above said free end for accommodation of said wires.

4,059,332

SNAP ACTION BREECH LOCK CONNECTOR

John J. Phillips, Rolling Hills, and Roger Stephenson, Woodland Hills, both of Calif., assignors to G & H Technology, Inc., Santa Monica, Calif.

Continuation of Ser. No. 684,923, May 10, 1976, abandoned, which is a continuation of Ser. No. 487,000, July 10, 1974, abandoned. This application Feb. 17, 1977, Ser. No. 769,583

Int. Cl.² H01R *13/54*

U.S. Cl. 339—113 R **3 Claims**

1. An electrical connector including the combination of

a plug section,

a first set of electrical contacts on said plug section,

a receptacle section adapted to mate with said plug section,

a second set of electrical contacts on said receptacle section,

the contacts in each set of electrical contacts being adapted to electrically engage a corresponding contact in the other set to provide mated pairs of contacts,

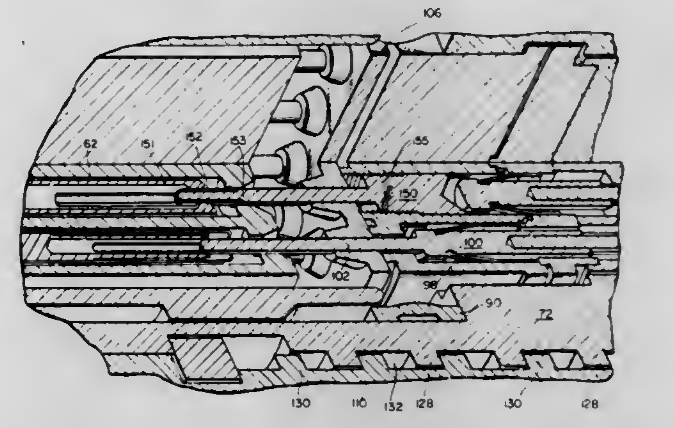
means for urging said sections into full electrical and locked engagement comprising

spring means operable to advance one of said sets of contacts into full electrical contact with the other set of contacts, said spring means biasing said section carrying said one set of said contacts into full locked engagement with the other sections,

and monitor means for indicating the position of said plug and receptacle sections in such full electrical and mechanically locked engagement,

said monitor means comprising

one of said mated pairs of contacts serving as monitoring contacts and having non-electrically conductive contacting surfaces mechanically engagable when said remaining



sets of contacts are initially mated and electrically conductive surfaces electrically engageable only upon said sections being positioned in full mechanically locked engagement by said spring means with all of the sets of contacts on one of said sections being fully locked into contacting engagement with all of the sets of contacts on the other of said sections, said monitor means indicating such full electrical and mechanically locked engagement only when all of said sets of contacts are in full mated contacting engagement.

4,059,333

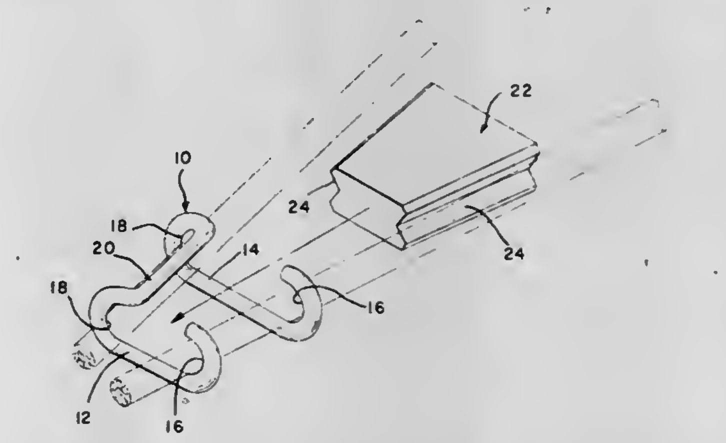
ELECTRICAL CONNECTOR

James Lenhart Mixon, Jr., Harrisburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Jan. 5, 1977, Ser. No. 756,949

Int. Cl.² H01R *7/06*

U.S. Cl. 339—247 **1 Claim**



1. An electrical connector for mechanically retaining and electrically connecting two cables, comprising:

a. a wedge member of conductive material having beveled sides converging toward one end; and

b. a member formed from a length of resilient spring wire having two spaced apart, parallel sections one shorter than the other, said sections being joined together by a length of said wire, the ends of each section being formed into inwardly facing hooks,

whereby upon cradling cables in parallel hooks and driving the wedge member inbetween, said cables are mechanically retained and electrically connected.

4,059,334

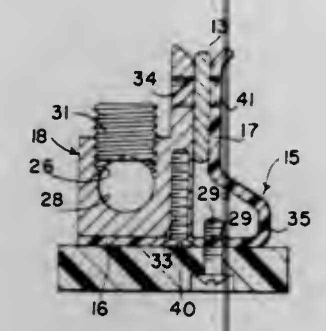
BLADE TYPE FUSE CLIP ASSEMBLY

William R. Bailey, Melrose Park, Ill., assignor to Eltra Corporation, New York, N.Y.

Filed June 17, 1976, Ser. No. 696,875

Int. Cl.^{2} H01R *11/22;* **H01H** *85/20, 85/24*

U.S. Cl. 339—258 F **3 Claims**



1. In a fuse clip assembly for receiving and retaining one end of a blade type cartridge fuse,

said assembly comprising;

a terminal connector block made of electrically conductive material and formed from an extrusion, said terminal connector block being a generally L-shape polyhedron having

a substantially flat base,

a pair of L-shape side surfaces extending upward from opposing edges of said base,

an elongate back surface extending upward from said base and in communication with said L-shape sides, said back surface being flat for providing an efficient electrically conductive surface contact between said block and the blade of a fuse positioned in said clip;

the front of said block including upper and lower substantially vertical surfaces connected by a substantially horizontal surface therebetween, and a top surface of said block being acutely angled with said back surface and extending upwardly therefrom toward the top of said upper front surface;

a hole extending through said block from a bottom portion of one L-shape side thereof to a bottom portion of the other, fastener means positioned in communication with said hole for retaining an electrical conductor positioned in said hole;

a resilient generally L-shape member made of a dielectric material and including

a horizontal base toward the distal end of which said base of said block is mounted, and

a generally vertical arm extending upward from said base, a portion of said arm being positioned generally parallel to said block back surface in close spatial relation thereto, whereby a blade end of a blade type fuse may be positioned between said block back side and said arm and be maintained in full surface contact with said back side by said resilient arm.

4,059,335

ELECTRIC CONNECTOR

Hans Simon, Bruchhausener Strasse, 5463 Unkel (Rhine), Germany

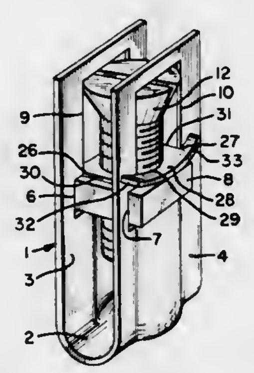
Filed Feb. 25, 1976, Ser. No. 661,274

Claims priority, application Germany, Mar. 3, 1975, 2509158

Int. Cl.^{2} H01R *7/08*

U.S. Cl. 339—272 UC **7 Claims**

1. Electric connector comprising a U-shaped main portion having parallel legs and a transverse base extending therebetween, said legs respectively being formed with aligned intermediate cutout portions, a nut extending between said legs and into said intermediate cutout portions thereof, and a screw threaded through said nut and situated between said legs while having a head situated at a greater distance from said base than said nut and an opposed free end situated nearer to said base than said nut and adapted to engage a conductor extending along said base between said legs, each of said intermediate cutout portions being defined in part by opposed transverse edge portions of each leg which extend transversely with respect to the axis of said screw and which are situated from each other by a distance substantially greater than the thickness of said nut, and a leaf spring extending together with said nut between said legs and into said intermediate cutout portions thereof, said leaf spring being formed with a substantially central hole through which said screw extends and engaging said nut at the region of said hole while being curved away from said nut toward one of said transverse edge portions of each intermediate cutout portion when said nut is in the region of the other of said transverse edge portions of each intermedi-



ate cutout portion, so that when said screw is turned at said free end thereof with respect to said nut into engagement with a conductor said nut will move along said screw away from said other toward said one transverse edge portion of each intermediate cutout portion to compress said leaf spring between said one transverse edge portion of each intermediate cutout portion and said nut for limiting pressure of the screw with respect to the conductor while preventing loosening of the screw by vibrations, said leaf spring extending outwardly beyond said legs and having outside of the space between said legs integral tongues projecting beyond said intermediate cutout portions so that said legs are situated between said tongues to be reinforced thereby for preventing outward buckling of said legs.

4,059,336

MICROSCOPE AND MAGNIFICATION CHANGER

Harold Horace Hopkins, 26 Cintra Ave., Reading, Berkshire, England

Filed Feb. 14, 1975, Ser. No. 549,981

Claims priority, application United Kingdom, Feb. 14, 1974, 6762/74

Int. Cl.^{2} G02B *21/20, 17/08*

U.S. Cl. 350—55 **9 Claims**

1. A stereo microscope for stereoscopically studying an object, comprising:

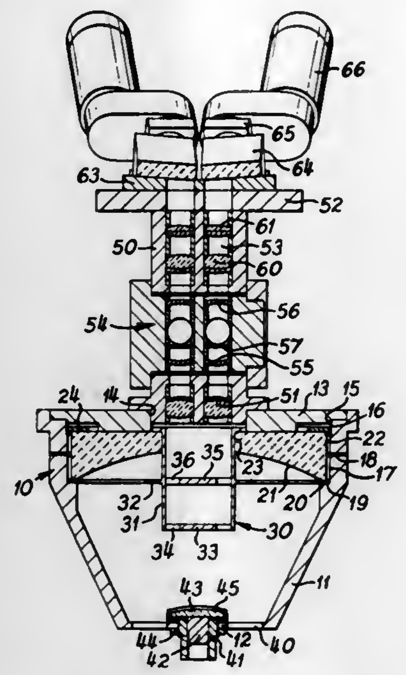
two separate light paths for two separate beams of light from the object; each said light path being defined by:

a respective first reflective surface positioned and directed so as to intercept a respective one of the two separate beams of light;

second reflecting surface means spaced from said first reflective surfaces; said second reflecting surface means being shaped and oriented to have the separated beams of light reflected to different locations on said second reflecting surface means by said first reflecting surfaces; said second reflected surface means also being shaped and oriented such that the two beams of light reflecting therefrom are disposed along substantially parallel axis;

a respective magnification means and eyepiece in each said light path and positioned to intercept and receive a respective beam of light reflected from said second reflecting surface means; and

a portion of each light path including, in series, a means for converging light leaving said second reflective surface means, and a magnification changer positioned to receive light converged by said converging means, said magnification changer comprising a converging lens, a diverging lens spaced along the optical axis thereof, means for rotat-



ing said lenses about a fixed point so that a converging light beam is initially incident upon either of said lenses or passes directly through the changer without impinging upon said lenses, thereby permitting a change of magnification to be effected between the three positions.

4,059,337

OPTICAL COUPLING DEVICES

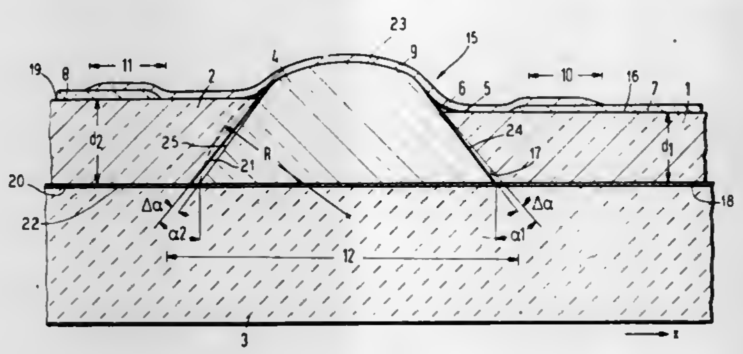
Gerhard Winzer, and Walter Rauscher, both of Munich, Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Apr. 6, 1976, Ser. No. 674,066

Claims priority, application Germany, Apr. 17, 1975, 2517072

Int. Cl.^{2} G02B *5/14*

U.S. Cl. 350—96 C **12 Claims**



1. An optical coupling device for coupling of integrated optical components which are arranged on separate component substrates that may have different thicknesses, said coupling device comprising a base substrate, at least two component substrates disposed on the base substrate and arranged closely adjacent to each other, each of said component substrates having an integrated optical component disposed thereon, an intermediate substrate disposed between the two component substrates and in engagement therewith, and at least one waveguide disposed on a surface of the intermediate substrate and coupled to the optical components on the respective component substrates.

4,059,338

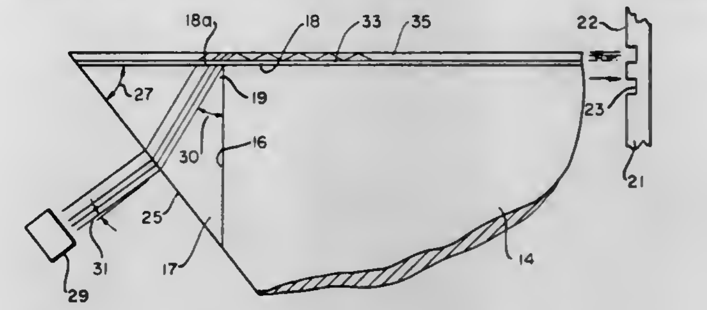
INTEGRATED OPTICAL WAVEGUIDE COUPLER

Clifford C. Hartelius, Jr., Sunnyvale, Calif., assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Sept. 9, 1975, Ser. No. 611,649

Int. Cl.^{2} G11B *7/12;* **G02B** *5/14*

U.S. Cl. 350—96 C **9 Claims**



1. An integrated optical waveguide coupler for coupling energy in one direction to illuminate an optical stylus tip and for carrying reflected energy received by said tip in the opposite direction, the coupler comprising,

a substrate including a first relatively low refractive index material portion having a face and a tip opposite said face and a second relatively high refractive index material portion formed on said face, said substrate having a planar top surface at an angle with respect to said face and defining a light corner within said second material portion at said surface, said second substrate further having a light receiving surface defined by a plane intersecting said face and said planar top surface at a predetermined angle with respect to said top surface,

a layer of relatively low refractive index material formed on said planar top surface having a thickness ranging from $\frac{1}{8}$ to $\frac{1}{4}$ of the equivalent vacuum wavelength at the coupler operating wavelength,

and an optical waveguide formed along the upper surface of said layer extending to said tip and overlapping and extending beyond said light corner,

so that when light energy of a predetermined operating wavelength is incident said light receiving surface at a predetermined entrance angle with respect to said top surface it illuminates a portion of said planar top surface adjacent said corner and is coupled to said waveguide and travels to said tip to illuminate an associated surface and light energy reflected from said associated surface is coupled to said waveguide and travels along said waveguide to a point beyond said light corner.

4,059,339

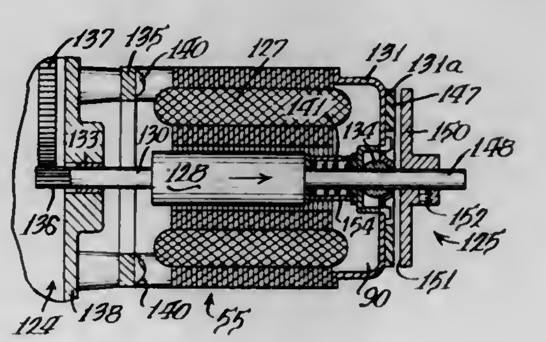
BRAKE MECHANISM FOR MOTOR DRIVEN PROJECTION SCREEN

Donald J. Brown, Naperville, Ill., assignor to Knox Manufacturing Co., Wood Dale, Ill.

Filed Jan. 8, 1976, Ser. No. 647,578

Int. Cl.^{2} G03B *21/56;* **H02K** *7/10*

U.S. Cl. 350—117 **8 Claims**



1. In an electric motor unit for rotatably driving the roller of a projection screen apparatus, the motor unit including a stator for establishing a magnetic field when electrically actuated,

and a rotor rotatably mounted within the stator and provided with limited axial movement from an inoperative position to an operative position in alignment with the magnetic field, said rotor having aligned journals at its opposite ends with one of said journals having an exposed end portion projecting outwardly of the motor unit and the other of said journals being operatively connected to rotate the roller of the projection screen apparatus, a brake mechanism for preventing rotation of the rotor and the roller when electric current to the stator is discontinued, comprising: a brake supporting member mounted exteriorly of the motor unit adjacent the exposed end portion of said one journal, said member having an outwardly facing braking surface; a braking element secured to said exposed end portion and having an inwardly facing braking surface in confronting relation to said outwardly facing braking surface; spring means normally urging the rotor toward inoperative position and normally urging the inwardly facing braking surface into frictional braking engagement with the outwardly facing braking surface, electric actuation of the stator causing the rotor to be moved to its operative position in opposition to said spring means so as to move the exposed end portion of the one journal and said braking element outwardly to separate the two braking surfaces, and subsequent discontinuance of electric current to the stator permitting the rotor to be shifted to inoperative position with the surfaces in braking engagement to prevent rotation of the rotor journals and the screen roller; and means for adjustably positioning the braking element axially of the exposed end portion to vary the force exerted by the spring means.

4,059,340

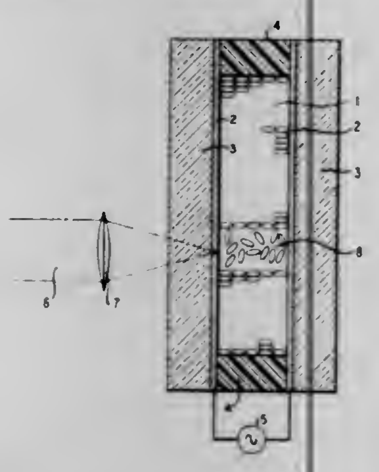
DOPED LIQUID CRYSTAL DISPLAY DEVICE

Frederic Jay Kahn, Palo Alto, Calif., and Gary Newton Taylor, Fanwood, N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N. J. 07974

Filed Nov. 18, 1974, Ser. No. 524,702

Int. Cl.² G02F *1/13*

U.S. Cl. 350—160 LC 1 Claim



1. Liquid crystal information storage and display device comprising a layer comprising a liquid crystal material which in the display mode is partly in an essentially transparent state and partly in a light scattering state, means for maintaining the temperature of said layer below the temperature of transition from the liquid crystal phase to the isotropic phase, a pair of optically transparent electrodes containing said layer and of which at least one is infrared absorbing, an infrared laser incident on said infrared absorbing electrode from a direction external to said layer for locally heating said infrared absorbing electrode, thereby locally raising the temperature of said layer above said transition temperature, so as to locally change the orientation of the molecules of said liquid crystal material,

CHARACTERIZED IN THAT said layer contains nonliquidcrystalline dopants which are more soluble in the isotropic phase than in the liquid crystal phase in the concentration range of from 0.1 percent to 5 percent by weight whereby the optical contrast ratio between said essentially transparent state and said light scattering state is improved, and further CHARACTERIZED IN THAT either (1) said liquid crystal material is a mixture of MBBA and CN and said dopant is o-MBBA, or (2) said liquid crystal material consists essentially of a mixture of CBOA, CBDA, and CBPDA and said dopant is selected from the group consisting of o-CBDA, o-MBBA, p-butylaniline, o-nitrononylbenzene, n-decylbenzene, and adamantane.

4,059,341

ELECTROCHROMIC DISPLAY DEVICE WITH ELECTROLYTES AND A METHOD OF PRODUCING THE SAME

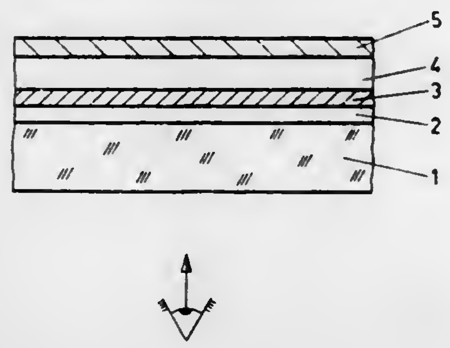
Hans-Rudolf Zeller, Birr, Switzerland, assignor to BBC Brown, Boveri & Company, Limited, Baden, Switzerland

Filed Apr. 2, 1976, Ser. No. 673,160

Claims priority, application Switzerland, May 7, 1975, 5866/72

Int. Cl.² G02F *1/16*

U.S. Cl. 350—160 R 9 Claims



1. In an electrochromic display device having an electrochromic layer present in its solid form upon a first electrode and in contact with a water-free electrolyte contacting a second electrode, the the improvement comprising:

a proton-free substance as said electrolyte and an operating voltage between said two electrodes exceeding two volts.

4,059,342

MICROSCOPE OBJECTIVE WITH CORRECTING MEANS

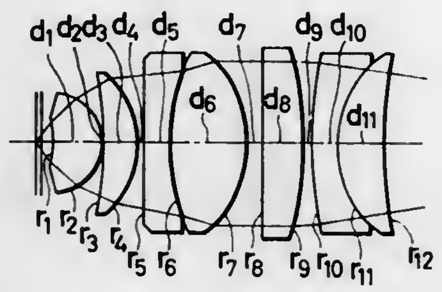
Tsutomu Tojyo, Hachicuji, Japan, assignor to Olympus Optical Co., Ltd., Japan

Filed Jan. 23, 1976, Ser. No. 651,781

Claims priority, application Japan, Jan. 28, 1975, 50-11636; Jan. 28, 1975, 50-11637

Int. Cl.² G02B *21/02*

U.S. Cl. 350—175 ML 6 Claims



1. A microscope objective with correcting means comprising a front lens group arranged on the object side of a predetermined airspace and a rear lens group arranged on the image side of said airspace, said microscope objective with correcting means being arranged to vary said pre-determined airspace by moving said rear lens group in respect to said front lens group in order to correct aberrations to be caused when thickness of a cover glass used for observation by said microscope objective is different from the corresponding standard thickness of the cover glass and satisfying the following condition when reference symbol f_I represents the focal length of said front lens group and reference symbol f_{II} represents the focal length of said rear lens group:

$$|f_{II}/f_I| \leq 8$$

4,059,343

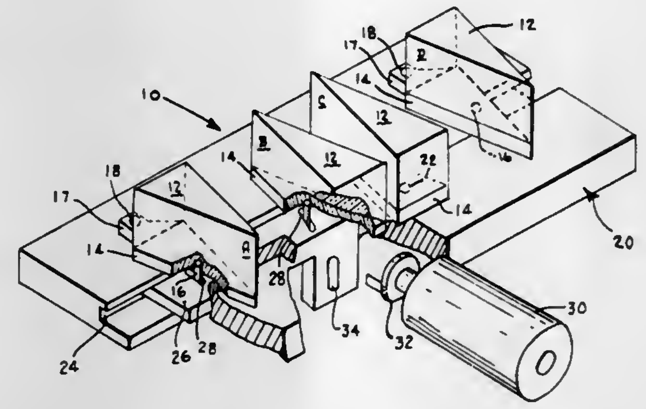
PRISMATIC ANAMORPHIC SYSTEM FOR OPTICAL CORRELATORS

Daniel C. Kowalski, Menlo Park, Calif.; Juan C. Dawson, Littleton, Colo., and Stanley J. Krulikoski, deceased, late of Dearborn, Mich. (by Shirley Ann Krulikoski, executrix), assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Feb. 26, 1976, Ser. No. 661,462

Int. Cl.² G02B *13/10, 5/18*

U.S. Cl. 350—182 11 Claims



1. A prismatic anamorphic system comprising a base plate having a surface thereon, said base plate having a longitudinal channel therein, a plurality of prisms, said plurality of prisms being arranged along the longitudinal axis of said base plate with adjacent pairs of prisms having their respective bases located on opposite sides of said longitudinal channel, each of said prisms being pivotally connected to said base plate about an axis, the pivotal axis of each of said prisms being perpendicular to said surface of said base plate, means located within said channel for rotating said prisms about said pivotal connections and means operatively connected to said means for rotating said prisms for providing operative power thereto.

4,059,344

RETROFOCUS-TYPE OBJECTIVE FOR ENDOSCOPES

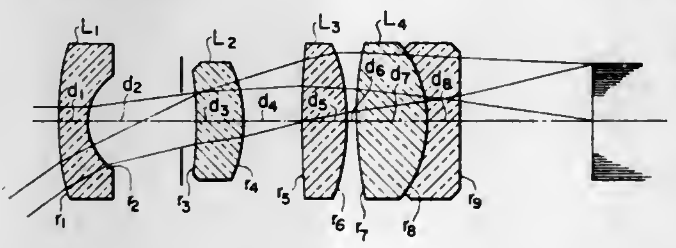
Nobuo Yamasita, Tama, Japan, assignor to Olympus Optical Co., Ltd., Japan

Continuation of Ser. No. 624,823, Oct. 22, 1975, abandoned. This application Feb. 14, 1977, Ser. No. 768,595

Claims priority, application Japan, Oct. 26, 1974, 49-123033

Int. Cl.² G02B *13/04*

U.S. Cl. 350—220 5 Claims



1. A retrofocus-type objective for endoscopes comprising a front diverging lens group and a rear converging lens group consisting of a first lens group and a second lens group, said retrofocus-type objective for endoscopes being arranged to be focused by varying the airspace between said first and second lens groups while fixing said front diverging lens group at a constant position.

4,059,345

FIXTURE FOR MOUNTING BAR LENS ARRAY IN ELECTROPHOTOGRAPHIC APPARATUS

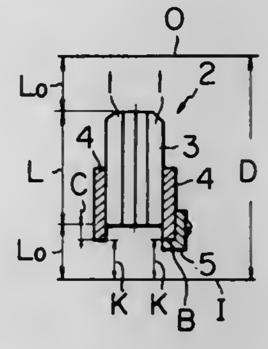
Atsushi Kawamura, and Motoaki Kawazu, both of Tokyo, Japan, assignors to Ricoh Co., Ltd., Tokyo, Japan

Filed Oct. 14, 1975, Ser. No. 621,881

Claims priority, application Japan, Oct. 17, 1974, 49-119692

Int. Cl.² G02B *7/02*

U.S. Cl. 350—252 2 Claims



1. A fixture for mounting a bar lens in such a manner that ends of the bar lens are equally spaced from two respective planes, comprising first alignment means having a sleeve fixed to the bar lens and second alignment means having a stopper fixedly disposed between the two planes, the first and second alignment means being arranged so that when the sleeve and the stopper are aligned with each other, the ends of the bar lens are equally spaced from the two respective planes.

4,059,346

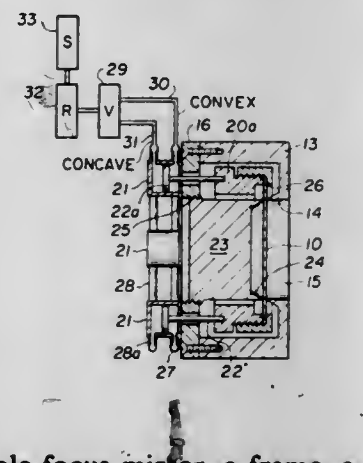
CONTROLLED FOCUS MIRROR WITH RIM CONTROLLED FLEXURE

Howard S. Levine, San Jose, Calif., and Robert Winter, Dix Hills, N.Y., assignors to Grumman Aerospace Corporation, Bethpage, N.Y.

Filed June 30, 1976, Ser. No. 701,196

Int. Cl.² G02B *5/10*

U.S. Cl. 350—295 4 Claims



1. In a variable focus mirror, a frame, a first internally extending annulus on said frame,

a second internally extending annulus on said frame opposite said first annulus,

a uniform, unstressed elastic disk, said disk having a diameter greater than the diameter of said annuli,

a reflective surface on said disk,

said disk being interposed said annuli,

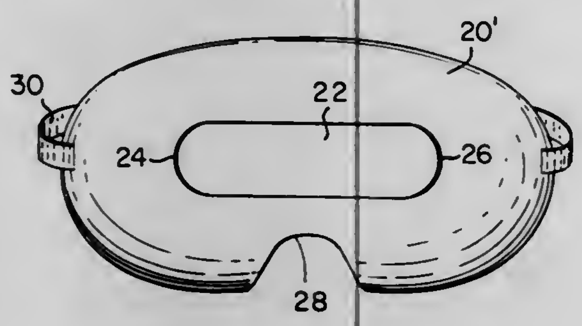
disk holding means encircling the rim of said disk for holding said disk in concentric relationship with and adjacent said annuli,

means for adjusting the position of said disk holding means axially relative to said annuli and thereby applying a force at the periphery of said disk in a direction urging said disk against said first or second annulus,

whereby said disk is flexed and said reflective surface assumes a substantially spherical concave configuration when said disk is urged against said first annulus, and said

disk is flexed and said reflective surface assumes a substantially spherical convex configuration when said disk is urged against said second annulus whence the focal length of said mirror is varied in accordance with the degree of flexure of said disk.

4,059,347
OPTICAL INSTRUMENT AND VIEWING METHOD
Richard P. Eitel, 2711 Taylor Drive, Everett, Wash. 98203
Filed May 24, 1976, Ser. No. 689,182
Int. Cl.² G02B 5/00
U.S. Cl. 350—319 **12 Claims**



1. An optical device for aiding an individual wearing the device to concentrate his vision on an object, said device comprising:

a head mount having a horizontal see-through zone with outwardly curved, clearly defined ends spaced apart horizontally about three inches to approximate the pupillary distance of the viewer and extending over a vertical distance sufficient for vertical proximity expansion, said zone having a vertical width through most of its horizontal length as great as at said outwardly curved ends, and

means for positioning said head mount with said zone centered in front of the viewer's eyes at a distance therefrom such that said outwardly curved ends horizontally approach each other by second degree fusion and vertically elongate by vertical proximity expansion whereby said ends are seen as a generally circular image when the viewer looks through said zone.

4,059,348
OBJECTIVE PLOTTING OF VISUAL FIELDS BY EYE MOVEMENT MONITORING
Marvin E. Jernigan, Weston, Mass., assignor to Narco Scientific Industries, Inc., Fort Washington, Pa.
Division of Ser. No. 505,339, Sept. 12, 1974, Pat. No. 3,984,156. This application July 21, 1976, Ser. No. 707,373
Int. Cl.² A61B 3/02
U.S. Cl. 351—30 **11 Claims**

1. An apparatus for presenting a target image at various selected locations within a subject's visual field comprising:

a light source adapted to emit a beam of light;

a mirror:

means mounting said mirror with respect to said light source to reflect said beam, said means mounting said mirror being constructed and arranged to enable said mirror to be oriented in various selected attitudes with respect to said beam of light to selectively reflect said beam of light to said various locations;

electrically operable drive means connected to said means for mounting said mirror to effect said movement thereof;

circuit means having its output connected to said drive means for operating said drive means;

said circuit means including storage register means for storing digital information corresponding to a selected intended position of said drive means:

feedback means operatively associated with said drive means for developing a signal corresponding to the position of said drive means;

said circuit means including a comparator having inputs from each of said storage register means and said feedback means;

said circuit means including means responsive to the output of said comparator to operate said drive means when said input to said comparator are unequal thereby to move said mirror toward a selected attitude and for thereafter terminating operation of said drive means when said inputs to said comparator are equal.

7. An apparatus for presenting a target image to a subject and for recording the position of said target image comprising:

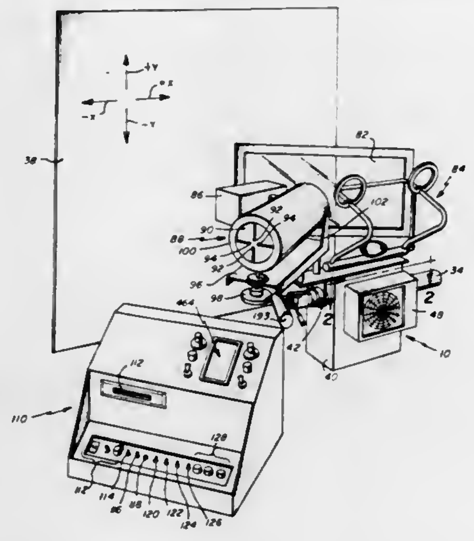
a housing having front and rear walls;

projection shutter means mounted to said front wall;

camera shutter means mounted to said rear wall.

a double faced mirror mounted within said housing between said projection shutter means and said camera shutter means;

projection light means supported within the housing and located with respect to said mirror to direct a first narrow



beam of light along an axis toward one surface of said mirror and to reflect said first beam toward said projection shutter;

recording light means supported in said housing on the other side thereof for directing a second narrow beam of light along said axis and toward the opposite surface of said mirror to enable said second beam to be reflected toward said camera shutter means and in a direction which is opposite to that at which said light beam is reflected from said one surface of said mirror;

film mounting means disposed on said rear wall and on the other side of said camera shutter means;

means for orienting said mirror in selected attitudes thereby to vary the direction of each of said reflected first and second beams;

means for operating said projection light means and said recording light means independently of each other; and

means for operating each of said projection shutter means and camera shutter means.

4,059,349
PHOTOGRAPHING SYSTEM AND A MOTION PICTURE CAMERA USING THE SAME
Yoshio Komine, Tokyo, and Noritsugu Hirata, Yokohama, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan
Filed May 7, 1975, Ser. No. 575,171
Claims priority, application Japan, May 10, 1974, 49-51988
Int. Cl.² G03B 23/02
U.S. Cl. 352—72 **22 Claims**

1. A motion picture camera capable of having a strip of silent film being able to record picture image information only and a strip of sound film being able to record picture image information and sound information selectively loaded thereinto, comprising:

a first transport means which contributes to the transporting

of said film to a picture formable position of a picture image forming means;

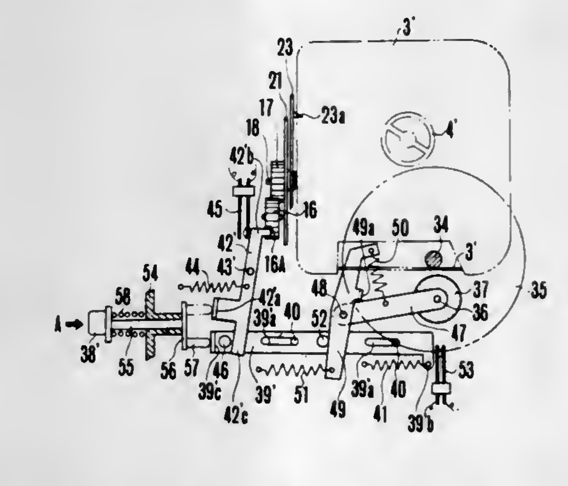
a sound recording head capable of recording sound information on a sound film when said film is loaded;

a second transport means having a capstan rotatable about a fixed axis and a movable pressure roller capable of shifting between a position to engage with said capstan and a position to disengage therefrom, said transport means being so positioned as sandwiching a running path of said sound film which passes through a position adjacent to said sound recording head, and capable of running the sound film on the running path which passes through near the sound recording head by pressing the pressure roller against the capstan; and

a control means to control said film transport means by the first transport means and the second transport means, said control means comprises:

a. a release means which can be handled from outside of the camera and can be shifted to (1) a first position to activate the camera and to (2) a second position to stop the operation of the camera,

b. a first actuating means to control the actuation of the first transport means and the stopping thereof, said first actuating means being able to be shifted to (1) a first position at which said actuating member is placed as the release means is positioned at its first position to put the first transport means in an operative state and to (2) a



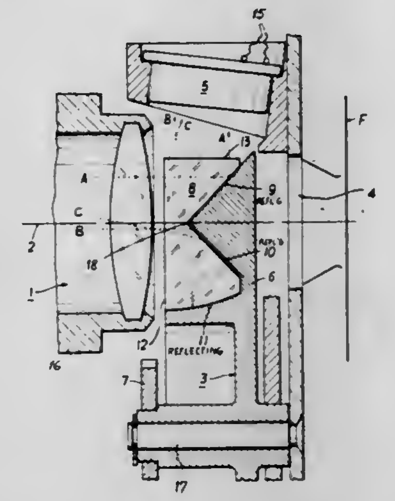
second position at which said actuating member is placed as the release member is positioned at its second position to put the first transport means in an inoperative state, in association with the shifting of the release means,

c. a second actuating means to control the shifting of the pressure roller, wherein said actuating means can be selectively shifted to a first position at which the pressure roller engages with the capstan and to a second position at which it disengages from the same, and

d. a mode change-over means to selectively establish the associating relationship between the release means and the second actuating means so that the second actuating means is shifted to its first position when the release member is placed at its first position, while the second actuating means is shifted to its second position when the release means is placed at its second position, wherein said changeover means can be shifted to a first position at which it is located between the release means and the second actuating means wherein the associated relationship is formed and to a second position at which it is placed outside of the space between the release means and the second actuating means wherein said associated relationship is released;

whereby, at the time when the silent film is loaded, the mode change-over means is placed at its first position, while said mode change-over means is placed at its second position when the sound film is used.

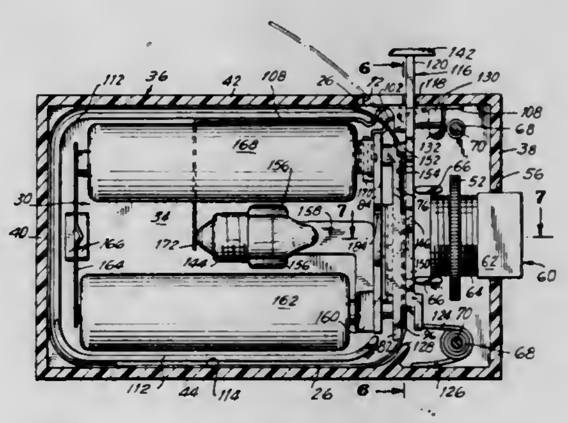
4,059,350
REFLEX SYSTEM FOR CINEMATOGRAPHIC CAMERA
Josef Schild, Vienna, Austria, assignor to Karl Vockenhuber and Raimund Hauser, both of Vienna, Austria
Filed Aug. 10, 1976, Ser. No. 713,223
Claims priority, application Austria, Aug. 11, 1975, 6232/75
Int. Cl.² G03B 7/08
U.S. Cl. 352—141 **7 Claims**



1. In a cinematographic camera comprising an objective in line with a light gate for illuminating an intermittently advancing film, a shutter periodically interposable between said objective and said light gate during intervals of advance of said film, and photosensitive means for generating a signal indicative of the amount of incident light traversing said objective, said shutter being provided with light-guiding means for directing light rays from said objective onto said photosensitive means during said intervals,

the improvements wherein said light-guiding means comprises a body of transparent material substantially overlying said light gate during said intervals, said body having a front surface proximal to said objective giving passage to incident light rays, an internally reflecting rear surface proximal to said light gate with two forwardly converging rear faces, a first lateral surface adjoining one of said rear faces for letting light rays reflected by said one of said rear faces pass directly to said photosensitive means, and an internally reflecting second lateral surface opposite said first lateral surface directing light rays reflected by the other of said rear faces toward said first lateral surface for passage to said photosensitive means.

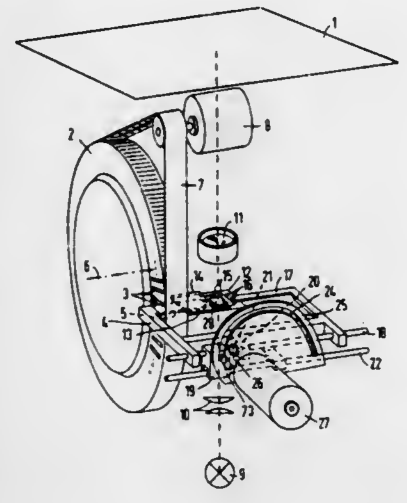
4,059,351
HAND-HELD FILM PROJECTORS
Harry A. Wisotsky, 1284 Ocean Parkway, Brooklyn, N.Y. 11230
Filed Oct. 15, 1976, Ser. No. 732,721
Int. Cl.² G03B 21/00
U.S. Cl. 353—43 **5 Claims**



1. In a hand-held projector for projecting onto a given surface a series of images derived from a series of transparencies carried by a film strip, comprising hollow casing means having

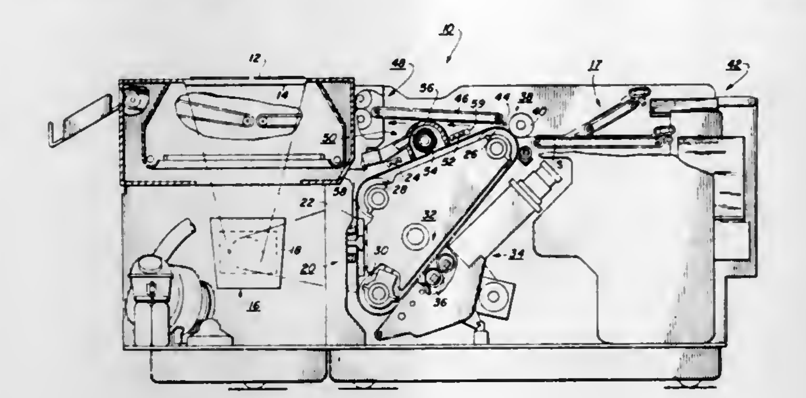
a pair of opposed side walls and an endless peripheral wall extending between and interconnecting said side walls and defining therewith a hollow interior of said casing means, said peripheral wall having opposed front and rear portions and opposed longitudinal portions extending between interconnecting said front and rear portions, said front portion of said peripheral wall having opposed ends and carrying substantially midway between said opposed ends an objective means having an optical axis extending substantially midway between said longitudinal portions of said peripheral wall for projecting onto said surface an image of a transparency situated in said casing means behind said objective means along said optical axis thereof, said casing means carrying in its interior a film-guide wall extending substantially perpendicularly to said side walls between the latter as well as substantially perpendicularly to said longitudinal portions of said peripheral wall, said film-guide wall having a front surface directed toward said front portion of said peripheral wall and adapted to engage and guide a film strip, and said casing means having to the rear of said film-guide wall and extending along said opposed longitudinal portions of said peripheral wall and said rear wall in the interior of said casing means a film-guide means for guiding a film strip along said film-guide wall and along said longitudinal wall portions and rear portion of said peripheral wall in the interior of said casing means, said film-guide wall being formed with an opening through which said optical axis extends, and said casing means carrying in its interior behind said film-guide wall a light source situated along said optical axis in alignment with said opening of said film-guide wall and on opposite sides of said light source a pair of batteries each extending between said film guide wall and said rear portion of said peripheral wall, one of said longitudinal wall portions of said peripheral wall being formed with a slot through which film is introduced to move along said film-guide wall and along said film guide means, one of said longitudinal portions of said peripheral wall being formed with an opening, and a manually operable film-advancing means extending through the latter opening into the interior of said casing means and being accessible at the exterior or said casing means at the region of the latter opening, said film-advancing means being situated between said film-guide wall and said objective means and cooperating with said film-guide wall for guiding the film strip, spring means situated in said casing means for urging said film-advancing means to an outer position, one of said side walls being formed with an opening and said film-advancing means having a springy pawl portion engaging an edge of the latter opening of said one side wall for maintaining said film-advancing means in an inner rest position in opposition to the force of said spring means, said film-advancing means having a film-advancing tooth for extending into a perforation of the film strip for advancing the latter during manual movement of said film-advancing means from said outer to said inner position thereof, said film-guiding wall carrying a tooth engating a perforation of the film strip to prevent the latter from moving with said film-advancing means when the latter is urged to its outer position by said spring means, and conductor means carried by said casing means in the interior thereof and electrically connected with the batteries and the light-source means for electrically connecting the batteries and light-source means into a circuit, said conductor means having portions forming a switch means for closing said circuit, said switch means having a normally closed position for energizing the light source means from the batteries, and said film-advancing means having a projection cooperating with said switch means for opening the latter and opening the circuit for deenergizing the light source means when the springy pawl of said film-advancing means engages said edge of said opening of said one side wall to maintain said film-advancing means at said inner position thereof in opposition to said spring means, whereby upon manual movement of said pawl of said film-advancing means away from said edge of said opening of said one side wall, said spring means displaces said film-advancing means to said outer position thereof whereupon said switch means closes to energize said light-source means for providing light traveling along the optical axis through said opening in said film guide means, said film-advancing means also being formed with an opening, and the latter opening being aligned with said opening of said film-guide means and situated along said optical axis only when said film-advancing means is in said outer position thereof, so that release of said film-advancing means to be moved by said spring means to said outer position thereof will result in projection of an image from a transparency aligned with the aligned openings of said film-guide means and said film-advancing means, while manual movement of said film-advancing means back to said inner position thereof will advance the next transparency into a position to be projected while a wall portion of said film-advancing means will cover said opening of said film-guide means to prevent the next transparency from having its image projected until the film-advancing means is returned by the spring means to said outer position thereof.

4,059,352
SLIDE PROJECTOR
Ulrich Bär, Nurnberg, and Martin Schmidt, Erlangen, both of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany
Filed May 5, 1976, Ser. No. 683,511
Claims priority, application Germany, Sept. 5, 1975, 2539597
Int. Cl.² G03B *23/06*
U.S. Cl. 353—103 **7 Claims**



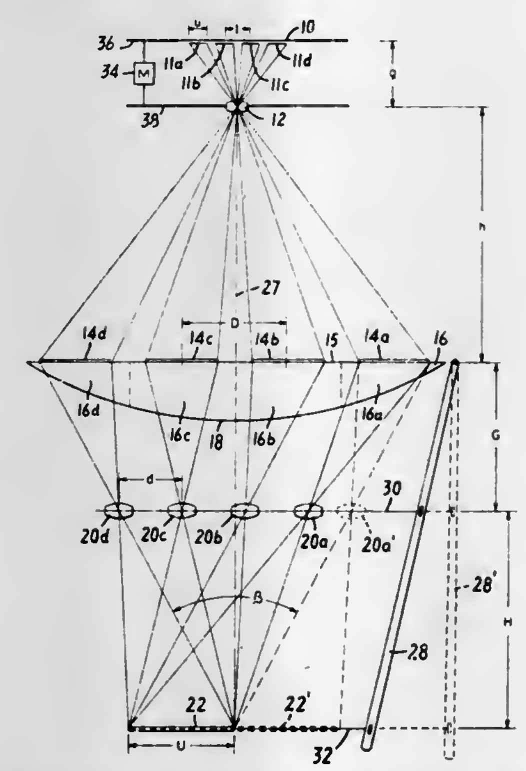
1. A slide projector comprising an optical projection system, a slide magazine being mounted for displacement, a drive motor coupled to said magazine for displacing the magazine, mechanical stop means for positioning a slide in a projection position in the projection system, guide means for guiding a slide as it is moved to the projection position, and pusher means for moving a slide from the magazine along the guide means to the projection position and for returning the slide back to said magazine, said pusher means including a pusher member being mounted for back and forth movement along a linear path, said member having two tongues extending toward one another and spaced apart to enable the magazine to move therebetween, one of the two tongues being for ejecting a slide from the magazine and the other of the two tongues being for pushing a slide back into the magazine, an electromotor, a disk having a curved slot coupled to said electromotor to move therewith, a roller being engaged in said slot, and means mounting the roller for movement in a linear path and including a spring for transferring linear displacement of the roller to the pusher member, said curved slot having a shape so that as the other tongue pushes the slide back into the magazine, it is inserted into said magazine and is then withdrawn from the magazine to a final position which enables the magazine to be freely displaced between the two spaced tongues.

4,059,353
PHOTORECEPTOR BELT SYSTEM
Louis W. W. Shaffer, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.
Filed Apr. 28, 1976, Ser. No. 680,811
Int. Cl.² G03G *15/00*
U.S. Cl. 355—16 **2 Claims**



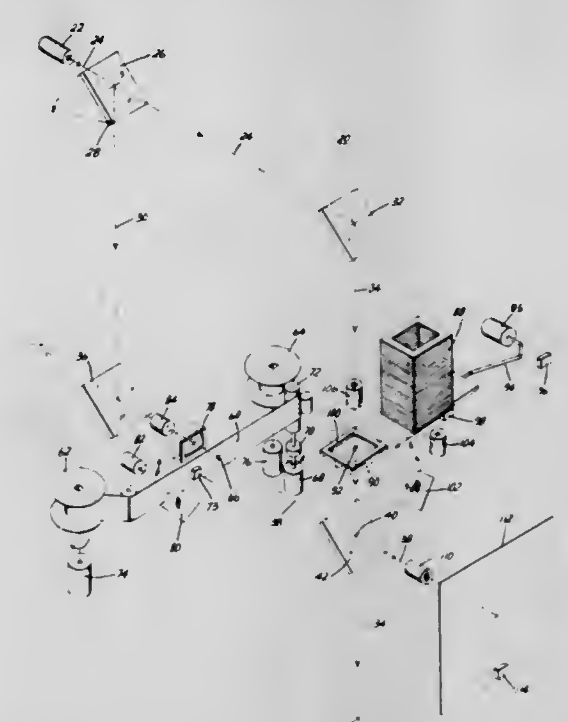
1. An improved photoreceptor belt system having an endless flexible photoreceptor belt, means for mounting the belt for movement around a closed path which includes a flat run, means defining a planar surface along the run, and means for drawing the belt toward the surface as the belt moves around the closed path, wherein the improvement comprises:
a mesh extending across the surface for preventing the belt from contacting the surface as the belt moves around the closed path, the open area of the mesh being approximately 40% of the total area of the mesh to minimize the rate of contamination of the mesh and consequently minimize the coefficient of friction between the photoreceptor belt and the mesh.

4,059,354
STEREOSCOPIC PHOTOGRAPH COMPOSITION APPARATUS
Allen Kwok Wah Lo, and Jerry Curtis Nims, both of Dunwoody, Ga., assignors to Dimensional Development Corporation, Atlanta, Ga.
Filed Oct. 12, 1976, Ser. No. 731,517
Int. Cl.² G03B *27/32, 35/14*
U.S. Cl. 355—22 **8 Claims**



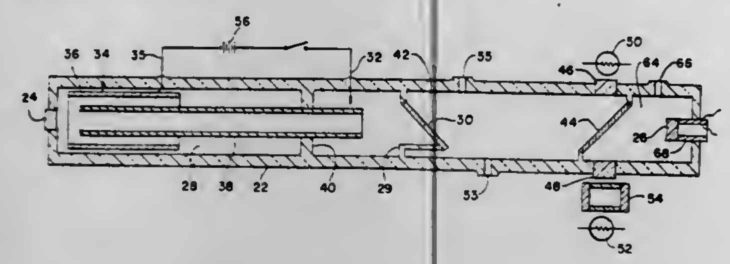
1. Apparatus for composing a stereoscopic photograph from a plurality N of adjacent two-dimensional views of an object field taken from spaced vantage points relative to the field, comprising:
means for enlarging said adjacent N two-dimensional views to form a corresponding plurality N of adjacent enlarged two-dimensional images of said views; and
means, including a corresponding plurality N of projecting lenses, for projecting said N enlarged two-dimensional images through a lenticular screen of lenticule width *w* and on to a photosensitive surface positioned therebehind, with the projected image from each enlarged image of a selected object in the object field in substantial registry with a reference point, so as to form behind each lenticule of said screen a corresponding plurality N of condensed images which are spaced apart by substantially *w*/N.

4,059,355
MICRO-COMPOSING REDUCTION PRINTER
Robert E. Fritsch, Fort Wayne, Ind., assignor to Micro-Copy, Inc., Fort Wayne, Ind.
Filed Nov. 8, 1976, Ser. No. 739,601
Int. Cl.² G03B *27/52, 27/70*
U.S. Cl. 355—43 **21 Claims**



1. Apparatus for reformatting previously photographed data comprising: a source of light; means for directing light from said source in at least one of first and second substantially mutually perpendicular axes which intersect at a predetermined point; means for advancing developed photographic film in a first plane past a first location, said first axis passing through said first location and being substantially perpendicular to said first plane, said first location being spaced from said point on one side thereof; means for positioning a developed photographic slide at a second location in a second plane substantially perpendicular to said first plane, said second axis passing through said second location and being substantially perpendicular to said second plane, said second location being spaced from said point on one side thereof; light beam splitting means at said point for passing a part of the total light in one of said first and second axes and reflecting the remaining part in the other of said first and second axes; viewing screen means on said one axis spaced from said point on the other side thereof for viewing the light image on said one axis from said beam splitting means; and means for positioning unexposed and undeveloped photographic film in a third plane at a third location, the other of said axes passing through said third location and being substantially perpendicular to said third plane, said third location being spaced from said point on the other side thereof whereby said unexposed and undeveloped film is exposed to the light image on said other axis from said beam splitting means.

4,059,356
GAS DETECTOR
Paul L. Kebabian, Sommerville, Mass., assignor to Environmental Research & Technology, Inc., Concord, Mass.
Continuation-in-part of Ser. No. 552,156, Feb. 24, 1975, abandoned. This application Aug. 13, 1976, Ser. No. 714,115
Int. Cl.² G01N *21/22*
U.S. Cl. 356—204 **20 Claims**



1. A device for detecting the presence of a specific gas in an atmosphere to be tested, said device comprising, in combination:

a laser having a resonant cavity at least a portion of which contains a material in which emission can be stimulated at least at two different frequencies centered at wave numbers separated by some difference $\Delta\nu$, the emission at one of said frequencies being more strongly absorbed by said gas that the emission at the other of said frequencies, said material and cavity being selected so that the gain of said laser is normally higher for emission at said one frequency that at said other frequency, said cavity being tuned so that

$$m/2L = \Delta\nu$$

where L is the optical length of the cavity and m is a number of half integers,

means for directing at least part of the stimulated emission outwardly from said cavity, first detector means positioned for irradiation by said part of said emission for producing electrical signals responsively to emissions at least at said other frequency; and

means for cyclically varying the tuning of said laser through at least a free spectral range.

4,059,357
DENSITOMETER CALIBRATED REFERENCE STANDARD
Gerald L. Klein, Orange, Calif., assignor to Beckman Instruments, Inc., Fullerton, Calif.
Filed Apr. 2, 1976, Ser. No. 673,026
Int. Cl.² G01J *1/02*
U.S. Cl. 356—243 **5 Claims**

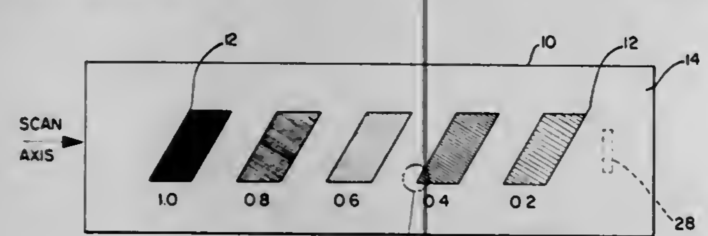


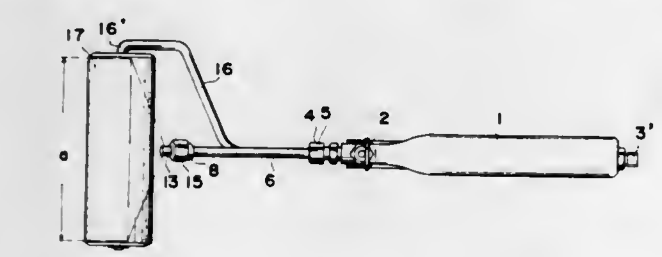
FIG. 3

1. A wavelength independent optical density standard for use in calibrating and checking an instrument which scans the standard with an illuminated zone along a predetermined scanning axis, the standard comprising:

a. an optically transparent substrate; and,

b. a light attenuating material imposed on said substrate to create a plurality of light attenuating strips in spaced relationship to form a band displaying a known optical density to light passing therethrough, said band having an area capable of totally eclipsing the illuminated zone, said light attenuating strips being disposed to produce a sweeping motion of the illuminated zone along a line normal to the scanning axis as the standard is scanned.

4,059,358
PRESSURE COATING ROLLER ASSEMBLY
Kazuo Arai, Tokyo, Japan, assignor to Iwata Air Compressor Mfg. Co., Ltd., Tokyo, Japan
Filed June 3, 1976, Ser. No. 692,581
Claims priority, application Japan, July 2, 1975, 50-93178[U]
Int. Cl.² B43M *11/02;* **B44D** *3/28*
U.S. Cl. 401—219 **4 Claims**



1. A pressure feed coating roller and spray gun assembly attachable to an external pressurized source of coating material, said assembly comprising:

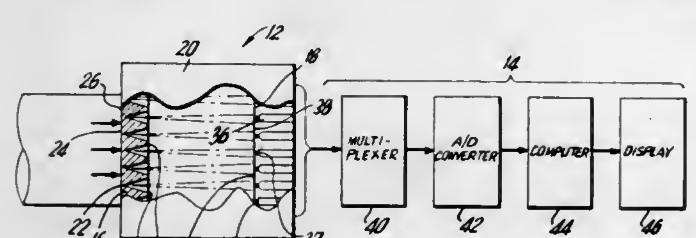
a coating roller;

a spray nozzle mounted in predetermined spaced relationship to said coating roller;

said spray nozzle including a jet orifice through which a jet of coating material passes and bevelled surface means facing said jet orifice and against which said jet of coating material impinges for diverting said jet toward the surface of said coating roller in the form of a thin, substantially flat spray which diverges laterally outwardly in a direction parallel to the longitudinal axis of said coating roller; and

the length of said coating roller being equal to the laterally divergent width of said spray at the position of contact of said spray with said surface of said coating roller.

4,059,359
METHOD AND APPARATUS FOR QUANTIZING RADIATION BEAMS BY OPTICAL DIFFRACTION
J. Walter Foster, Oakdale, and Charles L. Dunkerley, Levittown, both of N.Y., assignors to Grumman Aerospace Corporation, Bethpage, N.Y.
Filed Apr. 2, 1976, Ser. No. 672,989
Int. Cl.² G01J *1/42;* **G01K** *17/00*
U.S. Cl. 356—222 **22 Claims**



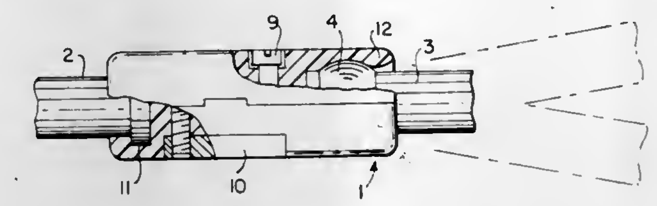
1. A method for quantizing a radiation beam, including the steps of:

sampling discrete portions of an incident radiation beam with a diffraction matrix to eliminate a substantial portion of the energy of the incident radiation beam;

optically diffracting on-axis the sampled portions of the incident radiation beam to provide quantized radiation beam portions of reduced intensity; and

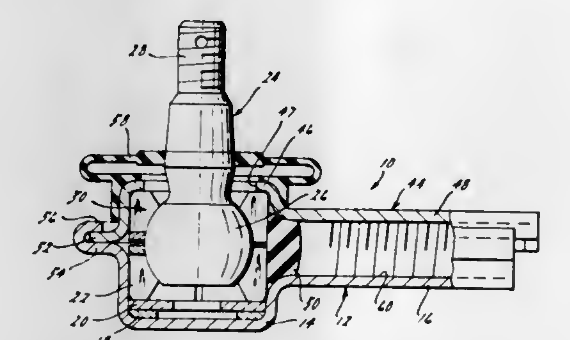
individually detecting the quantized radiation beam portions with a receiving plate having a plurality of sensors affixed thereto.

4,059,360
DEVICE FOR MECHANICAL CONNECTION
Etienne Leon Norbert Teissier, Cogolin, France, assignor to Etat Francais Représenté par de Délégue Ministériel pour l'Armement, Paris, France
Filed July 26, 1976, Ser. No. 708,318
Int. Cl.² F16B *2/02*
U.S. Cl. 403—2 **4 Claims**



1. A device for providing mechanical connection between a first and a second substantially coaxial element that are mutually subject to traction, said device disconnectable beyond a specific traction threshold and reusable, comprising a male piece fixed to the end of the first element, so as to form a bulge at the end of the first element, and a casing integral with the end of the second element, said casing comprised of elastic material and including a cavity that substantially adapts to the form of said bulge removably received in said cavity, said casing includes a first half and a second half, said halves assembled along a joint plane parallel to an axis that is common to the elements, each of said halves have a central part and including means for securing the central part of said first half to the central part of said second half, and wherein said securing means includes at least one screw, and wherein said casing includes a metallic platelet in which the end of said screw is secured; and wherein said cavity is located outside said central part, said cavity defined by adjacent ends of said halves, said ends separable from each other, and said central part being connected to the end of the second element.

4,059,361
TIE ROD END
William D. Allison, Grosse Pointe Farms, Mich., assignor to Ford Motor Company, Dearborn, Mich.
Division of Ser. No. 593,810, July 7, 1975, Pat. No. 3,988,818. This application July 2, 1976, Ser. No. 702,380
Int. Cl.² F16C *11/00*
U.S. Cl. 403—77 **7 Claims**



1. A ball and socket joint comprising:

a housing having a socket portion;

a first bearing means having a plurality of circumferentially spaced apart bearing elements positioned in said socket portion;

a ball stud having a ball seated in engagement with said first bearing means and a shank extending from said socket portion;

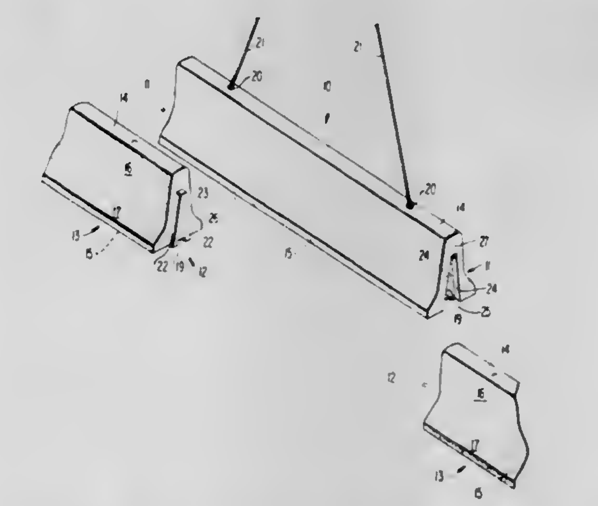
a second bearing means having a plurality of circumferentially spaced apart bearing elements positioned in said socket portion in enegagement with said ball;

a plastically deformable element situated within said socket portion;

means constructed to transfer a load from said ball stud to said deformable element that is of sufficient magnitude to deform said deformable element;

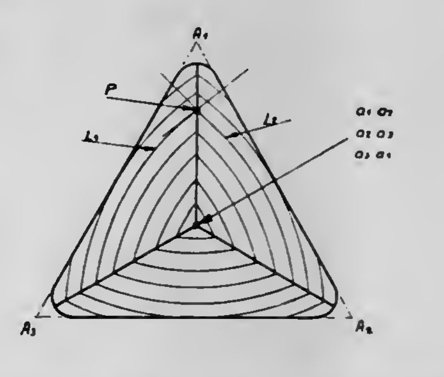
a closure member having an opening through which said shank extends and a peripheral portion in engagement with said socket portion.

4,059,362
CONCRETE HIGHWAY TRAFFIC BARRICADE HAVING INTEGRALLY FORMED COUPLING
Rodney I. Smith, Rte. No. 1, Midland, Va. 22728
Filed Nov. 24, 1976, Ser. No. 744,800
Int. Cl.² E01F *15/00*
U.S. Cl. 404—6 **11 Claims**



1. In a traffic barrier of the type wherein a series of elongated precast concrete barricades having a uniform cross-section along their respective lengths are joined in end-to-end interengaging, abutting alignment by similar mating tongue-and-groove couplings integrally formed in the respective abutting ends of each of the barricades, each tongue-and-groove coupling consisting of a vertically elongated tongue projecting longitudinally outwardly from the end of one of the abutting barricades and a recess complementary to said tongue being formed in the end of the other of the abutting barricades, said recess extending downwardly to the base of the barricade to permit entrance of the tongue in a vertical direction, the transverse width of the tongue and the recess being greater at their lower ends than at their upper ends to facilitate said entrance.

4,059,363
CUTTING PLATES WITH ROUNDED CUTTING EDGES AND CONCAVE FRUSTOCONICAL CUTTING SURFACES
Gerard Romagnolo, Eybens, France, assignor to Ugine Carbone, Grenoble, France
Filed Mar. 9, 1976, Ser. No. 665,263
Claims priority, application France, Apr. 9, 1975, 75.11727
Int. Cl.² B26D *1/00*
U.S. Cl. 407—114 **16 Claims**



1. A cutting plate of polygonal cross-sectional shape and including a chip-breaker on at least one of its working faces, said plate having an upper surface, a lower surface and a plurality of side surfaces defining said polygonal shape, at least

one cutting point on a cutting point plane generally parallel to and below said upper surface, at least two cutting surfaces each defined by at least one conical surface with an axis perpendicular to said cutting point plane, said cutting point including a cutting edge at said cutting plane and comprising a surface generated by an arc of a curve adjacent an intersection between two of said side surfaces, two of said cutting surfaces in the region of said cutting point being joined along an arc of a curve bisecting said cutting point in a plane perpendicular to said cutting point plane wherein a discontinuity is provided by the angle of said two cutting surfaces decreasing as each of said conical cutting surfaces approaches said arc of a curve bisecting said cutting point, and the juncture of said side surfaces and said cutting surfaces comprising a cutting edge defined by a plane Q_a connecting two cutting points, which plane Q_a defines a portion of said polygonal shape.

4,059,364

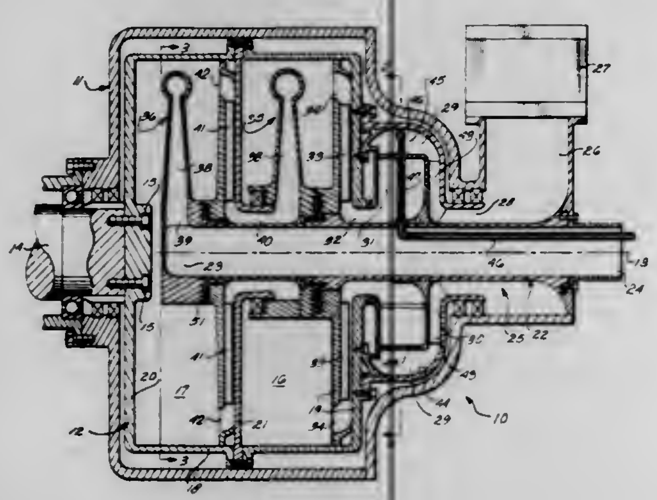
PITOT COMPRESSOR WITH LIQUID SEPARATOR

Poul H. Andersen, Torrance, and John W. Erickson, Huntington Beach, both of Calif., assignors to Kobe, Inc., Huntington Beach, Calif.

Filed May 20, 1976, Ser. No. 688,176

Int. Cl.² B04B *5/02;* **F03B** *11/08*

U.S. Cl. 415—89 **18 Claims**



1. A pitot compressor comprising
a. a rotary casing mounted for rotation in a selected direction about an axis,
b. a gas supply passage for delivering a gas to be compressed through an outlet of the gas supply passage to the interior of the casing,
c. a compressed gas discharge duct coaxial with the casing,
d. a pitot tube extending radially of said axis in the casing and having adjacent its outer end an inlet facing in a direction opposite to the direction of rotation of the rotary casing, the pitot tube having a diffuser passage connected to the inlet and extending toward the axis to an outlet port connected to the discharge duct, and
e. separating means cooperatively associated with the gas supply passage upstream of the outlet thereof for centrifugally separating liquid from gas in the supply passage, whereby gas delivered to the interior of the casing is essentially free of liquid.

4,059,365

SHEET METAL HUB ASSEMBLY

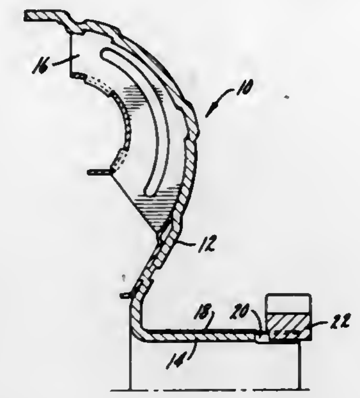
John Saxon Ivey, Bloomfield Hills, Mich., and Kenneth Albert Braybrook, Letchworth, England, assignors to Borg-Warner Corporation, Chicago, Ill.

Division of Ser. No. 598,441, July 23, 1975, Pat. No. 3,981,068. This application May 4, 1976, Ser. No. 683,125

Int. Cl.² F04D *29/04*

U.S. Cl. 416—174 **1 Claim**

1. An impeller assembly for a hydraulic torque converter constructed of sheet metal and having an axially extending hollow hub portion integral therewith adapted to be connected to drive a fluid pump, the hub member having a thin wall cylindrical bearing member thereon, the bearing member being secured to the hub portion so as to rotate therewith by extru-



sion of the hub through said bearing, said bearing member providing a wear resistant surface on the sheet metal hub surface.

4,059,366

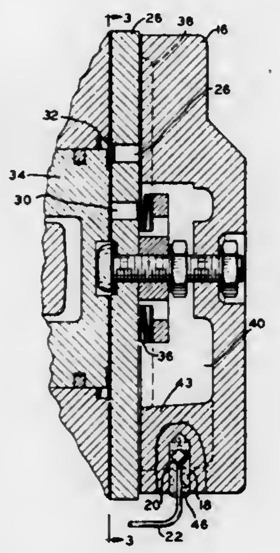
THERMAL OVERLOAD PROTECTIVE SYSTEM

Edwin L. Gannaway, Adrian, Mich., assignor to Tecumseh Products Company, Tecumseh, Mich.

Filed Mar. 26, 1976, Ser. No. 670,646

Int. Cl.² F04B *49/06, 49/10*

U.S. Cl. 417—32 **7 Claims**



1. In a motor driven compressor having at least one piston reciprocable in a cylinder with a valve device closing the outer end of the cylinder, a cylinder head defining a discharge passage and including a rib protruding into said discharge passage and exposed to gas being discharged from the compressor, and discharge ports from said passage on opposite sides of said rib at the base thereof, a discharge valve interposed between the cylinder and the said passage, said discharge valve opening into said passage in a region spaced from the apex of said rib whereby the gas being discharged through said discharge valve flows along said rib from the apex down opposite lengths thereof to said discharge ports, a blind hole formed in said rib from the side of the head facing away from said passage, and a heat sensitive element mounted in said hole and adapted for connection in controlling relation to the motor driving the compressor.

4,059,367

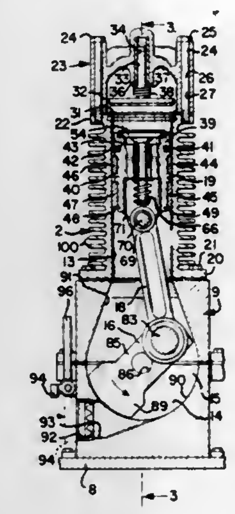
GASEOUS FLUID COMPRESSING APPARATUS

Richard Clarence Marshall, 408 W. 83rd Terrace, Kansas City, Mo. 64114

Filed Apr. 26, 1976, Ser. No. 680,525

Int. Cl.² F04B *23/14, 21/04*

U.S. Cl. 417—203 **8 Claims**



1. A gaseous fluid compressing apparatus having a cylinder with a bore therein, a compressed fluid discharge at one end of the cylinder, a discharge valve at said one end of the cylinder opening in response to fluid pressure in the cylinder bore, a piston reciprocable in the cylinder bore and an intake valve in the piston operating in response to pressure differential on opposed sides thereof, the improvement comprising:
a. a crankcase having walls defining an interior compartment and said cylinder extending therefrom with said cylinder bore communicating with said compartment;
b. a crank rotatably mounted in the crankcase and having a crank throw and opposed counterbalances in said compartment;
c. a connecting rod operably connecting said piston with said crank throw for reciprocating said piston in response to rotation of said crank;
d. said crankcase compartment being defined by surfaces adjacent to the paths of extremities of the crank throw and connecting rod as the crank is rotated;
e. an inlet port in the crankcase for gaseous fluid to be compressed, said inlet port having a passage extending therefrom to said compartment for movement of gaseous fluid from said inlet port to said compartment, said passage communication with said compartment being substantially tangentially and opposite from the location of entry to the cylinder bore and extending in the same direction as the movement of the crank throw when passing adjacent said passage whereby said crank throw, counterbalances and adjacent portion of the connecting rod function as impellers facilitating intake and compression of gaseous fluid to be compressed.

4,059,368

GAS COMPRESSOR UNLOADING MEANS

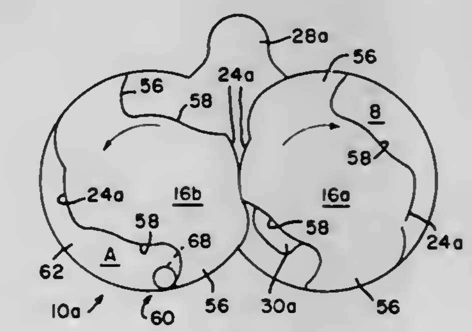
Wallace A. McGahan, Lawrenceville, N.J.; Paul D. Webb, Tioga, Pa., and Henry W. Morse, Savona, N.Y., assignors to Ingersoll-Rand Company, Woodcliff Lake, N.J.

Division of Ser. No. 577,347, May 14, 1975, Pat. No. 3,989,413. This application June 21, 1976, Ser. No. 698,171

Int. Cl.² F04B *49/02;* **F01C** *11/00;* **F04C** *17/04, 23/00*

U.S. Cl. 417—243 **9 Claims**

1. A rotary gas compressor having a plurality of compression chambers, rotary means confined in each of said chambers for displacing and compressing gas in said chambers, spaced-apart gas inlet and outlet port means for each of said chambers, and unloading means for the compressor, comprising:
unloading port means, for each of said compression chambers, each of said unloading port means opening both into its respective compression chamber and externally thereof; and
valving means coupled to said unloading port means operative for independently opening and closing selective ones of said unloading port means; wherein
said rotary means comprises rotors;
each of said rotors having a first radial sector which defines a hub, a second innermost radial sector which defines a groove, and a third outermost radial sector which defines a tooth;
said outlet port means of a given one of said chambers is cyclically sealed off from said given one chamber, sequentially, by two of said sectors of one of said rotors;
said unloading port means of a given one of said chambers is cyclically sealed off therefrom by only one of said sectors of one of said rotors;
said compression chambers each being defined by an enveloping, arcuate side wall, with which said teeth of said rotors effect a rotary interface, and an end wall joined to said side wall;
said rotors are arranged for rotation within said chambers on axes lying normal to said end wall;



each said gas inlet port means opening onto its respective chamber at a first location;
each said gas outlet port means opening through said end wall onto its respective chamber at a second location, relative to one of said rotation axes, which is spaced apart from said first location a given rotary or angular distance;
each said unloading port means opens onto said end wall at a location which, relative to at least one of said rotation axes, is intermediate said rotary or angular distance;
each said unloading port means comprises a port, a walled cylinder external to or outboard of said chambers, said port being formed in an end of said cylinder, said cylinder having venting means opening through the wall thereof for venting gas therethrough, and said cylinder slidably supporting a port-closure plunger, and said plunger having means cooperative with said port for metering an opening and closing of said port to effect, and to prohibit, a communication of said port with said venting means; and
means interactive with said cylinder for moving said plunger to effect closure and opening of said port.

4,059,369

FUEL INJECTION PUMP

Franz Eheim, Stuttgart, Germany, assignor to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Jan. 27, 1976, Ser. No. 652,873

Claims priority, application Germany, Jan. 28, 1975, 2503300

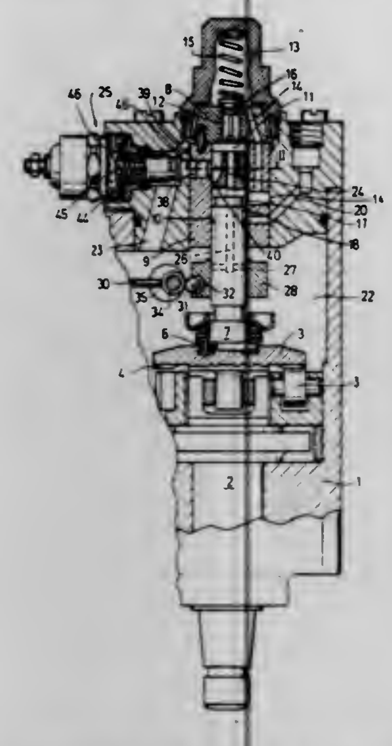
Int. Cl.² F04B *7/06*

U.S. Cl. 417—494 **5 Claims**

1. In a fuel injection pump for internal combustion engines which includes a housing, a fuel storage compartment in said housing, cylinder means disposed in said housing and a reciprocating and rotating piston moving in said cylinder means and defining a pressure chamber, a plurality of fuel channels in said housing, one terminus of each of said plurality of fuel channels lying in the wall of said cylinder, said piston having radial apertures which cooperate with said termini to thereby pro-

vide rpm-dependent flow control through said plurality of fuel channels, the improvement comprising

at least one connection channel in the cylinder means connected to said plurality to fuel channels for providing mutual fluid communication between at least two of said plurality of fuel channels, and a suction conduit connected between said mutually communicating fuel channels and said fuel storage compartment.



4,059,370

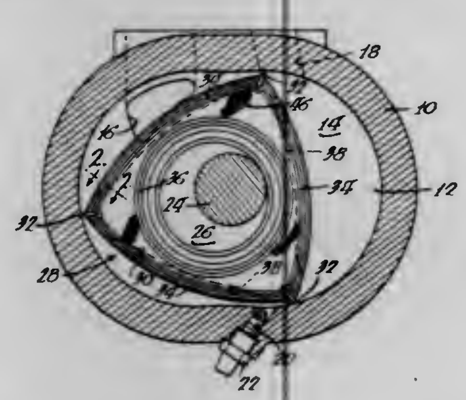
ROTARY ENGINE HAVING LOW THERMAL CONDUCTIVITY ROTOR

Myron R. Gibson, Edelstein, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed June 25, 1976, Ser. No. 699,757

Int. Cl.^{2} F01C *1/02, 21/08, 21/04, 19/08*

U.S. Cl. 418—56 **3 Claims**



1. In a rotary engine having a high surface to volume ratio, the combination of:

a housing having intake and exhaust ports and defining a chamber;

a shaft journalled in the housing to extend through the chamber and having an eccentric within the chamber;

a rotor journalled on said eccentric within said chamber, said rotor having a body consisting essentially of a ceramic material;

seals carried by said rotor sealingly engaging the walls of the chamber; and

metallic, grooved inserts in said rotor body for receiving the seals in the groove thereof, means placing said insets in tension so that said body is in compression.

4,059,371

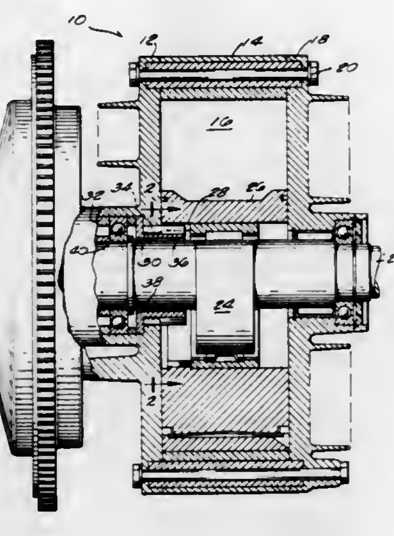
ROTARY ENGINE STATIONARY GEAR LOCATING AND TIMING DEVICE

John D. Sheldon, Zion, Ill., assignor to Outboard Marine Corporation, Waukegan, Ill.

Filed Sept. 18, 1975, Ser. No. 614,531

Int. Cl.^{2} F04C *1/02;* **F16H** *1/10, 1/32, 57/02*

U.S. Cl. 418—61 A **4 Claims**



1. A rotary piston engine comprising a housing assembly including a trochoid housing having means at least partially defining a trochoid cavity, a pair of end housings, means for aligning and securing together said end housings and said trochoid housing to further define the trochoid cavity, a shaft rotatably supported in said end housings and having an eccentric portion disposed within the trochoid cavity, a rotary piston rotatably supported on said eccentric portion of said shaft and extending within the trochoid cavity, said rotary piston having an internal timing gear, a stationary gear separate from said end housings and having teeth in mesh with said internal timing gear, and means extending from one of said end housings in interfitting relation with said teeth of said stationary gear for mounting said stationary gear in predetermined fixed relation to said one of said end housings.

4,059,372

PLANT FOR PRODUCING METALLIC PELLETS FROM SALT-ADDED MAGNESIUM OR ALLOYS THEREOF

Ivan Andreevich Barannik, prospekt Lenina, 182a, kv. 22, Zaporozhie; Anatoly Borisovich Kondratenko, ulitsa Sevastopolskaya, 4, kv. 6, Kalush Ivano-Frankovskoi oblasti; Alexandr Fedorovich Trukhin, ulitsa Zhdanova, 11, kv. 32, Kalush Ivano-Frankovskoi oblasti; Viktor Georgievich Raskatov, ulitsa Khimikov, 14, kv. 18, Kalush Ivano-Frankovskoi oblasti; Ivan Vasilievich Zharovsky, ulitsa Zhdanova, 11, kv. 32, Kalush-Ivano-Frankovskoi oblasti; Viktor Alexandrovich Rudakov, ulitsa Bogdana Khmelnitskogo, 60, kv. 121, Kalush Ivano-Frankovskoi oblasti; Andrei Efremovich Mordkovich, ulitsa 40 let Sovetskoi Ukrainy, 29, kv. 13, and Alexandr Vasilievich Chalov, ulitsa 40 let Sovetskoi Ukrainy, 46, kv. 20, both of Zaporozhie, all of U.S.S.R.

Filed Dec. 6, 1976, Ser. No. 747,814

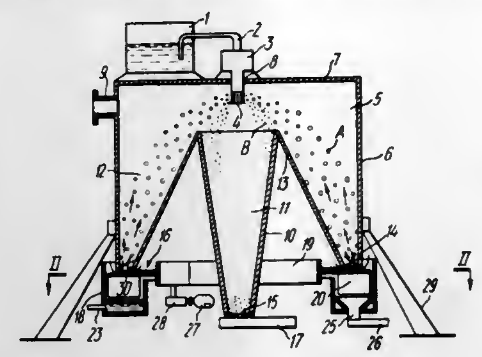
Claims priority, application U.S.S.R., Dec. 5, 1975, 2196202

Int. Cl.^{2} B29C *23/00*

U.S. Cl. 425—8 **3 Claims**

1. A plant for producing metallic pellets from a salt-added magnesium or alloys thereof, comprising: a furnace for melting a salt-added metal; a centrifugal pelletizer with a perforated bowl; a means for feeding the molten metal together with the salt additive to said centrifugal pelletizer; a cylindrical chamber accommodating the perforated bowl of said centrifugal pelletizer and adapted for collecting the pellets formed from the molten metal when the latter is shot out through the perforations in said bowl; a hopper provided in said cylindrical chamber under the coaxially with the perforated bowl; said

hopper dividing said cylindrical chamber into two concentric zones open from below, of which one zone established by said hopper is located centrally in said chamber and is adapted for collecting salvage that results from the pellet formation pro-



cess, while the other annular-shaped zone is located along the periphery of said chamber and is adapted for pellet collection; a pellet withdrawal mechanism provided under said latter zone; a salvage disposal mechanism provided under said former zone.

4,059,373

EXTRUDER HEAD

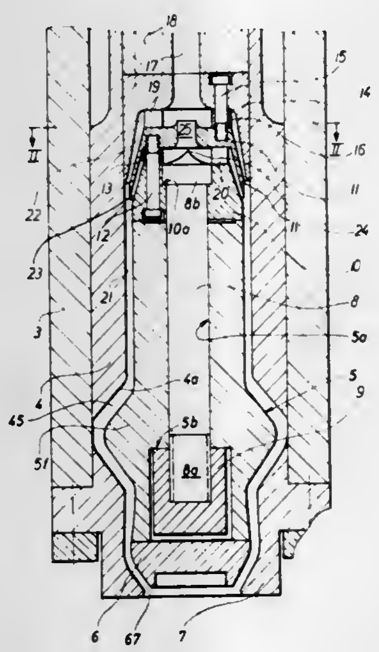
Rudolf Maier, Heidenheim, Germany, assignor to J. M. Voith GmbH, Heidenheim, Germany

Filed Apr. 13, 1976, Ser. No. 676,464

Claims priority, application Germany, Apr. 26, 1975, 2518649; Oct. 10, 1975, 2545415

Int. Cl.^{2} B29F *3/04*

U.S. Cl. 425—192 R **15 Claims**



1. In an apparatus for making tubular parisons of synthetic thermoplastic material, an extruder head comprising a hollow outer housing having front and rear end portions; an inner housing having a material-admitting channel and a forward portion extending into said rear end portion; a core coaxially received in said outer housing and having a rear end adjacent said forward portion and a front end defining an annular extrusion orifice with said front end portion, said core and said outer housing further defining an elongated annular compartment communicating with said orifice; and means securing said core to said inner housing, including a section disposed between said forward portion and said rear end, said section and said forward portion defining a first chamber through which the material can flow from said channel toward said compartment, said section and said rear end defining a second chamber through which the material can flow toward said compartment and said section having an opening communicatively connecting said first chamber with said second chamber, a first group of spaced-apart coupling elements extending across said first chamber and connecting said section to said inner housing, and a second group of spaced-apart coupling elements extending across said second chamber and connecting said section to said core, said coupling elements being substantially parallel to the axis of said core.

4,059,374

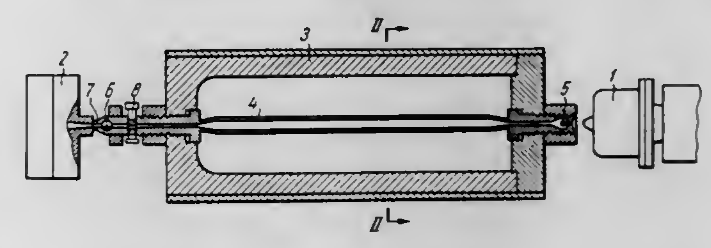
DEVICE FOR PREPARING POLYMER ARTICLES FROM MONOMERS

Nikolai Alexandrovich Mikhalev, prospekt Tsiolkovskogo, 79a, kv. 64; Boris Petrovich Shtarkman, prospekt Lenina, 65, kv. 63, and Jury Ivanovich Gladyshev, ulitsa Avtomobilnaya, 21, kv. 6, all of Dzerzhinsk Gorkovskoi oblasti, U.S.S.R.

Filed Dec. 16, 1976, Ser. No. 751,523

Int. Cl.^{2} B29F *3/02*

U.S. Cl. 425—207 **10 Claims**



1. A device for producing polymer articles from monomers, comprising: a source having means to supply a monomer, a mold, a means for preparing a polymer melt out of the monomer having an inlet communicating with said source of the monomer and an outlet communicating with said mold, at least one chamber having walls constructed of a flexible resilient material, said chamber being disposed intermediate said inlet and said outlet and having means communicating therewith, said chamber having a height several times less than its length and width, said chamber being disposed in a housing, said housing confining therein a medium, means to pressurize said medium to thereby exert pressure on the walls of said chamber, and means operable to heat said housing and said medium to thereby heat said chamber and the melt therein.

4,059,375

VEHICLE WHEEL PNEUMATIC TYRES AND THE MANUFACTURE THEREOF

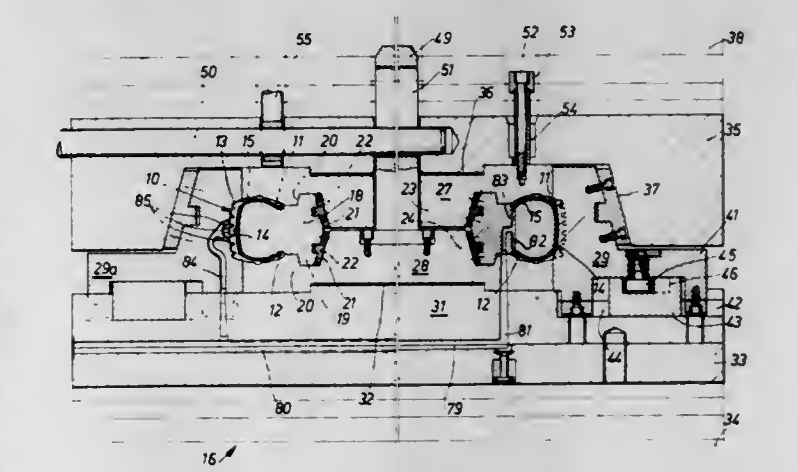
Friedrich Koch, Achim, and Lothar Fink, Achim-Baden, both of Germany, assignors to Sopecom S.A. Fribourg, Fribourg, Switzerland

Filed Mar. 30, 1976, Ser. No. 671,782

Claims priority, application Germany, Apr. 5, 1975, 2514973

Int. Cl.^{2} B29C *5/00;* **B29H** *3/08, 5/02*

U.S. Cl. 425—589 **11 Claims**



1. In an injection molding apparatus for producing molded articles having a multipart core defining the inner side of a mold cavity, the core being reduced in size about its external periphery by relative displacement of individual parts for the removal of the article from the mold, a multi-part injection

mold, said core inserted into said mold and completely enclosed thereby, said mold having upper, lower and sets of outer mold components, said sets of outer mold components being replaceable to form different sized mold cavities for the successive injection molding actions; the improvement comprising: a first injection molding station for injection molding a first part of said article, said first station disposed in a press, an upper thrust plate associated with said press, a first mold carrier having a first of said sets of outer mold components, a first closure bell for holding said core, said upper and lower mold components and first of said sets of outer mold components to define a first molding cavity, a first injection unit associated with said first molding station, a second injection molding station disposed in said press for molding a second part of said article, a second mold carrier arranged in a force transfer arrangement with said first closure bell, said second mold carrier having a second of said sets of outer mold components, a second closure bell for holding said core, said upper and lower mold components and second of said sets of outer mold components to define a second molding cavity, a base member in a force transfer relationship with said second closure bell, a second injection unit associated with said second molding station, force generating means to move said upper thrust plate toward said base and transmit a closure force through said upper thrust plate and said first and second closure bells to said base for simultaneous molding at said first and second stations, means for transporting said core, said upper and lower mold components with said first part to said second molding station for molding said second part, and means associated with said transporting means for placing and extracting said core, said upper and lower mold components relative to said first set of outer mold components when at said first injection molding station and relative to said second set of outer mold components when at said second injection molding station.

4,059,376

APPARATUS FOR MOULDING HYDRAULIC CEMENT OR THE LIKE MATERIAL

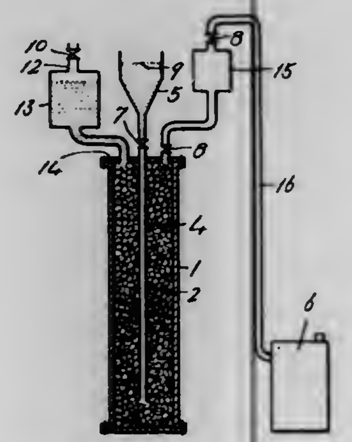
Yasuro Ito; Hideharu Kaga, both of Tokyo; Yasuhiro Yamamoto, Ageo, and Tadayuki Sumita, Tokyo, all of Japan, assignors to Yasuro Ito and Taisei Corporation, both of Tokyo, Japan

Division of Ser. No. 526,825, Nov. 25, 1974, Pat. No. 4,036,922. This application Feb. 28, 1977, Ser. No. 772,421

Claims priority, application Japan, Nov. 24, 1973, 48-131189; Mar. 14, 1974, 49-28598; Mar. 20, 1974, 49-30888; July 23, 1974, 49-83787; July 25, 1974, 49-84673; Oct. 9, 1974, 49-115596

Int. Cl.² B28B *13/02*; B29F *1/00*

U.S. Cl. 425—546 59 Claims



1. An apparatus for moulding a hydraulic substance comprising an injection tank, a moulding tank, and an overflow zone, said moulding tank being adapted to contain an aggregate, means for reducing the pressure in the moulding tank and in the overflow zone to a vacuum, means for introducing a cement and water mixture into the injection tank, means for transferring said mixture from the injection tank into the moulding tank in sufficient excess quantity to cause said mixture to overflow from the moulding tank into the overflow zone, and means for returning the overflow zone to at least atmospheric pressure, whereby at least a portion of said excess quantity of said mixture in the overflow zone is returned to the moulding tank to eliminate the voids between the aggregate in the moulding tank created by removing the excess water and entrained air under reduced pressure, and replacing said voids with said cement and water mixture to produce a substantially void-free product, said mixture being maintained in sufficient quantity in said overflow zone to avoid the introduction of air into the moulding tank.

4,059,377

APPARATUS FOR THE PRODUCTION AND DEPOSITION OF BANDS

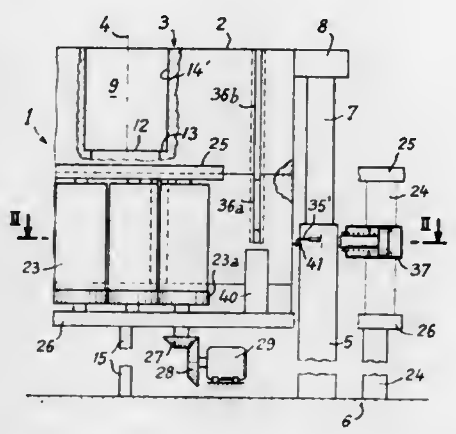
Yves Jean Corbic, Chatou, France, assignor to Societe a Responsabilite Limitee dite: TECCA, France

Filed Feb. 2, 1977, Ser. No. 764,713

Claims priority, application France, Feb. 4, 1976, 76.03100

Int. Cl.² B29C *17/00*

U.S. Cl. 425—305.1 11 Claims



1. An apparatus for the production and deposition of bands associated with shaping moulds of a shaping station of an installation for the thermal shaping of containers provided with bands, whereby said apparatus comprises an elongated body at least one preferably cylindrical, so-called winding cavity, at least one fixed cutting member and one movable cutting member located in the immediate vicinity of said cavity, at least one access slot issuing into the said cavity and which connects the latter laterally with the outside, at least one ejecting plunger mounted without any significant lateral clearance in the said cavity in such a way that it can occupy two end positions in the latter, actuating means for the movable cutting member, at least one pair of transporting rollers located upstream of the access slot, a strip whose width is at the most equal to the height of the slot whose free end is gripped between the said transporting rollers and from whcih the bands are cut, as well as driving means able to sequentially drive the two transporting rollers for the purpose of introducing into the said cavity a strip portion whose length is equal to that of one band, wherein each pre-winding cavity is located below a mould and the body containing the various cavities is integral with the block of moulds, each ejecting plunger is fixed in space on a frame, each mould comprises base plate aligned with the corresponding cavity integral with the ejecting plunger by means of an intermediate supporting member and whose cross-section is smaller than that of the shaping chamber of the mould in such a way that there is a marginal base portion between the side walls and the movable base plate of the mould, whereby the base plate, intermediate supporting member and ejecting plunger are arranged relative to one another and relative to the shaping chamber and the pre-winding cavity in such a way that the upper face of the movable base plate is located in the same plane as the marginal base portion and the intermediate member is located entirely within the said cavity when the ejecting plunger is located at the lower end of said cavity, the intermediate supporting member has a cross-section which is smaller than that of the ejecting plunger, each pair of transporting rollers is mounted so as to be fixed in space and extends parallel to the supporting member substantially over the entire height of the latter starting from the ejecting plunger, the actuating means for the movable cutting member comprise a control member which is independent of the movements of said movable cutting member and which are parallel to the axes of the mould and the cavity, and the driving means for each pair of transporting rollers comprises a reverse movement control which can be operated at the end of the cutting stroke of the movable cutting member and automatically stops the reverse movement of the transporting rollers as soon as the latter have moved back the end of the strip engaged in the slot to an area located outside the displacement path of the mould or moulds.

4,059,378

METHOD AND A MACHINE FOR REMOVING FROM THEIR MOLDS MOLDINGS OF CONFECTIONERY MASSES WHICH HAVE BEEN FORMED INTO CHOCOLATE CENTERS, BARS OR OTHER SINGLE OR CONTINUOUS MOLDINGS

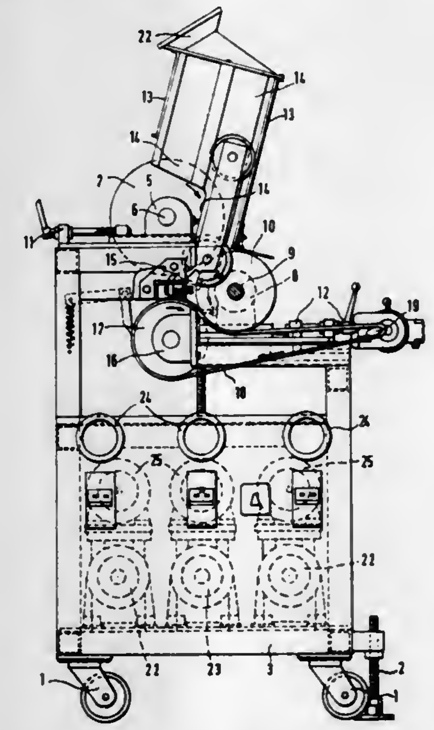
Helmut Sollich, Kalletal-Talle, Germany, assignor to Sollich AG, Bad Salzuflen, Germany

Filed July 20, 1976, Ser. No. 707,096

Claims priority, application Germany, Dec. 9, 1975, 2540613

Int. Cl.² A23G *3/12*

U.S. Cl. 425—362 4 Claims



1. A machine for molding confectionery masses into chocolate centers, bars, or other continuous or separate moldings, comprising:

a molding cylinder provided with molding recesses in its circumferential surface;

a suction belt disposed below and partially enclosing said molding cylinder, for removal of formed parts from the molding recesses of the molding cylinder;

a single intake cylinder disposed immediately adjacent to said molding cylinder, said intake cylinder having a larger diameter than said molding cylinder, said intake cylinder being operable to press the mass into the molding recesses of the molding cylinder;

feed hopper means, disposed above said intake cylinder and said molding cylinder, for directing feed onto said intake cylinder and onto said molding cylinder upstream of said intake cylinder;

drive means operable to cause rotation of said molding cylinder and said intake cylinder and to dirve said suction belt; and

control means operable to control the rotation velocities of said molding cylinder and said intake cylinder.

4,059,379

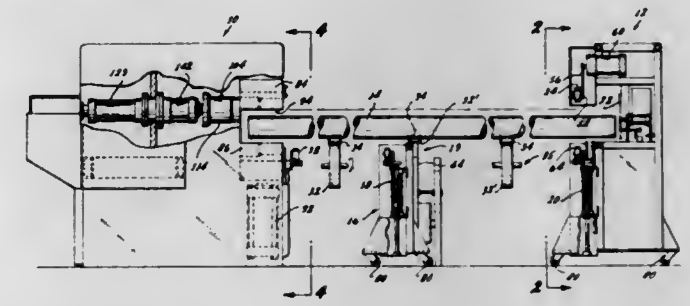
METHOD OF BELLING PLASTIC PIPE AND APPARATUS THEREFOR

Wolfram G. Korff; Vernon V. Emery, both of Granada Hills; Joseph Kim Bond, North Hollywood, and Joseph Marcella, Granada Hills, all of Calif., assignors to Emery Company, Inc., Pacoima, Calif.

Filed Aug. 26, 1976, Ser. No. 717,874

Int. Cl.² B29C *17/00*

U.S. Cl. 425—393 18 Claims



4. Apparatus for compression molding an end of the thermoplastic pipe to bell the same, said apparatus comprising:

a. A heating area to heat-soften the end of the pipe;

b. A belling station;

c. Conveyor means to dispose the end of a pipe to be belled in said heating area and to retain said pipe-end in said heating area for a predetermined period to heat-soften said pipe-end and then to move the pipe transversely to its axis so that said heat-softened pipe-end is disposed in the belling station;

d. A belling mandrel, said belling mandrel being co-axially aligned with, but, in its first position, spaced from the heat-softened end of said pipe, said mandrel being movable from its said first position to a second position wherein the mandrel is inserted in the heat-softened pipe-end, said mandrel having a leading substantially cylindrical nose with an outside diameter just sufficiently smaller than the inside diameter of the pipe so as to be insertable therein, and a following section configured to the desired internal configuration of the finally belled pipe-end;

e. A pair of mating mold halves, said mold halves being disposed in transverse alignment with the heat-softened pipe-end when disposed in said belling station, and said mold halves being movable from a first position spaced from each other to a second position wherein said mold halves are tightly closed together about the heat-softened pipe-end, when in said belling station each of said mold halves defining one-half of a cavity, said cavity having

i. A first inner portion which coincides with the outside diameter of the plastic pipe as it arrives in the belling station, and is disposed inwardly out of the softened pipe-end; and

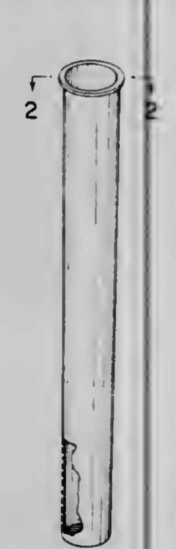
ii. A second portion with an inside diameter greater than the outside diameter of the pipe-end and defining the outer configuration desired for the finally belled pipe-end, said second portion of the cavity the outer configuration desired for the finally belled pipe-end, said second portion of the cavity extending from the first inner portion axially beyond the softened pipe-end when disposed in said belling station, the walls of the mold halves when so closed together defining said cavity and being spaced from the following section of the mandrel by the thickness of the walls desired for the pipe-end after belling.

f. A compression sleeve, said sleeve having an inside diameter just sufficiently greater than the outside diameter of the following section of the mandrel as to be slidable thereover, and an outside diameter just sufficiently smaller than the inside diameter of the mold walls defining the second portion of the cavity as to be slidable therein, said sleeve having an annular end edge face, and said sleeve being slidable over said mandrel between a first position

remote from the mandrel nose and a second position over the following section of the mandrel toward said mandrel nose to contact said transverse annular end wall of the pipe-end;

g. Means to force said sleeve slidably axially over said mandrel after said mandrel has been inserted in said heat-softened pipe-end from the sleeve's first position to its second position to cause said annular end edge face to contact and compress the said annular end wall of the heat-softened pipe-end as it is disposed in the spacing between the walls of the mold halves defining said cavity and the following section of the mandrel, said means to force being disposed symmetrically about the axis;
h. Means to cool the heat-softened pipe-end after said compression and mandrel insertion has occurred;
i. Means to retract said sleeve back along said mandrel to its first position;
j. Means to retract said mandrel back to its first position;
k. Means to move said mold halves back to their respective first positions; and
l. Means to eject the belled pipe from its disposition wherein its end is in said belling station.

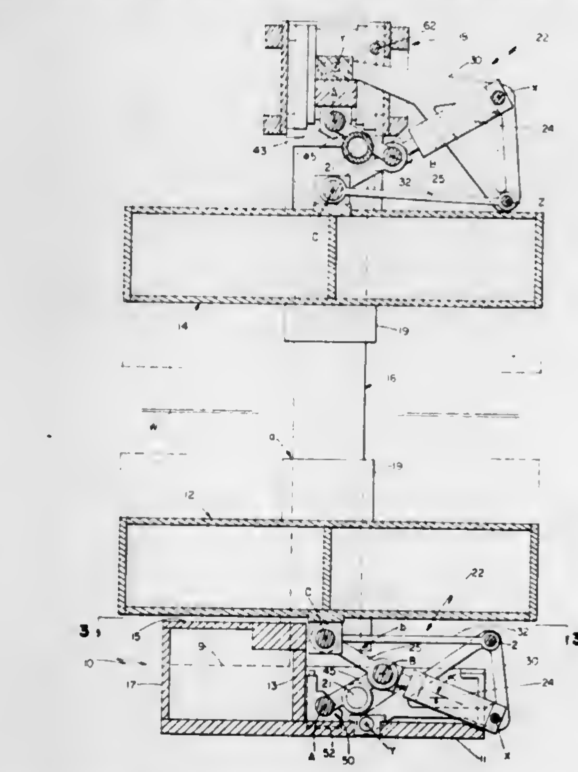
4,059,380
DEEP-DRAW THERMOFORMING OF THERMOPLASTIC SHEET
Arnis Judzis, Bedford Heights, and Thomas J. Bond, Chardon, both of Ohio, assignors to The Standard Oil Company, Cleveland, Ohio
Filed Aug. 26, 1976, Ser. No. 717,935
Int. Cl.^{2} B29C *17/03*
U.S. Cl. 425—298 **4 Claims**



1. In an apparatus for deep drawing of hollow articles from heated thermoplastic sheet comprising a heated mandrel and a mold cavity, means for securing the heated thermoplastic sheet in a position between the mandrel and mold cavity and means for moving the mandrel through the heated thermoplastic sheet so as to draw the heated thermoplastic onto the walls of the mandrel and into the mold cavity, the improvement comprising locating a domed guide located directly above and at the top of the mold cavity, said domed guide having internal walls which are greater in diameter than the internal diameter of the mold cavity and said domed guide being equipped with a hardened metal insert cutter located near the entrance to the mold cavity.

4,059,381
TOGGLE PRESS
Charles M. Schott, Jr., Gloucester, Mass., assignor to Gloucester Engineering Co., Inc., Gloucester, Mass.
Filed Dec. 6, 1976, Ser. No. 747,934
Int. Cl.^{2} B29C *3/00, 17/00;* **B30B** *1/16*
U.S. Cl. 425—406 **11 Claims**

1. A toggle press of the type comprising at least a lower platen mounted to move on guides of a frame between an open position accessible to a worker on the ground and a closed position in response to a toggle linkage, the toggle linkage comprising frame and platen links connected at pivots respectively on the frame and platen, the line between said pivots being parallel to the direction of said guides, said links joined at an intermediate actuating axis to which is also connected an actuator mounted on its other side to a second, reaction-force-absorbing linkage, said platen having a working face directed upwardly, the toggle linkage adapted to raise said platen to close said press,said second linkage comprising a lever and a link, said lever pivoted at one end at a fixed axis to the frame and at its other end to one end of said link, the other end of said link pivoted to the platen in the vicinity of said platen axis, said actuator extending between said toggle actuating axis and a reaction point located in the mid-region of said lever between its said end pivots, the improvement comprising the geometri-

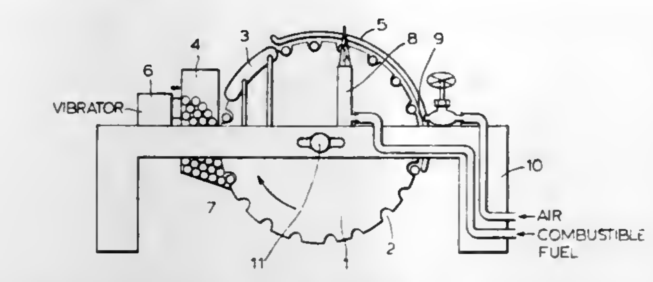


cal relationship of pivot axes providing enhanced actuator-to-toggle force ratio at toggle-open position without applying detrimental side loading on the platen, wherein said fixed axis of said lever is located in the direction perpendicular to the axis of said guides, closer to said line between centers of said frame and platen toggle axes than to the line between centers of said reaction point and the axis joining said link to said lever, and the line of action of said actuator, in the open position of said toggle, being inclined to the line bisecting the toggle angle defined at the actuating axis by the frame and platen toggle links, said inclination being in the direction downwardly progressing away from said toggle axis, toward the ground, and the fixed axis for the frame link of the toggle linkage being immediately adjacent to the ground, thereby enabling said open position to be at a convenient height to said worker.

4,059,382
APPARATUS FOR PROCESSING TOP ENDS OF ROD-LIKE RESIN ARTICLES
Hisawo Kobayashi, Funabashi, and Takehiko Watanabe, Saitama, both of Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan
Filed Mar. 25, 1977, Ser. No. 781,169
Claims priority, application Japan, Sept. 14, 1976, 51-124095[U]
Int. Cl.^{2} B29C *17/00*
U.S. Cl. 425—446 **4 Claims**

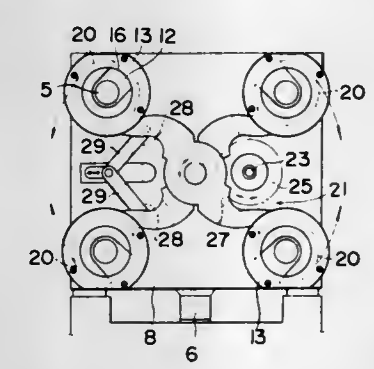
1. An apparatus for processing the ends of rod-like resin articles which comprises a cylindrical rotary member having

slits on the peripheral surface thereof, each slit being adapted to contain one rod-like resin article therein, and a processing



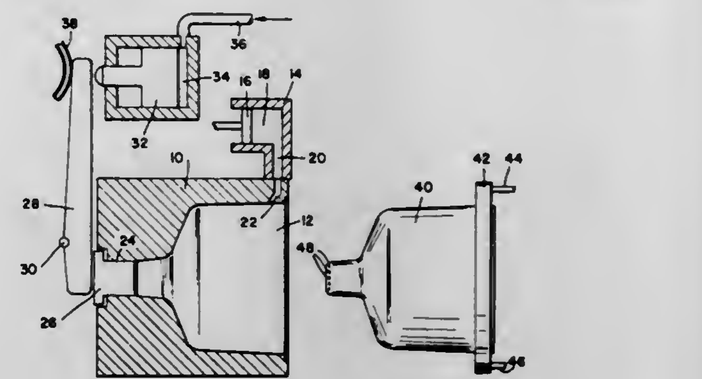
tool disposed in the path of travel of the rod-like resin articles for treating the end thereof.

4,059,383
MOLD OPENING AND LOCKING MECHANISM IN AN INJECTION MOLDING MACHINE OR THE LIKE
Shigeru Tsutsumi, No. 1165, Toyamacho, Yonezawa, Yamagata, Japan
Filed July 14, 1975, Ser. No. 595,980
Claims priority, application Japan, July 17, 1974, 49-81175
Int. Cl.^{2} B29C *1/16*
U.S. Cl. 425—451.6 **8 Claims**



1. A mold opening and locking mechanism in an injection molding machine comprising a fixed mold means mounting a first mold half, tie bars extending from said fixed mold means, a movable mold means movable along said tie bars, said movable mold means comprising a mold supporting plate mounting a second mold half, said movable mold means further comprising a rear plate and a toggle means interposed between said rear plate and said mold supporting plate, said movable mold means being movable to an operable position wherein said second mold half is disposed generally in a mating position with said first mold half, a lock member on said tie rods, said rear plate having means defining openings through which said tie rods and said lock member are passable, said toggle means being connected to one side of said rear plate, said lock member being disposed on an opposite side of said rear plate and being spaced from said rear plate to define a space therebetween when said movable mold means is in said operable position, a locking plate means movable into a locking position into said space, said movable mold means further comprising actuating means operable to actuate said toggle means such that said actuating means and said toggle means are operable to forcibly clamp said two mold halves together when said locking plate means is in said locking position and said movable mold means is in said operable position.

4,059,384
TWO-STEP INJECTION MOLDING
Charles M. Holland, San Lorenzo, and Lawrence W. Parrack, Hayward, both of Calif., assignors to Misto$_2$Gen Equipment Co., Oakland, Calif.
Division of Ser. No. 542,332, Jan. 20, 1975, Pat. No. 3,996,329. This application July 7, 1976, Ser. No. 703,142
Int. Cl.^{2} B29F *1/06*
U.S. Cl. 425—577 **4 Claims**

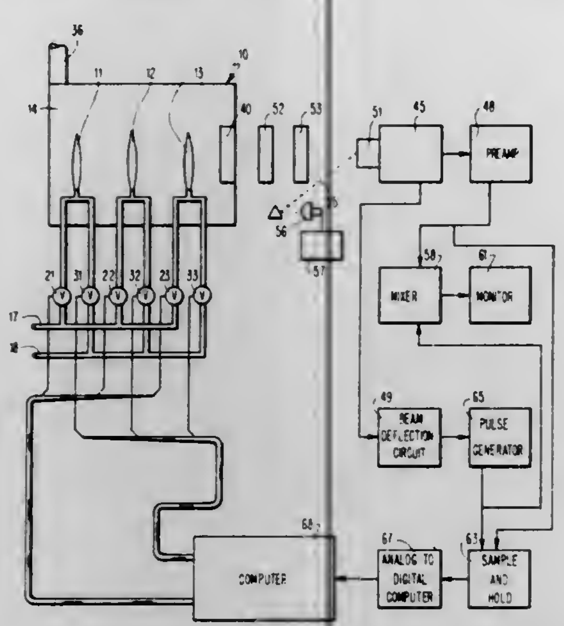


1. Apparatus for forming plastic articles having relatively thin wall portions, said apparatus comprising:
a cavity having an interior configuration generally conformed to the exterior of the plastic article to be formed, said cavity having an aperture adjacent the portion of the cavity adapted to form the thin portion of the article;
a primary core having an exterior configuration conformed to the interior configuration of the plastic article;
means operable to insert the primary core into the cavity to form a mold;
means operable to inject molten plastic into the mold;
a secondary core located in the aperture in the cavity; and
means operable to project the secondary core partially into the mold as molten plastic is injected into the mold to thin the plastic adjacent the secondary core, said secondary core being fully projected into the mold prior to the termination of said injecting so that the molten plastic is compressed into the mold, the projected secondary core and the primary core defining a space therebetween that is no greater than approximately 0.005 inch.

4,059,385
COMBUSTION MONITORING AND CONTROL SYSTEM
Louis Gulitz, Yorktown Heights; Theodore William Kwap, Brewster; Walter Irving Lisle, Stone Ridge, all of N.Y.; Daniel Francis O'Kane, Morgan Hill, Calif., and Michael Robert Poponiak, Newburgh, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.
Filed July 26, 1976, Ser. No. 708,527
Int. Cl.^{2} F23N *5/10*
U.S. Cl. 431—12 **8 Claims**

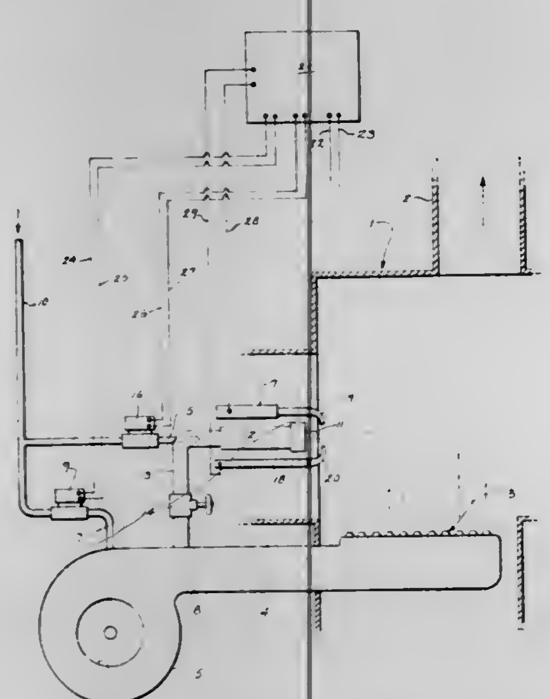
1. A real time monitoring and control system for adjusting combustion in a system having air and fuel supplies to at least one flame to optimum burning efficiency, including
sensing means responsive to a preselected portion of the emission spectrum of the flame for producing an electrical output signal proportional to the temperature of the flame,

said sensing means having a sensitivity of at least 0.2 amps $watt^{-1}$ $cm.^{-2}$, and



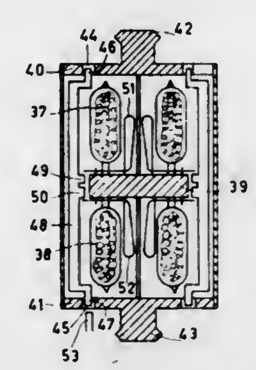
computer means responsive to said sensing means for adjusting the air fuel ratio of said supplies to maximize the burning temperature of said flame.

4,059,386
COMBUSTION HEATING APPARATUS TO IMPROVE OPERATION OF GAS PILOT BURNERS
John P. Eising, Oconomowoc, Wis., assignor to A. O. Smith Corporation, Milwaukee, Wis.
Filed Jan. 21, 1976, Ser. No. 651,217
Int. Cl.² F23Q *9/14*
U.S. Cl. 431—43 **1 Claim**



1. Combustion heating apparatus to improve operation of a gas pilot burner by providing a construction to supply a pressurized air-gas combustion mixture, a main gas burner and a pilot burner, a spark igniter and a flame sensor assembled with the pilot burner, a first conduit connected to the source of gas and to the pilot burner to supply gas to the pilot burner, a first solenoid valve disposed in the first conduit to control the flow of gas through the first conduit to the pilot burner, a second conduit connecting the source of gas to the main gas burner, a blower connected to the second conduit and adapted to force premixed air and gas to the main burner through the second conduit, a plenum chamber disposed on the discharge side of the blower, a mixing chamber provided at the rear portion of the pilot burner, a third conduit extending between the mixing chamber of the pilot burner and the plenum discharge chamber of the blower, electrical control means activated when heat is called for to start the blower and initially supply air to the pilot burner through the third conduit and simultaneously establish a spark by the igniter to open the first solenoid valve to also supply gas to the pilot burner through the first conduit to light said pilot, and a second solenoid valve located to control the flow of gas through the second conduit with air from the blower to the main burner and opened to initiate such gas flow when the sensor proves the pilot burner is lit and to then supply a mixture of gas and air through the third conduit to the pilot burner in addition to the gas supplied to the pilot burner through the first conduit to thereby provide a richer pilot flame which is not adversely affected by varying pressures in the main gas burner combustion chamber.

4,059,387
FLASH LAMP UNIT
Petrus Johannes Julius Witterick, and Joannes Henricus Franciscus Sieben, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.
Filed Mar. 22, 1976, Ser. No. 668,944
Claims priority, application Netherlands, Apr. 14, 1975, 7504397
Int. Cl.² F21K *5/02;* G03B *15/02*
U.S. Cl. 431—93 **3 Claims**



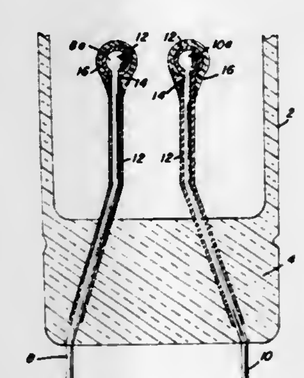
1. A flash lamp assembly comprising a housing, first and second opposed surfaces on said housing, first and second connection members which are respectively located on said opposing first and second surfaces of said housing, each connection member being suitable to be coupled to an associated camera, said assembly comprising first and second pluralities of flash lamps, said second plurality of flash lamps being disposed proximate to said first surface and said first plurality being disposed proximate to said second surface, said second connection member cooperating with only said second plurality of flash lamps and said first connection member cooperating only with said first plurality of flash lamps to ignite the lamps in said first and second pluralities respectively, said assembly cooperating with the associated camera to rotate about an axis of rotation, said assembly including a plurality of percussion springs, each lamp in said assembly being ignitable by an associated percussion spring locked in a tensioned position; and means to release a percussion spring cooperating with a lamp in said first plurality of lamps upon movement in a first axial direction and to release a spring cooperating with a lamp in said second plurality upon movement in a second axial direction, said means including a plurality of elongated members extending between said first and second connection members.

4,059,388
PHOTOFLASH LAMP
John W. Shaffer, Willamsport, Pa., assignor to GTE Sylvania Incorporated, Stamford, Conn.
Continuation-in-part of Ser. No. 629,159, Nov. 5, 1975, abandoned. This application Apr. 5, 1976, Ser. No. 673,569
Int. Cl.² F21K *5/02*
U.S. Cl. 431—95 R **12 Claims**

1. A photoflash lamp comprising:
an hermetically sealed, light-transmitting envelope;
a quantity of filamentary combustible material located within said envelope;
a combustion-supporting gas in said envelope at an initial fill pressure exceeding one atmosphere;
and a non-filament type ignition means disposed in said envelope in operative relationship with respect to said combustible fill material and adapted to be ignited by a high voltage pulse, said ignition means including a pair of lead-in wires extending into said envelope in a spaced

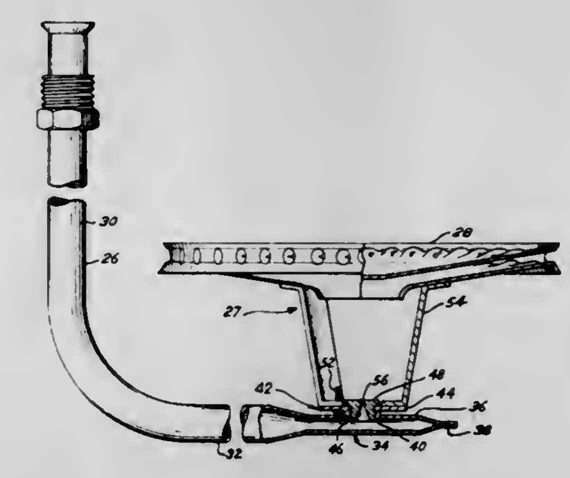
relationship, and a mass of primer material covering a portion of at least one of said lead-in wires within said envelope, said primer material comprising a particulate fuel, one or more oxides of metals having a boiling point substantially above 2097° C, said metal oxides being substantially nonconductive electrically and having a lower free energy of formation than the oxides of said fuels, and a binding agent, said primer material being free of oxidizer salts.

4,059,389
PHOTOFLASH LAMP AND METHOD OF MAKING SAME
Donald E. Armstrong, Williamsport; Ronald E. Sindlinger, Muncy; Bernard Cohen; John E. Tozier, both of Williamsport, all of Pa., and Emery G. Audesse, Beverly, Mass., assignors to GTE Sylvania Incorporated, Stamford, Conn.
Filed Sept. 7, 1976, Ser. No. 721,604
Int. Cl.² F21K *5/02*
U.S. Cl. 431—95 R **37 Claims**



1. A photoflash lamp comprising:
an hermetically sealed, light-transmitting envelope;
a quantity of filamentary combustible material located within said envelope;
a combustion supporting gas in said envelope;
and ignition means disposed in said envelope in operative relationship with respect to said filamentary combustible material, said ignition means including a pair of lead-in wires sealed through and extending inside said envelope in a spaced apart relationship, the termination of each of said lead-in wires within said envelope having a smooth and rounded configuration of larger diameter than the remainder of the wire, an insulating material coated on substantially the full length within said envelope of at least one of said lead-in wires for preventing preignition short circuits through said filamentary combustible material, and primer material coated about the smooth and rounded terminations of said lead-in wires, the primer coating on the insulatingly coated lead-in wire being disposed over said coating of insulating material.

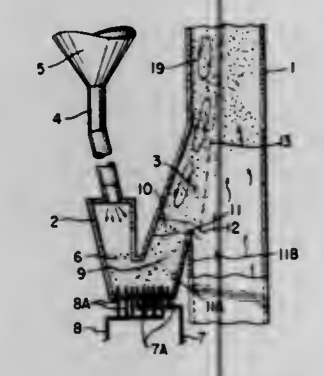
4,059,390
Patent Not Issued For This Number



4,059,391
PROCESS FOR PRODUCING REFRACTORY MATERIAL
Alan M. Hart, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.
Filed Mar. 3, 1976, Ser. No. 663,384
Int. Cl.² F27B *15/00;* C04B *35/00*
U.S. Cl. 432—13 **10 Claims**

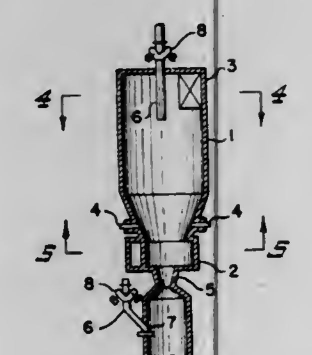
1. In a process for the densification of calcined magnesium oxide by sintering compacts of particles of the calcined magnesium oxide, the improvement which comprises:
a. heating the compacts within the temperature range of from about 1450° C to about 1550° C in a fluidized bed of particles containing magnesium oxide; and
b. retaining the compacts within the fluidized bed of particles for a sufficient time to sinter the compacts to a material having a bulk density of at least about 93 percent of the theoretical bulk density of the calcined magnesium oxide compacts heated in the fluidized bed.

4,059,392
CALCINATION OF PULVEROUS MATERIAL
Jorn Touborg, Copenhagen Valby, Denmark, assignor to F. L. Smidth & Co., Cresskill, N.J.
Division of Ser. No. 423,436, Dec. 10, 1973, Pat. No. 3,955,995. This application Jan. 28, 1976, Ser. No. 653,025
Claims priority, application United Kingdom, Dec. 11, 1972, 57071/72
Int. Cl.² F27B *15/00*
U.S. Cl. 432—58 **24 Claims**



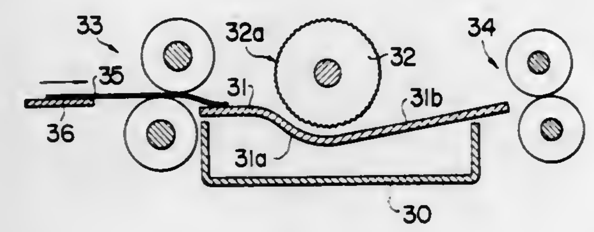
1. A calcination plant for treating a preheated, pulverous raw material consisting entirely of, or at least containing a portion of, lime comprising a conduit, means for passing a flow of oxygen-containing gas upwardly through said conduit, a mixing chamber positioned adjacent said conduit defining a mixing zone for mixing preheated raw material and a fuel, means for separately and continuously feeding fuel and preheated raw material to said mixing zone for accumulating and substantially and uniformly intimately mixing said fuel and preheated raw material prior to calcination to provide a suspension of a fuel gas and raw material particles, said mixing zone being positioned adjacent said conduit and communicating therewith such that the suspension of fuel gas and raw material particles are drawn from said mixing zone into said conduit by said flow of oxygen-containing gas so as to contact the oxygen-containing gas flowing up through said conduit to become entrained by said oxygen-containing gas to provide at least a partial substantially isothermal calcination of said raw material particles by the contact of the uniformly mixed preheated raw material and fuel with the oxygen-containing gas.

4,059,393
APPARATUS FOR CALCINING POWDER MATERIALS
Toshihiro Kobayashi, Tokyo, Japan, assignor to Ishikawajima-Harima Jukogyo Kabushiki Kaisha, Ote, Japan
Filed May 25, 1976, Ser. No. 689,725
Claims priority, application Japan, June 20, 1975, 50-74075
Int. Cl.² F27B *15/00*
U.S. Cl. 432—58 **2 Claims**



1. An apparatus for calcining powder materials consisting of:
a. a furnace body having a closed top portion and a tangential gas exhaust opening located at the top portion, said furnace body being in the form of a cylinder;
b. a volute chamber attached to the lower end portion of said furnace body for inducing combustion air into said furnace body so that an upwardly swirling gas flow is created along the furnace wall, while a negative pressure region is created along the furnace wall, while a negative pressure region is developed at the center of said furnace;
c. a kiln exhaust duct connected to the center of the bottom of said volute chamber so that the kiln exhaust may be induced upwardly toward the center portion of said furnace body;
d. a plurality of burners attached to the lower end portion of said furnace body, and
e. a material feeding device comprising a material chute connected to said kiln exhaust duct so that the raw material particles are supplied to said negative pressure region of the furnace body after being suspended in said kiln exhaust.

4,059,394
HEAT FIXING APPARATUS FOR USE IN A WET ELECTROPHOTOGRAPHIC COPYING MACHINE
Kenzo Ariyama, Tokyo; Hiroshi Mano, Yokohama, and Shinichi Kamiyama, Tokyo, all of Japan, assignors to Ricoh Co., Ltd., Japan
Filed Sept. 2, 1975, Ser. No. 609,550
Claims priority, application Japan, Sept. 5, 1974, 49-102243
Int. Cl.² F27B *9/28;* **G03G** *15/00*
U.S. Cl. 432—59 **3 Claims**

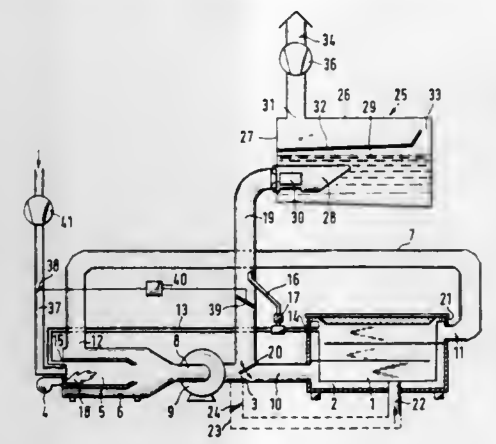


1. A heat fixing apparatus, for use in a wet electrophotographic copying apparatus for fixing a toner image carried on one surface of wet-developed copy sheets, comprising, in combination, heating means disposed along a path of movement of the wet copy sheets and including means forming a heating surface for sliding contact with the opposite surface of each sheet, said heating surface including, in the direction of travel of the copy sheets, a substantially planar sheet entry portion followed by a downwardly deflected, upwardly concave portion in turn followed by an upwardly extending sheet exit portion; heat source means operable to heat said heating surface; a rotatably mounted guide roller having a knurled peripheral surface facing said concave surface portion and spaced therefrom by a distance in excess of the thickness of the copy sheets, said roller being rotatable with a peripheral speed equal to the speed of travel of the copy sheets along said path of movement; and copy sheet feeding means, at a position upstream of said guide roller, operable to feed the copy sheets in said direction of travel toward said guide roller; the knurled peripheral surface of said guide roller engaging the copy sheets and deflecting the copy sheets into engagement with said concave surface portion of said heating surface, and the copy sheets, due to their inherent stiffness, remaining resiliently engaged with said concave and sheet exit portions of said heating surface.

4,059,395
DEVICE FOR REMOVING CARBONIZABLE RESIDUES
Dieter O. Strunz, Nurnberg, and Wolfgang Kern, Ebertraunsdorf, both of Germany, assignors to Siemens Aktiengesellschaft, Erlangen, Germany
Filed Mar. 15, 1976, Ser. No. 667,142
Claims priority, application Germany, Mar. 21, 1975, 2512603
Int. Cl.² F23J *15/00;* **F27B** *5/04*
U.S. Cl. 432—72 **9 Claims**

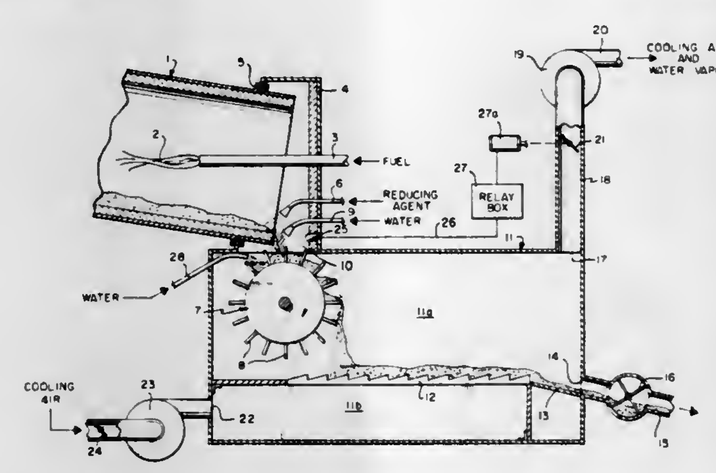
1. Device for removing carbonizable residues comprising a closed furnace heatable to low-level carbonization temperature, said furnace having an outlet for carbonization gases

formed therein, means for burning off carbonization gases from carbonizable residues and utilizing the heat of combustion therefrom for heating the furnace, said means comprising a burner and a combustion chamber connected to said burner and forming part of a hot gas circulatory system, said hot gas circulatory system also including a container wherein said furnace is disposed so as to be heatable by hot gas circulating



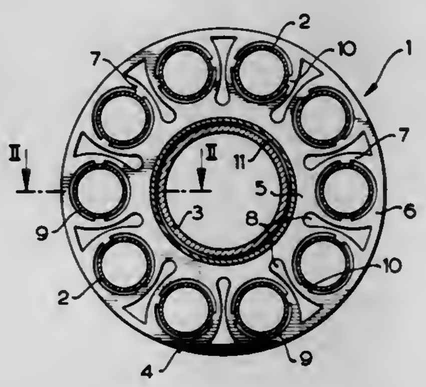
through said hot gas circulatory system, and a hot gas return line connecting said container with a mixing chamber communicating with said combustion chamber, a carbonization gas return line connecting said furnace and said combustion chamber for returning to said combustion chamber carbonization gases formed in said furnace, and an inert gas line communicating with the interior of said furnace for supplying inert gas thereto.

4,059,396
CEMENT MANUFACTURE
Tage Halfdan Danø, Copenhagen Valby, Denmark, assignor to F. L. Smidth & Co., Cresskill, N.J.
Filed Oct. 2, 1975, Ser. No. 618,819
Claims priority, application United Kingdom, Oct. 3, 1974, 42989/74
Int. Cl.² F27D *15/02;* **F26B** *19/00*
U.S. Cl. 432—78 **14 Claims**



1. A plant for producing cement which comprises:
a. an inclined rotary kilm for burning cement clinker having an upper material inlet end portion and a lower material outlet end portion for discharge of the clinker;
b. stationary means positioned and adapted to spray the cement clinker with a reducing agent immediately prior to discharge of the clinker from the kiln proper;
c. a cylindrical drum rotatable about its axis positioned adjacent the lower material outlet end portion of the kiln, said cylindrical drum having on its surface means defining at least one compartment configured to receive discrete portions of the clinker discharged from the kiln;
d. means to spray cooling liquid such as water onto the clinker substantially immediately after said clinker is discharged from the kiln and while being trasnferred onto said cylindrical drum;
e. clinker support means positioned below said cylindrical drum and adapted to receive clinker transferred from said cylindrical drum and to facilitate movement of the clinker away from said cylindrical drum while simultaneously being cooled thereon;
f. casing means to enclose the atmosphere adjacent said lower material outlet end portion of the kiln in substantially sealed relation therewith;
g. stationary pipe means positioned to supply a portion of a cooling liquid such as water successively into at least one of the compartments of said cylindrical drum prior to receipt of hot clinker into said compartment; and
h. means to control the pressure of the atmosphere within said casing means so as to be less than the pressure of the atmosphere within the material outlet end portion of the kiln so as to prevent cooling liquid evaporating from the cement clinker exiting the kiln from entering the kiln proper, thereby maintaining at minimum levels the liquid contact and heat losses occurring within the kiln proper.

4,059,397
ROTARY KILN
Josef Adler, Pinkmuhlenweg 16, 6101 Nieder-Ramstadt, Germany
Filed Apr. 20, 1976, Ser. No. 678,642
Claims priority, application Germany, May 2, 1975, 2519458
Int. Cl.² F27D *15/02*
U.S. Cl. 432—80 **15 Claims**

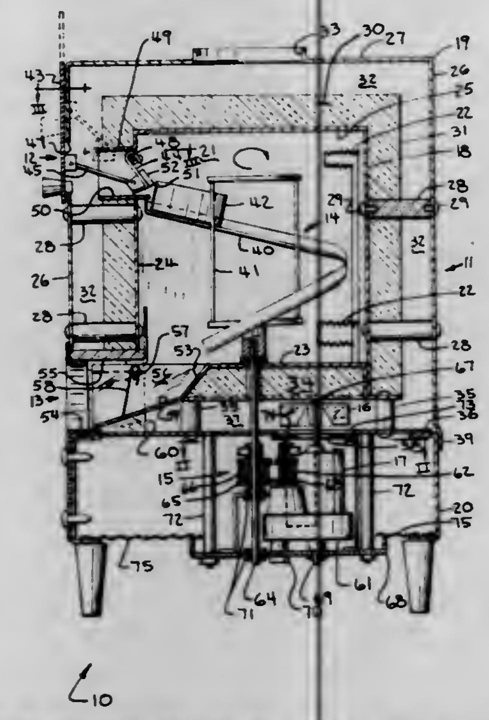


1. A rotary kiln comprising a casing having an annular periphery and a plurality of substantially parallel cooler tubes uniformly distributed in a row circumferentially around the casing at its outlet end and mounted on said casing periphery by common annular support means, characterized in that said annular support means comprises radially inner and outer substantially annular zones which are flexibly connected together in the radial direction and between which are disposed said cooler tubes.

4,059,398
FOOD OVEN
Elvis Simon Zimmer, Cedar, and David Allen Hassell, Coon Rapids, both of Minn., assignors to Jeno F. Paulucci, Duluth, Minn.
Filed Apr. 12, 1976, Ser. No. 676,211
Int. Cl.² F27B *9/00*
U.S. Cl. 432—121 **31 Claims**

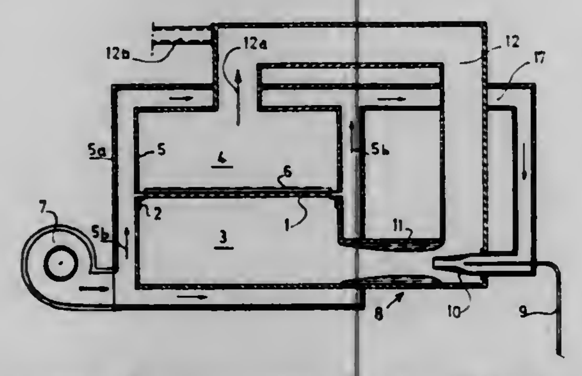
1. An oven of the conveyor type having a heatable inner oven chamber and an outer shell coolable by a forced flow of ambient air between the oven chamber and the outershell, comprising:
a. a base;
b. a metal shell mounted atop of and on the base and forming together with the base a heatable oven chamber having an electric heater therein for heating of the chamber;
c. a conveyor mounted within the oven chamber for moving an item to be heated through the oven chamber during heating of such item;
d. means for driving the conveyor;

e. means for providing access to the oven chamber, for loading and unloading items upon the conveyor;
f. a layer of thermal insulation mounted around and enclosing the oven chamber metal shell;
g. an exterior cabinet shell mounted outside of the insulation, the cabinet shell being spaced outwardly from the insulation, with there being an air passageway between the oven chamber insulation and the cabinet shell, the passageway



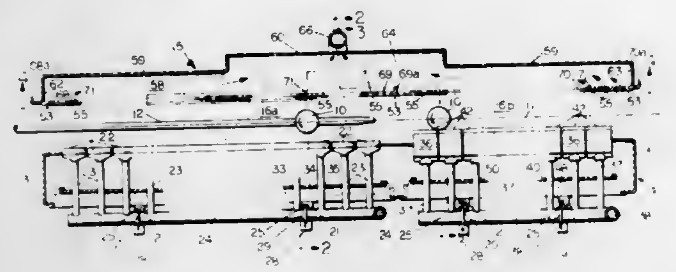
having an air inlet and an air outlet in fluid communication with ambient; and
h. a fan mounted in the oven and in fluid communication with the passageway for moving a flow of ambient air through the inlet and thence into and through the passageway and thence out of the outlet, for cooling the exterior cabinet during heating of the oven chamber to a temperature above the temperature of ambient.

4,059,399
COOLED TUNNEL-FURNACE WITH GROUND EFFECT
Michel Jean Jacques Cellier, Hendaye; Jean-Claude Guitton, Tarnos; Jean-Claude Scholle, Arcangues, and Stephane Georges Jean-Marie Viannay, Plaisir, all of France, assignors to Bertin & Cie, Plaisir, France
Filed Feb. 27, 1976, Ser. No. 661,985
Claims priority, application France, Mar. 4, 1975, 75.06742
Int. Cl.² F27B *9/00*
U.S. Cl. 432—121 **10 Claims**



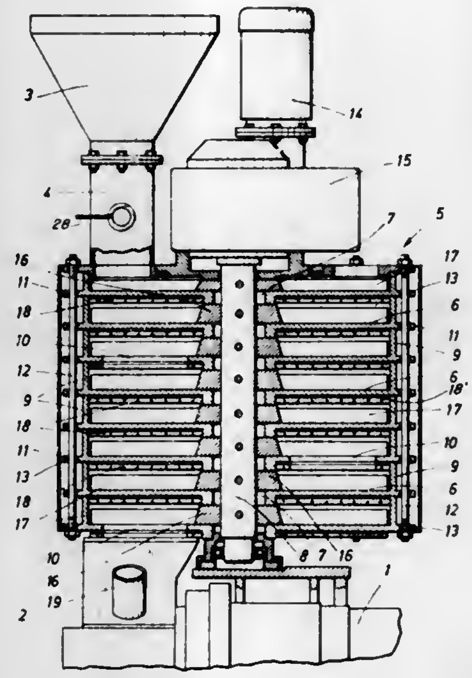
1. A ground-effect type tunnel furnace of the kind including a cooling jacket through which fluid is circulated, and a permeable hearth device subdividing said tunnel furnace along its entire length on the one hand into a succession of pneumatic boxes and on the other hand into a work corridor for the accomodation of the articles to be processed adjacent said permeable hearth device,
wherein the improvement comprises
duct means connecting said cooling jacket to said pneumatic boxes, a burner in said duct means, and a fuel supply line leading to said burner,
whereby said fluid after having circulated through said jacket and having been thereby heated is fed to said burner which in turn delivers burnt gases to said pneumatic boxes and thence across said permeable hearth device to levitate said articles by ground effect.

4,059,400
OVEN APPARATUS FOR SHRINKING THERMOPLASTIC SLEEVE WRAPS ON GLASS CONTAINERS
Russell William Heckman, Perrysburg, and George Allen Nickey, Toledo, both of Ohio, assignors to Owens-Illinois, Inc., Toledo, Ohio
Filed Mar. 31, 1976, Ser. No. 672,228
Int. Cl.² F27B *9/14*
U.S. Cl. 432—124 **10 Claims**



1. An apparatus for heat shrinking a pre-oriented plastic sleeve on the exterior of an article comprising
conveyor means moving the articles in vertical position and having sleeves of heat shrinkable plastic carried exteriorly thereon in a horizontal straight line path,
an elongated oven comprised of a heater section and an exhaust section each disposed on opposite sides of said path, the burner section comprising
a first heat control zone comprised of an elongated span of infrared burners,
means mounting said burners side by side facing the path of said conveyed articles, said means including a vertical height adjustment and an angular adjustment of the position of the burners with respect to the articles for locating the burners opposite the mid body of the articles,
a second heat control zone comprised of upper and lower elongated spans of infrared burners,
means mounting said upper and lowr spans of said burners individually, each said means including a vertical height adjustment and an angular adjustment of the position of the upper and lower burners with respect to the articles for respectively locating the upper span of burners directed at the upper portion of the articles and the lower span of burners directed at the lower portion of the articles, and
the exhaust section including means for moving air across the oven and into said exhaust section, a facing opposite the burner section thereof, plural horizontal rows of exhaust ports arranged along said facing, plural sets of dampers, and means supporting said dampers in said exhaust ports for movement with respect to said sets of the exhaust ports in each of the horizontal rows thereof, each of said dampers being operable for opening and closing one or more of the exhaust ports in the rows thereof for regulating movement of air within the oven.

4,059,401
SCRAPER FLIGHT CONVEYOR FOR CONVEYING PREHEATED THERMOPLASTIC BULK MATERIAL TO A SCREW EXTRUDER
Wilhelm Hanslik, Vienna, Austria, assignor to Krauss-Maffei Austria Gesellschaft m.b.H., Asten, Austria
Filed Apr. 14, 1976, Ser. No. 676,931
Claims priority, application Austria, Apr. 16, 1975, 2915/75
Int. Cl.² F27B *9/02*
U.S. Cl. 432—132 **3 Claims**



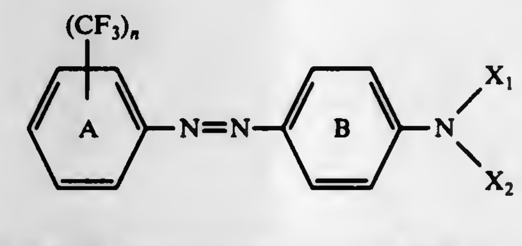
1. In combination with a screw extruder for thermoplastic bulk material, the screw extruder having an inlet: a scraper flight conveyor for preheating the thermoplastic bulk material and for feeding the preheated bulk material to the inlet of the screw extruder, the scraper flight conveyor comprising
a. a delivery end receiving the thermoplastic bulk material,
b. an outlet end in communication with the inlet of the screw extruder for delivering the preheated thermoplastic bulk material thereinto,
c. slideway means between the delivery and outlet ends, the slideway means being composed of a succession of axially aligned, superposed trays arranged in series, each of the trays having an annular bottom constituting a slideway, each tray bottom having an eccentric port and the eccentric ports in successive ones of the tray bottoms being angularly offset in relation to the ports in the adjacent tray bottoms,
d. a star wheel coaxial with the trays and associated with each of the trays, each star wheel including a set of angularly spaced scraper flights in scraping contact with the annular slideway bottom of the associated tray, adjacent ones of the scraper flights defining cells,
e. a drive shaft coaxially extending through the tray bottoms, each of the star wheels being keyed to the drive shaft and the drive shaft being mounted for rotation with respect to the tray bottoms,
f. means for rotating the drive shaft at a controlled speed to sweep the scraper flights along the tray bottoms whereby the thermoplastic bulk material received through the delivery end is pushed in discrete portions in said cells along the bottom of a first one of the trays, gravity fed through the port in said tray into a respective one of the cells associated with the next lower one of the trays whence the discrete portions are gravity fed through the ports in the succession of trays to the outlet end,
g. means for controlling the delivery rate of the thermoplastic bulk material to the delivery end, and
h. heating means associated with each of the tray bottoms and controllable to determine the heating temperature for each tray bottom.

4,059,402
TRANSFER PRINTING PROCESS

Gerhard Wolfrum, Bergisch-Neukirchen; Werner Kühnel, Leverkusen; Erich Klauke, Odenthal-Hahnenberg, and Gerhard Büttner, Cologne, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Continuation of Ser. No. 533,307, Dec. 16, 1974, abandoned. This application June 1, 1976, Ser. No. 691,869
Claims priority, application Germany, Dec. 24, 1973, 2364475
Int. Cl.^{2} D06P *5/20, 5/17*
U.S. Cl. 8—2.5 A **8 Claims**

1. In a process for printing hydrophobic fiber materials selected from the group consisting of polyesters and polyamides by the sublimation transfer printing process, the improvement which comprises employing sublimable azo dyestuffs which have the formula



wherein X_1 and X_2 are hydrogen, C_1–C_4-alkyl, C_5–C_7-cycloalkyl, substituted C_1–C_4-alkyl, or substituted C_5–C_7-cycloalkyl, wherein the substituents are C_1–C_2-alkoxy, halogen, or phenyl; *n* is a number from 1 to 3;

A is substituted as shown in the above formula or is further substituted by NO_2, CN, halogen, SO_2CH_3, $SO_2C_2H_5$, C_1–C_4-alkyl, or C_1–C_4-alkoxy; and

B is as shown in the formula or is further substituted by C_1–C_4-alkyl, C_1–C_4-alkoxy, halogen, benzyloxy, phenoxy, C_1–C_4-alkylcarbonylamino, formylamino, halo, (C_1–C_4-alkyl) carbonylamino, or haloformylamino.

4,059,403
PROCESS FOR DYEING WET-SPUN AROMATIC POLYAMIDES IN GEL FORM

Gerhard Dieter Wolf; Ralf Miessen; Hans Egon Künzel, all of Dormagen, and Francis Bentz, Cologne, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Aug. 7, 1975, Ser. No. 602,783
Claims priority, application Germany, Aug. 10, 1974, 2438544
Int. Cl.^{2} D06P *5/00, 3/24*
U.S. Cl. 8—168 B **13 Claims**

1. A process for the production of dyed filaments of aromatic polyamides which comprises continuously dyeing wet-spun gel filaments of an aromatic polyamide which contains acidic groups before, during, or after stretching, in an aqueous bath containing at least one water-soluble, cationic dye in dissolved form.

4,059,404
SWAB AND METHOD OF TAKING CELL SMEARS FOR DIAGNOSTIC EXAMINATION

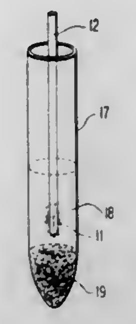
Wilhelm Schuster, Frankfurt am Main, and Gert Schüluter, Liederbach, Taunus, both of Germany, assignors to Battelle-Institute e.V., Frankfurt am Main, Germany

Filed Mar. 29, 1976, Ser. No. 671,369
Claims priority, application Germany, Mar. 29, 1975, 2513941
Int. Cl.^{2} C12K *1/10;* **A61B** *10/00*
U.S. Cl. 23—230 B **7 Claims**

1. A method of taking cell smears for diagnostic examination comprising the steps of:

a. collecting a cellular specimen of or from the skin, mucous membrane or other body area or surface to be examined by means of a swab located on applicator;

b. dissolving said swab in a solvent that has no detrimental effect on the collected cellular material in the speimen



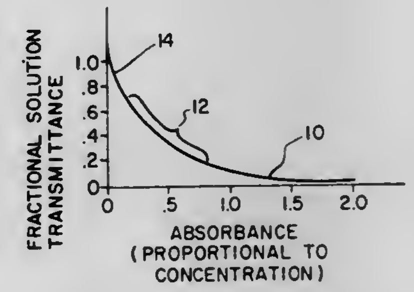
whereby a solution is formed containing said cellular material; and

c. diagnostically examining said cellular material.

4,059,405
METHOD AND APPARATUS FOR ANALYSIS OF CONSTITUENT CARRIED IN FIBROUS MEDIUM

Lester A. Sodickson, Newton, Mass., and Franklin Lim, Richmond, Va., assignors to Damon Corporation, Needham Heights, Mass.

Continuation-in-part of Ser. No. 243,068, April 11, 1972, abandoned, and a continuation-in-part of Ser. No. 498,646, Aug. 19, 1974, abandoned. This application Aug. 19, 1976, Ser. No. 715,855
Int. Cl.^{2} G01N *21/24, 33/16*
U.S. Cl. 23—230 R **36 Claims**



1. In the constituents analysis of sample material on a porous medium by reaction in a liquid state with reactants to produce a constituent-manifesting reaction product, the improvement comprising the steps of

A. producing said reaction product at said analysis site with only an optically-thin concentration,

B. illuminating said analysis site with incident electromagnetic radiation,

C. sensing, from a field of view coincident with said analysis site, electromagnetic radiation that is resultant from said incident radiation and responsive to both the background response of said medium to said illumination and the concentration of said reaction product, and

D. producing a sample-measuring signal in response to a differential function of said product-responsive sensed radiation and radiation resultant from incident radiation on said field of view and responsive to said background response of said medium at said analysis site and to said sample material and said reagents prior to said product-producing reaction.

4,059,406
ELECTROCHEMICAL DETECTOR SYSTEM

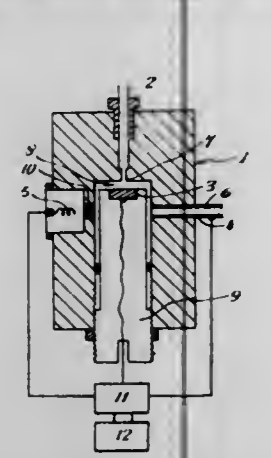
Bernard Fleet, London, England, assignor to E D T Supplies Limited, London, England

Filed July 12, 1976, Ser. No. 704,299
Int. Cl.^{2} G01N *27/26, 27/30, 31/08*
U.S. Cl. 23—230 R **18 Claims**

1. A method for detecting an electroactive species in a flow stream comprising the steps of:

i. forcing a solution containing the electroactive species through a fine nozzle to form a jet,

ii. impringing the jet normally to a surface of a sensor electrode so that the solution spreads radially over the surface in a thin film,



iii. applying a periodically changing voltage to the sensor electrode, so that one part of each cycle of the applied voltage functions as a detecting potential and another part of each cycle functions as a cleaning potential, and

iv. measuring a current at the sensor electrode during that part of each cycle of the applied voltage functioning as a detecting potential.

4,059,407

DISPOSABLE CHEMICAL INDICATORS

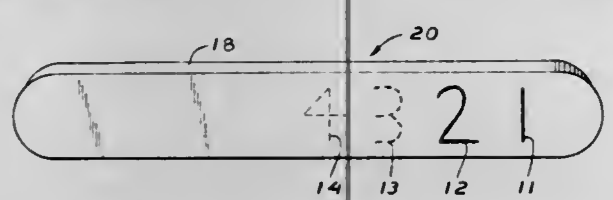
Harry T. Hochstrasser, Hastings-on-Hudson, N.Y., assignor to Becton, Dickinson and Company, Rutherford, N.J.

Continuation of Ser. No. 676,662, April 14, 1976, abandoned, which is a continuation-in-part of Ser. No. 533,972, Dec. 18, 1974, Pat. No. 3,964,871. This application Jan. 12, 1977, Ser. No. 758,646

The portion of the term of this patent subsequent to June 22, 1993, has been disclaimed.

Int. Cl.^{2} G01N *33/16*

U.S. Cl. 23—253 TP **9 Claims**



1. An indicator for the measurement of ketones dissolved in biological fluids, which comprises;

a support member; and

a plurality of indicating reagents for said ketones, each of which is located in a separate zone of said member and at least two of which indicate the presence of a different concentration of said ketones in solution.

4,059,408

AUTOMATIC LIQUID-LIQUID EXTRACTION DEVICE

Gilbert Boisde, Bures sur Yvette, and Alain Richerot, Bagneux, both of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed Mar. 3, 1977, Ser. No. 774,126

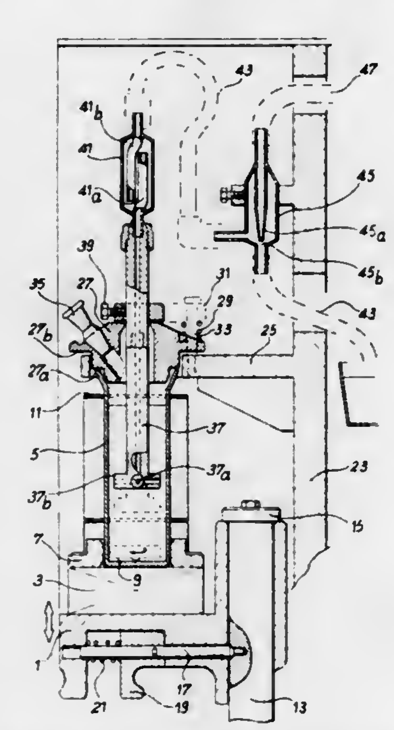
Claims priority, application France, Mar. 12, 1976, 76.07189

Int. Cl.^{2} B01D *11/04*

U.S. Cl. 23—267 R **7 Claims**

1. An automatic liquid-liquid extraction device comprising at least one extraction vessel equipped with agitation means, liquid-withdrawal means associated with said vessel and means for supporting said vessel or vessels and said liquid-withdrawal means, wherein said liquid-withdrawal means consist of a substantially vertical suction duct whose upper end is connected to a discharge pipe fitted with pneumatic pressure-reducing means and whose lower end is connected to a plurality of nozzles which open into the liquid of said vessel in the same horizontal plane at the periphery of said vessel, said withdrawal means being further provided with a leak-tight chamber connected at one end to said suction duct and at the other end to said discharge pipe, the level at which said duct opens into said chamber being higher than the level at which said pipe opens into said chamber said pneumatic pressure-reducing means being constituted by a Venturi tube so arranged that the ejector-nozzle of said tube has its opening at the level of the discharge pipe at the outlet of said Venturi tube, said means for supporting said vessel or vessels and the means for supporting said liquid-withdrawal means being constituted respectively by:

a movable platform which also supports said agitation means. said platform being capable of vertical motion between a bottom position and a top position, and by



a fixed structure for additionally supporting closure means for said vessel or vessels; said platform and said structure being arranged respectively and positioned with respect to each other in such a manner as to ensure that, in the top position of said platform, each vessel is fitted with closure means and associated with liquid-withdrawal means and that, in the bottom position of said platform, each vessel is disengaged from said closure means and from said liquid-withdrawal means so as to permit loading and unloading of said vessel, said closure means consisting of a plug freely mounted in translational motion on the suction duct of the liquid-withdrawal means associated with said vessel or vessels.

4,059,409

APPARATUS FOR ELIMINATING AMMONIA FUMES EMANATING FROM DIAZO COPIERS

Robert M. Barto, Wyckoff, and Loren E. Shelffo, S. Orange, both of N.J., assignors to Blu-Ray, Incorporated, Essex, Conn.

Filed Mar. 12, 1976, Ser. No. 666,314

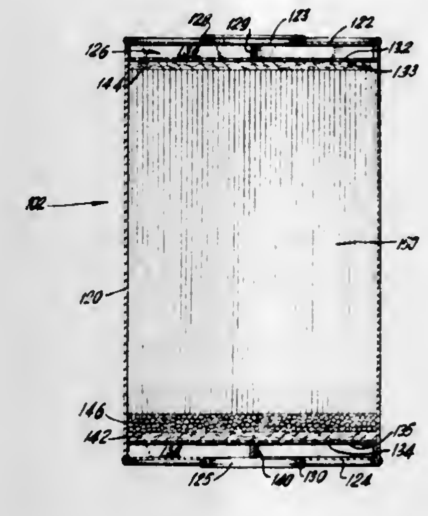
Int. Cl.^{2} B01D *53/34;* **B01J** *8/04;* **C01C** *1/12;* **G03D** *7/00*

U.S. Cl. 23—284 **26 Claims**

1. Apparatus for eliminating noxious fumes emanating from equipment used for the development of sheetlike prints, such equipment having means to develop said prints including a developing tank, a guide surface extending outwardly from said developing tank along which such prints are expelled from the equipment, and a wall member spaced a predetermined distance from said guide surface to form an elongated output aperture for said prints, said apparatus including

an enclosure attached to said wall of said equipment so that it extends along and partially covers said output aperture, said enclosure including a first and second members each of which has at least one elongated side, and a first and

second transverse ends, said first member having a portion which is spaced from said second wall of said equipment and extends toward said guide surface terminating in said one elongated longitudinal side of said first member which is adjacent to, but spaced from, said guide surface at a line spaced along said guide surface from said output aperture to form a first output slot, said first member having an aperture formed in said extending portion adjacent to said first end, and said second member extending substantially across said output aperture and terminating in said elongated longitudinal side of said second member which is adjacent to, but spaced from, said guide surface to form a



second output slot, at least one end piece, said end piece being connected between the first transverse ends of said first and second members, and an elongated flexible member attached along said longitudinal side of said first member and extending across said first output slot to contact said guide surface;

a filter assembly including a filter body which is adapted to absorb said noxious fumes from air passing therethrough;

coupling means connected between said aperture in said first wall member and said filter means; and

suction means adapted to draw air from said enclosure through said coupling means and said filter means.

4,059,410

METHOD FOR THE PREPARATION OF NONCAKING COALS FROM CAKING COALS BY MEANS OF ELECTROPHILIC AROMATIC SUBSTITUTION

Richard H. Schlosberg, New Providence; Martin L. Gorbaty, Fanwood, both of N.J., and Robert J. Lang, Baytown, Tex., assignors to Exxon Research & Engineering Co., Linden, N.J.

Filed June 28, 1976, Ser. No. 700,104

Int. Cl.^{2} C10L *9/02*

U.S. Cl. 44—1 R **15 Claims**

1. A process for the preparation of noncaking coal from caking coal which comprises the step of electrophilically aromatically substituting the caking coal yielding a product thereby which is a noncaking coal.

2. The process according to claim 1 wherein the electrophilic aromatic substitution reaction practiced on the coal comprises alkylation.

6. The process of claim 1 wherein the electrophilic aromatic substitution reaction step practiced on the coal is conducted in the presence of a catalyst.

4,059,411

METHOD FOR EXTENDING THE LOWER LEAN LIMIT OF RUNNING OF INTERNAL COMBUSTION ENGINES AND IMPROVING THE COMBUSTION OF FLUID FUELS

Marvin M. Smith, 1010 E. Parkway Drive, Muncie, Ind. 47304

Continuation-in-part of Ser. No. 605,534, Dec. 20, 1966, abandoned, Ser. No. 89,048, Nov. 12, 1970, abandoned, Ser. No. 289,973, Sept. 18, 1972, abandoned, Ser. No. 469,612, May 13, 1974, abandoned, and Ser. No. 545,730, Jan. 30, 1975, abandoned. This application Apr. 2, 1976, Ser. No. 673,293

Int. Cl.^{2} C10L *1/32*

U.S. Cl. 44—51 **3 Claims**

1. A fuel composition for lowering the lean limit of stable combustion of a combustible fuel and air mixture comprising a liquid hydrocarbon fuel having dispersed therein a quantity of discrete particulates of a size of about 10 to 40 microns substantially equivalent in number to the number of similarly sized polyvinyl alcohol particles which would equal in weight about 6% of the weight of a mixture of the said polyvinyl alcohol particles and the said liquid hydrocarbon fuel.

4,059,412

METHOD FOR PRODUCING FUEL BRIQUETTES

Walter Goossens; Wolfgang Hermann, both of Wuerselen-Bardenberg; Wilhelm Keusch, Baesweiler, and Rudolf Redlich, Herzogenrath, all of Germany, assignors to Eschweiler Bergwerks-Verein Aktiengesellschaft, Herzogenrath-Kohlscheid, Germany

Filed June 3, 1976, Ser. No. 692,376

Claims priority, application Germany, June 4, 1975, 2524692

Int. Cl.^{2} C10L *5/00*

U.S. Cl. 44—10 H **2 Claims**

1. A method for the production of fuel briquettes by hot pressing a mixture of a coal having a fine grain size which softens at the temperature at which the briquettes are pressed and of a component which is substantially undeformable at said temperature, wherein the starting components are heated to different temperatures prior to their being intermixed, by first introducing the non-softening component into a hot gas stream, as viewed in the flow direction, and then introducing the softening component into the hot gas stream, from which they are separated after heating, characterized in that pure oxygen or an oxygen/nitrogen mixture including more than 21% by volume of oxygen is used in such a manner as a process regulating medium and as a reaction component of a heat-up medium, preferrably in a ratio of 2:1 up to the stoichiometric ratio, and wherein a carrier gas stream, having temperatures between 1000° C to 1700° C, is produced in such a manner, that adjusted to the type of starting components which are present in grain sizes up to 14mm, granular structures are achieved which result in bulk weights of between $0.3t/m^3$ to $0.7t/m^3$ prior to the intermixing, at average or mean heat-up speeds of about 2500° C/sec and end temperatures of between 350° C to 700° C of the substantially undeformable component.

4,059,413

WINDOW SECURITY APPARATUS

Joseph Forgione, 6145 Highway 51 North, Millington, Tenn. 38053

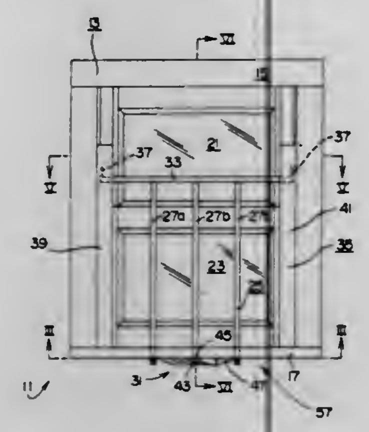
Filed June 4, 1976, Ser. No. 693,214

Int. Cl.^{2} E06B *3/68*

U.S. Cl. 49—56 **10 Claims**

5. Window security apparatus for attachment to the interior side of conventional window structure, said window security apparatus comprising guard means including a horizontally disposed bar member and a plurality of rigid, one-piece vertically disposed bar members having the respective upper ends thereof fixedly attached to said horizontally disposed bar member, the sill element of said window structure being provided with a plurality of apertures for respectively slidably receiving said plurality of vertically disposed bar members, track means

fixedly attached to the casing elements of the window structure for engaging and guidingly constraining said horizontally disposed bar member, said track means being separate from the tracks of the window structure that engage and guidingly constrain the sash members of the window structure, said guard means being free to be slidably moved between an up, window occluded position and a down, window unobstructed position independently from either of the sash members of the window structure lock means positioned beneath one of said



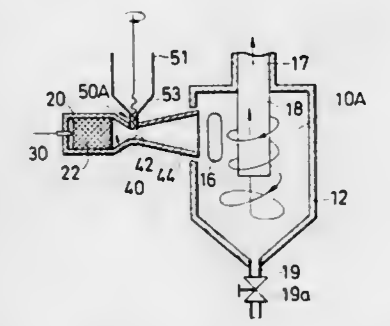
vertical bar members of said guard means and having locked and unlocked positions for selectively supporting the entire weight of said guard means to preclude downward movement of said guard means when said guard means is in said up, window occluded position and said lock means is in said locked position and for enabling said guard means to be moved up and down when said lock means is in said unlocked position, and lock trip-release means for remotely actuating said lock means between said locked and unlocked positions.

4,059,414
ASHLESS FUEL DETERGENT ADDITIVES
Hans D. Holtz, and Benedict R. Bonazza, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.
Filed May 28, 1976, Ser. No. 691,118
Int. Cl.² C10L *1/24*
U.S. Cl. 44—58 **4 Claims**

1. A method for reducing engine deposits in an internal combustion engine comprising the addition to the hydrocarbon fuel for the engine of a detergent fuel additive prepared by reacting (a) a sulfonic acid represented by the formula $R''SO_3H$ where R'' is alkyl or alkylaryl having 6–80 carbon atoms in the molecule with (b) the product of the reaction of (1) a long chain monocarboxylic acid having the general formula R'COOH in which R' is a straight or branched chain alkyl or arylalkyl radical having 10–30 carbon atoms and (2) a trialkanolamine represented by the generic formula $N(R\text{—}OH)_3$ wherein R is an alkylene radical having 2–10 carbon atoms, said ashless fuel detergent being added in an amount effective to reduce engine deposits and using said hydrocarbon fuel with ashless fuel detergent additive as fuel in an internal combustion engine.

4,059,415
APPARATUS FOR REFORMING COMBUSTIBLE INTO GASEOUS FUEL BY REACTION WITH DECOMPOSITION PRODUCT OF HYDROGEN PEROXIDE
Katuaki Kosaka, Hidaka; Fumio Wagatsuma, Tokyo; Mithuo Shimomoto, Sayama; Osamu Harada, Kawagoe, and Zene Ueno, Fuchu, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan
Filed May 27, 1976, Ser. No. 690,791
Claims priority, application Japan, May 28, 1975, 50-63037
Int. Cl.² B01J *7/00;* **C10J** *3/50;* **F02B** *43/08;* **F02C** *3/26*
U.S. Cl. 48—63 **3 Claims**

1. In an apparatus for carrying out the reforming of a combustible material into a gaseous fuel containing as combustible components at least one of hydrogen and carbon monoxide by reaction of the combustible material with a heated mixture of oxygen and steam prepared by the decomposition of hydrogen peroxide, the apparatus including a reaction chamber to carry out a reforming reaction, a catalytic reactor to decompose hydrogen peroxide into a heated mixture of oxygen and steam, a fluid passage connecting the reactor to the reaction chamber and a circuit for feeding the combustible material to the reaction chamber, the improvement comprising a venturi section formed in the fluid passage and a mixing section formed in the fluid passage adjacent and downstream of the constricted throat of said venturi section, the combustible material feed circuit opening into said venturi section substantially at the



constricted throat thereof, said venturi section and mixing section being formed such that the velocity of a flow of a mixture of the combustible material and the oxygen-steam mixture in said mixing section is in the range of from 10m/sec to the velocity of sound, said combustible material feed circuit comprising a screw conveyor adapted to transfer a solid combustible in the form of fine particles, the reaction chamber being in the form of a cyclone, the fluid passage being arranged such that the mixture of the combustible material and the oxygen-steam mixture is introduced into the reaction chamber generally in a tangential direction; whereby the oxygen steam mixture and the combustible material are rapidly and uniformly mixed with each other prior to the admission into the reaction chamber.

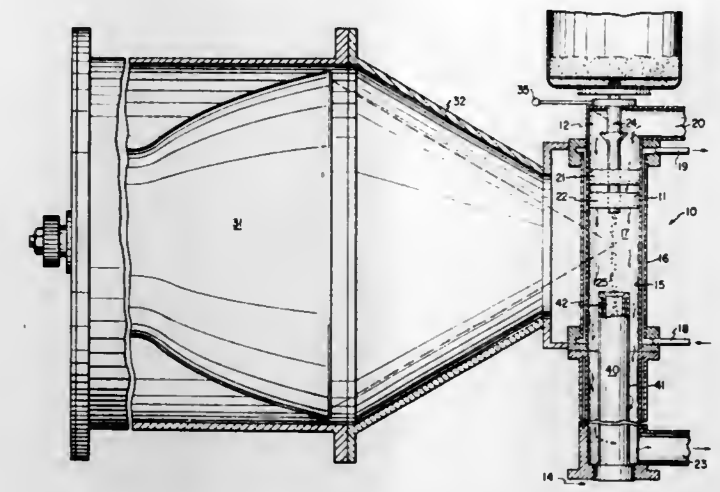
4,059,416
CHEMICAL REACTION PROCESS UTILIZING FLUID-WALL REACTORS
Edwin Matovich, Brea, Calif., assignor to Thagard Technology Company, Irvine, Calif.
Continuation-in-part of Ser. No. 271,560, July 13, 1972, Pat. No. 3,933,434, and a continuation-in-part of Ser. No. 591,949, June 30, 1975, and a continuation-in-part of Ser. No. 591,950, June 30, 1975, and a continuation-in-part of Ser. No. 606,222, Aug. 20, 1975, and a continuation-in-part of Ser. No. 616,393, Sept. 24, 1975, and a continuation-in-part of Ser. No. 631,912, Nov. 14, 1975. This application Jan. 19, 1976, Ser. No. 649,971
Int. Cl.² C10J *3/00*
U.S. Cl. 48—197 R **25 Claims**

1. A high temperature chemical reaction process which comprises:

a. generating an annular envelope of an inert fluid which is substantially transparent to radiation within a shell of a refractory material which reflects radiation; the volume enclosed by the shell constituting a black body cavity, the envelope having substantial axial length and the interior of the envelope defining a reaction chamber;

b. introducing a first group of reactants and a second group of reactants into the black body cavity and into the reaction chamber, at least one of the first group of reactants and at least one of the second group of reactants being directed along a predetermined path substantially coincident with the longitudinal axis of the envelope, the first group of reactants being capable of reacting endothermically at a predetermined temperature and the second group being capable of reacting exothermically at the predetermined temperature; and

c. directing high intensity radiant energy into the reaction chamber to coincide with at least a portion of the predetermined path of the reactants, sufficient radiant energy



being absorbed within the reaction chamber to raise the temperature of the reactants to the predetermined temperature required to initiate and sustain the endothermic and exothermic chemical reactions.

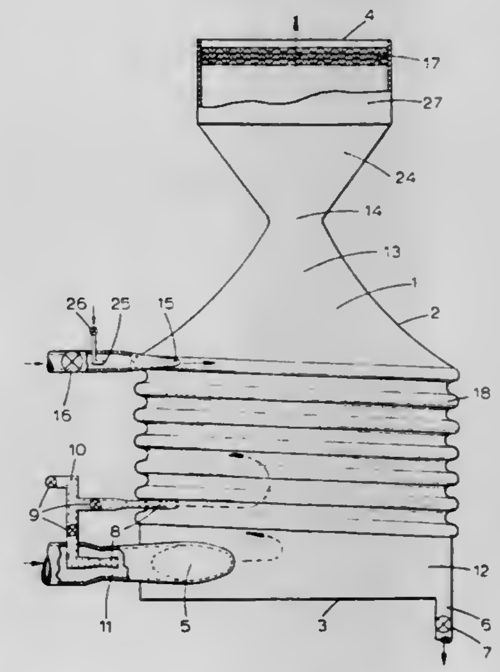
4,059,417
METHOD FOR PRODUCING ALUMINA AND ALUMINA-ZIRCONIA ABRASIVE MATERIAL
Bernard Ilmaier, Treibach, and Hans Zeiringer, Kappel, Krapfeld, both of Austria, assignors to Treibacher Chemische Werke Aktiengesellschaft, Treibach, Austria
Division of Ser. No. 579,555, May 21, 1975, abandoned. This application June 10, 1976, Ser. No. 694,993
Claims priority, application Austria, May 29, 1974, 4420/74; May 29, 1974, 4423/74; June 25, 1974, 5276/74
Int. Cl.² C04B *31/16;* **B24D** *3/04*
U.S. Cl. 51—309 A **18 Claims**

1. A method for producing abrasive granules on the basis of an oxide material selected from the group consisting of alumina and a mixture thereof with zirconia, wherein the oxide material is melted and the melt is rapidly cooled, comprising the steps of casting the melt into a molten salt selected from the group consisting of NaCl, $CaCl_2$, $BaCl_2$, $MgCl_2$ and mixtures thereof to cool the oxide material melt, separating the salt from the cooled and solidified oxide material, and thereafter producing abrasive granules from the solidified oxide material.

4,059,418
FLUE GAS DESULFURIZATION SORBENT AND PROCESS
Neville L. Cull, Baker, La., assignor to Exxon Research & Engineering Co., Linden, N.J.
Continuation of Ser. No. 390,919, Aug. 23, 1973, abandoned. This application Mar. 17, 1975, Ser. No. 559,010
Int. Cl.² B01D *53/02*
U.S. Cl. 55—73 **14 Claims**

1. In a process wherein sulfur dioxide is separated from a gaseous mixture containing the same by contacting said gaseous mixture, under desulfurization conditions, with a solid sorbent comprising a carrier and an active material supported thereon, which active material will selectively react with sulfur dioxide at the desulfurization conditions employed, the improvement wherein said carrier comprises a low surface area substrate coated with an adherent refractory oxide film.

4,059,419
VORTEX NUCLEATION SCRUBBING METHOD AND APPARATUS
Leon Irving Ross, P.O. Box 514, Grand Cayman, British W. Indies
Continuation-in-part of Ser. No. 398,587, Sept. 18, 1973, abandoned. This application July 11, 1975, Ser. No. 595,004
Claims priority, application United Kingdom, Oct. 2, 1972, 45266/72; Canada, Mar. 5, 1974, 181061
Int. Cl.² B01D *47/00*
U.S. Cl. 55—92 **13 Claims**



1. A process for separating particles suspended in a gas stream from the gaseous phase, at least some of the particles being too small to be centrifugally separated, the process comprising introducing a suspended particle-containing gas into an elongate vessel of generally circular internal cross-section, at a location adjacent the lower end of the vessel; introducing a scrubbing liquid at a location adjacent the upper end of said vessel; introducing scrubbing liquid vapor into the vessel whereby the gas and liquid move axially counter-currently through the vessel; spinning the gas and vapor within the vessel at a rotational velocity sufficient to create a vortex having a radial temperature gradient therethrough, the temperature decreasing radially inwardly of the vortex, as the gas adiabatically expands due to the tangential velocity; maintaining the temperature of the gas adjacent the outer periphery of the vortex sufficiently high to cause at least part of the scrubbing liquid to evaporate in an outer zone of the vortex, the radial temperature gradient being sufficient to cool the gas and vapor to the dew point of the vapor at a radius intermediate the outer periphery and longitudinal axis of the vortex, such that at least part of the resultant vapor is caused to condense upon some of the suspended particles at such relatively colder intermediate radius of the vortex, thus forming larger wetter particles; the larger wetted particles passing radially outwardly towards the warmer outer periphery of the vortex, where further condensation does not occur; and separately removing such larger wetted particles as the outer periphery of the vortex from the gaseous phase; wherein the suspended particles located between the aforesaid intermediate radius and the longitudinal axis of the vortex continue to be wetted by additional condensing vapor within the vortex until they are sufficiently heavy to be centrifugally separated from the gas stream by being spun outwardly towards the peripheral warmer portion of the gas vortex, from which they are removed.

4,059,420
BEARINGS AND RAPPING SHAFT IN ELECTROSTATIC PRECIPITATOR

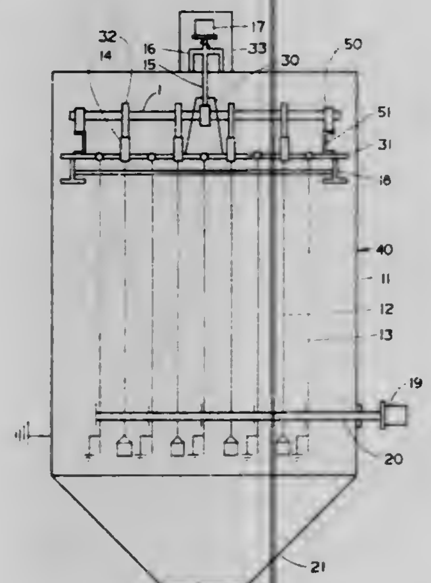
Alfred Frauenfelder, Zollikerberg, and Xaver Johann Huppi, Zurich, both of Switzerland, assignors to Elex A.G., Zurich, Switzerland

Continuation-in-part of Ser. No. 580,203, May 23, 1975, Pat. No. 3,958,844. This application Feb. 2, 1976, Ser. No. 654,088

The portion of the term of this patent subsequent to May 25, 1993, has been disclaimed.

Int. Cl.² B03C *3/76*

U.S. Cl. 55—112 **7 Claims**



1. In combination with an electrostatic precipitator having a housing with a flow through inlet and a flow through outlet and a plurality of discharge and collecting electrodes therein, said housing including an opening therein with a rapping shaft extending therethrough, said rapping shaft being in communication with rapping means for said electrodes, a bearing assembly for said rapping shaft comprising: two spaced bearings each supported by an elongated rod member mounted in spaced relation in slots open at the top extendng downwardly into a bearing block, the rapping shaft including a wear ring on the outer periphery thereof, the wear ring being detachably mounted to said shaft and disposed in contacting relationship with said bearings.

4,059,421
CROSS-FLOW TYPE STRIPPING-ABSORPTION APPARATUS

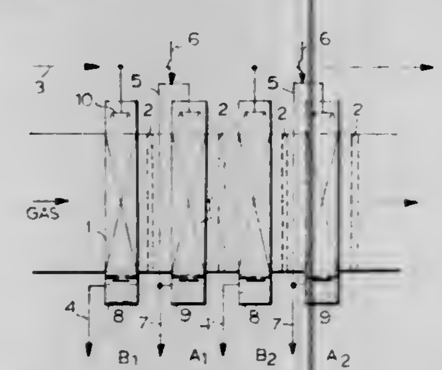
Shigehiro Kurata, Ichinomiya, and Kenzo Abe, Ohtaki, both of Japan, assignors to United Resources Industry Co., Ltd., Tokyo, Japan

Filed June 25, 1976, Ser. No. 699,806

Claims priority, application Japan, Sept. 2, 1975, 50-105656

Int. Cl.² B01D *53/14*

U.S. Cl. 55—196 **4 Claims**



1. A multi-stage cross-flow type stripping-absorption apparatus for recovery of at least one gas component from a solution containing said gas component which comprises (I) two or more of stripping-absorption units consisting of

a. a stripping part for removing the gas component; an inlet for the solution equipped at the top of said stripping part; an outlet at the bottom of said stripper part; an intermediate section between said inlet and outlet which forms a gas-liquid contacting zone; an inlet for an inert gas provided in the front side of said zone and an outlet in the rear side, so that the solution is contacted with the inert gas in a cross-flow system, and

b. an absorption part connected to and in series with said stripper part for removing the gas component; an inlet for introduction of a liquid absorbent equipped at the top of said absorption part; an outlet at the bottom thereof; an intermediate section between said inlet and outlet which forms a gas-liquid contacting zone; an inlet in the front side of said zone for the inert gas containing said gas component removed from the stripper part and connected to the gas outlet of the stripper part and an outlet in the rear side of said zone so that the liquid is contacted with said inert gas and gas component from the stripping part in a cross-flow system, said stripping part and absorbing part alternately arranged and in series so as to form a multistage system;

II. at least one blower for circulating the inert gas from the first unit to the following units in turn, and then finally again to said first unit, which blower is placed in a duct as defined in (III) below, and

III. a horizontal duct for connecting the units (I) and the blower (II) arranged in series in the direction of the inert gas, to form a closed circuit system such that the inert gas may be recirculated throughout the apparatus after the gas component is removed therefrom by contact with liquid absorbent in the absorption parts of unit (I).

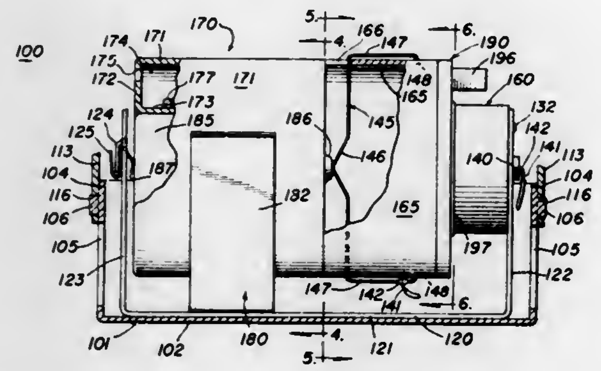
4,059,422
DISPENSER FOR ODOR CONTROL AGENT

Robert L. Steiner, Chicago, Ill., assignor to Steiner American Corporation, Salt Lake City, Utah

Filed June 21, 1976, Ser. No. 697,867

Int. Cl.² B01D *53/04*

U.S. Cl. 55—418 **14 Claims**



1. A dispenser for odor control agents comprising a housing having air intake openings and air discharge openings therein and including a base, a fan mounted on said base for drawing air through said air intake openings to establish an air stream through said housing, a cartridge removably mounted on said base and including a compartment for receiving an odor control agent therein, duct means for directing the air stream of said fan through said compartment past the odor control agent therein and out through the air discharge openings, and a cover for said base shiftably mounted with respect thereto for movement while mounted between a closed operating position and an open servicing position, said cover in the closed position thereof cooperating with said base to enclose said fan and said cartridge, said cover in the open position thereof rendering said fan and said cartridge accessible for removal and replacement and servicing, said housing and said fan and said cartridge being constructed and arranged so that the dispenser is operable in all orientations of said housing.

4,059,423
PROCESS FOR THE PREPARATION OF EXPANSIBLE BEADS

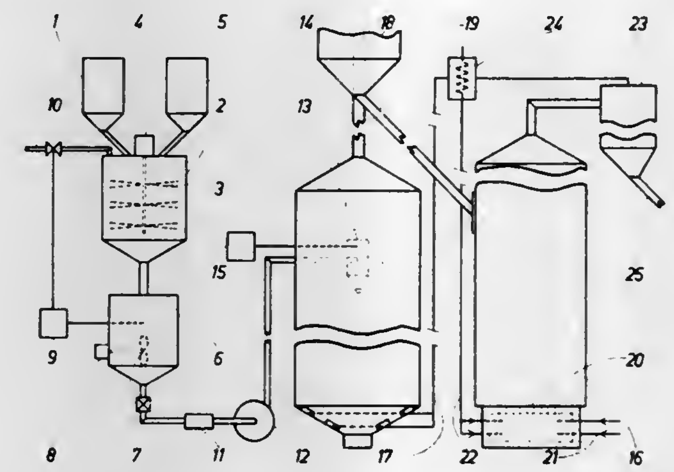
Daniel De Vos, Jette; Paul-Marie Michel, Jumet, and Alfred Berger, Jamioulx, all of Belgium, assignors to Sovitec S.A., Charleroi, Belgium

Filed July 1, 1976, Ser. No. 701,966

Claims priority, application United Kingdom, July 17, 1975, 30089/75

Int. Cl.² C03B *19/08, 19/10*

U.S. Cl. 65—21 **23 Claims**



1. A process for the preparation of expansible beads which are convertible by firing into cellular glass bodies, said process comprising the steps of:

preparing a slip having a liquid medium continuous phase and a disperse phase, said slip containing particles of glass or glass-forming material, a cellulating agent, and a binder, the disperse phase of said slip including at least most of said particles,

dividing said slip into drops, said slip which is divided into drops having a viscosity in the range 200 to 10,000 cp, and

subjecting said drops while in divided condition to a heat treatment including heating and cooling stages so as to cause evaporation of liquid from said drops and conversion thereof into self-sustaining beads in which said glass or glass-forming particles are held together by said binder and which contain said cellulating agent or gas derived therefrom.

4,059,424
APPARATUS FOR THE CONTROLLED SUPPLY OF CRYOGENIC FLUID

Gerard Bentz, Elancourt-Trappes, France, assignor to L'air Liquide, Societe Anonyme pour l'etude et l'exploitation des Procedes Georges Claude, Paris, France

Filed Feb. 10, 1976, Ser. No. 656,968

Claims priority, application France, Feb. 25, 1975, 75.05734

Int. Cl.² F17C *7/02*

U.S. Cl. 62—49 **14 Claims**

1. Apparatus for delivering the liquid phase of a cryogenic fluid to a point open to free air at which it is to be used, said apparatus comprising in combination:

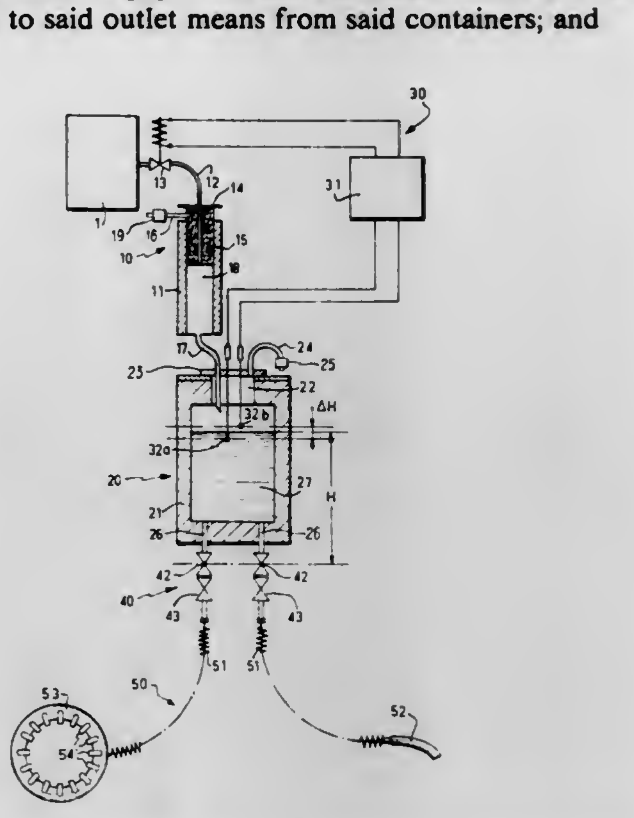
a. a tank in which said cryogenic fluid is stored under pressure;

b. a phase-separator having an infeed duct connected to said tank to allow said fluid, which is delivered in the form of a two-phase mixture, to pass to said separator, and discharge means to allow the liquid phase of said mixture to flow out by gravity, said infeed duct being provided with a member for regulating throughput which can be remotely actuated;

c. a liquid-collecting container which is fed by said discharge means and having outlet means to allow the body of liquid collected in said container to flow out by gravity;

d. a system to control said throughput regulating member which is sensitive to the level of liquid in said container and which is provided to maintain said level constant;

e. adjustable-throughput withdrawal means which are connected to said outlet means from said containers; and



f. distributor means connected to said withdrawal means which deliver the said liquid to said point at which it is to be used.

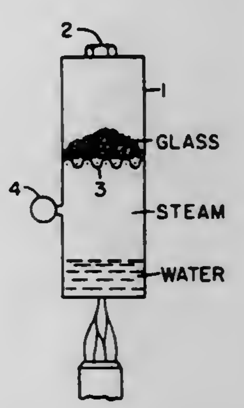
4,059,425
GASEOUS PROCESS FOR HYDRATING AND EXTRUDING GLASS

William T. Brydges, III, and Edwin J. Illig, both of Corning, N.Y., assignors to Corning Glass Works, Corning, N.Y.

Continuation of Ser. No. 542,233, Jan. 20, 1975, abandoned. This application Apr. 21, 1976, Ser. No. 678,930

Int. Cl.² C03C *19/00, 15/00;* **C03B** *31/00;* **C01B** *33/32*

U.S. Cl. 65—22 **1 Claim**



1. A process for combining hydrating and extruding Na_2O and/or K_2O-SiO_2 glass materials which consists of the steps:

a. forming anhydrous glass bodies having thickness dimensions not exceeding about 15 mm. and consisting essentially, in mole percent on the oxide basis, of about 3–25% Na_2O and/or K_2O and 50–95% SiO_2, the sum of those components constituting at least 55% of the total composition;

b. placing said anhydrous glass bodies within a chamber capable of withstanding a gaseous H_2O-containing environment at elevated temperatures and pressures and having at least one discharge orifice;

c. contacting said anhydrous glass bodies within said chamber with a gaseous H_2O-containing environment having a relative humidity of at least 5% at a temperature greater than 100° C. for a time and at a steam pressure sufficient

I. to hydrate at least a surface portion on said glass bodies to thereby cause an amount of water to be absorbed therein effective to impart thermoplastic properties

thereto and cause said hydrated glass bodies to coalesce together; and thereafter

II. to extrude said hydrated coalesced glass under steam pressure through said discharge orifice in the form of a solid hydrated or a foamed hydrated glass body exhibiting thermoplastic properties.

4,059,426

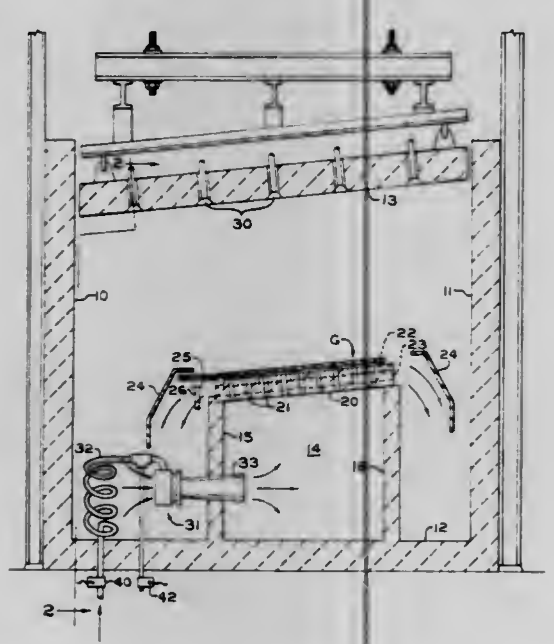
METHOD AND APPARATUS FOR HEATING GLASS SHEETS WITH RECIRCULATED GAS

Eugene W. Starr, Allison Park, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Oct. 1, 1976, Ser. No. 728,829

Int. Cl.² C03B *29/00*

U.S. Cl. 65—25 A **11 Claims**



1. A furnace for heating a sheet of glass while supporting on a layer of gas comprising:

an enclosure, means to heat said enclosure, a glass support bed within said enclosure having gas passages therethrough, an enclosed plenum chamber in communication with said gas passages, means for pressurizing said plenum chamber including an air flow amplifier having a conduit-like configuration with an inlet throat at one end in communication with ambient gas in said enclosure and an outlet opening at the opposite end in communication with said plenum chamber, a compressed gas tube connected at one end to a side inlet of said air flow amplifier and at the other end to a source of compressed gas outside of said enclosure, and a narrow, peripherally extending opening adjacent to the inside surface of said inlet throat communicating with the compressed gas inlet and adapted to direct a high velocity stream of gas along the interior surface of said inlet throat, whereby ambient gases in said enclosure are drawn into said plenum and forced through said passages in said support bed with sufficient pressure to establish gas support for a sheet of glass overlying said bed.

6. A method of heating a sheet of glass while supporting on a layer of gas comprising transporting a sheet of glass into an enclosure and into a position overlying a support bed having gas passages communicating with a plenum chamber therebelow, heating the gases within the enclosure, establishing an annular flow from a source of compressed gas in a Coanda effect air flow amplifier within the enclosure thereby drawing heated ambient gas from the enclosure into the air flow amplifier and discharging the gas into the plenum chamber so as to pressurize the plenum chamber and force gas through the support bed passages with sufficient pressure to support the sheet of glass on the gas.

4,059,427

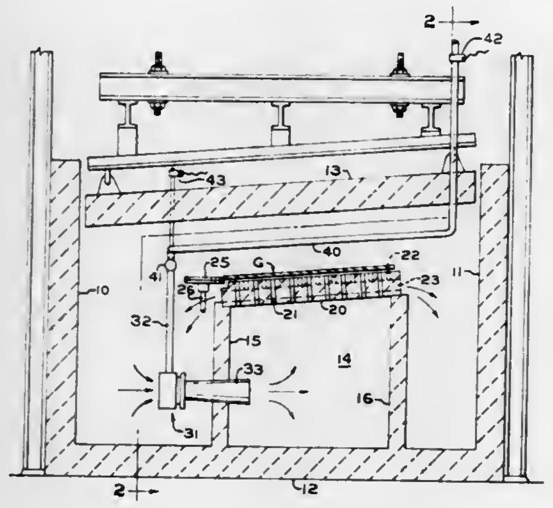
ELECTRIC GLASS SHEET HEATING FURNACE AND METHOD OF USING

Eugene W. Starr, Allison Park, and George W. Misson, Franklin Township, Butler County, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Oct. 1, 1976, Ser. No. 728,808

Int. Cl.² C03B *29/00*

U.S. Cl. 65—25 A **9 Claims**



1. A furnace for heating sheets of glass while supported on a layer of gas comprising:

an enclosure, a glass support bed within said enclosure having gas passages therethrough, an enclosed plenum chamber in communication with said gas passages, means for pressurizing said plenum chamber including gas entrainment means having an inlet throat in communication with ambient gas in said enclosure and an outlet opening in communication with said plenum chamber, an electrically conductive tube heater for carrying compressed gas communicating at one end with said gas entrainment means and at the other end to a source of compressed gas outside of said enclosure, whereby ambient gases in the enclosure are drawn into the plenum and forced through said passages in the support bed with sufficient pressure to establish gas support for a sheet of glass on the bed, an intermediate portion of said tube overlying the glass support bed in generally parallel, closely spaced relation thereto, and electric circuit means connected to said tube heater for passing current along and heating said intermediate portion of said tube heater, whereby the compressed gas and the glass sheets are heated by means of electric energy applied to said tube heater.

6. A method of heating a sheet of glass while supported on a layer of gas comprising transporting a sheet of glass into an enclosure and into a position overlying a support bed having gas passages communicating with a plenum chamber therebelow, establishing an entrained gaseous flow from a source of compressed gas with gas entrainment means within the enclosure thereby drawing ambient gas from the enclosure into the gas entrainment means and discharging the ambient gas into the plenum chamber so as to pressurize the plenum chamber and force gas through the support bed passages with sufficient pressure to support the sheet of glass on the gas, passing the incoming stream of compressed gas being fed to the gas entrainment means through a tube heater overlying the path of glass travel through the enclosure in closely spaced, generally parallel relation thereto, passing electric current through the tube heater to heat the compressed gas passing through the tube heater and the glass passing beneath the tube.

4,059,428

METHOD OF FORMING SAGGING MOLD FROM A GLASS CERAMIC

Wendell C. Andrews, Mesa, Ariz., assignor to Corning Glass Works, Corning, N.Y.

Filed Feb. 20, 1976, Ser. No. 659,698

Int. Cl.² C03B *23/02*

U.S. Cl. 65—33 **6 Claims**

6. A method of sagging a glass article to a desired surface contour which comprises, providing a sagging mold of glass-ceramic material having a predetermined contour corresponding to the desired surface contour of the finished sagged article, positioning the article to be sagged upon said sagged mold, subjecting the article and mold to a thermal cycle and sagging the article into desired conformity with the surface contour of said mold, maintaining the dimensional stability of said mold during the heat-up and cool-down of the sagging cycle with said mold having a maximum coefficient of thermal expansion of about $20 \times 10^{-7}/°$ C., and facilitating the dissipation of heat energy for effective thermal cycling by limiting the thickness of said glass-ceramic sagging mold to a maximum not substantially greater than one-half inch.

4,059,429

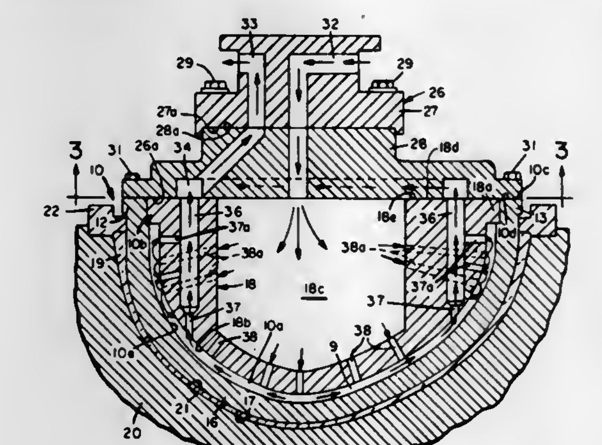
GLASS PRESSING PLUNGER COOLING

Arieh Carmi, Big Flats; Zung S. Chang, Painted Post, and Thomas J. Rayeski, Corning, all of N.Y., assignors to Corning Glass Works, Corning, N.Y.

Filed Oct. 4, 1976, Ser. No. 729,409

Int. Cl.² C03B *11/06, 9/38*

U.S. Cl. 65—355 **2 Claims**



1. In a hollow plunger (10) including corner regions (14, 15) of relatively sharp curvature joining regions (11, 12, 13) of substantially lesser curvature and for press forming in a complimental mold (20) a glass article (19) having similarly curved regions and a support member (26) for said plunger, apparatus for differentially cooling said regions, such apparatus comprising; a baffle member (18) disposed in the hollow of said plunger and providing a cooling fluid flow channel (9) between the outer surface (18*b*) of the baffle member (18) and the inner surface (10*e*) of the plunger (10) such baffle member (18) embodying,

A. a cooling fluid supply plenum chamber (18*c*),

B. a plurality of cooling fluid flow passages (38, 38*a*) connecting said plenum chamber (18*c*) with said cooling fluid flow channel (9) there being a substantially greater number of such passages in said corner regions (14, 15) of the plunger (10) than in said regions (11, 12, 13) thereof of lesser curvature, and

C. a plurality of spent cooling fluid exhaust passages (36, 37, 37*a*) connecting said fluid flow channel (9) with spent cooling fluid exhaust passages (33, 34) embodied in said support member (26) there being a substantially greater number of said spent cooling fluid exhaust passages in said corner regions (14, 15) of the plunger (10) than in said regions (11, 12, 13) thereof of lesser curvature.

4,059,430

ORGANIC (THIO) PHOSPHORIC ACID ESTER COMPOUNDS AND HERBICIDAL COMPOSITIONS

Masahiro Aya; Junichi Saito; Toyohiko Kume, and Kazuomi Yasui, all of Tokyo, Japan, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

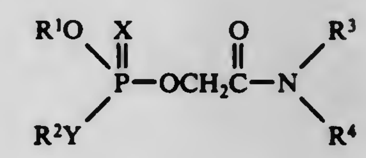
Filed Sept. 22, 1976, Ser. No. 725,614

Claims priority, application Japan, Oct. 22, 1975, 50-126321

Int. Cl.² A01N *9/36;* **G07F** *9/09, 9/165*

U.S. Cl. 71—86 **32 Claims**

1. Organic (thio)phosphoric acid ester compounds of the formula



wherein

R^1 is alkyl of from 1 to 6 carbon atoms, cyclohexyl or phenyl,

R^2 is alkyl of from 1 to 6 carbon atoms,

R^3 is alkyl of from 1 to 6 carbon atoms,

R^4 is cyclohexyl or phenyl,

X is oxygen or sulfur, and

Y is oxygen or sulfur.

26. Method of combatting undesired vegetation which method comprises applying to such vegetation or its habitat effective amounts of an organic (thio)phosphoric acid ester compound as claimed in claim 1.

4,059,431

PLANT GROWTH REGULATOR

Tetsuo Takematsu; Makoto Konnai, both of Utsunomiya; Makoto Takeda; Nobuhiko Fuga, both of Ami; Kaoru Ikeda, Utsunomiya, and Kiyoshi Shugaya, Ami, all of Japan, assignors to Mitsubishi Petrochemical Co., Ltd., Tokyo, Japan

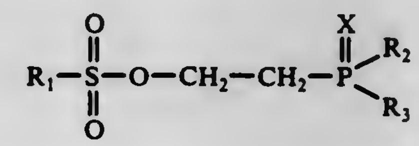
Division of Ser. No. 580,344, May 23, 1975. This application May 27, 1976, Ser. No. 690,779

Claims priority, application Japan, May 27, 1974, 49-59491; Dec. 30, 1974, 50-847; Apr. 28, 1975, 50-50649

Int. Cl.² A01N *9/36;* **C07C** *143/68*

U.S. Cl. 71—87 **7 Claims**

1. A compound of the formula



wherein R_1 is a member selected from the group consisting of substituted or unsubstituted C_1 to C_{12} linear- or branched-alkyl C_5 to C_{12} cyclo-alkyl, substituted or unsubstituted C_2 to C_{12} linear-or branched- alkenyl or C_5 to C_{12} cycloalkenyl and substituted or unsubstituted C_6 to C_{14} carbocyclic aryl; R_2 and R_3 are identical or different and each represents a group or an atom selected from the group consisting of (1) -OR' in which R' is a member selected from the group consisting of a hydrogen atom, substituted or unsubstituted C_1 to C_{12} linear- of branched- alkyl or C_5 to C_{12} cycloalkyl, substituted or unsubstituted C_2 to C_{12} linear- or branched- alkenyl or C_5 to C_{12} cycloalkenyl and substituted or unsubstituted C_6 to C_{14} carbocyclic aryl, (2) -SR' in which R' is as defined above, (3) $-N(R')_2$ in which R' is the same as defined above and the two R' groups

are identical or different, and (4) a halogen atom; and X is S or O; the substituent for the substituted alkyl group or the substituted alkenyl group is a member selected from the group consisting of halogen atoms, cyano, nitro, alkoxycarbonyl with the alkoxy moiety containing 1 to 12 carbon atoms, alkoxy of 1 to 12 carbon atoms, carboxyl, alkanoyl of 1 to 12 carbon atoms, alkanoyloxy of 1 to 12 carbon atoms, benzoyloxy, thiocyanato, isothiocyanato, acetamide, acetylthio, phosphono, β-phosphonoethyloxysulfonyl, $(CH_3)_3{}^+N^{Cl^-}—CH_2—CH_2—$, phenyl, phenylalkyl of 7 to 14 carbon atoms, and alkylthio with the alkyl moiety containing 1 to 12 carbon atoms; and the substituent for the substituted aryl group is a member selected from the group consisting of alkyl of 1 to 6 carbon atoms, halogen atoms, acetyl, acetamido, nitro, cyano, carboxyl, alkoxy of 1 to 6 carbon atoms and hydroxyl; with the proviso that when X is O and both R_2 and R_3 are the group -OR', at least one of —OR' groups is -OH, and when X is S, both R_2 and R_3 are not the groups $—N(R')_2$ at the same time.

2. A method for regulating the growth of plants which comprises applying to a plant or to the locus in which a plant is growing or is to be grown, a plant growth regulating amount of a compound according to claim 1.

4,059,432

PLANT GROWTH REGULATOR

Tetsuo Takematsu; Makoto Konnai, both of Utsunomiya; Makoto Takeda; Nobuhiko Fuga, both of Ami; Kaoru Ikeda, Utsunomiya, and Kiyoshi Shugaya, Ami, all of Japan, assignors to Mitsubishi Petrochemical Co., Ltd., Tokyo, Japan

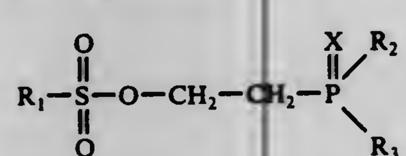
Filed May 23, 1975, Ser. No. 580,344

Claims priority, application Japan, May 27, 1974, 49-59491; Dec. 30, 1974, 50-847; Apr. 28, 1975, 50-50649

Int. Cl.² A01N *9/36;* **C07C** *143/68;* **C07D** *295/16*

U.S. Cl. 71—87 **7 Claims**

1. A compound of the formula



wherein R_1 is a member selected from the group consisting of substituted or unsubstituted C_1 to C_{12} linear- or branched-alkyl, C_5 to C_{12} cyclo-alkyl, substituted or unsubstituted C_2 to C_{12} linear- or branched-alkenyl or C_5 to C_{12} cycloalkenyl and substituted or unsubstituted C_6 to C_{14} carbocyclic aryl; at least one of R_2 and R_3 is morpholino and the other is selected from the group consisting of (1) —OR' in which R' is a member selected from the group consisting of a hydrogen atom, substituted or unsubstituted C_1 to C_{12} linear- or branched-alkyl or C_5 to C_{12} cyclo-alkyl, substituted or unsubstituted C_2 to C_{12} linear- or branched-alkenyl or C_5 to C_{12} cyclo-alkenyl and substituted or unsubstituted C_6 to C_{14} carbocyclic aryl, (2) —SR' in which R' is as defined above, (3) $—N(R')_2$ in which R' is the same as defined above or the R' groups together with the nitrogen to which they are attached form morpholino, and (4) a halogen atom; and X is S or O; the substituent for the substituted alkyl group or the substituted alkenyl group is a member selected from the group consisting of halogen atoms, cyano, nitro, alkoxycarbonyl with the alkoxy moiety containing 1 to 12 carbon atoms, alkoxy of 1 to 12 carbon atoms, carboxyl, alkanoyl of 1 to 12 carbon atoms, alkanoyloxy of 1 to 12 carbon atoms, benzoyloxy, thiocyanato, isothiocyanato, acetamide, acetylthio, phosphono, β-phosphonoethyloxysulfonyl, $(CH_3)_3{}^+N^{Cl^-}—CH_2—CH_2—$, phenyl, phenylalkyl of 7 to 14 carbon atoms, and alkylthio with the alkyl moiety containing 1 to 12 carbon atoms; and with the substituent for the substituted aryl group is a member selected from the group consisting of alkyl of 1 to 6 carbon atoms, halogen atoms, acetyl, acetamido, nitro, cyano, carboxyl, alkoxy of 1 to 6 carbon atoms and hydroxyl; with the proviso that when X is S, both R_2 and R_3 are not the groups morpholino or $—N(R')_2$ at the same time.

2. A method for regulating the growth of plants which comprises applying to a plant or to the locus in which a plant is growing or is to be grown a plant growth regulating amount of a compound according to claim 1.

4,059,433

3-ALKOXYISOTHIAZOLE DERIVATIVES AS HERBICIDES

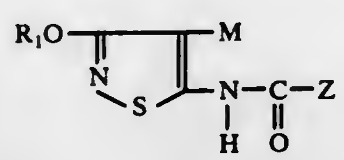
Loren Kenneth Gibbons, Medina, N.Y., assignor to FMC Corporation, Philadelphia, Pa.

Filed June 18, 1976, Ser. No. 697,457

Int. Cl.² A01N *9/12;* **C07D** *275/02*

U.S. Cl. 71—90 **14 Claims**

1. A substituted isothiazolylurea of the formula:



in which R_1 is alkyl of 1-5 carbon atoms; M is cyano or carbamoyl; Z is $—NR_2R_3$ or R_4, wherein R_2 is alkyl of 1-5 carbon atoms, R_3 is alkyl of 1-5 carbon atoms or hydrogen, R_4 is alkyl of 1-5 carbon atoms.

13. An herbicidal composition comprising an herbicidally effective amount of a compound of claim 1 in admixture with an extruder.

14. A method of preventing and destroying undesired plant growth which comprises applying to the locus to be protected an herbicidally effective amount of a compound of claim 1.

4,059,434

CYCLOALKANAPYRAZOLE HERBICIDES

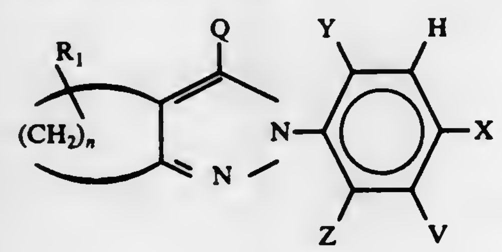
Anthony David Wolf, Newark, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 622,763, Oct. 15, 1975, abandoned, and Ser. No. 640,348, Dec. 12, 1975, abandoned. This application Aug. 26, 1976, Ser. No. 717,014

Int. Cl.² A01N *9/22;* **C07D** *231/56*

U.S. Cl. 71—92 **105 Claims**

1. A compound of the formula



where
- n is 3, 4 or 5;
- R_1 is hydrogen or methyl;
- Q is fluorine, chlorine, bromime or iodine;
- X is fluorine, chlorine, bromine, iodine, cyano, methoxy or nitro;
- Y is hydrogen, fluorine or chlorine;
- Z is hydrogen or flurorine; and
- V is hydrogen, fluorine, chlorine or methoxy; with the proviso that
  - a. when n is 5, R_1 must be hydrogen, Q must be chlorine or bromine, Z and V must both be hydrogen and Y must be hydrogen or fluorine;
  - b. when n is 3 or 4 and Q is fluorine or iodine, R_1, Z and Y must be hydrogen and Y must be hydrogen or fluorine;
  - c. when n is 3 and R_1 is methyl, Q must be chlorine or bromine, Y must be hydrogen or fluorine and Z and V must be hydrogen; and
  - d. when V is other than hydrogen, X must be fluorine, chlorine or bromine and Z must be hydrogen.

32. A composition for the control of undesirable vegetation consisting essentially of an effective amount of a compound of claim 1 and at least one of (a) an inert surface-active agent, and (b) a solid or liquid diluent.

63. A method for the control of undesirable vegetation comprising applying to the locus of such undesirable vegetation a herbicidally effective amount of a compound of claim 1.

4,059,435

HERBICIDAL 4-TRIFLUOROMETHYL-3-CYANOALKOXY-4-NITRO DIPHENYL ETHERS

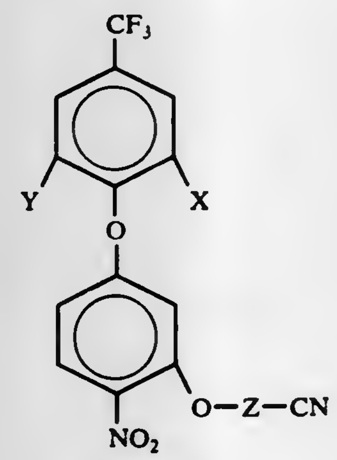
Wayne O. Johnson, Warminster, Pa., assignor to Rohm and Haas Company, Philadelphia, Pa.

Filed Aug. 31, 1976, Ser. No. 719,471

Int. Cl.² C07C *121/66;* **A01N** *9/20*

U.S. Cl. 71—105 **12 Claims**

1. A compound of the formula



wherein
- X is a hydrogen atom, a halogen atom, a trifluoromethyl group, a (C_1-C_4)alkyl group, or a cyano group,
- Y is a hydrogen atom, a halogen atom, or a trifluoromethyl group, and
- Z is a divalent (C_1-C_4)alkylene group.

4,059,436

HERBICIDAL COMPOSITIONS CONTAINING SILYLATED CHLOROACETANILIDES

Manfred Kühne, Pfeffingen, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

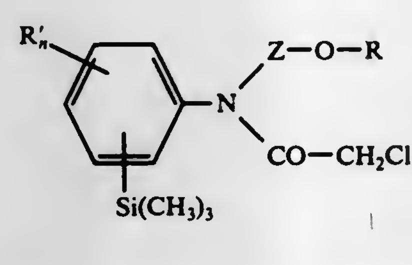
Continuation-in-part of Ser. No. 551,463, Feb. 20, 1975, Pat. No. 3,996,254. This application Nov. 11, 1976, Ser. No. 740,893

Claims priority, application Switzerland, Feb. 25, 1974, 02632/74

Int. Cl.² A01N *9/20*

U.S. Cl. 71—118 **10 Claims**

1. A plant growth regulating agent containing as active ingredient an effective amount of a silylated chloroacetanilide of formula I



(I)

wherein
- R represents a lower alkyl group having at most 4 carbon atoms, a group $—CH_2—CH_2—Si(CH_3)_3$, a group $—CH_2—Si(CH_3)_3$ or a trimethylsilyl group,
- Z represents a straight or branched alkylene chain having at most 3 carbon atoms,
- R' represents halogen, lower alkyl or alkoxy having at most 3 carbon atoms or trimethylsilyl, and
- *n* represents the number 0 or 1, together with a suitable carrier.

4,059,437

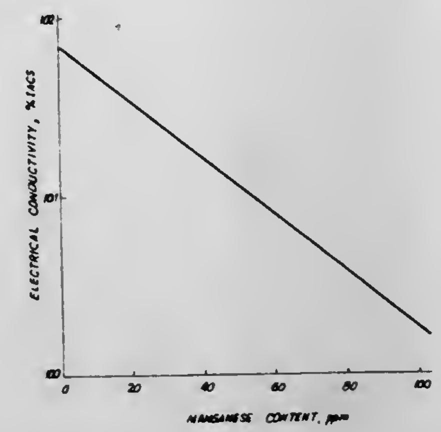
OXYGEN-FREE COPPER PRODUCT AND PROCESS

Donald John Nesslage, Old Bridge; Lin Sheng Yu, Princeton, both of N.J., and Michael Francis Shaw, El Paso, Tex., assignors to Phelps Dodge Industries, Inc., New York, N.Y.

Filed July 2, 1975, Ser. No. 592,622

Int. Cl.² C22C *9/05;* **C22F** *1/08*

U.S. Cl. 75—76 **22 Claims**



1. An improved oxygen-free copper product consisting essentially of non-deoxidized oxygen-free copper containing normal impurities and manganese in addition from approximately 1 to approximately 100 parts per million by weight, further characterized by having a minimum electrical conductivity of at least 100% I.A.C.S.

4,059,438

PROCESS FOR THE WORK-UP OF A CONTAMINATED INACTIVE MERCURY(II)CHLORIDE/ACTIVE CARBON-CATALYST

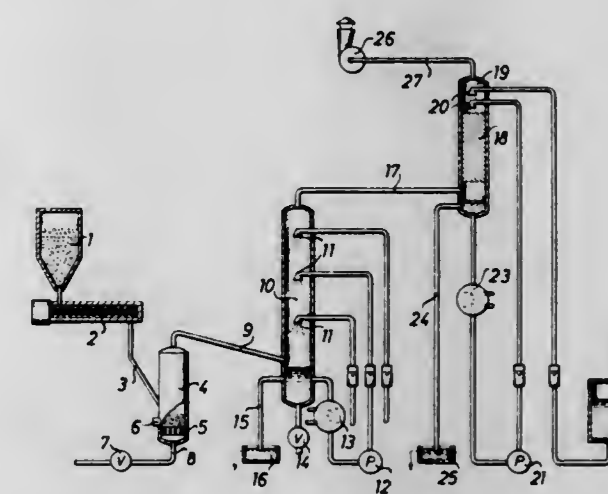
Heinz Müller, Bruhl, Germany, assignor to Hoechst Aktiengesellschaft, Knapsack, near Cologne, Germany

Continuation of Ser. No. 530,872, Dec. 9, 1974, abandoned. This application Aug. 27, 1976, Ser. No. 718,108

Claims priority, application Germany, Dec. 13, 1973, 2361917

Int. Cl.² C22B *43/00*

U.S. Cl. 75—81 **4 Claims**



1. A process for the work-up of a contaminated inactive mercury (II) chloride/active carbon-catalyst having a mercury (II) chloride content within the range 1.5 to 4 weight% by burning said catalyst in a furnace, which process comprises charging said furnace with constituents initially including a portion of said catalyst; igniting said catalyst portion by means of a pilot flame introduced into said furnace; then continuously charging said furnace with the catalyst balance portion together with air or oxygen or mixture thereof so as to accomplish a complete and self-sustaining combustion of the active carbon contained in said catalyst, the air or the oxygen or the mixture thereof being fed in the quantity necessary to produce combustion gases containing metallic mercury in vapor form together with between 0.5 and 5% by volume of oxygen and

between 2 and 15% by volume of carbon monoxide; injecting water into the combustion gases issuing from said furnace so as to condense metallic mercury therefrom; conveying the remaining gases through a scrubbing zone having an alkaline liquor therein; and delivering the gases leaving the scrubbing zone to the atmosphere, said gases containing less than 1 mg mercury/cbm.

4,059,439

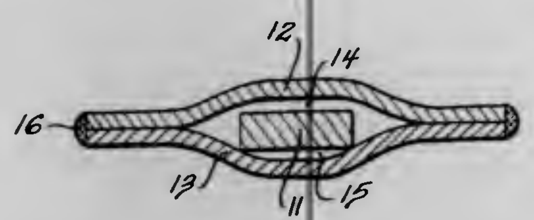
PU-ZR ALLOY FOR HIGH-TEMPERATURE FOIL-TYPE FUEL

Franklin D. McCuaig, LaGrange, Ill., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Mar. 15, 1974, Ser. No. 451,615

Int. Cl.² C22C *28/00*

U.S. Cl. 75—122.7 **2 Claims**



1. A nuclear reactor fuel alloy consisting essentially of 7 weight percent zirconium, balance plutonium, characterized in that said alloy is castable, is rollable to thin foils as thin as 0.0005 inch thick, and is compatible with stainless steel cladding.

4,059,440

HIGHLY CORROSION RESISTANT FERRITIC STAINLESS STEEL

Susumu Takemura; Masao Onoyama, and Masanobu Tsuji, all of Hikari, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Filed Jan. 27, 1976, Ser. No. 652,703

Claims priority, application Japan, Feb. 1, 1975, 50-13824

Int. Cl.² C22C *38/22, 38/26, 38/28*

U.S. Cl. 75—126 C **1 Claim**

1. A stable, highly corrosion resistant single phase ferritic stainless steel consisting essentially of the following components:

C ≦ 0.015%
Si ≦ 0.30%
Mn ≦ 0.30%
P ≦ 0.040%
S ≦ 0.030%
Cr : 18.00 to 25.00%
Ni ≦ 0.20%
Cu ≦ 0.20%
Mo : 1.50 - 3.50%
N ≦ 0.015%
Ti : 4 × (C + N)% to 0.50%, and
Nb : 8 × (C + N)% to 1.00%, wherein
Ti/Nb : 0.5 to 1.2 ,
(Ti + Nb)/(C + N) ≧ 8.0 in case of (C + N) < 0.017%, and
(Ti + Nb)/(C + N) ≧ 16.0 in case of (C + N) ≧ 0.017%

with the balance being iron and unavoidable impurities.

4,059,441

METALLIC GLASSES WITH HIGH CRYSTALLIZATION TEMPERATURES AND HIGH HARDNESS VALUES

Ranjan Ray, Morristown; Lee E. Tanner, Summit, and Carl F. Cline, Mendham, all of N.J., assignors to Allied Chemical Corporation, Morris Township, N.J.

Division of Ser. No. 495,458, Aug. 7, 1974, abandoned. This application Nov. 11, 1976, Ser. No. 740,897

Int. Cl.² C22C *27/02*

U.S. Cl. 75—174 **1 Claim**

1. A metal alloy at least 50% amorphous having a high crystallization temperature and a high hardness, characterized in that the alloy has the composition ranging from $Ta_{35}Ni_sW_{65-s}$ to $Ta_{45}Ni_sW_{55-s}$, where "s" ranges from about 35 to 45 atom percent.

4,059,442

METHOD FOR MAKING A POROUS TANTALUM PELLET

Walter J. Bernard, Williamstown, Mass., assignor to Sprague Electric Company, North Adams, Mass.

Filed Aug. 9, 1976, Ser. No. 713,012

Int. Cl.² B22F *1/00, 7/04*

U.S. Cl. 75—208 R **17 Claims**

1. A method for making a porous tantalum pellet comprising the sequential steps of:

a. heating a quantity of tantalum powder particles having a surface oxide to a temperature greater than 400° C and no greater than 1200° C in a non-oxidizing atmosphere to dissolve said surface oxide into the bulk of said particles;
b. dispensing said powder into a molding press cavity;
c. providing a protective atmosphere for said powder from said heating through said dispensing;
d. compressing said powder in said cavity to provide a porous tantalum pellet; and
e. vacuum firing said pellet to sinter said compressed particles to each other.

4,059,443

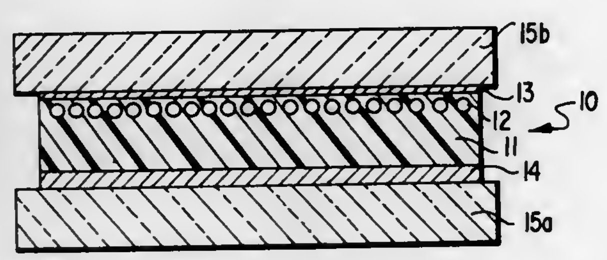
ELECTRICAL INFORMATION STORAGE SYSTEM

Koji Okumura, Penfield, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Jan. 9, 1975, Ser. No. 539,913

Int. Cl.² G03G *5/02*

U.S. Cl. 96—1 PS **10 Claims**



1. An electrical information storage member, comprising:

a layer of substantially electrically insulating material containing a layer of particulate electrically photoconductive material;
a layer of semiconductor material contacting one surface of the insulating layer, the semiconductor material having a resistivity of from about 500 to about 2,000 ohm-cm;
an electrode layer of a substantially transparent electrically conductive material contacting the opposite surface of the layer of insulating material; and
a plurality of electrode pairs contacting the semiconductor material on the side opposite the insulating layer.

5. The member of claim 1, wherein said semiconductor layer is of a thickness not greater than about 1 micron.

4,059,444

LIQUID DEVELOPMENT USING CONDUCTIVE INKS

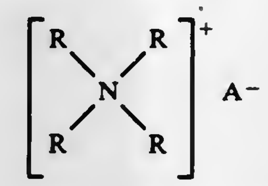
Chin H. Lu, Webster, and Richard A. Parent, Fairport, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 451,315, March 14, 1974, Pat. No. 3,904,936. This application July 19, 1976, Ser. No. 706,339

Int. Cl.² G03G *9/04, 13/10*

U.S. Cl. 96—1 LY **5 Claims**

1. A method for the development of latent electrostatic images on a photoconductive layer comprising applying to said latent image a conductive ink having a resistivity at 25° C of less than about 10^9 ohm-centimeters and a viscosity of about 50 to 1,000 centipoises at 25° C. and comprising about 0.1 to about 30 weight percent of a coloring agent capable of coloring said latent image when attracted thereto; about 0.05 to less than about 1.0 weight percent of a quaternary ammonium compound; about 5 to about 25 weight percent of a binder; about 1 to about 10 weight percent of a dispersing agent for said coloring agent; and the balance carrier, said quaternary ammonium compound being soluble in said carrier, said quaternary ammonium compound having the formula;



in which at least one R is a hydrocarbon having from about 1 to about 18 carbon atoms and each other R is a hydrogen or a hydrocarbon having from 1 to about 18 carbon atoms, and A is an anion.

4,059,445

NOBLE METAL IMAGE FORMING METHOD

Masamichi Sato, Asaka, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed July 30, 1975, Ser. No. 600,246

Claims priority, application Japan, Aug. 1, 1974, 49-88419

Int. Cl.² G03C *5/00, 7/00, 5/04, 5/26*

U.S. Cl. 96—35 **17 Claims**

1. A method for producing an image comprising, forming a silver image on a photographic material which comprises a glass substrate having thereon at least one silver halide emulsion layer having a binder comprising at least one material selected from the group consisting of gelatin, colloidal albumin, casein, a cellulose derivative, a saccharide derivative, a synthetic hydrophilic colloid, a modified gelatin, a gelatin derivative, or a synthetic high molecular weight material, either directly or on at least one subbing layer on the substrate, by imagewise exposing and developing said photographic material; replacing said silver image with a noble metal image by contacting said silver image with a toning solution containing a compound containing a noble metal having an ionization tendency smaller than the ionization tendency of silver, said noble metal being selected from the group consisting of gold, platinum, palladium, rhodium, iridium and ruthenium, and then subsequently heating after toning, the photographic material in an oxygen-containing gas to a temperature between about 350° to 600° C for a period sufficient to thermally decompose and substantially remove the organic components on the substrate.

4,059,446

PROCESSING OF PHOTOGRAPHIC SILVER HALIDE MATERIAL

Edwin Hendrik Hazenbosch, Mechelen; Antoine Roberta Van Rossen, Brustem; Roland Francois Beels, Linkebeek, and Marcel Frans Aelterman, Mortsel, all of Belgium, assignors to AGFA-GEVAERT N.V., Mortsel, Belgium

Filed Apr. 12, 1976, Ser. No. 676,006

Claims priority, application United Kingdom, Apr. 30, 1975, 18067/75

Int. Cl.² G03C *5/26, 5/38*

U.S. Cl. 96—50 R **10 Claims**

1. A method of rapid processing of black and white photographic silver halide material in a processing machine of the automatic type wherein the imagewise exposed photographic material is sequentially developed in a hardening developer, fixed in a thiosulphate or thiocyanate fixing solution, washed and dried, characterized in that the fixing medium and/or washing medium contains a polyoxyethylene compound of the formula:

$R—(OCH_2CH_2)_nOH$

wherein:

n is an integer of at least 12, and
R is an aliphatic group containing from 6 to 24 carbon atoms or an alkyl phenyl group comprising C_6–C_{24} carbon atoms in the alkyl chain or alkyl naphthyl comprising C_4–C_{10} carbon atoms in the alkyl chain.

4,059,447

PHOTOGRAPHIC MATERIAL CONTAINING OXAZOLINONE-2 COUPLERS

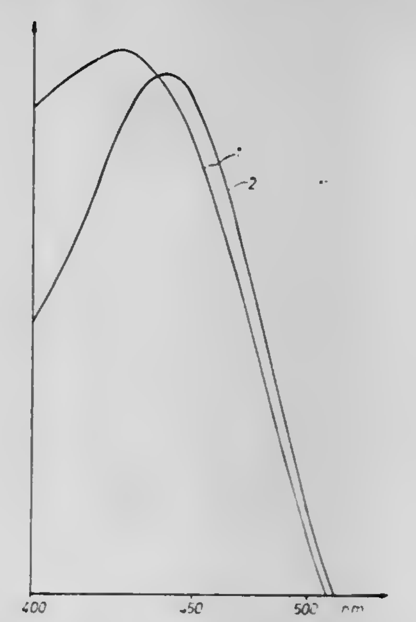
Ernst Meier, Munich; Hans Heinrich Credner, Hohenschaeftlarn; Wolfgang Lassig, Munich; Karl Küffner, Unterhaching, and Karl-Wilhelm Schranz, Odenthal-Hahnenberg, all of Germany, assignors to AGFA-Gevaert Aktiengesellschaft, Germany

Filed Dec. 23, 1975, Ser. No. 643,687

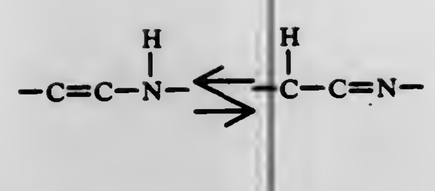
Claims priority, application Germany, Dec. 31, 1974, 2461949

Int. Cl.² G03C *7/00, 1/40*

U.S. Cl. 96—56.4 **9 Claims**



9. In the process for the production of photographic images by exposure and development of a light-sensitive photographic material containing at least one light-sensitive silver halide emulsion layer with an aromatic colour developer compound containing primary amino groups in the presence of a colour coupler that has a structural coupling moiety to which the oxidation product of a silver halide color developer couples to form a coupling product, the improvement according to which the color coupler is a monocyclic-1,3-oxazolinone-2-coupling color coupler having the tautomeric



structure.

4,059,448

DYE CONTAINING PHOTOGRAPHIC SENSITIVE ELEMENTS

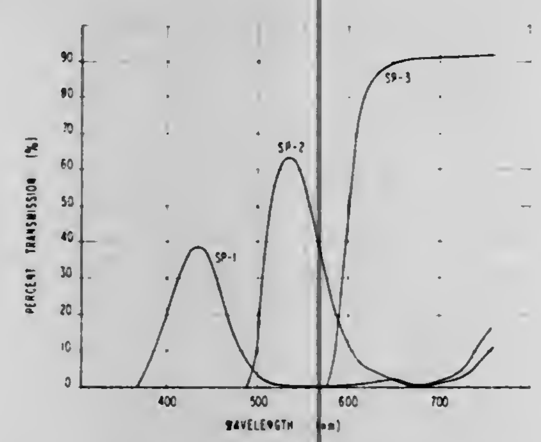
Masatoshi Sugiyama; Eiichi Kato, and Yasuharu Nakamura, all of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Sept. 12, 1975, Ser. No. 613,013

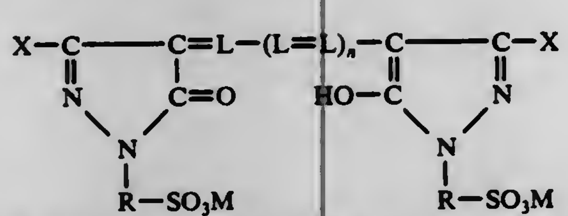
Claims priority, application Japan, Sept. 12, 1974, 49-105289

Int. Cl.[2] G03C *1/84*

U.S. Cl. 96—84 A **11 Claims**



1. A silver halide photographic light-sensitive element comprising at least one hydrophilic colloid layer which contains poly(2-diethylamino ethylmethacrylate), the poly(2-diethylamino ethymethacrylate) being a water-soluble high molecular weight material which has a basic residue in a main chain thereof or in a branch chain thereof and which is compatible with gelatin, the poly(2-diethylamino ethymethacrylate) being present in an amount of 80 to 800 mg/m² which is effective for mordanting, and at least one oxonal dye represented by the following formula (I):



wherein R represents a divalent aliphatic group; M represents a cation; L represents a methine group; *n* represents 0, 1 or 2, and -X represents a residue selected from the group consisting of —X[1], —CH_2X^1, —CONX[1], NHCOX[1], NHCONHX[1] or NHCSNHX[1], wherein X[1] represents a phenyl group, the at least one oxonol dye being present in an amount effective to photographically color the hydrophilic colloid layer.

4,059,449

PHOTORESIST CONTAINING A THIODIPROPIONATE COMPOUND

Thomas Francis Rosenkranz, Flemington, and Richard Joseph Himics, Skillman, both of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Sept. 30, 1976, Ser. No. 728,426

Int. Cl.[2] G03C *1/52, 1/68*

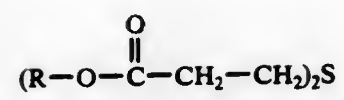
U.S. Cl. 96—91 D **13 Claims**

1. A photoresist composition comprising:

a. an alkali-soluble novolak resin

b. a naphthoquinone-(1,2)-diazide sulfonic acid ester sensitizer; and

c. a thiodipropionate compound of the formula



wherein R is an alkyl or alkenyl group having 6 to 24 carbon atoms and wherein the relative proportion of the thiodipropionate compound is from about 0.5 to 15 parts by weight per 100 parts by weight of the novolak resin.

4,059,450

DIRECT POSITIVE SILVER HALIDE ELEMENTS

Willy Joseph Vanassche, Kontich; Herman Alberik Pattyn, Kapellen, both of Belgium; Erik Moisar, and Sieghart Klotzer, both of Cologne, Germany, assignors to AGFA-GEVAERT N.V., Mortsel, Belgium

Filed Nov. 20, 1973, Ser. No. 417,499

Claims priority, application Germany, Dec. 8, 1972, 2260117

Int. Cl.[2] G03C *1/36, 1/28*

U.S. Cl. 96—101 **23 Claims**

1. Photographic material containing at least one direct-positive silver halide emulsion layer containing surface fogged silver halide grains selected from the group consisting of:

a. silver halide grains that are free of internal centers promoting the deposition of photolytic silver and have adsorbed to the surface of the grains an electron-accepting compound having an anodic polarographic half-wave potential and a cathodic polarographic half-wave potential which when added together give a positive sum, and

b. silver halide grains having a central silver halide core containing centers promoting the deposition of photolytic silver and a silver halide shell coated thereover,

wherein the silver halide grains have been precipitated so as to form in the silver halide grains (a) or in the silver halide shell of grains (b) an external shell of silver halide containing silver iodide in an amount up to 20 mole percent based on the silver halide of the external shell sufficient to provide an emulsion having improved sensitivity and which produces images of improved maximum density, the remainder of the silver halide grains being substantially free of silver iodide.

4,059,451

ELECTROLESS COPPER PLATING SOLUTION

Masahiro Oita, Kashiwara; Hyogo Hirohata, and Nobuhiro Hamasaki, both of Neyagawa, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Filed July 12, 1976, Ser. No. 704,618

Int. Cl.[2] C23C *3/02*

U.S. Cl. 106—1.26 **4 Claims**

1. An electroless copper plating solution comprising 0.001 to 0.30 mole/l of copper salt, 0.001 to 0.60 mole/l of a complexing agent for cupric ions, 0.0005 to 0.75 mole/l of a reducing agent to reduce cupric ions, 0.05 to 2.0 mole/l of alkali hydroxide, and 0.001 to 1.0 g/l of $R_fSO_2N(R')R(C_2H_4O)_mH$, wherein R_f is a perfluoroalkyl group containing 3 to 12 carbon atoms, R is an alkylene bridging group containing 1 to 12 carbon atoms, R' is a member selected from the group consisting of a hydrogen atom and an alkyl group containing 1 to 10 carbon atoms, and *m* is an integer of 1 to 15.

4,059,452

METAL SURFACE TREATMENT

Masanori Nishijima; Nobuyuki Oda, both of Yokohama, and Haruyoshi Terada, Tanashi, all of Japan, assignors to Oxy Metal Industries Corporation, Warren, Mich.

Filed Jan. 28, 1975, Ser. No. 544,616

Claims priority, application Japan, Jan. 28, 1974, 49-10960

Int. Cl.[2] C09D *5/08;* C23F *7/26*

U.S. Cl. 106—14 **6 Claims**

1. An aqueous composition suitable for imparting corrosion resistance to a metal surface comprising a hexavalent chromium compound and from 1 to 30 g/l of non-ionic surfactants of the formula

$RO(CH_2CH_2O)_nH$

wherein R = a saturated or unsaturated aliphatic radical of 5 to 25 carbon atoms, n = 2 to 30 and glycine in a concentration of from 1 to 50 g/l.

4,059,453

METHOD OF MAKING MOLDS FOR THE CASTING OF METALS

Werner Dittrich, Herten, Baden, and Friedhelm Schnippering, Troisdorf, both of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Troisdorf, Germany

Continuation of Ser. No. 510,831, Sept. 30, 1974, abandoned. This application May 12, 1976, Ser. No. 685,556

Claims priority, application Germany, Oct. 3, 1973, 2349593

Int. Cl.[2] B28B *7/34*

U.S. Cl. 106—38.3 **19 Claims**

1. In a process for making a multilayer mold comprising applying to a foundry mold form a first ceramic composition containing a refractory aggregate and a binder selected from the group consisting of an alcoholate of titanium, aluminum or zirconium and an alkyl silicate, hardening said first ceramic composition on said mold form to form a first layer and adding onto said first layer before said first layer has fully hardened a second ceramic composition in the form of a supportive backfill and hardening said second ceramic composition, the improvement comprising as said first ceramic composition,

A. A first refractory material of grain size 100 to 200 (Tyler) mesh and a second refractory material of 14 to 32 (Tyler) mesh, the volumetric ratio of said first refractory material being 1-2 : 1 and;

B. An anti-settling agent in an amount between 0.1 and 10 weight percent, said anti-settling agent selected from the group consisting of montmorillonite, bentonite, pyrogenic silica, asbestos flour, asbestos filaments, ethylcellulose, talc and mica.

4,059,454

GREEN COLORED GLASSES

Richard F. Reade, Corning, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Filed June 16, 1976, Ser. No. 696,582

Int. Cl.[2] C03B *32/00;* C03C *15/00, 3/22*

U.S. Cl. 106—39.7 **11 Claims**

1. A method for making a transparent green glass article containing crystallities in an amount of less than about 5% by volume, said crystallites consisting of nickel spinel, which consists of the steps of:

a. melting a batch for a glass having an overall composition selected from the group:

A. a glass consisting essentially, by weight on the oxide basis, of about 3–7.5% Li_2O, 18–28% Al_2O_3, 58–72% SiO_2, 0.3–4.5% NiO, 2.5–8% TiO_2, and 0–3% ZrO_2, the molar ratio of Al_2O_3 to the sum of all modifier ions being at least 0.95; and

B. a glass approximating the stoichiometry of carnegieite consisting essentially, by weight on the oxide basis, of about 10–20% Na_2O, 30–35% Al_2O_3, 35–40% SiO_2, 1–3% NiO, 4–8% TiO_2, 0–10% K_2O, and 0–3% ZrO_2, the molar ratio of Al_2O_3 to the sum of all modifier ions being at least 0.95;

b. simultaneously cooling said melt to at least below the transformation range threof and shaping a transparent glass article therefrom;

c. heating said transparent glass article to a temperature of at least about 675° C., but not more than about 900° C., for a period of time sufficient to cause the growth in situ of nickel spinel crystallites; and then

d. cooling said crystallized article to room temperature, said article being transparent with a green coloration.

4. A transparent green glass article containing crystallites in an amount of less than about 5% by volume, said crystallites consisting of nickel spinel, made in accordance with claim 1.

4,059,455

PRODUCTION OF FAST-SETTING BONDED AGGREGATE STRUCTURES

Robert W. Limes, Seven Hills, and Robert O. Russell, Fairview Park, both of Ohio, assignors to Republic Steel Corporation, Cleveland, Ohio

Filed June 17, 1976, Ser. No. 697,114

Int. Cl.[2] C04B *35/04*

U.S. Cl. 106—58 **6 Claims**

1. A method of making a fast-setting bonded aggregate structure, comprising the steps of

a. establishing a mixture of

i. an aggregate containing at least about 1% magnesia and

ii. ammonium phosphate in aqueous solution in an amount equal to at least about one part of P_2O_5 per 100 parts of said aggregate, the composition of said phosphates being between about 20% and 58% polyphosphates, balance orthophosphate;

b. disposing said mixture for setting, prompty after establishment thereof; and

c. allowing said mixture to set as thus disposed, while

d. continuously maintaining said mixture, throughout the performance of steps (a) and (b) and for at least the first several days of performance of step (c), in a situation of ambient atmospheric temperature not exceeding about 150° F.

4,059,456

COMPOSITION FOR ACCELERATING THE SETTING OF CALCINED GYPSUM AND THE PRODUCT FORMED THEREBY

Felix J. DeRooy, Plaster City; Thell D. Daniel, Plaster City; Erle C. Annes, Plaster City, and Billy G. Arnold, El Centro, all of Calif., assignors to United States Gypsum Company, Chicago, Ill.

Filed Oct. 21, 1975, Ser. No. 624,367

Int. Cl.[2] C04B *11/22, 11/24, 13/14, 11/14*

U.S. Cl. 106—114 **11 Claims**

1. A dry composition for accelerating the setting reaction of an aqueous slurry of calcium sulfate hemihydrate, comprising finely ground calcium sulfate dihydrate and a lignosulfonate, said lignosulfonate being present in an amount of from about 0.5 to about 99% by weight of said composition.

3. A composition according to claim 1, wherein said lignosulfonate has a wood sugar associated therewith.

4,059,457

CHITIN SOLUTION

Paul Rolland Austin, Wilmington, Del., assignor to The University of Delaware, Newark, Del.

Continuation-in-part of Ser. No. 659,280, Feb. 19, 1976. This application Sept. 30, 1976, Ser. No. 728,257

Int. Cl.[2] C09J *3/04*

U.S. Cl. 106—203 **3 Claims**

1. A solution of chitin in dimethylacetamide or N-methylpyrrolidone or mixtures of these amides in conjunction with a minor amount of lithium chloride.

4,059,458

OIL-IN-WATER EMULSION CONTAINING STARCH ESTERS

Felix Joseph Germino, Palos Park; Francis E. Kite, Riverside, and Edwin H. Christensen, Western Springs, all of Ill., assignors to CPC International Inc., Englewood Cliffs, N.J.

Division of Ser. No. 385,508, Aug. 3, 1973, abandoned, which is a continuation-in-part of Ser. No. 302,463, Oct. 31, 1972, abandoned. This application July 1, 1974, Ser. No. 485,049

Int. Cl.² C08L *3/06*

U.S. Cl. 106—213 **16 Claims**

1. A stable oil-in-water emulsion which comprises:

a. a continuous aqueous phase;

b. a discontinuous phase emulsified in said continuous phase comprising an oil or lipid; and

c. an emulsifying agent for maintaining said stable oil-in-water emulsion consisting essentially of a starch ester of at least one aliphatic carboxylic acid having 2 – 4 carbons having a degree of substitution of from about 0.05 to about 1.0.

4,059,459

LEAD CHROMATE PIGMENT WITH IMPROVED THERMAL STABILITY

James Francis Higgins, Livingston, N.J., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 561,436, March 24, 1975, abandoned. This application Oct. 7, 1976, Ser. No. 730,518

Int. Cl.² C09C *1/20, 3/06*

U.S. Cl. 106—298 **5 Claims**

1. A dense silica-coated chromate pigment prepared by the steps of

i. adding from 0.2% to 1% by weight of a soluble silicate compound, calculated as SiO_2 and based on the weight of the base lead chromate pigment, to an aqueous solution of a soluble salt of chromate and, optionally, at least one soluble salt selected from the group consisting of sulfate and molybdate,

ii. contacting the aqueous solution of step (i) with an aqueous lead salt to precipitate the base lead chromate pigment,

iii. treating the base lead chromate pigment with at least one hydrous metal oxide, and

iv. applying a coating of dense, amorphous silica to the treated lead chromate pigment of step (iii) in an amount from 2% to 40% by weight, calculated as SiO_2 and based on the weight of the dense silica-coated lead chromate pigment.

4,059,460

SOLID ANHYDROUS DEXTROSE

Charles E. Schollmeier, and Roger S. Leiser, both of Decatur, Ill., assignors to A. E. Staley Manufacturing Company, Decatur, Ill.

Filed Nov. 7, 1975, Ser. No. 629,739

Int. Cl.² C13K *1/10, 1/06*

U.S. Cl. 127—29 **12 Claims**

1. A process for preparing a solid, essentially free-flowing and non-compacting anhydrous, dextrose conversion syrup product from a dextrose conversion syrup having a dextrose content of at least 93% (dry substance weight basis), said process comprising the steps of:

A. preparing a molten dextrose conversion syrup concentrate having a dry weight solids content between 85% and 93% and a temperature in excess of 230° F. from the dextrose conversion syrup,

B. simultaneously shearing and cooling the concentrate to a temperature below 200° F. to form a more viscous but fluid dextrose conversion syrup mass,

C. depositing the fluid mass in a confining zone while maintaining the fluid mass at a solids level below 93% and the temperature above the dextrose hydrate crystallization temperature,

D. solidifying the fluid mass into a solid dextrose conversion syrup mass within the confining zone,

E. granulating the solid dextrose conversion syrup mass into a multiplicity of particles, and

F. dehydrating the dextrose conversion syrup particles to a water content of less than 2% by weight to provide a particulated, essentially free-flowing and non-compacting, anhydrous, dextrose conversion syrup product.

4,059,461

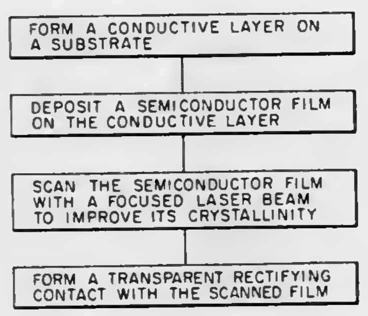
METHOD FOR IMPROVING THE CRYSTALLINITY OF SEMICONDUCTOR FILMS BY LASER BEAM SCANNING AND THE PRODUCTS THEREOF

John C. C. Fan, and Herbert J. Zeiger, both of Chestnut Hill, Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Dec. 10, 1975, Ser. No. 639,540

Int. Cl.² H01L *21/26*

U.S. Cl. 148—1.5 **34 Claims**



1. A method for improving the crystallinity of a semiconductor film by scanning it with a focused beam from a continuous wave laser having a wavelength at which the semiconductor film has an absorption coefficient sufficient to allow laser radiation to be absorbed over the semiconductor film thickness.

4,059,462

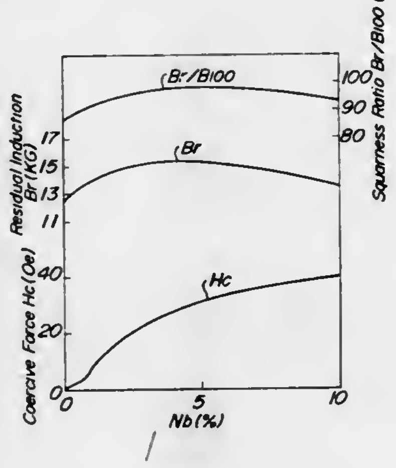
NIOBIUM-IRON RECTANGULAR HYSTERESIS MAGNETIC ALLOY

Hakaru Masumoto, Sendai; Yuetsu Murakami, Izumi, and Naoji Nakamura, Sendai, all of Japan, assignors to The Foundation: The Research Institute of Electric and Magnetic Alloys

Continuation-in-part of Ser. No. 536,635, Dec. 26, 1974, abandoned. This application Oct. 29, 1976, Ser. No. 737,053

Int. Cl.² C04B *35/00*

U.S. Cl. 148—31.55 **8 Claims**



1. A rectangular hysteresis magnetic material made of alloy consisting of 0.5 to 10% by weight of niobium and the balance of iron, said material being cold worked and then heat treated and having a coercive force of more than 2 oersteds, a residual induction of more than 12600 gauss and a squareness ratio of more than 80%.

4,059,463

PROCESS FOR PRODUCING FERROMAGNETIC POWDER

Masashi Aonuma; Tatsuji Kitamoto, and Goro Akashi, all of Odawara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-Ashogara, Japan

Continuation-in-part of Ser. No. 326,358, Jan. 24, 1973, abandoned, which is a continuation of Ser. No. 552,013, Feb. 24, 1975, abandoned. This application June 7, 1976, Ser. No. 693,669

Claims priority, application Japan, Jan. 27, 1972, 47-10389

Int. Cl.² H01F *1/02*

U.S. Cl. 148—105 **18 Claims**

1. A process for producing a ferromagnetic powder which comprises:

a. preparing an aqueous solution by (a) adding metal salts, hypophosphite ions, and precious metal ions to water; said metal salts consisting essentially of salts of nickel or cobalt or both, said metal salts also including salts of metals wherein the metal is selected from the group consisting of La, Ce, Nd, Sm, Al, S, Cr, Mn, Fe, Cu and Zn in an amount of 0 – 10% by weight of the total salts used; the concentration of total salts in the aqueous solution being in the range of 0.001 to 1 mole per liter and adjusting the pH to greater than 5, (b) adding an organic solvent to the aqueous solution at the same time said metal salts, hypophosphite ions and said precious metal ions are added to said water or up to the time immediately after the commencement of a hydrogen gas evolution which accompanies the reaction of said metal salts and hypophosphite ions; said organic solvent being non-reactive with the metal salts or hypophosphite ions, said organic solvent having a melting point lower than 65° C;

2. reacting and reducing the metal salts with the hypophosphite ions to form a precipitate by heating the aqueous solution to a temperature of 65° to 95° C, applying a pressure of 0.5 to 5 atmospheres, and subjecting the aqueous solution to a magnetic field of from 10 to 10,000 oe;

3. collecting the precipitate obtained in (2); and

4. washing the precipiate of (3).

4,059,464

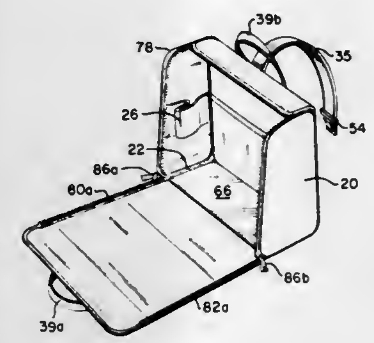
METHOD OF MAKING FOLD-OUT ZIPPER BAG

Thomas L. Geller, Colts Neck, and Harold Rabinowitz, Lakewood, both of N.J., assignors to Dart Industries Inc., Los Angeles, Calif.

Division of Ser. No. 625,980, Oct. 28, 1975, Pat. No. 3,994,372. This application Sept. 20, 1976, Ser. No. 724,444

Int. Cl.² B32B *1/10;* **A45C** *7/00;* **B32B** *31/20*

U.S. Cl. 156—66 **5 Claims**



1. A method of making a zipper bag including the steps of:

A. producing a cover subassembly comprising:

1. providing a generally rectangular cover sheet of thermoplastic material;

2. securing a rigid base board to the middle of said cover sheet;

B. producing a liner subassembly comprising:

1. providing a liner sheet of thermoplastic material;

2. securing rigid inserts adjacent the ends of said liner sheet;

C. producing a body panel by superimposing said liner subassembly with said cover subassembly on a flat surface and bonding together the edges of said liner subassembly and said cover subassembly;

D. securing one-half of two zipper means along each longitudinal edge of said body panel;

E. producing two end panels by consolidating two multilayer assemblies each comprising a rigid insert between a cover sheet and a liner sheet and bonding the edges of said sheets together;

F. securing a corresponding half of each of said two zipper means about the circumference of each of said end panels; and,

G. connecting each of said end panels to the edges of said body panel by fastening together each of the corresponding zipper halves.

4,059,465

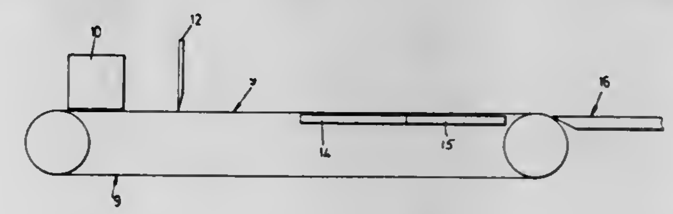
METHOD OF FORMING CARPET TILES

John B. Edgar, 9 Eastwood Ave., Giffnock, Glasgow, and Peter W. Bell, 66 Lomond Crescent, Beith, both of Scotland

Filed Jan. 9, 1973, Ser. No. 322,158

Int. Cl.² B32B *5/02*

U.S. Cl. 156—72 **3 Claims**



1. A method of forming carpet tiles comprising the steps of doctoring a layer of predetermined thickness of thermo-plastics material onto a carrier sheet, laying a piece of carpeting to be coated on said layer, the carpet piece being dimensionally only slightly larger than the desired carpet tile, applying heat to said layer so as to bond the layer of thermo-plastics material to said carpet piece, cooling the bonded layer and carpet piece so as to form a coated carpet piece, stripping the carrier sheet from the coated carpet piece and trimming waste from the periphery of the bonded carpet piece so as to form a carpet tile, and supporting the carrier sheet on a substantially flat surface during said heating and cooling steps whereby the carpet piece is maintained in a substantially flat and relaxed condition and the warps and wefts of the carpet piece do not support the weight of the carpet piece.

4,059,466

HOT MELT THERMOPLASTIC ADHESIVE FOAM SYSTEM

Charles H. Scholl, Vermilion; John R. Janner, Jr., Lorain; William C. Stumphauzer, Elyria, and Duane O. Shuster, Avon Lake, all of Ohio, assignors to Nordson Corporation, Amherst, Ohio

Filed Aug. 2, 1976, Ser. No. 710,378

Int. Cl.² B32B *5/18*

U.S. Cl. 156—78 **14 Claims**

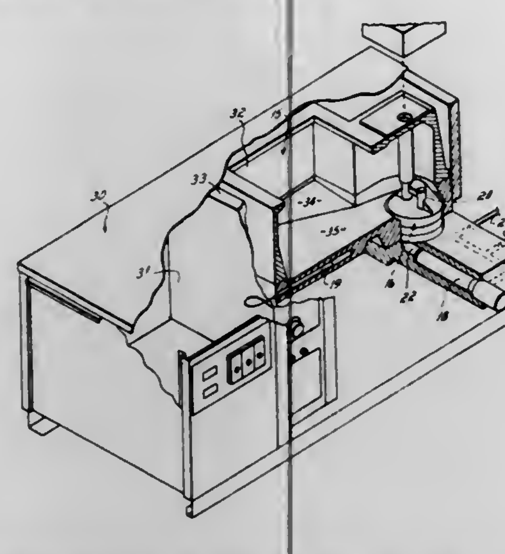
1. The method of bonding with a hot melt thermoplastic adhesive foam which comprises,

heating solid thermoplastic adhesive and a blowing agent so as to create a gaseous containing hot melt adhesive in a liquid state,

pressurizing the mixture of liquid and gas so as to force the gas into solution with the liquid adhesive,

dispensing the liquid and gas solution at a pressure less than the solution maintenance pressure of said gas and adhesive

solution whereby said gas is released from solution and forms a hot adhesive foam, and



compressing said hot adhesive foam between two substrates to force gas from the foam and to form a bond between said substrates.

4,059,467

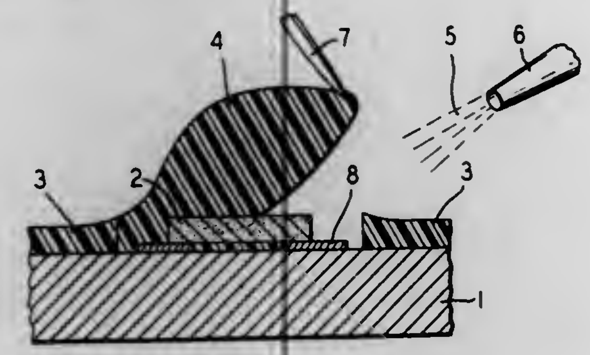
METHOD FOR REMOVAL OF ELASTOMERIC SILICONE COATINGS FROM INTEGRATED CIRCUITS

Ralph Gustavus Mancke, Bethlehem, and Nicholas Alec Soos, Macungie, both of Pa., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Sept. 27, 1976, Ser. No. 727,057

Int. Cl.^{2} B29B *3/00*

U.S. Cl. 156—80 **8 Claims**



1. In the fabrication of circuits on an insulating substrate, a method for removal of cured elastomeric encapsulants having a greater adhesive strength than cohesive strength from said substrate comprising the steps of:

defining the region of encapsulant to be removed by cutting through said encapsulant at the boundaries of said region;

cooling the region of said encapsulant such that the cohesive strength of the encapsulant becomes greater than its adhesive strength; and

peeling off the encapsulant in said region.

4,059,468

METHOD OF MANUFACTURE OF PARTS OF THREE-DIMENSIONAL FABRICS

Bernard Bouillon, Nozay, France, assignor to Commissariat a l'Energie Atomique, Paris, France

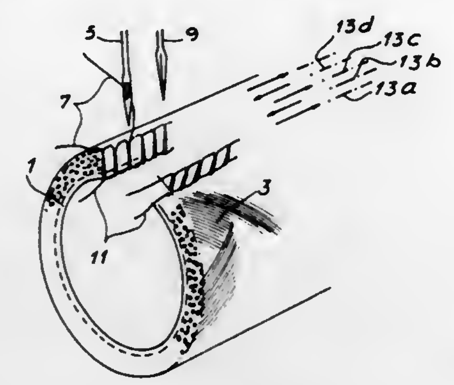
Filed Feb. 1, 1977, Ser. No. 764,654

Claims priority, application France, Feb. 3, 1976, 76.02943

Int. Cl.^{2} B32B *7/08*

U.S. Cl. 156—93 **8 Claims**

1. A method of manufacture of parts of three-dimensional fabrics of the type which consists in successively stacking layers of bidimensional fabrics or layers of parallel threads extending alternately from one layer to the next in a first direction and in a second direction, and sewing the stack thus formed in parallel lines by means of a thread which extends in a third direction, wherein said layers are stacked on a support of pyrolyzable material, wherein the stack of said layers and said support are sewn by means of the thread which extends in the third direction and wherein the assembly thus obtained is subjected to a temperature within the range of 800° C to 1200°



C in the presence of a stream of gaseous hydrocarbon in order to pyrolyze the material which constitutes said support and in order to deposit pyrolytic graphite or carbon on the threads which form said three-dimensional fabric.

4,059,469

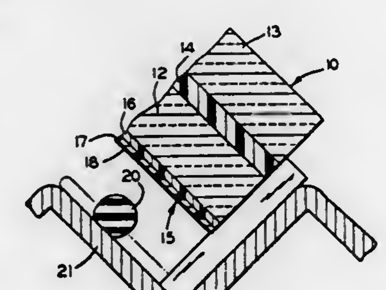
GLAZING UNITS, METHODS OF MAKING THE SAME AND ADHESION PROMOTERS THEREFOR

Paul T. Mattimoe, Toledo; Theodore J. Motter, Genoa; John J. Hofmann, and Siegfried H. Herliczek, both of Toledo, all of Ohio, assignors to Libbey-Owens-Ford Company, Toledo, Ohio

Continuation-in-part of Ser. No. 438,659, Feb. 1, 1974, abandoned, which is a continuation-in-part of Ser. No. 284,137, Aug. 28, 1972, abandoned. This application Jan. 5, 1976, Ser. No. 646,464

Int. Cl.^{2} B32B *9/04, 13/04*

U.S. Cl. 156—108 **11 Claims**



1. A transparent, temperature stable, glazing structure for automobiles that is free of apparent distortion and birefringence color; comprising the combination, with a surface of glass that is to become the inboard glass surface when said glazing structure is mounted in an automobile, of a relatively soft and extensible penetration resistant protective plastic cover on said surface that includes a layer of relatively high adhesion plastic selected from the group consisting of polyvinyl butyral, ionomer resin, polyurethane and polyvinyl chloride, heat and pressure laminated to said inboard glass surface of said structure, a more durable layer of stretched plastic selected from the group consisting of polyethylene terephthalate, polyurethane, cellulose triacetate, fluorinated copolymers of ethylene and propylene, copolymers of acrylic acid esters, and polyvinyl fluoride arranged with its major axis of stretch at right angles to the horizontal dimension of said glazing structure on said relatively high adhesion plastic layer, and a relatively harder abrasion resistant coating layer ½ to 14 mils thick selected from the group consisting of (a) mixtures of polysilicic acid and copolymers of fluorinated monomers with compounds containing alcohol groups, (b) hydrolysis and condensation products of methyltriethoxy silane and (c) a mixture of hydrolysis and condensation products of methyltriethoxy silane and polysilicic acid on said more durable layer of stretched plastic; and an adhesion promoter comprising a solution of a reaction product of a film forming resin with a compound capable of hydrolysis followed by condensation on a surface of one of said last mentioned layers.

4,059,470

APPARATUS AND METHOD FOR TRANSFERRING A MATERIAL FROM A CARRIER MEANS TO A SHEET MEANS

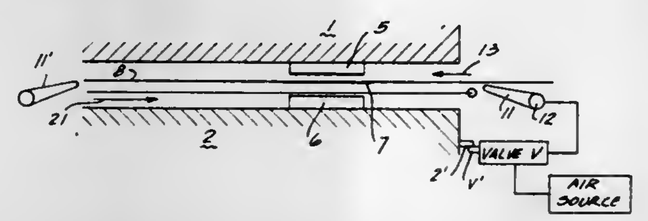
Otto Hubert Jan Primavesi, Offenbach am Main, Germany, and Alexander Primavesi, deceased, late of Offenbach am Main, Germany (by Dagmar Charlotte Primavesi, legal representative), assignors to J. Bobst et Fils S.A., Switzerland

Continuation-in-part of Ser. No. 693,624, Dec. 26, 1967, abandoned. This application Mar. 10, 1972, Ser. No. 233,638

Claims priority, application Switzerland, Dec. 27, 1966, 18789/66

Int. Cl.^{2} B44C *1/00*

U.S. Cl. 156—238 **6 Claims**



1. An apparatus for transferring material from one member to another comprising:

first and second means relatively reciprocable towards each other to clamp said members therebetween and effect transfers of said material from said one member to the other in sequential operations, and

separating means including means to inject a hot gaseous fluid between said members after each transfer and including means to heat said fluid.

4,059,471

TRANSFER DYEING OF PLASTIC SURFACES WHICH MAY BE COMBINED WITH LAMINATION OR MOLDING PROCEDURES

John M. Haigh, 102 Bay View Ave., Salem, Mass.

Filed Jan. 13, 1975, Ser. No. 540,383

The portion of the term of this patent subsequent to Jan. 14, 1992, has been disclaimed.

Int. Cl.^{2} B29C *5/06;* **B32B** *31/12;* **B41C** *1/06;* **D06P** *1/16*

U.S. Cl. 156—244 **19 Claims**

1. A method for transferring dye patterns to dye receptor plastic web comprising, interposing a polyolefin carrier web between a transfer web containing dispersed dyes and said dye receptor plastic web, pressing said webs together to obtain close contact therebetween; heating the pressed webs to a sublimation temperature for the dyes; maintaining said webs at said temperature until a substantial portion of said dyes have sublimed and transferred through said polyolefin web to said dye receptor web; cooling said webs below the softening temperature of the dye receptor web and separating the dye receptor web from the other webs.

7. A method for dye transfer and lamination of webs comprising interposing a polyolefin dye carrier web between a transfer web containing dispersed dyes and a plastic dye receptor web; placing a laminating web adjacent said dye receptor web on the reverse side thereof; pressing all of said webs together at a laminate pressure for said dye receptor web and said laminating web; heating the pressed webs to a sufficient temperature for sublimation of said dyes and for lamination of said dye receptor web and said laminating web, cooling the pressed materials to complete said lamination, releasing said pressure and separating the resulting laminate of dye receptor web and laminating web from the dye transfer web and the polyolefin carrier web.

15. A method for in-mold dye penetration and decorating of plastic articles comprising placing a dye transfer web, a polyolefin dye carrier web and a dye receptor web in said mold such that the dye carrier web is between the other webs, closing the mold, applying sufficient heat and pressure to force said dye receptor web into close contact with said dye carrier web and any adjacent mold walls, said heat being also sufficient to cause the dyes in the dye transfer web to sublime through said dye carrier web to penetrate and decorate the adjacent surfaces of said dye receptor web, to thus mold and decorate a plastic article, cooling said article below its softening point and opening said mold to eject the molded and decorated article.

4,059,472

COATED PRODUCTS

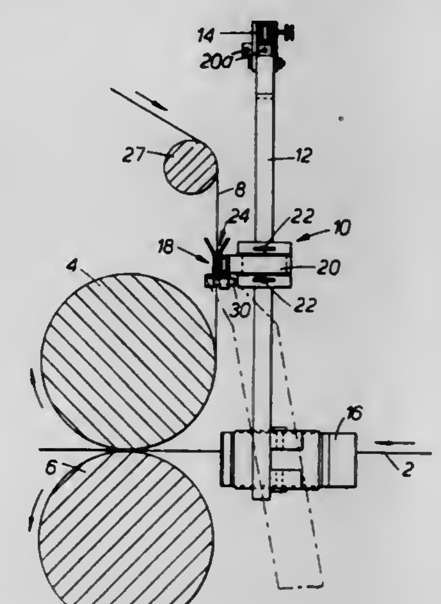
Ralph G. Timms, Wirral, England, assignor to British Steel Corporation, London, England

Filed Apr. 19, 1976, Ser. No. 677,867

Claims priority, application United Kingdom, Apr. 30, 1975, 18018/75

Int. Cl.^{2} B32B *31/00;* **B26D** *5/00, 5/38*

U.S. Cl. 156—259 **20 Claims**



1. A method for producing coated strip by continuously applying a film of the coating to the moving strip and trimming at least one edge of the film before it makes contact with the strip by means which are responsive to the position of the adjacent strip edge.

4,059,473

PRIMER COMPOSITIONS

Takehide Okami, Annaka, Japan, assignor to Shin-Etsu Chemical Company Limited, Tokyo, Japan

Filed May 25, 1976, Ser. No. 689,913

Claims priority, application Japan, May 29, 1975, 50-64762

Int. Cl.^{2} C09J *5/02*

U.S. Cl. 156—308 **10 Claims**

9. A method for adhesively bonding a room-temperature-curing silicone rubber elastomer to a substrate which comprises applying to the surface of the substrate a primer composition consisting essentially of (1) 2 to 98 parts by weight of a mercapto-containing organosilane or organopolysiloxane represented by the average unit formula

$$(HS-E^1)_a(R^2)_b(X)_cSiO_{\frac{4-a-b-c}{2}}$$

where R^1 is an alkylene group having 1 to 4 carbon atoms, R^2 is a substituted or unsubstituted monovalent hydrocarbon group, X is a hydroxy or hydrolyzable atom or group and *a, b,* and *c* have values as expressed by $0<a\leqq 1$, $0\leqq b\leqq 1$ and $0<c\leqq 3$, respectively, with the proviso that $a=b=c$ has the value as expressed by $0<(a+b+c \leqq 4$ and (2) 98 to 2 parts by

weight of a titanic acid ester, contacting the uncured elastomer with the thus primed surface, and subjecting the thus contacted elastomer to curing conditions.

4,059,474

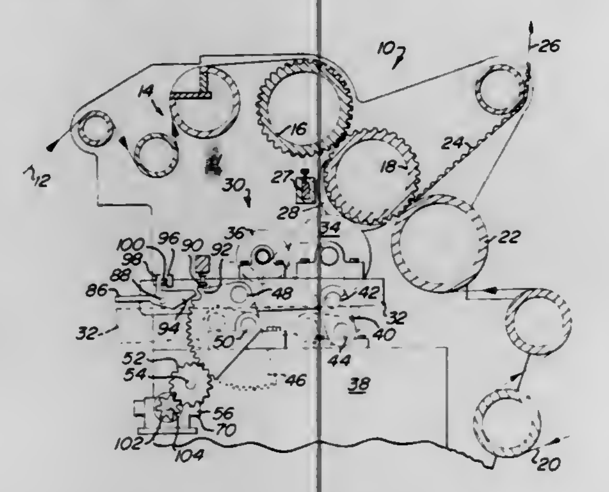
GLUE MECHANISM

Robert E. Coburn, Warminster, Pa., assignor to Molins Machine Company Inc., Cherry Hill, N.J.

Filed May 10, 1976, Ser. No. 684,607

Int. Cl.^{2} B05C *1/08;* **B31F** *1/28*

U.S. Cl. 156—356 **15 Claims**



1. A mechanism for applying a liquid to a moving web comprising a pan for containing a supply of the liquid, a support structure pivotably supporting said pan by a parallelogram link means on opposite ends of the pan for movement between operative and inoperative positions, each of said link means including a discrete segment gear and a link, and actuator means including a shaft below the elevation of said mechanism, a pair of pinions on said shaft for rotation therewith, each pinion being meshed with a discrete segment gear on opposite ends of the pan for simultaneously rotating said discrete segment gears to thereby move said pan between its operative and inoperative positions.

4,059,475

COMBINED MOUNTING AND PROJECTION APPARATUS FOR APERTURE CARDS

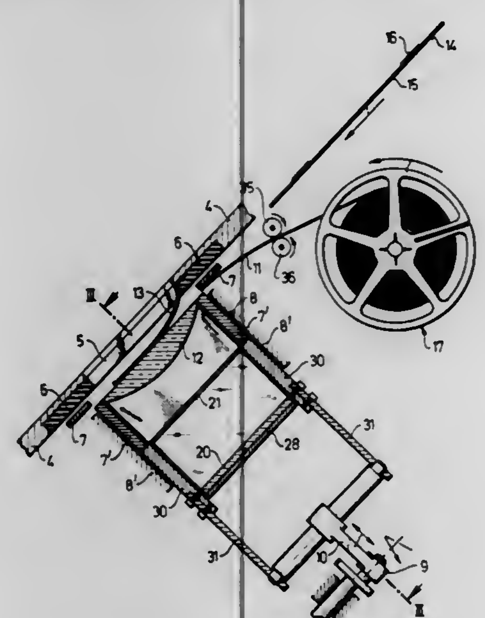
Wolfram Gernhardt, Tubingen; Gerhard Meier-Maletz, Wiesbaden-Biebrich, and Heinz Zeutschel, Tubingen, all of Germany, assignors to Hoechst Aktiengesellschaft, Germany

Filed Mar. 18, 1975, Ser. No. 559,537

Claims priority, application Germany, Mar. 20, 1974, 2413368

Int. Cl.^{2} B32B *31/00;* **B26D** *7/00;* **G03B** *21/00*

U.S. Cl. 156—379 **3 Claims**



1. A mounting apparatus for aperture cards comprising cutting means for severing individual filmed images from a strip of film, said cutting means including a knife unit and a counter-knife unit, said knife unit being part of a plunger means having an edge facing the filmed image, and said plunger means serving to first sever and then to press the severed filmed image upon a mounting card,

resilient counter-pressure frame means mounted opposite said plunger means,

projection means including a light source, a condenser lens and an objective lens, forming an optical path, an opening in said plunger means positioned in said path,

said condenser lens having a flat surface and being mounted in a portion of the plunger means facing the filmed image, the edge of the plunger means facing the filmed image being flush with said flat surface of said condenser lens,

whereby said flat surface and said edge of said plunger together form a pressing means for the filmed image.

4,059,476

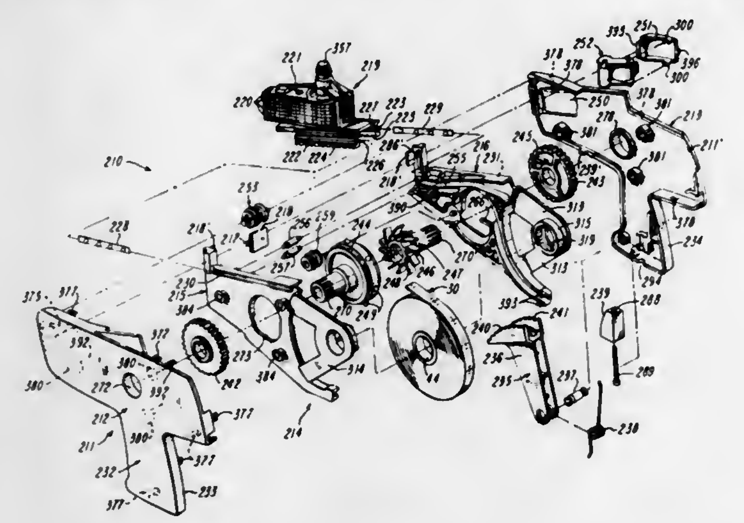
LABEL PRINTING AND APPLYING APPARATUS

Paul H. Hamisch, Jr., Franklin, Ohio, assignor to Monarch Marking Systems, Inc., Dayton, Ohio

Division of Ser. No. 449,111, March 7, 1974, abandoned, which is a division of Ser. No. 312,454, Dec. 6, 1972, Pat. No. 3,968,745, which is a continuation-in-part of Ser. No. 208,035, Dec. 8, 1971, abandoned. This application Jan. 23, 1976, Ser. No. 651,750

Int. Cl.^{2} B41F *1/02*

U.S. Cl. 156—384 **5 Claims**



1. A hand-held label printing and applying machine for printing and applying pressure sensitive labels carried on a web of supporting material, comprising: a housing having a handle and a first arcuate bearing surface, printing means, a delaminator downstream of the printing means, feeding means engageable with the web downstream of the delaminator for drawing the web to effect delamination of labels by the delaminator, an applicator for applying the labels, means including an actuator disposed at the handle and movable away from and toward an initial position for operating the printing and feeding means in sequence, the actuator having a second arcuate bearing surface, and a spring assembly disposed in the housing and comprising a sleeve, a plunger slidably received in the sleeve and a captive spring disposed within the sleeve and acting on the sleeve and on the plunger for exerting forces on both the handle and the actuator to effect return of the actuator to its initial position, and means for limiting the extent to which the sleeve and plunger can move apart to prevent the parts from separating and releasing the spring during assembly or disassembly of the machine, the limiting means including a snap-lock connection including a resilient member, wherein one of the sleeve and the plunger has an integrally formed bearing surface cooperable with the first bearing surface and the other of the sleeve and the plunger has an integrally formed bearing surface cooperable with second bearing surface.

4,059,477

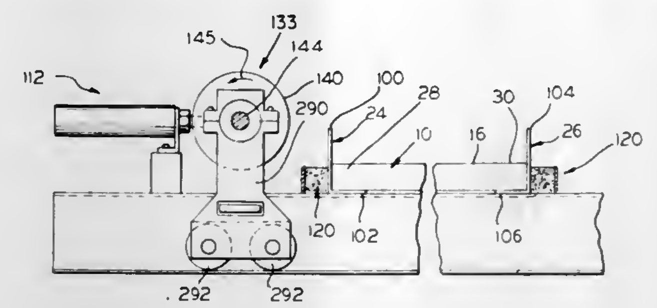
BOX END LABELING APPARATUS

John George Wesley, Forest Park, Ill., assignor to Labelette Company, Forest Park, Ill.

Filed May 26, 1976, Ser. No. 690,259

Int. Cl.^{2} B32B *3/04*

U.S. Cl. 156—479 **4 Claims**



1. A machine for simultaneously overlabeling both ends of a box of parallelipiped configuration, said machine comprising:

a processing way having entrance and exit ends,

means for conveying the box to be labeled longitudinally of said way including means for disposing the box to extend transversely of said way whereby the box ends project to either side of said conveying means,

said way including a labeling station and a label folding station in spaced apart relation therealong,

a label supply station for each box end and means for feeding a label from the respective label supply stations to said labeling station,

said label supply stations and said label feeding means for each box end being located relative to said conveying means to dispose the labels for each box end to have one end of same projecting toward the way and underlying the path of movement that the box end to be labeled thereby has when the box is moved along said way by said conveying means, and to have the other end of same project laterally of said way and said path endwise of the box end and away from said way and beyond said path, whereby the labels for each box end extend transversely of said way,

said labeling station including means for applying glue to the underside of the respective labels when received from said label supply station and means for rolling the respective said one ends of the respective labels onto the underside of the box at either end of same as the box is moved through said labeling station,

said label folding station including means for consecutively wiping the respective labels flush against said box ends for adhering same thereto, and for wiping the labels flush against the top side of the box for adhering same thereto,

said means for wiping the respective labels flush against said box ends comprising for each box end comprising:

a vertically movable wiping member mounted for reciprocating movement between a retracted position below the level of said paths to an elevated position projecting above the level of said paths,

said label folding station further including for each wiping member a generally planar pressure panel disposed vertically and paralleling said way,

said panels being respectively mounted and positioned in vertical alignment with and beneath the respective paths of movement of the respective box ends and defining rectilinear top edges horizontally disposed and substantially aligned with the level of the underside of the box when the box is positioned at said label folding station between said panels,

said wiping members each including a resiliently compressible pad defining a sliding wiping surface disposed to bear compressively against the respective panels when said wiping members are in their retracted positions, and to bear compressively against the respective box ends when said wiping members are in their elevated positions,

means for moving said wiping members between their said positions for slide wiping the respective labels flush against said box ends when the box is at said label folding station,

means for holding the box that is at said label folding station against vertical movement on movement of said wiping members to their said elevated positions,

said means for wiping the respective labels flush against the top side of the respective boxes at said label folding station comprising for each box end to be labeled:

a horizontally movable roller mounted for reciprocating movement in a plane level with the level of the top sides of the boxes, as they are disposed along the path of movement of the respective box ends, between a retracted position to one side of the way and an extended position overlying the way wherein said rollers ride on the top sides of the respective boxes when at said label folding station,

and means for reciprocating said rollers between said positions for wiping the respective labels against the top sides of the respective boxes.

4,059,478

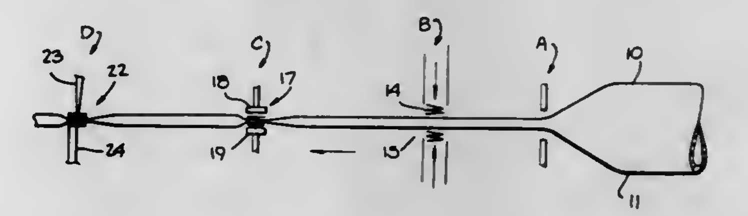
APPARATUS FOR BONDING LAYERS OF RESINOUS MATERIAL

Louis S. Hoffman, Evans Farm Road, Morristown, N.J. 07960

Division of Ser. No. 457,714, March 25, 1974, Pat. No. 3,956,045, which is a continuation of Ser. No. 210,523, Dec. 21, 1971, abandoned. This application Mar. 10, 1976, Ser. No. 665,723

Int. Cl.^{2} B32B *31/00*

U.S. Cl. 156—510 **10 Claims**



1. Apparatus for bonding adjacent portions of films of polyester resinous material to one another by means of at least one layer of polyester resinous material adjacent thereto comprising:

a. first means for supporting and advancing at least two films of polyester resinous material to be bonded to one another at a predetermined location, a portion of one surface of one film of polyester resinous material being supported contiguous with a portion of one surface of the other film of polyester resinous material for forming an interface between the contiguous portions,

said first means advancing said two films of polyester resinous material intermittently to said predetermined location at which said two films are to be bonded,

b. second means for supporting and advancing at least one layer of polyester resinous material adjacent the other surface of at least one of the films of polyester resinous material with a portion of the layer being contiguous with the other surface,

said second means being disposed adjacent to said predetermined location for advancing a web of polyester resinous material from a source thereof and across the portions of the films to be bonded to one another, the web of polyester resinous material forming said layer of resinous material,

said second means advancing said web of polyester resinous material along a line at which said two films are to be bonded, said second means advancing said web of polyester resinous material in synchronism with said first means, thereby placing said web at said predetermined location during the intermittent placement of said two films to be bonded at that location,

c. means for compressing the contiguous portions of the

films of polyester resinous material and the contiguous portion of each layer of polyester resinous material against one another, and

d. means for applying energy through at least one layer of polyester resinous material to the contiguous portions of the films of polyester resinous material sufficient to bond the films of polyester resinous material to one another, the energy being applied while the two films are compressed by the compressing means.

4,059,479

METHOD OF FORMING AN EMBOSSED PATTERN

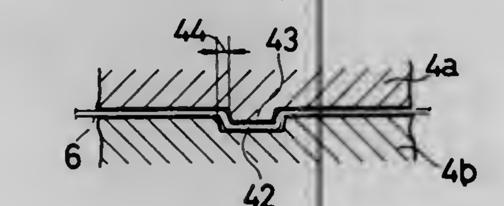
Hisaji Tanazawa, 8-4 Hanazono Higashimachi 1-chome, Higashi, Osaka, Japan

Continuation of Ser. No. 433,472, Jan. 15, 1974, abandoned. This application July 1, 1976, Ser. No. 701,998

Claims priority, application Japan, Aug. 10, 1973, 48-90436

Int. Cl.² C23F *1/02*

U.S. Cl. 156—640 **1 Claim**



1. A method of forming an embossing pattern which is comprised of providing on one of a pair of working surfaces, a soluble light sensitive coating which turns insoluble under exposure, while on the other, providing an insoluble light sensitive coating which turns soluble under exposure placing on one of the working surfaces, a transparent mask on which a predetermined pattern coordinated to an etching pattern is transparently or opaquely expressed and is closely fitted onto the light sensitive coating, while on the other working surface, another transparent mask of the same type on which the aforementioned pattern is symmetrically expressed is similarly closely fitted; then, exposing each working surface such that on one working surface, the pattern coordinated to that to be embossed is drawn positive with an acid-resistant coating, while on the other working surface, another pattern symmetrical and identical in size to the aforementioned pattern is drawn negative, thereafter, both working surfaces are subjected respectively to an etching treatment, thereby forming a concavity and a convexity corresponding to the patterns of the acid-resistant coatings, while etching treatment is applied such that a predetermined etching is produced on the sides of the concavity and the convexity, so that an appropriate clearance may be formed between the side surfaces of the said coordinated concavity and convexity.

4,059,480

METHOD OF FORMING VIADUCTS IN SEMICONDUCTOR MATERIAL

Wolf-Dieter Ruh, and Gerhard Trippel, both of Sindelfingen, Germany, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Sept. 29, 1976, Ser. No. 727,831

Claims priority, application Germany, Feb. 9, 1976, 2604939

Int. Cl.² B23P *15/00, 25/06;* **B44C** *1/22*

U.S. Cl. 156—644 **12 Claims**

1. A method of forming viaducts in semiconductor devices consisting of two layers by forming the viaducts in said two layers successively, and

said semiconductor devices are characterized by

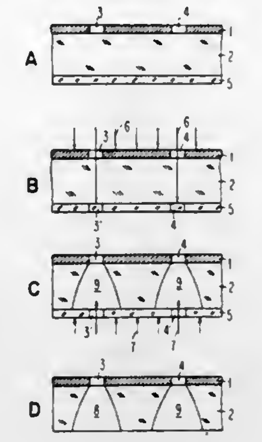
a first layer comprising a material that is impervious to radiation of a predetermined wavelength range, and a second layer comprising a material that is pervious to that radiation,

further comprising the steps of

forming a viaduct in said first layer,

coating the outer side of said second layer with positive working photoresist,

exposing said photoresist through said viaduct in said first



layer for forming an aperture in said coating aligned with the viaduct in said first layer, and

etching the viaduct in said second layer through said aperture formed in said exposed photoresist.

4,059,481

METHOD OF MAKING AN INTAGLIO HALFTONE GRAVURE PRINTING PLATE

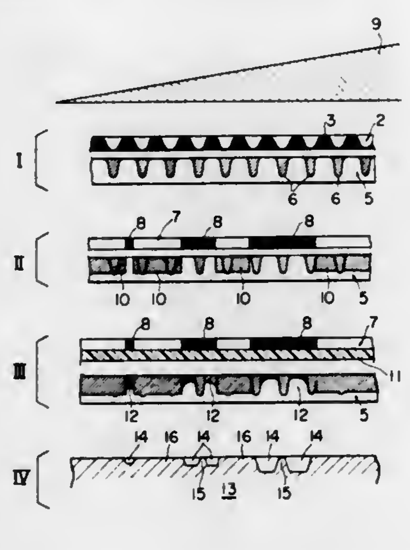
Katsusuke Nagano, Mitaka, Japan, assignor to Dai Nippon Insatsu Kabushiki Kaisha, Tokyo, Japan

Filed July 12, 1976, Ser. No. 704,405

Claims priority, application Japan, July 14, 1975, 50-85993; Mar. 22, 1976, 51-31011

Int. Cl.² G03F *7/02*

U.S. Cl. 156—660 **12 Claims**



1. A method of making an intaglio halftone gravure printing plate comprising the steps of:

contact-printing onto a sensitized carbon tissue a contact screen including a grid-like arrangement of minute dark dots each having the shape of a square rounded off at the four corners with a vignetted periphery and having densities tapering from a maximum value of 3.0 at the central part to a minimum value of 0.1 at the periphery;

contact-printing in registration a halftone positive onto the carbon tissue;

superposing a light diffusion sheet and the halftone positive on the carbon tissue in the order named, and contact-printing in registration the light diffusion sheet and the halftone positive combinedly onto the carbon tissue;

said steps being carried out in any desired order;

applying the thus treated carbon tissue to a printing plate to develop the tissue thereon; and

etching the printing plate to obtain the halftone gravure printing plate.

4,059,482

PAPER MACHINE PICKUP AND CREPE-SETTING PRESS SECTION

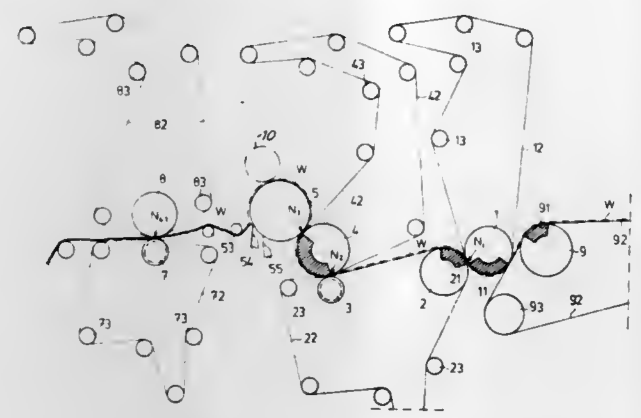
Matti Kankaanpää, Espoo, Finland; Ragnar Nylund, Taby, Sweden, and Yrjo Reijonen, Jyvaskyla, Finland, assignors to Valmet Oy, Finland

Filed Sept. 24, 1975, Ser. No. 616,244

Claims priority, application Finland, Sept. 27, 1974, 742844

Int. Cl.² D21F *3/04*

U.S. Cl. 162—281 **8 Claims**



1. In a pickup and press section of a paper machine, suction pickup roll and felt means for transferring a web away from a wire while supporting the web during transfer thereof, first suction press roll and felt means situated next to said suction pickup roll and felt means and defining therewith a first press nip to which the web is transferred by said suction pickup roll and felt means while being continuously supported thereby, second suction press roll and felt means and a lower roll and felt means situated next to said second suction press roll and felt means for defining therewith a second press nip, said lower roll of said lower roll and felt means at said second press nip having a recessed exterior surface and said felt means of said lower roll and felt means at said second press nip and said first suction press roll and felt means at said press nip being formed by a felt common to said first suction press roll and said lower roll at said second press nip, and said common felt supporting the web as it travels beyond said first press nip to said second press nip, first plain press roll means situated next to said second suction press roll and felt means and defining therewith a third press nip, said second suction press roll and felt means transferring the web beyond said second press nip to said third press nip while continuously supporting the web, whereby the web after being picked up by said suction pickup roll and felt means travels with closed conduction through at least three press nips the first two of which are double-felted while the third is single-felted, thus avoiding open draw of the web at least up to said third press nip, and conveyor means formed in part by said first plain press roll means for conveying the web beyond said third press nip along a predetermined path away from said third press nip, said conveyor means including a pair of additional rolls situated along said predetermined path beyond said first plain roll means of said third press nip and a felt cooperating with one of said additional rolls and defining with the other of said additional rolls a crepe-setting press nip to which the web travels along said predetermined path when conveyed beyond said first plain press roll means of said third press nip, said conveyor means including a second plain roll means situated next to said first plain roll means of said third press nip and defining with said first plain roll means a fourth press nip to which the web is conveyed by said first plain roll means while travelling beyond said third nip and while continuously supported by said first plain roll means, so that the web first travels through and beyond said fourth press nip before travelling along said predetermined path to said pair of additional rolls, and creping doctor means cooperating with said first plain press roll means subsequent to said fourth press nip for providing a creped web travelling along said predetermined path to said crepe-setting press nip where crepe-setting is performed by said pair of additional rolls and said felt cooperating with one of said additional rolls.

4,059,483

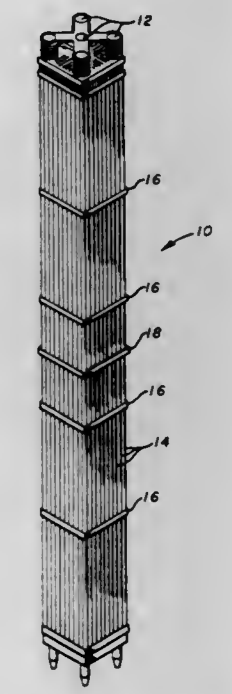
NUCLEAR FUEL ASSEMBLY SEISMIC AMPLITUDE LIMITER

Andrew J. Anthony, Tariffville, Conn., assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed Dec. 5, 1975, Ser. No. 637,983

Int. Cl.² G21C *3/30*

U.S. Cl. 176—78 **14 Claims**



1. In a nuclear reactor fuel assembly, the fuel assembly including a plurality of zircaloy spacer grids which locate and support elongated fuel elements which pass therethrough, said fuel assembly further including a plurality of guide tubes which extend through the fuel assembly parallelly of the fuel elements and which receive movable neutron absorber elements, the improvement comprising:

at least a first seismic grid positioned intermediate a pair of spacer grids, said seismic grid having a greater resistance to deformation when compared to the spacer grids and having larger external dimensions than said spacer grids, said seismic grid including:

a steel perimeter strip, said perimeter strip defining the exterior dimensions of said seismic grid, said perimeter strip being provided with a plurality of openings and a plurality of inwardly extending projections;

a plurality of divider members, said divider members being mechanically coupled to said perimeter strip and being arranged in a crossing pattern to define a plurality of grid sectors, said grid sectors being dimensioned so as to present fuel element motion limiting surfaces on said divider members and perimeter strip normally spaced from and out of contact with fuel elements passing through said seismic grid; and

means attaching some of said divider members to the guide tubes to support said seismic grid on the fuel assembly.

4,059,484

HYBRID NUCLEAR FUEL ASSEMBLY WITH REDUCED LINEAR HEAT GENERATION RATES

Lamar P. Bupp, Kirkland, and George A. Sofer, Richland, both of Wash., assignors to Exxon Nuclear Company, Inc., Bellevue, Wash.

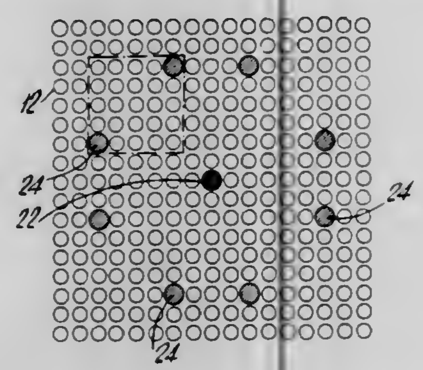
Filed May 2, 1975, Ser. No. 573,864

Int. Cl.² G21C *3/30*

U.S. Cl. 176—78 **10 Claims**

1. A hybrid fuel assembly to reduce the maximum and aver-

age linear heat generation rates for use in a nuclear reactor having a plurality of control rods comprising a plurality of elongated fuel rods disposed in spaced parallel array, said fuel rods including a first plurality of said fuel rods having a first diameter and a second plurality of said fuel rods having a second diameter greater than said first diameter, said first plurality of fuel rods includes a first fuel enrichment and said second plurality of fuel rods includes a second fuel enrichment



different from said first fuel enrichment, said second plurality of fuel rods being divided into clusters of fuel rods forming islands, said islands including guide tubes having diameters substantially the same as said second plurality of fuel rods, one guide tube corresponding to each of said control rods, said islands located within said assembly so that said guide tubes may receive all of said control rods, said islands being symmetrically located relative to the intersecting diagonal centerlines of said fuel assembly.

4,059,485

ADAPTATION OF CELL LINES TO SUSPENSION CULTURE

William R. Tolbert, Manchester, and Joseph Feder, University City, both of Mo., assignors to Monsanto Company, St. Louis, Mo.

Filed Nov. 3, 1976, Ser. No. 738,515

Int. Cl.² C12K *9/00*

U.S. Cl. 195—1.8 **12 Claims**

1. A method of rapidly adapting normally anchorage-dependent established cell lines to agitated liquid suspension culture comprising growing an inoculum of said cell line in substrate-attached culture to a stage beyond that of ordinary monolayer growth whereby multilayers of cells are produced, releasing the cells from the substrate-attached culture in the form of cell aggregates ranging from about 20 microns to about 500 microns in diameter, transferring said aggregates into a liquid suspension of nutrient culture medium of known essential amino acids, mineral salts, vitamins and carbohydrates, incubating at a temperature of from about 30° C to about 38° C while substantially continuously maintaining agitation of said medium, periodically transferring the growing cells into fresh nutrient medium and continuing the agitated incubation whereby said cells continue to be proliferated in aggregates.

4,059,486

CELL CULTURE PROCESS

William R. Tolbert, Manchester, Mo., assignor to Monsanto Company, St. Louis, Mo.

Filed Nov. 3, 1976, Ser. No. 738,513

Int. Cl.² C12K *9/00*

U.S. Cl. 195—1.8 **10 Claims**

1. A method of rapidly propagating SV3T3 cells in vitro to elaborate MIF and TAF comprising growing SV3T3 cells on a surface, thereafter transferring an inoculum of said growing cells into a normally liquid suspension of nutrient culture medium of known essential amino acids, mineral salts, vitamins, and carbohydrates, incubating at a temperature of from about 30° to about 38° C while substantially continuously maintaining agitation of said medium, periodically transferring the growing cells into fresh nutrient culture medium and continuing the agitated incubation until harvest whereby said cells are proliferated in aggregates and elaborate MIF and TAF in significantly detectable amounts.

4,059,487

PURINE NUCLEOSIDE 5′-PHOSPHATE(MONO, DI OR TRI)3′(2′)-DIPHOSPHATES AND PROCESSES FOR THEIR PREPARATION

Toyokazu Nishino, Hikisokita; Yasutaro Hamagishi, Sakai; Toshikazu Oki, Kamakura, and Sawao Murao, Sakai, all of Japan, assignors to Sanraku-Ocean Co., Ltd., Tokyo, Japan

Filed Mar. 18, 1975, Ser. No. 559,462

Claims priority, application Japan, Mar. 29, 1974, 49-34625; Dec. 16, 1974, 49-143546

Int. Cl.² C12D *13/06*

U.S. Cl. 195—28 N **6 Claims**

1. A process for producing the purine nucleoside 5′-phosphate (mono, di or tri) 3′(2′)-diphosphates of the formula mXpp,

wherein m represents one to three phosphoryl groups constituted by at least one of phosphate residues and methylene diphosphate residues, each p represents a phosphate residue and X represents a nucleoside selected from the group consisting of adenosine, guanosine and inosine, or lithium, potassium or sodium salts thereof which comprises placing a donor nucleotide or deoxynucleotide and an acceptor nucleotide in contact with a pyrophosphotransferase produced by an actinomycetes belonging to the genera Streptomyces, Streptoverticillium or Actinomyces, and characterized by a substrate specificity for a nucleotide or a deoxynucleotide as a donor and a nucleotide as an acceptor and the capability of transferring a pyrophosphoryl group from the 5′-position of said donor nucleotide or deoxynucleotide to the 3′(2′) position of said acceptor nucleotide, incubating the resultant reaction mixture to effect the transfer of a pyrophosphoryl group of the 50′-position of said donor nucleotide or deoxynucleotide to the 3′(2′)-position of said acceptor nucleotide and recovering the thus obtained purine nucleoside 5′-phosphate(-mono, di or tri) 3′(2′)-diphosphate or salts thereof.

4,059,488

METHOD OF PRODUCING LONG-CHAIN ALPHA-HYDROXYALKANOIC ACIDS

Kazumasa Hachikubo, Toda, and Shuzo Suzuki, Sayama, both of Japan, assignors to Bio Research Center, Co., Ltd., Tokyo, Japan

Filed June 8, 1976, Ser. No. 693,852

Claims priority, application Japan, June 20, 1975, 50-76123

Int. Cl.² C12D *1/02;* **C12K** *3/00*

U.S. Cl. 195—28 R **3 Claims**

1. A method of producing a long-chain alpha-hydroxyalkanoic acid from an alpha olefin having from 10 to 18 carbon atoms which comprises:

a. adapting a microorganism of the *Candida lipolytica* species to assimilate said alpha olefin and to produce said acid as the major metabolite of said assimilation by

1. first cultivating said microorganism in an aqueous nutrient medium containing a hydrocarbon boiling in the kerosene range to obtain a culture of said microorganism,
2. then cultivating said culture in a second separate aqueous nutrient medium containing an alpha having from 10 to 18 carbon atoms to obtain a second separate microorganism culture,
3. repeating in separate successive cultivation steps the cultivation of step (2), starting with said second separate microorganism culture as inoculum in the first of the successive cultivation steps and utilizing as inoculum in succeeding cultivation steps the microorganism culture obtained in the next preceding cultivation step, until there is obtained a final microorganism culture capable of producing said acid as the major metabolite of said alpha olefin assimilation;

b. then cultivating in an aqueous nutrient medium containing an alpha olefin having from 10 to 18 carbons said final microorganism culture from step(a)(3); and

c. recovering from cultivation step(b) an alphahydroxycarboxylic acid having the same number of carbon atoms as said alpha olefin.

4,059,489

PRODUCTION OF GLUCOSE ISOMERASE

John Laurence Meers, Stockton-on-Tees, England, assignor to Imperial Chemical Industries Limited, London, England

Filed July 11, 1975, Ser. No. 595,316

Claims priority, application United Kingdom, July 30, 1974, 33578/74; Dec. 30, 1974, 55994/74

Int. Cl.² C12D *13/02, 13/10*

U.S. Cl. 195—31 F **15 Claims**

11. A process which comprises isomerizing glucose to fructose wherein there is added in said isomerizing a glucose isomerase enzyme which has been produced by continuously cultivating a glucose isomerase-producing microorganism in a culture medium comprising a source of assimilable carbon and inorganic nutrients under conditions suitable for production of said enzyme and continuously recovering said enzyme wherein the concentration of a nutrient source in the culture medium is maintained at a level such as to be limiting to growth.

4,059,490

MEASUREMENT OF ALKALINE PHOSPHATASE LEVELS IN BODY FLUIDS

Barry Clifford Axcell, Johannesburg, and Cyril Donninger, Sandton, both of South Africa, assignors to Chembro Holdings (Proprietary) Limited, Johannesburg, South Africa

Filed Sept. 10, 1976, Ser. No. 722,240

Claims priority, application South Africa, Sept. 22, 1975, 75/6003

Int. Cl.² G01N *31/14, 33/00*

U.S. Cl. 195—99 **15 Claims**

1. A method of measuring the alkaline phosphatase level in a body fluid comprising hydrolysing excess monophosphate ester dissolved in a suitable buffer by action of the alkaline phosphatase in a predetermined volume of the body fluid to yield an oxidisable substrate, said ester being a catechol monophosphate ester which may have one or more ring substituents, oxidizing the substrate with excess molecular oxygen in the presence of excess oxygenase and measuring the rate of oxygen comsumption.

4,059,491

DILUENTS FOR RUBELLA VIRUS HEMAGGLUTINATION-INHIBITION TEST

Susumu Iwasa, Kyoto, and Isamu Yoshida, Takatsuki, both of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed Jan. 31, 1977, Ser. No. 764,058

Claims priority, application Japan, Feb. 2, 1976, 51-10474

Int. Cl.² G01N *33/16;* **C12K** *1/04*

U.S. Cl. 195—103.5 A **16 Claims**

8. A method for rubella virus hemagglutination -inhibition test, which comprises admixing a test serum previously diluted with a diluent which contains N-2-hydroxyethylpiperazine-N′-2′-ethanesulfonic acid in a molar concentration from about 0.001 to about 0.01 and NaCl, the pH of which is in the range of about 6.0 to about 7.5 and which is free from calcium ion with rubella virus hemagglutinating antigen previously diluted with the said diluent and, then, admixing the resultant mixture with a suspension of erythrocytes previously diluted with a diluent which contains N-2-hydroxyethylpiperazine-N′-2′-ethanesulfonic acid in a molar concentration from about 0.01 to about 0.05, $CaCl_2$ in a molar concentration from about 0.0005 to about 0.01 and NaCl and the pH of which is in the range of about 6.0 to about 6.5 to assess agglutination or nonagglutination of the erythrocytes.

4,059,492

PROCESS FOR THE PURIFICATION OF WASTE FROM ACRYLONITRILE PRODUCTION

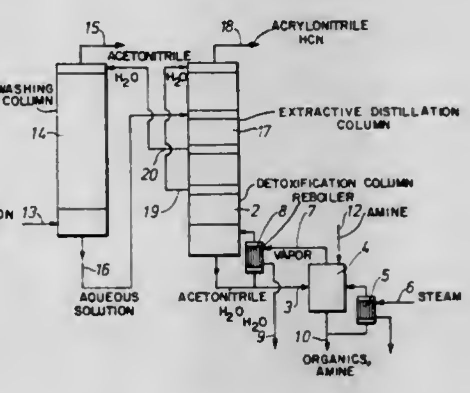
Arnold Hausweiler, Zons; Adolf Mayer, Dormagen, and Feliks Bitners, Leverkusen, all of Germany, assignors to Erdolchemie GmbH, Cologne and Bayer Aktiengesellschaft, Leverkusen, both of, Germany

Continuation-in-part of Ser. No. 544,458, Jan. 27, 1975, abandoned, which is a continuation of Ser. No. 466,350, May 2, 1974, abandoned, which is a continuation of Ser. No. 188,395, Oct. 12, 1971, abandoned. This application May 3, 1976, Ser. No. 682,555

Claims priority, application Germany, Oct. 15, 1970, 2050722

Int. Cl.² B01D *1/00, 3/34*

U.S. Cl. 203—11 **20 Claims**



1. Process for the purification of waste water from a process for preparing acrylonitrile by the gas phase oxidation of propylene and ammonia with oxygen in admisture with solid catalyst wherein water is used for the separation of acrylonitrile from the reaction mixture, said waste water being substantially free of acrylonitrile, acetonitrile and hydrogen cyanide and containing volatile and toxic and high-boiling and resinous organic compounds, which comprises:

i. treating said waste water with steam at a temperature between 100 ° and 125° C and at a pressure of from 0 to 2 atmospheres gauge, in a detoxification column containing at least 7 distribution baffles, removing volatile toxic materials as the distillate and recovering treated waste water as the bottoms product, said steam being generated in the bottom of said detoxification column by indirect heating with steam produced in the following step (iv) at the rate of 0.4 to 1.0 ton of steam per ton of waste water flowing into said detoxification column;

ii. removing the so treated waste water from said detoxification column and passing it into an evaporator vessel;

iii. vaporizing a major portion of the treated waste water from the detoxification column in said evaporation vessel;

iv. recovering steam as the head product from said evaporation vessel and using said head product to generate steam in the bottom of said detoxification column by indirect heat exchange with the contents of said detoxification column, for said steam treatment; and

v. removing an aqueous solution of said organic compounds as the bottoms product from said evaporation vessel.

4,059,493

ANODE, ANODE BASKET AND METHOD OF PACKAGING ANODES

Seymour S. Rice, Southbury, Conn., assignor to Cities Service Company, Tulsa, Okla.

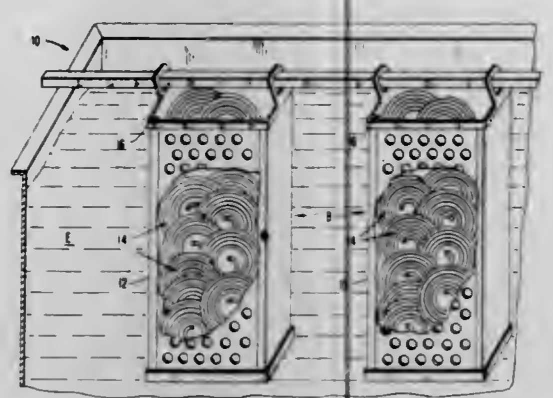
Filed Apr. 29, 1976, Ser. No. 681,622

Int. Cl.² C25D *17/10*

U.S. Cl. 204—3 **11 Claims**

1. In combination, a plurality of convolutely wound lengths of anode material formed of rod or wire, defining a plurality of

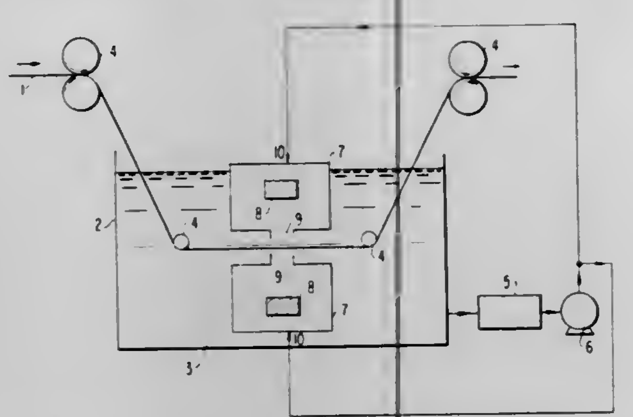
coils, said rod having a cross-section defining a predetermined configuration in at least a portion of the periphery of the cross-section, said rod being wound so that said predetermined configuration of said cross-section of each convolution of each said coil faces radially outwardly, each said coil being generally planar or flat, and a perforate anode basket having an



elongate loading opening, said opening having a width and a length, the outer diameter of each said coil being dimensioned so that it is greater than the width of the opening but less than the length thereof, whereby said coils stack freely in a predetermined pattern within the basket when the coils are fed through the opening.

4,059,494
PROCESS FOR CONTINUOUS ELECTROLYTIC COLORING OF ALUMINUM OR ALUMINUM BASE ALLOY STRIP AND WIRE

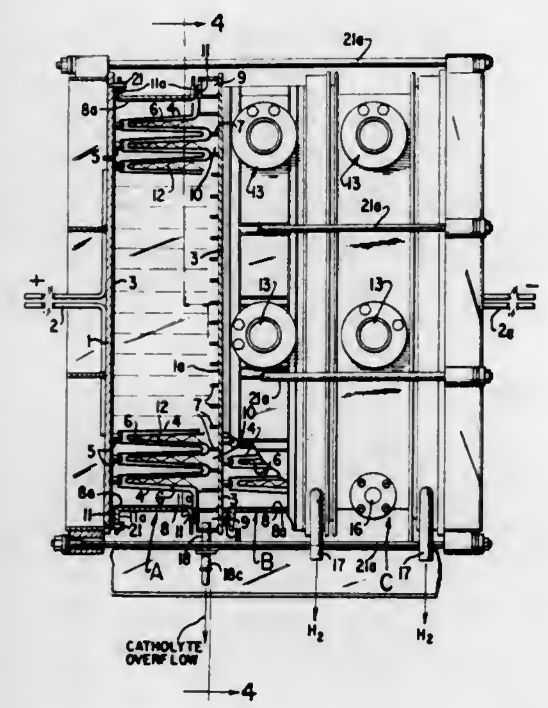
Kiyomi Yanagida; Tadashi Hirokane; Tadashi Tsukiyasu, and Tomoari Sato, all of Nagoya, Japan, assignors to Sumitomo Aluminum Smelting Co., Ltd., Osaka, Japan
Continuation of Ser. No. 633,198, Nov. 19, 1975, abandoned. This application Apr. 18, 1977, Ser. No. 788,386
Claims priority, application Japan, Nov. 19, 1974, 49-133433; Nov. 19, 1974, 49-133434
Int. Cl.² C25D *9/12*
U.S. Cl. 204—28 **5 Claims**



1. In a process for electrolytically coloring an anodically oxidized aluminum or aluminum base alloy strip or wire as a cathode in a coloring bath comprising an aqueous solution containing at least one nickel salt, cobalt salt, tin salt, iron salt, copper salt or selenious acid while continuously travelling said anodically oxidized aluminum or aluminum base allow strip or wire, the improvement which comprises subjecting said anodically oxidized aluminum or aluminum base alloy strip or wire as a cathode to direct current electrolysis using an electrolytic coloring means comprising at least one hollow body which has an anode therein, said anode being insulated from said hollow body, and has an opening of slit shape for continuously and uniformly supplying the coloring bath onto at least one surface of said strip or wire, the longitudinal direction of the slit being perpendicular to the direction of travel of said strip or wire in order that the coloring rate of said strip or wire becomes a maximum value at the portions in the vicinity of said hollow body, while continuously supplying said coloring bath onto at least one surface of said aluminum or aluminum base alloy strip or wire.

4,059,495
METHOD OF ELECTROLYTE FEEDING AND RECIRCULATION IN AN ELECTROLYSIS CELL

Oronzio de Nora, Milan, Italy, and Vittorio de Nora, Nassau, Bahamas, assignors to Oronzio de Nora Impianti Elettrochimici S.p.A., Milan, Italy
Continuation-in-part of Ser. No. 571,378, April 24, 1975, which is a continuation of Ser. No. 51,162, June 30, 1970, Pat. No. 3,930,980. This application June 11, 1976, Ser. No. 695,047
Int. Cl.² C25B *1/26, 1/16*
U.S. Cl. 204—98 **9 Claims**

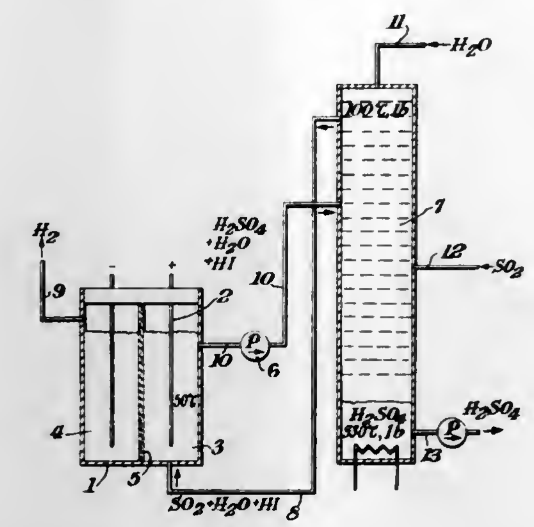


1. The method of providing electrolyte recirculation in a diaphragm-type electrolysis cell unit having an anode compartment with a vertical hollow wave anode and anolyte therein, a cathode compartment with a vertical wave cathode therein, a diaphragm between said anode and cathode and means to pass an electrolysis current between said anode and cathode, by which a gas is evolved from the anolyte at the anode, which comprises operating the cell unit with said anolyte compartment communicating with an overhead gas receiver and brine feed container, containing feed liquor for said cell unit, by at least one vertical conduit leading from the top of the anolyte compartment to the said brine container, causing the anolyte to rise through said vertical conduit and flow into said gas receiver and brine feed container by the gas lift effect of the gas bubbles evolved at the anode and rising in both the interior of the anode waves and in the space between the anode and the cathode, and recirculating the liquid anolyte through another conduit from the said gas receiver and brine container to the anolyte compartment.

4,059,496
PROCESS FOR THE PREPARATION OF SULFURIC ACID FROM SULPHUR DIOXIDE

Rudolf Schulten, Richterich, and Friedrich Behr, Gross-Denkte, both of Germany, assignors to Rheinische Braunkohlenwerke Aktiengesellschaft, Cologne, Germany
Filed Sept. 20, 1976, Ser. No. 724,290
Claims priority, application Germany, Sept. 26, 1975, 2542935
Int. Cl.² C25B *1/22, 1/02*
U.S. Cl. 204—104 **3 Claims**

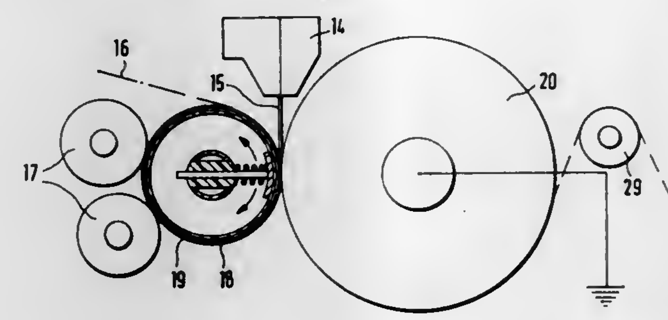
1. In a continuous process for the electrolytic production of sulfuric acid by oxidation of sulfur dioxide in the presence of water in an anode compartment of an electrolysis cell and of hydrogen in the cathode compartment of said cell, said cathode compartment containing aqueous sulfuric acid as catholyte and being separated from the anode compartment by a hydrogen-ion transfer permitting membrane, the improvement which comprises continuously introducing to the anode compartment sulfur dioxide, water and a compound selected from



the group consisting of hydrogen iodide and iodine, removing a mixture of aqueous sulfuric acid and hydrogen iodide from the anode compartment, separating the sulfuric acid from the said mixture, and removing from the cathode compartment the hydrogen set free therein.

4,059,497
CORONA APPARATUS

Andreas Kolbe, Wiesbaden, and Peter Dinter, Hallgarten, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany
Filed Dec. 10, 1976, Ser. No. 749,442
Claims priority, application Germany, Dec. 13, 1975, 2556228
Int. Cl.² B01K *1/00;* **H01J** *1/00*
U.S. Cl. 204—165 **19 Claims**



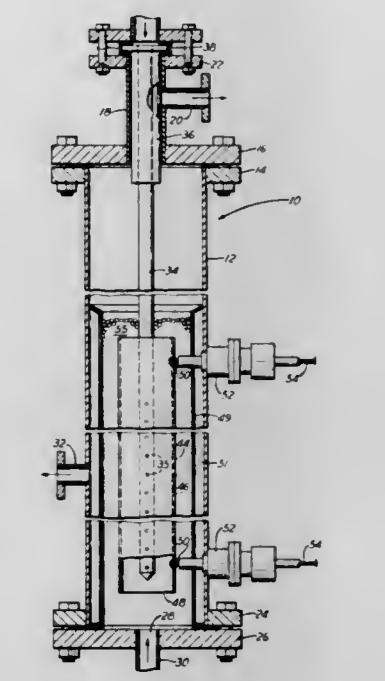
1. A method for the surface treatment of melts, films, foils and the like using a corona apparatus having a roller electrode assembly and a supporting surface acting as a counter electrode comprising the steps of:

a. positioning an electrode on a central shaft of said roller electrode assembly;
b. rotatably mounting a tube about said electrode and said shaft;
c. applying an alternating current voltage to said electrode; and
d. positioning said tube adjacent said counter electrode thereby forming a nib for said melts, films, foils and the like;

whereby said electrode produces an electric field in the region of said nib.

4,059,498
RADIAL FLOW ELECTROSTATIC FILTER

James H. Crissman, Kiskiminetas Township; G. Ray Fritsche, Bradford Woods; Frederick B. Hamel, Allison Park, and Lloyd W. Hilty, Apollo, all of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.
Filed Oct. 6, 1976, Ser. No. 729,956
Int. Cl.² B03C *5/00*
U.S. Cl. 204—188 **17 Claims**



1. A filter for removal of finely divided solid particles from liquids of low electrical conductivity comprising a vertical cylindrical casing, a particulate filter bed of substantially spherical, smooth-surfaced, nondeformable particles of high electrical resistivity within the casing, a central electrode extending vertically through at least a portion of the filter bed, a vertical cylindrical perforated outer electrode extending longitudinally in the filter bed concentric with the central electrode, means for applying a voltage gradient in the range of 5 to 20 kv per inch between the central electrode and outer electrode, and inlet and outlet means constructed and arranged to direct liquid to be filtered radially through the particulate bed.

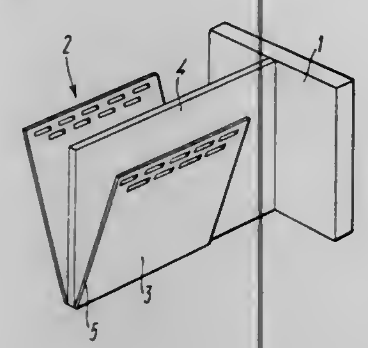
4,059,499
NITRATE ION SELECTIVE ELECTRODE

Hans Jørgen Ibsen Nielsen, Charlottenlund, and Elo Harald Hansen, Lyngby, both of Denmark, assignors to Bifok AB, Sollentuna, Sweden
Filed Nov. 19, 1976, Ser. No. 743,389
Claims priority, application Denmark, Nov. 20, 1975, 5217/75
Int. Cl.² G01N *27/30, 27/46*
U.S. Cl. 204—195 M **7 Claims**

1. An electrode for measuring the concentration of nitrate ions in aqueous solutions comprising a container embodying an internal reference system and a non-porous polymer membrane mounted upon said container, said membrane comprising a combination of an electroactive material, a solvent and a non-porous polymeric membrane matrix material; wherein said electroactive material is organic nitrate ion sensitive and comprises a quaternary ammonium salt selected from the group consisting of: tetraoctyl ammonium nitrate, tetranonyl ammonium nitrate, tetradecyl ammonium nitrate, tetraundecyl ammonium nitrate, tetradodecyl ammonium nitrate, tetratridecyl ammonium nitrate and tetratetradecyl ammonium nitrate; wherein the solvent is a liquid of substantial viscosity and is a solvent for said quaternary ammonium salt, said solvent consisting of a dialkylphthalate or a dialkyladipate of a solubility parameter of 9 ± 2 $(cal/cm^3)^{1/2}$ and being substantially organophilic and hydrophobic; and wherein the polymer membrane matrix material is a non-porous polymer membrane matrix

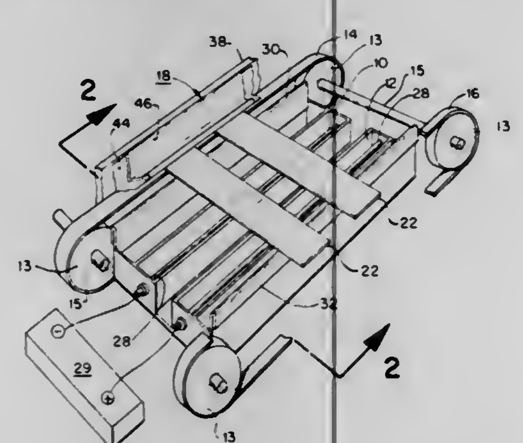
material selected from the group consisting of polyvinylchloride and polyurethane.

4,059,500
ELECTRODE UNIT
Georgy Mikirtychevich Kamarian, Kotelnicheskaya naberezhnaya, 25/8, kv. 45, Moscow, U.S.S.R.
Filed Apr. 12, 1976, Ser. No. 676,206
Claims priority, application U.S.S.R., Apr. 14, 1975, 2122952
Int. Cl.² C25B *1/26, 9/02*
U.S. Cl. 204—288 **20 Claims**



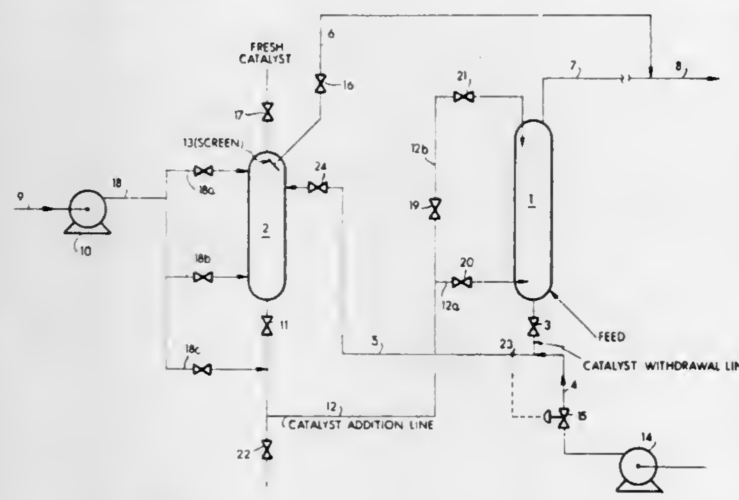
1. An electrode unit of an electrolyzer for the electrolysis of solutions of halogenides of alkali metals, which comprises:
a first vertically arranged current-distribution support comprising a planar segment;
at least one open-work or perforated electrode member having working surfaces, at which there is released gas in the course of the electrolysis of solutions of halogenides of alkali metals, said electrode member being disposed proximate to said planar segment and electrically connected thereto and being so arranged in relation to said support that said working surfaces are at a predetermined angle to a vertical plane normal to said planar segment of said first current-distribution support said predetermined angle being taken in a vertical plane substantially parallel to said planar segment.

4,059,501
AUTOMATED ELECTROPHORESIS UNIT
Allen Strickler, Fullerton, Calif., assignor to Beckman Instruments, Inc., Fullerton, Calif.
Filed Aug. 16, 1976, Ser. No. 707,399
Int. Cl.² G01N *27/26, 27/28*
U.S. Cl. 204—299 R **5 Claims**



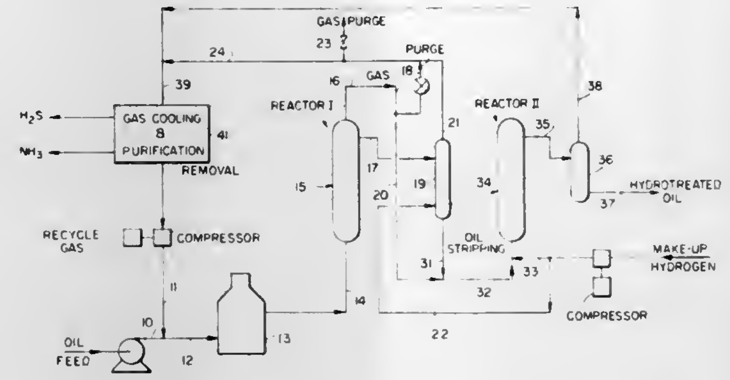
1. Automated electrophoresis apparatus comprising:
a. an elongated electrophoretic separation chamber having an inlet and an outlet and including a pair of electrolyte wells;
b. electrolyte contained within said wells;
c. means for moving a strip of electrophoretic medium through said separation chamber from said inlet to said outlet;
d. electrode means disposed in electrical contact with said electrolyte in said wells and adapted to be connected to a source of d.c. power;
e. a pair of wicks disposed one to each of said wells to provide constant electrical contact between said electrolyte in said wells and the electrophoretic medium as it moves through said chamber whereby an unchanging electrical field will be established in a portion of the electrophoretic medium while it is moving through said chamber;
f. a flexible backing material releasably carrying strips of electrophoretic medium;
g. an input plate in parallel relationship with said moving means and having an edge adjacent the input of said chamber whereby said flexible backing material can be moved across said plate carrying said strips of electrophoretic medium toward said inlet and said moving means then bend around said edge to a new direction substantially normal to said moving means to cause said strips of electrophoretic medium to be released from said flexible backing material and continue into said inlet of said electrophoretic separation chamber to engage said moving means; and,
h. means for moving said flexible backing material across said input plate in the manner described.

4,059,502
CATALYST WITHDRAWAL
Lewis C. James, East Windsor, N.J., assignor to Cities Service Research and Development Company, Tulsa, Okla.
Filed Dec. 17, 1975, Ser. No. 641,852
Int. Cl.² C10G *13/00*
U.S. Cl. 208—152 **2 Claims**



1. In a heterogeneous catalytic process wherein a solid catalyst is withdrawn from a reactor during normal operations, a method controlling the catalyst withdrawal from the reactor comprising
pumping a transport fluid in a first conduit line equipped with a temperature controller and temperatures sensor, at a temperature T_1,
exiting a portion of the reactor contents, comprising catalyst and liquid reactants at a temperature T_2, through a second conduit line that joins said first line, thus mixing the transport fluid and reactor effluent,
measuring the temperature of the mixture, and
controlling the flow of transport liquid and reactor effluent, and thus the flow of said catalyst, by controlling the temperature of the resultant stream, until sufficient catalyst is withdrawn from the reactor.

4,059,503
STRIPPING AMMONIA FROM LIQUID EFFLUENT OF A HYDRODENITRIFICATION PROCESS
Morgan C. Sze, Upper Montclair; Harvey D. Schindler, Fairlawn, and Anthony Fanelli, Rockaway, all of N.J., assignors to The Lummus Company, Bloomfield, N.J.
Filed Aug. 5, 1976, Ser. No. 712,088
Int. Cl.² C10G *23/02*
U.S. Cl. 208—254 H **8 Claims**



1. In a process for the hydrodenitrification of a nitrogen containing feed by sequentially passing the feed through a series of hydrodenitrification zones containing at least two hydrodenitrification zones, wherein the nitrogen containing feed is contacted with hydrogen under hydrodenitrification temperature and pressure conditions to convert nitrogen present in the feed to ammonia, and wherein ammonia is purged from a hydrodenitrification zone effluent prior to the last hydrodenitrification zone in said series of hydrodentrification zones to maintain a low ammonia partial pressure in the last hydrodenitrification zone, the improvement comprising:
a. separately separating a gaseous effluent and a liquid effluent from said hydrodenitrification zone prior to said last hydrodenitrification zone;
b. stripping ammonia from said liquid effluent of step (a); and
c. introducing at least a portion of said gaseous effluent from step (a) and stripped liquid effluent from step (b) into the next hydrodenitrification zone, said separating of step (a), stripping of step (b) and introducing of step (c) being effected without cooling of the liquid and gaseous effluents to a temperature below hydrodenitrification temperatures.

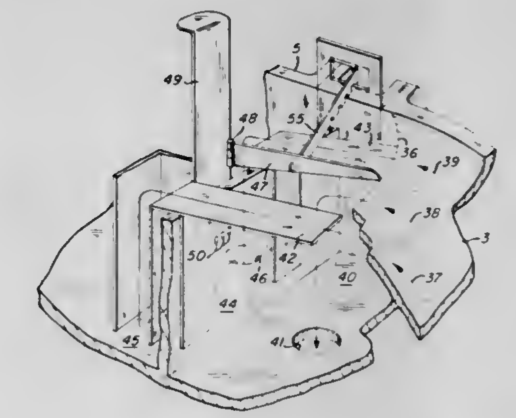
4,059,504
HYDROTREATING OF PYROLYSIS GASOLINE
William V. Bauer, New York, N.Y., assignor to The Lummus Company, Bloomfield, N.J.
Filed July 21, 1976, Ser. No. 707,252
Int. Cl.² C10G *23/02*
U.S. Cl. 208—255 **8 Claims**

1. In a process for selectively hydrogenating dienes in a liquid feed containing dienes, the improvement comprising:
effecting said hydrogenating in the presence of a cobalt-tungsten sulfide catalyst supported on high surface area alumina to produce a hydrotreated product without formation of dimers and higher polymers.

4,059,505
SEPARATING HYDROCARBONS
Colin William Cartwright, Woking, and Donald Lamb, Farnborough, both of England, assignors to The British Petroleum Company Limited, Sunbury-on-Thames, England
Filed Mar. 22, 1976, Ser. No. 668,843
Claims priority, application United Kingdom, Apr. 8, 1975, 14313/75
Int. Cl.² C07C *7/13;* **C10G** *25/04*
U.S. Cl. 208—310 Z **8 Claims**

1. A cyclic vapour phase process for separating n-paraffins boiling in the gasoline, kerosine or gas oil ranges from a feed mixture thereof with non-straight chain hydrocarbons by means of a bed of a 5A molecular sieve comprising:
i. an adsorption stage in which the feed mixture is passed into the bed under conditions of increasing pressure and an effluent produced from which the n-paraffins have been at least partly removed, and
ii. a desorption stage in which the n-paraffins are desorbed from the bed by pressure reduction wherein the feed is stopped to the adsorption stage when at least 50% of the breakthrough volume has been passed and then a mixture richer in n-paraffins than the feed is passed through the bed, while the pressure is still rising.

4,059,506
ORE TAILINGS TREATMENT
Roy E. Bryson, Port Cartier, Canada, assignor to United States Steel Corporation, Pittsburgh, Pa.
Filed May 23, 1975, Ser. No. 580,386
Int. Cl.² B03B *5/52*
U.S. Cl. 209—18 **7 Claims**

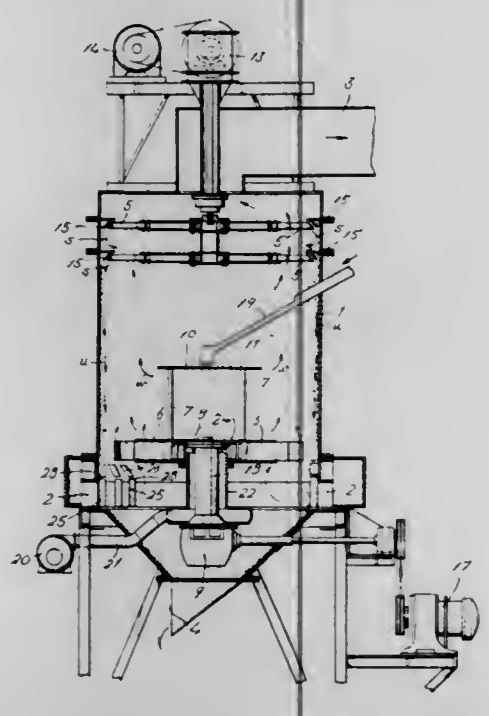


1. A splitter box for recovering value-rich tailings from the discharge end of a spiral concentrator including vertical concentrate collection means comprising (a) central gravity conduit means located centrally or near the inside curve of the discharge end of the spiral for disposing of relatively value-poor tailings, and inner and outer conduit means on both the inside and outside portions of the curve of the discharge end of the spiral for recovering relatively value-rich tailings, and (b) means for bringing together relatively value-rich tailings from both the inner and outer conduit means for further processing.

4,059,507
CLASSIFYING APPARATUS FOR PARTICULATE MATERIALS
Yoshimori Nobuo, No. 143, Ozenji, Tama, Kawasaki, Japan
Filed June 10, 1976, Ser. No. 694,611
Claims priority, application Japan, June 13, 1975, 50-70913
Int. Cl.² B07B *9/02*
U.S. Cl. 209—139 A **3 Claims**

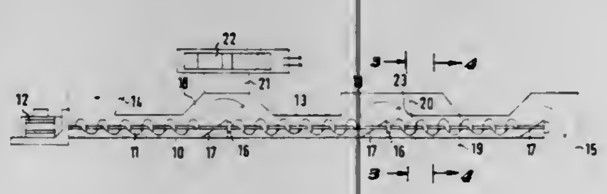
1. Apparatus, for classifying particulate material, comprising in combination:
i. a housing having a cylindrical wall and having at its top end a discharge opening for fine particulate material and at its bottom end a discharge opening for coarser particulate material
ii. means adjacent the bottom end of said housing for admitting a flow of fluid tangentially into said housing, thereby to create an upward whirling flow of fluid in said housing towards said top end discharge opening
iii. means disposed intermediate said top end and said bottom end of said housing for admitting mixed fine and coarser particulate material into said upward whirling flow of fluid
iv. rotary vanes disposed in said housing adjacent the top end thereof for separating coarser particles from fine particles, such that said fine particles may be discharged through said top end discharge opening

v. a rotary disc disposed in said housing above said flow admitting means and below said rotary vanes, said disc including a plurality of radial nozzles,
vi. blower means connected to said nozzles for blowing fluid through said nozzles to project said fluid from said blower means as jet streams against the wall of said housing
vii. a plurality of guide plates disposed in said housing adjacent to said flow admitting means for smoothly guiding coarser particles falling down along the wall of said housing such that said falling particles are not disturbed by the whirling flow of fluid admitted through said flow admitting means, and



viii. a rotary dispersion plate disposed in said housing between said rotary disc and said material admitting means to receive thereon material admitted by said material admitting means, said plate being of less diameter than said rotary disc and being perforated to permit a portion of said admitted material to fall into a space between said plate and said rotary disc.

4,059,508
CONVEYOR FOR GRANULAR MATERIAL
Jorma Metsa-Ketela, 60800 Ilmajoki, Finland
Filed Nov. 3, 1976, Ser. No. 738,466
Claims priority, application Finland, Nov. 7, 1975, 753137; Jan. 28, 1976, 760209; Oct. 7, 1976, 762853
Int. Cl.² B07B *4/02;* **B65G** *43/00*
U.S. Cl. 209—151 **9 Claims**

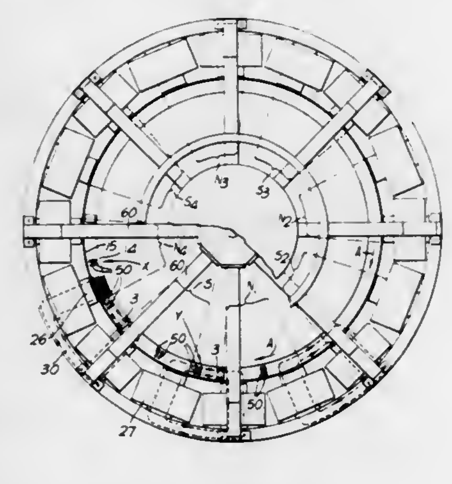


1. In a conveyer for granular material, elongated hollow channel means for receiving granular material which is to be conveyed along the interior of said channel means, cover means covering said channel means, rotary screw means extending longitudinally along the interior of said channel means for conveying granular materials therein longitudinally along the interior of said channel means, said rotary screw means including an elongated shaft extending longitudinally along the interior of said channel means and a screw carried by said shaft, at least one bearing means situated in said channel means at a portion of said shaft situated between opposed ends of said shaft for supporting said shaft for rotation, transverse wall means carried by said channel means in the interior thereof and supporting said bearing means, so that said wall means and bearing means together block the flow of granular material longitudinally along the interior of said channel means, and bypass means operatively connected with said channel means at the region of said transverse wall means and bearing means carried thereby for directing the material conveyed by said rotary screw means along a path at the region of said wall means and bearing means which bypasses said wall means and bearing means.

4,059,509
PHOSPHATE ORE FLOTATION
Frank B. Eisenbardt, and Stanislaus F. Muehlberger, both of Lakeland, Fla., assignors to Mobil Oil Corporation, New York, N.Y.
Filed Jan. 9, 1976, Ser. No. 647,959
Int. Cl.² B03D *1/02*
U.S. Cl. 209—166 **3 Claims**

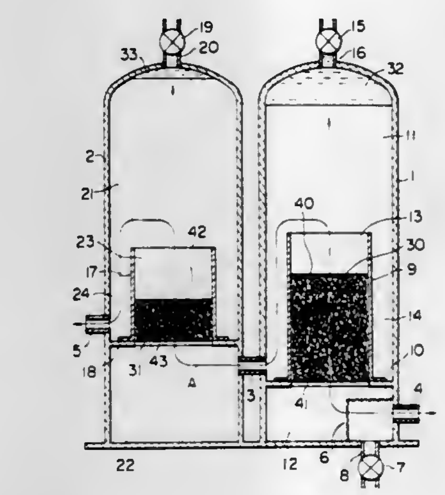
1. An improved process for the recovery of phosphate rock from an aqueous suspension of solids, the process comprising at least two flotation steps employing the appropriate reagent system, one of which is fatty acid flotation and the other an amine flotation, the improvement whereby the rougher concentrate from the fatty acid flotation is deoiled with a strong mineral acid, treated with lime to neutralize the strong acid, reagentized with an amine and refloated to recover the phosphate values present without washing following deoiling and addition of said lime.

4,059,510
MAGNETIC SEPARATORS
Hugh Thomas Reading, Goonellabah, Australia, assignor to Readings of Lismore Pty. Limited, Australia
Filed Jan. 13, 1976, Ser. No. 649,101
Claims priority, application Australia, Feb. 5, 1975, 0476/75
Int. Cl.² B03C *1/14*
U.S. Cl. 209—223 A **8 Claims**



1. A magnetic separator comprising:
a. a magnetically impermeable rotor mounted on a vertically oriented shaft and having at least one annulus constituting or formed on its periphery and defined by spaced-apart walls, the walls being formed from a material having non-magnetic characteristics, and the at least one annulus being disposed about the axis of rotation of the rotor,
b. a number of spacer bars of a magnetically permeable material extending in a radial direction between the walls of the annulus successive spacer bars together with the annulus walls defining through passages into which magnetic particles in a liquid slurry may be fed to pass in a direction substantially parallel to the axis of the rotor said spacer bars being of laminated construction with the planes of the laminations extending in the direction of rotation of the spacer bars,
c. a number of magnetic pole pieces surrounding the rotor and having their magnetic axes disposed radially with respect to the rotor said pole pieces providing successive radial magnetic pole regions of opposite polarity around the rotor whereby a magnetic field of maximum intensity is induced in the spacer bars intermediate successive ones of the magnetic pole regions,
d. means for feeding the slurry into the top ends of said passages adjacent the magnetic pole regions,
e. a plurality of first means above the respective pole regions for delivering a washing fluid into the top ends of said passages for washing magnetic particles from within the passages,
f. a plurality of second means for delivering a washing fluid into the top ends of said passages for washing non-magnetic particles from within the passages, said second means being disposed above top end of said annulus and circumferentially between said first means, and, separate means for collection of magnetic and non-magnetic particles which are washed from the bottom ends of said passages.

4,059,511
METHOD FOR CLARIFYING WASTE WATER CONTAINING FINELY DIVIDED OILY MATERIALS
Morito Musha, Seto; Tomizo Sawa, Nagoya, and Osami Kato, Kasugai, all of Japan, assignors to Mitsubishi Rayon Co., Ltd., Tokyo, Japan
Filed June 28, 1976, Ser. No. 700,075
Int. Cl.² B01D *17/02*
U.S. Cl. 210—23 R **5 Claims**

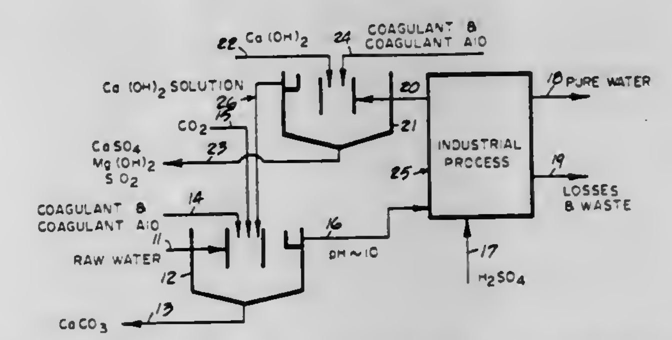


1. A method for clarifying waste water containing finely divided oil materials together with finely divided sludge, which comprises:
a. passing said waste water through an upstream fibrous strata of hydrophilic organic polymer fibers and coarsening said finely divided oil materials to catch and collect the finely divided sludge;
b. passing said waste water into a space where said coarsened particles are allowed to form a separate layer on the upper surface of said waste water in said space and are removed from said waste water;
c. passing said waste water in said space through a downstream fibrous strata composed of hydrophilic organic polymer fibers, and coarsening the finely divided oily materials in said waste water to catch and collect the finely divided solid materials;
d. introducing said waste water into a space in which said coarsened articles are allowed to float and form a separate layer on the surface of said waste water in said space and are removed from said waste water; and
e. recovering clarified waste water, wherein said upstream, fibrous strata is composed of hydrophilic fibers having a denier of 10–300 and is distributed to form gaps of 40 to 180 microns between said fibers, said stratum having a density of from 0.1 to 0.45 g/cm², a thickness of 3 to 100 cm, and a water permeability of 5 cm/sec or less under a pressure of 40 cm of water, and wherein said downstream fibrous strata has gaps of 15 to 100 microns, on the average, formed between the fibers and wherein said gaps are smaller, on the average than those in said upstream strata.

4,059,512
PROCESS FOR REMOVING ENDOTOXIN FROM BIOLOGICAL FLUIDS
Nick S. Harris, Galveston, Tex., assignor to Preventative Systems, Inc.
Continuation-in-part of Ser. No. 536,833, Dec. 27, 1974, Pat. No. 3,959,128. This application Dec. 16, 1975, Ser. No. 641,230
The portion of the term of this patent subsequent to May 25, 1993, has been disclaimed.
Int. Cl.² B01D *15/00*
U.S. Cl. 210—24 **3 Claims**

1. A process for selectively removing endotoxin derived from gram-negative bacilli from biological fluids, said process comprising:
passing a biological fluid contaminated with gram-negative bacilli derived endotoxin through a microporous film, having an effective pore size of from about 0.04 to about 0.5 micrometers, of a non-ionogenic hydrophobic non-polar aliphatic synthetic plastic polymer selected from the group consisting of a substantially crystalline, non-polar aliphatic hydrocarbon thermoplastic polymer, a substantially crystalline non-polar aliphatic thermoplastic fluorocarbon polymer, a cross-linked aliphatic silicone elastomeric polymer and mixtures thereof, whereby the endotoxin is adsorbed onto the surface of the polymer; and
removing the biological fluid from contact with said polymer essentially free of said endotoxin.

4,059,513
TREATMENT OF WATER TO REMOVE CERTAIN IONS THEREFROM
Karel V. Zadera, Sunnyhill Road, Dover, N.J. 07801
Continuation-in-part of Ser. No. 601,645, Aug. 4, 1975, abandoned, which is a continuation of Ser. No. 498,318, Aug. 19, 1974, abandoned. This application Feb. 22, 1977, Ser. No. 770,826
Int. Cl.² C02B *1/20, 5/02;* **C02C** *5/02;* **B01D** *21/01*
U.S. Cl. 210—45 **4 Claims**



1. A two stage method of treating water to reduce concentrations of sulfate and hardness for use in a physical separation process where minerals contained in makeup water are concentrated by removing substantially pure water, producing sulfate ion concentrations in excess of 1500 ppm, consisting of the following steps:
a. Conducting a portion of said concentrated mineral rich process water to a first reaction chamber, adding calcium hydroxide to the first reaction chamber in an amount sufficient to substantially increase calcium ion concentration and to produce hydroxide ion concentration in excess of 1000 ppm as calcium carbonate and in the presence of solid calcium sulfate precipitate calcium sulfate, and removing portion of solid calcium sulfate from the first reaction chamber;
b. Transferring only the supernatant water from the first reaction chamber, to the second reaction chamber, adding raw makeup water to the second reaction chamber, the amount of raw water being several times greater than the

amount of supernatant water from the first reaction chamber, together with sufficient amount of carbon dioxide or bicarbonate, to react with essentially all the hydroxide brought from the first reaction chamber forming carbonate and precipitate essentially all of the formed calcium carbonate;

c. Transferring only the supernatant water from the second reaction chamber to said physical separation process;

d. adding sufficient sulfuric acid to said physical separation process to prevent scaling therein;

e. treating said supernatant water in said physical separation process to yield substantially pure water and a makeup water containing carbonate and sulfate hardness.

4,059,514

METHOD FOR PURIFICATION OF INDUSTRIAL WASTE WATER

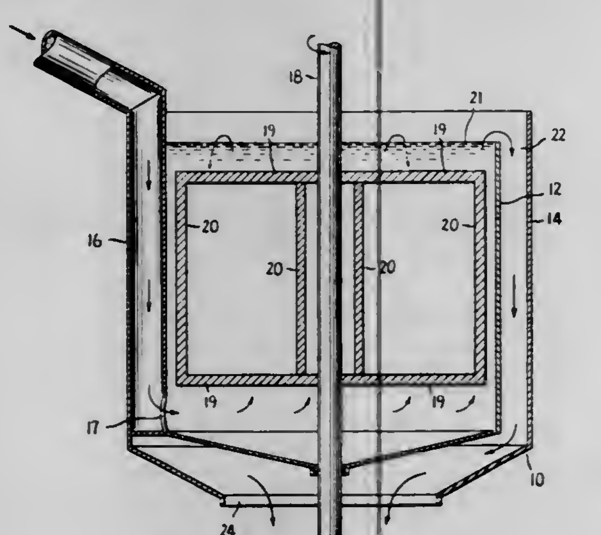
Knut Waldemar Jahnsen, Oslo, Norway, assignor to Elkem-Spigerverket A/S, Oslo, Norway

Continuation of Ser. No. 543,784, Jan. 24, 1975, abandoned, which is a division of Ser. No. 326,547, Jan. 24, 1973, Pat. No. 3,950,250. This application June 24, 1976, Ser. No. 701,352

The portion of the term of this patent subsequent to Apr. 13, 1993, has been disclaimed.

Int. Cl.^{2} C02B *1/36*

U.S. Cl. 210—49 **1 Claim**



1. A method for the continuous treatment of industrial waste water containing toxic cyanides and suspended material in a container, said container having an inner compartment with side and bottom walls and an outer concentric compartment with side and bottom walls, the side and bottom walls of said outer compartment being spaced away from the side and bottom walls of said inner compartment to surround the inner compartment therein and provide space between the exterior of the side and bottom walls of said inner compartment and the interior of the side and bottom walls of said outer compartment, the entire bottom wall of said inner compartment being inside the outer compartment and spaced above the bottom wall of the outer compartment, said inner compartment having an inlet opening located in the bottom end portion thereof and said inner compartment being open at the top thereof, the rim at the top end portion of the side wall of said outer compartment being located above the top of the side wall of said inner compartment and in open communication with the open top of said inner compartment, said outer compartment having an outlet opening in the bottom wall thereof in open communication with the said space between the bottom walls of said inner and outer compartments, the said space between the bottom walls of the inner and outer compartments and the said opening in the bottom wall of said outer compartment being free of obstruction to provide in combination an unobstructed exit outlet passage for the flow of treated waste water, said method comprising:

a. continuously combining industrial waste water containing toxic cyanide and suspended material with:

i. a chemical reagent capable of rendering the toxic cyanides harmless for deposit in public waters, said chemical reagent being selected from the group consisting of sodium hypochlorite, gaseous chlorine and sodium hypochlorite/-sodium hydroxide;

ii. a flocculating reagent capable of flocculating said suspended materials;

b. continuously feeding said industrial waste water combined with said flocculating reagent and said chemical reagent through said inlet into said lower portion of said inner compartment;

c. continuously agitating said industrial waste water in said inner compartment;

d. continuously controlling the pH of said industrial waste water in said inner compartment to maintain a pH of from about 10 to about 11;

e. continuing the feed of industrial waste water to said inlet whereby the simultaneously treated industrial waste water including the treated cyanides and the flocculated sediment continuously rises in the inner compartment and continuously flows over the top of the sidewall of the inner compartment along a substantial length thereof and into said chamber;

f. removing the treated industrial waste water including the treated cyanides and the flocculated sediment from said chamber through said outlet in said outer compartment; and, thereafter

g. subjecting said treated industrial waste water to further treatment including sedimentation of the flocculated sediment.

4,059,515

PROCESS FOR CLARIFICATION OF OIL-CONTAINING WASTE

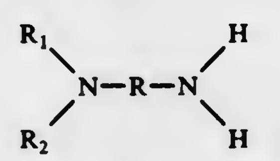
William J. Fowler, Berlin, N.J.; Richard A. Heberle, Holland; Richard G. Tonkyn, Cornwells Heights, and Norman Vorchheimer, Buckingham, all of Pa., assignors to Betz Laboratories, Inc., Trevose, Pa.

Continuation of Ser. No. 607,863, Aug. 26, 1975, abandoned. This application Mar. 18, 1977, Ser. No. 779,193

Int. Cl.^{2} B01D *17/02*

U.S. Cl. 210—51 **18 Claims**

1. A process for separating oil from oil-containing wastewater which comprises treating the wastewater with a water-soluble cationic polymer consisting essentially of the product of the polymerization of an epihalohydrin with an alkylene polyamine having the formula



wherein R is a lower alkylene having from 2 to about 6 carbon atoms, and R_1 and R_2 are each a lower alkyl of from 1 to about 6 carbon atoms.

4,059,516

PROCESS FOR TREATING WOOL SCOURING WASTES

Willis A. Heisey, Denver, Pa., assignor to Geo. W. Bollman & Co., Inc., Adamstown, Pa.

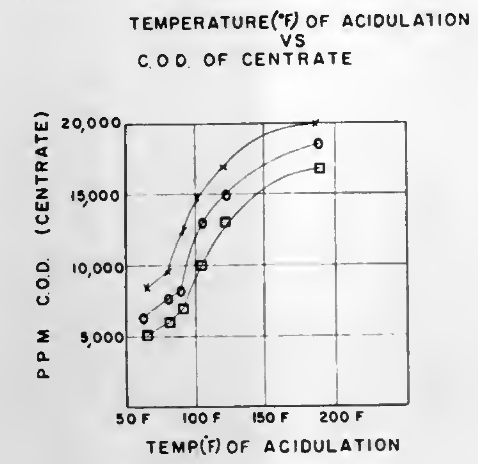
Filed May 19, 1976, Ser. No. 687,538

The portion of the term of this patent subsequent to Sept. 30, 1992, has been disclaimed.

Int. Cl.^{2} C02B *1/20*

U.S. Cl. 210—53 **2 Claims**

1. An improved process for treating wool scouring waste liquors having an initial COD in excess of 20,000 ppm, including the steps of cooling the waste liquor to a temperature in the range of 80° to 90° F after discharge from a scouring bowl at a temperature in the range of 130° to 150° F, adding acid and collodial bentonite to said cooled waste liquor, maintaining a pH range of 3.5 to 3.9 and bentonite at a weight to volume ratio in the range 0.10 to 0.3%, adding lime to adjust the pH range to 5.8 to 6.3 and flocculating the waste liquor, the improve-



EFFECT OF TEMP. OF ACIDULATION OF WOOL SCOUR LIQUOR ON FLOCCULATION EFFICIENCY (C.O.D.)

x 0.0% BENTONITE
o 0.15% BENTONITE
□ 0.30% BENTONITE

ment comprising the steps of heating the flocculated waste liquor to a temperature in the range of 130° to 150° F, separating the waste liquor into a supernatent liquor and a settled non-drainable grease containing sludge, and dewatering the settled grease containing sludge by centrifugal separation.

4,059,517

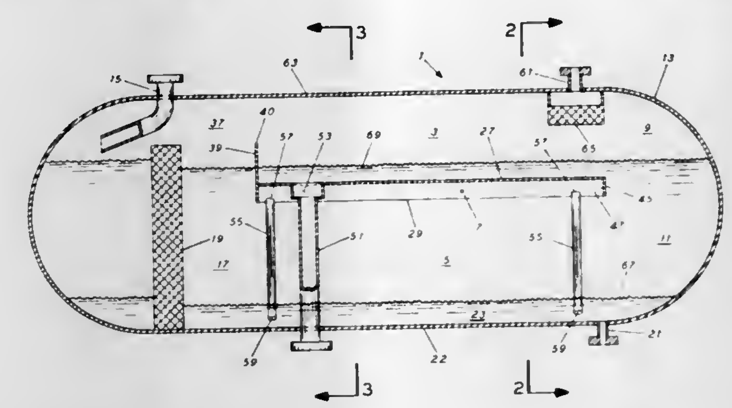
LIQUID SEPARATION APPARATUS AND METHOD

David F. Strahorn, and Roger F. Goldstein, both of Oakland, Calif., assignors to Chevron Research Company, San Francisco, Calif.

Filed Sept. 13, 1976, Ser. No. 722,972

Int. Cl.^{2} B01D *17/00*

U.S. Cl. 210—73 R **15 Claims**



1. Apparatus for gravity separation of a lighter liquid from a heavier liquid comprising in combination:

a vessel adapted to contain a mixture of said heavier and lighter liquids flowing longitudinally therein;

generally horizontal baffle means extending transversely entirely across the interior of said vessel and extending longitudinally to separate an upper space above said baffle means from a lower space below said baffle means in said vessel, said upper space and said lower space being in communication through passage means located adjacent a first longitudinal end of said baffle means;

said baffle means defining a sloping floor of said upper space, said floor having a higher portion and a lower portion;

means extending upwardly from a second longitudinal end of said horizontal baffle means to a height above said higher floor portion and extending transversely entirely across said horizontal baffle means for preventing the flow of liquid between said upper space and lower space;

said vessel including inlet means for introducing a mixture of said lighter liquid and said heavier liquid into said vessel and into said lower space

adjacent said second longitudinal end of said baffle means, said mixture flowing toward said first end of said baffle means whereupon said heavier liquid gravity separates from said lighter liquid and collects along the bottom of said lower space, and said lighter liquid flows along the top of said lower space and enters said upper space through said passage means;

said vessel including liquid outlet means communicating with said lower space for conducting said heavier liquid from said vessel;

first conduit means communicating with said upper space for conducting said lighter liquid from said vessel; and

second conduit means communicating with said upper space at a location lower than said first conduit means and adjacent said lower portion of said upper space floor for conducting from said upper space into said lower space heavier liquid which enters said upper space and gravity separates from said lighter liquid along said sloping floor.

9. Apparatus as defined in claim 1 further including a generally vertically oriented coalescing pad disposed transversely within said vessel between said inlet means and said horizontal baffle means.

4,059,518

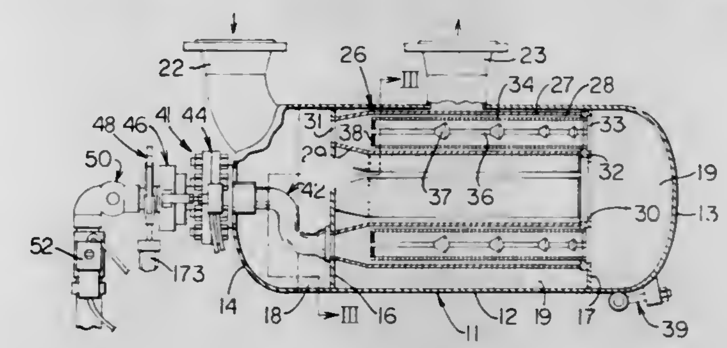
FILTER WITH AXIALLY SHIFTABLE ROTATING BACKWASH SELECTOR

John W. Rishel, Vicksburg, Mich., assignor to Dover Corporation, Portage, Mich.

Filed July 29, 1975, Ser. No. 599,956

Int. Cl.^{2} B01D *29/26*

U.S. Cl. 210—108 **11 Claims**



1. A filter assembly for removing contaminants from a fluid, comprising:

closed, hollow housing means;

a plurality of individual filter units circumferentially arranged in said housing means;

means compartmenting said housing means for channeling a contaminated fluid to be filtered in a filtering direction through said filter units from one end of each thereof and for receiving filtered fluid from the other ends of said filter units;

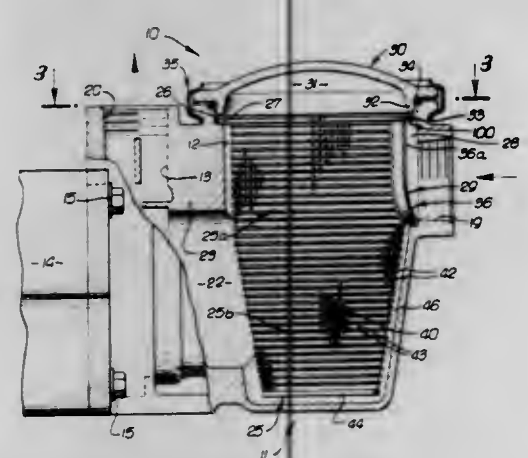
a rotatable backwash arm means in at least one end of said housing means and engageable with said one end of a given said filter unit for backwash fluid flow communication therewith, said rotatable backwash arm means including an arm conduit within said housing means and having a central extension passing from said housing means in sealed and rotatably and axially movable relation therewith, said one ends of said filter units lying substantially in a plane, the rotational axis of said backwash arm means being substantially perpendicular to said plane and coaxial with the circumferential array of filter units, said array of filter units and said backwash arm means being confined to zones on opposite sides of said plane;

means engaging said backwash arm means and actuable for rotatably indexing said backwash arm means from filter unit to filter unit while simultaneously axially offsetting

said backwash arm means away from said plane of said filter unit one ends during rotative movement of the backwash arm means, thereby to prevent scrubbing contact therebetween;

diametrically spaced pivot means on said one housing end, said means for axially offsetting said backwash arm means comprising collar means surrounding said arm conduit extension, bearing means coaxially locating said collar means with respect to said arm conduit extension and permitting rotation of said arm conduit extension therewith, annular means axially fixing said bearing means with respect to said arm conduit extension, yoke means adjacent said collar means and diametrically gimballed with respect thereto, said yoke means including mechanical advantage means pivotally coupled to said diametrically spaced pivot means and including a resilient motor means interposed therein and actuable for substantially axially reciprocating said collar means and hence said backwash arm means.

4,059,519
PUMP BASKET STRAINER AND ASSEMBLY
Steven A. Zieg, Yorba Linda, Calif., assignor to Purex Corporation, Lakewood, Calif.
Filed Dec. 29, 1975, Ser. No. 645,086
Int. Cl.² E04H *3/20*
U.S. Cl. 210—169 **7 Claims**



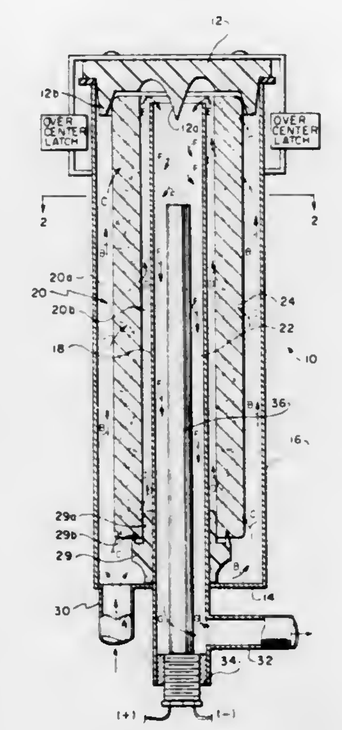
1. In a pump volute housing and strainer assembly,

a. a housing forming a downwardly extending primary chamber having an upper level fluid inlet port and a lower level fluid outlet port, said ports located at opposite sides of the chamber, the housing having an internal support ledge, and

b. a fluid strainer basket received downwardly in said chamber and supported on said ledge, the basket having a side inlet in registration with said primary chamber inlet port, the basket having exteriorly and interiorly presented ribs that intersect to form perforations to pass fluid from the basket interior to said primary chamber outlet port,

c. said internal support ledge being located above the level of said primary chamber inlet port, the ledge extending about the basket but being interrupted by an upward extension of said primary chamber inlet port, the basket having an external flange engaging said ledge, the flange extending generally circularly over the basket side inlet to thereby define a handle adapted to be grasped from the basket upper interior to remove the basket upwardly from the primary chamber, the basket and housing having generally vertically extending guide means proximate said inlet port and cooperating to locate the handle generally above said inlet port when the basket is received downwardly into said chamber.

4,059,520
APPARATUS FOR FILTERING AND HEATING A LIQUID
Thomas W. Roller, Webster, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.
Filed June 1, 1976, Ser. No. 691,690
Int. Cl.² B01D *35/18;* **F24H** *1/10;* **H05B** *1/00*
U.S. Cl. 210—184 **5 Claims**



1. An apparatus for filtering and heating a liquid, which apparatus comprises:

means defining an elongate housing having first and second opposed end walls;

means within said housing including a longitudinally extending imperforate wall means to define an inner chamber and cooperating with the elongate housing to define an outer chamber which substantially surrounds the inner chamber, the longitudinally extending wall means being spaced from the first end wall of the housing to permit filtered liquid to flow between the outer and inner chambers;

means for introducing a liquid to be filtered and heated into the outer chamber of the housing;

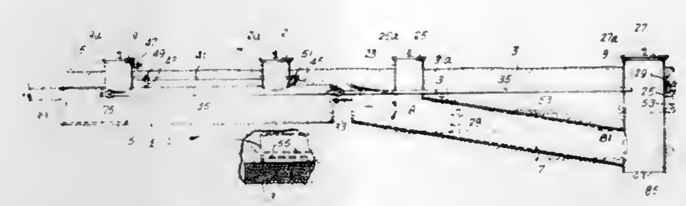
longitudinally extending filter means located in the outer chamber for filtering the liquid introduced into the housing, the filter means being spaced from the longitudinally extending wall means to define a liquid flow path between the filter means and the longitudinally extending wall means for flow of the filtered liquid towards the first end wall of the housing;

the first end wall of the housing including a dependent portion of generally conical configuration which extends into the inner chamber and has a base external of the inner chamber and a vertex within the inner chamber, said portion cooperating with the longitudinally extending imperforate wall means to reverse the direction of the liquid moving towards the first end wall of the housing and to direct the liquid to flow into the inner chamber in a direction towards the second end wall of the housing;

longitudinally extending heating means located in the inner chamber of the housing and extending from the second end wall of the housing towards the first end wall of the housing for heating the filtered liquid as it flows along the heater means; and

means located proximate the second end wall of the housing for removing filtered and heated liquid from the inner chamber.

4,059,521
SEWAGE PURIFICATION SYSTEM
Roy W. Lumsden, 13355 Granada, Houston, Tex. 77015
Filed Dec. 19, 1975, Ser. No. 642,377
Int. Cl.² C02B *1/34;* **C02C** *1/12*
U.S. Cl. 210—195 S **10 Claims**



1. An apparatus for purifying untreated liquid sewage containing biologically degradable solid waste material, which apparatus comprises, in combination:

A. means for feeding said untreated sewage into a first substantially closed elongate tank having a substantially horizontal axis and means for agitating and separate means for aerating the sewage in said tank to effect almost complete digestion thereof,

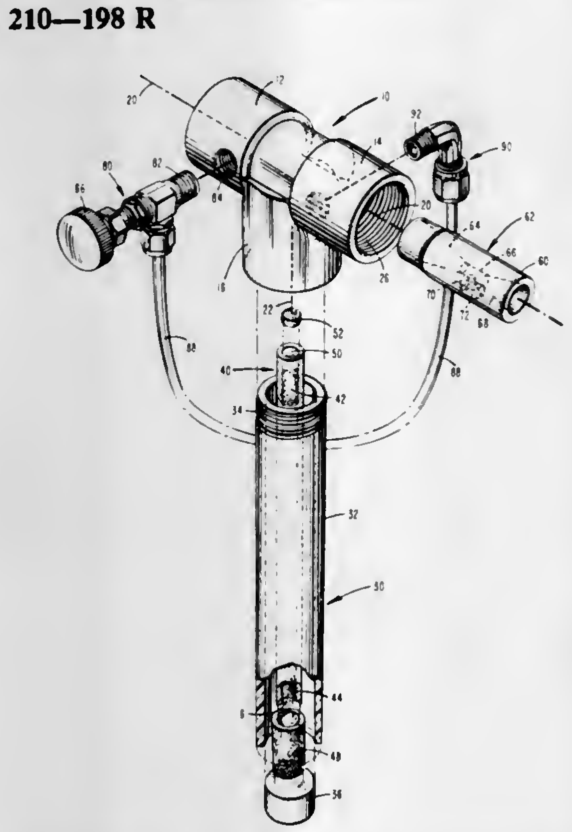
B. a second substantially closed elongate tank having a generally horizontal longitudinal axis declined with respect to the longitudinal axis of the first tank for receiving the treated sewage from the first tank and for settling the treated sewage,

C. a substantially closed collection tank disposed at the lower end of the second tank for receiving the settled sewage from the lower end of the second tank and for separating the settled sewage into a purified liquid component and a residual solid waste material in suspension component,

D. a recycle means for recycling the residual solid waste material in suspension component back to the first tank, and

E. a substantially closed third elongate tank for receiving and distributing the purified liquid component into the ground.

4,059,522
APPARATUS FOR PURIFYING WATER
Richard D. Polley; Eric L. Nilson; Roberto Constantakis, and Donovan E. Pruitt, all of El Paso, Tex., assignors to Iodinamics Corporation, El Paso, Tex.
Filed Dec. 12, 1975, Ser. No. 640,200
Int. Cl.² C02B *1/18*
U.S. Cl. 210—198 R **7 Claims**



1. An apparatus for purifying water comprising a fitting for installation in a water line, said fitting having substantially parallel sections defining a primary water flow path having openings for receiving inlet and outlet water lines, said fitting also having a laterally extending section defining a secondary water flow path, a Venturi tube mounted in said fitting in said primary water flow path, said Venturi tube defining a Venturi having a converging section, a throat and a diverging section, said converging section and said diverging section adapted to face upstream and downstream, respectively, relative to said primary water flow path, said Venturi tube defining an opening communicating with said throat and said secondary water flow path, a tank removably connected to and extending below said laterally extending section of said fitting to define a sump, a container housed within said tank and secured at one end to said opening in said Venturi tube and having its other end extending above the bottom of said tank, said container adapted to hold a bed of iodine crystals, distributor means positioned at the inlet and outlet of said container, said distributor means being permeable to water containing dissolved iodine and impermeable to said iodine crystals, and a metering valve having an inlet communicating with said primary water flow line at one end of said Venturi tube and having an outlet in flow communication with the inlet of said tank, said Venturi creating a pressure differential forcing a small portion of the water to flow through said metering valve, said tank and said container and be returned to said primary water flow stream at the throat of said Venturi, said container having a cross-sectional flow area which provides minimum velocity, as calculated through the freeboard area of said container, of about 7 cm/sec based on the volume flow through said container to produce a solution with a constant iodine concentration.

2. An apparatus for purifying water comprising a fitting for installation in a water line to define a primary water flow path, a Venturi means mounted in said fitting in said primary water flow path, a container housed in a tank defining a sump and having an inlet for admitting water into said container and an outlet communicating with said primary water flow path at the throat of said Venturi means, said container adapted to hold a bed of solid purfying agent, means for establishing a secondary water flow path between said fitting at one end of said Venturi means and the inlet of said container, metering valve means positioned in the secondary water flow path upstream of said container, distributor means positioned at the inlet and outlet of said container, said distributor means being permeable to water containing dissolved purifying agent and impermeable to said purifying agent, said Venturi means adapted to create a pressure differential forcing a small portion of the water in the water line to flow through said bed of purifying agent and be returned to said primary water flow path, said container having a cross-sectional flow area which provides a minimum velocity, as calculated through the freeboard area of said container, of about 7 cm/sec based on the volume flow through said container to produce a solution with a constant purifying agent concentration.

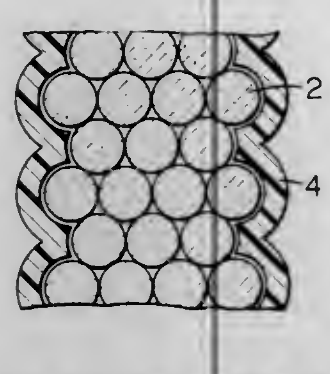
4,059,523
COLUMN FOR USE IN HIGH SPEED LIQUID CHROMATOGRAPHY
Koichi Mochizuki, and Shigeho Hiragaki, both of Hachioji, Japan, assignors to Japan Spectroscopic Co., Ltd., Tokyo, Japan
Filed Sept. 23, 1976, Ser. No. 725,938
Int. Cl.² B01D *15/08*
U.S. Cl. 210—198 C **5 Claims**

1. A column for use in high speed liquid chromatography which is constructed by closely packing a solid phase in a hollow tubular body, said column comprising:

a solid phase wherein the composing solid particles, having a substantially uniform particle size of a sphere having a diameter less than 0.10 mm, are packed in said tubular body in close contact relationship with each other; and

a tubular body having an inner diameter less than 1.0 mm, which is made of fluoro-carbon resin, and which is de-

formed to be adapted to the particles located at the radially outermost position, for permiting all of the particles



confronting with the inner surface thereof to closely contact therewith, substantially leaving no void spaces therebetween.

4,059,524

WATER PURIFYING DEVICE WITHOUT MOVABLE MECHANICAL PART IN CONTACT WITH THE LIQUID TO BE TREATED

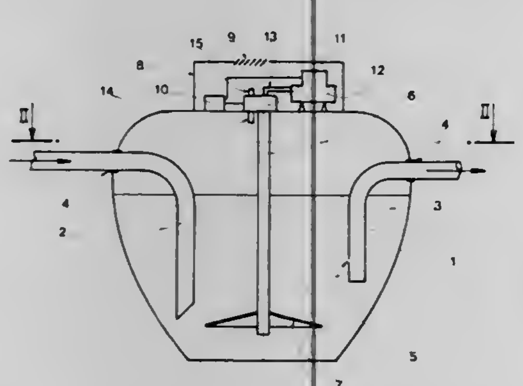
Jean Chataigner, 11 rue Hemingway la chaine, Plaisir 78370, and Jean-Claude Joseph Rader, 2 rue Paul Gimont, 92500 Rueil Malmaison, both of France

Filed May 11, 1976, Ser. No. 685,418

Claims priority, application France, May 15, 1975, 75.15255

Int. Cl.² C02B *1/34;* **C02C** *5/04*

U.S. Cl. 210—220 9 Claims



1. A water purifying device comprising a single tank defining a single chamber, a water feeding pipe extending into said chamber and having an outlet disposed in said chamber at a selected level, a water exhaust pipe extending into said chamber and having an outlet located in said chamber at a level above said selected level, the level at which said water exhaust pipe extends out of said chamber being lower than the level at which said water feeding pipe extends into said chamber, said tank having an upper portion and means for supplying gas under pressure at said upper portion, a stationary gas dispersing means extending into said tank to the lower part of said chamber, gas flow means located at the upper part of said chamber, and control valve means connected to said gas supplying means, said control valve means being movable, at least, between a first position, wherein gas under pressure is supplied to said stationary gas dispersing means and said gas flow means is connected to the atmosphere, and a second position, wherein said gas supplying means is connected to said gas flow means and said stationary gas dispersing means is closed.

4,059,525

SLIDE FILTERS

Leonard L. Krasnow, 293 Turnpike Road, Westboro, Mass. 01581

Filed June 28, 1976, Ser. No. 700,100

Int. Cl.² B01D *25/12*

U.S. Cl. 210—236 18 Claims

1. A slide filtration apparatus for filtering a fluid material, comprising in combination:

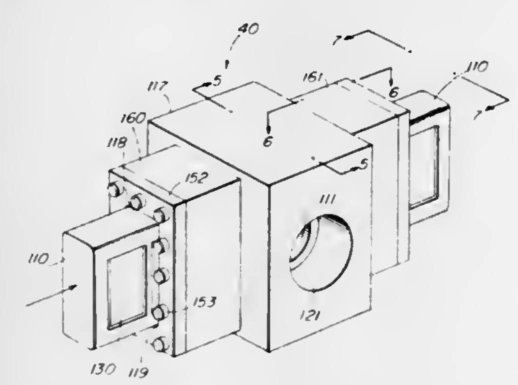
A. a fluid flow path means having a fluid inlet and a fluid outlet,

B. guideway means which intersects said flow path means in a substantially perpendicular relationship, said guideway means having inlet and outlet portions on opposite sides of said flow path means, thereby defining an area of flow intersection between said inlet and outlet portions,

C. a slide plate having at least a front surface and a back surface, said slide plate comprising at least one breaker means formed of bores extending through said front surface to said back surface; seal contact means surrounding said at least one breaker means on at least said front surface; said seal-contact means comprising substantially flat seal-contacting surfaces spatially displaced from and substantially parallel to said front surface; the total area of said seal-contacting surfaces representing a minor fraction relative to the area of said front surface,

D. seal means positioned within said guideway means; said slide plate functioning to be insertable in and through said guideway means and said seal means; said guideway means being larger in cross-section than said slide plate, and

E. seal adjustment means cooperatively functioning with said seal means to adjust said seal means within said guideway means so as to contact at least said front surface of said slide plate exclusively at said seal-contacting surfaces so as to enable said slide plate to be moved with reduced friction through said guideway for substantially continuous filter changing while maintaining substantially unchanged the adjustment of said seal adjustment means.



10. A slide filtration apparatus for filtering a fluid material, comprising in combination:

A. a fluid flow path means having a fluid inlet and a fluid outlet,

B. guideway means which intersects said flow path means in a substantially perpendicular relationship, said guideway means having inlet and outlet portions on opposite sides of said flow path means, thereby defining an area of flow intersection between said inlet and outlet portions,

C. a slide plate having at least a front surface and a back surface, said slide plate comprising at least one breaker means formed of bores extending through said front surface to said back surface; seal contact means surrounding said at least one breaker means on at least said front surface; said seal-contact means comprising substantially flat seal-contacting surfaces spatially displaced from and substantially parallel to said front surface; the total area of said seal-contacting surfaces representing a minor fraction relative to the area of said front surface,

D. seal means positioned exclusively within at least one of said inlet portion and said outlet portion of said guideway means; said slide plate functioning to be insertable in and through said guideway means and said seal means; said guideway means being larger in cross-section than said slide plate, and

E. seal adjustment means cooperatively functioning with said seal means to adjust said seal means within said at least one portion of said guideway means so as to contact at least said front surface of said slide plate exclusively at said seal-contacting surfaces exclusively within said at least one portion of said guideway means so as to enable said slide plate to be moved with reduced friction through said guideway for substantially continuous filter changing while maintaining substantially unchanged the adjustment of said seal adjustment means.

4,059,526

DEVICE FOR COLLECTING LIGHT-WEIGHT SUBSTANCES FLOATING ON A LIQUID SURFACE

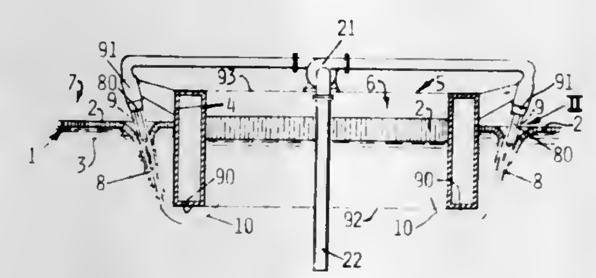
Cornelis Gerardus Middelbeek, Nootdorp, Netherlands, assignor to Ballast Nedam Groep N.V., Amstelveen, Netherlands

Filed Mar. 24, 1976, Ser. No. 669,834

Claims priority, application Netherlands, Apr. 4, 1975, 7504064

Int. Cl.² E02B *15/04*

U.S. Cl. 210—242 S 9 Claims



1. In apparatus for collecting light-weight material such as oil, from the surface of a body of water, which comprises wall means defining an enclosure for isolating a volume of a body of water from the free surface of the water outside such isolated volume, said wall means extending from a level above said free surface to a level below the oil so as to define a reservoir space which communicates directly with the body of water beneath the reservoir space; and nozzle means outside of and spaced from said wall means for downwardly and inwardly directing a stream of water through the oil on the surface of the body of water to a location beneath the open bottom of said enclosure said nozzle means comprising at least one jet nozzle discharging water at said downward inclination to impinge said oil; the improvement which comprises:

guide means attached to said jet nozzle and extending downwardly therefrom at said inclination to terminate at a point below the level of said light-weight material, said guide means being oriented with respect to said jet nozzle such that the water discharged therefrom clings to and concentrically surrounds said guide means.

4,059,527

PRETREATMENT FILTER PRESS DEWATERING SYSTEM

Albert Bähr, Parallelstrasse 2A, D-6683 Elversberg, Saar, Germany

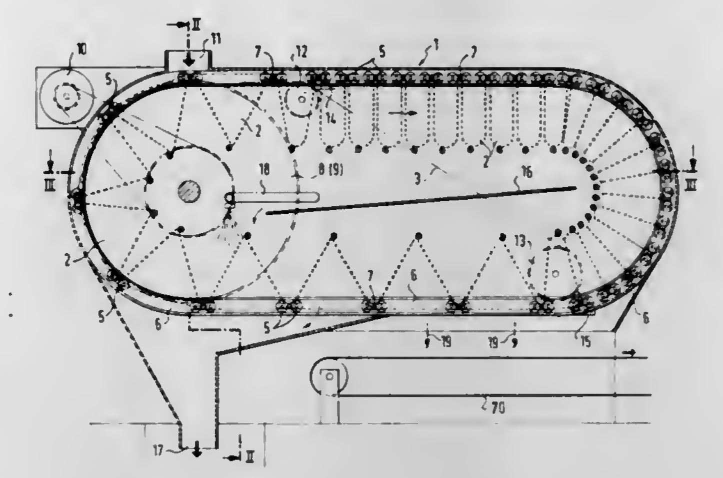
Filed Nov. 17, 1975, Ser. No. 632,691

Claims priority, application Germany, June 4, 1975, 2524851

Int. Cl.² B01D *33/02*

U.S. Cl. 210—259 8 Claims

1. An apparatus for the removal of an appreciable amount of liquid from an aqueous mixture having an appreciable solids content, which comprises a system of continuous filter pocket means, said filter pocket means being positioned to travel in an endless pattern whereby at one position said mixture enters into individual filter pocket means and at a second position said filter pocket means discharges the partially dewatered aqueous mixture out of said apparatus, each said filter pocket means having an open top, sidewalls and a closed bottom, said sidewalls and bottom comprising perforated material for the drainage of liquid therethrough, means for delivering an aqueous mixture of material into the open tops of said pocket means when those tops face upwardly, means for discharging an aqueous mixture of material from the open tops of said pocket means when those tops face downwardly, said apparatus further comprising means to compress the pocket means to reduce



the volume thereof after delivery of material thereinto and prior to discharge of material therefrom.

4,059,528

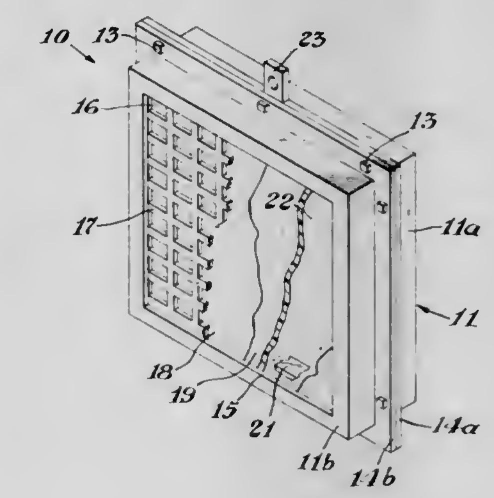
CARTRIDGE FILTER

Sandor Grosshandler, Middleburgh Heights, Ohio, assignor to The Dow Chemical Company, Midland, Mich.

Filed Feb. 9, 1976, Ser. No. 656,762

Int. Cl.² B01D *27/02*

U.S. Cl. 210—282 9 Claims



1. A filter cartridge, the filter cartridge comprising a hollow frame defining therein a fluid passage opening for liquid to pass through, the hollow frame having at least a first frame portion and a second frame portion, each of the frame portions being disposed in generally facing mating relationship and means to affix the first frame portion to the second frame portion, the hollow frame defining a generally inwardly facing annular channel, the channel being bounded by inwardly facing channel edges and surrounding the fluid passage opening, the channel edges having disposed thereon oppositely disposed sealing ridges or projections, the sealing ridge of the first frame portion and the second frame portion being generally oppositely disposed and dependent toward each other, first and second rigid foraminous sheet members disposed on first and second sealing ridges respectively, the first and second foraminous members being disposed in generally fixed parallel relationship across the fluid passage opening, first and second flexible foraminous members disposed adjacent, and between the first and second rigid foraminous members respectively, the first and second both rigid and flexible sheets extending into the annular channel a compressible particulate sorptive mass in partially compressed form disposed between the flexible foraminous members the amount of compression being sufficient to maintain the mass in position so that stratification does not occur under desired flow conditions and means to prevent substantial fluid flow from the annular channel between the first and second frame portions.

4,059,529

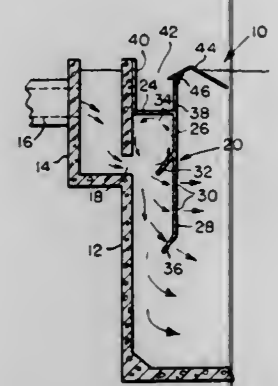
BAFFLE FOR WATER OR SEWAGE SETTLING TANKS

Robert F. McGivern, Columbus, Ohio, assignor to Sybron Corporation, Rochester, N.Y.

Filed May 17, 1976, Ser. No. 686,947

Int. Cl.² B01D *21/24*

U.S. Cl. 210—519 **7 Claims**



1. A baffle for water or sewage settling tanks adapted for attachment to an end wall of the tank containing inlets from which liquid to be treated enters the tank, said baffle comprising:

a. an upright panel;

b. a spacer fixed to and extending substantially normal to said upright panel for attaching said panel to the end wall of the tank containing said inlets;

c. at least one deflector on said upright panel, said deflector extending outwardly therefrom in the direction of said spacer and downwardly, said deflector being below said spacer so as to deflect liquid impinging thereagainst upwardly toward said spacer; and

d. said upright panel in the area between said spacer and deflector being solid and said upright panel in the area below said deflector having a plurality of horizontally and vertically spaced openings therethrough to permit the passage of liquid to be treated through said upright panel.

4,059,530

DIALYZER CARTRIDGE OF ROLL TYPE PARTICULARLY FOR EXTRACORPORAL ARTIFICIAL KIDNEYS

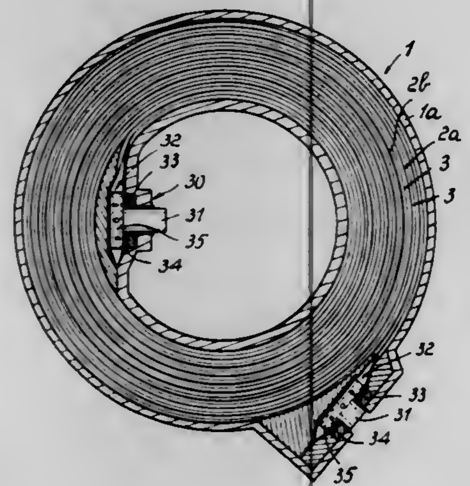
Libero Luppi, Viale Martiri, 13, Mirandola (Modena), Italy

Filed Apr. 7, 1975, Ser. No. 565,506

Claims priority, application Italy, Apr. 10, 1974, 21235/74

Int. Cl.² B01D *31/00*

U.S. Cl. 210—321 B **7 Claims**



1. A dialyser cartridge of roll type particularly for extracorporal artificial kidneys comprising an outer casing, a support element consisting of a length of plastics material sheet spirally wound in said casing and having a longitudinally extending web and at least one type of projections on both sides of the web distributed in aligned arrangement to provide spaces between the projections defining fluid flow passages for the dialysing liquid, the aligned arrangement of said projections on one side of said web defining a first plurality of parallel directional lines and the aligned arrangement of the projections on the other side of said web defining a second plurality of parallel centerlines, a flattened tubular dialyser membrane longitudinally and transversely coextensive with said support element and disposed, along turns thereof between said one side of said support element and said other side of the subsequent turn of said support element and wherein, the improvement consists in that at least part of said first plurality of directional lines is arranged at an angle with respect to said second plurality of directional lines, said first and said second plurality of directional lines crossing each other at least partially and at least part of said projections on one side of said web abutting with the interposition of said membrane against the projections on the other side of the web thereby to prevent embedding of said projections on one side of said web in the spaces between said projections on the other side of said web.

4,059,531

AUTOMATIC SLUDGE EXTRACTION AND WASHING DEVICE FOR USE IN A WATER TREATMENT SETTLING APPARATUS

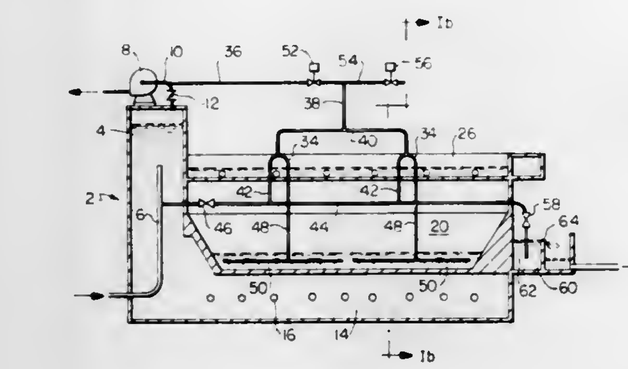
Jacques Tardivel, Plaisir, France, assignor to Societe Degremont, Rueil-Malmaison, France

Continuation-in-part of Ser. No. 595,303, July 11, 1975, abandoned. This application Feb. 15, 1977, Ser. No. 768,821

Claims priority, application France, Aug. 8, 1974, 74.27523

Int. Cl.² B01D *23/00*

U.S. Cl. 210—522 **10 Claims**



1. In a sludge bed settling apparatus of the type including a decanter containing therein a sludge bed, means for introducing fluid to be treated into said decanter and for passing said fluid upwardly through said sludge bed, whereby impurities are removed in the form of settling sludge, and a sludge concentrator for collecting a portion of said sludge; the improvement of means for selectively extracting sludge from said concentrator and for selectively washing said concentrator and decanter, said extracting and washing means comprising:

at least one siphon having a first end extending into said concentrator and a second end;

a manifold conduit extending from said fluid introducing means to a sludge removal station, said second end of said siphon being connected to said manifold conduit;

a vacuum source;

first valve means selectively movable from a first position connecting said siphon to said vacuum source to a second position blocking connection between said siphon and said vacuum source;

second valve means selectively movable from a first position connecting said siphon to atmosphere and a second position blocking said siphon from atmosphere;

third valve means selectively movable from a first position connecting said manifold conduit to said fluid introducing means and a second position blocking connection between said manifold conduit and said fluid introducing means;

fourth valve means selectively movable from a first position connecting said manifold conduit to said sludge removal station to a second position blocking connection between said manifold conduit and said sludge removal station;

whereby, when said first, second, third and fourth valve means are respectively in said first, second, second and first positions thereof sludge in said concentrator is sucked by said vacuum source into said first end of said siphon, out said second end of said siphon into said manifold conduit, and from said manifold conduit to said sludge removal station, thereby achieving a sludge extraction operation; and

whereby, when said first, second, third and fourth valve means are respectively in said first, second, first and second positions thereof, fluid passes from said fluid introducing means into said manifold conduit, is sucked by said vacuum source into said second end of said siphon, passes through said first end of said siphon into said concentrator, thereby washing said concentrator, and overflows said concentrator, thereby falling onto and washing the bottom of said decanter, thereby achieving a washing operation.

4,059,532

PHOSPHORUS-CONTAINING REACTION PRODUCTS USEFUL AS FLAMEPROOFING AGENTS

Hermann Nachbur, Dornach, and Peter Rohringer, Basel, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Dec. 5, 1975, Ser. No. 638,140

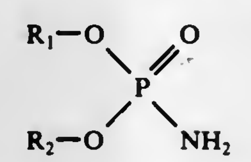
Claims priority, application Switzerland, Dec. 9, 1974, 16311/74; Feb. 12, 1975, 1716/75

Int. Cl.² C09K *3/00*

U.S. Cl. 252—8.1 **15 Claims**

1. A phosphorus-containing condensation products made from

a. 2 to 6 moles of an amidophosphate of the formula



in which R_1 and R_2 each independently are alkyl having 1 to 4 carbon atoms, halogenoalkyl or alkenyl having 2 to 4 carbon atoms, or R_1 and R_2 together are alkylene having 2 to 4 carbon atoms;

b. 1 mole of a 1,3,5-triazine substituted by at least 2 primary amino groups;

c. 2 to 12 moles of formaldehyde or of an agent releasing formaldehyde; and optionally

d. 0 to 6 moles of an alkanol having 1 to 4 carbon atoms.

4,059,533

OXYGEN SCAVENGING METHODS AND ADDITIVES

Jimmie L. Watson, and Leroy L. Carney, both of Duncan, Okla., assignors to Halliburton Company, Duncan, Okla.

Filed Oct. 29, 1974, Ser. No. 518,306

Int. Cl.² C09K *7/02, 7/04;* **E21B** *43/22;* **C01B** *17/66*

U.S. Cl. 252—8.5 A **5 Claims**

1. A method of maintaining the oxygen concentration in an aqueous fluid at a very low concentration comprising; adding to said aqueous fluid an oxygen scavenging composition comprising a carrier liquid having dispersed therein sodium dithionite or a mixture thereof with sodium dithionate, said carrier liquid containing a thickening agent to suspend therein said sodium dithionite or a mixture of sodium dithionite with sodium dithionate, wherein said carrier liquid is selected from the group consisting of liquid aliphatic hydrocarbon, liquid aromatic hydrocarbon and mixtures thereof.

4,059,534

HYDROCARBON/SILICON OIL LUBRICATING COMPOSITIONS FOR LOW TEMPERATURE USE

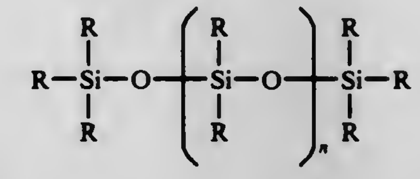
William Charles Morro, Montreal; Leo Ernest Hakka, Dollard des Ormeaux; James Mackay Brophy, Dorval; Michel Jacques Roger Hebrard, Montreal Nord, and Jean Claude Courtes, Chomedy Laval, all of Canada, assignors to Union Carbide Canada Limited, Toronto, Canada

Filed Apr. 7, 1976, Ser. No. 674,346

Int. Cl.² C10M *1/50*

U.S. Cl. 252—32.7 E **29 Claims**

1. A lubricating oil composition comprising a homogeneous mixture of from 1% to 50% by weight of (A) poly(dimethylsiloxane) having the general formula:



when R is a methyl group in essentially all cases and n has a value such that the average viscosity of the poly(dimethylsiloxane) at 100° F is between 10,000 cs and 1,000,000 cs, and the remainder of said mixture consisting of (B) hydrocarbon oil having a viscosity of less than 40,000 cs at −65° F, and a flashpoint higher than 175° F, and said hydrocarbon oil being at least one selected from the group consisting of (a) alkenes, (b) isoparaffins, and (c) naphthenics having a single ring which has multiple alkyl substituents; in the case of (a) and (b), the longest carbon chain, and in the case of (c) any alkyl substituent in which the longest carbon chain exceeds five carbon atoms, has multiple substituent alkyl branches, and its methyl branched homolog has a solubility parameter of less than 7.84 and said substituent alkyl branches of four or more carbon atoms are themselves branched, and where at least 50% of said substituent alkyl branches are bonded to carbons of the longest carbon chain which are immediately adjacent, or separated by only one carbon atom.

4,059,535

ASHLESS DETERGENT ADDITIVES FOR FUELS AND LUBRICANTS

Albert N. De Vault, and Hans D. Holtz, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed May 28, 1976, Ser. No. 691,119

Int. Cl.² C10M *1/40, 3/34, 5/22, 7/38*

U.S. Cl. 252—33 **12 Claims**

1. A method for producing detergent additive for lubricants and fuels comprising:

1. reacting a long chain monocarboxylic acid having the general formula R′COOH in which R′ is a long chain aliphatic radical having 10–30 carbon atoms with a multiamine represented by the generic formula $N(RNH_2)_3$ wherein R is an aliphatic radical having 1–6 carbon atoms to produce an amide and
2. further reacting the product of (1) with sulfonic acid represented by the formula $R''SO_3H$ where R″ is aliphatic, cycloaliphatic, or alkaryl having 12–30 carbon atoms in the molecule to produce a sulfonated product.

4,059,536

IMPROVED PROCESS FOR PREPARING SUPERBASIC DETERGENT ADDITIVES

Jacques Lallement, Aubervilliers; Guy Parc, Rueil Malmaison, and Gabriel de Gaudemaris, Grenoble, all of France, assignors to Institut Francais du Petrole, Rueil-Malmaison, France

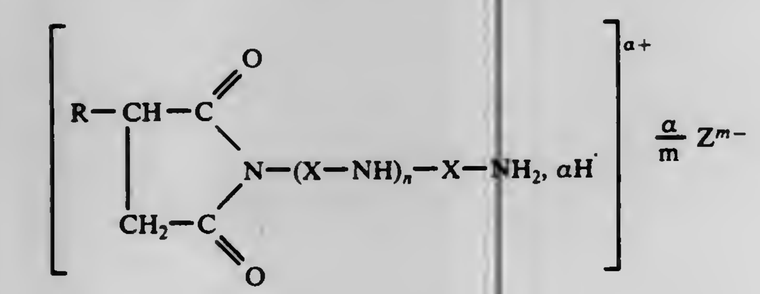
Filed Mar. 27, 1975, Ser. No. 562,897

Claims priority, application France, Mar. 29, 1974, 74.11255; May 14, 1974, 74.16958

Int. Cl.[2] **C10M** *1/40*

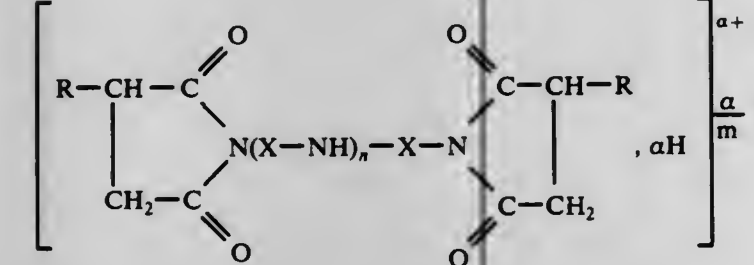
U.S. Cl. 252—33.3 **32 Claims**

1. In a process for preparing a superbasic detergent additive that comprises (a) contacting sulfonic acid with an excess of oxide or hydroxide of a metal element selected from the group consisting of lithium and a metal of Group IIA of the Periodic Classification for a time sufficient to form the sulfonic salt of said metal element, (b) contacting the reaction mixture from step (a) with an amount of carbon dioxide sufficient and at a temperature sufficient to carbonate a substantial portion of the excess amount of said oxide or hydroxide, and (c) separating the uncarbonated fraction of said oxide or hydroxide from the reaction mixture, wherein the improvement comprises employing in the reaction mixture of steps (a), (b) and (c) at least one salt of the formula



(I)

or

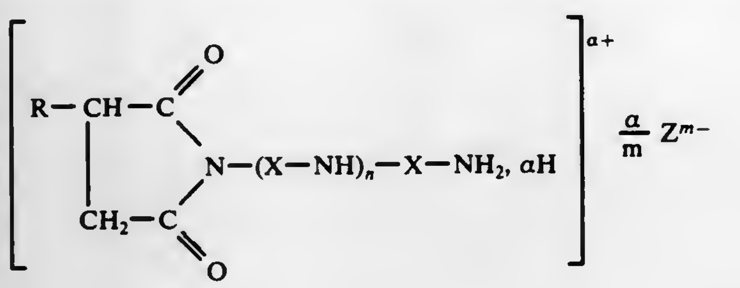


(II)

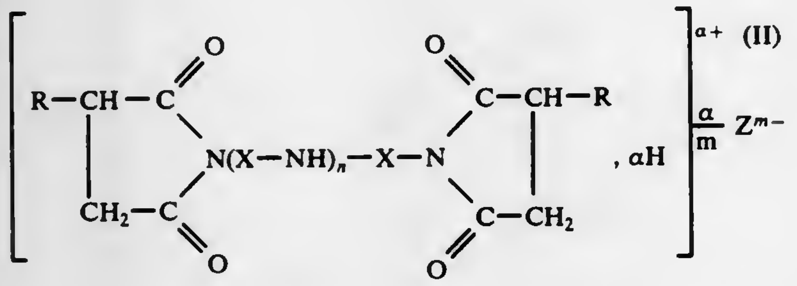
where R is a substantially saturated aliphatic hydrocarbon radical containing from 20 to 250 carbon atoms, X is an alkylene radical of 2-5 carbon atoms, the valences of which are located on separate carbon atoms, n is an integer from 1 to 5, Z^{m-} represents the anion of a protonic acid selected from the group consisting of a halohydric acid, a hydrocarbyl monocarboxylic acid of 1-24 carbon atoms, a hydrocarbyl dicarboxylic acid and a hydrocarbyl polycarboxylic acid, m being the number of acid groups of said protonic acid and α, which represents the number of salified amine groups per molecule of salt, has a value of at most $n+1$ in formula (I) and n in formula (II) said salt being present in sufficient amount to increase the utilization ratio of said excess amount of said oxide or hydroxide.

12. In a process for preparing a superbasic detergent additive that comprises (a) contacting sulfonic acid in a diluent oil which is a mineral oil or a synthetic oil of the ester, polyglycol, polyolefin or aromatic alkylate type, with an excess of oxide or hydroxide of a metal element selected from the group consisting of lithium and a metal of Group II A of the Periodic Classification, in the presence of a solvent system comprising a light aliphatic monohydric alcohol selected from the group consisting of methanol, isopropanol or n-butanol, and a liquid hydrocarbon selected from the group consisting of an aromatic hydrocarbon, a mixture of aromatic hydrocarbons, an aliphatic hydrocarbon of 5-15 carbon atoms, an oil cut boiling in the gasoline or white-spirit temperature range and a cycloaliphatic hydrocarbon, for a time sufficient to form the sulfonic salt of said metal element, (b) contacting the reaction mixture from step (a) with an amount of carbon dioxide sufficient and at a temperature sufficient to carbonate a substantial portion of the excess amount of said oxide or hydroxide without precipitating the carbonated product; (c) separating the uncarbonated fraction of said oxide or hydroxide from the reaction mixture; and (d) removing the volatile solvent components, wherein the improvement comprises employing in the reaction mixture of steps (a), (b), (c) and (d) at least one salt of the formula

(I)



or



where R is a substantially saturated aliphatic hydrocarbon radical containing from 20 to 250 carbon atoms, X is an alkylene radical of 2-5 carbon atoms the valences of which are located on separate carbon atoms, n is an interger from 1 to 5, Z^{m-} represents the anion of a protonic acid selected from the group consisting of a halohydric acid, a hydrocarbyl monocarboxylic acid of 1-24 carbon atoms, a hydrocarbyl dicarboxylic acid, and a hydrocarbyl polycarboxylic acid, m being the number of acid groups of said protonic acid and α, which is the number of amine groups salified in each salt molecule has a positive value of at most $n+1$ in formula (I) and n in formula (II), said salt being present in sufficient amount to increase the utilization ratio of said excess amount of said oxide or hydroxide.

4,059,537

PIEZOELECTRIC MATERIAL

Gerald P. Espinosa, Thousand Oaks, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Oct. 12, 1976, Ser. No. 731,160

Int. Cl.[2] **C04B** *35/46, 35/48*

U.S. Cl. 252—62.9 **1 Claim**

1. A piezoelectric material having the following approximate formula:

$$(Pb_{0.94}\,Bi_{0.06})_1\,(Zr_{0.432}\,Ti_{0.528}\,Ni_{0.02}\,Mn_{0.02})_1\,O_3,$$

and wherein the hysteresis of said material is less than 250 ppm and the temperature coefficient of resonant frequency between $-60°$ C to 100° C is approximately 22 ppm per ° C.

4,059,538

METHOD FOR PREPARING GRANULATED DETERGENT FORMULATIONS

Robin John Green; Richard Shaw Johnson, both of Wirral, and John Kenneth Potter, Wallasey, all of England, assignors to Lever Brothers Company, New York, N.Y.

Continuation of Ser. No. 408,125, Oct. 19, 1973, abandoned. This application Mar. 1, 1976, Ser. No. 662,772

Claims priority, application Canada, Oct. 20, 1972, 48420

Int. Cl.[2] **C11D** *7/54*

U.S. Cl. 252—95 **8 Claims**

1. A method of granulating a detergent formulation containing from about 2 to about 40% by weight of detergent active material, and from about 5 to about 60% by weight of detergency builder material to form granules in the range from about 0.3 mm to about 3.00 mm from detergent components in powder form, wherein the detergent components are formed into a substantially horizontal annular rotation bed within an apparatus comprising a roughened rotating table concentrically displaced within a smooth walled cylinder, and contacted with a compatible liquid binder that is released from a component during rotation of the formed bed.

4,059,539

(U,ZR)N ALLOY HAVING ENHANCED THERMAL STABILITY

Ralph A. Potter, Lynchburg, Va., and James L. Scott, Knoxville, Tenn., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Continuation of Ser. No. 490,447, July 22, 1974, abandoned. This application Jan. 8, 1976, Ser. No. 647,477

Int. Cl.[2] **G21C** *3/58*

U.S. Cl. 252—301.1 R **2 Claims**

1. In a method of operating a nuclear reactor at a temperature at which UN fuel decomposes to free uranium, the improvement which comprises using a (U,Zr)N composition containing at least 2 and up to 10 weight percent Zr at a temperature in the range 1500°-1700° C. as a reactor fuel in said reactor said (U,Zr)N being a solid solution of ZrN in a solvent matrix of UN and having a homogeneous single-phase structure.

4,059,540

PROCESS FOR MAKING COLLOIDAL SOLS OF ANTIMONY PENTOXIDE IN POLAR ORGANIC SOLVENTS

Charles E. Crompton, Arlington Heights, Ill., and Abdulla M. Z. Kazi, Euclid, Ohio, assignors to Chemetron Corporation, Chicago, Ill.

Continuation-in-part of Ser. No. 605,606, Aug. 18, 1975, Pat. No. 4,017,418. This application Aug. 10, 1976, Ser. No. 713,156

The portion of the term of this patent subsequent to Apr. 12, 1994, has been disclaimed.

Int. Cl.[2] **B01J** *13/00*

U.S. Cl. 252—309 **6 Claims**

1. A process for making a colloidal dispersion of hydrous antimony pentoxide particles comprising introducing particles of an oxidizable antimony oxide into a polar organic solvent selected from the group consisting of formamide, methylformamide, dimethyl formamide, acetamide, methylacetamide, dimethylacetamide, dimethyl sulfoxide, formic acid, tetramethyl urea, methanol and ethanol and contacting said particles with aqueous hydrogen peroxide in the presence of an aliphatic alpha-hydroxy carboxylic acid, and a halogen acid selected from the group consisting of hydrogen chloride and hydrogen bromide at a temperature of from about 0° C to about the decomposition temperature of the reaction mixture for a length of time sufficient to convert at least a portion of the oxidizable antimony oxide particles to colloidal particles of hydrous antimony pentoxide.

4,059,541

PLATINUM COLLOID SOL AND METHOD OF FORMING SAME

Henry G. Petrow, Watertown, and Robert J. Allen, Saugus, both of Mass., assignors to Prototech Company, Newton, Mass.

Division of Ser. No. 534,732, Dec. 20, 1974, Pat. No. 3,992,512, which is a continuation-in-part of Ser. No. 430,190, Dec. 28, 1973, abandoned, which is a continuation of Ser. No. 153,824, June 16, 1971, abandoned. This application May 6, 1976, Ser. No. 683,757

Int. Cl.[2] **B01J** *13/00*

U.S. Cl. 252—313 R **9 Claims**

1. A method of forming a platinum colloid sol of finely divided particles of average size of substantially 15-25 Angstroms, that comprises, oxidizing, by heating in air to dryness, a complex sulfite acid represented substantially by the empirical formula $H_3Pt(SO_3)_2OH$ to produce a black, glossy, oxidized material, and dispersing said glossy material in water.

4. A platinum colloidal sol of finely divided particles of oxidized complex platinum sulfite acid, said particles having an average size of substantially 15-25 Angstroms and being prepared in accordance with the method of claim 1.

7. A platinum colloidal sol consisting essentially of black, glossy, oxidized complex platinum sulfite acid dispersed in water, said oxidized acid being in the form of finely divided particles of average size of substantially 15-25 Angstroms.

4,059,542

ORGANO-PHOSPHOROUS CATALYST COMPOSITION AND PROCESS FOR MAKING THE SAME

James Robert Jennings, and Lawrence Francis Michael Kelly, both of Runcorn, England, assignors to Imperial Chemical Industries Limited, London, England

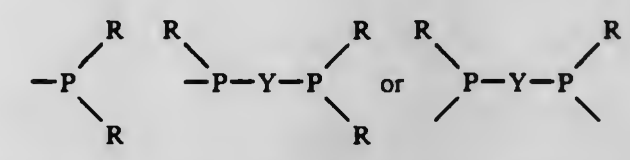
Filed May 10, 1976, Ser. No. 684,952

Claims priority, application United Kingdom, May 9, 1975, 19615/75

Int. Cl.[2] **B01J** *31/12, 31/02*

U.S. Cl. 252—431 P **12 Claims**

1. A catalyst composition, suitable for use in the dimerisation of acrylonitrile, consisting essentially of a matrix of a refractory metal oxide having chemically bonded to the surface thereof one or more organo phosphorus radicals of general formula



where groups R, which may be the same or different, present hydrocarbyl groups and Y represents either a divalent hydrocarbyl group or a direct link, the appropriate phosphorus atom or atoms of the compound being bonded to the matrix through the oxygen atom of one or more surface hydroxyl groups of the matrix.

4,059,543

CLINOPTILOLITE SORBENT

Joseph R. Kiovsky, and Pramad B. Koradia, both of Kent, Ohio, assignors to Norton Company, Worcester, Mass.

Filed June 23, 1975, Ser. No. 589,070

Int. Cl.[2] **B01J** *29/06, 29/00*

U.S. Cl. 252—455 Z **3 Claims**

1. An acid gas sorbent consisting of clinoptilolite which has been ammonium exchanged to remove essentially all exchangeable metal cations and has been acid treated to increase the silica to alumina ratio to not greater than 11.5.

2. Natural clinoptilolite, in the hydrogen exchanged form, having a silica to alumina ratio greater than in the naturally occuring product but not greater than 11.5, and containing no exchangeable alkali or alkaline earth metal cations.

4,059,544

ACTIVE MATERIAL COMPOSITIONS WITH POROUS PROTECTIVE SHEATH AND METHOD FOR PREPARING

Yoshinobu Yamaguchi; Nanahiko Kitano, both of Nagoya; Yoshihisa Watanabe, and Makoto Imanari, both of Ami, all of Japan, assignors to Fujimi Kenmazai Kogyo Kabushiki Kaisha and Mitsubishi Petrochemical Co., Ltd., both of, Japan

Continuation of Ser. No. 386,294, Aug. 7, 1973, abandoned. This application Jan. 8, 1976, Ser. No. 647,558

Claims priority, application Japan, Aug. 10, 1972, 47-80252

Int. Cl.[2] B01J *23/34, 35/02*

U.S. Cl. 252—471 **13 Claims**

1. A structurally strong particulate composite of active materials comprising a core and a microporous sheath surrounding said core, said core containing the active material selected from group consisting of catalysts, adsorbants, microsieves, ion exchangers or mixtures thereof in particulate form and said microporous sheath consisting of a solid, strengthening, enclosing structure for said core having an open porous structure including communicating open pores forming passageways for access to said core from the space surrounding said sheathed composite, said porous structure resulting from sintering a sheath-forming material admixed with an organic material that is combustible at sintering temperatures, said sheath-forming material being a crystalline or amorphous inorganic salt or oxide selected from the group consisting of fused alumina, silicon carbide, alumina, silica, zirconia, feldspar, sodium glass, lead glass, borosilicate glass, Portland cement and amorphous alumina cements and said communicating open pores resulting from the combustion of said combustible organic material thereby providing voids comprising said passageways for access to said core from the space surrounding said particulate composite.

4,059,545

CROSSLINKED STYRENE POLYMER FOAM HAVING SUPPRESSED IGNITION PROPERTIES

John M. Corbett; Richard E. Skochdopole, both of Midland, and Anthony L. Scaggs, Sanford, all of Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Dec. 22, 1975, Ser. No. 643,452

Int. Cl.[2] C08J *9/14, 9/36*

U.S. Cl. 260—2.5 FP **12 Claims**

1. A non-melting copolymer foam of a monovinylidene aromatic monomer and an ethylenically unsaturated carboxylic anhydride, said copolymer having chemically bonded thereto an amount of a halogenated moiety containing chlorine and/or bromine sufficient to reduce the propensity of the copolymer to propagate combustion, said copolymer containing at least 1 milliequivalent of anhydride moiety per gram of copolymer, and said copolymer being crosslinked with a polyfunctional compound through the anhydride moiety to a degree sufficient to render it non-melting upon exposure to flame.

4,059,546

TEXTILE FIBER BLEND COMPRISING CELLULOSIC FIBERS AND ETHYLENE 2,6-NAPHTHALENE DICARBOXYLATE-HALOGENATED COMONOMERS COPOLYESTER FIBERS

William N. Knopka, Wilmington, Del., assignor to Avtex Fibers Inc., Valley Forge, Pa.

Continuation-in-part of Ser. No. 328,043, Jan. 30, 1973, Pat. No. 3,874,155, and Ser. No. 328,044, Jan. 30, 1973, abandoned, and Ser. No. 328,045, Jan. 30, 1973. This application Aug. 3, 1973, Ser. No. 385,572

Int. Cl.[2] C08L *1/12*

U.S. Cl. 260—16 **6 Claims**

1. Copolyester resin textile fibers comprising linear, filament-forming, random copolyester resin of at least 75 mol % of ethylene-2,6-naphthalene dicarboxylate units and at least 3 mol % up to 25 mol % of copolymerized halogenated ester unit is represented by the general formula

$$-O-G-O-\overset{O}{\overset{\|}{C}}-A-\overset{O}{\overset{\|}{C}}-$$

wherein G is the residue of an alkylene glycol having from 2 to 10 carbon atoms, A is the residue of a saturated dicarboxylic acid selected from one of 2,5-dibromo-or 2,5-dichloroterephthalic acid, said ester unit present in an amount sufficient to provide at least 3.5% of the halogen, based on the weight of the copolyester, blended with flame-retardant cellulosic textile fibers in an amount of from about 10 to 90% copolyester fibers and from about 90 to 10% cellulosic fibers.

4,059,547

PAINT MANUFACTURE

Derek Norman Alfred Speakman, Ruislip, England, assignor to Imperial Chemical Industries Limited, United Kingdom

Division of Ser. No. 242,803, April 10, 1972, abandoned. This application May 23, 1975, Ser. No. 580,348

Claims priority, application United Kingdom, Apr. 15, 1971, 9494/71

Int. Cl.[2] C08K *9/04*

U.S. Cl. 260—17 R **12 Claims**

1. A pigment dispersion suitable for use in making a series of paints comprising a pigment, an organic liquid and a pigment dispersant which is a copolymer comprising units derived from the following ethylenically unsaturated monomers in the stated proportions by weight based on the total weight of the copolymer:

a. 0–50% of a hydroxy group-containing monomer, and/or
b. 0–20% of an amide group-containing monomer, provided that there is always present at least 5% of (a) or (b);
c. 20–80% of a monomer free from carboxyl groups and containing a straight or branched chain alkyl group of from 7 to 22 carbon atoms, and
d. a component containing one or more monomers free from the groups mentioned in (a), (b), or (c), said

component including as an essential constituent up to 20% based on the total weight of the copolymer of a comonomer containing an epoxide group, said epoxide group having been reacted with a compound bearing a carboxyl group and a pigment dispersant group and having the formula Ar

$$(CH{=}CH)_n-\overset{O}{\overset{\|}{C}}OH$$

where Ar is an aromatic group and n is 1 or 0, the total amount of said component (d) being up to 50% and the total of monomers being 100%.

4,059,548

HEXAHYDROPYRIMIDINE-1,3-DIACETONITRILES AND PROCESSES FOR PREPARING THE SAME

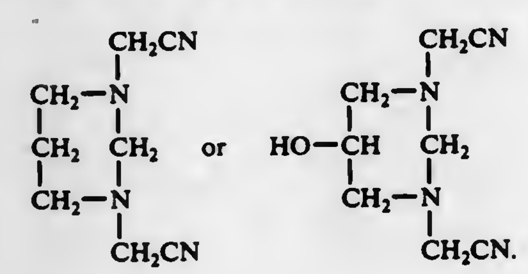
Roger Robert Gaudette, Hudson, N.H.; John Leonard Ohlson, Bedford, and Patricia Marie Scanlon, Arlington, both of Mass., assignors to W. R. Grace & Co., New York, N.Y.

Division of Ser. No. 630,791, Nov. 11, 1975, Pat. No. 3,988,367. This application July 7, 1976, Ser. No. 703,178

Int. Cl.[2] C07D *239/04*

U.S. Cl. 260—251 R **6 Claims**

1. A nitrile having the formula



4,059,549

MOISTURE-HARDENABLE SEALING AND COATING COMPOUNDS

Bernd Brinkmann, Bad Zwischenahn, and Eugen Griebsch, Nordkirchen, both of Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Germany

Filed May 13, 1976, Ser. No. 686,033

Claims priority, application Germany, May 16, 1975, 2521841

Int. Cl.[2] C09J *3/14, 3/16*

U.S. Cl. 260—22 TN **10 Claims**

1. A sealing and coating compound hardening in the presence of moisture and comprising a mixture of substantially equimolar amounts of

a. an addition product formed between an excess of a di- or poly-isocyanate having aliphatic or cycloaliphatic isocyanate groups and a polyester polyol or a linear or branched polyalkylene oxide having terminal hydroxy groups, and
b. a di- or poly-functional enamine which is prepared by reacting an aliphatic aldehyde or cyclic ketone and a polyaminoamide which is the condensation product formed between an excess of a di-secondary or primary-secondary diamine and at least one acid selected from the group consisting of di- and poly-carboxylic acids having 6 to 72 carbon atoms.

4,059,550

AQUEOUS DISPERSIONS OF POLYHYDROXY POLYETHER RESINS AND AMINOPLAST RESINS

David Alan Shimp, Prospect, Ky., assignor to Celanese Polymer Specialties Company, Louisville, Ky.

Filed July 6, 1976, Ser. No. 703,030

Int. Cl.[2] C08L *61/10, 61/28*

U.S. Cl. 260—29.4 R **6 Claims**

1. In an aqueous dispersion of a heat curable coating composition made from a mixture of a complex polyhydroxy polyether resin derived from an epihalohydrin and a dihydric phenol and having a melting point of at least 50° C. and an aminoplast or phenolplast resin, the improvement which comprises using as a catalyst for the curing reaction an adduct of phosphoric acid and a glycidyl polyether of a polyhydric phenol reacted in the ratio of about 1 mol of phosphoric acid per each epoxide group of the glycidyl polyether wherein the catalyst is present as an organic base salt of the adducted phosphoric acid and wherein about 0.1 to about 2 weight percent phosphoric acid, in the form of the adduct, is present as the catalyst, said weight percent being based on the total solids content, excluding pigmentation, of the coating composition.

4,059,551

MORTAR COMPOSITIONS

Davis S. Weiant, Moorestown, N.J.; Frank E. Bernett, Yardley, Pa., and William R. Velivis, Trenton, N.J., assignors to Tile Council of America, Inc., Princeton, N.J.

Continuation of Ser. No. 304,727, Nov. 8, 1972, Pat. No. 3,915,917, which is a continuation of Ser. No. 105,109, Jan. 8, 1971, abandoned. This application Sept. 4, 1974, Ser. No. 503,152

The portion of the term of this patent subsequent to Oct. 28, 1992, has been disclaimed.

Int. Cl.[2] C08L *61/24*

U.S. Cl. 260—29.6 H **22 Claims**

1. An aqueous mortar composition having a viscosity in the range of 10,000 to 1,200,000 cps comprising

a film-forming, room temperature cross-linkable polymer in the form of an emulsion, suspension, dispersion or partial solution, having substituents on the polymer chain selected from the group consisting of epoxy, hydroxy, methylol, carboxy, ester, α-olefin, isocyanate, methylol acrylamide, amino, N-methylol amide, internal double bond and combinations thereof, wherein said substituents are capable of reacting at room temperature to cross-link said polymer,
a water-insoluble filler selected from the group consisting of glass, quartz, silica, limestone, barytes, wollastonite, mica, flint powder, kryolite, alumina trihydrate, talc, pyrophyllite, zinc oxide and mixtures thereof, and
a cross-linking aid which is an acidic catalyst selected from the group consisting of inorganic and organic salts, organic acids, and amine acid-addition salts,

said polymer comprising from 2% to 16% by weight, and said filler from 50% to 90% by weight of the total aqueous composition and wherein said composition is a non-hydraulic mortar.

4,059,552

CROSS-LINKED WATER-SWELLABLE POLYMER PARTICLES

Maurice L. Zweigle, and Jack C. Lamphere, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 481,598, June 21, 1974, abandoned. This application Oct. 23, 1975, Ser. No. 625,297

Int. Cl.[2] C08L *33/02, 33/26, 41/00*

U.S. Cl. 260—29.6 TA **15 Claims**

1. A method for thickening an aqueous medium to obtain a composition having the properties of a viscous short solution and being resistant to viscosity degradation under conditions of high shear which comprises the step of thoroughly dispersing in said medium from about 0.1 to about 2 percent by weight of microbeads of a water-insoluble, water-swellable polymer of a water-soluble vinyl monomer or mixture of water-soluble vinyl monomers, cross-linked with a difunctional cross-linking agent copolymerizable with said monomer or monomers, said microbeads having diameters of from about 0.2 to about 4 microns and having a gel capacity of at least about 10 grams per gram in aqueous 0.27 molar sodium chloride solution, said cross-linking agent being present in an amount from about 50 to 1000 parts by weight of cross-linking agent per million parts of vinyl monomer or monomers in the polymer.

8. A viscous, short aqueous composition comprising an aqueous medium having dispersed therein from about 0.1 to about 2 percent by weight of microbeads of a water-insoluble, water-swellable polymer of a water-soluble vinyl monomer or mixture of water-soluble vinyl monomers, cross-linked with a difunctional cross-linking agent copolymerizable with said monomer or monomers, said microbeads having diameters of from about 0.2 to about 4 microns and having a gel capacity of at least about 10 grams per gram in aqueous 0.27 molar sodium chloride solution, said polymer being cross-linked with from about 50 to 1000 parts by weight of cross-linking agent per million parts of vinyl monomer or monomers in the polymer.

4,059,553

COATING COMPOSITION COMPRISING OXIDES AND/OR HYDROXIDES OF MG^{++}, CA^{++}, CHROMIUM, MANGANESE, AND ZN^{++} AND QUATERNARY AMMONIUM SILICATES USEFUL FOR BUILDING MATERIALS

Masao Tohyama; Minoru Ichigo, both of Nagoya; Takeshi Suzuki, Aichi; Makoto Nakasu, Iwakura; Akinobu Ando, Tajimi; Akitoshi Yoshida, Chiba; Masaharu Kosaka; Norihisa Hayasi, both of Ichikawa, and Shigeki Inoue, Funabashi, all of Japan, assignors to Kikusui Kagaku Kogyo Kabushiki Kaisha and Nissan Kagaku Kogyo Kabushiki Kaisha, both of Tokyo, Japan

Filed Apr. 20, 1976, Ser. No. 678,577

Claims priority, application Japan, Apr. 23, 1975, 50-49434

Int. Cl.[2] C08K *3/00;* **C08L** *25/14;* **C04B** *13/24;* **C08F** *45/24*

U.S. Cl. 260—29.6 S **11 Claims**

1. A coating composition for building materials which comprises 100 parts by weight of a quaternary ammonium silicate having a silica content, calculated as SiO_2, of 5 to 70% by weight; 2 to 200 parts by weight of a metal compound selected

from the group consisting of oxides and hydroxides of magnesium, calcium, chromium, manganese and zinc and mixtures thereof; and water in a quantity sufficient to plasticize said composition.

4,059,554

STABILIZED EMULSION INKS

Thomas John Pacansky, Penfield, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed May 28, 1976, Ser. No. 691,058

Int. Cl.[2] C08L *25/08*

U.S. Cl. 260—29.6 WQ **9 Claims**

1. A stabilized alcohol or water in oil ink emulsion comprising:

a. a coloring amount of a pigment,

b. from 20–40% by weight resin of a block or graft copolymer having one type of polar segment miscible with water and alcohols of from 2 to 6 carbon atoms, and another type of non-polar segment which can be absorbed on the pigment and is miscible with non-polar components of the ink, said coploymer having a number average molecular weight from 20,000 to 40,000 and

a vehicle for said resin and pigment comprising a mixture of polar and non-polar solvents.

4,059,555

NOVEL AQUEOUS ADHESIVE

Hirosuke Imai, and Hiroyuki Ito, both of Yokohama, Japan, assignors to Nippon Oil Company Ltd., Tokyo, Japan

Continuation of Ser. No. 442,769, Feb. 15, 1974, abandoned. This application Dec. 31, 1975, Ser. No. 645,751

Claims priority, application Japan, Feb. 19, 1973, 48-19179

Int. Cl.[2] C08L *9/00*

U.S. Cl. 260—29.7 H **6 Claims**

1. A water-soluble adhesive consisting essentially of an aqueous solution of a partly alkali metal modified butadiene-maleic anhydride copolymer wherein the free carboxylic acid groups and the carboxylic acid-alkali metal salt groups are contained in ratios of from 9 : 1 to 2.5 : 7.5, respectively, the partly alkali metal-modified copolymer being prepared from a starting butadiene-maleic anhydridecopolymer wherein the butadiene and maleic anhydride units are on the main chain and at least one alkali metal compound.

4,059,556

SPINNABLE SOLUTIONS CONTAINING CROSSLINKABLE COPOLYMERS OF ACRYLONITRILE AND N-METHYLOL ALKYL ETHER ACRYLAMIDES

Theo Neukam; Ulrich Reinehr, both of Dormagen; Francis Bentz, Cologne, and Günther Nischk, Dormagen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Jan. 19, 1977, Ser. No. 760,705

Claims priority, application Germany, Jan. 22, 1976, 2602350

Int. Cl.[2] C08F *2/00, 4/00, 220/70*

U.S. Cl. 260—30.2 **1 Claim**

1. A process for the production of spinnable solutions of crosslinkable copolymers of acrylonitrile which comprises solution polymerisation of at least 48% by weight of acrylonitrile, 0.5 to 12% by weight of a copolymerisable acid amide-N-methylol alkyl ether and, optionally, other copolymerisable comonomers in a strongly polar organic solvent and in the presence of a peroxodisulphate and a 1,3-diketone as catalyst system.

4,059,557

POLYMER DISPERSIONS

John Bentley, and Morice William Thompson, both of Maidenhead, England, assignors to Imperial Chemical Industries Limited, United Kingdom

Filed Apr. 19, 1976, Ser. No. 678,430

Claims priority, application United Kingdom, Apr. 24, 1975, 17060/75

Int. Cl.[2] C08K *5/01, 5/05, 5/07, 5/09*

U.S. Cl. 260—31.2 N **12 Claims**

1. A process for the production of a stable dispersion of particles of a copolymer selected from the group consisting of copolyester, copolyamide and copolyesteramide in an inert organic liquid medium in which the copolymer is insoluble by the copolymerization of two or more reactive comonomers each of which is capable of undergoing homopolymerization and each of which is solid at the temperature at which the copolymerization reaction takes place and is insoluble in the liquid medium at that temperature, the process comprising the steps of (1) dispersing the solid comonomers in an inert organic liquid in the presence of at least one monomerstabilizing agent so as to produce stably dispersed particles of the comonomers having a mean diameter not greater than 50μ, each monomer-stabilizing agent being per se soluble in the inert organic liquid and incorporating (i) a polymeric component which is solvatable by the liquid and (ii) a grouping which is capable of becoming associated with the particles of solid comonomer and (2) heating the dispersion of solid comonomers at the copolymerization temperature so as to bring about the copolymerization reaction, in the presence of a copolymerstabilizing agent which is per se soluble in the inert organic liquid and incorporated (a) a polymeric component which is solvatable by the liquid and (b) a grouping which is capable of effecting association with the resulting copolymer as the copolymer is formed.

4,059,558

WATER FREE LIGHT SILICA AND SILICATE FILLERS FOR CROSS-LINKING ELASTOMERS

Paul Golombeck, Bornheim-Widdig, and Friedrich Hertl, Wesseling, both of Germany, assignors to Deutsche Gold- und Silber-Schneideanstalt vormals Roessler, Frankfurt, Germany Division of Ser. No. 493,886, Aug. 1, 1974. This application Jan. 26, 1976, Ser. No. 652,058

Claims priority, application Germany, Aug. 27, 1973, 2343160

Int. Cl.[2] C08K *3/36;* **C08L** *7/00*

U.S. Cl. 260—42.33 **15 Claims**

1. A process comprising vulcanizing without the use of pressure a composition consisting essentially of (1) a vulcanizable elastomer, (2) a vulcanizing agent, and (3) a light filler selected from the group consisting of silica and silicates having a water content of not over 0.5% by weight and having a BET specific surface area of 25 to 300 m^2/g, said silica or silicate having been prepared by wet precipitation followed by drying until practically water free.

4,059,559

PROCESS FOR PREPARING N-TRIORGANOSILYLCARBAMIDE ACID ESTERS

Jürgen Burkhardt; Paul Hittmair, and Karl-Heinrich Wegehaupt, all of Burghausen, Germany, assignors to Wacker-Chemie GmbH, Munich, Germany

Filed Aug. 11, 1975, Ser. No. 603,413

Claims priority, application Germany, Oct. 7, 1974, 2447707

Int. Cl.[2] C07F *7/10*

U.S. Cl. 260—448.2 E **12 Claims**

1. A process for preparing N-triorganosilylcarbamide acid esters which comprises reacting in the substantial absence of a solvent a carbamide acid ester having two hydrogen atoms linked to its nitrogen atom with a hexaorganodisilazane and a triorganohalosilane at a temperature of from 20° to 65° C. and thereafter separating the thus formed N-triorganosilylcarbamide acid ester from ammonium halide by-product.

4,059,560

SMOKE AND FLAME RETARDED STYRENE POLYMERS

David Francis Lawson, and Edward Leo Kay, both of Akron, Ohio, assignors to The Firestone Tire & Rubber Company, Akron, Ohio

Filed May 5, 1976, Ser. No. 683,571

Int. Cl.[2] C08K *3/18, 3/22, 3/24*

U.S. Cl. 260—45.7 R **4 Claims**

1. A smoke and flame inhibited composition containing (a) 100 parts by weight of a polymeric material selected from butadiene-styrene elastomer, high impact polystyrene, polystyrene and copolymers of styrene with a monoethylenically unsaturated nitrile, (b) 30–200 parts hydrated magnesium oxychloride per 100 parts said polymer, said copolymer containing at least 10% by weight aromatic groups derived from styrene.

4,059,561

FLAME-RESISTANT COMPOSITION CONTAINING A NORBORNENE DERIVATIVE POLYMER

Fumio Arai, Machida; Masaaki Kira, Yokohama; Shiro Kokuryo, Yokohama, and Takashi Ueshima, Yokohama, all of Japan, assignors to Showa Denko Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 9, 1976, Ser. No. 656,266

Claims priority, application Japan, Feb. 7, 1975, 50-15280; Mar. 5, 1975, 50-26085

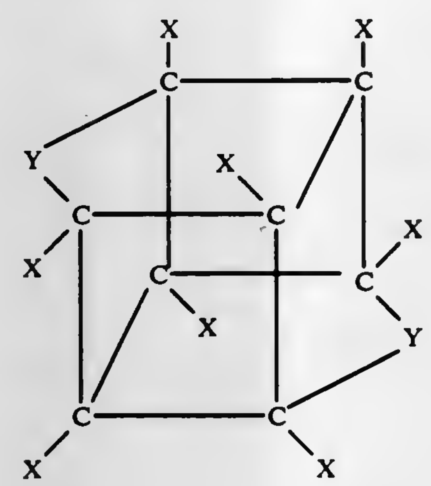
Int. Cl.[2] C08K *5/00*

U.S. Cl. 260—45.8 R **46 Claims**

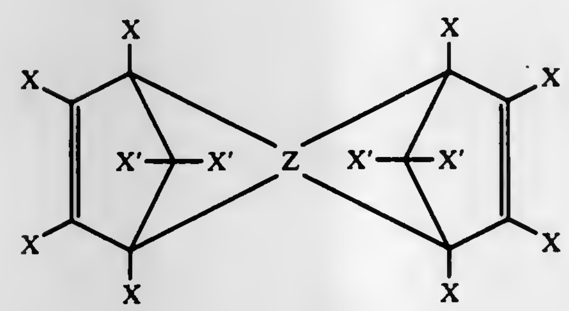
1. A thermally stable, flame resistant composition comprising:

a. a ring-opening polymerization product of a norbornene derivative containing at least one polar group, and

b. a flame retarding compound in sufficient amounts to elevate flame resistance of said composition without reducing mechanical strength thereof, said flame retarding compound selected from the group consisting of a halogen-containing multicyclic compound of the formula (1) to (3) or a bromine-containing aromatic compound of the formula (4) to (6) as follows:

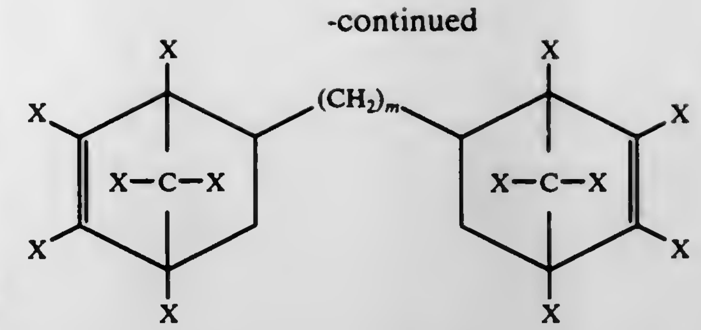


(1)



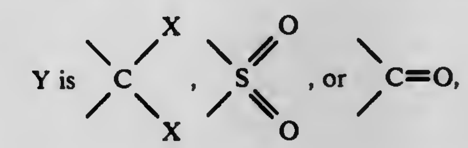
(2)

-continued



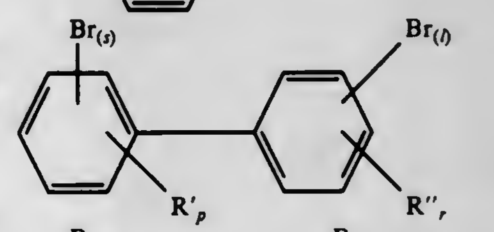
(3)

wherein X is chlorine or bromine, X' is fluorine, chlorine, bromine, alkyl, or alkoxy having 1–20 carbon atoms,

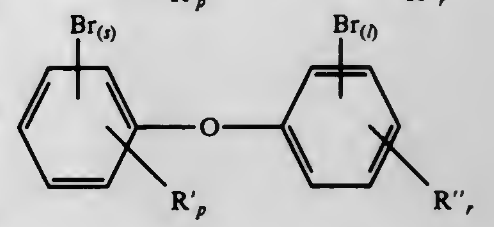


Z is a tetravalent cyclic hydrocarbon group having at least five carbon atoms and *m* is an integer from 4–16:

(4)



(5)



(6)

wherein R is hydrogen, alkyl having 1–6 carbon atoms, bromoalkyl, or hydroxy wherein one R, but not more than one R, is hydroxy; R' and R'' are hydrogen or alkyl having 1–6 carbon atoms; *n* is an integer from 3–6; *l, s, p* and *r* are each integers; the sum of *l* plus *s* is an integer from 2–10; and the sum of *l, s, p* and *r* is 10.

4,059,562

LIQUID STABILIZER SYSTEMS AND VINYL HALIDE RESIN COMPOSITIONS CONTAINING SAME

Samuel Hoch, Brooklyn; Mario Q. Ceprini, Cedarhurst, both of N.Y., and Emery Szabo, Freehold, N.J., assignors to Tenneco Chemicals, Inc., Saddle Brook, N.J.

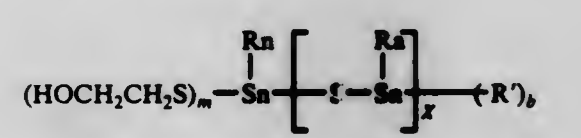
Filed Mar. 21, 1977, Ser. No. 779,650

Int. Cl.[2] C08K *5/58*

U.S. Cl. 260—45.75 S **25 Claims**

1. A liquid stabilizer system for vinyl halide resin compositions that comprises

a. 40% to 90% by weight of an organotin ethanol mercaptide having the structural formula



wherein each R represents an alkyl group having 1 to 8 carbon atoms,

R' represents $—SCH_2CH_2OH$, $—SCH_2COOR''$, or $—SR''$;

R'' represents an alkyl group having 6 to 18 carbon atoms;

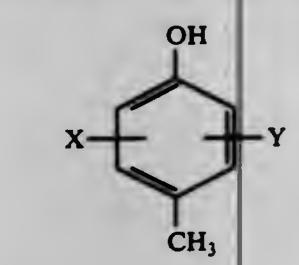
a, b, m, and *n* each represents 1 or 2;

X represents 0 or 1;

when X is 0, $m + n + b = 4$; and
when X is 1, $m + n = 3$ and $a + b = 3$;
b. 10% to 60% by weight of a liquid alcohol component comprising a glycol having 2 to 10 carbon atoms; and
c. 0.1% to 1% by weight of an alkyl acid phosphate selected from the group consisting of monoalkyl acid phosphates, dialkyl acid phosphates, and mixtures thereof, in which each alkyl group has from 1 to 10 carbon atoms.

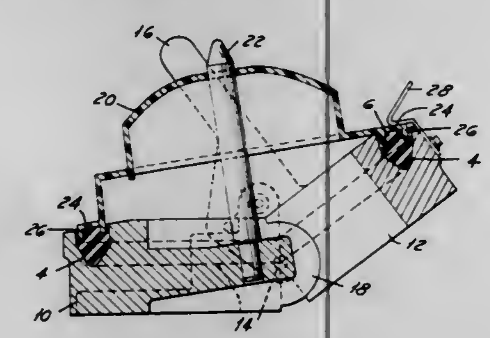
4,059,563
NOVEL PHENOL ANTIOXIDANTS
Kuniaki Goto, Tokyo; Harumi Asai, Kamakura, and Tadao Natsuume, Yokosuka, all of Japan, assignors to Nippon Zeon Co. Ltd., Tokyo, Japan
Division of Ser. No. 584,931, June 9, 1975, Pat. No. 4,008,284. This application Sept. 13, 1976, Ser. No. 722,826
Claims priority, application Japan, June 19, 1974, 49-69171
Int. Cl.^{2} C08K *5/13*
U.S. Cl. 260—45.95 H **6 Claims**

1. In a process for inhibiting the deterioration of degradable polymeric and oily substances by adding an antidegradation agent to said degradable substance the improvement which comprises adding to said degradable substance from 0.01 to 5 parts by weight per 100 parts by weight of the degradable substance of at least one p-cresol compound of the formula:



wherein X and Y each represent a cyclopentyl group.

4,059,564
METHOD OF APPLYING AN INTEGRAL SEALING MEMBER
Standly T. Coughlan, Huron, Ohio; John H. Dewar, and Henry A. Zampa, both of Grosse Ile, Mich., assignors to Ford Motor Company, Dearborn, Mich.
Filed May 27, 1975, Ser. No. 581,254
Int. Cl.^{2} B29D *27/00*
U.S. Cl. 264—46.4 **8 Claims**



1. A method for applying an integral sealing member to a non-planar surface member comprising:
A. dispensing an elastomer composition adapted to be cured to form said sealing member into a groove in a mold member which is disposed essentially in one plane; said mold member being adapted to have at least a portion thereof adjusted from a planar to various non-planar positions;
B. partially curing said composition such that it does not flow;
C. adjusting the disposition of at least a portion of said mold member having said groove therein and containing said partially cured composition such that said groove is no longer disposed in one plane and such that said nonplanar surface member may be embedded within the composition within said groove along the entire portion thereof to which said sealing member is to be applied;
D. positioning said non-planar surface member within said groove containing said partially cured composition such that at least a portion thereof is embedded therein along the entire portion thereof to which said sealing member is to be applied;
E. completing the curing of said composition; and
F. removing said non-planar surface with said sealing member integrally bonded thereto from said groove.

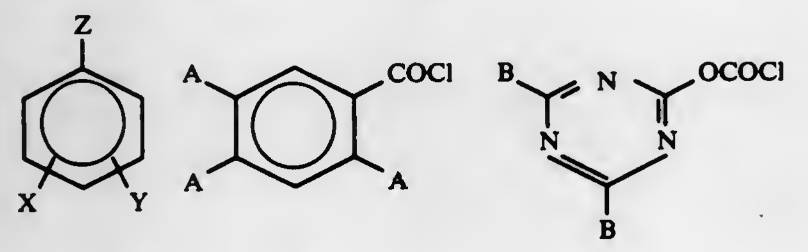
6. A process in accordance with claim 1 wherein said material is a foamable elastomeric material.

4,059,565
PROCESS FOR PRODUCING A BRANCHED POLYCARBONATE OR POLY(ESTER-CARBONATE)
Hiroyuki Yoshizaki, Toyonaka; Hiromitsu Takanihashi, Takarazuka, and Yoshitaka Masuda, Toyonaka, all of Japan, assignors to Mitsubishi Gas Chemical Company, Inc., Tokyo, Japan
Filed June 9, 1976, Ser. No. 694,294
Claims priority, application Japan, June 16, 1975, 50-72921; June 16, 1975, 50-72922; June 19, 1975, 50-74768
Int. Cl.^{2} C08G *63/62*
U.S. Cl. 260—47 XA **7 Claims**

1. In a process for producing a branched polycarbonate or poly(ester-carbonate) by reacting a combination of a monomer component composed of an aromatic dihydroxy compound (A) or a mixture of an aromatic dihydroxy compound (A) and a dibasic acid derivative (B), and a polyfunctional organic compound (C), with a compound of the formula

$$COM_2$$

where M is selected from a class of chloro and phenoxy, the improvement which comprises using, as the polyfunctional organic compound (C), a member selected from the compounds I, II, and III of the formulas



I II III

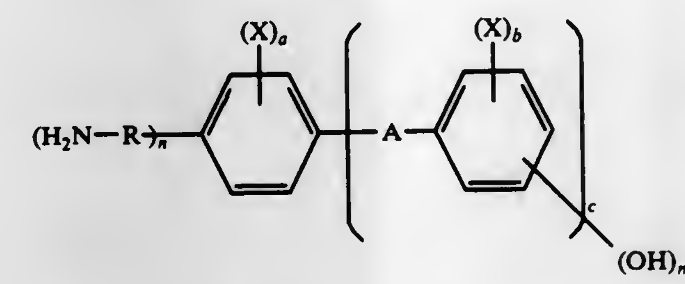
where Z is selected from the class of chloroformyl (—COCl) and chloroformyloxy (—OCOCl), X and Y are similar or dissimilar and selected from the class of —COCl, —OCOCl, —OH and —COOH, and X and Y attach to 2- and 4-positions, 3- and 4-positions, or 3- and 5-positions based on the Z; A is similar or dissimilar and selected from the class of —COCl and —COOH; and B is similar or dissimilar and selected from the class of —OCOCl and —OH, the quantity of compound (C) being sufficient and up to 2 mole % based on the moles of compound (A) to provide a branching structure and to permit the polymer to be dissolved in a solvent.

4,059,566
PROCESS FOR CONTROLLING THE MOLECULAR WEIGHT OF POLYCARBONATES USING AMMONIA OR AMMONIA COMPOUNDS
Joseph McClendon Baggett, Freeport, Tex., assignor to The Dow Chemical Company, Midland, Mich.
Filed July 12, 1976, Ser. No. 704,151
Int. Cl.^{2} C08G *63/62*
U.S. Cl. 260—47 XA **5 Claims**

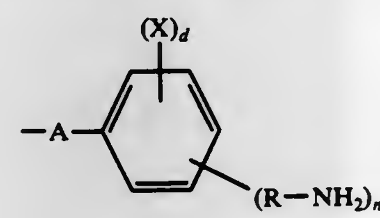
1. A process for controlling the molecular weight of thermoplastic aromatic polycarbonates which comprises reacting under interfacial polycarbonate-forming conditions
1. a carbonyl halide,
2. a dihydric phenol or mixtures of dihydric phenols,
3. a catalyst useful to form polycarbonates, and
4. a chain terminating amount of a compound selected from the group consisting of ammonia or an ammonium compound which liberates ammonia under the conditions of the reaction.

4,059,567
HIGH MOLECULAR WEIGHT POLYTRIAZINES OF SOLUBLE POLYMERIC N-CYANO-ISOUREA ETHERS
Rudolf Sundermann, New Martinsville, W. Va.; Günther Rottloff, Cologne, and Ernst Grigat, Odenthal-Gloebusch, both of Germany, assignors to Bayer Aktiengesellschaft, Germany
Filed July 22, 1976, Ser. No. 707,553
Claims priority, application Germany, July 24, 1975, 2533121
Int. Cl.^{2} C08G *73/08*
U.S. Cl. 260—47 R **2 Claims**

1. A process for producing a high molecular weight polytriazine which comprises reacting (1) a compound of the formula



wherein
R is a bond, alkylene having 1 to 9 carbon atoms or said alkylene substituted by phenyl or by alkyl having 1 to 4 carbon atoms;
X is hydrogen, halogen, alkyl having 1 to 9 carbon atoms,



or phenyl, or two X substituents together on adjacent carbon atoms of the phenylene moiety to which they are attached together from a hydrocarbon ring containing from 5 to 6 carbon atoms or together form in conjunction with O, S, N or P a 5 or 6-membered heterocyclic ring;
A is

$$—O—,\ —SO_2—,\ —\overset{O}{\overset{\|}{C}}—,\ —O—\overset{O}{\overset{\|}{C}}—O—,$$

alkylene having 1 to 9 carbon or said alkylene substituted by phenyl or by alkyl having 1 to 4 carbon atoms, a 5 or 6-membered cycloaliphatic or aromatic ring or a bond;
n is 1, 2 or 3;
m is 1, 2 or 3;
a is 5-*n* when *c* is 1 and 6-*m*-*n* when *c* is 0;
b is 5-*m*;
c is 0 or 1 and
d is 5-*n*

in the presence of an inorganic base or a tertiary amine or (2) a phenolate of said formula with cyanogen halide in the presence of a catalytic amount of a tertiary amine at a temperature from −40° to 65° C to thereby form the corresponding aromatic cyanic acid ester containing cyanamide groups; heating said ester at a temperature of from 65° to 150° C to thereby form a prepolymer soluble in organic solvents and heating said prepolymer at a temperature of from 150° to 350° C to form a high molecular weight polytriazine.

4,059,568
METHOD FOR THE CONTROL OF DIAMINE CATALYZED POLYPHENYLENE ETHER POLYMERIZATION
Glenn Dale Cooper, Delmar, N.Y., assignor to General Electric Company, Pittsfield, Mass.
Filed Aug. 30, 1976, Ser. No. 718,836
Int. Cl.^{2} C08G *65/44*
U.S. Cl. 260—47 ET **19 Claims**

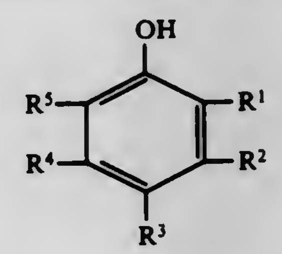
1. In a process for forming a polyphenylene ether resin by the oxidative coupling of a 2,6-disubstituted phenolic compound in the presence of a catalyst which comprises a copper compound, a diamine of the formula:

$$R^1HN—R^2—NHR^1$$

wherein each R^1 is independently isopropyl, a C_{4-8} tertiary alkyl or a cycloalkyl group having no hydrogens on the alpha-carbon atom and R^2 is C_{2-4} alkylene or C_{3-7} cycloalkylene; a tertiary amine, a bromine compound selected from the group consisting of hyrogen bromide, alkali metal bromides, alkaline earth metal bromides, 4-bromophenols and mixtures thereof in the presence of an oxygen containing gas, the improvement which comprises adding to the polymerization reaction an amount of water which will control the rate of polymerization.

4,059,569
ANTIOXIDANT RESINS FROM MERCAPTOALDEHYDES
Gerald William Langsley, Baslow, England, assignor to Coalite and Chemical Products Limited, Bolsover, England
Filed Sept. 22, 1976, Ser. No. 725,512
Claims priority, application United Kingdom, Oct. 9, 1975, 41527/75
The portion of the term of this patent subsequent to Oct. 12, 1993, has been disclaimed.
Int. Cl.^{2} C08G *75/04*
U.S. Cl. 260—48 **22 Claims**

1. A sulphur containing resin which is the condensation product of (i) one or more mercaptoaldehydes and (ii) one or more meta-substituted phenols, or a mixture of one or more meta-substituted phenols and one or more other phenols wherein the meta-substituted phenol has the general formula:



in which R^2 denotes a substituent and at least one of R^1, R^3, R^4, and R^5 denote hydrogen, any of R^1, R^3, R^4 and R^5 not denoting hydrogen denoting a substituent, said mercaptoaldehydes having the general formula:

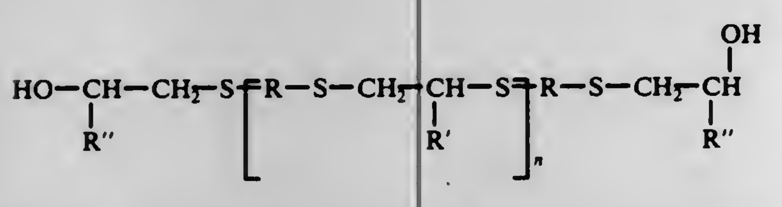
$$R—S—\underset{R_1}{\underset{|}{CH}}—CH_2—CHO$$

in which R is a $C_1 - C_{17}$ straight or branched alkyl group and R_1 denotes hydrogen or a $C_1 - C_4$ alkyl group.

4,059,570
POLYTHIOETHER POLYURETHANES AND THEIR PREPARATION

Alexis A. Oswald, Mountainside, N.J., assignor to Exxon Research & Engineering Co., Linden, N.J.
Division of Ser. No. 516,088, Oct. 18, 1974, Pat. No. 3,954,723, which is a continuation-in-part of Ser. No. 326,108, Jan. 23, 1973, abandoned, which is a division of Ser. No. 47,109, June 17, 1970, Pat. No. 3,717,618, which is a continuation-in-part of Ser. No. 541,696, April 11, 1966, Pat. No. 3,592,798. This application May 4, 1976, Ser. No. 682,840
Int. Cl.^{2} C08G *18/06*
U.S. Cl. 260—77.5 AP 8 Claims

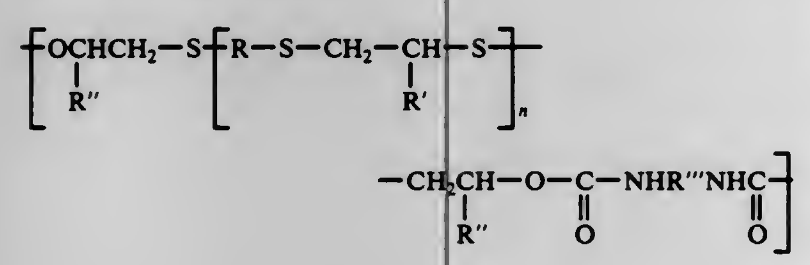
1. Process for the preparation of polythioether polyurethanes comprising reacting a polythioether diol of the formula



wherein R'' is hydrogen or methyl, R is a C_1 to C_{30} divalent organic radical; R' is selected from the group consisting of H, C_1–C_{30} alkyl, C_2–C_{30} alkenyl, C_2–C_{30} alkynyl, C_7–C_{20} aralkyl and mixtures thereof, providing that either R has a branched structure or R' is alkyl and *n* is 2 to 1000, with a diisocyanate of the formula

$R'''(NCO)_2$

wherein R''' is phenylene, tolylene, xylylene, diphenylmethane, chlorophenylene, C_2 to C_{16} polymethylene and polymethylene groups interrupted by thioether sulfur, to yield a product of the repeating structure



4,059,571
NOVEL IMMUNOGLOBULIN DERIVATIVES AND PROCESS FOR THE PREPARATION THEREOF

Katsuhiko Tomibe; Yasuhiko Masuho; Kimihiko Matsuzawa, all of Hino; Sachio Ishimoto, Tokyo; Kazuo Satake, Kawasaki, and Tsuneo Watanabe, Tokyo, all of Japan, assignors to Teijin Limited, Osaka, Japan
Filed Mar. 4, 1975, Ser. No. 555,132
Claims priority, application Japan, Mar. 8, 1974, 49-26341; June 24, 1974, 49-71274
Int. Cl.^{2} A23J *1/06*
U.S. Cl. 260—112 B 13 Claims

1. Novel immunoglobulin derivatives which are substantially free from oxidizing metal ions such as cupric ion comprising immunoglobulin in which the interchain disulfide bonds are predominantly cleaved, on the average 3 to 5 of the interchain disulfide bonds or the inter- and intra-chain disulfide bonds being cleaved, and so produced sulfur atoms (S—) are S-sulfonated (-S-SO_3).

4,059,572
MUCOPOLYSACCHARIDE HAVING FLOCCULATING ACTIVITY OF PROTEIN AND METHOD FOR PRODUCING THE SAME

Junji Nakamura, Tokyo; Shigeyoshi Miyashiro, Kawasaki; Yoshio Hirose, Fujisawa, and Takeyoshi Awao, Kawasaki, all of Japan, assignors to Ajinomoto Co., Inc., Tokyo, Japan
Filed Apr. 4, 1975, Ser. No. 565,077
Claims priority, application Japan, Apr. 9, 1974, 49-40298
Int. Cl.^{2} C12D *13/06*
U.S. Cl. 260—112 R 2 Claims

1. A mucopolysaccharide having flocculating activity for protein which is inactivated by treatment with a protease or with periodic acid characterized by the following chemical and physical properties:

1. The ultraviolet spectrum of FIG. 1;
2. The infrared spectrum of FIG. 2;
3. Containing carbon, hydrogen, oxygen and nitrogen;
4. Containing the following moieties: glutamic acid, tyrosine, valine, serine, leucine, aspartic acid, isoleucine, alanine, phenylalanine, proline, galactosamine, glucosamine, and 2-ketogluconic acid;
5. Having a molecular weight by the gel filtration method greater than 2×10^5;
6. Exhibiting a positive Lowry reaction and a negative iodo starch reaction;
7. Being slightly soluble in water and soluble in dilute aqueous acid or alkali; and
8. Exhibiting a viscosity of 400 C.P. in 1.0% solution in ammonium chloride as measured with a B-type viscometer at 22° C.

4,059,573
EXTRACTION OF N-BLOCKED AMINO ACIDS FROM AQUEOUS MEDIA

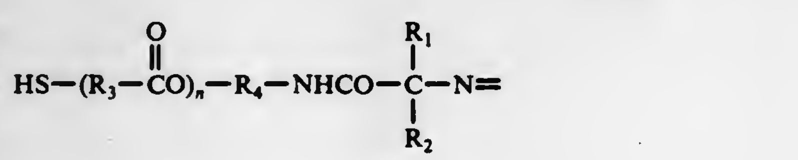
Colin Robinson, Grange-over-Sands, and Derek Walker, Windermere, both of England, assignors to Glaxo Laboratories Limited, Greenford, England
Continuation of Ser. No. 491,856, July 25, 1974, abandoned. This application Mar. 30, 1976, Ser. No. 671,935
Claims priority, application United Kingdom, Aug. 1, 1973, 36498/73
Int. Cl.^{2} C07C *103/52*
U.S. Cl. 260—112.5 R 14 Claims

1. In a process for extracting an N-blocked amino acid from a fermentation broth or other aqueous solutions wherein the improvement comprises treating a fermentation broth or other predominantly aqueous solutions containing an N-blocked amino acid with a diazoalkane in the presence of a water immiscible organic solvent to substantially simultaneously esterify said N-blocked amino acid and produce a solution of the thus formed ester in said water immiscible organic solvent.

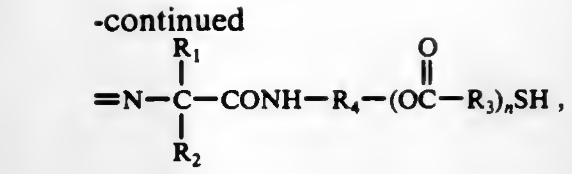
4,059,574
SYMMETRIC AZO-BIS-MERCAPTO COMPOUNDS

Otto Hitzler, Erzhausen; Horst Pennewiss, Darmstadt-Neu-Kranichstein; August Froelich, Darmstadt-St. Stephen-Siedlung; Gerhard Markert, Ober-Ramstadt-Eiche, and Winfried Wunderlich, Rossdorf, all of Germany, assignors to Rohm GmbH, Darmstadt, Germany
Filed Apr. 20, 1976, Ser. No. 678,699
Claims priority, application Germany, Apr. 26, 1975, 2518622
Int. Cl.^{2} C07C *107/02;* C08L *67/06;* C10L *1/14*
U.S. Cl. 260—192 4 Claims

1. A symmetric azo-bis-mercapto compound of the formula



-continued

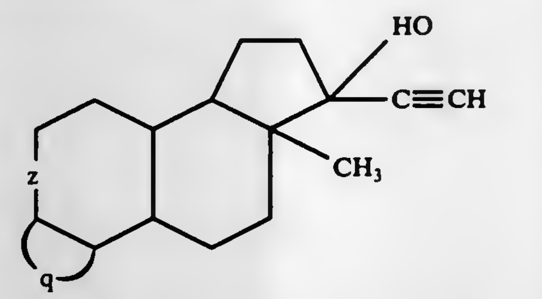


wherein R_1 and R_2 are methyl or ethyl, R_3 and R_4 are the same or different alkylene having 1 to 4 carbon atoms, and *n* is 0 or 1.

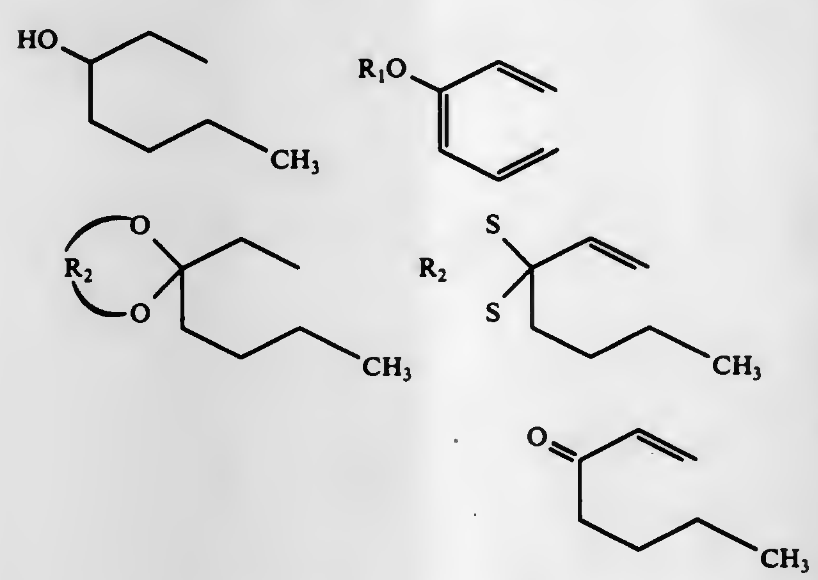
4,059,575
PROCESS FOR THE PREPARATION OF 17(20)ENE-21-STEROID ALDEHYDES

Kathlyn A. Parker, Providence, R.I., and Raymond W. Kosley, Jr., Convent Station, N.J., assignors to Research Corporation, New York, N.Y.
Filed Apr. 22, 1976, Ser. No. 679,152
Int. Cl.^{2} C07J *33/00, 21/00*
U.S. Cl. 260—239.5 18 Claims

1. A process which comprises reacting a cyclopenta deca hydro(a)naphthalene of the formula

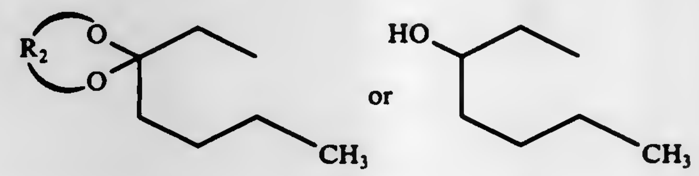


wherein —Z— is a carbon carbon single bond or a carbon carbon double bond and *q* is selected from the group consisting of

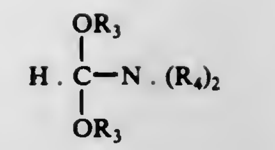


where R_1 is lower alkyl, phenyl or phenyl loweralkyl, R_2 is loweralkyl

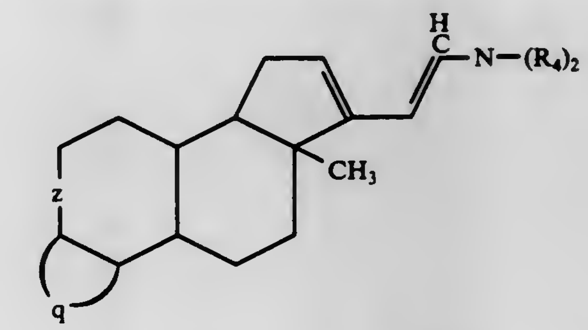
provided that where *q* is



z is a carbon carbon double bond and for the other values of *q*, *z* is a carbon carbon single bond with an excess of a diloweralkyl formamide diloweralkylacetal, wherein the term loweralkyl indicates an alkyl moiety of 1 to 5 carbon atoms



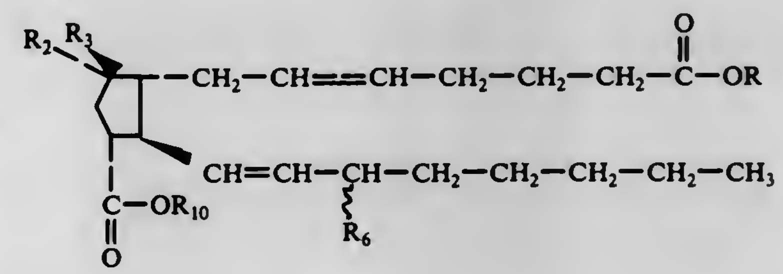
where R_3 and R_4 are loweralkyl and may be the same or different to yield the corresponding dienamine of the formula



4,059,576
11-SUBSTITUTED PROSTAGLANDINS

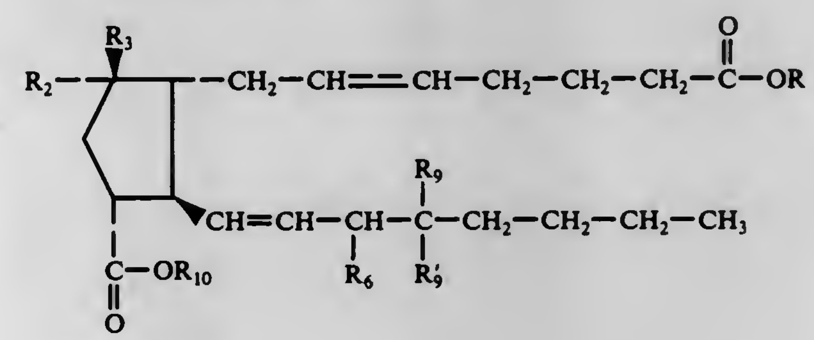
George William Holland, Cedar Grove; Jane Liu Jernow, Verona, and Perry Rosen, North Caldwell, all of N.J., assignors to Hoffmann-La Roche, Inc., Nutley, N.J.
Division of Ser. No. 480,458, June 18, 1974, which is a continuation-in-part of Ser. No. 386,117, Aug. 6, 1973, abandoned. This application Sept. 17, 1975, Ser. No. 614,051
Int. Cl.^{2} C07C *177/00*
U.S. Cl. 542—426 7 Claims

1. A compound of the formula:



wherein
R is hydrogen or lower alkyl;
R_{10} is lower alkyl;
R_2 is hydroxy;
R_3 is hydrogen;
R_6 is tetrahydropyranyloxy, benzyloxy, 4-methoxy-5,6-dihydropyranyloxy, benzhydryloxy, trityloxy, trialkylsilyloxy or methoxymethyl; and the dotted bond can be optionally hydrogenated;
or its optical active enantiomers or racemates thereof.

3. A compound of the formula:

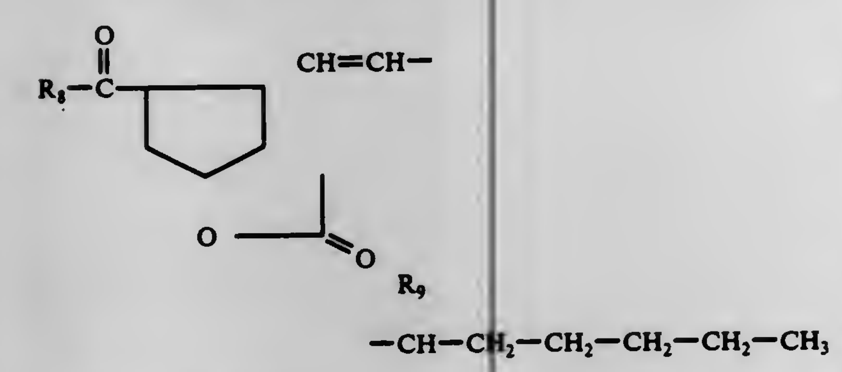


wherein
R is hydrogen or lower alkyl;
R_2 is hydroxy;
R_3 is hydrogen
R_6 is hydroxy, tetrahydropyranyloxy, benzyloxy, 4-methoxy-5,6-dihydro-2H-pyranyloxy, benzhydryloxy, trityloxy, trialkylsilyloxy and methoxymethyl;
R_9 is lower alkyl or fluoro;

R_9' is hydrogen or lower alkyl;
R_{10} is lower alkyl or hydrogen; and the dotted carbon to carbon bond can be optionally hydrogenated
or its optical active enantiomers or racemates thereof.

4,059,577
SYNTHESIS OF CYCLOPENTANOL
Frank Kienzle, Therwil, Switzerland, and Perry Rosen, North Caldwell, N.J., assignors to Hoffmann-La Roche, Inc., Nutley, N.J.
Division of Ser. No. 613,137, Sept. 15, 1975, Pat. No. 4,005,110, which is a division of Ser. No. 381,322, July 20, 1973, abandoned, which is a continuation-in-part of Ser. No. 300,633, Nov. 25, 1972, abandoned. This application Oct. 6, 1976, Ser. No. 730,059
Int. Cl.² C07C *177/00;* **C07D** *307/77*
U.S. Cl. 542—426 **1 Claim**

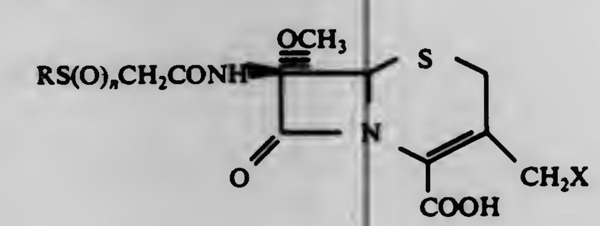
1. A compound of the formula:



wherein R_9 is lower alkanozloxy, benzoyloxy, benloxy or tetrahydropyranyloxy
and enantiomers and racemates thereof.

4,059,578
7-SUBSTITUTED MERCAPTOACETAMIDO CEPHAMYCINS
Robert M. DeMarinis, King of Prussia, Pa., and Jerry A. Weisbach, Cherry Hill, N.J., assignors to SmithKline Corporation, Philadelphia, Pa.
Continuation-in-part of Ser. No. 504,619, Sept. 9, 1974, abandoned. This application Jan. 13, 1975, Ser. No. 540,482
Int. Cl.² C07D *501/50;* **A61K** *31/545*
U.S. Cl. 544—21 **10 Claims**

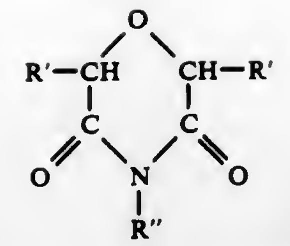
1. A compound of the formula



wherein
R is CF_3 or CF_3CH_2;
n is 0, 1, or 2;
X is SHet; and
Het is tetrazolyl, triazolyl, thiadiazolyl, or oxadiazolyl, each unsubstituted or substituted with 1 or 2 alkyl groups of 1–4 carbon atoms,
or a pharmaceutically acceptable salt thereof.

4,059,579
MORPHOLENONE DERIVATIVES
Dennis A. Ruest, Manchester; Roger L. Kidwell, Kirkwood, and Chung Y. Shen, St. Louis, all of Mo., assignors to Monsanto Company, St. Louis, Mo.
Filed Oct. 10, 1974, Ser. No. 513,792
Int. Cl.² C07D *295/00*
U.S. Cl. 544—172 **3 Claims**

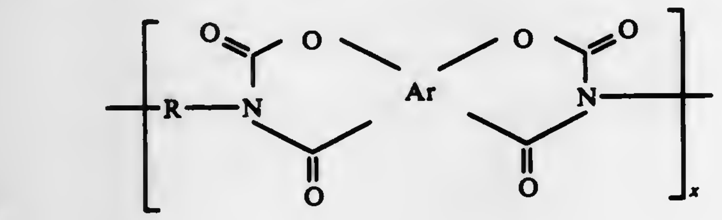
1. A compound represented by the formula:



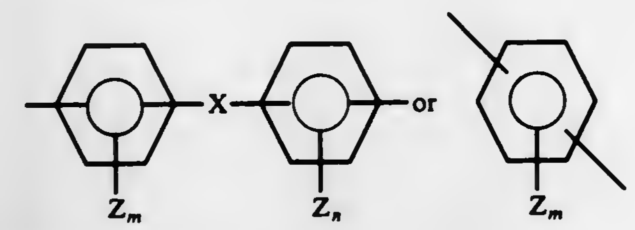
wherein R′ is selected from the group consisting of hydrogen and COOM′, M′ being alkali metal, ammonium or one-half magnesium, hydrogen, or alkyl radicals containing 1 to 12 carbon atoms, provided that at least one R′ substituent is COOM′ and R″ is selected from the group consisting of alkyl radicals containing from 1 to 12 carbon atoms, phenyl and COOM, M being alkali metal; and, the O-carboxylates of the said imide carboxylates.

4,059,580
SULPHONATED POLYBENZ-1,3-OXAZIN-2,4-DIONES
Klaus Elfert; Jurgen Hinz, and Rudolf Binsack, all of Krefeld, Germany, assignors to Bayer Aktiengesellschaft, Germany
Filed Aug. 10, 1976, Ser. No. 713,143
Claims priority, application Germany, Aug. 16, 1975, 2536491
Int. Cl.² C07D *265/00, 273/00, 295/00;* **C08F** */00*
U.S. Cl. 544—73 **4 Claims**

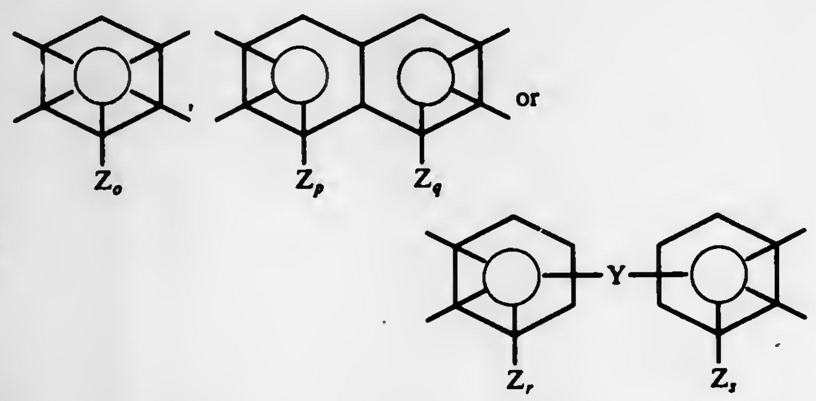
1. A sulphonated polybenz-1,3-oxazin-2,4-dione whose 0.5% solution in dimethyl formamide at 25° C has a relative viscosity of from 0.7 to 3.5 and which has an acid number of from 1 to 800 of the formula



wherein R is



and Ar is of the formula



wherein X is a bond, —O—, —S—, $—SO_2—$, $—C(CH_3)_2—$ or $—CH_2—$; Y is a bond, —O—, —S—, $—CH_2—$, $—SO_2—$ or —CO—; Z is $—SO_3H$ or a radical of a sulphonic acid salt of an alkali or alkaline earth metal; *m, n, o, p, q, r* and *s* are the same or different, and *m* and *n* represent 0 or an integer from 1 to 4, *o, p* and *q* represent 0, 1 or 2, and *r* and *s* represent 0 or an integer from 1 to 3; with the proviso that *m, n, o, p, q, r* and *s*

cannot all be 0 simultaneously; and *x* is an integer of from 10 to 200.

4,059,581
HETEROCYCLIC NITROGEN CONTAINING SILOXANES
Bela Prokai, Mahopac, N.Y., assignor to Union Carbide Corporation, New York, N.Y.
Continuation-in-part of Ser. No. 219,120, Jan. 19, 1972, abandoned, which is a division of Ser. No. 887,428, Dec. 22, 1969, Pat. No. 3,658,867. This application May 16, 1975, Ser. No. 578,091
Int. Cl.² C07F *7/04*
U.S. Cl. 544—69 **20 Claims**

1. A cationic bis(trimethylsiloxy) siloxane having the formula $MD_x'M$ wherein M is a trimethylsiloxy unit, $Me_3SiO_{1/2}$, *x* is an integer of 1 to 3 and D′ is a cationic difunctional unit having the formula:

$$X^{-}[R_2\underset{\displaystyle R}{\overset{+}{N}}R^{*}(O)_tSi(Me)O]$$

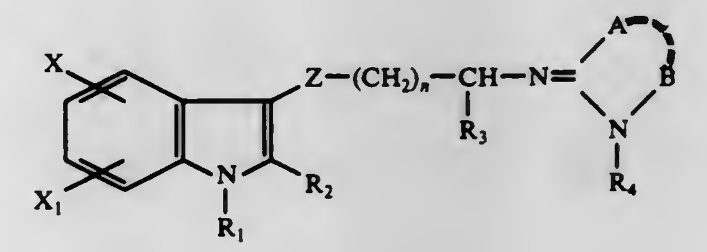
wherein R* is a divalent organic group, free of aliphatic unsaturation and having 2 to 18 carbon atoms, selected from the class consising of divalent hydrocarbon groups and hydroxy-substituted divalent hydrocarbon groups; R is selected from the class consisting of methyl and ethyl; R_2N is an organic heterocyclic radical selected from the group consisting of morpholinium, piperdinum, pyrrolium, and piperazinium, said heterocyclic radical being bonded through the N atom in the above formula to the R and R* groups; X is an anion selected from the class consisting of chlorine, iodine, bromine, aryl sulfonate having 6 to 18 carbon atoms, nitrate, nitrite and borate anions when taken individually, sulfate and sulfite anions when two X− groups are taken together and a phosphate anion when three X− groups are taken together; and *t* is an integer of 0 to 1, with the proviso that when *t* is 1, R* can also be a group of the formula —R″OR″— wherein R″ is selected from the class consisting of divalent hydrocarbon groups and hydroxy-substituted divalent hydrocarbon groups as defined above.

4,059,582
PROCESS FOR PREPARING ADENINE
Eiichi Yonemitsu, Kashiwa; Tomiya Isshiki, Tokyo, and Yasuhiko Kijima, Matsudo, all of Japan, assignors to Mitsubishi Gas Chemical Company, Inc., Tokyo, Japan
Filed July 24, 1975, Ser. No. 598,697
Claims priority, application Japan, July 31, 1974, 49-87818; Sept. 24, 1974, 49-109720
Int. Cl.² C07D *473/34*
U.S. Cl. 260—252 **13 Claims**

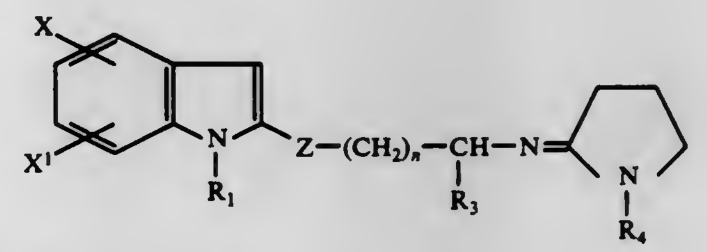
1. A process for preparing adenine directly which comprises reacting at least one member selected from the group consisting of diaminomaleonitrile and diaminofumaronitrile, a formic acid derivative selected from the group consisting of ammonium formate, formamide, orthoformic acid methyl and ethyl esters, and formic acid methyl and ethyl esters, and at least one member selected from the group of ammonia and ammonium salts in the presence or absence of a solvent, the amount of formic acid derivative being not less than 100 g per mole of nitrile.

4,059,583
SUBSTITUTED INDOLES
David Fred McComsey, Philadelphia, and Michael John Zelesko, Warminster, both of Pa., assignors to McNeil Laboratories, Incorporated, Fort Washington, Pa.
Continuation-in-part of Ser. No. 631,798, Nov. 13, 1975, abandoned, which is a continuation-in-part of Ser. No. 537,612, Dec. 30, 1974, abandoned. This application Oct. 13, 1976, Ser. No. 731,866
Int. Cl.² C07D *209/30*
U.S. Cl. 260—256.5 R **35 Claims**

1. A member selected from the group consisting of a compound having a formula selected from the group consisting of:



and

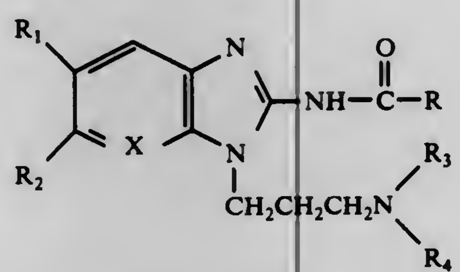


and the therapeutically active acid addition salts thereof, wherein:
X and X^1 are each members selected from the group consisting of hydrogen, loweralkyl, loweralkoxy, halo, loweralkylamino and acylamino; provided that X and X^1 are not both acylamino;
R_1 is a member selected from the group consisting of hydrogen, loweralkyl, cycloalkyl, phenyl, substituted phenyl, phenylloweralkyl, substituted phenylloweralkyl wherein said substitution is on only the phenyl portion, loweralkoxyloweralkyl, alkenyl, alkynyl, cycloalkylloweralkyl, and cycloalkenyl;
R_2 is a member selected from the group consisting of hydrogen, loweralkyl, phenyl, biphenyl, naphthyl, substituted phenyl, heterocyclic aryl, phenylloweralkyl, and substituted phenylloweralkyl wherein said substitution is on only the phenyl portion;
Z is a member selected from the group consisting of thio, sulfinyl, and sulfonyl;
n is the integer 1, 2, or 3;
R_3 is a member selected from the group consisting of hydrogen and loweralkyl;
R_4 is a member selected from the group consisting of hydrogen, loweralkyl, phenyl, substituted phenyl, phenylloweralkyl, substituted phenylloweralkyl wherein said substitution is on only the phenyl portion, cycloalkyl, hydroxyloweralkyl, and alkenyl;
A and B taken individually are each loweralkyl;
A and B taken together is a member selected from the group consisting of $—CH_2CH(R_5)CH_2—$, $—CH_2CH_2CH(R_5)—$, $—N(R_6)CH(R_5)(CH_2)_m—$, $—(CH_2)_4—$, and $—(CH_2)_5—$, said R_5 being a member selected from the group consisting of hydrogen, loweralkyl, phenyl, and substituted phenyl, said R_6 being a member selected from the group consisting of hydrogen and lower-alkyl, and said *m* being 1 or 2; provided that when *m* is 2,
R_5 is H; said cycloalkyl having from 3 to about 8 carbon atoms, said alkenyl having from 2 to about 5 carbon atoms; said alkynyl having from about 2 to about 5 carbon atoms; said cycloalkenyl having from 5 to about 7 carbon atoms;

said cycloalkylloweralkyl having from 3 to about 8 carbon atoms in its cycloalkyl portion and from 1 to about 5 carbon atoms in its loweralkyl portion; said acyl consisting of loweralkyl carboxy radicals, phenyl carboxy radicals, and substituted phenyl carboxy radicals; said substituted phenyl being phenyl substituted with from 1 to 3 members each selected from the group consisting of loweralkyl, loweralkoxy, and halo; and said heterocyclic aryl comprising 5- to 10-membered heteroaromatics wherein the hetero atoms are one or more thia, aza or oxa atoms.

4,059,584
2-ACYLAMINO-3-[3-(DIALKYLAMINO)PROPYL]-IMIDAZO[4,5-B]PYRIDINES
Saul Bernard Kadin, New London, Conn., assignor to Pfizer, New York, N.Y.
Division of Ser. No. 495,375, Aug. 7, 1974, Pat. No. 4,002,623. This application Aug. 6, 1976, Ser. No. 712,225
Int. Cl.² C07D 487/04
U.S. Cl. 260—268 BC 5 Claims

1. A compound having the formula:



and the pharmaceutically acceptable acid addition salts thereof wherein R is styryl, chlorostyryl, phenyl, or mono- or disubstituted phenyl wherein each substitutent is chloro, bromo, fluoro, trifluoromethyl, phenyl, alkoxy or alkyl, said alkoxy or alkyl having from 1 to 4 carbon atoms; R_1 and R_2 are each hydrogen, chloro, bromo, fluoro, trifluoromethyl, methoxy or methyl; X is nitrogen; and R_3 and R_4 when taken separately are each alkyl having from 1 to 4 carbon atoms and when taken together with the nitrogen to which they are attached form piperidino, pyrrolidino, morpholino, piperazino, 4-benzylpiperazino or 4-alkylpiperazino, said alkyl having from 1 to 4 carbon atoms.

4,059,585
PROCESS FOR PREPARING AN INTERMEDIATE FOR CNS DEPRESSANTS
Francois T. Bruderlein, Montreal, Canada, assignor to Ayerst McKenna and Harrison Ltd., Montreal, Canada
Filed July 27, 1976, Ser. No. 709,144
Int. Cl.² C07D 217/10
U.S. Cl. 260—286 Q 9 Claims

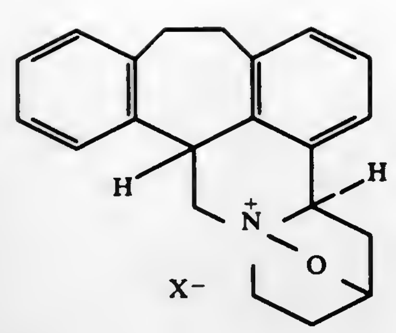
1. A process for preparing (4a,13b-trans)-1,2,4,4a,8,9,13b,14-octahydro-3H-benzo[6,7]cyclohepta[1,2,3-de]pyrido[2,1-a]isoquinolin-3-one, comprising:

a. oxidizing 1,7,8,12b-tetrahydrobenzo[1,2]cyclohepta[3,4,5-de]-isoquinoline with a peracid oxidizing agent to obtain 1,7,8,12b-tetrahydrobenzo[1,2]cyclohepta[3,4,5-de]-isoquinoline N-oxide;

b. reacting the last-named compound with a haloolefin of formula

$$X-CH_2CH_2C(=CH_2)-CH_3$$

in which X is chloro, bromo or iodo to obtain the corresponding quaternary salt of formula 4



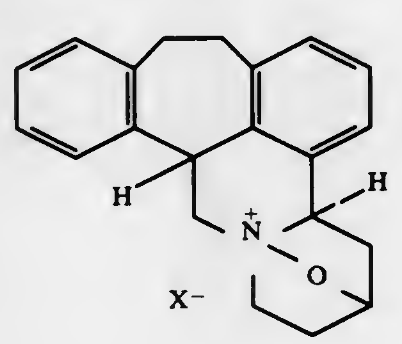
4

in which X is the same as the halogen of the haloolefin employed;

c. reducing the compound of formula 4 in which X is chloro, bromo or iodo with a complex metal hydride reducing agent to obtain (4a,13b-trans)-2,3,4,4a,8,9,13b,14-octahydro-1H-benzo[6,7]isoquinolin-3-ol; and

d. oxidizing the last-named compound with a reagent for converting a hydroxy function to the corresponding keto function to obtain (4a,13b-trans)-1,2,4,4a,8,9,13b,14-octahydro-3H-benzo[6,7]cyclohepta[1,2,3-de]pyrido[2,1-a]isoquinolin-3-one.

8. A compound of the formula



in which X is chloro, bromo or iodo.

4,059,586
5-ALKOXY-2-ALKYL-1,2,3,4-TETRAHYDROISOQUINOLENE-8-CARBOXALDEHYDE AND DERIVATIVES
Ian William Mathison; William Ebenezer Solomons, both of Memphis, Tenn., and Raymond Henry Jones, Northport, N.Y., assignors to Marion Laboratories, Inc., Kansas City, Mo.
Division of Ser. No. 455,600, March 28, 1974, Pat. No. 3,978,067. This application May 24, 1976, Ser. No. 689,078
Int. Cl.² C07D 217/24
U.S. Cl. 260—287 D 6 Claims

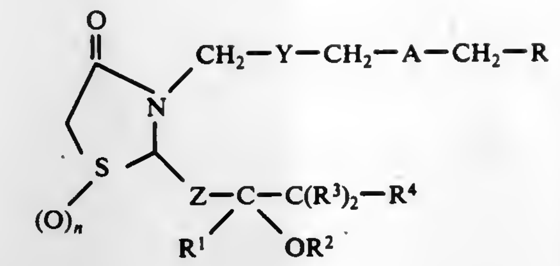
1. 5-Lower alkoxy-2-lower alkyl-1,2,3,4-tetrahydroisoquinoline-8-carboxaldehyde.

3. Beta-(5-lower alkoxy-2-lower alkyl-1,2,3,4-tetrahydroisoquinoline-8)propenoic acid.

5. Beta-(5-lower alkoxy-2-lower alkyl-1,2,3,4-tetrahydroisoquinoline-8)propanoic acid.

4,059,587
CERTAIN THIAZOLIDINE COMPOUNDS
Robert L. Smith, Lansdale; Ta-Jyh Lee, Hatfield, and Edward J. Cragoe, Jr., Lansdale, all of Pa., assignors to Merck & Co., Inc., Rahway, N.J.
Filed May 24, 1976, Ser. No. 689,311
Int. Cl.² C07D 277/14
U.S. Cl. 260—301 36 Claims

1. The compound of the formula



wherein

R is carboxy, a carboxy salt having the formula —COO^-M^+ from a metal or an amine, or derivatized carboxy in which R is selected from alkoxycarbonyl (—$COOR^5$ wherein R^5 is alkyl having 1–10 carbon atoms), carbamoyl (—CO_2NH_2), substituted carbamoyl (—$CONR^6R^7$) wherein R^6 and R^7 are selected from the group consisting of hydrogen, lower alkyl having 1–4 carbon atoms, and diloweralkylaminoalkyl having 4–7 carbon atoms, and carbazoyl (—$CONHNH_2$);

A is selected from the group consisting of methylene and oxygen;

Y is selected from the group consisting of ethylene, vinylene, and ethynylene;

n is 0, 1, or 2;

Z is selected from the group consisting of ethylene and vinylene;

R^1 is hydrogen or methyl;

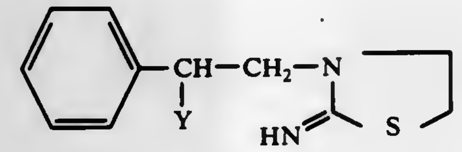
R^2 is hydrogen or lower alkanoyl of from 1–5 carbon atoms;

R^3 is hydrogen or methyl; and

R^4 is alkyl or branched chain alkyl of from 3–6 carbon atoms, 4,4,4-trifluorobutyl, or when R^4 is lower straight chain alkyl and R^1 is methyl, the terminal carbon atom of R^4 can be joined to R^1 to form a polymethylene chain of from 4–7 carbon atoms, or when R^4 is straight chain alkyl and R^1 is hydrogen, the terminal carbon atom of R^4 can be joined to the carbon atom bearing OR^2 to form a polymethylene chain of from 3–6 carbon atoms.

4,059,588
PROCESS FOR PREPARING 6-PHENYL-2,3,5,6-TETRAHYDROIMIDAZO [2,1-b]THIAZOLE
Asbjorn Baklien, Kingsbury, and Jan Kolm, Kew, both of Australia, assignors to ICI Australia Limited, Melbourne, Australia
Division of Ser. No. 565,092, July 14, 1966, Pat. No. 3,759,937. This application Apr. 3, 1972, Ser. No. 240,826
Claims priority, application Australia, July 19, 1965, 61653/65; July 26, 1965, 61931/65; Aug. 31, 1965, 63415/65; Sept. 8, 1965, 63786/65
Int. Cl.² C07D 513/04
U.S. Cl. 260—306.7 T 3 Claims

1. A process which comprises contacting an acid addition salt of a compound of the formula:



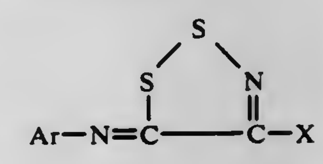
wherein Y is halogen, with an aqueous alkaline solution, heating the mixture at a temperature in the range between 40° and 150° C. to cause the formation of the free base of the dl 6-phenyl-2,3,5,6-tetrahydroimidazo[2,1-b]thiazole, as a separate phase separating the separate phase and recovering said product therefrom.

4,059,589
PROCESS FOR FORMYLATION
Paul Scherberich, Dietzenbach, and Wolf-Dieter Pfeifer, Grossauheim, both of Germany, assignors to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, Frankfurt, Germany
Filed July 12, 1974, Ser. No. 488,233
Claims priority, application Germany, July 14, 1973, 2335990
Int. Cl.² C07D 277/06, 277/46, 245/16
U.S. Cl. 260—306.7 C 18 Claims

1. In a process for the formylation of an organic basic nitrogen compound having at least a hydrogen atom attached to the basic nitrogen atom in the presence of acetic anhydride, the improvement comprising adding the nitrogen compound as a salt with an acid and carrying out the formylation without formic acid and with an alkali formate or ammonium formate in an inert organic solvent having limited solubility in water.

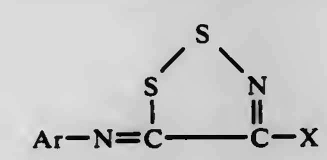
4,059,590
CERTAIN 4-HALO-5-ARYL-1,2,3-DITHIAZOLE COMPOUNDS AND THEIR PREPARATION
Joseph E. Moore, Richmond, Calif., assignor to Chevron Research Company, San Francisco, Calif.
Filed June 21, 1976, Ser. No. 698,383
Int. Cl.² C07D 285/00
U.S. Cl. 260—306.8 R 9 Claims

1. A compound of the formula



wherein X is fluoro, chloro, bromo, iodo and Ar is phenyl, naphthyl or phenyl or naphthyl substituted with 1 to 3 of the same or different substituents selected from hydroxy, fluoro, chloro, bromo, iodo, cyano, nitro, benzoyl, formyl, alkanoyl of 2 to 6 carbon atoms, alkyl of 1 to 6 carbon atoms, haloalkyl of 1 to 2 carbon atoms and 1 to 5 of the same or different halogens selected from fluoro, chloro or bromo, alkoxy of 1 to 4 carbon atoms, phenoxy, or phenoxy substituted with 1 to 2 of the same of different substituents selected from fluoro, chloro, bromo, iodo, trifluoromethyl, trichloromethyl, nitro, cyano or alkyl of 1 to 4 carbon atoms.

6. A process for preparing a compound of the formula



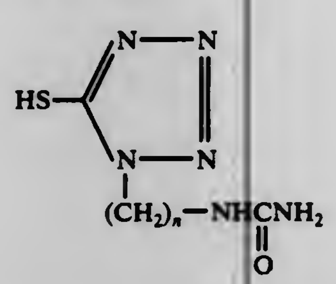
wherein Ar and X are as defined in claim 1 which comprises reacting substantially equimolar amounts of a sulfur dihalide wherein the halide is chloro or bromo and a N-aryl cyanothioformamide of the formula

$$ArNHC(=S)CN$$

wherein Ar is as defined above, in the liquid phase at a temperature of 0° to 100° C in the presence of a catalytic amount of an N,N-dialkylformamide or an N-alkylformamide wherein the alkyl groups have 1 to 4 carbon atoms, or a quaternary ammonium salt.

4,059,591
UREIDOALKYL SUBSTITUTED TETRAZOLE THIOL INTERMEDIATES FOR PREPARING CEPHALOSPORINS
David A. Berges, Wayne, Pa., assignor to SmithKline Corporation, Philadelphia, Pa.
Division of Ser. No. 639,033, Dec. 9, 1975, Pat. No. 4,025,626. This application Dec. 22, 1976, Ser. No. 753,410
Int. Cl.^{2} C07D *257/04*
U.S. Cl. 260—308 D **2 Claims**

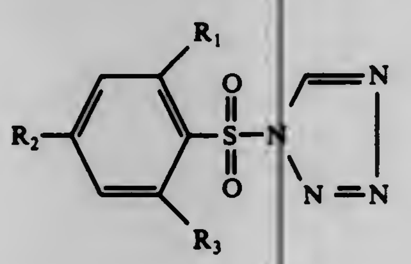
1. A compound of the formula



in which *n* is two to five.

4,059,592
ARYLSULFONYL TETRAZOLES
Saran A. Narang, and Jacek Stawinski, both of Ottawa, Canada, assignors to Canadian Patents and Development Limited, Ottawa, Canada
Filed Feb. 10, 1976, Ser. No. 656,858
Int. Cl.^{2} C07D *257/04*
U.S. Cl. 260—308 D **6 Claims**

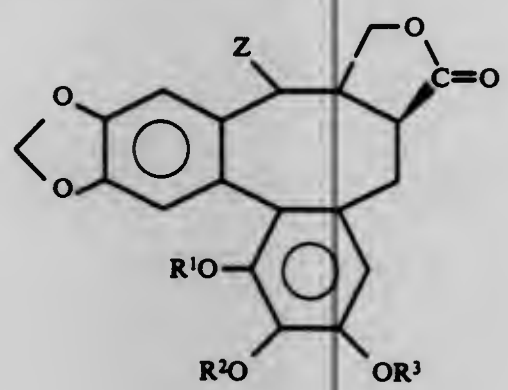
1. An arylsulfonyl tetrazole of the formula



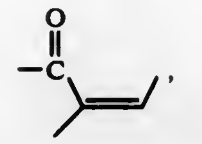
where R_1, R_2 and R_3 are selected from hydrogen, lower alkyl and lower alkoxy groups, the alkyl and alkoxy groups having from 1 to 4 carbon atoms.

4,059,593
SYNTHESIS OF STEGANACIN AND DERIVATIVES THEREOF
Andrew S. Kende, Pittsford, and Lanny S. Liebeskind, Snyder, both of N.Y., assignors to University of Rochester, Rochester, N.Y.
Division of Ser. No. 642,954, Dec. 22, 1975, Pat. No. 4,003,916. This application Aug. 18, 1976, Ser. No. 715,487
Int. Cl.^{2} C07D *317/44*
U.S. Cl. 260—340.5 R **2 Claims**

1. A process for the preparation of a racemic mixture of the compound having the formula

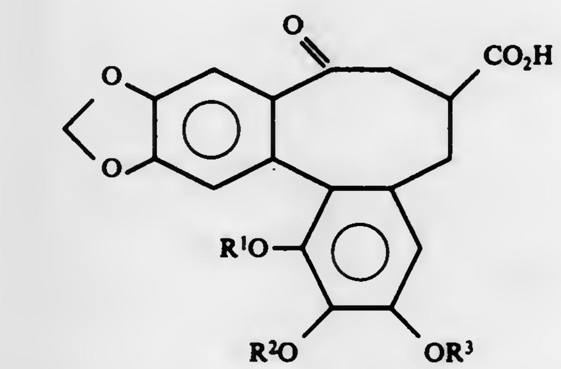


in which Z is ◄OH, oxo (=O) or ◄OW wherein W is acetyl or



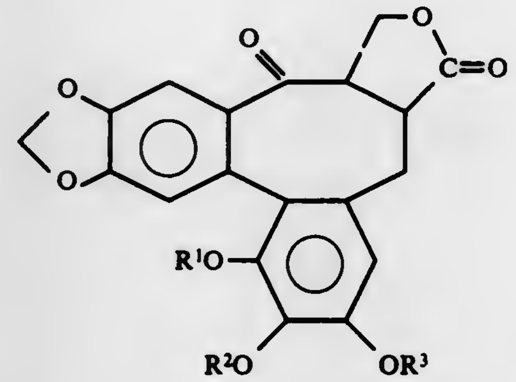
and R^1, R^2 and R^3 are alike or different and each is H or (lower-)alkyl of 1 to 3 carbon atoms, which process comprises the consecutive steps of

A. treating the compound having the formula



in which R^1, R^2 and R^3 are as defined above, with excess 37% aqueous formaldehdye in the presence of 0.1–2.0M alkali metal hydroxide for about 1 to 48 hours, followed by heating in the presence of excess dilute sulfuric acid and chloroform to produce the compound having the formula

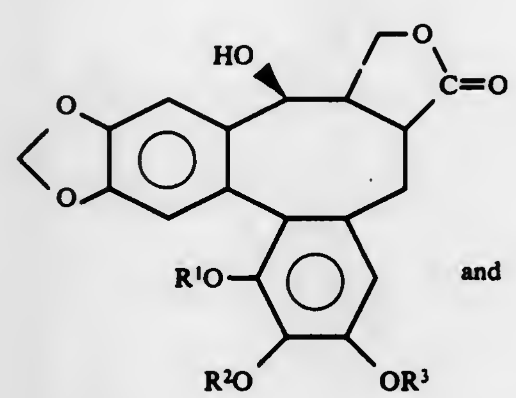
IV



in which R^1, R^2 and R^3 are as defined above;

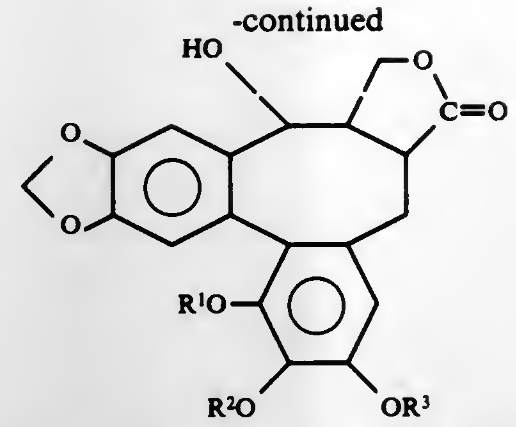
B. treating compound IV with sodium borohydride in methylene chloride-anhydrous methanol to produce a mixture of the compounds having the formula

III



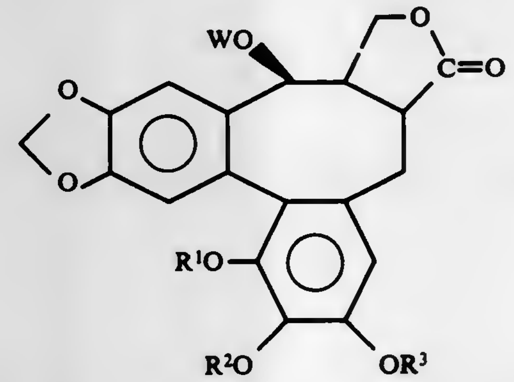
and

-continued

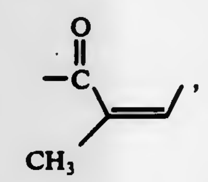


in which R^1, R^2 and R^3 are as defined above, which mixture is separated into its component parts;

C. acylating compound III with acetic anhydride, acetyl halide or angelic acid halide in the presence of a tertiary amine to produce the compound having the formula



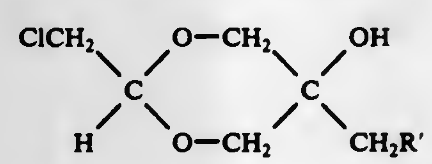
in which W is acetyl or



R^1, R^2 and R^3 are as defined above and halide is Cl, Br or I.

4,059,594
STEREOSPECIFIC PROCESS FOR PRODUCTION OF C-5-ARALKOXY-R-2-SUBSTITUTED-5-ALKYL-1,3-DIOXANES AND INTERMEDIATES
Marvin Joseph Konz, Lockport, N.Y., assignor to FMC Corporation, Philadelphia, Pa.
Continuation-in-part of Ser. No. 404,807, Oct. 9, 1973, abandoned, which is a continuation-in-part of Ser. No. 187,971, Oct. 12, 1971, abandoned. This application Jan. 16, 1975, Ser. No. 541,386
Int. Cl.^{2} C07D *319/04*
U.S. Cl. 260—340.7 **4 Claims**

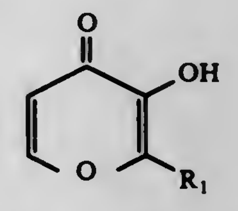
1. A hydroxy-1,3-dioxane of the formula:



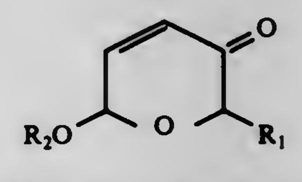
in which R′ is hydrogen or lower alkyl.

4,059,595
V **PROCESS FOR PREPARING 3-OXY-4H-PYRAN-4-ONE DERIVATIVES**
Tatsuya Shono, Kyoto, and Yoshihiro Matsumura, Takatsuki, both of Japan, assignors to Otsuka Kagaku Yakuhin Kabushiki Kaishi, Osaka, Japan
Filed Feb. 26, 1976, Ser. No. 661,823
Claims priority, application Japan, July 17, 1975, 50-87940
Int. Cl.^{2} C07D *309/22*
U.S. Cl. 260—345.9 R **10 Claims**

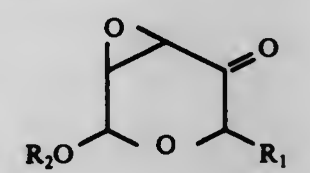
1. A process for preparing a 3-oxy-4H-pyran-4-one derivative represented by the formula:



wherein R_1 is hydrogen or straight-chain or branched-chain alkyl having 1 to 10 carbon atoms which comprises the steps of: (1) epoxidizing a 3-oxo-3,6-dihydro-2H-pyran derivative represented by the formula:



wherein R_1 is as defined above and R_2 is hydrogen, straight-chain or branched-chain alkyl having 1 to 6 carbon atoms or straight-chain or branched-chain acyl having 1 to 6 carbon atoms with a peroxide selected from the group consisting of hydrogen peroxide, trifluoroperacetic acid, perbenzoic acid, monochloroperbenzoic acid, monoperphthalic acid, tertiary butylhydroperoxide and di-tertiary butyl peroxide, in the presence of an alkaline substance at a temperature of about −30 to 40° C to obtain a 4,5-epoxy-3-oxotetrahydropyran derivative represented by the formula



wherein R_1 and R_2 are as defined above, and (2) heating the 4,5-epoxy-3-oxotetrahydropyran derivative in the presence of an acid catalyst.

4,059,596
2,5-BIS(BENZYLOXY)TETRAHYDROFURAN
Heinz Eggensperger; Wolfgang Beilfuss, and Helmut Hermann Ehlers, all of Hamburg, Germany, assignors to Sterling Drug Inc., New York, N.Y.
Division of Ser. No. 593,558, July 7, 1975, Pat. No. 4,004,024. This application July 15, 1976, Ser. No. 705,685
Claims priority, application Germany, July 15, 1974, 2433836
Int. Cl.^{2} C07D *307/20*
U.S. Cl. 260—347.8 **1 Claim**

1. 2,5-Bis(benzyloxy)tetrahydrofuran.

4,059,597

1-[5-(2-NITROPHENYL)-2-FURANCARBOXIMIDOYL]-1H-HEXAHYDROAZEPINE HYDROCHLORIDE

Stanford S. Pelosi; Ronald E. White; George C. Wright, and Chia Nien Yu, all of Norwich, N.Y., assignors to Morton-Norwich Products, Inc., Norwich, N.Y.

Filed Jan. 28, 1977, Ser. No. 763,328

Int. Cl.² C07D *307/66*

U.S. Cl. 260—347.7 **1 Claim**

1. The compound 1-[5-(2-nitrophenyl)-2-furancarboximidoyl]-1H-hexahydroazepine hydrochloride.

4,059,598

DECOMPOSITION OF HYDROPEROXIDES IN PROPYLENE EPOXIDATION REACTION PRODUCT

James J. Coyle, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Continuation of Ser. No. 384,857, Aug. 2, 1973, abandoned, and a continuation-in-part of Ser. No. 102,971, Dec. 30, 1970, abandoned. This application Aug. 13, 1973, Ser. No. 387,849

Int. Cl.² C07D *301/20, 301/32*

U.S. Cl. 260—348.16 **6 Claims**

1. A process for treating the reaction product of a process in which propylene is converted to propylene oxide by reaction with an organic hydroperoxide, said reaction product comprising propylene oxide and organic hydroperoxide, to decompose the organic hydroperoxide without substantial decomposition of the propylene oxide and without substantial formation of C_5 to C_7 hydrocarbons as products of the decomposition reaction, which comprises contacting a catalyst-free reaction mixture recovered as effluent from said epoxidation process, at a temperature in the range from about 0° to about 200° C and a pressure sufficient to maintain the reaction mixture in liquid phase with a non-acidic heterogeneous catalyst system consisting essentially of an oxide of cobalt on a solid support and from 0 to 100 percent by weight of copper oxide based on said cobalt oxide, and recovering a propylene oxide product essentially free of said organic hydroperoxide.

4,059,599

BORIDE CATALYST FOR EPOXIDIZING OLEFINIC COMPOUNDS

Robert Malone Gipson, Austin, Tex., assignor to Texaco Development Corporation, New York, N.Y.

Division of Ser. No. 565,004, April 4, 1975. This application June 25, 1976, Ser. No. 699,835

Int. Cl.² C07D *301/20*

U.S. Cl. 260—348.29 **2 Claims**

1. A method for the liquid phase epoxidation of an olefin having from about 2 to about 60 carbon atoms with an organic hydroperoxide comprising the step of:

intimately contacting said olefin with said organic hydroperoxide at lower temperatures of about 25° C to about 200° C and pressures sufficient to maintain the product and reactants substantially in liquid phase in the presence of a catalytically effective amount of a binary boride consisting of boron and cerium.

4,059,600

EPOXY DODECADIENAMIDES

Madhukar Subraya Chodnekar, Basel; Albert Pfiffner, Pfaffhausen; Norbert Rigassi, Arlesheim; Ulrich Schwieter, Reinach, and Milos Suchy, Pfaffhausen, all of Switzerland, assignors to Hoffmann-La Roche, Inc., Nutley, N.J.

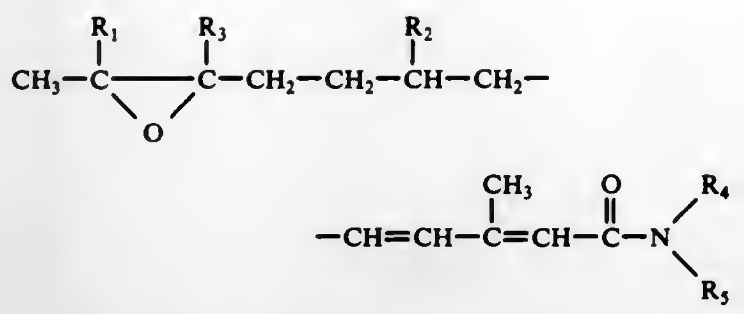
Filed Jan. 7, 1972, Ser. No. 216,256

Claims priority, application Switzerland, Jan. 20, 1971, 849/71; South Africa, Dec. 15, 1971, 71/8418; New Zealand, Dec. 15, 1971, 165805

Int. Cl.² C07D *303/46, 303/40, 303/28;* **A01N** *9/28*

U.S. Cl. 260—348.46 **3 Claims**

1. A compound of the formula:



wherein R_1 and R_2 are methyl and ethyl; R_3 is hydrogen or methyl; and R_4 and R_5 are hydrogen or lower alkyl.

4,059,601

8-HALO-11,12-SECOPROSTAGLANDINS

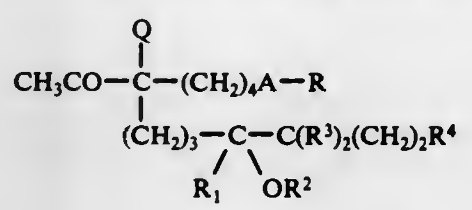
Edward J. Cragoe, Jr., and John B. Bicking, both of Lansdale, Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Division of Ser. No. 584,555, June 6, 1975, Pat. No. 3,991,087, which is a continuation-in-part of Ser. No. 424,501, Dec. 13, 1973, abandoned. This application July 8, 1976, Ser. No. 703,323

Int. Cl.² C09F *7/00*

U.S. Cl. 260—408 **12 Claims**

1. The compound having the following formula:



wherein R is carboxy, a carboxy salt, or —COOY wherein Y is alkyl having from 1–10 carbon atoms;

A is ethylene, trimethylene, α-methylethylene, β-methylethylene, α,α-dimethylethylene, or β,β-dimethylethylene;

Q is chloro or bromo;

R^1 is hydrogen or methyl;

R^2 is hydrogen or loweralkanoyl;

R^3 is hydrogen or methyl;

R^4 is 2,2,2-trifluoroethyl; or, when R^4 is loweralkyl and R^1 is methyl, R^4 and R^1 are joined to form a carbocyclic ring with from 6 to 9 members; or when R^4 is loweralkyl and R^1 is hydrogen, R^4 can be joined to the carbon atom bearing R^1 or OR^2 to form a carbocyclic ring with from 5 to 8 members.

4,059,602

8-METHYL-, PHENYL-, OR SUBSTITUTED PHENYL-11,12-SECOPROSTAGLANDINS

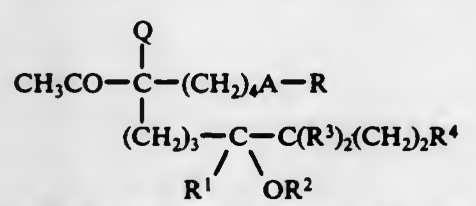
Edward J. Cragoe, Jr., and John B. Bicking, both of Lansdale, Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Division of Ser. No. 584,555, June 6, 1975, Pat. No. 3,991,087, and a continuation-in-part of Ser. No. 424,501, Dec. 13, 1973, abandoned. This application July 8, 1976, Ser. No. 703,330

Int. Cl.² C09F *7/00;* **C11C** *3/00*

U.S. Cl. 260—408 **22 Claims**

1. The compound having the following formula:



wherein R is carboxy, a carboxy salt, or —COOY wherein Y is alkyl having from 1–10 carbon atoms;

A is ethylene, trimethylene, α-methylethylene, β-methylethylene, α,α-dimethylethylene, or α,α-dimethylethylene;

Q is methyl, phenyl, or substituted phenyl;

R^1 is hydrogen or methyl;

R^2 is hydrogen or loweralkanoyl;

R^3 is hydrogen or methyl;

R^4 is hydrogen, loweralkyl, or 2,2,2-trifluoroethyl; or, when R^4 is loweralkyl and R^1 is methyl, R^4 and R^1 can be joined to form a carbocyclic ring with from 6 to 9 members; or when R^4 is loweralkyl and R^1 is hydrogen, R^4 can be joined to the carbon atom bearing R^1 or OR^2 to form a carbocyclic ring with from 5 to 8 members.

4,059,603

ESTERIFICATION OF CARBOXYLIC ACIDS BY CONTACT WITH A PHOSPHONIUM SALT

Noboru Yamazaki, and Fukuji Higashi, both of Tokyo, Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Division of Ser. No. 475,877, June 3, 1974, Pat. No. 3,974,219, and a continuation-in-part of Ser. No. 305,256, Nov. 10, 1972, abandoned. This application May 20, 1976, Ser. No. 688,289

Claims priority, application Japan, Nov. 12, 1971, 46-90767; Nov. 12, 1971, 46-90768; Nov. 22, 1971, 46-93872; Feb. 19, 1972, 47-17355

Int. Cl.² C09F *5/08;* **C11C** *3/02*

U.S. Cl. 260—408 **8 Claims**

1. A process for producing an ester which comprises reacting the carboxyl group of a carboxylic acid of the formula,

$$R^1COOH \qquad (I)$$

wherein R^1 is alkyl having 1–30 carbon atoms, halogen substituted alkyl having 1–10 carbon atoms, cycloalkyl having 3–8 carbon atoms, phenyl, alkyl having 1–4 carbon atoms substituted phenyl or phenylalkyl having 7–12 carbon atoms, with a phosphonium salt obtained by reacting a phosphorous ester selected from the group consisting of monomethyl, monoethyl, monoisopropyl, monophenyl, dimethyl, diethyl, diisopropyl, di-n-butyl, diphenyl, triethyl, triisopropyl and tributyl esters of phosphorous acid, or an ammonium salt of the phosphorous monoester, with an organic base selected from the group consisting of pyridine, 2-methylpyridine, 3-methylpyridine, 4-methylpyridine, 2,6-dimethylpyridine or triethylamine, and an oxidizing agent selected from the group consisting of bromine, iodine, mercurous chloride, mercuric chloride, mercuric bromide or mercuric acetate, at a temperature of from 30° to 200° C, and then reacting the resulting carboxylic acid with a hydroxyl group-containing compound of the formula,

$$R^4OH \qquad (III\text{-}a)$$

wherein R^4 is alkyl having 1–18 carbon atoms, cycloalkyl having 3–8 carbon atoms, phenyl, naphthyl, aryl having at least one substituent selected from the group consisting of alkyl having 1–4 carbon atoms, nitro, cyano, N,N-dimethylamino and methoxycarbonyl, or phenylalkyl having 7–12 carbon atoms, at a temperature of from 0° to 200° C.

3. A process according to claim 1, wherein the carboxylic acid has C_{1-18} alkyl, halogen substituted C_{1-6} alkyl, cyclo-C_{3-6} alkyl phenyl, C_{1-4} alkyl substituted phenyl or phenyl-C_{1-6} alkyl as R^1.

4,059,604

SEPARATION OF MATURE OKRA SEED INTO COMPONENT FRACTIONS

Herman J. Kresse, 7602 Marinette, Houston, Tex. 77074

Filed Nov. 29, 1976, Ser. No. 745,936

Int. Cl.² C11B *1/10*

U.S. Cl. 260—412.4 **2 Claims**

1. A method of separating mature okra seeds into various components comprising,

mixing broken up mature okra seeds with a liquid medium of a mixture of trichlorotrifluorethane and hexane adjusted to a specific gravity of 1.3 plus or minus 0.2 at 60° F. whereby the liquid medium extracts the oil from the broken up okra seed,

ceasing the mixing of the broken up seed with the liquid to allow the seed components to separate due to their differences in density whereby the hulls sink to the bottom of the liquid, the germ floats on top of the liquid, and the kernel floats or remains in suspension in the liquid,

decanting the solution of liquid and germ and kernel material from the hulls,

filtering the liquid from the germ and kernel components, and

separating the oil from the liquid medium.

4,059,605

NON-ISOMERIZABLE OLEFINIC POLYOXYALKYLENE POLYMERS AND SILOXANE-POLYOXYALKYLENE COPOLYMER DERIVATIVES THEREOF

Everett W. Bennett, Longmeadow, Mass., assignor to Union Carbide Corporation, New York, N.Y.

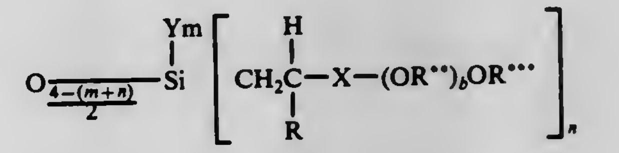
Continuation of Ser. No. 129,562, March 30, 1971, Pat. No. 3,957,843. This application Feb. 20, 1976, Ser. No. 659,973

Int. Cl.² C07F *7/08*

U.S. Cl. 260—448.2 B **1 Claim**

1. A siloxane-polyoxyalkylene block copolymer consisting essentially of:

a. at least one unit having the formula:



wherein X is a cyclic divalent hydrocarbon group free of aliphatic carbon to carbon multiple bonds, Y is a monovalent hydrocarbon group free of aliphatic carbon to carbon multiple bonds, R is hydrogen or a monovalent hydrocarbon group free of aliphatic carbon to carbon multiple bonds, R°° is an alkylene group containing at least two carbon atoms, R°°° is R, —OCNHR, —OCR', or OCOR' where R' is a monovalent hydrocarbon group free of aliphatic carbon to carbon multiple bonds, *m* has a value from 0 to 2 inclusive, *n* has a value from 1 to 3 inclusive, $(m+n)$ has a value from 1 to 3 inclusive, and *b* has a value of at least 5; and

b. units having the formula:

$$Z_pSiO_{\frac{4-p}{2}}$$

wherein *p* has a value from 1 to 3 inclusive and Z is a monovalent hydrocarbon group free of aliphatic carbon to carbon multiple bonds.

4,059,606

ORGANOSILICON COMPOUNDS

Richard Warren Walsingham, and Ronald Sangster Stuart, both of Manchester, England, assignors to Imperial Chemical Industries Limited, London, England

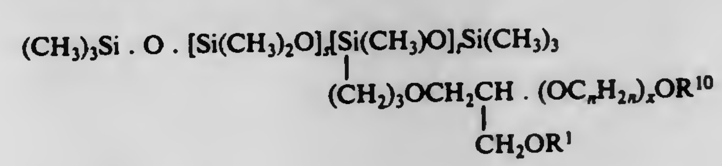
Filed Aug. 11, 1976, Ser. No. 713,503

Claims priority, application United Kingdom, Aug. 29, 1975, 35706/75

Int. Cl.² C07F *7/08*

U.S. Cl. 260—448.2 B **9 Claims**

1. A polysiloxane of the formula:



wherein

R^1 is lower alkyl, lower alkoxylower alkyl or cyclohexyl group,
R^{10} is H, acetyl or trimethylsilyl,
n is 2, 3 or 4, all units C_nH_{2n} not necessarily being alike,
x has a value from 2 to 100
s has a value from 0 to about 50 and
t has a value from 1 to about 20.

4,059,607
PREPARATION OF HYDROCARBON CHLOROSILANES FROM POLYSILANES
James Dale Reedy, New Fairfield, Conn., and Thomas Harold Barker, Newport, Ohio, assignors to Union Carbide Corporation, New York, N.Y.
Filed Dec. 20, 1976, Ser. No. 752,811
Int. Cl.² C07F *7/12*
U.S. Cl. 260—448.2 E **14 Claims**

1. A process of reacting

RC1 (1)

with a polysilane consisting of units of the formula:

Me_xC1_ySi (2)

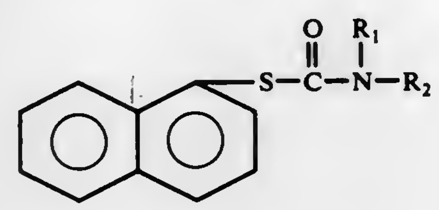
to produce RMe_xSiC1_{3-x}, which comprises carrying out the reaction in contact with a combined catalytic amount of co-catalyst (a) and co-catalyst (b), wherein co-catalyst (a) is selected from the group consisting of R'_3N, R'_3NHC1, R'_4NC1 and R'_4PC1, and co-catalyst (b) is selected from the group consisting of metal salts and metal complexes, at a temperature of from about 10° C to about 60° C, wherein
R is an alkyl radical of from 1 to 18 carbon atoms, an alkenyl radical of from 2 to 18 carbon atoms, or an aralkyl radical of from 7 to 18 carbon atoms,
x is 0 to 2,
y is 0 to 3,
the sum of x and y being from 2 to 3 with the proviso that at least one silicon atom of the polysilane be bonded to at least one chlorine group; all the silicon atoms in (2) being bonded to at least one other silicon atom and all the valences of the silicon atoms in (2) being satisfied by other silicon atoms, C1 or Me radicals, and R′ is one or more of an alkyl or aralkyl radical of from 1 to 18 carbon atoms.

4,059,608
PROCESS FOR THE PREPARATION OF HYDROGENOSILANES
Raymond Calas, Le Bouscat; Jacques Dunogués; Gérard Déléris, both of Talence; Marcel Lefort, Caluire et Cuire, and Christian Simonnet, Venissieux, all of France, assignors to Rhone-Poulenc Industries, Paris, France
Filed Mar. 4, 1977, Ser. No. 774,486
Claims priority, application France, Mar. 5, 1976, 76.07042
Int. Cl.² C07F *7/08, 7/12, 7/18*
U.S. Cl. 260—448.2 E **10 Claims**

1. A process for preparing hydrogenosilanes, which comprises the step of contacting at least one disilane of the formula $(R)_3Si—Si(R)_3$, wherein the substituents R are the same or different from each other and represent an alkyl group containing 1 to 6 carbon atoms, an alkoxy group containing 1 to 6 carbon atoms, phenyl, halogen, hydrogen, 3,3,3-trifluoropropyl or trimethylsiloxy, with gaseous hydrogen under pressure in the presence of a catalytic system consisting essentially of:
a. 0.2 to 10% by weight, relative to the weight of the disilane, of an aprotic base, and
b. 0.05 to 5%, as the weight of elemental metal relative to the weight of the disilane, of a nickel catalyst which consists essentially of finely divided nickel, and is obtained by reduction of a nickel compound.

4,059,609
S-NAPHTHYL N-ALKYLTHIOLCARBAMATES
Jay Kent Rinehart, Akron, Ohio, assignor to PPG Industries, Inc., Pittsburgh, Pa.
Filed June 4, 1976, Ser. No. 693,044
Int. Cl.² C07C *155/02*
U.S. Cl. 260—455 A **12 Claims**

1. A S-α-naphthyl N-alkylthiolcarbamate of the general formula:



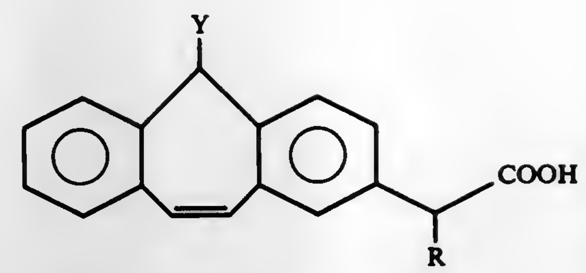
wherein:
R_1 is hydrogen, or an alkyl of one to five carbon atoms, and
R_2 is an alkyl of one to five carbon atoms.

4,059,610
PROCESS FOR PREPARING ISOCYANIC ACID DERIVATIVES
Susumu Handa, Wakayama; Yoshiaki Tanaka, Osaka; Atsushi Nishibata, Wakayama; Sadashi Ueda, Wakayama; Yoshiaki Inamoto, Wakayama; Masahiro Saito, Wakayama; Fumio Tanimoto, Kyoto, and Hisao Kitano, Osaka, all of Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan
Filed May 14, 1976, Ser. No. 686,381
Claims priority, application Japan, May 21, 1975, 50-60601
Int. Cl.² C07C *118/00*
U.S. Cl. 544—193 **10 Claims**

1. A process for preparing isocyanic acid derivative having a isocyanatomethyl group and/or isocyanurate ring structure, which consists essentially of reacting at 70° to 200° C (A) an organic halogen compound having a monohalogenomethyl group or monohalogenomethylene group, or mixtures thereof, with (B) an alkali cyanate selected from the group consisting of lithium cyanate, sodium cyanate, potassium cyanate, rubidium cyanate, cesium cyanate, ammonium cyanate and mixtures thereof, in (C) an organic solvent selected from the group consisting of N,N-disubstituted organic acid amines, N,N′-disubstituted organic sulfonic acid amides, dialkyl sulfoxides, dialkyl sulfones, polyalkylene sulfoxide, polyalkylene sulfone, macrocyclic polyethers and mixtures thereof, in the presence of (D) at least one polyhalogen compound selected from the group consisting of compounds having dihalogenomethyl group, dihalogenomethylene group or trihalogenomethyl group and tetrahalogenomethanes in an amount in the range of from 1 to 20 weight percent, based on the weight of said organic halogen compound (A), until isocyanic acid derivative of (A) is formed, said polyhalogen compound (D) being compatible with organic compounds or organic halogen compounds as reaction solvent and being present at the start or midway of the reaction and being effective to prevent side reactions and being unchanged by the reaction, and recovering from the reaction mixture said isocyanic acid derivative.

4,059,611
OXIDATIVE PROCESS FOR THE PREPARATION OF 2-(5H-DIBENZO[a,d]CYCLOHEPTEN-5-ON-2-yl)ACETIC, PROPIONIC AND BUTYRIC ACID
Peter H. Nelson, and Karl G. Untch, both of Los Altos, Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.
Division of Ser. No. 611,050, Sept. 8, 1975, abandoned. This application July 6, 1976, Ser. No. 702,651
Int. Cl.² C07C *143/68, 65/14, 83/00*
U.S. Cl. 260—456 P **3 Claims**

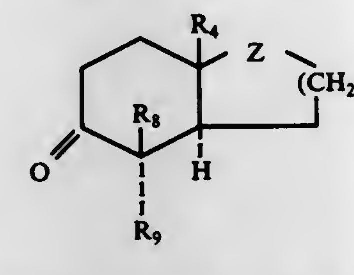
1. A compound represented by the formula



wherein R is hydrogen, methyl or ethyl and Y is hydroxy or a sulfonate moiety selected from the group consisting of methanesulfonyloxy, benzenesulfonyloxy, p-toluenesulfonyloxy, p-bromobenzenesulfonyloxy, p-nitrobenzenesulfonyloxy and naphthylsulfonyloxy; the esters thereof formed from straight or branched chain alkanols having from 1 to 20 carbon atoms or from benzyl alcohol; and the salts thereof selected from the group consisting of sodium, potassium, lithium, calcium, magnesium, ammonium, copper, ethanolamine, diethylamine, tris(-hydroxymethyl)aminomethane, choline, caffeine and lysine salts.

4,059,612
SUBSTITUTED INDANONES
Zoltan George Hajos, Upper Montclair, N.J., assignor to Hoffmann-La Roche, Inc., Nutley, N.J.
Division of Ser. No. 482,711, June 24, 1974, Pat. No. 3,984,473, which is a division of Ser. No. 765,023, Oct. 4, 1968, Pat. No. 3,897,460. This application July 14, 1976, Ser. No. 705,365
Int. Cl.² C07C *143/68*
U.S. Cl. 260—456 R **1 Claim**

1. A compound of the formula



wherein Z is $CH(OR_2)$; R_2 is hydrogen, lower alkyl, lower alkoxy-lower alkyl, phenyl-lower alkyl, lower alkanoyl, or trifluoroacetyl; R_4 is hydrogen or lower alkyl; m is an integer having the value of 1 or 2; R_8 is hydrogen and R_9 is methylene-X, where X is lower-alkylarylsulfonyloxy, arylsulfonyloxy or lower alkylsulfonyloxy,
its optical enantiomer and the racemate thereof.

4,059,613
FLUORINE-CONTAINING DICARBAMATE ESTERS
Yasusi Nakamura; Masashi Umemura, and Michimasa Yonekura, all of Tokyo, Japan, assignors to Asahi Denka Kogyo K.K., Tokyo, Japan
Division of Ser. No. 511,272, Oct. 2, 1974, Pat. No. 3,952,075. This application Jan. 6, 1976, Ser. No. 646,921
Claims priority, application Japan, Oct. 3, 1973, 48-111225; Oct. 3, 1973, 48-111226; Oct. 3, 1973, 48-111227; Oct. 3, 1973, 48-111229; Nov. 24, 1973, 48-132040; Nov. 24, 1973, 48-132041; Nov. 24, 1973, 48-132042; Nov. 24, 1973, 48-132043; Nov. 24, 1973, 48-132044; Nov. 24, 1973, 48-132045; Dec. 28, 1973, 49-113; Dec. 28, 1973, 49-114; Dec. 28, 1973, 49-115; Dec. 28, 1973, 49-116; Dec. 28, 1973, 49-118; Dec. 28, 1973, 49-119; Aug. 10, 1974, 49-65763; Aug. 10, 1974, 49-65764; Aug. 10, 1974, 49-65768; Aug. 10, 1974, 49-65769; Aug. 10, 1974, 49-65770; Aug. 10, 1974, 49-65771
Int. Cl.² C07C *125/06*
U.S. Cl. 560—26 **10 Claims**

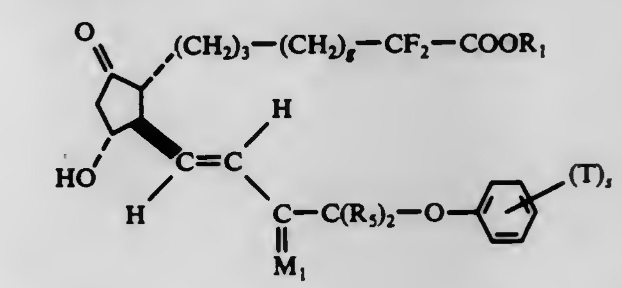
1. A compound having the formula

$R_f(CH_2)_pO(RO)_mCONHR'NHCOO(C_2H_4O)_nH$

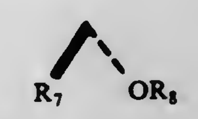
wherein R_f is perfluoroalkyl having 4 to 14 carbon atoms, p is a number of from one to 10 and $R_f(CH_2)_p$- has from 6 to 16 carbon atoms; R is alkylene having from 2 to 4 carbon atoms; R′ is alkylene, arylene or alkarylene having from 2 to 8 carbon atoms; m is a number of from one to 50; and n is a number of from one to 50.

4,059,614
2,2-DIFLUORO-16-PHENOXY-PGE₁ ANALOGS
Udo F. Axen, Plainwell, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.
Division of Ser. No. 552,708, Feb. 25, 1975, Pat. No. 4,001,300. This application Sept. 17, 1976, Ser. No. 724,240
Int. Cl.² C07C *65/22*
U.S. Cl. 560—53 **58 Claims**

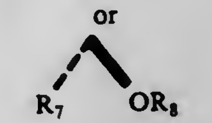
1. A compound of the formula



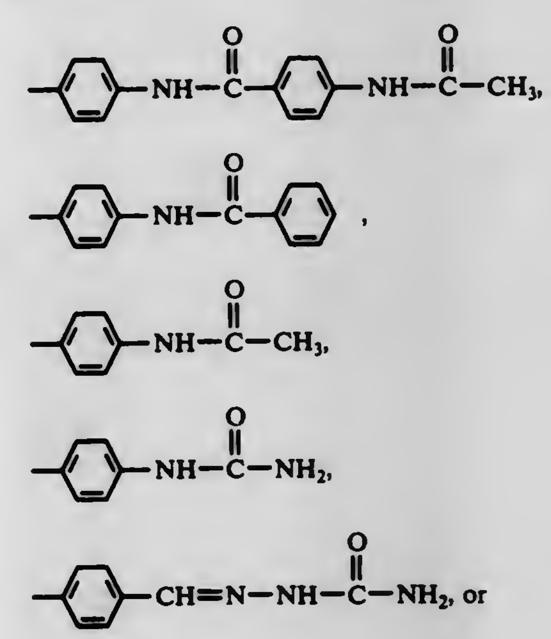
or a mixture comprising that compound and the enantiomer thereof,
wherein g is 2 to 4, inclusive;
wherein M_1 is



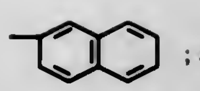
or



wherein R_7 and R_8 are hydrogen or methyl, with the proviso that one of R_7 or R_8 is methyl only when the other is hydrogen;
wherein T is alkyl of one to 3 carbon atoms, inclusive, fluoro, chloro, trifluoromethyl, or $—OR_4$ wherein R_4 is alkyl of one to 3 carbon atoms, inclusive, and wherein s is zero, one, 2, or 3, with the proviso that not more than two T's are other than alkyl;
wherein R_1 is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, 2, or 3 chloro, alkyl of one to 4 carbon atoms, inclusive, or a pharmacologically acceptable cation,



-continued



; and

wherein R_5 is hydrogen or methyl, with the proviso that R_5 is methyl only when R_7 and R_8 are both hydrogen.

4,059,615

SIDE CHAIN HALOGENATED ALKYLPHENYL HALOFORMATES AND DERIVATIVES

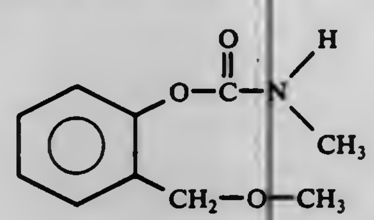
Edward D. Weil, Hastings-on-Hudson, N.Y., assignor to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.

Continuation of Ser. No. 19,516, March 13, 1970, abandoned, which is a continuation-in-part of Ser. No. 816,426, Nov. 7, 1968, Pat. No. 3,651,129, which is a division of Ser. No. 305,509, Aug. 29, 1963, Pat. No. 3,420,868. This application Feb. 17, 1976, Ser. No. 658,792

Int. Cl.² C07C *125/06*

U.S. Cl. 560—132 **1 Claim**

1. The compound of the formula



4,059,616

NOVEL METHACRYLIC POLYMERS HAVING ALLYL FUNCTIONALITY

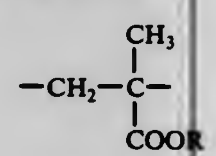
Sheldon N. Lewis, Willow Grove, and Richard A. Haggard, Fort Washington, both of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Continuation-in-part of Ser. No. 371,921, June 20, 1973, abandoned, which is a continuation-in-part of Ser. No. 137,057, April 23, 1971, abandoned. This application Oct. 23, 1974, Ser. No. 517,334

Int. Cl.² C07G *69/54*

U.S. Cl. 526—66 **8 Claims**

1. An alkoxide-polymerized addition homopolymer or copolymer of an ester of methacrylic acid wherein the polymer comprises mers having the formula



wherein R is a (C_2-C_4) alkenyl group, an allyloxyalkyl group having up to 12 carbon atoms, or an allyloxyalkoxyalkyl group having up to 12 carbon atoms,

and, optionally, mers derivable from other anionically copolymerizable monomers, and wherein n, the average chain length of the polymer is about 6 to 50 mers; the polmerization being carried out, in the presence of an alcohol and a catalytic amount of an alkoxide, using controlled rates of addition of at least one of the ester, the alcohol and the alkoxide.

4,059,617

SYNTHESIS OF DIMETHYLAMINOETHYL METHYLMETHACRYLATE

Terence Foster, Clayton, and Thomas Stephen Dawson, Guiseley, both of England, assignors to American Cyanamid Company, Stamford, Conn.

Filed Apr. 29, 1976, Ser. No. 681,679

Int. Cl.² C07C *69/54*

U.S. Cl. 560—222 **5 Claims**

1. In the synthesis of dimethylaminoethyl methacrylate by reaction of dimethylaminoethanol with methylmethacrylate in presence of a phenoxide catalyst under reflux conditions with removal of methanol-methylmethacrylate azeotrope by distillation as methanol is produced, the improvement wherein the sodium phenoxide catalyst is selected from sodium phenoxide and sodium 4-methoxyphenoxide and wherein the dimethylaminoethanol reactant is added continuously or regularly in small increments to the reaction mixture from the start and throughout the course of the reaction at a rate about the same as the rate at which the alcohol reactant is consumed.

4,059,618

TETRAHALOGEN XYLYLENE DIACRYLATES, TETRAHALOGEN XYLYL ACRYLATES, PENTAHALOGEN BENZYL ACRYLATES, AND SUBSTITUTED ACRYLATES

Georg Blumenfeld, St. Augustin; Hermann Richtzenhain, Much, Schwellbach; Wilhelm Vogt, Cologne-Sulz, and Norbert Volkommer, Troisdorf, all of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Troisdorf Bez. Cologne, Germany

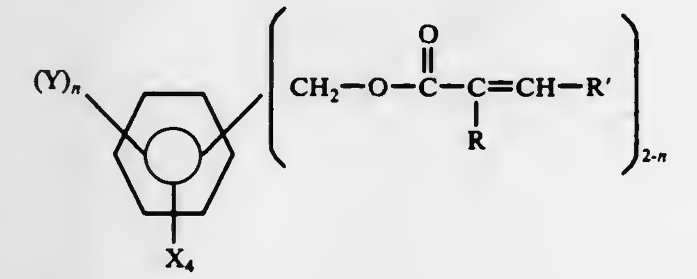
Filed June 24, 1975, Ser. No. 589,958

Claims priority, application Germany, June 26, 1974, 2430629; Feb. 27, 1974, 2408468

Int. Cl.² C07C *69/54*

U.S. Cl. 560—221 **8 Claims**

1. Compound of the formula:



wherein:

each X is chloro or bromo

Y is methyl or bromo

n is 0 or 1

each of R and R′ is hydrogen or methyl

4,059,619

PROCESS FOR THE PREPARATION OF PERCARBOXYLIC ACID SOLUTIONS

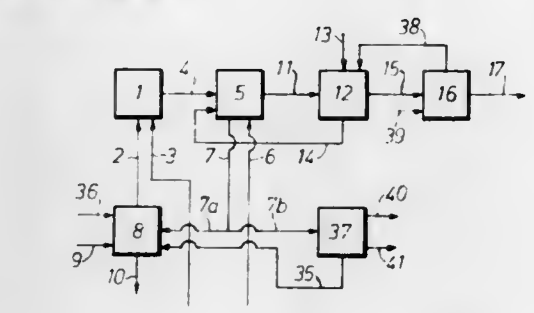
Günter Prescher; Gerd Schreyer, both of Hanau; Otto Weiberg, Neu-Isenburg; Rolf Wirthwein, Hanau; Helmut Waldmann, Leverkusen; Hermann Seifert, Cologne; Wulf Schwerdtel, Leverkusen, and Wolfgang Swodenk, Odenthal, all of Germany, assignors to Deutsche Gold-und Silber-Scheideanstalt Vormals Roessler, Frankfurt am Main and Bayer Aktiengesellschaft, Leverkusen, both of, Germany

Filed Apr. 28, 1976, Ser. No. 678,828

Claims priority, application Germany, Apr. 30, 1975, 2519289

Int. Cl.² C07C *179/10;* **C01B** *15/02*

U.S. Cl. 260—502 R **17 Claims**



1. In a process for the continuous production of a substantially anhydrous solution of perpropionic acid in benzene which comprises contacting aqueous hydrogen peroxide with propionic acid in the presence of sulfuric acid as catalyst for the reaction to produce the perpropionic acid and water, extracting the reaction mixture with benzene for formation of a benzene phase rich in perpropionic acid and propionic acid and containing hydrogen peroxide, and an aqueous raffinate phase rich in hydrogen peroxide and catalyst, after-treating said benzene phase by extraction with water for formation of an after-treated benzene phase containing perpropionic acid, propionic acid, water, and a reduced amount of hydrogen peroxide, and aqueous phase containing hydrogen peroxide, recycling said aqueous phase containing hydrogen peroxide to the extraction of the reaction mixture for extraction thereof with benzene, dehydrating the after-treated benzene phase by azeotropic distillation to produce said substantially anhydrous solution of perpropionic acid in benzene and an aqueous phase containing hydrogen peroxide, distilling aqueous raffinate of the benzene extraction under reduced pressure to remove water therefrom and form a concentrated solution of hydrogen peroxide and catalyst, recycling said concentrated solution to said contacting of hydrogen peroxide and propionic acid, and introducing make-up hydrogen peroxide and propionic acid into said contacting step, the improvement which comprises:

a. in said contacting step, the molar ratio of hydrogen peroxide: propionic acid being 0.8 – 1.4 : 1, the reaction temperature being 20°-60° C, the ratio of hydrogen peroxide: water by weight before the start of the reaction thereof with propionic acid based on 100% hydrogen peroxide being up to 1.2, and the concentration of sulfuric acid in the reaction mixture being 10 to 40% by weight;

b. the extraction of the after-treatment being performed in at least three stages by passing the benzene phase serially through the three stages and in each stage extracting with water or water containing hydrogen peroxide, the aqueous phase containing hydrogen peroxide produced in said azeotropic distillation being introduced into the first state, and employed as an extracting agent therein, and aqueous phase containing hydrogen peroxide being withdrawn from the first stage, the extraction in the second and subsequent stages being carried out with fresh water which is introduced into the final stage and is withdrawn from the second stage as an aqueous phase containing hydrogen peroxide, and recycling the withdrawn aqueous phases from the first and second stages to the extraction of the reaction mixture for extraction thereof with benzene;

c. employing aqueous hydrogen peroxide for the make-up of hydrogen peroxide, introducing at least part of the make-up aqueous hydrogen peroxide and at least part of the aqueous raffinate directly into the raffinate distillation, and in said raffinate distillation distilling off an amount of water about equal to the sum of the water in the aqueous hydrogen peroxide used as said make-up, the water formed during said contacting and the water introduced in said after-treatment, and withdrawing a sump product comprising a mixture of hydrogen peroxide, sulfuric acid, and water and recycling said sump mixture to said contacting, the raffinate distillation being performed in a rectification unit which at least in part consists essentially of a metal of the group tantalum, tantalum alloy, zirconium and zirconium alloy for reduction of decomposition of hydrogen peroxide, the residence time in the sump of the distillation column being 3-30 minutes, and the sump temperature of said raffinate distillation being 40° – 120° C;

d. impurities accumulating in the process, and controlling the level of impurities by withdrawl of impurities from the process.

4,059,620

PROCESS FOR PREPARING OLEFIN SULFONATES

Fred Lowery Johnson, Jr., Austin, Tex., assignor to Texaco Development Corporation, New York, N.Y.

Filed May 17, 1973, Ser. No. 361,264

Int. Cl.² C07C *139/00*

U.S. Cl. 260—513 T **7 Claims**

1. In the process for preparing olefin sulfonates by the reaction of sulfur trioxide and an olefin feed mixture in a continuous falling film reactor apparatus to produce an acid reaction effluent followed by aging and neutralization to convert said effluent to an olefin sulfonate, wherein the improvement comprises:

mixing and reacting a mixture of olefins having 14 to 16 carbon atoms per molecule, at least 30 percent by weight to 70 percent by weight of said olefin mixture being dimer olefins, and sulfur trioxide in a reaction zone of a continuous falling film reactor apparatus;

operating and maintaining the upper ⅛ to ⅓ of the reaction zone at a constant temperature of between about 0° C. to below about 10° C.;

operating and maintaining the lower ⅞ to ⅔ of said reaction zone at a higher constant temperature of between about 25° C. to about 40° C.; and

aging the resultant acidic reaction effluent at a temperature of about 20°-45° C. prior to neutralization.

4,059,621

SUBSTITUTED BENZAMIDO PROPANOLAMINES

Michel Vincent, Bagneux; Georges Rémond, Versailles, and Michel Laubie, Vaucresson, all of France, assignors to Science Union et Cie, Societe Francaise de Recherche Medicale, Suresnes, France

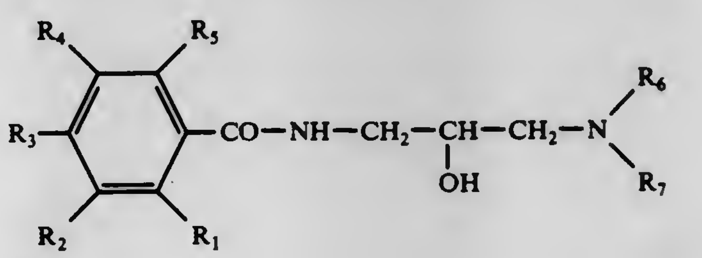
Filed July 16, 1973, Ser. No. 379,529

Claims priority, application United Kingdom, July 21, 1972, 34213/72

Int. Cl.² C07C *103/22, 103/26, 103/28, 103/29, 103/76;* **A61K** *31/165*

U.S. Cl. 260—558 R **6 Claims**

1. A compound selected from the group consisting of: - A propanol derivative having the formula I:



wherein:

R_1 represents a hydrogen or halogen atom, an alkyl, alkenyl, alkoxy or an alkenyloxy radical having from 1 to 5 carbon atoms, or carbamoyl radical;

R_2 represents a hydrogen atom, a hydroxy radical, an alkoxy radical having from 1 to 5 carbon atoms or a phenyl alkoxy radical wherein the alkoxy moiety has from 1 to 5 carbon atoms;

R_3 represents a hydrogen atom, a hydroxy radical, an alkoxy radical having from 1 to 5 carbon atoms, a phenyl alkoxy radical wherein the alkoxy moiety has from 1 to 5 carbon atoms, a nitro radical or an amino radical;

or R_1 and R_2 together or R_2 and R_3 together represent the —CH=CH—CH=CH moiety;

R_4 represents a hydrogen atom,

R_5 is selected from the group consisting of alkyl radicals having from 1 to 5 carbon atoms;

R_6 is selected from the group consisting of a hydrogen atom, a lower alkyl radical, a lower alkenyl radical and a benzyl radical;

R_7 is selected from the group consisting of a lower alkyl radical, a lower alkenyl and a phenyl lower alkyl radical wherein the lower alkyl moiety has 1 – 5 carbon atoms.

4,059,622
ALKANOLAMINE DERIVATIVES

David James Le Count, and Christopher John Squire, both of Macclesfield, England, assignors to Imperial Chemical Industries Limited, London, England

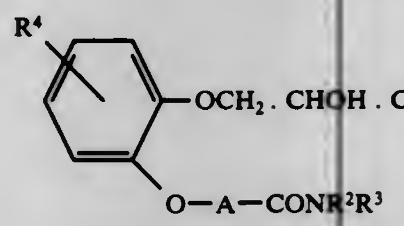
Continuation-in-part of Ser. No. 431,297, Jan. 7, 1974, Pat. No. 3,959,486, which is a continuation of Ser. No. 145,897, May 21, 1971, abandoned, and a continuation-in-part of Ser. No. 332,517, Feb. 14, 1973, abandoned. This application Feb. 26, 1974, Ser. No. 445,854

Claims priority, application United Kingdom, May 27, 1970, 25529/70; Nov. 20, 1970, 55246/70; Mar. 21, 1972, 13159/72

Int. Cl.² C07C *103/26;* A61K *31/165*

U.S. Cl. 260—559 A 3 Claims

1. An alkanolamine derivative selected from the group consisting of compounds of the formula:



wherein R^1 is hydrogen or alkyl, hydroxyalkyl or alkenyl each of up to 6 carbon atoms; wherein R^2 is hydrogen or alkyl of up to 6 carbon atoms; wherein R^3 is hydrogen, or alkyl, hydroxyalkyl or alkoxyalkyl each of up to 10 carbon atoms, or cycloalkyl or alkenyl each of up to 6 carbon atoms, or phenylalkyl of up to 12 carbon atoms; wherein R^4 is hydrogen, or halogen, or alkyl or alkoxy each of up to 6 carbon atoms, or hydroxy; wherein R^5 is hydrogen or alkyl of up to 6 carbon atoms; and wherein A is straight-or branched-chain alkylene of up to up to 4 carbon atoms; and the non-toxic, pharmaceutically acceptable acid-addition salts thereof.

4,059,623
BUTYRAMIDES AND BUTYRATES

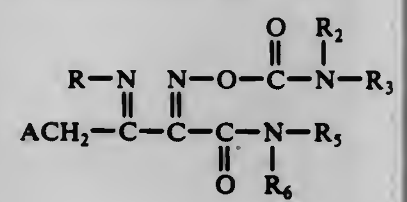
Russell Frank Bellina, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 369,606, June 13, 1973, abandoned. This application Apr. 25, 1974, Ser. No. 463,987

Int. Cl.² C07C *103/127*

U.S. Cl. 260—561 A 9 Claims

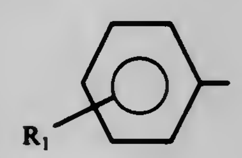
1. A compound of the formula



wherein:

A is hydrogen or methyl;

R is C_1–C_{18} alkyl; C_3–C_4 alkenyl; C_3–C_7 cycloalkyl optionally substituted with methoxy or with 1 or 2 methyl groups; C_6–C_8 cycloalkylalkyl; C_1–C_3 alkoxy; alkoxyalkyl with a total of 3–6 carbon atoms; benzyl; phenethyl;



R_1 is hydrogen, methyl, methoxy, $(CH_3)_2N$—, CH_3S—, or flourine;

R_2 is hydrogen, methyl, or ethyl;

R_3 is methyl; ethyl, or allyl;

R_5 is methoxy, C_1–C_4 alkyl or allyl;

R_6 is hydrogen, methyl, or ethyl;

R_5 and R_6 can be taken together to form a ring and are

$—(CH_2)_2O(CH_2)_2—$;

$—(CH_2)_2\overset{CH_3}{\overset{|}{N}}(CH_2)_2—$;

or $—(CH_2)_n—$; and

n is 4–6;

provided that the total carbon content of R_2, R_3, R_5 and R_6 is no greater than 8C.

4,059,624
INSOLUBILIZED SALTS OF 1,6-DI-p-(CHLOROPHENYL BIGUANIDO) HEXANE

Michael Harrison, Newcastle-upon-Tyne, England, assignor to Colgate Palmolive Company, New York, N.Y.

Division of Ser. No. 424,388, Dec. 13, 1973, Pat. No. 3,937,805, which is a continuation-in-part of Ser. No. 197,498, Nov. 10, 1971, abandoned. This application Nov. 10, 1975, Ser. No. 630,390

Claims priority, application United Kingdom, Nov. 27, 1970, 56578/70

Int. Cl.² C07C *129/08;* C09F *5/00;* A61K *7/18, 7/22*

U.S. Cl. 260—565 1 Claim

1. The water-insoluble salt of 1,6-di(p-chlorophenyl biguanido)hexane cation and polyvalent monofluorophosphate anion prepared by reacting in aqueous solution 1,6-di-(p-chlorophenyl biguanido)hexane of soluble salt thereof with a monofluorophosphate to form said salt with moieties of said anion having the structure

. . . + Chlorhexidine + − Anion − + Chlorhexidine + ...

4,059,625
CERTAIN OXIME COMPOSITIONS AND THEIR USE IN CONTROLLING FUNGI

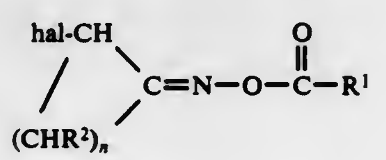
Don R. Baker, Orinda, and Arnold D. Gutman, Berkeley, both of Calif., assignors to Stauffer Chemical Company, Westport, Conn.

Division of Ser. No. 554,288, Feb. 28, 1975, Pat. No. 4,007,227, which is a division of Ser. No. 330,764, Feb. 8, 1973, Pat. No. 3,885,043, which is a continuation of Ser. No. 875,576, Nov. 10, 1969, abandoned. This application Nov. 15, 1976, Ser. No. 741,585

Int. Cl.² C07C *131/02, 131/06*

U.S. Cl. 260—566 AE 3 Claims

1. A compound having the formula



wherein n equals 4–6 and R^1 is selected from the group consisting of bromomethyl, methyl vinyl, chloromethyl vinyl and trichloromethyl.

4,059,626
TRIFLUOROETHYLANILINES

Louis Foulletier, Oullins; Jacques Pierre Edmond Pechmeze, Paris, and Robert Frederic Michel Sureau, Enghien les Bains, all of France, assignors to Produits Chimiques Ugine Kuhlmann, Paris, France

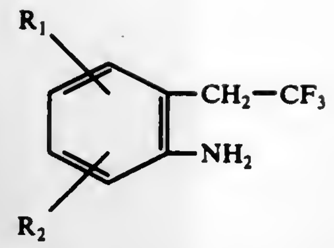
Filed Mar. 26, 1975, Ser. No. 562,063

Claims priority, application France, Mar. 29, 1974, 74.11263

Int. Cl.² C07C *87/52, 87/56, 91/44, 93/14*

U.S. Cl. 260—578 2 Claims

1. Compound of the formula:



in which R_1 is hydrogen, chlorine, bromine or nitro and R_2 is hydrogen, chlorine or bromine.

4,059,627
CHLORINATED AROMATIC AMINES

Helmuth Kritzler, Odenthal; Walter Bohm, Leverkusen; Wolfgang Kiel, Schildgen, and Udo Birkenstock, Ratingen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Nov. 1, 1976, Ser. No. 737,645

Claims priority, application Germany, Nov. 6, 1975, 2549900

Int. Cl.² C07C *85/11*

U.S. Cl. 260—580 13 Claims

1. In a process for the preparation of the chlorinated aromatic amine by a hydrogenation of the corresponding chlorinated nitro-aromatic compound in the presence of a noble metal catalyst on a carbon support and in the co-presence of a sulfur compound, the improvement in that the sulfur compound is a thio-ether.

4,059,628
PREPARATION OF AROMATIC AMINES

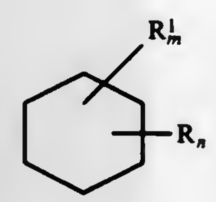
Thomas Wayne Del Pesco, and Frank Julian Weigert, both of Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 536,584, Dec. 26, 1974, abandoned, which is a continuation-in-part of Ser. No. 445,914, Feb. 26, 1974, abandoned. This application May 17, 1976, Ser. No. 687,175

Int. Cl.² C07C *85/18, 85/24*

U.S. Cl. 260—581 38 Claims

1. The process which consists essentially in heating a starting hydrocarbon of the formula

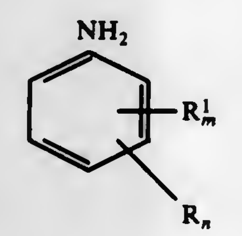


wherein

R and R^1 are alkyl of 1–4 carbon atoms and

m and n are 0 or 1

with anhydrous ammonia at a temperature range of 300°–650° C in the absence of air to produce a compound of the formula



where R, R^1, m and n have the values stated above and where the heating is carried out in the presence of a catalyst selected from the group consisting of:

A. one or more oxides of Al, Cd, Ce, Fe, In, Sn, Th, Ti, Zn and Zr;

B. vanadium oxide and one or more oxides of Ag, As, Ba, Ca, Cd, Ce, Co, Cu, Eu, Fe, Gd, Hf, In, La, Mg, Mn, Ni, P, Pb, Sb, Sn, Sr, Ti, U and Zn;

C. titanium oxide and one or more oxides of Bi, Cr, Cu, Mo, Pb, U and W;

D. zinc oxide and one or more oxides of Cr, La, Mg, P, Si, Sb, W and the pair Bi-Mo;

E. aluminum oxide and one or more oxides of Cu, Eu, La, Mn, Pb, and U;

F. aluminum oxide, molybdeum oxide and one or more oxides of Ca, Cd, Ce, Cu, Er, Fe, In, La, Ni, Pb, Sm, Sr, Ti, U, Y and Zn;

G. aluminum oxide, tungsten oxide and one or more oxides of Ca, Ce, Cu, Fe, In, La, Pb, Sm, Ti, U and Zn;

H. aluminum oxide, titanium oxide and one or more oxides of Cr, Mg, rare earths, Re, Te and V;

I. aluminum oxide, titanium oxide, zinc oxide and one or more oxides of Ag, Bi, Ca, Co, Cr, Cu, Hg, La, Mg, Nb, Ni, Pb, Pr, Ru, Sm, Sr, V, Yb, and Y;

J. aluminum oxide, molybdenum oxide, bismuth oxide and one or more oxides of Ca, Cu, Pb, Ti, and Zn;

K. aluminum oxide, molybdenum oxide, zirconium oxide and one or more oxides of Ce, Ti, and Zn;

L. molybdenum oxide and one or more oxides of Cd, Ce, Cu, Fe, Gd, La, Mg, Mn, Nb, P, Pb, Ti and Zn;

M. zinc oxide, titanium oxide and one or more oxides of Cr, La, Mg and Nb;

N. CdS; CoS; CdS/aluminum oxide; CdS/titanium oxide/aluminum oxide; chromium sulfide; ZnSe; ZnS; ZnTe; ZnS/aluminum oxide; CdS/ZnS/aluminum oxide and WS_2; and

O. aluminum oxide, vanadium oxide and one or more oxides of Ag, Ba, Ca, Cd, Cu, Ga, In, La, Mg, Pb, Sr, Y, Zn, and Zr.

4,059,629
PERFLUOROALIPHATIC SUBSTITUTED AMINE MIXTURES AND THE METHOD FOR PREPARING THE SAME

Louis Foulletier, Ouillins, and Jean-Pierre Lalu, La Mulatiere, both of France, assignors to Produits Chimiques Ugine Kuhlmann, Paris, France

Continuation of Ser. No. 138,748, April 29, 1971, abandoned, which is a continuation-in-part of Ser. No. 819,481, April 25, 1969, abandoned, which is a continuation-in-part of Ser. No. 694,045, Dec. 28, 1967, abandoned. This application July 3, 1975, Ser. No. 593,173

Claims priority, application France, Dec. 29, 1972, 70.30550

Int. Cl.² C07C *87/127, 87/22, 87/26, 87/32*

U.S. Cl. 260—583 GG 4 Claims

1. A perfluoroalkyl substituted amine of the formula

$$C_nF_{2n+1}(CR^1R^2)_m\underset{\underset{R^3}{|}}{N}—R^4$$

wherein n is an integer from 1 to about 20, m is 2 or 4, R^1 and R^2 each is hydrogen or alkyl containing 1 to 3 carbon atoms and R^3 is hydrogen and R^4 is hydrogen or alkenyl containing 3 to 10 carbon atoms.

4,059,630
ANTI-ANDROGENIC STEROIDS

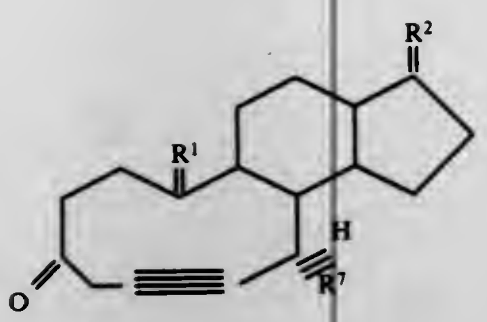
Cecil H. Robinson, Pylesville, Md., assignor to The Johns Hopkins University, Baltimore, Md.

Filed Feb. 26, 1976, Ser. No. 661,792

Int. Cl.² C07C *49/45*

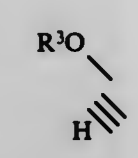
U.S. Cl. 260—586 E 3 Claims

1. A 5,10-secosteroid of the formula:

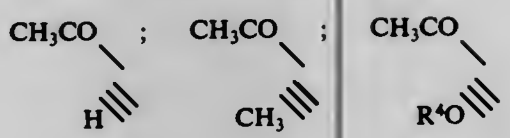


wherein R^1 is $CH_2=$, $O=$ or

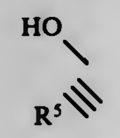
R^2 is $O=$,



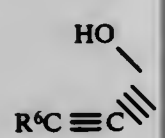
(where R^3 is H or lower alkanoyl);



(where R^4 is H or lower alkanoyl);



(where R^5 is lower alkyl) or



(where R^6 is H, lower alkyl or Cl); and R^7 is H or CH_3.

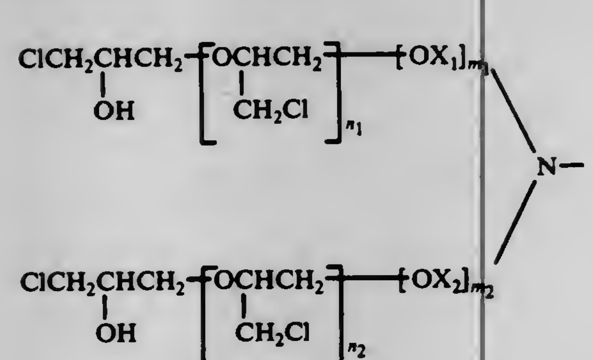
4,059,631

POLYCHLOROHYDRIN ETHERS OF TRIS-(HYDROXYMETHYL)-AMINOMETHANE

Richard Hochreuter, Oberwil, Switzerland, assignor to Sandoz Ltd., Basel, Switzerland

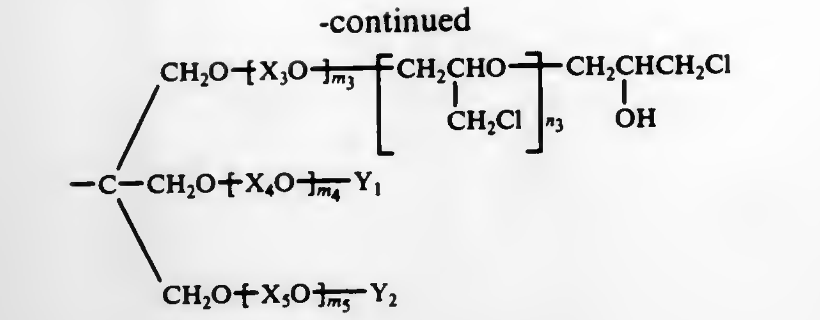
Division of Ser. No. 503,831, Sept. 6, 1974, Pat. No. 3,987,231. This application July 9, 1976, Ser. No. 703,751
Int. Cl.² C07C *87/06, 43/10*
U.S. Cl. 260—584 B **8 Claims**

1. A compound of formula I,

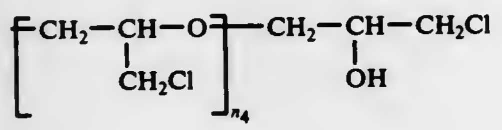


I

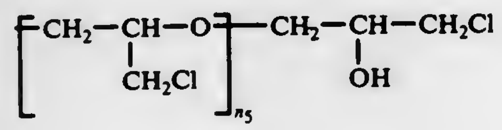
-continued



wherein
X_1, X_2, X_3, X_4 and X_5 are each, independently, 1,2-ethylene, 1,2-propylene or 1,2-butylene,
m_1 and m_2 are each, independently, an integer 1 to 30,
m_3, m_4 and m_5 are each, independently, 0 or an integer 1 to 30,
n_1, n_2 and n_3 are each, independently, 0 or an integer 1 or 2,
Y_1 is hydrogen or a radical of the formula



wherein
n_4 is 0 or an integer 1 or 2, and
Y_2 is hydrogen or a radical of the formula



wherein
n_5 is 0 or an integer 1 or 2,
and wherein the sum of m_1, m_2, m_3, m_4 and m_5 is an integer 2 to 100,
and the sum of n_1, n_2, n_3, n_4 and n_5 is 0 or an integer 1 to 7.

4,059,632

PROCESS FOR THE PRODUCTION OF ISOPHORONE

Charles Cane, and Bertram Yeomans, both of Hull, England, assignors to BP Chemicals Limited, London, England

Filed Oct. 4, 1976, Ser. No. 728,922
Claims priority, application United Kingdom, Oct. 20, 1975, 42911/75
Int. Cl.² C07C *45/00*
U.S. Cl. 260—586 C **10 Claims**

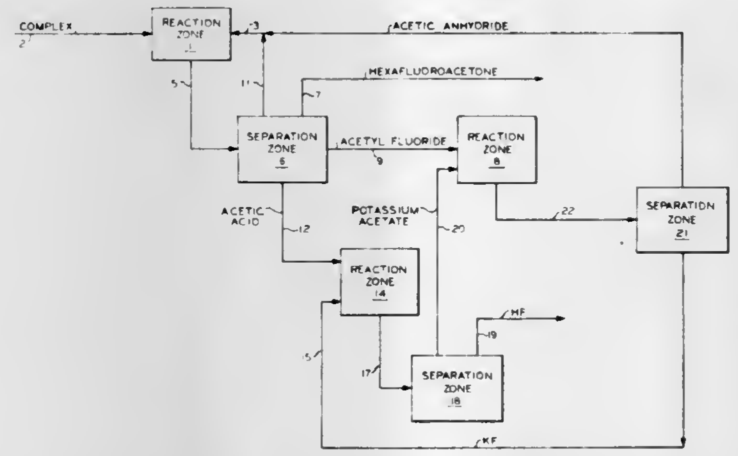
1. A process for the production of isophorone which process consists of continuously feeding a mixture consisting of acetone, water and an alkali catalyst to an intermediate point in a reaction zone within a column operating at elevated temperature and pressure at such a rate as to maintain an acetone/water azeotrope reflux having an alkali concentration of less than 0.1% w/w within said reaction zone, passing from the bottom of said reaction zone a fraction containing isophorone, water and unconverted acetone to a hydrolysis zone within said column or a second column also operating at elevated temperature and pressure wherein unconverted acetone is separated overhead and returned to said reaction zone, removing at a point in said hydrolysis zone where it acetone concentration is less than 30% w/w a side-stream containing isophorone, acetone, water and colour-forming compounds, passing said side-stream to a distillation zone wherein actor and water are removed in a heading distillation, contacting the base product consisting of isophorone and colour-forming compounds from said heading distillation with a strong acid at elevated temperature and recovering isophorone substantially free from colour-forming compounds overhead in a tailing distillation, removing from the base of said hydrolysis zone a bottoms fraction consisting of isophorone, water and said alkali catalyst, feeding said bottoms fraction together with a sufficient quantity of a strong mineral acid to reduce the pH thereof to a value within the range 5 to 9 to a decantation vessel wherein an isophorone-containing phase is separated and thereafter recovering said isophorone from said isophorone-containing phase.

4,059,633

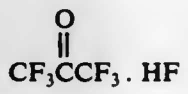
RECOVERY OF HEXAFLUOROACETONE FROM A HEXAFLUOROACETONE-HF CONTROL

William V. Childs, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Aug. 15, 1975, Ser. No. 605,124
Int. Cl.² C07C *49/16*
U.S. Cl. 260—593 H **8 Claims**



1. A process of removing hexafluoroacetone from a hexafluoroacetone-HF complex, represented by the formula



comprising the steps of:

a. contacting said hexafluoroacetone-HF complex with acetic anhydride under suitable reaction conditions to produce a first reaction effluent comprising hexafluoroacetone, acetyl fluoride and acetic acid; and
b. separating hexafluoroacetone from said first reaction effluent.

4,059,634

PRODUCTION OF PINACOLONE

Donovan Norman Smith, Jr., Kansas City, Mo., assignor to Mobay Chemical Corporation, Pittsburgh, Pa.

Filed Dec. 15, 1975, Ser. No. 640,828
Int. Cl.² C07C *45/00*
U.S. Cl. 260—593 R **6 Claims**

1. In the process wherein 4,4,5-trimethyl-1,3-dioxane is contacted with aqueous acid to produce pinacolone, the improvement which comprises slowly adding the 4,4,5-trimethyl-1,3-dioxane and approximately an equimolar amount of 2-methylbut-2-ene to stirred aqueous hydrogen halide acid having a concentration of about 20 to 60%, whereby the yield of pinacolone is increased.

4,059,635

SUBSTITUTED DERIVATIVES OF 1,1-DICHLOROALKENE-1 AND THEIR PREPARATION AND USES

Hironari Sugiyama, 166-20 Kitawaki; Isao Chiyomaru, 215 Kitawaki; Itsuki Okuda, 637-7 Wakakusa-cho, all of Shimizu, Shizuoka; Hisaaki Yamamoto, 3353 Kamo, Kikukawa-cho, Ogasa, Shizuoka, and Hideo Ito, 96 Funahara-cho, Shimizu, Shizuoka, all of Japan

Filed Oct. 6, 1969, Ser. No. 864,224
Claims priority, application Japan, July 15, 1969, 44-55445; Feb. 19, 1969, 44-1829; Feb. 13, 1969, 44-10088
Int. Cl.² C07C *149/08, 149/34, 149/16*
U.S. Cl. 260—609 E **6 Claims**

1. 7-(Para-chlorophenylthio)-1,1-dichloroheptene-1.

4,059,636

MERCAPTANS BY CATALYTIC CLEAVAGE OF ORGANIC SULFIDES

Donald H. Kubicek, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed May 4, 1976, Ser. No. 682,934
Int. Cl.² C07C *148/00*
U.S. Cl. 260—609 D **8 Claims**

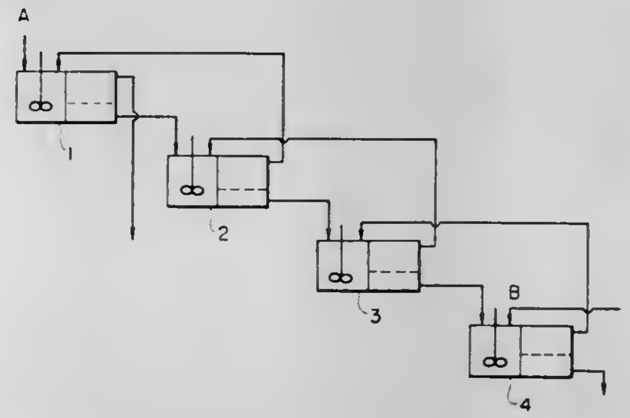
1. A method in which mercaptans are prepared by catalytic cleavage of organic sulfides with hydrogen sulfide in the presence of a supported phosphotungstic acid catalyst at a temperature and pressure sufficient for catalytic cleavage of organic sulfides.

4,059,637

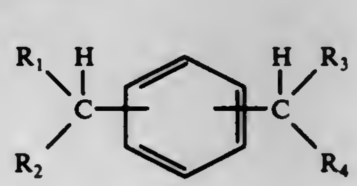
METHOD FOR EXTRACTION OF DIHYDROPEROXIDE

Hirokazu Hosaka; Kenji Tanimoto, both of Hirakata; Hiromichi Okabe; Kunthiko Tanaka, both of Ibaraki; Yuji Ueda, Izumiotsu, and Iwao Dohgane, Ashiya, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Aug. 22, 1975, Ser. No. 607,020
Claims priority, application Japan, Sept. 3, 1974, 49-101634
Int. Cl.² C07C *179/02*
U.S. Cl. 260—610 A **6 Claims**



1. A method for extracting a dihydroperoxide of a dialkylbenzene of the formula,

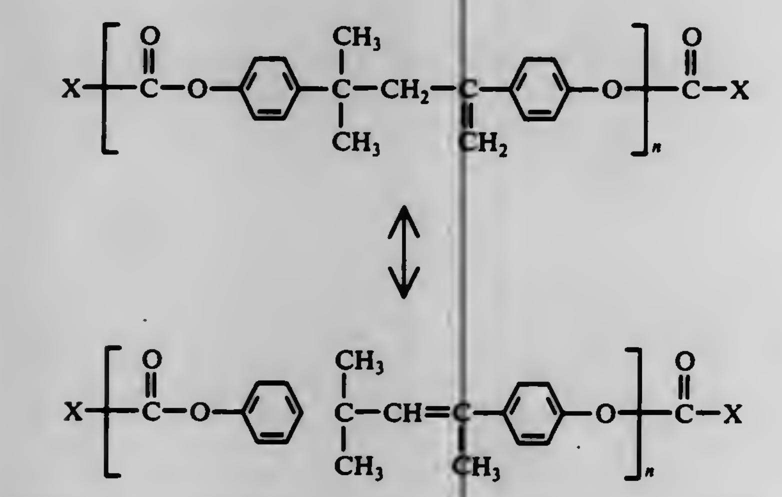


wherein each R_1, R_2, R_3 and R_4 is independently isopropyl or sec.butyl, from an aqueous alkali solution of the said dihydroperoxide with at least one organic solvent selected from the group consisting of C_4–C_{10} ketones, C_4–C_{10} ethers and C_4–C_8 alcohols, which comprises extracting the dihydroperoxide by a countercurrent multi-stage extraction with a temperature gradient between each stage and with all of the extractions being conducted at a temperature of from 0° to 85° C, the aqueous

alkali solution being fed to the lower temperature zone, the organic solvent being fed to the higher temperature zone with said lower temperature being from 0° to 50° C, and said higher temperature being from 50° to 85° C, and each aqueous alkali solution and organic solvent being fed countercurrently, whereby the dihydroperoxide is obtained in the form of organic solvent solution from the lower temperature zone.

4,059,638
TRISPHENOL PROCESS
Heinrich Krimm, and Erhard Tresper, both of Krefeld, Germany, assignors to Bayer Aktiengesellschaft, Germany
Filed Feb. 24, 1976, Ser. No. 660,876
Claims priority, application Germany, Feb. 28, 1975, 2508709
Int. Cl.² C07C *41/06, 37/00*
U.S. Cl. 260—613 R **3 Claims**

1. A process for the production of a trisphenol wherein a compound of the formula



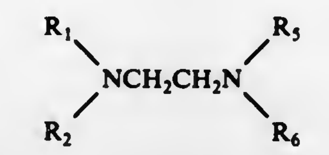
wherein: X represents a C_1–C_6 aliphatic group, a C_1–C_4 alkoxy group, a phenoxy group, a phenyl group optionally substituted by halogen, nitro or C_1–C_4 alkyl, or chlorine and n is an integer from 1 to 50, is reacted with a phenol selected from the group consisting of phenol, cresol, chlorophenol, 2,6-dichlorophenol, bromophenol, ethylphenol, propylphenol, isopropylphenol, butylphenol, isobutylphenol, tert.butylphenol, nonylphenol, dodecylphenol, 2,4-dimethylphenol, 3,4-dimethylphenol, 2,6-dimethylphenol, 2,6-diethylphenol, cyclohexylphenol, hydroquinone, resorcinol, pyrocatechol, hydroquinone monomethylether, resorcinol monomethylether and guaiacol in the presence of an acid catalyst at a temperature of from −20° to 30° C. and the resulting acyl derivative is saponified to form the trisphenol.

4,059,639
ETHER COMPOUNDS
Ross C. Terrell, Plainfield, N.J., assignor to Airco, Inc., New Providence, N.J.
Division of Ser. No. 633,763, Nov. 20, 1975, Pat. No. 3,987,111, which is a division of Ser. No. 367,596, June 6, 1973, Pat. No. 3,947,595, which is a division of Ser. No. 170,954, Aug. 11, 1971, Pat. No. 3,764,706. This application July 14, 1976, Ser. No. 705,369
Int. Cl.² C07L *43/12;* **A61K** *31/08*
U.S. Cl. 260—614 F **1 Claim**

1. The compound having the formula $CF_3CHFOCF_2CHCl_2$.

4,059,640
TRANSALKYLATION OF TERTIARY AMINES AND ALCOHOLS, TO PRODUCE ETHYLENE GLYCOL
Richard W. Goetz, Cincinnati, Ohio, assignor to National Distillers and Chemical Corporation, New York, N.Y.
Filed Oct. 28, 1975, Ser. No. 625,801
Int. Cl.² C07C *29/00*
U.S. Cl. 260—635 R **6 Claims**

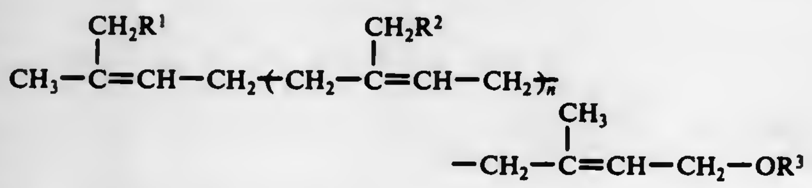
1. A method of producing ethylene glycol comprising reacting at a temperature of from about 50° to 300° C. a tertiary amine with an alkyl, cycloakyl, aralkyl or acylcycloalkyl alcohol containing up to 10 carbon atoms in the presence of carbon monoxide or with the formate ester of said alcohol, said tertiary amine being triethylenediamine or an amine of the formula



wherein each of R_1, R_2, R_5 and R_6 is an acylcic aliphatic hydrocarbon radical of up to 10 carbon atoms or a substituted acyclic aliphatic hydrocarbon radical wherein the substituent is hydroxy, alkoxy of up to 10 carbon atoms or alkanoyl of up to 10 carbon atoms.

4,059,641
POLYPRENYL DERIVATIVES
Hiroshi Mishima; Akira Ogiso, and Shinsaku Kobayashi, all of Tokyo, Japan, assignors to Sankyo Company Limited, Tokyo, Japan
Filed Nov. 18, 1975, Ser. No. 633,097
Int. Cl.² C07C *33/02*
U.S. Cl. 260—635 R **11 Claims**

1. A compound having the formula



in which R^1 and R^2 may be the same or different and each represents a hydrogen atom or a hydroxyl group, R^3 represents a hydrogen atom, *n* is an integer of 1–4 provided at least one of R^1 and R^2 is a hydroxyl group, said compound being in substantially pure form.

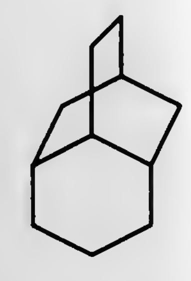
4,059,642
PREFERENTIAL ALKYLATION OR ACYLATION OF META-DISUBSTITUTED BENZENES
James R. Dewald, Bay City, Mich., and Lowell D. Markley, Clayton, Calif., assignors to The Dow Chemical Company, Midland, Mich.
Filed July 22, 1976, Ser. No. 707,924
Int. Cl.² C07C *25/08*
U.S. Cl. 260—650 R **11 Claims**

1. In an isomeric mixture comprising para- and meta-disubstituted benzenes having two halogen substituents, a process for the alkylation of the meta-disubstituted benzene which process comprises contacting the isomeric mixture with an alkylating agent in the presence of a catalytic amount of a Friedel-Crafts catalyst at a reaction temperature less than about 60° C such that the meta-disubstituted benzene is preferentially alkylated.

4,059,643
PROCESS FOR HYDRIDE TRANSFER REDUCTION REARRANGEMENT OF 8-EXO-HYDROXYMETHYL-ENDO-TRICYCLO 5.2.1.0^{2,6}] DECANE TO FORM TRICYCLO[5.3.1.0^{3,8}] UNDECANE
Yoshiaki Inamoto; Yoshiaki Fujikura, both of Wakayama; Kiyoshi Tsuchihashi, Kainan, and Eiji Kashihara, Wakayama, all of Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan
Filed Nov. 26, 1976, Ser. No. 744,957
Claims priority, application Japan, Dec. 4, 1975, 50-144673
Int. Cl.² C07C *13/54*
U.S. Cl. 260—666 PY **6 Claims**

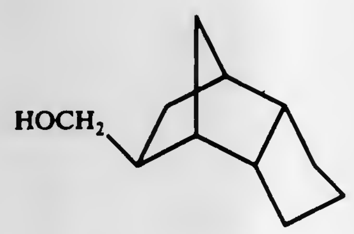
1. A process for preparing tricyclo[5.3.1.0^{3,8}]undecane having the formula (II),

(II)



which comprises, reacting one part by weight of 8-exo-hydroxymethyl-endo-tricyclo[5.2.1.0^{2,6}]decane having the formula (I)

(I)



with from 1 to 1000 parts by weight of concentrated sulfuric acid having a concentration of from 75 to 100%, and with from 1 to 1000 parts by weight of a hydrocarbon selected from the group consistingof n-pentane, n-hexane, n-heptane, n-octane, cyclopentane, cyclohexane, cyclooctane, methylcyclohexane, isooctane, petroleum ether and mixtures thereof, at a temperature of from −20° C to 100° C, until a substantial quantity of the formula (II) compound is formed, and recovering the formula (II) compound from the reaction mixture.

4,059,644
HIGH DENSITY FUELS
Lawrence G. Cannell, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.
Filed Feb. 12, 1976, Ser. No. 657,413
Int. Cl.² C07C *13/00, 13/28*
U.S. Cl. 260—666 PY **7 Claims**

1. A process for making high density fuel which comprises
a. heating a mixture of cyclopentadiene dimer and methylcyclopentadiene dimer at a temperature of 150°–250° C for from 10 minutes to 3 hours provided that any oxygen present will not exceed 0.1%wt of the mixture, then
b. hydrogenating the product of step (a) by reaction with sufficient hydrogen to completely saturate the olfinically unsaturated bonds of said product and in the presence of a hydrogenation catalyst at a temperature of from 25°–160° C and a hydrogen pressure of from 150–800 psig.

4,059,645
ALKYLAROMATIC ISOMERIZATION PROCESS
Robert L. Jacobson, Pinole, Calif., assignor to Chevron Research Company, San Francisco, Calif.
Filed Nov. 10, 1976, Ser. No. 740,580
Int. Cl.² C07C *5/24*
U.S. Cl. 260—668 A **5 Claims**

1. In a process for isomerizing an alkylaromatic hydrocarbon by contacting a feed including said hydrocarbon and hydrogen with a catalyst including 0.01–3 weight percent platinum and 0.01–3 weight percent rhenium on an alumina support at isomerization conditions including a temperature of 700° F to 900° F and a hydrogen pressure between 100 psi and 300 psi, the improved method for increasing the activity and selectivity of said catalyst in said process comprising: including in said catalyst greater than 1.2 weight percent combined chloride and contacting said feed with said catalyst in the presence of between 1.5 and 150 ppm, by volume, of free chloride and not more than 10 ppm, by volume, of water, based on the volume of said feed.

4,059,646
PROCESS FOR PRODUCING TRIPTANE BY CONTACTING METHANOL OR DIMETHYL ETHER WITH ZINC BROMIDE
Milton M. Wald, and Leo Kim, both of Houston, Tex., assignors to Shell Oil Company, Houston, Tex.
Filed Oct. 2, 1975, Ser. No. 619,117
Int. Cl.² C07C *1/20, 9/16*
U.S. Cl. 260—676 R **7 Claims**

1. A method for the production of triptane comprising contacting a material selected from the group consisting of methanol; dimethyl ether; other materials which react to provide methanol in situ, other reaction products, if any, being non-interfering; and mixtures thereof, with an effective amount of $ZnBr_2$ at a temperature of from 210° to 245° C.

4,059,647
PROCESS FOR PRODUCING TRIPTANE BY CONTACTING METHANOL OR DIMETHYL ETHER WITH ZINC CHLORIDE
Milton M. Wald, and Leo Kim, both of Houston, Tex., assignors to Shell Oil Company, Houston, Tex.
Filed Oct. 2, 1975, Ser. No. 619,118
Int. Cl.² C07C *1/20, 9/16*
U.S. Cl. 260—676 R **7 Claims**

1. A method for the production of triptane comprising contacting a material selected from the group consisting of methanol; dimethyl ether; other materials which react to provide methanol in situ, other reaction products, if any, being non-interfering; and mixtures thereof, with an effective amount of ZnI_2 at a temperature of from 180° to 245° C.

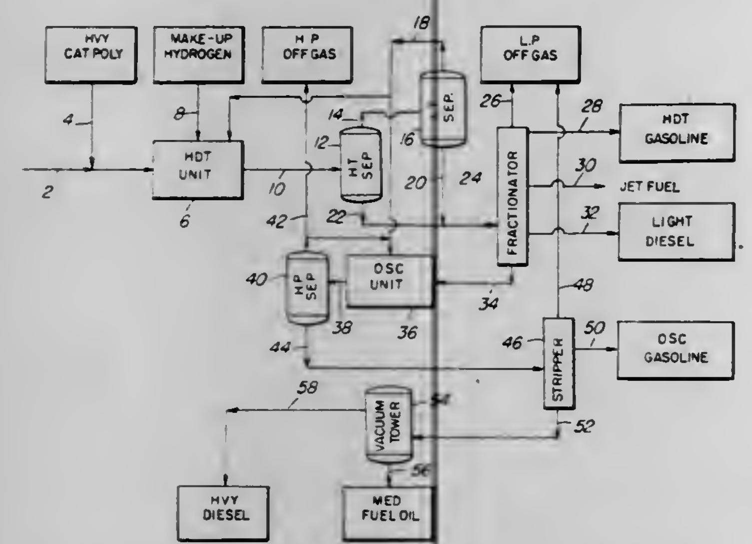
4,059,648
METHOD FOR UPGRADING SYNTHETIC OILS BOILING ABOVE GASOLINE BOILING MATERIAL
Walter R. Derr, Voorhees, N.J.; Joseph R. McClernon, Morrisville, Pa.; Stephen J. McGovern, Bellmawr, and Fritz A. Smith, Haddonfield, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.
Filed July 9, 1976, Ser. No. 703,887
Int. Cl.² C07C *1/04*
U.S. Cl. 260—676 R **4 Claims**

1. A method for upgrading a product of Fischer-Tropsch synthesis boiling above 300° F comprising hydrocarbons and oxygenates which comprises,
hydrogenating said product of Fischer-Tropsch synthesis boiling above 300° F at a temperature within the range of 450° F to 850° F and a hydrogen partial pressure of at least 200 psia by contact with a sulfided hydrogenation catalyst,
separating the product effluent of said hydrogenation operation in a high temperature separator into a first low boiling fraction and a first higher boiling fraction, separating the thus obtained first low boiling fraction in a lower temperature separator into a first hydrogen rich recycle gas stream and a second higher boiling product stream,
passing the separated first and second higher boiling streams of said high and lower temperature separation zones to a lower pressure separation zone maintained at a tempera-

ture within the range of 100° F to 800° F to recover a low pressure fuel gas stream, a gasoline product stream, a light diesel fuel product stream and a hydrogenated higher boiling product stream boiling above about 500° F,

selectively converting said separated hydrogenated product stream boiling above about 500° F by contacting a crystalline zeolite conversion catalyst providing a pore opening of at least 5 Angstroms, a constraint index within the range of 1 to 12 and a silica to alumina ratio of at least 12 under temperature conditions within the range of 550° to 770° F and a hydrogen pressure within the range of 200 to 400 psia,

separating the product of said crystalline zeolite conversion operation in a high pressure separation zone at a temperature selected to provide a hydrogen containing gaseous product stream separately from a higher boiling product fraction,



separating the higher boiling product fraction of said conversion operation under lower pressure conditions to provide a gasoline product of said conversion operation separate from material boiling above said gasoline product,

further separating said material higher boiling than said gasoline product into a medium fuel oil product and a heavy diesel oil product fraction, and

cascading hydrogen rich gases separated from said hydrogenated product effluent in said low temperature separation zone to said crystalline zeolite conversion operation as a major source of hydrogen therefor.

4,059,649

COOLING OF RECYCLE HYDROCARBON AND/OR ALKYLATE PRODUCT IN ISOPARAFFIN-OLEFIN ALKYLATION

Charles C. Chapman, and Paul D. Hann, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Aug. 3, 1976, Ser. No. 711,185

Int. Cl.² C07C *3/54*

U.S. Cl. 260—683.48 **9 Claims**

1. An alkylation process which comprises:

a. reacting in a reaction zone at least one isoparaffin with at least one olefin in the presence of a sufficient amount of an acid catalyst at liquid phase reaction conditions for a period of time sufficient to form alkylate;

b. separating the reaction effluent to form a liquid acid phase and a liquid hydrocarbon phase;

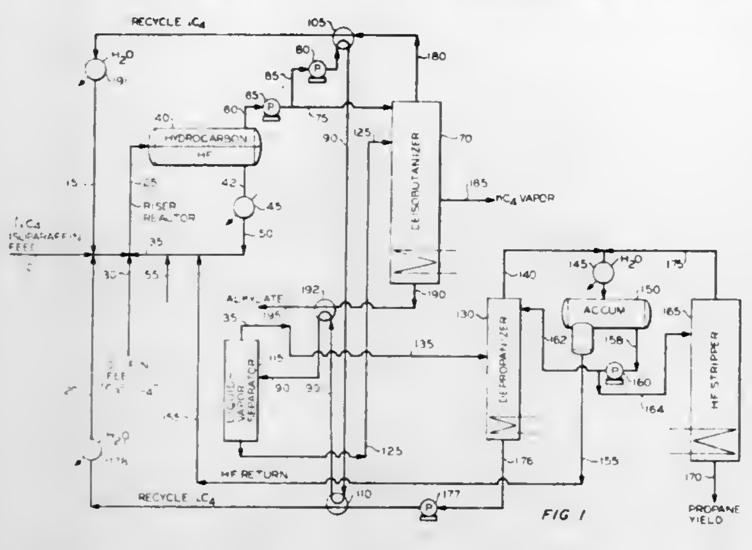
c. maintaining conditions in the separation zone of step (b) to retain the hydrocarbon phase in the liquid state;

d. pressurizing at least a portion of the liquid hydrocarbon phase from said separation zone to produce a pressurized liquid hydrocarbon stream;

e. vaporizing a portion of the pressurized liquid hydrocarbon stream by reducing the pressure on said pressurized liquid hydrocarbon stream;

f. maintaining a pressure on said vaporized hydrocarbons sufficient to permit the entry of vaporous hydrocarbons into a fractionating zone;

g. subjecting hydrocarbons entering said fractionating zone to fractionating conditions and withdrawing a fractionator overhead comprising a mixture of paraffin and said acid catalyst, an intermediate cut comprising unreacted isoparaffin stream and a bottoms streams comprising essentially alkylate;



h. recycling said isoparaffin stream to the reaction zone; and

i. utilizing said pressurized liquid hydrocarbon stream produced in step (e) to cool at least one of said bottoms stream, and said unreacted isoparaffin stream.

4,059,650

ANTI-DRIP ADDITIVE SYSTEM FOR FIRE RETARDANT POLYPROPYLENE

Francis J. Slama, Aurora, and Ivor R. Fielding, Naperville, both of Ill., assignors to Standard Oil Company (Indiana), Chicago, Ill.

Filed Jan. 27, 1976, Ser. No. 652,879

Int. Cl.² C08L *51/00, 63/00*

U.S. Cl. 260—837 R **9 Claims**

1. A composition comprising;

a. a resinous polymer of propylene comprising an alpha, beta-ethylenically unsaturated carboxylic acid modified resinous polymer of propylene; and

b. polyfunctional cross-linker containing vicinal polyepoxides wherein said polyfunctional cross-linker is present in a concentration of 0.5 to 15 parts by weight cross-linker per 100 parts by weight resinous polymer of propylene.

4,059,651

CURABLE BLENDS OF EPDM AND POLYPROPYLENE

William S. Smith, Jr., Freehold, N.J., assignor to Exxon Research & Engineering Co., Linden, N.J.

Continuation of Ser. No. 18,699, March 11, 1970, abandoned. This application July 14, 1975, Ser. No. 595,709

Int. Cl.² C08L *19/00, 61/14*

U.S. Cl. 260—848 **5 Claims**

1. A molded article exhibiting improved impact resistance in the cured state, said article being prepared from a polymer blend consisting essentially of:

a. 2 to 30% by weight of a cross-linkable EPDM elastomer wherein the diene component of said EPDM is ethylidene norbornene and said EPDM containing 1 to 20 parts per hundred of a bromomethyl alkylated phenol aldehyde resin as a cross-linking agent to effect curing of said elastomer; and

b. 70 to 98% by weight of a stereoregular polypropylene, said polypropylene being an uncurable component, said elastomer being blended with polypropylene at a temperature above the melting point of the polypropylene, and said cross-linkable EPDM being completely cured by said resin when said blend is subjected to molding temperatures of 350° to 650° F.

4,059,652

EXTRACTION RESISTANT POLYOLEFIN STABILIZER

John Leslie Hugh Allan, Glen Rock, N.J., and John James Roderick, Avon Lake, Ohio, assignors to Dart Industries Inc., Los Angeles, Calif.

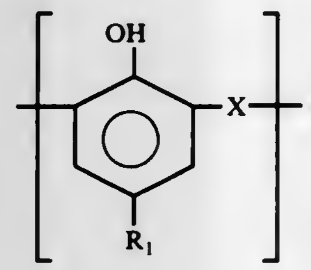
Filed Apr. 15, 1976, Ser. No. 677,105

Int. Cl.² C08G *8/02, 8/18, 75/16*

U.S. Cl. 260—848 **14 Claims**

1. An extraction resistant polymer composition which comprises:

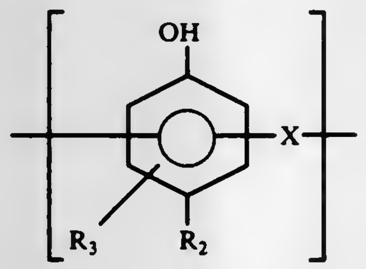
a major proportion of the recurring groups A of the formula



and

and

a minor proportion of the recurring groups B of the formula



wherein

X can be

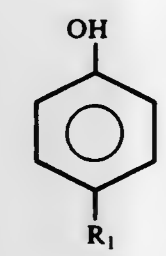
$$-\overset{\displaystyle R_4}{\underset{\displaystyle R_5}{\overset{|}{\underset{|}{C}}}}-;$$

- S - or --S_2-;

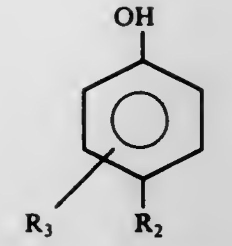
and wherein

R_1 and R_2 is a branched alkyl, cycloalkyl, alkaryl or an aryl group of 3 to 20 carbon atoms, R_3 is a sulfonic acid group - SO_3H or a salt thereof, R_4 and R_5 is hydrogen, or an alkyl, cycloalkyl, alkaryl or an aryl group of 1 to 20 carbon atoms; which polymer composition is prepared by reacting under acidic conditions

A. a mixture of a major proportion of at least one phenol of the formula



and a minor proportion of at least one phenol of the formula



B. with at least about 0.7 moles of a compound selected from the group consisting of aldehydes, ketones, sulfur monochloride and sulfur dichloride per mole of total phenols in the mixture of A.

9. A 2-8 carbon atom α - olefin polymer containing from about 0.01 to about 5 percent by weight of the polymer of claim 1.

4,059,653

ANTISTATIC DYEABLE POLYAMIDE COMPOSITION

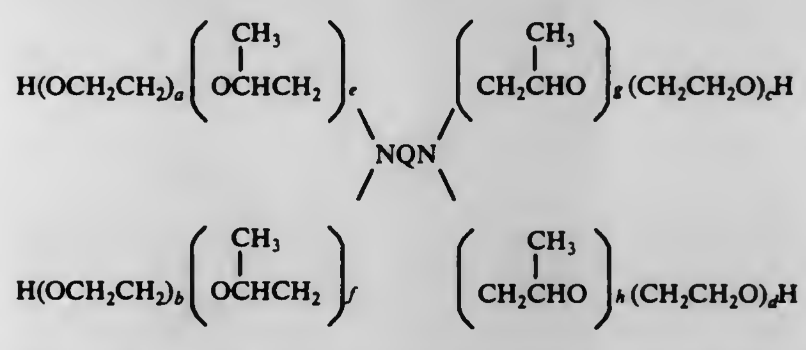
Ronald D. Mathis, Taylors, and James S. Dix, Greenville, both of S.C., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed May 27, 1976, Ser. No. 690,806

Int. Cl.² C08L *77/00*

U.S. Cl. 260—857 PG **36 Claims**

1. A polyamide composition prepared by admixing (A) a polyamide; (B) an antistatic agent comprising the reaction product of (1) at least one tetrol compound of the formula:



where *a, b, c, d, e, f, g,* and *h* are each a whole number and the total of *a, b, c,* and *d* is between 8 and 1,000 and the total of *e, f, g,* and *h* is between 8 and 850, Q is an alkylene radical containing 1 to 13 carbon atoms, wherein the molecular weight of said tetrol compound is between about 1,650 and about 135,000 and said (OCH_2CH_2) moieties make up from about 10 to about 90 weight percent of said tetrol compound, and (2) at least one dicarboxylic acid ester having the formula R'OOC—A—COOR' wherein A is a valence bond or a divalent hydrocarbyl radical having from 1 to 8 carbon atoms and R' is an alkyl group containing 1 to 4 carbon atoms or a hydroxyalkyl group containing 2 to 4 carbon atoms, wherein the two R' radicals may be the same or different; and (C) at least one zinc alkyl sulfinate of the formula:

$$Zn(R''SO_2)_2$$

wherein R'' is an alkyl group containing from 4 to 20 carbon atoms; wherein the amount of antistatic agent is that which is sufficient to improve the antistatic characteristics of said polyamide and the amount of zinc alkyl sulfinate is such that when said polyamide composition is dyed with an acid dye, the K/S value will be greater than that which would be observed if the zinc alkyl sulfinate were not present in said polyamide composition.

4,059,654

THERMOPLASTIC ELASTOMER BLEND OF EPDM, POLYETHYLENE, AND A C_3-C_{16} POLYOLEFIN AND METHOD

George A. Von Bodungen, and Curtis L. Meredith, both of Baton Rouge, La., assignors to Copolymer Rubber & Chemical Corporation, Baton Rouge, La.

Filed Nov. 2, 1976, Ser. No. 738,027

The portion of the term of this patent subsequent to May 18, 1993, has been disclaimed.

Int. Cl.^{2} C08L *23/16*

U.S. Cl. 260—897 A 26 Claims

1. A thermoplastic elastomer formed of (1) an EPDM interpolymer of ethylene, a monoolefin containing from 3-16 carbon atoms, and a polyene, (2) a polymer of a monoolefin monomer containing 3-16 carbon atoms, and (3) polyethylene in which the polyethylene is present in an amount greater than 15% but not more than 25% by weight, with the remainder of 70% to less than 85% by weight divided between the EPDM interpolymer and the monoolefin polymer in the ratio of 90-10 parts by weight of EPDM polymers to 10-90 parts by weight of monoolefin polymers, said components in admixture being subjected to free radical reaction during hot working in the presence of a free radical generating catalyst.

4,059,655

PROCESS FOR PREPARING HALOGENATED DIARYL HYDROGEN PHOSPHATES

John C. Crano, Akron, Ohio, assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Nov. 24, 1975, Ser. No. 634,690

Int. Cl.^{2} C07F *9/09*

U.S. Cl. 260—983 6 Claims

1. In the method for preparing a halogenated diaryl hydrogen phosphate which comprises reacting a halogenated phenol with a phosphorus oxyhalide in the presence of a catalyst and an inert organic solvent, the phenol being employed in excess of 2 moles per mole of oxyhalide, to form intermediate reaction product mixture consisting of diaryl phosphorohalidate, triaryl phosphate, and a minor proportion of monoaryl phosphorodihalidate, and then effecting hydrolysis of intermediate reaction product with water to form a final product mixture mixture of diaryl hydrogen phosphate, triaryl phosphate, and a minor proportion of monoaryl dihydrogen phosphate, the improvement for substantially avoiding coproduction of triaryl phosphate in the final product mixture which comprises:

employing as the halogenated phenol a 2,6-dihalophenol having the halogens in its 2 and 6 ring positions selected independently from the group consisting of bromine and iodine, and

effecting the hydrolysis in the presence of inert organic hydrolysis solvent at a pH between about 1 and 9 and a temperature between about 20° and 100° C. for a time between about 15 minutes and 18 hours to form bis(2,6-dihalophenyl) hydrogen phosphate having in admixture therewith only a minor proportion of tris(2,6-dihalophenyl)phosphate and 2,6-dihalophenyl dihydrogen phosphate.

4,059,656

PROCESSES FOR NEUTRALIZING 2,3-DIBROMOPROPANOL PHOSPHORIC ACID ESTERS CONTAINED IN TRIS(2,3-DIBROMO-1-PROPYL) PHOSPHATE

Michel Demarcq, Lyon, France, assignor to Produits Chimiques Ugine Kuhlmann, Paris, France

Filed Apr. 2, 1976, Ser. No. 672,988

Claims priority, application France, Apr. 25, 1975, 75.2982

Int. Cl.^{2} C07F *9/09*

U.S. Cl. 260—990 9 Claims

1. A process for neutralizing tris(2,3-dibromo-1-propyl) phosphate containing phosphoric acid acid esters of dibromopropanol alone or with hydrohalic acidity, which comprises heating the phosphate with at least one carbon-containing orthoester having the formula

$$Z—C(OY)_3$$

where Z is a hydrogen atom, a methyl or phenyl radical or an OY group and Y is a saturated aliphatic radical containing up to five carbon atoms or a 2,3-dibromo-1-propyl group.

9. A dibromopropyl phosphate prepared according to claim 1, the phosphate containing a quantity of the mixed phosphoric acid esters of 2,3-dibromo-1-propanol or of an alcohol having from formula YOH resulting from neutralization of said tris (2,3-dibromo-1-propyl) phosphate containing the acid esters and acidity.

4,059,657

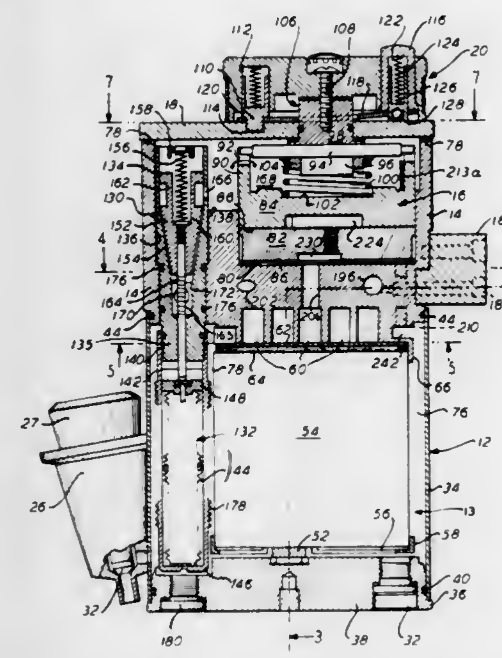
CALIBRATED ANESTHETIC VAPORIZER

Wayne W. Hay, Madison, Wis., assignor to Airco, Inc., New Providence, N.J.

Filed July 11, 1975, Ser. No. 595,186

Int. Cl.^{2} A61M *15/00, 17/00*

U.S. Cl. 261—104 12 Claims



12. An anesthetic vaporizer comprising a housing forming a vaporizing chamber containing liquid anesthetic and a liquid absorbing wick assembly extending into the liquid, a control valve assembly with gas inlet and outlet passages respectively, mounted on the housing to proportion the flow of inlet gas through, respectively, one path including the vaporizing chamber, and another path constituting a bypass passage to the outlet passage, the chamber having inlet and outlet passages extending vertically along opposite sides of the chamber respectively, the wick assembly comprising a stack of alternating planar and corrugated sheets forming a plurality of parallel passages extending horizontally across the chamber throughout its height, the stack substantially filling the chamber, and the horizontal passages connecting at opposite edges of the stack with the chamber inlet and outlet passages respectively, the planar sheets, at each side of a corrugated sheet, are formed by a lamina comprised of a planar sheet of thermally conductive material interposed between planar sheets of absorbent material.

4,059,658

LOW TEMPERATURE PRODUCTION OF HIGH PURITY FUSED SILICA

Robert D. Shoup, Painted Post, and William J. Wein, Lowman, both of N.Y., assignors to Corning Glass Works, Corning, N.Y.

Filed Sept. 15, 1975, Ser. No. 613,202

Int. Cl.^{2} C04B *35/14*

U.S. Cl. 264—43 4 Claims

1. A method for producing a solid, homogeneous, transparent fused silica article having an alkali metal content less than about 100 PPM which comprises:

a. preparing solutions having a pH between about 11-15 and containing about 1-12 moles SiO_2/liter in solution from silicate solutions selected from the group consisting of potassium silicate, sodium silicate, quaternary ammonium silicate, lithium polysilicate, and colloidal silica;

b. combining those solutions in one of the indicated proper proportions in weight percent equivalent to:

A. 50-90% potassium silicate solution and 10-50% colloidal silica solution wherein said potassium silicate solution consists essentially, by weight, of 8.3% K_2O, 20.8% SiO_2, balance H_2O and said colloidal silica solution consists essentially, by weight, of 40% SiO_2, balance H_2O;

B. 50-90% potassium silicate solution and/or sodium silicate solution and 10-50% quaternary ammonium silicate wherein said potassium silicate is that defined in (A), said sodium silicate consists essentially, by weight, of 6.8% Na_2O, 25.3% SiO_2, balance h_2O, and said quaternary ammonium silicate solution consists essentially, by weight, of 9.9% quaternary ammonium ions, 45% SiO_2, balance H_2O;

C. 50-90% potassium silicate solution and/or sodium silicate solution and 10-50% lithium polysilicate solution wherein said potassium silicate solution is that defined in (A), said sodium silicate solution is that defined in (B), and said lithium polysilicate solution consists essentially, by weight, of 2.1% Li_2O, 20% SiO_2, balance H_2O;

c. reacting an organic compound therewith selected from the group consisting of formaldehyde, paraformaldehyde, formamide, glyoxal, methyl formate, methyl acetate, ethyl formate, ethyl acetate, and mixtures thereof at a temperature between the freezing point and the boiling point of the solution for a sufficient length of time to reduce the pH of the silicate solution below about 11 and to polymerize the silica into a coherent, porous gelled body;

d. leaching said gelled body with a weak acid solution having a pH greater than about 4 to reduce the pH to at least below 6 to thereby yield a porosity of at least 50% with meon pore diameters ranging between 400A to 4000A and wherein at least 80% of the pores fall within ±30% of the average pore diameter;

e. consolidating said porous body into a solid, transparent body by firing at temperatures between about 1350°-1500° C.

4,059,659

PROCESS FOR PRODUCING FINISHED AND/OR IRREVERSIBLY EMBOSSED MICROPOROUS SHEET STRUCTURES

Karl Heinz Hilterhaus, Georgsmarienhutte, Oesede, Germany, assignor to Chemie-Anlagenbau Bischofsheim GmbH and Reuter Technologie GmbH, both of, Germany

Filed Oct. 22, 1975, Ser. No. 624,892

Int. Cl.^{2} B29D *27/04*; B32B *3/30, 31/12*

U.S. Cl. 264—45.3 18 Claims

1. In a method of producing microporous sheet structure having the appearance of artificial leather by coagulation of a polyurethane solution in which a coagulatable polyurethane solution is coagulated, washed, and dried, and in which a finishing agent for making artificial leather is utilized for making a leather appearance, the improvement wherein the polyurethane solution is spread out flat such that it has a free upper surface and wherein said finishing agent for making artificial leather is applied to the free surface of the polyurethane solution which has been spread out flat and before coagulation thereof to achieve a leather appearance without a subsequent finishing step.

4,059,660

METHOD OF MOLDING A LIGHT-WEIGHT PANEL

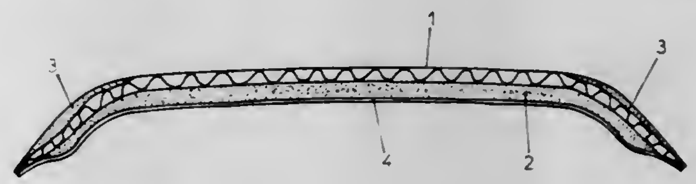
Jacques Roth, Strasbourg; Michel Roth, Ostwald; Paul Seiler, Illkirch-Graffenstaden; Roger Lavenir, Strasbourg, and Alain Manigold, Strasbourg-Koenigshoffen, all of France, assignors to Roth Freres, S.A., Strasbourg-Meinau, France

Filed Jan. 21, 1976, Ser. No. 650,983

Claims priority, application France, Feb. 5, 1975, 75.05064; Dec. 22, 1975, 75.40180

Int. Cl.^{2} B29D *27/00*

U.S. Cl. 264—46.4 7 Claims



1. A method of manufacturing a moulded panel, characterised in that it comprises the steps of:

i. wetting one of the surfaces of a sheet of cardboard with a solution of polymerisable urethane elastomer,

ii. wetting one of the surfaces of a sheet of cured polyurethane foam with a solution of polymerisable urethane elastomer,

iii. placing the non-wetted surface of the sheet of foam upon the wetted surface of the sheet of cardboard,

iv. placing a finishing cover material upon the wetted surface of the foam,

v. turning over the sandwich thus formed and then wetting the virgin surface of the sheet of cardboard with more of said solution,

vi. disposing upon this last-mentioned surface after thus wetting it at least one strip or layer of cured polyurethane foam,

vii. placing the resulting assemblage into a mould for shaping the assemblage into a panel of the desired form, and

viii. polymerising said urethane elastomer at least far enough to ensure that the panel will retain the said desired form and then removing the panel from the mould.

4,059,661

MANUFACTURE OF POLYVINYL CHLORIDE FOAMS

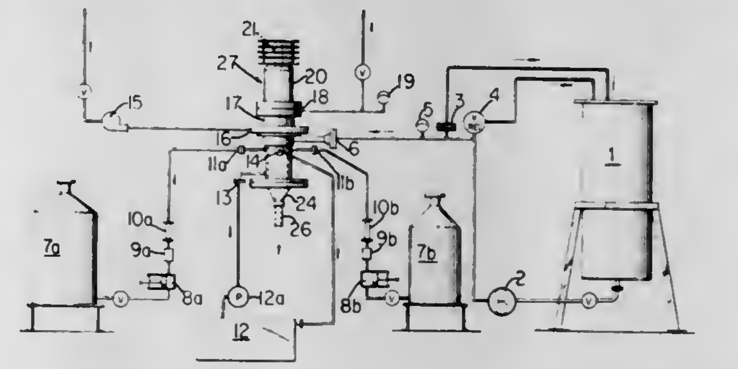
Herbert Eck; Gunter Weinhold, and Manfred Hannebaum, all of Burghausen, Germany, assignors to Wacker-Chemie GmbH, Munich, Germany

Filed Mar. 6, 1975, Ser. No. 555,712

Claims priority, application Germany, Mar. 6, 1974, 2410752

Int. Cl.^{2} B29D *27/00*

U.S. Cl. 264—54 15 Claims



1. A process for producing a soft polyvinyl chloride foam

which comprises feeding a foamable soft polyvinyl chloride plastisol to a high speed mixing zone, agitating said foamable soft polyvinyl chloride plastisol at high speed in said high speed mixing zone at a pressure not exceeding about 15 atmospheres gauge to thereby generate, by friction, at least about 60 percent of the heat necessary for foaming and gelatination of said plastisol and cause foaming and gelling of said plastisol within said mixing zone, and discharging an at least partially gelled and at least partially foamed polyvinyl chloride from said mixing zone.

4,059,662

METHOD OF MAKING IMMERSION NOZZLE AND LONG STOPPER FOR CONTINUOUS CASTING OF STEEL

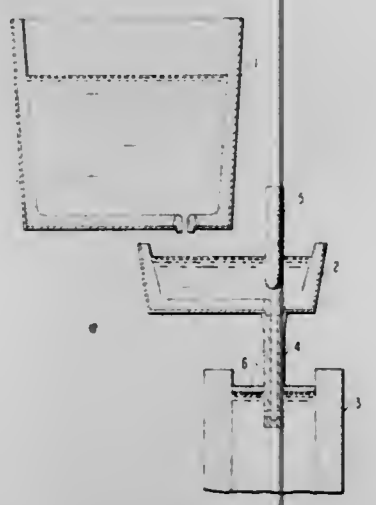
Kazumasa Murakami, Nagoya, and Takashi Natori, Osaka, both of Japan, assignors to Nippon Crucible Co., Ltd., Tokyo, Japan

Filed Dec. 1, 1975, Ser. No. 636,461

Claims priority, application Japan, Nov. 30, 1974, 49-138739

Int. Cl.[2] C04B *33/34*

U.S. Cl. 264—62 **6 Claims**



1. A method of making an immersion nozzle or a long stopper, which consists essentially of 3 to 15% by weight of a binder capable of forming a carbon bond upon burning to decompose the binder in a reducing atmosphere, 48 to 82% by weight of zircon sand, 10 to 35% by weight of natural flake graphite and 1 to 8% of silicon containing at least 90% silicon and having a particle diameter of not more than 74 microns, said process comprising the steps of kneading the binder with the zircon sand, graphite and silicon, molding the kneaded mixture in an isostatic press at a pressure of 500 to 1500 kg/cm², burning the molded product in a reducing atmosphere at a temperature of 900° to 1200 ° C and applying a glassy coating to the outer surface of the burned product.

4,059,663

PRODUCTION OF BETA-ALUMINA CERAMIC ARTICLES AND FURNACE THEREFOR

Lyndon James Miles, and Ivor Wynn Jones, both of Chester, England, assignors to The Electricity Council, London, England

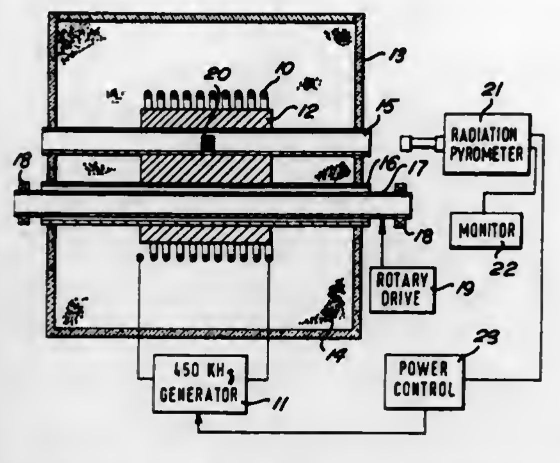
Continuation of Ser. No. 450,111, March 11, 1974, abandoned. This application Dec. 8, 1975, Ser. No. 638,868

Claims priority, application United Kingdom, Mar. 12, 1973, 11835/73

Int. Cl.[2] C04B *33/32*

U.S. Cl. 264—65 **9 Claims**

1. In a method of producing a beta-alumina ceramic article comprising the steps of forming a shape of compressed powder of a composition which on sintering will result in a beta-alumina ceramic, and then moving the shape continuously through a tubular furnace in the direction of the longitudinal axis thereof to thereby result in the formation of water vapor and a stable atmosphere of sodium oxide vapor and in order to sinter said powder, the improvement comprising simultaneously causing an air flow through the tubular furnace in the direction of movement of the shape at a speed not less than the speed of movement of the shape while moving said shape



through said furnace, said air flow being sufficient to carry said water vapor through said furnace but not so great that said sodium oxide is carried through said furnace faster than said sodium oxide is formed.

4,059,664

METHOD OF MANUFACTURING FERRIMAGNETIC MATERIAL FOR RECORDING, READ OUT AND ERASE HEADS UTILIZED IN MAGNETIC LAYER DEVICES

Jean Nicolas; Alain Lagrange, and Mieczyslaw Hildebrandt, all of Paris, France, assignors to Thomson-CSF, Paris, France

Continuation of Ser. No. 313,339, Dec. 8, 1972, abandoned. This application July 2, 1975, Ser. No. 592,657

Claims priority, application France, Dec. 14, 1971, 71.44897

Int. Cl.[2] C04B *35/30*

U.S. Cl. 264—66 **8 Claims**

1. A method of manufacturing a polycrystalline, spinelle structure ferrimagnetic material, the overall chemical composition of which satisfies the general formula:

$$Ni_{1-x}Zn_xFe_{2(1+e)}O_4$$

where

$0.50 \leqq x \leqq 0.70$ and

$-0.08 \leqq e \leqq +0.015$

exhibiting a porosity coefficient at most 1%, the microscopic structure thereof composed of grains having a mean diameter not in excess of 5 microns, comprising the following stages:

mixing zinc, nickel and iron oxides having a purity of better than 99% in order to obtain proportions of metal atoms and oxygen, as indicated by the gross formula:

$$Ni_{1-x}Zn_xFe_{2(1-a)}O_4$$

where x ranges between 0.50 and 0.70 and "*a*" between 0.01 and 0.015 account being taken of the known firing losses occurring during the later heat treatments; crushing in steel vessels using steel balls and distilled water, for around 24 hours; firing at a temperature ranging between 900° C and 1200° C, and further crushing in steel vessels using steel balls and distilled water, for around 48 hours; drying the mixture thus obtained; mixing the powder obtained, with an organic binder; obtaining a granulate from said mixture; pressing said granulate in suitably shaped moulds; heat treating to eliminate the binder; sintering at a temperature of about 1100° C to about 1200° C, at a pressure from 0.5 to 1 ton/cm², and for a period of time from about 15 to 300 minutes, the time of application of sintering pressure being related to sintering temperature according to FIG. 5.

4,059,665

BONDED NON-WOVEN FABRIC AND METHOD FOR MAKING IT

Louis E. Kelley, Philadelphia, Pa., assignor to Rohm and Haas Company, Philadelphia, Pa.

Continuation-in-part of Ser. No. 36,499, May 11, 1970, abandoned. This application May 14, 1973, Ser. No. 360,285

Int. Cl.[2] D04H *1/64*

U.S. Cl. 264—128 **2 Claims**

1. A process of making a non-woven fabric which comprises associating in random array, within a web or mat, a mass of fibers, bringing into contact with the fibers a binder comprising an aqueous dispersion of the mixture of

1. a water-insoluble emulsion compolymer consisting essentially of 1 to 8% by weight of an N-methylolamide selected from N-methylolacrylamide or N-methylolmethacrylamide, and for the balance to make 100%, at least one ester of acrylic acid or methacrylic acid and a C_1 to C_{18} alkanol and 0.5 to about 5% by weight, based on the copolymer weight, of an unsaturated aliphatic carboxylic acid having 3 to 6 carbon atoms and
2. about 0.5 to about 10% by weight, based on the weight of the copolymer of a polyalkylene glycol of the formula

$$HO—(RO)_n—H$$

wherein R is an alkylene group of 2 to 6 carbon atoms and *n* is a number having an average value of 4 to 50, drying the resulting fibrous mass to effect fusion of the polymer and bonding of the fibers, and then heating the fibrous product at a temperature of 210° F. to 750° F. to produce a soft, resillient nonwoven fibrous product of excellent solvent resistant properties.

4,059,666

METHOD OF CONVERTING OIL AND WASTE CONTAINING SLUDGE TO DRY WASTE

Leslie L. Fowler, 1722 E. 59 St., Tulsa, Okla. 74105

Continuation of Ser. No. 408,671, Oct. 23, 1973, abandoned. This application Apr. 17, 1975, Ser. No. 568,778

Int. Cl.[2] B29C *25/00*

U.S. Cl. 264—129 **1 Claim**

1. The method of converting oil and water containing sludge to dry waste comprising the steps of:

1. adding to the sludge petrophylic material selected from the group consisting of waste roofing felt and polyurethane fibers, in an amount sufficient to absorb the oily component of the sludge material;
2. adding to the mixture of sludge and petrophylic material fibrous material selected from the group consisting of fiberglass wastes, chopped glass fibers, Spanish moss, hay, straw and cornstalks in an amount sufficient to strengthen and bond the particles of petrophylic material;
3. allowing the entrained water to drain from the mixture as the oil components of the sludge are absorbed in the petrophylic material;
4. adding to the mixture a hydrophylic material selected from the group consisting of volcanic ash and bentonite in an amount sufficient to absorb and bond the remaining water in the mixture;
5. forming the mixture into suitably sized volumes or packages; and
6. coating the external surface of said packages with an air drying liquid selected from the group consisting of sodium silicate, and asphalt tar to form a water impervious layer thereon.

4,059,667

BIAXIALLY ORIENTED POLYETHYLENE TEREPHTHALATE FILM AND METHOD OF MAKING SUCH FILM

William James Pangonis, West Chester, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Oct. 20, 1975, Ser. No. 624,256

Int. Cl.[2] B29D *7/24, 7/00*

U.S. Cl. 264—289 **6 Claims**

1. A method of making biaxially oriented polyethylene terephthalate film including the steps of:

stretching amorphous polyethylene terephthalate film in a first direction about 1.2 to 2 times its initial length at a first temperature slightly above the glass transition temperature of the film to provide molecular orientation in that direction;

heating the thus oriented film to a temperature slightly higher than such first temperature for a time sufficient to partially remove such orientation while maintaining the film in a substantially amorphous state; and

thereafter, cooling the film to a temperature substantially the same as the first temperature and

stretching the film in a direction transverse to the first direction about 3 to 4 times its width before stretching whereby such film has a shrinkage, on heating to 100° C for 5 seconds, of less than 8% in the first direction and greater than 40% transverse to the first direction.

4,059,668

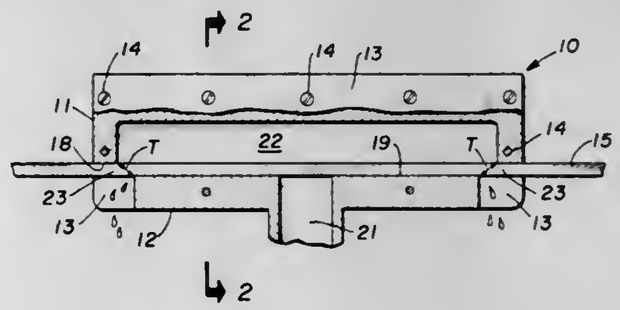
METHOD OF STRETCHING A TOW

David F. Bittle, Decatur, Ala., and Arnold L. McPeters, Raleigh, N.C., assignors to Monsanto Company, Decatur, Ala.

Continuation-in-part of Ser. No. 415,485, Nov. 13, 1973, abandoned, which is a continuation-in-part of Ser. No. 244,195, April 14, 1972, abandoned, which is a continuation-in-part of Ser. No. 50,485, June 29, 1970, abandoned. This application May 2, 1975, Ser. No. 574,062

Int. Cl.[2] B29C *17/02*

U.S. Cl. 264—290 R **10 Claims**



1. The method of stretching a tow of filaments selected from the group consisting of acrylic, modacrylic, nylon, polyester, rayon and polyvinyl chloride comprising:

a. advancing the tow into a chamber at a first speed, said chamber having an opening at each end thereof for the passage of tow into and out of the chamber and for the passage of a heated liquid out of the chamber.
b. forcing a stream of heated liquid into the chamber at a point between the openings in the chamber to fill the chamber with heated liquid and force said liquid through the tow from one side thereof to the other and, then transversely back through the tow and out of the chamber at said openings, said liquid being forced into the chamber at such a rate that the heated liquid flow rate outward through each of the openings is at least

$$x = 3{,}000T\sqrt{(WN/h)}\ (\mu/p)$$

where *x* is the flow rate through each openings in gallons per minute, *T* is the thickness in inches of the stream of heated liquid flowing through each opening, *W* is the width in inches of each liquid stream and the tow passing

through the openings, h is the thickness in inches of the tow passing through said openings, N is the number of filaments in the tow, μ is the viscosity of the heated liquid in pounds per foot-second and ρ is the density of the heated liquid in pounds per cubic foot, the dimensions W and h defining an area that the cross section of the tow is free to assume at the openings, the dimensions W and T defining an area WT which is the cross sectional area that the stream of liquid is free to assume at said openings, and

c. withdrawing the tow from the chamber at a second speed greater than the first so that the filaments are stretched.

4,059,669

METHOD OF MAKING ALUMINUM PHOSPHATE

Ian M. Thomas, Temperance, Mich., assignor to Owens-Illinois, Inc., Toledo, Ohio

Division of Ser. No. 305,342, Nov. 10, 1972, abandoned. This application July 12, 1974, Ser. No. 488,087

Int. Cl.² C01B *15/16*

U.S. Cl. 264—319 **4 Claims**

1. A method for making a shaped article consisting essentially of aluminum metaphosphate comprising mixing in reactive proportions a phosphoric acid or a phosphorous acid with

1. an organic aluminum compound represented by the structural formula:

$Al(OR)_3$

wherein R is a member selected from the group consisting of straight and branched chain alkyl groups containing from 1 to 20 carbon atoms, phenyl and alkaryl groups containing from 7 to 12 carbon atoms, or

2. the hydrolysis product of $Al(OR)_3$ wherein R is defined above, forming a clear, liquid reaction product mixture, mixing the liquid reaction product mixture with dry finely divided aluminum metaphosphate until a smooth, pourable paste is obtained, pouring the paste into a mold to obtain a molded product, thereafter heating the molded product to a sufficiently elevated temperature of at least 100° C. for a sufficient period of time to obtain a dimensionally stable article consisting essentially of aluminum metaphosphate.

4,059,670

METHOD FOR SEPARATION AND ENRICHMENT OF ISOTOPES

Hidetake Kakihana, Tokyo, and Tokuhisa Miyamatsu, Nagoya, both of Japan, assignors to Mitsubishi Rayon Co., Ltd., Tokyo, Japan

Filed Dec. 3, 1975, Ser. No. 637,112

Claims priority, application Japan, Dec. 9, 1974, 49-141354

Int. Cl.² C01G *56/00, 43/00*

U.S. Cl. 423—7 **9 Claims**

1. A method for separation and enrichment of isotopes, which comprises

loading a solution containing anions of a mixture of isotopes of an element selected from the group consisting of boron and uranium into weakly basic anion exchange fibers which have a diameter of not more than 100 μm, a length of not more than 5 mm, an aspect ratio of at least 5 and an exchange capacity of at least 2 meg/g-dry fiber, and which are packed with a specific volume of 2.0 – 20.0 ml/g-dry fiber and

then eluting said anions with an eluting agent at a temperature of 0°–100° C.

4,059,671

METHOD FOR INCREASING THE LIFETIME OF AN EXTRACTION MEDIUM USED FOR REPROCESSING SPENT NUCLEAR FUEL AND/OR BREEDER MATERIALS

Helmut Schmieder, Karlsruhe, and Ludwig Stieglitz, Graben-Neudorf, both of Germany, assignors to Gesellschaft fur Kernforschung m.b.H., Karlsruhe, Germany

Filed Oct. 20, 1975, Ser. No. 624,107

Claims priority, application Germany, Oct. 18, 1974, 2449589

Int. Cl.² B01D *11/04*

U.S. Cl. 423—10 **7 Claims**

1. In a method for increasing the lifetime of an extraction medium containing an organophosphorus acid ester and a hydrocarbon, and being used for reprocessing spent nuclear fuel and/or breeder materials, by removing from the extraction medium impurities resulting from chemical and/or radiolytic decomposition and complex compounds of such impurities with radionuclides by washing the extraction medium with an aqueous wash solution, the improvement comprising bringing the extraction medium, after use, into intimate contact with an aqueous hydrazine hydrate wash solution having a concentration of between about 0.1 molar and 1.0 molar, at a temperature between about 20° C to about 75° C, and then separating the aqueous hydrazine hydrate wash solution from the extraction medium.

4,059,672

METHOD OF DIGESTING BAUXITE VIA THE BAYER PROCESS WITH THE ADDITION OF REDUCING AGENTS

Trevor Crombie Maitland Davis, Sidney, Canada, and James Ernest Laurie, Mandeville, Jamaica, assignors to Revere Copper and Brass Incorporated, New York, N.Y.

Filed Apr. 2, 1973, Ser. No. 346,736

Int. Cl.² C01F *7/06, 7/08*

U.S. Cl. 423—121 **1 Claim**

1. In the Bayer process for the separation of alumina from goethite-containing or alumo-goethite-containing bauxite by digestion with aqueous caustic soda, the improvement whereby the settling rate of the resulting suspended solids in the digested mixture is increased by the chemical conversion of a portion of the goethite to hematite and magnetite, said improvement comprising contacting the bauxite during the digestion at a temperature of between about 400° and 500° F. under superatmospheric pressure for a period of time of between about 20 and 40 minutes with a reducing agent capable of reducing at least a part of the trivalent iron in the goethite or alumogoethite to the divalent state under the digestion conditions and selected from the group consisting of sucrose and cellulose, said reducing agent being added to the digestion mixture in an amount of between about 1 and 2 percent by weight based on the weight of dry bauxite.

4,059,673

PRODUCTION OF BAUXITE AND ALUMINIUM CHLORIDE OF LOW IRON CONTENT

Robin David Holliday, Daytona Beach, Fla., and David John Milne, Highfields, Australia, assignors to Comalco Limited, Melbourne, Australia

Filed Apr. 10, 1975, Ser. No. 567,007

Claims priority, application Australia, Apr. 17, 1974, 7271

Int. Cl.² C01F *7/56;* **C01G** *49/10*

U.S. Cl. 423—136 **8 Claims**

1. Process for production of aluminum chloride of low iron content from aluminous materials containing iron, which comprises in a first step reacting an aluminous material containing iron at temperatures from 400° to 750° C with a gas mixture comprising 20 to 40% SO_2 by volume, the balance being CO apart from minor diluents, to produce iron sulphide; in a second step, heating the product of the first step in the presence of chlorine, whereby ferric chloride is produced and removed by volatilization, whereby a purified aluminous material of low iron content is obtained; and in a third step, chlorinating said purified aluminous material with a chlorinating gas to produce aluminum chloride of low iron content.

6. Process for removing iron from bauxite which comprises

a. heating the bauxite raw material at temperatures not exceeding 750° C to remove entrained and combined water;

b. treating the product of step (a) at temperatures from 400° to 750° C with a gas mixture consisting essentially of 20 to 40% SO_2 and 80 to 60% CO by volume to sulphidize iron contained therein;

c. treating the product of step (b) at temperatures between 430° and 750° C with chlorine and removing the iron chloride so produced by volatilization.

4,059,674

METHOD FOR MANUFACTURING PHOSPHORIC ACID AND GYPSUM

Edwin B. Lopker, Fort Lauderdale, Fla., assignor to Pullman Incorporated, Chicago, Ill.

Filed July 18, 1972, Ser. No. 272,788

Int. Cl.² C01F *11/00;* **C01B** *25/16;* **C01F** *1/00*

U.S. Cl. 423—167 **4 Claims**

1. A method for producing phosphoric acid and high purity gypsum comprising:

a. introducing calcium phosphate rock, phosphoric acid and sulfuric acid into a reaction system;

b. reacting in said reaction system substantially all of said calcium phosphate rock to form a first slurry of phosphate-containing gypsum calcium sulfate in a first liquid comprising phosphoric acid having a concentration of at least 25 percent;

c. withdrawing a portion of said first slurry from said reaction system and separating phosphoric acid product having a concentration of at least 25 percent therefrom;

d. recrystallizing phosphate-containing gypsum calcium sulfate contained in the withdrawn portion in a second liquid comprising phosphoric acid having a concentration of less than about 10 percent and sulfuric acid to form a second slurry of calcium sulfate hemihydrate;

e. recrystallizing said calcium sulfate hemihydrate in a third liquid comprising phosphoric acid having a concentration of less than 10 percent to form a third slurry of high purity gypsum; and

f. separating said high purity gypsum as a product of the process.

4,059,675

DECOMPOSITION OF HALOGENATED ORGANIC COMPOUNDS

Kang Yang; James D. Reedy, and John F. Scamehorn, all of Ponca City, Okla., assignors to Continental Oil Company, Ponca City, Okla.

Continuation-in-part of Ser. No. 689,221, May 26, 1976, abandoned, which is a continuation-in-part of Ser. No. 613,159, Sept. 15, 1975, abandoned. This application June 14, 1976, Ser. No. 696,167

Int. Cl.² B01D *53/34*

U.S. Cl. 423—240 **17 Claims**

1. A method for decomposing chlorinated organic compounds, said chlorinated organic compounds containing 1 to 4 carbon atoms and containing at least as many hydrogen atoms as chlorine atoms, said method comprising:

a. heating the chlorinated organic compounds to a temperature above about 300° C., and

b. then contacting the heated organic compound with a catalytic amount of ruthenium in the presence of an oxidizing agent at a temperature of at least about 350° C.

4,059,676

DECOMPOSITION OF HALOGENATED ORGANIC COMPOUNDS

Kang Yang, and James D. Reedy, both of Ponca City, Okla., assignors to Continental Oil Company, Ponca City, Okla.

Continuation-in-part of Ser. No. 689,614, May 24, 1976, abandoned. This application June 14, 1976, Ser. No. 696,168

Int. Cl.² B01D *53/34*

U.S. Cl. 423—240 **16 Claims**

1. A method for decomposing chlorinated organic compounds, said chlorinated orgainc compounds containing 1 to 4 carbon atoms and containing at least as many hydrogen atoms as chlorine atoms, said method comprising:

a. heating the chlorinated organic compounds to a temperature above about 300° C., and

b. then contacting the heated organic compound with a catalytic amount of ruthenium-platinum catalyst in the presence of an oxidizing agent, selected from the group consisting of air, oxygen, and mixtures of nitrogen and oxygen, at a temperature of at least about 350° C., said catalysts being present in the range of 1 to 20 parts of platinum per part of ruthenium.

4,059,677

CATALYTIC OXIDATION OF C_2-C_4 HALOGENATED HYDROCARBONS

Edward J. Sare, Clinton, and Jerome M. Lavanish, Akron, both of Ohio, assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Dec. 23, 1976, Ser. No. 753,951

Int. Cl.² B01D *53/34*

U.S. Cl. 423—240 **23 Claims**

1. A method for treating a C_2–C_4 halogenated hydrocarbon containing gas stream, said halogenated hydrocarbon being selected from the group consisting of chlorinated and brominated hydrocarbons, which comprises contacting the halogenated hydrocarbon with an oxidizing amount of oxygen-containing gas in the presence of metal oxide catalyst system, the metal oxide catalyst content of which consists essentially of a mixture of hydrated manganese oxide and cobalt oxide, the weight ratio of manganese oxide to cobalt oxide being from 19:1 to 1:19, at temperatures within the range of from 20° C., to 500° C., for a time sufficient to reduce the halogenated hydrocarbon content of the gas stream, said temperature being such as to inhibit water-induced loss of catalyst activity.

4,059,678

STABILIZATION OF IRON-CONTAINING ACIDIC HYDROGEN PEROXIDE SOLUTIONS

Donald Charles Winkley, Treaton, N.J., assignor to FMC Corporation, Philadelphia, Pa.

Filed Feb. 2, 1973, Ser. No. 328,987

Int. Cl.² C01B *15/2*

U.S. Cl. 423—273 **7 Claims**

1. In the process of using hydrogen peroxide in aqueous mineral acid compositions at a pH below 2.0, in which the acid is selected from the group consisting of sulfuric, nitric and phosphoric acids, and the composition is relatively free of halide, but contains dissolved ferric iron in amounts between 30 ppm and 30,000 ppm, the method of retarding the decomposition of the hydrogen peroxide induced by the iron which comprises precipitating almost all of the dissolved iron by contacting it with an amino(methyl phosphonic acid) in solution in the composition, using at least three phosphonic acid groups for each ferric iron ion present.

4,059,679

MODIFIED ZIRCONIUM PHOSPHATES

Abraham Clearfield, Athens, Ohio, assignor to Ohio University, Athens, Ohio

Continuation of Ser. No. 132,569, April 18, 1971, abandoned. This application Aug. 5, 1974, Ser. No. 494,579

Int. Cl.[2] C01B *15/16, 25/26;* B01J *27/14*

U.S. Cl. 423—306 2 Claims

1. A process for modifying the interlayer spacing of a crystalline zirconium phosphate hydrate, containing replaceable hydrogen ions, to produce a compound especially suitable for use as a catalyst, comprising the steps of reacting said phosphate with an alkali metal salt or hydroxide for a time sufficient for at least part of the hydrogen ions thereof to be replaced by said alkali metal, elevating the temperature of said cation-containing phosphate to at least partially dehydrate said alkali metal containing zirconium phosphate, and thereafter replacing said alkali metal with a dissimilar metal selected from the groups IB, IIA, IIIB, VIIB, and VIII of the periodic table of elements.

4,059,680

METHOD OF PREPARING FUMED SiO_2

Joel F. M. Leathers, Midland, Mich., and Donald W. Calvin, Zachary, La., assignors to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 660,294, Feb. 23, 1976, Pat. No. 4,008,130. This application Sept. 20, 1976, Ser. No. 724,683

Int. Cl.[2] C01B *33/12, 7/22*

U.S. Cl. 423—337 4 Claims

1. A method of preparing fumed SiO_2 and HF from the combustion of H_2SiF_6, said method comprising

providing an aqueous H_2SiF_6 feed stream,

embodying said aqueous H_2SiF_6 feed stream into a ternary azeotrope containing about 36% H_2SiF_6, about 10% HF, and about 54% H_2O, said embodying being done by providing the aqueous H_2SiF_6 with at least about 10 parts of HF and at least about 54 parts of H_2O per 36 parts of H_2SiF_6 and then distilling the so formed solution to obtain the ternary azeotrope,

feeding the ternary azeotrope into the combustion chamber of a burner in which a combustible mixture of fuel and oxygen is burned, thereby forming fumed SiO_2 and HF which leave the burner in the resulting hot, gaseous combustion product stream,

and separating fumed SiO_2 from the said product stream.

4,059,681

STABLE DRIED ALUMINUM HYDROXIDE GEL

Stanley L. Hem, West Lafayette, and Joe L. White, Lafayette, both of Ind., assignors to Purdue Research Foundation, Lafayette, Ind.

Continuation-in-part of Ser. No. 360,043, May 14, 1973, abandoned. This application Apr. 9, 1975, Ser. No. 566,254

The portion of the term of this patent subsequent to Oct. 7, 1992, has been disclaimed.

Int. Cl.[2] C01B *31/24;* A01N *11/00;* A61K *33/10;* C01F *7/02*

U.S. Cl. 423—419 P 4 Claims

1. A process for drying an aqueous aluminum hydroxide gel to form a stable dried aluminum hydroxide gel meeting the United States Pharmacopeia, Eighteenth Revision specification, said process comprising: replacing the aqueous liquid in the aluminum hydroxide gel with a water miscible, non-aqueous solvent, said non-aqueous solvent being selected from a group consisting of lower alkanols having 1 to 5 carbon atoms, mixtures of lower alkanols having 1 to 5 carbon atoms and no more than 50% of benzene and toluene mixed therewith, and ketones having 2 to 4 carbon atoms; and drying the gel of aluminum hydroxide removing the non-aqueous solvent and producing a stable, acid-reactant dried amorphous powder

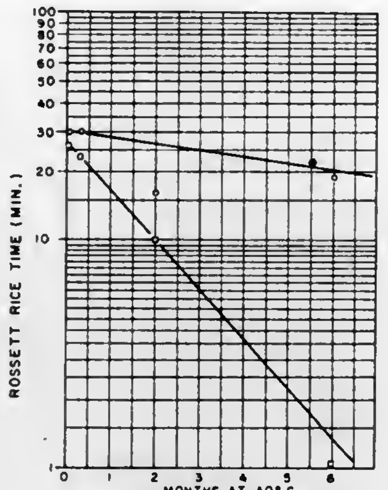


FIG. 1 EFFECT OF AGING AT 40° ON THE ROSSETT RICE TIME OF ALUMINUM HYDROXIDE GELS FRIED FROM WATER (□), ETHANOL, USP (o); 75% ETHANOL, USP: 25% BENZENE(•); AND 50% ETHANOL, USP: 50% BENZENE (Ö)

comprising not less than 50% and not more than about 56.8% of aluminum oxide.

4,059,682

METHOD OF MAKING SHAPED CARBONACEOUS BODIES

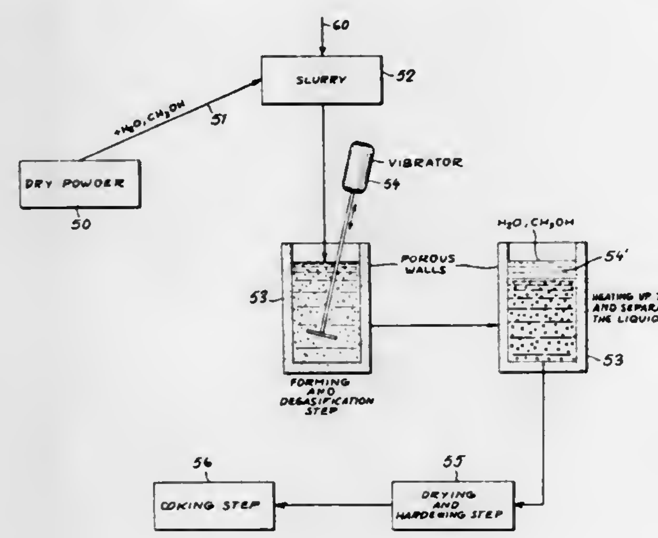
Hartmut Luhleich, Duren; Hubertus Nickel, and Francesco Dias, both of Julich, all of Germany, assignors to Kernforschungsanlage Julich GmbH, Julich, Germany

Division of Ser. No. 578,192, May 16, 1975, which is a continuation-in-part of Ser. No. 267,479, June 29, 1972, Pat. No. 3,927,187. This application Feb. 18, 1976, Ser. No. 659,020

Claims priority, application Germany, July 2, 1971, 2133044

Int. Cl.[2] C01B *31/02, 31/04*

U.S. Cl. 423—448 1 Claim



1. A method of making a graphitic body formed from filler particles consisting of petroleum coke, electrographite, natural graphite or carbon black, coated with binder selected from the group which consists of phenol-formaldehyde resins, pitch and tar, said method comprising the steps of:

a. producing a slurry of binder-coated filler particles by dissolving the binder first in methanol, a liquid in which the filler is slurried, and then introducing this slurry into water as a carrier liquid to produce an emulsion of the binder in the form of the coating upon the filler particles which settle and decanting the excess liquid;

b. shaping a mass of said binder-coated particles in a mold under vibrating and heating up for separation of the liquid phase;

c. thereafter drying the shaped mass of said binder-coated filler particles; and

d. cokefying the dried shaped mass.

4,059,683

DECOMPOSITION OF HALOGENATED ORGANIC COMPOUNDS

Robert C. Lindberg; James D. Reedy, and Kang Yang, all of Ponca City, Okla., assignors to Continental Oil Company, Ponca City, Okla.

Continuation-in-part of Ser. No. 679,429, April 22, 1976, abandoned. This application June 14, 1976, Ser. No. 696,169

Int. Cl.[2] C01B *7/08, 7/00*

U.S. Cl. 423—481 12 Claims

1. A method for decomposing halogenated organic compounds said halogenated organic compounds containing 1 to 4 carbon atoms and containing at least as many hydrogen atoms as halogen atoms, said method comprising:

a. heating the halogenated organic compounds to a temperature in the range of above about 300° C. to about 500° C., and,

b. then contacting the heated organic compounds with a catalyst, which is platinum-impregnated on a nonoxidizing carrier, in the presence of an oxidizing agent and in the absence of added hydrocarbons at a temperature, which is at least 350° C. and is higher than the temperature of step (a),

said method being characterized further in that at least 99% of the halogen present in the halogenated organic compounds is converted to hydrogen halides.

4,059,684

BONE CEMENT COMPOSITIONS CONTAINING GENTAMYCIN

Albert Gross, Frankfurt am Main; Roland Schaefer, Friedrichsdorf, Taunus, and Siegfried Reiss, Bad Homburg, all of Germany, assignors to Kulzer & Co. GmbH, Bad Homburg, Germany

Filed Feb. 9, 1976, Ser. No. 656,668

Claims priority, application Germany, Mar. 14, 1975, 2511122

Int. Cl.[2] A61K *31/78*

U.S. Cl. 424—4 13 Claims

1. A bone cement comprising the composition A or B, wherein:

A. comprises as the principal component a powdered copolymer of methyl methacrylate and methyl acrylate and 1.25 to 5 weight percent gentamycin in the form of the hydrochloride hydrobromide or 1.25 to 5 weight percent gentamycin in the form of the sulfate in admixture with 0.5 to 10 weight percent of sodium chloride, potassium chloride, sodium bromide or potassium bromide, and

B. comprises as the principal component monomeric methyl methacrylate and 2.5 to 10 weight percent gentamycin in the form of the hydrochloride hydrobromide or 2.5 to 10 weight percent of gentamycin in the form of the sulfate together with 1 to 20 weight percent of sodium chloride, potassium chloride, sodium bromide or potassium bromide.

4,059,685

IMMOBILIZED IMMUNOADSORBENT

Lavell R. Johnson, Salt Lake City, Utah, assignor to Summa Corporation, Culver City, Calif.

Filed Apr. 7, 1975, Ser. No. 565,848

Int. Cl.[2] G01N *31/00;* G01T *1/00;* G21C *17/00*

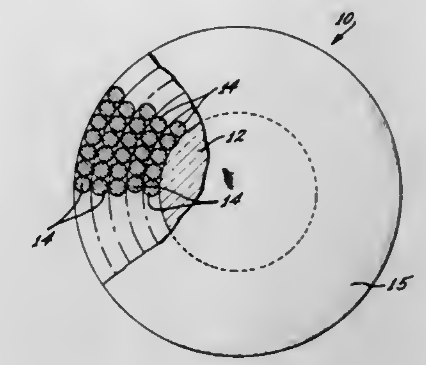
U.S. Cl. 424—12 9 Claims

1. A reusable immobilized immunoadsorbent for use in radioimmunoassay wherein an antigen sample is flowed through said immunoadsorbent for binding a specific antigen thereto and for release of said antigen comprising:

a mass of superficially porous refractory particles;

each said particle of said mass including an impervious core having joined to the core sufficient layers of microparticles to form an outer porous coating on said core;

a water insoluble polymer material chemically bound by silane linkages to said superficially porous refractory particles; and



said polymer having bound thereto, by covalent bonds, antibodies for binding a specific antigen.

4,059,686

PHARMACEUTICAL PREPARATION FOR ORAL CAVITY ADMINISTRATION

Wataru Tanaka, Hoya; Eiichiro Akito, Omiya; Koichi Yoshida, Soka; Takashi Terada, Yono, and Hiroshi Ninomiya, Sayama, all of Japan, assignors to Nippon Kayaku Kabushiki Kaisha, Tokyo, Japan

Filed Sept. 22, 1975, Ser. No. 615,301

Claims priority, application Japan, Sept. 24, 1974, 49-108891

Int. Cl.[2] A61K *9/22, 31/78, 31/45, 9/26*

U.S. Cl. 424—19 8 Claims

1. A pharmaceutical preparation for oral cavity administration comprising 10 to 60% by weight of sodium polyacrylate, 90 to 10% by weight of a pharmaceutical carrier selected from the group consisting of an excipient and ointment, and 50 to 0.05% by weight of a pharmacologically active agent.

4,059,687

ESTER SUBSTITUTED DIBIGUANIDES AND NON-TOXIC ANTIMICROBIAL COMPOSITIONS THEREOF

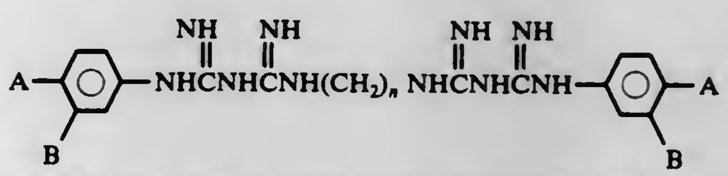
Robert Andrew Bauman, New Brunswick, N.J., assignor to Colgate Palmolive Company, New York, N.Y.

Filed Nov. 26, 1976, Ser. No. 745,511

Int. Cl.[2] A01N *9/24;* A61K *7/22;* C07C *129/16*

U.S. Cl. 424—54 9 Claims

1. A dibiguanide compound free of toxic substances having the structural formula:



wherein one of A and B is hydrogen and the other is the ester radical

$$\mathrm{RO\overset{\displaystyle O}{\overset{\|}{C}}-}$$

and R is an alkyl group containing 1-8 carbon atoms and *n* is an integer from 5 to 12; and the acid salts thereof selected from the group consisting of HCl, HBr, HI, HF, H_2SO_4, CH_3COOH, gluconic acid, H_2PO_3F and H_3PO_4.

9. A non-toxic composition containing an effective antimicrobial amount of the compound defined in claim 1 admixed with an oral preparation.

4,059,688

HAIR FIXING COMPOSITIONS CONTAINING FLUOROTERPOLYMERS AND METHOD

Ira E. Rosenberg, West Norwalk; John A. Ferguson, Darien, and Norman P. Loveless, Fairfield, all of Conn., assignors to Clairol Incorporated, New York, N.Y.

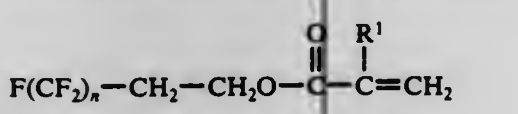
Filed June 29, 1976, Ser. No. 701,006

Int. Cl.² A61K *7/11*

U.S. Cl. 424—71 **18 Claims**

1. A process for fixing hair which comprises applying thereto an effective amount of a hair fixing composition comprising a vehicle containing an effective hair fixing amount of at least one fluoroterpolymer; said fluoroterpolymer having a molecular weight of the order of 10^3 to 10^6 consisting essentially by weight of:

a. 60 to 85% of at least one ester of the formula:



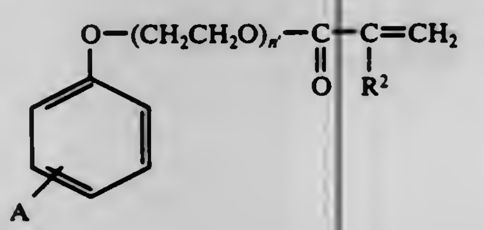
(I)

in which:

i. *n* is a number having an average value of from 3 to 20; and

ii. R^1 is hydrogen or lower alkyl having 1 to 4 carbons;

b. 10 to 30% of an ester of formula:



(II)

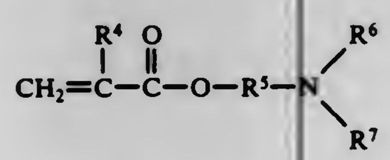
in which:

i. A is alkyl having 5 to 15 carbons;

ii. *n'* is a whole number having an average value of about from 20 to 45; and

iii. R^2 is hydrogen or lower alkyl having 1 to 4 carbons;

c. 2 to 10% of an amine ester of formula:



(III)

or the N-oxide or quaternary amine salt thereof in which:

i. R^4 is hydrogen or lower alkyl having 1 to 4 carbons;

ii. R^5 is a divalent straight chain or branched chain aliphatic hydrocarbon radical having 1 to 6 carbons; and

iii. R^6 and R^7 are lower alkyl having 1 to 4 carbons.

4,059,689

ATTRACTANT FOR BEET WEBWORM MOTHS

Dean L. Struble, and Charles E. Lilly, both of Lethbridge, Canada, assignors to Canadian Patents and Development Limited, Ottawa, Canada

Filed Jan. 24, 1977, Ser. No. 762,142

Claims priority, application Canada, Feb. 5, 1976, 245075

Int. Cl.² A01N *17/14*

U.S. Cl. 424—84 **4 Claims**

1. A composite insect attractant for male moths of the beet webworm (*Loxostege sticticalis*) comprising

a. E-11-tetradecen-1-ol acetate and

b. a compound from the group dodecan-1-ol acetate, dodecan-1-ol, tetradecan-1-ol, E-11-tetradecen-1-ol and E-11-tetradecenal with (b) being present in small amounts enhancing the attractancy and species specificity of (a) to beet webworm moths, said amounts being from about 2 to about 10% by wt. of the mixture for the dodecyl compounds, and from about 10 to about 30% by wt. of the mixture for the tetradecyl compounds.

4,059,690

TOPICAL LIQUID OR OINTMENT

Walter Mont, 8655 N. Miami, Miami, Fla. 33150

Filed Feb. 2, 1977, Ser. No. 764,850

Int. Cl.² A61K *31/60, 31/045, 33/18*

U.S. Cl. 424—150 **2 Claims**

1. A liquid to be applied topically comprising 90 parts by volume of tincture of iodides, 10 parts of menthol crystals liquefied in the tincture of iodides and 1 to 1½ parts of salicylic acid and 1½ parts of menthyl salicylate, said ingredients being thoroughly mixed to be topically applied.

4,059,691

METHOD OF REDUCING THE INCIDENCE OF INFECTIOUS DISEASES AND RELIEVING STRESS IN LIVESTOCK

John Wesley Willard, Sr., Rapid City, S. Dak., assignor to Caw Industries, Inc., Rapid City, S. Dak.

Continuation-in-part of Ser. No. 712,158, Aug. 6, 1976, Pat. No. 4,029,770, and Ser. No. 593,712, July 7, 1975, said Ser. No. 712,158, is a division of Ser. No. 455,022, March 26, 1974, Pat. No. 3,984,540, said Ser. No. 593,712, is a continuation-in-part of Ser. No. 317,097, Dec. 20, 1972, Pat. No. 3,893,943, which is a continuation of Ser. No. 108,198, Jan. 20, 1971, abandoned. This application Nov. 1, 1976, Ser. No. 737,513

Int. Cl.² A61K *33/12, 33/06, 33/00*

U.S. Cl. 424—155 **22 Claims**

1. A method of reducing the incidence of infectious disease in livestock or relieving stress in livestock comprising providing the livestock with drinking water containing a catalytically effective amount of a catalyst, the said catalyst being prepared by a process comprising

admixing a water soluble alkali metal silicate with an aqueous medium containing a dissolved substance which is a source of calcium ion and a dissolved substance which is a source of magnesium ion,

the aqueous medium containing said dissolved substances in amounts to provide between about 1×10^{-4} and 1×10^{-1} mole per liter each of calcium ion and magnesium ion,

the aqueous medium containing said dissolved substances in amounts to provide a molar ratio of calcium ion to magnesium ion between about 2.0:1.0 and 1.0:2.0,

the alkali metal silicate having an alkali metal oxide to silicon dioxide ratio between about 0.9:1.0 and less than 2.0:1.0 and being admixed with the aqueous medium in an amount of about 0.05-2 moles per liter,

reacting the alkali metal silicate with said dissolved substances providing calcium ion and magnesium ion to produce an aqueous suspension of finely divided particles of the reaction product,

admixing a micelle-forming surfactant with the aqueous medium in an amount to form catalyst micelles comprising said finely divided particles upon agitating the aqueous medium, and

agitating the aqueous medium containing the finely divided particles and surfactant to form said catalyst micelles.

4,059,692

TREATING IMPAIRED CONSCIOUSNESS WITH GLUTAMYL-L-HISTIDYL-L-PROLINAMIDE

Yoshinao Takahashi, Kobe, and Kazuo Takeuchi, Tokyo, both of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed Mar. 22, 1976, Ser. No. 669,455

Claims priority, application United Kingdom, Apr. 3, 1975, 13652/75; Nov. 26, 1975, 48557/75

Int. Cl.² A61K *37/00*

U.S. Cl. 424—177 **5 Claims**

1. A method for the treatment of a human patient with impaired consciousness due to cranial trauma, brain surgery, cerebrovascular disorder, or brain tumor, which comprises

administering to such patient an effective amount of L-pyroglutamyl-L-histidyl-L-prolinamide or a physiologically acceptable salt thereof.

4,059,693

ANALGESIC ACTION OF SUBSTANCE P

John M. Stewart, Denver, Colo., assignor to University Patents, Inc., Stamford, Conn.

Filed June 11, 1976, Ser. No. 694,974

Int. Cl.² C07C *103/52;* **A61K** *37/00*

U.S. Cl. 424—177 **4 Claims**

1. Method for the production of analgesia in mammals requiring such therapy which comprises administering by injection an amount of effective to produce analgesia within the range of about 0.1 to about 50 micrograms per kg. of body weight of a compound selected from the group consisting of Substance P, and salts thereof of a pharmaceutically acceptable acid.

4,059,694

CARDIOTONIC AGENT

Ted R. Norton; Shoji Shibata, and Midori Kashiwagi, all of Honolulu, Hawaii, assignors to The University of Hawaii, Honolulu, Hawaii

Continuation-in-part of Ser. No. 683,446, May 5, 1976, abandoned. This application Aug. 2, 1976, Ser. No. 710,534

Int. Cl.² A61K *37/00;* **C07C** *103/52*

U.S. Cl. 424—177 **8 Claims**

1. A peptide according to claim 1 having the amino acid sequence: Gly-Val-Ser-Cys-Leu-Cys-Asp-Ser-Asp-Gly-Pro-Ser-Val-Arg-Gly-Asn-Thr-Leu-Ser-Gly-Thr-Leu-Trp-Leu-Tyr-Pro-Ser-Gly-Cys-Pro-Ser-Gly-Trp-His-Asn-Cys-Lys-Ala-His-Gly-Pro-Thr-Ile-Gly-Trp-Cy-Cys-Lys-Gln.

4,059,695

METHOD FOR MANUFACTURING A TONIC COMPOSITION FOR MAN AND OTHER ANIMALS

Kanari Hirosaki, and Shin Hirosaki, both of Miyazaki, Japan, assignors to Kanari Hirosaki, Japan

Continuation-in-part of Ser. No. 481,235, June 20, 1974, abandoned. This application Feb. 17, 1976, Ser. No. 658,813

Claims priority, application Japan, Feb. 14, 1974, 49-017112

Int. Cl.² A61K *31/78*

U.S. Cl. 424—195 **26 Claims**

1. A method for manufacturing a composition, comprising:

a. preparing wood vinegar by heating and cooling chips of wood and bark and then allowing said wood vinegar to stand at rest and separate into two layers, removing the supernatant layer, washing the supernatant with benzene and then distilling the washed supernatant thereby obtaining refined wood vinegar free of soluble tars unsuitable for ingestion by man or other animals;

b. immersing in said refined wood vinegar leaves of plants in an amount in the range of about 0.1 to 10 parts by weight per 100 parts of said refined wood vinegar, said leaves comprising:

85 — 100% by weight comfrey leaves

0 — 15% by weight bamboo leaves

0— 15% by weight garden radish leaves

0 — 15% by weight matrimony vine leaves

c. allowing said leaves to be permeated and fermented by said refined wood vinegar causing extracts from said leaves to be removed by said refined wood vinegar,

and d. filtering the refined wood vinegar containing said extracts thereby removing solid remains of said leaves and obtaining a composition.

4,059,696

PYRIMIDINE (4,6)DIYL-BIS-(THIONO)(THIOL)-PHOSPHORIC(PHOSPHONIC)ACID ESTERS

Fritz Maurer; Hans-Jochem Riebel, both of Wuppertal; Ingeborg Hammann, Cologne; Wolfgang Behrenz, Overath-Steinenbrueck, and Bernhard Homeyer, Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

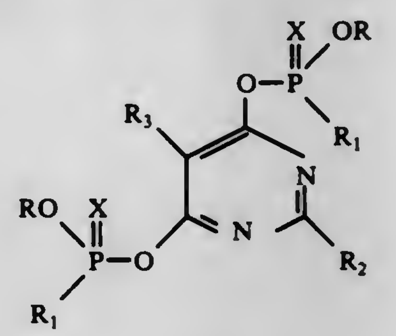
Filed May 11, 1976, Ser. No. 685,241

Claims priority, application Germany, May 27, 1975, 2523324

Int. Cl.² A01N *9/36;* **C07F** *9/65*

U.S. Cl. 424—200 **10 Claims**

1. A pyrimidine (4,6)diyl-bis-(thiono) (thiol)-phosphoric (phosphonic) acid ester of the formula



in which

R is alkyl with 1 to 6 carbon atoms,

R_1 is alkyl, alkoxy or alkylmercapto each with 1 to 6 carbon atoms or phenyl,

R_2 is alkyl, alkoxy or alkylmercapto each with 1 to 5 carbon atoms, hydrogen or phenyl,

R_3 is hydrogen, alkyl with 1 to 4 carbon atoms or halogen, and

X is oxygen or sulfur.

8. An insecticidal or acaricidal composition containing as active ingredient an insecticidally or acaricidally effective amount of a compound according to claim 1 in admixture with a diluent.

9. A method of combating insects or acarid pests which comprises applying to the pests or a habitat thereof an insecticidally or acaricidally effective amount of a compound according to claim 1.

4,059,697

N-(SUBSTITUTED)AMINOCARBONYL O,S-DIALKYL PHOSPHORAMIDO(DI)THIOATES AND METHOD OF CONTROLLING ARTHROPODS

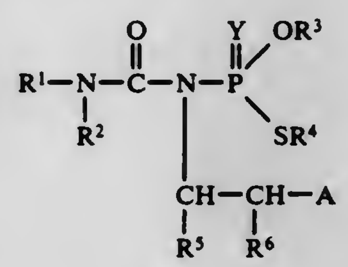
Janet Ollinger, North Wales, Pa., assignor to Rohm and Haas Company, Philadelphia, Pa.

Filed Mar. 1, 1976, Ser. No. 662,746

Int. Cl.² A01N *9/36;* **C07F** *9/24*

U.S. Cl. 424—211 **16 Claims**

1. A compound of the formula:



wherein

A is

a. a halogen atom,

b. a cyano group,

c. a (C_1-C_6)alkoxy group,

d. a (C_1-C_6)alkylthio group,

e. a (C_1-C_6)alkylcarbonyloxy group,

f. a phenoxy group, or

g. a phenylthio group;

R^1 is

a. a (C_1-C_{12})alkyl group,

b. a (C_3-C_8)cycloalkyl group,

c. an unsubstituted (C_7-C_{11})aralkyl group or a (C_7-C_{11})aralkyl group, the aryl portion of which is substituted with up to five substituents selected from the group consisting of (C_1-C_6)alkyl, (C_3-C_7)alkenyl, (C_1-C_6)alkoxy, (C_1-C_6)alkylthio, (C_1-C_6)alkylsulfinyl, (C_1-C_6)alkylsulfonyl, (C_1-C_6)alkylcarbonyl, di(C_1-C_3)alkylamino, (C_1-C_3)alkylcarbonylamino, (C_6-C_{10})aryl, (C_6-C_{10})aryloxy, (C_6-C_{10})arylthio, cyano, nitro, halogen and halomethyl,

d. an unsubstituted (C_6-C_{10})aryl group or a (C_6-C_{10})aryl group substituted with up to five substituents selected from the group consisting of (C_1-C_6)alkyl, (C_3-C_7)alkenyl, (C_1-C_6)alkoxy, (C_1-C_6)alkylthio, (C_1-C_6)alkylsulfinyl, (C_1-C_6)alkylsulfonyl, (C_1-C_6)alkylcarbonyl, di(C_1-C_3)alkylamino, (C_1-C_3)alkylcarbonylamino, (C_6-C_{10})aryl, (C_6-C_{10})-arylthio, cyano, nitro, halogen and halomethyl,

R^2 is a hydrogen atom or a (C_1-C_4)alkyl group when A is a halogen atom, and a hydrogen atom when A is other than a halogen atom;

R^3 is a (C_1-C_6) alkyl group;

R^4 is a (C_1-C_6)alkyl group; R^5 and R^6 are independently hydrogen atoms or (C_1-C_4)alkyl groups; and

Y is an oxygen or sulfur atom.

12. A method of controlling arthropods which comprises applying directly to the arthropods or to the loci to be freed of or protected from attack by such arthropods, an arthropodicidally effective amount of the compound of claim 1.

4,059,698

PESTICIDAL COMPOSITIONS SUITABLE FOR SPREADING FROM AIRCRAFT

Franco Pinamonti, and Sergio Maccone, both of Milan, Italy, assignors to Montecatini Edison S.p.A., Milan, Italy

Continuation of Ser. No. 798,782, Feb. 12, 1969, abandoned. This application Feb. 28, 1974, Ser. No. 447,011

Claims priority, application Italy, Feb. 14, 1968, 12725/68

Int. Cl.² A01N *9/36*

U.S. Cl. 424—211 **4 Claims**

1. Liquid pesticide composition suitable for being spread from aircraft containing a solution of N-monomethylamide of the O,O-dimethyldithiophosphoryl acetic acid in a mixture of a phenolic material selected from the group consisting of phenol, cresols, xylenols and mixtures thereof, and a mixture of aromatic and aliphatic hydrocarbons having a distillation starting point at atmospheric pressure above 150° C, a flammability point above 45° C, an aliphatic hydrocarbon content of from 0 to 35% and an aromatic hydrocarbon content of 65 to 100%, said solution being composed of at least 2% N-monomethylamide of the O,O dimethyldithiophosphoryl acetic acid, 0.5–50% of said phenolic material, and the remainder said mixture of aromatic and aliphatic hydrocarbons, said composition being stable at 0° C.

4,059,699

O,O-DIETHYL-O-CARBOXAMIDOPHOSPHATE ESTERS AND USE TO COMBAT INSECTS AND MITES

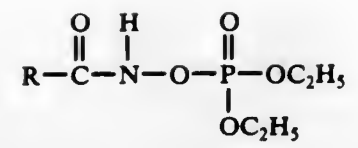
Gary M. Singerman, Allegheny County, Pa., assignor to Gulf Oil Corporation, Pittsburgh, Pa.

Division of Ser. No. 575,866, May 9, 1975, Pat. No. 3,994,997. This application June 7, 1976, Ser. No. 693,678

Int. Cl.² A01N *9/36*

U.S. Cl. 424—211 **11 Claims**

1. A method of combating insects and mites comprising applying to the locus of the insects and mites an effective amount, sufficient to kill a majority of said insects and mites of a compound of the structural formula:



in which R is selected from the group consisting of tert.butyl; 3,5-dimethylphenyl; 1-methyl-1-phenylthioethyl; 1-methyl-1-methylthioethyl; 1-cyclohexylthio-1-methylethyl; 1-cyclohexylthiopropyl; 1-ethylthio-1-methylethyl; 1-ethylthiopropyl and 1-ethylthioethyl.

4,059,700

DERMAL TOXICITY OF SOLID COMPOSITIONS CONTAINING A MONTMORILLONITE TYPE OF CLAY AND AN ORGANOPHOSPHORUS PESTICIDE

Alexander David Lindsay, East Brunswick, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Filed Feb. 17, 1976, Ser. No. 658,152

Int. Cl.² A01N *9/36*

U.S. Cl. 424—216 **3 Claims**

1. A composition possessing good insecticidal or nematocidal activity and low mammalian toxicity comprising (a) from 80% to 95%, by weight, of a montmorillonite type of clay consisting of 2:1 type of crystal lattice and containing 68% to 72.5%, by weight, of silica (SiO_2), 5% to 7%, by weight, of iron oxide (Fe_2O_3), 11% to 15%, by weight, of aluminum oxide (Al_2O_3), said clay being calcined at a temperature range from about 600° to about 1300° F, and (b) from 20% to 5%, by weight, of O,O-diethyl S-[(1,1-dimethylethyl)thio]phosphorodithioate.

4,059,701

15-SUBSTITUTED PROSTANOIC ACIDS FOR TREATING BRONCHIAL SPASM

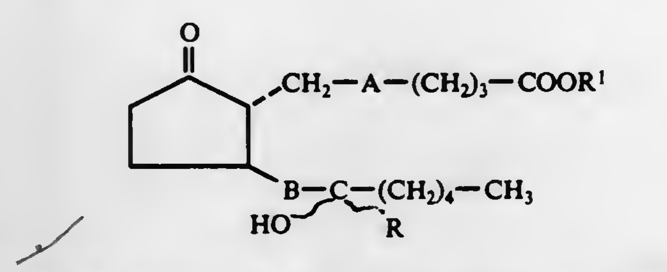
Donald Peter Strike, St. Davids, Pa., assignor to American Home Products Corporation, New York, N.Y.

Division of Ser. No. 569,026, April 17, 1975, Pat. No. 4,022,821, which is a division of Ser. No. 462,006, April 18, 1974, abandoned, which is a continuation-in-part of Ser. No. 383,007, July 26, 1973, Pat. No. 3,922,302. This application Apr. 19, 1976, Ser. No. 678,085

Int. Cl.² A61K *31/495, 31/215, 31/19*

U.S. Cl. 424—250 **2 Claims**

1. A process for relieving bronchial spasm and facilitating breathing in warm-blooded animals which comprises administering to a warm-blooded animal in need thereof an amount sufficient to relieve bronchial spasm and facilitate breathing in said warm-blooded animal of a prostanoic acid of the formula:



wherein R is ethynyl, A is —CH_2—CH_2— and B is —CH_2—CH_2—; R is ethynyl, A is —CH_2—CH_2—, and B is trans —CH =CH—; or R is ethynyl, A is cis —CH=CH—; and B is trans —CH=CH—; and R^1 is hydrogen, alkyl of from 1 to about 6 carbon atoms, alkali metal, or a pharmacologically acceptable cation derived from ammonia or a basic amine.

4,059,702

3,8-BIS-BASIC ETHERS OF 6H-DIBENZO[b,d]PYRAN-6-ONE

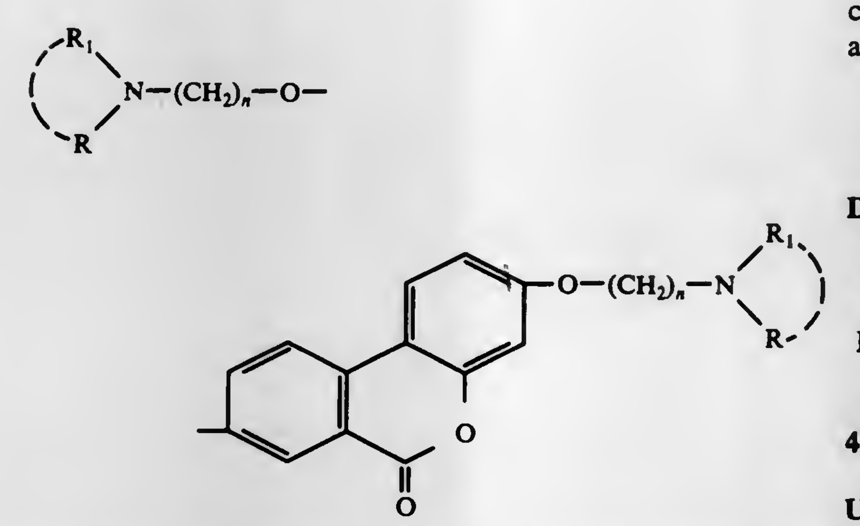
Donald R. Meyer, Goshen, Ohio, assignor to Richardson-Merrell Inc., Wilton, Conn.

Division of Ser. No. 317,237, Dec. 21, 1972, abandoned. This application Nov. 11, 1976, Ser. No. 740,806

Int. Cl.² C07D *413/14, 311/80;* **A61K** *31/365*

U.S. Cl. 424—248.55 **7 Claims**

1. A 3,8-bis-basic ether of 6H-dibenzo[b,d]pyran-6-one having the formula:



wherein *n* is an integer of from 2 to 6; R and R_1 are each selected from the group consisting of hydrogen, lower alkyl having from 1 to 6 carbon atoms, cycloalkyl having from 3 to 6 carbon atoms, alkenyl having from 3 to 6 carbon atoms in which the unsaturation is in a position other than the 1-position of the alkenyl group, and when R and R_1 are taken together with the nitrogen atom to which they are attached represent the pyrrolidinyl, piperidino or morpholino group; and the pharmaceutically acceptable acid addition salts thereof.

4. A method of preventing viral infections which comprises the daily prophylactic administration of from 0.1 milligrams to 500 milligrams per kilogram of body weight of a compound of claim 1 to a host susceptible to infection by pathogenic viral agents.

4,059,703

PESTICIDAL COMPOUNDS, PROCESSES AND COMPOSITIONS

Raymond Alexander Burrell, Camberley, and John Michael Cox, Wokingham, both of England, assignors to Imperial Chemical Industries Limited, London, England

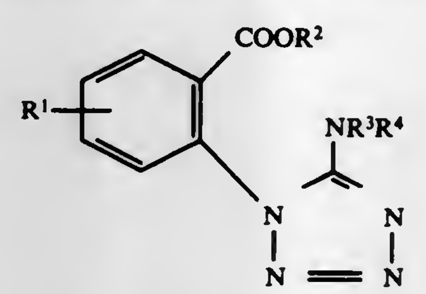
Filed Aug. 6, 1976, Ser. No. 712,378

Claims priority, application United Kingdom, Aug. 19, 1975, 34507/75

Int. Cl.² A61K *31/445;* **C07D** *257/04*

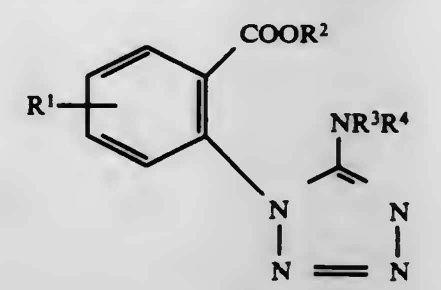
U.S. Cl. 424—269 **7 Claims**

1. A tetrazole derivative having the structural formula:



where R^1 is hydrogen or chlorine, R^2 and R^3 are hydrogen or alkyl containing 1 to 4 carbon atoms; R^4 is hydrogen, alkyl containing from 1 to 4 carbon atoms, cyclohexyl or acetyl; and salts thereof.

3. A process for combating fungi which comprises contacting said fungi or a locus thereof with an effective amount of a tetrazole derivative which has the formula:



where R^1 is hydrogen or chlorine, R^2 and R^3 are hydrogen or alkyl containing 1 to 4 carbon atoms; R^4 is hydrogen, alkyl containing from 1 to 4 carbon atoms, cyclohexyl or acetyl; or a salt thereof.

4,059,704

TETRAZOLE COUMARIN DERIVATIVES

Derek Richard Buckle, Redhill; Barrie Christian Charles Cantello, Horsham, and Harry Smith, Maplehurst, near Horsham, all of England, assignors to Beecham Group Limited, Great Britain

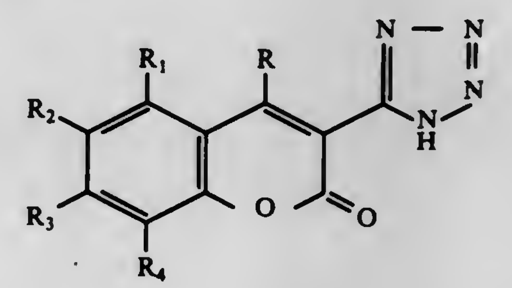
Division of Ser. No. 508,749, Sept. 24, 1974, abandoned. This application Apr. 1, 1976, Ser. No. 672,753

Claims priority, application United Kingdom, Oct. 11, 1973, 47484/73

Int. Cl.² A61K *31/41;* **C07D** *257/04*

U.S. Cl. 424—269 **27 Claims**

1. A method for the prophylaxis of asthma, hay-fever and rhinitis in humans which comprises administering to a human in need thereof orally, parenterally or by insufflation a compound of the formula



or a pharmaceutically acceptable salt thereof wherein R is lower alkyl, cyclopentyl, cyclohexyl, cycloheptyl or phenyl; R_1, is R_2, R_3 and R_4 are the same or different and each is hydrogen, lower alkyl, lower alkoxy, halogen, cyclohexyl, phenyl or benzyl; provided that when each of R_1, R_2, R_3 and R_4 is hydrogen, then R is not methyl, in an amount sufficient to be effective for the prophylaxis of asthma, hay-fever or rhinits, in combination with a pharmaceutically acceptable diluent or carrier suitable for said administration form.

4,059,705

DERIVATIVES OF SUBSTITUTED N-ALKYL IMIDAZOLES

Keith A. M. Walker, Palo Alto, Calif., assignor to Syntex (U.S.A.) Inc., Palo Alto, Calif.

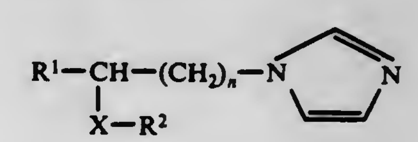
Continuation-in-part of Ser. No. 599,616, July 28, 1975, abandoned. This application Mar. 8, 1976, Ser. No. 665,024

Int. Cl.² A61K *31/415;* **C07D** *233/60*

U.S. Cl. 424—273 R **33 Claims**

1. A compound of the formula

(I)

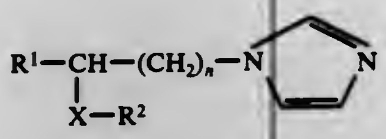


wherein X is sulfur, *n* is 1 or 2, and R^1 and R^2 are each indepen-

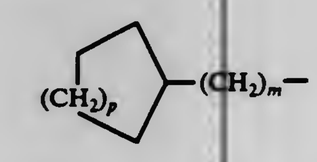
dently straight chain alkyl of from 1 to 12 carbon atoms such that the total number of carbon atoms in R^1 and R^2 is between 7 and 18; and the antimicrobial acid addition salts thereof.

31. A method of inhibiting the growth of fungi, bacteria or protozoa which comprises applying to a host object containing, or subject to attack by, fungi, bacteria or protozoa, an effective amount of a compound of the formula

(I)



wherein R^1 and R^2 are each independently alkyl of from 1 to 12 carbon atoms, cyclohexyl substituted with from one to three lower alkyl groups each having from 1 to 4 carbon atoms, or a group of the formula



wherein m is an integer of from 0 to 3 and p is an integer of from 1 to 3; X is sulfur or oxygen; n is an integer of from 1 to 8; or an antimicrobial acid addition salt thereof; or a composition containing same as an active ingredient.

4,059,706

SPRAY-DRIED L-ASPARTIC ACID DERIVATIVES

LaMonte D. Pischke, and Myron D. Shoaf, both of Danbury, Conn., assignors to General Foods Corporation, White Plains, N.Y.

Continuation-in-part of Ser. No. 448,845, March 7, 1974, Pat. No. 3,962,468. This application Feb. 14, 1975, Ser. No. 550,084

The portion of the term of this patent subsequent to Mar. 8, 1993, has been disclaimed.

Int. Cl.² A23L *1/236*

U.S. Cl. 426—548 **18 Claims**

1. A process for fixation of sweet L-aspartic acid derivative dipeptide compounds which comprises forming a dispersion containing a slurry of undissolved particles of said sweetening compound in an aqueous solution of encapsulating agent, the level of said undissolved sweetening compound solids being in excess of the total sweetening solids of said compounds in solution in said dispersion and the dispersion being maintained at a temperature low enough to assure the existence of at least a part of the sweetening compound as discretely distributed undissolved particles, and drying said dispersion to a moisture content below 5% and a density greater than 0.2 grams per cc. to encapsulate the particles of said sweetening compound in said encapsulating agent.

4,059,707

METHOD OF FILLING APERTURES WITH CRYSTALLINE MATERIAL

Roland Wright Smith, and Arnold Robert Moore, both of Princeton, N.J., assignors to RCA Corporation, New York, N.Y.

Filed Aug. 29, 1975, Ser. No. 609,005

Int. Cl.² B05D *3/06*

U.S. Cl. 427—35 **9 Claims**

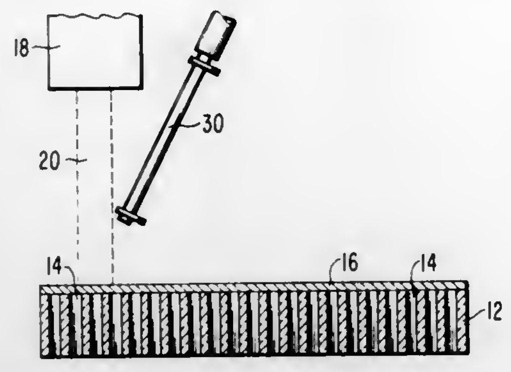
1. A method for filling a plurality of tiny apertures in a sheet with a transparent crystalline material comprising:

coating one surface of the sheet having aperture openings with a layer of the crystalline material;

heating the layer with a localized heat source so that a portion of the layer melts and flows into some of the apertures;

scanning the layer with the heat source so that the crystalline material flows into all of the apertures to be filled; and

bias heating the entire sheet to a temperature below the melting point of the crystalline material during the heating and scanning steps so that the material in each aperture



recrystallizes to form a transparent substantially single crystalline mass.

4,059,708

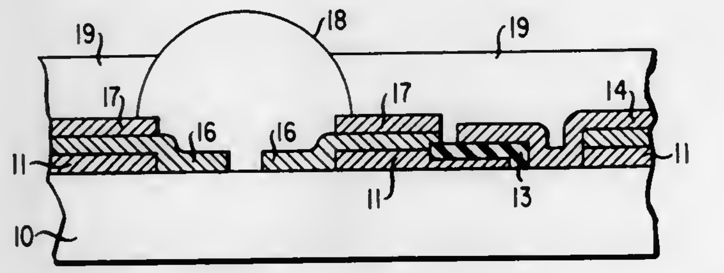
METHOD FOR SELECTIVE ENCAPSULATION

John Herbert Heiss, Jr., Bethlehem, Pa., and Joel Mark Schoen, Freehold, N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed July 30, 1976, Ser. No. 710,010

Int. Cl.² B05D *1/32*

U.S. Cl. 427—96 **5 Claims**



1. A method of selectively encapsulating a solid state integrated circuit formed on an insulating board comprising the steps of:

depositing on a selected area of the circuit a mask in the form of a stable droplet in a dome configuration with a height within the range 30–50 mils, said mask comprising a water soluble polymer which is inert to the organic solvents included in the encapsulant;

applying an encapsulating material comprising a room temperature vulcanizing silicone rubber dissolved in an organic solvent to said circuit by flow coating the material over the area of the circuit not covered by said mask;

curing said encapsulating material; and

dissolving said polymer material by applying water thereto so as to expose the area of the circuit covered by said polymer and leave encapsulating material on the remaining area of the circuit.

4,059,709

PROCESSES OF APPLYING URETHANE TOP COATINGS TO RESILIENT FLOOR COVERINGS

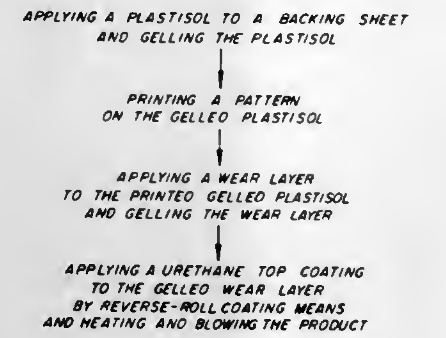
Robert P. Conger, Park Ridge, N.J., and Vincent F. Pogozelski, Newtown, Pa., assignors to Congoleum Corporation, Kearny, N.J.

Filed May 21, 1976, Ser. No. 688,804

Int. Cl.² B05D *1/36, 3/00, 5/00*

U.S. Cl. 427—264 **10 Claims**

1. In a process for manufacturing a resilient, resinous floor covering having an embossed polyurethane surface coating, the inline manufacturing improvement which comprises: applying to a foamable resinous sheet material a urethane coating composition having a viscosity in the range of from about 10 centipoises to about 100 centipoises, the application of said urethane coating composition being accomplished by a reverse-roll coating procedure wherein the casting ratio is in the range of from about 0.8:1 to about 1.1:1; and then, in an in-line manufacturing step, heating said coated, foamable, resinous sheet material to dry and cure and harden said urethane coating composition and subsequently to blow said foamable, resinous sheet material to form a resilient, resinous floor covering having an embossed polyurethane surface coating, the extent



of the curing and hardening of said urethane coating composition being controlled so as not to exceed about 80% during the heating and before the beginning of the blowing of said foamable, resinous sheet material, whereby the curing and hardening of said urethane coating composition does not proceed too far as to interfere with the subsequent formation of the embossed effects.

4,059,710

PROCESS FOR PLATING SHAPED ARTICLES MADE OF SYNTHETIC RESINS

Keizo Nishiyama, Handa; Sadao Maeda, Okazaki, and Kohshi Iwata, Tokai, all of Japan, assignors to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho and Kabushiki Kaisha Maeda Shell Service, both of, Japan

Filed July 2, 1976, Ser. No. 702,098

Claims priority, application Japan, July 2, 1975, 50-82129

Int. Cl.² C23C *3/02*

U.S. Cl. 427—307 **11 Claims**

1. Process for plating a casting tool of a synthetic resin, comprising the steps of:

a. applying an adhesive agent over the surface of a master pattern used to shape said article;
b. diffusing fine metal particles or pieces of non-uniform particle size over the layer of adhesive agent to cause said particles or pieces to settle densely over the surface of the master pattern;
c. pouring said synthetic resin in a molten state in order to shape the casting tool further over said adhesive agent;
d. solidifying the synthetic resin;
e. separating the solidified synthetic resin from the master pattern;
f. removing the adhesive agent to expose surfaces of the metal particles or pieces;
g. etching the exposed surfaces of the metal particles or pieces; and
h. chemically plating metal over the surface of the article.

4,059,711

PARTIALLY ALLOYED GALVANIZE PRODUCT AND METHOD

George M. Mino, Hamburg, and Donald L. Dustin, Elma, both of N.Y., assignors to Bethlehem Steel Corporation, Bethlehem, Pa.

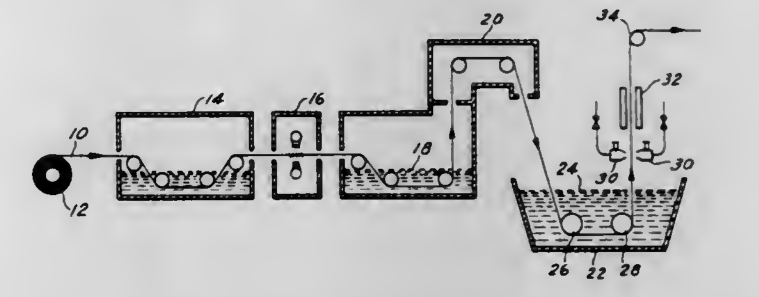
Filed May 14, 1976, Ser. No. 686,961

Int. Cl.² C23C *1/02*

U.S. Cl. 427—310 **10 Claims**

1. A process for producing an improved galvanized coating on a ferrous strand, which coating is characterized by an iron-zinc intermetallic layer consisting essentially of the zeta phase and a surface layer of free zinc, said process comprising:

a. cleaning said ferrous strand to remove oxides therefrom,
b. protecting said ferrous strand against reoxidation by the application of a flux to the oxide free surfaces of said strand,
c. heating said ferrous strand to a temperature sufficient to dry said flux in situ without burning such flux off the said ferrous strand prior to its immersion in a galvanizing bath,
d. immersing said heated and oxide free ferrous strand in a molten galvanizing bath containing at least 0.15% aluminum, by weight, balance essentially zinc maintained at a temperature of at least 900° F (482° C) to produce a coat-



ing on said ferrous strand of between 0.2 to 0.5 oz. per square foot of strand,

e. subjecting said ferrous strand having such galvanized coating thereon to a controlled heat treatment at a temperature below the melting point of zinc for a period of time to promote the development of the zeta phase, wherein the average iron content of such galvanized coating is at least 2% but less than 4%, by weight, and
f. cooling said galvanized coated ferrous strand.

4,059,712

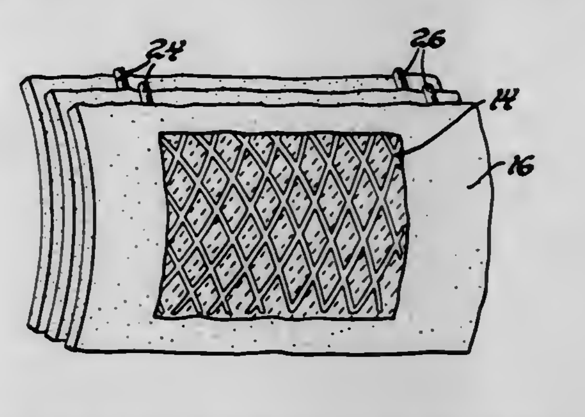
METAL-CERAMIC COMPOSITE AND METHOD FOR MAKING SAME

Bruce E. Bothwell, 6077 Wellesley Court, W. Bloomfield, Mich. 48033

Filed Jan. 26, 1976, Ser. No. 652,008

Int. Cl.² B32B *17/00;* D03D *13/00;* B05D *3/02;* C04B *33/34*

U.S. Cl. 428—36 **9 Claims**



1. A high temperature insulation of a metalceramic composite comprising a rigid metal wall, a monolithic, layer of ceramic positioned adjacent the metal wall and having imbedded therein a metal grid including openings of substantially the same size and shape, said composite having been made by coating said metal grid so as to fill the grid openings with ceramic slurry to provide a layer of the ceramic having imbedded therein said metal grid, heating said layer of ceramic with said metal grid therein to a temperature at which the ceramic forms into a monolithic ceramic body, and thereafter cooling said ceramic body with said metal grid therein, said metal grid having a melting temperature higher than said temperature at which said ceramic forms into said monolithic ceramic body and said metal grid having a higher coefficeint of thermal expansion than that of said ceramic, and said grid openings having a size of from about one-sixty-fourth inch to three-eighth inch and the aggregate area of the openings constituting from about 30% to 80% of the total area fo the grid.

4,059,713

EXTRUDED PLASTICS NET OR MESH STRUCTURES

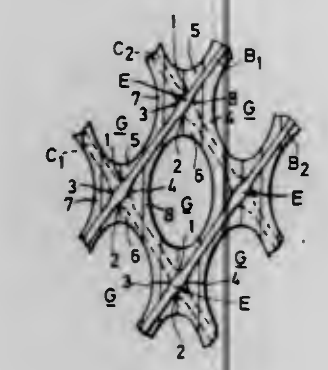
Frank Brian Mercer, Blackburn, England, assignor to Netlon Limited, Blackburn, England

Filed Aug. 23, 1976, Ser. No. 716,560

Claims priority, application United Kingdom, Sept. 5, 1975, 36729/75

Int. Cl.² B32B *5/12*

U.S. Cl. 428—36 **3 Claims**



1. A mesh structure of extruded plastics material having mesh openings each of which is a six-sided figure bounded on four sides by portions of four separate molecularly orientated mesh strands and on two oppositely disposed sides by molecularly oriented strandlike members comprising confluent portions of pairs of said four strands wherein at opposite ends of each strandlike member there is provided in and across the included angle of the crotch between each pair of strands which merge into the confluent portion and integral therewith a web to inhibit longitudinal splitting or tearing of the strandlike member.

4,059,714

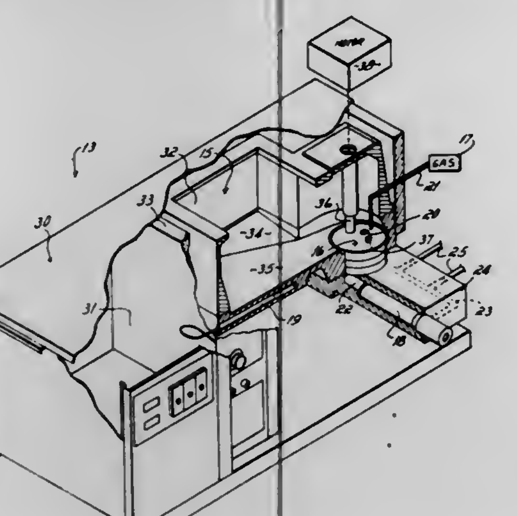
HOT MELT THERMOPLASTIC ADHESIVE FOAM SYSTEM

Charles H. Scholl, Vermilion; John R. Janner, Jr., Lorain, and William C. Stumphauzer, Elyria, all of Ohio, assignors to Nordson Corporation, Amherst, Ohio

Filed Aug. 2, 1976, Ser. No. 710,377

Int. Cl.² B32B *5/18*

U.S. Cl. 428—310 **36 Claims**



1. The method of bonding with a hot melt thermoplastic adhesive foam which comprises,

heating solid thermoplastic adhesive to convert it to a liquid state,

mechanically agitating the liquid adhesive in the presence of a gas so as to obtain a mixture of said gas in the liquid adhesive,

pressurizing the mixture of liquid and gas so as to force the gas into solution with the liquid adhesive,

dispensing the liquid and gas solution at atmospheric pressure whereby said gas is released from solution and forms a hot adhesive foam, and

compressing said hot adhesive foam between two substrates to force gas from the foam and to form a bond between said substrates.

4,059,715

ADHESIVE COMPOSITION AND SHEET-LIKE PRODUCT FORMED THEREWITH

Wayne A. Pletcher, Roseville, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation-in-part of Ser. No. 591,935, June 30, 1975, abandoned. This application June 25, 1976, Ser. No. 699,976

Int. Cl.² C09J *7/02*

U.S. Cl. 428—349 **34 Claims**

1. A sheet backing provided on at least one major surface with a thermoplastic, coherent layer which essentially comprises a segmented copolyester capable of forming a strong, dependable bond to a substrate at a temperature below its melting temperature and without the involvement of volatiles consisting essentially of from about 5 to 75 percent by weight of amorphous ester units and 95 to 25 percent by weight of crystallizable ester units joined through ester linkages, the crystallizable ester units being of the formula:

$$-\overset{O}{\overset{\|}{C}}R_1\overset{O}{\overset{\|}{C}}-OR_2O-$$

and the amorphous ester units being of the formula:

$$-\overset{O}{\overset{\|}{C}}R_3\overset{O}{\overset{\|}{C}}-OR_4O-$$

wherein R_1 consists of residues of one or more diacids selected from saturated aliphatic dicarboxylic acids containing from 4 to 10 carbon atoms and aromatic dicarboxylic acids selected from terephthalic acid, isophthalic acid, phthalic acid, 4,4'-benzophenone dicarboxylic acid, 4,4'-diphenylmethane dicarboxylic acid, 4,4'-diphenylether dicarboxylic acid, 4,4'-diphenylthioether dicarboxylic acid and 4,4'-diphenylamine dicarboxylic acid, R_2 consists of residues of one or more saturated aliphatic diols containing from 2 to 12 carbon atoms, R_3 is R_1 or R_5, R_4 is R_2 or R_6, R_5 consists of the divalent radicals containing from about 22 to 50 carbon atoms which remain after removal of the carboxyl groups from saturated aliphatic dimer acids and R_6 consists of the divalent radicals remaining after removal of the hydroxyl groups of long chain aliphatic diols having an average molecular weight of 200 to 4000, provided that at least one of R_3 and R_4 in each amorphous ester unit is R_5 or R_6, and provided that when R_1 is aromatic, R_2 contains from 6 to 12 carbon atoms and the amorphous content is 50–75 percent by weight, the said copolyester having a DTA melting temperature of from about 25° to 150° C., an inherent viscosity of at least 0.5 dl/g at 25° C., as measured in 0.3 g/dl solutions of polymer in chloroform at 25° C., an open time of at least about ½ minute at 20° C., substantially complete solubility in toluene at 25° C. in the ratio of about 10 percent by weight of copolyester and 90% by weight of solvent, a tensile strength of 100–400 kg/cm², an elongation at break of 400–1000 percent, a T-peel adhesion to vinyl of at least 0.9 kg/cm of width and a DTA glass transition temperature, T_g, below −25° C.

4,059,716

MANUFACTURE OF GAMMA-IRON(III) OXIDE

Helmut Kopke, Ludwigshafen; Manfred Ohlinger, Frankenthal; Werner Grau, Willstaett; Eduard Schoenafinger, Ludwigshafen, and Hans Henning Schneehage, Mutterstadt, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Filed June 12, 1975, Ser. No. 586,346

Claims priority, application Germany, June 14, 1974, 2428875

Int. Cl.² H01F *1/11, 10/02*

U.S. Cl. 428—403 **5 Claims**

1. A process for the manufacture of acicular gamma-iron(III) oxide of high coercive force which comprises: contacting an acicular non-magnetic alpha-iron(III) oxide or goethite pigment with a solution of an organic compound; drying the coated pigment, heating the coated pigment to from 250° to 700° C in an inert or reducing gas atmosphere and subsequently oxidizing the magnetite formed in an oxidizing atmosphere at from 150° to 550° C, wherein the pigment is coated with from 0.5 to 10% by weight, based on the pigment, of said compound and is selected from the group consisting of N-oleylmethylaminoacetic acid, N-dimethyl-tridecyclpropiobetaine, $R_2HN^+—CH_2—CH_2OPO_3H^-$, the calcium salt of the betaine of N,N-dimethyl-N-sulfobenzyl-aniline-3-sulfonic acid and soybean lecithin.

4,059,717

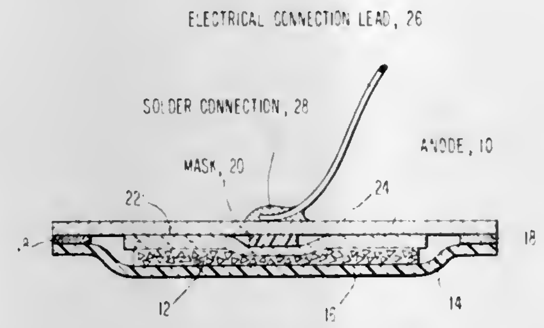
BATTERY HAVING MASK WHICH ELECTROCHEMICALLY INACTIVATES LIMITED SURFACE OF METALLIC COMPONENT

Alf Marlov Bredland, Middleton; Walter Lee Fong, Madison; Terry Glen Messing, Verona, and John Walter Paulson, Madison, all of Wis., assignors to ESB Incorporated, Philadelphia, Pa.

Filed Oct. 26, 1976, Ser. No. 735,827

Int. Cl.² H01M *2/32*

U.S. Cl. 429—162 **32 Claims**



1. An improvement in a flat battery having a metallic foil component the inner surface of which is in contact with the battery electrolyte and the outer surface of which is not in contact with the electrolyte, the improvement providing means for preventing undesired corrosion of the metallic component, the improvement comprising a mask over a portion of the inner surface which electrochemically inactivates the portion of the inner surface covered by it.

4,059,718

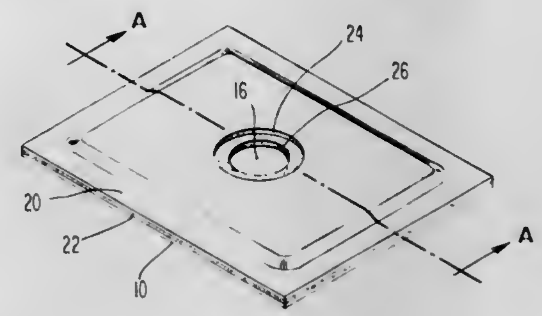
COMPOSITE OF METAL AND INSULATING MATERIAL WITH SETBACK WHICH EXPOSES BATTERY TERMINAL

Terry Glen Messing, Verona, Wis., assignor to ESB Incorporated, Philadelphia, Pa.

Filed Oct. 26, 1976, Ser. No. 735,828

Int. Cl.² H01M *2/02*

U.S. Cl. 429—162 **8 Claims**



1. The combination of

a. a battery having a terminal;

b. a composite of metal and an insulating material overlaying the battery terminal and having openings in both the metal and insulating material which expose the terminal, the insulating material being situated between the metal and the terminal, the composite being further described as having a portion of the insulating material extend inside the opening of the metal layer so that edge of the metal is set back from the edge of the insulating material.

4,059,719

PROCESS FOR FORMING BRANCHED NITROPOLYPHENYLENE

Eli W. Blaha, Wheaton, Ill.; Sandra K. Koster, Aiken, S.C., and Chen-Shen Wang, Naperville, Ill., assignors to Standard Oil Company (Indiana), Chicago, Ill.

Filed Apr. 29, 1976, Ser. No. 681,751

Int. Cl.² C08F *8/00*

U.S. Cl. 526—52 **4 Claims**

1. A process for preparing branched nitropolyphenylene comprising contacting finely-divided, solid branched polyphenylene with a dinitrogen tetraoxide-nitrogen dioxide gas mixture in the absence of a liquid diluent.

4,059,720

PROCESS FOR THE PRODUCTION OF POLYETHYLENE HAVING MOLECULAR WEIGHTS ABOVE 500,000

Helmut Kolling; Friedrich Rappen, and Nikolaus Geiser, all of Oberhausen, Germany, assignors to Ruhrchemie Aktiengesellschaft, Oberhausen-Holten, Germany

Continuation of Ser. No. 528,737, Dec. 2, 1974, abandoned. This application Mar. 31, 1976, Ser. No. 672,140

Claims priority, application Germany, Dec. 11, 1973, 2361508

Int. Cl.² C08F *4/66, 10/02*

U.S. Cl. 526—74 **4 Claims**

1. A process for preparing polyethylene having a viscosimetrically determined molecular weight greater than about 500,000, said process comprising the steps of:

A. Reducing a titanium (IV) halide with an aluminum alkyl compound of the formula AlR_3 or $AlXR_2$, wherein R is an alkyl radical having 2 to 10 carbon atoms and X is halogen whereby an activated titanium (III) halide is formed, and

B. Polymerizing ethylene having an oxygen content of less than 1 ppm. in the presence of

a. a hydrocarbon solvent having a boiling point in the range of 80° C. - 200° C., said solvent having been pre-purified by hydrogenation,

b. a catalyst comprising said activated titanium (III) halide and an aluminum alkyl compound, in a respective molar

ratio of 1:0.2 to 1:5, said aluminum compound being of the formula AlR_3 or $AlXR_2$, wherein R is an alkyl radical having 2 to 10 carbon atoms and X is halogen, and

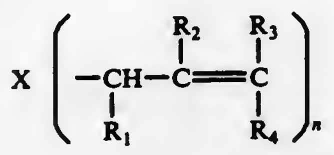
c. a mono - or polyhydric alcohol having 2 - 5 carbon atoms in an amount of 2 to 10 moles per kg. of catalyst; said polymerizing being conducted at a pressure of 1 to 100 atmospheres at a temperature of 30° C. to 100° C.

4,059,721
STABILIZED ACRYLIC ACID ESTERS OF POLYHYDRIC ALCOHOLS AND A PROCESS FOR THEIR PREPARATION

Hans Jürgen Rosenkranz, Krefeld, and Hans Rudolph, Krefeld-Bockum, both of Germany, assignors to Bayer Aktiengesellschaft, Germany

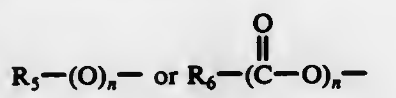
Filed July 18, 1975, Ser. No. 597,168
Claims priority, application Germany, July 24, 1974, 2435509
Int. Cl.[2] C07C *69/54*
U.S. Cl. 560—205 **7 Claims**

1. A composition comprising an acrylic acid ester of a polyhydric alcohol having at least two acrylate moieties and a stabilizing amount of an allyl compound of the formula



wherein R_1–R_4 are hydrogen or alkyl having 1 to 4 carbon atoms;

X is chlorine, bromine, hydroxy,



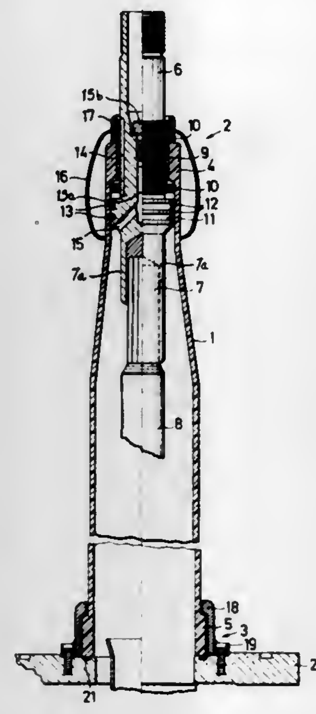
wherein R_5 is an n-valent aliphatic, araliphatic, cycloaliphatic or aromatic hydrocarbon radical which may contain free hydroxy moieties or —O— linking moieties and R_6 is an n-valent aliphatic, cycloaliphatic, araliphatic or aromatic radical and n is an integer of from 1 to 4.

ELECTRICAL

4,059,722
TERMINAL CONNECTOR FOR ELECTRICAL CABLES

Horst Adler; Werner Grella, and Hans-Peter Israel, all of Cologne, Germany, assignors to Felten & Guilleaume Kabelwerke Aktiengesellschaft, Cologne, Germany

Filed Oct. 1, 1975, Ser. No. 618,312
Claims priority, application Germany, Oct. 12, 1974, 2448705
Int. Cl.[2] H02G *15/22, 15/04*
U.S. Cl. 174—19 **13 Claims**



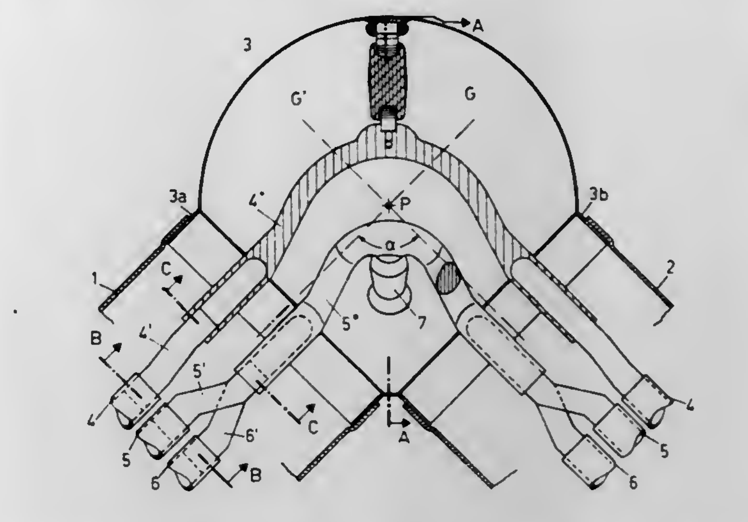
1. A terminal connector for electrical cables, particularly high-current electrical cables, comprising an electrically-insulating casing having a circumferential wall bounding an interior for accommodation of an end portion of an electrical cable, and an end region formed with an opening; a conductive member having an inner portion located within said casing and being connectable to the end portion of the cable, and an outer portion extending through said opening outwardly of said casing; adjusting means for movably mounting said conductive member through a range of positions relative to said casing; and means for sealing the interior of said casing from its exterior including during operation of said adjusting means, said sealing means including an annular projection located on said inner portion remote from said opening, said projection extending in radial direction towards said circumferential wall and being formed with a circumferential groove, said sealing means also including a resilient sealing element accommodated in said groove and having a side facing and in sliding engagement with said circumferential wall so as to seal the interior from the exterior of said casing through the entire adjustment range of said conductive member.

4,059,723
APPARATUS FOR CHANGING THE DIRECTION OF A THREE-PHASE PIPE-TYPE GAS-PRESSURIZED ELECTRICAL CABLE

Carl Dieter Floessel, Fislisbach, Switzerland, assignor to BBC Brown Boveri & Company Limited, Baden, Switzerland

Filed Dec. 22, 1975, Ser. No. 643,114
Claims priority, application Switzerland, Jan. 10, 1975, 275/75
Int. Cl.[2] H01B *9/00;* **H02G** *15/08*
U.S. Cl. 174—21 R **3 Claims**

1. In a three-phase pipe-type gas-pressurized electrical cable constituted principally by rigid straight pipe lengths connected in series and wherein the axes of the three phase conductors supported within the pipe when viewed in cross-section form an equilateral triangle, the improvement wherein means are provided for changing the direction of the cable, said direction-changing means comprising a spherical elbow interposed between two straight pipe lengths, said elbow including a pair of branch pipe stubs connected to the ends of the adjoining straight pipe lengths and three curved conductor members supported in spaced relation within said elbow, one of said curved conductor members and which has the largest radius of curvature being located in a plane formed by the respective axes of said two branch pipe stubs which intersect at the center of said elbow and the other two curved conductor members

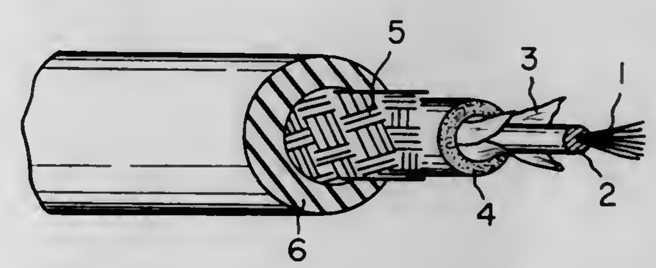


having a smaller radius of curvature being located at equal distances on each side of said plane, and three intermedite conductor sections connecting and adapting the respective positions of the ends of the three conductors supported within the adjoining pipe lengths to their correlated conductor members within said elbow.

4,059,724
SHIELD WIRE

Homare Ide, 22, Hazawa 2-Chome, Nerima, Tokyo, Japan

Filed Mar. 15, 1976, Ser. No. 667,032
Claims priority, application Japan, Mar. 22, 1975, 50-37197[U]
Int. Cl.[2] H01B *11/06*
U.S. Cl. 174—36 **5 Claims**



1. A shield wire comprising:
an inner conductor of metal;
a first dielectric surrounding said inner conductor;
a second dielectric placed on top of said first dielectric;
a middle conductor formed of a mixture of carbon powder and plastic and having a relatively high resistance placed over said second dielectric;
a braid of metal woven over said middle conductor to form an outer conductor; and
a covering of electric dielectric placed on top of said braid.

4,059,725

AUTOMATIC CONTINUOUS SPEECH RECOGNITION SYSTEM EMPLOYING DYNAMIC PROGRAMMING

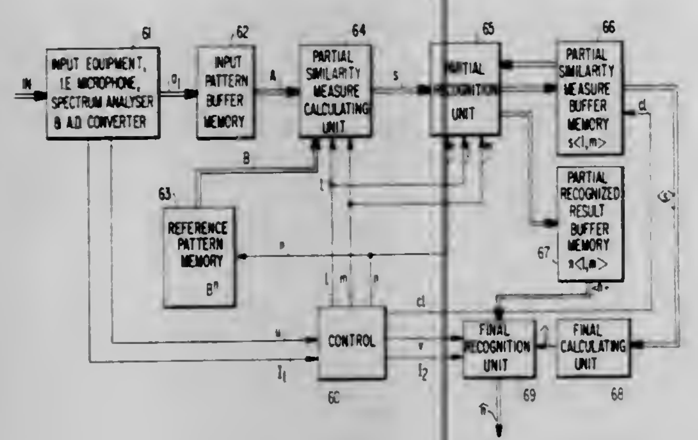
Hiroaki Sakoe, Tokyo, Japan, assignor to Nippon Electric Company, Ltd., Tokyo, Japan

Continuation of Ser. No. 665,759, March 11, 1976, abandoned. This application Dec. 21, 1976, Ser. No. 753,072

Claims priority, application Japan, Mar. 12, 1975, 50-29891; Oct. 31, 1975, 50-132003

Int. Cl.² G10L *1/00*

U.S. Cl. 179—1.5 D **5 Claims**



1. A speech pattern recognition system for continuous speech composed of a series of words pronounced word by word, said system comprising:

means for producing from said continuous speech an input pattern A representative of time sequences of feature vectors $a_1, a_2 \cdots a_i, \cdots a_I$;

first memory means for storing said input pattern A;

second memory means for storing n reference word patterns B^n, each representing by time sequences of feature vectors $b_1^n, b_2^n, \cdots b_j^n, \cdots b_{jn}^n$;

means for reading out a partial pattern A(l,m) which is a part of said input pattern A extending from a time point l to another time point m ($1 \leqq l < m \leqq I$), said partial pattern A(l,m) being represented by time sequence of feature vectors $a_{l+1}, a_{l+2}, \cdots a_i, \cdots a_m$;

first means for calculating through dynamic programming similarity measures S(A(l,m), B^n) between said partial pattern A(l,m) and said reference word pattern B^n;

means for extracting the maximum value of the partial similarity measures $S<l,m>$ with respect to n words;

means for providing a partial recognized result $n<l,m>$ which is a word in said n words and by which said partial similarity measure $S<l,m>$ is obtained;

third memory means for said partial similarity measure $s<l,m>$ and said partial recognized result $n<l,m>$ obtained with respect to said time points l and m;

means for dividing said input pattern A to Y partial patterns $A(l_{(x-1)}, L_{(x)})$ ($X = 1, 2, 3, \cdots Y$), said input pattern A being composed of Y words and having (Y − 1) breaking points $l_{(1)}, l_{(2)} \cdots l_{(x)} \cdots l_{(Y-1)}$;

means responsive to said partial similarity measure $S<l,m>$ and said partial recognized result $n<l,m>$ for reading out the partial similarity measures $S<O,l_{(1)}>, S<l_{(1)},l_{(2)}>, \cdots S<l_{(x-1)}, l_{(x)}>, \cdots S<l_{Y-1}, l_{(Y)}>$ with respect to the combinations $(O,l_{(1)}), (l_{(1)}, l_{(2)}), \cdots (l_{(x-1)}, l_{(x)}), \cdots (l_{(Y-1)}, l_{(Y)})$ of said breaking points;

second means for calculating the maximum value of the sum of said partial similarity measures $S>O,l_{(1)}>+S<l_{(1)}, l_{(2)}>+\cdots + S<l_{(x-1)}, l_{(x)}> \cdots + S<l_{(Y-1)}, l_{(Y)}>$; and

means responsive to said second calculating means and said partial recognized result n, m for providing Y words.

4,059,726

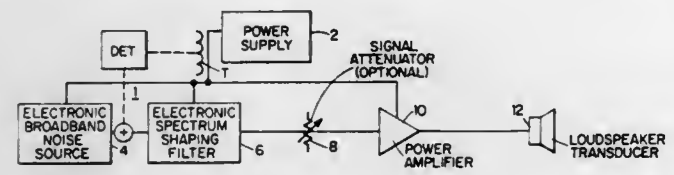
PROCESS AND APPARATUS FOR SPEECH PRIVACY IMPROVEMENT THROUGH INCOHERENT MASKING NOISE SOUND GENERATION IN OPEN-PLAN OFFICE SPACES AND THE LIKE

Bill G. Watters, Gloucester; Michael Nacey, Belmont, and Thomas R. Horrall, Harvard, all of Mass., assignors to Bolt Beranek and Newman, Inc., Cambridge, Mass.

Continuation of Ser. No. 527,941, Nov. 29, 1974, abandoned. This application June 18, 1976, Ser. No. 697,562

Int. Cl.² H04K *1/00*

U.S. Cl. 179—1.5 M **14 Claims**



1. A process of distributing masking sound in an open-plan space and the like, that comprises, independently and incoherently generating and radiating noise at a plurality of positions laterally separated from one another above a sound-transmitting surface covering such an open space; shaping the frequency spectrum of the noise to correspond substantially to that desired for speech privacy masking; and adjusting the lateral separation of noise radiation positions from one another to control the diffusion and distribution of the masking noise sound cumulatively transmitted through and below said surface into the open space, in order to provide a uniform, delocalized incoherent masking radiation within said open space.

4,059,727

DATA TRANSMISSION SYSTEM BETWEEN TELEPHONE SUBSCRIBER LOCATION AND TELEPHONE EXCHANGE LOCATION DURING IDLE TELEPHONE CONDITION

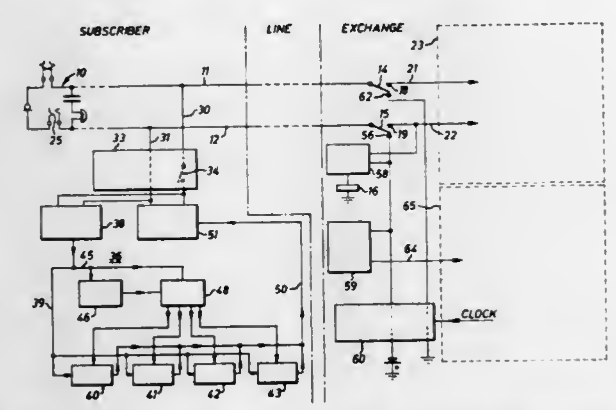
Leonard William Kingswell, Uxbridge, and Oliver Charles Matthews, Edgware, both of England, assignors to The Post Office, London, England

Filed Jan. 3, 1977, Ser. No. 756,004

Claims priority, application United Kingdom, Jan. 9, 1976, 848/76

Int. Cl.² H04M *11/00*

U.S. Cl. 179—2 AM **15 Claims**



1. A data transmission system for transmitting information over a telephone line comprising a line for connecting the telephone to a telephone exchange, first idle line sensing means associated with the subscriber end of the line and operable to connect the line to subscriber data equipment when the line is sensed to be in an idle condition and to disconnect the line from subscriber data equipment when the line is sensed to be in a busy condition, second idle line sensing means associated with the exchange end of the line and operable to connect the line to exchange data equipment when the line is sensed to be in an idle condition, and to disconnect the line from the exchange data equipment when the line is sensed to be in a busy condition, the arrangement being such that a data transmission circuit is established between the exchange data equipment and the subscriber data equipment when the line is in the idle condition.

4,059,728

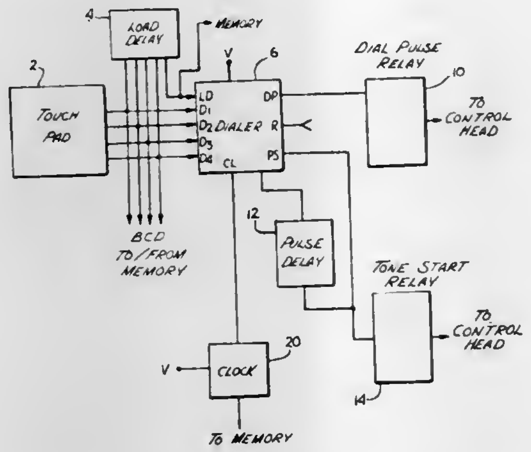
TOUCHPAD DIALER FOR MOBILE TELEPHONES

C. Paul Milkes, Encino, Calif., assignor to American Communication Systems, Encino, Calif.

Filed June 1, 1976, Ser. No. 691,427

Int. Cl.² H04Q *7/04*

U.S. Cl. 179—2 E **11 Claims**



1. A touchpad dialer for mobil telephones having a control head and wherein dial pulses are transmitted to a central office as interruptions in a tone comprising:

a touchpad keyboard means having a plurality of keyboard buttons, each of said buttons being assigned one alphanumeric symbol, said keyboard means generating an output signal when one of said buttons is depressed, said output signal being an electrical representation of the alpha-numeric symbol assigned to said button;

a dial pulse control means coupled to said control head of said mobil telephone for interrupting said tone in response to a control signal;

a means for converting said output signals from said keyboard to said control signals for said dial pulse control means;

a tone start control means coupled to said control head of said mobil telephone for turning on said tone; and

a means coupled to said converting means for actuating said tone start control means some predetermined time before said control signals are transmitted to said dial pulse control means and for keeping said tone pulse control means actuated for some predetermined time after said control signals to said dial pulse control means cease.

4,059,729

METHOD AND SYSTEM FOR SELECTIVELY ACCESSING MULTIPLEXED DATA TRANSMISSION NETWORK FOR MONITORING AND TESTING OF THE NETWORK

Wesley L. Eddy, Howey-in-the-Hills; Daniel J. Mullen, and Arthur R. Bonham, both of Orlando, all of Fla., assignors to Martin Marietta Aerospace, Orlando, Fla.

Filed June 9, 1976, Ser. No. 694,302

Int. Cl.² H04J *3/14*

U.S. Cl. 179—15 BF **20 Claims**

1. In a multiplexed data transmission system receiving data from a plurality of data channels and time division multiplexing the received data for transmission over a transmission path as a multiplexed data stream containing a predetermined pattern of framing signals together with the data from the plurality of data channels positioned in time at predetermined data channel locations relative to the pattern of framing signals, a system for accessing data of a desired data channel comprising:

line access means connected in series with the transmission path for accessing the multiplexed data stream without disturbing the transmission of the multiplexed data stream along the transmission path;

means responsive to the multiplexed data stream from said line access means for detecting the framing signals in the multiplexed data stream;

means for generating a control signal designating one of the plurality of data channels as the desired data channel;

means receiving said multiplexed data stream and, responsive to said control signal and to the detected framing signals, for locating and providing access to the designated one of the plurality of data channels in the multiplexed data stream without disturbing the transmission of the multiplexed data stream over the transmission path.

4,059,730

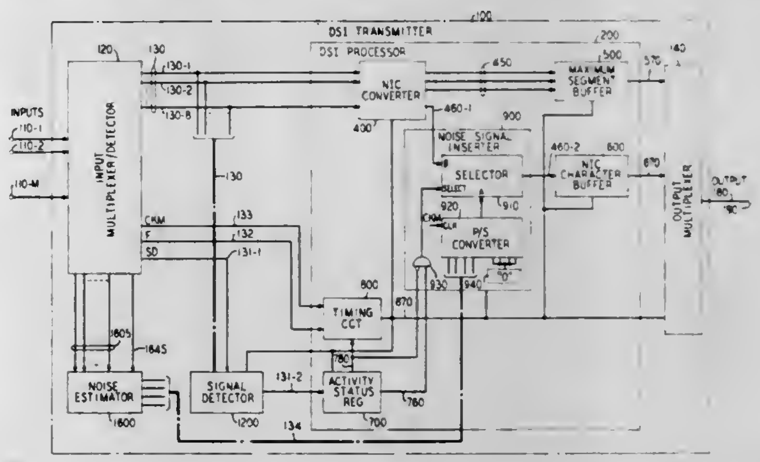
APPARATUS FOR MITIGATING SIGNAL DISTORTION AND NOISE SIGNAL CONTRAST IN A COMMUNICATIONS SYSTEM

David Gavin Messerschmitt, Middletown, and Timothy James Zebo, Freehold, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Aug. 17, 1976, Ser. No. 715,122

Int. Cl.² H04J *6/02*

U.S. Cl. 179—15 AS **11 Claims**



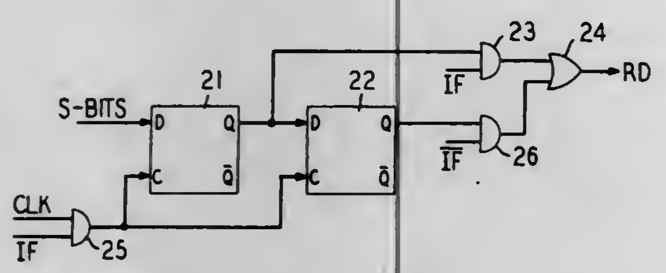
4. Communications apparatus having an input terminal adapted to receive an input signal from a trunk and having an output terminal adapted to transmit an output signal to a channel, said communications apparatus including detection apparatus for detecting the activity status of said trunk, characterized in that said communications apparatus further comprises:

means for mitigating contrast between an input signal detected during a first trunk activity status state and an input noise signal detected during a second trunk activity status state, said contrast mitigating means including

means responsive to said second activity status state for measuring noise on said trunk, and

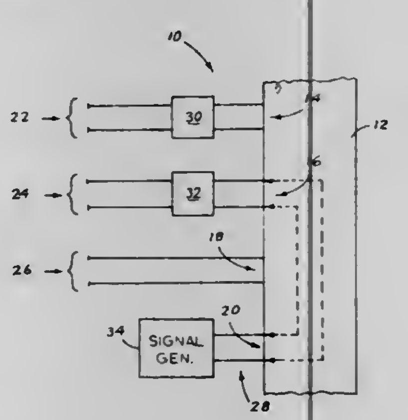
means responsive to said noise measuring means for extending a representation of said measure to said output terminal upon transition of said first activity state to said second activity state.

4,059,731
SIGNALING STORAGE IN DIGITAL CHANNEL BANKS
John Henry Green, Georgetown, Mass., and Joseph Elide Landry, Atkinson, N.H., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.
Filed Feb. 1, 1977, Ser. No. 764,571
Int. Cl.² H04J *3/12*
U.S. Cl. 179—15 BY **6 Claims**



1. A digital channel bank wherein a plurality of incoming digital messages is received in separate time division multiplexed channels and signaling information bits for each channel are disposed at predetermined positions in the incoming digital message bit stream, the signaling bits being separated out from the incoming bit stream in the channel bank; said digital channel bank being characterized by a signaling storage circuit for each channel comprising means for storing two or more of the most recent signaling information bits of the channel, means for continually updating the stored signaling bits, means for stopping said updating when a carrier disturbance is detected in the incoming digital message bit stream, and means for deriving an output signal in accordance with an older stored signaling bit when a disturbance is detected.

4,059,732
CENTRALIZED TELEPHONE ANSWERING APPARATUS WITH REMOTE ACCESSING
Robert W. Hayden, Clackamas, and Glenn Clarridge, Portland, both of Oreg., assignors to Ford Industries, Inc., Portland, Oreg.
Filed July 9, 1976, Ser. No. 703,745
Int. Cl.² H04M *3/42*
U.S. Cl. 179—18 B **4 Claims**



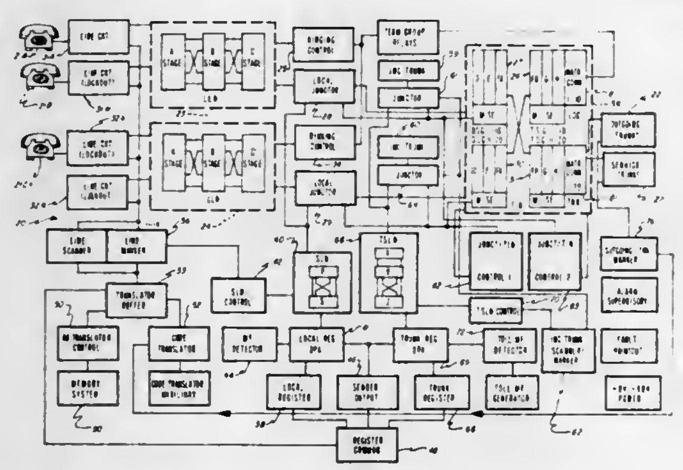
1. Apparatus in a telephone system for accessing, from a subscriber's telephone line in the system, a remote associated answering device located adjacent central switching circuitry in the system, which circuitry includes a plurality of ports each operatively connectable to a different telephone line and means for producing selected couplings through said circuitry between different pairs of said ports, said apparatus, in operative condition with respect to such equipment, comprising

an electrical signal generator operatively connected to one of said ports and operable, on a call being recevied at said one port through said switching circuitry, to apply an electrical signal to said one port, and through said one port and said switching circuitry to the particular port then coupled through said switching circuitry with said one port,

electrical switching means operatively interposed between said subscriber's line, said answering device and another one of said ports, normally producing a closed connection between said other port and said line, and an open connection between said other port and said answering device, and

a sensor operatively connected both to said line and to said switching means responsive to the occurrence on said line of signal received through said other port and said switching circuitry from said signal generator, to actuate said switching means, thus to open said normally closed connection and to close said normally open connection.

4,059,733
CALL DISTRIBUTOR FOR INCREASING SWITCHING SYSTEM CALL TERMINATION RATE
Otto Altenburger, Rochester, N.Y., assignor to Stromberg-Carlson Corporation, Rochester, N.Y.
Filed Dec. 8, 1975, Ser. No. 638,443
Int. Cl.² H04Q *3/47*
U.S. Cl. 179—18 ET **2 Claims**



2. In an electronic switching system, the combination comprising:

first and second line-link network groups, each of said groups comprising a plurality of line units, said line units providing paths between local subscribers and the system;

a plurality of local registers operatively associated with said first and second line-link network groups;

a plurality of incoming trunks providing paths between remote telephone switching systems and the system;

a plurality of trunk registers operatively associated with said plurality of incoming trunks;

first and second originating trunk-link network groups for establishing paths for calls which have entered the system through said first and second line-link network groups, respectively, and for calls which have entered the system through said plurality of incoming trunks;

one and another terminating trunk-link network groups which are selectively transposable in their connection to said first and second originating trunk-link network groups, said one and another terminating trunk-link network groups being operative to establish paths to call termini;

number translator means for translating calls which terminate locally;

code translator means for translating calls which terminate at an outgoing trunk;

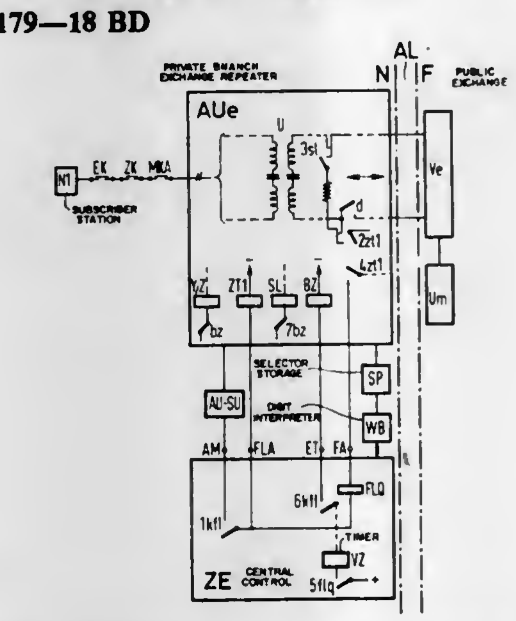
said plurality of local registers being operatively connected to either one or the other of: (I) said number translating means, and (II) said code translating means, depending upon whether the originating local subscriber dialed a local call or an outgoing trunk call, said plurality of local registers being operative to temporarily store information for completing the terminating portion of a phone call;

said plurality of trunk registers being operatively connected to either one or the other of: (A) said number translating means, and (B) said code translating means, depending upon whether the call originator dialed a local call or an outgoing trunk call, said plurality of trunk registers being operative to temporarily store information for completing the terminating portion of a phone call;

means for monitoring the plurality of local registers and the plurality of trunk registers to identify a pair of calls comprising a locally originating-locally terminating call which originated in one of said first and second line-link network groups and a locally originating-outgoing trunk call which originated in the other of said first and second line-link network groups; and

means for terminating the identified pair of calls within a time frame which includes temporary storage of both the locally originating-locally terminating and the locally originating-outgoing trunk calls within the respective registers in which they are stored, said means for terminating the identified pair of calls providing the calls termination in cooperation with: (1) said first line-link network groups, (2) said first originating trunk-link network groups, and (3) whichever of said one and another terminating trunk-link network groups is connected to the output of said first originating trunk-link network groups for a given call, and in cooperation with: (a) said second line-link network groups, (b) said second originating trunk-link network groups, and (c) whichever of said one and another terminating trunk-link network groups is connected to said second originating trunk-link network groups for a given call.

4,059,734
METHOD FOR TRANSFERRING DATA INTO A DATA INPUT DURING A TELEPHONE CONNECTION ESTABLISHED OVER AN INTEROFFICE TRUNK
Robert Vanderbusse, Oostende, Belgium, assignor to Siemens Aktiengesellschaft, Munich, Germany
Filed Oct. 21, 1975, Ser. No. 624,552
Claims priority, application Germany, Oct. 22, 1974, 2450189
Int. Cl.² H04M *3/58*
U.S. Cl. 179—18 BD **1 Claim**



1. In a telecommunication switching apparatus comprising a central control, a digit interpreter and an exchange repeater, said exchange repeater including means for initiating call-back connections between subscribers connected thereto and holding the connection to the central office subscriber in a waiting position, a method of operation comprising the steps of:

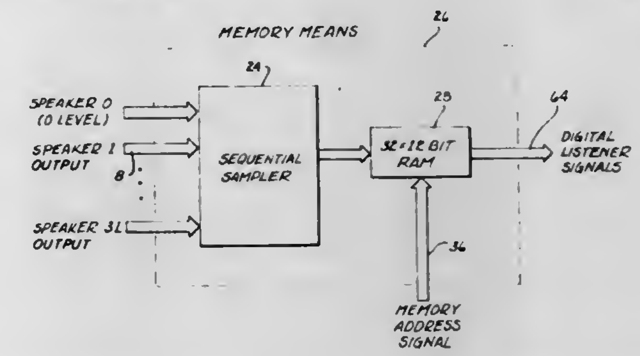
initiating a call-back connection by dialing a special dial code,

disconnecting a holding circuit of a waiting subscriber after initiating said call-back connection,

starting a timing device responsive to said disconnecting step, said timing device determining the period of interruption of the holding circuit and

through connecting, under the control of the timing device, a transmission path for data transmission between said telecommunication switching apparatus and a public exchange.

4,059,735
DIGITAL CONFERENCE SYSTEM
William L. Betts, St. Petersburg, Fla., assignor to NCR Corporation, Dayton, Ohio
Filed Nov. 18, 1976, Ser. No. 742,978
Int. Cl.² H04M *3/56*
U.S. Cl. 179—18 BC **14 Claims**



1. A digital conference system for providing conference conversations among selected groups of stations in a communications system, said system comprising in combination:

a. a plurality of stations for generating speaker signals and for generating conference control signals, each of said stations responsive to a listener address signal for receiving selected groups of listener output signals;

b. programmable list processor means connected to receive said conference control signals and responsive thereto for generating memory address signals and control signals;

c. memory means connected to receive said speaker signals and for sequentially storing and periodically updating samples of said speaker signals, said memory means also connected to receive said memory address signals and responsive thereto for generating a series of listener output pulses;

d. accumulator means coupled to said memory means and responsive to said control signals for accumulating selected groups of listener output pulses and for generating corresponding groups of listener output signals; and

e. listener address means responsive to said control signals for generating the listener address signals;

whereby, said corresponding listener output signals received by a station are representative of the desired conference conversation to be heard at said station.

4,059,736
DUAL TESTING SYSTEM FOR SUPERVISING DUPLICATED TELECOMMUNICATION EQUIPMENT
Giovanni Perucca; Flavio Melindo, both of Turin, and Girolamo De Vincentiis, San Mauro Torinese, all of Italy, assignors to CSELT - Centro Studi e Laboratori Telecomunicazioni S.p.A., Turin, Italy
Filed June 17, 1976, Ser. No. 697,234
Claims priority, application Italy, June 17, 1975, 68551/75
Int. Cl.² H04M *3/22*
U.S. Cl. 179—175.2 R **10 Claims**

1. A dual testing system for supervising the performance of two substantially identical assemblies of telecommunication equipment served by respective sets of ancillary units, comprising:

a pair of mutually independent and substantially identical command sections each comprising a processor programmed to transmit outgoing messages to designated ancillary units of either of said sets and to receive incoming messages from said ancillary units;

a pair of mutually independent and substantially identical monitoring sections each including one of said assemblies and the associated set of ancillary units;

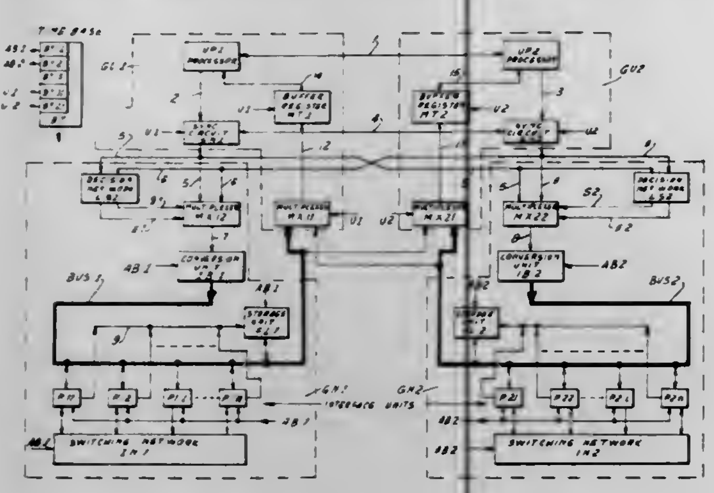
a transmitting path in each of said command sections for outgoing messages originating at the processor thereof, said transmitting path having a pair of parallel outgoing branches each leading to one of said monitoring sections;

a receiving path in each of said command sections for incom-

ing messages destined for the processor thereof, said receiving path having a pair of parallel incoming branches each extending from one of said monitoring sections;

check means connected to said transmitting paths for determining the performance of said processors;

first routing means in each of said monitoring sections for



selectively directing said outgoing messages from either of said processors, under the control of said check means, to designated units in the corresponding set of ancillary units and

second routing means in said command sections for directing any incoming message from either of said sets of ancillary units to both said processors.

4,059,737

KEYBOARD SWITCH STRUCTURE HAVING MATRIX ARRANGED ELONGATED UNDULATED CONTACTS

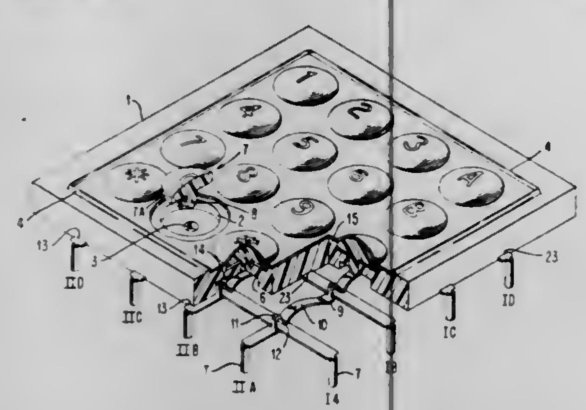
Fernand Gergaud, LaGaude, France, assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Aug. 3, 1976, Ser. No. 711,323

Claims priority, application France, Aug. 11, 1975, 75.25820

Int. Cl.² H01H *13/70*

U.S. Cl. 200—5 A **3 Claims**



1. A keyboard comprising a support having in its upper surface a plurality of recesses therein arranged as a matrix and having apertures therein which extend through said support, a plurality of keys having upper portions adapted to fit in said recesses and rod portions which extend through said apertures, contact elements arranged as a matrix in the lower portion of said support comprising a first set of parallelly arranged conducting strips and a second set of parallelly arranged conducting strips generally perpendicular to said first set, a conducting strip of said first set and a conducting strip of said second set crossing each other below and laterally to one side of said rod portion of each said key, said conducting strip of said second set having a flexible arcuate portion which engages the lower end of the rod of a key and normally biases said key to its upper position and a second arcuate portion contiguous with said flexible arcuate portion, the juncture between the arcuate portions having a first position which is spaced apart from a conducting strip and a second position which is in contact with the last mentioned conducting strip, said flexible arcuate portion moving downwardly when said key is depressed thereby causing said juncture to move downwardly from one of its aforementioned positions to the other, and means for maintaining said keys in their recesses.

4,059,738

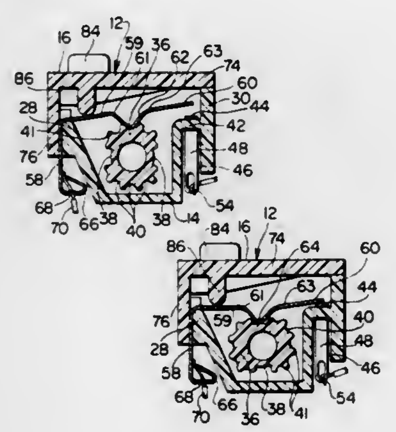
MULTI-POSITION SWITCH ASSEMBLY HAVING PLURAL OPERATOR WITH PRIMARY AND SECONDARY DETENTED CAMS

Roland E. Mongeau, Cumberland, R.I., assignor to Tower Manufacturing Corporation, Providence, R.I.

Filed May 24, 1976, Ser. No. 689,518

Int. Cl.² H01H *19/62, 3/42*

U.S. Cl. 200—6 B **11 Claims**



5. A multi-circuit switch for use with household appliances and the like comprising a housing including a first housing member having opposed upstanding end and opposed upstanding side walls, a rotor journalled at the ends thereof in said end walls and adapted for at least partial rotation with respect to said housing, said rotor intermediate the ends thereof having a plurality of axially spaced circumferential cam tracks, a stationary contact supported along one of said side walls, a plurality of generally parallel resilient switch conductors supported by the other of said side walls at a first end thereof and outwardly extending to means intermediate the ends thereof for contacting said cam track positioned in alignment therewith and terminating in a contact at the other end thereof in position to engage said stationary contact, and a second housing member cooperating with said first housing member to generally enclose said switch, said second housing member including means for contacting upper portions of said conductors intermediate said first end and said cam track contacting means for simultaneously urging said switch conductor contact ends into engagement with said stationary contact, said conductor cam track contacting means serving to hold a plurality of said switch conductor other ends out of contact with said stationary contact at any given time.

4,059,739

ELECTRICAL POWER RECEPTACLE HAVING BUILT-IN SWITCHING CONTACTS

Fahir Girismen, 372 Baldwin Road, Carlisle, Mass. 01741

Division of Ser. No. 467,654, May 7, 1974, Pat. No. 3,974,492.

Filed Aug. 9, 1976, Ser. No. 712,774

Int. Cl.² H01R *33/30*

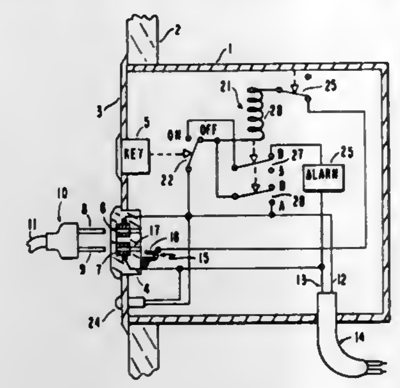
U.S. Cl. 200—51.09 **1 Claim**

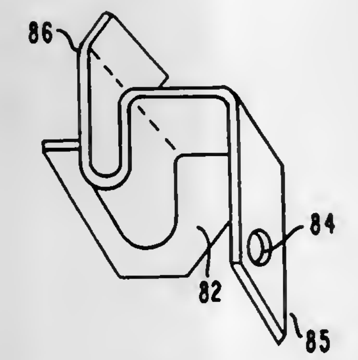
1. In a power receptacle security alarm system for detecting that a power plug to an appliance has been removed from the receptacle, at least an electrical detection terminal on the receptacle in combination with conventional receptacle contacts comprising,

a unitary piece of electrically conductive material including a pad portion and a contact portion,

the pad portion being attached to the bottom of a substantially conventional AC power receptacle,

the contact portion being folded, the free end of the fold extending perpendicular to the pad portion, so that the free end is in registration with one of the conventional receptacle contacts into which a prong of the AC plug is





inserted so that said prong contacts the free end and the receptacle contact.

4,059,740

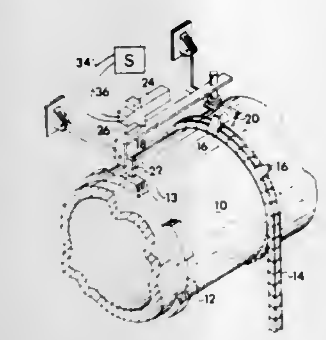
SWITCH AND OPERATING MECHANISM FOR CIRCULAR HOSIERY KNITTING MACHINE SPEED CONTROL

John M. Laughlin, 225 Roseboro Drive, Asheboro, N.C. 27203

Filed Mar. 24, 1976, Ser. No. 669,763

Int. Cl.² H01H *29/00, 35/00;* **D04B** *35/10*

U.S. Cl. 200—52 R **4 Claims**



1. In combination with a circular hosiery knitting machine, an improved cylinder speed control system of the type having lugs on the pattern chain and/or cams on the cam drum, a vertically reciprocal lever mechanism pivotally mounted to said machine in the path of said lugs and cams and activated in response to engagement by said lugs and cams, a switching mechanism in the path of and operated by said lever mechanism, and a speed control mechanism electrically connected to and operated by electrical pulses from said switching mechanism to shift a drive belt between a slow and fast pulley, wherein said switching mechanism comprises:

a. a housing having an elongated chamber therein and pivotally mounted to said machine for arcuate reciprocal movement between a first position in which one end of said chamber is tilted downwardly and a second position in which said one end is tilted upwardly;

b. a glass encapsulated mercury switch having leads extending therefrom and mounted in said chamber with said leads extending through the other end of said chamber opposite said one end, whereby, when said one end of the chamber is tilted downwardly, the mercury in said switch is out of engagement with the contacts of said leads, and when said one end is tilted upwardly, the mercury is in contact with said leads;

c. said housing including an abutment means thereon, engaged by said lever during operation, for moving said housing between said first and second positions responsive to movement of said lever by said pattern chain and cam drum.

4,059,741

PUFFER TYPE GAS CIRCUIT BREAKER

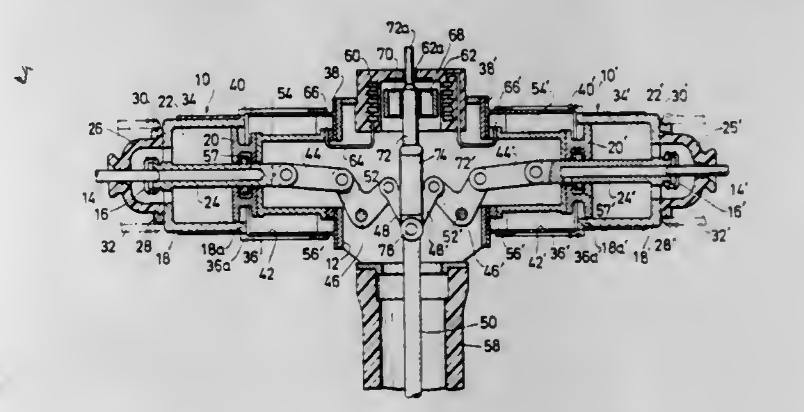
Yoshio Yoshioka; Kunio Hirasawa, and Masanori Tsukushi, all of Hitachi, Japan, assignors to Hitachi, Ltd., Japan

Filed Feb. 24, 1976, Ser. No. 660,787

Claims priority, application Japan, Mar. 10, 1975, 50-28049

Int. Cl.² H01H *33/70*

U.S. Cl. 200—148 A **8 Claims**



1. A puffer type gas circuit breaker comprising:

at least a pair of puffer type breaking units having their movable parts disposed to face each other, each breaking unit including:

at least a pair of contacts capable of being opened and separated from each other, and

a puffer device having a puffer cylinder and a puffer piston,

said puffer device being disposed so that when said contacts are opened and separated, said puffer device compresses an arc-extinguishing gas and blows it to an arc produced between said contacts;

a bracket disposed between said puffer type breaking units;

electrically insulating and supporting means for supporting said bracket in state electrically insulated from ground potential;

linking means mounted on said bracket to transmit an actuating force to each of the movable parts of said puffer type breaking units;

an electrically insulated operating rod for connecting said linking means with operating means disposed at ground potential in the insulated state;

supporting means for supporting each of said puffer type breaking units to said bracket;

insulating connecting means for connecting the movable parts of the puffer type breaking units with said linking means in the insulated state;

an electromagnetic coil attached in the insulated state to said bracket to form a series connecting circuit with each of said puffer type breaking units;

an electromagnetic repulsive member electromagnetically connected to said electromagnetic coil and arranged to actuate said linking means to open said puffer type breaking units in proportion to the intensity of an electric current flowing through said electromagnetic coil;

and current transferring means mounted on said puffer type breaking units to short-circuit said electromagnetic coil at closing positions of said puffer type breaking units and to release the short circuit at the initial stage of the breaking operation.

4,059,742

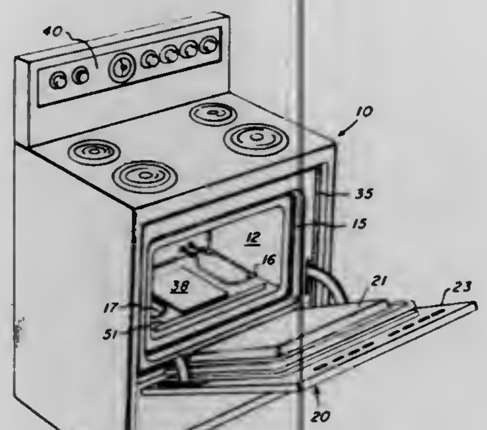
MICROWAVE SEAL FOR COMBINATION COOKING APPARATUS

David A. Baron, Edina, Minn., assignor to Litton Systems, Inc., Beverly Hills, Calif.

Filed July 9, 1975, Ser. No. 594,526

Int. Cl.² H05B *9/06*

U.S. Cl. 219—10.55 D **15 Claims**



1. A cooking appliance comprising in combination:
a frame;
a cooking cavity having a front access portion, said cavity being supported in said frame;
means for thermally heating said cavity;
means providing microwave energy to said cavity at a preselected frequency;
a door mounted on said frame adapted for movement between an open and a closed position and including an interior face portion, said interior face portion substantially covering said front access portion of said cavity when said door is in the closed position;
said door including means defining an annular chamber extending around the periphery of said front access portion when said door is closed, said chamber including an entrance portion located outside of and faced away from said cavity, said entrance portion being spaced away from said interior face portion a distance approximately equal to one-half wavelength of the microwave energy at said preselected frequency, said chamber having a dimension measured from said entrance portion of the rear wall of said chamber approximately equal to one-fourth wavelength of the microwave energy at said preselected frequency.

4,059,743

PLASMA ARC CUTTING TORCH

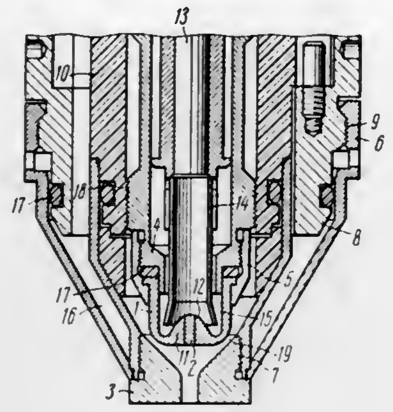
Eduard Migranovich Esibian, ulitsa Kikvidze, 4, kv. 21; Daniil Andreevich Dudko, ulitsa Anri Barbjusa, 22-26, kv. 113; Mikhail Evgenievich Danchenko, Bulvar Likhacheva, 3, kv. 53; Vasily Berkovich Malkin, prospekt Voroshilova, 31, kv. 305, and Valery Andreevich Kozhema, ulitsa Dovnar-Zapolskogo, 6, kv. 59, all of Kiev, U.S.S.R.

Filed Oct. 6, 1975, Ser. No. 619,701

Int. Cl.² B23K *9/00*

U.S. Cl. 219—121 P **9 Claims**

1. A plasma torch comprising an electrode which has a diameter selected to suit an arc current and which has a side surface and a flat end face whose diameter is selected to be in the range of approximately 0.4 – 0.5 of the electrode diameter, said side surface and said flat end of said electrode mating with each other through a portion which is a part of the external surface of a torus; and a nozzle which has a flat end face and an internal surface having cylindrical and tapering portions, said cylindrical portion having a length selected to correspond to the arc current and adjoining said nozzle flat end face, said tapering portion facing said flat end face of said electrode, said tapering and cylindrical portions being mated with each other along a radius that is substantially equal to the length of said cylindrical portion of the internal surface of said nozzle so as to make a part of the internal surface of a torus, and said flat



electrode end face being spaced from said nozzle end face at a distance approximately equal to 1.5 diameters of said electrode flat end face.

4,059,744

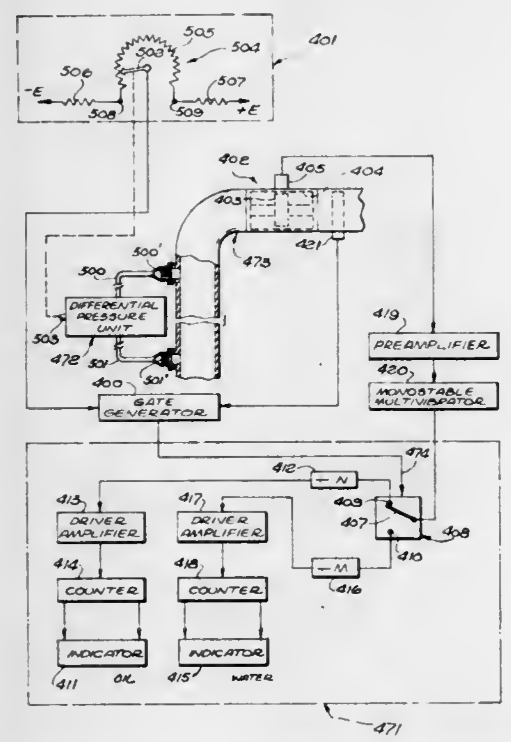
NET OIL COMPUTER OR THE LIKE

Peter P. Elderton, Fountain Valley, Calif., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Dec. 8, 1976, Ser. No. 748,459

Int. Cl.² G06M *3/08;* G01N *11/00*

U.S. Cl. 235—92 FL **6 Claims**



1. A net oil computer or the like for producing an output directly proportional to the total mass or volume flow of at least one of first and second fluids flowing as a mixture in a pipeline, said computer comprising: first means having an output lead and connected with the pipeline for producing first pulses on said first means output lead at a pulse repetition frequency directly proportional to the volume rate of flow of both fluids in said pipeline; second means connected with the pipeline for producing an output directly proportional to the difference in pressures at two different elevations in the pipeline in which the mixture of the first and second fluids can flow; third means for producing an output directly proportional to the density of the first fluid; fourth means for producing an output directly proportional to the density of the second fluid; a switch having first input lead connected from said first means output lead to receive said first pulses, said switch having at least one output lead, said switch having a second input lead and being electrically operable upon receipt of a pulse on said second input lead to change the connection between the first input and the output lead of said switch; and fifth means connected from said second, third and fourth means to receive the outputs thereof and adapted to impress second pulses on the second input lead of said switch to cause first pulses to be passed and interrupted alternately from the first input lead to the output lead of said switch.

4,059,745

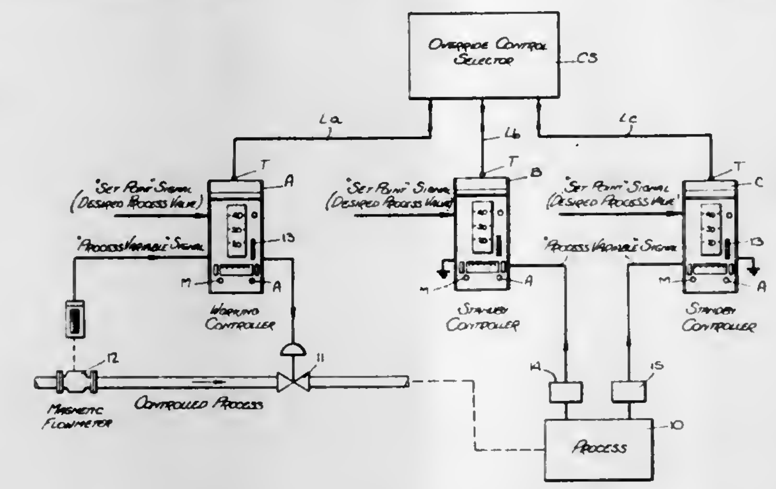
OVERRIDE PROCESS CONTROL SYSTEM

Max H. Gaertner, Warminster, Pa., assignor to Fischer & Porter Co., Warminster, Pa.

Filed Sept. 29, 1976, Ser. No. 727,667

Int. Cl.² G05B *11/01*

U.S. Cl. 364—108 **9 Claims**



1. An override process control system for regulating a process from a single final control element from at least two process variables that are interdependent and must not exceed safe minimum and maximum limits, the first process variable being directly influenced by the setting of the final control element, said system comprising:

A. a primary electronic process controller responsive to the first process variable to compare this variable with a first set point to produce in a non-override mode a first output signal that reflects the deviation of the first process variable from the set point and is applied to said final control element to govern this element accordingly;

B. a standby electronic process controller responsive to the second process variable to compare this variable with a second set point to produce in the non-override mode a second output signal that reflects the deviation of the second process variable from the set point, which second signal under certain conditions may assume an unsafe value to produce an unsafe signal; and

C. an override control selector station coupled by individual lines to said controllers to monitor the operations thereof, and in the event an unsafe signal is received from the standby controller, to cause said controllers to operate in an override mode in which the primary controller responds to the unsafe signal from the standby controller to govern the final control element accordingly.

4,059,746

PULSE DISTRIBUTION APPARATUS FOR LINEAR INTERPOLATION IN A NUMERICAL CONTROL SYSTEM

Kyosuke Haga, Anjo, Japan, assignor to Toyoda-Koki Kabushiki-Kaisha, Japan

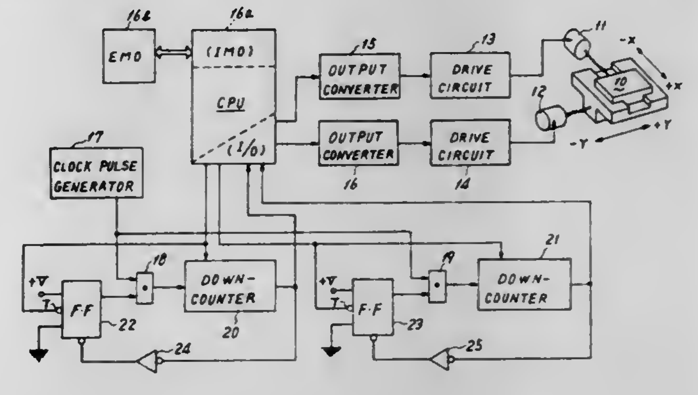
Filed Dec. 29, 1976, Ser. No. 755,140

Claims priority, application Japan, Feb. 25, 1976, 51-20338

Int. Cl.² G05B *19/28*

U.S. Cl. 364—107 **7 Claims**

1. A pulse distribution apparatus for distributing drive pulses to drive a plurality of servomechanisms in a numerical control system to thereby displace a movable member along a line segment to be linearly interpolated, comprising:
a digital computer connected with said servomechanisms;
a clock pulse generator for generating clock pulses at a predetermined frequency;
a plurality of presettable counter means each respectively associated with one of said plurality of servomechanisms and each connected to said digital computer to receive a preset value therefrom and to said clock pulse generator to receive said clock pulses for generating an output command to said digital computer when receiving said clock pulses corresponding in number to said preset value therein; and
gate means respectively connected between said counter means and said clock pulse generator for inhibiting the transmitting of said clock pulses to the corresponding counter means when the same generates said output command;



said digital computer including:
means for calculating from numerical control data the time which is required for said movable member to travel over the entire length of said line segment at a commanded feed rate,
means for calculating periods for pulse distribution cycles for said respective servomechanisms, each of said cycles being determined to assign within said required time all of pulses to be distributed to one of said axes relating thereto, and
means for distributing one drive pulse to one of said servomechanisms and for supplying the value of the period of one of said distribution cycles for said one servomechanisms as said preset value to one of said counter means each time the same generates said output command.

4,059,747

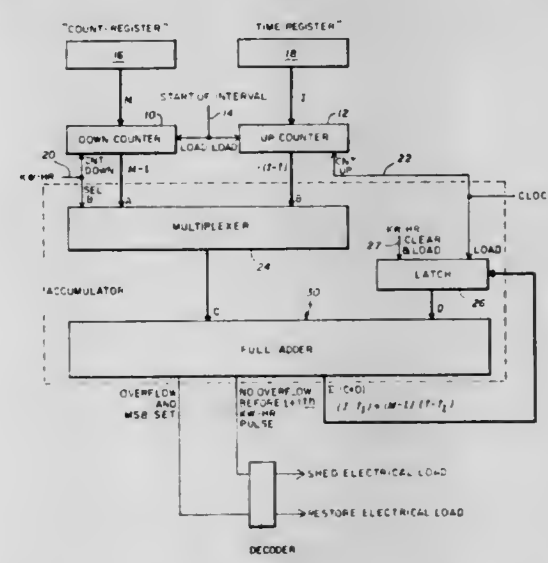
DEMAND CONTROLLER

Mitchell D. Brody, 77 Gibbs St., Brookline, Mass. 02146

Filed June 8, 1976, Ser. No. 693,865

Int. Cl.² G06F *15/56*

U.S. Cl. 364—493 **12 Claims**



1. A system for controlling a load means to forecast power consumption and maintain the total electrical power demand below a predetermined peak value, said system comprising;

first counting means operated by kilowatt-hour pulses for continuously registering a count corresponding to the number of kilowatt-hour pulses needed to reach a target count indicative of a peak demand count,

means for generating clock pulses,

second counting means operated by said clock pulses for continuously registering a count corresponding to the time remaining in the demand interval,

accumulator means,

and selector means responsive to said kilowatt-hour pulses and said clock pulses and including means for loading the contents of the second counting means into the accumulator means and means for thereafter combining the contents of the first counting means with the contents of the second counting means upon the occurrence of each clock pulse.

4,059,748

COMPUTER ACCOUNTING SYSTEM

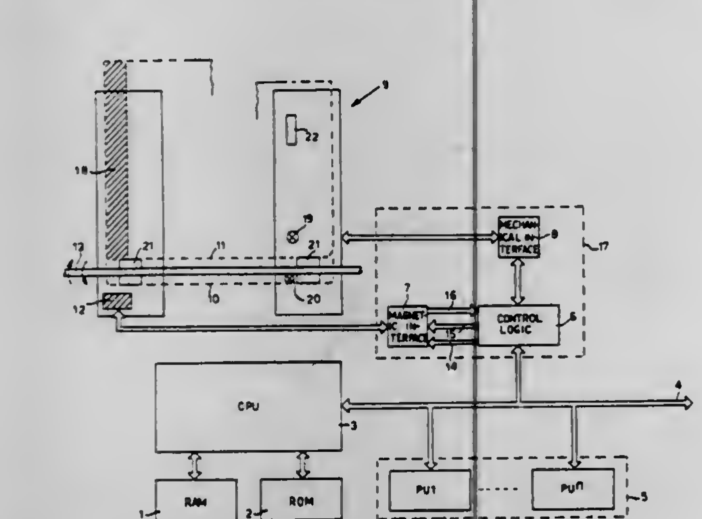
Ettore Violino, Ivrea (Turin), Italy, assignor to Ing. C. Olivetti & C., S.p.A., Ivrea (Turin), Italy

Filed Mar. 4, 1976, Ser. No. 663,951

Claims priority, application Italy, Apr. 8, 1975, 67888/75

Int. Cl.^{2} G06F *11/00*

U.S. Cl. 235—303.1 **4 Claims**



1. A computerized accounting system for reading and writing information comprising:

a first memory for storing microinstructions arranged in a plurality of microprograms;

a processor connected to said first memory for processing said plurality of microprograms;

at least one peripheral unit connected to said processor for processing cards having a magnetic track, said peripheral unit including an insertion device for handling said cards and a control unit connected to said insertion device and said processor for enabling said peripheral unit to perform reading or writing operations in response to particular microprograms stored in said first memory and processed by said processor, said control unit including means for writing information on said magnetic track during said writing operation and means for reading information from said magnetic track during said reading or writing operations;

a first register connected to said processor adapted to record the number of times that an operation of reading or writing on said magnetic track has been executed, wherein said processor comprises error detecting means responsive to said reading means for detecting reading or writing errors in said magnetic track during said reading or writing operations and repeating means responsive to the contents of said first register and said error detecting means for repeating the operation until either the operation is performed without an error being detected or said first register indicates that the operation has been repeated a predetermined number of times.

4,059,749

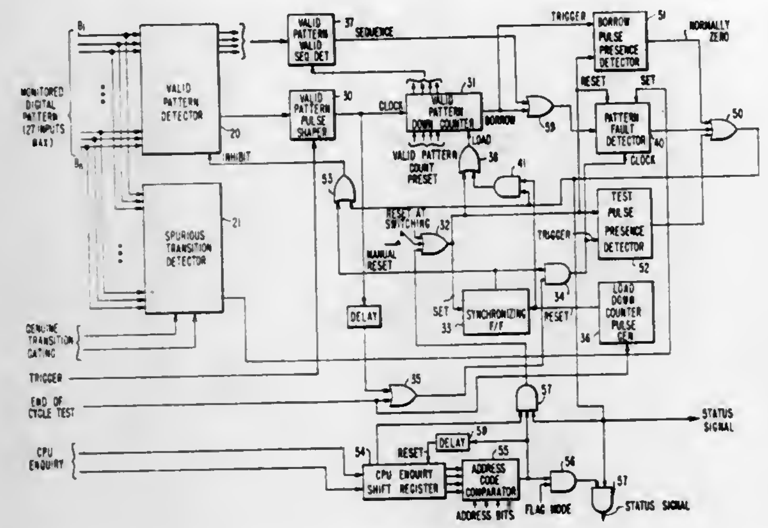
DIGITAL MONITOR

Michal M. Feilchenfeld, Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Nov. 9, 1976, Ser. No. 740,280

Int. Cl.^{2} G06F *11/00*

U.S. Cl. 235—302 **5 Claims**



1. Apparatus for determining the operational status of a digital system comprising:

a. first means for receiving as an input digital signals, each of said signals including a plurality of bits having a predictable bit pattern indicative of the operational status of said digital system, and for generating in response thereto a pattern fault signal for each of said digital signals having an unexpected bit pattern;

b. second means for receiving as an input said digital signals and for in response thereto generating an error signal for each pattern found to be in an unexpected sequence; and

c. third means for combining said pattern fault and said error signals to generate a composite status signal indicative of the operation status of said digital system.

4,059,750

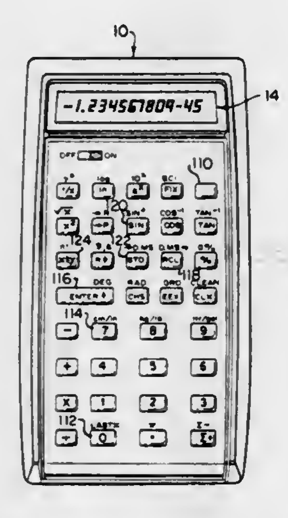
GENERAL PURPOSE CALCULATOR HAVING SELECTIVE DATA STORAGE, DATA CONVERSION AND TIME-KEEPING CAPABILITIES

Peter D. Dickinson, Monte Sereno; Thomas E. Osborne, San Francisco; France Rode, and Allen J. Baum, both of Los Altos, all of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Continuation of Ser. No. 364,570, May 29, 1973, abandoned. This application Apr. 8, 1975, Ser. No. 566,143

Int. Cl.^{2} G06F *13/00*

U.S. Cl. 364—715 **8 Claims**



1. An electronic calculator comprising:

an input unit including a plurality of manually operable keys having key codes assigned thereto for entering information into, and initiating mathematical operations performed by, the calculator, said plurality of keys including a class of numeric and non-numeric keys having unique key codes assigned thereto;

a first memory unit coupled to the input unit for storing information received therefrom and for storing results of operations performed by the calculator;

a second memory unit coupled to the first memory unit for storing information received therefrom;

a processing unit having arithmetic means coupled to the input and first memory units for executing mathematical operations performed by the calculator employing the information or results stored in the first memory unit and storing the results of executed operations in the first memory unit, and having control means coupled to the input, first and second memory units, said control means being automatically responsive to the key code of an actuated key on the input unit for selectively transferring a copy of the information or results previously stored in the first memory unit to the second memory unit prior to storing information entered or results initiated by the actuated key in the first memory unit when the actuated key is one of said class of keys; and

an output display unit coupled to the control means to provide visual display of the information stored in the first memory unit;

the control means also being responsible to the key code of at least one other of the plurality of keys when actuated for selectively transferring a copy of the information entered or results stored in the second memory unit to the first memory unit.

4,059,751

LOGIC CONTROLLED INTEGRATOR

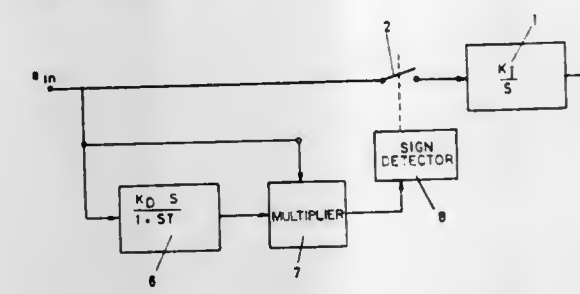
Sven Willner Eriksson, Karlskoga, Sweden, assignor to AB Bofors, Bofors, Sweden

Filed Sept. 29, 1975, Ser. No. 617,557

Claims priority, application Sweden, Oct. 21, 1974, 7413199

Int. Cl.^{2} G06G *7/18*

U.S. Cl. 364—829 **3 Claims**



1. A control system including an integrator controlled by a logic circuit comprising:

an integrator having an input terminal,

switching means for at times connecting an input signal e to said integrator input terminal,

logic means driven by said input signal e for controlling said switching means to connect said input signal e to said integrator input terminal, said logic means including a derivative circuit to produce the derivative $\dot{e}$ of said input signal and in which said logic means forms the product of $e \cdot \dot{e}$.

4,059,752

TROPHY LAMP

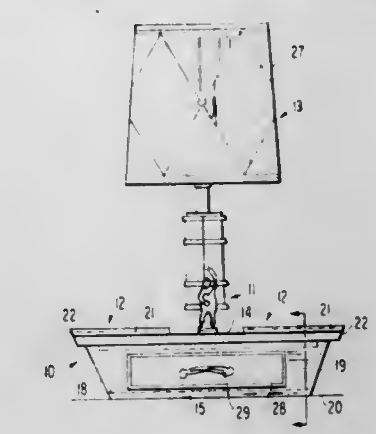
James Henry Pickett, Jr., 1362 Otis Place, NW., Washington, D.C. 20010

Filed Jan. 9, 1976, Ser. No. 647,879

Int. Cl.^{2} F21V *33/00;* A47B *17/04*

U.S. Cl. 362—98 **6 Claims**

1. A trophy lamp comprising a base, a three-dimensional trophy supported fixedly upon said base, a receptacle fixedly supported by said base for displaying a sheet commemorative of the award of said trophy comprising a picture frame having a removable transparent cover, a source of illumination comprising an ornamental pedestal lamp mounted behind said trophy supported by said base and positioned to illuminate said



trophy and sheet, a drawer to receive mementos relating to said trophy, and means for slidably receiving said drawer within said base.

4,059,753

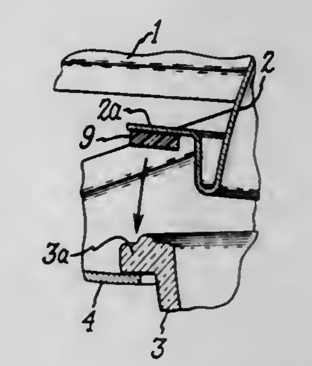
GASKET MATERIAL AND METHOD OF MAKING

David K. Tart, Lenox, Mass., and Mitchell M. Osteen, Zirconia, N.C., assignors to General Electric Company, New York, N.Y.

Filed Apr. 25, 1974, Ser. No. 463,898

Int. Cl.^{2} F21S *13/10*

U.S. Cl. 362—267 **5 Claims**



1. In a luminaire, an optical system comprising a reflector and a light transmitting closure defining a closed optical enclosure, means for mounting a lamp in said enclosure, and a gasket arranged between and compressed by said reflector and said light transmitting closure, said gasket formed of felt material comprising synthetic resin fibers which have been heated at a temperature of about 130° C – 230° C for a sufficient time to appreciably increase the compression recovery thereof.

4,059,754

LOUVER FOR LIGHT DISTRIBUTION

Ian Lewin, Scottsdale, Ariz., assignor to American Louver Company, Skokie, Ill.

Filed Jan. 12, 1976, Ser. No. 648,036

Int. Cl.^{2} F21S *1/06*

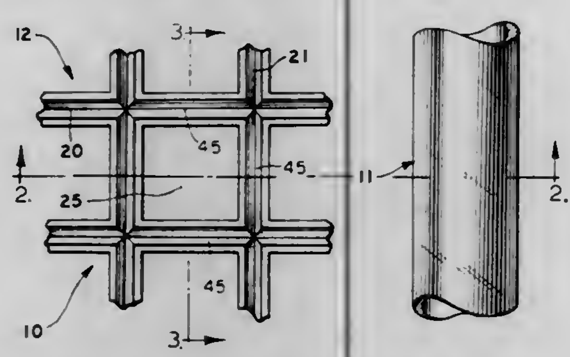
U.S. Cl. 362—217 **4 Claims**

1. In a lighting fixture assembly including an elongated lamp surmounting a louver unit which has first vertically orientated blades extending longitudinally of the axis of the elongated lamp and second vertically orientated blades extending transversely of the axis of the elongated lamp whereby said blades form a plurality of cells between opposed side surfaces of said blades and the cells are open from the upper surfaces of the blades to the lower surfaces thereof, the improvement comprising:

a. in at least a substantial majority of the cells, the opposed side surfaces on said first blades each having at least a portion thereof curved about a horizontal axis,

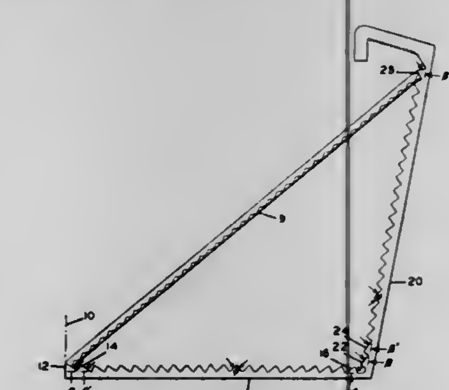
b. in said cells the opposed side surfaces on said second blades each having at least a portion thereof curved about a horizontal axis,

c. the radius of curvature of said curved surface portion on each of said first longitudinally extending blades being smaller than the radius of curvature of said surface portion on each of said second transversely extending blades



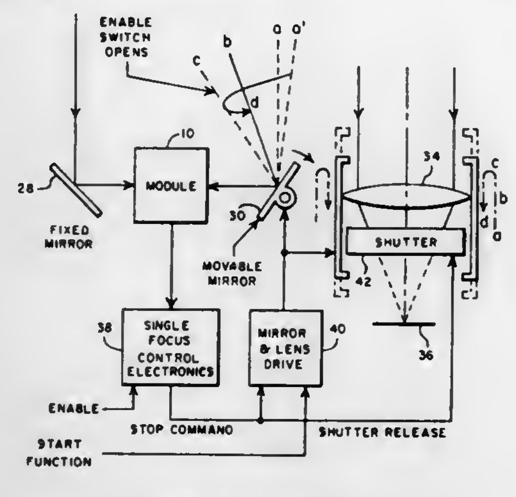
whereby light rays emitted from said elongated lamp longitudinally thereof strike said second transversely extending blades and are reflected at a greater angle to the vertical than light which is emitted transversely of said elongated lamp and strikes said side surfaces of said first longitudinally extending blades to provide a substantially uniform light effect.

4,059,755
LUMINAIRE LENS INSERT
Grafton K. Brabson, Quarryville, Pa., assignor to Armstrong Cork Company, Lancaster, Pa.
Filed Dec. 29, 1975, Ser. No. 644,754
Int. Cl.^{2} F21V *5/04*
U.S. Cl. 362—224 **2 Claims**



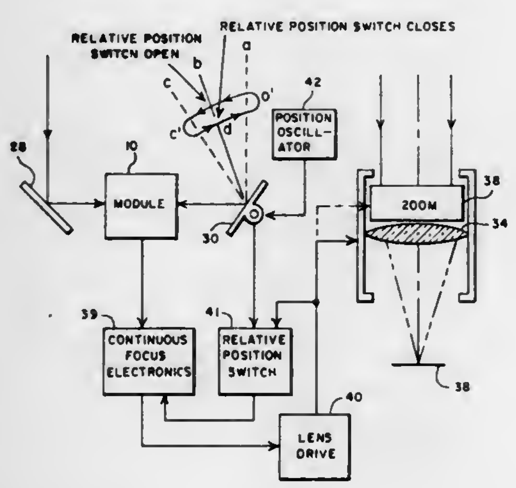
1. An elongated luminaire for illuminating an area therebelow comprising a linear light source, an elongated primary prism having a bottom section formed with a series of parallel prisms extending from the center of the bottom section of the luminaire to the edge of the luminaire, said prisms having an included angle fixed in size and an included angle which increases in size as one progresses from the centermost prism to the edgemost prism of the bottom section, said prisms being formed on the sides thereof facing the light source, said prisms constituting light incident and light emergent surfaces for redirecting and emitting light rays from the light source generally away from a vertical plane passing through the axis of the linear light source and into annular ranges on either side thereof, and a lens insert means between the light source and the primary prism, said lens insert having prisms on the side thereof facing away from the light source, the distribution of light from both the primary prism and lens insert being such that substantially half of the light distribution will emit in an area of 0° to 30° from the vertical plane and substantially the other half of the light is distributed in an area from 30° to 60° from the vertical plane, and the light actually is distributed in two zones either side of the vertical plane.

4,059,756
FOCUS CONTROL SYSTEM WITH DUAL SCAN
Dennis J. Wilwerding, Littleton, Colo., assignor to Honeywell Inc., Minneapolis, Minn.
Filed Oct. 1, 1976, Ser. No. 728,566
Int. Cl.^{2} G01U *1/20*
U.S. Cl. 250—201 **42 Claims**



1. An optical system comprising:
lens means for providing a primary image of an object;
scanning means for providing first and second scans of an auxiliary image of the object;
range sensing means for receiving the auxiliary image and providing a correlation signal having a major extremum in each scan indicative of the distance to the object;
extremum sensing means for receiving the correlation signal and providing an output signal which changes from a first to a second state only once during the second scan;
lens drive means for moving the lens means in a predetermined relationship with the scanning means during the second scan; and
focus control means for halting motion of the lens means in response to the change of state of the output signal.

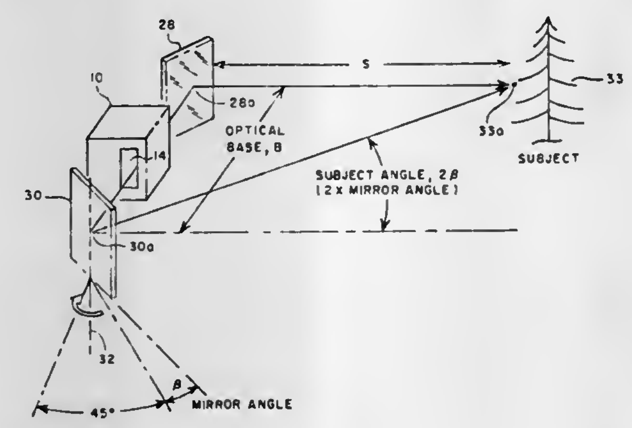
4,059,757
FOCUS SYSTEM FOR MOVIE CAMERAS
Dennis J. Wilwerding, Littleton, Colo., assignor to Honeywell Inc., Minneapolis, Minn.
Filed Oct. 1, 1976, Ser. No. 728,567
Int. Cl.^{2} G01J *1/20*
U.S. Cl. 250—201 **35 Claims**



1. An optical system comprising:
lens means for providing a primary image of an object.
scanning means for providing a plurality of scan cycles, each scan cycle comprising first and second scans of an auxiliary image of the object;
range sensing means for receiving the auxiliary image and providing a correlation signal having a major extremum in each scan indicative of the distance to the object;
extremum sensing means for receiving the correlation signal

and providing an output signal which changes from a first to a second state only once during the second scan;
relative position sensing means for producing a position signal having a third state when the scanning means and the lens means have a first positional relationship and having a fourth state when the scanning means and the lens means have a second positional relationship;
focus control means for producing a position correction signal which is a function of the state of the position signal when the output signal changes from the first to the second state during the second scan; and
lens drive means for positioning the lens means in response to the position correction signal.

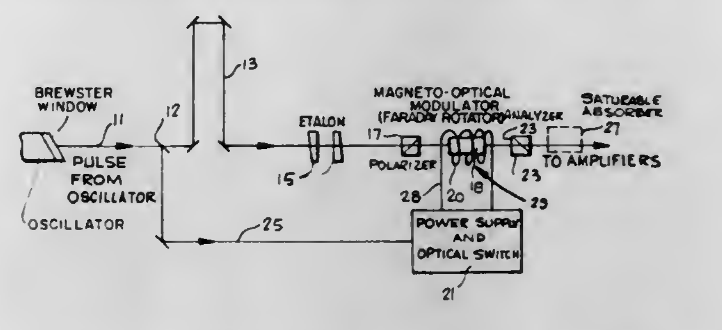
4,059,758
AUTOFOCUS SYSTEM
Dennis J. Wilwerding, Littleton, Colo., assignor to Honeywell Inc., Minneapolis, Minn.
Filed Oct. 7, 1976, Ser. No. 730,489
Int. Cl.^{2} G01J *1/20*
U.S. Cl. 250—201 **13 Claims**



1. An optical system comprising:
lens means for providing a primary image of an object;
scanning means for providing first and second scans of an auxiliary image of the object;
range sensing means for receiving the auxiliary image and providing a correlation signal having a major extremum during the first scan;
position sensing means for providing a position signal indicative of the position of the scanning means;
storing means for storing the value of the position signal when the major extremum occurs during the first scan;
lens drive means for moving the lens means in a predetermined relationship with the scanning means during the second scan; and
focus control means for halting motion of the lens means during the second scan when the position signal attains the value stored by the storing means.

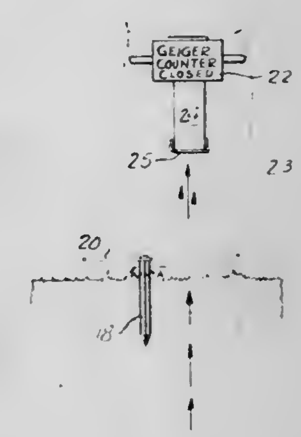
4,059,759
PASSIVE AND ACTIVE PULSE STACKING SCHEME FOR PULSE SHAPING
Robert C. Harney, Livermore, and John F. Schipper, Palo Alto, both of Calif., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.
Filed May 25, 1976, Ser. No. 689,766
Int. Cl.^{2} H01J *39/12;* **G02B** *27/10;* **G02F** *1/01, 1/03*
U.S. Cl. 250—206 **38 Claims**

1. Apparatus for producing, from a pulsed beam of light, a sequence of light pulses with a pulse envelope of controllable time variation, the apparatus comprising:
at least two partially transmissive reflective means, spaced apart and positioned to intercept the beam, for producing a sequence of light pulses in response to the original pulse;
means for linearly polarizing the radiation;
analyzer means, with the direction of linear polarization oriented at a fixed angle relative to the polarization direction of the polarizer means and positioned to receive the light transmitted by the polarization means, for transmitting only that component of polarized radiation oriented along the polarization direction of the analyzer means;
a magneto-optical modulator positioned intermediate between the polarizer means and the analyzer means;



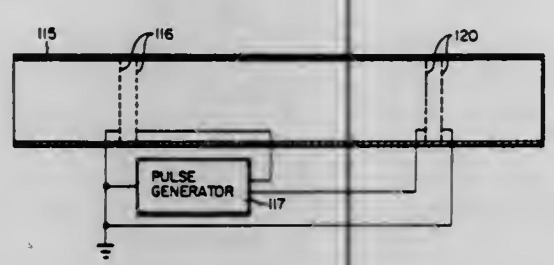
power supply and optical switch means for externally producing a controllable, time-varying electromagnetic signal at the magneto-optical modulator in response to receipt of a portion of the incoming beam of light; and
pulse directing means for directing a portion of the incoming light beam into the power supply and optical switch means.

4,059,760
GEORADIOLOGICAL SURVEYING FOR OIL AND GAS AND SUBSURFACE STRUCTURE CONTOUR MAPPING
John A. Murphy, 920 E. 36th Place, Tulsa, Okla. 74105
Continuation-in-part of Ser. No. 525,002, Nov. 18, 1974, abandoned. This application July 6, 1976, Ser. No. 702,607
Int. Cl.^{2} G01V *5/00*
U.S. Cl. 250—253 **2 Claims**



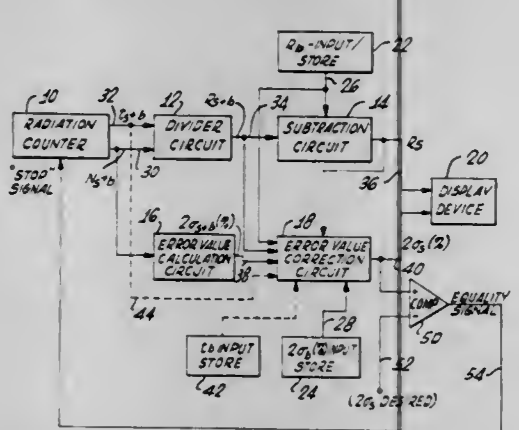
1. A prospecting system using georadiograph techniques comprising the steps of selecting an area to be surveyed, subdividing the area into a plurality of equal squares, placing an identifying check point number at each corner and also in the center of each of the squares, measuring with a geiger counter the background radiation at each check point from a point spaced above the ground with the geiger counter receiving tube closed, measuring with a geiger counter the ground level radiation at each check point with the geiger counter receiving tube open and pressed flat against the ground, subtracting the two measurements to determine if there has been a reduction in radiation as said radiation passed through the earth, and using these subtracted radiation figures to plot a contour georadiograph map of the area.

4,059,761
SEPARATION OF ISOTOPES BY TIME OF FLIGHT
John Myrick Dawson, Pacific Palisades, Calif., assignor to TRW Inc., Redondo Beach, Calif.
Division of Ser. No. 562,993, March 27, 1975. This application Feb. 17, 1976, Ser. No. 658,566
Int. Cl.² H01J *39/24*
U.S. Cl. 250—287 3 Claims



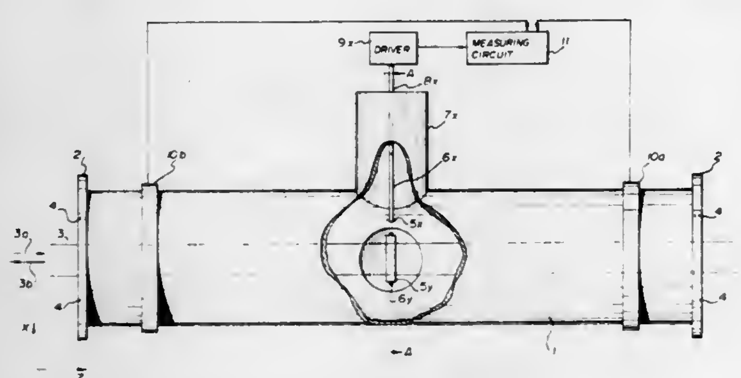
1. The method of separating one isotope of an element from the others which comprises the steps of:
a. generating a dense, substantially neutral plasma including an element having at least two ionized isotopes to be separated;
b. generating a substantially steady magnetic field extending through the plasma for confining the plasma;
c. imparting more energy to a selected isotope than to the other isotopes while the element is in the magnetic field by subjecting the isotopes to a pulsed electric accelerating field; and
d. subsequently separating the accelerated isotopes by their differential time of flight due to their different velocity corresponding to their different mass.

4,059,762
METHOD AND APPARATUS FOR DETERMINING ACCURACY OF RADIATION MEASUREMENTS MADE IN THE PRESENCE OF BACKGROUND RADIATION
Donald L. Horrocks, Placentia, Calif., assignor to Beckman Instruments, Inc., Fullerton, Calif.
Filed May 17, 1976, Ser. No. 686,973
Int. Cl.² G01T *1/20*
U.S. Cl. 250—336 10 Claims



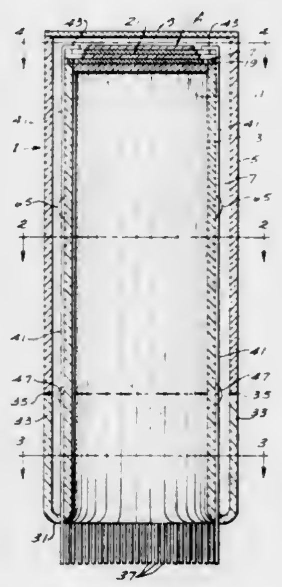
1. A method of determining the accuracy of a measurement of radioactivity of a sample alone when taken in the presence of background radiation, said method comprising the steps of:
measuring the background radiation alone;
measuring radiation from the sample in the presence of said background radiation;
determining error values respectively related to said measuring steps;
determining the radiation attributable to the sample alone, by subtracting the result of said first-mentioned measuring step from the result of said second-mentioned measuring step; and
determining the accuracy of the result of said last-mentioned step by combining the error values related to said measuring steps.

4,059,763
ELECTRON BEAM CURRENT, PROFILE AND POSITION MONITOR
Edward A. Heighway; Kenneth J. Hohban, and Stanley O. Schriber, all of Deep River, Canada, assignors to Atomic Energy of Canada Limited, Ottawa, Canada
Filed Nov. 30, 1976, Ser. No. 746,133
Claims priority, application Canada, Mar. 2, 1976, 246958
Int. Cl.² G01T *1/16*
U.S. Cl. 250—336 10 Claims



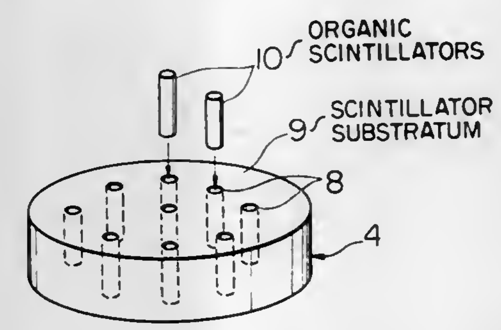
1. An electron beam monitor comprising:
a. foil means having surface of width w_1 and length l_1 where w_1 is smaller than the electron beam cross-section and l_1 is greater that the electron beam cross-section, said foil means producing bremsstrahlung radiation when the surface is struck by electrons from the electron beam;
b. means for moving the foil means transversely through the electron beam path with the surface facing the electron beam;
c. radiation detector means located circumferential about the beam path at a distance displaced from the foil means in the direction of beam travel for detecting radiation from the foil means produced by the electron beam; and
d. means for measuring the intensity of the radiation detected as a function of the position of the foil means in the beam path.

4,059,764
MULTI-ELEMENT INFRA RED SENSORS
Melvin Belasco, Dallas, and Billie Joe Cottongim, Richardson, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.
Filed Aug. 13, 1968, Ser. No. 752,196
Int. Cl.² G01J *1/00*
U.S. Cl. 250—352 11 Claims



1. A multi-element infra-red sensor comprising a glass Dewar tube having a tubular glass core open at one end and closed by a metallic plug at the other and a jacket surrounding the core with a space therebetween, said space being evacuated, the jacket extending beyond the closed end of the core and having an infra-red transmitting window at its end beyond the closed end of the core, a printed circuit member on the closed end of the core, said member having a face toward said window and a pattern of electrically conductive leads printed on its said face including a generally central common lead, an array of infra-red sensing elements on said common lead in ohmic connection therewith, said pattern further comprising a plurality of printed leads, one for each sensing element, radiating out toward the margin of said member from points adjacent but spaced from said common lead and having their outer ends spaced at intervals around said margin, electrical interconnections between said sensing elements and the inner ends of said radiating printed leads, and means extending longitudinally of the core from the outer ends of said radiating printed leads and from said common lead for interconnecting each sensing element in an electrical circuit with terminals on the outside of the Dewar tube.

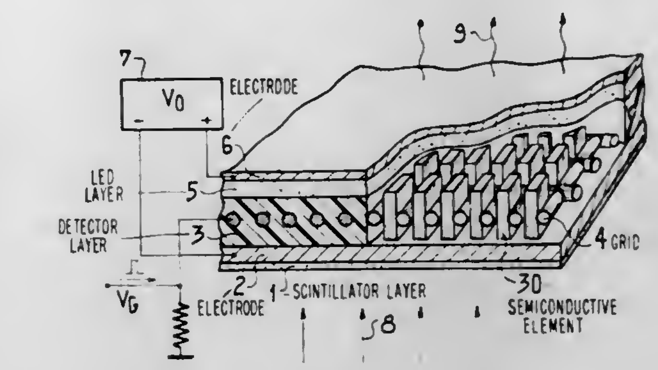
4,059,765
GAMMA-RAY SCINTILLATION DETECTOR
Hatsumi Tatsuta, and Shigeru Kumazawa, both of Mito, Japan, assignors to Japan Atomic Energy Research Institute, Tokyo, Japan
Filed Apr. 14, 1976, Ser. No. 676,803
Claims priority, application Japan, Apr. 24, 1975, 50-49996
Int. Cl.² G01T *1/20*
U.S. Cl. 250—367 2 Claims



1. A γ-ray scintillation detector for measuring radiation dose rate comprising:
a scintillator substratum provided with a plurality of independent scintillators,
a photomultiplier tube facing the scintillator substratum, and
a light shielding shutter locating between the scintillator substratum and the photomultiplier, the opening of said shutter through which light passes through being adjustable.

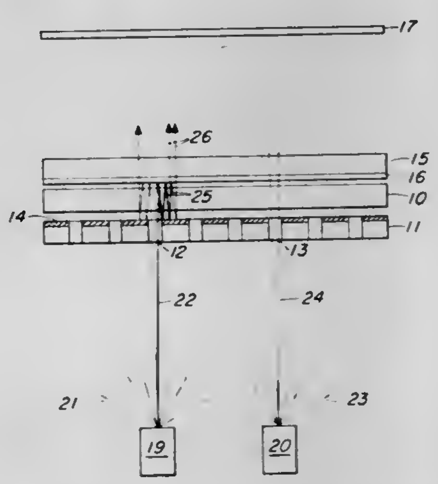
4,059,766
DEVICE FOR VISUALIZING DATA PRESENTED IN THE FORM OF RADIANT ENERGY
Henri Rougeot, Paris, France, assignor to Thomson-CSF, Paris, France
Filed Dec. 6, 1976, Ser. No. 747,791
Claims priority, application France, Sept. 12, 1975, 75.37663
Int. Cl.² G01T *1/22*
U.S. Cl. 250—370 17 Claims

1. A device for the visualisation of data presented in the form of radiant energy, comprising:
a first layer which receives said incident radiant energy and which releases photons, the number of which is dependent at any point upon the intensity of said incident radiation;
a detector layer, formed by a mosaic of semiconductor elements receiving said photons and which release electrical charge carriers;
a conductive grid, arranged in such a way that each of said semiconductor elements is accommodated in a mesh of said grid and is in electrical contact therewith;
means for biasing said grid and said detector layer to produce a spatial distribution of electrical charges, represent-



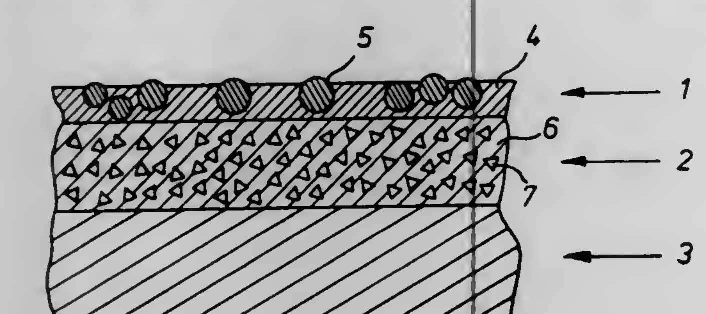
ing said incident radiation, on that surface of said detector layer which is opposite said first layer;
means for visualising said distribution of charges.

4,059,767
BACK-ILLUMINATED TRANSPARENCY CONTRAST ENHANCEMENT SYSTEM
Albert Macovski, Menlo Park, Calif., assignor to Maxim Diagnostic Imaging, Palo Alto, Calif.
Filed Dec. 27, 1976, Ser. No. 747,424
Int. Cl.² G01N *21/38;* G02B *21/06*
U.S. Cl. 250—461 R 21 Claims



1. Apparatus for enhancing the contrast of a transparency as seen by a viewer comprising:
ans aperture structure in substantial contact with the non-viewing side of the transparency having an array of transparent regions and having a light converter surface in the non-transparent regions for converting invisible light to visible light;
a reflective means having a reflective surface in substantial contact with the viewing side of the transparency; and
means for transmitting a first light component which is invisible to the viewer through the array of transparent regions and, after passing through the transparency, is reflected by the reflective means back through the transparency to the converter surface where it is converted into visible light which is transmitted through the transparency and the reflective means whereby the viewer sees a contrast enhancement of the transparency.

4,059,768
RADIOGRAPHIC INTENSIFYING SCREENS
Willy Karel Van Landeghem, Sint-Gillis-Waas, and André Roger Suys, Kalmthout, both of Belgium, assignors to AGFA-GEVAERT N.V., Mortsel, Belgium
Filed Apr. 12, 1976, Ser. No. 675,990
Claims priority, application United Kingdom, Apr. 15, 1975, 15510/75
Int. Cl.² G01J *1/58*
U.S. Cl. 250—483 **15 Claims**



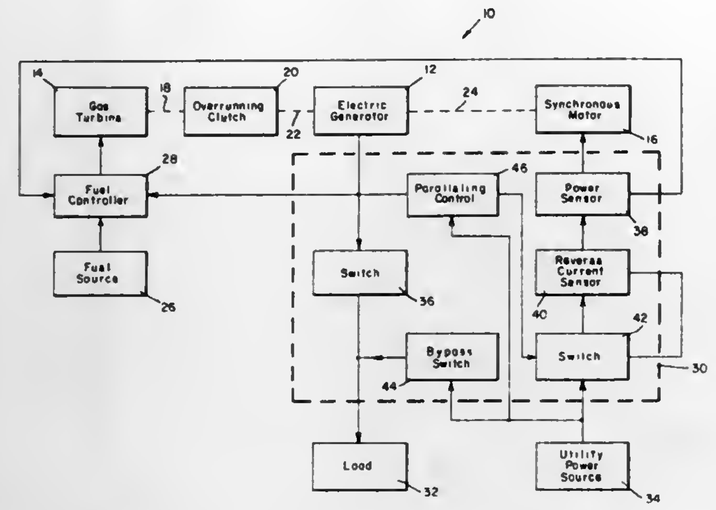
1. Fluorescent X-ray image intensifying screen comprising discrete particles of fluorescent material dispersed in a binder layer which screen has an outermost layer overlaying said binder layer containing solid particulate material protruding from a coherent film-forming organic binder medium and having a static friction coefficient at room temperature not higher than 0.50 on steel.

4,059,769
STARTING MATERIAL RADIATION SOURCE FOR MOSSBAUER INVESTIGATIONS OF TELLURIUM COMPOUNDS
Anatoly Julianovich Alexandrov, ulitsa Butlerova, 10, kv. 112, Moscow; July Sergeevich Grushko, ulitsa Koli Podryadchikova, 16, kv. 40, Gatchina Leningradskoi oblasti; Evgeny Fredovich Makarov, Trubnikovsky pereulok, 11, kv. 3, Moscow; Konstantin Yakovlevich Mishin, ulitsa Kirgetova, 23, kv. 73, Gatchina Leningradskoi oblasti, and Daljus Antanas Jono Baltrunas, ulitsa Zhirmunu 17, kv. 27, Vilnjus Litovskoi SSR, all of U.S.S.R.
Division of Ser. No. 554,705, March 3, 1975, Pat. No. 4,004,970. This application July 6, 1976, Ser. No. 702,617
Int. Cl.² G21G *4/00*
U.S. Cl. 250—493 **3 Claims**

1. A radiation source for Mossbauer investigations of tellurium compounds consisting of $5MgO.Te^{125m}O_3$.

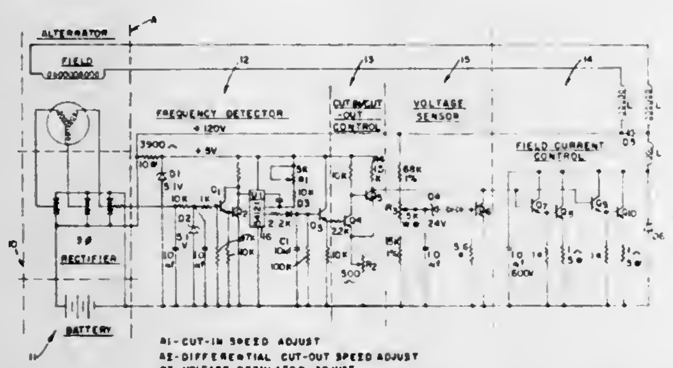
4,059,770
UNINTERRUPTIBLE ELECTRIC POWER SUPPLY
Robin Mackay, Palos Verdes Peninsula, Calif., assignor to The Garrett Corporation, Los Angeles, Calif.
Filed Oct. 15, 1974, Ser. No. 514,728
Int. Cl.² H02K *7/18*
U.S. Cl. 290—4 C **14 Claims**

1. A combination comprising:
an electric generator;
first and second mover means connected to simultaneously drive said generator; and
means connected for proportioning motive energy to said first and second mover means to maintain generator output frequency constant, and responsive to disability of said first mover means to disengage said first mover means and maintain generator output frequency constant with said second mover means, and responsive to disability of said second mover means to disengage said second mover



means and maintain generator output frequency constant with said first mover means.

4,059,771
WIND ELECTRIC PLANT WITH IMPROVED ALTERNATOR FIELD EXCITATION
Marcellus L. Jacobs, and Paul R. Jacobs, both of Rte. 11, Box 722, Fort Myers, Fla. 33901
Filed Nov. 5, 1975, Ser. No. 628,952
Int. Cl.² H02P *9/04*
U.S. Cl. 290—44 **6 Claims**

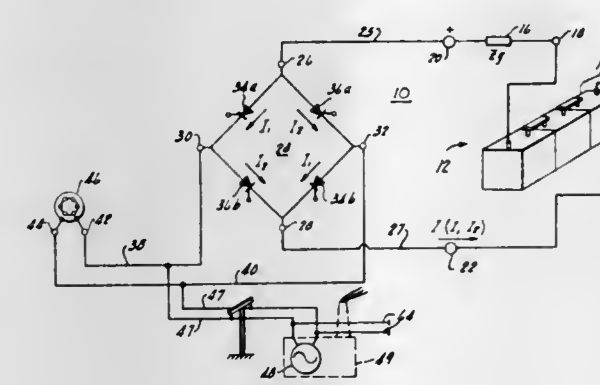


1. In a wind electric plant of the type including a wind driven propeller or the like supported at the top of a tower and connected to drive an alternator supported on the tower to generate electrical energy, and storage battery means connected to be charged by the alternator, the improvement comprising: electrical control circuit means connecting the storage battery means with the field winding of the alternator to supply a substantially constant current to the field winding at substantially all speeds of operation of the wind electric plant within a predetermined range of speeds to excite the field of the alternator and thus obtain full excitation of the alternator field at substantially all speeds of operation of the wind electric plant within said range.

5. A wind electric plant as in claim 1, wherein said electrical control circuit means includes a frequency detector connected with the alternator output to sense the frequency of the alternator and develop a signal representative thereof, a switching means connected with the frequency control means to receive the signals therefrom and operative in response thereto to develop output pulses representative of a predetermined frequency range, a normally disabled field current control means connected with the output of the switching means to receive the signals therefrom and enabled in response to the signals, a rectifier connected with the output of the alternator to rectify the alternating current alternator output, and a voltage sensor connected to receive the rectified output and including means to sense the charging voltage applied to the battery means and operative to develop an output signal in response thereto, said voltage sensor output connected with the field current control means to regulate the amount of current applied to the field of the alternator to thus prevent excessive battery voltage.

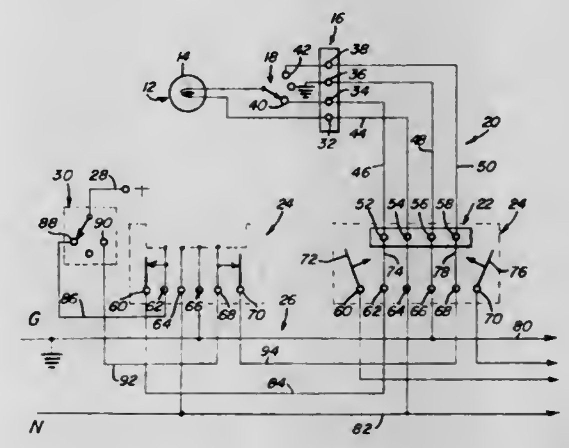
6. A wind electric plant as in claim 5, wherein the frequency detector includes a zener diode connected across the input thereto from the alternator to limit the input to a maximum swing of five volts, a pair of transistors connected to receive the limited input, and having their output connected to an integrated circuit chip which develops a fixed amplitude pulse in response to pulses developed by revolution of the alternator, a variable resistor connected with the integrated circuit to vary the width of the pulses developed thereby, and a storage capacitor connected with the output of the integrated circuit to receive the pulses and store them to obtain an average voltage across the capacitor proportional to the number of pulses per minute of the alternator, a second pair of transistors connected with the capacitor and triggered upon discharge of the capacitor, one of the transistors of said second pair having a threshold selected such that it is turned on when the voltage across the capacitor exceeds a given RPM equivalent of the alternator, and connected to turn the other transistor of said pair of transistors off, thus enabling current flow to the bases of four additional transistors connected together to form two identical series current regulators operated in parallel, and a variable resistor connected across the terminals of the battery and having a tap therefrom connected through a zener diode to the base of a further transistor, whereby when the voltage at the tap of the variable resistor exceeds the value of the zener diode, the further transistor is turned on, said further transistor being shunted across the series current regulators to reduce the field control current available to the field winding of the alternator to thereby prevent any further increase in charging voltage to the battery.

4,059,772
WASTE ENERGY SOURCE UTILIZATION CIRCUIT AND METHOD
Alan W. Wilkerson, 410 Madero Drive, Thiensville, Wis. 53092
Filed Feb. 27, 1976, Ser. No. 662,129
The portion of the term of this patent subsequent to Mar. 23, 1993, has been disclaimed.
Int. Cl.² F03G *7/08;* **H02J** *3/40*
U.S. Cl. 307—46 **78 Claims**



1. A waste energy utilization circuit for energizing an a.c. load coupled to a.c. power mains from a source of waste energy occurring as a by-product of man's activities, said waste energy being applied to said circuit in the form of a corresponding amount of electrical power having a unipolarity voltage characteristic, said circuit comprising:
switching means having a first terminal means couplable to said waste energy source and a second terminal means connectable to the a.c. load and across the a.c. power mains for receiving a periodically varying voltage from the a.c. power mains, said switching means including controllable current conduction means interposed between the first and second terminal means for allowing the polarity of the unipolarity voltage to remain unchanged and for conducting current between said first terminal means and said second terminal means; and
control means coupled to said switching means for rendering said controllable current conduction means conductive for establishing a current flow at said second terminal means during periods when the voltage on said second terminal means causes said utilization circuit to comprise an electrical power source for the a.c. load for providing a net supply of power from the utilization circuit to the a.c. load.

4,059,773
SWITCH CONTROLLED POWER RECEPTACLE SYSTEM
Charles A. Nash, P.O. Box 1271, Chautauqua, N.Y. 14722
Filed July 15, 1976, Ser. No. 705,563
Int. Cl.² H01R *33/30*
U.S. Cl. 307—115 **9 Claims**



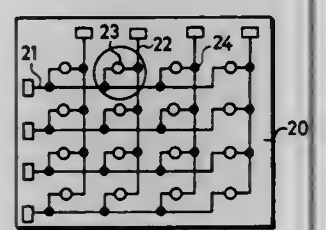
1. In combination with a source of electrical energy, a system of supplying said electrical energy to an electrically operated device, comprising a plurality of plug-in receptacles, a connector device having a plurality of prongs adapted to be inserted into any selected one of said receptacles, means electrically connecting said connector device to the electrically operated device for completing an operating circuit through the electrically operated device, each of said plug-in receptacles having normally closed contact means opened in response to insertion of the prongs into the receptacle, and electrical conduit means interconnecting the receptacles with said source for establishing said operating circuit only through the opened contact means of the selected one of the receptacles in series with the normally closed contact means of those receptacles located between the selected one of the receptacles and the source of electrical energy.

4,059,774
SWITCHING INVERTER WITH THERMOCONDUCTIVE MATERIALS
Olivier Cahen, Paris, France, assignor to Thomson-CSF, Paris, France
Filed May 11, 1976, Ser. No. 685,375
Claims priority, application France, May 13, 1975, 75.14878
Int. Cl.² H03K *3/26, 17/60, 19/08, 23/08*
U.S. Cl. 307—299 R **6 Claims**

1. An inverter logic circuit comprising:
an input terminal;
an output terminal;
a first source terminal;
a second source terminal;
means for respectively connecting the first and second source terminals to a first and a second pole of a d.c. source;
a first switching element, consisting of a first substrate, and, successively deposited on said substrate, a first layer that is electrically resistant and insulated from said substrate, said layer having one end connected to said first source terminal and an other end connected to said input terminal; a second electrically insulating and thermally conductive layer; and a third layer consisting of a thermoconductive

material having one end connected to said first source terminal and another end connected to said output terminal;

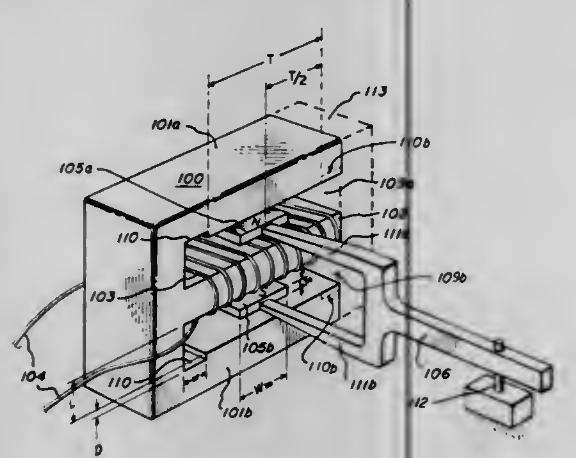
a second switching element consisting of a second substrate, and, successively deposited on said substrate, a fourth layer that is electrically resistant and insulated from said substrate, said fourth layer having one end connected to said second source terminal, and another end connected to said input terminal; a fifth electrically insulating and ther-



mally conductive layer; and a sixth layer consisting of a thermoconductive material having one end connected to said second source terminal and another end connected to said output terminal;

said input terminal adapted to be put alternately at the potential of one or the other of said poles, so as to cause the resistant layer to heat the thermoconductive layer, in order to have the potential of one or the other pole appear at said output terminal.

4,059,775
LINEAR MOTOR
Gary Paul Warmka, Bloomington, Minn., assignor to Control Data Corporation, Minneapolis, Minn.
Filed Nov. 22, 1976, Ser. No. 743,890
Int. Cl.² H02K *33/00*
U.S. Cl. 310—12 **4 Claims**



1. A linear motor comprising

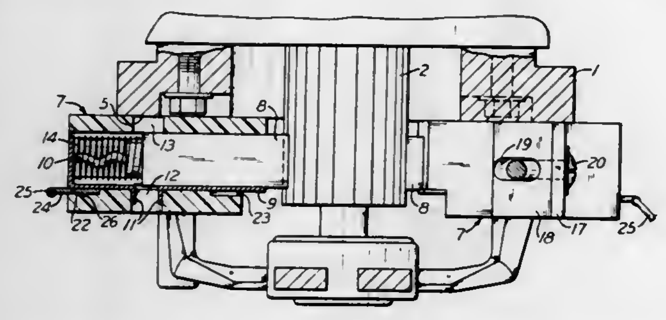
a. an E-shaped field core of ferromagnetic material having a first leg and second and third legs on opposite sides of, substantially parallel to, and spaced apart from the first leg, at least one leg containing a notch adjacent the closed end of the space between adjacent legs;

b. a winding wound on the first leg and forming between itself and the second and third legs first and second slots respectively;

c. first and second substantially rectangular magnets having north and south pole faces opposite faced and spaced apart less than the width of each slot; and

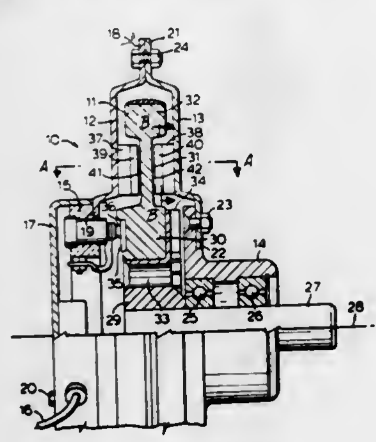
d. rotating arm means for supporting the first and second magnets in the first and second slots respectively, with similar pole faces adjacent the winding, for allowing translation of the magnets along the legs while maintaining the pole faces in substantially the same position during translation of the magnets.

4,059,776
ELECTRIC MOTOR BRUSH MOUNTING
Robert E. Schreiber, and Edward J. Zelt, both of St. Marys, Pa., assignors to Stackpole Carbon Company, St. Marys, Pa.
Filed Apr. 19, 1976, Ser. No. 678,023
Int. Cl.² H02K *13/00*
U.S. Cl. 310—242 **12 Claims**



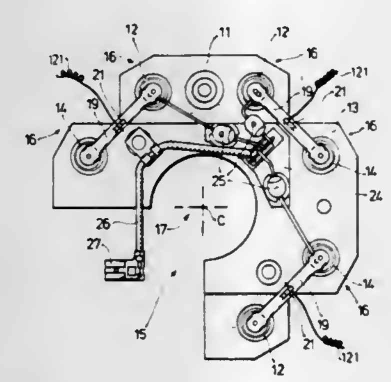
1. In an electric motor having a frame and a commutator rotatably mounted therein, the frame having a brush-receiving recess beside the commutator provided with top and bottom walls, a brush housing made of insulating material disposed in said recess, means holding said housing in fixed position in the recess, a brush disposed in the housing and slidable lengthwise thereof, a stationary metal strip inside the housing between the brush and one side of the housing, the strip extending substantially full length of the housing and having an outer end portion extending transversely of the brush and spaced therefrom, one side of the strip engaging the brush and the other side of the strip engaging the housing, a coil spring compressed between said end portion and the brush for holding the brush against the commutator, a flexible wire electrically connecting the brush with said end portion of the strip, and an electrical conductor engaging said strip.

4,059,777
COOLING OF DISCOIDAL DYNAMOELECTRIC MACHINES
Eric Whiteley, Peterborough, Canada, assignor to Canadian General Electric Company Limited, Toronto, Canada
Filed Sept. 15, 1975, Ser. No. 613,565
Claims priority, application Canada, Sept. 30, 1974, 210350
Int. Cl.² H02K *5/18*
U.S. Cl. 310—64 **22 Claims**



1. An axial gap, disc-type dynamoelectric machine comprising a housing having a pair of oppositely disposed side walls and other wall means defining an enclosure for a cooling fluid; a discoidal rotor located inside said housing spaced from said walls with the axis of the discoid transverse to and in the middle of said side walls; means for supporting said rotor for rotation on said axis; a first field pole structure located inside said housing between one wall thereof and said rotor and having a first plurality of axially oriented pole bodies equally spaced from said axis and spaced apart so as to define radially directed interpolar spaces, said first pole bodies having planar pole faces located very near one planar surfaces of said rotor; a second field pole structure located inside said housing between the other wall thereof and said rotor and having a second plurality of pole bodies oriented axially with said first pole bodies and spaced apart so as to define other radially directed interpolar spaces, said second pole bodies having planar pole faces located very near the other planar surface of said rotor, and fluid directing means for inducing vortical flow of said cooling fluid in said interpolar spaces whereby the fluid transfers heat from the rotor to the housing.

4,059,778
RECTIFIER ASSEMBLY STRUCTURE, PARTICULARLY FOR AUTOMOTIVE-TYPE ALTERNATOR-RECTIFIER COMBINATION
Rüdiger Sohnle, Stuttgart, Germany, assignor to Robert Bosch G.m.b.H., Stuttgart, Germany
Filed Jan. 25, 1977, Ser. No. 762,772
Claims priority, application Germany, Jan. 31, 1976, 2603786
Int. Cl.² H02K *11/00*
U.S. Cl. 310—68 D **15 Claims**



1. Rectifier assembly to rectify the output of a three-phase alternator comprising

first and second heat sink cooling plates (11, 13);

a first group (12) of positive rectifying diode rectifiers secured in electrical and thermal contact to the first plate (11);

a second group (14) of negative rectifying diode rectifiers secured in electrical and thermal contact with the second plate (13);

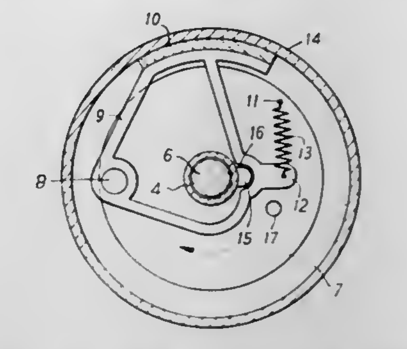
and connecting leads (19) interconnecting the diode groups and the alternator phase windings (121),

wherein, in accordance with the invention,

the first and second heat sink plates (11, 13) are flat, elongated, essentially rectangular plates located radially symmetrically, and axially staggered with respect to the shaft (C) of the alternator and positioned in crossed relation with respect to each other.

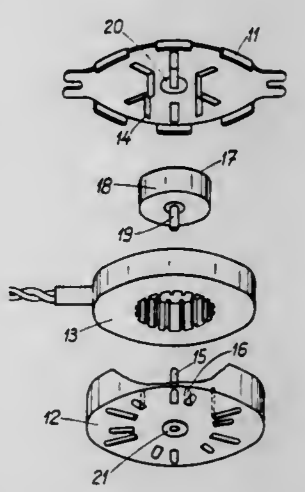
4,059,779
ELECTRIC MOTOR AND BRAKE ARRANGEMENT
Walter Wistinghausen, Bentweg 3, D-4930 Detmold 17, Germany
Filed May 4, 1976, Ser. No. 682,990
Claims priority, application Germany, May 7, 1975, 2520285
Int. Cl.² H02K *7/102*
U.S. Cl. 310—77 **9 Claims**

1. An electric motor and brake arrangement comprising an electric motor, a casing for said motor, a drive shaft for said motor, an output shaft for the arrangement, a support plate mounted on said output shaft for movement therewith and extending radially therefrom, a brake element mounted on said support plate, a brake drum associated with said casing, a brake shoe on said brake element for co-operating with said brake drum, spring means for urging said brake shoe into contact with said brake drum, torque transmitting means on said drive shaft for transmitting torque to said brake element in a direction to release said brake and stop means on said support plate



engageable with said brake element for transmitting torque from said brake element to said support plate.

4,059,780
SYNCHRONOUS MOTOR
Maurice Mazuir, Cluses, France, assignor to Carpano & Pons, France
Filed Dec. 22, 1975, Ser. No. 643,531
Claims priority, application France, Jan. 20, 1975, 75.01653
Int. Cl.² H02K *21/12*
U.S. Cl. 310—164 **2 Claims**



1. In a synchronous motor, a stator comprising a first plate having a plurality of axial poles spaced thereon from each other in a circular configuration and a second plate spaced from the first plate and in opposed relationship therewith, said second plate having a plurality of paired poles arranged in a circular configuration in pairs with the pairs spaced from each other, the individual pairs of poles disposed extending axially between next adjacent poles of the first plate, an induction coil circumferentially of all of said poles, a rotor disposed for rotation within the circular configuration of the poles of said first and second plates and coaxial therewith, the poles on each of said plates having ends spaced from the other opposed plate to define therebetween axial air gaps, the improvement wherein the air gaps defined by some poles of one of said plates have an axial length equal at most to one tenth the axial length of said some poles, and up to a maximum axial length of 1.2 mm.

4,059,781
SHADOW MASK EACH APERTURE OF WHICH IS DEFINED BY A QUADRUPOLAR LENS

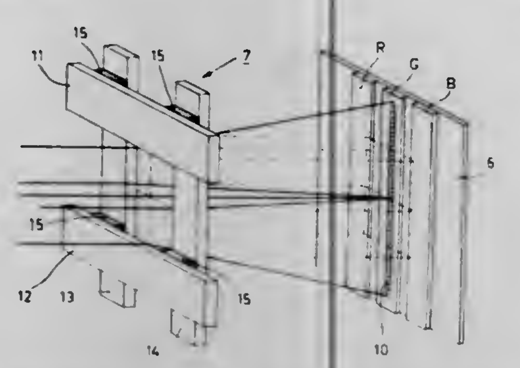
Willem Meijndert van Alphen, and Jan Verweel, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 590,315, June 25, 1975, abandoned. This application Mar. 22, 1977, Ser. No. 780,026

Claims priority, application Netherlands, July 17, 1974, 7409642

Int. Cl.² H01J *29/07, 31/20*

U.S. Cl. 313—403 **8 Claims**



1. A color television image producing tube comprising, an evacuated envelope, means to generate a plurality of electron beams, a display screen having a plurality of regions of elongate form luminescing in different colors, means for selectively impinging said beams each upon a respective luminescent color region, said means comprising an apertured electrode system interposed between said beam generating means and said display screen, said apertured electrode system comprising a plurality of quadrupolar lenses each defining an aperture for the passage of said beams to an associated color region of said screen, said quadrupolar lens comprising two pairs of electrode elements arranged in space quadrature, the electrode elements of each pair being arranged in spaced opposing relationship transverse to the path of said beams through the aperture oppositely confronting electrodes of said pairs operating at the same potential and adjacently positioned electrodes of said pairs operating at a potential difference whereby electrostatic fields having substantially hyperbolic configurations are formed between each adjacent pair of said electrodes.

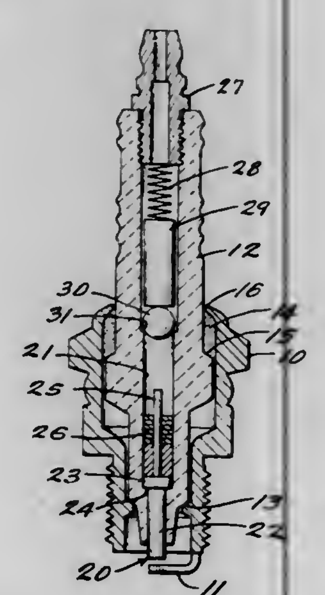
4,059,782
SPARK PLUG

Lawrence R. Lentz, Toledo, Ohio, assignor to Champion Spark Plug Company, Toledo, Ohio

Continuation-in-part of Ser. No. 701,582, July 1, 1976, abandoned. This application Apr. 4, 1977, Ser. No. 784,045

Int. Cl.² H01T *13/20*

U.S. Cl. 315—58 **2 Claims**



1. In a spark plug having a shell and an insulator seated in said shell and sealed therein against the passage of combustion gases, said insulator having a stepped central bore, an improved center electrode assembly mounted in said insulator bore comprising a lower center electrode element seated in said bore, said electrode element having first end means for defining one side of a main spark gap exterior to said bore and second end means defining one side of an auxiliary spark gap within said bore, an electrically conductive ball seated on a step in said bore, said ball being spaced from said second end means for defining a second side of such auxialy spark gap, an ignition noise suppressor positioned within said bore, a terminal, and springs means electrically connecting said ball, said suppressor and said terminal in series.

4,059,783
FIELD EMISSION APPARATUS

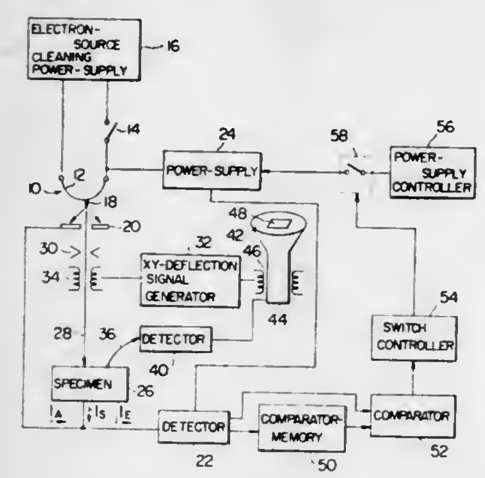
Yasushi Nakaizumi; Yukichi Ueno, both of Katsuta, and Masahide Okumura, Hachioji, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Jan. 12, 1977, Ser. No. 758,794

Claims priority, application Japan, Jan. 21, 1976, 51-5733

Int. Cl.² H05B *41/36;* **H02H** *7/20*

U.S. Cl. 315—107 **10 Claims**



1. An electron producing apparatus of the field emission type comprising:
- a source for producing electrons;
- an anode disposed opposite to said electron producing source;
- first means for applying a voltage to said electron producing source so as to cause said electron producing source to emit a field emission electron current toward said anode;
- second means for detecting the instantaneous value and the minimum value of the emitted electron current;
- third means for comparing said instantaneous value with said minimum value and for delivering an output signal when said instantaneous value assumes a predetermined magnitude relative to said minimum value; and
- fourth means for interrupting the field emission in response to said output signal of said third means.

4,059,784
ELECTRON-BEAM CONVERTER

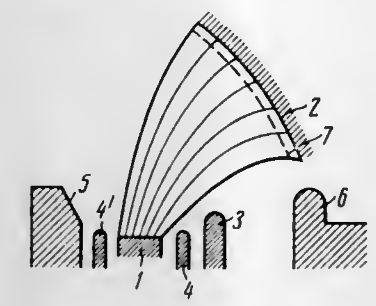
Vladimir Innokentievich Perevodchikov, ulitsa Krzhizhavovskogo, 4, korpus 2, kv. 32; Valentina Nikolaevna Shapenko, ulitsa Verkhne-Pervomaiskaya, 63, korpus 2, kv. 60; Zarem Sergeevich Chernov, prospekt Garibaldi, 19, kor. 2, kv. 66, and Nina Sergeevna Bunina, ulitsa Polyarnaya, 13, kor. 1, kv. 87, all of, Moscow, U.S.S.R.

Filed June 14, 1976, Ser. No. 695,980

Int. Cl.² H01J *21/14, 21/26*

U.S. Cl. 315—349 **9 Claims**

1. An electron-beam converter comprising: a cathode; an anode; an accelerating electrode; control electrodes; all of said electrodes being made elongate; said control electrodes being arranged near said cathode on either side of an electron flow; a cathode-adjacent focusing electrode disposed on the cathode side opposite to said accelerating electrode, behind one of said control electrodes; an anode-adjacent focusing electrode inserted between said anode and said accelerating electrode; said anode having a surface orthogonal with respect to a divergent electron flow and being so arranged relative to said cathode that the angle between normals to the surfaces of said electrodes. is greater than zero but less than 180°; said accelerating electrode being disposed in the opening of said angle; the distance between said accelerating electrode and said anode being substantially greater than that between said cathode and said accelerating electrode; all of said electrodes making up an electron-optical system shaping said electron flow into a curvi-



linear beam broadening towards said anode so as to prevent electrons from impinging upon said accelerating electrode; the potentials across said electrodes being distributed so that applied to said accelerating electrode is a potential positive with respect to said cathode, the anode potential is also positive with respect to said cathode but is substantially lower than the accelerating electrode potential, said cathode-adjacent focusing electrode receives a potential close or equal to the cathode potential said anode-adjacent focusing electrode receives a potential close or equal to the anode potential, and said control electrodes have potentials equal to the cathode potential during the positive half-cycle, and negative with respect to said cathode during the negative half cycle.

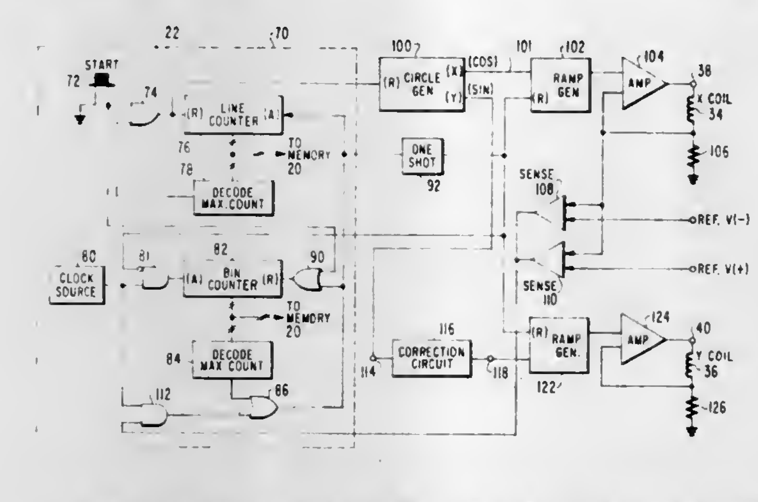
4,059,785
CRT DISPLAY WITH TRUNCATED RHO-THETA PRESENTATION

Charles Albert Clark, Jr., Chatsworth, Calif., assignor to RCA Corporation, New York, N.Y.

Filed May 19, 1976, Ser. No. 687,747

Int. Cl.² H01J *29/78*

U.S. Cl. 315—378 **9 Claims**



1. In a cathode ray tube display device which has a viewing screen and which includes a deflectable electron beam and which includes a deflection means for causing said beam to scan from a common origin on said screen across said viewing screen to and beyond the edge of said viewing screen in a succession of scan lines, the improvement comprising:
- first means responsive to an indication that said electron beam has been scanned to said edge of said viewing screen for producing a signal; and
- second means responsive to said signal for initiating retrace of said electron beam to said common origin, and a fixed time after initiating said retrace for initiating the deflection by said deflection means of the next scan line of said succession thereof.

4,059,786
WHEELCHAIR CONTROL CIRCUIT

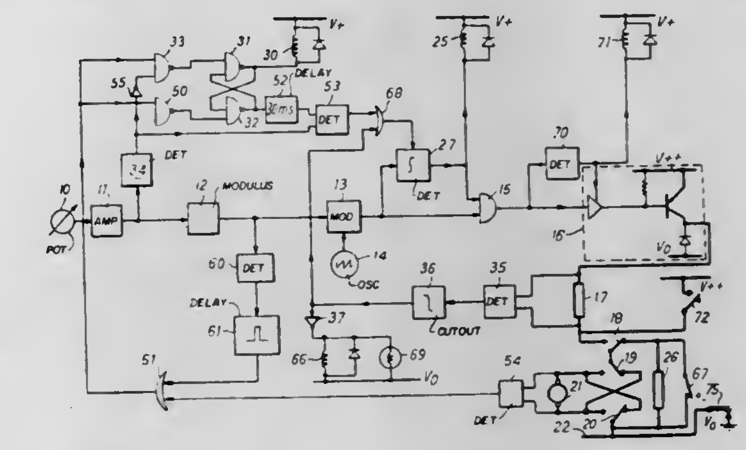
Michael Lloyd Jones, Tring, and Peter Meredith Jobson, Aylesbury, both of England, assignors to Possum Controls Limited, Aylesbury, England

Filed May 16, 1975, Ser. No. 578,023

Claims priority, application United Kingdom, May 23, 1974, 23004/74

Int. Cl.² B62D *11/04;* **H02P** *7/00*

U.S. Cl. 318—17 **13 Claims**



1. A control circuit suitable for use in controlling the two electric motors of a wheelchair of the type specified, comprises two control potentiometers with respective wipers which are connected to a common control lever, said control lever having a datum position and being operable from the datum position to manipulate the positions of the wipers of the potentiometers both independently and simultaneously from their corresponding datum positions, terminals through which voltages can be applied across the resistance-elements of the potentiometers whereby the output voltages at the wipers have magnitudes dependent upon the positioning of the control lever, a predetermined magnitude corresponding to the datum position and deviations on opposite sides of the predetermined magnitude constituting control signals for forward and reverse operation respectively of the two motors, each motor having a reversing relay connected thereto and the energising circuit of each reversing relay including a detector circuit individual to the relay and the corresponding control potentiometer, the detector circuit including means for detecting output voltage from its associated control potentiometer representative of a control signal for reverse operation of the motor to energise the associated reversing relay, and further means for driving each motor in dependence upon the deviation in the magnitude of the output voltage at the wiper of its associated control potentiometer from the datum.

4,059,787
METHOD FOR THE AUTOMATIC LOCATION OF PARTICULAR ZONES OF A SURFACE AND AN INSTALLATION FOR THE APPLICATION OF SAID METHOD

Jean Louis Aimar, Mennecy, and Gerard Olin, Le-Plessis-Robinson, both of France, assignors to SEVE, Chatillon-sous-Bagneux, France

Filed Mar. 25, 1976, Ser. No. 670,271

Claims priority, application France, Mar. 28, 1975, 75.09846

Int. Cl.² G05B *19/42*

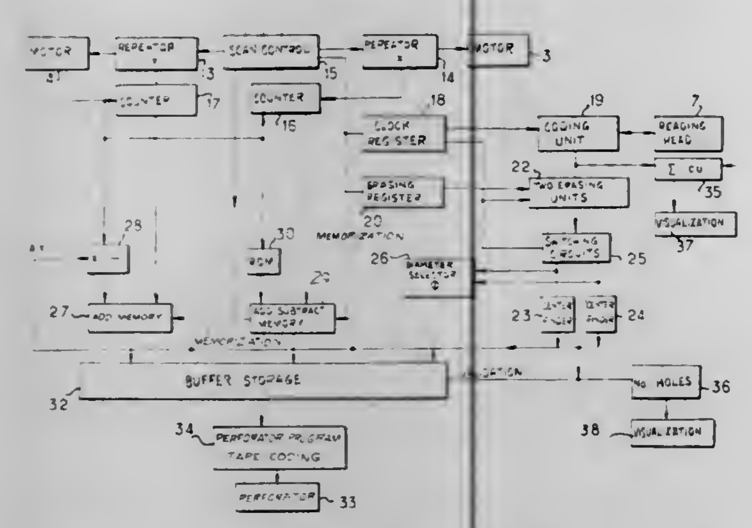
U.S. Cl. 318—568 **19 Claims**

1. A method for the automatic location of particular zones on a surface, especially of points to be machined on the surface of a workpiece by an automatic machine which operates point by point, wherein said method consists:
- in giving said particular zones a distinctive appearance with respect to the region surrounding said zones on said sur-

face, especially an appearance which is transparent at the center of an opaque pastille,

in automatically scanning the surface in a system of two coordinates, especially perpendicular rectilinear coordinates, by means of a reader comprising at least one detecting element which is responsive to said distinctive appearance,

in establishing by means of electrical signals delivered by the reader a primary image coded in binary notation in which two different states represent respectively the presence and absence of said distinctive appearance at each point of the surface which is scanned by the detector,

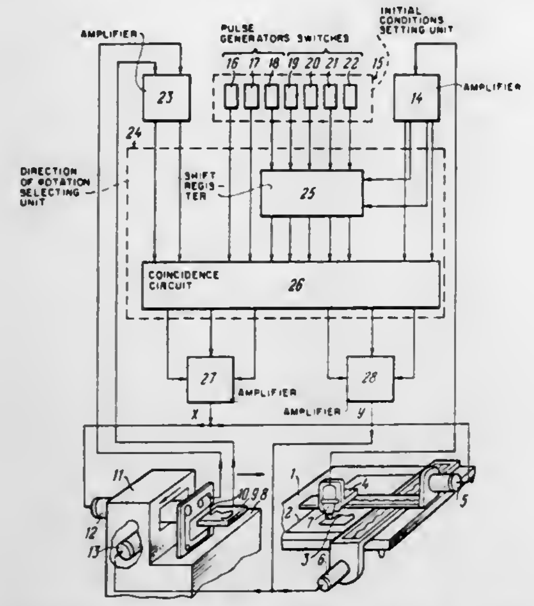


in processing said primary image in coded form in order to erase in successive points from the edges thereof in accordance with said system of coordinates all the states which are representative of the presence of the distinctive appearance encountered before a zone of absence of said distinctive appearance in order to obtain a clear image in coded form only of those points which have said distinctive appearance and are separated from the edges of the image by one point or a plurality of successive points which do not have said distinctive appearance,

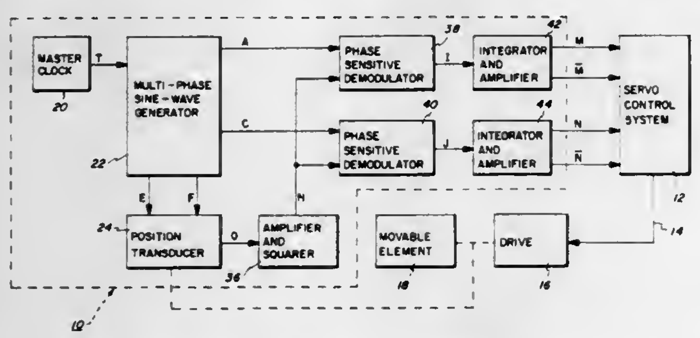
in determining the coordinates of at least a certain number of the points having a distinctive appearance which remain on said clear image.

4,059,788
DEVICE FOR AUTOMATICALLY CONTROLLING AN ELECTROEROSION CUTTING MACHINE
Vladimir Sergeevich Vasiliev, Novye Cheremushki, kvartal 26/6, korpus 28, kv. 67; Abram Lazarevich Livshits, Profsojuznaya ulitsa, 62, korpus 2, kv. 69; Vadim Evgenievich Polotsky, Leninsky prospekt, 70/11, kv. 238, and Yakov Iosifovich Zlatkin, Shosseinaya ulitsa, 42, kv. 311, all of Moscow, U.S.S.R.
Filed Feb. 2, 1976, Ser. No. 654,284
Int. Cl.² G05B *19/36*
U.S. Cl. 318—577 **2 Claims**

1. A device for automatically controlling an electroerosion cutting machine, comprising: a coordinate follow table with a drawing placed thereon; an optical reading head; coordinate drive motors which move coordinate-wise said optical reading head relative to said drawing and an electroerosion tool relative to a workpiece; a first amplifier having an input connected to the output of said optical reading head, and four outputs; a second amplifier having an input connected to the erosion gap, and two outputs; a unit for setting initial conditions of electroerosion working having outputs; a unit for selecting directions of rotation of said drive motors in the course of said electroerosion working and having inputs and outputs; a reversible ring shift register of said unit for selecting directions of rotation of said drive motors and having inputs and outputs, inputs of said reversible ring shift register being connected to outputs of said unit for setting initial conditions of electroerosion working intended for a signal of initial rotation directions, said outputs of the unit for setting initial conditions of electroerosion working being intended for a signal of shift speed of said reversible ring shift register, and said first and second outputs of said first amplifier being intended for signals for reversing the shift direction of said register; a coincidence circuit in said unit for selecting directions of rotation of said drive motors and having inputs and outputs, inputs of said coincidence circuit being connected to said third and fourth outputs of said first amplifier, said outputs of said reversible ring shift register, said outputs of said second amplifier, and outputs of the unit for setting initial conditions of electroerosion working being intended for a signal of preset rotation speeds of said drive motors; a third amplifier having three inputs connected to the said three first outputs of said coincidence circuit, and two outputs connected to said drive motors for moving said optical head relative to said coordinate table and said electroerosion tool relative to said workpiece along the first coordinate; a fourth amplifier having three inputs connected to said three other outputs of said coincidence circuit, and two outputs connected to said drive motors for moving said optical head relative to said coordinate table and said electroerosion tool relative to said workpiece along the second coordinate.



4,059,789
PHASE-SENSITIVE TRANSDUCER APPARATUS WITH SIGNAL OFFSET MEANS
Kenneth W. Cocksedge, Pleasanton, Calif., assignor to Xerox Corporation, Stamford, Conn.
Filed Mar. 25, 1976, Ser. No. 670,463
Int. Cl.² G05B *1/01*
U.S. Cl. 318—608 **6 Claims**



1. A phase-sensitive transducer apparatus comprising:

first and second relatively movable members, said first relatively movable member having a plurality of windings and said second relatively movable member having a winding;

means for applying a first input signal to one of the windings of said first relatively movable member and a second input signal to another of the windings of said first relatively movable member, an output signal being developed on the winding of said second relatively movable member, said first and second input signals being sinusoidal in nature of substantially identical frequency and peak amplitude and being phase-displaced by a predetermined amount, and said output signal being substantially constant in peak amplitude and variable in phase during relative movement of said first and second relatively movable members;

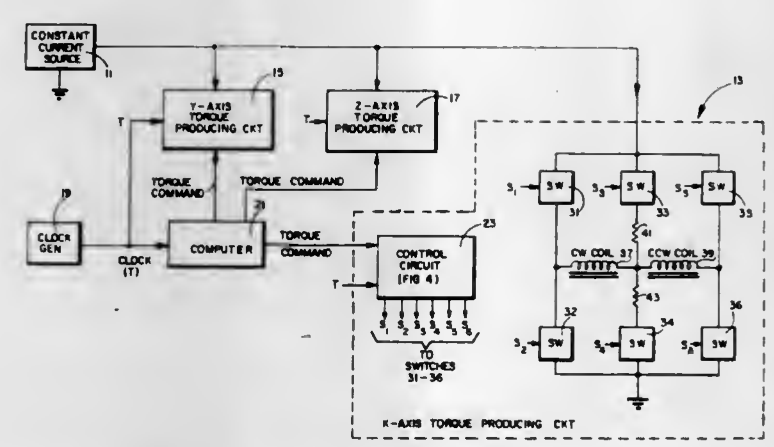
means coupled to the winding of said second relatively movable member for squaring said output signal;

means coupled to said means for squaring for demodulating said squared output signal to derive a pulse signal of constant peak amplitude and variable pulse width as said first and second relatively movable members are moved relative to one another;

means coupled to said means for demodulating for integrating said pulse signal to derive a position signal indicative of the relative movement of said first and second relatively rotatable members, said position signal alternating during such relative movement between a peak voltage and a reference voltage; and

means coupled to said means for integrating for offsetting said position signal so that it is substantially balanced about said reference voltage.

4,059,790
NON-OSCILLATING TORQUE CONTROL APPARATUS
John M. Kennel, Santa Ana, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.
Filed Oct. 18, 1976, Ser. No. 733,839
Int. Cl.² G05B *17/00;* **H02P** *7/00*
U.S. Cl. 318—689 **15 Claims**



1. A torque producing apparatus comprising:

a source of current;

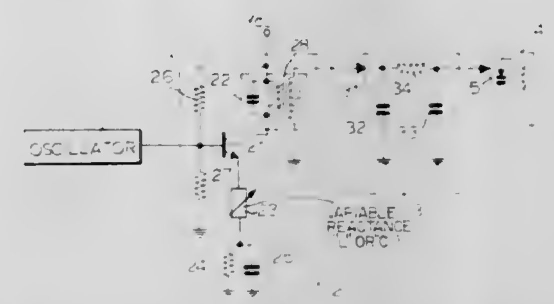
first means for producing a clockwise torque in response to current therethrough from said source;

second means for producing a counterclockwise torque in response to current therethrough from said source,

switching means responsive to a plurality of control signals for selectively coupling said first and second means to said source; and

control means responsive to a torque command signal for selectively generating the plurality of control signals as a function of the torque command signal, said plurality of control signals enabling said switching means to selectively control the flow of current through said first and second means such that the clockwise and counter-clockwise torques combine into a resultant non-oscillating torque corresponding to the torque commanded by the torque command signal.

4,059,791
VOLTAGE SUPPLY CIRCUIT FOR VOLTAGE-DEPENDENT CAPACITOR DIODE TUNING
Masabumi Serizawa, Ikoma, and Tsuneo Takezaki, Noyagawa, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan
Filed Apr. 30, 1976, Ser. No. 682,176
Claims priority, application Japan, May 6, 1975, 50-54847
Int. Cl.² H02M *3/335*
U.S. Cl. 363—37 **10 Claims**



6. A tuning apparatus for voltage-dependent capacitor diode tuning, comprising: a voltage supply circuit having: (1) an oscillator for producing an a.c. signal at an output terminal thereof; (2) a voltage regulator having an input terminal thereof coupled to said output terminal of said oscillator for producing an a.c. voltage at an output terminal thereof, said voltage regulator having a transistor amplifier of the series-feedback type having an amplifying transistor the base of which is coupled to said oscillator and a variable reactance element coupled to the emitter of said transistor for controlling the amount of negative feedback and controlling the degree of amplification of said transistor amplifier, and a tank circuit having a resonant frequency the same as the frequency of said a.c. signal from said oscillator, said tank circuit being coupled to the collector of said amplifying transistor and also coupled to said output terminal of said voltage regulator; and 3) a voltage converter having the input terminal thereof coupled to said output terminal of said voltage regulator for converting said a.c. voltage from said voltage regulator to a d.c. voltage; and a tuning circuit including a voltage-dependent capacitor diode to which said d.c. voltage from said voltage converter is applied for tuning.

4,059,792
METHOD FOR PRODUCING RECTIFIER WITH SWITCHES OF ASYMMETRIC VOLTAGE BREAKDOWN STRENGTHS
Peter Etter, Oberehrendingen, and Werner Faust, Wettingen, both of Switzerland, assignors to BBC Brown Boveri & Company Limited, Baden, Switzerland
Filed Sept. 30, 1975, Ser. No. 619,941
Claims priority, application Switzerland, Oct. 29, 1974, 14457/74
Int. Cl.² H02M *7/757;* **H03K** *3/35*
U.S. Cl. 363—135 **7 Claims**

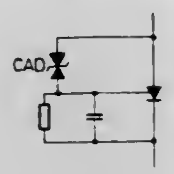
1. A method for producing rectifiers for medium and high voltage systems at reduced cost comprising the steps of:

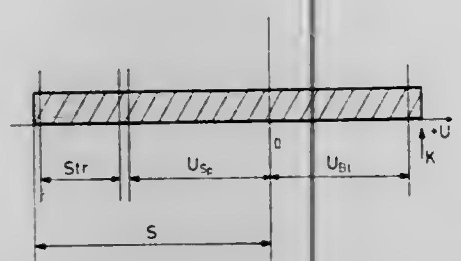
providing a rectifier element including a plurality of series connected thyristor switches,

constructing said rectifier element so as to have an asymmetric breakdown voltage characteristic in which the breakdown strength is at least 10% greater in the reverse direction than in the forward direction; and,

dimensioning said rectifier element voltagewise to safely block even long lasting overvoltages in both the forward

and reverse blocking directions occurring during operation and to withstand momentary surge and switching





voltages limited by an overvoltage suppressor in the reverse blocking direction.

4,059,793

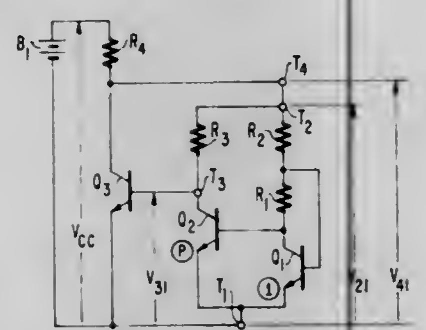
SEMICONDUCTOR CIRCUITS FOR GENERATING REFERENCE POTENTIALS WITH PREDICTABLE TEMPERATURE COEFFICIENTS

Adel Abdel Aziz Ahmed, Annandale, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Aug. 16, 1976, Ser. No. 714,361

Int. Cl.^{2} G05F *1/58*

U.S. Cl. 323—19 **7 Claims**



1. A reference potential generator comprising:
first and second and third terminals;
bias means for tending to increase the potential between said first and said second terminals;
first and second transistors of the same conductivity type, each having base and emitter electrodes with a base-emitter junction therebetween and having a collector electrode, each of their emitter electrodes being directly connected without substantial intervening impedance to said first terminal;
a first resistive element having a first end which connects to the base electrode of said first transistor and having a second end which connects to the base electrode of said second transistor and has the collector electrode of said first transistor connected thereto;
a second resistive element having a first end connected to said second terminal and having a second end connected to the first end of said first resistive element;
a third resistive element having a first end connected to said second terminal and having a second end connected to a third terminal and to the collector electrode of said second transistor;
means for sensing when the potential between said first and third terminals exceeds a predetermined threshold value to decrease the potential between said first and said second terminals, thereby to generate a reference potential; and
means applying between said first and said second terminals a fixed portion of said reference potential, thereby completing a feedback loop for regulating said reference potential to prescribed value.

4,059,794

METHOD AND APPARATUS FOR MONITORING PASS ALIGNMENT IN ROLLING MILLS

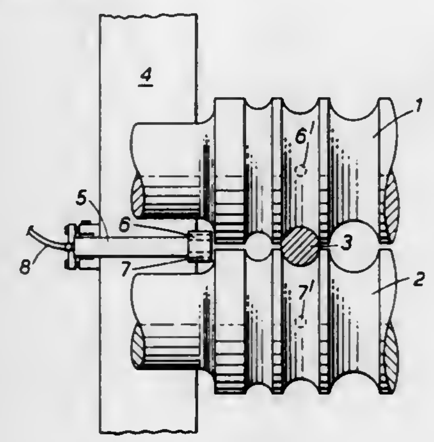
Bernard J. Furness; John R. Cousins, and Dennis Tuft, all of Rotherham, England, assignors to British Steel Corporation, London, England

Filed July 7, 1975, Ser. No. 593,389

Claims priority, application United Kingdom, July 15, 1974, 31276/74

Int. Cl.^{2} G01R *33/12*

U.S. Cl. 324—208 **11 Claims**



1. A method of monitoring the alignment of a rolling pass defined between cooperating rolls in a mill stand during rolling of a bar, rod or section stock, comprising the steps of:
fixedly positioning an eddy current sensor in close proximity to an end surface of each of said cooperating rolls,
energizing said sensors to provide outputs representative of the amount by which said sensors are spaced from the said end surfaces, and
processing said outputs to indicate changes in the spacing of said rolls along their axes from a reference position defining an aligned pass.

4,059,795

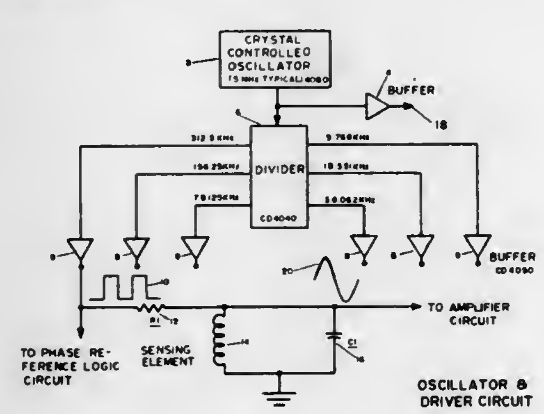
DIGITAL EDDY CURRENT APPARATUS FOR SENSING AND ANALYZING METALLURGICAL CHARACTERISTICS OF AN ELECTRICALLY CONDUCTIVE MATERIAL

George Mordwinkin, Scottdale, Pa., assignor to Sensor Corporation, Scottdale, Pa.

Filed June 3, 1976, Ser. No. 692,481

Int. Cl.^{2} G01R *33/12*

U.S. Cl. 324—233 **8 Claims**



1. A digital eddy current apparatus for sensing and analzying metallurgical characteristics of an electrically conductive material comprising:
a. driving means supplying a square wave which is used as a reference;
b. a resonating means coupled to the driving means, the resonating means having a sensing element with an impedance which varies depending upon an eddy current characteristic of the electricity conductive material, the resonating means changes the square wave to a sinusoidal waveform which is a function of the impedance of the sensing element;
c. converting means coupled to the resonating means and converting the sinusoidal waveform produced by the resonating means into a rectangular pulse output, which pulse, when the resonating means is at a resonance condition, when referenced to the square wave pulse would be positioned in the center of one-half of the square wave, when the resonating means is magnetically coupled to the conductive material, the amplitude and phase of the sinusoidal waveform will be affected by the material characteristics, and the width and phase of the rectangular pulse will also be affected, the width of the rectangular pulse is a direct function of the amplitude of the sinusoidal waveform, movement of the rectangular pulse from its referenced position in the center of one-half of the square wave is a function of phase shift of the sinusoidal waveform; and
d. means for monitoring the width and position of the rectangular pulse with respect to the reference square wave as a direct function of the electrically conductive material's metallurgical characteristics.

4,059,796

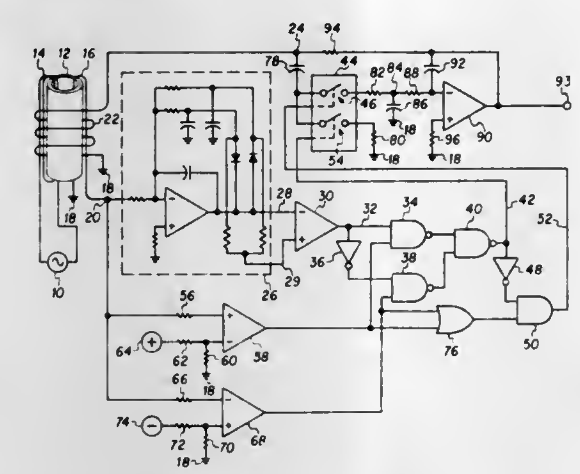
SECOND HARMONIC MAGNETIC FIELD DETECTION CIRCUIT WITH MEANS TO RECTIFY THE SENSED SIGNAL

Melvin H. Rhodes, Cedar Rapids, Iowa, assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Nov. 11, 1976, Ser. No. 740,911

Int. Cl.^{2} G01R *33/04*

U.S. Cl. 324—253 **7 Claims**



1. Magnetic field detection apparatus for use with a magnetic sensor of the type having a magnetic core, an excitation producing winding, an excitation detecting winding, and a magnetic field sensing winding operatively associated with said core, comprising:
means for supplying a periodic excitation signal to said excitation producing winding to induce a flux in said magnetic core to drive said magnetic core periodically into saturation, to induce a voltage in the excitation detection winding and to enable the magnetic field to be detected to induce a signal onto said sensing winding;
first means connected to said excitation detecting winding for detecting the direction of the flux produced in said magnetic core by the excitation signal and generating signals indicative thereof;
second means connected to said excitation detecting winding for detecting the polarity of the induced voltage and when the induced voltage exceeds a predetermined level and generating signals indicative thereof;
integrating means having an input and an output;
means connected to the sensing winding and to the signals from said first and second means to rectify the signals induced onto said sensing winding in timed relation with changes in the polarity of the induced excitation voltage and the direction of the excitation signal induced flux, and supplying the rectified signals to the input of said integrating means;
and feedback means connected between the output of said integrating means and said sensing winding for supplying feedback signals to said sensing winding to substantially cancel the effect of flux generated in said magnetic core by the magnetic field to be detected.

4,059,797

A.C. CAPACITANCE MEASURING BRIDGE

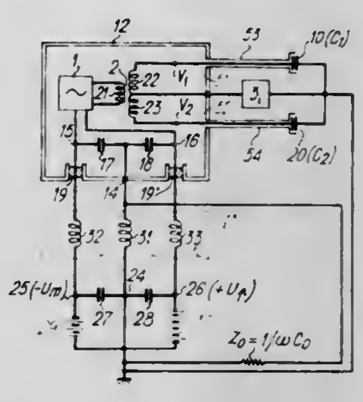
Michel J. L. Gay, Fresnes, France, assignor to Office National d'Etudes et de Recherches Aerospatiales, Chatillon-sous-Bagneux, France

Filed Dec. 27, 1976, Ser. No. 754,578

Claims priority, application France, Dec. 30, 1975, 75.40114

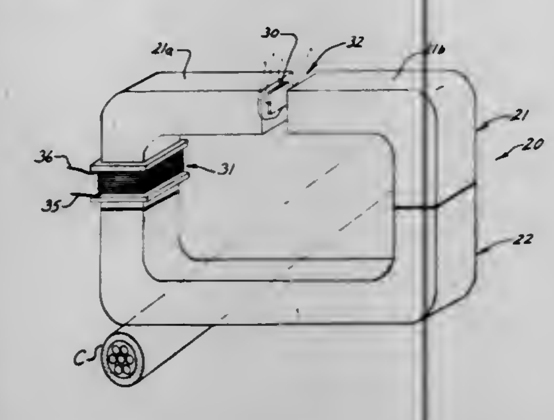
Int. Cl.^{2} G01R *27/26*

U.S. Cl. 324—60 C **7 Claims**



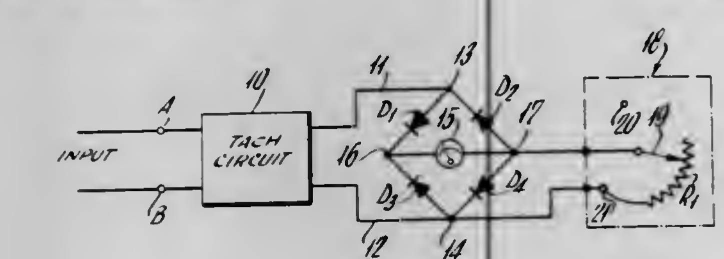
1. An alternating current capacitance measuring bridge for measuring the capacitance of capacitors having one terminal connected to an ground comprising an alternating voltage source, a differential transformer having a primary winding connected to said alternating voltage source and two secondary windings having a common terminal, screened coaxial connections for connecting said capacitors to said secondary windings, a detector inserted in said common terminal of said secondary windings via an amplification stage, a first metal screen box connected to said common terminal of said secondary windings inside of which said alternating voltage source and said primary and secondary windings are placed, whose interior is connected directly to first conductors of the screens of said screened coaxial connections, which surround coaxially the internal conductors of said screened coaxial connections, means for direct current supplying said alternating voltage source via internal direct current supply terminals comprising a first winding connecting to said common terminal of said secondary windings and said external earth, a second and a third windings connecting to said internal direct current supply terminals and external direct current supply terminals, said first, second and third windings having a high impedance at the operational frequency of said alternating voltage source, two first capacitors of high impedance inserted between said internal direct current supply terminals and said first metal screen box, and two second capacitors of high impedance inserted between said external direct current terminals and said external earth.

4,059,798
METHOD AND APPARATUS FOR MEASURING THE CURRENT FLOWING IN A WORKPIECE
Jeffrey A. Dierker, Westerville, and Prentice G. Moore, Columbus, both of Ohio, assignors to F. W. Bell, Inc., Columbus, Ohio
Filed Mar. 8, 1976, Ser. No. 664,716
Int. Cl.² G01R *33/00*
U.S. Cl. 324—127 **5 Claims**



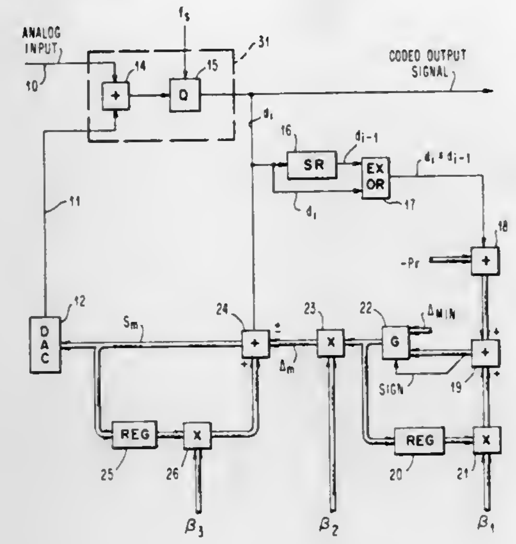
1. The method of measuring the current flowing in a workpiece which comprises placing the workpiece inside a magnetic core, continuously inducing a plurality of damped, oscillatory-waveform magnetic fields in said magnetic core at closely spaced intervals so as to maintain the core at all times on an idealized magnetization curve essentially without hysteresis while said workpiece is present therein and current is flowing in the workpiece, and measuring by means of a flux sensor the magnetic field generated by the said current while said workpiece is inside said magnetic core and immediately after at least one of said induced oscillatory magnetic fields has been applied whereby the hysteresis effect present is minimized.

4,059,799
TACHOMETER APPARATUS
Thomas G. Faria, 17 Park Drive, Waterford, Conn. 06385
Filed June 7, 1976, Ser. No. 693,535
Int. Cl.² G01P *3/48*
U.S. Cl. 324—169 **18 Claims**



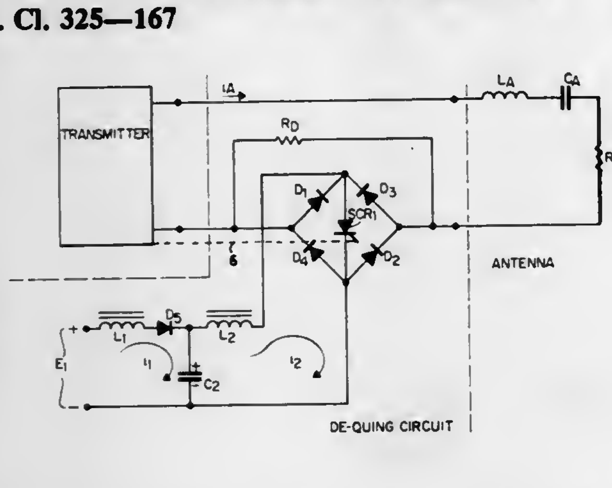
1. Electric tachometer instrumentation having selective adaptability to each of a plurality of engine configurations having different numbers of cylinders and adapted to function in response to a pulsating input signal characterized by pulses of alternating polarity and for which the pulsating frequency bears a direct relation to a speed to be measured, said instrumentation comprising a full-wave rectifier bridge having four arms serially connected at four corner terminals, a first pair of opposed terminals being adapted to receive said input signal, current-measuring means connected across the other pair of opposed terminals, and selectively operable means including on-off switch means connected in shunt across one of said arms; whereby in the OFF-selected position of said switch means, said measuring means will correctly produce an engine-speed measuring response for an engine of a first number of cylinders; and whereby in the ON-selected position of said switch means, said measuring means will again correctly produce an engine-speed measuring response for a similar engine having a greater number of cylinders.

4,059,800
DIGITAL MULTI-LINE COMPANDED DELTA MODULATOR
Gardner Dulany Jones, Jr., Raleigh, N.C., assignor to International Business Machines Corporation, Armonk, N.Y.
Filed June 30, 1976, Ser. No. 701,265
Int. Cl.² H04B *1/00*
U.S. Cl. 325—38 B **10 Claims**



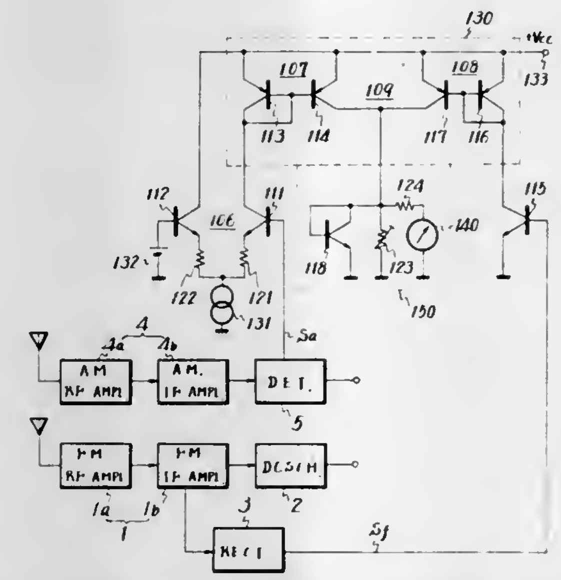
1. A delta modulator comprising:
a first means for comparing the amplitudes of an analog input signal and an analog feedback signal and periodically providing a first or a second output signal voltage d_i as a function of said comparison;
second means for forming the product of the output signal d_i of the current period and the output signal of the next prior period d_{i-1};
third means for summing the said product during each period with a digital reference signal;
a first digital recursive filter means responsive to the output of said third means for generating a gain control signal Δ_m;
fourth means responsive to the output from said first means and said first filter means output for generating a digital signal which is a function of the said gain control signal;
a second digital recursive filter responsive to the said fourth means for providing a digital feedback signal; and
a digital to analog converter responsive to the said second filter output for providing the said analog feedback signal.

4,059,801
APPARATUS FOR DEGRADING Q IN A HIGH-Q RF PULSE TRANSMITTING SYSTEM AND THE LIKE
Paul R. Johannessen, 40 Tyler Road, Lexington, Mass. 02173, and Peter Ver Planck, 103 Puritan Lane, Sudbury, Mass. 01776
Filed Dec. 11, 1975, Ser. No. 639,908
Int. Cl.² H04B *1/04;* **G01S** *1/24*
U.S. Cl. 325—167 **11 Claims**



6. Apparatus for degrading the Q of a high-Q antenna circuit in the period between transmitted pulses that includes, in combination, means for periodically generating successive pulses, high-Q antenna circuit means connected to receive said pulses and to resonate in response thereto to produce corresponding periodic RF pulse transmissions, resistive loss-producing means, means for introducing said resistive loss-producing means into the antenna circuit only for the length of the time interval between said successive pulses and removing the same during said pulse transmissions, said introducing means comprising electronic switching means controlled by time-constant charging and discharging circuit means.

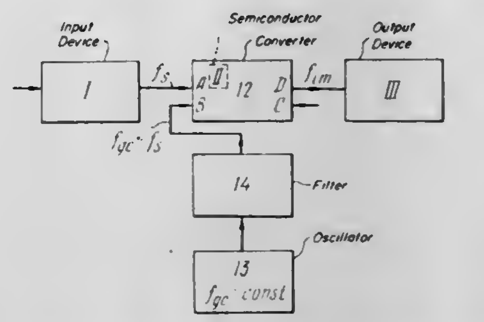
4,059,802
INPUT LEVEL DISPLAY CIRCUIT FOR RECEIVERS
Mitsuo Ohsawa, Fujisawa; Wataru Yamatani, Hatogaya, and Yukio Onoe, Tokyo, all of Japan, assignors to Sony Corporation, Tokyo, Japan
Filed Mar. 30, 1976, Ser. No. 671,968
Claims priority, application Japan, Apr. 2, 1975, 50-40702; Apr. 2, 1975, 50-40703
Int. Cl.² H04B *1/16*
U.S. Cl. 325—398 **12 Claims**



1. An input level display circuit for receivers, comprising:
a. first and second input circuits for receiving and amplifying first and second broadcasting signals, respectively,
b. first and second carrier amplitude detector circuits connected to said first and second input circuits, respectively, for producing first and second direct current signals, respectively;
c. a meter drive circuit means connected to a current supply and supplied with said first and second direct current signals for producing a third direct current signal in response to either one of said first and second direct current signal; and
d. an indicating means connected to a reference potential supplied with said third direct current signal for indicating the input level of either the first input circuit or the second input circuit, said indicating means being separated from said current supply by said meter drive circuit means.

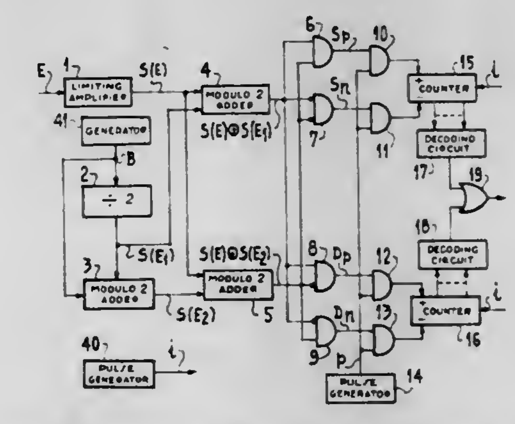
4,059,803
METHOD OF CONVERTING THE ELECTROMAGNETIC SPECTRUM CARRIER FREQUENCY AND AN ELECTROMAGNETIC ENERGY RECEIVER FOR SAME
Leonard Konstantinovich Mikhailovsky, Fakultetsky pereulok 6, kv. 25, Moscow, U.S.S.R.
Continuation of Ser. No. 424,611, Dec. 13, 1973, abandoned. This application Apr. 20, 1976, Ser. No. 678,723
Int. Cl.² H03D *7/00*
U.S. Cl. 325—445 **25 Claims**

1. In a method of converting the carrier frequency of the electromagnetic frequency spectrum in an electromagnetic energy receiver including a converter, the steps of: transmitting to the input of said converter incoming electromagnetic waves and conveying from the output thereof converted electromagnetic waves, having the incoming electromagnetic waves act on at least one semiconductor element in said converter with the electromagnetic characteristics thereof depending on the intensity, polarization and frequency of the field associated with said incoming electromagnetic waves, effecting auxiliary power modulation of said incoming electromagnetic waves, and subjecting the frequency spectrum, polarization and intensity of the field set up by said incoming elec-



tromagnetic waves to said auxiliary power modulation, to establish the magnitudes and directions of the magnetic or electric moments, and the conductance and impedance of said semiconductor element such that said carrier frequency of each region in the spectrum of the converted electromagnetic waves becomes a multiple of the frequency of said auxiliary power modulation of said electromagnetic waves being converted.

4,059,804
FREQUENCY COMPARISON CIRCUIT
Pierre Agnus, and Henri Butin, both of Paris, France, assignors to Thomson-CSF, Paris, France
Filed Nov. 19, 1976, Ser. No. 743,333
Claims priority, application France, Nov. 25, 1975, 75.36003
Int. Cl.² H03D *13/00*
U.S. Cl. 328—134 **5 Claims**

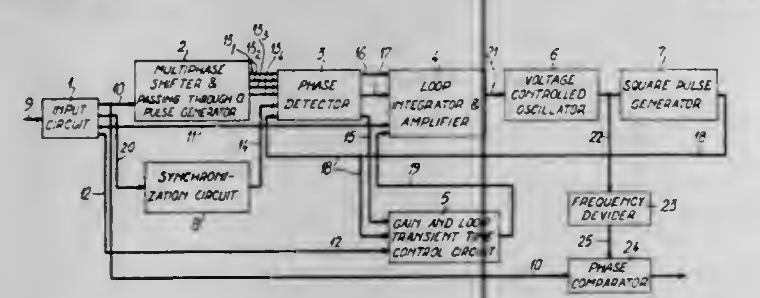


1. A frequency comparison circuit for comparing the frequency of a received signal with a frequency F and comprising:
first means for producing, independently of the received signal, a reference signal having the frequency F,
second means for generating sampling pulses,
third means for determining as a function of time t the relation between the sign "m" of the received signal at time t, the sign "p" of said reference signal at time t and the sign "q" of said reference signal at time $t-$T, T being a predetermined time interval such that 2πFT is not a multiple of π, and for generating a first relation signal if "m" is different from "p" and "q", a second relation signal if "m", "p" and "q" are alike, a third relation signal if "m" is identical with "p" and different from "q" and a fourth relation signal if "m" is different from "p" and identical with "q"
first and second bidirectional counting means,
means controlled by said third means for, for each sampling pulse, causing said first bidirectional counting means to change its count if one of said first or second relation signal is present, the change being in one direction or the other according to whether said first or said second relation signal is present, and causing said second bidirectional

counting means to change its counts if one of said third or fourth relation signal is present, the change being in one direction or the other according to whether said third or fourth relation signal is present,

and an output circuit comprising first detecting means, coupled to said first bidirectional counting means, for providing a first output signal for a predetermined value of the count of said first bidirectional counting means and second detecting means, coupled to said second bidirectional counting means, for providing a second output signal for a predetermined value of the count of said second bidirectional counting means.

4,059,805
PHASE LOCK LOOP CARRIER GENERATOR FOR RECEIVER OF PHASE MODULATED CARRIER PULSE SIGNALS
Patrick M. de Laage de Meux, St. Germain-en-Laye, and Michel J. Maitre, Conflans-Sainte-Honorine, both of France, assignors to Lignes Telegraphiques et Telephoniques, Paris, France
Filed Feb. 1, 1977, Ser. No. 764,543
Claims priority, application France, Feb. 3, 1976, 76.02867
Int. Cl.² H03D *3/02;* **H03K** *9/04*
U.S. Cl. 329—50 **5 Claims**



1. A demodulator of phase modulated carrier pulse signals in which the pulses are coded according to a plurality of N phases of the carrier, comprising a digital phase lock loop system for locking to a frequency equal to N times the carrier frequency, said phase lock loop system including at least a phase detector, a loop integrator fed from said phase detector and itself controlling a voltage controlled oscillator having an output connected to said phase detector, means for dividing by N the frequency of said oscillator and for generating a reference carrier signal, a phase comparator for comparing the phase of the carrier of said phase modulated carrier pulse signals to the phase of said reference carrier signal and for delivering a decoded signal depending on the comparison of the two latter phases, a multiphase shifter receiving the carrier of said phase modulated carrier pulse signals and locally generating a plurality of carriers having phase shifts equal to 0, $2\pi/N$, $2\times2\pi/N$, . . . $([N/2]-1) \times 2\pi/N$ with respect to said received carrier, means for generating passing through zero pulses coinciding with the passage through zero of said received and locally generated carriers, means for gating those of said passing through zero pulses which occur during the central part of each phase modulated carrier pulse and means for applying to said phase detector said gated passing through zero pulses.

4,059,806
PULSE POSITION DEMODULATOR CIRCUIT
Henry Tyrrell Vagt, Jr., Scarsdale, N.Y., assignor to The Singer Company, Little Falls, N.J.
Filed Nov. 15, 1976, Ser. No. 741,759
Int. Cl.² H03K *9/04*
U.S. Cl. 329—107 **8 Claims**

1. A pulse position demodulator circuit for providing digital outputs representative of the time spacing between received incrementally modulated pulse pairs, said circuit comprising:

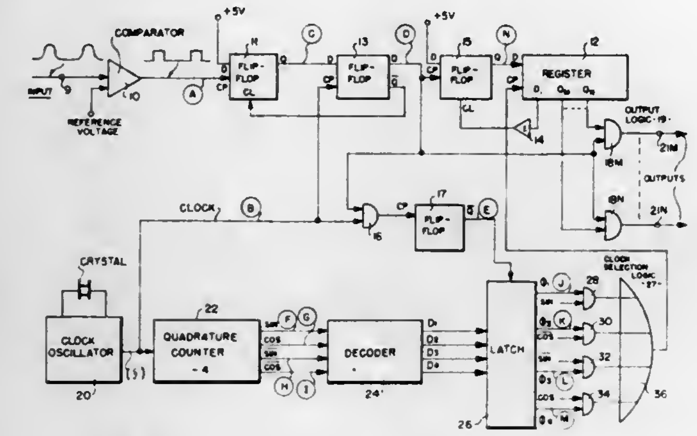
a clock oscillator for generating a clock signal of relatively high frequency;

quantizing circuit means coupled to the clock oscillator for producing quantized pulses synchronized with said clock signal in response to the received modulated pulse pairs;

shift register means;

means coupling said quantizing circuit means to said shift register means for propagating the quantized pulses down the shift register means;

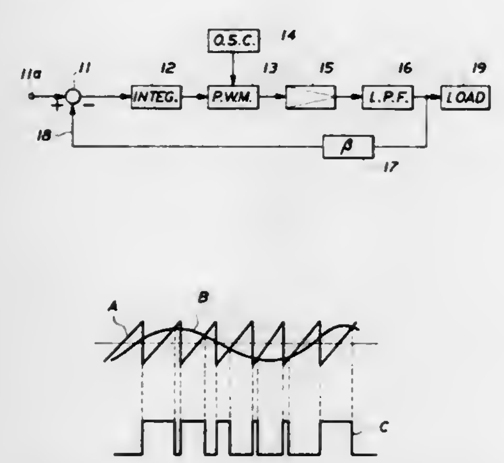
first circuit means coupled to the clock oscillator for producing a plurality of clock signals and having predetermined mutual phase relationships with one another;



further circuit means coupling the quantizing circuit means to said first circuit means to select one of said plurality of clock signals for application to said shift register as determined by the timing of the first quantizing pulses of each of the received pairs with respect to a selected reference; and

output circuit means obtaining inputs from said shift register means providing said digital outputs.

4,059,807
PULSE WIDTH MODULATED AMPLIFIER
Osamu Hamada, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan
Filed Oct. 29, 1975, Ser. No. 626,823
Claims priority, application Japan, Nov. 2, 1974, 49-126802
Int. Cl.² H03F *3/38*
U.S. Cl. 330—10 **5 Claims**



1. A pulse width modulated amplifier circuit comprising:

a mixer having audio and feedback inputs and an output,

means for integrating a signal derived from said output,

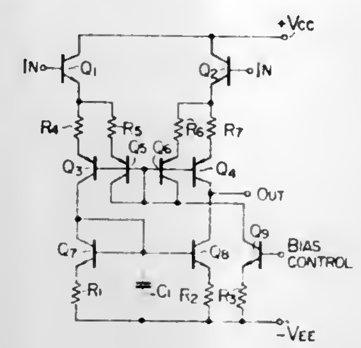
means for pulse width modulating a signal derived from an output of said integrating means,

means for filtering said pulse width modulated signal and for applying said filtered signal to a load, and

means for feeding back a portion of said filtered signal to said mixer,

said integrating means eliminating any modulating signal from the feedback from passing to said pulse width modulating means.

4,059,808
DIFFERENTIAL AMPLIFIER
Yoshio Sakamoto, Kokubunji, and Masahiro Yamamura, Fuchu, both of Japan, assignors to Hitachi, Ltd., Japan
Filed July 23, 1976, Ser. No. 708,046
Claims priority, application Japan, July 30, 1975, 50-91922
Int. Cl.² H03F *3/45*
U.S. Cl. 330—257 **6 Claims**



1. A differential amplifier comprising:

an input amplifier stage comprising a first pair of npn transistors having collector electrodes connected to a first voltage supply, base electrodes forming input terminals of said differential amplifier and emitter electrodes, and a second pair of pnp transistors each having an emitter electrode connected to the emitter electrode of a corresponding one of said first pair of npn transistors, a base electrode and a collector electrode;

a third pair of pnp transistors each having a base electrode connected to its collector electrode and having substantially the same operating characteristics as those of said second pair of pnp transistors, each transistor of said third pair of pnp transistors having an emitter electrode connected to the emitter of a corresponding one of said second pair of pnp transistors, each transistor of said third pair of pnp transistors having a base electrode connected to the base electrode of the corresponding one of said second pair of pnp transistors, thereby providing bias currents through said second pair of pnp transistors and compensating for changes in operating characteristics of said second pair of pnp transistors due to temperature fluctuations;

bias circuit means connected to the base electrodes of said third pair of pnp transistors for supplying bias currents therein;

load circuit means connected to the collector electrodes of said second pair of pnp transistors for providing at one of the collector electrodes of said second pair of pnp transistors, differential voltage changes having a correspondence to the variations between input signals applied to said input terminals; and

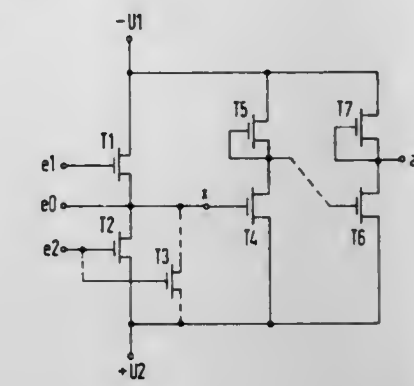
output means connected to the collector electrode of one of said second pair of pnp transistors for deriving said differential voltage changes as an output signal of said differential amplifier.

4,059,809
DIFFERENTIAL AMPLIFIER
Frithjof V. Sichart, Munich, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany
Filed Aug. 25, 1975, Ser. No. 607,586
Claims priority, application Germany, Aug. 27, 1974, 2440937
Int. Cl.² H03F *3/45*
U.S. Cl. 330—253 **6 Claims**

1. A differential amplifier, comprising:

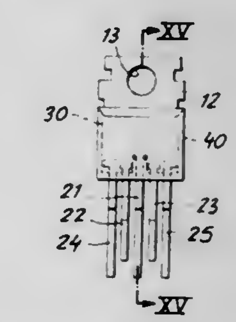
supply voltage means,

first and second metal oxide semiconductor (MOS) transistors of, respectively, the depletion and enhancement types, the source-drain paths of said transistors being connected in series at a common junction point such that the source terminal of said first transistor is connected to the drain terminal of said second transistor, the other terminals of said source-drain paths being connected to said supply voltage means, said transistors having control electrodes connected, respectively, directly to separate input voltages the difference between which is to be indicated and



output terminal means connected to said common junction point for producing differential voltages corresponding to the difference between said input voltages.

4,059,810
RESIN-ENCASED MICROELECTRONIC MODULE
Raimondo Paletto, Milan, Italy, assignor to SGS-ATES Componenti Elettronici SpA, Milan, Italy
Continuation-in-part of Ser. No. 508,951, Sept. 23, 1974. This application Mar. 29, 1976, Ser. No. 671,374
Claims priority, application Italy, Sept. 26, 1973, 29390/73
The portion of the term of this patent subsequent to June 28, 1994, has been disclaimed.
Int. Cl.² H05K *5/00*
U.S. Cl. 330—65 **5 Claims**



1. A microelectronic module comprising:

a sheet-metal plate with an upper and a lower face;

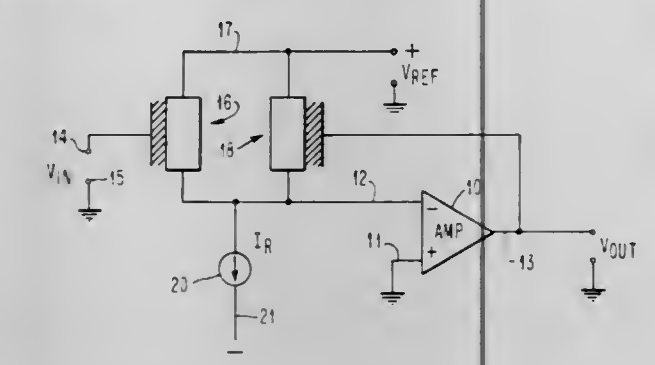
a five-terminal power amplifier in the form of a semiconductive chip supported on the upper face of said plate, one of the terminals of said amplifier being constituted by said plate;

a set of conductive tongues including a central tongue conductively and mechanically secured to said plate, a pair of intermediate tongues flanking said central tongue, and a pair of outer tongues flanking said intermediate tongues, said intermediate and outer tongues being respectively connected to the other four terminals of said amplifier; and

a resinous body encasing said chip and three sides of said plate while leaving the lower face thereof exposed, said tongues being partly imbedded in said body and having portions projecting generally parallel to one another from a side of said body, said projecting portions being alternately bent upwardly and downwardly outside said body to increase the spacing of their free ends;

said plate having an edge confronting said tongues and forming an upwardly open median recess, said central tongue having a downwardly bent encased extremity received in said recess, said intermediate tongues having T-shaped encased ends offset from said encased extremity, said outer tongues having outwardly pointing L-shaped encased ends offset from said T-shaped ends.

4,059,811
INTEGRATED CIRCUIT AMPLIFIER
Charles Reeves Hoffman, Raleigh, N.C., assignor to International Business Machines Corporation, Armonk, N.Y.
Filed Dec. 20, 1976, Ser. No. 752,958
Int. Cl.² H03F *3/16*
U.S. Cl. 330—277 **1 Claim**



1. An amplifier for incorporation on a semiconductor chip with other circuits in integrated circuits, said amplifier having a high impedance to an input signal, a low current signal feedback circuit and having an overall signal gain substantially equal to a design value over a wide range of production parameters and including:

a high gain circuit having an input terminal, a reference voltage input terminal, and an output terminal, the signal on said output terminal being substantially larger than and inverted with respect to a signal applied to said input terminal;

a power supply having a positive voltage side, a negative voltage side and a reference zero level connection to said high gain circuit;

a constant current regulating device connected between said input terminal and the negative side of said power supply;

a first n-channel, depletion type field effect transistor having a source terminal connected to said input terminal, a drain terminal connected to the positive side of said power supply and a control terminal connected to a signal source; and

a second n-channel, depletion type field effect transistor having a source terminal connected to said input terminal, a drain connection connected to the positive side of said power supply and a control terminal connected to said amplifier's output terminal; said second transistor having a width-to-length ratio different from the width-to-length ratio of said first transistor such that a gate voltage change which is the product of that of said first transistor multiplied by said value of said overall signal gain is required to produce the same change of current in said second transistor as is produced in said first transistor by said gate voltage change whereby, said constant current regulating device, said first field effect transistor, said second field effect transistor and said high gain circuit coact to maintain the voltage level of said input terminal at a virtual level essentially equal to said reference level voltage applied to said reference voltage input terminal.

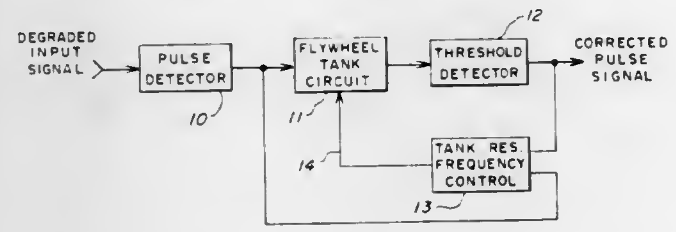
4,059,812
SYNCHRONOUS PULSE GENERATOR INCLUDING FLYWHEEL TANK CIRCUIT WITH PHASE LOCKED LOOP
Samuel Anderson Procter, Minneapolis, Minn., assignor to Control Data Corporation, Minneapolis, Minn.
Filed Nov. 22, 1976, Ser. No. 743,891
Int. Cl.² H03B *3/04*
U.S. Cl. 331—1 A **8 Claims**

1. Apparatus receiving a degraded synchronous pulse signal and supplying a corrected data pulse signal in which missing pulses have been replaced and phase shifted pulses have been properly positioned, comprising:

a. a flywheel tank circuit whose resonant frequency varies responsive to a frequency control signal, which produces an oscillating output signal whose amplitude remains above a pre-selected value responsive to an in-phase substantially synchronous pulse train at a pulse train input and which decays to less than the predetermined value within a predetermined number of cycles upon cessation of the in-phase synchronous pulse train;

b. a pulse detector receiving the degraded pulse signal and supplying a pulse to the pulse train input of the flywheel tank circuit at a selected time following each crossing of a pre-selected level in a pre-selected direction by the degraded data pulse signal;

c. a threshold detector receiving the output of the flywheel tank circuit and producing the corrected data pulse signal



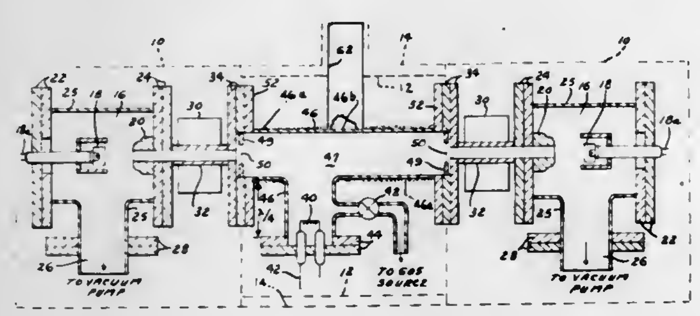
having first and second values respectively as the flywheel tank circuit output signal is greater and less than a pre-selected value;

d. a first one-shot receiving the pulse detector output, and having an on time substantially less than the shortest time between the start of adjacent pulses of the degraded data pulse signal;

e. an exclusive OR circuit receiving as inputs the output of the first one-shot and the threshold detector; and

f. a first integrator circuit receiving the exclusive OR circuit output and a second integrator circuit receiving the output of the first, and supplying its output to the flywheel tank circuit as the frequency control signal.

4,059,813
COHERENT COUNTER-STREAMING ELECTROSTATIC WAVE RAMAN INTERACTION SYSTEM UTILIZING OPPOSING ELECTRON BEAMS FOR THE PRODUCTION OF COHERENT MICROWAVES IN PLASMAS
Clare C. Leiby, Jr., 229 Old Billercia Road, Bedford, Mass. 01730, and Balram Prasad, 56 William St., West Newton, Mass. 02165
Filed Jan. 12, 1977, Ser. No. 758,877
Int. Cl.² H03B *17/00*
U.S. Cl. 331—94 **7 Claims**

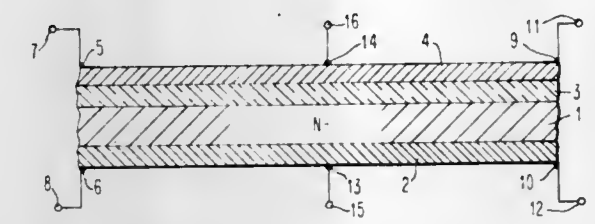


1. A method of generating controlled, coherent microwave radiation from a warm, uniform plasma at approximately twice the plasma frequency comprising the steps of

counter-streaming a pair of electron beam sources into a plasma to excite longitudinal waves in the plasma such that the energy density level of the said waves is sufficient to stimulate transverse electromagnetic wave radiation at approximately twice the plasma frequency, and

coupling said electromagnetic energy for use in appropriate circuitry.

4,059,814
CONTROLLABLE SEMICONDUCTOR ELEMENT
Otto G. Folberth, Boblingen, Germany, assignor to International Business Machines Corporation, Armonk, N.Y.
Filed June 23, 1975, Ser. No. 589,303
Claims priority, application Germany, Aug. 14, 1974, 2439051
Int. Cl.² H03H *7/22, 7/30;* H03C *1/36, 3/22*
U.S. Cl. 333—29 **5 Claims**



4. Controllable semiconductor element comprising:

a laminar circuit system with a lamination sequence consisting of a conductive layer, a semiconductor layer, an insulation layer, and finally a conductive strip;

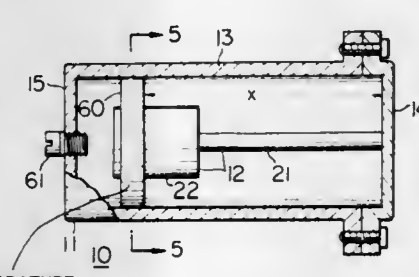
the said conductive strip is interrupted and forms separately addressable electrodes;

means for applying an input signal at one end of said circuit system between the said conductive strip and said conductive layer;

means for deducting an output signal at the other end of the said circuit system between the said conductive strip and the said conductive layer; and

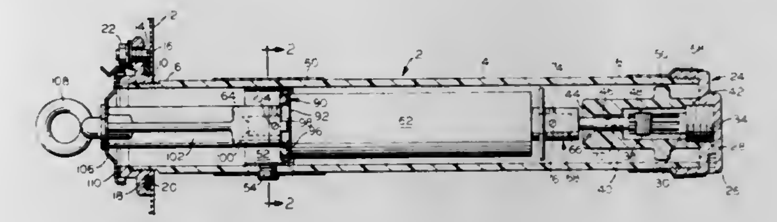
control means connected to said conductive layer and said conductive strip which, by means of conductivity modulation, with a control frequency lower than the dielectric relaxation frequency the transit time of the signal guided via the said semiconductor layer can be controlled.

4,059,815
COAXIAL CAVITY RESONATOR
Mitsuo Makimoto, and Sadahiko Yamashita, both of Kawasaki, Japan, assignors to Matsushita Electric Industrial Co., Limited, Japan
Filed July 30, 1976, Ser. No. 710,207
Claims priority, application Japan, July 31, 1975, 50-94031; July 31, 1975, 50-94032
Int. Cl.² H01P *1/30, 7/04*
U.S. Cl. 333—82 BT **10 Claims**



1. A cavity resonator comprising, an enclosure having opposed ends, a center cylindrical conductive body in the enclosure and shaped into first and second portions having respective characteristic impedances, the first portion being in short-circuit connection with one of said ends of the enclosure and having a larger characteristic impedance than said second portion, said second portion being in open-circuit relation with the other end of the enclosure, and a body of dielectric material encircling said second portion of the center conductive body, the dielectric constant of said material having a negative temperature coefficient.

4,059,816
ELECTRICAL LOADBREAK FUSE AND CANISTER ASSEMBLY
Thayer A. Bonecutter; Charles E. Lewis, both of Zanesville, Ohio, and John E. Smith, Nacogdoches, Tex., assignors to McGraw-Edison Company, Elgin, Ill.
Continuation of Ser. No. 633,692, Nov. 20, 1975, abandoned, which is a continuation of Ser. No. 545,782, Jan. 31, 1975, abandoned. This application July 21, 1976, Ser. No. 707,709
Int. Cl.² H01H *85/38*
U.S. Cl. 337—278 **12 Claims**



1. An electrical loadbreak, fuse and canister assembly comprising:

a fuse and contact assembly including,

1. an elongated fuse having first and second ends including conductive portions between which the fuse extends, and to which the fuse element is electrically connected;
2. a first non-loadbreak contact supported on and electrically connected to said first end of said fuse;
3. an elongated insulator having first and second ends, said first end being secured to said first end of said fuse;
4. a cap and operating means secured to the second end of said insulator;
5. a first loadbreak contact electrically connected to and projecting from said second end of said fuse, and having a contact engaging conductive portion and a tip formed of insulating material;
6. a barrier of insulating material supported between said contact engaging conductive portion of said first loadbreak contact and said second end of said fuse;

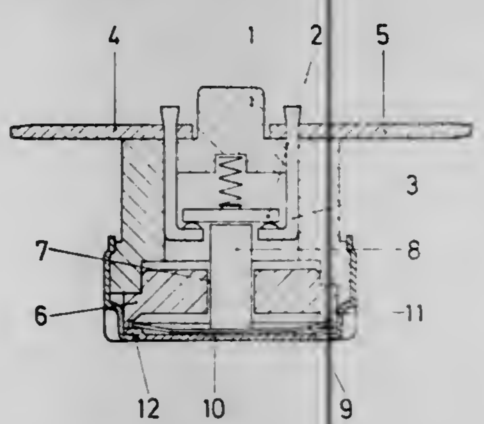
B. an enclosure and mounting assembly including,

1. a tube of insulating material having first and second ends forming an enclosure;
2. a mounting means for said assembly secured to said first end of said tube;
3. a second non-loadbreak contact having a contact portion adjacent the inner wall of said tube and positioned to be engaged by said first non-loadbreak contact, and having an electrical connection portion extending through the wall of said tube for making external electrical connection thereto;
4. a closure and loadbreak contact assembly secured to said second end of said tube including:
   a. a closure means closing said second end of said tube;
   b. a second loadbreak contact supported at one end and having a free end projecting into said tube for engagement with said first loadbreak contact,
   c. electrically conductive means connected to said second loadbreak contact and extending through said closure means for making external electrical connection to said second loadbreak contact;
   d. an insulating sleeve supported at one end on said closure means and having a free end projecting into said tube, said sleeve surrounding and spaced from said first loadbreak contact assembly, and spaced from the inner wall of said tube, the free end of said sleeve extending beyond the free end of said second loadbreak contact having a bore of reduced cross-sectional area, the outer wall of said sleeve intermediate its length being provided with a portion of enlarged cross-sectional area so as to be closely spaced from the inner wall of said tube:

whereby gases generated by an arc established between said first and second loadbreak contacts are first confined within

said sleeve and then pass out of said bore of reduced cross-sectional area and are thereafter substantially confined to the volume defined by said barrier, the perimeter of which is closely spaced from the inner wall of said tube, said sleeve portion of enlarged cross-sectional area and the inner wall of said tube therebetween, the gases being cooled by impingement with said confining members such that as said fuse and contact assembly is removed from said enclosure, said hot gases do not escape from said enclosure around said fuse, nor do they contact said fuse, whereby said arc is extinguished without the escape of gases from said confined volume during a loadbreak operation.

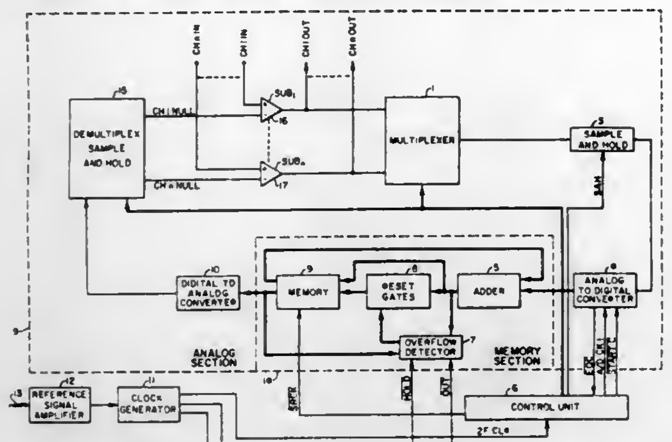
4,059,817
TEMPERATURE SENSITIVE SWITCH WITH SEPARATE BIMETAL AND HEAT TRANSFER MEANS
Walter Hollweck, Dormitzerstr. 3; Wilhelm Schnee, Franz Reichel Ring 16; Karlheinz Eberl, Dunantstrasse 33, and Werner Basel, Am Steig 14, all of D-8500 Nurnberg, Germany
Filed Dec. 19, 1975, Ser. No. 642,567
Claims priority, application Germany, Dec. 21, 1974, 2460860
Int. Cl.^{2} H01H *37/54*
U.S. Cl. 337—365 **9 Claims**



1. A temperature sensitive switch comprising :
a. a switch housing containing at least a pair of switch contacts,
b. an arched bimetal disc, whose dome height changes under temperature influence,
c. a guiding disc with a centrally located and freely movable transfer pin, which transfers movements of the bimetal disc to at least one of said switch contacts to effect relative movement thereof with respect to said other contact,
d. a potlike support mounted on said switch housing, and
e. a heat transfer plate having predetermined heat transfer characteristics placed between guiding disc and said potlike support, and characterized by an opening at the bottom of said potlike support, to allow direct heat access to the heat transfer plate.

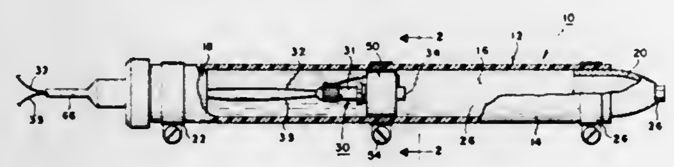
4,059,818
PERIODIC WAVEFORM INTERFERENCE ELIMINATOR
Richard J. Kostelnicek, Houston, Tex., assignor to Exxon Production Research Company, Houston, Tex.
Filed Apr. 19, 1976, Ser. No. 678,010
Int. Cl.^{2} G01V *1/36;* **H03B** *1/04*
U.S. Cl. 340—15.5 DP **11 Claims**

1. An iterative method for reducing the amplitude of an unwanted periodic signal in an electrical signal which may include a data signal, which comprises:
a. generating a nulling signal having a period slightly less than the period of the unwanted periodic signal;
b. subtracting said nulling signal from said electrical signal to generate an error signal;
c. sampling the amplitude of the error signal at discrete intervals;
d. combining a fraction of each discrete sample of the error signal with the corresponding portions of the nulling signal to generate an updated nulling signal;



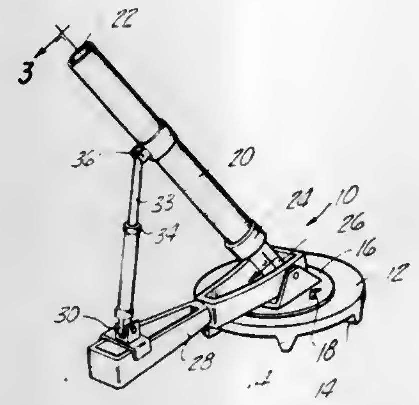
e. repeating steps (b) - (d) a plurality of times wherein the updated nulling signal replaces the nulling signal during each repetition.

4,059,819
DETECTOR ASSEMBLY FOR SEISMIC MARINE SURVEY
John C. Mollere, Nassay Bay, Tex., assignor to Hercules Incorporated, Wilmington, Del.
Continuation-in-part of Ser. No. 115,360, Feb. 16, 1971, abandoned. This application Apr. 25, 1973, Ser. No. 354,269
Int. Cl.^{2} H04B *13/00*
U.S. Cl. 340—8 LF **9 Claims**



1. In an apparatus for marine seismic prospecting in a body of water having a seismic vessel towing a gun adapted to initiate explosively-operated charges at a sufficient depth below the water's surface to thereby create in the water high-pressure, acoustic pulses which produce reflected seismic pulses and unreflected seismic pulses, a streamer cable for detecting the reflected pulses, and a detector for detecting the unreflected pulses in the ambient water surrounding said detector, the improvement wherein said detector comprises:
a. a housing having a flexible wall defining a chamber, said wall transmitting said unreflected pulses therethrough,
b. a substantially-incompressible, dielectric liquid completely filling said chamber,
c. a detector probe completely immersed in said liquid, said probe comprising: a metallic housing, a quartz crystal mounted on an inner wall portion of said metallic housing, am amplifier in said metallic housing, and circuit means coupling said quartz crystal to the input circuit of said amplifier,
d. a direct-current source on said vessel, a long cable for supplying direct-current from said source to said amplifier; and
e. recorder means on said vessel, said recorder being A-C coupled to said amplifier through said cable for recording the output pules from said corresponding to said unreflected seismic pulses.

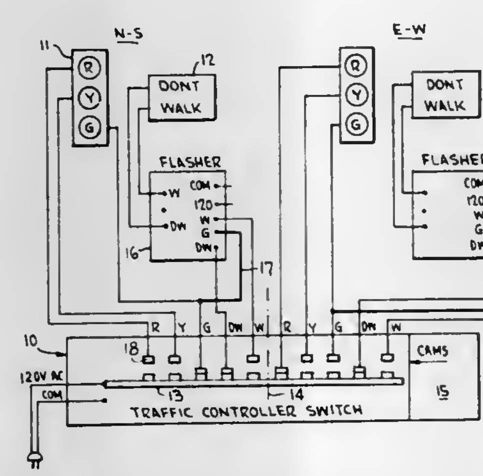
4,059,820
SEISMIC WAVE GENERATOR AND METHOD OF GEOPHYSICAL PROSPECTING USING THE SAME
Roger M. Turpening, Howell, Mich., assignor to Environmental Research Institute of Michigan, Ann Arbor, Mich.
Filed Nov. 21, 1975, Ser. No. 634,146
Int. Cl.^{2} G01V *1/10*
U.S. Cl. 340—15.5 SW **21 Claims**



1. A device for generating seismic waves comprising: a base plate adapted to be supported on the earth; an elongated barrel having an open end and a closed end; adjustable support means for affixing the closed end of the barrel to the base plate so that the barrel projects at an angle of at least about 15° with respect to the base; means for containing water in a volume of the barrel spaced from the closed end; means for supporting an explosive charge in the volume between the closed end of the barrel and said means for containing water; and means for detonating said charge, whereby the recoil imposed on the base will force the base against the earth generating seismic waves.

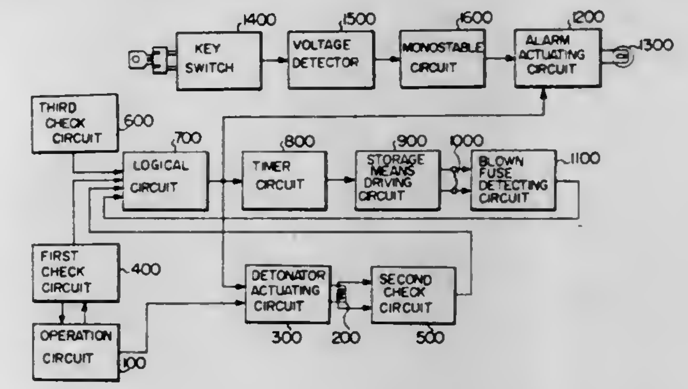
13. The method of geophysical prospecting comprising: impacting a first point on the earth at least twice at different angles relative to the earth's surface with a force to create therefrom simultaneous longitudinal and shear seismic waves in the earth; recording both the longitudinal and shear waves resulting from the impacts at a second point, remote from the first point; and mathematically operating upon the resulting recordings to separate components attributable to the longitudinal and the shear waves generated by said impact.

4,059,821
TRAFFIC SIGNAL CONTROLLER FLASHER FOR PEDESTRIAN CLEARANCE
Joseph A. Nicholls, 1729 Westwood Drive, Twinsburg, Ohio 44087
Filed Sept. 8, 1976, Ser. No. 721,498
Int. Cl.^{2} G08G *1/00*
U.S. Cl. 340—44 **5 Claims**



3. A modular traffic signal controller unit operable from an a-c line for converting to a flashing mode a traffic signal system sequencing traffic signals through red, green, and yellow phases and pedestrian signals through WALK and DONT-WALK phases with the DONT-WALK phase partly overlapping the green phase, consisting in combination, isolator inputs for deriving WALK, DONT-WALK and green phases from said system, a counter responsive to the a-c line frequency enabled by the green phase to divide it down thereby obtaining an on-off flashing signal preferably exhibiting in the order of 55 flashes per minute, logic AND circuitry producing an output DONT-WALK phase signal responsive conjointly to the flashing signal and the input DONT-WALK phase, an a-c line input, and solid state pedestrian signal lamp power drivers operable from said line input and the output DONT-WALK phase signal thereby to produce output flashing of the DONT-WALK output power signals during the overlap period of the input green and DONT-WALK phases.

4,059,822
FAULT DETECTING SYSTEM FOR VEHICLE OCCUPANTS PROTECTIVE APPARATUS
Toru Toshioka, Toyota; Kazuo Oishi, Oobu, and Takashi Yamada, Anjo, all of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota and Nippon Soken, Inc., Nishio, both of, Japan
Continuation-in-part of Ser. No. 348,533, April 6, 1973, abandoned. This application Aug. 11, 1975, Ser. No. 603,503
Claims priority, application Japan, Apr. 10, 1972, 47-35933
Int. Cl.^{2} B60R *21/02;* **G08B** *29/00*
U.S. Cl. 340—52 H **9 Claims**



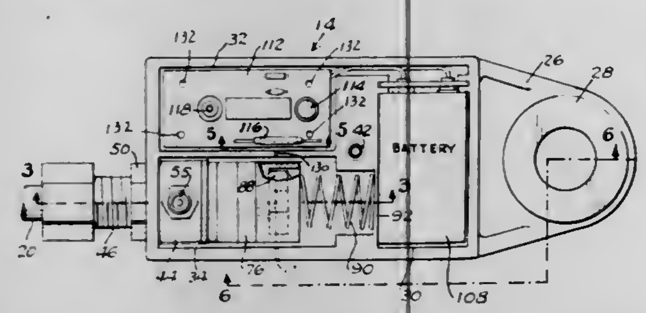
1. In a vehicle occupants protective apparatus having an operation circuit for radiating an electromagnetic wave, receiving the electromagnetic wave reflected from a target body and combining said radiated wave and said reflected wave to generate a detection signal indicative of a vehicle collision, and an actuating circuit, connected to said operation circuit, for actuating an occupants protector means in response to said detection signal, a fault detecting system comprising:
a first check circuit, connected to said operation circuit, for applying a pseudo signal of fixed frequency thereto to thereby continuously check an occurrence of a fault of said operation circuit;
a second check circuit for checking an occurrence of a fault of at least one function of said vehicle occupants protective apparatus;
a logical circuit, connected to said first and second check circuits, for generating an indication signal while at least one of the fault occurrences are being detected by said first and second check circuits;
an indicator means, connected to said logical circuit, for indicating an occurrence of a fault in response to said indication signal;
a timer circuit, connected to said logical circuit, for generating a timer signal representing that duration of said indication signal has exceeded a predetermined time;
a storage means, connected to said timer circuit, for memorizing the generation of said timer signal irrespectively of expiration of said timer signal; and
a prohibition circuit, connected between said storage means and said actuating circuit, for preventing the operation of said actuating circuit while said storage means memorizes

the generation of said timer signal, whereby said occupants protector means is maintained irresponsive to said detection signal while at least one fault exists.

4,059,823
TIRE PRESSURE INDICATOR

Clyde J. Martin, Cincinnati, and Floyd A. Nicholson, Mount Clemens, both of Mich., assignors to Tyrspy Inc., Detroit, Mich.

Filed Jan. 17, 1977, Ser. No. 759,820
Int. Cl.[2] B60C *23/04*
U.S. Cl. 340—58 20 Claims

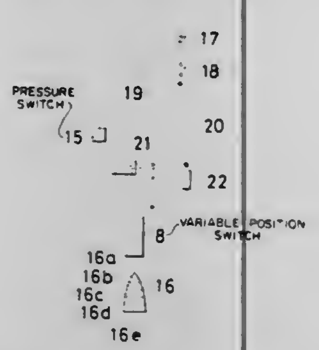


1. A tire pressure indicator comprising a housing having means thereon for attaching it to a vehicle wheel, a cylinder in said housing, a piston slideable axially in said cylinder, a switch actuator supported by said piston for movement therewith, means on said cylinder adapted to be connected with the valve stem of a vehicle tire for subjecting one side of the piston to the pressure of the air in the tire, a spring yieldably opposing movement of the piston in response to the air pressure exerted against said one side thereof so that the position of said switch actuator in a direction axially of said cylinder is determined by the extent to which the tire air pressure overcomes the force on the piston produced by said spring, an indicator light on said housing and means in said housing forming an electrical circuit for energizing the indicator light, said circuit means including a switch disposed in said housing in a predetermined position axially of said cylinder for actuation by said switch actuator when the tire pressure is below a predetermined value and thereby energize said signal light.

4,059,824
AUTOMOTIVE LIGHT FOR PREVENTING REAR END COLLISION

Kiyotaka Tanimura, 5-2, Hama-cho 1-chome,, Odawara, Kanagawa, Japan

Filed Aug. 25, 1976, Ser. No. 717,558
Claims priority, application Japan, June 12, 1976, 51-68859
Int. Cl.[2] B60Q *1/26*
U.S. Cl. 340—71 3 Claims



1. A vehicular light assembly for indicating the speed of movement of a vehicle and for indicating engine braking of the vehicle, said assembly comprising:

a lamp including at least three first color lights and at least three second color lights;

first switch means responsive to the relative position of the accelerator pedal of the vehicle, said first switch means comprising first and second contacts, a plurality equal to the number of first color lights of first contact portions one each electrically connected to a respective one of said first color lights, and a plurality equal to the number of second color lights of second contact portions one each electrically connected to a respective one of said second color lights, said first and second contacts being movable between and relative to said first and second contact portions as a function of the position of the accelerator pedal of the vehicle, with said first contact electrically contacting a respective one of said first contact portions and said second contact electrically contacting a respective one of said second contact portions;

first circuit means for electrically connecting said first contact to an electrical power source of the vehicle and for thereby lighting selected of said first color lights as a function of the position of said first contact with respect to said first contact portions, thereby giving a visual indication of the speed of the vehicle;

second switch means, electrically coupled to said first circuit means and responsive to the intake pressure of the engine of the vehicle, for electrically opening said first circuit means upon the decrease of said intake pressure below a predetermined level indicative of engine braking and for thereby extinguishing all of said first color lights;

second circuit means for electrically connecting said second contact to the electrical power source of the vehicle and for thereby lighting selected of said second color lights as a function of the position of said second contact with respect to said second contact portions;

a relay electrically coupled to said first circuit means and responsive to opening or closing thereof by said second switch means;

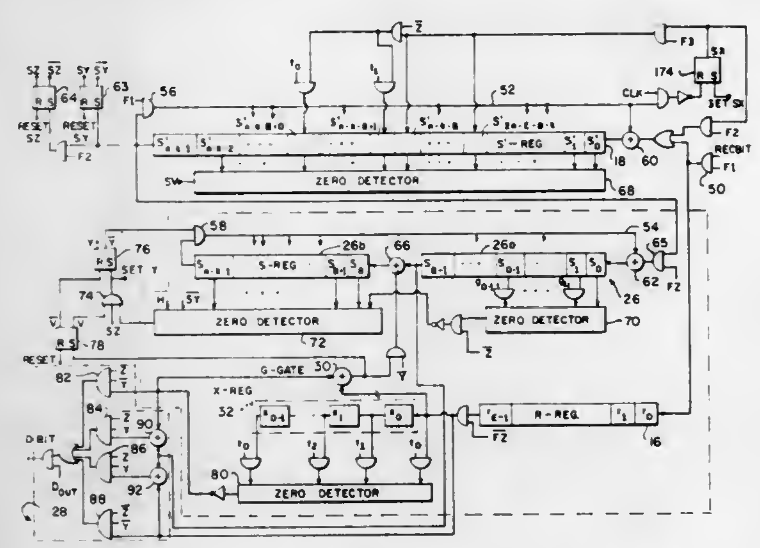
said second circuit means including relay switch means responsive to and operable by said relay for opening said second circuit means when said first circuit means is closed and for closing said second circuit means when said first circuit means is open; and

dimming resistor means, electrically coupled to said second circuit means in parallel with said relay switch means, for electrically coupling said second contact with the vehicle electrical power source when said second circuit means is opened and for lighting said selected second color lights at a dimmed intensity.

4,059,825
BURST/SLIP CORRECTION DECODER AND METHOD

Edward P. Greene, 19 Lakeside Drive, Greenbelt, Md. 20770

Filed Oct. 12, 1976, Ser. No. 731,837
Int. Cl.[2] G06F *11/12*
U.S. Cl. 340—146.1 D 10 Claims



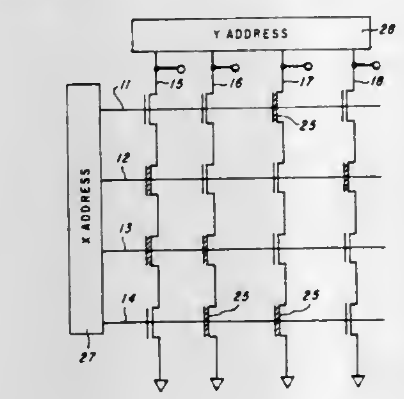
1. In a machine implemented process for use in a data communications system having decoding apparatus for decoding on a first-in-first-out basis n' received data characters encoded in a shortened cyclic block code of the type (n,k), n being the total number of characters and k being the number of information characters, by the use of a generating polynomial having an exponent E, the received data characters having been subjected to an error inducing environment such that the data can contain a burst error of b characters having a slip error of d characters, the process comprising the steps of:

1. determining the slip error d of the received characters;
2. storing the received n' characters in a first register means;
3. generating and storing an initial syndrome in a second register means, said initial syndrome being computed using the generating polynomial and the received data characters;
4. generating an intermediate syndrome from said generated initial syndrome by rotating and feeding back pursuant to the syndrome generating polynomial the characters stored in said second register means;
5. selectively combining parts of the received n' characters stored in said first register means with selected characters of said generated intermediate syndrome to generate further characters; and
6. testing said generated further characters to determine if said received data characters have undergone a burst error.

4,059,826
SEMICONDUCTOR MEMORY ARRAY WITH FIELD EFFECT TRANSISTORS PROGRAMMABLE BY ALTERATION OF THRESHOLD VOLTAGE

Gerald D. Rogers, Houston, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Dec. 29, 1975, Ser. No. 645,173
Int. Cl.[2] G11C *11/40, 17/00*
U.S. Cl. 365—104 9 Claims



1. A semiconductor memory comprising:

a. an array of rows and columns of memory cells on a face of a semiconductor body;

b. an MOS transistor included in each of said memory cells, each MOS transistor having gate, source and drain regions and a channel region, insulator material above the channel region and beneath the gate being much thinner than surrounding insulator material on said face;

c. selected ones of the channel regions of the MOS transistors being implanted with conductivity-detemining impurities to a depth much less than that of the source and drain regions and to an extent whereby the threshold voltage is substantially zero and the source and drain regions are essentially shorted together at zero volts on the gate, to thereby permanently program certain cells of the memory.

4,059,827
MOLECULAR INFORMATION STORAGE SYSTEMS

Dennis William George Byatt, Chelmsford, England, assignor to The Marconi Company Limited, England

Filed Feb. 19, 1976, Ser. No. 659,560
Claims priority, application United Kingdom, Mar. 13, 1975, 10493/75
Int. Cl.[2] G11C *11/46*
U.S. Cl. 365—126 10 Claims

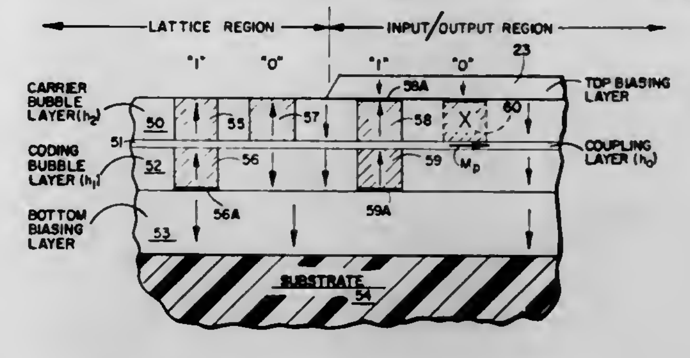
3. Apparatus for recording data on thermoplastic film consisting of polyvinylidene flouride having a random orientation of its polar molecules including generating means for generating an electric potential which is modulated in accordance with the data to be stored, means for transporting the thermoplastic film relative to the generating means so as to record the data thereon, means for heating the thermoplastic film prior to

recording whereby said polar molecules are reoriented by said generating means to record the data as potential differences across the surface of said film; and means for cooling the thermoplastic film after recording has taken place to retain said potential differences.

4,059,828
BUBBLE LATTICE FILE STRUCTURE

Tsutomu Kobayashi, Placentia; John L. Archer, Orange, and Michael T. Elliott, Balboa Island, all of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed Aug. 20, 1976, Ser. No. 715,967
Int. Cl.[2] G11C *19/08*
U.S. Cl. 365—32 9 Claims



1. In a magnetic bubble domain storage apparatus,

a first layer of magnetic bubble domain material for supporting carrier magnetic bubble domains,

a second layer of magnetic bubble domain material for supporting coded magnetic bubble domains which are coupled to said carrier magnetic bubble domains,

a first biasing layer supporting said second layer of magnetic bubble domain material and for applying a first magnetic bias field to said second layer of magnetic bubble domain material to affect the coded magnetic bubble domains formed therein, and

a second biasing layer supported by at least portions of said first layer of magnetic bubble domain material in order to apply a second magnetic bias field to interact with said first magnetic bias field to affect the magnetic bubble domains formed in said first and second layers of magnetic bubble domain materials.

4,059,829
MULTI STATE MAGNETIC BUBBLE DOMAIN CELL FOR RANDOM ACCESS MEMORIES

Witold Kinsner, Hamilton, and Edward Della Torre, Toronto, both of Canada, assignors to Canadian Patents and Development Limited, Ottawa, Canada

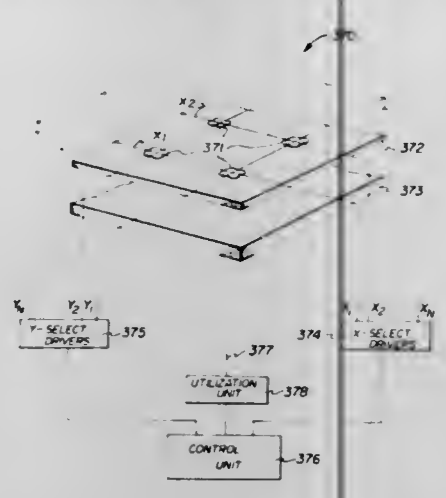
Filed Nov. 17, 1975, Ser. No. 632,803
Int. Cl.[2] G11C *11/14*
U.S. Cl. 365—19 17 Claims

1. A multi-state bubble memory cell comprising:

channel means formed in a magnetic bubble supporting material said channel means having a number of discrete energy minima positions separated by barriers to provide stable magnetic bubble positions; and

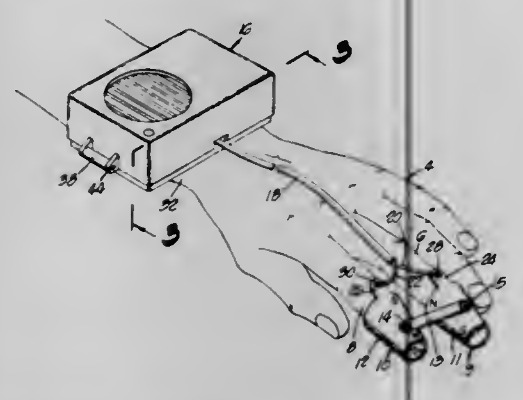
switching means for each pair of adjacent stable positions having first select current conductor means positioned

over the barrier between the two stable positions and second select current conductor means positioned adjacent to the two stable positions, for conducting predeter-



mined coincident currents to produce a magnetic field in the cell for switching a magnetic bubble across the barrier from the one stable position to the other stable position.

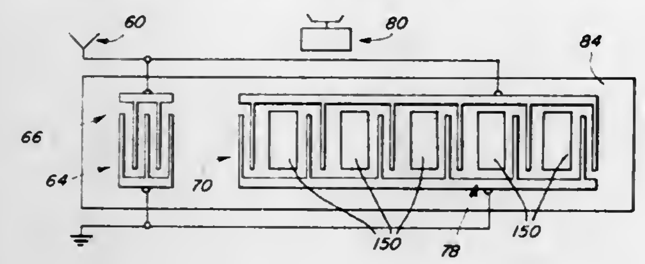
4,059,830
SLEEP ALARM DEVICE
Murray H. Threadgill, 33372 Palo Alto St., Dana Point, Calif. 92629
Filed Oct. 31, 1975, Ser. No. 627,557
Int. Cl.² G08B *21/00*
U.S. Cl. 340—279 **16 Claims**



1. A switching apparatus comprising at least two switch contacts, adapted to be worn on adjacent fingers of a human hand and adapted to close an electrical circuit when brought into mutual contact as a result of said adjacent fingers being brought into a contiguous relationship, each said contact comprising:
- a ring-like device having a face portion for contacting a similar face portion on an adjacent switch contact and adapted to be removably positioned on a human finger and to be retained thereon by frictional engagement with said finger, and
- means urging said face portions toward each other in opposition to muscular forcing of said fingers apart when said devices are on said two fingers.

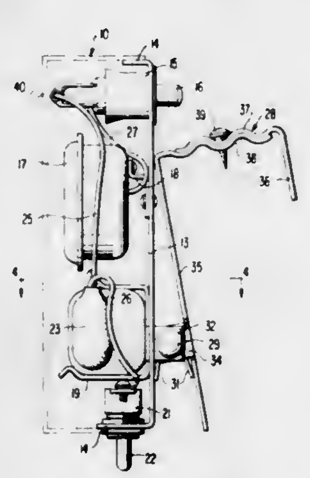
4,059,831
PASSIVE TRANSPONDERS USING ACOUSTIC SURFACE WAVE DEVICES
Max Epstein, Highland Park, Ill., assignor to Northwestern University, Evanston, Ill.
Filed Oct. 6, 1975, Ser. No. 617,251
Int. Cl.² G01S *9/56*
U.S. Cl. 343—6.8 R **4 Claims**

1. A transponder for receiving and for retransmitting pulsed electromagnetic energy characterized by a frequency range of from about 10 meg. Hz to 1000 meg. Hz and comprising:
- antenna means for receiving and for transmitting a signal of said pulsed electromagnetic energy,
- peizoelectric substrate means remote from said antenna means,
- electrode means carried as an array of electrodes on said peizoelectric substrate means to define therewith an acoustic surface wave device, said device including a plurality of interdigital transducers,
- electrical energy conducting means interconnecting said antenna means with at least one of said interdigital transducers,
- said transducers and said substrate means constituting means responsive to a signal received by said transducers from



said antenna means to effect a finite time delay in the conductive travel of said signal along said piezoelectric substrate means, thereby to provide a time-delayed signal,
- said transducers constituting means for transmitting the time-delayed signal to said antenna means,
- said transducers including a circular input transducer propagating radially and an array of output taps disposed in cyclical succession about said transducer,
- said output taps being disposed on a circumference of a circular pattern, and
- means connecting at least one of said output taps to said antenna means,
- whereby said transducers obviate bi-directional radiation and are compatible with each other.

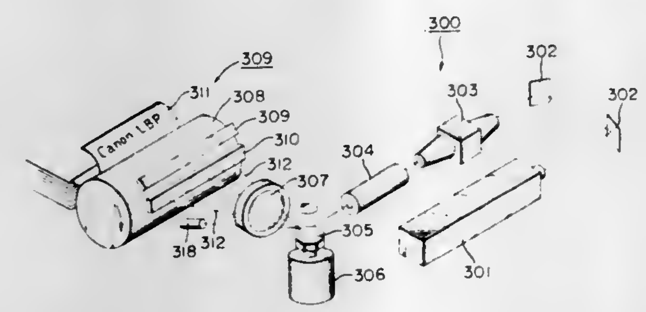
4,059,832
PORTABLE INTRUSION ALARM
LeRoy T. Conklin, 136 S. Ash, Blackfoot, Idaho 83401
Filed Oct. 24, 1975, Ser. No. 625,389
Int. Cl.² G08B *13/08*
U.S. Cl. 340—274 R **1 Claim**



1. A portable alarm device for closures comprising a mounting plate, an alarm switch, an on-off switch and an audible electrical alarm element secured to one side of the mounting plate, a battery holder on the same side of the mounting plate and having a pair of spaced ears formed integrally thereon, the mounting plate having spaced slots receiving said ears and the ears projecting beyond the other side of the mounting plate, said battery holder having a substantially U-shaped body portion including a flat base lying against the mounting plate and being fixed thereto, said spaced ears being directly attached to said flat face at opposite sides thereof and extending substantially at right angles to the flat face and said mounting plate, said alarm switch having an actuating plunger projecting be-

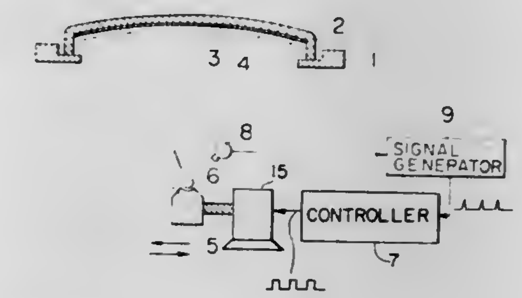
yond said other face of the mounting plate, a hanger bracket for said alarm device having a plate body extending near said mounting plate, said plate body having a pair of spaced ears formed integrally therewith and interfitting laterally with the ears of the battery holder, a pintle hingedly connecting the ears of the battery holder with the ears of the plate body, a coiled torsion spring surrounding the pintle between said ears of the battery holder and having ends bearing on the mounting plate and said plate body and biasing the mounting plate pivotally in one direction relative to said hanger bracket, and said hanger bracket including a substantially right angular extension which is transversely corrugated and said extension carried by the upper end of said plate body, and a coacting L-shaped corrugated hanger extension on the hanger bracket whose corrugations interfit adjustably with the corrugations of said extension, whereby the effective width of the hanger bracket may be varied to accommodate closures of different thicknesses, and separable threaded fastener means securing the interfitting corrugations in selected adjusted positions.

4,059,833
RECORDING POSITION ADJUSTER
Takashi Kitamura, Yokohama; Asao Watanabe, Higashikurume; Takashi Nakano, Yokohama; Katsumi Masaki, Kodaira; Kazuhiro Hirayama, Yokohama; Yasushi Sato, Kawasaki, and Taisuke Tokiwa, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan
Filed Sept. 25, 1975, Ser. No. 616,675
Int. Cl.² B41B *15/00*
U.S. Cl. 346—108 **22 Claims**



1. An apparatus for defining the position for initiating recording on a recording member, comprising in combination:
- a. beam forming means for forming a beam modulated by record signals applied thereto;
- b. deflecting means for deflecting said beam along a scanning path;
- c. a member having a recording region on one portion thereof within which said record signals are recorded by the irradiation of said region with said deflected beam;
- d. beam detecting means for detecting when said beam is at a predetermined position and for producing a detection output in response to the detection of said beam at said predetermined position;
- e. first clock signal generating means for generating first clock signals of a predetermined frequency
- f. second clock signal generating means for generating second clock signals which are synchronized with said first clock signals and which have a lower frequency than that of said first clock signals;
- g. first detecting means for detecting a time period corresponding to a predetermined number of said second clock signals, wherein said time period is initiated at the next successive first clock signal after said beam detection; and
- h. record signal applying means for applying said record signals to said beam forming means in response to generation of said second clock signals after the detection, by said first detecting means, of when said predetermined number of second clock signals has been generated.

4,059,834
LIGHT EXPOSING APPARATUS FOR FORMING A PHOSPHOR SCREEN OF A CATHODE RAY TUBE
Kakuichiro Hosokoshi, Neyagawa; Hikoshi Yamamoto; Masayuki Tanaka, both of Takatsuki, and Shinichi Omura, Nagaokakyo, all of Japan, assignors to Matsushita Electronics Corporation, Osaka, Japan
Filed Mar. 10, 1975, Ser. No. 556,876
Claims priority, application Japan, Mar. 13, 1974, 49-29372; Mar. 13, 1974, 49-29373
Int. Cl.² G03B *41/00*
U.S. Cl. 354—1 **4 Claims**

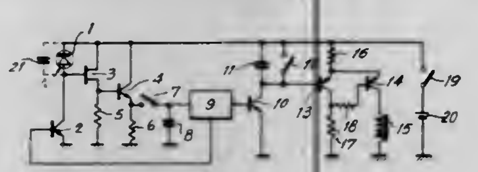


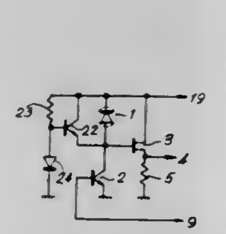
1. In combination,
- a cathode ray tube comprising
  - a face panel,
  - a shadow mask having a plurality of slots therein, and
  - a light sensitive film secured to the inner surface of said face panel between said face panel and said shadow mask, and
- a light exposing apparatus for selectively exposing said light sensitive film comprising
  - an ultraviolet light source for exposing said light sensitive film to ultraviolet light through the slots in said shadow mask,
  - movable platform means producing relative movement to the light source and said light sensitive film in a plane parallel to said film,
  - means for receiving and converting part of said ultraviolet rays to corresponding first electrical signals,
  - signal generator means for accumulating and counting said first electrical signals to generate a second electrical signal each time the accumulated first signals reach a predetermined value, and
  - means for controlling said platform means to cause a stepwise relative movement of at least one of said light source and said light sensitive film in the direction of the length of the slots in said shadow mask, said movement being determined by said second electrical signal.

4,059,835
BYPASS CIRCUITS FOR IMPROVING THE RESPONSE OF ELECTRIC SHUTTERS
Masahiro Kawasaki, and Hirokazu Ando, both of Tokyo, Japan, assignors to Asahi Kogaku Kogyo Kabushiki Kaisha, Japan
Filed July 25, 1975, Ser. No. 599,006
Claims priority, application Japan, July 27, 1974, 49-89964
Int. Cl.² G03B *7/08*
U.S. Cl. 354—24 **7 Claims**

1. In an electric shutter circuit, a two terminal light receiving element capable of generating a current corresponding to a received light quantity, said element being a photodiode having anode and cathode terminals and including a junction capacitor, a logarithmic amplifier coupled to said element for providing a compressed current signal and means coupling to said amplifier a memory capacitor operative to charge to a value determined by said compressed current signal, and, for controlling the charge on said memory capacitor, an active device having an input terminal and first and second output terminals, with said first output terminal coupled to one terminal of said light receiving element and said second output terminal coupled to said other terminal of said light receiving

element, to thereby effectively shunt said element, a signal operation circuit coupled to said memory capacitor and a lead from said signal operation circuit coupled to said logarithmic amplifier to provide a feedback loop, and means separate from and unconnected to said logarithmic amplifier while being connected to said input terminal of said active device to determine the amount of current flowing between said first and second output terminals and hence, the amount of current flowing in said light receiving element and, therefore, the





charge of said capacitor, said means coupling said memory capacitor to said amplifier including a source-follower FET coupled to said logarithmic amplifier and an emitter-follower transistor coupled between said source-follower FET and said memory capacitor, said active device, when the electric shutter circuit is set into operation, providing for discharge of said junction capacitor and providing additional current for said logarithmic amplifier for preventing cut-off of said emitter-follower transistor and dropping of the voltage of said memory capacitor to an undesirably low level.

4,059,836

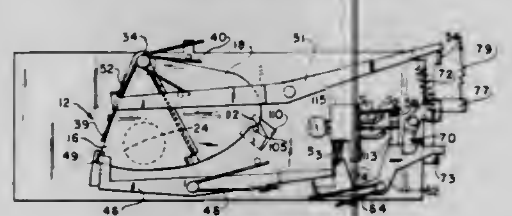
EXPOSURE CONTROL MECHANISM

William Thomas Hochreiter, Rochester; Loren Jackson Craig, Springwater, and Fredric A. Mindler, Rochester, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Apr. 5, 1976, Ser. No. 673,515

Int. Cl.² G03B *7/18*

U.S. Cl. 354—29 **6 Claims**



1. In a camera having an adjustable mechanism to set an exposure aperture, a shutter to control exposure duration, and a member movable to actuate said shutter to open said exposure aperture to initiate an exposure, movement of said member within a predetermined initial range being ineffective to actuate said shutter to open, the improvement comprising:

means, including an electromagnet, effective upon energization and subsequent de-energization of said electromagnet for controlling said mechanism to set a desired exposure aperture and effective, when said electromagnet is energized with said shutter open, for holding said shutter open until de-energization thereof;

a photosensor exposed to scene brightness; and

circuitry including switch means controlled by said movable member for operatively connecting said photosensor to said electromagnet, said circuitry being effective 1) to energize and then temporarily de-energize said electromagnet to establish a restricted exposure aperture setting in accordance with scene brightness during movement of said member in said initial range and 2) to re-energize said electromagnet, and after an exposure of duration related to scene brightness, to again de-energize said electromagnet.

4,059,837

GLASS-MOULDED TYPE SEMICONDUCTOR DEVICE

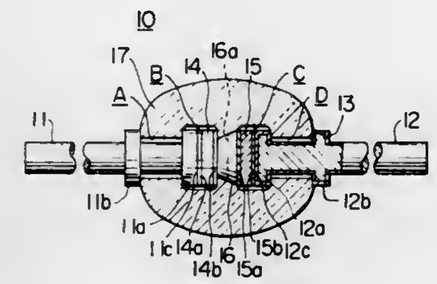
Kensuke Suzuki; Takeshi Sasaki, and Mitsuyuki Matsuzaki, all of Hitachi, Japan, assignors to Hitachi, Ltd., Japan

Filed Apr. 5, 1976, Ser. No. 673,530

Claims priority, application Japan, Apr. 7, 1975, 50-41293; Apr. 7, 1975, 50-41294

Int. Cl.² H01L *23/30, 23/48, 29/40*

U.S. Cl. 357—73 **28 Claims**



1. A glass-moulded type semiconductor device comprising at least one semiconductor pellet having at least one p-n junction extending to a lateral circumferential surface, lead electrodes each having a thermal expansion coefficient much greater than that of said at least one semiconductor pellet and including a header portion to which said at least one semiconductor pellet can be adhesively fixed, a soft solder having a low melting point for adhesively fixing said lead electrodes to both sides of said at least one semiconductor pellet, and a mould glass having a passivation function to said at least one p-n junction of said at least one semiconductor pellet and adhesively fixed to said at least one semiconductor pellet all over the surface of its lateral circumference and having a thermal expansion coefficient substantially approximate to that of said at least one semiconductor pellet.

4,059,838

CHROMA-PREFERENCE CONTROL FOR VIR AUTOMATIC OPERATION

Robert O. Banker, Portsmouth, and Howard E. Holshouser, Suffolk, both of Va., assignors to General Electric Company, Portsmouth, Va.

Filed Sept. 24, 1976, Ser. No. 726,182

Int. Cl.² H04N *9/535*

U.S. Cl. 358—27 **7 Claims**

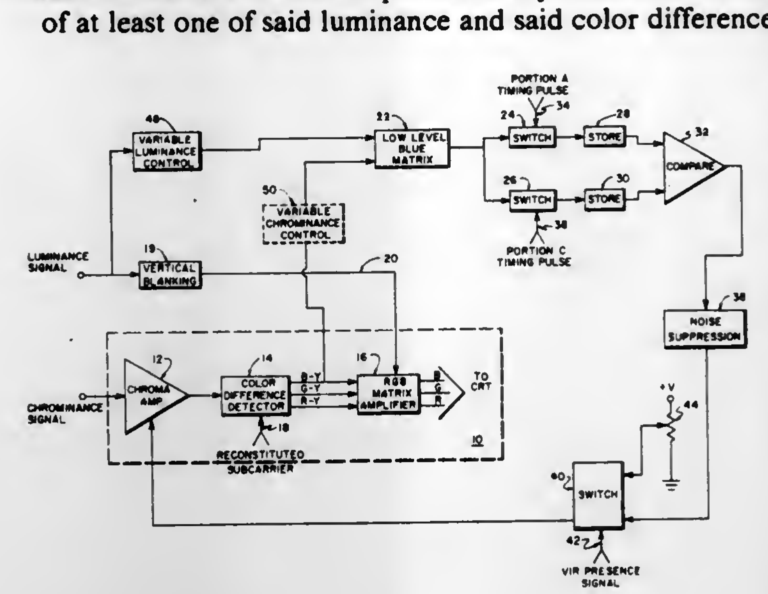
1. In a color television receiver, an automatic saturation control circuit responsive to a VIR signal comprising:

means for providing a luminance signal,

means for providing a color difference signal from a chrominance signal,

control means responsive to both said luminance signal and said color difference signal during receipt of said VIR signal for governing the chrominance to luminance matrix ratio of said receiver, and

means to enable a viewer to preferentially control the level of at least one of said luminance and said color difference



signals to vary said chrominance to luminance matrix ratio.

4,059,839

SOLID STATE CAMERA

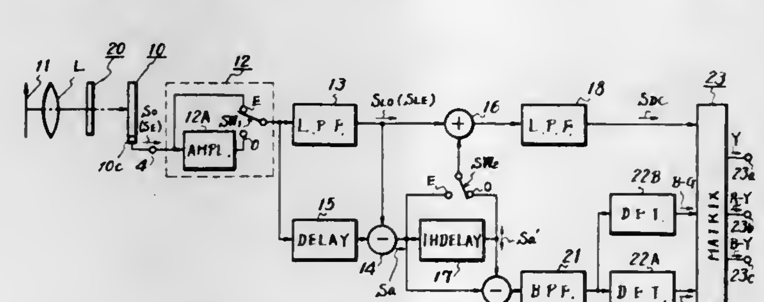
Seisuke Yamanaka, Mitaka, and Fumio Nagumo, Koshigaya, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Feb. 9, 1976, Ser. No. 656,299

Claims priority, application Japan, Feb. 14, 1975, 50-18593

Int. Cl.² H04N *9/07*

U.S. Cl. 358—44 **7 Claims**



1. A solid state color camera employing a solid state image receiving device having a plurality of picture elements aligned in both horizontal and vertical directions, comprising:

a. means for projecting an image of an object on said solid state image receiving device;
b. means for developing and storing electrical information corresponding to the image displayed on said picture elements;
c. means for reading said information line-by-line in sequence; and
d. color filter means disposed between said solid state image receiving device and said image projecting means for producing a color signal component only at every other line of picture elements.

4,059,840

TELEVISION CAMERA AND PICK-UP TUBE HAVING STRIPES FOR IMPROVED RESOLUTION AND LINEARITY

Leendert Johan van de Polder, and Sing Liong Tan, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

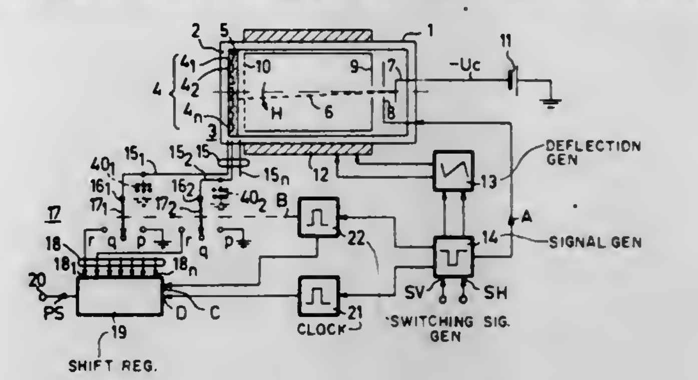
Filed Apr. 29, 1976, Ser. No. 681,548

Claims priority, application Netherlands, Feb. 11, 1976, 7601361

Int. Cl.² H04N *9/07, 5/30*

U.S. Cl. 358—48 **15 Claims**

1. A television camera comprising a a pick-up tube including an electron gun means for generating an electron beam, and a target plate including a photo-sensitive layer to be scanned by the electron beam and a signal electrode having electrically conducting strips which are separated from each other, deflection means for providing a line scanning across successive strips by said beam, a switching circuit having parallel inputs separately coupled to the strips of the signal electrode respectively, and switches coupled to the parallel inputs, and a switching signal generator means for controlling the switches



and for providing that prior to a line scan of the target plate by the electron beam the signal electrode strips are coupled to a reference potential through the switching circuit and for providing that after a local line scan by the electron beam of a signal electrode strip the switch which is coupled to the associated parallel input is closed for providing information.

4,059,841

OPTICAL READ-OUT SYSTEM INCLUDING ASYMETRICAL BEAM INTENSITY AND FOUR DETECTOR CELLS

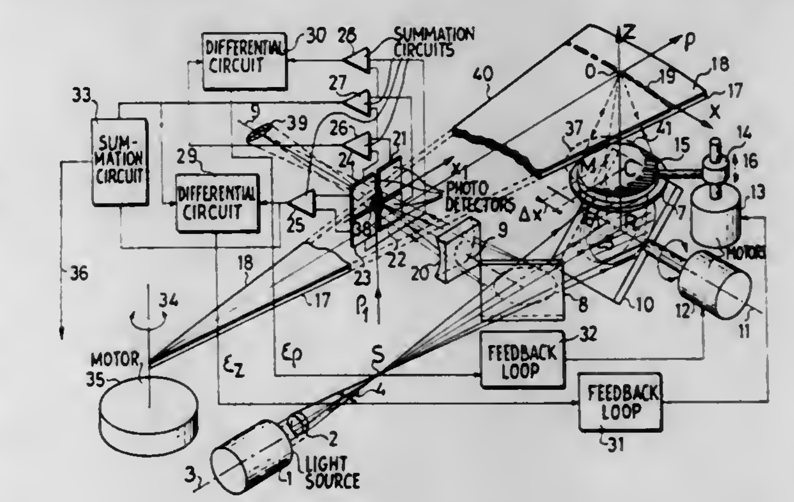
Claude Bricot, and Jean-Claude Lehureau, both of Paris, France, assignors to Thomson-Brandt, Paris, France

Filed Sept. 24, 1976, Ser. No. 726,161

Claims priority, application France, Sept. 29, 1975, 75.29707

Int. Cl.² H04N *5/76;* **G11B** *7/12*

U.S. Cl. 358—128 **22 Claims**



1. Optical readout system for optically reading a recording in the form of a support carrying a track of substantially constant width arranged in a reading surface; said track being made of a string of information items having non-uniform length and spacing, said information items ensuring by an alternative modification of a physical characteristic of said reading surface, the transcription of an angularly modulated waveform carrying the information stored in said recording; said optical readout system comprising: a source of coherent light, a lens arranged for causing said coherent light to converge into a reading spot illuminating a single area of said track extending across said width and photodetector means arranged for collecting, through said lens, a fraction of the modulated light emerging from said single area; the spatial distribution of the luminous intensities of the light beam incident upon the aperture of said lens being rendered asymmetrical in a direction coinciding with the direction of scanning of said track by said reading spot; said photodetector means comprising four cells arranged respectively along the quadrants of a detection

plane; the crossed lines of separation of said quadrants forming a rectangular trihedron with the optical axis of said lens; one of said crossed lines of separation being oriented in said direction of scanning; each pair of said cells pertaining to two contiguous portions of said quadrants being electrically connected to a summation circuit; said summation circuit belonging to a set of four summation circuits delivering four electrical signals representative of the light energies respectively collected on each side of said crossed lines of separation; said electrical signals being applied to first and second subtraction circuits; the first of said subtraction circuits having two inputs fed respectively by those of said cells situated on the two sides of one of said crossed lines of separation; the second of said subtraction circuits having two inputs fed respectively by those of said cells situated on the two sides of the other of said crossed lines of separation.

4,059,842

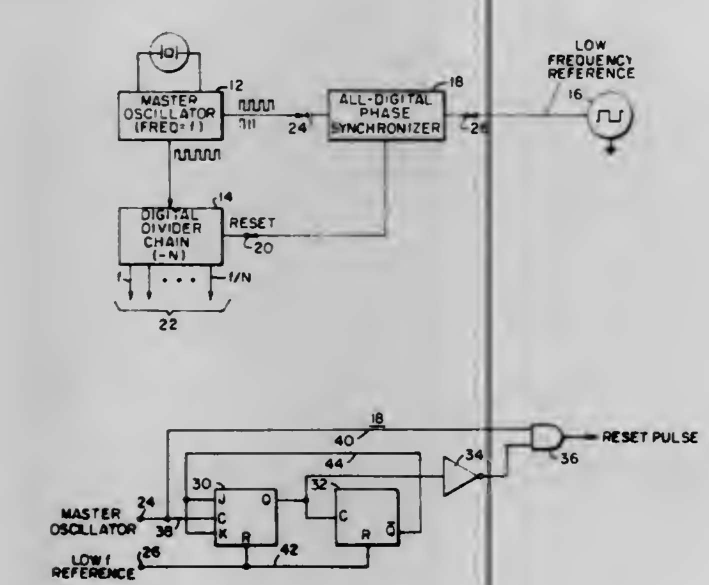
METHOD AND APPARATUS FOR SYNCHRONIZING A DIGITAL DIVIDER CHAIN WITH A LOW FREQUENCY PULSE TRAIN

James H. Meacham, Laurel, Md., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Oct. 31, 1975, Ser. No. 627,735

Int. Cl.² H04N ***5/06;*** **H03F** ***3/42, 3/68;*** **H03K** ***1/17***

U.S. Cl. 358—150 **20 Claims**



1. A digital divider phase locking system for synchronizing the divider output signal with respect to a reference pulse train alternately having first and second levels, and having a predetermined frequency, said phase locking system comprising:

at least one resettable counter stage for providing an output signal in response to the signal applied to an input;

a source for providing a clock pulse train alternately having first and second levels, and having a higher frequency than the frequency of said reference pulse train, said clock pulse train being applied to the input of the counter stage;

a first binary logic element responsive to signals provided to first, second, and third inputs to provide an output signal having alternately high and low states, said first binary logic element providing a transition between the states of the output signal in response to a transition between levels of the clock pulse train applied to the first input in combination with one level of the reference pulse train applied to the second input and a signal of one of a high or low state applied to the third input;

a second binary logic element responsive to signals provided to first and second inputs to provide an output signal having alternately high and low states, said second binary logic element providing an output signal of the other of the high or low states to the third input of said first binary logic element in response to the transition in the output signal of the first logic element applied to the first input of said second binary logic element in combination with the one level of the reference pulse train applied to the second input of said second binary logic element; and

a binary logic circuit that is responsive to one state of the output of said first binary logic element in combination with one level of the clock pulse train to provide a reset signal for synchronizing the phase of the counter stage output signal with respect to the phase of the reference pulse train by resetting the counter stage to an initial condition.

4,059,843

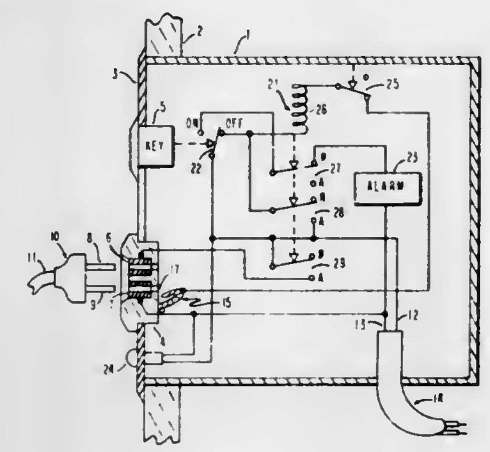
OVERLOAD AND GROUND FAULT PROTECTIVE DEVICE

Fahir Girismen, 372 Baldwin Road, Carlisle, Mass. 01741

Division of Ser. No. 467,654, May 7, 1974, Pat. No. 3,974,492. This application Aug. 9, 1976, Ser. No. 712,852

Int. Cl.² H02H ***3/00***

U.S. Cl. 361—93 **2 Claims**



1. In a power receptacle of an AC power system which includes AC power wires which feed power to one or more such receptacles in parallel, means for interrupting power to a receptacle when that receptacle draws excessive current comprising,

an overload switch connecting one of the power wires to the receptacle when said switch is actuated,

control means for actuating said switch when the control means draws current,

another switch between the power wires and the control means for energizing the control means, said other switch also having an actuated condition and being controlled by said control means,

whereby, once said control means draws current, resulting in the actuation of both of said switches, the control means remains energized and power is fed from the power wires to the receptacle, and

thereafter when the receptacle draws excessive current, current to the control means decreases so that the control means no longer actuates the switches, whereupon the switches become de-actuated cutting off power to the receptacle and current to the control means.

4,059,844

SOLENOID DRIVER CIRCUIT

John W. Stewart, Wichita, Kans., assignor to NCR Corporation, Dayton, Ohio

Filed June 4, 1976, Ser. No. 693,035

Int. Cl.² H01H ***47/32***

U.S. Cl. 361—152 **10 Claims**

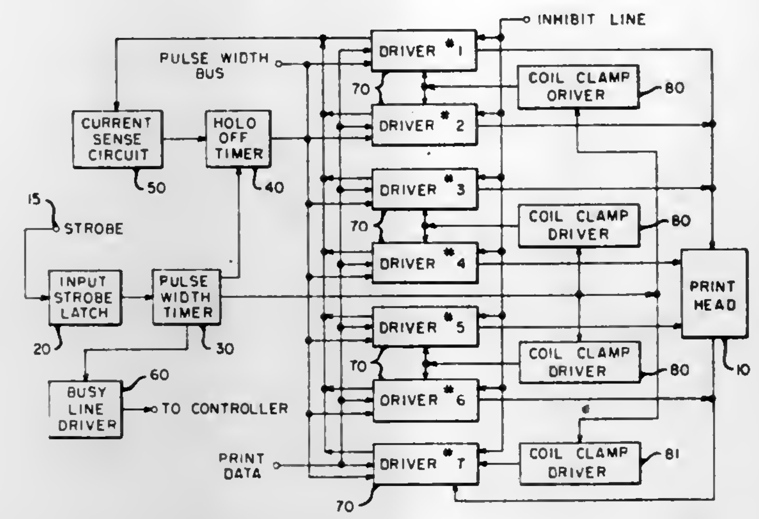
1. A solenoid drive circuit comprising:

a solenoid;

switch means for operatively connecting a source of drive voltage in circuit with said solenoid; and

means for cycling said switch means in response to the level

of current in said solenoid to disconnect the source of drive voltage from said solenoid for fixed periods of time



so as to maintain the level of current in said solenoid below a selected level.

4,059,845

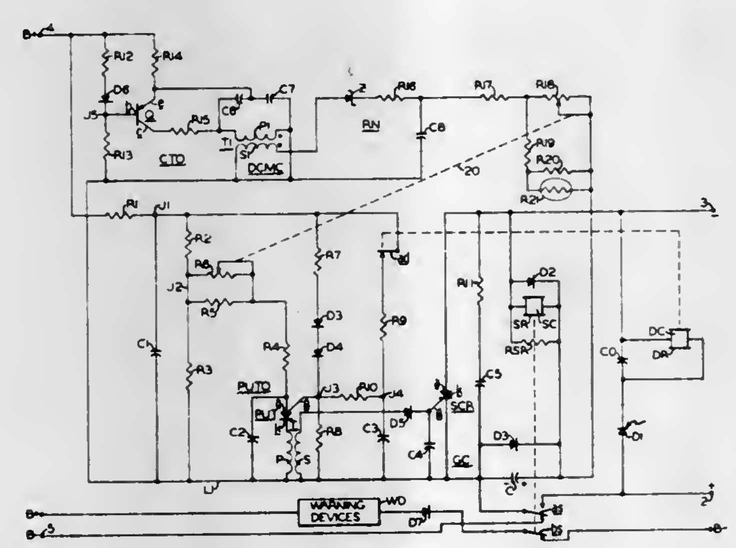
FAIL-SAFE TIME DELAY CIRCUIT

Dick J. Kolkman, Gibsonia, Pa., assignor to Westinghouse Air Brake Company, Swissvale, Pa.

Filed May 14, 1976, Ser. No. 686,304

Int. Cl.² H01H ***47/18***

U.S. Cl. 361—198 **10 Claims**



1. A fail-safe time delay circuit comprising, detection means for sensing the presence and absence of an input signal on a pair of terminals, switching means connectable between said pair of input signal terminals and a pair of d.c. supply terminals, said switching means assuming a first and a second condition in accordance with the presence and absence of the input signal on said pair of input signal terminals, oscillating means connectable to said pair of d.c. supply terminals, gating means connected to said oscillating means, and d.c. making means connectable to said pair of d.c. supply terminals, and said oscillating, gating and d.c. making means controlled by the second condition of said switching means for providing a time delay period between the disappearance and the reappearance of the input signal on said pair of input signal terminals prior to said switch means reassuming the first condition.

4,059,846

LIFT WITH ELECTRICAL GROUNDING MEANS

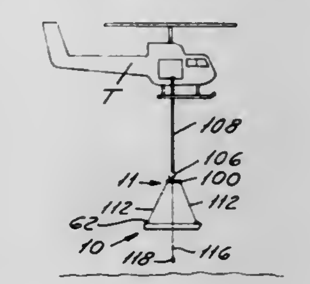
Leigh E. Eisenhauer, Van Wert, Ohio, assignor to The Eisenhauer Manufacturing Company, Van Wert, Ohio

Filed Jan. 12, 1976, Ser. No. 648,168

Int. Cl.² H05F ***3/02***

U.S. Cl. 361—212 **1 Claim**

1. A device for suspending a raft from a transport such as a helicopter, which device can be lowered from the transport for attachment to the raft afloat in the water without subjecting persons attending or occupying the raft to an electric shock from a static charge that may be carried by the transport, said device comprising a support formed of electrically conductive material and having a central apertured part in which the hook of a lifting cable from the transport is engageable, flexible



linear elements depending from the periphery of said support and releasably attachable to the raft, and a ground wire electrically connected to and depending from said support having a weight on its lower end, said ground wire being sufficiently longer than said linear elements as to contact the water and ground the transport before said linear elements contact the raft.

4,059,847

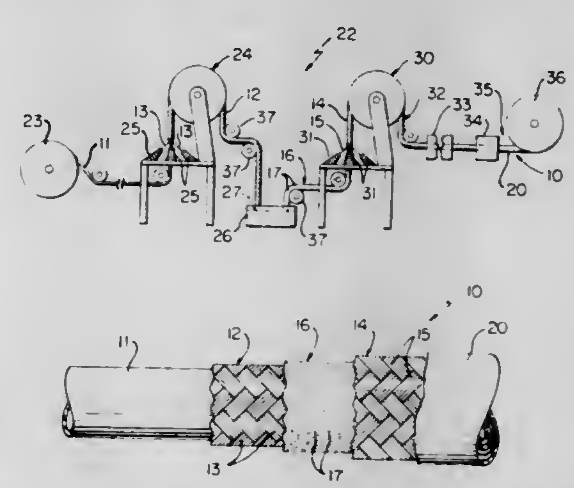
HOSE HAVING AN ELECTRICALLY CONDUCTIVE LAYER FOR DISSIPATING STATIC ELECTRICITY AND METHOD OF MAKING SAME

Alfred R. Phillips, and Arthur D. Logan, both of Waynesville, N.C., assignors to Dayco Corporation, Dayton, Ohio

Filed Sept. 1, 1976, Ser. No. 719,873

Int. Cl.² F16L ***11/12;*** **H05F** ***3/02***

U.S. Cl. 361—215 **20 Claims**

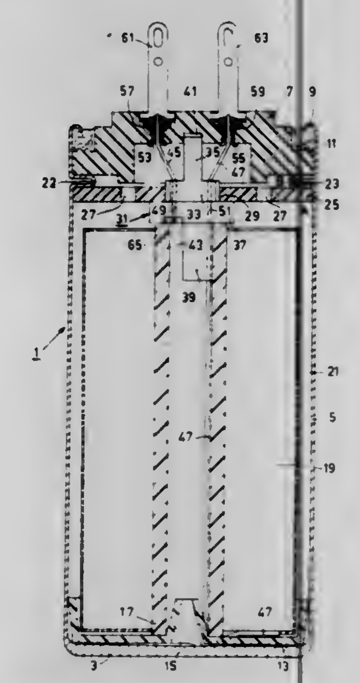


1. A hose construction having means for dissipating static electricity and comprising, a polymeric inner tubular layer, a braided layer disposed against said inner tubular layer and comprised of a plurality of filaments, and an electrically conductive layer made of carbonaceous particles overlying said braided layer and including carbonaceous particles dispersed between said filaments, said particles being disposed in overlapped relation in layer form enabling relative movement therebetween while maintaining electrical continuity to enable dissipating said static electricity.

12. A method of making a flexible hose construction for dissipating static electricity built up thereon, said method comprising the steps of, providing a polymeric inner tube, braiding a first braided layer against said tube, placing the tube with the first braided layer thereon in contact with a dispersion containing carbonaceous particles disposed therethrough causing said carbonaceous particles to form an electrically conductive layer around said first braided layer and between filaments comprising said first braided layer, braiding a second braided layer around the electrically conductive layer to sandwich the

electrically conductive layer between said first and second braided layers, and drying the hose construction.

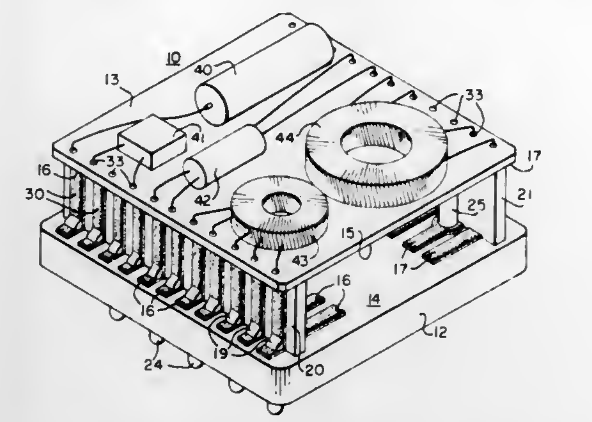
4,059,848
WOUND CAPACITOR COMPRISING AN EXCESS-PRESSURE SAFETY DEVICE
Maarten Koel, and Hubertus J. Theelen, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.
Filed Aug. 5, 1976, Ser. No. 711,711
Claims priority, application Netherlands, Aug. 8, 1975, 7509465
Int. Cl.² H01G *1/11*
U.S. Cl. 361—272 **4 Claims**



1. A wound capacitor comprising
a cylindrical housing having an open end and including a ridge in the wall of the housing;
a cylindrical core and a capacitor roll arranged thereon contained in said housing;
a lid closing said open end of the housing and including a centering member comprising a loose insert of electrically insulating material having a portion locked against axial displacement relative to said housing between an end of said core and a side of said centering disc facing said capacitor roll, said centering member having a first projection which has a shpaed cross section that engages a similarly shaped recess in said lid, and a second projection which has a shaped cross section engaging a similarly shaped recess in said capacitor core for preventing relative rotation of said centering member; and
an electrical connection anchored in said lid and said centering disc for connection to a capacitor electrode.

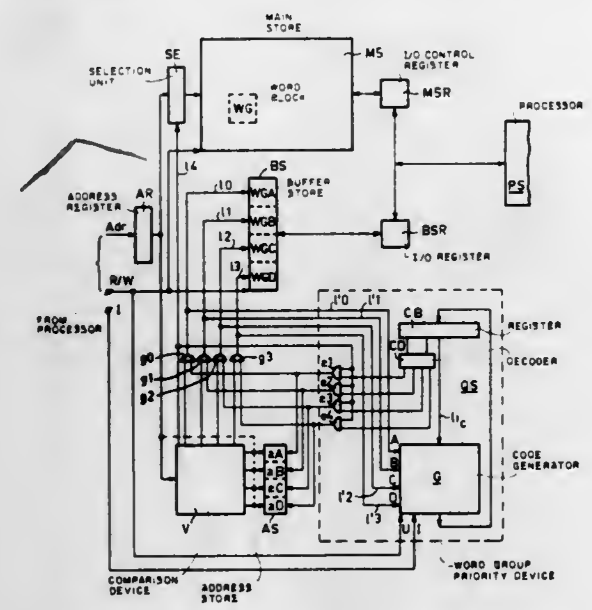
4,059,849
INTERCONNECTED MODULE
James T. Mitchell, Lima, Ohio, assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.
Filed Dec. 16, 1974, Ser. No. 533,405
Int. Cl.² H05K *5/00*
U.S. Cl. 361—395 **9 Claims**

1. A module comprising:
a plurality of substrates;
a conductive circuit matrix having input and output terminals disposed on each of said substrates;
at least one insulated spacing element disposed between and holding said substrates in a spaced relationship;
a plurality of conductive strips disposed upon at least one of said insulated spacing elements, said conductive strips being electrically connected to said input and output terminals of adjacent substrates; and,
a plurality of electrical connector pins disposed in electrical contact with said input and output terminals of a selected one of said substrates, said pins being mechanically con-



nected to said selected substrate and to said at least one of said insulated spacing elements.

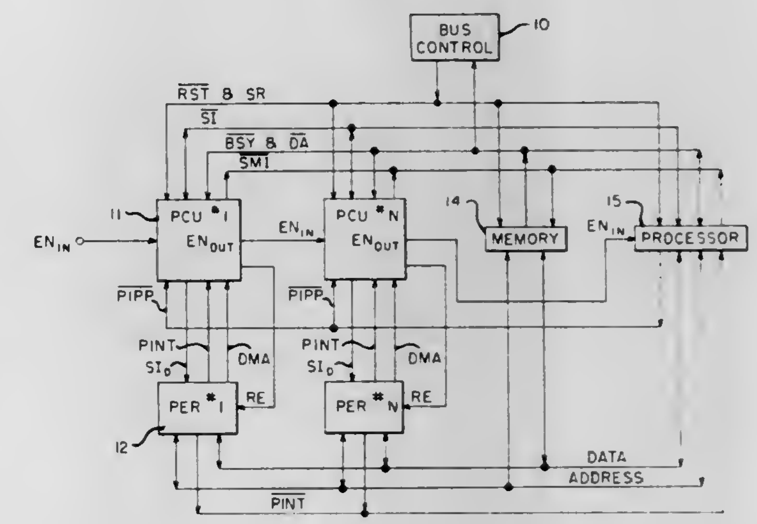
4,059,850
MEMORY SYSTEM WORD GROUP PRIORITY DEVICE WITH LEAST-RECENTLY USED CRITERION
Rudolf Van Eck, Beekbergen, and Antonius Cornelis Maria Touw, Eindhoven, both of Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.
Filed Sept. 14, 1976, Ser. No. 723,154
Claims priority, application Netherlands, Sept. 17, 1975, 7510904
Int. Cl.² G06F *13/00;* G11C *9/06*
U.S. Cl. 364—200 **4 Claims**



1. For use with a data processing system having a processor and a storage configuration including a first store and a relatively faster second store, wherein data is organized in each of said stores in word blocks each having a predetermined number of words of data, with each of said word blocks in said second store having a relative priority at any given time assigned on the basis of the least-recently-used criterion, and the number of words in said second store being less than the number of words in said first store, the combination comprising:
means for supplying from said processor the word block address of a predetermined word block for addressing individual word blocks within said first and second stores;
means for storing said predetermined word block address;
address store means for storing addresses of word blocks stored in said second store;
comparison means for comparing said stored predetermined word block address with said addresses stored in said address store means and for producing a selecting signal on a selection line connected to said second store for selecting the addresses word block;
a code generator having an input connected to said selection line and an output for generating an *m*-bit priority code for each of said word blocks, said code comprising *k*-bits for identifying the one word block having lowest priority and $(m-k)$-bits for coding all priority combinations for the other of said word blocks not having lowest priority, where *k, m,* and *m—k* are positive integers;
means connected to said code generator for supplying from said processor a signal that a read/write operation on one of said word blocks is occurring;
register means connected to said output of said code generator for storing a newly generated priority code and having a *k*-bit output; and
decoder means having an input connected to said *k*-bit output of said register means and an output connected to said address store means for specifying which one of said word blocks has the lowest priority.

4,059,851
PRIORITY NETWORK FOR DEVICES COUPLED BY A COMMON BUS
Roy S. Nutter, Jr., Morgantown, W. Va.; Jerry R. Washburn, Alhambra, Calif., and John H. Verwys, Wichita, Kans., assignors to NCR Corporation, Dayton, Ohio
Filed July 12, 1976, Ser. No. 704,256
Int. Cl.² G06F *9/18*
U.S. Cl. 364—200 **5 Claims**

1. A common bus system comprising:
a common bus having one end;
a plurality of devices coupled to said bus, with the priority of said devices being determined by their proximity to said one end;
means at each device for producing a flag signal to indicate that it needs servicing;
a plurality of device control units each associated with a device for receiving a produced flag signal and for passing an enabling signal from the highest priority device control unit to the first device control unit receiving a flag signal and for preventing the passage of the enabling signal to all device control units having a lower priority than the first device producing a flag signal, so as to allow access to the highest priority device requesting common bus access;
a processor connected to said one end of said common bus;



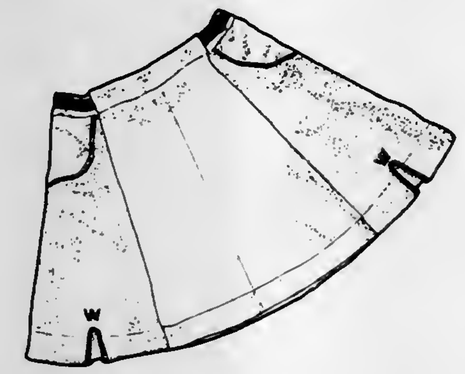
a memory unit connected to said common bus; and
bus control means connected to said common bus and responsive to signals from said plurality of device control units for interrupting said processor when a device desires processor access, said bus control means also sensing the availability of said memory unit for providing a signal to said device control units permitting memory unit access.

DESIGNS

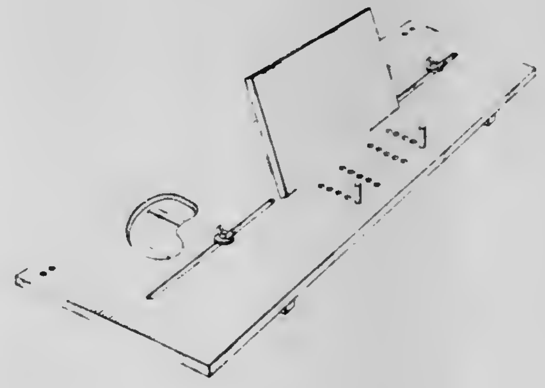
NOVEMBER 22, 1977

246,401
JACKET OR SIMILAR ARTICLE
Wolf Georg Müller-Scherak, Vincenz-Statz Str. 8, 5 Cologne 41, Germany
Filed June 17, 1975, Ser. No. 587,616
Claims priority, application Germany, Feb. 28, 1975, 43 MR 6025
Term of patent 3½ years
Int. Cl. D2—*02*
U.S. Cl. D2—191

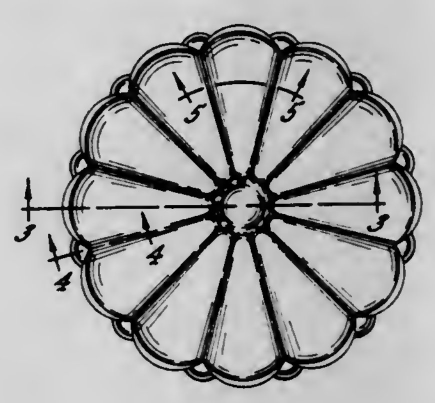
246,402
SKIRT
Peter William Swift Morgan, Keighley, England, assignor to Dunlop Limited
Filed Feb. 12, 1976, Ser. No. 657,479
Claims priority, application United Kingdom, Aug. 13, 1975, 972177/75
Term of patent 14 years
Int. Cl. D2—*02*
U.S. Cl. D2—224



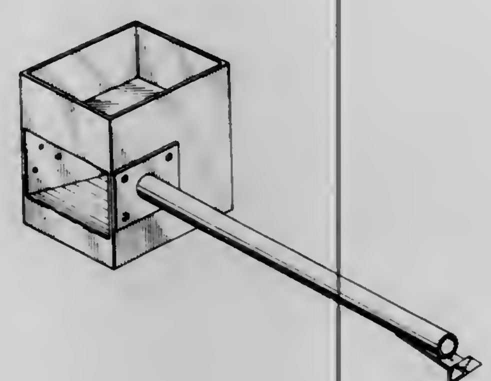
246,403
BOOK REST FOR BATHTUBS AND ARMCHAIRS
William Tempchin, 11385 Columbia Pike, No. C-1, Silver Spring, Md. 20904
Filed Aug. 9, 1976, Ser. No. 712,724
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—86



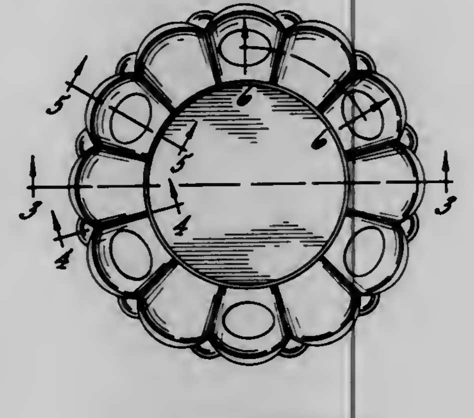
246,404
SOAP DISH HOLDER
Raymond U. H. Tegner, Lodi, Wis., assignor to Amerock Corporation, Rockford, Ill.
Filed Feb. 23, 1977, Ser. No. 771,152
Term of patent 14 years
Int. Cl. D23—*02*; D8—*06*
U.S. Cl. D6—89



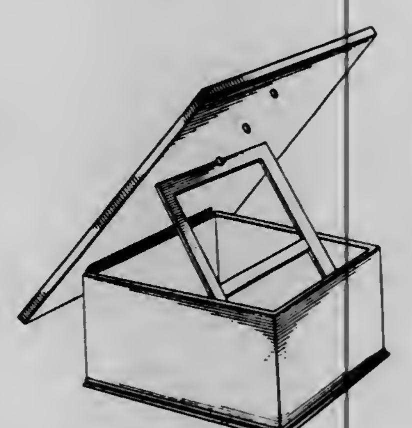
246,405
COMBINED SOAP HOLDER AND PAPER TOWEL DISPENSER
Theodore W. Richards, 1936 Sloat Blvd., San Francisco, Calif. 94116
Filed Sept. 2, 1975, Ser. No. 609,782
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D6—91



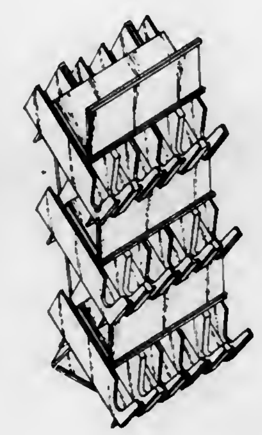
246,406
COMBINED TUMBLER AND TOOTHBRUSH HOLDER
Raymond U. H. Tegner, Lodi, Wis., assignor to Amerock Corporation, Rockford, Ill.
Filed Feb. 23, 1977, Ser. No. 771,153
Term of patent 14 years
Int. Cl. D23—*02;* D8—*06*
U.S. Cl. D6—92



246,407
TABLE
James Vance Holdam, Jr., 605 San Vincente, Apt. 110, Santa Monica, Calif. 90402
Filed Feb. 23, 1976, Ser. No. 660,165
Term of patent 14 years
Int. Cl. D6—*03*
U.S. Cl. D6—179

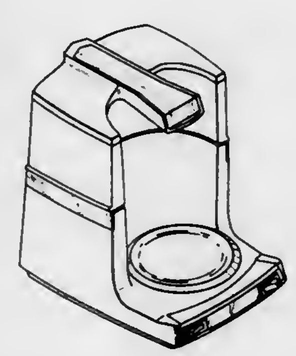


246,408
COMBINED DISPLAY AND DISPENSING STAND
Robert R. Snediker, Winnetka, Ill.; Steve Chalmers, St. Louis, Mo., and Robert E. Drapeau, Berwyn, Ill., assignors to Brown & Williamson Tobacco Corporation, Louisville, Ky.
Filed Nov. 11, 1975, Ser. No. 631,091
Term of patent 14 years
Int. Cl. D6—*04;* D20—*02*
U.S. Cl. D6—189

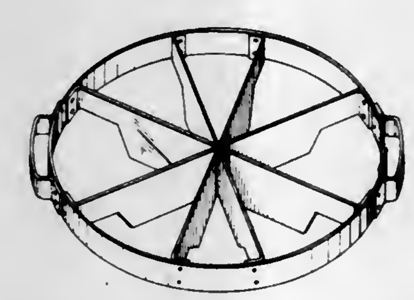


246,409
DOLL STAND
Frank D. Ventura, Commack, N.Y., assignor to Ideal Toy Corporation, Hollis, N.Y.
Filed June 23, 1976, Ser. No. 699,028
Term of patent 14 years
Int. Cl. D20—*02*
U.S. Cl. D6—146

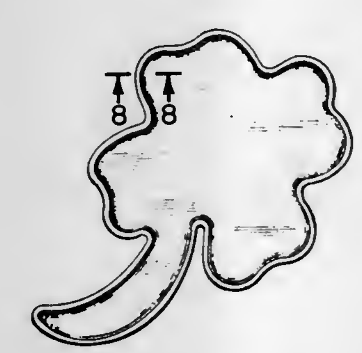
246,410
COFFEEMAKER OR THE LIKE
Wolfgang Harms, Cherry Hill, N.J.; Marshall B. Johnson, Chillicothe, Ohio; Karl H. Bergmann, and Richard G. Gelak, both of Cherry Hill, N.J., assignors to Melitta, Inc., Cherry Hill, N.J.
Filed Mar. 22, 1976, Ser. No. 669,254
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D7—41



246,411
PIE CUTTER
Robert E. Blanchard, 31 Agawam Road, Rumford, R.I. 02916
Filed Feb. 17, 1976, Ser. No. 658,847
Term of patent 14 years
Int. Cl. D7—*04*
U.S. Cl. D7—43

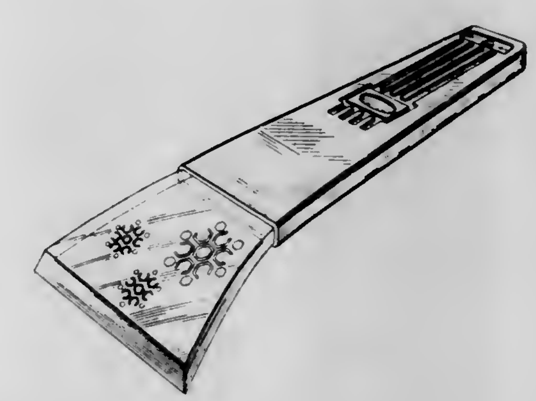


246,412
COOKIE CUTTER OR THE LIKE
Donald A. Brunner, Pottstown, Pa., assignor to Dart Industries Inc., Los Angeles, Calif.
Filed Apr. 7, 1976, Ser. No. 674,241
Term of patent 14 years
Int. Cl. D7—02
U.S. Cl. D7—43

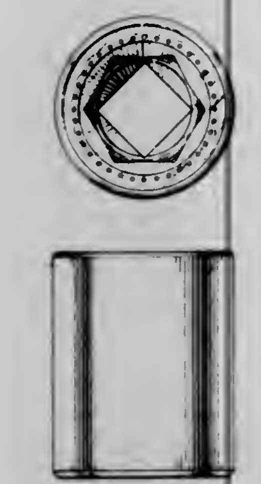


246,413
PITCHER
Leo F. Wildgen, Minneapolis, Minn., assignor to Ball Corporation, Muncie, Ind.
Filed Feb. 6, 1976, Ser. No. 655,944
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—64

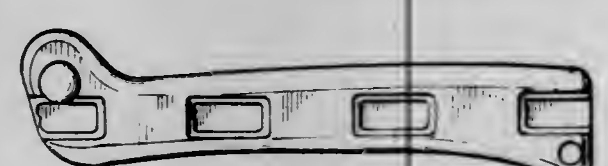
246,414
ICE AND SNOW SCRAPER
Evan Leon Hopkins, Greenville, S.C., and Donald W. Cartner, Kansas City, Mo., assignors to Hopkins Manufacturing Corporation, Emporia, Kans.
Continuation-in-part of Ser. No. 592,237, July 1, 1975, abandoned. This application May 17, 1976, Ser. No. 686,914
Term of patent 14 years
Int. Cl. D7—*05*
U.S. Cl. D7—181



246,415
WRENCH SOCKET
John L. Critcher, 114 Bosley Ave., Cockeysville, Md. 21030
Filed Jan. 16, 1976, Ser. No. 649,868
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D8—29



246,416
HACKSAW BLADE HOLDER
Harald Schmidt, Kings Park, N.Y., assignor to Hansa Plastics Inc., Kings Park, N.Y.
Filed June 24, 1976, Ser. No. 699,516
Term of patent 14 years
Int. Cl. D8—*03*
U.S. Cl. D8—97

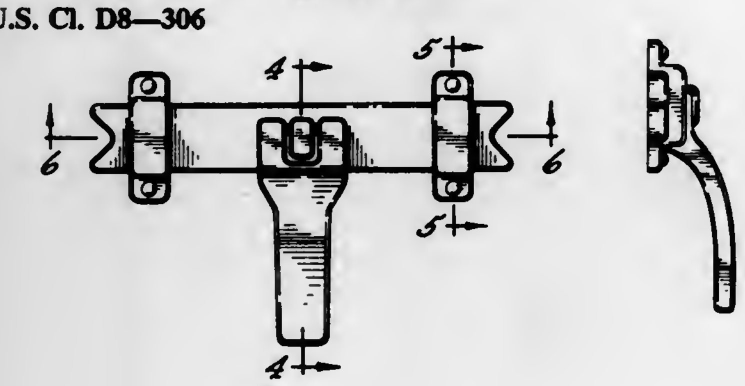


246,417
HAND-HELD TOOL FOR REMOVING INSULATION FROM ELECTRICAL CONDUCTORS
Walter N. Christiansen, Spring Lake, Mich., assignor to Gardner-Denver Company, Dallas, Tex.
Filed Sept. 27, 1976, Ser. No. 726,856
Term of patent 14 years
Int. Cl. D8—*03*
U.S. Cl. D8—98

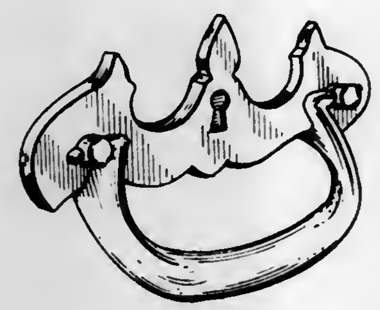
246,418
DOOR PULL HAVING SIMULATED THUMB LEVER
Keith E. Ridgway, West Covina, and Edward W. Scott, Culver City, both of Calif., assignors to Ajax Hardware Corporation, City of Industry, Calif.
Filed Jan. 13, 1977, Ser. No. 758,925
Term of patent 14 years
Int. Cl. D8—*06*
U.S. Cl. D8—302

246,419
DOOR PULL HAVING SIMULATED THUMB LEVER
Keith E. Ridgway, West Covina, and Edward W. Scott, Culver City, both of Calif., assignors to Ajax Hardware Corporation, City of Industry, Calif.
Filed Jan. 13, 1977, Ser. No. 759,050
Term of patent 14 years
Int. Cl. D8—*06*
U.S. Cl. D8—302

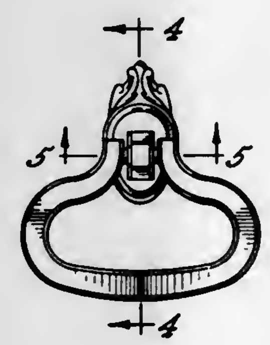
246,420
PULL
Teresa R. B. Pittenger, Rockford, Ill., assignor to Amerock Corporation, Rockford, Ill.
Filed Dec. 1, 1976, Ser. No. 746,582
Term of patent 14 years
Int. Cl. D8—*06*
U.S. Cl. D8—306



246,421
DRAWER PULL HAVING BAIL
Keith E. Ridgway, West Covina, and Edward W. Scott, Culver City, both of Calif., assignors to Ajax Hardware Corporation, City of Industry, Calif.
Filed Jan. 13, 1977, Ser. No. 759,080
Term of patent 14 years
Int. Cl. D8—*06*
U.S. Cl. D8—306

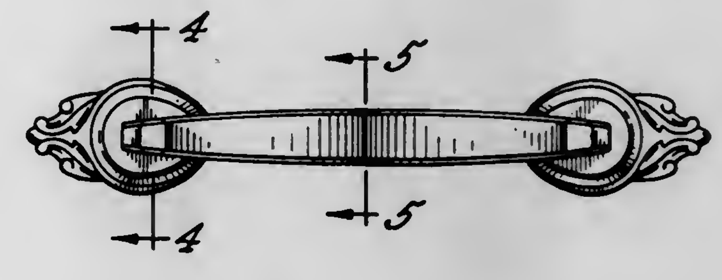


246,422
PENDANT PULL
LaVerne E. Clayton, Rockford, Ill., assignor to Amerock Corporation, Rockford, Ill.
Filed Dec. 1, 1976, Ser. No. 746,610
Term of patent 14 years
Int. Cl. D8—*06*
U.S. Cl. D8—307

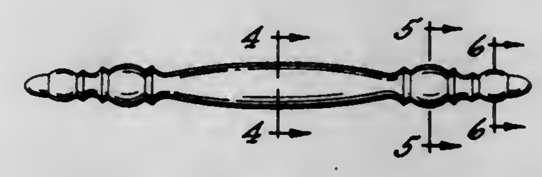


246,423
RING PULL
Keith E. Ridgway, West Covina, and Edward W. Scott, Culver City, both of Calif., assignors to Ajax Hardware Corporation, City of Industry, Calif.
Filed Jan. 13, 1977, Ser. No. 759,048
Term of patent 14 years
Int. Cl. D8—*06*
U.S. Cl. D8—310

246,424
PULL
LaVerne E. Clayton, Rockford, Ill., assignor to Amerock Corporation, Rockford, Ill.
Filed Dec. 1, 1976, Ser. No. 746,521
Term of patent 14 years
Int. Cl. D8—*06*
U.S. Cl. D8—317



246,425
PULL
Leland George Stone, Largo, Fla., assignor to Amerock Corporation, Rockford, Ill.
Filed Dec. 8, 1976, Ser. No. 748,569
Term of patent 14 years
Int. Cl. D8—*06*
U.S. Cl. D8—318

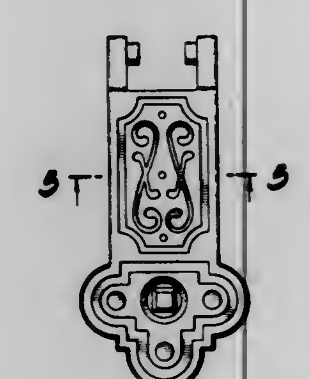


246,426
PULL FOR DOORS, DRAWERS OR THE LIKE
Keith E. Ridgway, West Covina, and Edward W. Scott, Culver City, both of Calif., assignors to Ajax Hardware Corporation, City of Industry, Calif.
Filed Jan. 13, 1977, Ser. No. 759,100
Term of patent 14 years
Int. Cl. D8—*06*
U.S. Cl. D8—318

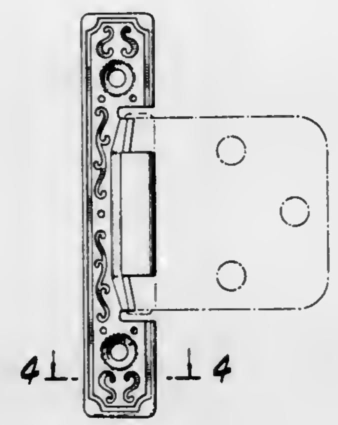
246,427
PULL
Keith E. Ridgway, West Covina, and Edward W. Scott, Culver City, both of Calif., assignors to Ajax Hardware Corporation, City of Industry, Calif.
Filed Jan. 13, 1977, Ser. No. 759,079
Term of patent 14 years
Int. Cl. D8—*06*
U.S. Cl. D8—318

246,428
PULL
Jacqueline Brezney, Bridgewater, N.J., assignor to Unican Security Systems, Ltd., Montreal, Canada
Filed Feb. 16, 1977, Ser. No. 769,232
Term of patent 14 years
Int. Cl. D8—*06*
U.S. Cl. D8—318

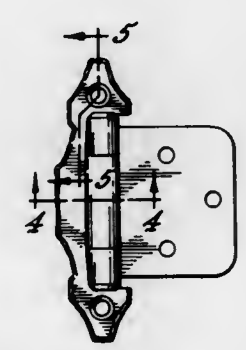
246,429
PENDANT PULL FOR DOORS, DRAWERS OR THE LIKE
David F. James, Redondo Beach, Calif., assignor to Norris Industries, Inc., Los Angeles, Calif.
Filed Mar. 29, 1976, Ser. No. 671,127
Term of patent 14 years
Int. Cl. D8—*06*
U.S. Cl. D8—321



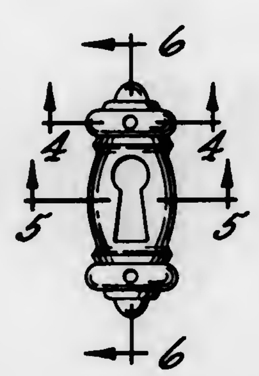
246,430
HINGE LEAF
David F. James, Redondo Beach, Calif., assignor to Norris Industries, Inc., Los Angeles, Calif.
Filed Mar. 29, 1976, Ser. No. 671,128
Term of patent 14 years
Int. Cl. D8—*06*
U.S. Cl. D8—327



246,431
HINGE BASE
LaVerne E. Clayton, Rockford, Ill., assignor to Amerock Corporation, Rockford, Ill.
Filed Dec. 1, 1976, Ser. No. 746,607
Term of patent 14 years
Int. Cl. D8—*06*
U.S. Cl. D8—327



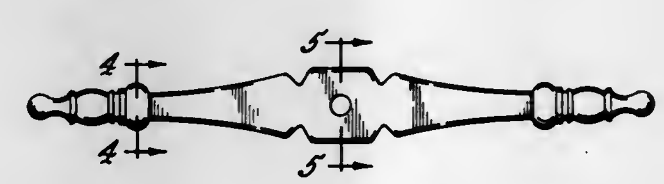
246,432
KEYHOLE ESCUTCHEON
Raymond U. H. Tegner, Lodi, Wis., assignor to Amerock Corporation, Rockford, Ill.
Filed Dec. 1, 1976, Ser. No. 746,468
Term of patent 14 years
Int. Cl. D8—*09*
U.S. Cl. D8—350



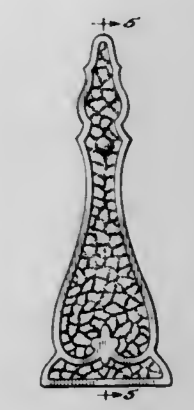
246,433
KEYHOLE ESCUTCHEON
Raymond U. H. Tegner, Lodi, Wis., assignor to Amerock Corporation, Rockford, Ill.
Filed Dec. 1, 1976, Ser. No. 746,529
Term of patent 14 years
Int. Cl. D8—*09*
U.S. Cl. D8—350

246,434
PULL BACKPLATE
Keith E. Ridgway, West Covina, and Edward W. Scott, Culver City, both of Calif., assignors to Ajax Hardware Corporation, City of Industry, Calif.
Filed Jan. 13, 1977, Ser. No. 759,049
Term of patent 14 years
Int. Cl. D8—*09*
U.S. Cl. D8—350

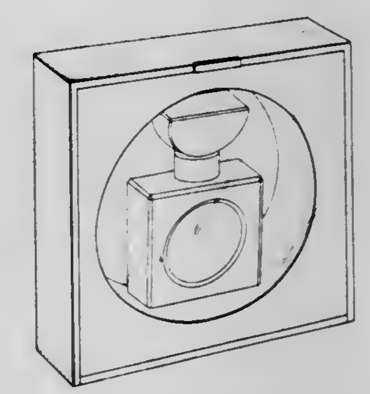
246,435
ESCUTCHEON
Leland George Stone, Largo, Fla., assignor to Amerock Corporation, Rockford, Ill.
Filed Jan. 24, 1977, Ser. No. 761,891
Term of patent 14 years
Int. Cl. D8—*09*
U.S. Cl. D8—350



246,436
BACK PLATE
Jacqueline Brezney, Bridgewater, N.J., assignor to Unican Security Systems, Ltd., Montreal, Canada
Filed Feb. 16, 1977, Ser. No. 769,231
Term of patent 14 years
Int. Cl. D8—*09*
U.S. Cl. D8—350

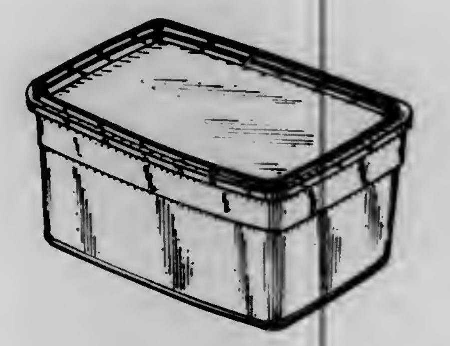


246,437
COMBINED BOTTLE AND DISPLAY CONTAINER
Adam J. Grodin, Forest Hills, N.Y., assignor to American Cyanamid Company, Stamford, Conn.
Filed Mar. 1, 1976, Ser. No. 662,298
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—12

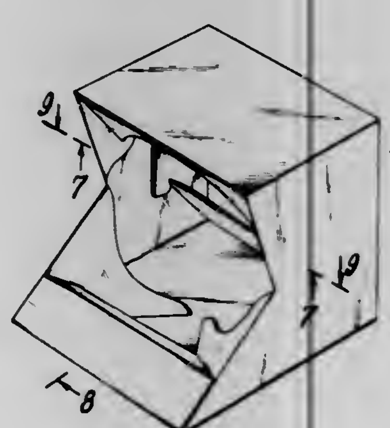


246,438
PACKAGING CONTAINER OR SIMILAR ARTICLE
Andrew E. Weber, 606 S. Olive St., Los Angeles, Calif. 90014
Filed Feb. 23, 1976, Ser. No. 660,166
Term of patent 14 years
Int. Cl. D9—*99*
U.S. Cl. D9—198

246,439
PACKAGING CONTAINER OR THE LIKE
Elmer C. Lynn, 405 Kimberly Lane, Des Moines, Iowa 50317, and Leonard Slaughter, Jr., 1828 Walnut Ave., Kansas City, Mo. 64108
Filed Nov. 26, 1975, Ser. No. 635,664
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—219

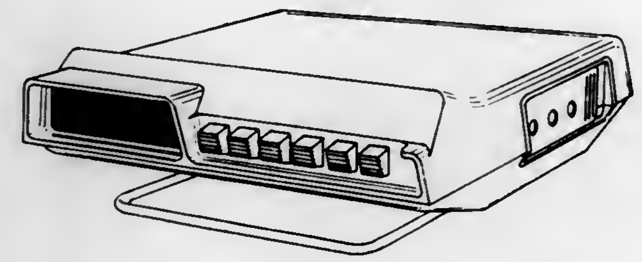


246,440
DISPLAY CARTON
Wallace E. Hanson, Hampden, Mass., assignor to Champion International Corporation, Stamford, Conn.
Filed Nov. 10, 1975, Ser. No. 630,295
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—224

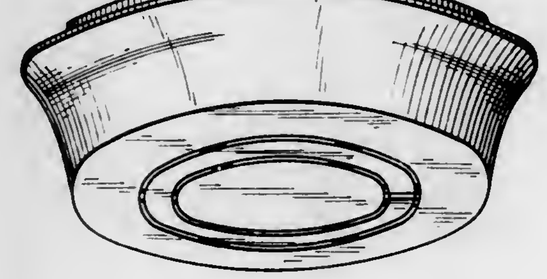


246,441
STRAIGHTEDGE
Fred Bergendorff, 7429 Orien, La Mesa, Calif. 92041
Filed Oct. 14, 1975, Ser. No. 622,066
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—71

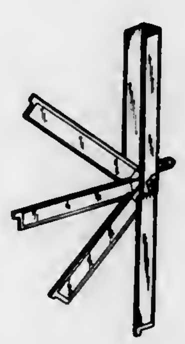
246,442
PORTABLE ELECTRONIC MULTIMETER
Donald P. Aupperle, Loveland, Colo., assignor to Hewlett-Packard Company, Palo Alto, Calif.
Filed Apr. 29, 1976, Ser. No. 681,315
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—78



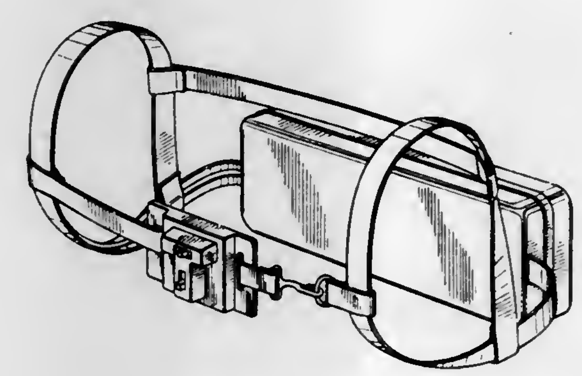
246,443
COMBINED FIRE AND SMOKE ALARM
Robert Orman Ernest, Oak Park, Ill., assignor to Sunbeam Corporation, Chicago, Ill.
Filed July 14, 1976, Ser. No. 705,123
Term of patent 14 years
Int. Cl. D10—*05*
U.S. Cl. D10—106



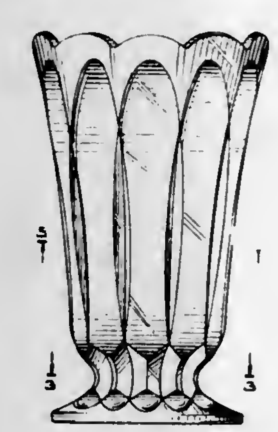
246,444
SAFETY REFLECTOR OR SIMILAR ARTICLE
John V. Kitrell, 1830 N. 49th, Lincoln, Nebr. 68504
Filed June 1, 1976, Ser. No. 691,821
Term of patent 14 years
Int. Cl. D10—*06*
U.S. Cl. D10—111



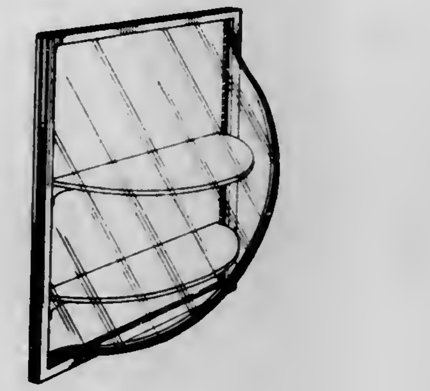
246,445
BACK PACK SIGNAL LIGHT UNIT
Bruce Wayne Inman, 469 Vernon Way, El Cajon, Calif. 92020
Filed Apr. 5, 1976, Ser. No. 673,620
Term of patent 7 years
Int. Cl. D10—*06*; D03—*99*
U.S. Cl. D10—114



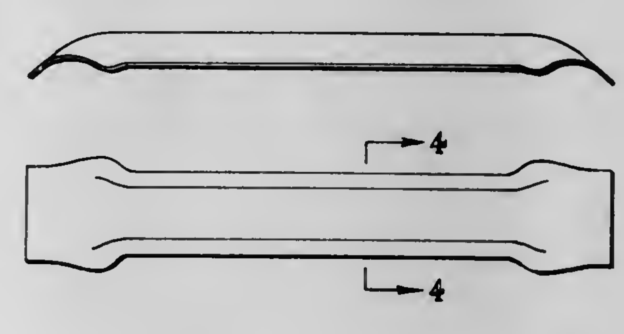
246,446
VASE OR SIMILAR ARTICLE
Frank J. Benes, Lancaster, Ohio, assignor to Anchor Hocking Corporation, Lancaster, Ohio
Division of Ser. No. 544,913, Jan. 29, 1975, Pat. No. Des. 243,431, which is a division of Ser. No. 397,069, Sept. 13, 1973, Pat. No. Des. 238,541. This application June 22, 1976, Ser. No. 698,761
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D11—153



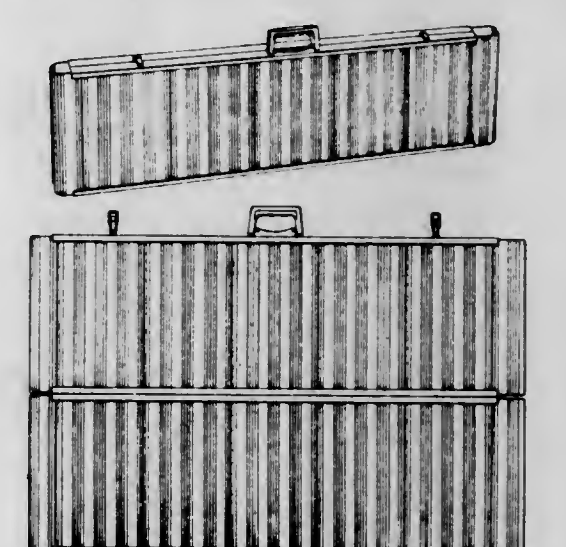
246,447
WINDOW GREENHOUSE
William H. Hamilton, 560 Concord Ave., Lexington, Mass. 02173
Filed Nov. 7, 1975, Ser. No. 629,791
Term of patent 14 years
Int. Cl. D25—*02*; D30—*02*
U.S. Cl. D11—145



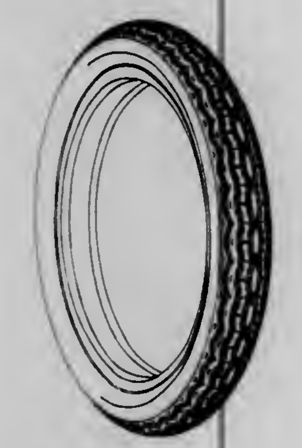
246,448
RAILROAD TIE
Albert Edward Rex, Adelaide, Australia, assignor to General & Railway Supplies Pty. Ltd.
Filed Aug. 19, 1976, Ser. No. 716,000
Term of patent 14 years
Int. Cl. D12—*03*
U.S. Cl. D12—49



246,449
PORTABLE RAMP FOR WHEELCHAIRS
Alice M. Poe, 10330 Outlook Drive, Overland Park, Kans. 66207
Filed Feb. 23, 1976, Ser. No. 660,419
Term of patent 14 years
Int. Cl. D12—*05*
U.S. Cl. D12—53

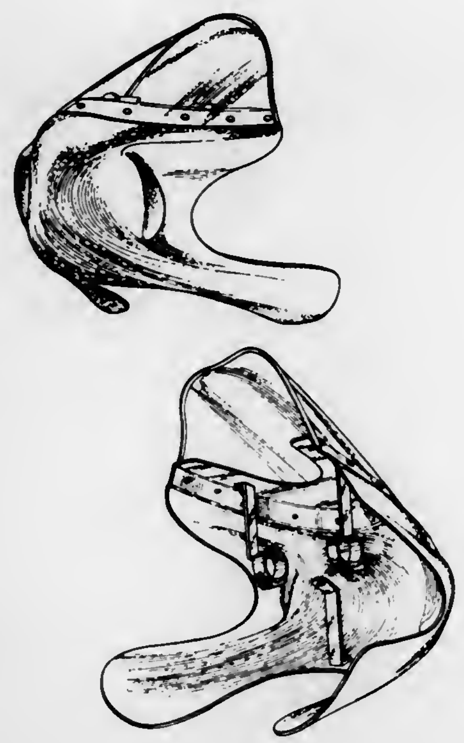


246,450
VEHICLE TIRE
Kazuo Matsuda, No. 2800-1, Ogawa-Higashi, Kodaira, Tokyo, and Hiroshi Kojima, No. 19-5, 4-Chome, Higashi-Toyota, Hino, Tokyo, both of Japan
Filed Feb. 3, 1977, Ser. No. 765,127
Claims priority, application Japan, Sept. 22, 1976, 51-37325
Term of patent 14 years
Int. Cl. D12—*15*
U.S. Cl. D12—141

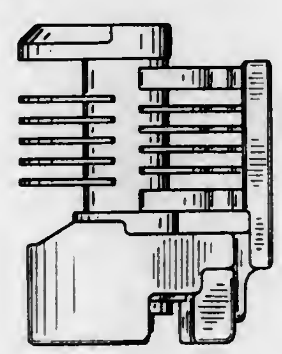


246,451
AXLE HOUSING
Noah Alvin Shealy, Niles, Mich., assignor to Clark Equipment Company, Buchanan, Mich.
Filed July 22, 1976, Ser. No. 707,595
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—160

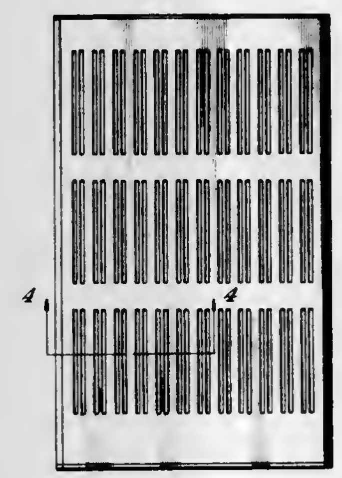
246,452
BICYCLE FAIRING
Moye Harris, 899 S. Umatilla Way, Denver, Colo. 80223
Filed Aug. 18, 1976, Ser. No. 715,311
Term of patent 14 years
Int. Cl. D12—*11*
U.S. Cl. D12—182



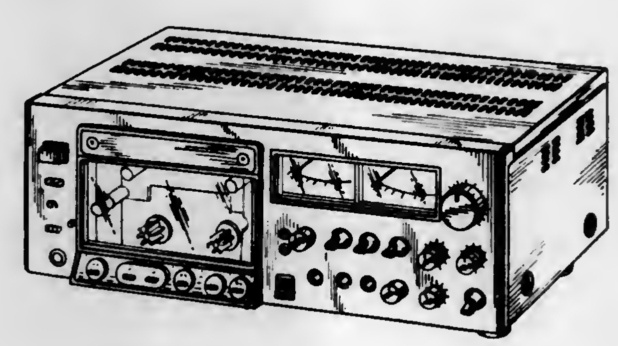
246,453
VARIABLE CAPACITOR
William J. Chermak; F. Joseph Kozan, and Chander M. Wahi, all of Waseca, Minn., assignors to E. F. Johnson Company, Waseca, Minn.
Filed Mar. 15, 1977, Ser. No. 778,781
Term of patent 14 years
Int. Cl. D13—*02*
U.S. Cl. D13—21



246,454
PRINTED CIRCUIT CABINET
John S. Ebner, Boca Raton; Sheldon Steinman, Miramar, and Frederick W. Haase, Palm Springs North, all of Fla., assignors to Milgo Electronic Corporation, Miami, Fla.
Filed Sept. 15, 1976, Ser. No. 723,555
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D13—41



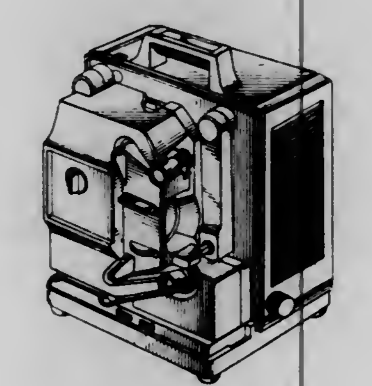
246,455
TAPE RECORDER
Shigeo Takahashi, Urawa, and Kaoru Sumita, Tokyo, both of Japan, assignors to Sony Corporation, Tokyo, Japan
Filed June 16, 1976, Ser. No. 696,490
Claims priority, application Japan, Jan. 30, 1976, 51-2582
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D14—6



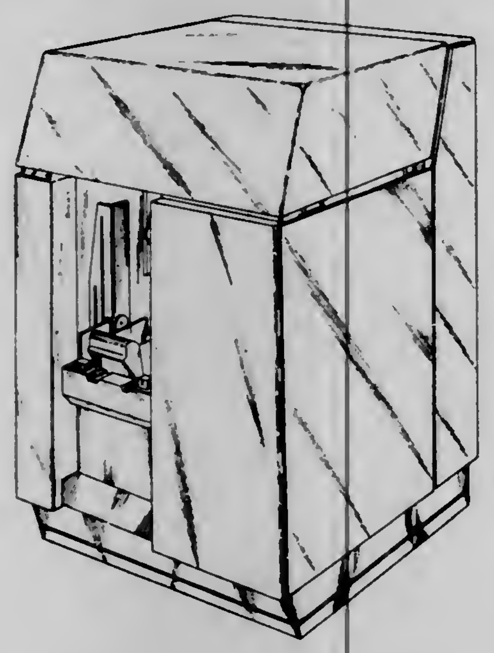
246,456
REMOTE OPERATED DRAIN FOR AN OIL PAN
Hiroyasu Mitsui, No. 24-9, Amanuma 1-chome, Suginami, Tokyo, Japan
Filed Jan. 15, 1976, Ser. No. 649,415
Term of patent 14 years
Int. Cl. D15—*01*
U.S. Cl. D15—5

246,457
CULTIVATOR TINE
Cornelis van der Lely, 7, Bruschenrain, Zug, Switzerland
Filed Feb. 19, 1976, Ser. No. 659,537
Claims priority, application Switzerland, Aug. 20, 1975, 50496/75
Term of patent 14 years
Int. Cl. D15—*03*
U.S. Cl. D15—29

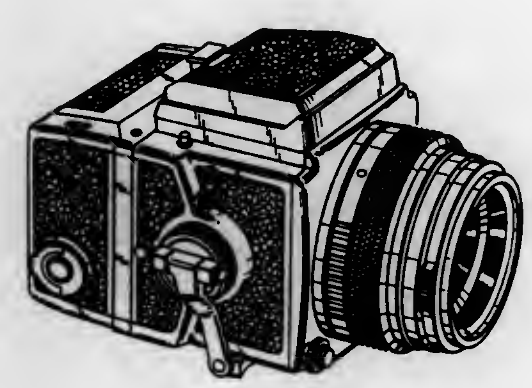
246,458
MOTION PICTURE PROJECTOR
Anastasios J. Vasilatos, 244 Hibbard Road, Wilmette, Ill. 60091, and Vincent S. Pasturczak, 4915 W. Argyle, Chicago, Ill. 60630
Filed Dec. 17, 1975, Ser. No. 641,398
Term of patent 14 years
Int. Cl. D16—*02*
U.S. Cl. D16—23



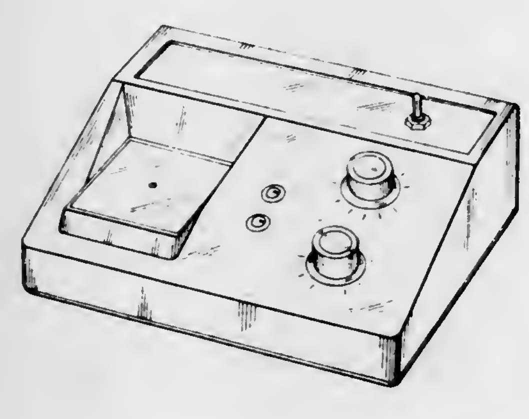
246,459
COPY FINISHER
Richard Joseph Olson, Webster, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.
Filed Mar. 30, 1976, Ser. No. 671,869
Term of patent 14 years
Int. Cl. D18—*99*
U.S. Cl. D16—32



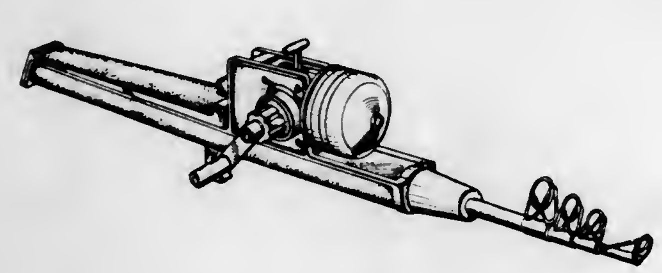
246,460
SINGLE LENS REFLEX CAMERA
Zenzaburo Yoshino, 3-30-10, Kamikitazawa, Setagaya-ku, Tokyo, Japan
Filed Sept. 8, 1976, Ser. No. 721,303
Claims priority, application Japan, Mar. 9, 1976, 51-8029
Term of patent 14 years
Int. Cl. D16—*01*
U.S. Cl. D16—08



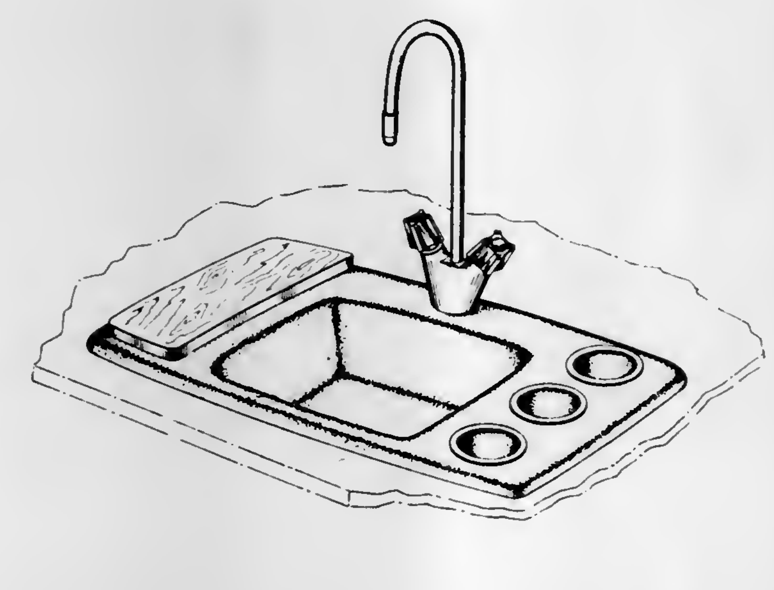
246,461
DARKROOM EXPOSURE METER AND DENSITOMETER
Darwin E. Chapman, 3481 Kenneth Drive, Palo Alto, Calif. 94306
Filed Feb. 6, 1976, Ser. No. 655,825
Term of patent 14 years
Int. Cl. D16—*05*
U.S. Cl. D16—39



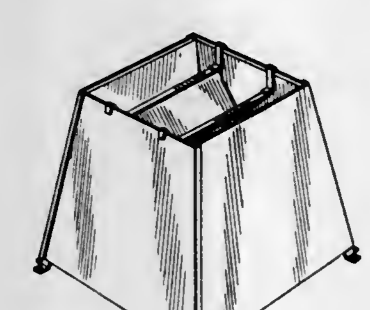
246,462
COMBINED ROD AND REEL
James R. Reichow, Brooklyn Park, Minn., assignor to St. Croix Corporation, Minneapolis, Minn.
Filed Nov. 22, 1976, Ser. No. 743,696
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—26



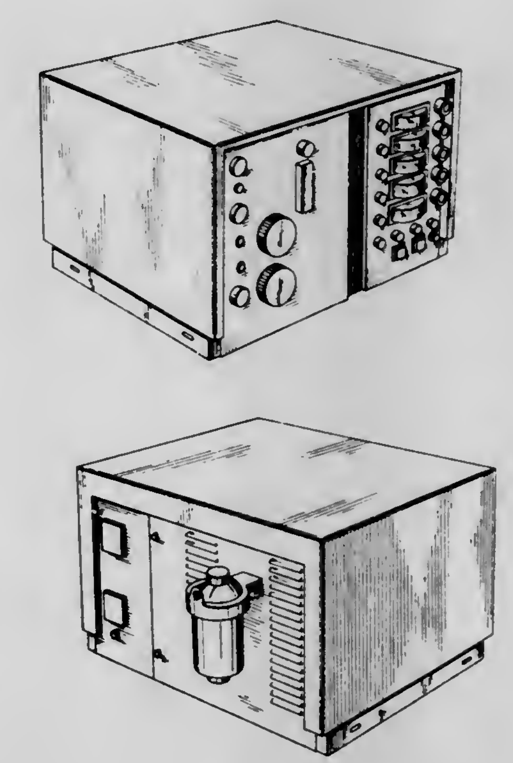
246,463
COMBINED SINK AND FAUCET
Donald W. Doman, Janesville, Wis., assignor to Kohler Co.
Filed Mar. 31, 1975, Ser. No. 563,567
The portion of the term of this patent subsequent to Feb. 1, 1991, has been disclaimed.
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D23—49



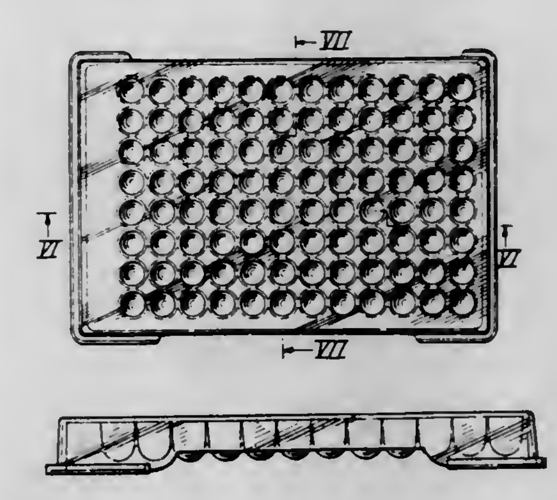
246,464
CHIMNEY CAP
David O. Brazell, La Mesa, Calif., assignor to Fireplace Sales, Division of Taylor Construction, San Marcos, Calif.
Filed May 3, 1976, Ser. No. 682,711
Term of patent 14 years
Int. Cl. D23—*04*
U.S. Cl. D23—154



246,465
PROPORTIONAL DIALYSIS UNIT
James G. Bruni, Manhattan Beach, Calif.; Richard W. George, Libertyville, Ill.; Stephen G. Hauser, Tarzana, Calif.; Charles E. Hodgson, and Richard J. Range, both of Silver Spring, Md., assignors to Baxter Travenol Laboratories, Inc.
Filed May 24, 1976, Ser. No. 689,004
Term of patent 14 years
Int. Cl. D24—*01*
U.S. Cl. D24—21

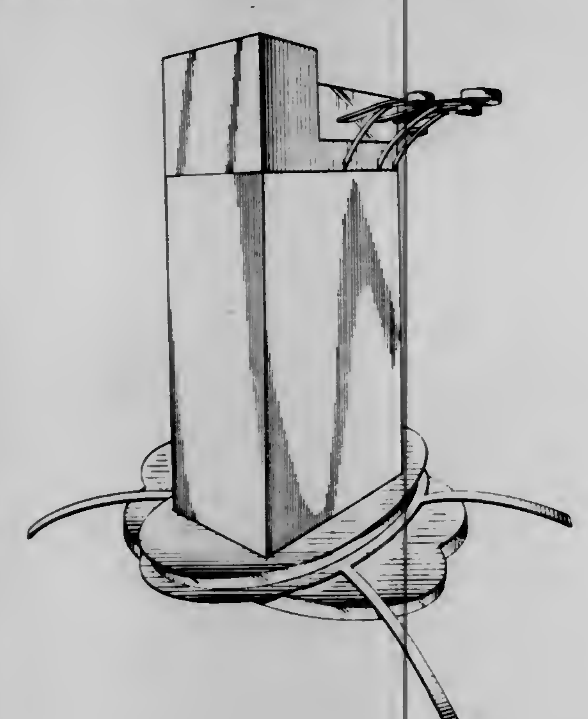


246,466
TRAY FOR BIOLOGICAL TESTS
James Albert Attree, Gravesend, and Kenneth George Morallee, Orpington, both of England, assignors to Lever Brothers Company, New York, N.Y.
Filed Nov. 15, 1976, Ser. No. 741,770
Claims priority, application United Kingdom, May 14, 1976. 975663/76
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D24—31

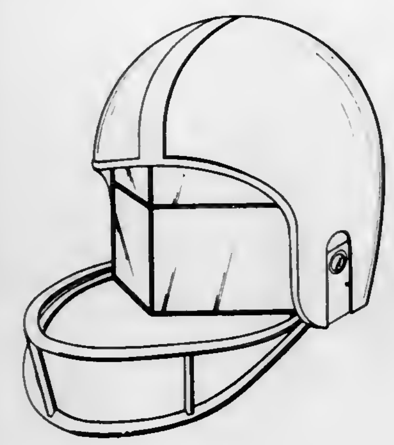


246,467
TEST TUBE
Motoji Kurata, Hatsukaichi, Japan, assignor to Japan Medical Supply Co., Ltd., Japan
Filed Nov. 5, 1975, Ser. No. 629,042
Term of patent 7 years
Int. Cl. D24—*02*
U.S. Cl. D24—56

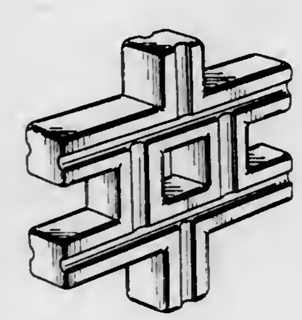
246,468
BUILDING
Joseph N. DiPasqua, 611 Ora St., Daytona Beach, Fla. 32018
Filed Sept. 25, 1974, Ser. No. 509,296
Term of patent 14 years
Int. Cl. D25—*03*
U.S. Cl. D25—5



246,469
BUILDING
James D. Morton, and Luke Arnett, both of P.O. Box 26332, Houston, Tex. 77207
Filed Aug. 18, 1975, Ser. No. 605,548
Term of patent 14 years
Int. Cl. D25—*03*
U.S. Cl. D25—7

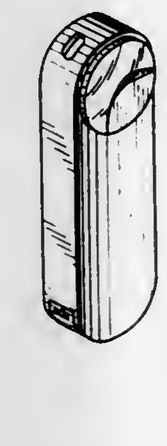


246,470
BUILDING BLOCK
Mitsuru Sato, No. 3690, Tsuruta-Cho, Utdunomiya, Tochigi, Japan
Filed Dec. 29, 1975, Ser. No. 645,298
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—91

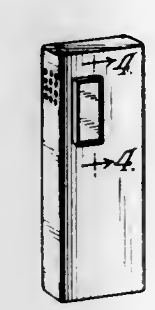


246,471
LIGHTER
Franz Alban Stützer, Mulheim (Main), and Bernd Figur, Nieder-Roden, both of Germany, assignors to Rowenta-Werke GmbH, Offenbach (Main), Germany
Filed Sept. 27, 1976, Ser. No. 727,316
Claims priority, application Germany, Apr. 2, 1976, 59941
Term of patent 14 years
Int. Cl. D27—*05*
U.S. Cl. D27—42

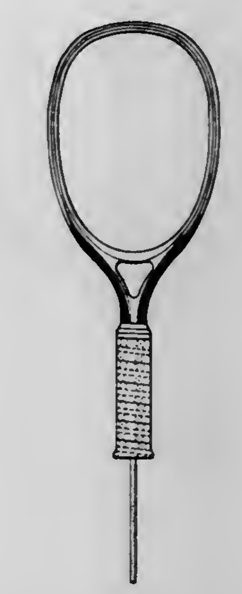
246,472
LIGHTER
Franz Alban Stützer, Mulheim (Main), Germany, assignor to Rowenta-Werke GmbH, Offenbach (Main), Germany
Filed Oct. 18, 1976, Ser. No. 733,031
Claims priority, application Germany, Apr. 23, 1976, 59946
Term of patent 14 years
Int. Cl. D27—*05*
U.S. Cl. D27—42



246,473
LIGHTER
Franz Alban Stützer, Mulheim (Main), Germany, assignor to Rowenta-Werke GmbH, Offenbach (Main), Germany
Filed Nov. 11, 1976, Ser. No. 740,846
Claims priority, application Germany, Aug. 6, 1976, 59964
Term of patent 14 years
Int. Cl. D27—*05*
U.S. Cl. D27—42

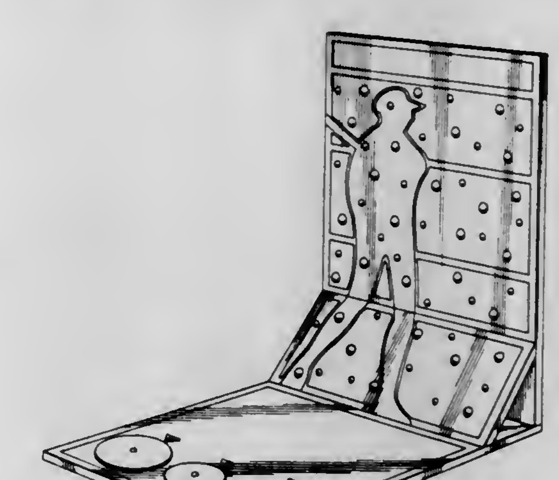


246,474
RACKETBALL RACKET FRAME
Charles L. Segal; Michael G. Anderson, and David N. Vincent, all of San Diego, Calif., assignors to Groves-Kelco Sales, Inc., Bloomington, Minn.
Filed Oct. 31, 1975, Ser. No. 627,789
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 ST

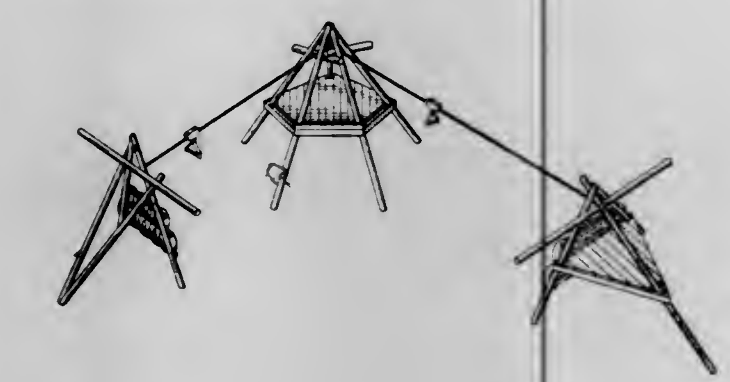


246,475
HEAD FOR A GOLF PUTTER
O. Jackson Denman, 1212 Lynn, Weatherford, Tex. 76086
Filed Feb. 4, 1976, Ser. No. 655,151
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 GH

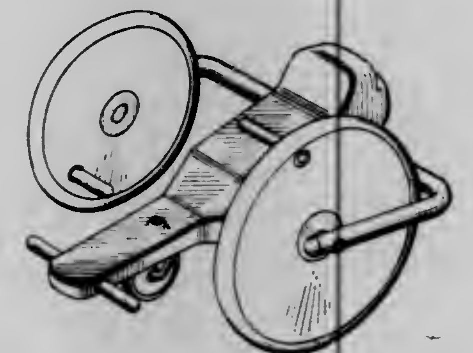
246,476
BASEBALL GAME BANGBOARD
Donald McGuire, 91 Parker St., Lowell, Mass. 01851
Filed Feb. 17, 1976, Ser. No. 658,281
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 PP



246,477
CHILD RECREATION STRUCTURE
Robert L. Callecod, Long Lake, Minn., assignor to Recreation Systems Co., North Aurora, Ill.
Filed June 4, 1976, Ser. No. 693,225
Term of patent 14 years
Int. Cl. D21—*03*
U.S. Cl. D34—5 L

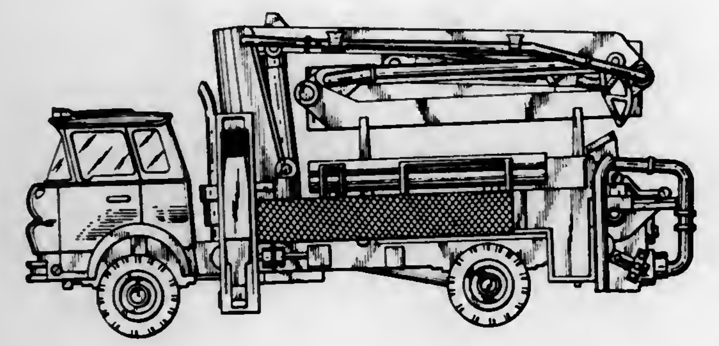


246,478
TOY VEHICLE
Raymond J. Lohr, 5043 Sterrettania Road, Erie, Pa. 16506
Filed Oct. 31, 1975, Ser. No. 627,547
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 AJ

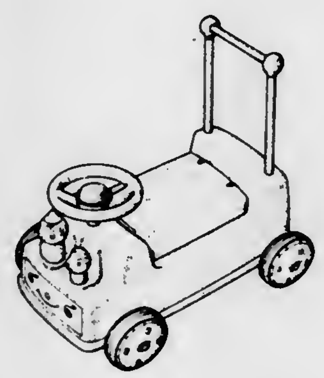


246,479
TOY VEHICLE
Kiyoji Asano, 2-27-23, Sumida, Sumida, Tokyo, Japan
Filed Dec. 2, 1975, Ser. No. 637,003
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 AJ

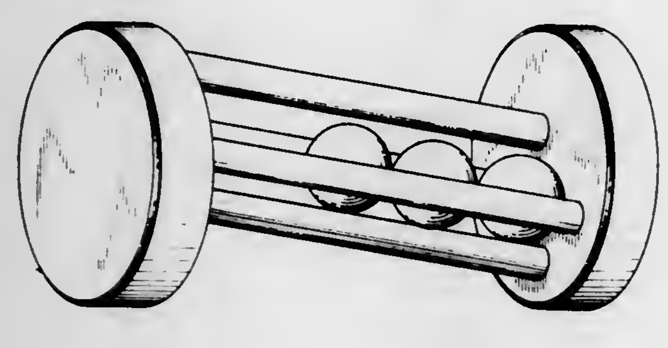
246,480
TOY VEHICLE
Kiyoji Asano, 2-27-23, Sumida, Sumida, Tokyo, Japan
Filed Dec. 2, 1975, Ser. No. 637,094
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 AJ



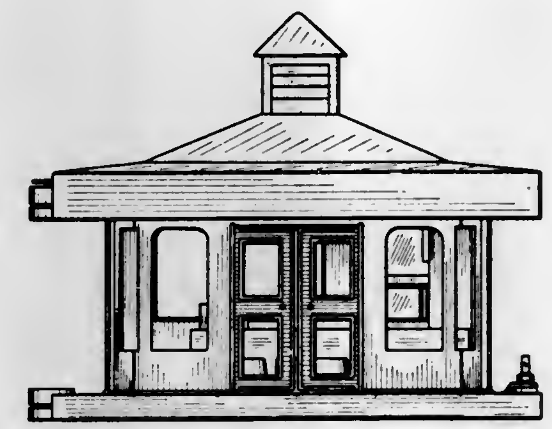
246,481
TOY VEHICLE
Shinroku Nakao, Yokohama, Japan, assignor to Combi Co., Ltd., Tokyo, Japan
Filed Jan. 2, 1976, Ser. No. 646,103
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 AJ



246,482
AUDIBLE TOY
Kerstin Margaretha Hagland-Ahrnborg, Falun, Sweden, assignor to Brio Toy AB, Osby, Sweden
Filed Jan. 5, 1976, Ser. No. 646,673
Claims priority, application Germany, July 8, 1975, 447
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 C

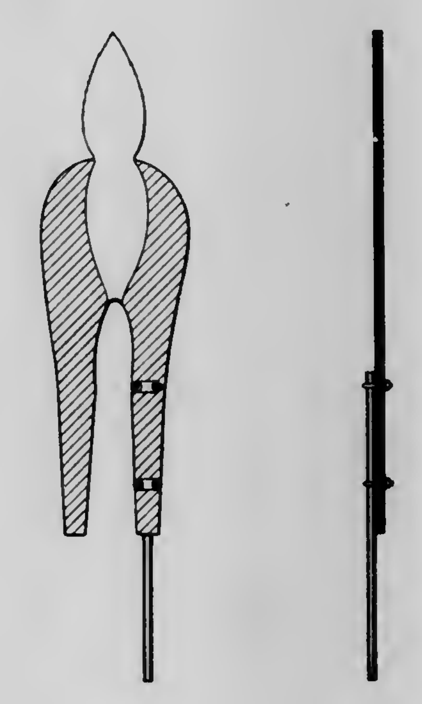


246,483
TOY RESTAURANT
Michael I. Satten, 15 Spruce Place, Great Neck Estates, N.Y. 11021
Filed Jan. 29, 1976, Ser. No. 653,545
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 LL



246,484
MODULAR TRAVEL CASE
Arnold S. Wasserman, 826 Cheltenham Road, Santa Barbara, Calif. 93105
Filed Dec. 30, 1975, Ser. No. 645,366
Term of patent 14 years
Int. Cl. D3—*01*
U.S. Cl. D87—5 G

246,485
ANIMAL WARNING SIGN
Terry L. Bashore, 259 Governors Park Road, Bellefonte, Pa. 16823
Filed May 27, 1976, Ser. No. 690,594
Term of patent 14 years
Int. Cl. D20—*03*
U.S. Cl. D96—12 C



LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 22ND DAY OF NOVEMBER, 1977

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. E. Staley Manufacturing Company: *See—*
  Schollmeier, Charles E.; and Leiser, Roger S., 4,059,460, Cl. 127-29.000.
A. O. Smith Corporation: *See—*
  Eising, John P., 4,059,386, Cl. 431-43.000.
AB Bofors: *See—*
  Eriksson, Sven Willner, 4,059,751, Cl. 364-829.000.
AB IRO: *See—*
  Laursen, Ove, 4,059,240, Cl. 242-47.010.
Abe, Kenzo: *See—*
  Kurata, Shigehiro; and Abe, Kenzo, 4,059,421, Cl. 55-196.000.
Acda, Petrus Marinus; and Guitoneau, Hans Edward, to Polva Nederland B. V. Branch connection. 4,059,291, Cl. 285-197.000.
Acme Highway Products Corporation: *See—*
  Puccio, Guy S., 4,058,867, Cl. 14-16.500.
Acorn Engineering Company: *See—*
  Morris, Earl Lavern; and Fields, Larry, 4,059,289, Cl. 285-56.000
Adamko, Edward W., to Raymond Lee Organization, Inc., The, a part interest. Food decorating instrument. 4,058,892, Cl. 30-178.000.
Adams, John M., to Medtronic, Inc. Synchronous pacemaker with upper rate stabilization and method of use. 4,059,116, Cl. 128-419.0PG.
Addressograph Multigraph Corporation. *See—*
  Maul, John A.; and Valentine, Richard E., 4,059,051, Cl. 101-45.000.
Adjusting Tables Inc.: *See—*
  Perold, Helmuth Conny, 4,059,255, Cl. 269-323.000.
Adler, Horst; Grella, Werner; and Israel, Hans-Peter, to Felten & Guilleaume Kabelwerke Aktiengesellschaft. Terminal connector for electrical cables. 4,059,722, Cl. 174-19.000.
Adler, Josef. Rotary kiln. 4,059,397, Cl. 432-80.000.
Aelterman, Marcel Frans: *See—*
  Hazenbosch, Edwin Hendrik; Van Rossen, Antoine Roberta; Beels, Roland Francois; and Aelterman, Marcel Frans, 4,059,446, Cl. 96-50.00R.
AGFA-Gevaert Aktiengesellschaft: *See—*
  Meier, Ernst; Credner, Hans Heinrich; Lassig, Wolfgang; Kuffner, Karl, and Schranz, Karl-Wilhelm, 4,059,447, Cl. 96-56.400.
AGFA-GEVAERT N.V.: *See—*
  De Roeck, Joseph Irma; and Pira, Francois Jean, 4,059,241, Cl. 242-75.500.
  Hazenbosch, Edwin Hendrik; Van Rossen, Antoine Roberta; Beels, Roland Francois; and Aelterman, Marcel Frans, 4,059,446, Cl. 96-50.00R.
  Vanassche, Willy Joseph, Pattyn, Herman Alberik; Moisar, Erik; and Klotzer, Sieghart, 4,059,450, Cl. 96-101.000.
  Van Landeghem, Willy Karel; and Suys, Andre Roger, 4,059,768, Cl. 250-483.000.
Agnus, Pierre; and Butin, Henri, to Thomson-CSF. Frequency comparison circuit. 4,059,804, Cl. 328-134.000.
Ahiba AG: *See—*
  Dietrich, Roland, 4,059,013, Cl. 73-159.000.
Ahlen, Karl Gustav, to S.R.M. Hydromekanik Aktiebolag. Heat exchangers. 4,058,980, Cl. 60-337.000.
Ahmed, Adel Abdel Aziz, to RCA Corporation. Semiconductor circuits for generating reference potentials with predictable temperature coefficients. 4,059,793, Cl. 323-19.000.
Aimar, Jean Louis; and Olin, Gerard, to SEVE. Method for the automatic location of particular zones of a surface and an installation for the application of said method. 4,059,787, Cl. 318-568.000.
Aimar, Michele, to ITW Fastex Italia, S.p.A Plastic filler cap. 4,059,200, Cl. 220-233.000.
Airco, Inc.: *See—*
  Hay, Wayne W., 4,059,657, Cl. 261-104.000.
  Terrell, Ross C., 4,059,639, Cl. 260-614.00F.
Aiuola, Franco: *See—*
  Rueff, Herbert Richard, and Aiuola, Franco, 4,059,187, Cl. 198-461.000.
Ajinomoto Co., Inc.: *See—*
  Nakamura, Junji; Miyashiro, Shigeyoshi; Hirose, Yoshio; and Awao, Takeyoshi, 4,059,572, Cl. 260-112.00R.
Akashi, Goro: *See—*
  Aonuma, Masashi; Kitamoto, Tatsuji; and Akashi, Goro, 4,059,463, Cl. 148-105.000.
Akito, Eiichiro: *See—*
  Tanaka, Wataru; Akito, Eiichiro; Yoshida, Koichi; Terada, Takashi; and Ninomiya, Hiroshi, 4,059,686, Cl. 424-19.000.
Alberny, Robert; Birat, Jean Pierre; and Ventavoli, Roger, to Institut de Recherches de la Siderurgie Francaise (IRSID). Continuous casting of a metallic product by electromagnetic centrifuging. 4,059,142, Cl. 164-49.000.
Alexandrov, Anatoly Julianovich; Grushko, July Sergeevich; Makarov, Evgeny Fredovich; Mishin, Konstantin Yakovlevich, and Baltrunas, Daljus Antanas Jono. Starting material radiation source for Mossbauer investigations of tellurium compounds. 4,059,769, Cl. 250-493.000.
Alimanestianu, Mihai; and Alimanestianu, Nicholas M., to Alimanestianu, Mihai. Railroad type switch. 4,059,054, Cl. 104-88.000.
Alimanestianu, Nicholas M.: *See—*
  Alimanestianu, Mihai; and Alimanestianu, Nicholas M., 4,059,054, Cl. 104-88.000.
Allan, John Leslie Hugh; and Roderick, John James, to Dart Industries Inc. Extraction resistant polyolefin stabilizer. 4,059,652, Cl. 260-848.000.
Allegheny Ludlum Industries, Inc.: *See—*
  Choby, Edward G., Jr., 4,059,218, Cl. 228-207.000.
Allen, Joseph C.; and Shum, Yick-Mow, to Texaco Inc. Thermal recovery method 4,059,152, Cl. 166-261.000.
Allen, Robert J.: *See—*
  Petrow, Henry G.; and Allen, Robert J., 4,059,541, Cl. 252-313.00R.
Allied Chemical Corporation: *See—*
  Ray, Ranjan; Tanner, Lee E.; and Cline, Carl F., 4,059,441, Cl 75-174.000.
Allison, William D., to Ford Motor Company. Tie rod end. 4,059,361, Cl. 403-77.000.
Alpha Marine Systems, Inc.: *See—*
  Dickey, Baron Christian. 4,059,064, Cl. 114-144.00E.
Altenburger, Otto, to Stromberg-Carlson Corporation. Call distributor for increasing switching system call termination rate. 4,059,733, Cl. 179-18.0ET.
Alvarez, Joseph A.; and Mills, Robert J., to Reed Tool Company. Bearing retaining pin for earth boring drill. 4,059,316, Cl. 308-8.200.
Alvarez, Oscar E. Battery case salvage machine. 4,058,886, Cl. 29-563.000.
Alvarez, Robert J.: *See—*
  Horvay, Julius B.; and Alvarez, Robert J., 4,058,989, Cl. 62-256.000.
American Communication Systems: *See—*
  Milkes, C. Paul, 4,059,728, Cl. 179-2.00E.
American Cyanamid Company: *See—*
  Casey, Donald James, 4,059,097, Cl. 128-1.00R.
  Foster, Terence, and Dawson, Thomas Stephen, 4,059,617, Cl. 560-222.000.
  Lindsay, Alexander David, 4,059,700, Cl. 424-216.000.
American Filtrona Corporation: *See —*
  Berger, Richard M., 4,059,043, Cl. 93-1.00C.
American Home Products Corporation: *See—*
  Strike, Donald Peter, 4,059,701, Cl. 424-250.000.
American Louver Company: *See—*
  Lewin, Ian. 4,059,754, Cl. 362-217.000.
American Safety Equipment Corporation: *See—*
  Tanaka, Akira, 4,059,242, Cl. 242-107.40A
Ammco Tools, Inc.: *See—*
  Mitchell, Wallace F., 4,058,937, Cl. 51-259.000.
Ammirata, Vincent T. Seat and foot rest tilting chair. 4,059,305, Cl. 297-338.000.
AMP Incorporated: *See—*
  Mixon, James Lenhart, Jr., 4,059,333, Cl. 339-247.000.
Amstutz, Jacob. Track assembly for tracked vehicles. 4,059,314, Cl. 305-31.000.
Anders, Walter G., Cole, Michael A.; Duncan, James C.; and Leipelt, Paul A., to Diebold, Incorporated. Pneumatic tube banking system. 4,059,246, Cl. 243-7.000.
Andersen, Poul H.; and Erickson, John W., to Kobe, Inc. Pitot compressor with liquid separator. 4,059,364, Cl. 415-89.000.
Anderson, John Erling, to Union Carbide Corporation. Slag tap. 4,059,252, Cl. 266-236.000.
Ando, Akinobu: *See—*
  Tohyama, Masao; Ichigo, Minoru; Suzuki, Takeshi; Nakasu, Makoto, Ando, Akinobu; Yoshida, Akitoshi; Kosaka, Masaharu; Hayasi, Norihisa; and Inoue, Shigeki, 4,059,553, Cl. 260-29.60S.
Ando, Hirokazu: *See—*
  Kawasaki, Masahiro; and Ando, Hirokazu, 4,059,835, Cl. 354-24.000.
Andrews, Wendell C., to Corning Glass Works. Method of forming sagging mold from a glass ceramic. 4,059,428, Cl. 65-33.000.
Annes, Erle C.: *See—*
  DeRooy, Felix J.; Daniel, Theil D.; Annes, Erle C.; and Arnold, Billy G., 4,059,456, Cl. 106-114.000
Anthony, Andrew J., to Combustion Engineering, Inc. Nuclear fuel assembly seismic amplitude limiter. 4,059,483, Cl. 176-78.000.
Aonuma, Masashi; Kitamoto, Tatsuji; and Akashi, Goro, to Fuji Photo Film Co., Ltd. Process for producing ferromagnetic powder 4,059,463, Cl. 148-105.000.

Aragona, Louis. Shirt type garment including built in arm positioning means. 4,058,852, Cl. 2-115.000.
Arai, Fumio; Kira, Masaaki; Kokuryo, Shiro; and Ueshima, Takashi, to Showa Denko Kabushiki Kaisha. Flame-resistant composition containing a norbornene derivative polymer. 4,059,561, Cl. 260-45.80R.
Arai, Kazuo, to Iwata Air Compressor Mfg. Co., Ltd. Pressure coating roller assembly. 4,059,358, Cl. 401-219.000.
Archer, John L.: *See—*
Kobayashi, Tsutomu; Archer, John L.; and Elliott, Michael T., 4,059,828, Cl. 365-32.000.
Ariyama, Kenzo; Mano, Hiroshi; and Kamiyama, Shinichi, to Ricoh Co., Ltd. Heat fixing apparatus for use in a wet electrophotographic copying machine. 4,059,394, Cl. 432-59.000.
Armour and Company: *See—*
Henry, J. R.; and Teague, Willis E., 4,058,872, Cl. 17-1.00R.
Armstrong Cork Company: *See—*
Brabson, Grafton K., 4,059,755, Cl. 362-124.000.
Armstrong, Donald E.; Sindlinger, Ronald E.; Cohen, Bernard; Tozier, John E.; and Audesse, Emery G., to GTE Sylvania Incorporated. Photoflash lamp and method of making same. 4,059,389, Cl. 431-95.00R.
Arnold, Billy G.: *See—*
DeRooy, Felix J.; Daniel, Thell D.; Annes, Erle C.; and Arnold, Billy G., 4,059,456, Cl. 106-114.000.
Arnold Engineering Company, The: *See—*
Ford, Donald T., 4,059,069, Cl. 118-642.000.
Arro Corporation: *See—*
Koepcke, Robert L., 4,059,208, Cl. 224-45.00S.
Arrowood, Gordon W., to McKenney's, Inc. Water closet carrier. 4,058,859, Cl. 4-252.00R.
Asahi Denka Kogyo K.K.: *See—*
Nakamura, Yasusi; Umemura, Masashi; and Yonekura, Michimasa, 4,059,613, Cl. 560-26.000.
Asahi Kasei Kogyo Kabushiki Kaisha: *See—*
Iriguchi, Norio; Kuroda, Toru; Kominami, Naoya; and Inagaki, Kenji, 4,059,107, Cl. 128-173.00H.
Asahi Kogaku Kogyo Kabushiki Kaisha: *See—*
Kawasaki, Masahiro; and Ando, Hirokazu, 4,059,835, Cl. 354-24.000.
Asai, Harumi: *See—*
Goto, Kuniaki; Asai, Harumi; and Natsuume, Tadao, 4,059,563, Cl. 260-45.95H.
Asami, Kazuto, to Glory Kogyo Kabushiki Kaisha. Coin packaging machine. 4,058,954, Cl. 53-54.000.
Aschberger, Anton A.; Avery, Jack L.; Cartwright, William J.; Dean, Geoffrey J.; Tysver, Oliver J.; Wolfe, Robert W.; and Bautz, Frederick H., to Continental Group, Inc., The. Can body shaper. 4,059,186, Cl. 198-481.000.
Aspro, Inc.: *See—*
Sproul, Nolte V., 4,059,023, Cl. 74-230.300.
Associated Concrete Products, Inc.: *See—*
Quaney, Patrick E., 4,059,199, Cl. 220-3.800.
Atkinson, David L. Heat collector and storage chamber. 4,059,226, Cl. 237-1.00A.
Audesse, Emery G.: *See—*
Armstrong, Donald E.; Sindlinger, Ronald E.; Cohen, Bernard; Tozier, John E.; and Audesse, Emery G., 4,059,389, Cl. 431-95.00R.
Austin, Paul Rolland, to University of Delaware, The. Chitin solution. 4,059,457, Cl. 106-203.000.
Avakian, Souren, to Centaur Chemical Co. Filter for micropipettes. 4,059,020, Cl. 73-425.40P.
Avco Corporation: *See—*
Bartos, Joseph S.; and St. Onge, Robert J., 4,059,123, Cl. 134-102.000.
Avery, Jack L.: *See—*
Aschberger, Anton A.; Avery, Jack L.; Cartwright, William J.; Dean, Geoffrey J.; Tysver, Oliver J.; Wolfe, Robert W.; and Bautz, Frederick H., 4,059,186, Cl. 198-481.000.
Avtex Fibers Inc.: *See—*
Knopka, William N., 4,059,546, Cl. 260-16.000.
Awao, Takeyoshi: *See—*
Nakamura, Junji; Miyashiro, Shigeyoshi; Hirose, Yoshio; and Awao, Takeyoshi, 4,059,572, Cl. 260-112.00R.
Axcell, Barry Clifford; and Donninger, Cyril, to Chembro Holdings (Proprietary) Limited. Measurement of alkaline phosphatase levels in body fluids. 4,059,490, Cl. 195-99.000.
Axen, Udo F., to Upjohn Company, The. 2,2-Difluoro-16-phenoxy-PGE_1 analogs. 4,059,614, Cl. 560-53.000.
Aya, Masahiro; Saito, Junichi; Kume, Toyohiko; and Yasui, Kazuomi, to Bayer Aktiengesellschaft. Organic (thio) phosphoric acid ester compounds and herbicidal compositions. 4,059,430, Cl. 71-86.000.
Ayerst McKenna and Harrison Ltd.: *See—*
Bruderlein, Francois T., 4,059,585, Cl. 260-286.00Q.
B. F. Goodrich Company, The: *See—*
Nickerson, Malcolm Horace, 4,059,126, Cl. 137-142.000.
B. & R. Choiniere Ltee: *See—*
Dion, Narcisse, 4,059,233, Cl. 241-47.000.
Babuka, Robert; and Harris, John Bernard, to International Business Machines Corporation. Apparatus for interconnecting plural mating members. 4,059,323, Cl. 339-75.00M.
Babushkina, Natalya Borisovna: *See—*
Movshovich, Pavel Mikhailovich; Khavkin, Viktor Pavlovich; Maximov, Gennady Konstantinovich; Babushkina, Natalya Borisovna; Baranov, Alexandr Anatolievich; Ivanov, Lev Nikolaevich; Nezelenov, Sergei Vladimirovich; Shutov, Gennady Nikolaevich; Tsygulev, Leonid Nikiforovich; and Ilin, Vadim Sergeevich, 4,058,960, Cl. 57-34.0AT.
Bader, Alfred: *See—*
Settlemyer, Bernard W.; Knappenberger, Clifford W.; and Bader, Alfred, 4,059,017, Cl. 73-395.000.
Baggett, Joseph McClendon, to Dow Chemical Company, The. Process for controlling the molecular weight of polycarbonates using ammonia or ammonia compounds. 4,059,566, Cl. 260-47.0XA.
Bahr, Albert. Pretreatment filter press dewatering system. 4,059,527, Cl. 210-259.000.
Bailey Meter Company: *See—*
Cohen, Kenneth W., 4,059,130, Cl. 137-82.000.
Bailey, William R., to Eltra Corporation. Blade type fuse clip assembly. 4,059,334, Cl. 339-258.00F.
Baker, Don R.; and Gutman, Arnold D., to Stauffer Chemical Company. Certain oxime compositions and their use in controlling fungi. 4,059,625, Cl. 260-566.0AE.
Baker International Corporation: *See—*
Berryman, William O., 4,059,167, Cl. 175-297.000.
Crowe, Talmadge L., 4,059,157, Cl. 166-317.000.
Baker, Martin T.: *See—*
Schaeffer, Claude W.; and Baker, Martin T., 4,058,996, Cl. 72-49.000.
Baklien, Asbjorn; and Kolm, Jan, to ICI Australia Limited. Process for preparing 6-phenyl-2,3,5,6-tetrahydroimidazo[2,1-b]thiazole. 4,059,588, Cl. 260-306.70T.
Ball, Dean M.; and Hendrix, Warren P., to Micromeritics Instrument Corporation. Liquid chromatography system. 4,059,009, Cl. 73-61.10C.
Ballast Nedam Groep N.V.: *See—*
Middelbeek, Cornelis Gerardus, 4,059,526, Cl. 210-242.00S.
Baltrunas, Daljus Antanas Jono: *See—*
Alexandrov, Anatoly Julianovich; Grushko, July Sergeevich, Makarov, Evgeny Fredovich; Mishin, Konstantin Yakovlevich; and Baltrunas, Daljus Antanas Jono, 4,059,769, Cl. 250-493.000.
Balzers Patent-Und Beteiligungs-Aktiengesellschaft: *See—*
Lardon, Marcel; and Pluker, Hans, 4,059,067, Cl. 118-7.000.
Banker, Robert O.; and Holshouser, Howard E., to General Electric Company. Chroma-preference control for VIR automatic operation. 4,059,838, Cl. 358-27.000.
Bar, Ulrich; and Schmidt, Martin, to Siemens Aktiengesellschaft. Slide projector. 4,059,352, Cl. 353-103.000.
Barannik, Ivan Andreevich; Kondratenko, Anatoly Borisovich; Trukhin, Alexandr Fedorovich; Raskatov, Viktor Georgievich; Zharovsky, Ivan Vasilievich; Rudakov, Viktor Alexandrovich; Mordkovich, Andrei Efremovich; and Chalov, Alexandr Vasilievich. Plant for producing metallic pellets from salt-added magnesium or alloys thereof. 4,059,372, Cl. 425-8.000.
Baranov, Alexandr Anatolievich: *See—*
Movshovich, Pavel Mikhailovich; Khavkin, Viktor Pavlovich; Maximov, Gennady Konstantinovich; Babushkina, Natalya Borisovna; Baranov, Alexandr Anatolievich; Ivanov, Lev Nikolaevich; Nezelenov, Sergei Vladimirovich; Shutov, Gennady Nikolaevich; Tsygulev, Leonid Nikiforovich; and Ilin, Vadim Sergeevich, 4,058,960, Cl. 57-34.0AT.
Barker, Thomas Harold: *See—*
Reedy, James Dale; and Barker, Thomas Harold, 4,059,607, Cl. 260-448.20E.
Barmag Barmer Maschinenfabrik Aktiengesellschaft: *See—*
Kubler, Hermann, 4,058,961, Cl. 57-34.0HS.
Baron, David A., to Litton Systems, Inc. Microwave seal for combination cooking apparatus. 4,059,742, Cl. 219-10.55D.
Barrington, Burchus Q.: *See—*
Nix, George J.; Barrington, Burchus Q.; Farley, David L.; and Hortman, Norman G., 4,059,153, Cl. 166-264.000.
Barrio de Mendoza, Cayo Petronio. Solar energy collector apparatus. 4,059,094, Cl. 126-271.000.
Barry, Leonard D. Container overhead transfer and storage system. 4,059,194, Cl. 214-38.0CA.
Barthule, George, to Liftex Slings, Inc. Metal chain sling. 4,059,302, Cl. 294-74.000.
Barto, Robert M.; and Shelffo, Loren E., to Blu-Ray, Incorporated. Apparatus for eliminating ammonia fumes emanating from diazo copiers. 4,059,409, Cl. 23-284.000.
Bartos, Joseph S.; and St. Onge, Robert J., to Avco Corporation. Cleaning and preservation unit for turbine engine. 4,059,123, Cl. 134-102.000.
Basel, Werner: *See—*
Hollweck, Walter; Schnee, Wilhelm; Eberl, Karlheinz; and Basel, Werner, 4,059,817, Cl. 337-365.000.
BASF Aktiengesellschaft: *See—*
Kopke, Helmut; Ohlinger, Manfred; Grau, Werner; Schoenafinger, Eduard; and Schneehage, Hans Henning, 4,059,716, Cl. 428-403.000.
Battelle-Institute e.V.: *See—*
Schuster, Wilhelm; and Schuluter, Gert, 4,059,404, Cl. 23-230.00B.
Bauer, William V., to Lummus Company, The. Hydrotreating of pyrolysis gasoline. 4,059,504, Cl. 208-255.000.
Bauhutte Leitl-Werke Rieger-Anlagentechnik GmbH: *See—*
Rieger, Walter, 4,058,944, Cl. 52-235.000.
Baum, Allen J.: *See—*
Dickinson, Peter D.; Osborne, Thomas E.; Rode, France; and Baum, Allen J., 4,059,750, Cl. 364-715.000.
Bauman, Robert Andrew, to Colgate Palmolive Company. Ester substituted dibiguanides and non-toxic antimicrobial compositions thereof. 4,059,687, Cl. 424-54.000.

Bautz, Frederick H.: *See—*
Aschberger, Anton A.; Avery, Jack L.; Cartwright, William J.; Dean, Geoffrey J.; Tysver, Oliver J.; Wolfe, Robert W.; and Bautz, Frederick H., 4,059,186, Cl. 198-481.000.
Baxter, Donald J.: *See—*
Lowery, Robert D.; Baxter, Donald J.; and Lawn, Joseph R., 4,059,176, Cl. 192-12.0BA.
Bayer Aktiengesellschaft: *See—*
Aya, Masahiro; Saito, Junichi; Kume, Toyohiko; and Yasui, Kazuomi, 4,059,430, Cl. 71-86.000.
Elfert, Klaus; Hinz, Jurgen; and Binsack, Rudolf, 4,059,580, Cl. 544-73.000.
Hausweiler, Arnold; Mayer, Adolf; and Bitners, Feliks, 4,059,492, Cl. 203-11.000.
Krimm, Heinrich; and Tresper, Erhard, 4,059,638, Cl. 260-613.00R.
Kritzler, Helmuth; Bohm, Walter; Kiel, Wolfgang; and Birkenstock, Udo, 4,059,627, Cl. 260-580.000.
Maurer, Fritz; Riebel, Hans-Jochem; Hammann, Ingeborg; Behrenz, Wolfgang; and Homeyer, Bernhard, 4,059,696, Cl. 424-200.000.
Neukam, Theo; Reinehr, Ulrich; Bentz, Francis; and Nischk, Gunther, 4,059,556, Cl. 260-30.200.
Prescher, Gunter; Schreyer, Gerd; Weiberg, Otto; Wirthwein, Rolf; Waldmann, Helmut; Seifert, Hermann; Schwerdtel, Wulf; and Swodenk, Wolfgang, 4,059,619, Cl. 260-502.00R.
Rosenkranz, Hans Jurgen; and Rudolph, Hans, 4,059,721, Cl. 560-205.000.
Sundermann, Rudolf; Rottloff, Gunther; and Grigat, Ernst, 4,059,567, Cl. 260-47.00R.
Wolf, Gerhard Dieter; Miessen, Ralf; Kunzel, Hans Egon; and Bentz, Francis, 4,059,403, Cl. 8-168.00B.
Wolfrum, Gerhard; Kuhnel, Werner; Klauke, Erich; and Buttner, Gerhard, 4,059,402, Cl. 8-2.50A.
Bayerisches Leichtmetallwerk Graf Blucher von Wahlstatt KG: *See—*
Weissmann, Gerd, 4,059,214, Cl. 228-265.000.
BBC Brown Boveri & Company Limited: *See—*
Etter, Peter; and Faust, Werner, 4,059,792, Cl. 363-135.000.
Floessel, Carl Dieter, 4,059,723, Cl. 174-21.00R.
Pfenninger, Hans, 4,058,974, Cl. 60-39.120.
Zeller, Hans-Rudolf, 4,059,341, Cl. 350-160.00R
Beckman Instruments, Inc.: *See—*
Horrocks, Donald L., 4,059,762, Cl. 250-336.000.
Klein, Gerald L., 4,059,357, Cl. 356-243.000.
Strickler, Allen, 4,059,501, Cl. 204-299.00R.
Becton, Dickinson and Company: *See—*
Hochstrasser, Harry T., 4,059,407, Cl. 23-253.0TP.
Beecham Group Limited: *See—*
Buckle, Derek Richard; Cantello, Barrie Christian Charles; and Smith, Harry, 4,059,704, Cl. 424-269.000.
Beels, Roland Francois: *See—*
Hazenbosch, Edwin Hendrik; Van Rossen, Antoine Roberta; Beels, Roland Francois, and Aelterman, Marcel Frans, 4,059,446, Cl. 96-50.00R.
Behr, Friedrich: *See—*
Schulten, Rudolf; and Behr, Friedrich, 4,059,496, Cl. 204-104.000.
Behrenz, Wolfgang: *See—*
Maurer, Fritz; Riebel, Hans-Jochem; Hammann, Ingeborg; Behrenz, Wolfgang; and Homeyer, Bernhard, 4,059,696, Cl. 424-200.000.
Beilfuss, Wolfgang: *See—*
Eggensperger, Heinz; Beilfuss, Wolfgang; and Ehlers, Helmut Hermann, 4,059,596, Cl. 260-347.800.
Beinsen, Dieter; and Kribitzneck, Otto. Aspirators for medical purposes. 4,059,115, Cl. 128-276.000.
Belasco, Melvin; and Cottongim, Billie Joe, to Texas Instruments Incorporated. Multi-element infra red sensors. 4,059,764, Cl. 250-352.000.
Bell, Peter W.: *See—*
Edgar, John B.; and Bell, Peter W., 4,059,465, Cl. 156-72.000.
Bell Telephone Laboratories, Incorporated: *See—*
Green, John Henry; and Landry, Joseph Elide, 4,059,731, Cl. 179-15.0BY.
Heiss, John Herbert, Jr.; and Schoen, Joel Mark, 4,059,708, Cl. 427-96.000.
Kahn, Frederic Jay; and Taylor, Gary Newton, 4,059,340, Cl. 350-160.0LC.
Mancke, Ralph Gustavus; and Soos, Nicholas Alec, 4,059,467, Cl. 156-80.000.
Messerschmitt, David Gavin, and Zebo, Timothy James, 4,059,730, Cl. 179-15.0AS.
Bellem, Norman A., to Butler Manufacturing Company. Building roof insulation. 4,058,949, Cl. 52-407.000.
Bellina, Russell Frank, to Du Pont de Nemours, E. I., and Company. Butyramides and butyrates. 4,059,623, Cl. 260-561.00A.
Bendix Corporation, The: *See—*
Snyder, Gene L.; and Hennessey, Walter F., Jr., 4,059,324, Cl. 339-89.00M.
Bennett, Everett W., to Union Carbide Corporation. Non-isomerizable olefinic polyoxyalkylene polymers and siloxane-polyoxyalkylene copolymer derivatives thereof. 4,059,605, Cl. 260-448.20B.
Benson, Gustav E., to Owens-Corning Fiberglas Corporation. Bulked yarn and method of forming a bulked yarn. 4,058,968, Cl. 57-140.00R.
Bentley, John; and Thompson, Morice William, to Imperial Chemical Industries Limited. Polymer dispersions. 4,059,557, Cl. 260-31.20N.
Bentz, Francis: *See—*
Neukam, Theo; Reinehr, Ulrich; Bentz, Francis; and Nischk, Gunther, 4,059,556, Cl. 260-30.200.
Wolf, Gerhard Dieter; Miessen, Ralf; Kunzel, Hans Egon; and Bentz, Francis, 4,059,403, Cl. 8-168.00B.
Bentz, Gerard, to L'air Liquide, Societe Anonyme pour l'etude et l'exploitation des Procedes Georges Claude. Apparatus for the controlled supply of cryogenic fluid. 4,059,424, Cl. 62-49.000.
Berg, Clyde H. Geothermal brine production. 4,059,156, Cl. 166-314.000.
Berger, Alfred: *See—*
De Vos, Daniel; Michel, Paul-Marie; and Berger, Alfred, 4,059,423, Cl. 65-21.000.
Berger, Richard M., to American Filtrona Corporation. Method and apparatus for making tobacco smoke filters. 4,059,043, Cl. 93-1.00C.
Berges, David A., to SmithKline Corporation. Ureidoalkyl substituted tetrazole thiol intermediates for preparing cephalosporins. 4,059,591, Cl. 260-308.00D
Bergman, Raymond A. Method for locating and clamping a work member supporting fixture. 4,058,885, Cl. 29-559.000.
Bernard, Walter J., to Sprague Electric Company. Method for making a porous tantalum pellet. 4,059,442, Cl. 75-208.00R.
Bernett, Frank E.: *See—*
Weiant, Davis S.; Bernett, Frank E.; and Velivis, William R., 4,059,551, Cl. 260-29.60H
Berryman, Angus L.; Hooper, Gene R.; and Hague, Richard E., to Rax, Incorporated. Railway side parcel installation. 4,059,056, Cl. 105-368.00R.
Berryman, William O., to Baker International Corporation. Hydraulic fishing jar having tandem piston arrangement. 4,059,167, Cl. 175-297.000.
Bertin & Cie: *See—*
Cellier, Michel Jean Jacques; Guitton, Jean-Claude; Scholle, Jean-Claude; and Viannay, Stephane Georges Jean-Marie, 4,059,399, Cl. 432-121.000.
Bethlehem Steel Corporation: *See—*
Mino, George M.; and Dustin, Donald I., 4,059,711, Cl. 427-310.000.
Betts, William L., to NCR Corporation. Digital conference system. 4,059,735, Cl. 179-18.0BC.
Betz Laboratories, Inc.: *See—*
Fowler, William J.; Heberle, Richard A.; Tonkyn, Richard G.; and Vorchheimer, Norman, 4,059,515, Cl. 210-51.000.
Beyers, Marvin E.; and Dadds, Floyd S., to Caterpillar Tractor Co. Track belt assembly. 4,059,313, Cl. 305-19.000.
Bicking, John B.: *See—*
Cragoe, Edward J., Jr.; and Bicking, John B., 4,059,601, Cl. 260-408.000.
Cragoe, Edward J., Jr.; and Bicking, John B., 4,059,602, Cl. 260-408.000
Biedert, Hartmut: *See—*
Spitzer, Artur; Biedert, Hartmut; and Gramlich, Fritz, deceased, 4,059,311, Cl. 302-53.000.
Bifok AB: *See—*
Ibsen Nielsen, Hans Jorgen; and Hansen, Elo Harald, 4,059,499, Cl. 204-195.00M.
Binsack, Rudolf: *See—*
Elfert, Klaus; Hinz, Jurgen; and Binsack, Rudolf, 4,059,580, Cl. 544-73.000.
Bio Research Center, Co., Ltd.: *See—*
Hachikubo, Kazumasa, and Suzuki, Shuzo, 4,059,488, Cl. 195-28.00R.
Birat, Jean Pierre: *See—*
Alberny, Robert; Birat, Jean Pierre; and Ventavoli, Roger, 4,059,142, Cl. 164-49.000.
Birkenstock, Udo: *See—*
Kritzler, Helmuth; Bohm, Walter; Kiel, Wolfgang; and Birkenstock, Udo, 4,059,627, Cl. 260-580.000.
Bitners, Feliks: *See—*
Hausweiler, Arnold; Mayer, Adolf; and Bitners, Feliks, 4,059,492, Cl. 203-11.000.
Bittle, David F.; and McPeters, Arnold L., to Monsanto Company. Method of stretching a tow. 4,059,668, Cl. 264-290.00R.
Bixler, Kenneth D.: *See—*
Reifers, Richard F.; Bixler, Kenneth D.; and Lord, Henry A., 4,059,219, Cl. 229-2.5EC.
Blaha, Eli W.; Koster, Sandra K.; and Wang, Chen-Shen, to Standard Oil Company (Indiana). Process for forming branched nitropolyphenylene. 4,059,719, Cl. 526-52.000
Blomsma, Everhard C., to Shell Oil Company. Pressure-compensated dual marine riser. 4,059,148, Cl. 166-[illegible].
Blu-Ray, Incorporated: *See—*
Barto, Robert M.; and Shelffo, Loren E., 4,059,409, Cl. 23-284.000.
Blumenfeld, Georg; Richtzenhain, Hermann; Vogt, Wilhelm; and Volkommer, Norbert, to Dynamit Nobel Aktiengesellschaft. Tetrahalogen xylylene diacrylates, tetrahalogen xylyl acrylates, pentahalogen benzyl acrylates, and substituted acrylates. 4,059,618, Cl. 560-221.000.
Bockelmann, Wilfried; Veigel, Martin W.; Grossmann, Dietrich; Grozinger, Hans, and Schwander, Dieter. Regulating device for metering a supplementary air quantity to improve combustion in combustion engines. 4,058,978, Cl. 60-277.000.
Bodnar, Ernest Robert. Rotary embosser and process of embossing strip sheet metal. 4,059,000, Cl. 72-197.000.
Bohm, Leslie Eric: *See—*
Jackson, W. Shaun; and Bohm, Leslie Eric, 4,059,207, Cl. 224-31.000.
Bohm, Walter: *See—*
Kritzler, Helmuth; Bohm, Walter; Kiel, Wolfgang; and Birkenstock, Udo, 4,059,627, Cl. 260-580.000.

Bohn, Jack R.: *See—*
Pearson, Durk J.; and Bohn, Jack R., 4,059,308, Cl. 299-5.000.
Boisde, Gilbert; and Richerot, Alain, to Commissariat a l'Energie Atomique. Automatic liquid-liquid extraction device. 4,059,408, Cl. 23-267.00R.
Bolt Beranek and Newman, Inc.: *See—*
Watters, Bill G.; Nacey, Michael; and Horrall, Thomas R., 4,059,726, Cl. 179-1.50M.
Bom, Cornelis Johannes Gerardus: *See—*
van der Lely, Ary; and Bom, Cornelis Johannes Gerardus, 4,059,160, Cl. 172-47.000.
Bombardier Limited: *See—*
Esquilat, Georges, 4,058,913, Cl. 37-50.000.
Bonazza, Benedict R.: *See—*
Holtz, Hans D.; and Bonazza, Benedict R., 4,059,414, Cl. 44-58.000.
Bond, Joseph Kim: *See—*
Korff, Wolfram G.; Emery, Vernon V.; Bond, Joseph Kim; and Marcella, Joseph, 4,059,379, Cl. 425-393.000.
Bond, Thomas J.: *See—*
Judzis, Arnis; and Bond, Thomas J., 4,059,380, Cl. 425-298.000.
Bonecutter, Thayer A.; Lewis, Charles E.; and Smith, John E., to McGraw-Edison Company. Electrical loadbreak fuse and canister assembly. 4,059,816, Cl. 337-278.000.
Bonham, Arthur R.: *See—*
Eddy, Wesley L.; Mullen, Daniel J.; and Bonham, Arthur R., 4,059,729, Cl. 179-15.0BF.
Borg-Warner Corporation: *See—*
Ivey, John Saxon; and Braybrook, Kenneth Albert, 4,059,365, Cl. 416-174.000.
Bothwell, Bruce E. Metal-ceramic composite and method for making same. 4,059,712, Cl. 428-36.000.
Botterill, Derrick: *See—*
Samson, Ronald; and Botterill, Derrick, 4,059,274, Cl. 273-130.00D.
Bouillon, Bernard, to Commissariat a l'Energie Atomique. Method of manufacture of parts of three-dimensional fabrics. 4,059,468, Cl. 156-93.000.
Bourboulis, Cedric D. Heat deflector. 4,059,092, Cl. 126-215.000.
Boxer, Robert Keith: *See—*
Boxer, Rubin; and Boxer, Robert Keith, 4,058,853, Cl. 2-239.000.
Boxer, Rubin; and Boxer, Robert Keith. Socks with flexible self-contained fastener patches. 4,058,853, Cl. 2-239.000.
Boyajian, Alfred Z. Bolt cutter. 4,058,893, Cl. 30-250.000.
BP Chemicals Limited: *See—*
Cane, Charles; and Yeomans, Bertram, 4,059,632, Cl. 260-586.00C.
Brabson, Grafton K., to Armstrong Cork Company. Luminaire lens insert. 4,059,755, Cl. 362-224.000.
Brackmann, Warren A.; and Di Ianni, Daniel, to Rothmans of Pall Mall Canada Limited. Filter for tobacco smoke. 4,059,121, Cl. 131-269.000.
Braden, William B., Jr.; and Flourny, Kenoth H., to Texaco Inc. Micellar dispersions with tolerance for extreme water hardness for use in petroleum recovery. 4,059,154, Cl. 166-274.000.
Brandenstein, Manfred: *See—*
Ernst, Horst Manfred; Olschewski, Armin; Schurger, Rainer; Walter, Lothar; Brandenstein, Manfred; and Burkl, Erich, 4,059,179, Cl. 192-98.000.
Brandon, Bobby C.: *See—*
DePriest, Donald R.; Brandon, Bobby C.; and Buie, Connell M., 4,059,104, Cl. 128-132.00D.
Braybrook, Kenneth Albert: *See—*
Ivey, John Saxon; and Braybrook, Kenneth Albert, 4,059,365, Cl. 416-174.000.
Brediand, Alf Marlov; Fong, Walter Lee; Messing, Terry Glen; and Paulson, John Walter, to ESB Incorporated. Battery having mask which electrochemically inactivates limited surface of metallic component. 4,059,717, Cl. 429-162.000.
Brendel, Albert E.; and Sedman, Myron P., to Lebow Associates, Inc. Rotary transformer shunt calibration. 4,059,005, Cl. 73-1.00B.
Brewer, John C., to Garbalizer Corporation of America. Shearing structure in materials reduction machinery. 4,059,236, Cl. 241-243.000.
Bricot, Claude; and Lehureau, Jean-Claude, to Thomson-Brandt. Optical read-out system including asymetrical beam intensity and four detector cells. 4,059,841, Cl. 358-128.000.
Bridgestone Tire Company Limited. *See—*
Nishimoto, Kichinosuke; and Nishimura, Seiichiro, 4,059,139, Cl. 157-13.000.
Bridwell, John W.; and Meiner, George H., III, to Caterpillar Tractor Co. Hydraulic system for extremely cold environments. 4,059,042, Cl. 91-469.000.
Brinkmann, Bernd; and Griebsch, Eugen, to Schering Aktiengesellschaft. Moisture-hardenable sealing and coating compounds. 4,059,549, Cl. 260-22.0TN.
British Petroleum Company Limited, The: *See—*
Cartwright, Colin William; and Lamb, Donald, 4,059,505, Cl. 208-310.00Z.
British Steel Corporation: *See—*
Furness, Bernard J.; Cousins, John R.; and Tuft, Dennis, 4,059,794, Cl. 324-208.000.
Timms, Ralph G., 4,059,472, Cl. 156-259.000.
Brizzolara, Ernest E., to Eastman Kodak Company. Web material storage device. 4,059,211, Cl. 226-11.000.
Brody, Mitchell D. Demand controller. 4,059,747, Cl. 364-493.000.
Brophy, James Mackay: *See—*
Morro, William Charles; Hakka, Leo Ernest; Brophy, James Mackay; Hebrard, Michel Jacques Roger; and Courtes, Jean Claude, 4,059,534, Cl. 252-32.70E.
Brown, Donald J., to Knox Manufacturing Co. Brake mechanism for motor driven projection screen. 4,059,339, Cl. 350-117.000.
Brown, Elwood B.: *See—*
Krivec, Bert; Brown, Elwood B.; and Raynor, Warren S., 4,059,180, Cl. 193-37.000.
Brown Oil Tools, Inc.: *See—*
Manderscheid, Phillip H., 4,059,150, Cl. 166-120.000.
Brown, Robert L. Machine and method for successively feeding stacked blanks. 4,059,261, Cl. 271-9.000.
Brown & Root, Inc.: *See—*
Weidler, Jay B., Jr.; and Stelly, Charles Warren, 4,058,984, Cl. 61-48.000.
Browning, John H. D.: *See—*
Watson, Hugh R.; Rowsell, David G.; and Browning, John H. D., 4,059,118, Cl. 131-8.00R.
Bruderlein, Francois T., to Ayerst McKenna and Harrison Ltd. Process for preparing an intermediate for CNS depressants. 4,059,585, Cl. 260-286.00Q.
Bryant Grinder Corporation: *See—*
Lovely, John W.; and Hobbs, Robert N., 4,058,934, Cl. 51-5.00D.
Bryant, James G., to Bryant-Poff, Inc. Shredding device. 4,059,235, Cl. 241-223.000.
Bryant-Poff, Inc.: *See—*
Bryant, James G., 4,059,235, Cl. 241-223.000.
Brydges, William T., III; and Illig, Edwin J., to Corning Glass Works. Gaseous process for hydrating and extruding glass. 4,059,425, Cl. 65-22.000.
Bryson, Roy E., to United States Steel Corporation. Ore tailings treatment. 4,059,506, Cl. 209-18.000.
Bucher, Robert: *See—*
Diesner, Ferdinand; and Bucher, Robert, 4,059,133, Cl. 139-440.000.
Bucher, Robert R., to Sulzer Brothers Limited. Jacquard selection system. 4,059,131, Cl. 139-59.000.
Buckle, Derek Richard; Cantello, Barrie Christian Charles; and Smith, Harry, to Beecham Group Limited. Tetrazole coumarin derivatives. 4,059,704, Cl. 424-269.000.
Buie, Connell M.: *See—*
DePriest, Donald R.; Brandon, Bobby C.; and Buie, Connell M., 4,059,104, Cl. 128-132.00D.
Bullis, Douglas E.: *See—*
Linde, John P.; and Bullis, Douglas E., 4,058,925, Cl. 42-79.000.
Bunina, Nina Sergeevna: *See—*
Perevodchikov, Vladimir Innokentievich; Shapenko, Valentina Nikolaevna; Chernov, Zarem Sergeevich; and Bunina, Nina Sergeevna, 4,059,784, Cl. 315-349.000.
Bunnelle, Philip R., to FMC Corporation. Subterranean drilling and slurry mining. 4,059,166, Cl. 175-232.000.
Bupp, Lamar P.; and Sofer, George A., to Exxon Nuclear Company, Inc. Hybrid nuclear fuel assembly with reduced linear heat generation rates. 4,059,484, Cl. 176-78.000.
Burkhalter, John E.: *See—*
Runge, Thomas M.; Burkhalter, John E.; and Pallas, Spiros George, 4,058,857, Cl. 3-1.700.
Burkhardt, Jurgen; Hittmair, Paul; and Wegehaupt, Karl-Heinrich, to Wacker-Chemie GmbH. Process for preparing N-triorganosilylcarbamide acid esters. 4,059,559, Cl. 260-448.20E.
Burkl, Erich: *See—*
Ernst, Horst Manfred; Olschewski, Armin; Schurger, Rainer; Walter, Lothar; Brandenstein, Manfred; and Burkl, Erich, 4,059,179, Cl. 192-98.000.
Burrell, Raymond Alexander; and Cox, John Michael, to Imperial Chemical Industries Limited. Pesticidal compounds, processes and compositions. 4,059,703, Cl. 424-269.000.
Butin, Henri: *See—*
Agnus, Pierre; and Butin, Henri, 4,059,804, Cl. 328-134.000.
Butler Manufacturing Company: *See—*
Bellem, Norman A., 4,058,949, Cl. 52-407.000.
Buttner, Gerhard: *See—*
Wolfrum, Gerhard; Kuhnel, Werner; Klauke, Erich; and Buttner, Gerhard, 4,059,402, Cl. 8-2.50A.
Buvel, Harry: *See—*
Miller, Bernard; Martin, J. Ronald; Meiser, Charles H., Jr.; Lambert, Harold W.; and Buvel, Harry, 4,059,007, Cl. 73-190.00R.
Byatt, Dennis William George, to Marconi Company Limited, The. Molecular information storage systems. 4,059,827, Cl. 365-126.000.
C. H. Heist Corporation: *See—*
Goodwin, Robert J., 4,058,870, Cl. 15-104.10R.
C. van der Lely N. V.: *See—*
van der Lely, Ary; and Bom, Cornelis Johannes Gerardus, 4,059,160, Cl. 172-47.000.
Cahen, Olivier, to Thomson-CSF. Switching inverter with thermoconductive materials. 4,059,774, Cl. 307-299.00R.
Calas, Raymond; Dunogues, Jacques; Deleris, Gerard; Lefort, Marcel; and Simonnet, Christian, to Rhone-Poulenc Industries. Process for the preparation of hydrogenosilanes. 4,059,608, Cl. 260-448.20E.
Calvin, Donald W.: *See—*
Leathers, Joel F. M.; and Calvin, Donald W., 4,059,680, Cl. 423-337.000.
Campau, Walter Joseph: *See—*
Tomczak, Lawrence William; Crall, Frederick William; Caron, LaVerne Andrew; and Campau, Walter Joseph, 4,058,888, Cl. 29-593.000.
Camusot, Gerard R. Tiered grandstand. 4,058,939, Cl. 52-2.000.

Canada, Atomic Energy of, Limited: *See—*
Heighway, Edward A.; Hohban, Kenneth J.; and Schriber, Stanley O., 4,059,763, Cl. 250-336.000.
Canadian General Electric Company Limited: *See—*
Whiteley, Eric, 4,059,777, Cl. 310-64.000.
Canadian Patents and Development Limited: *See—*
Kinsner, Witold; and Torre, Edward Della, 4,059,829, Cl. 365-19.000.
Narang, Saran A.; and Stawinski, Jacek, 4,059,592, Cl. 260-308.00D.
Struble, Dean L.; and Lilly, Charles E., 4,059,689, Cl. 424-84.000.
Cane, Charles; and Yeomans, Bertram, to BP Chemicals Limited. Process for the production of isophorone. 4,059,632, Cl. 260-586.00C.
Cannell, Lawrence G., to Shell Oil Company. High density fuels. 4,059,644, Cl. 260-666.0PY.
Canney, Robert S.: *See—*
Ouelette, Ronald J.; Canney, Robert S.; and Stetson, Ralph B., 4,059,326, Cl. 339-113.00R.
Canon Kabushiki Kaisha: *See—*
Kitamura, Takashi; Watanabe, Asao; Nakano, Takashi; Masaki, Katsumi; Hirayama, Kazuhiro; Sato, Yasushi; and Tokiwa, Taisuke, 4,059,833, Cl. 346-108.000.
Komine, Yoshio; and Hirata, Noritsugu, 4,059,349, Cl. 352-72.000.
Cantello, Barrie Christian Charles: *See—*
Buckle, Derek Richard; Cantello, Barrie Christian Charles; and Smith, Harry, 4,059,704, Cl. 424-269.000.
Carlson, Alden J., to Warwick Electronics Inc. Electrical musical instrument with chord generation. 4,059,039, Cl. 84-1.010.
Carmi, Arieh; Chang, Zung S.; and Rayeski, Thomas J., to Corning Glass Works. Glass pressing plunger cooling. 4,059,429, Cl. 65-355.000.
Carney, Leroy L.: *See—*
Watson, Jimmie L.; and Carney, Leroy L., 4,059,533, Cl. 252-8.50A.
Carnwath, Joseph W., to Pennsylvania Pacific Corporation. Pallet assembly. 4,059,057, Cl. 108-51.100.
Caron, LaVerne Andrew: *See—*
Tomczak, Lawrence William; Crall, Frederick William; Caron, LaVerne Andrew; and Campau, Walter Joseph, 4,058,888, Cl. 29-593.000.
Carpano & Pons: *See—*
Mazuir, Maurice, 4,059,780, Cl. 310-164.000.
Carre, Jean-Jacques, to Societe Anonyme D.B.A. Braking correction device. 4,059,174, Cl. 188-195.000.
Carten, Charles T.: *See—*
Van Huis, Robert L.; and Carten, Charles T., 4,059,071, Cl. 119-18.000.
Cartwright, Colin William; and Lamb, Donald, to British Petroleum Company Limited, The. Separating hydrocarbons. 4,059,505, Cl. 208-310.00Z.
Cartwright, William J.: *See—*
Aschberger, Anton A.; Avery, Jack L.; Cartwright, William J.; Dean, Geoffrey J.; Tysver, Oliver J.; Wolfe, Robert W.; and Bautz, Frederick H., 4,059,186, Cl. 198-481.000.
Casada, James H.: *See—*
Smith, Edward M.; Casada, James H.; and Taylor, Timothy H., 4,059,161, Cl. 172-60.000.
Casey, Donald James, to American Cyanamid Company. Method of minimizing tissue reaction during surgery with chitin. 4,059,097, Cl. 128-1.00R.
Cassano, James R.: *See—*
Stange, Klaus K.; Smith, Richard E.; Hamlin, Thomas J.; and Cassano, James R., 4,059,260, Cl. 271-3.000.
Caterpillar Tractor Co.: *See—*
Beyers, Marvin E.; and Dadds, Floyd S., 4,059,313, Cl. 305-19.000.
Bridwell, John W.; and Meiner, George H., III, 4,059,042, Cl. 91-469.000.
Gibson, Myron R., 4,059,370, Cl. 418-56.000.
Henson, Ralph B., 4,058,981, Cl. 60-605.000.
Stedman, Robert N., 4,059,163, Cl. 175-73.000.
Stedman, Robert N., 4,059,172, Cl. 187-9.00E.
Caw Industries, Inc.: *See—*
Willard, John Wesley, Sr., 4,059,691, Cl. 424-155.000.
Cawi, Ingo M. Transmission for driving a movable element, particularly a component in a machine tool, at high speed or creep speed. 4,059,029, Cl. 74-785.000.
Celanese Polymer Specialties Company: *See—*
Shimp, David Alan, 4,059,550, Cl. 260-29.40R.
Cellier, Michel Jean Jacques; Guitton, Jean-Claude; Scholle, Jean-Claude; and Viannay, Stephane Georges Jean-Marie, to Bertin & Cie. Cooled tunnel-furnace with ground effect. 4,059,399, Cl. 432-121.000.
Centaur Chemical Co.: *See—*
Avakian, Souren, 4,059,020, Cl. 73-425.40P.
Ceprini, Mario Q.: *See—*
Hoch, Samuel; Ceprini, Mario Q.; and Szabo, Emery, 4,059,562, Cl. 260-45.75S.
Chaisson, Maurice J., to Raymond Lee Organization, Inc., The. Tie rack. 4,059,191, Cl. 211-90.000.
Chalov, Alexandr Vasilievich: *See—*
Barannik, Ivan Andreevich; Kondratenko, Anatoly Borisovich; Trukhin, Alexandr Fedorovich; Raskatov, Viktor Georgievich; Zharovsky, Ivan Vasilievich; Rudakov, Viktor Alexandrovich; Mordkovich, Andrei Efremovich; and Chalov, Alexandr Vasilievich, 4,059,372, Cl. 425-8.000.
Champion, Robert J., to Perry Industries, Inc. Capsule cleaning and polishing. 4,058,868, Cl. 15-4.000.
Champion Spark Plug Company: *See—*
Lentz, Lawrence R., 4,059,782, Cl. 315-58.000.
Chang, Zung S.: *See—*
Carmi, Arieh; Chang, Zung S.; and Rayeski, Thomas J., 4,059,429, Cl. 65-355.000.
Chapman, Charles C.; and Hann, Paul D., to Phillips Petroleum Company. Cooling of recycle hydrocarbon and/or alkylate product in isoparaffin-olefin alkylation. 4,059,649, Cl. 260-683.480.
Chapman, Wayne A.: *See—*
Olson, Gregory J.; and Chapman, Wayne A., 4,059,221, Cl. 229-39.00R.
Chataigner, Jean; and Rader, Jean-Claude Joseph. Water purifying device without movable mechanical part in contact with the liquid to be treated. 4,059,524, Cl. 210-220.000.
Che-Wei, Liao. Water storage tank for flush toilets. 4,058,858, Cl. 4-67.00R.
Chembro Holdings (Proprietary) Limited: *See—*
Axcell, Barry Clifford; and Donninger, Cyril, 4,059,490, Cl. 195-99.000.
Chemetron Corporation: *See—*
Crompton, Charles E.; and Kazi, Abdulla M. Z., 4,059,540, Cl. 252-309.000.
Chemie-Anlagenbau Bischofsheim GmbH: *See—*
Hilterhaus, Karl Heinz, 4,059,659, Cl. 264-45.300.
Chernov, Zarem Sergeevich: *See—*
Perevodchikov, Vladimir Innokentievich; Shapenko, Valentina Nikolaevna; Chernov, Zarem Sergeevich; and Bunina, Nina Sergeevna, 4,059,784, Cl. 315-349.000.
Chevron Research Company: *See—*
Jacobson, Robert L., 4,059,645, Cl. 260-568.00A.
Moore, Joseph E., 4,059,590, Cl. 260-306.80R.
Strahorn, David F.; and Goldstein, Roger F., 4,059,517, Cl. 210-73.00R.
Childs, William V., to Phillips Petroleum Company. Recovery of hexafluoroacetone from a hexafluoroacetone-HF control. 4,059,633, Cl. 260-593.00H.
Chiyomaru, Isao: *See—*
Sugiyama, Hironari; Chiyomaru, Isao; Okuda, Itsuki; Yamamoto, Hisaaki; and Ito, Hideo, 4,059,635, Cl. 260-609.00E.
Choby, Edward G., Jr., to Allegheny Ludlum Industries, Inc. Method of soldering with phosphoric acid soldering flux. 4,059,218, Cl. 228-207.000.
Chodnekar, Madhukar Subraya; Pfiffner, Albert; Rigassi, Norbert; Schwieter, Ulrich; and Suchy, Milos, to Hoffmann-La Roche, Inc. Epoxy dodecadienamides. 4,059,600, Cl. 260-348.460.
Christensen, Edwin H.: *See—*
Germino, Felix Joseph; Kite, Francis E.; and Christensen, Edwin H., 4,059,458, Cl. 106-213.000.
Chrysler Corporation: *See—*
Tomczak, Lawrence William; Crall, Frederick William; Caron, LaVerne Andrew; and Campau, Walter Joseph, 4,058,888, Cl. 29-593.000.
Ciba-Geigy Corporation: *See—*
Furer, Richard; Halter, Paul; and Wettstein, Klaus, 4,059,074, Cl. 119-156.000.
Kuhne, Manfred, 4,059,436, Cl. 71-118.000.
Nachbur, Hermann; and Rohringer, Peter, 4,059,532, Cl. 252-8.100.
Cincinnati Milacron Inc.: *See—*
McDonald, David Ian, 4,059,188, Cl. 198-477.000.
Cities Service Company: *See—*
Rice, Seymour S., 4,059,493, Cl. 204-3.000.
Cities Service Research and Development Company: *See—*
James, Lewis C., 4,059,502, Cl. 208-152.000.
Citizen Watch Co., Ltd.: *See—*
Tamaru, Munetaka; Kume, Kazunari; Oono, Hideshi; Watanabe, Minoru; Sato, Hideo; and Morokawa, Shigeru, 4,058,969, Cl. 58-23.0BA.
Clairol Incorporated: *See—*
Rosenberg, Ira E.; Ferguson, John A.; and Loveless, Norman P., 4,059,688, Cl. 424-71.000.
Clamans, Pedro Carlos Segismundo. Support arrangements for rotary scrapers. 4,058,876, Cl. 29-78.000.
Clark, Charles Albert, Jr., to RCA Corporation. CRT display with truncated Rho-Theta presentation. 4,059,785, Cl. 315-378.000.
Clark, Robert L.; and Dahan, Paul C., to Mobil Oil Corporation. Semisubmersible loading mooring and storage facility. 4,059,065, Cl. 114-256.000.
Clark, Wallace. Versatile fluid motor and pump. 4,059,165, Cl. 175-107.000.
Clarkson, Douglas Mel: *See—*
Zakrzewski, Andrew Steven; Clarkson, Douglas Mel; and Webster, Gordon A., 4,058,941, Cl. 52-169.100.
Clarridge, Glenn: *See—*
Hayden, Robert W.; and Clarridge, Glenn, 4,059,732, Cl. 179-18.00B.
Clearfield, Abraham, to Ohio University. Modified zirconium phosphates. 4,059,679, Cl. 423-306.000.
Cleary, James M. Apparatus and method for cutting elongated slots in earth formations. 4,059,309, Cl. 299-18.000.
Cline, Carl F.: *See—*
Ray, Ranjan; Tanner, Lee E.; and Cline, Carl F., 4,059,441, Cl. 75-174.000.
Cluett, Peabody & Co., Inc.: *See—*
Hausner, Franz, 4,058,874, Cl. 28-153.000.
Coach and Car Equipment Corporation: *See—*
Harder, Arthur J., Jr., 4,059,306, Cl. 297-452.000.

- Coalite and Chemical Products Limited: *See—*
  - Langsley, Gerald William. 4,059,569, Cl. 260-48.000.
- Cobb, Lawrence R. Heat saving concealed fireplace front. 4,059,091, Cl. 126-140.000.
- Coburn, Robert E., to Molins Machine Company Inc. Glue mechanism. 4,059,474, Cl. 156-356.000.
- Cocksedge, Kenneth W., to Xerox Corporation. Phase-sensitive transducer apparatus with signal offset means. 4,059,789, Cl. 318-608.000.
- Cohen, Bernard: *See—*
  - Armstrong, Donald E.; Sindlinger, Ronald E.; Cohen, Bernard; Tozier, John E.; and Audesse, Emery G., 4,059,389, Cl. 431-95.00R.
- Cohen, Kenneth W., to Bailey Meter Company Proximity sensor with zero adjustment. 4,059,130, Cl. 137-82.000.
- Cole, Michael A.: *See—*
  - Anders, Walter G.; Cole, Michael A.; Duncan, James C.; and Leipelt, Paul A., 4,059,246, Cl. 243-7.000.
- Colgate Palmolive Company: *See—*
  - Bauman, Robert Andrew, 4,059,687, Cl. 424-54.000.
  - Harrison, Michael, 4,059,624, Cl. 260-565.000.
- Comalco Limited: *See—*
  - Holliday, Robin David; and Milne, David John, 4,059,673, Cl. 423-136.000.
- Combustion Engineering, Inc.: *See—*
  - Anthony, Andrew J., 4,059,483, Cl. 176-78.000.
  - Ssinegurski, Eugen; and Wilkinson, Donald, 4,059,075, Cl. 122-6.00A.
- Commissariat a l'Energie Atomique: *See—*
  - Boisde, Gilbert; and Richerot, Alain, 4,059,408, Cl. 23-267.00R.
  - Bouillon, Bernard, 4,059,468, Cl. 156-93.000.
- Conger, Robert P.; and Pogozelski, Vincent F., to Congoleum Corporation. Processes of applying urethane top coatings to resilient floor coverings. 4,059,709, Cl. 427-264.000.
- Congoleum Corporation: *See—*
  - Conger, Robert P.; and Pogozelski, Vincent F., 4,059,709, Cl. 427-264.000.
- Conklin, LeRoy T. Portable intrusion alarm. 4,059,832, Cl. 340-274.00R.
- Conort Engineering AB: *See—*
  - Wallander, Bengt Olof Henrik, 4,059,027, Cl. 74-718.000.
- Constantakis, Roberto: *See—*
  - Poliey, Richard D.; Nilson, Eric L.; Constantakis, Roberto; and Pruitt, Donovan E., 4,059,522, Cl. 210-198.00R.
- Continental Group, Inc., The: *See—*
  - Aschberger, Anton A.; Avery, Jack L.; Cartwright, William J.; Dean, Geoffrey J.; Tysver, Oliver J.; Wolfe, Robert W.; and Bautz, Frederick H., 4,059,186, Cl. 198-481.000.
- Continental Oil Company: *See—*
  - Lindberg, Robert C.; Reedy, James D.; and Yang, Kang, 4,059,683, Cl. 423-481.000.
  - Yang, Kang; Reedy, James D.; and Scamehorn, John F., 4,059,675, Cl. 423-240.000.
  - Yang, Kang; and Reedy, James D., 4,059,676, Cl. 423-240.000.
- Control Data Corporation: *See—*
  - Procter, Samuel Anderson, 4,059,812, Cl. 331-1.00A.
  - Warmka, Gary Paul, 4,059,775, Cl. 310-12.000.
- Conway, Gerald A., to Gerald Conway & Co., Inc. Clip for dispensing advertising literature. 4,059,190, Cl. 211-57.100.
- Cooper, Glenn Dale, to General Electric Company. Method for the control of diamine catalyzed polyphenylene ether polymerization. 4,059,568, Cl. 260-47.0ET.
- Copolymer Rubber & Chemical Corporation: *See—*
  - Von Bodungen, George A.; and Meredith, Curtis L., 4,059,654, Cl. 260-897.00A.
- Coppola, Louis. Locking device for securing an outboard motor to a boat. 4,058,994, Cl. 70-232.000.
- Corbett, John M.; Skochdopole, Richard E.; and Scaggs, Anthony L., to Dow Chemical Company, The. Crosslinked styrene polymer foam having suppressed ignition properties. 4,059,545, Cl. 260-2.5FP.
- Corbic, Yves Jean, to Societe a Responsabilite Limitee dite: TECCA. Apparatus for the production and deposition of bands. 4,059,377, Cl. 425-305.100.
- Cork, Gordon H.: *See—*
  - Helm, Homer E., 4,059,295, Cl. 285-305.000.
- Corning Glass Works: *See—*
  - Andrews, Wendell C., 4,059,428, Cl. 65-33.000.
  - Brydges, William T., III; and Illig, Edwin J., 4,059,425, Cl. 65-22.000.
  - Carmi, Arieh; Chang, Zung S.; and Rayeski, Thomas J., 4,059,429, Cl. 65-355.000.
  - Reade, Richard F., 4,059,454, Cl. 106-39.700.
  - Shoup, Robert D.; and Wein, William J., 4,059,658, Cl. 264-43.000.
- Cosmo, Nicola, to Ing. C. Olivetti & C., S.p.A. Sheet cartridge for reprographic machine. 4,059,259, Cl. 271-3.000.
- Cottongim, Billie Joe: *See—*
  - Belasco, Melvin; and Cottongim, Billie Joe, 4,059,764, Cl. 250-352.000.
- Coughlan, Standly T.; Dewar, John H.; and Zampa, Henry A., to Ford Motor Company. Method of applying an integral sealing member. 4,059,564, Cl. 264-46.400.
- Courtes, Jean Claude: *See—*
  - Morro, William Charles; Hakka, Leo Ernest; Brophy, James Mackay; Hebrard, Michel Jacques Roger; and Courtes, Jean Claude, 4,059,534, Cl. 252-32.70E.
- Cousins, John R.: *See—*
  - Furness, Bernard J.; Cousins, John R.; and Tuft, Dennis, 4,059,794, Cl. 324-208.000.
- Cox, John Michael: *See—*
  - Burrell, Raymond Alexander; and Cox, John Michael, 4,059,703, Cl. 424-269.000.
- Coyle, James J., to Shell Oil Company. Decomposition of hydroperoxides in propylene epoxidation reaction product. 4,059,598, Cl. 260-348.160.
- CPC International Inc.: *See—*
  - Germino, Felix Joseph; Kite, Francis E.; and Christensen, Edwin H., 4,059,458, Cl. 106-213.000.
- Cragoe, Edward J., Jr.; and Bicking, John B., to Merck & Co., Inc. 8-Halo-11,12-secoprostaglandins. 4,059,601, Cl. 260-408.000.
- Cragoe, Edward J., Jr.; and Bicking, John B., to Merck & Co., Inc. 8-Methyl-, phenyl-, or substituted phenyl-11,12-secoprostaglandins 4,059,602, Cl. 260-408.000.
- Cragoe, Edward J., Jr.: *See—*
  - Smith, Robert L.; Lee, Ta-Jyh; and Cragoe, Edward J., Jr., 4,059,587, Cl. 260-301.000.
- Craig, Loren Jackson: *See—*
  - Hochreiter, William Thomas; Craig, Loren Jackson; and Mindler, Fredric A., 4,059,836, Cl. 354-29.000.
- Crall, Frederick William: *See—*
  - Tomczak, Lawrence William; Crall, Frederick William; Caron, LaVerne Andrew; and Campau, Walter Joseph, 4,058,888, Cl. 29-593.000.
- Crano, John C., to PPG Industries, Inc. Process for preparing halogenated diaryl hydrogen phosphates. 4,059,655, Cl. 260-983.000.
- Credner, Hans Heinrich: *See—*
  - Meier, Ernst; Credner, Hans Heinrich; Lassig, Wolfgang; Kuffner, Karl; and Schranz, Karl-Wilhelm, 4,059,447, Cl. 96-56.400.
- Crest Industries, Inc.: *See—*
  - Rasmussen, Harry R.; and Topel, Kenneth D., 4,059,321, Cl. 339-34.000.
- Crissman, James H.; Fritsche, G. Ray; Hamel, Frederick B.; and Hilty, Lloyd W., to Gulf Research & Development Company. Radial flow electrostatic filter. 4,059,498, Cl. 204-188.000.
- Crompton, Charles E.; and Kazi, Abdulla M. Z., to Chemetron Corporation. Process for making colloidal sols of antimony pentoxide in polar organic solvents. 4,059,540, Cl. 252-309.000.
- Crowe, Talmadge L., to Baker International Corporation. Well control valve apparatus. 4,059,157, Cl. 166-317.000.
- CSELT - Centro Studi e Laboratori Telecomunicazioni S.p.A.: *See—*
  - Perucca, Giovanni; Melindo, Flavio; and De Vincentiis, Girolamo, 4,059,736, Cl. 179-175.20R.
- Cull, Neville L., to Exxon Research & Engineering Co. Flue gas desulfurization sorbent and process. 4,059,418, Cl. 55-73.000.
- Cutruzzula, Jeffrey F.; and Schattner, Robert L., to Omnimed, Inc. Cannula securing device. 4,059,105, Cl. 128-133.000.
- Dadds, Floyd S.: *See—*
  - Beyers, Marvin E.; and Dadds, Floyd S., 4,059,313, Cl. 305-19.000.
- Dahan, Paul C.: *See—*
  - Clark, Robert L.; and Dahan, Paul C., 4,059,065, Cl. 114-256.000.
- Dai Nippon Insatsu Kabushiki Kaisha: *See—*
  - Nagano, Katsusuke, 4,059,481, Cl. 156-660.000.
- Daidone, Kenneth. Suspended bed with height control. 4,058,860, Cl. 5-10.00R.
- Damon Corporation: *See—*
  - Sodickson, Lester A.; and Lim, Franklin, 4,059,405, Cl. 23-230.00R.
- Danchenko, Mikhail Evgenievich: *See—*
  - Esibian, Eduard Migranovich; Dudko, Daniil Andreevich; Danchenko, Mikhail Evgenievich; Malkin, Vasily Berkovich; and Kozhema, Valery Andreevich, 4,059,743, Cl. 219-121.00P.
- Daniel, Thell D.: *See—*
  - DeRooy, Felix J.; Daniel, Thell D.; Annes, Erle C.; and Arnold, Billy G., 4,059,456, Cl. 106-114.000.
- Dano, Tage Halfdan, to F. L. Smidth & Co. Cement manufacture. 4,059,396, Cl. 432-78.000.
- Dart Industries Inc.: *See—*
  - Allan, John Leslie Hugh; and Roderick, John James, 4,059,652, Cl. 260-848.000.
  - Geller, Thomas L.; and Rabinowitz, Harold, 4,059,464, Cl. 156-66.000.
- Data General Corporation: *See—*
  - Seligman, Lawrence, 4,059,224, Cl. 235-462.000.
- David Brown Tractors Limited: *See—*
  - Moorhouse, Stephen; Horsfall, Harry; and Dean, Alan Rangeley, 4,059,159, Cl. 172-7.000.
- Davis, Belford L. Resuscitative device. 4,059,099, Cl. 128-28.000.
- Davis, Charles McRea, Jr. Can crusher. 4,059,050, Cl. 100-91.000.
- Davis, John: *See—*
  - Kahlert, George; Pommer, Lawrence; Davis, John; and Whebell, Bert, 4,059,061, Cl. 110-7.00A.
- Davis, Trevor Crombie Maitland; and Laurie, James Ernest, to Revere Copper and Brass Incorporated. Method of digesting bauxite via the Bayer process with the addition of reducing agents. 4,059,672, Cl. 423-121.000.
- Davis, William Lawrence. Apparatus for cutting pipe insulation. 4,059,035, Cl. 83-1.000.
- Dawson, John Myrick, to TRW Inc. Separation of isotopes by time of flight. 4,059,761, Cl. 250-287.000.
- Dawson, Juan C.: *See—*
  - Kowalski, Daniel C.; Dawson, Juan C.; and Krulikoski, Stanley J., deceased, 4,059,343, Cl. 350-182.000.

- Dawson, Thomas Stephen: *See—*
  - Foster, Terence; and Dawson, Thomas Stephen, 4,059,617, Cl. 560-222.000.
- Dayco Corporation: *See—*
  - Phillips, Alfred R.; and Logan, Arthur D., 4,059,847, Cl. 361-215.000.
- Dean, Alan Rangeley: *See—*
  - Moorhouse, Stephen; Horsfall, Harry; and Dean, Alan Rangeley, 4,059,159, Cl. 172-7.000.
- Dean, Geoffrey J.: *See—*
  - Aschberger, Anton A.; Avery, Jack L.; Cartwright, William J.; Dean, Geoffrey J.; Tysver, Oliver J.; Wolfe, Robert W.; and Bautz, Frederick H., 4,059,186, Cl. 198-481.000.
- Dean, Rudy. Frames for buildings. 4,058,951, Cl. 52-656.000.
- Deere & Company: *See—*
  - Smith, Edward M.; Casada, James H.; and Taylor, Timothy H., 4,059,161, Cl. 172-60.000.
- Deering, Hartland W., Jr., to Minnesota Mining and Manufacturing Company. Tape Dispenser. 4,059,210, Cl. 225-47.000.
- de Gaudemaris, Gabriel: *See—*
  - Lallement, Jacques; Parc, Guy; and de Gaudemaris, Gabriel, 4,059,536, Cl. 252-33.300.
- de Laage de Meux, Patrick M.; and Maitre, Michel J., to Lignes Telegraphiques et Telephoniques Phase lock loop carrier generator for receiver of phase modulated carrier pulse signals. 4,059,805, Cl. 329-50.000.
- Deleris, Gerard: *See—*
  - Calas, Raymond; Dunogues, Jacques; Deleris, Gerard; Lefort, Marcel; and Simonnet, Christian, 4,059,608, Cl. 260-448.20E.
- Dellario, Patrick J.: *See—*
  - Diminnie, Edward A.; and Dellario, Patrick J., 4,059,325, Cl. 339-94.00A.
- Del Pesco, Thomas Wayne; and Weigert, Frank Julian, to Du Pont de Nemours, E. I., and Company. Preparation of aromatic amines. 4,059,628, Cl. 260-581.000.
- Demarcq, Michel, to Produits Chimiques Ugine Kuhlmann. Processes for neutralizing 2,3-dibromopropanol phosphoric acid esters contained in tris(2,3-dibromo-1-propyl) phosphate. 4,059,656, Cl. 260-990.000.
- DeMarinis, Robert M.; and Weisbach, Jerry A., to SmithKline Corporation. 7-Substituted mercaptoacetamido cephamycins. 4,059,578, Cl. 544-21.000.
- de Nora, Oronzio; and de Nora, Vittorio, to Oronzio de Nora Impianti Elettrochimici S.p.A. Method of electrolyte feeding and recirculation in an electrolysis cell. 4,059,495, Cl. 204-98.000.
- de Nora, Vittorio: *See—*
  - de Nora, Oronzio; and de Nora, Vittorio, 4,059,495, Cl. 204-98.000.
- DePriest, Donald R.; Brandon, Bobby C.; and Buie, Connell M., to Humboldt Products Corporation. Apparatus, process and product. 4,059,104, Cl. 128-132.00D.
- De Roeck, Joseph Irma; and Pira, Francois Jean, to AGFA-GEVAERT N.V. Air flotation turner bar. 4,059,241, Cl. 242-75.500.
- DeRooy, Felix J.; Daniel, Thell D.; Annes, Erle C.; and Arnold, Billy G., to United States Gypsum Company. Composition for accelerating the setting of calcined gypsum and the product formed thereby. 4,059,456, Cl. 106-114.000.
- Derr, Walter R.; McClernon, Joseph R.; McGovern, Stephen J.; and Smith, Fritz A., to Mobil Oil Corporation. Method for upgrading synthetic oils boiling above gasoline boiling material. 4,059,648, Cl. 260-676.00R.
- DeStephanis, Ralph, to RCA Corporation. Stylus arm lifting/lowering apparatus for a video disc player system. 4,059,277, Cl. 274-23.00A.
- De Trey, Rene: *See—*
  - Lendi, Georges; Hardegger, Bruno; and De Trey, Rene, 4,058,901, Cl. 33-178.00R.
- Deutsche Gold-und Silber-Scheideanstalt Vormals Roessler: *See—*
  - Prescher, Gunter; Schreyer, Gerd; Weiberg, Otto; Wirthwein, Rolf; Waldmann, Helmut; Seifert, Hermann; Schwerdtel, Wulf; and Swodenk, Wolfgang, 4,059,619, Cl. 260-502.00R.
- Deutsche Gold- und Silber-Schneideanstalt vormals Roessler: *See—*
  - Golombeck, Paul; and Hertl, Friedrich, 4,059,558, Cl. 260-42.330.
  - Scherberich, Paul; and Pfeifer, Wolf-Dieter, 4,059,589, Cl. 260-306.70C.
- Devas, Michael Bertrand, to National Research Development Corporation. Bone securing devices. 4,059,102, Cl. 128-92.00B.
- De Vault, Albert N.; and Holtz, Hans D., to Phillips Petroleum Company. Ashless detergent additives for fuels and lubricants. 4,059,535, Cl. 252-33.000.
- Devienne, Andre M.: *See—*
  - Mirtain, Henri J.; and Devienne, Andre M., 4,059,138, Cl. 152-330.0RF.
- De Vincentiis, Girolamo: *See—*
  - Perucca, Giovanni; Melindo, Flavio; and De Vincentiis, Girolamo, 4,059,736, Cl. 179-175.20R.
- De Vos, Daniel; Michel, Paul-Marie; and Berger, Alfred, to Sovitec S.A. Process for the preparation of expansible beads. 4,059,423, Cl. 65-21.000.
- Dewald, James R.; and Markley, Lowell D., to Dow Chemical Company, The. Preferential alkylation or acylation of meta-disubstituted benzenes. 4,059,642, Cl. 260-650.00R.
- Dewar, John H.: *See—*
  - Coughlan, Standly T.; Dewar, John H.; and Zampa, Henry A., 4,059,564, Cl. 264-46.400.
- Dewitt, David, to International Business Machines Corporation. Method for forming a transistor comprising layers of silicon dioxide and silicon nitride. 4,058,887, Cl. 29-571.000.
- Diamond International Corporation: *See—*
  - Reifers, Richard F.; Bixler, Kenneth D.; and Lord, Henry A., 4,059,219, Cl. 229-2.5EC.
- Diamond Shamrock Corporation: *See—*
  - Meyer, Lewis M., 4,059,216, Cl. 228-179.000.
- Dias, Francesco: *See—*
  - Luhleich, Hartmut; Nickel, Hubertus; and Dias, Francesco, 4,059,682, Cl. 423-448.000.
- Dickey, Baron Christian, to Alpha Marine Systems, Inc. Marine auto pilot. 4,059,064, Cl. 114-144.00E.
- Dickinson, Peter D.; Osborne, Thomas E.; Rode, France; and Baum, Allen J., to Hewlett-Packard Company. General purpose calculator having selective data storage, data conversion and time-keeping capabilities. 4,059,750, Cl. 364-715.000.
- Dickson, Robert Daniel. Means of fumigating raw and finished agricultural products. 4,059,048, Cl. 99-482.000.
- Diebold, Incorporated: *See—*
  - Anders, Walter G.; Cole, Michael A.; Duncan, James C.; and Leipelt, Paul A., 4,059,246, Cl. 243-7.000.
- Dierker, Jeffrey A.; and Moore, Prentice G., to F. W. Bell, Inc. Method and apparatus for measuring the current flowing in a workpiece. 4,059,798, Cl. 324-127.000.
- Diesner, Ferdinand; and Bucher, Robert. Weft insert apparatus for ribbon looms. 4,059,133, Cl. 139-440.000.
- Dietrich, Roland, to Ahiba AG. Laboratory test device for textile samples. 4,059,013, Cl. 73-159.000.
- Digman, Robert Howard, Sr., to Raymond Lee Organization, Inc., The. Disposable fly killer container. 4,058,928, Cl. 43-131.000.
- Di Ianni, Daniel: *See—*
  - Brackmann, Warren A.; and Di Ianni, Daniel, 4,059,121, Cl. 131-269.000.
- Dimensional Development Corporation: *See—*
  - Lo, Allen Kwok Wah; and Nims, Jerry Curtis, 4,059,354, Cl. 355-22.000.
- Diminnie, Edward A.; and Dellario, Patrick J., to General Electric Company. Terminal protection shield. 4,059,325, Cl. 339-94.00A.
- Dinter, Peter: *See—*
  - Kolbe, Andreas; and Dinter, Peter, 4,059,497, Cl. 204-165.000.
- Dion, Narcisse, to B. & R. Choiniere Ltee. Forage harvester. 4,059,233, Cl. 241-47.000.
- Dittrich, Werner; and Schnippering, Friedhelm, to Dynamit Nobel Aktiengesellschaft. Method of making molds for the casting of metals. 4,059,453, Cl. 106-38.300.
- Dix, James S.: *See—*
  - Mathis, Ronald D.; and Dix, James S., 4,059,653, Cl. 260-857.0PG.
- Dr. -Ing. Ludwig Pietzsch: *See—*
  - Pietzsch, Ludwig; and Overlach, Knud, 4,059,012, Cl. 73-141.00A.
- Doerman, Eryk Stefan: *See—*
  - Molins, Desmond Walter; Mills, John Alfred; and Doerman, Eryk Stefan, 4,059,120, Cl. 131-23.00R.
- Doerre, Erhard; Semlitsch, Manfred; and Frey, Otto, to Sulzer Brothers Limited. Joint endoprosthesis. 4,058,856, Cl. 3-1.910.
- Dohgane, Iwao: *See—*
  - Hosaka, Hirokazu; Tanimoto, Kenji; Okabe, Hiromichi; Tanaka, Kunthiko; Ueda, Yuji; and Dohgane, Iwao, 4,059,637, Cl. 260-610.00A.
- Dominion Foundries and Steel, Limited: *See—*
  - Zakrzewski, Andrew Steven; Clarkson, Douglas Mel; and Webster, Gordon A., 4,058,941, Cl. 52-169.100.
- Doncaster, Peter Henry: *See—*
  - Franek, Jozef Tadeusz; and Doncaster, Peter Henry, 4,058,998, Cl. 72-84.000.
- Donnelly, Frank R. Expansion of building structure. 4,058,952, Cl. 52-741.000.
- Donninger, Cyril: *See—*
  - Axcell, Barry Clifford; and Donninger, Cyril, 4,059,490, Cl. 195-99.000.
- Dorr-Oliver Incorporated: *See—*
  - Lewis, Kenneth Dan, 4,059,223, Cl. 233-1.00R.
- Dover Corporation: *See—*
  - Rishel, John W., 4,059,518, Cl. 210-108.000.
- Dow Chemical Company, The: *See—*
  - Baggett, Joseph McClendon, 4,059,566, Cl. 260-47.0XA.
  - Corbett, John M.; Skochdopole, Richard E.; and Scaggs, Anthony L., 4,059,545, Cl. 260-2.5FP.
  - Dewald, James R.; and Markley, Lowell D., 4,059,642, Cl. 260-650.00R.
  - Grosshandler, Sandor, 4,059,528, Cl. 210-282.000.
  - Hart, Alan M., 4,059,391, Cl. 432-13.000.
  - Leathers, Joel F. M.; and Calvin, Donald W., 4,059,680, Cl. 423-337.000.
  - Zweigle, Maurice L.; and Lamphere, Jack C., 4,059,552, Cl. 260-29.6TA.
- Draiswerke GmbH: *See—*
  - Engels, Kaspar, 4,059,232, Cl. 241-46.170.
- Dressell, Richard G., Jr.; and Heideman, Robert J. Linear force shock absorber. 4,059,175, Cl. 188-285.000.
- Dresser Industries, Inc.: *See—*
  - Heske, William Albert; and Grudzien, Christopher Peter, 4,059,128, Cl. 137-487.500.
- Drevet, Georges. Sewing machine having a dual-purpose complementary case. 4,059,062, Cl. 112-258.000.
- Ducellier & Cie: *See—*
  - Habert, Roger J., 4,059,083, Cl. 123-146.50A.

Dudko, Daniil Andreevich: *See—*
Esibian, Eduard Migranovich; Dudko, Daniil Andreevich; Danchenko, Mikhail Evgenievich; Malkin, Vasily Berkovich; and Kozhema, Valery Andreevich, 4,059,743, Cl. 219-121.00P.
Duncan, James C.: *See—*
Anders, Walter G.; Cole, Michael A.; Duncan, James C.; and Leipelt, Paul A., 4,059,246, Cl. 243-7.000.
Duncan, Robert John; and Elliott, Richard Montgomery, to USM Corporation. System for dispensing and controlling the temperature of hot melt adhesive. 4,059,204, Cl. 222-146.0HE.
Dunham-Bush, Inc.: *See—*
Shaw, David N., 4,058,988, Cl. 62-160.000.
Dunkerley, Charles L.: *See—*
Foster, J. Walter; and Dunkerley, Charles L., 4,059,359, Cl. 356-222.000.
Dunogues, Jacques: *See—*
Calas, Raymond; Dunogues, Jacques; Deleris, Gerard; Lefort, Marcel; and Simonnet, Christian, 4,059,608, Cl. 260-448.20E.
Du Pont de Nemours, E. I., and Company: *See—*
Bellina, Russell Frank, 4,059,623, Cl. 260-561.00A.
Del Pesco, Thomas Wayne; and Weigert, Frank Julian, 4,059,628, Cl. 260-581.000.
Gavin, John Henry; and Spickler, John Martin, 4,058,881, Cl. 29-715.000.
Higgins, James Francis, 4,059,459, Cl. 106-298.000.
Pangonis, William James, 4,059,667, Cl. 264-289.000.
Wolf, Anthony David, 4,059,434, Cl. 71-92.000.
Dupre, Herman K. Hip mounted tethered ball game. 4,059,271, Cl. 273-95.00A.
Dustin, Donald L.: *See—*
Mino, George M.; and Dustin, Donald L., 4,059,711, Cl. 427-310.000.
Dynamit Nobel Aktiengesellschaft: *See—*
Blumenfeld, Georg; Richtzenhain, Hermann; Vogt, Wilhelm; and Volkommer, Norbert, 4,059,618, Cl. 560-221.000.
Dittrich, Werner; and Schnippering, Friedhelm, 4,059,453, Cl. 106-38.300.
E D T Supplies Limited. *See—*
Fleet, Bernard, 4,059,406, Cl. 23-230.00R.
E. J. Brooks Company: *See—*
Moberg, Sigurd Manfred; and Lundberg, George A., 4,059,300, Cl 292-322.000.
Earle, Paul Lewis; and Snider, George William, to Johns-Manville Corporation. Fire resistant joint system for concrete structures. 4,058,947, Cl 52-396.000.
Eastman Kodak Company: *See—*
Brizzolara, Ernest E., 4,059,211, Cl. 226-11.000.
Hochreiter, William Thomas; Craig, Loren Jackson; and Mindler, Fredric A., 4,059,836, Cl. 354-29.000.
Roller, Thomas W., 4,059,520, Cl. 210-184.000.
Eastwood, Brian Geoffrey, to Hall & Hall Limited. Seal ring assembly. 4,059,280, Cl. 277-188.00A.
Eberl, Karlheinz: *See—*
Hollweck, Walter; Schnee, Wilhelm; Eberl, Karlheinz; and Basel, Werner, 4,059,817, Cl. 337-365.000.
Ebert, Michael: *See—*
Reick, Franklin G., 4,059,018, Cl. 73-418.000.
Eck, Herbert; Weinhold, Gunter; and Hannebaum, Manfred, to Wacker-Chemie GmbH. Manufacture of polyvinyl chloride foams. 4,059,661, Cl. 264-54.000.
Eddy, Wesley L.; Mullen, Daniel J.; and Bonham, Arthur R., to Martin Marietta Aerospace. Method and system for selectively accessing multiplexed data transmission network for monitoring and testing of the network. 4,059,729, Cl. 179-15.0BF.
Edgar, John B.; and Bell, Peter W. Method of forming carpet tiles. 4,059,465, Cl. 156-72.000.
Edwards, Frank E. Amalgam retriever. 4,058,897, Cl. 32-40.00R.
Eggensperger, Heinz; Beilfuss, Wolfgang; and Ehlers, Helmut Hermann, to Sterling Drug Inc. 2,5-Bis(benzyloxy)tetrahydrofuran. 4,059,596, Cl. 260-347.800.
Eheim, Franz, to Robert Bosch G.m.b.H. Fuel injection pump. 4,059,369, Cl. 417-494.000.
Ehlers, Helmut Hermann: *See—*
Eggensperger, Heinz; Beilfuss, Wolfgang; and Ehlers, Helmut Hermann, 4,059,596, Cl. 260-347.800.
Eiland, P. Frank: *See—*
Spanel, Abram N.; Eiland, P. Frank; and Jacobs, David R., 4,059,021, Cl. 74-89.200.
Eisend, Ewald: *See—*
Schulz, Horst; Flosser, Josef; Kessler, Reinhard; Schmidt, Karl-Heinz; Eisend, Ewald, Hild, Erich; Loffler, Karl-Heinz; and Steuer, Werner, 4,059,028, Cl. 74-781.00B.
Eisenhardt, Frank B.; and Muehlberger, Stanislaus F., to Mobil Oil Corporation. Phosphate ore flotation. 4,059,509, Cl. 209-166.000.
Eisenhauer, Leigh E., to Eisenhauer Manufacturing Company, The. Lift with electrical grounding means. 4,059,846, Cl. 361-212.000.
Eisenhauer Manufacturing Company, The: *See—*
Eisenhauer, Leigh E., 4,059,846, Cl. 361-212.000.
Eisenmann, Siegfried: *See—*
Harle, Hermann; and Eisenmann, Siegfried, 4,058,938, Cl. 51-287.000.
Eising, John P., to A. O. Smith Corporation. Combustion heating apparatus to improve operation of gas pilot burners. 4,059,386, Cl. 431-43.000.
Eitel, Richard P. Optical instrument and viewing method. 4,059,347, Cl. 350-319.000.
Elbe, Ronald E.; Krolak, Donald W.; and Vernon, Philip L., to United States of America, Army. Rifle adapter assembly. 4,058,922, Cl. 42-16.000.
Elderton, Peter P., to International Telephone and Telegraph Corporation. Net oil computer or the like. 4,059,744, Cl. 235-92.0FL.
Eleanor & Wilson Greatbatch Foundation: *See—*
Greatbatch, Wilson; Mead, Ralph T.; McLean, Robert L.; Rudolph, Frank W.; and Frenz, Norbert W., 4,058,889, Cl. 29-623.500.
Electricity Council, The: *See—*
Miles, Lyndon James; and Jones, Ivor Wynn, 4,059,663, Cl. 264-65.000.
Elex A.G.: *See—*
Frauenfelder, Alfred; and Huppi, Xaver Johann, 4,059,420, Cl. 55-112.000.
Elfert, Klaus; Hinz, Jurgen; and Binsack, Rudolf, to Bayer Aktiengesellschaft. Sulphonated polybenz-1,3-oxazin-2,4-diones. 4,059,580, Cl. 544-73.000.
Elkem-Spigerverket A/S: *See—*
Jahnsen, Knut Waldemar, 4,059,514, Cl. 210-49.000.
Ellingham, Bruce: *See—*
Shaw, Jack; and Ellingham, Bruce, 4,058,965, Cl. 57-58.910.
Elliott, Michael T.: *See—*
Kobayashi, Tsutomu; Archer, John L.; and Elliott, Michael T., 4,059,828, Cl. 365-32.000.
Elliott, Richard Montgomery: *See—*
Duncan, Robert John; and Elliott, Richard Montgomery, 4,059,204, Cl. 222-146.0HE.
Ellwood, Henry, to USM Corporation. Extrusion machine having collar for seal. 4,059,206, Cl. 222-413.000.
Eltra Corporation: *See—*
Bailey, William R., 4,059,334, Cl. 339-258.00F.
Emery Company, Inc.: *See—*
Korff, Wolfram G.; Emery, Vernon V.; Bond, Joseph Kim; and Marcella, Joseph, 4,059,379, Cl. 425-393.000.
Emery, Vernon V.: *See—*
Korff, Wolfram G.; Emery, Vernon V.; Bond, Joseph Kim; and Marcella, Joseph, 4,059,379, Cl. 425-393.000.
Encotech, Inc.: *See—*
Kindl, Fred Henry, 4,058,976, Cl. 60-39.46S.
Engels, Kaspar, to Draiswerke GmbH. Stirring or agitating mills. 4,059,232, Cl. 241-46.170.
Environmental Research Institute of Michigan: *See—*
Turpening, Roger M., 4,059,820, Cl. 340-15.5SW.
Environmental Research & Technology, Inc.: *See—*
Kebabian, Paul L., 4,059,356, Cl. 356-204.000.
Epperson, Ronald D., to Hughes Aircraft Company. Digital wristwatch and stopwatch. 4,058,971, Cl. 58-39.500.
Epstein, Max, to Northwestern University. Passive transponders using acoustic surface wave devices. 4,059,831, Cl. 343-6.80R.
Erasmus, Frans P. G., to Smith Kline & French (Proprietary) Limited. Apparatus and method for oral dosing. 4,059,111, Cl. 128-223.000.
Erdelyi, Frank F. Method and apparatus for the production of machine tools. 4,059,031, Cl. 76-108.00R.
Erdmannsdorff, Max Von: *See—*
McBrayer, Doyle C., 4,058,940, Cl. 52-104.000.
Erdolchemie GmbH: *See—*
Hausweiler, Arnold; Mayer, Adolf; and Bitners, Feliks, 4,059,492, Cl. 203-11.000.
Erickson, John W.: *See—*
Andersen, Poul H.; and Erickson, John W., 4,059,364, Cl 415-89.000.
Eriksson, Sven Willner, to AB Bofors. Logic controlled integrator. 4,059,751, Cl. 364-829.000.
Ernesto Guglielmo Pagnozzi: *See—*
Pagnozzi, Vincenzo, 4,058,906, Cl. 34-16.500.
Ernst, Horst Manfred; Olschewski, Armin; Schurger, Rainer; Walter, Lothar; Brandenstein, Manfred; and Burkl, Erich, to SKF Industrial Trading and Development Company B.V. Self-centering clutch bearing. 4,059,179, Cl. 192-98.000.
ESB Incorporated: *See—*
Bredland, Alf Marlov; Fong, Walter Lee; Messing, Terry Glen; and Paulson, John Walter, 4,059,717, Cl. 429-162.000.
Messing, Terry Glen, 4,059,718, Cl. 429-162.000.
Esche, Delbert Eugene. Apparatus for forming shell molds. 4,059,144, Cl. 164-166.000.
Escher Wyss Limited: *See—*
Lehmann, Rolf, 4,058,877, Cl. 29-116.0AD.
Lehmann, Rolf, 4,058,878, Cl. 29-116.0AD.
Eschweiler Bergwerks-Verein Aktiengesellschaft: *See—*
Goossens, Walter; Hermann, Wolfgang; Keusch, Wilhelm; and Redlich, Rudolf, 4,059,412, Cl. 44-10.00H.
Esibian, Eduard Migranovich; Dudko, Daniil Andreevich; Danchenko, Mikhail Evgenievich; Malkin, Vasily Berkovich; and Kozhema, Valery Andreevich. Plasma arc cutting torch. 4,059,743, Cl. 219-121.00P.
Espinosa, Gerald P., to Rockwell International Corporation. Piezoelectric material. 4,059,537, Cl. 252-62.900.
Esquilat, Georges, to Bombardier Limited. Lightweight trail groomer. 4,058,913, Cl. 37-50.000.
Etat Francais Represente par de Delegue Ministeriel pour l'Armement: *See—*
Teissier, Etienne Leon Norbert, 4,059,360, Cl. 403-2.000.
Etter, Peter; and Faust, Werner, to BBC Brown Boveri & Company Limited. Method for producing rectifier with switches of asymmetric voltage breakdown strengths. 4,059,792, Cl. 363-135.000.

Evans, Dafydd W., to Towmotor Corporation. Mounting assembly for a controllably movable fluid tank. 4,059,281, Cl. 280-5.00A.
Exxon Nuclear Company, Inc.: *See—*
Bupp, Lamar P.; and Sofer, George A., 4,059,484, Cl. 176-78.000.
Exxon Production Research Company: *See—*
Kostelnicek, Richard J., 4,059,818, Cl. 340-15.5DP.
Exxon Research & Engineering Co.: *See—*
Cull, Neville L., 4,059,418, Cl. 55-73.000.
Oswald, Alexis A., 4,059,570, Cl. 260-77.5AP.
Schlosberg, Richard H.; Gorbaty, Martin L.; and Lang, Robert J., 4,059,410, Cl. 44-1.00R.
Smith, William S., Jr., 4,059,651, Cl. 260-848.000.
Ezawa, Sadaaki: *See—*
Obayashi, Nobuharu; Hashizume, Hikaru; Sakashita, Noriji; Kameyama, Seiji; Ezawa, Sadaaki; Kugisawa, Toshio; Washiyama, Yutaka; Kondo, Tatsunori; and Watanahe, Hironori, 4,059,040, Cl. 84-1.030.
F. L. Smidth & Co.: *See—*
Dano, Tage Halfdan, 4,059,396, Cl. 432-78.000.
Touborg, Jorn, 4,059,392, Cl. 432-58.000.
F. W. Bell, Inc.: *See—*
Dierker, Jeffrey A.; and Moore, Prentice G., 4,059,798, Cl. 324-127.000.
Fairchild Camera and Instrument Corporation: *See—*
Phy, William S., 4,058,899, Cl. 33-26.000.
Falcone, Joseph R., to Syracuse Plastics, Inc. Annular metal fitting for rigid plastic part. 4,059,294, Cl. 285-238.000.
Fan, John C. C.; and Zeiger, Herbert J., to Massachusetts Institute of Technology. Method for improving the crystallinity of semiconductor films by laser beam scanning and the products thereof. 4,059,461, Cl. 148-1.500.
Fanelli, Anthony: *See—*
Sze, Morgan C.; Schindler, Harvey D.; and Fanelli, Anthony, 4,059,503, Cl. 208-254.00H.
Faria, Thomas G. Tachometer apparatus 4,059,799, Cl. 324-169.000.
Farley, David L.: *See—*
Nix, George J.; Barrington, Burchus Q.; Farley, David L.; and Hortman, Norman G., 4,059,153, Cl. 166-264.000.
Farris, Ralph J. Self-stabilizing drilling tool. 4,059,164, Cl. 175-73.000.
Fasline Food Equipment Co.: *See—*
Gerson, Samuel L.; and Jones, Frank W., 4,059,037, Cl. 83-407.000.
Faust, Werner: *See—*
Etter, Peter; and Faust, Werner, 4,059,792, Cl. 363-135.000.
Fawcett, John Neville; and Nicol, Stuart William, to National Research Development Corporation. Drive assembly. 4,059,022, Cl. 74-226.000.
Feder, Joseph: *See—*
Tolbert, William R.; and Feder, Joseph, 4,059,485, Cl. 195-1.800.
Feilchenfeld, Michal M., to Westinghouse Electric Corporation. Digital monitor. 4,059,749, Cl. 235-302.000.
Feinwerkbau Helfer & Co. KG: *See—*
Hornung, Ewald, 4,059,034, Cl. 81-57.370.
Feis, Nikolaas, to Nederlandsche Organisatie Voor Toegepast-Natuurwetenschappelijk Onderzoek Ten Behoeve Van Nijverheid. Cylindrical body provided with means for counteracting vibrations resulting from a transversely flowing fluid. 4,059,129, Cl. 138-37.000.
Fellner, Erwin J., to Sierra Engineering Co. Dust protective assembly for breakaway connectors. 4,059,322, Cl. 339-44.00R.
Felten & Guilleaume Kabelwerke Aktiengesellschaft: *See—*
Adler, Horst; Grella, Werner; and Israel, Hans-Peter, 4,059,722, Cl. 174-19.000.
Ferdico, Vincent. Swimming glove. 4,058,863, Cl. 9-308.000.
Ferguson, John A.: *See—*
Rosenberg, Ira E.; Ferguson, John A.; and Loveless, Norman P., 4,059,688, Cl. 424-71.000.
Ferm, Stig; and Torstenfelt, Ragnar, to Stal-Laval Turbin AB. Apparatus for starting turbine plants. 4,058,973, Cl. 60-39.09R.
Fiat Trattori S.p.A.: *See—*
Shelton, Peter Alfred, 4,059,283, Cl. 280-461.00A.
Fichtel & Sachs AG: *See—*
Schulz, Horst; Flosser, Josef; Kessler, Reinhard; Schmidt, Karl-Heinz; Eisend, Ewald; Hild, Erich; Loffler, Karl-Heinz; and Steuer, Werner, 4,059,028, Cl. 74-781.00B.
Fielding, Ivor R.: *See—*
Slama, Francis J.; and Fielding, Ivor R., 4,059,650, Cl. 260-837.00R.
Fielding-Russel, George Samuel; and Gent, Alan N., to Goodyear Tire & Rubber Company, The. Energy absorbing unit. 4,059,254, Cl. 267-140.000.
Fields, Larry: *See—*
Morris, Earl Lavern; and Fields, Larry, 4,059,289, Cl. 285-56.000.
Fink, Lothar: *See—*
Koch, Friedrich; and Fink, Lothar, 4,059,375, Cl. 425-589.000.
Firestone Tire & Rubber Company, The: *See—*
Lawson, David Francis; and Kay, Edward Leo, 4,059,560, Cl. 260-45.70R.
Fischer, Edward T., to Raymond Lee Organization, Inc., The. Curtain and drape holder. 4,058,873, Cl. 24-73.0CH.
Fischer & Porter Co.: *See—*
Gaertner, Max H., 4,059,745, Cl. 364-108.000.
Satori, Toshio, 4,059,015, Cl. 73-209.000.
Fleet, Bernard, to E D T Supplies Limited. Electrochemical detector system. 4,059,406, Cl. 23-230.00R.
Floessel, Carl Dieter, to BBC Brown Boveri & Company Limited. Apparatus for changing the direction of a three-phase pipe-type gas-pressurized electrical cable. 4,059,723, Cl. 174-21.00R.
Floral Innovations, Inc.: *See—*
O'Connell, Donald L., 4,058,929, Cl. 47-41.120.
Flosser, Josef: *See—*
Schulz, Horst; Flosser, Josef; Kessler, Reinhard; Schmidt, Karl-Heinz; Eisend, Ewald; Hild, Erich; Loffler, Karl-Heinz; and Steuer, Werner, 4,059,028, Cl. 74-781.00B.
Flourny, Kenoth H.: *See—*
Braden, William B., Jr.; and Flourny, Kenoth H., 4,059,154, Cl. 166-274.000.
Flumm, Paul: *See—*
Wuthrich, Paul; and Flumm, Paul, 4,059,110, Cl. 128-218.00A.
FMC Corporation: *See—*
Bunnelle, Philip R., 4,059,166, Cl. 175-232.000.
Gibbons, Loren Kenneth, 4,059,433, Cl. 71-90.000.
Konz, Marvin Joseph, 4,059,594, Cl. 260-340.700.
Winkley, Donald Charles, 4,059,678, Cl. 423-273.000.
Folberth, Otto G., to International Business Machines Corporation. Controllable semiconductor element. 4,059,814, Cl. 333-29.000.
Fong, Walter Lee: *See—*
Bredland, Alf Marlov; Fong, Walter Lee; Messing, Terry Glen; and Paulson, John Walter, 4,059,717, Cl. 429-162.000.
Food Systems, Inc.: *See—*
Greenfield, Irving E., Jr.; and Jacobson, Ronald C., 4,059,181, Cl. 194-13.000.
Ford, Bacon & Davis, Incorporated: *See—*
Gambs, Gerard C.; and Morgan, Horace P., 4,059,060, Cl. 110-1.00J.
Ford, Donald T., to Arnold Engineering Company, The. Coating apparatus. 4,059,069, Cl. 118-642.000.
Ford Industries, Inc.: *See—*
Hayden, Robert W.; and Clarridge, Glenn, 4,059,732, Cl. 179-18.00B.
Ford Motor Company: *See—*
Allison, William D., 4,059,361, Cl. 403-77.000.
Coughlan, Standly T.; Dewar, John H.; and Zampa, Henry A., 4,059,564, Cl. 264-46.400.
Forgione, Joseph. Window security apparatus. 4,059,413, Cl. 49-56.000.
Forrest, Charles P. Agility running obstacle device. 4,059,268, Cl. 273-55.00R.
Foster, Graham Terence, to Linread Limited. Machines for handling and assembling fasteners and washers. 4,058,866, Cl. 10-155.00A.
Foster, J. Walter; and Dunkerley, Charles L., to Grumman Aerospace Corporation. Method and apparatus for quantizing radiation beams by optical diffraction. 4,059,359, Cl. 356-222.000.
Foster, John A., to J. L. Clark Manufacturing Co. Container closure with foil seal. 4,059,201, Cl. 220-258.000.
Foster, Terence; and Dawson, Thomas Stephen, to American Cyanamid Company. Synthesis of dimethylaminoethyl methylmethacrylate. 4,059,617, Cl. 560-222.000.
Foulletier, Louis; Pechmeze, Jacques Pierre Edmond; and Sureau, Robert Frederic Michel, to Produits Chimiques Ugine Kuhlmann. Trifluoroethylanilines. 4,059,626, Cl. 260-578.000.
Foulletier, Louis; and Lalu, Jean-Pierre, to Produits Chimiques Ugine Kuhlmann. Perfluoroaliphatic substituted amine mixtures and the method for preparing the same. 4,059,629, Cl. 260-583.0GG.
Foundation: The Research Institute of Electric and Magnetic Alloys, The: *See—*
Masumoto, Hakaru; Murakami, Yuetsu; and Nakamura, Naoji, 4,059,462, Cl. 148-31.550.
Fowler, Leslie L. Method of converting oil and waste containing sludge to dry waste. 4,059,666, Cl. 264-129.000.
Fowler, William J.; Heberle, Richard A.; Tonkyn, Richard G.; and Vorchheimer, Norman, to Betz Laboratories, Inc. Process for clarification of oil-containing waste. 4,059,515, Cl. 210-51.000.
Franek, Jozef Tadeusz; and Doncaster, Peter Henry, to Metal Box Limited. Containers. 4,058,998, Cl. 72-84.000.
Frauenfelder, Alfred; and Huppi, Xaver Johann, to Elex A.G. Bearings and rapping shaft in electrostatic precipitator. 4,059,420, Cl. 55-112.000.
Frenz, Norbert W.: *See—*
Greatbatch, Wilson; Mead, Ralph T.; McLean, Robert L.; Rudolph, Frank W.; and Frenz, Norbert W., 4,058,889, Cl. 29-623.500.
Frey, Otto: *See—*
Doerre, Erhard; Semlitsch, Manfred; and Frey, Otto, 4,058,856, Cl. 3-1.910.
Fritsch, Robert E., to Micro-Copy, Inc. Micro-composing reduction printer. 4,059,355, Cl. 355-43.000.
Fritsche, G. Ray: *See—*
Crissman, James H.; Fritsche, G. Ray; Hamel, Frederick B.; and Hilty, Lloyd W., 4,059,498, Cl. 204-188.000.
Frodermann, Gerd: *See—*
Wurster, Winfried; Kuhne, Jochen; and Frodermann, Gerd, 4,059,019, Cl. 73-421.50A.
Froelich, August: *See—*
Hitzler, Otto; Pennewiss, Horst; Froelich, August; Markert, Gerhard; and Wunderlich, Winfried, 4,059,574, Cl. 260-192.000.
Fuga, Nobuhiko: *See—*
Takematsu, Tetsuo; Konnai, Makoto; Takeda, Makoto; Fuga, Nobuhiko; Ikeda, Kaoru; and Shugaya, Kiyoshi, 4,059,431, Cl. 71-87.000.
Takematsu, Tetsuo; Konnai, Makoto; Takeda, Makoto; Fuga, Nobuhiko; Ikeda, Kaoru; and Shugaya, Kiyoshi, 4,059,432, Cl. 71-87.000.

Fuji Photo Film Co., Ltd.: *See—*
Aonuma, Masashi; Kitamoto, Tatsuji; and Akashi, Goro, 4,059,463, Cl. 148-105.000.
Sato, Masamichi, 4,059,445, Cl. 96-35.000.
Sugiyama, Masatoshi; Kato, Eiichi; and Nakamura, Yasuharu, 4,059,448, Cl. 96-84.00A.
Fujikura, Yoshiaki: *See—*
Inamoto, Yoshiaki; Fujikura, Yoshiaki; Tsuchihashi, Kiyoshi; and Kashihara, Eiji, 4,059,643, Cl. 260-666.0PY.
Fujimi Kenmazai Kogyo Kabushiki Kaisha: *See—*
Yamaguchi, Yoshinobu; Kitano, Nanahiko; Watanabe, Yoshihisa; and Imanari, Makoto, 4,059,544, Cl. 252-471.000.
Fujimoto, Sakae, to Ricoh Co., Ltd. Sheet delivery apparatus. 4,059,262, Cl. 271-35.000.
Fujisoku Electric Co., Ltd.: *See—*
Mizutani, Masumi; Hata, Hiromichi; and Shimazaki, Masasuke, 4,059,006, Cl. 73-17.00A.
Fukuda, Tokiharu: *See—*
Morita, Akiyoshi; Hayasaka, Tamio; Shimizu, Kunio; and Fukuda, Tokiharu, 4,059,143, Cl. 164-113.000.
Fund, Harry, to Modular Products Corporations (Labelmaster Division). Vehicle placarding apparatus. 4,058,918, Cl. 40-129.00C.
Funk, David C., to University of Iowa Research Foundation. Apparatus for teaching the structures and projection of arterial systems. 4,058,910, Cl. 35-17.000.
Furer, Richard; Halter, Paul; and Wettstein, Klaus, to Ciba-Geigy Corporation. Device and process for the control of ear ticks. 4,059,074, Cl. 119-156.000.
Furman, Motel Khaimovich: *See—*
Jumashev, Georgy Stepanovich; and Furman, Motel Khaimovich, 4,059,115, Cl. 128-317.000.
Furness, Bernard J.; Cousins, John R.; and Tuft, Dennis, to British Steel Corporation. Method and apparatus for monitoring pass alignment in rolling mills. 4,059,794, Cl. 324-208.000.
Furstlich Hohenzollernsche Huttenver Waltung Laucherthal: *See—*
Harle, Hermann; and Eisenmann, Siegfried, 4,058,938, Cl. 51-287.000.
Furuno, Fumiya: *See—*
Uchino, Hisanori; Takada, Masamichi; Shimizu, Takahiro; Shibayama, Masamitsu; and Furuno, Fumiya, 4,059,196, Cl. 214-138.00R.
G & H Technology, Inc.: *See—*
Phillips, John J.; and Stephenson, Roger, 4,059,332, Cl. 339-113.00R.
Gabriele, Leonard A., to Lear Siegler, Inc. Gear rolling equipment. 4,058,999, Cl. 72-102.000.
Gaertner, Max H., to Fischer & Porter Co. Override process control system. 4,059,745, Cl. 364-108.000.
Gair, Robert: *See—*
Gerbault, Marcel; and Gair, Robert, 4,058,987, Cl. 61-86.000.
Galer, Herbert W., to United States Steel Corporation. Injection mold for molding internally threaded plastic article. 4,059,249, Cl. 249-58.000.
Gamble, Bruce. Newspaper recycling apparatus and method. 4,059,222, Cl. 229-54.00R.
Gambs, Gerard C.; and Morgan, Horace P., to Ford, Bacon & Davis, Incorporated. Method and apparatus for coal treatment. 4,059,060, Cl. 110-1.00J.
Gannaway, Edwin L., to Tecumseh Products Company. Thermal overload protective system. 4,059,366, Cl. 417-32.000.
Garbalizer Corporation of America: *See—*
Brewer, John C., 4,059,236, Cl. 241-243.000.
Garrett Corporation, The: *See—*
Mackay, Robin, 4,059,770, Cl. 290-4.00C.
Gaudette, Roger Robert; Ohlson, John Leonard; and Scanlon, Patricia Marie, to W. R. Grace & Co. Hexahydropyrimidine-1,3-diacetonitriles and processes for preparing the same. 4,059,548, Cl. 260-251.00R.
Gavin, John Henry; and Spickler, John Martin, to Du Pont de Nemours, E. I., and Company. Application machine for mounting circuit board pins with an improved control system. 4,058,881, Cl. 29-715.000.
Gay, Michel J. L., to Office National d'Etudes et de Recherches Aerospatiales. A.C. capacitance measuring bridge. 4,059,797, Cl. 324-60.00C.
Gebr. Lodige Maschinenbau-Gesellschaft mbH, Firma: *See—*
Lipp, Eberhard; and Jurgens, Hans-Hermann, 4,058,907, Cl. 34-61.000.
Geiser, Nikolaus: *See—*
Kolling, Helmut; Rappen, Friedrich; and Geiser, Nikolaus, 4,059,720, Cl. 526-74.000.
Geller, Thomas L.; and Rabinowitz, Harold, to Dart Industries Inc. Method of making fold-out zipper bag. 4,059,464, Cl. 156-66.000.
General Cable Corporation: *See—*
Settlemyer, Bernard W.; Knappenberger, Clifford W.; and Bader, Alfred, 4,059,017, Cl. 73-395.000.
General Electric Company: *See—*
Banker, Robert O.; and Holshouser, Howard E., 4,059,838, Cl. 358-27.000.
Cooper, Glenn Dale, 4,059,568, Cl. 260-47.0ET.
Diminnie, Edward A.; and Dellario, Patrick J., 4,059,325, Cl. 339-94.00A.
Gilbert, Kendall E.; Johnson, Daniel; and Macier, Robert Raymond, 4,058,975, Cl. 60-39.28T.
Horvay, Julius B.; and Alvarez, Robert J., 4,058,989, Cl. 62-256.000.
Ouelette, Ronald J.; Canney, Robert S.; and Stetson, Ralph B., 4,059,326, Cl. 339-113.00R.
Tart, David K.; and Osteen, Mitchell M., 4,059,753, Cl. 362-267.000.
General Foods Corporation: *See—*
Pischke, LaMonte D.; and Shoaf, Myron D., 4,059,706, Cl. 426-548.000.
Gent, Alan N.: *See—*
Fielding-Russel, George Samuel; and Gent, Alan N., 4,059,254, Cl. 267-140.000.
Georg Fischer Aktiengesellschaft: *See—*
Guldener, Erich; and Trosch, Paul, 4,059,250, Cl. 251-304.000.
Geo. W. Bollman & Co., Inc.: *See—*
Heisey, Willis A., 4,059,516, Cl. 210-53.000.
Gerald Conway & Co., Inc.: *See—*
Conway, Gerald A., 4,059,190, Cl. 211-57.100.
Gerbault, Marcel; and Gair, Robert, to Sea Tank Co. S.A.; and Oceanic Contractors Inc. Method and device for connecting sub-marine pipelines to a weight platform. 4,058,987, Cl. 61-86.000.
Gergaud, Fernand, to International Business Machines Corporation. Switch structure having matrix arranged elongated undulated contact. 4,059,737, Cl. 200-5.00A.
Germain, Fernand. Energy storage and conversion technique and apparatus. 4,058,979, Cl. 60-327.000.
Germino, Felix Joseph; Kite, Francis E.; and Christensen, Edwin H., to CPC International Inc. Oil-in-water emulsion containing starch esters. 4,059,458, Cl. 106-213.000.
Gernhardt, Wolfram; Meier-Maletz, Gerhard; and Zeutschel, Heinz, to Hoechst Aktiengesellschaft. Combined mounting and projection apparatus for aperture cards. 4,059,475, Cl. 156-379.000.
Gerson, Samuel L.; and Jones, Frank W., to Fasline Food Equipment Co. Slicing device. 4,059,037, Cl. 83-407.000.
Gesellschaft fur Kernforschung m.b.H.: *See—*
Schmieder, Helmut; and Stieglitz, Ludwig, 4,059,671, Cl. 423-10.000.
Gibbons, Loren Kenneth, to FMC Corporation. 3-Alkoxyisothiazole derivatives as herbicides. 4,059,433, Cl. 71-90.000.
Gibson, Myron R., to Caterpillar Tractor Co. Rotary engine having low thermal conductivity rotor. 4,059,370, Cl. 418-56.000.
Gifford, Bruce M.: *See—*
Owen, Alfred B.; and Gifford, Bruce M., 4,059,215, Cl. 228-173.00C.
Gilbert, Kendall E.; Johnson, Daniel; and Macier, Robert Raymond, to General Electric Company. Gas turbine temperature sensor validation apparatus and method. 4,058,975, Cl. 60-39.28T.
Gipson, Robert Malone, to Texaco Development Corporation. Boride catalyst for epoxidizing olefinic compounds. 4,059,599, Cl. 260-348.290.
Girismen, Fahir. Electrical power receptacle having built-in switching contacts. 4,059,739, Cl. 200-51.090.
Girismen, Fahir. Overload and ground fault protective device. 4,059,843, Cl. 361-93.000.
Giss, Alador J.: *See—*
Waack, Carl L.; and Giss, Alador J., 4,059,025, Cl. 74-482.000.
Gladyshev, Jury Ivanovich: *See—*
Mikhalev, Nikolai Alexandrovich; Shtarkman, Boris Petrovich; and Gladyshev, Jury Ivanovich, 4,059,374, Cl. 425-207.000.
Glage nee Moller, Gisela: *See—*
Glage, Ulrich, 4,059,100, Cl. 128-36.000.
Glage, Ulrich, to Glage nee Moller, Gisela. Massaging apparatus. 4,059,100, Cl. 128-36.000.
Glaser, Ralph P. Abdominal and hernia support. 4,059,103, Cl. 128-96.000.
Glaxo Laboratories Limited: *See—*
Robinson, Colin; and Walker, Derek, 4,059,573, Cl. 260-112.50R.
Gleason Works, The: *See—*
Stritzel, Gene A., 4,059,026, Cl. 74-711.000.
Glory Kogyo Kabushiki Kaisha: *See—*
Asami, Kazuto, 4,058,954, Cl. 53-54.000.
Kinoshita, Yoshio, 4,059,122, Cl. 133-3.00D.
Nakai, Shiro; and Nakamura, Minoru, 4,058,955, Cl. 53-212.000.
Gloucester Engineering Co., Inc.: *See—*
Schott, Charles M., Jr., 4,059,381, Cl. 425-406.000.
Goetz, Richard W., to National Distillers and Chemical Corporation. Transalkylation of tertiary amines and alcohols, to produce ethylene glycol. 4,059,640, Cl. 260-635.00R.
Goldstein, Roger F.: *See—*
Strahorn, David F.; and Goldstein, Roger F., 4,059,517, Cl. 210-73.00R.
Golombeck, Paul; and Hertl, Friedrich, to Deutsche Gold- und Silber-Schneideanstalt vormals Roessler. Water free light silica and silicate fillers for cross-linking elastomers. 4,059,558, Cl. 260-42.330.
Goodwin, Robert J., to C. H. Heist Corporation. Lance tip construction. 4,058,870, Cl. 15-104.10R.
Goodyear Tire & Rubber Company, The: *See—*
Fielding-Russel, George Samuel; and Gent, Alan N., 4,059,254, Cl. 267-140.000.
Goossens, Walter; Hermann, Wolfgang; Keusch, Wilhelm; and Redlich, Rudolf, to Eschweiler Bergwerks-Verein Aktiengesellschaft. Method for producing fuel briquettes. 4,059,412, Cl. 44-10.00H.
Gorbaty, Martin L.: *See—*
Schlosberg, Richard H.; Gorbaty, Martin L.; and Lang, Robert J., 4,059,410, Cl. 44-1.00R.
Gosling, Alexander Bennett; Plummer, Dexter Robert; and Stanwell-Smith, Colin Howard, to Strathearn Audio Limited. Mechanical gearing. 4,059,030, Cl. 74-798.000.

Goto, Kuniaki; Asai, Harumi; and Natsuume, Tadao, to Nippon Zeon Co. Ltd. Novel phenol antioxidants 4,059,563, Cl. 260-45.95H.
Grahl, Darwin R.; and Haramoto, Cary, to Parker-Hannifin Corporation. Tube coupling. 4,059,297, Cl. 285-340.000.
Gramlich, Fritz, deceased: *See—*
Spitzer, Artur; Biedert, Hartmut; and Gramlich, Fritz, deceased. 4,059,311, Cl. 302-53.000.
Gramlich, Ute, legal representative: *See—*
Spitzer, Artur; Biedert, Hartmut; and Gramlich, Fritz, deceased, 4,059,311, Cl. 302-53.000.
Granholm, Sven, to Linden-Alimak AB. Ground stabilizing agent feeding device. 4,058,986, Cl. 61-63.000.
Grantham, Frederick W. Laundry folder. 4,059,257, Cl. 270-66.000.
Grantham, Frederick W. Double fold automatic folding apparatus. 4,059,258, Cl. 270-67.000.
Grassl, Reinhold. Mechanical motion sensor. 4,059,066, Cl. 116-115.000.
Grau, Werner: *See—*
Kopke, Helmut; Ohlinger, Manfred; Grau, Werner; Schoenafinger, Eduard; and Schneehage, Hans Henning, 4,059,716, Cl. 428-403.000.
Greatbatch, Wilson; Mead, Ralph T.; McLean, Robert L.; Rudolph, Frank W.; and Frenz, Norbert W., to Eleanor & Wilson Greatbatch Foundation. Method of making a lithium-bromine cell. 4,058,889, Cl. 29-623.500.
Greaves, Cecil. Lock de-icer. 4,058,995, Cl. 70-431.000.
Green, Edmund T. Tire-chain device. 4,059,137, Cl. 152-232.000.
Green, John Henry; and Landry, Joseph Elide, to Bell Telephone Laboratories, Incorporated. Signaling storage in digital channel banks. 4,059,731, Cl. 179-15.0BY.
Green, Robin John; Johnson, Richard Shaw; and Potter, John Kenneth, to Lever Brothers Company. Method for preparing granulated detergent formulations. 4,059,538, Cl. 252-95.000.
Greene, Edward P. Burst/slip correction decoder and method. 4,059,825, Cl. 340-146.10D.
Greenfield, Irving E., Jr.; and Jacobson, Ronald C., to Food Systems, Inc. Meal-service powdered foods dispenser. 4,059,181, Cl. 194-13.000.
Greer, Tom R., to International Enterprises, Inc. Junk basket and method of removing foreign material from a well 4,059,155, Cl. 166-301 000.
Grefco, Inc.: *See—*
Neu, Ernest L., 4,059,231, Cl. 241-5.000.
Grella, Werner: *See—*
Adler, Horst; Grella, Werner; and Israel, Hans-Peter, 4,059,722, Cl. 174-19.000.
Griebsch, Eugen: *See—*
Brinkmann, Bernd; and Griebsch, Eugen, 4,059,549, Cl. 260-22.0TN.
Grigat, Ernst: *See—*
Sundermann, Rudolf; Rottloff, Gunther; and Grigat, Ernst, 4,059,567, Cl. 260-47.00R.
Grisel, Byron Lynn, to Grizzley Ski Lock Corporation. Carrier and lock for ski equipment. 4,059,209, Cl. 224-45.00S.
Griswold, James L. Trench shoring assembly with lifting attachment. 4,058,983, Cl. 61-41.00A.
Grizzley Ski Lock Corporation: *See—*
Grisel, Byron Lynn, 4,059,209, Cl. 224-45.00S.
Gross, Albert; Schaefer, Roland; and Reiss, Siegfried, to Kulzer & Co. GmbH. Bone cement compositions containing gentamycin. 4,059,684, Cl. 424-4.000.
Grosshandler, Sandor, to Dow Chemical Company, The. Cartridge filter. 4,059,528, Cl. 210-282.000.
Grossman, Harold, to Montclair Research Corporation. Cigarette and filter. 4,059,119, Cl. 131-9.000.
Grossmann, Dietrich: *See—*
Bockelmann, Wilfried; Veigel, Martin W.; Grossmann, Dietrich; Grozinger, Hans; and Schwander, Dieter, 4,058,978, Cl. 60-277.000.
Grozinger, Hans: *See—*
Bockelmann, Wilfried; Veigel, Martin W.; Grossmann, Dietrich; Grozinger, Hans; and Schwander, Dieter, 4,058,978, Cl. 60-277.000.
Grudzien, Christopher Peter: *See—*
Heske, William Albert; and Grudzien, Christopher Peter, 4,059,128, Cl. 137-487.500.
Grumman Aerospace Corporation: *See—*
Foster, J. Walter; and Dunkerley, Charles L., 4,059,359, Cl. 356-222.000.
Knowles, Gregory W.; Sangesland, Odd E.; Vroom, Henry J.; and Madey, Robert W., 4,059,093, Cl. 126-271.000.
Levine, Howard S.; and Winter, Robert, 4,059,346, Cl. 350-295.000.
Grundmann, Edgard; Heitland, Herbert; and Kroll, Rudolf, to Volkswagenwerk Aktiengesellschaft. Device for utilizing the heat energy of solar radiation. 4,059,095, Cl. 126-271.000.
Gruniger, Emil, to IDC Chemie AG. Heating system with a thermal pump. 4,059,146, Cl. 165-45.000.
Grushko, July Sergeevich: *See—*
Alexandrov, Anatoly Julianovich; Grushko, July Sergeevich; Makarov, Evgeny Fredovich; Mishin, Konstantin Yakovlevich; and Baltrunas, Daljus Antanas Jono, 4,059,769, Cl. 250-493.000.
GTE Sylvania Incorporated: *See—*
Armstrong, Donald E.; Sindlinger, Ronald E.; Cohen, Bernard; Tozier, John E.; and Audesse, Emery G., 4,059,389, Cl. 431-95.00R.
Shaffer, John W., [illegible]059,388, Cl. 431-95.00R.
Guillermin, Rene; J[illegible], Jean; and Sangalli, Sylvio, to Rhone-Poulenc-Textile. Apparatus for treating filamentary products. 4,059,068, Cl. 118-420.000.
Guitoneau, Hans Edward: *See—*
Acda, Petrus Marinus; and Guitoneau, Hans Edward, 4,059,291, Cl. 285-197.000.
Guitton, Jean-Claude: *See—*
Cellier, Michel Jean Jacques; Guitton, Jean-Claude; Scholle, Jean-Claude; and Viannay, Stephane Georges Jean-Marie, 4,059,399, Cl. 432-121.000.
Guldener, Erich; and Trosch, Paul, to Georg Fischer Aktiengesellschaft. Stop valve with a spherical stopcock. 4,059,250, Cl. 251-304.000.
Gulf Oil Corporation: *See—*
Singerman, Gary M., 4,059,699, Cl. 424-211.000.
Gulf Research & Development Company: *See—*
Crissman, James H.; Fritsche, G. Ray; Hamel, Frederick B.; and Hilty, Lloyd W., 4,059,498, Cl. 204-188.000.
Gulitz, Louis; Kwap, Theodore William; Lisle, Walter Irving; O'Kane, Daniel Francis; and Poponiak, Michael Robert, to International Business Machines Corporation. Combustion monitoring and control system. 4,059,385, Cl. 431-12.000.
Gustafsson, Lars Ake Olof; and Ulin, Carl-Otto, to U.S. Philips Corporation. Mosaic printer. 4,059,182, Cl. 197-1.00R.
Gutman, Arnold D.: *See—*
Baker, Don R.; and Gutman, Arnold D., 4,059,625, Cl. 260-566.0AE.
Habert, Roger J., to Ducellier & Cie. Method and apparatus for obtaining an automatic ignition advance in automobile internal combustion engine. 4,059,083, Cl. 123-146.50A.
Habrant, Yvon. Wallcovering. 4,058,946, Cl. 52-273.000.
Hachikubo, Kazumasa; and Suzuki, Shuzo, to Bio Research Center, Co., Ltd. Method of producing long-chain alpha-hydroxyalkanoic acids. 4,059,488, Cl. 195-28.00R.
Haemonetics Corporation: *See—*
Latham, Allen, Jr., 4,059,108, Cl. 128-214.00R.
Haga, Kyosuke, to Toyoda-Koki Kabushiki-Kaisha. Pulse distribution apparatus for linear interpolation in a numerical control system. 4,059,746, Cl. 364-107.000.
Hagen, Winston H. Monitor for biological volume changes. 4,059,169, Cl. 128-2.05V.
Haggard, Richard A.: *See—*
Lewis, Sheldon N.; and Haggard, Richard A., 4,059,616, Cl. 526-66.000.
Hague, Richard E.: *See—*
Berryman, Angus L.; Hooper, Gene R.; and Hague, Richard E., 4,059,056, Cl. 105-368.00R.
Haigh, John M. Transfer dyeing of plastic surfaces which may be combined with lamination or molding procedures. 4,059,471, Cl. 156-244.000.
Hajos, Zoltan George, to Hoffmann-La Roche, Inc. Substituted indanones. 4,059,612, Cl. 260-456.00R.
Hake, Leon M., to Wittwer Construction Company. Backhoe-mounted shear. 4,058,915, Cl. 37-117.500.
Hakka, Leo Ernest: *See—*
Morro, William Charles; Hakka, Leo Ernest; Brophy, James Mackay; Hebrard, Michel Jacques Roger; and Courtes, Jean Claude, 4,059,534, Cl. 252-32.70E.
Hall & Hall Limited: *See—*
Eastwood, Brian Geoffrey, 4,059,280, Cl. 277-188.00A.
Hall, Roy W. Door hinge template. 4,058,902, Cl. 33-189.000.
Halliburton Company: *See—*
Nix, George J.; Barrington, Burchus Q.; Farley, David L.; and Hortman, Norman G., 4,059,153, Cl. 166-264.000.
Watson, Jimmie L.; and Carney, Leroy L., 4,059,533, Cl. 252-8.50A.
Halter, Paul: *See—*
Furer, Richard; Halter, Paul; and Wettstein, Klaus, 4,059,074, Cl. 119-156.000.
Hamada, Osamu, to Sony Corporation. Pulse width modulated amplifier. 4,059,807, Cl. 330-10.000.
Hamagishi, Yasutaro: *See—*
Nishino, Toyokazu; Hamagishi, Yasutaro; Oki, Toshikazu; and Murao, Sawao, 4,059,487, Cl. 195-28.00N.
Hamasaki, Nobuhiro: *See—*
Oita, Masahiro; Hirohata, Hyogo; and Hamasaki, Nobuhiro, 4,059,451, Cl. 106-1.260.
Hamel, Frederick B.: *See—*
Crissman, James H.; Fritsche, G. Ray; Hamel, Frederick B.; and Hilty, Lloyd W., 4,059,498, Cl. 204-188.000.
Hamisch, Paul H., Jr., to Monarch Marking Systems, Inc. Label printing and applying apparatus. 4,059,476, Cl. 156-384.000.
Hamlin, Thomas J.: *See—*
Stange, Klaus K.; Smith, Richard E.; Hamlin, Thomas J.; and Cassano, James R., 4,059,260, Cl. 271-3.000.
Hammann, Ingeborg: *See—*
Maurer, Fritz; Riebel, Hans-Jochem; Hammann, Ingeborg; Behrenz, Wolfgang; and Homeyer, Bernhard, 4,059,696, Cl. 424-200.000.
Handa, Susumu; Tanaka, Yoshiaki; Nishibata, Atsushi; Ueda, Sadashi, Inamoto, Yoshiaki; Saito, Masahiro; Tanimoto, Fumio; and Kitano, Hisao, to Kao Soap Co., Ltd. Process for preparing isocyanic acid derivatives. 4,059,610, Cl. 544-193.000.
Hann, Paul D.: *See—*
Chapman, Charles C.; and Hann, Paul D., 4,059,649, Cl. 260-683.480.

Hannebaum, Manfred: *See—*
Eck, Herbert; Weinhold, Gunter; and Hannebaum, Manfred, 4,059,661, Cl. 264-54.000.
Hansel, William B., to Suntech, Inc. Interlock system for a fuel dispensing nozzle. 4,059,135, Cl. 141-207.000.
Hansen, Elo Harald: *See—*
Ibsen Nielsen, Hans Jorgen; and Hansen, Elo Harald, 4,059,499, Cl. 204-195.00M.
Hanslik, Wilhelm, to Krauss-Maffei Austria Gesellschaft m.b.H. Scraper flight conveyor for conveying preheated thermoplastic bulk material to a screw extruder. 4,059,401, Cl. 432-132.000.
Harada, Osamu: *See—*
Kosaka, Katuaki; Wagatsuma, Fumio; Shimomoto, Mithuo; Harada, Osamu; and Ueno, Zene, 4,059,415, Cl. 48-63.000.
Haramoto, Cary: *See—*
Grahl, Darwin R.; and Haramoto, Cary, 4,059,297, Cl. 285-340.000.
Hardegger, Bruno: *See—*
Lendi, Georges; Hardegger, Bruno; and De Trey, Rene, 4,058,901, Cl. 33-178.00R.
Harder, Arthur J., Jr., to Coach and Car Equipment Corporation. Seat with removable seat cushion. 4,059,306, Cl. 297-452.000.
Harle, Hermann; and Eisenmann, Siegfried, to Furstlich Hohenzollernsche Huttenver Waltung Laucherthal. Method and apparatus for grinding the tooth flanks of internally-toothed gear wheels. 4,058,938, Cl. 51-287.000.
Harney, Robert C.; and Schipper, John F., to United States of America, Energy Research and Development Administration. Passive and active pulse stacking scheme for pulse shaping. 4,059,759, Cl. 250-206.000.
Harrigan, Roy M. Weight for spin casting. 4,058,926, Cl. 43-43.120.
Harris, John Bernard: *See—*
Babuka, Robert; and Harris, John Bernard, 4,059,323, Cl. 339-75.00M.
Harris, Nick S., to Preventative Systems, Inc. Process for removing endotoxin from biological fluids. 4,059,512, Cl. 210-24.000.
Harrison, Michael, to Colgate Palmolive Company. Insolubilized salts of 1,6-di-p-(chlorophenyl biguanido) hexane. 4,059,624, Cl. 260-565.000.
Harrison, Robert J., to Texaco Inc. Self-operating chemical feeder for an oil well. 4,059.149, Cl. 166-64.000.
Hart, Alan M., to Dow Chemical Company, The. Process for producing refractory material. 4,059,391, Cl. 432-13.000.
Hartelius, Clifford C., Jr., to Sharp Kabushiki Kaisha. Integrated optical waveguide coupler. 4,059,338, Cl. 350-96.00C.
Hartley, John Edward, to T.I. (Group Services) Limited. Shearing hollow stock. 4,059,036, Cl. 83-188.000.
Hartley, Kenneth H. Skein dispenser. 4,059,243, Cl. 242-129.600.
Hasegawa, Akira: *See—*
Tanigami, Takahiko; Hasegawa, Akira; and Horikoshi, Shigeru, 4,059,087, Cl. 123-196.00S.
Hashizume, Hikaru: *See—*
Obayashi, Nobuharu; Hashizume, Hikaru; Sakashita, Noriji; Kameyama, Seiji; Ezawa, Sadaaki; Kugisawa, Toshio; Washiyama, Yutaka; Kondo, Tatsunori; and Watanabe, Hironori, 4,059,040, Cl. 84-1.030.
Hassan, Edward, to Raymond Lee Organization, Inc., The, a part interest. Snap-on screw. 4,059,041, Ci. 85-1.00S.
Hassell, David Allen: *See—*
Zimmer, Elvis Simon; and Hassell, David Allen, 4,059,398, Cl. 432-121.000.
Hata, Hiromichi: *See—*
Mizutani, Masumi; Hata, Hiromichi; and Shimazaki, Masasuke, 4,059,006, Cl. 73-17.00A.
Hatori, Kunitake, to Sankyo Electric Company Limited. Vending machine. 4,059,319, Cl. 312-319.000.
Hauser, Raimund: *See—*
Schild, Josef, 4,059,350, Cl. 352-141.000.
Hausner, Franz, to Cluett, Peabody & Co., Inc. Method for knitting and pre-shrinking knit fabrics in accordance with pre-determined comfort levels. 4,058,874, Cl. 28-153.000.
Hausweiler, Arnold; Mayer, Adolf; and Bitners, Feliks, to Erdolchemie GmbH; and Bayer Aktiengesellschaft. Process for the purification of waste from acrylonitrile production. 4,059,492, Cl. 203-11.000.
Hay, Wayne W., to Airco, Inc. Calibrated anesthetic vaporizer. 4,059,657, Cl. 261-104.000.
Hayasaka, Tamio: *See—*
Morita, Akiyoshi; Hayasaka, Tamio; Shimizu, Kunio; and Fukuda, Tokiharu, 4,059,143, Cl. 164-113.000.
Hayashida, Takemi: *See—*
Yamazaki, Tatsuo; Hayashida, Takemi; and Sakuma, Masatoshi, 4,059,046, Cl. 99-355.000.
Hayasi, Norihisa: *See—*
Tohyama, Masao; Ichigo, Minoru; Suzuki, Takeshi; Nakasu, Makoto; Ando, Akinobu; Yoshida, Akitoshi; Kosaka, Masaharu; Hayasi, Norihisa; and Inoue, Shigeki, 4,059,553, Cl. 260-29.60S.
Hayden, Robert W.; and Clarridge, Glenn, to Ford Industries, Inc. Centralized telephone answering apparatus with remote accessing. 4,059,732, Cl. 179-18.00B.
Hazenbosch, Edwin Hendrik; Van Rossen, Antoine Roberta; Beels, Roland Francois; and Aelterman, Marcel Frans, to AGFA-GEVAERT N.V. Processing of photographic silver halide material. 4,059,446, Cl. 96-50.00R.
Heberle, Richard A.: *See—*
Fowler, William J.; Heberle, Richard A.; Tonkyn, Richard G.; and Vorchheimer, Norman, 4,059,515, Cl. 210-51.000.
Hebrard, Michel Jacques Roger: *See—*
Morro, William Charles; Hakka, Leo Ernest; Brophy, James Mackay; Hebrard, Michel Jacques Roger; and Courtes, Jean Claude, 4,059,534, Cl. 252-32.70E.
Heckman, Russell William; and Nickey, George Allen, to Owens-Illinois, Inc. Oven apparatus for shrinking thermoplastic sleeve wraps on glass containers. 4,059,400, Cl. 432-124.000.
Heideman, Robert J.: *See—*
Dressell, Richard G., Jr.; and Heideman, Robert J., 4,059,175, Cl. 188-285.000.
Heighway, Edward A.; Hohban, Kenneth J.; and Schriber, Stanley O., to Canada, Atomic Energy of, Limited. Electron beam current, profile and position monitor. 4,059,763, Cl. 250-336.000.
Heim Universal Corporation, The: *See—*
McCloskey, Albert R., 4,059,317, Cl. 308-72.000.
Heinz Mack: *See—*
Mack, Heinz; and Singer, Gunter, 4,058,895, Cl. 32-32.000.
Heisey, Willis A., to Geo. W. Bollman & Co., Inc. Process for treating wool scouring wastes. 4,059,516, Cl. 210-53.000.
Heiss, John Herbert, Jr.; and Schoen, Joel Mark, to Bell Telephone Laboratories, Incorporated. Method for selective encapsulation. 4,059,708, Cl. 427-96.000.
Heitland, Herbert: *See—*
Grundmann, Edgard; Heitland, Herbert; and Kroll, Rudolf, 4,059,095, Cl. 126-271.000.
Hellenic Plastics and Rubber Industry: *See—*
Panourgias, Constantin George, 4,059,296, Cl. 285-312.000.
Helm, Homer E., to Cork, Gordon H. Tube coupling. 4,059,295, Cl. 285-305.000.
Hem, Stanley L.; and White, Joe L., to Purdue Research Foundation. Stable dried aluminum hydroxide gel. 4,059,681, Cl. 423-419.00P.
Henc, Edward V. Vacuum feed. 4,059,263, Cl. 271-171.000.
Hendrix, Warren P.: *See—*
Ball, Dean M.; and Hendrix, Warren P., 4,059,009, Cl. 73-61.10C.
Hennessey, Walter F., Jr.: *See—*
Snyder, Gene L.; and Hennessey, Walter F., Jr., 4,059,324, Cl. 339-89.00M.
Henry, J. R.; and Teague, Willis E., to Armour and Company. Sheep and lamb mechanical toe-breaker. 4,058,872, Cl. 17-1.00R.
Henson, Ralph B., to Caterpillar Tractor Co. Lubricating system and method for turbocharged engines. 4,058,981, Cl. 60-605.000.
Hercules Incorporated: *See—*
Mollere, John C., 4,059,819, Cl. 340-8.0LF.
Herliczek, Siegfried H.: *See—*
Mattimoe, Paul T.; Motter, Theodore J.; Hofmann, John J.; and Herliczek, Siegfried H., 4,059,469, Cl. 156-108.000.
Hermann, Wolfgang: *See—*
Goossens, Walter; Hermann, Wolfgang; Keusch, Wilhelm; and Redlich, Rudolf, 4,059,412, Cl. 44-10.00H.
Hershey, George P.: *See—*
Hershey, Virginia L.; and Hershey, George P., 4,058,927, Cl. 43-43.130.
Hershey, Virginia L.; and Hershey, George P., to Raymond Lee Organization, Inc., The. Snag-free hydrodynamic fishing sinker container. 4,058,927, Cl. 43-43.130.
Hertl, Friedrich: *See—*
Golombeck, Paul; and Hertl, Friedrich, 4,059,558, Cl. 260-42.330.
Heske, William Albert; and Grudzien, Christopher Peter, to Dresser Industries, Inc. Digital pressure standard. 4,059,128, Cl. 137-487.500.
Hewlett-Packard Company: *See—*
Dickinson, Peter D.; Osborne, Thomas E.; Rode, France; and Baum, Allen J., 4,059,750, Cl. 364-715.000.
Pierce, Perry H.; and Prendergast, Dan L., 4,058,890, Cl. 29-625.000.
Toomay, Timothy L., 4,059,213, Cl. 226-151.000.
Heyl, Robert D., to Young Industries, Inc., The. Rotary valve. 4,059,205, Cl. 222-368.000.
Hi-Life Rubber Co., Inc.: *See—*
Siddall, Don F.; and Hoffman, Vincent L., 4,059,070, Cl. 119-14.470.
Higashi, Fukuji: *See—*
Yamazaki, Noboru; and Higashi, Fukuji, 4,059,603, Cl. 260-408.000.
Higgins, James Francis, to Du Pont de Nemours, E. I., and Company. Lead chromate pigment with improved thermal stability. 4,059,459, Cl. 106-298.000.
Hild, Erich: *See—*
Schulz, Horst; Flosser, Josef; Kessler, Reinhard; Schmidt, Karl-Heinz; Eisend, Ewald; Hild, Erich; Loffler, Karl-Heinz; and Steuer, Werner, 4,059,028, Cl. 74-781.00B.
Hildebrandt, Nieczyslaw: *See—*
Nicolas, Jean; Lagrange, Alain; and Hildebrandt, Nieczyslaw, 4,059,664, Cl. 264-66.000.
Hill, Edward J. Valved stopper for a urine bottle. 4,059,124, Cl. 137-38.000.
Hilterhaus, Karl Heinz, to Chemie-Anlagenbau Bischofsheim GmbH; and Reuter Technologie GmbH. Process for producing finished and/or irreversibly embossed microporous sheet structures. 4,059,659, Cl. 264-45.300.
Hilty, Lloyd W.: *See—*
Crissman, James H.; Fritsche, G. Ray; Hamel, Frederick B.; and Hilty, Lloyd W., 4,059,498, Cl. 204-188.000.
Himics, Richard Joseph: *See—*
Rosenkranz, Thomas Francis; and Himics, Richard Joseph, 4,059,449, Cl. 96-91.00D.

Hinz, Jurgen: *See—*
Elfert, Klaus; Hinz, Jurgen; and Binsack, Rudolf, 4,059,580, Cl. 544-73.000.
Hiragaki, Shigeho: *See—*
Mochizuki, Koichi; and Hiragaki, Shigeho, 4,059,523, Cl. 210-198.00C.
Hirasawa, Kunio: *See—*
Yoshioka, Yoshio; Hirasawa, Kunio; and Tsukushi, Masanori, 4,059,741, Cl. 200-148.00A.
Hirata, Noritsugu: *See—*
Komine, Yoshio; and Hirata, Noritsugu, 4,059,349, Cl. 352-72.000.
Hirayama, Kazuhiro: *See—*
Kitamura, Takashi; Watanabe, Asao; Nakano, Takashi; Masaki, Katsumi; Hirayama, Kazuhiro; Sato, Yasushi; and Tokiwa, Taisuke, 4,059,833, Cl. 346-108.000.
Hirohata, Hyogo: *See—*
Oita, Masahiro; Hirohata, Hyogo; and Hamasaki, Nobuhiro, 4,059,451, Cl. 106-1.260.
Hirokane, Tadashi: *See—*
Yanagida, Kiyomi; Hirokane, Tadashi; Tsukiyasu, Tadashi; and Sato, Tomoari, 4,059,494, Cl. 204-28.000.
Hirosaki, Kanari; and Hirosaki, Shin, to Hirosaki, Kanari. Method for manufacturing a tonic composition for man and other animals. 4,059,695, Cl. 424-195.000.
Hirosaki, Shin: *See—*
Hirosaki, Kanari; and Hirosaki, Shin, 4,059,695, Cl. 424-195.000.
Hirose, Huminori, to Matsushita Electric Industrial Co., Ltd. Magnetic recording-reproducing device. 4,059,245, Cl. 242-201.000.
Hirose, Yoshio: *See—*
Nakamura, Junji; Miyashiro, Shigeyoshi; Hirose, Yoshio; and Awao, Takeyoshi, 4,059,572, Cl. 260-112.00R.
Hitachi, Ltd.: *See—*
Nakaizumi, Yasushi; Ueno, Yukichi; and Okumura, Masahide, 4,059,783, Cl. 315-107.000.
Sakamoto, Yoshio; and Yamamura, Masahiro, 4,059,808, Cl. 330-257.000.
Suzuki, Kensuke; Sasaki, Takeshi; and Matsuzaki, Mitsuyuki, 4,059,837, Cl. 357-73.000.
Tanigami, Takahiko; Hasegawa, Akira; and Horikoshi, Shigeru, 4,059,087, Cl. 123-196.00S.
Tsubouchi, Haruyoshi, 4,059,086, Cl. 123-196.00R.
Yoshioka, Yoshio; Hirasawa, Kunio; and Tsukushi, Masanori, 4,059,741, Cl. 200-148.00A.
Hittmair, Paul: *See—*
Burkhardt, Jurgen; Hittmair, Paul; and Wegehaupt, Karl-Heinrich, 4,059,559, Cl. 260-448.20E.
Hitzler, Otto; Pennewiss, Horst; Froelich, August; Markert, Gerhard; and Wunderlich, Winfried, to Rohm GmbH. Symmetric azo-bis-mercapto compounds. 4,059,574, Cl. 260-192.000.
Hobbs, Robert N.: *See—*
Lovely, John W., and Hobbs, Robert N., 4,058,934, Cl. 51-5.00D.
Hoch, Samuel; Ceprini, Mario Q.; and Szabo, Emery, to Tenneco Chemicals, Inc. Liquid stabilizer systems and vinyl halide resin compositions containing same. 4,059,562, Cl. 260-45.75S.
Hochreiter, William Thomas; Craig, Loren Jackson; and Mindler, Fredric A., to Eastman Kodak Company. Exposure control mechanism. 4,059,836, Cl. 354-29.000.
Hochreuter, Richard, to Sandoz Ltd. Polychlorohydrin ethers of tris-(hydroxymethyl)-aminomethane. 4,059,631, Cl. 260-584.00B.
Hochstrasser, Harry T., to Becton, Dickinson and Company. Disposable chemical indicators. 4,059,407, Cl. 23-253.0TP.
Hoechst Aktiengesellschaft: *See—*
Gernhardt, Wolfram; Meier-Maletz, Gerhard; and Zeutschel, Heinz, 4,059,475, Cl. 156-379.000.
Kolbe, Andreas; and Dinter, Peter, 4,059,497, Cl. 204-165.000.
Muller, Heinz, 4,059,438, Cl. 75-81.000.
Hoffman, Charles Reeves, to International Business Machines Corporation. Integrated circuit amplifier. 4,059,811, Cl. 330-277.000.
Hoffman, Louis S. Apparatus for bonding layers of resinous material. 4,059,478, Cl. 156-510.000.
Hoffman, Vincent L.: *See—*
Siddall, Don F.; and Hoffman, Vincent L., 4,059,070. Cl. 119-14.470.
Hoffmann-La Roche, Inc.: *See—*
Chodnekar, Madhukar Subraya; Pfiffner, Albert; Rigassi, Norbert, Schwieter, Ulrich; and Suchy, Milos, 4,059,600, Cl. 260-348.460.
Hajos, Zoltan George, 4,059,612, Cl. 260-456.00R.
Holland, George William; Jernow, Jane Liu; and Rosen, Perry, 4,059,576, Cl. 542-426.000.
Kienzle, Frank; and Rosen, Perry, 4,059,577, Cl. 542-426.000.
Hofmann, John J.: *See—*
Mattimoe, Paul T.; Motter, Theodore J.; Hofmann, John J.; and Herliczek, Siegfried H., 4,059,469, Cl. 156-108.000.
Hohban, Kenneth J.: *See—*
Heighway, Edward A.; Hohban, Kenneth J.; and Schriber, Stanley O., 4,059,763, Cl. 250-336.000.
Hokushin Electric Works, Ltd.: *See—*
Torimaru, Takashi, 4,059,014, Cl. 73-194.0EM.
Uchino, Hisanori; Takada, Masamichi; Shimizu, Takahiro; Shibayama, Masamitsu; and Furuno, Fumiya, 4,059,196, Cl. 214-138.00R.
Holland, Charles M.; and Parrack, Lawrence W., to Misto-Gen Equipment Co. Two-step injection molding. 4,059,384, Cl. 425-577.000.
Holland, George William; Jernow, Jane Liu; and Rosen, Perry, to Hoffmann-La Roche, Inc. 11-Substituted prostaglandins. 4,059,576, Cl. 542-426.000.
Holliday, Robin David; and Milne, David John, to Comalco Limited. Production of bauxite and aluminium chloride of low iron content. 4,059,673, Cl. 423-136.000.
Hollingsworth, Leon W., to Pioneer Motor Bearing Co. Hydrostatically supported tilting pad journal bearing improvements. 4,059,318, Cl. 308-73.000.
Hollweck, Walter; Schnee, Wilhelm; Eberl, Karlheinz; and Basel, Werner. Temperature sensitive switch with separate bimetal and heat transfer means. 4,059,817, Cl. 337-365.000.
Holshouser, Howard E.: *See—*
Banker, Robert O.; and Holshouser, Howard E., 4,059,838, Cl. 358-27.000.
Holtz, Hans D.; and Bonazza, Benedict R., to Phillips Petroleum Company. Ashless fuel detergent additives. 4,059,414, Cl. 44-58.000.
Holtz, Hans D.: *See—*
De Vault, Albert N.; and Holtz, Hans D., 4,059,535, Cl. 252-33.000.
Homeyer, Bernhard: *See—*
Maurer, Fritz; Riebel, Hans-Jochem; Hammann, Ingeborg; Behrenz, Wolfgang; and Homeyer, Bernhard, 4,059,696, Cl. 424-200.000.
Honeywell Inc.: *See—*
Wilwerding, Dennis J., 4,059,756, Cl. 250-201.000.
Wilwerding, Dennis J., 4,059,757, Cl. 250-201.000.
Wilwerding, Dennis J., 4,059,758, Cl. 250-201.000.
Hood, Frederick E.; Mitchell, Donald K.; and Uhring, Gary S., to Hood Sailmakers, Inc. Roll-furling mainsail. 4,059,063, Cl. 114-106.000.
Hood Sailmakers, Inc.: *See—*
Hood, Frederick E.; Mitchell, Donald K.; and Uhring, Gary S., 4,059,063, Cl. 114-106.000.
Hooker Chemicals & Plastics Corporation: *See—*
Weil, Edward D., 4,059,615, Cl. 560-132.000.
Hooper, Gene R.: *See—*
Berryman, Angus L.; Hooper, Gene R.; and Hague, Richard E., 4,059,056, Cl. 105-368.00R.
Hooper, Inc.: *See—*
Sanborn, Philip A., Jr.; Westbrook, Shelby F.; and Sullivan, Donald A., 4,058,953, Cl. 53-22.00A.
Hopkins, Harold Horace. Microscope and magnification changer. 4,059,336, Cl. 350-55.000.
Hori, Kikuo; Horiuchi, Takumi; Nishikawa, Mikio; Ryugo, Shiro; Ishizuka, Akira; and Takenaka, Yoshisuke, to Teijin Limited. Method and apparatus for winding a thread on a bobbin at a high winding speed. 4,059,239, Cl. 242-18.100.
Hori, Kikuo: *See—*
Iimuro, Hiroyuki; Horiuchi, Takumi; Kuroda, Yoji; Hori, Kikuo; and Kawano, Tatumi, 4,058,967, Cl. 57-140.00J.
Horikoshi, Shigeru: *See—*
Tanigami, Takahiko; Hasegawa, Akira; and Horikoshi, Shigeru, 4,059,087, Cl. 123-196.00S.
Horiuchi, Takumi: *See—*
Hori, Kikuo; Horiuchi, Takumi; Nishikawa, Mikio; Ryugo, Shiro; Ishizuka, Akira; and Takenaka, Yoshisuke, 4,059,239, Cl. 242-18.100.
Iimuro, Hiroyuki; Horiuchi, Takumi; Kuroda, Yoji; Hori, Kikuo; and Kawano, Tatumi, 4,058,967, Cl. 57-140.00J.
Hornung, Ewald, to Feinwerkbau Helfer & Co. KG. Screw-driving devices. 4,059,034, Cl. 81-57.370.
Horrall, Thomas R.: *See—*
Watters, Bill G.; Nacey, Michael; and Horrall, Thomas R., 4,059,726, Cl. 179-1.50M.
Horrocks, Donald L., to Beckman Instruments, Inc. Method and apparatus for determining accuracy of radiation measurements made in the presence of background radiation. 4,059,762, Cl. 250-336.000.
Horsfall, Harry: *See—*
Moorhouse, Stephen; Horsfall, Harry; and Dean, Alan Rangeley, 4,059,159, Cl. 172-7.000.
Hortman, Norman G.: *See—*
Nix, George J.; Barrington, Burchus Q.; Farley, David L.; and Hortman, Norman G., 4,059,153, Cl. 166-264.000.
Horvay, Julius B.; and Alvarez, Robert J., to General Electric Company. Refrigerator including air wall separating the freezer and fresh food portions. 4,058,989, Cl. 62-256.000.
Hosaka, Hirokazu; Tanimoto, Kenji; Okabe, Hiromichi; Tanaka, Kunthiko; Ueda, Yuji; and Dohgane, Iwao, to Sumitomo Chemical Company, Limited. Method for extraction of dihydroperoxide. 4,059,637, Cl. 260-610.00A.
Hoshi, Akira: *See—*
Yoshida, Toshio; Terai, Kiyoshi; Matsui, Shigetomo; Kinoshita, Tsuneo; Hoshi, Akira; and Tohmoto, Toru, 4,058,883, Cl. 29-448.000.
Hoskins, Phillip Keith, to International Business Machines Corporation. Dot matrix printer with slanted print head and modular skewing of dot pattern information. 4,059,183, Cl. 197-1.00R.
Hosokoshi, Kakuichiro; Yamamoto, Hikoshi; Tanaka, Masayuki; and Omura, Shinichi, to Matsushita Electronics Corporation. Light exposing apparatus for forming a phosphor screen of a cathode ray tube. 4,059,834, Cl. 354-1.000.
House, Herbert Douglas. Runner attachment for bicycles with a reaction thrust device. 4,059,168, Cl. 180-1.00P.
Hughes Aircraft Company: *See—*
Epperson, Ronald D., 4,058,971, Cl. 58-39.500.
Hughes, Bernard J. Protective system. 4,059,059, Cl. 109-1.00R.
Hughey, Emerson Dee. Propeller making apparatus and method. 4,058,880, Cl. 29-156.80P.
Humboldt Holdings, Inc.: *See—*
Shaw, William Stuart, 4,059,090, Cl. 126-121.000.

Humboldt Products Corporation: *See—*
DePriest, Donald R.; Brandon, Bobby C.; and Buie, Connell M., 4,059,104, Cl. 128-132.00D.
Hunter, Edwin J., to Toro Company, The. Moisture sensing apparatus and method. 4,059,227, Cl. 239-1.000.
Huntley, Orville P. Auxiliary portable lock. 4,059,299, Cl. 292-294.000.
Huppi, Xaver Johann: *See—*
Frauenfelder, Alfred; and Huppi, Xaver Johann, 4,059,420, Cl. 55-112.000.
Hurst, Forrest G.: *See—*
Moss, Robert J.; and Hurst, Forrest G., 4,058,959, Cl. 56-295.000.
Hutton, James L. Intrusion barrier and guide for sliding windows, doors and the like. 4,059,141, Cl. 160-90.000.
Huzyak, Paul. Agitator for melting furnace. 4,059,251, Cl. 266-235.000.
HydroTech International, Inc.: *See—*
Mohr, Harvey O., 4,059,288, Cl. 285-2.000.
Ibsen Nielsen, Hans Jorgen; and Hansen, Elo Harald, to Bifok AB. Nitrate ion selective electrode. 4,059,499, Cl. 204-195.00M.
Ichigo, Minoru: *See—*
Tohyama, Masao; Ichigo, Minoru; Suzuki, Takeshi; Nakasu, Makoto; Ando, Akinobu; Yoshida, Akitoshi; Kosaka, Masaharu; Hayasi, Norihisa; and Inoue, Shigeki, 4,059,553, Cl. 260-29.60S.
Ichimi, Hideo. Joint for connection of gas cock to metal pipe. 4,059,290, Cl. 285-169.000.
Ichinose, Matzuo, to Kabushiki Kaisha Suwa Seikosha. Digital display electronic timepiece. 4,058,970, Cl. 58-23.00R.
ICI Australia Limited: *See—*
Baklien, Asbjorn; and Kolm, Jan, 4,059,588, Cl. 260-306.70T.
IDC Chemie AG: *See—*
Gruniger, Emil, 4,059,146, Cl. 165-45.000.
Ide, Homare. Shield wire. 4,059,724, Cl. 174-36.000.
Iida, Hiroshi, to Manno Kogyo Company, Limited. Spare tire carrier. 4,059,197, Cl. 214-451.000.
Iimuro, Hiroyuki; Horiuchi, Takumi; Kuroda, Yoji; Hori, Kikuo; and Kawano, Tatumi, to Teijin Limited. Textured polyester multifilament yarn. 4,058,967, Cl. 57-140.00J.
Ikeda, Kaoru: *See—*
Takematsu, Tetsuo; Konnai, Makoto; Takeda, Makoto; Fuga, Nobuhiko; Ikeda, Kaoru; and Shugaya, Kiyoshi, 4,059,431, Cl. 71-87.000.
Takematsu, Tetsuo; Konnai, Makoto; Takeda, Makoto; Fuga, Nobuhiko; Ikeda, Kaoru; and Shugaya, Kiyoshi, 4,059,432, Cl. 71-87.000.
Ilin, Vadim Sergeevich: *See—*
Movshovich, Pavel Mikhailovich; Khavkin, Viktor Pavlovich; Maximov, Gennady Konstantinovich; Babushkina, Natalya Borisovna; Baranov, Alexandr Anatolievich; Ivanov, Lev Nikolaevich; Nezelenov, Sergei Vladimirovich; Shutov, Gennady Nikolaevich; Tsygulev, Leonid Nikiforovich; and Ilin, Vadim Sergeevich, 4,058,960, Cl. 57-34.0AT.
Illig, Edwin J.: *See—*
Brydges, William T., III; and Illig, Edwin J., 4,059,425, Cl. 65-22.000.
Illinois Tool Works Inc.: *See—*
Morland, Richard Harlon, 4,058,864, Cl. 10-2.000.
Ilmaier, Bernard; and Zeiringer, Hans, to Treibacher Chemische Werke Aktiengesellschaft. Method for producing alumina and alumina-zirconia abrasive material. 4,059,417, Cl. 51-309.00A.
Ilsemann, Bernhard: *See—*
Otto, Heinz; and Ilsemann, Bernhard, 4,059,286, Cl. 280-673.000.
Imai, Hirosuke; and Ito, Hiroyuki, to Nippon Oil Company Ltd. Novel aqueous adhesive. 4,059,555, Cl. 260-29.70H.
Imanari, Makoto: *See—*
Yamaguchi, Yoshinobu; Kitano, Nanahiko; Watanabe, Yoshihisa; and Imanari, Makoto, 4,059,544, Cl. 252-471.000.
Imperial Arts Corporation: *See—*
Schneider, Irwin, 4,059,096, Cl. 126-375.000.
Imperial Chemical Industries Limited: *See—*
Bentley, John; and Thompson, Morice William, 4,059,557, Cl. 260-31.20N.
Burrell, Raymond Alexander; and Cox, John Michael, 4,059,703, Cl. 424-269.000.
Jennings, James Robert; and Kelly, Lawrence Francis Michael, 4,059,542, Cl. 252-431.00P.
Le Count, David James; and Squire, Christopher John, 4,059,622, Cl. 260-559.00A.
Meers, John Laurence, 4,059,489, Cl. 195-31.00F.
Speakman, Derek Norman Alfred, 4,059,547, Cl. 260-17.00R.
Walsingham, Richard Warren; and Stuart, Ronald Sangster, 4,059,606, Cl. 260-448.20B.
In Situ Technology, Inc.: *See—*
Terry, Ruel C., 4,059,151, Cl. 166-258.000.
Inagaki, Kenji: *See—*
Iriguchi, Norio; Kuroda, Toru; Kominami, Naoya; and Inagaki, Kenji, 4,059,107, Cl. 128-173.00H.
Inamoto, Yoshiaki; Fujikura, Yoshiaki; Tsuchihashi, Kiyoshi; and Kashihara, Eiji, to Kao Soap Co., Ltd. Process for hydride transfer reduction rearrangement of 8-exo-hydroxymethyl-endo-tricyclo 5.2.1.0^{2,6}] decane to form tricyclo[5.3.1.0^{3,8}] undecane. 4,059,643, Cl. 260-666.0PY.
Inamoto, Yoshiaki: *See—*
Handa, Susumu; Tanaka, Yoshiaki; Nishibata, Atsushi; Ueda, Sadashi; Inamoto, Yoshiaki; Saito, Masahiro; Tanimoto, Fumio; and Kitano, Hisao, 4,059,610, Cl. 544-193.000.
Ing. C. Olivetti & C., S.p.A.: *See—*
Cosmo, Nicola, 4,059,259, Cl. 271-3.000.
Violino, Ettore, 4,059,748, Cl. 235-303.100.
Ingersoll-Rand Company: *See—*
McGahan, Wallace A.; Webb, Paul D.; and Morse, Henry W., 4,059,368, Cl. 417-243.000.
Inoue, Shigeki: *See—*
Tohyama, Masao; Ichigo, Minoru; Suzuki, Takeshi; Nakasu, Makoto; Ando, Akinobu; Yoshida, Akitoshi; Kosaka, Masaharu; Hayasi, Norihisa; and Inoue, Shigeki, 4,059,553, Cl. 260-29.60S.
Institut de Recherches de la Siderurgie Francaise (IRSID): *See—*
Alberny, Robert; Birat, Jean Pierre; and Ventavoli, Roger, 4,059,142, Cl. 164-49.000.
Institut Francais du Petrole: *See—*
Lallement, Jacques; Parc, Guy; and de Gaudemaris, Gabriel, 4,059,536, Cl. 252-33.300.
International Business Machines Corporation: *See—*
Babuka, Robert; and Harris, John Bernard, 4,059,323, Cl. 339-75.00M.
Dewitt, David, 4,058,887, Cl. 29-571.000.
Folberth, Otto G., 4,059,814, Cl. 333-29.000.
Gergaud, Fernand, 4,059,737, Cl. 200-5.00A.
Gulitz, Louis; Kwap, Theodore William; Lisle, Walter Irving; O'Kane, Daniel Francis; and Poponiak, Michael Robert, 4,059,385, Cl. 431-12.000.
Hoffman, Charles Reeves, 4,059,811, Cl. 330-277.000.
Hoskins, Phillip Keith, 4,059,183, Cl. 197-1.00R.
Jones, Gardner Dulany, Jr., 4,059,800, Cl. 325-38.00B.
Redding, Robert Caldwell; and Vaughan, Joe Larry, 4,059,184, Cl. 197-18.000.
Ruh, Wolf-Dieter; and Trippel, Gerhard, 4,059,480, Cl. 156-644.000.
International Enterprises, Inc.: *See—*
Greer, Tom R., 4,059,155, Cl. 166-301.000.
International Telephone and Telegraph Corporation: *See—*
Elderton, Peter P., 4,059,744, Cl. 235-92.0FL.
Invicta Plastics Limited: *See—*
Kindred, Michael, 4,059,273, Cl. 273-130.00R.
Iodinamics Corporation: *See—*
Polley, Richard D.; Nilson, Eric L.; Constantakis, Roberto; and Pruitt, Donovan E., 4,059,522, Cl. 210-198.00R.
Iriguchi, Norio; Kuroda, Toru; Kominami, Naoya; and Inagaki, Kenji, to Asahi Kasei Kogyo Kabushiki Kaisha. Two step type pressurized injector. 4,059,107, Cl. 128-173.00H.
Isaacson, Milton S.: *See—*
Smilg, Benjamin; and Isaacson, Milton S., 4,058,935, Cl. 51-163.100.
Ishida, Takashi. Internal grinder. 4,058,933, Cl. 51-5.00D.
Ishikawajima-Harima Jukogyo Kabushiki Kaisha: *See—*
Kobayashi, Toshihiro, 4,059,393, Cl. 432-58.000.
Ishimoto, Sachio: *See—*
Tomibe, Katsuhiko; Masuho, Yasuhiko; Matsuzawa, Kimihiko; Ishimoto, Sachio; Satake, Kazuo; and Watanabe, Tsuneo, 4,059,571, Cl. 260-112.00B.
Ishizuka, Akira: *See—*
Hori, Kikuo; Horiuchi, Takumi; Nishikawa, Mikio; Ryugo, Shiro; Ishizuka, Akira; and Takenaka, Yoshisuke, 4,059,239, Cl. 242-18.100.
Israel, Hans-Peter: *See—*
Adler, Horst; Greila, Werner; and Israel, Hans-Peter, 4,059,722, Cl. 174-19.000.
Isshiki, Tomiya: *See—*
Yonemitsu, Eiichi; Isshiki, Tomiya; and Kijima, Yasuhiko, 4,059,582, Cl. 260-252.000.
Ito, Hideo: *See—*
Sugiyama, Hironari; Chiyomaru, Isao; Okuda, Itsuki; Yamamoto, Hisaaki; and Ito, Hideo, 4,059,635, Cl. 260-609.00E.
Ito, Hiroyuki: *See—*
Imai, Hirosuke; and Ito, Hiroyuki, 4,059,555, Cl. 260-29.70H
Ito, Yasuro; Kaga, Hideharu; Yamamoto, Yasuhiro; and Sumita, Tadayuki, to Ito, Yasuro; and Taisei Corporation. Apparatus for moulding hydraulic cement or the like material. 4,059,376, Cl. 425-546.000.
ITW Fastex Italia, S.p.A.: *See—*
Aimar, Michele, 4,059,200, Cl. 220-233.000.
Ivanov, Lev Nikolaevich: *See—*
Movshovich, Pavel Mikhailovich; Khavkin, Viktor Pavlovich; Maximov, Gennady Konstantinovich; Babushkina, Natalya Borisovna; Baranov, Alexandr Anatolievich; Ivanov, Lev Nikolaevich; Nezelenov, Sergei Vladimirovich; Shutov, Gennady Nikolaevich; Tsygulev, Leonid Nikiforovich; and Ilin, Vadim Sergeevich, 4,058,960, Cl. 57-34.0AT.
Ivey, John Saxon; and Braybrook, Kenneth Albert, to Borg-Warner Corporation. Sheet metal hub assembly. 4,059,365, Cl. 416-174.000.
Iwasa, Susumu; and Yoshida, Isamu, to Takeda Chemical Industries, Ltd. Diluents for rubella virus hemagglutination-inhibition test. 4,059,491, Cl. 195-103.50A.
Iwata Air Compressor Mfg. Co., Ltd.: *See—*
Arai, Kazuo, 4,059,358, Cl. 401-219.000.
Iwata, Kohshi: *See—*
Nishiyama, Keizo; Maeda, Sadao; and Iwata, Kohshi, 4,059,710, Cl. 427-307.000.
J. Bobst et Fils S.A.: *See—*
Primavesi, Otto Hubert Jan; and Primavesi, Alexander, deceased, 4,059,470, Cl. 156-238.000.
J. L. Clark Manufacturing Co.: *See—*
Foster, John A., 4,059,201, Cl. 220-258.000.
J. M. Voith GmbH: *See—*
Maier, Rudolf, 4,059,373, Cl. 425-192.00R.

Jackson, W. Shaun; and Bohm, Leslie Eric. Motorcycle tank bag. 4,059,207, Cl. 224-31.000.
Jacobs, David R.: *See—*
Spanel, Abram N.; Eiland, P. Frank; and Jacobs, David R., 4,059,021, Cl. 74-89.200.
Jacobs, Marcellus L.; and Jacobs, Paul R. Wind electric plant with improved alternator field excitation. 4,059,771, Cl. 290-44.000.
Jacobs, Paul R.: *See—*
Jacobs, Marcellus L.; and Jacobs, Paul R., 4,059,771, Cl. 290-44.000.
Jacobson, Robert L., to Chevron Research Company. Alkylaromatic isomerization process. 4,059,645, Cl. 260-668.00A.
Jacobson, Ronald C.: *See—*
Greenfield, Irving E., Jr.; and Jacobson, Ronald C., 4,059,181, Cl. 194-13.000.
Jahnsen, Knut Waldemar, to Elkem-Spigerverket A/S. Method for purification of industrial waste water. 4,059,514, Cl. 210-49.000.
James, Lewis C., to Cities Service Research and Development Company. Catalyst withdrawal. 4,059,502, Cl. 208-152.000.
Janner, John R., Jr.: *See—*
Scholl, Charles H.; Janner, John R., Jr.; Stumphauzer, William C.; and Shuster, Duane O., 4,059,466, Cl. 156-78.000.
Scholl, Charles H.; Janner, John R., Jr.; and Stumphauzer, William C., 4,059,714, Cl. 428-310.000.
Japan Atomic Energy Research Institute: *See—*
Tatsuta, Hatsumi; and Kumazawa, Shigeru, 4,059,765, Cl. 250-367.000.
Japan Spectroscopic Co., Ltd.: *See—*
Mochizuki, Koichi; and Hiragaki, Shigeho, 4,059,523, Cl. 210-198.00C.
Jean Walterscheid GmbH: *See—*
von Allworden, Wilhelm, 4,058,990, Cl. 64-1.00S.
Jennings, James Robert; and Kelly, Lawrence Francis Michael, to Imperial Chemical Industries Limited. Organo-phosphorous catalyst composition and process for making the same. 4,059,542, Cl. 252-431.00P.
Jernigan, Marvin E., to Narco Scientific Industries, Inc. Objective plotting of visual fields by eye movement monitoring. 4,059,348, Cl. 351-30.000.
Jernow, Jane Liu: *See—*
Holland, George William; Jernow, Jane Liu; and Rosen, Perry, 4,059,576, Cl. 542-426.000.
Jobson, Peter Meredith: *See—*
Jones, Michael Lloyd, and Jobson, Peter Meredith, 4,059,786, Cl. 318-17.000.
Johannessen, Paul R.; and Ver Planck, Peter. Apparatus for degrading Q in a high-Q RF pulse transmitting system and the like. 4,059,801, Cl. 325-167.000.
John, Ronald, to Vacu-Blast Limited. Classification of particles. 4,059,189, Cl. 209-112.000.
Johns Hopkins University, The: *See—*
Robinson, Cecil H., 4,059,630, Cl. 260-586.00E.
Johns-Manville Corporation: *See—*
Earle, Paul Lewis; and Snider, George William, 4,058,947, Cl. 52-396.000.
Johnson, Daniel: *See—*
Gilbert, Kendall E.; Johnson, Daniel; and Macier, Robert Raymond, 4,058,975, Cl. 60-39.28T
Johnson, Dennis G. Oil cap remover. 4,059,033, Cl. 81-3.10B.
Johnson, Fred Lowery, Jr., to Texaco Development Corporation. Process for preparing olefin sulfonates. 4,059,620, Cl. 260-513.00T.
Johnson, Lavell R., to Summa Corporation. Immobilized immunoadsorbent. 4,059,685, Cl. 424-12.000.
Johnson, Richard Shaw: *See—*
Green, Robin John; Johnson, Richard Shaw; and Potter, John Kenneth, 4,059,538, Cl. 252-95.000.
Johnson, Wayne O., to Rohm and Haas Company. Herbicidal 4-trifluoromethyl-3-cyanoalkoxy-4-nitro diphenyl ethers. 4,059,435, Cl. 71-105.000.
Jolliffe, James D.; and Sessions, Allen D. Cleat anchor for flexible vehicle track. 4,059,315, Cl. 305-35.0EB.
Joly, Jean: *See—*
Guillermin, Rene; Joly, Jean; and Sangalli, Sylvio, 4,059,068, Cl 118-420.000.
Jones, Frank W.: *See—*
Gerson, Samuel L.; and Jones, Frank W., 4,059,037, Cl. 83-407.000.
Jones, Gardner Dulany, Jr., to International Business Machines Corporation. Digital multi-line companded delta modulator. 4,059,800, Cl. 325-38.00B.
Jones, Ivor Wynn: *See—*
Miles, Lyndon James; and Jones, Ivor Wynn, 4,059,663, Cl. 264-65.000
Jones, John P., Jr., to Mobil Oil Corporation. Cover plate having adjustable latch means. 4,059,202, Cl. 220-325.000.
Jones, Michael Lloyd; and Jobson, Peter Meredith, to Possum Controls Limited. Wheelchair control circuit. 4,059,786, Cl. 318-17.000.
Jones, Raymond Henry: *See—*
Mathison, Ian William; Solomons, William Ebenezer; and Jones, Raymond Henry, 4,059,586, Cl. 260-287.00D.
Jones, Vercoe C., to S I Handling Systems, Inc. Driverless vehicle traffic control system. 4,059,053, Cl. 104-35.000.
Jonner, Wolf-Dieter, to Teldix GmbH. Anti-locking control system. 4,059,312, Cl. 303-92.000.
Judzis, Arnis; and Bond, Thomas J., to Standard Oil Company, The. Deep-draw thermoforming of thermoplastic sheet. 4,059,380, Cl. 425-298.000.
Jumashev, Georgy Stepanovich; and Furman, Motel Khaimovich. Surgical instrument for operation of anterior fenestrated spondylodessis in vertebral osteochondrosis. 4,059,115, Cl. 128-317.000.
Jundt, Werner, to Robert Bosch G.m.b.H. Ignition system for internal combustion engines using an ignition coil. 4,059,084, Cl. 123-148.00E.
Jurgens, Hans-Hermann: *See—*
Lipp, Eberhard; and Jurgens, Hans-Hermann, 4,058,907, Cl. 34-61.000.
Kabushiki Kaisha Kawai Gakki Seisakusho: *See—*
Obayashi, Nobuharu; Hashizume, Hikaru; Sakashita, Noriji; Kameyama, Seiji; Ezawa, Sadaaki; Kugisawa, Toshio; Washiyama, Yutaka; Kondo, Tatsunori; and Watanabe, Hironori, 4,059,040, Cl. 84-1.030.
Kabushiki Kaisha Maeda Shell Service: *See—*
Nishiyama, Keizo; Maeda, Sadao; and Iwata, Kohshi, 4,059,710, Cl. 427-307.000.
Kabushiki Kaisha Nakamura Seisakusho: *See—*
Nakamura, Masaya, 4,059,266, Cl. 273-1.00E.
Kabushiki Kaisha Suwa Seikosha: *See—*
Ichinose, Matzuo, 4,058,970, Cl. 58-23.00R.
Kabushiki Kaisha Toyoda Jidoshokki Seisakusho: *See—*
Nishiyama, Keizo; Maeda, Sadao; and Iwata, Kohshi, 4,059,710, Cl. 427-307.000.
Kadin, Saul Bernard, to Pfizer. 2-Acylamino-3-[3-(dialkylamino)-propyl]imidazo[4,5-b]pyridines. 4,059,584, Cl. 260-268.0BC.
Kaga, Hideharu: *See—*
Ito, Yasuro; Kaga, Hideharu; Yamamoto, Yasuhiro; and Sumita, Tadayuki, 4,059,376, Cl. 425-546.000.
Kahlert, George; Pommer, Lawrence; Davis, John; and Whebell, Bert, to Northwood Pulp and Timber Limited. Waste burner overfire draft system. 4,059,061, Cl. 110-7.00A.
Kahn, Frederic Jay; and Taylor, Gary Newton, to Bell Telephone Laboratories, Incorporated. Doped liquid crystal display device. 4,059,340, Cl. 350-160.0LC.
Kakihana, Hidetake; and Miyamatsu, Tokuhisa, to Mitsubishi Rayon Co., Ltd. Method for separation and enrichment of isotopes. 4,059,670, Cl. 423-7.000.
Kamarian, Georgy Mikirtychevich. Electrode unit. 4,059,500, Cl. 204-288.000.
Kameyama, Seiji: *See—*
Obayashi, Nobuharu; Hashizume, Hikaru; Sakashita, Noriji; Kameyama, Seiji; Ezawa, Sadaaki; Kugisawa, Toshio. Washiyama, Yutaka; Kondo, Tatsunori; and Watanabe, Hironori, 4,059,040, Cl. 84-1.030.
Kamiyama, Shinichi: *See—*
Ariyama, Kenzo; Mano, Hiroshi; and Kamiyama, Shinichi, 4,059,394, Cl. 432-59.000.
Kankaanpaa, Matti; Nylund, Ragnar; and Reijonen, Yrjo, to Valmet Oy. Paper machine pickup and crepe-setting press section. 4,059,482, Cl. 162-281.000.
Kanro Co. Ltd.: *See—*
Yamazaki, Tatsuo; Hayashida, Takemi; and Sakuma, Masatoshi, 4,059,046, Cl. 99-355.000.
Kao Soap Co., Ltd.: *See—*
Handa, Susumu; Tanaka, Yoshiaki; Nishibata, Atsushi; Ueda, Sadashi; Inamoto, Yoshiaki; Saito, Masahiro; Tanimoto, Fumio; and Kitano, Hisao, 4,059,610, Cl. 544-193.000.
Inamoto, Yoshiaki, Fujikura, Yoshiaki; Tsuchihashi, Kiyoshi; and Kashihara, Eiji, 4,059,643, Cl. 260-666.0PY.
Kobayashi, Hisawo; and Watanabe, Takehiko, 4,059,382, Cl. 425-446.000.
Karhu-Titan Oy: *See—*
Tiitola, Antti-Jussi, 4,059,269, Cl. 273-67.00A.
Karr, Philip R., to United States of America, Army. Fuze modulation system. 4,059,052, Cl. 102-70.20P.
Kashihara, Eiji: *See—*
Inamoto, Yoshiaki; Fujikura, Yoshiaki; Tsuchihashi, Kiyoshi; and Kashihara, Eiji, 4,059,643, Cl. 260-666.0PY.
Kashiwagi, Midori: *See—*
Norton, Ted R.; Shibata, Shoji; and Kashiwagi, Midori, 4,059,694, Cl. 424-177.000.
Kasima, Osamu; and Sanda, Shougo, to Nippondenso Co., Ltd.; and Toyota Jidosha Kogyo Kabushiki Kaisha. Internal combustion engine. 4,059,079, Cl. 123-30.00D.
Kato, Eiichi: *See—*
Sugiyama, Masatoshi; Kato, Eiichi, and Nakamura, Yasuharu, 4,059,448, Cl. 96-84.00A.
Kato, Osami: *See—*
Musha, Morito, Sawa, Tomizo; and Kato, Osami, 4,059,511, Cl. 210-23.00R.
Kawamura, Atsushi; and Kawazu, Motoaki, to Ricoh Co., Ltd. Fixture for mounting bar lens array in electrophotographic apparatus. 4,059,345, Cl. 350-252.000.
Kawano, Tatumi: *See—*
Iimuro, Hiroyuki; Horiuchi, Takumi; Kuroda, Yoji; Hori, Kikuo; and Kawano, Tatumi, 4,058,967, Cl. 57-140.00J.
Kawasaki Jukogyo Kabushiki Kaisha: *See—*
Yoshida, Toshio; Terai, Kiyoshi; Matsui, Shigetomo; Kinoshita, Tsuneo; Hoshi, Akira; and Tohmoto, Toru, 4,058,883, Cl. 29-448.000.
Kawasaki, Masahiro; and Ando, Hirokazu, to Asahi Kogaku Kogyo Kabushiki Kaisha. Bypass circuits for improving the response of electric shutters. 4,059,835, Cl. 354-24.000.
Kawasaki Yukogyo Kabushiki Kaisha: *See—*
Takahashi, Yutaka; and Kobayashi, Toshiji, 4,059,253, Cl. 266-259.000.

Kawazu, Motoaki: *See—*
Kawamura, Atsushi; and Kawazu, Motoaki, 4,059,345, Cl. 350-252.000.
Kay, Edward Leo: *See—*
Lawson, David Francis; and Kay, Edward Leo, 4,059,560, Cl. 260-45.70R.
Kayanuma, Nobuaki, to Toyota Jidosha Kogyo Kabushiki Kaisha. EVAP system-provided throttle valve control unit. 4,059,081, Cl. 123-136.000.
Kazi, Abdulla M. Z.: *See—*
Crompton, Charles E.; and Kazi, Abdulla M. Z., 4,059,540, Cl. 252-309.000.
Kazuhide, Takahama, to Simon International S.p.A. Reducible volume desk. 4,059,058, Cl. 108-129.000.
Kebabian, Paul L., to Environmental Research & Technology, Inc. Gas detector. 4,059,356, Cl. 356-204.000.
Kelley, Louis E., to Rohm and Haas Company. Bonded non-woven fabric and method for making it. 4,059,665, Cl. 264-128.000.
Kelly, Lawrence Francis Michael: *See—*
Jennings, James Robert; and Kelly, Lawrence Francis Michael, 4,059,542, Cl. 252-431.00P.
Kende, Andrew S.; and Liebeskind, Lanny S., to University of Rochester. Synthesis of steganacin and derivatives thereof. 4,059,593, Cl. 260-340.50R.
Kenk, Erhard: *See—*
Kenk, Theodor; and Kenk, Erhard, 4,059,132, Cl. 139-207.000.
Kenk, Theodor; and Kenk, Erhard, to Leder & Co., AG. Bobbin retainer on a shuttle. 4,059,132, Cl. 139-207.000.
Kennel, John M., to Rockwell International Corporation. Non-oscillating torque control apparatus. 4,059,790, Cl. 318-689.000.
Kern, Wolfgang: *See—*
Strunz, Dieter O.; and Kern, Wolfgang, 4,059,395, Cl. 432-72.000.
Kernforschungsanlage Julich GmbH: *See—*
Luhleich, Hartmut; Nickel, Hubertus; and Dias, Francesco, 4,059,682, Cl. 423-448.000.
Kessler, Reinhard: *See—*
Schulz, Horst; Flosser, Josef; Kessler, Reinhard; Schmidt, Karl-Heinz; Eisend, Ewald; Hild, Erich; Loffler, Karl-Heinz; and Steuer, Werner, 4,059,028, Cl. 74-781.00B.
Keusch, Wilhelm: *See—*
Goossens, Walter; Hermann, Wolfgang; Keusch, Wilhelm; and Redlich, Rudolf, 4,059,412, Cl. 44-10.00H.
Khavkin, Viktor Pavlovich: *See—*
Movshovich, Pavel Mikhailovich; Khavkin, Viktor Pavlovich; Maximov, Gennady Konstantinovich; Babushkina, Natalya Borisovna; Baranov, Alexandr Anatolievich; Ivanov, Lev Nikolaevich; Nezelenov, Sergei Vladimirovich; Shutov, Gennady Nikolaevich; Tsygulev, Leonid Nikiforovich; and Ilin, Vadim Sergeevich, 4,058,960, Cl. 57-34.0AT.
Kido, Akio: *See—*
Takida, Hiroshi; Kido, Akio; and Takahashi, Masazumi, 4,058,904, Cl. 34-12.000.
Kidwell, Roger L.: *See—*
Ruest, Dennis A.; Kidwell, Roger L.; and Shen, Chung Y., 4,059,579, Cl. 544-172.000.
Kiel, Wolfgang: *See—*
Kritzler, Helmuth; Bohm, Walter; Kiel, Wolfgang; and Birkenstock, Udo, 4,059,627, Cl. 260-580.000.
Kienzle, Frank; and Rosen, Perry, to Hoffmann-La Roche, Inc. Synthesis of cyclopentanol. 4,059,577, Cl. 542-426.000.
Kijima, Yasuhiko: *See—*
Yonemitsu, Eiichi; Isshiki, Tomiya; and Kijima, Yasuhiko, 4,059,582, Cl. 260-252.000.
Kikusui Kagaku Kogyo Kabushiki Kaisha: *See—*
Tohyama, Masao; Ichigo, Minoru; Suzuki, Takeshi; Nakasu, Makoto; Ando, Akinobu; Yoshida, Akitoshi; Kosaka, Masaharu; Hayasi, Norihisa; and Inoue, Shigeki, 4,059,553, Cl. 260-29.60S.
Kim, Leo: *See—*
Wald, Milton M.; and Kim, Leo, 4,059,646, Cl. 260-676.00R.
Wald, Milton M.; and Kim, Leo, 4,059,647, Cl. 260-676.00R.
Kindl, Fred Henry, to Encotech, Inc. Method and apparatus for removal of last traces of soluble ash and elements from solvent refined coal. 4,058,976, Cl. 60-39.46S.
Kindred, Michael, to Invicta Plastics Limited. Word game having a board and a plurality of pieces. 4,059,273, Cl. 273-130.00R.
Kingswell, Leonard William; and Matthews, Oliver Charles, to Post Office, The. Data transmission system between telephone subscriber location and telephone exchange location during idle telephone condition. 4,059,727, Cl. 179-2.0AM.
Kinoshita, Tsuneo: *See—*
Yoshida, Toshio; Terai, Kiyoshi; Matsui, Shigetomo; Kinoshita, Tsuneo; Hoshi, Akira; and Tohmoto, Toru, 4,058,883, Cl. 29-448.000.
Kinoshita, Yoshio, to Glory Kogyo Kabushiki Kaisha. Coin classifying and counting machine. 4,059,122, Cl. 133-3.00D.
Kinsner, Witold; and Torre, Edward Della, to Canadian Patents and Development Limited. Multi state magnetic bubble domain cell for random access memories. 4,059,829, Cl. 365-19.000.
Kiovsky, Joseph R.; and Koradia, Pramad B., to Norton Company. Clinoptilolite sorbent. 4,059,543, Cl. 252-455.00Z.
Kira, Masaaki: *See—*
Arai, Fumio; Kira, Masaaki; Kokuryo, Shiro; and Ueshima, Takashi, 4,059,561, Cl. 260-45.80R.
Kiss, Sandor G. Alternate flow suction dredge. 4,058,914, Cl. 37-66.000.
Kitamoto, Tatsuji: *See—*
Aonuma, Masashi; Kitamoto, Tatsuji; and Akashi, Goro, 4,059,463. Cl. 148-105.000.
Kitamura, Takashi; Watanabe, Asao; Nakano, Takashi; Masaki, Katsumi; Hirayama, Kazuhiro; Sato, Yasushi; and Tokiwa, Taisuke, to Canon Kabushiki Kaisha. Recording position adjuster. 4,059,833, Cl. 346-108.000.
Kitano, Hisao: *See—*
Handa, Susumu; Tanaka, Yoshiaki; Nishibata, Atsushi; Ueda, Sadashi; Inamoto, Yoshiaki; Saito, Masahiro; Tanimoto, Fumio; and Kitano, Hisao, 4,059,610, Cl. 544-193.000.
Kitano, Nanahiko: *See—*
Yamaguchi, Yoshinobu; Kitano, Nanahiko; Watanabe, Yoshihisa; and Imanari, Makoto, 4,059,544, Cl. 252-471.000.
Kite, Francis E.: *See—*
Germino, Felix Joseph; Kite, Francis E.; and Christensen, Edwin H., 4,059,458, Cl. 106-213.000.
Kitoku Co., Ltd.: *See—*
Mizutani, Masumi; Hata, Hiromichi; and Shimazaki, Masasuke, 4,059,006, Cl. 73-17.00A.
Kitzinger, Frank; and Rosenblum, Frank, to Noranda Mines Limited. Froth level monitor. 4,059,016, Cl. 73-304.00R.
Klauke, Erich: *See—*
Wolfrum, Gerhard; Kuhnel, Werner; Klauke, Erich; and Buttner, Gerhard, 4,059,402, Cl. 8-2.50A.
Klein, Gerald L., to Beckman Instruments, Inc. Densitometer calibrated reference standard. 4,059,357, Cl. 356-243.000.
Klockner-Humboldt-Deutz Aktiengesellschaft: *See—*
Wurster, Winfried; Kuhne, Jochen; and Frodermann, Gerd, 4,059,019, Cl. 73-421.50A.
Klotzer, Sieghart: *See—*
Vanassche, Willy Joseph; Pattyn, Herman Alberik; Moisar, Erik; and Klotzer, Sieghart, 4,059,450, Cl. 96-101.000.
Knapp, Ronald H. Pressure and buckling resisting undulated polyhedral shell structure. 4,058,945, Cl. 52-244.000.
Knappenberger, Clifford W.: *See—*
Settlemyer, Bernard W.; Knappenberger, Clifford W.; and Bader, Alfred, 4,059,017, Cl. 73-395.000.
Knight, John H., to Superior Oil Company, The. Method for reducing residence time and eliminating gas leakage between zones in a cross-flow device for heating and cooling solids. 4,058,905, Cl. 34-15.000.
Knopka, William N., to Avtex Fibers Inc. Textile fiber blend comprising cellulosic fibers and ethylene 2,6-naphthalene dicarboxylate-halogenated comonomers copolyester fibers. 4,059,546, Cl. 260-16.000.
Knowles, Gregory W.; Sangesland, Odd E.; Vroom, Henry J., and Madey, Robert W., to Grumman Aerospace Corporation. Solar energy collector. 4,059,093, Cl. 126-271.000.
Knox Manufacturing Co.: *See—*
Brown, Donald J., 4,059,339, Cl. 350-117.000.
Kobayashi, Hisawo; and Watanabe, Takehiko, to Kao Soap Co., Ltd. Apparatus for processing top ends of rod-like resin articles. 4,059,382, Cl. 425-446.000.
Kobayashi, Shinsaku: *See—*
Mishima, Hiroshi; Ogiso, Akira; and Kobayashi, Shinsaku, 4,059,641, Cl. 260-635.00R.
Kobayashi, Toshihiro, to Ishikawajima-Harima Jukogyo Kabushiki Kaisha. Apparatus for calcining powder materials. 4,059,393, Cl. 432-58.000.
Kobayashi, Toshiji: *See—*
Takahashi, Yutaka; and Kobayashi, Toshiji, 4,059,253, Cl. 266-259.000.
Kobayashi, Tsutomu; Archer, John L.; and Elliott, Michael T., to Rockwell International Corporation. Bubble lattice file structure. 4,059,828, Cl. 365-32.000.
Kobe, Inc.: *See—*
Andersen, Poul H.; and Erickson, John W., 4,059,364, Cl. 415-89.000.
Koch, Friedrich; and Fink, Lothar, to Sopecom S.A. Fribourg. Vehicle wheel pneumatic tyres and the manufacture thereof. 4,059,375, Cl. 425-589.000.
Koel, Maarten; and Theelen, Hubertus J., to U S. Philips Corporation. Wound capacitor comprising an excess-pressure safety device. 4,059,848, Cl. 361-272.000.
Koepcke, Robert L., to Arro Corporation. Ski and pole tote. 4,059,208, Cl. 224-45.00S.
Kokuryo, Shiro: *See—*
Arai, Fumio; Kira, Masaaki; Kokuryo, Shiro; and Ueshima, Takashi, 4,059,561, Cl. 260-45.80R.
Kolbe, Andreas; and Dinter, Peter, to Hoechst Aktiengesellschaft. Corona apparatus. 4,059,497, Cl. 204-165.000.
Kolkman, Dick J., to Westinghouse Air Brake Company. Fail-safe time delay circuit. 4,059,845, Cl. 361-198.000.
Kolling, Helmut; Rappen, Friedrich; and Geiser, Nikolaus, to Ruhrchemie Aktiengesellschaft. Process for the production of polyethylene having molecular weights above 500,000. 4,059,720, Cl. 526-74.000.
Kolm, Jan: *See—*
Baklien, Asbjorn; and Kolm, Jan, 4,059,588, Cl. 260-306.70T.
Kominami, Naoya: *See—*
Iriguchi, Norio; Kuroda, Toru; Kominami, Naoya; and Inagaki, Kenji, 4,059,107, Cl. 128-173.00H.
Komine, Yoshio; and Hirata, Noritsugu, to Canon Kabushiki Kaisha. Photographing system and a motion picture camera using the same. 4,059,349, Cl. 352-72.000.

Kondo, Tatsunori: *See—*
Obayashi, Nobuharu; Hashizume, Hikaru; Sakashita, Noriji; Kameyama, Seiji; Ezawa, Sadaaki; Kugisawa, Toshio; Washiyama, Yutaka; Kondo, Tatsunori; and Watanabe, Hironori, 4,059,040, Cl. 84-1.030.
Kondratenko, Anatoly Borisovich: *See—*
Barannik, Ivan Andreevich; Kondratenko, Anatoly Borisovich; Trukhin, Alexandr Fedorovich; Raskatov, Viktor Georgievich; Zharovsky, Ivan Vasilievich; Rudakov, Viktor Alexandrovich; Mordkovich, Andrei Efremovich; and Chalov, Alexandr Vasilievich, 4,059,372, Cl. 425-8.000.
Konnai, Makoto: *See—*
Takematsu, Tetsuo; Konnai, Makoto; Takeda, Makoto; Fuga, Nobuhiko; Ikeda, Kaoru; and Shugaya, Kiyoshi, 4,059,431, Cl. 71-87.000.
Takematsu, Tetsuo; Konnai, Makoto; Takeda, Makoto; Fuga, Nobuhiko; Ikeda, Kaoru; and Shugaya, Kiyoshi, 4,059,432, Cl. 71-87.000.
Konz, Marvin Joseph, to FMC Corporation. Stereospecific process for production of c-5-aralkoxy-r-2-substituted-5-alkyl-1,3-dioxanes and intermediates. 4,059,594, Cl. 260-340.700.
Kopke, Helmut; Ohlinger, Manfred; Grau, Werner; Schoenafinger, Eduard; and Schneehage, Hans Henning, to BASF Aktiengesellschaft. Manufacture of gamma-iron(III) oxide. 4,059,716, Cl. 428-403.000.
Koradia, Pramad B.: *See—*
Kiovsky, Joseph R.; and Koradia, Pramad B., 4,059,543, Cl. 252-455.00Z.
Korff, Wolfram G.; Emery, Vernon V.; Bond, Joseph Kim; and Marcella, Joseph, to Emery Company, Inc. Method of belling plastic pipe and apparatus therefor. 4,059,379, Cl. 425-393.000.
Korshunov, Evgeny Alexeevich pereulok. Mill for rolling continuously cast ingot. 4,059,001, Cl. 72-214.000.
Kosaka, Katuaki; and Ueno, Zene, to Nissan Motor Co., Ltd. Method and apparatus for generating reformed gas containing hydrogen and carbon monoxide from hydrocarbon fuel. 4,059,076, Cl. 123-3.000.
Kosaka, Katuaki; Wagatsuma, Fumio; Shimomoto, Mithuo; Harada, Osamu; and Ueno, Zene, to Nissan Motor Co., Ltd. Apparatus for reforming combustible into gaseous fuel by reaction with decomposition product of hydrogen peroxide. 4,059,415, Cl. 48-63.000.
Kosaka, Masaharu: *See—*
Tohyama, Masao; Ichigo, Minoru; Suzuki, Takeshi; Nakasu, Makoto; Ando, Akinobu; Yoshida, Akitoshi; Kosaka, Masaharu; Hayasi, Norihisa; and Inoue, Shigeki, 4,059,553, Cl. 260-29.60S.
Kosan A/S: *See—*
Vestergaard, Bent, 4,058,931, Cl. 47-87.000.
Kosley, Raymond W., Jr.: *See—*
Parker, Kathlyn A.; and Kosley, Raymond W., Jr., 4,059,575, Cl. 260-239.500.
Kostelnicek, Richard J., to Exxon Production Research Company. Periodic waveform interference eliminator. 4,059,818, Cl. 340-15.5DP.
Koster, Sandra K.: *See—*
Blaha, Eli W.; Koster, Sandra K.; and Wang, Chen-Shen, 4,059,719, Cl. 526-52.000.
Kowalski, Daniel C.; Dawson, Juan C.; and Krulikoski, Stanley J., deceased (by Krulikoski, Shirley Ann, executrix), to United States of America, Air Force. Prismatic anamorphic system for optical correlators. 4,059,343, Cl. 350-182.000.
Kozhema, Valery Andreevich: *See—*
Esibian, Eduard Migranovich; Dudko, Daniil Andreevich; Danchenko, Mikhail Evgenievich; Malkin, Vasily Berkovich; and Kozhema, Valery Andreevich, 4,059,743, Cl. 219-121.00P.
Krasnow, Leonard L. Slide filters. 4,059,525, Cl. 210-236.000.
Krauss-Maffei Austria Gesellschaft m.b.H.: *See—*
Hanslik, Wilhelm, 4,059,401, Cl. 432-132.000.
Kresse, Herman J. Separation of mature okra seed into component fractions. 4,059,604, Cl. 260-412.400.
Kribitzneck, Otto: *See—*
Beinsen, Dieter; and Kribitzneck, Otto, 4,059,113, Cl. 128-276.000.
Krimm, Heinrich; and Tresper, Erhard, to Bayer Aktiengesellschaft. Trisphenol process. 4,059,638, Cl. 260-613.00R.
Kritzler, Helmuth; Bohm, Walter; Kiel, Wolfgang; and Birkenstock, Udo, to Bayer Aktiengesellschaft. Chlorinated aromatic amines. 4,059,627, Cl. 260-580.000.
Krivec, Bert; Brown, Elwood B.; and Raynor, Warren S., to Rexnord Inc. Roller assembly with improved mounting means. 4,059,180, Cl. 193-37.000.
Krolak, Donald W.: *See—*
Elbe, Ronald E.; Krolak, Donald W.; and Vernon, Philip L., 4,058,922, Cl. 42-16.000.
Kroll, Rudolf: *See—*
Grundmann, Edgard; Heitland, Herbert; and Kroll, Rudolf, 4,059,095, Cl. 126-271.000.
Krulikoski, Shirley Ann, executrix: *See—*
Kowalski, Daniel C.; Dawson, Juan C.; and Krulikoski, Stanley J., deceased, 4,059,343, Cl. 350-182.000.
Krulikoski, Stanley J., deceased: *See—*
Kowalski, Daniel C.; Dawson, Juan C.; and Krulikoski, Stanley J., deceased, 4,059,343, Cl. 350-182.000.
Kruse, Eckart. Cabinet. 4,058,861, Cl. 5-164.00R.
Kubicek, Donald H., to Phillips Petroleum Company. Mercaptans by catalytic cleavage of organic sulfides. 4,059,636, Cl. 260-609.00D.
Kubler, Hermann, to Barmag Barmer Maschinenfabrik Aktiengesellschaft. False twist-crimping machine. 4,058,961, Cl. 57-34.0HS.
Kubota, Ltd.: *See—*
Ryumon, Yutaka; Yano, Naomichi; and Yukimachi, Shinsuke, 4,059,193, Cl. 214-8.50A.
Kuffner, Karl: *See—*
Meier, Ernst; Credner, Hans Heinrich; Lassig, Wolfgang; Kuffner, Karl; and Schranz, Karl-Wilhelm, 4,059,447, Cl. 96-56.400.
Kugisawa, Toshio: *See—*
Obayashi, Nobuharu; Hashizume, Hikaru; Sakashita, Noriji; Kameyama, Seiji; Ezawa, Sadaaki; Kugisawa, Toshio; Washiyama, Yutaka; Kondo, Tatsunori; and Watanabe, Hironori, 4,059,040, Cl. 84-1.030.
Kuhlman Corporation: *See—*
Macemon, Herbert J., 4,059,329, Cl. 339-60.00R.
Kuhne, Jochen: *See—*
Wurster, Winfried; Kuhne, Jochen; and Frodermann, Gerd, 4,059,019, Cl. 73-421.50A.
Kuhne, Manfred, to Ciba-Geigy Corporation. Herbicidal compositions containing silylated chloroacetanilides. 4,059,436, Cl. 71-118.000.
Kuhnel, Werner: *See—*
Wolfrum, Gerhard; Kuhnel, Werner; Klauke, Erich; and Buttner, Gerhard, 4,059,402, Cl. 8-2.50A.
Kulzer & Co. GmbH: *See—*
Gross, Albert; Schaefer, Roland; and Reiss, Siegfried, 4,059,684, Cl. 424-4.000.
Kumazawa, Shigeru: *See—*
Tatsuta, Hatsumi; and Kumazawa, Shigeru, 4,059,765, Cl. 250-367.000.
Kume, Kazunari: *See—*
Tamaru, Munetaka; Kume, Kazunari; Oono, Hideshi; Watanabe, Minoru; Sato, Hideo; and Morokawa, Shigeru, 4,058,969, Cl. 58-23.0BA.
Kume, Toyohiko: *See—*
Aya, Masahiro; Saito, Junichi; Kume, Toyohiko; and Yasui, Kazuomi, 4,059,430, Cl. 71-86.000.
Kuntz, Gregg R. Shelf support bracket for mounting on railings and the like. 4,059,248, Cl. 248-214.000.
Kunzel, Hans Egon: *See—*
Wolf, Gerhard Dieter; Miessen, Ralf; Kunzel, Hans Egon; and Bentz, Francis, 4,059,403, Cl. 8-168.00B.
Kurata, Shigehiro; and Abe, Kenzo, to United Resources Industry Co., Ltd. Cross-flow type stripping-absorption apparatus. 4,059,421, Cl. 55-196.000.
Kuroda, Toru: *See—*
Iriguchi, Norio; Kuroda, Toru; Kominami, Naoya; and Inagaki, Kenji, 4,059,107, Cl. 128-173.00H.
Kuroda, Yoji: *See—*
Iimuro, Hiroyuki; Horiuchi, Takumi; Kuroda, Yoji; Hori, Kikuo; and Kawano, Tatumi, 4,058,967, Cl. 57-140.00J.
Kwap, Theodore William: *See—*
Gulitz, Louis; Kwap, Theodore William; Lisle, Walter Irving; O'Kane, Daniel Francis; and Poponiak, Michael Robert, 4,059,385, Cl. 431-12.000.
L. R. Nelson Corporation: *See—*
Pescetto, James R., 4,059,229, Cl. 239-183.000.
Labelette Company: *See—*
Wesley, John George, 4,059,477, Cl. 156-479.000.
Lagrange, Alain: *See—*
Nicolas, Jean; Lagrange, Alain; and Hildebrandt, Nieczyslaw, 4,059,664, Cl. 264-66.000.
L'air Liquide, Societe Anonyme pour l'etude et l'exploitation des Procedes Georges Claude: *See—*
Bentz, Gerard, 4,059,424, Cl. 62-49.000.
Lallement, Jacques; Parc, Guy; and de Gaudemaris, Gabriel, to Institut Francais du Petrole. Improved process for preparing superbasic detergent additives. 4,059,536, Cl. 252-33.300.
Lalu, Jean-Pierre: *See—*
Foulletier, Louis; and Lalu, Jean-Pierre, 4,059,629, Cl. 260-583.0GG.
Lamb, Donald: *See—*
Cartwright, Colin William; and Lamb, Donald, 4,059,505, Cl. 208-310.00Z.
Lambert, Harold W.: *See—*
Miller, Bernard; Martin, J. Ronald; Meiser, Charles H., Jr.; Lambert, Harold W.; and Buvel, Harry, 4,059,007, Cl. 73-190.00R.
Laminoirs Trefileries Cableries de Lens (Anciens Etablissements Gaillard-Stievenart): *See—*
Leturgez, Georges Joseph, 4,058,894, Cl. 30-251.000.
Lamons Metal Gasket Company: *See—*
Owen, Alfred B.; and Gifford, Bruce M., 4,059,215, Cl. 228-173.00C.
Lamphere, Jack C.: *See—*
Zweigle, Maurice L.; and Lamphere, Jack C., 4,059,552, Cl. 260-29.6TA.
Landry, Joseph Elide: *See—*
Green, John Henry; and Landry, Joseph Elide, 4,059,731, Cl. 179-15.0BY.
Lang, Ernest U., to National-Standard Company. Band clutch assembly. 4,059,177, Cl. 192-41.00S.
Lang, Robert J.: *See—*
Schlosberg, Richard H.; Gorbaty, Martin L.; and Lang, Robert J., 4,059,410, Cl. 44-1.00R.
Langsley, Gerald William, to Coalite and Chemical Products Limited. Antioxidant resins from mercaptoaldehydes. 4,059,569, Cl. 260-48.000.
Lardon, Marcel; and Pluker, Hans, to Balzers Patent-Und Beteiligungs-

Aktiengesellschaft. Apparatus for determining the rate of flow of particles in a vacuum deposition device. 4,059,067, Cl. 118-7.000.

Larsen, Glen D., to Southern Railway Company. Coupler height adjuster for railway cars. 4,059,192, Cl. 213-61.000.

Lassig, Wolfgang: *See—*
  Meier, Ernst; Credner, Hans Heinrich; Lassig, Wolfgang; Kuffner, Karl; and Schranz, Karl-Wilhelm, 4,059,447, Cl. 96-56.400.

Latham, Allen, Jr., to Haemonetics Corporation. Process for pheresis procedure and disposable pheresis bowl therefor. 4,059,108, Cl. 128-214.00R.

Lattion, Andre: *See—*
  Spescha, Gelli; and Lattion, Andre, 4,058,962, Cl. 57-34.00R.

Laubie, Michel: *See—*
  Vincent, Michel; Remond, Georges; and Laubie, Michel, 4,059,621, Cl. 260-558.00R.

Laughlin, John M. Switch and operating mechanism for circular hosiery knitting machine speed control. 4,059,740, Cl. 200-52.00R.

Laurie, James Ernest: *See—*
  Davis, Trevor Crombie Maitland; and Laurie, James Ernest, 4,059,672, Cl. 423-121.000.

Laursen, Ove, to AB IRO. Thread storage and supply device. 4,059,240, Cl. 242-47.010.

Lavanish, Jerome M.: *See—*
  Sare, Edward J.; and Lavanish, Jerome M., 4,059,677, Cl. 423-240.000.

Lavenir, Roger: *See—*
  Roth, Jacques; Roth, Michel; Seiler, Paul; Lavenir, Roger; and Manigold, Alain, 4,059,660, Cl. 264-46.400.

Lawn, Joseph R.: *See—*
  Lowery, Robert D.; Baxter, Donald J.; and Lawn, Joseph R., 4,059,176, Cl. 192-12.0BA.

Lawrence Brothers, Inc.: *See—*
  Zbinden, James; and Ries, George W., 4,059,162, Cl. 173-37.000.

Lawson, David Francis; and Kay, Edward Leo, to Firestone Tire & Rubber Company, The. Smoke and flame retarded styrene polymers. 4,059,560, Cl. 260-45.70R.

Lear Siegler, Inc.: *See—*
  Gabriele, Leonard A., 4,058,999, Cl. 72-102.000.

Leathers, Joel F. M.; and Calvin, Donald W., to Dow Chemical Company, The. Method of preparing fumed SiO_2. 4,059,680, Cl. 423-337.000.

Lebow Associates, Inc.: *See—*
  Brendel, Albert E.; and Sedman, Myron P., 4,059,005, Cl. 73-1.00B.

Le Count, David James; and Squire, Christopher John, to Imperial Chemical Industries Limited. Alkanolamine derivatives. 4,059,622, Cl. 260-559.00A.

Leder & Co., AG: *See—*
  Kenk, Theodor; and Kenk, Erhard, 4,059,132, Cl. 139-207.000.

Ledgerwood, Harry James, to Plessey Incorporated. Stock feeder for punched stock. 4,059,212, Cl. 226-141.000.

Lee, Ta-Jyh: *See—*
  Smith, Robert L.; Lee, Ta-Jyh; and Cragoe, Edward J., Jr., 4,059,587, Cl. 260-301.000.

Lee, Yuan Ho. Automatic high-speed cold heading machine. 4,058,865, Cl. 10-13.000.

Lefort, Marcel: *See—*
  Calas, Raymond; Dunogues, Jacques; Deleris, Gerard; Lefort, Marcel; and Simonnet, Christian, 4,059,608, Cl. 260-448.20E.

Lehman, James A., to Warner-Lehman Corporation. Flying saucer launching pistol. 4,059,089, Cl. 124-27.000.

Lehmann, Rolf, to Escher Wyss Limited. Deflection-controlled roll for the pressure treatment of materials in web form. 4,058,877, Cl. 29-116.0AD.

Lehmann, Rolf, to Escher Wyss Limited. Controlled deflection roll. 4,058,878, Cl. 29-116.0AD.

Lehureau, Jean-Claude: *See—*
  Bricot, Claude; and Lehureau, Jean-Claude, 4,059,841, Cl. 358-128.000.

Leiby, Clare C., Jr.; and Prasad, Balram. Coherent counter-streaming electrostatic wave raman interaction system utilizing opposing electron beams for the production of coherent microwaves in plasmas. 4,059,813, Cl. 331-94.000.

Leipelt, Paul A.: *See—*
  Anders, Walter G.; Cole, Michael A.; Duncan, James C.; and Leipelt, Paul A., 4,059,246, Cl. 243-7.000.

Leiser, Roger S.: *See—*
  Schollmeier, Charles E.; and Leiser, Roger S., 4,059,460, Cl. 127-29.000.

Lendi, Georges; Hardegger, Bruno; and De Trey, Rene, to Tesa S.A. Plug gage. 4,058,901, Cl. 33-178.00R.

Lentz, James A.; and Safford, George J., to Xerox Corporation. Compositions and method for enhancing electrical life of polymers used in xerographic devices. 4,058,879, Cl. 29-132.000.

Lentz, Lawrence R., to Champion Spark Plug Company. Spark plug. 4,059,782, Cl. 315-58.000.

Leturgez, Georges Joseph, to Laminoirs Trefileries Cableries de Lens (Anciens Etablissements Gaillard-Stievenart). Lever-operated shears. 4,058,894, Cl. 30-251.000.

Lever Brothers Company: *See—*
  Green, Robin John; Johnson, Richard Shaw; and Potter, John Kenneth, 4,059,538, Cl. 252-95.000.

Levine, Howard S.; and Winter, Robert, to Grumman Aerospace Corporation. Controlled focus mirror with rim controlled flexure. 4,059,346, Cl. 350-295.000.

Lewin, Ian, to American Louver Company. Louver for light distribution. 4,059,754, Cl. 362-217.000.

Lewis, Charles E.: *See—*
  Bonecutter, Thayer A.; Lewis, Charles E.; and Smith, John E., 4,059,816, Cl. 337-278.000.

Lewis, Kenneth Dan, to Dorr-Oliver Incorporated. Centrifuge pressure relief device. 4,059,223, Cl. 233-1.00R.

Lewis, Sheldon N.; and Haggard, Richard A., to Rohm and Haas Company. Novel methacrylic polymers having allyl functionality. 4,059,616, Cl. 526-66.000.

Libbey-Owens-Ford Company: *See—*
  Mattimoe, Paul T.; Motter, Theodore J.; Hofmann, John J.; and Herliczek, Siegfried H., 4,059,469, Cl. 156-108.000.

Liddell, Orval E. Protection of metallic structural elements against corrosion. 4,058,985, Cl. 61-54.000.

Liebeskind, Lanny S.: *See—*
  Kende, Andrew S.; and Liebeskind, Lanny S., 4,059,593, Cl. 260-340.50R.

Liftex Slings, Inc.: *See—*
  Barthule, George, 4,059,302, Cl. 294-74.000.

Lignes Telegraphiques et Telephoniques: *See—*
  de Laage de Meux, Patrick M.; and Maitre, Michel J., 4,059,805, Cl. 329-50.000.

Lilly, Charles E.: *See—*
  Struble, Dean L.; and Lilly, Charles E., 4,059,689, Cl. 424-84.000.

Lim, Franklin: *See—*
  Sodickson, Lester A.; and Lim, Franklin, 4,059,405, Cl. 23-230.00R.

Limes, Robert W.; and Russell, Robert O., to Republic Steel Corporation. Production of fast-setting bonded aggregate structures. 4,059,455, Cl. 106-58.000.

Lindberg, Robert C.; Reedy, James D.; and Yang, Kang, to Continental Oil Company. Decomposition of halogenated organic compounds. 4,059,683, Cl. 423-481.000.

Linde, John P.; and Bullis, Douglas E., to Remington Arms Company, Inc. Concepts of remington super trap choke. 4,058,925, Cl. 42-79.000.

Linden-Alimak AB: *See—*
  Granholm, Sven, 4,058,986, Cl. 61-63.000.

Lindsay, Alexander David, to American Cyanamid Company. Dermal toxicity of solid compositions containing a montmorillonite type of clay and an organophosphorus pesticide. 4,059,700, Cl. 424-216.000.

Linread Limited: *See—*
  Foster, Graham Terence, 4,058,866, Cl. 10-155.00A.

Lipp, Eberhard; and Jurgens, Hans-Hermann, to Gebr. Lodige Maschinenbau-Gesellschaft mbH, Firma. Device for the heat treatment of bulk material. 4,058,907, Cl. 34-61.000.

Lisle, Walter Irving: *See—*
  Gulitz, Louis; Kwap, Theodore William; Lisle, Walter Irving; O'Kane, Daniel Francis; and Poponiak, Michael Robert, 4,059,385, Cl. 431-12.000.

Litton Systems, Inc.: *See—*
  Baron, David A., 4,059,742, Cl. 219-10.55D.

Livshits, Abram Lazarevich: *See—*
  Vasiliev, Vladimir Sergeevich; Livshits, Abram Lazarevich; Polotsky, Vadim Evgenievich; and Zlatkin, Yakov Iosifovich, 4,059,788, Cl. 318-577.000.

Lo, Allen Kwok Wah; and Nims, Jerry Curtis, to Dimensional Development Corporation. Stereoscopic photograph composition apparatus. 4,059,354, Cl. 355-22.000.

Loffler, Karl-Heinz: *See—*
  Schulz, Horst; Flosser, Josef; Kessler, Reinhard; Schmidt, Karl-Heinz; Eisend, Ewald; Hild, Erich; Loffler, Karl-Heinz; and Steuer, Werner, 4,059,028, Cl. 74-781.00B.

Logan, Arthur D.: *See—*
  Phillips, Alfred R.; and Logan, Arthur D., 4,059,847, Cl. 361-215.000.

Lopker, Edwin B., to Pullman Incorporated. Method for manufacturing phosphoric acid and gypsum. 4,059,674, Cl. 423-167.000.

Lord, Henry A.: *See—*
  Reifers, Richard F.; Bixler, Kenneth D.; and Lord, Henry A., 4,059,219, Cl. 229-2.5EC.

Lorenz, Achim R., to MacMillan Bloedel Containers, Inc. Reinforced single-face corrugated containers. 4,059,220, Cl. 229-37.00R.

Loveless, Norman P.: *See—*
  Rosenberg, Ira E.; Ferguson, John A.; and Loveless, Norman P., 4,059,688, Cl. 424-71.000.

Lovely, John W.; and Hobbs, Robert N., to Bryant Grinder Corporation. Interform grinding machine. 4,058,934, Cl. 51-5.00D.

Lowery, Robert D.; Baxter, Donald J.; and Lawn, Joseph R., to Marquette Metal Products Company. Unitary spring clutch brake and actuator assembly. 4,059,176, Cl. 192-12.0BA.

Lu, Chin H.; and Parent, Richard A., to Xerox Corporation. Liquid development using conductive inks. 4,059,444, Cl. 96-1.0LY.

Luhleich, Hartmut; Nickel, Hubertus; and Dias, Francesco, to Kernforschungsanlage Julich GmbH. Method of making shaped carbonaceous bodies. 4,059,682, Cl. 423-448.000.

Lummus Company, The: *See—*
  Bauer, William V., 4,059,504, Cl. 208-255.000.
  Sze, Morgan C.; Schindler, Harvey D.; and Fanelli, Anthony, 4,059,503, Cl. 208-254.00H.

Lumsden, Roy W. Sewage purification system. 4,059,521, Cl. 210-195.00S.

Lundberg, George A.: *See—*
  Moberg, Sigurd Manfred; and Lundberg, George A., 4,059,300, Cl. 292-322.000.

Luppi, Libero. Dialyzer cartridge of roll type particularly for extracorporal artificial kidneys. 4,059,530, Cl. 210-321.00B.

Lydon, Ralph P.; and Weismueller, Sr. William A. Automatic screw

driver system and method for utilizing same. 4,058,884, Cl. 29-526.00R.

Macawber Engineering Limited: *See—*
  MacDonald, Eric John Christopher; and Snowdon, Brian, 4,059,195, Cl. 214-44.00R.

Maccone, Sergio: *See—*
  Pinamonti, Franco; and Maccone, Sergio, 4,059,698, Cl. 424-211.000.

MacDonald, Eric John Christopher; and Snowdon, Brian, to Macawber Engineering Limited. Material handling device. 4,059,195, Cl. 214-44.00R.

Macemon, Herbert J., to Kuhlman Corporation. Double bushing well with cantilever load supporting legs. 4,059,329, Cl. 339-60.00R.

Macier, Robert Raymond: *See—*
  Gilbert, Kendall E.; Johnson, Daniel; and Macier, Robert Raymond, 4,058,975, Cl. 60-39.28T.

Mack, Heinz; and Singer, Gunter, to Heinz Mack. Dental articulator. 4,058,895, Cl. 32-32.000.

Mackay, Robin, to Garrett Corporation, The. Uninterruptible electric power supply. 4,059,770, Cl. 290-4.00C.

MacMillan Bloedel Containers, Inc.: *See—*
  Lorenz, Achim R., 4,059,220, Cl. 229-37.00R.

Macovski, Albert, to Maxim Diagnostic Imaging. Back-illuminated transparency contrast enhancement system. 4,059,767, Cl. 250-461.00R.

Maddox, James A. Labels and label readers. 4,059,225, Cl. 235-437.000.

Madey, Robert W.: *See—*
  Knowles, Gregory W.; Sangesland, Odd E.; Vroom, Henry J.; and Madey, Robert W., 4,059,093, Cl. 126-271.000.

Madsen, Elmer W.; and Soden, George B., to North American Philips Corporation. Gear train with integral stop. 4,059,024, Cl. 74-421.00R.

Maeda, Sadao: *See—*
  Nishiyama, Keizo; Maeda, Sadao; and Iwata, Kohshi, 4,059,710, Cl. 427-307.000.

Magg, Alfred; and Thurau, Gunther, to Zahnradfabrik Friedrichshafen Aktiengesellschaft. Gear-shifting jaw clutch for speed-changing vehicular transmission. 4,059,178, Cl. 192-53.00F.

Maier, Rudolf, to J. M. Voith GmbH. Extruder head. 4,059,373, Cl. 425-192.00R.

Maitre, Michel J.: *See—*
  de Laage de Meux, Patrick M.; and Maitre, Michel J., 4,059,805, Cl. 329-50.000.

Makarov, Evgeny Fredovich: *See—*
  Alexandrov, Anatoly Julianovich; Grushko, July Sergeevich; Makarov, Evgeny Fredovich; Mishin, Konstantin Yakovlevich; and Baltrunas, Daljus Antanas Jono, 4,059,769, Cl. 250-493.000.

Makimoto, Mitsuo; and Yamashita, Sadahiko, to Matsushita Electric Industrial Co., Limited. Coaxial cavity resonator. 4,059,815, Cl. 333-82.0BT.

Malkin, Vasily Berkovich: *See—*
  Esibian, Eduard Migranovich; Dudko, Daniil Andreevich; Danchenko, Mikhail Evgenievich; Malkin, Vasily Berkovich; and Kozhema, Valery Andreevich, 4,059,743, Cl. 219-121.00P.

Mancke, Ralph Gustavus; and Soos, Nicholas Alec, to Bell Telephone Laboratories, Incorporated. Method for removal of elastomeric silicone coatings from integrated circuits. 4,059,467, Cl. 156-80.000.

Manderscheid, Phillip H., to Brown Oil Tools, Inc. Anchoring assembly. 4,059,150, Cl. 166-120.000.

Manigold, Alain: *See—*
  Roth, Jacques; Roth, Michel; Seiler, Paul; Lavenir, Roger; and Manigold, Alain, 4,059,660, Cl. 264-46.400.

Manno Kogyo Company, Limited: *See—*
  Iida, Hiroshi, 4,059,197, Cl. 214-451.000.

Mannstrom, Bo Knut, to Oy Keskuslaboratorio - Centrallaboratorium, Ab. System for feeding a double disc refiner. 4,059,237, Cl. 241-246.000.

Mano, Hiroshi: *See—*
  Ariyama, Kenzo; Mano, Hiroshi; and Kamiyama, Shinichi, 4,059,394, Cl. 432-59.000.

Mansfield, Wilfred Percival; and Priede, Theodor, to National Research Development Corporation. Engine structure. 4,059,085, Cl. 123-195.00R.

Marcella, Joseph: *See—*
  Korff, Wolfram G.; Emery, Vernon V.; Bond, Joseph Kim; and Marcella, Joseph, 4,059,379, Cl. 425-393.000.

Marconi Company Limited, The: *See—*
  Byatt, Dennis William George, 4,059,827, Cl. 365-126.000.

Marion Laboratories, Inc.: *See—*
  Mathison, Ian William; Solomons, William Ebenezer; and Jones, Raymond Henry, 4,059,586, Cl. 260-287.00D.

Markert, Gerhard: *See—*
  Hitzler, Otto; Pennewiss, Horst; Froelich, August; Markert, Gerhard; and Wunderlich, Winfried, 4,059,574, Cl. 260-192.000.

Markley, Lowell D.: *See—*
  Dewald, James R.; and Markley, Lowell D., 4,059,642, Cl. 260-650.00R.

Markowski, Stanley J.; and Nolan, James J., to United Technologies Corporation. Low emission combustion chamber. 4,058,977, Cl. 60-39.650.

Marquette Metal Products Company: *See—*
  Lowery, Robert D.; Baxter, Donald J.; and Lawn, Joseph R., 4,059,176, Cl. 192-12.0BA.

Marshall, Richard Clarence. Gaseous fluid compressing apparatus. 4,059,367, Cl. 417-203.000.

Martin, Clyde J.; and Nicholson, Floyd A., to Tyrspy Inc. Tire pressure indicator. 4,059,823, Cl. 340-58.000.

Martin, J. Ronald: *See—*
  Miller, Bernard; Martin, J. Ronald; Meiser, Charles H., Jr.; Lambert, Harold W.; and Buvel, Harry, 4,059,007, Cl. 73-190.00R.

Martin Marietta Aerospace: *See—*
  Eddy, Wesley L.; Mullen, Daniel J.; and Bonham, Arthur R., 4,059,729, Cl. 179-15.0BF.

Marton, Miksa. Vacuum sander. 4,058,936, Cl. 51-170.00T.

Masaki, Katsumi: *See—*
  Kitamura, Takashi; Watanabe, Asao; Nakano, Takashi; Masaki, Katsumi; Hirayama, Kazuhiro; Sato, Yasushi; and Tokiwa, Taisuke, 4,059,833, Cl. 346-108.000.

Maschinenfabrik Fahr Aktiengesellschaft Gottmadingen: *See—*
  Purrer, Josef, 4,059,234, Cl. 241-222.000.

Mason, Neil E. Pistol adapted for dispensing debilitating chemical repellants. 4,058,921, Cl. 42-1.00G.

Massachusetts Institute of Technology: *See—*
  Fan, John C. C.; and Zeiger, Herbert J., 4,059,461, Cl. 148-1.500.

Massey-Ferguson Inc.: *See—*
  Waack, Carl L.; and Giss, Alador J., 4,059,025, Cl. 74-482.000.

Mast, Aquila D.: *See—*
  Sadler, Loren G.; and Mast, Aquila D., 4,058,958, Cl. 56-228.000.

Masuda, Yoshitaka: *See—*
  Yoshizaki, Hiroyuki; Takanihashi, Hiromitsu; and Masuda, Yoshitaka, 4,059,565, Cl. 260-47.0XA.

Masuho, Yasuhiko: *See—*
  Tomibe, Katsuhiko; Masuho, Yasuhiko; Matsuzawa, Kimihiko; Ishimoto, Sachio; Satake, Kazuo; and Watanabe, Tsuneo, 4,059,571, Cl. 260-112.00B.

Masumoto, Hakaru; Murakami, Yuetsu; and Nakamura, Naoji, to Foundation: The Research Institute of Electric and Magnetic Alloys, The. Niobium-iron rectangular hysteresis magnetic alloy. 4,059,462, Cl. 148-31.550.

Mathis, Ronald D.; and Dix, James S., to Phillips Petroleum Company. Antistatic dyeable polyamide composition. 4,059,653, Cl. 260-857.0PG.

Mathison, Ian William; Solomons, William Ebenezer; and Jones, Raymond Henry, to Marion Laboratories, Inc. 5-Alkoxy-2-alkyl-1,2,3,4-tetrahydroisoquinolene-8-carboxaldehyde and derivatives. 4,059,586, Cl. 260-287.00D.

Matovich, Edwin, to Thagard Technology Company. Chemical reaction process utilizing fluid-wall reactors. 4,059,416, Cl. 48-197.00R.

Matsui, Shigetomo: *See—*
  Yoshida, Toshio; Terai, Kiyoshi; Matsui, Shigetomo; Kinoshita, Tsuneo; Hoshi, Akira; and Tohmoto, Toru, 4,058,883, Cl. 29-448.000.

Matsumura, Yoshihiro: *See—*
  Shono, Tatsuya; and Matsumura, Yoshihiro, 4,059,595, Cl. 260-345.90R.

Matsushita Electric Industrial Co., Ltd.: *See—*
  Hirose, Huminori, 4,059,245, Cl. 242-201.000.
  Makimoto, Mitsuo; and Yamashita, Sadahiko, 4,059,815, Cl. 333-82.0BT.
  Oita, Masahiro; Hirohata, Hyogo; and Hamasaki, Nobuhiro, 4,059,451, Cl. 106-1.260.
  Serizawa, Masabumi; and Takezaki, Tsuneo, 4,059,791, Cl. 363-37.000.

Matsushita Electronics Corporation: *See—*
  Hosokoshi, Kakuichiro; Yamamoto, Hikoshi; Tanaka, Masayuki; and Omura, Shinichi, 4,059,834, Cl. 354-1.000.

Matsuzaki, Mitsuyuki: *See—*
  Suzuki, Kensuke; Sasaki, Takeshi; and Matsuzaki, Mitsuyuki, 4,059,837, Cl. 357-73.000.

Matsuzawa, Kimihiko: *See—*
  Tomibe, Katsuhiko; Masuho, Yasuhiko; Matsuzawa, Kimihiko; Ishimoto, Sachio; Satake, Kazuo; and Watanabe, Tsuneo, 4,059,571, Cl. 260-112.00B.

Matthews, Oliver Charles: *See—*
  Kingswell, Leonard William; and Matthews, Oliver Charles, 4,059,727, Cl. 179-2.0AM.

Mattimoe, Paul T.; Motter, Theodore J.; Hofmann, John J.; and Herliczek, Siegfried H., to Libbey-Owens-Ford Company. Glazing units, methods of making the same and adhesion promoters therefor. 4,059,469, Cl. 156-108.000.

Maul, John A.; and Valentine, Richard E., to Addressograph Multigraph Corporation. Data recorder with portable cartridge. 4,059,051, Cl. 101-45.000.

Maurer, Fritz; Riebel, Hans-Jochem; Hammann, Ingeborg; Behrenz, Wolfgang; and Homeyer, Bernhard, to Bayer Aktiengesellschaft. Pyrimidine (4,6)diyl-bis-(thiono)(thiol)-phosphoric(phosphonic)acid esters. 4,059,696, Cl. 424-200.000.

Mauri, Ambrogio. Light alloy body structure, particularly for transport vehicles, and a process for its formation. 4,059,303, Cl. 296-28.00M.

Maxim Diagnostic Imaging: *See—*
  Macovski, Albert, 4,059,767, Cl. 250-461.00R.

Maximov, Gennady Konstantinovich: *See—*
  Movshovich, Pavel Mikhailovich; Khavkin, Viktor Pavlovich; Maximov, Gennady Konstantinovich; Babushkina, Natalya Borisovna; Baranov, Alexandr Anatolievich; Ivanov, Lev Nikolaevich; Nezelenov, Sergei Vladimirovich; Shutov, Gennady Nikolaevich; Tsygulev, Leonid Nikiforovich; and Ilin, Vadim Sergeevich, 4,058,960, Cl. 57-34.0AT.

Mayer, Adolf: *See—*
  Hausweiler, Arnold; Mayer, Adolf; and Bitners, Feliks, 4,059,492, Cl. 203-11.000.

Mazuir, Maurice, to Carpano & Pons. Synchronous motor. 4,059,780, Cl. 310-164.000.

McBrayer, Doyle C., to Erdmannsdorff, Max Von. Synthetic monument marker. 4,058,940, Cl. 52-104.000.
McCauley, Roger A. Fuel conservation means for internal combustion engines and the like. 4,059,082, Cl. 123-141.000.
McClain, Richard D., to Mercury Metal Products, Inc. Engine exhaust rain cap with extruded bearing support means. 4,059,045, Cl. 98-122.000.
McClernon, Joseph R.: *See—*
  Derr, Walter R.; McClernon, Joseph R.; McGovern, Stephen J.; and Smith, Fritz A., 4,059,648, Cl. 260-676.00R.
McCloskey, Albert R., to Heim Universal Corporation, The. Spherical bearing with slotted key. 4,059,317, Cl. 308-72.000.
McCollough, John K., to Milliken Research Corporation. Dyeing machine. 4,058,991, Cl. 68-205.00R.
McComsey, David Fred; and Zelesko, Michael John, to McNeil Laboratories, Incorporated. Substituted indoles. 4,059,583, Cl. 260-256.50R.
McCoy, Willie. Home shopping cart. 4,059,285, Cl. 280-651.000.
McCuaig, Franklin D., to United States of America, Energy Research and Development Administration. Pu-Zr alloy for high-temperature foil-type fuel. 4,059,439, Cl. 75-122.700.
McDonald, David Ian, to Cincinnati Milacron Inc. Manual preform removal device. 4,059,188, Cl. 198-477.000.
McGahan, Wallace A.; Webb, Paul D.; and Morse, Henry W., to Ingersoll-Rand Company. Gas compressor unloading means. 4,059,368, Cl. 417-243.000.
McGivern, Robert F., to Sybron Corporation. Baffle for water or sewage settling tanks. 4,059,529, Cl. 210-519.000.
McGovern, Stephen J.: *See—*
  Derr, Walter R.; McClernon, Joseph R.; McGovern, Stephen J.; and Smith, Fritz A., 4,059,648, Cl. 260-676.00R.
McGraw-Edison Company: *See—*
  Bonecutter, Thayer A.; Lewis, Charles E.; and Smith, John E., 4,059,816, Cl. 337-278.000.
McKenney's, Inc.: *See—*
  Arrowood, Gordon W., 4,058,859, Cl. 4-252.00R.
McLean, Robert L.: *See—*
  Greatbatch, Wilson; Mead, Ralph T.; McLean, Robert L.; Rudolph, Frank W.; and Frenz, Norbert W., 4,058,889, Cl. 29-623.500.
McNeil Corporation: *See—*
  Tallon, James I., 4,058,917, Cl. 40-125.00M.
McNeil Laboratories, Incorporated: *See—*
  McComsey, David Fred; and Zelesko, Michael John, 4,059,583, Cl. 260-256.50R.
McPeters, Arnold L.: *See—*
  Bittle, David F.; and McPeters, Arnold L., 4,059,668, Cl. 264-290.00R.
Meacham, James H., to Westinghouse Electric Corporation. Method and apparatus for synchronizing a digital divider chain with a low frequency pulse train. 4,059,842, Cl. 358-150.000.
Mead, Ralph T.: *See—*
  Greatbatch, Wilson; Mead, Ralph T.; McLean, Robert L.; Rudolph, Frank W.; and Frenz, Norbert W., 4,058,889, Cl. 29-623.500.
Medtronic, Inc.: *See—*
  Adams, John M., 4,059,116, Cl. 128-419.0PG.
Meers, John Laurence, to Imperial Chemical Industries Limited. Production of glucose isomerase. 4,059,489, Cl. 195-31.00F.
Meier, Ernst; Credner, Hans Heinrich; Lassig, Wolfgang; Kuffner, Karl; and Schranz, Karl-Wilhelm, to AGFA-Gevaert Aktiengesellschaft. Photographic material containing oxazolinone-2 couplers. 4,059,447, Cl. 96-56.400.
Meier-Maletz, Gerhard: *See—*
  Gernhardt, Wolfram; Meier-Maletz, Gerhard; and Zeutschel, Heinz, 4,059,475, Cl. 156-379.000.
Meiner, George H., III: *See—*
  Bridwell, John W.; and Meiner, George H., III, 4,059,042, Cl. 91-469.000.
Meiser, Charles H., Jr.: *See—*
  Miller, Bernard; Martin, J. Ronald; Meiser, Charles H., Jr.; Lambert, Harold W.; and Buvel, Harry, 4,059,007, Cl. 73-190.00R.
Melindo, Flavio: *See—*
  Perucca, Giovanni; Melindo, Flavio; and De Vincentiis, Girolamo, 4,059,736, Cl. 179-175.20R.
Mercer, Frank Brian, to Netlon Limited. Extruded plastics net or mesh structures. 4,059,713, Cl. 428-36.000.
Merck & Co., Inc.: *See—*
  Cragoe, Edward J., Jr.; and Bicking, John B., 4,059,601, Cl. 260-408.000.
  Cragoe, Edward J., Jr.; and Bicking, John B., 4,059,602, Cl. 260-408.000.
  Smith, Robert L.; Lee, Ta-Jyh; and Cragoe, Edward J., Jr., 4,059,587, Cl. 260-301.000.
Mercury Metal Products, Inc.: *See—*
  McClain, Richard D., 4,059,045, Cl. 98-122.000.
Meredith, Curtis L.: *See—*
  Von Bodungen, George A.; and Meredith, Curtis L., 4,059,654, Cl. 260-897.00A.
Messerschmitt, David Gavin; and Zebo, Timothy James, to Bell Telephone Laboratories, Incorporated. Apparatus for mitigating signal distortion and noise signal contrast in a communications system. 4,059,730, Cl. 179-15.0AS.
Messing, Terry Glen, to ESB Incorporated. Composite of metal and insulating material with setback which exposes battery terminal. 4,059,718, Cl. 429-162.000.
Messing, Terry Glen: *See—*
  Bredland, Alf Marlov; Fong, Walter Lee; Messing, Terry Glen; and Paulson, John Walter, 4,059,717, Cl. 429-162.000.
Metal Box Limited: *See—*
  Franek, Jozef Tadeusz; and Doncaster, Peter Henry, 4,058,998, Cl. 72-84.000.
Metsa-Ketela, Jorma. Conveyor for granular material. 4,059,508, Cl. 209-151.000.
Meyer, Donald R., to Richardson-Merrell Inc. 3,8-Bis-basic ethers of 6H-dibenzo[b,d]pyran-6-one. 4,059,702, Cl. 424-248.550.
Meyer, Engelbert Anthony, to USM Corporation. Molding retainer. 4,059,301, Cl. 293-62.000.
Meyer, Lewis M., to Diamond Shamrock Corporation. Metal laminate strip construction of bipolar electrode backplates. 4,059,216, Cl. 228-179.000.
Michel, Paul-Marie: *See—*
  De Vos, Daniel; Michel, Paul-Marie; and Berger, Alfred, 4,059,423, Cl. 65-21.000.
Micro-Copy, Inc.: *See—*
  Fritsch, Robert E., 4,059,355, Cl. 355-43.000.
Micromeritics Instrument Corporation: *See—*
  Ball, Dean M.; and Hendrix, Warren P., 4,059,009, Cl. 73-61.10C.
Middelbeek, Cornelis Gerardus, to Ballast Nedam Groep N.V. Device for collecting light-weight substances floating on a liquid surface. 4,059,526, Cl. 210-242.00S.
Miessen, Ralf: *See—*
  Wolf, Gerhard Dieter; Miessen, Ralf; Kunzel, Hans Egon; and Bentz, Francis, 4,059,403, Cl. 8-168.00B.
Mikhailovsky, Leonard Konstantinovich. Method of converting the electromagnetic spectrum carrier frequency and an electromagnetic energy receiver for same. 4,059,803, Cl. 325-445.000.
Mikhalev, Nikolai Alexandrovich; Shtarkman, Boris Petrovich; and Gladyshev, Jury Ivanovich. Device for preparing polymer articles from monomers. 4,059,374, Cl. 425-207.000.
Miles, Lyndon James; and Jones, Ivor Wynn, to Electricity Council, The. Production of beta-alumina ceramic articles and furnace therefor. 4,059,663, Cl. 264-65.000.
Miles, Oscar L. Turf growing apparatus. 4,058,930, Cl. 47-58.000.
Milkes, C. Paul, to American Communication Systems. Touchpad dialer for mobile telephones. 4,059,728, Cl. 179-2.00E.
Miller, Bernard; Martin, J. Ronald; Meiser, Charles H., Jr.; Lambert, Harold W.; and Buvel, Harry, to Textile Research Institute. Convective air flow dynamic calorimeter. 4,059,007, Cl. 73-190.00R.
Milliken Research Corporation: *See—*
  McCollough, John K., 4,058,991, Cl. 68-205.00R.
Mills, John Alfred: *See—*
  Molins, Desmond Walter; Mills, John Alfred; and Doerman, Eryk Stefan, 4,059,120, Cl. 131-23.00R.
Mills, Robert J.: *See—*
  Alvarez, Joseph A.; and Mills, Robert J., 4,059,316, Cl. 308-8.200.
Milne, David John: *See—*
  Holliday, Robin David; and Milne, David John, 4,059,673, Cl. 423-136.000.
Mindler, Fredric A.: *See—*
  Hochreiter, William Thomas; Craig, Loren Jackson; and Mindler, Fredric A., 4,059,836, Cl. 354-29.000.
Minnesota Mining and Manufacturing Company: *See—*
  Deering, Hartland W., Jr., 4,059,210, Cl. 225-47.000.
  Pletcher, Wayne A., 4,059,715, Cl. 428-349.000.
  Richards, Shirley T., 4,059,114, Cl. 128-287.000.
Mino, George M.; and Dustin, Donald L., to Bethlehem Steel Corporation. Partially alloyed galvanize product and method. 4,059,711, Cl. 427-310.000.
Mirtain, Henri J.; and Devienne, Andre M., to Uniroyal, S.A. Run-flat tire and hub therefor. 4,059,138, Cl. 152-330.0RF.
Mishima, Hiroshi; Ogiso, Akira; and Kobayashi, Shinsaku, to Sankyo Company Limited. Polyprenyl derivatives. 4,059,641, Cl. 260-635.00R.
Mishin, Konstantin Yakovlevich: *See—*
  Alexandrov, Anatoly Julianovich; Grushko, July Sergeevich; Makarov, Evgeny Fredovich; Mishin, Konstantin Yakovlevich; and Baltrunas, Daljus Antanas Jono, 4,059,769, Cl. 250-493.000.
Misson, George W.: *See—*
  Starr, Eugene W.; and Misson, George W., 4,059,427, Cl. 65-25.00A.
Misto$_2$Gen Equipment Co.: *See—*
  Holland, Charles M.; and Parrack, Lawrence W., 4,059,384, Cl. 425-577.000.
Mitchell, Donald K.: *See—*
  Hood, Frederick E.; Mitchell, Donald K.; and Uhring, Gary S., 4,059,063, Cl. 114-106.000.
Mitchell, James T., to Westinghouse Electric Corporation. Interconnected module. 4,059,849, Cl. 361-395.000.
Mitchell, Wallace F., to Ammco Tools, Inc. Grinder attachment for a lathe. 4,058,937, Cl. 51-259.000.
Mitsubishi Gas Chemical Company, Inc.: *See—*
  Yonemitsu, Eiichi; Isshiki, Tomiya; and Kijima, Yasuhiko, 4,059,582, Cl. 260-252.000.
  Yoshizaki, Hiroyuki; Takanihashi, Hiromitsu; and Masuda, Yoshitaka, 4,059,565, Cl. 260-47.0XA.
Mitsubishi Jidosha Kogyo Kabushiki Kaisha: *See—*
  Yamanaka, Akira, 4,059,304, Cl. 296-35.00R.
Mitsubishi Petrochemical Co., Ltd.: *See—*
  Takematsu, Tetsuo; Konnai, Makoto; Takeda, Makoto; Fuga, Nobuhiko; Ikeda, Kaoru; and Shugaya, Kiyoshi, 4,059,431, Cl. 71-87.000.

  Takematsu, Tetsuo; Konnai, Makoto; Takeda, Makoto; Fuga, Nobuhiko; Ikeda, Kaoru; and Shugaya, Kiyoshi, 4,059,432, Cl. 71-87.000.
  Yamaguchi, Yoshinobu; Kitano, Nanahiko; Watanabe, Yoshihisa; and Imanari, Makoto, 4,059,544, Cl. 252-471.000.
Mitsubishi Rayon Co., Ltd.: *See—*
  Kakihana, Hidetake; and Miyamatsu, Tokuhisa, 4,059,670, Cl. 423-7.000.
  Musha, Morito; Sawa, Tomizo; and Kato, Osami, 4,059,511, Cl. 210-23.00R.
Mixon, James Lenhart, Jr., to AMP Incorporated. Electrical connector. 4,059,333, Cl. 339-247.000.
Miyamatsu, Tokuhisa: *See—*
  Kakihana, Hidetake; and Miyamatsu, Tokuhisa, 4,059,670, Cl. 423-7.000.
Miyashiro, Shigeyoshi: *See—*
  Nakamura, Junji; Miyashiro, Shigeyoshi; Hirose, Yoshio; and Awao, Takeyoshi, 4,059,572, Cl. 260-112.00R.
Mizutani, Masumi; Hata, Hiromichi; and Shimazaki, Masasuke, to Showa Industries Co., Ltd.; Fujisoku Electric Co., Ltd.; and Kitoku Co., Ltd. Liquid quality-evaluating apparatus. 4,059,006, Cl. 73-17.00A.
Mobay Chemical Corporation: *See—*
  Smith, Donovan Norman, Jr., 4,059,634, Cl. 260-593.00R.
Moberg, Sigurd Manfred; and Lundberg, George A., to E. J. Brooks Company. Seal. 4,059,300, Cl. 292-322.000.
Mobil Oil Corporation: *See—*
  Clark, Robert L.; and Dahan, Paul C., 4,059,065, Cl. 114-256.000.
  Derr, Walter R.; McClernon, Joseph R.; McGovern, Stephen J.; and Smith, Fritz A., 4,059,648, Cl. 260-676.00R.
  Eisenhardt, Frank B.; and Muehlberger, Stanislaus F., 4,059,509, Cl. 209-166.000.
  Jones, John P., Jr., 4,059,202, Cl. 220-325.000.
Mochizuki, Koichi; and Hiragaki, Shigeho, to Japan Spectroscopic Co., Ltd. Column for use in high speed liquid chromatography. 4,059,523, Cl. 210-198.00C.
Modular Products Corporations (Labelmaster Division): *See—*
  Fund, Harry, 4,058,918, Cl. 40-129.00C.
Mohr, Harvey O., to HydroTech International, Inc. Pressure balanced safety pipeline connector. 4,059,288, Cl. 285-2.000.
Moisar, Erik: *See—*
  Vanassche, Willy Joseph; Pattyn, Herman Alberik; Moisar, Erik; and Klotzer, Sieghart, 4,059,450, Cl. 96-101.000.
Molins, Desmond Walter; Mills, John Alfred; and Doerman, Eryk Stefan, to Molins Limited. Manufacture of cigarettes. 4,059,120, Cl. 131-23.00R.
Molins Limited: *See—*
  Molins, Desmond Walter; Mills, John Alfred; and Doerman, Eryk Stefan, 4,059,120, Cl. 131-23.00R.
Molins Machine Company Inc.: *See—*
  Coburn, Robert E., 4,059,474, Cl. 156-356.000.
Mollere, John C., to Hercules Incorporated. Detector assembly for seismic marine survey. 4,059,819, Cl. 340-8.0LF.
Moltrecht, Reinhold. Telephone number register. 4,058,920, Cl. 40-336.000.
Monarch Marking Systems, Inc.: *See—*
  Hamisch, Paul H., Jr., 4,059,476, Cl. 156-384.000.
Mongeau, Roland E., to Tower Manufacturing Corporation. Multiposition switch assembly having plural operator with primary and secondary detented cams. 4,059,738, Cl. 200-6.00B.
Monsanto Company: *See—*
  Bittle, David F.; and McPeters, Arnold L., 4,059,668, Cl. 264-290.00R.
  Ruest, Dennis A.; Kidwell, Roger L.; and Shen, Chung Y., 4,059,579, Cl. 544-172.000.
  Tolbert, William R.; and Feder, Joseph, 4,059,485, Cl. 195-1.800.
  Tolbert, William R., 4,059,486, Cl. 195-1.800.
Mont, Walter. Topical liquid or ointment. 4,059,690, Cl. 424-150.000.
Montabert, Roger. Hollow percussion drill rod with seal for cleaning fluid inlet tube. 4,059,279, Cl. 277-166.000.
Montclair Research Corporation: *See—*
  Grossman, Harold, 4,059,119, Cl. 131-9.000.
Montecatini Edison S.p.A.: *See—*
  Pinamonti, Franco; and Maccone, Sergio, 4,059,698, Cl. 424-211.000.
Moore, Arnold Robert: *See—*
  Smith, Roland Wright; and Moore, Arnold Robert, 4,059,707, Cl. 427-35.000.
Moore, Charles H. Process for producing heavy-duty high-pressure ferrous metal cup-shaped products having a cylindrical barrel. 4,059,003, Cl. 72-256.000.
Moore, Joseph E., to Chevron Research Company. Certain 4-halo-5-aryl-1,2,3-dithiazole compounds and their preparation. 4,059,590, Cl. 260-306.80R.
Moore, Prentice G.: *See—*
  Dierker, Jeffrey A.; and Moore, Prentice G., 4,059,798, Cl. 324-127.000.
Moore, Roland E. Dental aspirator tip. 4,058,896, Cl. 32-33.000.
Moorhouse, Stephen; Horsfall, Harry; and Dean, Alan Rangeley, to David Brown Tractors Limited. Agricultural tractor with draft load sensing springs for power lift control. 4,059,159, Cl. 172-7.000.
Mordkovich, Andrei Efremovich: *See—*
  Barannik, Ivan Andreevich; Kondratenko, Anatoly Borisovich; Trukhin, Alexandr Fedorovich; Raskatov, Viktor Georgievich; Zharovsky, Ivan Vasilievich; Rudakov, Viktor Alexandrovich; Mordkovich, Andrei Efremovich; and Chalov, Alexandr Vasilievich, 4,059,372, Cl. 425-8.000.
Mordwinkin, George, to Sensor Corporation. Digital eddy current apparatus for sensing and analyzing metallurgical characteristics of an electrically conductive material. 4,059,795, Cl. 324-233.000.
Morgan, Horace P.: *See—*
  Gambs, Gerard C.; and Morgan, Horace P., 4,059,060, Cl. 110-1.00J.
Morita, Akiyoshi; Hayasaka, Tamio; Shimizu, Kunio; and Fukuda, Tokiharu, to Toyota Jidosha Kogyo Kabushiki Kaisha. Method of and a means for pouring molten metal in a die casting device. 4,059,143, Cl. 164-113.000.
Morland, Richard Harlon, to Illinois Tool Works Inc. Screw shank slotting mechanism. 4,058,864, Cl. 10-2.000.
Morokawa, Shigeru: *See—*
  Tamaru, Munetaka; Kume, Kazunari; Oono, Hideshi; Watanabe, Minoru; Sato, Hideo; and Morokawa, Shigeru, 4,058,969, Cl. 58-23.0BA.
Morris, Earl Lavern; and Fields, Larry, to Acorn Engineering Company. Waste drain connection. 4,059,289, Cl. 285-56.000.
Morro, William Charles; Hakka, Leo Ernest; Brophy, James Mackay; Hebrard, Michel Jacques Roger; and Courtes, Jean Claude, to Union Carbide Canada Limited. Hydrocarbon/silicon oil lubricating compositions for low temperature use. 4,059,534, Cl. 252-32.70E.
Morse, Henry W.: *See—*
  McGahan, Wallace A.; Webb, Paul D.; and Morse, Henry W., 4,059,368, Cl. 417-243.000.
Morton-Norwich Products, Inc.: *See—*
  Pelosi, Stanford S.; White, Ronald E.; Wright, George C.; and Yu, Chia Nien, 4,059,597, Cl. 260-347.700.
Moss, Robert J.; and Hurst, Forrest G. Grass cutting blades. 4,058,959, Cl. 56-295.000.
Motoren- und Turbinen-Union Friedrichshafen GmbH: *See—*
  Rudert, Wolfgang, 4,059,080, Cl. 123-41.330.
Motter, Theodore J.: *See—*
  Mattimoe, Paul T.; Motter, Theodore J.; Hofmann, John J.; and Herliczek, Siegfried H., 4,059,469, Cl. 156-108.000.
Movshovich, Pavel Mikhailovich; Khavkin, Viktor Pavlovich; Maximov, Gennady Konstantinovich; Babushkina, Natalya Borisovna; Baranov, Alexandr Anatolievich; Ivanov, Lev Nikolaevich; Nezelenov, Sergei Vladimirovich; Shutov, Gennady Nikolaevich; Tsygulev, Leonid Nikiforovich; and Ilin, Vadim Sergeevich. Distributing device for supplying compressed air to chambers of apparatus for making self-twisted product. 4,058,960, Cl. 57-34.0AT.
Muckelrath, Ernest R., to Tioga Air Heaters, Co. Metal fence post and method of making. 4,058,882, Cl. 29-407.000.
Muehlberger, Stanislaus F.: *See—*
  Eisenhardt, Frank B.; and Muehlberger, Stanislaus F., 4,059,509, Cl. 209-166.000.
Mullen, Daniel J.: *See—*
  Eddy, Wesley L.; Mullen, Daniel J.; and Bonham, Arthur R., 4,059,729, Cl. 179-15.0BF.
Muller, Heinz, to Hoechst Aktiengesellschaft. Process for the work-up of a contaminated inactive mercury(II)chloride/active carbon-catalyst. 4,059,438, Cl. 75-81.000.
Mullner, Franz, to Steyr-Daimler-Puch Aktiengesellschaft. Pretriggerable trigger mechanism for sporting rifles. 4,058,924, Cl. 42-69.00R.
Mumford, George V., to Owens-Illinois, Inc. Vapor-seal safety cap and container. 4,059,198, Cl. 215-222.000.
Murakami, Kazumasa; and Natori, Takashi, to Nippon Crucible Co., Ltd. Method of making immersion nozzle and long stopper for continuous casting of steel. 4,059,662, Cl. 264-62.000.
Murakami, Yuetsu: *See—*
  Masumoto, Hakaru; Murakami, Yuetsu; and Nakamura, Naoji, 4,059,462, Cl. 148-31.550.
Murao, Sawao: *See—*
  Nishino, Toyokazu; Hamagishi, Yasutaro; Oki, Toshikazu; and Murao, Sawao, 4,059,487, Cl. 195-28.00N.
Murdock, David M., to Stanford Research Institute. Flexible ultrasound coupling system. 4,059,098, Cl. 128-2.00V.
Murphy, John A. Georadiological surveying for oil and gas and subsurface structure contour mapping. 4,059,760, Cl. 250-253.000.
Musha, Morito; Sawa, Tomizo; and Kato, Osami, to Mitsubishi Rayon Co., Ltd. Method for clarifying waste water containing finely divided oily materials. 4,059,511, Cl. 210-23.00R.
Nacey, Michael: *See—*
  Watters, Bill G.; Nacey, Michael; and Horrall, Thomas R., 4,059,726, Cl. 179-1.50M.
Nachbur, Hermann; and Rohringer, Peter, to Ciba-Geigy Corporation. Phosphorus-containing reaction products useful as flameproofing agents. 4,059,532, Cl. 252-8.100.
Nagano, Katsusuke, to Dai Nippon Insatsu Kabushiki Kaisha. Method of making an intaglio halftone gravure printing plate. 4,059,481, Cl. 156-660.000.
Nagumo, Fumio: *See—*
  Yamanaka, Seisuke; and Nagumo, Fumio, 4,059,839, Cl. 358-44.000.
Naka, Hiromitsu. Flexible non-skid strip with fluorescent surface portions. 4,058,942, Cl. 52-179.000.
Nakai, Shiro; and Nakamura, Minoru, to Glory Kogyo Kabushiki Kaisha. Coin stack supporting device in coin wrapping machine. 4,058,955, Cl. 53-212.000.
Nakaizumi, Yasushi; Ueno, Yukichi; and Okumura, Masahide, to Hitachi, Ltd. Field emission apparatus. 4,059,783, Cl. 315-107.000.
Nakamura, Junji; Miyashiro, Shigeyoshi; Hirose, Yoshio; and Awao, Takeyoshi, to Ajinomoto Co., Inc. Mucopolysaccharide having

flocculating activity of protein and method for producing the same. 4,059,572, Cl. 260-112.00R.

Nakamura, Masaya, to Kabushiki Kaisha Nakamura Seisakusho. Game machine. 4,059,266, Cl. 273-1.00E.

Nakamura, Minoru: *See—*

Nakai, Shiro; and Nakamura, Minoru, 4,058,955, Cl. 53-212.000.

Nakamura, Naoji: *See—*

Masumoto, Hakaru; Murakami, Yuetsu; and Nakamura, Naoji, 4,059,462, Cl. 148-31.550.

Nakamura, Yasuharu: *See—*

Sugiyama, Masatoshi; Kato, Eiichi; and Nakamura, Yasuharu, 4,059,448, Cl. 96-84.00A.

Nakamura, Yasusi; Umemura, Masashi; and Yonekura, Michimasa, to Asahi Denka Kogyo K.K. Fluorine-containing dicarbamate esters. 4,059,613, Cl. 560-26.000.

Nakano, Takashi: *See—*

Kitamura, Takashi; Watanabe, Asao; Nakano, Takashi; Masaki, Katsumi; Hirayama, Kazuhiro; Sato, Yasushi; and Tokiwa, Taisuke, 4,059,833, Cl. 346-108.000.

Nakasu, Makoto: *See—*

Tohyama, Masao; Ichigo, Minoru; Suzuki, Takeshi; Nakasu, Makoto; Ando, Akinobu: Yoshida, Akitoshi; Kosaka, Masaharu; Hayasi, Norihisa; and Inoue, Shigeki, 4,059,553, Cl. 260-29.60S.

Narang, Saran A.; and Stawinski, Jacek, to Canadian Patents and Development Limited. Arylsulfonyl tetrazoles. 4,059,592, Cl. 260-308.00D.

Narco Scientific Industries, Inc.: *See—*

Jernigan, Marvin E., 4,059,348, Cl. 351-30.000.

Nash, Charles A. Switch controlled power receptacle system. 4,059,773, Cl. 307-115.000.

Nash, John E., to Star Dental Manufacturing Co., Inc. Dental burr. 4,058,898, Cl. 32-59.000.

National Distillers and Chemical Corporation: *See—*

Goetz, Richard W., 4,059,640, Cl. 260-635.00R.

National Research Development Corporation: *See—*

Devas, Michael Bertrand, 4,059,102, Cl. 128-92.00B.

Fawcett, John Neville; and Nicol, Stuart William, 4,059,022, Cl. 74-226.000.

Mansfield, Wilfred Percival; and Priede, Theodor, 4,059,085, Cl. 123-195.00R.

National-Standard Company: *See—*

Lang, Ernest U., 4,059,177, Cl. 192-41.00S.

Natori, Takashi: *See—*

Murakami, Kazumasa; and Natori, Takashi, 4,059,662, Cl. 264-62.000.

Natsuume, Tadao: *See—*

Goto, Kuniaki; Asai, Harumi; and Natsuume, Tadao, 4,059,563, Cl. 260-45.95H.

NCR Corporation: *See—*

Betts, William L., 4,059,735, Cl. 179-18.0BC.

Nutter, Roy S., Jr.; Washburn, Jerry R.; and Verwys, John H., 4,059,851, Cl. 364-200.000.

Stewart, John W., 4,059,844, Cl. 361-152.000.

Nederlandsche Organisatie Voor Toegepast-Natuurwetenschappelijk Onderzoek Ten Behoeve Van Nijverheid: *See—*

Feis, Nikolaas, 4,059,129, Cl. 138-37.000.

Nelson McCoy Pottery Company: *See—*

Wheeler, Howard R., 4,058,869, Cl. 15-101.000.

Nelson, Peter H.; and Untch, Karl G., to Syntex (U.S.A.) Inc. Oxidative process for the preparation of 2-(5H-Dibenzo[a,d]cyclohepten-5-on-2-yl)acetic, propionic and butyric acid. 4,059,611, Cl. 260-456.00P.

Nesslage, Donald John; Yu, Lin Sheng; and Shaw, Michael Francis, to Phelps Dodge Industries, Inc. Oxygen-free copper product and process. 4,059,437, Cl. 75-76.000.

Netlon Limited: *See—*

Mercer, Frank Brian, 4,059,713, Cl. 428-36.000.

Neu, Ernest L., to Grefco, Inc. Method and apparatus for selectively comminuting particles of a frangible material. 4,059,231, Cl. 241-5.000.

Neufeldt, Jacob J. Vehicle tailgate assembly. 4,059,307, Cl. 298-23.00R.

Neukam, Theo; Reinehr, Ulrich; Bentz, Francis; and Nischk, Gunther, to Bayer Aktiengesellschaft. Spinnable solutions containing crosslinkable copolymers of acrylonitrile and n-methylol alkyl ether acrylamides. 4,059,556, Cl. 260-30.200.

Nezelenov, Sergei Vladimirovich: *See—*

Movshovich, Pavel Mikhailovich; Khavkin, Viktor Pavlovich; Maximov, Gennady Konstantinovich; Babushkina, Natalya Borisovna; Baranov, Alexandr Anatolievich; Ivanov, Lev Nikolaevich; Nezelenov, Sergei Vladimirovich; Shutov, Gennady Nikolaevich; Tsygulev, Leonid Nikiforovich; and Ilin, Vadim Sergeevich, 4,058,960, Cl. 57-34.0AT.

Nicholls, Joseph A. Traffic signal controller flasher for pedestrian clearance. 4,059,821, Cl. 340-44.000.

Nicholson, Floyd A.: *See—*

Martin, Clyde J.; and Nicholson, Floyd A., 4,059,823, Cl. 340-58.000.

Nickel, Hubertus: *See—*

Luhleich, Hartmut; Nickel, Hubertus; and Dias, Francesco, 4,059,682, Cl. 423-448.000.

Nickerson, Malcolm Horace, to B. F. Goodrich Company, The. Solar actuated siphon drain. 4,059,126, Cl. 137-142.000.

Nickey, George Allen: *See—*

Heckman, Russell William; and Nickey, George Allen, 4,059,400, Cl. 432-124.000.

Nicol, Stuart William: *See—*

Fawcett, John Neville; and Nicol, Stuart William, 4,059,022, Cl. 74-226.000.

Nicolas, Jean; Lagrange, Alain; and Hildebrandt, Nieczyslaw, to Thomson-CSF. Method of manufacturing ferrimagnetic material for recording, read out and erase heads utilized in magnetic layer devices. 4,059,664, Cl. 264-66.000.

Nielsen, Anker J., Jr. Barrel type lock and key. 4,058,992, Cl. 70-34.000.

Nilson, Eric L.: *See—*

Polley, Richard D.; Nilson, Eric L.; Constantakis, Roberto; and Pruitt, Donovan E., 4,059,522, Cl. 210-198.00R.

Nims, Jerry Curtis: *See—*

Lo, Allen Kwok Wah; and Nims, Jerry Curtis, 4,059,354, Cl. 355-22.000.

Ninomiya, Hiroshi: *See—*

Tanaka, Wataru; Akito, Eiichiro; Yoshida, Koichi; Terada, Takashi; and Ninomiya, Hiroshi, 4,059,686, Cl. 424-19.000.

Nippon Crucible Co., Ltd.: *See—*

Murakami, Kazumasa; and Natori, Takashi, 4,059,662, Cl. 264-62.000.

Nippon Electric Company, Ltd.: *See—*

Sakoe, Hiroaki, 4,059,725, Cl. 179-1.50D.

Nippon Gohsei Kagaku Kogyo Kabushiki Kaisha: *See—*

Takida, Hiroshi; Kido, Akio; and Takahashi, Masazumi, 4,058,904, Cl. 34-12.000.

Nippon Kayaku Kabushiki Kaisha: *See—*

Tanaka, Wataru; Akito, Eiichiro; Yoshida, Koichi; Terada, Takashi; and Ninomiya, Hiroshi, 4,059,686, Cl. 424-19.000.

Nippon Oil Company Ltd.: *See—*

Imai, Hirosuke; and Ito, Hiroyuki, 4,059,555, Cl. 260-29.70H.

Nippon Soken, Inc.: *See—*

Toshioka, Toru; Oishi, Kazuo; and Yamada, Takashi, 4,059,822, Cl. 340-52.00H.

Nippon Steel Corporation: *See—*

Takemura, Susumu; Onoyama, Masao; and Tsuji, Masanobu, 4,059,440, Cl. 75-126.00C.

Nippon Zeon Co. Ltd.: *See—*

Goto, Kuniaki; Asai, Harumi; and Natsuume, Tadao, 4,059,563, Cl. 260-45.95H.

Nippondenso Co., Ltd.: *See—*

Kasima, Osamu; and Sanda, Shougo, 4,059,079, Cl. 123-30.00D.

Nischk, Gunther: *See—*

Neukam, Theo; Reinehr, Ulrich; Bentz, Francis; and Nischk, Gunther, 4,059,556, Cl. 260-30.200.

Nishibata, Atsushi: *See—*

Handa, Susumu; Tanaka, Yoshiaki; Nishibata, Atsushi; Ueda, Sadashi; Inamoto, Yoshiaki; Saito, Masahiro; Tanimoto, Fumio; and Kitano, Hisao, 4,059,610, Cl. 544-193.000.

Nishijima, Masanori; Oda, Nobuyuki; and Terada, Haruyoshi, to Oxy Metal Industries Corporation. Metal surface treatment. 4,059,452, Cl. 106-14.000.

Nishikawa, Mikio: *See—*

Hori, Kikuo; Horiuchi, Takumi; Nishikawa, Mikio; Ryugo, Shiro; Ishizuka, Akira; and Takenaka, Yoshisuke, 4,059,239, Cl. 242-18.100.

Nishimoto, Kichinosuke; and Nishimura, Seiichiro, to Bridgestone Tire Company Limited. Tire finishing apparatus. 4,059,139, Cl. 157-13.000.

Nishimura, Seiichiro: *See—*

Nishimoto, Kichinosuke; and Nishimura, Seiichiro, 4,059,139, Cl. 157-13.000.

Nishino, Toyokazu; Hamagishi, Yasutaro; Oki, Toshikazu; and Murao, Sawao, to Sanraku-Ocean Co., Ltd. Purine nucleoside 5'-phosphate(-mono, di or tri)3'(2')-diphosphates and processes for their preparation. 4,059,487, Cl. 195-28.00N.

Nishiyama, Keizo; Maeda, Sadao; and Iwata, Kohshi, to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho; and Kabushiki Kaisha Maeda Shell Service. Process for plating shaped articles made of synthetic resins. 4,059,710, Cl. 427-307.000.

Nissan Kagaku Kogyo Kabushiki Kaisha: *See—*

Tohyama, Masao; Ichigo, Minoru; Suzuki, Takeshi; Nakasu, Makoto; Ando, Akinobu; Yoshida, Akitoshi; Kosaka, Masaharu; Hayasi, Norihisa; and Inoue, Shigeki, 4,059,553, Cl. 260-29.60S.

Nissan Motor Co., Ltd.: *See—*

Kosaka, Katuaki; and Ueno, Zene, 4,059,076, Cl. 123-3.000.

Kosaka, Katuaki; Wagatsuma, Fumio; Shimomoto, Mithuo; Harada, Osamu; and Ueno, Zene, 4,059,415, Cl. 48-63.000.

Nix, George J.; Barrington, Burchus Q.; Farley, David L.; and Hortman, Norman G., to Halliburton Company. Weight and pressure operated well testing apparatus and its method of operation. 4,059,153, Cl. 166-264.000.

Noble, Howard E. Follow through indicator for bowlers. 4,059,267, Cl. 273-54.00B.

Nobuo, Yoshimori. Classifying apparatus for particulate materials. 4,059,507, Cl. 209-139.00A.

Nolan, James J.: *See—*

Markowski, Stanley J.; and Nolan, James J., 4,058,977, Cl. 60-39.650.

Noranda Mines Limited: *See—*

Kitzinger, Frank; and Rosenblum, Frank, 4,059,016, Cl. 73-304.00R.

Nordson Corporation: *See—*

Scholl, Charles H.; Janner, John R., Jr.; Stumphauzer, William C.; and Shuster, Duane O., 4,059,466, Cl. 156-78.000.

Scholl, Charles H.; Janner, John R., Jr.; and Stumphauzer, William C., 4,059,714, Cl. 428-310.000.

Norprint Limited: *See—*

Wright, Maurice J., 4,059,203, Cl. 221-73.000.

North American Philips Corporation: *See—*

Madsen, Elmer W.; and Soden, George B., 4,059,024, Cl. 74-421.00R.

Northwestern University: *See—*

Epstein, Max, 4,059,831, Cl. 343-6.80R.

Northwood Pulp and Timber Limited: *See—*

Kahlert, George; Pommer, Lawrence; Davis, John; and Whebell, Bert, 4,059,061, Cl. 110-7.00A.

Norton Company: *See—*

Kiovsky, Joseph R.; and Koradia, Pramad B., 4,059,543, Cl. 252-455.00Z.

Norton, Ted R.; Shibata, Shoji; and Kashiwagi, Midori, to University of Hawaii, The. Cardiotonic agent. 4,059,694, Cl. 424-177.000.

Nubani, Jawdat Ibrahim; and Rysz, Walter Robert, to RCA Corporation. Method of assembling a mask-panel assembly of a shadow-mask cathode-ray tube. 4,058,875, Cl. 29-25.150.

Nutter, Roy S., Jr.; Washburn, Jerry R.; and Verwys, John H., to NCR Corporation. Priority network for devices coupled by a common bus. 4,059,851, Cl. 364-200.000.

Nylund, Ragnar: *See—*

Kankaanpaa, Matti; Nylund, Ragnar; and Reijonen, Yrjo, 4,059,482, Cl. 162-281.000.

Oakland Corporation, The: *See—*

Wallace, Richard B., 4,059,136, Cl. 151-14.500.

Obayashi, Nobuharu; Hashizume, Hikaru; Sakashita, Noriji; Kameyama, Sejji; Ezawa, Sadaaki; Kugisawa, Toshio; Washiyama, Yutaka; Kondo, Tatsunori; and Watanabe, Hironori, to Kabushiki Kaisha Kawai Gakki Seisakusho. Tone-source apparatus for electronic musical instrument. 4,059,040, Cl. 84-1.030.

Oceanic Contractors Inc.: *See—*

Gerbault, Marcel; and Gair, Robert, 4,058,987, Cl. 61-86.000.

O'Connell, Donald L., to Floral Innovations, Inc. Holder for a foam block for supporting flower arrangements. 4,058,929, Cl. 47-41.120.

Oda, Nobuyuki: *See—*

Nishijima, Masanori; Oda, Nobuyuki; and Terada, Haruyoshi, 4,059,452, Cl. 106-14.000.

Office National d'Etudes et de Recherches Aerospatiales: *See—*

Gay, Michel J. L., 4,059,797, Cl. 324-60.00C.

Ogiso, Akira: *See—*

Mishima, Hiroshi; Ogiso, Akira; and Kobayashi, Shinsaku, 4,059,641, Cl. 260-635.00R.

Ohio University: *See—*

Clearfield, Abraham, 4,059,679, Cl. 423-306.000.

Ohlinger, Manfred: *See—*

Kopke, Helmut; Ohlinger, Manfred; Grau, Werner; Schoenafinger, Eduard; and Schneehage, Hans Henning, 4,059,716, Cl. 428-403.000.

Ohlson, John Leonard: *See—*

Gaudette, Roger Robert; Ohlson, John Leonard; and Scanlon, Patricia Marie, 4,059,548, Cl. 260-251.00R.

Ohsawa, Mitsuo; Yamatani, Wataru; and Onoe, Yukio, to Sony Corporation. Input level display circuit for receivers. 4,059,802, Cl. 325-398.000.

Oishi, Kazuo: *See—*

Toshioka, Toru; Oishi, Kazuo; and Yamada, Takashi, 4,059,822, Cl. 340-52.00H.

Oita, Masahiro; Hirohata, Hyogo; and Hamasaki, Nobuhiro, to Matsushita Electric Industrial Co., Ltd. Electroless copper plating solution. 4,059,451, Cl. 106-1.260.

Okabe, Hiromichi: *See—*

Hosaka, Hirokazu; Tanimoto, Kenji; Okabe, Hiromichi; Tanaka, Kunthiko; Ueda, Yuji; and Dohgane, Iwao, 4,059,637, Cl. 260-610.00A.

Okami, Takehide, to Shin-Etsu Chemical Company Limited. Primer compositions. 4,059,473, Cl. 156-308.000.

O'Kane, Daniel Francis: *See—*

Gulitz, Louis; Kwap, Theodore William; Lisle, Walter Irving; O'Kane, Daniel Francis; and Poponiak, Michael Robert, 4,059,385, Cl. 431-12.000.

Oki, Toshikazu: *See—*

Nishino, Toyokazu; Hamagishi, Yasutaro; Oki, Toshikazu; and Murao, Sawao, 4,059,487, Cl. 195-28.00N.

Okuda, Itsuki: *See—*

Sugiyama, Hironari; Chiyomaru, Isao; Okuda, Itsuki; Yamamoto, Hisaaki; and Ito, Hideo, 4,059,635, Cl. 260-609.00E.

Okumura, Koji, to Xerox Corporation. Electrical information storage system. 4,059,443, Cl. 96-1.0PS.

Okumura, Masahide: *See—*

Nakaizumi, Yasushi; Ueno, Yukichi; and Okumura, Masahide, 4,059,783, Cl. 315-107.000.

Olin, Gerard: *See—*

Aimar, Jean Louis; and Olin, Gerard, 4,059,787, Cl. 318-568.000.

Ollinger, Janet, to Rohm and Haas Company. N-(Substituted)aminocarbonyl O,S-dialkyl phosphoramido(di)thioates and method of controlling arthropods. 4,059,697, Cl. 424-211.000.

Olschewski, Armin: *See—*

Ernst, Horst Manfred; Olschewski, Armin; Schurger, Rainer; Walter, Lothar; Brandenstein, Manfred; and Burkl, Erich, 4,059,179, Cl. 192-98.000.

Olson, Gregory J.; and Chapman, Wayne A., to Packaging Corporation of America. Shipping container and blank therefor. 4,059,221, Cl. 229-39.00R.

Olson, Leonard J. Self-cleaning non-return drainage valve. 4,059,127, Cl. 137-244.000.

Olympus Optical Co., Ltd.: *See—*

Tojyo, Tsutomu, 4,059,342, Cl. 350-175.0ML.

Yamasita, Nobuo, 4,059,344, Cl. 350-220.000.

Omnimed, Inc.: *See—*

Cutruzzula, Jeffrey F.; and Schattner, Robert L., 4,059,105, Cl. 128-133.000.

Omura, Shinichi: *See—*

Hosokoshi, Kakuichiro; Yamamoto, Hikoshi; Tanaka, Masayuki; and Omura, Shinichi, 4,059,834, Cl. 354-1.000.

Onoe, Yukio: *See—*

Ohsawa, Mitsuo; Yamatani, Wataru; and Onoe, Yukio, 4,059,802, Cl. 325-398.000.

Onoyama, Masao: *See—*

Takemura, Susumu; Onoyama, Masao; and Tsuji, Masanobu, 4,059,440, Cl. 75-126.00C.

Oono, Hideshi: *See—*

Tamaru, Munetaka; Kume, Kazunari; Oono, Hideshi; Watanabe, Minoru; Sato, Hideo; and Morokawa, Shigeru, 4,058,969, Cl. 58-23.0BA.

Oronzio de Nora Impianti Elettrochimici S.p.A.: *See—*

de Nora, Oronzio; and de Nora, Vittorio, 4,059,495, Cl. 204-98.000.

Osborne, Thomas E.: *See—*

Dickinson, Peter D.; Osborne, Thomas E.; Rode, France; and Baum, Allen J., 4,059,750, Cl. 364-715.000.

Osteen, Mitchell M.: *See—*

Tart, David K.; and Osteen, Mitchell M., 4,059,753, Cl. 362-267.000.

Oswald, Alexis A., to Exxon Research & Engineering Co. Polythioether polyurethanes and their preparation. 4,059,570, Cl. 260-77.5AP.

Otsuka Kagaku Yakuhin Kabushiki Kaishi: *See—*

Shono, Tatsuya; and Matsumura, Yoshihiro, 4,059,595, Cl. 260-345.90R.

Otto, Heinz; and Ilsemann, Bernhard, to Volkswagenwerk Aktiengesellschaft. Wheel suspension for motor vehicles. 4,059,286, Cl. 280-673.000.

Ouelette, Ronald J.; Canney, Robert S.; and Stetson, Ralph B., to General Electric Company. Dry-type instrument transformer with potential tap and connector therefor. 4,059,326, Cl. 339-113.00R.

Outboard Marine Corporation: *See—*

Roseberry, Ward A., 4,058,957, Cl. 56-11.300.

Sheldon, John D., 4,059,371, Cl. 418-61.00A.

Waskiewicz, John J.; and Winston, John H., 4,059,310, Cl. 302-42.000.

Overlach, Knud: *See—*

Pietzsch, Ludwig; and Overlach, Knud, 4,059,012, Cl. 73-141.00A.

Overway, Roy E.: *See—*

Saylor, Lee H.; and Overway, Roy E., 4,059,278, Cl. 277-139.000.

Owen, Alfred B.; and Gifford, Bruce M., to Lamons Metal Gasket Company. Circular double-jacketed gasket with single joint. 4,059,215, Cl. 228-173.00C.

Owens-Corning Fiberglas Corporation: *See—*

Benson, Gustav E., 4,058,968, Cl. 57-140.00R.

Owens-Illinois, Inc.: *See—*

Heckman, Russell William; and Nickey, George Allen, 4,059,400, Cl. 432-124.000.

Mumford, George V., 4,059,198, Cl. 215-222.000.

Thomas, Ian M., 4,059,669, Cl. 264-319.000.

Oxy Metal Industries Corporation: *See—*

Nishijima, Masanori; Oda, Nobuyuki; and Terada, Haruyoshi, 4,059,452, Cl. 106-14.000.

Oy Keskuslaboratorio - Centrallaboratorium, Ab: *See—*

Mannstrom, Bo Knut, 4,059,237, Cl. 241-246.000.

Pacansky, Thomas John, to Xerox Corporation. Stabilized emulsion inks. 4,059,554, Cl. 260-29.6WQ.

Packaging Corporation of America: *See—*

Olson, Gregory J.; and Chapman, Wayne A., 4,059,221, Cl. 229-39.00R.

Pagnozzi, Vincenzo, to Ernesto Guglielmo Pagnozzi. Process for drying large pieces of wood at subatmospheric pressure or in vacuo, particularly for drying delicate wood and/or wood which is easily split. 4,058,906, Cl. 34-16.500.

Pakosh, Daniel. Reversible seat and steering console for tractors. 4,059,171, Cl. 180-77.00S.

Paletto, Raimondo, to SGS-ATES Componenti Elettronici SpA. Resin-encased microelectronic module. 4,059,810, Cl. 330-65.000.

Pallas, Spiros George: *See—*

Runge, Thomas M.; Burkhalter, John E.; and Pallas, Spiros George, 4,058,857, Cl. 3-1.700.

Palmer, Sherwin. Loading rack for minicomputer. 4,059,256, Cl. 270-52.000.

Pangonis, William James, to Du Pont de Nemours, E. I., and Company. Biaxially oriented polyethylene terephthalate film and method of making such film. 4,059,667, Cl. 264-289.000.

Panourgias, Constantin George, to Hellenic Plastics and Rubber Industry. Quick-action coupling for pipes or tubes. 4,059,296, Cl. 285-312.000.

Parc, Guy: *See—*

Lallement, Jacques; Parc, Guy; and de Gaudemaris, Gabriel, 4,059,536, Cl. 252-33.300.

Parent, Richard A.: *See—*

Lu, Chin H.; and Parent, Richard A., 4,059,444, Cl. 96-1.0LY.

Parker-Hannifin Corporation: *See—*

Grahl, Darwin R.; and Haramoto, Cary, 4,059,297, Cl. 285-340.000.

Parker, Kathlyn A.; and Kosley, Raymond W., Jr., to Research Corpo-

ration. Process for the preparation of 17(20)ene-21-steroid aldehydes. 4,059,575, Cl. 260-239.500.

Parrack, Lawrence W.: *See—*
Holland, Charles M.; and Parrack, Lawrence W., 4,059,384, Cl. 425-577.000.

Pattyn, Herman Alberik: *See—*
Vanassche, Willy Joseph; Pattyn, Herman Alberik; Moisar, Erik; and Klotzer, Sieghart, 4,059,450, Cl. 96-101.000.

Paulson, John Walter: *See—*
Bredland, Alf Marlov; Fong, Walter Lee; Messing, Terry Glen; and Paulson, John Walter, 4,059,717, Cl. 429-162.000.

Paulucci, Jeno F.: *See—*
Zimmer, Elvis Simon; and Hassell, David Allen, 4,059,398, Cl. 432-121.000.

Payant, Noel M. Tape cassette phrase retriever. 4,059,244, Cl. 242-200.000.

Pearson, Durk J.; and Bohn, Jack R., to TRW Inc. Pressure swing recovery system for oil shale deposits. 4,059,308, Cl. 299-5.000.

Pechmeze, Jacques Pierre Edmond: *See—*
Foulletier, Louis; Pechmeze, Jacques Pierre Edmond; and Sureau, Robert Frederic Michel, 4,059,626, Cl. 260-578.000.

Pelosi, Stanford S.; White, Ronald E.; Wright, George C.; and Yu, Chia Nien, to Morton-Norwich Products, Inc. 1-[5-(2-Nitrophenyl)-2-furancarboximidoyl]-1H-hexahydroazepine hydrochloride. 4,059,597, Cl. 260-347.700.

Pennewiss, Horst: *See—*
Hitzler, Otto; Pennewiss, Horst; Froelich, August; Markert, Gerhard; and Wunderlich, Winfried, 4,059,574, Cl. 260-192.000.

Pennsylvania Pacific Corporation: *See—*
Carnwath, Joseph W., 4,059,057, Cl. 108-51.100.

Perevodchikov, Vladimir Innokentievich; Shapenko, Valentina Nikolaevna; Chernov, Zarem Sergeevich; and Bunina, Nina Sergeevna. Electron-beam converter. 4,059,784, Cl. 315-349.000.

Perkins, Robert W., to Spiral Tubing Corporation. Method of forming helically corrugated tubing. 4,059,004, Cl. 72-299.000.

Perold, Helmuth Conny, to Adjusting Tables Inc. Adjustable table for physical therapy. 4,059,255, Cl. 269-323.000.

Perry Industries, Inc.: *See—*
Champion, Robert J., 4,058,868, Cl. 15-4.000.

Personer Verkstad, AB: *See—*
Tillgren, Gunnar Kurt Arne, 4,059,049, Cl. 100-41.000.

Perucca, Giovanni; Melindo, Flavio; and De Vincentiis, Girolamo, to CSELT - Centro Studi e Laboratori Telecomunicazioni S.p.A. Dual testing system for supervising duplicated telecommunication equipment. 4,059,736, Cl. 179-175.20R.

Pescetto, James R., to L. R. Nelson Corporation. Traveling sprinkler guide wheel assembly. 4,059,229, Cl. 239-183.000.

Peterson, James A.: *See—*
Peterson, James H.; and Peterson, James A., 4,058,932, Cl. 49-177.000.

Peterson, James H.; and Peterson, James A. Mounting apparatus for swinging and sliding doors. 4,058,932, Cl. 49-177.000.

Petrow, Henry G.; and Allen, Robert J., to Prototech Company. Platinum colloid sol and method of forming same. 4,059,541, Cl. 252-313.00R.

Pfeifer, Wolf-Dieter: *See—*
Scherberich, Paul; and Pfeifer, Wolf-Dieter, 4,059,589, Cl. 260-306.70C.

Pfenninger, Hans, to BBC Brown Boveri & Company Limited. Combined gas/steam power plant with pressurized-gas generator. 4,058,974, Cl. 60-39.120.

Pfiffner, Albert: *See—*
Chodnekar, Madhukar Subraya; Pfiffner, Albert; Rigassi, Norbert; Schwieter, Ulrich; and Suchy, Milos, 4,059,600, Cl. 260-348.460.

Pfizer: *See—*
Kadin, Saul Bernard, 4,059,584, Cl. 260-268.0BC.

Phelps Dodge Industries, Inc.: *See—*
Nesslage, Donald John; Yu, Lin Sheng; and Shaw, Michael Francis, 4,059,437, Cl. 75-76.000.

Phillips, Alfred R.; and Logan, Arthur D., to Dayco Corporation. Hose having an electrically conductive layer for dissipating static electricity and method of making same. 4,059,847, Cl. 361-215.000.

Phillips, John J.; and Stephenson, Roger, to G & H Technology, Inc. Snap action breech lock connector. 4,059,332, Cl. 339-113.00R.

Phillips Petroleum Company: *See—*
Chapman, Charles C.; and Hann, Paul D., 4,059,649, Cl. 260-683.480.
Childs, William V., 4,059,633, Cl. 260-593.00H.
De Vault, Albert N.; and Holtz, Hans D., 4,059,535, Cl. 252-33.000.
Holtz, Hans D.; and Bonazza, Benedict R., 4,059,414, Cl. 44-58.000.
Kubicek, Donald H., 4,059,636, Cl. 260-609.00D.
Mathis, Ronald D.; and Dix, James S., 4,059,653, Cl. 260-857.0PG.

Philograph Publications Limited: *See—*
Tacey, Charles Arthur, 4,058,912, Cl. 35-34.000.

Phy, William S., to Fairchild Camera and Instrument Corporation. Device for forming reference axes on an image sensor array package. 4,058,899, Cl. 33-26.000.

Piaget, Robert E. Safety plug unit. 4,059,320, Cl. 339-19.000.

Pickett, James Henry, Jr. Trophy lamp. 4,059,752, Cl. 362-98.000.

Pierce, Perry H.; and Prendergast, Dan L., to Hewlett-Packard Company. Method for mounting printed circuit boards. 4,058,890, Cl. 29-625.000.

Pietzsch, Ludwig; and Overlach, Knud, to Dr. -Ing. Ludwig Pietzsch. Force sensing device. 4,059,012, Cl. 73-141.00A.

Pinamonti, Franco; and Maccone, Sergio, to Montecatini Edison S.p.A. Pesticidal compositions suitable for spreading from aircraft. 4,059,698, Cl. 424-211.000.

Pioneer Motor Bearing Co.: *See—*
Hollingsworth, Leon W., 4,059,318, Cl. 308-73.000.

Pira, Francois Jean: *See—*
De Roeck, Joseph Irma; and Pira, Francois Jean, 4,059,241, Cl. 242-75.500.

Pischke, LaMonte D.; and Shoaf, Myron D., to General Foods Corporation. Spray-dried L-aspartic acid derivatives. 4,059,706, Cl. 426-548.000.

Platt Saco Lowell Limited: *See—*
Shaw, Jack; and Ellingham, Bruce, 4,058,965, Cl. 57-58.910.

Plessey Incorporated: *See—*
Ledgerwood, Harry James, 4,059,212, Cl. 226-141.000.

Pletcher, Wayne A., to Minnesota Mining and Manufacturing Company. Adhesive composition and sheet-like product formed therewith. 4,059,715, Cl. 428-349.000.

Pluker, Hans: *See—*
Lardon, Marcel; and Pluker, Hans, 4,059,067, Cl. 118-7.000.

Plummer, Dexter Robert: *See—*
Gosling, Alexander Bennett; Plummer, Dexter Robert; and Stanwell-Smith, Colin Howard, 4,059,030, Cl. 74-798.000.

Pogozelski, Vincent F.: *See—*
Conger, Robert P.; and Pogozelski, Vincent F., 4,059,709, Cl. 427-264.000.

Poleri, Victor Joseph. Construction kit. 4,058,909, Cl. 35-16.000.

Polley, Richard D.; Nilson, Eric L.; Constantakis, Roberto; and Pruitt, Donovan E., to Iodinamics Corporation. Apparatus for purifying water. 4,059,522, Cl. 210-198.00R.

Polotsky, Vadim Evgenievich: *See—*
Vasiliev, Vladimir Sergeevich; Livshits, Abram Lazarevich; Polotsky, Vadim Evgenievich; and Zlatkin, Yakov Iosifovich, 4,059,788, Cl. 318-577.000.

Polva Nederland B. V.: *See—*
Acda, Petrus Marinus; and Guitoneau, Hans Edward, 4,059,291, Cl. 285-197.000.

Pommer, Lawrence: *See—*
Kahlert, George; Pommer, Lawrence; Davis, John; and Whebell, Bert, 4,059,061, Cl. 110-7.00A.

Poponiak, Michael Robert: *See—*
Gulitz, Louis; Kwap, Theodore William; Lisle, Walter Irving; O'Kane, Daniel Francis; and Poponiak, Michael Robert, 4,059,385, Cl. 431-12.000.

Portec, Inc.: *See—*
Ravani, Chandrakant D.; and Robertson, James C., 4,059,055, Cl. 105-368.00R.

Possum Controls Limited: *See—*
Jones, Michael Lloyd; and Jobson, Peter Meredith, 4,059,786, Cl. 318-17.000.

Post Office, The: *See—*
Kingswell, Leonard William; and Matthews, Oliver Charles, 4,059,727, Cl. 179-2.0AM.

Potomac Applied Mechanics, Inc.: *See—*
Stubbings, James H., 4,058,993, Cl. 70-58.000.

Potter, John Kenneth: *See—*
Green, Robin John; Johnson, Richard Shaw; and Potter, John Kenneth, 4,059,538, Cl. 252-95.000.

Potter, Ralph A.; and Scott, James L., to United States of America, Energy Research and Development Administration. (U,Zr)N alloy having enhanced thermal stability. 4,059,539, Cl. 252-301.10R.

PPG Industries, Inc.: *See—*
Crano, John C., 4,059,655, Cl. 260-983.000.
Rinehart, Jay Kent, 4,059,609, Cl. 260-455.00A.
Sare, Edward J.; and Lavanish, Jerome M., 4,059,677, Cl. 423-240.000.
Starr, Eugene W., 4,059,426, Cl. 65-25.00A.
Starr, Eugene W.; and Misson, George W., 4,059,427, Cl. 65-25.00A.

Prasad, Balram: *See—*
Leiby, Clare C., Jr.; and Prasad, Balram, 4,059,813, Cl. 331-94.000.

Prendergast, Dan L.: *See—*
Pierce, Perry H.; and Prendergast, Dan L., 4,058,890, Cl. 29-625.000.

Prescher, Gunter; Schreyer, Gerd; Weiberg, Otto; Wirthwein, Rolf; Waldmann, Helmut; Seifert, Hermann; Schwerdtel, Wulf; and Swodenk, Wolfgang, to Deutsche Gold-und Silber-Scheideanstalt Vormals Roessler; and Bayer Aktiengesellschaft. Process for the preparation of percarboxylic acid solutions. 4,059,619, Cl. 260-502.00R.

Preventative Systems, Inc.: *See—*
Harris, Nick S., 4,059,512, Cl. 210-24.000.

Prewitt, Richard H. Convertiblade. 4,059,247, Cl. 244-7.00R.

Price, William Lawrence. Board game. 4,059,275, Cl. 273-130.00D.

Prickett, Ervin. Boat bow dolly. 4,059,282, Cl. 280-47.13B.

Priede, Theodor: *See—*
Mansfield, Wilfred Percival; and Priede, Theodor, 4,059,085, Cl. 123-195.00R.

Primavesi, Alexander, deceased: *See—*
Primavesi, Otto Hubert Jan; and Primavesi, Alexander, deceased, 4,059,470, Cl. 156-238.000.

Primavesi, Dagmar Charlotte, legal representative: *See—*
Primavesi, Otto Hubert Jan; and Primavesi, Alexander, deceased, 4,059,470, Cl. 156-238.000.

Primavesi, Otto Hubert Jan; and Primavesi, Alexander, deceased (by Primavesi, Dagmar Charlotte, legal representative), to J. Bobst et Fils S.A. Apparatus and method for transferring a material from a carrier means to a sheet means. 4,059,470, Cl. 156-238.000.

Procter, Samuel Anderson, to Control Data Corporation. Synchronous pulse generator including flywheel tank circuit with phase locked loop. 4,059,812, Cl. 331-1.00A.

Produits Chimiques Ugine Kuhlmann: *See—*
Demarcq, Michel, 4,059,656, Cl. 260-990.000.
Foulletier, Louis; Pechmeze, Jacques Pierre Edmond; and Sureau, Robert Frederic Michel, 4,059,626, Cl. 260-578.000.
Foulletier, Louis; and Lalu, Jean-Pierre, 4,059,629, Cl. 260-583.0GG.

Prokai, Bela, to Union Carbide Corporation. Heterocyclic nitrogen containing siloxanes. 4,059,581, Cl. 544-69.000.

Prototech Company: *See—*
Petrow, Henry G.; and Allen, Robert J., 4,059,541, Cl. 252-313.00R.

Pruitt, Donovan E.: *See—*
Polley, Richard D.; Nilson, Eric L.; Constantakis, Roberto; and Pruitt, Donovan E., 4,059,522, Cl. 210-198.00R.

Puccio, Guy S., to Acme Highway Products Corporation. Uplift restraint for composite expansion joint assembly. 4,058,867, Cl. 14-16.500.

Pullman, Burke Cole. Games and educational devices. 4,059,272, Cl. 273-130.00E.

Pullman Incorporated: *See—*
Lopker, Edwin B., 4,059,674, Cl. 423-167.000.

Purdue Research Foundation: *See—*
Hem, Stanley L.; and White, Joe L., 4,059,681, Cl. 423-419.00P.

Purex Corporation: *See—*
Zieg, Steven A., 4,059,519, Cl. 210-169.000.

Purrer, Josef, to Maschinenfabrik Fahr Aktiengesellschaft Gottmadingen. Field chopper. 4,059,234, Cl. 241-222.000.

Quaney, Patrick E., to Associated Concrete Products, Inc. Utility box fastener. 4,059,199, Cl. 220-3.800.

Raasch, Hans, to W. Schlafhorst & Co. Device for protecting tangential drives of a textile machine. 4,058,966, Cl. 57-78.000.

Rabinowitz, Harold: *See—*
Geller, Thomas L.; and Rabinowitz, Harold, 4,059,464, Cl. 156-66.000.

Rader, Jean-Claude Joseph: *See—*
Chataigner, Jean; and Rader, Jean-Claude Joseph, 4,059,524, Cl. 210-220.000.

Ramiro de la Rosa, Raul. Steam injection apparatus. 4,059,078, Cl. 123-25.00K.

Ranger, Clifford A. Rock and root picker. 4,059,158, Cl. 171-63.000.

Rappen, Friedrich: *See—*
Kolling, Helmut; Rappen, Friedrich; and Geiser, Nikolaus, 4,059,720, Cl. 526-74.000.

Raskatov, Viktor Georgievich: *See—*
Barannik, Ivan Andreevich; Kondratenko, Anatoly Borisovich; Trukhin, Alexandr Fedorovich; Raskatov, Viktor Georgievich; Zharovsky, Ivan Vasilievich; Rudakov, Viktor Alexandrovich; Mordkovich, Andrei Efremovich; and Chalov, Alexandr Vasilievich, 4,059,372, Cl. 425-8.000.

Rasmussen, Harry R.; and Topel, Kenneth D., to Crest Industries, Inc. Pull-out receptacle for floor ducts. 4,059,321, Cl. 339-34.000.

Rauscher, Walter: *See—*
Winzer, Gerhard; and Rauscher, Walter, 4,059,337, Cl. 350-96.00C.

Ravani, Chandrakant D.; and Robertson, James C., to Portec, Inc. Railway car hinge-deck lock. 4,059,055, Cl. 105-368.00R.

Rax, Incorporated: *See—*
Berryman, Angus L.; Hooper, Gene R.; and Hague, Richard E., 4,059,056, Cl. 105-368.00R.

Ray, Ranjan; Tanner, Lee E.; and Cline, Carl F., to Allied Chemical Corporation. Metallic glasses with high crystallization temperatures and high hardness values. 4,059,441, Cl. 75-174.000.

Rayeski, Thomas J.: *See—*
Carmi, Arieh; Chang, Zung S.; and Rayeski, Thomas J., 4,059,429, Cl. 65-355.000.

Raymond Lee Organization, Inc., The: *See—*
Adamko, Edward W., 4,058,892, Cl. 30-178.000.
Chaisson, Maurice J., 4,059,191, Cl. 211-90.000.
Digman, Robert Howard, Sr., 4,058,928, Cl. 43-131.000.
Fischer, Edward T., 4,058,873, Cl. 24-73.0CH.
Hassan, Edward, 4,059,041, Cl. 85-3.00S.
Hershey, Virginia L.; and Hershey, George P., 4,058,927, Cl. 43-43.130.

Raynor, Warren S.: *See—*
Krivec, Bert; Brown, Elwood B.; and Raynor, Warren S., 4,059,180, Cl. 193-37.000.

RCA Corporation: *See—*
Ahmed, Adel Abdel Aziz, 4,059,793, Cl. 323-19.000.
Clark, Charles Albert, Jr., 4,059,785, Cl. 315-378.000.
DeStephanis, Ralph, 4,059,277, Cl. 274-23.00A.
Nubani, Jawdat Ibrahim; and Rysz, Walter Robert, 4,058,875, Cl. 29-25.150.
Rosenkranz, Thomas Francis; and Himics, Richard Joseph, 4,059,449, Cl. 96-91.00D.
Smith, Roland Wright; and Moore, Arnold Robert, 4,059,707, Cl. 427-35.000.

Reade, Richard F., to Corning Glass Works. Green colored glasses. 4,059,454, Cl. 106-39.700.

Reading, Hugh Thomas, to Readings of Lismore Pty. Limited. Magnetic separators. 4,059,510, Cl. 209-223.00A.

Readings of Lismore Pty. Limited: *See—*
Reading, Hugh Thomas, 4,059,510, Cl. 209-223.00A.

Redding, Robert Caldwell; and Vaughan, Joe Larry, to International Business Machines Corporation. Single print element selection apparatus with multiple selection inhibiting means. 4,059,184, Cl. 197-18.000.

Redington, Incorporated: *See—*
Vogel, Walter H., 4,059,264, Cl. 271-270.000.

Redlich, Rudolf: *See—*
Goossens, Walter; Hermann, Wolfgang; Keusch, Wilhelm; and Redlich, Rudolf, 4,059,412, Cl. 44-10.00H.

Reed Tool Company: *See—*
Alvarez, Joseph A.; and Mills, Robert J., 4,059,316, Cl. 308-8.200.

Reedy, James D.: *See—*
Lindberg, Robert C.; Reedy, James D.; and Yang, Kang, 4,059,683, Cl. 423-481.000.
Yang, Kang; Reedy, James D.; and Scamehorn, John F., 4,059,675, Cl. 423-240.000.
Yang, Kang; and Reedy, James D., 4,059,676, Cl. 423-240.000.

Reedy, James Dale; and Barker, Thomas Harold, to Union Carbide Corporation. Preparation of hydrocarbon chlorosilanes from polysilanes. 4,059,607, Cl. 260-448.20E.

Reffay, Louis: *See—*
Sedlacek, William S.; and Reffay, Louis, 4,059,331, Cl. 339-198.00R.

Reick, Franklin G., to Ebert, Michael, a part interest. Direct-acting low pressure sensor. 4,059,018, Cl. 73-418.000.

Reifers, Richard F.; Bixler, Kenneth D.; and Lord, Henry A., to Diamond International Corporation. Egg carton. 4,059,219, Cl. 229-2.5EC.

Reijonen, Yrjo: *See—*
Kankaanpaa, Matti; Nylund, Ragnar; and Reijonen, Yrjo, 4,059,482, Cl. 162-281.000.

Reinehr, Ulrich: *See—*
Neukam, Theo; Reinehr, Ulrich; Bentz, Francis; and Nischk, Gunther, 4,059,556, Cl. 260-30.200.

Reiss, Joseph M. Method and force determining apparatus for ice breaking vessels. 4,059,011, Cl. 73-133.00R.

Reiss, Siegfried: *See—*
Gross, Albert; Schaefer, Roland; and Reiss, Siegfried, 4,059,684, Cl. 424-4.000.

Reliable Electric Company: *See—*
Sedlacek, William S.; and Reffay, Louis, 4,059,331, Cl. 339-198.00R.

Remington Arms Company, Inc.: *See—*
Linde, John P.; and Bullis, Douglas E., 4,058,925, Cl. 42-79.000.

Remond, Georges: *See—*
Vincent, Michel; Remond, Georges; and Laubie, Michel, 4,059,621, Cl. 260-558.00R.

Republic Steel Corporation: *See—*
Limes, Robert W.; and Russell, Robert O., 4,059,455, Cl. 106-58.000.

Research Corporation: *See—*
Parker, Kathlyn A.; and Kosley, Raymond W., Jr., 4,059,575, Cl. 260-239.500.

Reuter Technologie GmbH: *See—*
Hilterhaus, Karl Heinz, 4,059,659, Cl. 264-45.300.

Revere Copper and Brass Incorporated: *See—*
Davis, Trevor Crombie Maitland; and Laurie, James Ernest, 4,059,672, Cl. 423-121.000.

Rexnord Inc.: *See—*
Krivec, Bert; Brown, Elwood B.; and Raynor, Warren S., 4,059,180, Cl. 193-37.000.

Rhee, Jhoon Goo. Protective helmet. 4,058,854, Cl. 2-412.000.

Rheinische Braunkohlenwerke Aktiengesellschaft: *See—*
Schulten, Rudolf; and Behr, Friedrich, 4,059,496, Cl. 204-104.000.

Rhodes, Melvin H., to Rockwell International Corporation. Second harmonic magnetic field detection circuit with means to rectify the sensed signal. 4,059,796, Cl. 324-253.000.

Rhone-Poulenc Industries: *See—*
Calas, Raymond; Dunogues, Jacques; Deleris, Gerard; Lefort, Marcel; and Simonnet, Christian, 4,059,608, Cl. 260-448.20E.

Rhone-Poulenc-Textile: *See—*
Guillermin, Rene; Joly, Jean; and Sangalli, Sylvio, 4,059,068, Cl. 118-420.000.

Rice, Seymour S., to Cities Service Company. Anode, anode basket and method of packaging anodes. 4,059,493, Cl. 204-3.000.

Richards, Shirley T., to Minnesota Mining and Manufacturing Company. Garment shield. 4,059,114, Cl. 128-287.000.

Richardson-Merrell Inc.: *See—*
Meyer, Donald R., 4,059,702, Cl. 424-248.550.

Richerot, Alain: *See—*
Boisde, Gilbert; and Richerot, Alain, 4,059,408, Cl. 23-267.00R.

Richmond, Martin. Therapeutic device for massaging gingival tissue. 4,059,101, Cl. 128-62.00A.

Richtzenhain, Hermann: *See—*
Blumenfeld, Georg; Richtzenhain, Hermann; Vogt, Wilhelm; and Volkommer, Norbert, 4,059,618, Cl. 560-221.000.

Ricoh Co., Ltd.: *See—*
Ariyama, Kenzo; Mano, Hiroshi; and Kamiyama, Shinichi, 4,059,394, Cl. 432-59.000.
Fujimoto, Sakae, 4,059,262, Cl. 271-35.000.
Kawamura, Atsushi; and Kawazu, Motoaki, 4,059,345, Cl. 350-252.000.

Riebel, Hans-Jochem: *See—*
Maurer, Fritz; Riebel, Hans-Jochem; Hammann, Ingeborg; Behrenz, Wolfgang; and Homeyer, Bernhard, 4,059,696, Cl. 424-200.000.

Rieger, Walter, to Bauhutte Leitl-Werke Rieger-Anlagentechnik GmbH. Building structure wall. 4,058,944, Cl. 52-235.000.

Ries, George W.: *See—*

Zbinden, James; and Ries, George W., 4,059,162, Cl. 173-37.000.

Rietema, Simon Petrus. Assembly and method for guiding a portable power saw. 4,059,038, Cl. 83-745.000.

Rieter Machine Works, Ltd.: *See—*

Spescha, Gelli; and Lattion, Andre, 4,058,962, Cl. 57-34.00R.

Stalder, Herbert, 4,058,964, Cl. 57-58.890.

Weber, Kurt, 4,059,185, Cl. 198-339.000.

Rigassi, Norbert: *See—*

Chodnekar, Madhukar Subraya; Pfiffner, Albert; Rigassi, Norbert; Schwieter, Ulrich; and Suchy, Milos, 4,059,600, Cl. 260-348.460.

Rigo, Larry E. Mountings for electrical fixtures in junction boxes. 4,059,328, Cl. 339-122.00R.

Rinehart, Jay Kent, to PPG Industries, Inc. S-naphthyl N-alkylthiolcarbamates. 4,059,609, Cl. 260-455.00A.

Rishel, John W., to Dover Corporation. Filter with axially shiftable rotating backwash selector. 4,059,518, Cl. 210-108.000.

Roark, Thomas A. Head gate. 4,059,073, Cl. 119-98.000.

Robert Bosch G.m.b.H.: *See—*

Eheim, Franz, 4,059,369, Cl. 417-494.000.

Jundt, Werner, 4,059,084, Cl. 123-148.00E.

Sohnle, Rudiger, 4,059,778, Cl. 310-68.00D.

Robertson, James C.: *See—*

Ravani, Chandrakant D.; and Robertson, James C., 4,059,055, Cl. 105-368.00R.

Robinson, Cecil H., to Johns Hopkins University, The. Anti-androgenic steroids. 4,059,630, Cl. 260-586.00E.

Robinson, Colin; and Walker, Derek, to Glaxo Laboratories Limited. Extraction of N-blocked amino acids from aqueous media. 4,059,573, Cl. 260-112.50R.

Rockwell International Corporation: *See—*

Espinosa, Gerald P., 4,059,537, Cl. 252-62.900.

Kennel, John M., 4,059,790, Cl. 318-689.000.

Kobayashi, Tsutomu; Archer, John L.; and Elliott, Michael T., 4,059,828, Cl. 365-32.000.

Rhodes, Melvin H., 4,059,796, Cl. 324-253.000.

Rode, France: *See—*

Dickinson, Peter D.; Osborne, Thomas E.; Rode, France; and Baum, Allen J., 4,059,750, Cl. 364-715.000.

Roderick, John James: *See—*

Allan, John Leslie Hugh; and Roderick, John James, 4,059,652, Cl. 260-848.000.

Rogers, Gerald D., to Texas Instruments Incorporated. Semiconductor memory array with field effect transistors programmable by alteration of threshold voltage. 4,059,826, Cl. 365-104.000.

Rohm GmbH: *See—*

Hitzler, Otto; Pennewiss, Horst; Froelich, August; Markert, Gerhard; and Wunderlich, Winfried, 4,059,574, Cl. 260-192.000.

Rohm and Haas Company: *See—*

Johnson, Wayne O., 4,059,435, Cl. 71-105.000.

Kelley, Louis E., 4,059,665, Cl. 264-128.000.

Lewis, Sheldon N.; and Haggard, Richard A., 4,059,616, Cl. 526-66.000.

Ollinger, Janet, 4,059,697, Cl. 424-211.000.

Rohr Industries, Incorporated: *See—*

Woodward, James R., 4,059,217, Cl. 228-181.000.

Rohringer, Peter: *See—*

Nachbur, Hermann; and Rohringer, Peter, 4,059,532, Cl. 252-8.100.

Roller, Thomas W., to Eastman Kodak Company. Apparatus for filtering and heating a liquid. 4,059,520, Cl. 210-184.000.

Romagnolo, Gerard, to Ugine Carbone. Cutting plates with rounded cutting edges and concave frustoconical cutting surfaces. 4,059,363, Cl. 407-114.000.

Rommen, Hans; and Stoy, Erich, to Schloemann- Siemag Aktiengesellschaft. Multi-roll rolling mill stand. 4,059,002, Cl. 72-238.000.

Roseberry, Ward A., to Outboard Marine Corporation. Deadman control and blade clutch for power rotary lawn mowers. 4,058,957, Cl. 56-11.300.

Rosen, Perry: *See—*

Holland, George William; Jernow, Jane Liu; and Rosen, Perry, 4,059,576, Cl. 542-426.000.

Kienzle, Frank; and Rosen, Perry, 4,059,577, Cl. 542-426.000.

Rosenberg, Ira E.; Ferguson, John A.; and Loveless, Norman P., to Clairol Incorporated. Hair fixing compositions containing fluoroterpolymers and method. 4,059,688, Cl. 424-71.000.

Rosenberg, Peretz. Fluid flow control device and fluid distribution system including a plurality of such devices. 4,059,230, Cl. 239-542.000.

Rosenblum, Frank: *See—*

Kitzinger, Frank; and Rosenblum, Frank, 4,059,016, Cl. 73-304.00R.

Rosenfeld, Pnina. Girdle accessory. 4,059,117, Cl. 128-531.000.

Rosenkranz, Hans Jurgen; and Rudolph, Hans, to Bayer Aktiengesellschaft. Stabilized acrylic acid esters of polyhydric alcohols and a process for their preparation. 4,059,721, Cl. 560-205.000.

Rosenkranz, Thomas Francis; and Himics, Richard Joseph, to RCA Corporation. Photoresist containing a thiodipropionate compound. 4,059,449, Cl. 96-91.00D.

Ross, Leon Irving. Vortex nucleation scrubbing method and apparatus. 4,059,419, Cl. 55-92.000.

Roth Freres, S.A.: *See—*

Roth, Jacques; Roth, Michel; Seiler, Paul; Lavenir, Roger; and Manigold, Alain, 4,059,660, Cl. 264-46.400.

Roth, Jacques; Roth, Michel; Seiler, Paul; Lavenir, Roger; and Manigold, Alain, to Roth Freres, S.A. Method of molding a light-weight panel. 4,059,660, Cl. 264-46.400.

Roth, Michel: *See—*

Roth, Jacques; Roth, Michel; Seiler, Paul; Lavenir, Roger; and Manigold, Alain, 4,059,660, Cl. 264-46.400.

Rothmans of Pall Mall Canada Limited: *See—*

Brackmann, Warren A.; and Di Ianni, Daniel, 4,059,121, Cl. 131-269.000.

Rottloff, Gunther: *See—*

Sundermann, Rudolf; Rottloff, Gunther; and Grigat, Ernst, 4,059,567, Cl. 260-47.00R.

Rougeot, Henri, to Thomson-CSF. Device for visualizing data presented in the form of radiant energy. 4,059,766, Cl. 250-370.000.

Rowsell, David G.: *See—*

Watson, Hugh R.; Rowsell, David G.; and Browning, John H. D., 4,059,118, Cl. 131-8.00R.

Ruble, Theodore A., to Sid Richardson Carbon & Gasoline Co. Method and apparatus for controlling surface temperature. 4,059,145, Cl. 165-1.000.

Rudakov, Viktor Alexandrovich: *See—*

Barannik, Ivan Andreevich; Kondratenko, Anatoly Borisovich; Trukhin, Alexandr Fedorovich; Raskatov, Viktor Georgievich; Zharovsky, Ivan Vasilievich; Rudakov, Viktor Alexandrovich; Mordkovich, Andrei Efremovich; and Chalov, Alexandr Vasilievich, 4,059,372, Cl. 425-8.000.

Rudert, Wolfgang, to Motoren- und Turbinen-Union Friedrichshafen GmbH. Engine compartment ventilating arrangement. 4,059,080, Cl. 123-41.330.

Rudolph, Frank W.: *See—*

Greatbatch, Wilson; Mead, Ralph T.; McLean, Robert L.; Rudolph, Frank W.; and Frenz, Norbert W., 4,058,889, Cl. 29-623.500.

Rudolph, Hans: *See—*

Rosenkranz, Hans Jurgen; and Rudolph, Hans, 4,059,721, Cl. 560-205.000.

Rueff, Herbert Richard; and Aiuola, Franco. Apparatus for transferring at a predetermined spacing on to a reception conveyor objects fed at an irregular spacing from a delivery conveyor. 4,059,187, Cl. 198-461.000.

Ruest, Dennis A.; Kidwell, Roger L.; and Shen, Chung Y., to Monsanto Company. Morpholenone derivatives. 4,059,579, Cl. 544-172.000.

Ruh, Wolf-Dieter; and Trippel, Gerhard, to International Business Machines Corporation. Method of forming viaducts in semiconductor material. 4,059,480, Cl. 156-644.000.

Ruhrchemie Aktiengesellschaft: *See—*

Kolling, Helmut; Rappen, Friedrich; and Geiser, Nikolaus, 4,059,720, Cl. 526-74.000.

Runge, Thomas M. Cardiac pumping device. 4,058,855, Cl. 3-1.700.

Runge, Thomas M.; Burkhalter, John E.; and Pallas, Spiros George. Cardiac replacement pumping devices. 4,058,857, Cl. 3-1.700.

Russell, Robert O.: *See—*

Limes, Robert W.; and Russell, Robert O., 4,059,455, Cl. 106-58.000.

Rysz, Walter Robert: *See—*

Nubani, Jawdat Ibrahim; and Rysz, Walter Robert, 4,058,875, Cl. 29-25.150.

Ryugo, Shiro: *See—*

Hori, Kikuo; Horiuchi, Takumi; Nishikawa, Mikio; Ryugo, Shiro; Ishizuka, Akira; and Takenaka, Yoshisuke, 4,059,239, Cl. 242-18.100.

Ryumon, Yutaka; Yano, Naomichi; and Yukimachi, Shinsuke, to Kubota, Ltd. Panel feeder. 4,059,193, Cl. 214-8.50A.

S I Handling Systems, Inc.: *See—*

Jones, Vercoe C., 4,059,053, Cl. 104-35.000.

S.R.M. Hydromekanik Aktiebolag: *See—*

Ahlen, Karl Gustav, 4,058,980, Cl. 60-337.000.

Sachs, Thomas D. Ultrasonic inspection and diagnosis system. 4,059,010, Cl. 73-596.000.

Sadler, Loren G.; and Mast, Aquila D., to Sperry Rand Corporation. Method and means for converting a crop pickup on a crop processing machine between field and transport modes. 4,058,958, Cl. 56-228.000.

Safford, George J.: *See—*

Lentz, James A.; and Safford, George J., 4,058,879, Cl. 29-132.000.

St. Onge, Robert J.: *See—*

Bartos, Joseph S.; and St. Onge, Robert J., 4,059,123, Cl. 134-102.000.

Saito, Junichi: *See—*

Aya, Masahiro; Saito, Junichi; Kume, Toyohiko; and Yasui, Kazuomi, 4,059,430, Cl. 71-86.000.

Saito, Masahiro: *See—*

Handa, Susumu; Tanaka, Yoshiaki; Nishibata, Atsushi; Ueda, Sadashi; Inamoto, Yoshiaki; Saito, Masahiro; Tanimoto, Fumio; and Kitano, Hisao, 4,059,610, Cl. 544-193.000.

Sakamoto, Yoshio; and Yamamura, Masahiro, to Hitachi, Ltd. Differential amplifier. 4,059,808, Cl. 330-257.000.

Sakashita, Noriji: *See—*

Obayashi, Nobuharu; Hashizume, Hikaru; Sakashita, Noriji; Kameyama, Seiji; Ezawa, Sadaaki; Kugisawa, Toshio; Washiyama, Yutaka; Kondo, Tatsunori; and Watanabe, Hironori, 4,059,040, Cl. 84-1.030.

Sakoe, Hiroaki, to Nippon Electric Company, Ltd. Automatic continuous speech recognition system employing dynamic programming. 4,059,725, Cl. 179-1.50D.

Sakuma, Masatoshi: *See—*

Yamazaki, Tatsuo; Hayashida, Takemi; and Sakuma, Masatoshi, 4,059,046, Cl. 99-355.000.

Salco Products, Inc.: *See—*

Werner, David, 4,059,228, Cl. 239-106.000.

Samson, Ronald; and Botterill, Derrick. Board game including code defining playing pieces. 4,059,274, Cl. 273-130.00D.

Sanborn, Philip A., Jr.; Westbrook, Shelby F.; and Sullivan, Donald A., to W. R. Grace & Co.; and Hooper, Inc. Gas flushing or filling packaging machine. 4,058,953, Cl. 53-22.00A.

Sanda, Shougo: *See—*

Kasima, Osamu; and Sanda, Shougo, 4,059,079, Cl. 123-30.00D.

Sandoz Ltd.: *See—*

Hochreuter, Richard, 4,059,631, Cl. 260-584.00B.

Sangalli, Sylvio: *See—*

Guillermin, Rene; Joly, Jean; and Sangalli, Sylvio, 4,059,068, Cl. 118-420.000.

Sangesland, Odd E.: *See—*

Knowles, Gregory W.; Sangesland, Odd E.; Vroom, Henry J.; and Madey, Robert W., 4,059,093, Cl. 126-271.000.

Sankyo Company Limited: *See—*

Mishima, Hiroshi; Ogiso, Akira; and Kobayashi, Shinsaku, 4,059,641, Cl. 260-635.00R.

Sankyo Electric Company Limited: *See—*

Hatori, Kunitake, 4,059,319, Cl. 312-319.000.

Sanraku-Ocean Co., Ltd.: *See—*

Nishino, Toyokazu; Hamagishi, Yasutaro; Oki, Toshikazu; and Murao, Sawao, 4,059,487, Cl. 195-28.00N.

Sare, Edward J.; and Lavanish, Jerome M., to PPG Industries, Inc. Catalytic oxidation of C_2-C_4 halogenated hydrocarbons. 4,059,677, Cl. 423-240.000.

Sasaki, Takeshi: *See—*

Suzuki, Kensuke; Sasaki, Takeshi; and Matsuzaki, Mitsuyuki, 4,059,837, Cl. 357-73.000.

Satake, Kazuo: *See—*

Tomibe, Katsuhiko; Masuho, Yasuhiko; Matsuzawa, Kimihiko; Ishimoto, Sachio; Satake, Kazuo; and Watanabe, Tsuneo, 4,059,571, Cl. 260-112.00B.

Sato, Hideo: *See—*

Tamaru, Munetaka; Kume, Kazunari; Oono, Hideshi; Watanabe, Minoru; Sato, Hideo; and Morokawa, Shigeru, 4,058,969, Cl. 58-23.0BA.

Sato, Masamichi, to Fuji Photo Film Co., Ltd. Noble metal image forming method. 4,059,445, Cl. 96-35.000.

Sato, Tomoari: *See—*

Yanagida, Kiyomi; Hirokane, Tadashi; Tsukiyasu, Tadashi; and Sato, Tomoari, 4,059,494, Cl. 204-28.000.

Sato, Yasushi: *See—*

Kitamura, Takashi; Watanabe, Asao; Nakano, Takashi; Masaki, Katsumi; Hirayama, Kazuhiro; Sato, Yasushi; and Tokiwa, Taisuke, 4,059,833, Cl. 346-108.000.

Satori, Toshio, to Fischer & Porter Co. Angle-to-current converter. 4,059,015, Cl. 73-209.000.

Sawa, Tomizo: *See—*

Musha, Morito; Sawa, Tomizo; and Kato, Osami, 4,059,511, Cl. 210-23.00R.

Sayers, Bernard. Method for custom fitting golf clubs. 4,059,270, Cl. 273-77.00R.

Saylor, Lee H.; and Overway, Roy E., to Sealed Power Corporation. Piston ring spacer-expander with overlap-preventing expander joint. 4,059,278, Cl. 277-139.000.

Scaggs, Anthony L.: *See—*

Corbett, John M.; Skochdopole, Richard E.; and Scaggs, Anthony L., 4,059,545, Cl. 260-2.5FP.

Scamehorn, John F.: *See—*

Yang, Kang; Reedy, James D.; and Scamehorn, John F., 4,059,675, Cl. 423-240.000.

Scanlon, Patricia Marie: *See—*

Gaudette, Roger Robert; Ohlson, John Leonard; and Scanlon, Patricia Marie, 4,059,548, Cl. 260-251.00R.

Schaefer, Roland: *See—*

Gross, Albert; Schaefer, Roland; and Reiss, Siegfried, 4,059,684, Cl. 424-4.000.

Schaeffer, Claude W.; and Baker, Martin T. Machine for the manufacture of helically wound metal duct or pipe. 4,058,996, Cl. 72-49.000.

Schattner, Robert L.: *See—*

Cutruzzula, Jeffrey F.; and Schattner, Robert L., 4,059,105, Cl. 128-133.000.

Scherberich, Paul; and Pfeifer, Wolf-Dieter, to Deutsche Gold- und Silber-Schneideanstalt vormals Roessler. Process for formylation. 4,059,589, Cl. 260-306.70C.

Schering Aktiengesellschaft: *See—*

Brinkmann, Bernd; and Griebsch, Eugen, 4,059,549, Cl. 260-22.0TN.

Schild, Josef, to Vockenhuber, Karl; and Hauser, Raimund. Reflex system for cinematographic camera. 4,059,350, Cl. 352-141.000.

Schindler, Harvey D.: *See—*

Sze, Morgan C.; Schindler, Harvey D.; and Fanelli, Anthony, 4,059,503, Cl. 208-254.00H.

Schipper, John F.: *See—*

Harney, Robert C.; and Schipper, John F., 4,059,759, Cl. 250-206.000.

Schliek, Gunter; and Tirp, Erwin, to Windmoller & Holscher. Apparatus for forming and taking away packets of bags. 4,059,044, Cl. 93-93.0HT.

Schloemann- Siemag Aktiengesellschaft: *See—*

Rommen, Hans; and Stoy, Erich, 4,059,002, Cl. 72-238.000.

Schlosberg, Richard H.; Gorbaty, Martin L.; and Lang, Robert J., to Exxon Research & Engineering Co. Method for the preparation of noncaking coals from caking coals by means of electrophilic aromatic substitution. 4,059,410, Cl. 44-1.00R.

Schmidt, Karl-Heinz: *See—*

Schulz, Horst; Flosser, Josef; Kessler, Reinhard; Schmidt, Karl-Heinz; Eisend, Ewald; Hild, Erich; Loffler, Karl-Heinz; and Steuer, Werner, 4,059,028, Cl. 74-781.00B.

Schmidt, Martin: *See—*

Bar, Ulrich; and Schmidt, Martin, 4,059,352, Cl. 353-103.000.

Schmieder, Helmut; and Stieglitz, Ludwig, to Gesellschaft fur Kernforschung m.b.H. Method for increasing the lifetime of an extraction medium used for reprocessing spent nuclear fuel and/or breeder materials. 4,059,671, Cl. 423-10.000.

Schnee, Wilhelm: *See—*

Hollweck, Walter; Schnee, Wilhelm; Eberl, Karlheinz; and Basel, Werner, 4,059,817, Cl. 337-365.000.

Schneehage, Hans Henning: *See—*

Kopke, Helmut; Ohlinger, Manfred; Grau, Werner; Schoenafinger, Eduard; and Schneehage, Hans Henning, 4,059,716, Cl. 428-403.000.

Schneider, Irwin, to Imperial Arts Corporation. Unitized serving base with imperforate pellet. 4,059,096, Cl. 126-375.000.

Schnippering, Friedhelm: *See—*

Dittrich, Werner; and Schnippering, Friedhelm, 4,059,453, Cl. 106-38.300.

Schoen, Joel Mark: *See—*

Heiss, John Herbert, Jr.; and Schoen, Joel Mark, 4,059,708, Cl. 427-96.000.

Schoenafinger, Eduard: *See—*

Kopke, Helmut; Ohlinger, Manfred; Grau, Werner; Schoenafinger, Eduard; and Schneehage, Hans Henning, 4,059,716, Cl. 428-403.000.

Scholl, Charles H.; Janner, John R., Jr.; Stumphauzer, William C.; and Shuster, Duane O., to Nordson Corporation. Hot melt thermoplastic adhesive foam system. 4,059,466, Cl. 156-78.000.

Scholl, Charles H.; Janner, John R., Jr.; and Stumphauzer, William C., to Nordson Corporation. Hot melt thermoplastic adhesive foam system. 4,059,714, Cl. 428-310.000.

Scholle, Jean-Claude: *See—*

Cellier, Michel Jean Jacques; Guitton, Jean-Claude; Scholle, Jean-Claude; and Viannay, Stephane Georges Jean-Marie, 4,059,399, Cl. 432-121.000.

Schollmeier, Charles E.; and Leiser, Roger S., to A. E. Staley Manufacturing Company. Solid anhydrous dextrose. 4,059,460, Cl. 127-29.000.

Schott, Charles M., Jr., to Gloucester Engineering Co., Inc. Toggle press. 4,059,381, Cl. 425-406.000.

Schranz, Karl-Wilhelm: *See—*

Meier, Ernst; Credner, Hans Heinrich; Lassig, Wolfgang; Kuffner, Karl; and Schranz, Karl-Wilhelm, 4,059,447, Cl. 96-56.400.

Schreiber, Robert E.; and Zelt, Edward J., to Stackpole Carbon Company. Electric motor brush mounting. 4,059,776, Cl. 310-242.000.

Schreyer, Gerd: *See—*

Prescher, Gunter; Schreyer, Gerd; Weiberg, Otto; Wirthwein, Rolf; Waldmann, Helmut; Seifert, Hermann; Schwerdtel, Wulf; and Swodenk, Wolfgang, 4,059,619, Cl. 260-502.00R.

Schriber, Stanley O.: *See—*

Heighway, Edward A.; Hohban, Kenneth J.; and Schriber, Stanley O., 4,059,763, Cl. 250-336.000.

Schroder, John: *See—*

Shirey, James W., 4,059,330, Cl. 339-177.00R.

Schulten, Rudolf; and Behr, Friedrich, to Rheinische Braunkohlenwerke Aktiengesellschaft. Process for the preparation of sulfuric acid from sulphur dioxide. 4,059,496, Cl. 204-104.000.

Schuluter, Gert: *See—*

Schuster, Wilhelm; and Schuluter, Gert, 4,059,404, Cl. 23-230.00B.

Schulz, Horst; Flosser, Josef; Kessler, Reinhard; Schmidt, Karl-Heinz; Eisend, Ewald; Hild, Erich; Loffler, Karl-Heinz; and Steuer, Werner, to Fichtel & Sachs AG. Multiple speed hub with coaster brake. 4,059,028, Cl. 74-781.00B.

Schurger, Rainer: *See—*

Ernst, Horst Manfred; Olschewski, Armin; Schurger, Rainer; Walter, Lothar; Brandenstein, Manfred; and Burkl, Erich, 4,059,179, Cl. 192-98.000.

Schuster, Wilhelm; and Schuluter, Gert, to Battelle-Institute e.V. Swab and method of taking cell smears for diagnostic examination. 4,059,404, Cl. 23-230.00B.

Schwander, Dieter: *See—*

Bockelmann, Wilfried; Veigel, Martin W.; Grossmann, Dietrich; Grozinger, Hans; and Schwander, Dieter, 4,058,978, Cl. 60-277.000.

Schwarz, Gunter. Ski brake mechanism. 4,059,284, Cl. 280-605.000.

Schwerdtel, Wulf: *See—*

Prescher, Gunter; Schreyer, Gerd; Weiberg, Otto; Wirthwein, Rolf; Waldmann, Helmut; Seifert, Hermann; Schwerdtel, Wulf; and Swodenk, Wolfgang, 4,059,619, Cl. 260-502.00R.

Schwieter, Ulrich: *See—*

Chodnekar, Madhukar Subraya; Pfiffner, Albert; Rigassi, Norbert; Schwieter, Ulrich; and Suchy, Milos, 4,059,600, Cl. 260-348.460.

Science Union et Cie, Societe Francaise de Recherche Medicale: *See—*

Vincent, Michel; Remond, Georges; and Laubie, Michel, 4,059,621, Cl. 260-558.00R.

Scott, James L.: *See—*

Potter, Ralph A.; and Scott, James L., 4,059,539, Cl. 252-301.10R.

Sea Tank Co. S.A.: *See—*
Gerbault, Marcel; and Gair, Robert, 4,058,987, Cl. 61-86.000.
Sealed Power Corporation: *See—*
Saylor, Lee H.; and Overway, Roy E., 4,059,278, Cl. 277-139.000.
Sedgwick, Jarvis D., to Sumrall, James. Tire changing machine. 4,059,140, Cl. 157-1.170.
Sedlacek, William S.; and Reffay, Louis, to Reliable Electric Company. Terminal block. 4,059,331, Cl. 339-198.00R.
Sedman, Myron P.: *See—*
Brendel, Albert E.; and Sedman, Myron P., 4,059,005, Cl. 73-1.00B.
Seifert, Hermann: *See—*
Prescher, Gunter; Schreyer, Gerd; Weiberg, Otto; Wirthwein, Rolf; Waldmann, Helmut; Seifert, Hermann; Schwerdtel, Wulf; and Swodenk, Wolfgang, 4,059,619, Cl. 260-502.00R.
Seiler, Paul: *See—*
Roth, Jacques; Roth, Michel; Seiler, Paul; Lavenir, Roger; and Manigold, Alain, 4,059,660, Cl. 264-46.400.
Seligman, Lawrence, to Data General Corporation. Code recognition record medium and technique. 4,059,224, Cl. 235-462.000.
Semlitsch, Manfred: *See—*
Doerre, Erhard; Semlitsch, Manfred; and Frey, Otto, 4,058,856, Cl. 3-1.910.
Sensor Corporation: *See—*
Mordwinkin, George, 4,059,795, Cl. 324-233.000.
Serizawa, Masabumi; and Takezaki, Tsuneo, to Matsushita Electric Industrial Co., Ltd. Voltage supply circuit for voltage-dependent capacitor diode tuning. 4,059,791, Cl. 363-37.000.
Sessions, Allen D.: *See—*
Jolliffe, James D.; and Sessions, Allen D., 4,059,315, Cl. 305-35.0EB.
Settlemyer, Bernard W.; Knappenberger, Clifford W.; and Bader, Alfred, to General Cable Corporation. Detecting apparatus with excess pressure protectors. 4,059,017, Cl. 73-395.000.
SEVE: *See—*
Aimar, Jean Louis; and Olin, Gerard, 4,059,787, Cl. 318-568.000.
SGS-ATES Componenti Elettronici SpA: *See—*
Paletto, Raimondo, 4,059,810, Cl. 330-65.000.
Shaffer, John W., to GTE Sylvania Incorporated. Photoflash lamp. 4,059,388, Cl. 431-95.00R.
Shaffer, Louis W. W., to Xerox Corporation. Photoreceptor belt system. 4,059,353, Cl. 355-16.000.
Shannon, Richard D. Ear rack for veterinary purposes. 4,059,106, Cl. 128-133.000.
Shapenko, Valentina Nikolaevna: *See—*
Perevodchikov, Vladimir Innokentievich; Shapenko, Valentina Nikolaevna; Chernov, Zarem Sergeevich; and Bunina, Nina Sergeevna, 4,059,784, Cl. 315-349.000.
Sharp Kabushiki Kaisha: *See—*
Hartelius, Clifford C., Jr., 4,059,338, Cl. 350-96.00C.
Shaw, David N., to Dunham-Bush, Inc. Heat pump system with high efficiency reversible helical screw rotary compressor. 4,058,988, Cl. 62-160.000.
Shaw, Jack; and Ellingham, Bruce, to Platt Saco Lowell Limited. Open-end spinning machines. 4,058,965, Cl. 57-58.910.
Shaw, Michael Francis: *See—*
Nesslage, Donald John; Yu, Lin Sheng; and Shaw, Michael Francis, 4,059,437, Cl. 75-76.000.
Shaw, William Stuart, to Humboldt Holdings, Inc. Fireplace heating unit. 4,059,090, Cl. 126-121.000.
Sheldon, John D., to Outboard Marine Corporation. Rotary engine stationary gear locating and timing device. 4,059,371, Cl. 418-61.00A.
Shelffo, Loren E.: *See—*
Barto, Robert M.; and Shelffo, Loren E., 4,059,409, Cl. 23-284.000.
Shell Oil Company: *See—*
Blomsma, Everhard C., 4,059,148, Cl. 166-.500.
Cannell, Lawrence G., 4,059,644, Cl. 260-666.0PY.
Coyle, James J., 4,059,598, Cl. 260-348.160.
Wald, Milton M.; and Kim, Leo, 4,059,646, Cl. 260-676.00R.
Wald, Milton M.; and Kim, Leo, 4,059,647, Cl. 260-676.00R.
Shelton, Peter Alfred, to Fiat Trattori S.p.A. Three-point tractor linkage. 4,059,283, Cl. 280-461.00A.
Shen, Chung Y.: *See—*
Ruest, Dennis A.; Kidwell, Roger L.; and Shen, Chung Y., 4,059,579, Cl. 544-172.000.
Shibata, Shoji: *See—*
Norton, Ted R.; Shibata, Shoji; and Kashiwagi, Midori, 4,059,694, Cl. 424-177.000.
Shibayama, Masamitsu: *See—*
Uchino, Hisanori; Takada, Masamichi; Shimizu, Takahiro; Shibayama, Masamitsu; and Furuno, Fumiya, 4,059,196, Cl. 214-138.00R.
Shimazaki, Masasuke: *See—*
Mizutani, Masumi; Hata, Hiromichi; and Shimazaki, Masasuke, 4,059,006, Cl. 73-17.00A.
Shimizu, Kunio: *See—*
Morita, Akiyoshi; Hayasaka, Tamio; Shimizu, Kunio; and Fukuda, Tokiharu, 4,059,143, Cl. 164-113.000.
Shimizu, Takahiro: *See—*
Uchino, Hisanori; Takada, Masamichi; Shimizu, Takahiro; Shibayama, Masamitsu; and Furuno, Fumiya, 4,059,196, Cl. 214-138.00R.
Shimizu, Takeshi. Hinge assembly for knock down furniture. 4,058,871, Cl. 16-172.000.
Shimomoto, Mithuo: *See—*
Kosaka, Katuaki; Wagatsuma, Fumio; Shimomoto, Mithuo; Harada, Osamu; and Ueno, Zene, 4,059,415, Cl. 48-63.000.
Shimp, David Alan, to Celanese Polymer Specialties Company. Aqueous dispersions of polyhydroxy polyether resins and aminoplast resins. 4,059,550, Cl. 260-29.40R.
Shin-Etsu Chemical Company Limited: *See—*
Okami, Takehide, 4,059,473, Cl. 156-308.000.
Shirey, James W., to Schroder, John, a part interest. Solderless prong connector for coaxial cable. 4,059,330, Cl. 339-177.00R.
Shoaf, Myron D.: *See—*
Pischke, LaMonte D.; and Shoaf, Myron D., 4,059,706, Cl. 426-548.000.
Shono, Tatsuya; and Matsumura, Yoshihiro, to Otsuka Kagaku Yakuhin Kabushiki Kaishi. Process for preparing 3-oxy-4H-pyran-4-one derivatives. 4,059,595, Cl. 260-345.90R.
Shoup, Robert D.; and Wein, William J., to Corning Glass Works. Low temperature production of high purity fused silica. 4,059,658, Cl. 264-43.000.
Showa Denko Kabushiki Kaisha: *See—*
Arai, Fumio; Kira, Masaaki; Kokuryo, Shiro; and Ueshima, Takashi, 4,059,561, Cl. 260-45.80R.
Showa Industries Co., Ltd.: *See—*
Mizutani, Masumi; Hata, Hiromichi; and Shimazaki, Masasuke, 4,059,006, Cl. 73-17.00A.
Shtarkman, Boris Petrovich: *See—*
Mikhalev, Nikolai Alexandrovich; Shtarkman, Boris Petrovich; and Gladyshev, Jury Ivanovich, 4,059,374, Cl. 425-207.000.
Shugaya, Kiyoshi: *See—*
Takematsu, Tetsuo; Konnai, Makoto; Takeda, Makoto; Fuga, Nobuhiko; Ikeda, Kaoru; and Shugaya, Kiyoshi, 4,059,431, Cl. 71-87.000.
Takematsu, Tetsuo; Konnai, Makoto; Takeda, Makoto; Fuga, Nobuhiko; Ikeda, Kaoru; and Shugaya, Kiyoshi, 4,059,432, Cl. 71-87.000.
Shum, Yick-Mow: *See—*
Allen, Joseph C.; and Shum, Yick-Mow, 4,059,152, Cl. 166-261.000.
Shuster, Duane O.: *See—*
Scholl, Charles H.; Janner, John R., Jr.; Stumphauzer, William C.; and Shuster, Duane O., 4,059,466, Cl. 156-78.000.
Shutov, Gennady Nikolaevich: *See—*
Movshovich, Pavel Mikhailovich; Khavkin, Viktor Pavlovich; Maximov, Gennady Konstantinovich; Babushkina, Natalya Borisovna; Baranov, Alexandr Anatolievich; Ivanov, Lev Nikolaevich; Nezelenov, Sergei Vladimirovich; Shutov, Gennady Nikolaevich; Tsygulev, Leonid Nikiforovich; and Ilin, Vadim Sergeevich, 4,058,960, Cl. 57-34.0AT.
Sichart, Frithjof V., to Siemens Aktiengesellschaft. Differential amplifier. 4,059,809, Cl. 330-253.000.
Sid Richardson Carbon & Gasoline Co.: *See—*
Ruble, Theodore A., 4,059,145, Cl. 165-1.000.
Siddall, Don F.; and Hoffman, Vincent L., to Hi-Life Rubber Co., Inc. Milking inflations. 4,059,070, Cl. 119-14.470.
Sieben, Joannes Henricus Franciscus: *See—*
Witterick, Petrus Johannes Julius; and Sieben, Joannes Henricus Franciscus, 4,059,387, Cl. 431-93.000.
Siegwart, Emil. Apparatus for manufacturing tubes. 4,058,997, Cl. 72-50.000.
Siemens Aktiengesellschaft: *See—*
Bar, Ulrich; and Schmidt, Martin, 4,059,352, Cl. 353-103.000.
Sichart, Frithjof V., 4,059,809, Cl. 330-253.000.
Strunz, Dieter O.; and Kern, Wolfgang, 4,059,395, Cl. 432-72.000.
Vanderbusse, Robert, 4,059,734, Cl. 179-18.0BD.
Winzer, Gerhard; and Rauscher, Walter, 4,059,337, Cl. 350-96.00C.
Sierra Engineering Co.: *See—*
Fellner, Erwin J., 4,059,322, Cl. 339-44.00R.
Sigmatex, A.G.: *See—*
Weman, Per Olaf, 4,059,287, Cl. 280-745.000.
Simon, Hans. Electric connector. 4,059,335, Cl. 339-272.0UC.
Simon International S.p.A.: *See—*
Kazuhide, Takahama, 4,059,058, Cl. 108-129.000.
Simonnet, Christian: *See—*
Calas, Raymond; Dunogues, Jacques; Deleris, Gerard; Lefort, Marcel; and Simonnet, Christian, 4,059,608, Cl. 260-448.20E.
Sindlinger, Ronald E.: *See—*
Armstrong, Donald E.; Sindlinger, Ronald E.; Cohen, Bernard; Tozier, John E.; and Audesse, Emery G., 4,059,389, Cl. 431-95.00R.
Singer Company, The: *See—*
Vagt, Henry Tyrrell, Jr., 4,059,806, Cl. 329-107.000.
Singer, Gunter: *See—*
Mack, Heinz; and Singer, Gunter, 4,058,895, Cl. 32-32.000.
Singerman, Gary M., to Gulf Oil Corporation. O,O-diethyl-O-carboxamidophosphate esters and use to combat insects and mites. 4,059,699, Cl. 424-211.000.
Sipler, Clarence L. Connector. 4,059,293, Cl. 285-236.000.
Skates, Raymond E. Expansible coupling. 4,059,292, Cl. 285-229.000.
SKF Industrial Trading and Development Company B.V.: *See—*
Ernst, Horst Manfred; Olschewski, Armin; Schurger, Rainer; Walter, Lothar; Brandenstein, Manfred; and Burkl, Erich, 4,059,179, Cl. 192-98.000.
Skochdopole, Richard E.: *See—*
Corbett, John M.; Skochdopole, Richard E.; and Scaggs, Anthony L., 4,059,545, Cl. 260-2.5FP.
Skonieczny, Wayne J. Vegetation clipping catcher. 4,058,956, Cl. 56-1.000.
Slama, Francis J.; and Fielding, Ivor R., to Standard Oil Company (Indiana). Anti-drip additive system for fire retardant polypropylene. 4,059,650, Cl. 260-837.00R.
Smilg, Benjamin; and Isaacson, Milton S., to Vibrodyne, Inc. Vibratory apparatus with electromagnet control system. 4,058,935, Cl. 51-163.100.

Smith, Donovan Norman, Jr., to Mobay Chemical Corporation. Production of pinacolone. 4,059,634, Cl. 260-593.00R.
Smith, Edward M.; Casada, James H.; and Taylor, Timothy H., to Deere & Company. Tillage apparatus and improved blade therefor. 4,059,161, Cl. 172-60.000.
Smith, Forrest D. Shotgun safety device. 4,058,923, Cl. 42-17.000.
Smith, Fritz A.: *See—*
Derr, Walter R.; McClernon, Joseph R.; McGovern, Stephen J.; and Smith, Fritz A., 4,059,648, Cl. 260-676.00R.
Smith, Harry: *See—*
Buckle, Derek Richard; Cantello, Barrie Christian Charles; and Smith, Harry, 4,059,704, Cl. 424-269.000.
Smith, John E.: *See—*
Bonecutter, Thayer A.; Lewis, Charles E.; and Smith, John E., 4,059,816, Cl. 337-278.000.
Smith Kline & French (Proprietary) Limited: *See—*
Erasmus, Frans P. G., 4,059,111, Cl. 128-223.000.
Smith, Marvin M. Method for extending the lower lean limit of running of internal combustion engines and improving the combustion of fluid fuels. 4,059,411, Cl. 44-51.000.
Smith, Richard E.: *See—*
Stange, Klaus K.; Smith, Richard E.; Hamlin, Thomas J.; and Cassano, James R., 4,059,260, Cl. 271-3.000.
Smith, Robert L.; Lee, Ta-Jyh; and Cragoe, Edward J., Jr., to Merck & Co., Inc. Certain thiazolidine compounds. 4,059,587, Cl. 260-301.000.
Smith, Rodney I. Concrete highway traffic barricade having integrally formed coupling. 4,059,362, Cl. 404-6.000.
Smith, Roland Wright; and Moore, Arnold Robert, to RCA Corporation. Method of filling apertures with crystalline material. 4,059,707, Cl. 427-35.000.
Smith, William S., Jr., to Exxon Research & Engineering Co. Curable blends of EPDM and polypropylene. 4,059,651, Cl. 260-848.000.
SmithKline Corporation: *See—*
Berges, David A., 4,059,591, Cl. 260-308.00D.
DeMarinis, Robert M.; and Weisbach, Jerry A., 4,059,578, Cl. 544-21.000.
Snider, George William: *See—*
Earle, Paul Lewis; and Snider, George William, 4,058,947, Cl. 52-396.000.
Snowdon, Brian: *See—*
MacDonald, Eric John Christopher; and Snowdon, Brian, 4,059,195, Cl. 214-44.00R.
Snyder, Gene L.; and Hennessey, Walter F., Jr., to Bendix Corporation, The. Electrical connector. 4,059,324, Cl. 339-89.00M.
Societe a Responsabilite Limitee dite: TECCA: *See—*
Corbic, Yves Jean, 4,059,377, Cl. 425-305.100.
Societe Anonyme D.B.A.: *See—*
Carre, Jean-Jacques, 4,059,174, Cl. 188-195.000.
Societe Degremont: *See—*
Tardivel, Jacques, 4,059,531, Cl. 210-522.000.
Soden, George B.: *See—*
Madsen, Elmer W.; and Soden, George B., 4,059,024, Cl. 74-421.00R.
Sodickson, Lester A.; and Lim, Franklin, to Damon Corporation. Method and apparatus for analysis of constituent carried in fibrous medium. 4,059,405, Cl. 23-230.00R.
Sofer, George A.: *See—*
Bupp, Lamar P.; and Sofer, George A., 4,059,484, Cl. 176-78.000.
Sohnle, Rudiger, to Robert Bosch G.m.b.H. Rectifier assembly structure, particularly for automotive-type alternator-rectifier combination. 4,059,778, Cl. 310-68.00D.
Sollich AG: *See—*
Sollich, Helmut, 4,059,378, Cl. 425-362.000.
Sollich, Helmut, to Sollich KG. Conditioning machine for chocolate masses. 4,059,047, Cl. 99-455.000.
Sollich, Helmut, to Sollich AG. Method and a machine for removing from their molds moldings of confectionery masses which have been formed into chocolate centers, bars or other single or continuous moldings. 4,059,378, Cl. 425-362.000.
Sollich KG: *See—*
Sollich, Helmut, 4,059,047, Cl. 99-455.000.
Solomons, William Ebenezer: *See—*
Mathison, Ian William; Solomons, William Ebenezer; and Jones, Raymond Henry, 4,059,586, Cl. 260-287.00D.
Sony Corporation: *See—*
Hamada, Osamu, 4,059,807, Cl. 330-10.000.
Ohsawa, Mitsuo; Yamatani, Wataru; and Onoe, Yukio, 4,059,802, Cl. 325-398.000.
Yamanaka, Seisuke; and Nagumo, Fumio, 4,059,839, Cl. 358-44.000.
Soos, Nicholas Alec: *See—*
Mancke, Ralph Gustavus; and Soos, Nicholas Alec, 4,059,467, Cl. 156-80.000.
Sopecom S.A. Fribourg: *See—*
Koch, Friedrich; and Fink, Lothar, 4,059,375, Cl. 425-589.000.
Southern Railway Company: *See—*
Larsen, Glen D., 4,059,192, Cl. 213-61.000.
Sovitec S.A.: *See—*
De Vos, Daniel; Michel, Paul-Marie; and Berger, Alfred, 4,059,423, Cl. 65-21.000.
Spanel, Abram N. Hair cutters. 4,058,891, Cl. 30-30.000.
Spanel, Abram N.; Eiland, P. Frank; and Jacobs, David R., to Spanel, Abram N. Apparatus for converting oscillatory motion to reciprocating motion. 4,059,021, Cl. 74-89.200.
Speakman, Derek Norman Alfred, to Imperial Chemical Industries Limited. Paint manufacture. 4,059,547, Cl. 260-17.00R.
Specht, Thomas F.; Trodler, Juergen W.; and Vanecek, Pavel, to Union Special Corporation. Automatic brake mechanism for milling machines. 4,059,173, Cl. 188-110.000.
Sperry Rand Corporation: *See—*
Sadler, Loren G.; and Mast, Aquila D., 4,058,958, Cl. 56-228.000.
Spescha, Gelli; and Lattion, Andre, to Rieter Machine Works, Ltd. Method and apparatus for detecting periodic yarn irregularities in a yarn between a yarn forming stage and a yarn winding stage. 4,058,962, Cl. 57-34.00R.
Spickler, John Martin: *See—*
Gavin, John Henry; and Spickler, John Martin, 4,058,881, Cl. 29-715.000.
Spiral Tubing Corporation: *See—*
Perkins, Robert W., 4,059,004, Cl. 72-299.000.
Spitzer, Artur; Biedert, Hartmut; and Gramlich, Fritz, deceased (by Gramlich, Ute, legal representative), to Spitzer Silo-Fahrzeugwerk KG. Process for discharging bulk material from a silo. 4,059,311, Cl. 302-53.000.
Spitzer Silo-Fahrzeugwerk KG: *See—*
Spitzer, Artur; Biedert, Hartmut; and Gramlich, Fritz, deceased, 4,059,311, Cl. 302-53.000.
Sprague Electric Company: *See—*
Bernard, Walter J., 4,059,442, Cl. 75-208.00R.
Sproul, Nolte V., to Aspro, Inc. One-piece sintered pulley hub construction. 4,059,023, Cl. 74-230.300.
Squire, Christopher John: *See—*
Le Count, David James; and Squire, Christopher John, 4,059,622, Cl. 260-559.00A.
Ssinegurski, Eugen; and Wilkinson, Donald, to Combustion Engineering, Inc. Buckstay arrangement. 4,059,075, Cl. 122-6.00A.
Stackpole Carbon Company: *See—*
Schreiber, Robert E.; and Zelt, Edward J., 4,059,776, Cl. 310-242.000.
Stahlecker, Fritz, to Stahlecker, Fritz; and Stahlecker, Hans. Open-end spinning machine with a plurality of spinning units and with at least one servicing device. 4,058,963, Cl. 57-56.000.
Stahlecker, Hans: *See—*
Stahlecker, Fritz, 4,058,963, Cl. 57-56.000.
Stal-Laval Turbin AB: *See—*
Ferm, Stig; and Torstenfelt, Ragnar, 4,058,973, Cl. 60-39.09R.
Stalder, Herbert, to Rieter Machine Works, Ltd. Open-end rotor for a spinning machine. 4,058,964, Cl. 57-58.890.
Standard Oil Company, The: *See—*
Judzis, Arnis; and Bond, Thomas J., 4,059,380, Cl. 425-298.000.
Standard Oil Company (Indiana): *See—*
Blaha, Eli W.; Koster, Sandra K.; and Wang, Chen-Shen, 4,059,719, Cl. 526-52.000.
Slama, Francis J.; and Fielding, Ivor R., 4,059,650, Cl. 260-837.00R.
Stanford Research Institute: *See—*
Murdock, David M., 4,059,098, Cl. 128-2.00V.
Stange, Klaus K.; Smith, Richard E.; Hamlin, Thomas J.; and Cassano, James R., to Xerox Corporation. Document handling apparatus. 4,059,260, Cl. 271-3.000.
Stanwell-Smith, Colin Howard: *See—*
Gosling, Alexander Bennett; Plummer, Dexter Robert; and Stanwell-Smith, Colin Howard, 4,059,030, Cl. 74-798.000.
Star Dental Manufacturing Co., Inc.: *See—*
Nash, John E., 4,058,898, Cl. 32-59.000.
Starr, Eugene W., to PPG Industries, Inc. Method and apparatus for heating glass sheets with recirculated gas. 4,059,426, Cl. 65-25.00A.
Starr, Eugene W.; and Misson, George W., to PPG Industries, Inc. Electric glass sheet heating furnace and method of using. 4,059,427, Cl. 65-25.00A.
Stauffer Chemical Company: *See—*
Baker, Don R.; and Gutman, Arnold D., 4,059,625, Cl. 260-566.0AE.
Stawinski, Jacek: *See—*
Narang, Saran A.; and Stawinski, Jacek, 4,059,592, Cl. 260-308.00D.
Stedman, Robert N., to Caterpillar Tractor Co. Mine drilling apparatus and method. 4,059,163, Cl. 175-73.000.
Stedman, Robert N., to Caterpillar Tractor Co. Lift truck mast positioning mechanism. 4,059,172, Cl. 187-9.00E.
Steiger, Anton, to Sulzer Brothers Limited. Reciprocating internal combustion engine for operation with fuel in powder form. 4,059,077, Cl. 123-23.000.
Steiner American Corporation: *See—*
Steiner, Robert L., 4,059,422, Cl. 55-418.000.
Steiner, Robert L., to Steiner American Corporation. Dispenser for odor control agent. 4,059,422, Cl. 55-418.000.
Stelly, Charles Warren: *See—*
Weidler, Jay B., Jr.; and Stelly, Charles Warren, 4,058,984, Cl. 61-48.000.
Stephenson, Roger: *See—*
Phillips, John J.; and Stephenson, Roger, 4,059,332, Cl. 339-113.00R.
Sterling Drug Inc.: *See—*
Eggensperger, Heinz; Beilfuss, Wolfgang; and Ehlers, Helmut Hermann, 4,059,596, Cl. 260-347.800.
Stetson, Ralph B.: *See—*
Ouelette, Ronald J.; Canney, Robert S.; and Stetson, Ralph B., 4,059,326, Cl. 339-113.00R.

Steuer, Werner: *See—*
Schulz, Horst; Flosser, Josef; Kessler, Reinhard; Schmidt, Karl-Heinz; Eisend, Ewald; Hild, Erich; Loffler, Karl-Heinz; and Steuer, Werner, 4,059,028, Cl. 74-781.00B.
Stevens, Daryl A.; and Wicktor, Russell D. Water safety device. 4,058,862, Cl. 9-14.000.
Stewart, John M., to University Patents, Inc. Analgesic action of substance P. 4,059,693, Cl. 424-177.000.
Stewart, John W., to NCR Corporation. Solenoid driver circuit. 4,059,844, Cl. 361-152.000.
Steyr-Daimler-Puch Aktiengesellschaft: *See—*
Mullner, Franz, 4,058,924, Cl. 42-69.00R.
Stieglitz, Ludwig: *See—*
Schmieder, Helmut; and Stieglitz, Ludwig, 4,059,671, Cl. 423-10.000.
Story, Anne W., to United States of America, Transportation. Roadrunner alcohol safety interlock system. 4,058,911, Cl. 35-22.00R.
Stoy, Erich: *See—*
Rommen, Hans; and Stoy, Erich, 4,059,002, Cl. 72-238.000.
Strahorn, David F.; and Goldstein, Roger F., to Chevron Research Company. Liquid separation apparatus and method. 4,059,517, Cl. 210-73.00R.
Strathearn Audio Limited: *See—*
Gosling, Alexander Bennett; Plummer, Dexter Robert; and Stanwell-Smith, Colin Howard, 4,059,030, Cl. 74-798.000.
Strickler, Allen, to Beckman Instruments, Inc. Automated electrophoresis unit. 4,059,501, Cl. 204-299.00R.
Strike, Donald Peter, to American Home Products Corporation. 15-Substituted prostanoic acids for treating bronchial spasm. 4,059,701, Cl. 424-250.000.
Stritzel, Gene A., to Gleason Works, The. Two stage limited slip differential. 4,059,026, Cl. 74-711.000.
Stromberg-Carlson Corporation: *See—*
Altenburger, Otto, 4,059,733, Cl. 179-18.0ET.
Struble, Dean L.; and Lilly, Charles E., to Canadian Patents and Development Limited. Attractant for beet webworm moths. 4,059,689, Cl. 424-84.000.
Strunz, Dieter O.; and Kern, Wolfgang, to Siemens Aktiengesellschaft. Device for removing carbonizable residues. 4,059,395, Cl. 432-72.000.
Stuart, Ronald Sangster: *See—*
Walsingham, Richard Warren; and Stuart, Ronald Sangster, 4,059,606, Cl. 260-448.20B.
Stubbings, James H., to Potomac Applied Mechanics, Inc. Lock box. 4,058,993, Cl. 70-58.000.
Stumphauzer, William C.: *See—*
Scholl, Charles H.; Janner, John R., Jr.; Stumphauzer, William C.; and Shuster, Duane O., 4,059,466, Cl. 156-78.000.
Scholl, Charles H.; Janner, John R., Jr.; and Stumphauzer, William C., 4,059,714, Cl. 428-310.000.
Sturgill, Lawrence W. Glass block panel. 4,058,943, Cl. 52-227.000.
Suchy, Milos: *See—*
Chodnekar, Madhukar Subraya; Pfiffner, Albert; Rigassi, Norbert; Schwieter, Ulrich; and Suchy, Milos, 4,059,600, Cl. 260-348.460.
Sugimura, Kazuo: *See—*
Sugimura, Nobuyuki; and Sugimura, Kazuo, 4,059,125, Cl. 137-73.000.
Sugimura, Nobuyuki; and Sugimura, Kazuo. Pressure container with an injection valve provided with a fusible valve member. 4,059,125, Cl. 137-73.000.
Sugiyama, Hironari; Chiyomaru, Isao; Okuda, Itsuki; Yamamoto, Hisaaki; and Ito, Hideo. Substituted derivatives of 1,1-dichloroalkene-1 and their preparation and uses. 4,059,635, Cl. 260-609.00E.
Sugiyama, Masatoshi; Kato, Eiichi; and Nakamura, Yasuharu, to Fuji Photo Film Co., Ltd. Dye containing photographic sensitive elements. 4,059,448, Cl. 96-84.00A.
Sullivan, Donald A.: *See—*
Sanborn, Philip A., Jr.; Westbrook, Shelby F.; and Sullivan, Donald A., 4,058,953, Cl. 53-22.00A.
Sulzer Brothers Limited: *See—*
Bucher, Robert R., 4,059,131, Cl. 139-59.000.
Doerre, Erhard; Semlitsch, Manfred; and Frey, Otto, 4,058,856, Cl. 3-1.910.
Steiger, Anton, 4,059,077, Cl. 123-23.000.
Sumita, Tadayuki: *See—*
Ito, Yasuro; Kaga, Hideharu; Yamamoto, Yasuhiro; and Sumita, Tadayuki, 4,059,376, Cl. 425-546.000.
Sumitomo Aluminum Smelting Co., Ltd.: *See—*
Yanagida, Kiyomi; Hirokane, Tadashi; Tsukiyasu, Tadashi; and Sato, Tomoari, 4,059,494, Cl. 204-28.000.
Sumitomo Chemical Company, Limited: *See—*
Hosaka, Hirokazu; Tanimoto, Kenji; Okabe, Hiromichi; Tanaka, Kunthiko; Ueda, Yuji; and Dohgane, Iwao, 4,059,637, Cl. 260-610.00A.
Yamazaki, Noboru; and Higashi, Fukuji, 4,059,603, Cl. 260-408.000.
Summa Corporation: *See—*
Johnson, Lavell R., 4,059,685, Cl. 424-12.000.
Sumrall, James: *See—*
Sedgwick, Jarvis D., 4,059,140, Cl. 157-1.170.
Sundermann, Rudolf; Rottloff, Gunther; and Grigat, Ernst, to Bayer Aktiengesellschaft. High molecular weight polytriazines of soluble polymeric N-cyano-isourea ethers. 4,059,567, Cl. 260-47.00R.
Suntech, Inc.: *See—*
Hansel, William B., 4,059,135, Cl. 141-207.000.
Superior Oil Company, The: *See—*
Knight, John H., 4,058,905, Cl. 34-15.000.
Sureau, Robert Frederic Michel: *See—*
Foulletier, Louis; Pechmeze, Jacques Pierre Edmond; and Sureau, Robert Frederic Michel, 4,059,626, Cl. 260-578.000.
Suys, Andre Roger: *See—*
Van Landeghem, Willy Karel; and Suys, Andre Roger, 4,059,768, Cl. 250-483.000.
Suzuki, Kensuke; Sasaki, Takeshi; and Matsuzaki, Mitsuyuki, to Hitachi, Ltd. Glass-moulded type semiconductor device. 4,059,837, Cl. 357-73.000.
Suzuki, Shuzo: *See—*
Hachikubo, Kazumasa; and Suzuki, Shuzo, 4,059,488, Cl. 195-28.00R.
Suzuki, Takeshi: *See—*
Tohyama, Masao; Ichigo, Minoru; Suzuki, Takeshi; Nakasu, Makoto; Ando, Akinobu; Yoshida, Akitoshi; Kosaka, Masaharu; Hayasi, Norihisa; and Inoue, Shigeki, 4,059,553, Cl. 260-29.60S.
Swodenk, Wolfgang: *See—*
Prescher, Gunter; Schreyer, Gerd; Weiberg, Otto; Wirthwein, Rolf; Waldmann, Helmut; Seifert, Hermann; Schwerdtel, Wulf; and Swodenk, Wolfgang, 4,059,619, Cl. 260-502.00R.
Sybron Corporation: *See—*
McGivern, Robert F., 4,059,529, Cl. 210-519.000.
Syntex (U.S.A.) Inc.: *See—*
Nelson, Peter H.; and Untch, Karl G., 4,059,611, Cl. 260-456.00P.
Walker, Keith A. M., 4,059,705, Cl. 424-273.00R.
Syracuse Plastics, Inc.: *See—*
Falcone, Joseph R., 4,059,294, Cl. 285-238.000.
Szabo, Emery: *See—*
Hoch, Samuel; Ceprini, Mario Q.; and Szabo, Emery, 4,059,562, Cl. 260-45.75S.
Sze, Morgan C.; Schindler, Harvey D.; and Fanelli, Anthony, to Lummus Company, The. Stripping ammonia from liquid effluent of a hydrodenitrification process. 4,059,503, Cl. 208-254.00H.
T.I. (Group Services) Limited: *See—*
Hartley, John Edward, 4,059,036, Cl. 83-188.000.
Tacey, Charles Arthur, to Philograph Publications Limited. Didactic apparatus. 4,058,912, Cl. 35-34.000.
Taisei Corporation: *See—*
Ito, Yasuro; Kaga, Hideharu; Yamamoto, Yasuhiro; and Sumita, Tadayuki, 4,059,376, Cl. 425-546.000.
Takada, Masamichi: *See—*
Uchino, Hisanori; Takada, Masamichi; Shimizu, Takahiro; Shibayama, Masamitsu; and Furuno, Fumiya, 4,059,196, Cl. 214-138.00R.
Takahashi, Masazumi: *See—*
Takida, Hiroshi; Kido, Akio; and Takahashi, Masazumi, 4,058,904, Cl. 34-12.000.
Takahashi, Yoshinao; and Takeuchi, Kazuo, to Takeda Chemical Industries, Ltd. Treating impaired consciousness with glutamyl-L-histidyl-L-prolinamide. 4,059,692, Cl. 424-177.000.
Takahashi, Yutaka; and Kobayashi, Toshiji, to Kawasaki Yukogyo Kabushiki Kaisha. Apparatus for cooling steel blooms, slabs, and the like. 4,059,253, Cl. 266-259.000.
Takanihashi, Hiromitsu: *See—*
Yoshizaki, Hiroyuki; Takanihashi, Hiromitsu; and Masuda, Yoshitaka, 4,059,565, Cl. 260-47.0XA.
Takeda Chemical Industries, Ltd.: *See—*
Iwasa, Susumu; and Yoshida, Isamu, 4,059,491, Cl. 195-103.50A.
Takahashi, Yoshinao; and Takeuchi, Kazuo, 4,059,692, Cl. 424-177.000.
Takeda, Makoto: *See—*
Takematsu, Tetsuo; Konnai, Makoto; Takeda, Makoto; Fuga, Nobuhiko; Ikeda, Kaoru; and Shugaya, Kiyoshi, 4,059,431, Cl. 71-87.000.
Takematsu, Tetsuo; Konnai, Makoto; Takeda, Makoto; Fuga, Nobuhiko; Ikeda, Kaoru; and Shugaya, Kiyoshi, 4,059,432, Cl. 71-87.000.
Takematsu, Tetsuo; Konnai, Makoto; Takeda, Makoto; Fuga, Nobuhiko; Ikeda, Kaoru; and Shugaya, Kiyoshi, to Mitsubishi Petrochemical Co., Ltd. Plant growth regulator. 4,059,431, Cl. 71-87.000.
Takematsu, Tetsuo; Konnai, Makoto; Takeda, Makoto; Fuga, Nobuhiko; Ikeda, Kaoru; and Shugaya, Kiyoshi, to Mitsubishi Petrochemical Co., Ltd. Plant growth regulator. 4,059,432, Cl. 71-87.000.
Takemura, Susumu; Onoyama, Masao; and Tsuji, Masanobu, to Nippon Steel Corporation. Highly corrosion resistant ferritic stainless steel. 4,059,440, Cl. 75-126.00C.
Takenaka, Yoshisuke: *See—*
Hori, Kikuo; Horiuchi, Takumi; Nishikawa, Mikio; Ryugo, Shiro; Ishizuka, Akira; and Takenaka, Yoshisuke, 4,059,239, Cl. 242-18.100.
Takeuchi, Kazuo: *See—*
Takahashi, Yoshinao; and Takeuchi, Kazuo, 4,059,692, Cl. 424-177.000.
Takezaki, Tsuneo: *See—*
Serizawa, Masabumi; and Takezaki, Tsuneo, 4,059,791, Cl. 363-37.000.
Takida, Hiroshi; Kido, Akio; and Takahashi, Masazumi, to Nippon Gohsei Kagaku Kogyo Kabushiki Kaisha. Process for drying wet particles of hydrolyzed ethylene-vinyl acetate copolymer. 4,058,904, Cl. 34-12.000.
Tallon, James I., to McNeil Corporation. Wheel disk display and placard holder. 4,058,917, Cl. 40-125.00M.
Tamaru, Munetaka; Kume, Kazunari; Oono, Hideshi; Watanabe, Minoru; Sato, Hideo; and Morokawa, Shigeru, to Citizen Watch Co., Ltd. Electric timepiece for displaying the operating condition thereof. 4,058,969, Cl. 58-23.0BA.

Tamura, Tetsuomi: *See—*
Tateno, Hidenori; and Tamura, Tetsuomi, 4,059,088, Cl. 123-103.00R.
Tan, Sing Liong: *See—*
van de Polder, Leendert Johan; and Tan, Sing Liong, 4,059,840, Cl. 358-48.000.
Tanaka, Akira, to American Safety Equipment Corporation. Safety belt retractor. 4,059,242, Cl. 242-107.40A.
Tanaka, Kunthiko: *See—*
Hosaka, Hirokazu; Tanimoto, Kenji; Okabe, Hiromichi; Tanaka, Kunthiko; Ueda, Yuji; and Dohgane, Iwao, 4,059,637, Cl. 260-610.00A.
Tanaka, Masayuki: *See—*
Hosokoshi, Kakuichiro; Yamamoto, Hikoshi; Tanaka, Masayuki; and Omura, Shinichi, 4,059,834, Cl. 354-1.000.
Tanaka, Wataru; Akito, Eiichiro; Yoshida, Koichi; Terada, Takashi; and Ninomiya, Hiroshi, to Nippon Kayaku Kabushiki Kaisha. Pharmaceutical preparation for oral cavity administration. 4,059,686, Cl. 424-19.000.
Tanaka, Yoshiaki: *See—*
Handa, Susumu; Tanaka, Yoshiaki; Nishibata, Atsushi; Ueda, Sadashi; Inamoto, Yoshiaki; Saito, Masahiro; Tanimoto, Fumio; and Kitano, Hisao, 4,059,610, Cl. 544-193.000.
Tanazawa, Hisaji. Method of forming an embossed pattern. 4,059,479, Cl. 156-640.000.
Tanigami, Takahiko; Hasegawa, Akira; and Horikoshi, Shigeru, to Hitachi, Ltd. Oil pressure detecting apparatus for internal combustion engines. 4,059,087, Cl. 123-196.00S.
Tanimoto, Fumio: *See—*
Handa, Susumu; Tanaka, Yoshiaki; Nishibata, Atsushi; Ueda, Sadashi; Inamoto, Yoshiaki; Saito, Masahiro; Tanimoto, Fumio; and Kitano, Hisao, 4,059,610, Cl. 544-193.000.
Tanimoto, Kenji: *See—*
Hosaka, Hirokazu; Tanimoto, Kenji; Okabe, Hiromichi; Tanaka, Kunthiko; Ueda, Yuji; and Dohgane, Iwao, 4,059,637, Cl. 260-610.00A.
Tanimura, Kiyotaka. Automotive light for preventing rear end collision. 4,059,824, Cl. 340-71.000.
Tanner, Lee E.: *See—*
Ray, Ranjan; Tanner, Lee E.; and Cline, Carl F., 4,059,441, Cl. 75-174.000.
Tardivel, Jacques, to Societe Degremont. Automatic sludge extraction and washing device for use in a water treatment settling apparatus. 4,059,531, Cl. 210-522.000.
Tart, David K.; and Osteen, Mitchell M., to General Electric Company. Gasket material and method of making. 4,059,753, Cl. 362-267.000.
Tateno, Hidenori; and Tamura, Tetsuomi, to Toyota Jidosha Kogyo Kabushiki Kaisha. Throttle positioner. 4,059,088, Cl. 123-103.00R.
Tatsuta, Hatsumi; and Kumazawa, Shigeru, to Japan Atomic Energy Research Institute. Gamma-ray scintillation detector. 4,059,765, Cl. 250-367.000.
Taylor, Gary Newton: *See—*
Kahn, Frederic Jay; and Taylor, Gary Newton, 4,059,340, Cl. 350-160.0LC.
Taylor, Timothy H.: *See—*
Smith, Edward M.; Casada, James H.; and Taylor, Timothy H., 4,059,161, Cl. 172-60.000.
Teague, Willis E.: *See—*
Henry, J. R.; and Teague, Willis E., 4,058,872, Cl. 17-1.00R.
Tecumseh Products Company: *See—*
Gannaway, Edwin L., 4,059,366, Cl. 417-32.000.
Teijin Limited: *See—*
Hori, Kikuo; Horiuchi, Takumi; Nishikawa, Mikio; Ryugo, Shiro; Ishizuka, Akira; and Takenaka, Yoshisuke, 4,059,239, Cl. 242-18.100.
Iimuro, Hiroyuki; Horiuchi, Takumi; Kuroda, Yoji; Hori, Kikuo; and Kawano, Tatumi, 4,058,967, Cl. 57-140.00J.
Tomibe, Katsuhiko; Masuho, Yasuhiko; Matsuzawa, Kimihiko; Ishimoto, Sachio; Satake, Kazuo; and Watanabe, Tsuneo, 4,059,571, Cl. 260-112.00B.
Teissier, Etienne Leon Norbert, to Etat Francais Represente par de Delegue Ministeriel pour l'Armement. Device for mechanical connection. 4,059,360, Cl. 403-2.000.
Teldix GmbH: *See—*
Jonner, Wolf-Dieter, 4,059,312, Cl. 303-92.000.
Tenneco Chemicals, Inc.: *See—*
Hoch, Samuel; Ceprini, Mario Q.; and Szabo, Emery, 4,059,562, Cl. 260-45.75S.
Terada, Haruyoshi: *See—*
Nishijima, Masanori; Oda, Nobuyuki; and Terada, Haruyoshi, 4,059,452, Cl. 106-14.000.
Terada, Takashi: *See—*
Tanaka, Wataru; Akito, Eiichiro; Yoshida, Koichi; Terada, Takashi; and Ninomiya, Hiroshi, 4,059,686, Cl. 424-19.000.
Terai, Kiyoshi: *See—*
Yoshida, Toshio; Terai, Kiyoshi; Matsui, Shigetomo; Kinoshita, Tsuneo; Hoshi, Akira; and Tohmoto, Toru, 4,058,883, Cl. 29-448.000.
Terrell, Ross C., to Airco, Inc. Ether compounds. 4,059,639, Cl. 260-614.00F.
Terry, Ruel C., to In Situ Technology, Inc. Methods of fluidized production of coal in situ. 4,059,151, Cl. 166-258.000.
Tesa S.A.: *See—*
Lendi, Georges; Hardegger, Bruno; and De Trey, Rene, 4,058,901, Cl. 33-178.00R.
Texaco Development Corporation: *See—*
Gipson, Robert Malone, 4,059,599, Cl. 260-348.290.
Johnson, Fred Lowery, Jr., 4,059,620, Cl. 260-513.00T.
Texaco Inc.: *See—*
Allen, Joseph C.; and Shum, Yick-Mow, 4,059,152, Cl. 166-261.000.
Braden, William B., Jr.; and Flourny, Kenoth H., 4,059,154, Cl. 166-274.000.
Harrison, Robert J., 4,059,149, Cl. 166-64.000.
Texas Instruments Incorporated: *See—*
Belasco, Melvin; and Cottongim, Billie Joe, 4,059,764, Cl. 250-352.000.
Rogers, Gerald D., 4,059,826, Cl. 365-104.000.
Textile Research Institute: *See—*
Miller, Bernard; Martin, J. Ronald; Meiser, Charles H., Jr.; Lambert, Harold W.; and Buvel, Harry, 4,059,007, Cl. 73-190.00R.
Thagard Technology Company: *See—*
Matovich, Edwin, 4,059,416, Cl. 48-197.00R.
Theelen, Hubertus J.: *See—*
Koel, Maarten; and Theelen, Hubertus J., 4,059,848, Cl. 361-272.000.
Thomas, Ian M., to Owens-Illinois, Inc. Method of making aluminum phosphate. 4,059,669, Cl. 264-319.000.
Thompson, Morice William: *See—*
Bentley, John; and Thompson, Morice William, 4,059,557, Cl. 260-31.20N.
Thomson-Brandt: *See—*
Bricot, Claude; and Lehureau, Jean-Claude, 4,059,841, Cl. 358-128.000.
Thomson-CSF: *See—*
Agnus, Pierre; and Butin, Henri, 4,059,804, Cl. 328-134.000.
Cahen, Olivier, 4,059,774, Cl. 307-299.00R.
Nicolas, Jean; Lagrange, Alain; and Hildebrandt, Nieczyslaw, 4,059,664, Cl. 264-66.000.
Rougeot, Henri, 4,059,766, Cl. 250-370.000.
Thorne, John K., to Universal Oil Products Company. Integral finned tube for submerged boiling applications having special O.D. and/or I.D. enhancement. 4,059,147, Cl. 165-133.000.
Threadgill, Murray H. Sleep alarm device. 4,059,830, Cl. 340-279.000.
Thurau, Gunther: *See—*
Magg, Alfred; and Thurau, Gunther, 4,059,178, Cl. 192-53.00F.
Tiitola, Antti-Jussi, to Karhu-Titan Oy. Hockey stick or the like, particularly blade structure thereof. 4,059,269, Cl. 273-67.00A.
Tile Council of America, Inc.: *See—*
Weiant, Davis S.; Bernett, Frank E.; and Velivis, William R., 4,059,551, Cl. 260-29.60H.
Tillgren, Gunnar Kurt Arne, to Personer Verkstad, AB. Method and a device for a bale press. 4,059,049, Cl. 100-41.000.
Timex Corporation: *See—*
Wuthrich, Paul; and Flumm, Paul, 4,059,110, Cl. 128-218.00A.
Timms, Ralph G., to British Steel Corporation. Coated products. 4,059,472, Cl. 156-259.000.
Tioga Air Heaters, Co.: *See—*
Muckelrath, Ernest R., 4,058,882, Cl. 29-407.000.
Tirp, Erwin: *See—*
Schliek, Gunter; and Tirp, Erwin, 4,059,044, Cl. 93-93.0HT.
Tischlinger, Edward A. Mixing and dispensing disposable medicament injector. 4,059,109, Cl. 128-218.00M.
Tischlinger, Edward A. Disposable additive syringe. 4,059,112, Cl. 128-272.300.
Tohmoto, Toru: *See—*
Yoshida, Toshio; Terai, Kiyoshi; Matsui, Shigetomo; Kinoshita, Tsuneo; Hoshi, Akira; and Tohmoto, Toru, 4,058,883, Cl. 29-448.000.
Tohyama, Masao; Ichigo, Minoru; Suzuki, Takeshi; Nakasu, Makoto; Ando, Akinobu; Yoshida, Akitoshi; Kosaka, Masaharu; Hayasi, Norihisa; and Inoue, Shigeki, to Kikusui Kagaku Kogyo Kabushiki Kaisha; and Nissan Kagaku Kogyo Kabushiki Kaisha. Coating composition comprising oxides and/or hydroxides of Mg^{++}, Ca^{++}, chromium, manganese, and Zn^{++} and quaternary ammonium silicates useful for building materials. 4,059,553, Cl. 260-29.60S.
Tojyo, Tsutomu, to Olympus Optical Co., Ltd. Microscope objective with correcting means. 4,059,342, Cl. 350-175.0ML.
Tokiwa, Taisuke: *See—*
Kitamura, Takashi; Watanabe, Asao; Nakano, Takashi; Masaki, Katsumi; Hirayama, Kazuhiro; Sato, Yasushi; and Tokiwa, Taisuke, 4,059,833, Cl. 346-108.000.
Tolbert, William R.; and Feder, Joseph, to Monsanto Company. Adaptation of cell lines to suspension culture. 4,059,485, Cl. 195-1.800.
Tolbert, William R., to Monsanto Company. Cell culture process. 4,059,486, Cl. 195-1.800.
Tomczak, Lawrence William; Crall, Frederick William; Caron, LaVerne Andrew; and Campau, Walter Joseph, to Chrysler Corporation. Method of calibrating variable inductance transducers. 4,058,888, Cl. 29-593.000.
Tomibe, Katsuhiko; Masuho, Yasuhiko; Matsuzawa, Kimihiko; Ishimoto, Sachio; Satake, Kazuo; and Watanabe, Tsuneo, to Teijin Limited. Novel immunoglobulin derivatives and process for the preparation thereof. 4,059,571, Cl. 260-112.00B.
Tonkyn, Richard G.: *See—*
Fowler, William J.; Heberle, Richard A.; Tonkyn, Richard G.; and Vorchheimer, Norman, 4,059,515, Cl. 210-51.000.
Toomay, Timothy L., to Hewlett-Packard Company. Clutchless paper advance mechanism. 4,059,213, Cl. 226-151.000.
Topel, Kenneth D.: *See—*
Rasmussen, Harry R.; and Topel, Kenneth D., 4,059,321, Cl. 339-34.000.

Torimaru, Takashi, to Hokushin Electric Works, Ltd. Electromagnetic flowmeter. 4,059,014, Cl. 73-194.0EM.
Tornell, Charles B. Device for prying loose a pressure cooker cover. 4,059,032, Cl. 81-3.00R.
Toro Company, The: *See—*
Hunter, Edwin J., 4,059,227, Cl. 239-1.000.
Torre, Edward Della: *See—*
Kinsner, Witold; and Torre, Edward Della, 4,059,829, Cl. 365-19.000.
Torstenfelt, Ragnar: *See—*
Ferm, Stig; and Torstenfelt, Ragnar, 4,058,973, Cl. 60-39.09R.
Torstensson, Bengt-Arne. Method and device for pore pressure sounding. 4,059,008, Cl. 73-38.000.
Toshioka, Toru; Oishi, Kazuo; and Yamada, Takashi, to Toyota Jidosha Kogyo Kabushiki Kaisha; and Nippon Soken, Inc. Fault detecting system for vehicle occupants protective apparatus. 4,059,822, Cl. 340-52.00H.
Touborg, Jorn, to F. L. Smidth & Co. Calcination of pulverous material. 4,059,392, Cl. 432-58.000.
Touw, Antonius Cornelis Maria: *See—*
Van Eck, Rudolf; and Touw, Antonius Cornelis Maria, 4,059,850, Cl. 364-200.000.
Tower Manufacturing Corporation: *See—*
Mongeau, Roland E., 4,059,738, Cl. 200-6.00B.
Towmotor Corporation: *See—*
Evans, Dafydd W., 4,059,281, Cl. 280-5.00A.
Toyoda-Koki Kabushiki-Kaisha: *See—*
Haga, Kyosuke, 4,059,746, Cl. 364-107.000.
Toyota Jidosha Kogyo Kabushiki Kaisha: *See—*
Kasima, Osamu; and Sanda, Shougo, 4,059,079, Cl. 123-30.00D.
Kayanuma, Nobuaki, 4,059,081, Cl. 123-136.000.
Morita, Akiyoshi; Hayasaka, Tamio; Shimizu, Kunio; and Fukuda, Tokiharu, 4,059,143, Cl. 164-113.000.
Tateno, Hidenori; and Tamura, Tetsuomi, 4,059,088, Cl. 123-103.00R.
Toshioka, Toru; Oishi, Kazuo; and Yamada, Takashi, 4,059,822, Cl. 340-52.00H.
Tozier, John E.: *See—*
Armstrong, Donald E.; Sindlinger, Ronald E.; Cohen, Bernard; Tozier, John E.; and Audesse, Emery G., 4,059,389, Cl. 431-95.00R.
Treibacher Chemische Werke Aktiengesellschaft: *See—*
Ilmaier, Bernard; and Zeiringer, Hans, 4,059,417, Cl. 51-309.00A.
Tresper, Erhard: *See—*
Krimm, Heinrich; and Tresper, Erhard, 4,059,638, Cl. 260-613.00R.
Trippel, Gerhard: *See—*
Ruh, Wolf-Dieter; and Trippel, Gerhard, 4,059,480, Cl. 156-644.000.
Trodler, Juergen W.: *See—*
Specht, Thomas F.; Trodler, Juergen W.; and Vanecek, Pavel, 4,059,173, Cl. 188-110.000.
Trosch, Paul: *See—*
Guldener, Erich; and Trosch, Paul, 4,059,250, Cl. 251-304.000.
Trukhin, Alexandr Fedorovich: *See—*
Barannik, Ivan Andreevich; Kondratenko, Anatoly Borisovich; Trukhin, Alexandr Fedorovich; Raskatov, Viktor Georgievich; Zharovsky, Ivan Vasilievich; Rudakov, Viktor Alexandrovich; Mordkovich, Andrei Efremovich; and Chalov, Alexandr Vasilievich, 4,059,372, Cl. 425-8.000.
Truth Incorporated: *See—*
Van Klompenburg, Marlo G., 4,059,298, Cl. 292-199.000.
TRW Inc.: *See—*
Dawson, John Myrick, 4,059,761, Cl. 250-287.000.
Pearson, Durk J.; and Bohn, Jack R., 4,059,308, Cl. 299-5.000.
Tsubouchi, Haruyoshi, to Hitachi, Ltd. Fuel and lubricating oil supply device. 4,059,086, Cl. 123-196.00R.
Tsuchihashi, Kiyoshi: *See—*
Inamoto, Yoshiaki; Fujikura, Yoshiaki; Tsuchihashi, Kiyoshi; and Kashihara, Eiji, 4,059,643, Cl. 260-666.0PY.
Tsuji, Masanobu: *See—*
Takemura, Susumu; Onoyama, Masao; and Tsuji, Masanobu, 4,059,440, Cl. 75-126.00C.
Tsukiyasu, Tadashi: *See—*
Yanagida, Kiyomi; Hirokane, Tadashi; Tsukiyasu, Tadashi; and Sato, Tomoari, 4,059,494, Cl. 204-28.000.
Tsukushi, Masanori: *See—*
Yoshioka, Yoshio; Hirasawa, Kunio; and Tsukushi, Masanori, 4,059,741, Cl. 200-148.00A.
Tsutsumi, Shigeru. Mold opening and locking mechanism in an injection molding machine or the like. 4,059,383, Cl. 425-451.600.
Tsygulev, Leonid Nikiforovich: *See—*
Movshovich, Pavel Mikhailovich; Khavkin, Viktor Pavlovich; Maximov, Gennady Konstantinovich; Babushkina, Natalya Borisovna; Baranov, Alexandr Anatolievich; Ivanov, Lev Nikolaevich; Nezelenov, Sergei Vladimirovich; Shutov, Gennady Nikolaevich; Tsygulev, Leonid Nikiforovich; and Ilin, Vadim Sergeevich, 4,058,960, Cl. 57-34.0AT.
Tuft, Dennis: *See—*
Furness, Bernard J.; Cousins, John R.; and Tuft, Dennis, 4,059,794, Cl. 324-208.000.
Turpening, Roger M., to Environmental Research Institute of Michigan. Seismic wave generator and method of geophysical prospecting using the same. 4,059,820, Cl. 340-15.5SW.
Tyrspy Inc.: *See—*
Martin, Clyde J.; and Nicholson, Floyd A., 4,059,823, Cl. 340-58.000.
Tysver, Oliver J.: *See—*
Aschberger, Anton A.; Avery, Jack L.; Cartwright, William J.; Dean, Geoffrey J.; Tysver, Oliver J.; Wolfe, Robert W.; and Bautz, Frederick H., 4,059,186, Cl. 198-481.000.
Uchino, Hisanori; Takada, Masamichi; Shimizu, Takahiro; Shibayama, Masamitsu; and Furuno, Fumiya, to Hokushin Electric Works, Ltd. System for controlling a power shovel. 4,059,196, Cl. 214-138.00R.
Ueda, Sadashi: *See—*
Handa, Susumu; Tanaka, Yoshiaki; Nishibata, Atsushi; Ueda, Sadashi; Inamoto, Yoshiaki; Saito, Masahiro; Tanimoto, Fumio; and Kitano, Hisao, 4,059,610, Cl. 544-193.000.
Ueda, Yuji: *See—*
Hosaka, Hirokazu; Tanimoto, Kenji; Okabe, Hiromichi; Tanaka, Kunthiko; Ueda, Yuji; and Dohgane, Iwao, 4,059,637, Cl. 260-610.00A.
Ueno, Yukichi: *See—*
Nakaizumi, Yasushi; Ueno, Yukichi; and Okumura, Masahide, 4,059,783, Cl. 315-107.000.
Ueno, Zene: *See—*
Kosaka, Katuaki; and Ueno, Zene, 4,059,076, Cl. 123-3.000.
Kosaka, Katuaki; Wagatsuma, Fumio; Shimomoto, Mithuo; Harada, Osamu; and Ueno, Zene, 4,059,415, Cl. 48-63.000.
Ueshima, Takashi: *See—*
Arai, Fumio; Kira, Masaaki; Kokuryo, Shiro; and Ueshima, Takashi, 4,059,561, Cl. 260-45.80R.
Ugine Carbone: *See—*
Romagnolo, Gerard, 4,059,363, Cl. 407-114.000.
Uhring, Gary S.: *See—*
Hood, Frederick E.; Mitchell, Donald K.; and Uhring, Gary S., 4,059,063, Cl. 114-106.000.
Ulin, Carl-Otto: *See—*
Gustafsson, Lars Ake Olof; and Ulin, Carl-Otto, 4,059,182, Cl. 197-1.00R.
Umemura, Masashi: *See—*
Nakamura, Yasusi; Umemura, Masashi; and Yonekura, Michimasa, 4,059,613, Cl. 560-26.000.
Union Carbide Canada Limited: *See—*
Morro, William Charles; Hakka, Leo Ernest; Brophy, James Mackay; Hebrard, Michel Jacques Roger; and Courtes, Jean Claude, 4,059,534, Cl. 252-32.70E.
Union Carbide Corporation: *See—*
Anderson, John Erling, 4,059,252, Cl. 266-236.000.
Bennett, Everett W., 4,059,605, Cl. 260-448.20B.
Prokai, Bela, 4,059,581, Cl. 544-69.000.
Reedy, James Dale; and Barker, Thomas Harold, 4,059,607, Cl. 260-448.20E.
Union Special Corporation: *See—*
Specht, Thomas F.; Trodler, Juergen W.; and Vanecek, Pavel, 4,059,173, Cl. 188-110.000.
Uniroyal, S.A.: *See—*
Mirtain, Henri J.; and Devienne, Andre M., 4,059,138, Cl. 152-330.0RF.
United Resources Industry Co., Ltd.: *See—*
Kurata, Shigehiro; and Abe, Kenzo, 4,059,421, Cl. 55-196.000.
United States Gypsum Company: *See—*
DeRooy, Felix J.; Daniel, Thell D.; Annes, Erle C.; and Arnold, Billy G., 4,059,456, Cl. 106-114.000.
U.S. Industries, Inc.: *See—*
Van Huis, Robert L.; and Carten, Charles T., 4,059,071, Cl. 119-18.000.
United States of America
Air Force: *See—*
Kowalski, Daniel C.; Dawson, Juan C.; and Krulikoski, Stanley J., deceased, 4,059,343, Cl. 350-182.000.
Army: *See—*
Elbe, Ronald E.; Krolak, Donald W.; and Vernon, Philip L., 4,058,922, Cl. 42-16.000.
Karr, Philip R., 4,059,052, Cl. 102-70.20P.
Energy Research and Development Administration: *See—*
Harney, Robert C.; and Schipper, John F., 4,059,759, Cl. 250-206.000.
McCuaig, Franklin D., 4,059,439, Cl. 75-122.700.
Potter, Ralph A.; and Scott, James L., 4,059,539, Cl. 252-301.10R.
Transportation: *See—*
Story, Anne W., 4,058,911, Cl. 35-22.00R.
U.S. Philips Corporation: *See—*
Gustafsson, Lars Ake Olof; and Ulin, Carl-Otto, 4,059,182, Cl. 197-1.00R.
Koel, Maarten; and Theelen, Hubertus J., 4,059,848, Cl. 361-272.000.
van Alphen, Willem Meijndert; and Verweel, Jan, 4,059,781, Cl. 313-403.000.
van de Polder, Leendert Johan; and Tan, Sing Liong, 4,059,840, Cl. 358-48.000.
Van Eck, Rudolf; and Touw, Antonius Cornelis Maria, 4,059,850, Cl. 364-200.000.
Witterick, Petrus Johannes Julius; and Sieben, Joannes Henricus Franciscus, 4,059,387, Cl. 431-93.000.
United States Steel Corporation: *See—*
Bryson, Roy E., 4,059,506, Cl. 209-18.000.
Galer, Herbert W., 4,059,249, Cl. 249-58.000.
United Technologies Corporation: *See—*
Markowski, Stanley J.; and Nolan, James J., 4,058,977, Cl. 60-39.650.

Universal Oil Products Company: *See—*
Thorne, John K., 4,059,147, Cl. 165-133.000.
University of Delaware, The: *See—*
Austin, Paul Rolland, 4,059,457, Cl. 106-203.000.
University of Hawaii, The: *See—*
Norton, Ted R.; Shibata, Shoji; and Kashiwagi, Midori, 4,059,694, Cl. 424-177.000.
University of Iowa Research Foundation: *See—*
Funk, David C., 4,058,910, Cl. 35-17.000.
University of Rochester: *See—*
Kende, Andrew S.; and Liebeskind, Lanny S., 4,059,593, Cl. 260-340.50R.
University Patents, Inc.: *See—*
Stewart, John M., 4,059,693, Cl. 424-177.000.
Untch, Karl G.: *See—*
Nelson, Peter H.; and Untch, Karl G., 4,059,611, Cl. 260-456.00P.
Upjohn Company, The: *See—*
Axen, Udo F., 4,059,614, Cl. 560-53.000.
USM Corporation: *See—*
Duncan, Robert John; and Elliott, Richard Montgomery, 4,059,204, Cl. 222-146.0HE.
Ellwood, Henry, 4,059,206, Cl. 222-413.000.
Meyer, Engelbert Anthony, 4,059,301, Cl. 293-62.000.
Vacu-Blast Limited: *See—*
John, Ronald, 4,059,189, Cl. 209-112.000.
Vagt, Henry Tyrrell, Jr., to Singer Company, The. Pulse position demodulator circuit. 4,059,806, Cl. 329-107.000.
Valentine, Richard E.: *See—*
Maul, John A.; and Valentine, Richard E., 4,059,051, Cl. 101-45.000.
Vallee, Louis Leonce. Integrated sheet metal roofing system. 4,058,950, Cl. 52-461.000.
Valmet Oy: *See—*
Kankaanpaa, Matti; Nylund, Ragnar; and Reijonen, Yrjo, 4,059,482, Cl. 162-281.000.
van Alphen, Willem Meijndert; and Verweel, Jan, to U.S. Philips Corporation. Shadow mask each aperture of which is defined by a quadrupolar lens. 4,059,781, Cl. 313-403.000.
Vanassche, Willy Joseph; Pattyn, Herman Alberik; Moisar, Erik; and Klotzer, Sieghart, to AGFA-GEVAERT N.V. Direct positive silver halide elements. 4,059,450, Cl. 96-101.000.
van de Polder, Leendert Johan; and Tan, Sing Liong, to U.S. Philips Corporation. Television camera and pick-up tube having stripes for improved resolution and linearity. 4,059,840, Cl. 358-48.000.
Vanderbusse, Robert, to Siemens Aktiengesellschaft. Method for transferring data into a data input during a telephone connection established over an interoffice trunk. 4,059,734, Cl. 179-18.0BD.
van der Lely, Ary; and Bom, Cornelis Johannes Gerardus, to C. van der Lely N. V. Rotary harrows. 4,059,160, Cl. 172-47.000.
Vanecek, Pavel: *See—*
Specht, Thomas F.; Trodler, Juergen W.; and Vanecek, Pavel, 4,059,173, Cl. 188-110.000.
Van Eck, Rudolf; and Touw, Antonius Cornelis Maria, to U.S. Philips Corporation. Memory system word group priority device with least-recently used criterion. 4,059,850, Cl. 364-200.000.
Van Huis, Robert L.; and Carten, Charles T., to U.S. Industries, Inc. Poultry cage system with controlled feeder. 4,059,071, Cl. 119-18.000.
Van Klompenburg, Marlo G., to Truth Incorporated. Window lock. 4,059,298, Cl. 292-199.000.
Van Landeghem, Willy Karel; and Suys, Andre Roger, to AGFA-GEVAERT N.V. Radiographic intensifying screens. 4,059,768, Cl. 250-483.000.
Vann, Donald S. Recessed electrical outlet. 4,059,327, Cl. 339-122.00R.
Van Rossen, Antoine Roberta: *See—*
Hazenbosch, Edwin Hendrik; Van Rossen, Antoine Roberta; Beels, Roland Francois; and Aelterman, Marcel Frans, 4,059,446, Cl. 96-50.00R.
Vasiliev, Vladimir Sergeevich; Livshits, Abram Lazarevich; Polotsky, Vadim Evgenievich; and Zlatkin, Yakov Iosifovich. Device for automatically controlling an electroerosion cutting machine. 4,059,788, Cl. 318-577.000.
Vassallo, Emmanuel; and Vassallo, Helen I. Automatic aquarium lighting and fish feeding device. 4,059,072, Cl. 119-51.130.
Vassallo, Helen I.: *See—*
Vassallo, Emmanuel; and Vassallo, Helen I., 4,059,072, Cl. 119-51.130.
Vaughan, Joe Larry: *See—*
Redding, Robert Caldwell; and Vaughan, Joe Larry, 4,059,184, Cl. 197-18.000.
Veigel, Martin W.: *See—*
Bockelmann, Wilfried; Veigel, Martin W.; Grossmann, Dietrich; Grozinger, Hans; and Schwander, Dieter, 4,058,978, Cl. 60-277.000.
Velivis, William R.: *See—*
Weiant, Davis S.; Bernett, Frank E.; and Velivis, William R., 4,059,551, Cl. 260-29.60H.
Ventavoli, Roger: *See—*
Alberny, Robert; Birat, Jean Pierre; and Ventavoli, Roger, 4,059,142, Cl. 164-49.000.
Vernon, Philip L.: *See—*
Elbe, Ronald E.; Krolak, Donald W.; and Vernon, Philip L., 4,058,922, Cl. 42-16.000.
Ver Planck, Peter: *See—*
Johannessen, Paul R.; and Ver Planck, Peter, 4,059,801, Cl. 325-167.000.
Verweel, Jan: *See—*
van Alphen, Willem Meijndert; and Verweel, Jan, 4,059,781, Cl. 313-403.000.
Verwys, John H.: *See—*
Nutter, Roy S., Jr.; Washburn, Jerry R.; and Verwys, John H., 4,059,851, Cl. 364-200.000.
Vestergaard, Bent, to Kosan A/S. Cultivation block and a method for the manufacturing of same. 4,058,931, Cl. 47-87.000.
Viannay, Stephane Georges Jean-Marie: *See—*
Cellier, Michel Jean Jacques; Guitton, Jean-Claude; Scholle, Jean-Claude; and Viannay, Stephane Georges Jean-Marie, 4,059,399, Cl. 432-121.000.
Vibrodyne, Inc.: *See—*
Smilg, Benjamin; and Isaacson, Milton S., 4,058,935, Cl. 51-163.100.
Vincent, Michel; Remond, Georges; and Laubie, Michel, to Science Union et Cie, Societe Francaise de Recherche Medicale. Substituted benzamido propanolamines. 4,059,621, Cl. 260-558.00R.
Violette, Theodore T. Mobile drum filling assembly. 4,059,134, Cl. 141-59.000.
Violino, Ettore, to Ing. C. Olivetti & C., S.p.A. Computer accounting system. 4,059,748, Cl. 235-303.100.
Vockenhuber, Karl: *See—*
Schild, Josef, 4,059,350, Cl. 352-141.000.
Vogel, Walter H., to Redington, Incorporated. Method of feeding a leaflet and the apparatus therefor. 4,059,264, Cl. 271-270.000.
Vogt, Kurt. Machine for winding containers. 4,059,238, Cl. 242-7.210.
Vogt, Wilhelm: *See—*
Blumenfeld, Georg; Richtzenhain, Hermann; Vogt, Wilhelm; and Volkommer, Norbert, 4,059,618, Cl. 560-221.000.
Volkommer, Norbert: *See—*
Blumenfeld, Georg; Richtzenhain, Hermann; Vogt, Wilhelm; and Volkommer, Norbert, 4,059,618, Cl. 560-221.000.
Volkswagenwerk Aktiengesellschaft: *See—*
Grundmann, Edgard; Heitland, Herbert; and Kroll, Rudolf, 4,059,095, Cl. 126-271.000.
Otto, Heinz; and Ilsemann, Bernhard, 4,059,286, Cl. 280-673.000.
von Allworden, Wilhelm, to Jean Walterscheid GmbH. Device for supporting the drive shaft of an agricultural machine for coupling to a power take-off shaft. 4,058,990, Cl. 64-1.00S.
Von Bodungen, George A.; and Meredith, Curtis L., to Copolymer Rubber & Chemical Corporation. Thermoplastic elastomer blend of EPDM, polyethylene, and a C_3–C_{16} polyolefin and method. 4,059,654, Cl. 260-897.00A.
Vorchheimer, Norman: *See—*
Fowler, William J.; Heberle, Richard A.; Tonkyn, Richard G.; and Vorchheimer, Norman, 4,059,515, Cl. 210-51.000.
Vroom, Henry J.: *See—*
Knowles, Gregory W.; Sangesland, Odd E.; Vroom, Henry J.; and Madey, Robert W., 4,059,093, Cl. 126-271.000.
W. R. Grace & Co.: *See—*
Gaudette, Roger Robert; Ohlson, John Leonard; and Scanlon, Patricia Marie, 4,059,548, Cl. 260-251.00R.
Sanborn, Philip A., Jr.; Westbrook, Shelby F.; and Sullivan, Donald A., 4,058,953, Cl. 53-22.00A.
W. Schlafhorst & Co.: *See—*
Raasch, Hans, 4,058,966, Cl. 57-78.000.
Waack, Carl L.; and Giss, Alador J., to Massey-Ferguson Inc. Speed control. 4,059,025, Cl. 74-482.000.
Wacker-Chemie GmbH: *See—*
Burkhardt, Jurgen; Hittmair, Paul; and Wegehaupt, Karl-Heinrich, 4,059,559, Cl. 260-448.20E.
Eck, Herbert; Weinhold, Gunter; and Hannebaum, Manfred, 4,059,661, Cl. 264-54.000.
Wagatsuma, Fumio: *See—*
Kosaka, Katuaki; Wagatsuma, Fumio; Shimomoto, Mithuo; Harada, Osamu; and Ueno, Zene, 4,059,415, Cl. 48-63.000.
Wakabayashi, Yasuo. Segment type, electric light alpha-numeric figure indicator. 4,058,919, Cl. 40-130.00E.
Wald, Milton M.; and Kim, Leo, to Shell Oil Company. Process for producing triptane by contacting methanol or dimethyl ether with zinc bromide. 4,059,646, Cl. 260-676.00R.
Wald, Milton M.; and Kim, Leo, to Shell Oil Company. Process for producing triptane by contacting methanol or dimethyl ether with zinc chloride. 4,059,647, Cl. 260-676.00R.
Waldmann, Helmut: *See—*
Prescher, Gunter; Schreyer, Gerd; Weiberg, Otto; Wirthwein, Rolf; Waldmann, Helmut; Seifert, Hermann; Schwerdtel, Wulf; and Swodenk, Wolfgang, 4,059,619, Cl. 260-502.00R.
Walker, Derek: *See—*
Robinson, Colin; and Walker, Derek, 4,059,573, Cl. 260-112.50R.
Walker, Keith A. M., to Syntex (U.S.A.) Inc. Derivatives of substituted n-alkyl imidazoles. 4,059,705, Cl. 424-273.00R.
Wallace, Richard B., to Oakland Corporation, The. Thread lock. 4,059,136, Cl. 151-14.500.
Wallander, Bengt Olof Henrik, to Conort Engineering AB. Multi-engine assembly. 4,059,027, Cl. 74-718.000.
Walsingham, Richard Warren; and Stuart, Ronald Sangster, to Imperial Chemical Industries Limited. Organosilicon compounds. 4,059,606, Cl. 260-448.20B.
Walter, Lothar: *See—*
Ernst, Horst Manfred; Olschewski, Armin; Schurger, Rainer; Walter, Lothar; Brandenstein, Manfred; and Burkl, Erich, 4,059,179, Cl. 192-98.000.
Wang, Chen-Shen: *See—*
Blaha, Eli W.; Koster, Sandra K.; and Wang, Chen-Shen, 4,059,719, Cl. 526-52.000.

Warmka, Gary Paul, to Control Data Corporation. Linear motor. 4,059,775, Cl. 310-12.000.
Warner-Lehman Corporation: *See—*
Lehman, James A., 4,059,089, Cl. 124-27.000.
Warren Insulated Bloc, Inc.: *See—*
Warren, Millard R., 4,058,948, Cl. 52-405.000.
Warren, Millard R., to Warren Insulated Bloc, Inc. Insulated masonry block. 4,058,948, Cl. 52-405.000.
Warwick Electronics Inc.: *See—*
Carlson, Alden J., 4,059,039, Cl. 84-1.010.
Washburn, Jerry R.: *See—*
Nutter, Roy S., Jr.; Washburn, Jerry R.; and Verwys, John H., 4,059,851, Cl. 364-200.000.
Washiyama, Yutaka: *See—*
Obayashi, Nobuharu; Hashizume, Hikaru; Sakashita, Noriji; Kameyama, Seiji; Ezawa, Sadaaki; Kugisawa, Toshio; Washiyama, Yutaka; Kondo, Tatsunori; and Watanabe, Hironori, 4,059,040, Cl. 84-1.030.
Waskiewicz, John J.; and Winston, John H., to Outboard Marine Corporation. Apparatus and method for uniform powder feed. 4,059,310, Cl. 302-42.000.
Watanabe, Asao: *See—*
Kitamura, Takashi; Watanabe, Asao; Nakano, Takashi; Masaki, Katsumi; Hirayama, Kazuhiro; Sato, Yasushi; and Tokiwa, Taisuke, 4,059,833, Cl. 346-108.000.
Watanabe, Hironori: *See—*
Obayashi, Nobuharu; Hashizume, Hikaru; Sakashita, Noriji; Kameyama, Seiji; Ezawa, Sadaaki; Kugisawa, Toshio; Washiyama, Yutaka; Kondo, Tatsunori; and Watanabe, Hironori, 4,059,040, Cl. 84-1.030.
Watanabe, Minoru: *See—*
Tamaru, Munetaka; Kume, Kazunari; Oono, Hideshi; Watanabe, Minoru; Sato, Hideo; and Morokawa, Shigeru, 4,058,969, Cl. 58-23.0BA.
Watanabe, Takehiko: *See—*
Kobayashi, Hisawo; and Watanabe, Takehiko, 4,059,382, Cl. 425-446.000.
Watanabe, Tsuneo: *See—*
Tomibe, Katsuhiko; Masuho, Yasuhiko; Matsuzawa, Kimihiko; Ishimoto, Sachio; Satake, Kazuo; and Watanabe, Tsuneo, 4,059,571, Cl. 260-112.00B.
Watanabe, Yoshihisa: *See—*
Yamaguchi, Yoshinobu; Kitano, Nanahiko; Watanabe, Yoshihisa; and Imanari, Makoto, 4,059,544, Cl. 252-471.000.
Watson, Hugh R.; Rowsell, David G.; and Browning, John H. D., to Wilkinson Sword Limited. Tobacco and tobacco-containing manufactures containing an ingredient having physiological cooling activity. 4,059,118, Cl. 131-8.00R.
Watson, Jimmie L.; and Carney, Leroy L., to Halliburton Company. Oxygen scavenging methods and additives. 4,059,533, Cl. 252-8.50A.
Watters, Bill G.; Nacey, Michael; and Horrall, Thomas R., to Bolt Beranek and Newman, Inc. Process and apparatus for speech privacy improvement through incoherent masking noise sound generation in open-plan office spaces and the like. 4,059,726, Cl. 179-1.50M.
Webb, Paul D.: *See—*
McGahan, Wallace A.; Webb, Paul D.; and Morse, Henry W., 4,059,368, Cl. 417-243.000.
Weber, Erich. Apparatus for drying flat printed material. 4,058,908, Cl. 34-149.000.
Weber, Kurt, to Rieter Machine Works, Ltd. Apparatus for supplying spinning preparatory machines with cans or the like. 4,059,185, Cl. 198-339.000.
Webster, Gordon A.: *See—*
Zakrzewski, Andrew Steven; Clarkson, Douglas Mel; and Webster, Gordon A., 4,058,941, Cl. 52-169.100.
Wegehaupt, Karl-Heinrich: *See—*
Burkhardt, Jurgen; Hittmair, Paul; and Wegehaupt, Karl-Heinrich, 4,059,559, Cl. 260-448.20E.
Weiant, Davis S.; Bernett, Frank E.; and Velivis, William R., to Tile Council of America, Inc. Mortar compositions. 4,059,551, Cl. 260-29.60H.
Weiberg, Otto: *See—*
Prescher, Gunter; Schreyer, Gerd; Weiberg, Otto; Wirthwein, Rolf; Waldmann, Helmut; Seifert, Hermann; Schwerdtel, Wulf; and Swodenk, Wolfgang, 4,059,619, Cl. 260-502.00R.
Weick, Heinz Hermann. Wristwatch having a perfume chamber. 4,058,972, Cl. 58-88.00E.
Weidler, Jay B., Jr.; and Stelly, Charles Warren, to Brown & Root, Inc. Marine cushioning unit. 4,058,984, Cl. 61-48.000.
Weigert, Frank Julian: *See—*
Del Pesco, Thomas Wayne; and Weigert, Frank Julian, 4,059,628, Cl. 260-581.000.
Weil, Edward D., to Hooker Chemicals & Plastics Corporation. Side chain halogenated alkylphenyl haloformates and derivatives. 4,059,615, Cl. 560-132.000.
Wein, William J.: *See—*
Shoup, Robert D.; and Wein, William J., 4,059,658, Cl. 264-43.000.
Weinhold, Gunter: *See—*
Eck, Herbert; Weinhold, Gunter; and Hannebaum, Manfred, 4,059,661, Cl. 264-54.000.
Weisbach, Jerry A.: *See—*
DeMarinis, Robert M.; and Weisbach, Jerry A., 4,059,578, Cl. 544-21.000.
Weismueller, Sr. William A.: *See—*
Lydon, Ralph P.; and Weismueller, Sr. William A., 4,058,884, Cl. 29-526.00R.
Weissmann, Gerd, to Bayerisches Leichtmetallwerk Graf Blucher von Wahlstatt KG. Forging process. 4,059,214, Cl. 228-265.000.
Weman, Per Olaf, to Sigmatex, A.G. Safety belt for motor vehicles. 4,059,287, Cl. 280-745.000.
Weniger, Robert W. Board game. 4,059,276, Cl. 273-134.00D.
Werner, David, to Salco Products, Inc. Self cleaning, pressure responsive emitter valve for soil irrigation. 4,059,228, Cl. 239-106.000.
Wesley, John George, to Labelette Company. Box end labeling apparatus. 4,059,477, Cl. 156-479.000.
Westbrook, Shelby F.: *See—*
Sanborn, Philip A., Jr.; Westbrook, Shelby F.; and Sullivan, Donald A., 4,058,953, Cl. 53-22.00A.
Westinghouse Air Brake Company: *See—*
Kolkman, Dick J., 4,059,845, Cl. 361-198.000.
Westinghouse Electric Corporation: *See—*
Feilchenfeld, Michal M., 4,059,749, Cl. 235-302.000.
Meacham, James H., 4,059,842, Cl. 358-150.000.
Mitchell, James T., 4,059,849, Cl. 361-395.000.
Wettstein, Klaus: *See—*
Furer, Richard; Halter, Paul; and Wettstein, Klaus, 4,059,074, Cl. 119-156.000.
Whebell, Bert: *See—*
Kahlert, George; Pommer, Lawrence; Davis, John; and Whebell, Bert, 4,059,061, Cl. 110-7.00A.
Wheeler, Howard R., to Nelson McCoy Pottery Company. Scrubbing apparatus for pottery greenware. 4,058,869, Cl. 15-101.000.
White, Joe L.: *See—*
Hem, Stanley L.; and White, Joe L., 4,059,681, Cl. 423-419.00P.
White, Ronald E.: *See—*
Pelosi, Stanford S.; White, Ronald E.; Wright, George C.; and Yu, Chia Nien, 4,059,597, Cl. 260-347.700.
Whiteley, Eric, to Canadian General Electric Company Limited. Cooling of discoidal dynamoelectric machines. 4,059,777, Cl. 310-64.000.
Whyatt, Roy. Object retaining and display calendar. 4,058,916, Cl. 40-107.000.
Wicktor, Russell D.: *See—*
Stevens, Daryl A.; and Wicktor, Russell D., 4,058,862, Cl. 9-14.000.
Wieder, Horst K.; and Wieder, Klaus A. Elastic pull-type exerciser. 4,059,265, Cl. 272-137.000.
Wieder, Klaus A.: *See—*
Wieder, Horst K.; and Wieder, Klaus A., 4,059,265, Cl. 272-137.000.
Wilkerson, Alan W. Waste energy source utilization circuit and method. 4,059,772, Cl. 307-46.000.
Wilkerson, Edward D. Wheel base, tracking and frame analyzer. 4,058,903, Cl. 33-288.000.
Wilkinson, Donald: *See—*
Ssinegurski, Eugen; and Wilkinson, Donald, 4,059,075, Cl. 122-6.00A.
Wilkinson Sword Limited: *See—*
Watson, Hugh R.; Rowsell, David G.; and Browning, John H. D., 4,059,118, Cl. 131-8.00R.
Willard, John Wesley, Sr., to Caw Industries, Inc. Method of reducing the incidence of infectious diseases and relieving stress in livestock. 4,059,691, Cl. 424-155.000.
Wilwerding, Dennis J., to Honeywell Inc. Focus control system with dual scan. 4,059,756, Cl. 250-201.000.
Wilwerding, Dennis J., to Honeywell Inc. Focus system for movie cameras. 4,059,757, Cl. 250-201.000.
Wilwerding, Dennis J., to Honeywell Inc. Autofocus system. 4,059,758, Cl. 250-201.000.
Windmoller & Holscher: *See—*
Schliek, Gunter; and Tirp, Erwin, 4,059,044, Cl. 93-93.0HT.
Winkley, Donald Charles, to FMC Corporation. Stabilization of iron-containing acidic hydrogen peroxide solutions. 4,059,678, Cl. 423-273.000.
Winston, John H.: *See—*
Waskiewicz, John J.; and Winston, John H., 4,059,310, Cl. 302-42.000.
Winter, Robert: *See—*
Levine, Howard S.; and Winter, Robert, 4,059,346, Cl. 350-295.000.
Winzer, Gerhard; and Rauscher, Walter, to Siemens Aktiengesellschaft. Optical coupling devices. 4,059,337, Cl. 350-96.00C.
Wirthwein, Rolf: *See—*
Prescher, Gunter; Schreyer, Gerd; Weiberg, Otto; Wirthwein, Rolf; Waldmann, Helmut; Seifert, Hermann; Schwerdtel, Wulf; and Swodenk, Wolfgang, 4,059,619, Cl. 260-502.00R.
Wisotsky, Harry A. Hand-held film projectors. 4,059,351, Cl. 353-43.000.
Wistinghausen, Walter. Electric motor and brake arrangement. 4,059,779, Cl. 310-77.000.
Witterick, Petrus Johannes Julius; and Sieben, Joannes Henricus Franciscus, to U.S. Philips Corporation. Flash lamp unit. 4,059,387, Cl. 431-93.000.
Wittwer Construction Company: *See—*
Hake, Leon M., 4,058,915, Cl. 37-117.500.
Wolf, Anthony David, to Du Pont de Nemours, E. I., and Company. Cycloalkanapyrazole herbicides. 4,059,434, Cl. 71-92.000.
Wolf, Gerhard Dieter; Miessen, Ralf; Kunzel, Hans Egon; and Bentz, Francis, to Bayer Aktiengesellschaft. Process for dyeing wet-spun aromatic polyamides in gel form. 4,059,403, Cl. 8-168.00B.
Wolfe, Robert W.: *See—*
Aschberger, Anton A.; Avery, Jack L.; Cartwright, William J.; Dean, Geoffrey J.; Tysver, Oliver J.; Wolfe, Robert W.; and Bautz, Frederick H., 4,059,186, Cl. 198-481.000.
Wolfrum, Gerhard; Kuhnel, Werner; Klauke, Erich; and Buttner,

Gerhard, to Bayer Aktiengesellschaft. Transfer printing process. 4,059,402, Cl. 8-2.50A.
Woodward, James R., to Rohr Industries, Incorporated. Superalloy liquid interface diffusion bonding. 4,059,217, Cl. 228-181.000.
Wright, George C.: *See—*
Pelosi, Stanford S.; White, Ronald E.; Wright, George C.; and Yu, Chia Nien, 4,059,597, Cl. 260-347.700.
Wright, Maurice J., to Norprint Limited. Dispensing of labels. 4,059,203, Cl. 221-73.000.
Wright, Ralph Wallace. Modular heating section. 4,058,982, Cl. 61-1.00R.
Wunderlich, Winfried: *See—*
Hitzler, Otto; Pennewiss, Horst; Froelich, August; Markert, Gerhard; and Wunderlich, Winfried, 4,059,574, Cl. 260-192.000.
Wurster, Winfried; Kuhne, Jochen; and Frodermann, Gerd, to Klockner-Humboldt-Deutz Aktiengesellschaft. Method and apparatus for extracting gas samples of high temperature gases, particularly for cement rotary kiln furnace exhaust gases. 4,059,019, Cl. 73-421.50A.
Wuthrich, Paul; and Flumm, Paul, to Timex Corporation. Clockwork driven hypodermic syringe. 4,059,110, Cl. 128-218.00A.
Xerox Corporation: *See—*
Cocksedge, Kenneth W., 4,059,789, Cl. 318-608.000.
Lentz, James A.; and Safford, George J., 4,058,879, Cl. 29-132.000.
Lu, Chin H.; and Parent, Richard A., 4,059,444, Cl. 96-1.0LY.
Okumura, Koji, 4,059,443, Cl. 96-1.0PS.
Pacansky, Thomas John, 4,059,554, Cl. 260-29.6WQ.
Shaffer, Louis W. W., 4,059,353, Cl. 355-16.000.
Stange, Klaus K.; Smith, Richard E.; Hamlin, Thomas J.; and Cassano, James R., 4,059,260, Cl. 271-3.000.
Yamada, Takashi: *See—*
Toshioka, Toru; Oishi, Kazuo; and Yamada, Takashi, 4,059,822, Cl. 340-52.00H.
Yamaguchi, Yoshinobu; Kitano, Nanahiko; Watanabe, Yoshihisa; and Imanari, Makoto, to Fujimi Kenmazai Kogyo Kabushiki Kaisha; and Mitsubishi Petrochemical Co., Ltd. Active material compositions with porous protective sheath and method for preparing. 4,059,544, Cl. 252-471.000.
Yamamoto, Hikoshi: *See—*
Hosokoshi, Kakuichiro; Yamamoto, Hikoshi; Tanaka, Masayuki; and Omura, Shinichi, 4,059,834, Cl. 354-1.000.
Yamamoto, Hisaaki: *See—*
Sugiyama, Hironari; Chiyomaru, Isao; Okuda, Itsuki; Yamamoto, Hisaaki; and Ito, Hideo, 4,059,635, Cl. 260-609.00E.
Yamamoto, Yasuhiro: *See—*
Ito, Yasuro; Kaga, Hideharu; Yamamoto, Yasuhiro; and Sumita, Tadayuki, 4,059,376, Cl. 425-546.000.
Yamamura, Masahiro: *See—*
Sakamoto, Yoshio; and Yamamura, Masahiro, 4,059,808, Cl. 330-257.000.
Yamanaka, Akira, to Mitsubishi Jidosha Kogyo Kabushiki Kaisha. Energy absorbing apparatus for vehicles. 4,059,304, Cl. 296-35.00R.
Yamanaka, Seisuke; and Nagumo, Fumio, to Sony Corporation. Solid state camera. 4,059,839, Cl. 358-44.000.
Yamashita, Sadahiko: *See—*
Makimoto, Mitsuo; and Yamashita, Sadahiko, 4,059,815, Cl. 333-82.0BT.
Yamasita, Nobuo, to Olympus Optical Co., Ltd. Retrofocus-type objective for endoscopes. 4,059,344, Cl. 350-220.000.
Yamatani, Wataru: *See—*
Ohsawa, Mitsuo; Yamatani, Wátaru; and Onoe, Yukio, 4,059,802, Cl. 325-398.000.
Yamazaki, Noboru; and Higashi, Fukuji, to Sumitomo Chemical Company, Limited. Esterification of carboxylic acids by contact with a phosphonium salt. 4,059,603, Cl. 260-408.000.
Yamazaki, Tatsuo; Hayashida, Takemi; and Sakuma, Masatoshi, to Kanro Co. Ltd. Apparatus for manufacturing a snack food whose raw material is fruitage or vegetables. 4,059,046, Cl. 99-355.000.
Yanagida, Kiyomi; Hirokane, Tadashi; Tsukiyasu, Tadashi; and Sato, Tomoari, to Sumitomo Aluminum Smelting Co., Ltd. Process for continuous electrolytic coloring of aluminum or aluminum base alloy strip and wire. 4,059,494, Cl. 204-28.000.
Yandell, James L. Inside and outside caliper and tool-joint identifier. 4,058,900, Cl. 33-148.00E.
Yang, Kang; Reedy, James D.; and Scamehorn, John F., to Continental Oil Company. Decomposition of halogenated organic compounds. 4,059,675, Cl. 423-240.000.
Yang, Kang; and Reedy, James D., to Continental Oil Company. Decomposition of halogenated organic compounds. 4,059,676, Cl. 423-240.000.
Yang, Kang: *See—*
Lindberg, Robert C.; Reedy, James D.; and Yang, Kang, 4,059,683, Cl. 423-481.000.
Yano, Naomichi: *See—*
Ryumon, Yutaka; Yano, Naomichi; and Yukimachi, Shinsuke, 4,059,193, Cl. 214-8.50A.
Yasui, Kazuomi: *See—*
Aya, Masahiro; Saito, Junichi; Kume, Toyohiko; and Yasui, Kazuomi, 4,059,430, Cl. 71-86.000.
Yeomans, Bertram: *See—*
Cane, Charles; and Yeomans, Bertram, 4,059,632, Cl. 260-586.00C.
Yonekura, Michimasa: *See—*
Nakamura, Yasusi; Umemura, Masashi; and Yonekura, Michimasa, 4,059,613, Cl. 560-26.000.
Yonemitsu, Eiichi; Isshiki, Tomiya; and Kijima, Yasuhiko, to Mitsubishi Gas Chemical Company, Inc. Process for preparing adenine. 4,059,582, Cl. 260-252.000.
Yoshida, Akitoshi: *See—*
Tohyama, Masao; Ichigo, Minoru; Suzuki, Takeshi; Nakasu, Makoto; Ando, Akinobu; Yoshida, Akitoshi; Kosaka, Masaharu; Hayasi, Norihisa; and Inoue, Shigeki, 4,059,553, Cl. 260-29.60S.
Yoshida, Isamu: *See—*
Iwasa, Susumu; and Yoshida, Isamu, 4,059,491, Cl. 195-103.50A.
Yoshida, Koichi: *See—*
Tanaka, Wataru; Akito, Eiichiro; Yoshida, Koichi; Terada, Takashi; and Ninomiya, Hiroshi, 4,059,686, Cl. 424-19.000.
Yoshida, Toshio; Terai, Kiyoshi; Matsui, Shigetomo; Kinoshita, Tsuneo; Hoshi, Akira; and Tohmoto, Toru, to Kawasaki Jukogyo Kabushiki Kaisha. Fabrication of panel structures having thin skin plate in vehicles, water craft, buildings, and the like. 4,058,883, Cl. 29-448.000.
Yoshioka, Yoshio; Hirasawa, Kunio; and Tsukushi, Masanori, to Hitachi, Ltd. Puffer type gas circuit breaker. 4,059,741, Cl. 200-148.00A.
Yoshizaki, Hiroyuki; Takanihashi, Hiromitsu; and Masuda, Yoshitaka, to Mitsubishi Gas Chemical Company, Inc. Process for producing a branched polycarbonate or poly(ester-carbonate). 4,059,565, Cl. 260-47.0XA.
Young Fire Equipment Corporation: *See—*
Young, Richard E., 4,059,170, Cl. 180-54.00R.
Young Industries, Inc., The: *See—*
Heyl, Robert D., 4,059,205, Cl. 222-368.000.
Young, Richard E., to Young Fire Equipment Corporation. Fire engine construction. 4,059,170, Cl. 180-54.00R.
Yu, Chia Nien: *See—*
Pelosi, Stanford S.; White, Ronald E.; Wright, George C.; and Yu, Chia Nien, 4,059,597, Cl. 260-347.700.
Yu, Lin Sheng: *See—*
Nesslage, Donald John; Yu, Lin Sheng; and Shaw, Michael Francis, 4,059,437, Cl. 75-76.000.
Yukimachi, Shinsuke: *See—*
Ryumon, Yutaka; Yano, Naomichi; and Yukimachi, Shinsuke, 4,059,193, Cl. 214-8.50A.
Zadera, Karel V. Treatment of water to remove certain ions therefrom. 4,059,513, Cl. 210-45.000.
Zahnradfabrik Friedrichshafen Aktiengesellschaft: *See—*
Magg, Alfred; and Thurau, Gunther, 4,059,178, Cl. 192-53.00F.
Zakrzewski, Andrew Steven; Clarkson, Douglas Mel; and Webster, Gordon A., to Dominion Foundries and Steel, Limited. Building construction. 4,058,941, Cl. 52-169.100.
Zampa, Henry A.: *See—*
Coughlan, Standly T.; Dewar, John H.; and Zampa, Henry A., 4,059,564, Cl. 264-46.400.
Zbinden, James; and Ries, George W., to Lawrence Brothers, Inc. Drilling unit for stadium seats. 4,059,162, Cl. 173-37.000.
Zebo, Timothy James: *See—*
Messerschmitt, David Gavin; and Zebo, Timothy James, 4,059,730, Cl. 179-15.0AS.
Zeiger, Herbert J.: *See—*
Fan, John C. C.; and Zeiger, Herbert J., 4,059,461, Cl. 148-1.500.
Zeiringer, Hans: *See—*
Ilmaier, Bernard; and Zeiringer, Hans, 4,059,417, Cl. 51-309.00A.
Zelesko, Michael John: *See—*
McComsey, David Fred; and Zelesko, Michael John, 4,059,583, Cl. 260-256.50R.
Zeller, Hans-Rudolf, to BBC Brown, Boveri & Company, Limited. Electrochromic display device with electrolytes and a method of producing the same. 4,059,341, Cl. 350-160.00R.
Zelt, Edward J.: *See—*
Schreiber, Robert E.; and Zelt, Edward J., 4,059,776, Cl. 310-242.000.
Zeutschel, Heinz: *See—*
Gernhardt, Wolfram; Meier-Maletz, Gerhard; and Zeutschel, Heinz, 4,059,475, Cl. 156-379.000.
Zharovsky, Ivan Vasilievich: *See—*
Barannik, Ivan Andreevich; Kondratenko, Anatoly Borisovich; Trukhin, Alexandr Fedorovich; Raskatov, Viktor Georgievich; Zharovsky, Ivan Vasilievich; Rudakov, Viktor Alexandrovich; Mordkovich, Andrei Efremovich; and Chalov, Alexandr Vasilievich, 4,059,372, Cl. 425-8.000.
Zieg, Steven A., to Purex Corporation. Pump basket strainer and assembly. 4,059,519, Cl. 210-169.000.
Zimmer, Elvis Simon; and Hassell, David Allen, to Paulucci, Jeno F. Food oven. 4,059,398, Cl. 432-121.000.
Zlatkin, Yakov Iosifovich: *See—*
Vasiliev, Vladimir Sergeevich; Livshits, Abram Lazarevich; Polotsky, Vadim Evgenievich; and Zlatkin, Yakov Iosifovich, 4,059,788, Cl. 318-577.000.
Zweigle, Maurice L.; and Lamphere, Jack C., to Dow Chemical Company, The. Cross-linked water-swellable polymer particles. 4,059,552, Cl. 260-29.6TA.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 22ND DAY OF NOVEMBER, 1977

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Ampex Corporation: *See—*
  Monforte, Frank R.; and Argentina, Giltan M., Re. 29,476, Cl. 29-600.000.
Argentina, Giltan M.: *See—*
  Monforte, Frank R.; and Argentina, Giltan M., Re. 29,476, Cl. 29-600.000.
Axen, Rolf E. A. V.; Porath, Jerker O.; and Wide, Leif Edvin, to Pharmacia AB. Method for determining vitamin B_{12} and reagent therefor. Re. 29,480, Cl. 424-1.500.
Glacier Industries, Inc.: *See—*
  Wight, Edward M., Re. 29,477, Cl. 62-266.000.
Goren, Yoram; and Lloyd, Samuel H., III, to Santa Fe International Corporation. Single column semisubmersible drilling vessel. Re. 29,478, Cl. 114-265.000.
Lloyd, Samuel H., III: *See—*
  Goren, Yoram; and Lloyd, Samuel H., III, Re. 29,478, Cl. 114-265.000.
Mohr, Joseph J. Tennis Ball pitching apparatus with anti-jamming ball feed mechanism. Re. 29,479, Cl. 124-1.000.
Monforte, Frank R.; and Argentina, Giltan M., to Ampex Corporation. Method for fabricating a dielectric filled ferrite toroid for use in microwave devices. Re. 29,476, Cl. 29-600.000.
Pharmacia AB: *See—*
  Axen, Rolf E. A. V.; Porath, Jerker O.; and Wide, Leif Edvin, Re. 29,480, Cl. 424-1.500.
Porath, Jerker O.: *See—*
  Axen, Rolf E. A. V.; Porath, Jerker O.; and Wide, Leif Edvin, Re. 29,480, Cl. 424-1.500.
Santa Fe International Corporation: *See—*
  Goren, Yoram; and Lloyd, Samuel H., III, Re. 29,478, Cl. 114-265.000.
Wide, Leif Edvin: *See—*
  Axen, Rolf E. A. V.; Porath, Jerker O.; and Wide, Leif Edvin, Re. 29,480, Cl. 424-1.500.
Wight, Edward M., to Glacier Industries, Inc. Food product freezing apparatus. Re. 29,477, Cl. 62-266.000.

LIST OF PLANT PATENTEES

Duffett, William E.: *See—*
  Jessel, Walter H., Jr.; and Duffett, William E., 4,153, Cl. 74.000.
  Jessel, Walter H., Jr.; and Duffett, William E., 4,156, Cl. 74.000.
Holtkamp, Hermann, Sr. African violet plant. 4,154, 11-22-77, Cl. 69.000.
Jessel, Walter H., Jr.; and Duffett, William E., to Yoder Brothers, Inc. Chrysanthemum plant. 4,153, 11-22-77, Cl. 74.000.
Jessel, Walter H., Jr.; and Duffett, William E., to Yoder Brothers, Inc. Chrysanthemum plant. 4,156, 11-22-77, Cl. 74.000.
Schmidt, John Frank, Jr. Mountain ash tree. 4,157, 11-22-77, Cl. 51.000.
Yoder Brothers, Inc.: *See—*
  Jessel, Walter H., Jr.; and Duffett, William E., 4,153, Cl. 74.000.
  Jessel, Walter H., Jr.; and Duffett, William E., 4,156, Cl. 74.000.
Zaiger, Chris Floyd. Nectarine tree. 4,155, 11-22-77, Cl. 41.000.

LIST OF DESIGN PATENTEES

Ajax Hardware Corporation: *See—*
  Ridgway, Keith E.; and Scott, Edward W., 246,418, Cl. D8-302.000.
  Ridgway, Keith E.; and Scott, Edward W., 246,419, Cl. D8-302.000.
  Ridgway, Keith E.; and Scott, Edward W., 246,421, Cl. D8-306.000.
  Ridgway, Keith E.; and Scott, Edward W., 246,423, Cl. D8-310.000.
  Ridgway, Keith E.; and Scott, Edward W., 246,426, Cl. D8-318.000.
  Ridgway, Keith E.; and Scott, Edward W., 246,427, Cl. D8-318.000.
  Ridgway, Keith E.; and Scott, Edward W., 246,434, Cl. D8-350.000.
American Cyanamid Company: *See—*
  Grodin, Adam J., 246,437, Cl. D9-12.000.
Amerock Corporation: *See—*
  Clayton, LaVerne E., 246,422, Cl. D8-307.000.
  Clayton, LaVerne E., 246,424, Cl. D8-317.000.
  Clayton, LaVerne E., 246,431, Cl. D8-327.000.
  Pittenger, Teresa R. B., 246,420, Cl. D8-306.000.
  Stone, Leland George, 246,425, Cl. D8-318.000.
  Stone, Leland George, 246,435, Cl. D8-350.000.
  Tegner, Raymond U. H., 246,404, Cl. D6-89.000.
  Tegner, Raymond U. H., 246,406, Cl. D6-92.000.
  Tegner, Raymond U. H., 246,432, Cl. D8-350.000.
  Tegner, Raymond U. H., 246,433, Cl. D8-350.000.
Anchor Hocking Corporation: *See—*
  Benes, Frank J., 246,446, Cl. D11-153.000.
Anderson, Michael G.: *See—*
  Segal, Charles L.; Anderson, Michael G.; and Vincent, David N., 246,474, Cl. D34-5.0ST.
Arnett, Luke: *See—*
  Morton, James D.; and Arnett, Luke, 246,469, Cl. D25-7.000.
Asano, Kiyoji. Toy vehicle. 246,479, 11-22-77, Cl. D34-15.0AJ.
Asano, Kiyoji. Toy vehicle. 246,480, 11-22-77, Cl. D34-15.0AJ.
Attree, James Albert; and Morallee, Kenneth George, to Lever Brothers Company. Tray for biological tests. 246,466, 11-22-77, Cl. D24-31.000.
Aupperle, Donald P., to Hewlett-Packard Company. Portable electronic multimeter. 246,442, 11-22-77, Cl. D10-78.000.
Ball Corporation: *See—*
  Wildgen, Leo F., 246,413, Cl. D7-64.000.
Bashore, Terry L. Animal warning sign. 246,485, 11-22-77, Cl. D96-12.00C.
Baxter Travenol Laboratories, Inc.: *See—*
  Bruni, James G.; George, Richard W.; Hauser, Stephen G.; Hodgson, Charles E.; and Range, Richard J., 246,465, Cl. D24-21.000.
Benes, Frank J., to Anchor Hocking Corporation. Vase or similar article. 246,446, 11-22-77, Cl. D11-153.000.
Bergendorff, Fred. Straightedge. 246,441, 11-22-77, Cl. D10-71.000.
Bergmann, Karl H.: *See—*
  Harms, Wolfgang; Johnson, Marshall B.; Bergmann, Karl H.; and Gelak, Richard G., 246,410, Cl. D7-41.000.
Blanchard, Robert E. Pie cutter. 246,411, 11-22-77, Cl. D7-43.000.
Brazell, David O., to Fireplace Sales, Division of Taylor Construction. Chimney cap. 246,464, 11-22-77, Cl. D23-154.000.
Brezney, Jacqueline, to Unican Security Systems, Ltd. Pull. 246,428, 11-22-77, Cl. D8-318.000.
Brezney, Jacqueline, to Unican Security Systems, Ltd. Back plate. 246,436, 11-22-77, Cl. D8-350.000.
Brio Toy AB: *See—*
  Hagland-Ahrnborg, Kerstin Margaretha, 246,482, Cl. D34-15.00C.
Brown & Williamson Tobacco Corporation: *See—*
  Snediker, Robert R.; Chalmers, Steve; and Drapeau, Robert E., 246,408, Cl. D6-189.000.
Bruni, James G.; George, Richard W.; Hauser, Stephen G.; Hodgson, Charles E.; and Range, Richard J., to Baxter Travenol Laboratories, Inc. Proportional dialysis unit. 246,465, 11-22-77, Cl. D24-21.000.
Brunner, Donald A., to Dart Industries Inc. Cookie cutter or the like. 246,412, 11-22-77, Cl. D7-43.000.

Callecod, Robert L., to Recreation Systems Co. Child recreation structure. 246,477, 11-22-77, Cl. D34-5.00L.
Cartner, Donald W.: *See—*
  Hopkins, Evan Leon; and Cartner, Donald W., 246,414, Cl. D7-181.000.
Chalmers, Steve: *See—*
  Snediker, Robert R.; Chalmers, Steve; and Drapeau, Robert E., 246,408, Cl. D6-189.000.
Champion International Corporation: *See—*
  Hanson, Wallace E., 246,440, Cl. D9-224.000.
Chapman, Darwin E. Darkroom exposure meter and densitometer. 246,461, 11-22-77, Cl. D16-39.000.
Chermak, William J.; Kozan, F. Joseph; and Wahi, Chander M., to E. F. Johnson Company. Variable capacitor. 246,453, 11-22-77, Cl. D13-21.000.
Christiansen, Walter N., to Gardner-Denver Company. Hand-held tool for removing insulation from electrical conductors. 246,417, 11-22-77, Cl. D8-98.000.
Clark Equipment Company: *See—*
  Shealy, Noah Alvin, 246,451, Cl. D12-160.000.
Clayton, LaVerne E., to Amerock Corporation. Pendant pull. 246,422, 11-22-77, Cl. D8-307.000.
Clayton, LaVerne E., to Amerock Corporation. Pull. 246,424, 11-22-77, Cl. D8-317.000.
Clayton, LaVerne E., to Amerock Corporation. Hinge base. 246,431, 11-22-77, Cl. D8-327.000.
Combi Co., Ltd.: *See—*
  Nakao, Shinroku, 246,481, Cl. D34-15.0AJ.
Critcher, John L. Wrench socket. 246,415, 11-22-77, Cl. D8-29.000.
Dart Industries Inc.: *See—*
  Brunner, Donald A., 246,412, Cl. D7-43.000.
Denman, O. Jackson. Head for a golf putter. 246,475, 11-22-77, Cl. D34-5.0GH.
DiPasqua, Joseph N. Building. 246,468, 11-22-77, Cl. D25-5.000.
Doman, Donald W., to Kohler Co. Combined sink and faucet. 246,463, 11-22-77, Cl. D23-49.000.
Drapeau, Robert E.: *See—*
  Snediker, Robert R.; Chalmers, Steve; and Drapeau, Robert E., 246,408, Cl. D6-189.000.
Dunlop Limited: *See—*
  Morgan, Peter William Swift, 246,402, Cl. D2-224.000.
E. F. Johnson Company: *See—*
  Chermak, William J.; Kozan, F. Joseph; and Wahi, Chander M., 246,453, Cl. D13-21.000.
Eastman Kodak Company: *See—*
  Olson, Richard Joseph, 246,459, Cl. D16-32.000.
Ebner, John S.; Steinman, Sheldon; and Haase, Frederick W., to Milgo Electronic Corporation. Printed circuit cabinet. 246,454, 11-22-77, Cl. D13-41.000.
Ernest, Robert Orman, to Sunbeam Corporation. Combined fire and smoke alarm. 246,443, 11-22-77, Cl. D10-106.000.
Figur, Bernd: *See—*
  Stutzer, Franz Alban; and Figur, Bernd, 246,471, Cl. D27-42.000.
Fireplace Sales, Division of Taylor Construction: *See—*
  Brazell, David O., 246,464, Cl. D23-154.000.
Gardner-Denver Company: *See—*
  Christiansen, Walter N., 246,417, Cl. D8-98.000.
Gelak, Richard G.: *See—*
  Harms, Wolfgang; Johnson, Marshall B.; Bergmann, Karl H.; and Gelak, Richard G., 246,410, Cl. D7-41.000.
General & Railway Supplies Pty. Ltd.: *See—*
  Rex, Albert Edward, 246,448, Cl. D12-49.000.
George, Richard W.: *See—*
  Bruni, James G.; George, Richard W.; Hauser, Stephen G.; Hodgson, Charles E.; and Range, Richard J., 246,465, Cl. D24-21.000.
Grodin, Adam J., to American Cyanamid Company. Combined bottle and display container. 246,437, 11-22-77, Cl. D9-12.000.
Groves-Kelco Sales, Inc.: *See—*
  Segal, Charles L.; Anderson, Michael G.; and Vincent, David N., 246,474, Cl. D34-5.0ST.
Haase, Frederick W.: *See—*
  Ebner, John S.; Steinman, Sheldon; and Haase, Frederick W., 246,454, Cl. D13-41.000.
Hagland-Ahrnborg, Kerstin Margaretha, to Brio Toy AB. Audible toy. 246,482, 11-22-77, Cl. D34-15.00C.
Hamilton, William H. Window greenhouse. 246,447, 11-22-77, Cl. D11-145.000.
Hansa Plastics Inc.: *See—*
  Schmidt, Harald, 246,416, Cl. D8-97.000.
Hanson, Wallace E., to Champion International Corporation. Display carton. 246,440, 11-22-77, Cl. D9-224.000.
Harms, Wolfgang; Johnson, Marshall B.; Bergmann, Karl H.; and Gelak, Richard G., to Melitta, Inc. Coffeemaker or the like. 246,410, 11-22-77, Cl. D7-41.000.
Harris, Moye. Bicycle fairing. 246,452, 11-22-77, Cl. D12-182.000.
Hauser, Stephen G.: *See—*
  Bruni, James G.; George, Richard W.; Hauser, Stephen G.; Hodgson, Charles E.; and Range, Richard J., 246,465, Cl. D24-21.000.
Hewlett-Packard Company: *See—*
  Aupperle, Donald P., 246,442, Cl. D10-78.000.
Hodgson, Charles E.: *See—*
  Bruni, James G.; George, Richard W.; Hauser, Stephen G.; Hodgson, Charles E.; and Range, Richard J., 246,465, Cl. D24-21.000.
Holdam, James Vance, Jr. Table. 246,407, 11-22-77, Cl. D6-179.000.
Hopkins, Evan Leon; and Cartner, Donald W., to Hopkins Manufacturing Corporation. Ice and snow scraper. 246,414, 11-22-77, Cl. D7-181.000.
Hopkins Manufacturing Corporation: *See—*
  Hopkins, Evan Leon; and Cartner, Donald W., 246,414, Cl. D7-181.000.
Ideal Toy Corporation: *See—*
  Ventura, Frank D., 246,409, Cl. D6-146.000.
Inman, Bruce Wayne. Back pack signal light unit. 246,445, 11-22-77, Cl. D10-114.000.
James, David F., to Norris Industries, Inc. Pendant pull for doors, drawers or the like. 246,429, 11-22-77, Cl. D8-321.000.
James, David F., to Norris Industries, Inc. Hinge leaf. 246,430, 11-22-77, Cl. D8-327.000.
Japan Medical Supply Co., Ltd.: *See—*
  Kurata, Motoji, 246,467, Cl. D24-56.000.
Johnson, Marshall B.: *See—*
  Harms, Wolfgang; Johnson, Marshall B.; Bergmann, Karl H.; and Gelak, Richard G., 246,410, Cl. D7-41.000.
Kitrell, John V. Safety reflector. 246,444, 11-22-77, Cl. D10-111.000.
Kohler Co.: *See—*
  Doman, Donald W., 246,463, Cl. D23-49.000.
Kojima, Hiroshi: *See—*
  Matsuda, Kazuo; and Kojima, Hiroshi, 246,450, Cl. D12-141.000.
Kozan, F. Joseph: *See—*
  Chermak, William J.; Kozan, F. Joseph; and Wahi, Chander M., 246,453, Cl. D13-21.000.
Kurata, Motoji, to Japan Medical Supply Co., Ltd. Test tube. 246,467, 11-22-77, Cl. D24-56.000.
Lever Brothers Company: *See—*
  Attree, James Albert; and Morallee, Kenneth George, 246,466, Cl. D24-31.000.
Lohr, Raymond J. Toy vehicle. 246,478, 11-22-77, Cl. D34-15.0AJ.
Lynn, Elmer C.; and Slaughter, Leonard, Jr. Packaging container or the like. 246,439, 11-22-77, Cl. D9-219.000.
Matsuda, Kazuo; and Kojima, Hiroshi. Vehicle tire. 246,450, 11-22-77, Cl. D12-141.000.
McGuire, Donald. Baseball game bangboard. 246,476, 11-22-77, Cl. D34-5.0PP.
Melitta, Inc.: *See—*
  Harms, Wolfgang; Johnson, Marshall B.; Bergmann, Karl H.; and Gelak, Richard G., 246,410, Cl. D7-41.000.
Milgo Electronic Corporation: *See—*
  Ebner, John S.; Steinman, Sheldon; and Haase, Frederick W., 246,454, Cl. D13-41.000.
Mitsui, Hiroyasu. Remote operated drain for an oil pan. 246,456, 11-22-77, Cl. D15-5.000.
Morallee, Kenneth George: *See—*
  Attree, James Albert; and Morallee, Kenneth George, 246,466, Cl. D24-31.000.
Morgan, Peter William Swift, to Dunlop Limited. Skirt. 246,402, 11-22-77, Cl. D2-224.000.
Morton, James D.; and Arnett, Luke. Building. 246,469, 11-22-77, Cl. D25-7.000.
Muller-Scherak, Wolf Georg. Jacket or similar article. 246,401, 11-22-77, Cl. D2-191.000.
Nakao, Shinroku, to Combi Co., Ltd. Toy vehicle. 246,481, 11-22-77, Cl. D34-15.0AJ.
Norris Industries, Inc.: *See—*
  James, David F., 246,429, Cl. D8-321.000.
  James, David F., 246,430, Cl. D8-327.000.
Olson, Richard Joseph, to Eastman Kodak Company. Copy finisher. 246,459, 11-22-77, Cl. D16-32.000.
Pasturczak, Vincent S.: *See—*
  Vasilatos, Anastasios J.; and Pasturczak, Vincent S., 246,458, Cl. D16-23.000.
Pittenger, Teresa R. B., to Amerock Corporation. Pull. 246,420, 11-22-77, Cl. D8-306.000.
Poe, Alice M. Portable ramp for wheelchairs. 246,449, 11-22-77, Cl. D12-53.000.
Range, Richard J.: *See—*
  Bruni, James G.; George, Richard W.; Hauser, Stephen G.; Hodgson, Charles E.; and Range, Richard J., 246,465, Cl. D24-21.000.
Recreation Systems Co.: *See—*
  Callecod, Robert L., 246,477, Cl. D34-5.00L.
Reichow, James R., to St. Croix Corporation. Combined rod and reel. 246,462, 11-22-77, Cl. D22-26.000.
Rex, Albert Edward, to General & Railway Supplies Pty. Ltd. Railroad tie. 246,448, 11-22-77, Cl. D12-49.000.
Richards, Theodore W. Combined soap holder and paper towel dispenser. 246,405, 11-22-77, Cl. D6-91.000.
Ridgway, Keith E.; and Scott, Edward W., to Ajax Hardware Corporation. Door pull having simulated thumb lever. 246,418, 11-22-77, Cl. D8-302.000.
Ridgway, Keith E.; and Scott, Edward W., to Ajax Hardware Corporation. Door pull having simulated thumb lever. 246,419, 11-22-77, Cl. D8-302.000.
Ridgway, Keith E.; and Scott, Edward W., to Ajax Hardware Corporation. Drawer pull having bail. 246,421, 11-22-77, Cl. D8-306.000.
Ridgway, Keith E.; and Scott, Edward W., to Ajax Hardware Corporation. Ring pull. 246,423, 11-22-77, Cl. D8-310.000.
Ridgway, Keith E.; and Scott, Edward W., to Ajax Hardware Corporation. Pull for doors, drawers or the like. 246,426, 11-22-77, Cl. D8-318.000.
Ridgway, Keith E.; and Scott, Edward W., to Ajax Hardware Corporation. Pull. 246,427, 11-22-77, Cl. D8-318.000.

Ridgway, Keith E.; and Scott, Edward W., to Ajax Hardware Corporation. Pull backplate. 246,434, 11-22-77, Cl. D8-350.000.

Rowenta-Werke GmbH: *See*—
  Stuetzer, Franz Alban, 246,472, Cl. D27-42.000.
  Stuetzer, Franz Alban, 246,473, Cl. D27-42.000.
  Stutzer, Franz Alban; and Figur, Bernd, 246,471, Cl. D27-42.000.

St. Croix Corporation: *See*—
  Reichow, James R., 246,462, Cl. D22-26.000.

Sato, Mitsuru. Building block. 246,470, 11-22-77, Cl. D25-91.000.

Satten, Michael I. Toy restaurant. 246,483, 11-22-77, Cl. D34-15.0LL.

Schmidt, Harald, to Hansa Plastics Inc. Hacksaw blade holder. 246,416, 11-22-77, Cl. D8-97.000.

Scott, Edward W.: *See*—
  Ridgway, Keith E.; and Scott, Edward W., 246,418, Cl. D8-302.000.
  Ridgway, Keith E.; and Scott, Edward W., 246,419, Cl. D8-302.000.
  Ridgway, Keith E.; and Scott, Edward W., 246,421, Cl. D8-306.000.
  Ridgway, Keith E.; and Scott, Edward W., 246,423, Cl. D8-310.000.
  Ridgway, Keith E.; and Scott, Edward W., 246,426, Cl. D8-318.000.
  Ridgway, Keith E.; and Scott, Edward W., 246,427, Cl. D8-318.000.
  Ridgway, Keith E.; and Scott, Edward W., 246,434, Cl. D8-350.000.

Segal, Charles L.; Anderson, Michael G.; and Vincent, David N., to Groves-Kelco Sales, Inc. Racketball bracket frame. 246,474, 11-22-77, Cl. D34-5.0ST.

Shealy, Noah Alvin, to Clark Equipment Company. Axle housing. 246,451, 11-22-77, Cl. D12-160.000.

Slaughter, Leonard, Jr.: *See*—
  Lynn, Elmer C.; and Slaughter, Leonard, Jr., 246,439, Cl. D9-219.000.

Snediker, Robert R.; Chalmers, Steve; and Drapeau, Robert E., to Brown & Williamson Tobacco Corporation. Combined display and dispensing stand. 246,408, 11-22-77, Cl. D6-189.000.

Sony Corporation: *See*—
  Takahashi, Shigeo; and Sumita, Kaoru, 246,455, Cl. D14-6.000.

Steinman, Sheldon: *See*—
  Ebner, John S.; Steinman, Sheldon; and Haase, Frederick W., 246,454, Cl. D13-41.000.

Stone, Leland George, to Amerock Corporation. Pull. 246,425, 11-22-77, Cl. D8-318.000.

Stone, Leland George, to Amerock Corporation. Escutcheon. 246,435, 11-22-77, Cl. D8-350.000.

Stuetzer, Franz Alban, to Rowenta-Werke GmbH. Lighter. 246,472, 11-22-77, Cl. D27-42.000.

Stuetzer, Franz Alban, to Rowenta-Werke GmbH. Lighter. 246,473, 11-22-77, Cl. D27-42.000.

Stutzer, Franz Alban; and Figur, Bernd, to Rowenta-Werke GmbH. Lighter. 246,471, 11-22-77, Cl. D27-42.000.

Sumita, Kaoru: *See*—
  Takahashi, Shigeo; and Sumita, Kaoru, 246,455, Cl. D14-6.000.

Sunbeam Corporation: *See*—
  Ernest, Robert Orman, 246,443, Cl. D10-106.000.

Takahashi, Shigeo; and Sumita, Kaoru, to Sony Corporation. Tape recorder. 246,455, 11-22-77, Cl. D14-6.000.

Tegner, Raymond U. H., to Amerock Corporation. Soap dish holder. 246,404, 11-22-77, Cl. D6-89.000.

Tegner, Raymond U. H., to Amerock Corporation. Combined tumbler and toothbrush holder. 246,406, 11-22-77, Cl. D6-92.000.

Tegner, Raymond U. H., to Amerock Corporation. Keyhole escutcheon. 246,432, 11-22-77, Cl. D8-350.000.

Tegner, Raymond U. H., to Amerock Corporation. Keyhole escutcheon. 246,433, 11-22-77, Cl. D8-350.000.

Tempchin, William. Book rest for bathtubs and armchairs. 246,403, 11-22-77, Cl. D6-86.000.

Unican Security Systems, Ltd.: *See*—
  Brezney, Jacqueline, 246,428, Cl. D8-318.000.
  Brezney, Jacqueline, 246,436, Cl. D8-350.000.

van der Lely, Cornelis. Cultivator tine. 246,457, 11-22-77, Cl. D15-29.000.

Vasilatos, Anastasios J.; and Pasturczak, Vincent S. Motion picture projector. 246,458, 11-22-77, Cl. D16-23.000.

Ventura, Frank D., to Ideal Toy Corporation. Doll stand. 246,409, 11-22-77, Cl. D6-146.000.

Vincent, David N.: *See*—
  Segal, Charles L.; Anderson, Michael G.; and Vincent, David N., 246,474, Cl. D34-5.0ST.

Wahi, Chander M.: *See*—
  Chermak, William J.; Kozan, F. Joseph; and Wahi, Chander M., 246,453, Cl. D13-21.000.

Wasserman, Arnold S. Modular travel case. 246,484, 11-22-77, Cl. D87-5.00G.

Weber, Andrew E. Packaging container or similar article. 246,438, 11-22-77, Cl. D9-198.000.

Wildgen, Leo F., to Ball Corporation. Pitcher. 246,413, 11-22-77, Cl. D7-64.000.

Yoshino, Zenzaburo. Single lens reflex camera. 246,460, 11-22-77, Cl. D16-08.000.

CLASSIFICATION OF PATENTS

ISSUED NOVEMBER 22, 1977

NOTE.—First number, class; second number, subclass; third number, patent number

CLASS 2	
115	4,058,852
239	4,058,853
412	4,058,854
CLASS 3	
1.7	4,058,855
	4,058,857
1.91	4,058,856
CLASS 4	
67 R	4,058,858
252 R	4,058,859
CLASS 5	
10 R	4,058,860
164 R	4,058,861
CLASS 8	
2.5 A	4,059,402
168 B	4,059,403
CLASS 9	
14	4,058,862
308	4,058,863
CLASS 10	
2	4,058,864
13	4,058,865
155 A	4,058,866
CLASS 14	
16.5	4,058,867
CLASS 15	
4	4,058,868
101	4,058,869
104.1 R	4,058,870
CLASS 16	
172	4,058,871
CLASS 17	
1 R	4,058,872
CLASS 23	
230 B	4,059,404
230 R	4,059,405
	4,059,406
253 TP	4,059,407
267 R	4,059,408
284	4,059,409
CLASS 24	
73 CH	4,058,873
CLASS 28	
153	4,058,874
CLASS 29	
25.15	4,058,875
78	4,058,876
116 AD	4,058,877
	4,058,878
132	4,058,879
156.8 P	4,058,880
407	4,058,882
448	4,058,883
526 R	4,058,884
559	4,058,885
563	4,058,886
571	4,058,887
593	4,058,888
600	Re.29,476
623.5	4,058,889
625	4,058,890
715	4,058,881
CLASS 30	
30	4,058,891
178	4,058,892
250	4,058,893
251	4,058,894
CLASS 32	
32	4,058,895
33	4,058,896
40 R	4,058,897
59	4,058,898
CLASS 33	
26	4,058,899
148 E	4,058,900
178 R	4,058,901
189	4,058,902
288	4,058,903
CLASS 34	
12	4,058,904
15	4,058,905
16.5	4,058,906
61	4,058,907
149	4,058,908
CLASS 35	
16	4,058,909
17	4,058,910
22 R	4,058,911
34	4,058,912
CLASS 37	
50	4,058,913
66	4,058,914
117.5	4,058,915
CLASS 40	
107	4,058,916
125 M	4,058,917
129 C	4,058,918
130 E	4,058,919
336	4,058,920
CLASS 42	
1 G	4,058,921
16	4,058,922
17	4,058,923
69 R	4,058,924
79	4,058,925
CLASS 43	
43.12	4,058,926
43.13	4,058,927
131	4,058,928
CLASS 44	
1 R	4,059,410
10 H	4,059,412
51	4,059,411
58	4,059,414
CLASS 47	
41.12	4,058,929
58	4,058,930
87	4,058,931
CLASS 48	
63	4,059,415
197 R	4,059,416
CLASS 49	
56	4,059,413
177	4,058,932
CLASS 51	
5 D	4,058,933
	4,058,934
163.1	4,058,935
170 T	4,058,936
259	4,058,937
287	4,058,938
309 A	4,059,417
CLASS 52	
2	4,058,939
104	4,058,940
169.1	4,058,941
179	4,058,942
227	4,058,943
235	4,058,944
244	4,058,945
273	4,058,946
396	4,058,947
405	4,058,948
407	4,058,949
461	4,058,950
656	4,058,951
741	4,058,952
CLASS 53	
22 A	4,058,953
54	4,058,954
212	4,058,955
CLASS 55	
73	4,059,418
92	4,059,419
112	4,059,420
196	4,059,421
418	4,059,422
CLASS 56	
1	4,058,956
11.3	4,058,957
228	4,058,958
295	4,058,959
CLASS 57	
34 AT	4,058,960
34 HS	4,058,961
34 R	4,058,962
56	4,058,963
58.89	4,058,964
58.91	4,058,965
78	4,058,966
140 J	4,058,967
140 R	4,058,968
CLASS 58	
23 BA	4,058,969
23 R	4,058,970
39.5	4,058,971
88 E	4,058,972
CLASS 60	
39.09 R	4,058,973
39.12	4,058,974
39.28 T	4,058,975
39.46 S	4,058,976
39.65	4,058,977
277	4,058,978
327	4,058,979
337	4,058,980
605	4,058,981
CLASS 61	
1 R	4,058,982
41 A	4,058,983
48	4,058,984
54	4,058,985
63	4,058,986
86	4,058,987
CLASS 62	
49	4,059,424
160	4,058,988
256	4,058,989
266	Re.29,477
CLASS 64	
1 S	4,058,990
CLASS 65	
21	4,059,423
22	4,059,425
25 A	4,059,426
	4,059,427
33	4,059,428
355	4,059,429
CLASS 68	
205 R	4,058,991
CLASS 70	
34	4,058,992
58	4,058,993
232	4,058,994
431	4,058,995
CLASS 71	
86	4,059,430
87	4,059,431
	4,059,432
90	4,059,433
92	4,059,434
105	4,059,435
118	4,059,436
CLASS 72	
49	4,058,996
50	4,058,997
84	4,058,998
102	4,058,999
197	4,059,000
214	4,059,001
238	4,059,002
256	4,059,003
299	4,059,004
CLASS 73	
1 B	4,059,005
17 A	4,059,006
38	4,059,008
61.1 C	4,059,009
133 R	4,059,011
141 A	4,059,012
159	4,059,013
190 R	4,059,007
194 EM	4,059,014
209	4,059,015
304 R	4,059,016
395	4,059,017
418	4,059,018
421.5 A	4,059,019
425.4 P	4,059,020
596	4,059,010
CLASS 74	
89.2	4,059,021
226	4,059,022
230.3	4,059,023
421 R	4,059,024
482	4,059,025
711	4,059,026
718	4,059,027
781 B	4,059,028
785	4,059,029
798	4,059,030
CLASS 75	
76	4,059,437
81	4,059,438
122.7	4,059,439
126 C	4,059,440
174	4,059,441
208 R	4,059,442
CLASS 76	
108 R	4,059,031
CLASS 81	
3 R	4,059,032
3.1 B	4,059,033
57.37	4,059,034
CLASS 83	
1	4,059,035
188	4,059,036
407	4,059,037
745	4,059,038
CLASS 84	
1.01	4,059,039
1.03	4,059,040
CLASS 85	
3 S	4,059,041
CLASS 91	
469	4,059,042
CLASS 93	
1 C	4,059,043
93 HT	4,059,044
CLASS 96	
1 LY	4,059,444
1 PS	4,059,443
35	4,059,445
50 R	4,059,446
56.4	4,059,447
84 A	4,059,448
91 D	4,059,449
101	4,059,450
CLASS 98	
122	4,059,045
CLASS 99	
355	4,059,046
455	4,059,047
482	4,059,048
CLASS 100	
41	4,059,049
91	4,059,050
CLASS 101	
45	4,059,051
CLASS 102	
70.2 P	4,059,052
CLASS 104	
35	4,059,053
88	4,059,054
CLASS 105	
368 R	4,059,055
	4,059,056
CLASS 106	
1.26	4,059,451
14	4,059,452
38.3	4,059,453
39.7	4,059,454
58	4,059,455
114	4,059,456
203	4,059,457
213	4,059,458
298	4,059,459
CLASS 108	
51.1	4,059,057
129	4,059,058
CLASS 109	
1 R	4,059,059
CLASS 110	
1 J	4,059,060
7 A	4,059,061
CLASS 112	
258	4,059,062
CLASS 114	
106	4,059,063
144 E	4,059,064
256	4,059,065
265	Re.29,478
CLASS 116	
115	4,059,066
CLASS 118	
7	4,059,067
420	4,059,068
642	4,059,069
CLASS 119	
14.47	4,059,070
18	4,059,071
51.13	4,059,072
98	4,059,073
156	4,059,074
CLASS 122	
6 A	4,059,075
CLASS 123	
3	4,059,076
23	4,059,077
25 K	4,059,078
30 D	4,059,079
41.33	4,059,080
103 R	4,059,088
136	4,059,081
141	4,059,082
146.5 A	4,059,083
148 E	4,059,084
195 R	4,059,085
196 R	4,059,086
196 S	4,059,087
CLASS 124	
1	Re.29,479
27	4,059,089
CLASS 126	
121	4,059,090
140	4,059,091
215	4,059,092
271	4,059,093
	4,059,094
	4,059,095
375	4,059,096
CLASS 127	
29	4,059,460
CLASS 128	
1 R	4,059,097
2 V	4,059,098
2.05 V	4,059,169
28	4,059,099
36	4,059,100
62 A	4,059,101
92 B	4,059,102
96	4,059,103
132 D	4,059,104
133	4,059,105
	4,059,106
173 H	4,059,107
214 R	4,059,108
218 A	4,059,110
218 M	4,059,109
223	4,059,111
272.3	4,059,112
276	4,059,113
287	4,059,114
317	4,059,115
419 PG	4,059,116
531	4,059,117
CLASS 131	
8 R	4,059,118
9	4,059,119
23 R	4,059,120
269	4,059,121
CLASS 133	
3 D	4,059,122
CLASS 134	
102	4,059,123
CLASS 137	
38	4,059,124
73	4,059,125
82	4,059,130
142	4,059,126
244	4,059,127
487.5	4,059,128
CLASS 138	
37	4,059,129
CLASS 139	
59	4,059,131
207	4,059,132
440	4,059,133
CLASS 141	
59	4,059,134
207	4,059,135
CLASS 148	
1.5	4,059,461
31.55	4,059,462
105	4,059,463
CLASS 151	
14.5	4,059,136
CLASS 152	
232	4,059,137
330 RF	4,059,138
CLASS 156	
66	4,059,464
72	4,059,465
78	4,059,466
80	4,059,467
93	4,059,468
108	4,059,469
238	4,059,470
244	4,059,471
259	4,059,472
308	4,059,473
356	4,059,474
379	4,059,475
384	4,059,476
479	4,059,477
510	4,059,478
640	4,059,479
644	4,059,480
660	4,059,481
CLASS 157	
1.17	4,059,140
13	4,059,139
CLASS 160	
90	4,059,141
CLASS 162	
281	4,059,482
CLASS 164	
49	4,059,142
113	4,059,143
166	4,059,144
CLASS 165	
1	4,059,145
45	4,059,146
133	4,059,147

CLASSIFICATION OF PATENTS

CLASS 166

.5	4,059,148
64	4,059,149
120	4,059,150
258	4,059,151
261	4,059,152
264	4,059,153
274	4,059,154
301	4,059,155
314	4,059,156
317	4,059,157

CLASS 171

63	4,059,158

CLASS 172

7	4,059,159
47	4,059,160
60	4,059,161

CLASS 173

37	4,059,162

CLASS 174

19	4,059,722
21 R	4,059,723
36	4,059,724

CLASS 175

73	4,059,163
	4,059,164
107	4,059,165
232	4,059,166
297	4,059,167

CLASS 176

78	4,059,483
	4,059,484

CLASS 179

1.5 D	4,059,725
1.5 M	4,059,726
2 AM	4,059,727
2 E	4,059,728
15 AS	4,059,730
15 BF	4,059,729
15 BY	4,059,731
18 B	4,059,732
18 BC	4,059,735
18 BD	4,059,734
18 ET	4,059,733
175.2 R	4,059,736

CLASS 180

1 P	4,059,168
54 R	4,059,170
77 S	4,059,171

CLASS 187

9 E	4,059,172

CLASS 188

110	4,059,173
195	4,059,174
285	4,059,175

CLASS 192

12 BA	4,059,176
41 S	4,059,177
53 F	4,059,178
98	4,059,179

CLASS 193

37	4,059,180

CLASS 194

13	4,059,181

CLASS 195

1.8	4,059,485
	4,059,486
28 N	4,059,487
28 R	4,059,488
31 F	4,059,489
99	4,059,490
103.5 A	4,059,491

CLASS 197

1 R	4,059,182
	4,059,183
18	4,059,184

CLASS 198

339	4,059,185
461	4,059,187
477	4,059,188
481	4,059,186

CLASS 200

5 A	4,059,737
6 B	4,059,738
51.09	4,059,739
52 R	4,059,740
148 A	4,059,741

CLASS 203

11	4,059,492

CLASS 204

3	4,059,493
28	4,059,494
98	4,059,495
104	4,059,496
165	4,059,497
188	4,059,498
195 M	4,059,499
288	4,059,500
299 R	4,059,501

CLASS 208

152	4,059,502
254 H	4,059,503
255	4,059,504
310 Z	4,059,505

CLASS 209

18	4,059,506
112	4,059,189
139 A	4,059,507
151	4,059,508
166	4,059,509
223 A	4,059,510

CLASS 210

23 R	4,059,511
24	4,059,512
45	4,059,513
49	4,059,514
51	4,059,515
53	4,059,516
73 R	4,059,517
108	4,059,518
169	4,059,519
184	4,059,520
195 S	4,059,521
198 C	4,059,523
198 R	4,059,522
220	4,059,524
236	4,059,525
242 S	4,059,526
259	4,059,527
282	4,059,528
321 B	4,059,530
519	4,059,529
522	4,059,531

CLASS 211

57.1	4,059,190
90	4,059,191

CLASS 213

61	4,059,192

CLASS 214

8.5 A	4,059,193
38 CA	4,059,194
44 R	4,059,195
138 R	4,059,196
451	4,059,197

CLASS 215

222	4,059,198

CLASS 219

10.55 D	4,059,742
121 P	4,059,743

CLASS 220

3.8	4,059,199
233	4,059,200
258	4,059,201
325	4,059,202

CLASS 221

73	4,059,203

CLASS 222

146 HE	4,059,204
368	4,059,205
413	4,059,206

CLASS 224

31	4,059,207
45 S	4,059,208
	4,059,209

CLASS 225

47	4,059,210

CLASS 226

11	4,059,211
141	4,059,212
151	4,059,213

CLASS 228

173 C	4,059,215
179	4,059,216
181	4,059,217
207	4,059,218
265	4,059,214

CLASS 229

2.5 EC	4,059,219
37 R	4,059,220
39 R	4,059,221
54 R	4,059,222

CLASS 233

1 R	4,059,223

CLASS 235

92 FL	4,059,744
302	4,059,749
303.1	4,059,748
437	4,059,225
462	4,059,224

CLASS 237

1 A	4,059,226

CLASS 239

1	4,059,227
106	4,059,228
183	4,059,229
542	4,059,230

CLASS 241

5	4,059,231
46.17	4,059,232
47	4,059,233
222	4,059,234
223	4,059,235
243	4,059,236
246	4,059,237

CLASS 242

7.21	4,059,238
18.1	4,059,239
47.01	4,059,240
75.5	4,059,241
107.4 A	4,059,242
129.6	4,059,243
200	4,059,244
201	4,059,245

CLASS 243

7	4,059,246

CLASS 244

7 R	4,059,247

CLASS 248

214	4,059,248

CLASS 249

58	4,059,249

CLASS 250

201	4,059,756
	4,059,757
	4,059,758
206	4,059,759
253	4,059,760
287	4,059,761
336	4,059,762
	4,059,763
352	4,059,764
367	4,059,765
370	4,059,766
461 R	4,059,767
483	4,059,768
493	4,059,769

CLASS 251

304	4,059,250

CLASS 252

8.1	4,059,532
8.5 A	4,059,533
32.7 E	4,059,534
33	4,059,535
33.3	4,059,536
62.9	4,059,537
95	4,059,538
301.1 R	4,059,539
309	4,059,540
313 R	4,059,541
431 P	4,059,542
455 Z	4,059,543
471	4,059,544

CLASS 260

2.5 FP	4,059,545
16	4,059,546
17 R	4,059,547
22 TN	4,059,549
29.4 R	4,059,550
29.6 H	4,059,551
29.6 S	4,059,553
29.6 TA	4,059,552
29.6 WQ	4,059,554
29.7 H	4,059,555
30.2	4,059,556
31.2 N	4,059,557
42.33	4,059,558
45.7 R	4,059,560
45.75 S	4,059,562
45.8 R	4,059,561
45.95 H	4,059,563
47 ET	4,059,568
47 R	4,059,567
47 XA	4,059,565
	4,059,566
48	4,059,569
77.5 AP	4,059,570
112 B	4,059,571
112 R	4,059,572
112.5 R	4,059,573
192	4,059,574
239.5	4,059,575
251 R	4,059,548
252	4,059,582
256.5 R	4,059,583
268 BC	4,059,584
286 Q	4,059,585
287 D	4,059,586
301	4,059,587
306.7 C	4,059,589
306.7 T	4,059,588
306.8 R	4,059,590
308 D	4,059,591
	4,059,592
340.5 R	4,059,593
340.7	4,059,594
345.9 R	4,059,595
347.7	4,059,597
347.8	4,059,596
348.16	4,059,598
348.29	4,059,599
348.46	4,059,600
408	4,059,601
	4,059,602
	4,059,603
412.4	4,059,604
448.2 B	4,059,605
	4,059,606
448.2 E	4,059,559
	4,059,607
	4,059,608
455 A	4,059,609
456 P	4,059,611
456 R	4,059,612
502 R	4,059,619
513 T	4,059,620
558 R	4,059,621
559 A	4,059,622
561 A	4,059,623
565	4,059,624
566 AE	4,059,625
578	4,059,626
580	4,059,627
581	4,059,628
583 GG	4,059,629
584 B	4,059,631
586 C	4,059,632
586 E	4,059,630
593 H	4,059,633
593 R	4,059,634
609 D	4,059,636
609 E	4,059,635
610 A	4,059,637
613 R	4,059,638
614 F	4,059,639
635 R	4,059,640
	4,059,641
650 R	4,059,642
666 PY	4,059,643
	4,059,644
668 A	4,059,645
676 R	4,059,646
	4,059,647
	4,059,648
683.48	4,059,649
837 R	4,059,650
848	4,059,651
	4,059,652
857 PG	4,059,653
897 A	4,059,654
983	4,059,655
990	4,059,656

CLASS 261

104	4,059,657

CLASS 264

43	4,059,658
45.3	4,059,659
46.4	4,059,564
	4,059,660
54	4,059,661
62	4,059,662
65	4,059,663
66	4,059,664
128	4,059,665
129	4,059,666
289	4,059,667
290 R	4,059,668
319	4,059,669

CLASS 266

235	4,059,251
236	4,059,252
259	4,059,253

CLASS 267

140	4,059,254

CLASS 269

323	4,059,255

CLASS 270

52	4,059,256
66	4,059,257
67	4,059,258

CLASS 271

3	4,059,259
	4,059,260
9	4,059,261
35	4,059,262
171	4,059,263
270	4,059,264

CLASS 272

137	4,059,265

CLASS 273

1 E	4,059,266
54 B	4,059,267
55 R	4,059,268
67 A	4,059,269
77 R	4,059,270
95 A	4,059,271
130 D	4,059,274
	4,059,275
130 E	4,059,272
130 R	4,059,273
134 D	4,059,276

CLASS 274

23 A	4,059,277

CLASS 277

139	4,059,278
166	4,059,279
188 A	4,059,280

CLASS 280

5 A	4,059,281
47.13 B	4,059,282
461 A	4,059,283
605	4,059,284
651	4,059,285
673	4,059,286
745	4,059,287

CLASS 285

2	4,059,288
56	4,059,289
169	4,059,290
197	4,059,291
229	4,059,292
236	4,059,293
238	4,059,294
305	4,059,295
312	4,059,296
340	4,059,297

CLASS 290

4 C	4,059,770
44	4,059,771

CLASS 292

199	4,059,298
294	4,059,299
322	4,059,300

CLASS 293

62	4,059,301

CLASS 294

74	4,059,302

CLASS 296

28 M	4,059,303
35 R	4,059,304

CLASS 297

338	4,059,305
452	4,059,306

CLASS 298

23 R	4,059,307

CLASS 299

5	4,059,308
18	4,059,309

CLASS 302

42	4,059,310
53	4,059,311

CLASS 303

92	4,059,312

CLASS 305

19	4,059,313
31	4,059,314
35 EB	4,059,315

CLASS 307

46	4,059,772
115	4,059,773
299 R	4,059,774

CLASS 308

8.2	4,059,316
72	4,059,317
73	4,059,318

CLASS 310

12	4,059,775
64	4,059,777
68 D	4,059,778
77	4,059,779
164	4,059,780
242	4,059,776

CLASS 312

319	4,059,319

CLASS 313

403	4,059,781

CLASS 315

58	4,059,782
107	4,059,783
349	4,059,784
378	4,059,785

CLASS 318

17	4,059,786
568	4,059,787
577	4,059,788
608	4,059,789
689	4,059,790

CLASS 323

19	4,059,793

CLASS 324

60 C	4,059,797
127	4,059,798
169	4,059,799
208	4,059,794
233	4,059,795
253	4,059,796

CLASS 325

38 B	4,059,800
167	4,059,801
398	4,059,802
445	4,059,803

CLASS 328

134	4,059,804

CLASS 329

50	4,059,805
107	4,059,806

CLASS 330

10	4,059,807
65	4,059,810
253	4,059,809
257	4,059,808
277	4,059,811

CLASS 331

1 A	4,059,812
94	4,059,813

CLASS 333

29	4,059,814
82 BT	4,059,815

CLASS 337

278	4,059,816
365	4,059,817

CLASS 339

19	4,059,320
34	4,059,321
44 R	4,059,322
60 R	4,059,329
75 M	4,059,323
89 M	4,059,324
94 A	4,059,325
113 R	4,059,326
	4,059,332
122 R	4,059,327
	4,059,328
177 R	4,059,330
198 R	4,059,331
247	4,059,333
258 F	4,059,334
272 UC	4,059,335

CLASS 340

8 LF	4,059,819
15.5 DP	4,059,818
15.5 SW	4,059,820
44	4,059,821
52 H	4,059,822
58	4,059,823
71	4,059,824
146.1 D	4,059,825
274 R	4,059,832
279	4,059,830

CLASS 343

6.8 R	4,059,831

CLASS 346

108	4,059,833

CLASSIFICATION OF PATENTS

CLASS 350

55	4,059,336
96 C	4,059,337
	4,059,338
117	4,059,339
160 LC	4,059,340
160 R	4,059,341
175 ML	4,059,342
182	4,059,343
220	4,059,344
252	4,059,345
295	4,059,346
319	4,059,347

CLASS 351

30	4,059,348

CLASS 352

72	4,059,349
141	4,059,350

CLASS 353

43	4,059,351
103	4,059,352

CLASS 354

1	4,059,834
24	4,059,835
29	4,059,836

CLASS 355

16	4,059,353
22	4,059,354
43	4,059,355

CLASS 356

204	4,059,356
222	4,059,359
243	4,059,357

CLASS 357

73	4,059,837

CLASS 358

27	4,059,838
44	4,059,839
48	4,059,840
128	4,059,841
150	4,059,842

CLASS 361

93	4,059,843
152	4,059,844
198	4,059,845
212	4,059,846
215	4,059,847
272	4,059,848
395	4,059,849

CLASS 362

98	4,059,752
217	4,059,754
224	4,059,755
267	4,059,753

CLASS 363

37	4,059,791
135	4,059,792

CLASS 364

107	4,059,746
108	4,059,745
200	4,059,850
	4,059,851
493	4,059,747
715	4,059,750
829	4,059,751

CLASS 365

19	4,059,829
32	4,059,828
104	4,059,826
126	4,059,827

CLASS 401

219	4,059,358

CLASS 403

2	4,059,360
77	4,059,361

CLASS 404

6	4,059,362

CLASS 407

114	4,059,363

CLASS 415

89	4,059,364

CLASS 416

174	4,059,365

CLASS 417

32	4,059,366
203	4,059,367
243	4,059,368
494	4,059,369

CLASS 418

56	4,059,370
61 A	4,059,371

CLASS 423

7	4,059,670
10	4,059,671
121	4,059,672
136	4,059,673
167	4,059,674
240	4,059,675
	4,059,676
	4,059,677
273	4,059,678
306	4,059,679
337	4,059,680
419 P	4,059,681
448	4,059,682
481	4,059,683

CLASS 424

1.5	Re.29,480
4	4,059,684
12	4,059,685
19	4,059,686
54	4,059,687
71	4,059,688
84	4,059,689
150	4,059,690
155	4,059,691
177	4,059,692
	4,059,693
	4,059,694
195	4,059,695
200	4,059,696
211	4,059,697
	4,059,698
	4,059,699
216	4,059,700
248.55	4,059,702
250	4,059,701
269	4,059,703
	4,059,704
273 R	4,059,705

CLASS 425

8	4,059,372
192 R	4,059,373
207	4,059,374
298	4,059,380
305.1	4,059,377
362	4,059,378
393	4,059,379
406	4,059,381
446	4,059,382
451.6	4,059,383
546	4,059,376
577	4,059,384
589	4,059,375

CLASS 426

548	4,059,706

CLASS 427

35	4,059,707
96	4,059,708
264	4,059,709
307	4,059,710
310	4,059,711

CLASS 428

36	4,059,712
	4,059,713
310	4,059,714
349	4,059,715
403	4,059,716

CLASS 429

162	4,059,717
	4,059,718

CLASS 431

12	4,059,385
43	4,059,386
93	4,059,387
95 R	4,059,388
	4,059,389
354	4,059,390

CLASS 432

13	4,059,391
58	4,059,392
	4,059,393
59	4,059,394
72	4,059,395
78	4,059,396
80	4,059,397
121	4,059,398
	4,059,399
124	4,059,400
132	4,059,401

CLASS 526

52	4,059,719
66	4,059,616
74	4,059,720

CLASS 542

426	4,059,576
	4,059,577

CLASS 544

21	4,059,578
69	4,059,581
73	4,059,580
172	4,059,579
193	4,059,610

CLASS 560

26	4,059,613
53	4,059,614
132	4,059,615
205	4,059,721
221	4,059,618
222	4,059,617

CLASSIFICATION OF DESIGNS

D2—	191	246,401
	224	246,402
D6—	86	246,403
	89	246,404
	91	246,405
	92	246,406
	146	246,409
	179	246,407
	189	246,408
D7—	41	246,410
	43	246,411
		246,412
	64	246,413
	181	246,414
D8—	29	246,415
	97	246,416
	98	246,417
	302	246,418
		246,419
	306	246,420
		246,421
	307	246,422
	310	246,423
	317	246,424
	318	246,425
		246,426
		246,427
		246,428
	321	246,429
	327	246,430
		246,431
	350	246,432
		246,433
		246,434
		246,435
		246,436
D9—	12	246,437
	198	246,438
	219	246,439
	224	246,440
D10—	71	246,441
	78	246,442
	106	246,443
	111	246,444
	114	246,445
D11—	145	246,447
	153	246,446
D12—	49	246,448
	53	246,449
	141	246,450
	160	246,451
	182	246,452
D13—	21	246,453
	41	246,454
D14—	6	246,455
D15—	5	246,456
	29	246,457
D16—	08	246,460
	23	246,458
	32	246,459
	39	246,461
D22—	26	246,462
D23—	49	246,463
	154	246,464
D24—	21	246,465
	31	246,466
	56	246,467
D25—	5	246,468
	7	246,469
	91	246,470
D27—	42	246,471
		246,472
		246,473
D34—	5 GH	246,475
	5 L	246,477
	5 PP	246,476
	5 ST	246,474
	15 AJ	246,478
		246,479
		246,480
		246,481
	15 C	246,482
	15 LL	246,483
D87—	5 G	246,484
D96—	12 C	246,485

CLASSIFICATION OF PLANTS

P.—	41	4,155
	51	4,157
	69	4,154
	74	4,153
		4,156

GEOGRAPHICAL INDEX OF RESIDENCE OF INVENTORS

(U.S. States, Territories and Armed Forces, the Commonwealth of Puerto Rico, and the Canal Zone)

Alabama	1	Kentucky	21	Oregon	41
Alaska	2	Louisiana	22	Pennsylvania	42
American Samoa	3	Maine	23	Puerto Rico	43
Arizona	4	Maryland	24	Rhode Island	44
Arkansas	5	Massachusetts	25	South Carolina	45
California	6	Michigan	26	South Dakota	46
Canal Zone	7	Minnesota	27	Tennessee	47
Colorado	8	Mississippi	28	Texas	48
Connecticut	9	Missouri	29	Utah	49
Delaware	10	Montana	30	Vermont	50
District of Columbia	11	Nebraska	31	Virginia	51
Florida	12	Nevada	32	Virgin Islands	52
Georgia	13	New Hampshire	33	Washington	53
Guam	14	New Jersey	34	West Virginia	54
Hawaii	15	New Mexico	35	Wisconsin	55
Idaho	16	New York	36	Wyoming	56
Illinois	17	North Carolina	37	U.S. Air Force	57
Indiana	18	North Dakota	38	U.S. Army	58
Iowa	19	Ohio	39	U.S. Navy	59
Kansas	20	Oklahoma	40		

(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

PATENTS

1 :	4,059,147		4,059,322		4,059,112		4,058,981		4,059,550		4,059,207
	4,059,209		4,059,332		4,059,123		4,059,042	22 :	4,058,959		4,059,256
	4,059,268		4,059,338		4,059,128		4,059,045		4,059,035		4,059,278
	4,059,668		4,059,340		4,059,169		4,059,096		4,059,164		4,059,295
4 :	4,059,094		4,059,343		4,059,202		4,059,107		4,059,418		4,059,301
	4,059,428		4,059,346		4,059,219		4,059,127		4,059,654		4,059,315
	4,059,754		4,059,357		4,059,223		4,059,162	24 :	4,058,993		4,059,330
5 :	4,059,048		4,059,364		4,059,225		4,059,163		4,059,103		4,059,361
	4,059,327		4,059,379		4,059,317		4,059,168		4,059,192		4,059,365
6 :	Re.29,476		4,059,384		4,059,483		4,059,172		4,059,630		4,059,366
	Re.29,478		4,059,416		4,059,493		4,059,173		4,059,825		4,059,391
	Re.29,479		4,059,456		4,059,584		4,059,186		4,059,842		4,059,518
	4,058,853		4,059,501		4,059,607		4,059,201	25 :	4,058,911		4,059,545
	4,058,893		4,059,517		4,059,688		4,059,229		4,058,916		4,059,552
	4,058,899		4,059,519		4,059,706		4,059,264		4,058,992		4,059,614
	4,058,921		4,059,537		4,059,799		4,059,302		4,059,063		4,059,642
	4,058,923		4,059,590	10 :	4,059,032		4,059,306		4,059,108		4,059,669
	4,058,928		4,059,611		4,059,037		4,059,313		4,059,191		4,059,680
	4,058,971		4,059,625		4,059,434		4,059,331		4,059,204		4,059,712
	4,058,985		4,059,645		4,059,457		4,059,334		4,059,224		4,059,820
	4,059,033		4,059,705		4,059,546		4,059,339		4,059,309	27 :	4,058,862
	4,059,038		4,059,728		4,059,623		4,059,370		4,059,348		4,059,114
	4,059,050		4,059,744		4,059,628		4,059,371		4,059,356		4,059,116
	4,059,052		4,059,750	11 :	4,059,011		4,059,390		4,059,381		4,059,210
	4,059,064		4,059,759		4,059,752		4,059,422		4,059,442		4,059,244
	4,059,066		4,059,761	12 :	4,058,886		4,059,439		4,059,461		4,059,282
	4,059,069		4,059,762		4,058,996		4,059,458		4,059,471		4,059,298
	4,059,089		4,059,767		4,059,003		4,059,460		4,059,525		4,059,398
	4,059,092		4,059,770		4,059,099		4,059,477		4,059,541		4,059,715
	4,059,098		4,059,783		4,059,181		4,059,540		4,059,605		4,059,742
	4,059,106		4,059,789		4,059,509		4,059,650		4,059,726		4,059,775
	4,059,117		4,059,790		4,059,673		4,059,719		4,059,731		4,059,812
	4,059,134		4,059,828		4,059,674		4,059,831		4,059,739	28 :	4,059,104
	4,059,141		4,059,830		4,059,690	18 :	4,058,880		4,059,747	29 :	4,058,940
	4,059,156	8 :	4,058,890		4,059,729		4,058,930		4,059,753		4,058,949
	4,059,166		4,058,905		4,059,735		4,058,943		4,059,801		4,059,212
	4,059,183		4,058,947		4,059,771		4,059,165		4,059,813		4,059,292
	4,059,199		4,059,017	13 :	4,058,859		4,059,235		4,059,843		4,059,367
	4,059,213		4,059,151		4,059,009		4,059,355	26 :	4,058,888		4,059,485
	4,059,217		4,059,693		4,059,220		4,059,411		4,058,983		4,059,486
	4,059,222		4,059,756		4,059,249		4,059,681		4,058,999		4,059,579
	4,059,227		4,059,757		4,059,261	19 :	4,058,910		4,059,005		4,059,634
	4,059,228		4,059,758		4,059,328		4,058,922		4,059,025	31 :	4,059,073
	4,059,231	9 :	4,058,932		4,059,354		4,059,140		4,059,055	33 :	4,059,326
	4,059,242		4,058,977	15 :	4,058,945		4,059,796		4,059,056		4,059,548
	4,059,248		4,058,988		4,059,694	20 :	4,058,897		4,059,071	34 :	4,058,852
	4,059,255		4,059,004	16 :	4,059,832		4,059,844		4,059,091		4,058,891
	4,059,257		4,059,020	17 :	4,058,864	21 :	4,058,989		4,059,124		4,058,903
	4,059,258		4,059,024		4,058,914		4,059,161		4,059,136		4,058,952
	4,059,289		4,059,075		4,058,918		4,059,184		4,059,144		4,059,007
	4,059,299		4,059,097		4,058,937		4,059,247		4,059,175		4,059,018
	4,059,308		4,059,109		4,058,956		4,059,325		4,059,177		4,059,021
	4,059,318		4,059,110		4,058,957		4,059,329		4,059,194		4,059,051

	4,059,101		4,059,026		4,059,740		4,059,823		4,059,578		4,059,316
	4,059,119		4,059,054		4,059,800		4,059,846		4,059,583		4,059,512
	4,059,270		4,059,059		4,059,811		4,059,849		4,059,587		4,059,521
	4,059,277		4,059,060		4,059,847	40 :	4,058,915		4,059,591		4,059,522
	4,059,305		4,059,065	38 :	4,058,882		4,059,082		4,059,601		4,059,566
	4,059,368		4,059,093	39 :	4,058,869		4,059,149		4,059,602		4,059,598
	4,059,409		4,059,137		4,058,885		4,059,414		4,059,616		4,059,599
	4,059,410		4,059,170		4,058,917		4,059,533		4,059,665		4,059,604
	4,059,437		4,059,211		4,058,927		4,059,535		4,059,667		4,059,620
	4,059,441		4,059,252		4,058,935		4,059,633		4,059,697		4,059,644
	4,059,449		4,059,260		4,058,968		4,059,636		4,059,699		4,059,646
	4,059,459		4,059,267		4,059,023		4,059,649		4,059,701		4,059,647
	4,059,464		4,059,285		4,059,070		4,059,666		4,059,708		4,059,764
	4,059,478		4,059,294		4,059,126		4,059,675		4,059,745		4,059,818
	4,059,502		4,059,297		4,059,130		4,059,676		4,059,749		4,059,819
	4,059,503		4,059,323		4,059,176		4,059,683		4,059,755		4,059,826
	4,059,513		4,059,324		4,059,188		4,059,760		4,059,776	49 :	4,059,236
	4,059,515		4,059,351		4,059,190	41 :	4,059,314		4,059,795		4,059,685
	4,059,551		4,059,353		4,059,198		4,059,732		4,059,845	50 :	4,058,926
	4,059,570		4,059,359		4,059,216	42 :	4,058,873	44 :	4,059,575		4,058,934
	4,059,576		4,059,385		4,059,246		4,058,874		4,059,738		4,059,010
	4,059,612		4,059,407		4,059,254		4,058,875	45 :	4,058,868	51 :	4,058,854
	4,059,639		4,059,425		4,059,281		4,058,881		4,058,953		4,059,043
	4,059,648		4,059,429		4,059,320		4,058,898		4,058,991		4,059,300
	4,059,651		4,059,433		4,059,380		4,058,958		4,059,653		4,059,362
	4,059,652		4,059,443		4,059,400		4,059,053	46 :	4,059,691		4,059,405
	4,059,678		4,059,444		4,059,455		4,059,057	47 :	4,058,948		4,059,539
	4,059,687		4,059,454		4,059,466		4,059,105		4,059,413		4,059,797
	4,059,700		4,059,504		4,059,469		4,059,135		4,059,586		4,059,838
	4,059,707		4,059,520		4,059,476		4,059,205	48 :	Re.29,477	53 :	4,059,039
	4,059,709		4,059,554		4,059,528		4,059,218		4,058,855		4,059,226
	4,059,730		4,059,562		4,059,529		4,059,251		4,058,857		4,059,321
	4,059,793		4,059,568		4,059,543		4,059,263		4,058,872		4,059,347
36 :	4,058,860		4,059,581		4,059,560		4,059,271		4,058,896		4,059,484
	4,058,863		4,059,593		4,059,564		4,059,276		4,058,900	54 :	4,059,851
	4,058,867		4,059,594		4,059,609		4,059,293		4,058,902	55 :	4,058,884
	4,058,879		4,059,597		4,059,640		4,059,333		4,058,984		4,059,180
	4,058,887		4,059,615		4,059,655		4,059,388		4,059,145		4,059,208
	4,058,889		4,059,658		4,059,677		4,059,389		4,059,150		4,059,221
	4,058,892		4,059,711		4,059,679		4,059,426		4,059,152		4,059,265
	4,058,909		4,059,733		4,059,702		4,059,427		4,059,154		4,059,310
	4,058,925		4,059,773		4,059,714		4,059,435		4,059,155		4,059,386
	4,058,929		4,059,806		4,059,782		4,059,467		4,059,157		4,059,657
	4,058,975		4,059,836		4,059,798		4,059,474		4,059,167		4,059,717
	4,058,976	37 :	4,058,870		4,059,816		4,059,498		4,059,215		4,059,718
	4,058,994		4,059,031		4,059,821		4,059,516		4,059,288		4,059,772
	4,058,995		4,059,243								

DESIGN PATENTS

6 :	246,405		246,441		246,461	24 :	246,403	31 :	246,444		246,478
	246,407		246,445		246,468		246,415	34 :	246,410		246,485
	246,418		246,464	17 :	246,408	25 :	246,440		246,428	44 :	246,411
	246,419		246,465		246,420		246,447		246,436	45 :	246,414
	246,421		246,474		246,422		246,476	36 :	246,409	48 :	246,469
	246,423		246,484		246,424	26 :	246,417		246,416		246,475
	246,426	8 :	246,442		246,431		246,451		246,437	55 :	246,404
	246,427		246,452		246,443	27 :	246,413		246,459		246,406
	246,429	12 :	246,425		246,458		246,453		246,483		246,432
	246,430		246,435	19 :	246,439		246,462	39 :	246,446		246,433
	246,434		246,454	20 :	246,449		246,477	42 :	246,412		246,463
	246,438										

PLANT PATENTS

6 :	4,155	41 :	4,157	54 :	4,153		4,156				

U. S. GOVERNMENT PRINTING OFFICE : O - 1977

CHANGE OF ADDRESS FORM

NAME—FIRST, LAST

COMPANY NAME OR ADDITIONAL ADDRESS LINE

STREET ADDRESS

CITY | STATE | ZIP CODE

PLEASE PRINT OR TYPE

(or) COUNTRY

Mail this form to: NEW ADDRESS

Superintendent of Documents
Government Printing Office SSOM
Washington, D.C. 20402

Attach last subscription label here.

SUBSCRIPTION ORDER FORM

SUBSCRIPTION ORDER FORM

ENTER MY SUBSCRIPTION TO:

@ $ Domestic; @ $ Foreign.

NAME—FIRST, LAST

COMPANY NAME OR ADDITIONAL ADDRESS LINE

STREET ADDRESS

CITY | STATE | ZIP CODE

PLEASE PRINT OR TYPE

(or) COUNTRY

☐ Remittance Enclosed (Make checks payable to Superintendent of Documents)

☐ Charge to my Deposit Account No. ....

MAIL ORDER FORM TO:
Superintendent of Documents
Government Printing Office
Washington, D.C. 20402

OFFICIAL GAZETTE of the UNITED STATES PATENT and TRADEMARK OFFICE

November 29, 1977 Volume 964 Number 5

CONTENTS

The following are mailed under direction of the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, to whom all subscriptions should be made payable and all communications addressed:

THE OFFICIAL GAZETTE (PATENTS SECTION), issued weekly, subscription $342.20 per annum for first class mailing, also available as fourth-class mail at $250.00; foreign mailing $85.55 additional; single copies $6.60 each.

THE OFFICIAL GAZETTE (TRADEMARK SECTION), issued weekly, subscription $88.40 per annum, foreign mailing $22.10 additional; single copies $1.70 each.

CIRCULARS OF GENERAL INFORMATION concerning PATENTS, price 60 cents each.

CIRCULARS OF GENERAL INFORMATION concerning TRADEMARKS, price 50 cents each.

PRINTED COPIES OF PATENTS are furnished by the Patent and Trademark Office at 50 cents each; PLANT PATENTS in color, $1.00 each; copies of TRADEMARKS AND DESIGN PATENTS at 20 cents each. Address orders to the Commissioner of Patents and Trademarks, Washington, D.C., 20231.

Printing authorized by Section 11(a)3 of Title 35, U.S. Code P.T.O.

PATENT AND TRADEMARK OFFICE NOTICES

August and September 1977 Classification Orders

The reclassifications covered by the following classification changes became effective between August and September 1977.

	Class	Subclasses
Classification Order 594, effective August 2, 1977:		
Abolished	260	240-249.9; 309-312; 343.2; 346.1; 346.2; 346.8; 348-348.6.
Established	260	242.2; 243.3; 343.21; 343.41-343.45; 346.11; 346.22; 346.71-346.76; 347.91; 348.11-349.19; 348.21-348.29; 348.31-348.39; 348.41-348.49; 348.51-348.59; 348.61-348.64.
	(New) 542	400-476.
	(New) 544	1-223.
	(New) 548	300-379.
Title change	260	239.
Classification Order 595, effective August 2, 1977:		
Abolished	310	2-9.8.
Established	310	300-371; 800.
Classification Order 596, effective August 2, 1977:		
Abolished	206	498.
	229	51; 66; 85 and 86.
Established	206	601-634.
Classification Order 597, effective September 6, 1977:		
Abolished	181	33-72.
Established	181	200-296; 403; 404.
Title change	181	198.
Classification Order 598, effective September 6, 1977:		
Abolished	29	95; 95.1; 96; 97; 97.5; 98; 101-106; 567.
Established	(New) 407	1-120.
	408	203.5.
Classification Order 599, effective September 6, 1977:		
Abolished	260	468-499.
Established	(New) 560	1-266.
Classification Order 600, effective September 27, 1977:		
Abolished	330	12-40.
Established	330	250-311.
Classification Order 601, effective September 27, 1977:		
Abolished	164	273-283.
Established	164	413-450.
Title change	164	267.
Classification Order 602, effective September 27, 1977:		
Abolished	137	608-612.1.
Established	137	861-887.
Classification Order No. 603, effective September 27, 1977:		
Abolished	106	1.
Established	106	1.05; 1.11-1.19; 1.21-1.29.
Classification Order No. 604, effective September 27, 1977:		
Abolished	425	455.
Established	425	403.1.

ALFRED C. MARMOR,
Administrator for Documentation,
October 27, 1977.

Withdrawal From Practice

On August 19, 1977, Eugene V. Mandel of 311 W. 24th Street, Apt. 3D, New York, N.Y. 10011 withdrew from further practice before the United States Patent and Trademark Office. Accordingly, his name has been removed from the Register of Patent Attorneys and Patent Agents, effective August 19, 1977.

LUTRELLE F. PARKER,
Acting Commissioner of Patents and Trademarks and Chairman, Committee on Enrollment.

Patent Suits

Notices under 35 U.S.C. 290; Patent Act of 1952

2,807,016, P. F. M. Gloess, SOUNDING DEVICE USING ELECTROMAGNETIC WAVES, **filed** Aug. 14, 1973, United States Court of Claims (District of Columbia), Doc. 263–73, *International Telephone and Telegraph Corporation and International Standard Electric Corporation* v. *The United States and American Marine Defense Electronics Corporation (formerly Ridge Electronics Corporation), Texas Instruments, Inc. and Sperry-Rand Corporation.* Judgment is entered for plaintiff, July 14, 1977.

2,909,384, M. F. Saxton, MAGNETIC DOOR CATCH, **filed** Jan. 10, 1975, D.C., N.D. Ill. (Chicago), Doc. 75c99, *Engineered Products Co.* v. *Richard K. Sweet and Assoc.* Cause dismissed with prejudice pursuant to stipulation, July 26, 1977.

2,968,164, A. W. Hanson, METHOD OF GENERATING SNOW, **filed** June 20, 1977, D.C.N.J. (Newark), Doc. 77–1204, *Alden W. Hanson* v. *Hedco, Inc.*

3,166,154, J. M. Titzel, PORTABLE SCAFFOLDS AND WORK TOWERS, **filed** Dec. 9, 1976, D.C., W.D. Pa. (Pittsburgh), Doc. 76–1541, *Fordees Corporation* v. *Vulcan, Inc.* Defendant's motion for summary judgment is granted, June 20, 1977.

3,192,198, Naylor and Smith, PENICILLINS, **filed** July 19, 1977, D.C. Del. (Wilmington), Doc. 77–274, *Beecham Group Limited* v. *Bristol-Myers Co.*

3,211,167, Clift and Snyder, APPARTUS FOR TRANSPORTING SEWAGE AND WASTE LIQUIDS, **filed** Apr. 23, 1976, United States Court of Claims (District of Columbia), Doc. 163–76, *Julia Ann Clift* v. *The United States.* Order, plaintiff's petition is dismissed for lack of prosecution, June 10, 1977.

3,214,836, R. F. West, COILABLE RULE; **3,216,117**, A. L. Stowell, same, **filed** July 11, 1977, D.C., S.D. Calif. (San Diego), Doc. 77–0469–GT, *The Stanley Works* v. *Stephen J. Watson, doing business as Tools-R-Us.*

3,216,117. (See 3,214,836.)

3,308,839, D. J. Barday, APPARATUS FOR CLEANING OBJECTS WITH SOLVENT, **filed** May 24, 1977, D.C. Colo. (Denver), Doc. 77–0504, *Donald James Barday* v. *Detrex Chemical Industries, Inc.*

3,310,824, C. C. Beer, VEHICLE WASHER, **filed** June 6, 1977, D.C., W.D. Pa. (Pittsburgh), Doc. 77–661, *Sherman Industries, Inc.* v. *N/S Car Wash Enterprises, Inc.*

3,341,021, K. H. Casson, MAGNETIC SEPARATOR, **filed** Sept. 9, 1976, D.C., N.D. Ill. (Chicago), Doc. 76c3358, *Barnes Drill Co.* v. *Chemaperm Magnetics Inc.* Cause dismissed on stipulation, June 15, 1977.

3,343,264, N. F. Guichet, DENTAL ARTICULATOR AND METHOD OF USE; **3,350,782**, same, DENTAL APPARATUS AND METHOD, **filed** June 29, 1977, D.C., C.D. Calif. (Los Angeles), Doc. CV77–2408–RJK, *Niles F. Guichet and Denar Corp.* v. *U.S. Shizai Corp.*

3,344,933, Jelatis and Chesley, REMOTE CONTROL CRANE SYSTEM, **filed** Feb. 22, 1977, D.C. Iowa (Cedar Rapids), Doc. C–77–9, *Highway Equipment Company* v. *Dickey-John Corporation.* Defendant shall not hereafter make, use or sell structures coming within scope of one or more claims of said patent unless pursuant to license or other agreement with plaintiff, July 11, 1977.

3,350,782. (See 3,343,264.)

3,384,037, K. A. Blevins, SEWING-MACHINE TABLE, **filed** July 18, 1977, D.C., W.D. Wash. (Seattle), Doc. C77–528M, *Bascorp* v. *Northwest Sales & Manufacturing Corporation.*

3,398,745, Tjerneld and Hook, DEVICE FOR THE TAPPING OF URINE AND SIMILAR PURPOSES, **filed** July 15, 1977, United States Court of Claims (District of Columbia), Doc. 381–77, *Aktiebolaget Stille-Werner* v. *The United States.*

3,418,990, A. W. Lindell, IGNITION SYSTEM ISOLATION CIRCUIT FOR INTERNAL COMBUSTION ENGINES AND THE LIKE; **3,461,851**, J. B. Stephens, IGNITION SYSTEM AND MAGNETO THEREFOR; **Re. 28,392**, B. E. McMillen, MAGNETO IGNITION SYSTEM FOR INTERNAL COMBUSTION ENGINES AND THE LIKE, **filed** July 12, 1977, D.C., W.D. Wis. (Madison), 77–C–262, *AMBAC Industries, Incorporated* v. *Colt Industries, Inc.*

3,461,851. (See 3,418,990.)

3,514,074, R. E. Self, HIGH ENERGY LOSS FLUID CONTROL, **filed** July 18, 1977, D.C., C.D. Calif. (Los Angeles), Doc. CV77–2659–R, *Control Components, Inc.* v. *Sargent Industries, Inc.*

3,522,814, G. R. Olson, WASHER FOR PARTS AND THE LIKE, **filed** June 1, 1977, D.C. La. (New Orleans), Doc. 77–1721 (C.A.), *Safety-Kleen Corporation* v. *Tommy Breaux et al.*

3,528,660, R. C. Price, SAMPLE DISPLAY FIXTURE, **filed** June 19, 1975, D.C.N.J. (Newark), Doc. 75–1079, *Congoleum Industries, Inc.* v. *Raymond C. Price and Royal Engineering Company.*

3,583,596, C. T. Brewer, Ltd; **Re. 28,797**, same, **filed** July 7, 1977, D.C., N.D. Ill. (Chicago), Doc. 77c2441, *Solo Cup Corporation* v. *Sweetheart Cup Corporation.*

3,590,865, M. Bremshey, FLAT UMBRELLA, **filed** Jan. 11, 1977, D.C., N.D. Ga. (Atlanta), Doc. C77–47A, *Knirps Canada Ltd. and Knirps Canada Ltee* v. *Atlanta Umbrella Company, Inc.* Final judgment on consent, June 30, 1977.

3,649,401, D. B. Gunnerson, METHOD OF MAKING CONTINUOUS FIBERGLASS - FILAMENT OPEN WEAVE FRAMES AND STRUCTURES, **filed** June 6, 1977, D.C. Ariz. (Phoenix), Doc. 77–443–Phx WPC, *Dale B. Gunnerson and Geostrand Products, Inc.* v. *Craft Originals, Inc. and Arizona Commonwealth Corporation et al.*

3,667,449, B. D. Williams, WRIST WATCH ASSEMBLY, **filed** Apr. 23, 1976, D.C., N.D. Ala. (Birmingham), Doc. CA 76–L–0580–NE, *Bill D. Williams* v. *Service Merchandise Co. No. 24, Inc.* Order that said patent issued to Bill D. Williams is void because anticipated by the prior art or in the alternative, because its claimed invention was obvious to one skilled in the art of the design or manufacture of watch bands. This action is dismissed with prejudice, July 27, 1977.

3,672,187, E. C. Simpson, FABRIC, **filed** Apr. 18, 1975, D.C., S.D.N.Y., Doc. 75–C–1886, *Polylok Corporation* v. *Disto Textilwerk GmbH.* Consent decree, defendant is hereby enjoined from further infringement of said patent, and all claims and counterclaims are dismissed with prejudice, June 17, 1977.

3,723,273, H. P. Wilson, ELECTRODIALYTIC PRODUCTION OF STANNIC OXIDE SOL, **filed** July 11, 1977, D.C., W.D. Pa. (Pittsburgh), Doc. 77–813, *Pitt Metals & Chemicals Inc.* v. *Vulcan Materials Company.*

3,736,685, R. Shibata, ADHESIVE SHEET MATERIAL, **filed** July 29, 1977, D.C., S.D. Fla. (Miami), Doc. 77–2342–C–WMH, *Desmarais & Frere, Ltd. and Ryoji Shibata* v. *J. & M. Enterprises (U.S.A.), Inc. and Al Nyman & Son, Inc.*

3,743,561, Koontz, Heitkamp and Jackson, MANUFACTURE OF FIBER REINFORCED POLYMER ARTICLES, **filed** June 9, 1977, United States Court of Claims (District of Columbia), Doc. 326–77, *EFMC Corporation* v. *The United States of America.*

3,801,104, Potts and Word, BOARD GAME APPARATUS, **filed** July 27, 1977, D.C., E.D.N.Y. (Brooklyn), Doc. 77–C–1531, *Vantage Point, Inc.* v. *Parker Brothers, Inc. et al.*

3,874,258, Semola and Droesbeke, KEYED ATTACHMENT DEVICE FOR VEHICLE WHEELS, **filed** July 6, 1977, D.C., C.D. Calif. (Los Angeles), Doc. CV77–2489–RJK, *Stallion Enterprises, Inc.* v. *Kyoei American Corporation.*

3,923,176, Wynn and Butler, FIRST TABLE FOR A BALE WAGON, **filed** July 27, 1977, D.C., S.D.N.Y., Doc. 77–C–3600, *Hunter Wolfe* v. *Sperry Rand Corporation.*

3,929,019, C. L. Graversen, EXTENDED PITCH SAW CHAIN, **filed** Jan. 27, 1976, D.C. Oreg. (Portland), Doc. 76–87, *Omark Industries, Inc.* v. *Sabre Saw Chain (1963) Limited, Handyman Home Center, Inc. and G. I. Joes, Inc.* Stipulation for dismissal filed July 15, 1977.

3,958,294, D. E. Thompson, ROTARY SCRAPER, **filed** July 12, 1977, D.C. Conn. (Bridgeport), Doc. B–77–208, *Thompson Tool Co., Inc.* v. *Milton Rosembaum et al.*

3,962,125, D. Armstrong, MULTI-PURPOSE DILUENT FOR USE IN BLOOD ANALYSIS BY ELECTRONIC INSTRUMENTATION OF THE COULTER TYPE, **filed** June 1, 1977, D.C., N.D. Ill. (Chicago), Doc. 77c1941, *Coulter Electronics, Inc.* v. *J. T. Baker Chemical Corporation, Ipco Hospital Supply Corp. and Rupp & Bowman Company.*

3,968,985, Nielsen, Jr. and Morse, LOCKS FOR ELECTRIC METER BOXES, **filed** June 28, 1977, D.C. Mass. (Boston), Doc. 77–1892–M, *Omco, Inc.* v. *E. J. Brooks Co.*

3,994,415, A. M. Hodge, TRASH CONTAINER LID SYSTEM, **filed** June 17, 1977, D.C., C.D. Calif. (Los Angeles), Doc. CV77–2247–FW, *Balanced Lid Systems, Inc. and Allan Hodge* v. *Consolidated Fabricators Corp.*

4,015,299, R. Tinnel, WATER BED, **filed** July 22, 1977, D.C., N.D. Calif. (San Francisco), Doc. C–77–1585WAI, *Robert Tinnel and Ultimate Waterbed Co.* v. *Intimate Sleep Products and Gordon Weatherly & Associates.*

4,022,028, C. F. Martin, SUBMARINE PIPE TRENCHING APPARATUS, **filed** June 22, 1977, D.C., W.D. La. (Shreveport), Doc. 770670–L, *Charles F. Martin* v. *Norman Industries, Inc. and Robert M. Norman.*

4,037,476, J. McCrabb, GRAIN SAMPLING PROBE, **filed** July 28, 1977, D.C., S.D. Iowa (Des Moines), Doc. 77–223–2, *McCrabb Bros. Mfg. Inc.* v. *M.M.C. Enterprises, Inc. and Larry Martin.*

Re. 25,338, D. L. Olson, PRESSURE-OPERATED VALVE WITH MAGNETICALLY ACTUATED PILOT, **filed** May 12, 1977, D.C.N.J. (Newark), Doc. 77–0912, *Marotta Scientific Controls, Inc.* v. *Valcor Engineering Corp.* Plaintiff's notice of voluntary dismissal of action, May 16, 1977.

Re. 25,536, D. T. Thompson, APPARATUS FOR MAKING AN ANNULUS, **filed** June 18, 1976, D.C., N.D. Ohio (Cleveland), Doc. C 76–608, *Thompson Bagel Machine Manufacturing Corp.* v. *Amster Bagel Machine Co., Inc.* This action is dismissed with prejudice, June 6, 1977.

Re. 28,392. (See 3,418,990.)

Re. 28,797. (See 3,583,596.)

D. 227,352, Meng and Driessen, PACKAGE WITH STAGGERED PRODUCT SLICES, **filed** Mar. 16, 1976, D.C., E.D. Wis. (Milwaukee), Doc. 76–189, *L. D. Schreiber Cheese Company, Inc.* v. *Land-O-Lakes, Inc. and Palmer Manufacturing Corporation.*

D. 235,779, K. Barr, PHASING SIMULATOR FOR MUSICAL INSTRUMENT; **Reg. No. 996,083** (PHASE 90), MXR Innovations, **filed** Apr. 15, 1977, D.C. Colo. (Denver), Doc. 77–M–370, *MXR Innovations, Inc.* v. *Ross Musical Products, Inc., Gunilla M. Ross and I. B. and D. E. Lusty.* Defendant is permanently enjoined from infringing upon plaintiff's said design patent and trademark, entered June 7, 1977.

D. 244,161, I. Friedman, SEAT; **D. 244,329**, same, CHAIR, **filed** June 27, 1977, D.C., C.D. Calif. (Los Angeles), Doc. CV77–2369–MM, *Rowe Furniture Corp.* v. *Chairmakers, Inc. et al.*

D. 244,329. (See D. 244,161.)

Reg. No. 996,083. (See D. 235,779.)

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b)).

3,547,811 Re. S.N. 836,757, Filed Sept. 26, 1977, Cl. 210/7, CYCLIC OXYGENATION OF BOD-CONTAINING WATER, John R. McWhirter, Owner of Record: *Union Carbide Corporation, New York, N.Y.* Attorney or Agent: Harrie M. Humphreys, et al., Ex. Gp.: 176

3,547,812, Re. S.N. 836,740, Filed Sept. 26, 1977, Cl. 210/7, HIGH OXYGEN UTILIZATION IN BOD-CONTAINING WATER TREATMENT, John R. McWhirter, Owner of Record: *Union Carbide Corporation, New York, N.Y.* Attorney or Agent: Harrie M. Humphreys, et al., Ex. Gp.: 176

3,968,867, Re. S.N. 806,082, Filed Sept. 26, 1977, Cl. 197/1 R, INFORMATION TRANSMISSION DEVICE FOR POINT CONTACT ON AN INFORMATION CARRIER, Sven Gunnar Valter Stenudd, Owner of Record: *Inventor,* Attorney or Agent: Alfred E. Miller, Ex. Gp.: 337

PATENT NOTICES

Certificates of Correction for the Week of Nov. 29, 1977

P.P. 4,049	3,997,835	4,017,872	4,028,344	4,034,381	4,037,995	4,040,114	4,043,810
D. 242,614	3,999,715	4,018,781	4,028,345	4,034,481	4,037,999	4,040,308	4,043,812
D. 244,038	3,999,947	4,018,797	4,028,611	4,034,658	4,038,042	4,040,339	4,043,831
3,901,886	4,000,120	4,018,938	4,028,656	4,034,886	4,038,177	4,040,418	4,043,886
3,911,242	4,000,164	4,019,764	4,028,680	4,034,977	4,038,248	4,040,580	4,044,095
3,919,469	4,003,024	4,020,018	4,028,847	4,035,039	4,038,253	4,040,610	4,044,403
3,926,685	4,003,434	4,020,056	4,029,165	4,035,124	4,038,261	4,040,648	4,044,438
3,927,091	4,004,552	4,020,359	4,029,872	4,035,281	4,038,397	4,040,797	4,044,462
3,935,621	4,004,648	4,020,632	4,029,874	4,035,407	4,038,413	4,040,819	4,044,496
3,938,228	4,006,864	4,021,311	4,029,995	4,035,420	4,038,447	4,040,858	4,044,575
3,938,354	4,006,868	4,021,412	4,030,352	4,035,659	4,038,530	4,040,888	4,044,811
3,939,286	4,008,143	4,021,434	4,030,438	4,035,720	4,038,540	4,040,902	4,044,877
3,939,959	4,008,318	4,021,826	4,030,546	4,035,864	4,038,762	4,041,122	4,044,941
3,949,291	4,008,323	4,022,209	4,030,579	4,036,072	4,038,781	4,041,669	4,044,945
3,961,044	4,008,372	4,022,481	4,030,583	4,036,522	4,038,810	4,042,104	4,045,015
3,972,776	4,009,126	4,022,569	4,031,285	4,036,579	4,038,871	4,042,116	4,045,025
3,981,131	4,009,852	4,022,711	4,031,744	4,036,620	4,038,949	4,042,197	4,045,191
3,984,926	4,011,181	4,022,809	4,032,015	4,036,633	4,039,017	4,042,354	4,045,341
3,988,353	4,011,196	4,023,276	4,032,073	4,036,808	4,039,026	4,042,401	4,045,415
3,988,748	4,011,491	4,023,462	4,032,432	4,036,874	4,039,350	4,042,459	4,045,507
3,989,216	4,011,637	4,024,038	4,032,914	4,037,289	4,039,394	4,042,680	4,045,513
3,989,580	4,012,431	4,024,150	4,033,678	4,037,313	4,039,417	4,042,694	4,045,527
3,989,825	4,012,617	4,024,470	4,033,808	4,037,365	4,039,509	4,042,708	4,045,912
3,990,240	4,013,787	4,025,545	4,033,923	4,037,367	4,039,538	4,042,773	
3,991,775	4,016,174	4,025,664	4,033,933	4,037,372	4,039,545	4,043,378	
3,992,760	4,016,435	4,027,722	4,033,959	4,037,583	4,039,691	4,043,614	
3,995,755	4,017,457	4,028,214	4,034,082	4,037,736	4,039,862	4,043,706	
3,995,973	4,017,469	4,028,330	4,034,238	4,037,829	4,039,906	4,043,738	

Disclaimers

3,430,365.—*John F. Dee, Jr.,* Notre Dame, Ind. LOW CUT SPORTS SHOE. Patent dated Mar. 4, 1969. Disclaimer filed Sept. 19, 1977, by the inventor.

Hereby enters this disclaimer to claims 2, 3 and 4 of said patent.

3,637,145.—*Robert M. Williams,* Ladue, Mo. REVERSIBLE MATERIAL REDUCING MILL. Patent dated Jan. 25, 1971. Disclaimer filed Sept. 19, 1977, by the assignee, *Williams Patent Crusher and Pulverizer Co., Inc.*

Hereby enters this disclaimer to all claims of said patent.

3,725,093.—*Richard D. Sanner,* Sylvania, Ohio. HIGH LEAD CONTENT GLASS COMPOSITION FOR TELEVISION NECK TUBES. Patent dated Apr. 3, 1973. Disclaimer filed Sept. 22, 1977, by the assignee, *Owens-Illinois, Inc.*

Hereby enters this disclaimer to claims 1 through 8 of said patent.

3,840,926.—*Helmut Stoeberl,* Eggstaett-Bachham, Germany. BOAT HULL. Patent dated Oct. 15, 1974. Disclaimer filed Oct. 5, 1977, by the assignee, *Klepper-Werke Kommanditgesellschaft.*

Hereby enters this disclaimer to claims 1, 5, 12 and 13 of said patent.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner
WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF OCTOBER 8, 1977

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	6-22-76
GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	1-3-77
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	2-1-77
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	10-22-76
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	10-27-76
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales.	8-18-76
SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	6-15-76
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	1-7-77
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating.	10-12-76
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	7-9-76
DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts.	3-24-76
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—D. J. STOCKING, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	9-1-76
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus: Plastics Working Apparatus; Plastic Block and Earthenware Apparatus: Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks.	3-17-77
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—G. M. FORLENZA, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	11-1-76
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GAY, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication.	11-1-76
GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors: Miscellaneous Hardware; Locks; Building Structures: Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines.	2-3-77

Expiration of patents: The patents within the range of numbers indicated below expire during October 1977, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

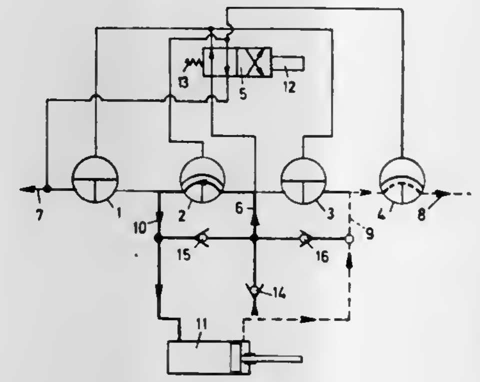
Patents .... Numbers 2,954,560 to 2,958,080, inclusive
Plant Patents .... Numbers 1,974 to 1,977, inclusive

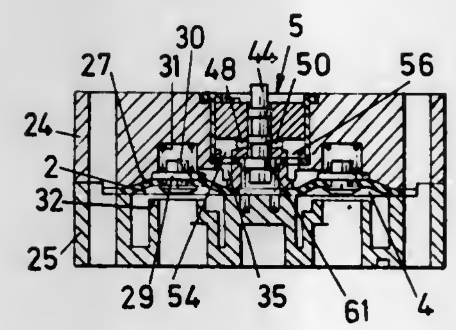
REISSUES

NOVEMBER 29, 1977

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 29,481
MULTI-WAY DIRECTIONAL FLUID FLOW CONTROL VALVE ARRANGEMENT
Donald Alexander Larner, Kingston-upon-Thames, England, assignor to Fluid Devices, Ltd.
Original No. 3,760,843, dated Sept. 25, 1973, Ser. No. 222,569, Feb. 1, 1972. Application for reissue Jan. 15, 1976, Ser. No. 649,416
Claims priority, application United Kingdom, Feb. 1, 1971, 3646/71
Int. Cl.² F15B *13/043*
U.S. Cl. 137—596.15 **18 Claims**





23. A multi-way directional fluid flow control valve assembly for the directional control of a fluid power actuator which comprises:

a first molded housing formed with a pilot valve cavity and with four cavities, each cavity constituting a first diaphragm valve portion, said housing having an end wall defining said diaphragm valve cavity and including a plurality of orifices formed therein, said orifices including a supply orifice, an exhaust orifice and control diaphragm valve orifice in fluid flow communication with said first diaphragm valve portion;

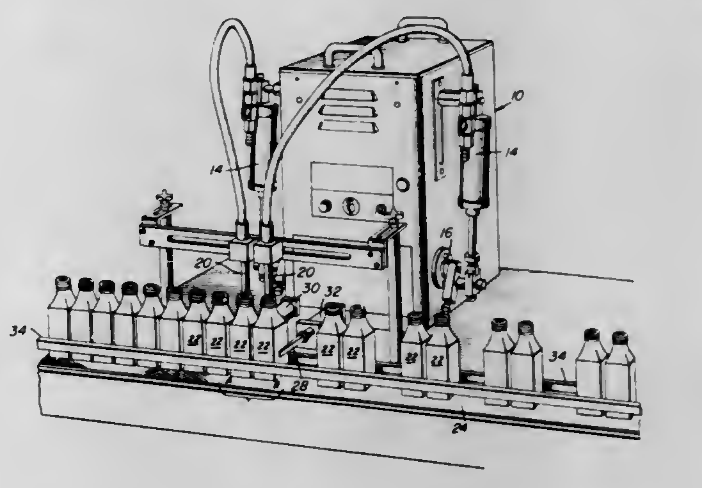
a second molded housing formed with four cavities, each cavity constituting a second diaphragm valve portion, said housing being formed with fluid supply conduit means in fluid communication with two of said second diaphragm valve portions, said housing being formed with fluid exhaust conduit means in fluid communication with the remaining two of said second diaphragm valve portions, said housing being formed with fluid control conduit means in fluid communication with said fluid supply conduit means and said fluid exhaust conduit means;

valve seating means positioned between said first diaphragm valve portion and said second diaphragm valve portion thereby forming a diaphragm valve;

a pressure balanced spool-type valve disposed in said pilot valve cavity of said first molded housing and comprised of a spool of hard metal and a sleeve of hard metal, said spool being formed with a supply conduit means, an exhaust conduit means, and a plurality of conduit means in fluid flow communication with said diaphragm valve control orifices, said conduit means being in alignment with the respective orifices formed in said end wall of said first housing; and

means for mounting said first housing to said second housing.

Re. 29,482
CONTAINER FILLING SYSTEM
Sidney Rosen, 4119-27 Fordleigh Road, Baltimore, Md. 21215
Original No. 3,237,661, dated Mar. 1, 1966, Ser. No. 333,026, Dec. 24, 1963. Application for reissue Jan. 21, 1974, Ser. No. 434,884
Int. Cl.² B65B *43/42;* **B67C** *3/00*
U.S. Cl. 141—160 **25 Claims**



1. A system for filling a plurality of containers with fluid, comprising, structure including a pair of spaced movable members defining a filling area, continuously operating means sequentially passing said containers into and out of said filling area, pump means delivering a predetermined amount of said fluid to said containers while within said filling area, first and second means responsive to the operation of said pump means to automatically control the respective movement of each of said movable members, one of said movable members retaining a portion of said containers within said filling area to be filled by said pump means while the other of said movable members separates said portion of said containers from the remainder thereof, said one movable member releasing said portion of said containers when filled and then returning to the retaining position, said other of said movable members releasing said remainder of said containers to permit another portion thereof to pass into said filling area and then returning to the retaining position to separate said another portion of containers from the remaining containers.

Re. 29,483
RECLINING CHAIR
Frank Manuel Ré, Holyoke, Mass., assignor to Dual Manufacturing and Engineering, Incorporated, Holyoke, Mass.
Original No. 3,874,724, dated Apr. 1, 1975, Ser. No. 307,176, Nov. 16, 1972. Division of Ser. No. 222,563, Feb. 1, 1972, Pat. No. 3,758,151, which was reissued as Ser. No. 435,461, Jan. 22, 1974, Pat. No. Re. 28,210. Application for reissue Feb. 28, 1977, Ser. No. 773,054
The portion of the term of this patent subsequent to Oct. 22, 1991, has been disclaimed.
Int. Cl.² A47C *1/02*
U.S. Cl. 297—88 **5 Claims**

1. A reclining chair adapted to be positioned in close adjacency to and forwardly of a room wall when in the upright sitting position and yet so structured as to allow ready assumption of a reclined position without physical contact with the same room wall, the reclining chair comprising:

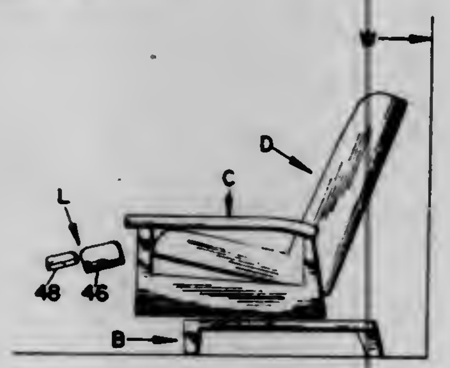
a base, a chassis supported relative to the base,

a body-supporting unit including a seat and a back having a pivotal relationship as to each other,

a leg-supporting unit, mounting means for mounting the body-supporting unit relative to the chassis in movements between upright and reclining positions,

means for mounting the chassis relative to the base in linear movements relative to the base as the body-supporting unit is concomitantly moved,

means for mounting the leg-supporting unit relative to the body-supporting unit in movements between retracted and extended positions as the body-supporting unit is concomitantly moved,



control means for controlling the pivotal motion of the back relative to the seat as the body-supporting unit is concomitantly moved,

and means operatively connecting the body-supporting unit and base for moving the chassis forwardly and progressively away from the wall and the body-supporting unit relative to the wall as transition is made from upright sitting position toward a position of reclination and for moving the chassis rearwardly and progressively toward the wall and the body-supporting unit relative to the wall as transition is made from a position of reclination toward upright sitting position.

Re. 29,484

BARIUM TITANATE BASE CERAMIC COMPOSITION HAVING A HIGH DIELECTRIC CONSTANT

Kazuaki Utsumi; Norio Tsubouchi, and Tomeji Ohno, all of Tokyo, Japan, assignors to Nippon Electric Company, Limited, Tokyo, Japan

Original No. 3,912,527, dated Oct. 14, 1975, Ser. No. 453,998, Mar. 22, 1974. Application for reissue Oct. 4, 1976, Ser. No. 729,290

Claims priority, application Japan, Mar. 24, 1973, 49-33896; May 9, 1973, 48-51996; Feb. 20, 1974, 49-20303; Feb. 22, 1974, 49-21225

Int. Cl.² C04B *35/46;* **H01B** *1/08*

U.S. Cl. 106—73.32 **8 Claims**

1. A dielectric ceramic composition having a high dielectric constant, consisting of 77.5 to 99.79 mol % of $BaTiO_3$ 0.1 to 10 mol % of at least one of Nb_2O_5 and Ta_2O_5, and about 0.01 to 15 mol % of at least one of the compounds In_2O_3, Ga_2O_3, and Tl_2O_3.

Re. 29,485

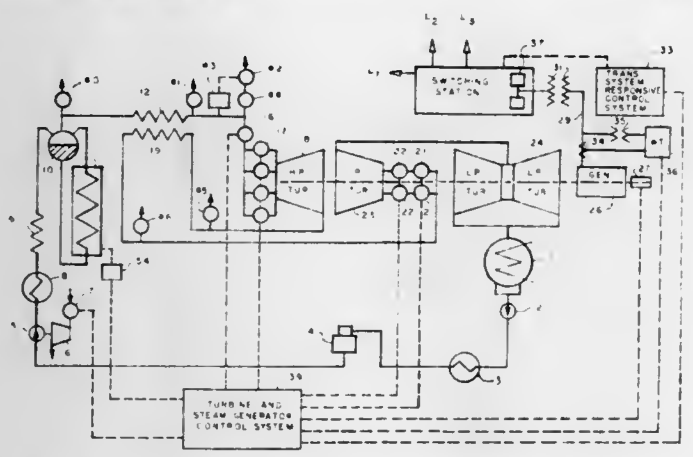
METHOD OF EFFECTING FAST TURBINE VALVING FOR IMPROVEMENT OF POWER SYSTEM STABILITY

Robert H. Park, Main St., Brewster, Mass. 02631

Original No. 3,848,138, dated Nov. 12, 1974, Ser. No. 388,619, Aug. 15, 1973. Continuation-in-part of Ser. No. 244,594, April 17, 1972. Application for reissue Nov. 10, 1975, Ser. No. 630,724

Int. Cl.² F01K *13/02*

U.S. Cl. 290—40 R **17 Claims**



1. In a steam-electric installation which incorporates *an alternating current type generator driven by a compound type steam turbine incorporating control valves ahead of the high pressure turbine, and intercept valves ahead of the turbine or turbines that receive steam from the discharge of the high pressure turbine, which installation also incorporates a fossil fuel type steam generator equipped with* a reheater, *and also one or more* power operated relief valves located ahead of the high pressure turbine, which are so controlled as to open and discharge steam to atmosphere when pressure ahead of the valve or valves exceeds a preset value that is less than that at which the turbine's high pressure safety valves are set to open, and to reclose when pressure falls below a preset value which exceeds normal operating pressure ahead of the turbine, *the generator of* which installation [is part of] *makes connection to* a power system which includes a plurality of prime mover driven generators, which generators are interconnected by a plurality of *alternating current* transmission circuits, the method of employing fast [turbine] valving as a way to avoid development of system instability [as a consequence of stability endangering events of a type adapted to cause the generator of the said installation to experience a sudden at least momentary reduction of load,] which comprises the steps of,

1. providing within the turbine and steam generator control system, for response to a fast valving initiation signal input by bringing into effect preprogrammed jointly effected processes of,
   a. *at least partial* intercept valve closure effected fast enough to have a favorable effect on generator rotor first swing stability, and control valve repositioning plus intercept valve reopening so effected as to cause turbine driving power subsequent to generator rotor first forward swing to hold below a preset value that is less than the driving power that applied prior to the event that brought about development of the signal,
   b. runback of rate of steam production within the steam generator to a value that will cause termination of [the] *whatever* discharge of steam through said power operated relief valves [that will] *may* at first take place, with provision so that said runback is effected rapidly enough *and is otherwise so executed as* to avoid overheating of the reheater,
2. providing in a preprogrammed manner so that [a fast valving signal is generated and transmitted as an input to the turbine and steam generator control system on the occurrence of certain types of events that endanger preservation of system stability.]
   a. a fast valving signal is generated on the occurrence of system stability endangering events of a type that cause the said generator to experience a sudden at least momentary reduction of load,
   b. the said fast valving signal is made available as an input to that portion of the turbine's control system that is adapted to bring into effect the said preprogrammed processes.

PLANT PATENTS

GRANTED NOVEMBER 29, 1977

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

4,158

MINIATURE ROSE PLANT

Ralph S. Moore, 2519 E. Noble Ave., Visalia, Calif. 93277

Filed Nov. 1, 1976, Ser. No. 737,410

Int. Cl.² A01H *5/00*

U.S. Cl. Plt.—9 **1 Claim**

1. A new and distinct variety of miniature rose plant of hardy, dwarf, bushy, rounded, much branched habit, essentially as illustrated and described, characterized by buds and flowers of a light to medium pink color resembling the June Time miniature rose (U.S. Plant Pat. No. 2,563) — and resembling the Cinderella miniature rose (U.S. Plant Pat. No. 1,051 — expired) in size and form of bud and flower; and further characterized by a plant which is vigorous and compact, said plant being easy to propagate from cuttings, with small, disease resistant, semi-glossy leaves, an abundance of bloom, making this variety useful as a potted plant, with flowers borne usually several to the stem in loose clusters.

4,159

APPLE TREE

William E. Silvers, Zillah, Wash., assignor to Claud Callahan and Marjorie McCormick, both of Yakima, Wash.

Filed Nov. 15, 1976, Ser. No. 742,529

Int. Cl.² A01H *5/03*

U.S. Cl. Plt.—35 **1 Claim**

1. A new and distinct variety of Apple tree, substantially as herein shown and described, characterized particularly as to novelty by the unique combination of a more dwarf tree with many fruit spurs and larger, deeper green color, heavier and tougher leaves than the variety "Hi Early Delicious", bright cherry red striped early color with exceptionally long fruit, the date of maturity and ability to harvest two weeks ahead of the Hi Early parent variety, the coloring beginning with red striping finishing into solid red 3 weeks ahead of its recommended harvest season, very juicy extra firm fruit with greater sugar test percentage than the Hi Early parent variety, and the ability to keep fruit for much longer periods of time than other varieties, together with its disease resistance.

4,160

MINIATURE ROSE PLANT

Ralph S. Moore, 2519 E. Noble Ave., Visalia, Calif. 93277

Filed Jan. 24, 1977, Ser. No. 762,029

Int. Cl.² A01H *5/00*

U.S. Cl. Plt.—9 **1 Claim**

1. A new and distinct variety of miniature rose plant of hardy, dwarf, bushy, upright, much branched habit, essentially as illustrated and described, characterized by buds and flowers of a coral pink to light red color resembling the Persian Princess miniature rose (U.S. Plant Pat. No. 3,181) but often being somewhat more pink in the bud and opening stages, then becoming more red in the maturing and final stages (especially when grown outdoors), the form and size of bud and flower also being similar to Persian Princess; and further characterized by a plant which is vigorous and relatively compact, said plant being easy to propagate from cuttings, with small, disease resistant, glossy foliage, an abundance of bloom with excellent keeping quality, with flowers borne singly or several to the stem in loose clusters.

PATENTS

GRANTED NOVEMBER 29, 1977

ERRATA

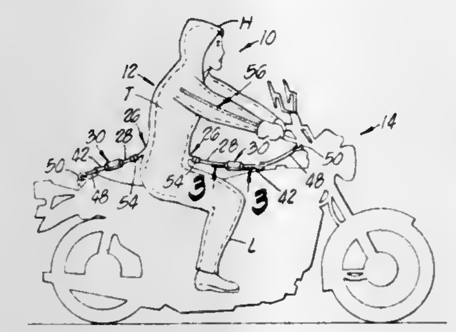
For CLASS	See PATENT NO.
029–403	4,059,896
029–432.1	4,059,897
029–598	4,059,898
280–106 T	4,060,145
366–179	4,060,223
366–169	4,060,224
366–040	4,060,225
366–075	4,060,226
062–162	4,060,400
252–008.8	4,060,505
560–208	4,060,545
428–195	4,060,643
424–329	4,060,652
560–222	4,060,681
219–219	4,060,712
364–416	4,060,713
364–431	4,060,714
364–557	4,060,715
364–576	4,060,716
364–497	4,060,717
364–421	4,060,718
364–729	4,060,719
235–309	4,060,720
362–013	4,060,721
362–032	4,060,722
362–205	4,060,723
362–032	4,060,724
363–057	4,060,757
364–900	4,060,794
364–900	4,060,795
365–183	4,060,796
365–025	4,060,798
346–001	4,060,804

PATENTS

GRANTED NOVEMBER 29, 1977

GENERAL AND MECHANICAL

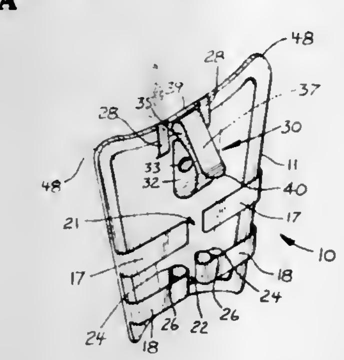
4,059,852
INFLATABLE SUIT FOR CYCLISTS
Stanley J. Crane, 1771 N. Vermont Ave., Los Angeles, Calif. 90027
Filed May 24, 1976, Ser. No. 689,244
Int. Cl.² B60R *21/00;* **A41D** *13/00*
U.S. Cl. 2—2 **5 Claims**



1. A protective garment for minimizing impact-caused injury to the body of a vehicle rider, the combination of:

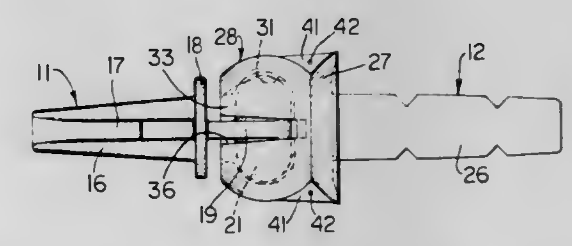
a. a suit adapted to be worn by said vehicle rider including an inflatable means which, when inflated will provide impact protection to the vehicle rider;
b. inlet means for introducing gas into said inflatable means;
c. a source of gas under pressure connected to said inlet means;
d. detachable means connected to said source of gas under pressure and to said vehicle, said detachable means including means for permitting separation of said source of gas from said vehicle upon movement of said vehicle rider relative to said vehicle, said source of gas under pressure remaining connected to said inlet means after separation of said source of gas from said vehicle has occurred; and
e. means whereby said valve is opened by said detachable means.

4,059,853
TIE CLASP
George W. Girdler, Fort Lauderdale, Fla., assignor to Jack Steinberg, Hialeah, Fla., a part interest
Continuation-in-part of Ser. No. 666,962, March 16, 1976, Pat. No. 4,024,585, which is a continuation-in-part of Ser. No. 613,172, Sept. 15, 1975, Pat. No. 3,958,277. This application Jan. 12, 1977, Ser. No. 758,717
Int. Cl.² A41D *25/08*
U.S. Cl. 2—152 A **9 Claims**



1. A tie clasp for supporting neckwear comprising a plate adapted to be positioned on the front of a shirt collar; hook means mounted on the back of said plate for suspending said plate from the shirt collar; and neckwear receiving means positioned on the back of said plate below said hook means with said neckwear receiving means including upper and lower generally parallel bars each segmented to define a central slot through which neckwear may be passed in suspending the neck wear from the receiving means bars with the neckwear ends draped in mutually lateral or overlaid positions, respectively, and wherein at least one of said bars has a pair of inwardly directed neckwear retaining tabs straddling said one bar central slot; and wherein said neckwear retaining tabs are generally cylindrical thereby presenting convex surfaces facing said one bar central slot over which neckwear may be smoothly passed through the slot.

4,059,854
RIBBED FINGER JOINT IMPLANT
George R. Laure, Kalamazoo, Mich., assignor to Laure Prosthetics, Inc., Portage, Mich.
Filed Jan. 3, 1977, Ser. No. 756,240
Int. Cl.² A61F *1/24*
U.S. Cl. 3—1.91 **2 Claims**



1. In an implantable-type endoprosthesis for a digital joint, the endoprosthesis including a protuberant headed member provided with a stem portion at one end thereof for affixing said member in a bone and a protuberant head portion at the other end thereof, and a socketed member provided with a stem portion at one end thereof for fixing said member in a bone and a socket portion at the other end thereof which defines an interior socket cavity in which the protuberant head portion is removably retained and swingably supported, said socket portion including a socket part having a generally spheroid external configuration, said socket portion also including an annular guard flange fixedly connected to the rearward side of said socket part so as to be interposed between said socket part and the respective stem portion, said guard flange and said socket part having opposed external surfaces which diverge away from one another, comprising the improvement wherein said socket portion has means fixedly associated therewith and disposed exteriorly thereof for permitting the ligaments, muscles or tendons to be fixedly tied thereto, said means defining a pair of ribs which are integral with said socket portion and extend between the diverging external surfaces of said socket part and said guard flange, said ribs extending in a direction approximately parallel to the elongated direction of the respective stem portion and being disposed in wide circumferentially spaced relationship with respect to the socket part so as to be positioned on opposite sides of the joint when implanted in a digit, said ribs having opening means extending therethrough for permitting suturing of the tendons, ligaments or muscles thereto, and said ribs being dimensioned so as to not project outwardly beyond the outer dimensional limits defined by either said guard flange or said socket part so as to not interfere with the implanting of the joint in a digit.

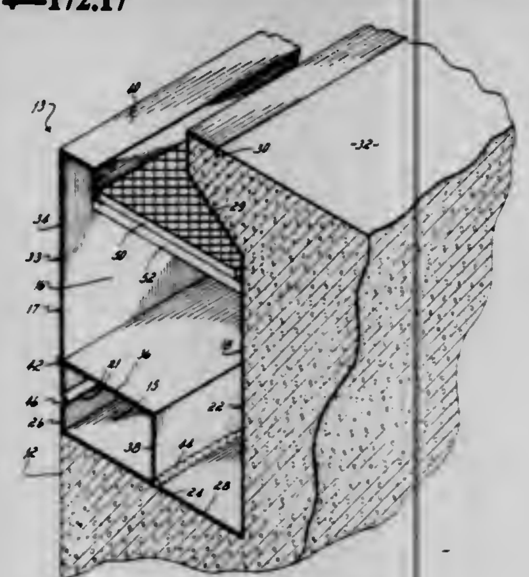
4,059,855
RETRACTABLE COVER FOR GROUND OPENING
Carmel Riendeau, 25, boul. des Haut-Bois, Ste-Julie, Quebec, Canada
Filed Nov. 8, 1976, Ser. No. 739,970
Int. Cl.² E04H *3/16, 3/18;* **F16L** *22/02*
U.S. Cl. 4—172.14 **17 Claims**

1. A retractable cover mechanism for covering an open area, said mechanism comprising a pair of parallel channels secured on a respective opposed side of an open area to be covered, a

plurality of displaceable intermediate cylinders in each of said channels between displaceable end cylinders, said intermediate cylinders and said end cylinder at a first common end of both said channels being water conducting, said end cylinders at a second common end of both said channels having solid end walls which are non-water conducting, first extensible conduit means secured between facing ends of adjacent ones of said intermediate and end cylinders, attachment means secured to at least some of said cylinders and to a cover sheet to displace-

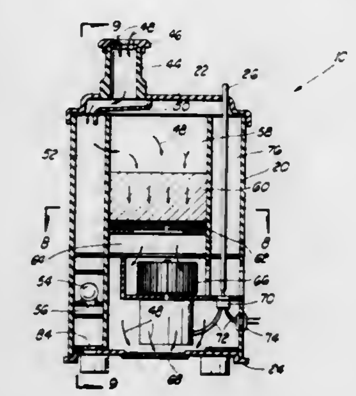
ably support said cover sheet between said pair of parallel channels, first and second conduit means connectable to a source of water pressure, second extensible conduit means secured between outer end walls of said end cylinders and an associated one of said first and second conduit means whereby said source of water pressure is applicable against said outer end walls of one of said end cylinders at a common end of each of said channels, and valve means to evacuate said first and second conduit means.

4,059,856
SWIMMING POOL GUTTER
James A. Patterson, P.O. Box 2894, Columbus, Ohio 43204
Filed June 1, 1976, Ser. No. 691,446
Int. Cl.² E04H *3/16, 3/18;* **F16L** *22/02*
U.S. Cl. 4—172.17 **9 Claims**



1. A gutter for swimming pool comprising, in combination,
a first sheet metal member including a vertical back wall, a horizontal bottom wall, a vertical inside wall; and
a second sheet metal member including a vertical wall in spaced relation to said back wall and a horizontal wall spaced substantially below the top of said vertical wall of said second member defining with said first member a gutter conduit, over the top of said vertical wall of said second member water may flow from the pool into said gutter conduit;
said vertical wall of said second member being joined to said vertical inside wall of said first member by a continuous, longitudinal weld exposed at the pool side thereof to form the inside wall of said gutter;
said horizontal wall of said second member being joined to said first member by a second continuous, longitudinal weld exposed at the gutter conduit side thereof to form at the bottom of said gutter conduit substantially below the top of said vertical wall of said second member a sealed inlet conduit adapted to receive filtered water under pressure for introduction into the pool, said vertical inside wall of said first member forming the inside wall of said inlet conduit.

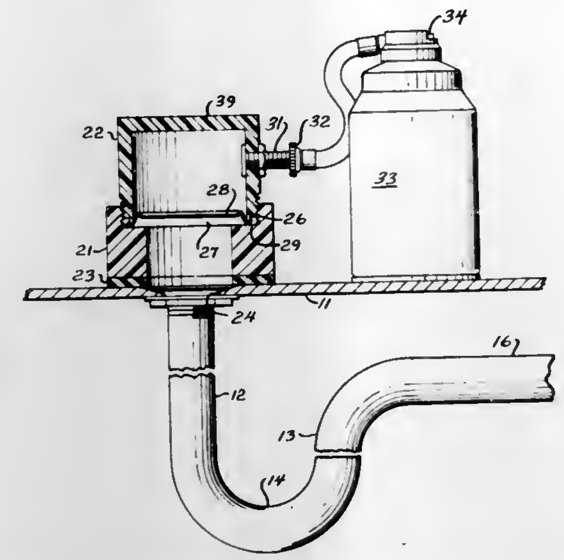
4,059,857
FREE STANDING TOILET STOOL VENTILATING DEVICE
Clarence E. Poister, 2934 Lydia, Apt. 103, Topeka, Kans. 66614
Filed Dec. 20, 1976, Ser. No. 752,470
Int. Cl.² A47K *3/22;* **E03D** *9/04, 13/00*
U.S. Cl. 4—213 **9 Claims**



1. A free standing toilet stool ventilating device for placing adjacent a toilet and ventilating fumes therefrom, the device comprising:
a housing having an air intake port disposed in the top thereof and an air discharge port disposed in the bottom thereof;
a hollow air inlet arm having one end disposable between the top of the toilet bowl and the bottom of the toilet seat, the other end of said air inlet arm pivotally attached to the air intake port of said housing;
an electric blower mounted in said housing for drawing air from the air intake port and discharging it through the air discharge port;
a filter mounted in said housing and positioned above the blower for filtering the intake air; and
water overflow means mounted in said housing for receiving an overflow of water from the toilet through the air intake port and discharging the water out a water discharge port, thereby preventing the water from contacting said filter and said electric blower.

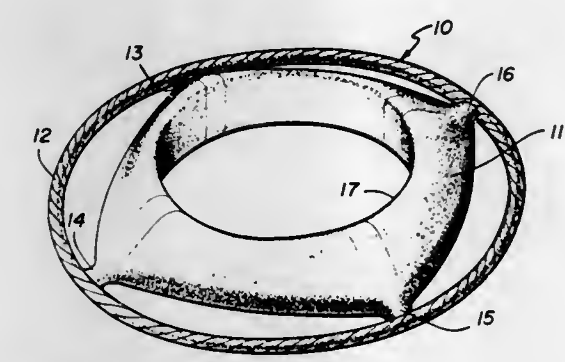
4,059,858
DRAIN CLEANER PROVIDING SUDDEN BLAST OF GAS
Reinhold Lambel, 517 E. Algonquin Road, Arlington Heights, Ill. 60005, and Steven Maynard, 716 Webley Court, Schaumburg, Ill. 60671
Filed Nov. 26, 1975, Ser. No. 635,344
Int. Cl.² B08B *9/02, 5/00*
U.S. Cl. 4—255 **2 Claims**

1. Apparatus for clearing clogged drains including a sealing ring for sealing around the drain opening, a pressure chamber arranged for delivering through said seal ring and opening a sudden burst of fluid under gas pressure; a rupturable diaphragm initially sealing the pressure chamber from said ring but constructed to open suddenly for copious flow in response to a high pressure in the pressure chamber, and means for supplying gas under pressure to the pressure chamber to raise the pressure therein until said high pressure is reached; in which the diaphragm is constructed with a scoredemarked tongue, the scoring leaving a web which retains



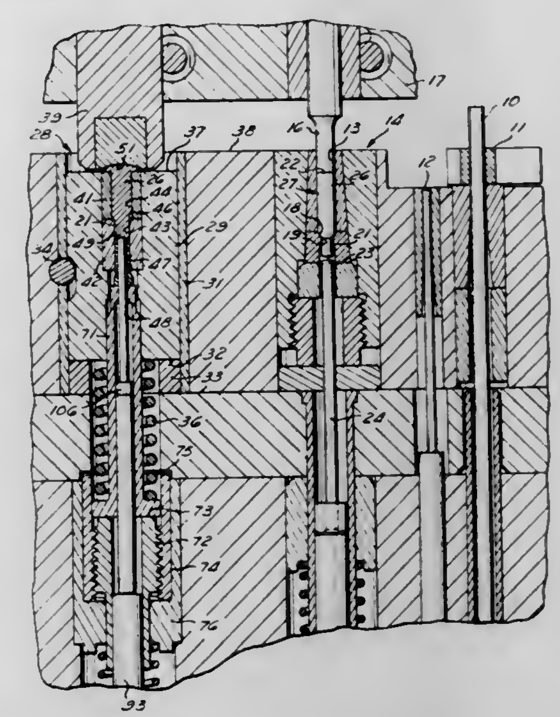
connection of the tongue to the diaphragm when rupture separates other tongue edges.

4,059,859
LIFE RING
Evan B. Hull, 49 Pleasant St., Northboro, Mass. 01532
Filed May 21, 1976, Ser. No. 688,737
Int. Cl.² B63C *9/08*
U.S. Cl. 9—340 **6 Claims**



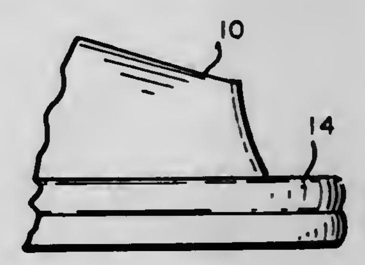
1. Life ring, comprising:
a. main body of ring-like configuration with a cross-section in the shape of a closed plane figure, formed of flotation material, and having a circular central aperture, the outer periphery of the main body being in the shape of a multi-sided figure having corners in which the sides are of equal length, each of the sides being in the form of the arc of a circle whose radius of curvature is substantially larger than the radius of the aperture, the cross-sectional shape of the main body being generally triangular with rounded corners, one side defining a bottom plane surface, a second side defining a central aperture in the main body, the said bottom plane surface being perpendicular to the axis of the central aperture,
b. a circular rigid secondary ring located externally of the main body and generally in the said bottom plane surface, and
c. means joining the outer periphery of the main body to the secondary ring at the said corners.

4,059,860
APPARATUS FOR MAKING SHOULDERED TUBULAR RIVETS
Paul A. Fick, Fremont, Ohio, assignor to The National Machinery Company, Tiffin, Ohio
Division of Ser. No. 519,925, Nov. 1, 1974, Pat. No. 3,978,538. This application June 11, 1976, Ser. No. 695,089
Int. Cl.² B21K *1/60*
U.S. Cl. 10—11 R **3 Claims**



1. An apparatus for forming shouldered tubular rivets comprising cooperating first tool and die means operable in a first operation to trap extrude a blank to form an extruded inner end portion of reduced diameter and to square the outer end of the blank, said cooperating first tool and die means being structured to accommodate variations in the volume of the blank at the inner end thereof, cooperating second tool and die means operable in a second operation to square said inner end of said blank and confine a predetermined volume extending from said inner end thereof required to form all but the head of the rivet and to upset a head from the unconfined portion, variations in the volume of said blank appearing as variations in the head of said rivet, and third cooperating tool and die means operable in a third operation to forward extrude a tubular skirt on the inner end of said blank.

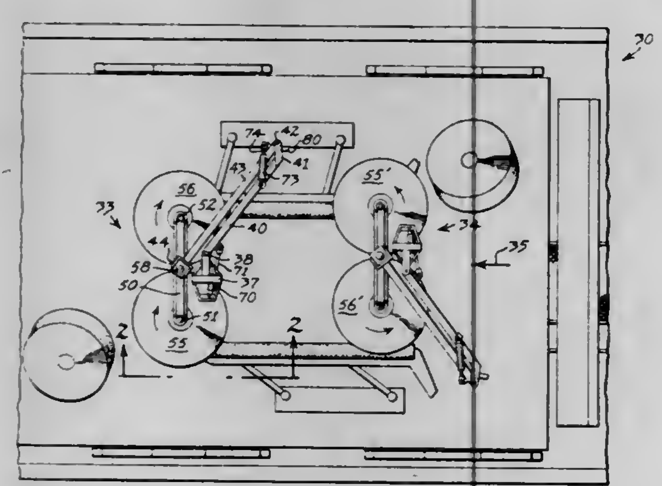
4,059,861
WET LATEX LASTING SYSTEM
John J. Santos, Jr., N. Attleboro, and Joseph V. Tassone, Milford, both of Mass., assignors to Compo Industries, Inc., Waltham, Mass.
Filed June 1, 1976, Ser. No. 691,548
Int. Cl.² A43D *21/00*
U.S. Cl. 12—145 **4 Claims**



1. The method of lasting a cover strip to the insole at the bottom of a shoe upper provided with a sock lining turned down at the edge of the insole and stitched to the lower edge of the upper and the upper folded edge of the cover strip, and wherein said insole is fiberboard material, comprising lasting the unattached portion of the cover strip about the edge of the

insole onto the bottom with latex applied to the cover strip in a uniformly thick, partially coagulated adhesive condition, characterized in that a uniformly thick prime coating of compatible rubber adhesive dissolved in a hydrocarbon solvent is applied to the marginal edge of the insole and allowed to dry prior to lasting the cover strip thereto.

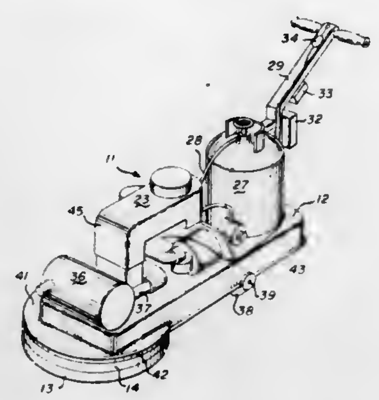
4,059,862
DOUBLE WRAPAROUND BRUSH ASSEMBLY FOR VEHICLE WASHING APPARATUS
Shirley B. Ashton, Lavergne, Tenn., assignor to The Smith Company, Brentwood, Tenn.
Filed June 18, 1976, Ser. No. 697,536
Int. Cl.² B60S *3/06*
U.S. Cl. 15—53 AB **3 Claims**



1. In a vehical washing apparatus including a frame having a longitudinal axis coinciding with the path of movement of the vehicle through the apparatus, a double wraparound brush assembly comprising:

a. a control arm having first and second ends,
b. mounting means pivotally supporting said first end upon said frame for pivotal movement of said control arm about a first vertical axis,
c. a brush arm having first and second ends,
d. means connecting the first end of said brush arm to the second end of said control arm for relative, pivotal movement about a second vertical axis,
e. a brush beam having opposite ends,
f. means journalling the middle portion of said brush beam to the second end of said brush arm for free rotary movement about a third vertical axis,
g. rotary brush means journaled at each end of said brush beam for rotary movement about vertical brush axes,
h. means for driving said brush means,
i. biasing means constantly urging said brush arm toward said control arm, said biasing means yielding to the pressure exerted between the vehicle moving along said path against said brush means to force said brush means to move from the front of said vehicle along the side of said vehicle,
j. positioning means to position said control arm at a substantially outboard position while said brush means is in front of, and engaging the side of, said vehicle,
k. means for swinging said control arm to a substantially longitudinal inboard position causing said brush means to swing across the rear surface of said vehicle as the vehicle moves forward along said path, and
l. a rotary position sensor adapted to be actuated by the change in rotary movement between said brush beam and said brush arm as said brush means moves from the front of the vehicle, moving forward along said path, to a position engaging the side of said forward-moving vehicle, said rotary position sensor being operatively connected to said means for swinging said control arm, so that actuation of said sensor causes said control arm to swing toward its inboard longitudinal position.

4,059,863
COMBUSTION ENGINE POWERED FLOOR BUFFER
Robert C. Deuchar, 3401 Hoover St., Redwood City, Calif. 94063, and Gene J. Waitzman, 1055 Avondale St., San Jose, Calif. 95129
Filed May 7, 1975, Ser. No. 575,343
Int. Cl.² A47L *11/162*
U.S. Cl. 15—98 **10 Claims**

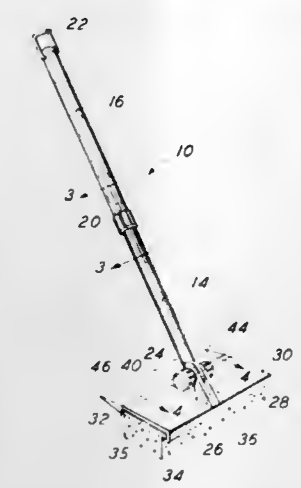


1. In a combustion engine powered floor buffer:
floor buffer chassis means for supportively receiving the operative elements of the floor buffer;
buffer pad driver means for rotationally driving a buffer pad to be coupled thereto, said buffer pad driver means being rotationally coupled to said floor buffer chassis means;
an air cooled internal combustion engine means for supplying the rotational driving power to said buffer pad driver means;
means for coupling said combustion engine means in heat exchanging relation with said chassis means for heat sinking said engine so as to provide substantial thermal conduction cooling of said combustion engine means to said chassis means and thence to the surrounds of said chassis means, in use; and
wherein said buffer pad driver means includes, pad driver shaft means rotationally carried from said chassis means, power transmission means for transmitting the rotational output power derived from the output shaft of said engine means to the buffer pad, said power transmission means including first and second pulley means coupled to the output shaft of said engine means and to said pad driver shaft means respectively, and drive belt means interconnecting said first and second pulley means, and wherein said first and second pulley means and said drive belt means are disposed underneath said chassis means on the opposite side of said chassis means from said engine means.

4,059,864
OVEN CLEANING IMPLEMENT
Sharon Spresny, 3197 Arnold Court, Bay City, Mich. 48706
Filed Aug. 24, 1976, Ser. No. 717,119
Int. Cl.² A47L *13/08*
U.S. Cl. 15—105 **4 Claims**

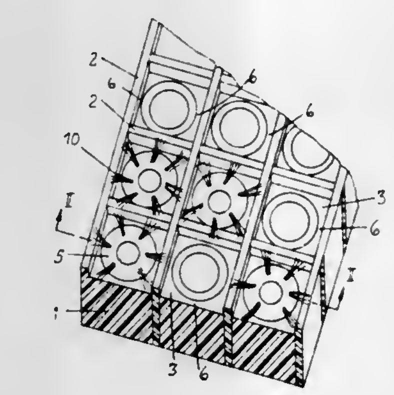
1. An oven cleaning implement comprising:
An elongated tubular handle having an upper and lower telescoping portion, means on said handle for locking said upper and lower telescoping portions together in adjusted relation, said locking means including a plurality of resilient split fingers on a terminal end of said upper telescoping portion of said handle having configuous threads about their outer circumference, and a nut threadedly received on said fingers,
an elongated base,
means rotatably mounting the lower telescoping portion of said handle on said base,
means between said base and lower telescoping portion of said handle for clamping said handle to said base.
said rotatable mounting means and clamping means including a pair of integrally formed upright plates on said base,

an integrally formed flat on the lower terminal end of said lower telescoping portion of said handle received between said upright plates, a bolt having a threaded end received



through said upright plates and flat, and a nut threadedly connected to the threaded end of said bolt, and
a sponge removably mounted on said base.

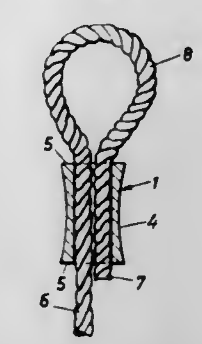
4,059,865
SHOE CLEANING MAT
Achim D. Schmidt, Hohenlockstedt, Holstein, Germany, assignor to Alveru S. A., Fribourg, Switzerland
Filed June 30, 1976, Ser. No. 701,023
Claims priority, application Germany, July 2, 1975, 7520999[U]
Int. Cl.² A46B *7/04;* **A47L** *23/26*
U.S. Cl. 15—161 **14 Claims**



1. A device for cleaning of shoe gear in the form of a traversible mat having a basic body with an upper surface of suitable solid material providing recesses between webs arranged in a grate form, comprising: annular, removable brush bodies held in the recesses, and stiff, resilient bristles fixed in and projecting from the bodies over the webs, said bristles being arranged as rings around the peripheries of said brush bodies to project outwardly at an incline to the vertical from the upper surface of said brush body and over the webs of said basic body of the mat.

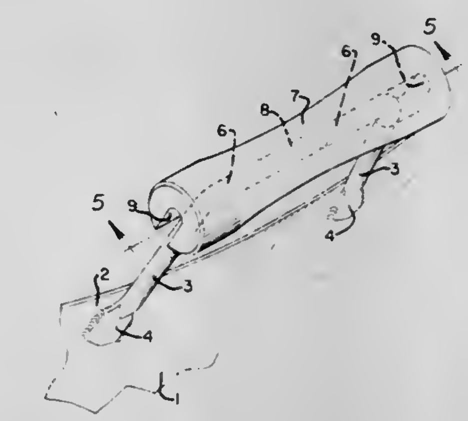
4,059,866
SWAGEABLE SLEEVE
Bernhard Rohland, Molndal, Sweden, assignor to Firma Bernex, Molndal, Sweden
Continuation of Ser. No. 547,034, Feb. 4, 1975, abandoned. This application June 1, 1976, Ser. No. 691,782
Int. Cl.² F16L *11/10*
U.S. Cl. 16—108 **3 Claims**

1. In a rope clamp comprising a sleeve of plastic malleable material arranged to be firmly pressed around one or more rope parts, the improvement wherein the sleeve is provided with an axial center hole having substantially the same cross-section over the entire sleeve length and with a wall thickness



which is thinnest at the mid-portion of the sleeve and thickest at the end portions of the sleeve.

4,059,867
HANDLE FOR UTENSILS
Robert J. Adamis, 3425 Monterey St., San Mateo, Calif. 94403
Filed Sept. 1, 1976, Ser. No. 719,372
Int. Cl.² A47B *95/02*
U.S. Cl. 16—110 A **1 Claim**

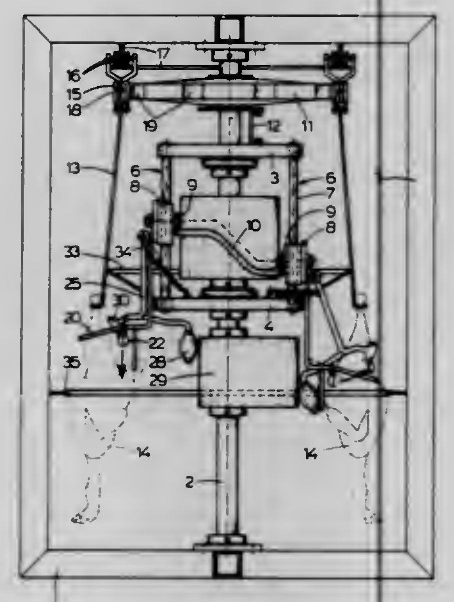


1. In combination,
a pan,
a rim on said pan,
a handle grip having an axial passage therethrough and having an outer periphery defined by a cylindrical portion at each end joined by a concave intermediate portion,
a radial pocket at each end of the passage extending toward said pan through said cylindrical portions,
a rigid connecting bar at each end of the handle grip,
a bent end of each bar extending from said pocket axially into said passage and a radial portion of the bar being restrained in said pocket axially inwardly of the end of said handle for preventing rotation of said handle grip and exposure of the bent ends,
the other end of each bar being flattened in a plane containing said radial portions and welded to said pan adjacent said rim.

4,059,868
APPARATUS FOR CUTTING OPEN A FOWL
Pieter Meyn, Noordeinde 68, Oostzaan, Netherlands
Filed Oct. 18, 1976, Ser. No. 733,362
Claims priority, application Netherlands, Nov. 25, 1975, 7513767
Int. Cl.² A22C *21/00*
U.S. Cl. 17—11 **15 Claims**

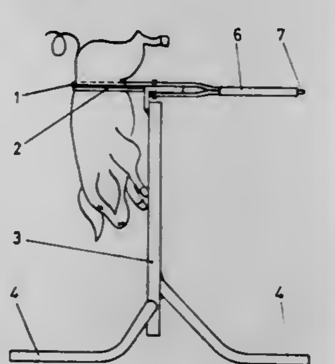
1. An apparatus for cutting open the body cavity of a fowl, which is hanging by the ankle joints from a hook of an overhead conveyor and the vent of which has been cut out, comprising
a frame;
at least one guide means movable connected to said frame;
means for moving said guide means along with the conveyor;

a slide block reciprocatably mounted on said guide means;
means allowing said slide block to move down along said guide means towards a fowl carried by said conveyor, and for moving said slide block up and away from said fowl; and
a cutting means supported by said slide block; said cutting means comprising
a generally rounded protrusion formed by two laterally separatable complementary segments,



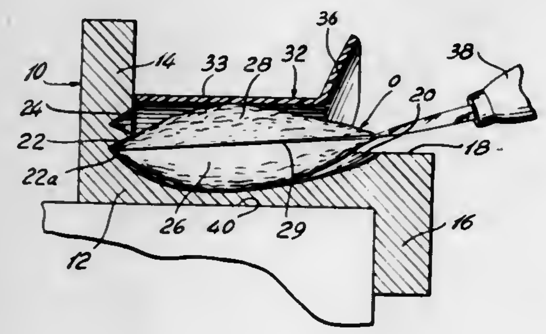
a knife attached to at least one of said segments, and
means for moving said segments apart and together in synchronisation with the movements of said slide block;
said protrusion segments being adapted when closed to be inserted into the opening previously made in the fowl by cutting out the vent thereof, during the downward movement of said slide block, and thereafter to be separated so that said fowl is cut open by said knife.

4,059,869
ANIMAL HOLDER
Mathias Dunstheimer, No. 48, Holzheim, Germany (8851)
Filed Sept. 26, 1975, Ser. No. 617,138
Claims priority, application Germany, Sept. 27, 1974, 2446370
Int. Cl.² A22B *1/00*
U.S. Cl. 17—44 **2 Claims**



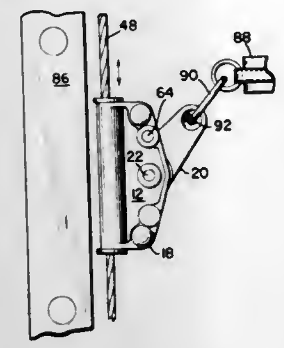
1. A holding apparatus for hanging animals with their heads in the downward direction, said apparatus comprising:
a stand;
a first and second clamp means for embracing an animal immediately before its hind legs, said second clamp means being fixedly attached to said stand and said first clamp means being also connected to said stand and rotable about a vertical axis;
a disc means connected to said first clamp means, said disc means including a plurality of notches on the periphery thereof;
a rotatable lever means associated with said disc means for moving said first clamp means relative to said second clamp means, said lever means being adapted to engage at least one of the notches on the periphery of said disc; and,
a locking means for locking said first clamp means, relative to said second clamp means, whereby the first clamp means with respect to the second clamp means can be adjusted in finite discrete steps through the use of said lever means.

4,059,870
OYSTER BOARD
Morris Finkelman, Montreal, Canada, assignor to Amcar Industries, Ltd., Canada
Filed Aug. 30, 1976, Ser. No. 718,819
Int. Cl.² A22C *29/04*
U.S. Cl. 17—75 **2 Claims**



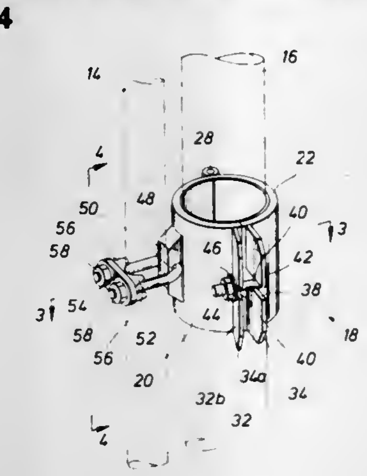
1. An improved oyster board comprising a base, a rear wall extending upwardly from the base, a receiving depression in an upper surface of said base, the depression being situated in the base adjacent at least one longitudinal groove in the rear wall, the at least one groove being situated adjacent the upper surface of the base and adapted to receive an edge portion of any oyster or clam shell therein, the base having a leg portion extending downwardly therefrom, the leg portion portion adapted to engage an edge of a surface on which the board is placed so as to retain the board in position on the surface when in use, a flexible grip for manually holding an oyster or clam in the receiving depression during opening thereof with an oyster knife, the grip having a curved upper surface spanning the width of the receiving depression, with opposite edges of the curved upper surface resting on the upper surface of the base, the grip being sufficiently flexible so as to engage an upper part of the oyster shell when pressure is applied to the grip with one's hand, the grip including means to protect one's hand from being accidently cut by the oyster knife when opening the oyster or clam, the means on the grip to protect one's hand comprises a flange extending upwardly and forwardly along a front edge of the upper surface of the grip, the height of the flange being sufficient to protect one's hand placed on the curved upper surface of the grip, the oyster board including two spaced-apart longitudinal V-shaped grooves extending approximately the length of the receiving depression in the rear wall of the oyster board, a lower longitudinal groove adapted to receive an edge portion of a smaller oyster, while the upper longitudinal groove is adapted to receive the edge portion of the shell of a larger oyster positioned within the receiving depression, the receiving depression being concave in configuration and is substantially oval in plan view, with a longer dimension of the oval configuration extending along the length of the upper surface of the base to receive an oyster positioned lengthwise of the base in the receiving depression, the receiving depression also including a forwardly extending bulge from the oval configuration to permit the placing of oysters or clams in the receiving depression placed widthwise of the base, the oyster receiving depression being of a depth such that a juncture between the upper and lower shells of the oyster is situated above the upper surface of the oyster board, thereby providing access to the juncture of the shells by means of the oyster knife.

4,059,871
CLAMPING DEVICE WITH LOCKING TRIGGER ARM
William E. Swager, P.O. Box 656, Fremont, Ind. 46737
Filed Sept. 17, 1976, Ser. No. 724,262
Int. Cl.² F16G *11/10*
U.S. Cl. 24—134 R **7 Claims**



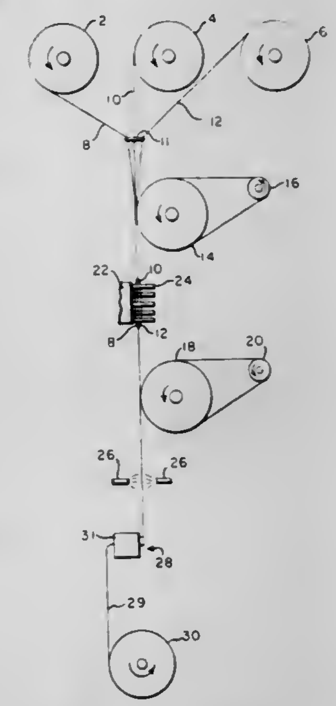
1. In a safety clamp, a housing for slidably mounting about an elongated body of the character of a rope, cable, bar, pipe or the like, and a clamping means for gripping said elongated body in clamped engagement thereon, said clamping means comprising a pivotally supported lever having one end extending outward thereof as a trigger arm for fastening to the body of the climber, whereby the safety device may be drawn slidingly upon said elongated body as the climber ascends or descends a ladder or the like near said elongated body, the inner end of said clamping means being shaped as a cam and adapted to grip said elongated body, firmly clamping thereagainst, and resilient means biasing sid cam and trigger arm into clamping engagement with said elongated body on its pivotal support, and latching means engaging said trigger arm in unclamped position, securing said trigger arm and cam out of clamping engagement with said elongated body to allow free sliding thereon in climbing movement of said climber.

4,059,872
HOSE CLAMP ASSEMBLY
Domenico Delesandri, P. O. Box 428, League City, Tex. 77573
Filed Nov. 24, 1975, Ser. No. 634,540
Int. Cl.² F16L *3/08;* B65D *63/00*
U.S. Cl. 24—284 **5 Claims**



1. In combination with an elongate, constictable, relatively slack hose, and an elongate, substantially incompressible, relatively taut cable disposed generally laterally adjacent and parallel thereto, a clasp assembly for gripping said hose and securing said hose to said cable for stabilizing said hose underwater, said clasp assembly comprising:
a. mating first and second gripping components with a pivotable connection to each other, said components having respective opposed longitudinally extending edges distal said pivotable connection, and movable about said connection to encircle said hose for frictional, substantially non-constricting gripping engagement between said clasp assembly and said hose;
b. locking means on said gripping components for locking said components together, said locking means including:
i. a bolt section pivotally secured to said first gripping component adjacent its edge and having a threaded movable end;
ii. a nut member threaded to said movable end of said bolt section;
iii. a plate member rigidly adjoined to and extending generally radially from said second gripping component adjacent its edge, said plate member having a generally radially opening slit therein for receipt of said bolt section, and an outer side surface flared away from said edge of said second gripping component from its radially innermost to its radially outermost extremity whereby said nut member may engage said outer side surface, when said bolt section is received in said slit, at an angle to lock said components together; and
c. clamp means connected to the exterior of one of said components for gripping said cable.

4,059,873
FLUID PROCESS FOR MAKING CONTINUOUS FILAMENT HEATHER YARN
Thomas Larson Nelson, Georgetown, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.
Division of Ser. No. 609,010, Aug. 29, 1975, abandoned. This application Nov. 2, 1976, Ser. No. 738,168
Int. Cl.² D02G *1/16;* D02J *1/08*
U.S. Cl. 28—271 **10 Claims**



1. A process for making a continuous filament heather yarn, comprising
a. subjecting a plurality of crimped continuous filament yarns of different color and/or dye receptivity and having a total denier of at least 400 to a tension of from 0.5 to 1.25 grams per denier to straighten the crimp of the filaments within each of said yarns and to disentangle and parallelize the filaments,
b. feeding said yarns under tension and in contiguous relationship into a jet intermingling zone,
c. randomly jet intermingling the filaments of said yarns from yarn-to-yarn, and
d. withdrawing the intermingled yarn from said zone at a rate which is 4 to 30% less than the feed rate of the yarns to said zone.

4,059,874

FABRIC CUTTING MACHINE FOR PRODUCING STRIPS FROM TUBULAR MATERIAL

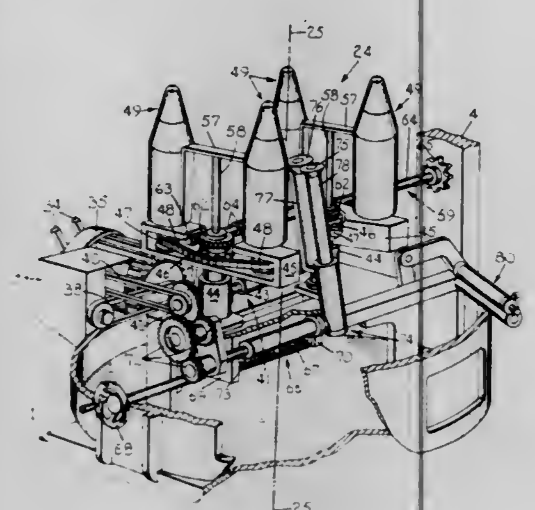
Luigi Pisani, Cilavegna (Pavia), Italy, assignor to Rockwell-Rimoldi S.p.A., Milan, Italy

Filed July 9, 1976, Ser. No. 703,990

Claims priority, application Italy, July 18, 1975, 25541/75

Int. Cl.² B21D *43/00;* **B26D** *3/16*

U.S. Cl. 29—2.16 **3 Claims**



1. A strip cutting machine of the type having a stationary frame with a support frame mounted thereon for rotation about the axis of the machine and for supporting a source of tubular fabric to be cut into strip form by a cutting apparatus carried on the stationary frame, said strip cutting machine comprising:

a. feed means (24) connected to the stationary frame which includes a plurality of rotatably driven stretch and feed rollers (49) radially spaced from and extending substantially parallel to the axis of the machine;

b. a first regulating means (59) operatively connected to said feed means for selectively inclining each of said stretch and feed rollers simultaneously relative to the axis of the machine to produce a withdrawing force on the tubular fabric and direct the same toward the cutting apparatus;

c. means defining a second regulating means (66) connected to said feed means for varying the distance between said stretch and feed rollers (49) and the axis of the machine for maintaining a substantially cylindrical configuration of the fabric while it is being advanced to the cutting apparatus; and

d. variable drive means operatively associated with said feed means for sychronizing the rate of rotation of said feed means (24) with the rate of rotation of the support frame.

4,059,875

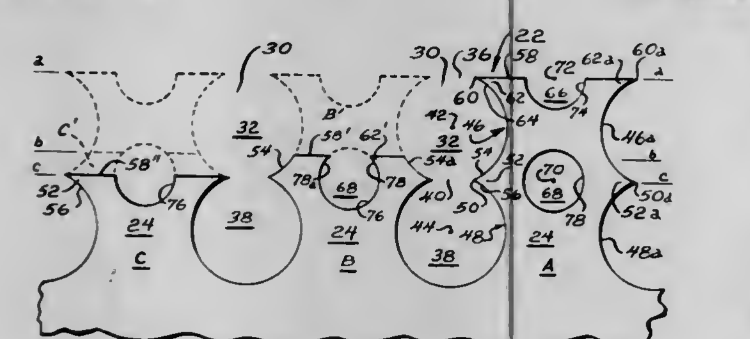
TIRE RASP BLADES WITH RENEWABLE CUTTING AND BUFFING EDGES

Wayne E. Jensen, Homewood, Ill., assignor to B & J Manufacturing Company, Glenwood, Ill.

Filed Dec. 12, 1975, Ser. No. 640,041

Int. Cl.² B23D *71/00*

U.S. Cl. 29—78 **36 Claims**



1. Blade for a rotatable tire rasp comprising a sheet metal member having an outer working edge and means spaced from said edge adapted for mounting the blade in said rasp, wherein the working edge thereof includes a tooth having multi-pointed leading and trailing side edges, an outer edge, and an intermediately notched area interrupting the outer edge of said tooth, said leading and trailing side edges of the tooth each having a first laterally projecting prong at the outer edge of the tooth and at least a second laterally projecting prong at a level spaced inwardly of the first prongs.

4,059,876

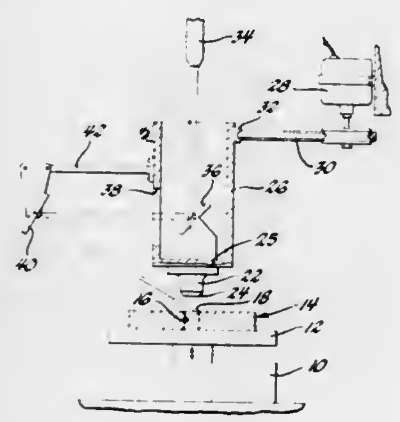
METHOD OF ALLOYING AND FORMING A VALVE SEAT

Edwin D. Ditto, Bloomfield Hills, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Nov. 3, 1976, Ser. No. 738,432

Int. Cl.² B23P *15/00;* **B23K** *26/00;* **B23P** *3/02*

U.S. Cl. 29—156.7 A **2 Claims**



1. A method of alloying and forming a valve seat in a base metal, the valve seat having an axis, comprising the steps of

depositing a mass of alloy materials on the surface of the valve seat,

aligning a forming tool with the valve seat axis for movement between a first retracted position spaced from the valve seat, defining an annular space between the tool and the valve seat, and a second valve seat engaging position,

directing a beam of radiant energy through said annular space between the tool and the valve seat to impinge on the valve seat, said beam being focused at a limited focal spot for heating the said surface of the valve seat and the material deposited thereon at that spot,

sweeping the beam of radiant energy to scan the limited focal spot and peripherally traverse the valve seat to heat the entire valve seat surface and the deposited material to alloying temperature,

then immediately forming the alloyed valve seat by forcefully engaging the forming tool with the alloyed valve seat while the valve seat is at a temperature suitable for forming, whereby the valve seat is alloyed and shaped to a configuration which requires little or no grinding of the alloy.

4,059,877

METHODS FOR FORMING BUBBLE CAP ASSEMBLIES FOR A GAS AND LIQUID CONTACT APPARATUS

John R. Powers, Port Arthur, Tex., assignor to Texaco Inc., New York, N.Y.

Filed Aug. 6, 1976, Ser. No. 712,451

Int. Cl.² B23P *15/00*

U.S. Cl. 29—157 R **9 Claims**

1. A method for forming a bubble cap assembly over a hole having upper and lower peripheral surfaces in a tray deck of a gas and liquid contact apparatus comprising the steps of,

a. forming an outwardly extending annular flange on the lower end of a tubular riser having an internal diameter substantially equal to the hole diameter,

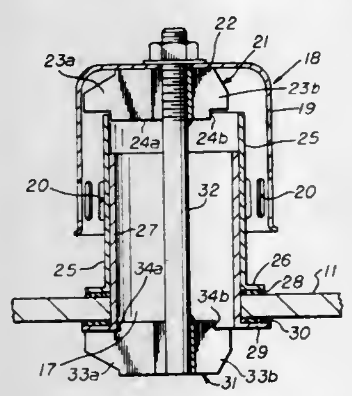
b. positioning the riser over the upper peripheral surface of the hole in the tray deck,

c. inserting an annular gasket seal having an inside diameter substantially equal to the hole diameter between the riser annulus flange and the upper peripheral surface around the hole in the tray deck,

d. forming an outwardly extending annular flange on the lower end of an inner tubular sleeve,

e. inserting an annular gasket seal having an inside diameter substantially equal to the hole diameter on top of the inner sleeve annular flange,

f. inserting the inner sleeve up through the hole in the tray deck and the riser thereon contiguous with the inner surface of the riser and hole to clamp the upper and lower



peripheral surfaces of the tray deck between the respective riser and inner sleeve annular flanges,

g. mounting a top spider having a sleeve therein on the riser,

h. mounting a bubble cap on the top spider,

i. inserting a hold-down stud having a lower spider up through the inner sleeve and the riser to protrude through the top of the bubble cap, and

j. attaching a fastening means on the top of the hold-down stud protruding from the top of the bubble cap assembly for applying pressure to both of the annular gasket seals on the upper and lower peripheral surfaces of the hole for assuring proper alignment of the bubble cap assembly relative to the tray deck and for providing a double seal between the tray deck and the bubble cap assembly for minimizing leakage.

4,059,878

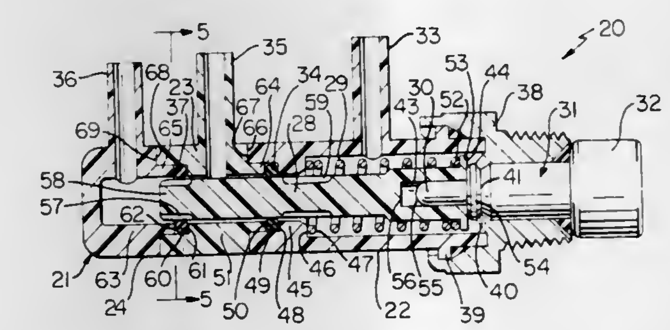
METHOD OF MAKING A CONDITION RESPONSIVE VALVE CONSTRUCTION

Byron L. Jackson, and Joseph P. Wagner, both of Knoxville, Tenn., assignors to Robertshaw Controls Company, Richmond, Va.

Division of Ser. No. 596,565, July 16, 1975, Pat. No. 3,989,058. This application Aug. 19, 1976, Ser. No. 715,845

Int. Cl.² B23P *15/00*

U.S. Cl. 29—157.1 R **9 Claims**



1. A method of making a condition responsive valve construction comprising the steps of forming a first housing means to have an internal chamber therein and an inwardly directed shoulder projecting into said chamber and defining a first valve seat on one side thereof and a spring seat on the other side thereof, said forming step also forming said chamber to define an open end of said first housing means that is spaced outboard of said shoulder thereof, disposing an axially movable valve member in said chamber for controlling said first valve seat, disposing a spring between said spring seat and said valve member to tend to move said valve member in one axial direction in said chamber, interconnecting a condition responsive device to said valve member to move said valve member in the other axial direction upon an increase in sensed condition, securing a second housing means to said first housing means, forming said second housing means with a chamber aligned with said chamber of said first housing means and receiving said valve member therein, forming said second housing means with an inwardly directed shoulder projecting into its respective chamber, forming said first valve seat from a resilient annular member, and disposing said annular member against said one side of said shoulder of said first housing means and against an adjacent side of said shoulder of said second housing means so as to project inwardly beyond said shoulders to sealing engage said valve member, said step of securing said second housing means to said first housing means causing said adjacent side of said shoulder of said second housing means to be disposed in said chamber of said first housing means and, thus, be disposed inboard of said open end of said first housing means.

4,059,879

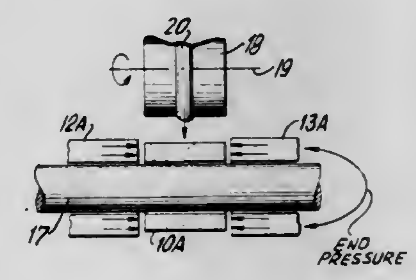
METHOD FOR THE CONTROLLED MECHANICAL WORKING OF SINTERED POROUS POWDER METAL SHAPES TO EFFECT SURFACE AND SUBSURFACE DENSIFICATION

William J. Chmura, Southington; Ronald S. Slusarski, Berlin, and Charles B. Burk, Collinsville, all of Conn., assignors to Textron Inc., Providence, R.I.

Filed Nov. 17, 1975, Ser. No. 632,709

Int. Cl.² B21K *1/04;* **B21H** *1/12*

U.S. Cl. 29—148.4 R **21 Claims**



1. A method for producing an annular metal bearing ring by powder metallurgy which comprises,

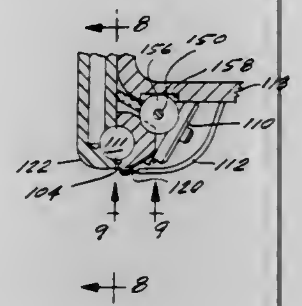
forming a sintered porous metal ring having a porosity corresponding to a density of about 70% to 90% of true density, coaxially supporting said ring on a rotatable mandrel,

applying restraining clamping pressure to opposite sides of said ring,

and maintaining said clamping pressure while roll-forming a bearing raceway on a circumferential bearing face of said ring by mechanically cold rolling said raceway to a suitable depth to support rolling elements therein, such that the subsurface adjacent said raceway is markedly densified to at least 95% of true density while the remaining portion of said ring is maintained substantially porous over the range of about 80% to 92% of true density,

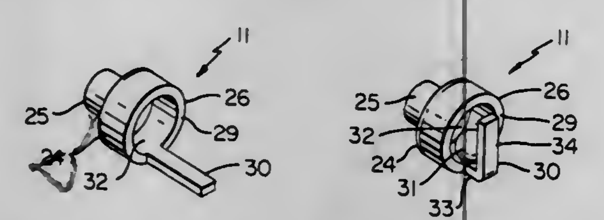
the amount of clamping pressure being at least sufficient to inhibit growth of said ring during said working while substantially inhibiting cracking of said ring during cold rolling of said raceway.

4,059,880
METHOD OF MAKING AN APPARATUS FOR DYEING AND PRINTING OF MATERIALS
Norman E. Klein, Inman, S.C., assignor to Milliken Research Corporation, Spartanburg, S.C.
Division of Ser. No. 430,527, Jan. 3, 1974, abandoned. This application Aug. 14, 1975, Ser. No. 604,582
Int. Cl.² B23P *15/00, 13/00*
U.S. Cl. 29—157 C **4 Claims**



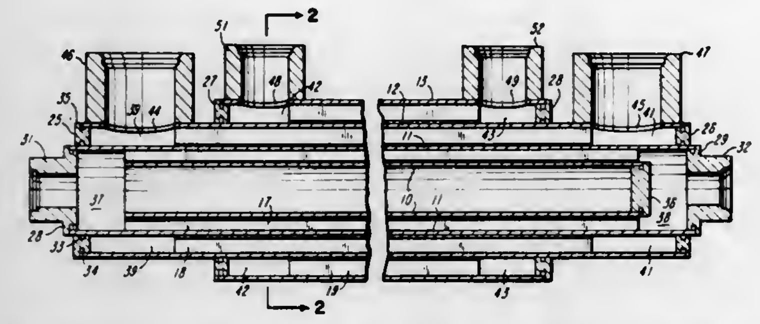
1. The method of making a dye applicator of a gun bar for applying dye to a material comprising the steps of providing a first member with a substantially flat face having a cavity therein, provided a second member with a substantially flat face having a cavity therein, providing at least one groove in the face on one of said members which communicates with said cavity and an outer edge of said face therein, mating said faces of said first and second members so that the cavities of the members form a chamber and providing a clamping force on said members which produces a perpendicular and a parallel force effect with respect to the mating faces to hold said members in engagement and to facilitate alignment of the edges of said faces adjacent said groove.

4,059,881
VENT VALVE ARRANGEMENT AND METHOD OF MAKING THE SAME
Boyd P. Sliger, Concord, Tenn., assignor to Robertshaw Controls Company, Richmond, Va.
Division of Ser. No. 551,282, Feb. 20, 1975, Pat. No. 3,973,729. This application May 17, 1976, Ser. No. 686,819
Int. Cl.² B23P *15/00;* **F16K** *27/00*
U.S. Cl. 29—157.1 R **7 Claims**



1. A method of making a vent valve arrangement comprising the steps of forming a one-piece valve seat member to have a valve seat opening and a chamber for containing a movable valve member therein that will open and close said valve seat opening, disposing an unattached ball valve member in said chamber through an open end of said one-piece valve seat member, and forming said valve seat member to contain said valve member in said chamber by forming said one-piece valve seat member to have a single integral tab extension disposed adjacent said open end to contain said valve member in said chamber and by bending said single integral tab extension into substantially an L-shaped configuration with one leg thereof being an extension of said open end and the other leg thereof being disposed in front of and spaced outwardly from said open end.

4,059,882
METHOD OF MAKING AN ANNULAR TUBE-FIN HEAT EXCHANGER
John E. Wunder, Dayton, Ohio, assignor to United Aircraft Products, Inc., Dayton, Ohio
Filed May 24, 1976, Ser. No. 689,190
Int. Cl.² B23P *15/26, 17/00*
U.S. Cl. 29—157.3 A **8 Claims**



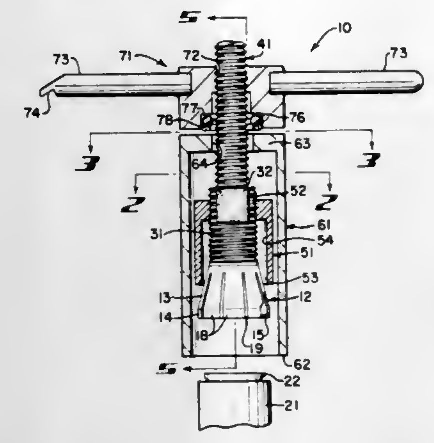
1. A method of making a heat exchanger, including the steps of:

a. providing a tube made of a relatively rigid heat conductive metal and a compressible fin annulus comprising corrugated thin metal deformable material,
b. inserting the compressible fin annulus in said tube and providing a central support therefor, said support rigidly backing said fin annulus,
c. applying a radial compressive force to said fin annulus so that all parts thereof are in closely contacting compressive relation to the interior wall of said tube irrespective of irregularities in fin height, the application of compressive forces being accomplished by displacing the tube wall radially inwardly,
d. the fin annulus reacting upon said central support and the tube wall deforming to conform to fin irregularities,
e. prior to applying said radial compressive force inserting in at least one end of said tube a relatively incompressible closure member,
f. said member having a cross sectional dimension to have a relatively loose fit in said tube and the tube wall in being radially inwardly displaced encountering between its ends relatively compressible means in the form of said fin annulus and at least at said one end thereof encountering the firm resistance of said closure member,
g. a single contracting tube therefore closing tightly at least at said one end on an inserted closure member and between its ends engaging and applying a compressive pressure to said fin annulus,
h. and metallurgically bonding together the parts so assembled.

4,059,883
APPARATUS FOR REMOVING AN IGNITION KEY CYLINDER
Ray L. Osborne, Cuyahoga Falls, Ohio, assignor to Milton English, Akron, Ohio
Filed Feb. 25, 1976, Ser. No. 661,402
Int. Cl.² B23P *19/04*
U.S. Cl. 29—259 **4 Claims**

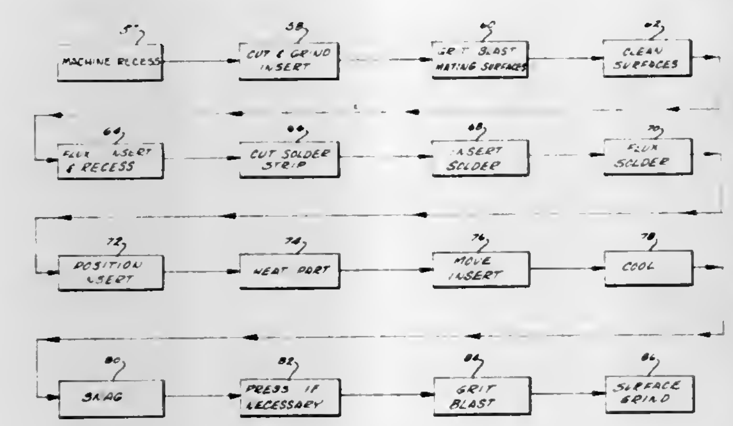
1. An apparatus for removing a lock cylinder, comprising;
a collet assembly, said collet assembly having a conical base portion having resilient collet fingers, said collet fingers having an inwardly projecting lip,
a shaft, said shaft connected to said collet base portion and having an external thread portion,
an annulus having an internal thread engaging said external thread portion and having a shoulder, said annulus engaging said collet base portion to thereby bias said collet fingers inwardly,

a casing, said casing extending at least partially about said collet assembly,
a lever, said lever engaging said shaft,



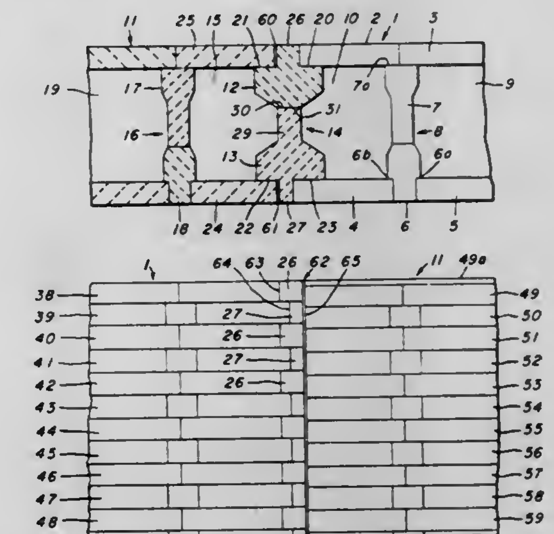
said lever bearing against said casing so that tightening of said lever causes said collet assembly to be drawn into said casing.

4,059,884
WEAR PART
Theodore C. Weill, 110 Carol Circle, Tylertown, Miss. 39667
Filed Sept. 18, 1975, Ser. No. 614,494
Int. Cl.² B23P *7/00;* **B22P** *19/10*
U.S. Cl. 29—401 E **5 Claims**



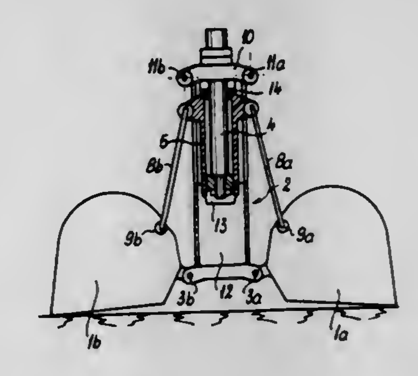
1. A method of repairing the wear parts of a wood chipper such as a knife holder, comprising the steps of:
removing material from the worn area of the wear part to form a recess;
forming an insert from a material having a coefficient of thermal expansion substantially equal to that of the material of the wear part, said insert dimensioned to fit within the recess;
fluxing the recess;
positioning a silver alloy filler in the recess;
positioning the insert within the recess;
induction heating the wear part and insert so that bonding occurs by brazing between the wear part and insert, said insert being formed from a surface hardened steel, said fluxing step employing a high temperature, paste form black flux;
grit blasting the mating surfaces of said insert and said recess prior to fluxing the recess, said silver alloy filler material containing approximately 50% silver and having a flow point of approximately 1120° F, said induction heating step including heating at a temperature of approximately 1200° F for a period of at least one minute; and
moving said insert once said heating step is started to insure wetting of the mating surfaces.

4,059,885
PROCESS FOR PARTIAL RESTORATION OF A COKE OVEN BATTERY
Hans Oldengott, Bockum-Hovel, Germany, assignor to Dr. C. Otto & Comp. G.m.b.H., Bochum, Germany
Filed Mar. 19, 1976, Ser. No. 668,468
Claims priority, application Germany, May 19, 1975, 2512013; May 28, 1975, 2523640
Int. Cl.² B23P *7/00*
U.S. Cl. 29—401 F **16 Claims**



1. A process for restoring a damaged part of a battery of coke ovens including the steps of exposing existing masonry for continued use as part of the coke ovens to provide support for flat connecting surfaces such that a lateral expansion joint for the replacement masonry forming a restored part of the coke ovens lies between such flat connecting surfaces and replacement masonry while said flat connecting surfaces form a continuous aligned surface for a horizontal expansion joint connecting with said lateral expansion joint and extending along between the replaced masonry and the existing masonry, selecting a replacement masonry comprising a masonry bridging material having a low thermal expansion property to provide essentially constant dimensional characteristics during heating thereof to the operating temperature of the coke ovens, and arranging said masonry bridging material to close and support said existing masonry while using surfaces on said masonry bridging material to form said flat connecting surfaces for providing said lateral expansion joint for the renewed part of the coke ovens.

4,059,886
HYDRAULIC ACTUATED GRAB BUCKET
Jean-Pierre Luc Bricon, Venissieux, France, assignor to International Harvester Company, Chicago, Ill.
Division of Ser. No. 656,237, Feb. 9, 1976, Pat. No. 4,047,313. This application Dec. 1, 1976, Ser. No. 746,990
Int. Cl.² C02F *3/60*
U.S. Cl. 29—426 **2 Claims**



1. A method of converting a digging bucket suspended from a frame to a rehandling bucket, said digging bucket having a pair of mating shells, each of which has inner and outer pivot

connections, a piston including a rod affixed to said frame, a cylinder reciprocally mounted upon and sealingly engaging said rod and piston, link means pivotally connected between said cylinder and said outer pivot connections and pivot means carried by said frame and pivotally connecting said inner pivot connections to said frame; said method comprising the steps of:

disconnecting said link means from said cylinder;

disconnecting said pivot means from said inner pivot connections;

connecting said inner pivot conections to said cylinder; and, connecting said link means to said frame.

4,059,887

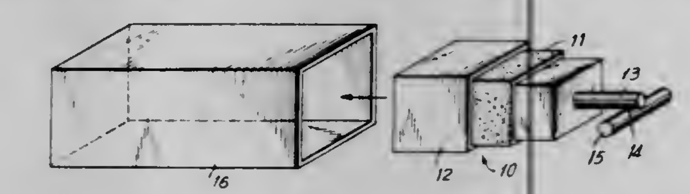
TANTALUM CHIP CAPACITOR AND METHOD OF MANUFACTURE

John L. Galvagni, Little Genesee, N.Y., assignor to AVX Corporation, Great Neck, N.Y.

Division of Ser. No. 695,596, June 14, 1976. This application Apr. 27, 1977, Ser. No. 791,511

Int. Cl.² B01J *17/00*

U.S. Cl. 29—570 **9 Claims**



1. The method of manufacturing a capacitor from a capacitor subassembly which includes a cathode body and an anode lead, comprising the steps of providing a metal case member open at least at one end and having a hollow interior, inserting said subassembly into said case member, forming a first electrical connection between said cathode body and a first portion of said case member, forming a second electrical connection between said anode lead and a second portion of said case member longitudinally spaced from said first portion, introducing into the interior of said case member a quantity of a hardenable liquid polymeric material in quantity sufficient substantially to fill the void within said case surrounding said capacitor subassembly and lead, causing said material to harden, and thereafter removing a section of said case between said first and second portions at an area in registry with said polymeric material completely to divide said case into first and second sections mechanically connected but electrically isolated by said polymeric material.

4,059,888

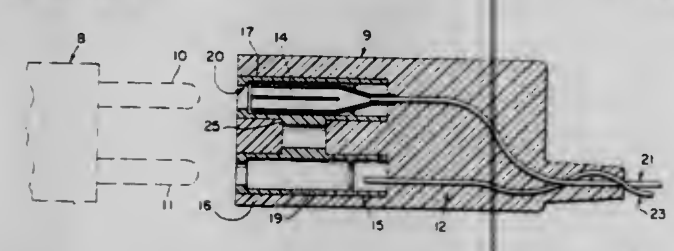
METHOD OF MAKING A PIN ACTUATOR CONNECTOR

David T. Leh, Pottstown, Pa., assignor to Sperry Rand Corporation, New York, N.Y.

Continuation of Ser. No. 444,585, Feb. 21, 1974, abandoned. This application Aug. 7, 1975, Ser. No. 602,867

Int. Cl.² H01R *43/00*

U.S. Cl. 29—629 **3 Claims**



1. The method of providing a male-female electrical connector device where split female receptacles may receive misaligned male connector pins without damage thereto comprising the steps of:

a. surrounding each of said split female receptacles with a respective rigid jacket of plastic material,

each said receptacle being spaced from the walls of its rigid jacket, thereby allowing for expansion of said receptacle upon receipt of a misaligned male pin;

b. providing hinge means between said rigid jackets, thereby allowing one receptacle to be repositioned independently of the other receptacle when receiving a misaligned male pin

c. encapsulating the hinged female receptacles and their respective rigid jackets in a flexible plastic material which yields sufficiently to allow relative movement between said female receptacles to prevent damage to said split female receptacles upon receipt of a misaligned male pin.

4,059,889

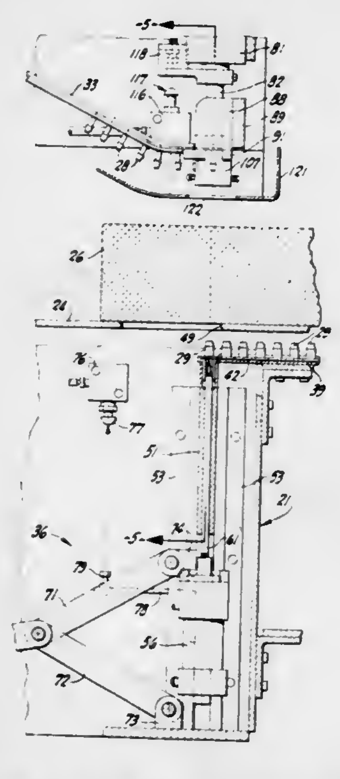
QUILTING MACHINE

Arthur J. Randolph, Santa Rosa, and Richard M. Boyce, Windsor, both of Calif., assignors to Arthur J. Randolph, Santa Rosa, Calif.

Continuation-in-part of Ser. No. 616,199, Sept. 24, 1975, Pat. No. 3,995,359. This application Dec. 6, 1976, Ser. No. 748,132

Int. Cl.² B23Q *7/10*

U.S. Cl. 29—706 **6 Claims**



1. A quilting machine for rapidly inserting a two-part quilting button having a male and a female button part through a workpiece comprising

a male button part holder adapted to receive male button parts contiguously fed thereto and including resiliently displaceable means receiving and holding each successive male button part,

a single displacement male button part drive means for forcing a male button part axially thereof into a female button part,

a female button part holder adapted to receive successive female button parts fed thereto and including a movable drive member for displacing a female button part toward said male button part holder, and

means moving said drive member to drive a female button part through a workpiece and means actuating said male button part drive means for driving a male button part through a female button part that extends through a workpiece.

4,059,890

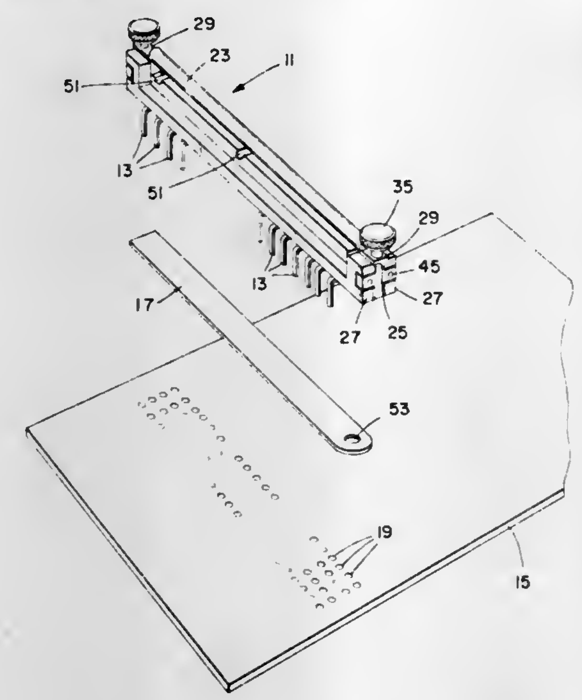
PIN LOADING SYSTEM

Theodore R. Sherwood, Sunnyvale, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 1, 1976, Ser. No. 662,643

Int. Cl.² H05K *3/32*

U.S. Cl. 29—739 **7 Claims**



1. A loading system for loading at least one contact pin onto a board having an upper side and a lower side and having at least one mating hole therefor which system comprises:

a. at least one elongated clamp rotatably mounted about its longitudinal axis having end portions with a notch therein and an outwardly inclined inner cross-section, and having an interior portion of lesser height than said end portions to allow for exposure of a contact pin common rail attached to said at least one contact pin for removal tool access;

b. an elongated spacer having a rectangular interior portion and T-shaped end portions, at least one arm of said T-shaped end portions being pivotally engaged to said at least one elongated clamp;

c. an elongated cylindrical rod in abutting relationship with said outwardly inclined inner cross-section; and

e. elevation means to adjust the location of said rod relative to said outwardly inclined inner cross-section so that said at least one elongated clamp rotates about said longitudinal axis with the lower edge of said at least one elongated clamp forcefully engaging said at least one contact pin to hold said at least one contact pin within said loading system.

4,059,891

BLADE AND IMPROVED HOLDER FOR IT

Georgios Panagiotoulis, II, Velvendous Street, Athens, Greece

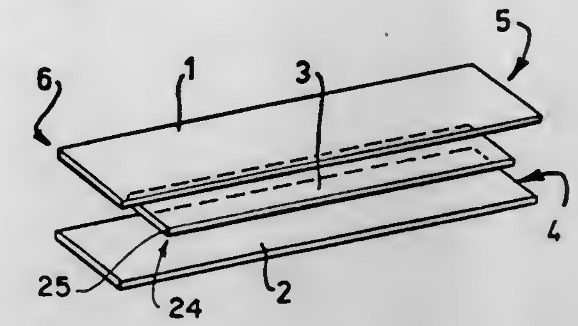
Filed Oct. 20, 1975, Ser. No. 623,610

Claims priority, application Greece, Oct. 25, 1974, 5464; Nov. 29, 1974, 5650; Aug. 28, 1975, 7284

Int. Cl.² B26B *21/22, 21/54*

U.S. Cl. 30—50 **5 Claims**

1. A holder for a blade comprising a pair of spaced limbs permanently fixed in position relative to one another and having opposed internal surfaces defining an elongate seat which in use receives a strip blade, the seat having a depth less than the depth of a blade to be used so that the cutting edge of the blade projects beyond the spaced limbs and the spacing between the limbs being such that a blade to be used is held in position during use primarily by surface adhesion between said opposed internal surfaces and the surface of the blade, the depth of the seat being limited by means forming the back of the seat against which the blade abuts to limit penetration of the blade between the limbs, said limit means extending only a part of the length of said seat so that a pivot point is formed spaced from one end of the seat, whereby rearward pressure on



the blade at said one end of the seat causes the blade to pivot about said pivot point releasing the blade at the other end of the seat to enable removal.

4,059,892

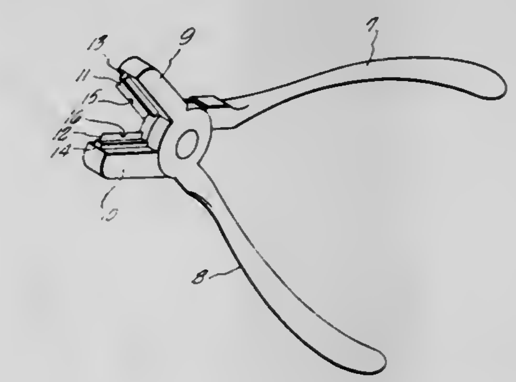
DEFORMABLE WIRE STRIPPER

Dennis Siden, Portola Valley, Calif., assignor to Raychem Corporation, Menlo Park, Calif.

Continuation-in-part of Ser. No. 480,821, June 19, 1974, Pat. No. 3,931,672. This application Oct. 29, 1975, Ser. No. 626,780

Int. Cl.² H02G *1/12*

U.S. Cl. 30—90.1 **19 Claims**



1. A tool for stripping insulation from an insulated conductor which comprises in combination a deformable blade means having a Rockwell hardness between M30 and L115, said blade mean including a tapered edge and being comprised of a material exhibiting a deformation less than the deformation of the insulation and greater than that of the conductor and means for exerting a force on said insulated conductor opposite the point at which said deformable blade means engages the insulated conductor to urge said insulated conductor into engagement with said deformable blade means so that said deformable blade means cuts through said insulation and deforms upon contact with said conductor.

4,059,893

COAXIAL CABLE CUTTING TOOL

Thomas F. Solury, 150 Colony Drive, Sierra Madre, Calif. 91024

Filed July 19, 1976, Ser. No. 706,790

Int. Cl.² H02G *1/12*

U.S. Cl. 30—90.1 **16 Claims**

1. A tool for cutting material from cable of the type having a central conductor concentrically within insulation material, said tool comprising:

a rotatable housing having an axis of rotation and having a bore extending along said axis from one end of the housing at least part way through the housing toward its other end, into which there may be inserted a length of the cable, and having a peripheral wall between the ends;

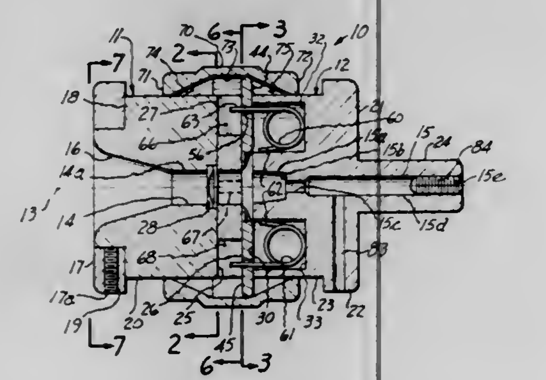
a first groove means and a second groove means each ex-

tending through the housing in a direction transverse to said axis and opening into the bore;

spacing means between the first and second groove means separating the first and second groove means axially from each other;

first cutter means slidable in said first groove means and second cutter means slidable in said second groove means, each of said cutter means containing cutting edge means positioned so that each cutting edge means may be moved from a normal position away from the bore to a position within the bore where it can cut into a cable within the bore;

means urging each of said cutter means to slide in the direction which maintains its cutting edge means away from the bore;



movable means attached to the housing adapted to separately slide each of said cutter means against the force of said urging means so that its cutting edge means moves into the bore to cut into material of the cable when the housing is rotated relative to the cable; and

means on the housing limiting the movement into the bore of the cutting edge means of each cutter means;

whereby when the housing is rotated relative to a length of cable inserted in the bore there are made two axially separated peripheral cuts through the wall of the cable, the depth of each cut being established by the limiting means.

4,059,894

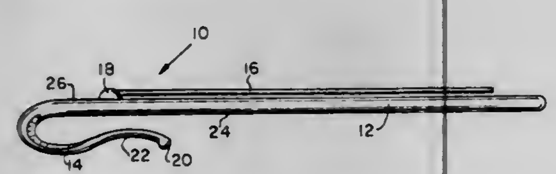
CAULKING GUN CARTRIDGE OPENING TOOL

Stanley Yavor, 209 Jackson St., Berwick, Pa. 18603

Filed Aug. 24, 1976, Ser. No. 717,123

Int. Cl.² B26B *27/00*

U.S. Cl. 30—296 A **6 Claims**



1. A caulking gun cartridge opening tool comprising an elongated plate, a portion of one marginal edge of the plate having a knife-like edge, a portion of the plate adjacent one end thereof being disposed folded into an S-shape extending substantially parallel to a first lateral surface of the plate, a needle-like rod, one end of the rod having a ball-like shape, a socket, said socket fixedly secured to a second lateral surface of the plate, said ball-like shape being partially captured in said socket the length of the rod being shorter than the length of the plate.

4,059,895

FULL POSITION SAFETY BRAKE FOR PORTABLE CHAIN SAW

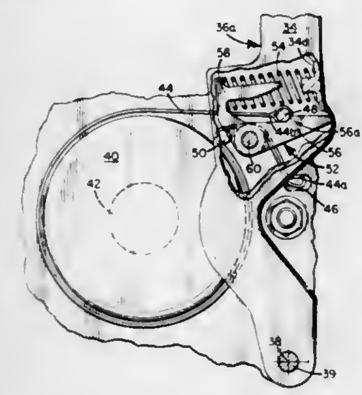
Sidney Hirschkoff, Los Angeles, Calif., assignor to McCulloch Corporation, Los Angeles, Calif.

Continuation-in-part of Ser. No. 515,047, Oct. 15, 1974, Pat. No. 3,964,333. This application Apr. 19, 1976, Ser. No. 678,169

The portion of the term of this patent subsequent to June 22, 1993, has been disclaimed.

Int. Cl.² B27B *17/00;* B60T *13/04*

U.S. Cl. 30—382 **16 Claims**



1. In a hand portable chain saw having a housing with a carrying handle, a cutting chain, a support bar projecting forwardly from the housing for supporting the cutting chain for endless movement, motive means carried by the housing for driving the cutting chain, and a safety brake for stopping the cutting chain, the improvement in said safety brake comprising

A. safety bar means mounted on said housing for swinging movement relative to a first axis and arranged to be swung forward upon being struck by an operator, said safety bar means having a wrap-around configuration extending around the top and sides of said housing forward of said carrying handle,

B. a flexible brake band having a first end secured to the housing and a second end coupled to said safety bar means for movement therewith such that forward swinging of said safety bar means moves said brake band into frictional braking engagement with said motive means to stop said cutting chain, and

C. a single spring member engaged between said safety bar means and the housing at a location spaced from said first axis and for exerting resilient force longitudinal to said forward direction, said spring member being arranged constantly to bias said safety bar means forward to said braking position, and further arranged to impose yieldable latching force on said safety bar means to resist forward movement of said safety bar means and thereby prevent inadvertent brake engagement with said motive means.

4,059,896

PROCESS FOR CONVERTING ALUMINUM SCRAP INTO USEFUL PRODUCTS

Akira Asari, Osa, and Kenzou Tatsuno, Kobe, both of Japan, assignors to Kobe Steel, Ltd., Kobe, Japan

Continuation-in-part of Ser. No. 692,753, June 4, 1976, abandoned, which is a continuation of Ser. No. 573,085, April 30, 1975, abandoned. This application July 1, 1976, Ser. No. 701,578

Claims priority, application Japan, Dec. 27, 1974, 50-2673; Dec. 27, 1974, 50-2676; Dec. 24, 1975, 50-3166

Int. Cl.² B21C *23/04*

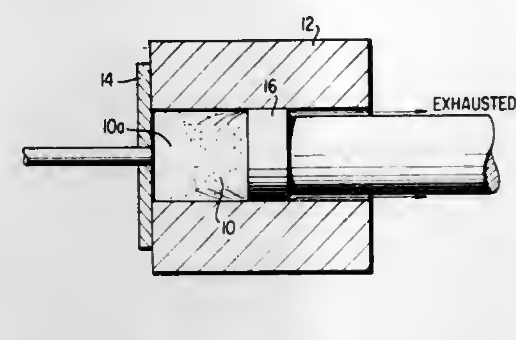
U.S. Cl. 29—403 **7 Claims**

1. A process for converting aluminum scrap into a finished article, comprising the steps of:

compacting the aluminum scrap at ambient temperature into a billet having a density between 1.8 and 2.4 g/cm³;

heating the compacted billet to a temperature between 350° and 550° C;

compacting the heated billet into a dense mass, having a density above 2.4 g/cm³, while maintaining a condition under which the air pressure at the outer periphery of the billet is lower than that in the central portion of the billet; and



subsequently extruding the billet after completion of the second compaction thereof from an extrusion container through an extrusion die, while maintaining said condition, so as to form the finished article.

4,059,897

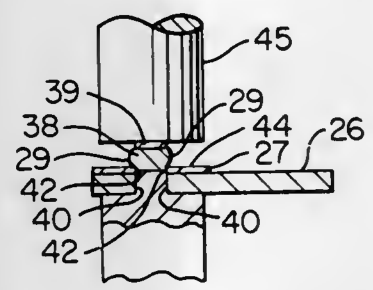
METHOD OF JOINING THIN AND THICK SWITCH MEMBERS

Edgar E. Marquis, Newtown, Conn., assignor to Robertshaw Controls Company, Richmond, Va.

Division of Ser. No. 613,634, Sept. 15, 1975, abandoned. This application Oct. 22, 1976, Ser. No. 734,756

Int. Cl.² B23P *11/00*

U.S. Cl. 29—432.1 **7 Claims**



1. A method of joining a relatively thin metal switch blade member to a relatively thick terminal member to form as assembly for an electrical switch comprising the steps of disposing one surface of said terminal member against one surface of one end of the switch blade member, punching a part of said terminal member through an unblanked part of said one surface of said one end of said switch blade member so that said part of said terminal member extends beyond the opposed surface of said switch blade member, and staking said part of said terminal member to said opposed surface of said switch blade member to secure said members together whereby the other end of said switch blade member is carried in cantilevered fashion by said terminal member to perform a contact switching function.

4,059,898

METHOD OF MAKING A SMALL ELECTRIC MOTOR

Gerald L. Adair, 419 Dane St., Woodstock, Ill. 60098

Division of Ser. No. 588,011, June 18, 1975, Pat. No. 4,035,676. This application Sept. 20, 1976, Ser. No. 724,589

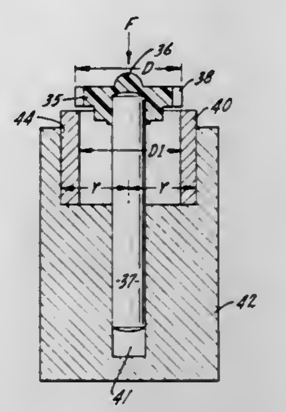
Int. Cl.² H02K *15/02*

U.S. Cl. 29—598 **1 Claim**

1. A method of assembling a cylindrical rotor and a metal rotor shaft into a rotor assembly for a subfractional dynamoelectric machine comprising the following steps:

A. presenting to one end of the rotor a circular hub molded substantially concentrically to one end of the shaft, said hub having a toothed periphery of deformable and shearable plastic material softer than the rotor, and the outer diameter of the hub being larger than the inner diameter of the rotor;

B. press-fitting the hub into the inner diameter of the rotor, while maintaining the outer diameters of the shaft and the rotor in concentric relation, the teeth of the hub distorting



during press fitting to compensate for any eccentricity between the peripheral ends of the teeth and the inner diameter of the rotor.

4,059,899

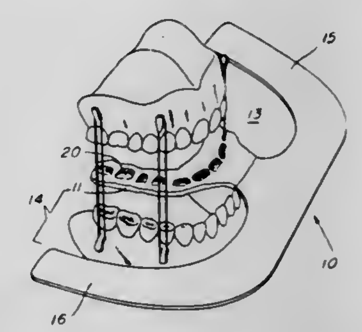
METHOD FOR FITTING DENTURES TO VARIOUS JAW POSITIONS

John P. Dyal, 408 Coronado Tower, 6006 N. Mesa, El Paso, Tex. 79901

Filed Oct. 23, 1975, Ser. No. 625,026

Int. Cl.² A61C *13/08*

U.S. Cl. 32—2 **7 Claims**



2. A denture fitting device comprising a plurality of indexed means each comprising a rigid bite form having index markings preformed on the upper and lower sides thereof for horizontally and simultaneously pre-positioning upper and lower dentures with respect to each other according to any one of many different horizontal relationships of a patient's natural jaw set, depending upon which of said indexing means is used for a given patient, means for resiliently attaching said dentures over said preformed markings in said pre-positioned relationship upon a selected one of said indexed means, and means for simultaneously fitting both said upper and lower dentures to a patient's mouth while said dentures are attached together and to said selected indexed means according to said preformed markings.

4,059,900

CLIP-ON DENTAL RESTORATION AND TOOLS FOR REMOVING SAME

William C. Orthwein, P.O. Box 3332, Carbondale, Ill. 62901

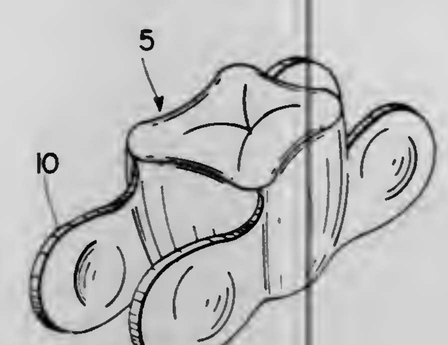
Continuation-in-part of Ser. No. 613,196, Sept. 15, 1975, abandoned. This application Nov. 30, 1976, Ser. No. 746,193

Int. Cl.² A61C *13/22*

U.S. Cl. 32—5 **15 Claims**

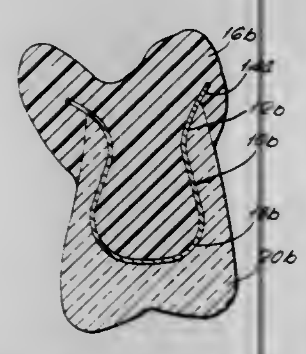
1. A removable dental restoration for filling an edentulous space defined at least at one end by a natural tooth, comprising a central body portion shaped to simulate a natural tooth, said central body portion comprising a pair of substantially parallel resilient longitudinal walls, a pair of substantially rigid end walls substantially perpendicular to said longitudinal walls, an upper wall and a lower wall; and gripping means extending from each said longitudinal wall for at least partially encircling

and releasably gripping an adjacent natural tooth, whereby said gripping means resiliently clamps said restoration and can be released by applying pressure inwardly against said longitu-



dinal walls, said substantially rigid end walls serving as fulcrum points about which said gripping means pivot for movement away from gripping engagement with said adjacent natural tooth when such inward pressure is applied.

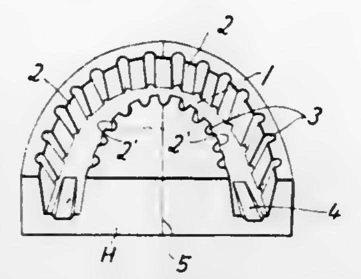
4,059,901
PORCELAIN FUSED TO METAL DENTURE TOOTH RETAINER
Robert Spalten, 745 Fifth Ave., New York, N.Y. 10022
Filed Aug. 20, 1975, Ser. No. 606,190
Int. Cl.² A61C *13/00*
U.S. Cl. 32—8 **4 Claims**



1. A denture tooth for attachment to a denture appliance having a molded denture base conforming to the gum areas of the mouth, said denture tooth comprising a body and an extending metal retainer made of a single piece of metal terminating in a head portion for attachment to the denture base, said metal retainer having embedded in said body, a metal retention portion, U-shaped in cross-section, extending longitudinally towards the biting edge of the tooth for the major portion of the tooth length, providing a large engaging surface to increase its retention and reinforcing characteristics with the tooth body, the anterior and posterior portions of the U-shaped cross-section extending from the tooth body to form the head portion for attachment to the denture base.

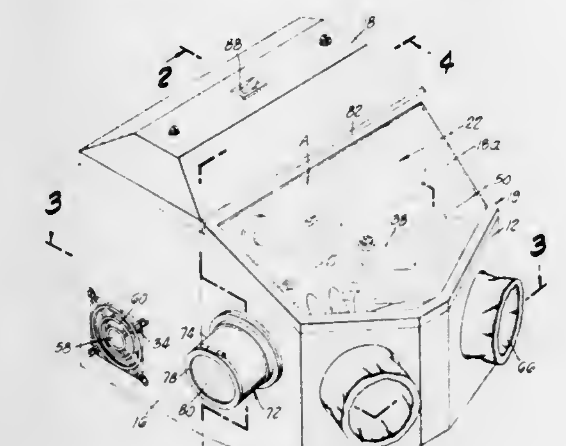
4,059,902
TRAY FOR PREPARING A DENTIFORM MODEL USED FOR AN OPERATION ON A DENTAL TECHNIC
Yoichi Shiokawa, No. 1, 206, Ooazaiwamurada, Saku, Nagano, Japan (385)
Filed May 5, 1976, Ser. No. 683,457
Claims priority, application Japan, May 7, 1975, 51-8222
Int. Cl.² A61C *13/22*
U.S. Cl. 32—11 **1 Claim**

1. A tray for preparing a dental model, the tray comprising a single, integral flat body, an arcuate channel formed in a flat surface of the body and simulating the curvature of a row of teeth, the channel having side walls which are outwardly tapered in the direction of said surface, substantially vertical grooves of arcuate cross section formed at regularly spaced intervals along the entire extent of each of the side walls, the arcuate channel also having a base and open ends and, formed in the base contiguous with each of the open ends of the channel, a respective wedge shaped notch for assisting removal by means of a driver blade of a hard body cast in the channel, the open ends of the channel being adapted to be closed by adhe-



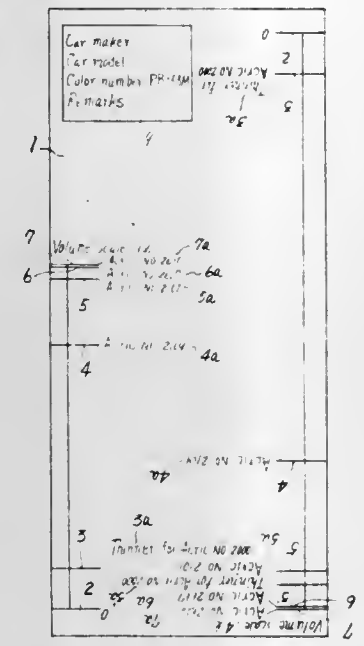
sive tape and the notches being adapted to be filled with a soft substance prior to the filling of the channel with a material which will set to form said hard body.

4,059,903
CONTROLLED ENVIRONMENT WORK ENCLOSURE
Meyer Piet, Arcadia, and Dean Gaylord Giles, Valinda, both of Calif., assignors to Futurecraft Corporation, City of Industry, Calif.
Filed Mar. 31, 1976, Ser. No. 672,510
Int. Cl.² A61C *3/00*
U.S. Cl. 32—40 R **10 Claims**



1. A controlled subatmospheric pressure environment work enclosure comprising:
a. a hollow housing defining a work space;
b. a work platform disposed intermediate said work space;
c. at least one air inlet provided in said housing above said work platform for permitting air to be drawn inwardly from the exterior of said housing;
d. an air outlet provided in said housing below said work platform adapted to permit air to be ejected from said housing;
e. suction means for maintaining subatmospheric pressure in said work enclosure and for continuously drawing a stream of air inwardly through said air inlet and then rapidly in a downward direction through said work space past said work platform toward said air outlet for ejection therethrough; and
f. filter means interposed in said stream of air for filtering the air flowing past said work platform thereby preventing vapors and particulate materials contained therein from escaping from said work enclosure to the exterior of said housing through said air outlet.

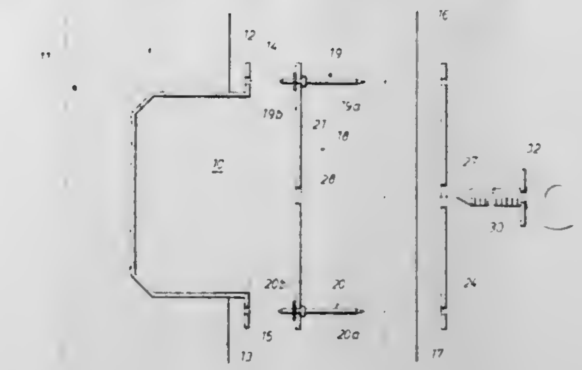
4,059,904
PREPARATION OF COATING COMPOSITION OF SPECIFIED COLOR
Hidetaka Sato, Amagasaki, Japan, assignor to Kansai Paint Company, Limited, Amagasaki, Japan
Filed Mar. 4, 1975, Ser. No. 555,278
Int. Cl.² G01F *23/04*
U.S. Cl. 33—126.7 A **2 Claims**



1. A method of measuring off specified volumes of coloured base coating compositions to be formulated into a coating composition of a specified colour which comprises the steps of:
a. removably inserting on a measuring apparatus a card for measuring off specified volumes of coloured base coating compositions which are to be formulated into a coating composition of a specified colour, wherein said card comprises a scale for indicating the volumes of solvent and coloured base, said scale containing a graduation adjacent to a zero line and indicating the volume of the solvent and graduation lines subsequent to the graduation line to indicate the volumes of coloured base coating compositions and arranged in order of progressively decreasing volumes,
b. setting a pointer to the solvent graduation line on the card, whereby a probe member vertically movable with the pointer in a constant ratio of movement thereto is brought to a specified position within a container on the measuring apparatus,
c. pouring the solvent into said container until it is ascertained with the unaided eyes that the surface of the solvent has contacted the probe member thereby forming a solvent layer
d. progressively setting the pointer to the coloured base coating composition graduation lines, and
e. measuring off specified volumes of coloured base coating compositions being poured into the container for measurement, in the order of progressively decreasing volumes of the base coating compositions by ascertaining with the unaided eyes that the surface of the solvent layer present above the base coating compositions has contacted the probe member.

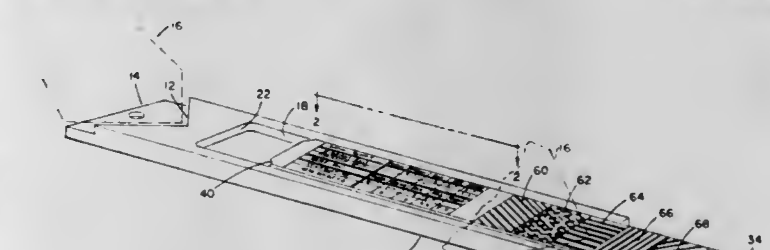
4,059,905
APPARATUS FOR LOCATING ACCESS OPENINGS FOR ELECTRICAL OUTLET BOXES IN COVERING MEMBERS
James H. Wieting, 12914 Memorial Drive, Houston, Tex. 77024
Filed Feb. 26, 1976, Ser. No. 661,624
Int. Cl.² G01B *5/14*
U.S. Cl. 33—180 R **7 Claims**

1. Apparatus for locating an access opening to an electrical outlet box concealed behind a covering member comprising a locator pin assembly for mounting on the outlet box, said assembly having a plate member and sharp-pointed locator pins extending perpendicularly from both sides of the plate member with the pin on one side extending a relatively short distance from the plate member for piercing a relatively thin covering member, such as a wood panel, and the pin on the other side extending a relatively longer distance from the plate



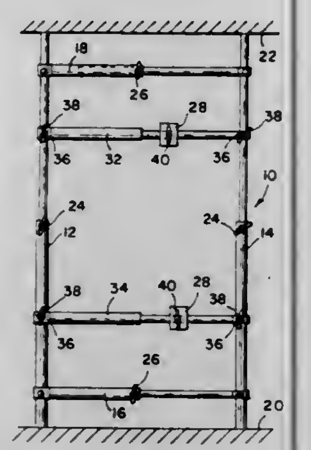
member for piercing a relatively thick covering member, such as wallboard, means for mounting the locator pin assembly on the outlet box with the proper length of pin positioned to pierce the wall covering, and a template for positioning on the pin after it has pierced the wall covering to indicate the proper position for the access opening.

4,059,906
TIE LOCATING DEVICE
George W. Kurtz, 611 Suhill Drive, Huntsville, Ala. 35802
Filed Nov. 10, 1976, Ser. No. 740,424
Int. Cl.² G01B *3/08*
U.S. Cl. 33—180 R **4 Claims**



1. A necktie tying aid comprising:
first and second elongated members, said members being slidably attached and relatively movable along a longitudinal path;
a reference notch adjacent to one end of said first member for receiving and referencing the narrow width end of a tie when positioned around the neck of the user;
adjustable stop means for interacting between said first and second members for setting said aid to a selected overall length; and
index means by which the length of the wide end of the tie is referenceable, and comprising a plurality of adjacent, individually coded, reference areas extending longitudinally along said second member;
whereby, for a selected overall extended length of said aid, a tie would be tied by first placing it around one's neck at an approximate hanging position, placing the narrow end at said reference notch on said first member, extending said second member to a preset stop position, adjusting the tie position until the wide end of the tie is positioned on a selected reference mark on said second member, and tying a tie knot between the hanging lengths of the tie.

4,059,907
ELECTRICAL OUTLET AND SWITCHBOX LOCATOR
Howard Dauber, 24 Heron Lane, Commack, N.Y. 11725
Filed Aug. 24, 1976, Ser. No. 717,130
Int. Cl.^{2} G01B *5/14, 3/00*
U.S. Cl. 33—174 G **7 Claims**

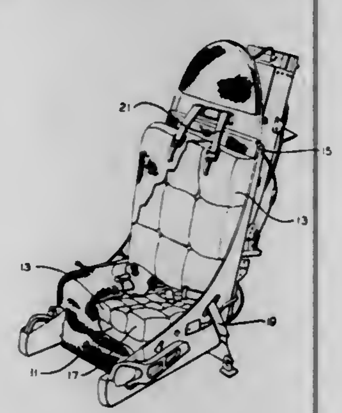


1. A tool for locating and marking an electrical outlet or the like on a wall panel prior to installation comprising:
a framework including a spaced pair of horizontal telescoping members connected at the ends thereof to a pair of spaced vertical telescoping members;
at least one horizontal bar between said pair of vertical members slidably mounted at its opposite ends on said vertical members for vertical movement therealong; and
a template for locating an electrical outlet or the like slidably mounted on said horizontal bar for horizontal movement therealong.

4,059,908
METHOD FOR IMPROVING THE STABILITY OF SEEDS
Walton J. Smith, East Grafton, N.H. 03240
Filed Mar. 30, 1976, Ser. No. 671,996
Int. Cl.^{2} F26B *5/04*
U.S. Cl. 34—15 **4 Claims**

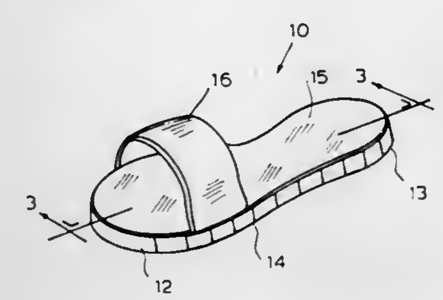
1. A method of improving the stability of primarily dry seeds obtained by naturally or commercially drying seeds to reduce their moisture content and thereby improve their vitality and viability which comprises a step of secondary drying of the seeds at a first temperature of from 50° to 60° C and under a vacuum of at least 100 microns Hg for from 30 minutes to 24 hours and then repeating the secondary drying step at temperature increments of from 5° to 20° C each.

4,059,909
NEURAL RECEPTOR AUGMENTED G SEAT SYSTEM
Gerald Joseph Kron, Binghamton, N.Y., assignor to The Singer Company, Binghamton, N.Y.
Continuation of Ser. No. 224,763, Feb. 9, 1972, abandoned. This application Aug. 9, 1974, Ser. No. 496,131
Int. Cl.^{2} G09B *9/08*
U.S. Cl. 35—12 E **21 Claims**



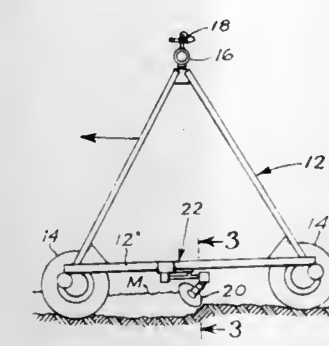
1. Apparatus for providing an occupant of a vehicle simulator with a realistic sensation of G forces associated with a particular vehicular maneuver or motion, comprising:
a. a seat for said occupant comprising:
1. a supporting structure;
2. a plurality of inflatable air cells arranged in side-by-side relationship on said supporting structure, said air cells supporting the body of said occupant, the degree of inflation of said air cells being controllable to cause body excursion, and
3. a plurality of inflatable firmness cells, each of said firmness cells being located between different air cells and said occupant to independently apply pressure to selected portions of the body of said occupant, the degree of inflation of said firmness cells being controllable to selectively vary said applied pressure.
b. coordination means for generating coordinated command signals representative of degrees of inflation of said air and firmness cells which will produce a compatible body excursion and applied pressure variation comparable to that experienced during said particular vehicular maneuver or motion; and
c. means for selectively inflating and deflating said air cells and firmness cells in response to said command signals, whereby said compatible body excursion and applied pressure variation provide said realistic sensation of G forces to the occupant of said seat.

4,059,910
FOOTWEAR APPARATUS
Kenneth Bryden, 1525 G & H Drive, Kissimmee, Fla. 32741, and Norman C. Barrett, 18 Sea Gull Drive, Vero Beach, Fla. 32960
Filed Dec. 23, 1976, Ser. No. 753,633
Int. Cl.^{2} A43B *13/00, 3/12;* A43D *0/00*
U.S. Cl. 36—103 **9 Claims**



1. A footwear apparatus comprising in combination:
a plurality of elongated wooden members of a generally uniform cross-section, each shaped to receive an adjacent member, and having a predetermined shape to collectively form a foot support;
a pair of end elongated wooden members shaped to form the toe and heel end members of a foot support;
flexible connecting means attached at one side of each wooden member to hold said wooden members together in a spaced relationship to each other and to allow separation of said wooden members when said flexible connecting means is flexed;
an upper footwear portion attached to said flexible connecting means to attach said flexible means and wooden members to a wearer's foot, thereby providing a piece of footwear, said upper footwear portion having a flat flexible portion having the same general shape as the flexible connecting means, and forming a pair of flexible portions connecting to said plurality of elongated wooden members; and
said upper footwear portion flat flexible portion also having one portion of a hook and loop material attached thereto and said flexible connecting means is a second portion of a hook and loop material whereby said upper footwear portion and said wooden members can be removably attached to each other.

4,059,911
TRACK FILLER ATTACHMENT FOR CENTER PIVOT IRRIGATION SYSTEMS
Roland C. Bean, and Bruce L. Bean, both of Star Route, Burley, Idaho 83318
Filed Sept. 8, 1975, Ser. No. 611,179
Int. Cl.^{2} E02F *5/22*
U.S. Cl. 37—142.5 **9 Claims**

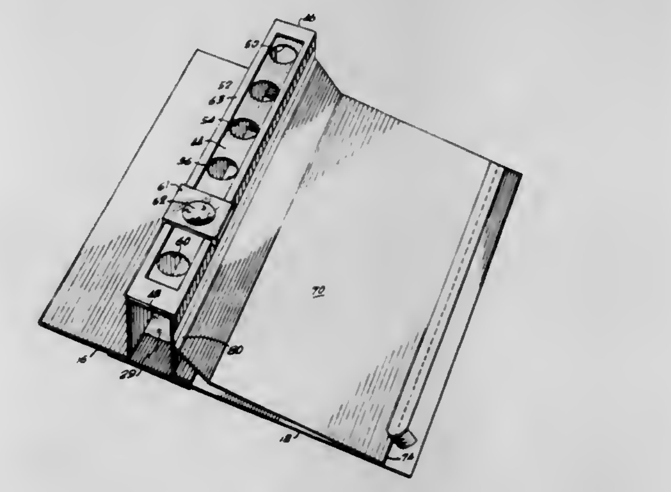


1. A track filler in combination with a center pivot irrigation system having a plurality of support towers each mounted on wheels which, upon rotation of the system, retrace their paths to form depressed annular tracks in the ground by displacing earth to the opposite sides of the track and forming raised mounds thereof, the track filler comprising:
earth moving means attached to each wheelmounted support tower in position to extend transversely across and engage said opposed earth mounds upwardly from substantially ground level and arranged upon repeated rotation of the irrigation system to move the mounded earth back into the track, whereby substantially to level the ground across said track.

4,059,912
IDENTIFICATION STICKER
James D. Noah, 2300 Race St., Fort Worth, Tex. 76111
Filed Aug. 19, 1976, Ser. No. 715,919
Int. Cl.^{2} A44C *3/00*
U.S. Cl. 40—2 R **7 Claims**

1. A display adapted to be attached to an object, comprising:
three sheets of material laminated together and comprising a first layer, a second intermediate layer, and a third layer; said second intermediate layer being sandwiched between said first and third layers;
each of said layers having respective first and second opposite sides;
said first layer being removably secure to said first side of said second intermediate layer with an adhesive such that when said first layer is removed, said first side of said second intermediate layer may be secured to an object with said adhesive;
said first side of said third layer being removably secure to said second side of said second intermediate layer;
said second side of said third layer having a color different from that of said second side of said second intermediate layer;
a plurality of spaced apart groups of like elements of a predetermined shape kiss cut only into said third layer;
said elements being separately removable to expose said second side of said second intermediate layer within the spaces resulting from removal of said elements for forming respective different symbols and which symbols are readily distinguishable due to the difference in color between said second sides of said second intermediate and third layers;
said elements of each said group being located in respective rows and columns adjacent and contiguous each other and being sufficient in number such that any letter of the alphabet and any number from zero through nine may be formed by selective removal of said elements from said third layer to expose said second side of said second intermediate layer of a different color to create a final design that can be secured to said object.

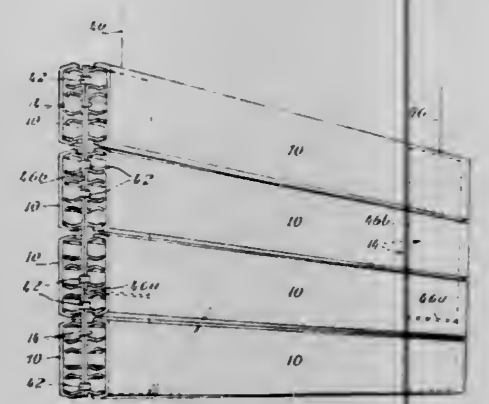
4,059,913
SLIDE DISPLAY
Federico Garcia, 12865 SW. 54th St., Miami, Fla. 33175
Filed July 21, 1976, Ser. No. 707,310
Int. Cl.^{2} G02B *7/02*
U.S. Cl. 40—64 A **6 Claims**



1. A back panel having a fold line thereacross in the central zone defining a first portion and a second portion on opposite sides respectively of the fold line and including,
a strip zone included in the first portion parallel to the fold line with one edge of the strip zone being closely adjacent the fold line, the strip having a plurality of aligned spaced windows therealong and a retainer means to hold a piece of film in each of the windows,
a viewing box comprising a first and a second side wall in spaced parallel relation with an upper edge and a lower edge and comprising a roof having a first end and a second end spanning the upper edges of the side walls, said roof having a plurality of viewing openings in registry with the windows of the strip zone,
means connecting the lower edges of the side walls to the back panel along the strip edges,
a slide on the box and including a magnifying means and guide track means connecting the slide for longitudinal movement across the box between the first and second end of said roof,
a pull member having a first end and a second end, the first end of said pull member being connected to the first side wall of said box and said first side wall being adjacent said fold line and the second end being connected to the second portion of said back panel,
hinge means at the connection of said pull member and said first side wall and said back panel and hinge means included in said means connecting the lower edges of said side wall to said second portion of the back panel, the length of the pull member and the distance between (a) the first side wall of the box at the connection of the pull member and the said first side wall and (b) the second portion of the back panel being a ratio such that the angle opposite the length of the pull member is about 90°,
whereby the box is adapted to collapse when the back panel is folded along the fold line and the box is adapted to be

erected with the first and second side wall in perpendicular relation to the first portion of the back panel when the portions of the back panel are in a parallel plane.

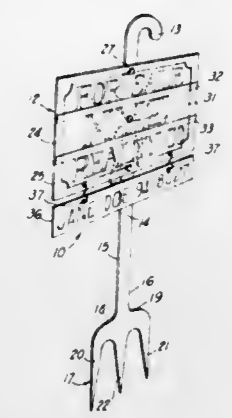
4,059,914
PANEL DEVICE
Charles Edward Dobson, 21 Easton Close, Fishponds, Bristol, England
Filed Apr. 1, 1976, Ser. No. 672,601
Claims priority, application United Kingdom, Apr. 2, 1975, 13736/75
Int. Cl.² G09F *7/18*
U.S. Cl. 40—125 F **7 Claims**



1. A board comprising in combination at least one essentially rigid extruded panel of uniform cross-section, said cross-section being of shallow channel form to provide a planar front surface and a pair of flanges directed rearwardly from opposite edges of the panel and concave on their mutually facing surfaces; and at least two support members arranged behind said panel, the support members being elongate in the direction transverse to the direction of extrusion of said panel and arranged in parallel spaced apart relationship, each support member being a relatively short length cut from an extension so that it is elongate in the direction transverse to the direction of extrusion, the cross-section of the support member extrusion providing a flat base and a plurality of pairs of lugs projecting from at least one face of the base, the pairs of lugs being equidistantly spaced apart across the cross-section so as to define a unit center-to-center spacing, the outer surfaces of each pair of lugs being mutually outwardly convex so as to be spaced apart at their ends which join with the base and at their ends remote from the base and more widely spaced apart intermediate said ends, the lugs being of a thickness which allows them to be resiliently deflectable towards each other to a small degree; the overall width of said panel in the direction transverse to its direction of extrusion being substantially a multiple of said unit center-to-center spacing, such that the panel can be pushed onto the support members by movement in a rearward direction for a snap fit of the rearmost edge portions of the flanges over the mutually outermost lugs of separate pairs of lugs on each support member and a friction fit of said mutually inwardly facing surfaces of the flanges on the lugs.

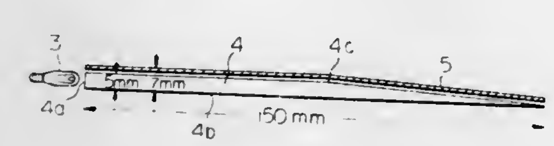
4,059,915
SIGN ASSEMBLY
Frances R. Owens, Rte. 2, Austell, Ga. 30001
Filed June 7, 1976, Ser. No. 693,477
Int. Cl.² G09F *1/00*
U.S. Cl. 40—125 H **4 Claims**

1. A sign assembly comprising, in combination:
a. a standard including a curved upper portion, a lower portion having means thereon for engaging the ground to support said standard in an upright position and an elongated portion interconnecting said upper portion and said lower portipn;
b. a sign adapted to receive indicia for display rotatably mounted on said elongated portion between a display position and a stored position wherein said sign is in longitudinal alignment with said elongated portion and wherein said sign comprises a plurality of rigid, rectangular, foldably interconnected sections, said sign being secured in said display position by means of a combination on said sign and said standard of a protrusion and opening in



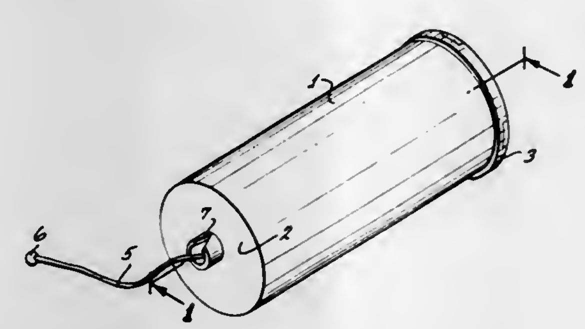
mating engagement with said protrusion, and said sign being supported on said standard through one of said sections such that when said securing means is manually disengaged, the remaining sections are foldable onto said secured section for rotation into said stored position.

4,059,916
LIGHT DIFFUSING DEVICE
Noribumi Tachihara, Tokyo; Yukio Mizohata, Kawagoe, and Jun-ichi Makita, Tokorozawa, all of Japan, assignors to Copal Company Limited, Tokyo, Japan
Filed Jan. 26, 1976, Ser. No. 652,574
Claims priority, application Japan, Jan. 30, 1975, 50-12799; Apr. 17, 1975, 50-52177[U]; May 8, 1975, 50-62501[U]; May 22, 1975, 50-69013[U]; Sept. 9, 1975, 50-123458[U]; Sept. 11, 1975, 50-125560[U]
Int. Cl.² G09F *13/18*
U.S. Cl. 40—130 K **20 Claims**



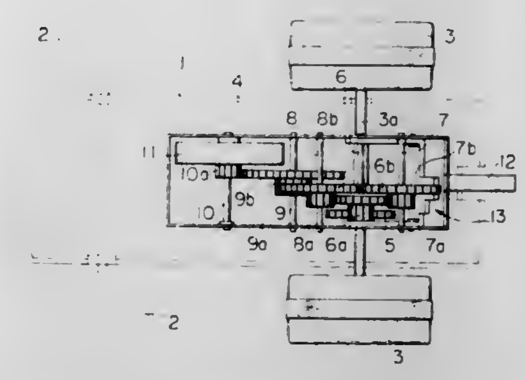
1. In a light diffusing device for illumination purposes including a light source, a thin transparent base plate having a front illuminating surface and a rear surface with a side edge arranged adjacent to said light source, said rear surface being a roughened surface with a directional light reflecting property parallel to major side edges of said base plate, and a light reflecting plate arranged adjacent to said rear surface for permitting light from said light source to be received into said base plate and emanated from said front illuminating surface directly or after being reflected by said rear surface and said light reflecting plate so that uniform illumination is obtained over the entire area of said front illuminating surface, the light reflecting property of said roughened rear surface being determined so that, when the light is incident thereto at an angle of 75° in a plane parallel to the direction of the major side edges of said base plate, the peak of the reflecting power is in the range of 5–30% at the reflecting angle of 75° and the width of the half value is in the fange of 4°–6°, when the light is incident at an angle of 75° in a plane perpendicular to the direction of the major side edges, the peak of the reflecting power is in the range of 5–30% at the reflecting angle of 75° and the width of thehalf value is in the range of 6°–10°, said light reflecting plate having a light reflecting power substantially greater than 30% and a width of the half value of the distribution of the reflecting light greater than 90°, whereby uniform illumination prevails over the entire area of said illuminating surface by a combination of the optical properties of said rear surface and said reflecting plate, said rear surface of said base plate having a plurality of small parallel grooves defined by a plurality of small parallel ridges running the direction from said side edge of said base plate adjacent to said light source to the opposite side edge, said light reflecting plate being of a light diffusing reflecting surface having an extremely low transparency and absorption.

4,059,917
SIMULATED FIRECRACKER
Larry Averett Sims, Hermosa Beach, and William John Kelley, Torrance, both of Calif., assignors to Mattel, Inc., Hawthorne, Calif.
Filed Nov. 10, 1976, Ser. No. 740,506
Int. Cl.² A63H *5/00*
U.S. Cl. 46—196 **11 Claims**



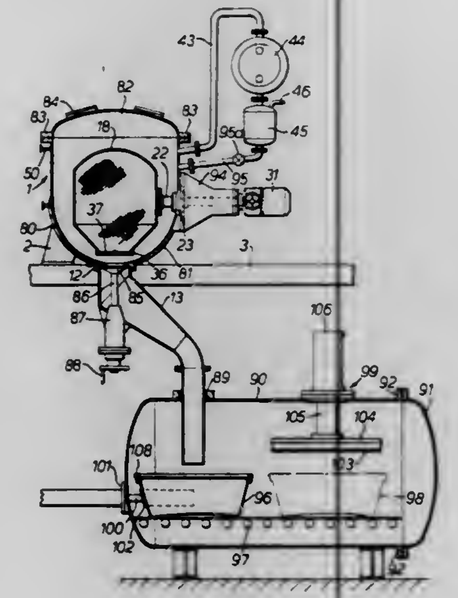
1. A firecracker which comprises:
a cylindrical tube, said tube having a first wall closing one end and an aperture through said end wall;
a resiliant cord extending through said aperture into said tube;
piston means located within said tube in sealing engagement with the inner walls thereof and adapted to travel therethrough and pressurize a portion of said tube;
helical spring means connected in between said piston and said first end wall for driving said piston means;
means coupling said cord to said piston for permitting said cord to retract said piston to a loaded position and concurrently to compress said spring;
acoustic sound generating means coupled to said piston means for generating a whistle-like sound over a predetermined interval of time upon release of said cord;
a cap-detonating means, including a base;
a detonating cap-receiving anvil means;
hammer means adapted to pivot and strike said cap-receiving anvil means for exploding any cap placed thereon;
shoulder pin means mounted to said base for pivotally mounting said hammer means for pivotal movement transverse to the axis of said tube;
torsion spring means mounted on said shoulder pin means coupled to said hammer means for driving said hammer means;
latch means for holding said hammer means in a loaded position;
latch pin means for releasing said latch means in response to a force thereon;
said base being carried at the remaining end of said tube in sealing engagement therewith;
a passage through said base;
said latch pin means extending through said passage for slidable movement therein with an end of said pin located in the path of travel of said piston means, said compression spring means having sufficient force to push said piston means into engagement with and move said latch pin means, whereby upon release of said cord a whistle-like sound is emitted for a short interval of time followed by explosion of an installed cap.

4,059,918
TOY VEHICLE
Yukimitsu Matsushiro, Tokyo, Japan, assignor to K. K. Matsushiro, Tokyo, Japan
Filed July 19, 1976, Ser. No. 706,330
Claims priority, application Japan, Aug. 1, 1975, 50-94648
Int. Cl.² A63H *29/20*
U.S. Cl. 46—209 **4 Claims**



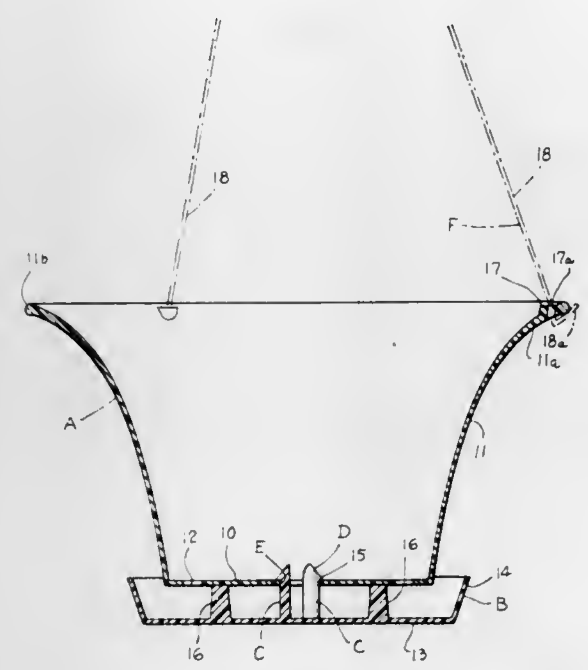
1. A toy vehicle comprising:
at least one ground-engaging drive wheel;
a flywheel;
a gear train for connecting the drive wheel and the flywheel whereby the drive wheel can be employed to bring about rotation of the flywheel and the inertia of the flywheel when rotating can be employed to bring about rotation of the drive wheel, the gear train including a drive gear connected to the drive wheel, an idler gear in meshing engagement with the drive gear, and at least first and second additional gears;
an idler gear shaft upon which the idler gear is mounted and which is displaceable between a position in which the idler gear meshes with said first additional gear, and the drive wheel and the flywheel are connected through an even number of gears including said idler gear and said first additional gear, and a position in which the idler gear meshes with said second additional gear, and the drive wheel and the flywheel are connected through an odd number of gears including said idler gear and said second additional gear, the idler gear shaft having at least one intermediate position in which it meshes with neither the first additional gear nor the second additional gear; and
a lever coupled to the idler gear shaft and operable to displace said idler gear shaft without breaking meshing engagement of the drive gear and the idler gear, the lever having a first position in which the idler gear shaft is positioned so that the idler gear meshes with the first additional gear, a second position in which the idler gear shaft is positioned so that the idler gear meshes with neither the first additional gear nor the second additional gear and the idler gear shaft is prevented from moving to a position in which the idler gear engages the second additional gear but is free to move to a position in which the idler gear engages the first additional gear and is urged towards engagement with the first additional gear by the drive gear when the drive wheel is rotated in one sense, a third position in which the idler gear shaft is positioned so that the idler gear meshes with neither the first additional gear nor the second additional gear and the idler gear shaft is prevented from moving to a position in which the idler gear engages the first additional gear but is free to move to a position in which the idler gear engages the second additional gear and is urged towards engagement with the second additional gear by the drive gear when the drive wheel is rotated in the sense opposite to said one sense, and a fourth position in which the idler gear shaft is positioned so that the idler gear meshes with the second additional gear.

4,059,919
HEAT TREATING PARTICULATE MATERIAL
Joseph Green, Maidenhead, England, assignor to H. J. Heinz Company Limited, Middlesex, England
Filed Apr. 26, 1976, Ser. No. 680,419
Claims priority, application United Kingdom, Apr. 25, 1975, 17326/75
Int. Cl.² A01G *1/04*
U.S. Cl. 47—1.1 **6 Claims**



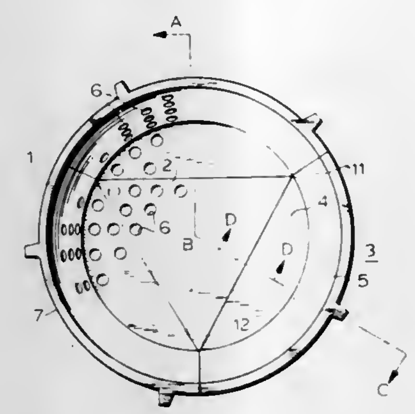
1. A method of heat treating particulate food or other grain material comprising:
a. supplying batch of particulate food or other grain material to be treated into an autoclave;
b. sealing the autoclave;
c. supplying water in liquid or vapour phase into the autoclave at a sufficient temperature and for a sufficient time to hydrate and sterilize the particulate material;
d. applying vacuum to the autoclave to effect flash cooling of the hydrated material;
e. agitating the material in the autoclave while it is hydrated, sterilized and flash-cooled; and
f. directly feeding the sterilized treated material from the autoclave into a sterile container under aseptic conditions.
5. A method for the hydration of grain for use in the production of mushroom spawn comprising:
a. supplying a batch of grain into an autoclave;
b. sealing the autoclave;
c. supplying water in liquid or vapour phase into the autoclave at a sufficient temperature and for a sufficient time to effect a predetermined degree of hydration and sterilization of the grain;
d. agitating the grain in the autoclave while it is hydrated and sterilized;
e. flash-cooling the hydrated grain in the autoclave while agitation continues;
f. adding a powder to the flash-cooled hydrated grain and continuing said agitation to mix the powder with the grain so that the grain is coated and separated;
g. feeding steam into the autoclave for a time sufficient to sterilize the coated grain;
h. flash cooling the sterilized grain;
i. continuing agitation of the grain in the autoclave during the sterilization and flash-cooling of steps (g) and (h);
j. removing the cooled sterile grain from the autoclave under aseptic conditions;
k. inoculating mycelium into the cooked sterile grain; and
l. then packing the inoculated grain into a sterile container which permits growth of the mycelium under incubation conditions.

4,059,920
HANGING FLOWER POT ARRANGEMENT
Paul O. Worrell, P.O. Box 347, Etowah, N.C. 28729
Filed Mar. 3, 1976, Ser. No. 663,560
Int. Cl.² A01G *9/02*
U.S. Cl. 47—67 **1 Claim**



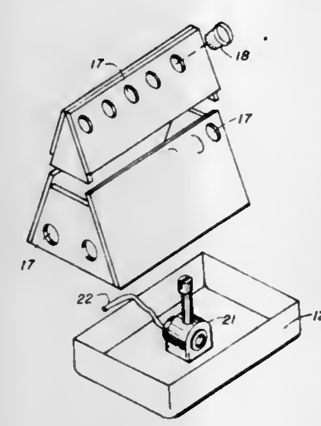
1. A hanging flower pot assembly comprising:
A. a flower pot for containing the roots of a plant having a bottom, and a surrounding side wall extending upwardly from a marginal portion of said bottom;
B. a dish carried below said bottom having a base and an upwardly extending flange carried by said base extending upwardly with an upper edge terminating substantially coplanar with said bottom;
C. a plurality of circumferentially spaced, flexible projections extending upwardly from a medial portion of said base;
D. enlarged inwardly converging cam follower portions carried by said projections having outwardly extending portions projecting beyond said projections carried adjacent an upper portion thereof in spaced relation to said base;
E. a camming portion defining an opening in the medial portion of said bottom for urging said cam follower portions inwardly so as to be received therein;
F. said outwardly extending portions having a substantially flat lower surface which rests on the bottom of said pot for supporting said dish;
G. means carried by said flower pot for suspending the entire assembly forming a hanging arrangement; and
H. a plurality of circumferentially spaced protuberances extending upwardly from said base toward said bottom when said dish is suspended from said pot, said protuberances substantially surrounding said projections and extending at least half the distance from said projections to the periphery of said bottom and further comprising a plurality of drain holes in said bottom positioned radially beyond said protuberances to facilitate the drainage and aeration of said soil when the water level is therebelow;
whereby water may flow from the the bottom of the flower pot into said dish providing drainage for the roots avoiding excessive soaking thereof as may cause rotting.

4,059,921
PLANT POT FOR GROWING A PLANT
Takeshi Moriwaki, Sakai, Japan, assignor to Daicel Co., Ltd., Sakai, Japan
Filed June 18, 1976, Ser. No. 697,732
Claims priority, application Japan, June 21, 1975, 50-85978[U]
Int. Cl.² A01G *9/02*
U.S. Cl. 47—73 **12 Claims**



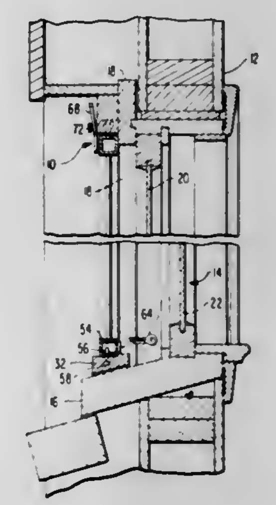
1. A pot for growing and transplanting plants comprising:
an inner base portion having a plurality of holes therethrough;
a plurality of flap portions adjacent each other flexibly connected to said inner base portion and having a plurality of holes therethrough, each flap portion comprised of:
a flat outer base portion flexibly connected to said base portion and having a plurality of holes therethrough, and
a side portion projecting upward from said flat outer base portion and having a plurality of holes therethrough, and
said flexible connection permitting said flap portions to be flexed outwardly for transplanting; and
clamping means on said flap portions for holding said flap portions together in a closed position for growing said plant, said inner and outer base portions being coplanar when said pot is in said closed position.

4,059,922
SPRAYER HYDROPONIC GROWER
Joseph A. DiGiacinto, 535 Ocean Blvd., Coronado, Calif. 92118
Filed Jan. 12, 1976, Ser. No. 648,098
Int. Cl.² A01G *25/00*
U.S. Cl. 47—82 **5 Claims**



1. An essentially self-contained and portable hydroponic grower comprising an enclosure having a base pan for containing a liquid nutrient solution; a pair of walls projecting upward from said base pan to support a plurality of plants thereabove, said walls being inclined relative to the bottom of said pan in an A-frame configuration with the apex thereof above said base pan and having their lower ends circumscribed by said pan, each of said walls being generally planar and including a plurality of apertures extending generally normally therethrough communicating with the interior of said enclosure; a plurality of plant pots, each of which is adapted to contain a porous plant support medium and extend through an associated one of said apertures with its side wall in engagement with the peripheral edge of said aperture for said pot to be held in position thereby, the root end of each of said pots being permeable both to the flow of liquid nutrient solution to the interior thereof and to the passage of the roots of plants supported thereby outward; a liquid spray head positioned within said enclosure between said inclined walls to spray a liquid toward roots of plants projecting from the root ends of pots extending through said apertures; a liquid pump positioned within said base pan and connected to said spray head to deliver thereto under pressure a liquid nutrient solution contained in said pan; and end walls at opposite ends of said enclosure extending between said inclined walls and from the apex of said A-frame configuration to said base pan to define with said inclined walls a hollow enclosure containing said spray head and adapted to contain said root ends of said pots, said end walls being substantially moisture impermeable for maintaining a humid atmosphere within said enclosure.

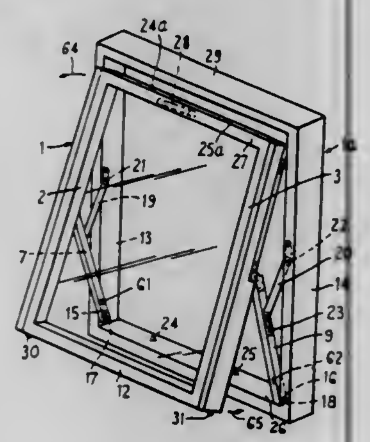
4,059,923
SECURITY WINDOW GUARD
Abe Sauer, 1205 Bristol Apt. 17, Memphis, Tenn. 38117
Filed Apr. 16, 1975, Ser. No. 568,494
Int. Cl.² E06B *3/68, 7/088*
U.S. Cl. 49—57 **3 Claims**



1. In a security guard for windows having a rigid metal grid assembly mounted on the window frame and covering the window opening, the improvement wherein said security guard includes a fixed rectangular frame which extends entirely about the window frame to the exterior of the window opening, said fixed frame including generally opposed horizontal top and bottom frame members and opposed vertically extending side frame members, each of the opposed members of at least one of said opposed horizontal top and bottom frame members and said opposed vertically extending side frame members including orifice means in the inwardly directed surface thereof; a rigid open rectangular frame movably mounted in said fixed frame and including opposed top and bottom beams and opposed side beams, said rigid open rectangular frame being inset within said fixed frame with said beams thereof normally disposed in closely adjacent parallel relation to corresponding members of said fixed frame and with the exterior surface of said beams thereof non-extendant beyond the exterior surface of corresponding members of said fixed frame, each of the opposed beams of at least one of said opposed top and bottom beams and opposed side beams including keeper means, said orifice means of said fixed rectangular frame and said keeper means of said rigid open rectangular frame being provided on respectively corresponding members thereof and positioned so that said keeper means of said rigid rectangular frame cooperatively engages with said orifice means of the corresponding member of said fixed frame, said keeper means comprising key actuated blinded mortice lock means including bolt means adapted to project into said orifice

means of the member of said fixed frame corresponding to the member of said rigid open rectangular frame having the same in a manner to lock said movable frame in said fixed frame, the key receiving face of said key actuated blinded mortice lock means being positioned on the inner side of said opposed beam having the same and opening toward the window opening about which said security guard is provided; and a metal grid rigidly mounted within the opening of said movable frame and covering the window thereof in an outwardly spaced relation thereto.

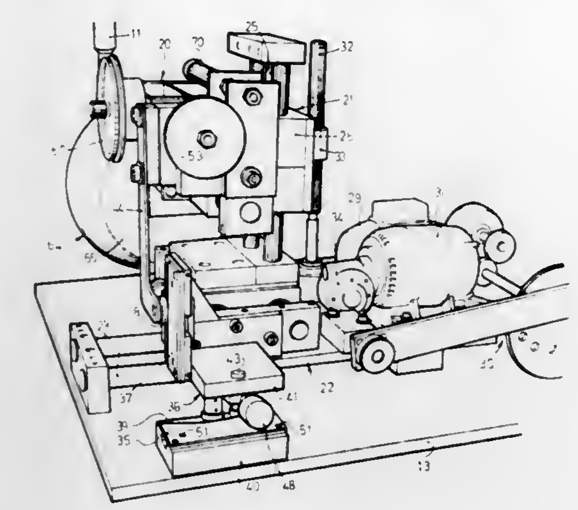
4,059,924
OPERATING MECHANISM FOR DOORS AND WINDOWS
Johannes Harald Bierlich, Oresundshoj 15, Charlottenlund, Denmark
Filed July 7, 1976, Ser. No. 703,293
Int. Cl.² E05D *15/48*
U.S. Cl. 49—192 **10 Claims**



1. A window assembly comprising a window sash, a surrounding frame, the sash having a pair of secondary stiles which are hinged to the frame and to opposite sides respectively of the sash so that the sash can be tilted with said stiles from a closed position into a ventilating position and can be rotated horizontally about one of the ends of said stiles into a reversed position, and the assembly further comprising operating and locking mechanism including an operating member which in a first condition with the sash in the closed position locks the sash to the frame, in a second condition frees the sash from the frame and locks said stiles to the sash to permit tilting of the sash to the ventilating position and in a third condition with the sash in the ventilating position unlocks said stiles from said sash to permit rotation of the sash with respect to said stiles.

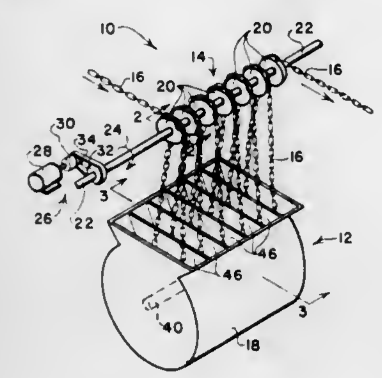
4,059,925
MACHINE FOR FORMING A CURVED SURFACE ON A WORKPIECE
Stuart Eadow-Allen, Birmingham, England, assignor to Dollond & Aitchison (Services) Limited, Birmingham, England
Filed Jan. 27, 1976, Ser. No. 652,764
Int. Cl.² B24B *13/00, 17/02*
U.S. Cl. 51—100 R **10 Claims**

1. A machine comprising:
a. a tool carrier,
b. a carriage mounted for movement relative to the tool carrier,
c. means for confining movement of the carriage to reciprocation in three manually perpendicular directions
d. a workpiece carrier secured on the carriage,
e. drive means for causing movement of the workpiece carrier in both a first of said directions and in a second of said directions said movement in at least the first of said directions being continuous reciprocation and said second of said directions being transverse to said first of said directions and
f. guide means for so constraining movement of the workpiece carrier in a third of said directions in accordance with said movement in the first and second of said directions that, when the tool carrier is moved and



a cutting tool is carried by the tool carrier, the cutting tool describes a curved surface of predetermined form on a workpiece carried by the workpiece carrier.

4,059,926
CHAIN FINISHING SYSTEM
John F. Rampe, Mayfield Heights, Ohio, assignor to Rampe Research, Cleveland, Ohio
Filed June 16, 1976, Ser. No. 696,558
Int. Cl.² B24B *31/06*
U.S. Cl. 51—163.1 **15 Claims**

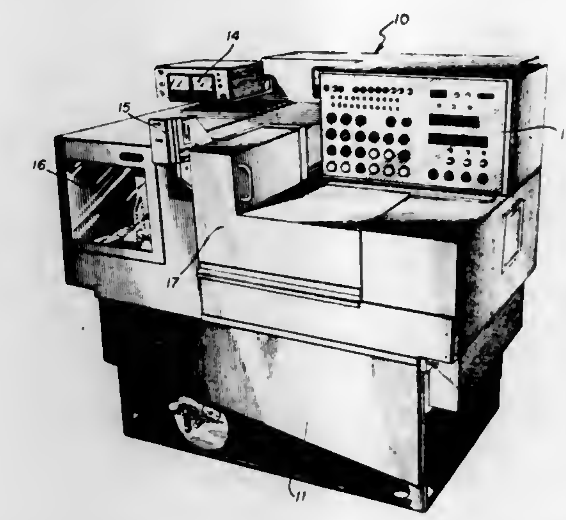


1. A method of finishing surface portions of an elongated, flexible substrate formed from a multiplicity of loosely interconnected links, comprising the steps of:
a. supporting at least one loop of the substrate such that lower portions of the loop depend into a quantity of finishing media contained in a vibratory finishing machine receptacle, with the loop being of sufficient length to let lower portions of the loop lie loosely on the bottom surface of the receptacle whereby adjacent links can move freely relative to each other;
b. vibrating the receptacle to impart a finishing action to its contents; and
c. feeding successive segments of the substrate along a path of travel defined by the loop to effect surface finishing of such segments.

4,059,927
GRINDING MACHINE
Edward G. Robillard, Cherry Valley, Mass., assignor to Cincinnati Milacron-Heald Corporation, Worcester, Mass.
Filed Aug. 30, 1976, Ser. No. 718,900
Int. Cl.² B24B *49/10*
U.S. Cl. 51—165.77 **3 Claims**

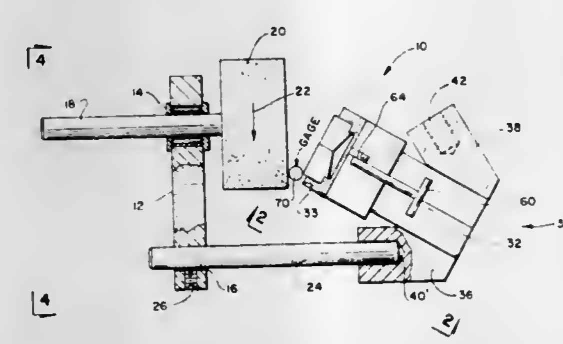
1. A grinding machine for generating a surface of revolution on a workpiece, comprising: a. a base,

b. a workhead and a wheelhead mounted on the base for relative movement transversely of the axis of the surface of revolution,
c. a stepping motor operative to produce the said relative movement in response to receipt of electrical pulses,
d. a pulse generator connected to the stepping motor to supply the said electrical pulses, the generator including a



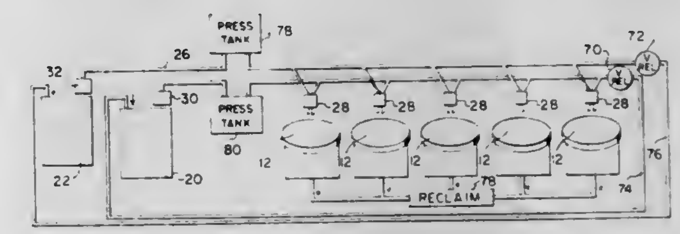
resistance unit connected to control the frequency of the pulses, the unit including an actuator movable in increments to connect equal increments of resistance to the generator, the said increments of resistance producing equal increments of frequency of pulses, and
e. a circuit that reduces the pulse frequency to zero when an open circuit occurs in the resistance unit.

4,059,928
DRILL GRINDING ATTACHMENT
Raymond Marchitello, 3905 Carpenter Ave., Bronx, N.Y. 10466
Filed Oct. 12, 1976, Ser. No. 731,705
Int. Cl.² B24B *19/00*
U.S. Cl. 51—241 R **8 Claims**



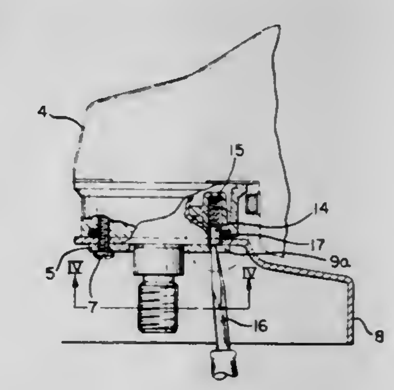
1. Apparatus for sharpening drill bits for use in a drill, said drill bit having an end with two facets to be sharpened, comprising, in combination: a main frame; a first shaft rotatably supported by said main frame near one end thereof; a second shaft substantially parallel to the first shaft and fixedly supported in said main frame near the other end thereof; a grinding wheel rotatably mounted on one end of said first shaft for sharpening said facets of said drill bits; means for rotating said grinding wheel; and a drill bit holding element mounted on one end of said second shaft for holding said drill bit therein, said holding element being positioned such that said drill bit has its facets in close proximity to the flat surface of said grinding wheel, whereby said facets are sharpened for subsequent reuse, and wherein said drill bit holding element comprises a longitudinally extending locking plate having a first end and a second end, said second end being adjacent said grinding wheel, a first arm and a second arm divergingly extending from opposite side of said first end of said locking plate, each of said first and second arms having an elongated opening formed therein for receiving said one end of said second shaft, whereby either one of said first and second arms may be attached to said second shaft for sharpening one or the other of said two facets of said drill bit, and wherein said first arm extends downwardly at an angle relative to said first end of said locking plate, and said second arm extends upwardly at an angle relative to said first end of said locking plate.

4,059,929
PRECISION METERING SYSTEM FOR THE DELIVERY OF ABRASIVE LAPPING AND POLISHING SLURRIES
David C. Bishop, Des Plaines, Ill., assignor to Chemical-Ways Corporation, Lake Bluff, Ill.
Filed May 10, 1976, Ser. No. 684,972
Int. Cl.² B24B *57/00*
U.S. Cl. 51—263 **11 Claims**



1. A system for supplying an abrasive-containing liquid to a machine for use therein which comprises, a supply of abrasive slurry concentrate containing abrasive grain which is suspended in a liquid containing sufficient emulsifying agent to suspend the abrasive grain, a supply of diluent liquid incapable of suspending the grain, a mixing chamber positioned relatively close to a desired work surface, means for separately conveying said slurry concentrate and said diluent to said mixing chamber to develop a diluted slurry concentrate in which the concentration of emulsifying agent is insufficient to suspend the grain such that at least a substantial portion of the liquid can be separated from the abrasive grain in said diluted slurry concentrate substantially immediately after use, and means for supplying said diluted slurry concentrate to said work surface.

4,059,930
REMOVABLE GUARD ARRANGEMENT FOR A POWER TOOL HAVING A ROTATING HEAD FOR PERFORMING WORK ON A WORKPIECE
Lorenzo Ercole Alessio, Lecco, Italy, assignor to The Black and Decker Manufacturing Company, Towson, Md.
Filed June 2, 1976, Ser. No. 692,217
Claims priority, application Italy, July 30, 1975, 25929/75
Int. Cl.² B24B *55/04*
U.S. Cl. 51—268 **14 Claims**



1. A removable guard arrangement for a power tool having a rotating head for rotatably driving a tool for working a workpiece comprising:
a guard member;
a mounting member fixedly attached to the tool for accommodating said guard member thereon;
means formed on said guard member and said mounting member for removably bayonet-engaging said members; and

a. locking mechanism including: a locking piece, resilient means for holding said locking piece in a first position against said mounting member to restrict the movement of said guard member while mounted on said mounting member, and engaging means formed on said guard member for engaging said locking piece when said locking piece is in said first position, said locking piece and said engaging means defining respective engaging surfaces extending in direction parallel to each other thereby ensuring that said guard member is held firmly on said mounting member, said locking piece being mounted so as to be movable against the force of said resilient means to a second position thereby permitting said guard member to be rotated past said locking piece so as to facilitate the bayonet removal of said guard member from the tool.

4,059,931

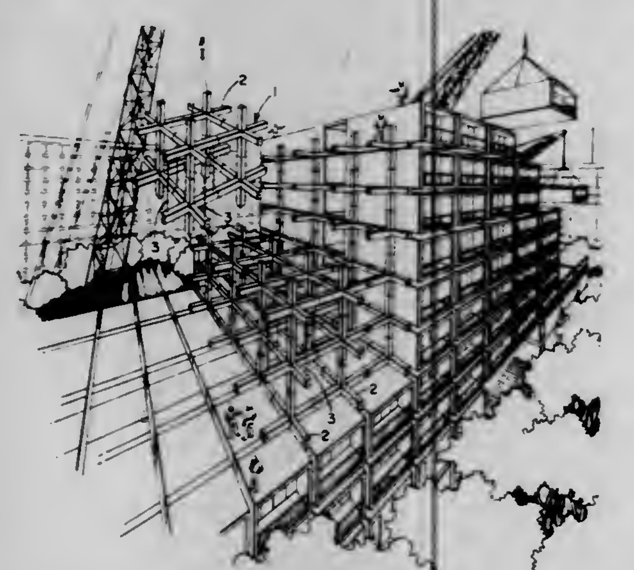
BUILDING FRAMING SYSTEM FOR POST-TENSIONED MODULAR BUILDING STRUCTURES

William T. Mongan, Box 69, R.D. No. 2, Factoryville, Pa. 18419

Filed Jan. 29, 1976, Ser. No. 653,398

Int. Cl.² E04B *1/348;* **E04C** *3/10*

U.S. Cl. 52—79.12 **5 Claims**



1. In a building system wherein an assembly of post-tensioned structural elements are utilized, said post-tensioning being accomplished after preliminary assembly of said structural elements, the combination comprising:

a. a multiple number of said structural elements, each of said elements being of precast material and comprising at least four intersecting legs extending from a common axis and lying in one plane and at least one leg extending from said axis and in a second plane vertically to said one plane, each of said legs having a tendon conduit therethrough, said conduit being adapted to receive a plurality of tendons therethrough, said structural elements being aligned so that the legs in one plane abut each other and the legs in said second plane abut each other thereby to permit alignment of the conduits in said respective one and second planes;

b. a plurality of tendons extending through said conduits in said one and second planes, each of said tendons having a button at the end thereof,

c. means to lock said tendons in position before tension has been applied thereto comprising a rotatable locking plate having a plurality of keyhole tendon and tendon button receiving apertures therein, whereby, upon rotation in one direction said tendon buttons are retained by said plate to maintain tension and upon rotation in the opposite direction said tendon buttons are released to thereby release said tension,

d. means to exert tension upon the ends of said tendons at the outermost of said legs, said means including an anchor plug in the end of each of said outermost legs, said anchor plug having apertures therein to receive said tendons, wedges adapted to engage said tendons and be retained in said apertures after tension has been applied to said tendons, and

e. tension applying means in interconnection with the ends of said tendons.

4,059,932

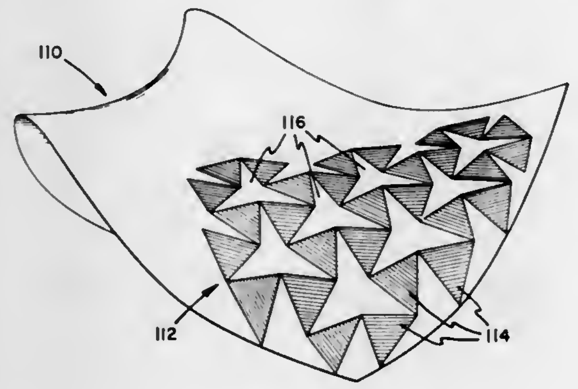
SELF-SUPPORTING STRUCTURAL UNIT HAVING A THREE-DIMENSIONAL SURFACE

Ronald Dale Resch, 1257 2nd Ave., Salt Lake City, Utah 84103

Filed June 21, 1976, Ser. No. 697,701

Int. Cl.² E04B *1/32*

U.S. Cl. 52—81 **13 Claims**



1. A self-supporting structural unit having a polygonal, non-planar surface in three dimensions approximating a smooth, predefined, non-planar, analytical surface in three dimensions, said polygonal, non-planar surface comprising: a first plurality of identical, individually fabricated and constructed planar polygons having predefined and fixed areas and equal sides of a predetermined fixed length; and a second plurality of individually fabricated and constructed substantially planar polygons having various areas with respect to themselves and equal sides of a predetermined length, the sides of said first plurality of identical, individually fabricated and constructed planar polygons being equal in length to the sides of said second plurality of individually fabricated and constructed substantially planar polygons and being secured together with their sides in coextensive alignment, all the vertices of said first and said second pluralities of individually fabricated and constructed polygons lying substantially in the smooth, predefined, non-planar, analytical surface in three dimensions and with the surface areas of said first and said second pluralities of individually fabricated and constructed polygons forming the polygonal, non-planar surface in three dimensions of said self-supporting structural unit.

4,059,933

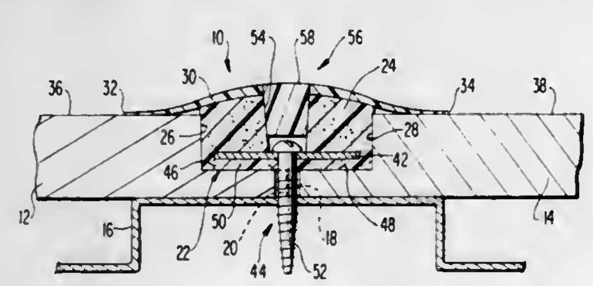
STRIP FOR FASTENING AND SEALING SHEETS OF CONSTRUCTION MATERIAL

Richard S. Funk, Altadena; S. Alan Stewart, Rancho Palos Verdes, and David L. Ruff, Torrance, all of Calif., assignors to Grefco, Inc., Bala Cynwyd, Pa.

Filed Mar. 11, 1977, Ser. No. 776,757

Int. Cl.² E04F *19/02*

U.S. Cl. 52—127 **24 Claims**



1. An apparatus for sealingly joining two edge-abutted sheets of construction meterial and for attaching the sheets to an underlying frame, the sheets having outwardly-facing surfaces and being oriented with the abutted edges positioned over a frame member, the abutted edges being rabbeted to form a channel along the junction of the sheets, the apparatus comprising:

a. a compressible resilient pad member for being drawn into the channel, said pad member extending in the longitudinal direction along the channel and having a transverse dimension for providing an interference fit with the sides of the channel when said pad member is drawn into the channel;

b. a resilient cap member permanently adhered to said pad member, said cap member extending longitudinally along the channel and having edges extending in the transverse direction past said pad member for contacting the outwardly-facing surfaces of the abutted sheets when said pad member is drawn into the channel, said extended edges being sufficiently flexible in both the transverse and longitudinal directions to sealingly conform to the outwardly-facing surfaces when said extended edges have been made to contact the outwardly-facing surfaces;

c. a metal strip embedded in said pad member and extending longitudinally along the channel, said strip being oriented to overlie the junction when said pad member is drawn into the channel; and

d. means for securing said metal strip to the frame member, said pad member being drawn into the channel upon activation of said securing means, the rabbeted surfaces of the sheets being captured between the portion of said pad underlying said metal strip and the frame member.

4,059,934

ARRANGEMENT FOR FASTENING AN UPSTANDING POST TO A FLOORBOARD

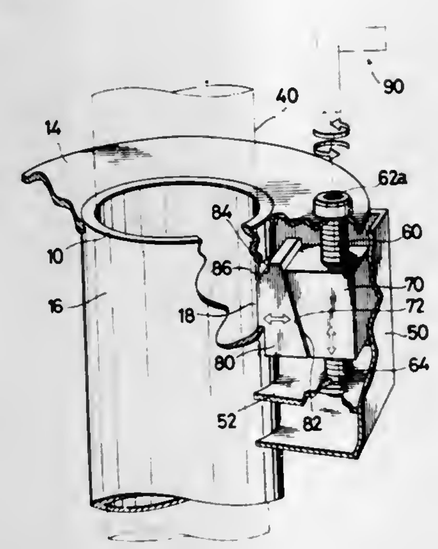
Seiji Hayamizu, Koshigaya, Japan, assignor to Senoh Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 18, 1977, Ser. No. 779,233

Claims priority, application Japan, Sept. 3, 1976, 51-118448[U]

Int. Cl.² E02D *27/42*

U.S. Cl. 52—297 **4 Claims**



1. An arrangement for fastening an upstanding post in a floor board for use in indoor sports comprising:

a. a hollow cylindrical support, being provided with an opening in the circumferential wall thereof for receiving a loosely fitted post, said support being defined by a ring-shaped flange at an upper end thereof and having a truncated conically shaped projection at the bottom thereof, said support being embedded in a concrete block positioned below the floorboard at a predetermined depth,

b. a guide box, having a support plate therein, disposed on the outer circumferential wall of said cylindrical support for covering the opening in said cylindrical support,

c. a headed screw rod being rotatably supported below the head thereof by said flange whereby said head appears above said guide box, and being rotatably supported at the lower end thereof by said support plate disposed within said guide box,

d. a first wedge member, having a tapered surface at one side thereof, a screw for threadedly receiving said screw rod for upward and downward movement, said first wedge member being prevented from rotation about an axis of said screw rod by said guide box,

e. a second wedge member, having a tapered surface facing said tapered surface of said first wedge member received in the opening of said circumferential wall of said support being movable in the radial direction of said support in accordance with movement of said first wedge member,

f. step means provided at the top end of said second wedge member, said second wedge member being disposed to be stopped by the edge of said opening in said support when said second wedge member moves in a radial direction of said support to firmly press the outer circumferential surface of said post, said second wedge being further provided with a tapered surface in proximity to said step, and

g. a hole provided through the floorboard being in vertical alignment with said screw rod, whereby as means for turning said screw rod at the driving end thereof are inserted through said hole said driving end being positionable in said head of said screw rod for rotation, said first wedge member being movable in an upward and downward direction in response to rotation of said screw rod, said second wedge member being in turn movable in radial direction of said support to securely fasten the outer circumferential surface of said port in said support.

4,059,935

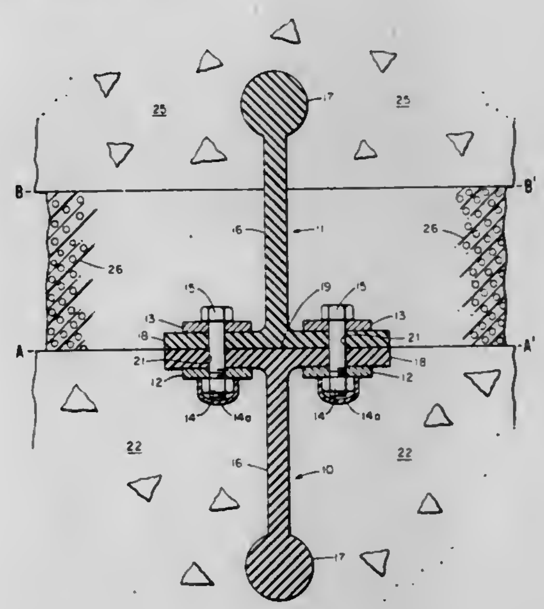
POST-APPLIED WATERSTOP

Robert W. Faid, Westford, Mass., assignor to W. R. Grace & Co., Cambridge, Mass.

Filed June 7, 1976, Ser. No. 693,507

Int. Cl.² E04B *1/68;* **E01C** *11/02*

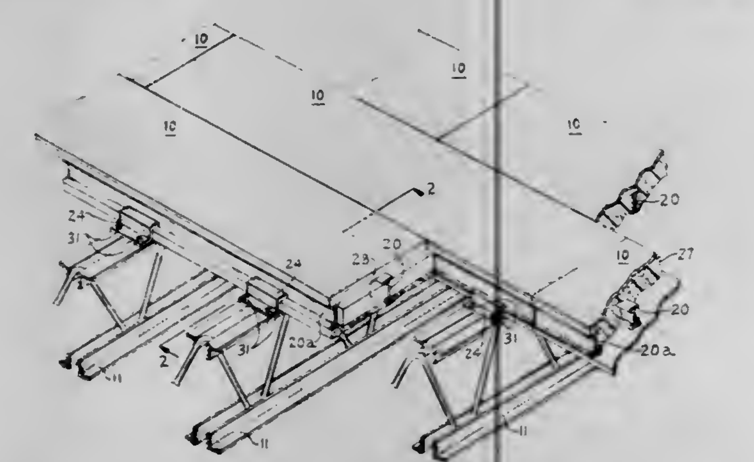
U.S. Cl. 52—396 **12 Claims**



1. A waterstop member in the form of a solid strip made of resilient elastomeric material for use in a post-applied waterstop assembly employed to seal the joint between two concrete bodies, said waterstop comprising in transverse cross-section; (a) a central web to be anchored in said concrete and joined by one of its two edges to the median of (b) a crossweb, thereby forming a substantially T-shaped cross-section, the said central web (a) constituting the lower, downwardly-extending leg of said T, the said crossweb (b) constituting the upper, horizontally-extending leg of said T, said central web further in cross section having thickened areas at locations generally removed from its edge joined to said crossweb, which thickened areas resist withdrawal of said central web from said concrete; said

crossweb having perforations preformed therethrough along the length thereof, said perforations being regularly distributed on each side of the central web, said crossweb further having a substantially flat surface remote from its surface to which the said central web is joined for engaging in sealing relationship with another said substantially flat surface of a second like waterstop member.

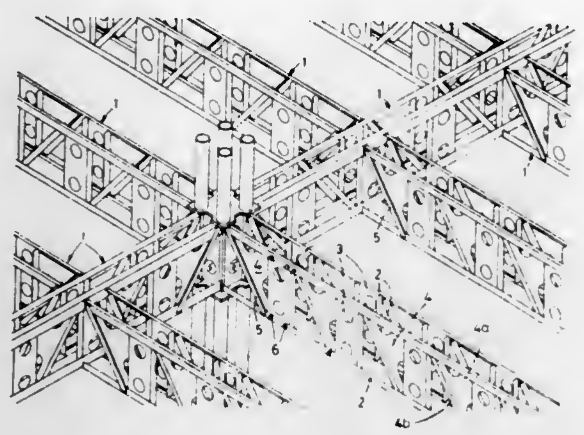
4,059,936
PANEL CONSTRUCTION FOR ROOFS AND THE LIKE
Edward E. Lukens, Bethlehem, Pa., assignor to Insuldeck Corporation, Bath, Pa.
Filed Sept. 27, 1976, Ser. No. 727,170
Int. Cl.² E04B *5/52*
U.S. Cl. 52—492 **14 Claims**



1. A panel of generally rectangular shape for use in building construction and for attachment to a support comprising
a first lower fire resistant gypsum board lamina,
a second lamina superposed thereon in adherent relation thereto,
said second lamina being of stabilized plastic foam and having embedded therein between the side edges a longitudinally extending steel I-beam with its lower flanges engaged with a face of the first lamina and held in engagement therewith by said second lamina,
the upper flanges of said longitudinally extending I-beam being interiorly disposed below the face of said second lamina opposite to that engaged with the face of the first lamina,
the second lamina being in covering relation to said upper flanges,
said second lamina having a tongue along one longitudinal edge thereof,
said second lamina having in secured engagement along an opposite edge face a steel I-beam having its lower flanges in the same plane as the lower flanges of the first mentioned I-beam and its upper flanges in the same plane as the upper flanges of the first mentioned I-beam and having a longitudinal edge providing a groove for the reception of an edge tongue of an adjoining panel, and
members for securing said second mentioned I-beam in place on the support.

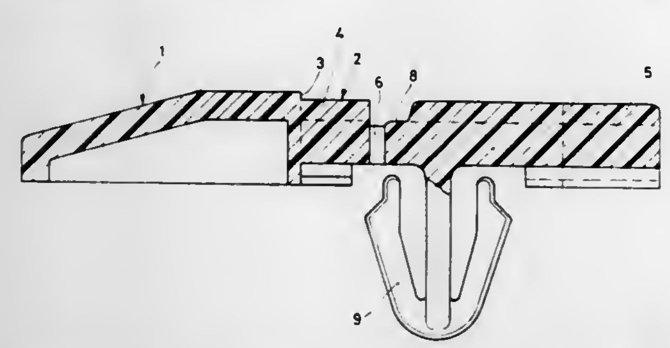
4,059,937
STEEL GIRDER
Fritz Haller, Solothurn, Switzerland, assignor to U. Scharer Sohne AG, (USM), Munsinger, Switzerland
Filed May 25, 1976, Ser. No. 689,798
Claims priority, application Switzerland, May 30, 1975, 7031/75
Int. Cl.² E04C *3/04*
U.S. Cl. 52—693 **2 Claims**

1. A steel girder rectangular in cross-section and having a top portion, bottom portion and opposite side portions,
four elongated parallel beams located at the respective corners of said rectangular cross-section,
pairs of spaced-apart strut elements disposed on opposite sides of said girder for connecting pairs of said beams on the top and bottom portions of said girder,
diagonally disposed H-shaped bracing elements secured within said girder and extending from the lower ends of one pair of strut elements to the upper ends of an adjacent



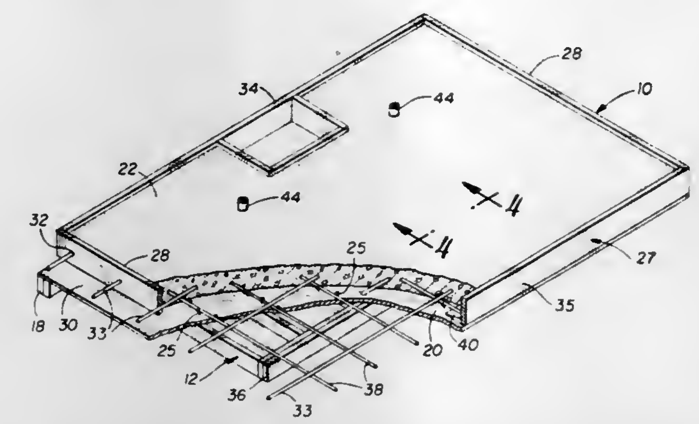
pair of strut elements, said H-shaped bracing elements having oppositely disposed open U-shaped recesses in their upper and lower ends to provide a continuous unobstructed open space in the top and bottom portions of said girder to provide ease of mounting auxiliary elongated building components within said girder.

4,059,938
ADJUSTABLE MOLDING END CAP
Michele Aimar, Turin, Italy, assignor to ITW Fastex Italia, S.p.A., Turin, Italy
Filed Sept. 10, 1976, Ser. No. 721,151
Claims priority, application Italy, Sept. 11, 1975, 27134/75
Int. Cl.² E04C *2/38*
U.S. Cl. 52—716 **3 Claims**



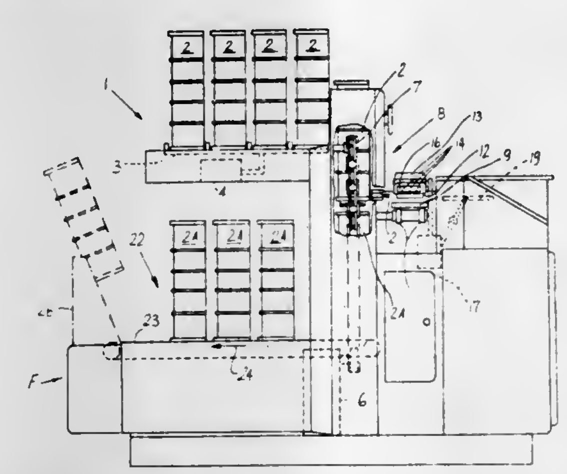
1. A one-piece plastic adjustable end cap and retaining means adapted for mounting decorative moldings to an apertured work panel including a first portion retaining means having a substantially rigid head complementary to and adapted to be accepted within said molding in spaced relation to an end of said molding, said first portion further having stud means for anchoring said head in relatively fixed relation to said apertured panel, a second portion moveably spaced relative to said first portion and having molding engaging means for complementary acceptance within the said molding and a decorative end cap integral with and extending from said engaging means, said cap abutting the end of the molding and projecting axially therefrom, and resilient means connecting said two portions whereby relative movement is permitted between said anchored first portion and said second end cap portion.

4,059,939
PREFABRICATED BUILDING UNIT
Lillard H. Elliott, Monte Vista, Colo., assignor to Elliott Enterprises of Monte Vista, Monte Vista, Colo.
Filed Aug. 30, 1976, Ser. No. 718,973
Int. Cl.² E04G *21/00*
U.S. Cl. 52—745 **1 Claim**



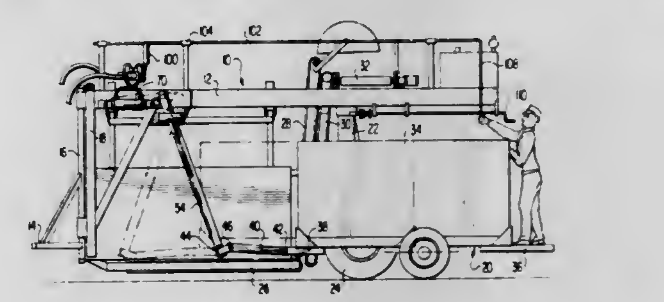
1. The method of constructing a prefabricated building unit for use with similar adjacent units, comprising:
a. framing a stud wall against a flat horizontal surface,
b. nailing a coating of intermediate wall on one side of said stud wall, allowing the nail heads to protrude a substantial distance from the intermediate wall,
c. placing a frame for concrete on top of the intermediate wall,
d. placing horizontal reinforcing bars in the frame with the ends of the bars extending through holes in the sides of the frame for joining units,
e. pouring a concrete outer wall in the frame while the stud wall remains against the flat horizontal surface, the concrete holding the stud wall in a flat plane and preventing warpage of the studs,
f. washing the concrete to produce an exposed aggregate finish, and
g. raising the wall to vertical position for installation with said similar units at a building site.

4,059,940
APPARATUS FOR FILLING CONTAINERS WITH CIGARETTES OR THE LIKE
Gunter Menge; Karl-Heinz Grieben; Lutz Reitmeier, all of Hamburg, and Willi Frank, Hohnsdorf, all of Germany, assignors to Hauni-Werke Korber & Co. KG, Hamburg, Germany
Filed Mar. 30, 1976, Ser. No. 671,744
Claims priority, application Germany, Apr. 11, 1975, 2515898
Int. Cl.² B65B *19/04*
U.S. Cl. 53—148 **19 Claims**



1. In an apparatus for introducing groups of cigarettes or analogous rod-shaped articles into containers, a combination comprising a group forming device; means for supplying articles to said device; conveyor means for transporting containers past said device; transfer means for moving groups of articles from said device into a container on said conveyor means, said transfer means being arranged to perform translatory movements between first and second positions and to move a group of articles from said device into a container during movement from said first position; and drive means for said transfer means, including a variable-speed prime mover having a rotary output element, a mechanical transmission having input means receiving motion from said output element and output means for imparting translatory movements to said transfer means, and control means for varying the RPM of said output element in accordance with a predetermined pattern, said control means including means for effecting the acceleration of said prime mover from zero speed at a relatively high first rate and the deceleration of said prime mover to zero speed at a relatively low second rate.

4,059,941
TRAILER HITCH FOR A TOBACCO HARVESTER
Oren M. Taylor, Highway 701 South, Elizabethtown, N.C. 28337
Filed May 7, 1976, Ser. No. 684,227
Int. Cl.² A01D *45/16*
U.S. Cl. 56—27.5 **3 Claims**

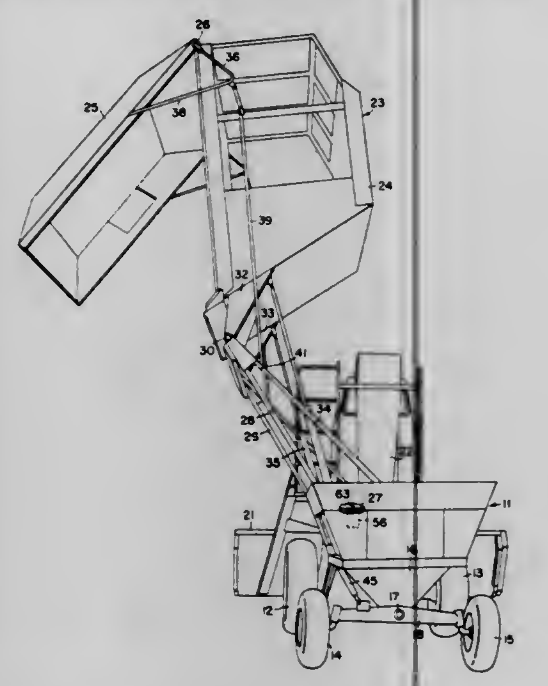


1. A tobacco harvesting combination comprising a tobacco harvester having defoliator means adapted to remove the leaves from tobacco plants as the harvester transverses a row of tobacco plants and conveyor means for depositing said leaves to one side of said harvester, a trailer having means thereon for receiving said tobacco leaves and coupling means for adjustably coupling said trailer to said harvester in operative relation to receive the leaves from said conveyor means, said coupling means comprising lever means pivotally mounted on said harvester, hydraulic means mounted on said harvester and operatively connected to said lever means for pivoting said lever means and connecting means for connecting said trailer to said lever means whereby upon operation of said hydraulic means to pivot lever means said trailer will be moved relative to said harvester and said leaves will be evenly received and distributed throughout said trailer.

4,059,942
COTTON HARVESTER
David Lee Trimble, Polk City; Russell Dean Copley; James Keith Jensen, both of Ankeny, and Francis Edward Schlueter, Des Moines, all of Iowa, assignors to Deere & Company, Moline, Ill.
Filed July 18, 1975, Ser. No. 597,102
Int. Cl.² A01D *46/08*
U.S. Cl. 56—30 **8 Claims**

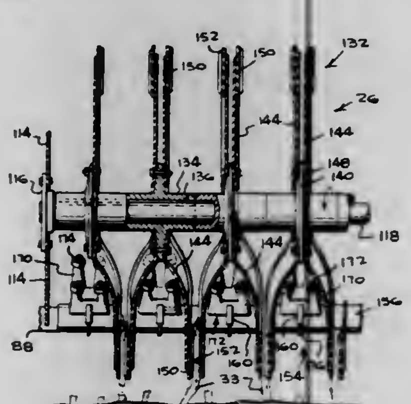
1. In a cotton harvesting implement having a main frame carried on a pair of transversely spaced traction wheels at its forward end and a pair of transversely spaced steerable wheels at its other end, with the former wheels being mounted on the frame by a transversely elongated wheel support rigid with the frame, and the latter wheels being mounted on the frame by a transversely elongated rigid wheel support pivotally mounted at its center on the frame on a fore-and-aft extending horizontal axis, harvesting devices supported on the frame forward of the front traction wheels and having a transverse expanse greater

than the transverse expanse of the wheels; structure on the frame defining a fore-and-aft extending pivot above and outboard of the wheels, and a cotton receptacle supported on the frame above the front and rear wheels and shiftable about the pivot defined by the structure between an inboard position in which the receptacle is generally inboard of the pivot and above the wheels and a discharge position in which the receptacle is over the pivot and a large portion thereof is outboard of the pivot; power means for shifting the receptacle between



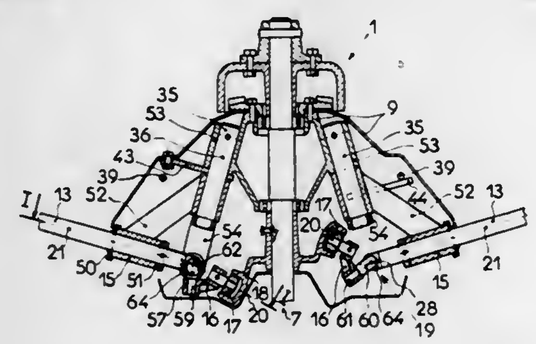
inboard and discharge positions; a hydraulic cylinder extending between the wheel support for the steerable wheels and the frame normally permitting free relative vertical movement between the support and frame; a hydraulic control for said cylinder actuated upon the power means shifting the receptacle toward said discharge position to lock the cylinder againt extension or retraction and upon returning the receptacle to its inboard position making the cylinder freely extensible and retractable.

4,059,943
HARVESTER APPARATUS
Gerald J. Peasley, R.R. No. 1, Eilers Road, Montaque, Mich. 49437
Filed May 28, 1975, Ser. No. 581,632
Int. Cl.² A01D *45/00*
U.S. Cl. 56—327 A **17 Claims**



1. A harvesting apparatus adapted for traveling along an asparagus bed and picking asparagus stalks, said apparatus comprising a support frame, ground engaging means mounted to the frame for maintaining the support frame at a predetermined distance above the ground, and picking means mounted on the support frame for grasping only the stalks of a predetermined first height above the ground and bending the stalks of the asparagus to break the stalks at a second height above the ground which is less than the predetermined first height and at which the stalk is of a predetermined desired pith, said picking means including a rotary driven shaft mounted on the support frame perpendicular to the direction of travel of the harvesting apparatus and parallel to the ground, pairs of parallel flexible discs fixed to the rotary shaft and having protrusions on at least one of the radial surfaces of each disc, spacing means for bringing pairs of adjacent discs into close proximity during rotation of the discs through a picking zone, means for separating the discs after the discs rotate out of the picking zone and drive means for rotating the discs at peripheral speeds other than the ground speed of the harvesting apparatus and at sufficient relative velocity between the periphery of the disc and the ground to bend and break the asparagus stalks thereby permitting asparagus or the like guided into the picking zone to be grasped, bent and broken by the adjacent discs and then to be removed as the discs separate to produce a macimum yield of premium grade asparagus by picking only asparagus of the proper pith at a second height lower than a predetermined first height to which the asparagus must grow before being harvested.

4,059,944
HAYMAKING MACHINE FOR THE TEDDING AND WINDROWING OF FODDER
Walter Reber, Saverne, France, assignor to Kuhn, S.A., Saverne, France
Filed May 4, 1976, Ser. No. 683,032
Claims priority, application France, May 5, 1975, 75.14257; Oct. 28, 1975, 75.33490
Int. Cl.² A01D *79/00*
U.S. Cl. 56—370 **22 Claims**

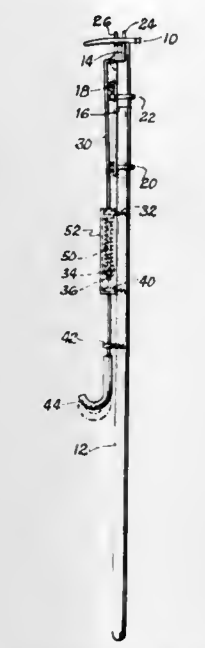


1. In a haymaking machine for the tedding and windrowing of fodder, comprising at least one rake wheel driven in rotation on which working tool-carrier arms are mounted for pivoting in support bearings and possess at their ends facing the rotation axis of the corresponding rake wheel a control crank provided with a roller which moves in a guide cam so as to cause the working tools to pivot, over a portion of their path of revolution, upwards and in the direction opposite to the direction of rotation of the corresponding rake wheel during windrowing; the improvement in which the control cranks provided with rollers are connected with the working tool-carrier arms by means of an articulation, the angle formed between the geometric axes of the control cranks and the geometric axes of the working tool-carrier arms, seen from above, varying when the said carrier arms are transposed from the windrowing position into the tedding position and vice versa, the rollers fast with the said control cranks remaining in engagement with the guide cam of the corresponding rake wheel both during windrowing and during tedding.

4,059,945
RAKE CLEANING ATTACHMENT
Robert Martinez, 2340 San Diego Ave., Ramona, Calif. 92065
Filed May 20, 1976, Ser. No. 688,273
Int. Cl.² A01D *7/00*
U.S. Cl. 56—400.1 **3 Claims**

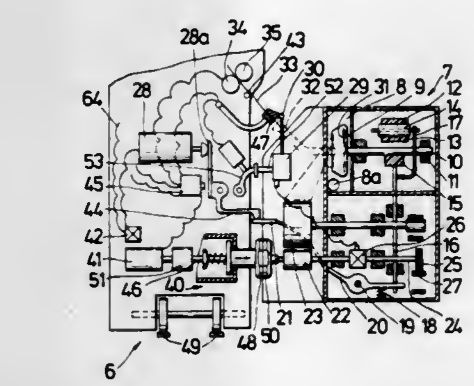
1. In combination with a rake having an elongated handle and a series of spaced tines projecting from a common base element at one end of said handle, support member secured to said handle near said one end, an ejector member pivoted at one end on said support member and formed at the other end

with a series of tine cleaning projections extending through the spaces between adjacent tines, said ejector member being movable between a normal retracted position where said projections are disposed at the bases of said tines and an extended position where said projections are disposed at the tips of said tines, a manual pull member longitudinally slidably mounted on said handle for movement generally parallel to said handle,



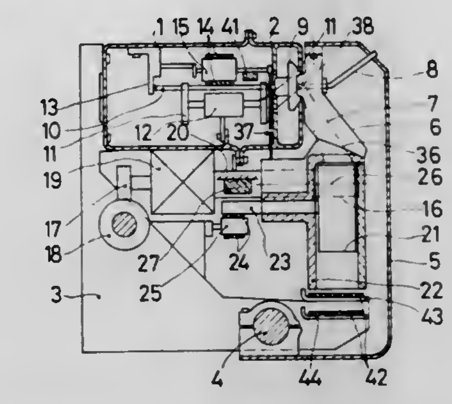
an actuating rod pivotally connected at opposite ends to said ejector member and said pull member, resilient means on said handle connected to said actuating rod for biasing said rod to dispose said ejector member in retracted position, and means on said handle coacting with said pull member providing a limiting stop to prevent said ejector member from being displaced beyond the tips of said tines in said extended position.

4,059,946
METHOD AND APPARATUS FOR START-SPINNING A THREAD ON OPEN-END SPINNING UNITS
Dieter Böttcher, Bad Uberkingen; Heinz Schulz, Donzdorf, and Fritz Stahlecker, Bad Uberkingen, all of Germany, assignors to Fritz Stahlecker and Hans Stahlecker, both of, Germany
Filed Dec. 2, 1975, Ser. No. 637,050
Claims priority, application Germany, Dec. 7, 1974, 2458042
Int. Cl.² D01H *15/00*
U.S. Cl. 57—34 R **27 Claims**



3. An apparatus for start-spinning a thread on open-end spinning units, in which each spinning unit is equipped with means for feeding a sliver which are switched off after a thread break, said means being acted upon by control means of a travelling maintenance unit, which is equipped with means which switch means for feeding said sliver of said spinning unit on and/or off,
in which the maintenance unit is divided into two independently travelling partial units, one containing the means for switching the sliver feed on and off for a given period of time and the other containing means for performing the actual start-spinning operation.

4,059,947
OPEN-END SPINNING UNIT
Gerd Stahlecker, Bad Uberkingen, Germany, assignor to Fritz Stahlecker and Hans Stahlecker, both of, Germany
Filed Oct. 17, 1975, Ser. No. 623,474
Claims priority, application Germany, Oct. 30, 1974, 2451551
Int. Cl.² D01H *1/12*
U.S. Cl. 57—58.89 **26 Claims**

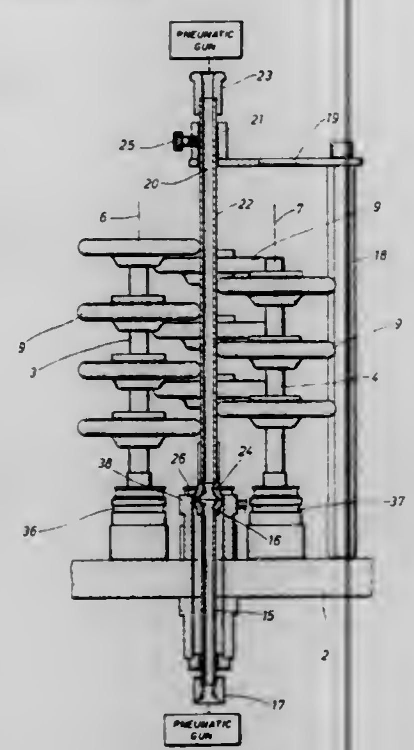


1. An open-end spinning unit comprising:
spinning rotor means for spinning fiber material supplied thereto,
opener roller means for opening fiber material supplied to the spinning rotor means,
opener roller drive means for driving said opener roller means,
a common lid covering said spinning rotor means and said opener roller means, said common lid being movable between a closed operating position and an open non-operating position,
and opener roller housing means carrying said opener roller means, said opener roller housing means being movable with respect to said spinning rotor means between a driving position with said opener roller means in driving engagement with said opener roller drive means and a non-driving position with said opener roller means out of driving engagement with said opener roller drive means,
said common lid being operable to hold said opener roller housing means in said driving position when said common lid is in said closed operating position.

4,059,948
AUTOMATIC THREADING FALSE-TWIST SPINDLE
Yves C. Derail, La Murette-Ambierle, and Jean-Claude Dupenble, Roanne, both of France, assignors to ASA S.A., Roanne, France and Societa Nazionale Industria Applicazioni Viscosa S.p.A., Milan, Italy
Filed May 21, 1976, Ser. No. 688,791
Claims priority, application France, May 23, 1975, 75.16736
Int. Cl.² D01H *7/92*
U.S. Cl. 57—77.33 **14 Claims**

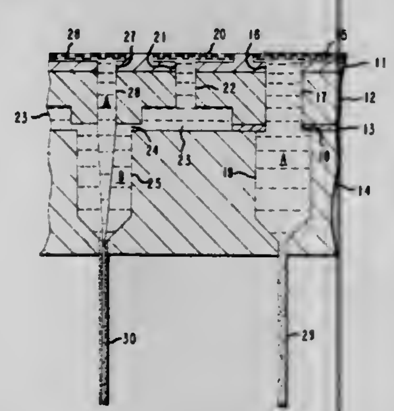
8. In a false twist texturing spindle unit of the type having at least three driven parallel axles symmetrically disposed about a median axis defining the central axis of the spindle, each said axle being provided with at least one rotationally symmetric frictional twisting disc whereby said discs overlap said central axis in an operative mode to supply twists to the yarns passing therealong and said axles being outwardly movable in a threading mode and said unit having means for supplying yarn to the spindle area and means for taking up yarn after the false twist operation, the improvement comprising a first fixed guide tube colinear with said central axis and providing a tubular path for introducing yarn into the spindle unit and terminating in a mouth portion proximate one end of said discs, a second linearly retractable guide tube colinear with said central axis and having a length at least as long as the portion of said axles incorporating said discs and being selectably positionable in either a retracted operating position wherein the yarn passes through the retractable tube after engagement with said discs or in a threading position wherein the terminal end portion of

the retractable tube is moved into communication with the mouth of said fixed tube for establishing a substantially uninterrupted tubular path along the central axis of the unit, and means for propelling yarn through said first and second tubes during the threading mode.



10. A spindle unit as claimed in claim 8 wherein said means for propelling comprises pneumatic gun means for moving the yarn through said first and second tubes.

4,059,949
SHEATH-CORE COSPUN HEATHER YARNS
Lin-Fa Lee, Chattanooga, Tenn., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.
Division of Ser. No. 442,905, Feb. 15, 1974, Pat. No. 3,992,499. This application Sept. 2, 1976, Ser. No. 719,954
Int. Cl.² D02G *3/04*
U.S. Cl. 57—140 BY **16 Claims**



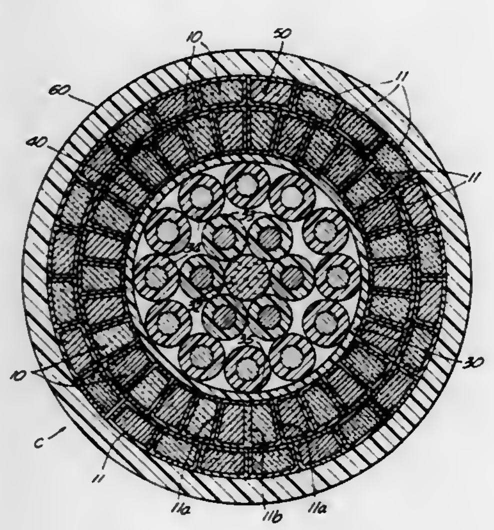
12. A yarn exhibiting differential dyeing capability consisting essentially of two groups of filaments which are comprised of two different thermoplastic, melt-spinnable, fiber-forming polymers selected from the group consisting of poly(ethylene terephthalate) and poly[ethylene terephthalate/5-(sodium-sulfo)isophthalate], said polymer compositions having substantially different receptivities for a first class of dyes and a common receptivity for a second class of dyes, wherein a first group of filaments consists of homofilaments of one of said polymers and the second group of filaments consists of substantially concentric, sheath-core filaments, the sheath being comprised of the other of said two polymers and the core being comprised of the same polymer as the homofilaments.

4,059,950
MULTIFILAMENT YARN HAVING NOVEL CONFIGURATION AND A METHOD FOR PRODUCING THE SAME
Takao Negishi, and Kazuo Tomiita, both of Otsu, Japan, assignors to Toray Industries, Inc., Tokyo, Japan
Filed Dec. 11, 1975, Ser. No. 639,873
Int. Cl.² D02G *1/02, 3/34*
U.S. Cl. 57—140 J **9 Claims**

1. A polyester yarn composed of a plurality of individual fibrous materials, each of said fibrous materials provided with thicker cross-sectional portions, thinner cross-sectional portions and intermediate thickness-size portions randomly distributed along the axial direction thereof, said by the following four conditions,

a. a distribution curve of the cross-sectional area of said individual fibrous materials is deviated to the thinner side,
b. the degree of variability, V/S, of said cross-sectional area of said individual fibrous materials, where V is the standard deviation and S is the mean value, is in a range between 7% and 30%,
c. in the distribution of the cross-sectional areas of said fibrous materials, if the range of distribution is divided in such a way that the distribution range in the thicker side from the average value is divided by a width corresponding to ½ of the standard deviation thereof, the distribution frequency in any class defined by the above-mentioned method of division is less than three times the distribution frequency in a class adjacent to said specific class in the thinner side of the distribution.
d. the standard deviation of the average cross-sectional area of individual fibrous materials in optional cross sections of said multifilament yarn is smaller than the quotient of the standard deviation of said fibrous materials divided by the one-fourth power of the average number of said fibrous materials constituting said optional cross sections of said multifilament yarn.

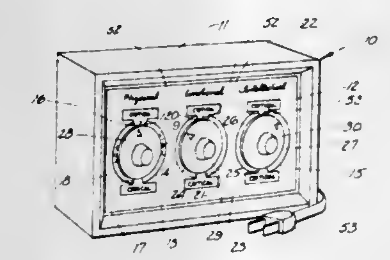
4,059,951
COMPOSITE STRAIN MEMBER FOR USE IN ELECTROMECHANICAL CABLE
Norman P. Roe, Idyllwild, Calif., assignor to Consolidated Products Corporation, Idyllwild, Calif.
Division of Ser. No. 574,611, May 5, 1975, Pat. No. 3,973,385. This application May 3, 1976, Ser. No. 682,329
Int. Cl.² H01B *7/18;* **D07B** *1/16*
U.S. Cl. 57—149 **5 Claims**



1. In an electromechanical cable, a composite strain member comprising:

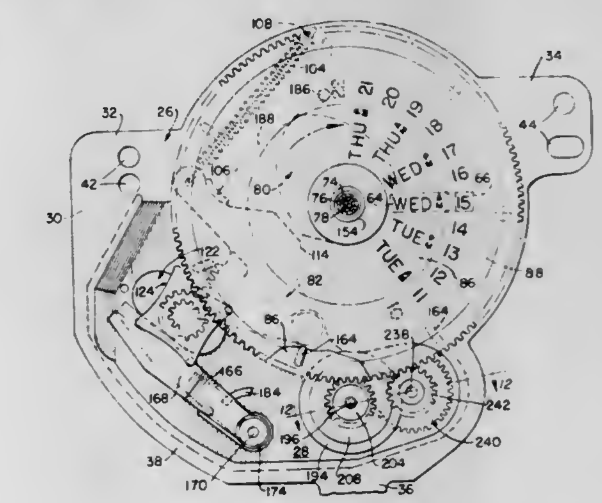
a plurality of fibers having high tensile strength and slick surfaces disposed in adjacent parallel relationship to form a bundle; and
a jacket of plastic material enclosing said bundle;
the cross-sectional configuration of said composite member being easily deformable, and said jacket serving to confine said fibers in a predetermined lateral position while said fibers may slide longitudinally relative to each other and within said jacket as required by mechanical movements of the cable.

4,059,952
BIO-RHYTHM CALCULATOR
Erwin Kaestner, 8125 Brill Road, Cincinnati, Ohio 45243
Filed May 27, 1976, Ser. No. 690,515
Int. Cl.² G04B *19/24, 19/30, 19/06;* **G06C** *27/00*
U.S. Cl. 58—4 R **2 Claims**



1. A Bio-Rhythm calculator comprising:
a. a display panel having a first circular dial face comprising a first locus of points, a second circular dial face comprising a second locus of points and a third circular dial face comprising a third locus of points, said first, second and third loci of points corresponding, respectively, to an individual's physical, emotional and intellectual Bio-Rhythm cycles, and each marked to exhibit a pair of relatively narrow diametrically opposed arcs disposed along the periphery of each of said dial faces and incorporating those points defining the critical phase of the corresponding Bio-Rhythm cycle;
b. first, second and third pointing members rotatably associated, respectively, with said first, second and third dial faces, each of said pointing members being operable for scanning its corresponding dial face for identifying the points in its associated locus of points, each of said pointing members being independently presettable to identify any point in its associated locus of points, said first, second and third pointing members comprising, respectively, a first knob having a first circular skirt depending therefrom, said first circular skirt having indicia dividing the periphery thereof into 23 equal sections and having indicia thereon overlying one of said dividing indicia for pointing toward the periphery of said first dial face, a second knob having a second circular skirt depending therefrom, said second circular skirt having indicia dividing the periphery thereof into 28 equal sections and having indicia thereon overlying one of said dividing indicia for pointing toward the periphery of said second dial face, and a third knob having a third circular skirt depending therefrom, said third circular skirt having indicia dividing the periphery thereof into 33 equal sections and having indicia thereon overlying one of said dividing indicia pointing toward the periphery of said third dial face; and
c. means for operating said first, second and third pointing members for sequentially scanning all points in said first, second and third loci of points in, respectively, 23, 28 and 33 days, said indicating means comprising means for rotatably advancing each of said circular skirts and its associated knob one division per day relative to its associated dial face, said means for rotatably advancing including a prime mover having an output shaft bearing a driver gear, a first idler gear meshing with said driver gear, first and second control gears meshing with said first idler gear and having control shafts connected respectively for rotating said first knob and circular skirt and said second knob and circular skirt relative to said first and second circular dial faces, a second idler gear meshing with said second control gear and a third control gear meshing with said second idler gear and having a control shaft connected for rotating said third knob and circular skirt and relative to said third circular dial face, the speed of said motor and the gear ratios of said driver, idler and control gears being selected for rotating said first, second and third circular skirts one division per day so as to perform respectively one complete rotation every 23, 28 and 33 days.

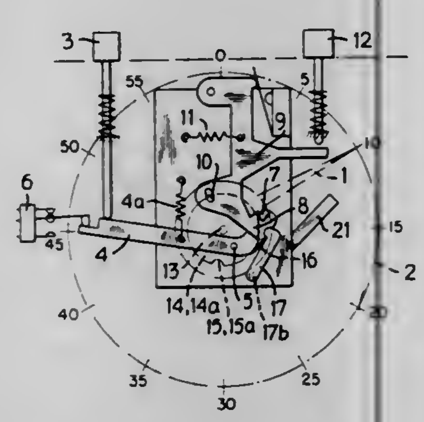
4,059,953
TIMEPIECE CALENDAR INDEXING APPARATUS
David Morrison, Atlanta, Ga., and Donald J. Rogers, Huntersville, N.C., assignors to General Time Corporation, Thomaston, Conn.
Filed June 18, 1976, Ser. No. 697,682
Int. Cl.² G04B *19/24*
U.S. Cl. 58—4 R **24 Claims**



1. Apparatus for rapidly changing calendar information displayed in a timepiece, comprising:
a. support means;
b. means carried by said support means having an aperture for viewing said calender information;
c. first calendar means including
1. a first surface area of annular outline,
2. a second surface area disposed radially inwardly of said first surface area, and
3. alpha indicia representative of each of the days of the week in ordered sequence and wherein said alpha indicia is presented in substantial duplicate with each presentation including means thereby indicative of one twelve hour period as distinguished from an adjacent presentation which is indicative of another twelve hour period, said alpha indicia disposed in one of said surface areas at equiangular positions about an axis of rotation of said first calendar means;
d. means for mounting said first calender means on said support means for movement about said axis relative to said support means;
e. second calendar means having numeric indicia in ascending order from 1 to 31, said numeric indicia disposed on said calendar means at equiangular positions about said axis;
f. means on said first calendar means for mounting said second calender means whereby said calendar means are adapted for independent movement about said axis; and
g. means carried by said support means for moving rotationally each of said calendar means through substantially instantaneous advance under control of said timepiece at the end of each second 12-hour period and said first calendar means through substantially instantaneous advance at

the end of intermediate 12-hour periods, said first calendar means controlling said advance of said second calendar means.

4,059,954
LABORATORY CLOCK
Wilhelm Grosse-Plankermann, Unterhaching, Germany, assignor to Hauck GmbH, Germany
Filed May 25, 1976, Ser. No. 689,825
Claims priority, application Germany, Jan. 13, 1976, 7600670[U]
Int. Cl.² G04B *13/00*
U.S. Cl. 58—21.13 **18 Claims**



1. In a timer including a motor, a pointer driven by the motor through a transmission gear train, the pointer being settable to a predetermined position representing a desired time interval, a start lever for actuating the motor in such a manner that the pointer runs toward a zero position from the predetermined position and a trip mechanism for actuating a stop lever when the pointer has run back to the zero position to stop the motor, the improvement comprising:

switch means for selectively changing the direction of travel of the pointer through the gear train so that the pointer runs away from the zero position, the switch means being coupled to the trip mechanism to prevent the actuation of the stop lever by the trip mechanism when the pointer runs away from the zero position; and means for manually actuating the stop lever so that the motor can be stopped when the pointer runs away from the zero position, whereby the timer is operable as a stop watch.

4,059,955
ONE BUTTON DIGITAL WATCH AND METHOD OF SETTING THE DISPLAY
Jan Willem L. Prak, Sunnyvale, Calif., assignor to Intersil, Inc., Cupertino, Calif.
Filed Nov. 12, 1975, Ser. No. 631,120
Int. Cl.² G04B *19/30;* G04C *3/00*
U.S. Cl. 58—23 R **8 Claims**

1. A single button digital watch display system for an electronic watch that generates a plurality of time varying functions for display as digits by display means on a watch face comprising:

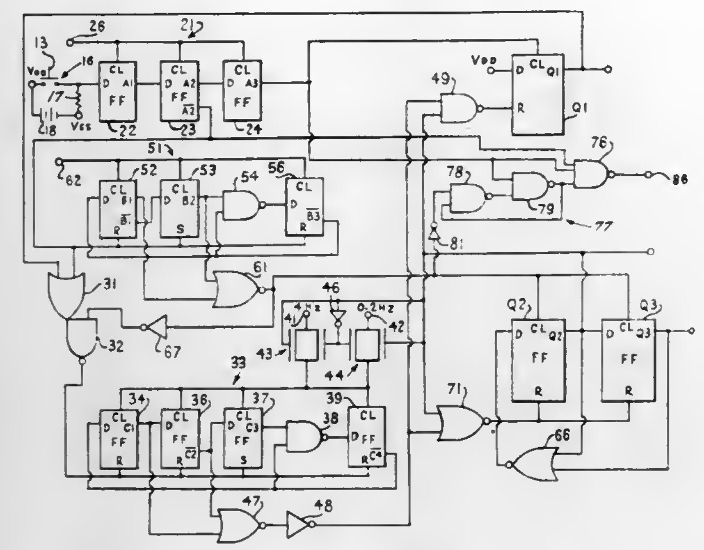
a single button on said watch being manually movable between a normal extended position and a depressed position,

a normally open switch in said watch operable to close in the depressed position of said button,

a power supply in said watch,

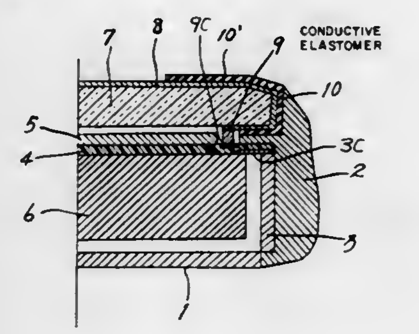
logic circuitry in said watch and connected by said switch to said power supply whereby switch closure applies an input signal to the logic circuitry,

said logic circuitry being responsive to input signals of different total duration in a predetermined time period to establish different display modes of said display means and a set mode of operation of said display means, and



said logic circuitry in said set mode being responsive to successive switch closures to apply successive set signals to said display means for adding digits to the display.

4,059,956
TOUCH TYPE CONTACTLESS SWITCH STRUCTURE FOR ELECTRONIC WRISTWATCHES HAVING INSULATIVE MEMBER PRECLUDING ESTABLISHMENT OF SHUNT PATH BY FOREIGN MATTER
Hidetoshi Maeda, Tenri, and Takehiko Sasaki, Yamatokoriyama, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan
Filed Jan. 7, 1976, Ser. No. 647,154
Claims priority, application Japan, Jan. 10, 1975, 50-6567[U]
Int. Cl.² G04B *19/30;* H01H *35/00*
U.S. Cl. 58—23 R **4 Claims**



1. In an electronic wristwatch including an enclosure, a viewing window and movements accommodated within the interior of the enclosure, a touch type contactless switch structure operated by the wearer of the watch comprising:

a film of transparent electrode disposed on the viewing window for engagement with a portion of the body of the wearer, said electrode film serving as one electrode of said contactless switch structure;

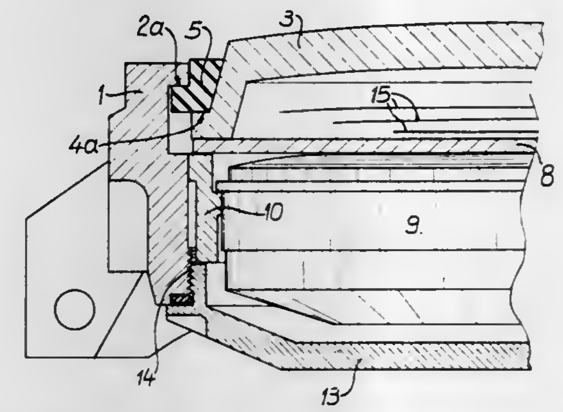
said enclosure being engageable with the wrist of the wearer and made of electrically conductive material for serving as another electrode of said contactless switch structure;

an insulating member provided between the electrode film and the enclosure for establishing electrical isolation therebetween; and

an extension provided at the one end of the insulating member in a position to overlay the electrode film and thus the viewing window in an amount sufficient to preclude establishment of a shunt path between said electrodes by the accumulation of foreign material on said insulating member.

2. A touch type contactless switch structure as defined in claim 1 wherein the electrode film and the enclosure are connected to a C-MOS switching circuit disposed within said enclosure.

4,059,957
WATER-TIGHT FITTING OF A GLASS IN A WATCH CASE
Ferjeux Jean Pierre Monnet, Damprichard, France, assignor to S.B.B.M. Burdet S.A., France
Filed Apr. 20, 1976, Ser. No. 678,662
Claims priority, application France, May 23, 1975, 75.16208
Int. Cl.² G04B *37/08, 39/00*
U.S. Cl. 58—90 R **6 Claims**



1. A watch case, comprising;

A middle-bezel having, as an integral part thereof, an inwardly-directed collar defining a non-circular upper opening, the collar having a generally flat lower collar face;

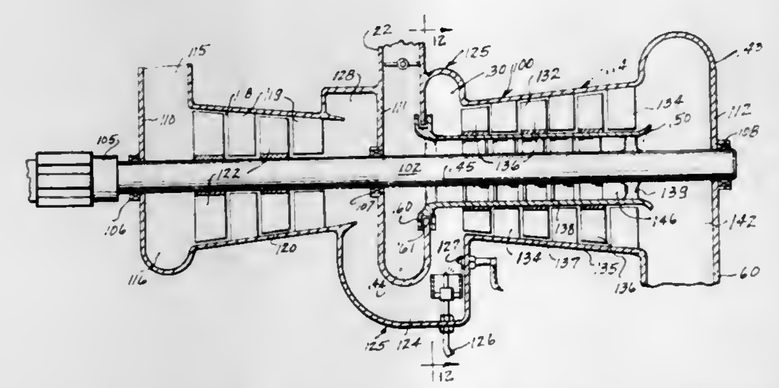
a watch glass receivable in the non-circular upper opening, being of a corresponding non-circular shape, and having an outwardly-directed peripheral glass flange dimensioned to pass with slight play through the non-circular upper opening in the middle-bezel;

a packing seal having an outer part disposed under the collar and an inner part on and coextensive with the glass flange; and

means for applying pressure to the glass to compress the seal between the collar and the glass flange,

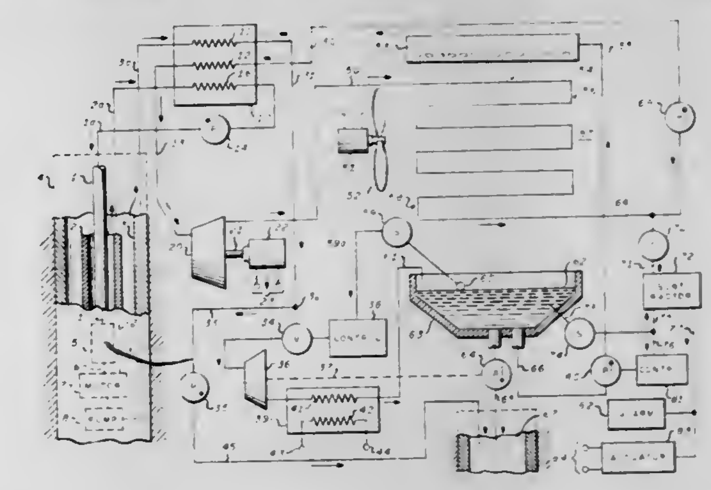
whereby the glass can be inserted in the middle-bezel through the upper opening, and can be held in the upper opening by the compressing of the seal.

4,059,958
AUTOMOTIVE ENGINE EXHAUST — CLEAN AIR SYSTEM
Florian Heklowski, and William Nicholas, both of Chicago, Ill., assignors to Florian Heklowski, Chicago, Ill.
Continuation-in-part of Ser. No. 442,928, Feb. 15, 1974, abandoned. This application Mar. 22, 1976, Ser. No. 669,095
Int. Cl.² F02G *3/00;* F01N *5/04*
U.S. Cl. 60—614 **10 Claims**



1. An internal Combustion engine having a combustion chamber and exhaust ports in communication therewith for discharging exhaust gasses — the improvement comprising: a turbine having a housing with intercommunicating chambers including a front compression chamber, an aft burner chamber and an intermediate mixing chamber, means for compressing air in the compression chamber, means for delivering the compressed air to the mixing chamber, means for supplying a combustible gas mixture into said mixing chamber, means for igniting said combustible gas mixture in the mixing chamber, means for conducting the ignited gasses into the burner chamber, heat-transfer conduit means providing passage means for the exhaust gasses through said burner chamber isolated from the ignited gasses in the burner chamber for heating said exhaust gasses for substantial consumption of the exhaust gasses in the conduit means, and means for exhausting the spent gasses from said burner chamber and said passage means, said burner means completely enshrouding said conduit means and providing an enveloping thermal shield therefor.

4,059,959
GEOTHERMAL ENERGY PROCESSING SYSTEM WITH IMPROVED HEAT REJECTION
Hugh B. Matthews, Boylston, Mass., assignor to Sperry Rand Corporation, New York, N.Y.
Filed Nov. 5, 1976, Ser. No. 739,382
Int. Cl.² F03G *7/00*
U.S. Cl. 60—641 **15 Claims**



1. Geothermal deep well energy extraction apparatus of the kind in which solute-bearing water is pumped to a station at the earth's surface utilizing thermal energy extracted within said well from said solute-bearing water for operating turbine-motor driven electrical generator means at said station, a major portion of said solute-bearing water being returned from said station into reinjection well means, said extraction apparatus further including:

coupling means for supplying a working fluid utilizing a portion of said extracted thermal energy to an input of said turbine motor means,

condenser conduit means coupled to the output of said turbine motor means for condensing said working fluid and returning said condensed working fluid to said coupling means,

manifold distributor means for enveloping said condenser conduit means in a coolant shower in droplet form,

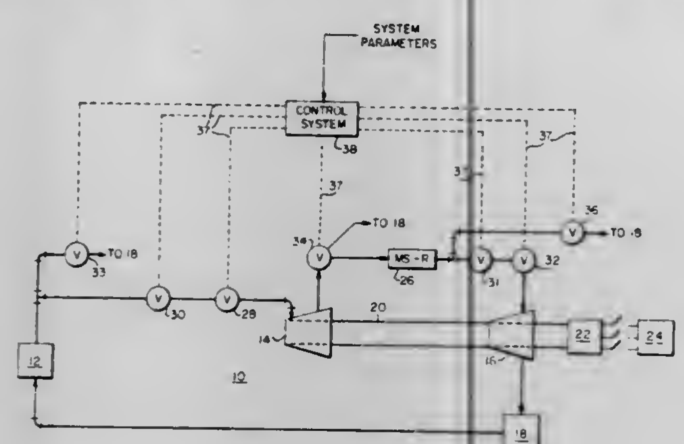
wet well tank means for collecting said coolant shower after cooling said condenser conduit means,

air circulating means for cooling said droplets of said coolant shower while descending from said manifold distributor means to said wet well tank means,

first pump means for conveying coolant from said wet well tank means to said manifold distributor means, and

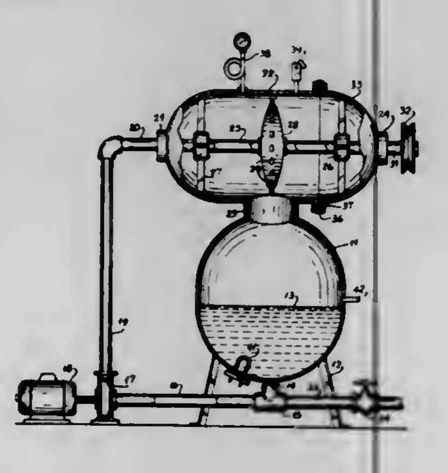
control means for selecting a minor portion of said solute-bearing water before said major portion is returned to said reinjection well means for maintaining a predetermined liquid level within said wet tank means.

4,059,960
METHOD AND APPARATUS FOR TESTING THE MOVABILITY OF VALVE PLUGS
Robert L. Osborne, Wallingford, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.
Filed Mar. 11, 1976, Ser. No. 665,821
Int. Cl.² F01K *13/00*
U.S. Cl. 60—646 **14 Claims**



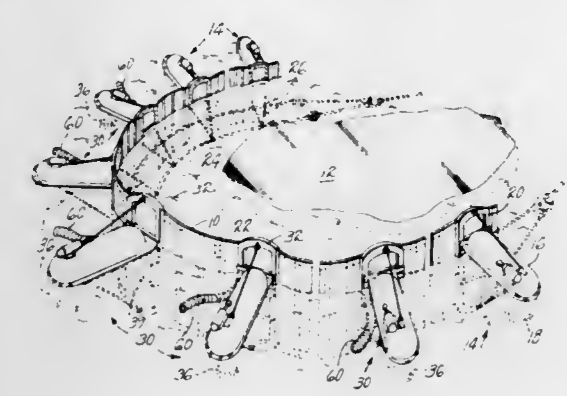
1. A steam turbine power plant comprising:
a turbine;
steam generating means for supplying steam to said turbine;
an electrical generator driven by said turbine to generate electrical energy for a predetermined load;
valve means normally movable between a fully open to a fully seated position for controlling the admission of steam into said turbine;
means for controlling the position of said valve means in accordance with an electrical control signal;
means for testing the motion of said valve means during the operation of said turbine without effectively disturbing the predetermined load, said testing means including
actuator means for moving said valve means from a first to a second position in a first predetermined direction in response to a testinitiation signal from said control means,
means for detecting the responsive movement of said valve means to said actuator means, and,
means responsive to said detecting means for indicating that the responsive movement of said valve means has occurred.

4,059,961
THERMAL MOTOR OF ACTION AND REACTION FORCES
Rodolfo de la Parra M., Isabel la Catolica No. 1055, Mexico 13, D.F., Mexico
Filed Sept. 13, 1976, Ser. No. 723,007
Claims priority, application Mexico, Dec. 10, 1975, 162457
Int. Cl.² F01K *21/00*
U.S. Cl. 60—670 **10 Claims**



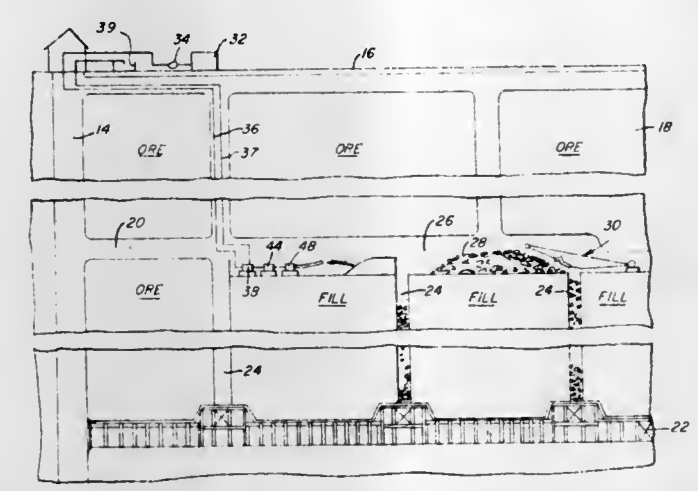
1. A thermal engine which comprises a first closed upper container having a lower orifice; a second closed lower container having an upper orifice and an inlet for liquid and a discharge for liquid, a neck member connecting the orifices of first and second containers, thus making up a double closed container with communication through said neck, a pump means having inlet and outlet, a driving means for said pump, a tube means which connects said discharge of said lower container to said inlet of said pump means, bearing means supported on the inside of said upper container, a hollow shaft rotatably supported in said bearing means, a tube means connecting outlet of said pump to said hollow shaft, fluid-tight hermetic sealing means installed integral with wall of said first upper container, by means of which the said connection between said tube means and said hollow rotating shaft is effected, said hollow shaft being closed at the end opposite to the end connected to said tube means and extending out through the wall of said first upper container, fluid-tight sealing means integral with said wall of first upper container through which the closed end of said hollow shaft extends in sealing relationship, power transmission means connected to said closed end of said hollow shaft extending out from said first upper container, reaction turbine means connected to said hollow shaft with internal communication of the fluid therewith, discharge means from the reaction turbine which project radially and tangentially therefrom, a liquid mass introduced into said second lower container through said liquid inlet, a heat source to raise the temperature of said liquid mass; whereby said liquid mass when heated is driven by said pump through said tube means and said hollow rotary shaft to said reaction turbine, said hot liquid mass being discharged therefrom and converted into saturated vapor which is subsequently condensed, there being constant pressure and constant temperature inside said containers in presence of its liquid in the closed system.

4,059,962
FLOATING SKIMMING BARRIER ASSEMBLIES
Jerome H. Milgram, 23 Mellen St., Cambridge, Mass. 02138
Filed Oct. 8, 1976, Ser. No. 730,811
Int. Cl.² E02B *15/04*
U.S. Cl. 61—1 F **7 Claims**



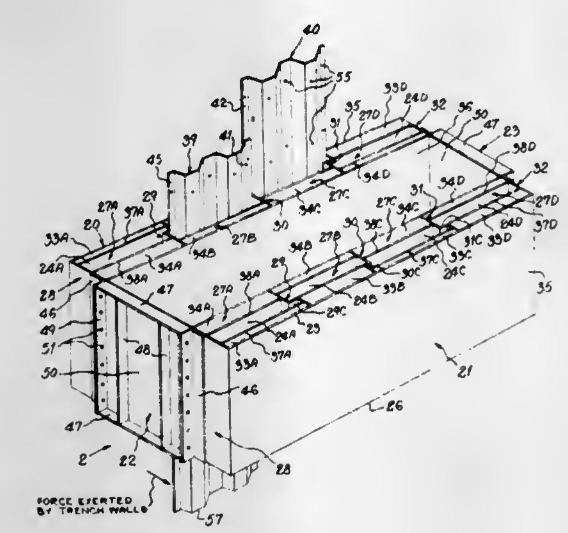
1. A skimming sub-assembly for collecting oil floating on water by the motion of a barrier in a forward direction, comprising a two part rigid frame mountable upon an elongated flexible barrier sheet adapted to being supported in a generally upright position and partially submerged in the water, a tank integral with the frame and extending from a level above the water to a bottom substantially below the water level, the tank having an inlet opening near the water level and a conduit extending between the bottom of the tank and an outlet connectible to a suction hose at the water surface.

4,059,963
METHOD OF MINE BACKFILLING AND MATERIAL THEREFOR
William Ross Wayment, Kitchener, Canada, assignor to Joy Manufacturing Company, Pittsburgh, Pa.
Filed Aug. 19, 1976, Ser. No. 716,017
Int. Cl.² E02D *3/12;* **E21C** *37/00, 41/00, 45/00*
U.S. Cl. 61—35 **8 Claims**



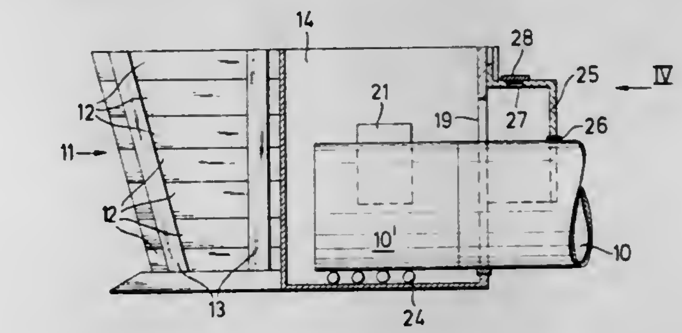
1. A method of backfilling underground cavities and the like comprising: transporting a slurry of mill tailings and water through a closed conduit system to an underground location, dewatering said slurry at said location as said slurry is received thereat to produce a material of a consistency that said material stabilizes as substantially an unsupported mass without removing water therefrom by auxiliary means, and placing said material in a cavity or the like to be filled.

4,059,964
SHEETING INSTALLATION SYSTEM
John R. Pavese, 761 Cathy Ann Court, Paramus, N.J. 07652
Continuation-in-part of Ser. No. 566,079, April 8, 1975, abandoned. This application Sept. 3, 1976, Ser. No. 720,138
Int. Cl.² E21D *5/12*
U.S. Cl. 61—41 A **9 Claims**



1. A sheeting installation frame for installing sheeting sections during trench excavations and the like comprising
a pair of sheeting support wall members, each of said wall members having at least two substantially vertically-disposed sheeting support slots extending therethrough for slidably supporting sheeting sections therein with cantilever support, the sheeting support slots of each of said wall members being located along the length of the wall member and disposed in modular sections of the wall member defined by a series of substantially vertically-disposed and spaced apart end plates having laterally-extending edge portions, the end plates between abutting modular sections being stepped plates having longitudinally-extending central portions joining the edge portions thereof to separate the support slots of the abutting modular sections, so that the support slots of abutting modular sections are disposed on opposite sides of the end plate central portions in overlapping relationship, whereby sheeting sections disposed in said slots are overlapped;
a pair of spreader members disposed between said wall members adjacent opposite ends thereof for separating said wall member slots the distance between sheeting sections to be installed on opposite trench sides; and
means for removably connecting said spreader members to said wall members to form a frame which resists the lateral forces exerted by said trench sides on the sheeting sections in said slots.

4,059,965
APPARATUS FOR AND A METHOD OF LAYING A PIPE LINE
Dieter Stuckmann, Selm, Germany, assignor to Gewerkschaft Eisenhutte Westfalia, Wethmar near Lunen, Germany
Filed May 17, 1976, Ser. No. 687,077
Claims priority, application Germany, May 27, 1975, 2523339
Int. Cl.² F16L *1/00;* **E21D** *11/00*
U.S. Cl. 61—105 **8 Claims**



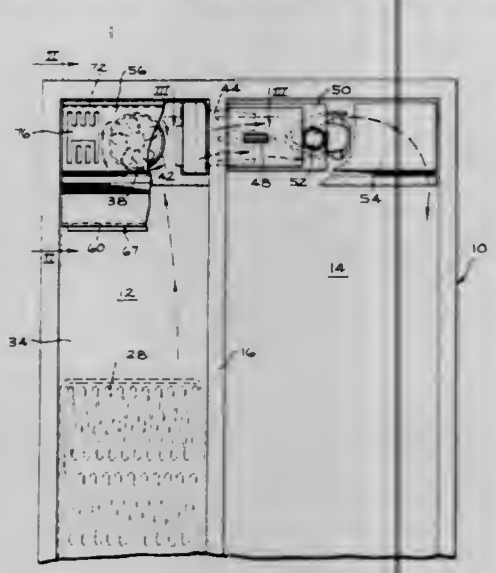
8. A method of laying a pipe-line composed of pipe sections arranged end-to-end; said method comprising excavating an open trench, introducing a pipe section into a receptacle located in the trench, arranging the pipe section in end-to-end relationship with a pipe section previously-installed and projecting through a sealed opening into the interior of the receptacle, displacing the receptacle to follow-up the advancement of the trench and repeating said sequence and whenever the pipe section to be introduced is provided with an access tube projecting outwardly from its exterior periphery carrying out the following additional steps: utilizing a hollow unit to extend the interior of the receptacle and engage on the exterior of the previously-installed pipe section to form part of the sealed opening, removing or displacing a plate defining part of the sealed opening to permit the tube of the newly-introduced pipe section to pass into the interior of the unit as the receptacle is displaced, relocating the plate to re-establish a seal with the pipe section inwardly of the receptacle relative to its tube and removing or displacing the unit to expose the tube of the pipe section.

4,059,966
AIRFLOW DISTRIBUTION ARRANGEMENT FOR A SIDE-BY-SIDE REFRIGERATOR
Howard D. F. True, Jr., Fern Creek, Ky., assignor to General Electric Company, Louisville, Ky.
Filed July 26, 1976, Ser. No. 708,431
Int. Cl.² F25D *17/06*
U.S. Cl. 62—414 **2 Claims**

1. In a side-by-side refrigerator of the type including a freezer compartment, a fresh food compartment, a vertical partition separating the compartments, an evaporator air channel extending vertically along the rear wall of the freezer compartment and having an air outlet near the top for directing cool evaporator air generally forward, means for forcing

circulation of air through the evaporator air channel and out the air outlet near the top, and a passageway in the partition for passing cool evaporator air into the fresh food compartment, an airflow distribution arrangement comprising:

a cover spaced forwardly of the evaporator air channel outlet such that cool evaporator air is directed towards and tends to travel down the inner surface of said cover, said cover having a bottom opening for discharging cool evaporator air into the freezer compartment, and said



cover defining a lateral duct communicating with the passageway in the partition; and

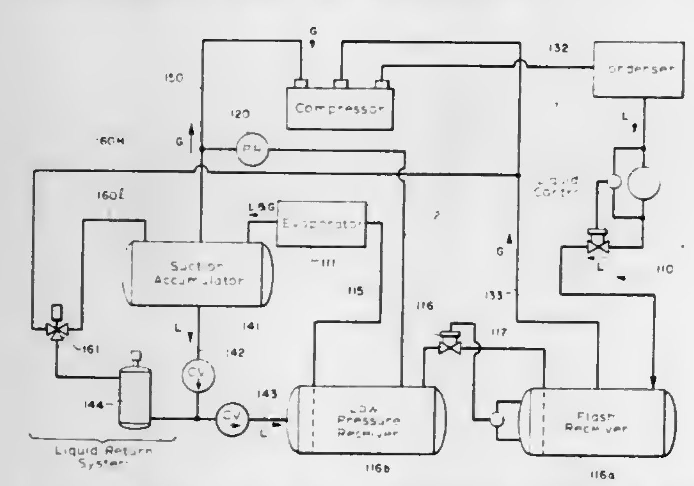
a horizontally-extending inward bulge formed in said cover and located generally between the region on the inner surface of said cover against which cool evaporator airflow is directed and the cover bottom, said bulge serving to interrupt the otherwise smooth downward flow of air to produce back pressure to force a portion of the cool evaporator airflow through the partition passageway into the fresh food compartment.

4,059,967
PROCESS FOR FREEZING BLOOD PLATELETS
Arthur W. Rowe, Stamford, Conn., and George Dayian, Albany, N.Y., assignors to The Community Blood Council of Greater New York, Inc., New York, N.Y.
Filed Feb. 19, 1976, Ser. No. 659,397
Int. Cl.^{2} F25D *17/02*
U.S. Cl. 62—64 **13 Claims**

1. A process for preserving blood platelets which comprises:
A. Contacting said platelets with an aqueous saline solution containg 4 to 7 weight percent glycerol and 2 to 6 weight percent glucose, the glycerol being employed in at least a 5 : 1 volume solution to volume platelet ratio;
B. Removing supernatant liquid;
C. Concentrating platelets to about 20 mg platelet protein/ml;
D. Thereafter freezing said platelets at a rate of at least 20° C per minute.

4,059,968
REFRIGERATION SYSTEM
Robert R. Ross, Wheaton, Ill., assignor to H. A. Phillips & Co., St. Charles, Ill.
Continuation-in-part of Ser. No. 484,271, June 28, 1974, abandoned. This application Apr. 5, 1976, Ser. No. 673,601
Int. Cl.^{2} F25B *41/00*
U.S. Cl. 62—174 **2 Claims**

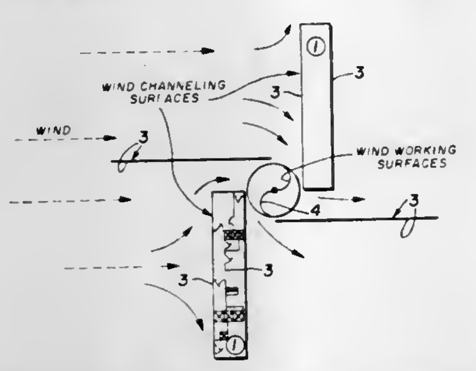
1. A circulating refrigeration system, comprising:
a. compressor means for compressing vaporized refrigerant,
b. condensor means for receiving compressed refrigerant gas from said compressor means and removing heat from said gas to liquify all or a substantial portion of it,
c. a receiver tank for receiving said liquified refrigerant from said condensor means and having a predetermined relatively high gas pressure therein,
d. evaporator means,
e. a receiver tank for receiving refrigerant liquid from said high pressure receiver tank and having a predetermined lower gas pressure therein,
f. liquified refrigerant from said low pressure receiver tank being forced from said low pressure receiver tank through said evaporator means in an amount substantially exceeding the evaporator means requirement for achieving the system's designed refrigeration output and refrigerant vaporized in said evaporator means being returned to said compressor means for compression,
g. said compressor means being a screw compressor having a low pressure inlet to a first stage, an intermediate pressure inlet to a second stage, and a high pressure outlet,
h. said vaporized refrigerant from said evaporator means being returned to said low pressure inlet,



i. at least a portion of the vaporized refrigerant which reaches said high pressure receiver tank being bled to said compressor through said intermediate pressure inlet,
j. means for accumulating unvaporized liquid refrigerant from said evaporator,
k. said unvaporized liquid refrigerant being substantially cooler than the saturated liquid in said low pressure receiver tank as a result of the evaporation of refrigerant,
l. dump tank means for receiving liquid refrigerant from said accumulating means, and
m. means connecting said high pressure receiver tank with said dump tank means through a control valve,
n. said control valve being effective upon receipt of a predetermined signal to direct flash gas under pressure from said high pressure into said dump tank means to force liquid refrigerant therein back to said low pressure receiver tank.

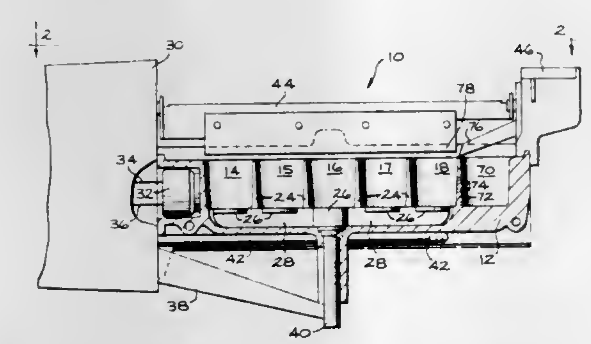
4,059,969
AIR CONDITIONED SHELTER
Thomas Y. Awalt, Jr., 804 Poinciana Drive, Gulf Breeze, Fla. 32561
Continuation-in-part of Ser. No. 487,721, July 1, 1974, abandoned, and Ser. No. 540,866, Jan. 14, 1975. This application Dec. 1, 1975, Ser. No. 636,675
Int. Cl.^{2} F25B *27/02*
U.S. Cl. 62—238 **19 Claims**

11. A mechanically air conditioned shelter having external walls and a living space and comprising in combination:
a. liquid energy storage including:
1. liquid storage space, and
2. liquid;
b. a first heat transfer means coacting with said liquid;
c. a variable speed gas compressor;
d. a second heat transfer means coacting with a fluid medium external to said shelter and said storage space;
e. fluid transfer means between each of said first and second heat transfer means and said compressor, whereby compressed fluid may be evaporated in either of said heat transfer means and condensed in the other of said heat transfer means;
f. heat transfer and distribution means whereby heat is transferred to or from said storage space from or to said living space and distributed within said living space;
g. a plurality of blades positioned radially and moveable about a generally vertical axis so that upon movement about said axis, each blade presents a generally vertical planar surface workably opposed to at least one line of force extending along a generally tangential line from any point thereon to the point of departure of said tangential line from the arc described by the rotation of the periphery of the blades;



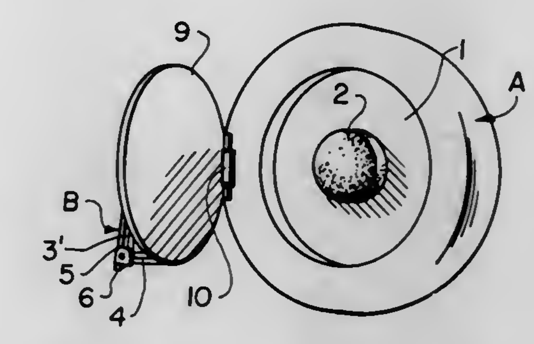
h. rotatable mounting means for said blades whereby rotation of said blades about said axis is permitted;
i. mechanical power transfer means between said blades and said compressor, and
j. fixed wind deflector means including at least a substantial portion of the outer surface of said external walls of said shelter and comprising a plurality of fixed generally planar surfaces at least two of which are generally vertical and extending generally tangential to said arc described by the periphery of said blades upon rotation thereby to funnel prevailing winds tangentially toward said arc so as workably to engage said blades.

4,059,970
AUTOMATIC ICEMAKER INCLUDING MEANS FOR MINIMIZING THE SUPERCOOLING EFFECT
Leopold Loeb, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.
Filed Oct. 15, 1976, Ser. No. 732,772
Int. Cl.^{2} F25C *1/04, 1/00*
U.S. Cl. 62—353 **7 Claims**



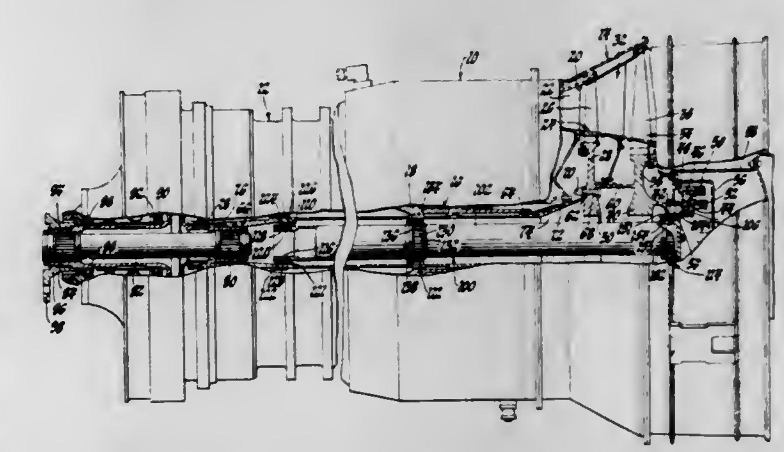
1. In a batch type automatic icemaker adapted for installation in the freezer compartment of a refrigerator and including a mold having an ice-forming cavity, means for filling said ice-forming cavity with water, control means, and means responsive to the control means for removing ice pieces from said ice-forming cavity, the combination with said ice-forming cavity of:
means for retaining a piece of ice in communication with said ice-forming cavity throughout each entire icemaker operating cycle;
whereby the retained ice piece reliably provides a seed ice crystal during the next operating cycle, to initiate freezing of water in said ice-forming cavity with a minimum of supercooling.

4,059,971
EARRING HAVING MAGNETICALLY SECURED DISPLACEABLE ORNAMENT FOR FACILITATING TELEPHONING
Ota Shoji, 207-9 Daibutsugahira, Nishiherano, Mikage-cho, Higashinada, Kobe, Japan
Filed Oct. 7, 1976, Ser. No. 730,316
Int. Cl.^{2} A44C *7/00*
U.S. Cl. 63—14 R **4 Claims**



1. An earring construction for use by a wearer and which will facilitate phone calling without interference, comprising an earring decorative body having an exterior ornamental side which is adapted to project outwardly from the person's ear and an opposite earfacing side, first magnet means mounted on said earfacing side, an ear-engagement mounting pivotally mounted on said body adjacent one side thereof and having at least a first side facing said body with at least a portion defining second magnet means attractable to said first magnet means to hold said body close against said ear-engagement mounting, said ear-engagement mounting including an opposite second side facing the wearer's ear, an ear-engagement device carried by said mounting on said opposite second side for holding the earring on a person's ear, said body being pivotal outwardly from said ear-engagement mounting to a position said body alongside the ear so as to free the ear of the wearer so that the earring will not interfere with the engagement of the ear by a telephone earpiece.

4,059,972
TURBINE SHAFT BALANCING
Paul E. Beam, Jr., Indianapolis, and Charles K. Meyers, Danville, both of Ind., assignors to General Motors Corporation, Detroit, Mich.
Division of Ser. No. 490,907, July 22, 1974, Pat. No. 3,964,342. This application Mar. 17, 1976, Ser. No. 667,629
Int. Cl.^{2} F16C *1/00*
U.S. Cl. 64—1 V **2 Claims**



1. A rotor balance assembly comprising: a drive shaft having a longitudinal axis and a mass thereon rotatable about said longitudinal axis, said drive shaft including an elongated tubular portion thereon having a first access opening thereto, a plurality of axially spaced reference surfaces on the interior of said tubular portion, each of said surfaces being formed continuously circumferentially of said interior, a balance tube located

interiorly of said tubular portion in radially inwardly spaced relationship thereto, means for removably connecting one end of said balance tube to one end of said tubular portion, a plurality of axially spaced index splines on the outer periphery of said balance tube, an annular balance weight removably secured to each of said index splines against rotation with respect to said tube and arcuately adjustable through a plurality of circumferentially indexed positions when said balance tube is removed from said shaft, each of said balance weights having an outer peripheral surface engageable with said reference surfaces when the balance tube is inserted within said tubular portion of said shaft to align said tube concentrically within said shaft with its longitudinal axis colinear of the longitudinal axis of said shaft, said weights being configured to balance said shaft means and mass thereon in multple planes in-situ within said shaft.

4,059,973

CIRCULAR KNIT LOWER BODY GARMENT AND METHOD OF MANUFACTURE

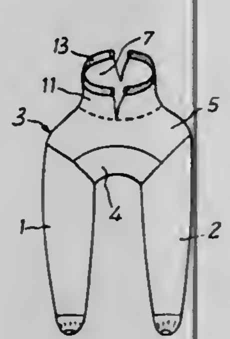
Robert Gresillon, Colroy la Grande, France, assignor to Prenihan AG, Zurich, Switzerland

Continuation of Ser. No. 335,893, Feb. 29, 1973, abandoned. This application Aug. 18, 1975, Ser. No. 605,526

Claims priority, application France, Apr. 28, 1972, 72.15303; Nov. 16, 1972, 72.40673

Int. Cl.^{2} A41B *9/02*

U.S. Cl. 66—177 **16 Claims**



1. A method of knitting a seamless integral bifurcated lower body garment having pants and a waist opening provided with a waistband, by continuous unidirectional rotary knitting from one end of the garment to the other end on a knitting machine having a circle of needles, said method comprising the steps of:

a. knitting a first portion of the garment,

b. removing a selected number of needles to inactive position, while permitting said needles to retain their stitches.

c. knitting an additional portion of the garment on the nonselected active needles,

d. feeding elastomeric yarn to at least some of the active needles during knitting of the additional portion to form knitted elasticated fabric portions providing segments of an integral knitted elastic waistband,

e. forming an opening in the garment during knitting of the additional portion to provide the waist opening,

f. and, following knitting of the additional portion, putting the inactive needles back into action and knitting the remainder of the garment.

4,059,974

APPARATUS FOR THE CONTINUOUS TREATMENT OF ENDLESS MATERIAL, ESPECIALLY THE SHRINKING THEREOF

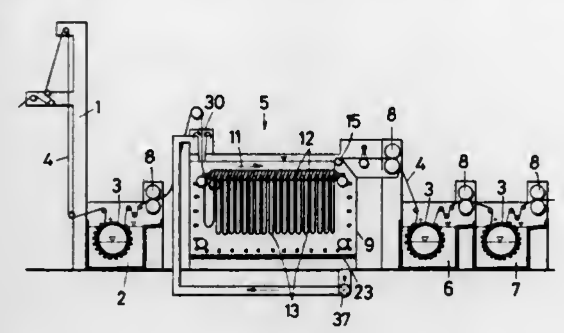
Hans Fleissner, Riehen, Switzerland, assignor to Vepa AG, Switzerland

Filed Dec. 15, 1975, Ser. No. 640,697

Claims priority, application Germany, Oct. 3, 1975, 2544240; Oct. 3, 1975, 2544241; Dec. 14, 1974, 2459217; Dec. 19, 1974, 2460117

Int. Cl.^{2} D06B *21/00, 3/12, 3/20*

U.S. Cl. 68—15 **22 Claims**



1. An apparatus for the continuous wet treatment, especially shrinking, relaxing and/or bulking of endless material, including webs having an operating width, made of textured polyester fabric or knit which comprises a container for retaining a treatment liquor at a liquid level, said container having an inlet and an outlet for said endless material, an endless conveying means having support rods extending transversely across the width of the endless material within said container for transporting the material through the liquor in the form of suspended loops in an operating direction from the inlet to the outlet of the container, vertically disposed partition means positioned within said container for defining a treatment chamber having a top portion and a bottom portion and a liquid recycling chamber, said partition means having an upper portion and a lower portion, being spaced from an outer wall of the container and being arranged so that the treatment chamber and the recycling chamber are in communication with one another at the upper portion and at the lower portion of the partition means, means for producing a liquid circulation from the treatment chamber into the liquor recycling chamber, said liquor being directed from the top portion of the treatment chamber to the bottom portion of the treatment chamber, means for supplying heat to the liquor within said container and take-off means for removing the endless material from said liquor in a substantially tension-free manner, said take-off means being arranged at the outlet of said container and having a supporting surface positioned at the liquid level therein and means immediately adjacent and down-stream of said take-off means for cooling said liquor treated endless material to fix the volume of said material.

4,059,975

BELT-DRIVEN TRANSFER ARM CLUTCH MECHANISM FOR AGITATOR WASHER

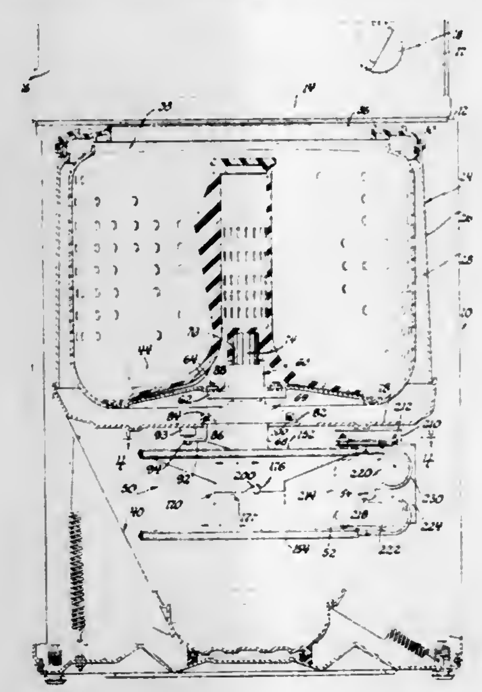
James W. Jacobs, Dayton, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Nov. 29, 1976, Ser. No. 745,576

Int. Cl.^{2} D06F *13/02, 37/40*

U.S. Cl. 68—23.7 **3 Claims**

1. In a washing machine, a tub, an agitator in said tub, means for rotably supporting said tub, means for rotating said tub, agitate shaft means enclosed by a portion of said rotating means, a power drive shaft, and power transmitting means drivingly connecting said drive shaft to said agitator shaft, means for oscillating said agitator, said power transmitting means comprising upper and lower concentrically arranged driven pulleys rotatably carried in fixed respective planes with respect to said agitator shaft means, drive belt means encircling said driven pulleys and opposite ends of said drive shaft, whereby said driven pulleys will be simultaneously driven by opposite directions of rotation by rotation of said drive shaft, reversible clutch means between said driven pulleys for drivingly rotating said agitate shaft means relative to either of said driven pulleys, said clutch means including a radial transfer arm pivotally secured to said agitator shaft means intermediate the driven pulleys for pivotal movement about a horizontal axis through the axis of said agitate shaft means, said upper driven pulley having a downwardly opening drive notch formed therein, said lower driven pulley having an upwardly opening drive notch formed therein, said notches each having cam portions in mirror image relation upon being rotated into substantial vertically opposed alignment, whereby said lower



pulley notch being operative to engage said transfer arm to effect a driving relationship between said drive shaft and said lower pulley and rotate said agitator shaft in a first direction through a predetermined angular stroke, said clutch means operative upon said lower pulley being rotated through said stroke positioning said lower notch in substantial vertically opposed alignment with said upper pulley notch, such that said transfer arm is free to move from its engaged position along said lower pulley notch cam portion under the dislodging force of the rotation of said lower pulley, whereby said transfer arm is pivoted upwardly and engaged by said upper pulley notch to effect a driving relationship between said drive shaft and said upper pulley and rotate said agitator shaft in a reverse direction through a predetermined angular stroke.

4,059,976

ROLLING MILL

Alfred Christ, Zurich, and Rolf Lehmann, Mutschellen, both of Switzerland, assignors to Escher-Wyss Limited, Zurich, Switzerland

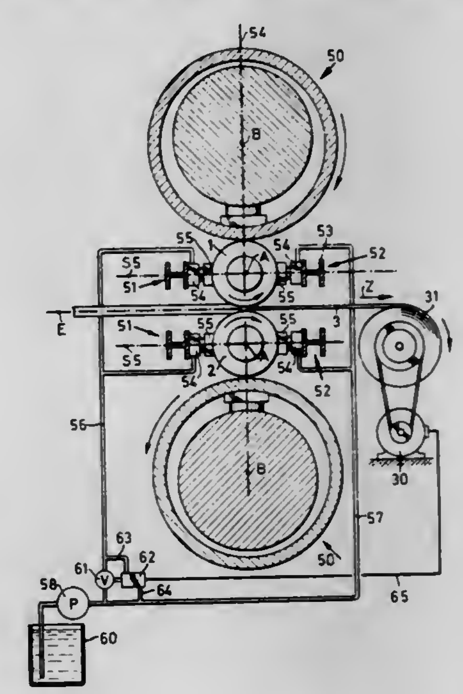
Filed Feb. 6, 1976, Ser. No. 655,767

Claims priority, application Switzerland, Feb. 13, 1975, 1765/75

Int. Cl.^{2} B21B *37/00, 29/00, 31/32*

U.S. Cl. 72—19 **1 Claim**

1. A rolling mill for rolling materials in web form which comprises a pair of working rolls between which the material is rolled in a rolling plane, a pair of sag-compensating back-up rolls on respective opposite sides of said rolling plane and engaging said pair of working rolls respectively, each of said sag-compensating back-up rolls having a fixed support beam with a roll shell rotatable about the beam, at least one hydrostatic support means mounted on the beam for exerting pressure against the shell, said hydrostatic support means having at least one chamber formed in said beam, and at least one piston member disposed within said chamber and movable therein, means to supply fluid under pressure to said chamber, said piston member having an end portion facing the interior of said shell, said end portion having a plurality of hydrostatic bearing pockets formed therein, said piston member having a throttling duct communicating each of said pockets with said chamber to permit fluid under pressure to flow through said ducts to said pockets thereby continuously contacting interior surface portions of said shell and causing each piston to exert hydrostatic pressure on the respective shell toward the respective working roll in a support plane passing through the axes of corresponding working and back-up rolls, while said fluid under pressure continuously contacting said shell removes from said shell, heat generated during said material rolling process, said support plane for at least one of said working rolls being perpendicular to the rolling plane, said rolling mill further including a pair of lateral supporting means for each of said working rolls positioned on the downstream and upstream sides thereof with respect to the direction of movement of the material being



rolled for exerting forces on each working roll in opposite directions in a plane parallel to the rolling plane, each lateral supporting means including at least one hydrostatic support device, supply means for supplying a coolant hydraulic medium under pressure to each of said hydrostatic support devices, said support devices each bearing directly against the surface of the respective working roll with a flow of said hydraulic medium of the device between the device and the surface of the working roll, means for exerting a tractive force on the material being rolled, and control means responsive to said tractive force for controlling the relative hydraulic pressures in the upstream and downstream support devices of each working roll to produce differences in the lateral forces acting thereon, said differences acting in a direction counter to said tractive force.

4,059,977

METHOD OF PRODUCING HERMETICALLY SEALED END IN A TUBULAR WORKPIECE

Vladimir Georgievich Kaporovich, ulitsa Lenina, 2, kv. 106; Vitaly Kirillovich Udovenko, ulitsa Parkovaya, 35, kv. 105, both of Kramatorsk; Viktor Petrovich Krasnorutsky, 4 Mikroraion, 5, kv. 41, and Akhmet Galievich Chechenets, 5 Mikroraion, 27, kv. 41, both of Frunze, all of U.S.S.R.

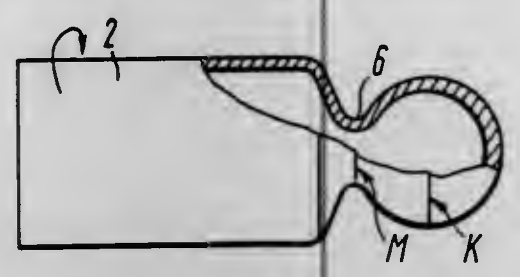
Filed Oct. 5, 1976, Ser. No. 729,846

Int. Cl.^{2} B21D *41/04*

U.S. Cl. 72—69 **2 Claims**

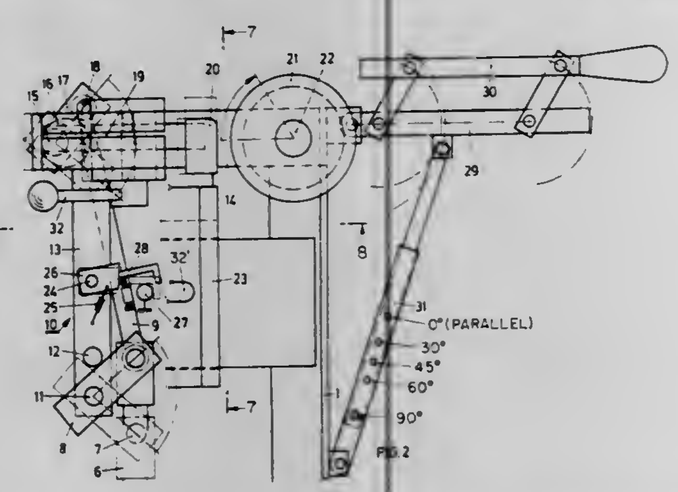
1. A method of producing a sphere having a hermetically sealed end at an end of a tubular cylindrically shaped workpiece, wherein the diameter of the sphere is less than the diameter of the tubular workpiece, comprising the steps of heating a tubular workpiece end to a forging temperature; reducing the diameter of said end of the tubular heated workpiece until a tubular end portion is obtained with a diameter equal to the diameter of the sphere to be formed; roll-shaping the end

portion of the reduced diameter tubular end portion of the workpiece until a semi-spherical shaped hermetically sealed end is formed; roll-shaping the remaining portion of the reduced diameter end portion of the workpiece to form a sphere comprising the steps of roll-shaping the reduced diameter



portion of the workpiece starting from the conjugation between said semi-sphere shaped portion and said cylinder-shaped reduced diameter portion along a sphere generatrix towards the main portion of said workpiece until an intermediate neck portion with a prescribed diameter is formed.

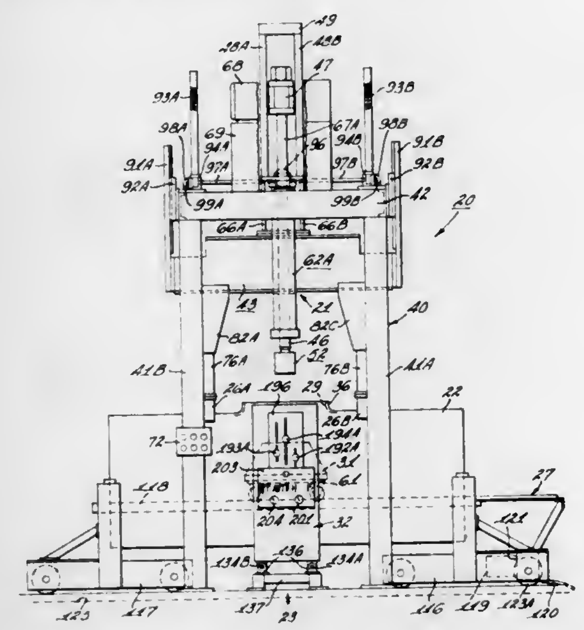
4,059,978
TUBE BENDING MACHINE
Paul Dettling, Chaletstrasse 1, 8600 Dubendorf, Switzerland
Filed July 19, 1976, Ser. No. 706,835
Int. Cl.^{2} B21D *7/04*
U.S. Cl. 72—156 8 Claims



1. A tube bending machine having hydraulic drive including a hydraulic cylinder characterized by the following: a single hydraulic pressure cylinder means, a lever system, a bending roller, the lever being operative in a first partial stroke of its driving stroke so as to press a tube to be bent against the bending roller, a pivotally mounted bending arm having detent means associated therewith, and the lever system being operative in a second partial stroke to swing the pivotally mounted bending arm around the axis of rotation of the bending roller, the detent means normally restraining the bending arm and being released by the said lever system at the end of the said first partial stroke.

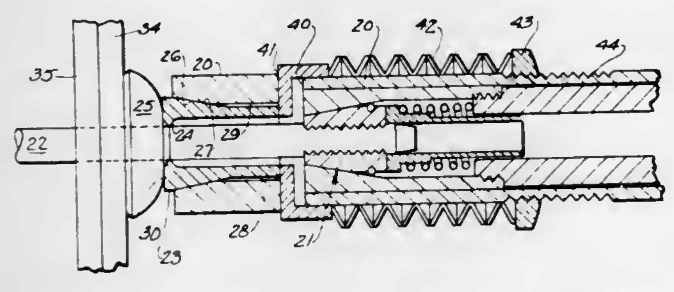
4,059,979
MEANS FOR FLARING OPENINGS IN CYLINDRICAL BODIES
Gordon E. Mackie, Utica, and Peter A. Morris, Jackson, both of Miss., assignors to Allis-Chalmers Corporation, Milwaukee, Wis.
Filed June 23, 1976, Ser. No. 698,831
Int. Cl.^{2} B21D *31/40*
U.S. Cl. 72—342 3 Claims

1. An apparatus for flaring the edge of an opening formed in a cylindrical workpiece comprising:
a stationary frame having a work station;
a flaring tool in said work station engageable in the opening formed in the cylindrical workpiece;
a ram movably supported by said frame in said work station for vertical movement into and out of coupled engagement with said flaring tool;
power means operable to effect coupling engagement of said ram with said flaring tool and to forcefully engage the flaring tool with the edge of the opening in the cylindrical workpiece to form a circular collar portion around the opening;
clamping means carried by said frame for securing the workpiece in the work station;
heat applying means carried for movement into a position to heat an area of the cylindrical workpiece adjacent the opening to be flared to a plastic state;



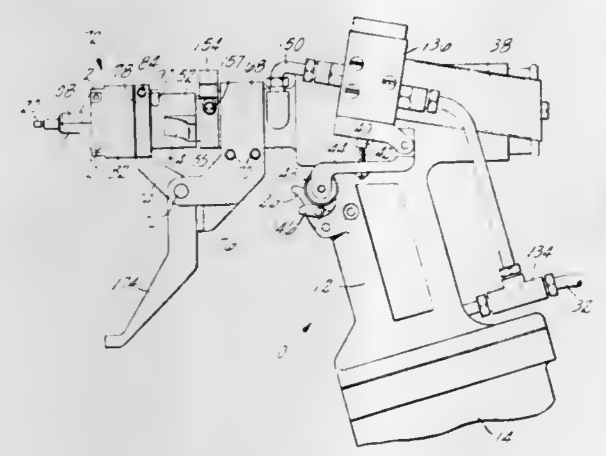
a second heat applying means operably disposed to apply heat to the cylindrical workpiece on a side thereof which is diametrically opposite to the side which said first heating means applies its heat; and,
control means operably connected to effect a predetermined movement of the heat applying means in a path of travel which is parallel to the contour of the cylindrical workpiece from a point of rest to a point short of a vertical plane which passes through the longitudinal axis of the cylindrical workpiece.

4,059,980
METHOD AND MEANS FOR INSTALLING BLIND FASTENERS
Frank B. Nance, Los Alamitos, Calif., assignor to Olympic Fastening Systems, Inc., Middletown, Ohio
Filed Nov. 17, 1975, Ser. No. 632,394
Int. Cl.^{2} B21J *15/34*
U.S. Cl. 72—391 7 Claims



1. Setting means for installing a blind fastener comprised of a headed rivet sleeve and a headed pin inserted therewithin, the head of the sleeve being adapted to engage the top side of the work being fastened, the head of the pin engaging the end of the sleeve remote from the sleeve head, the sleeve end and pin head being beyond the blind side of the work, and the pin having a tail extending beyond the sleeve head which means comprises: a support housing; a chuck assembly slidably mounted within said support housing and having means to grasp the tail of said pin; a collet slidably mounted within said support housing and protruding beyond said support housing, said collet having a forward portion to engage a sleeve head; a first cam surface on said support housing and a second cam surface on said collet, said cam surfaces being arranged to engage one another; a cutting edge on said collet adjacent said forward portion; abutment means slidable in said support housing, said collet having a rearward portion to engage said abutment means; and yieldable means cooperating with said abutment means to prevent initial movement of said abutment means and said collet; whereby when the load forces exerted by movement of the chuck assembly are sufficient to upset the blind fastener, continued movement of said chuck assembly will thereafter cause relative movement and engagement between said cam surfaces to move said cutting edge into said pin to weaken same adjacent the sleeve head, further movement of said chuck assembly causing said pin to break where so weakened.

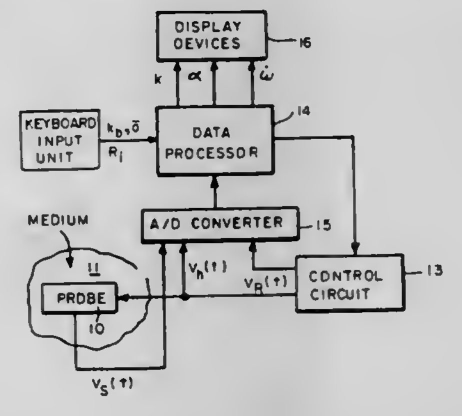
4,059,981
BLIND RIVETING TOOLS
David John Holloway, Aldridge, England, assignor to USM Corporation, Boston, Mass.
Filed Sept. 22, 1976, Ser. No. 725,530
Claims priority, application United Kingdom, Jan. 22, 1976, 2412/76
Int. Cl.^{2} B21J *15/34*
U.S. Cl. 72—391 8 Claims



1. A pull-through blind riveting tool comprising a housing, a rivet-setting mandrel having a head and a stem and movable toward and from an operating position in the housing, mandrel-pulling means reciprocably mounted in the housing, an assembly for movably supporting the mandrel and including abutment means openable to allow axial passage of a head of a rivet on the mandrel and closeable to abut the rivet head during relative mandrel retraction, and means interconnecting the assembly and the housing permitting their limited relative separation and approach to allow a rivet to be assembled on the mandrel stem when the mandrel head is engaged and positioned by the relatively separated assembly.

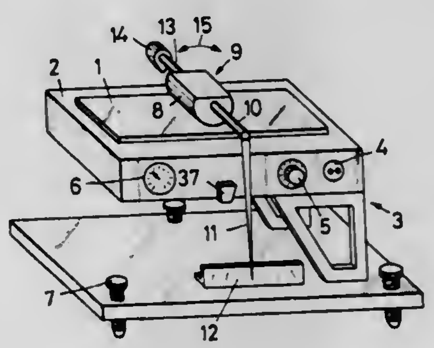
4,059,982
APPARATUS FOR THE MEASUREMENT OF THERMAL PROPERTIES OF BIOMATERIALS
Harry Frederick Bowman, Needham, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.
Filed Aug. 29, 1975, Ser. No. 608,954
Int. Cl.^{2} G01F *1/68;* G01N *25/18*
U.S. Cl. 73—15 A 32 Claims

1. A method for determining physical characteristics of a medium comprising the steps of
predetermining the thermal conductivity of a heating means as a function of temperature, said heating means having a predetermined resistance versus temperature relationship;
immersing said heating means in said medium;
determining the reference temperature of said medium when said medium is unheated;
applying power to said heating means sufficiently rapidly to heat said means to a volume mean temperature above said reference temperature so that the power necessary to maintain said volume mean temperature varies as a function of time;
determining the time varying relationship between the power required to maintain said heating means at said volume mean temperature after said temperature has been reached and the time during which said power is being applied thereto;
determining the temperature difference between said volume mean temperature and said reference temperature and determining the resistance of said heating means at said volume mean temperature;



determining the thermal conductivity of said medium as a function of said temperature difference, of the resistance of said heating means at said volume mean temperature, of said applied power in accordance with said time varying power and time relationship, of said predetermined thermal conductivity of said heating means, and of at least one characteristic dimension of said heating means in accordance with a thermal model of said heating means and said medium in which it is immersed wherein said heating means is treated as a distributed thermal mass and wherein heat conduction occurs in a coupled thermal system which comprises both the heating means and the adjacent region of said medium which surrounds said heating means.

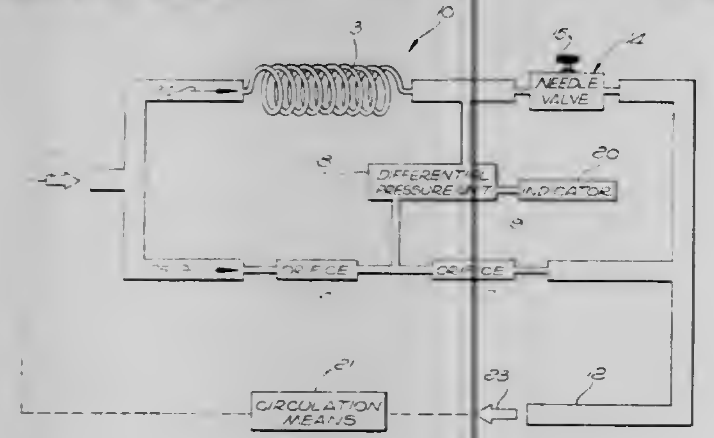
4,059,983
PROCESS FOR THE DETERMINATION OF THE VISCO-ELASTIC CHARACTERISTICS OF POLYMERS AND ARRANGEMENT TO CARRY OUT THE PROCESS
Christoph Fritzsche, Villars-sur-Glane, Switzerland, assignor to Lonza, Ltd., Gampel, Switzerland
Filed Sept. 2, 1976, Ser. No. 719,708
Claims priority, application Switzerland, Sept. 2, 1975, 11351
Int. Cl.^{2} G01N *3/54*
U.S. Cl. 73—15.6 18 Claims



1. A process for the determination of the visco-elastic characteristics of a polymer sample having a flat surface, which comprises the steps of:

a. spatially arranging the polymer sample so that its flat surface is an upper horizontal surface;
b. placing a rolling pendulum on the flat horizontal sample surface of the polymer sample, the rolling pendulum being supported thereon in a manner which allows the rolling pendulum to freely roll in an oscillating manner;
c. varying the temperature of the polymeric sample;
d. concurrently with step (c), exciting the rolling pendulum to free, damped rolling oscillations at the varied temperature of the polymeric sample; and
e. measuring the frequency and damping of the rolling oscillations of the rolling pendulum in dependence on the temperature of the polymeric sample.

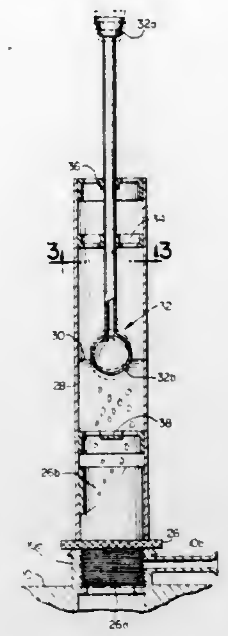
4,059,984
FLUID LEAK DETECTOR
William J. Uhlarik, Monterey Park, Calif., assignor to International Telephone and Telegraph Corporation, New York, N.Y.
Filed Oct. 14, 1976, Ser. No. 732,497
Int. Cl.² G01M *3/28*
U.S. Cl. 73—40.5 R **8 Claims**



1. A fluid flow detector, said detector comprising: first, second, third and fourth conduits; an inlet; an outlet, said first and second conduits being connected in succession from said inlet to said outlet, one of said first and second conduits having an adjustable valve, said third and fourth conduits being connected in succession from said inlet to said outlet, each of said third and fourth conduits including a constriction to the flow of fluid therethrough such that the flow through said third and fourth conduits is substantially smaller than that through said first and second conduits; a differential pressure unit (DPU); a fifth conduit connected from between said first and second conduits to said DPU; a sixth conduit connected from between said third and fourth conduits to said DPU; and means connected from said DPU to indicate the difference between the pressures within said fifth and sixth conduits, said indicator means being actuated when the other of said first and second conduits is leaking.

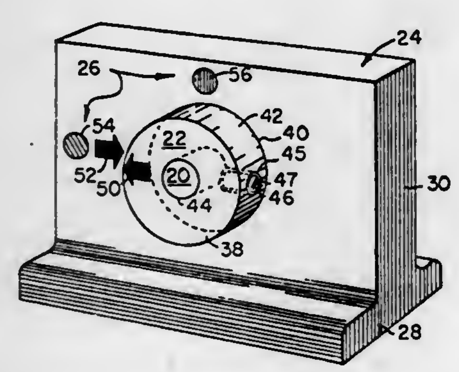
4,059,985
HEAD GASKET LEAK DETECTOR
Buford L. Kelly, 1570 West St., Southington, Conn. 06489
Filed June 3, 1976, Ser. No. 692,463
Int. Cl.² G01M *3/02*
U.S. Cl. 73—46 **11 Claims**

7. A method for isolating that cylinder, in a multi-cylinder internal combustion engine of the liquid cooled type, having a blown head gasket, said method comprising:
a. removing the filler cap on the radiator filler opening,
b. removing the engine valve covering,
c. inserting an adaptor in said filler opening, said adapter having a reservoir defining structure associated therewith and an indicator device movably mounted therein,
d. filling said reservoir with liquid to a level such that the indicator floats freely therein,
e. operating the engine to compress gases in the various cylinders, thereby forcing gas to escape through the



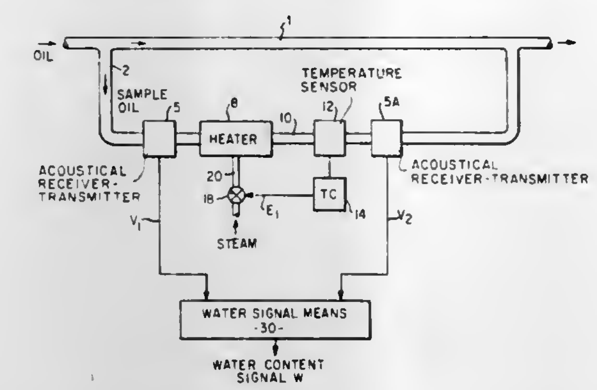
blown head gasket into the engine cooling system and cause movement of the indicator.

4,059,986
MUCUS TESTING PROCESSES AND DEVICES
Samuel R. Schuster, Wellesley, Mass., assignor to Ovutime, Inc., Brookline, Mass.
Continuation-in-part of Ser. No. 523,047, Nov. 12, 1974, Pat. No. 3,982,423, which is a continuation-in-part of Ser. No. 462,298, April 19, 1974, abandoned, which is a continuation-in-part of Ser. No. 433,767, Jan. 16, 1974, abandoned, which is a continuation-in-part of Ser. No. 300,187, Oct. 24, 1972, abandoned, and a continuation-in-part of Ser. No. 472,611, May 23, 1974, abandoned, which is a continuation-in-part of Ser. No. 300,187, Oct. 24, 1972, abandoned. This application Sept. 10, 1976, Ser. No. 722,228
Int. Cl.² G01N *11/00*
U.S. Cl. 73—54 **6 Claims**



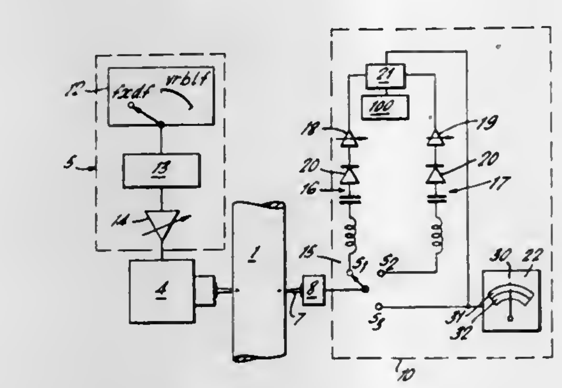
1. A device for testing mucus from a bodily cavity, said device comprising an inner bearing element and an outer bearing element constrained for motion with respect to each other, means for biasing said elements for said motion, and means for indicating the occurence of such motion, said inner bearing element and said outer bearing element have inner and outer bearing surfaces, each of said bearing surfaces having a surface finish ranging from 8 to 125 microinches in valley to peak height.

4,059,987
APPARATUS AND METHOD FOR MEASURING THE WATER CONTENT OF OIL FLOWING IN A PIPE
Donald J. Dowling, Houston, and William Schoen, Missouri City, both of Tex., assignors to Texaco Inc., New York, N.Y.
Filed Oct. 20, 1976, Ser. No. 734,060
Int. Cl.² G01N *25/58*
U.S. Cl. 73—61.1 R **8 Claims**



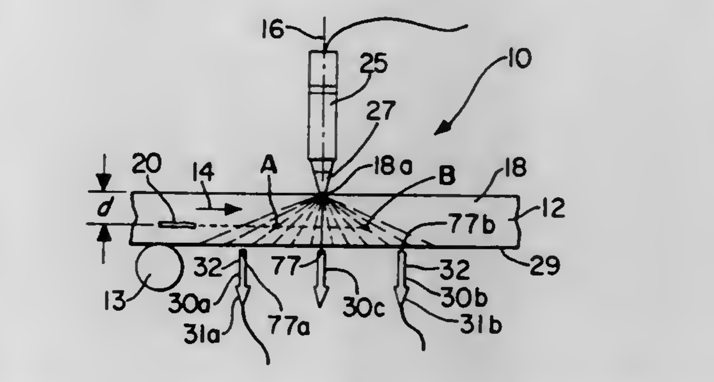
1. Apparatus for providing an output corresponding to the water content of oil flowing in a pipe comprising means for continuously sampling the oil to provide a stream of sample oil, means for changing the temperature of the sample oil by a predetermined amount, means for measuring the acoustical velocity of the sample oil prior to the temperature change and after the temperature change and providing corresponding signals, and output means connected to acoustical velocity sensing means for providing the output corresponding to the water content of the oil in accordance with the signals from the acoustical velocity sensing means and the known predetermined temperature change.

4,059,988
PRELIMINARY SCREENING OF WOODEN POLES
Alan Douglas Shaw, Geilston Bay, Australia, assignor to Fanner Pty. Limited, Northmead, Australia, a part interest
Filed May 24, 1976, Ser. No. 689,434
Claims priority, application Australia, June 5, 1975, 1891/75
Int. Cl.² G01N *29/00;* G01M *7/00*
U.S. Cl. 73—579 **15 Claims**



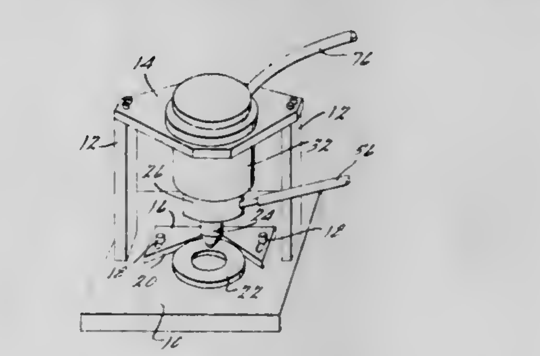
1. A method of preliminary screening a wooden pole to see if its characteristics are such that a more thorough examination is called for, comprising injecting into the pole, at a first position, a mechanical signal of constant amplitude obtained from a hammer having a reproducible performance; connecting to a listening point on the other side of the pole an electro mechanical transducer providing an electrical output significant of the level of mechanical vibratory energy present at the listening point; passing the electrical output through two filters having mutually exclusive pass bands, the first filter passing a frequency or range of frequencies found empirically to be virtually unaffected by the condition of the pole and the second filter passing a frequency or range of frequencies whose amplitude is found empirically to be significantly affected by the condition of the pole; comparing the levels of the electrical outputs of the two filters with one another; and providing a read-out value of each electrical output so that, by comparing the read-out values, a decision may be taken on whether the pole should be examined more thoroughly.

4,059,989
NON-DESTRUCTIVE EXAMINATION OF AN ARTICLE PARTICULARLY A TIRE, WITH ULTRASONIC ENERGY
George H. Halsey, Indiana, Pa., assignor to The Goodyear Tire & Rubber Company, Akron, Ohio
Filed Dec. 10, 1976, Ser. No. 749,545
Int. Cl.² G01N *29/04*
U.S. Cl. 73—598 **8 Claims**



1. Method of determining the location of an anomaly in an article and particularly in a vehicle tire without impairment of the integrity of the article which method comprises, moving the article at a constant rate in liquidfree space with respect to a reference line normal to a surface of the article, continuously impacting wave energy of 20 kilohertz to 100 kilohertz on said surface at the reference line, receiving wave energy emergent from the article at a plurality of locations each spaced in the direction of movement of the article, detecting a change in the emergent wave energy at each of said locations to provide a first signal at the first of said locations and a second signal at the second of said locations, measuring the time of travel by said article relative to the reference line between the first and the second said signal, and displaying or recording said time, said time being indicative of the depth of said anomaly below said surface.

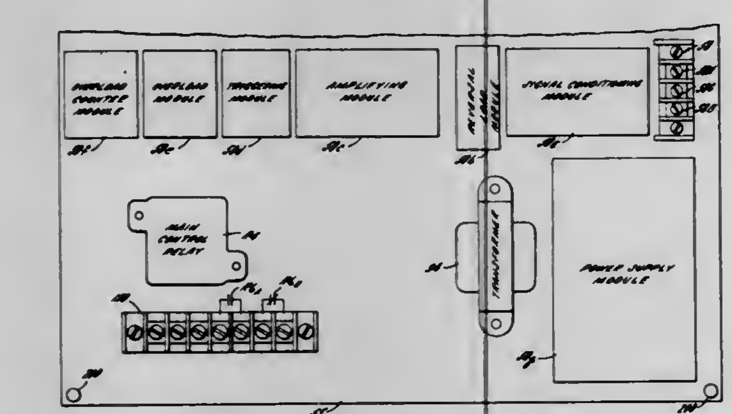
4,059,990
MATERIALS HARDNESS TESTING DEVICE
Douglas Glover, and Marvin J. Minter, both of Ann Arbor, Mich., assignors to Federal-Mogul Corporation, Southfield, Mich.
Filed Aug. 2, 1976, Ser. No. 710,445
Int. Cl.² G01N *3/40*
U.S. Cl. 73—81 **17 Claims**



1. A hardness testing device comprising a framework, a head including penetrating means supported by said framework for movement relative to a workpiece to and from a stand-by position spaced from the surface of the workpiece and an indented test position, means for applying a predetermined opposed force to said penetrating means and workpiece when in said test position to effect a penetration of the workpiece by said penetrating means to a depth proportional to the hardness of the workpiece surface stratum, fluid supply means for supplying fluid at a preselected pressure, variable flow control

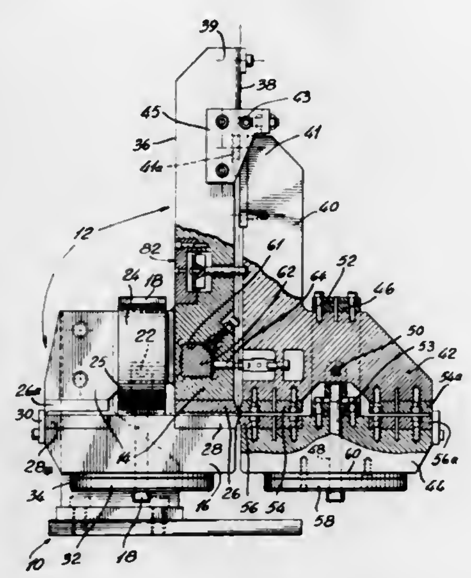
means associated with said fluid supply means movable to and from a first position when said penetrating means is in said stand-by position and a variable second position when said penetrating means is in said test position in proportion to the depth of penetration of said penetrating means, said variable flow control means comprising a member resiliently mounted on said head and including an engaging end positioned axially beyond the end of said penetrating means and adapted to contact the surface of a workpiece being tested in a region adjacent to the point of penetration of said penetrating means, said member movable through an axial displacement relative to said penetrating means in response to movement of said penetrating means to said test position, said axial displacement of said member being proportional to the depth of penetration of said penetrating means, said member including a portion defining an orifice of a size variable in proportion to said axial displacement of said member when in said second position, said orifice disposed in communication with said fluid supply means providing a variable restriction of flow of said fluid through said orifice and a corrresponding change in the condition of said fluid indicative of the hardness of the workpiece, and sensing means associated with said fluid supply means for sensing the condition of the fluid therein when said penetrating means is in said test position as indicative of the hardness of the workpiece.

4,059,991
MODULAR CONSTRUCTED LOAD SENSING SYSTEM
William P. Dybel, and Frank R. Dybel, both of 981 Wingate Road, Olympia Fields, Ill. 60461
Filed Aug. 1, 1975, Ser. No. 601,326
Int. Cl.² G01L *1/16*
U.S. Cl. 73—88.5 R **33 Claims**



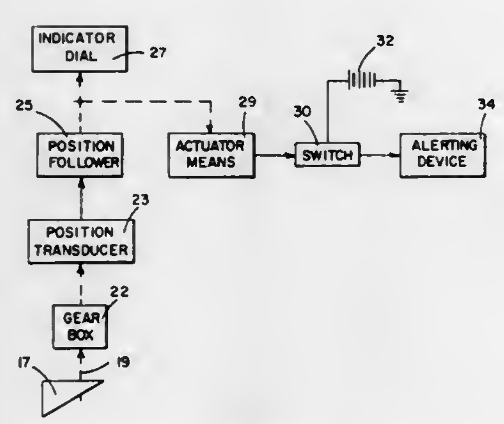
1. A system for monitoring loads that are intermittently applied to a force carrying member comprising mounting means fixed to said member substantially in line with the load to be detected, a transducer interposed between said mounting means and having a pair of output terminals with a piezoelectric crystal therebetween for developing at said output terminals electrical signals substantially proportional to the stresses experienced by to said member, electrically operated means responsive to said transducer signals for monitoring the loading on said member, said monitoring means including a main circuit board and a plurality of individual modules each containing at least one electrical component, means for engaging each said module with said board as an incident to positioning of said module at a predetermined location on said board, said engaging means including a plurality of mounting and conductor pins extending from the underside of each said module for electrically coupling said modules and the components thereon to said circuit board when said modules are in mounted position, and said modules each being individually removable from said circuit board.

4,059,992
APPARATUS FOR TESTING THE TENSILE STRENGTH OF SHEET MATERIAL
Wavell Frederick Cowan, Montreal West, and Bote Bruinsma, Hudson, both of Canada, assignors to Pulmac Instruments Ltd., Montreal, Canada.
Filed Aug. 20, 1976, Ser. No. 716,097
Claims priority, application Canada, May 31, 1976, 253719
Int. Cl.² G01N *3/10*
U.S. Cl. 73—95 **9 Claims**



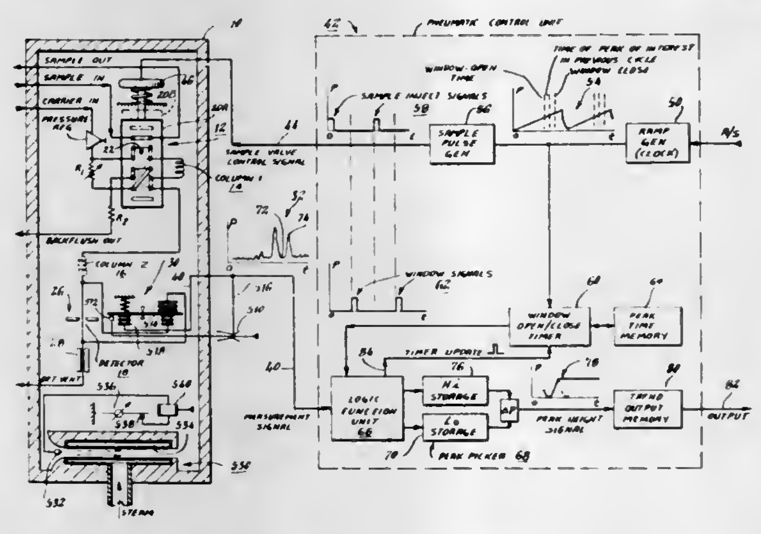
1. An apparatus for testing the tensile strength of fibers in a flat sheet comprising a base, a first support member on the base, a first pair of clamping jaws mounted to said first support member and adapted to receive and clamp a sheet material to be tested, said first support member extending above said first pair of jaws, a second support member pivoted to said first support member in pendulum manner, a second pair of clamping jaws mounted on said second support member opposite to said first pair of jaws and adapted to clamp said sheet material adjacent said first pair of jaws, said second support member pivoting in a pendulum manner and being at dead center with said second pair of clamping jaws being juxtaposed and in contact with the first jaws, means for pivotally causing the movement of the second support member away from dead center such that the pairs of jaws, while still clamping said sheet material, will move apart under pressure.

4,059,993
SYSTEM FOR MONITORING WATER FLOW ANGLE RELATIVE TO A BOAT KEEL
Leonard M. Greene, Chappaqua, N.Y., assignor to Safe Flight Instrument Corporation, White Plains, N.Y.
Filed Aug. 23, 1976, Ser. No. 716,659
Int. Cl.² G01C *21/00*
U.S. Cl. 73—178 R **10 Claims**



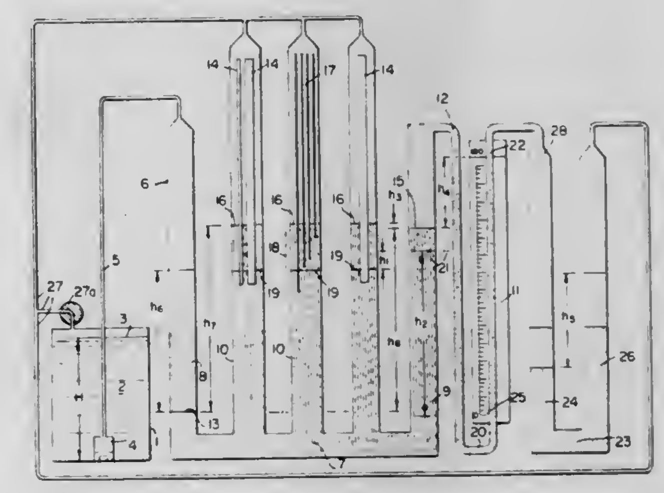
1. A device for monitoring the angle between the direction of ambient water flow and the keel of a sailboat comprising:
a sensing vane mounted on the hull of the boat immediately forward of the leading edge of the sailboat keel for rotation about an axis substantially parallel to the longitudinal center plane of the hull,
means responsive to rotational movement of said vane for providing a rotational movement in accordance with said vane movement at a location remote from said vane, and
indicator means responsive to said last mentioned means for providing an indication of the flow angle, said indicator means comprising an indicator dial having a dial scale calibrated to indicate various values of water flow angle and an identifiable indication on said scale indicating optimum water flow angle.

4,059,994
PNEUMATIC CHROMATOGRAPH
Raymond Annino, Golden, N.Y.; Robert C. Prescott, Foxboro; Edwin L. Karas, Sharon, both of Mass., and Richard W. Kalinoski, East Providence, R.I., assignors to The Foxboro Company, Foxboro, Mass.
Filed Nov. 26, 1976, Ser. No. 745,392
Int. Cl.² G01N *31/08*
U.S. Cl. 73—23.1 **3 Claims**



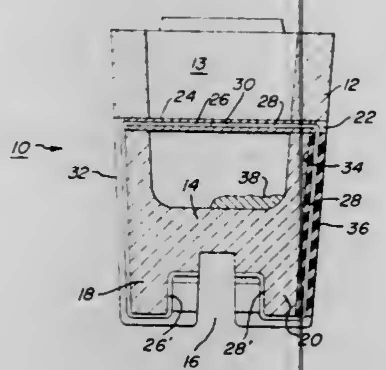
1. In industrial instrumentation apparatus of the type including a pressure line arranged to carry a pneumatic measurement signal representing a measurement such as the concentration of eluting components from a chromatographic analyzer and wherein the measurement signal passes through maximum and/or minimum values at least one of which is desired to be detected and retained for subsequent functions;
that improvement which comprises;
a force-balanceable member;
means for applying to said member a first force corresponding to said measurement signal;
feedback means to apply to said balanceable member a feedback force opposing said first force;
said feedback means including pressure storage means to receive a pneumatic feedback signal for developing said feedback force;
pneumatic sensing means adjacent said balanceable member for producing a pneumatic feedback signal responsive to changes in the force balance of said member; and
pressure-transmitting means connecting said sensing means to said pressure storage means;
said pressure-transmitting means including check-valve means to allow flow of pneumatic fluid in one direction between said sensing means and said pressure storage means to provide that the feedback pressure in said pressure storage means tracks said measurement signal as said measurement signal varies towards one of said values, said check-valve means serving to prevent flow in the opposite direction between said sensing means and said pressure storage means so as to trap in said pressure storage means a pressure corresponding to said one value after the measurement varies away from said one value.

4,059,995
LEVEL INDICATORS FOR LIQUIDS
Raul Calderon De Palacio, Pensylvania 171, Mexico City, Mexico (18)
Filed July 28, 1976, Ser. No. 709,330
Claims priority, application Mexico, Dec. 12, 1975, 162559
Int. Cl.² G01F *23/16*
U.S. Cl. 73—301 **5 Claims**



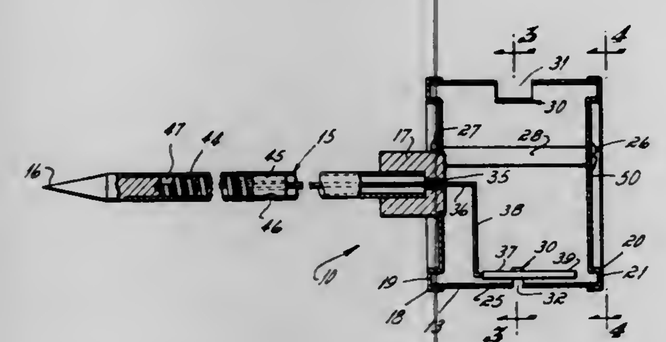
1. Apparatus for indicating the level of liquid in a receptacle, which comprises:
a. a first U-tube having a horizontal base, a pair of vertical arms at opposite ends of the base and a plurality of vertical branches rising from said base, the base, arms and branches being in fluid communication and containing a dense indicating liquid, and means for adjusting the liquid level in said branches;
b. means for transmitting hydrostatic pressure from the receptable to the surface of said dense liquid in one of said arms of said first U-tube;
c. a second U-tube, conduit means for providing fluid communication between said other arm of said first U-tube and an arm of said second U-tube, the second U-tube being of smaller diameter than said first U-tube, and a less dense liquid extending from the surface of the dense indicating liquid in said other arm of said first U-tube through said conduit means and into said second U-tube, the height of the less dense liquid in the other arm of the second U-tube being an indication of the liquid level in said receptacle;
d. a third U-tube of larger diameter than said second U-tube and containing a less dense liquid, second conduit means for providing fluid communication between the other arm of said second U-tube and an arm of the third U-tube, there being a volume of air between the liquids in said second and third U-tubes such that any expansion or contraction in the indicating liquid contained in said other arm of the first U-tube as a result of a change in ambient temperature will produce a proportionate change in volume of the air to cause porportionally an opposing head of liquid in the other arm of the third U-tube in compensation therefor; and
e. conduit means for connecting the free arm of the third U-tube and the branches to the atmosphere when the receptacle is selected to be open to the atmosphere or to the top of the receptacle when the receptacle is subject to a pressure different from atmospheric.

4,059,996
MOLTEN METAL SAMPLE CUP CONTAINING BLOB FOR PROMOTING CARBIDE FORMATION
Omer Paul Curé, Diepenbeek, Belgium, assignor to Electro-Nite Co., Philadelphia, Pa.
Filed Nov. 16, 1976, Ser. No. 742,293
Claims priority, application Belgium, Nov. 20, 1975, 2/54666
Int. Cl.² G01N *1/10;* **G01K** *13/12*
U.S. Cl. 73—354 **11 Claims**



1. In a device for use in determining phase change of a molten metal comprising a refractory cup having a cavity for receiving molten metal and temperature sensing means supported by said cup, the improvement comprising a blob attached to said cup within said cavity, said blob containing a first material for promoting carbide formation mixed with a refractory material for delaying dispersion of said first material into a sample of molten iron, said blob containing a second material capable of evolving hydrogen when contacted by molten iron, said second material being waterglass, whereby said first material for promoting carbide formation may be thoroughly mixed with said molten iron.

4,059,997
MEAT THERMOMETER
David H. Trott, Cincinnati, Ohio, assignor to Crossbow, Inc., Cincinnati, Ohio
Filed Mar. 8, 1976, Ser. No. 664,624
Int. Cl.² G01K *5/62, 13/00*
U.S. Cl. 73—352 **6 Claims**

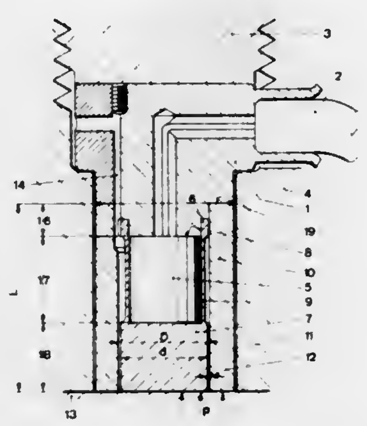


1. A meat thermometer adapted for direct exposure to flame, smoke and grease and temperatures of the order of 500° F. comprising a pointed stem containing a bimetallic element in its pointed end,
a housing mounted on the opposite end of said stem, said housing comprising a circular disk and cap spaced from each other and lying generally in plane perpendicular to the axis of the stem,
a cylindrical indicator face fixedly sandwiched between said disk and cap, said cylindrical indicator being a strip which has its ends brought together to form a cylinder of approximately one inch outside diameter,
said cylindrical indicator face being uncovered,
indicia indelibly formed on said indicator face and adapted to withstand direct exposure to flame, smoke and grease accompanying broiling meat,
a bolt eccentrically located with respect to the axis of said stem clamping said disk and cap against said cylindrical face,
and an indicator disposed in said housing and connected to said bimetallic element, said indicator being rotatable through a path adjacent the cylindrical indicator face, said bolt being out of the normal operating path of said indicator element,
said indicator face having a circumferential slot through which said indicator is visible.

4,059,998
GAS PRESSURE THERMOMETER, AND APPARATUS FOR APPLICATION IN A GAS PRESSURE THERMOMETER
Albertus van der Kolk, and Johannes-Gerhardus Stiller, both of Roden, Netherlands, assignors to Stiko B.V., Roden, Netherlands
Filed Apr. 27, 1976, Ser. No. 680,552
Claims priority, application Netherlands, Apr. 28, 1975, 7505015
Int. Cl.² G01K *5/28, 5/36*
U.S. Cl. 73—368.2 **4 Claims**

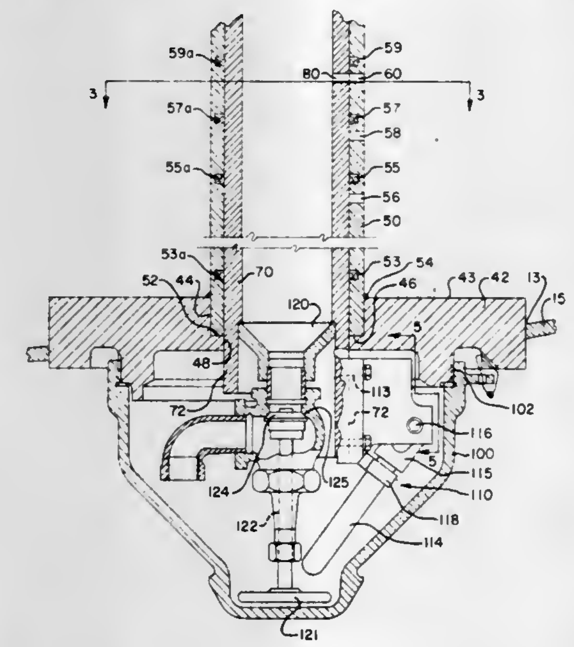
1. A gas pressure thermometer, comprising an indicator, recording or control section, and a measuring section coupled therewith and comprising a closed system containing a gas having an increased initial pressure, which measuring section comprises a container for gas, a Bourdon tube and a capillary which connects the gas container to the Bourdon tube, characterized in that increased initial pressure has a value above which, upon isothermal pressure increase, the gas undergoes a compressibility reduction.

4,059,999
PRESSURE TRANSDUCERS FOR PLASTIC SUBSTANCES
Paul Engeler, Oberohringen; Hans Ulrich Baumgartner, Winterthur; Ulrich Dübendorfer, Bassersdorf, and Hans Conrad Sonderegger, Neftenbach, all of Switzerland, assignors to Kistler Instrumente AG, Switzerland
Filed May 5, 1975, Ser. No. 574,337
Claims priority, application Switzerland, May 3, 1974, 006020/74
Int. Cl.² G01L *7/16, 9/08*
U.S. Cl. 73—419 **35 Claims**



1. A transducer for measuring pressure characteristics of elastic material in an injection moulding device, said transducer comprising:
a hollow sleeve member having an inner peripheral wall,
first means arranged in said sleeve member for measuring pressure of a pressure medium,
second means arranged at a first end of said sleeve member for transmitting pressure characteristics to said first means, and
third means for radially and axially supporting said first and second means within said sleeve member,
wherein said second means is arranged concentrically within said hollow sleeve member with a sealing gap between said second means and the inner wall of said hollow sleeve member, said sealing gap being of a predetermined size so that said gap in cooperation with the elastic material of said pressure medium forms a seal for sealing said first means within said hollow sleeve member from said pressure medium.

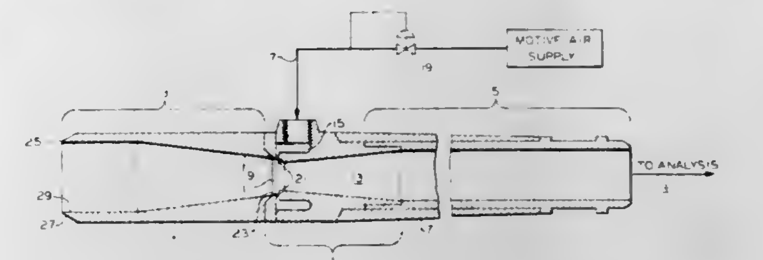
4,060,000
LADING SAMPLING DEVICE FOR A TANK
Forrest L. Baker, St. Charles, and Gunter R. Behle, St. Peters, both of Mo., assignors to ACF Industries, Incorporated, New York, N.Y.
Filed June 28, 1976, Ser. No. 700,107
Int. Cl.² G01N *1/16*
U.S. Cl. 73—421 B **23 Claims**



1. A lading sampling device for taking a sample from a given level in a tank comprising:
two concentric tubes including an inner tube and an outer tube mounted in an opening in the bottom of the tank and extending upwardly inside the tank; means mounting said inner tube for axial rotation relative to said outer tube; a plurality of vertically spaced sample receiving openings formed through the wall of each tube through which a lading sample may pass from the tank into the innermost tube when the respective openings in said two tubes are aligned; the sample receiving openings of one tube being spaced circumferentially relative to the sample receiving openings of the other tube such that only the sample receiving openings at the same level in each tube are aligned to receive a lading sample in a particular rotated position of said tube; sealing means provided between the inner and outer tubes between each sampling level to seal the outer tube relative to the inner tube between the various sampling levels; whereby samples of lading may be selectively taken at different levels in the tank by rotation of the inner tube relative to the outer tube; and means for effecting rotation of said inner tube relative to said outer tube.

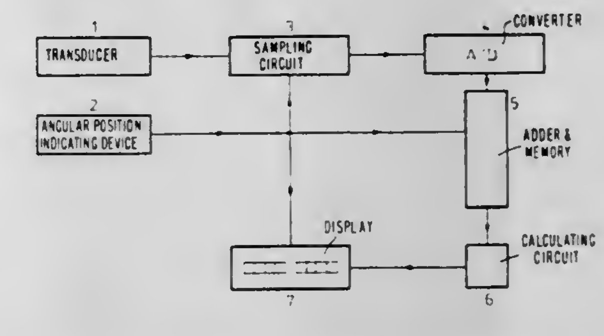
4,060,001
SAMPLING PROBE AND METHOD OF USE
Paul H. Archerd, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.
Filed Aug. 27, 1976, Ser. No. 718,302
Int. Cl.² G01N *1/24*
U.S. Cl. 73—421.5 R **9 Claims**

1. A sampling probe comprising:
a. a flow amplifier utilizing the Coanda wall attachment effect; and



b. attached to the inlet of said flow amplifier a nozzle adapted to induce an isokinetic flow of sample at the operating flow of said amplifier.

4,060,002
APPARATUS FOR THE DETERMINATION OF UNBALANCE IN ROTATING BODIES
Angel J. Mortensen, Eskildstrup, Roennede, Denmark (DK 4683)
Filed June 12, 1975, Ser. No. 586,173
Claims priority, application Denmark, June 12, 1974, 3126/74
Int. Cl.² G01M *1/22*
U.S. Cl. 73—462 **7 Claims**

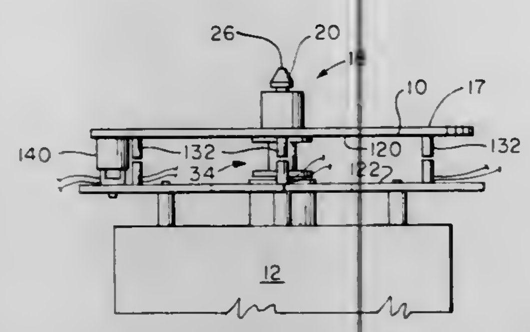


1. An apparatus for determination of unbalance in rotating bodies consisting of:
a test bench in which a body can be fixed and rotated,
devices which measure the vibrations caused by the rotating body unbalances and convert mechanical vibrations or pressure variations to electrical signals,
electronic instrument means to evaluate the amplitudes and angular positions of the unbalances from the electrical signals, said electronic instrument means comprising sampling circuits for sampling said signals, an angular position indicating device connected to said test bench and body which delivers corresponding signals for each of a predetermined number of angular positions, e.g. 100, to said sampling circuits for activating said circuits, and storing means in which predetermined fractions of the sampled signals are stored during a number of revolutions to form average values for each of the predetermined angular positions.

4,060,003
IMBALANCE DETERMINING APPARATUS AND METHOD
Thomas J. Bacsanyi, Novi, and Edward J. Harmon, Wixom, both of Mich., assignors to Ransburg Corporation, Indianapolis, Ind.
Filed Oct. 18, 1976, Ser. No. 733,433
Int. Cl.² G01M *1/08*
U.S. Cl. 73—483 **28 Claims**

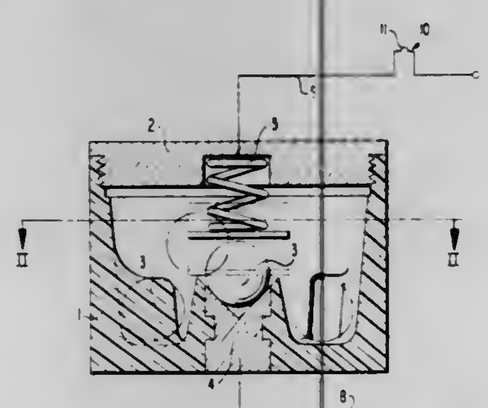
1. Apparatus for determining the amount of location of imbalance in an article to be balanced about an axis thereof comprising means for receiving the article and for positioning its axis, a base, means for substantially freely movably supporting the article receiving means relative to said base, means for sensing the orientation of the article receiving means relative

to the base and for producing at least one electrical output signal related to the sensed orientation, and means for applying a force to the article receiving means at at least one selected location about the axis to bring the article receiving means into



a substantially neutral orientation, said force applying means being responsive to signals related to said electrical output signals for acting between the article receiving means and said base.

4,060,004
SENSOR ADAPTED TO BE TRIGGERED BY DECELERATION FORCES
Hansjürgen Scholz, Echterdingen; Hans-Gerd Backhaus, Holzgerlingen; Luigi Brambilla, Boblingen, and Jürgen Gimbel, Gechingen, all of Germany, assignors to Daimler-Benz Aktiengesellschaft, Germany
Filed Mar. 19, 1976, Ser. No. 668,421
Claims priority, application Germany, Mar. 25, 1975, 2513023
Int. Cl.² G01P *15/02;* **H01H** *35/14*
U.S. Cl. 73—514 **7 Claims**



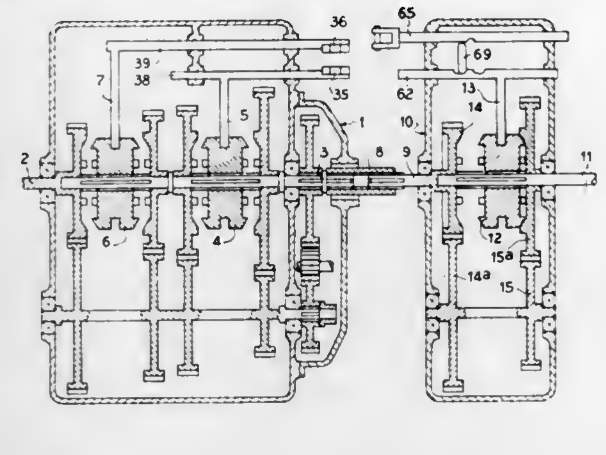
1. A sensor triggerable by deceleration forces which include a housing means having a bottom, a mass retained with prestress in said housing means and received, when deflected, by the bottom of the housing interior, wherein the interior space of the housing means is subdivided by generally upright partition wall means into chambers which hold fast the deflected mass; and wherein said deflectable mass serves as an electrical switching element connected via an electrical connecting line to an indicating means which undergoes a change in condition when current flows therethrough.

4,060,005
TRANSMISSION ASSEMBLY COMPRISING A MAIN GEARBOX IN SERIES WITH COUNTERSHAFTING PROVIDING AT LEAST TWO GEAR RATIOS
Jean Rémy Bost, Bois-Colombes, France, assignor to Automobiles Peugeot, Paris, France
Filed Aug. 30, 1976, Ser. No. 718,966
Claims priority, application France, Sept. 1, 1975, 75.26776
Int. Cl.² F16H *3/02;* **G05G** *1/00, 13/00*
U.S. Cl. 74—745 **12 Claims**

1. In a transmission assembly, in particular for an automobile vehicle, comprising:

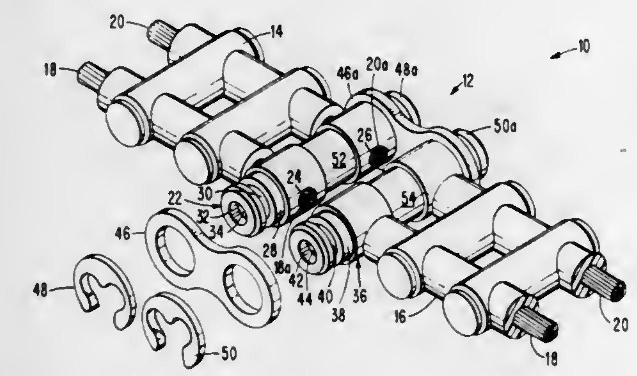
a gearbox comprising means providing a plurality of stepped gear ratios and a first control mechanism having a change gear lever movable to various positions for selecting and changing said ratios;

and countershafting comprising means providing at least two gear ratios placed in series with the gearbox and a second control mechanism having a pre-selecting lever having at least two positions corresponding respectively to said gear ratios of the countershafting;



the improvement comprising a device performing the function of a delay device adapted to retain instructions to change the gear ratio of the countershafting, which instructions result from a change in the position of said pre-selecting lever, actuating means being provided between the first control mechanism and said device for suppressing the retention of said instructions when the change gear lever is brought to a given position.

4,060,006
DEVICE FOR AND METHOD OF AFFIXING THE ENDS OF A SUBSTANTIALLY PLASTIC LADDER CHAIN TO MAKE A CONTINUOUS LADDER CHAIN THEREOF
Stephen Carl Abel, and Jeffrey Allen Carlson, both of Longmont, Colo., assignors to International Business Machines Corporation, Armonk, N.Y.
Filed Sept. 20, 1976, Ser. No. 724,794
Int. Cl.² F16G *13/02*
U.S. Cl. 74—258 **28 Claims**



1. A master coupling link for affixing the exposed metallic cable ends of a substantially plastic ladder chain to make a continuous ladder chain thereof comprising:

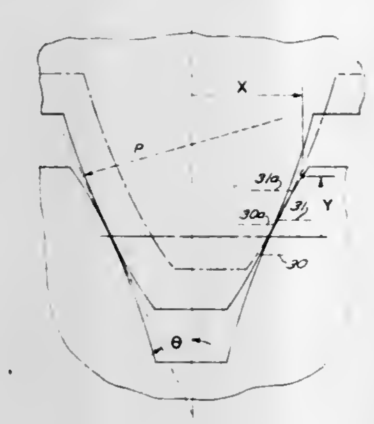
plural master cross links of metal having approximately the configuration of a plastic cross link member of said substantially plastic ladder chain, but each of said plural master cross links having a plurality of cavities disposed therein with two of said plurality of cavities, termed cable cavities, spaced symmetrically and perpendicular to the longitudinal dimension thereof and extending therethrough and at a distance apart equivalent to the distance between said exposed cable ends of said substantially plastic ladder chain for receiving said exposed cable ends, and with two of said plurality of cavities, termed side pin cavities, disposed in the ends of each master cross link perpendicular to and intersecting said cable cavities;

a plurality of master link side lock pins of a metal softer than either said exposed cable ends or said plural master cross links for insertion, under a measured deflection force, into said side pin cavities for affixing said exposed cable ends to each of said plural master cross links forming, thereby, substantially a molecular bond;

plural master link retainer clamps having dual openings therein for clamping and retaining the ends of said plural master cross links each in a position corresponding to the position of adjacent plastic cross links of said substantially plastic ladder chain; and

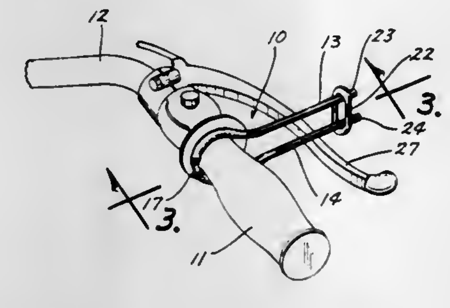
a plurality of master link retainer clips for clipping said ends of said plural master cross links against said plural master link retainer clamps for the retaining and securing thereof to said plural master cross links thereby forming said master coupling link and making said continuous ladder chain.

4,060,007
CLUTCH TEETH
George N. Levesque, Warwick, R.I., assignor to Brown & Sharpe Manufacturing Company, North Kingstown, R.I.
Filed Sept. 13, 1976, Ser. No. 722,481
Int. Cl.² F16H *55/08;* **F16D** *11/04;* **B23F** *1/00, 9/00*
U.S. Cl. 74—457 **4 Claims**



1. A clutch ring for a positively acting clutch, said clutch ring being adapted to cooperate with the cooperating clutch ring of identical construction, said clutch ring having clutch teeth, each of said teeth having faces lying substantially in a plane perpendicular to the axis of rotation of said ring, each of said teeth having a form profile which is of substantially exponential shape and each of said teeth is substantially tangent to a helicoid surface with constant lead at the pitch plane.

4,060,008
THROTTLE CONTROL DEVICE
Jerome L. Wilkinson, 1322 Des Moines St., Des Moines, Iowa 50316
Filed June 14, 1976, Ser. No. 695,521
Int. Cl.² G05G *5/04, 5/16*
U.S. Cl. 74—488 **6 Claims**



1. A throttle control device comprising:

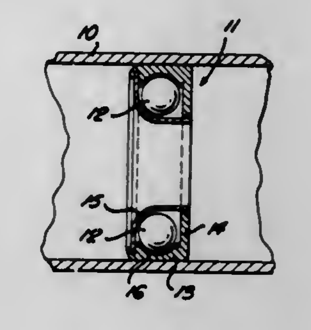
a first member having a first end and a second end;

a second member having a first end and a second end;

means for pivotally attaching the first ends of said first and second members with respect to each other, said pivotally attaching means including a link member, means for pivotally connecting the link member to said first member along a first pivotal axis and means for pivotally connecting said link member to said second member along a second pivotal axis, said first and second pivotal axis being substantially parallel with respect to each other; and

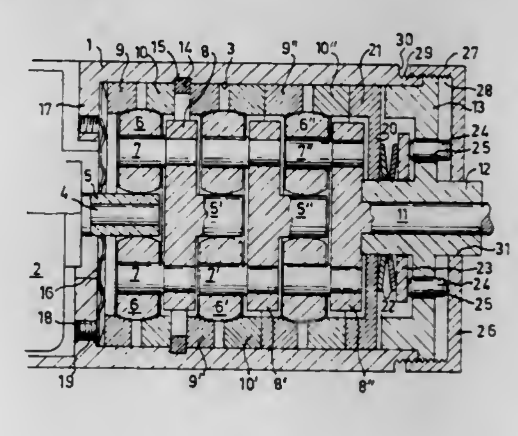
means for selectively connecting said second ends together and holding the first ends of said first and second members in direct frictional engagement with a throttle handle member.

4,060,009
BALANCING ROTORS
Howard John Wyman, Kenilworth, England, assignor to Chrysler United Kingdom Limited, London, England
Filed Oct. 23, 1975, Ser. No. 625,242
Claims priority, application United Kingdom, Oct. 30, 1974, 46987/74
Int. Cl.² F16F *15/22*
U.S. Cl. 74—573 R **8 Claims**



1. A method of balancing an out of balance rotor comprising the steps of providing within a cavity encircling the rotor axis a plurality of weights which are free to move around the cavity with the cavity and said weights being separated by an initially inert thermo-setting adhesive which freely permits movement of the weights within said cavity and which subsequently may be activated to permanently bond the weights to the cavity in the required positions, rotating the shaft to a speed at which the shaft is between two resonant frequencies of vibration and is nearer the lower of those frequencies so that the weights take up positions within the cavity which counteract any out of balance condition of the shaft and then temporarily applying heat to the region of the rotor having the cavity containing the weights so as to activate the adhesive and permanently lock the weights to the cavity in the balancing position.

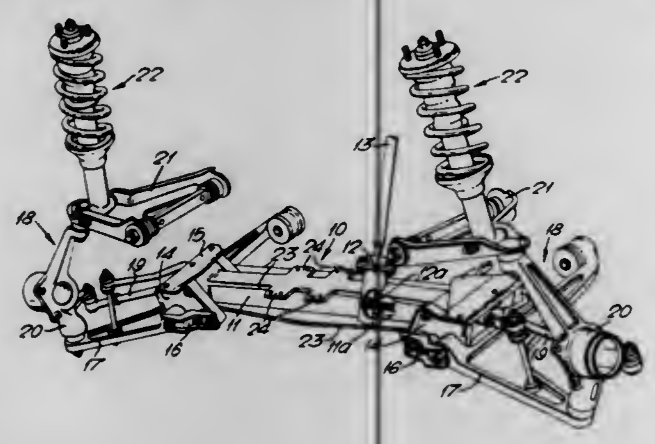
4,060,010
REDUCTION GEAR, ESPECIALLY FOR CAMERA LENS MOTORS
Björn Harald Hedén, Stenbrogatan 3 D, S-431 43 Molndal, Sweden
Filed Sept. 25, 1975, Ser. No. 616,538
Claims priority, application Sweden, Sept. 26, 1974, 7412124
Int. Cl.² F16H *13/06;* **F16D** *7/02*
U.S. Cl. 74—798 **6 Claims**



1. A transmission for a camera lens motor, comprising

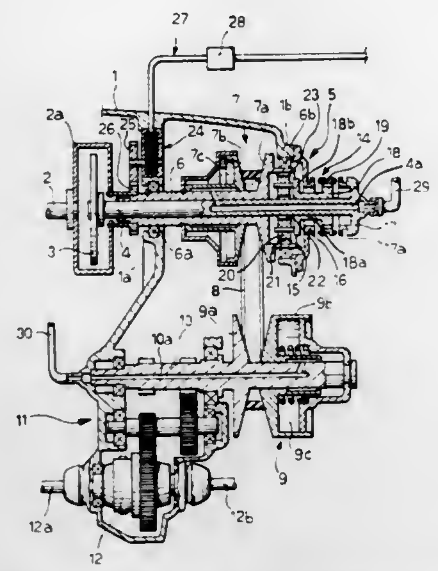
a. a transmission housing;
b. a motor adjacent to the housing;
c. an input shaft driven by the motor;
d. an output shaft for driving a lens part;
e. a reduction gear means between the input and output shafts;
f. the reduction gear means comprising at least two friction planetary gear sets arranged axially in series, and divided into first and second groups;
g. the first said group being arranged on the transmission input side and the second said group on the transmission output side, each of said groups comprising at least one planetary gear set;
h. variable slip clutch means associated with at least one planetary gear set of said second group and with said output shaft for setting a predetermined maximum torque on said output shaft; and
i. separate means associated with a planetary gear set of said first group and with said input shaft for setting a predetermined maximum torque on said input shaft, whereby pre-stressing of each of said first and second groups is independently adjustable.

4,060,011
ENGINE MOUNTINGS
Clive Jones, Coventry, England, assignor to Chrysler United Kingdom Limited, London, England
Filed Dec. 15, 1975, Ser. No. 640,863
Claims priority, application United Kingdom, Dec. 24, 1974, 55693/74
Int. Cl.² B62D *1/20*
U.S. Cl. 74—498 **3 Claims**



1. A steering system and engine mounting assembly for a motor vehicle having an engine comprising:
a. a rack and pinion steering mechanism having a rigid housing with opposing ends and a rack mounted for sliding movement in the housing and having opposing ends;
b. wheel guidance means carried by the ends of the housing and attached to the rack;
c. rack actuating means mounted in the housing and including a pinion engageable with the rack;
d. said housing having an upper side on which the engine is partly supported and having a lower side;
e. webs formed integral with and extending the length of the housing at the upper and lower sides thereof so as to stiffen the housing against bending so that the housing can support the weight of the engine; and
f. means on the housing for mounting the engine thereon and including integral mounting pads formed on the web on the upper side and projecting laterally therefrom.

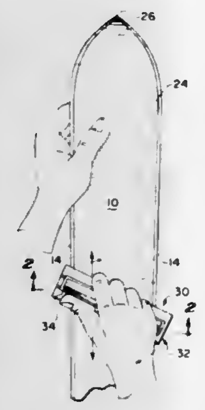
4,060,012
STEPLESS SPEED CHANGE GEAR FOR MOTOR PROPULSION SYSTEMS OF MOTOR VEHICLES
Dante Giacosa, Turin, Italy, assignor to Sira Societa' Industriale Richerche Automotoristiche, Turin, Italy
Filed Apr. 27, 1976, Ser. No. 680,555
Claims priority, application Italy, May 9, 1975, 68183/75
Int. Cl.² F16H *37/00*
U.S. Cl. 74—689 **3 Claims**



1. Stepless speed change gear for monitor propulsion systems of motor vehicles, of the type comprising:
a driving shaft connectible to the motor propulsion system;
a main shaft which receives drive transmission from the driving shaft, and which supports a driving pulley,
a driven shaft which supports a driven pulley;
a V-section endless belt would upon the two pulleys, each pulley being of the type consisting of two plates, with conical surfaces facing each other, one of which plates if fixed to its supporting shaft and the other of which is slidable axially upon its supporting shaft so as to allow corresponding radial movement of the portions of the interposed endless belt between said plates, and
an hydraulic circuit for controlling the position of the slidable plate of each pulley relative to the associated fixed plate and comprising a pump, including an adjustment device through which oil is fed under pressure into respective chambers adjacent to the slidable plates of the respective pulleys,
wherein the improvements consists in:
the main shaft being hollow, and there being mounted coaxially within the main shaft a rotatable drive shaft
a friction clutch at one end of said drive shaft for connecting the latter to the driving shaft, and
a reversing gear at the other end of said drive shaft connecting the latter to the main shaft,
said reversing gear having external control means under which it can assume two extreme operating positions, in the first of which the main shaft rotates in the same direction as the driving shaft, and in the other of which the main shaft rotates in the opposite direction to the driving shaft, and a neutral position in which the main shaft is idle relative to the driving shaft, and wherein the reversing gear comprises, in combination:
a cylindrical shell appendage at the end of the main shaft adjacent the reversing gear,
an epicyclic gear train with cylindrical gears housed in said shell appendage of the main shaft, said train consisting of a toothed ring fixed to the inner wall of the cylindrical shell, a central toothed ring on the driving shaft, a number of toothed planet wheels interposed between and meshing with said toothed rings and the central gear, and a planet carrier structure carrying said planet wheels;
a toothed device consisting of an annular plate, fixed to the planet carrier structure a first externally toothed flange upon the fixed support structure, said first flange being

disposed between the planet carrier structure and the annular plate and facing one side of the latter, a second externally toothed flange fixed to that end of the drive shaft which is adjacent the reversing gear and facing the opposite side of the annular plate from the first flange, and
an axially slidable control collar splined to said annular plate and having two sets of teeth or dogs;
the said collar having a first extreme axial position, in which it couples the annular plate with the second flange, and a second extreme axial position in which it couples the annular plate with the first flange.

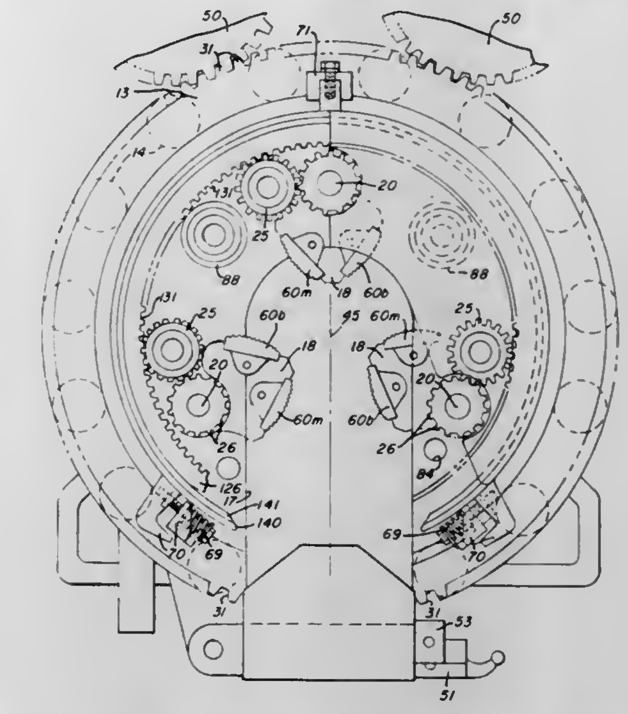
4,060,013
SKI-RENOVATING OR CONDITIONING TOOL
Arnold M. Thompson, Wheaton, Ill., assignor to Gold Lode, Inc., Wheaton, Ill.
Filed June 11, 1976, Ser. No. 695,128
Int. Cl.² A63C *11/06;* **B27G** *17/04*
U.S. Cl. 76—83 **9 Claims**



1. A ski-renovating or conditioning tool comprising a generally rectangular body having a torque-applying handle thereon, said body being of sufficient length as to straddle and overhang the bottom surface of a ski, a pair of non-circular shaving members depending from the overhanging end regions of the body, pivotally connected to said overhanging end regions for swinging movement about vertical axes, and adapted to condition the side surfaces of the ski when the tool body is manually reciprocated along said bottom surface in screed-like fashion with unidirectional torque being applied thereto by means of the handle, the effective distance between said shaving members being fixed and appreciably greater than the maximum width of the bottom surface of the ski whereby such application of unidirectional torque to the body will cause said shaving members to follow the contour of said side surfaces with substantially equal pressure during reciprocation of the body in either direction, said shaving members being shaped so as to present spaced apart shaving edges which automatically adjust themselves to the side surfaces of the ski under the influence of the application of unidirectional torque to the tool body.

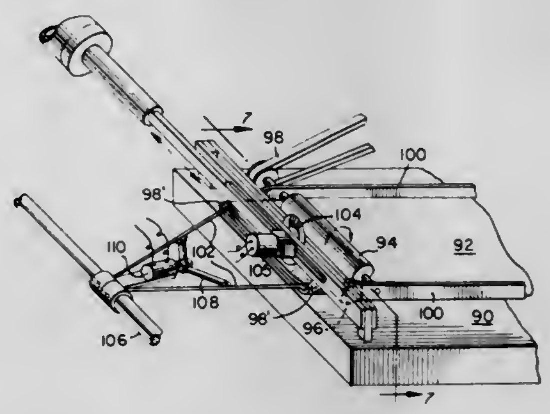
4,060,014
POWER TONG
John W. Turner, Jr., Houston, Tex., assignor to Joy Manufacturing Company, Pittsburgh, Pa.
Filed Apr. 29, 1976, Ser. No. 681,654
Int. Cl.² B25B *17/00*
U.S. Cl. 81—57.2 **21 Claims**

1. A tong assembly comprising, a housing having an extent with a through opening therein, a plurality of engaging means supported by said housing with each of said engaging means being movable in opposite directions between two positions radially spaced from the central axis of said opening, said engaging means each having portions movable within the extent of said opening intermediate said positions to engage a portion of a member extending axially within said opening, said engaging means being pivotally supported with respect to said housing on axes parallel to and circumferentially spaced with respect to said central axis, said engaging means each having a pair of cam surfaces converging toward an apex spaced laterally outermost from said pivot axis and means carried by said housing for selectively simultaneously moving said engaging means between and into said positions and into engagement



with such a portion of such a member at a third position intermediate said two positions, and said means being operable during such engagement whereby such a member is selectively rotatable in either one of opposite rotational directions with respect to the central axis of such member.

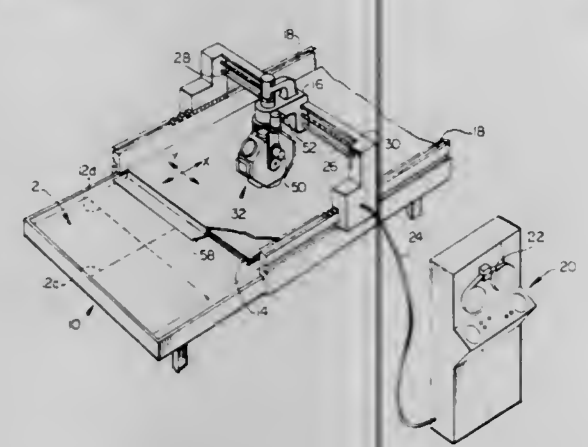
4,060,015
APPARATUS AND METHOD FOR MANUFACTURING RESILIENT BANDS
Chajim Gros, 172, Gladstone Park Gardens, London, N.W. 2 GRL, England
Division of Ser. No. 536,464, Dec. 26, 1974, Pat. No. 3,968,710. This application Feb. 27, 1976, Ser. No. 662,253
Claims priority, application United Kingdom, Dec. 29, 1973, 60165/73
Int. Cl.² B26D *1/18*
U.S. Cl. 83—19 **7 Claims**



1. Apparatus for use in the manufacture of resilient bands comprising means for displacing a tube of resilient material longitudinally towards a cutting station, a band engaging station downstream of said cutting station and comprising at least two spaced fingers for entering the leading end portion of the tube on the egress side of the cutting station, cutting means at the cutting station and movable transversely of the tube to sever the leading end portion of the tube from the remainder of the tube to form a band, means for urging the fingers of the finger arrangement apart to tension the severed band against said fingers, and means for displacing the spread fingers bodily

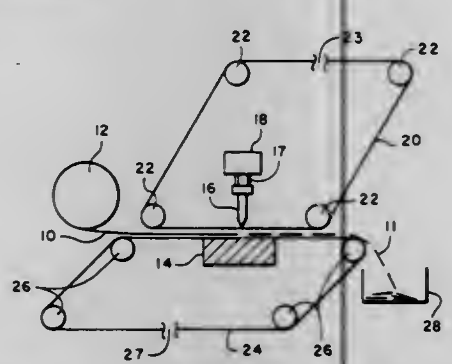
to remove the severed band from said cutting station to clear said cutting station for the next cycle.

4,060,016
METHOD AND APPARATUS FOR BLANKING OUT PATTERN PIECES FROM A LAYUP
Heinz Joseph Gerber, West Hartford, Conn., assignor to Gerber Garment Technology, Inc., East Hartford, Conn.
Filed July 26, 1976, Ser. No. 708,700
Int. Cl.² B26F *1/40;* **D06H** *7/00*
U.S. Cl. 83—451 **10 Claims**



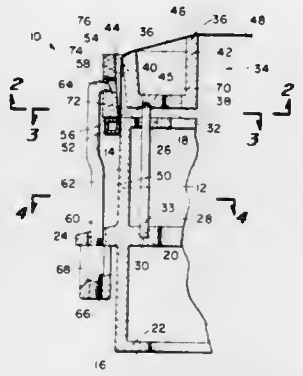
1. Apparatus for blanking pattern pieces out of a layup of sheet material and comprising:
a. means defining a substantially continuous upwardly facing supporting surface for the sheet layup, said supporting surface being mechanically rigid,
b. means for withdrawing the air from between adjacent sheets in said layup to provide a compacted layup on said supporting surface,
c. a turret having a plurality of faces, and means rotatably supporting said turret for indexing movement on a turret axis,
d. a plurality of blanking dies provided on said turret faces,
e. means for moving said turret and said turret axis normally relative to said sheet layup supporting surface to move one of said blanking dies through the layup to blank pattern pieces out of said layup, said supporting surface being rigid enough to react the forces imposed thereon by said blanking die as it cuts through the layup and contacts said supporting surface.

4,060,017
METHOD OF CUTTING LITHIUM
John R. Backlund, Chalfont, Pa., assignor to Honeywell Inc., Minneapolis, Minn.
Filed Feb. 18, 1977, Ser. No. 770,180
Int. Cl.² B26D *7/06, 5/08*
U.S. Cl. 83—23 **11 Claims**



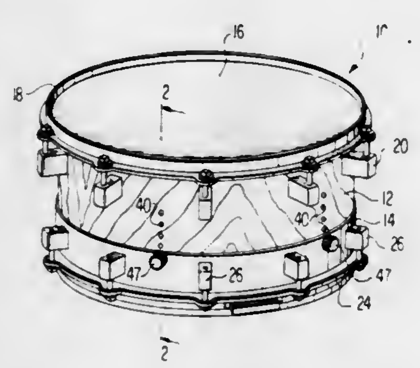
1. A method of cutting lithium metal into a plurality of pieces, comprising the steps of:
positioning a quantity of lithium metal at a predetermined position between an anvil means and a cutting blade means;
interposing a thin flexible film between said blade means and said lithium, said film being inert to said lithium;
repetitively forcing said blade means toward said anvil means with sufficient force to cut said lithium, and retracting said blades; and indexing said lithium and said film after each cut.

4,060,018
BANJO DRUMHEAD
Donald A. Gilbrech, 1302 Beechwood Ave., Fayetteville, Ark. 72701
Filed Feb. 23, 1976, Ser. No. 660,700
Int. Cl.² G10D *1/10*
U.S. Cl. 84—269 **9 Claims**



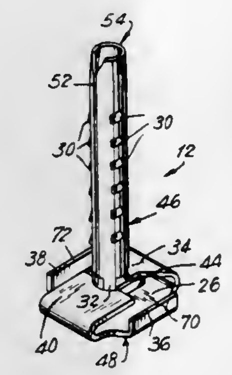
1. An improved banjo drumhead comprising:
a circumferential body rim having an upper and lower end;
a plurality of spaced apart elongated cantilevered support columns each affixed at the lower end to said body rim at a point on said body rim below said upper end, and extending above and being spaced from said upper end, each support column being in a plane parallel to the rim axis;
a circumferential tone ring of diameter substantially equal to said body rim, the tone ring having an upper and a lower surface, the lower surface having means engaging the upper end of said support columns whereby said tone ring is supported adjacent to and spaced from said body rim in a plane parallel and coaxial with said body rim upper end, the upper surface of said tone ring being configured to receive a head membrane;
a circular head membrane stretched over said tone ring upper surface; and
means securing the circumferential periphery of said head membrane to said body rim, said cantilevered support columns permitting vibrational movement of said tone ring relative to said body rim.

4,060,019
ADJUSTABLE DRUM
Charles P. Cordes, 27 Kenneth Place, Clark, N.J. 07066
Filed Aug. 18, 1976, Ser. No. 715,587
Int. Cl.² G10D *13/02*
U.S. Cl. 84—411 R **4 Claims**



1. An adjustable drum comprising first and second cylindrical shells telescopically disposed relative to each other, each shell having a drum head, means for adjustably securing said drum head to each shell, a plurality of equally spaced apart adjusting means for providing stepwise adjustment between said shells and insulating means associated with each of said adjusting means for insulating said shells from each other while providing a plurality of circumferential gaps between said telescopically disposed shells.

4,060,020
SHEET METAL SCREW
John N. Pollak, East Meadow, N.Y., assignor to Leviton Manufacturing Co., Inc., Little Neck, N.Y.
Filed Sept. 16, 1976, Ser. No. 723,729
Int. Cl.² F16B *35/00*
U.S. Cl. 85—1 L **1 Claim**



1. A fastener capable of being formed from a blank of sheet material, comprising, in combination: a fastener body comprising a generally tubular shank portion extending substantially about a longitudinal axis from a shank extremity, said shank portion including a plurality of generally cantilevered projection means extending outwardly from said longitudinal axis, each of said projection means including outer bearing surfaces which join substantially helically extending free edges thereof, said shank portion further including a pair of spaced tongue members integral therewith and spaced from one another, said tongue members extending in generally parallel relationship with respect to said longitudinal axis, and head means integral with said shank portion at a disposition opposite said shank extremity for transmitting both linear driving forces substantially parallel to said longitudinal axis and rotating forces about said longitudinal axis to said shank portion, said head means including external bearing surfaces for receiving said linear driving forces and internal opposing bearing surfaces extending substantially perpendicularly with respect to said external bearing surfaces for cooperatively receiving said rotating forces from a first tool inserted within an opening defined by said internal bearing surfaces, said head means further including substantially polygonal external surfaces capable of being engaged by a second rotating tool, said head portion formed by a plurality of 180° bends of sheet material extending from a web interconnecting said shank and head portions to remote surfaces disposed adjacent said tongue members for preventing rotation of said tongue members.

4,060,021
CIRCULAR INDEXING PLATE FOR A MACHINE TOOL
Charles William Berthiez, Lausanne, Switzerland, assignor to Charles William Berthiez, Lausanne, Switzerland
Filed Dec. 12, 1974, Ser. No. 531,878
Claims priority, application France, Dec. 12, 1973, 73.44419
Int. Cl.² B23D *7/08;* **B23Q** *3/10*
U.S. Cl. 90—58 B **9 Claims**

1. In a machine tool having a circular indexing plate adapted to support a load, said plate being formed with an upper and lower face, means mounting said plate for rotation about a vertical axis, a plurality of jacks disposed along the periphery of said plate and bearing against portions thereof to support said plate, each of said jacks including a body portion and a movable portion, said movable portion being adjustable vertically, at least between at low end of stroke and a high end of stroke, the stroke of each so disposed jack movable portion in the direction of said plate being capable of exceeding the horizontal position of said plate without load each of said jacks including control means for determining the vertical position of each said movable portion including at least two sets of contacts mounted on each of said jacks, one of said sets being arranged to provide control contact at the level position of said

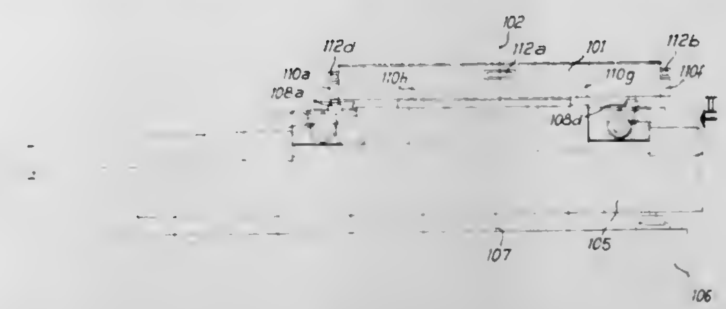
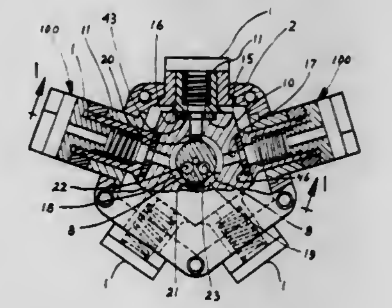


plate without load and the other set being arranged to provide control contact at the high end-of-stroke of said jack movable portion and means mounted on each said jacks responsive to the movement of the movable portion with respect to said body to actuate one of said contact sets.

4,060,022
HYDRAULIC MOTOR HAVING POSITIVE LOCKING MEANS
Philip A. Kubik, 1527 Lochridge, Bloomfield Hills, Mich. 48013
Filed Nov. 10, 1976, Ser. No. 740,596
Int. Cl.² F15B *21/02*
U.S. Cl. 91—40 **12 Claims**

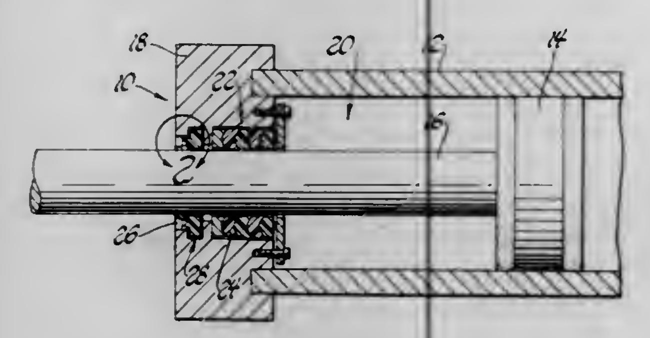


1. A hydraulic motor comprising:
a housing;
a shaft rotatably mounted within said housing;
an eccentric carried by said shaft;
a bearing block carried by said eccentric for relative rotation between said bearing block and said eccentric;
a plurality of hydraulic cylinders grouped about the axis of said shaft in a common plane normal to said axis;
a plurality of pistons each having a passage means, one piston being slideably mounted in each of said cylinders;
means urging each of said pistons in the direction of said bearing block, said cylinder and said piston defining therebetween an enclosed pressure chamber when communicated with a source of fluid, generates a force on said piston to extend said piston from said cylinder toward said bearing block and, when closed, said pressure chamber defining a volume fluid which prevents said piston from retracting into said cylinder to prevent said shaft from rotating; said shaft and eccentric having supply and exhaust passages communicating with said bearing block and adapted for connection to a source of fluid pressure and an exhaust means, respectively, and means disposed between said piston and said bearing block for admitting fluid pressure to said pistons in turn, one after the other, during the operation of said motor such that said pistons exert direct thrust on the eccentric to cause rotation of said shaft;
valve means normally operable to permit flow of pressure fluid from said piston to said pressure chamber, said valve means being operable upon actuation to close said fluid

communication and block the flow of fluid from said pressure chamber; and

means for operating said valve means.

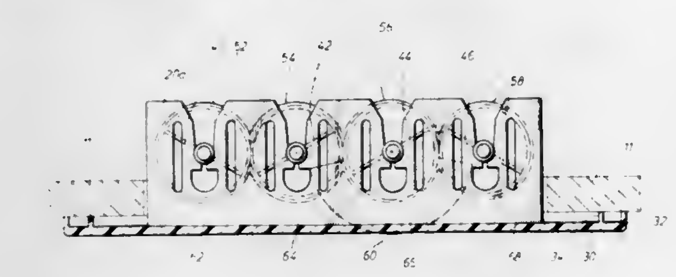
4,060,023
DUAL LIP ROD WIPING SEAL
George Vegella, 13428 E. Nine Mile, Warren, Mich. 48089
Filed June 4, 1976, Ser. No. 693,055
Int. Cl.² F16J *15/18*
U.S. Cl. 92—168 **4 Claims**



1. A one-piece self-supporting rod wiping seal member of flexible elastomeric material that can be snap fitted into a retention groove comprising: an endless body portion having a mounting section for mounting the seal member in a supporting groove by flexibly distorting the body portion and snap fitting the mounting section in the supporting groove; and a sealing section extending radially from said mounting section, said body portion having a pair of spaced end walls each extending over both of said mounting and sealing sections and inner and outer side walls extending therebetween; said inner side wall being located on said sealing section and said outer side wall being located on said mounting section; first and second endless lips projecting from one of said end walls at said sealing section; each of said lips having an inner end joined integrally to said one end wall and projecting therefrom to an outer free end with the respective free ends spaced radially from each other; said first lip constituting a rod engaging lip and having an inner side surface extending between the inner and outer ends thereof and projecting from the junction between said inner side and said one end wall axially and radially inwardly in the unstressed condition of said first lip; said first lip having an outer side surface extending between the ends thereof with its inner end located at said one end wall at a location spaced radially outwardly of said inner side wall and radially inwardly of said outer side wall; said second lip consituting a cylinder engaging lip and having an outer side surface extending between the ends thereof with its inner end joined to said one end wall at a location spaced radially outwardly from said first lip and radially inwardly from said outer side wall, said outer side surface of said second lip projecting axially and radially outwardly from said one end wall in the unstressed condition of said second lip; said second lip having an inner side surface extending between the ends thereof with its inner end joined to said one end wall at a location spaced radially inwardly from said outer side surface thereof; said mounting section extending radially outwardly of said second lip with the portion of said one end wall in said mounting section, said outer side wall, and said other end wall constituting mounting groove engaging surfaces of said body for supporting said body in a mounting groove.

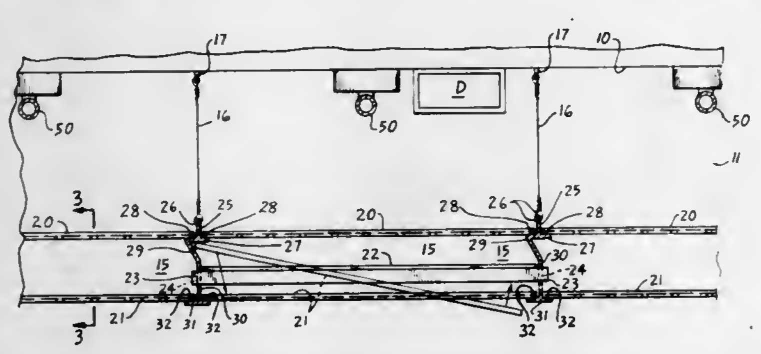
4,060,024
DAMPER ASSEMBLY
Arthur M. Deck, Houston, Tex., assignor to Goodman Manufacturing Corporation, Houston, Tex.
Filed Oct. 28, 1976, Ser. No. 736,400
Int. Cl.² F24F *7/00*
U.S. Cl. 98—40 VM **9 Claims**

1. A damper assembly adapted to be installed in a wall or ceiling at the opening of an air duct to control air flow therethrough, which comprises:
- a series of generally rectangular blades each having an axis of rotation extending longitudinally substantially centrally of the blade with a journal portion at each end;
- means operatively interconnecting said blades for simultaneous rotation on said axes from an open position to a closed position; and
- a pair of spaced frame members having blade mounts defined therein in aligned cooperating pairs, each pair of blade mounts receiving the journal portions on one of said blades to mount the same for rotation;



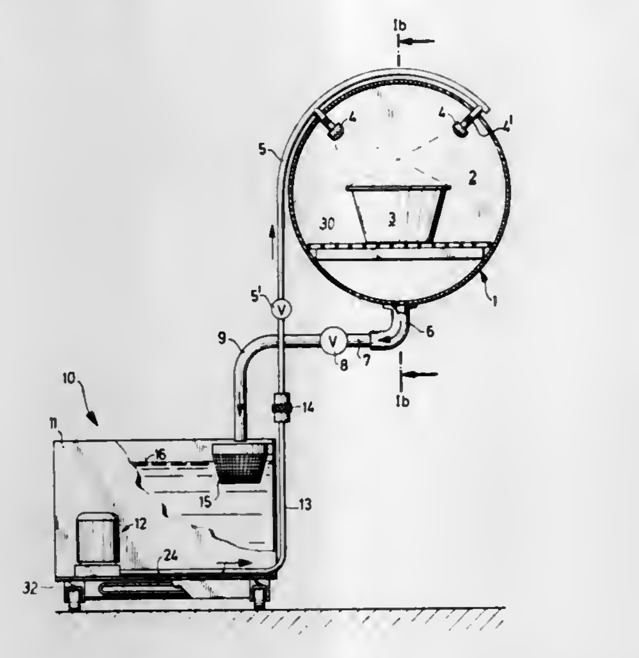
each of said blade mounts having an entry channel defined by opposed surfaces leading to a bearing aperture, said channel narrowing from a width greater than the diameter of said bearing aperture to a width less than the diameter of said bearing aperture at the point of intersection of said channel and said aperture, and at least one relief opening formed adjacent said bearing aperture to permit said opposed surfaces to spread apart as said journal portion is advanced through the channel and snapped into said bearing apertures.

4,060,025
AIR DISTRIBUTION CEILING
Michael H. Pelosi, Jr., 520 Abbott Drive, Broomall, Pa. 19008
Filed Sept. 30, 1976, Ser. No. 728,258
Int. Cl.² F24F *7/00*
U.S. Cl. 98—40 DL **9 Claims**



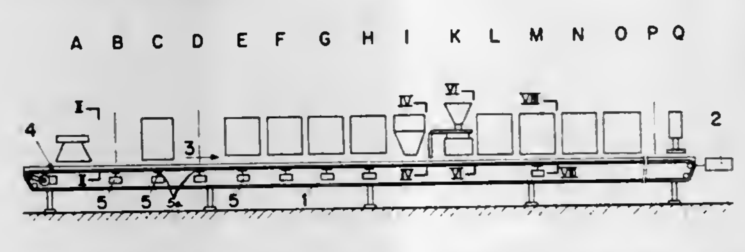
1. A support member for the panels of an air distribution system comprising a unitary elongated bar having
- an upper attaching rib,
- an upper horizontally extending portion below said rib with horizontal panel supporting faces therealong,
- a lower horizontally extending portion below said upper portion with horizontal panel supporting faces therealong, and
- a vertically disposed connecting portion between said horizontally extending portions and having a portion thereof offset to provide a clearance for insertion of the panels from below.

4,060,026
APPARATUS FOR ADDING SALT OR SEASONINGS TO FOOD BEING COOKED IN STEAM COOKERS
Alfred Löhr, Bochum, and Wolfgang Tschek, Gelsenkirchen, both of Germany, assignors to F. Kuppersbusch & Sohne Aktiengesellschaft, Gelsenkirchen, Germany
Division of Ser. No. 556,174, March 6, 1975, abandoned. This application Nov. 10, 1975, Ser. No. 630,669
Claims priority, application Germany, Mar. 6, 1974, 2410552; Mar. 6, 1974, 7407720[U]
Int. Cl.² A47J *27/66*
U.S. Cl. 99—346 **5 Claims**



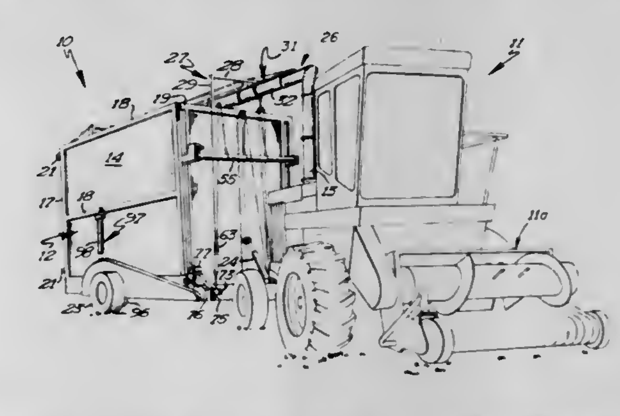
1. Apparatus for adding salt or seasonings to food being cooked in a steam cooker cooking vessel having a cooking chamber comprising:
- a. a cooking vessel having a support platform and food containers on the support platform for holding the food being cooked;
- b. a plurality of spray nozzles at the top of the cooking vessel for spraying the food with a salt or seasoning solution;
- c. a separate and portable collecting vessel for accommodating the salt or seasoning solution;
- d. a supply line attached to said collecting vessel for connecting said collecting vessel to the spray nozzles of the cooking vessel;
- e. a conveying and turnover pump for conveying the salt or seasoning solution from the collecting vessel to the food in the cooking chamber through the supply line; and
- f. a discharge line connected to the bottom of the cooking vessel below the support platform and which serves as a return line to the collecting vessel.

4,060,027
APPARATUS FOR APPLYING INGREDIENTS
Damian Johann Jenny, Zurich, Switzerland, assignor to Damian J. Jenny AG, Zurich, Switzerland
Filed Dec. 8, 1975, Ser. No. 638,935
Claims priority, application Switzerland, Dec. 16, 1974, 16718/74
Int. Cl.² A21C *9/04;* **A23P** *1/00;* **B23Q** *7/04*
U.S. Cl. 99—450.1 **3 Claims**



1. An apparatus for applying ingredients to an edible product, comprising a conveyor band, means for step-wise advancing said conveyor band, at least one work station arranged along the conveyor band for the application of at least one type of ingredient to the edible product, a carriage, means mounting the carriage to be movable transversely with respect to the direction of movement of the conveyor band, means for displacing the carriage transversely with respect to the direction of movement of the conveyor band between a first terminal position and a second terminal position, a receiver container for the ingredient, said receiver container being provided with a discharge chute, said carriage when located in its first terminal position being disposed above the conveyor band and when in its second terminal position being located adjacent the conveyor band and above said discharge chute of the receiving container, said carriage being provided with a plurality of individual suction heads which engage with the discharge chute in the second terminal position of the carriage, each suction head comprises a head portion equipped with substantially parallel bores, means defining a vacuum compartment flow communicating with said substantially parallel bores, a piston displaceable in the carriage provided substantially coaxially with respect to each head portion, said piston having a leading end provided with pins which engage into said bores when the piston assumes a lower terminal position for closing said bores, said piston being movable into an upper terminal position where said bores are freed.

4,060,028
STACK FORMING VEHICLE
Gene A. Luscombe, Dolliver, Iowa 50531
Filed Aug. 2, 1976, Ser. No. 711,107
Int. Cl.² B30B *3/02;* **B60P** *1/32*
U.S. Cl. 100—100 **6 Claims**



1. A stack forming vehicle adapted to be towed by a prime mover and adapted to receive a chopped forage crop from a crop harvesting device of the type having a discharge spout through which the chopped forage crop is discharged, comprising:
- a generally rectangular shaped vehicle body including a bottom wall, a front wall, upstanding substantially opposed vertical sidewalls, a closure structure shiftably mounted on said vehicle body adjacent the rear end thereof and being swingable between a closed position for closing the rear end of the vehicle body, and an open position to permit a formed stacked to be removed rearwardly from the vehicle body,
- ground-engaging wheels connected with said vehicle body to permit the latter to travel over the surface of the ground,
- a revolvable compacting roller mechanism positioned within said body and being operable to continuously travel over the surface of the forage crop during the loading of the vehicle body to continuously compact the forage crop therein,
- a vertical pusher member positioned in upstanding substantially vertical relation within the body and being longitudinally shiftable between a forward position adjacent the front wall of the body and a rearward position adjacent the rear of the body whereby said pusher member will progressively push the form stacked rearwardly from the wagon, when shifted from the forward position to the rearward position,

drive means connected with the said pusher member and to a source of power and being operable to shift said pusher member between said forward position and said rearward position,

said drive means being operatively connected with said ground engaging wheels and being operable to drive said wheels in a forwardly direction simultaneously as the pusher member is being shifted rearwardly.

4,060,029

BOUNCE-FREE OBJECT ARRESTING SYSTEM

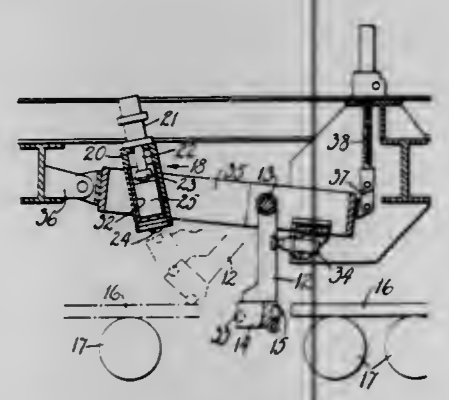
Robert Marshall, Sheffield, England, assignor to Davy-Loewy Limited, Sheffield, England

Filed June 24, 1976, Ser. No. 699,327

Claims priority, application United Kingdom, June 24, 1975, 26791/75

Int. Cl.² B21B *45/00;* **B44B** *5/00*

U.S. Cl. 101—4 **9 Claims**



1. An arresting system for arresting without substantial bounce an arcuately moving object having a striking face, the system including:

a. a linear guideway;

b. an energy absorber disposed at one end of said guideway;

c. said energy absorber having a piston rod extending axially of said guideway towards the other end of said guideway;

d. a first elastic element disposed at the other end of said guideway and in the path of said moving object so as to be struck by said striking face; and

e. a second elastic element which is a close sliding fit within said guideway between said piston rod and said first elastic element, and which is normally in contact with said first element until said first element is struck by said striking face,

f. the coefficients of restitution between said first and second elements and between said striking face and said first element being high, whereby the kinetic energy of said moving object is transferred to said second element and thence to said energy absorber without substantial movement of said first element.

4,060,030

STENCIL SHEET HOLDER

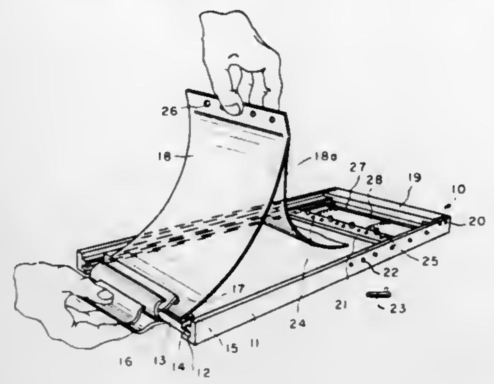
Fred J. Noschese, 74 Gavin St., Yonkers, N.Y. 10701

Filed July 28, 1975, Ser. No. 599,606

Int. Cl.² B41F *15/36*

U.S. Cl. 101—127.1 **8 Claims**

1. A stencil-sheet holder assembly comprising, a rigid frame having peripheral leg members that define a central open area, said peripheral leg members including two rigid non-flexible longitudinally extending parallel leg members, clamping means located near one end of said frame for securing one end of a stencil-sheet to said one end of the frame, a cross-bar support means movably mounted to the other end of the frame and having means for securing the stencil-sheet thereto, means for longitudinally adjusting the position of the cross-bar support means, and spring tensioning means secured to the cross-bar support means and the position adjusting means so as to urge the cross-bar support means in the direction of said other end



of the frame thereby to support a stencil-sheet under tension over the central open area of the frame.

4,060,031

PRINTING METHOD AND APPARATUS FOR PERFORMING THE PRINTING METHOD

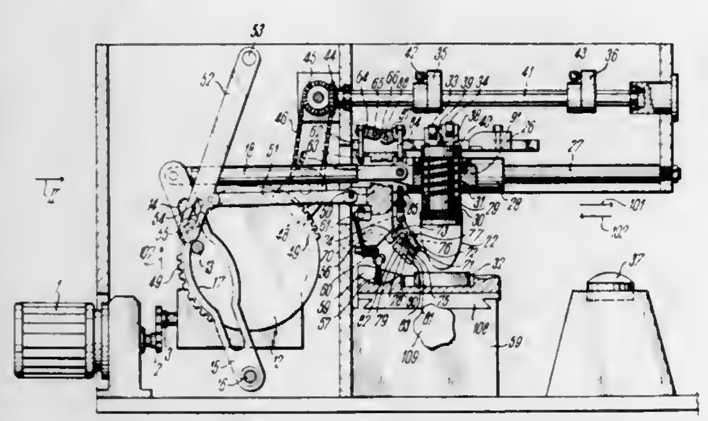
Wilfried Philipp, Daimlerstrasse 27/1, 7254 Munchingen-Kallenberg, Germany

Continuation of Ser. No. 59,056, July 29, 1970, abandoned. This application Oct. 16, 1973, Ser. No. 406,901

Claims priority, application Germany, Aug. 2, 1969, 1939437

Int. Cl.² B41F *17/00;* **B41M** *1/14*

U.S. Cl. 101—163 **19 Claims**



1. Apparatus for printing materials comprising a table for an ink container, a matrix, a print carrier, a brush for inking the matrix, a doctor blade and at least one printing pad having an ink repellent surface which permits ink to adhere thereto when the pad is pressed onto the matrix with a predetermined pressure, the printing pad being disposed on a plunger and arranged for movement between the matrix and the print carrier which is spaced therefrom, the printing pad having a rest position arranged above at least one of the matrix and the print carrier and being movable in the direction of one of the matrix and the print carrier for contact therewith, the brush and the doctor blade being arranged for movement over and engagement with the matrix, at least one of the plunger and the brush and the doctor blade being secured to movable carriages disposed in a guide means, and means connecting said brush, said doctor blade and said plunger via said carriages to a common drive for coordinating the movements thereof, said common drive being in the form of a motor driven disc, the disc being provided at a point about its periphery with a roller engaging a guide of a lever, the lever being pivotally mounted on a first pin secured to a casing of the apparatus, the lever being pivotally connected to the carriages by connecting members, the guide of the lever being constructed at its two ends as a slot guide and having in its central portion an outwardly extending bulge constituting a portion of the periphery of a circle along the circumference of which the roller of the disc travels during a portion of its movement so as to maintain the printing pad in

contact with one of the matrix and the print carrier for a predetermined period.

4,060,032

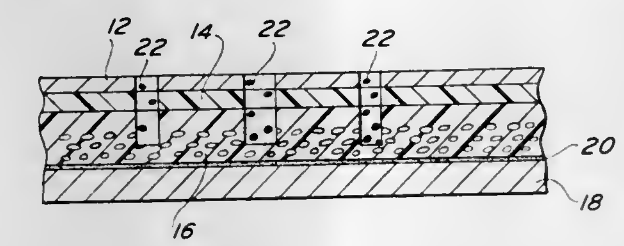
SUBSTRATE FOR COMPOSITE PRINTING AND RELIEF PLATE

Charles P. Evans, Trumbul, Conn., assignor to Laser Graphic Systems Corporation, Sudbury, Mass.

Continuation of Ser. No. 579,741, May 21, 1975, abandoned. This application Oct. 27, 1976, Ser. No. 736,026

Int. Cl.² B41N *1/12*

U.S. Cl. 101—401.1 **5 Claims**



1. A composite plate, comprising:

a dimensionally stable cellular polymer substrate selectively removable on exposure to a developing radiation of first wavelength,

a writing layer overlying the surface of said substrate selectively removable on exposure to a writing radiation of second wavelength but not removable on exposure to said developing radiation, and

said polymer substrate being selected from the group consisting of cellulose nitrate, methyl methacrylate and ethyl cellulose and cross-linked with trimethylol propane trimethacrylate.

4,060,033

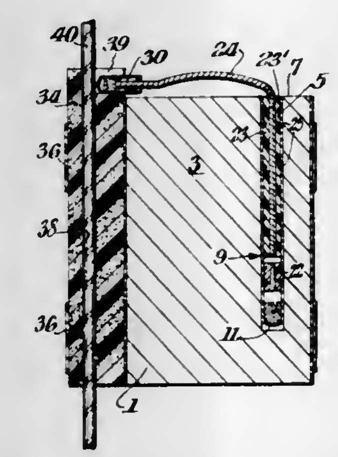
DELAY BOOSTER ASSEMBLY

Constantine Postupack, Tamaqua, Pa.; David G. Borg, Sagamore Hills, Ohio; Norman M. Junk, Ringgold, Pa.; Gerald L. Oswald, and Arthur F. Bowman, both of Tamaqua, Pa., assignors to Atlas Powder Company, Dallas, Tex.

Filed Mar. 9, 1976, Ser. No. 665,297

Int. Cl.² F42B *3/10*

U.S. Cl. 102—24 R **4 Claims**



1. A delay booster assembly comprising a booster shell, explosive material in said shell, a cap well extending through an end wall of the booster shell and into the explosive material in said shell, a nonelectric delay cap inserted in the cap well, said cap being open at its outermost end and having explosive material and a delay material located in the innermost end portion of the cap, a plug for sealing off the open end of the cap, a passageway in the plug, a passive signal carrier in the form of an empty open ended tube extending from a point externally of the cap into the open end of said cap, a sensor element attached to that end of the empty tube signal carrier extending externally of the booster shell, said end of said empty tube signal carrier being in open and direct communication with the sensor with the other end of said open tube being in open and direct communication with the open end of said cap, and a shock absorbing detonating cord tunnel member forming a part of the booster assembly through which tunnel a detonating cord can be passed, said sensor being so positioned with respect to said detonating cord that it lies adjacent to said cord.

4,060,034

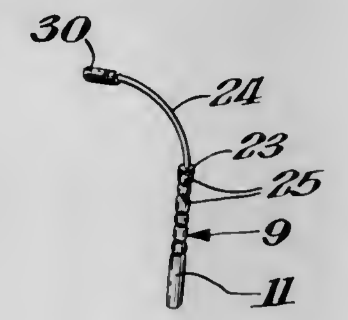
DELAY BOOSTER ASSEMBLY

Arthur F. Bowman, and Francis J. Camerini, both of Tamaqua, Pa., assignors to Atlas Powder Company, Dallas, Tex.

Filed Mar. 9, 1976, Ser. No. 665,298

Int. Cl.² F42B *3/10*

U.S. Cl. 102—24 R **3 Claims**



1. A delay insert assembly for initiating a booster explosive in response to the detonation of detonating means comprising a nonelectric cap which is open at one end and has explosive material and a delay material located in the opposite end of the cap, a passive signal carrier in the form of an empty open ended tube extending from a point externally of the cap into the open end of said cap, and a sensor attached to that end of the signal carrier extending externally of the cap, said end of said empty tube attached to said sensor being in open and direct communication with the sensor with the other end of said tube being in open and direct communication with the open end of said cap.

4,060,035

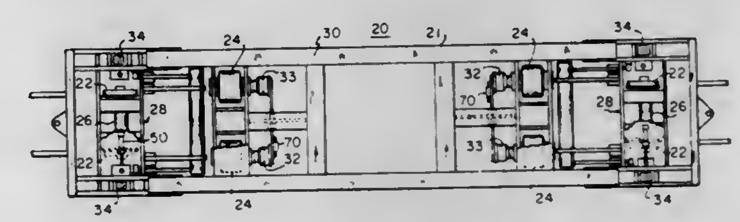
CONVERTIBLE RAIL-HIGHWAY SHUTTLE CAR

Jon R. Swoager, Imperial, Pa., assignor to Automation Equipment, Inc., Imperial, Pa.

Filed June 26, 1975, Ser. No. 590,412

Int. Cl.² B61C *11/00, 13/00;* **B61F** *13/00;* **B62D** *61/12*

U.S. Cl. 105—177 **18 Claims**



1. A shuttle car, for transporting massive loads, movable on a road bed and a rail bed comprising:

an elongated main frame;

a pair of movable truck assemblies spaced apart and movably supported from said elongated main frame;

a pair of flanged rail wheels supported from each truck assembly for rotation about an axis perpendicular to the longitudinal axis of said elongated main frame;

a plurality of smooth solid resilient wheels supported from said elongated main frame for rotary movement about axes fixed with respect to said elongated main frame which axes are parallel to the longitudinal axis of said elongated main frame;

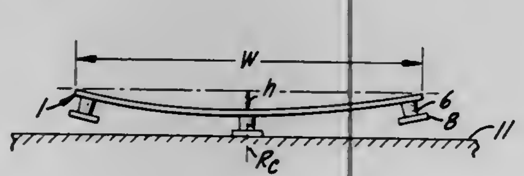
drive means connected to said plurality of smooth solid resilient wheels for driving all of said plurality of smooth solid resilient wheels when activated; and,

positioning means for moving said pair of truck assemblies between a first position wherein said flanged rail wheels are lower than said plurality of smooth solid resilient wheels, fully supporting said frame, and a second position wherein said plurality of smooth solid resilient wheels are lower than said flanged rail wheels, fully supporting said frame, and a second position wherein said plurality of smooth solid resilient wheels are lower than said flanged rail wheels, fully supporting said frame, for moving the shuttle car in a direction transverse to its longitudinal axis.

4,060,036
ANCHORED TRANSPORTATION DEVICE
Joseph X. Palms, 80 Lakeshore, Grosse Pointe, Mich. 48230
Filed Sept. 13, 1976, Ser. No. 722,807
Int. Cl.^{2} B60P *7/08*
U.S. Cl. 105—368 T **3 Claims**

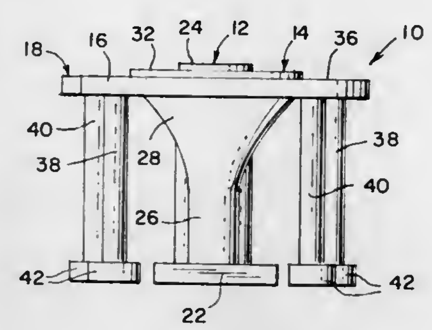
1. In a railway flatbed car or the like:
a generally rectangular flat lading supporting surface formed of a plurality of juxtaposed wooden timbers,
a plurality of elongated upwardly opening channels arranged in parallel spaced apart relation and disposed in spaces between said timbers and extending substantially coextensively with the length thereof,
a plurality of transversely extending webs secured in each channel and spaced apart therein,
and a rod-like anchor disposed substantially within each channel and spaced from the bottom and walls thereof and secured to said webs, said web members being provided with through apertures adjacent the rod-like anchor for receiving therethrough tie-down means.

4,060,037
PALLET
Hans Hjalmar Gustafsson, 22 Tradgardsgatan, S-172 38 Sundbyberg, Sweden
Continuation-in-part of Ser. No. 539,942, Jan. 10, 1975, abandoned. This application Dec. 16, 1976, Ser. No. 751,034
Claims priority, application Sweden, Jan. 21, 1974, 7400759
Int. Cl.^{2} B65D *19/00*
U.S. Cl. 108—51.1 **5 Claims**



1. A pallet including:
a rectangular load carrying deck of generally uniform thickness formed of several sheets of flexible wooden material having spring characteristics, the sheets being superimposed upon one another and formed to be upwardly concave about a single axis and glued together so as to constitute an upwardly concave structure substantially free from inherent tension forces in its unloaded condition and having sufficient elasticity to assume a substantially planar form under load, and supporting means attached to the under convex side of said deck,
said supporting means being arranged in a plurality of parallel rows extending in the direction of the axis of curvature of the deck, one of said rows being located in a plane intersecting the axis and a line on the deck substantially corresponding to a transverse center deck line, a second row extending along a first outer edge portion of the deck and a third row extending along a second outer edge portion of the deck, the supporting means being of the same height so that all of the supporting means cannot touch a supporting surface for the pallet in the unloaded condition thereof but will allow the deck to assume a planar shape with all of the supporting means in contact with the supporting surface under load.

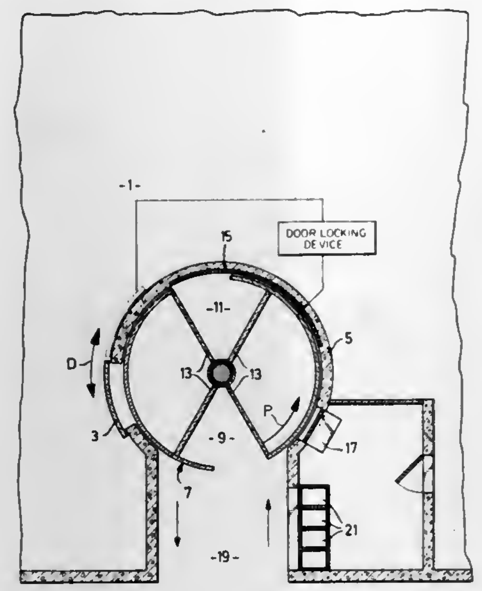
4,060,038
ROTATING DINING ROOM TABLE
Sylvia Ruvolo, 15 Pine Tree Road, Huntington Station, N.Y. 11746
Filed Aug. 24, 1976, Ser. No. 717,129
Int. Cl.^{2} A47B *57/00*
U.S. Cl. 108—94 **4 Claims**



1. A rotatable dining room table comprising:
a pedestal,
a relatively fixed inner section supported on said pedestal, said inner section having an upper support surface for a centerpiece,
an intermediate serving section rotatably mounted on said pedestal in concentric relation to said inner section, said intermediate section having an upper support surface concentrically disposed relative to the upper support surface on said inner section, and
an outer dining section supported in concentric relation to said inner and intermediate sections, said outer section including a plurality of arcuate segments arranged about said intermediate section in a circle, each segment having a planar support surface individually supported, on a pair of vertical support legs, adjacent the upper support surface of said intermediate sections.

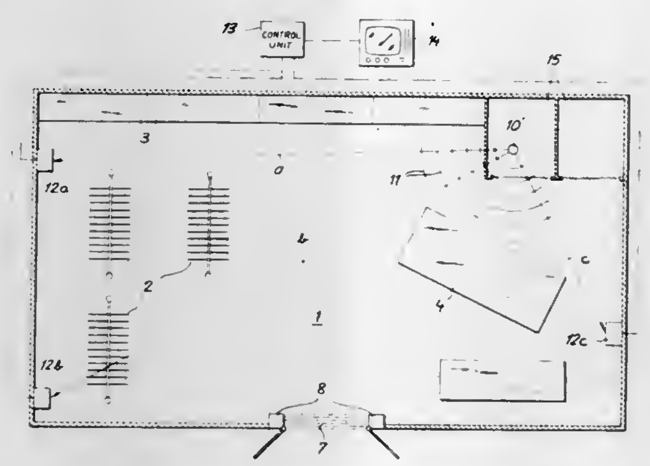
4,060,039
SECURITY SYSTEM
Serge Lagarrigue, Domaine d'Escosse, F 78 Chevreuse, France
Filed June 4, 1975, Ser. No. 583,725
Claims priority, application Germany, June 6, 1974, 2427359; May 6, 1975, 2520077
Int. Cl.^{2} E05G *5/02*
U.S. Cl. 109—3 **6 Claims**

1. A security system for the outer area of a room comprising a bullet-proof revolving door having a circular outer wall with an opening therein leading into the room and an exit, a movable door movable along said outer wall to close said opening, a release device and means for locking the movable door in combination with said release device, said release device being a weapon detector which is positioned in the region of the revolving door outside the room, the movable door forming part of a bullet-proof surrounding of said revolving door divided by bullet-proof partition walls forming plural compartments of a first type separated by plural compartment of a second type, said compartments of said first type including an exit passage and said compartments of said second type having no exit passage, only one of said compartments of said first type being adjacent said movable door at a given time, said walls being situated outside the room, said weapon detector being



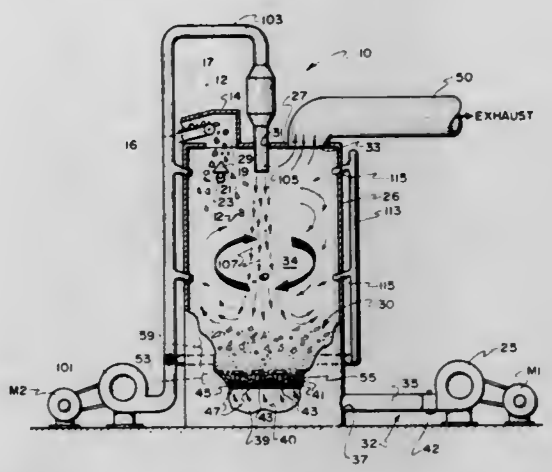
disposed in an area situated in front of the movable door as seen in the revolving direction of the door.

4,060,040
ANTITHEFT SYSTEM FOR SALES AREAS
Friedrich Karl Johnssen, Kiefernhalde 23, Essen, Germany (4300)
Filed Apr. 30, 1976, Ser. No. 682,032
Claims priority, application Germany, May 3, 1975, 2519799
Int. Cl.^{2} G08B *13/00;* **E05G** *1/10*
U.S. Cl. 109—40 **9 Claims**



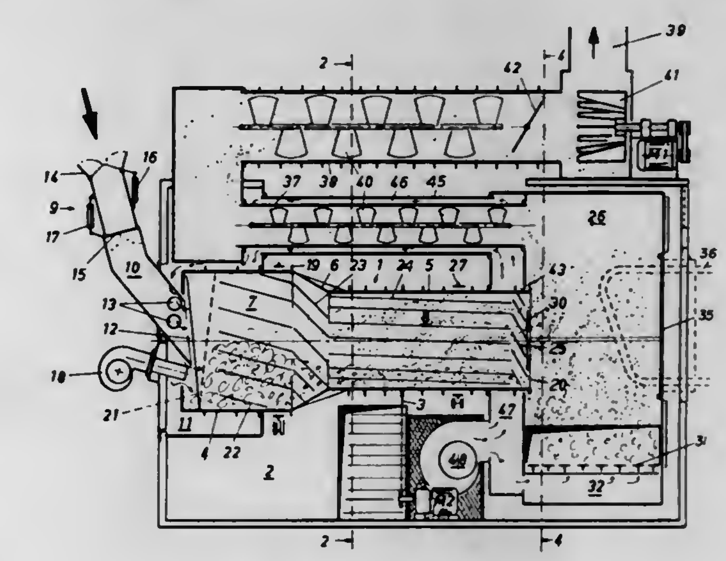
1. An antishoplifting system for protecting a premises against theft of goods therefrom, comprising:
a plurality of signal transmitters affixed to respective articles of said goods, each of said transmitters comprising:
a housing,
a first, continuously effective, signal emitter in said housing,
a second, stored-energy, triggerable signal emitter in said housing, and
means on said housing for triggering said second emitter upon the removal of the transmitter from the respective article;
means responsive to said first signal emitter for signaling the removal of an article carrying the transmitter thereof from the premises; and
means responsive to a signal from said second emitter upon the triggering thereof for localizing the source of said signal on said premises.

4,060,041
LOW POLLUTION INCINERATION OF SOLID WASTE
Norman K. Sowards, Coeur d'Alene, Idaho, assignor to Energy Products of Idaho, Coeur d'Alene, Idaho
Filed June 30, 1975, Ser. No. 591,556
Int. Cl.^{2} F23G *5/00*
U.S. Cl. 110—8 F **8 Claims**



1. A method of low pollution eliminating of solid particles vaporized during incineration, the steps of:
elevating the temperature of a confined fluidized bed in an order of magnitude capable of supporting combustion;
continuously causing pieces of solid waste to become embedded within the confined fluidized bed;
impinging influent air centrally downward against the fluidized bed within the confinement;
combusting the solid waste within the fluidized bed and volatizing the volatile matter contained within the solid waste into the vapor space between the top of the fluidized bed and the top of the confinement;
after-burning the volatile matter in the vapor space extending substantially above the fluidized bed;
causing an annulus of air to be vortically circulated around the impinging influent air throughout substantially the entirety of the vapor space within the confinement to increase residence time, prevent channeling and centrifuging airborn solid particles causing at least some of said particles to return to the bed by force of gravity.

4,060,042
INCINERATOR
Enzo Baraldi, and Giuliano Longhi, both of Bologna, Italy, assignors to Fire Victor Holding S.A., Luxembourg, Luxembourg
Filed May 12, 1976, Ser. No. 685,911
Claims priority, application Italy, May 17, 1975, 6488/75
Int. Cl.^{2} F23G *5/06*
U.S. Cl. 110—14 **16 Claims**



1. An incinerator comprising a rotary furnace of highly heat

resistant steal, having a horizontal axis of rotation and comprising a drying chamber and an incinerating chamber; drive means for rotating said furnace; charging means for feeding refuse to said drying chamber; a burner projecting into said drying chamber; afterburner means for recombusting any incompletely burned refuse leaving said incinerating chamber and for ridding combustion gases of solids; means for supplying preheated comburent air to said furnace; and means for cooling and exhausting said combustion gases; wherein said furnace further comprises:

first and second cylindrical sections connected by a hollow, frustoconical connecting piece which is shorter than both said first and second sections, said first section containing said drying chamber and said second section containing said incinerating chamber, said first section being shorter in length and larger in diameter than said second section so that said drying chamber is shorter in length and has a larger inside diameter than said incinerating chamber and has a laterally closed-off portion;

a refuse entry gate disposed at the end of said first section remote from said section and having an inside diameter smaller than that of said first section, said laterally closed-off portion of said drying chamber being situated below the level of said entry gate and said incinerating chamber for preventing liquid refuse from flowing out of said drying chamber;

a slag and cinder outlet opening disposed at the end of said second section remote from said first section;

a screw conveyor disposed on that portion of the inside wall of said drying chamber nearest said entry gate;

a first series of conveyor blades disposed on the remainder of said inside wall of said drying chamber;

a second series of conveyor blades disposed on the inside wall of said connecting piece;

a third series of conveyor blades disposed on the inside wall of said incinerating chamber from the junction thereof with said connecting piece to the vicinity of said outlet opening; and

a fourth series of conveyor blades disposed immediately adjacent to said outlet opening, said blades of said first series having an angle of pitch, relative to said axis of rotation, which is greater than that of said third series but less than that of said second and fourth series, and said blades of said second series having an angle of pitch, relative to said axis of rotation, which is less than that of said fourth series, said refuse thereby being rapidly carried away from the region of said entry gate by said screw conveyor upon rotation of said furnace, then moved relatively slowly through said drying chamber by said first series of blades for the purpose of drying and pre-heating, thereafter transported relatively quickly through said connecting piece into said incinerating chamber by said second series of blades, and moved on by said third series of blades within said incinerating chamber more slowly than in said drying chamber for being incinerated until the resultant ash reaches said fourth series of blades and is rapidly removed thereby from said rotary furnace through said outlet opening; and said incinerator further comprising for cooling the outer wall of said furnace:

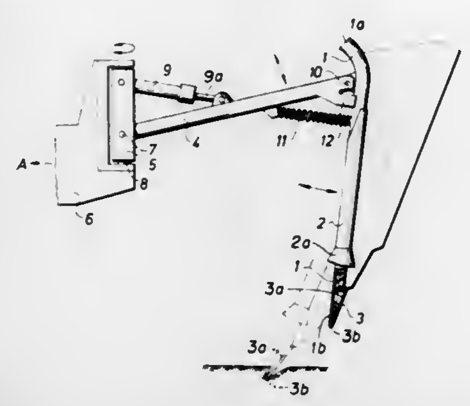
a stationary cooling chamber in which said furnace is mounted for rotation,

at least one pusher fan for supplying cooling air to said cooling chamber,

adjustable air-flow control means disposed between said at least one pusher fan and said cooling chamber for adjusting the rate of flow of said cooling air through said cooling chamber, and

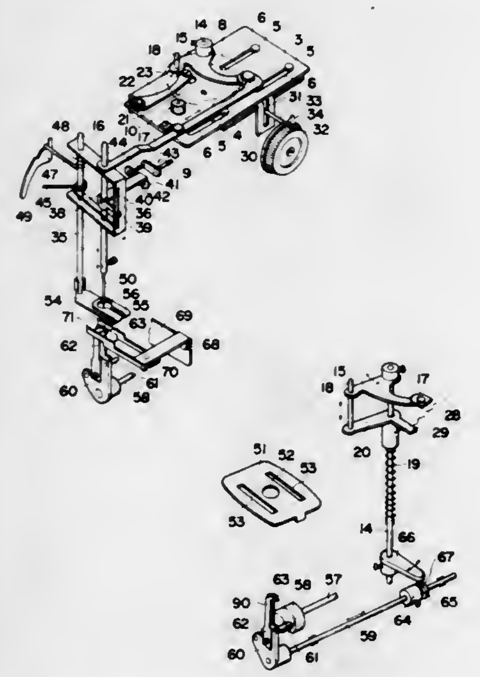
air-flow chanelling screens disposed on each side of the upper half of said rotary furnace and spaced therefrom for directing said cooling air around said upper half of said furnace, said screens defining an elongated opening above said furnace for the escape of said cooling air from said cooling chamber.

4,060,043
DIGGING AND PLANTING MACHINE
Stig-Gunnar Lofgren, Jarved, Sweden, assignor to Mo och Domsjo AB, Ornskoldsvik, Sweden
Continuation-in-part of Ser. No. 526,278, Nov. 22, 1974, Pat. No. 3,998,171. This application Aug. 4, 1975, Ser. No. 601,557
Claims priority, application Sweden, Aug. 15, 1974, 7410431
Int. Cl.² A01C *5/04, 11/02*
U.S. Cl. 111—3 **14 Claims**



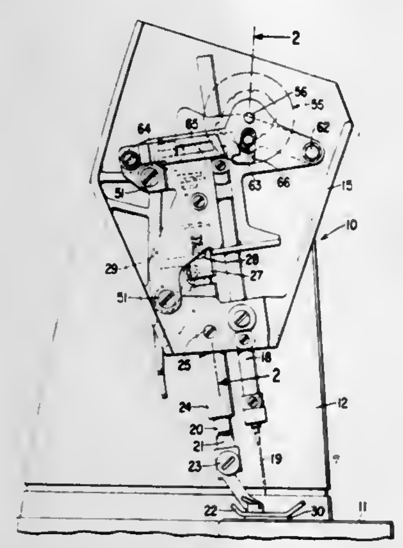
1. A digging and planting machine comprising a digging and planting tool including a tubular member movable between a lower position partially embedded in the ground and an upper position above the ground, said tubular member having a lower open digging and planting tip end; closure means mounted solely on the outside of said tubular member and solely for slidable reciprocable movement along the exterior to the digging and planting tool and across said open tip end between a first position completely closing off the open end and preventing entry of dirt thereinto, for digging a hole, and a second position exposing the entire open end for delivery of a plant through the open end of said tubular member into the hole; and means slidable reciprocably between a ground-contacting position and an elevated position for compacting earth around the plant after planting.

4,060,044
TOY SEWING MACHINE
Shigeaki Kuramochi, 24-17, Koishikawa 5-Chome, Bunkyo, Tokyo, Japan
Filed Feb. 9, 1976, Ser. No. 656,640
Int. Cl.² D05B *3/02*
U.S. Cl. 112—158 R **1 Claim**



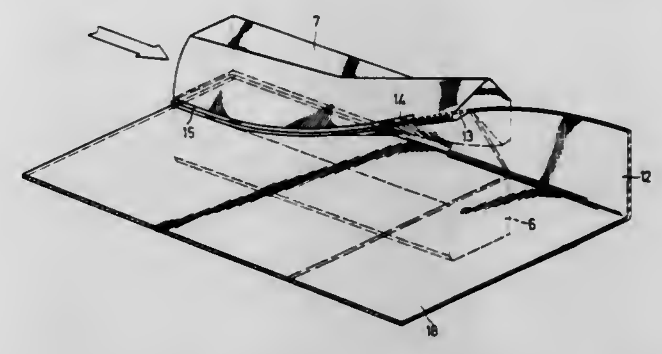
1. A toy sewing machine comprising:
a rotary cam shaft associated with a rotary rod for moving a needle-holding rod having a needle thereon in the upper and lower directions;
a cam body comprising a plurality of overlapping cams having plural cam faces at the periphery thereof and supported by the cam shaft;
a vertically movable pin arranged to engage with any one of the cam faces of the cam body;
a rotary shaft;
a freely rotatable lever of "L" shape pivotally supported by the rotary shaft and urged in one direction by a torsion bar spring, one end of said lever having the pin penetrated therethrough;
a frame to which the base portion of said lever is pivotally attached;
a link pivotally attached to the other end of said lever and connected to a needle-holding rod;
thread-holding pieces for cooperation with said needle;
a thread-holding rod for controlling the thread holding operation of the thread-holding pieces; and
an arm projected from the rotary shaft and connected to the thread-holding rod for controlling the thread holding operation of the thread-holding rod.

4,060,045
PRESSER BAR PRESSURE REGULATING MODULE
Erwin Vahle, Stutensee, and Arnold Hartig, Karlsruhe, both of Germany, assignors to The Singer Company, New York, N.Y.
Filed May 26, 1976, Ser. No. 690,125
Int. Cl.² D05B *29/02*
U.S. Cl. 112—235 **2 Claims**



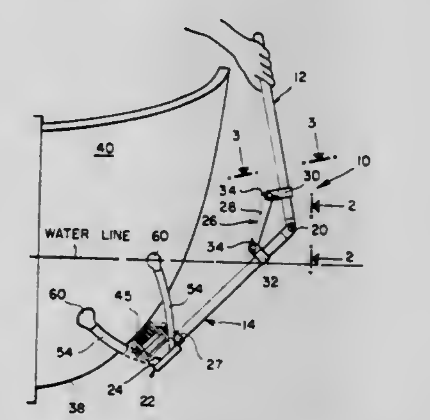
1. A pressure regulating module for a sewing machine having a presser bar with an axial bore on one end and adapted to have a presser foot secured to the other and thereof, a bearing endwise shiftably supporting the presser bar in the sewing machine, a compression spring for biasing said presser bar endwise carried within said axial bore, an abutment member received in said axial bore in engagement with said compression spring and protruding from said presser bar in an enlarged right circular platform, said module comprising: a support bracket, fastenings for detachably securing said support bracket to said sewing machine in a predetermined position with respect to said presser bar, a cam shiftably supported on said support bracket, a cam follower mechanism shiftably supported on said support bracket and arranged in cooperative engagement with said cam, said cam follower mechanism having a portion thereof of spherical surface form in axial engagement with said right circular platform of said abutment member.

4,060,046
HAND TOOL
Gerd-Jurgen Eckold, Silberhutte 11, D 3424 St. Andreasberg, and Hans Maass, Germelmannstr. 12, D 3422 Bad Lauterberg, both of Germany
Filed Jan. 30, 1976, Ser. No. 653,883
Int. Cl.² B21D *19/02, 39/02*
U.S. Cl. 113—54 R **13 Claims**



1. A power-operable hand tool for folding back upright flange portions at the edges of sheet material, which comprises a support jaw having a main pressing surface for supporting the underside of the sheet material during said folding, an operative jaw pivotally mounted about an axis extending parallel to the main pressing surface of the support jaw, drive means for causing operative pivoting of said operative jaw, said drive means being connectable to a source of motive power therefor, wherein the operative jaw includes a main pressing surface portion at one end of the operative jaw and a recessed surface portion at the other end of the jaw, the recessed surface portion having at its periphery a lug portion capable of engaging over the edge of the upright flange portion to be folded back.

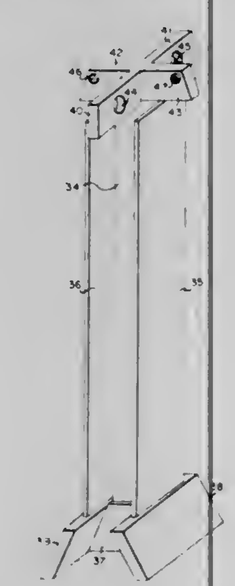
4,060,047
DEVICE FOR CLEANING BOTTOM OF A BOAT
Barney Sabella, 7940 Lankershim Ave., Highland, Calif. 92346
Filed Aug. 24, 1976, Ser. No. 717,117
Int. Cl.² B63B *39/00, 43/02*
U.S. Cl. 114—222 **6 Claims**



1. A device for cleaning the bottom of a boat while the boat is afloat, the device comprising:
a. a first and second rod member, said first rod member pivotally mounted at a first end portion to a first end portion of said second rod member;
b. cleaning means having a scrubbing face rotatably mounted to a second end portion of said second rod member, said cleaning means rotatable about the longitudinal axis of said second rod member;
c. a plurality of flexible stabilizing members independently disposed about the cleaning means, each of said members having a first portion affixed to said cleaning means and divergent cantilevered second portions extending in the direction of and beyond said scrubbing face and adapted to cooperate with the contour of the boat for further aligning said scrubbing thereof; and

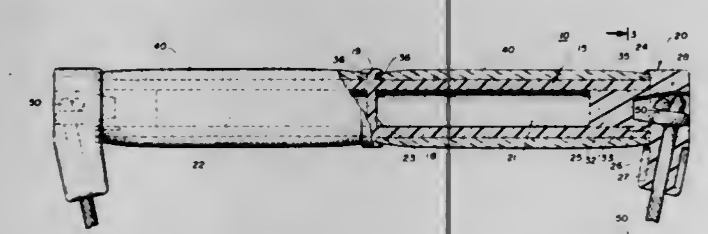
d. means for adjustably clamping said first rod member to a desired angular position with respect to said second rod member to enable the positioning of said scrubbing face of said cleaning means against a surface of the bottom of the boat.

4,060,048
MECHANICAL COUPLINGS FOR PONTOONS AND SIMILAR FLOATABLE UNITS
Michel Francois Bréhéret, Le Fresne sur Loire; Andre Raphael Wambergue, Daon, and Andre Jacques Carpentier, Paris, all of France, assignors to Ateliers Breheret S.A.R.L., St. Georges-sur-Loire, France
Filed Dec. 13, 1976, Ser. No. 749,765
Claims priority, application France, Dec. 19, 1975, 75.39894
Int. Cl.² B63B *35/38*
U.S. Cl. 114—266 **8 Claims**



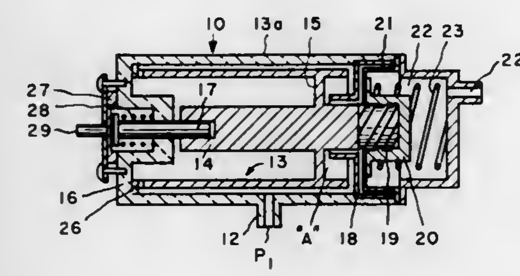
1. A joining device for use in connecting together buoyant members, such as pontoons, to make a buoyant structure, said joining device comprising channel means on each of said buoyant members, I shaped section key means for cooperating with said channel means on each of said buoyant members to connect said buoyant members together, said I shaped section including spaced apart flange sections separated by a web section, said channel means defining a slot in which the web sections of the key means locates in the assembled condition of the device so that the flange sections of the key means lie in the respective channel means and the channel means are prevented by said flange sections from being moved apart, and said key means further including two inclined plates at the bottom of the flange sections of said key means, two trapezoidal half wedges respectively at the bottom of the channels for engaging and wedging together with said inclined plates.

4,060,049
WATER SKI ROPE HANDLE
James T. Rumbaugh, Spirit Lake, Iowa, assignor to Berkley & Company, Inc., Spirit Lake, Iowa
Filed Oct. 28, 1976, Ser. No. 736,426
Int. Cl.² A63C *11/10*
U.S. Cl. 115—6.1 **7 Claims**



1. A water ski rope handle comprising: a cylindrical handle portion having a pair of hollow recesses therein and extending from opposite ends of the same, a pair of rope anchoring flanges mounted on the ends of the cylindrical handle portion, said flanges having ski rope anchoring portions and plug portions with the plug portions extending translationally from the achoring portions and being positioned into the recesses in the ends of cylindrical handle portion closing the same to define floatation cavities therein and mounting the flanges on the handle portion, said rope anchoring portions each having an aperture formed therein extending therethrough to the plug portion terminating in an exposed recess therein, said flanges being adapted to receive the ends of the tow rope to extend through the apertures in the rope anchoring portions with the rope being secured by knots at the ends of the same located in the exposed recesses of the rope anchoring the flanges, said rope anchoring flanges being inclined to the extent of the cylindrical portion by approximately 75°

4,060,050
FILL INDICATOR FOR A VACUUM CLEANER DUST COLLECTOR
Sven Bertil Simonsson, Tyreso, Sweden, assignor to Aktiebolaget Electrolux, Stockholm, Sweden
Filed Aug. 18, 1976, Ser. No. 715,303
Claims priority, application Sweden, Aug. 29, 1975, 7509600
Int. Cl.² G01P *13/08;* **G01L** *7/16*
U.S. Cl. 116—114 AD **5 Claims**



1. An indicator for visually denoting the amount of dust or dirt in a dust receptacle of a vacuum cleaner or the like comprising: a trasparent cylinder, a piston having indicia is rotatably journalled in said cylinder and communicating with the inlet of said dust receptacle that has a predetermined pressure, the outer surface of said cylinder being provided with marking for continually indicating the amount of filling of the dust collector, said piston being provided with a central shaft having a threaded end projecting from the forward end of said piston, a nut adapted to be screw-connected to said threaded end, and a diaphragm communicating with the outlet of said dust receptacle and fixed to said nut, the pressure difference between the inlet and outlet of said dust receptacle causing said diaphragm to effect a translating movement which causes the threaded shaft of said piston to turn within said nut thereby rotating said piston in said cylinder, a latching means on said piston and cylinder which co-acts to retain said piston in the position it has assumed in the cyliner due to said pressure difference, said latching means including a first row of teeth at the end of the piston remote from said diaphragm, a spring engaging said nut on the opposite side from the diaphragm and biasing said piston rearwardly towards said first row of teeth, and a second row of teeth on a surface of said cylinder facing said first row of teeth, said spring urging said first and second row of teeth into latching engagement when said vacuum cleaner is inoperative.

4,060,051
INDICATOR SIMULATING A SEVEN-SEGMENT READOUT DEVICE
Alarico A. Valdettaro, Bloomington, Ind., assignor to Sarkes Tarzian, Inc., Bloomington, Ind.
Filed Feb. 17, 1976, Ser. No. 658,706
Int. Cl.² H03J *1/04*
U.S. Cl. 116—124.1 A **8 Claims**

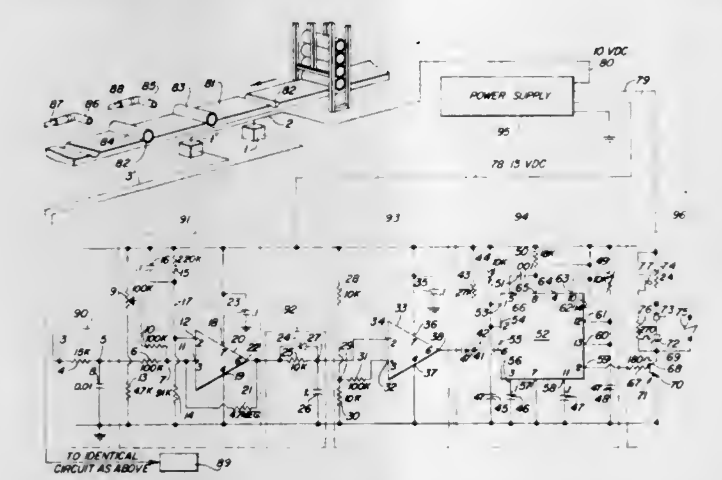
1. A simulated seven-segment display comprising:

a mask having a viewing aperture defined therein;

a film strip having a plurality of numeric characters disposed thereon, each of said numeric characters having a segmented type font wherein each numeric character is formed from one or more of a predetermined number of possible segments arranged to consistently simulate a predetermined type of seven-segment digital display as the film strip is incrementally advanced, said predetermined possible segments comprising at least three substantially parallel horizontal segments spaced substantially vertically from each other, and at least four substantially vertical segments grouped in two spaced groups, each group containing two spaced, substantially coaxial segments, the segments of one of the groups being substantially parallel to the segments forming the other group, with the substantially horizontal segments being interposed between the two groups; and

means for advancing said film strip past said aperture sequentially to align predetermined ones of said numeric characters with said aperture for viewing therethrough.

4,060,052
COATING APPARATUS CONTROL INCLUDING TIME DEPENDENT INHIBITOR CIRCUIT
Harvey R. Algeri, North Olmsted, and William C. Stumphauzer, Elyria, both of Ohio, assignors to Nordson Corporation, Amherst, Ohio
Filed June 1, 1976, Ser. No. 691,820
Int. Cl.² B05B *15/00;* **G05B** *11/16;* **H03K** *19/00*
U.S. Cl. 118—2 **9 Claims**



1. A system for automatically treating articles comprising:

a conveyor which conveys the articles to be treated into and out of a predetermined treating position, and which translationally stops said articles in said treating position for a predetermined period of dwell time sufficient to treat said articles;

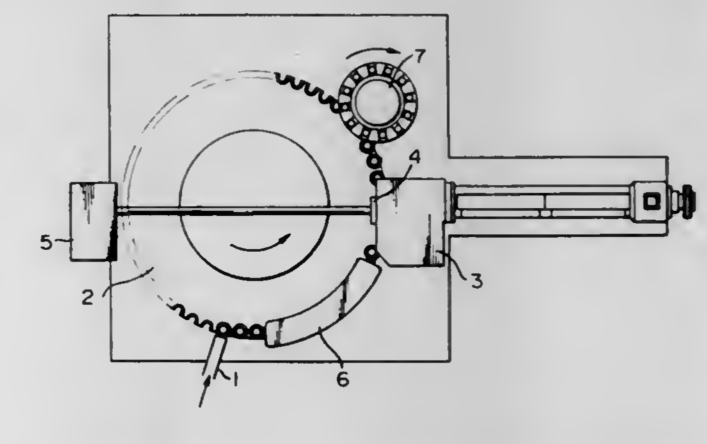
a sensor positioned to sense articles in said treating position having an output which is in a first state when no article is sensed, and in a second state when an article is sensed;

a time dependent inhibitor having a control input functionally connected to the output of the sensor and an output which remains in a first state until said sensor output has remained in its second state for a predetermined time period, and which inhibitor output changes to a second state after said period has elapsed;

means to rapidly reset the timing period when said sensor output has changed to its first state from its second state;

an article treatment apparatus having a control input functionally connected to said inhibitor output, and which apparatus is activated in response to said second state of said inhibitor output.

4,060,053
APPARATUS FOR DISPENSING CAP LINING MATERIAL
Hidehiko Ohmi, Komaki, Japan, assignor to Japan Crown Cork Co., Ltd., Tokyo, Japan
Filed Oct. 27, 1976, Ser. No. 736,185
Claims priority, application Japan, Feb. 16, 1976, 51-14824
Int. Cl.² B05C *7/00;* **B29D** *31/00;* **B29F** *3/00*
U.S. Cl. 118—215 **4 Claims**



1. An apparatus for dispensing predetermined amounts of lining material into cap shells, said apparatus comprising:

conveyor means including a passage for conveying cap shells at predetermined speeds;

extruder means provided above and along the shell-conveying passage for extruding a predetermined quantity of a lining material through a discharge passage into each cap shell;

a blade positioned adjacent the exit end of said discharge passage and adapted to rotate across said exit end for cutting said lining material into said predetermined quantity; and

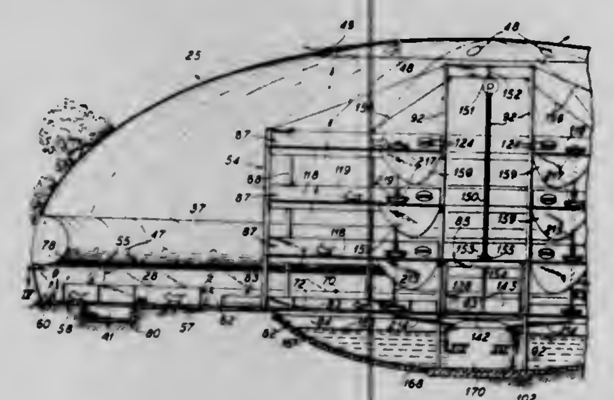
drive means for rotating said blade at a non-uniform speed in response to the speed of conveyance of said cap shells such that the speed of said blade gradually decreases as the exterior end of said blade in its radial direction approaches said shell-conveying passage, and such that the speed of said blade gradually increases as said exterior blade end moves away from said shell-conveying passage.

4,060,054
SYSTEM FOR HOG PRODUCTION IN A CONTROLLED ENVIRONMENT
Bruce A. Blair, 2400 Lakeview, Apt. 410, Chicago, Ill. 60614
Filed June 19, 1975, Ser. No. 588,330
Int. Cl.² A01K *1/00*
U.S. Cl. 119—16 **34 Claims**

1. Means for hog production in a controlled environment and including a housing rising from and covering a base providing a first floor of substantial expanse, and a multi-tiered structure spaced substantially inwardly from the perimeter of the housing, and comprising:

a plurality of vertically spaced tier floors above said first floor and all of the tier floors being equipped with hog finishing pens large enough to accommodate a social group of growing hogs to finished market size, each finishing pen having a social floor area in one end portion in

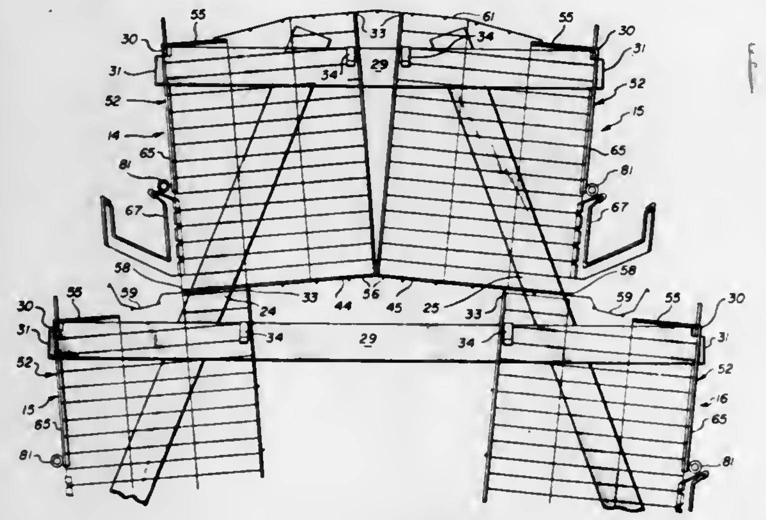
which the hogs penned therein for finish growing can congregate and rest, and each finishing pen having a slatted feeding and drop-through dunging floor area in an opposite end portion where hog feeding and dunging can take place without disturbing the hogs in the social area, there being automatic hog food supplying means in each feeding and dunging area;
the social areas of the finishing pens of each tier floor being vertically aligned with the same areas in the pens therebelow and the feeding and dunging areas of the finishing pens of each tier floor being vertically aligned with the same areas in the pens therebelow;
means under each of the slatted feeding and dunging areas for collecting dropped hog waste and funneling the waste to drop through such a small portion of the slatted feeding and dunging area therebelow that the hogs can readily avoid said small drop portion while using the feeding and dunging area;
a substantial width area on the first floor between said housing perimeter and said multi-tiered structure being divided into:
an annular array of farrowing pens for farrowing crates adjacent to the housing perimeter;
an annular array of breeding pens surrounded by said farrowing pens and having gates adjacent to the farrowing pens;
an annular array of nursery pens surrounded by and separated from the breeding pens by an annular aisle and adapted for receiving small nursery size pigs from the farrowing pens;



means enabling hand feeding of the nursery pigs from said aisle;
an annular array of training pens surrounded by and having gates separating them from the nursery pens and in which training pens trainer pigs are received from the nursery pens after attaining a stage of development in which they can adjust to automatic feeding means;
at least said training pens being under said tier floors in vertical alignment under said finishing pens and each training pen having a social area and a slatted feeding and drop-through dunging area both of which training pen areas are located in vertical alignment under the corresponding areas of the overhead finishing pens, and there being similar automatic hog food supplying means in the training pen feeding and dunging areas as in the overhead feeding and dunging areas of the finishing pens, the waste collecting means of the finishing pens funneling and dropping the hog waste through the training pen feeding and dunging areas in the same manner as in the like areas of the finishing pens, whereby to accustom the trainer pigs to the conditions in the upper tier floor finishing pens before transfer of the pigs as growing hogs to said finishing pens;
and means centrally located relative to the array of training pens by which the pigs are transferred to the hog finishing pens on said tier floors after a limited growth and training development time interval in said training pens.

24. A system for hog production in a controlled environment wherein facilities for large volume hog production are contained within a housing including animal pens from which animal waste drops downwardly, comprising:
a receiving basin under said pens and of ample capacity to accommodate all waste produced by a large number of animals for conversion into reusable animal feed for recycling into food supply for the animals;
a tank within said basin substantially immersed in the deepest part of the waste and having means for separating hog bristles from the waste material in the basin;
means for agitating and warming the waste material in the basin outside the tank to promote conversion;
means for supplying fresh feed to said tank;
means within the tank for combining the fresh feed and converted waste material derived from the basin into a feed mixture and for cooking and pasturizing the mixture;
means within the tank for cooling the cooked mixture; and
means for delivering the cooled feed mixture from the cooking and pasturizing means in the tank to said pens.

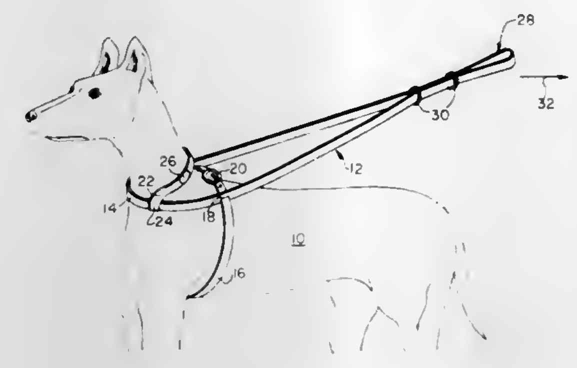
4,060,055
POULTRY CAGE STRUCTURE
Mark Skinner, Decatur, Ala., assignor to Chore-Time Equipment, Inc., Milford, Ind.
Continuation of Ser. No. 686,291, May 14, 1976, abandoned. This application Mar. 25, 1977, Ser. No. 781,185
Int. Cl.[2] A01K *31/06*
U.S. Cl. 119—48 **7 Claims**



1. A cage structure for poultry and the like, comprising in combination, a plurality of cage rows mounted in steppedback, elevational array, each cage row including a plurality of cage end partitions, a separate, unitary L-shaped bottom/back member secured to the partitions and a separate, unitary L-shaped top/front member separated from the bottom/back member at the cage row top and front but secured to the end partitions to form a row of cages of rectangular cross-section, the L-shaped bottom/back member having a bottom element being extended forwardly from the cage row to define an egg collecting trough at the cage row front bottom, the L-shaped top/front member having a top element defining the forward portion only of the cage row top, the remaining portion of the cage row top being covered to prevent animal escape by the overhanging bottom/back member egg collecting trough of the cage row immediately above and to the rear, the L-shaped top/front member also having a front element defining the upper portion only of the cage row front, the cage structure further including feed trough means mounted to the cage row at the cage row lower front and defining the remaining portions of the cage row front.

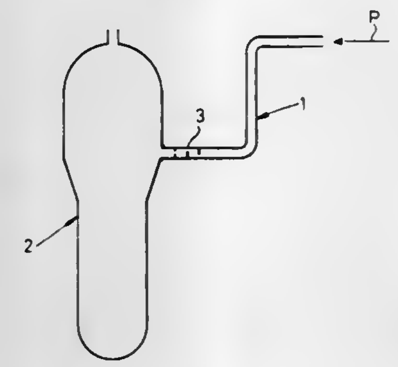
4,060,056
ANIMAL HARNESS
Josephine Maietta, 85-40 111 st St., Richmond Hill, N.Y. 11418
Filed Aug. 24, 1976, Ser. No. 717,245
Int. Cl.[2] A01K *27/00*
U.S. Cl. 119—96 **5 Claims**

1. An animal harness comprising a unitary construction, said unitary construction including an elongated endless band, means to conform the proximal end of said endless band into a closed loop, an inverted substantially U-shaped band, one end of said U-shaped band slideably affixed to and adjacent with the distal end of said endless band, the other end of said U-shaped band slideably affixed to and adjacent with said distal end of said endless band and disposed in spaced apart relationship with said one end thereof, a waist cinching band, said waist cinching band slideably affixed to two portions of said



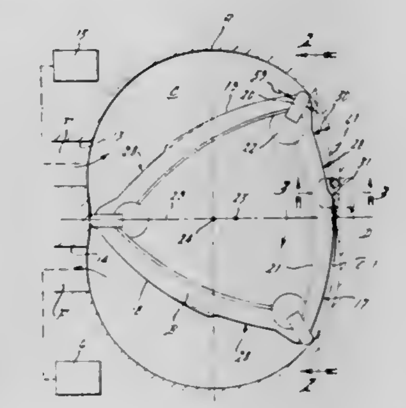
endless band intermediate said distal end and said proximal end thereof, said waist cinching band having a pair of free end portions thereof, means to adjustably secure one of said free end portions to and along the length of said waist cinching band at a point therealong located adjacent the other free end portion thereof, said endless band serving as the only means of interconnecting said U-shaped band and said waist cinching band together.

4,060,057
WATER SUPPLY PIPE FOR A STEAM GENERATOR
Marc Félix Maurice Carteus; Yvrs Marie Grovgrs De Bruyne, both of Brussels; Jean Pierre Gustaaf Rosa Lemmens, Heverlee, and Elie Jozef Stubbe, Sterrebeek, all of Belgium, assignors to Societe de Traction et D'Electricite S.A., Brussels, Belgium
Filed May 12, 1976, Ser. No. 685,605
Claims priority, application Belgium, May 12, 1975, 156239
Int. Cl.[2] F22D *5/00*
U.S. Cl. 122—451 R **3 Claims**



1. In combination, a steam generator, a water supply pipe coupled to said steam generator for supplying water thereto, the improvement wherein said water supply pipe comprises the following elements:
a horizontal or substantially horizontal pipe portion,
a lower baffle plate disposed in the pipe portion,
an upper opening defined by the lower baffle plate,
a horizontal lower edge defining the upper opening,
an upper baffle plate disposed in the pipe portion upstream of the lower baffle plate with respect to the normal flow direction of the water,
a lower opening defined by the upper baffle plate,
a horizontal upper edge which defines the lower opening and which is situated lower than the horizontal lower edge such that the two baffle plates together form a hydraulic barrier which, when the water supply is cut off or reduced, prevents or substantially limits the passage of the steam produced by the generator, this steam then condensing upstream of the upper baffle plate in contact with the water and restoring the hydraulic barrier.

4,060,058
INTERNAL COMBUSTION ENGINE CONTROL SYSTEM
Laszlo Hideg, Dearborn, and Robert P. Ernest, Dearborn Heights, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.
Filed Nov. 28, 1975, Ser. No. 636,184
Int. Cl.[2] F02B *53/12*
U.S. Cl. 123—8.09 **10 Claims**

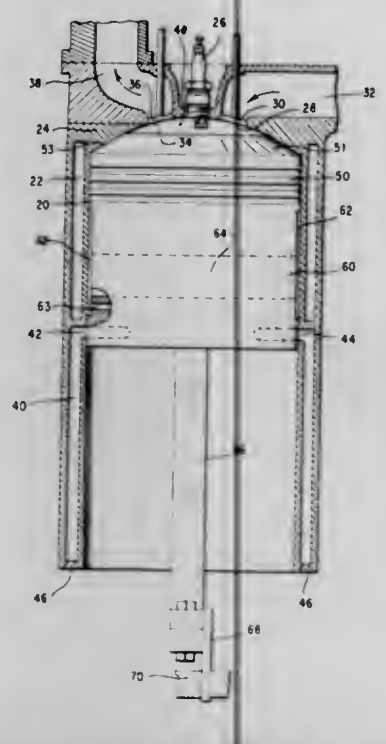


1. In an Otto cycle internal combustion engine of the rotary type having a housing with interior side walls and an end wall and providing a source of fuel, the apparatus comprising:
a. a volume defined by parallel flat surfaces of said side walls and closed by a continuous epitrochoid surface of said end wall,
b. a multi-lobed rotor received in said volume with apices of each lobe arranged to sealingly engage said epitrochoid and flat surfaces thereby defining one or more variable volume combustion chambers, each combustion chamber receiving fuel from said source to provide a combustible mixture when in the smallest volume condition, and
c. means exterior to each of said combustion chambers for igniting a combustible mixture in a confined space smaller than any of said combustion chambers when in the smallest volume condition, said exterior means being effective to selectively generate a torch flame during each expansion cycle of said engine and to direct said torch flame into the trailing portion of at least one of said combustion chambers opposite to the flow of gases therein and particularly when substantially in the smallest volume condition and without contact with walls defining said one combustion chamber.

4,060,059
INTERNAL COMBUSTION ENGINE
Florencio Blaser, Alexandria, Va., assignor to Blaser Engine, Ltd., College Park, Md.
Continuation of Ser. No. 422,719, Dec. 7, 1973, which is a continuation of Ser. No. 123,705, March 12, 1971, abandoned. This application May 27, 1977, Ser. No. 801,401
Int. Cl.[2] F02B *9/00, 75/10, 33/00;* F02F *3/14*
U.S. Cl. 123—32 ST **7 Claims**

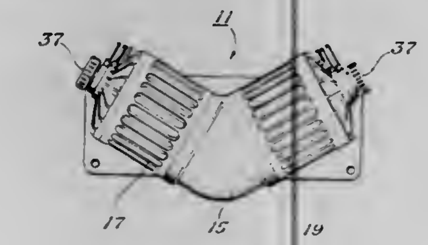
1. A method of operating an internal combustion engine having a cylinder closed at one end, a piston movable within said cylinder between a first position proximate to said one end and a second position remote from said one end to form a working chamber, said piston having a piston chamber, comprising the steps of:
introducing a rich air-fuel mixture into said working chamber from said one end during an intake stroke of said piston;
adding additional air to said working chamber during said intake stroke adjacent said piston as said piston approaches said second position;

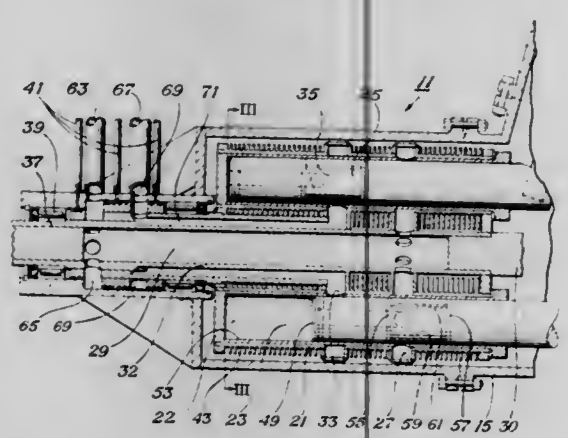
transferring said additional air from said working chamber to said piston chamber during a compression stroke of said piston;
igniting said rich air-fuel mixture to produce a quasi-instantaneous first phase of combustion; and
transferring said additional air from said piston chamber to



said working chamber at an intermediate point of a power stroke of said piston in response to decreasing pressure within said working chamber as said working chamber expands following said first phase of combustion to participate in a second phase of combustion over a period of time of the unburned fuel remaining after said first phase of combustion.

4,060,060
VALVING SYSTEM FOR COMPRESSORS, ENGINES AND THE LIKE
William F. Turner, Graham, Tex., assignor to Turner Research, Inc., Graham, Tex.
Filed May 17, 1976, Ser. No. 687,207
Int. Cl.^{2} F02B 57/06
U.S. Cl. 123—43 A **14 Claims**



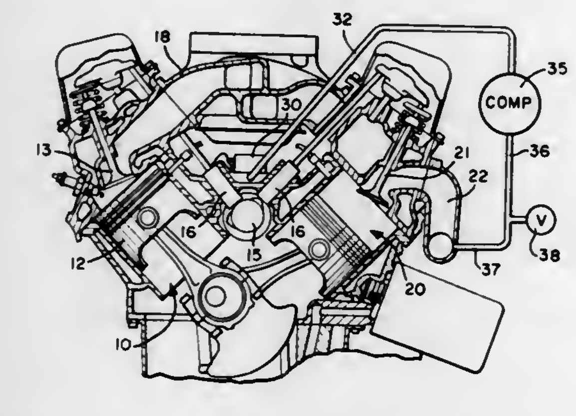


1. In a rotary vee device that includes:
a. a rotational cylinder block having a plurality of cylinders defined therewithin and rotatable about a central longitudinal axis;
b. a plurality of pistons disposed within said cylinders such that there is relative rotational and reciprocal motion between interior walls of said cylinder and the exterior walls of said pistons;
c. a plurality of respective inlet ports and passageways for intake of a fluid within respective cylinders atop respective said pistons therewithin at least by the time said pistons and said cylinders have attained a predetermined first position; said intake ports being connected with and communicating with respective said cylinders at least by said first position;
d. a plurality of respective discharge ports and discharge passageways for discharging fluid from within said cylinder at a predetermined second position; said discharge port being connected with and communicating with respective said cylinders at said second position;
e. power delivery means connected with said device for delivering power with respect thereto;

an improvement comprising:
f. a plurality of respective first flow areas defined on one of the surfaces of said piston and cylinder such that respective ports will traverse thereacross during a revolution of said cylinder block;
g. a plurality of first flow passageways communicating intermediate said first flow area and its said cylinder, at least one for each said cylinder and piston; each said first fluid passageway terminating at a first end in communication with the interior of its respective said cylinder above its respective said piston and at its second end in communication with its respective said first flow area;
h. said respective plurality of intake ports and discharge ports comprising apertures located at predetermined locations on the other of said surface of said cylinder and piston and connected with respective intake and discharge passageways for respective intake and discharge flow of a fluid when a respective port is rotatably and reciprocally brought into communication with its said first flow area;

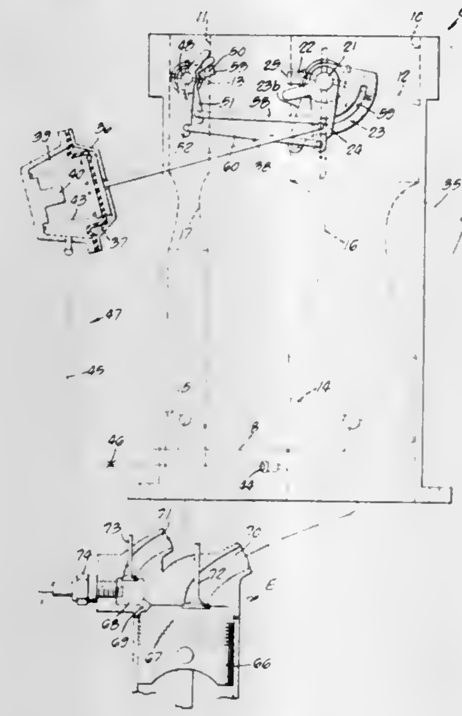
such that as respective said relative rotational and reciprocal motion is effected between respective said pistons and cylinders an intake flow passage is defined for intake of a fluid interiorly of said cylinder, followed by closure of said intake flow passage, followed by pressurizing of said fluid, followed by opening of a discharge flow passage for discharge of a fluid from the interior of said cylinder, followed by closure of said discharge flow passage to complete a cycle; thereafter repeating said cycle.

4,060,061
PROCESS AND APPARATUS FOR IMPROVED I.C. ENGINE COMPOSITION
Willard C. Might, 393 N. Jay St., West Milton, Ohio 45383
Filed Sept. 19, 1975, Ser. No. 615,179
Int. Cl.^{2} F02B 75/02; F02D 39/02; F02M 7/12
U.S. Cl. 123—75 B **6 Claims**



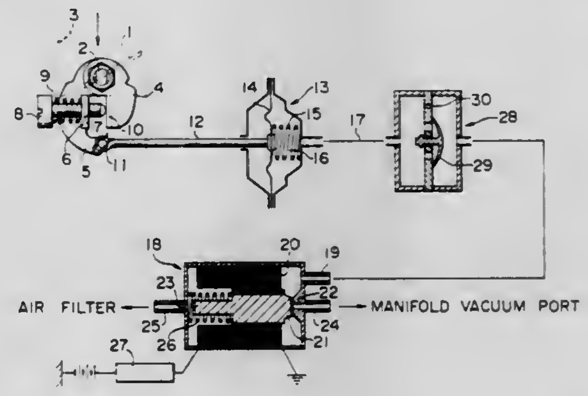
1. An Otto cycle internal combustion engine having at least one cylinder and a piston having a head and reciprocable therein through intake, compression, expansion and exhaust strokes, intake and exhaust valves controlling the admission of a charge to said cylinder and the exhaust of products of combustion, and valve operating mechanism having timed relation to piston movement; the improvement comprising
means forming an inlet into said cylinder separate from the inlet valve and below the top dead center position of the head of said piston,
means connected to supply gas under pressure to said inlet means,
an inlet control valve connected between said compressor means and said inlet means to control the timing of gas admission therethrough,
and operating means actuated in timed relation to said valve operating mechanism and controlling said inlet control valve to open the same during the initial portion of the compression stroke to introduce gas into said cylinder above the piston head and below the charge admitted through said intake valve.

4,060,062
CARBURETOR CHOKE VALVE CONTROL SYSTEM APPARATUS
Katsuhiko Tsutsui; Heihachi Miura, and Yukio Miyano, all of Kawasaki, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan
Filed Nov. 3, 1975, Ser. No. 628,087
Claims priority, application Japan, Nov. 6, 1974, 49-127716
Int. Cl.^{2} F02B 75/02; F02D 39/02
U.S. Cl. 123—75 B **6 Claims**



1. For use with a carburetor for an internal combustion engine, the carburetor having a main intake passage for supplying main combustion chambers of the engine with a lean mixture and having an auxiliary intake passage for supplying auxiliary combustion chambers of the engine with a rich mixture, the improvement comprising, in combination: a main choke valve in the main intake passage and fixed on a shaft, a first lever fixed to the shaft, a second lever mounted to turn on the shaft, a spring acting to turn the second lever with respect to the first lever, hook means on the first lever limiting such turning movement of the second lever, an auxiliary choke valve in the auxiliary intake passage, means including an auxiliary lever for moving the auxiliary choke valve, means including a lost-motion connection between said second lever and said auxiliary lever whereby the auxiliary choke valve is moved from open position toward closed position only after predetermined closing movement of said main choke valve, a third lever mounted to turn on the shaft and engageable with said hook means, connecting means whereby said third lever may move said auxiliary choke valve, and means responsive to reduction in pressure in one of said intake passages upon starting of the engine to cause the third lever to open both choke valves.

4,060,063
THROTTLE POSITIONER
Koichi Hirasawa, Toyota, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan
Filed Aug. 13, 1975, Ser. No. 604,209
Claims priority, application Japan, June 2, 1975, 50-74612[U]; June 2, 1975, 50-74613[U]
Int. Cl.^{2} F02D 31/00
U.S. Cl. 123—97 B **9 Claims**

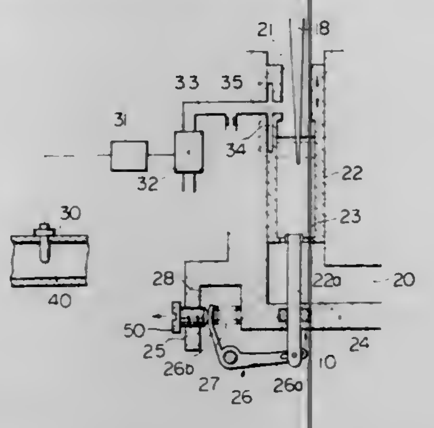


1. A throttle positioner for a throttle valve of an automobile engine having a rotary shaft, comprising:
a lever fixedly mounted on said rotary shaft;
a lever driving element mounted on said rotary shaft to be freely rotatable with respect to said shaft and adapted to drive said lever in a direction to open said throttle valve;
said lever and said lever driving element individually having lugs confronting each other;
said lug and said lever driving element supporting an adjusting screw threadably mounted thereto;
said adjusting screw having a tip end which drivingly abuts against said lug of said lever, whereby movement of said screw supported by said lever driving element in a first direction imparts motion of said lever;
a diaphragm means drivingly connected to said lever driving element so as to drive said lever in a first direction to ensure that said throttle valve is opened at least to a throttle positioner preset opening when a vacuum is applied thereto;
said lever driving element being adapted to release said lever in a second direction opposite to said first direction when atmospheric pressure is applied thereto;
passage means for supplying the manifold vacuum or atmospheric pressure to said diaphragm means;
an electro-magnetic valve which controls said passage means to selectively supply the manifold vacuum or atmospheric pressure through said passage means, and
an electric circuit means for controlling said electro-magnetic valve in accordance with the operational conditions of the vehicle which incorporates the throttle positioner.

4,060,064
VARIABLE SIZE VENTURI CARBURETOR WITH AN ELECTRONIC AIR/FUEL RATIO CONTROL SYSTEM
Hidehiro Minami, Yokohama, and Hideo Kamino, Chofu, both of Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan
Filed Mar. 18, 1976, Ser. No. 668,072
Claims priority, application Japan, Mar. 20, 1975, 50-38593
Int. Cl.^{2} F02M 7/00
U.S. Cl. 123—119 EC **5 Claims**

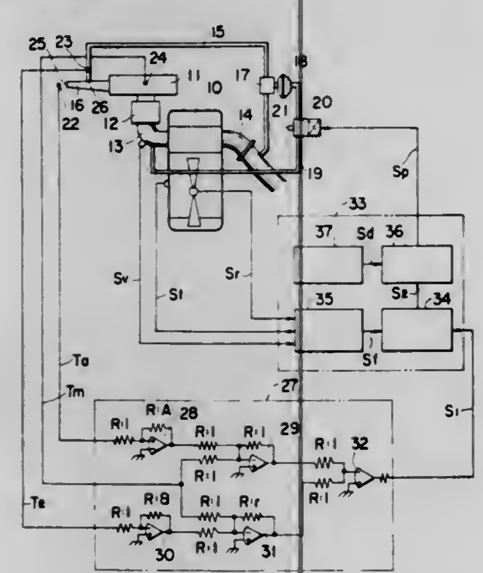
1. In a variable size venturi carburetor of an internal combustion engine with an electronic air/fuel ratio control system operable in accordance with at least one engine operating variable and having a body defining a bore, a suction responsive piston projecting into the bore to form a venturi and movable in response to the suction adjacent the venturi to be withdrawn from the bore, a fuel delivery passageway in the body through which fuel is discharged from a reservoir to the

venturi, a metering needle valve extending from the suction responsive piston across the venturi into the fuel delivery passageway, and additional air delivery passageway being controlled by the electronic air/fuel ratio control system, the improvement comprising; a tubular nozzle carrying member vertically slidably fitted in the fuel delivery passageway and in constant communication with said additional air delivery passageway and means for manually vertically displacing said nozzle carrying member relative to the body to adjust the



position of the nozzle with respect to the venturi, a manual adjusting screw having indicating means mounted in the carburetor body and linkage means to transfer the adjustment of the adjusting screw to the nozzle carrying member to move the same relative to the body, said linkage means having an L-shaped pivotal lever having one arm abutting against one end of the adjusting screw opposite to the screw head and the other arm operatively linked with the bottom of the tubular nozzle carrying member.

4,060,065
EXHAUST GAS RECIRCULATION SYSTEM HAVING MEANS TO ESTIMATE ACTUAL RECIRCULATION RATE BASED ON INTAKE AND EXHAUST GAS TEMPERATURES
Yoshitaka Hata, Fujisawa; Kenji Ikeura, Yokohama, and Masaaki Ozeki, Chigasaki, all of Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan
Continuation of Ser. No. 515,061, Oct. 15, 1974, abandoned. This application May 25, 1976, Ser. No. 689,864
Claims priority, application Japan, Oct. 23, 1973, 48-119239
Int. Cl.² F02M *25/06*
U.S. Cl. 123—119 A **3 Claims**



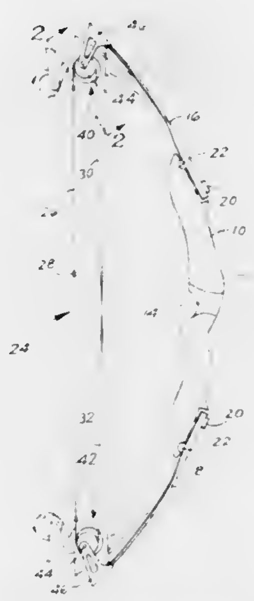
1. A method of estimating the exhaust gas recirculation rate in an internal combustion engine having a recirculation passage for recirculating a portion of the exhaust gas from the exhaust line to the induction passage of the engine, so that the recirculated exhaust gas is mixed with a fresh gas which is either air or an air-fuel mixture flowing through the induction passage at a section where the recirculation passage joins the induction passage, the recirculation rate being defined by the ratio of the mass of the recirculated exhaust gas per unit time to the mass flow rate of said fresh gas in the induction passage, the method comprising the steps of:

measuring the respective temperatures of said fresh gas, the recirculated exhaust gas and a resulting mixture of said fresh gas and the recirculated exhaust gas; and computing the recirculation rate by the following equation,

$$\frac{q}{Q} = \frac{T_m - \frac{C_a}{C_m} \cdot T_a}{\frac{C_e}{C_m} \cdot T_e - T_m}$$

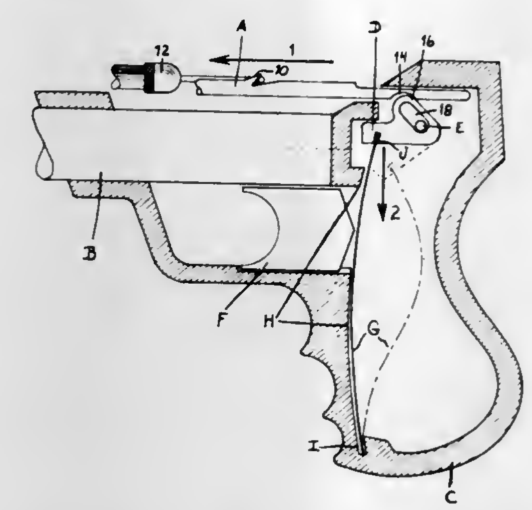
where q is the mass of the recirculated exhaust gas per unit time, Q is the mass flow rate of said fresh gas at said section of the induction passage, T is gas temperature, C is specific heat, and the subscripts a, e and m represent said fresh gas, recirculated exhaust gas and a resulting mixture, respectively.

4,060,066
COMPOUND ARCHERY BOW WITH ECCENTRIC CAM ELEMENTS
Donald S. Kudlacek, 3412 Oak St., Longview, Wash. 98632
Filed Dec. 11, 1975, Ser. No. 639,649
Int. Cl.² F41B *5/00*
U.S. Cl. 124—23 R **2 Claims**



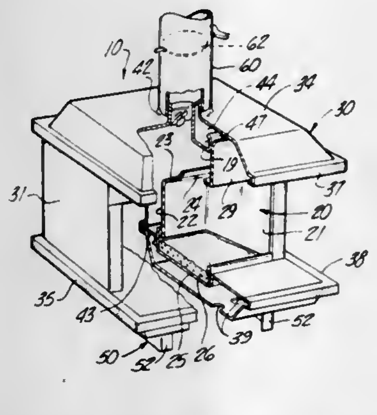
1. A compound archery bow comprising:
a. a handle member,
b. a pair of bow limbs projecting from opposite ends of the handle member,
c. a pair of cam members each comprising a pair of cam elements of different diameters secured together eccentrically and having a common pivot axis which is eccentric with respect to both cam elements,
d. a pivot member on the outer end of each limb pivotally mounting one of the cam members on said pivot axis which is eccentric with respect to both cam elements, and
e. a bow string having a medial working stretch segment for projecting an arrow and opposite end segments each extending therefrom and wrapped first over the peripheral surface of the larger diameter cam element of the associated cam member, thence over the peripheral surface of the smaller diameter cam element and being secured to the cam member, and thence extending from the smaller diameter cam element of the associated cam member to attachment with the opposed limb.

4,060,067
TRIGGER ASSEMBLY FOR SPRING LOADED WEAPONS
Pierre Dandine, 23 Boulevard Franck Pilatte 06300, Nice, France
Filed Nov. 20, 1975, Ser. No. 633,785
Claims priority, application Monaco, Nov. 21, 1974, 1130
Int. Cl.² F41B *7/04*
U.S. Cl. 124—31 **10 Claims**



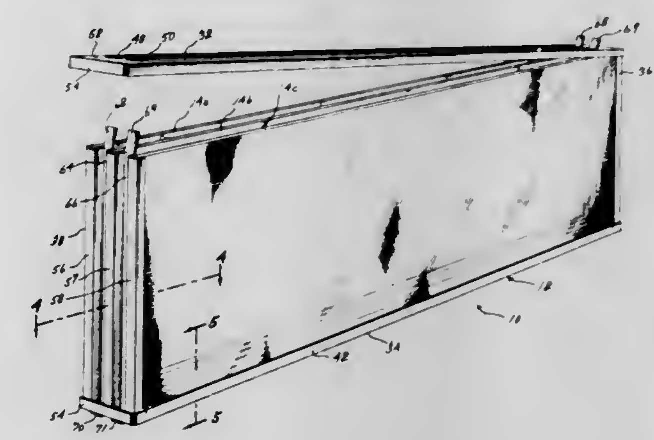
1. A trigger assembly for launching the projectile of a spring loaded weapon comprising a barrel hollow butt stock in which the rear end of the projectile is received, an axle fixedly mounted in said butt stock transversely to the direction of the barrel, a detent adapted to engage the rear end of the projectile, said detent being mounted within said butt stock and swingable about said axle, said detent having a slot through which said axle passes, said slot extending at an angle to the axis of said barrel so as to be axially movable and pivotable about the axle, a spring means supported within said butt stock, said spring means including a spring, said spring directly engaging said detent, and said spring means being in stressed condition when the gun is in a cocked condition to produce a force on said detent to hold a projectile in a retracted position, means located within said butt stock for limiting the flexing of said spring means when a projectile is in a cocked condition, and a trigger member for displacing said spring means from its flexed position when the gun is in a cocked position to a position releasing the spring means force on said detent.

4,060,068
AIR COOLED FREESTANDING FIREPLACE
Paul H. Lever, Fallbrook, and Clifford D. Mohr, Rancho, both of Calif., assignors to Fireplace Corporation of America, Walled Lake, Mich.
Filed Nov. 28, 1975, Ser. No. 636,187
Int. Cl.² F24B *1/18*
U.S. Cl. 126—120 **8 Claims**



1. A fireplace unit comprising: an outer housing having a rear wall, a top, bottom and side walls and a frontal opening;
a flue connected to an opening in said outer housing;
a firebox disposed within said outerhousing, an opening corresponding to said outer housing frontal opening and having a floor for supporting a hearth;
said firebox also including bottom, sides and rear wall at least some of said walls or floor being supported in spaced apart relationship to said outer housing bottom, sides, or top to define air passages therebetween;
means for creating primary air flow through said firebox for supporting combustion therein, said means including a pipe connecting said firebox with said flue, said pipe being of smaller cross-sectional area than said flue and extending into said flue so as to define a clearance space therebetween and also defining a sudden enlargement in the flow path through which said primary air flows;
means for creating a secondary air flow through said air passages, said means including air inlets in communication with said air passages and also including means creating a fluid connection between said air passages and said clearance space between said pipe and said flue, whereby relatively low pressure created in said clearance space by flow of primary air into said sudden enlargement induces flow through said air passages.

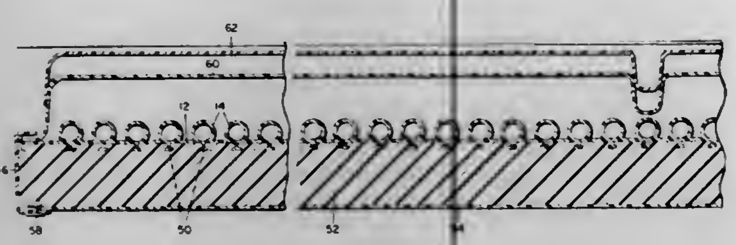
4,060,069
WINDOW UNIT FOR USE IN OVEN DOORS
Claude Drouin, Ste-Julie, Canada, assignor to Les Industries BFG Limitee, Montmagny, Canada
Filed Apr. 14, 1976, Ser. No. 676,874
Claims priority, application Canada, Apr. 12, 1976, 250042
Int. Cl.² F23M *7/00*
U.S. Cl. 126—200 **3 Claims**



1. A window unit for use in an oven door comprising, in combination:
a frame consisting of top and bottom members and a pair of side members; and
glass sheets supported in said frame and arranged in spaced parallel relationship to define air spaces between adjacent glass sheets;
said top and bottom frame members each having laterally spaced longitudinal portions forming channels to individually receive therein a major portion of the upper and lower marginal edges of said glass sheets, said top and bottom frame members each further including full end portions receiving the remaining extremity portions of said marginal edges;
said pair of side frame members each having recessed portions forming side channels to receive therein side marginal edges of said glass sheets; each said side frame member including, at opposite ends thereof and between said side channels, outwardly projecting tongues extending between said channels of said top and lower frame members; said tongues being made of a material capable of being bent whereby said tongues may be folded over corresponding end portions of said top and bottom frame members to thereby lock said frame members in assembly with said glass sheets contained therein; air circulation through said unit being effected between said channels of said bottom frame member, up said air spaces between said

glass sheets, and between said channels of said top frame member.

4,060,070
SOLAR HEATING
Donald Gerton Harter, Holmdel, N.J., assignor to Solar Industries, Inc., Farmingdale, N.J.
Filed Jan. 22, 1976, Ser. No. 651,479
Int. Cl.² F24J *3/02*
U.S. Cl. 126—271 1 Claim



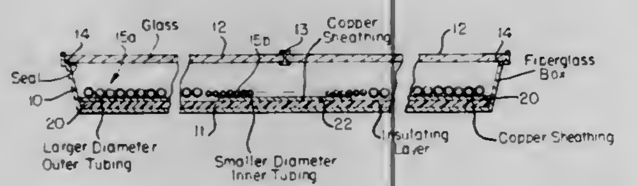
1. A mechanism for the collection of heat from solar radiation by the maximizing of the surface area capable of absorbing direct radiation and diffuse radiation and trapping some radiation for purposes of reradiation comprising:

a unitary construction of a polymer mixed with a black coloring agent consisting of planar web of a certain thickness and certain width and certain length and a multiplicity of closed-spaced parallel-disposed tubular elements extending across the entirety of the certain web width and throughout the entirety of the certain web length,

each tubular element being of circular cross section and having a wall thickness equal to the certain web thickness, the web and each tubular element merging into each other along each respective line of contact with each tubular element projecting upwardly from the web plane,

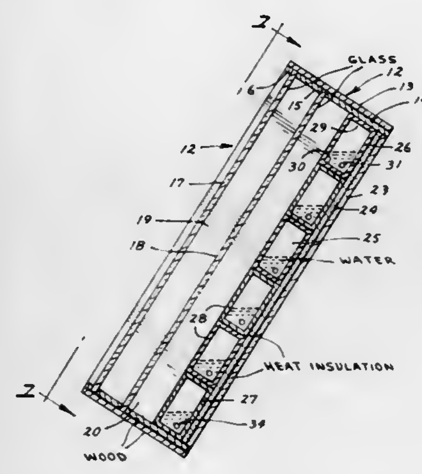
a pair of apertured header tubes of circular cross section extended transversely to and bonded at opposite ends of each of the tubular elements and a tubular communicating adapter extended through each aperture in each header tube and into the interior of a respective tubular element for effecting a communicating connection therebetween.

4,060,071
SOLAR COLLECTOR FOR SOLAR HEATING SYSTEMS
Emil L. Chayet, Largo, Fla., assignor to Solar Energy Dynamics Corporation, Tampa, Fla.
Filed June 17, 1976, Ser. No. 696,988
Int. Cl.² F24J *3/02*
U.S. Cl. 126—271 10 Claims



1. A solar collector for use in a solar heating system, comprising a sealed housing, one face of said housing being planar and being transparent to admit solar radiation to the interior of said housing, a continuous length of tubing tightly coiled in a substantially flat planar helical array of closely adjacent contiguous turns, means for supporting said flat planar helical tubing array within said housing with the plane of said array being disposed substantially parallel to the plane of said transparent housing face, said array comprising two pluralities of helical turns respectively connected in series flow communication with one another and respectively disposed in concentric, substantially coplanar relation to one another, the diameters of the tubings in said two pluralities of helical turns respectively differing from one another, a flow inlet line connected to the larger diameter tubing one of said two pluralities of helical turns and a flow outlet line connected to the smaller diameter tubing one of said two pluralities of helical turns.

4,060,072
SOLAR HEATER APPARATUS
Donald F. Johnson, Watertown, S. Dak., assignor to American Solar Energy Corporation, Denver, Colo.
Filed July 1, 1976, Ser. No. 701,759
Int. Cl.² F24J *3/02*
U.S. Cl. 126—271 7 Claims



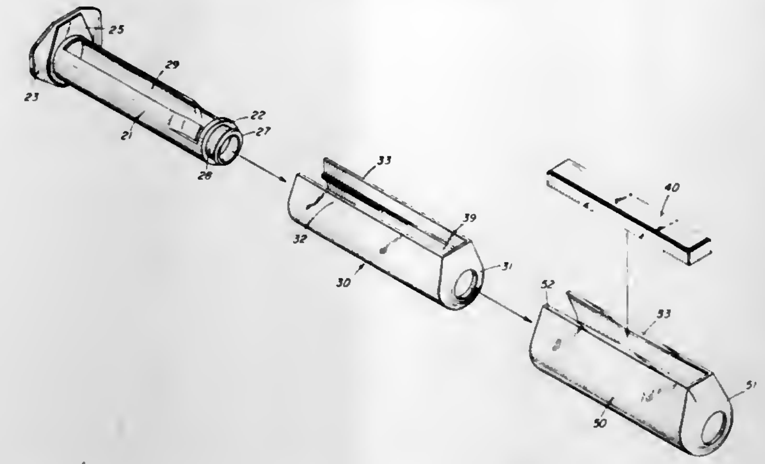
1. Solar heating apparatus comprising a solar panel having a perimetric frame that has an upper wall, a lower wall, an open front side, and an open back side, first means joined to the frame to close the back side opening, second means that permits passage of infrared rays of the sun mounted on the frame in substantial spaced relationship to the first means to close the front side opening, wall means defining a plurality of horizontally elongated tubular fluid channels with one extending vertically above the other mounted in the frame between the first and second means and spaced from the second means, each channel having a top wall portion, a bottom wall portion, a first end wall and a second end wall, a liquid inlet opening to the interior of the vertically uppermost fluid channel adjacent the first end wall thereof, a liquid outlet opening to the interior of the vertically lowermost fluid channel adjacent one of the end walls thereof, and conduit means opening to interiors of the fluid channels adjacent the end walls thereof other than the ones adjacent the liquid inlet and liquid outlet for interconnecting the channels to provide a liquid flow path between the channels from the liquid inlet to the liquid outlet with the liquid flowing in a direction through a channel that is opposite the direction of flow through the channel immediately vertically therebeneath, means remote from the panel for storing heat energy, and means for conducting liquid from the liquid outlet to the heat storing means and from the heat storing means to the liquid inlet whereby liquid from the heat storing means passes through the liquid inlet and along the liquid flow path to the liquid outlet, the liquid connecting means including means for controlling the flow of liquid through the liquid inlet to maintain liquid in each channel at a level that is a substantial distance below the top wall portion of the respective channel to provide a dead air space in each channel above the level of the liquid in the respective channel.

4,060,073
SYRINGE SHIELD
Carl Collica, New Rochelle; Leonard Epifano, Rye, and Ralph Farella, Scarsdale, all of N.Y., assignors to Medi-Ray, Inc., Tuckahoe, N.Y.
Filed Mar. 19, 1976, Ser. No. 668,532
Int. Cl.² A61B *6/00*
U.S. Cl. 128—1.1 15 Claims

1. A syringe shield, comprising:

an inner generally cylindrical shell formed of poastic material having an elongated slot extending longitudinally therein;

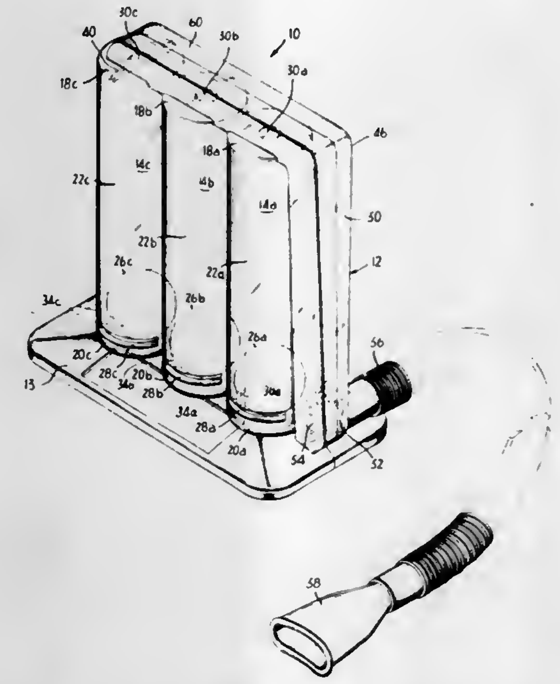
a generally cylindrical lead body, said body being proportioned such that its inner surface conforms generally to the outer surface of said inner shell, said body having an elongated slot aligned with the slot in said inner shell;



an outer shell formed of plastic material, said outer shell having an elongated slot aligned with the slots in said inner shell and said body; and

an elongated optically transparent radiation shielding member proportioned to fit in the elongated slot in said body.

4,060,074
INHALATION DEVICE
Ronald D. Russo, Hamden, Conn., assignor to Chesebrough-Pond's, Inc., Greenwich, Conn.
Filed Feb. 11, 1976, Ser. No. 657,242
Int. Cl.² A61M *16/00*
U.S. Cl. 128—2.08 15 Claims



1. A self-supporting incentive inhalation device for inducing respiratory exercise, comprising:

a container having a plurality of transparent compartments in alignment along an axis of said container,

said compartments each having a top wall, a bottom wall, a vertical wall therebetween, and a chamber therewithin which extends from said bottom wall to said top wall,

a light-weight article in each of said chambers which is normally in the lower portions thereof,

a slot in each of said compartments which extends through the lower portion thereof and connects each of said chambers to the surrounding atmosphere at a point at least partially below each of said articles,

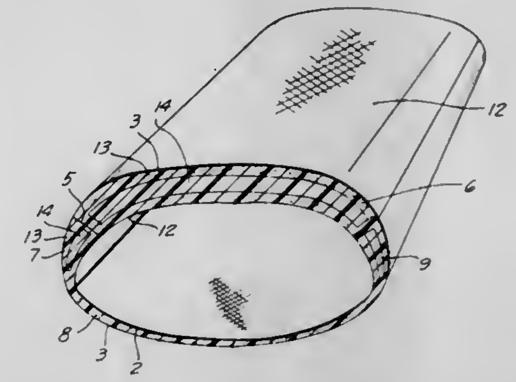
a passageway in said container which extends over said compartment top walls and has an outlet adjacent one of the outer of said chambers,

a restricted port in each compartment which extends through said top wall thereof and connects said chambers to said passageway,

a ridge in said last compartment depending from the top wall thereof to prevent said article therein from closing said last top port,

means connected to said outlet to allow a person to withdraw air from said chambers through said passageway, whereupon said article is said chamber adjacent said outlet rises to the top thereof and closes said top port when a person inspires air at a precalibrated flow rate, said article in each intermediate chamber sequentially rises to the top thereof and closes each intermediate top port when a person inspires predetermined additional amounts of air at a precalibrated flow rate, and said article in the last of said chamber rises to the top thereof and contacts said depending ridge therein when a person inspires still an additional predetermined amount of air at a precalibrated flow rate.

4,060,075
SPLINT AND BODY-SUPPORT DEVICE
Alois Blomer, Gildenstrasse 61, 4390 Gladbeck, and Hans Schulze, Fliederweg 8, 5931 Netphen-Deuz, both of Germany
Filed Jan. 6, 1976, Ser. No. 646,978
Int. Cl.² A61F *5/04*
U.S. Cl. 128—90 15 Claims

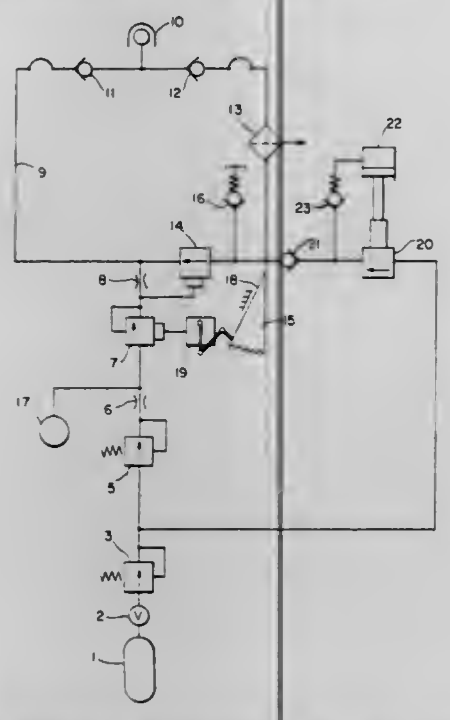


1. A device for the immobilization or support of a body part of a human or animal subject comprising a flexible envelope of double-wall tubing having a pair of fabric walls defining an annular space between them, partitions subdividing said space into compartments spaced around the tubing, two interreactive reaction compounds in each of said compartments, and destructible means holding said reaction compounds apart but adapted to be destroyed by an applied effect to permit mixing of said reaction compounds and setting of the resulting reaction mixture to retain a contour applied to said envelope.

4,060,076
BREATHING APPARATUS INCORPORATING DEPTH COMPENSATION
Imre Botos, Lidingo, and Ivan Aldine Hellquist, Rotebro, both of Sweden, assignors to AGA Aktiebolag, Lidingo, Sweden
Filed Feb. 26, 1976, Ser. No. 661,491
Claims priority, application Sweden, Mar. 14, 1975, 7502856
Int. Cl.² A62B *7/00*.
U.S. Cl. 128—142 R 4 Claims

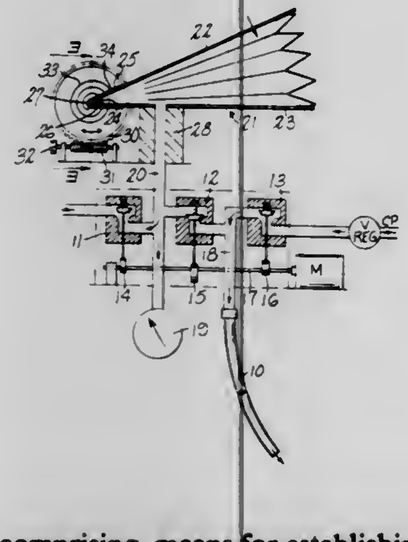
1. Breathing apparatus for use under water comprising: a fresh gas container, connection means for connecting the apparatus to the breathing organ of a user, a breathing circuit in communication with said connection means and comprising carbon-dioxide absorbing means in communication with said connecting means, an expansible gas chamber in communication with said connection means and control means for controlling the operation of said breathing circuit to provide (i) a first operating period wherein said breathing circuit is closed and a breathing gas is caused to circulate in said breathing circuit until the oxygen concentration of the circulating breathing gas is reduced to a predetermined value and (ii) a second operating period, which alternates with said first period, wherein the

used breathing gas is released to the ambient environment and a fresh gas, the quantity of which is substantially independent of the depth of the user under the water surface, is supplied to the breathing circuit; wherein the improvement comprises a valve means disposed in a connection between said fresh-gas container and said breathing circuit, and means for sensing the



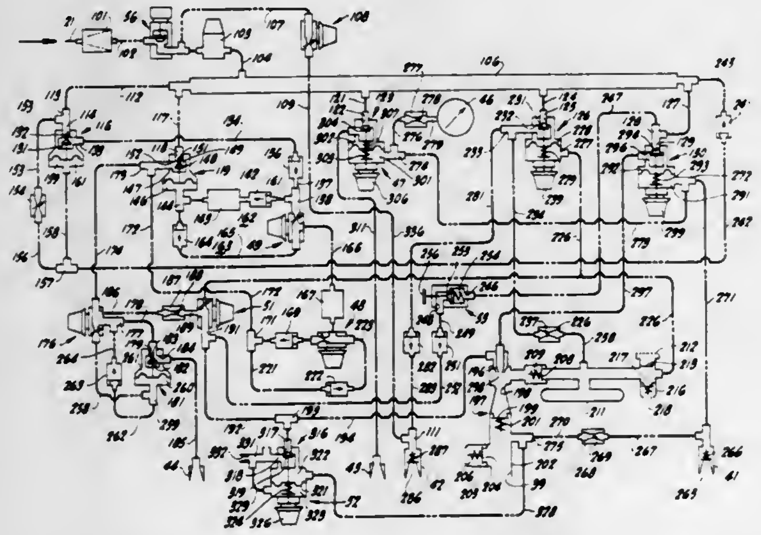
pressure of the ambient environment and for controlling said valve means to cause release of further fresh gas from said fresh gas container through said valve means to the breathing circuit when the diving depth of the user is increased whereby a change in floating capacity resulting from a decrease in the volume of the expansible gas chamber of the breathing circuit is compensated for.

4,060,077
RESPIRATOR
Irving Friedman, New Haven, Conn., assignor to Diana W. Friedman, New Haven, Conn.
Filed Nov. 12, 1975, Ser. No. 631,374
Int. Cl.² A61M *16/00*
U.S. Cl. 128—145.8 **9 Claims**



1. A respirator comprising, means for establishing communication with a patient's lungs, means for continuously supplying gas at a predetermined pressure, an expansible and contractible reservoir, a first conduit containing a first valve connected between said supplying means and said communication means, a second conduit containing a second valve connected between said communication means and said reservoir said second conduit including an unobstructed passageway between said reservoir and said second valve, a third conduit containing a third valve downstream from said reservoir and also connected to said second conduit between said reservoir and said second valve, said third conduit communicating with the atmosphere when said third valve is open, means associated with said reservoir for monitoring and indicating the volume of gas received therein, and valve actuating means adapted simultaneously to open the first and third valves and close the second valve during the inspiratory phase and to simultaneously open the second valve and close the first and third valves during the expiratory phase whereby during an expiratory phase said reservoir is connected to said communication means and receives the expired gas, and means associated with said reservoir to maintain a terminal pressure on gas remaining in the lungs at the end of each expiratory phase when said second valve is open.

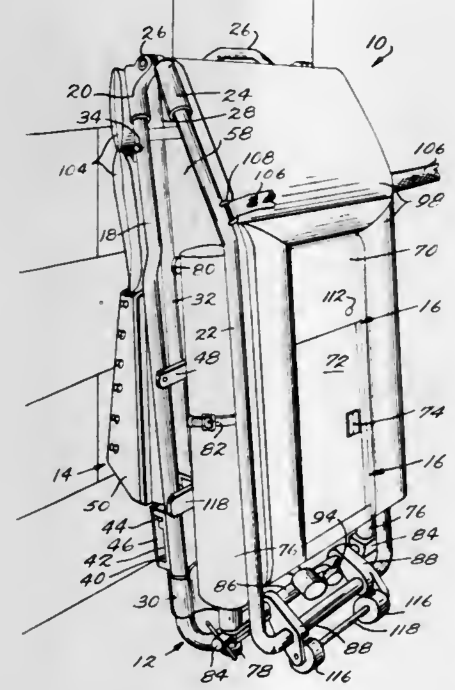
4,060,078
VENTILATOR AND METHOD
Forrest M. Bird, 212 NW. Cerritos, Palm Springs, Calif. 92262
Filed Aug. 18, 1975, Ser. No. 605,529
Int. Cl.² A61M *16/00*
U.S. Cl. 128—145.8 **33 Claims**



1. In a ventilator having an inhalation phase and an exhalation phase in its operative cycle for use with a source of gas under pressure, an inlet adapted to be connected to the source of gas under pressure, master control valve means having an inlet and an outlet and a valve member movable between open and closed positions for controlling the flow of gas from the inlet to the outlet, means connecting the inlet of the control valve means to the inlet of the ventilator, said valve member being in an open position during the inspiratory phase and in a closed position during the expiratory phase of the ventilator, said master control valve means including a diaphragm which upon movement causes movement of the valve member, said control valve means having a chamber formed on one side of the diaphragm, a breathing head assembly, said breathing head assembly including an exhalation valve assembly, means for supplying gas from the outlet of the control valve means to the breathing head assembly, timing means connected between the outlet of the control valve means and said chamber for timing the introduction of gases into said chamber during the inspiratory phase and the bleeding of gases from said chamber during the expiratory phase to thereby control the movement of the valve member to initiate the inspiratory and expiratory phases of the ventilator, means for sensing the pressure of the gases in the breathing head assembly and baseline compensation means connected to the inlet of the ventilator and responsive to the sensed pressure in the breathing head assembly for supplying gas to the exhalation valve assembly so that the patient must exhale against a substantially constant positive pressure, said baseline compensation means including an inlet and an outlet with the inlet being connected to the inlet of the ventilator and the outlet being connected to the exhalation valve assembly, a valve member movable between open and closed positions for controlling the flow of gas from the inlet to the outlet of the baseline compensation means, said baseline compensation means including a diaphragm and means forming a chamber on

one side of the diaphragm whereby upon movement of the diaphragm the valve member is moved between said open and closed positions, means connecting the chamber of the baseline compensation means to means for sensing the pressure of the gases in the breathing circuit, yieldable spring means for yieldably urging the diaphragm of the baseline compensation means in a direction to cause movement of said valve member and means for causing adjustment of said spring means.

4,060,079
HEART-LUNG RESUSCITATOR LITTER UNIT
Herbert E. Reinhold, Jr., Rockville, Md., assignor to Survival Technology, Inc., Bethesda, Md.
Filed Nov. 17, 1975, Ser. No. 632,657
Int. Cl.² A61M *16/00*
U.S. Cl. 128—145.8 **8 Claims**



1. A device for use under emergency conditions in applying heart-lung resuscitation procedures and the like to a patient while supported thereon which enables such patient to be transported from an inaccessible location of attack onto an ambulance stretcher without removing such support, said device being in the form of a self-contained portable unit, said unit comprising:

a frame structure having a first part for supporting the legs and a second part for supporting the back of a patient,

means connecting said parts for movement between a collapsed unit carrying position and an extended patient supporting treatment and transporting position,

downwardly facing horizontal surface engaging means on said first and second parts of said frame structure operable when said frame structure is disposed in said patient treatment and transporting position to engage a horizontal surface such as a floor or the like and support said frame structure in stable relation thereon,

said parts including upwardly facing patient engaging means on said frame structure operable when said frame structure is disposed in said patient treatment and transporting position to engage and support a patient on said frame structure in a supine position and cooperating with said horizontal surface to provide for a relatively unyielding support of the patient's back area sufficient to effect cardiac compression through the application of periodic mechanical downward forces on the chest area of the patient,

means carried by said frame structure on said second part for applying said periodic mechanical downward forces on the chest area of the patient when said patient engaging means and said horizontal surface engaging means are in cooperating relation as aforesaid,

said upwardly facing patient engaging means on said second part being contoured adjacent the head end of said frame structure to support the head of the patient in a position extending downwardly from the adjacent back area so that the breathing channel is maintained in a favorable position for the reception of oxygen,

storage compartment means carried by said frame structure on said first part thereof in a position generally below the level of the associated patient engaging means when said frame structure is disposed in said patient supporting position so as to define a space for the reception of suitable emergency treatment supplies which is conveniently accessible,

oxygen tank supporting means carried by said frame structure on said first part for supporting a pair of oxygen cylinders in a position generally below the level of the associated patient engaging means alongside said storage compartment means,

the downwardly facing horizontal surface engaging means of said first and second parts and the leg supporting portions of the upwardly facing patient engaging means on said first part when in said patient supporting position being disposed in generally parallel planes spaced apart a distance generally equal to the vertical height of the space defined by said storage compartment means,

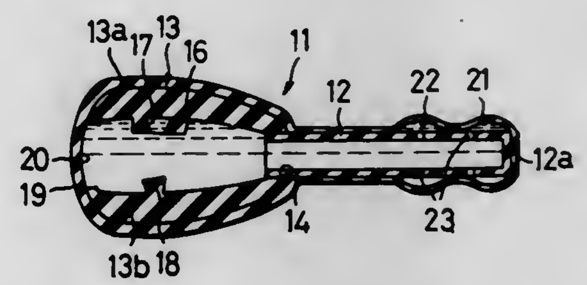
means carried by said frame structure engageable with a patient supported as aforesaid for supplying oxygen from said container means to the patient,

manually engageable means at the head and foot ends of said frame structure for enabling two attendants stationed at said ends to lift and carry said unit and a patient supported on said frame structure as aforesaid by manual engagement of said manually engageable means,

the width dimensions of said unit with oxygen container means supported thereon when in supporting relation to a patient being sufficiently extended to provide the aforesaid back area support but sufficiently limited to enable the unit to be supported on a conventional ambulance stretcher, and

said horizontal surface engaging means of said first and second parts when said frame structure is in said collapsed position being disposed in adjacent relation so that with oxygen container means supported on the unit the latter is of a size and shape to enable movement thereof by one attendant to an inaccessible location of attack.

4,060,080
PLUG FOR LIVING BODY
Taichiro Akiyama, 2-19-23, Shimoochiai, Shinjuku-ku, Tokyo, Japan
Filed Mar. 15, 1976, Ser. No. 667,122
Claims priority, application Japan, Mar. 17, 1975, 50-35609[U]; Nov. 22, 1975, 50-158874[U]
Int. Cl.² A61F *11/02*
U.S. Cl. 128—152 **8 Claims**



1. A plug for insertion into a natural orifice of the body comprising

a. a first chamber and an actuating means located therein;

b. a tube member;

c. a second chamber communicating with said first chamber through said tube member, said second chamber being formed by said tube member and a flexible envelope at-

tached to the outer surface of said tube member, said first chamber being formed of a flexible envelope;

d. said actuating means comprising a pair of substantially flat actuating members;

e. said actuating means being formed of elastic material whereby facing wall surfaces thereof are normally held in spaced-apart relationship,

f. cooperating locking means disposed on the respective facing wall surfaces whereby forcing said actuating means together operates to unite the actuating members and to hold the actuating members in the united position;

g. and a fluid located in said first and second chambers, said fluid being pressed into said second chamber through said tube member when the volume of said first chamber is reduced by forcing said actuating members together so that the volume of said second chamber is increased.

4,060,081

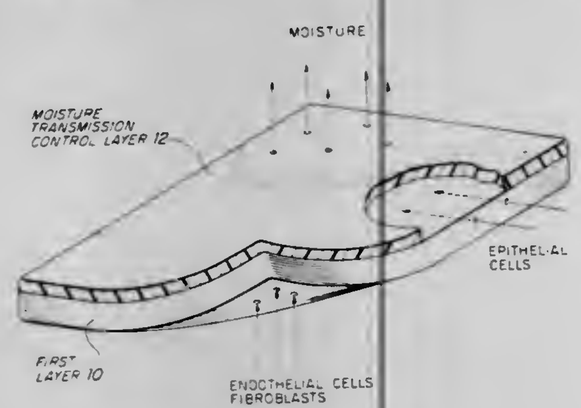
MULTILAYER MEMBRANE USEFUL AS SYNTHETIC SKIN

Ioannis V. Yannas, Newton Center; John F. Burke, Belmont; Philip L. Gordon, Lexington, all of Mass., and Chor Huang, Avon Lake, Ohio, assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Filed July 15, 1975, Ser. No. 596,112

Int. Cl.[2] A61L *15/00*

U.S. Cl. 128—156 **24 Claims**



1. A multilayer membrane, comprising:

a. a first layer formed from a crosslinked collagen-mucopolysaccharide composite containing at least about 0.5% by weight mucopolysaccharide; and,

b. a moisture transmission control layer formed from a non-toxic material, said moisture transmission control layer providing said multilayer membrane with a moisture flux of from about 0.1 to about 1 mg/cm²/hr.

4,060,082

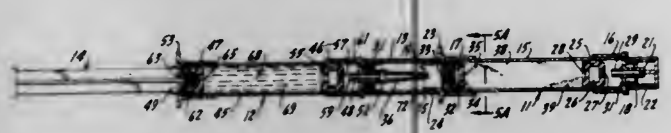
DUAL-INGREDIENT MEDICATION DISPENSER

Richard M. Lindberg, Des Plaines, and Srinivas T. Raghavachari, Chicago, both of Ill., assignors to MPL, Inc., Chicago, Ill.

Filed Aug. 16, 1976, Ser. No. 714,661

Int. Cl.[2] A61M *5/00*

U.S. Cl. 128—218 M **9 Claims**



1. A dual ingredient medication dispenser comprising:

a mixer-dispenser syringe including a housing having an outlet end and an outlet end, a dispensing valve-seal member normally sealing the outlet end of the housing, an inlet valve-seal member normally sealing the inlet end of the housing, the inlet valve-seal member being actuatable from a normal closed condition to an open condition by engagement with a fill needle, with the mixer-dispenser syringe housing and its two valve-seal members defining a mixing chamber containing a first medication ingredient;

a carrier syringe including a housing having an outlet end and an inlet end, a fill needle projecting outwardly from the outlet end of the housing, a discharge valve-seal member normally sealing the outlet end of the housing, and a piston-seal member normally sealing the inlet end of the housing, with the carrier syringe housing, the piston member, and the discharge valve-seal member defining a storage chamber containing a second medication ingredient;

and connecting means, comprising a connecting sleeve, for releasably connecting the outlet end of the carrier syringe to the inlet end of the mixer dispenser syringe with the fill needle aligned with the inlet valve-seal member of the mixer-dispenser syringe, but permitting movement of the two syringes together to engage the fill needle with the inlet valve-seal member of the mixer-dispenser syringe for discharge of the second medication ingredient into the mixing chamber without requiring removal of the sleeve; the connecting sleeve being a length of tubing of flexible material which includes a normally closed vent aperture which is opened whenever the two syringes are moved together sufficiently to engage the fill needle with the inlet valve-seal member of the mixer-dispenser syringe.

4,060,083

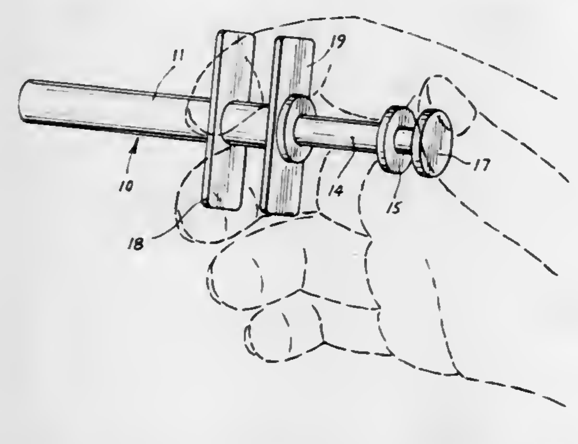
PILL GUN

Raymond L. Hanson, State Highway 8, Lindstrom, Minn. 55045

Filed Apr. 1, 1976, Ser. No. 672,799

Int. Cl.[2] A61D *7/00;* **A61M** *31/00*

U.S. Cl. 128—223 **6 Claims**



1. A hand held pill gun for administering medicinal pills and capsules to small animals such as cats, comprising:

an elongate and stiff barrel having an open and blunt front end to receive and carry such a pill therein;

a pill discharging plunger slidable in the barrel to engage and eject the pill and having a thumb piece adjacent the rear end of the barrel for moving the plunger and pill; and

means for holding the fingers of the hand in close grasping contact with the barrel while administering such pills and comprising a pair of broad surfaced manipulating bars mounted on the barrel adjacent the rear end thereof, said bars extending transversely of the barrel and outwardly from the barrel in both directions and in planes lying transversely of the longitudinal center line of the barrel, each of the bars having a breadth of the same order as the width of the barrel, the bars being spaced from each other on the barrel and having broad flat surfaces confronting each other to bear against and grip the front and rear faces of adjacent fingers of the hand for efficient manipulation of the gun, one of the bars movably and snugly engaging the barrel and being forcibly movable longitudinally along the barrel to hold the fingers on the barrel.

4,060,084

METHOD AND THERAPEUTIC SYSTEM FOR PROVIDING CHEMOTHERAPY TRANSDERMALLY

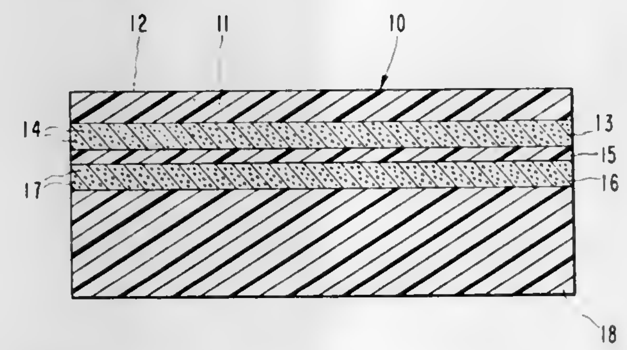
Santosh Kumar Chandrasekaran; John Urquhart, both of Palo Alto, and Jane Elizabeth Shaw, Atherton, all of Calif., assignors to Alza Corporation, Palo Alto, Calif.

Continuation-in-part of Ser. No. 721,602, Sept. 7, 1976, Pat. No. 4,031,894, which is a continuation-in-part of Ser. No. 638,947, Dec. 8, 1975, abandoned, which is a continuation-in-part of Ser. No. 547,504, Feb. 6, 1975, abandoned. This application Jan. 28, 1977, Ser. No. 763,314

The portion of the term of this patent subsequent to June 28, 1994, has been disclaimed.

Int. Cl.[2] A61M *31/00*

U.S. Cl. 128—260 **10 Claims**



1. Method for providing chemotherapy transdermally comprising:

a. administering a priming dose of a drug to a predetermined area of unbroken skin, said drug being (i) indicated systemically for said therapy at a predetermined systemic concentration and (ii) capable of permeating through said predetermined area of skin at a rate that produces a steady-state systemic concentration of the drug at least about equal to said predetermined systemic concentration, with the proviso that the ratio of said rate on an hourly basis to the quantity of drug immobilized by said predetermined area of skin is less than about 10, wherein the quantity of the drug in the priming dose is at least a substantial portion of said quantity of drug immobilized by said predetermined area of skin; and

b. thereafter administering the drug to said predetermined area of skin continuously at a rate that maintains the steady-state systemic concentration of the drug at about said predetermined systemic concentration.

4,060,085

DIAPER TAPE FASTENER

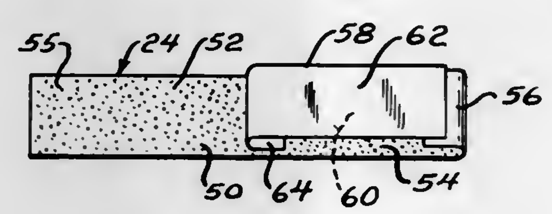
Hamzeh Karami, Crystal Lake, Ill., assignor to Colgate-Palmolive Company, New York, N.Y.

Filed Feb. 2, 1976, Ser. No. 654,241

The portion of the term of this patent subsequent to Apr. 6, 1993, has been disclaimed.

Int. Cl.[2] A61F *13/16*

U.S. Cl. 128—287 **26 Claims**



1. A disposable diaper, comprising:

an absorbent pad assembly having an absorbent pad, opposed first and second surfaces, at least one side edge, and opening means extending through the pad assembly including said pad, said opening means being spaced from said side edge; and

a tape fastener comprising.

a pressure-sensitive tape strip having a first end section secured to the first surface of the pad assembly with adhesive on the first end section being exposed through said opening means of the pad assembly, and a second securement section extending past said side edge of the pad assembly, and

a sheet having a first surface and a second surface facing the second surface of the pad assembly, with said adhesive exposed through the opening means being fixedly attached to the sheet.

4,060,086

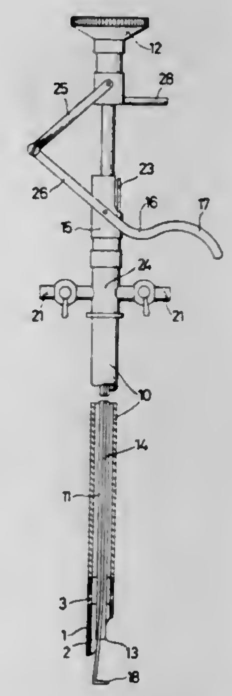
ENDOSCOPE WITH AN OPERATING DEVICE

Karl Storz, Auf dem Schildrain 39, 7200 Tuttlingen, Germany

Filed May 24, 1976, Ser. No. 689,560

Int. Cl.[2] A61B *17/32*

U.S. Cl. 128—303.15 **4 Claims**



1. An endoscope comprising a tubular shaft, an electrode in said shaft arranged to be supplied with high frequency current, a distal end on said shaft terminating in an outer tubular insulated portion, said distal end also including an inner tubular layer of material having a higher heat resistance than said insulated portion provided on the interior of said outer tubular insulated portion said inner tubular layer terminating in an end edge, and means for moving aid electrode longitudinally in said shaft whereby said electrode is operable with said end edge upon movement thereof to perform operations.

4,060,087

SINGLE OR DOUBLE-SHANK CUTTING LOOP DEVICE FOR RESECTOSCOPES

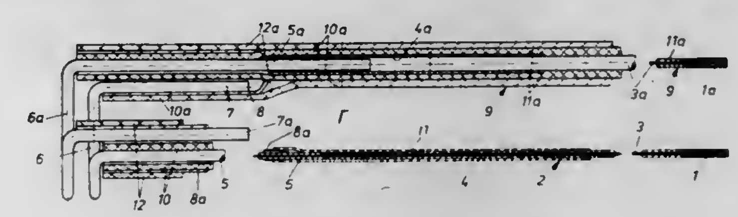
Siegfried Hiltebrandt, and Ludwig Bonnet, both of Knittlingen, Germany, assignors to Richard Wolf GmbH, Knittlingen, Germany

Filed June 11, 1976, Ser. No. 694,990

Claims priority, application Germany, June 11, 1975, 2525982

Int. Cl.[2] A61B *17/32*

U.S. Cl. 128—303.15 **5 Claims**



1. An electrical surgical instrument for resection, comprising:

a. shank means having a proximal and a distal end and comprising two arms each having insulation along the length thereof,

b. two parallel wires respectively carried in the insulation and terminating in two parallel single cutting loops of wire supported by said arms at the distal end of the shant means, remote from the surgeon, said cutting loops lying respectively in planes spaced a predetermined distance from each other normal to the axis of the shank means and
c. means for connecting said cutting loops to a high frequency current source, including;
i. two conductors, each connected to a respective one of said cutting loops and passing through a respective one of said arms, and
ii. two conductive contacts carried by said shank means at the opposite proximal end thereof, and each connected to a respective one of said conductors, whereby the more proximal of said cutting loops can be connected to the live pole of said high frequency source and the more distal of said cutting loops can be connected to the neutral pole of said source.

4,060,088

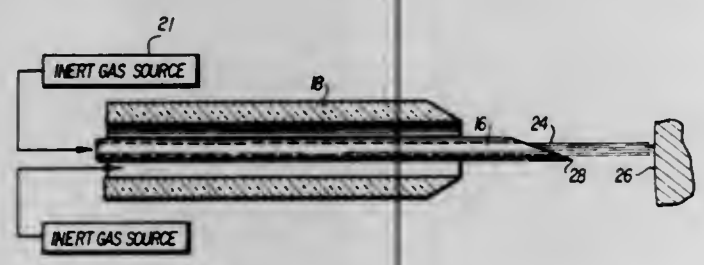
ELECTROSURGICAL METHOD AND APPARATUS FOR ESTABLISHING AN ELECTRICAL DISCHARGE IN AN INERT GAS FLOW

Charles F. Morrison, Jr.; Frank W. Harris, and Michael D. Patzer, all of Boulder, Colo., assignors to Valleylab, Inc., Boulder, Colo.

Filed Jan. 16, 1976, Ser. No. 649,725

Int. Cl.² A61B *17/36*

U.S. Cl. 128—303.17 **17 Claims**



17. An electrosurgical method for coagulating tissue by fulguration with an instrument comprising a support; a tubular electrode supported by said support and outwardly extending therefrom; and a hollow, electrically insulative tube disposed about said electrode and supported by said support, said method being performed by a person and comprising the steps of

directing inert flowing gas through said tubular electrode and said electrically insulative tube and outwardly therefrom;

applying high frequency electrical energy to said electrode; and

said person gripping said instrument and placing a finger on said tube and positioning the instrument adjacent the tissue to be coagulated whereby an auxiliary electrical discharge is established between the inner surface of said electrically insulative tube and said tubular electrode to thereby initiate a primary electrical discharge from the end of the electrode to said tissue and hence effect the coagulation thereof.

4,060,089

SURGICAL FASTENING METHOD AND DEVICE THEREFOR

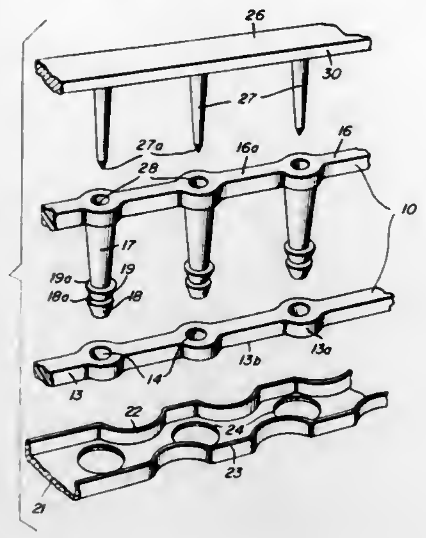
Douglas G. Noiles, New Canaan, Conn., assignor to United States Surgical Corporation, Baltimore, Md.

Filed Sept. 3, 1975, Ser. No. 609,949

Int. Cl.² A61B *17/12, 17/08*

U.S. Cl. 128—325 **11 Claims**

1. A surgical fastening device comprising, in combination, a retaining member of absorbable material having an opening therein and arranged to be positioned on one side of body tissue, a fastener member of absorbable material having a prong thereon arranged to be inserted through the tissue disposed between said members and into said retainer member opening to the extent that the tissue is secured between said fastener member and said retainer member, means on said



prong for retaining said prong in said retainer member, and means for maintaining said prong in a rigid condition during a tissue joining procedure as the prong is inserted through the tissue into said retainer member opening to secure the tissue.

4,060,090

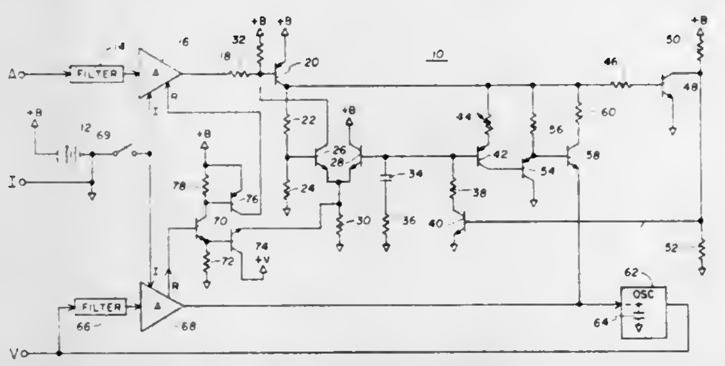
VARIABLE P-R INTERVAL PACEMAKER

Heh-Sen Lin, Brooklyn Center, Minn., and John M. Adams, Mesa, Ariz., assignors to Medtronic, Inc., Minneapolis, Minn.

Filed Mar. 4, 1976, Ser. No. 663,690

Int. Cl.² A61N *1/36*

U.S. Cl. 128—419 PG **10 Claims**



1. In a cardiac pacemaker having means for providing an electrical stimulus to the ventricle after the sensing of an atrial contraction, the improvement comprising means responsive to the rate of atrial contractions for affecting the time between the sensing of an atrial contraction and the provision by said providing means of said electrical stimulus to the ventricle, said affecting means including a two input comparator circuit, a first input circuit coupled to one comparator input for maintaining that one input at a reference value and a second input circuit for providing a value to be compared with said reference value to the other input of said comparator circuit, said second input circuit including a variable value providing means for providing a value which increases at a first rate to said reference value from the time each atrial contraction is sensed and which decreases at a second rate from each time said reference value is reached until the next atrial contraction is sensed.

4,060,091

TOBACCO AND TOBACCO-CONTAINING MANUFACTURES CONTAINING AN INGREDIENT HAVING PHYSIOLOGICAL COOLING ACTIVITY

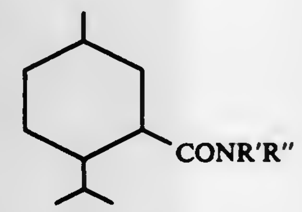
Hugh R. Watson, Wargrave; David G. Rowsell, Staines, and David John Spring, Datchet, all of England, assignors to Wilkinson Sword Limited, London, England

Continuation-in-part of Ser. No. 221,755, Jan. 28, 1972, abandoned. This application July 8, 1974, Ser. No. 486,565

Int. Cl.² A24B *3/12*

U.S. Cl. 131—9 **10 Claims**

1. A tobacco or tobacco-containing manufacture comprising tobacco and an agent capable of stimulating the cold receptors of the nervous system of the nasal or oral mucosa when brought into contact therewith upon use of the manufacture, wherein said agent comprises an effective amount of a cold receptor stimulating N-substituted p-methane carboxamide of the formula:



Where

R', when taken separately, is hydrogen or an aliphatic radical containing up to 25 carbon atoms and selected from alkyl, cycloalkyl, cycloalkylalkyl, hydroxyalkyl, alkynyl, hydroxyalkynyl, acyloxyalkyl, alkoxyalkyl, aminoalkyl, acylaminoalkyl, calboxyalkyl and alkylcarbonyalkyl;

R'', when taking separately, is hydroxy, or an aliphatic radical containing up to 25 carbon atoms and selected from alkyl, cycloalkyl, cycloalkylalkyl, hydroxyalkyl, alkynyl, hydroxyalkynyl, acyloxyalkyl, alkylcarbonyalkyl, with the proviso that when R' is hydrogen R'' may also be an aryl radical of up to 10 carbon atoms and selected from the group consisting of benzyl, pyridyl, and substituted phenyl wherein the substituents are selected from C_1– C_4 alkyl, hydroxy, C_1 – C_4 alkoxy, nitro and halogen; and

R' and R'', when taken together with the nitrogen atom to which they are attached, represent a cyclic or heterocyclic group of up to 25 carbon atoms.

4,060,092

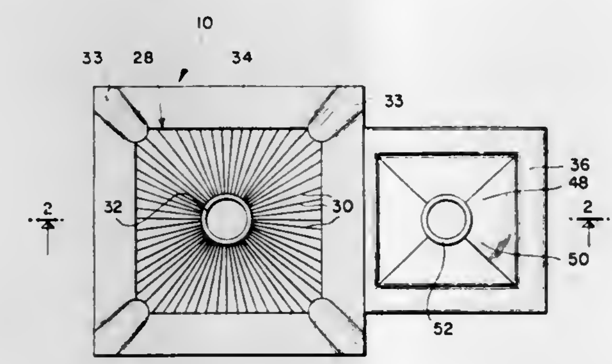
ASHTRAY AND EXTINGUISHER

James Pappas, 11576-72 Avenue, Delta, British Columbia, Canada

Filed Sept. 27, 1976, Ser. No. 726,493

Int. Cl.² A24F *13/18, 19/14*

U.S. Cl. 131—236 **7 Claims**



1. An ashtray and extinguisher comprising:
a. a first container including a bottom portion and side portion forming a chamber including a mouth portion;
b. a grid element adapted to rest on said mouth portion of said chamber and a multiplicity of radially arranged wires in a somewhat pyramidal arrangement emanating upwardly from a first central ring portion on one end to an outer frame portion on the other end, said frame portion adapted to rest on said mouth;
c. a second container including a bottom element and side elements forming a cavity and an upper opening and adapted to contain an extinguisher liquid therein;
d. a shield element removably affixed to said upper opening of said cavity having a substantially trapeqoidally shaped surface having a central opening at the small end thereof, said surface being sloped upwardly from said central opening, a second ring element affixed to said central opening, the upper marginal edges of said second ring element extending upwardly from a portion of said surface adjacent said second ring element; and
e. a rigid unitary housing including a first and second cavity, said first cavity adapted to removably contain said first container therein and said second cavity adapted to removably contain said second container therein, said first cavity and said second cavity being accessible from the top of said housing, said mouth portion of said first container being disposed level with an open mouth portion of said first cavity, said first container being larger in size than said second container, wherein the top of said second container is lower than the top of said first container.

4,060,093

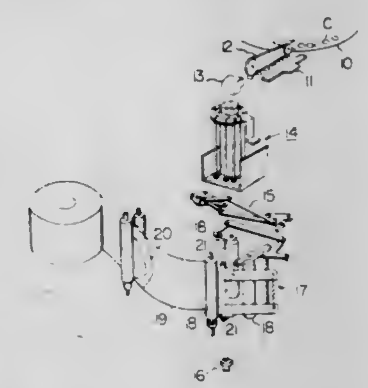
COIN STACKER IN AUTOMATIC COIN WRAPPING APPARATUS

Syugo Douno, Himeji, Japan, assignor to Glory Kogyo Kabushiki Kaisha, Himeji, Japan

Continuation of Ser. No. 230,818, March 1, 1972, abandoned. This application June 17, 1976, Ser. No. 697,217

Int. Cl.² G07D *9/06*

U.S. Cl. 133—1 A **15 Claims**

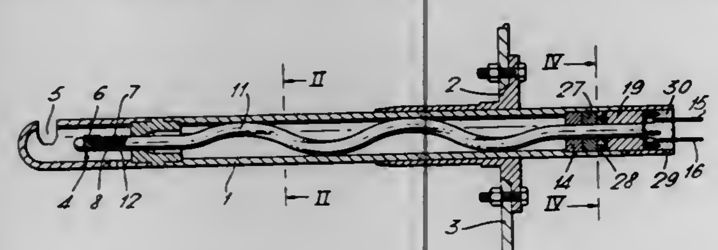


1. In a coin stacking device adapted for a coin wrapping apparatus in which coins fed from a coin supply passage are stacked at a coin stacking means comprising a plurality of coin guide members each of which has a coin guide surface and a diameter-adjusting means adapted for adjusting the inner diameter of a coin stacking space inscribed by said coin guide surfaces, a lower part of said coin stacking means being opened after a predetermined number of coins are stacked in said coin stacking space thereby to transmit said coin stack into a coin wrapping position and then the thus transmitted coin stock is wrapped with a wrapping sheet; the improvement of said coin stacking means and said diameter-adjusting means, said impro vement residing in that said coin guide surfaces of said coin stacking members are vertically elongated and mutually, partially, and mutual-slidably overlapped at their adjoining side wall positions so as to be mutually slid and to form therein an adjustable coin stacking space having a substantially polygonal cross-section, said coin stacking means comprising a coin-stack mounting means having a coin mounting surface adapted to open or close the bottom face of said coin stacking space and to mount thereon a coin stack stacked in said space when said bottom face is closed, said mounting surface being adapted to be moved along a lower part of said coin guide members so as to open the same to transfer a coin stack to the coin wrapping

apparatus after a predetermined number of coins are stacked in said coin stacking space; and said diameter-adjusting means comprises a support means for adjustably supporting said coin guide surfaces of said coin guide members in parallel to the vertical-axis of said coin stacking space thereby to vary the diameter of the inscribed circle of said polygonal cross-section of said space so as to conform to the diameter of coins to be processed.

4,060,094
ELECTRICAL-INTERCONNECTION ASSEMBLIES AND METHODS OF FORMING INTERCONNECTIONS THEREIN

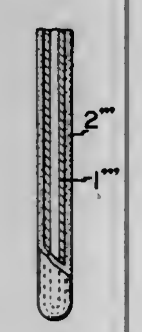
Kenneth G. McAinsh, Frimley, England, assignor to Smiths Industries Limited, London, England
Filed Nov. 26, 1975, Ser. No. 635,490
Int. Cl.² H01V *1/02*
U.S. Cl. 136—230 **11 Claims**



1. An electrical-interconnection assembly comprising two electrical conductors, a support member fabricated of electrically-insulative material, said support member having an end face and being operative to support said two conductors, a first of the two conductors extending from a first direction into and through the support member to emerge from said end face, and the second conductor extending into said support member from a second direction opposite to said first direction, said second conductor having an end portion thereof that turns back on itself through the support member to emerge from said end face of the support member from said first direction, and means electrically interconnecting the said end portion of said second conductor to the emergent portion of said first conductor at a position exterior of said electrically-insulative support member where said first conductor emerges from said end face.

4,060,095
THERMOCOUPLE PROTECTING TUBE

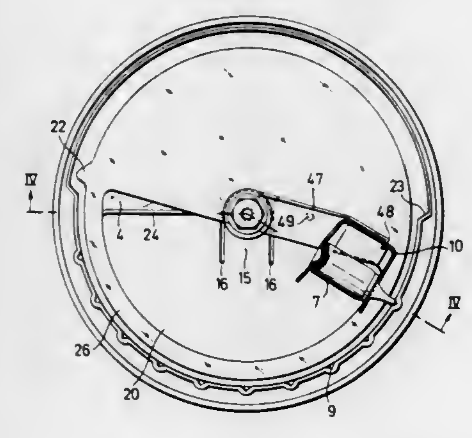
Sumihiko Kurita, Arita, Japan, assignor to Koransha Co., Ltd., Japan
Filed Aug. 17, 1976, Ser. No. 715,023
Claims priority, application Japan, Aug. 23, 1975, 50-116346[U]; Sept. 1, 1975, 50-106144[U]; Feb. 10, 1976, 51-13800; Feb. 10, 1976, 51-14939[U]; Feb. 12, 1976, 51-15519[U]
Int. Cl.² H01L *35/02*
U.S. Cl. 136—234 **5 Claims**



1. A thermocouple protecting tube comprising an inner ceramic tube having one end closed and containing a thermocouple element therein, and a thermal-shock resistant outer means disposed concentrically over said inner ceramic tube and over said one closed end of said inner tube, said outer means being a mixed body of high refractory powder of 100 parts by weight and aluminum phosphate of 7 to 200 parts by weight.

4,060,096
VENTILATOR VALVE

Max Gunter Schade, Parkstrasse 36, Bensberg, Germany (5060)
Filed June 25, 1976, Ser. No. 699,625
Claims priority, application Germany, July 2, 1975, 2529579; Nov. 27, 1975, 2553364
Int. Cl.² F16K *13/04, 17/40*
U.S. Cl. 137—74 **26 Claims**

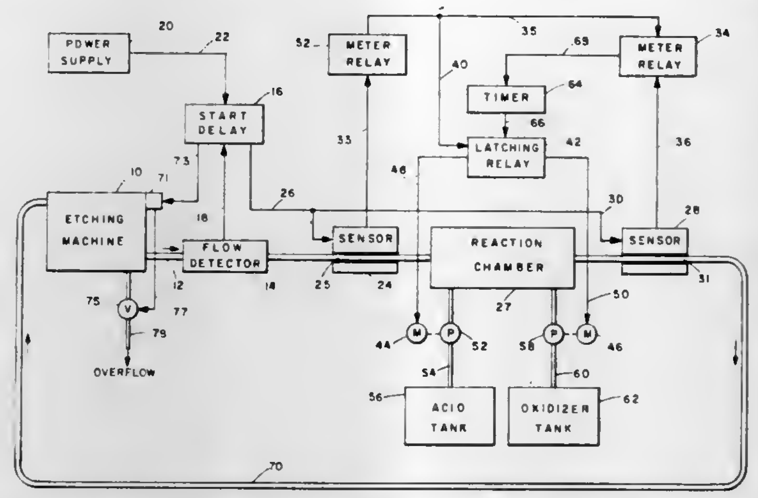


1. A ventilator valve comprising a housing, means defining a flow passage through said housing at least a portion of which is defined by an aperture in a plate incorporated in said housing, a valve plate mounted for rotation in a plane adjacent to the plane of said plate which includes said aperture, said valve plate having at least one aperture adapted to be selectively positioned with respect to the aperture in said first mentioned plate, means for mounting a locking element in connection with said valve plate, for rotation therewith, means having a relatively fixed relation to said housing including a plurality of arcuately spaced anchoring means adapted to be selectively engaged by the locking element whereby to position a selected portion of said one aperture in said rotatable plate in alignment with a selected portion of the aperture in said first mentioned plate, the locking element mounted in connection with said valve plate and the anchoring means to which it is engaged being arranged to disengage in the presence of a predetermined level of the temperature of their environment, and said rotatable plate being conditioned to move to a position to close said aperture in said first mentioned plate upon a disengagement of the locking element from its anchoring means.

4,060,097
AUTOMATIC ETCHING SYSTEM

Keith E. Oxford, 4010 Paducah Drive, San Diego, Calif. 92117
Continuation of Ser. No. 614,072, Sept. 17, 1975, abandoned. This application Apr. 4, 1977, Ser. No. 784,236
Int. Cl.² C23F *1/02*
U.S. Cl. 137—93 **6 Claims**

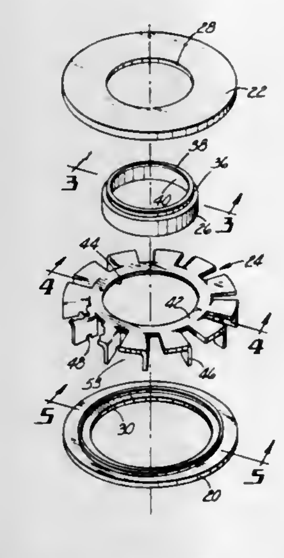
1. For use with an etching machine, an etchant regenerating system for automatically monitoring and regenerating etchant, said system comprising:
- means for circulating sample of etchant along a flow path,
- constituent component adding means for selectively adding a selected one of two constituent components to said flow path,
- first monitoring means upstream of said adding means for monitoring changes in the etchant composition and responsive upon monitoring etchant deficiency of a constituent component thereof for activating said constituent adding means,
- second monitoring means downstream of said adding means for monitoring changes in the etchant,
- said adding means responsive to said second monitoring means for selectively adding alternate ones of said constituent components into the etchant for a predetermined period of time until an improvement in the etchant quality is monitoring by said second monitoring means at which time selection of the improving constituent is maintained, and said first monitoring means maintaining the adding means in the addition mode until the etchant quality falls between preselected parameters,



- said first monitoring means comprises a light sensing means for sensing the intensity of light rays passing through a sample of the etchant,
- said second monitoring means comprises light sensing means for sensing the intensity of light rays passing through a sample of the etchant downstream of the constituent component adding means.

4,060,098
VALVE PLATE CONSTRUCTION

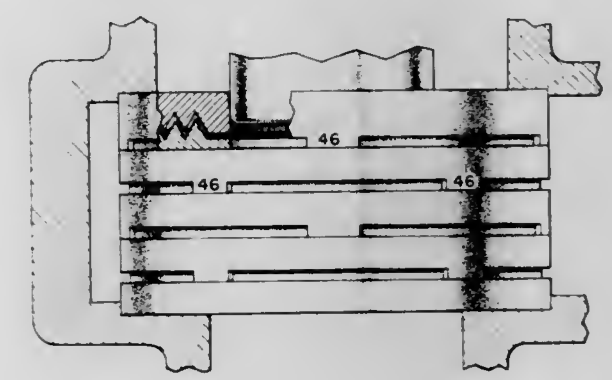
James D. Bares, Woodstock Road, Gates Mills, Ohio 44040, and William P. Burke, Jr., 7665 Chesterbrook Road, Chesterland, Ohio 44024
Filed Dec. 22, 1975, Ser. No. 643,181
Int. Cl.² F16K *15/08*
U.S. Cl. 137—594 **6 Claims**



1. A method of forming a valve plate assembly for a compressor comprising the steps of:
- providing first and second annular end plates, a spacer plate having a central opening and means to define radial passages, and a central locating collar, said means defining said radial passages including radially extending leg means and means for axially aligning said plates and collar along a central longitudinal axis
- assembling said plates and said collar with the spacer plate interposed between said end plates and defining with said end plates a plurality of radially extending passages and with said collar disposed internally of said spacer plate and all maintained in axial alignment along said axis, said collar having a central opening defining an axial central bore around said axis, and said collar having wall means, and thereafter interconnecting said plate and said collar in their assembled position with the wall means of the collar and the spacer plate and said end plates defining an annular opening communicating with said radial passages.

4,060,099
CONTROLLED PRESSURE DROP VALVE

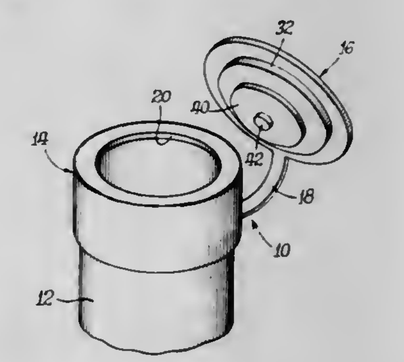
Charles L. Bates, Jr., P.O. Box 100C, Springville, Utah 84663
Continuation-in-part of Ser. No. 444,524, Feb. 21, 1974, Pat. No. 3,977,435. This application Jan. 3, 1975, Ser. No. 538,450
Int. Cl.² F16K *47/08*
U.S. Cl. 137—625.3 **4 Claims**



1. A circular disk for stacking in register with similar disks in a valve body to provide an extended flow-resistant surface area comprising a disk having a central annular opening, a circular outer perimeter with each facial surface having a plurality of concentric annular ridges thereon and having interlocking means to hold said disk in register with and to space said disk from an adjacent disk, said interlocking means comprises an outer rim which encircles the outer perimeter of said disk to form an overlapping means to overlap an adjacent disk.

4,060,100
CLOSURE FOR CYLINDRICAL PIPE

Gerald V. Miller, 125 Adams Drive, and David W. Zeh, 63 Oak St., both of, Addison, Ill. 60101
Filed May 10, 1976, Ser. No. 684,536
Int. Cl.² F16L *55/10*
U.S. Cl. 138—89 **6 Claims**

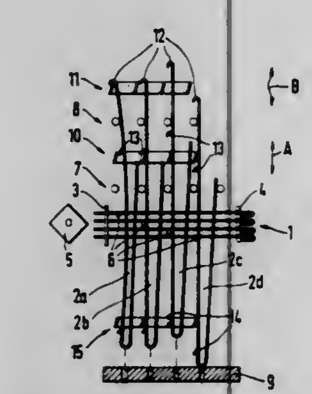


1. A closure for covering and providing access to the interior of a cylindrical pipe or the like comprising:
- a nonmetallic resilient cap portion having a generally cylindrical shaped side wall, the inside surface of which is adapted to fittingly engage the outside of said pipe, the top of said cap portion having an inwardly directed flange integrally formed with said wall, said flange being in overlying relation to the end of said pipe and having a circular aperture defined by the inside of said flange, said flange forming a seat into which a cover portion of said closure can be snugly engaged;
- a nonmetallic resilient cover portion adapted to overlie said cap portion for covering said aperture, said cover portion being generally circular and having an outside diameter generally coextensive with said side wall, said cover portion having a transverse cylindrical extension the outer diameter of which is substantially similar to the inside

diameter of said aperture, said extension snugly engaging said aperture when said cover portion is applied to said cap portion to cover said aperture; and,

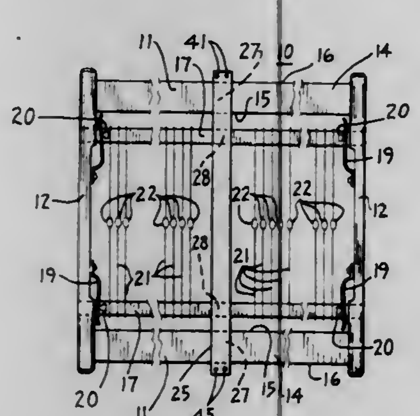
a ferromagnetic member attached to the underside of said cylindrical extension of said cover portion.

4,060,101
DOUBLE LIFT, OPEN SHED JACQUARD LOOM
Wolfgang Seiler, Munchen-Gladbach, Germany, assignor to Firma Oskar Schleicher, Munchen-Gladbach, Germany
Filed July 8, 1976, Ser. No. 703,701
Claims priority, application Germany, July 10, 1975, 2530799
Int. Cl.² D03C *3/08*
U.S. Cl. 139—65 **11 Claims**



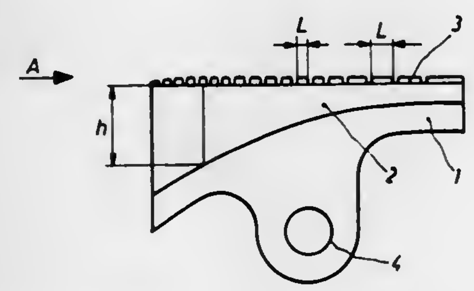
1. A double lift, open shed Jacquard comprising:
a plurality of hooks controlled by control needles;
first and second mutually parallel, opposed, vertically spaced apart sets of knives;
a Jacquard prism for controlling said needles;
lifting means for lifting said first and second sets of knives toward and away from one another without crossing;
transverse guide means for producing a transverse component of movement toward said Jacquard prism in both up and down directions of lift of said upper set of knives, said transverse component of movement occurring between upper and lower centers of movement of said upper set of knives; and
straight line guide means for guiding the lower set of knives along a straight line path.

4,060,102
HEDDLE FRAMES
Frank H. Kaufmann, Greenville, S.C., assignor to Steel Heddle Manufacturing Company, Greenville, S.C.
Filed Oct. 12, 1976, Ser. No. 731,736
Int. Cl.² D03C *9/06*
U.S. Cl. 139—91 **8 Claims**



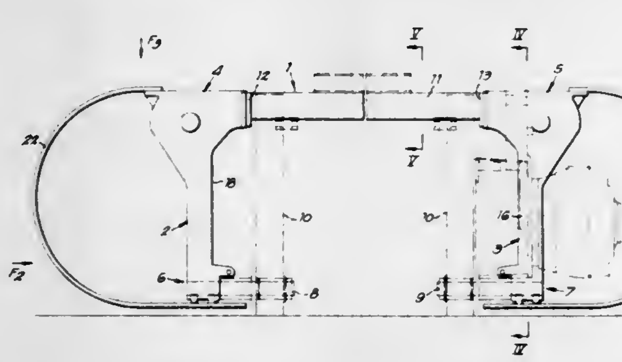
1. In a heddle frame having top and bottom frame rails and heddle supporting rods inwardly of said rails, the means for bracing said rails which comprises
a brace extending between said rails and having separable portions with their ends in surrounding relation to and in engagement with said rails,
said brace ends having sockets for engagement with said frame rails,
said brace portions inwardly of said frame rails having sockets for engagement with said heddle supporting rails, and
fastening members for retaining said separable portions in clamped engagement with said rails at a selected location intermediate the ends of the frame rails.

4,060,103
BRAKESHOE FOR SHUTTLE BRAKES OF LOOMS
Robert Gründler, Arbon, and Hubert Jenny, Gotzis, both of Switzerland, assignors to Aktiengesellschaft Adolph Saurer, Arbon, Switzerland
Filed Mar. 2, 1977, Ser. No. 773,524
Claims priority, application Switzerland, Mar. 29, 1976, 3904/76
Int. Cl.² D03D *49/54*
U.S. Cl. 139—185 **7 Claims**



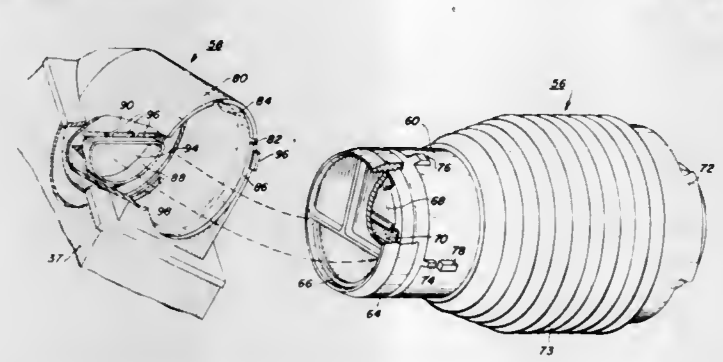
1. A brakeshoe for shuttle brakes of looms upon which cloth is woven comprising:
a. a rigid arcuate shaped support member; and
b. a resilient lining carried on said arcuate shaped support member having a resilience which decreases progressively with the distance from a front end of said lining facing the selvage of said cloth being woven on said loom towards the remote end.

4,060,104
SLAY FOR WEAVING LOOMS
Patrick A. Steverlynck, Vichte, Belgium, assignor to N.V. Weefautomaten Picanol, Ieper, Belgium
Filed Sept. 7, 1976, Ser. No. 720,592
Claims priority, application Belgium, Sept. 19, 1975, 7511123
Int. Cl.² D03D *49/60*
U.S. Cl. 139—188 R **5 Claims**



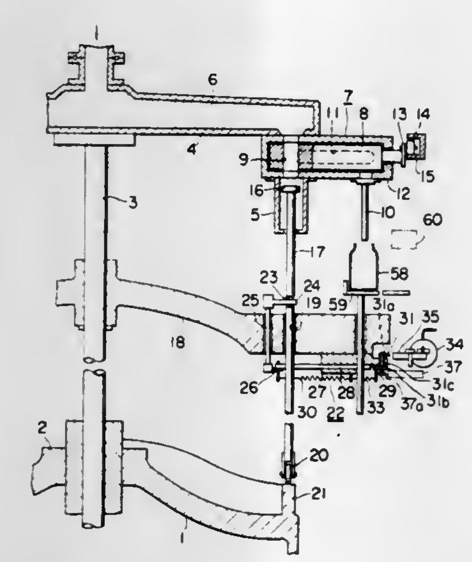
1. Improved slay for weaving looms, having a frame supporting a slay itself and two slay swords, characterized by the fact that at least the slay swords are hollow structures with the head of each slay sword attached to the corresponding end of the slay and along the extension of same, the width of slay swords being greater than that of the slay itself, the slay swords being secured to the outer sides of said frame.

4,060,105
TONER LOADING APPARATUS WITH REPLENISHING SUPPLY CONTAINER
Ronald F. Feldeisen, Fairport; John A. Minchak, Wesbter, both of N.Y.; Richard B. Gerstman, Tenafly, N.J.; Herbert M. Meyers, New Rochelle, and Richard C. Edstrom, New York, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.
Continuation of Ser. No. 612,529, Sept. 11, 1975. This application Oct. 22, 1976, Ser. No. 734,787
Int. Cl.² B65B *1/06*
U.S. Cl. 141—1 **5 Claims**



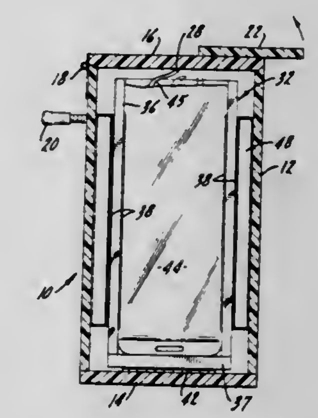
5. An improved method for adding toner to a toner hopper in an electrostatic reproduction machine by moving the tone from a toner bottle through an outlet opening in one end of the toner bottle and through an inlet opening in the toner hopper, wherein the improvement comprises the steps of:
a. positioning the one end of the bottle in a predetermined position over the inlet opening in the hopper;
b. rotating a portion of the bottle to simultaneously open the outlet opening and lock the bottle onto the hopper;
c. stopping the rotation of the bottle portion when the openings are aligned and the outlet opening is completely opened by rotating the bottle portion until a lug on the bottle portion contacts a lug on the toner hopper; and
d. compressing the bottle to expel toner through the aligned openings.

4,060,106
METHOD AND SYSTEM FOR PREVENTING CONTAINERLESS DISCHARGING OF FILLING MATERIAL IN CONTAINER FILLING APPARATUS
Kenji Takasuga, Yokohama, Japan, assignor to Kewpie Kabushiki Kaisha, Tokyo and Toyo Shokuhin Kikai Kabushiki Kaisha, both of, Japan
Filed May 21, 1976, Ser. No. 688,788
Int. Cl.² B65B *3/04*
U.S. Cl. 141—1 **7 Claims**



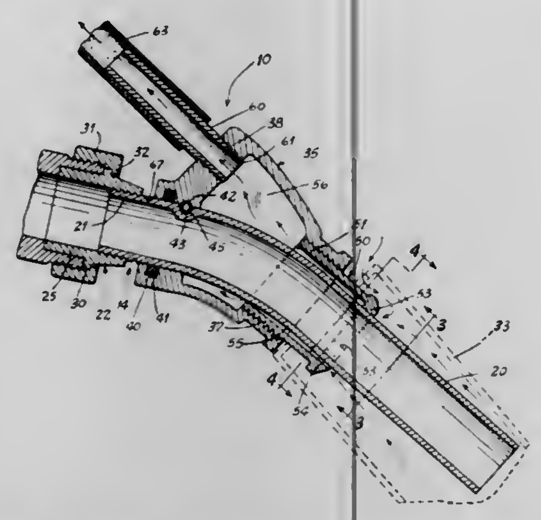
1. In a method of filling successively a prescribed quantity of a fluid material into respective containers by means of a plurality of charging cylinders arranged in a circle around a vertical main shaft to revolve therearound and having respective pistons while precluding discharge of the fluid material in the absence of a container to be filled, each of the cylinders being adapted to introduce thereinto the fluid material from a header chamber during the intake stroke of the piston thereof and then to discharge its filled material into a corresponding container during the discharge stroke of the piston, passageways of the introduction and discharge of the fluid material being established through a switching valve member, and switching of the valve member and reciprocal stroke of the cylinder piston being caused in relation to the revolution of the charging cylinders, an improvement in the preclusion process for discharge of the fluid material in the absence of a container to be filled comprising when the absence of a container at a filling position on a container platform is detected, the piston of the charging cylinder corresponding to the filling position is locked in response to the detection against the intake stroke thereof prior to the intake stroke and the locking is released after the piston and its cylinder have revolved past the filling position in order to prevent containerless discharging of the fluid material.

4,060,107
METHOD AND APPARATUS FOR COLLECTING FLUIDS
Henry Naftulin, 8341 N. Kenton Ave., Skokie, Ill. 60076
Filed Oct. 26, 1976, Ser. No. 735,764
Int. Cl.² B65B *31/02;* **A61M** *1/00*
U.S. Cl. 141—7 **7 Claims**



1. Apparatus for collecting and storing biological fluids, comprising:
a. a rigid outer chamber having a fluid inlet opening and a vacuum port;
b. a flexible container disposed within said outer chamber in communication with said fluid inlet for receipt of fluid therein upon the creation of a vacuum within said outer chamber through said vacuum port;
c. inner chamber means disposed within said outer chamber for receipt of said flexible container therein, said inner chamber means being split into at least two sections which are movable between a closed position and an open position, said inner chamber means defining a smaller volume when in its closed position than when in its open position; and
d. bladder means disposed within said outer chamber between said inner chamber means and said outer chamber, the interior of said bladder means being in communication through an opening in said outer chamber with the atmosphere so as to cause said bladder means to expand and fill the space between said inner chamber and said outer chamber upon the application of a vacuum to said outer chamber so as to exert a pressure on said inner chamber sections and thereby move said sections toward one another into its closed position.

4,060,108
VAPOR CONTROL SPOUT
Paul George Weston, La Crescenta, Calif.; Glenn A. Jennemann, St. Louis, Mo., and Thomas Kemp Hutchinson, Godfrey, Ill., assignors to Milton D. Hartman, St. Louis, Mo.
Filed Jan. 9, 1976, Ser. No. 647,911
Int. Cl.^{2} B65B *31/06*
U.S. Cl. 141—59 **8 Claims**

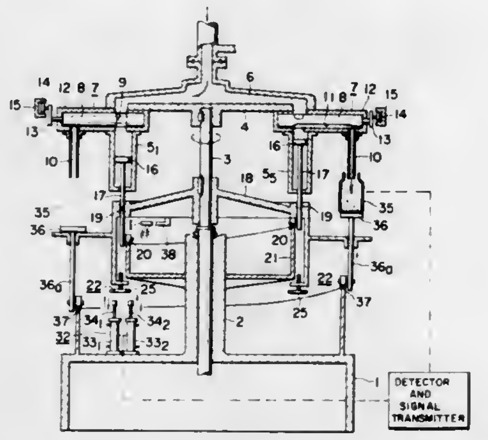


1. A spout for a gasoline nozzle comprising a curved, rigid tube, an inlet end of the tube having means for attachment to the outlet end of a nozzle, an outlet end of the tube being adapted to extend into the mouth of a fill tube of a vehicle fuel tank, a rigid housing surrounding said tube, said housing having a rearward end, a forward end, and a vapor outlet port, said housing defining with an outer wall of said tube a vapor receiving chamber therebetween, said chamber having passage means communicating with said port, means providing sealing engagement of the rearward end of said housing about said tube at a first position on the tube, a wedge sleeve adjustably engaged to the forward end of the housing for movement relative to the housing to engage and bind a rear sleeve portion against the tube at a second position on the tube forward of the first position on the tube and curved away from the first position on the tube, said wedge sleeve having an engaging surface in a forward sleeve portion acting with said rear sleeve portion on said tube to support the forward end of said housing on the tube, said engaging and binding at the second position on the tube occurring when the housing has said rearward end sealingly engaged about the tube at said first position on the tube, said wedge sleeve having means forming a vapor passage between said sleeve and said tube to communicate said vehicle tank with said chamber.

4,060,109
FILLING QUANTITY REGULATING SYSTEM IN CONTAINER FILLING APPARATUS
Koichi Sotoma, Yokohama, Japan, assignor to Kewpie Kabushiki Kaisha, Tokyo and Toyo Shokuhin Kikai Kabushiki Kaisha, Kanagawa, both of, Japan
Filed May 14, 1976, Ser. No. 686,262
Int. Cl.^{2} B65B *3/28, 3/32*
U.S. Cl. 141—83 **9 Claims**

1. In a container filling apparatus comprising a plurality of charging cylinders arranged in a circle around a vertical main shaft so as to revolve thereabout and provided with respective pistons for pushing out the material supplied into said cylinders to fill respective containers, a limiting adjusting mechanism provided for each of said charging cylinders and adapted for setting adjustably the limit end of the intake stroke of the piston in each charging cylinder, thereby to adjust the quantity of the material to be filled into each container, an actuating device for adjustably actuating said limit adjusting mechanism, and driving means for activating said actuating device thereby to cause adjustable operation of said limit adjusting mechanism, the improvement of said limit adjusting mechanism, said actuating device and said driving means:

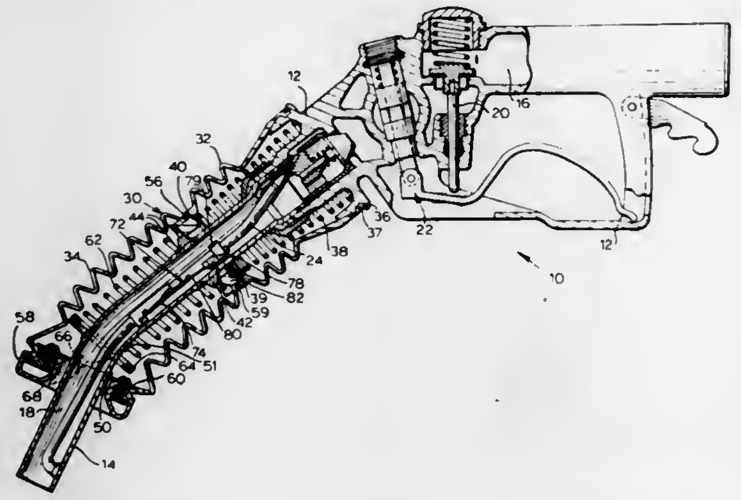
said limit adjusting mechanism comprising a finely adjustable adjusting screw having a contact surface of one end thereof and engaged with a structural part secured integrally with and revolving unitarily with the corresponding charging cylinder, and a rotation transmitting wheel having sprocket-like teeth and fixed to the other end of said adjusting screw, said contact surface being adapted for abutment against the end part of a piston rod secured to the piston of said cylinder;



said actuating device comprising at least one pair of actuating members respectively disposed on opposite sides of the orbital path of revolution of said rotation transmitting wheel and adapted to be driven into engagement respectively with one sprocket-like tooth, thereby to turn said wheel respectively in clockwise or counterclockwise directions by an angular displacement corresponding to one tooth thereof; and

said driving means being adapted for driving said actuating members into and out of said engagement.

4,060,110
VAPOR RECOVERY NOZZLE
Allen M. Bower, Conneaut, Ohio, assignor to Emco Wheaton Inc., Conneaut, Ohio
Filed Sept. 30, 1976, Ser. No. 728,378
Int. Cl.^{2} B65B *31/00;* **B67C** *3/28*
U.S. Cl. 141—207 **15 Claims**

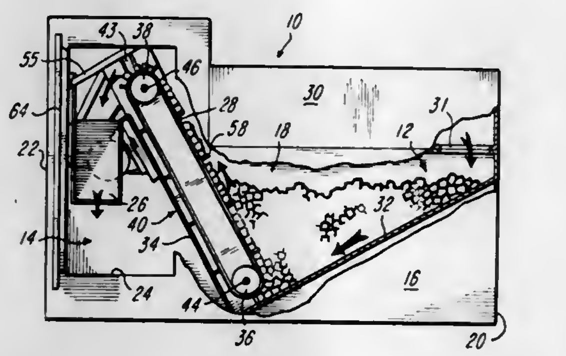


1. In a vapour recovery dispenser nozzle having a main body portion, a discharge tube projecting from one end of the main body portion, said discharge tube having an outer end portion thereof proportioned for ease of insertion into a filling tube of a liquid storage tank, a liquid flow passage extending through said main body and said discharge tube, vapour recovery passage means formed in said main body, an extensible vapour recovery shroud having an inner end and an outer end, said inner end of said shroud being mounted on said main body and communicating with said vapour recovery passage means of said main body, said shroud being disposed radially outwardly from said discharge tube and being movable between an extended position and a retracted position with respect to said main body, said shroud being normally urged towards said extended position, a first sealing collar at the outer end of said shroud for engagement with the end of the filling tube of a gas tank during filling thereof to direct vapour which is expelled from the tank to the vapour recovery passage means in the main body by way of the shroud, the improvement of

a. sealing seat means on said discharge tube, said sealing seat means being located rearwardly from said outer end portion of said discharge tube to be disposed outwardly from the end of the filling tube of a liquid storage tank in use,

b. second seal closure means disposed within said shroud and spaced a substantial distance rearwardly from said outer end of said shroud, said second seal closure means sealingly engaging said sealing seat means when said shroud is in its extended position whereby vapour which is located inwardly thereof cannot escape from within the shroud by way of the outer end thereof, said seal closure means being moved rearwardly away from said sealing seat when said shroud is moved to its retracted position in use whereby vapour expelled from the tank during filling may be directed through the shroud to the vapour recovery passage means of the main body.

4,060,111
VENDING AND DISPENSING BIN
Howard L. Burks, Dunedin, Fla., assignor to Perino B. Wingfield, Yellow Springs, Ohio, a part interest
Filed Dec. 15, 1975, Ser. No. 640,890
Int. Cl.^{2} B65B *3/00;* **B65G** *11/18;* **G01F** *11/20*
U.S. Cl. 141—231 **16 Claims**



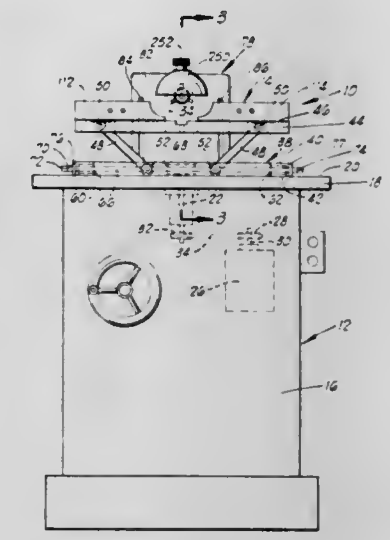
1. Vending and dispensing apparatus comprising a housing including a bin portion and a dispensing portion, said bin portion accommodating material to be dispensed as separated individual elements and existing in said bin in a manner form in which individual elements tend to adhere to one another, material delivery means in association with said bin portion operable to deliver said material from said bin portion to said dispensing portion and embodying means for applying twisting forces within said bin portion to influence elements of said mass of material therein to separate one from the other within said bin portion and to move said material including said separated elements to said dispensing portion for discharge from said housing.

4,060,112
MULTIPLE PURPOSE WOODWORKING APPARATUS
William E. Leeper, Jr., 3405 S. Independence, Oklahoma City, Okla. 73119
Filed May 17, 1976, Ser. No. 687,167
Int. Cl.^{2} B27C *5/02*
U.S. Cl. 144—134 R **19 Claims**

1. A horizontal cutter adapter attachment for use with a universal shaper having a horizontal shaper table with a vertically journaled spindle positioned adjacent the horizontal top surface of the shaper table and drive means carried by the shaper for vertically rotating the spindle, comprising:

a table adapter assembly having a horizontal bottom surface supportable on the top surface of the shaper table, and having a workpiece supporting table with a horizontal top surface positioned intermediate said horizontal bottom surface and a power output shaft position;

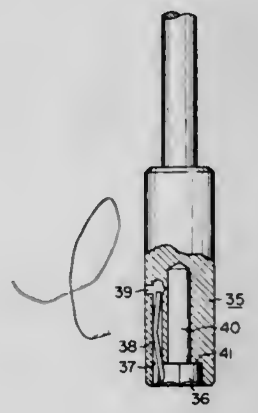
a power output shaft horizontally journaled on said table adapter assembly;



means carried by said table adapter assembly for drivingly interconnecting the spindle of the shaper and said power output shaft to transmit rotational movement from the spindle to said power output shaft; and

means on said power output shaft for drivingly engaging a cutter for horizontal rotation therewith.

4,060,113
TIGHTENING DEVICE FOR THREADED SCREW PART
Ryuzo Matsushima, 36-7, Oshiage 3-chome, Sumida, Tokyo, Japan
Division of Ser. No. 591,035, June 27, 1975, Pat. No. 4,007,768. This application Nov. 26, 1976, Ser. No. 745,288
Claims priority, application Japan, July 3, 1974, 49-78859; Nov. 21, 1974, 49-141956; May 23, 1975, 50-69483
Int. Cl.^{2} B25B *15/00*
U.S. Cl. 145—50 D **3 Claims**



1. A driver for nut and bolt which comprises in combination:

a shank with one end portion thereof fitted to a holder or a handle;

a body having in one end part thereof an engaging socket to fit on the outer periphery of the nut or a head of the bolt, the other end portion of said shank being connected to the other end thereof;

a narrow groove formed alongside an engaging surface of said engaging socket, and extending in the direction substantially parallel to the axis of said engaging socket;

a small passage formed in said body, one end of which is blind within said body, and the other end of which communicates with said narrow groove;

a plate spring having a bent portion at the rear part thereof and a tapering surface at the tip end thereof, said spring

extending from the blind portion of said small passage up to the open end of said engaging socket along said narrow groove, the rear part of said spring being held in the blind portion of said small passage on its own resiliency to be exerted from said bent portion thereof, and the tip end of said spring projecting from said narrow groove of said engaging socket with its tapering surface to the outer periphery of the nut or a head of the bolt to be tightened; and

a small port formed in said body in the direction substantially perpendicular to the axis of said body, one end thereof meeting the blinded position of said small passage, and the other end thereof being open at the peripheral surface of said body, said small port serving to push forward the rear end of said spring at the time of exchanging said spring.

4,060,114

TIGHTENING DEVICE FOR THREADED SCREW PART

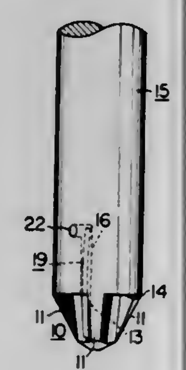
Ryuzo Matsushima, 36-7, Oshiage 3-Chome, Sumida, Tokyo, Japan

Division of Ser. No. 591,035, June 27, 1975, Pat. No. 4,007, 768. This application Nov. 26, 1976, Ser. No. 745,289

Claims priority, application Japan, July 3, 1974, 49-78859; Nov. 21, 1974, 49-141956; May 23, 1975, 50-69483

Int. Cl.² B25B *13/00*

U.S. Cl. 145—50 D **1 Claim**



1. A screw driver which comprises in combination:

a shank with one end portion thereof fitted to a holder of a handle, and with an opposite end portion thereof provided with a flat plane or surface in the direction substantially perpendicular to the axis of said shank;

an engaging means having engaging blades in the shape of the cross, or a "Plus (+)", to be engaged with a threaded screw, and projecting from said flat plane of said shank;

a narrow groove formed in the inclined surface of one of the cross-shaped blades of said engaging means at the intersection thereof along the axial direction of said shank and to the side of the forwarding or rotational direction of said screw driver;

a small passage formed in said shank, one end thereof being blind within said shank, and the other end thereof being open at said flat end surface of said shank;

a wire spring having a bent portion at the rear part thereof and a tapering surface at the tip end thereof, said spring extending from the blind portion of said small passage up to the open end of said narrow groove, the rear part of said spring being held in the blind portion of said small passage due to self-resiliency of said bent portion thereof, and the tip end of said spring projecting from said narrow groove with its tapering surface to the cross-shaped groove formed in the head part of the threaded screw; and

a small port formed in said shank in the direction substantially perpendicular to the axis of the shank, one end thereof meeting the blinded position of said small passage, and the other end thereof being open at the peripheral surface of said shank, said small port serving to push forward the rear end of said spring at the time of exchanging said spring.

4,060,115

HANDLE FOR HAND TOOLS TO BE ROTATED DURING OPERATION

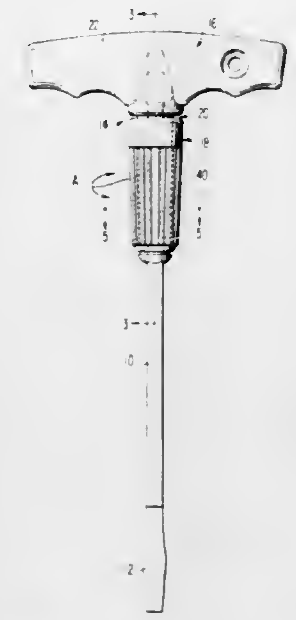
Jesus Bocanegra Marquina, Burgos, Avda. Reyes, Catolicos, Edificio, Nebrija, Spain

Filed Jan. 24, 1977, Ser. No. 761,623

Claims priority, application Spain, Jan. 23, 1976, 218263

Int. Cl.² B25G *1/00*

U.S. Cl. 145—61 G **7 Claims**



1. A handle for hand tools including a shank with a tool element at one end and that must be rotated about an axis longitudinal of the shank during operation, comprising a T-shaped member including a central beam portion and a perpendicular cross-bar portion at one end of the beam portion, said central beam portion being constituted by a sleeve structure having an axially disposed blind bore adapted to receive and be rigidly fixed to a tool shank at the end opposite the tool end thereof, and the cross-beam portion constituting a handle for turning the tool, said beam portion having a smooth generally cylindrical bearing surface intermediate thereof with a bead at its free end, and a sleeve fitted around the generally cylindrical surface and retained by said bead for rotatable movement of the bearing surface during operation of the tool so that the tool can be firmly grasped and held securely in correct position by one hand of the operator grasping the sleeve while the operator uses the cross-bar handle with the other hand to rotate the handle and the tool.

4,060,116

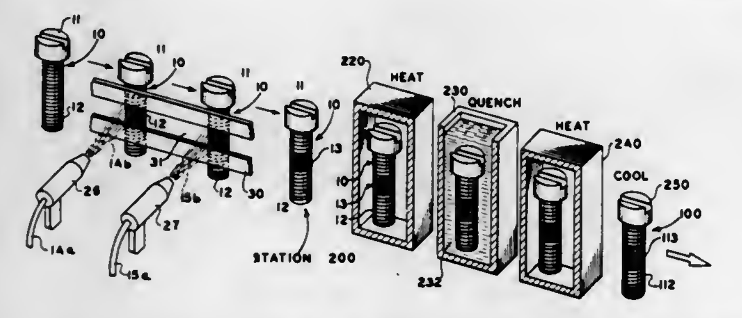
METHOD FOR PRODUCING SELF-LOCKING FASTENERS

Robert A. Frailly, Massillon, Ohio, assignor to Eaton Corporation, Cleveland, Ohio

Continuation of Ser. No. 522,976, Nov. 11, 1974, abandoned, which is a division of Ser. No. 458,370, April 5, 1974, abandoned. This application Dec. 11, 1975, Ser. No. 639,953

Int. Cl.² F16B *39/34*

U.S. Cl. 151—7 **2 Claims**



1. An improved, reusable, all metallic, self-locking threaded fastener comprising an elongated, metallic threaded portion and a relatively spongy, porous metallic patch bonded to a

selected area of said threaded portion, said patch being thicker in the thread valleys than on the adjacent thread crests, said patch extending sufficiently radially outwardly from said threaded portion to be compressed between said threaded portion and a threadably engaged complementary threaded fastener, the improvement comprising:

said patch having an outer surface which is substantially smoother, less porous and of greater density than the remainder of the patch.

4,060,117

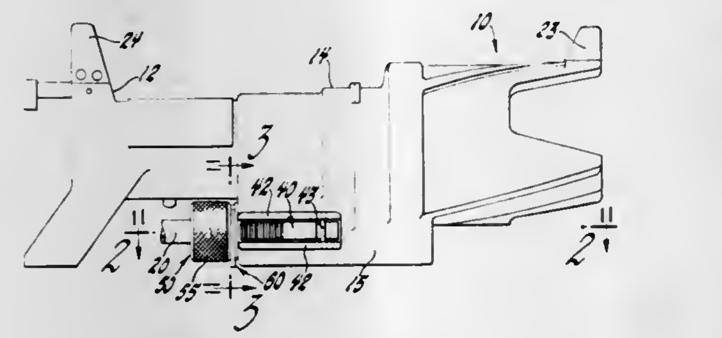
INERTIAL RING LOCK

Daniel H. Chabot, Los Alamos; Robert S. Peterson, and Roy D. Plumer, both of Santa Barbara, all of Calif., assignors to General Motors Corporation, Detroit, Mich.

Filed Apr. 12, 1976, Ser. No. 676,354

Int. Cl.² F16B *39/00, 21/00*

U.S. Cl. 151—43 **4 Claims**



1. In combination, a threaded fastener having a head and a shank extending therefrom, said shank adjacent its free end having external threads and having an annular relief groove next adjacent said head, a body means having a threaded bore extending from one end surface thereof receiving said external threads of said threaded fastener in threaded engagement therewith and, a ring like mass loosely encircling said threaded fastener in said relief groove, said ring like mass being loosely sandwiched between said head and said one end surface of said body means when said threaded fastener is fully operatively threaded into said body means whereby said ring like mass is operative to serve as an inertia damper to prevent rotation of said threaded fastener in a loosening direction relative to said body means when said body means is subjected to vibrational and torsional loads.

4,060,118

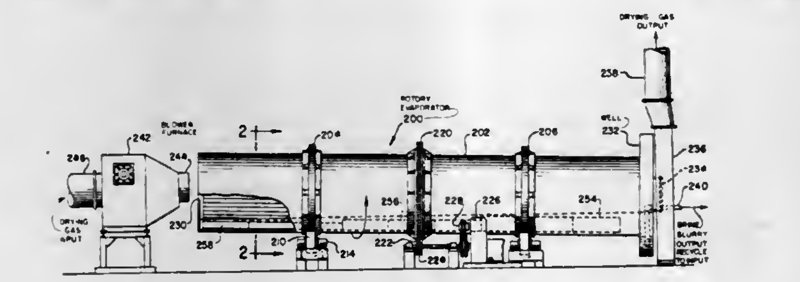
RECOVERING CHLORIDE FLUX SALTS FOR ALUMINUM

Pandelis N. Papafingos, and Richard T. Lance, both of Riverside, Calif., assignors to Alumax Mill Products, Inc., Riverside, Calif.

Continuation-in-part of Ser. No. 658,150, Feb. 17, 1976, abandoned, and a continuation-in-part of Ser. No. 658,430, Feb. 17, 1976. This application Oct. 21, 1976, Ser. No. 734,484

Int. Cl.² B01D *1/22, 9/02*

U.S. Cl. 159—49 **3 Claims**



1. A process for recovering soluble chloride flux salts for aluminum from an aluminum dross brine comprising the steps of:

introducing the brine to an input end of a cylindrical evaporator;

introducing hot evaporator gas into the evaporator;

rotating the cylindrical evaporator to repeatedly immerse evaporating surfaces of said evaporator to form thereon a film of brine and to expose said film to said evaporator gas to thereby form salt crystals on said surfaces and immersing said salt crystal covered surfaces into a body of brine to thereby form a slurry of salt crystals in saturated brine;

removing slurry from an output of the evaporator; and

separating the slurry into salt crystal product and saturated brine.

4,060,119

SHIELDING TENT

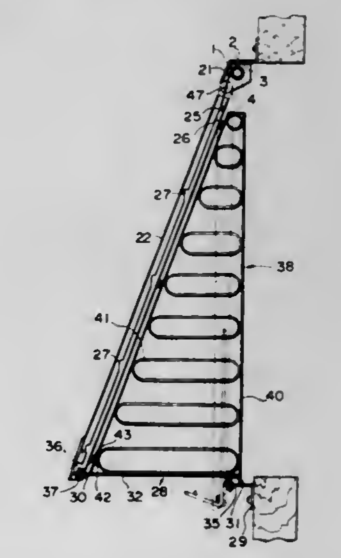
Ryotaro Nohmura, Suita; Eiji Tazaki, Mitaka, and Akio Sato, Kodaira, all of Japan, assignors to Taiyo Kogyo Company Limited, Osaka, Japan

Filed May 6, 1976, Ser. No. 683,582

Claims priority, application Japan, Sept. 6, 1975, 50-108192

Int. Cl.² E06B *9/17*

U.S. Cl. 160—266 **11 Claims**



1. A foldable shielding tent for a window comprising in combination:

a. mounting means adapted to be secured to a structure adjacent the top of the window;

b. elongated winding means;

c. means releasably securing said winding means to said mounting means;

d. means biasing said winding means for rotation in one direction;

e. web material secured at one end thereof to said winding means for coiling about said winding means when rotated in said one direction;

f. a pair of elongated sliding frame members;

g. means pivotally securing one end of each of said sliding frame members to said mounting means adjacent opposite ends of said elongated winding means such that said sliding frame members extend in a generally downward direction;

h. means on at least one of said sliding frame members for retaining the free end of said web material at at least one location along the length of said sliding frame member;

i. a bottom member;

j. means pivotally securing one side of said bottom member to said sliding frame members adjacent their lower ends; such that said bottom member may be pivoted upwardly between the sliding frame members and the window; and

k. means for releasably securing the side of said bottom member opposite said one side to the structure adjacent the bottom of the window;

l. whereby, when said shielding tent is unfolded, said sliding frame members extend angularly outwardly from the top of the window when the lower ends of said sliding frame

members are supported by said bottom member at a predetermined distance from the bottom of said window, and when said shielding tent is folded, said sliding frame members extend parallel to the window when said bottom member is released from the structure and pivoted upwardly parallel to said sliding frame members; and

m. whereby different winding means supporting different web materials may be exchanged in said shielding tent.

4,060,120

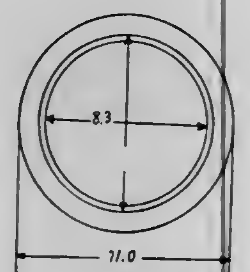
INVESTMENT CASTING PROCESS OF CHROMIUM-COBALT AND/OR NICKEL ALLOYS

Shigeo Takahashi; Michio Ito, both of Shioziri; Sakae Nagasawa, Matsumoto, and Sigeo Suzuki, Nagoya, all of Japan, assignors to Matsumoto Dental College, Shiroziri and Sumitomo Chemical Company, Limited, Osaka, both of, Japan

Filed Dec. 31, 1975, Ser. No. 645,895

Int. Cl.^{2} B22D ***21/06, 13/00***

U.S. Cl. 164—35 **5 Claims**



1. In an investment casting process for producing dental restorations having excellent dimensional accuracy and excellent surface smoothness by the steps of fixing a wax pattern onto a truncated cone in a metallic ring having a lining of a cushioning material, pouring an investment material into the space around the wax pattern in the metallic ring, drying the resultant product, melting out the invested wax pattern, curing the resultant product to give a mold, fixing the mold to a centrifugal casting machine and casting a molten chromium-cobalt and/or nickel alloy in the mold, wherein the improvement comprises curing the mold by heating it at a temperature of 700° to 950° C for 20 to 150 minutes and centrifugally casting the alloy while maintaining the temperature of the mold at 100° to 500° C.

4,060,121

SPRUE REMOVAL MECHANISM FOR DIE CASTING APPARATUS

Robert E. Gwaltney, Brentwood, and John L. Mikovits, Nashville, both of Tenn., assignors to Hada Company, Inc., Elk Grove Village, Ill.

Filed July 6, 1976, Ser. No. 702,933

Int. Cl.^{2} B22D ***31/00***

U.S. Cl. 164—262 **9 Claims**

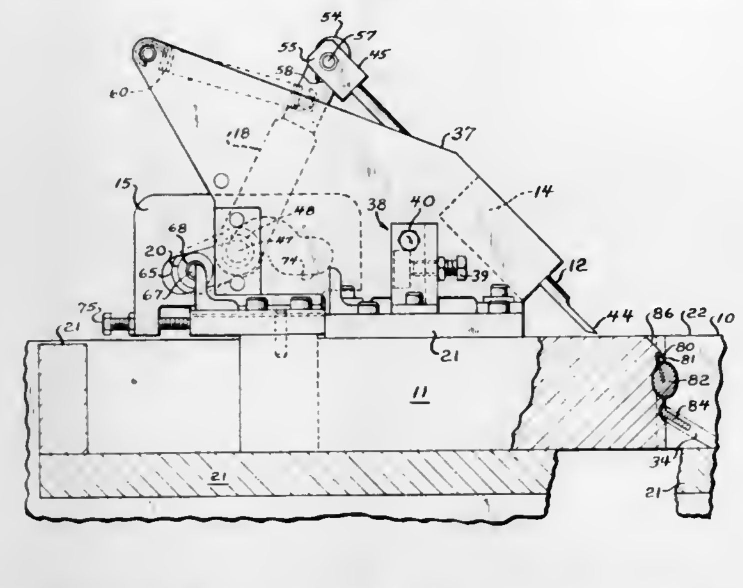
1. A die casting apparatus with a sprue removal mechanism including a supporting frame, a first die mounted on the frame having two transversely separable segments, a second die reciprocably mounted on the frame longitudinally movable into engagement with the first die, the dies having mating faces defining a mold cavity therebetween when in closed engagement, and an injection gate through which molding material is delivered to the mold cavity, the sprue removal mechanism comprising:

a rocker arm having oppositely disposed end portions, said rocker arm being pivotally mounted to the supporting frame intermediate said end portions to swing about an axis fixed relative to the supporting frame;

cam means fixed to the second die for movement therewith;

cam following means carried by one of said end portions of said rocker arm for operatively engaging said cam means; and

a degater knife mechanically connected to the other of said end portions of said rocker arm, said degater knife being adapted to sever a sprue from a casting whereby movement of the second die away from the first die causes said



cam following means to travel along said cam means to pivot said rocker arm about said fixed axis and drive said knife from a retracted position spaced from the mold cavity to an extended position between the open first die segments to sever the sprue from the casting while the casting is supported by the first die segments.

4,060,122

LOW-PRESSURE DIE CASTING MACHINE

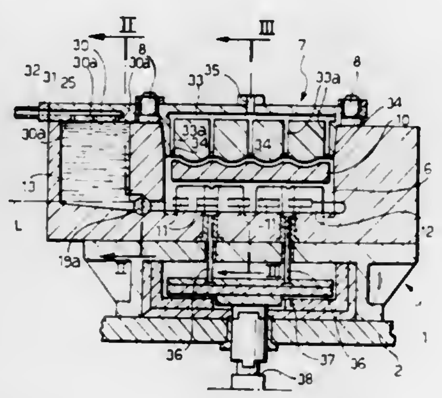
Gaetano Di Rosa, Pino Torinese (Turin), Italy, assignor to FATA S.p.A., Turin, Italy

Filed Jan. 31, 1977, Ser. No. 764,144

Claims priority, application Italy, Feb. 4, 1976, 67255/76

Int. Cl.^{2} B22D ***17/00***

U.S. Cl. 164—304 **5 Claims**



1. In a low pressure die casting machine for light alloy castings, of the type comprising:

a plurality of cooperating die elements which define between them a die cavity,

at least two of said die elements being separable by a relative horizontal movement,

means defining a charging chamber which is closable in a pressure-tight manner and which, in use of the machine, receives a charge of molten alloy to be cast in said die cavity,

casting conduit means connecting said charging chamber to said die cavity, said casting conduit means communicating at one end with the lower part of said charging chamber,

a plurality of casting gates interconnecting said die cavity and the other end of said casting conduit means, and

means for applying to the interior of said charging chamber, above the space occupied therein by a charge of molten alloy, a pressure above atmospheric pressure whereby to urge said charge of molten alloy along said casting conduit means and into said die cavity through said casting gates,

the improvement which consists in:

said charging chamber is formed by means defining cooperating recesses in two of said die elements and is located to one side of said die cavity,

means defining a removable cover which can close over said casting chamber in a pressure-tight manner,

the bottom of said charging chamber, said casting conduit and said casting gates are all located at a level corresponding substantially to that of the lower portion of said die cavity,

means defining recesses in facing surfaces of said two die elements defining said casting conduit and said casting gates, said recesses being so shaped that any alloy which solidifies in the said casting conduit, or said casting gates defined thereby does not impede the opening movement of said two die elements or the subsequent ejection of a casting made in the die constituted by said plurality of die elements, and

valve means in said die for selectively closing communication between said charging chamber and said casting conduit.

4,060,123

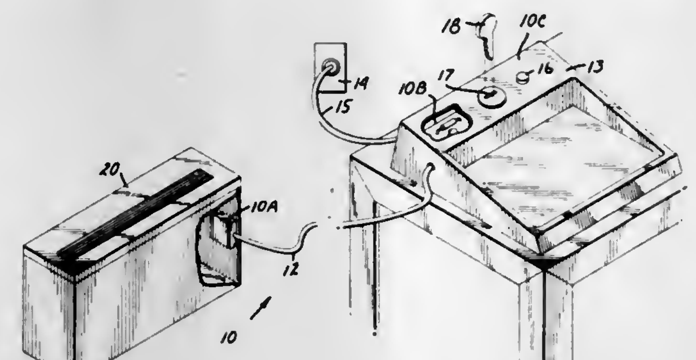
ENERGY SAVING TEMPERATURE CONTROL APPARATUS

Gerald F. Hoffman, Excelsior, Minn., and Dewayne P. Bolton, Memphis, Tenn., assignors to Fabri-Tek Incorporated, Minneapolis, Minn.

Filed Sept. 27, 1976, Ser. No. 726,977

Int. Cl.^{2} G05D ***23/24;*** **F05B** ***65/00***

U.S. Cl. 165—11 **10 Claims**



1. A method of conserving electrical energy in heating and cooling a room having an individual heating and cooling unit load normally energized from an electrical power source to maintain the ambient room air temperature within a selectable comfort temprature range, comprising the steps of:

a. sensing the ambient air temperature within a room and providing a variable electronic output signal responsive thereto;

b. electronically determining in response to said variable electronic output signal whether the sensed air temperature is within a predetermined energy saving range of consecutive temperature degrees and selectively providing an interrupt control signal in response thereto;

c. automatically electrically preventing in response to said interrupt control signal, energization of the heating and cooling unit load whenever said sensed ambient room air temperature is within said predetermined energy saving temperature range; and

d. detecting the active presence of an occupant within the room by electrically sensing presence within the room of a uniquely detectable physical activating member of a type generally carried by the room occupant upon leaving the room, and overriding said energy prevention response to said interrupt control signal, to maintain the ambient air room temperature within the comfort temperature range, whenever the activating member presence is detected within the room.

4,060,124

FEEDWATER PREHEATER WITH TWO STEAM CHAMBERS

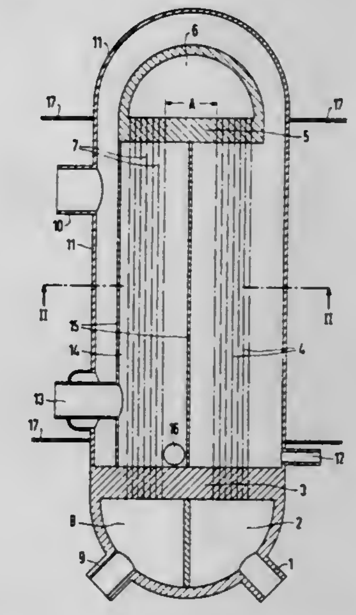
Herbert Tratz, Ottensoos; Fritz Kelp, and Erich Netsch, both of Erlangen, all of Germany, assignors to Kraftwerk Union Aktiengesellschaft, Mulheim (Ruhr), Germany

Filed Dec. 8, 1975, Ser. No. 638,456

Claims priority, application Germany, Dec. 10, 1974, 2458471

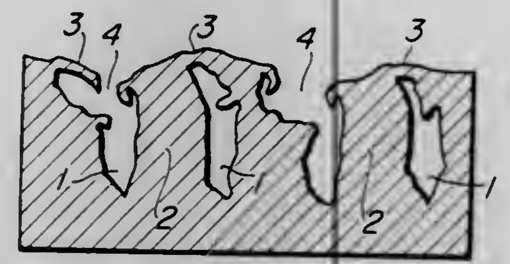
Int. Cl.^{2} F22D ***1/32***

U.S. Cl. 165—110 **4 Claims**



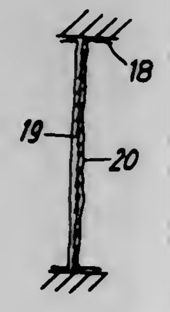
1. Feedwater preheater for heating feedwater in the form of steam turbine condensate by means of condensing extraction steam from a turbine, comprising a casing containing an outer steam chamber, a fixed tube plate and a movable tube plate disposed opposite one another in the casing, feedwater inlet and outlet chambers located adjacent said fixed tube plate, a feedwater reversing chamber disposed in said casing and partly defined by said movable tube plate, a first group of rectilinear feedwater conducting tubes connected at one end thereof through said fixed tube plate to said feedwater inlet chamber and at the other end through a first part of said movable tube plate to said reversing chamber, a second group of rectilinear tubes connected at one end thereof through a second part of said movable tube plate to said reversing chamber and at the other end thereof through said fixed tube plate to said feedwater outlet chamber, a steam vessel disposed in said casing and surrounding said second group of tubes, said steam vessel being closed against communication with said outer steam chamber and being rigidly connected to said second part, said first part of said movable tube plate extending freely beyond the connection of said steam vessel to said second part of said movable tube plate, said first group of tubes, on the one hand, and said second group of tubes, on the other hand, being substantially parallel to and coextensive with one another being mutually spaced apart a given distance so as to permit tipping and deformation of said movable tube plate within given limits in response to stresses producible therein by varying thermal expansion of the tubes of said first and second groups thereof.

4,060,125
HEAT TRANSFER WALL FOR BOILING LIQUIDS
Kunio Fujie, Tokyo; Wataru Nakayama; Heikichi Kuwahara, both of Kashiwa, and Kimio Kakizaki, Hitachi, all of Japan, assignors to Hitachi Cable, Ltd. and Hitachi, Ltd., both of, Japan
Filed June 16, 1975, Ser. No. 586,930
Claims priority, application Japan, Oct. 21, 1974, 49-120261
Int. Cl.² F28F *13/00*
U.S. Cl. 165—133 **16 Claims**



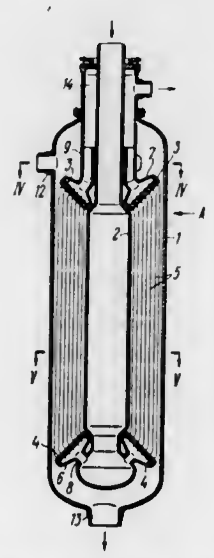
1. A heat transfer wall of thermally conductive metal for contacting a liquid and transferring heat to said liquid, comprising:
a multiplicity of tunnels formed beneath a surface of said heat transfer wall to be in contact with said liquid and separated from said surface by a thin surface layer of the metal of said heat transfer wall, each of said tunnels being parallel to and spaced from an adjacent tunnel through a thin wall of the metal of said heat transfer wall, the spacing between adjacent two tunnels being in the range between 0.2 and 1.0 millimeter, each tunnel having a width in the range between 0.1 and 0.8 millimeter and each tunnel having a depth in the range between 0.2 and 0.8 millimeter; and a multiplicity of tiny holes formed through said thin surface layer separating each of said tunnels from the surface of said heat transfer wall to be in contact with said liquid, for providing communication between the interiors of said tunnels and the surface of said heat transfer wall to be in contact with said liquid, said tiny holes being arranged equidistantly along each of said tunnels at intervals of less than 1 millimeter and being of a substantially equilateral triangular-shape.

4,060,126
HEAT TRANSFER BETWEEN SOLIDS AND FLUIDS UTILIZING POLYCRYSTALLINE METAL WHISKERS
Hermann J. Schladitz, 74 Plaentschweg, Munich, Germany
Continuation of Ser. No. 489,095, July 17, 1976, abandoned, which is a division of Ser. No. 308,433, Nov. 21, 1972, Pat. No. 3,824,247. This application Aug. 20, 1976, Ser. No. 716,096
Claims priority, application Germany, Nov. 22, 1971, 2157807
Int. Cl.² F28F *1/10*
U.S. Cl. 165—133 **5 Claims**



1. A heat transfer element having at least one surface cooperating in defining a path for conducting a fluid medium, and polycrystalline metal whiskers attached in a heat conducting manner to said surface to thereby increase the heat emitting and absorbing surface area of said element, said whiskers being formed of thin elongated members attached in substantial alignment with overlapping ends to further enhance the conductivity and the strength of the heat transfer element, said whiskers penetrating the boundary layer of the fluid as the fluid is conducted over said surface with the strength of the whiskers being capable of withstanding the pressure of the flowing medium.

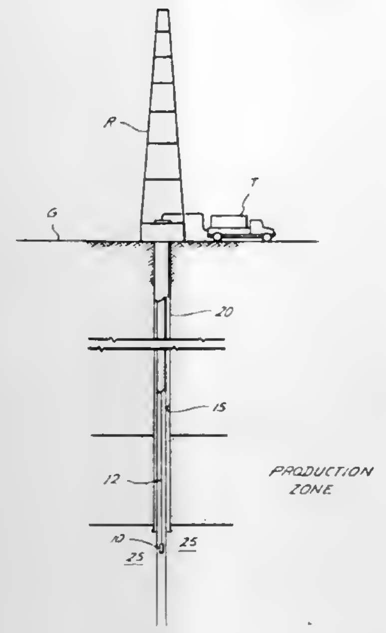
4,060,127
SHELL-AND-TUBE HEAT EXCHANGER
Nikolai Ivanovich Savin, ulitsa Zvezdinka 3, kv. 71; Tamara Alexandrovna Ternikova, prospekt Kirova, 2, kv. 63; Vladimir Jurievich Filippov, ulitsa Piskunova, 32, kv. 14, and Vladimir Ivanovich Shiryaev, ulitsa Strazh Revoljutsii, 22, kv. 19, all of Gorky, U.S.S.R.
Filed Apr. 15, 1975, Ser. No. 568,184
Int. Cl.² F28F *9/02*
U.S. Cl. 165—145 **1 Claim**



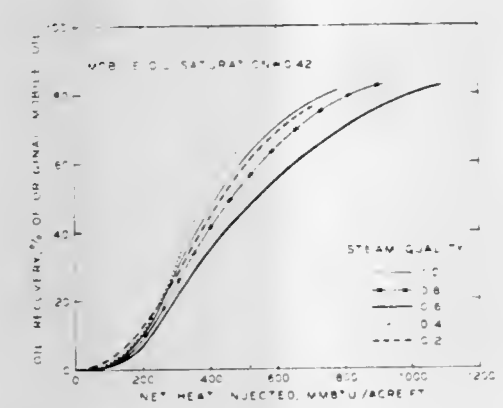
1. A shell-and-tube heat exchanger having upper and lower portions and inlet and outlet portions comprising a shell having a wall; a tubular core axially disposed inside said shell; heat transfer tubes uniformly spaced inside said shell defining an intertubular space, between the shell wall and said core; upper and lower tube plates disposed at the upper and lower portions of the heat exchanger for said heat transfer tubes to be secured therein; each of said tube plates consisting of an array of separate trapezoidal sections, said sections of the tube plates being inclined relative to the heat transfer tubes secured therein and to said tubular core, so that gaps are formed between adjacent sections, which gaps ensure free passage of a heat transfer agent in the axial direction into the intertubular space at the inlet and outlet portions of the heat exchanger; inlet and outlet collectors connected to each section of the upper and lower tube plates, respectively, for the supply of the heat transfer agent into said heat transfer tubes.

4,060,128
TERTIARY CRUDE OIL RECOVERY PROCESS
William J. Wallace, 5815 Queenslock, Houston, Tex. 77096
Filed Oct. 1, 1976, Ser. No. 728,871
Int. Cl.² E21B *43/25*
U.S. Cl. 166—249 **1 Claim**

1. A method for secondary recovery of hydrocarbons from a well bore having a casing and hydrocarbon pump therein comprising the steps of:
a. Positioning a sonic source below the casing in the well bore and below the desired production zone;
b. Transmitting power to the sonic source to thereby cause said sonic source to emit sonic waves through the earth's strata to the desired production zone;
c. Changing the orifices among the earth's strata surrounding the hydrocarbons by using the sonic waves emitted from the sonic source to thus change the surface tension of the hydrocarbons in the production zone;
d. Producing the hydrocarbons with the hydrocarbon pump due to the hydrocarbons gravitating to the well bore because the reduction of surface tension of the hydrocarbons enables the hydrocarbons to fall downwardly toward the well bore and follow the return echo force vector wave emanating toward the sonic source.

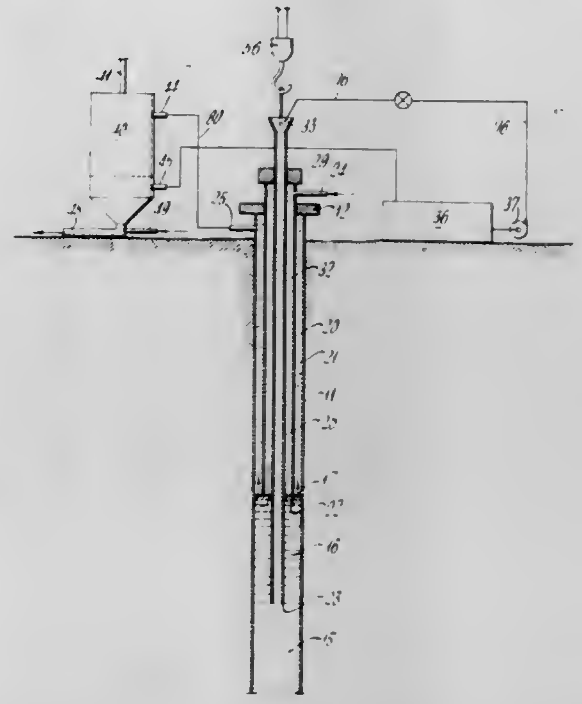


4,060,129
METHOD OF IMPROVING A STEAM DRIVE
Ezzat E. Gomaa, El Cerrito, and Roger E. Young, San Rafael, both of Calif., assignors to Chevron Research Company, San Francisco, Calif.
Filed Dec. 1, 1976, Ser. No. 746,565
Int. Cl.² E21B *43/24*
U.S. Cl. 166—252 **3 Claims**



1. In a method of assisting the recovery of hydrocarbons from a hydrocarbon-bearing formation wherein high-quality steam has been injected through an injection well into a hydrocarbon-bearing formation to initiate a steam drive by promoting a flow of hydrocarbons to a production well for recovery therefrom, the improvement comprising determining the average quality of the steam that has been injected into the formation during the steam drive and then injecting steam having a predetermined low-quality or water in a predetermined quantity to adjust the cumulative quality of the total steam injected into the formation to a value of between 35% quality and 45% quality and then maintaining the quality of the steam injected into the formation within a range of from 35 to 45% to continue the steam drive.

4,060,130
CLEANOUT PROCEDURE FOR WELL WITH LOW BOTTOM HOLE PRESSURE
Joseph I. Hart, Pointe-a-Pierre, Trinidad and Tobago, assignor to Texaco Trinidad, Inc., Pointe-a-Pierre, Trinidad and Tobago
Filed June 28, 1976, Ser. No. 700,624
Int. Cl.² E21B *21/00, 43/25*
U.S. Cl. 166—312 **10 Claims**



1. Cleanout procedure for a low pressure well containing sand fill and well fluid therein, comprising the steps of:
inserting a first string of pipe in said well and forming an outer annulus therearound in the well,
said first string extending below the static fluid level of said well fluid in said well,
inserting a second string of pipe inside said first string and forming an inner annulus between said strings, said second string extending adjacent to the top of said sand fill,
applying a gas under pressure to one of said annuli, and
circulating a wash fluid down said second string of pipe to wash out sand with gas entrained fluid through the other of said annuli.

4,060,131
MECHANICALLY SET LINER HANGER AND RUNNING TOOL
John W. Kenneday; Charles W. Kinney; Floyd L. Scott, Jr., and Phillip W. Schmuck, all of Houston, Tex., assignors to Baker International Corporation, Houston, Tex.
Filed Jan. 10, 1977, Ser. No. 758,359
Int. Cl.² E21B *23/00, 43/10*
U.S. Cl. 166—315 **65 Claims**

63. A method of running, setting and anchoring a liner in a well bore casing, comprising the steps of: (1) inserting within said well bore an apparatus connectable to a tubular member extendible to the top of the well thereof, said apparatus comprising: an inner longitudinally extending body, an outer longitudinally extending body around said inner body; connecting means on one of said inner and outer bodies for connection of a liner therebelow; expander means carried on one of said inner and outer bodies; gripping means carried on the other of said inner and outer bodies and engagable with said expander means whereby said gripping means are shifted into gripping engagement with said casing; a manipulatable tubular running tool releasably secured to said inner and outer bodies, drag means mounted on said running tool slidable longitudinally along said casing; means for selective disengagement of said running tool from said inner and outer bodies, and setting means carried on said running tool and responsive to manipulation of said running tool to longitudinally shift one of said inner

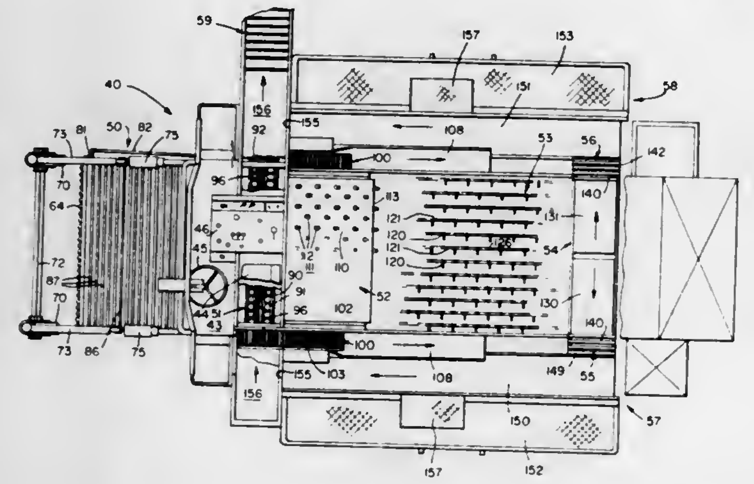
and outer bodies with respect to the other of said inner and outer bodies to anchor said liner to said casing, said drag means resisting longitudinal travel of said apparatus while in said well bore with sufficient frictional force to support the weight of one of said inner and outer bodies therebelow and to afford operation of said setting means; (2) running said apparatus in said well to a positionable depth within said well bore adjacent said casing; (3) raising said tubular member extendible to the top of the well to remove said carriage means within said slot means from initial running position; (4) shifting said tubular member extending to the top of the well rotatably and longitu-

dinally downwardly to cause said carriage means to travel in said slot means to position for anchoring said liner within said well bore and on said casing and for shifting said longitudinally shiftable tubular body downwardly with respect to said sleeve means to cause said expander means carried by said tubular body to engage said gripping means carried on said sleeve means and move said gripping means outwardly into gripping engagement with said well bore casing; and (5) rotating said tubular member extendible to the top of the well to release said tubular running tool from said longitudinally shiftable body for subsequent retrieval of said running tool out of said well bore.

4,060,132
FIRE FIGHTING WITH THIXOTROPIC FOAM
Peter J. Chiesa, Jr., Coatesville, Pa., assignor to Philadelphia Suburban Corporation, Bryn Mawr, Pa.
Continuation-in-part of Ser. No. 525,175, Nov. 19, 1974, Ser. No. 369,584, June 13, 1973, Pat. No. 3,957,657, and Ser. No. 307,479, Nov. 17, 1972, abandoned, said Ser. No. 525,175 is a continuation-in-part of said Ser. No. 369,584, said Ser. No. 307,479, and Ser. No. 254,404, May 18, 1972, Pat. No. 3,849,315, said Ser. No. 369,584 is a continuation-in-part of said Ser. No. 307,479, said Ser. No. 254,404 and Ser. No. 131,763, Apr. 6, 1971, abandoned, said Ser. No. 307,479, is a continuation-in-part of said Ser. No. 254,404 and said Ser. No. 131,763, said Ser. No. 254,404 is a continuation in-part of said Ser. No. 131,763. This application Mar. 12, 1975, Ser. No. 557,757.
Int. Cl.² A62D *1/00*
U.S. Cl. 169—47 **4 Claims**

1. In the method of fighting a fire on a burning liquid with a single fire-fighting concentrate by highly diluting the concentrate with water, foaming the diluate, and applying the foamed diluate to the burning liquid to blanket and thus extinguish the burning, the improvement according to which the burning liquid is a hydrophilic liquid and the concentrate contains a dissolved thixotropic polysaccharide in an amount that causes the foamed diluate to gel upon contact with the hydrophilic liquid and lose some of its water to the hydrophilic liquid to form a foamed mat that does not dissolve in the hydrophilic liquid rapidly enough to significantly diminish the blanketing action of the foam.

4,060,133
METHOD FOR MECHANICALLY HARVESTING TOMATOES
Thomas S. Bettencourt, Isleton, and Lowell K. Marshall, Sacramento, both of Calif., assignors to The Regents of the University of California, Berkeley, Calif.
Division of Ser. No. 495,530, Aug. 7, 1974, Pat. No. 3,986,561. This application May 4, 1976, Ser. No. 683,066
Int. Cl.² A01D *46/00*
U.S. Cl. 171—1 **5 Claims**

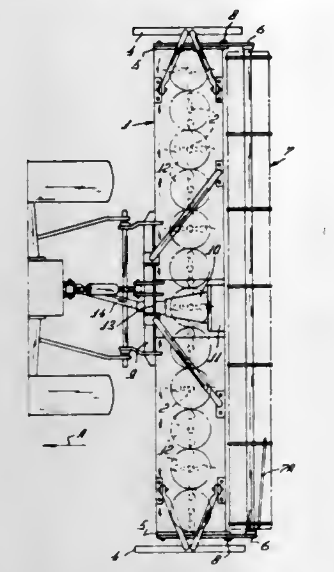


1. A method of mechanically harvesting tomatoes comprising the steps of:

a. moving a mechanical harvester through a row of growing tomato plants,
b. slicing a thin top layer of soil in said row to sever tomato plant stems just below the surface of the ground,
c. picking up severed tomato plants, loose tomatoes, and dirt clods, while returning the loose dirt to the ground,
d. separating said severed tomato plants from said loose tomatoes and dirt clods,
e. agitating said tomato plants with an increasingly intense up and down and forward and backward motion to shake off tomatoes without damaging them,
f. recovering said tomatoes shaken from said plants while separating and discarding chaff, leaves, twigs, dirt, trash, and exhausted tomato plants,
g. conveying said recovered tomatoes forwardly past sorters who remove culls and pass good tomatoes,
h. passing said loose tomatoes and dirt clods rearwardly by said sorters, some of whom recover the good said loose tomatoes, and
i. loading said recovered good tomatoes into a suitable container.

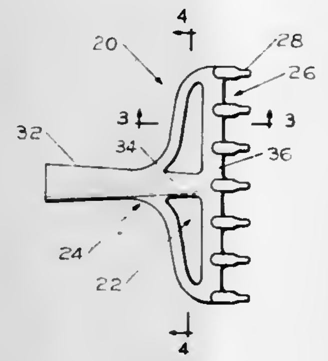
4,060,134
SOIL CULTIVATING IMPLEMENTS
Cornelis van der Lely, 7, Bruschenrain, Zug, Switzerland
Filed Apr. 6, 1976, Ser. No. 674,166
Claims priority, application Netherlands, Apr. 11, 1975, 7504320
Int. Cl.² A01B *33/14*
U.S. Cl. 172—59 **8 Claims**

1. A soil cultivating implement comprising a frame and a plurality of adjacent soil working members rotatably supported on said frame, said members being rotatable about corresponding upwardly extending axes and driving means engaging said members to rotate same and work soil, each of said members comprising a support and at least one downwardly extending substantially rigid tine fastened to said support, said tine having an upper fastening portion and a lower soil working portion, said fastening portion being held in a holder adjacent an outer end of said support, further soil working tine means deflectively mounted on said soil working member and rotatable therewith, said further tine means being fastened to said holder by at least one spring coil that surrounds said holder, the tine means of adjacent soil working members cooperating to work overlapping paths of soil during



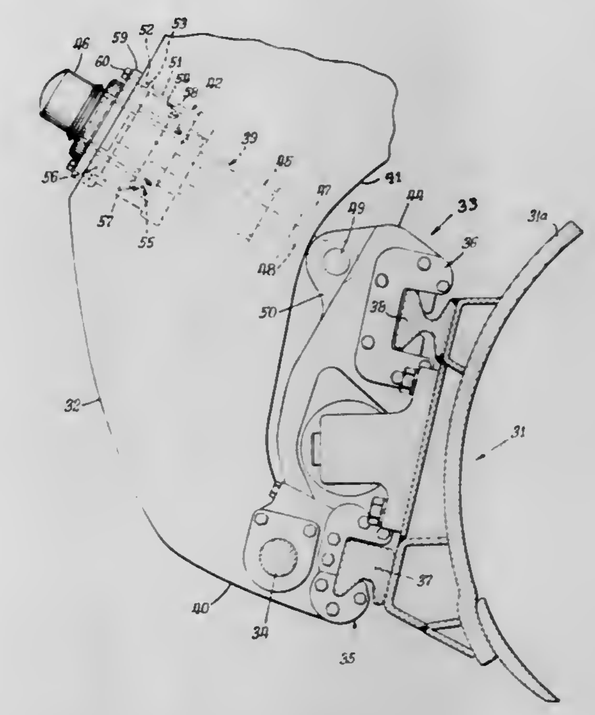
operation, and said tine means being deflectable against the resilient opposition of said coil and turnable about an axis that is substantially parallel to the axis of rotation of the corresponding soil working member.

4,060,135
SHEET METAL GARDEN TOOL
William A. Keller, Crestwood, Mo., assignor to Keller Manufacturing Co., Inc., St. Louis, Mo.
Filed Aug. 2, 1976, Ser. No. 711,094
Int. Cl.² A01B *1/14*
U.S. Cl. 172—380 **8 Claims**



1. A sheet metal garden tool comprised of a flat body bounded on its edges by a forwad head portion, a rearward central handle receiving portion, and opposed side portions each bounded by a generally perpendicular bent over flange, said side portions curving rearwardly from said forward head portion to said handle receiving portion, said head portion having a plurality of forward extending tines, said tines having spaced apart side walls of substantially uniform depth defining a generally inverted U-shaped cross section at the rear thereof and merging with a flange portion of said head, said flange portion extending at right angles to the tines and having sections thereof connected at opposed ends to said tine side walls, the outer tines having outer downwardly extending side walls formed in the same plane as the bent over flanges of the body and formed so that each of said outer side walls forms a continuous planar surface with one of said flanges, said flanges extending from said outer side walls of said tines as a continuous border of the body rearwardly to and merging with the handle receiving portion and said tine side walls being pressed solidly together at a forward terminating end portion, said latter portion extending a substantial length of the tine to provide strength and rigidity.

4,060,136
MOTOR GRADER BLADE MOUNTING AND TILT MECHANISM
Vergil Philip Hendrickson, Morton, and Carroll Richard Cole, Decatur, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.
Filed June 14, 1976, Ser. No. 696,106
Int. Cl.² E02F *3/76*
U.S. Cl. 172—795 **5 Claims**



1. In a motor grader which has a circle, improved grader blade mounting means comprising, in combination:

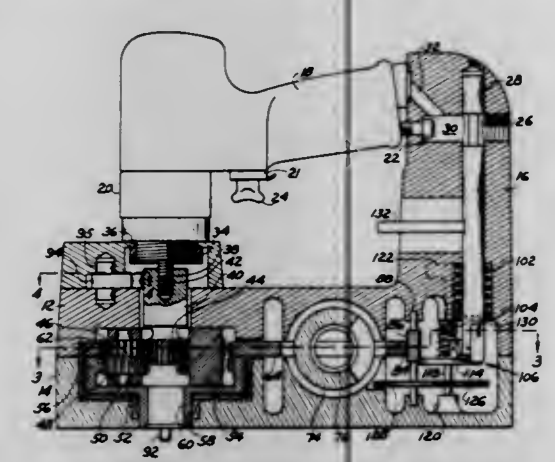
a pair of integral, depending support arms at the rear of the circle;
blade carrying means including a pair of bearing housings the lower end portions of which are mounted on transverse pivots in the lower extremities of the support arms, said bearing housings having an upright position forward of said arms and having upper portions which are located laterally inwardly from and immediately adjacent the arms;
jaw means at the front of said blade carrying means adapted to mount a grader blade assembly for lateral shifting movement;
integral sleeves at the upper parts of the arms, said sleeves having one side defined by the arms and having longitudinal axes aligned with extreme upper portions of the bearing housings, extensions of said axes lying substantially tangential to an arc of a circle struck about the transverse pivots which mount the bearing housings;
and a hydraulic cylinder and piston unit supported in each of said sleeves, each of said units having a head end at the rear of the sleeve and a piston rod lying on the projected axis of the sleeve and connected to a transverse pivot on said upper portion of the adjacent bearing housing, whereby working forces are applied substantially axially to said piston rods in all positions of the housings.

4,060,137
TORQUE WRENCH
John H. Bickford, Middletown; Donald H. Ranheim, Jr., East Hartford, and Willard A. Saxby, Newington, all of Conn., assignors to Raymond Engineering Inc., Middletown, Conn.
Filed May 3, 1976, Ser. No. 682,735
Int. Cl.² B25B *23/145*
U.S. Cl. 173—12 **29 Claims**

1. A torque wrench including:

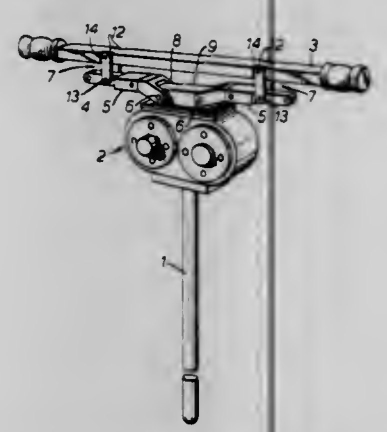
a casing;
input drive means in said casing receiving an operating input;

first planetary gear means in said casing drivingly connected to said input drive means;
rotatable output means connected to and driven by said first planetary gear means, said output means being adapted to engage an element to be torqued;
second planetary gear means in said casing drivingly connected to said input drive means;
said first and second planetary gear means having different gear ratios and common sun gear means;



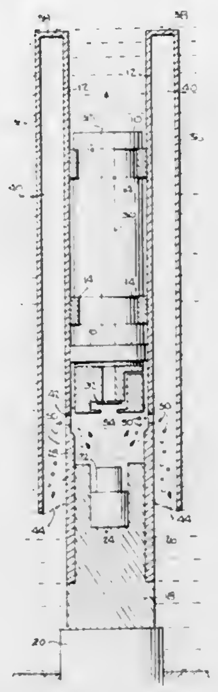
reaction means coupled to said second planetary gear means;
load resisting means in said casing coooperating with said reaction means, said reaction means being movable within a limited range of movement against said load resisting means; and
indicating means operatively connected to said reaction means to indicate the torque output of the wrench as a function of the movement of said reaction means.

4,060,138
VIBRATORY TOOLS
William Edward Cox, Great Missenden, and Frank James Lee, Okehampton, both of England, assignors to Post Office, London, England
Filed July 8, 1976, Ser. No. 703,665
Claims priority, application United Kingdom, July 11, 1975, 29244
Int. Cl.^{2} H01B *17/00*
U.S. Cl. 173—49 **11 Claims**



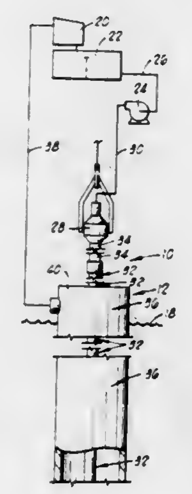
1. A vibratory tool having a handle, a body and a vibration isolation mechanism connecting the handle to the body, the vibration isolation mechanism comprising two beams pivotally connected to the tool body and, for each beam, at least one respective torsionally-resilient member, the torsionally-resilient members being so mounted relative to the beams as to convert translational oscillation of the tool body into forced angular oscillation of each beam about a respective induced nodal axis located perpendicular to the beam and at a position along the length thereof, and means pivotally connecting the handle to each beam at the said nodal axis, which means offers substantially no resistance to rotational movement of the beam in a plane to which the nodal axis is perpendicular.

4,060,139
UNDERWATER GAS DISCHARGE HAMMER WITH GAS RESERVOIR
Harold Lee Adair, Rockwall, Tex., assignor to Raymond International Inc., Houston, Tex.
Filed Nov. 29, 1976, Ser. No. 745,637
Int. Cl.^{2} B25D *9/00*
U.S. Cl. 173—137 **13 Claims**



1. A gas discharge type underwater hammer comprising, a hollow elongated guide tube open at its upper end, a massive ram guided for up and down movement inside said guide tube, an anvil mounted at the lower end of the guide tube in the path of movement of said ram to be struck by said ram on its downward stroke, means forming a cavity within said guide tube under and open to said ram, a gas discharge device positioned within said cavity, said gas discharge device being operable in response to a triggering signal to emit a sudden discharge of pressurized gas to drive the ram upwardly in the guide tube, a gas reservoir located outside said guide tube, and means for placing the interior of said guide tube under the ram into open fluid communication with said gas reservoir during the upward stroke of said ram.

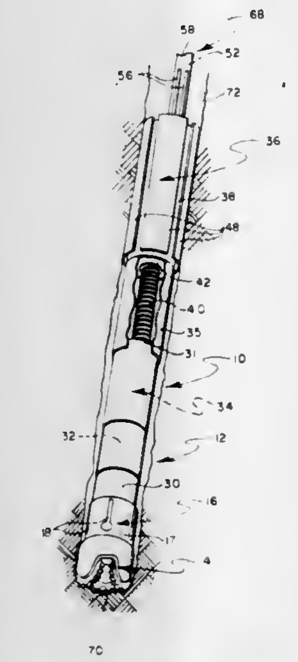
4,060,140
METHOD AND APPARATUS FOR PREVENTING DEBRIS BUILD-UP IN UNDERWATER OIL WELLS
Burchus Q. Barrington, Duncan, Okla., assignor to Halliburton Company, Duncan, Okla.
Continuation-in-part of Ser. No. 624,950, Oct. 22, 1975, abandoned. This application Oct. 12, 1976, Ser. No. 731,251
Int. Cl.^{2} E21B *15/02*
U.S. Cl. 175—7 **29 Claims**

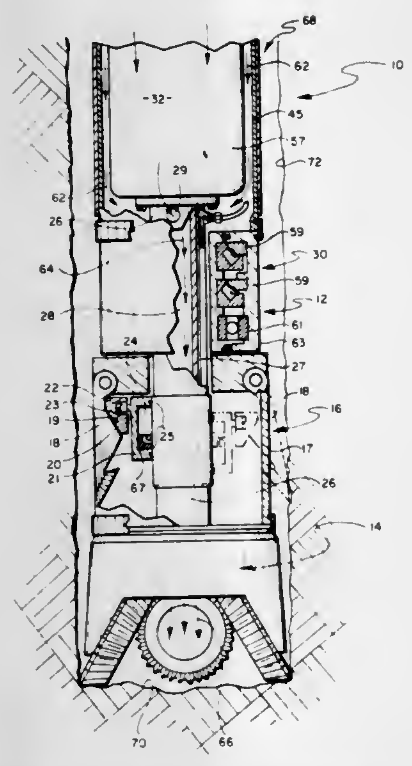


1. A drilling tool, for use with a drill string insertable within

a riser pipe string in underwater drilling operations, comprising:
a first tubular member having an upper end portion, a lower end portion and an inner diameter greater than the outer diameter of at least a part of the drill string by less than a predetermined amount;
support means adjacent said lower end portion of said first tubular member for supporting said first tubular member at a first position within at least the lower end portion of said riser pipe string independently of said drill string; and
carrier means for carrying said tubular member on said drill string independently of said riser pipe string at positions above said first position.

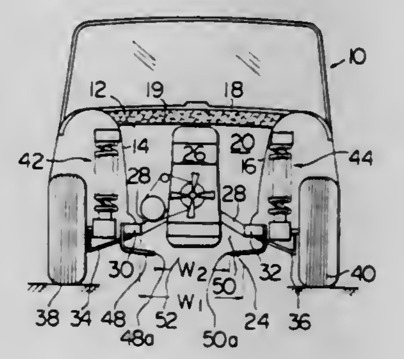
4,060,141
SELF-PROPELLED DEEP WELL TURBINE DRILL
Fritz C. Catterfeld, Canoga Park, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.
Filed July 6, 1976, Ser. No. 703,042
Int. Cl.^{2} E21B *1/06*
U.S. Cl. 175—94 **8 Claims**





1. A self-propelled turbine drill apparatus for drilling well holes comprising:
means clamping a first cylindrical end against a well casing wall, said first cylindrical end making up part of said turbine drill having clamping means therein, said first end being operably connected to and opposite to a second cylindrical end containing a cutter head assembly, said first and second ends being axially movable one from the other,
means driving said cutter head assembly at said second end deeper into said well hole by extending said cutter head assembly axially from said clamped first cylindrical end,
means clamping said cutter head assembly at said second cylindrical end near the end of said well hole when said cutter head assembly is advanced axially into said hole its maximum length, said means clamping said cutter head assembly is an underreamer section affixed to and axially in line with a base of said cutter head assembly, said underreamer section having expandable cutter arms equidistantly spaced around said underreamer section, said cutter arms expand out against said casing wall, thereby clamping said cutter head assembly near the bottom of the hold,
means releasing said clamped first cylindrical end,
means retracting said released first cylindrical end toward said cutter head assembly, and
subsequently reclamping said first cylindrical end thereby initiating a subsequent turbine drill cycle thereby advancing said drill deeper into said hole after said cutter arms have been retracted in said underreamer section.

4,060,142
ENVIRONMENTAL NOISE POLLUTION REDUCTION DEVICE OF RUNNING ROAD VEHICLE
Eiichi Abe, Yokohama, Japan, assignor to Nissan Motor Company, Limited, Yokohama, Japan
Filed Nov. 19, 1975, Ser. No. 633,419
Claims priority, application Japan, Nov. 20, 1974, 49-139551[U]; June 5, 1975, 50-76601[U]
Int. Cl.^{2} B62D *25/08*
U.S. Cl. 180—54 A **8 Claims**

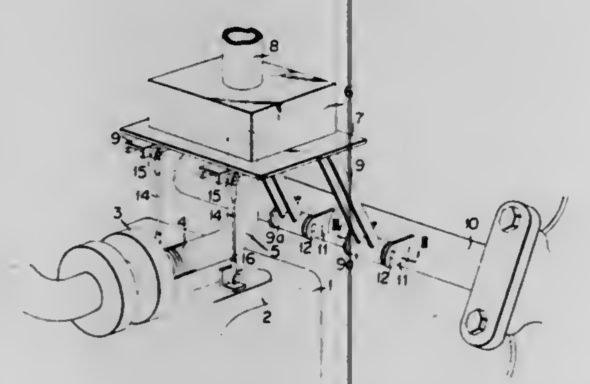


1. In a road vehicle body including an engine compartment in which an engine is disposed, the engine compartment being defined by two opposite longitudinal side panels, a hood spanning between the top portions of the side panels, a fire-wall separating a passenger compartment from the engine compartment, and a front wall oppositely disposed to the fire-wall and having therethrough openings for inducting cooling air, the engine compartment having at its bottom portion a generally rectangular opening in plan, the improvement comprising:
first and second under-covers which are of generally elongate rectangular shape in plan and generally of the same size for partly covering the rectangular opening to reflect the engine noise, said first and second under-covers being oppositely disposed longitudinally along the bottom portions of the side panels and extending from the front wall to the fire-wall, the opposed edges of said first and second under-covers being separated from each other by a rectangular ventilation opening therebetween, the bottom portion of the engine being substantially spaced apart from the plane of the rectangular ventilation opening and substantially closer to the hood than the plane of the rectangular ventilation opening, said first and second under-covers being respectively secured to two opposite rigid side members which extend from the front wall toward the fire-wall and are attached to the bottom portions of the side panels, the engine being mounted on the side members, the width of said rectangular ventilation opening

defined between the opposed edges of the under-covers being in the range of 60 to 75% of the width of said rectangular opening defined between the opposed inner sides of the side members; and

sound absorbent material attached to the inner surface of the hood for absorbing the noise reflected by the under-covers into the engine compartment.

4,060,143
MUFFLER MOUNTING APPARATUS IN CONSTRUCTION MACHINERY
Takeshi Matsumoto, Hirakata; Kazukiyo Chiba, Katano; Atsuo Shioyama, and Yoshitake Yamaguchi, both of Hirakata, all of Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan
Filed Feb. 5, 1976, Ser. No. 655,577
Claims priority, application Japan, Feb. 5, 1975, 50-015911[U]
Int. Cl.² B60K *13/04*
U.S. Cl. 180—64 A **9 Claims**

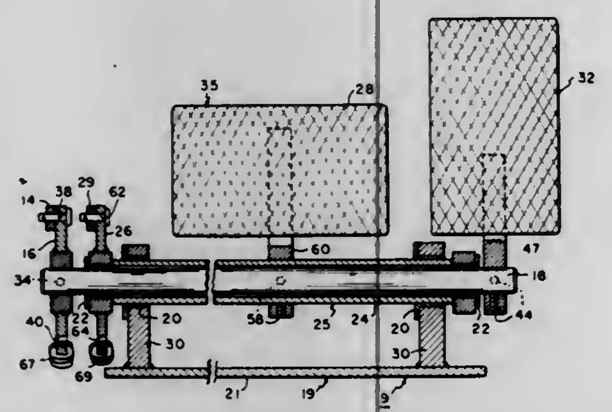


1. A muffler mounting apparatus in construction machinery comprising a vehicle body, an engine mounted on said body, a muffler connected to an exhaust port of said engine to reduce the noise level of exhaust gas,

supporting lever means connected to and supporting said muffler, one end of said supporting lever means being pivotally connected to said body, and

linkage means pivotally connected to and extending between said engine and said muffler supporting lever means.

4,060,144
COMBINED ACCELERATOR AND BRAKE ASSEMBLY
John J. Teti, Saltville, Va., assignor to Pyott-Boone Machinery Corporation, Saltville, Va.
Filed Jan. 12, 1976, Ser. No. 648,054
Int. Cl.² B60K *26/02*
U.S. Cl. 180—77 R **6 Claims**



1. An accelerator and brake pedal assembly for use on a vehicle having a floor, accelerator actuating means and brake actuating means, said pedal assembly comprising:

a mounting plate adapted to be mounted on the upper side of said floor;

a pair of spaced, upwardly extending supports mounted on said plate;

a bearing mounted in each of said supports, said bearings being aligned to define an axis;

a shaft extending along said axis, rotatably supported by said bearings;

an accelerator pedal mounted on said shaft for rotating therewith;

means mounted on said shaft for rotation therewith, adapted to be connected to said accelerator actuating means for control thereof in response to rotation of said accelerator pedal;

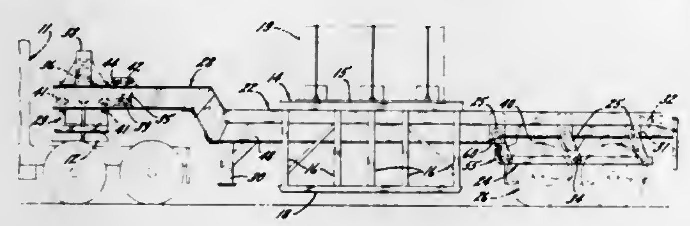
a tubular sleeve member coaxially, rotatably mounted on said shaft;

a brake pedal;

means for slidably mounting said brake pedal along said sleeve member between a plurality of fixed positions in which said pedal is rotatable with said sleeve member; and,

means mounted on said sleeve member for rotation therewith, adapted to be connected to said brake actuating means for control thereof in response to rotation of said brake pedal.

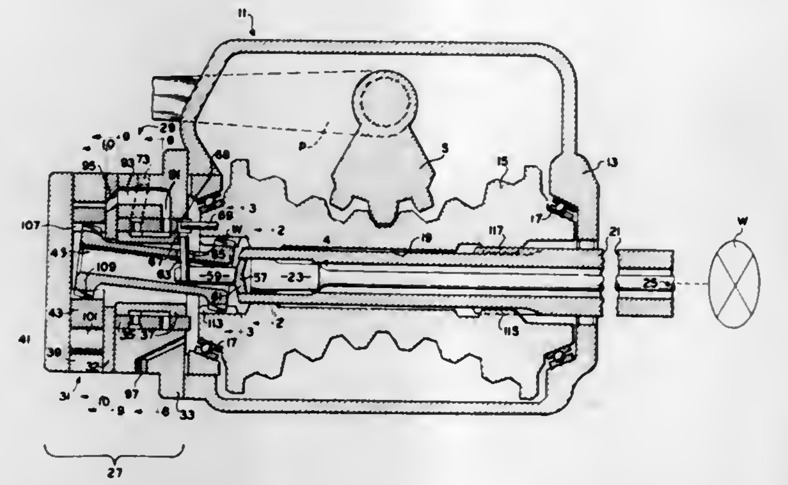
4,060,145
LIFT BED TRAILER SUSPENSION SUBFRAME
Stephen A. Kingman, Rensselaer, and Leslie A. Weaver, Monon, both of Ind., assignors to Eugene A. LeBoeuf, Gary, Ind.
Filed Jan. 20, 1976, Ser. No. 650,787
Int. Cl.² B62D *21/02*
U.S. Cl. 280—106 T **9 Claims**



5. In a lift bed highway trailer adapted for attachment to a tractor, the combination comprising:

a. a liftable main frame having a lowered loading and unloading position and a raised transport position;
b. a loaded pallet frame unit adapted to straddle said main frame;
c. a subframe underlying and pivotally connected to said main frame, said subframe having a vertical dimension substantially smaller than that of said main frame;
d. a wheeled suspension underlying said subframe;
e. a pair of main structural members secured in underlying relation with said main frame and spaced laterally from each other so as to overlie said subframe;
f. a first pair of guide abutments mounted on one end of said subframe is relatively closely spaced relation to said longitudinal structural members of said liftable main frame;
g. a second pair of guide abutments on said main frame structural members disposed in opposed and relatively closely spaced relation with said suspension guide abutments when said main frame is in raised transport position; and
h. power lift means interposed at an acute angle between said main frame and said subframe for moving said main frame relative to said subframe between the lowered loading and unloading position and the raised transport position.

4,060,146
POWER STEERING MECHANISM
Edward J. Goscenski, Jr., Battle Creek, Mich., assignor to Eaton Corporation, Cleveland, Ohio
Filed Nov. 13, 1975, Ser. No. 631,754
Int. Cl.² F15B *13/16*
U.S. Cl. 180—161 **21 Claims**



1. A power steering mechanism for providing movement of an output steering member in response to rotation of a steering wheel, comprising:

a. a worm gear in toothed engagement with the output steering member, said worm gear being mounted in a housing and having an input end toward the steering wheel and an output end;
b. an input shaft receiving steering input and having a lost motion connection to said worm gear permitting a relative rotational displacement therebetween;
c. valve means including a first valve member rotatable relative to the housing and means for transmitting rotation of said input shaft into rotation of said first valve member;
d. a fluid-actuated motor disposed adjacent the output end of said worm gear including a movable element, said movable element having a motion one component of which is rotational;
e. said valve means being disposed between said output each of said worm gear and said fluid-actuated motor and being operable to direct pressurized fluid from a fluid source to said fluid-actuated motor upon said relative rotation of said first valve member, said pressurized fluid causing movement of said movable element; and
f. means for translating said movement of said movable element into rotational movement of said worm gear.

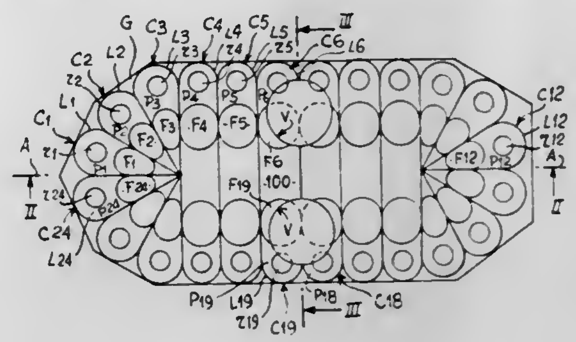
4,060,147
VEHICLES RIDING ON AIR CUSHIONS
Paul Guienne, Neuilly sur Seine; Guy Herrouin, Paris; Andre Lafont, Coudoux, all of France; Jean Bertin, deceased, late of Neuilly sur Seine, France; by Michel Bertin, Neuilly sur Seine, France; by Laurent Bertin, Neuilly sur Seine, France; by Philippe Bertin, Neuilly sur Seine, France; by Catherine Midy nee Bertin, Neuilly sur Seine, France; by Francoise Gonzalez-Camino nee Bertin, Madrid, Spain, and by Genevieve Bertin nee Loustau, heirs, Neuilly sur Seine, France, assignors to Bertin & Cie, Plaisir and Societe d'Etudes et de Developpement des Aeroglisseurs Marins, Terrestres et Amphibies S.E.D.A.M., Paris, both of, France
Filed Feb. 11, 1976, Ser. No. 657,120
Claims priority, application France, Feb. 18, 1975, 75.04960
Int. Cl.² B60V *1/04, 1/11*
U.S. Cl. 180—121 **9 Claims**

1. An air cushion vehicle comprising:

a platform,

a central air cushion region beneath said platform surrounded by a continuous series of peripheral cells, each of said cells including

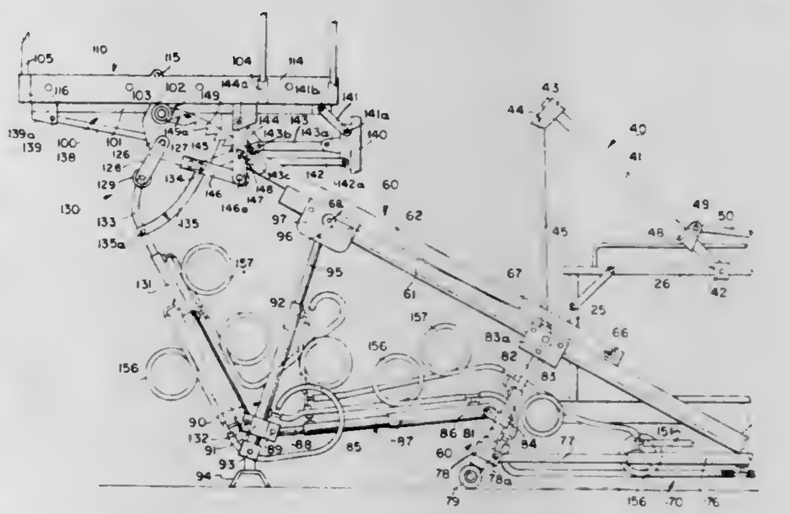
an outer lobe and a tubular skirt within said lobe, a portion of each skirt and lobe defining a peripheral sector within each lobe, each skirt having a closed horizontal cross-section and being contiguous with the skirts immediately preceding and succeeding it to define a continuous ring of skirts, said ring of skirts being between said central air



cushion region and said peripheral sectors within said lobes, and

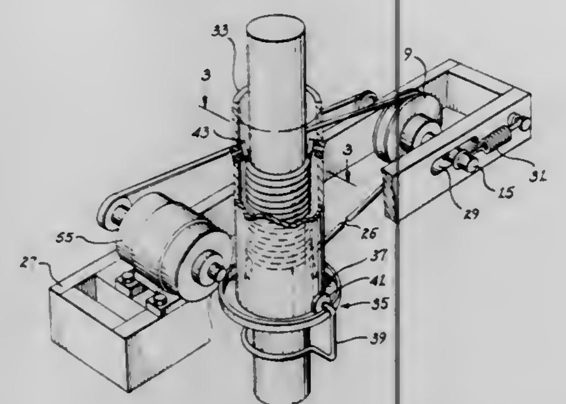
means carried by said platform for providing air under pressure to said central air cushion region, said ring of skirts, and said peripheral sectors within said lobes.

4,060,148
PORTABLE COLLAPSIBLE SCAFFOLD STRUCTURE
James T. Sidney, 1105 Wentworth Ave., Chicago Heights, Ill. 60411
Filed Dec. 23, 1976, Ser. No. 753,928
Int. Cl.² B66F *11/04*
U.S. Cl. 182—2 **20 Claims**



1. A portable collapsible scaffold structure adapted to be supported in use and transported by a self-powered ground vehicle, said scaffold structure comprising extensible support means adapted to be mounted on the associated vehicle, two spaced-apart parallel extensible boom members releasably attachable to said support structure for support thereby in an inclined use configuration with the upper ends thereof being spaced a substantial distance horizontally away from the vehicle, drive means coupled to said extensible support means for effecting extension and retraction thereof to change the angle of inclination of said boom members with respect to the ground, a work platform extending in use between said boom members and removably pivotally secured thereto adjacent to the upper ends thereof, and control means coupled to said boom members and to said platform and operative when the angle of inclination of said boom members changes to effect a corresponding change in the angle between said boom members and said platform for maintaining said platform substantially horizontal, said support means and said boom members and said platform and said drive means and said control means all being dimensioned so that when disassembled from one another they may be readily stored on the associated vehicle for transportation thereby.

4,060,149
CONVEYER APPARATUS
James C. Henley, 7240 S. 7th St., Space C-38, Phoenix, Ariz. 85011
Filed Nov. 17, 1976, Ser. No. 742,589
Int. Cl.² F16H *27/02;* **A63B** *27/00*
U.S. Cl. 182—133 **10 Claims**



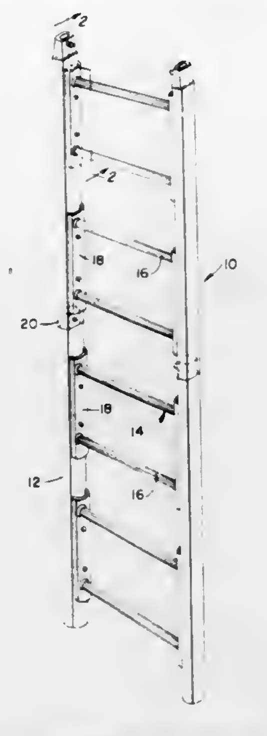
1. A conveyer apparatus for producing translation along the longitudinal axis of a cylindrically shaped body, said apparatus comprising in combination:

a. a body having a substantially circular cross-section and a longitudinal axis;
b. an endless length of cable forming a coil around and in contact with said body, said coil having a first and a second end and said cable including a loop displaced from said body;
c. a support frame mounted on the first and second ends of said coil and rotatable about the longitudinal axis of said body;
d. loop support means mounted on said frame for maintaining said loop at a substantially constant radial distance from said coil;
e. first means for inducing relative rotational motion between said loop and said body about the longitudinal axis of said body to wind said cable onto the first end of said coil while simultaneously unwinding cable from the second end of said coil; and
f. tension means for maintaining said coil in tight contact with said body; whereby said frame is conveyed along the longitudinal axis of said body.

4,060,150
LADDER KIT
Peter Hughes, 33 Lower Park, Putney, SW. 15, London, England
Continuation-in-part of Ser. No. 503,623, Sept. 6, 1974, abandoned. This application July 19, 1976, Ser. No. 706,621
Claims priority, application United Kingdom, Sept. 7, 1973, 42189/73
Int. Cl.² E06C *7/08, 1/08*
U.S. Cl. 182—151 **10 Claims**

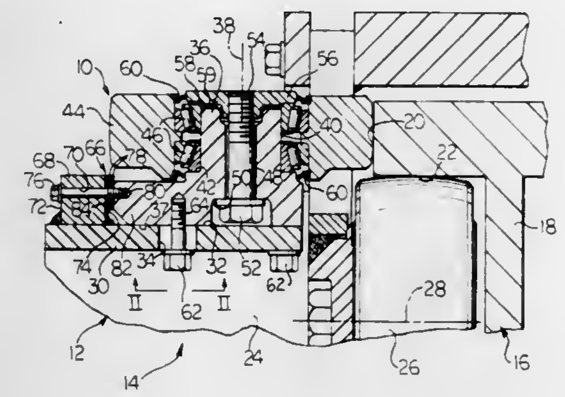
1. In a ladder comprising a plurality of interfitting parts which are adapted to be readily disassembled;

a plurality of elongated tubular elements,
at least one frame member, said frame member fastening by means of threaded fastening elements said tubular elements into a parallel pair of side rails of said ladder,
said frame member comprising a pair of rung holder brackets having a surface edge which abuts said side rail, wherein said fastening elements pass through said brackets and into said side rails, and wherein said rungs are fixed in said



brackets and are received by second apertures in said side rails.

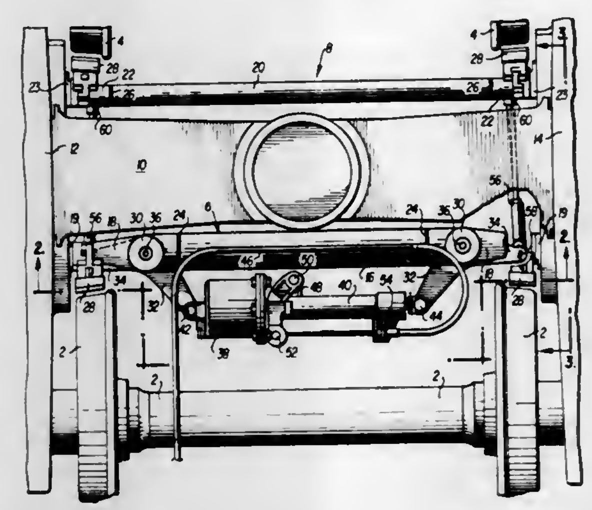
4,060,151
ADJUSTABLE ARBOR WHEEL MOUNTING ARRANGEMENT
Charles R. Chelin, and Alan J. Hickman, both of Peoria, Ill., assignors to Towmotor Corporation, Mentor, Ohio
Filed Dec. 20, 1976, Ser. No. 752,707
Int. Cl.² B66B *7/02*
U.S. Cl. 187—95 **5 Claims**



1. An adjustable arbor wheel mounting arrangement, comprising:

a support frame having a mounting surface;
an arbor having an axis, an end mounting surface positioned substantially normal to the axis, and a reaction face;
wheel means mounted on the arbor for rotation about the axis;
fastening means for axially clamping the arbor end mounting surface against the mounting surface of the support frame at a preselected working position of the wheel means; and
abutment reaction means including an abutment bar having a reaction face and being mounted on the mounting surface of the support frame for directing thrust forces substantially normal to the axis from the wheel means and the reaction face of the arbor to the support frame.

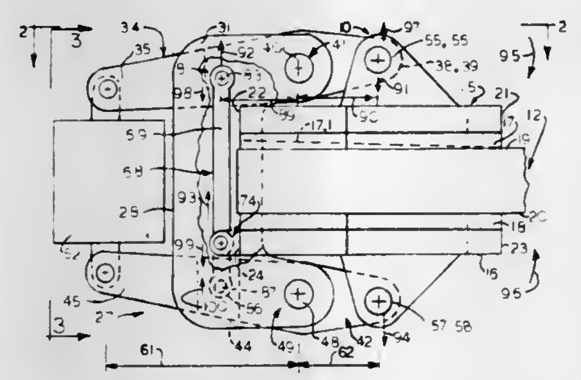
4,060,152
RAIL CAR BRAKE APPARATUS
Thomas M. Bogenschutz, Clayton; Thomas H. Engle, Cape Vincent, and Eugene D. McEathron, Watertown, all of N.Y., assignors to General Signal Corporation, Rochester, N.Y.
Continuation of Ser. No. 590,168, June 25, 1975. This application Apr. 28, 1976, Ser. No. 680,952
Int. Cl.² B61H *13/24*
U.S. Cl. 188—52 **29 Claims**



18. A brake rigging for a four-wheel type of vehicle truck, said rigging comprising:

a first brake beam extending transverse to the axis of said truck;
a second brake beam parallel to said first brake beam;
a pair of bell-crank levers each having a fulcrum and a pair of arms, said levers being pivotably mounted on said first brake beam at spaced locations thereon;
a pair of push rods, each one of the pair pivotably connected respectively at one end to one arm of said bell-crank levers and at the other end of said second brake beam; and
a fluid pressure operable brake actuator mounted between the other arms of said bell-crank levers for applying brake actuating forces in opposite directions to said levers, said actuator including means attached to said actuator for manually expanding said actuator to apply brake actuating forces in opposite direction to said levers in the event of a loss in fluid pressure.

4,060,153
SELF-BALANCING BRAKE SHOES FOR CALIPER BRAKE
Jacob Kobelt, 6110 Oak Street, Vancouver, British Columbia, Canada (V6M 2W2)
Filed Sept. 14, 1976, Ser. No. 723,140
Int. Cl.² F16D *55/26*
U.S. Cl. 188—72.6 **10 Claims**

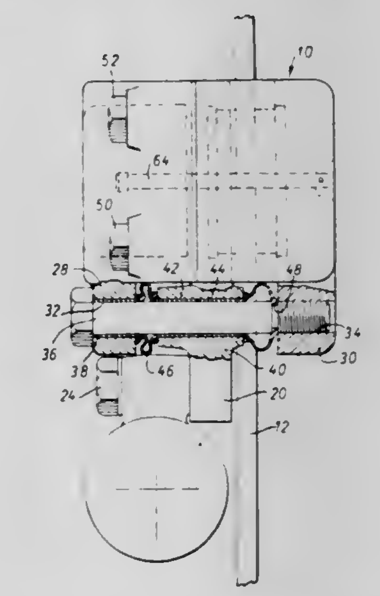


1. In a caliper brake assembly having a frame journalling on opposite sides thereof opposed first and second arms for rotation relative to the frame, the arms journalling first and second brake shoes respectively and cooperating with a brake actuator, a member to be braked being positioned between the shoes, a self-balancing means to equalize essentially wear of brake linings being characterized by:

a. a pair of balancing links, each link hingedly interconnecting a particular shoe on one side of the frame with an arm on the opposite side of the frame,

so that each shoe reflects movement of the opposite arm, so that a movement towards the member by one side of one shoe is reflected by a movement of essentially equal magnitude towards the member by an opposite side of the other shoe.

4,060,154
DISC BRAKES CALIPER AND SUPPORT STRUCTURE
George Windsor Smith, Studley, England, assignor to Girling Limited, Birmingham, England
Continuation of Ser. No. 607,021, Aug. 22, 1975, abandoned. This application Feb. 25, 1977, Ser. No. 772,292
Claims priority, application United Kingdom, Aug. 28, 1974, 37517/74
Int. Cl.² F16D *55/224*
U.S. Cl. 188—73.3 **11 Claims**



1. A sliding caliper brake device for operatively cooperating with a brake disc which is rotatable abouts its central axis, comprising:

i. a torque plate;
ii. a caliper slidably connected to the torque plate;
iii. directly and indirectly operated friction pad assemblies carried by at least one of a pair of members comprising the caliper and torque plate, each friction pad assembly comprising a friction pad carried by a pad backing plate;
iv. a pair of drag taking abutments positioned to prevent lateral displacement of the friction pad assemblies in response to drag forces generated upon engagement of the pads with the brake disc when the disc is rotating;
v. a single guide pin mounting the caliper for axial sliding movement relative to the torque plate, said guide pin being:
a. of cylindrical section;
b. firmly fixed to one of said pair of members comprising the torque plate and the caliper;
c. a snug fit in a cylindrical hole in the other of said two members;
d. not directly contacted by either of said pad backing plates;
e. adapted such that relative sliding between said caliper and torque plate is effected by relative sliding between said guide pin and said hole, and
vi. at least one pad retention pin which:
f. extends through and operatively engages aligned apertures in the caliper, the torque plate and at least one of said pad backing plates such as firstly to directly prevent any movement of the pad carried by said at least one backing plate relative to the caliper and torque plate, in any mode in a plane perpendicular to said

central axis of the brake disc, which is not prevented by said drag taking abutments and secondly to directly prevent pivoting of the caliper about said guide pin relative to the torque plate;

g. is axially located with respect to one of said pair of members by a locking means;

h. is axially withdrawable upon release of the locking means to facilitate the removal of said pad assemblies to be removed without breaking the sliding connection between the caliper and torque plate; and

i. is unprotected by boots and sealing means at any aperture through which it passes.

4,060,155

HYDRAULIC SHOCK ABSORBER

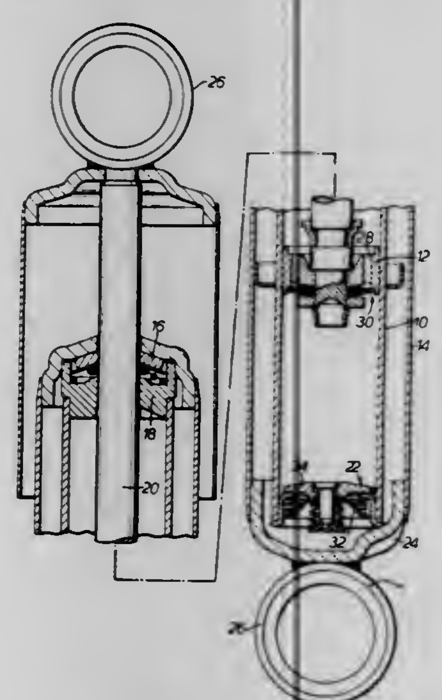
William Arthur Duckett, Ossett, England, assignor to Jonas Woodhead Limited, England

Filed Oct. 20, 1975, Ser. No. 623,989

Claims priority, application United Kingdom, Oct. 23, 1974, 45779/74

Int. Cl.² F16F *9/50*

U.S. Cl. 188—282 **3 Claims**



1. In a hydraulic shock absorber comprising, a piston slideable in a cylinder and having an annular valve seat on one side and having at least one flow passage providing communication between the area within the said annular valve seat and the other side of the said piston, a first valve disc of resilient sheet material which is arranged to cooperate with the said annular valve seat to control flow through the said flow passage to said one side of the said piston from the other side of the said piston, and which has flow apertures extending therethrough, and a second valve disc of resilient sheet material which is positioned between a portion of the said piston and the said first valve disc and is arranged to cooperate with the surface of the first valve disc around said flow apertures to control flow from said one side of the said piston through the said flow apertures and the said flow passage to the other side of the said piston, the improvement comprising: forming the said flow apertures in said first valve disc each in the shape of an elongate arcuate slot whose center of curvature lies generally at the center of the first valve disc, with said flow apertures together subtending approximately 360° at the center of said first valve disc, whereby fluid flow through said flow apertures will flow radially outwardly between said first and second valve discs around substantially the whole circumference of said valve discs, said shock absorber further including a third valve disc of resilient sheet material supporting said first valve disc on the side thereof opposite to the side facing said valve seat, the third valve disc having flow apertures to accommodate fluid flow from said one side of said piston to said other side thereof, and said flow apertures of said first and third valve discs being so arranged that the total effective cross-sectional area of the flow path through said flow apertures is substantially independent of the relative angular position of said first and third valve discs.

4,060,156

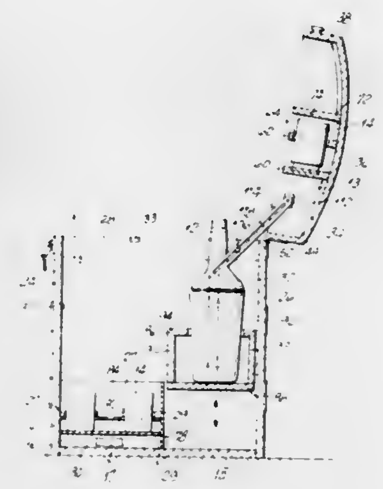
LIQUOR TRUNK

Gary Gast, 515 Janssen St., Combined Locks, Wis. 54113

Filed Feb. 17, 1977, Ser. No. 769,504

Int. Cl.² A45C *5/12, 13/02*

U.S. Cl. 190—30 **9 Claims**



1. A liquor trunk for storage of glasses and liquor bottles, which comprises:

a. a body having a base, a pair of upwardly extending end walls, an upwardly extending front wall, an upwardly extending rear wall, an open top, and a chamber therein;

b. a cover member having a top; a pair of downwardly extending end walls, a downwardly extending rear wall, a downwardly extending front wall, an open base, and a chamber therein;

c. a plurality of hinge elements hingeably joining said rear wall of said body to said rear wall of said cover member;

d. a first elongated board element longitudinally disposed in said chamber of said cover member;

e. a second elongated board element longitudinally disposed in said chamber of said cover member above said first board element, said second board element having a plurality of openings therethrough, said glasses received through said opening to rest on said board element;

f. a pair of channel guide bars, one of said guide bars disposed on an inner surface of each said end wall of said cover above said second board element;

g. a deformable male snap element disposed in each of said guide bars;

h. an elongated board member, the ends of said board member slideably disposed in said guide bars;

i. a female snap element disposed in each said end of said board member, each said male snap element removably received into one of said female snap elements, said board member engaging against said glasses thereby maintaining said glasses in position;

j. a glass rack longitudinally aligned in a forward portion of said chamber of said body;

k. a bottle rack longitudinally aligned in said chamber rearwardly of said glass rack; and

l. means for vertically moving said bottle rack up and down within said chamber of said body, said vertically moving means dependent upon opening and closing of said cover member.

4,060,157

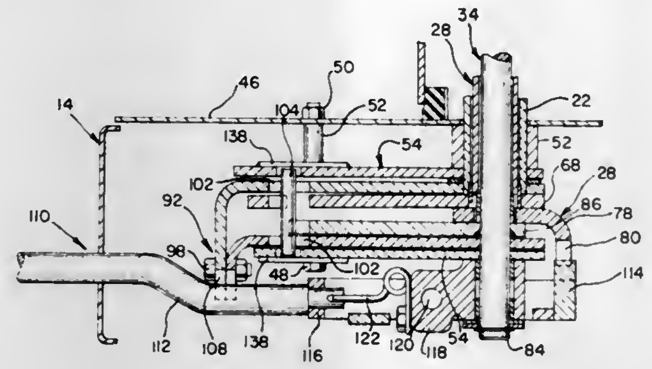
CONTROL MECHANISM

Thomas P. Hillstrom, Hinsdale, Ill., assignor to International Harvester Company, Chicago, Ill.

Filed Aug. 20, 1976, Ser. No. 715,749

Int. Cl.² G05G *9/16*

U.S. Cl. 192—4 A **20 Claims**



1. A control mechanism for a vehicle, including:

a support rigidly attached to said vehicle, having a cam aperture with a first and second distinct elements and a transition portion therebetween, a roller retainer and a shaft aperture;

a first control assembly rotatably carried by said support in said shaft aperture, having a tubular section through said shaft aperture and a cam slot corresponding positionally to said transition and first cam aperture elements;

a first controllable member operably connected to and movable through a control range by rotation of said first control assembly;

a second control assembly rotatably carried by said first control assembly in said tubular section, having a conduit section through said tubular section and a tooth notch;

a second controllable member operably connected to and movable through a control range by rotation of said second control assembly;

a third control assembly rotatably carried by said second control assembly in said conduit section, having a shaft section through said conduit section and a cam groove corresponding positionally to said transition portion and second element;

a third controllable member operably connected to and movable through a control range by rotatation of said third control assembly;

a drive assembly rotatably carried by said tubular section and said shaft section, having a roller slot and a handle notch;

a roller constrained by said roller retainer and positioned within said transition cam element, said cam slot, said cam groove, and said roller slot;

a handle rotatably and pivotally carried by said shaft section having a rod selectively engageable with said handle notch and an extension selectively engageable with said tooth notch upon pivotal movement of said handle;

means pivotally and resiliently attached to said handle and journalled to said shaft section for mounting said handle, said means including a centering spring urging said handle to a normal position about said pivotal connection;

means for regulating movement of said handle by selective engagement of said tooth notch or said handle notch when said handle is in its normal position about said pivotal connection and operative, when said handle extension engages said tooth notch, to produce rotation of said second control assembly, and operative, when said handle rod engages said handle notch, to produce selective rotation of said first and third control assemblies by interaction of said roller in said cam aperture, said cam roller slot, said cam groove, and said cam slot.

4,060,158

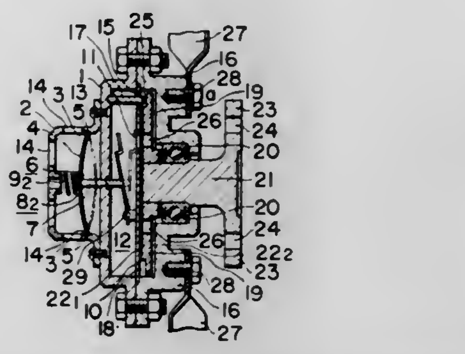
COOLING FAN CONTROL MECHANISM

Yasuhei Kikuchi, Shizuoka, Japan, assignor to Usui International Industry, Ltd., Japan

Filed Jan. 28, 1976, Ser. No. 653,255

Int. Cl.² F16D *35/00, 43/25*

U.S. Cl. 192—82 T **6 Claims**



1. A control mechanism for a fluid clutch coupling a cooler fan with an engine including a mounting base; a cup-shaped, snap-deformable heat-responsive bimetal member with a central apex portion and a concave-convex section, which member is mounted by engagement of its peripheral edge in a annular groove formed in the mounting base; an actuating rod extending from the apex portion of the bimetal member adapted to actuate the fluid clutch and a coil spring disposed to apply an urging force on a central apex portion of the surface of said heat-responsive bimetal member to minimize the difference between a temperature at which the bimetal member snap deforms to couple the engine and fan, and a temperature at which the bimetal member snap deforms to decouple the engine and fan.

4,060,159

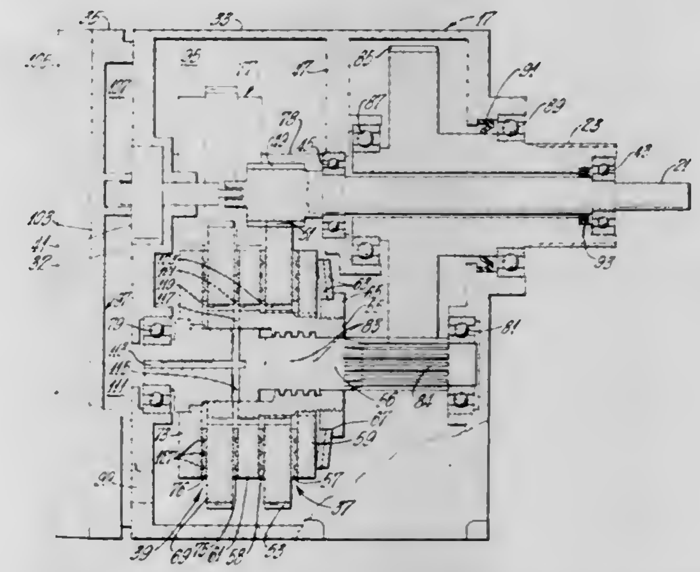
HOIST COOLING SYSTEM

Lynn Harold Chaney, Forrest City, Ark., and Glenn S. Smith, Abqaiq, Saudi Arabia, assignors to Eaton Corporation, Cleveland, Ohio

Filed May 5, 1976, Ser. No. 683,602

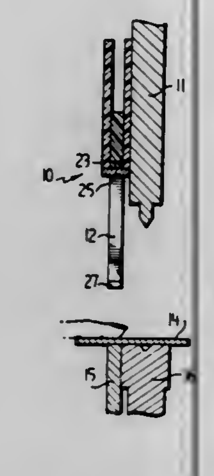
Int. Cl.² F16D *13/72, 13/74*

U.S. Cl. 192—113 B **12 Claims**



1. In a hoist, a housing, an energy absorbing device mounted in said housing, a prime mover mounted in said housing and operatively connected to said energy absorbing device, a pump mounted in said housing and operatively connected to said prime mover, an oil sump formed in said housing, oil passage means formed in said energy absorbing device for distributing oil thereto, and a cover attached to a wall of said housing, said cover having a heat exchange surface formed thereon and including an oil inlet gallery in communication with said sump and with the inlet of said pump, and an oil outlet gallery in communication with the outlet of said pump and with said oil passage means.

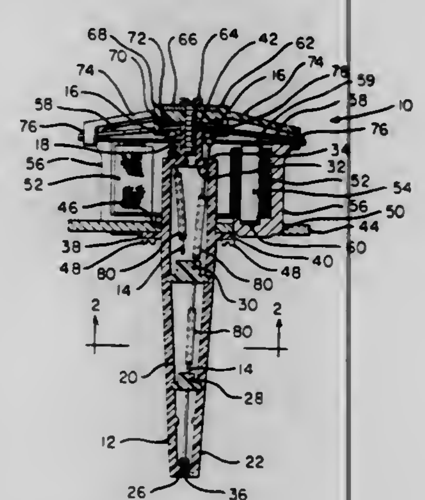
4,060,160
SAFETY GUARD FOR POWER OPERATED MACHINE
Raymond Stanley Lieber, P.O. Box 813, Holloman AFB, N. Mex. 88330
Filed Nov. 17, 1975, Ser. No. 632,627
Int. Cl.^{2} F16D *71/00;* **H01H** *3/16*
U.S. Cl. 192—134 **16 Claims**



1. A safety guard for a power operated machine, which machine utilizes a reciprocating part, including a working tool, located above a fixed bed for supporting a workpiece, comprising;

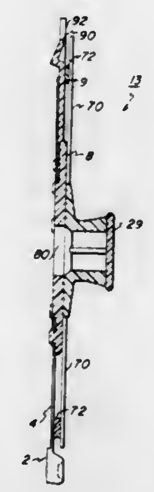
a safety gate mounted to the reciprocating part by a connecting means and made to be free floating in at least one direction, said gate being spaced from said reciprocating part and movable in a path parallel to said working tool;
a first sensing means actuated by movement of said safety gate to sense the presence of a foreign object;
an interfacing means to interface said first sensing means with said power operated machine so the initial motion of the reciprocating part will be stopped when the foreign object is sensed;
a second electrically conductive sensing means secured to said safety gate to sense the presence of a conductive workpiece; and
means for connecting said second conductive sensing means to said power operated machine through said conductive workpiece and said interfacing means for continuing the initial motion of said reciprocating part while said second sensing means is in contact with said workpiece.

4,060,161
VIBRATION DAMPENING MEANS FOR PRINTING MECHANISM
Carl R. Nelson, Derby; David R. Pierce; Noel F. Depew, both of Wichita, and Marlyn F. Harp, Winfield, all of Kans., assignors to NCR Corporation, Dayton, Ohio
Filed Jan. 11, 1977, Ser. No. 758,521
Int. Cl.^{2} B41J *3/04*
U.S. Cl. 197—1 R **11 Claims**



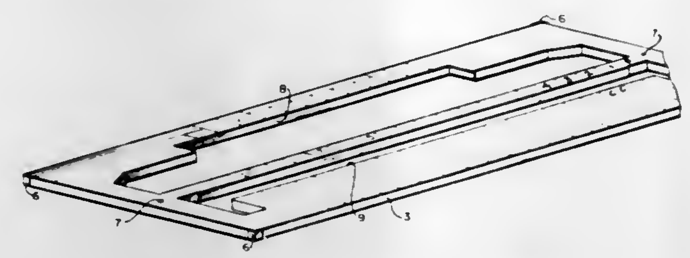
1. A printing mechanism comprising:
frame means including at least two support members;
at least one elongated printing element extending through and supported by said support members and capable of being driven in an axial direction to effect printing;
driving means operatively connected to said printing element for axially driving said element; and
at least one tubular element having a length less than the distance between adjacent support members, and being unattached to said support members and riding freely on said printing element to dampen undesired transverse movement and vibration thereof.

4,060,162
RIBBON LIFT GUIDE
Kenneth R. Frechette, Dallas, Tex., assignor to Stamford, Xerox Corporation, Stamford, Conn.
Filed May 27, 1976, Ser. No. 690,684
Int. Cl.^{2} B41J *1/24*
U.S. Cl. 197—53 **5 Claims**



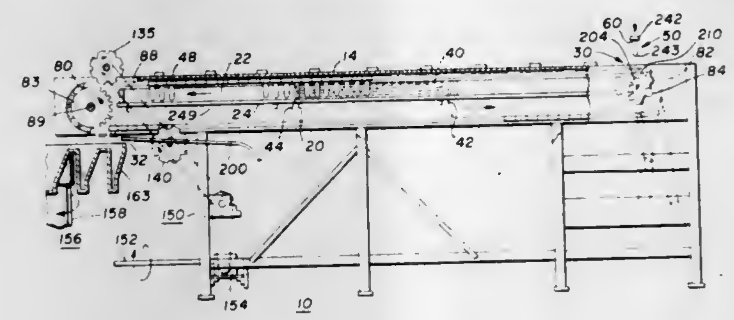
1. In a printer having a platen for supporting a record medium, a laterally movable carrier for traversing a print line, a printing mechanism supported on said carrier for printing characters on said record medium, wherein said printing mechanism includes a print hammer, rotatable daisy wheel print element including a hub, a plurality of spokes extending radially outward from said hub and each spoke terminating in a character slug with a print surface and an impact surface, a ribbon supply means, a ribbon feed means for feeding an ink ribbon past said print element and a ribbon lift means for positioning said ribbon between a first position and then a second position for printing; an improved ribbon lift guide comprising:
a substantially circularly shaped flexible disc member coupled to the hub of the print wheel element on the side of the print wheel containing the print surface of the character slug and positioned in a first plane formed by the print surfaces of said character slugs, said first plane being parallel to and a predetermined distance from a second plane formed by said spokes, said disc having a radius of a predetermined value less than the distance from the center of the hub to the closest point on the print surface of the character slug, the distance between the outer periphery of the disc and the closest point on the print surface being less than the height of the ribbon, said disc being coaxial with the print wheel to guide the ribbon to a print position with respect to the print surfaces during ribbon lift operation; and
an annular member positioned between the disc and the spokes and coupled to the disc to maintain the disc in operable relationship with the print surfaces, said member being coaxial with the disc.

4,060,163
KEYBOARD GUARD
James S. Willingham, No. 1 Shari Drive, Des Peres, Mo. 63122
Filed Feb. 12, 1976, Ser. No. 657,620
Int. Cl.^{2} B41J *29/04*
U.S. Cl. 197—105 **13 Claims**



1. A guard for protecting the keys of a keyboard from being untimely depressed, comprising a guard formed of a rigid material having a thickness equal to or exceeding the heighth of the keys above the keyboard, said guard having at least one aperture provided therethrough allowing for projection of the keys therein when the guard is emplaced, said guard providing for totally surrounding the sides of the composite keys arranged therein to prevent their lateral contact, said guard being reversible upon the keyboard, and said guard aperture generally conforming to the arrangement of the keys upon the keyboard to provide for a proximity of the guard with respect to the surrounded keys.

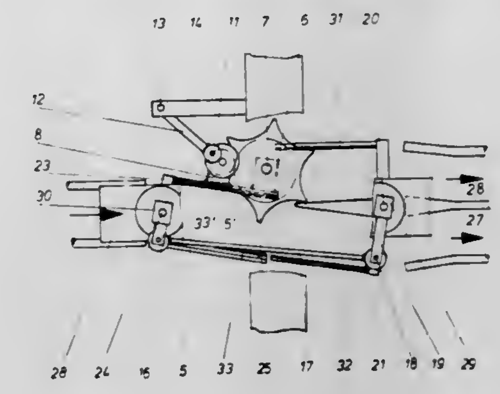
4,060,164
METHOD AND APPARATUS FOR LOADING BLOW MOLDING MACHINES
Joseph R. Reilly, Naugatuck, Conn., assignor to Monsanto Company, St. Louis, Mo.
Filed Dec. 29, 1975, Ser. No. 645,052
Int. Cl.^{2} B65G *37/00*
U.S. Cl. 198—424 **4 Claims**



1. A method of charging hot preforms to loading hoppers circularly moving in a substantially horizontal plane at a blow molding machine which comprises:
Linearly continuously advancing such preforms supported in side-by-side relationship above such hoppers; and
Selectively removing supports from beneath individual ones of the side-by-side positioned preforms according to a predetermined sequence to permit each preform to drop by gravity into a particular one of said hoppers then passing beneath it.

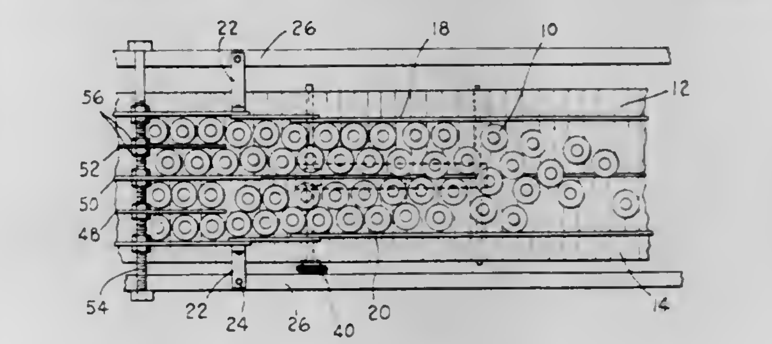
4,060,165
DIVERTER FOR DISTRIBUTING ARTICLES SUPPLIED IN ONE LINE AMONGST A PLURALITY OF CONVEYING TRACKS
Everhard Bauer, Hudeweg 2, 479 Padervorn, Germany
Filed May 11, 1976, Ser. No. 685,256
Claims priority, application Germany, May 12, 1975, 2521054; June 6, 1975, 2525356
Int. Cl.^{2} B65G *47/26*
U.S. Cl. 198—442 **9 Claims**

1. Apparatus for distributing articles supplied in one line to a plurality of conveying tracks, comprising lateral guides which bound a passage for the articles to be distributed, said guides being pivotable about a vertical axis disposed at the inlet region of the guides, a starwheel rotatable about a vertical axis mounted on one lateral guide and arranged to project into the pivotable passage formed by the guides so that it is stepped by one tooth by each of the articles passing through, wherein said



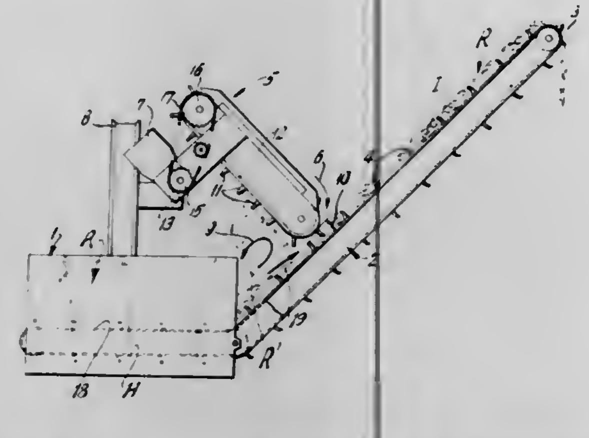
starwheel is connected to gear means that drive a crank on which there is mounted a pivotable steering member of which the other end is pivotably mounted about a stationary vertical axis so that the free end of the passage formed by the guides swings between the conveying tracks upon rotation of the starwheel.

4,060,166
CONTAINER SEPARATOR
Thomas P. Hartness, 305 Bridgewater Drive, and Robert G. Hartness, 203 Wilmington Road, both of Greenville, S.C. 29607
Filed Nov. 5, 1976, Ser. No. 739,126
Int. Cl.^{2} B65G *27/10*
U.S. Cl. 198—446 **3 Claims**



1. A device for aiding in separating a comingled mass of containers being moved on at least a pair of driven conveyor belts into rows, said conveyor belts being positioned adjacent each other with the inner edges thereof running parallel to each other, vertically extending divider plates are carried above the conveyor belts for separating and maintaining the containers in rows as they are moved on the conveyor belts, said device comprising:
a. an eccentrically mounted cam carried below said conveyor belts in engagement with the inner edges of said belts directly ahead of said divider plates, and
b. means for alternately raising and lowering said cam means causing said inner edges of said conveyor belts directly ahead of said divider plates to be reciprocally raised and lowered, said containers being moved on said belts being raised and lowered with said belts,
whereby the movement of said containers caused by being raised and lowered prevents said containers from becoming jammed against the ends of said divider plates as they are separated into rows.

4,060,167
METHOD FOR CONVERTING INTERMITTENT TO CONSTANT REFUSE FLOW
George Edwin Smith, East Amherst, N.Y., assignor to Union Carbide Corporation, New York, N.Y.
Filed July 12, 1976, Ser. No. 704,385
Int. Cl.² B65G *15/00*
U.S. Cl. 198—622 **5 Claims**

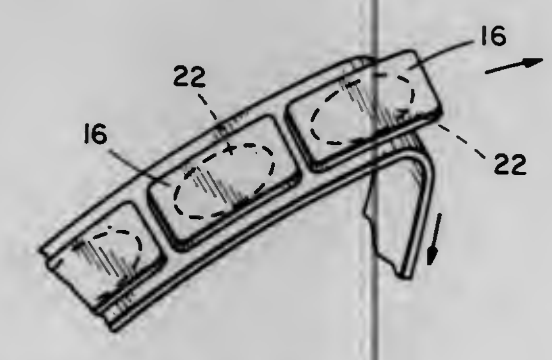


1. A method for providing surge capacity and for smoothing out the flow rate of refuse in a refuse feed system wherein refuse is loaded onto a moving conveyor at variable or intermittent rates, comprising:

1. preventing excess refuse from passing beyond a given point on the conveyor by providing a rotating leveler spaced at a predetermined distance from the conveyor so as to permit a desired level of refuse to remain on the conveyor beyond the leveler, and
2. rotating the leveler at a surface speed greater than twice the speed of the conveyor, the direction of travel of the leveler being opposite to the direction of travel of the refuse on the conveyor,

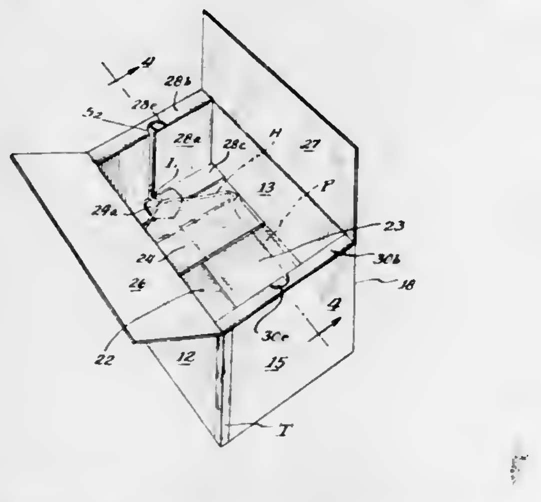
whereby refuse in excess of the amount desired to be retained on the conveyor is caused to be retained behind the leveler as a rolling inventory of refuse, thereby causing the refuse to be discharged from the conveyor at a constant and uniform rate.

4,060,168
LABEL CONSTRUCTION
Robert A. Romagnoli, New York, N.Y., assignor to Fleming-Potter Company, Inc., Peoria, Ill.
Filed Oct. 31, 1975, Ser. No. 627,593
Int. Cl.² B65D *75/54, 77/28;* **B32B** *31/18*
U.S. Cl. 206—216 **14 Claims**



1. An improved label assembly comprising, in combination:
a. a plurality of separate labels, each of said labels having a print side and an adhesive side; and
b. label backing material, said backing material including a plurality of cut portions, each of said cut portions having a smaller area than said separate labels, each of said cut portions having a side for printing, said backing material having said labels separated and mounted thereon with the adhesive side of each label being in generally opposed relation to one of said cut portions, said separate labels, backing strip and cut portions positioned so that said separate labels are carrried on said backing strip and when said labels are removed from said backing strip said cut portion is also removed from said backing material in opposed relation to said separate label.

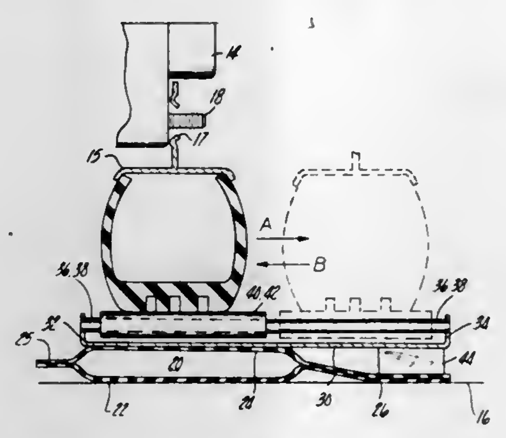
4,060,169
FOLDABLE CONTAINER
Larry R. Hildebrand, Center Valley, and Siegfried K. Pausinger, Allentown, both of Pa., assignors to Packaging Corporation of America, Evanston, Ill.
Filed June 16, 1976, Ser. No. 696,534
Int. Cl.² B65D *85/18, 5/22*
U.S. Cl. 206—289 **12 Claims**



1. A foldable container formed from a single blank of sheet material for accommodating a product having a hanger loop associated therewith, said container comprising a bottom for subtending the accommodated product; a pair of opposed side walls extending angularly from said bottom; a pair of opposed end walls extending angularly from said bottom and disposed intermediate said side walls, adjacent walls being integral with one another and separted from one another by a foldline, said walls and bottom cooperating to form an open top product-receiving compartment; and a top section foldably connected to at least one side wall for overlying and closing the compartment open top; one end wall including an outer panel and an inner panel connected thereto by a second foldline, the inner panel defining a surface portion of said compartment and being provided with an elongated hanger loop-receiving slot angularly disposed relative to said bottom and having an end portion thereof intersecting said second foldline, said inner panel being disposed in spaced, face to face relation with said outer panel and being foldably connected thereto.

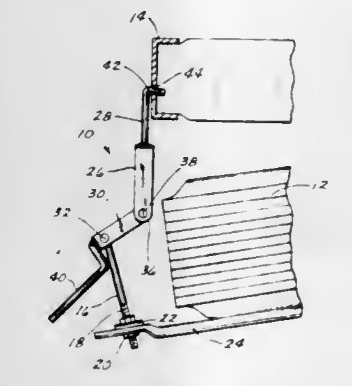
4,060,170
TIRE MOUNT-DISMOUNT MECHANISM
David F. Walters, Royal Oak, Mich., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.
Filed Oct. 8, 1976, Ser. No. 730,919
Int. Cl.² B60B *29/00*
U.S. Cl. 214—331 **1 Claim**

1. Vehicle tire mount-dismount mechanism comprising an inflatable-deflatable pillow **(20)** having a flap-like extension **(26)** adapted to rest on the terrain surface; an upstanding foot structure **(44)** of rectangular cross-section and of a given height carried on the extension remote from the pillow; a rigid base **(30)** extending along the upper surface of the pillow and onto the foot structure, whereby said base is conjointly supported by the pillow and foot structure; two parallel support rods **(36** and **38)** mounted on said rigid base in spaced apart relation; and cradle-forming rollers **(40** or **42)** individually slidable and rotatable on the support rods; the rollers having axial lengths slightly greater than the tread width of a vehicle tire; the support rods having lengths at least twice the lengths of the rollers; the mechanism being constructed so that the pillow and rollers are positionable directly beneath a tire on the vehicle, whereby the pillow can be inflated to elevate the rollers into weight-absorbing engagement with the tire; the support rods being of such length that the cradled tire can be drawn away from the vehicle to a position completely disengaged from the vehicle axle; the rollers being freely rotatable on the support rods whereby a cradled tire is enabled to roll on the roller surfaces as said tire is turned about its axis during a



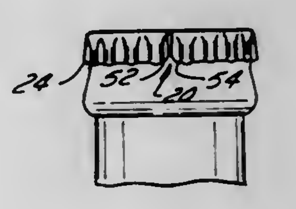
stud-hole alignment operation, said rigid base comprising a plate having upturned edges at opposite ends of the plate; said support rods having their ends anchored in holes in said upturned edges of the plate, whereby the plate-rod assembly functions as a single movable unit and further the said given height of the foot structure is approximately equal to the height of the pillow when said pillow is inflated.

4,060,171
QUICK CATCH AND RELEASE CLAMP FOR RELEASEABLY HOLDING A SPARE TIRE OF A VEHICLE
Duane H. Ludwig, Box 216, Sioux Rapids, Iowa
Filed Apr. 8, 1976, Ser. No. 675,152
Int. Cl.² B62D *43/04*
U.S. Cl. 214—451 **8 Claims**



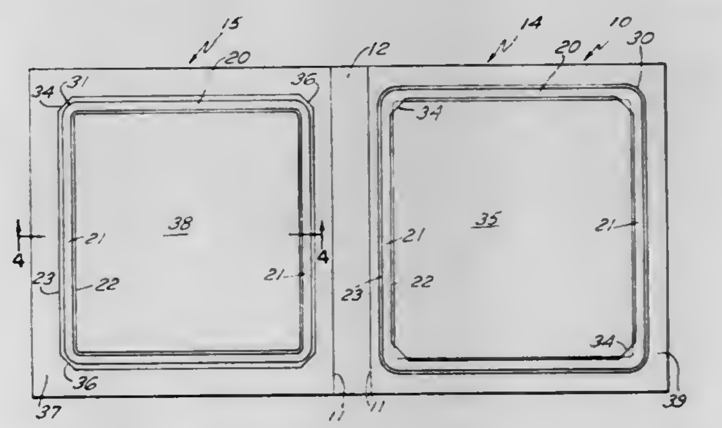
1. A quick catch and release clamp for supporting a tire beneath the frame of a vehicle comprising,
an upstanding support post having top and bottom ends, said bottom end being adapted for rigid but detachable attachment to a tire-holding brace,
a clamp means comprised of an inverted U-shaped bottom member extending toward the top of said support post and a rigid inverted L-shaped hooked top member fixedly attached to the bridge portion of said U-shaped member and projecting outwardly therefrom, adapted for engaging an aperture of said vehicle frame for releasable securement thereto,
a toggle link pivotally mounted at one end to the top portion of said support post and pivotally mounted at its other end to the bottom portion of said clamp means,
means to move part of said toggle link, including the pivotal mounting thereof to the top portion of said support post, above the pivotal mounting at said other end of said toggle link and past the longitudinal axis of said clamp means to a locked position, and
a tire holding brace means associated with said support post for movement into a tire securing position upon movement of said toggle link to its locked position,
whereby when said clamp means is in its unlocked position the L-shaped hooked member may be easily released from said aperture and the brace means lowered to facilitate loading or unloading of a tire.

4,060,172
CONTAINER AND CLOSURE CAP
Arnaldo Amabili, 7680 Dollier, St. Leonard, Quebec, Canada
Continuation-in-part of Ser. No. 670,060, March 24, 1976, abandoned. This application Oct. 26, 1976, Ser. No. 735,783
Int. Cl.² B65D *41/12*
U.S. Cl. 215—295 **10 Claims**



1. In combination, a container comprising a body portion enclosing a cavity adapted to retain a commodity therein, a dispensing aperture communicating with said cavity, and a cylindrical neck having a rim surrounding said aperture; and, a closure cap, said closure cap comprising a top crown covering said aperture and seating on said rim, and a skirt depending from said top crown in a sealing relationship with said neck, said skirt having a pair of diametrically opposed slots therein, said slots being defined by a pair of side walls and a top wall, each of said slots extending from a free marginal edge of said skirt to said top crown, said side walls merging arcuately with the free marginal edge of said skirt and with the top wall, said side walls being spaced apart proximate the top wall and tapering inwardly in the direction of the free marginal edge.

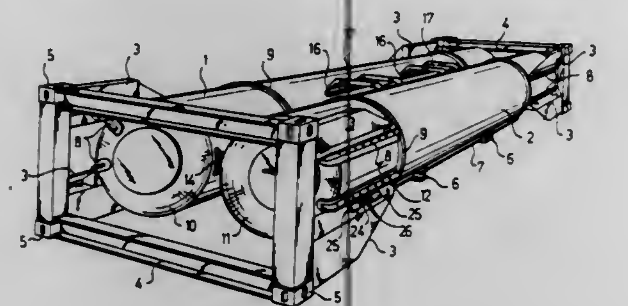
4,060,173
CONTAINER
Nils J. Dahl, Barrington, R.I., assignor to Crystal Thermoplastics, Inc., Ashton, R.I.
Filed Nov. 15, 1976, Ser. No. 741,861
Int. Cl.² B65D *1/34, 1/44, 5/36*
U.S. Cl. 220—4 B **2 Claims**



1. A container formed from a flexible sheet of resilient thermoplastic resin and having a body section and a cover section hinged together by a hinge integral with both sections, each section having a closure wall with side and end walls of a size to telescope one into the other when the sections are in closed relation, said side and end walls meeting in angular relation to form corners, all of said corners of the inner telescoping walls being undercut in a plane at an angle to both meeting walls on their outer surfaces and all of said corners of the outer telescoping walls being undercut in a plane at an angle to both meeting walls on the inner surfaces whereby the undercut

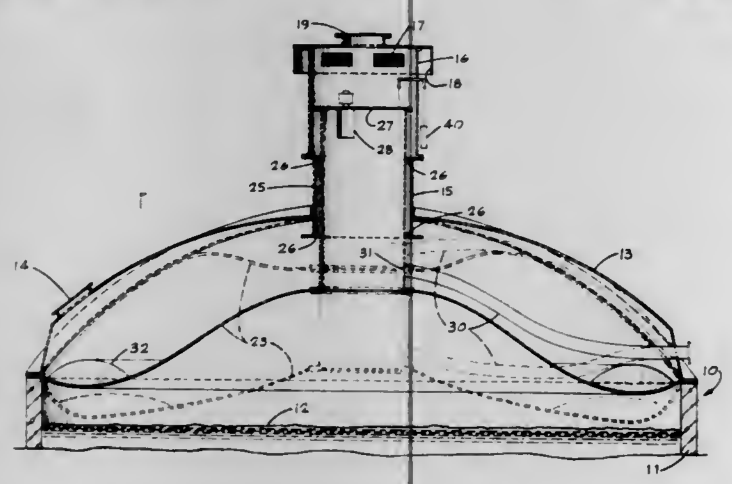
corners of the sections will lock at all of the corners when the body and cover sections are in closed position.

4,060,174
SELF-CONTAINED DOUBLE-TUBULAR TRANSPORT CONTAINER
Helmut Gerhard, Weitefeld, Sieg, Germany, assignor to Westerwalder Eisenwerk Gerhard KG, Germany
Filed Sept. 17, 1975, Ser. No. 614,308
Claims priority, application Germany, Sept. 26, 1974, 7432279[U]
Int. Cl.^{2} B65D *21/02*
U.S. Cl. 220—23.4 **14 Claims**



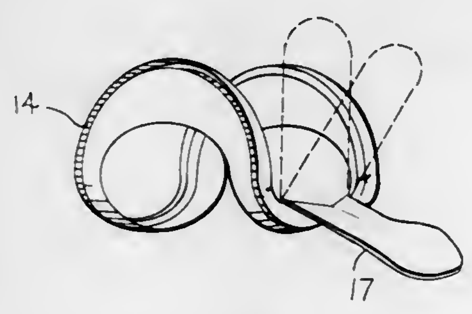
1. A self-contained double-tubular transport container comprising two end sections with corner fittings for stacking and lifting the container; two adjacent cylindrical liquid tanks extending between the end sections; upper and lower saddle elements arranged diagonally with respect to the tank cross-section for connecting the cylindrical tanks to the end sections; at least two intermediate saddles arranged at different locations along the length of the container and extending along the underside thereof transversely to a longitudinal direction for interconnecting the cylindrical tanks; transverse connecting members arranged above the horizontal center line of the cylindrical tanks; and first, second and third T-members welded to suitable regions of the cylindrical tanks, said T-members extending in the longitudinal direction of said tanks and being bolted respectively to the saddle elements, the intermediate saddle and the transverse connecting members.

4,060,175
DIAPHRAGM TANK COVER
John R. Rysgaard, Sr., St. Paul, Minn., assignor to Fiberglass Specialty Co., Inc., St. Paul, Minn.
Filed July 2, 1976, Ser. No. 702,218
Int. Cl.^{2} B65D *87/08;* **F17B** *1/26*
U.S. Cl. 220—85 B **7 Claims**



1. In a tank for anerobic digestion of sludge including a wall forming a container for holding sludge and a fixed outer cover mounted over said tank, the improvement comprising a flexible diaphragm sealingly attached to said wall and overlying said tank below said cover and above sludge in the tank to form a gas tight chamber below the diaphragm, said diaphragm being supported at its periphery on said wall and spaced above sludge in the tank, a vent stack for regulating pressure attached to said diaphragm in the center portions thereof and opening directly to the chamber below the diaphragm and, passing through said fixed cover, means to slidably guide said vent stack with respect to said cover to guide said diaphragm and permit said diaphragm and stack to move between upper and lower positions spaced at different heights above said sludge as a function of gas volume under said diaphragm formed by said sludge, and to maintain a substantially constant pressure through out movement of said diaphragm between its upper and lower positions, and weight means on said diaphragm comprising a ballast material on the upper surface of said diaphragm which is movable with said diaphragm as the gas volume changes below said diaphragm.

4,060,176
CONTAINER LID-SPOON COMBINATION
John R. Tobiasson, 3315 Steiner St., No. 15, San Francisco, Calif. 94123
Filed Aug. 8, 1975, Ser. No. 603,095
Int. Cl.^{2} B65D *51/24*
U.S. Cl. 220—212 **8 Claims**

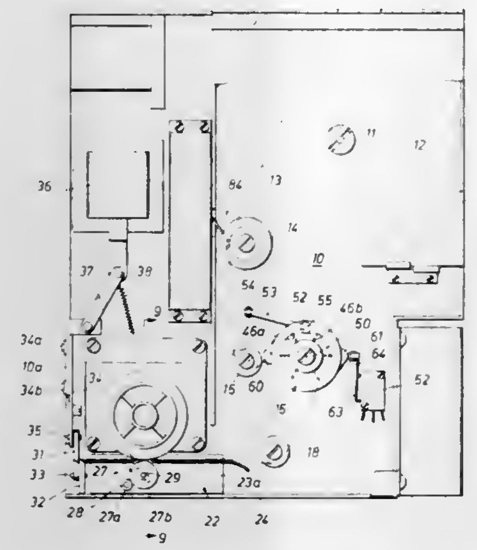


1. A container lid convertible between the first position to function as a lid for closing the top of a container for food and a second position wherein it is folded to function as a spoon for removing and eating the contents of the container, comprising:

in its first position a generally disc-shaped, snap-on food container lid comprising a generally discoidal removable planar covering for the mouth of said container, and a peripheral edge portion defining a rim channel circumscribing the body of said covering for receiving a complimentary lip on said container, said rim channel having an inner and an outer edge; a planar flap at the mid-portion of said covering having an edge contour generally corresponding to that of the planar projection of a bowl of a spoon with the base of said spoon bowl edge contour permanently secured to said covering along a straight fold line that extends between two points at least closely adjacent said inner edge of said rim channel of said covering; and

in its second position a spoon having said flap bent on said straight fold line at said base outward from said covering through approximately 180° from said first position so as to be overlapping said rim channel; said flap projecting outwardly from said covering and said rim channel for a major portion of its length as measured along the longitudinal axis of said flap perpendicular to said straight fold line; both said covering and said rim channel being folded upon themselves about the longitudinal axis of said flap so that said flap is curved about its longitudinal axis to form a spoon bowl, so that the fold line and the corresponding arcuate shape of said rim channel and said covering overlaid by said flap provide structural rigidity to the connection between said spoon bowl and said handle, and said rim channel strengthens said peripheral edge portion to resist bending under pressure of said spoon bowl when said spoon bowl is in use.

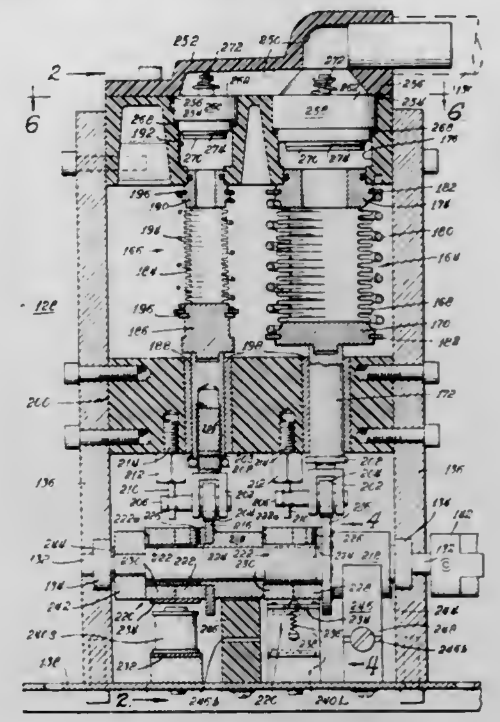
4,060,177
STAMP DISPENSING APPARATUS
John L. Surber, Jr., 11818 Warfield Drive, San Antonio, Tex. 78216
Continuation of Ser. No. 548,248, Feb. 10, 1975, abandoned. This application July 22, 1976, Ser. No. 707,656
Int. Cl.^{2} G07F *11/66*
U.S. Cl. 221—25 **6 Claims**



1. Apparatus for dispensing items, such as stamps, tickets, and the like from an elongated web of said items formed by a plurality of the items connected through a backing strip, rows of perforations, and the like, comprising a housing having an opening through which the web is moved when such items are being dispensed, means for moving the web through the opening, means for actuating the web moving means, means for stopping the web moving means when a preselected number of such items have been dispensed, and means to position the web for the dispensed item or items to be severed at a connection between such items and the remaining web, said positioning means including a wheel mounted to rotate freely around an axis transverse the direction of movement of the web, said wheel being positioned for the web to wrap around a portion of the wheel as it moves toward the dispensing opening and having a plurality of ridges parallel to the axis of rotation and spaced to engage the web at the connections between the items forming the web as the wheel is rotated by the moving web, and means providing a resilient force on the web to hold the web in engagement with the wheel sufficient to prevent slippage between the wheel and the moving web, and said means for stopping the web moving means including means responsive to the position of the wheel to stop the web moving means when a preselected number of such items have been dispensed.

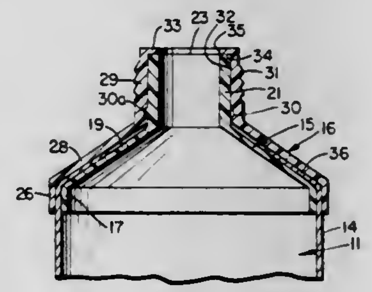
4,060,178
METERING PUMP
Herbert L. Miller, Roselle, Ill., assignor to Miller Mfg. Co. of Schiller Park, Inc., Addison, Ill.
Continuation of Ser. No. 468,935, May 10, 1974, abandoned, which is a division of Ser. No. 305,255, Nov. 10, 1972, Pat. No. 3,851,798. This application Aug. 18, 1975, Ser. No. 605,630
Int. Cl.^{2} G01F *11/08;* **F04B** *9/04, 13/00*
U.S. Cl. 222—14 **9 Claims**

1. A metering pump comprising a pair of positive displacement pumping chambers having different displacement volumes, liquid supply passage means having an inlet and in communication with both of said pumping chambers, inlet check valve means for permitting liquid flow into said pumping chambers during expansion thereof from said liquid supply passage means, liquid discharge passage means having an outlet and in communication with both of said pumping chambers, outlet check valve means for permitting the discharge of metered liquid from said pumping chambers upon contraction of the same into said discharge passage means, power means for expanding and contracting said respective chambers automatically through a preselected number of repetitive identical pumping cycles, and means independently controllable for each of said pumping chambers for automatically and selectively interconnecting of disconnecting said power means and



a respective pumping chamber for operating each pumping chamber for a required number of cycles corresponding to said preselected number to automatically meter a precise volume of liquid into said discharge passage means.

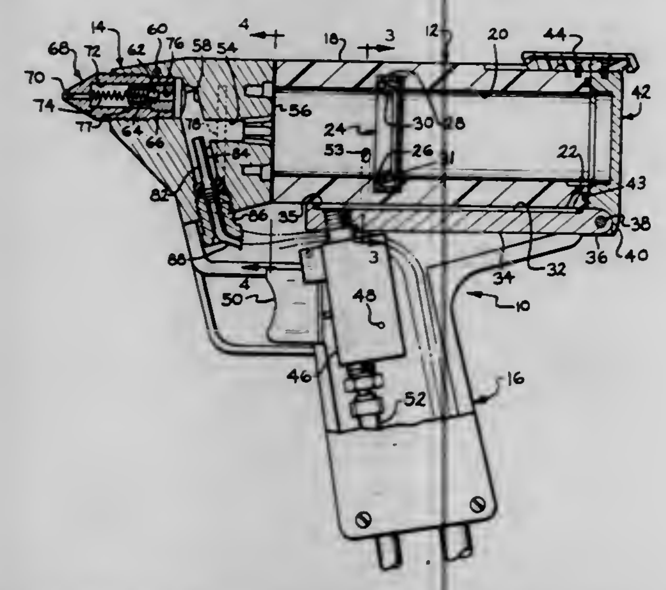
4,060,179
COLLAPSIBLE TUBE STRUCTURE
Russell Park McGhie, Somers, N.Y., assignor to Colgate-Palmolive Company, New York, N.Y.
Continuation of Ser. No. 249,658, May 2, 1972, abandoned. This application July 26, 1974, Ser. No. 492,213
Int. Cl.^{2} B65D *35/00*
U.S. Cl. 222—92 **4 Claims**



1. A collapsible tube assembly comprising a tubular body having a flexible side wall that includes a sheet of ductile metal coextensive throughout, a dispensing head structure of relatively stiff solid non-metallic synthetic plastics material at one end of said body, said head structure comprising an integral inner element composed of relatively hard synthetic plastics material having an annular tapered shoulder and an annular skirt around the larger end of the shoulder having an external smooth cylindrical surface extending longitudinally from an annular corner junction with the outer periphery of said shoulder, said body at one end having a longitudinally extending cylindrical wall region of appreciable area closely surrounding said cylindrical skirt surface and terminating in an annular end region inwardly turned over said junction to overlie the outer surface of said shoulder in a substantially dead fold crimped condition, and an integral outer element of said head structure composed of a relatively resilient synthetic plastic material having an annular tapered shoulder closely overlying said shoulder of the inner head element to clamp said crimped inturned body end region between said shoulders to anchor said body against longitudinal separation from said head struc-

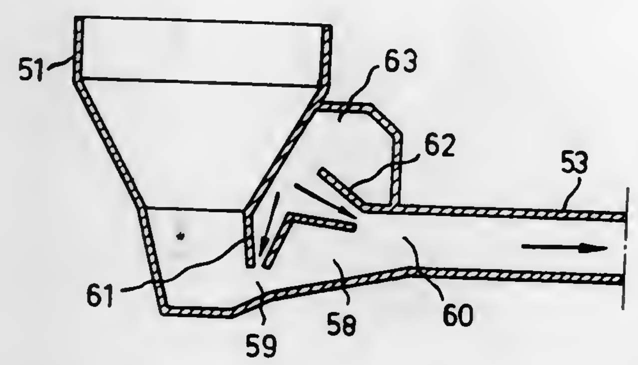
ture, a reduced diameter hollow neck projecting axially from the smaller end of the shoulder of said outer head element, a hollow neck projecting axially from the smaller end of the shoulder of said inner element axially forced into a tight smooth surfaced friction fit within and lining said neck of the outer head element, and a longitudinally extending annular skirt around the larger end of the shoulder having an internally smooth cylindrical surface extending longitudinally from an annular corner junction with the outer periphery of the shoulder of said outer head element closely surrounding said cylindrical wall region of the body, said skirts being longitudinally coextensive for a sufficient distance from their respective shoulder junctions to define a longitudinal space between them of constant thickness wherein said cylindrical wall region of the body is tightly radially clamped with a force fit to provide a fluid tight seal independent of the anchor between said shoulders.

4,060,180
TOOL FOR APPLYING ADHESIVE MATERIAL
Howard N. Wieland, Jr., Amherst, Ohio, assignor to TRW Inc., Cleveland, Ohio
Filed Jan. 12, 1976, Ser. No. 648,494
Int. Cl.² B67D *5/62*
U.S. Cl. 222—146 HE **9 Claims**



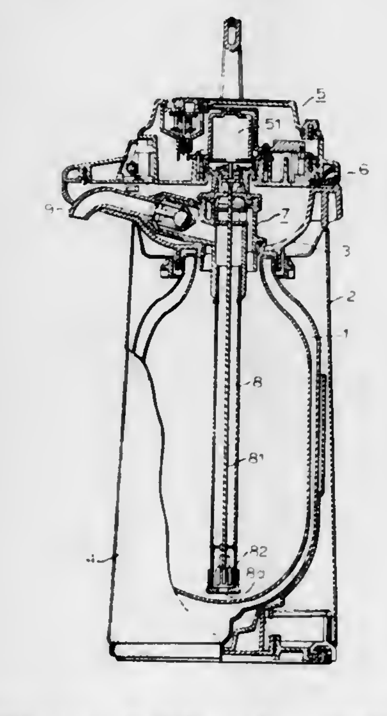
1. An adhesive-applying tool for melting and applying adhesive to a workpiece from a plurality of sequentially fed adhesive cartridges, said tool comprising wall means forming an elongate chamber of substantially uniform cross section throughout its length, heat-conducting means located at one end of said chamber and having an outlet passage communicating with said chamber, said heat-conducting means being effective to heat and melt an end of one of the cartridges in contact with said heat-conducting means at said one end of said chamber, means for closing off the other end of said chamber, resilient sealing means carried by said wall means and extending into said chamber at an intermediate position between said heat-conducting means and said closing means and effective to engage the outer surface of the cartridges of adhesive material inserted into said chamber, said sealing means being fixed and being spaced substantially rearwardly from said heat-conducting means and the melted ends of the cartridges, means for supplying fluid under pressure directly to said other end of said chamber, said sealing means being effective to substantially prevent the passage of fluid under pressure past said sealing means toward said outlet passage, and vent means communicating with said chamber and located proximate said sealing means to vent any fluid under pressure which might leak past said sealing means to prevent the fluid under pressure from directly acting on the molten adhesive to force the molten adhesive from said outlet passage.

4,060,181
METHOD AND APPARATUS FOR CONTROLLING THE TRANSFER OF PARTICULATE MATERIAL
Xavier Roger Grataloup, Montereau, Siene et Marne, France, assignor to Nodet-Gougis (Societe de droit francais), France
Filed June 28, 1976, Ser. No. 700,500
Claims priority, application France, July 3, 1975, 75.20987; Feb. 9, 1976, 76.03519
Int. Cl.² B65D *83/06*
U.S. Cl. 222—193 **15 Claims**



1. A method for controlling the transfer of particulate material from a main hopper to at least one auxiliary storage unit through a hermetic conduit having a rising portion, in which method the particulate substance is entrained in a gas stream whose flow rate varies with the filling of the auxiliary storage unit from the main hopper, wherein the improvement comprises the steps of: forming said auxiliary storage unit to have an increasing resistance to gaseous flow thereinto as the level of particulate material rises therein, creating a partial vacuum at a location in the conduit with the pressure at said location rising as the auxiliary storage units fills with the pressure reaching at least zero when the auxiliary storage unit is full; and introducing the particulate material into the gas stream substantially at said location.

4,060,182
BOTTLE WITH ELECTRICALLY-OPERATED PUMP
Yoshito Kikuchi, 7-37, Otani, Nishinomiya, Hyogo, Japan
Filed Mar. 10, 1976, Ser. No. 665,435
Claims priority, application Japan, Mar. 10, 1975, 50-32783; Mar. 12, 1975, 50-34058; Mar. 12, 1975, 50-34059; Mar. 14, 1975, 50-34850
Int. Cl.² B67D *5/48;* **F04B** *49/02*
U.S. Cl. 222—333 **9 Claims**



1. A container with an electrically operated pump comprising:

a casing open at the top thereof;

a vacuum bottle within said casing, said vacuum bottle having an open mouth at the top thereof;

a funnel-like pour member fitted over the top portion of said casing, the bottom of said member having an opening therein at least as large as the outside diameter of the mouth of said vacuum bottle and fitted around the mouth of said vacuum bottle in the open top end of said casing;

a hollow fistulous plug fitted within the opening in said pour member and extending downward thereform into the mouth of said vacuum bottle;

a first pipe connected to the bottom of said fistulous plug and extending downward therefrom into said vacuum bottle;

a propeller shaft fitted through the top of said fistulous plug and extending downward into said first pipe;

a first clutch member at the top of said propeller shaft above said fistulous plug;

a propeller blade at the bottom of said shaft;

a second pipe connected to the upper portion of said fistulous plug above the mouth of said vacuum bottle and extending substantially laterally therefrom;

box member means fitted over said pour member for covering the top of said pour member; and

electric motor means within said box member means and engagable with said first clutch member on said propeller shaft for rotating said shaft, said motor means comprised of:

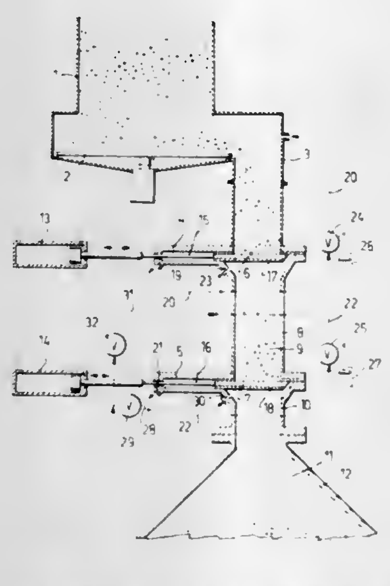
a battery operated electric motor having a rotary shaft extending therefrom,

a second clutch member attached to the end of said rotary shaft and engagable with said first clutch member when said box member is positioned over said pour member;

at least one dry cell battery for operating said motor, and

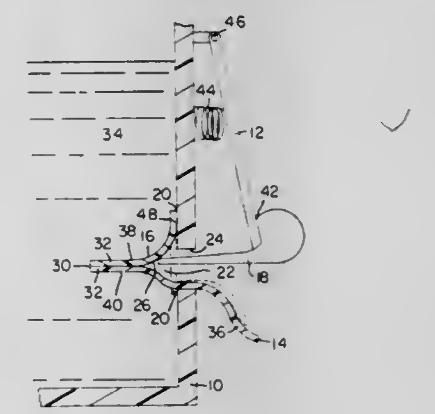
switch means for operating said electric motor.

4,060,183
APPARATUS FOR PORTIONING OF A SOLID VEGETABLE RAW MATERIAL
Juhani Puurunen, Pietniemi, Finland, assignor to Oy W. Rosenlew AB, Pori, Finland
Filed June 14, 1976, Ser. No. 695,757
Claims priority, application Finland, June 17, 1975, 751798
Int. Cl.² G01F *11/36*
U.S. Cl. 222—442 **2 Claims**



1. An apparatus for feeding a solid vegetable raw material into a reactor under pressure through a vertical sluice channel limited by gate means, which apparatus comprises a storage space for the raw material to be fed, a vertical shoot leading from the storage space into the reactor under pressure, at least two slide-type gate means that close the shoot and that define in said sluice channel a sluice space between said gate, actuating means having slide chambers for opening said gate means alternatingly in order to connect said sluice space alternately to the vertical shoot above the gate means and to said reactor, and pressure-levelling channels which pass from the sluice space to said vertical shoot above said gate means and to the reactor under pressure, respectively, so as to bring the sluice space alternately in pressure connection with same, wherein the respective pressure-levelling channels are connected to the slide chamber means of said gate means, but positioned remote from the sluice space so that, before the gate means are opened, the pressure-levelling vapor escaping from the sluice space to the shoot and from the reactor to the sluice space respectively are connected via said slide chambers.

4,060,184
LIQUID DISPENSING CONTAINER
Thomas O'Neil, Sr., 10810 S. Trumbull, Chicago, Ill. 60655
Filed May 4, 1976, Ser. No. 683,010
Int. Cl.² B65D *5/72*
U.S. Cl. 222—501 **2 Claims**

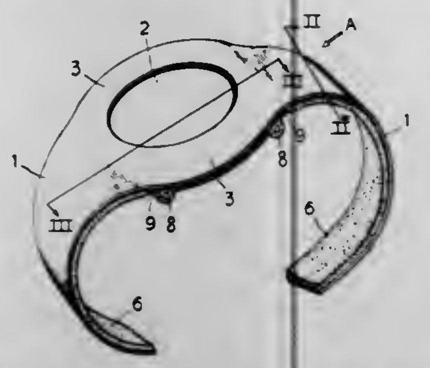


1. The liquid dispensing container comprising a container for the storage of liquid therein, said container having an opening, self closing valve means for selective dispensing of said liquid from said container, said valve means fixedly secured to the interior surface of said container adjacent the entire marginal edges of said opening, said valve means self biased into a closed position preventing said dispensing of said liquid, said valve means responsive to the presence of said liquid within said container, said liquid when within said container urging said valve means in said closed position, valve opening means for manually manipulating said valve means into an open position, wherein said valve means is heat sealed to said container, wherein said valve means is disposed within the liquid storing portion of said container, wherein said valve means comprises a flexible thermoplastic material having a generally tubular shape, one end of said tubular shape having an outwardly radially extending flange, the other end of said tubular shape having the innermost surfaces adjacent thereto in touching engagement, said innermost surfaces being disposed in said touching engagement by the thermoplastic properties comprising said flexible material, wherein said valve opening means comprises a tapered rod, hinging means for hingeably affixing said tapered rod to the outermost surface of said container, biasing means for biasing said tapered rod outwardly from said outermost surface, said tapered rod being disposed through said opening when said biasing means is manually overridden.

4,060,185
BAND FOR WRIST-WATCH
Yoshiyuki Kuroda, Tokyo, Japan, assignor to Citizen Watch Co., Ltd. and Sunarrow Koski, Co., Ltd., both of Tokyo, Japan
Filed Oct. 24, 1975, Ser. No. 625,477
Claims priority, application Japan, Oct. 25, 1974, 49-123184
Int. Cl.² A44C *5/12*
U.S. Cl. 224—4 F **7 Claims**

1. A band for a wrist-watch adapted to fit the arm of a user comprising a thin elastic metal plate having front and rear surfaces and first and second ends, a mounting hole through said metal plate adapted for mounting said wrist-watch behind said mounting hole with the back of the watch adjacent to said rear surface and the face of said watch protruding partly

through said mounting hole, the ends of said metal plate forming a wrist encircling portion for the arm, and the metal plate being one piece, resilient material bonded to the rear surface of said wrist encircling portion, and said resilient material being



wider than said wrist encircling portion whereby said resilient material protrudes outward beyond the side edges of said wrist encircling portion, and the front surface of said metal plate being exposed.

4,060,186

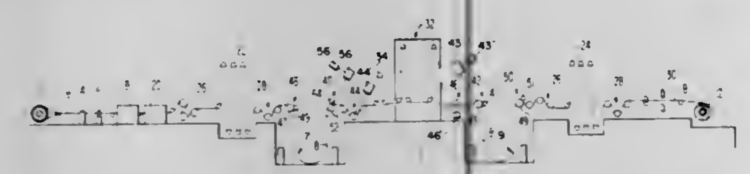
METAL STRIP HANDLING APPARATUS AND METHOD

George A. Nabhan, Chesterton, Ind., assignor to National Steel Corporation, Pittsburgh, Pa.

Filed Nov. 18, 1975, Ser. No. 629,124

Int. Cl.² B65H *17/20, 23/14*

U.S. Cl. 226—1 **13 Claims**



1. In a continuous strip handling apparatus in which there are uncoiling means for withdrawing strip from a coil of the strip at desired strip speeds, coiling means for coiling the strip, strip treating means having an entry end and an exit end between the uncoiling means and the coiling means for carrying out a treatment of the strip which requires tension on the strip controlled independently of the tension on the strip in the remainder of the strip handling apparatus, the combination comprising

a. loop forming means for forming a free hanging loop in the strip of varying length of strip on the uncoiling means side of the strip treating means,

b. the loop forming means comprising drag strip tensioning roll means on the strip exit side of the free hanging loop for withdrawing strip from the free hanging loop,

c. drag generator means associated with the drag strip tensioning roll means for placing controlled back tension on the strip being withdrawn from the loop as the strip moves toward the entry end of the strip treatment means,

d. first auxiliary roll means interposed between the free hanging loop and the drag strip tensioning roll means arranged to make continuous surface contact with the strip over an appreciable circumferential surface area of the auxiliary roll means,

e. independent drag generator means connected to the first auxiliary roll means for placing back tension on the strip entering the drag strip tensioning roll means,

f. independent control means associated with the independent drag generator means for maintaining by means of the first auxiliary roll means a desired back tension on the strip entering the drag strip tensioning roll means, which back tension is independent of the weight of the strip in the loop,

g. second loop forming means for forming a second free hanging loop in the strip of varying length on the coiling means side of the strip treating means,

h. the second loop forming means comprising drive strip tensioning roll means on the strip entry side of the free hanging loop for pulling strip at controlled speed through the strip treating means and feeding strip into the free hanging loop,

i. second auxiliary roll means interposed between the second free hanging loop and the drive strip tensioning roll means arranged to make continuous surface contact with the strip over an appreciable circumferential surface area of the second auxiliary roll means,

j. independent driving motor means connected to the second auxiliary roll means for placing pulling tension on the strip leaving the drive strip tensioning roll means, and

k. second independent control means associated with the independent driving motor means for maintaining by means of the second auxiliary roll means a desired constant pulling tension on the strip leaving the drive strip tensioning roll means, which pulling tension is independent of the weight of the strip in the loop.

9. In the operation of a continuous strip handling apparatus in which there are uncoiling means for withdrawing strip from a coil of the strip at desired strip speeds, coiling meand for coiling the strip, strip treating means having an entry end and an exit end between the uncoiling means and the coiling means for carrying out a treatment of the strip which requires tension on the strip controlled independently of the tension on the strip in the remainder of the strip handling apparatus, loop forming means for forming a free hanging loop in the strip of varying length of strip on the uncoiling means side of the strip treating means, the loop forming means comprising drag strip tensioning roll means on the strip exit side of the free hanging loop for withdrawing strip from the free hanging loop, drag generator control means for placing controlled back tension on the strip being withdrawn from the loop as the strip moves toward the entry end of the strip treatment means, and in which there are second loop forming means for forming a second free hanging loop in the strip of varying length on the coiling side of the strip treating means, the second loop-forming means comprising drive strip tensioning roll means on the strip entry side of the free-hanging loop for pulling strip through the strip treating means and feeding strip into the free-hanging loop while controlling the speed at which the strip is pulled through the strip treating means, the method comprising

a. providing a first auxiliary roll means interposed between the free-hanging loop and the drag strip tensioning roll means,

b. cause the strip to make continuous surface contact with an appreciable circumferential surface area of the first auxiliary roll means,

c. exerting a drag force on the first auxiliary roll means for placing back tension on the strip entering the drag strip tensioning roll means,

d. independently controlling the drag force on the first auxiliary roll means to maintain by means of the first auxiliary roll means a desired, constant back tension on the strip entering the drag strip tensioning roll means, which back tension is independent of the weight of the strip in the loop,

e. providing a second auxiliary roll means interposed between the second free-hanging loop and the drive strip tensioning roll means,

f. causing the strip to make continuous surface contact with an appreciable circumferential surface area of the second auxiliary roll means,

g. exerting a driving force on the second auxiliary roll means for placing pulling tension on the strip leaving the drive strip tensioning roll means, and

h. independently controlling the driving force on the second auxiliary roll means to maintain by means of the second auxiliary roll means a desired constant pulling tension on the strip leaving the drive strip tension roll means, which pulling tension is independent of the weight of the strip in the loop.

4,060,187

PROCESS AND APPARATUS FOR PERMANENTLY CONTROLLING THE MOVEMENT OF WEB OF MATERIAL CONTINUOUSLY DELIVERED TO A MACHINE PROCESSING THE WEB

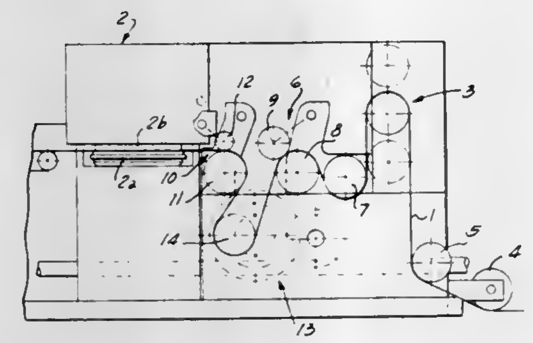
Jean Grob, Chavannes, Switzerland, assignor to J. Bobst & Fils, S.A., Switzerland

Filed Nov. 26, 1976, Ser. No. 745,245

Claims priority, application Switzerland, Nov. 26, 1975, 015311/75

Int. Cl.² B65H *17/22, 23/26*

U.S. Cl. 226—8 **10 Claims**



1. In a process of permanently controlling the movement of a web of material being continuously supplied at a fixed rate of speed from a web feeding means to a machine which operates sequentially on portions of the web with each portion being at a standstill while being operated by the machine, said process comprising feeding the web from the feeding means around a circumferential portion of a roller of a web take-up means and then to the machine, said web take-up means having a pair of members mounted for rotation on a first axis and supporting the roller for rotation on a second axis offset from the first axis so that during one revolution of the take-up means, the length of the path of the web between the feeding means and the machine is continuously changing, the improvements comprising changing the angular position of the second axis of the roller relative to the first axis during each rotation of the take-up means and controlling the rate of change of the angular position in response to the amount of eccentricity of the second axis to the first axis so that the portion of the web within the machine is at a full standstill for a predetermined period which is required for the machine to operate on the portion due to the eccentric movement of the roller absorbing the total length of the web being supplied from the web feeding means during the predetermined period.

4,060,188

IMPACT NAILING ARRANGEMENT

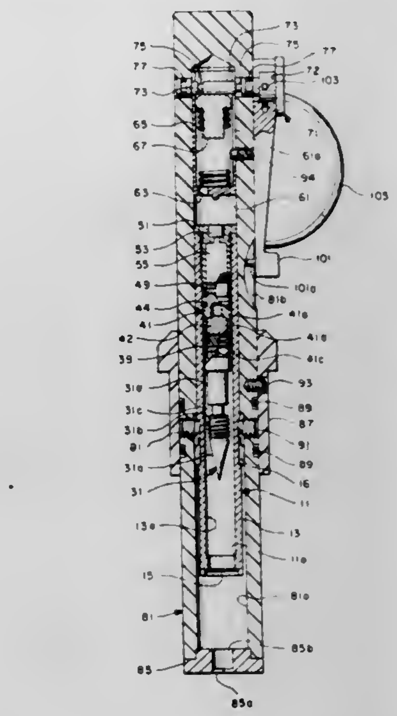
Franklin A. Monson, Glen Arm, Md., assignor to AAI Corporation, Cockeysville, Md.

Continuation-in-part of Ser. No. 367,063, June 4, 1973, abandoned. This application June 3, 1974, Ser. No. 476,010

Int. Cl.² B25C *1/12*

U.S. Cl. 227—9 **13 Claims**

1. An impact nailing arrangement, comprising
support means,
a nail unit carried and directionally oriented by said support means,
and latent energy means disposed in energy-transmitting relation to said nail unit for imparting linear motion to said nail unit,
said nail unit having a forward penetrator section, a hammer section and a medial impact-compression shear section between said penetrator section and said hammer section, and which impact-compression shear section is impact-shearable as a function of energizing said latent energy means and resultant linear motion impacting of said pene-



trator section with a target object to which it is desired to be attached.

4,060,189

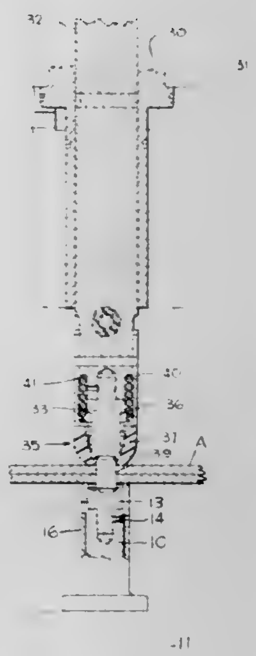
SLUG RIVETING APPARATUS

Joseph Vargo, Jr., West Seneca, and John W. Davern, North Tonawanda, both of N.Y., assignors to General-Electro Mechanical Corporation, Buffalo, N.Y.

Filed Oct. 26, 1976, Ser. No. 735,388

Int. Cl.² B21J *15/36*

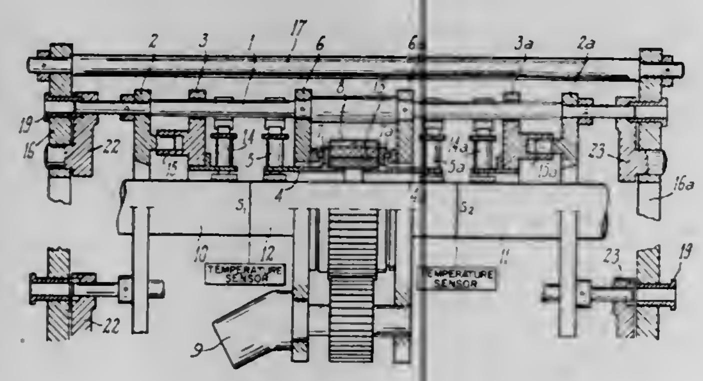
U.S. Cl. 227—53 **9 Claims**



1. Apparatus for inserting cylindrical rivet blanks in workpieces and forming rivet heads at opposite ends thereof comprising opposed rivet head forming anvils adapted to receive workpieces therebetween, at least one of said anvils being movable toward the other, an annular elastomeric rivet blank holder having a bore coaxial with respect to said anvils and adapted to fit over the end of one of said anvils and an outer portion having a bore of slightly less diameter than a rivet blank to receive and hold the same elastically therein, said last mentioned anvil being adapted to move axially relative to said blank holder upon relative movement of said anvils toward each other to expand the blank holder radially outwardly and

move to a rivet blank into the workpieces and against the other of said anvils under pressure to form heads at the opposite ends thereof.

4,060,190
PROCESS FOR JOINING TUBULAR MEMBERS OF GREAT LENGTH
Laurent Paolini, Nice, France, assignor to Naphtachimie, Paris, France
Filed Feb. 21, 1974, Ser. No. 444,515
Claims priority, application France, Feb. 21, 1973, 73.06063
Int. Cl.² B23K *19/02*
U.S. Cl. 228—2 **5 Claims**



1. Apparatus for assembling by friction-welding tubular components made of metal or thermoplastic material, comprising

separate support means for retaining each of the tubular components in endwise alignment with the adjacent ends spaced one from the other;

means operatively associated with the support means and forming a part of said support means for releasably gripping the tubular components to prevent rotational movement about their axes;

a frame;

means operatively associated with the frame mounting each of said support means on the frame for independent movement of one support means relative to the other in the axial direction;

means operatively associated with the frame for supporting a short tubular cuff in axial alignment between adjacent ends of the tubular components;

means operatively associated with the means for supporting the cuff for rotating the short tubular cuff between the ends of the tubular components;

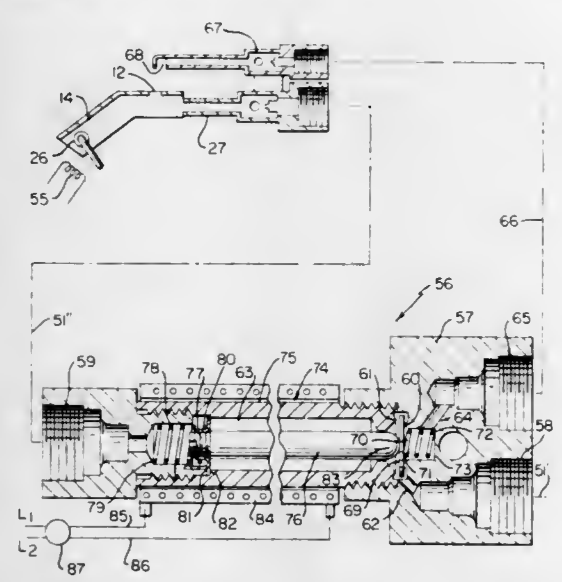
separate drive means mounted on the frame and operatively engaging each of said support means for independent axial movement of each of said support means in the direction to thrust the adjacent ends of the tubular components into pressure contact with the adjacent ends of the cuff to effect softening by heat generation in response to such frictional engagement during rotational movement and to effect consolidation by welding upon cooling after movement of the cuff has been stopped;

means associated with said cuff supporting means for sensing the temperature at the frictionally engaged ends of the tubular members in engagement with the rotating cuff, said separate drive means being responsive to said temperature sensing means to suppress or decrease the thrust on the support means for the tubular component having the higher temperature for equalization of the temperature conditions existing at the respective ends.

4,060,191
METHOD OF SOLDERING WITH PHOSPHORIC ACID SOLDERING FLUX
Edward G. Choby, Jr., Pittsburgh, Pa., assignor to Allegheny Ludlum Industries, Inc., Pittsburgh, Pa.
Division of Ser. No. 535,744, Dec. 23, 1974, Pat. No. 3,985,586. This application June 25, 1976, Ser. No. 699,833
Int. Cl.² B23K *1/00, 35/24*
U.S. Cl. 228—207 **8 Claims**

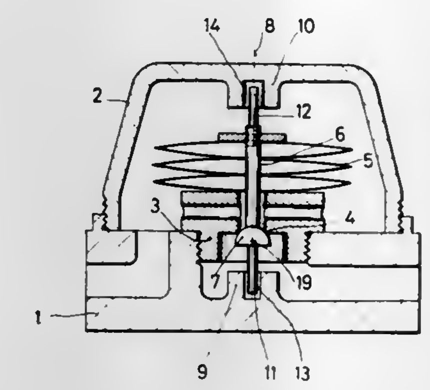
1. In the soldering of copper and copper-plated stainless steel wherein metal selected from the group consisting of copper and copper-plated stainless steel is placed in close proximity with other metal, solder and soldering flux, and wherein said solder is melted and applied to said metals in such a way that it solidifies and effects a bond therebetween; the improvement which comprises utilizing a soldering flux comprised of a viscous fluid; said fluid consisting essentially of, in weight percent, 35 to 85% phosphoric acid, 15 to 65% of organic material selected from the group consisting of polyethers and polyimines and mixtures thereof having an atomic ratio of carbon to ether oxygen plus imine nitrogen between 1.5 and 3.1, and from 0 to 30% water; and organic material having a molecular weight between 4,000 and 20,000.

4,060,192
FUEL CONTROL SYSTEM AND METHOD OF OPERATING THE SAME AND DIVERTER VALVE THEREFOR
Charles D. Branson, Greensburg, Pa., assignor to Robertshaw Controls Company, Richmond, Va.
Division of Ser. No. 558,813, March 17, 1975, Pat. No. 3,989,188. This application Aug. 19, 1976, Ser. No. 715,846
Int. Cl.² G05D *23/02*
U.S. Cl. 236—46 D **5 Claims**



1. A diverter valve construction comprising a housing having a pair of valve seats and a movable valve member for respectively opening one of said valve seats while closing the other of said valve seats, said housing having an inlet leading between said pair of valve seats and having a pair of outlets respectively leading from said pair of valve seats, said housing carrying a rod and tube arrangement operatively associated with said valve member for moving said valve member relative to said seats upon temperature changes sensed by said rod and tube arrangement, said rod and tube arrangement having the tube thereof defining part of one of said outlets of said housing, an electrical heater operatively associated with said rod and tube arrangement for heating the same when said heater is energized, and a timer operatively associated with said heater to energize the same after a lapse of a selected time period of said timer.

4,060,193
THERMALLY CONTROLLED VALVE
Werner Föller, Stuhr-Heiligenrode, Germany, assignor to Gestra-KSB Vertriebsgesellschaft mbH & Co. Kommanditgesellschaft, Bremen, Germany
Filed June 14, 1976, Ser. No. 695,606
Claims priority, application Germany, June 23, 1975, 2527851
Int. Cl.² F16T *1/04*
U.S. Cl. 236—59 **7 Claims**



1. A thermally-controlled valve comprising:

a housing having an internal chamber which is communicative to an inlet and outlet;

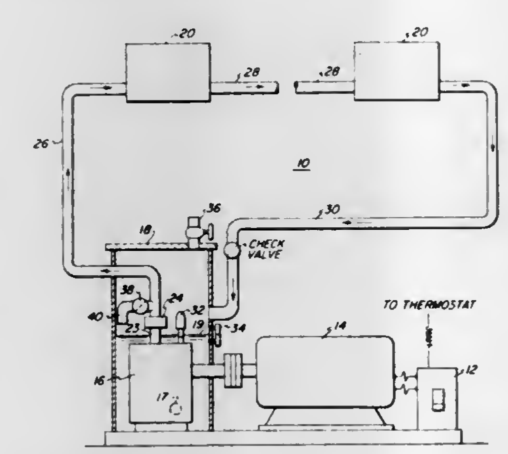
a valve seat element disposed in said housing having a valve seat for communicating the outlet to the inlet;

a valve shaft slidably retained in said housing and extending through the opening defined by said valve seat and including a spherically-shaped, valve member communicative with said valve seat element;

guide bushing elements diposed in said housing and having diametrical clearances for retaining at least a portion of said valve shaft on opposite sides of said valve seat; and

a bimetallic element coupled to said shaft and in engagement with said valve seat element, for opening and closing said valve member, wherein the dimensions of the diametrical clearances between said guide bushing elements and said valve shaft portions are in a ratio with respect to each other which is proportional to the ratio of distances between the spherical center point of said valve member and the points at which said valve shaft radially engages said guide bushing elements when said valve member is in its closed position, whereby, upon engagement of said valve shaft with said guide bushing elements, said spherical center point of said valve member is aligned with the center axis of the opening defined by said valve seat.

4,060,194
HEATING SYSTEM AND ELEMENT THEREFOR
George H. Lutz, 1210 Front St., Binghamton, N.Y. 13905
Filed Mar. 8, 1976, Ser. No. 664,922
Int. Cl.² F24C *9/00*
U.S. Cl. 237—1 SL **11 Claims**



1. A closed heating system comprising:

a liquid storage tank;

a liquid in the liquid storage tank;

a pump connected to the liquid storage tank to pump liquid therefrom;

means for operating the pump;

at least one heat transfer means;

a heat generating unit;

a first liquid distribution line connected from the pump to the heat generating unit;

a second liquid distribution line connected from the heat generating unit to the heat transfer means;

a third liquid distribution line connected from the heat transfer means to the pump to thereby form a closed system;

the liquid being somewhat compressible and having a specific heat in the order of 0.86;

the heat generating unit being formed of a synthetic resin material having a melting point above 300° F and having a plurality of small holes therein through which the liquid is forced, the holes being of such size that a back compressional force is developed in the liquid not flowing through the openings thereby causing the temperature of the liquid to rise and deliver heat to the heat transfer means;

the thermal integrity of the heat generating unit being such that the back compressional force is maintained over the operating temperature range of the liquid.

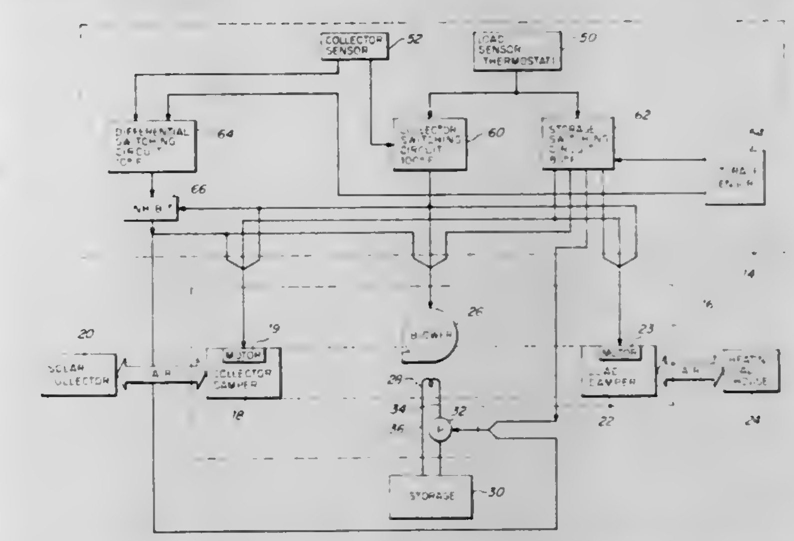
9. In a closed heating system utilizing a liquid having a high specific heat as the heat transfer medium and having storage means for storing the liquid, pump means for pumping the liquid through the system, a heat generating unit to which the liquid is pumped to thereby heat the liquid, heat transfer means for transferring heat from the liquid to the ambient atmosphere, the heat generating unit comprising:

a block of synthetic resin material having a melting point above 300° F;

the block having a plurality of small longitudinal openings through which a small quantity of the liquid is forced to thereby develop a back compressional force in the liquid not flowing through the openings which causes the liquid temperature to rise;

the thermal integrity of the block being such that the back compressional force is maintained over the operating temperature range of the liquid.

4,060,195
SOLAR HEATING CONTROL SYSTEM
Felix Rapp, Jr., Marlboro, and James M. Barron, Framingham, both of Mass., assignors to DIY-Sol, Inc., Marlboro, Mass.
Filed July 26, 1976, Ser. No. 708,872
Int. Cl.² F24J *3/02*
U.S. Cl. 237—1 A **2 Claims**



1. A control circuit for a solar heating system having a solar collector, a heating load and a heat transfer control unit including a collector valve for controlling the flow of heating fluid to and from a solar collector; a load valve for controlling the flow of heating fluid to and from a heating load; a heating pump for moving the heating fluid; a heat exchanger; and a storage pump

for circulating a storage fluid from a storage tank through said heat exchanger; said control circuit comprising:

a load sensor for sensing the temperature of the load;

a collector sensor for sensing the temperature of the solar collector;

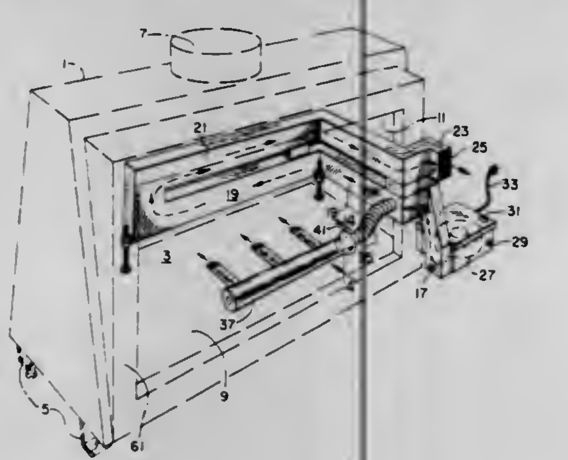
a collector switching circuit responsive to an indication from said load sensor that the load temperature is below a preset level and from said collector sensor that the collector temperature is above a predetermined level, to open said valves and actuate said heating pump to move the heating fluid from the load to the collector to be heated and then returned to the load;

a storage sensor for sensing the temperature of the storage fluid in the storage tank;

a storage switching circuit responsive to an indication from said load sensor that the load temperature is below a preset level and from said storage sensor that the storage fluid temperature is above a predetermined level to open said load valve, close said collector valve, actuate said storage pump to move said storage fluid internally through said heat exchanger, and actuate said heating pump to move the heating fluid for the load externally through said heat exchanger to be heated and then returned to the load; and

a differential switching circuit, responsive to said storage sensor and said collector sensor, upon a preestablished minimum differential between said collector temperature and said storage fluid temperature, when said collector switching circuit and said storage switching circuit are inoperative in the absence of an indication from said load sensor, for actuating said storage pump to move said storage fluid internally through said heat exchanger, opening said collector valve and closing said load valve, and activating said heating pump for moving the heating fluid from the collector externally through said heat exchanger to increase the heat stored in said storage fluid and, when said storage switching circuit is operative, to open said collector valve and activate said storage pump to preheat the heating fluid coming from said load before it reaches said heat exchanger.

4,060,196
HEAT EXTRACTOR FOR STOVES
Claude W. Goldsby, P.O. Box 7646, Salem, Oreg. 97303, and Roray J Sandau, Rte. 1, Box 729, Salem, Oreg. 97304
Filed Apr. 12, 1976, Ser. No. 676,138
Int. Cl.² F24B 7/00
U.S. Cl. 237—51 **8 Claims**



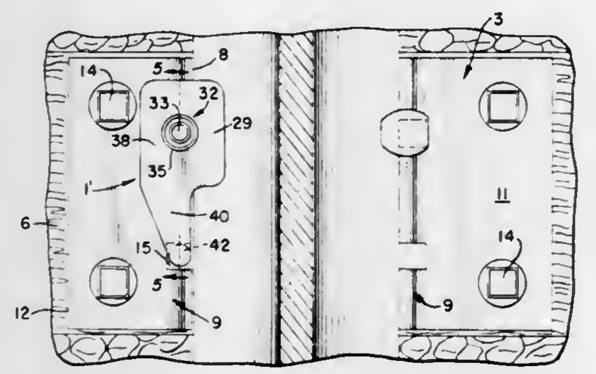
1. Apparatus for extracting head from a combustion chamber with a room, including, in combination, a combustion chamber having an open front, a floor, side walls and a back wall, and a heat extractor, the extractor comprising: a single, hollow U-shaped member defining a continuous U-shaped air path, the U-shaped member lying on a vertical plane and extending inwardly along one side wall of the combustion chamber, an air supply fan operatively connected to the U-shaped member, and combustion chamber air supply means branching from the U-shaped member into the chamber, wherein the improvement comprises:

an elongate combustion air supply tube protruding from the U-shaped member into the combustion chamber;

and an air distributing manifold separate from the U-shaped member and the air supply tube and positioned on the chamber floor;

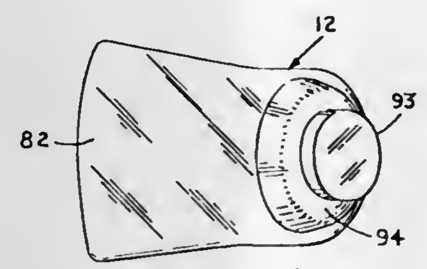
the manifold having an open end and a closed end, the open end defining a horn-shaped throat open to the chamber and associated with the air supply tube by insertion of the tube into the throat so that air directed into the manifold by the tube is mixed with combustion chamber gases drawn into the manifold through the throat.

4,060,197
RAIL FASTENER ASSEMBLY
Khurshid Ahmed Qureshi, Bolingbrook, Ill., assignor to Portec, Inc., Oak Brook, Ill.
Filed Oct. 21, 1976, Ser. No. 734,537
Int. Cl.² E01B 9/36
U.S. Cl. 238—338 **10 Claims**



1. A rail fastener including a restraining block and a tie plate, said tie plate provided with a rail seat section bounded by opposed shoulders, at least one said shoulder provided with a pair of spike holes disposed therethrough adjacent said rail seat section, said one shoulder having a curved upper surface, said block having a longitudinal extent overlying said pair of spike holes, a main body portion on said block spanning one said spike hole and including a lower curved bearing surface mating with said tie plate shoulder upper surface, said main body portion having a vertical hole therethrough vertically aligned above said one spike hole, an arm extending longitudinally from said main body portion toward said other spike hole, a lip portion extending inwardly from said main body portion and overlying a rail base flange disposed upon said rail seat section of said tie plate, anchor means extending from said main body and joining said block to both said spike holes, and said anchor means includes a multi-part fastener disposed through said one spike hole and aligned block hole and a lug depending from said arm and entering said other spike hole.

4,060,198
DISPENSING HEAD ASSEMBLY FOR FLUID DISPENSING SYSTEM AND A NOZZLE THEREFOR MADE OF PLASTIC MATERIAL
Richard C. Dreibelbis, Fair Lawn, and Warren E. Turner, Succasunna, both of N.J., assignors to Emerson Electric Co. (H&H Thermostats Div.), Cedar Grove, N.J.
Division of Ser. No. 588,049, June 18, 1975, and a continuation-in-part of Ser. No. 536,177, Dec. 24, 1974, abandoned. This application June 2, 1976, Ser. No. 692,105
Int. Cl.² E03B 9/20
U.S. Cl. 239—24 **9 Claims**



1. In a dispensing nozzle assembly for the dispensing head on a fluid dispensing system,

a. said dispensing head having a longitudinally extending bore with a predetermined diameter to define the inner wall of an outlet in said dispensing head,

b. nozzle means press fitted into the outlet formed in said dispensing head,

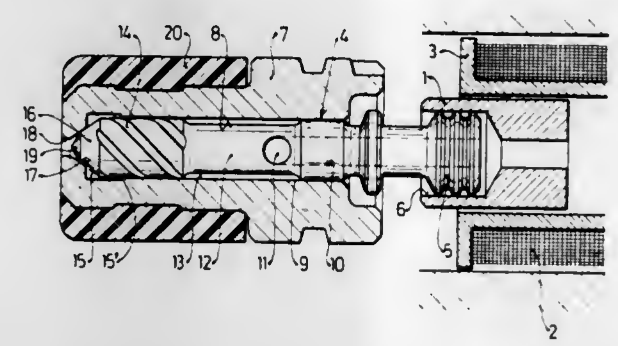
c. said nozzle means made of plastic material and having a fluid flow passage therethrough having an inlet at one end for the fluid to be dispensed and an outlet formed at the opposite end,

d. at least one portion of the outer diameter of said nozzle means adapted to form a friction fit with the inner wall of the outlet when said nozzle means is press fitted into assembled position in said dispensing head,

e. a plurality of circumferentially spaced shoulders disposed on the inner wall of the outlet for operative engagement with the inlet end of the nozzle means to limit the depth the nozzle means is press fitted into the outlet in said dispensing head, and

f. means to provide a fluid tight seal between the nozzle means and the inner wall of the outlet in said dispensing head.

4,060,199
ELECTROMAGNETIC FUEL INJECTION VALVE
Gerhard Brune, and Waldemar Hans, both of Bamberg, Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany
Filed Sept. 29, 1976, Ser. No. 727,701
Claims priority, application Germany, Oct. 1, 1975, 2543805
Int. Cl.² F16K 31/06; B05B 1/34
U.S. Cl. 239—488 **4 Claims**

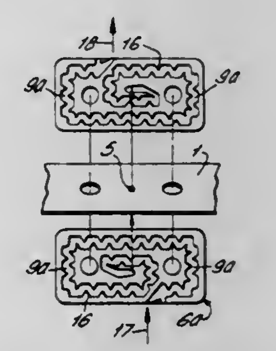


1. In an electromagnetic fuel injection valve which includes a casing, a magnetic coil, a stationary iron core within said coil and a movable armature moving axially with said core within said casing and provided with a valve closing needle guided by portions of said casing for cooperation with an injection orifice obturated by said valve needle, the improvement comprising:

said valve needle is provided with a plurality of curved channels for carrying fuel and for imparting turbulence thereto; and

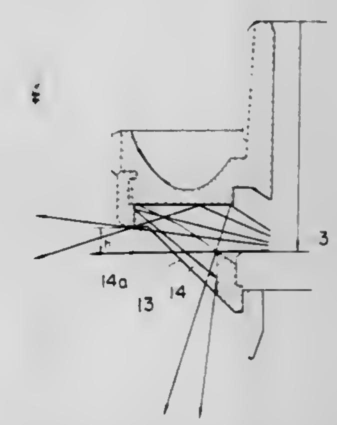
said casing and said valve needle together define a pressure chamber whose maximum volume is no greater than the volume of fuel from said valve during a single stroke.

4,060,200
DRIP LEVEL IRRIGATION
Raphael Mehoudar, Tel-Aviv, Israel, assignor to Hydro-Plan Engineering Ltd., Tel-Aviv, Israel
Filed Aug. 14, 1975, Ser. No. 604,838
Claims priority, application Israel, Aug. 14, 1974, 45466
Int. Cl.² B05B 15/00
U.S. Cl. 239—542 **8 Claims**



1. An emitter unit comprising a pair of casing components, each having a surface, and oriented so that the surfaces face each other, coupling means for coupling said components together via a unitary strip that has continuous opposite surfaces, the strip being interposed between the components such that the surfaces thereof respectively engage the opposite surfaces of the strip which extends beyond the components to form a closed conduit within which fluid can flow, means on the surface of at least one component coacting with the surface of the strip engaged therewith for defining a flow restricting flowpath within which fluid flows in contact with both surfaces, and communicating means for effecting communication between said flowpath and the other component via said strip.

4,060,201
SPRINKLER HEAD
Tomiichi Tomita, Tokyo, Japan, assignor to Sanwa Seiki Kabushiki Kaisha, Tokyo, Japan
Filed Mar. 26, 1976, Ser. No. 670,685
Claims priority, application Japan, Mar. 28, 1975, 50-36811
Int. Cl.² A62C 37/10
U.S. Cl. 239—553 **5 Claims**



1. An improved sprinkler head, comprising:

a funnel-shaped housing member provided at its upper end with an annular internally threaded flange, and at its lower end with a central bore which is substantially aligned with the longitudinal axis of the funnel-shaped housing member, said housing member also including a conical wall

which slants inwardly and downwardly as it extends between the annular flange and said central bore, said conical wall having a plurality of sprinkling apertures extending therethrough;

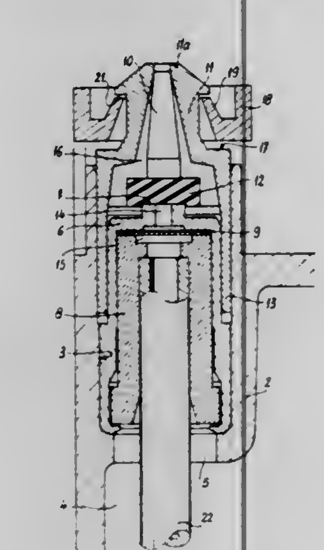
a threaded disc-shaped cover threadably engaged within the annular flange, said cover having a pipe portion fixed centrally thereto and projecting upwardly therefrom, said cover having a substantially flat bottom surface which extends substantially perpendicular to said longitudinal axis and is spaced upwardly above the interior surface of said conical wall;

a deflector mounted on said housing member and positioned below said cover, said deflector having an upper platelike portion normally maintained in sealed engagement with said cover in surrounding relationship to the discharge end of said pipe portion;

means coacting between said housing member and said deflector for normally maintaining said platelike portion in sealed engagement with said cover, said means including a fusable portion which melts in response to a preselected temperature for permitting the deflector to be moved downwardly into a lowered position out of sealed engagement with said cover;

the improvement wherein each sprinkling aperture is defined by a peripheral wall which extends substantially perpendicular to the flat bottom surface of said cover, whereby said peripheral wall has an axial direction which is substantially parallel to the longitudinal axis of said housing member, and at least a portion of said peripheral wall as disposed radially outermost from said longitudinal axis being positioned at an elevation between the bottom surface of said cover and the upper surface of said platelike portion when the latter is in said lowered position, whereby at least part of the liquid supplied through said pipe portion impinges against the upper surface of said deflector and is deflected radially outwardly and impinges against the outer portion of said peripheral wall.

4,060,202
VALVE FOR GAS LIGHTER
Guy Neyret, Francheville, France, assignor to Societe Anonyme dite: Etablissement Genoud & Cie, Venissieux, France
Filed June 4, 1976, Ser. No. 692,730
Claims priority, application France, June 5, 1975, 75.18162
Int. Cl.² F23D ***13/04***
U.S. Cl. 239—579 **10 Claims**



1. A valve for a gas lighter comprising:

a housing formed with a well communicating with a fuel reservoir;

an axially elongated tubular valve member received in said well and having one end anchored therein and another end formed with a valve seat surrounding an orifice;

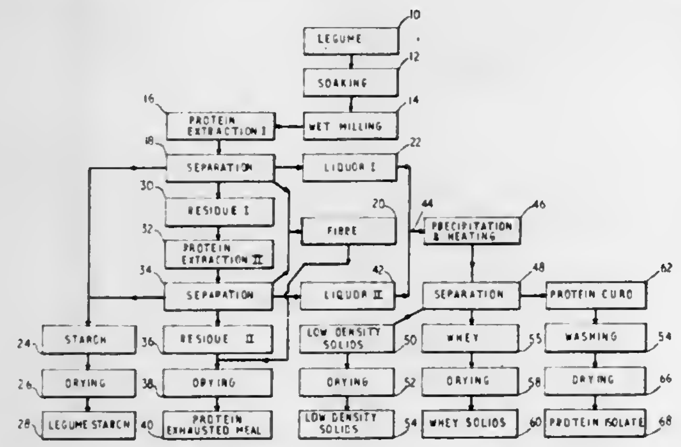
a tubular filter-support member received in said valve member and coaxial therewith;

a pressure-regulating filter clamped between said members for regulating the flow of gaseous fuel through said orifice;

an elongated burner member formed at one end with a burner nozzle and a passage communicating between said orifice and said nozzle, and at its opposite end with an elongated cylindrical skirt slidingly engaging the exterior of said valve member; and

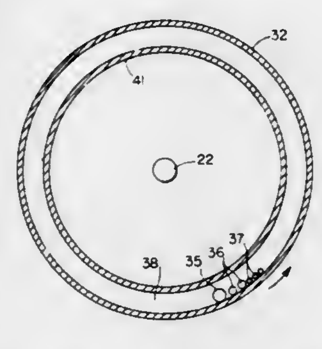
a valve body on said burner-member engageable with said seat for blocking flow from said orifice to said passage, said passage extending only over a portion of the length of said burner-member.

4,060,203
PROTEIN ISOLATION
Ronald Alexander Nixon Edwards, Caringbah, and Jorge Manrique, Newcastle, both of Australia, assignors to Unisearch Limited, Kensington, Australia
Filed Feb. 1, 1977, Ser. No. 764,509
Claims priority, application Australia, Feb. 3, 1976, 4714/76
Int. Cl.² B02C ***23/36***
U.S. Cl. 241—7 **8 Claims**



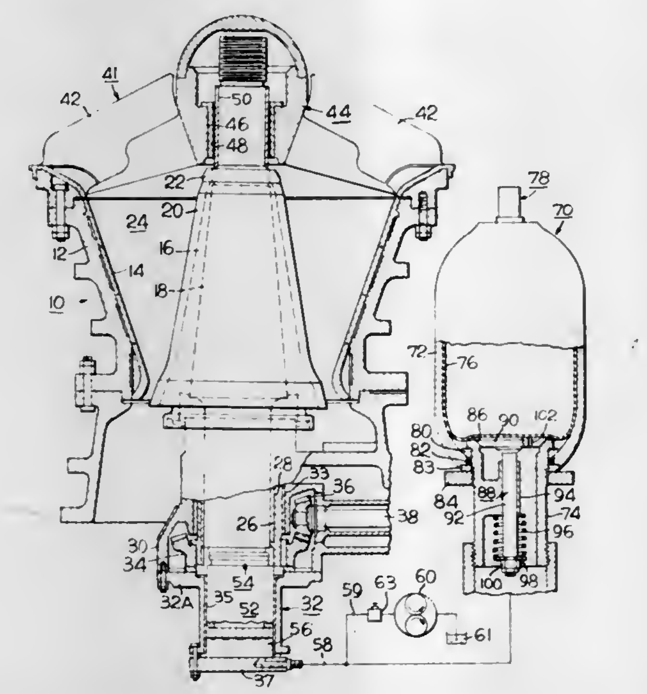
1. In a process for the extraction of protein from low fat seeds, the improvement comprising soaking the seeds in an aqueous medium until the seed are saturated with water and wet milling the seeds prior to extracting the protein from the seeds.

4,060,204
CREMATED REMAINS PROCESSOR
Danny Franklin Williford, Miami, Fla., assignor to No Flame Process, Inc., Miami, Fla.
Filed Oct. 22, 1976, Ser. No. 734,985
Int. Cl.² B02C ***17/02***
U.S. Cl. 241—74 **8 Claims**



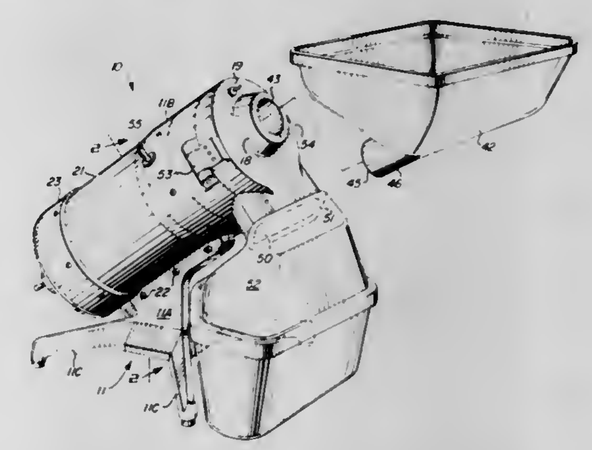
1. Apparatus for reducing cremated remains including the combination of a housing having an entry opening for receiving a charge of the remains, a hollow reducing drum mounted for rotation about is longitudinal axis within the housing, said drum including an outer cylindrical shell formed with a plurality of apertures sized for passing fragments of the remains below a predetermined size, the shell further including an end opening positioned in register with the entry opening of the housing for receiving the charge of remains, means for rotating the drum about its longitudinal axis, a plurality of elongate rods carried within the drum, at least certain of the rods having disparate diameters, means for constraining the rods for relative movement about the inner periphery of the drum whereby the rods are caused to react with the rotating shell of the drum and tumble one over the other for progressively reducing the remains to a size for passing through the apertures, and means for collecting the remains which pass through the apertures.

4,060,205
HYDRAULIC ACCUMULATOR FOR USE WITH GYRATORY CRUSHERS AND COMBINATION OF SUCH ACCUMULATOR WITH A GYRATORY CRUSHER
Robert J. Pollak, Appleton, Wis., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.
Filed Nov. 8, 1976, Ser. No. 740,114
Int. Cl.² B02C ***2/06***
U.S. Cl. 241—211 **9 Claims**



1. In combination, a gyratory crusher, said crusher comprising a crusher head and a shaft-like member in supporting relation to said crusher head, means forming part of the crusher structure and defining a crusher hydraulic chamber for receiving a hydraulic fluid which is in supporting relation to said shaft-like member and to said crusher head, a hydraulic accumulator located in spaced relation to said crusher, a hydraulic conduit fluidly connecting said crusher hydraulic chamber and said hydraulic accumulator, said hydraulic accumulator comprising a hollow accumulator chamber for receiving hydraulic fluid from said crusher hydraulic chamber whereby to permit lowering of said shaft-like member and said crusher head when said crusher encounters uncrushable material, said crusher head during the period when it is attempting to pass uncrushable matter through the crusher moving toward the uncrushable material on one part of each gyratory cycle whereby to increase the hydraulic pressure in said hydraulic conduit and moving away from said uncrushable material on another part of each gyratory cycle whereby to reduce the hydraulic pressure in said hydraulic conduit, an elastic bladder member positioned in said accumulator chamber, said bladder member containing a precharge of a gas at a predetermined precharge pressure, valve means incorporated as part of the accumulator structure for controlling flow of hydraulic fluid between said hydraulic conduit and said accumulator chamber,. spring means engaging said valve means and biasing said valve means toward a closed position, said valve means being openable to admit hydraulic fluid from said hydraulic conduit into the interior of said accumulator chamber during said one part of the gyratory cycle in which said crusher head is moving toward said uncrushable material, said spring means being adapted to close said valve means to prevent any significant reverse hydraulic flow from said accumulator chamber into said hydraulic conduit during said another part of the gyratory cycle when said crusher head is moving away from said uncrushable material, whereby to prevent "water hammer" in said hydraulic conduit, and bleed passage means fluidly communicating the interior of said accumulator chamber with said hydraulic conduit, said bleed passage means being effective to permit a restricted reverse flow of hydraulic fluid from said accumulator chamber into said hydraulic conduit and thus to said crusher hydraulic chamber with said valve means in closed position whereby to cause a gradual upward movement of said shaft-like member and said crusher head after the uncrushable material has passed through said crusher.

4,060,206
GRINDING MILL
Clarence E. Granzow, 2516 E. Jackson St., Phoenix, Ariz. 85034
Filed Oct. 8, 1976, Ser. No. 730,804
Int. Cl.² B02C ***5/08***
U.S. Cl. 241—259.1 **6 Claims**



1. A grinding mill for seeds, nuts, grains and like materials comprising in combination:

a frame having a base portion and a cover portion,

said cover portion having a pivotally mounted cover for exposing and concealing the inside of said cover portion,

motor means comprising a rotating shaft mounted on said base portion of said frame,

a milling head comprising a pair of relatively movable disc type cutting and grinding members juxtapositioned in coplanar arrangement when in a grinding and milling operation within said cover portion,

one of said members being mounted on said shaft for rotation therewith and the other of said members being mounted on said cover for pivotal movement therewith from a position juxtapositioned to said one member to a position spaced therefrom for exposing said one member,

said cover being provided with an aperture extending therethrough for alignment with an aperture extending through said other member into a space between said members,

a collar surrounding said aperture in said cover,

a hopper mountable on said cover and having a discharge passage leading into said aperture of said cover, and

said hopper being detachably mounted on said collar surrounding said aperture in said cover,

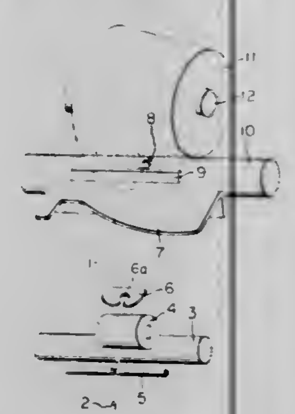
said cover portion comprising a milling chamber housing said milling head and defining an outlet port for discharging the ground and milled products, and

an adjustment means for axially positioning one of said grinding members relative to the other for controlling the condition of the milled product,

said adjustment means comprises a cam rotatably mounted on said cover,

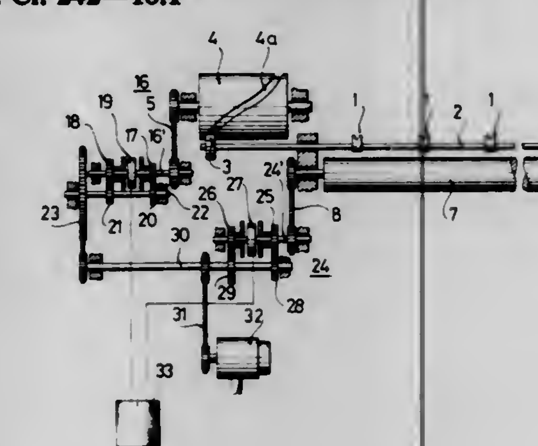
said frame supporting said motor and rotating shaft at an acute angle with a supporting surface of the grinding mill with the longitudinal axis of said outlet port of said milling chamber being substantially perpendicular to the axis of said rotating shaft.

4,060,207
YARN WINDING MECHANISM IN SPINNING MACHINE
Tsutomu Miyazaki, Kariya; Yoshiaki Yoshida, Ohbu; Shozo Ueda, Kariya; Kinpei Mitsuya, Aichi, and Takeshi Ogasawara, Gamagori, all of Japan, assignors to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho, Kariya, Japan
Filed Feb. 7, 1977, Ser. No. 766,507
Claims priority, application Japan, Feb. 10, 1976, 51-12806
Int. Cl.² B65H *54/02*
U.S. Cl. 242—18 R **4 Claims**



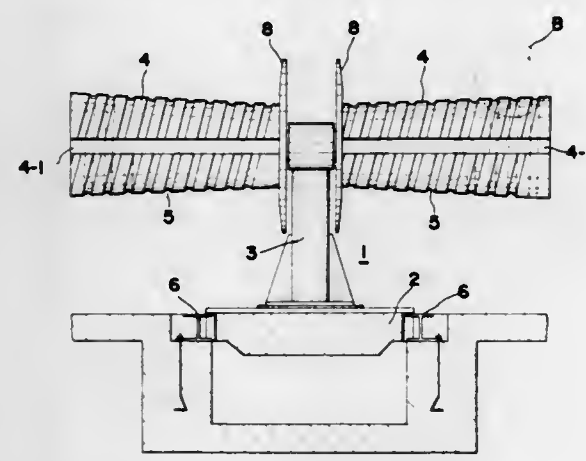
1. A yarn winding mechanism in a spinning unit comprising a pair of yarn taking-out rollers taking the yarn out of a yarn discharge point of the spinning unit, a traversing device for traversing the yarn discharged from the yarn discharge point, and a cone bobbin onto which the yarn is traversely wound in a cone cheese, one of the yarn taking-out rollers being provided with a yarn catch in its end face edge, characterized in that a yarn tension compensating device is disposed between the traversing device and the yarn taking-out rollers with a yarn guide surface so contoured as to compensate changes in yarn tension due to the traverse and cone winding of the yarn, a portion of the yarn guide surface of the compensating device on the larger diameter side of the cone bobbin being so shaped and positioned that the yarn following a path adjacent to one of endmost paths between which the yarn traverses on the yarn discharge point is caused to be caught by the yarn catch of the yarn taking-out roller on the larger diameter side of the cone bobbin.

4,060,208
METHOD AND DEVICE FOR IRREGULARIZING OR DISTURBING A WINDING PATTERN IN A WINDING APPARATUS FOR CROSS-WOUND COILS
Hans Raasch, Munchen-Gladbach, Germany, assignor to W. Schlafhorst & Co., Munchen-Gladbach, Germany
Filed July 30, 1976, Ser. No. 710,315
Claims priority, application Germany, July 31, 1975, 2534239
Int. Cl.² B65H *54/38*
U.S. Cl. 242—18.1 **3 Claims**



1. In apparatus for winding cross-wound coils with a constant thread feeding velocity having a reciprocating thread guide, means for reciprocating the thread guide and means for driving the reciprocating means for time intervals alternatingly with at least two different speeds, a device for irregularizing or disturbing the winding pattern in the apparatus comprising separate means for driving the thread guide and for winding the cross-wound coil, means for controlling both said thread guide driving means and said cross-wound coil winding means in dependence upon one another, so that the quotient of the peripheral speed of the cross-wound coil and the cosine of half the thread crossing angle is constant, both said driving means and said winding means being each selectively switchable from one to another speed of rotation differing by approximately 10% from one another in accordance with a parameter of switching selections that includes rhythmic switching and random switching at predetermined time intervals, and gear transmission systems including respective shifting clutches operatively connected to each of said thread-guide driving means and said cross-wound coil winding means, and timing control means for controlling shifting of said shifting clutches.

4,060,209
COIL HOLDING DEVICE
Kotaro Tsukamoto, 7-8 Kashima, 4-Block, Yodogawa, Osaka, Osaka, Japan
Filed June 10, 1976, Ser. No. 694,798
Int. Cl.² B65H *49/26;* **B21C** *47/20*
U.S. Cl. 242—54 R **4 Claims**

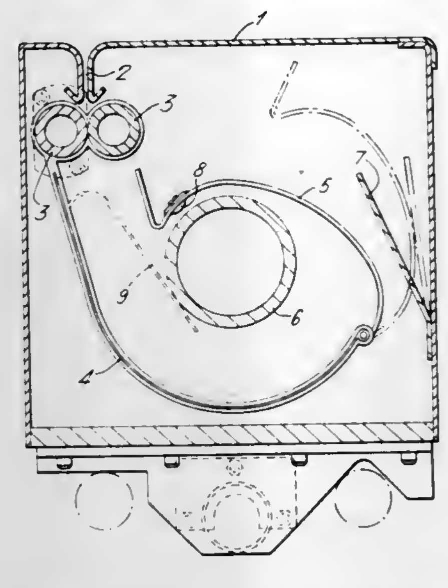


1. A coil holding device comprising:
a bed plate;
an upright support on said bed plate; and
a pair of rotary drum means mounted on said upright support above said bed plate for rotatably holding two of said coils thereon, each drum means having a spiral groove around the circumference thereof, said spiral being inverse to the rotary direction of said drum means, whereby said spiral groove moves toward said support as said rotary drum means rotates.

4,060,210
TAKE-UP SPOOLS
John Henry Norris, Beaconsfield, England, assignor to Linotype-Paul Limited, England
Filed June 14, 1976, Ser. No. 695,812
Claims priority, application United Kingdom, Feb. 13, 1976, 5844/76
Int. Cl.² G03B *1/04*
U.S. Cl. 242—71.1 **14 Claims**

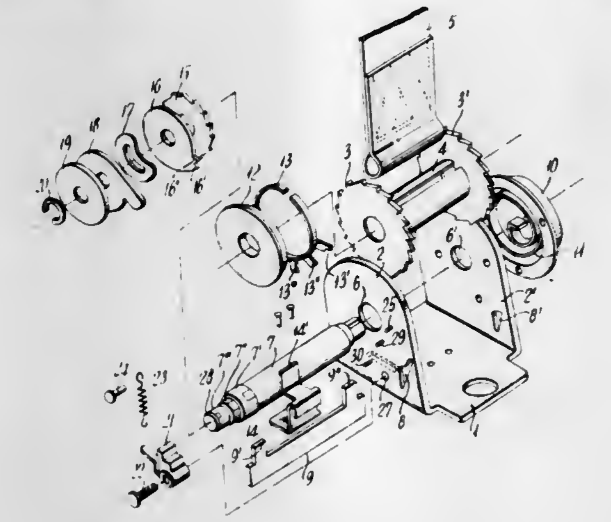
1. A mechanism for automatically taking up strip material to be wound on a spool, comprising a take-up spool, a fixed rigid guide member arranged, in use, to guide said strip material to and around said spool, and a pivotally mounted guide member

arranged, in use, to guide said strip material from said fixed guide member around said take-up spool such that the leading



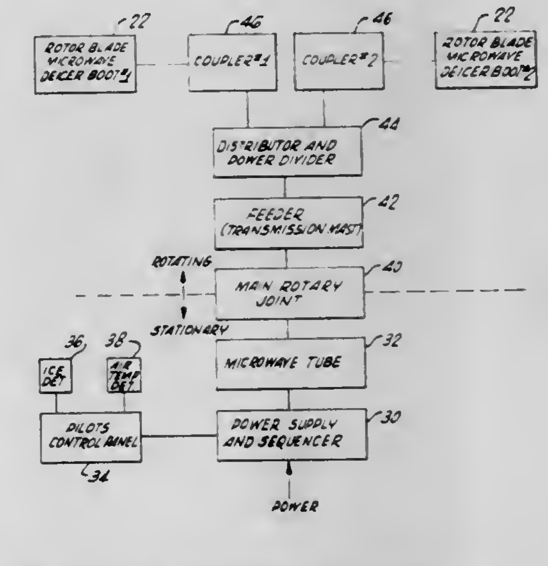
end of said strip is gripped between said spool and a remote portion of said strip.

4,060,211
RETRACTION LOCKING SAFETY BELT RETRACTOR
Juichiro Takada, Shin, Japan, assignor to Takata Kojyo Co., Ltd., Tokyo, Japan
Filed Apr. 19, 1976, Ser. No. 678,510
Claims priority, application Japan, Apr. 22, 1975, 50-048212
Int. Cl.² A62B *35/00;* **B65H** *75/48*
U.S. Cl. 242—107.7 **5 Claims**



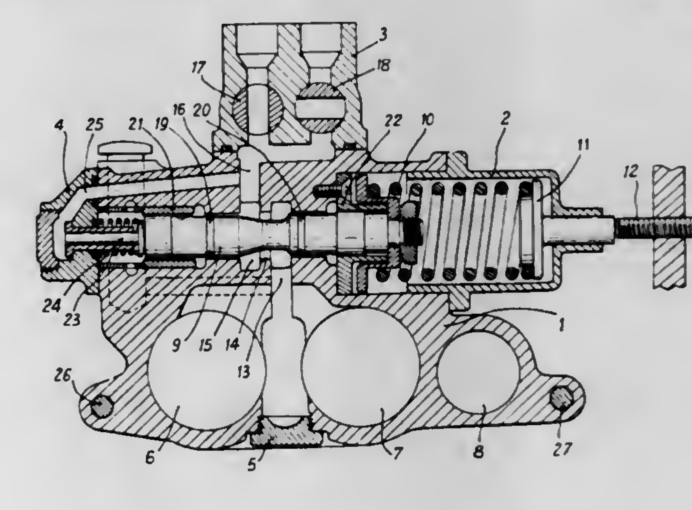
1. A belt retractor device comprising a U-shaped mounting bracket, a shaft rotatably supported by said bracket, a reel mounted on said shaft and rotatable therewith in opposite belt retraction and extraction directions, a belt coupled to said reel and windable thereon with the belt retraction rotation thereof, spring means biasing said reel and shaft in a belt retraction direction, first braking means for braking said reel against rotation in a belt retraction direction and transferrable between braking and release positions and actuating means responsive to the successive extraction and retraction rotation of said reel for alternatively positioning said first braking means in said braking or release positions, said device being characterized in that said first braking and actuating means comprise a ratchet wheel rotatable with said shaft, a pawl pivotally mounted on said bracket and movable between ratchet wheel engage and disengage positions to respectively brake and release said reel, spring means urging said pawl toward a ratchet wheel engage position, a first driven member slip drive coupled to said reel and rotatable a predetermined angle and having a lock portion adapted to releasably lock said pawl in its ratchet wheel disengage position, a second driven member slip coupled to said reel and rotatable a predetermined angle to swing said pawl toward said first drive member with the belt extraction rotation of said reel, a drive disc coaxially affixed to said shaft, said first and second driven members comprising disc members coaxially located on said shaft and rotatable relative thereto between said ratchet wheel and said drive disc and spring means urging each of said driven disc members into frictional drive engagement with said drive disc and ratchet wheel respectively.

4,060,212
DEICING APPARATUS AND METHOD
Bertram Magenheim, Bethesda, Md., assignor to System Development Corporation, Santa Monica, Calif.
Filed Apr. 1, 1976, Ser. No. 672,613
Int. Cl.² B64D *15/12*
U.S. Cl. 244—134 D **10 Claims**



1. Aircraft deicing apparatus, comprising:
means for generating microwave electromagnetic energy;
distribution means for transmitting the microwave energy to a surface to be deiced; and
coupling means, for coupling the microwave energy from said distribution means to a surface layer of ice, said coupling means being configured to transmit the microwave energy through the ice layer in the manner of a surface waveguide, whereby substantially all of the energy is dissipated as heat primarily in the ice layer, thereby raising the temperature of the ice layer sufficiently to effect removal of the ice layer from the aircraft.

4,060,213
PRESSURE CONTROL DEVICE
Jean H. Hasquenoph, Lagny-sur-Marne, and Pierre Fernand Coutin, Paris, both of France, assignors to R. Alkan & Cie, Valenton, France
Filed July 1, 1976, Ser. No. 701,707
Claims priority, application France, July 2, 1975, 75.20712
Int. Cl.² B64D *1/02*
U.S. Cl. 244—137 R **4 Claims**



1. A pressure control device comprising:

i. a valve body including:
   a. a valve chamber including a first chamber portion, a second chamber portion spaced axially from said first chamber portion, and an annular valve seating between said first and second chamber portions
   b. cavities for receiving sources of gas under pressure
   c. inlet passage means leading from said cavities to said first chamber portion
   d. outlet passage means leading from said second chamber portion to outlet ports
   e. a control gas passage communicating with said outlet passage means

ii. a spool valve assembly axially movable in said valve chamber and having a frusto-conical portion adapted to coact with said annular valve seating

iii. a first element detachably mounted on said valve body and including a cylinder aligned with said valve chamber

iv. spring means disposed in said first element cylinder and abutting one end of said spool valve assembly to urge said spool valve assembly in the axial direction to increase the opening between the frusto-conical portion and the annular valve seating

v. a second element detachably mounted on said valve body and including valve passage means communicating with the outlet passage means, and adjustable cock means for controlling gas flow through said valve passage means

vi. A third element detachably mounted on said valve body and defining a transfer passage providing communication between said control gas passage and said spool valve assembly such that gas pressure in said control gas passage acts to urge the spool valve assembly axially against the action of said spring means.

4,060,214

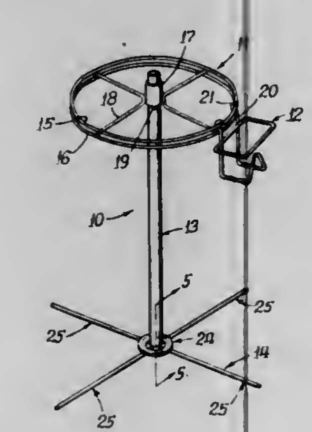
MERCHANDISE DISPLAY STAND

Derek N. G. Metcalf, La Grange Park, Ill., assignor to Athena Industries, Inc., La Grange, Ill.

Filed Nov. 15, 1976, Ser. No. 741,965

Int. Cl.² F16M *11/32*

U.S. Cl. 248—165 **7 Claims**



1. In an upright merchandise display stand and the like, the combination of a central support pole having an internal chamber opening inwardly of its lower end, and a base pedestal for supporting said pole upright and comprising a base ring, operationally located centrally beneath the pole's lower end, and plural leg members affixed to said ring; each leg member having an elongated ground engaging arm portion extending radially ouwardly and downwardly from said ring and an upstanding inner end portion forming a linear finger projecting above the central opening of said ring in diverging relation to a vertical axis passing centrally therethrough; said ring operationally moving under vertical load simultaneously to converge said finers for insertion into said chamber whereby to frictionally interconnect said pole and pedestal.

4,060,215

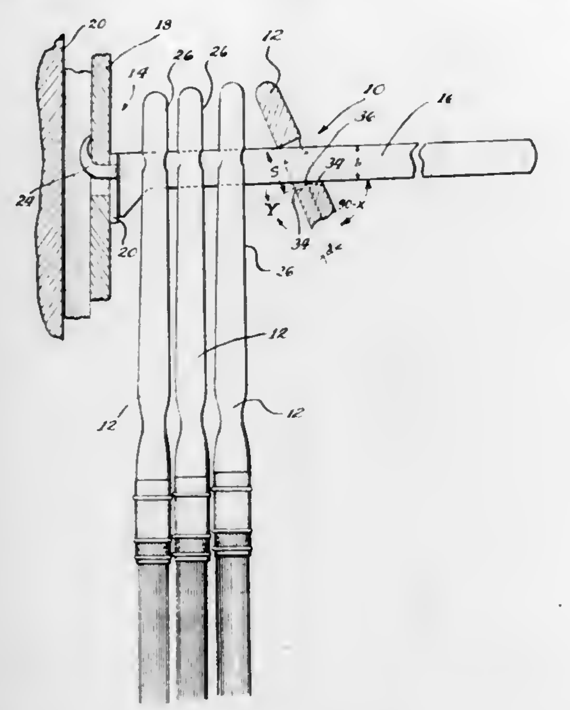
SLOTTED TOOL HANDLE

Fredrick B. Burns, South Milwaukee, and Peter Balint, Wauwatosa, both of Wis., assignors to E Z Painter Corporation, Milwaukee, Wis.

Filed July 16, 1976, Ser. No. 706,075

Int. Cl.² A47G *29/00*

U.S. Cl. 248—360 **9 Claims**



6. A tool handle and cantilever hanging support comprising, in combination:
   a cantilever support arm extending outwardly from a suitable supporting surface, said support arm comprising a generally flat, vertically oriented arm member;
   a vertical slot in the tool handle adapted to slidably engage the cantilever support arm to maintain vertical alignment of the tool handles and relative alignment between a plurality of tool handles; and
   a pair of flat inwardly and upwardly canted converging surfaces formed at the bottom of the slot to prevent binding by preventing engagement of the edges of the slot at the bottom thereof with the cantilever arm as the tool is canted relative to the cantilever arm during mounting or removal to facilitate relative sliding movement between the handle and the cantilever arm.

4,060,216

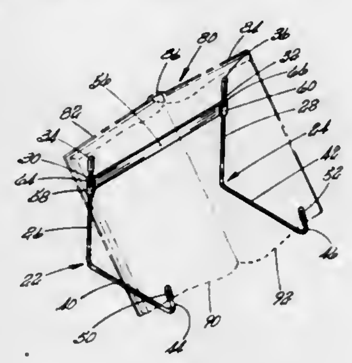
ADJUSTABLE READING MATERIAL SUPPORTER

Theodore L. Million, 793 Cambridge Drive, Santa Barbara, Calif. 93111

Continuation of Ser. No. 628,483, Nov. 4, 1975, abandoned. This application Jan. 17, 1977, Ser. No. 760,003

Int. Cl.² E01B *7/10*

U.S. Cl. 248—460 **10 Claims**



1. An adjustable reading material supporter comprising
   a pair of unitary side members, each side member including an extended vertical back portion terminating in an aligned support end and a substantially horizontal base portion terminating in a deflector guide end inclined in a spaced upward and rearward direction relative to said back portion; and
   a rigid elongated back structure having a pair of spaced aligned ends each defining a passageway of a selected dimension to clamp and pivotally support the extended vertical back portion of a side member, said back structure and said pair of side members being assembled with the extended vertical back portion of one side member extending through and past one passageway to position the support end of said one side member a spaced distance above and from the elongated back structure and the extended vertical back portion of the other side member extending through and past the other passageway to position the support end of said other side member a spaced distance above and from the elongated back structure forming a three point vertical support comprising each spaced support end of the side members and the elongated back structure with each of the extended vertical back portion being clamped in the passageway in a substantially planar parallel spaced relationship, and with each of the base portions of the side members being located on and equidistant from the same side of the back structure enabling each side member to be independently rotatable 360° within its fixed clamping pivotal support to form an integral structure adapted to support reading material positioned between the support end, back structure and deflector guide ends, said guide ends being capable of being adjusted relative to the reading material by rotation of the side members.

4,060,217

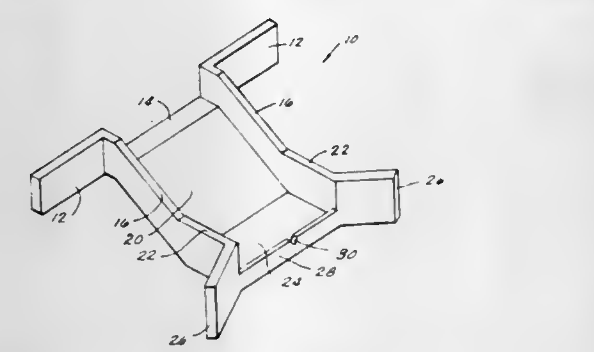
CONCRETE FORMS FOR BUILDING A CONCRETE SPILLWAY

Donald Kirk, 1903 N. Maize Road, Wichita, Kans. 67212

Filed Sept. 2, 1975, Ser. No. 609,671

Int. Cl.² B28B *7/22;* **F02B** *5/08;* **F04C** *1/00*

U.S. Cl. 249—10 **6 Claims**



1. A concrete form for use in pouring concrete structures on a ground surface, the concrete form comprising:
   form plates adjacent to one another for receiving the concrete therebetween and forming a desired structure, said form plates having outwardly extending flange portions on the top and bottom of said plates and angular shaped keepers mounted on the outer side of said form plates, the top flange portions having apertures therein;
   a "U" shaped yoke having a rigid unitary structure and an angular cross-section, said yoke including;
   a top portion;
   two downwardly extending parallel arms attached at one end to the ends of the top portion, the other ends of the two arms removably inserted into the apertures in the top flange portion of said form plates and therethrough, the other ends of the two arms received in the keepers of said form plates;
   "L" shaped brackets extending outwardly from the sides of the arms and having apertures therein for receiving securing means therethrough for securing the arms to the top flange portions of said form plates;
   an angular shaped crossbar disposed below and parallel to the top portion of said yoke, the ends of the crossbar attached to the arms of said yoke, the crossbar resting on the top flange portion of said form plates when said yoke is slidably received in said form plates; and
   anchor arms and anchor pins, said anchor arms having one end attached to the bottom flange portion of said form plates, the other end of said anchor arms attached to said anchor pins, said anchor pins driven into the ground surface.

4,060,218

PNEUMATICALLY CONTROLLED RIGID CORE-FORMER

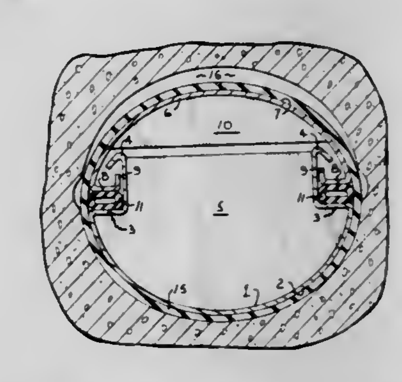
Kandiah Tharma Nayagam, No. 6B 2nd Floor, Lorong Medan Tuanku Satu, Kuala Lumpur, Malaysia

Filed June 14, 1976, Ser. No. 696,125

Claims priority, application United Kingdom, June 26, 1975, 27090/75

Int. Cl.² B28B *7/32*

U.S. Cl. 249—65 **5 Claims**



1. A form assembly for use in forming a core portion of a structure, comprising:
   a pair of former elements each having an exterior forming surface, said former elements being adapted to fit together and being relatively movable between a first collapsed position and a second expanded position wherein said former elements interfit with one another with their forming surfaces cooperating to present a surface for shaping the core;
   a resilient sleeve member closely fitting on said former elements in substantially surrounding relation thereto;
   a hook member on one of said former elements;
   a hook engaging member on the other of said former elements adapted to engagingly interlock with said hook member in the expanded position and separated from said hook member in the collapsed position; and
   means located between said former elements for effecting relative movement thereof from said collapsed to said expanded position.

4,060,219

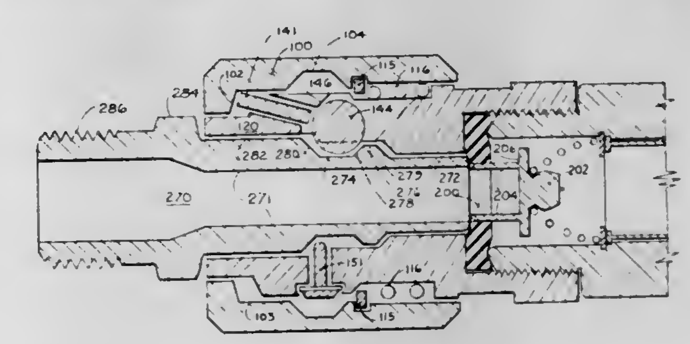
QUICK DISCONNECT COUPLER AND SAFETY CHECK VALVE

Charles S. Crawford, 405 S. LaJolla Ave., Tucson, Ariz. 85711

Filed June 4, 1975, Ser. No. 583,573

Int. Cl.² F16L *29/00, 37/28*

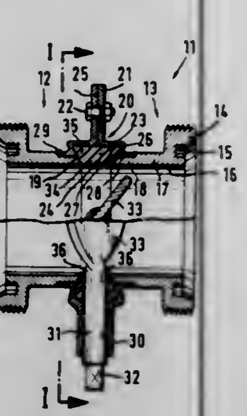
U.S. Cl. 251—149.6 **10 Claims**



1. In a compressed air system in-line quick disconnect female coupler adapted to receive an associated cylindrical male plug having a truncated cone cross-sectional shaped annular ring

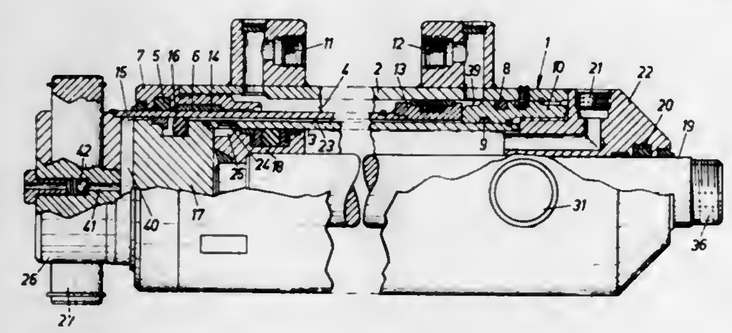
formed thereon and an annular groove formed therein, said annular ring defining in part said annular groove an improvement comprising cylindrical body means having at least one each angled first passageway through the cylindrical wall thereof; retractable sleeve means exteriorly coaxial said cylindrical body means, said sleeve means defining a first interior annular groove means juxtaposed said first passageway in said cylindrical body means, annular split ring means nesting in said first annular groove means, compression spring means interior said sleeve means juxtaposed said annular split ring means and said cylindrical body means outside surface, and second interior annular groove means adjacent said first interior annular groove means; holding ball means residing in said cylindrical body means first passageway communicating with both said cylindrical body means interior and exterior; and full flow valve means interiorly said cylindrical body means whereby when inserting said associated male plug means into said female coupler, said holding ball means is engaged by the associated male plug means annular ring, said holding ball rises in said first passageway, engages said sleeve means split ring means and wall of said second interior annular groove means, and retracts said sleeve means thereby permitting continued movement of said holding ball means in order to ride up said associated male plug annular ring into said sleeve means second interior annular groove which has moved over said cylindrical body first passageway, over said associated male plug annular ring and down into said associated male plug annular groove means, said spring means then urging said sleeve means to its initial position and the associated male plug is held in place by coaction of said holding ball means, said associated male plug annular groove means, and said sleeve means, and said cylindrical body means thereby engaging said full flow valve means permits air to flow through said coupler.

4,060,220
VALVE
Josef Fischer, Underkochen, Germany, assignor to Firma Neumo Armaturenfabrik-Apparatebau-Metallgiesserei GmbH, Germany
Filed Apr. 7, 1976, Ser. No. 674,332
Claims priority, application Germany, Apr. 11, 1975, 7511424[U]
Int. Cl.² F16K *1/22*
U.S. Cl. 251—306 **8 Claims**



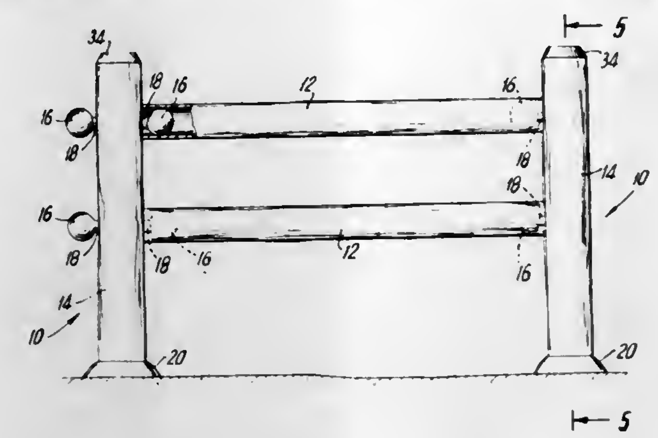
1. A valve, comprising:
a valve housing comprising two valve housing halves, each of said valve housing halves being comprised of a connection piece and a flange section, said flange section being constructed from stamped sheet material and provided with an annular area forming flanges, said flange sections of each of said housing halves being fastened together by detachable fasteners, each of said sheet material flange sections having a connection area surrounding a valve opening which is welded to one of said connection pieces forming one of said housing halves,
each sheet material flange section being provided with at least one semi-circular recess to form a shaft guide recess for a valve shaft, located in the separation plane between the flange sections, that runs transversely to the valve opening, said valve shaft being provided with a valve flap that swivels with the valve shaft; and
an integral valve sealing ring penetrated by the valve shaft for sealing off the valve shaft and forming a valve seat for said valve flap, said valve sealing ring being mounted in an undercut recess of the valve housing that encircles the valve opening and is partially retained by said flange sections.

4,060,221
DOUBLE-ACTING HYDRAULIC CYLINDER HAVING TWO PISTONS ARRANGED FOR COAXIAL MOVEMENT RELATIVE THERETO
Ulf Christer Rilbe, Hudiksvall, Sweden, assignor to Hiab-Foco Aktiebolag, Hudiksvall, Sweden
Filed Jan. 27, 1977, Ser. No. 762,836
Claims priority, application Sweden, Feb. 3, 1976, 7601122
Int. Cl.² F01B *7/20*
U.S. Cl. 254—93 R **1 Claim**



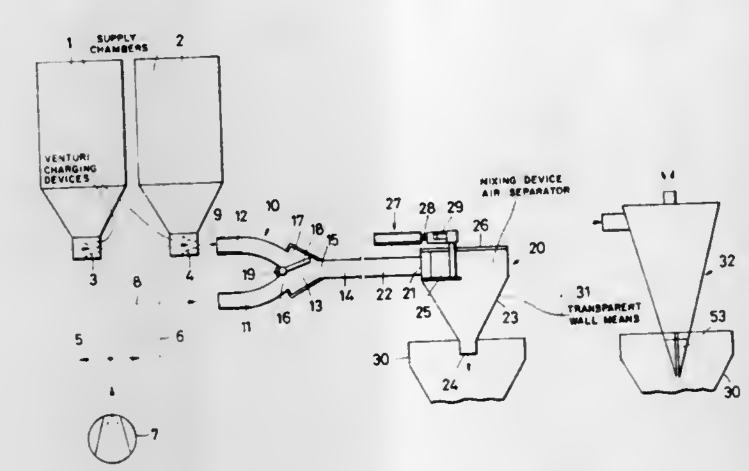
1. A double acting hydraulic cylinder unit having two concentrically arranged jackets forming between them an annular chamber, inlet and outlet ports for the admission and withdrawal of a pressurized medium provided at the ends of the annular chamber, an annular piston arranged for axial movement in said annular chamber, said annular chamber having a first end section, there being an annular gap formed between said first end section and the innermost one of said jackets, said annular piston having a tubular piston rod arranged for axial displacement in said annular gap, and a second piston arranged for axial displacement inside of said innermost jacket, the improvement comprising a bottom section in the innermost jacket, means forming an inlet and outlet port for said pressurized medium at the opposite end of said innermost jacket, there being aperture means provided near and inwardly of said bottom section of the innermost jacket and through the side wall thereof, there being first and second end spaces in said annular chamber and in the innermost jacket which communicate through said aperture means, said first end space of said annular chamber being between said annular piston and an adjacent end section of the outermost of said jackets and the second end space disposed between said bottom section of the innermost jacket and said second piston, there being another annular gap between said annular piston and said innermost jacket, the last-named annular gap communicating with said aperture means, a seal disposed between said tubular piston rod and said bottom section of said innermost jacket, said bottom section closing one end of said innermost jacket and defining one end wall of a space at the outer end of said tubular piston rod, an end closure piece on the tubular piston rod defining an opposing wall of said space, and said space having communication with the atmosphere.

4,060,222
PREFABRICATED FENCING SYSTEM
Sheldon Pitkin, 17 Verdin Drive, New City, N.Y. 10956; Richard Varcadipane, R.D. 3 - Box 542-D, Sussex, N.J. 07461, and Walter H. Poppe, 7 Alexander Ave., Waldwick, N.J. 07463
Filed June 22, 1976, Ser. No. 698,504
Int. Cl.² B21F *27/00*
U.S. Cl. 256—50 **15 Claims**



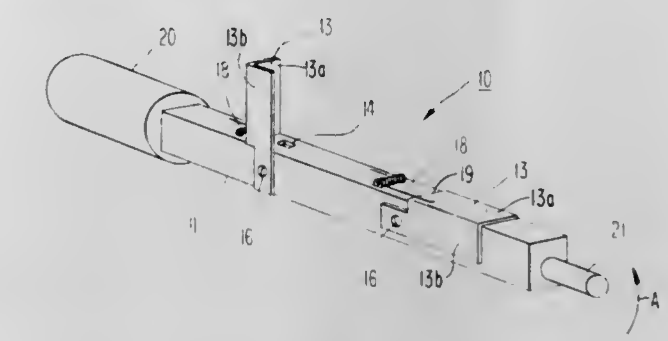
1. A plurality of unassembled prefabricated fence components for on site ground assembly which comprises:
a plurality of uprightable posts, each having a plurality of connection members projecting radially therefrom in at least two opposite directions,
each of said posts having an opening passing axially therethrough for receiving a rod for mounting said post in the ground,
a plurality of rails for horizontal disposition between said posts,
said rails having end openings axially aligned with said rails dimensioned to engage said connection members, whereby said rails can be supported at their ends by said connection members, and
a plurality of rods for axial insertion through each of the axial openings of each of said posts so that said rods project from said posts for mounting and positioning said posts in the ground.

4,060,223
DEVICE FOR MIXING GRANULAR AND/OR PULVEROUS SUBSTANCES
Paul Bongartz, Isny-Kleinhaslach, and Franz Haag, Isny, both of Germany, assignors to Motan Gesellschaft mit beschrankter Haftung, Isny, Germany
Filed Aug. 17, 1976, Ser. No. 715,046
Claims priority, application Germany, Oct. 4, 1975, 2544441
Int. Cl.² B01F *15/00*
U.S. Cl. 366—179 **20 Claims**



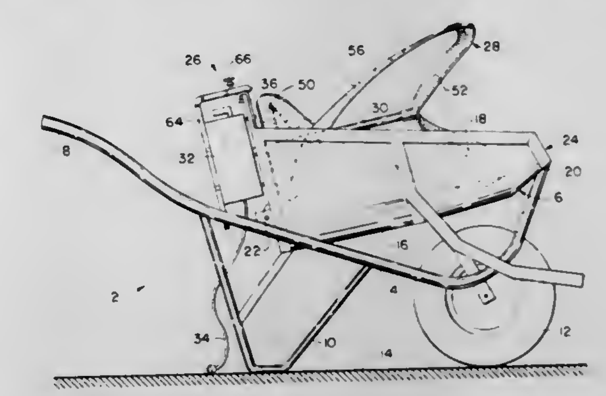
1. In a device for mixing flowable materials, especially dry materials, comprising; at least a pair of supply conduits each adapted to convey a respective material, a discharge conduit, a fitting connected to the downstream ends of said supply conduits and to the upstream end of said discharge conduit, valve means selectively operable for closing off either one of the discharge ends of said supply conduits, and means for supplying materials to the supply conduits under control of the valve means positioned alternately to block and to permit discharge of material from the respective conduit.

4,060,224
MIXING BAR AND SYSTEM
William Wilson, 716 Scott St., Stroudsburg, Pa. 18360
Filed Mar. 8, 1976, Ser. No. 664,718
Int. Cl.² B01F *7/00, 15/02*
U.S. Cl. 366—169 **7 Claims**



1. A mixing bar comprising a hollow elongated member which is rotatable about its axis, means for coupling the interior of said bar to a supply of fluid, at least one aperture in said member for permitting said fluid to be discharged from said member, at least one blade, means for pivotally connecting said blade to said elongated member so that it can pivot between a first position in which it covers said aperture and a second position in which said aperture is uncovered and fluid is discharged from said aperture, and said blade is moved toward said second position when said member is rotated.

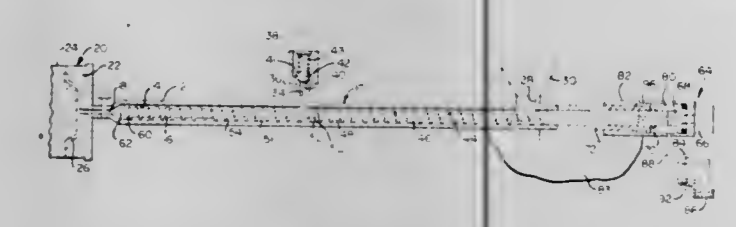
4,060,225
WHEELBARROW WITH REMOVABLE MIXER
Art Cunningham, deceased, late of Pleasant Hill, Calif. (by Velma Ruth Cunningham, executrix), assignor to Roger E. Bergman, Vallejo, Calif.
Filed Mar. 31, 1976, Ser. No. 672,088
Int. Cl.² B28C *5/14, 5/42*
U.S. Cl. 366—40 **12 Claims**



1. Apparatus for mixing and transporting a cementitious slurry comprising in combination: a container including upwardly inclined sidewalls for receiving slurry materials including water and means mounting the container for movement over a support surface; a mixing unit including a mixing blade being at least partially disposed in the container and drive means including a shaft for rotating the blade; and means for removably mounting the mixing unit to and supporting the unit on an end wall of the container so that slurry materials in the container are intimately mixed by the blade when the drive means is actuated, the mounting means including a mounting plate to which the drive means is secured and through which the shaft extends, the plate including a U-shaped upper end defining a downwardly opening channel for engaging an upper

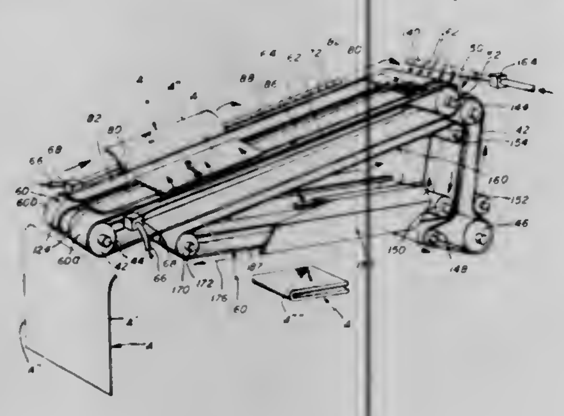
edge of the end wall during the mixing operation; whereby the slurry can be mixed in the container by temporarily positioning the mixing unit thereon and thereafter removing it for movement of the mixed slurry in the container to a point of use.

4,060,226
APPARATUS FOR INJECTION MOLDING
John Schweller, 3075 Plainfield Road, Dayton, Ohio 45432
Filed July 8, 1976, Ser. No. 703,424
Int. Cl.² B29B *1/10*
U.S. Cl. 366—75 **5 Claims**



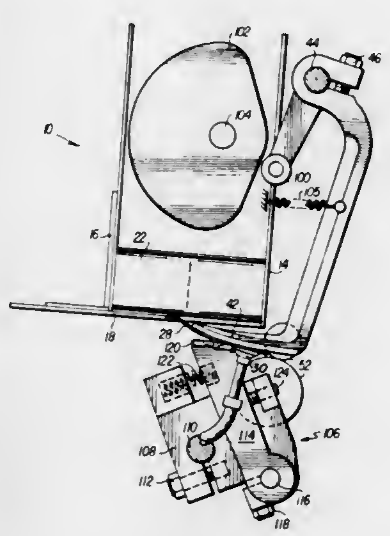
1. An injection molding machine for accepting synthetic resinous material degradable when heated and exposed to air, working the material, and forming the material, comprising:
a barrel having a material discharge opening, a screw receiving bore communicating with the discharge opening, a feed opening communicating with the screw receiving bore and a vent opening communicating with the screw receiving bore intermediate the feed opening and the discharge opening;
screw means mounted in the screw receiving bore, having a first stage upstream of said vent opening and a second stage communicating with the vent opening so that vapor evolved from the material leaving the first stage will discharge through the vent opening;
rotary means connected to the screw means and operable to rotate the screw means in the barrel;
reciprocatory means connected to the screw means and operable to reciprocate the screw means in the barrel; and
check valve means communicating with the vent opening interposed between said vent opening and the atmosphere for blocking flow of air from the atmosphere into said vent, operable to open in response to positive pressure of evolved vapor to exhaust the evolved vapor from the screw receiving bore and operable to close in the absence of positive pressure to substantially exclude flow of air into the bore, so as to avoid contact of air and plasticated material.

4,060,227
FOLDER
Glenn A. Landgraf, and Fred H. Ebel, both of Boca Raton, Fla., assignors to Gold Thread Machinery Co., Boca Raton, Fla.
Filed June 29, 1976, Ser. No. 700,752
Int. Cl.² B65H *45/22*
U.S. Cl. 270—66 **7 Claims**



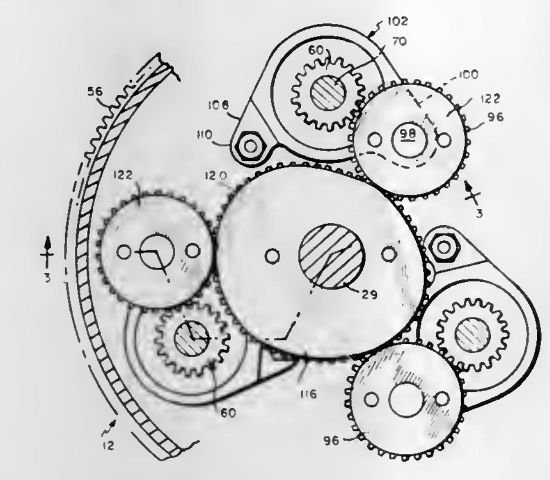
1. A small piece folder comprising
a frame and means for continuously moving articles to be folded including a continuously moving feed conveyor mounted on the frame,
a pair of width control blades mounted on the frame and overlying the continuously moving feed conveyor,
means for feeding articles to be folded onto one end of the conveyor beneath the control blades,
a pair of air tubes positioned to underly the margins of articles carried by the conveyor and having exhaust ports adapted to direct a blast of air upwardly to the side margins of articles as the articles are being moved by the feed conveyor to longitudinally fold the margins over the blades as the articles move,
and control means including a valve for each of the tubes for sequentially directing compressed air to each to cause the folds to be made in sequence.

4,060,228
PULL-FOOT FEED
Norwood E. Tress, Bath, and Winston A. Orsinger, Bethlehem, both of Pa., assignors to Bell & Howell Company, Phillipsburg, N.J.
Continuation-in-part of Ser. No. 608,970, Aug. 29, 1975, Pat. No. 4,013,283. This application July 29, 1976, Ser. No. 709,826
Int. Cl.² B65H *3/08, 3/50*
U.S. Cl. 271—14 **6 Claims**



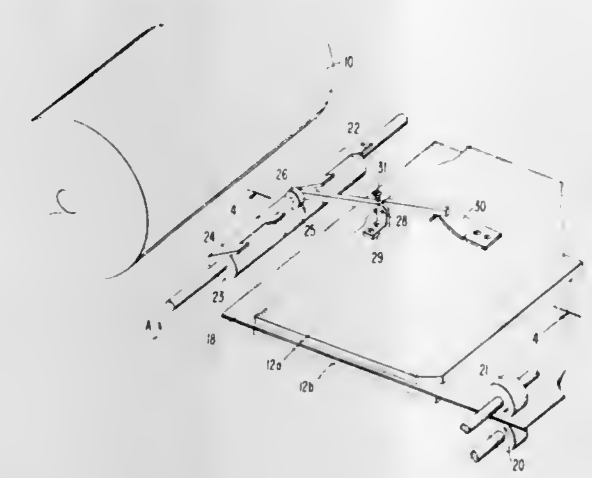
1. In a sheet feeding mechanism for feeding individual sheets separately from a stack comprising:
a main hopper assembly for supporting a stack of sheets;
means for drawing an exposed edge of an outer sheet away from the remaining stack;
a pull-foot moveable between a first position in which it is between the remaining stack and the edge of the outer sheet which has been exposed and a second position in which it is away from the hopper assembly; and
roller means arranged to cooperate with the pull-foot, for pinching the edge of the outer sheet between it and the pull foot while rolling on the sheet as the pull-foot moves away from the remaining stack and pulls the outer sheets from the remaining stack;
the improvement wherein said roller means comprises a driving means including a driving shaft for rotating a carrier fixedly mounted on said driving shaft about a driving-shaft axis, a roller segment pivotally mounted on said carrier at a pivot axis offset from said axis of said driving shaft, and a biasing means mounted between said carrier and said roller segment to bias said roller segment to rotate about its pivot axis toward said pull foot, said roller segment having a surface for pinching the edge of the outer sheet between it and the pull-foot while rolling on the sheet in response to rotation of said driving shaft.

4,060,229
ROTARY GLUE PICKER
Sidney T. Carter, Shrewsbury, Mass., assignor to A-T-O Inc., Cleveland, Ohio
Filed Mar. 29, 1976, Ser. No. 671,172
Int. Cl.² B65C *9/16;* **B65H** *3/20*
U.S. Cl. 271—33 **7 Claims**



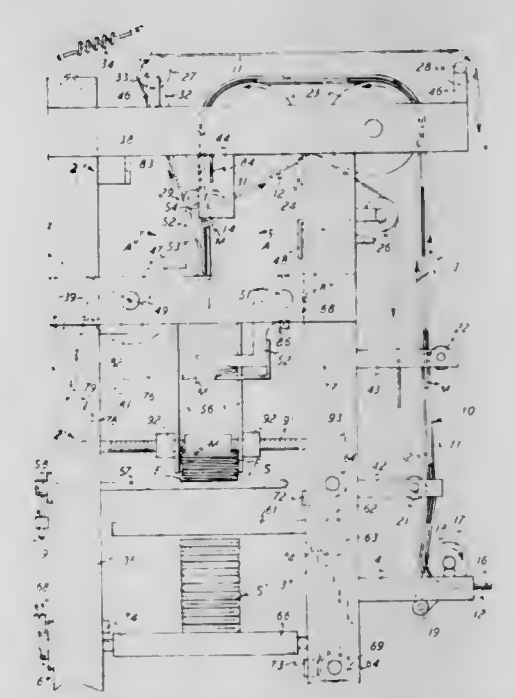
7. Drive mechanism for a picker designed to remove glue from a glue roll, apply it to the flat surface of a label and place the glue-coated label on a transfer turret comprising a support shaft, a support mounted on the support shaft for rotation about the axis of the support shaft, means for rotating the support about the axis of the support shaft, a rotatable shaft mounted on the support with its axis parallel to that of the support shaft and at a predetermined radial distance therefrom for movement in a circle about the axis of the support shaft and for rotation about its own axis during rotation of the support, said rotatable shaft mounting a picker for movement circularly about the axis of the support shaft relative to a glue-applying roll, a label holder and a transfer roll arranged about the axis of the support shaft as a center, and means comprising a drive element fixed to the support shaft having a varying radius of curvature, a drivable element fixed to the rotatable shaft for effecting rotation of the rotatable shaft about its own axis, a transfer element arranged in engagement with the drive and drivable elements for transferring the rotation of one to the other and means supporting the transfer element for radial movement relative to the axis of the drive element while maintaining driving engagement with both the drive and drivable elements.

4,060,230
EMBOSSING GATE ROLLER
Wayne Edward Church, Longmont, and Frederick Fenn Quist, Jr., Boulder, both of Colo., assignors to International Business Machines Corporation, Armonk, N.Y.
Filed Nov. 11, 1976, Ser. No. 741,099
Int. Cl.² B65H *29/00*
U.S. Cl. 271—63 **8 Claims**



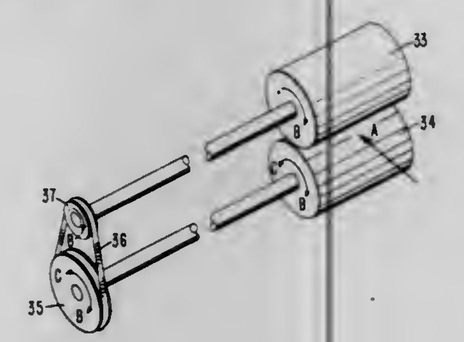
1. In an electrophotographic machine wherein copy paper is moved from a supply area to a transfer station whereat an image of a document to be copied is transferred from an image-bearing drum to said copy paper through contact of said copy paper with said drum, apparatus including:
embossing means located prior to said transfer station in the path of said copy paper, for forming a small embossed section in the leading edge of said copy paper so that said small embossed section including a portion of said leading edge stands away from the surface of said drum when said leading edge is in contact with said drum; and
stripper means for removing said copy paper from said drum, said stripper coacting with said embossed section of said copy paper.

4,060,231
APPARATUS AND METHOD FOR STACKING SHEETS
Anton Rudolph Stobb, R.D. 1, and Walter John Stobb, R.D. 1, Box 60, both of Pittstown, N.J. 08867
Filed Oct. 1, 1976, Ser. No. 728,547
Int. Cl.² B65H *29/40, 31/32*
U.S. Cl. 271—80 **12 Claims**



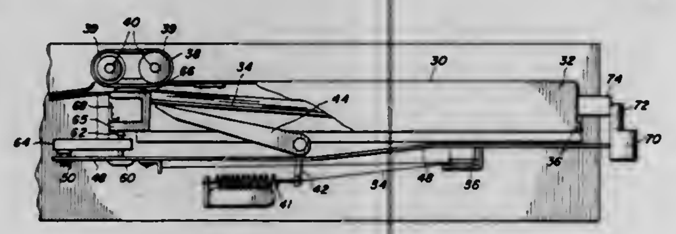
11. Means for stacking sheets of paper, comprising means for supporting sheets of paper in end-to-end spaced-apart relation and with said means having a terminal end where the sheets are released from said means along a path extending from said means, two rotatably mounted means disposed adjacent said terminal end and each having sheet engager means for individually releasably receiving the sheets from the first said means and moving the sheets away from the first said means and being arranged to drop the sheets into a stack when the second said means are rotated, the second said means being disposed on opposite sides of said path of the sheets released by the first said means and being rotatably driven in opposite directions, rotation driver means operatively associated with the second said means and a sheet movement means arranged to monitor the sheets moving toward the second said means and with said driver means and said sheet movement means being operatively associated together for the control of rotation of the second said means in synchronization with the movement of the sheets, an additional control means for rotation of said rotatably mounted means and arranged to interrupt rotation every one-quarter revolution thereof, and said control means and said sheet movement means being operatively associated together for respectively stopping and starting of rotation of said rotatably mounted means for receiving and releasing of the sheets, and receiver means operatively disposed relative to the second said means for receiving the sheets from the second said means and in a stack when the sheets are released by said sheet engage means.

4,060,232
CONTROLLED SLIP PAPER SEPARATOR
David Kent Gibson, Boulder, Colo., assignor to International Business Machines Corporation, Armonk, N.Y.
Filed Nov. 12, 1976, Ser. No. 741,426
Int. Cl.² B65H *3/46*
U.S. Cl. 271—122 **1 Claim**



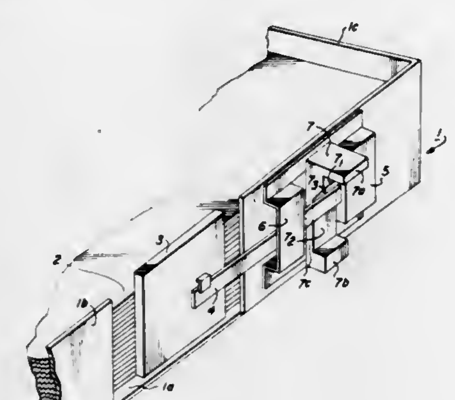
1. Apparatus for feeding sheets one at a time from a stack of sheets wherein sheet picking and feeding means are employed for moving at least one sheet from said stack and separating means are employed for receiving sheets from said picking and feeding means and rejecting all but one sheet, said separator means comprising:
- a positively driven separator roll;
- a retard roll located in contact with said separator roll to form a nip therewith;
- a first pulley rigidly connected to the shaft of said separator roll;
- a second pulley rigidly connected to the shaft of said retard roll; and
- a continuous garter spring means situated around said first and said second pulleys for allowing said retard roll to rotate in a first direction under the influence of said separator roll due to slippage between said garter spring and at least one of said pulleys, and for driving said retard roll in a second direction when multiple sheets are in said nip, when slippage occurs between said multiple sheets, and when slippage does not occur between said garter spring and the two pulleys.

4,060,233
CASSETTE LOADED SHEET FEEDER FOR REPRODUCTION MACHINE
Klaus K. Stange, Pittsford, and Thomas J. Hamlin, Macedon, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.
Filed Nov. 1, 1976, Ser. No. 737,450
Int. Cl.² B65H *1/12, 3/04*
U.S. Cl. 271—160 **3 Claims**



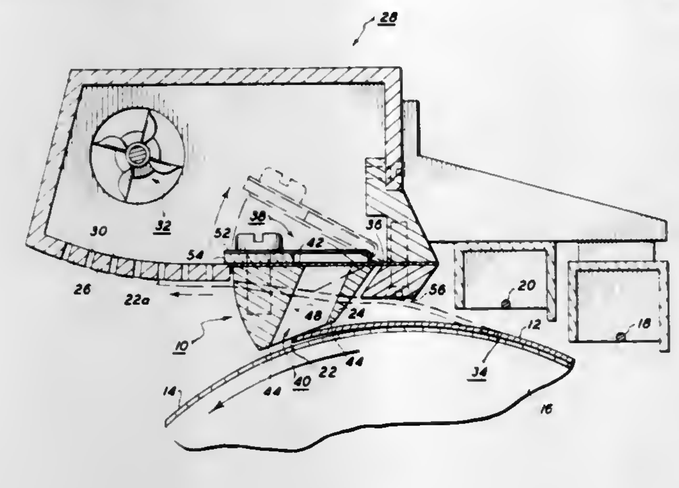
1. A reproduction machine having a copy sheet cassette adapted for insertion and removal from the machine for loading copy sheets therein comprising
- a cassette having a front wall, a rear wall, side walls and a top wall adapted to receive a stack of copy sheets therein,
- a bottom wall, adapted for pivotal movement toward and away from said top wall,
- a friction retard sheet feeder adapted for sequentially separating single copy sheets from the top of the copy sheet stack, said friction retard feeder comprising sheet separator means permanently mounted within the reproduction machine and friction retard means mounted on said front wall of the copy sheet cassette,
- means for positioning the front wall of the cassette within the reproduction machine to provide the required spacial relationship between said sheet separator means and said friction retard means, said positioning means including an abutment means formed on the front wall of said cassette and a corresponding abutment mounted within the reproduction machine;
- a cassette locking lever moveable between a cassette locking position and a cassette removal position having a cam surface formed thereon adapted for cooperation with a cam follower to force the sheet cassette upwardly such that said abutment means on the wall of the cassette is moved into engagement with said abutment means mounted within the machine to accurately position the cassette within the machine and provide the required spacial relationship between said sheet separator means and said friction retard means when said locking lever is moved to the locking position; and,
- biased lever means adapted for contact with said bottom wall of the cassette to bias said bottom wall in an upward direction to maintain the top sheet in the copy sheet stack in contact with said sheet separator means irrespective of the quantity of copy sheets in the sheet cassette.

4,060,234
CARTRIDGE TRAY FOR USE IN A COPYING MACHINE
Masamitsu Motoyama, Tokyo, Japan, assignor to Rank Xerox Ltd., London, England
Filed July 27, 1976, Ser. No. 709,032
Claims priority, application Japan, Aug. 27, 1975, 50-117006[U]
Int. Cl.² B65H *3/56*
U.S. Cl. 271—164 **2 Claims**



1. A paper tray positionable in abutting relationship with a surface of a copier machine for holding a stack of paper comprising
- a movable guide,
- spring means for continously biasing said guide toward said stack to a first position in abutment with said stack, and
- actuator means adapted for manual movement to a first position for moving said guide against said bias and away from said stack to a second position, said actuator means movable to a second position by abutment with said surface upon insertion of said tray into said machine for permitting said actuator means to return to said first position, said surface being located in a horizontal plane and said actuator being movable vertically between said first and second positions, said second position being vertically above said first position.

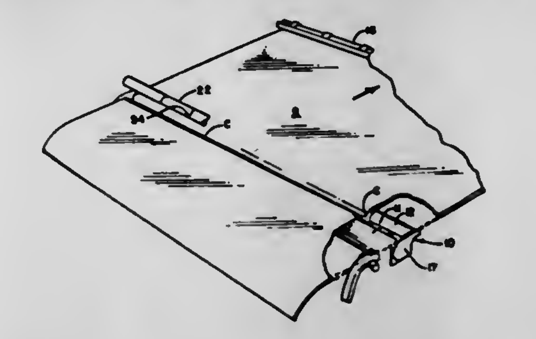
4,060,235
SELF-LIFTING VACUUM STRIPPER
Donald J. Weikel, Jr., Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.
Filed Sept. 1, 1976, Ser. No. 719,642
Int. Cl.² B65H *29/56*
U.S. Cl. 271—174 **6 Claims**



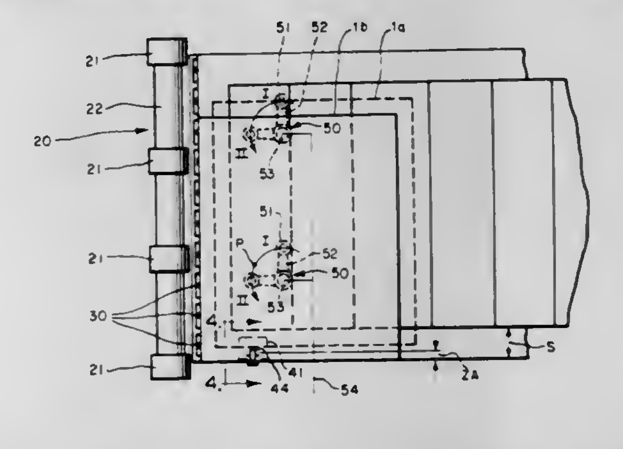
1. In a copying apparatus in which images on a reusable initial image support surface are transferred to copy sheets in electrostatically adhering engagement with said initial image support surface, and in which the electrostatically adhering copy sheets bearing the transferred images are stripped from the initial image support surface, the improvement comprising:
- copy sheet transport means substantially spaced from said initial image support surface for transporting copy sheets away from said initial image support surface;
- a highly apertured stripper head with a highly apertured unobstructed stripping surface normally closely overlying said initial image support surface,
- wherein the ratio of the apertured surface area to the non-apertured surface area of said stripping surface of said stripper head is greater than 1 to 1, and said apertures extend through said stripper head to provide substantially unrestricted air flow through said stripper head,
- said stripper head being freely pivotally mounted for rapid movement away from said initial image support surface toward said copy sheet transport means, and
- vacuum means applying a high air flow through said stripper head through said apertures therein sufficient to pneumatically strip a lead edge area of a single copy sheet electrostatically adhered to said initial image support surface away from said initial image support surface to said stripping surface, but with a low vacuum pressure only slightly below ambient pressure, which vacuum pressure is insufficient to pivot said stripper head away from said normal position closely overlying said image support surface,
- said stripper head being automatically pneumatically self-actuated by said same vacuum means to pivot said stripper head and the lead edge area of said copy sheet away from said initial image support surface toward said copy sheet transport means solely by the coverage of said apertures in said stripping surface by said single copy sheet stripped from said initial image support surface increasing the vacuum force on said stripper head, said stripper head being so pivoted by a distance sufficient to substantially shift the stripping point of said copy sheet from said initial image support surface.

4,060,236
AUTOMATIC SHEET DECURLER
Howard B. Carstedt, Rte. 1, Box 208, Loretto, Minn. 55357
Continuation of Ser. No. 358,981, May 10, 1973, abandoned. This application Feb. 13, 1976, Ser. No. 657,874
Int. Cl.² B65H *29/70, 29/04*
U.S. Cl. 271—183 **6 Claims**

1. Apparatus for decurling a sheet of material curled downwardly at its trailing end about an axis extending transversely to the direction in which the material is traveling, comprising:
P1 a pair of fixed, elongated support surfaces of arcuate convex shape positioned substantially parallel to each other in spaced apart relation and extending transversely with respect to the path of travel of the sheet to be decurled, and forming a decurling zone between said arcuate support surfaces recessed below the top extremities of said support surfaces, said support surfaces having a length at least as great as the width of said sheet;
- means for creating a pressure gradient in said zone between said elongated support surfaces throughout the length thereof sufficient to deform the sheet of material in a direction opposite to the curl in the sheet, said means for creating a pressure gradient comprising a vacuum chamber in fluid flow communication with said decurling zone on the reverse side of said support surfaces from that traversed by a sheet of material, means for evacuating said chamber, and means disposed on the side of the sheet of material opposite the support surfaces for directing a pressurized air stream between the support surfaces into the decurling zone against the sheet material; and
- pulling means for drawing the sheet of material over said support surfaces and through said zone, whereby the entire sheet will progressively pass through said zone and be decurled, said pulling means positively engaging the sheet and cooperating with said pressure gradient in said decurling zone to hold said sheet in tension therebetween to facilitate the decurling of said sheet.



4,060,237
SHEET POSITIONING MECHANISM FOR FEED TABLE OF A SHEET-FED PRINTING PRESS
Klaus Degen, Froschhausen, and Herbert Herrmann, Hausen, both of Germany, assignors to Roland Offsetmaschinenfabrik Faber & Schleicher AG, Offenbach, Germany
Filed Feb. 4, 1977, Ser. No. 765,860
Claims priority, application Germany, Feb. 5, 1976, 2604379
Int. Cl.² B65H *9/14*
U.S. Cl. 271—231 **10 Claims**



5. A sheet positioning mechanism for the feed table of a sheet-fed printing press comprising, in combination, a set of releaseable front stops at the front edge of the feed table, a side guide at the side edge of the feed table, wiping means adjacent to the side guide for engaging a sheet which is to be positioned and urging it against the side guide, said wiping means having a limited zone of action, conveyor means for feeding sheets in shingled relation in a straight stream along the feed table, the stream being laterally spaced from the side guide sufficiently to

be out of the zone of action of the wiping means, an auxiliary transport device near the front end of the table below the sheet path engageable with and sychronized with the arrival of the sheet to be positioned for transporting the sheet (a) forwardly in the direction of the front stops and (b) laterally from its position in the stream into the zone of action of the wiping means so that the wiping means acts exclusively on the sheet to be positioned free from interference of the wiping means by the following sheet in the stream.

4,060,238

DEVICE FOR THE SMOOTH AND FLUTTER-FREE FEEDING OF SHEETS ON SHEET-FED MACHINES, PARTICULARLY OFFSET PRINTING PRESSES

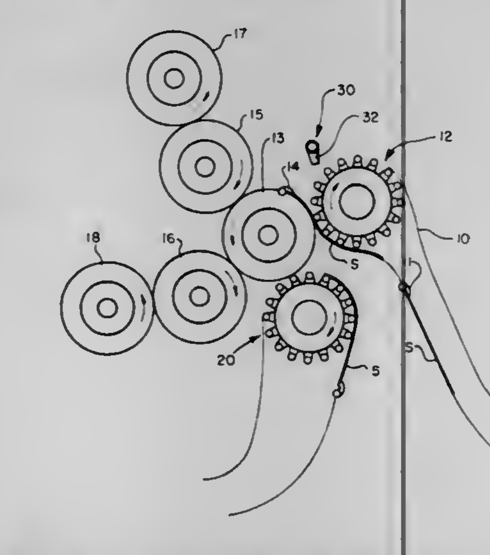
Claus Simeth, Offenbach, Germany, assignor to Roland Offset-maschinenfabrik Faber & Schleicher AG, Germany

Filed Nov. 9, 1976, Ser. No. 740,204

Claims priority, application Germany, Nov. 12, 1975, 2550721

Int. Cl.² B65H *5/22*

U.S. Cl. 271—276 **5 Claims**



1. A feed drum assembly for feeding sheets in succession to an impression cylinder of a lithographic printing press comprising, in combination, a rotatable core, a cylindrical mantle mounted on the core and having a substantially smooth surface which is concentric with the core, an axially and circumferentially distributed array of spacers spaced radially outward from the surface of the mantle at a constant spacing to define a sheet supporting locus, means for guiding a sheet onto and away from the sheet supporting locus so that the sheet makes only a partial turn about the drum, and axially extensive nozzle means stationarily mounted with respect to the drum and spaced outwardly therefrom for directing high velocity air chordwise of the drum and into the region between the sheet and the mantle, the change in direction of the air as it strikes and tends to follow the curved surface of the mantle serving to create suction upon the sheet drawing the sheet into contact with the array of spacers and thereby preventing fluttering of the sheet as it is passed to the impression cylinder.

4,060,239

ERGOMETER WITH AUTOMATIC LOAD CONTROL SYSTEM

Werner Pfleiderer, Eningen; Friedrich Arnold, Reutlingen, and Richard Häussermann, Pfullingen, all of Germany, assignors to Keiper Trainingsysteme GmbH & Co., Rockenhausen, Germany

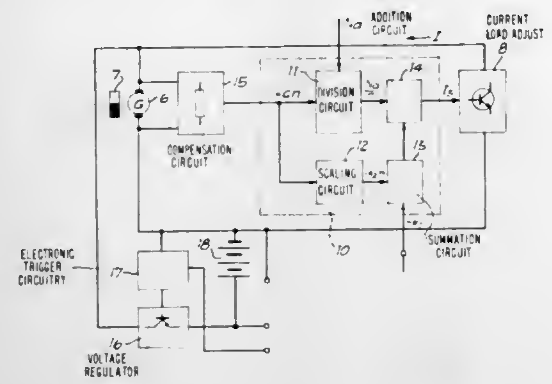
Filed Sept. 9, 1976, Ser. No. 721,780

Claims priority, application Germany, Sept. 11, 1975, 2540492

Int. Cl.² A61B *5/05;* A63B *21/24*

U.S. Cl. 272—73 **5 Claims**

1. An ergometer comprising a direct current generator which is operatively connected with a driving device to be operated by the person being tested, permanent magnets for producing an exciter field, a loading device connected to the outlet of the generator with an electronic load adjusting device for keeping the electrical load of the generator at the pre-set value and an electronic control circuit fed by the generator which determines the nominal value to be set in the loading device, the nominal value being a function of the additional load caused by mechanical losses, wherein the improvement comprises an electronic control circuit including means for providing a nominal value dimension of the load current as a



difference from a first portion, on the one hand, and the sum of the second and third portions, on the other hand, whereby the first share is proportional to the quotient of the output (N_e) to the produced by the person being tested and the generator voltage (U), the second share being proportional to the generator voltage (U) and the third portion being constant.

4,060,240

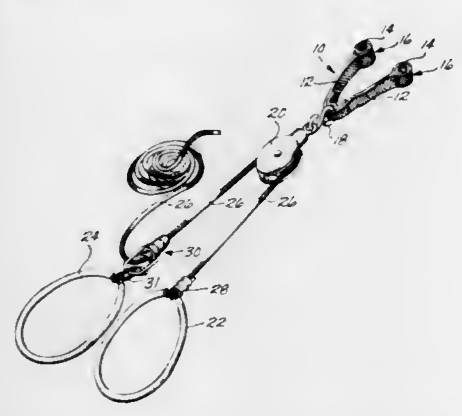
PUSH PULL EXERCISING DEVICE

Virgil M. Dunston, 1408 SW. Donovan, Seattle, Wash. 98106

Filed Apr. 19, 1976, Ser. No. 677,915

Int. Cl.² A63B *21/00*

U.S. Cl. 272—126 **2 Claims**



1. A portable exercising device comprising a flexible cross strap having a central portion of sufficient length to be retained by being stood on by a wearer of shoes or being placed between a door and its adjacent supporting post and having enlarged end portions positionable on the outside of said shoes or beyond a door and its adjacent support post to engage the same, said enlarged end portion resisting sliding movement of the cross strap when a tension is placed on a central portion thereof; pulley means for supporting a cable means; pulley connector means disposed between said pulley means and the central portion of said cross strap; a pair of cord connector means for connecting first and second stirrup means to a cable means; first and second handle-stirrup means for grasping by a user during an exercise program; cord means having one end portion thereof connected with said first handle-stirrup means, thence reeved about said pulley means, and thence releasably connected with one of said cord connector means at a location intermediate the cord means length and removed from its other end portion; said other of said cord means including an additional means to permit free sliding movement of said cord means when pulled in one direction and to automatically lock and stop the cord means in response to only pulling in the opposite direction of said cord means when said second handle stirrup means is held stationary.

4,060,241

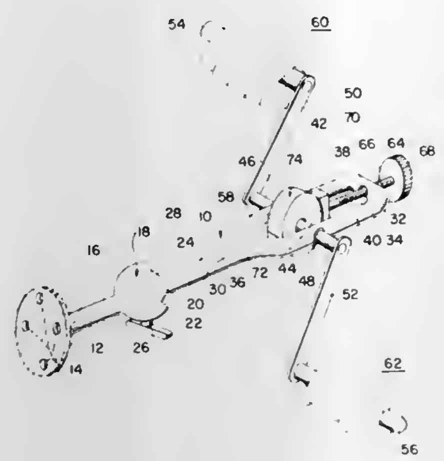
FRICTION TYPE EXERCISING DEVICE

Edward Hegel, 484 Park Ave., N. Merrick, N.Y. 11566

Filed Oct. 13, 1976, Ser. No. 732,157

Int. Cl.² A63B *21/22*

U.S. Cl. 272—132 **2 Claims**



1. An exercising device comprising a wheel, a frame, said frame including an elongated plate and a rod, one end of the rod fixedly secured to a first marginal edge of the plate, the wheel being disposed journalled to opposed sides of an opening located in the frame, the first marginal edge being disposed intermediate said opposite sides, a shaft, the shaft co-axially aligned with an fixedly secured to the wheel extending outwardly from the frame, a pair of handles fixedly secured eccentrically to the ends of the shaft, means to apply a variable magnitude drag force on the periphery of the wheel, said drag force applying means including a threaded rod, one end of the threaded rod carrying a bar, the bar having a portion of the outer surface thereof arcuately shaped disposed in touching engagement with a portion of the periphery of the wheel, the other end of the threaded rod having a handle fixedly secured thereto, the frame having a threaded hole disposed in a second marginal edge of the plate, the second marginal edge being disposed intermediate said sides and opposite to said first marginal edge, a portion of the threaded rod being disposed in threaded engagement with the threaded hole, the portion of the threaded rod including a portion of the rod intermediate the handle and the bar, said fastening means includes a circular plate, the circular plate having a plurality of holes therein, a plurality of screws, said plurality of holes having said plurality of screws passing therethrough for mounting said circular plate to said mounting surface, means to adjustably position including a block, the block having a hemi-sperhical socket disposed therewithin, the socket having an open mouth portion disposed in the surface of the block, a ball, a portion of the surface of the ball being disposed captured within the socket, the rod being disposed fixedly secured to another portion of the surface of the ball and passing through the open mouth portion, the block being disposed fixedly secured to the circular plate, means to releasingly clamp the ball to the block, means to adjustably position the longitudinal axis of the shaft relative to a stationary mounting surface, means to fasten the frame to said mounting surface.

4,060,242

ELECTRONIC GAME APPARATUS

Thomas L. Huang, and Ling Ling Huang, both of 5565-02 Walnut Blossom Drive, San Jose, Calif. 95123

Filed Aug. 21, 1975, Ser. No. 606,439

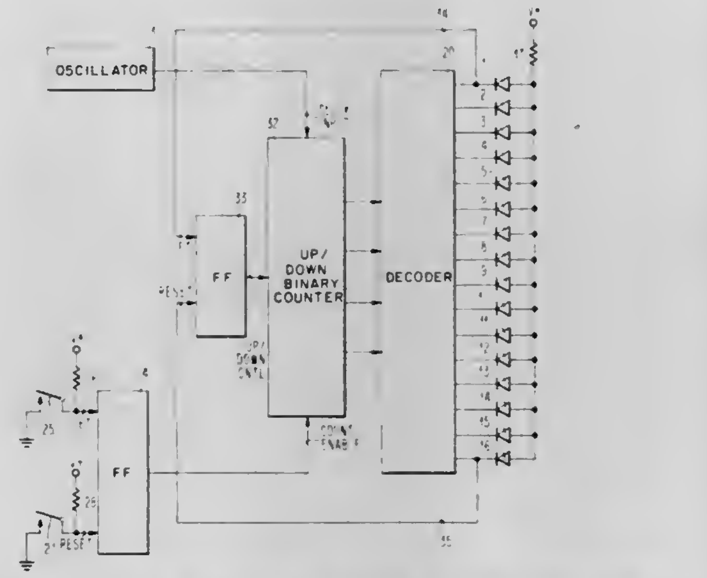
Int. Cl.² A63B *71/06*

U.S. Cl. 273—1 E **6 Claims**

1. In a game apparatus, the combination comprising:

a series of more than two selectively energized light sources disposed for view by a player;

circuit means for controlling the energization of said light sources, said circuit means being switchable between first and second states and operative when in said first state to progressively and repetitively energize said light sources one-at-a-time to effect the appearance to the player of an illuminated light moving from one end of the series towards the other end, said light sources being energized at a rate allowing the player to operate said apparatus as a game of skill, said circuit means being operative in said second state to energize only one light source to effect the appearance of a stationary light; and,



means for switching said circuit means between said states and including player-actuated switch means operative to switch said circuit means from said first state to said second state, whereby a player upon watching the moving light can actuate said switch means and attempt to stop the moving light at a desired one of said light sources, said circuit means including means to reverse the direction in which said light sources are progressively energized, to effect the appearance to the player of an illuminated light moving back and forth.

4,060,243

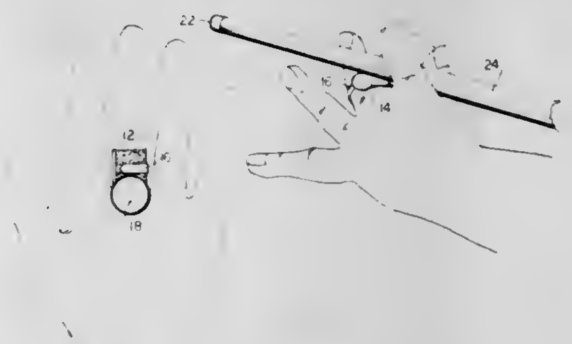
COMBINATION CHALK HOLDER AND CUE SLIDE

John J. Langan, Box 239, Russell Ave., Frostburg, Md. 21532

Filed June 24, 1976, Ser. No. 699,593

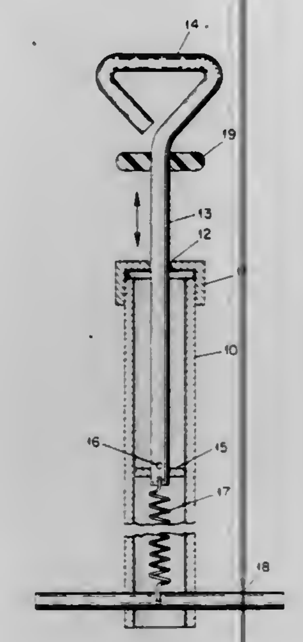
Int. Cl.² A63D *15/16*

U.S. Cl. 273—18 **4 Claims**



1. In combination, a chalk holder and a flexible cue slide band for encircling a finger of a pool or billiards player, said band including a felt material cue slide portion said band further including on one end thereof a strip of narrower width than said cue slide portion, said strip having Velcro hooks on one side thereof, said band further including on the other end thereof a patch of Velcro loops said Velcro hooks and loops being engaged to fasten said band on a player's finger; said chalk holder being releasably attached to said patch by a means to releasably engage said a chalk holder.

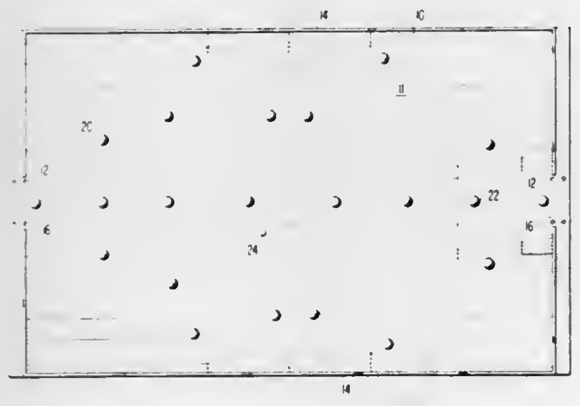
4,060,244
RETRACTABLE ANCHORS FOR GAME BASES
Robert E. Graham, 2041 Wilson Road, Knoxville, Tenn. 37912
Filed May 22, 1975, Ser. No. 579,923
Int. Cl.² A63B *71/00*
U.S. Cl. 273—25 **3 Claims**



1. A retractable game base anchor for permanent installation in a vertical orientation beneath the surface of a playing field, said anchor having a portion thereof for extending above said surface to engage a game base when in use and retract below said surface when not in use, which comprises:
- a hollow tubular body member for positioning in said vertical orientation beneath said surface;
- a closure covering the upper end of said body member when so oriented, said closure being provided with a central aperture;
- a rigid cross arm engaged with the lower end of said body member and extending outwardly from opposite sides thereof to aid in stabilizing said body member, when in use, below said playing field surface;
- an axially movable rod disposed along the longitudinal axis of said body member and extending through said central aperture, with a first end of said rod being within said body member and a second end of said rod being exterior of said body member, said second end being formed into a loop, a portion of said loop most distant from said body member being a straight section perpendicular to said rod;
- a non-sealing spacer disk encircling and fixedly engaged to said first end of said rod interiorly of said body member to maintain said first end of said rod on the longitudinal axis of said body member; and
- an elongated helical spring within said body member having an axis extending along the longitudinal axis of said body member, a first end of said spring engaged with said spacer disk, and a second end engaged with said closure cover whereby said loop is normally retained in a retracted position adjacent said closure but whereby said loop may be elevated above said surface to engage said game base.

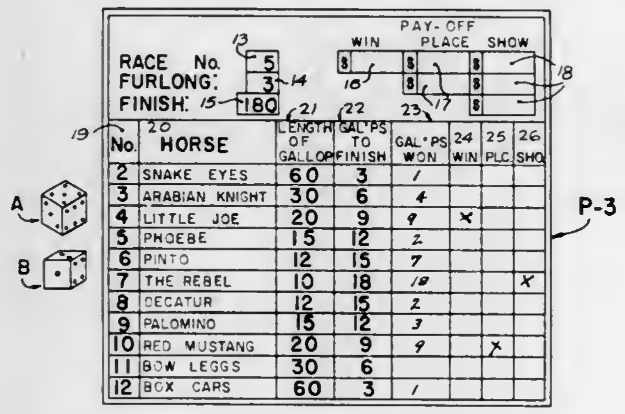
4,060,245
SOCCER BOARD GAME
Enrique Gamez Duch, 10a Calle 3-02, Zona 1, Ciudad Guatemala, Guatemala
Filed July 27, 1976, Ser. No. 709,132
Claims priority, application Guatemala, July 28, 1975, 37842
Int. Cl.² A63F *9/00*
U.S. Cl. 273—85 R **3 Claims**

1. A game for instructing the rules of soccer by simulating soccer play on a planar surface having a soccer field layout thereon, comprising:
- a pair of goals for placement at either end of said soccer field layout,
- a first set of round player pieces, each of which has a vertical circular side wall and an upper concave surface, said first set comprising a first team,
- a second set of round player pieces each of which has a vertical, circular side wall the circumference of which is the same as those layer pieces in said first set and each having an upper concave surface, said second set comprising a second team,
- a circular ball piece having a circumference substantially less than that of said player pieces,



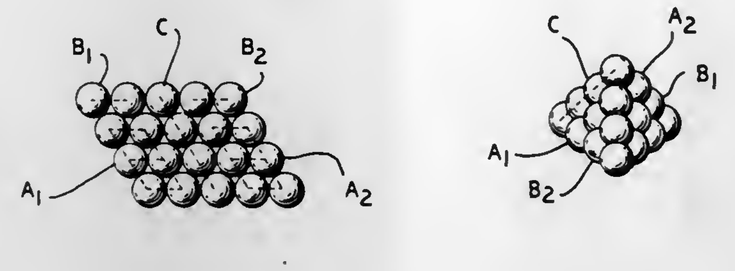
- first and second shooting discs having a circumference substantially the same as said player pieces and having a relatively thin body and an enlarged semicircular edge about its periphery,
- whereby first and second players are given, respectively, one of said discs and first and second sets of said players and said players dispose said sets according to their tactics and in accordance with certain game rules and said shooter discs are utilized to slide over said concave surfaces of said players to impel said players with sufficient force to strike said ball piece and move said ball piece toward one of said goals.

4,060,246
HORSE-RACE-SIMULATING PARLOR OR CASINO GAME OF PURE CHANCE
Leslie J. Ward, 2450 Blackwood Drive, Vineland, N.J. 08360
Filed Apr. 25, 1977, Ser. No. 790,710
Int. Cl.² A63F *3/00*
U.S. Cl. 273—135 AA **21 Claims**



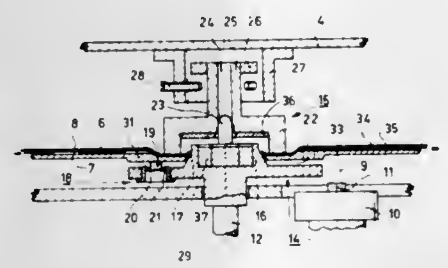
18. A game of pure chance comprising a combination of a pair of dice which can be rolled to eleven numbers, from 2 through 12, and a play-board having thereon eleven play-numbers, from 2 through 12, and having thereon means for indicating a finish-number which is an integral-number-multiple of the lowest common multiple of the numbers representing the ways in which said eleven play-numbers can be rolled by the dice, and having thereon a chance-equalizing number for each play-number which chance-equalizing-number is said lowest-common-multiple divided by the number of ways the play-number can be rolled by the dice.

4,060,247
GEOMETRIC PUZZLE
Robert E. Kobres, Jr., Rte. 1, Nicholson, Ga. 30565
Filed June 28, 1976, Ser. No. 681,519
Int. Cl.² A63F *9/12*
U.S. Cl. 273—157 R **2 Claims**



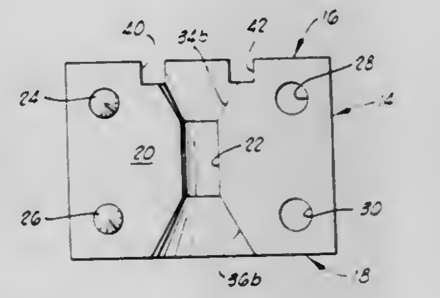
1. A geometric puzzle comprising two pieces having six connected balls in a planar array as shown in FIG. 1, two pieces having two connected balls as shown in FIG. 2, and one piece having four connected balls in planar array as shown in FIG. 3, said pieces being assemblable into either a two dimensional rhomboid or a three dimensional tetrahedron.

4,060,248
PLAYING APPARATUS, IN PARTICULAR A VIDEO PLAYER FOR PLAYING A RECORD WHICH IS MADE OF A TRANSPARENT MATERIAL AND PROVIDED WITH A CENTRAL HOLE
Herman Gerard Lakerveld; Gerard Eduard van Rosmalen; Kornelis Bulthius, and Johannes Petrus Sinjou, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.
Filed June 5, 1975, Ser. No. 583,987
Claims priority, application Netherlands, Mar. 12, 1975, 7502416
Int. Cl.² G11B *7/24;* H04N *1/28*
U.S. Cl. 274—41.6 R **2 Claims**



1. An apparatus for playing a round disc provided with a center hole and a transparent body reflectively encoded with optically readable information on a surface of the transparent body, the apparatus comprising:
- a housing,
- a motor driven drive spindle extending from said housing, p1 optical means mounted in said housing for radial movement with respect to said drive spindle for projecting a light beam through said transparent body of said record to said reflectively encoded surface of said body and for receiving light reflected from the encoded surface and modulated thereby, said optical means being primarily adapted to read a rigid record of a specific standard thickness,
- a detachably mounted plane parallel transparent adapter disc for adapting said apparatus to play relatively thin flexible foil disc records, said adapter disc being provided with a center hole and having a thickness and a refractive index sufficient to substantially remove the spherical aberration produced by the difference in thickness between the rigid disc and the foil disc and having a diameter substantially equal to that of said foil disc, and
- means for tiltably and rotatably mounting said adapter disc on said drive spindle.

4,060,249
ROD PACKING
Milton G. Stowe, Dallas, and Barry J. Brooks, Midland, both of Tex., assignors to WPC, Inc., Midland, Tex.
Filed Dec. 17, 1976, Ser. No. 751,390
Int. Cl.² F16J *15/00*
U.S. Cl. 277—24 **9 Claims**

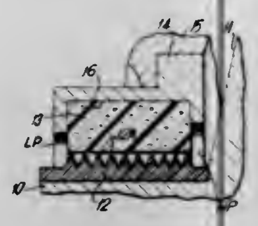


1. An elastomeric packing for stripping oil from an elongated member extended through the packing as the member is removed from an oil well comprising:
- a pair of packing halves detachably interconnected at a central plane of the packing, and each including a planar central face substantially coplanar with said central plane of the packing and having a semicylindrical groove formed centrally therein and a guiding cavity communicating with one end of said semicylindrical groove for guiding said elongated member into said cavity as said member is pulled through the packing;
- a plurality of spaced, cylindrical pins projecting normal to said central planar face and disposed to one side of said semicylindrical groove;
- a plurality of spaced cavities on the opposite side of said semicylindrical groove from said pins, each of said cavities being dimensioned and configured to mate with, and tightly receive, one of said pins;
- a pair of opposed end faces intersecting said planar central face, one of said end faces having said rod-guiding cavity opening in said face; and
- oil channel means in the other of said end faces communicating with said semicylindrical groove for receiving oil carried through said semicylindrical groove on said elongated member when said member is moved through said semicylindrical groove in the direction of said oil channel means.

4,060,250
ROTOR SEAL ELEMENT WITH HEAT RESISTANT ALLOY COATING
Hugh M. Davis, Trenton, N.J., and Alan H. Miller, Philadelphia, Pa., assignors to De Laval Turbine Inc., Princeton, N.J.
Filed Nov. 4, 1976, Ser. No. 738,903
Int. Cl.² F16J *15/44;* F01D *5/28*
U.S. Cl. 277—53 **6 Claims**

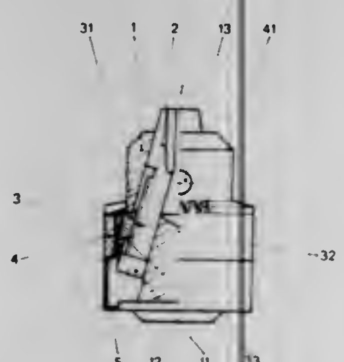
1. In rotary machinery, including a wear ring seal member stationarily mounted in a holding member so as to extend generally coaxially about a rotatable cylindrical member in substantially sealing relationship with the surface of said rotatable member, said rotatable member being made of a low alloy carbon steel, the improvement,
- wherein the surface of said rotatable cylindrical member is substantially completely covered by a fused welding alloy coating metallurgically bonded thereto,

said weld coating being formed of a heat and corrosion resistant alloy composition containing by weight about



10% to 30% chromium and the balance at least about 60% nickel.

4,060,251
CHUCK WITH KEY TIGHTENING
Claude Amyot, Les Gras, France, assignor to Establissements Amyot S.A., Pontarlier, France
Filed Feb. 6, 1975, Ser. No. 547,590
Claims priority, application France, Feb. 19, 1974, 74.05528
Int. Cl.^{2} B23B *31/04*
U.S. Cl. 279—62 **8 Claims**



1. A chuck useful in percussion drilling and being of the type receiving a tool at the front thereof and being tightened with a key and having a chuck body, threaded tool gripping means which are guided for translatory movement in grooves in the chuck body and which are inclined with respect to the longitudinal axis of the chuck, a split tightening nut with threads engaging the gripping means, a toothed ring for engaging the key and connected to rotate the tightening nut, and a protective skirt member fixed coaxially to the toothed ring and at least partially surrounding the chuck body rearwardly of the toothed ring, the chuck being characterized by:

a retaining shoulder on the toothed ring with a smaller diameter than the external diameter of the tightening nut, said retaining shoulder being frontward of the tightening nut,

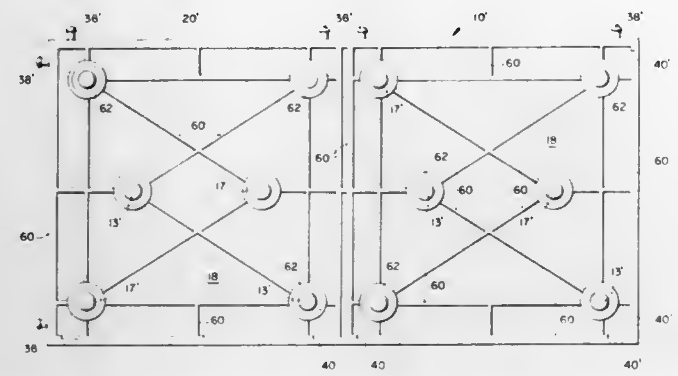
interfitting shoulder means for mounting the protective skirt member to prevent the skirt member from sliding rearwardly during percussion drilling,

said interfitting shoulder means including a shoulder on the tightening nut with the protective skirt member being fitted onto said shoulder on the tightening nut,

said protective skirt member comprising a first part of small diameter at the tool side of the chuck and a second part of large diameter at the machine side of the chuck, said parts being connected by a central shoulder region, and

the skirt member being surrounded, at least over a portion of the length of the small diameter part, by the toothed ring.

4,060,252
BALL TYPE TRANSFER APPARATUS
Geoffrey John Mowery, 27349 Miles Rd., Chagrin Falls, Ohio 44022
Continuation-in-part of Ser. No. 521,547, Nov. 6, 1974, abandoned. This application Nov. 14, 1975, Ser. No. 631,975
Int. Cl.^{2} B62B *1/00*
U.S. Cl. 280—79.1 R **8 Claims**



1. A ball type transfer apparatus particularly adapted for transferring bodies from a first location to a second location comprising in combination:

a base member;

ball bearing means for providing omnidirectional rolling engagement with the ground surface beneath the transfer apparatus; and

interlocking means for interchangeably interlocking any number of ball type transfer apparatus together to provide for the fabrication of ball type transfer apparatus of different dimensions to suit particular needs;

said base member having a plurality of spaced-apart ball bearing cavities, each of which contains a ball bearing means that is resiliently captured in said ball bearing cavity and freely rotatable relative to said base member, with a portion of said ball bearing means protruding outwardly of the lower face of said base member such that the ball bearing means supports the base member above the ground surface and provides for omnidirectional rolling engagement with the ground surface beneath the ball type transfer apparatus;

said base member being a generally planar member including a top surface, a bottom surface and a continuous sidewall, said top and bottom surfaces being substantially opposed to each other, said bottom surface further including a plurality of spaced-apart ball bearing cavities, each of which contains a ball bearing means which is freely rotatable relative to said base member;

each of said bearing cavities being defined by a ball race chamber at one end of said cavity, a resilient chamfered edge at the opposite end of said cavity, and a main bearing chamber between said ball race chamber and said resilient chamfered edge;

said resilient chamfered edge being located at said bottom surface of said base member and extending inwardly from said bottom surface to said main bearing chamber;

said main bearing chamber being defined by a generally cylindrical bore having a larger diameter than the diameter of said resilient chamfered edge;

said ball race chamber being defined by a generally cylindrical bore having a diameter less than the diameter of said main bearing chamber;

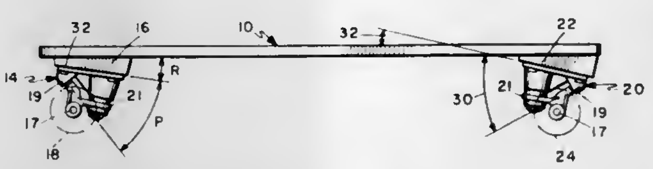
said resilient chamfered edge, main bearing chamber the ball race chamber being axially aligned;

said ball bearing means being comprised of a ball race and a main bearing, both captured in said ball bearing cavity, said ball race being positioned in said ball race chamber in rolling engagement with said base member, said main bearing being rotatably supported between said ball race and said resilient chamfered edge of said base member, said ball bearing means being resiliently captured in said ball bearing cavity by said resilient chamfered edge which has a diameter smaller than the diameter of said main bearing such that said main bearing is held in said ball bearing cavity between said ball race and said resilient chamfered edge;

said interlocking means being comprised of outwardly extending integral locking pins located on two adjacent sides of said continuous sidewall and inwardly extending pin receiving sockets located on the other two adjacent sides of said continuous sidewall;

said locking pins each having an elongated shaft portion terminating in an outermost head portion enlarged from said shaft portion, said locking pins adapted to be closely received in the pin receiving sockets of other similar base members whereby said head portions may retainingly maintain said base members in at least one of closely spaced unitary side by side and end to end relationships to each other.

4,060,253
METHOD AND APPARATUS FOR SKATEBOARD SUSPENSION SYSTEM
Eric W. Oldendorf, 2805 Angelo Drive, Los Angeles, Calif. 90024
Filed Mar. 8, 1976, Ser. No. 664,812
Int. Cl.^{2} A63C *17/00*
U.S. Cl. 280—87.04 A **9 Claims**

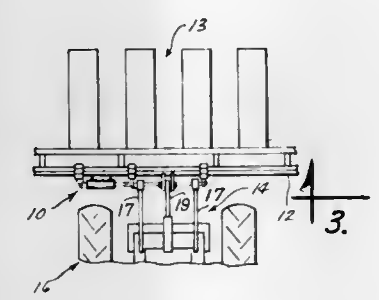


1. In a skateboard having a board and front and rear truck assemblies for supporting the board, each truck assembly having wheels rotatably mounted on an axle which is pivotally mounted at a pivot angle to a mounting bracket, the improvement comprising:

angle pad means for being removably sandwiched between the truck assemblies and the board for supporting said board on said truck assemblies,

and said pad means comprising an individual pad for each truck assembly, each of said pads having interface angles respectively with the truck assemblies and board for altering the effective pivot angle of the truck assemblies between the board and the wheels.

4,060,254
IMPLEMENT RE-ALIGNMENT HITCH
Arnold E. Ernst, Wolverton, Minn. 56594
Filed Jan. 12, 1976, Ser. No. 648,413
Int. Cl.^{2} B60D *1/14*
U.S. Cl. 280—461 A **8 Claims**



1. Apparatus for maintaining an implement having a tool bar in a controlled position behind a prime mover having a conventional three-point hitch arrangement with a draw bar including an upper arm and a pair of lower lift arms, the upper arm pivotally connected to a mounting device secured to a tool bar, said apparatus comprising:

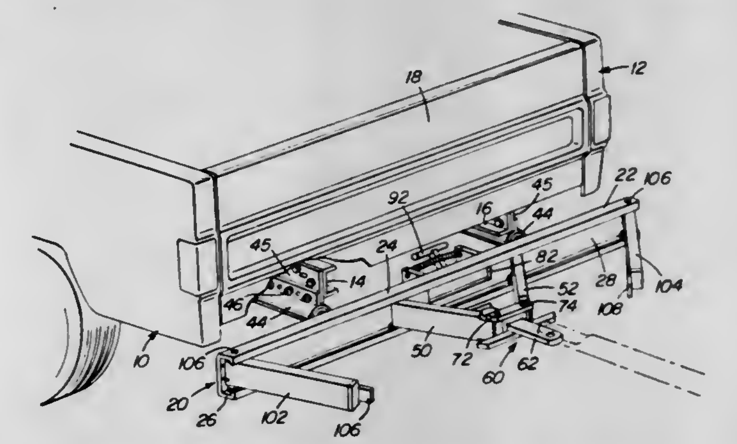
a pair of rock arm means, each of which includes an upright plate, each plate adapted to be connected at its lower end to a respective lower lift arm, said rock arm means being mounted for movement transverse of the tool bar;

a pair of bracket devices, each bracket device secured to the tool bar in a spaced relationship thereon;

means rotatably connecting each bracket device to a respective plate at a point on said plate intermediate the ends thereof; and

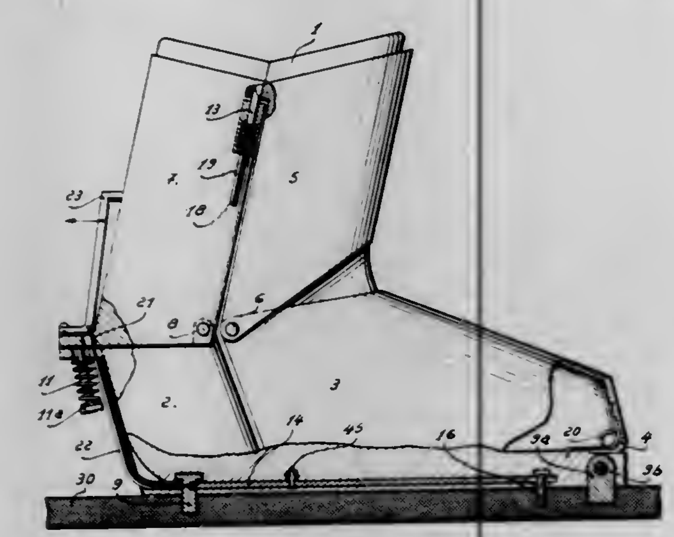
means for moving said plates simultaneously including a fluid operated piston and cylinder device, one end of which is pivotally connected to the tool bar and the other end of which is operatively connected to said plates at their upper ends, said plates moved normally in a vertical plane about their lower ends, whereby said plates above their lower ends move in a direction normal to the direction of movement of the prime mover.

4,060,255
WIDE RANGE BUMPER MOUNTED HITCH
Benjamin G. Zimmerman, Carlock, Ill., assignor to Dennis Wettstein, Eureka, Ill., a part interest
Filed Mar. 16, 1976, Ser. No. 667,375
Int. Cl.^{2} B60D *1/00*
U.S. Cl. 280—478 R **8 Claims**



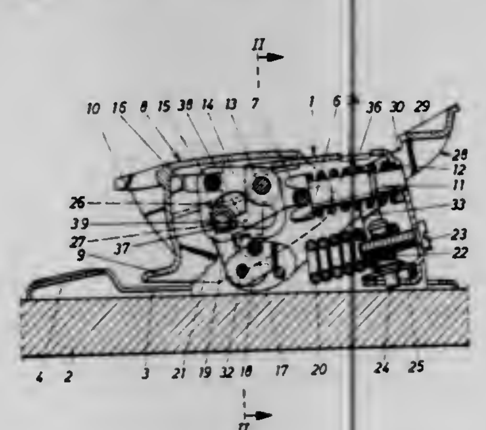
1. In combination, an elongated horizontal base member for mounting in transverse position on one end of a towing vehicle, a pair of horizontal support arms, one pair of corresponding ends of said support arms and said base member including coacting support means supporting said one pair of ends on said base member, at points spaced therealong, for shifting along said base member and horizontal swinging of said arms relative to said base member about upstanding axes shiftable along said base member with said one pair of arm ends between first outwardly convergent positions and second substantially aligned positions generally paralleling said base member with said one pair of arm ends disposed remote from each other and the other pair of arm ends disposed adjacent each other, said coacting support means including means supporting said support arms from said elongated base member against angular displacement of said arms about said base member during sliding and horizontal swinging movement of said support arms relative to said base member, and a hitch member to which said other pair of arm ends are pivotally secured, said hitch member and said base member including lock means operative to releasably lock said hitch member in position relative to said base member when said arms are disposed in said second positions thereof.

4,060,256
DEVICE FOR CONNECTING A SKIER'S LEG TO A SKI
André Marcel Collombin, Avully, Switzerland, and Georges Pierre Joseph Salomon, Bordet-a-Quintal, France, assignors to Ets. Francois Salomon et Fils S.A., Annecy, France
Filed Nov. 28, 1975, Ser. No. 635,592
Claims priority, application Switzerland, Nov. 28, 1974, 15790/74; Nov. 4, 1975, 14192/75
Int. Cl.² A63C *9/08*
U.S. Cl. 280—613 **12 Claims**



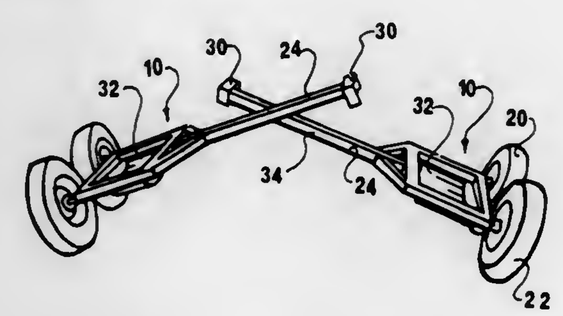
1. Apparatus for connecting the leg of a skier to a ski, comprising a rigid casing in at least three parts, means articulatedly interconnecting said parts for vertical swinging movement relative to each other about a plurality of horizontal axes that are perpendicular to the length of the ski, means for fixing the casing to a ski, locking means for releasably securing together said parts of said casing in a position closely to surround a lower extremity of a skier, and means to release said locking means thereby to release said parts from locked together position responsive to the imposition by the leg of the skier on at least one of said parts of a force greater than a predetermined maximum thereby to release said lower extremity from said apparatus, said casing comprising a base and an upper articulated on the forward end of the base, a rear part of a boot top articulated on a rear portion of said base, and a front part of a boot top articulated on one of a rear portion of said upper and a rear portion of said base.

4,060,257
HEEL RETAINER FOR SAFETY SKI-BINDINGS
Roland Jungkind, Garmisch-Partenkirchen, and Gerhard Sedlmair, Farchant, both of Germany, assignors to Hannes Marker, Garmisch-Partenkirchen, Germany
Filed July 12, 1976, Ser. No. 704,626
Claims priority, application Germany, Feb. 27, 1976, 2608073
Int. Cl.² A63C *9/08*
U.S. Cl. 280—626 **9 Claims**



1. A heel retainer for a safety ski-binding, comprising a supporting member, means for fixing said supporting member to a ski, a sole holder, means for pivoting said sole holder to the supporting member about a horizontal transverse shaft and means for displacing said sole holder in slots substantially parallel to the ski, said sole holder comprising a closing pedal, a first spring means positioned between the sole holder and supporting member for keeping the sole holder in the operative or open position, a handle means for deliberately relieving the sole holder, and a second spring means for biassing said transverse shaft of the sole holder at least approximately in the direction of the slots in the supporting member towards the ski tip, wherein said supporting member comprises a housing and an entrainment member means for the sole holder, a horizontal transverse pivot shaft, means for pivoting said entrainment member means about said pivot shaft, suspending means for suspending said sole holder from said entrainment member means comprising a slot and a horizontal transverse pin respectively provided on said sole holder and entrainment member means, wherein said first spring means engages said entrainment member means.

4,060,258
TOW TRUCK DOLLY
Norbert G. Pigeon, 59 Rg Nord - West, R.R. No. 1, Ste. Madeleine Co., St. Hyacinthe, Canada (J0H 1S0)
Filed June 22, 1976, Ser. No. 698,774
Int. Cl.² B62B *3/02*
U.S. Cl. 280—638 **7 Claims**

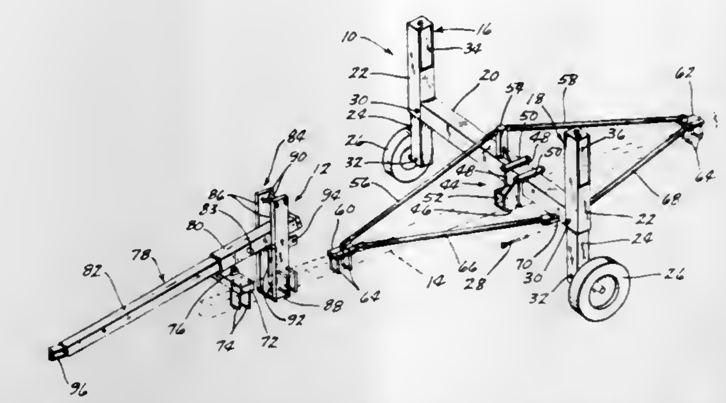


1. A dolly member for supporting a wheel of a towed vehicle comprising a rigid frame, a trough member supported by said frame for receiving a wheel of a towed vehicle, a pair of longitudinally aligned wheels pivotally mounted on one side of the frame, at least one beam transversely secured to said frame on the side opposite the wheels, a stirrup-shaped member rigidly secured sideways near the end of said beam. the open side of said stirrup-shaped member facing downwardly, whereby when a pair of said dolly members are disposed opposite one another and the beams are adjacent one another, the stirrup-shaped member is adapted to hook onto and firmly engage to the beam of the opposite dolly member so that the bottom side of said latter beam is the only one free for movement.

4,060,259
IMPLEMENT TRANSPORTING DEVICE
Roy J. Mefferd, 219 W. Myrtle, Laurens, Iowa 50554, and Gregory L. Mangold, Rural Route, Linn Grove, Iowa 51033
Filed Aug. 2, 1976, Ser. No. 710,431
Int. Cl.² B62D *53/00*
U.S. Cl. 280—656 **8 Claims**

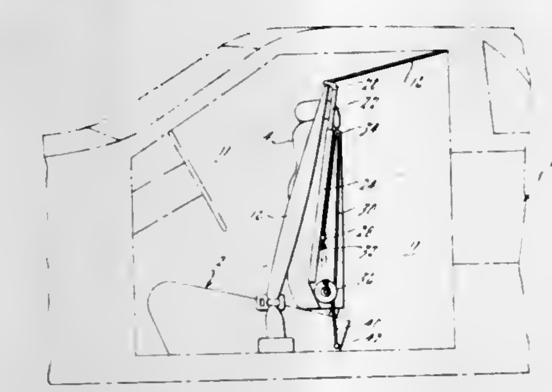
1. A device of the kind described, comprising:
an elongated implement having an elongated implement frame, implement wheels pivotal about an axis parallel to the longitudinal axis of said implement, and tongue means extending transversely from said longitudinal axis of said implement intermediate the opposite ends thereof;
a transporting wheel assembly mounted to said implement frame intermediate the opposite ends thereof, said wheel assembly comprising a pair of spaced-apart vertical legs, each of said legs having upper and lower leg members, means for rigidly securing said upper leg member to said implement frame, said lower leg member being vertically extensibly mounted with respect to said upper leg member each of said lower leg members having a transporting

wheel mounted thereon for rotation about an axis transverse to the longitudinal axis of said implement;
power means connected to said legs for causing vertical extensive movement of said lower leg member from a retracted position wherein said transporting wheel is



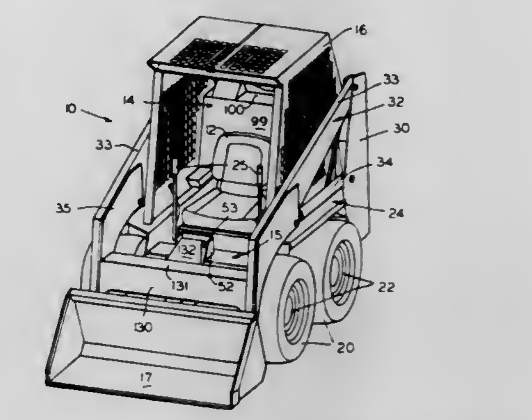
above said implement wheels to an extended position wherein said transporting wheels are below said implement wheels;
a transporting tongue assembly mounted to one end of said elongated implement frame and having a transporting tongue for attaching to a pulling vehicle.

4,060,260
SEAT BELT CONTROL SYSTEM
Cecil A. Collins, Pontiac, Mich., assignor to Robert C. Fisher, West Palm Beach, Fla.
Filed May 14, 1976, Ser. No. 686,266
Int. Cl.² B60R *21/10*
U.S. Cl. 280—747 **4 Claims**



1. In a vehicle having a seat provided with a back which is foldable forwardly, a door port permitting access to said seat and to the area in rear thereof when said back is folded forwardly, a shoulder strap extending normally from a point behind said foldable back near the top of said vehicle downwardly to the upper corner of said seat back adjacent to said door port, a guide member having an aperture at the top through which the shoulder strap extends, said guide member having a downwardly extending rod, a tube on said foldable back in which the rod extends, a pair of interconnected pulleys of different diameter mounted near the base of said back, flexible means connecting the pulley of smaller diameter adjacent to the seat, flexible means connecting the pulley of large diameter to said rod whereby when the back is folded forwardly the rotation of the two pulleys due to the one flexible means wound on the pulley of smaller diameter operates the flexible member on the pulley of larger diameter to extend the rod and therefor the guide member a greater distance than would have occurred if the pulleys were of the same diameter.

4,060,261
LOADER MAIN FRAME FOR SKID STEER LOADER
James J. Bauer, Lisbon, and Thomas M. Sagaser, Gwinner, both of N. Dak., assignors to Clark Equipment Company, Buchanan, Mich.
Filed Feb. 2, 1976, Ser. No. 654,262
Int. Cl.² B60R *21/02*
U.S. Cl. 280—756 **2 Claims**

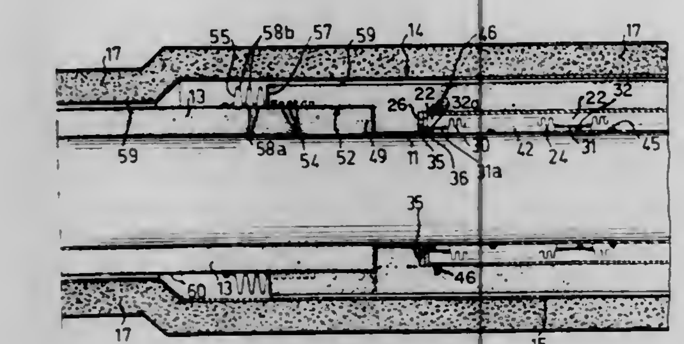


1. A skid steer loader vehicle and vehicle main frame in combination, the main frame comprising laterally spaced, longitudinal extending side beams on opposite sides of the vehicle centerline, crossmembers mounted between the side beams at opposite ends thereof, said members partially enclosing a center compartment, said side beams having outwardly disposed flanges overlying opposite pairs of side wheels for the vehicle, a pair of upright members mounted on respective side beams at the rear thereof, the upright members disposed outwardly of the side beams and projecting upwardly from adjacent the rear of each side beam, a rear crossmember provided between an upper end of the uprights, and an upper enclosure mounted on the main frame and overlying the center compartment of the vehicle, the enclosure disposed forwardly of the uprights of the vehicle, the enclosure generally of two-piece construction and including side, top and rear walls and an open front wall providing entry to the enclosure, the side walls terminating in mounting surfaces comprising inwardly directed flanges overlying the side beam flanges and the rear wall including outwardly directed tabs engaging the rear cross member, the upper enclosure comprising an overhead guard defining an operator's compartment for the vehicle and the side, top and rear walls comprising a grid which physically isolates the operator from movable structural elements of the vehicle, energy absorbing mounting means provided on the main frame between the mounting surfaces of the overhead guard and the mounting surfaces of the frame to vibrationally isolate the overhead guard from the vehicle, and mounting locations for the upper enclosure provided on the side flanges of the side beams and at opposite ends of the rear crossmember for mounting the enclosure on the vehicle.

4,060,262
RECORD MATERIAL
Theodore Maierson, Dayton, Ohio, assignor to The Standard Register Company, Dayton, Ohio
Filed Mar. 24, 1976, Ser. No. 669,960
Int. Cl.² B41M *5/16, 5/22*
U.S. Cl. 282—27.5 **10 Claims**

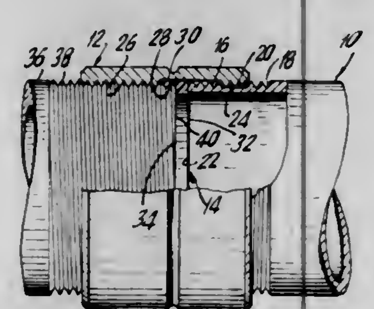
1. A record sheet sensitized with an acidic reactant for developing a color in an oily printing liquid containing a colorless, basic, chromogenic dye-precursor applied thereto by expression of droplets retained by pressure-rupturable wall material located in the sensitized sheet or in an overlying sheet placed against the sensitized sheet, wherein at least one surface of the sensitized sheet bears a substantially colorless, liquid ink comprising an acidic phenolic resin and a lower-alkyl gallate with both the resin and the gallate dissolved in a liquid organic solvent having a boiling point above 300° C and a vapor pressure at 100° C of 1 mm. of mercury or less.

4,060,263
CONDUIT FOR CONVEYING A FLUID, THE TEMPERATURE OF WHICH IS DIFFERENT FROM THE SURROUNDING TEMPERATURE
Michel Kotcharian, Paris, France, assignor to Technigaz, Paris, France
Filed Feb. 6, 1976, Ser. No. 656,071
Claims priority, application France, Feb. 24, 1975, 75.05679
Int. Cl.² F16L *9/22, 59/16*
U.S. Cl. 285—47 **20 Claims**



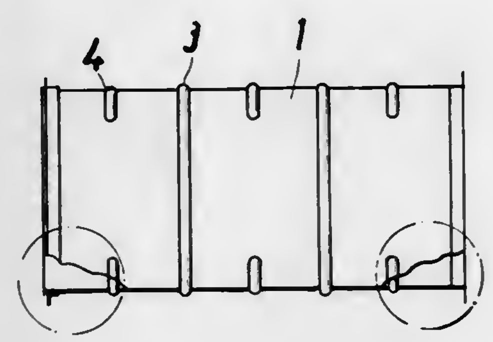
1. Conduit for conveyance of a fluid, in particular a fluid whose temperature is substantially different from the surrounding or ambient temperature, including a circulation pipe for the said fluid, sheath means of insulating material surrounding and engaging said pipe and an outer rigid covering surrounding and protecting said sheath means, characterized in that the said sheath means of insulating material is interrupted at substantially regular intervals and said sheath means forming at each interval at least one fluid-tight lap joint having a coaxial structure and a variable lap surface, that the said circulation pipe is interrupted and terminates at the region of each interval in two spaced ends defining between themselves a gap in said circulation pipe, and that said pipe communicates, through the medium of said gap, with a fluid-tight, substantially annular cylindrical space outside the said pipe, a stationary coaxial sleeve surrounding and spaced from said pipe and surrounded by said lap joint of said sheath means, said sleeve extending across and beyond said gap over a certain length and two corrugated waved compensators, a pair of connecting members respectively fixedly connecting said compensators to said pipe at the region of said two ends thereof, fixing means fixing said compensators at portions thereof respectively distant from said pipe ends to said stationary sleeve, said sleeve and compensators defining between themselves said substantially annular cylindrical space with which said pipe communicates through said gap thereof, and attaching means attaching said sleeve to said outer rigid covering for maintaining said sleeve stationary.

4,060,264
SWIVEL CONDUIT COUPLING ASSEMBLY
Padej Gajajiva, Elmhurst, N.Y., assignor to I-T-E Imperial Corporation Efcor Division, East Farmingdale, N.Y.
Filed June 16, 1976, Ser. No. 696,545
Int. Cl.² F16L *15/00*
U.S. Cl. 285—175 **8 Claims**



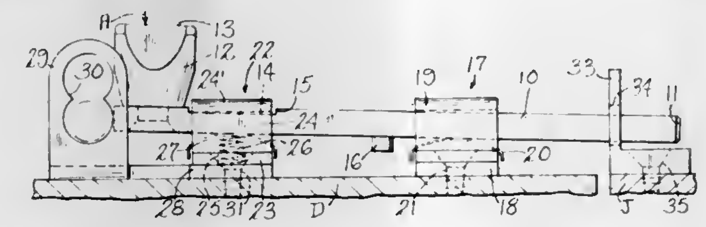
1. A swivel conduit coupling assembly comprising:
a. a first conduit having;
1. a first set of threads formed proximate a first end thereof, said first set of threads on said first conduit being arranged to advance in a first axial direction;
2. a second set of threads formed adjacent and axially inward of said first set of threads, said second set of threads on said first conduit being arranged to advance in said first axial direction; and
3. a first annular, axially elongated groove formed intermediate said first and second sets of threads on said first conduit; and
b. a coupling member having:
1. a third set of threads arranged to advance in a second axial direction that is opposite to said first axial direction to thereby matingly engage said first and second sets of threads on said first conduit;
2. a fourth set of threads arranged to advance in said first axial direction, said fourth set of threads of said coupling member being adapted to mate with threads on a second conduit that is to be coupled to said first conduit; and
3. a second annular, axially elongated groove intermediate said third and fourth sets of threads on said coupling member; and
c. said third set of threads of said coupling member being movable from a temporarily locked position, with respect to said first conduit, to an unlocked position when said coupling member is free to rotate relative to said first conduit, said third set of threads of said coupling member being engaged in said second set of threads of said first conduit in said temporarily locked position.

4,060,265
PIPE CONSTRUCTION
Donald Herbst, Marienplatz 11, 1 Berlin 45, Germany
Filed Sept. 15, 1975, Ser. No. 613,487
Claims priority, application Germany, Nov. 25, 1974, 2456070
Int. Cl.² F16L *23/00*
U.S. Cl. 285—405 **1 Claim**



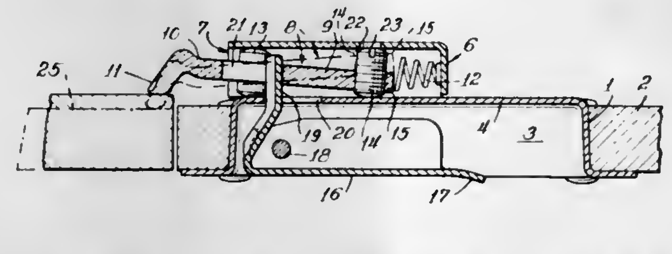
1. A piping system comprising individual pipe sections, each pipe section having a rectangular cross-section, the opposite ends of each pipe section having corner areas with a curvature of radius which allows for a contiguous, outwardly directed edge defining a flange formed by bending the ends of each pipe section;
frames for joining the individual pipe sections, each frame being adjacent an end edge flange and snugly fitting the outside wall of each individual pipe section, said frames, each being formed by bending a continuous L-shaped angle iron piece to conform to the peripheral contour of the outside wall of said pipe section such that said bent continuous L-shaped angle iron piece has corner areas with a curvature of radius that conforms to the corner areas of said pipe section and the opposing ends of said angle iron piece are in abutment, said frame ends being welded, one leg of said angle iron piece being adjacent to and parallel with said outside wall, while the other leg of said angle iron piece is adjacent to and parallel with said flange;
a first plurality of longitudinally spaced reinforcing bands encircling each pipe section; and
a second plurality of reinforcing bands located between said first reinforcing bands and covering only said corner areas for providing torsional stiffness to said pipe section.

4,060,266
SURFACE BOLT
Eric Wilkinson, Woodbridge, Conn., assignor to Leigh Products, Inc., Coopersville, Mich.
Filed June 1, 1976, Ser. No. 691,415
Int. Cl.² E05C *1/04*
U.S. Cl. 292—148 **3 Claims**



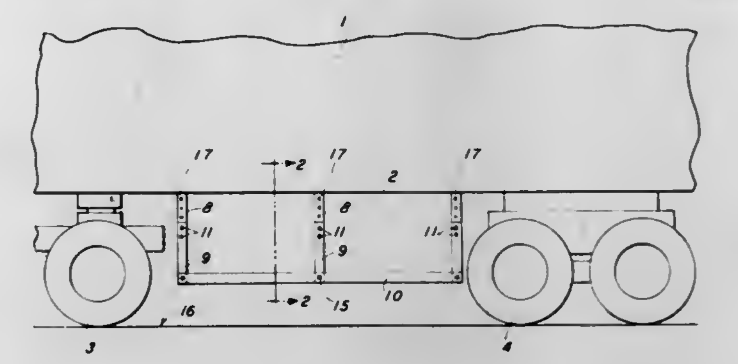
1. A surface bolt assembly comprising, an elongated bolt body having top and bottom surfaces and forward and rearward ends, forward and rearward guides for said body, the body being slidable longitudinally in said guides between locked and unlocked positions, a knob projecting from said top surface adjacent the rearward end of the bolt, and means adjacent the rearward guide adapted to receive a bolt stopping member, said means being constituted by projecting elements disposed on opposite sides of the path of movement of the bolt and knob, said elements having holes aligned to receive said bolt stopping member in either of two positions, wherein in a first of said positions said bolt stopping member is engagable with said bolt to prevent movement thereof in one direction, and in a second of said positions said bolt stopping member is engagable with said knob to prevent movement thereof in the opposite direction.

4,060,267
ADJUSTABLE DOOR LATCH
Paul Monfardini, 744 Chandler Road, Gurnee, Ill. 60031
Filed June 7, 1976, Ser. No. 693,307
Int. Cl.² E05C *1/12*
U.S. Cl. 292—173 **7 Claims**



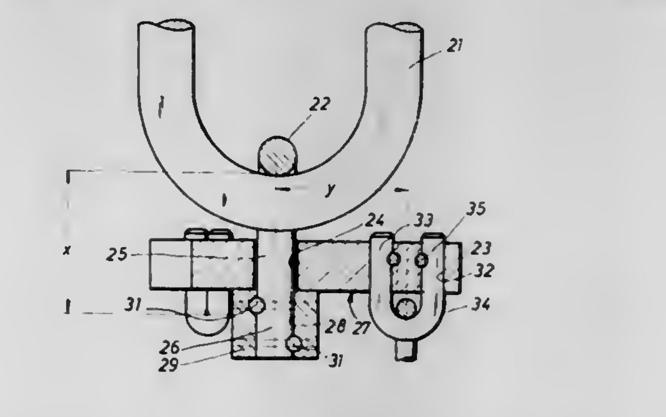
1. In a hinged door latch comprising a bolt case adapted to be mounted upon a door, a bolt arranged for axial reciprocating movement within said case and including a catch at the forward end thereof, and means for moving said bolt in extension and retraction to latch and unlatch the door, the improvement which comprises means affixed to and carried by said bolt for adjusting the angle of emergence of said bolt whereby to laterally adjust the extended position of said catch, said means comprising a post mounted for axial adjustment transversely of said bolt at the rear end thereof, said post extending in sliding relationship between top and bottom inner surfaces of the bolt case, and a fulcrum element mounted transversely of the bolt in the forward portion thereof rearwardly of the catch, said fulcrum element extending in sliding relationship between top and bottom inner surfaces of the bolt case.

4,060,268
GUARD RAIL DEVICE
William H. Page, Jr., 200 Cemetary St., Oakland, Ill. 61943
Filed Jan. 5, 1977, Ser. No. 756,751
Int. Cl.² B60R *19/00*
U.S. Cl. 293—62 **1 Claim**



1. A height adjustable guard rail device for attachment to each side of a large wheel diameter vehicle to prevent an object colliding into the side of the vehicle from falling under the rear wheels thereof comprised of:
a. a horizontal guard rail extending from about the rear of the front wheels to about the front of the rear wheels of the vehicle and extending substantially within the plane of the rear and front wheels of the vehicle, said guard rail positioned at such a height that as the vehicle travels across a road surface the guard rail does not touch the road surface;
b. a plurality of upper vertical braces attached to the underside of the vehicle and attached to a plurality of lower vertical braces, the lower vertical braces being attached to the horizontal guard rail;
c. a plurality of upper diagonal braces attached to the underside of the vehicle and attached to a plurality of lower diagonal braces, the lower diagonal braces being attached to the horizontal guard rail;
d. wherein the upper and lower diagonal and vertical braces are slidably mounted to each other allowing for the guard rail to be secured in raised or lowered positions; and
e. the upper diagonal brace is rotatably mounted to the underside of the vehicle and the lower diagonal brace is rotatably mounted to the guard rail.

4,060,269
EQUALIZING HEAD FOR CHAIN SLINGS
Werner Rieger, Haus Haselbach, 7080 Aalen 9; Manfred Böning, Klistostrasse 20a, 1000 Berlin 37; Hans Dalferth, Haydnstrasse 21, 7083 Wasseralfingen, and Reinhard Smetz, Baldingerstrasse 2, 8860 Nordlingen, all of Germany
Filed Apr. 8, 1976, Ser. No. 675,179
Claims priority, application Germany, Apr. 15, 1975, 2516817; Apr. 15, 1975, 7512193[U]; Apr. 15, 1975, 7512194[U]
Int. Cl.² B66C *1/10*
U.S. Cl. 294—78 A **13 Claims**



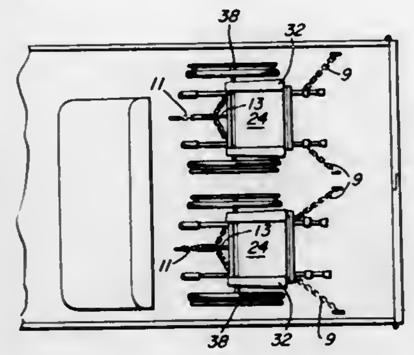
1. In an improved equalising head for a chain sling of the type comprising a hanger, a first connecting member for connecting the hanger to an equalising head, and a plurality of

secondary connecting members for connecting individual falls of chain to said equalising head, the improvement comprising:
said first connecting member being a clevis-type shackle ending in shanks, said shanks of said first connecting member having parallel grooves on opposite sides thereof,
said equalising head having openings therein to receive said shanks and said equalising head having parallel bores adjacent to and transverse to said openings, said parallel bores being complementary to said grooves on said shanks,
said shanks being insertably fitted into said openings with said respective grooves and bores in alignment, and
locking elements positioned within said bores to retain said shanks within said equalising head, thereby securing said shanks of said first connecting member to said equalising head,
whereby said first connecting member is detachably fastened to said equalising head.

4,060,270
DEVICE FOR STOWING AWAY A SPARE-WHEEL ON AN AUTOMOBILE VEHICLE
Jean Croissant, Freneuse, France, assignor to Automobiles Peugeot, Paris, France
Filed June 22, 1976, Ser. No. 698,503
Claims priority, application France, July 7, 1975, 75.21251
Int. Cl.² B60P *3/22*
U.S. Cl. 296—37.2 10 Claims

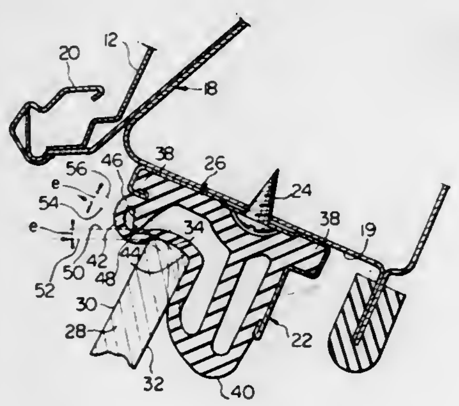
1. A device for stowing away a spare-wheel adjacent an end of a vehicle and comprising, in combination with a floor of the vehicle and a fuel tank carried under the floor, support means mounted under the floor, a basket for carrying and locating the spare-wheel between the tank and said end of the vehicle and mounted on the support means to be pivotable about a first axis extending transversely of the vehicle, the support means being mounted under the floor to pivot about a second axis extending transversely of the vehicle and located with respect to the first axis toward the centre of the vehicle longitudinally of the vehicle and at a higher level than the first axis, and releasable connecting means between the floor and the support means for holding the support means stationary in normal operation of the device and capable of being released in the event of an accident producing an impact capable of displacing the spare-wheel in a direction from said end toward said centre of the vehicle, the support having such position relative to the tank and the first axis and second axis being spaced apart a distance which is such that, upon release of the connecting means, the support means are capable of swinging about the second axis downwardly and toward the centre of the vehicle longitudinally of the vehicle to constrain the basket to move the spare-wheel toward a position under the tank.

4,060,271
WHEELCHAIR HOLD DOWN ASSEMBLY
Joseph J. Williams, 4546 58th, San Diego, Calif. 92115
Filed Mar. 23, 1976, Ser. No. 669,951
Int. Cl.² B60N *1/02;* B60P *7/08;* B61D *45/00;* B62B *11/00*
U.S. Cl. 296—65 R 2 Claims



1. A three point tie down arrangement to secure wheelchairs to a vehicle bed comprising: means securing said wheelchairs to said vehicle bed including; three eyebolts, each eyebolt attached to the bed of the vehicle by a backing plate and nut, the two front eyebolts being spaced apart a width to accommodate the width of a wheelchair, and the third eyebolt spaced rearwardly and equidistantly from each of the front two eyebolts a distance to accommodate the front to rear length of a wheelchair, link chains secured to the front eyebolts having an S-shaped hook at their respective free ends for attachment to the front side frame of the wheelchair at the juncture of the front vertical rod and lower horizontal rod of the chair, a third chain attached to the rear eyebolt, a flexible cross member adapted to extend transversely of the wheelchair beneath the seat thereof and attached to the rear side frame of the chair, an overcenter toggle chain tightener having a quick release attached to the flexible cross member and the last named chain and floating therebetween, so that pressure exerted on the fexible cross member and chain to tighten and secure the wheelchair to the bed causes the flexible cross member and chain to have a Y-shape.

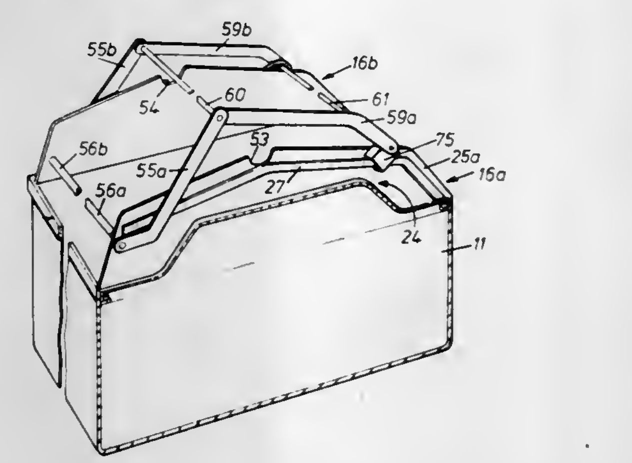
4,060,272
WEATHERSTRIP
Kenichi Mori, No. 714, Nishiterao-cho, Kanagawa, Yokohama, Japan
Filed Feb. 3, 1976, Ser. No. 654,741
Claims priority, application Japan, Mar. 17, 1975, 50-35728[U]
Int. Cl.² B60J *1/17*
U.S. Cl. 296—93 7 Claims



1. A weatherstrip in a motor vehicle body structure having a roof rail defining an upper side of a window opening and a vehicle door having a window pane movable between raised and lowered positions relative to the window opening, comprising:
an elongated, resiliently deformable member extending along the roof rail and having an upper mounting portion secured to the roof rail;

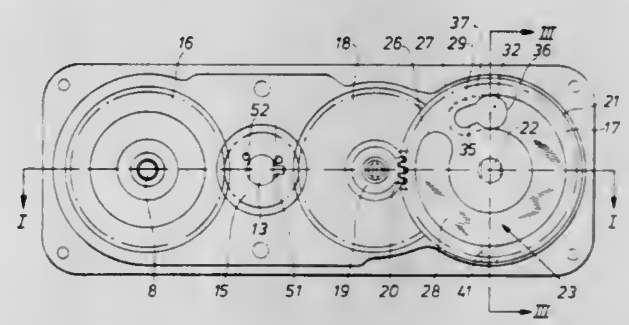
an inboard lip portion on said member extending in use substantially downwardly from the upper mounting portion; an outboard lip portion on said member extending substantially downwardly from the upper mounting portion a transverse bridge portion opposed to said mounting portion and interconnecting the inboard lip portion and the outboard lip portion; the upper mounting portion, inboard lip portion, outboard lip portion and bridge portion defining the hollow of the resiliently deformable member; and restraining means integral with said member disposed within the hollow coactive with the upper mounting portion and the bridge portion to define a barrier to prevent the window pane from moving in a direction substantially normal to the plane of the window opening and corresponding to a direction outwardly of the vehicle body structure;
said restraining means comprising an internal projection portion of said elongated resiliently deformable member disposed internally of the hollow and thereinto and disposed outwardly of the outboard surface of the window pane when the vehicle door is closed with the window pane in a raised position, said internal projection portion being integral with said upper mounting portion but separate from said bridge portion.

4,060,273
VEHICLE BODY COVERING DEVICE
George Edgar Neville, Mansfield, England, assignor to George Neville Truck Equipment Limited, England
Filed Aug. 19, 1975, Ser. No. 605,940
Claims priority, application United Kingdom, Aug. 21, 1974, 28732/74
Int. Cl.² B60P *7/04*
U.S. Cl. 296—100 7 Claims



1. A vehicle body covering device for attachment to an open-top vehicle body, said device comprising: a main frame, comprising first and second upstanding, longitudinally spaced, end walls and a longitudinally extending side member interconnecting said end walls at one side of said main frame, and defining an opening between said end walls and said side member through which the vehicle body can be loaded and unloaded; means for mounting the main frame on the vehicle body so that said interconnecting side member is disposed along one side of the vehicle body; a moveable support frame carried by said main frame and adapted to support a cover, said support frame comprising a pair of longitudinally spaced arms, means for mounting each arm adjacent a respective end wall for lateral movement in a path adjacent its respective end wall; means for moving said pair of longitudinally spaced arms of said support frame in said path between a first, covering position wherein a cover supported by said support frame extends across the full width of the vehicle body and covers said opening and a second, uncovering position wherein said longitudinally spaced arms and said cover carried thereby are disposed adjacent to said interconnecting side member so as to uncover said opening; said pair of longitudinally spaced arms of said support frame being positioned, in said covering position, with their outer ends adjacent the side of said main frame remote from said longitudinally extending side member and with their inner ends positioned, in said covering position, with their inner ends intermediate the sides of said main frame; a longitudinal connecting member interconnecting the outer ends of said pair of longitudinally spaced arms and moveable therewith; and a further longitudinal connecting member interconnecting said longitudinally spaced arms at a point intermediate the sides of said main frame and moveable therewith, said longitudinal connecting member and said further longitudinal connecting member being adapted to support a cover for said opening.

4,060,274
MOTOR VEHICLE ROOF
Horst Bienert, Gauting; Hans Jardin, Inning, and Walter Schätzler, Aufhausen, all of Germany, assignors to Webasto-Werk W. Baier GmbH & Co., Germany
Filed Nov. 22, 1976, Ser. No. 743,987
Claims priority, application Germany, Nov. 25, 1975, 2552773
Int. Cl.² B60J *7/02*
U.S. Cl. 296—137 G 20 Claims

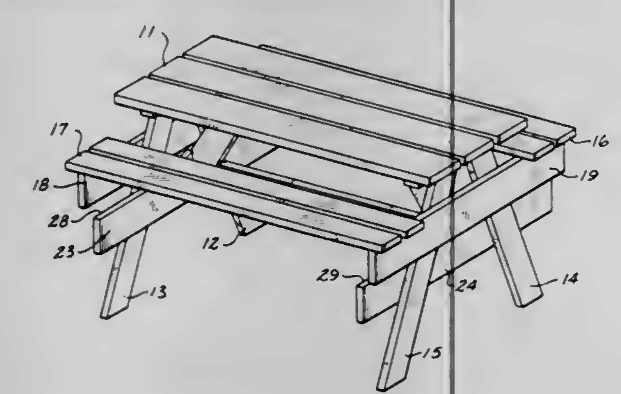


1. Movable vehicle panel member apparatus comprising:
a vehicle panel member,
driving means for tiltingly and slidingly moving said panel member with respect to adjacent vehicle structure,
a movement control member engageable and movable with said driving means for limiting movement of said panel member as a function of the position of said movement control member,
and an abutment member engageable with said movement control member for limiting movement of said movement control member,
wherein said movement control member includes a first guide section which receives the abutment member during sliding movement of the panel member and a second guide section which receives the abutment member during tilting movement of the roof panel,
wherein said first and second guide sections overlap at an interconnecting passage permitting displacement of said abutment member between said guide sections when said panel member is in a predetermined intermediate position.

4,060,275
COLLAPSIBLE TABLE
M. James Hansen, 11348 SW. Ironwood Lp., Tigard, Oreg. 97223
Filed Sept. 21, 1976, Ser. No. 725,274
Int. Cl.² A47B *3/14*
U.S. Cl. 297—159 1 Claim

1. In a table with foldable legs,
a table top means,
a first, second, third and fourth table leg means,
a first and second leg attachment means,
a first and second bench means,
a first and second bench securing means,
a first, second, third and fourth hinge means,
brace means,
a first and second cross member for securing a pair of said

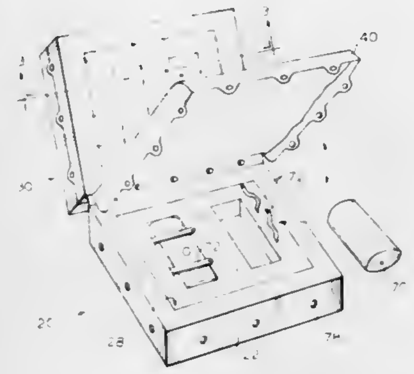
legs in planar relationship, for supporting said bench means, and for receiving said brace means,
said first leg attachment means being secured to the underside of said top means at one end thereof,
said second leg attachment means being secured to the other end of said underside of said top means,
said first cross member secured to said first and said second leg means at a location determined by the desired height of said bench means and by the desired distance between said bench means and said table top means,
said second cross member secured to said third and fourth leg means at a location determined in the same manner as was said first assembly means,
said first and second leg means connected to said first leg attachment means by said first hinge means,
said third and fourth leg means connected to said second leg attachment means by said second hinge means,
said first bench securing means secured to one end of said pair of bench means,
said second bench securing means secured to the other end of said pair of bench means,



said bench securing means positioned inwardly of said top means edges so as to be confined by the underside of said top means and outwardly of said table leg means,
said bench means secured to said bench securing means to form a unitary structure, said bench means and said top means forming substantially a single plane when the table is in the stored position,
said brace means having a center brace means,
a pair of connecting board means,
a third and fourth hinge means,
said third and fourth hinge means secured to the bottom of said table top means and spaced from each other,
each of said connecting board means hinge connected at one end to one of said third and fourth hinge means and rigidly secured at the other end to said center brace means,
said connecting board means forming an acute angle with respect to said center brace means, and
said connecting means and said third and fourth hinge means permit said center brace means to lie parallel to the underside of said top means when stored and compressively to engage said cross members to position said table leg means against said bench securing means to provide rigidity to the set-up table.

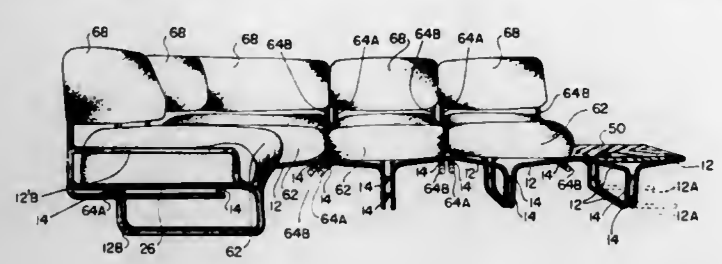
4,060,276
COOLING SEAT
Robert A. Lindsay, 2105 Harrell Road, Orlando, Fla. 32807
Filed Nov. 22, 1976, Ser. No. 744,030
Int. Cl.² A47C *7/74*
U.S. Cl. 297—180 **9 Claims**

1. A portable seat cushion comprising in combination:
a seat section for detachably resting on a supporting surface, said seat section defined by a first base section having generally upstanding circumferential sides for forming an opening central void therein;
said seat section further including a first insert formed of an insulating material for removably coupling within said central void, said insert further including an open recessed cavity therein;
first coolant means comprising a container having a liquid therein for being frozen and then removably coupled within said recessed cavity for absorbing heat from adjacent said central void of said seat cushion;
first pad means coupled over said coolant means and said central void of said seat cushion for transferring heat



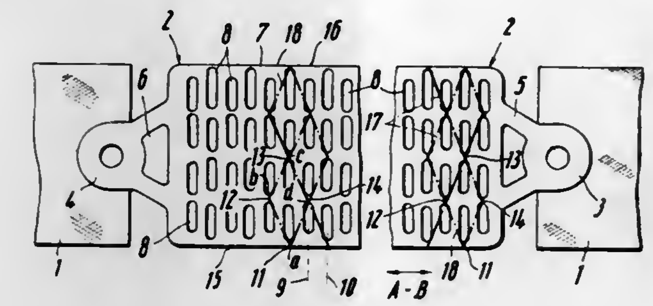
therethrough, said first pad means including a foraminous cover and a ventilated spacer means for spacing said foraminous cover from said first coolant means, whereby moisture forming on said first coolant means will not be exposed to the occupant of said cushion, and such that said seat section and the occupant are cooled by the transfer of heat through said first pad means into said first coolant means.

4,060,277
MODULAR FURNITURE
Roger K. Leib, 11740 Wilshire Blvd., Los Angeles, Calif. 90025
Filed Nov. 7, 1975, Ser. No. 629,898
Int. Cl.² A47C *13/00*
U.S. Cl. 297—248 **10 Claims**



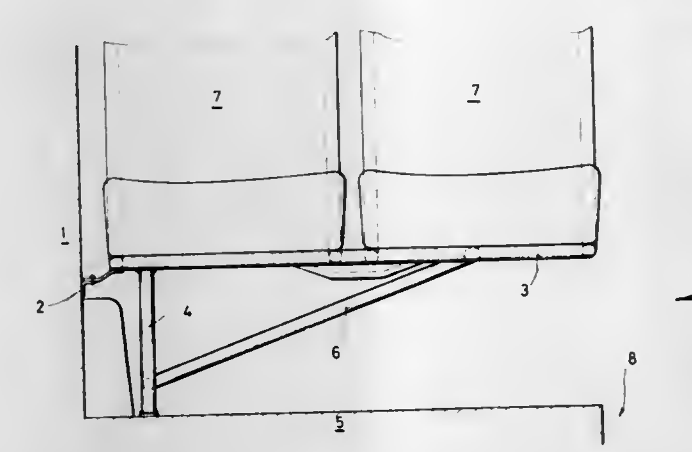
1. A modular multiple unit furniture assembly formed of a plurality of intercoupled modular pairs, each of said modular pairs comprising two modules individually formed of an elongated U-shaped tubular member bent about an intermediate axis to form a vertical section adjacent to the closed end of the U-shaped member and further to form a horizontal bent-over section adjacent to the open end of the U-shaped member, and a cross-bar extending across the open end of the U-shaped member and secured thereto, the vertical sections of the two modules forming each modular pair being positioned adjacent to one another to constitute legs for the assembly, and the bent-over horizontal section of each module being positioned adjacent to the horizontal bent-over section of one of the modules of an adjacent modular pair to constitute a seat support for the assembly; first fastening means intercoupling the vertical sections of the two modules forming the modular pair; and second fastening means intercoupling the horizontal sections of the two modules of the adjacent modular pairs.

4,060,278
ENERGY ABSORBING MEMBER
Bernhard Maeyerspeer, Stuttgart, Germany, assignor to Firma Porsche Design, Germany
Filed Nov. 7, 1975, Ser. No. 629,624
Claims priority, application Germany, Nov. 3, 1974, 2452336
Int. Cl.² A62B *35/00*
U.S. Cl. 297—386 **9 Claims**



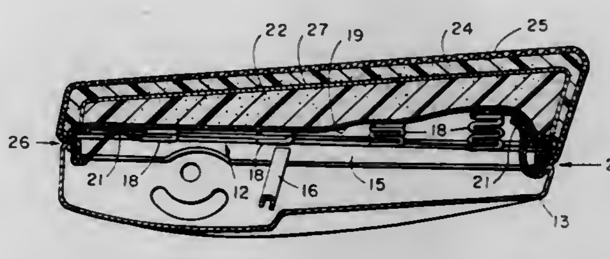
1. An energy absorbing arrangement comprising:
a safety belt means,
an energy absorbing band arranged in said safety belt means for absorbing energy resulting from an impact load on said safety belt means,
said band includes spaced lateral edges,
a plurality of slots provided in said band, said slots being disposed adjacent one another in a plurality of spaced parallel rows extending transversely to a loading direction of the energy absorbing band, and
means defining predetermined separation points on said energy absorbing band for dissipating energy resulting from an impact load including dimensioned strips of said energy absorbing band disposed between at least some of adjacent slots in at least one of said parallel rows and between at least one of said slots and one of said spaced lateral edges.

4,060,279
PASSENGER SEAT STRUCTURE FOR VEHICLES
Ignaz Vogel, Karlsruhe, Germany, assignor to Ignaz Vogel GmbH and Co. KG-Fahrzeugsitze, Karlsruhe, Germany
Filed Sept. 27, 1976, Ser. No. 726,618
Claims priority, application Germany, Sept. 25, 1975, 2542754
Int. Cl.² A47C *1/12*
U.S. Cl. 297—445 **6 Claims**



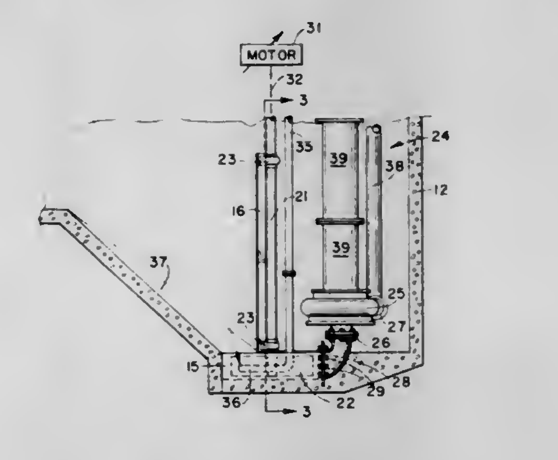
1. A passenger seat underframe structure for a vehicle having side walls and a floor, which includes in combination: a frame comprising a first section for receiving and supporting at least one seat with a back, a second section having one end connected to that one end portion of said first section which is to be placed near one side wall of the vehicle to be equipped with said seat structure, said second section having its other end arranged for connection directly with only the vehicle floor, and a third section forming reinforcing means having opposite end portions respectively connected to said first and second sections so as to form a cantilever triangle-shaped structure therewith.

4,060,280
FLAME-RESISTANT CUSHION
William Rudolph Van Loo, Grand Rapids, Mich., assignor to American Seating Company, Grand Rapids, Mich.
Filed July 8, 1976, Ser. No. 703,619
Int. Cl.² A47C *5/12, 7/18*
U.S. Cl. 297—452 **4 Claims**



1. A flame-resistant cushion comprising a metal frame assembly; an inner core of foamed urethane material carried by said frame; and exterior layer of foamed neoprene material covering the entire exterior surface of the top, front, back and sides of said inner core; means for uniting said core and said exterior layer together substantially throughout the adjacent surfaces thereof and a metal pan enclosing the bottom thereof and attached to said frame.

4,060,281
COAL SLURRY FEEDER
Richard E. Doerr, Ponca City, Okla., assignor to Continental Oil Company, Ponca City, Okla.
Filed Nov. 10, 1976, Ser. No. 740,446
Int. Cl.² B65G *53/30*
U.S. Cl. 302—14 **3 Claims**



1. A feeder apparatus for transferring particulate material and water from a sump outlet to a pump inlet wherein said sump has sidewalls and a bottom; a well having sidewalls and a bottom formed in the bottom of said sump and having an outlet, and an inlet communicating with the bottom of said sump; means for moving said particulate materials from said sump into the inlet of said well; impeller means mounted in said well for moving said material from said well inlet to said well outlet; pump means having an inlet connected to the outlet of said well; and means for imparting a velocity to said water and particulate material, said velocity being sufficient to cause said particulate material to enter the inlet of said pump means.

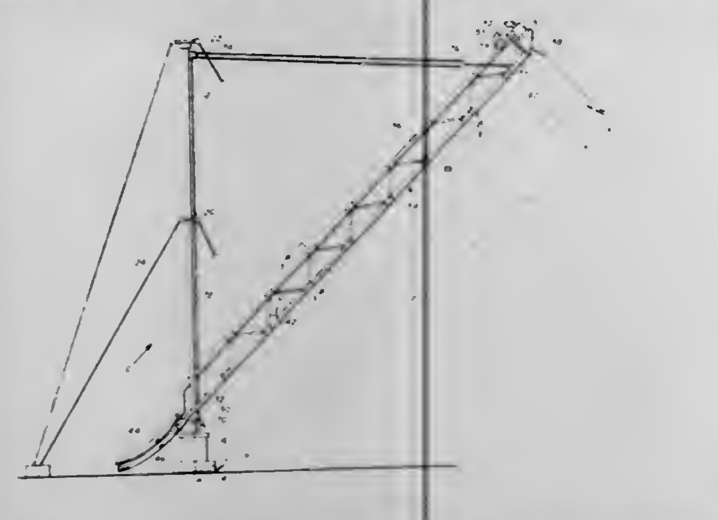
4,060,282
HYDROSEPARATOR STACKER
Edwin A. Kehr, 260 W. Van Fleet, Apt. 29, Bartow, Fla. 33830
Filed Jan. 29, 1976, Ser. No. 653,389
Int. Cl.² B65G *53/30*
U.S. Cl. 302—16 **12 Claims**

1. An apparatus for movably supporting a separator of the

type which accepts an input slurry comprising a solid suspended in a liquid and removes a portion of the liquid therefrom to produce a slurry concentrate, said movable separator support comprising:

a vertical support having a vertical pivot axis therethrough;

a boom movably coupled to said vertical support, said boom having said separator attached thereto, said boom defined by a plurality of support elements including a first hollow support element operably coupled between a source of



said slurry and an input of said separator for transporting said slurry thereto, said boom further including a second hollow support element operably coupled to said separator for removing said portion of said liquid therefrom, and said boom including a third support element connected to said first and second support elements and positioned substantially parallel thereto along the length of said boom, said first, second and third support elements disposed to define said boom as having a generally triangular cross-section.

4,060,283

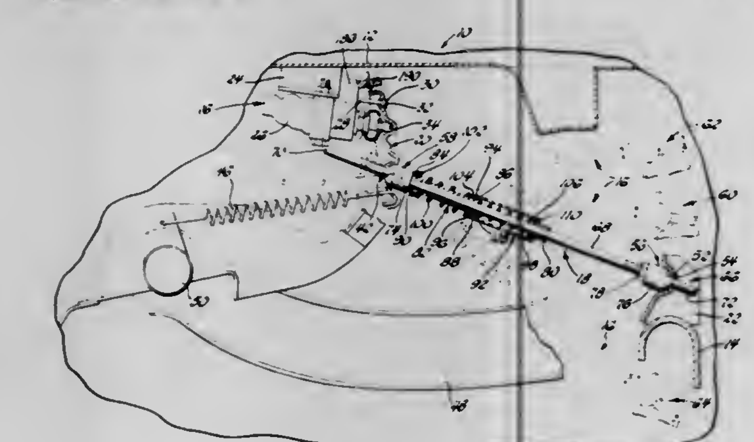
BRAKE ACTUATING PRESSURE PROPORTIONING SYSTEM AND PROPORTIONER MODIFYING ARM THEREFOR

Michael Demido, Troy, and Ronald L. Shellhause, Vandalia, both of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed Nov. 11, 1976, Ser. No. 740,794

Int. Cl.² B60T *8/18, 8/26*

U.S. Cl. 303—6 C 5 Claims



3. In a vehicle having a load sensing proportioner, a vehicle sprung portion on which said proportioner is mounted, a vehicle unsprung portion including a support member having a range of movements relative to the vehicle sprung portion, the limits of said range of movements being defined by full jounce and full rebound limits of said vehicle unsprung portion, said range of movements including intermediate support member positions corresponding to vehicle curb weight as a light load and gross vehicle weight as a full load, the improvement comprising a linkage including:

a proportioner control arm movably mounted on said proportioner and having a range of movements the limits of which are defined by proportioner control requirements for vehicle curb weight and gross vehicle weight;

and link means connecting said proportioner control arm to said support member, said link means having a fixed effective length between said proportioner control arm and said support member during excursions of said support member within the portion of its range of movements defined by its aforesaid intermediate positions as limits and transmitting such support member movements to said proportioner control arm to move that arm within its aforesaid range of movements correspondingly, said link means changing its effective length to accommodate movements of said support member in its range of movements toward either of said full jounce and full rebound limits of movement beyond the support member range of movements defined by the aforesaid intermediate positions without moving said proportioner control arm, the effective length of said link means being the length from the connections of said link means to said proportioner control arm and said support member.

4,060,284

INSTALLATION FOR THE CONTROL OF THE BRAKE FORCE AT WHEELS OF MOTOR VEHICLES

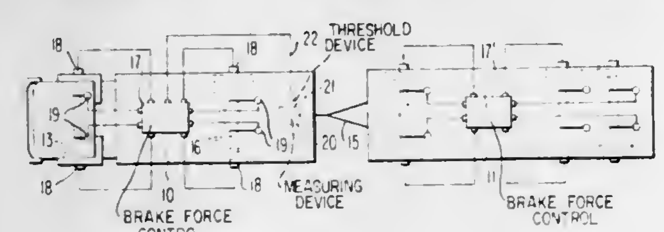
Adolf Steiner, Baden-Baden, Germany, assignor to Daimler-Benz Aktiengesellschaft, Germany

Continuation of Ser. No. 597,177, July 18, 1975, abandoned. This application Dec. 6, 1976, Ser. No. 747,724

Claims priority, application Germany, July 22, 1974, 2435115

Int. Cl.² B60T *8/02*

U.S. Cl. 303—100 20 Claims



1. An installation for the control of the brake force at wheels of interconnected motor vehicle combinations including a pulling section and a trailer section connected to the pulling section, which comprises one locking protective brake force control means each coordinated to the pulling section and to the trailer section, said brake force control means being operable to control the individual wheels of a respective section within the stable range of the friction value-slippage-curve, characterized in that a measuring means is arranged in the connection between the pulling section and the trailer section for measuring the tow-bar force occurring thereat, said measuring means being operatively connected only with the locking protective brake force control means of the pulling section and being operable to produce a control signal upon exceeding a predetermined pushing tow-bar force value, and said control signal being operable to block an increase of the brake force in the pulling section for the duration of the control signal, whereby swerving or breaking out of the trailer section when the pulling and trailer sections are on road surfaces having different friction values is prevented.

4,060,285

BRAKE CONTROL LOGIC CIRCUIT FOR VEHICLE SKID CONTROL BRAKE SYSTEM

James J. Jones, Plano, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Division of Ser. No. 266,798, June 27, 1972, Pat. No. 3,982,793. This application Aug. 6, 1976, Ser. No. 712,308

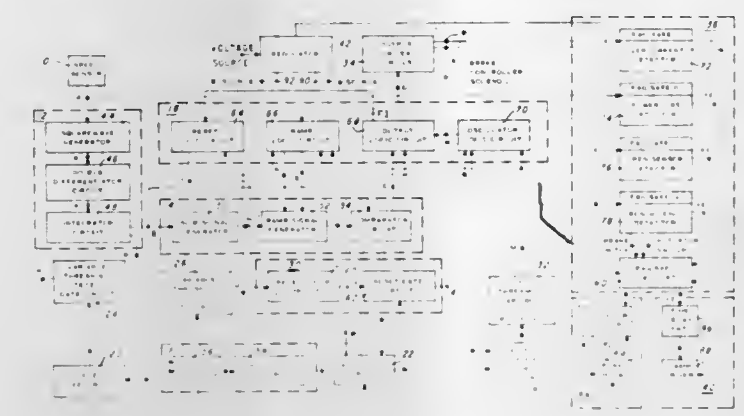
Int. Cl.² B60T *8/02*

U.S. Cl. 303—106 7 Claims

1. In an electronic control system of the type that monitors

a first condition of a mechanical system to provide an input to the electronic control system which generates in response thereto output control signals for selectively controlling the mechanical system, a brake control logic circuit for selectively generating an output logic signal from a plurality of input signals representative of other conditions of said mechanical system to enable generation of said output control signals, said brake control logic circuit comprising in combination:

an oscillator logic circuit responsive to a first input signal representative of a preselected value of said first condition, to a second input signal representative of a second condition of said mechanical system, and to a third input signal representative of a third condition of said mechanical system to provide an oscillator logic signal related to said third condition;



output logic circuit means connected to the output of said oscillator logic circuit, said output logic circuit means being responsive to said oscillator logic signal and to a fourth input signal representative of a selected relationship between said first condition and a fourth condition of said mechanical system to generate said output logic signal; and

ramp logic circuit means connected to the output of said oscillator logic circuit, said ramp logic circuit means being responsive to said first and third input signals, to said oscillator logic signal, and to a fifth input signal representative of a peselected value of said third condition for generating a hold signal and a slow signal indicative respectively of said second condition and said third condition.

4,060,286

WEAR RESISTANT DRILL PIPE COLLAR AND METHOD OF MAKING SAME

Elvin G. Boice, Richmond, Va., assignor to Reynolds Metals Company, Richmond, Va.

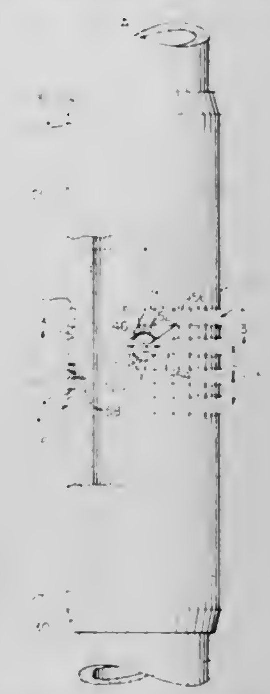
Filed Oct. 1, 1976, Ser. No. 728,739

Int. Cl.² F16C *29/00*

U.S. Cl. 308—4 A 27 Claims

1. A wear-resistant drill pipe collar comprising, a main body having a substantially annular groove and an access opening for said groove defined therein with said groove extending around said main body from opposite locations of said access opening, said main body having an outside surface, said groove being defined by a bottom surface having opposed end edges defining a particular width for said bottom surface and a pair of opposed side surfaces adjoining said end edges, said side surfaces having outer edges spaced apart a distance less than said width to thereby define said groove having a constricted substantially annular opening, a plurality of inserts made of a wear-resistant material disposed within said groove, each of said inserts being confined by said bottom surface and said side surfaces and having an outer portion extending between said constricted opening, each outer portion having a wear-resistant exposed surface which conforms to the configuration of said outside surface, each of said inserts being adapted to be inserted in and removed from said groove through said access opening, and a plug fixed to said main body within said access opening to prevent movement of said inserts within said annular groove and egress of said inserts from said access opening.

23. A method of making a wear-resistant drill pipe collar comprising the steps of, forming a substantially annular groove and an access opening for said groove in the main body of said collar radially inwardly from a cylindrical outside surface thereof and with said groove extending around said main body from opposite locations of said access opening, said groove being defined by a bottom surface having opposed end edges defining a particular width for said bottom surface and a pair of opposed side surfaces adjoining said end edges, said side surfaces having outer edges spaced apart a distance less than said



width to thereby define said groove having a constricted substantially annular opening, providing a plurality of inserts made of a wear-resistant material, disposing said inserts within said groove, each of said inserts being confined by said bottom surface and said side surfaces and having an outer portion extending between said constricted opening, each outer portion having a wear-resistant exposed surface which conforms to the configuration of said outside surface, each of said inserts being adapted to be inserted in and removed from said groove through said access opening, and fixing a plug to said main body within said access opening to prevent movement of said inserts within said annular groove and egress of said inserts from said access opening.

4,060,287

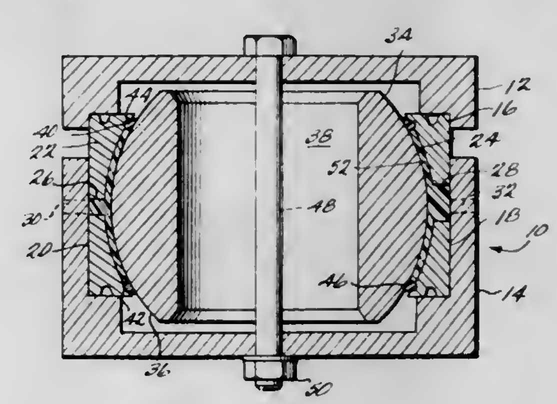
BEARING SEAL AND METHOD OF FORMING SAME

Stanley S. Orkin, Rockville, Conn., assignor to Kamatics Corporation, Bloomfield, Conn.

Filed June 30, 1976, Ser. No. 701,739

Int. Cl.² F16C *33/74*

U.S. Cl. 308—72 3 Claims



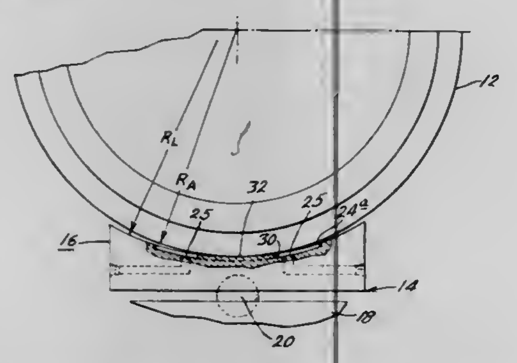
1. A bearing assembly comprising:

an outer bearing member having an inner surface,

an inner bearing member having an exterior surface shaped complementarily with respect to said inner surface of said

outer bearing member, said inner and outer bearing members being movable relative to one another,
sealing members disposed between and in contact with said inner surface of said outer bearing member and said exterior surface of said inner bearing member,
said inner surface of said outer bearing member having means for retaining said sealing members in place, said retaining means including a bearing surface coating on said interior surface, said coating comprising a cured mixtue of an acrylate composition and a particulate solid lubricant which is adhered to at least a portion of said sealing members.

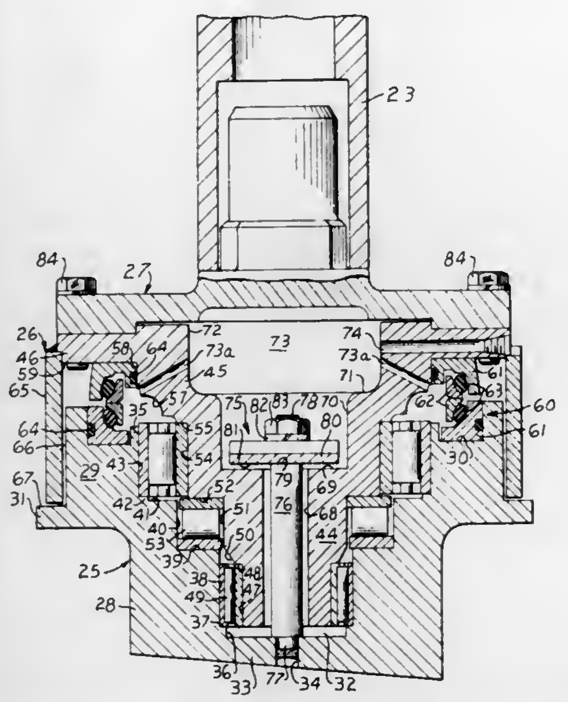
4,060,288
SUPPORT IN HYDROSTATIC BEARINGS
Torsten Henry Arsenius, Goteborg, and Sven Christian Bildtsén, Lerum, both of Sweden, assignors to SKF Industrial Trading and Development Company B.V., Jutphaas, Netherlands
Filed Apr. 9, 1976, Ser. No. 676,309
Claims priority, application South Africa, Apr. 23, 1975, 75/2286
Int. Cl.² F16C *17/06*
U.S. Cl. 308—73 **4 Claims**



1. In a hydrostatic bearing for rotatably supporting therein a member comprising a shoe having an arcuate first surface confronting the member and having formed therein a pocket for a fluid under pressure, the first surface and said member being of a predetermined relative configuration to provide essentially a line contact between said member and the surface of said shoe at diametrically opposed locations in said arcuate first surface, the improvement comprising means defining a projection in said pocket having a second surface confronting the member of generally the same contour as said first surface to provide an additional essentially line contact between said member and said second surface generally aligned with the line contact between said member and said arcuate first surface and disposed approximately midway therebetween.

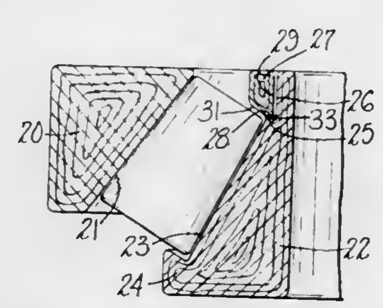
4,060,289
BEARING ASSEMBLY FOR AN AUGER SCRAPER
James Edgar Gee, Washington, and Edward Joseph Ohms, Decatur, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.
Filed Nov. 3, 1975, Ser. No. 628,022
Int. Cl.² F16C *19/38;* E02F *3/62*
U.S. Cl. 308—187.1 **12 Claims**

1. A bearing assembly for rotatably supporting the lower end of an auger adjacent the floor of a self-loading auger scraper bowl, said assembly comprising, in combination:
a lower, fixed housing member mounted adjacent the bowl floor, said fixed housing member having a stepped cylindrical cavity and an external, annular top flange;
bearing means in said cavity;
an upper housing member rotatably carried on said bearing means, said upper housing member having an external annular upper flange confronting said top flange;
means surmounting said upper housing which is adapted to receive the lower end of an auger shaft;
annular lubricant seal means mounted between said annular flanges, said seal means including elastomeric ring means which must be compressed to make said seal means effective;
and means for preloading said upper housing member to compress said elastomeric ring means, said preloading means comprising fixed means secured to the lower housing member, and force-multiplying means engageable with



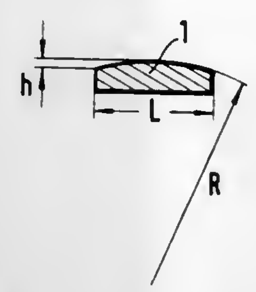
said fixed means, said force multiplying means including flange means which bears upon a transverse surface of the upper housing to depress said upper housing and thereby force said upper flange against the seal means, said upper housing member being further depressed by the weight of the auger to separate said transverse surface from said flange means.

4,060,290
BEARING COMPONENT AND METHOD OF MAKING SAME
Thomas Scott Brawley, 152 Green Countrie Court, 7841 Ridge Ave., Philadelphia, Pa. 19128
Continuation-in-part of Ser. No. 456,139, March 29, 1974, Pat. No. 3,960,419. This application May 28, 1976, Ser. No. 691,083
Int. Cl.² F16C *33/58*
U.S. Cl. 308—216 **12 Claims**



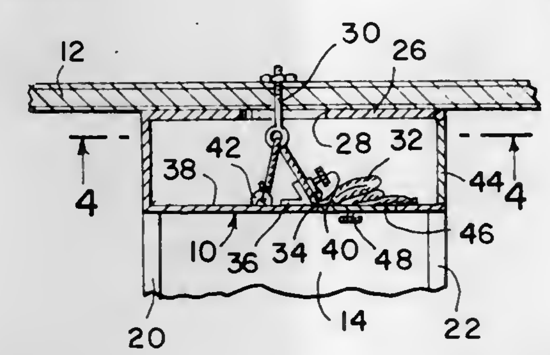
1. A channel-anti-friction bearing component comprising a generally cylindrical body portion, a frusto-conic inwardly facing bearing surface on said body portion constituting the main bearing surface of the outer ring of a tapered bearing and an integrally formed rib having a surface defining the larger end of the channel, the metal flow in said body and said integrally formed rib running in directions which lie substantially parallel to the corresponding sides of the axial cross-section of the channel.

4,060,291
FRICTION BEARING
Rolf Seybold, Eichenstrasse 21a, 5650 Solingen, Germany
Filed July 6, 1976, Ser. No. 702,616
Claims priority, application Germany, July 8, 1975, 2530472
Int. Cl.² F16C *17/10*
U.S. Cl. 308—241 **15 Claims**



1. In a friction bearing having a plurality of projecting bearing portions for supporting a component intended to move over said bearing, the improvement wherein each of said bearing portions has a bearing surface which is variably inclined with respect to the adjacent surface of said component, the degree of such inclination of the bearing surface progressively decreasing from a maximum to a minimum in the direction of movement of the component over the bearing.

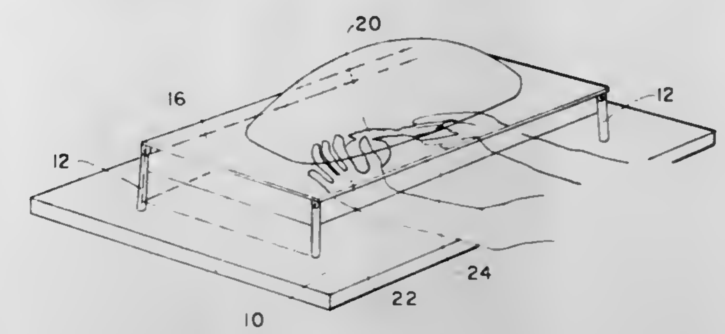
4,060,292
STORAGE BOX
Carmen Medina, P.O. Box 431, New York, N.Y. 10023
Filed July 19, 1976, Ser. No. 706,146
Int. Cl.² A47F *5/08*
U.S. Cl. 312—247 **5 Claims**



1. A storage box construction comprising:
a substantially rectangular container in mating engagement with vertical guide rails mounted on opposed side walls of an enclosed space having a ceiling and a floor,
a door mounted on said container providing access to the interior of said container, and
means for raising and lowering said container from a position adjacent said ceiling to a position adjacent said floor, said means including an eyebolt extending through an aperture located in a top surface of said container, said eyebolt connected to said ceiling, a ring on the bottom interior surface of said container, a bracket on the bottom interior surface of said container, a clamp mounted on said bracket, and a rope connected to said ring and threaded in sequence through said eyebolt, and said clamp, said rope selectively threadable through the opening in which said door is mounted.

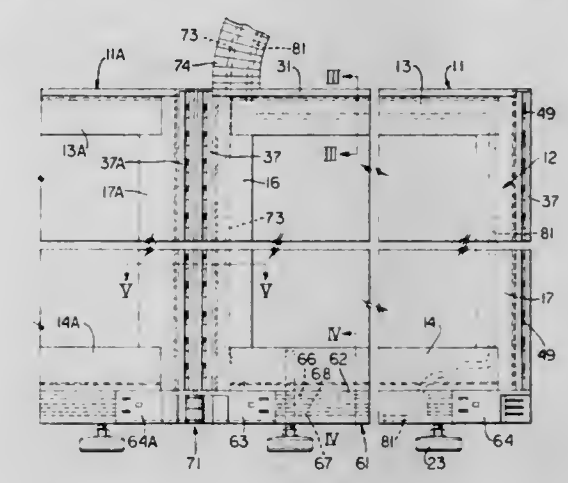
4,060,293
PROTECTIVE DEVICE
Irene Walters, 780 Barry Place, Uniondale, N.Y. 11553
Filed Apr. 14, 1976, Ser. No. 677,045
Int. Cl.² A47B *81/00;* A61G *11/00;* A47B *97/00;* A47G *19/26*
U.S. Cl. 312—284 **5 Claims**

1. A protective device especially adapted for use when working with sensory irritating foodstuff items, comprising a cover member having a substantially centrally disposed transparent bubble portion and at least two support members disposed substantially perpendicular to said cover member and integral therewith, said at least two support members pivotably secured to said cover member, said support members pivot



between substantially vertical use and horizontal storage positions relative to said cover member, whereby said support members when in said substantially vertical use position provide vertical support of said cover member above a work surface for said sensory irritating items.

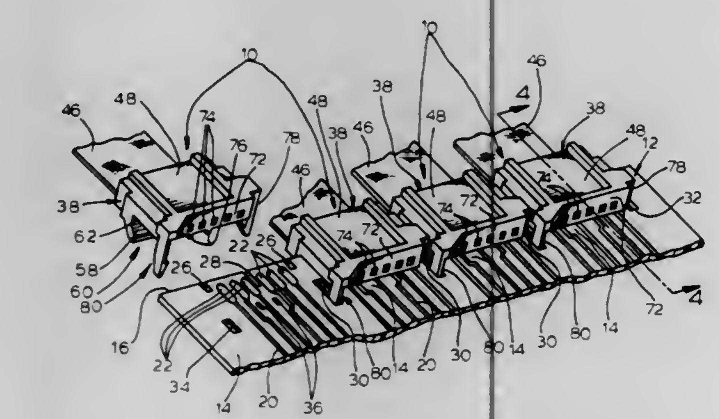
4,060,294
WALL PANEL WITH PREWIRED POWER SYSTEM
Richard G. Haworth, Holland; Charles J. Saylor, Zeeland, and Harold R. Wilson, Holland, all of Mich., assignors to Haworth Mfg., Inc., Holland, Mich.
Filed Sept. 22, 1975, Ser. No. 615,506
Int. Cl.² H01R *39/00*
U.S. Cl. 339—4 **46 Claims**



1. In a portable, prefabricated wall panel positionable in a vertical upright position and having a frame and panel means secured to the opposite sides of said frame and defining the exterior vertical side surfaces of said panel, the improvement comprising elongated channel means fixedly secured to said panel, said channel means extending across said panel between a pair of opposed edges thereof and defining a closed interior passage extending longitudinally therealong, first and second electrical terminals fixedly mounted on said panel adjacent the opposite ends of said channel means and disposed adjacent the opposed edges of said panel, at least said first electrical terminal including a pair of first multiple-hole electrical sockets formed therein, one of the pair of first sockets being on one side of the panel and the other being on the other side of the panel, said first sockets each being adapted to receive a conventional two or three-pronged electrical plug therein, said first and second terminals each including a pair of second electrical sockets formed therein, one of the pair of second sockets being on one side of the panel and the other being on the other side of the panel, said second sockets each defining a plug receptacle having a different geometrical configuration from the plug receptacle defined by each of said first sockets so that the plugs which mate with said second sockets will not mate with said first sockets, and electrical cable means extending along said

passage and interconnected to said first and second terminals for transmitting electrical energy therebetween.

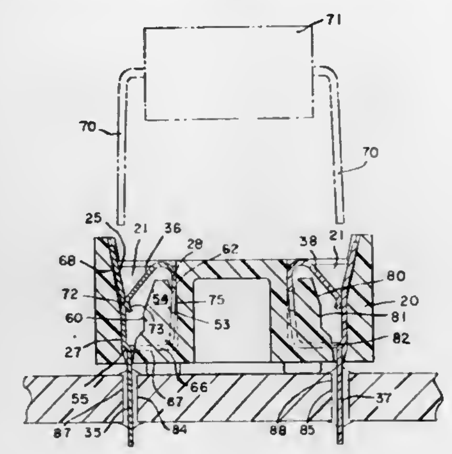
4,060,295
ZERO INSERTION FORCE PRINTED CIRCUIT BOARD EDGE CONNECTOR ASSEMBLY
Thaddeus K. Tomkiewicz, Bolingbrook, Ill., assignor to Molex Incorporated, Lisle, Ill.
Filed Mar. 15, 1976, Ser. No. 666,769
Int. Cl.² H05K *1/12*
U.S. Cl. 339—17 LC **1 Claim**



1. A circuit assembly comprising:
a printed circuit board including an edge and a plurality of adjacent connector mounting areas at and near said edge, each connector mounting area having a top surface with a group of connection tabs arranged along the edge, a bottom surface, and aperture means spaced from the edge; and
a plurality of connector assemblies each mounted on a connector mounting area, each connector assembly including an insulated housing and a plurality of like spring terminals mounted in the housing for engaging a connection tab, said housing including an edge receiving slot for receiving the edge of the board therein, said board being rotatable within said edge receiving slot from a non-engaging position wherein the terminals are spaced from the connection tabs to a mounted position wherein the contact portions are engaging the connection tabs, and two hook means formed on the overlying portion of the connector assembly for penetrating the aperture means and engaging the bottom surface of the respective connector mounting area for holding the board in the mounted position, said hook means being staggered so that the hook means on one connector assembly and the hook means on an adjacent connector assembly can be linearly aligned so that both hook means can be mounted in the same aperture means.

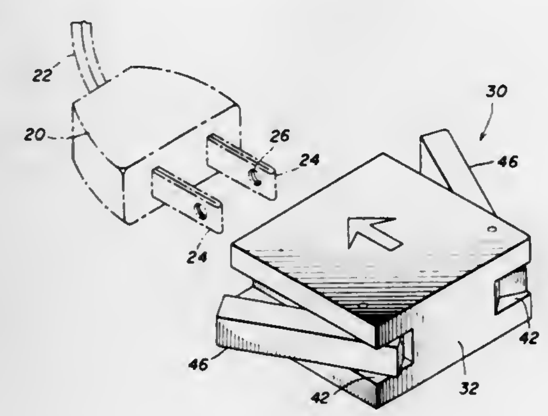
4,060,296
LOW PROFILE DIP RECEPTACLE
James Raymond Kunkle, Enola, and Billy Erik Olsson, New Cumberland, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.
Filed Oct. 26, 1976, Ser. No. 735,232
Int. Cl.² H05K *1/12;* **H01R** *5/04, 13/50*
U.S. Cl. 339—17 CF **15 Claims**

15. A low profile DIP socket comprising:
housing means having at least one major surface with at least one contact retaining cavity formed in said major surface;
said cavity having side walls and a bottom with an aperture through said bottom and further comprising a rib-like element extending into said cavity from a first of said side walls;
contact means retained in said at least one cavity and comprising:
a generally U-shaped configuration having first and second legs with a transverse element joining together said legs;
a first of said legs having a extension thereon which is bent back downwardly into the channel of said "U" and towards and adjacent said second leg; and
a tab sheared from the center portion of said transverse element and said first leg and extending downwardly



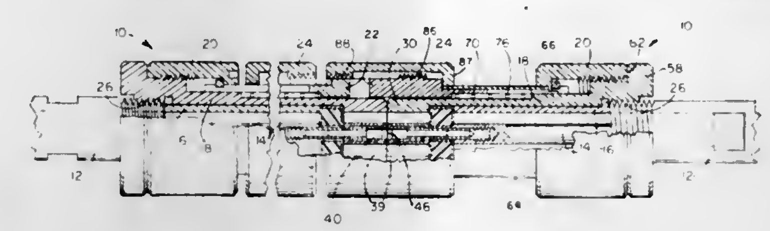
from said second leg through said aperture in said bottom of said at least one cavity and leaving a slot in the center portion of said transverse element and said leg;
said contact means being frictionally retained in said at least one cavity with said transverse element positioned near said bottom of said cavity and the rib of said cavity extending through the slot in said contact means.

4,060,297
PLUG CAP
Bruce H. Marshall, 2256 W. Arthur Ave., Chicago, Ill. 60645, and Henry E. Blenner, 1515 E. Central Road, Arlington Heights, Ill. 60005
Filed Nov. 29, 1976, Ser. No. 745,531
Int. Cl.² H01R *13/44*
U.S. Cl. 339—37 **13 Claims**



1. A plug cap for use in association with a male electrical plug having two spaced-apart prongs, respectively with apertures near the ends thereof, said plug cap comprising a body having a pair of spaced-apart channels therein respectively to receive the prongs of the male electrical plug, said body further having therein a pair of outwardly facing, oppositely directed recesses, a pair of legs pivotally mounted on said body and movable between a locking position respectively in said recesses and respectively alongside said channels and an unlocking position respectively out of said recesses and respectively away from said channels, and a pair of fingers respectively carried by said legs and located thereon respectively to enter the apertures of the prongs when the legs are in the locking positions thereof and to be withdrawn from the apertures when the legs are in the unlocking positions thereof.

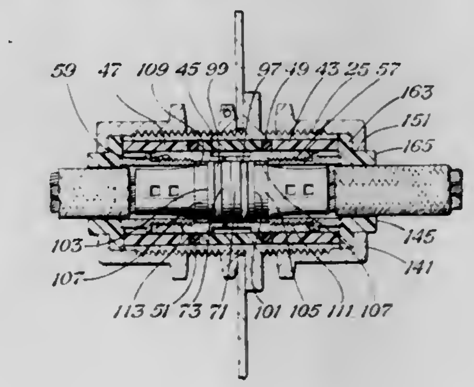
4,060,298
HERMAPHRODITIC CONNECTOR ASSEMBLY
John M. Gearin, Brookfield, Conn., assignor to Bunker Ramo Corporation, Oak Brook, Ill.
Continuation of Ser. No. 531,912, Dec. 12, 1974, abandoned. This application Apr. 12, 1976, Ser. No. 675,666
Int. Cl.² H01R *25/10*
U.S. Cl. 339—48 **7 Claims**



1. A hermaphroditic connector assembly arrangement for use with a pair of airlines each having an outer conductor including an end face and an inner conductor including a spring biased contact having an end face with each end face adapted to engage a respective other end face along a common radial plane to complete an electrical connection between the outer conductors and another electrical connection between the inner conductors comprising:
a tubular body for each airline with each body having a front end forming the end face for the respective outer conductor adjacent the respective spring biased contact end face and means for securing the respective body to the respective outer conductor,
a registration ring carried on each body for axial movement on the respective tubular body and having a plurality of spaced teeth projecting axially in one direction,
means for biasing said ring in said one direction for positioning the teeth of each ring in overlapping engagement with the tubular body secured to the outer conductor of the other airline to align each end face in said common plane
means on each body and ring for enabling rotation of each ring on the respective body to a predetermined position for circumferentially aligning the teeth on each ring with the spaces on the other ring for enabling the positioning of the teeth on each ring in overlapping engagement with the tubular body secured to the outer conductor of the other airline and for axially aligning all of said end faces with each ring thereafter held against rotation relative each body and a coupling nut having means engaging one ring and threadingly engaging the other of said rings in response to rotation in one direction for moving said rings axially towards each other and for securing said airlines to each other.

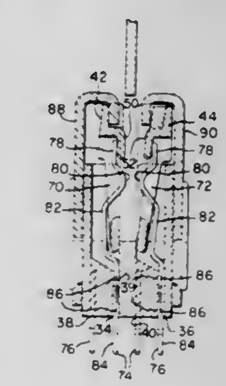
4,060,299
ELECTRICAL CONNECTOR
Robert A. Williams, 55 Bounty Road East, Fort Worth, Tex. 76116
Filed July 8, 1976, Ser. No. 703,622
Int. Cl.² H01R *13/54*
U.S. Cl. 339—48 **10 Claims**

1. An electrical connector for connecting two leads together, comprising:
a housing having a cylindrical opening formed therethrough,
electrical insulating cylindrical means located in said opening,
said electrical insulating cylindrical means being separate from said housing and removable from said opening,
said electrical insulating cylindrical means having an opening formed therethrough,
a metallic cylinder located in the opening of said insulating cylindrical means and having threads formed in its inside wall at opposite ends thereof,
said metallic cylinder having an opening formed therethrough and having two contacts received through its opposite ends, each contact adapted to have an electrical lead connected thereto,
said two contacts having shoulders extending outwardly therefrom,
two holding means adapted to be fitted around said contacts and having threads formed on their outer surfaces and adapted to be threaded into opposite ends of said metallic cylinder for applying a holding force to said shoulders of said contacts for holding said contacts in said metallic cylinder,
said housing having threads formed on its outer surface at opposite ends thereof, and



two cup-shaped end caps, each having an inside cylindrical wall with threads formed therein, a first end with a large opening, and a rear wall at an opposite end with a small opening formed therethrough,
said small opening of each end cap having a diameter less than the outside diameter of the ends of said housing and of a size sufficient to receive one of said leads,
the size of said large opening of each end cap being sufficient to allow each end cap to be fitted around and threaded to one end of said housing.

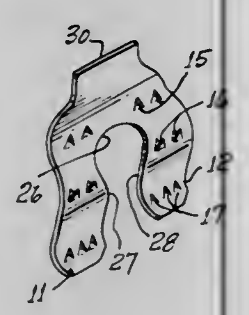
4,060,300
LONGITUDINALLY ACTUATED ZERO FORCE CONNECTOR
Max L. Jayne, North Warren, and Paul R. Natale, Warren, both of Pa., assignors to GTE Sylvania Incorporated, Stamford, Conn.
Filed Jan. 31, 1977, Ser. No. 764,278
Int. Cl.² H05K *1/07*
U.S. Cl. 339—74 R **10 Claims**



1. A longitudinally actuated connector comprising:
a hollow support member comprising two longitudinally extending side walls, each having at least one lug which protrudes from the exterior surface thereof;
at least two opposing contact holders positioned within said support member and comprising opposing surfaces which include opposing cam surfaces having at least one high point and at least one low point;
at least one resilient electrical contact engaging each of said holders to form a pair of opposing contacts; and,
at least two actuator plates having apertures therein through which said lugs extend to movably affix said plates to the

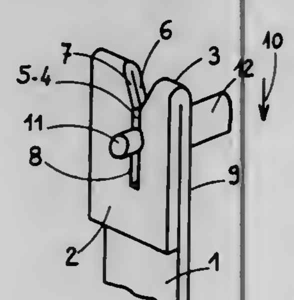
exterior surfaces of said support member each of said plates including at least one cam follower which extends into said support member and engages one of said cam surfaces such that movement of said plates which causes said cam followers to engage said high points forces said opposing contacts apart and movement of said plates which causes said cam followers to engage said low points allows said opposing contacts to move towards each other.

4,060,301
ELECTRICAL CONNECTOR FOR TRANSMISSION LINE INSULATORS
Albert W. Beatty, 1201 Fairhaven No. 6K, Santa Ana, Calif. 92701
Filed Mar. 12, 1974, Ser. No. 450,287
Int. Cl.² H01R *7/04*
U.S. Cl. 339—95 R **13 Claims**



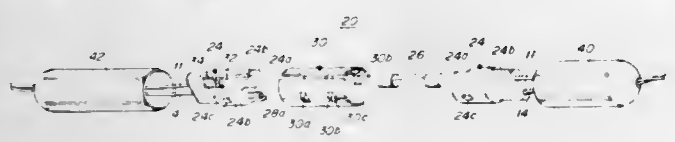
1. An electrically conductive clip for providing an electrical path between metal components of transmission line insulators, said clip comprising:
a resilient, electrically conductive member comprising a U-shaped sheet deformed from its central plane so that it extends outwardly in both directions from its central plane and having two arms forming an inner passage way, said member having at least one sharp contact finger protruding outwardly away from said plane in a first direction and at least two protrusions extending outwardly away from said plane in the opposite direction, at least one of said protrusions having a sharp extremity with sufficient hardness to penetrate corrosive and insulative formations on the metallic components.

4,060,302
CONNECTOR ADAPTED TO GRIP ELECTRIC CONDUCTORS
Yves Saligny, Cluses, France, assignor to Etablissements Carpano & Pons, France
Filed Oct. 8, 1976, Ser. No. 731,011
Claims priority, application France, Oct. 27, 1975, 75.33486
Int. Cl.² H01R *13/38*
U.S. Cl. 339—97 R **10 Claims**



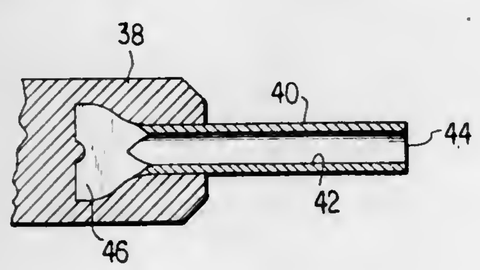
1. A connector for the connection of electrical conductors of relatively small cross-section, of the type comprising a flat conducting element in which there is a gripping slot of relatively small width in relation to the thickness of the flat element, said slot being dimensioned to receive and grip at least one conductor, wherein the flat element is formed of two flat pieces disposed in piled configuration against one another and rigidly connected to one another, each piece having a narrow slot which is not substantially wider than the thickness of the piece, said narrow slots of the flat pieces being aligned to form the gripping slot of the flat element.

4,060,303
FUSED IN-LINE POWER CONNECTOR ARRANGEMENT
Mieczyslaw Wilczynski, Fort Lauderdale, Fla., assignor to Motorola, Inc., Schaumburg, Ill.
Filed Mar. 2, 1977, Ser. No. 773,721
Int. Cl.² H01H *85/50*
U.S. Cl. 339—147 R **3 Claims**



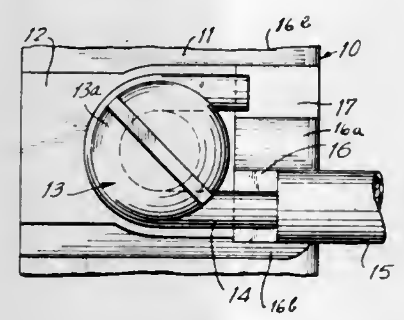
1. An improved power connector arrangement with self-contained in-line fusing device, comprising in combination:
a pair of substantially identical connector elements for interfitting each with the other, each of said connector elements having a forward reduced portion and a pair of laterally displaced but longitudinally extending openings therein, one of said openings being capable of retaining a glass tube fuse device therein and the other of said openings being capable of retaining respective portions of a jack assembly, said connector elements further including a pair of up-raised projections on the surfaces thereof; and
a split-ring retainer member having a pair of slots at one end thereof for overfitting and capturing said projections on one of said connector elements, said retainer having a pair of L-shaped openings at the other end thereof for permitting the insertion of said projection of said other connector element and the rotation thereof laterally to effect a locking action.

4,060,304
BATTERY CABLES AND PROCESS FOR MAKING SAME
Joseph O. Abramson, 5629 Edgewater Drive, Orlando, Fla. 32810
Filed July 1, 1976, Ser. No. 701,682
Int. Cl.² H01R *11/26*
U.S. Cl. 339—224 **11 Claims**



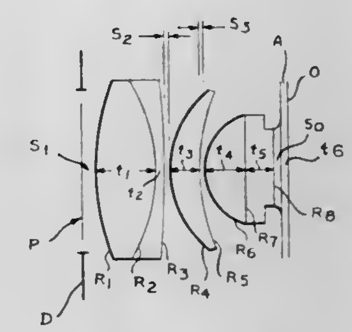
1. An improved battery cable, comprising:
an elongated electrically conductive cable formed by a multiplicity of wire strands;
a terminal member adapted to connect said electrically conductive cable to a projecting post of a storage battery;
said terminal member including a body having a forward portion and a rear portion;
said forward portion having a pair of forwardly extending arms which circumscribe and define an opening into which said projecting battery cable post can extend;
a tubular engagement member connecting said terminal member with said electrically conductive cable;
said tubular engagement member having a forward end and a rear end;
said tubular engagement member having a forward portion thereof, including said forward end, embedded within said rear portion of said terminal member, with the remainder of said tubular engagement member projecting beyond said terminal member rear portion;
said projecting portion of said tubular engagement member being cylindrical and said embedded forward end thereof being flattened and having a width in excess of the diameter of said cylindrical projecting portion;
said electrically conductive cable having one end thereof inserted into the projecting portion of said tubular engagement member;
said tubular engagement member being compressed inwardly along the projecting portion thereof to compress the wire strands therewithin into a substantially solid mass;
said electrically conductive cable including an insulating sheath surrounding said multiplicity of wire strands;
said insulating sheath at said one end of said electrically conductive cable terminating substantially at said rear end of said tubular engagement member to assure that said wire strands are unexposed; and
a protective plastic tube extending along at least part of said tubular engagement member projecting portion and said insulating sheath and being heat shrunk into intimate contact therewith.

4,060,305
LOOP FORMING GAUGE AND METHOD OF FORMING A LOOP
John M. Poliak, East Meadow; Juan M. Lopez, and Robert W. Gritz, both of New York, all of N.Y., assignors to Leviton Manufacturing Co., Inc., Little Neck, N.Y.
Filed Apr. 30, 1976, Ser. No. 682,082
Int. Cl.² H01R *9/10, 43/00*
U.S. Cl. 339—269 **5 Claims**



1. In an electrical wiring device, the improvement comprising: a base of rigid insulating material; a terminal plate mounted on said base; a binding screw threadably carried by said plate; wire-restraints formed on said base in spaced relation to said binding screw; said wire-restraints including projections defining open passageways communicating with opposite sides of said binding screw; a strip gauge formed on said base for measuring a length of insulated conductor wire for removal of insulation therefrom and a loop forming gauge formed in said base for receiving and bending the said length of conductor wire into a loop for engagement with said binding screw with insulation on the wire extending into one of said wire-restraint passageways, said loop forming gauge comprising a cavity formed within a base of substantially rigid insulating material and of a predetermined configuration; the configuration of said cavity being defined by substantially straight base wall portions communicating with stepped termination portions thereof, said stepped termination portions comprising means for accepting wires of more than one diameter, and a base surface with shoulder portions thereof extending in a substantially arcuate path in communication with said steped termination portions, thereby providing means for guiding and forming an arucate wire configuration.

4,060,306
ACHROMATIC APLANATIC CONDENSER
Krishnaiyer Swaminathan, Williamsville, N.Y., assignor to American Optical Corporation, Southbridge, Mass.
Filed Dec. 16, 1974, Ser. No. 532,988
Int. Cl.² G02B *21/08*
U.S. Cl. 350—87 **1 Claim**



I II III

1. An achromatic aplanatic condenser having a numerical aperture of 1.30 which is well corrected for spherical and chromatic aberrations and capable of uniformly filling a field of about 2.4mm in diameter which comprises, a double convex doublet consisting of a double convex singlet cemented to a concavo-convex singlet as the first component, a meniscus lens as the second component and a convex plano doublet as the third component all being aligned along an optical axis and having a front pupil plane external to said condenser, having the following parameters:

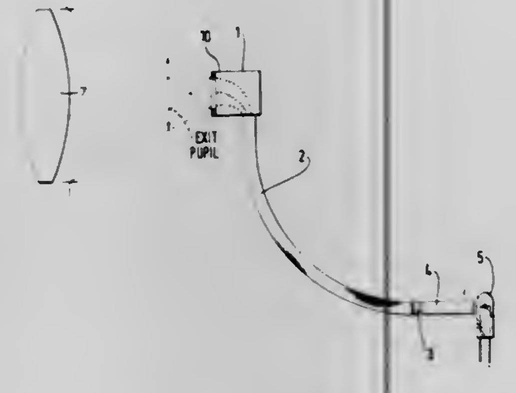
Lens	Radius	Thickness	Space	Refractive Index	Abbe No.
			S_1= 1.526		
	R_1= 38.54				
		T_1= 8.73		ND_1= 1.6203	γ_1= 60.3
I	R_2= 24.33				
		T_2 = 1.50		ND_2= 1.786	γ_2= 25.5
	R_3= −169.084				
			S_2= 0.10		
	R_4= 13.48				
II		T_3= 4.77		ND_3= 1.6203	γ_3= 60.3
	R_5= 32.96				
			S_3= 0.10		
	R_6= 7.77				
		T_4= 6.13		ND_4= 1.651	γ_4= 55.8
III	R_7= 00				
		T_5= 4.12		ND_5= 1.786	γ_5= 25.5
	R_8= 00				

wherein the values for radii, thicknesses, and air spaces are in mm and the refractive indices and Abbe numbers are absolute values.

4,060,307
FACE PLATE GRATICULE

David George Anthony Demaine, and David Gordon Norrie, both of Leeds, England, assignors to The Rank Organisation Limited, London, England

Filed Apr. 30, 1976, Ser. No. 682,131
Claims priority, application United Kingdom, Apr. 30, 1975, 17972/75
Int. Cl.² G02B *5/16;* **G08B** *5/00;* **G02B** *23/10*
U.S. Cl. 350—96 B **6 Claims**

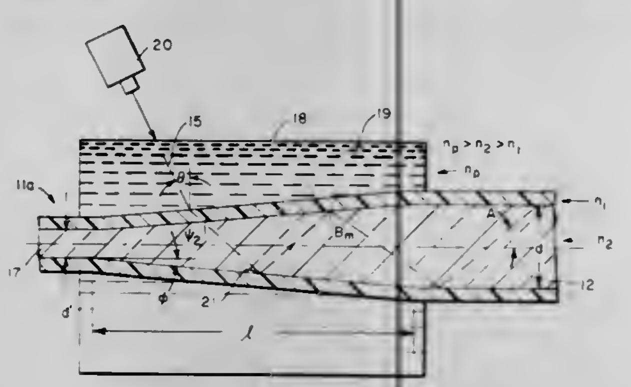


1. In an optical system having a stand-by sight device comprising a flexible fibre optic bundle, a light input unit at one end of the bundle, a fibre distributing element at the other end of the bundle, and a graticule on the output face of the distributing element, and a lens unit through which an image of the graticule is projected via a combining mirror into the user's field of view, the improvement that the distributing element has a face plate having an outer face with which the output ends of the fibres are coplanar and on which is deposited a dark ground graticule, the face plate bearing the graticule and the flexible fibre optic bundle having a numerical aperture sufficiently large to cover the maximum acceptance angle of the lens unit.

4,060,308
ANGLE SELECTIVE COUPLER FOR OPTICAL FIBERS

Michael K. Barnoski, and Viktor Evtuhov, both of Pacific Palisades, Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Filed Aug. 4, 1975, Ser. No. 601,863
Int. Cl.² G02B *5/14*
U.S. Cl. 350—96 C **5 Claims**

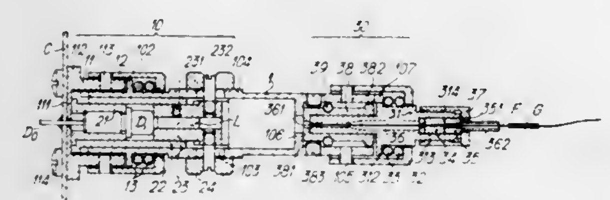


1. An angle selective fiber optic coupler comprising:
a. a strand of step index low loss clad glass fiber immersed in a medium whose index of refraction, n, is higher than the index of refraction, n, of the glass core of said fiber which in turn is higher than the index of refraction, n_1, of the cladding material on said glass core of said fiber;
b. excitation means comprising a modified section of said strand of glass fiber having a tapered core portion with a gradually decreasing thickness along the length thereof for receiving optical energy, said core portion thickness adapted to allow excitation of any one or more of a plurality of orders of modes of optical propagation, each mode being defined by a predetermined angle of propagation relative to the direction of the longitudinal axis of said core of said glass fiber strand measured at a point beyond said modified section; and,
c. means for impinging a beam of optical radiation through said medium of index n_p and through said modified section and into said core of said strand of glass fiber, the impingement angle of said beam of the cladding of said modified section being preselected to produce said predetermined mode angle of propagation after said beam has traversed said modified section by undergoing one or more total internal reflections therein.

4,060,309
ADJUSTABLE CONNECTOR ASSEMBLY FOR LASER EFFECT DIODE, FOCUSSING LENS AND AN OPTICAL FIBRE IN OPTICAL FIBRE TRANSMISSION SYSTEM

Georges E. Le Noane, Kerrougant Bras, Tregastel, France (22730), and André M. Mathern, Route du Rusquet Brelevenez, Lannion, France (22300)

Filed May 24, 1976, Ser. No. 689,122
Claims priority, application France, May 27, 1975, 75.16470
Int. Cl.² G02B *5/16*
U.S. Cl. 350—96 C **4 Claims**

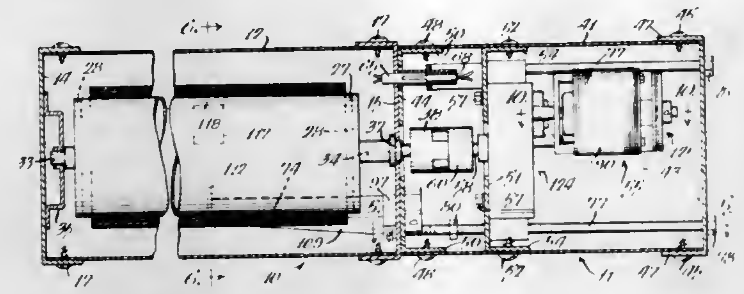


1. An adjustable connector assembly for a laser effect diode, the diode feed circuit, a focussing lens and the ends of optical fibres in an optical fibre transmission system comprising:
a tubular body of circular cross-section generally symetrical about its axis Z;
a first end of said body constituting the front end of said connector having an adjustable ready lock and unlock diode socket assembly means for said diode and feed circuit and a socket means for the focussing lens, said adjustable diode socket assembly means including first adjustment means to vary the distance along the axis of said tubular body between said diode and said lens;
the other end of said tubular body constituting the back end of said connector having a fibre ends ready lock and unlock socket means for moving the fibre ends in a transverse direction along the *xy* directions relative to the axis Z of said tubular body in a plane perpendicular to said axis, said perpendicular plane passing by the focus seen through said lens of a luminous beam emitted by said diode;
said diode socket assembly means comprising a first socket for the diode frictionally secured in a second socket and thereby secured in a predetermined location in said front end of said connector;
said socket means for said focussing lens constituting a third socket which slidably fits into said second socket;
said first adjustment means comprising radial fingers which are threadedly engaged in said third socket to adjustably position said lens by screw movement; and,
guide means for said radial fingers constituting slots in said tubular body to guide the displacement of said lens relative to each diode and nuts on said tubular body for manipulation of said first adjustment means.

4,060,310
DETACHABLE MODULAR DRIVE UNIT FOR PROJECTION SCREEN APPARATUS

Donald J. Brown, Naperville, Ill., assignor to Knox Manufacturing Co., Wood Dale, Ill.

Filed Jan. 6, 1976, Ser. No. 646,922
Int. Cl.² G03B *21/56;* **E06B** *9/20*
U.S. Cl. 350—117 **7 Claims**

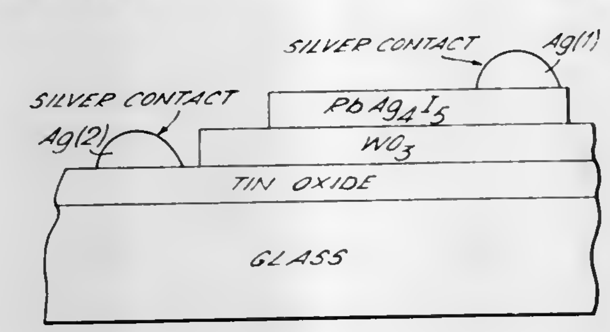


1. A projection screen adapted to be mounted on a supporting surface, comprising: a modular screen unit including an elongate screen casing having a longitudinal slot extending between its opposite ends, an elongate roller within said casing and having one of its opposite end positions exposed at one end of the screen casing, spaced bearings for rotatably supporting the opposite end portions of the roller within said casing, support means for securing said casing to the supporting surface, and a flexible screen having a transverse marginal edge portion secured to said rotatable roller, said screen being wound upon the roller when in closed position and being unwound from said roller when in exposed operative position so as to extend through said slot; a modular motor unit extending cantileverwise outwardly from said one end of said screen casing, said modular motor unit including a motor casing, and an electric drive unit within said motor casing having control means for rotating said roller to move said screen to exposed operative position and to closed position, the drive unit including a rotatable shaft with a free end portion positioned at one end of said motor casing; means for releasably securing said one end of said motor casing in fixed relation to said one end of the screen casing of the modular screen unit so as to position said free end portion of the shaft of the drive unit adjacent said one end portion of the roller; and means for releasably coupling the free end portion of the rotatable shaft with said one end portion of the roller to impart rotation from the shaft to the roller to move the screen between exposed operative position and closed position.

4,060,311
ELECTROCHROMIC DEVICE

Mino Green, London, England, assignor to Imperial Chemical Industries Limited, London, England

Filed Jan. 8, 1976, Ser. No. 647,440
Claims priority, application United Kingdom, Jan. 10, 1975, 1168/75
Int. Cl.² G02F *1/16*
U.S. Cl. 350—160 R **11 Claims**

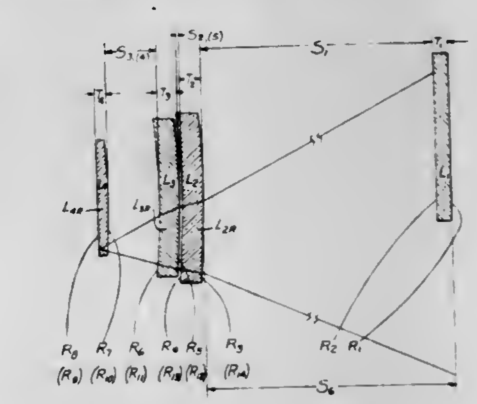


1. An electrochromic device comprising a first electrode, a metal-sensitive compound in contact with the first electrode and with a solid fast ion conductor in which fast ion conductor the fast ion is an ion of a metal which dissolves in the metal sensitive compound to change the colour thereof, the fast ion conductor itself being in contact with a second electrode capable of providing ions the same as the fast ions of the conductor.

4,060,312
COPIER LENS OF REFLEX DESIGN

Walter R. Linke, Chicago, and Andor A. Fleischman, Northbrook, both of Ill., assignors to Bell & Howell Company, Chicago, Ill.

Filed Sept. 3, 1976, Ser. No. 720,482
Int. Cl.² G02B *3/04, 17/08*
U.S. Cl. 350—189 **1 Claim**

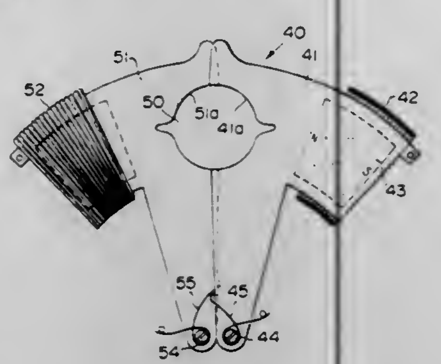


1. An optical system of a reflex copier lens including a combination of glass and plastic elements, at least one of the elements being plastic and having aspheric surfaces, the system having substantially the following specifications:
EFL = 7.4388 inches (188.94mm)
Half Angle of Field = 25.92 degrees
Aperture = f/5.02 (All dimensions in Inches)

Lens	Radii	Thickness	Spacing	N_D	V
L_1	R_1 = INF.	T_1 = .2350		1.522	59.5
	R_2 = INF.				
			S_1 = .0100		
L_2	R_3 = +13.3610	T_2 = .3090		1.755	27.6
	R_4 = − 8.0685				
			S_2 = .0230		
L_3	*R_5 = + 4.10036	T_3 = .3240		1.490	57.4
	*R_6 = − 4.01434				
			S_3 = .8560		
L_4	R_7 = + 9.4050	T_4 = .1660		1.589	61.3
	R_8 = +39.1650				
			—		
L_{4R}	R_9 = +39.1650	T_5 = .1660		1.589	61.3
	R_{10} = + 9.4050				
			S_4 = .8560		
L_{3R}	*R_{11} = −4.01434	T_6 = .3240		1.490	57.4
	*R_{12} = +4.10036				
			S_5 = .0230		
L_{2R}	R_{13} = − 8.0685	T_7 = .3090		1.755	27.6
	R_{14} = +13.3610				
			S_6 = 13.5345		

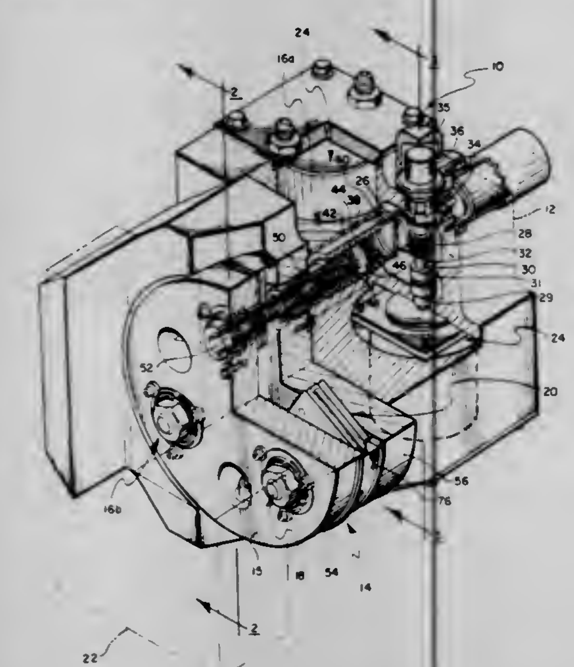
wherein the first column lists the lens elements numerically, the second column lists the respective radii and vertex radii of the aspheric surfaces *R_5, *R_6, *R_{11}, and *R_{12} of the elements, using the convention that convex surfaces have positive radii and concave surfaces have negative radii, the third column lists the respective thicknesses of the elements, the fourth column lists the axial spacings between adjacent elements and the film plane, and the fifth and sixth columns list respectively the refractive and dispersive indices of the optical materials of the lens system.

4,060,313
ELECTROMAGNETICALLY DRIVEN OPTICAL BLADE
Toshihiro Kondo, Chofu, Japan, assignor to Toshihiro Kondo, Chofu and Fuji Photo Film Co., Ltd., Minami-ashigara, both of, Japan
Filed Mar. 9, 1976, Ser. No. 665,185
Claims priority, application Japan, Mar. 19, 1975, 50-33194
Int. Cl.² G05D *25/00*
U.S. Cl. 350—269 **6 Claims**



1. An optical blade which is electromagnetically driven comprising an opaque plastic sheet member and a permanent magnet sheet sealed therein, said permanent magnet sheet extending in parallel to the plastic sheet member at the middle of the thickness of said plastic sheet member, said permanent magnet sheet being provided with a number of perforations through which the plastic material on one side of the magnet sheet is bound with the plastic material on the other side thereof.

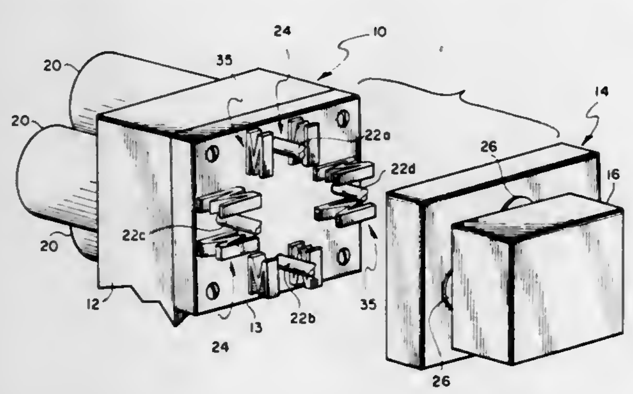
4,060,314
TWO AXES REMOTE MIRROR MOUNT
Theodore A. Heinz, Moorpark, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.
Filed June 28, 1976, Ser. No. 700,430
Int. Cl.² G02B *5/08*
U.S. Cl. 350—285 **8 Claims**



1. In an apparatus to suspend and remotely position a device affixed to a backup plate and cantilevered from a fixed support by at least one V-shaped beam flexure suspension support, said device having at least one preloaded actuating means between said backup plate and said fixed support, the improvement which comprises:

at least one preloaded differential ball-bearing screw actuating means affixed between said backup plate at a first end and said fixed support at a second end, said ball-bearing screw having a multiplicity of ball bearings encapsulated within an enclosed continuous helical race at both said first and second ends, said helical race at said first end having a different pitch angle than said helical race at said second end to provide differential movement between said first and second ends as said screw is rotated either clockwise or counter-clockwise, each of said multiplicity of ball bearings within said enclosed continuous race are in compressional contact with walls formed by said enclosed continuous race, the compressional force being supplied by said at least one V-shaped beam flexure between said backup plate and said fixed support, the combined deflection of both ball and contact surface of said walls averages out any error introduced into said apparatus between the multiplicity of balls which provides an adjustment precision of the backup plate with respect to said fixed support of about 0.5×10^{-6} in.

4,060,315
PRECISION MIRROR MOUNT
Theodore A. Heinz, Moorpark, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.
Filed July 7, 1975, Ser. No. 593,357
Int. Cl.² G02B *5/08*
U.S. Cl. 350—289 **4 Claims**



1. An apparatus to suspend and remotely position, a device cantilevered from a fixed support means comprising:

a rigid base plate portion affixed to said fixed support,

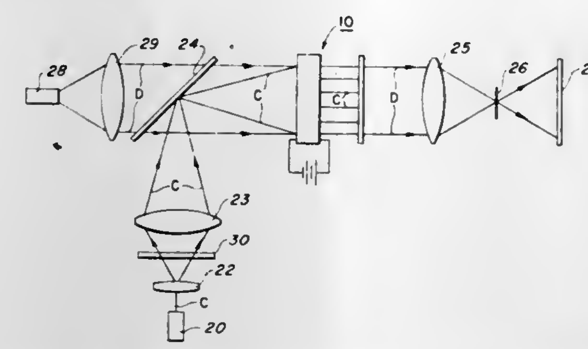
a movable plate spaced from and positioned substantially parallel to said base plate portion,

at least three actuation means connected between said base plate portion and said movable plate to provide tip and tilt of said movable plate as well as a means to translate said movable plate away from or towards said rigid base plate portion,

at least one flexure means connected in compression between said rigid base plate portion and said substantially parallel movable plate to preload said at least three actuation means in tension while resisting shear forces resultant from the weight of said device cantilevered from said fixed support, said at least one flexure means is a V-shaped beam flexure where one end of a first leg of the V is affixed to said rigid base plate and the end of the second leg of said V-shaped flexure is affixed to said movable plate, the opposite ends of said first and second legs are affixed to each other, the resultant joint is suspended between said rigid base plate and said movable plate, the elastic beams of said V-shaped flexure being under compressive loads to provide rigidity and resistance to shear forces as well as maintaining said actuation means in tension, and

means to lock said at least three actuation means thereby fixing said movable plate in a desired position.

4,060,316
IMAGING METHOD
Joel M. Pollack, Rochester, and John B. Flannery, Webster, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.
Continuation of Ser. No. 552,897, Feb. 25, 1975, abandoned. This application Mar. 22, 1976, Ser. No. 668,896
Int. Cl.² G11B *21/14;* **G02B** *5/18;* **G02F** *1/13*
U.S. Cl. 353—20 **15 Claims**



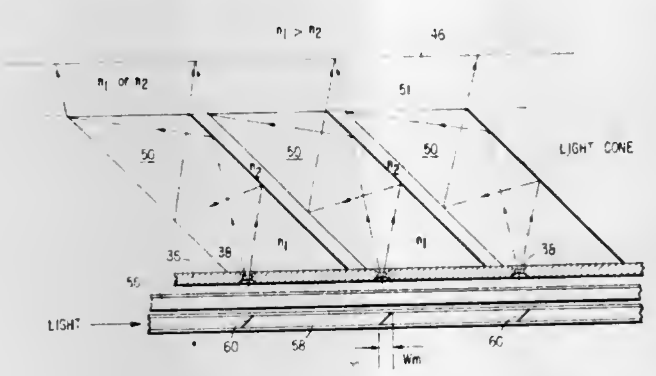
1. A method of imaging, comprising:

a. providing an imaging member comprising, between two electrodes, a photoconductor in contact with a layer of homogeneously aligned nematic liquid crystalline material; said layer of nematic material having a thickness of from about 1 to about 6 microns and having negative dielectric anisotropy;

b. applying a D.C. voltage between said two electrodes above the parallel variable grating mode threshold voltage level for said nematic liquid crystalline material; and

c. during application of said D.C. voltage, imagewise exposing said photoconductor to actinic electromagnetic radiation from a first radiation source to form vortical domains of said liquid crystalline material in the parallel variable grating mode, wherein vortical domains of said liquid crystalline material are formed in a direction parallel to the direction of initial homogeneous alignment, and passing linearly polarized electromagnetic radiation from a second radiation source through regions of said nematic liquid crystalline material in the parallel variable grating mode, said linearly polarized electromagnetic radiation having a polarization direction substantially orthogonal to the major axes of said vortical domains.

4,060,317
COMPACT FOLDED MIRROR RECORDER AND VIEWER OF INFORMATION
George Johannus Yevick, Leonia, N.J., assignor to Personal Communications, Inc., Stamford, Conn.
Filed Sept. 12, 1975, Ser. No. 612,862
Int. Cl.² G03B *23/08, 21/28*
U.S. Cl. 353—27 R **2 Claims**



1. A compact optical device for both viewing and recording, including,

a. means for supporting and transporting a sheet carrying microimages, a sheet carrying microimages, the microimages corresponding to macro scenes recorded on the sheet, the microimages of and corresponding to any macro scene being dispersed over the area of the sheet,

b. means for illuminating dispersed portions of said sheet,

c. an aperture plate carrying lenses at fixed locations thereover, light cones passing through said lenses,

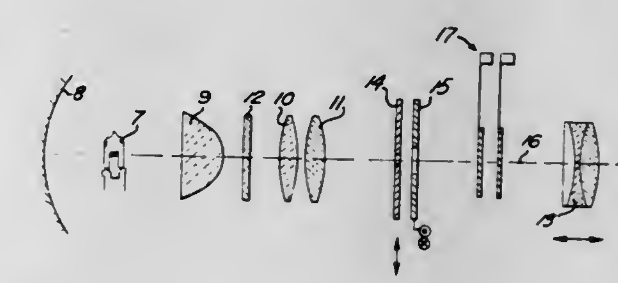
d. means for folding light from each light cone associated with each of said lenses to effectively shorten the length of each light cone,

e. means for limiting the solid angular extent of the light cones,

f. a rear projection viewing screen for receiving an image contained within each projected light cone,

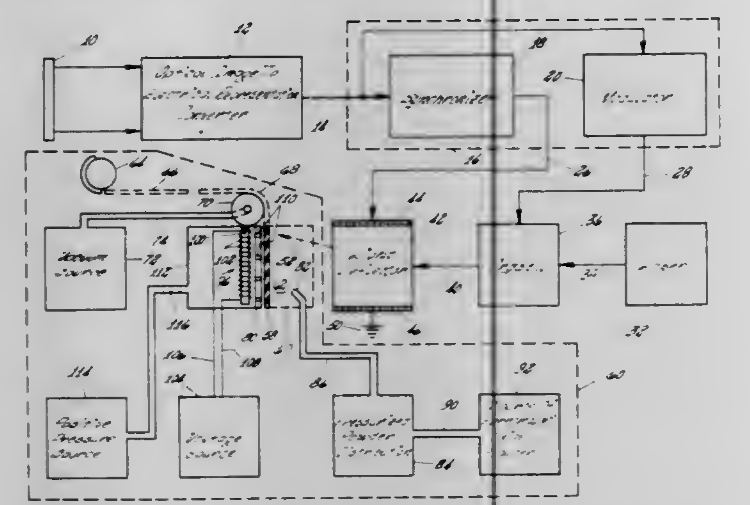
g. said (b) means for illuminating being defined by a plurality of lighting sheets, each defined by a totally internally reflecting sheet having an array of reflectors between the two surfaces of the sheet, said reflectors being positioned and arranged so as to provide an array of sources of light emanating from one surface of said sheet, said (d) means for folding light cones including a plurality of parallel mirrors, a pair of said mirrors sandwiching the lighting sheets, the lighting sheets being parallel and making an angle of less than 90 degrees with the surface of the aperture plate, a reflecting surface on the side of said sheet which carries microimages opposite to the aperture plate, whereby light exiting from the reflectors in the lighting sheets passes through the lenses to the reflecting surface to illuminate microimages.

4,060,318
PROJECTION APPARATUS
Reginald Frederick Hansford, London, England, assignor to Decca Limited, London, England
Filed Mar. 22, 1976, Ser. No. 669,288
Int. Cl.² G03B *21/00, 21/26*
U.S. Cl. 353—42 **15 Claims**



1. Navigational light simulating apparatus for use in a navigational training system comprising in combination a screen and a projection means for projecting a plurality of movable spots of light onto the screen to simulate a changeable pattern of navigational lights, said projection means comprising a plurality of light spot projectors displaced one from another laterally about a center line of the system extending between the screen and the projection means, wherein each projector comprises an optical system having an optical axis and including means defining an aperture which is controllably displaceable in a predetermined aperture plane, a light source for illuminating the aperture and means for focusing an image of the illuminated aperture onto the screen to form a respective spot of light thereon, said means defining the displaceable aperture comprising a pair of parallel plates mounted adjacent one another and normal to said optical axis, each being opaque to the light from said light source apart from a fine straight transparent line, said lines extending in orthogonal directions and crossing one another at a crossing point defining said aperture, mounting means by which each of said plates is mounted for linear movement in its own plane in a direction transverse the direction in which the respective transparent line extends, and means for independently moving said plates in said respective directions of linear movement, thereby to displace the aperture.

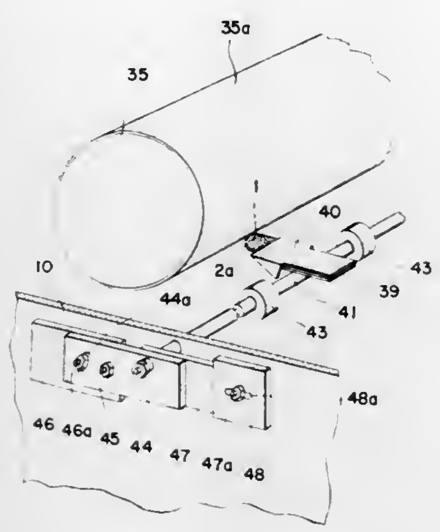
4,060,319
COHERENT BEAM IMAGING APPARATUS AND METHOD
Daniel J. Meaney, Jr., 574 Calle Anzuelo, Santa Barbara, Calif. 93111
Filed June 20, 1975, Ser. No. 588,668
Int. Cl.² G03G *15/24*
U.S. Cl. 355—3 DD **14 Claims**



1. Apparatus for imaging graphic indicia comprising means for converting the graphic indicia into electrical representations thereof;
- a source of a coherent beam of optical radiation having a wavelength within a particular wavelength range;
- means disposed relative to the coherent beam and responsive to a modulating signal for modulating the propagation of the coherent beam at the particular wavelength within the wavelength range;
- means responsive to a scanning signal for scanning said modulated coherent beam across a surface;
- control means operatively coupled to said converting means for generating the modulation signal and the scanning signal from the electrical representations, said control means including means for controllably gating the modulation signal to the modulating means and the scanning signal to the scanning means to scan the coherent beam in a controlled pattern on the surface and to modulate the scanned coherent beam imaging on the surface a representation of graphic indicia;
- means for selectively adhering a thin film of developing fluid on the imaged surface forming a developed image of said graphic indicia; and
- means for establishing a gradient field which attracts and holds said thin film of developing fluid in communication with said surface as the modulated coherent beam is scanned thereacross.

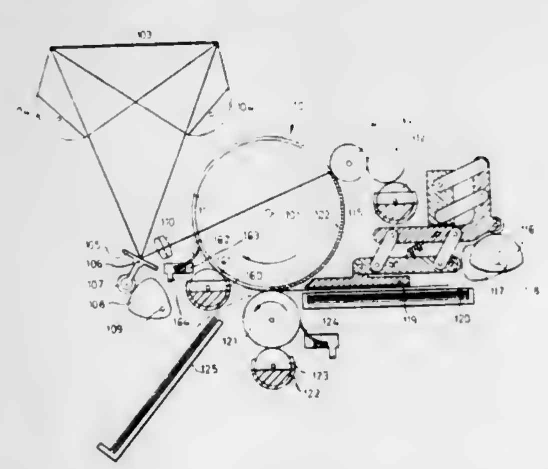
4,060,320
TRANSFER MATERIAL SEPARATING DEVICE
Yasuhiko Doi, Toyokawa; Yukio Tokura, Toyohashi, and Koji Imaizumi, Aichi, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan
Filed Dec. 29, 1975, Ser. No. 645,293
Claims priority, application Japan, Jan. 8, 1975, 50-5708[U]; Jan. 14, 1975, 50-7222[U]
Int. Cl.² G03G *15/00*
U.S. Cl. 355—3 R **12 Claims**

1. A transfer material separating device for use in an electrophotographic copying apparatus having:
- a platform for supporting thereon an original object to be copied;
- an optical system beneath said platform for optically transferring the image of said object on said platform; and
- a rotatable photoreceptor having a photoconductive surface for receiving the image from said optical system and for contacting and transferring said image to said transfer material, said separating device comprising:
- separating claw member means adjacent and at least intermittently contacting said photoreceptor for separating said transfer material from said photoconductive surface after said image is transferred to said transfer material, said claw member means having a semi-circular shaped front portion contacting said photoconductive surface, said



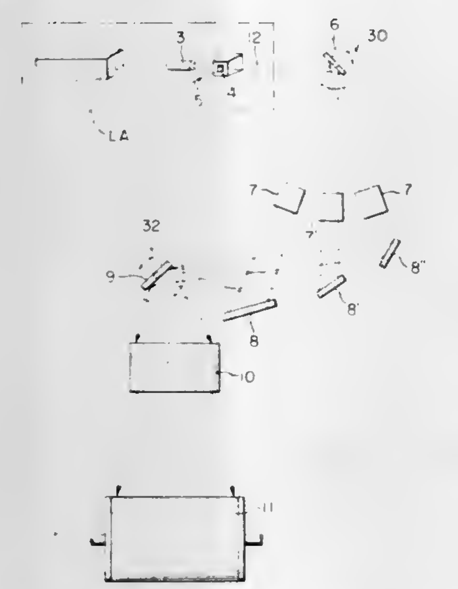
front portion having short fibers of flexible material thereon; and
- contacting means operatively connected to said claw member means for causing said claw member means to contact said photoconductive surface.

4,060,321
ELECTRO-PHOTOGRAPHIC ELEMENT
William Alan Stewart Butement, 5A Barry Street, Kew, Victoria, Australia
Division of Ser. No. 308,700, Nov. 22, 1972, Pat. No. 3,941,593. This application Jan. 14, 1976, Ser. No. 648,955
Claims priority, application Australia, Dec. 9, 1971, 7367/71; Aug. 18, 1972, 0142/72
Int. Cl.² G03G *15/28*
U.S. Cl. 355—8 **16 Claims**



1. In an electrophotographic apparatus, an image receiving plate comprising a transparent base, a layer of optically transparent, electrically conducting material on the base and a layer of photoconductive material on the layer of optically transparent, electrically conducting material, means to cause an image to impinge on the photoconductive layer through the base, and a developing tank associated with the said photoconductive layer and insulated therefrom, a power source to provide a field between the layer of transparent conducting material and a plate associated therewith, the plate being formed on part of the surface of a cylindrical drum mounted for rotation about its axis, means to project an image through the part of the drum which is not the plate onto the plate, means to apply pigment to the drum to form an image thereon, means whereby paper or the like can be brought into contact with the drum and the image transferred from the drum to the paper comprising a second drum having paper receiving means thereon the drums rotating at the same speed and being relatively movable from a position at which an image can be received and pigment applied to the first drum to a position at which the image can be transferred to paper on the second drum, said means to apply pigment to the drum including a plurality of sources of pigment which can selectively be applied to the first drum when it is in its image receiving condition, filters locatable in the path of the image whereof the apparatus can form images of different colors on paper on the second drum, and the sources of pigment including rollers having a length at least equal to that of the drum, which rollers are movable along their axis.

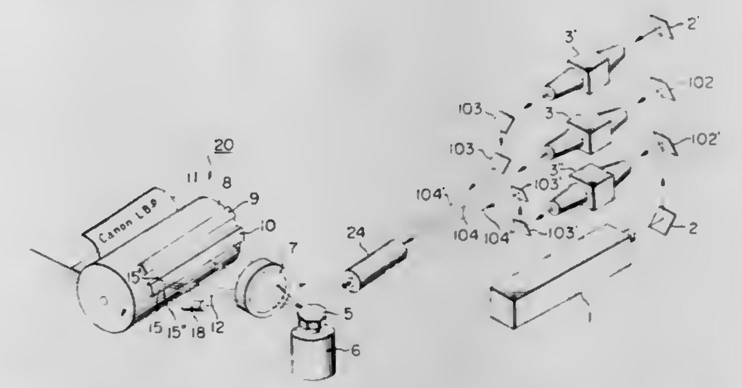
4,060,322
IMAGE INFORMATION HANDLING DEVICE
Kazuhiro Hirayama, Yokohama; Yasushi Sato, Kawasaki; Taisuke Tokiwa, Yokohama; Kazuo Kawakubo, Hino; Fujio Iwatate, Tokyo, and Hisashi Nakatsui, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan
Continuation-in-part of Ser. No. 607,504, Aug. 25, 1975, and Ser. No. 594,126, July 8, 1975. This application Aug. 25, 1975, Ser. No. 607,503
Claims priority, application Japan, Sept. 9, 1974, 49-103642; Sept. 12, 1974, 49-105257; July 10, 1974, 49-79475; Oct. 14, 1974, 49-117892; Aug. 22, 1974, 49-96500; Sept. 14, 1974, 49-106342; Dec. 17, 1974, 49-144727; Sept. 11, 1974, 49-104737; Sept. 12, 1974, 49-105257
Int. Cl.² G03B *23/00, 27/70*
U.S. Cl. 355—60 **10 Claims**



6. An image information handling device comprising:
- means for modulating a light beam by an image information signal;
- a medium for receiving the modulated light beam;
- scanning means for causing the modulated beam to scan said medium; and
- optical means between said modulating means and said scanning means for selectively directing the modulated beam along any one of a plurality of light paths extending to said medium, said optical means also being effective to vary the image forming characteristic of the light beam incident on said medium.

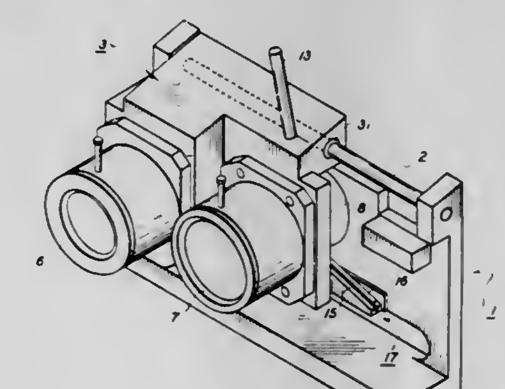
4,060,323
IMAGE INFORMATION HANDLING METHOD AND DEVICE
Kazuhiro Hirayama, Yokohama; Yasushi Sato, Kawasaki; Taisuke Tokiwa, Yokohama; Fujio Iwatate, Tokyo; Kazuo Kawakubo, Hino, and Hisashi Nakatsui, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan
Continuation-in-part of Ser. No. 594,126, July 8, 1975. This application Aug. 25, 1975, Ser. No. 607,504
Claims priority, application Japan, Sept. 9, 1974, 49-103642
Int. Cl.² G01D *15/10;* **G03B** *23/00, 27/32, 27/70*
U.S. Cl. 355—60 **24 Claims**

1. A method of imaging light on a medium to form a plurality of information elements, said method comprising the steps of:
- forming a plurality of light beams;
- modulating said plurality of light beams by image information signals in such a manner that the same modulation is applied to each of a predetermined number of said plurality of light beams, said number being selected in accordance with a desired size of the information elements formed on said medium: and



- deflecting each of said modulated light beams toward said medium to scan said medium and form thereon the predetermined number of rows of light spots having the same modulation;
- wherein the size of the information elements, defined by adjacent rows of identical light spots, is changed by varying the number of light beams receiving the same modulation.

4,060,324
LENS SWITCHING MECHANISM FOR USE IN COPYING MACHINE
Susumu Wakatsuki, Ebina, Japan, assignor to Rank Xerox Ltd., London, England
Filed July 27, 1976, Ser. No. 709,033
Claims priority, application Japan, Nov. 21, 1975, 50-157371[U]
Int. Cl.² G03B *27/70*
U.S. Cl. 355—60 **3 Claims**



1. In a copying apparatus including means for projecting an image of an original onto a photosensitive member selectively at one of a plurality of magnifications, said projecting means including:
- two lenses;
- a movable carriage for supporting said lenses;
- means for supporting said carriage for movement between a first position wherein one of said lenses is operative and a second position wherein the other of said lenses is operative;
- the improvement wherein, said apparatus further includes:
- adjustable means for stopping said carriage at said first or second positions; and over center means responsive to the movement of said carriage more than half its distance of travel between said first and second positions for moving

and biasing said carriage against said stop means, said over center means comprising:

a guide member having inclined surfaces meeting at an apex, said guide member being supported by said carriage support means; an arm pivotably supported by said carriage; a roller supported at one end of said arm; and a spring biasing said arm about said pivot, said spring being connected to the other end of said arm, said arm and roller being arranged so that said roller is biased against said inclined surfaces, said apex of said inclined surfaces being positioned about halfway along a path of travel of said roller between said first and second positions.

4,060,325

AUTOMATIC FOCUSING SYSTEM EMPLOYING TWO VARIABLE FREQUENCY OSCILLATORS

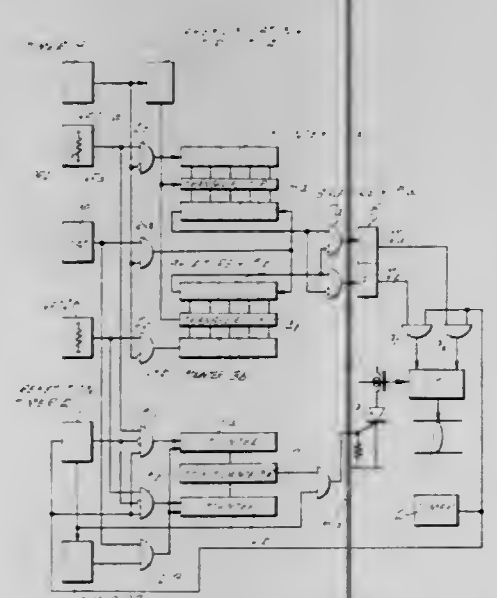
Tsukumo Nobusawa, Minami Oizumi, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed May 17, 1976, Ser. No. 687,040

Claims priority, application Japan, May 20, 1975, 50-60006

Int. Cl.² G03B *7/08;* G01C *3/08*

U.S. Cl. 354—25 **5 Claims**



1. In an automatic focusing system having an objective spaced an adjustable distance from an image plane, apparatus which comprises:

first means for producing first and second variable-frequency signals that have substantially the same frequency when light passing through the objective is brought into focus at the image plane, the first means including

a first photoconductor element having impinging on it light which has traversed a first distance from the objective to reach the first photoelectric element, the first distance being less than the adjustable distance by a predetermined amount

a second photoconductor element having impinging on it light which has traversed a second distance from the objective to reach the second photoelectric element, the second distance being greater than the adjustable distance by a predetermined amount

each of the photoelectric elements serving as a variable resistor having a peak resistance value when the light impinging on it is in focus;

a first variable frequency oscillator controlled by the resistance value of the first photoelectric element for producing the first variable frequency signal, and

a second variable frequency oscillator controlled by the resistance value of the second photoelectric element for producing the second variable frequency signal; and

second means responsive to a difference in frequency between the first and second variable-frequency signals for adjusting the spacing between the objective and the image plane to a relative position at which the frequencies thereof are substantially the same.

4,060,326

OPTICAL INSTRUMENT FOR MEASURING CONCENTRATIONS OF POLLUTING GASES ON LONG AND SHORT GEOMETRICAL PATHS

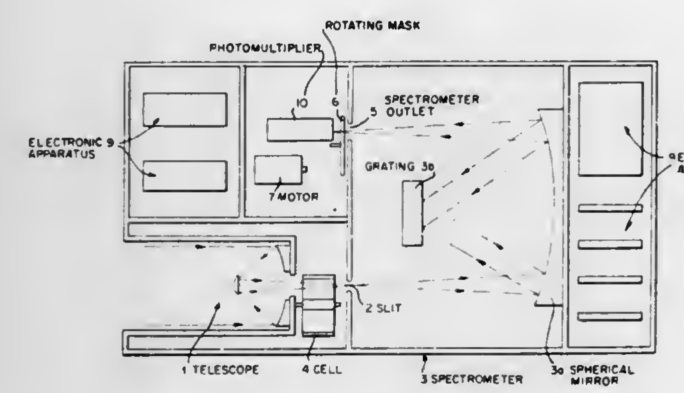
Tiziano Tirabassi, Carpi; Giorgio Giovanelli, Bologna; Giulio Cesari, Bologna; Ubaldo Bonafe, Bologna, and Ottavio Vittori Antisari, Bologna, all of Italy, assignors to Tecneco S.p.A., Fano (Pesaro), Italy

Filed July 3, 1975, Ser. No. 592,727

Claims priority, application Italy, July 4, 1974, 3431/74

Int. Cl.² G01J *3/42*

U.S. Cl. 356—96 **9 Claims**



1. An optical instrument for measuring concentrations of polluting gases on long and short geometrical paths, characterized in that it comprises a spectrometer; a telescope focussing a light beam coming from a source located at a predetermined distance, into a slit of said spectrometer; at least a cell, containing a known concentration of the polluting gas under examination, brought by first control means along the path of the light beam between said telescope and said slit; said spectrometer dispersing and focussing said light beam on its own outlet focal plane; a mask provided with movable slits, moved by second control means and located on the outlet focal plane of said spectrometer, said mask provided with movable slits that are adapted to effect the sampling of said dispersed light beam in at least four series of wave length ranges; a photodetector giving at the outlet electrical signals when receiving at the inlet light signals caused by said sampling; an electronic apparatus, located at the outlet of said photodetector, including means to elaborate at least four numerical values, of which: a first numerical value relating to the ratio between two electrical signals referring respectively to the sampling of a first and second of said series of wave length ranges of the dispersed light beam, a second numerical value referring to the ratio between two electrical signals referring respectively to the sampling of a third and fourth of said series of wave length ranges of the dispersed light beam, a third numerical value referring to the ratio between two electrical signals referring respectively to the sampling of said first and second series of wave length ranges of the dispersed light beam when said cell is interlocated along the light beam, and a fourth numerical value relating to the ratio between two electrical signals referring respectively to the sampling of said third and fourth series of wave length ranges of the dispersed light beam when said cell is interlocated along the path of the light beam; said elaboration of the numerical data being such to give at the outlet a numerical value given by the value of the known concentration of the polluting gas contained in said cell multiplied by the length of the cell and by a ratio having as numerator the difference between said first and second numerical value and as denominator the product of the distance between said source and the measuring device by the value obtained substracting from the difference between said third and fourth numerical value the said difference between the first and second numerical value.

4,060,327

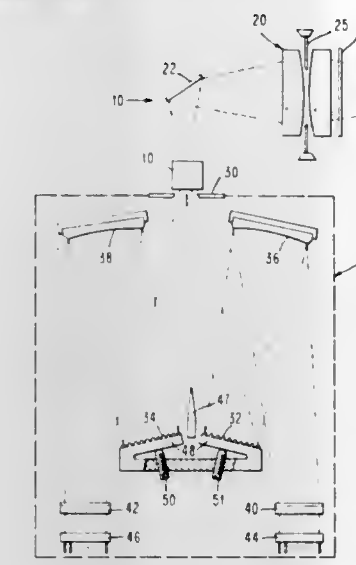
WIDE BAND GRATING SPECTROMETER

Lawrence Jacobowitz; Einar S. Mathisen, both of Poughkeepsie, and Lawrence D. Thorp, Yorktown, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Sept. 13, 1976, Ser. No. 722,944

Int. Cl.² G01J *3/42, 3/12*

U.S. Cl. 356—96 **7 Claims**



1. In a spectrometer for measuring the intensities of radiant energies within a beam of light across different wavelengths thereof, said spectrometer including an elongated rectangular entrance slit for admitting said beam, the combination comprising:

first and second stationary gratings disposed in the path of said beam admitted by said slit, each of said gratings having lines parallel to said slit, the lines of each grating being different to produce different primary orders of dispersion, said gratings being operative to dispense light in said beam into two separated dispersed beams;

first and second arrays of photodiodes, said photodiodes being arranged in each array along a line and operative to produce output signals proportional to the intensities of rays of radiant energies illuminated thereby;

and means for focusing said dispersed beams separately on said arrays so as to image said slit thereon, whereby successive photodiodes in each array produce outputs proportional to the intensities in rays of successive wavelengths.

4,060,328

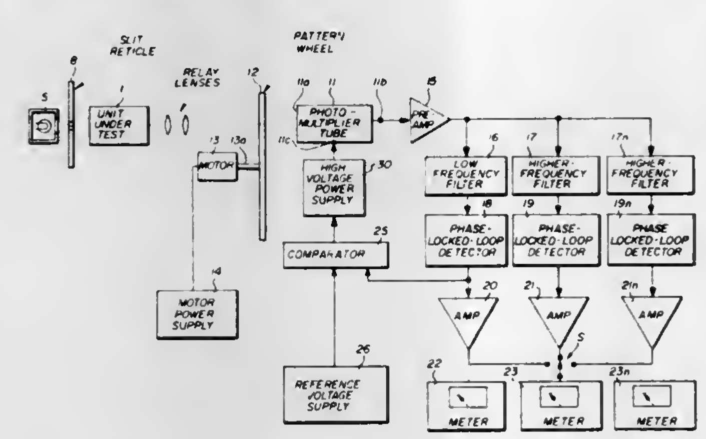
SYSTEM FOR MEASURING THE MODULATION TRANSFER FUNCTION OF AN OPTICAL DEVICE

William E. Flynt, Garland, Tex., assignor to Varo, Inc., Garland, Tex.

Filed Feb. 6, 1976, Ser. No. 655,905

Int. Cl.² G01B *9/00*

U.S. Cl. 356—124 **23 Claims**



1. A system for determining the image-forming quality of an optical device by projecting an image through said device and measuring the relative amount of light transmitted therethrough at a plurality of spatial frequencies, with said system determinations being normalized automatically and continuously throughout the duration of the evaluation of the optical devices under test, said system comprising: photoelectric transducer means, including an optical input section and an electrical output section, for converting a light signal incident upon said input section into a corresponding electrical signal at said output section; means for projecting said image along a projection path through said optical device and onto said optical input section; means disposed in said projection path for modulating said projected image to produce simultaneously a low-frequency image component incident upon said optical input section and at least one higher-frequency image component incident upon said optical input section; a plurality of filter means respectively tuned to the frequency of each of said image component and coupled to the electrical output section of said photoelectric transducer means for developing a corresponding plurality of discrete electrical signals each representative of a different one of said image components; indicating means coupled to said filter means for indicating the amplitude of said discrete electrical signals; and means for adjusting said system to cause said indicating means to indicate a predetermined amplitude for said low-frequency image component, said adjusting means comprising means for comparing the amplitude of said discrete low-frequency signal with the amplitude of a preselected reference signal and generating an error signal which automatically adjusts said system to substantially equalize the amplitude of said reference signal and said low-frequency signal, whereby the system is automatically and continuously set to a normalized level for the optical device being measured during the evaluation of the optical device under test and with the higher-frequency image components then capable of being measured under a standardized system for determining the image-forming quality of a series of optical devices at one or more higher spatial frequencies.

4,060,329

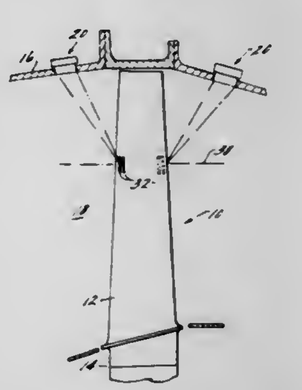
METHOD AND APPARATUS FOR MEASURING DEFLECTION OF ROTATING AIRFOILS

Delmar H. Ellis, Cincinnati, Ohio, assignor to General Electric Company, Cincinnati, Ohio

Filed Oct. 23, 1975, Ser. No. 625,053

Int. Cl.² G01B *11/00;* G01M *9/00*

U.S. Cl. 356—167 **14 Claims**



1. A method of measuring deflection of a rotating member of finite radial length comprising the steps of:

illuminating a portion of the radial length of the rotating member spaced from the tip thereof with a first high intensity light beam projected from a location axially disposed from said member, the illuminated portion being that at which deflection is to be determined;

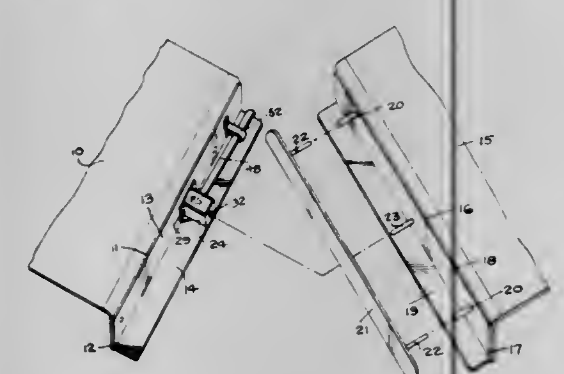
illuminating a rotating reference location with a second high intensity light beam;

reflecting and dispersing the first and second high intensity light beams from their respective locations as light impulses;

sensing at least a portion of the reflected light impulses with light sensitive means;

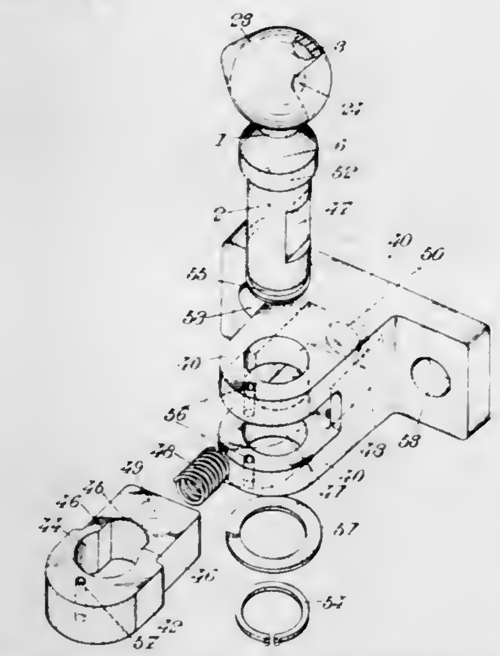
converting the light beam impulses to electrical impulses;
measuring the time increment between the electrical impulse related to the deflection measurement location and the electrical impulse related to the rotating reference location; and
converting the time increment to a length dimension.

4,060,330
LOOSE LEAF BINDER LOCKING DEVICE
Anthony Baccile, Lansdowne, Pa., assignor to Buchan Industries, Inc., Clifton Heights, Pa.
Filed Aug. 11, 1976, Ser. No. 713,380
Int. Cl.² B42F *5/02, 13/30*
U.S. Cl. 402—47 **7 Claims**



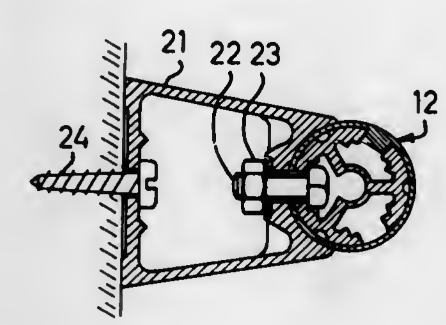
1. In a loose leaf binder of the type having separable front and back cover members having coacting telescopically extensible posts which project through perforations in the loose leaf sheets for holding the same positioned between said cover members, a locking mechanism for releasably securing said cover members together comprising in combination a locking post on a first one of said cover members and a lock device on the other one of said cover members adapted to telescopically receive said locking post, said lock device including an elongated main body part having an elongated guide channel conforming to the shape of said locking post and extending substantially the entire length of said main body part into which said locking post is rectilinearly insertable, a pair of post-clutching roller elements respectively disposed at opposite sides of said channel adjacent the entrance thereto and adapted to frictionally engage diametrically opposite sides of said locking post at any point along the length of the portion of the post which is received in said channel, one of said elements being held in a fixed position for constant frictional engagement with one side of said post and the other of said elements being shiftable relatively to said channel for movement thereof into and out of locking engagement with the opposite side of said locking post, said shiftable element being normally biased into a position wherein it coacts with said axially fixed element to automatically clutch said locking post against withdrawal from said channel, means operative to positively draw said shiftable element out of clutching engagement with said locking post whereby to release the same for its partial or complete withdrawal from said lock device, said means including a rectilinearly shiftable elongated draw bar which is disposed in closely spaced parallel relation to only one side of said locking post guide channel and is operatively connected at its outer end to said shiftable roller element for moving the latter into and out of said locking engagement with said locking post, spring means acting on the inner end of said bar to normally bias the same outwardly whereby the automatically effect clutching engagement of said shiftable roller element with said locking post, and an operating lever wholly confined between the covers of said binder, said lever being pivoted within said locking device and connected to said bar cross-wise thereof for limited swinging movement through an arc of very small degree in a plane extending parallel to the path of movement of said bar and the expansible back of the binder, said operating lever being manually actuatable against the bias of said spring means to draw said bar into its post unlocking position and automatically shiftable into inactive position solely under the biasing effort of said spring means.

4,060,331
SPHERICAL COUPLINGS FOR VEHICLE TOWING OR KINDRED PURPOSES
Michel Domer, Montigny-les-Cormeilles, and Jean-Yves Haÿ, Colombes, both of France, assignors to Societe Paulstra, France
Filed May 21, 1976, Ser. No. 688,490
Claims priority, application France, May 28, 1975, 75.16664; Jan. 7, 1976, 76.00243
Int. Cl.² F16D *1/12*
U.S. Cl. 403—130 **12 Claims**



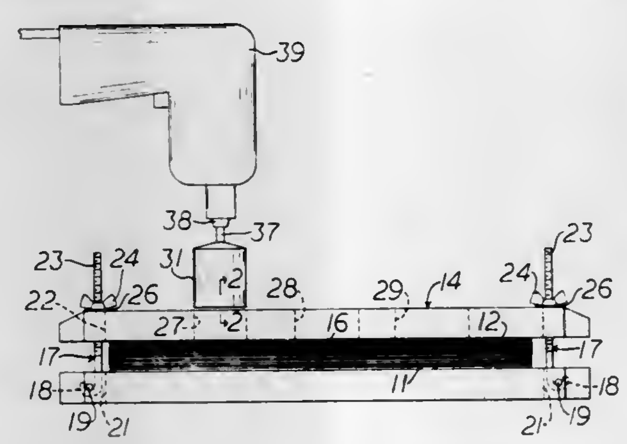
1. A ball-joint coupling comprising: a male coupling member provided with a ball; a layer of elastomeric material bonded on said ball; a part-spherical cap received on said ball over said elastomeric layer and bonded to said layer; a female coupling member having a part-spherical socket for releasably receiving said cap; and retaining means, acting between said cap and said female coupling member, for preventing relative rotation of said cap in said socket at least in the horizontal plane.

4,060,332
SPLINE AND GROOVE CONNECTION
Kim Jacobsen, 4 Spurvevaenget, Odense, Denmark (5000)
Filed Nov. 6, 1975, Ser. No. 629,214
Claims priority, application Denmark, Nov. 14, 1974, 5926/74
Int. Cl.² F16B *7/00*
U.S. Cl. 403—359 **6 Claims**



1. An assembling set comprising an elongated rod member and a structural part, said rod member comprising an elongated hub, a plurality of elongated flanges radiating from said hub, an elongated individual head carried by each flange with each head being spaced from an adjacent head, said heads and said flanges defining a longitudinal groove between each adjacent pair of heads and a longitudinal cavity between each pair of flanges, each groove opening into a respective one of said cavities, said heads having arcuate outer surfaces in transverse section wherein said rod member is generally circular in cross-section, said structural part including a tubular portion telescoped over said rod member, and said structural part having a radially inwardly extending projection seated in one of said grooves and anchoring said structural part against rotation around said rod member, said tubular part being of limited axial extent as compared to said rod member and there being at least one tubular spacer telescoped over said rod member and axially positioning said structural part.

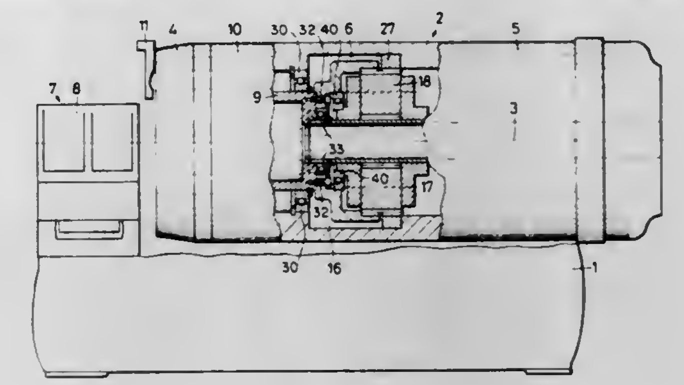
4,060,333
APPARATUS FOR CUTTING DISKS FROM SHEETS
John T. White, 100 Pike Road, Birmingham, Ala. 35218
Filed July 14, 1976, Ser. No. 705,093
Int. Cl.² B23D *45/14*
U.S. Cl. 408—103 **4 Claims**



1. Apparatus for cutting disks from sheets of material comprising:

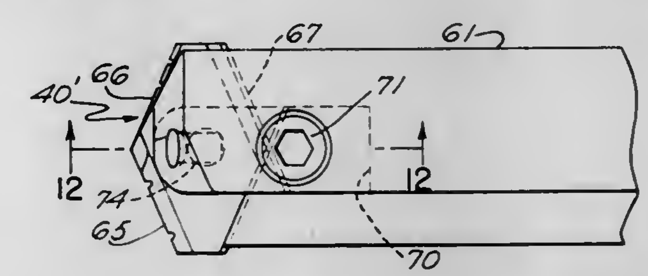
a. a first clamping element having a flat surface disposed to engage one side of and support a stack of sheets of material from which said disks are to be cut,
b. a second clamping element having a flat surface disposed to engage the other side of said stack of sheets,
c. an elongated connector member having a hook-shaped end pivotally connected to a transverse pin carried by each end of said first clamping element with the other end of each said connector member being adapted to extend toward said second clamping element,
d. releasable means connecting said other end of each said connector member to one adjacent end of said second clamping element,
e. there being at least one opening through said second clamping element extending perpendicular to said sheets of material and being of a size corresponding to the size of the disks to be cut,
f. a cutter member having inner and outer cylindrical surfaces with the outer cylindrical surface being of a size corresponding to the size of said opening through said second clamping element with the inner cylindrical surface being of a constant diameter and providing an unrestricted cylindrical chamber for receiving the cut disks and with said inner cylindrical surface at one end of said cutter member being beveled to provide an outwardly flaring annular surface which terminates in an annular cutting edge, and
g. means operatively connecting the other end of said cutter member to rotary power means.

4,060,334
MACHINE FOR MACHINING BARS AND TUBES
Rudolf Wagner, Stuttgart, Germany, assignor to Remswerk Christian Foll und Sohne, Waiblingen, Germany
Filed Jan. 19, 1976, Ser. No. 650,157
Claims priority, application Germany, Jan. 18, 1975, 7501376[U]
Int. Cl.² B23B *39/10*
U.S. Cl. 408—126 **16 Claims**



1. A thread cutting machine, which includes in combination: housing means, a cutting head with an axis and spindle means therewith journalled in said housing means, motor means having an axis arranged in axial alignment with said cutting head, and a planetary gear transmission with a main axis and having an input gear drivingly connected to said motor means and also having an output gear drivingly connected to said cutting head, said planetary gear transmission being arranged between said motor means and said cutting head, the main axis of said planetary gear transmission being in alignment with the axis of said motor means and with the axis of said cutting head.

4,060,335
SPADE DRILL
William Stuart Holloway, St. Charles, Ill., and Manfred Grunsky, Dreieichenhain, Germany, assignors to Amtel, Inc., Providence, R.I.
Continuation-in-part of Ser. No. 595,607, July 14, 1975, abandoned. This application Oct. 26, 1976, Ser. No. 735,143
Claims priority, application Germany, Mar. 4, 1976, 2608809
Int. Cl.² B23B *27/16*
U.S. Cl. 408—233 **5 Claims**

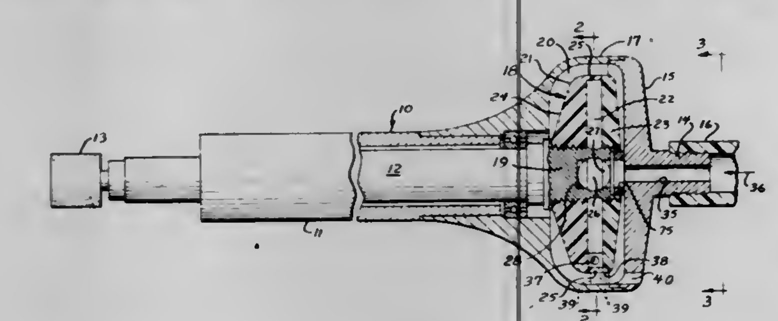


1. Spade drill having a holder and a spade cutting blade said holder having a clamp slot and a clamp screw which passes through the clamp slot perpendicularly to its clamp surfaces, said holder clamping slot having a narrow extension into the bottom thereof and diametrically across the holder on an axial plane thereto, said blade being received in said slot in such a way that the drill bit of the spade cutting blade sticks out of the clamp slot in feed direction, and the spade cutting blade rests against an abutment surface in said slot to seat it and avoid a sideways movement of the spade cutting blade, said abutment surface being V-shaped with respect to an axial plane of said holder, the included angle of the abutment surface being smaller than the included angle between the cutting surfaces of the cutter blade, the side of the spade cutting blade located across from the exposed drill bit surface having a second drill bit surface whose shape corresponds to the one of the first drill bit surface, said spade drill blade being provided with a central

aperture and being urged against the abutment surfaces by means of a holding piece which passes through the one clamp slot arm and engages said central aperture of the spade cutting blade substantially on the central rotational axis of the holder.

2. A spade drill as in claim 1 wherein the holding piece is a screw that passes through the holder in the region of the extension slit transversely to the plane of the blade.

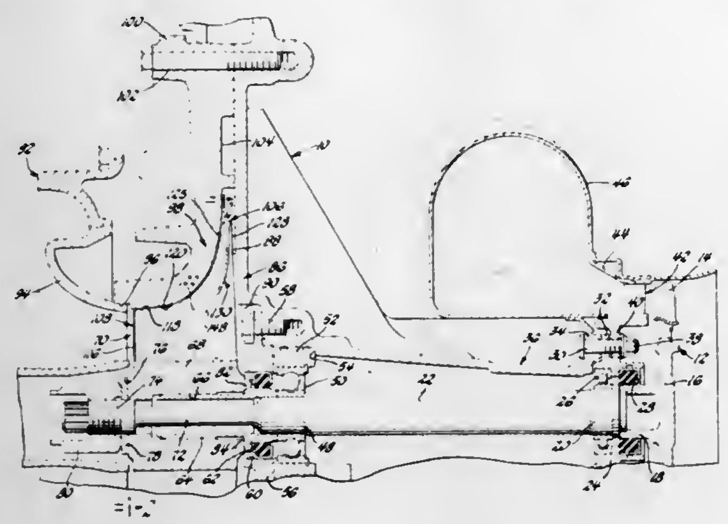
4,060,336
FLUID ENGINE
James V. Theis, Jr., Delray Beach, Fla.; John B. McCord, Evanston, and Harry H. Holly, Olympia Fields, both of Ill., assignors to Hollymatic Corporation, Park Forest, Ill.
Continuation of Ser. No. 569,544, April 18, 1975, abandoned, which is a continuation of Ser. No. 353,456, April 23, 1973, abandoned. This application Oct. 15, 1976, Ser. No. 732,905
Int. Cl.² F01B *1/18*
U.S. Cl. 415—80 **6 Claims**



1. A pressure gas turbine, comprising: a casing having a pressure gas entrance and a gas exit defining a gas fow path; a circular rotor in said casing rotatable about an axis of rotation and having a hollow interior section forming a part of said flow path and being substantially free of impediments tending to interfere with gas flow and to impart added rotational force to said gas during its flow through said rotor, said rotor having an arcuate surface means as a part of said hollow interior section defining a part of said gas flow path, said surface means being outwardly arcuately sloped relative to said axis and to said flow path; and a converging-diverging nozzle means for said gas aligned in series gas flow relationship with said arcuately sloped surface for converting gas pressure energy of said gas flowing into the turbine nozzle to gas velocity energy of said gas flowing from the nozzle, said nozzle having an internal passage with a converging entrance, a throat and a diverging exit, said gas flow path between said arcuate surface means of said hollow interior section and said nozzle being substantially free of flow restricting bends tending to impart turbulence to said gas, said nozzle having a lateral dimension adjacent to said arcuately sloped surface means that is essentially the same as the corresponding lateral dimension of said surface means for further promoting said essentially streamline gas flow.

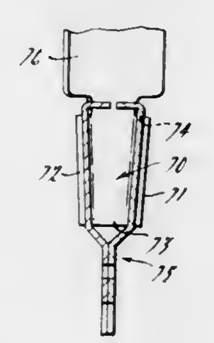
4,060,337
CENTRIFUGAL COMPRESSOR WITH A SPLITTER SHROUD IN FLOW PATH
Albert H. Bell, III, Birmingham, Mich., assignor to General Motors Corporation, Detroit, Mich.
Filed Oct. 1, 1976, Ser. No. 728,721
Int. Cl.² F01D *5/22*
U.S. Cl. 416—186 R **3 Claims**

1. A low inertia centrifugal rotary compressor impeller of unitary construction for association with a gasifier turbine and wherein the gasifier turbine is driven by motive fluid to accelerate the impeller comprising: an impeller hub having means for connection to a gasifier turbine shaft, a plurality of blades on said hub each having a root portion integrally connected to the outer periphery of the hub and defining a flow passage with an adjacent blade, each of said blades including a free rear edge portion directed essentially radially outwardly of the hub and being circumferentially spaced with respect to an adjacent blade free rear edge portion to define a rear opening through the impeller at the hub from each of the flow passages to reduce windage losses during impeller operation, a flow splitter ring formed continuously circumferentially around the impeller and being integrally formed with each of the separate blades, said flow splitter ring having an inlet edge located at the transition of axial to radial flow through the impeller and



including an outlet edge located adjacent the outer periphery of the circumferentially spaced blades of the impeller, said flow splitter ring interconnecting each of the separate blade members to prevent blade flutter during impeller rotation, said splitter ring being located in the flow passage between each of the separate blades and at a point forwardly of the rear plane of the impeller.

4,060,338
CONTOURED SHEET METAL AIRFOIL FANS
William T. Macauley, West Bloomfield, Mich., assignor to Ford Motor Company, Dearborn, Mich.
Division of Ser. No. 485,645, July 3, 1974, Pat. No. 3,963,373. This application Mar. 1, 1976, Ser. No. 662,386
Int. Cl.² F04D *29/34*
U.S. Cl. 416—214 R **3 Claims**



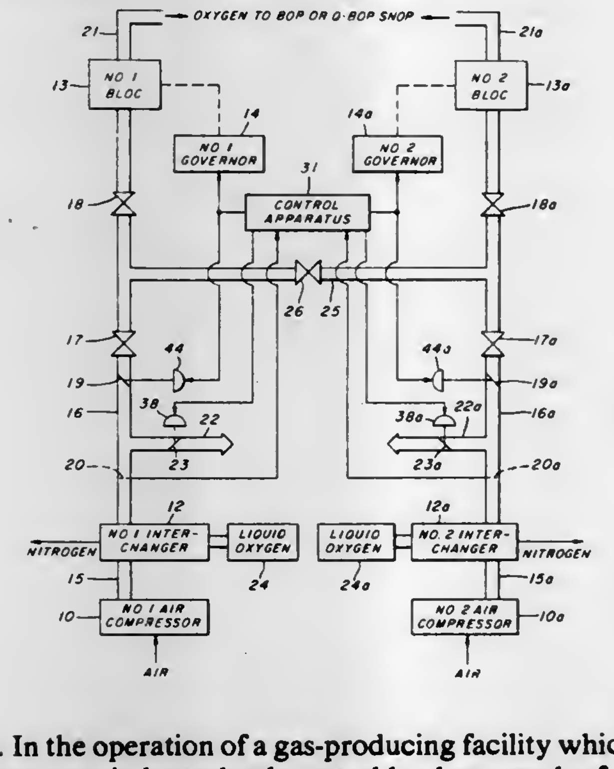
1. A fan assembly, comprising:

a. a multiple number of sheet metal blades useful for impelling air and having a predetermined curvilinear air foil contour,

b. a multiple number of blade roots each integral with one each of said blades, and having substantially all portions thereof constructed of a single ply sheet metal, said root having a curvilinear web extending from said blade along an axis of said blade disposed between the leading and trailing edges of said blade, said root having symmetrically arranged wing portions extending from leading and trailing edges of said web, said wings for each of said blade roots comprising a tab extending substantially along the entire leading or trailing edge of said web,

c. a hub formed of at least one pair of single ply discs each joined at a central zone and separated to form a hollow ring at a radially outer zone, said hollow ring having circumferentially spaced receptacles for receiving each of said blade root assemblies and to enclose at least part of said tabs, said hub receptacles having flanges which extend toward the root assembly with the edges of said flanges terminating to form a mating relationship with the contour of said web, said hub further having means for securing said root assemblies within said receptacles against relative rotary movement therein, said hub means comprising slots complimentary in shape of said tabs and receiving said tabs for extension therethrough.

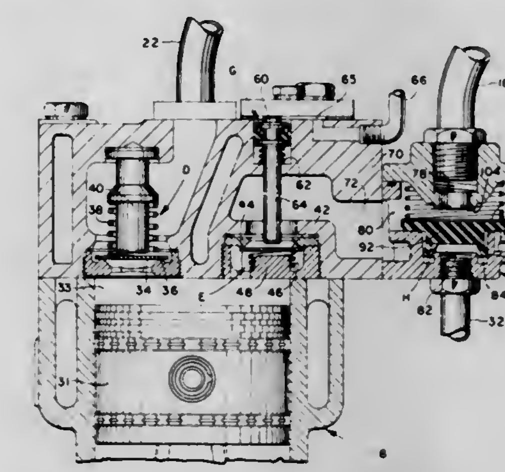
4,060,339
METHOD AND APPARATUS FOR CONTROLLING A GAS-PRODUCING FACILITY
Frederick L. Raff, Worth, and Edward Szymanski, Bloom, both of Ill., assignors to United States Steel Corporation, Pittsburgh, Pa.
Filed Sept. 23, 1976, Ser. No. 725,802
Int. Cl.² F04B *41/06*
U.S. Cl. 417—2 **10 Claims**



1. In the operation of a gas-producing facility which includes at least two independently operable plants, each of said plants having a respective interchanger and a respective compressor for receiving gas from its interchanger during normal operation, an improved method of operating and controlling said plants during periods of reduced operation when less then all of said compressors are running, said method comprising operating said interchangers at reduced rates, directing the gas output from said interchangers to a compressor which is running, developing a control signal representative of the combined gas outputs of the interchangers, and utilizing said signal to control the speed of the compressor which is running.

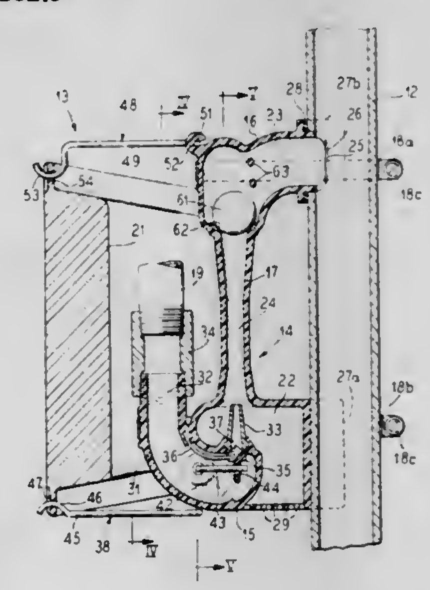
4,060,340
AIR COMPRESSOR WITH INLET DIVERSION VALVE
LeRoy Yanik, and Dario R. Gross, both of Owosso, Mich., assignors to Midland-Ross Corporation, Cleveland, Ohio
Filed Dec. 24, 1975, Ser. No. 644,116
Int. Cl.² F04B *49/00;* **F16B** *15/18*
U.S. Cl. 417—28 **5 Claims**

1. A compressor having an inlet port communicating with a pressurized gas source, a compressor inlet valve communicating with said inlet port, a governor and unloader for unloading said compressor by maintaining said inlet valve open, diversion valve means between said inlet port and the pressurized gas source for blocking communication of the pressurized gas source with said inlet valve through said inlet port when said governor and unloader operate to maintain said inlet valve open, said diversion valve means including a valve body having generally oppositely located gas source and governor ports respectively communicating with said pressurized gas source and with said governor, said valve body having supply and vent ports located intermediate said gas source and governor ports and respectively communicating with said inlet port and with atmosphere, said diversion valve means including mounting means for mounting same directly to said compressor with said supply port in direct communication with said inlet port, a movable valve member in said valve body and including an enlarged main body portion and a smaller extension portion, said valve member being movable between a first position wherein said main body portion closes said vent port while establishing communication directly therepast between said gas source and supply ports and a second position wherein said main body portion closes said gas source port while establishing communication directly therepast between said supply and vent ports, said movable valve member in both said positions



thereof maintaining said governor port isolated against communication with the other of said ports, yieldable biasing means acting directly on said main body portion of said valve member for normally biasing said valve member to said first position, said valve body having a cylindrical bore defining a variable volume chamber communicating with said governor port and including a variable volume chamber wall, said extension portion of said valve member being positioned in said chamber in sliding sealing engagement with said wall for movement of said valve member to said second position by fluid pressure supplied to said variable volume chamber through said governor port.

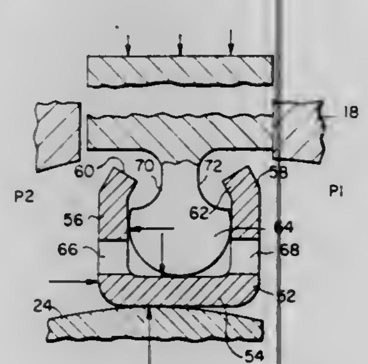
4,060,341
AUTOMATIC AUXILIARY JET SUMP PUMP
David L. Tremain, Sterling; Burt L. Beach, and James C. Hadley, both of Prophetstown, all of Ill., assignors to Houdaille Industries, Inc., Buffalo, N.Y.
Continuation-in-part of Ser. No. 529,804, Dec. 5, 1974, abandoned. This application Sept. 19, 1975, Ser. No. 614,795
Int. Cl.² F04F *5/48*
U.S. Cl. 417—182.5 **14 Claims**



1. An auxiliary water jet sump pump to supplement an electrical sump pump connected to a vertically extending discharge conduit, said water jet sump pump comprising a hollow

body section having a connection to said discharge conduit, a vertically extending venturi passageway located within said body section, means for positioning said venturi passageway parallel to said discharge conduit and transversely spaced therefrom, the lower end of said venturi passageway being in fluid communication with a nozzle disposed in axial alignment with said venturi passageway, a valve for admitting water to said nozzle in response to a preselected fluid level in the sump, and a check valve in the upper part of said body section, the upper end of said venturi passageway being in fluid communication with said check valve and being in fluid communication with the conduit through said check valve, and said body section being in fluid communication with said electrical sump pump at its lower end and in fluid communication with said discharge conduit at its upper end.

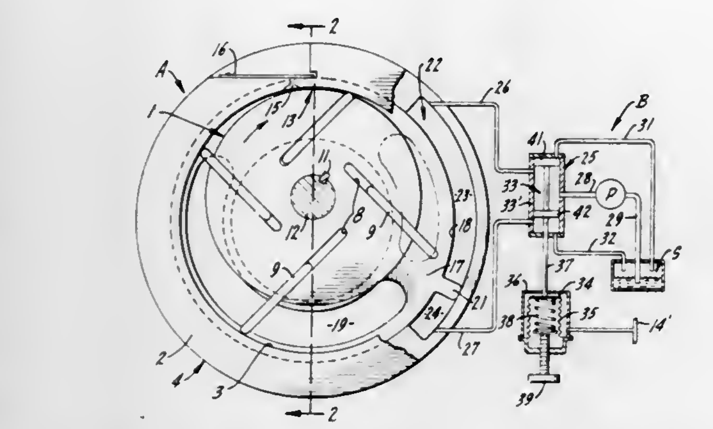
4,060,342
VANE ASSEMBLY FOR ROTARY COMPRESSOR
Delmar R. Riffe, and Robert R. Young, both of Franklin Borough, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.
Filed June 17, 1976, Ser. No. 697,164
Int. Cl.[2] **F04B** *49/00;* **F01C** *19/04;* **F04C** *27/00*
U.S. Cl. 417—284 **3 Claims**



1. In a blade and shoe vane assembly for a rotary device in which the shoe socket encompasses the blade edge in a cylindrical pivot type joint, the improvement comprising means for venting from the space on one side of said shoe to the space on the other side under conditions of the pressure differential between the two sides exceeding a predetermined value, comprising relief openings in both sides of said shoe, and said blade edge is smaller than said shoe socket to permit movement of said edge within the socket to a position in which said relief openings are in communication with each other, said blade edge bearing against the base of said shoe socket under normal operating conditions in which the pressure differential is less than said predetermined value so that under the normal operating conditions communication between said relief openings is blocked.

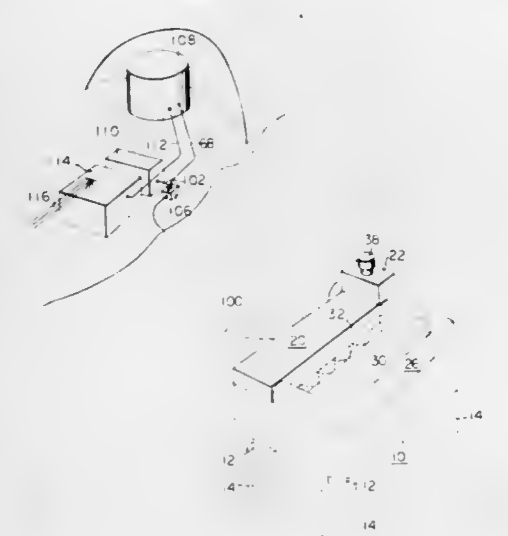
4,060,343
CAPACITY CONTROL FOR ROTARY COMPRESSOR
Alwin B. Newton, York, Pa., assignor to Borg-Warner Corporation, Chicago, Ill.
Filed Feb. 19, 1976, Ser. No. 659,188
Int. Cl.[2] **F04B** *49/02;* **F01C** *21/12;* **F04C** *29/08*
U.S. Cl. 417—309 **2 Claims**

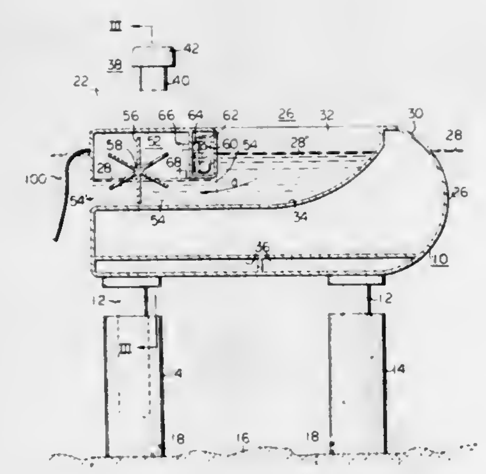
1. A rotary fluid compressor comprising a housing having a closed working chamber provided with a substantially cylindrical surface, said housing having an inlet port and an outlet port communicating with said chamber; a rotor mounted in said chamber and rotatable about an axis eccentric to the axis of said cylindrical surface, said rotor having contact with said cylindrical surface at one point on its periphery, and a plurality of vanes slidably supported in said rotor and engaging said cylindrical surface whereby when said rotor is rotated said vanes compress fluid from said inlet port to said outlet port providing a compression area within said chamber; and a control member rotatably mounted in said housing and provided with an elongated arcuate aperture in fluid contact with said working chamber and spanning at least one of said vanes to permit fluid to bypass the vanes and thereby change the compression area in said chamber, said control member being operative upon rotation thereof to vary the location of the aperture to vary the compression volume of said chamber to



thereby vary the capacity of the compressor, and means to rotate said control member, said means comprising a hydraulic valve operatively connected to said control member and actuated by a diaphragm which is responsive to the suction pressure of the compressor.

4,060,344
TRANSDUCER FOR CONVERSION OF SEA WATER-ENERGY
Fumio Ootsu, 6-4, Shirahae-cho, Saseho, Nagasaki, Japan
Filed Oct. 26, 1976, Ser. No. 735,409
Int. Cl.[2] **F04B** *17/02;* **F03B** *13/10*
U.S. Cl. 417—330 **3 Claims**

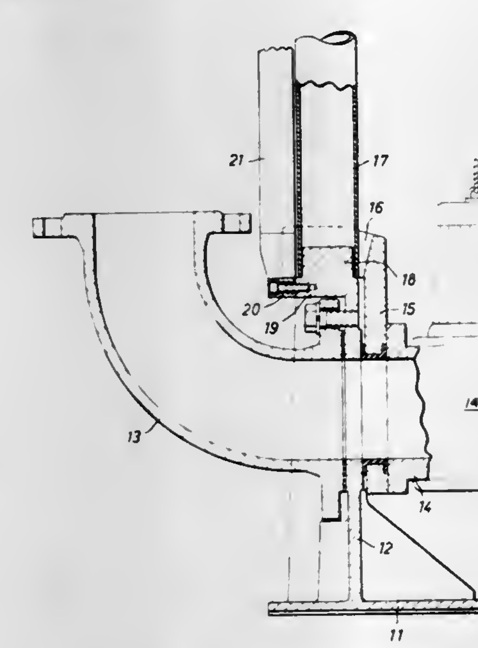




1. A transducer apparatus for converting the energy of sea

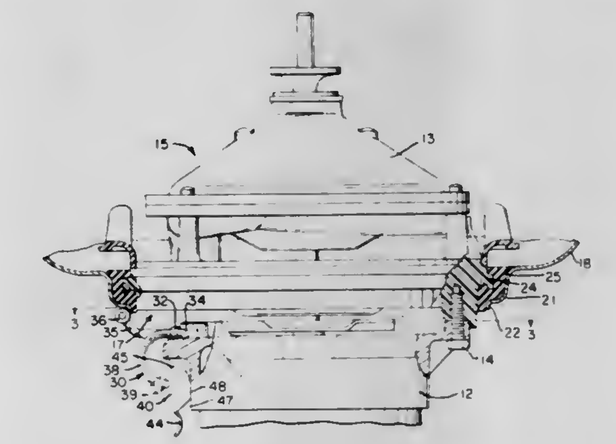
waves to an energy of a high pressure fluid, comprising, in combination, a rectangular casing having an interior communicating with the air, a plurality of impeller chambers disposed in spaced relationship within said casing, each of said impeller chambers including a plenum space located on the upper portion thereof, a sea-water channel located in the lower portion thereof to communicate with said plenum space, said sea-water channel having both ends opened into the exterior of said casing, an impeller disposed therein such that an upper portion thereof is located in said plenum space and the substantial portion of its lower half is located in said sea-water channel, and a rotary shaft for said impeller running slightly above and in parallel to an interface between the plenum space and the sea-water channel, said rotary shaft having both end portions extending externally of said impeller chamber, fluid compression means disposed on either side of said impeller chamber externally thereof to be operatively coupled to each end of said rotary shaft, and a U-shaped bank means having a pair of legs of the U bridged by said casing, the arrangement being such that, with said casing and said U-shaped bank means partly submerged in the sea to project the upper portions thereof above the surface of the sea, a sea water pool is formed between said casing and said U-shaped bank means to communicate with the outer sea water only through said sea-water channels and that sea waves overflowing said upper projecting portion of said bank means flow through said sea water channels to drive the associated impellers to cause said fluid compressor means to produce a high pressure fluid from the air.

4,060,345
SUBMERSIBLE PUMP WITH GUIDE MEANS
Albert Blum, Scheiderhoehe, Lomar, Germany
Continuation-in-part of Ser. No. 203,304, Nov. 30, 1971, Pat. No. 3,861,834. This application May 15, 1974, Ser. No. 470,078
Claims priority, application Germany, Jan. 30, 1970, 2004168
Int. Cl.[2] **F04B** *17/06, 35/04*
U.S. Cl. 417—360 **18 Claims**



1. A submersible electric motor-pump assembly having a drive motor and a pump connected therewith, which is lowerable into a body of fluid with the outlet of said pump being guided into engagement with a discharge pipe, comprising: guiding means in the form of a single element of circular cross-section and co-operatively associated male and female secondary aligning elements of mating rib and slot configurations, one of which is part of a fixed stationary reference and the other being a part of said moveable motor-pump assembly and being disposed about said guiding means of circular cross-section; and said male and female aligning elements together being adapted to co-operatively align the outlet of said motor-pump assembly with said discharge pipe as said assembly is brought into proximity to the outlet of said pump, whereby alignment of the motor-pump assembly with said discharge pipe is achieved by said aligning elements shortly before said motor-pump assembly reaches its lowest travel position.

4,060,346
DISHWASHER MOTOR/PUMP MOUNTING MEANS
Theodore F. Meyers, Troy, Ohio, assignor to Hobart Corporation, Troy, Ohio
Filed July 27, 1976, Ser. No. 708,927
Int. Cl.[2] **F04B** *17/00, 35/00*
U.S. Cl. 417—360 **12 Claims**



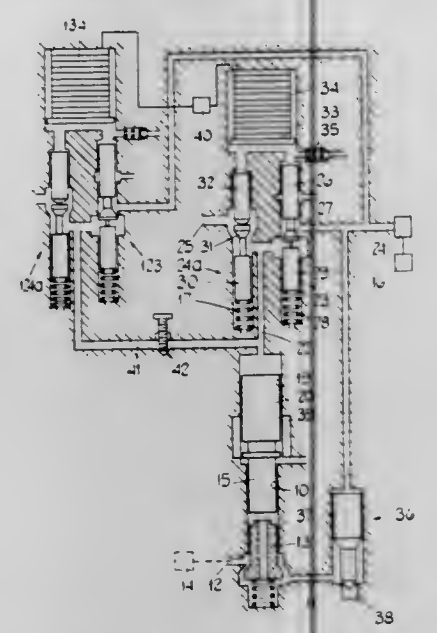
1. For use in a dishwasher for resiliently retaining a motor/-pump assembly within the dishwashing tank, the bottom of the tank having an opening for receiving the motor/pump assembly therein, and the motor/pump assembly having a seat portion dimensioned to engage the sides of the tank opening to support the motor/pump assembly thereon, the improvement comprising:

a. at least one spring member having a hook portion along the length thereof, and
b. a pivot post on the motor/pump assembly for receiving and retaining said spring member hook portion, said hook portion being dimensioned to fit around said post with said spring member below the tank and in compression between the bottom of the tank and the motor/pump assembly to place a substantially constant downward force on the motor/pump assembly to secure the seat portion thereof on the sides of the tank opening.

4,060,347
LIQUID FUEL PUMPING APPARATUS
Boaz Antony Jarret, Sevenoaks, England, assignor to Cav Limited, Birmingham, England
Filed Sept. 2, 1976, Ser. No. 720,090
Claims priority, application United Kingdom, Sept. 16, 1975, 37968/75
Int. Cl.[2] **F04B** *17/00*
U.S. Cl. 417—392 **4 Claims**

1. A fuel injection pumping apparatus comprising a cylinder, a displacement piston located in said cylinder, a fuel outlet from one end of said cylinder, an inlet through which fuel can be admitted to said one end of the cylinder, a further cylinder, a fluid pressure operable member mounted within said further cylinder for moving said piston towards said one end of the first-mentioned cylinder thereby to cause fuel flow through said outlet, means operable upon movement of the piston to a predetermined position in said first-mentioned cylinder during delivery of fuel through said outlet to terminate flow of fuel through the outlet, valve means operable to place an end of said further cylinder in communication with a source of fluid under pressure to effect movement of the displacement piston in a direction to cause delivery of fuel through said outlet, further valve means operable to place said one end of the further cylinder in communication with the source of fluid under pressure to effect movement of the displacement piston in a direction to deliver fuel through said outlet, the apparatus also including a restricted orifice interposed between said

further valve means and said one end of said further cylinder, whereby said further valve means may be operated before said first-mentioned valve means when it is required to supply fuel



through the outlet, said orifice determining the rate of fuel supply through said outlet, said firstmentioned valve means being operated when the full rate of fuel supply through said outlet outlet is required.

4,060,348

ROLLER PUMP CARRYING OUT ALTERNATE PUMPING OPERATIONS, PARTICULARLY SUITED TO EXTRA-CORPOREAL BLOOD CIRCULATION

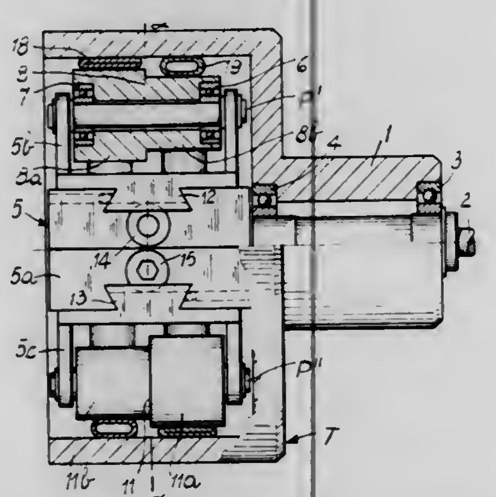
Luciano Della Bianca, Voghera, Italy, assignor to Bioengineering Research S.A., Luxembourg

Filed June 23, 1976, Ser. No. 699,203

Claims priority, application Italy, July 1, 1975, 24991/75

Int. Cl.² F04B *43/08, 43/12, 45/06*

U.S. Cl. 417—475 **7 Claims**



1. A rotary roller pump for carrying out sequential pumping of fluid in a plurality of separate squeezable tubings, the pump comprising a plurality of tubings; a stator, having an inwardly facing seating and a rotor which is provided at opposite lateral ends with respective rollers, for engagement with the said tubings; a gap provided between said rotor and said inwardly facing seating of said stator, which seating partially surrounds said rotor, for accommodating said tubings which are arranged substantially parallel to each other and extend in a general circumferential direction; and wherein each said roller includes two cylindrical and coaxial parts having different diameters, each said cylindrical part having the larger diameter being engageable with a respective one of said tubings between that cylindrical part of larger diameter and the inwardly facing seating for exerting a pumping action on that tubing when said rotor rotates, and that each said cylindrical part having the smaller diameter being in supportive and non-pumping engagement with a different one of said tubings, which is adjacent that one engaged by said cylindrical part of larger diameter, the repsective positions of said rollers being reversed so that each of said tubings is engaged with a respective one of said cylindrical parts of larger diameter and a respective one of said parts of smaller diameter forming part of a different one of said rollers.

4,060,349

CONTINUOUS FLOW, OSCILLATING PISTON MEAT PUMP

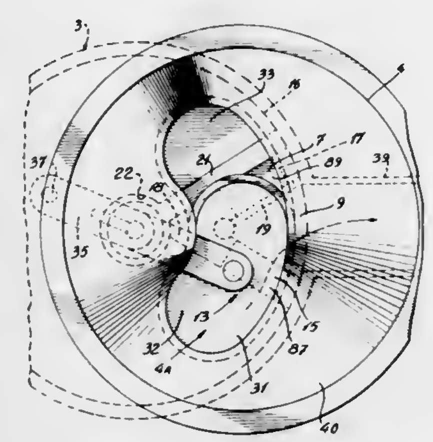
Ludwig Piereder, Pierrefonds, Canada, assignor to L. P. Machinery Ltd., Canada

Filed Oct. 13, 1976, Ser. No. 731,927

Claims priority, application United Kingdom, Oct. 14, 1975, 42059/75

Int. Cl.² F04C *21/00;* **F04B** *15/02*

U.S. Cl. 417—482 **7 Claims**



1. A continuous flow pump comprising:

a hollow chamber enclosed by a top wall, a bottom wall and a side wall;

an inlet opening in said top wall and an outlet opening in said side wall;

blocking means, adjacent said inlet opening, for alternately blocking a first portion of said inlet opening when said blocking means is in a first position, and a second portion of said inlet opening when said blocking means is in a second position;

means for moving the blocking means from the first position to the second position and from the second position to the first position;

a V-shaped wall, having a right-hand leg and a left-hand leg, within said chamber to define a V-shaped chamber portion within said chamber;

said V-shaped wall having its legs, spaced from each other at either side of the outlet opening in the side wall of the chamber, extending into the chamber towards each other and meeting at an apex disposed in the chamber and spaced from the side wall thereof;

each leg being equal in height to the height of the chamber;

flap means between said legs in the V-shaped chamber portion and being freely movable from one leg to the other;

an opening extending through each one of said legs;

said flap means being disposed to cover the opening in the wall against which it is adjacent;

a vane disposed in said chamber and outside said V-shaped chamber portion and being movable from one position, adjacent said right-hand leg, to a second position adjacent the said left-hand leg, and from the second position to the first position;

means for moving said vane from the first position to the second position and from the second position to the first position;

said vane extending from the center of the chamber to the side wall thereof; and

means for providing a space of reduced pressure in said chamber behind said vane in the direction of travel thereof.

4,060,350

CYLINDER HEAD MOUNTING ARRANGEMENT FOR A DIESEL INJECTION PUMP

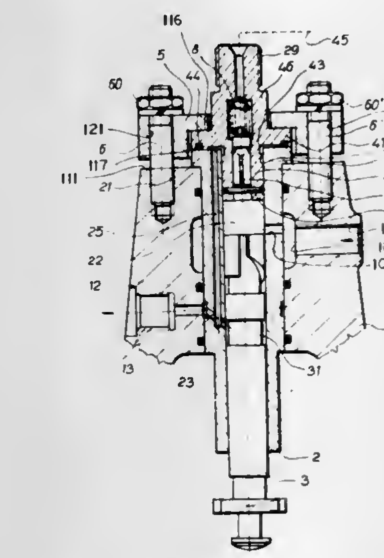
Jaromir Indra, Brno, Czechoslovakia, assignor to Vysoke uceni technicke, Brno, Czechoslovakia

Filed Mar. 29, 1976, Ser. No. 671,117

Claims priority, application Czechoslovakia, Mar. 27, 1975, 2105/75

Int. Cl.² F04B *7/04*

U.S. Cl. 417—490 **5 Claims**



1. In an injection pump assembly, an elongated, vertically disposed hollow pump body, a working cylinder supported vertically within the pump body, the cylinder terminating upwardly in an extension projecting axially beyond the upper surface of the pump body, the extension having a laterally projecting shoulder in contact with the upper surface of the pump body, a piston supported for vertical reciprocation in the lower portion of the cylinder, a hollow cylinder head having an upper end adapted to receive a pressure fitting, the cylinder head having a lateral extension intermediate its ends, the lower surface of the lateral extension of the cylinder head being disposed in contact with the upper surface of the laterally projecting shoulder of the extension of the cylinder, the cylinder head having an elongated lower end tightly received within the extension of the cylinder to define therewith an elongated pressure-sealing zone, the lower end of the cylinder head terminating within the cylinder in spaced relation to the upper end of the piston when the piston is in its upper position, a hollow cylindrical flange having a radially inner portion in contact with the upper surface of the lateral extension of the cylinder head and a radially outer portion disposed in spaced, superposed relation to the upper surface of the pump body outwardly of the projecting shoulder on the axial extension of the cylinder, and means for securing the radially outer portion of the flange to the upper portion of the pump body.

4,060,351

CONTROLLED INLET VALVES FOR METERING PUMPS

Jean Cloup, 33360 Latresne, France

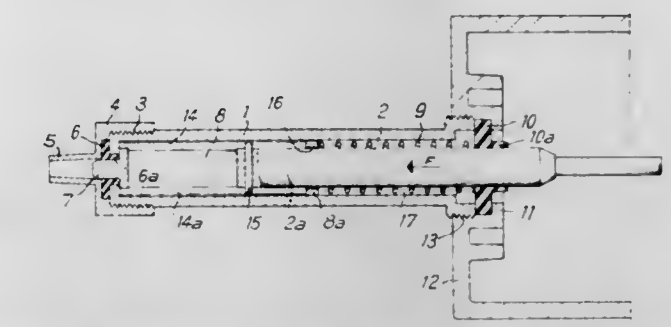
Filed Mar. 1, 1976, Ser. No. 662,584

Claims priority, application France, Mar. 5, 1975, 75.06915

Int. Cl.² F04B *7/00*

U.S. Cl. 417—520 **3 Claims**

1. A controlled inlet valve for a metering pump, said pump comprising a cylinder having an inlet opening and an outlet opening, a piston moveable in said cylinder, and means for imparting a reciprocating movement to said piston, wherein a member is mounted to slide in said pump cylinder, one of the ends of said member having an obturator which cooperates with a sealing gland arranged at the inlet opening to said cylinder, said slidable member being selectively coupled at its other end to the piston and being subject to the urging of an elastic member which is capable of thrusting said obturator back to the closed position, said sliding obturator member being tubular and containing at least one longitudinal slot in which is



engaged a pin attached to the end of said piston, which piston is mounted to slide in said tubular obturator member, said pin being capable of coming to bear against a base of said tubular member which forms the boundary of said slot at the opposite end from said obturator.

4,060,352

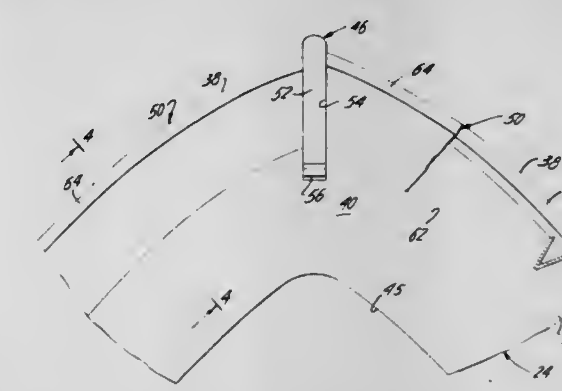
SEALING GRID SYSTEM FOR ROTARY PISTON MECHANISM OF THE WANKEL TYPE

George H. Woodier, Ringwood, and Robert E. Mount, Mendham, both of N.J., assignors to Curtiss-Wright Corporation, Wood-Ridge, N.J.

Filed Oct. 14, 1976, Ser. No. 732,412

Int. Cl.² F01C *19/04, 19/08;* **F04C** *27/00*

U.S. Cl. 418—122 **5 Claims**



1. In a rotary mechanism comprising a rotor having opposite side faces and peripheral surfaces intersecting each other to form apex portions and which rotor is supported for rotation within a cavity formed by a peripheral wall and opposite end walls of a housing, an apex seal means, including blade means at each apex portion to engage said peripheral wall, side seal assembly carried in at least one side face of the rotor for sealing the interstices between the one side face and the adjacent end wall of the housing and substantially isolating the working chambers formed by the rotor and said cavity, the side seal assembly comprises:

a. a plurality of recesses in said one side face of the rotor;

b. each recess extending in said one side face and along the juncture of the one side face and a peripheral surface between next adjacent apex seal means;

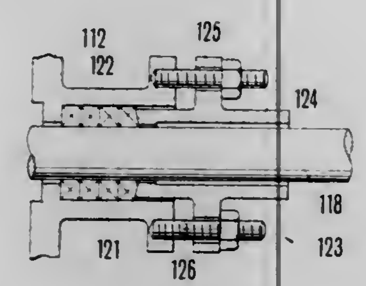
c. a seal member slidably receivable in each of the recesses and dimensioned to extend between and in sealing abutting relation with next adjacent apex blade means;

d. each seal member having a wear surface for engaging the adjacent housing end wall;

e. a groove in each of said recesses; and

f. a biasing member having two resilient leg portions disposed in each groove to bias the associated seal member in a direction outwardly of the recess and its wear surface in contact with the adjacent housing end wall and simultaneously effecting a seal of the space between the recess and its associated seal member.

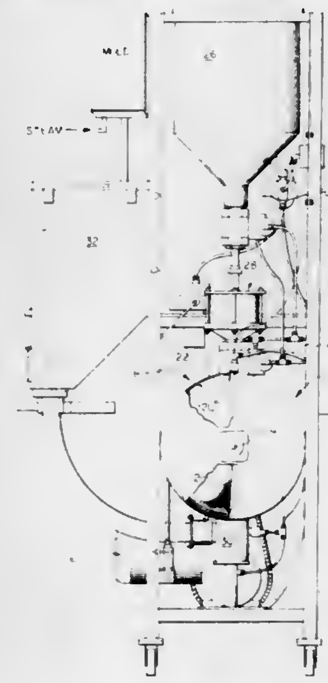
4,060,353
ROTARY PUMP FOR HOT PITCH, ASPHALT AND LIKE VISCOUS SOLIDIFIABLE MATERIAL
Minoru Akimoto, No. 17, Kanekodaira, Azumada, Iwaki, Fukushima, and Masaharu Tomizawa, No. 60-1, Sagiuchi, Nishiki, Iwaki, Fukushima, both of Japan
Filed Oct. 4, 1976, Ser. No. 729,258
Claims priority, application Japan, Oct. 2, 1975, 50-133993[U]
Int. Cl.² F01C *19/00, 21/04;* **F04C** *15/00;* **F16J** *15/18*
U.S. Cl. 418—102 **3 Claims**



1. In a rotary pump for pumping hot, viscous, solidifiable material, having a housing provided with an inlet for receiving said material and an outlet, a drive shaft extending into said housing, an impeller mounted on said drive shaft and rotatably disposed within said housing to displace said material from said inlet to said outlet, and an elongated packing casing extending about a portion of said drive shaft for sealingly holding a packing material about said drive shaft and having a first annular flange at one end thereof, the improvement comprising a packing gland disposed about said drive shaft and adjacent to said packing casing and having:
- an elongated body extending about said drive shaft;
- a second annular flange disposed externally on said body and defining first and second elongated portions of said body on either side of said second flange, said second flange being cooperatively attached to first flange to position said gland with said first elongated portion extending within said casing in abutment against said packing material and said second elongated portion extending away from said packing casing; and
- a stepped, inner passage extending along said body for receiving said drive shaft, said inner passage having a first diameter defining a constricted clearance around said drive shaft and a second diameter defining a second clearance of approximately twice as large as the constricted clearance, said constricted clearance being of a predetermined length and being provided adjacent to the end of said first elongated portion extending within said packing casing, and said second clearance extending the remaining length of said first elongated portion and the total length of said second elongated portion,
- said stepped, inner passage providing a clearance around said drive shaft of a length sufficient to allow viscous material leaking past said packing material to solidify and be ground to powder by rotation of said drive shaft.

4,060,354
APPARATUS FOR PRE-EXPANDING AND MOLDING EXPANDABLE THERMOPLASTIC POLYMER PARTICLES
Stuart B. Smith, Chelmsford, Mass., assignor to Foster Grant Co., Inc., Leominster, Mass.
Continuation-in-part of Ser. No. 288,230, Sept. 11, 1972, abandoned. This application July 22, 1975, Ser. No. 598,508
Int. Cl.² B29D *27/00*
U.S. Cl. 425—4 R **2 Claims**

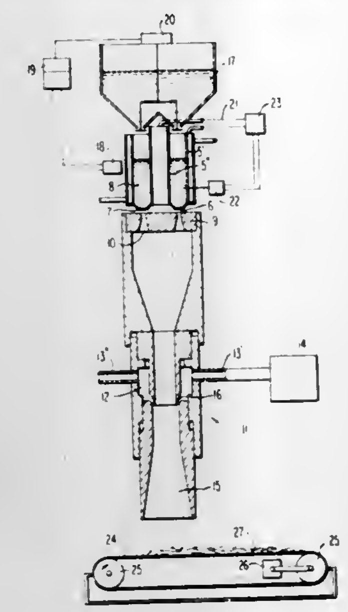
1. Apparatus for partially expanding expandable thermoplastic polymer particles containing a blowing agent comprising:
a. a horizontally mounted substantially closed cylindrical vessel;
b. means operatively connected with said vessel for inserting a measured amount of said expandable particles within said vessel;
c. means connected to the walls of said vessel for heating the vessel walls for heating the particle within to soften the polymer particles and volatize the blowing agent causing partial expansion of said particles during their residence in said vessel;
d. continuously driven agitating means mounted thereon and extending axially of said vessel for repeatedly wiping the particles within the vessel against the side walls thereof and then returning said particles toward the center thereof before being wiped once more against said side walls;



e. means connected with said vessel for supplying a substantially dry pressurized gaseous medium to said vessel to increase the pressure on said particles within while in their heat softened state to superatmospheric, said pressure being adequate to substantially prevent further expansion of the particles after a predetermined amount of pre-expansion to obtain the desired uniform density thereof; and
f. means for discharging the particles from the vessel including an exit opening in said vessel through which the gaseous medium may carry the particles from said vessel.

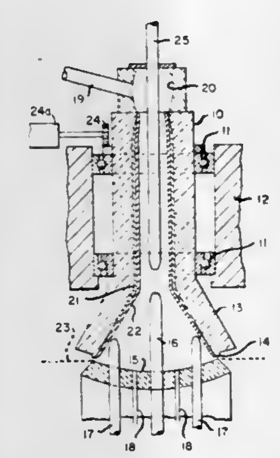
4,060,355
DEVICE FOR THE MANUFACTURE OF FIBERS FROM FUSIBLE MATERIALS
Alfred H. Walz, Emmendingen, and Paul-Jürgen Hahn, Karlsruhe-Durlach, both of Germany, assignors to Firma VKI-Rheinhold & Mahla AG, Mannheim, Germany
Division of Ser. No. 384,565, Aug. 1, 1973, Pat. No. 4,001,357. This application Oct. 6, 1976, Ser. No. 730,084
Claims priority, application Germany, Aug. 2, 1972, 2237884
Int. Cl.² B29C *23/00;* **B22D** *23/08*
U.S. Cl. 425—7 **7 Claims**

1. An apparatus for the manufacture of fibers from fusible low viscosity melts of inorganic mineral or metal materials or organic materials, comprising:
- crucible means for heating the starting material above the melting point thereof and having an orifice in the bottom thereof;
- Laval nozzle means for causing abrupt temperature drop of gases passing therethrough at supersonic speeds and being disposed in relation to said orifice to receive liquid passing therethrough;
- means for permitting a gaseous flow medium to enter the inlet of said Laval nozzle means; and
- flow control means for causing said flow medium to pass through said Laval nozzle means at supersonic speed;
- wherein said Laval nozzle means comprises a Laval nozzle having a narrow inner diameter part and an enlarged inner diameter part downstream of said narrow part, the shape of said enlarged part being so selected so as to achieve a sufficient temperature drop of the flow medium within a



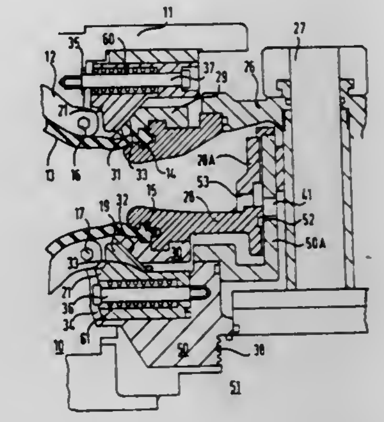
sufficiently short length of the enlarged part of said Laval nozzle, when said flow medium is flowing therethrough at a supersonic speed, to solidify the melt of starting material into the form of fibers before the surface tension of the melt forms the melt into droplets.

4,060,356
APPARATUS FOR MAKING BEADS
Charles W. Schott, 175 Carmella Drive, McKeesport, Pa. 15131
Continuation of Ser. No. 515,191, Oct. 16, 1974, abandoned, which is a continuation-in-part of Ser. No. 291,262, Sept. 22, 1972, Pat. No. 3,856,899, which is a continuation-in-part of Ser. No. 35,962, May 11, 1970, Pat. No. 3,694,528. This application Apr. 27, 1976, Ser. No. 680,692
Int. Cl.² B29C *23/00*
U.S. Cl. 425—8 **13 Claims**



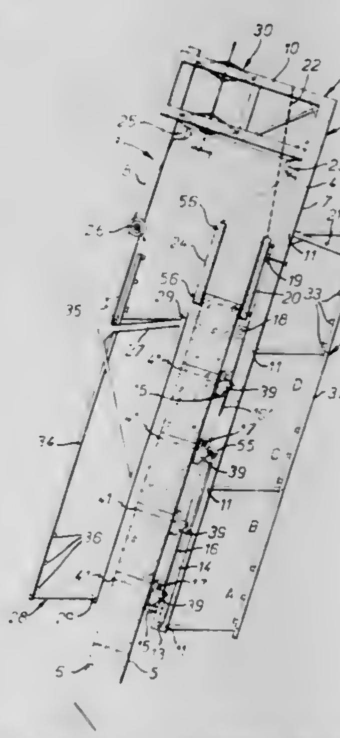
1. An apparatus for making spherical pellets comprising a member including a central axial conical surface about a generally vertical axis having at the cone base a continuous generally circular outer peripheral edge, means continuously depositing a layer of material onto said central axial conical surface, means creating heat on said central axial conical surface sufficient to maintain said layer of material in a molten condition, means forming at least a part of said central axial conical surface imparting motion to said layer of material along and away from said vertical axis, whereby said outer peripheral edge is operable to discharge molten material generally radially in the form of spherical pellets, and fluid cooling means adjacent to and below said peripheral edge receiving said radially discharged pellets discharged from said edge while still at least partially molten at an angle such that the molten pellets enters the fluid cooling means retaining their spherical shape and solidifying the same by cooling in said fluid cooling means.

4,060,357
PNEUMATIC TIRE MANUFACTURE
Bernard Charles Allitt, Sutton Coldfield, England, assignor to Dunlop Limited, England
Filed Sept. 22, 1976, Ser. No. 725,577
Claims priority, application United Kingdom, Oct. 2, 1975, 40284/75
Int. Cl.² B29H *5/02*
U.S. Cl. 425—36 **2 Claims**



1. A mould for the manufacture of a pneumatic tire having a bead diameter which, in the green state of the tire, is slightly smaller than that of the finished tire, the mould having a support ring for a bead of the tire which ring is variable in dimensions between a fully expanded condition in which the outer periphery of the ring is substantially uninterrupted and is of diameter substantially equal to the diameterof the bead of the finished tire and a retracted condition in which the dimensions of the ring are reduced sufficiently to permit the unobstructed mounting thereover of the bead of the green tire, means to bias the ring to its retracted condition and to be overcome by curing pressure in operation of the mould whereby the ring adopts its expanded condition automatically upon application of curing pressure within the mould and automatically resumes its retracted condition when curing pressure is relieved.

4,060,358
CLIMBING SCAFFOLDING ASSEMBLIES WITH ASSOCIATED SHUTTERING
Bernard Fougea, Neuilly-sur-Seine, France, assignor to Coignet S.A., France
Filed May 28, 1976, Ser. No. 691,212
Claims priority, application France, June 5, 1975, 75.17557
Int. Cl.² E04G *11/04*
U.S. Cl. 425—65 **12 Claims**



1. A climbing scaffolding assembly for in situ casting a rein-

forced concrete wall in successive superposed layers of variable inclination, said assembly comprising a scaffolding unit of generally inverted U-shaped configuration including a support frame adapted to be disposed to one side of a wall in construction and to bear against the one wall side only, a cantilever member disposed at an end of said support frame for defining headspace above the top of a wall portion previously cast and a movable frame suspended from said cantilever member and generally parallel to and spaced from said support frame, means operatively associated with said movable frame for adjusting the position of said movable frame with respect to said support frame, a first shuttering panel and first set of working catwalks provided on said support frame, a second shuttering panel provided adjacent to said movable frame and a second set of working catwalks provided on said movable frame, said shuttering panels corresponding to opposed sides of a wall portion to be cast, first cooperable means securable to the said one side of a lower portion of a previously cast wall portion and second cooperable means on said support frame cooperable with said first cooperable means and associated with motor means mounted on said support frame for lifting the entire scaffolding unit including said support frame and said movable frame, said cantilever member, said first and second shuttering panels and said first and second sets of catwalks all in unison from a level corresponding to a last-poured layer of concrete to a lever corresponding to the layer of concrete to be poured next.

4,060,359

ISOSTATIC PRESS

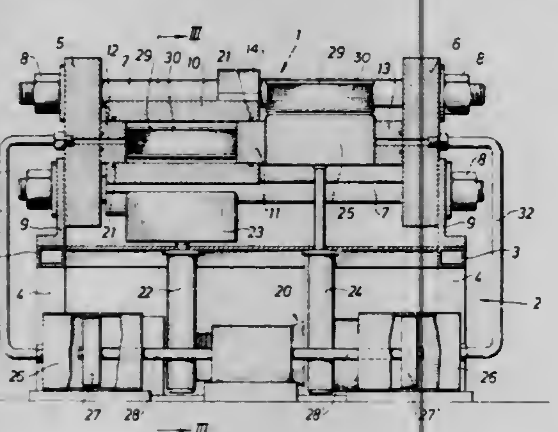
Sten Trolle, and Åke Jonson, both of Ystad, Sweden, assignors to AB Carbox, Ystad, Sweden

Filed Feb. 9, 1977, Ser. No. 766,876

Claims priority, application Sweden, June 10, 1976, 7606596

Int. Cl.^{2} B30B *5/02, 11/00*

U.S. Cl. 425—78 **15 Claims**



1. An isostatic press, comprising frame means (3);

a tubular jacket (10) slidably mounted to said frame means (3), said jacket (10) having end apertures and being longitudinally displaceable at least between two end positions on said frame means;

at least three plugs (11,12,13) mounted to said frame means (3), two of said plugs (12,13) being at respective ends of the travel of said jacket (10) and the remaining plug (11) being intermediate said ends;

the end apertures of said jacket (10), when said jacket (10) is in each of its end positions, being engaged and closed by one of said two end plugs (12,13) and by an intermediate plug (11) so as to form a pressurizing vessel with said engaged plugs, whereby the side of said frame means which is free of said jacket (10) may be charged in preparation for a pressurizing operation thereat.

4,060,360

APPARATUS FOR DRY FORMING A LAYER OF FIBER

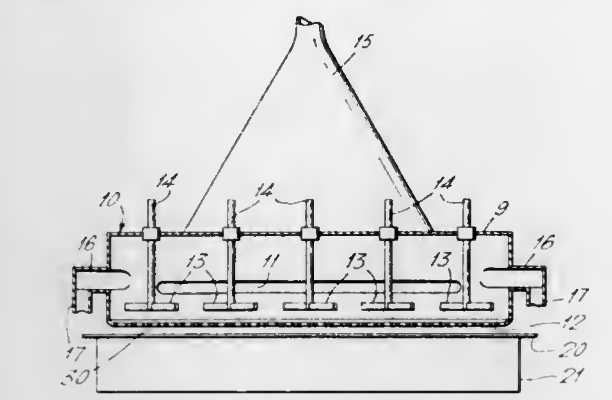
Frederick Tapp, Bristol, England, assignor to Karl Kroyer St. Anne's Limited, Bristol, England

Filed Apr. 20, 1976, Ser. No. 678,600

Claims priority, application United Kingdom, May 29, 1975, 23369/75

Int. Cl.^{2} B29C *13/00*

U.S. Cl. 425—83 **9 Claims**



1. Apparatus for drying forming a layer of fibre and comprising a distributor box having an inlet for fibres and a fixed perforated bottom wall, a foraminous forming surface which is spaced below the bottom wall, is movable past the distributor box and is arranged to receive the fibers through the bottom wall under the influence of suction exerted by a suction system connecting with the underside of the forming surface, wherein obturating means are disposed at an air gap between the bottom wall and the forming surface, which obturating means comprise a plurality of obturators positioned along the periphery of the air gap which are adjustable to provide variation in positions wherein laterally inward air flow through the periphery of the air gap is obstructed and positions wherein air openings are provided for laterally inward air flow through the periphery of the air gap.

4,060,361

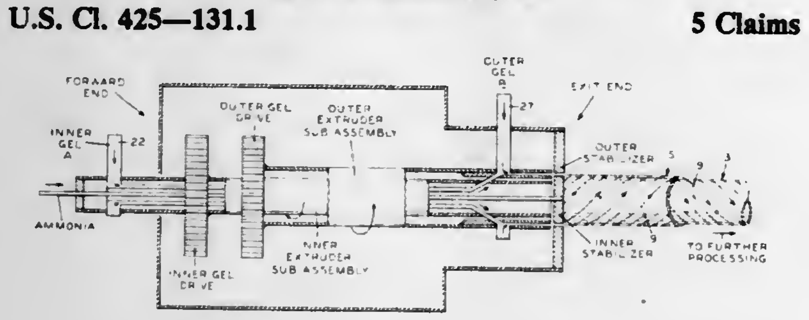
EXTRUDER APPARATUS FOR FORMING A TUBULAR CASING

Francis Joseph Ziolko, Somerville, N.J., assignor to Devro, Inc., Somerville, N.J.

Filed Jan. 16, 1975, Ser. No. 541,465

Int. Cl.^{2} B29D *23/04*

U.S. Cl. 425—131.1 **5 Claims**



1. An apparatus for forming a tubular collagen casing comprising:

a. a stationary frame;

b. a stationary member mounted on said frame;

c. an inner hollow extruder member mounted on said frame, said inner hollow extruder member having a plurality of radially extending orifices therethrough for directing collagen outwardly;

d. means for mounting said inner extruder member on said frame concentric with respect to said stationary member and spaced outwardly therefrom;

e. an outer extruder member having a plurality of radially extending orifices therethrough for directing collagen inwardly;

f. means for mounting said outer extruder member on said frame concentric with respect to said inner extruder member and spaced outwardly therefrom to form a passageway therebetween for merging said collagen of said inwardly and outwardly directions; and

g. means for rotating said inner extruder member in one direction and means for rotating the outer extruder member in the opposite direction.

4,060,362

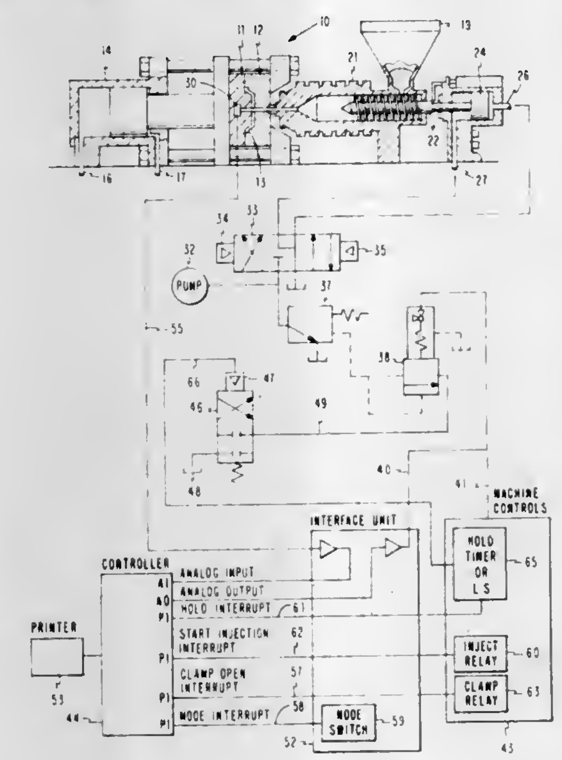
INJECTION MOLDING SAME CYCLE CONTROL

Charles Eugene Wilson, III, Rochester, Minn., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed May 12, 1975, Ser. No. 576,518

Int. Cl.^{2} B29F *1/06*

U.S. Cl. 425—145 **7 Claims**



1. An injection molding machine including hydraulically driven reciprocating ram for injecting plasticized material from an injection barrel into a mold cavity and a control system comprising;

hydraulic pressure fluid circuit means operable to advance said ram;

pump means operatively connected to said fluid circuit means to deliver hydraulic fluid to said ram;

electrically responsive valve means connected to said fluid circuit means for controlling delivery of hydraulic fluid from said pump means to said ram;

a sensor responsive to the fluid pressure of material within said mold cavity;

sensing means connected to the output of said sensor for periodically sensing signals which are a function of cavity pressure encountered by said sensor;

accumulating and averaging means connected to said sensing means for receiving and averaging a series of signals representative of cavity pressure commencing with the attainment of a predetermined cavity pressure and terminating with a second event to produce a sensed average value;

means to produce a reference pressure value;

comparison means operable to compare said sensed average value with said reference value to generate an error signal;

means operable to control said valve means for modifying the hydraulic system pressure driving said ram during the same cycle of machine operation following said second event, by an increment which is a function of the sign and magnitude of said error signal;

error signal compare means connected to receive said error signal and generate an output signal when said error signal exceeds a predetermined magnitude; and

disabling means responsive to said error signal compare means which inhibits alteration of the fluid pressure driving said ram by said means for modifying the hydraulic system pressure, during a cycle in which a signal is generated by said error signal compare means.

4,060,363

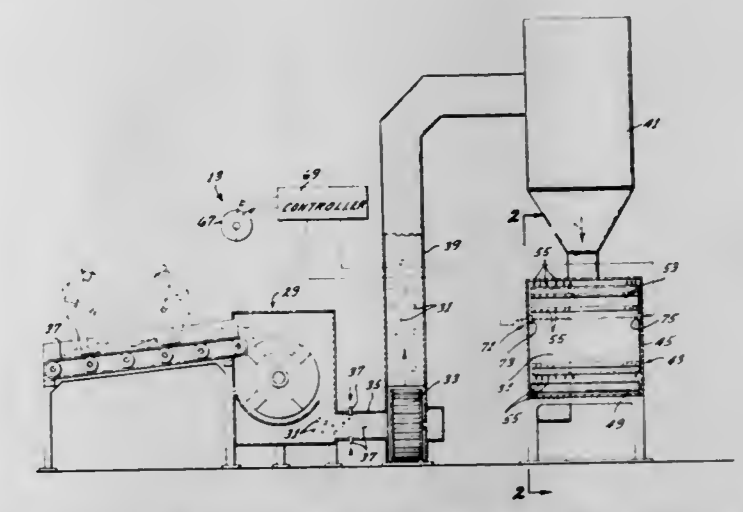
APPARATUS FOR MAKING STABLE BLOCKS FORMED OF SHREDDED PAPER-LIKE MATERIAL

Gerald B. Nelson, San Diego, Calif., assignor to Papakube Corporation, San Diego, Calif.

Division of Ser. No. 382,817, July 26, 1973, Pat. No. 3,949,036. This application Nov. 20, 1975, Ser. No. 633,948

Int. Cl.^{2} B29C *3/06*

U.S. Cl. 425—147 **20 Claims**



1. An apparatus for making stable blocks of paper comprising:

a first conveyor;

means for supplying paper fragments to said first conveyor;

said first conveyor moving the paper fragments along a first path;

a pickup conveyor for removing paper fragments from the first conveyor and moving the paper fragments along a second path which extends upwardly from the first conveyor, said second path forming an obtuse angle with the first path;

means defining an open zone extending downwardly from the upper end of said pickup conveyor whereby the paper fragments fall from the upper end of the pickup conveyor through said zone;

means for directing a liquid into said zone beneath the upper end of said pickup conveyor;

means for transporting the paper fragments from said zone-defining means;

means downstream of said directing means for compacting the paper fragments; and

means downstream of the compacting means for compressing the compacted paper fragments to form stable blocks of paper.

4,060,364

APPARATUS FOR FABRICATING MOLDED ARTICLES USING HIGH-FREQUENCY HEATING

Elie Gras, Maisons Alfort, France, assignor to Societe Immobiliere et Financiere Suchet Alfort (S.I.F.S.A.), Paris, France

Filed Aug. 2, 1976, Ser. No. 710,475

Claims priority, application France, Aug. 9, 1975, 75.27466

Int. Cl.^{2} B29C *1/12*

U.S. Cl. 425—174 **10 Claims**

1. An apparatus for fabricating molded articles by high-frequency heating of plastic under pressure, comprising:

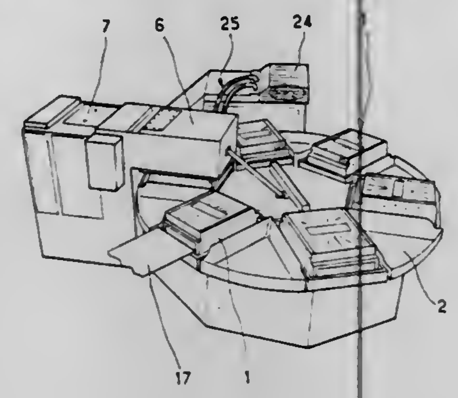
a turntable having an edge and an axis of rotation;

a series of independent diaphragm presses supported on said turntable and spaced from the axis of rotation of said turntable;

a fixed high-frequency heating station positioned above and

in vicinity of the edge of said turntable and into which each press in turn is fitted for heating;

cooling means operatively coupled to said presses for cooling said presses subsequent to the respective heating thereof in said high-frequency heating station;



rotation means operatively connected to said turntable for effecting rotation of said turntable;

and lifting means operative to lift the respective presses in a direction parallel to said axis into said high-frequency heating station.

4,060,365

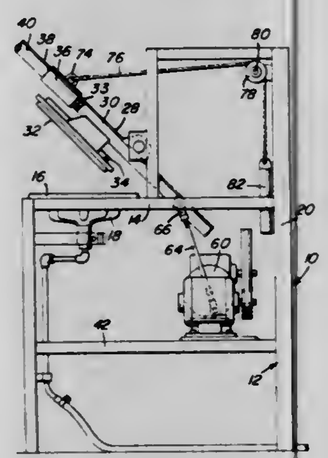
DOUGH PRESS

Ruben G. Duarte, and Manuel G. Duarte, both of 1012 E. Nevada, El Paso, Tex. 79902

Filed Apr. 8, 1975, Ser. No. 566,115

Int. Cl.² A21C *9/00*

U.S. Cl. 425—214 1 Claim



1. A dough press comprising a support having front, rear and opposite side portions and including a lower stationary horizontally oriented plate supported from the front portion of said support, a single generally horizontal front to rear extending support arm spaced above and extending over said lower plate, the front end portion of said arm disposed over said lower plate having an upper plate suspended therefrom closely overlying said lower plate, said upper and lower plates having heating means operatively associated therewith for heating said plates, said opposite side portions including elevated rear portions from which a pair of horizontally aligned journals are supported, the rear end portion of said arm disposed to the rear of said plates including a horizontal transverse support shaft oscillatably supported from said journals for oscillation about a horizontal axis extending transversely of said rear end portion of said arm and said support, motorized drive means carried by a lower rear portion of said support and including a slow turning rotatable output shaft, single pitman arm means pivotally eccentrically connected to said output shaft to one end and removably pivotally connected to the rear end of said arm at the other end thereof rearward and on the side of said axis remote from said upper plate for oscillation of said arm and swinging movement of said upper plate about said axis toward and away from said lower plate in response to rotation of said output shaft, gravity type counterbalance means operatively connected to said support arm over-balancing said arm, when the latter is in a horizontal position, for upward swinging of the front end portion of said arm from which said upper plate is suspended and thus said upper plate, away from said lower plate, the front end portion of said arm from which said upper plate is suspended having an elongated handle removably supported therefrom and projecting endwise outwardly thereof, said support including an elevated rear transverse portion extending between said elevated rear portions of said opposite side portions, disposed above the elevation of said axis and from which a pulley wheel is journaled for rotation about a horizontal transverse axis, said counterbalance means including an elongated flexible tension member having one end portion thereof anchored to the front end portion of said arm from which said upper plate is supported at an elevation appreciably below said pulley wheel when said arm is horizontally disposed, the other end portion of said tension member extending upwardly and rearwardly from said arm and being trained over said pulley wheel and depending freely downwardly therefrom and having a weight member supported therefrom, said motorized drive means including motor and reduction gear units mounted on said support in transversely spaced relation below said axis of oscillation of said support shaft and including output and input shaft portions, respectively, rotatable about front to rear extending axes and provided with aligned drive and driven wheels, respectively, an endless flexible drive member trained about said wheels drivingly connecting the drive wheel to the driven wheel, said output shaft comprising a rotatable output shaft projection outwardly from said reduction gear unit transversely of said support toward said motor unit and having single eccentric crank means mounted thereon centrally intermediate said units and to which said one end of said pitman arm is connected, said support arm, eccentric crank means and said pitman arm means being disposed centrally intermediate the opposite side portions of said support.

4,060,366

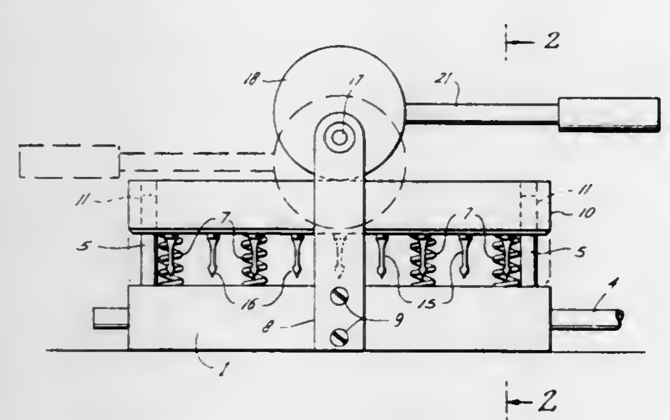
TUBE PERFORATOR

Sven Olof G. Johansson, 123 Winkler, Apt. 101, Houston, Tex. 77087

Filed Nov. 1, 1976, Ser. No. 737,498

Int. Cl.² B26F *1/14;* B29C *17/14*

U.S. Cl. 425—290 5 Claims



1. In a tube perforating device for forming perforations having outwardly extending margins, a lower member forming a base, said base having a groove in which a tube to be perforated may be mounted, said upper member being maintained yieldably above said base and movable downwardly against the base, needles adjustably mounted in said upper member, the extended ends thereof having an ovoid enlargement adjacent the point adapted to be forced through the first contacted wall of the tube, and perforate the second contact with the wall of the tube, forming diametrically opposed perforations.

4,060,367

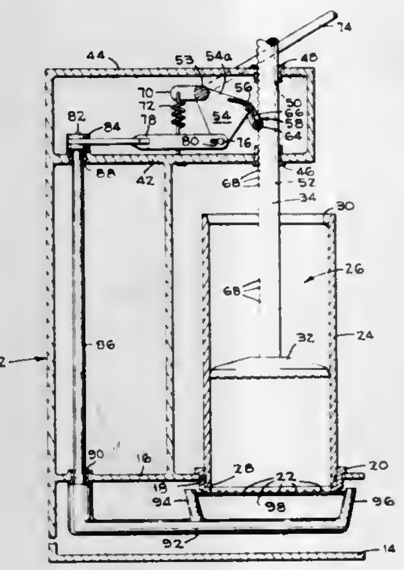
DRIVE MECHANISM FOR DOUGH SHAPING APPARATUS

Mounir A. Shatila, Blackfoot; John L. Veeneman, Idaho Falls; John H. Lach, and James F. Harmon, both of Blackfoot, all of Idaho, assignors to Ampco Foods Inc., San Francisco, Calif.

Filed Jan. 2, 1976, Ser. No. 646,332

Int. Cl.² A21C *11/10*

U.S. Cl. 425—311 8 Claims



1. In apparatus for forming french fry shaped bodies from potato dough of the type in which dough is moved through the spaces between a plurality of parallelly spaced elongate members so as to form protruding dough pieces that protrude by a distance corresponding to the width of a french fry shaped piece and wherein a cutter wire is reciprocated across the protruding dough to sever the protruding dough pieces from the dough on the opposite side of the elongate members, the improvement comprising a piston for moving the dough toward said elongate members, an elongate rod secured to said piston, a plurality of uniformly spaced apart slots in said rod, each said slot having a concave cylindric surface extending transversely and chordally of said rod, the interval between adjacent slots being approximately equal to the width of a french fry shaped potato piece, a crank arm and means for supporting said crank arm for pivotal movement above a fixed pivot axis perpendicular to and spaced from said rod, said crank arm having a distal end spaced from said rod by an increment so that said distal end is intermediate said pivot axis and said rod, a yoke having a first end pivotally supported at said distal end and a free end spaced from the distal end by a distance greater than the increment, a cross pin mounted at said free end and extending in parallelism to said pivot axis and engagable with said notches, said cross pin being of cylindric shape and having a radius substantially equal to that of said notch surface so as to contact said notch surface over a substantial surface area, means for biasing said yoke relative said crank arm to effect engagement of said cross pin with the notches in said shaft, means for rocking said crank arm in an arc less than 360° to produce a power stroke so that said cross pin moves said rod and said piston toward the spaced apart elongate members, said distal end describing an arcuate path during said power stroke so that said crank arm and said yoke pass through a dead center position during said power stroke, said cross pin, said distal end and said pivot axis residing in coplanar relation at said dead center position so that further pivotal movement of said crank does not effect further movement of said rod and said piston, and means linked to said rocker arm for reciprocating said cutter wire, said reciprocating means acting to reciprocate said wire cutter only after said dead center position.

4,060,368

FLAT-SHEET INJECTION HEAD

Helmuth Theysohn, late of Wiehbergstraße 25 C, 3 Hannover, Germany, by Ernestine Theysohn, administratrix Division of Ser. No. 369,846, June 14, 1973, Pat. No. 3,895,898.

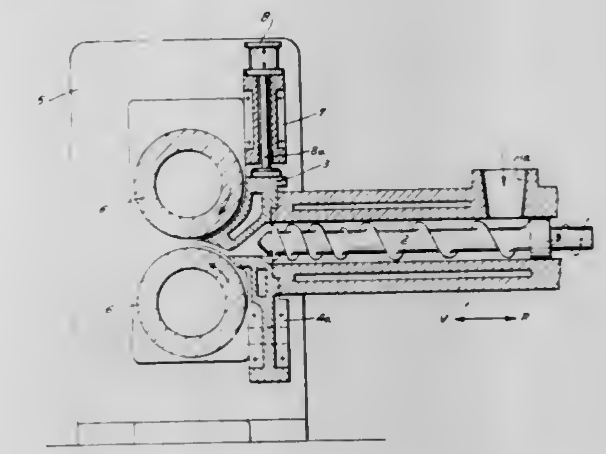
This application Jan. 27, 1975, Ser. No. 544,365

Claims priority, application Germany, June 19, 1972, 2229828

The portion of the term of this patent subsequent to July 22, 1992, has been disclaimed.

Int. Cl.² B29C *15/00*

U.S. Cl. 425—376 B 8 Claims



1. An extruder, comprising; an extruder barrel; an extruder screw rotatable therein;

a flat sheet extruder head defining an extruder aperture elongate transversely of said barrel, the head being disposed in use for extruding material in a plastic state from the barrel through the aperture into a nip of calender rolls, the extruder head comprising first and second, similarly elongate parts generally disposed on mutually opposite, elongate sides of said aperture;

rigid stationary means extending along said extruder head and rigidly stationarily supporting the first elongate part of said extruder head, the second elongate part of said extruder head being mounted on said barrel and being movable therewith toward and away from said rigid means; and

pressure means mounted on said rigid means and actuatable between said rigid means and said movable elongate part for releasably pressing at least a central portion of said movable elongate part toward said stationary elongate part to counteract distortion of the movable elongate part in the use of the extruder.

4,060,369

BURNER FOR THE COMBUSTION OF HYDROCARBONATES

Bernardus A. Schoute, Einsteinstraat 76, Nijmegen, and Gerardus H. Th. M. Verhoeven, Wilgenhoek 23, Zevenaar, both of Netherlands

Filed Apr. 23, 1975, Ser. No. 570,967

Claims priority, application Germany, Oct. 3, 1974, 7433163[U]

Int. Cl.² F23M *3/00*

U.S. Cl. 431—9 5 Claims

1. A method of burning liquid fuel with air so as to produce a long stable flame comprising:

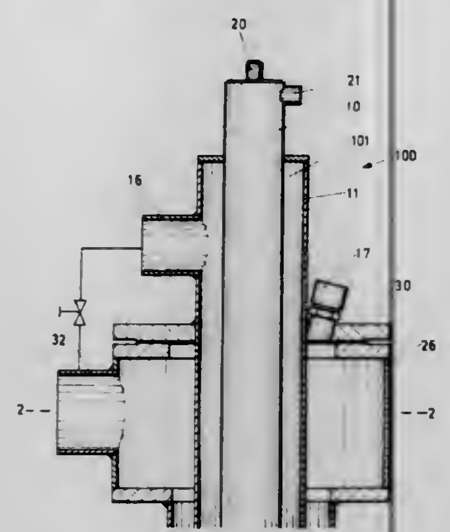
atomizing said fuel by swirling; mixing said fuel with primary air by introduction under pressure the primary air into a flow of said swirling fuel tangential to the direction of said flow and forming a confined cylindrical stream; releasing said confined stream;

introducing secondary air flowing parallel to said released stream into said confined stream;

expanding said released stream from a first to a second cross-section larger than said first cross-section during introduction of said secondary air; and

supplying tertiary air to said stream in a helical swirling path about the periphery of said second cross-section and

within a transition between said second cross-section and a larger cross-section so that said tertiary air is admixed



with the burning mixture over an extended distance to produce a stable flame.

4,060,370

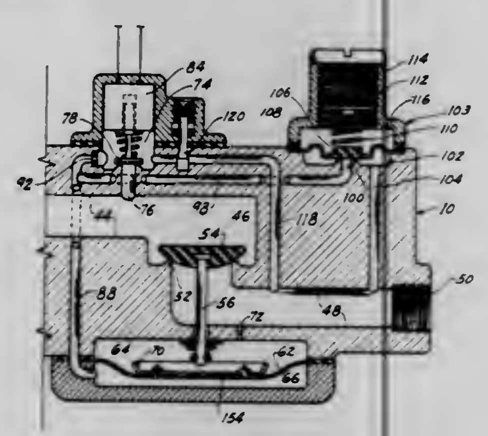
MANIFOLD GAS VALVE WITH STEPPED FLOW OPERATION

Thomas P. Fleer, Sunset Hills, Mo., assignor to Emerson Electric Co., St. Louis, Mo.

Division of Ser. No. 618,901, Oct. 2, 1975, abandoned. This application Sept. 7, 1976, Ser. No. 721,022

Int. Cl.² F23N *1/00;* **F16K** *31/12*

U.S. Cl. 431—62 **2 Claims**



1. In a gas valve device, a body member having an inlet for connection to a source of gas under pressure, an outlet for connection with a gas burner, main fuel passageway means connecting said inlet and outlet, and auxiliary fuel passageway means connecting said inlet and outlet, said main and auxiliary fuel passageway means jointly providing the full rated flow from said inlet to said outlet with said auxiliary passageway means alone providing sufficient fuel flow to support combustion at the burner, a biased closed main valve controlling flow through said main fuel passageway means, a flexible diaphragm forming the movable wall of an expansible chamber and operative upon expansion of said chamber to move said main valve openward, a normally closed control valve in said auxiliary passageway means controlling the flow therethrough, operating pressure passageway means leading from said auxiliary passageway means at a point downstream from said control valve to said expansible chamber, and means to retard the increase in pressure in said expansible chamber when said control valve is opened comprising a restricted flow passageway leading from said expansible chamber to said outlet providing a constant limited bleed off thereby to delay opening of said main valve.

4,060,371

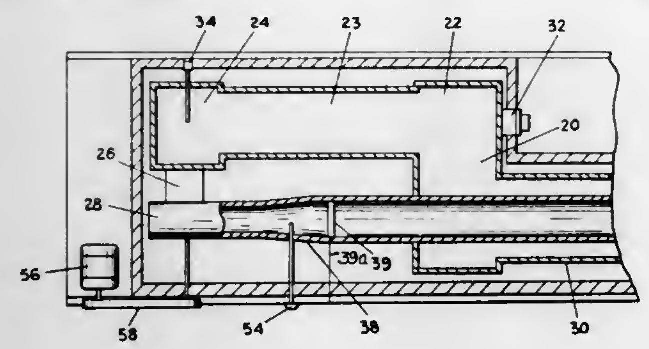
LIQUID OR GASEOUS FUEL FIRED BURNER

Charles B. Gentry, Grand Rapids, and William A. Phillips, Comstock Park, both of Mich., assignors to Granco Equipment, Inc., Grand Rapids, Mich.

Continuation-in-part of Ser. No. 397,606, Sept. 14, 1973, Pat. No. 3,949,053. This application Oct. 22, 1975, Ser. No. 624,997

Int. Cl.² B01D *53/34*

U.S. Cl. 431—75 **5 Claims**



1. A burner which can be fired by gas or oil without the use of secondary air for an oil burner, the burner comprising:
a combustion chamber for burning fuel, said combustion chamber including a gas burner;
means for supplying normally gaseous fuel to said gas burner;
a feed conduit communicating with said combustion chamber for passing oxygen-containing gas to said gas burner;
means for heat exchanging the oxygen-containing gas in said feed conduit with the hot exhaust from said combustion chamber to raise the temperature of said oxygen-containing gas above the vaporization temperature and below the preignition temperature of a liquid fuel;
a source of fuel which is liquid at ordinary temperature and pressure;
a means for injecting the liquid fuel directly into the feed conduit downstream of the heat exchange means so that the normally liquid fuel is vaporized as it is injected into the feed conduit;
means in the feed conduit between the injecting means and the gas burner for turbulating the gases in the feed conduit to evenly disperse and admix the vaporized normally liquid fuel with the oxygen-containing gas; and
means for igniting the vaporized fuel at the gas burner.

4,060,372

SELF-DEFENSE APPARATUS COMPRISING FLASHCUBE LIGHT SOURCE

Walter Beck, Hesligenstrasse 8, Kusnacht, Switzerland (8701), and Werner Bürk, Wilhelm Hachtel Str. 13, Musberg, Germany (7021)

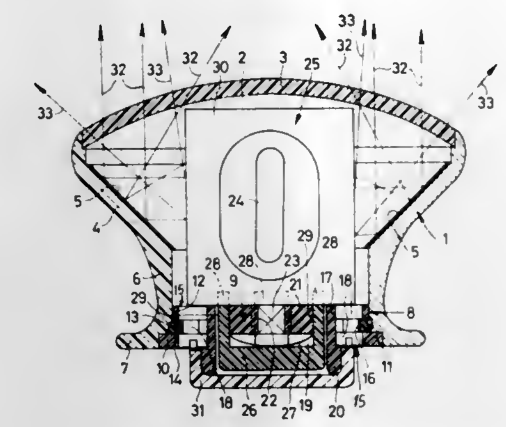
Filed Aug. 4, 1975, Ser. No. 601,445

Claims priority, application Germany, Aug. 6, 1974, 2437763

Int. Cl.² F21K *5/02*

U.S. Cl. 431—93 **4 Claims**

2. A self-defense apparatus comprising:
a housing dimensioned to be held in the hand;
a flash-cube light source in said housing having a plurality of flash lamps capable of generating flash of strength sufficient to temporarily blind a person; and
means on said housing for firing all of said lamps simultaneously, said housing, being axially symmetrical, has a narrow neck adapted to be held between two fingers on the same hand, said means for firing includes a button on one axial end of said housing operable by the thumb of a user of the apparatus, said housing being provided on the opposite end with a transparent lens and wherein said



housing is provided internally with a frustoconical mirror tapering away from said lens.

4,060,373

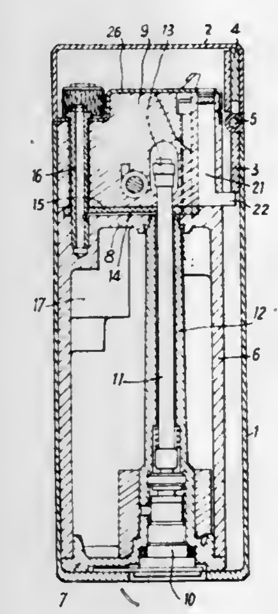
GAS LIGHTER

Jean-Marie Paroty, Ableiges, France, assignor to Societe Franco-Hispano-Americaine (FRANCISPAM), Saint-Gratien, France

Filed Mar. 25, 1976, Ser. No. 670,102

Int. Cl.² F23Q *2/08*

U.S. Cl. 431—135 **15 Claims**



1. Lighter adapted to use a liquefied gas under pressure and comprising a casing, a cap for said casing movable between a closed rest position and an open rest position, a reservoir provided with a valve leading to a burner covered by said cap in said closed position, and an ignition mechanism comprising an abrasive wheel and a flint biassed against said abrasive wheel, said lighter further comprising a spring having three parts; a first part which is connected to the cap to hold it in either said open or said closed position, a second part which is adapted to be displaced by the movement of said first spring part and cooperates with said valve to open said valve during opening of said cap, and a third part which is at one end of said spring and cooperates with said flint to bias said flint against said abrasive wheel.

4,060,374

FUEL SAVING SYSTEM

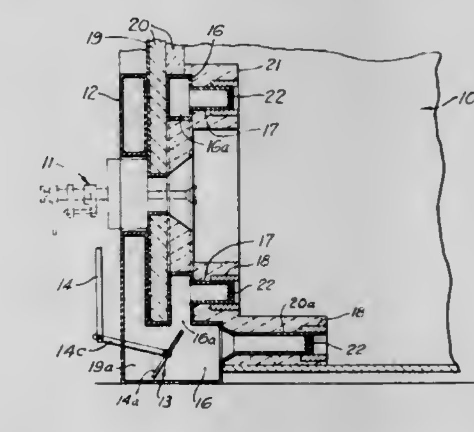
Benjamin F. Kwait, 100 Old Cow Pasture Lane, Smoke Rise, Kinnelon, N.J. 07405

Filed June 8, 1976, Ser. No. 693,760

Int. Cl.² F23C *7/02*

U.S. Cl. 431—190 **1 Claim**

1. A boiler comprising:
a boiler including an elongated, tubular combustion chamber having a front wall and a rear wall;
a burner mounted on said front wall of said combustion chamber and disposed to direct the flame emitted therefrom, toward said rear wall of said combustion chamber;
a first plurality of spaced-apart, air-feeding tubes, each having an inlet and outlet opening, encased in a refractory material and mounted on said front wall of said chamber and spaced about the periphery of said burner, so as to direct the air flowing from the outlet openings thereof into the heart of the flame emitted by said burner and into the center of said combustion chamber;
a second plurality of spaced-apart, air-feeding tubes, each having an inlet and outlet opening, encased in a refractory material and mounted on said front wall of said chamber and disposed beneath said burner and said first plurality, for directing the air flowing from the outlet openings



thereof into the bottom portion of the flame emitted by said burner, so as to create turbulence therein;
a plurality of tubular refractory shields, each of which encases one of said air-feeding tubes adjacent the outlet opening thereof, and a plurality of louvered baffles, each of which covers the outlet opening of one of said air-feeding tubes, said refractory shields, louvered baffles, and refractory encasement of said tubes cooperating to superheat the air flowing through said tubes, prior to injection into said combustion chamber; and
means for supplying air under pressure to said inlet openings of said tubes, said means including a blower carried by said boiler, a windbox having an end connected with said blower, a damper connected with the other end of said windbox, and a metal duct connecting said damper with said inlet openings of said tubes, and a modulator carried by said boiler and operatively connected with said damper for regulating the flow of air therethrough.

4,060,375

METHODS AND APPARATUS FOR THE HEAT TREATMENT OF FINE-GRAINED MATERIALS

Paul Weber, Oelde; Hans Möllenkopf; Kurt Henning, both of Neubeckum; Otto Heinemann, Ennigerloh; Heinz-Herbert Schmits, Rheda; Wolfgang Rother, Stromberg; Horst Ritzmann, Enniger; Jürgen Wurr, Enniger; Karl Krützner, Jr., Neubeckum; Werner Schössler, Ahlen; Wolf Goldmann, and Georg Schepers, both of Enniger, all of Germany, assignors to Polysius AG, Neubeckum, Germany

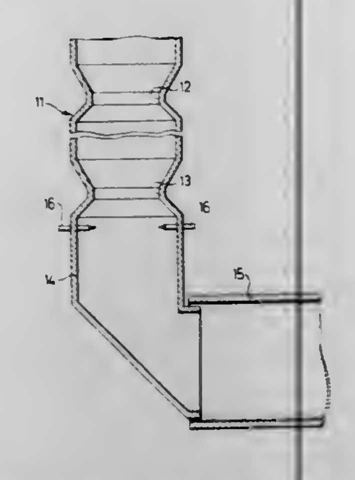
Division of Ser. No. 469,358, May 13, 1974, Pat. No. 3,940,236. This application Jan. 12, 1976, Ser. No. 648,271

Int. Cl.² F27B *15/00*

U.S. Cl. 432—14 **14 Claims**

1. A method for the heat treatment of fine-grained material prior to firing said material in a furnace having a walled, vertical waste gas conduit, said method comprising conducting a waste gas stream from said furnace upwardly through said conduit at a predetermined velocity; supplying fine-grained material having a grain size so related to the velocity of said gas stream that no substantial portion of said material is entrained by said gas stream; introducing said material into said

conduit at a first level between its upper and lower ends so that said material will fall downwardly in opposition to said gas stream toward the lower end of said conduit; combusting fuel in said conduit at a second level below said first level to provide a heating zone below the level at which said material is



introduced to said conduit; and deflecting downwardly moving material inwardly of said conduit toward the center thereof and at a level above that of said heating zone to assure that said downwardly moving material passes through said heating zone as said material falls toward said lower end of said conduit.

4,060,376

METHOD OF FIRING AND FURNACE THEREFOR

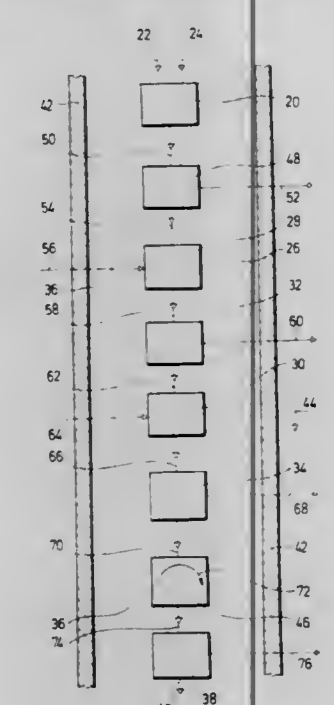
Károly Perédi, Budapest, Hungary, assignor to Energiagazdalkodasi Intezet, Budapest, Hungary

Continuation of Ser. No. 605,319, Aug. 18, 1975, abandoned. This application Nov. 15, 1976, Ser. No. 741,988

Claims priority, application Hungary, Dec. 11, 1974, EE 2292

Int. Cl.[2] F23M *3/04;* F27B *1/10*

U.S. Cl. 432—24 **4 Claims**



1. A method of firing for heat consuming equipment such as boilers and industrial furnaces comprising decomposing a fuel in a first stage in the presence of deficient amounts of primary combustion air so as to produce a hot combustible gas, gradually combusting said hot combustible gas in a second stage by means of secondary combustion air also in deficient amount for complete combustion and in a third stage with tertiary air in an amount for complete combustion, and exhausting said combustion gases with heat withdrawal, cooling down said hot combustible gas by at least 50° C. to a temperature of more than 650° C. prior to introducing said secondary combustion air, and mixing said combustion gases without heat withdrawal at a temperature of more than 650° C. prior to their being exhausted.

4,060,377

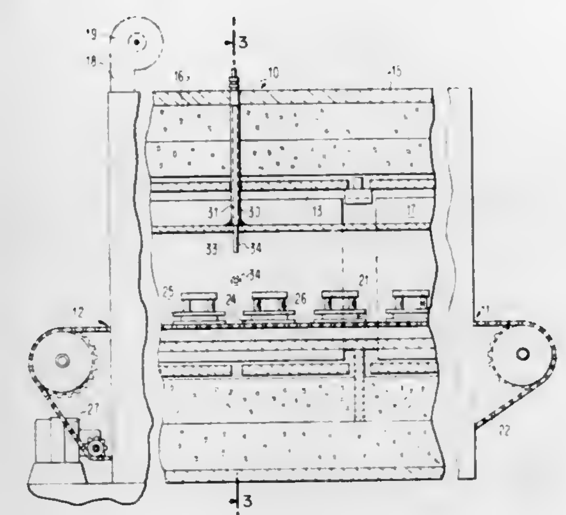
TEMPERATURE MONITORING FURNACE

LeRoy Richard Hentz, Hyde Park; Gary Frank Pavlovic, Beacon; Angelo James Scarafino, Wappingers Falls, and John Joseph Seksinsky, Poughkeepsie, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed June 14, 1976, Ser. No. 695,603

Int. Cl.[2] F27D *19/00*

U.S. Cl. 432—50 **8 Claims**



1. Apparatus for monitoring product temperature in a furnace; comprising in combination: an open ended furnace of the secondary emission type having a plurality of serially arranged heating zones therein, said furnace having an outer casing and an inner muffle with a cavity therebetween, means for applying heat to said cavity in each of said zones to heat said muffle, and at least one conveyor passing through said furnace for carrying product thereon through said muffle; open ended tubes passing through said casing into said muffle and attached thereto; and temperature sensing means passing through at least some of said tubes, into said muffle, and superimposed of said conveyor so that one end is positioned in direct communication with the gaseous medium in the muffle; and means to seal said tubes at said casing and said muffle to inhibit gaseous medium communication between said muffle and externally of said casing.

4,060,378

METHOD OF FIRING AND FURNACE THEREFOR

Károly Perédi, Budapest, Hungary, assignor to Energiagazdalkodasi Intezet, Budapest, Hungary

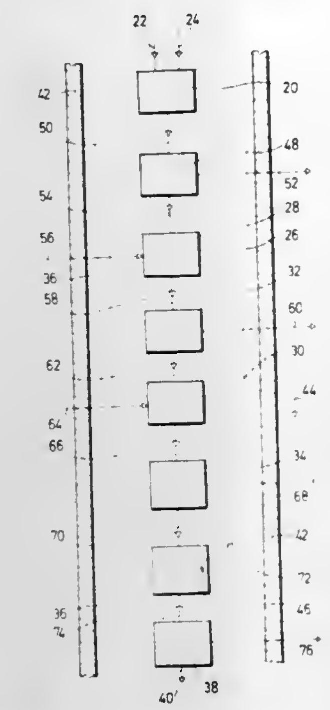
Division of Ser. No. 605,319, Aug. 18, 1975, abandoned. This application June 14, 1976, Ser. No. 695,567

Claims priority, application Hungary, Dec. 14, 1974, EE2292

Int. Cl.[2] F23M *3/04;* F27B *1/10*

U.S. Cl. 432—96 **4 Claims**

1. A furnace comprising a flame channel extending therethrough, a gasifier at the inlet end of the flame channel, means for supplying fuel to said gasifier, means for supplying primary combustion air to said gasifier in a deficient amount so that a combustible hot gas is formed in a first stage combustion for flow through said flame channel, heat withdrawal means in the path of flow of said combustible gas, means for introducing secondary combustion air into said combustible hot gas downstream of said heat withdrawal means in a deficient amount for complete combustion of the gas in a second combustion stage, means downstream of the second stage for supplying tertiary air to said gas for complete combustion in a third combustion stage, said flame channel being at least partly confined by ceramic walls, and an uncooled mixing chamber downstream



of the combustion stages for receiving the combustion gas from said flame channel.

4,060,379

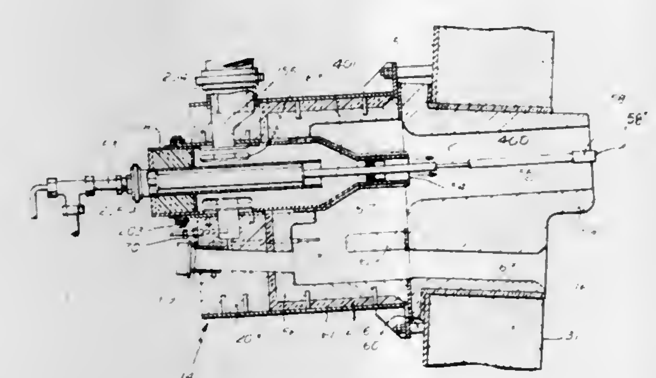
ENERGY CONSERVING PROCESS FURNACE SYSTEM AND COMPONENTS THEREOF

Paul G. LaHaye; John W. Bjerklie, both of Cape Elizabeth, and Gerald G. Gallant, Jr., Gorham, all of Maine, assignors to Hague International, S. Portland, Maine

Continuation-in-part of Ser. No. 547,381, Feb. 6, 1975. This application Jan. 27, 1976, Ser. No. 652,877

Int. Cl.[2] F27D *17/00*

U.S. Cl. 432—179 **9 Claims**



1. A recirculating burner for use in a furnace area comprising,

means defining an eductor channel opening to a burner side at one end and having a second end,

second means defining a second channel having an end interconnected with said second end of said eductor channel, said second channel being positioned to receive heated gas for recirculation,

said eductor channel having mounted therein a fuel nozzle tip and an eductor combustion air outlet nozzle for passing combustion air toward said fuel nozzle tip with said fuel nozzle tip facing outwardly at said one end,

third means for supplying combustion air to said combustion air outlet nozzle,

fuel means for providing fuel at said fuel nozzle tip which fuel is exposed to combustion air from said eductor, and mixed with recirculated gas from said recirculating channel to form a flame front when ignited which flame front is positioned out of said eductor channel one end.

4,060,380

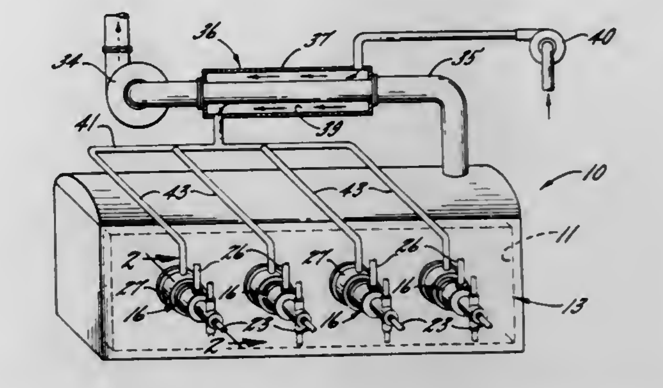
FURNACE HAVING BURNERS SUPPLIED WITH HEATED AIR

James S. Bolt, Rockford, Ill., assignor to Alco Standard Corporation, Valley Forge, Pa.

Filed June 14, 1976, Ser. No. 696,062

Int. Cl.[2] F27D *17/00*

U.S. Cl. 432—179 **6 Claims**



1. A furnace comprising a walled enclosure defining a heating chamber, a burner supported by said enclosure for heating said chamber, said burner comprising a tubular metallic body adapted to receive fuel and combustion air for producing a hot gaseous stream, a tubular burner block made of non-metallic refractory material and secured to one end of said body for receiving said stream, said burner block having a constricted nozzle for increasing the velocity of said stream and having a tubular extension located downstream of said nozzle, said extension having an interior larger than the downstream end of said nozzle, means defining an annular compartment around said extension, a series of passages formed through and spaced angularly around said extension and establishing communication between said compartment and the interior of said extension, means defining an air chamber located to be heated by heat produced in said heating chamber, and means for establishing communication between said air chamber and said compartment whereby heated air in said air chamber flows into said compartment and through said passages to mix with the hot gaseous stream passing within said extension.

4,060,381

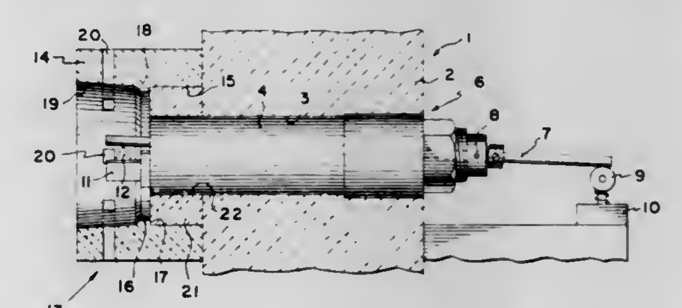
SHIELD FOR PYROMETRIC CONES USED IN CERAMIC FIRING KILNS

John C. Watson; John D. Watson, and Gerald K. Watson, all of Caseville, Mich., assignors to Evenheat Kiln, Inc., Caseville, Mich.

Filed May 3, 1976, Ser. No. 682,193

Int. Cl.[2] F27D *1/10*

U.S. Cl. 432—247 **9 Claims**



1. In a ceramic kiln into which extends one end of a hollow tube through which a swingable control member extends and projects beyond said tube into said kiln, said control member normally being maintained in a preselected position by means of a heat deformable cone member, , and means for supporting said cone member at a position adjacent but spaced axially from said one end of said tube, the improvement comprising a shield construction having a heat resistant shield member supported on said tube at said one end thereof and being of such length as to extend axially of said tube into said kiln a distance to overhang the supporting means for said cone member, said shield member having at least one opening therein in communication with said kiln.

4,060,382

METHOD AND DEVICE FOR DYE TRANSFER PRINTING

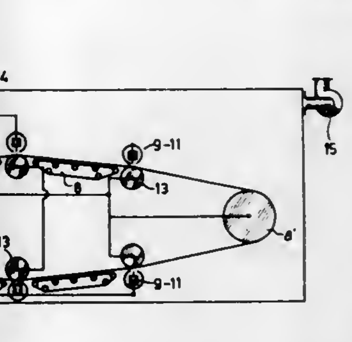
Jacobus Gerardus Vertegaal, Boxmeer, Netherlands, assignor to Stork Brabant B.V., Boxmeer, Netherlands

Filed June 23, 1976, Ser. No. 699,208

Claims priority, application Netherlands, July 2, 1975, 7507902

Int. Cl.[2] D06P *5/20;* **B41M** *5/26;* **H01T** *19/00;* **H02N** *1/00*

U.S. Cl. 8—2.5 A **3 Claims**



1. A method for transferring a dye design from a moving support strip to a textile web which comprises:

pressing the surface of the moving support strip which has the dye design thereon in contact with the textile web;

passing said contacting support strip and said textile web in a common path through an enclosed housing;

evacuatign said housing to create a subatmospheric pressure therein;

heating the surface of said moving support strip opposite to the surface in contact with said textile web while in said housing to aid said dye design transfer;

passing the surface of said textile web opposite to the surface in contact with said support strip over a charged supporting surface while in said housing, and at the same time directing a very narrow and converging beam of electrostatic charge opposite in character to the charge on said supporting surface against the surface of the moving support strip opposite to said textile web in order to produce an electrical adherance between the moving support strip and textile web and thereby aid in dye design transfer.

4,060,383

MONOAZO DYESTUFFS

Denis Robert Annesley Ridyard, Manchester, England, assignor to Imperial Chemical Industries Limited, London, England

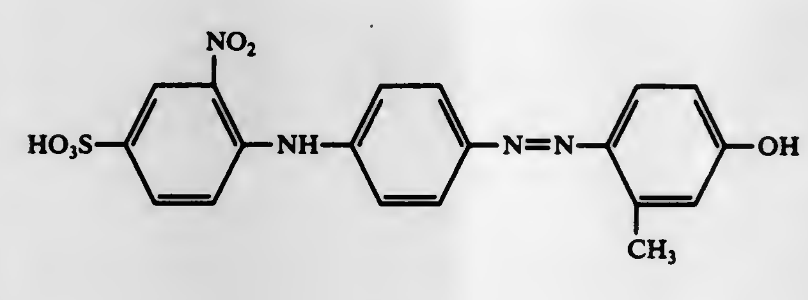
Continuation of Ser. No. 498,853, Aug. 19, 1974, abandoned, which is a division of Ser. No. 252,576, May 12, 1972, abandoned. This application Nov. 19, 1975, Ser. No. 633,558

Claims priority, application United Kingdom, May 17, 1971, 15272/71

Int. Cl.[2] D06P *1/39, 3/34*

U.S. Cl. 8—41 B **1 Claim**

1. A process for the coloration of synthetic polyamide textile materials which comprises applying thereto an aqueous solution of a monoazo dyestuff consisting of a dye having the formula



4,060,384

MANUFACTURE OF LEATHER

Marcel Siegler, North Bergen, N.J., assignor to Seton Company, Newark, N.J.

Filed Sept. 9, 1976, Ser. No. 721,706

Int. Cl.[2] C14C *3/06, 3/28*

U.S. Cl. 8—94.27 **14 Claims**

1. In the manufacture of grain and split leather from a hide, the improvement according to which the hide is subjected to a pre-tanning with an essentially chromium-free tan until its shrinkage temperature is about 170° to about 185° F, the pre-tanned hide is split to provide a pre-tanned grain intermediate and a pre-tanned split intermediate, at least one of these intermediates is shaved to give it a more uniform caliper, and the shaved intermediate is chrome-tanned into leather.

4,060,385

METHOD FOR HYDROGEN PEROXIDE BLEACHING IN ACID OR NEUTRAL SOLUTIONS

Jerome Katz, P.O. Box 1544, Rochester, N.Y. 14603

Continuation-in-part of Ser. No. 312,637, Dec. 6, 1972, Pat. No. 3,918,898. This application Sept. 2, 1975, Ser. No. 609,734

Int. Cl.[2] D06L *3/02*

U.S. Cl. 8—111 **32 Claims**

1. A process for scouring, desizing and bleaching cotton griege goods comprising the steps of:

a. immersing said goods for a time sufficient to achieve commercial brightness but less than about 30 minutes in an aqueous solution having a temperature in the range from 112° to 212° F and consisting of from 3 to 70% by volume hydrogen peroxide, water and sufficient hydroxide to adjust said solution to a pH in the range 2 to 7, said solution being substantially free of heavy metal ions and maintained out of contact with all metals while said goods are immersed therein;

b. cycling a portion of said solution through a filtration means to remove solid impurities therefrom while maintaining the volume, composition and pH of said solution in contact with said goods substantially the same;

c. rinsing said goods with water to wash said aqueous solution therefrom; and

d. drying said goods.

4,060,386

ALKALINE HYDROGEN PEROXIDE BLEACHING METHOD

Jerome Katz, P.O. Box 1544, Rochester, N.Y. 14603

Continuation-in-part of Ser. No. 312,637, Dec. 6, 1972, Pat. No. 3,918,898. This application Sept. 2, 1975, Ser. No. 609,735

The portion of the term of this patent subsequent to Nov. 11, 1992, has been disclaimed.

Int. Cl.[2] D06L *3/02*

U.S. Cl. 8—111 **33 Claims**

1. A process for scouring, desizing and bleaching cotton greige goods comprising the steps of:

a. immersing said goods for a time sufficient to achieve commercial brightness but less than about 30 minutes in an aqueous solution having a temperature in the range from 100° to 212° F and consisting of from 0.3 to 70% by volume hydrogen peroxide, water and sufficient alkaline additive to adjust said solution to a pH in the alkaline range, said solution being substantially free of heavy metal ions and maintained out of contact with all metals while said goods out of contact with all metals while said goods are immersed therein;

b. cycling a portion of said solution through a filtration means to remove solid impurities therefrom while maintaining the volume, composition and pH of said solution in contact with said goods substantially the same;

c. rinsing said goods with water to wash said aqueous solution therefrom; and

d. drying said goods.

4,060,387

AROMATIC CARBOXYLIC ACID ESTERS AND AMIDES AS FIXING AGENTS

Hans-Peter Baumann, Allschwil, and Hans-Georg Karmann, Binningen, both of Switzerland, assignors to Sandoz Ltd., Basel, Switzerland

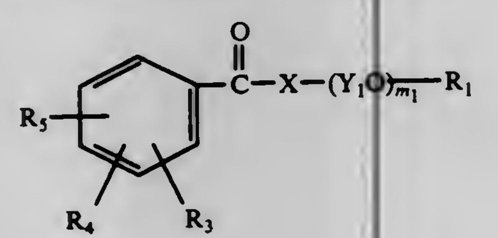
Division of Ser. No. 404,696, Oct. 9, 1973, Pat. No. 3,950,419. This application Nov. 10, 1975, Ser. No. 630,089

Claims priority, application Switzerland, Oct. 13, 1972, 15035/72

Int. Cl.² D06P *5/04*

U.S. Cl. 8—169 15 Claims

1. In a process wherein a fabric consisting of or containing fibers of polyester, cellulose 2½ acetate, cellulose triacetate or polyvinyl chloride is dyed or printed, the improvement which comprises applying to the fabric before, during or after the dyeing or printing thereof a compound of the formula



I

wherein

X is —O— or —NR—,

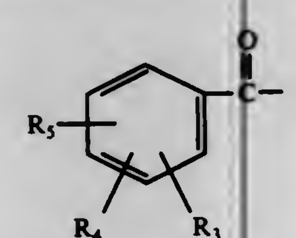
R is hydrogen, phenyl, phenylalkyl (C_7-C_{22}), phenyl or phenylalkyl (C_7-C_{22}) substituted by —OH, alkyl or halogen and having up to 22 carbon atoms in the aggregate thereof, alkyl (C_1-C_{22}), cycloalkyl (C_5-C_7), alkyl (C_1-C_{15}) cycloalkyl (C_5-C_7), cycloalkyl (C_5-C_7) alkyl (C_1-C_{15}), alkyl (C_1-C_{15}) cycloalkyl (C_5-C_7) alkyl (C_1-C_{15}) or a group —$(Y_2$—$O)_{m_2}$—R_2

Y_1 and Y_2 are, independently, ethylene, 1,2-propylene, 1,3-propylene, 1,2-butylene or phenylethylene, with the proviso that

a. only the group Y_1 or Y_2 which is bound to —X—, can be 1,3-propylene, and

b. each (Y_1-O) or (Y_2-O) chain contains no more than 2 phenylethylene groups,

R_1 and R_2 are, independently, hydrogen, phenyl, phenylalkyl (C_7-C_{22}), phenyl or phenylalkyl substituted on the phenyl nucleus by —OH, alkyl or halogen and having up to 22 carbon atoms in the aggregate thereof, alkyl (C_1-C_{22}), cycloalkyl (C_5-C_7), alkyl (C_1-C_{15}) cycloalkyl (C_5-C_7), cycloalkyl (C_5-C_7) alkyl (C_1-C_{15}), alkyl (C_1-C_{15}) cycloalkyl (C_5-C_7) alkyl (C_1-C_{15}), or a group



R_3 is hydrogen, halogen, alkyl (C_1-C_{22}), cycloalkyl (C_5-C_7), cycloalkyl (C_5-C_7) alkyl (C_1-C_{15}), alkyl (C_1-C_{15}) cycloalkyl (C_5-C_7), alkyl (C_1-C_{15}) cycloalkyl (C_5-C_7) alkyl (C_1-C_{15}), —CN, —$COOR_6$, —SO_3R_6, —OR_6, —NHR_6 or —$N(R_6)_2$, —CO_2M, —SO_3M or a group —CO—X—$(Y_1O)_{m_1}$—R_1,

R_4 is hydrogen, —CO_2M, —OR_6 or a group —CO—X—$(Y_1O)_{m_1}$—R_1,

R_5 is hydrogen, —CO_2M or a group —CO—X—$(Y_1O)_{m_1}$—R_1,

M is a charge equivalent of a cation, m_1 and m_2 are integers 1 to 100, the sum of all integers m_1 and m_2 being 1 to 100,

and R_6 is hydrogen or a group R.

4,060,388

SPECIMEN HOLDING DEVICE AND METHOD OF USING SAME

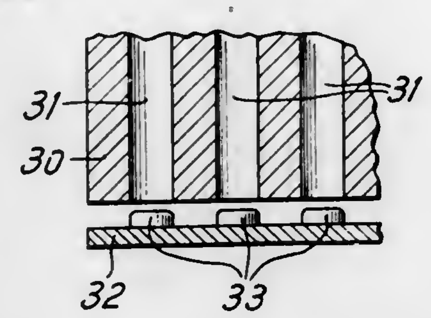
Wolfgang Rapp, Edingen; Karl-Heinz Haas, Wetzlar, and Heribert Luessem, Braunfels, all of Germany, assignors to Ernst Leitz GmbH Wetzlar, Wetzlar, Germany

Filed Apr. 6, 1976, Ser. No. 674,122

Claims priority, application Germany, Apr. 9, 1975, 7511053[U]

Int. Cl.² G01L *3/00;* G01N *21/00, 31/02, 33/16*

U.S. Cl. 23—230 R 25 Claims



18. A method for analyzing a fluid substance comprising the steps of placing in each of the elongated recesses of a device comprising:

a. a generally horizontally axially elongated, generally solid block of a transparent material, said block having longitudinal side surfaces, at least one of said surfaces enabling viewing through the block;

b. plural means for holding both the reagent and the fluid substance to be analyzed, with said fluid substance overlying the upper surface of the reagent before reaction therewith, said holding means including a plurality of elongated recesses extending downwardly from the top surface of the block, said recesses being positioned to permit separate lateral viewing, transverse to said at least one side surface, of each recess and of the reaction taking place therein between the reagent and the fluid substance in a region contiguous to the surface of the reagent, and

c. means for closing off the bottom ends of said recesses; a reagent which is reactive with said substance to produce a detectable indication function, adding said fluid substance to each recess so that the fluid substance overlies the upper surface of the reagent, whereby a detectable indication function is produced in said recesses, and observing said indication function by lateral viewing through each of said recesses.

4,060,389

APPARATUS FOR USE IN THE AMMONIA SODA PROCESS OR THE AMMONIUM CHLORIDE SODA PROCESS

Yoshiki Nishimura; Kazutaka Sakiyama; Tadao Adachi, and Kenji Harada, all of Shin-nanyo, Japan, assignors to Toyo Soda Manufacturing Co., Ltd. and Nihon Kinzoku Kogyo Kabushiki Kaisha, Tokyo, both of, Japan

Filed Jan. 7, 1976, Ser. No. 647,091

Claims priority, application Japan, Jan. 10, 1975, 50-4866; Jan. 10, 1975, 50-4867

Int. Cl.² B01J *1/20*

U.S. Cl. 23—252 A 5 Claims

1. In an apparatus having parts intended for contact with an ammoniacal brine, a mother liquor formed in the carbonation tower of an ammonia soda process, an ammonium chloride soda process solution or an ammonium chloride mother liquor, the improvement wherein the surfaces of said parts comprise an austenitic steel consisting essentially of less than 0.05 wt. % of C; 0.1 - 2.0 wt. % of Si; 0.01 - 2.0 wt. % of Mn; 3.0 - 20.0 wt. % of Ni; 15.0 - 30.0 wt. % of Cr; 0.5 - 7.0 wt. % of Mo and the remainder iron.

4,060,390

APPARATUS FOR PRODUCING COMPOSTS

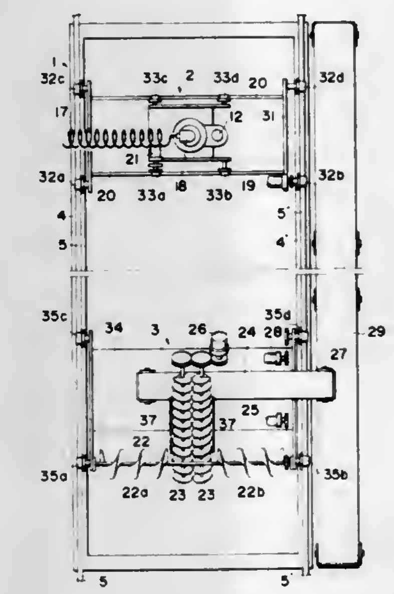
Kazufusa Shimizu, Setugaya; Shigeo Katsuori, Minosato, Tadaaki Nishikawa, Hino; Keisaku Senoo, Onishi; Kenji Sakamaki, Funabashi; Makio Fujita, Gunma; Teruo Tano, Ota; Hiroshi Takano, Shibuya, and Hideo Komori, Yokohama, all of Japan, assignors to Niigata Engineering Co., Ltd. and Seibu Chemical Industry Co., Ltd., both of Tokyo, Japan

Filed Aug. 9, 1976, Ser. No. 713,042

Claims priority, application Japan, Aug. 13, 1975, 50-98239

Int. Cl.² C05F *9/02*

U.S. Cl. 23—259.1 7 Claims



1. An apparatus for producing compost from a base compost mixture of previously fermented compost, and a slurry-like organic waste mixture added to said base compost, said apparatus comprising:

a fermentation vessel containing said base compost therein, said vessel having a base plate, vertical side walls and end walls extending upward from said base plate, and an open top;

feeding and stirring means for feeding said slurry-like organic waste within said base compost in said fermentation vessel and for simultaneously stirring said base compost and said slurry-like organic waste, said feeding and stirring means comprised of:

at least one rotatable stirring shaft member extending downwardly into said vessel, said shaft member having a passage therethrough which said slurry-like organic wastes are fed within said base compost, and

spiral member means fixed around the outside of said rotatable shaft for mixing said base compost and said slurry-like organic waste;

air supply means at the base of said fermentation vessel for supplying air into said fermentation vessel, whereby said mixture of base compost and said slurry-like organic wastes is aerobically fermented; and

gathering and carrying means at the top of said fermentation vessel above said mixture of base compost and organic waste for gathering an upper portion of predetermined thickness of said mixture, and carrying said gathered mixture out of and away from said fermentation vessel, said gathering and carrying means comprised of:

first conveying means mounted across the top of said fermentation vessel having a length substantially the same as the width of the fermentation vessel for gathering the upper portion of said mixture, and

second conveying means adjacent said first conveying means for carrying said mixture away from said fermentation vessel;

said feeding and stirring means and said gathering and carrying means being movable in the longitudinal direction along the top of said fermentation vessel.

4,060,391

APPARATUS FOR PRECIPITATING AND SEPARATING A MATERIAL IN A SOLID FORM FROM A GASEOUS MIXTURE

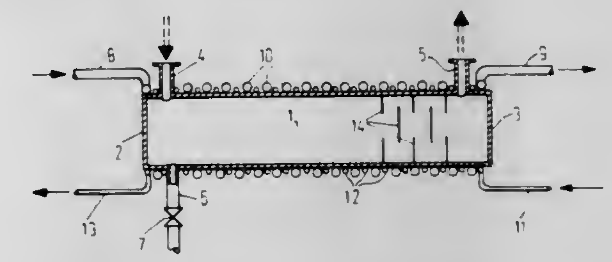
Hubertus Johannes Gerardus van Heel, Vriezenveen; Victor Leonard Bruins, and Joost Smid, both of Alkmaar, all of Netherlands, assignors to Ultra-Centrifuge Nederland N.V., The Hague, Netherlands

Filed Dec. 15, 1976, Ser. No. 750,628

Claims priority, application Netherlands, Dec. 19, 1975, 7514821

Int. Cl.² B01D *7/00, 5/00*

U.S. Cl. 23—264 3 Claims



1. Apparatus for precipitating and separating a material in solid form from a gaseous mixture comprising: an elongated vessel having a gas inlet connection at one end and a gas outlet connection at the other end; at least one cooling coil for conveying a cooling fluid, said cooling coil extending along at least a portion of the length of the vessel and being attached to a wall of the vessel; at least one heating coil for conveying a heating fluid said heating coil extending along at least a portion of the length of the vessel and being attached to a wall thereof, said coils being wrapped around the exterior of the vessel, with the convolutions of the cooling coil alternating with the convolutions of the heating coil and arranged to convey their fluids in counterflow relation, each of said coils including a controllable bypass by means of which the fluid being conveyed may be bypassed around a portion of the respective coil, said portion being less than the entire length of the respective coil, and a connecting pipe line provided with a flow-regulating element and connecting the two coils at a location intermediate their ends a fluid supply line connected to one end of each coil and a fluid discharge line connected to the other end of each coil, the controllable bypass for each coil including a valved bypass line connected between the respective supply and discharge lines and valved branch lines connecting spaced-apart locations along the length of the bypass line with spaced-apart locatons along the length of the respective coil.

4,060,392

DEVICE FOR THE SUPPORT OF A CRYSTALLINE ROD

Heinz Herzer, and Helmut Zauhar, both of Burghausen, Germany, assignors to Wacker-Chemitronic Gesellshaft fur Elektronik Grundstoffe mbH, Burghausen, Germany

Filed May 19, 1976, Ser. No. 687,711

Claims priority, application Germany, July 1, 1975, 2529366

Int. Cl.² B01J *17/10*

U.S. Cl. 23—273 SP 5 Claims

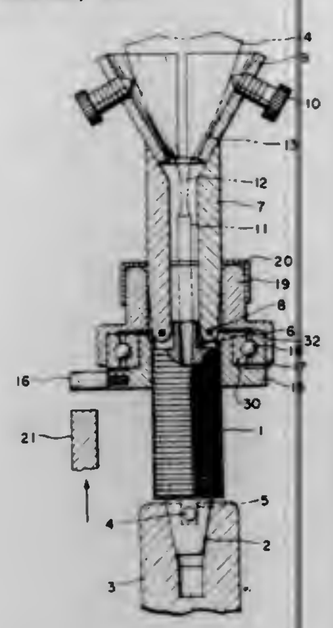
1. A device for supporting a crystalline rod and a seed crystal during crucible-free zone melting, said device being coupled to the rotatable shaft of a zone-drawing apparatus, comprising:

an externally threaded screw bolt mounted for rotation with the shaft, the top end of the screw bolt having an axially extending bore formed therein for receiving a seed crystal;

at least two vertically pivotable swivel arms, the lower ends of which are pivotably mounted adjacent to the bore and the outer ends of which are movable radially outwardly and inwardly relative to the axis of said bore to define respectively an open and closed position of said arms;

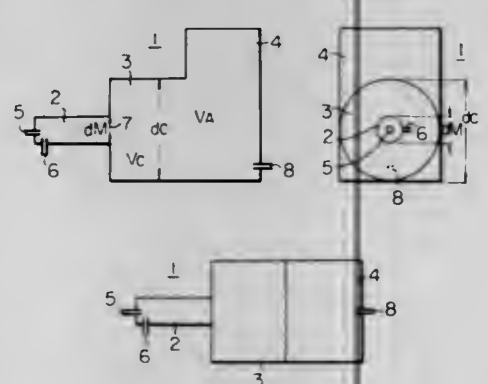
a ring coaxially surrounding the bolt and said inner ends of said arms and in sliding contact with said swivel arms and which is non-rotatably vertically movable so as to effect

movement of said swivel arms between said open and closed positions; and



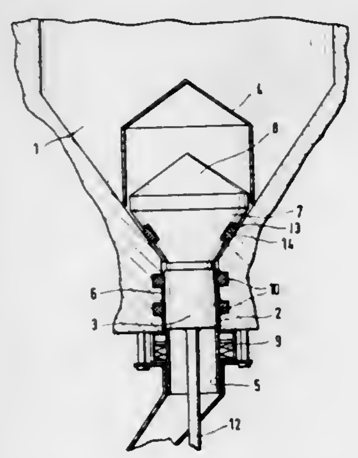
means for non-rotatably vertically moving said ring so as to non-rotatably adjust the position of said swivel arms with respect to said bolt during the zone-melting operation.

4,060,393
APPARATUS FOR TREATING RAW MATERIAL WITH A TREATING GAS
Shozo Ito, Ichikawa, Japan, assignor to Mifuji Iron Works Co., Ltd., Japan
Continuation-in-part of Ser. No. 823,746, May 12, 1969, abandoned. This application Feb. 3, 1975, Ser. No. 546,737
Claims priority, application Japan, May 15, 1968, 43-3217; June 20, 1968, 43-42258
Int. Cl.² B01J *1/00*
U.S. Cl. 23—277 R **9 Claims**



1. In an apparatus for treating raw material with a treating gas comprising a mixing chamber wherein a fuel is mixed with oxygen or air to form a mixture gas, a combustion chamber connected to said mixing chamber and having an inner space large enough in volume for the complete combustion of the mixture gas to generate a combustion gas, and a treating chamber wherein a raw material is converted into a desired product by the action of a treating gas; an improvement comprising a conditioning chamber connected between said combustion chamber and treating chamber and separated from said treating chamber; said combustion chamber having a cylindrical inner space with the entire cylindrical exit end thereof directly opening into and connected, without any intervening restrictive structure, to the entrance end of the interior of said conditioning chamber; said conditioning chamber having at least one of its cross-sectional dimensions larger than that of said combustion chamber so that the inner space of said conditioning chamber has a volume of one and one-half to six times larger than that of said cylindrical space of said combustion chamber and having means defining at least one gas inlet in said conditioning chamber for admitting at least one additional gas to be mixed with the combustion gas in said conditioning chamber to prepare the treating gas, said gas inlet being spaced from and generally facing said combustion chamber exit end so that the combustion gas and the additional gas flow in opposite directions into said conditioning chamber to effect uniform intermixing thereof to form the treating gas and having a treating gas outlet for discharging the treating gas from said conditioning chamber; and said treating chamber having one inlet connected to said treating gas outlet for receiving the treating gas and having spaced therefrom another inlet for receiving raw material which is to be treated with the treating gas.

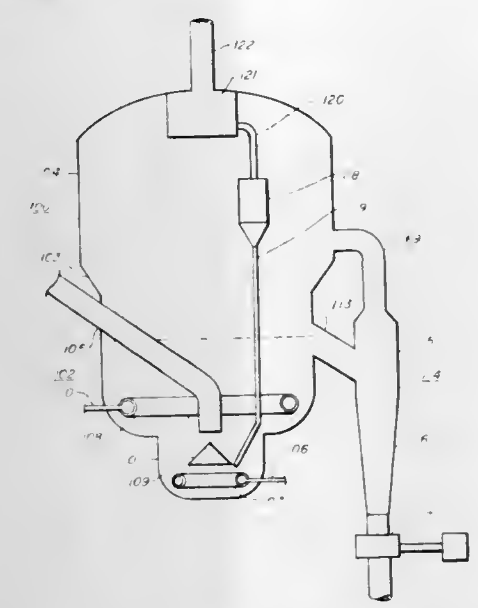
4,060,394
BOTTOM CLOSURE FOR A CHEMICAL REACTOR
Herbert Grebe; Wolfgang Hartwig, both of Bremen; Johann Köhler, Barrien; Rudolf Rothe, Bremen, and Karl-Friedrich Schröder, Bremen-Lesum, all of Germany, assignors to HAG Aktiengesellschaft, Bremen, Germany
Filed Mar. 18, 1976, Ser. No. 667,949
Claims priority, application Germany, Mar. 21, 1975, 2512591
Int. Cl.² B01J *8/02, 4/00*
U.S. Cl. 23—284 **6 Claims**



1. In a reaction vessel for holding solids and having a lower section including a conical part and a cylindrical outlet extending downwardly from said conical part for discharge of solids for said reaction vessel, and a closure member for closing off said outlet, said closure member having a cylindrical portion and a conical portion, the conical portion seating on said lower section conical part and said cylindrical portion locating in said cylindrical outlet when said closure member is in a closure position, there further being first seal means associated with said closure member and said lower section of the reaction vessel for effecting a seal of said outlet when said closure member is in closure position, said closure member being movable upwardly to an open position in said lower conical section for opening said outlet, the upward movement of said closure member being effective to destroy any bridge of solids as may exist in said lower section adjacent said outlet, the improvement which comprises

a cap member loosely received in said lower section conical part in covering position over said closure member and resting on said lower section conical part when said closure member is in a closure position, said closure member during upward movement thereof engaging said cap member for lifting said cap member upwardly in said lower section conical part, and means operable to protect said first seal means from contact with solids when said closure member is moved to an open position, there being sufficient free space provided between said closure member and cap member such that said closure member during upward movement thereof does not engage with said cap member to lift same until said means for protecting said first seal means have become operable.

4,060,395
FLUIDIZED CRACKING CATALYST REGENERATION APPARATUS
Leonce F. Castagnos, Jr., Nederland, and Roy E. Pratt, Groves, both of Tex., assignors to Texaco Inc., New York, N.Y.
Filed May 7, 1976, Ser. No. 684,438
Int. Cl.² B01J *8/24;* **B01D** *15/06*
U.S. Cl. 23—288 B **9 Claims**



1. Fluidized catalytic regeneration apparatus, which comprises:

a. a vertical regenerator vessel **100** comprising a cylindrical lower regenerator section **101** having a closed bottom and open top, a cylindrical upper regenerator section **102** having an open top and an axially centered opening in the bottom for communication with the open top of lower regenerator section **101**, a frusto-conic transition section **103** having an open top and an open bottom for communication with the open top of upper regenerator section **102**, and a cylindrical dilute phase regenerator section **104** having a closed top and an open bottom for communication with the open top of transition section **103**;

b. spent catalyst conduit means **105** having a discharge end for transferring coke-contaminated spent catalyst from a reaction zone substantially vertically downward into about the axial center of lower regenerator section **101**;

c. spent catalyst distribution means **109** for distributing spent catalyst from the discharge of said spent catalyst conduit means **105** radially into lower regenerator section **101**;

d. primary regeneration gas distribution means **107** for distributing an oxygen containing primary regeneration gas radially into the bottom portion of lower regenerator section **101** under turbulent conditions such that spent catalyst and primary regeneration gas are intimately mixed at catalyst regeneration conditions;

e. secondary regeneration gas distribution means **110** for radially distributing an oxygen containing regeneration gas into the bottom of upper regenerator section **102** such that an intimate mixture of spent catalyst and primary regeneration gas flowing upoward into upper regenerator section **102** from lower regenerator section **101** forms a fluidized dense phase bed of catalyst at regeneration conditions;

f. a regenerated catalyst duct **113** in communication with the interior of upper regenerator section **102** for withdrawing regenerated catalyst from the upper portion of said fluidized dense phase catalyst bed;

g. a regenerated catalyst standpipe **114** located exterior to reactor vessel **100** and in communication with the discharge or regenerated catalyst duct **113**;

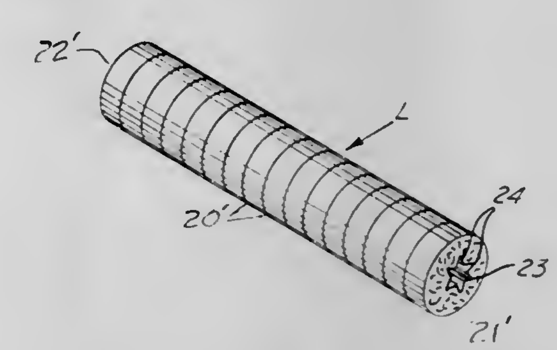
h. a deaeration gas line **69** communicating from the top of regenerated catalyst standpipe **114** to dilute phase regenerator section **104**

i. catalyst gas separation means **118** for separating catalyst and spent regeneration gas from a dilute phase of catalyst suspended in regeneration gas within said dilute phase regenerator section **104**;

j. vent means **122** in communication with said catalyst-gas separation means **118** for removing separated spent regeneration gas from said regenerator vesel **100**; and

k. a conduit means **119** for transferring separated catalyst from catalyst-gas separation means **118** to lower regenerator section **101**.

4,060,396
WAFERED FUEL OF COMPRESSED WOOD PRODUCTS
James V. Burton, P.O. Box 749, Laramie, Wyo. 82070
Filed Oct. 28, 1975, Ser. No. 626,491
Int. Cl.² C10L *5/36, 11/00*
U.S. Cl. 44—14 **3 Claims**



1. A fuel in a cylindrical form of selected length comprising:

a plurality of relatively thin wafers arranged as an interlocking array of disc-shaped wafers including a major portion of wood particles without binders, with each wafer being a discrete member having one concave end and one convex end arranged to nest with a neighboring wafer,

each said wafer having a pointed star shaped central passage; and

the particles of each wafer being compressed together so as to tightly adhere to each other with the wafers only lightly adhered to an adjacent wafer so as to permit easy breaking of the fuel into discrete wafers.

4,060,397
TWO STAGE PARTIAL COMBUSTION PROCESS FOR SOLID CARBONACEOUS FUELS
Pieter Buiter, The Hague; Maarten J. van der Burgt, Akersloot, and Henricus J. A. Van Helden, Haarlem Resp, all of Netherlands, assignors to Shell Internationale Research Maatschappij B.V., Netherlands
Continuation-in-part of Ser. No. 545,248, Jan. 29, 1975, abandoned. This application Nov. 26, 1976, Ser. No. 745,244
Claims priority, application United Kingdom, Feb. 21, 1974, 7903/74
Int. Cl.² C10J *3/00*
U.S. Cl. 48—197 R **1 Claim**

1. A process for the production of a hydrogen and carbon monoxide-containing gas by partial combustion of a non-slurried solid carbonaceous fuel with an oxidant gas which comprises the steps of:

a. preheating the oxidant gas, being air or oxygen diluted with steam, carbon dioxide, nitrogen, oxygen, or mixtures thereof, to a temperature of from 200° to 1300° C;

b. mixing the preheated oxidant gas with the unslurried solid carbonaceous fuel having a partial size such that 70% is smaller than 200 mesh in proportions such that the atomic ratio of oxygen to total carbon in the fuel is from about 0.9 to about 1.4;

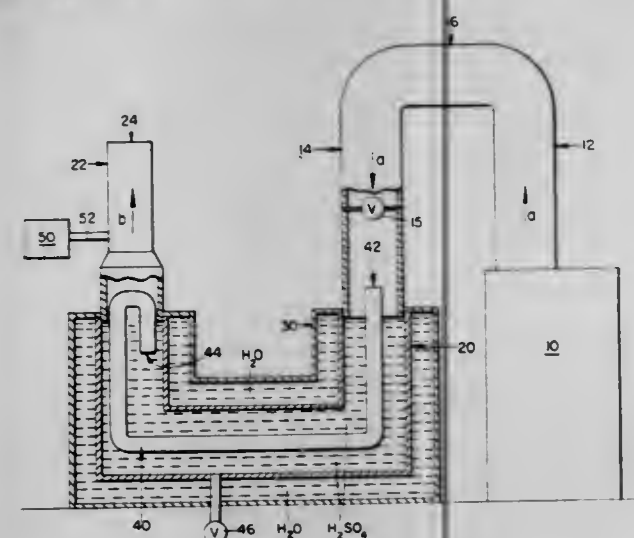
c. injecting the mixture into a first reaction zone at a linear velocity of from 10 to 200 m/sec;

d. passing the mixture through the first reaction zone, maintained at a temperature of from 1200° to 1700° C and a pressure of from 1 to 200 kg/cm², absolute, with a residence time of from 0.02 to 20 seconds to convert from

about 70 to about 90% of the fuel to a partial combustion product made up principally of hydrogen and carbon monoxide;

e. passing the combustion product from the first zone through a second reaction zone, maintained at an average temperature at least 100° C lower than that of the first zone and at a pressure up to 200 kg/cm², absolute, with a residence time of from 0.5 to 40 seconds wherein the remaining solid carbonaceous fuel is substantially completely converted to a partial combustion reaction product made up principally of hydrogen and carbon monoxide without formation of soot.

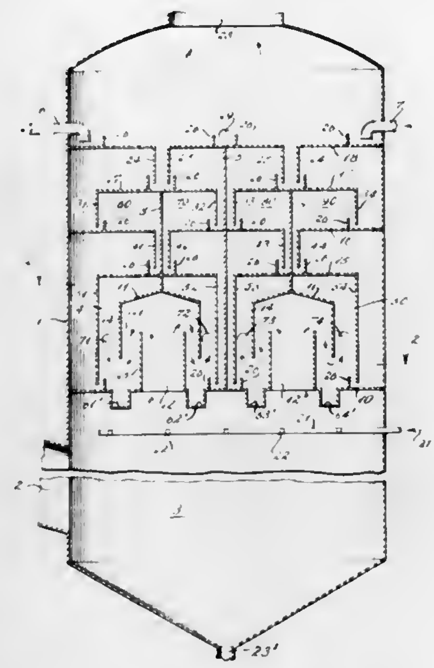
4,060,398
ABSORPTION PROCESS
Joseph Francois Houle, Oxford, Mass., assignor to Leah Mary Louise Houle, Oxford, Mass., a part interest
Filed Aug. 18, 1976, Ser. No. 715,285
Int. Cl.² B01D *47/00*
U.S. Cl. 55—73 **1 Claim**



1. An absorption process for purifying sulfur-containing exhaust gases emanating from a smoke-generating facility comprising the steps:
conducting the exhaust gases from the facility through a connecting gas inlet conduit to a water-cooled sulfuric acid bath communicating with the conduit,
directing the gases through the length of the bath via a bath conduit having an upstream entrance terminal disposed in the gas supply conduit and above the acid level in the bath and having a downstream discharge terminal reversed upon itself interiorly of the bath for the direct charge of the gases into the acid below the acid level in the bath, and
drawing by means of a vacuum pump the cleansed exhaust gases outwardly of the acid in the bath through a connecting gas outlet conduit for the venting of the cleansed gases therefrom to atmosphere.

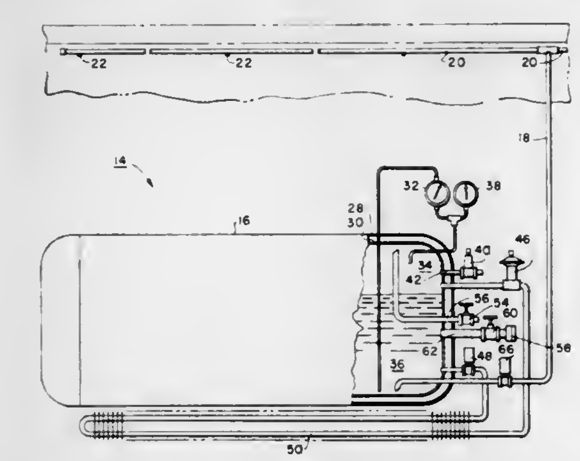
4,060,399
SCRUBBER-COOLER TOWER
Thomas G. Gleason, 99 Colonial Parkway, Manhasset, N.Y. 11030
Filed Aug. 30, 1976, Ser. No. 718,600
Int. Cl.² B01D *47/02*
U.S. Cl. 55—244 **5 Claims**

1. A gas liquid contact apparatus adapted for efficient operation at high turn down comprising:
a vertical tower through which scrubbing liquid flows downwardly therethrough from at least one inlet thereto and gas flows upwardly therethrough from an inlet thereto to an outlet therefrom in counter flow gas-liquid contact.
at least one vertical baffle within said tower dividing the tower into compartments constituting separated gas-liquid contact flow paths through the tower; and
means for blocking gas flow through at least one compartment hereinafter termed the first compartment without impeding flow through another compartment, such means including a trap out tray at the bottom of the first compartment from which the liquid effluent is removed and a pair of drains in flow communication with said trap out



tray, said drains being disposed at different elevations and means to close off the lower elevation drain forcing thereby a rise in the level of liquid effluent on said trap out tray to the level of the higher elevation drain, the rise in liquid level creating a hydrostatic head barrier to gas flow into the first compartment.

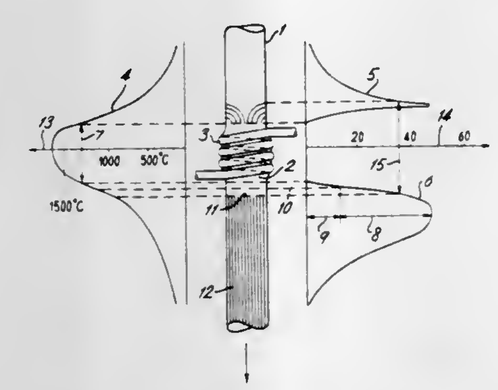
4,060,400
REFRIGERATED SEMITRAILER TRUCK FOR LONG AND LOCAL DELIVERIES
David Roth Williams, Dallas, Tex., assignor to Henry L. Franke
Filed Aug. 22, 1975, Ser. No. 606,836
Int. Cl.² F25D *29/00*
U.S. Cl. 62—162 **6 Claims**



1. A vehicle for transporting a substantial load of frozen foods over a substantial distance and then off-loading portions of the load at each of a number of relatively closely spaced destinations which comprises:
a vehicle having an insulated load carrying compartment having at least one access door;
a mechanical refrigeration unit for refrigerating the compartment by means of a compression-expansion refrigeration cycle;
a cryogenic refrigeration unit for introducing liquified gas into the compartment when enabled by a manual switch of a control system and not disabled by the control system; and
a control system including

a. manual means for manually enabling operation of the control system,
b. high temperature means for automatically disabling the cryogenic refrigeration unit in response to the temperature of the air space in the compartment rising above a predetermined maximum value,
c. detection means for disabling the high temperature means to permit operation of the cryogenic refrigeration unit in response to a failure of the compression-expansion refrigerator unit to maintain the temperature of the air space in the chamber at or below the predetermined maximum value,
d. low temperature means for disabling the cryogenic refrigeration unit in response to the temperature of the air space compartment falling below a predetermined minimum value, and
e. door detection means for automatically disabling the cryogenic refrigeration unit when an access door to the compartment is opened.

4,060,401
METHOD FOR MAKING ALIGNED FIBROUS CRYSTALS
Alan Maries, London, and Philip Sydney Rogers, Rickmansworth, both of England, assignors to National Research Development Corporation, London, England
Filed Apr. 1, 1976, Ser. No. 672,599
Claims priority, application United Kingdom, Apr. 2, 1975, 13456/75
Int. Cl.² C03B *32/00, 31/00*
U.S. Cl. 65—33 **10 Claims**

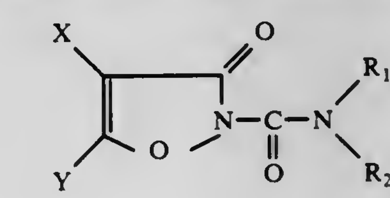


1. A method of producing a rod which comprises essentially aligned individual fibrous crystals displaying a silicate chain structure, said method comprising the successive steps of:
1. providing a rod of siliceous material which when subjected to melting and drawing yields at its crystallization temperature a primary crystalline phase having a silicate chain structure, said siliceous material selected from the group consisting, by weight percent, of:
a. CaO 30%, SiO_2 50%, ZnO 20%;
b. CaO 35%, SiO_2 55%, ZnO 10%;
c. CaO 26%, MgO 2%, Al_2O_3 13%, SiO_2 46%, ZnO 13%; and
d. CaO 42.5%, SiO_2 50%, Na_2O 7.5%;
2. providing an orifice of a coil of metallic material;
3. drawing said rod through said metallic oil and heating said rod to form a melt which melt is both supported by and in contact with said heated metallic coil such that the melt crystallizes out in the form of aligned fibrous crystals;
4. drawing the rod and melt through said coil at a predetermined rate while concurrently:
i. maintaining the melt in a molten condition as it is drawn through said heated coil by heating said coil, and
ii. adjusting the rate of drawing to be within the speed of propagation of said crystalline phase through the melt, thereby

forming fiberous crystals substantially continuously and in a substantially parallel relationship to both each other and the longitudinal axis of the rod.

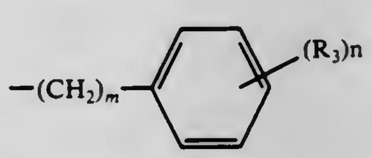
4,060,402
ISOXAZOLONE DERIVATIVES, THEIR PREPARATION AND THEIR USE AS PLANT GROWTH REGULATORS
Kazuo Tomita, Yokosuka; Tadashi Murakami, Tokyo; Yoshio Yamazaki, and Toyokuni Honma, both of Nozu, all of Japan, assignors to Sankyo Company Limited, Tokyo, Japan
Division of Ser. No. 517,298, Oct. 23, 1974, which is a continuation-in-part of Ser. No. 498,617, Aug. 19, 1974, abandoned, which is a continuation of Ser. No. 308,942, Nov. 24, 1972, abandoned. This application Apr. 9, 1975, Ser. No. 566,238
Claims priority, application Japan, Oct. 19, 1972, 47-104720; Oct. 19, 1972, 47-104721
Int. Cl.² A01N *9/22;* C07D *261/10*
U.S. Cl. 71—76 **5 Claims**

1. A composition for herbicidal or plant growth retardation use which comprises a herbicidally or plant growth retarding effective amount of 0.1 - 99% by weight, based upon the composition, of a compound having the formula



wherein
X is hydrogen atom, lower alkyl or halogen atom;
Y is hydrogen atoms, lower alkyl or phenyl; and
R_1 and R_2 may be the same or different and each represents lower alkyl, dialkoxyalkyl having from 1 to 3 carbon atoms in each of the alkyl and alkoxy portions, alkoxycarbonylalkyl having 1 to 4 carbon atoms in the alkoxy portion and 1 to 2 carbons in the alkyl portion, cycloalkyl having from 5 to 7 carbon atoms, alkeny having from 3 to 5 carbon atoms, alkynyl having from 3 to 4 carbon atoms, lower alkoxy, substituted phenyl having the formula

wherein R_3 is lower alkyl, halogen, lower alkoxy, alkoxycarbonyl having 1 to 4 carbon atoms in the alkoxy portion, nitro or trifluoromethyl, and n is an integer from 0 to 3 and R_3 may be the same or different, or substituted aralalkyl having the formula



wherein m is 1 or 2 and R_3 and n are as defined above and an inert carrier.--

4,060,403
METHOD OF CONTROLLING WEEDS WITH N-(3-METHYL-5-ISOTHIAZOLYL)-2-METHYLPENTANAMIDE
Joseph Deli, Rockford, Ill., and Henry C. Stevens, Akron, Ohio, assignors to PPG Industries, Inc., Pittsburgh, Pa.
Division of Ser. No. 574,792, May 5, 1975, Pat. No. 4,013,675. This application Aug. 23, 1976, Ser. No. 716,722
Int. Cl.² A01N *9/12*
U.S. Cl. 71—90 **10 Claims**

1. A method of controlling weeds which comprises contacting the environment of the weed with a herbicidal dosage of

the compound N-(3-methyl-5-isothiazolyl)-2-methylpentanamide.

4,060,404
SELECTIVE HERBICIDE FOR SUGARCANE
Arlyn Wayne Evans, Memphis, Tenn., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.
Continuation-in-part of Ser. No. 700,079, July 6, 1976, abandoned, which is a continuation of Ser. No. 607,896, Aug. 26, 1975, abandoned. This application Aug. 9, 1976, Ser. No. 712,194
Int. Cl.² A01N *9/22*
U.S. Cl. 71—93 **5 Claims**

1. Method for preventing and controlling undesired vegetation in sugarcane crops without causing significant injury to said crop comprising applying to the locus of said crop an effective amount of 1-methyl-3-cyclohexyl-6-dimethylamino-s-triazine-2,4(1H,3H)-dione.

4,060,405
SELECTIVE HERBICIDE FOR EVERGREEN SEEDLINGS
Aaron Waddington Welch, Raleigh, N.C., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.
Filed Aug. 26, 1975, Ser. No. 607,897
Int. Cl.² A01N *9/22*
U.S. Cl. 71—93 **8 Claims**

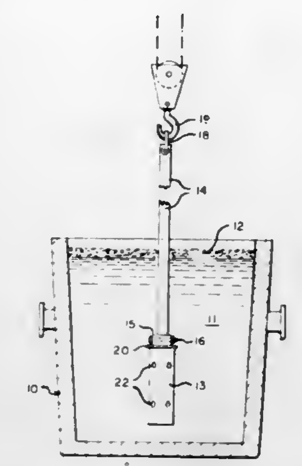
1. Method for preventing and controlling undesired vegetation in the locus of evergreen seedlings without causing significant injury to said seedlings comprising applying to the locus of said seedlings an effective amount of 1-methyl-3-cyclohexyl-6-dimethylamino-s-triazine-2,4(1H, 3H)dione.

4,060,406
ARC STEELMAKING
Evan Thomas Richard Jones, Birmingham, England, assignor to Foseco International Limited, Birmingham, England
Filed July 8, 1976, Ser. No. 703,674
Claims priority, application United Kingdom, July 16, 1975, 29920/75
Int. Cl.² C21C *5/52;* **C22B** *9/10*
U.S. Cl. 75—12 **12 Claims**

1. A slag conditioner for use in electric arc steelmaking, which conditioner comprises by weight:
alumina—30 to 80%
aluminium—10 to 30%
fluorspar—5 to 40%
and up to 20% by weight of alkali metal carbonate.

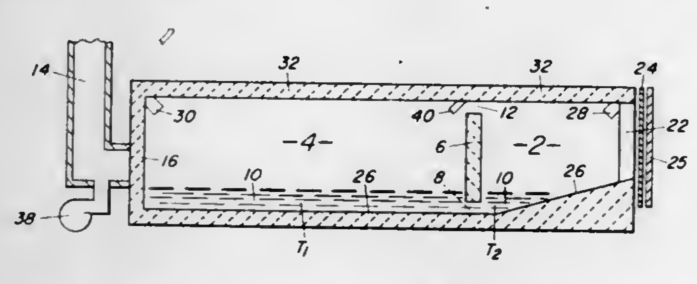
4,060,407
METHODS AND APPARATUS FOR ADDING MISCHMETAL TO MOLTEN STEEL
Joseph R. Jackman, West Pittsburgh, Pa., assignor to Reactive Metals & Alloys Corporation, West Pittsburgh, Pa.
Division of Ser. No. 607,625, Aug. 25, 1975, Pat. No. 4,022,444. This application Nov. 22, 1976, Ser. No. 744,123
Int. Cl.² C21C *7/00;* **C22C** *23/06*
U.S. Cl. 75—58 **7 Claims**

1. The method of adding mischmetal to steel comprising the steps of:
a. forming a composite article consisting essentially of a metal canister filled with a mischmetal-magnesium alloy in which the magnesium is present in an amount sufficient to generate stirring in a molten steel bath to which it is added in the range 1% to 2.5% and the balance is mischmetal,
b. plunging the metal canister containing mischmetal magnesium alloy beneath the surface of a molten steel bath being treated, and



c. holding the metal canister beneath the surface of the steel bath until the canister and mischmetal-magnesium alloy is dissolved.

4,060,408
MELTING PROCESS
John E. Kuhn, Lower Burrell, Pa., assignor to Aluminum Company of America, Pittsburgh, Pa.
Filed Jan. 31, 1977, Ser. No. 763,829
Int. Cl.² C22B *21/00*
U.S. Cl. 75—68 R **12 Claims**

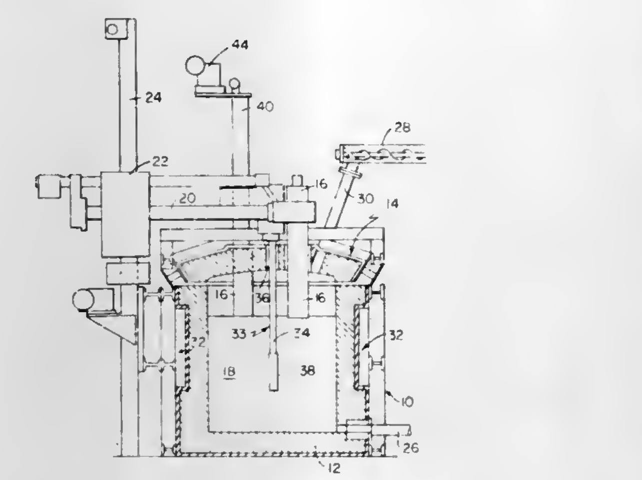


1. A process for burning hydrocarbons in vapors emitted from contaminated metallic scrap comprising the steps of:
charging the scrap into a charging chamber of a furnace having a molten bath moving therethrough, said bath located substantially across the bottom portions of said charging chamber and a directly fired heating chamber, said chambers separated by a wall, said chambers in communication below the surface of the molten bath through at least one lower passageway through said wall, and said chambers in communication above the surface of the molten bath through at least one upper passageway through said wall;
maintaining a negative pressure in the heating chamber with respect to the charging chamber, whereby hydrocarbon vapors emitted from the scrap charged into the charging chamber are drawn through the upper passageway through said wall and into the heating chamber by said pressure differential; and
completing the combustion of the hydrocarbons in the vapors in the heating chamber.

4,060,409
MECHANICALLY STIRRED FURNACE FOR PYROMETALLURGICAL OPERATIONS AND PROCESSES
Paul R. Ammann, Boxford; Peter B. Crimes, Sudbury, and Jonathan J. Kim, Chelmsford, all of Mass., assignors to Kennecott Copper Corporation, New York, N.Y.
Filed Feb. 23, 1976, Ser. No. 660,147
Int. Cl.² C22B *9/02;* **C21C** *5/52;* **H05B** *7/18*
U.S. Cl. 75—93 R **12 Claims**

1. A pyrometallurgical system for maintaining a material in a molten state, comprising

a vessel for the material, said vessel having an internal shape, in a horizontal cross section, which is dividable into a predetermined number of substantially equiaxed cells of substantially uniform size,
a plurality of mechanical stirrers projecting into said vessel



for stirring molten material therein, each stirrer being substantially centered in a cell,
drive means for rotating each stirrer with a predetermined sense of rotation, and
heating means for supplying heat to the contents of said vessel.

4,060,410
PROCESS FOR REMOVING HEAVY METALS FROM FLUID MEDIA
Marcel Laszlo, Utmarksvagen 17, 151 52 Sodertalje, Sweden
Filed July 6, 1976, Ser. No. 702,791
Claims priority, application Sweden, July 7, 1975, 75077438
Int. Cl.² C22B *5/00*
U.S. Cl. 75—109 **17 Claims**

1. A method for removing one or more heavy metals from a fluid containing same, said heavy metal being selected from the group consisting of mercury, lead, cobalt, silver, gold, copper, zinc, cadmium, bismuth, manganese, arsenic, tin and nickel, which comprises the steps of placing a metal sheet in said fluid so that a portion of the surface of said sheet contacts said fluid and another portion of said sheet surface contacts the ambient air, said metal sheet being made of a metal having a lower redox potential than said heavy metal; contacting said fluid and said sheet with a solution of a complex effective as an activator to cause said heavy metal to precipitate in the fluid; and then separating said precipitate from said fluid.

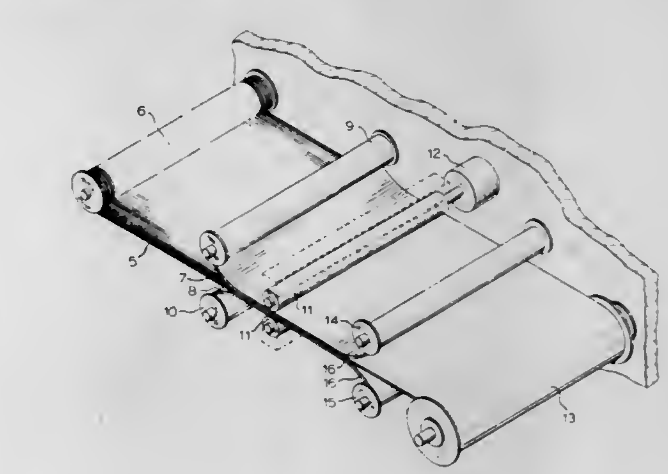
4,060,411
PRECIPITATION-HARDENABLE, NITRIDED ALUMINUM ALLOYS AND NITRIDED MOTHER ALLOYS THEREFOR
Mituhiro Goto, Tokyo; Isao Hashimoto, Ichikawa; Shugo Watanabe, Tokyo, and Koji Itabashi, Kitamoto, all of Japan, assignors to Mamiya Koki Kabushiki Kaisha, Otsuka, Japan
Filed Feb. 9, 1976, Ser. No. 656,601
Claims priority, application Japan, Feb. 26, 1975, 50-23529; Feb. 26, 1975, 50-23530
Int. Cl.² C22C *1/02, 1/03, 21/00*
U.S. Cl. 75—138 **8 Claims**

1. A process for producing a nitrided mother alloy to be used in preparing a final composition which is a precipitation-hardenable, nitrided aluminum alloy which nitrided aluminum alloy consists essentially of 3.2 to 8.0% of zinc, 1.2 to 4.5% of magnesium, 0.1 to 1.0% of copper, 0.1 to 0.5% of chromium, 0.01 to 1.2% of zirconium and/or titanium, 0.2 to 1.2% of nickel or cobalt, 0.02 to 1.0% of beryllium, 0.005 to 0.2% of boron, and the remainder aluminum, the process comprising the steps of alloying metals selected from the group consisting of (1) chromium, zirconium and/or titanium, nickel or cobalt, beryllium, boron and aluminum, and (2) chrominum, zirconium and/or titanium, nickel or cobalt, beryllium boron, aluminum and at least one selected from the group consisting of zinc, magnesium and copper, the amount of the metals other than aluminum being 2 to 10 times larger than that desired in the final composition, and blowing a nitriding gas selected from the group consisting of molecular nitrogen, decomposable nitrogenous gases and mixtures thereof into the molten alloy having a temperature of 800° C to 1200° C to produce the nitrided mother alloy.

4,060,412
METHOD FOR PREPARING A FIBER REINFORCED METAL MATRIX USING MICROSCOPIC FIBERS
Amarnath P. Divecha, Falls Church, Va., assignor to A Silag Inc., McMurray, Pa.
Filed Jan. 8, 1976, Ser. No. 647,442
Int. Cl.² B22F *3/00*
U.S. Cl. 75—203 **11 Claims**

1. A process of preparing a fiber-reinforced metal composite which includes dry mixing a metal powder with ceramic fibers to obtain a substantially uniform dispersion of fibers throughout a dry metal-fiber mixture, cold pressing the metal powder-fiber mixture so formed at a first predetermined pressure, heating the pressed metal powder-fiber mixture to a temperature sufficient to permit further densification of the metal powder-fiber mixture, hot pressing the mixture to product further densification thereof, and cooling the resultant composite.

4,060,413
METHOD OF FORMING A COMPOSITE STRUCTURE
Peter J. Mazzei, Jordan, and Gerrit VanDrunen, Hamilton, both of Canada, assignors to Westinghouse Canada Limited, Hamilton, Canada
Filed June 11, 1976, Ser. No. 694,927
Claims priority, application Canada, Dec. 24, 1975, 242605
Int. Cl.² B22F *3/00*
U.S. Cl. 75—208 R **9 Claims**



1. A method of forming a composite article of specific shape formed from matrix material and reinforcing fibres comprising forming a flexible plastic tape including said matrix material in powdered form and a flexible plastic decomposable binder, arranging a plurality of continuous parallel fibres on the surface of said tape, embedding said fibres in said tape by heat and pressure or by applying a second layer of tape matrix material cutting from the resulting tape a plurality of laminae of suitable shape, arranging said laminae in a container in such a manner as to form said specific shape, subjecting said laminae to heat and outgassing to remove said decomposable binder and subjecting said laminae and container to heat and pressure to bond said matrix material and fibres into a substantially void free coherent composite article.

8. A method of forming a composite article formed from a matrix of superalloy and metallic fibres selected from the class of tungsten, molybdenum, silicon carbide and graphite fibres,

comprising forming a flexible tape consisting of powdered superalloy and a plastic organic material, arranging a plurality of continuous parallel fibres between two layers of said tape, bonding the tape and fibres into a substantially void free composite tape, substantially filling a metallic container with laminae cut from said composite tape, heating and outgassing said container to decompose and remove said organic material, flushing said heated container with hydrogen gas, filling any remaining space in said container with powdered superalloy, evacuating said container and subjecting said container to hot isostatic pressing sufficient to form a coherent composite article.

4,060,414

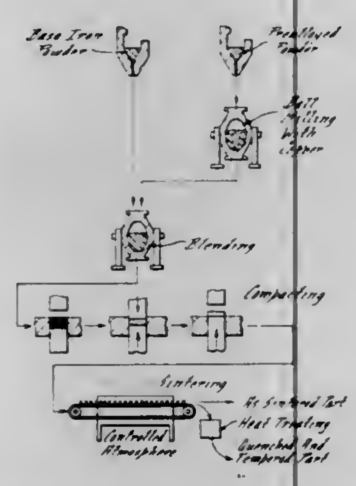
COPPER COATED IRON-CARBON EUTECTIC ALLOY POWDERS

Sydney M. Kaufman, Livonia, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Division of Ser. No. 584,562, June 6, 1975, Pat. No. 4,011,077. This application May 14, 1976, Ser. No. 686,620

Int. Cl.² C22C *1/02*

U.S. Cl. 75—246 **3 Claims**



1. A sintered iron based alloy composition, comprising:

a matrix of iron-carbon particles sintered together in intimate contact,

each iron-carbon particle having at least an interior peripheral zone containing dissolved and diffused metal alloying ingredients, said ingredients consisting essentially of copper and at least one of chromium and manganese in an amount of 2–10% by weight, and

said iron-carbon particles also each having a gradient proceeding from an outer exterior region rich in said metal alloying ingredients, and

said particles having a carbon content of 0.4–.68% by weight.

4,060,415

ELECTROPHOTOGRAPHIC PROCESS

Petrus J. M. van Nunen, Reuver, and Willem van Barneveld, Grubbenvorst, both of Netherlands, assignors to Océ-van der Grinten, N.V., Venlo, Netherlands

Filed June 4, 1973, Ser. No. 366,845

Claims priority, application Netherlands, June 7, 1972, 7207688

Int. Cl.² G03G *5/08*

U.S. Cl. 96—1.8 **14 Claims**

1. An electrophotographic process which comprises charging electrostatically and thereafter exposing imagewise a photoconductive layer of less than 6 microns in thickness containing zinc oxide and a binder in a weight ratio ZnO:binder of between 9 and 14 to 1 and which layer is chargeable at most to a surface potential between 100 and 250 V, said layer being present on a flexible support having a specific resistance of less than 10^{13} ohm. cm, and developing the charge pattern resulting on said layer so as to render it visible by contacting it during not more than 3 seconds with one-component developing powder of a mass thereof the particles of which are of substantially the same composition and predominantly comprise resin and finely divided relatively conductive material, and which has a specific resistance below 10^7 ohm. cm, while maintaining a connection for charge conductance, at least in part through said mass, between said powder and said support.

4,060,416

STABILIZATION OF FREE-RADICAL PHOTOSENSITIVE MATERIALS

Freddy Ghisleen Van Royen, Ranst; Ludovicus Maria Mertens, Borgerhout, and Jozef Willy Van Den Houte, Berchem, all of Belgium, assignors to AGFA-GEVAERT N.V., Mortsel, Belgium

Filed Sept. 14, 1976, Ser. No. 723,179

Claims priority, application United Kingdom, Sept. 16, 1975, 38072/75

Int. Cl.² G03C *1/52, 5/24, 1/48*

U.S. Cl. 96—48 R **9 Claims**

1. A photosensitive recording material, which comprises a support bearing at least one layer containing at least one photosensitive organic polyhalogen compound producing free radicals upon exposure to ultraviolet and/or visible light, a dye precursor in said layer or in a layer adjacent thereto, which by the action of said free radicals forms a dye, and a thermally activatable stabilizing substance within the scope of the following general formula:

$$Y{-}O{-}\overset{\displaystyle O}{\overset{\|}{C}}{-}X$$

wherein:

X represents

1. an aryl group,
2. the group —OR¹ in which R¹ is an aryl group,
3. the group —CH=CH—R² in which R² is an aryl group, or
4. the group

$$-N\begin{matrix} \diagup R^3 \\ \diagdown R^4 \end{matrix}$$

in which R³ stands for hydrogen, an alkyl group, a cycloalkyl group, an aryl group and in which R⁴ stands for an alkyl group, a cycloalkyl group, or an aryl group, or R³ and R⁴ together represent the necessary atoms to close a saturated 5- or 6-membered nitrogen-containing heterocyclic ring, and

Y represents the group

$$-N{=}\underset{\displaystyle R^5}{\underset{|}{C}}{-}R^6$$

in which R⁵ represents hydrogen or an alkyl group, and R⁶ represents (1) an aryl group or (2) an acyl group.

9. A recording process including image stabilization comprising the steps of:

1. image-wise exposing to ultraviolet radiation and/or visible light a photosensitive recording material, which comprises at least one supported or self-supporting layer containing at least one photosensitive organic polyhalogen compound producing free radicals upon exposure to ultraviolet radiation and/or visible light, a dye precursor in said layer or in a layer adjacent thereto, which by the action of said free radicals forms a dye in the said layer or in a layer adjacent thereto, and a thermally activatable stabilizing substance within the scope of the following general formula:

$$Y{-}O{-}\overset{\displaystyle O}{\overset{\|}{C}}{-}X$$

wherein:

X represents

1. an aryl group,
2. the group —OR¹ in which R¹ is an aryl group,
3. the group —CH=CH—R² in which R² is an aryl group, or
4. the group

$$-N\begin{matrix} \diagup R^3 \\ \diagdown R^4 \end{matrix}$$

in which R³ stands for hydrogen, an alkyl group, a cycloalkyl group or an aryl group and in which R⁴ stands for an alkyl group, a cycloalkyl group or an aryl group, or R³ and R⁴ together represent the necessary atoms to close a 5- or 6-membered saturated nitrogen-containing heterocyclic ring, and

Y represents the group

$$-N{=}\underset{\displaystyle R^5}{\underset{|}{C}}{-}R^6$$

in which R⁵ represents hydrogen or an alkyl group, and R⁶ represents an aryl group, or an acyl group, and

2. heating the photo-exposed material to effect conversion of non-decomposed polyhalogen compound into a non-photosensitive condition by means of said thermally activatable substance.

4,060,417

DIFFUSION TRANSFER ELEMENTS COMPRISING COLOR-PROVIDING COMPOUNDS CAPABLE OF CLEAVAGE UPON REACTION WITH SILVER IONS AND SILVER ION BARRIER LAYERS

Ronald F. W. Cieciuch; Roberta R. Luhowy, both of Newton; Frank A. Meneghini, Arlington, and Howard G. Rogers, Weston, all of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Continuation-in-part of Ser. No. 465,694, April 30, 1974, abandoned, which is a continuation-in-part of Ser. No. 317,168, Dec. 21, 1972, abandoned, which is a division of Ser. No. 155,123, June 17, 1971, Pat. No. 3,719,489. This application May 5, 1975, Ser. No. 574,296

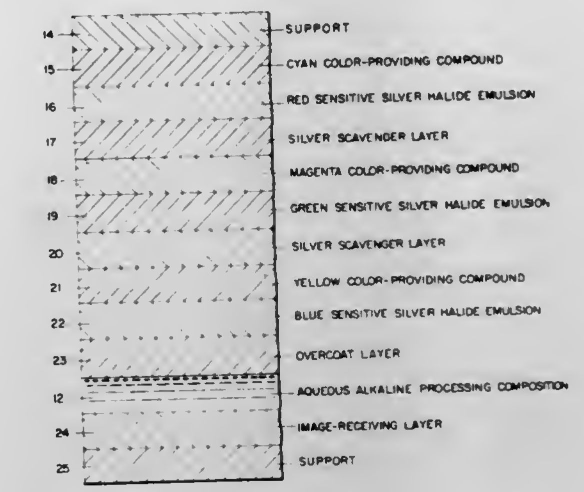
The portion of the term of this patent subsequent to Mar. 6, 1990, has been disclaimed.

Int. Cl.² G03C *7/00, 1/40, 1/76, 5/54*

U.S. Cl. 96—3 **52 Claims**

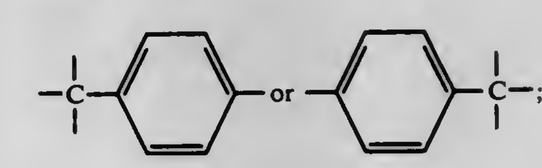
20. A photographic process for forming multicolor images comprising the steps of

a. exposing a photosensitive element comprising a plurality of layers including a support, at least two selectively sensitized silver halide emulsion layers, each of said emulsion layers having associated therewith, a color-providing compound capable of undergoing cleavage in the presence of an imagewise distribution of silver ions and/or soluble silver complex to liberate a color-providing moiety in an imagewise distribution corresponding to said distribution of silver ions and/or said complex, one of said color-providing compound and said color-providing moiety being diffusible in aqueous alkaline solution and the other being substantially non-diffusible in aqueous alkaline solution, and a scavenger layer containing a scavenger for silver ion and/or soluble silver complex, said scavenger layer being positioned between said two selectively sensitized silver halide emulsion layers, each of said color-providing compounds being a compound containing a group selected from



$$-S{-}X{-}\overset{|}{N}{-} \text{ and } -S{-}X{-}N{=} \text{ wherein X is } -\overset{|}{\underset{|}{C}}-;$$

$$-\overset{|}{C}{=}\overset{|}{C}{-}\overset{|}{\underset{|}{C}}{-};\ -\overset{|}{\underset{|}{C}}{-}\overset{|}{C}{=}\overset{|}{C}{-};$$



b. applying an aqueous alkaline processing composition to said photosensitive element to provide an aqueous alkaline solution of a silver halide developing agent and a silver halide solvent therein, thereby developing said photosensitive element;

c. forming in undeveloped areas of each of said emulsions an imagewise distribution of silver ions and/or soluble silver complex; and

d. contacting said imagewise distribution of silver ions and/or soluble silver complex formed in each of said emulsion with the emulsion's associated color-providing compound thereby forming corresponding imagewise distributions of each of said color-providing moieties.

4,060,418

PHENOXY CARBONYL DERIVATIVES OF A PARAPHENYLENEDIAMINE COLOR DEVELOPER AND THEIR USE IN AN IMAGE-RECEIVING SHEET FOR COLOR DIFFUSION TRANSFER

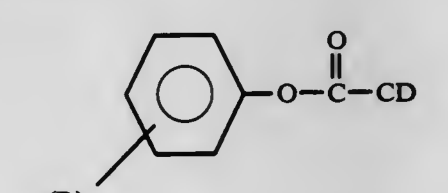
Burton H. Waxman, Endwell, and Michael C. Mourning, Vestal, both of N.Y., assignors to GAF Corporation, New York, N.Y.

Filed Feb. 13, 1976, Ser. No. 657,855

Int. Cl.² G03C *7/00, 5/54, 1/40;* **C07C** *79/46*

U.S. Cl. 96—29 D **15 Claims**

1. A receiving sheet for a photographic element containing at least one silver halide emulsion layer, which comprises a support carrying a hydrophilic colloid layer containing a compound of the formula:



wherein R is halogen or trifluoromethyl, *n* is 0 to 5, and CD is the residue of a paraphenylenediamine color developer having

a primary amino group available for oxidative coupling, the phenoxycarbonyl group being attached to the primary nitrogen atom of said paraphenylenediamine color developer.

12. In a process for forming diffusion transfer images in color, in which an imagewise exposed photosensitive diffusion transfer element having at least one photographic silver halide emulsion and a color former associated therewith is developed by contact with an aqueous alkaline processing solution to form an imagewise distribution of diffusible color former in unexposed areas of the silver halide emulsion and at least a portion of said diffusible color former is transferred by imbibition to a superposed image receiving sheet, the improvement wherein the receiving sheet is the receiving sheet of claim 1, the receiving sheet is treated with a strong oxidizing agent to oxidize said compound, and a positive dye image is formed by coupling of the color former transferred to the receiving sheet with said oxidized compound to form an indoaniline or azomethine dye.

4,060,419

METHOD OF FORMING SILVER HALIDE GRAINS BY ELECTROLYSIS

Arthur M. Gerber, Boston, and Vivian K. Walworth, Concord, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed Apr. 1, 1976, Ser. No. 672,647

Int. Cl.^{2} G03C *1/02; C25B 1/24*

U.S. Cl. 96—94 R **34 Claims**

34. A method for forming a photographic silver halide emulsion layer which comprises the steps of:

a. the substantially simultaneous generation of silver ions and halide ions in a solution of an electrolyte by electrolysis, employing a silver anode and a cathode which is a source of halide ions;

b. precipitating the ion pairs remote from said anode and cathode to provide silver halide grains in the substantial absence of counterions in said electrolyte;

c. growing said grains to a predetermined size;

d. photographically sensitizing said grains;

e. disposing said grains in a polymeric binder material; and

f. coating said binder and said grains on a support.

4,060,420

SULFONYLACETATE ACTIVATOR-STABILIZER PRECURSOR

Paul Barrett Merkel, and Hans Gway Ling, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 6, 1976, Ser. No. 712,459

Int. Cl.^{2} G03C *1/02, 5/24, 1/34*

U.S. Cl. 96—114.1 **28 Claims**

1. In a heat developable and heat stabilizable photographic element comprising a support having thereon, in reactive association, (a) a photographic silver salt, (b) a photographic silver salt developing agent, (c) a binder, and (d) a stabilizing concentration of an activator-stabilizer precursor having a base portion and an acid portion the improvement wherein said acid portion is an alpha-sulfonylacetate.

4,060,421

COMBINED REVERSIBLE AQUEOUS COLLOIDAL DENTAL IMPRESSION MATERIAL

Ikuji Yoshikawa, 1198, Iwato, Komae, Tokyo; Yoshihisa Noro, 71-16, Narashinodai 4-chome, Funabashi, Chiba, and Junji Okaneya, No. 204, 35-14, Satsukigaoka 1-chome, Chiba, Chiba, all of Japan

Filed May 21, 1976, Ser. No. 688,591

Claims priority, application Japan, Dec. 16, 1975, 50-149713

Int. Cl.^{2} C08L *5/12*

U.S. Cl. 106—38.5 D **7 Claims**

1. A reversible aqueous colloidal dental impression material emplaceable about a tooth for making an impression thereof, and which effectively bonds to an alginate solidifying material placed therearound in a combined impression process, said reversible impression material comprising:

respective quantities of water and agar-agar;

minor amounts of silicone oil and potassium sulfate for minimizing the formation of rough skin when said impression material is in contact with dental plaster; and

a minor amount of water soluble starch sufficient for causing effective bonding between said impression material and said alginate solidifying material in a combined impression process.

4,060,422

SEALING GLASS FOR GLASS LASER

Yoshiyuki Asahara, Higashiyamato, Japan, assignor to Hoya Corporation, Tokyo, Japan

Filed Dec. 8, 1976, Ser. No. 748,444

Claims priority, application Japan, Dec. 9, 1975, 50-146757

Int. Cl.^{2} C03C *3/16*

U.S. Cl. 106—47 Q **1 Claim**

1. A sealing glass for a glass laser comprising, in mole percent, 45 to 65% P_2O_5, 15 to 35% ZnO, 5 to 25% PbO, 4 to 12% Li_2O, 1 to 4% Al_2O_3, 0 to 7% Sb_2O_3, 0 to 5% Ag_2O, and 2.0 to 10% V_2O_5.

4,060,423

HIGH-TEMPERATURE GLASS COMPOSITION

George L. Thomas, Bay Village, Ohio, assignor to General Electric Company, Schenectady, N.Y.

Filed July 27, 1976, Ser. No. 708,949

Int. Cl.^{2} C03C *3/04, 3/10*

U.S. Cl. 106—52 **4 Claims**

1. A molybdenum seal glass composition which consists essentially of oxides in approximate percent by weight 55–68 SiO_2, 15–18 Al_2O_3, 7–13 CaO, and 6–16 BaO, along with minor amounts of incidental impurities, residual fluxes, and refining agents, wherein the weight ratio of Al_2O_3 to combined weight ratio of CaO and BaO is about in the range 0.6:1 to 1:1 so as to reside in the eutectic region of this aluminosilicate system, said glass composition having a liquidus temperature no greater than about 1250° C, a strain point of at least about 725° C, and an average coefficient of linear thermal expansion in the 0–300° C temperature range between about 42 $\times$ 10^{-7} cm/cm/° C to about 48 $\times$ 10^{-7} cm/cm/° C.

4,060,424

LOW TEMPERATURE SETTING REFRACTORY CEMENTS

Harriet E. Hofmann, Shrewsbury, Mass., assignor to Norton Company, Worcester, Mass.

Filed Feb. 3, 1976, Ser. No. 654,882

Int. Cl.^{2} C04B *35/10, 35/56, 35/18, 35/04*

U.S. Cl. 106—55 **1 Claim**

1. A low temperature setting dry refractory cement raw batch mix comprising from 95 to 99.5% by weight of a refractory grain selected from the group consisting of aluminum oxide, magnesium oxide, silicon carbide, mullite, spinel, and mixtures thereof, and a low temperature setting bond which is a borosilicate glass having an average particle size of approximately 10 microns, said bond being composed, on a weight basis, of 1 to 65% silicon oxide, 5 to 35% boron oxide, 0 to 25% aluminum oxide, 0 to 25% sodium oxide, 0 to 8% potassium oxide, 0 to 15% calcium oxide, 0 to 4% boric acid, 0 to 10% zinc oxide, 0 to 35% lead oxide, 0 to 45% phosphorous pentoxide, 0 to 15% zirconium oxide, 0 to 10% titanium oxide, and 0 to 20% of an inorganic fluorine compound, said bond having a softening range between approximately 350° to 800° C.

4,060,425

SUPER RAPID HARDENING MIXTURE

Yutaka Harada; Noriyuki Itai, both of Musashino; Hiroshi Ucikawa, Funabashi; Hajime Kato, Yokohama; Katutoshi Sato, Adachi, and Akira Itoh, Adachi, all of Japan, assignors to Japanese National Railways, Tokyo; Onoda Cement Company Limited, Yamaguchi and Nichireki Chemical Industry Company Limited, Tokyo, all of, Japan

Filed Mar. 31, 1976, Ser. No. 672,511

Claims priority, application Japan, Apr. 5, 1975, 50-40791

Int. Cl.^{2} C04B *7/02*

U.S. Cl. 106—90 **15 Claims**

1. A super rapid hardening mixture, comprising

a. a super rapid hardening cement comprising as essential components 1–60 weight % $11CaO.7Al_2O_3.CaX_2$, wherein X is halogen, more than 5 weight % $3CaO.SiO_2$ and $CaSO_4$ such that the weight ratio of Al_2O_3/SO_3 ranges from 0.4–3.0 and such that the upper limit of said $3CaO.SiO_2$ is established by the amounts of said $11CaO.7Al_2O_3.CaX_2$ and $CaSO_4$ present in said cement;

b. at least one short range strength accelerator selected from the group consisting of (b-1) from 1–50 weight % of $CaO.Al_2O_3$, $12CaO.7Al_2O_3$, $3CaO.3Al_2O_3.CaF_2$ or $CaO.2Al_2O_3$, (b-2) from 0.1 – 25 weight % of quick lime or slaked lime, (b-3) from 0.002–2.5 weight % of monoethanolamine, diethanolamine, or triethanolamine, (b-4) from 0.02–1% of monoethyleneglycol, diethyleneglycol, triethyleneglycol or polyethyleneglycol and (b-5) from 0.2–2.5 weight % calcium sulfate hemihydrate with the proviso that Al_2O_3/SO_3 ratio of said mixture is maintained within a range of 0.4–3.0;

c. at least one emulsion selected from the group consisting of from 0.02–3.0 parts by weight of a bituminous emulsion based on the nonvolatile content of the emulsion per one part by weight of the said cement mixture, wherein the bituminous material of said emulsion is selected from the group consisting of straight asphalt, blown asphalt, semiblown asphalt, propane precipitated asphalt, natural asphalt, bitumen, coal, tar, oil tar, tar pitch, tall oil pitch, fatty acid pitch, heavy oil, rubber-incorporated bitumen and resin-incorporated bitumen; and

d. from 12 to 50% by weight of water in the total mixture.

4,060,426

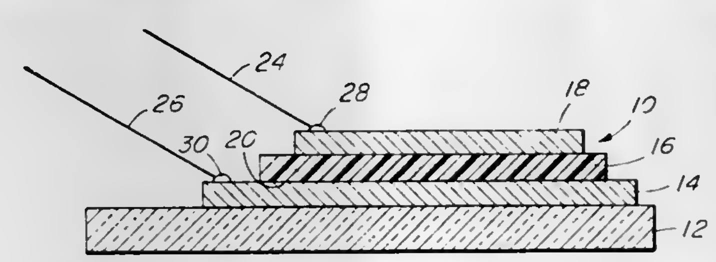
TIN INDIUM OXIDE AND POLYVINYLCARBAZOLE LAYERED POLARIZED PHOTOVOLTAIC CELL

Michael Zinchuk, Waltham, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Continuation-in-part of Ser. No. 485,129, July 2, 1974, abandoned. This application June 14, 1976, Ser. No. 696,027

Int. Cl.^{2} H01L *31/06*

U.S. Cl. 136—89 NB **4 Claims**



1. A polarized photosensitive transducer of the type exhibiting both a photovoltaic and a photoconductive effect comprising:

a transparent substrate;

a first electrically conductive layer disposed on said substrate to a sufficient thickness to display a continuous electrical conductivity throughout while still accommodating the transmission of visible light;

a photoconductive layer comprising a mixture of poly-N-vinylcarbazole and 2,4,7-trinitro-9-fluorenone deposed on said electrically conductive layer; and

a second electrically conductive layer comprising tin oxide-indium oxide sputtered on said photoconductive layer to a sufficient thickness to display a continuous electrical conductivity throughout while accommodating the transmission of visible light to provide a barrier layer at the boundary between said photoconductive layer and said second layer resulting in said transducer displaying a polarized photovoltaic response regardless of transducer orientation with respect to incident radiation.

4,060,427

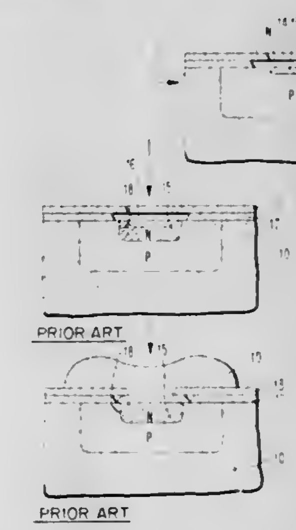
METHOD OF FORMING AN INTEGRATED CIRCUIT REGION THROUGH THE COMBINATION OF ION IMPLANTATION AND DIFFUSION STEPS

Conrad A. Barile, Wappingers Falls; Robert M. Brill, Fishkill; John L. Forneris, Lagrangeville, and Joseph Regh, Wappingers Falls, all of N.Y., assignors to IBM Corporation, Armonk, N.Y.

Filed Apr. 5, 1976, Ser. No. 673,314

Int. Cl.^{2} H01L *21/265, 21/324*

U.S. Cl. 148—1.5 **7 Claims**



1. In the fabrication of integrated circuits, a method of ion implantation into a semiconductor substrate comprising

forming a bottom layer of an electrically insulative material on a surface of said substrate,

forming an upper layer of another electrically insulative material on said bottom layer,

said upper layer being an ion implantation barrier and more etchable than said bottom layer in selected solvents and said bottom layer being more etchable than said upper layer in selected solvents,

etching at least one aperture through said upper layer to expose said bottom layer,

etching at least one aperture through said bottom layer to expose said surface, said aperture being in registration with and having greater lateral dimensions than said aperture in said upper layer thereby undercutting the upper layer at the periphery of said opening,

ion implanting conductivity-determining impurities of a selected type through said registered apertures into said substrate whereby said opening in said upper layer defines the lateral dimensions of said implantation and the portions of said substrate exposed by said undercutting at the periphery of said opening remain unimplanted, and

diffusing a conductivity-determining impurity of said selected type through said registered apertures in said substrate whereby said diffusion is made into said unimplanted peripheral portions of said exposed substrate and extends laterally beyond said periphery of the opening in the bottom layer.

4,060,428

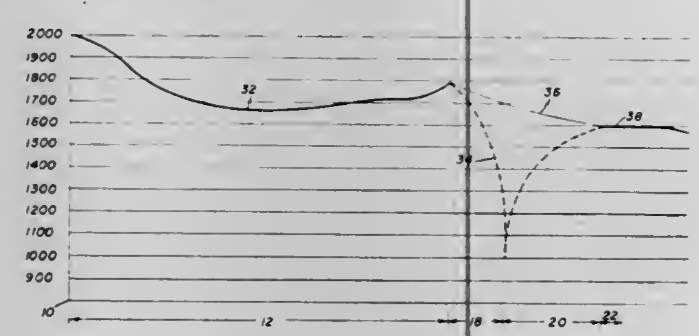
PROCESS FOR FORMING FERROUS BILLETS INTO FINISHED PRODUCT

Norman A. Wilson, Shrewsbury, Mass., and Johann Grotepass, Rehweg, Germany, assignors to Morgan Construction Company, Worcester, Mass.

Filed July 30, 1976, Ser. No. 710,023

Int. Cl.² C21D *7/14*

U.S. Cl. 148—12 R **9 Claims**



1. A process for forming a ferrous billet into a finished product comprising the following steps in sequence:

a. heating the billet to an elevated bulk temperature;

b. hot rolling the heated billet in a rolling mill to produce a semifinished product having an intermediate bulk temperature below said elevated bulk temperature and above a desired finish rolling bulk temperature;

c. subjecting the semifinished product to a cooling operation to lower the surface temperature thereof to a level below said finish rolling bulk temperature;

d. allowing the temperatures of the surface and center portions of the semifinished product to equalize substantially to said desired finish rolling bulk temperature;

e. finish rolling the semifinished product to a finished product; and,

f. subjecting the finished product to further cooling to an ambient bulk temperature.

4,060,429

MANGANESE-NICKEL ALLOYS

Anthony Vincent Dean, Solihull, and Philip James Ennis, Birmingham, both of England, assignors to The International Nickel Company, Inc., New York, N.Y.

Continuation-in-part of Ser. No. 431,676, Jan. 9, 1974, abandoned. This application May 1, 1975, Ser. No. 573,627

Claims priority, application United Kingdom, May 13, 1974, 2516874

Int. Cl.² C22C *22/00, 30/00, 38/58*

U.S. Cl. 148—31 **8 Claims**

3. A substantially non age-hardenable manganese-nickel alloy composition characterized in having been satisfactorily hot worked or cold worked or both and being further characterized by improved resistance to both general corrosion and stress-corrosion cracking, the alloy consisting essentially of from 5 to 15% nickel, 5 to 12% chromium, 30 to 60% iron, up to 2.5% copper, up to 2% lead, up to 1% silicon, up to 0.25% carbon and the balance essentially manganese, the manganese being from 18 to 55%.

4,060,430

PRODUCTION OF FILAMENTS OF HEXAGONAL CLOSE-PACKED METALS AND ALLOYS THEREOF

Sheldon Kavesh, Whippany, N.J., assignor to Allied Chemical Corporation, Morris Township, N.J.

Division of Ser. No. 499,386, Aug. 21, 1974, Pat. No. 3,960,200, which is a division of Ser. No. 306,472, Nov. 14, 1972, Pat. No. 3,845,805. This application Feb. 18, 1976, Ser. No. 659,171

The portion of the term of this patent subsequent to Nov. 5, 1991, has been disclaimed.

Int. Cl.² B22D *11/12*

U.S. Cl. 148—32 **2 Claims**

1. A filament consisting essentially of hexagonal close-packed metals and alloys thereof wherein the <001> axes are oriented at an angle greater than 60° to the filament axis said filament produced by a process which comprises the steps of

a. melting material comprising hexagonal close-packed metals or alloys thereof;

b. extruding a molten filament of the molten material;

c. passing said molten filament in sequence (1) through a controlled gaseous interface zone and (2) into a liquid quench zone, said quench zone comprising a liquid medium which is flowing cocurrently with and essentially as the same velocity as the filament introduced therein; and

d. recovering the solidified filament.

4,060,431

HEAT-TREATABLE STEEL

Helmut Brandis; Albert Von Den Steinen, both of Krefeld, and Serosh Engineer, Tonisvorst, all of Germany, assignors to Thyssen Edelstahlwerke Aktiengesellschaft, Krefeld, Germany

Filed Aug. 17, 1976, Ser. No. 715,203

Claims priority, application Germany, Aug. 23, 1975, 2537702

Int. Cl.² C22C *38/24, 38/26*

U.S. Cl. 148—36 **2 Claims**

1. A part made of an alloy steel consisting essentially of

0.35% to 0.6% C
0.1% to 0.5% Si
0.3% to 1.0% Mn
0.1% to 0.6% Cr, and
0.01% to 0.1% Nb
balance iron

which after austenisation is rapidly cooled from temperatures above 1000° C. to form a structure consisting principally of martensite and intermediate stage and then reheated to below the A_1 critical temperature, whereby the said part retains its hardness, and has a minimum tensile strength of 700 N/mm² and a notch toughness (DVM test) of at least 55 joules.

4,060,432

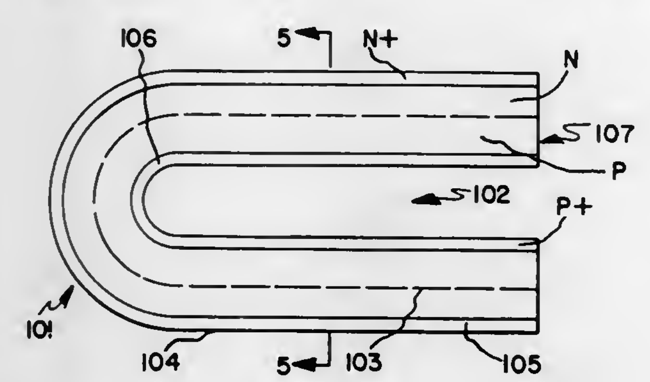
METHOD FOR MANUFACTURING NUCLEAR RADIATION DETECTOR WITH DEEP DIFFUSED JUNCTION

Robert N. Hall, Schenectady, N.Y., assignor to General Electric Co., Schenectady, N.Y.

Filed Oct. 20, 1975, Ser. No. 623,974

Int. Cl.² H01L *21/228*

U.S. Cl. 148—186 **15 Claims**



1. A method for manufacturing deep junctions in germanium bodies comprising:

forming a body of high purity p-type germanium having an initial acceptor concentration and

diffusing lithium, from a precalculated concentration of lithium, deep into said body, in the absence of electrolytic processes within said body, to form a junction of high purity n-type germanium and high purity p-type germanium within said body.

4,060,433

FOAM PHOSPHATIZING METHOD AND COMPOSITION

Gerald W. Chunat, Apple Valley, and James E. Maloney, Eagan, both of Minn., assignors to Economics Laboratory, Inc., St. Paul, Minn.

Filed Mar. 5, 1976, Ser. No. 664,165

Int. Cl.² C23G *7/08*

U.S. Cl. 148—6.17 **19 Claims**

1. A method of phosphatizing a metallic drainable surface, comprising the steps of:

A. providing a mixture comprising:

a. a phosphatizing composition containing at least 0.2% by weight of phosphate anions and having a pH ranging from about 3.0 to about 5.5;

b. at least about 0.25 parts by weight, per 100 parts by weight of said phosphatizing composition, of a high-foaming surfactant having an initial Ross-Miles foam height in excess of 100 mm. determined at 0.1% by weight concentration in water in a column of zero hardness water maintained at 50° C.; and

c. a volume of gaseous fluid which is relatively larger than the combined volume of said phosphatizing composition and said high-foaming surfactant; said gaseous fluid being gaseous at normal ambient temperatures;

B. generating an adherent foam spray comprising the mixture provided by said step (A) and directing said foam spray onto said metallic drainable surface to obtain an adherent foam deposit on said metallic drainable surface;

C. permitting said adherent foam deposit to adhere to said drainable surface until a phosphate coating weight of at least 10mg/ft² is obtained and until said adherent deposit has been in place on said surface for a single-pass, actual dwell time which inherently corresponds to a single-pass, vertical, ASTM D 609-61 panel dwell time of about 10-180 seconds whereby the resulting phosphatized metallic drainable surface, after draining of foam deposits therefrom, has an adherent phosphate coating weight of at least 10mg/ft², but is substantially free of powdery, nonadherent deposits.

11. A method for phosphatizing a three-dimensional object having exposed metallic surfaces comprising the steps of:

a. locating said object so that at least one of the metallic surfaces to be phosphatized is a drainable surface;

b. blending 0.2 to 5 parts by weight of an organic ammonium phosphate with 0.1-1.5 parts by weight of an organic ammonium fluosilicate; 0.01-1.0 parts by weight of a nitrated aromatic accelerator; 0.25-5 parts by weight of a high-foaming surfactant having an initial Ross-Miles foam height in excess of 100 mm. determined at 0.1% by weight concentration in water in a column of zero hardness water maintained at 50° C., selected from the group consisting of an alkyl-aryl sulfonate, an alkyl-phenolethylene oxide adduct, an alkyl ether sulfate, and mixtures thereof; essentially the balance of the resulting mixture being a liquid carrier selected from the group consisting of water, an aromatic liquid solvent, and mixtures thereof; said resulting mixture having a pH ranging from about 3.0 to about 5.5;

c. generating a foam from said mixture of said step (b) and a greater volume of air, relative to the volume of said mixture; and spraying said foam onto a said drainable surface, said volume of air being selected to provide an actual dwell time of foam deposit on said drainable surface, which actual dwell time is at least long enough to provide an adherent phosphate layer on said drainable surface in excess of 10mg/ft² but not long enough to create powdery, non-adherent deposits; said actual dwell time ranging from about 30 seconds to about 20 minutes; and

d. causing downward draining of the foam deposits, resulting from the spraying according to said step (c), on said drainable surface.

18. A foam phosphatizing composition comprising: air and a liquid, said liquid comprising:

Parts by Weight	
0.75–4	Phosphoric acid;
0.01–1.5	an accelerator system comprising a compound selected from the group consisting of a molybdenum oxide, a molybdate salt, a nitrated aromatic sulfonic acid, a nitrated aromatic sulfonate, and mixtures thereof;
0.25–10	at least one high foaming surfactant having an initial Ross-Miles foam height in excess of 100 mm. determined at 0.1% by weight concentration in water in a column of zero hardness water maintained at 50° C., said surfactant selected from the group consisting of an alkyl sulfonate; an alkyl sulfate; an alkyl ether sulfonate; corresponding acids thereof; an alkyl phenoxy polyethoxy ethanol; alkyl, ethyl cycloimidinium, 1-hydroxy, 3-ethyl alcoholate, 2-methyl-carboxylate; alkyl amine oxide; neutralized or non-neutralized polypeptide; and fatty acid diethanol amide;
0–100	organic liquid solvent having a flash point of excess of 85° F. and an initial boiling point in excess of 180° F.;
0–100	water;

said composition further containing about 1–3 equivalents of an amine for each three equivalents of phosphoric acid; the pH of said composition being in the range of about 3.0 to about 5.5, said foam having sufficient volume of air per volume of liquid to provide a foam having a controlled degree of stability and capable of adhering to overhead, inclined or vertical metal surface.

19. A foam phosphatizing composition comprising: gaseous fluid and a liquid, said liquid comprising:

0.75–4.0% by weight phosphoric or polyphosphoric acid; at least about one equivalent of an amine for each 3 equivalents of said acid;

0–1.5% by weight of an agent selected from the group consisting of an accelerator, a debronzing agent, and mixtures thereof;

0–1.5% by weight of a compound of the formula H_2MF_6 wherein M is an element of Group IV A or IV B of the Periodic Table;

at least one high-foaming surfactant having an initial Ross-Miles foam height in excess of 100 mm. determined at 0.1% by weight concentration in water in a column of zero

hardness water maintained at 50° C; and

substantially the balance of said liquid being a liquid carrier selected from the group consisting of water, a substantially hydrocarbon solvent, and mixtures thereof; said gaseous fluid being present in an amount sufficient to provide moderately stiff foam capable of remaining in adherent bonding contact with a vertical metal surface until a phosphate coating weight in excess of 10 mg/ft² is obtained, the pH of said composition being in the range of about 3.0 to about 5.5, said foam being sufficiently wet to flow under the influence of gravity once the adherent bond between the foam and metal surface relaxes or is broken by chemical change.

4,060,434

MATCH-HEAD COMPOSITIONS

Albert Frank Lanham, Maidstone; Philip Sydney Barned, Welling, and Sydney Ralph Potter, London, all of England, assignors to Bryant and May, London, England

Filed June 8, 1976, Ser. No. 693,898

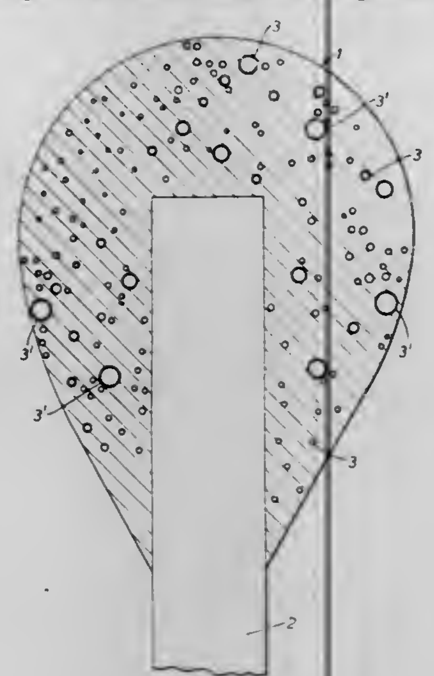
Claims priority, application United Kingdom, June 11, 1975, 25019/75

Int. Cl.² C06B *45/00*

U.S. Cl. 149—2 **9 Claims**

1. In a match-head composition, the improvement which comprises incorporating therein, as a strike sensitizer, from 1-33% by weight of hollow microspheres of siliceous material having a melting point above the combustion temperature of

the match-head composition, said microspheres having diameters in the range 5 to 5000 microns, a sphere density in the

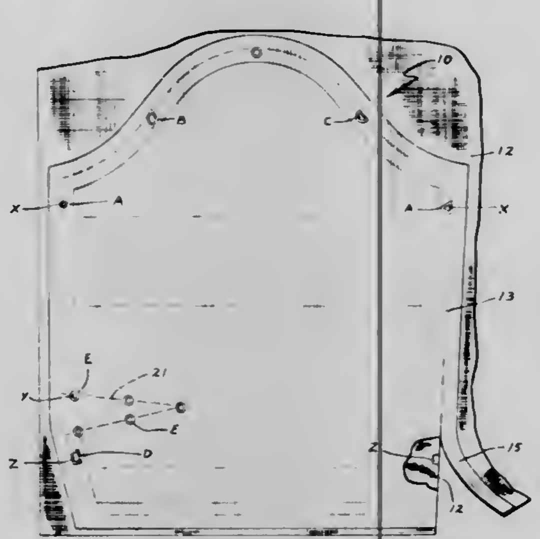


range 0.3 to 0.6 g/cc and a bulk density in the range 0.2 to 0.4 g/cc.

4,060,435
FLOATABLE INCENDIARY COMPOSITION
Fred Schroeder, Lakeview Terrace, Calif., assignor to Dow Corning Corporation, Midland, Mich.
Continuation-in-part of Ser. No. 487,474, July 11, 1974, abandoned. This application June 25, 1975, Ser. No. 590,370
Int. Cl.^{2} C06B *45/10, 33/00;* **F42B** *11/24*
U.S. Cl. 149—19.2 **4 Claims**

1. A floating incendiary composition comprising magnesium powder, an oxidizing agent for said magnesium, and a cured elastomeric polysiloxane binder, said composition further comprising a sufficient quantity of hollow microballoons to lower the specific gravity of the composition to less than 1.0, thereby rendering the composition floatable on the surface of water.

4,060,436
METHOD OF MARKING FOR GARMENT PATTERN
Eunice A. Carlin, 322 N. Mississippi Blvd., St. Paul, Minn. 55104
Filed Dec. 1, 1976, Ser. No. 746,483
Int. Cl.^{2} B44C *1/24*
U.S. Cl. 156—63 **3 Claims**



1. A method of applying markings onto material corresponding to garment pattern markings consisting of the steps of

a. forming apertures in a garment pattern at each marking point on said pattern,

b. forming corresponding of said apertures to have like configurations,

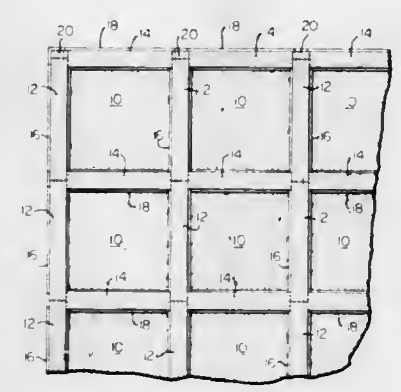
c. overlying material with said pattern,

d. forming marking members of material having an adhesive surface,

e. configuring said marking members to conform to said apertures, and

f. disposing said marking members through like of said apertures to secure the same therethrough to said underlying material.

4,060,437
PANELLING METHOD
Theodore M. Strout, 24 Sharon Lane, Wethersfield, Conn. 06109
Filed Mar. 23, 1977, Ser. No. 780,489
Int. Cl.^{2} E04F *13/00*
U.S. Cl. 156—71 **7 Claims**

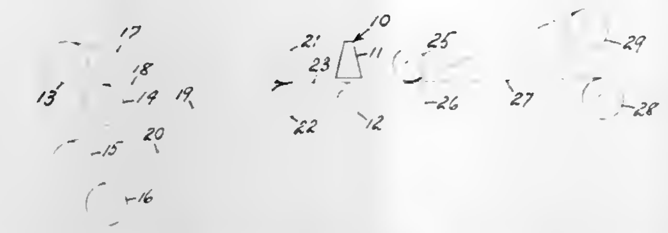


1. A method of panelling a surface comprising the steps of providing a plurality of similar flat rectangular panels each with a contact adhesive on a rear surface thereof, adhesively affixing the panels to the surface in quadrilateral abutting relationship to define continuous linear vertical and horizontal seam lines therebetween, providing first and second groups of similar narrow elongated inner marginal members each having a contact adhesive on a rear surface thereof and a centrally disposed outwardly projecting rectangular tab at each end, dimensioning said tabs so that two end-to-end adjacent and aligned members of one group define opposing rectangular notches adapted to receive and substantially fit the tabs of two aligned members of the other group when said two members of said other group are placed in perpendicular relationship with the members of said one group, providing each of the tabs of at least one of said groups of members with centrally disposed locating means, affixing members of said one group to said panels with each member overlaying a seam between adjacent panels and with the locating means on its tabs aligned with the seam, affixing members of said other group to said panels with each member overlaying a perpendicular seam between adjacent tabs on members of said one group so as to be located and aligned with the seam, providing first and second groups of similar narrow elongated outer marginal members each having a contact adhesive on a rear surface and being slightly narrower than said inner marginal members, and affixing said outer members on and respectively centered and in alignment with said inner members to provide unitary stepped marginal members about all four sides of each panel.

4,060,438
PROCESS FOR IMPARTING COLOR ON A DISCRETE BASIS TO THE THERMALLY FUSED PORTION OF QUILTED SYNTHETIC RESINOUS MATERIALS
Charles A. Johnson, Rockingham, N.C., assignor to Home Curtain Corporation, Far Rockaway, N.Y.
Filed Sept. 2, 1976, Ser. No. 719,910
Int. Cl.^{2} B32B *31/20, 31/22*
U.S. Cl. 156—73.1 **6 Claims**

1. A process for imparting color to fused portions of a quilted laminate comprising the steps of: providing quilting

means including a sealing location for effecting fusing of a plurality of heat sealable laminae on a continuous basis; providing a source of web supply for each of said plurality of laminae; providing a source of web supply of a dyestuff-coated transfer



paper; bringing said laminae and said transfer paper into superimposed proximity and moving the same past said sealing location, whereby said laminae are simultaneously sealed and a quantity of dyestuff is transferred to an exposed surface of the resulting laminae in the areas where sealing is effected.

4,060,439
POLYURETHANE FOAM COMPOSITION AND METHOD OF MAKING SAME
Walter Richard Rosemund, Englewood, N.J., and Charles Vincent Rose, Brewster, N.Y., assignors to Union Carbide Corporation, New York, N.Y.
Division of Ser. No. 472,173, May 22, 1974, abandoned. This application Feb. 9, 1976, Ser. No. 656,383
Int. Cl.^{2} B32B *5/18*
U.S. Cl. 156—78 **14 Claims**

1. Method of thermally bonding flexible polyether polyurethane foam to a substrate which comprises:

A. reacting and foaming a composition consisting essentially of

a. a polyisocyanate reactant containing at least two isocyanate groups per molecule;

b. at least one graft copolymer polyether polyol reactant having a molecular weight of at least about 2000 and containing an average of at least two hydroxyl groups per molecule, said graft copolymer polyether polyol having been produced by polymerizing one or more ethylenically unsaturated monomers dispersed in a polyether polyol in the presence of a free radical catalyst;

c. a blowing agent;

d. a catalyst;

e. a surfactant; and

f. about 1 to about 7% based on the weight of graft copolymer polyether polyol (b), of at least one polyol modifier selected from the class consisting of:

1. alkylene glycols having 2 to about 8 carbon atoms;

2. glycol ethers having the empirical formula;

$$HO—[C_nH_{2n}O]_m\,H$$

wherein n is an integer having values of 2 to 4 and m is an integer having values of 2 to 4 when n is 2, 2 to 3 when n is 3 and 2 when n is 4;

3. triols having the empirical formula:

$$C_xH_{2x-1}(OH)_3$$

wherein x is an integer having values of 3 to about 10;

4. alkanolamines having the empirical formula:

$$C_yH_{2y}N_z(OH)_p$$

wherein y is an integer having values of 2 to about 10, z is an integer having values of 1 to 2 and p is an integer having values of 2 to 4; and

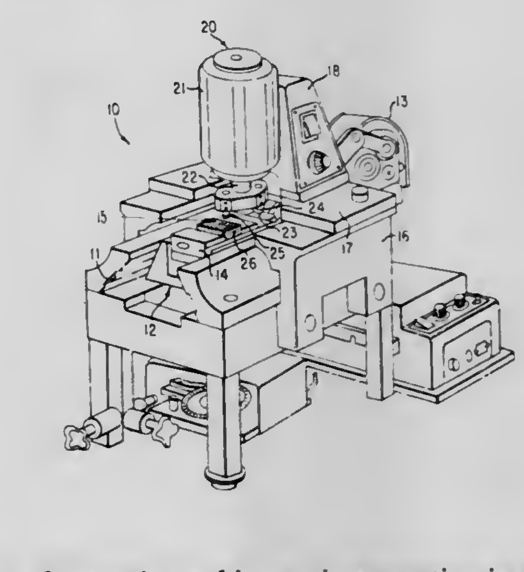
5. polyhydric mononuclear phenols;

B. Heating the surface of the foamed composition of (A) above its melting or fusion point;

C. Contacting the melted or fused surface of the foamed composition of (A) with a substrate whereby a flexible polyurethane foam/substrate laminate is formed; and

D. Cooling the flexible polyurethane foam/substrate laminate below the melting or fusion point of the flexible polyurethane foam.

4,060,440
METHOD OF SPECIMEN PREPARATION
Werner Behme, Walldorf, and Manfred Berleth, Eppelheim, both of Germany, assignors to R. Jung AG Fabrik fur Prazisionsapparate, Heidelberg, Germany
Continuation of Ser. No. 625,961, Oct. 28, 1975, abandoned, which is a division of Ser. No. 453,142, March 20, 1974, abandoned. This application June 6, 1977, Ser. No. 804,197
Int. Cl.^{2} B32B *31/18*
U.S. Cl. 156—154 **1 Claim**



1. A method of preparing a thin specimen section in a microtome having a rotary milling cutter for microscopic studies in a transmitted light microscope comprising mounting a specimen to be prepared for examination on the slide means of said microtome, advancing said specimen relatively toward said rotary milling cutter of said microtome in a plane parallel to the plane of said rotary milling cutter of said microtome, removing a predetermined thickness of material of said specimen by cutting by said rotary milling cutter thereby to achieve a mirror-smooth and roughness-free, flatly-reduced specimen surface, removing said specimen from said slide means, affixing said reduced surface to an examination slide holder, further mounting said specimen on said examination slide holder to said slide means of said microtome, advancing said specimen generally horizontally relatively toward said rotary milling cutter of said microtome, removing a predetermined thickness of material of said specimen by cutting by said rotary milling cutter thereby to achieve a specimen slide having a layer thickness which accommodates microscopic examination in transmitted light.

4,060,441
METHOD FOR FORMING A TRANSPARENT PROTECTIVE COATING ON A PHOTOGRAPH OR THE LIKE
Wasaburo Ohta, and Tatsuya Watanabe, both of Tokyo, Japan, assignors to Kabushiki Kaisha Ricoh, Tokyo, Japan
Division of Ser. No. 448,555, March 6, 1974, abandoned. This application July 8, 1975, Ser. No. 594,182
Claims priority, application Japan, Apr. 20, 1973, 48-44914; May 1, 1973, 48-49479
Int. Cl.^{2} B32B *31/20*
U.S. Cl. 156—234 **26 Claims**

1. A method of forming a protective coating on a sheet material, comprising the steps of:

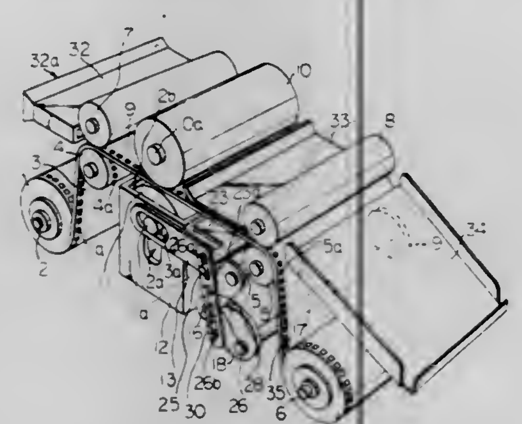
a. preparing a coating material by forming a releasing layer on a heat resistant backing sheet and then releasably adhering a transparent thermal bonding layer onto the re-

leasing layer, the bonding layer comprising a material selected from the group consisting of vinyl choloride, vinyl acetate and polyamide;

b. maintaining the coating material in a state of tension;

c. placing the sheet material and the coating material together so that the bonding layer is in face-to-face contact with the sheet material;

d. applying heat and pressure to bond the bonding layer to the sheet meterial; and



e. separating both the backing sheet and the releasing layer from the bonding layer so that the bonding layer remains bonded to the sheet material to constitute the protective coating, said separating step (e) comprising applying a force to said coated sheet material in a direction perpendicular to the general plane of said coated sheet material, said force being applied to the said coated sheet material at a location just preceding the actual separation of the backing sheet and release layer from the bonding layer, whereby said applied force facilitates separation of said backing sheet and release layer from said bonding layer.

4,060,442

MACHINE FOR SEALING PARALLELEPIPEDAL BOXES HAVING A VARIABLE HEIGHT

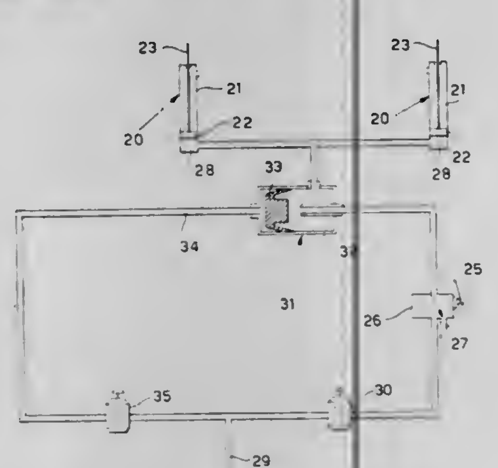
Augusto Marchetti, Piazza Sicilia, 7 Milan, Italy

Filed Nov. 3, 1976, Ser. No. 738,511

Claims priority, application Italy, Nov. 28, 1975, 29840/75

Int. Cl.² G05G *15/00*

U.S. Cl. 156—358 **3 Claims**



1. A machine for sealing parallelpipedal boxes of different heights comprising

a rest plane for the boxes,

conveyor means to advance the boxes along said rest plane from an inlet section of said conveyor means,

a tape-applying head mounted for vertical displacement above said rest plane and for thrust by its own weight toward a position of maximum depression,

lifting means to lift said tape-applying head from the position of maximum depression,

sensitive means carried by said tape-applying head and engageable by a front wall of each of the boxes coming from said inlet section of said conveyor means to control the instantaneous actuation of said lifting means to vertically displace said tape-applying head to a distance above said rest plane which is higher than the height of the box engaging said sensitive means,

said lifting means including

at least one fluid-operated ram having a control chamber,

valve means controlled by said sensitive means to connect alternately to a pressurized fluid source and to an outlet,

a cutoff valve inserted between said control chamber of said fluid-operated ram and said controlled valve means,

said cutoff valve automatically cutting communication between said controlled valve means and said control chamber of said ram whereas the pressure within said control chamber of said ram drops below a preselected magnitude.

4,060,443

DEVICE FOR THE HEAT-SEALING OF THERMOPLASTIC MATERIAL OR PAPER MATERIAL COATED WITH THERMOPLASTICS

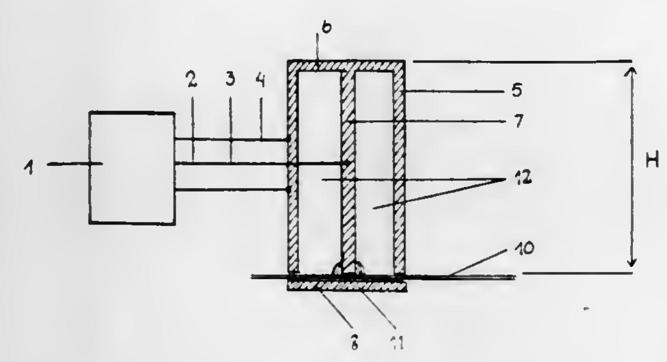
Gyula Balla, Malmo, Sweden, assignor to Tetra Pak International AB, Lund, Sweden

Filed Apr. 23, 1973, Ser. No. 353,376

Claims priority, application Sweden, May 23, 1972, 6722/72

Int. Cl.² H05B *7/06, 9/04*

U.S. Cl. 156—380 **6 Claims**



1. A device for heat sealing at least two layers of a thermoplastic material comprising a metal body having at least two substantially parallel side walls, a first metal wall connected to said side walls, a second metal wall connected to said first wall substantially equidistant from said side walls, a coaxial cable having a central conductor, a shield conductor, said central conductor being connected to said second wall, and shield conductor being connected to one of said side walls and means connecting said coaxial cable to a high frequency generator and a metal yoke connected to and spaced from said side walls to provide a space therebetween for the passage of a web of material.

4,060,444

TAPE APPLICATOR

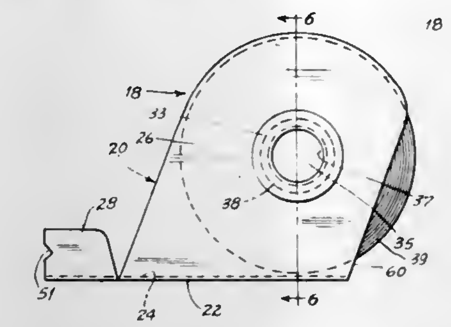
Eugene S. Schweig, Jr., 6900 Washington, St. Louis, Mo. 63130, and Marcus I. Diehl, 7023 Florence, St. Louis, Mo. 63136

Continuation of Ser. No. 600,459, July 30, 1975, abandoned. This application Mar. 14, 1977, Ser. No. 777,393

Int. Cl.² B44C *7/02;* **B65H** *19/02*

U.S. Cl. 156—391 **22 Claims**

1. A tape applicator for applying tape to a surface, said applicator comprising a frame, means for rotatably supporting at least one tape roll within said frame for permitting withdrawal of said tape from said roll, a flat elongated pressure surface located at the bottom of the frame for sliding pressure engagement of at least a substantial portion of said pressure surface with the upper side of said tape as said applicator is pushed forwardly over said surface, said elongated pressure surface having a forwardly extending portion adapted for the placement of the ends of the index and middle fingers of one hand which extend forwardly thereto from above the frame for applying pressure during operation of the applicator, and means located near the points of pressure contact by said fingers for guiding said tape from said roll and into contact with the surface to which the tape is to be applied, the bottom side of the tape contacting the surface adjacent the points of



pressure contact of the fingers, said guide means further guiding the tape rearwardly under said elongated pressure surface as said fingers apply pressure at the point of initial tape contact with the surface as said applicator is pushed forwardly over said surface to which the tape is to be applied.

4,060,445

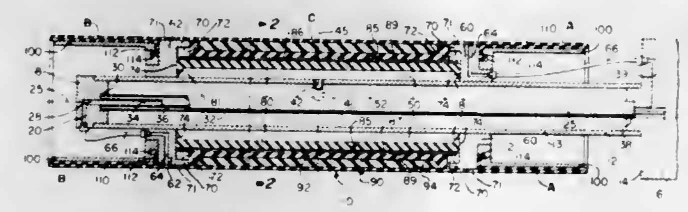
BUILDING DRUM FOR TIRES AND CYLINDRICAL ARTICLES HAVING AXIALLY SPACED BEADS

Staley J. Houck, Akron, and Michael W. Smith, Mogadore, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Aug. 25, 1975, Ser. No. 607,325

Int. Cl.² B29H *17/16, 17/22*

U.S. Cl. 156—414 **1 Claim**



1. A building drum for tires, airsprings, and like articles, said drum being free of and operable without axially movable rigid parts and comprising a center shaft, a pair of axially spaced apart rigid end rings each having a circumferentially and axially continuous cylindrical extension coaxially fixed thereon and an integral annular flange projecting axially toward the other end ring and terminating outwardly of the nearer bead ring of a pair thereof in such tire, airspring or like article intended to be built on the drum, a radially extensible sleeve disposed around the shaft between the end rings and terminating in sealing engagement with the respective end rings to form an air pressure chamber, a plurality of control members disposed axially and circumferentially of said sleeve, being engageable with said flanges on radial expansion of said sleeve and being stiff parallel to said shaft but flexible radially thereof, a unitary thick-wall cylinder of elastically deformable rubbery material for partially enveloping a bead ring or pair of bead rings disposed circumferentially therearound at any selected axial location therealong between the respective flanges, said cylinder being disposed around said control members and extending axially from one to the other of said flanges, and a single axially and circumferentially continuous elastic membrane providing a cylindrical building surface for accommodating a ply thereon and extending around and axially along said cylinder, said end rings and said cylindrical extensions to the respective ends of said extensions and thence axially inwardly along and in circumferential contact with the respective extensions, its ends being fixed adjacent the respective end rings, whereby portions of said membrane axially outwardly of bead rings partially enveloped by said cylinder can be moved axially to turn ply endings about said bead rings.

4,060,446

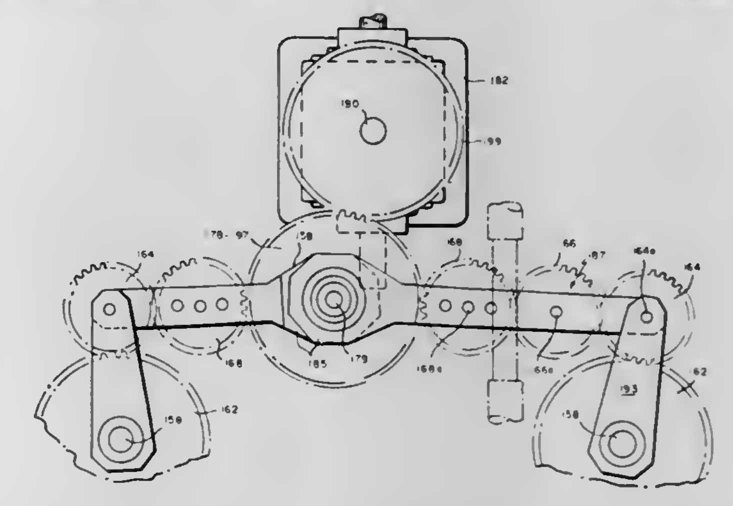
APPARATUS EMBODYING CONTINUOUS CONVEYORS FOR APPLYING LABELS TO CONTAINERS

Sidney T. Carter, Shrewsbury, Mass., assignor to A-T-O Inc., Cleveland, Ohio

Division of Ser. No. 493,217, July 31, 1974, Pat. No. 3,954,549. This application Jan. 21, 1976, Ser. No. 651,136

Int. Cl.² B29C *17/00*

U.S. Cl. 156—475 **2 Claims**



1. In a labeling apparatus, a container conveyor traveling along a predetermined horizontal path for moving containers along said path, a support at each side of the conveyor movable toward and from the container conveyor, endless chains, bearing members at each end of each support, a sprocket shaft rotatably mounted in each bearing member in a vertical position, a sprocket fixed to the upper and lower ends of each sprocket shaft, said chains being entrained about said sprockets in vertically spaced parallel relation, wiper assemblies including wiper pads pivotally mounted between the chains with the pads projecting outwardly from the chains, means for effecting movement of the supports toward and from each other relative to the container conveyor, a common drive gear, means drivably connecting the sprocket shafts at one end to said common drive gear without interfering with movement of the movable supports relative to the container conveyor and continuous uninterrupted drive comprising a first gear fixed to the sprocket shaft and means drivably connecting each of the sprocket shafts to the common drive gear comprising articulated supports pivotally connected at their distal ends for pivotal movement about the axis of the common gear and axes of the sprocket shafts and trains of gears, the gear at one end of each train being rotatable about the pivot connecting the proximal ends of the articulated supports and in mesh with the first gear and the gear at the other end of the train being in mesh with the common drive gear and means for effecting adjustment of the distance between said sprocket shafts comprising vertically spaced parallel cam plates mounted on the supports within the chains containing cam surfaces at their opposed sides, cam rolls mounted on the assemblies inwardly of the pivots engaged with said grooves, the cam plates being divided intermediate their ends such as to enable adjusting the distance between the shafts mounting the sprockets and means for effecting adjustment of the distance between said shaft.

4,060,447

PROCESS FOR ETCHING OF METAL

Warren A. Nelson, Hohokus, N.J., assignor to Philip A. Hunt Chemical Corporation, Palisades Park, N.J.

Filed Mar. 29, 1976, Ser. No. 671,310

Int. Cl.² C23F *1/00*

U.S. Cl. 156—642 **14 Claims**

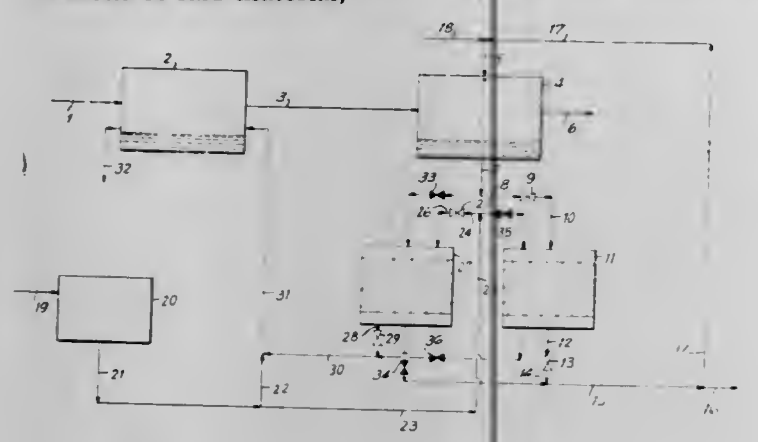
1. In an etching process in which

A. a material is dissolved as cations from a surface of a body in an etcher by contact with an etching solution, said etching solution containing

I. an active etchant and

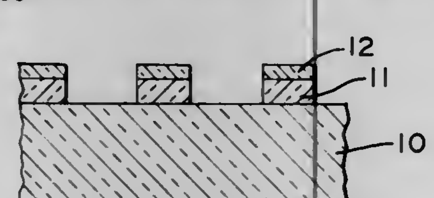
II. dissolved cations of such material,

B. a stream of aqueous replenishing solution containing a lesser concentration of such cation than said etching solution is passed into said etcher, and some etching solution is removed,
C. said body is
 I. withdrawn from said etcher and
 II. rinsed with a liquid,
D. whereby residual etching solution containing cations of said material is washed from said body and diluted by said liquid,
E. the resulting diluted liquid containing dissolved cations of said material is passed in contact through cation exchange means which selectively retains cations of said material whereby said cation exchange means becomes laden with cations of said material,



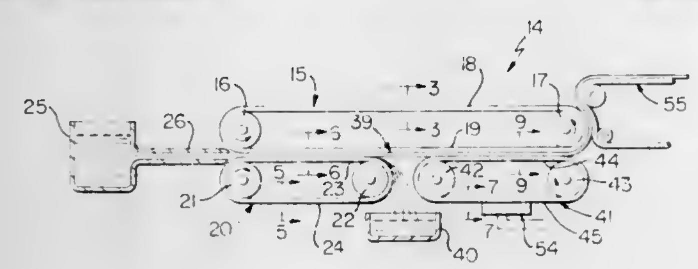
F. said cation exchange means is regenerated by
 I. terminating the flow of said resulting liquid and
 II. then passing a regenerating solution stream through said cation exchange means to remove cations of said material from said cation exchange means, the improvement of:
G. regenerating said cation exchange means by
 I. passing at least a portion of said replenishing solution stream through said cation exchange means
 II. before passing said replenishing solution portion into said etcher,
 III. whereby cations of said material are removed from said cation exchange means and introduced into said replenishing solution stream portion.

4,060,448
YTTRIUM IRON GARNET DISKS ON GADOLINIUM GALLIUM SUBSTRATES FOR MICROWAVE APPLICATIONS
Michael Nemiroff, Solana Beach, Calif.; Hong Jun Yue, Bud Lake, N.J., and William Russell Schevey, Honesdale, Pa., assignors to Allied Chemical Corporation, Morris Township, N.J.
Filed Jan. 28, 1977, Ser. No. 763,964
Int. Cl.^{2} B44C *1/00;* **C03C** *15/00;* **C23F** *1/02*
U.S. Cl. 156—653 **15 Claims**



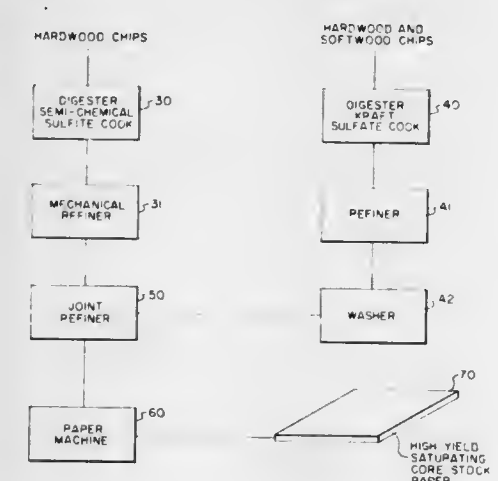
1. A process for fabricating microwave electronic devices comprising yttrium iron garnet disks which comprises
a. forming a thin film of yttrium iron garnet, doped with about 0.5 to 1.5 atom percent of trivalent lanthanum ions, on a gadolinium gallium garnet substrate;
b. forming a thin layer of SiO_2 on the lanthanum-doped yttrium iron-garnet layer;
c. forming a photoresist mask layer on the SiO_2 layer;
d. removing portions of the photoresist mask layer to expose portions of the underlying SiO_2 layer;
e. removing the exposed portions of the SiO_2 layer to expose portions of the underlying lanthanum-doped yttrium iron garnet film; and
f. removing the exposed portions of the yttrium iron garnet film to form an array of lanthanum-doped yttrium iron garnet disks supported on the gadolinium gallium garnet substrate.

4,060,449
ELECTROSTATIC METHOD AND APPARATUS FOR MAKING A PATTERNED, NON-WOVEN SHEET
James T. Candor, 5440 Cynthia Lane, Dayton, Ohio 45429
Filed Oct. 10, 1973, Ser. No. 405,023
The portion of the term of this patent subsequent to Aug. 31, 1993, has been disclaimed.
Int. Cl.^{2} D21H *5/06*
U.S. Cl. 162—109 **20 Claims**



1. A method of making a patterned non-woven sheet comprising the steps of providing a slurry of fluid and fibers, forming said slurry into sheet-like form, and creating an electrostatic field action that acts on said sheet-like form and causes said fibers to be arranged into a predetermined pattern.

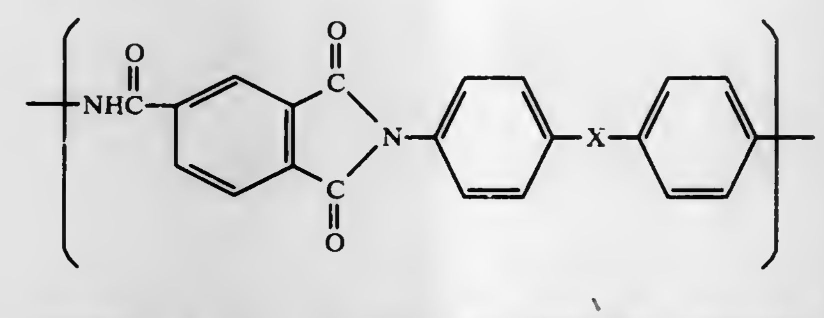
4,060,450
HIGH YIELD SATURATING PAPER
Salvatore E. Palazzolo, Hampton, and Harold O. McCaskey, Jr., Allendale, both of S.C., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.
Division of Ser. No. 285,697, Sept. 1, 1972, Pat. No. 3,940,538. This application Apr. 11, 1975, Ser. No. 567,221
Int. Cl.^{2} B32B *5/14*
U.S. Cl. 162—141 **8 Claims**



1. A resin saturable paper sheet with an apparent density of about 2.7 - 3.1 and an air porosity of about 5-15 seconds, having an essentially homogeneous distribution of both hardwood and softwood cellulosic fibers and essentially free of wood slivers, containing from about 8 up to 15 percent total lignin based on total weight, at least about 65 percent of said fibers being hardwood fibers, a major portion of said lignin being hardwood lignin, the softwood lignin not exceeding about 2.8 percent of the total weight.

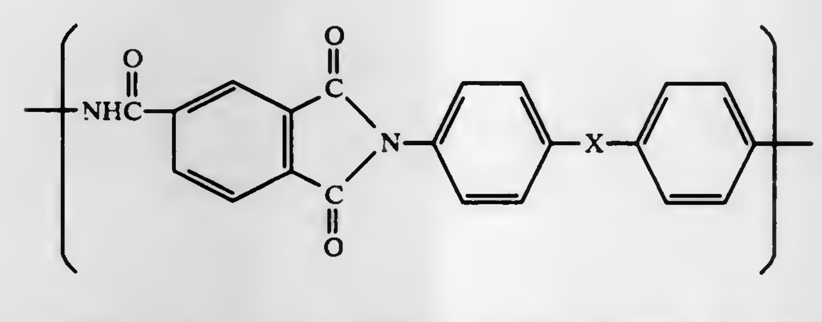
4,060,451
POLYAMIDE-IMIDE AND MICA PULP PARTICLES AND PAPER-LIKE SHEETS MADE THEREFROM
Shuichi Uchiyama; Satoshi Utsunomiya, and Hideo Watase, all of Hino, Japan, assignors to Teijin Limited, Osaka, Japan
Continuation of Ser. No. 492,136, July 26, 1974, abandoned, which is a continuation-in-part of Ser. No. 345,287, March 27, 1973, abandoned. This application July 8, 1976, Ser. No. 703,364
Claims priority, application Japan, Mar. 31, 1972, 47-32407
Int. Cl.^{2} D21F *11/00*
U.S. Cl. 162—157 R **17 Claims**

1. Pulp particles consisting essentially of 50 to 90% by weight of mica particles having a particle size in a range of 60 - 3000 Tyler mesh and 50 to 10% by weight of a film-forming polyamide-imide at least 70 mol % of which recurring units consist of at least one or more of recurring units of the following formula



wherein X is —O— or —CH_2— in which said polyamide-imide forms a continuous phase and said mica particles are dispersed discontinuously in said continuous phase.

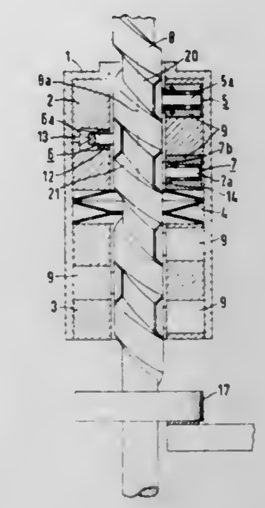
10. Pulp particles consisting essentially of 50 - 90% by weight of mica particles having a particle size such that at least 90% by weight are from 1 to 150 microns, and 50 - 10% by weight of a film-forming polyamide-imide having recurring units which consist essentially of



wherein X is —O— or —CH_2— in which said polyamide-imide forms a continuous phase and said mica particles are dispersed discontinuously in said continuous phase.

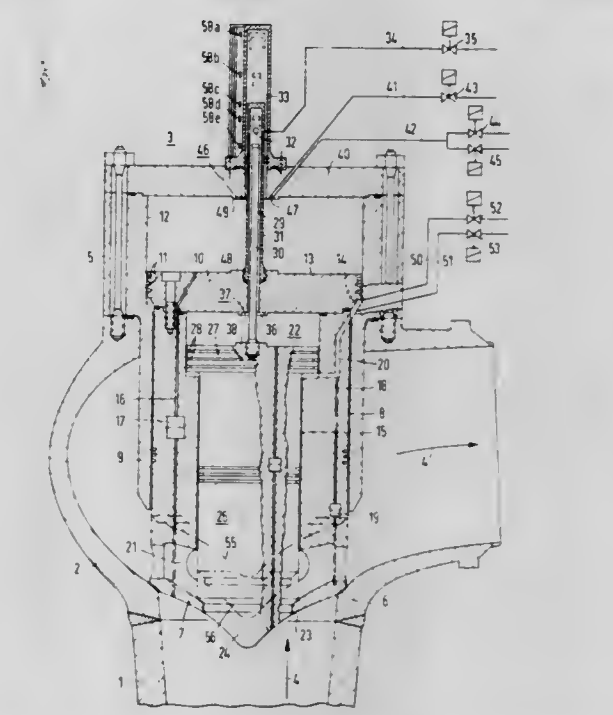
4,060,452
POSITIONING DRIVE FOR ABSORBER RODS OF A NUCLEAR REACTOR
Heinz Acher, Friedberg, Germany, assignor to Kraftwerk Union Aktiengesellschaft, Mulheim (Ruhr), Germany
Filed Dec. 11, 1975, Ser. No. 613,527
Int. Cl.^{2} G21C *7/08*
U.S. Cl. 176—36 R **9 Claims**

1. A nuclear absorber and positioning drive comprising a spindle having a longitudinal axis and at least one screw thread having sides and a crest, said thread being engaged by a traveling nut having anti-friction bearing means engaging said sides; wherein the improvement comprises said bearing means comprising at least three rollers having axes at right angles to the spindle's said axis, a traveling-nut housing, and low-friction bearing members journaling said rollers to said housing so that said rollers are interspaced circumferentially around said spindle and so that said rollers are interspaced longitudinally with respect to said axis, said housing containing at least two nut bodies to which said rollers are journaled by said bearing members with at least three of the rollers to each nut body, and means for elastically thrusting said nut bodies apart, said screw thread having a width between adjacent convolutions and said



rollers having a diameter, said diameter being smaller than said width.

4,060,453
NUCLEAR REACTOR INSTALLATION
Hans-Peter Schabert, Erlangen, and Erwin Laurer, Mohrendorf, both of Germany, assignors to Kraftwerk Union Aktiengesellschaft, Mulheim (Ruhr), Germany
Filed Apr. 21, 1976, Ser. No. 679,078
Claims priority, application Germany, Apr. 30, 1975, 2519376
Int. Cl.^{2} G21C *9/00*
U.S. Cl. 176—38 **16 Claims**



1. In a nuclear reactor installation having a containment shell, a live steam line leading outwardly from the containment shell, a fast-acting shut-off valve connected in the steam line and having a flow cross section corresponding to the cross section of the steam line, the shut-off valve including a normally open main valve disk which is actuatable to close in response to pressure from a leak in the steam line, pressure dependent means associated with the main valve disk for sensing a pressure higher than operating pressure of the steam line, an opening mechanism comprising a piston-actuated auxiliary valve disk disposed in a cut-out formed in the main valve disk and having an area equal at most to one-half the flow cross-sectional area of the shut-off valve, said auxiliary valve disk being operable by said pressure-dependent means to open said cut-out opening when a pressure higher than operating pressure of the steam line is sensed by said pressure dependent means.

4,060,454

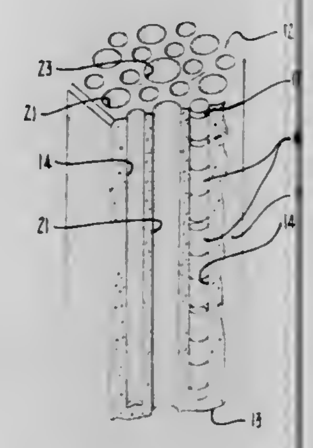
NUCLEAR FUEL ELEMENT AND METHOD FOR MAKING SAME

Gary N. Miertschin, San Diego, and Kenneth F. Powell, Cardiff, both of Calif., assignors to General Atomic Company, San Diego, Calif.

Filed Apr. 7, 1975, Ser. No. 565,868

Int. Cl.² G21C *5/00*

U.S. Cl. 176—84 **6 Claims**



1. A nuclear fuel element comprising, a block comprised substantially of graphite and having opposite surfaces thereon, said block having a plurality of longitudinal passages therethrough for flowing coolant, said block having a plurality of elongated fuel holes therein separate from said longitudinal passages substantially parallel therewith extending from one of said opposite surfaces and terminating spaced from the other of said opposite surfaces, a plurality of substantially cylindrical fuel rod segments in each of said holes engaging the sides thereof with sufficient friction to hold said fuel rod segments in place axially in said holes but allowing said fuel rod segments to slide with respect to said block in response to differential shrinkage therebetween, said fuel rod segments being spaced axially along said holes, at least some of said segments being spaced from each other axially distances forming void spaces the total of which compensates for shrinkage of said block due to irradiation, and a plug closing each of said holes at said one of said opposite surfaces.

4,060,455

PROCESS FOR THE MICROBIAL PRODUCTION OF L-SERINE USING PSEUDOMONAS SP. DSM 672

Fritz Wagner, Braunschweig-Stockheim; Hermann Sahm, Wolfenbuttel, and Walter Hartmut Keune, Braunschweig, all of Germany, assignors to Gesellschaft fur Biotechnologische Forschung mbH, (GBF), Braunschweig-Stockheim, Germany

Filed Dec. 6, 1976, Ser. No. 747,725

Claims priority, application Germany, Dec. 4, 1975, 2554530

Int. Cl.² C12D *13/06*

U.S. Cl. 195—29 **14 Claims**

1. A process for the production of L-serine in which methanol and glycine are mixed with a submerse culture containing inorganic nutrients and the bacterium Pseudomonas sp. DSM 672 and/or L-Serine accumulating mutants of this bacterium in a reactor supplied with a gas which is air or oxygen-enriched air at a pH in the range 6.0 to 9.0 and at a temperature in the range 20° to 40° C, the mixture is allowed to react, the resulting cell mass is separated from the culture filtrate and the L-serine is isolated from the culture filtrate.

4,060,456

GLUCOSE ISOMERIZATION PROCESS

Margaret E. Long, Winston-Salem, N.C., assignor to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.

Continuation of Ser. No. 320,034, Jan. 2, 1973, abandoned, which is a continuation-in-part of Ser. No. 161,337, July 9, 1971, Pat. No. 3,821,086. This application Oct. 14, 1975, Ser. No. 621,713

The portion of the term of this patent subsequent to June 28, 1991, has been disclaimed.

Int. Cl.² C12D *13/00*

U.S. Cl. 195—31 F **9 Claims**

1. A continuous process for isomerizing glucose to fructose in the presence of glucose isomerase-containing microbial cells wherein said cells are used in the form of an aggregate resulting from prior treatment of said cells with 0.5 to 50 percent by weight based on the wet weight of said cells of a polyelectrolyte flocculating agent followed by drying and sieving of the aggregate to produce dried aggregate particles that are approximately 10 to 30 mesh in size, said continuous process comprising passing a glucose solution through a bed of said aggregate at a temperature of 50° to 90° C. and a pH of 6 to 10 to effect isomerization of a portion of the glucose and recovering an effluent syrup containing glucose and fructose.

4,060,457

APPARATUS FOR GROWING ANIMAL CELLS

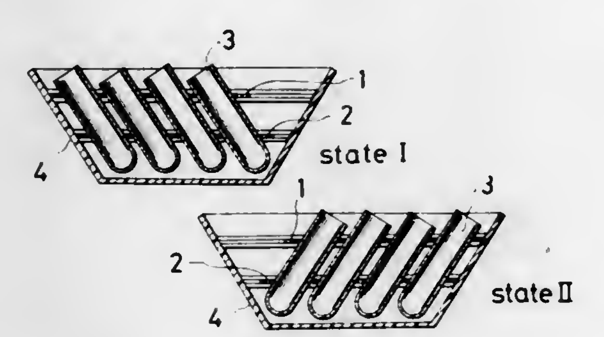
Masahiko Iizuka, Fujisawa; Jiro Suzuki, and Sigeyasu Kobayashi, both of Kamakura, all of Japan, assignors to Ichiro Kojima, Tokyo, Japan

Filed Jan. 7, 1976, Ser. No. 647,177

Claims priority, application Japan, Jan. 7, 1975, 50-4272

Int. Cl.² C12K *9/00, 1/10*

U.S. Cl. 195—127 **8 Claims**



1. An apparatus for growing animal cells, said apparatus comprising:

a. a plurality of small vessels, each said vessel having a hole in the lower portion thereof;

b. a box reservoir; and

c. vessel holder means including an upper panel and a lower panel mounted in said box reservoir, said upper panel and said lower panel each including holding means for cooperating with each other to hold each of said vessels, wherein at least one of said panels can be moved horizontally with respect to the other of said panels such that the angle of the axis of each said vessel when in said holder means can be set parallel to one another at 30°-60° on either side of the vertical by the horizontal movement of said panels with respect to one another, and wherein said hole is positioned in said vessel such that it is at the lowest point of said vessel when said vessel is tilted to one side of the vertical by said holder means.

4,060,458

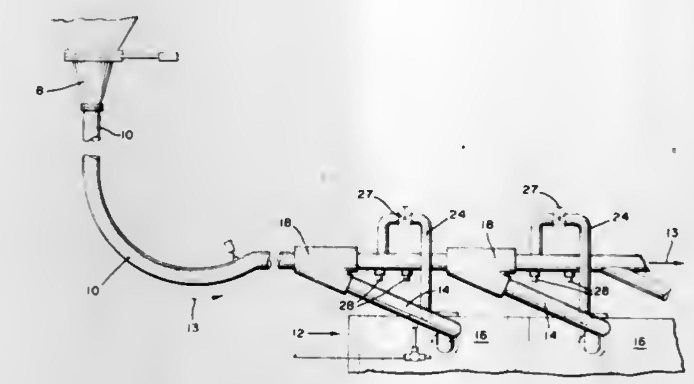
SEPARATION OF GAS FROM SOLIDS

Rufus F. Davis, Jr., Russell, Ky., assignor to Coaltek Associates, Morris Township, N.J.

Filed Dec. 24, 1975, Ser. No. 643,964

Int. Cl.² C10B *31/04*

U.S. Cl. 201—40 **4 Claims**



1. In a method for charging a plurality of coke oven chambers of a coke oven battery with preheated coal particles by conveying a mixture of said coal particles and a carrier gas through a primary pipeline which communicates with each of the coke oven chambers of said battery through a plurality of branch pipelines, passing at least a portion of said mixture from said primary pipeline into a branch pipeline communicating with a coke oven chamber to be charged while the remaining portion of said mixture continues to be conveyed in said primary pipeline downstream from said branch pipeline, and removing a portion of said carrier gas from said mixture in said branch pipeline prior to introducing said mixture into said coke oven chamber to be charged by said branch pipeline; the improvement comprising reintroducing the carrier gas removed from said branch pipeline into the primary pipeline conveying the remaining portion of said mixture at a point downstream from where that portion of said mixture in the primary pipeline was passed into said branch pipeline.

3. In an apparatus for charging a plurality of coke oven chambers of a coke oven battery with preheated coal particles contained in a mixture of said coal particles and a carrier gas comprising a primary pipeline communicating at one of its ends with a source of said mixture and on the other end said coke oven chambers through a plurality of branch pipelines, each of which communicates with a coke oven chamber, diverting means in said primary pipeline for diverting at least a portion of said mixture from said primary pipeline to a branch pipeline and means in said branch pipeline for removing from said branch pipeline a portion of the carrier gas from said mixture prior to introducing said mixture into a coke oven chamber; the improvement wherein said means for removing a portion of carrier gas from said branch pipeline comprises a bleed-off pipeline connected at one of its ends to said branch pipe line and connected at its other end to said primary pipeline downstream of said diverter means for said branch pipeline.

4,060,459

COKE OVEN DOOR FRAME AND JAMB

Patsie Carmen Campana, 2614 Sherwood Drive, Lorain, Ohio 44053

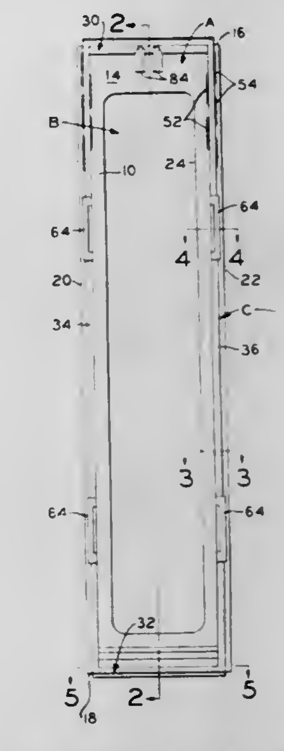
Filed July 6, 1976, Ser. No. 703,111

Int. Cl.² C10B *25/02*

U.S. Cl. 202—248 **9 Claims**

1. In a coke oven of the type having an elongated vertical opening in the front wall thereof with a frame received thereover which has a coke oven opening in the central portion thereof adapted to operably receive a coke oven door in a covering relationship therewith and wherein said frame has generally flat inner and outer faces, a top edge, a bottom edge and opposed elongated side edges with a jamb disposed about at least a portion of said outer face adjacent the outer peripheral edges thereof, the improvement comprising:

said frame outer face including a groove extending longitudinally therealong adjacent each side edge, said grooves having a width *x* and a groove bottom wall; an elongated side jamb member received in each of said grooves against said groove bottom walls with said side jamb members having a thickness *y* which is less than width *x* such that a



clearance area is provided between the portions of said side jamb members received in said grooves and the side walls of said grooves with said side jamb members extending outwardly of said frame outer face and being rigidly affixed thereto; and, said frame and at least said side jamb members being constructed from mild steel plate.

4,060,460

REMOVAL OF CHLOROPRENES FROM ETHYLENE DICHLORIDE

Edmund W. Smalley, Brewerton; Bruce Edward Kurtz, Marcellus, and Bhaskar Bandyopadhyay, Camillus, all of N.Y., assignors to Allied Chemical Corporation, Morris Township, N.J.

Filed May 22, 1975, Ser. No. 580,077

Int. Cl.² C07C *17/38*

U.S. Cl. 203—29 **6 Claims**

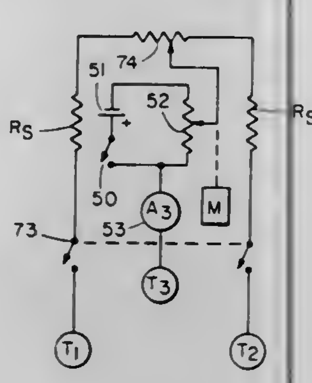
1. In a process for recovering ethylene dichloride from an impure ethylene dichloride stream containing (i) impurities boiling at a temperature lower than the boiling point of ethylene dichloride and consisting at least in part of a chloroprene-impurity selected from the group consisting of chloroprene, alpha-chloroprene and mixtures thereof, and (ii) impurities boiling at a temperature higher than the boiling point of ethylene dichloride, wherein

a. said impure ethylene dichloride stream is passed to a first distillation zone and distilled therein under conditions sufficient to provide (1) first distillate containing said lower boiling impurities and (2) first bottoms containing ethylene dichloride together with said higher boiling impurities, and

b. said first bottoms is passed to a second distillation zone and distilled therein under conditions sufficient to provide (1) second distillate containing ethylene dichloride and (2) second bottoms containing said higher boiling impurities,

the improvement which comprises chlorinating at least the portion of said chloroprene-impurity by introducing into said first distillation zone, during the distillation of ethylene dichloride therein, a gas containing elemental chlorine, thereby producing chloroprene reaction products having a boiling point higher than the boiling point of ethylene dichloride, and withdrawing said chloroprene reaction products with said first bottoms for passage to a second distillation zone.

4,060,461
METHOD AND APPARATUS FOR CORRECTING ERROR IN CORROSION RATE MEASUREMENTS
Robert G. Seyl, 1123 Mulford St., Evanston, Ill. 60202
Continuation-in-part of Ser. No. 530,870, Dec. 9, 1974, Pat. No. 3,947,329. This application Feb. 3, 1976, Ser. No. 654,854
Int. Cl.[2] G01N *27/46*
U.S. Cl. 204—1 T **10 Claims**



1. The method for adjusting the value of a variable resistor for IR loss correction in a corrosion current measuring device operating with duplicated measured electrodes in a non-gaseous ionic conductor and having a circuit for equalizing difference in free electrode potential between said electrodes, including the steps of generating an alternating current voltage selected within the frequency range of about 400 to 1,000 Hertz, delivering said AC voltage to a potentiometer for adjustment of voltage output, leading one output terminal through a full-wave rectifier with DC output to a microammeter, and to one pole of a selector switch, leading the other output terminal through a blocking condenser to another pole of said selector switch, before immersing said electrodes in said ionic conductor, connecting the DC power supply to said circuit for equalizing difference in free electrode potential to establish its operating DC resistance, advancing said selector switch from contact position zero to position one to connect one of said poles to one of said electrodes through the lead wire from said electrode, and to connect the other of said poles to the other of said electrodes through said circuit for equalizing difference in free electrode potential and through the lead wire from said other electrode, adjusting said potentiometer to produce a measured and noted value of current through said microammeter, advancing said selector switch to contact position two to connect said poles across a variable condenser, adjusting the capacity of said variable condenser to produce through said microammeter the value of current noted above, thereby determining and storing the distributed capacity C_w of said lead wires, and returning said selector switch to contact position zero until later operation in resistance measurement, at a selected time after immersion of said electrodes in said ionic conductor and immediately before corrosion current measurements of corrosion rate measurement, advancing said selector switch to contact position one, adjusting said potentiometer to produce a second measured and noted value of current through said microammeter, then advancing said selector switch to position three to connect said poles to said stored capacity C_w and to a variable resistor, adjusting said variable resistor to produce said second measured and noted value of current through said microammeter, and returning said selector switch to contact position zero, whereby said variable resistor is adjusted to equal the sum of ionic conductor resistance R_i between said electrodes, of lead wire resistance R_w connecting said electrodes to said corrosion current measuring device, and of the resistance R_e of said circuit for equalizing free electrode potential between said electrodes.

2. A device for measuring unaccelerated and accelerated corrosion rates of an electronic conductor immersed in a non-gaseous ionic conductor, including an electrode probe with two duplicated electrodes positioned at uniform separation distance, a third electrode positioned at uniform equidistant separation distance from said two duplicated electrodes, a lead wire from the end of each of said electrodes, and a corrosion resistant electrical insulator holding each of said electrodes in position at the end of lead wire connection, means for variable DC voltage delivery throughout a selected voltage range that extends from zero in both plus and minus polarity, with one output terminal connected to a lead wire from one of said duplicated electrodes, a double-pole-double-throw switch with center-off position, wired for polarity reversal with one output terminal connected to the other output terminal of said means for variable DC voltage delivery and with the other output terminal connected to the lead wire from the other of said duplicated electrodes, means for ohmic resistance determination of the sum R_t of ionic conductor resistance R_i between said duplicated electrodes, of the resistance R_w of lead wires connecting said duplicated electrodes to said device, and of the resistance R_v of said means for variable DC voltage delivery, a variable resistor means, means for adjusting said variable resistor to the ohmic value of said determined resistance R_t, a microammeter for measuring polarizing current i_p, a fixed resistor of ohmic value equal to the DC resistance of said microammeter, and connected in series with said variable resistor, two resistors of equal ohmic value connected in series and connected at one end to the one end of said series connection of said variable resistor and said fixed resistor, a second means for variable DC voltage delivery connected across said two equal resistors, voltage sensing means connectable across said series connection of said variable resistor and said fixed resistor and the one of said two equal resistors that is connected to one end of said series connection, a voltage nulling means operating through said voltage sensing means to adjust said second means for variable DC voltage delivery to maintain zero voltage input to said voltage sensing means, a low ohm resistor with one end connected to the other end of said series connection of said two resistors of equal ohmic value, a DC voltage supply connectable across said low ohm resistor for applying across said resistor a selected value of polarizing voltage e_p of polarity adding to that of said second means for variable DC voltage delivery, a connection of said microammeter to the other end of said low ohm resistor, in polarity to measure DC current i_p flowed by said polarizing voltage e_p, the connection across the input terminals of said double-pole-double-throw switch of the series connection of said variable resistor, of said fixed resistor, of the series connection of said two resistors of equal ohmic value, of said low ohm resistor, and of said microammeter, switch means for turning on and off said DC voltage supply connectable across said low ohm resistor, two isolation resistors, two cathodic terminals each connected to a first end of said isolation resistors and for connection to said two duplicated electrodes, a source of DC voltage, means for variable voltage delivery connected across said source of DC voltage, a DC current indicating device connected in series with a lead from said means for variable voltage delivery, an anode terminal connected to the positive lead from said means for variable voltage delivery and for connection to said third electrode, a ratio resistor connected in series with a second end of said two isolation resistors, a connection from the negative lead of said means for variable voltage delivery to a contact arm traversable along the resistor element of said ratio resistor, and means to increase the voltage delivered from said means for variable voltage delivery at a substantially constant rate of voltage increase from zero to maximum within a time lapse range selectable from about 3 to 10 minutes by a source of motive power.

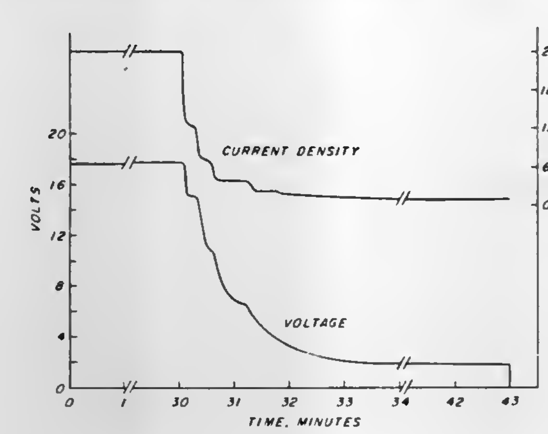
4,060,462
COLOR ANODIZING OF ALUMINUM
William P. Kampert, Lower Burrell, Pa., assignor to Aluminum Company of America, Pittsburgh, Pa.
Filed Oct. 21, 1976, Ser. No. 734,613
Int. Cl.[2] C25D *11/14*
U.S. Cl. 204—58 **8 Claims**

1. A process capable of producing a colored anodic coating on an aluminum alloy substrate comprising:

a. anodizing said aluminum in a sulfuric acid electrolyte at a

direct current voltage in the range of 6 to 24 volts to provide a conventional, substantially colorless coating thereon;

b. thereafter, reducing the voltage to a direct current voltage in the range of 0.5 to 3 volts while continuing to anodize said aluminum in the electrolyte; and



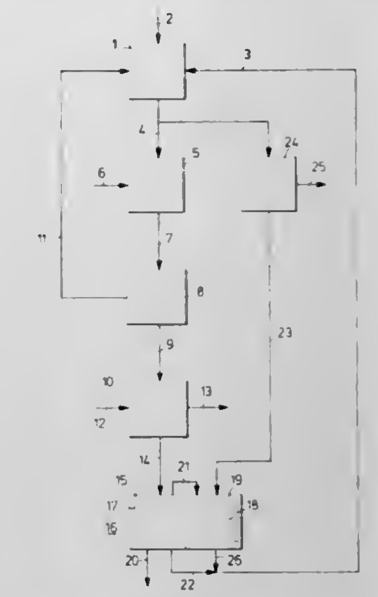
c. anodizing said aluminum alloy substrate at said voltage in the range of 0.5 to 3 volts for a period of time not greater than 15 minutes to produce the colored anodic coating by increasing the thickness of a barrier zone located intermediate the conventional coating and the aluminum alloy substrate.

4,060,463
OPERATION OF MERCURY-CATHODE CELLS
Denis Lee, and Alan David Cole Cantwell, both of Runcorn, England, assignors to Imperial Chemical Industries Limited, London, England
Filed Nov. 10, 1975, Ser. No. 630,688
Claims priority, application United Kingdom, Nov. 19, 1974, 50002/74
Int. Cl.[2] C25B *1/36, 9/00*
U.S. Cl. 204—99 **13 Claims**

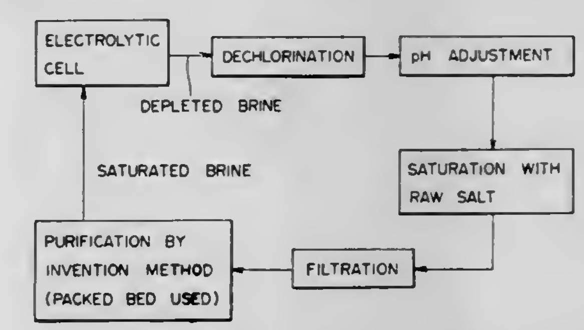
1. In a method of operating a mercury cell comprising a circulating stream of fluid amalgam which passes through the cell as a flowing cathode, a pump and denuder and which includes at least one station at which the flowing amalgam enters a substantially static pool of amalgam covered by an aqueous phase at a velocity which causes a portion of the aqueous phase becomes dispersed in the amalgam, the improvement which reduces the amount of aqueous dispersion in the amalgam, said improvement comprising reducing the velocity of the amalgam just before the amalgam enters the substantially static pool.

4,060,464
METHOD FOR EXTRACTING AND RECOVERING IRON AND NICKEL IN METALLIC FORM
Per Anders Herman Henningsson Fahlström, Akers Runo; Thomas Konrad Mioen, Stockholm, and Gotthard E. Björling, Djursholm, all of Sweden, assignors to Boliden Aktiebolag, Stockholm, Sweden
Continuation of Ser. No. 585,669, June 10, 1975, abandoned. This application July 19, 1976, Ser. No. 706,485
Claims priority, application Sweden, June 26, 1974, 7408394
Int. Cl.[2] C25C *1/06, 1/08, 1/24*
U.S. Cl. 204—113 **17 Claims**

1. A method of extracting and recovering the iron and nickel content of sulphidic iron-nickel-materials in the form of an alloy comprising at least 15% by weight nickel comprising the steps of leaching the material with an acidic solution containing an oxidizing agent comprising trivalent iron, so that substantially the whole quantity of said oxidizing agent is consumed; leading a part of the leaching liquid obtained to the anode chamber of an electrolytic cell, which comprises separate cathode and anode chambers; regenerating in said anode chamber said oxidizing agent for re-use in the leaching step; leading the remaining part of said leaching liquid having a nickel/iron ratio of at least about 1:2 to the cathode chamber; co-electrodepositing the iron and nickel content in said leaching liquid on the cathode in said cathode chamber; separating the iron - nickel deposit obtained from said leaching liquid and returning said leaching liquid to the leaching step.



4,060,465
METHOD OF PURIFYING THE RAW BRINE USED IN ALKALI SALT ELECTROLYSIS
Noriyuki Yokota, Ashiya; Shingo Tokuda, Nishinomiya; Yoshiro Ito, and Kenji Itaya, both of Amagasaki, all of Japan, assignors to Osaka Soda Co. Ltd., Osaka, Japan
Continuation of Ser. No. 482,496, June 24, 1974, abandoned. This application Dec. 10, 1975, Ser. No. 639,409
Int. Cl.[2] C25B *1/00, 1/26*
U.S. Cl. 204—128 **7 Claims**



4. A method for the electrolysis of aqueous NaCl or KCl brine solution for the production of chlorine which comprises passing the brine solution through an electrolytic cell, passing an electric current through the cell and brine solution, passing the depleted brine solution to a dechlorination step to remove chlorine therefrom, adjusting the pH of the depleted brine solution to 3 to 10, saturating the depleted brine solution with raw salt containing Mg and Ca, filtering the saturated brine solution to remove undissolved solids, flowing the filtered brine solution at a pH of 3 to 10 and a space velocity of 2 to 20 hr^{-1} through a bed containing a member selected from the group consisting of a solid granular chelate-forming water-insoluble resins capable of forming an intramolecular complex with the Mg and Ca ions, said resins being selected from the group consisting of the styrene-butadiene copolymer resins containing the group $>N-CH_2COOH$, the epichlorohydrin polymer resins containing the group $>N-CH_2COOH$, and the N-phenyl glycine-glycidyl methacrylate copolymer resins containing the group $>N-CH_2COOH$ to selectively remove and substantially reduce the Mg and Ca concentration and recycling the saturated brine solution reduced in Mg and Ca to the electrolytic cell.

4,060,466

PROCESS FOR PREPARING HYDROGEN FROM WATER

Jean Marius Mascarello, Versailles; Paul Godin, Louveciennes, and Jacques Francois Millet, Paris, all of France, assignors to Electricite De France, Paris, France

Filed Mar. 14, 1975, Ser. No. 558,299

Claims priority, application France, Mar. 29, 1974, 74.11466

Int. Cl.² C25B *1/02;* **C01B** *1/02, 1/26*

U.S. Cl. 204—129 **5 Claims**

1. In the closed cycle method for the preparation of hydrogen by an endothermic cycle of a plurality of successive chemical steps occurring at different temperatures in which the products of each chemical step other than hydrogen and oxygen are used in a successive step or recycled to a prior step, the net effect of said cycle being to break down water to its constituent elements, comprising (1) hydrolyzing magnesium chloride to magnesium hydroxide and hydrochloric acid, (2) reacting the hydrochloric acid produced in step 1 with copper to produce cupric chloride and hydrogen, (3) dismuting the cupric chloride produced in step 2 to copper and chlorine and recycling the copper thus produced to step 2, and (4) reacting the chlorine produced in step 3 with the magnesium hydroxide produced in step 1 to produce magnesium chloride, hydrogen and oxygen and recycling the magnesium chloride thus produced to step 1, the improvement which comprises effecting the dismuting of the cupric chloride electrochemically.

4,060,467

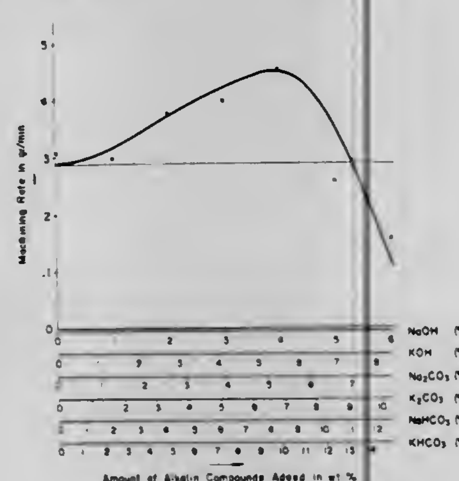
ELECTROLYTIC MACHINING SYSTEM

Sachio Maeda, Machida; Nagoa Saito, Nagoya; Shinji Arai, Nagoya, and Yuichiro Haishi, Nagoya, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Continuation-in-part of Ser. No. 104,467, Jan. 15, 1971, abandoned. This application Feb. 12, 1975, Ser. No. 549,438

Int. Cl.² C25F *3/02*

U.S. Cl. 204—129.75 **13 Claims**



1. A method for electrolytically machining a workpiece consisting essentially of tungsten carbide alloy comprising the steps of: positioning a machining electrode opposite a surface portion of a workpiece consisting essentially of tungsten carbide alloy to form a small machining gap therebetween; flowing an aqueous electrolyte solution through said machining gap, said electrolyte solution consisting essentially of 5% to saturated value by weight of an alkali metal chloride selected from a group consisting of sodium chloride and potassium chloride, and an alkali metal compound selected from the group consisting of 3.6%–5.3% by weight of sodium hydroxide, up to 7.5% by weight of potassium hydroxide, up to 7.1% by weight of sodium carbonate, up to 9.2% by weight of potassium carbonate, up to 11.2% by weight sodium bicarbonate, and up to 13.3% by weight potassium bicarbonate; and passing an alternating electric current through said electrolyte solution in said machining gap, through said workpiece and through said machining electrode to render said workpiece anodic during part of the cycle of said alternating current to form oxides on the workpiece and to render said workpiece cathodic during the reverse part of the cycle of said alternating current to dissolve said oxides.

4,060,468

OLEFIN METATHESIS PROCESS AND CATALYST THEREFOR

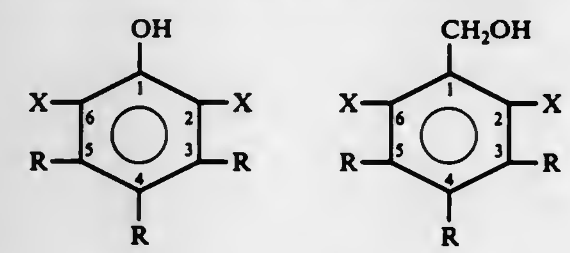
Kenneth F. Castner, Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Oct. 4, 1976, Ser. No. 729,315

Int. Cl.² B01J *1/10, 23/16;* **C07C** *3/10;* **C07F** *2/46*

U.S. Cl. 204—158 R **8 Claims**

1. The method of preparing a catalyst useful for olefin metathesis which comprises mixing (A) a salt selected from the group consisting of WCl_6, WCl_5, WCl_4, WBr_5, $WOCl_4$, WO_2Cl_2, and $WOBr_4$, and (B) an oxygenated organic compound selected from the group represented by the formula:



X is selected from Cl, Br, I, methyl, isopropyl or t-butyl group; R is selected from H, Cl, Br, I, alkyl, aryl, arylalkyl, alkaryl and cycloalkyl; and subsequently exposing said mixture of (A) and (B) to ultraviolet irradiation for at least long enough to give approximately 0.4 KWH per mole of the metal salt of tungsten.

4,060,469

PREPARATION OF 1,1,1-TRIFLUORO-2,2-DICHLOROETHANE

Richard F. Sweeney, Elma, N.Y., and James O. Peterson, Sylvania, Ohio, assignors to Allied Chemical Corporation, N.J.

Filed Dec. 21, 1976, Ser. No. 753,155

Int. Cl.² B01J *1/10*

U.S. Cl. 204—163 R **14 Claims**

1. A process for the preparation of 1,1,1-trifluoro-2,2-dichloroethane, comprising photochlorinating 1,1,1-trifluoro-2-chloroethane in a reaction zone with a less than molar equivalent of chlorine in the presence of actinic radiation, and with a residence time in the chlorine/1,1,1-trifluoro-2-chloroethane reaction zone of such duration that essentially no unreacted chlorine is entrained in the reaction effluent, but of insufficient duration as to effect other than minimal by-production of perhalogenated contaminant.

4,060,470

SPUTTERING APPARATUS AND METHOD

Peter J. Clarke, 760 Arcady Road, Santa Barbara, Calif. 93108

Continuation-in-part of Ser. No. 530,069, Dec. 6, 1974, abandoned. This application Dec. 19, 1975, Ser. No. 642,455

Int. Cl.² C23C *15/00*

U.S. Cl. 204—192 R **26 Claims**

1. Glow discharge sputtering apparatus for coating a work piece including:

anode and cathode electrode means for operation at independent operating electrical potentials to establish in use a main electric field intercepted by said cathode means;

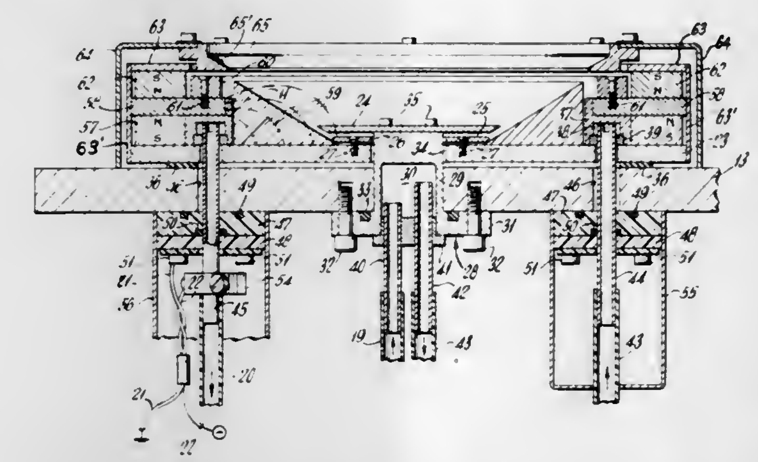
said cathode electrode means adapted to contain a main portion made of a material to be sputtered from said cathode means onto the work piece;

magnet means including a main magnetic circuit for producing a main magnetic field passing out of and looping back into said main cathode portion and a stray magnetic field not intercepted by said main cathode portion and said main magnetic field being crossed with said electric field over said main cathode portion;

means for applying an operating electrical potential between said anode and cathode means for establishing in operation a main magnetically enhanced glow discharge over said main cathode portion for bombarding said main portion of said cathode means with positive ions to produce sputtering of said cathode material onto the work piece; and

said magnetic circuit including stray glow discharge suppression means for shaping said stray magnetic field lines in a stray glow discharge region which is otherwise susceptible of supporting a stray glow discharge therein in order to reduce the intensity of said stray glow discharge and stray sputtering generated thereby.

9. In a glow discharge sputtering method for coating a work piece, the steps of:



producing crossed magnetic and electric fields over the main surface of a cathode electrode made of a material to be sputtered onto the work piece, such produced magnetic field having a stray magnetic field component disposed over portions of the cathode electrode structure from which sputtering is to be suppressed;

suppressing the stray sputtering of the cathode electrode structure by shaping the stray magnetic field in the region of the stray glow discharge region so as to substantially reduce the intensity of the stray magnetic field component at right angles to the electric field component in the region of the stray glow discharge, whereby such stray glow discharge is substantially suppressed thereby suppressing undesired cathode sputtering resulting therefrom.

4,060,471

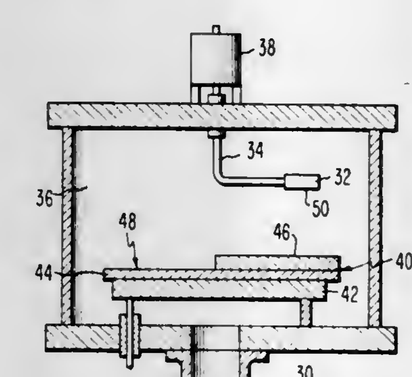
COMPOSITE SPUTTERING METHOD

Harry Louis Pinch, Princeton, N.J., and Herbert Irwin Moss, Yardley, Pa., assignors to RCA Corporation, New York, N.Y.

Division of Ser. No. 578,899, May 19, 1975, Pat. No. 4,013,830. This application Sept. 17, 1976, Ser. No. 724,220

Int. Cl.² C23C *15/00*

U.S. Cl. 204—192 SP **7 Claims**



1. A method for sputtering a layer in which the concentration of the component materials varies through the thickness of the layer, said method comprising the steps of:

moving the substrate within a sputtering apparatus having sources of the different component materials, the substrate being moved during the deposition from a position where the deposition is substantially from a first source to at least one intermediate position where deposition is from said first source and at least another of said sources to a position where deposition is substantially from said another of said sources, so that the deposited layer varies in concentration through its thickness.

6. A method for making a video disc stylus comprising the steps of:

placing a substrate formed of a dielectric material into the chamber of a radio frequency diode sputtering apparatus, the chamber containing a composite sputtering target having a section of the same conductive material and a section of dielectric material which comprises the substrate;

activating the sputtering apparatus causing the materials of the sputtering target to sputter; and

moving the substrate across the surface of the composite sputtering target from an initial position near the section of dielectric material to a position near the section of conductive material so that the sputtered material strikes and adheres to the substrate.

4,060,472

ANODE-FITTING ASSEMBLY

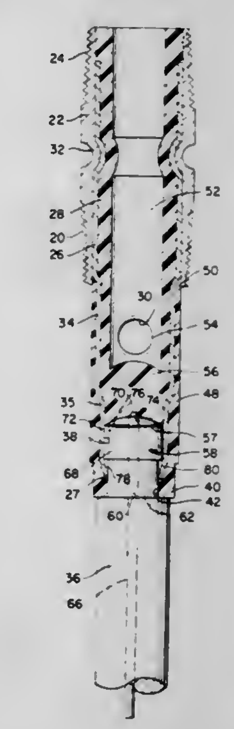
Sam Alewitz, Painesville, Ohio, assignor to Perfection Corporation, Madison, Ohio

Continuation-in-part of Ser. No. 310,561, Nov. 29, 1972, Pat. No. 3,891,530. This application June 24, 1975, Ser. No. 589,865

The portion of the term of this patent subsequent to June 24, 1992, has been disclaimed.

Int. Cl.² C23F *13/00*

U.S. Cl. 204—197 **8 Claims**



1. An anode-fitting assembly for a water heater or the like comprising in combination:

a fitting member adapted to be secured to the wall of such water heater in electrical contact therewith, said fitting member having an interior cylindrical wall defining a recess at one end thereof;

an anode member comprising:

an electrode;

a joining member received about one end of said electrode;

locking recess means defined in said anode member;

said joining member and said one end of said electrode being disposed in said recess of said fitting member;

said joining member having a cylindrical portion the inner wall of which is in physical and electrical contact with the exterior surface of said electrode and the exterior wall of which is in physical and electrical contact with at least a portion of said interior cylindrical wall defining said recess of said fitting member, said cylindrical portion being entirely received within said recess of said fitting member and, in a radial direction, being located between said electrode and said fitting member providing an electrical interconnection between said electrode and said fitting member;

said fitting member having a locking portion disposed essentially adjacent said locking recess means of said anode member, a part of said locking portion being disposed in said locking recess means thus to provide for locking of said anode member to said fitting member.

4,060,473

NOVEL COPOLYMERS AND DIAPHRAGMS MADE THEREFROM

Luigi Giuffre, Milan, Italy; Vittorio de Nora, Nassau, Bahamas, and Placido Spaziante, Milan, Italy, assignors to Oronzio de Nora Impianti Elettrochimici S.p.A., Milan, Italy

Filed Nov. 14, 1975, Ser. No. 632,056

Claims priority, application Italy, Mar. 28, 1975, 21810/75

Int. Cl.^{2} C25B *1/16, 1/26, 9/00*

U.S. Cl. 204—253 **19 Claims**

1. A diaphragm for an electrolysis cell comprising a film made of water-wettable and water-insoluble at least 60% sulfonated copolymer of (A) a monomer of the formula

Y—CH═CH—X

wherein X is an electron attracting group and Y is selected from the group consisting of hydrogen, methyl and ethyl and (B) a halogenated monomer of the formula

$$R-\overset{\overset{Y'}{|}}{C}=\overset{\overset{Y''}{|}}{C}-Y'''$$

wherein R is selected from the group consisting of hydrogen, halogen and alkyl of 1 to 4 carbon atoms optionally halogenated, Y', Y'' and Y''' are individually selected from the group consisting of hydrogen and halogen with the proviso that at least one of the Y's is fluorine and the sulfonic acid group is attached to the carbon atom α to the electron attracting group, the ratio of B to A being 1:2.5 to 1:42.

4,060,474

ELECTROLYTIC CELL OF THE DIAPHRAGM TYPE COMPRISING A BASE MADE OF AN INSULATING MATERIAL

Daniel Masure, Lavera; Jacques Guillaumont, Saint-Auban, and Jean-Marie Pigeaud, Lavera, all of France, assignors to Rhone-Poulenc Industries, Paris, France

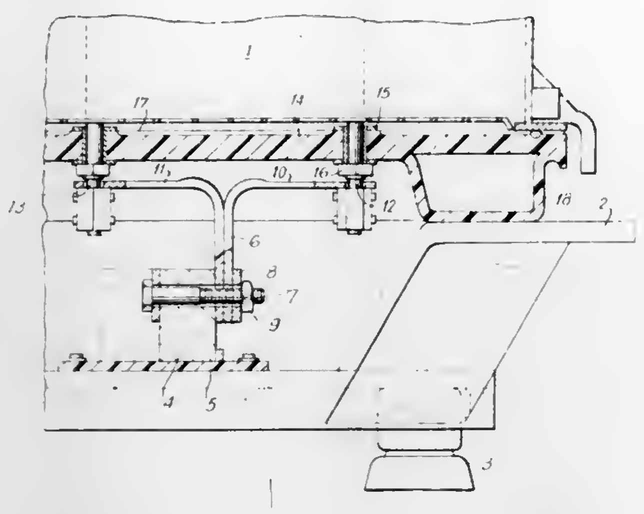
Filed Feb. 26, 1976, Ser. No. 661,531

Claims priority, application France, Feb. 26, 1975, 75.05963

Int. Cl.^{2} C25B *1/16, 1/26, 9/02*

U.S. Cl. 204—270 **3 Claims**

1. An electrolytic cell of the diaphragm type, comprising, in combination, a base of an electrically insulating material, a plurality of anodes fixed on said base of said cell by means of extensions of said anodes which pass through said base, said extensions comprising at least one core of a metal which is a good electrical conductor, connecting means connected to at least one of a plurality of current distributing bars, and a rigid structure with the distributing bar and the base of the cell resting thereon, said distributing bars being disposed between said base of said cell and said rigid structure, said plurality of current distribution bars being extended by a platform located in front of said cell, from which electrical connection between cells is provided, said rigid structure resting on supports and



with at least one said current distributing bar resting on said rigid structure by means of an insulating element.

4,060,475

ELECTROLYTIC CELL SUITABLE FOR PRODUCING ALKALI METAL CHLORATES

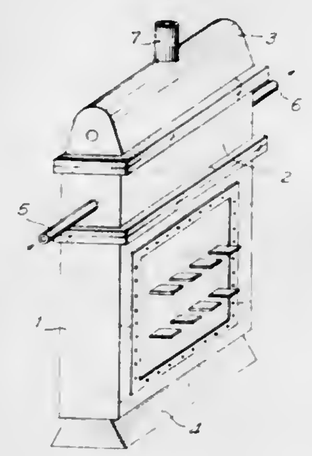
Daniel Fournier, Paris, and Hugues Bourgeois, Chedde, both of France, assignors to Rhone-Poulenc Industries, Paris, France

Filed Feb. 26, 1976, Ser. No. 661,527

Claims priority, application France, June 3, 1975, 75.07008

Int. Cl.^{2} C25B *1/16, 1/26, 9/02*

U.S. Cl. 204—270 **19 Claims**



1. An electrolytic cell, without a diaghragm, wherein products resulting from the anode and cathode reactions react together inside the cell, suitable for use in obtaining alkali chlorates from alkali chlorides, said electrolytic cell comprising an anode block and a cathode block, each block including a set of parallel electrodes arranged so that the anodes of said anode block are accommodated in the space defined between two cathode surfaces of the cathodes of said cathode block, the interpolar space being kept constant, wherein said anodes and cathodes are mounted on substantially vertical anode and cathode ends so as to provide an open space above the anode and cathode units; the cathodes including perforated elements; at least one surface of the cathode elements facing an anode surface with said surface of said cathode elements being perforated and the proportion of cavities of said perforations being at least about 10% of said cathode surface; thereby permitting exit of the gases contained in the interpolar space; the other surface of said cathode elements facing another cathode surface, so as to define a cathode space in which the products of the anode and cathode reactions can react; and the said cathodes also containing openings at least at the top, so as to permit the cathode space to communicate with the open space provided above said anodes and cathode units, and so as to permit exit of the gaseous substances contained in the cathode space; said interpolar distance being from about 2 to 4 millimeters, and the width of said cathode space being from about 4 to 12 centimeters.

4,060,476

ANODE FOR ELECTROCHEMICAL PROCESSES

Wolfram Treptow, Ludwigshafen, and Gerd Wunsch, Speyer, both of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed Dec. 15, 1975, Ser. No. 640,575

Claims priority, application Germany, Dec. 30, 1974, 2461800

Int. Cl.^{2} C25B *11/04, 11/16*

U.S. Cl. 204—290 F **7 Claims**

1. An anode suitable for use in electrochemical process and comprising an electrode base plate made of a metal which can be passivated electrochemically, a protective layer of the nitride of the metal of the electrode base plate applied thereto, and a layer containing manganese dioxide as electrochemically active material and overlying the protective layer, said last-mentioned layer having been produced by applying over the protective nitride layer of the electrode base plate a thermally decomposable manganese salt and decomposing said salt to form manganese dioxide by rapidly bringing the salt, after its application over the protective nitride layer, to its decomposition temperature in a period of less than 60 seconds.

4,060,477

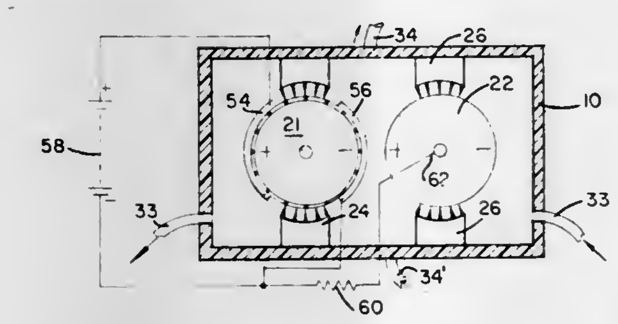
APPARATUS FOR REMOVING IONS FROM AN IONIZED LIQUID

Philip E. Benner, 1739 Randolph Road, Schenectady, N.Y. 12308

Filed Jan. 3, 1977, Ser. No. 756,199

Int. Cl.^{2} C02B *1/14*

U.S. Cl. 204—300 R **13 Claims**



1. In a system for removing ions from an ionized liquid of the type employing a pair of adjacent rotating bi-polar electrodes having peripheral surfaces of selective ion adsorption material disposed in the ionized liquid and wherein electrically induced ion-adsorption takes place in one portion of the liquid, said ions are transported out of said one portion of the liquid by the rotation of the electrodes and rejected into another portion of the liquid, the improvement comprising:

a. At least one segmented rotating electrode; and

b. Brush contact means operatively associated with said segmented electrode and a direct current voltage source for applying one polarity voltage to a plurality of segments on one side of said segmented electrode and the opposite polarity voltage to a similar plurality of segments on the opposite side of said segmented electrode and establish a voltage polarity difference between the two sides of said segmented electrode to effect ion-adsorption from one portion of the ionized liquid and ion-rejection to another portion of the ionized liquid.

4,060,478

COAL LIQUEFACTION BOTTOMS CONVERSION BY COKING AND GASIFICATION

Robert J. Lang, Baytown, Tex., assignor to Exxon Research and Engineering Company, Linden, N.J.

Filed Sept. 30, 1976, Ser. No. 728,335

Int. Cl.^{2} C10G *1/04;* **C01B** *1/18*

U.S. Cl. 208—8 **19 Claims**

1. A process for upgrading heavy bottoms produced by the liquefaction of coal or similar carbonaceous solids which comprises pyrolyzing said bottoms in the presence of an added alkaline earth metal compound to produce coke containing added alkaline earth metal constituents and thereafter gasifying said coke in the presence of steam.

4,060,479

PROCESS FOR OBTAINING OIL, GAS, SULFUR AND OTHER PRODUCTS FROM OIL SHALE

Eduardo Da Costa Barcellos, Avenida Atlantica 290 Apt. 92, Rio de Janeiro, Brazil

Filed Oct. 20, 1975, Ser. No. 623,984

Claims priority, application Brazil, Oct. 21, 1974, 8744

Int. Cl.^{2} C10G *1/02*

U.S. Cl. 208—11 R **15 Claims**

1. A process for obtaining useful products from oil shale, comprising introducing crushed raw oil shale through the upper part of an essentially vertical processing vessel, causing said shale to move continuously downwardly as a moving bed, continuously introducing a gaseous mixture consisting essentially of oxygen and steam into the bottom of said moving bed, whereby an ascending gaseous stream continuously contacts said downwardly moving bed, said moving bed of shale passing, successively, through a drying and heating zone, a pyrolysis zone in which the temperature ranges from about 320° C. to about 700° C., a gasification zone in which the temperature ranges from about 760° C. up to the maximum bed temperature, a combustion zone and a cooling zone, withdrawing the spent shale from the bottom of the vessel, and withdrawing the resulting vapor, oil mist and gas product stream mixed with unreacted introduced steam from the upper portion of the processing vessel; said pyrolysis comprising converting the kerogen of the oil shale into essentially oil, gases and water vapor, leaving residual carbon, hydrogen and sulfur in the shale; said gasification comprising the reaction of steam with said residual carbon and sulfur in the shale to form H_2, CO, CO_2 and H_2S; said combustion comprising the burning of fuel matter remaining in the shale with the introduced oxygen, and serving as the source of heat required by the process, the temperature of the combustion zone being the maximum bed temperature, said temperature being controlled slightly lower than the clinkerization point of the spent shale, but being permitted to reach said clinkerization point occasionally, and the amount of steam employed being sufficient to assure such control of the maximum bed temperature and the presence of the gasification zone above the combustion zone.

4,060,480

HYDROCARBON HYDROCONVERSION PROCESS EMPLOYING HYDROXY-ALUMINUM STABILIZED CATALYSTS SUPPORTS

Marion G. Reed, Hacienda Heights, and Joseph Jaffe, Berkeley, both of Calif., assignors to Chevron Research Company, San Francisco, Calif.

Division of Ser. No. 177,819, Sept. 3, 1971, Pat. No. 3,798,177. This application Nov. 26, 1973, Ser. No. 419,178

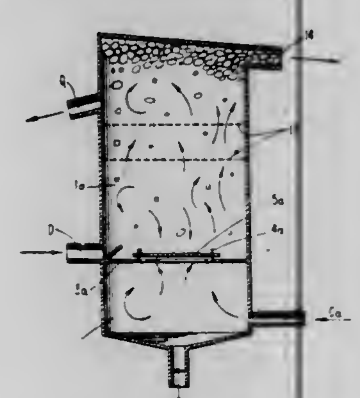
Int. Cl.^{2} C10G *13/04, 23/02;* **C01B** *29/28;* **C10G** *27/08*

U.S. Cl. 208—111 **12 Claims**

1. In a hydrocarbon conversion process for the production of hydrocracked hydrocarbons by hydrocracking said hydrocarbon in a conversion catalyzed by a catalyst comprising a support and at least one hydrogenating component selected from the group consisting of Groups IV, V, VI, VII and VIII

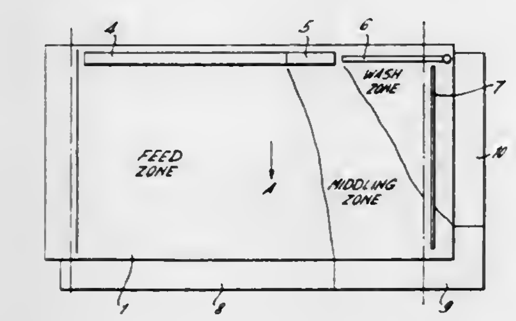
of the Periodic Table, said support being a crystalline silica-alumina having a surface area within the range from about 50 to about 750 m^2 per gram selected from the group consisting of natural and synthetic clay-type minerals and zeolitic molecular sieves; and said conversion being effected under ordinary hydrocarbon hydroconversion conditions, the improvement which comprises carrying out said hydrocracking wherein said catalyst support is stabilized, said stabilization having been effected by treating said support with an aqueous hydroxy-aluminum solution having a ratio of hydroxyl groups to aluminum atoms in the range from about 1.5 to about 2.7.

4,060,481
MATERIAL TREATING APPARATUS INCLUDING PNEUMO-HYDRAULIC VIBRATOR
Stoycho Mitrev Stoev; Metodi Stoyanov Metodiev; Lyubomir Vladimirov Kuzev; Petko Georgiev Vedrichkov; Ivan Mitrev Sapunarov; Vassil Vladimirov Vassilev; Spas Petkov Dimitrov; Vihar Assenov Gasharov; Sheko Kolev Russev, and Kostadin Georgiev Mitrev, all of Sofia, Bulgaria, assignors to Vish Minno-Geoloshki Institute - NIS, Sofia, Bulgaria
Division of Ser. No. 572,457, April 28, 1975, abandoned. This application May 20, 1976, Ser. No. 688,267
Claims priority, application Bulgaria, Feb. 19, 1974, 25837
Int. Cl.² B03D *1/24*
U.S. Cl. 209—170 **1 Claim**



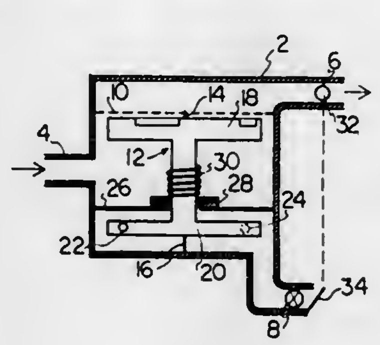
1. An apparatus for treating pulp in a liquid, such apparatus having a working cell with opposite vertical walls adapted to contain the liquid and pulp, the improvement which comprises a gas cell disposed at least partially below said working cell, first wall means disposed in said apparatus having at least one aperture separating said working cell and said gas cell, a valve disposed in said aperture and having a valve element disposed above the aperture and normally urged into a closed position by the weight of the liquid, a source of pressurized gas, first conduit means adapted to place said source of pressurized gas in fluid communication with said gas cell, valve means operatively mounted in said first conduit means between said source of pressurized gas and said gas cell and adapted to regulate the pressurized gas flow to said gas cell, the pressurized gas in said gas cell producing intermittently sufficient force to move said valve element upwardly and permit the escape of gas into said working cell and thereby causes a vibration of said valve element, means for guiding the valve element for vertical travel with respect to at least a portion of said wall means, a pair of vertically spaced horizontal grids spanning between said opposite vertical walls of said working cell and being supported by them, and at least two discharge conduit means disposed in one of said vertical walls of said working cell above the uppermost horizontal grid for discharging a froth product from said working cell.

4,060,482
METHOD OF AND APPARATUS FOR SEPARATING FRACTIONS OF DIFFERENT DENSITY CONTAINED IN ORES OR OTHER SOLID MATERIALS
Richard Owen Burt, Camborne, England, assignor to Bartles (Carn Brea) Limited, United Kingdom
Filed Oct. 15, 1975, Ser. No. 622,722
Claims priority, application United Kingdom, Oct. 18, 1974, 45230/74
Int. Cl.² B03B *5/08*
U.S. Cl. 209—432 **25 Claims**



1. A method of separating fractions of different densities contained in solid material which comprises directing the solid material in a liquid suspension on to a surface of an endless belt moving in the direction of its length and, inclined transversely to its direction of motion, along a first part of the length of a higher portion of the belt and subjecting said moving surface of the belt to a shaking motion so that lighter fractions are separated from the material and flow off a lower side edge of the belt into a receptacle; directing washing liquid on to said moving surface from another part of the length of said higher portion of the belt that is downstream of said first part so that the washing liquid flows transversely across said shaking, moving surface to separate middling fractions from the material and carry them off the lower side edge of the belt into a second receptacle; discharging heavier fractions of the material that remain on said shaking, moving surface over the downstream end of said moving surface of the endless belt into a third receptacle; retreating the middling fractions collected in the second receptacle by redirecting them on to the moving surface of the endless belt along a part of the higher portion of the belt that lies between the first part, along which the material in a liquid suspension is directed on to the moving surface, and the other part, along which washing liquid is directed on to the moving surface to flow transversely across the moving surface; and discharging the heavier of the middling fractions over the higher part of the downstream end of the moving surface into said third receptacle.

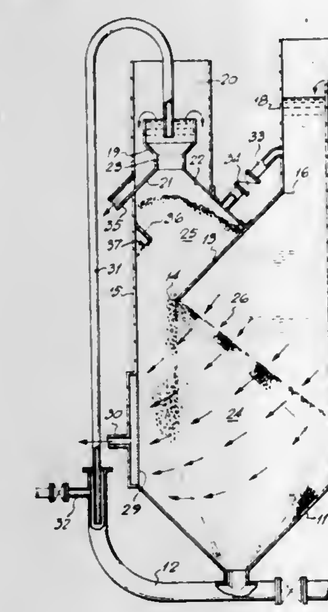
4,060,483
METHOD AND APPARATUS FOR EFFECTING THE CLEANING OF A FLUID FILTER
Ytzhak Barzuza, 1 Mevo Bosmat Str.Gilo, Jerusalem, Israel
Filed May 5, 1976, Ser. No. 683,487
Claims priority, application Israel, May 14, 1975, 47305
Int. Cl.² B08B *9/04*
U.S. Cl. 210—79 **15 Claims**



1. A method for effecting the cleaning of a clogged fluid

filtering member in a filtering system situated between an inlet and an outlet port comprising utilizing at least a portion of the fluid to be filtered in said system to impart motion to a movable hollow cleaning body provided therein in fluid communication with a valved cleaning outlet and to carry matter unable to pass through said filtering member into a fluid intake portion of said cleaning body and out said cleaning outlet, said hollow body is imparted said motion by virtue of the fluid flow in the path established through said hollow body between said fluid intake portion and said cleaning outlet when the normally closed valved cleaning outlet is opened.

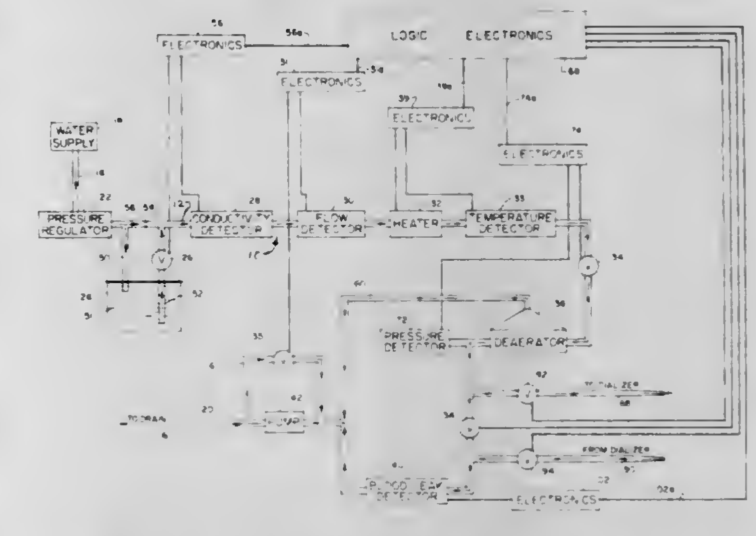
4,060,484
FILTERS
Eric Paul Austin, Sandbach, and John Trevor Allanson, Alsager, both of England, assignors to Simon-Hartley Limited, Stockport, England
Continuation of Ser. No. 488,819, July 15, 1974, abandoned. This application Dec. 19, 1975, Ser. No. 642,313
Claims priority, application United Kingdom, Aug. 25, 1973, 40368
Int. Cl.² B01D *23/16*
U.S. Cl. 210—80 **9 Claims**



1. A method of filtering a liquid comprising the steps of providing a bed of particulate material comprising particles of varying sizes and contained within a vessel, continually withdrawing material from the base of the bed, continually supplying replacement particulate material to the bed through an opening having an edge forming a boundary to said opening and past which the material flows, the vessel extending beneath the opening on either side of said edge whereby the bed has a freely formed inclined upper surface extending downwardly from said edge and where due to classification as the particles move down said surface an outer layer of predominately larger particles is formed over an inner layer or layers of predominately smaller particles beneath said outer layer, and causing the liquid to be filtered to enter the vessel through a duct separate from said opening for flow downwardly through the bed, the liquid entering the bed substantially only through said inclined upper surface for initial flow through said outer layer.

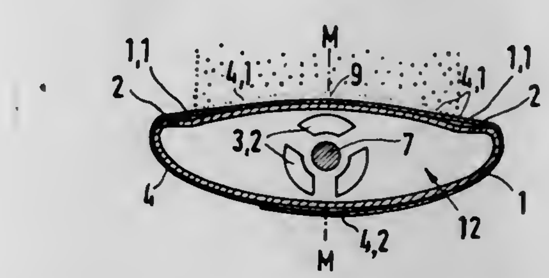
4,060,485
DIALYSIS APPARATUS
Thomas Eaton, Hawthorne, Calif., assignor to I T L Technology, Inc., Hawthorne, Calif.
Filed June 9, 1975, Ser. No. 585,074
Int. Cl.² B01D *31/00, 13/00*
U.S. Cl. 210—87 **9 Claims**

1. A dialysis apparatus comprising:
an elongated flow passage having a water inlet at one end and a fluid discharge at the other end;
a reservoir containing a brine concentrate said reservoir communicating with portions of said passage downstream of said water inlet so that water enters said reservoir to force said brine concentrate out of said reservoir and into said passage;
a water inlet tube connected between said passage and said reservoir and in direct communication with said brine concentrate in said reservoir;
a brine outlet tube connected to said reservoir and to said passage downstream of said water inlet tube;
a restrictor means in said passage between said water inlet tube and said brine outlet tube for permitting water to flow therethrough at a pressure lower than the water pressure applied to said water inlet tube whereby said brine concentrate entering said passage from said brine outlet tube will be diluted by the water passing through said restrictor means to form a brine solution;



a conductivity detector means in said passage downstream of said brine outlet tube for detecting changes in the conductivity of said brine solution;
valve means in said brine outlet tube operable by said conductivity detector means for controlling flow of said brine concentrate through said brine outlet tube;
spaced inlet and outlet tubes connected to said passage downstream from said conductivity detector means for connecting a blood dialyzer device to said passage; and
a pump downstream of said dialyzer device having an inlet connected to said passage for drawing said brine solution through said dialyzer and an outlet for discharging said brine solution to a drain.

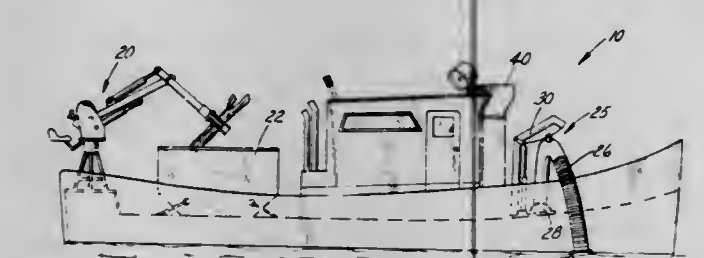
4,060,486
WASTE WATER AERATION DEVICE
August Schreiber, Bahnhofstr. 45, 3001 Hannover-Vinnhorst, Germany
Filed Mar. 25, 1976, Ser. No. 670,223
Claims priority, application Germany, Mar. 26, 1975, 2513547
Int. Cl.² C02C *1/12;* B01F *3/04*
U.S. Cl. 210—220 **7 Claims**



1. A device for the intermittent aeration of waste water which comprises an elongated air supply container, said container consisting of connected upper and lower outwardly arched walls enclosing an air passage chamber therebetween, said upper wall consisting of an outwardly arched central portion and opposite, substantially horizontal portions adjacent the two longitudinal edges thereof in the elongated direction of said air supply container, said lower arched wall being

connected to the opposite, substantially horizontal portions of said upper wall, means forming a plurality of air passage openings in said opposite, substantially horizontal portions of said upper wall, means closing the opposite ends of said elongated air supply container, means for intermittently supplying air to the air passage chamber in said elongated air supply container; a flexible air distribution casing stretched over said upper wall of said air passage chamber so as to cover said outwardly arched central portion of said upper wall in an air-tight fashion but retain respective free air spaces between said opposite, substantially horizontal portions of said upper wall and said flexible air distribution casing, means forming air outlet openings in said air distribution casing, said air outlet openings being positioned in said casing adjacent said arched central portion of said upper wall and between said opposite longitudinal rows of air passage openings in said opposite, substantially horizontal portions of the upper wall of said elongated container, whereby upon the supply of air to the air passage chamber in said container, the air passes through said air passage openings in said opposite, substantially horizontal portions of said upper wall to fill said free air spaces with no resistance and thereafter lift said air distribution casing away from said container, and finally pass through said air outlet openings of said casing into surrounding waste water.

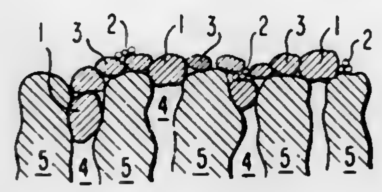
4,060,487
APPARATUS FOR CLEANING OIL SPILLS
Frank J. Samsel, 13455 Lake Ave., Lakewood, Ohio 44107
Filed Dec. 17, 1973, Ser. No. 425,324
Int. Cl.[2] E02B *15/04*
U.S. Cl. 210—242 R **4 Claims**



1. An integrated system for collecting and transferring to land for disposal thereon liquid and solid waste floating on or near the surface of a body of water, said system comprising, in combination:

a floating vessel with a hull and a deck, crane means with controls therefor mounted on the deck of said vessel and positioned for removing large solids from said body of water, container means removably installed on said deck adjacent said crane for containing said solids, storage tank means for the storage of liquid waste which has been removed from the surface of said body of water, pump means for producing a vacuum connected to said storage tank means, hose means with a first open end connected to said storage tank means and a second open end constructed and arranged to draw in surface liquid while spaced above the surface of said body of water, support means for supporting the second open end of said hose spaced above the surface of said body of water, pump means connected to said storage tank for removing the contents thereof, and shore based means including a truck for removing containers filled with solid waste from the deck of said vessel when at a dock, whereby said containers may be transported by said truck for the disposal of said solid waste on land.

4,060,488
PARTICULATE MEMBRANE ULTRAFILTRATION DEVICE
Fred Wayne Hoover, and Ralph K. Iler, both of Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.
Filed Nov. 20, 1975, Ser. No. 633,835
Int. Cl.[2] B01D *31/00*
U.S. Cl. 210—433 M **8 Claims**



1. In an ultrafiltration device of the type comprising an integral porous support having pores about from 0.5 to 45 microns in their smallest cross sectional dimension and a removable and renewable particulate membrane inert to feedstock coated onto at least a portion of the surface of the support, the improvement wherein the membrane comprises

a. large inorganic particles about from 0.5 to 45 microns in average cross sectional dimension and of such size as will enter but not pass through the pores of the support and
b. small inorganic particles about from 0.002 to 0.5 microns in average cross sectional dimension and of such size as will pass through the pores of the support, said particles being bonded together with silica particles formed by heating the membrane with an alkaline solution of silica at about 90°-100° C.

4,060,489
FIRE FIGHTING WITH THIXOTROPIC FOAM
Peter J. Chiesa, Jr., Coatesville, Pa., assignor to Philadelphia Suburban Corporation, Bryn Mawr, Pa.
Continuation-in-part of Ser. No. 557,757, March 12, 1975, and a continuation-in-part of Ser. No. 525,175, Nov. 19, 1974, and a continuation-in-part of Ser. No. 369,584, June 13, 1973, Pat. No. 3,957,657, said Ser. No. 557,757, is a continuation-in-part of Ser. No. 307,479, Nov. 17, 1972, abandoned, said Ser. No. 525,175, is a continuation-in-part of Ser. No. 307,479, , said Ser. No. 369,584, is a continuation-in-part of Ser. No. 307,479, , which is a continuation-in-part of Ser. No. 254,404, May 18, 1972, Pat. No. 3,849,315, which is a continuation-in-part of Ser. No. 131,763, April 6, 1971, abandoned. This application Mar. 25, 1976, Ser. No. 670,252
Int. Cl.[2] A62D *1/00*
U.S. Cl. 252—3 **17 Claims**

1. An aqueous pumpable fire-fighting concentrate for dilution with at least about ten times its volume of water and foaming with air to produce a fire-fighting foam, said concentrate containing (a) a foaming agent that causes the diluted concentrate to form a foam having an expansion of at least about 3, and (b) a water-soluble thixotropic polysaccharide dissolved in an amount that causes the foam to undergo syneresis and form a floating gel mat when applied to a non-aqueous polar solvent.

6. The concentrate of claim 1 which also contains film-forming material in an amount that causes the foam to form an aqueous film over a liquid hydrocarbon to which the foam is applied.

4,060,490
COMPOSITION AND METHOD FOR ENHANCED OIL RECOVERY UTILIZING AQUEOUS POLYACRYLAMIDE SOLUTIONS
George G. Bernard, La Mirada, Calif., assignor to Union Oil Company of California, Brea, Calif.
Filed Aug. 23, 1976, Ser. No. 716,887
Int. Cl.[2] E21B *43/22*
U.S. Cl. 252—8.55 D **10 Claims**

1. A displacement fluid composition for enhanced recovery of liquid hydrocarbons from a subterranean reservoir comprising an aqueous solution comprising:

a. about 0.005 to about 1.5 percent by weight of a polymer thickener having a molecular weight above about 0.2×10^6 selected from the group consisting of polyacrylamide, partially hydrolyzed polyacrylamide and copolymers of acrylic acid and acrylamide;
b. about 1 to about 10 percent by weight of a liquid detergent consisting essentially of:
  1. 25–40 percent by weight of a sulfated and neutralized reaction product obtained from (i) condensing 1–5 moles of ethylene oxide and 1 mole of monohydric alcohol of from 10–16 carbon atoms in the molecule, (ii) sulfating the condensation product of (i), (iii) neutralizing the sulfated product of (ii) with a neutralizing agent selected from the group consisting of ammonia and alkylol-substituted ammonia having from 2–3 carbon atoms in the alkylol group;
  2. an organic builder substance consisting essentially of alkylol amide of saturated fatty acids having 10, 12 and 14 carbon atoms and an alkylol amine, said alkylol amide having not more than 3 carbon atoms in each alkylol radical and the amount thereof being from 6 to 12 percent by weight of the composition;
  3. 15–25 percent by weight of alcohol selected from the group consisting of ethanol, normal propanol and isopropanol;
  4. not over 5 percent by weight of extraneous substances produced by the condensing, sulfating and neutralizing reactions of step (b) (1) above; and
  5. water to make 100 percent by weight; and
c. aqueous media selected from the group consisting of fresh water and brine to make 100 percent by weight.

4,060,491
LUBRICANT COMPOSITION
Robert F. Bridger, and Kirk D. Schmitt, both of Hopewell, N.J., assignors to Mobil Oil Corporation, New York, N.Y.
Continuation-in-part of Ser. No. 619,098, Oct. 2, 1975, abandoned. This application May 26, 1976, Ser. No. 690,219
Int. Cl.[2] C10M *1/32, 3/26, 5/20, 7/30*
U.S. Cl. 252—50 **11 Claims**

1. A method for reducing wear between moving steel-on-steel surfaces which comprises introducing between said surfaces a lubricant composition comprising an oil of lubricating viscosity or a grease prepared therefrom containing an antiwear amount of a 5-alkylbenzotriazole wherein the alkyl group contains from 4 to 16 carbon atoms.

4,060,492
SYNTHETIC SATURATED OILS, AND THEIR PRODUCTION AND USE
Seimei Yasui, Takarazuka, and Hiroshi Sato, Toyonaka, both of Japan, assignors to Sumitomo Chemical Company, Limited, Japan
Filed May 25, 1976, Ser. No. 689,689
Claims priority, application Japan, May 26, 1975, 50-63266
Int. Cl.[2] C10M *1/18*
U.S. Cl. 252—59 **11 Claims**

1. A method for the preparation of synthetic saturated oils, which comprises hydrogenation of low molecular weight polyisoprene having the 1,4 structure of at least 70% of the main chains and a number average molecular weight of about 150 to 3,000.

2. The method according to claim 1, wherein the hydrogenation is carried out by treatment with hydrogen in the presence of a hydrogenation catalyst.

4,060,493
LIQUID ELECTROSTATIC DEVELOPER
Kazuo Tsubuko, Yokohama; Taro Kimura, Tokyo; Junichiro Hashimoto, Tokyo, and Tsuneo Kurotori, Tokyo, all of Japan, assignors to Ricoh Co., Ltd., Tokyo, Japan
Filed July 10, 1975, Ser. No. 594,806
Int. Cl.[2] G03G *9/12*
U.S. Cl. 252—62.1 L **4 Claims**

1. A liquid electrostatic developer consisting essentially of pigment or dyestuff blended in a non-aqueous dispersion of a graft copolymer and from one to 50 parts by weight, per 100 parts by weight of said graft copolymer, of at least one substance selected from the group consisting of polyethylene, polyethylene wax and paraffin wax having a softening point of 60° C to 130° C, said graft copolymer and said substance being dispersed in an organic liquid carrier having a high resistivity of more than $10^9 \Omega$.cm and a low dielectric constant of less than 3, which non-aqueous dispersion has been prepared by carrying out successively the following three steps (a), (b) and (c) in said liquid carrier at an elevated temperature, adding said substance in one of the three steps and then cooling the reaction product of step (c) containing said substance while stirring vigorously:

a. copolymerizing from 99.9 to 80 parts by weight of a monomer having the formula (I):

$$CH_2{=}\underset{\displaystyle A}{\overset{\displaystyle R}{\underset{|}{\overset{|}{C}}}} \qquad (I)$$

, wherein R is hydrogen of methyl, A is $—COOC_nH_{2n+1}$ or $—OC_nH_{2n+1}$, and n is an integer of 6 to 20, with from 0.1 to 20 parts by weight of at least one compound selected from the group consisting of acrylic acid, methacrylic acid, fumaric acid, crotonic acid, itaconic acid, maleic acid, glycidyl acrylate and glycidyl methacrylate,
b. esterifying 100 parts by weight of the copolymer obtained in step (a) with from 0.1 to 20 parts by weight of glycidyl acrylate or glycidyl methacrylate when said copolymer has been prepared by using acrylic acid, methacrylic acid, fumaric acid, crotonic acid, itaconic acid or maleic acid, or esterifying 100 parts by weight of the copolymer obtained in step (a) with from 0.1 to 20 parts by weight of acrylic acid, methacrylic acid, fumaric acid, crotonic acid, itaconic acid or maleic acid when said copolymer has been prepared by using glycidyl acrylate or glycidyl methacrylate, and then
c. grafting 100 parts by weight of the esterified copolymer obtained in step (b) with from 5 to 100 parts by weight of a monomer having a vinyl group selected from the group consisting of acrylic acid, methacrylic acid, a lower alkyl ester of acrylic acid or methacrylic acid, styrene, methylstyrene and vinyl acetate.

4,060,494
NON-CAUSTIC DRAIN CLEANER
Daniel Schoenholz, Basking Ridge, and Arthur W. Petersen, Chatham Township, Morris County, both of N.J., assignors to Foster D. Snell, Inc., Florham Park, N.J.
Filed June 12, 1975, Ser. No. 586,188
Int. Cl.[2] C11D *7/54*
U.S. Cl. 252—105 **5 Claims**

1. A method of unclogging clogged drains comprising contacting a clog in a clogged drain with an amount sufficient to soften and loosen the clog by generated heat of approximately

stochiometric amounts of an inorganic per oxygen oxidizing agent and a water-soluble reducing agent.

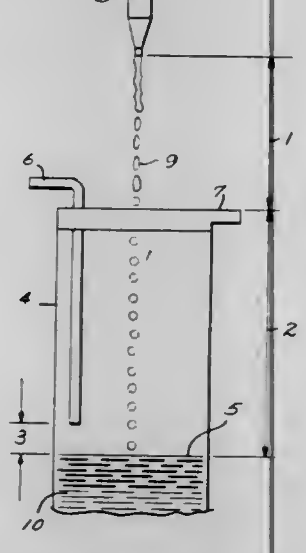
4,060,495
HYDROXYARYLDIALKYL SULFONIUM HALIDES
Vincent Lamberti, Upper Saddle River, and Mark D. Konort, Haworth, both of N.J., assignors to Lever Brothers Company, New York, N.Y.
Division of Ser. No. 114,034, Feb. 9, 1971, Pat. No. 4,034,046. This application Dec. 22, 1976, Ser. No. 755,091
Int. Cl.² A61L *13/00;* **C07C** *149/46;* **C11D** *3/48, 9/50*
U.S. Cl. 252—106 **4 Claims**

1. A germicidal detergent composition containing a germicidally effective amount of (4-hydroxyphenyl)n-dodecylmethyl sulfonium bromide or chloride.

4,060,496
STAINLESS STEEL CLEANER
Julius F. T. Berliner, Chicago, Ill., assignor to Burnishine Products Inc., Skokie, Ill.
Filed Apr. 29, 1976, Ser. No. 681,716
Int. Cl.² C23G *5/02;* **C11D** *7/50*
U.S. Cl. 252—171 **7 Claims**

1. A cleaning composition for stainless steel consisting essentially of about 9% to 12% by weight of a halogenated C_2 hydrocarbon having 2 to 4 atoms of a halogen of the group consisting of chlorine and bromine per molecule;
about 3% to 6% by weight of a fatty acid having 10 to 20 carbon atoms per molecule;
about 3% to 5% by weight of an alkanol amine having 2 to 12 carbon atoms and 1 to 2 amino groups per molecule;
about 25% to 30% by weight of a water-soluble C_1 to C_4 alkyl glycol ether; and
the balance of the composition being water;
said composition being a stable, clear non-flammable solution.

4,060,497
PROCESS FOR THE PRODUCTION OF SPHERICAL FUEL AND FERTILE PARTICLES
Hans Huschka, Hanau, and Martin Kadner, Maintal, both of Germany, assignors to HOBEG Hochtemperaturreaktor-Brennelement GmbH, Hanau, Germany
Filed Dec. 8, 1975, Ser. No. 638,662
Claims priority, application Germany, Dec. 16, 1974, 2459445
Int. Cl.² C01G *43/02*
U.S. Cl. 252—301.1 S **7 Claims**



1. A process of forming uniform spherical particles of fuel particles, fertile particles or a mixture of fuel and fertile particles comprising flowing an oscillating liquid stream comprising a solution of a uranium compound, a thorium compund or a mixture of a uranium compound and a thorium compound from at least one nozzle at a rate of at least 3,000 drops per minute, determining the boundary between a first falling zone free of ammonia and a second falling zone containing ammonia by stroboscopically measuring the roundness of the drops, passing the drops through said first falling zone free of ammonia, regulating the length of the first falling zone so that the drops have just taken on an exact spherical form, then passing the drops through a second falling zone containing ammonia flowing both countercurrently to the falling drops and also horizontally cross currently to the drops in an amount guaranteeing that the space between the drops is filled with ammonia, the length of said second falling zone being 150 to 300 mm and being so regulated that the spherical drops are sufficiently hardened before immersion in an ammonia solution directly below said second zone that they are not deformed by contact with said solution and then passing said hardened drops from said second zone into said ammonia solution.

4,060,498
PROCESS FOR STEAM REFORMING OF HYDROCARBONS
Hiroshi Kawagoshi, Hitachi; Masato Takeuchi, Katsuta, and Fumito Nakajima, Hitachi, all of Japan, assignors to Hitachi, Ltd., Japan
Division of Ser. No. 364,427, May 29, 1973, abandoned. This application Nov. 4, 1974, Ser. No. 520,950
Claims priority, application Japan, June 2, 1972, 47-55241
Int. Cl.² C07C *2/14*
U.S. Cl. 252—373 **10 Claims**

1. In a process for steam reforming gaseous hydrocarbons selected from the group consisting of methane, liquefied natural gas, liquefied petroleum gas, butane, hexane, petroleum light distillates, naphtha and off-gas from processes utilizing various hydrocarbons as feeds, wherein the hydrocarbons are passed in a gaseous state through a catalyst together with steam at an elevated temperature under pressure whereby the hydrocarbons are subjected to a steam reforming reaction wherein the resulting product gas consists mainly of hydrogen, carbon monoxide, carbon dioxide, methane and steam with the relationship among these product components being represented by the following equilibrium equations:

$$CH_4 + H_2O \rightleftarrows CO + 3H_2$$

$$CO + H_2O \rightleftarrows CO_2 + H_2$$

the improvement wherein when said off-gas is the feed, said off-gas comprises paraffinic hydrocarbons and up to about 15% by volume of olefinic hydrocarbons and wherein said catalyst consists essentially of from 3% to 30% by weight of nickel in terms of NiO, based on the catalyst, at least 2 mg-atoms of silver per 100 gram of the catalyst, at least one rare earth element in an atomic ratio of the rare earth element to silver of 0.2 to 10, and a heat-resistant carrier, the elevated temperature being from 350 to 900° C. and the pressure being from 1 to 50 kg/cm².

4,060,499
COPPER CHLORIDE/BORON NITRIDE CATALYST FOR SUBSTITUTION CHLORINATION
Wim J. M. Pieters, Morristown; Emery J. Carlson, Chatham, and Guido P. Pez, Boonton, all of N.J., assignors to Allied Chemical Corporation, Morris Township, N.J.
Filed Jan. 24, 1977, Ser. No. 761,561
Int. Cl.² B01J *21/00, 27/06;* **C07C** *17/00*
U.S. Cl. 252—432 **3 Claims**

1. Composition useful as catalyst for substitution chlorination of partially chlorinated organic material by action of elemental chlorine, or hydrogen chloride, and elemental oxygen in vapor phase at elevated temperature, which composition consists essentially of at least 10% by weight of copper, as cuprous chloride, intercalated in boron nitride.

3. Process for producing the composition of claim 1, which process comprises heating copper chloride and boron nitride in weight ratio in the range of about 0.3:1 to 10:1, calculated as cuprous chloride, at a temperature in the range of about 550° to 800° C. in an inert environment, maintained dry and substantially free of oxygen.

4,060,500
PREPARATION OF MIXED METAL OXIDES BY DECOMPOSITION OF CARBONATE SOLID SOLUTIONS HAVING THE CALCITE STRUCTURE
LeRoy R. Clavenna, Baytown, Tex.; John M. Longo, New Providence, and Harold S. Horowitz, Clark, both of N.J., assignors to Exxon Research and Engineering Company, Linden, N.J.
Filed May 10, 1976, Ser. No. 684,744
Int. Cl.² B01J *23/04, 23/06, 23/34, 23/84*
U.S. Cl. 252—471 **45 Claims**

1. A method for the preparation of mixed metal oxides of the formula:

$$Ca_{(a)}Fe_{(b)}Co_{(c)}Zn_{(d)}Cd_{(e)}Mg_{(f)}Mn_{(g)}[0]_Q,$$

wherein Q is 1, a to g are decimals ranging from 0 to <1 with a minimum, when the metal cation is present at all of 0.01 and wherein the sum of the products of each cation subscript times the respective cation valence equals 2(Q), which method comprises the steps of:

1. dissolving individual metal salts in water to give metal salt solutions;
2. mixing 2 or more of the metal salt solutions of (1) in appropriate molar amounts, provided they do not result in formation of a spontaneous precipitate, to give a solution which when contacted with a source of carbonate ions will yield only a single phase calcite structure carbonate precipitate having the metal ion stoichiometry desired in the final product;
3. mixing the solution of step (2) with a source of carbonate ions thereby yielding a single phase mixed metal carbonate solid solution precipitate having a calcite structure;
4. separating the precipitate from the solution;
5. firing the isolated precipitate under oxidizing conditions for a time at a temperature of from 300° to 900° C thereby yielding the mixed metal oxide.

4,060,501
NOVOLAK DERIVATIVES AS DEFOAMERS
Carter G. Naylor, and Ernest L. Yeakey, both of Austin, Tex., assignors to Texaco Development Corporation, New York, N.Y.
Filed Aug. 30, 1976, Ser. No. 718,640
Int. Cl.² C11D *1/72, 1/76, 3/20*
U.S. Cl. 252—548 **20 Claims**

1. A composition useful as a defoamer and foam inhibitor comprising the reaction product obtained by alkoxylating a novolak resin having a functionality less than 3, said alkoxylation being carried out with ethylene oxide and a higher alkylene oxide of 3 carbons or more in a manner such that the final defoamer composition has a cloud point of 10°-60° C by first alkoxylating said novolak resin with ethylene oxide or a mixture of ethylene oxide and said higher alkylene oxide wherein said ethylene oxide predominates in said mixture, and effecting a final alkoxylation with said higher alkylene oxide or a mixture of ethylene oxide and said higher alkylene oxide wherein said higher alkylene oxide predominates.

4,060,502
SPONGE RUBBER RUG UNDERLAY HAVING IMPROVED LOAD BEARING CAPACITY
Richard E. Benton, Alliance, Ohio, assignor to The General Tire & Rubber Company, Akron, Ohio
Filed Feb. 14, 1974, Ser. No. 442,539
Int. Cl.² C08J *9/10;* **C08K** *5/01*
U.S. Cl. 260—2.5 P **7 Claims**

1. A flexible sponge rubber comprising
a. about 100 parts of a mixture consisting of rubber and from 10 to 40 parts of a resin selected from the group consisting of polyvinyl chloride and copolymers of chloride
b. from about 100 to about 300 parts of a reinforcing filler and
c. from about 50 to about 200 parts of oil.

4,060,503
ADHESIVE COMPOSITION
George W. Feeney, Akron, and Bruce W. Habeck, Cuyahoga Falls, both of, OH, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio
Continuation of Ser. No. 552,688, Feb. 24, 1975, abandoned. This application Jan. 10, 1977, Ser. No. 758,264
Int. Cl.² C08L *7/00*
U.S. Cl. 260—5 **8 Claims**

1. A rubber, α-methylstyrene-modified piperylene/2-methyl-2-butene resin adhesive composition which comprises an admixture of (1) about 100 parts by weight of a rubber comprised of at least one of natural rubber, synthetic cis-1,4-polyisoprene elastomer, and an unvulcanized elastomeric styrene/isoprene block copolymer having the general configuration A - B - A wherein each A is an independently selected nonelastomeric styrene polymer block having an average molecular weight of about 2,000 to about 100,000 and a glass transition temperature above about 25° C., the total block A content being from about 10 to about 50 percent by weight of the copolymer, and B is an elastomeric conjugated diene block of polyisoprene having an average molecular weight from about 25,000 to about 1,000,000 and a glass transition temperature below about 10° C., said copolymer having a tensile strength at 25° C. in excess of about 200 pounds per square inch, and (2) about 60 to about 140 parts by weight of a compatible piperylene/2-methyl-2-butene type, thermoplastic tackifying resin, modified with a minor amount of α-methylstyrene containing carbon-to-carbon unsaturation therein and having a softening point in the range of about 80° C. to about 105° C. prepared by the method which comprises reacting in the presence of an aliphatic hydrocarbon solvent and a catalyst selected from at least one of aluminum chloride and ethylaluminum dichloride, a monomer mixture consisting of about 92 to about 99 weight percent of a diolefin/olefin mixture of a weight ratio in the range of about 0.6/1 to about 1.4/1 and, correspondingly, about 8 to about 1 weight percent α-methylstyrene, where said diolefin is at least about 95 weight percent piperylene and said olefin is 2-methyl-2-butene; wherein said diolefin is optionally modified by containing up to about 5 weight percent isoprene and wherein said monomer mixture is optionally modified by containing up to about 10 weight percent of at least one monomer selected from the group consisting of piperylene dimers, piperylene trimers, 2-methyl-1-butene, 2-methyl-2-pentene, 2-methyl-1-pentene, 2,3-dimethyl-1-butene, 2,3-dimethyl-2-butene, 2-methyl-2-pentene, cyclopentene and 1,3-cyclopentadiene.

4,060,504
EMULSIFIABLE RESOLES HAVING DISPERSED INERT SALTS
Harold P. Higginbottom, Wilbraham, Mass., assignor to Monsanto Company, St. Louis, Mo.
Filed Sept. 15, 1975, Ser. No. 613,651
Int. Cl.² C08L *89/00;* **C08K** *3/18*
U.S. Cl. 260—7 **18 Claims**

1. An improved stable aqueous solution of an emulsifiable resole wherein the solution has a pH in the range 6 to 8.5 and contains less than 2 percent of free phenol, less than 2 percent of free formaldehyde, said resole has a number average molecular weight of less than 300, a water tolerance between about 100 and 800 percent, a combined formaldehyde to phenol molar ratio in the range of 2.0:1 to 2.9:1, and contains sufficient methylolated 2,2'-and 2,4'-dihydroxydiphenylmethanes to inhibit crystallization of the resole solution, said resole being prepared with a catalyst comprising alkaline earth metal hy-

droxides selected from the group consisting of calcium, barium, strontium and mixtures thereof wherein said improvement comprises: said pH being adjusted with a compound selected from the group consisting of oxalic acid, ammonium oxalate and mixtures thereof providing a stable colloidal dispersion of insoluble oxalate salts of said alkaline earth metal ions in said solution, said resole and said salts being emulsifiable by about 1 to 12 percent by weight of an emulsifier based on the weight of said resole, said emulsifier being selected to provide a stable emulsion of the resole and salt when water in excess of the water tolerance is added to said solution.

4,060,505

COMPOSITIONS FOR SOURING AND SOFTENING LAUNDERED TEXTILE MATERIALS AND STOCK SOLUTIONS PREPARED THEREFROM

John D. Ciko, Allen Park, and John J. Cramer, Grosse Ile, both of Mich., assignors to BASF Wyandotte Corporation, Wyandotte, Mich.

Continuation-in-part of Ser. No. 541,448, Jan. 16, 1975, Pat. No. 3,984,335. This application Aug. 27, 1976, Ser. No. 718,219

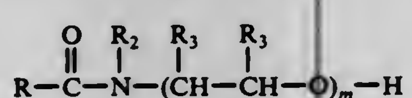
The portion of the term of this patent subsequent to Oct. 5, 1993, has been disclaimed.

Int. Cl.² D06M *1/14, 5/04*

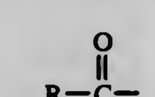
U.S. Cl. 252—8.8 **54 Claims**

1. A stable homogeneous liquid composition for souring laundered textile materials and imparting softness thereto consisting essentially of

I. 0.5–25% by weight of a fatty amide softening agent for textile materials corresponding to the structural formula



wherein R is selected from the group consisting of monovalent alkyl radicals and sulfonated monovalent alkyl radicals containing about 8–22 carbon atoms, R_2 is selected from the group consisting of hydrogen and



wherein R is as defined above, R_3 is selected from the group consisting of hydrogen and monovalent alkyl radicals containing 1–2 carbon atoms, and m is 2–6;

II. 7.5–75% by weight of an acidic souring agent for laundered textile materials, the souring agent being a water soluble organic carboxylic acid containing about 1–20 carbon atoms and having a primary ionization constant between about 10^{-1} and 10^{-5}, and

III. 0–92% by weight of water;

the said ingredients I and II being present in amounts whereby laundered textile materials are effectively softened and simultaneously soured upon treatment with the said liquid composition, and

the said ingredients I, II and III being present in amounts whereby a stable homogeneous liquid composition is produced.

4,060,506

STARCH ACRYLAMIDES AND THE METHOD FOR PREPARING THE SAME

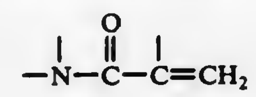
Frank Verbanac, Decatur, Ill., assignor to A. E. Staley Manufacturing Company, Decatur, Ill.

Filed Apr. 27, 1976, Ser. No. 680,646

Int. Cl.² C08L *3/00*

U.S. Cl. 260—17.4 GC **41 Claims**

1. A starch acrylamide suitable for use in preparing starch polymerizates which contain recurring and interpolymerized starch acrylamide units, said starch acrylamide comprising a starch chain and appendant acrylamide groups contiguously attached to said starch chain with said appendant group being characterized as containing terminal



moieties.

4,060,507

AMINOPOLYAMIDE-ACRYLAMIDE-GLYOXAL RESIN

Don E. Floyd, and Demetri Potente, both of Minneapolis, Minn., assignors to General Mills Chemicals, Inc., Minneapolis, Minn.

Filed Aug. 1, 1975, Ser. No. 601,143

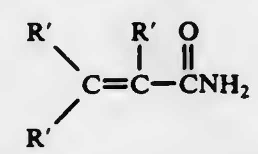
Int. Cl.² C08G *12/04;* C08L *61/20;* D21D *3/00;* D21H *3/52*

U.S. Cl. 260—21 **8 Claims**

1. An aminopolyamide-acrylamide-glyoxal resin prepared by reacting

a. a polymeric fat acid aminopolyamide having an amide number of about 150 to 600

b. an amount of an unsaturated amide sufficient to react with substantially all the amine groups in the aminopolyamide, said unsaturated amide having the formula



where R′is hydrogen or an alkyl group containing up to 6 carbon atoms and

c. reacting the resulting aminopolyamideunsaturated amide adduct with about 0.3 to 1.5 moles of glyoxal per amide group present in said adduct.

8. A sized paper treated with about 0.03 to 5 percent by weight based on the weight of paper of the resin defined in claim 1.

4,060,508

STABILIZER COMPOSITION FOR CHLORINE-CONTAINING POLYMERS

Yujiro Sugahara, Tokyo; Yoshibumi Noshi, Tsuruoka; Hiroyuki Naito, Tsuruoka, and Seiichi Nakamura, Tsuruoka, all of Japan, assignors to Mizusawa Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Nov. 14, 1975, Ser. No. 632,009

Claims priority, application Japan, Nov. 15, 1974, 49-131165

Int. Cl.² C08L *91/00*

U.S. Cl. 260—23 XA **32 Claims**

1. A stabilizer composition for chlorine-containing polymers having a much reduced tendency to blow at the molding step, which comprises (A) an inorganic stabilizer having a pore volume of at least 0.5 cc/g, said stabilizer (A) consisting essentially of at least one member selected from the group consisting of silicates of metals of Groups II and IV of the Periodic Table and composites of silicic acid with oxides, hydroxides and carbonates of said metals, and (B) an organic additive having a boiling point or decomposition point higher than a chlorine-containing polymer processing temperature, said organic additive (B) being incorporated into the stabilizer (A) so that the organic additive (B) is impregnated and permeated uniformly into the pores of stabilizer (A) at a weight ratio (A) : (B) of 1 : at least 0.1 so that the pore volume ratio defined by the following formula:

$$R = \frac{PVc}{PVa}$$

wherein PVc denotes the pore volume (cc/g) of the entire composition and PVa denotes the pore volume (cc/g) of said inorganic stabilizer (A),

is not higher than 0.8.

25. A stabilized chlorine-containing polymer composition comprising a chlorine-containing polymer and a stabilized amount of the stabilizing composition of claim 1.

4,060,509

SOLID, RAPID-SETTING, RIGID POLYURETHANES

Franciszek Olstowski, Freeport, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Continuation of Ser. No. 573,714, May 1, 1975, Pat. No. 3,966,662, which is a division of Ser. No. 405,244, Oct. 10, 1973, Pat. No. 4,001,166, which is a continuation-in-part of Ser. No. 327,630, Jan. 29, 1973, abandoned, which is a continuation-in-part of Ser. No. 221,784, Jan. 28, 1972, abandoned. This application May 19, 1976, Ser. No. 687,801

The portion of the term of this patent subsequent to June 29, 1993, has been disclaimed.

Int. Cl.² C08K *5/52*

U.S. Cl. 260—30.6 R **14 Claims**

1. A rigid, non-cellular, solid composition having a density of at least 1 g/cc, a percent elongation of less than 100 and which is demoldable within about 5 minutes, without the application of an external source of heat, after admixture in the absence of a catalytic quantity of a catalyst for urethane formation and also in the absence of a chemically hindered aromatic diamine of the components of a rapid-setting polyurethane-forming composition comprising

A. an amine initiated polyol having an OH equivalent weight of from about 50 to less than about 250 and from about 3 to about 8 hydroxyl groups;

B. an organic aromatic polyisocyanate;

C. a liquid modifier compound having a boiling point above about 150° C selected from the group consisting of organic phosphates, organic phosphites, organic phosphonates and mixtures thereof; and

wherein Components (A) and (B) are present in quantities such that the NCO:OH ratio is from about 0.8:1 to about 1.5:1 and Component (C) is employed in quantities of from about 5% to about 60% by weight of the combined weight of components (A), (B) and (C).

4,060,510

DRY BLENDING PROCESS

Glenn R. Himes, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Oct. 4, 1976, Ser. No. 729,241

Int. Cl.² C08K *5/01;* C08L *53/02*

U.S. Cl. 260—33.6 AQ **8 Claims**

1. An improvement in the process for dry blending a polymeric composition in a mixing vessel, said composition having various components including:

a. 100 parts by weight of a thermoplastic elastomer, said thermoplastic elastomer being a block copolymer having at least two monoalkenyl arene polymer end blocks A and at least one elastomeric conjugated diene mid block B, each block A having an average molecular weight between about 5,000 and about 125,000 and each block B having an average molecular weight between about 15,000 and about 250,000, said blocks A comprising 8–55% by weight of the copolymer, said block copolymer having an average particle size of between about 0.1 mm and about 2.0 mm,

b. between about 25 and about 150 parts by weight of a thermoplastic polymer having an average particle size of between about 0.1 mm and 2.0 mm, and

c. between about 5 and about 175 parts by weight of a plasticizer,

which improvement comprises dry blending the various components at a temperature of between about 175° F and about 250° F.

4,060,511

PIGMENTED, PARTICULATE POWDER COATING COMPOSITION

Richard G. Sinclair, Columbus, and George E. Cremeans, Groveport, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Jan. 7, 1976, Ser. No. 647,247

Int. Cl.² C08J *3/20*

U.S. Cl. 260—34.2 **23 Claims**

1. In preparing a coating composition involving catalytic polymerization of at least one ethylenically unsaturated monomer in a nonaqueous aliphatic hydrocarbon solvent for said monomer and in the presence of a pigment insoluble in said solvent and in the presence of a dispersion stabilizer having a polymeric segment solvated by said solvent and another segment relatively non-solvated by said solvent and associated with polymer particles which are formed upon said polymerization of said monomer and which are insoluble in said solvent for providing a non-aqueous dispersion of said polymer particles, the improvement of preparing a free-flowing, homogeneous, polymer-coated pigment, particulate powder coating composition through a sequence of steps including:

i. preparing said dispersion stabilizer in a solution containing a coalescing solvent which is an active solvent for said polymer particles;

ii. admixing a portion of the product of (i) with said pigment to form a pigment dispersion;

iii. drying another portion of the product of (i);

iv. admixing the products of (ii) and (iii) in said nonaqueous aliphatic hydrocarbon solvent so that the resulting mixture contains not more than 6000 parts per million by weight of the coalescing solvent with a then adding of said monomer and a carrying forth therein of the catalytic polymerization of at least one ethylenically unsaturated monomer;

v. cooling a resulting polymerizate of (iv); and

vi. drying the cooled polymerizate of (v) to provide the free-flowing, homogeneous, polymer-coated pigment, particulate powder coating composition.

4,060,512

PHYSIOLOGICALLY UNOBJECTIONABLE STABILIZER COMPOSITIONS FOR HALOGENATED POLYOLEFINS

Franz Scheidl, Gersthofen, and Werner Sommer, Sulzbach, Taunus, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed May 25, 1976, Ser. No. 689,812

Claims priority, application Germany, May 30, 1975, 2523909

Int. Cl.² C08K *5/00*

U.S. Cl. 260—45.8 N **6 Claims**

1. Stabilizer compositions for stabilizing molding compositions of halogenated polyolefins, consisting of

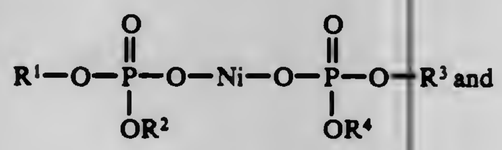
A. from 10 to 80 weight % of a neutral or basic aluminum salt of an aliphatic monocarboxylic or dicarboxylic acid having from 6 to 40 carbon atoms or of an aromatic monocarboxylic, dicarboxylic or tricarboxylic acid having 7 to 25 carbon atoms, or mixtures thereof,

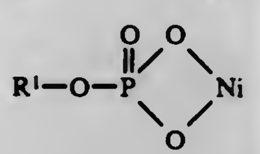
B. from 10 to 70 weight % of a secondary or tertiary organic phosphite or of a cyclic phosphite, or mixtures thereof, and

C. from 5 to 70 weight % of an indole carrying in 2-position as substituent either an alkyl group, an alkenyl group or an aryl group, or mixtures thereof.

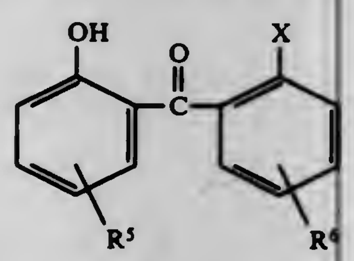
4,060,513
NICKEL ORGANOPHOSPHATE/BENZOPHENONE U.V. STABILIZERS
Kenneth Richard Molt, Cincinnati, Ohio, assignor to Cincinnati Milacron, Inc., Cincinnati, Ohio
Filed Apr. 26, 1976, Ser. No. 680,130
Int. Cl.^{2} C08K *5/52*
U.S. Cl. 260—45.75 N **28 Claims**

1. A polyolefin resin composition comprising 1) a polyolefin resin and 2) a stabilizingly effective amount of a stabilizer consisting essentially of in synergistic combination A) a nickel salt of an organic ester of phosphoric acid having the following general formulae


I(a)


I(b)

and B) a benzophenone selected from the group consisting of unsubstituted and substituted 2-hydroxybenzophenone and mixtures thereof and having the general formula


II

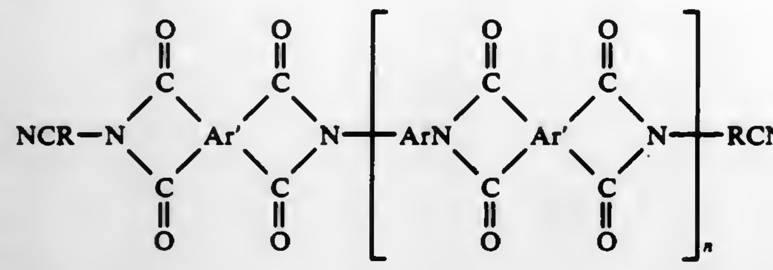
wherein R^1, R^2, R^3 and R^4 are the same or different and are alkyl, aryl, cycloalkyl, aralkyl or alkaryl radicals, X is hydroxyl or nothing and both or either R^5 and R^6 are nothing or the same or different straight or branched chain alkyl or alkoxy radical of 1 to 20 carbon atoms or either R^5 and R^6 but not both R^5 and R^6 are bromine, chlorine or fluorine.

4,060,514
PROCESS FOR THE REDUCTION OF COLOR IN POLYPHENYLENE OXIDE RESINS
Dwain M. White, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.
Continuation-in-part of Ser. No. 431,129, Jan. 7, 1974, abandoned. This application Jan. 19, 1976, Ser. No. 649,981
Int. Cl.^{2} C08G *65/44*
U.S. Cl. 260—47 ET **14 Claims**

1. The process comprising contacting polyphenylene oxide with a phase transfer agent having a cation portion selected from the group consisting of quaternary ammonium, quaternary phosphonium, and tertiary sulfonium ions or mixtures thereof and a reducing agent having an anion portion selected from the group consisting of a dithionite $[S_2O_4]^{32}$ ion, a dithiosulfate $[S_2O_6]^{=}$ ion, or mixtures thereof.

4,060,515
CHAIN-EXTENDING NITRILE END-CAPPED POLYIMIDES
Gaetano Francis D'Alelio, South Bend, Ind., assignor to University of Notre Dame du Lac, Notre Dame, Ind.
Division of Ser. No. 363,801, May 25, 1973, Pat. No. 3,897,395. This application Mar. 14, 1975, Ser. No. 558,452
Int. Cl.^{2} C08G *73/12*
U.S. Cl. 260—63 R **10 Claims**

1. A polymeric chain-extending process comprising: heating at a temperature in the range of about 150°-450° C. a polyimide in the presence of a catalytic amount of a Lewis acid salt catalyst, said polyimide of the formula:



wherein

Ar' is a tetravalent aromatic organic radical, the four carbonyl groups being attached directly to separate carbon atoms and each pair of carbonyl groups being attached to adjacent carbon atoms in the Ar' radical,

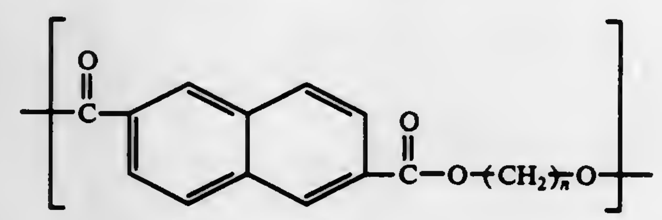
Ar is a divalent aromatic organic radical,

R is a hydrocarbon radical of 1 to 12 carbon atoms, and

n is a positive integer of at least one.

4,060,516
NAPHTHALATE POLYESTER FILAMENTS
Takatoshi Kuratsuji; Shoji Kawase, and Takeo Shima, all of Iwakuni, Japan, assignors to Teijin Limited, Osaka, Japan
Continuation of Ser. No. 480,819, June 19, 1974, abandoned. This application Jan. 5, 1976, Ser. No. 646,645
Claims priority, application Japan, June 19, 1973, 48-68241; June 27, 1973, 48-71641
Int. Cl.^{2} C08G *63/18, 63/70*
U.S. Cl. 260—75 T **6 Claims**

1. Naphthalate polyester fiber consisting essentially of a naphthalate polyester which has an intrinsic viscosity of 0.3 to 3.5 and in which at least 85 mol% of the total recurring units consist of units of the formula



wherein n is 4, and up to 15 mol% of the total recurring units consist of units of mono-, di-tri, or tetrafunctional monomers copolymerizable there-with and having at least one diffraction peak at a Bragg scattering angle 2θ = 16.3° - 16.7° in its X-ray diffraction, said fiber having a tenacity of from about 2.5 g/de to about 8.0 g/de.

4,060,517
CONTINUOUS MANUFACTURE OF POLYAMIDES
Friedrich Mertes, Ludwigshafen; Helmut Doerfel, Heidelberg; Eduard Heil, Limburgerhof, and Claus Cordes, Weisenheim, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany
Filed Mar. 17, 1975, Ser. No. 559,255
Claims priority, application Germany, Apr. 8, 1974, 2417003
Int. Cl.^{2} C08G *69/04*
U.S. Cl. 260—78 R **3 Claims**

1. A process for the manufacture of a polyamide by continuously conveying the aqueous solution of a salt of essentially equivalent amounts of a diamine, or of a mixture of several diamines, and of a dicarboxylic acid, or of a mixture of several dicarboxylic acids, through several reaction zones under polyamide-forming conditions, wherein

a. in a first reaction zone the mixture of starting materials is heated to a temperature of at least 220° C, but not higher than 300° C, at a pressure which is above the corresponding saturation vapor pressure of water and prevents the formation of a vapor phase, until the polycondensation conversion is at least 80%, but without completing the condensation in this zone,

b. in a second reaction zone the pressure acting on the polycondensation mixture is released adiabatically to a level of not less than 3 atmospheres and not more than 20 atmospheres, so as to reach a temperature below 215° C,

c. in a third reaction zone the polycondensation mixture is heated by means of a heat exchanger consisting of heat exchanger elements connected in parallel, to from 220° to 330° C, in the course of less than 5 minutes, with evaporation of the bulk of the water, at a pressure level not higher than the pressure to which the mixture had previously been expanded,

d. in a fourth reaction zone the polycondensation mixture is separated from the water vapor, and

e. finally the condensation is completed under the conditions prevailing at the end of the third reaction zone to form a high molecular weight filament-forming polyamide.

4,060,518
MANUFACTURE OF POLYAMIDE FILM-FORMING MATERIALS CONTAINING MAGNESIUM SILICATE
Wolfgang-Dieter Jeserich, Frankenthal; Claus Cordes, Weisenheim; Wolfgang Seydl, Frankenthal, and Hans-Peter Weiss, Altrip, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany
Filed Oct. 8, 1975, Ser. No. 620,713
Claims priority, application Germany, Oct. 25, 1974, 2450673
Int. Cl.^{2} C08G *69/16*
U.S. Cl. 260—78 L **6 Claims**

1. A process for the continuous manufacture of ϵ-caprolactam polymers for high-grade transparent thin film, which comprises

a. agitating ϵ-caprolactam continuously in a first reaction zone under polyamide-forming conditions at temperatures of from 240° to 290° C until at least 20% of the ϵ-caprolactam has reacted, but the melt viscosity of said reacted ϵ-caprolactam is still less than 500 poises,

b. adding magnesium silicate having a particle size of less than 30 μm to the melt to give magnesium silicate concentrations in the reaction mixture of from 0.0005 to 0.5%, and

c. polymerizing the ϵ-caprolactam melt at atmospheric pressure or in vacuo to completion until the relative viscosity is from 2.4 to 3.3, said viscosity being calculated as the ratio of the flow times of a 1% solution of polyamide in 96% sulfuric acid and pure 96% sulfuric acid at 25° C in a capillary viscometer.

4,060,519
POLYTHIOL SEALANTS
Richard C. Doss, and Timothy P. Murtha, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.
Filed Mar. 1, 1976, Ser. No. 662,779
Int. Cl.^{2} C08G *63/68;* **C08L** *81/02*
U.S. Cl. 260—79 **14 Claims**

1. Curable sealant and coating compositions comprising (a) a poly(oxyalkylene)-polyester-poly(monosulfide)-polythiol having an average of more than two mercapto groups per molecule and (b) at least one of naphthalene and alkylated naphthalenes as sulfur-solubilizers containing dissolved sulfur, the amount of sulfur present being sufficient to provide some curing in the polymer.

4,060,520
CONTINUOUS REACTION FOR PREPARATION OF ARYLENE SULFIDE POLYMER
Howard B. Irvin, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.
Filed Mar. 30, 1976, Ser. No. 671,775
Int. Cl.^{2} C08G *75/16*
U.S. Cl. 260—79.1 **6 Claims**

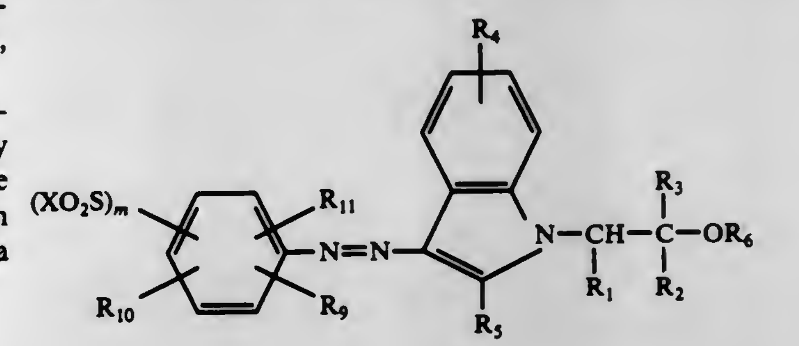
1. A continuous process for producing particulate arylene sulfide polymer by contacting, at reaction conditions, a reaction mixture comprising (1)an organic amide, (2) a dihalo aromatic compound and (3) a sulfur complex produced by contacting sodium N-methylamino butyrate with an organic amide in which H_2S is absorbed, said process comprising:

a. introducing said reaction mixture into a first reaction zone maintained at polymerization conditions at a pressure within the range of about 13.5 Kg/cm^2 to about 15.0 Kg/cm^2 and within a temperature range sufficient to evaporate water and small amounts of organic amide and dihalo aromatic compound, maintaining the reaction mixture in said first reaction zone for a time sufficient to permit partial polymerization; and

b. passing the partially polymerized reaction mixture into at least one further reaction zone maintained at polymerization conditions in the same temperature range as the first reaction zone but at a lower pressure than said first reaction zone, the pressure of said second zone within the range of about 12.0 Kg/cm^2 to about 13.5 Kg/cm^2, for a time sufficient further to polymerize said reaction mixture and further to evaporate water and organic amide, substantially completing the polymerization reaction therein.

4,060,521
BENZENE-AZO-INDOLE DYESTUFFS
Dieter vor der Brück, Cologne; Richard Sommer, and Gerhard Wolfrum, both of Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany
Filed June 17, 1975, Ser. No. 587,656
Claims priority, application Germany, June 26, 1974, 2430682
Int. Cl.^{2} C09B *29/36, 43/18;* **D06P** *1/06, 3/24*
U.S. Cl. 260—165 **14 Claims**

1. Monoazo dyestuff which in the form of the free acid corresponds to the formula



wherein

X represents OH, NH—SO_2—R_7,

$-N(R_8)-C_2-C_4$—alkylene—OSO_3H,

$-N(R_8)-C_2-C_4$—alkylene—SO_3H,

$-N(R_8)$—phenylene—SO_3H, $-N(R_8)$—phenylene—CH_2—SO_3H

or $-N(R_8)$—phenylene—SO_2—NH—SO_2—R_7;

wherein any of said phenylene radicals is unsubstituted or substituted by C_1-C_4-alkyl, C_1-C_4-alkoxy, benzyloxy, chloro, bromo, cyano, or nitro;

R_1 and R_2 represent H; C_1–C_4-alkyl; C_1–C_4-alkyl substituted by C_1–C_4-alkoxy, cyclohexyloxy, benzyloxy, phenoxy, cyano, fluoro, chloro, bromo, OH or C_1–C_4-alkylcarbonyloxy; phenyl; naphthyl; phenyl or naphthyl substituted by phenyl, C_1–C_4-alkyl, fluoro, chloro, bromo, nitro, or C_1–C_4-alkoxy; benzyl; 2-phenylethyl; benzyl or 2-phenylethyl substituted by C_1–C_4-alkyl, C_1–C_4-alkoxy, fluoro, chloro, bromo or cyano; cyclopentyl; cyclohexyl; or carbo-C_1-C_4-alkoxy; provided that at least one of R_1 or R_2 must be hydrogen;

R_3 represents H or C_1–C_4-alkyl,

R_4 represents hydrogen; fluoro; chloro; bromo; cyano; sulpho; C_1–C_4-alkyl; C_1–C_4-alkoxy; C_1–C_4-alkoxy substituted by OH, fluoro, chloro, bromo, or cyano;

R_5 represents C_1–C_4-alkyl; phenyl; naphthyl; phenyl or naphthyl substituted by phenyl, C_1–C_4-alkyl, fluoro, chloro, bromo, nitro, or C_1–C_4-alkoxy;

R_6 represents hydrogen; C_2–C_4-alkylcarbonyl; C_1–C_4-alkoxycarbonyl; sulpho; C_1–C_4-alkylsulphonyl; C_1–C_4-akylaminocarbonyl; phenylcarbonyl; phenyloxycarbonyl; phenylsulphonyl; or phenylaminocarbonyl; wherein any of the said phenyl radicals may be substituted by C_1–C_4-alkyl, fluoro, chloro, bromo, or C_1–C_4-alkoxy;

R_7 represents C_1–C_4-alkyl; di-C_1–C_4-alkylamino, phenyl; naphthyl; phenyl or naphthyl substituted by C_1–C_4-alkyl, fluoro, chloro, bromo, nitro, or C_1–C_4-alkoxy;

R_8 represents hydrogen; C_1–C_4-alkyl; or C_1–C_4-alkyl substituted by fluoro, chloro, bromo, cyano, hydroxyl, or C_1–C_4-alkoxy;

R_9 and R_{10} represent H, chloro; bromo; thiocyanato; cyano; nitro; C_1–C_4-alkyl; C_1–C_4-alkoxy; carbo-C_1–C_4-alkoxy; carbamoyl; sulphamoyl; hydroxyl; trifluoromethyl; C_1–C_4-alkylsulphonyl; phenylsulphonyl; or benzylsulphonyl;

R_{11} represents hydrogen, chloro; bromo; C_1–C_4-alkyl; trifluoromethyl; C_1–C_4-alkylsulphonyl; phenylsulphonyl; benzylsulphonyl; carbamoyl; or sulphamoyl; wherein said carbamoyl and said sulphamoyl radicals in R_9, R_{10}, and R_{11} are unsubstituted, mono- or disubstituted by C_1–C_4-alkyl; C_1–C_4-alkyl substituted by fluoro, chloro, bromo, cyano, hydroxyl, or C_1–C_4-alkoxy; phenyl; naphthyl; phenyl or naphthyl substituted by phenyl, C_1–C_4-alkyl, fluoro, chloro, bromo, nitro, or C_1–C_4-alkoxy; benzyl; 2-phenylethyl; or benzyl or 2-phenylethyl substituted by C_1-C_4-alkyl, C_1-C_4-alkoxy, fluoro, chloro, bromo, or cyano; and

m represents 0 or 1, with the proviso that the total number of acid groups per molecule is 1 or 2.

4,060,522

SULFONAMIDO CONTAINING CARBOXYLIC ACIDS

Wolfgang Kindscher, Fussgoenheim; Martin Fischer, Ellerstadt; Karl Eicken, Wachenheim, and Guenter Vitt, Mannheim, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

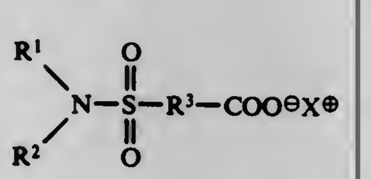
Filed Mar. 15, 1976, Ser. No. 666,975

Claims priority, application Germany, Mar. 15, 1975, 2511400

Int. Cl.² C07D *211/96;* **C23F** *11/16*

U.S. Cl. 260—293.85 **4 Claims**

1. A compound of formula I



I,

wherein R^1 denotes straight-chain or branched-chain, saturated or olefinically or acetylenically unsaturated alkyl of from 1 to 18 or 3 to 18 carbon atoms respectively, corresponding alkyl substituted by a methoxy or ethoxy group, cycloalkyl of from 5 to 12 ring members, phenyl, phenyl substituted by C_{1-3} alkyl, methoxy or ethoxy groups or halogen atoms, or phenylalkyl of from 1 to 5 carbon atoms in the alkyl group, R^2 denotes hydrogen or R^1, R^1 and R^2 form, together with the nitrogen atoms, a piperidine, pyrrolidine or morpholine ring, R^3 denotes alkylene of from 2 to 5 carbon atoms, and X^+ denotes an alkali metal or ammonium cation or proton.

4,060,523

1-ALKOXY-1-SUBSTITUTED PHENYL-1,3-DEHYDROFURO[3,4-b]QUINOXALINE-4,9-DIOXIDES

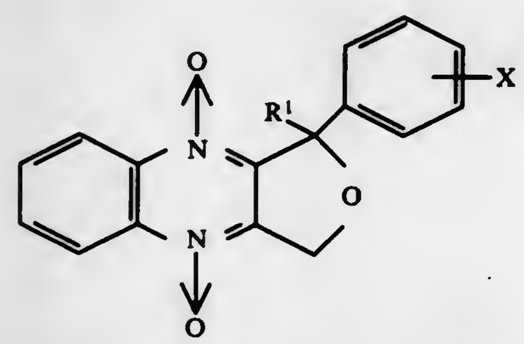
John P. Dirlam, New London, Conn., assignor to Pfizer Inc., New York, N.Y.

Division of Ser. No. 602,480, Aug. 6, 1975, Pat. No. 4,012,385. This application Nov. 3, 1976, Ser. No. 738,300

Int. Cl.² C07D *241/52;* **A61K** *31/50*

U.S. Cl. 260—250 QN **3 Claims**

1. A compound of the formula



wherein X is selected from the group consisting of hydrogen, hydroxy, nitro, fluoro, chloro, bromo, alkyl having from one to five carbon atoms and alkoxy having from one to five carbon atoms;

and R^1 is alkoxy having from one to five carbon atoms.

4,060,524

6-ACYLAMIDO-2,2-DIMETHYL-3-(PYRIMIDIN-4,6-DIONE-2-YL)PENAMS

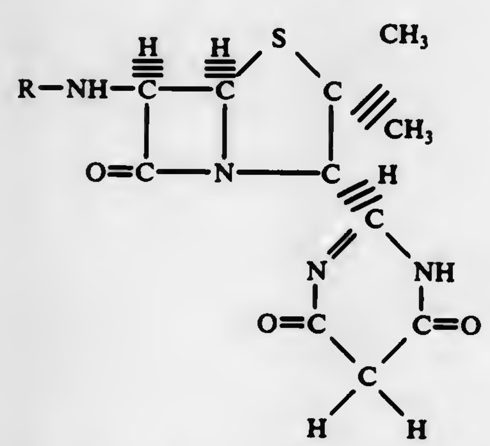
Gene Michael Bright, Groton, Conn., assignor to Pfizer Inc., New York, N.Y.

Division of Ser. No. 669,508, March 23, 1976, Pat. No. 4,028,360. This application Dec. 16, 1976, Ser. No. 751,280

Int. Cl.² A61K *31/43;* **C07D** *499/46, 499/60, 499/68*

U.S. Cl. 260—256.5 R **5 Claims**

1. A compound having the formula



wherein R is selected from the group consisting of 2-phenylacetyl, 2-phenoxyacetyl, 2-azido-2-phenylacetyl and 2-amino-2-phenylacetyl.

4,060,525

FIVE- OR SIX-MEMBERED HETEROCYCLIC MONO- AND DIALCOHOLS

Hans Batzer, Arlesheim; Juergen Habermeier, Allschwil, and Daniel Porret, Binningen, all of Switzerland, assignors to Ciba-Geigy AG, Basel, Switzerland

Continuation of Ser. No. 262,422, June 13, 1972, abandoned, which is a continuation-in-part of Ser. No. 109,953, Jan. 26, 1971, Pat. No. 3,828,045. This application Apr. 16, 1975, Ser. No. 568,536

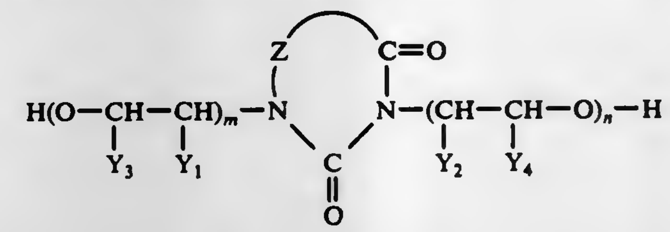
Claims priority, application Switzerland, Jan. 30, 1970, 1347/70; Oct. 8, 1970, 14891/70

The portion of the term of this patent subsequent to Dec. 21, 1988, has been disclaimed.

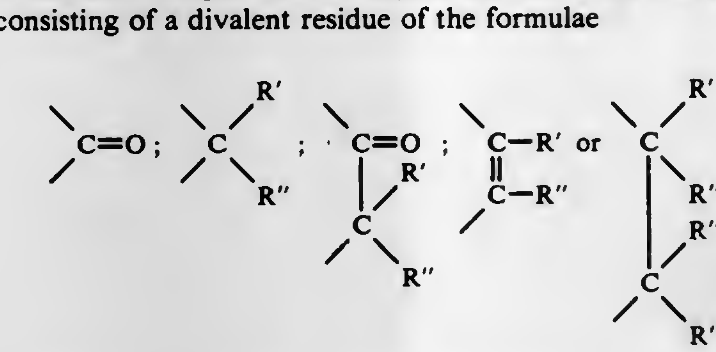
Int. Cl.² C07D *239/54, 233/72*

U.S. Cl. 260—260 **6 Claims**

1. A mono- or dialcohol of the formula



wherein Y_1 and Y_2 each denotes hydrogen or methyl and Y_3 and Y_4 each denotes methyl or ethyl, the sum of the carbon atoms in Y_1 and Y_3 or Y_2 and Y_4 having always to be 2, or wherein Y_2 and Y_4 together denote trimethylene or tetramethylene, and Z represents a member selected from the group consisting of a divalent residue of the formulae



wherein R′, R″, R‴ and R⁗ each represents a member selected from the group consisting of alkyl with 1 to 4 carbon atoms, alkenyl with 2 to 4 carbon atoms, cyclohexyl, cyclohexenyl, and phenyl, or when Z represents the formula

R′ and R″ together denote tetramethylene and pentamethylene, and *m* and *n* each represents an integer having a value of 0 to 30 with the sum of *m* and *n* having to be at least 1.

4,060,526

1-HETEROCYCLIC ALKYL-1,2,3,4-TETRAHYDROQUINAZOLINONES AND ANALGESIC INTERMEDIATES THEREOF

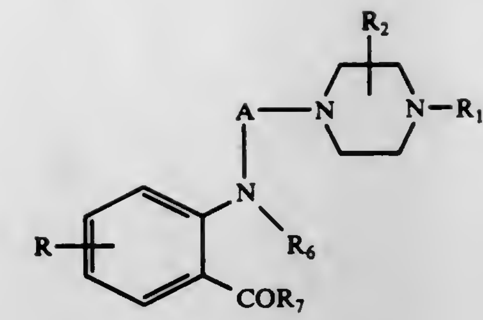
Bola Vithal Shetty, Rockville, Md., assignor to Pennwalt Corporation, Philadelphia, Pa.

Continuation-in-part of Ser. No. 452,587, March 19, 1974, abandoned, which is a continuation of Ser. No. 108,659, Jan. 21, 1971, abandoned, which is a division of Ser. No. 691,955, Dec. 20, 1967, Pat. No. 3,635,976. This application Aug. 23, 1976, Ser. No. 716,925

Int. Cl.² C07D *241/04, 401/12, 295/14*

U.S. Cl. 260—268 PH **6 Claims**

1. A member of the group consisting of (a) a compound having the formula:



wherein:

R is H, alkyl of 1–4 carbons, hydroxy, alkoxy of 1–4 carbons, halogen, amino, —$NHCOCH_3$ or —NHCHO;

A is $(CH_2)_n$, where *n* is 1-5, or branched chain alkyl of 3–5 carbons;

R_1 is alkyl of 1–4 carbons; phenyl; phenyl substituted with NH_2, OH, OCH_3 or Cl; H when R is other than H or halogen; or phenalkyl of 7–10 carbons;

R_2 is H or alkyl of 1–4 carbons;

R_6 is H; alkyl of 1–4 carbons; alkanoyl of 1–4 carbons; benzoyl; phenyl; phenalkyl; or phenyl or phenalkyl substituted in the ring with NH_2, OH, OCH_3 or Cl;

R_7 is piperidyl, pyrrolidyl, —NH_2, —NH-alkyl of 1–4 carbons, or —N= (disubstituted with alkyl of 1–4 carbons); and

(b) a pharmacologically acceptable acid addition salt thereof.

4,060,527

PYRIDO[2,3-c]-ACRIDINE-1-HYDROXY-2-CARBOXYLIC ACID DERIVATIVES

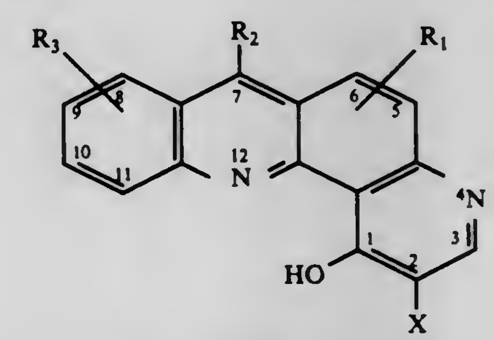
Hiromasa Nakamoto, Takaoka; Shin-Ichi Nakamoto, Oyabe; Hidemitu Amemiya, Takaoka; Souji Miyamura, Takaoka; Motoo Shiba, Takaoka, and Nobuko Nakamura, Takaoka, all of Japan, assignors to Fuji Chemical Industries, Ltd., Japan

Filed June 23, 1975, Ser. No. 589,772

Int. Cl.² C07D *471/04;* **A61K** *31/47*

U.S. Cl. 260—279 R **3 Claims**

1. A member selected from the group consisting of a compound of the formula



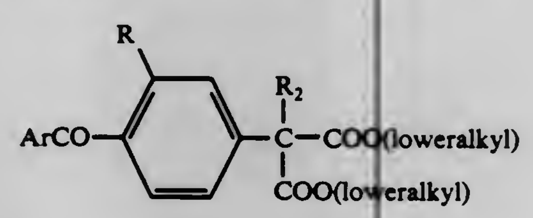
wherein X is a member selected from carboxy and C_1 - C_6 alkoxy-containing carbalkoxy, and each of R_1, R_2 and R_3 is a member selected from the group consisting of (1) hydrogen, (2) C_1 - C_{10} alkyl, (3) C_2 - C_6 alkyl-containing alkenyl, (4) C_6 - C_{10} aryl which is unsubstituted or substituted by a member of a group consisting of C_1 - C_5 alkyl, halogen, nitro, C_1 - C_5 alkylamino, hydroxy and C_1 - C_5 alkoxy, (5) C_1 - C_4 alkyl-containing alkylamino, (6) C_1 - C_6 alkyl-containing alkylmercapto, (7) nitro, (8) cyano, (9) C_1 - C_2 alkyl-containing alkylsulfonyl, (10) carboxy, (11) C_1 - C_6 alkoxy-containing carbalkoxy, (12) C_1 - C_6 alkyl-containing hydroxyalkyl, (13) C_1 - C_3 alkyl-containing aminoalkyl, (14) C_1 - C_2 hydroxyalkylamino, and (15) C_1 - C_2 alkyl-containing acetoxyalkylamino and a pharmaceutically acceptable acid addition salt thereof.

4,060,528
AROYL-SUBSTITUTED PHENYLMALONIC ACID DERIVATIVES

Paul Adriaan Jan Janssen, Vosselaar (Turnhout); Georges Henri Paul Van Daele, Turnhout, and Jozef Martin Boey, Wilrijk (Antwerp), all of Belgium, assignors to Janssen Pharmaceutica N.V., Beerse, Belgium

Division of Ser. No. 620,906, Oct. 8, 1975, Pat. No. 4,035,376, which is a continuation-in-part of Ser. No. 395,877, Sept. 10, 1973, abandoned, which is a continuation-in-part of Ser. No. 300,079, Oct. 24, 1972, abandoned. This application Dec. 10, 1976, Ser. No. 749,574
Int. Cl.² C07D *213/55*
U.S. Cl. 260—295 R **9 Claims**

1. A diloweralkyl malonate having the formula:



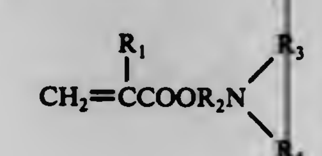
wherein:
ArCO is an aroyl substituent the Ar function of which is a member selected from the group consisting of 2-thienyl, 5-methyl-2-thienyl, 5-chloro-2-thienyl, 2-naphthyl and 3-pyridyl;
R is a member selected from the group consisting of hydrogen, loweralkyl and halo, provided that when said R is halo, then said Ar is 2-thienyl-5-methyl-2-thienyl or 5-chloro2-thienyl;
R_2 is a member selected from the group consisting of hydrogen, allyl and loweralkyl.

4,060,529
POLYMERIZATION INHIBITORS FOR N-SUBSTITUTED AMINOALKYL ACRYLIC MONOMERS

Frank L. Slejko, Bristol, Pa., assignor to Rohm and Haas Company, Philadelphia, Pa.

Continuation-in-part of Ser. No. 477,126, June 6, 1974, abandoned. This application Sept. 11, 1975, Ser. No. 612,401
Int. Cl.² C07D *263/06;* **C07C** *103/133;* **C07D** *265/06*
U.S. Cl. 260—307 FA **14 Claims**

1. A method for inhibiting the polymerization of acrylic monomers having the formula:



where
R_1 is hydrogen or methyl,
R_2 is a divalent alkylene radical of 1 to 5 carbon atoms, and
R_3 is a hydrogen or an alkyl having 1 to 5 carbon atoms,
R_4 is an alkyl having 1 to 5 carbon atoms, or
R_3 and R_4 are taken together with the nitrogen atom to form a five or six membered saturated heterocyclic ring, optionally having at least one of the hetero atoms, N and O, in the ring,

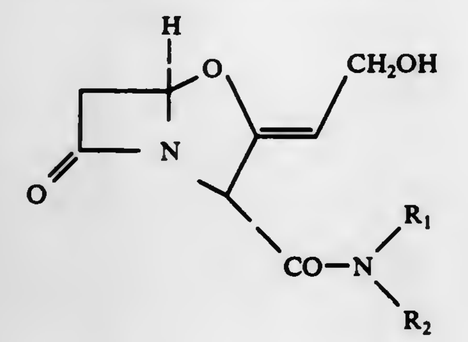
at ambient and above ambient temperatures, said method comprising contacting said monomers with an amount of nabam, mancozeb, maneb, zineb, or a halide, halogenate, sulfate, nitrate, chromate, phosphate or carboxylate of tin (II), copper (I), manganese (II) or cobalt (II), effective to inhibit the polymerization of the monomers during the preparation, purification or storage of said monomers.

4,060,530
CLAVULANIC ACID AMIDES

Thomas Trefor Howarth, Ewhurst, and John Barry Harbridge, Coulsdon, both of England, assignors to Beecham Group Limited, Great Britain

Filed June 28, 1976, Ser. No. 700,493
Claims priority, application United Kingdom, July 4, 1975, 28206/75
Int. Cl.² C07D *498/04*
U.S. Cl. 260—307 FA **7 Claims**

1. A compound of the formula (II):



(II)

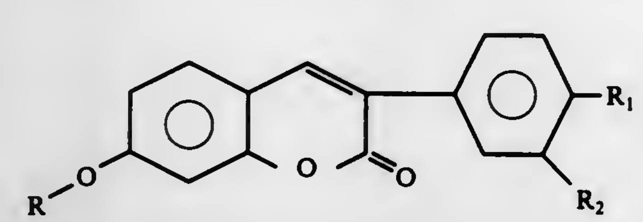
wherein R_1 is hydrogen, alkyl of 1 to 4 carbon atoms, CF_3CH_2, phenyl, tolyl or benzyl and R_2 is hydrogen or alkyl of 1 to 4 carbon atoms.

4,060,531
COUMARIN DERIVATIVES

Annick Marthe Suzanne Simone Domergue, Eaubonne, and Robert Frédéric Michel Sureau, Enghien les Bains, both of France, assignors to Produits Chimiques Ugine Kuhlmann, Paris, France

Continuation of Ser. No. 351,942, April 17, 1973, abandoned. This application May 3, 1976, Ser. No. 682,294
Claims priority, application France, Apr. 18, 1972, 72.13524
Int. Cl.² C07D *249/06, 249/08*
U.S. Cl. 260—308 R **10 Claims**

1. Coumarin compound of the formula:



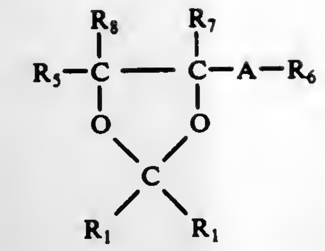
in which R represents an alkyl group containing 1 to 5 carbon atoms, one of the substituents R_1 or R_2 represents a triazole radical selected from the group consisting of 1,2,4-triazol-1-yl, 1,2,3-triazol-4-yl and 1,2,3-triazol-2-yl, and the other represents hydrogen or chlorine, or an alkyl group containing from 1 to 3 carbon atoms, the triazole radical being unsubstituted or substituted by one or two alkyl groups containing from 1 to 3 carbon atoms.

4,060,532
HALOGENATED DIOXOLANE TRANQUILIZERS

Ludwig A. Hartmann, Wilmington, Del., assignor to ICI United States Inc., Wilmington, Del.

Continuation-in-part of Ser. No. 235,025, March 15, 1972, abandoned. This application Mar. 28, 1972, Ser. No. 238,956
Int. Cl.² C07D *317/28*
U.S. Cl. 260—340.9 R **17 Claims**

1. A compound of the formula



wherein each R_1 is independently selected from the group consisting of perhalogenated alkyl radicals having from 1 to 7 carbon atoms and wherein each halogen atom has an atomic weight of at most 80, A is an alkylene radical having from 1 to 6 carbon atoms, R_6 is selected from the group consisting of

$$-O\overset{\overset{O}{\|}}{C}NH_2$$

$$-O\overset{\overset{O}{\|}}{C}NHR_4$$

where R_4 is selected from the group consisting of lower alkyl radicals having from 1 to 4 carbon atoms, phenyl, tolyl, monochlorophenyl, and cyclohexyl, R_5 is selected from the group consisting of hydrogen, alkyl having no more than 6 carbon atoms and —A—R_6, R_7 is hydrogen and R_8 is independently selected from the group consisting of hydrogen and lower alkyl radicals having from 1 to 4 carbon atoms,

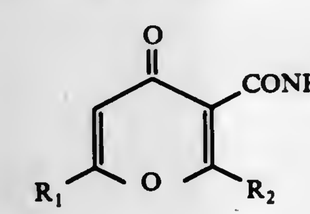
---

4,060,533
PYRANONE CARBOXAMIDES

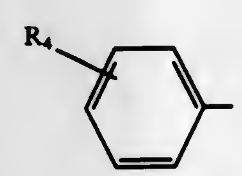
Jeffrey Nadelson, Lake Parsippany, N.J., assignor to Sandoz, Inc., E. Hanover, N.J.

Filed June 25, 1976, Ser. No. 700,066
Int. Cl.² C07D *309/22;* **A61K** *31/35*
U.S. Cl. 260—345.7 R **4 Claims**

1. A compound of the formula

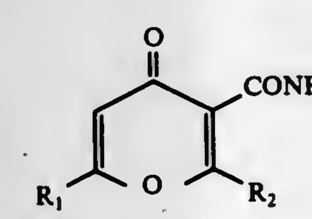


where
R_1 and R_2 represent
where

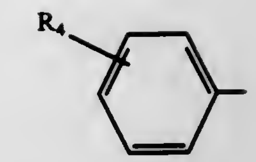


R_4 is hydrogen, halogen having an atomic weight of from 19 to 36, lower alkoxy or lower alkyl; and
R_3 is lower alkyl.

3. A compound of the formula



where
R_1 and R_2 each independently is lower alkyl or



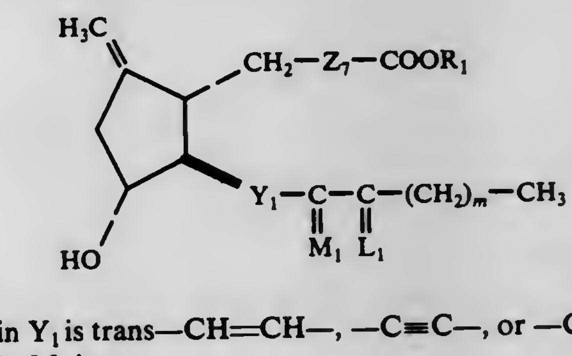
where
R_4 is hydrogen, halogen having an atomic weight of from 19 to 36, lower alkoxy or lower alkyl; and
R_3 is lower alkyl.

4,060,534
9-DEOXY-9-METHYLENE-PGF COMPOUNDS

Gordon L. Bundy, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

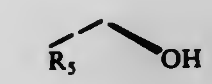
Continuation-in-part of Ser. No. 651,622, Jan. 23, 1976, Pat. No. 4,021,467, which is a division of Ser. No. 556,768, March 10, 1975, Pat. No. 3,950,363. This application May 4, 1976, Ser. No. 682,848
Int. Cl.² C07C *177/00*
U.S. Cl. 260—408 **226 Claims**

1. A prostaglandin analog of the formula:

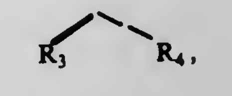


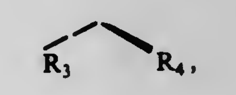
wherein Y_1 is trans—CH=CH—, —C≡C—, or —CH_2CH_2—;
wherein M_1 is

or

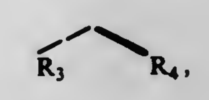


wherein R_5 is hydrogen or methyl;
wherein L_1 is





or a mixture of



wherein R_3 and R_4 are hydrogen, methyl, or fluoro, being the same or different, with the proviso that one of R_3 and R_4 is fluoro only when the other is hydrogen or fluoro;
wherein Z_7 is
1. cis—CH=CH—CH_2—$(CH_2)_g$—CH_2—,
2. cis—CH=CH—CH_2—$(CH_2)_g$—CF_2—,
3. cis—CH_2—CH=CH—$(CH_2)_g$—CH_2—,
4. —$(CH_2)_3$—$(CH_2)_g$—CH_2—,
5. —$(CH_2)_3$—$(CH_2)_g$—CF_2—,

6. $—CH_2—O—CH_2—(CH_2)_g—CH_2—$,
7. $—C{\equiv}C—CH_2—(CH_2)_g—CH_2—$, or $—CH_2—C{\equiv}C—(CH_2)_g—CH_2—$,
wherein g is one, 2, or 3;
wherein m is one to 5, inclusive; and
wherein R_1 is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, two, or three chloro or alkyl of one to 3 carbon atoms, inclusive, or a pharmacologically acceptable cation.

4,060,535
PROCESS FOR THE PRODUCTION OF METAL SALTS OF ORGANIC ACIDS
Salvatore A. Cinco, Succasunna, N.J., assignor to Tenneco Chemicals, Inc., Saddle Brook, N.J.
Filed Aug. 31, 1976, Ser. No. 719,301
Int. Cl.² C11C *1/00*
U.S. Cl. 260—414 **10 Claims**

1. The process for the production of finely-divided metal salts of carboxylic acids that comprises the steps of
a. forming a reaction mixture that consists essentially of
1. a metal component selected from the group consisting of the oxides, hydroxides, and carbonates of the alkali metals, magnesium, calcium, cadmium, strontium, barium, mercury, nickel, cobalt, lead, copper, and mixtures thereof,
2. a carbxylic acid component having a melting point above 20° C., and
3. from 0.1% to 8.0%, based on the total weight of the metal component and the carboxylic acid component, of water and
b. subjecting said reaction mixture to vigorous agitation in an apparatus having an attrition and shearing action at a temperature that is below the melting point of the carboxylic acid component and below the melting point of the metal salt that is being produced until substantially all of the carboxylic acid component has reacted.

7. The process of claim 1 wherein the carboxylic acid component of the reaction mixture formed in Step a) comprises stearic acid.

4,060,536
METHOD OF PREPARING N,N'-BIS-TRIMETHYLSILYLUREA
Hans-Joachim Kötzsch, Rheinfelden, and Hans-Joachim Vahlensieck, Wehr, both of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Troisdorf, Germany
Filed Nov. 30, 1976, Ser. No. 746,023
Claims priority, application Germany, Dec. 1, 1975, 2553932
Int. Cl.² C07F *7/10*
U.S. Cl. 260—448.2 E **10 Claims**

1. In a process for preparing N,N'-bis-trimethylsilylurea by contacting urea with hexamethyldisilazane at elevated temperature sufficient to evolve ammonia, the improvement which comprises carrying out the process in the presence of an acid catalyst, which acid catalyst is a Lewis acid or a hydrogen ion yielding acid.

4,060,537
PREPARATION OF ORGANOSILOXANES
Günther Maass, Cologne; Hans Joachim Lücking; Werner Büchner, both of Leverkusen, and Bruno Degen, Schildgen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany
Filed Dec. 3, 1976, Ser. No. 747,262
Claims priority, application Germany, Dec. 20, 1975, 2557624
Int. Cl.² C07F *7/08*
U.S. Cl. 260—448.2 E **6 Claims**

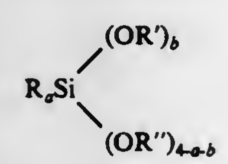
1. In the preparation of cyclic and linear organosiloxanes by reacting an organohalogenosilane with a compound of the formula

ROR'

in which
R is an alkyl radical with 1-4 C atoms, and
R' is hydrogen or an alkyl radical with 1-4 C atoms, the improvement which comprises effecting the reaction in an aqueous solution of a Lewis acid.

4,060,538
PROCESS FOR THE PREPARATION OF SILANE ESTERS OF TERTIARY ALCOHOLS
Hans Joachim Kötzsch, Rheinfelden; Hans-Joachim Vahlensieck, Wehr, and Claus-Dieter Seiler, Rheinfelden, all of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Troisdorf Berz. Cologne, Germany
Filed Jan. 25, 1974, Ser. No. 436,759
Claims priority, application Germany, Jan. 31, 1973, 23045036
Int. Cl.² C07F *7/04, 7/18*
U.S. Cl. 260—448.8 R **32 Claims**

1. An alkoxysilane of the formula



wherein R is hydrogen, or an alkenyl radical of C_2-C_{10};
R' is alkyl of 1-8 carbon atoms, alkylene or a polyhydroxy alkylene group having a terminal hydroxy alkyl group;
R'' is a tertiary alkyl of 4 to 8 carbon atoms;
a is 1 or 2;
b is 1 or 2; and
a + b does not exceed 3.

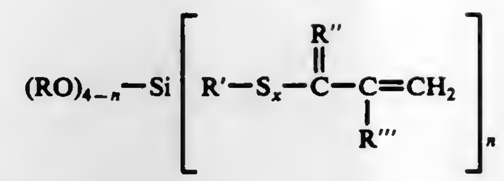
17. A process for preparing a compound of claim 1 which comprises the steps of:
A. contacting in the liquid phase and without contacting in the gas phase hydrogen silane of the formula

R_2SiX_{4-a}

wherein R is hydrogen, alkenyl of C_2-C_{10} or alkyl of C_1-C_4, a is 1 or 2 and X is halogen, with a primary or secondary alcohol having the formula R'OH wherein R' is an alkyl group, an alkylene group or a polyhydroxyalkylene group having a terminal hydroxy alkyl group; said alcohol present in an amount not in excess of a 10% stoichiometric excess relative to the halogen alkoxysilane thereby produced;
B. thereafter without isolating the resultant halogen alkoxysilane from step A contacting said halogen alkoxysilane with an alcohol of the formula R''OH wherein R'' is a tertiary alkyl group of C_4-C_8 in the presence of an acid binding agent.

4,060,539
SULFUROUS ORGANIC SILICON COMPOUNDS, A PROCESS FOR THEIR PREPARATION, AND THEIR USE AS ADHESIVIZING AGENTS
Claus-Dietrich Seiler, Rheinfelden; Hans-Joachim Vahlensieck, Wehr, and Jürgen Amort, Troisdorf-Sieglar, all of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Troisdorf, Germany
Filed Feb. 24, 1976, Ser. No. 660,952
Claims priority, application Germany, Mar. 1, 1975, 2508931
Int. Cl.² C07F *7/18*
U.S. Cl. 260—448.8 R **18 Claims**

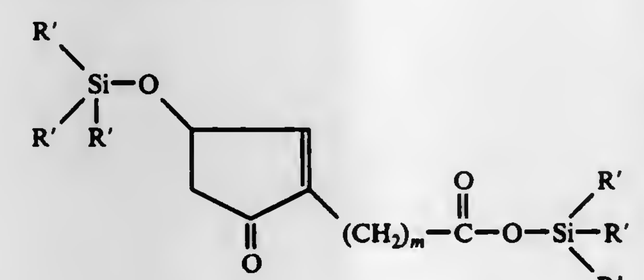
1. A sulfur-containing organosilicon compound of the formula



wherein
R is a C_{1-4} alkyl, cycloalkyl, C_{2-3} alkoxyalkyl or phenyl radical,
R' is a branched or unbranched alkylene radical having 1 to 6 carbon atoms, phenylene or benzyl radical,
R'' is an oxygen or sulfur atom
R''' is a hydrogen atom or a methyl group,
n is 1 or 2,
x is 1 or 2
or a hydrolysis product thereof.

4,060,540
NOVEL 3-TRIPHENYLMETHOXY-1-ALKYNES, 3-TRIPHENYL-METHOXY-1-TRANS-ALKENYL-DIALKYL-ALANES, AND LITHIUM 3-TRIPHENYLMETHOXY-1-TRANS-ALKENYL-DIALKYL ALANATES
Karel Francis Bernady; Middleton Brawner Floyd, Jr., both of Suffern; John Frank Poletto, Nanuet, all of N.Y.; Robert Eugene Schaub, Upper Saddle River, and Martin Joseph Weiss, Oradell, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.
Division of Ser. No. 613,776, Sept. 18, 1975, Pat. No. 4,007,210, which is a division of Ser. No. 355,350, April 27, 1973, Pat. No. 3,932,479. This application Nov. 5, 1976, Ser. No. 739,174
Int. Cl.² C07F *7/18*
U.S. Cl. 260—448.8 R **2 Claims**

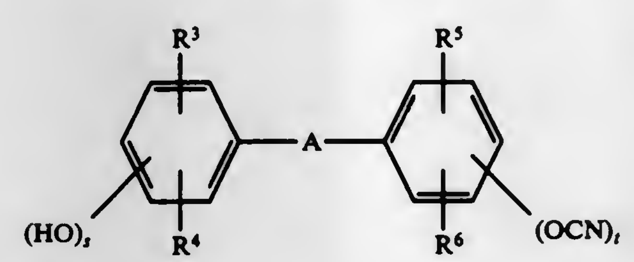
1. Compounds of the formula:



wherein m is an integer having the value of 4 to 8, inclusive, and R' are alkyl groups having from 1 to 10 carbon atoms and are not necessarily the same.

4,060,541
AROMATIC CYANIC ACID ESTERS
Rudolf Sundermann, Leverkusen, Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Germany
Filed Feb. 5, 1976, Ser. No. 655,362
Claims priority, application Germany, Feb. 22, 1975, 2507746
Int. Cl.² C07C *122/00*
U.S. Cl. 260—453 AR **3 Claims**

1. Aromatic cyanic acid esters of the formula



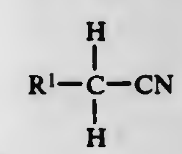
wherein
R^3, R^4, R^5 and R^6 are the same or different and are hydrogen, halogen or alkyl,
A is a bond between the aromatic rings or divalent alkyl with up to 6 carbon atoms, optionally substituted by lower alkyl, optionally substituted 5-membered or 6-membered cycloaliphatic, sulphonyl ($—SO_2—$) or carbonyl (—CO—),
wherein
s and t are the same or different and are one of the numbers from 1 to 5.

4,060,542
14-DESOXY-14 THIOCYANATO-ACETOXY-MUTILIN
Kurt Riedl, Kufstein, Austria, assignor to Biochemie Gesellschaft m.b.H., Vienna, Austria
Division of Ser. No. 416,246, Nov. 15, 1973, Pat. No. 3,979,423, which is a continuation of Ser. No. 261,335, June 9, 1972, abandoned, which is a continuation-in-part of Ser. No. 57,761, June 23, 1970, abandoned. This application June 28, 1976, Ser. No. 700,114
Claims priority, application Austria, July 25, 1969, 7223/69
Int. Cl.² C07C *161/02, 161/04*
U.S. Cl. 260—454 **1 Claim**

1. 14-desoxy-14-thiocyanatoacetoxy-mutilin.

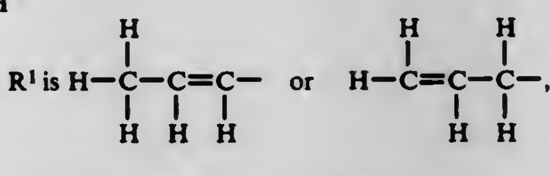
4,060,543
MANUFACTURE OF 5-CYANOVALERIC ACID AND ITS ESTERS
Hans-Martin Weitz, Bad Durkheim, and Rolf Fischer, Heidelberg, both of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany
Filed Aug. 2, 1976, Ser. No. 710,427
Claims priority, application Germany, Sept. 18, 1975, 2541640
Int. Cl.² C07C *120/00*
U.S. Cl. 260—464 **9 Claims**

1. A process for the manufacture of 5-cyanovaleric acid and its esters by reaction of alkenyl-nitriles with carbon monoxide and hydroxyl-containing compounds at elevated temperature and elevated pressure in the presence of metal carbonyls and basic compounds, said process being carried out by effecting the reaction without adding hydrogen, wherein a pentenonitrile of the formula



I

where R^1 is



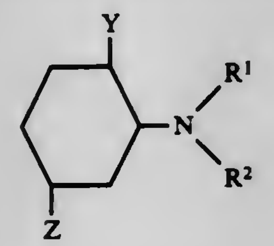
is reacted with carbon monoxide and a compound, containing a hydroxyl group, of the formula

$R^2 — OH$ II

where R^2 is alkyl of 1 to 12 carbon atoms which may be substituted by 1 or 2 hydroxyl groups, cycloalkyl of 5 to 7 carbon atoms, aralkyl of 7 to 12 carbon atoms, phenyl or hydrogen, the above radicals may be further substituted by alkyl or alkoxy each of 1 to 4 carbon atoms, or hydroxy, at a temperature of from 140° to 300° C and a pressure of from 100 to 700 bars, in the presence of pure carbonyls and/or carbonyls of which the carbon monoxide is partially replaced by neutral or charged ligands and/or carbonyl hydrides of iridium, iron, nickel, ruthenium, rhodium and/or cobalt and basic heterocyclic compounds, said basic heterocyclic compound being a 5-membered or 6-membered nitrogen-containing ring which is unsubstituted or substituted by alkyl or alkoxy each of 1 to 4 carbon atoms, or hydroxyl, to each of which rings one or 2 aromatic nuclei, which may be substituted by the above substituents, may be fused.

4,060,544
N-2-[N-(KETO-TERT-ALKYL CARBAMYL)ALKYL]PHENYLAMINES
Lester N. Stanley, Delmar, and Russell E. Farris, Elnora, both of N.Y., assignors to GAF Corporation, New York, N.Y.
Division of Ser. No. 319,034, Dec. 27, 1972, Pat. No. 3,931,145. This application Aug. 18, 1975, Ser. No. 605,265
Int. Cl.² C07C *69/02, 103/20, 121/50*
U.S. Cl. 260—465 D **2 Claims**

1. A compound of the formula



wherein
- Z is hydrogen, halo, lower alkyl, or NHX;
- X is SO_2R, SO_2OR, COR or COOR;
- R is hydrogen, lower alkyl or phenyl;
- Y is hydrogen, lower alkyl or lower alkoxy;
- R^1 is $—C_2H_4CONHC(CH_3)_2CH_2COCH_3$; and
- R^2 is R^1, lower alkyl, lower alkenyl, lower alkynyl or lower alkyl, lower alkenyl or alkynyl substituted with chlorine, bromine, fluorine, hydroxy, cyano, thiocyano, lower alkoxy, hydroxyethoxy, lower alkoxycarbonyl, lower alkanoyloxy, benzoyloxy, unsubstituted carbamyl, or carbamyl N-mono- or N,N-di-substituted with lower alkyl.

4,060,545
PREPARATION OF UNSATURATED CARBOXYLIC ESTERS FROM PROPYLENE OR ISOBUTYLENE
Arthur F. Miller, Lyndhurst; Robert J. Zagata, Seven Hills, and Robert K. Grasselli, Chagrin Falls, all of Ohio, assignors to The Standard Oil Company, Cleveland, Ohio
Filed May 28, 1976, Ser. No. 691,052
Int. Cl.² C07C *69/54*
U.S. Cl. 560—208 **11 Claims**

1. A process for the oxidative esterification of unsaturated olefins selected from the group consisting of propylene and isobutylene, to produce acrylates and methacrylates, respectfully, comprising:
a. passing a gaseous stream comprising the olefin, molecular oxygen and ethylene or an alcohol to a single fluid bed reactor, said reactor containing one or more oxidation catalysts effective for the oxidation of the olefin to its corresponding aldehyde and acid, and operated at a temperature between 200° to 600° C., and
b. collecting the acrylates or methacrylates in the reactor effluent.

4,060,546
PROCESS FOR THE MANUFACTURE OF ACYLATION PRODUCTS OF PHOSPHOROUS ACID
Bruno Blaser, Dusseldorf-Urdeibach; Hans-Günther Germscheid, Hosel, and Karl-Heinz Worms, Dusseldorf, all of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Dusseldorf-Holthausen, Germany
Continuation of Ser. No. 703,789, Feb. 5, 1968, abandoned, which is a continuation of Ser. No. 446,742, March 8, 1965, abandoned, which is a continuation-in-part of Ser. No. 159,159, Dec. 13, 1961, abandoned. This application Sept. 25, 1969, Ser. No. 869,437
Claims priority, application Germany, July 3, 1961, 43035
Int. Cl.² C07F *9/38*
U.S. Cl. 260—502.4 A **10 Claims**

1. A process for the manufacture of acylation products of a phosphorous acid having at least two phosphorus atoms in their molecules, which consists essentially of the steps of mixing one mol of phosphorus trichloride with from 2.5 to 3 mols of a mixture of carboxylic acid plus water, said acid being selected from the group consisting of an aliphatic monocarboxylic acid having 2 to 12 carbon atoms and benzoic acid; the share of said water in said mixture being from 1.2 to 1.5 mols; at a temperature up to 80° C; heating the reaction blend thus obtained, after completing of said mixing to 100° C to 160° C and recovering said acylation products.

4,060,547
PRODUCTION OF DICARBOXYLIC ACIDS
Frank E. Paulik, Houston, Tex.; Arnold Hershman, Creve Coeur, Mo.; Walter R. Knox, Town and Country, Mo., and James F. Roth, Creve Coeur, Mo., assignors to Monsanto Company, St. Louis, Mo.
Continuation of Ser. No. 752,762, Aug. 15, 1968, abandoned, which is a continuation-in-part of Ser. No. 628,581, April 5, 1967, abandoned. This application Jan. 22, 1973, Ser. No. 325,291
The portion of the term of this patent subsequent to Oct. 30, 1990, has been disclaimed.
Int. Cl.² C07C *51/12, 51/14*
U.S. Cl. 260—532 **21 Claims**

1. A process for the carbonylation of reactants selected from the group consisting of tetrahydrofuran and non-vicinal acyclic glycols wherein the hydroxyl groups are on different carbon atoms and there are from 3 to 20 carbon atoms in the glycol, said process comprising contacting
1. at least one of said reactants,
2. carbon monoxide, and
3. a catalyst system consisting essentially of
   a. a metal compound selected from the group consisting of rhodium compounds, and iridium compounds and
   b. a halogen component which is bromine, iodine, a bromide compound or an iodide compound, wherein during said contacting, said metal compound and said halogen component are present in an amount sufficient to catalyze the carbonylation of said reactants, said contacting being carried out at a temperature in the range of 125° C to 250° C.

4,060,548
PROCESS OF MAKING PENICILLAMINE
Friedrich Asinger, Aachen; Heribert Offermanns, Grossauheim, and Miklos Ghyczy, Laurensberg, all of Germany, assignors to Deutsche Gold- und Silber-Scheideanstalt Vormals Roessler, Frankfurt, Germany
Division of Ser. No. 346,825, March 29, 1973, Pat. No. 3,948,984, and a continuation-in-part of Ser. No. 862,148, Sept. 4, 1969, abandoned. This application Dec. 19, 1975, Ser. No. 642,572
Claims priority, application Germany, Sept. 6, 1968, 1795297
The portion of the term of this patent subsequent to Apr. 6, 1993, has been disclaimed.
Int. Cl.² C07C *99/10*
U.S. Cl. 260—534 S **10 Claims**

1. In a process for the production of D,L-penicillamine or its hydrochloride by reacting 2-isopropyl-5,5-dimethylthiazoline-3 with hydrogen cyanide to form 2-isopropyl-5,5-dimethylthiazoline-4-carbonitrile, hydrolysis of the nitrile with hydrochloric acid to form 2-isopropyl-5,5-dimethylthiazolidine-4-carboxylic acid hydrocloride and converting said 2-isopropyl-5,5-dimethylthiazolidine-4-carboxylic acid hydrochloride to penicillamine hydrochloride the improvement consisting of:
a. reacting 2-isopropyl-5,5-dimethylthiazoline-3 with substantially anhydrous hydrogen cyanide to form said thiazolidine carbonitrile,
b. heating said thiazolidine carbonitrile with excess concentrated hydrochloric acid at a temperature between about 70° C. and 110° C. to form said thiazolidine carboxylic acid hydrochloride, and,
c. converting said thiazolidine carboxylic acid hydrochloride to penicillamine hydrochloride by subjecting it to a steam distillation.

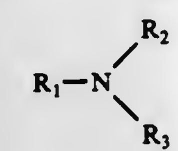
4,060,549
PROCESS FOR PREPARING SULFONIC ACID FLUORIDES
Arthur H. Schmidt, Wiesbaden; Reinhard Lantzsch, Cologne; Albrecht Marhold, Leverkusen; Klaus-Friedrich Lehment, Odenthal, and Adolf Staffe, Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany
Filed Mar. 4, 1976, Ser. No. 663,881
Claims priority, application Germany, Mar. 21, 1975, 2512498
Int. Cl.² C07C *143/70, 139/00*
U.S. Cl. 260—543 F **10 Claims**

1. In a process for preparing sulfonic acid fluorides by reacting sulfonic acid halides with inorganic fluorides in an organic aqueous phase, the improvement comprising carrying out the reaction of a sulfonic acid halide having the structure

$$R—SO_2—X$$

in which
- X is bromine or chlorine and
- R is a straight-chain, branched or cyclic hydrocarbon radical of 1-28 C atoms which can simultaneously contain chain and cyclic structural elements, saturated, unsaturated or aromatic, which can be further substituted by $—SO_2X—$groups, fluorine, chlorine, bromine, iodine, oxygen, sulphur, nitrogen and/or phosphorus, one or more of which being arranged in and/or on a ring or in and/or on a chain

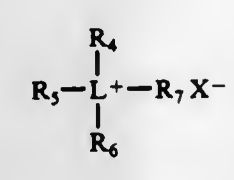
with an inorganic fluoride in a water immiscible inert organic solvent in the presence of a catalytic amount of an amine having the structure



I

in which
- R_1, R_2, and R_3 are independently selected from the group consisting of alkyl, alkyl substituted by hydroxy or lower alkoxy, alkenyl, cycloalkyl, cycloalkyl substituted by hydroxy or alkyl, aralkyl, aralkyl substituted by halogen, alkyl or lower alkoxy, aryl, aryl substituted by lower alkyl, methoxy or halogen, or conjointly R_1, R_2 and/or R_3 combined with the nitrogen and/or additional heteroatoms selected from the group consisting of oxygen, sulphur or nitrogen, form a 5-membered or 6-membered heterocyclic structure,

or in the presence of a catalytic amount of an onium salt having the formula

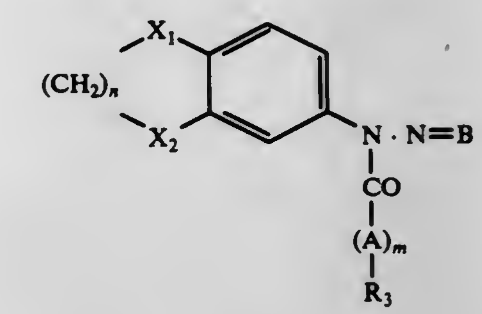


in which
- L is nitrogen or phosphorous; R_4, R_5, R_6 and R_7 are independently selected from the group consisting of alkyl, aralkyl substituted by C_1–C_4 alkyl, methoxy or halogen, aryl, and aryl substituted by C_1–C_4 alkyl, C_1–C_2 alkoxy or halogen, or alternatively, two adjacent radicals amongst R_4, R_5, R_6 and R_7 and including the central atom L, form a 5 or 6-membered heterocyclic structure which can additionally contain a further hetero atom selected from the group consisting of oxygen, sulfur or nitrogen; and X^- is a halide, cyanide or hydroxyl ion.

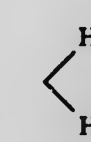
4,060,550
NOVEL N'-ACYLATED PHENYL-HYDRAZINE AND -HYDRAZONE DERIVATIVES
Michio Kimura, Minoo; Shigeho Inaba, Takarazuka, and Hisao Yamamoto, Nishinomiya, all of Japan, assignors to Sumitomo Chemical Company, Limited, Japan
Division of Ser. No. 439,035, Feb. 4, 1974, Pat. No. 3,974,145, which is a division of Ser. No. 173,700, Aug. 20, 1971, Pat. No. 3,812,112. This application Jan. 23, 1976, Ser. No. 651,831
Claims priority, application Japan, Aug. 26, 1970, 45-75198; Dec. 9, 1970, 45-109769; Dec. 9, 1970, 45-109771; Feb. 15, 1971, 46-6887; Feb. 16, 1971, 46-7492; Aug. 27, 1970, 45-75818
Int. Cl.² C07C *103/133*
U.S. Cl. 260—340.5 R **10 Claims**

1. A compound of the formula,

(II)



wherein X_1 and X_2 are each methylene; A is an unsubstituted ethylenically unsaturated hydrocarbon chain having up to 5 carbon atoms, *m* is 0 or 1; *n* is 1 or 2; R_3 is alkyl having up to 4 carbon atoms, cycloalkyl having 3 to 7 carbon atoms, unsubstituted or C_1–C_4 alkyl-, nitro-, trifluoromethyl-, methylenedioxy-, ethylenedioxy- or halogen-substituted phenyl, or halogen-, C_1–C_4 alkyl- or phenyl-substituted or benzene ring-condensed C_3–C_7 cycloalkyl, or unsubstituted or halogen-, C_1–C_4 alkyl- or phenyl-substituted or benzene ring-condensed C_5–C_6 cycloalkenyl; and B is



4,060,551
METHOD OF PRODUCING PANTETHINE
Saburo Uchikuga, Yokohama, and Masataka Kuroki, Sagamihara, both of Japan, assignors to Sogo Pharmaceutical Company Limited, Japan
Filed Aug. 10, 1976, Ser. No. 713,282
Claims priority, application Japan, May 25, 1976, 51-059679
Int. Cl.² C07C *149/23*
U.S. Cl. 260—561 S **12 Claims**

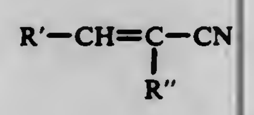
1. A method of producing pantethine comprising reacting a salt of pantothenic acid and a salt of cystamine in the presence of a carbodiimide and an N-hydroxy compound selected from the group consisting of 1-hydroxybenzotriazole and N-hydroxysuccinimide.

4,060,552
PREPARATION OF N,N'-di-2-NAPHTHYL-p-PHENYLENEDIAMINE
George Kletecka, Rocky River, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio
Filed Dec. 12, 1975, Ser. No. 640,053
Int. Cl.² C07C *87/64*
U.S. Cl. 260—576 **7 Claims**

1. In a process for reacting β-naphthol with p-phenylenediamine to form N,N'-di-2-naphthyl-p-phenylenediamine the improvement which comprises including a boric oxide in the reaction.

4,060,553
HYDROXYALKYLAMINOALKYLAMIDES AND PREPARATION AND USES THEREOF
Derek Redmore, Ballwin, and Benjamin T. Outlaw, Webster Groves, both of Mo., assignors to Petrolite Corporation, St. Louis, Mo.
Filed May 10, 1976, Ser. No. 684,711
Int. Cl.^{2} C07C *103/29, 103/183*
U.S. Cl. 260—559 A **10 Claims**

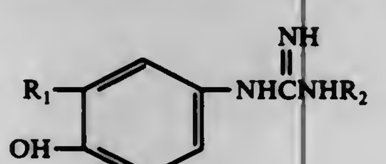
1. A process of reacting about 1 mole of an unsaturated nitrile of the formula



wherein R' and R'' are hydrogen or alkyl, aryl, cycloalkyl, alkaryl, and aralkyl, with about 3 moles of an alkanolamine which comprises mixing said nitrile and alkanolamine and then heating said mixture at a temperature and for a time so that one mole of the alkanolamine reacts with the unsaturated group to form an N-alkanol group and the other 2 moles of the alkanolamine react with the nitrile group to form an hydroxyalkylaminoalkylamide group.

4,060,554
SUBSTITUTED 4-HYDROXYPHENYL GUANIDINES
Robert Chung-Huan Liu, and John Lawrence Hughes, both of Kankakee, Ill., assignors to Armour Pharmaceutical Company, Phoenix, Ariz.
Division of Ser. No. 518,925, Oct. 29, 1974, Pat. No. 4,014,934, which is a continuation-in-part of Ser. No. 460,815, April 15, 1974, Pat. No. 3,908,013, which is a division of Ser. No. 73,244, Sept. 17, 1970, abandoned. This application Jan. 25, 1977, Ser. No. 762,359
Int. Cl.^{2} C07C *129/08*
U.S. Cl. 260—565 **2 Claims**

1. Aromatic quanidine compounds having the formula



wherein: R_1 is hydroxymethyl; and R_2 is hydrogen or methyl.

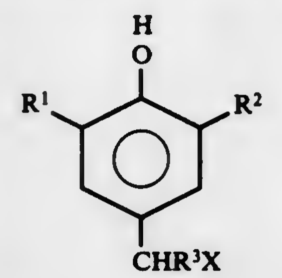
4,060,555
PROCESS FOR THE PRODUCTION OF CHLOROFLUORINATED ALIPHATIC KETONES
James Oliver Peterson, Snyder; Bernard Sukornick, Williamsville; Richard Francis Sweeney, Elma; Henry R. Nychka, East Aurora; Richard E. Eibeck, Orchard Park, all of N.Y., and Morris B. Berenbaum, Summit, N.J., assignors to Allied Chemical Corporation, Morris Township, N.J.
Filed Dec. 22, 1975, Ser. No. 642,832
Int. Cl.^{2} C07C *49/30, 49/04*
U.S. Cl. 260—586 R **47 Claims**

1. The process for the production of chlorofluorinated ketones by the oxychlorofluorination of ketones which comprises reacting a gaseous mixture of a starting material selected from an acyclic or cyclic saturated aliphatic ketone containing only C, H and O atoms and halogenated derivatives thereof in which one or more hydrogen atoms but not all are replaced with halogen atoms selected from chlorine and fluorine, or mixtures thereof, at least .25 mole oxygen in an oxygen-containing gas per C—H bond in the starting material, at least 0.25 mole HCl or equivalent of Cl_2 for each C—H bond present in the starting material, and HF, in the presence of a Deacon catalyst supported by a stable, inert metal salt carrier, with the weight percentage of cation in the Deacon catalyst ranging from about 0.6–20 based on the total cation content of the Deacon catalyst and metal salt carrier, at elevated temperatures and with a contact time of about 1.—20 seconds.

4,060,556
PREPARATION OF ANTIOXIDANTS
Dane K. Parker, Canton, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio
Division of Ser. No. 435,569, Jan. 22, 1974, Pat. No. 3,989,741. This application Dec. 11, 1975, Ser. No. 639,665
Int. Cl.^{2} C07C *49/82*
U.S. Cl. 260—590 R **3 Claims**

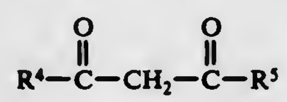
1. A process comprising reacting compounds having the general structural formula, about one mole

(I)



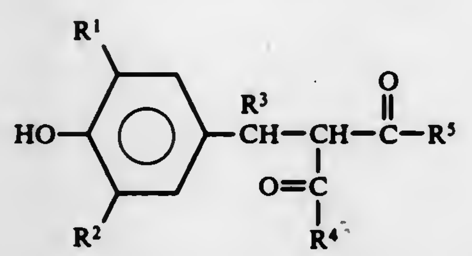
with compounds having the general formula

(II)



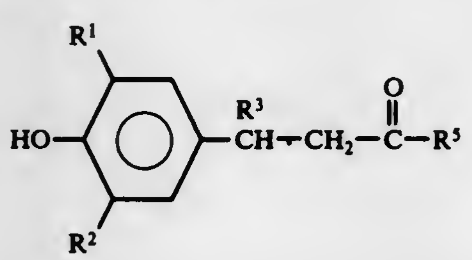
reacting in the presence of a basic catalyst while dissolved in ethanol solvent to yield a monoalkylated diketone having the structural formula

(III)



which under reflux in ethanol solvent forms a compound having the general structural formula

(IV)



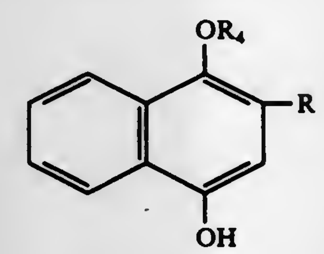
wherein in said formulas R^1 and R^2 are the same or different radicals selected from the group consisting of tertiary alkyl radicals having from 4 to 12 carbon atoms, R^3 is selected from the group consisting of hydrogen and n-alkyl radicals having from 1 to 20 carbon atoms and X is selected from the group consisting of chloro, bromo and iodo, R^4 and R^5 are the same or different radicals selected from the group consisting of alkyl radicals having from 1 to 10 carbon atoms, alkylene radicals having from 2 to 10 carbon atoms, and aryl radicals having from 6 to 12 carbon atoms.

4,060,557
HYDROFORMYLATION
Anthony Macaluso, Sr., Port Arthur, and Lawrence F. Kuntschik, Nederland, both of Tex., assignors to Texaco Inc., New York, N.Y.
Continuation-in-part of Ser. No. 366,387, June 4, 1973, abandoned. This application June 19, 1975, Ser. No. 588,534
Int. Cl.^{2} C07C *45/08*
U.S. Cl. 260—604 HF **7 Claims**

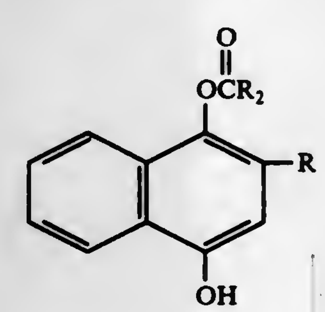
1. In a process for the production of aldehydes and alcohols by contacting olefins of the group of C_{11}–C_{14} alpha olefins with carbon monoxide and hydrogen in a hydroformylation zone at a temperature of about 100° to about 300° C. under a pressure of 1 to 200 psig in the presence of a cobalt catalyst consisting of cobalt in complex combination with carbon monoxide and a tertiary organo-phosphine to form a product phase containing unreacted olefins, paraffins, saturated aldehydes and alcohols, catalyst residue and heavy end; which are separated, the improvement whereby said separation is effected by the steps of metering said phase to a thin film evaporating zone, mechanically forming a thin film of said phase on a heated surface; continuously wiping said film on said surface at a temperature range of 200° to 250° C for an exposure time for said residue of 5 to 55 seconds thereby separating a distillate containing unreacted olefins, paraffins, aldehydes and alcohols, from said catalyst residue and heavy end; fractionating said distillate to separate the components thereof and directly recycling at least a part of said residue to said hydroformylation zone.

4,060,558
PROCESS FOR PREPARING 3-ALKYL-4-ALKOXY-1-NAPHTHOLS
Henry Rapoport, Berkeley, and Clinton D. Snyder, Monte Sereno, both of Calif., assignors to The Regents of the University of California, Berkeley, Calif.
Division of Ser. No. 565,472, April 7, 1975, Pat. No. 3,948,958. This application Oct. 7, 1975, Ser. No. 620,288
Int. Cl.^{2} C07C *41/00*
U.S. Cl. 260—613 D **4 Claims**

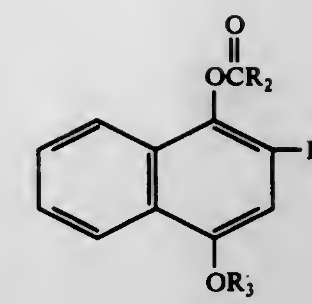
1. A method of preparing 1-naphthol of the formula



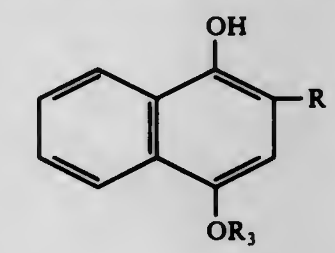
wherein R is lower alkyl and R_4 is lower alkyl, comprising alkylating with a benzyl halide alkylating agent of 7 to about 10 carbon atoms 1-acylated-1,4-naphthoquinol of the formula



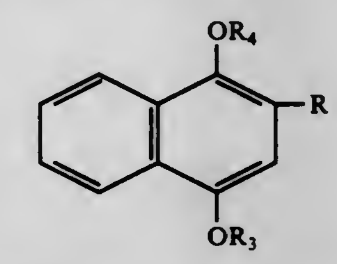
wherein R_2 is lower alkyl to produce ether-ester of the formula



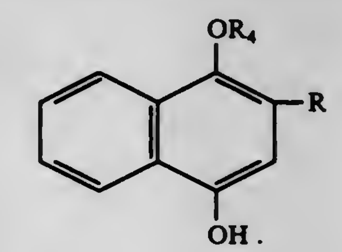
wherein R_3 is a benzyl of 7 to about 10 carbon atoms, hydrolyzing said ether-ester to naphthol of the formula



, alkylating said naphthol with a lower alkyl halide alkylating agent to form a diether of the formula



, and hydrogenolyzing said diether at a temperature of about 15° to 100° C. in the presence of a platinum group metal catalyst to form the corresponding 1-naphthol of the formula



4,060,559
PROCESS FOR PREPARING O-PHENYLPHENOL
Hideo Goto; Nobuyori Shibamoto, and Shunsaku Tanaka, all of Wakayama, Japan, assignors to Sugai Chemical Industry Co., Ltd., Wakayama, Japan
Filed May 3, 1976, Ser. No. 682,524
Claims priority, application Japan, May 14, 1975, 50-57806; May 12, 1975, 50-56272
Int. Cl.^{2} C07C *37/06*
U.S. Cl. 260—620 **7 Claims**

1. A process for preparing o-phenylphenol by dehydrogenating at least one of cyclohexanone dimer and o-cyclohexylphenol in the presence of a catalyst, characterized in that the catalyst consists essentially of a metal oxide carrier, and about 0.1 to about 10% by weight based on the carrier of at least one of alkali metal salts of sulfur-oxygen acids and 0.1 to 3.0% by weight based on the carrier of at least one of platinum and palladium supported by the carrier.

4,060,560

DISPROPORTIONATION OF XYLENOLS WITH PHENOL TO FORM CRESOLS

Bruce Eugene Leach, Ponca City, Okla., assignor to Continental Oil Company, Ponca City, Okla.

Filed Mar. 26, 1976, Ser. No. 670,772

Int. Cl.² C07C 39/04

U.S. Cl. 260—621 D **8 Claims**

1. An improved process for the conversion of xylenols to cresols by contacting said xylenols with phenol in the presence of magnesium oxide catalysts, the improvement comprising promoting the catalytic activity and catalyst life of magnesium oxide by adding a promotor selected from the group consisting of tungsten oxide or uranium oxide while carrying out the reaction in the vapor phase at temperatures of from about 350° to about 550° C and pressures up to about 1,000 pounds per square inch gauge.

4,060,561

METHOD FOR THE PREPARATION OF TRIMETHYLHYDROQUINONE

Charles M. Starks, Ponca City, Okla., assignor to Continental Oil Company, Ponca City, Okla.

Filed Sept. 20, 1976, Ser. No. 724,788

Int. Cl.² C07C 39/08

U.S. Cl. 260—621 F **11 Claims**

1. A method for the production of trimethyhydroquinone comprising reacting 4-methoxyphenol with methanol over catalysts selected from the group consisting of magnesium oxide and aluminum oxide at temperatures of from about 350° C to about 550° C at pressures of from about atmospheric to about 1,000 psig.

4,060,562

PROCESS FOR PREPARING META-SUBSTITUTED HALOPHENOLS

Karlfried Wedemeyer, Cologne; Wolfgang Kiel, Schildgen, and Werner Evertz, Monheim, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

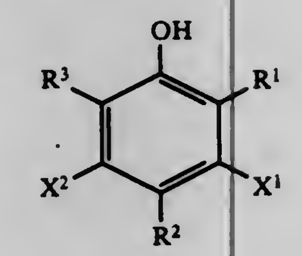
Filed Aug. 29, 1975, Ser. No. 609,140

Claims priority, application Germany, Sept. 10, 1974, 2443152

Int. Cl.² C07C 39/30

U.S. Cl. 260—623 R **11 Claims**

1. In a process for preparing a phenol which is meta-substituted by halogen by contacting a halogen phenol of the formula



wherein

X^1 and X^2 are identical or different and represent halogen, hydrogen, aryl selected from the group consisting of phenyl, naphthyl and aralkyl wherein the aralkyl group has 7 to 18 carbon atoms of which the alkyl portion has up to 6 carbon atoms, substituted aryl or substituted aralkyl wherein the substituent is selected from the group consisting of hydroxyl, halogen, alkyl having 1 to 6 carbon atoms, cycloalkyl having 5 to 6 carbon atoms, with at least one of the radicals X^1 or X^2 representing a halogen, and

R^1, R^2 and R^3 are identical or different and represent hydrogen, aryl selected from the group consisting of phenyl, naphthyl and aralkyl having 7 to 18 carbon atoms of which the alkyl portion has up to 6 carbon atoms, substituted aryl or aralkyl wherein the substituent is a hydroxyl group, halogen, an alkyl group having 1 to 6 carbon atoms, a cycloalkyl group having 5 or 6 carbon atoms, chlorine, bromine or iodine, with at least one of the radicals R^1, R^2, and R^3 representing chlorine, bromine or iodine,

with hydrogen under a pressure of 20 to 250 atmospheres at an elevated temperature of 100° to 350° C in the presence of a catalyst, the improvement which comprises employing as the catalyst a catalyst consisting essentially of elemental sulfur, an inorganic sulfur compound selected from the group consisting of hydrogen sulfide, a sulfide or polysulfide or an alkyali metal or alkaline earth metal, or an organic sulfur compound selected from the group consisting of carbon disulfide, carbon oxysulfide, thiocarbonic acid ethyl ester, a xanthic acid derivative, a thiourethane, thiourea, a thiocarbonic acid or its derivative, a thioaldehyde, a thiol, a thiophenol, a thioalkane, thioaxane, dithiane, disulfide and a thioketone.

4,060,563

PROCESS FOR PREPARING 2-ALLYL PHENOL

Delmar Frederick Lohr, Jr., Akron, Ohio, and Lynn Burritt Wakefield, Milwaukee, Oreg., assignors to The Firestone Tire & Rubber Company, Akron, Ohio

Filed Oct. 18, 1976, Ser. No. 733,612

Int. Cl.² C07C 39/20

U.S. Cl. 260—624 B **4 Claims**

1. A process for preparing 2-allyl phenol from phenol comprising, the sequential steps of:

a. reacting in situ a compound selected from the class consisting of an alkali metal hydroxide with the phenol to form an alkali phenoxide, the amount of said alkali metal hydroxide to said phenol ranging from about 1.0 to about 1.5 on an equivalent basis,
b. carrying out said in situ reaction in a water miscible polar solvent, said polar solvent selected from the class consisting of alcohols having from 1 to about 6 carbon atoms and diols having from 2 to about 4 carbon atoms,
c. reacting said alkali phenoxide with allyl chloride in said polar solvent to form an allyl phenyl ether mixture containing various by-products,
d. reacting said alkali metal phenoxide with said allyl chloride under autogenous pressure at a temperature of from about 20° C to about 100° C, the amount of said allyl chloride to said alkali phenoxide ranging from about 1.1 to about 1.5 equivalents,
e. washing said allyl phenyl ether mixture with water,
f. adding to said allyl phenyl ether mixture a non-polar hydrocarbon azeotropic solvent, said non-polar solvent being an aromatic having from 6 to 12 carbon atoms,
g. azeotropically distilling off said non-polar hydrocarbon solvent and said various reaction by-products so that only said allyl phenyl ether remains, said azeotropically distillation occurring at a temperature slightly below the boiling point of said azeotropic non-polar solvent, the boiling point of said azeotropic non-polar solvent ranging from about 70° C to about 140° C, and
h. thermally rearranging said allyl phenyl ether to produce 2-allyl phenol, said rearrangement occurring at a temperature of from about 160° C to about 240° C.

4,060,564

PROCESS FOR PREPARING ALCOHOLS

Muneaki Kanemaru, Yokohama; Tetsuo Kimura, Kamakura; Norimichi Ishii, Yokohama, and Hideo Kawashima, Kamakura, all of Japan, assignors to Mitsui Toatsu Chemicals, Incorporated, Tokyo, Japan

Filed Jan. 5, 1977, Ser. No. 757,023

Claims priority, application Japan, Jan. 21, 1976, 51-515043

Int. Cl.² C07C 29/08

U.S. Cl. 260—641 **8 Claims**

1. A process for hydrating aliphatic olefins having from 2 to 12 carbon atoms to prepare corresponding alcohols comprising contacting said aliphatic olefins with an aqueous 0.1 to 20.0 wt % phosphoric acid solution containing a compound selected from oxyacids of chromium and salts thereof in an amount of from 0.001 to 1.0 wt % of the reaction solution at a temperature of from 100° to 350° C under a pressure of from 10 to 350 kg/cm²(G) under which the reaction solution is maintained in a liquid state.

4,060,565

HYDROCARBON CONVERSION PROCESS USING A SUPPORTED PERFLUORINATED POLYMER CATALYST

James D. McClure, and Stanley G. Brandenberger, both of Houston, Tex., assignors to Shell Oil Company, Houston, Tex.

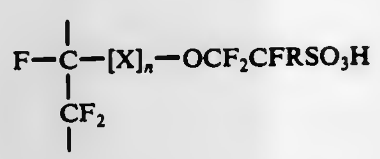
Division of Ser. No. 663,956, March 4, 1976, Pat. No. 4,038,213. This application Apr. 1, 1977, Ser. No. 783,917

Int. Cl.² C07C 3/54

U.S. Cl. 260—671 C **6 Claims**

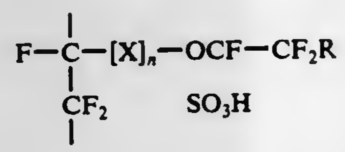
1. A liquid phase process for the preparation of ethylbenzene which conprises contacting an ethylene feed stream with a benzene feed stream at a reaction temperature of between about 125° C and about 225° C in the presence of a catalyst composition comprising a solid perfluorinated polymer catalyst supported on an inert porous carrier having an average pore diameter of between about 50 A and about 600 A in a weight ratio of catalyst to support of between about 0.1:100 and about 20:100 wherein said catalyst contains a repeating structure selected from the group of:

a)



or

b)



where *n* is 0, 1 or 2; R is a radical selected from the group consisting of fluorine and perfluorealkyl radicals having from 1 to 10 carbon atoms; and X is selected from the group consisting of:

$[O(CF_2)_m]$, $[OCF_2CFY]$ or $[OCFYCF_2]$

where *m* is an integer from 2 to 10 and Y is a radical selected from the class consisting of fluorine and trifluoromethyl radical.

4,060,566

MEMBRANE PROCESS FOR SEPARATING MATERIALS

Robert L. Yahnke, Naperville, Ill., assignor to Standard Oil Company (Indiana), Chicago, Ill.

Filed Nov. 19, 1975, Ser. No. 633,258

Int. Cl.² C07C 11/04

U.S. Cl. 260—677 A **26 Claims**

1. A process for separating a material from a fluid mixture comprising contacting said mixture containing said material with a first side of an essentially solid, water-insoluble, semi-permeable membrane having in contact therewith an aqueous liquid barrier having metal-containing ion which combine with said material to form a water-soluble complex, the partial pressure of said material on a second side of the semi-permeable membrane being sufficiently less than the partial pressure of said material on said first side to provide separated material on the second side of the semi-permeable membrane, and removing said separated material from the vicinity of the second side of the semi-permeable membrane, wherein the total pressure on the second side is about 75 to 125% of the total pressure of the mixture on the first side, and the latter total pressure is at least about 50 psig.

4,060,567

METHOD OF REDUCING α-ACETYLENE CONTENT OF HYDROCARBON

James J. Tazuma, Stow, and Angelo Bergomi, Akron, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Sept. 10, 1976, Ser. No. 722,189

Int. Cl.² C07C 7/00

U.S. Cl. 260—681.5 C **7 Claims**

1. A method of reducing the α-acetylene content of a hydrocarbon fraction which comprises a diolefin containing 4 to 8 carbon atoms and small amounts of α-acetylenes by contacting said hydrocarbon fraction with alkali metal amide dispersed on a support to reduce the α-acetylene content, separating the fraction from support and treating the fraction separated from the support to remove ammonia generated as fraction contacts the alkali metal amide.

4,060,568

SILICA-MODIFIED ZEOLITE CATALYST AND CONVERSION THEREWITH

Paul G. Rodewald, Rocky Hill, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Mar. 31, 1976, Ser. No. 672,194

Int. Cl.² C07C 1/20, 1/24

U.S. Cl. 260—682 **7 Claims**

1. A process for producing a hydrocarbon mixture rich in C_2-C_3 olefins which comprises contacting, under conversion conditions, a charge consisting essentially of one or more lower monohydric alcohols having up to four carbon atoms, the ethers derived therefrom or mixtures of said alcohols and ethers with a catalyst composition comprising a crystalline aluminosilicate zeolite having a silica to alumina ratio of at least about 12, a constraint index within the approximate range of 1 to 12 and containing interdispersed within the interior crystalline structure thereof added amorphous silica in an amount of at least about 0.1 weight percent.

4,060,569

HYDROCARBON POLYMERS

John Henry Woods, Tulsa, and Toby R. Graves, Bartlesville, both of Okla., assignors to Petrolite Corporation, St. Louis, Mo.

Filed Dec. 24, 1975, Ser. No. 644,138

Int. Cl.² C07C 3/10

U.S. Cl. 260—683.15 R **39 Claims**

1. A process of preparing polymers which have congealing and melting points which are essentially no higher than those of the starting materials, which comprises polymerizing a hydrocarbon starting material consisting primarily of alpha olefins, and which is a solid at room temperature, in the presence of a free radical catalyst under pressures of less than 500 psig but sufficient to keep the reactants and catalysts from vaporizing and at temperatures of about 40° C. to 250° C. for a period of 1 to 20 half-lives of the free radical catalyst, the molar ratio of free radical catalyst to hydrocarbon being from about 0.005 to 0.35.

4,060,570

CURABLE LIQUID POLYSULFIDE POLYMER BASED SEALANTS

Henry Neil Paul, 3rd, Blue Bell, Pa., assignor to Thiokol Corporation, Newtown, Pa.

Filed May 10, 1976, Ser. No. 684,990

Int. Cl.² C08L 9/00, 23/22, 23/20

U.S. Cl. 260—889 **23 Claims**

1. A polysulfide based sealant composition which comprises:
a. a curable liquid polysulfide polymer of the formula

HS—(RSS)$_n$—RSH wherein R is a hydrocarbon, oxahydrocarbon or thiahydrocarbon radical and *n* is from 4 to about 23;

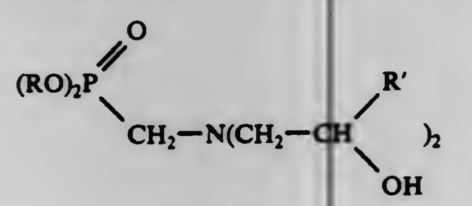
b. a butyl rubber, a polybutene polymer, or a mixture thereof as an adhesive additive; and

c. an oil absorbent filler.

4,060,571
PRODUCTION OF N,N-BIS-(2-HYDROXYALKYL)-AMINOMETHANE PHOSPHONIC ACID DIALKYL ESTERS

Manfred Kapps, Leverkusen; Karl-Heinz Mitschke, Odenthal, and Reinhard Schliebs, Cologne, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany
Filed Feb. 6, 1976, Ser. No. 656,034
Claims priority, application Germany, Feb. 15, 1975, 2506442
Int. Cl.^{2} C07F *9/40*
U.S. Cl. 260—970 5 Claims

1. A process for the production of N,N-bis(2-hydroxyalkyl)-aminomethane phosphonic acid dialkyl esters of the formula

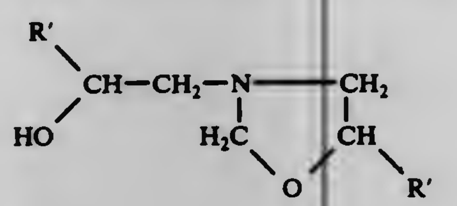


in which

R is an optionally substituted alkyl radical with 2 to 10 carbon atoms, and

R' is hydrogen or a lower alkyl radical with up to 6 carbon atoms,

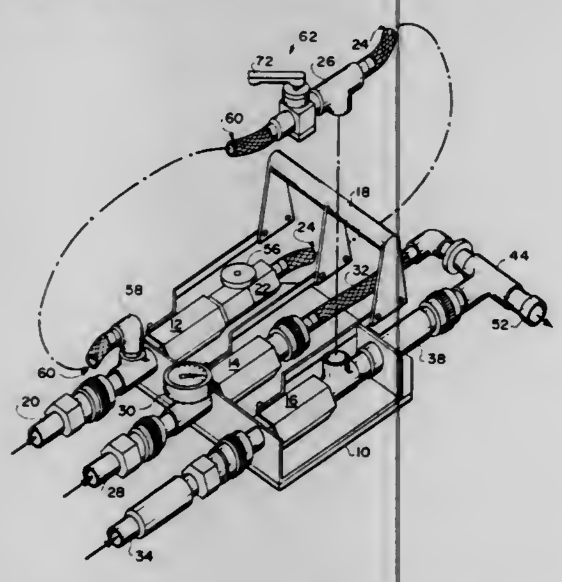
comprising reacting an oxazolidine of the formula



with a dialkyl phosphite in the presence of an acid ion exchanger.

4,060,572
FOAMING APPARATUS

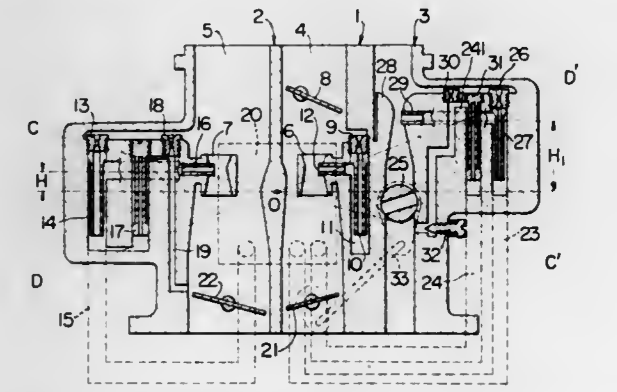
Marcel Widmann, West Hill, Canada, assignor to Borden Products Limited, West Hill, Canada
Continuation of Ser. No. 493,706, July 31, 1974, abandoned. This application Apr. 7, 1976, Ser. No. 674,618
Int. Cl.^{2} B01F *3/04*
U.S. Cl. 261—18 B 6 Claims



1. Apparatus for producing foam without the aid of beads in the foaming chamber comprising a foaming chamber, a mesh screen disposed in said foaming chamber, a choke of reduced cross-section relative to said foaming chamber disposed at the downstream portion of said foaming chamber which functions in cooperation with said mesh screen to promote mixing of air and foaming agent solution, a first conduit in communication with said foaming chamber for introducing foaming agent solution thereinto, a first valve provided in said first conduit upstream of said foaming chamber, a second conduit in communication with said foaming chamber for introducing air under pressure thereinto, a second valve provided in said second conduit upstream of said foaming chamber, a third conduit connected into said second conduit upstream of said second valve and being in communication with said foaming chamber, a third valve provided in said third conduit upstream of said foaming chamber which serves to purge said chamber of any remaining material when opened, a mixing chamber, a connecting conduit between said mixing chamber and said foaming chamber, an exit conduit leading from said mixing chamber, a fourth conduit in communication with said mixing chamber for introducing a resin solution thereinto and fourth valve provided in said fourth conduit upstream of said mixing chamber.

4,060,573
CARBURETOR ASSEMBLY

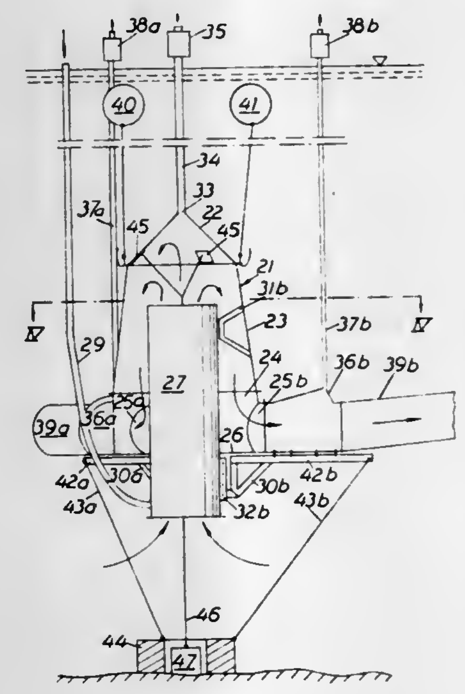
Michitsugu Mori; Mitsuo Ohfuji, both of Katsuta, and Akiyasu Kuwahara, Hitachi, all of Japan, assignors to Hitachi, Ltd., Japan
Continuation-in-part of Ser. No. 562,395, March 27, 1975, abandoned. This application Oct. 5, 1976, Ser. No. 729,701
Claims priority, application Japan, Mar. 29, 1974, 49-34478
Int. Cl.^{2} F02M *13/04;* F02B *19/10*
U.S. Cl. 261—23 B 3 Claims



1. A carburetor assembly for stratified charge combustion type engines comprising a lean set carburetor consisting of a primary side carburetor and a secondary side carburetor each having a main fuel nozzle for supplying lean fuel-air mixtures to an engine combustion chamber; a rich set carburetor having a main fuel nozzle for supplying rich fuel-air mixtures to said engine combustion chamber, said rich set carburetor being disposed adjacent said primary side carburetor of said lean set carburetor and formed integrally therewith; said primary side carburetor, said secondary side carburetor and said rich set carburetor being arranged such that a substantially straight line connects together the center of an inlet bore of each carburetor as seen from above; and a float chamber for supplying fuel to said rich set carburetor and said lean set carburetor, said float chamber being arranged such that the center of its inclination is disposed in the vicinity of the center line between the main fuel nozzles of said primary side carburetor and said secondary side carburetor, and an open end of the main fuel nozzle of said rich set carburetor being disposed at a level higher than open ends of the main fuel nozzles of said primary side carburetor and said secondary side carburetor of said lean set carburetor.

4,060,574
DEVICE FOR LAKE RESTORATION BY OXYGEN-ENRICHING OF THE WATER

Bo Lennart Verner, Stockholm, and Lars Borje Staffan Fors, Ingaro, both of Sweden, assignors to Atlas Copco Aktiebolag, Nacka, Sweden
Continuation of Ser. No. 258,546, June 1, 1972, abandoned. This application Feb. 21, 1975, Ser. No. 551,930
Claims priority, application Sweden, June 1, 1971, 7002/71; Jan. 28, 1972, 972/72
Int. Cl.^{2} B01F *3/04*
U.S. Cl. 261—77 3 Claims



1. Apparatus for oxygenating a thermally stratified body of water having an upper warmer and relatively oxygen-rich epilimnion and a lower colder and relatively oxygen-poor hypolimnion without destratification thereof, which apparatus comprises:

a. an upwardly extending open ended shell located in the hypolimnion;

b. means for introducing pressurized oxygen-containing gas into the lower end of said shell to propel by gas lift pump action a column of water upwardly within said shell whereby to increase the oxygen concentration of said column of water;

c. entrapment means located in the hypolimnion above said shell for entrapping a volume of undissolved gas;

d. passage means for passing the oxygen-enriched water downwardly from over the top of said shell;

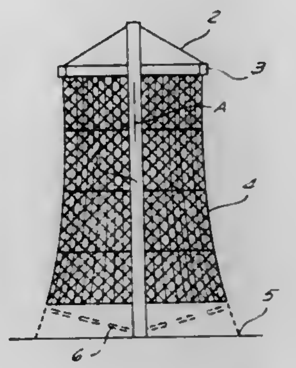
e. controlled means for venting entrapped undissolved gas from said entrapment means to the atmosphere to maintain said volume of undissolved gas under a predetermined pressure effective to cause the oxygen-enriched water to flow downwardly in said passage means;

f. outlet means for receiving the downwardly flowing oxygen-enriched water and introducing it into the hypolimnion; and

g. secondary bulged venting means connected to said outlet means for removing residual undissolved gas to the atmosphere.

4,060,575
COOLING TOWER AND WALL STRUCTURE THEREFOR

Kurt Uhlirsch, and Hermann Lindhuber, both of Braunau, Austria, assignors to Vereinigte Metallwerke Ranshofen-Berndorf Aktiengesellschaft, Ranshofen near Braumau, Austria
Filed Feb. 14, 1975, Ser. No. 550,014
Claims priority, application Austria, Feb. 15, 1974, 1252/74; Feb. 15, 1974, 1253/74
Int. Cl.^{2} B01F *3/04*
U.S. Cl. 261—111 3 Claims



1. In a cooling tower having an upwardly open chimney for inducing a flow of air therethrough and provided with means for supplying a cooling liquid thereto, a structure forming said chimney, said structure comprising:

an upright post defining an axis;

a horizontal upper ring suspended from said post and centered on said axis;

an array of cables hanging from said ring and defining thereunder a generally hyperboloidal surface centered on said axis, said cables crossing one another at intersections;

a plurality of clips each secured to said cables at a respective intersection;

a plurality of metal plates having vertical corrugations of generally trapezoidal section; and

respective rigid stringers each secured to a plurality of said clips and extending across the width of each of said plates and fastened thereto, said stringers securing each plate to said array by said clips so that each plate lies on said surface with its corrugations horizontally spread to greater and lesser extent at different vertical regions along the plate.

4,060,576
METHOD AND APPARATUS FOR VAPOR SATURATED GAS DELIVERY

Graham Cameron Grant, 205 Wigram Road, Glebe, N.S.W. 2037, Australia
Continuation of Ser. No. 396,032, Sept. 10, 1973, abandoned. This application Sept. 8, 1975, Ser. No. 611,382
Claims priority, application Australia, Sept. 13, 1972, 0427; Nov. 17, 1972, 1267
Int. Cl.^{2} A61M *15/00;* B01F *15/06*
U.S. Cl. 261—130 7 Claims

1. Gas conditioning apparatus, comprising:

a gas humidifier including means defining a water evaporation chamber in said humidifier;

first heating means for heating water in said evaporation chamber;

a presettable temperature controller for controlling said first heating means to control the water temperature in said chamber;

a gas delivery line extending between said gas humidifier and a delivery point;

a second heater associated with and extending along substantially the entire length of said delivery line;

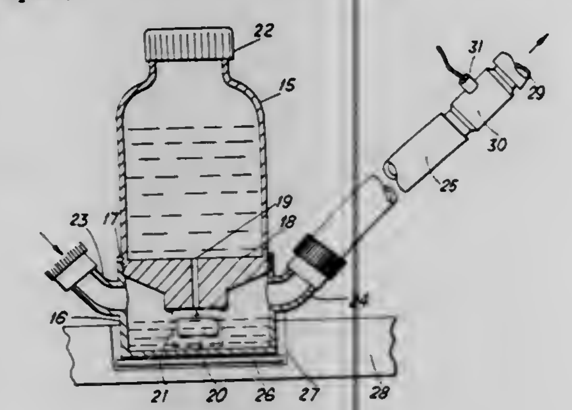
a temperature sensor detecting the temperature of gas leaving the delivery line; and,

a variable temperature controller responsive to said temper-

ature sensor and controlling the secondary heater to alter the heat applied thereby to gas flowing through said line, said first heating means heating said gas in said humidifier to a temperature T_1 and a vapour level W_1 of significantly less than 100% saturation and the variable temperature controller operating independently to maintain the gas temperature at the delivery point at a second temperature T_2, lower than T_1, with a selected vapour level W_2 which is higher than W_1.

7. A method for humidifying and heating gas to be breathed by a patient undergoing anaesthesia, artificial respiration, or the like, comprising:

passing said gas into a humidification tank containing humidifying liquid;



heating the humidifying liquid in said humidification tank thereby heating said gas in the humidification tank to a temperature above a temperature at which it is to be breathed by the patient and humidifying said gas to a humidity of up to 85% with vapor from the humidifying liquid in said tank;

transferring said gas from said humidification tank to a delivery point via a heated delivery line;

sensing the temperature of gas passing from said delivery line; and

controlling automatically the amount of heat supplied to said gas in said delivery line in accordance with the temperature of gas passing from said delivery line so that said gas passes from said delivery line at about normal body temperature and about 100% relative humidity.

4,060,577

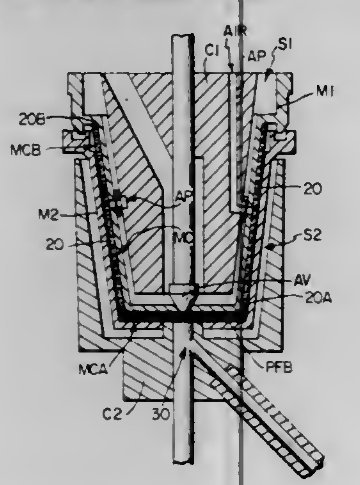
METHOD FOR PRODUCING SEAMLESS FOAM PLASTIC CUPS FROM EXPANDABLE SIDEWALL BLANKS

Richard D. Collins, Timonium, Md., assignor to Maryland Cup Corporation, Owings Mills, Md.

Filed Feb. 11, 1976, Ser. No. 657,184

Int. Cl.² B29D *27/00*

U.S. Cl. 264—45.4 **16 Claims**



1. The method of forming a smooth-sided foam plastic container from a expandable foam plastic cylinder comprising the steps of:

placing said expandable foam cylinder on a mandrel and heating said cylinder to a desired temperature over a desired interval to initially size the wall thickness thereof;

removing said cylinder from said mandrel and inserting same in the mold cavity of a steam heated expandable foam plastic bead container mold of a substantially conformal interior shape;

injecting expandable foam plastic beads into one end of said mold; and

heating said mold to cause said beads to expand and mutually fuse with themselves and one edge of said cylinder to form a container bottom which is seamlessly integrated with said cylinder to provide a seamless foam container.

4,060,578

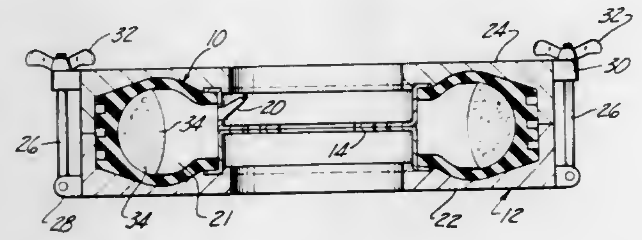
METHOD OF FOAM-FILLING A TIRE CARCASS

Frederick N. Kisbany, 464 Lexington Road, Grosse Point Farms, Mich. 48236

Filed Oct. 30, 1973, Ser. No. 411,106

Int. Cl.² B29D *27/00;* **B60C** *7/00*

U.S. Cl. 264—46.6 **3 Claims**



1. The method of making a foam-filled tire comprising the steps of:

1. mounting a tire carcass on the rim of a wheel,
2. introducing sufficient foam-forming elastomer into the tire carcass as would be capable of forming a foam only partially filling the carcass interior;
3. pressuring the tire carcass interior to a relatively high superatmospheric pressure appreciably above the pressure to be employed within the tire at the time it is placed in service on the road,
4. reacting the foam-forming ingredients while the carcass interior is at the afore-mentioned relatively high superatmospheric pressure to produce a cured foam that only partially fills the carcass interior; and
5. later reducing the pressure within the tire interior space unoccupied by the foam to permit further expansion and to produce a final tire pressure that approximates expected normal road service pressure.

4,060,579

METHOD FOR THE CONTINUOUS FORMING OF FOAM BLOCKS

Willi Schmitzer, Birlinghoven; Heinz Kisteneich, St. Augustin, and Ferdinand Proksa, Bergisch-Neukirchen, all of Germany, assignors to Maschinenfabrik Hennecke GmbH, Leverkusen, Germany

Continuation of Ser. No. 371,812, June 20, 1973, abandoned. This application Feb. 11, 1975, Ser. No. 548,934

Claims priority, application Germany, June 24, 1972, 2231084

Int. Cl.² B29D *27/04*

U.S. Cl. 264—51 **8 Claims**

1. A method of continuously producing foam blocks comprising:

a. providing an elongated conveying surface divided into a first zone and a second zone

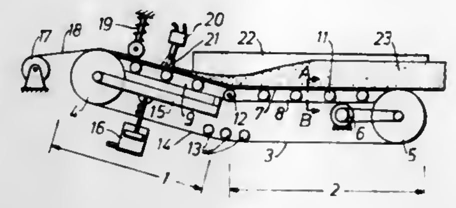
i. said first zone being inclined at a downward angle to the horizontal in the direction of the work,

ii. said second zone being substantially horizontal and forming a less than 180° angle with said first zone as measured between the top surfaces, and

iii. at least said second zone comprises an endless drivable conveyor belt,

b. positively feeding a continuous cover sheet to the surface of said first zone,

c. continuously depositing a foamable reaction mixture on top of said cover sheet in said first zone,



d. maintaining freshly deposited mixture in said first zone for a short enough time that it does not begin to foam substantially, and

e. allowing the mixture to foam in said second zone.

4,060,580

PROCESS FOR THE PRODUCTION OF SHAPED COMPONENTS OF WOOD MATERIAL, ESPECIALLY BOARDS, BOUND WITH A HYDRAULIC BINDER, PREFERABLY CEMENT

Helmut Pampel, Volksen, Germany, assignor to Bison-werke Bahre & Greten GmbH & Co. KG, Germany

Filed July 16, 1975, Ser. No. 596,523

Claims priority, application Germany, July 16, 1974, 2434212

Int. Cl.² B28B *23/00;* **B29D** *3/02;* **B29J** *5/00*

U.S. Cl. 264—109 **8 Claims**

1. In a process for making shaped articles of a wood material bonded with hydraulic cement wherein at least one mineralizing agent, water and a hydraulic cement are added to the cellulosic material comprised of wood particles, and the thus-prepared mixture is then shaped and pressed at a constant temperature above the freezing point, the improvement comprising: adding the amount of water, required for the hydraulic cement, to said cellulosic material and mixing said water therewith; thereafter adding said at least one mineralizing agent, reactive with a component of said cement, to said cellulosic material and then adding said hydraulic cement to the resulting wet cellulosic material.

4,060,581

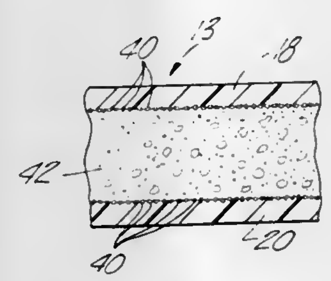
METHOD OF MAKING A COMPOSITE BURIAL VAULT

David L. Darby, 501 Brickyard Road, and James W. Darby, 2117 Smith, both of Danville, Ill. 61832

Filed Nov. 8, 1974, Ser. No. 522,133

Int. Cl.² B28B *11/06*

U.S. Cl. 264—131 **5 Claims**



1. The method of forming a composite burial vault comprising the steps of:

constructing a self supporting liner of thermosetting plastic resinous material,

while said liner is drying and before it has set, applying a granular material to at least one surface of said liner, said granular material being applied to substantially all of said surface, whereby when said liner has dried said granular material will be embedded in said surface;

after said liner has dried with said granular material embedded therein, pouring a flowable concrete material into contact with said surface and said granular material and permitting said concrete material to dry whereby said granular material will act as a mechanical bond between said liner and said hardened concrete.

4. The method of forming a composite burial vault comprising the steps:

constructing a self supporting liner of plastic resinous material,

after said liner has been formed, applying a solvent to at least one surface of said liner to thereby temporarily soften the surface,

while said liner is soft and before it has hardened again, applying a granular material to said softened surface of said liner, said granular material being applied to substantially all of said surface, whereby when said liner has dried said granular material will be embedded into said surface of said liner,

after said liner has dried with said granular material embedded therein, pouring a flowable concrete material into contact with said surface and said granular material and permitting said concrete material to dry whereby said granular material will act as a mechanical bond between said liner and said hardened concrete.

4,060,582

METHOD OF MANUFACTURING POLYOXYMETHYLENE FILAMENTS

Boris Afanasievich Egorov, ulitsa Pavla Tychiny, 12b, kv. 11; Alexandr Sergeevich Grzhimalovsky, ulitsa Karla Libknekhta, 11/1, kv. 15; Alexandr Vladimirovich Judin, Rusanovsky bulvar, 3, kv. 73; Konstantin Evgenievich Fishman, ulitsa Krasnotkatskaya, 17, kv. 47, and Ljudmila Dmitrievna Vernaya, ulitsa Yanvarskogo vosstaniya, 24, kv. 98, all of Kiev, U.S.S.R.

Filed Aug. 13, 1974, Ser. No. 497,060

Int. Cl.² D01D *5/12*

U.S. Cl. 264—210 F **3 Claims**

1. A method of manufacturing a polyoxymethylene filament, comprising thermally treating polyoxymethylene having a molecular weight of from 30,000 to 100,000 and containing stabilizing additives including an antioxidant and an acceptor of formaldehyde in a quantity from 0.1 to 3.0% of the weight of said polyoxymethylene at a temperature of from 100° to 150° C and a residual pressure of from 1 to 100 mm. Hg to constant weight, melting said thermally treated polyoxymethylene at a temperature of from 170° to 230° C, forcing the melt through the orifices of an extrusion nozzle, cooling the jets of said melt leaving the orifices of the extrusion nozzle to a temperature of from 70° to 169° C in a cooling medium selected from the group consisting of air, an inert gas and steam, and drawing the moulded filament obtained after said cooling at a temperature of from 120° to 165° C to a length exceeding the initial length by about 7 to 14 times to obtain a polyoxymethylene filament having a tensile strength of from 70 to 100 grams per tex, an elongation at rupture of from 9% to 12%, and an initial modulus of from 1200 to 1800 kilograms per square millimeter.

4,060,583

ELECTRICALLY INSULATING COMPOSITION

James D. Groves, Hudson, Wis., and Stefano Loffredo, Naples, Italy, assignors to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.

Continuation of Ser. No. 553,982, Feb. 28, 1975, abandoned. This application Aug. 6, 1976, Ser. No. 712,399

Int. Cl.² H01B *3/30, 3/22, 3/20*

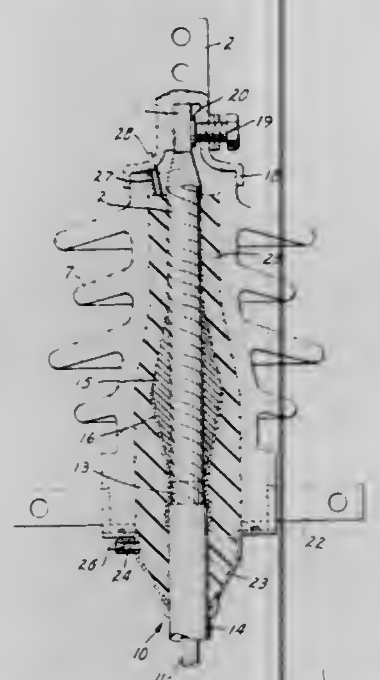
U.S. Cl. 264—272 **24 Claims**

10. A method for electrically insulating a section of power transmission line comprising

A. placing a housing capable of holding a liquid electrically insulating composition around a base conductor that is to be insulated; and

B. introducing into the housing a composition that comprises

(1) a dry water-immiscible nonvolatile free-flowing organic liquid that has a dielectric strength of at least 6 kilovolts per millimeter at a gap of 2.5 millimeters, a dielectric constant of no more than about 10, and a dissipation factor of no more than about 0.2, and that remains liquid at at least 0° C; and (2) at least two room-temperature-reactive ingredients that are uniformly and compatibly dispersed in said organic liquid and that chemically react with one another at room temperature to form a thermally stable high-viscosity thickening agent that is



uniformly and compatibly dispersed in said organic liquid, the coreactive groups of said ingredients averaging between about 1.8 and 2.3 per molecule; said composition prior to reaction of said ingredients having a room-temperature viscosity of less than 5000 centipoises, and after reaction of said ingredients, (a) being flowable so as to assume the shape of its container, (b) having a room-temperature viscosity of at least 50,000 centipoises, and (c) having a variation in viscosity in the temperature interval 25° C to 100° C of at least 10,000 centipoises.

4,060,584

PROCESS FOR RECOVERY OF IRON OXIDE AND CHLORINE FROM DUST PRODUCED IN CHLORINATION OF TITANIFEROUS ORES

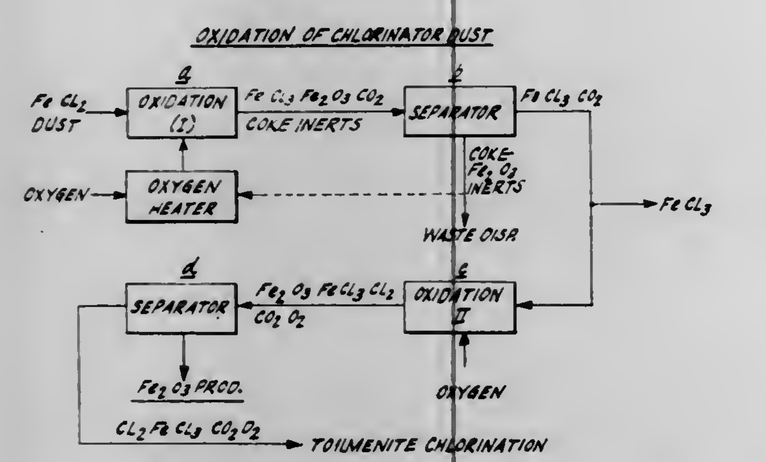
Achim Hartmann; Achim Kulling, and Hans Thumm, all of Leverkusen, Germany, assignors to Kronos Titan G.m.b.H., Leverkusen, Germany

Filed Feb. 14, 1977, Ser. No. 768,542

Claims priority, application Germany, Mar. 19, 1976, 2611667

Int. Cl.² C01G *49/06;* **C01B** *7/03*

U.S. Cl. 423—149 7 Claims



1. A multistage process for recovering gaseous chlorine and solid ferric oxide from chlorinator dust, said dust produced in the chlorination of titaniferous ores and comprising particulate ferrous chloride plus contaminates, said process comprising the steps of: (a) reacting said chlorinator dust at temperatures of from 500° to 800° C. with oxygen in an amount sufficient only to form solid materials consisting essentially of particulate ferric oxide and gases consisting essentially of varporous ferric chloride; (b) separating the solid materials including the particulate ferric oxide from the gases produced in step a while maintaining the temperature in the range from 500° to 800° C.; (c) reacting the vaporous ferric chloride produced in step a with additional oxygen to form particulate ferric oxide and gases consisting essentially of gaseous chloride, the reaction in stage c being initiated at temperature from 600 ° to 800° C. followed by gradual lowering of the temperature to below 600° C.; and then (d) separating the particulate ferric oxide from the gases produced in stage c.

4,060,585

PROCESS FOR PRODUCING BARIUM HYDROXIDE

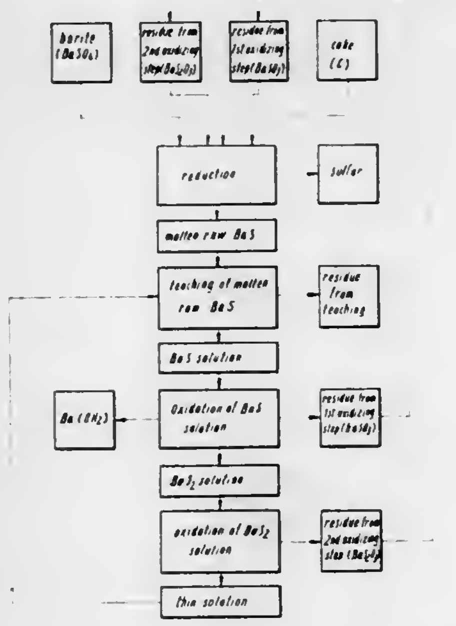
Hans-Joachim Röhrborn, Moers, Germany, assignor to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Germany

Filed Feb. 20, 1976, Ser. No. 659,875

Claims priority, application Germany, Mar. 24, 1975, 2512958

Int. Cl.² C01F *11/08*

U.S. Cl. 423—164 4 Claims



1. Process for continuously producing barium hydroxide from barite wherein sulfur is essentially the only bi-product, comprising the steps of:

a. reducing barite with carbon at temperatures of 800° to 1300° C and hot-leaching the reaction mixture of molten raw barium sulfide;
b. partially oxidizing the leaching product from the raw barium sulfide by treatment with oxygen-containing gases until a ratio of 50 mol percent barium hydroxide to 50 mol percent barium polysulfide is reached and precipitating the resulting barium hydroxide in crystalline form by cooling and removing same;
c. oxidizing the barium polysulfide contained in the mother liquor from (b) to difficulty soluble barium thiosulfate by treatment with oxygen-containing gases and removing the precipitated barium thiosulfate; and
d. recycling the precipitated barium thiosulfate from (c) to reduction step (a).

4,060,586

RECOVERY OF FLUORIDES FROM GYPSUM

John B. Sardisco, Shreveport, La., and Erhart Karl Drechsel, Houston, Tex., assignors to Pennzoil Company, Shreveport, La.

Filed June 15, 1976, Ser. No. 696,289

Int. Cl.² C01F *1/00, 5/00, 11/00;* **C22B** *26/20*

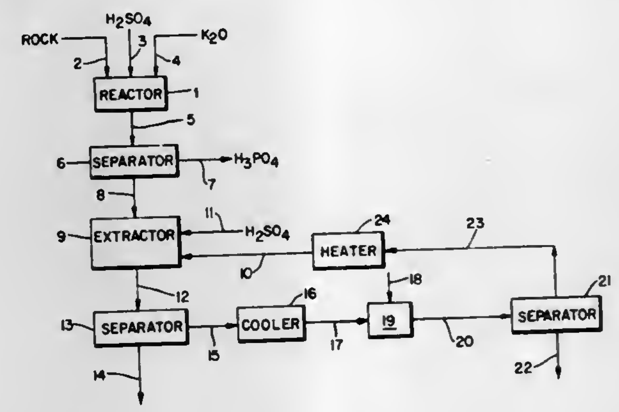
U.S. Cl. 423—167 8 Claims

1. A method for conducting an acidulation reaction for the

production of phosphoric acid, gypsum and alkali metal silicofluoride which comprises reacting phosphate rock, sulfuric acid, and potassium ion provided by addition of a member selected from the group consisting of KH_2PO_4, $KHSO_4$, K_2SO_4, KOH and mixtures thereof, in sufficient amounts to acidulate the phosphate rock to form phosphoric acid and to cause precipitation of fluorides as potassium silicofluoride, containing the acidulation reaction to obtain reaction products comprising:

a. a phosphoric acid solution; and
b. a gypsum solids precipitate containing potassium silicofluoride;

separating the gypsum precipitate from the phosphoric acid



solution, removing the gypsum solids precipitate to an extractor maintained at a temperature of about 60°-100° C., contacting the gypsum in the extractor with an extractant solution selected from the group consisting of, (a) 5-30 weight percent phosphoric acid containing up to 0.3 parts of sulfuric acid per part of gypsum solids to be extracted, and (b) a fluorine-containing phosphoric acid containing up to 0.3 parts of sulfuric acid per part of gypsum being extracted, said extraction being carried out by contacting the gypsum mixture with a ratio of 3-10 parts of phosphoric acid solution per part of the gypsum mixture at a temperature of about 60°-100° C., separating and recovering the gypsum solids and a phosphoric acid extractant solution containing potassium silicofluoride.

4,060,587

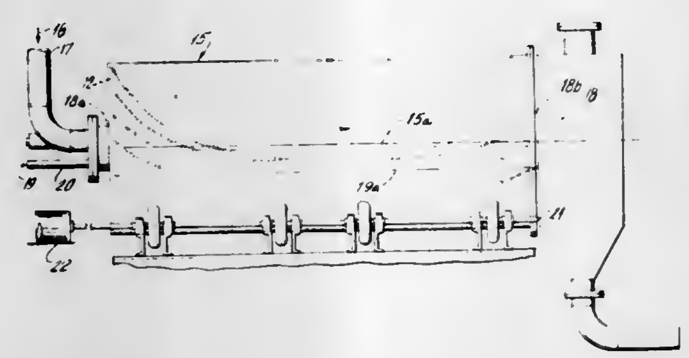
GASEOUS AND LIQUID REACTANT TREATMENT

Clifford J. Lewis, Lakewood, Colo., assignor to National Lime Association, Washington, D.C.

Continuation-in-part of Ser. No. 591,791, June 30, 1975, abandoned, which is a continuation of Ser. No. 529,647, Dec. 16, 1974, abandoned, and Ser. No. 303,368, Nov. 3, 1972, abandoned. This application Aug. 24, 1976, Ser. No. 717,072

Int. Cl.² B01F *9/08;* **B01J** *1/00;* **B08B** *9/06;* **C01B** *17/04*

U.S. Cl. 423—210 10 Claims



1. Method for carrying out a reaction between gaseous and liquid reactants which comprises conducting a gaseous reactant through a rotating substantially horizontally extending confined feedline containing a gaseous reactant flow path and having a center axis, maintaining liquid reactant in the feedline in the form of a pool within the lower horizontal portion below the center axis of the feedline in any position of rotation of such feedline, reacting such reactants in the presence of an assemblage of flexible linear means including a plurality of axially spaced apart successive sets of flexible linear means, each set extending substantially normal to the axis of the feedline and including a plurality of loosely disposed individual flexible linear means suspendedly attached at circumferentially spaced apart points in the vicinity of the respective ends of each such flexible linear means adjacent the peripheral interior portion of the feedline for rotation therewith and collectively forming a dynamic curtain of such flexible linear means operatively extending substantially normal to the axis of the feedline and into the path of the gaseous reactant above such pool for effecting the dynamic contacting and intermingling of the gaseous reactant with portions of the liquid reactant thereby taken up from the pool and wetting the surface of the flexible linear means thereat during rotation of the feedline, whereby to enhance the reaction between such reactants, and recovering from the pool portions of liquid reactant containing reaction product from the reaction between the gaseous and liquid reactants.

4,060,588

PROCESS FOR REMOVING SULFUR-CONTAINING GASES FROM WASTE GASES

Bernard G. Mandelik, Houston, Tex., assignor to Pullman Incorporated, Chicago, Ill.

Filed Dec. 22, 1975, Ser. No. 643,267

Int. Cl.² B01J *8/00;* **C01B** *17/00;* **C01F** *5/24;* **C01B** *17/02*

U.S. Cl. 423—242 14 Claims

1. In a process for reducing an alkaline earth metal sulfate/-sulfite slurry to the corresponding sulfide by mixing the slurry with a carbonaceous reductant and heating the mixture to a temperature lower than the decomposition temperature of the alkaline earth metal sulfate/sulfite to cause the reduction reaction to occur, the improvement which comprises:

a. mixing sufficient reductant with the slurry, containing at least about 55% solids by weight, to provide a molecular excess of carbon of from about 15 to about 40% over that necessary to react with the alkaline earth metal sulfate/-sulfite in the slurry to maintain a reducing atmosphere during the reducing step, wherein from from about 50 to about 63% of the reducing potential of the mixture is used in the reaction, and provide a combustible effluent gas from the reducing step having a heating value of at least about 80 BTU per standard cubic foot; and
b. burning the combustible effluent gas from the reducing step to dry the mixture at a temperature less than the gasification temperature of the reductant to remove substantially all the water in the mixture prior to the reducing step.

4,060,589

PROCESS FOR REDUCING NO_x AND/OR SO_x IN FEED GAS STREAMS

Robert H. Hass, Fullerton, and Michael H. Gibson, Santa Ana, both of Calif., assignors to Union Oil Company of California, Los Angeles, Calif.

Filed Jan. 26, 1976, Ser. No. 652,290

Int. Cl.² C01B *17/16*

U.S. Cl. 423—244 9 Claims

1. In a process for removing SO_x components from an industrial stack gas stream also comprising O_2 and water vapor, said water vapor being present in a concentration in excess of three times the molar percentage of SO_x components, wherein said SO_x components are converted to H_2s, which H_2s is subsequently removed, the improvement comprising:

1. contacting said stack gas stream with a solid carbonaceous material in a combustion zone maintained at a peak temperature between about 900° and 1600° F so as to (a) convert at least some of said SO_x components to H_2S and

COS, (b) consume essentially all of said O_2 in combustion of said carbonaceous material, and (c) consume a portion of said water vapor by reaction with said carbonaceous material to form CO and H_2, thereby producing a gaseous effluent of reduced SO_x content but containing water vapor, H_2S, COS, residual SO_x components, and at least sufficient H_2 and CO for the reduction of said residual SO_x components to H_2S in step (2) hereinafter;

2. contacting said gaseous effluent from step (1) with a solid catalyst comprising cobalt and molybdenum at a temperature between about 300° and 800° F so as to (a) reduce at least some of said residual SO_x components to H_2S and (b) convert essentially all of said COS and H_2S and essentially all of said CO to CO_2 and H_2 by reaction with water vapor;
3. withdrawing a purified gas stream containing H_2S as essentially the only gaseous sulfur component therein; and
4. removing said H_2S from said purified gas stream.

4,060,590
ZEOLITE NU-1

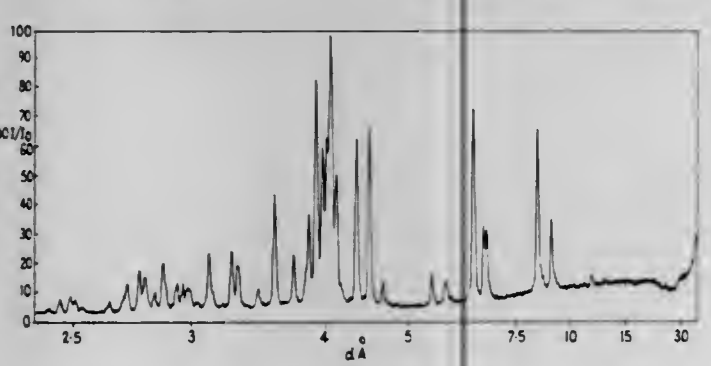
Thomas Vincent Whittam, Stockton-on-Tees, and Barry Youll, Middlesbrough, both of England, assignors to Imperial Chemical Industries Limited, London, England

Filed Sept. 29, 1976, Ser. No. 727,773

Claims priority, application United Kingdom, Oct. 3, 1975, 40631/75; Feb. 9, 1976, 4957/76; July 29, 1976, 31641/76

Int. Cl.² C01B *33/28;* B01J *29/28*

U.S. Cl. 423—328 **4 Claims**



1. Zeolite nu-1 having a composition expressed by the formula

$0.9 \text{ to } 1.3\ R_2O . Al_2O_3 . 20 \text{ to } 150\ SiO_2 . 0 \text{ to } 40\ H_2O$

where R is one or more of hydrogen, ammonium, phosphonium or $1/n$ of a cation having a valency n and having an X-ray diffraction pattern when R is H substantially as shown in Table 1.

4,060,591
CONTINUOUS PROCESS FOR RECOVERING PURE, CONCENTRATED AMMONIA

Alfred Garber, Linz, Austria; Hans-Martin Stönner, Schwalbach, Germany; Paul Wiesner, Oberursel, Germany; Alan Sinclair, Frankfurt am Main, Germany, and Alfred Schmidt, Wien, Austria, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Germany and Chemie Linz Aktiengesellschaft, Linz, Austria

Filed May 25, 1976, Ser. No. 690,203

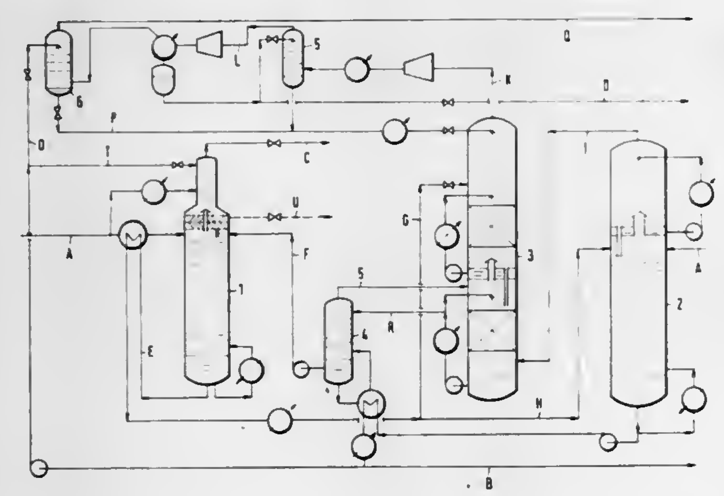
Claims priority, application Germany, June 24, 1975, 2527985

Int. Cl.² C01C *1/10, 1/12;* B01D *19/00*

U.S. Cl. 423—352 **17 Claims**

1. In a continuous process of recovering pure, concentrated ammonia, which contains not more than 0.2% H_2O, 0.1% CO_2, 10 ppm H_2S, and 10 ppm HCN, from aqueous liquors from which dust, tar, oil, and phenols have been removed, said aqueous liquors being condensates formed during the gasification or degasification of coal, or from aqueous liquors of similar compositions which contain free and/or combined ammonia in concentrations between 0.1 and 12 n carbon dioxide in concentrations between 0.1 and 12 n, hydrogen sulfide in concentrations between 0.003 and 3 n hydrocyanic acid in concentrations between 0.001 to 1 g/l, and residual organic substances introduced during a preceding dephenolation, which process includes the steps of stripping off gas water, de-acidification, scrubbing, and withdrawing ammonia from the top of a scrubbing column, the improvement which comprises the following steps:

a. stripping ammonia from the aqueous liquor in a stripping column having 15–80 actual plates or equivalent packing columns operated under a pressure of 1–2 bars with an inlet temperature of 30°–90° C, the ammonia and the acid constituents being jointly withdrawn overhead and waste water being withdrawn from the sump of the column,
b. scrubbing the overhead product from (a) with an aqueous solution containing surplus ammonia from which the acid constituents have been substantially removed under a pressure of 1–2 bars and at temperatures of 30°–70° C withdrawing pure ammonia overhead and subjecting it to a fine purification by liquification and treatment to remove inert constituents;



c. stripping most of the residual ammonia from the spent scrubbing liquor from (b) in a stripping column having 3–25 plates, or equivalent packing columns, operated under 1–2 bars, top temperatures of 50°–80° C, and sump temperatures of 60°–90° C, and withdrawing ammonia overhead and recycling it to (b); and
d. de-acidifying aqueous solutions having a $(CO_2 + H_2S)$; NH_3 ratio $\geqq 1$ under superatmospheric pressure by stripping the acid constituents in a pressure de-acidification column operated under a pressure of 3–25 bars, and sump temperatures of 110°–180° C, and withdrawing same from the top of said column;

said steps being carried out in the sequence a), b), c), d), with the sump product of step c) being subjected to step d) in the processing of solutions in which the $(CO_2 + H_2S)$: NH_3 weight ratio $\leqq 1$ whereas the feed solution is subjected to the pressure de-acidification step d) and this is succeeded by steps a), b), c) in the processing of solutions having a $(CO_2 + H_2S) : NH_3$ weight ratio > 1.

4,060,592
METHOD OF MAKING SHAPED CARBONACEOUS BODIES

Hartmut Luhleich, Duren; Hubertus Nickel, Julich-Koslar, and Francesco Dias, Julich, all of Germany, assignors to Kernforschungsanlage Julich GmbH, Julich, Germany

Continuation-in-part of Ser. No. 267,479, June 29, 1972, Pat. No. 3,927,187. This application May 16, 1975, Ser. No. 578,192

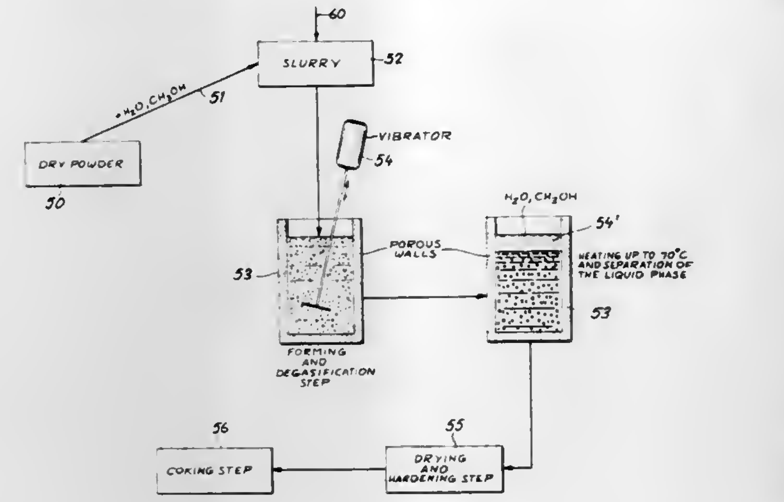
Claims priority, application Germany, July 2, 1971, 2133044

Int. Cl.² C01B *31/02, 31/04*

U.S. Cl. 423—448 **2 Claims**

1. A method of making a graphitic body from carbonaceous filler particles selected from the group which consists of petroleum coke, electrographite, natural graphite and carbon black, coated with a binder selected from the group which consists of phenol-formaldehyde resin, pitch and tar, comprising the steps of:

a. forming a paste or slurry of the binder-coated filler particles in a carrier liquid containing 5% to 20% by volume of a solvent for said binder, said binder being at most slightly soluble in said liquid;



b. introducing said paste or slurry into a mold wherein said paste or slurry is shaped without the application of pressure;
c. drying the paste in said mold to form a shaped body therein; and
d. cokefying said body.

4,060,593
PREPARATION OF TITANIUM TRICHLORIDE

Yamaguchi Kazuo, Fujisawa; Kakogawa Genjiro; Hasuo Masayoshi, both of Yokohama; Nobuaki Goko, and Yasuo Maruyama, both of Kawasaki, all of Japan, assignors to Mitsubishi Chemical Industries, Tokyo, Japan

Continuation-in-part of Ser. No. 598,425, July 23, 1975, abandoned. This application July 31, 1975, Ser. No. 600,819

Claims priority, application Japan, July 31, 1974, 49-88476; July 31, 1974, 49-88477

Int. Cl.² C01G *23/02*

U.S. Cl. 423—492 **12 Claims**

1. A process for the production of solid purple titanium trichloride suitable as a catalyst for polymerization of an α-olefin, which comprises:

forming a homogeneous solution or mixture comprising titanium trichloride by treating titanium tetrachloride with an organoaluminum compound represented by the generic formula, $AlR^3_nX_{3-n}$, wherein R^3 denotes a hydrocarbon radical of 1 to 20 carbon atoms, n a number of the value of 1 to 3 and X a halogen atom, in the presence of an ether and hydrocarbon solvent, said ether having the generic formula, R^1—O—R^2 wherein R^1 and R^2 are normal alkyl or normal alkenyl having at least six carbon atoms; and

heating the thus obtained, homogeneous solution or mixture in the presence of a Lewis acid at a temperature in the range of 20°–150° C to cause precipitation of a finely granulated purple solid titanium trichloride and separating the precipitate.

4,060,594
REDUCING THE CONSUMPTION OF ANTHRAQUINONE DISULFONATE IN STRETFORD SOLUTIONS

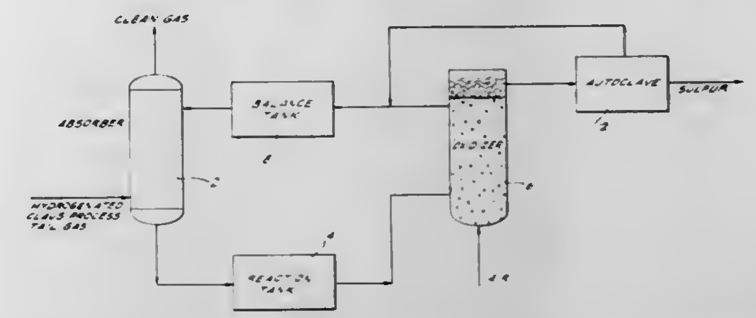
Donald M. Fenton, Anaheim, and Raoul P. Vaell, Los Angeles, both of Calif., assignors to Union Oil Company of California, Brea, Calif.

Filed May 21, 1975, Ser. No. 579,311

Int. Cl.² B01D *53/34;* C01B *17/04*

U.S. Cl. 423—573 R **4 Claims**

1. In the process for treating a hydrogen sulfide-containing hydrogenated Claus process tail gas to convert the hydrogen sulfide to elemental sulfur in which said gas is contacted with an aqueous alkaline washing solution containing a water-soluble metal vanadate and a water-soluble anthraquinone disulfonate to yield an effluent gas of reduced sulfur content, the solution is thereafter regenerated by contact with an oxygen-containing gas, elemental sulfur is recovered from said solution, and said regenerated solution is recycled to said gas-contacting step, and in which said anthraquinone disulfonate is being chemically consumed, the improvement which comprises employing as said washing solution an aqueous alkaline solution containing a water-soluble metal vanadate, a water-soluble anthraquinone disulfonate, and an effective amount of a complexing agent for ferrous ions comprised of a water-soluble, inorganic fluoride, whereby chemical consumption of said anthraquinone disulfonate is substantially reduced.



4,060,595
PROCESS FOR RECOVERING ELEMENTAL SULFUR FROM GASES HAVING A HIGH CARBON DIOXIDE CONTENT AND CONTAINING SULFUR COMPOUNDS

Karl-Heinz Eisenlohr, Buchschlag, and Karl Bratzler, Bad Homburg, both of Germany, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Germany

Filed July 14, 1976, Ser. No. 705,115

Claims priority, application Germany, July 17, 1975, 2531930

Int. Cl.² C01B *17/04*

U.S. Cl. 423—574 R **6 Claims**

1. A process for recovering elemental sulfur from a gas continuous inorganic and/or organic sulfur compounds together with carbon dioxide and impurities which may include hydrogen cyanide and unsaturated hydrocarbon, said process comprising the steps of:

a. combining said gas with a combustion promoter and burning same with a slight excess to produce a combustion gas stream;
b. contacting said combustion gas stream with coke at a temperature of 300° to 450° C to remove residual oxygen, sulfur trioxide and nitrogen oxides from said combustion gas stream and forming a prepurified gas stream;
c. thereafter cooling said prepurified gas stream to a temperature of 20° to 80° C and scrubbing same with an aqueous solution of an absorbent selected from the group which consists of alkali salts of weak inorganic acids and organic acids, and amines, thereby absorbing in said solution sulfur dioxide from the prepurified gas stream;
d. heating said absorbent and stripping sulfur dioxide from said absorbent and forming a hot SO_2-containing gas stream;
e. cooling the SO_2-containing gas stream and removing water by condensation therefrom;
f. adding hydrogen to said SO_2-containing gas stream and following step (e) and reacting the resulting mixture at a temperature of 200° to 450° C on a catalyst selected from the group which consists of oxides of cobalt, oxides of nickel, oxides of molybdenum and oxides of tungsten to reduce the SO_2 and form a sulfur and H_2S-containing gas stream;
g. separating from the sulfur and H_2S containing gas stream resulting in step (f) by cooling elemental sulfur and recovering same;

h. admixing with the hydrogen sulfide containing gas from which elemental sulfur has been removed in step (g) an amount of SO_2 stoichiomtrically sufficient to react with the H_2S thereof and passing the resulting mixture at a temperature of 200° to 300° C over an alumina or activated carbon catalyst to form the gas stream containing elemental sulfur;

i. separating elemental sulfur from the gas stream formed in step (h) by cooling and recovering the elemental sulfur thus separated; and

j. recycling the gas remaining after step (i) at least in part to a preceding step.

4,060,596

METHOD OF MAKING GOETHITE POWDER

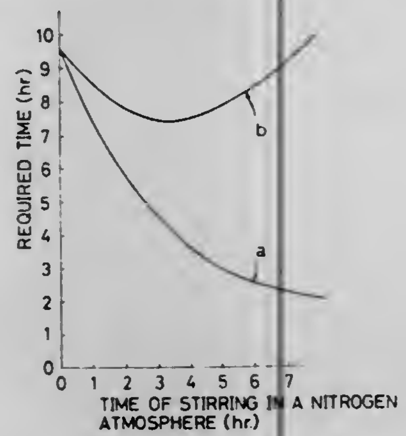
Tokio Nakamura, Yokohama, Japan, assignor to Sony Corporation, Tokyo, Japan

Continuation of Ser. No. 401,415, Sept. 27, 1973, abandoned. This application Oct. 31, 1975, Ser. No. 627,757

Claims priority, application Japan, Sept. 30, 1972, 47-98511

Int. Cl.² C01G *49/06*

U.S. Cl. 423—633 **12 Claims**



1. In the production of goethite, the improvement comprising a method of making acicular goethite powder comprising the steps of:

1. mixing in a relatively short time an aqueous solution of an alkali hydroxide selected from the group consisting of sodium hydroxide and potassium hydroxide with an aqueous solution of ferrous salt selected from the group consisting of ferrous chloride and ferrous sulfate under an inert atmosphere to form a suspension of ferrous hydroxide in a temperature range of 60° to 80° centrigrade,
2. continuously stirring said mixed ferrous hydroxide suspension for a period of 2 to 5 hours which time is substantially greater than said mixing time under an inert gaseous atmosphere until milk-white colored fine ferrous hydroxide suspension is formed, and during said period of stirring the temperature of the solution being in the temperature range of 60° to 80° centrigrade,
3. and then oxidizing said ferrous hydroxide suspension by an oxygen containing gas for a period of 4 to 6.5 hours until yellow colored goethite is formed, the temperature range being 50° to 80° centrigrade when the alkali hydroxide is potassium hydroxide and the ferrous salt is ferrous chloride and the temperature range being 40° to 60° centrigrade when sodium hydroxide is the alkali hydroxide and the ferrous salt is ferrous sulfate.

4,060,597

SEROLOGICAL REAGENT AND PREPARATION THEREOF

Yukio Sato; Seijun Wada, both of Osaka, and Shigetaka Matsuzawa, Tokyo, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed July 7, 1975, Ser. No. 593,531

Claims priority, application Japan, July 8, 1974, 49-78604

Int. Cl.² G01N *31/00, 31/06, 33/16*

U.S. Cl. 424—12 **14 Claims**

1. A method for preparing a latex reagent for serologic reactions, which comprises allowing latex particles to adsorb a nonionic surfactant, sensitizing the latex particles with an antigen or antibody and suspending the sensitized latex particles in an aqueous solvent, said nonionic surfactant being selected from the group consisting of a block copolymer of ethylene oxide and polyoxypropylene glycol which contains, within it's respective molecules, about 50% to about 80% of ethylene oxide, with the molecular weight of the hydrophobic polyoxypropylene glycol units being about 950 to about 3,850; a polyoxyethylene alkyl ether containing about 30 moles to about 100 moles of ethylene oxide and wherein the alkyl group contains 12 to 18 carbon atoms; and a polyoxyethylene alkylaryl ether which contains about 30 moles to about 100 moles of ethylene oxide and wherein the alkylaryl is phenyl substituted with alkyl of 8 to 18 carbon atoms.

13. A latex reagent for serologic reactions, which is prepared by allowing latex particles to adsorb a nonionic surfactant, sensitizing the latex particles with an antigen or antibody and suspending the sensitized latex particles in an aqueous solvent, said nonionic surfactant being selected from the group consisting of a block copolymer of ethylene oxide and polyoxypropylene glycol which contains, within it's respective molecules, about 50% to about 80% of ethylene oxide, with the molecular weight of the hydrophobic polyoxypropylene glycol units being about 950 to about 3,850; a polyoxyethylene alkyl ether containing about 30 moles to about 100 moles of ethylene oxide and wherein the alkyl group contains 12 to 18 carbon atoms; and a polyoxyethylene alkylaryl ether which contains about 30 moles to about 100 moles of ethylene oxide and wherein the alkylaryl is phenyl substituted with alkyl of 8 to 18 carbon atoms.

4,060,598

TABLETS COATED WITH AQUEOUS RESIN DISPERSIONS

Gregor Groppenbächer, Mannheim-Feudenheim; Peter Rieckmann, Mannheim-Waldhof, and Werner Rothe, Hockenheim, all of Germany, assignors to Boehringer Mannheim G.m.b.H., Mannheim, Germany

Division of Ser. No. 463,216, April 22, 1974, Pat. No. 3,935,326, which is a continuation-in-part of Ser. No. 44,557, June 8, 1970, abandoned, which is a division of Ser. No. 740,058, June 26, 1968, abandoned. This application Oct. 28, 1975, Ser. No. 626,513

Claims priority, application Germany, June 28, 1967, 1617351

Int. Cl.² A61K *9/32*

U.S. Cl. 424—33 **19 Claims**

1. Coated tablet comprising a core of active material soluble in the gastrointestinal tract and a coating surrounding said core said coating comprising a continuous porous matrix of a synthetic resin insoluble in the gastrointestinal tract and a water or alkaline soluble material in the pores of said matrix, said coating being formed by applying to said core at least one layer of a coating composition of a film forming aqueous zynthetic resin dispersion with a resin content between 30 and 60% by weight and from 2 to 50% by weight of said water or alkaline soluble material and permitting said coating composition layer to dry, said coated tablet being initially air and moisture tight.

4,060,599

DENTIFRICES

Martin Cordon, Highland Park, N.J., assignor to Colgate-Palmolive Company, New York, N.Y.

Continuation-in-part of Ser. No. 561,842, March 25, 1975, Pat. No. 3,957,968, which is a continuation-in-part of Ser. No. 389,826, Aug. 20, 1973, abandoned, which is a continuation-in-part of Ser. No. 355,365, April 30, 1973, abandoned. This application Apr. 9, 1976, Ser. No. 675,098

The portion of the term of this patent subsequent to May 18, 1993, has been disclaimed.

Int. Cl.² A61K *7/16, 7/26*

U.S. Cl. 424—49 **6 Claims**

1. A dentifrice comprising, as an abrasive, ground crystals of alpha-alumina, ground to its ultimate particle form and having a mean ultimate particle size of about 1 to 2 microns, the proportion of said alpha-alumina being above 0.1% and less than 60%.

4,060,600

TREATING TEETH

Jaroslav Vit, Belle Mead, N.J., assignor to National Patent Development Corporation, New York, N.Y.

Filed Oct. 26, 1972, Ser. No. 301,073

Int. Cl.² A61H *9/00;* **A61K** *7/16*

U.S. Cl. 424—53 **10 Claims**

1. A method of treating teeth in dentistry, for the purpose of prevention of calculus, removal of caries or dissolving plaque which comprises bringing into contact with the teeth an amount of an aqueous solution effective for such purpose containing the reaction product resulting from mixing a solution of (1) a hypochlorite selected from the group consisting of the hypochlorites of Li, Na, K, Rb, Cs, Ca, Sr and Ba and a solution of (2) ethylene diamine tetra acetic acid.

4,060,601

CERTAIN LOWER-ALKYL AMINO-2'-HYDROXY-PROPOXY PYRIDINES

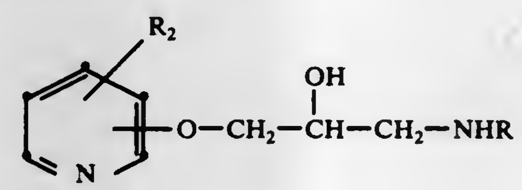
John J. Baldwin, Lansale, Pa., assignor to Merck & Co., Inc., Rahway, N.J.

Filed June 15, 1976, Ser. No. 696,237

Int. Cl.² C07D *213/50, 213/52;* **A61K** *31/395*

U.S. Cl. 424—263 **26 Claims**

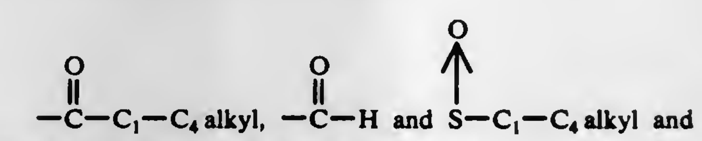
1. Compound having the formula



wherein

R is C_3–C_4 branched alkyl and

R_2 is selected from trihalomethyl,



pharmaceutically acceptable salt thereof.

21. A method of treating hypertension in hypertensive humans which comprises oral, inhalation, suppository or parenteral administration of an effective amount of a compound of claim 1.

4,060,602

ORAL PREPARATIONS FOR PREVENTING DENTAL CARIES

Gerhard Julius Haas, Woodcliff Lake, N.J., and Edwin Bernard Herman, Yorktown Heights, N.Y., assignors to General Foods Corporation, White Plains, N.Y.

Continuation-in-part of Ser. No. 466,945, May 6, 1976, abandoned. This application Oct. 26, 1976, Ser. No. 735,723

Int. Cl.² A61K *7/26, 35/78*

U.S. Cl. 424—58 **2 Claims**

1. A method for inhibiting cariogenic streptococcus mutans, lactobacilli fermenti and casei, oral bacteria responsible for the formation of dental plaque, dental caries and mixtures thereof, which comprises reimmersing said bacteria in solutions containing as an active ingredient an amount greater than 0.17% of pimento berry oil, for at least 1 minute, three times each day, until said reimmersions are effective in inhibiting said bacteria responsible for the formation of dental plaque, dental caries and mixtures thereof.

4,060,603

HISTIDINE DERIVATIVES

Barry A. Morgan, Hull, and Derek J. Schafer, Harpenden, both of England, assignors to Reckitt & Colman Products Limited, London, England

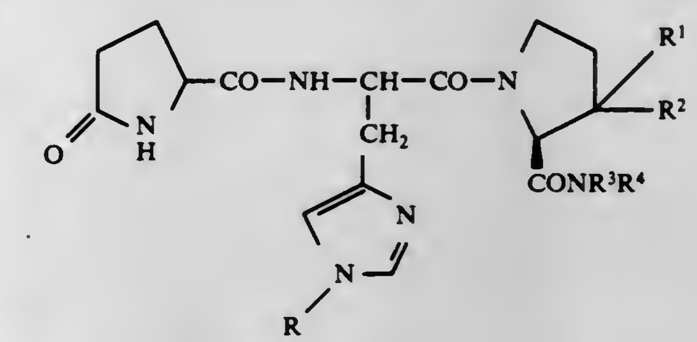
Filed Feb. 20, 1976, Ser. No. 659,913

Claims priority, application United Kingdom, Mar. 8, 1975, 10144/75

Int. Cl.² A61K *37/00;* **C07C** *103/52*

U.S. Cl. 424—177 **14 Claims**

1. Compounds of the formula:



I

wherein R is hydrogen or alkyl C_{1-3}; R^1 is alkyl or alkoxy C_{1-3}; R^2 is hydrogen, alkyl or alkoxy C_{1-3}; R^3 is hydrogen, alkyl C_{1-6}, or cycloalkyl C_{3-6}; and R^4 is hydrogen or alkyl C_{1-6}.

4,060,604

ISOLATION OF UTERO-EVACUANT SUBSTANCES FROM PLANT EXTRACTS

Ramesh M. Kanojia, Somerville, N.J., assignor to Ortho Pharmaceutical Corporation, Raritan, N.J.

Filed Sept. 27, 1976, Ser. No. 726,860

Int. Cl.² A61K *35/78, 31/335*

U.S. Cl. 424—195 **16 Claims**

1. The method of purifying extracts containing utero-evacuant materials obtained from the zoapatle plant which comprises the steps of:

reacting the semi-purified utero-evacuant materials with a peracid to epoxidize the β,γ-unsaturated system, chromatographing the reaction mixture over an adsorbent material, eluting the adsorbent material with a mixture of polar and non-polar organic solvents and collecting the fractions containing the epoxidized and unreacted utero-evacuant materials.

4,060,605
WATER-SOLUBLE DERIVATIVE OF 6-DEOXY-TETRACYCLINES

Gino Cotti, Monza (Milan), Italy, assignor to Ankerfarm, S.p.A., Milan, Italy

Continuation-in-part of Ser. No. 509,271, Sept. 25, 1974, abandoned. This application Sept. 25, 1975, Ser. No. 616,830

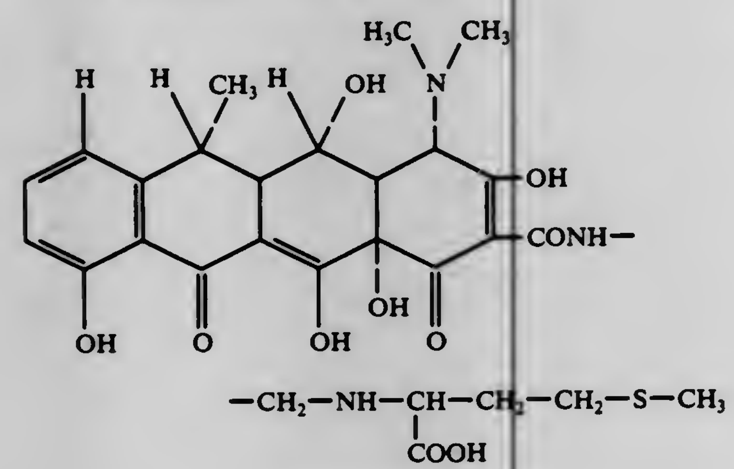
Claims priority, application Italy, Sept. 28, 1973, 29486/73

Int. Cl.[2] A61K *31/65*

U.S. Cl. 424—227 **5 Claims**

1. A compound with the formula:

(I)



4,060,606
16-ETHERS OF FUSIDIC ACID DERIVATIVES

Welf von Daehne, Rungsted Kyst, and Poul Rodbroe Rasmussen, Frederikssund, both of Denmark, assignors to Leo Pharmaceutical Products Ltd. A/S, Ballerup, Denmark

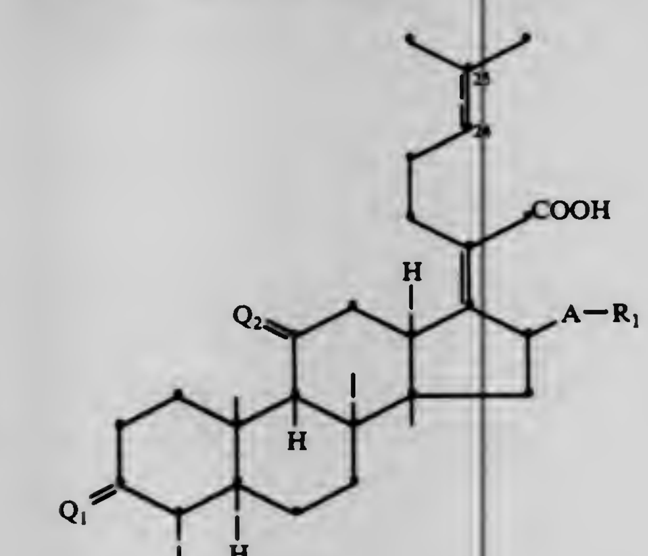
Filed June 8, 1976, Ser. No. 693,976

Int. Cl.[2] A61K *31/56;* C07J *7/00*

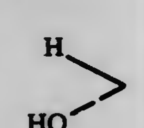
U.S. Cl. 424—238 **46 Claims**

1. A compound of the following formula I:

I



in which the C_{24-25} bond is a single or a double bond, and in which Q_1 and Q_2 stand for



or oxygen; A stands for oxygen, sulphur or a sulfinyl radical; R_1 stands for a straight or branched alkyl radical having from 1 to 8 carbon atoms, an alkenyl or alkynyl radical having from 2 to 6 carbon atoms, a cycloalkyl radical having from 3 to 7 carbon atoms in the alkyclic ring, an aryl, aralkyl or heterocyclylalkyl radical, or a heterocyclic radical having 5 or 6 ring atoms and containing oxygen, sulphur or nitrogen selected from the group consisting of 2- or 3-pyrrolyl, 2- or 3-furyl, 2- or 3-thienyl, 2-, 3- or 4-pyridyl, 2-, 4- or 5-pyrimidinyl, 2- or 3-pyrazolyl, imidazolyl, triazolyl, tetrazolyl, thiazolyl and thiadiazolyl, all R_1 radicals being optionally substituted; and non-toxic pharmaceutically acceptable salts and easily hydrolyzable esters thereof.

24. A pharmaceutical composition in dosage unit from for systemic treatment of bacterial infections in patients which comprises as a therapeutical ingredient at least one compound of claim 1, the therapeutically active compound being admixed with an atoxic, pharmaceutically acceptable carrier, and the dosage unit being between 100 to 1000 mg, preferably 100 to 500 mg, calculated as the free acid of the therapeutically active compound.

4,060,607
CARDENOLIDE DERIVATIVES

François-Xavier Jarreau, and Roger Gerard Sarfati, both of Paris, France, assignors to Etablissements Nativelle S.A., Paris, France

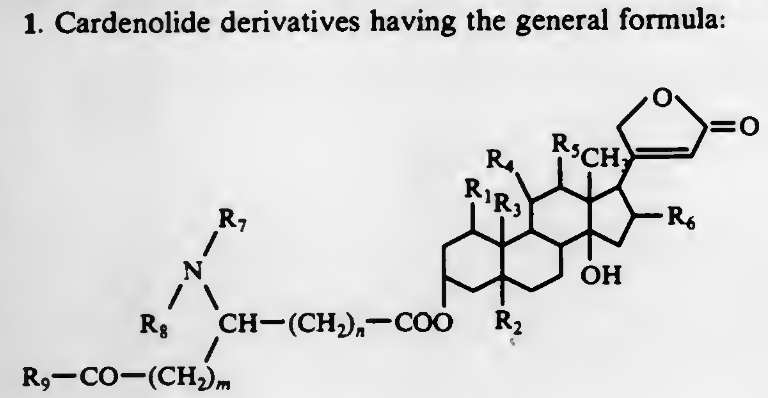
Filed May 10, 1976, Ser. No. 684,819

Claims priority, application France, May 16, 1975, 75.15462

Int. Cl.[2] C07J *19/00*

U.S. Cl. 424—241 **9 Claims**

1. Cardenolide derivatives having the general formula:



in which *n* and *m* are the same or different and can be equal to 0, 1, 2, 3 or 4; R_1, R_2, R_4, R_5, and R_6 are the same or different and denote a hydrogen atom or a hydroxy, alkoxy or acyloxy group; R_3 denotes a lower alkyl, aldehyde, halo-alkyl, hydroxyalkyl, acyloxyalkyl or ethylene dioxyalkyl group; R_7 denotes an hydrogen atom or an alkyl, alkyloxycarbonyl or aralkoxycarbonyl group; R_8 denotes a hydrogen atom or an alkyl group; R_9 denotes a hydroxy, alkoxy or aralkoxy group; and pharmaceutically acceptable mineral or organic salts of the aforementioned derivatives.

8. Method for treating cardiac insufficiency and rhythm irregularities comprising orally or parenterally administering a therapeutically effective amount of a cardenolide derivative as described in claim 1, together with a pharmaceutically acceptable carrier.

4,060,608
SUBSTITUTED HYDROXYMETHYL BENZODIAZEPINES

Umakant Devdas Shenoy, London, England, assignor to DDSA Pharmaceuticals, London, England

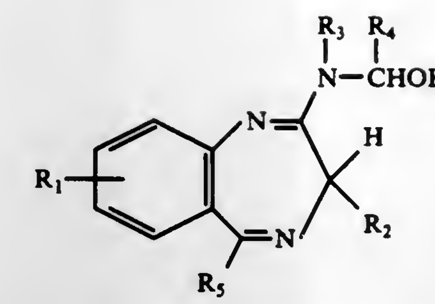
Continuation-in-part of Ser. No. 487,478, July 11, 1974, abandoned, Continuation-in-part of Ser. No. 481,944, June 21, 1974, abandoned. This application Oct. 14, 1975, Ser. No. 622,349

Int. Cl.[2] A61K *31/55;* C07D *405/06, 243/20*

U.S. Cl. 424—244 **9 Claims**

1. A benzodiazepine derivative of the formula I

I



in which R_1 represents a radical selected from the group consisting of hydrogen and halogen atoms and trifluoromethyl, cyano, nitro, lower alkyl, lower alkoxy and lower alkylthio:

R_2 represents a radical selected from the group consisting of hydrogen atoms and hydroxy, lower alkyl, lower alkoxy and lower alkanoyloxy:

R_3 represents a radical selected from the group consisting of lower alkyl, hydroxy (lower alkyl), lower alkenyl and benzyl;

R_4 represents a radical selected from the group consisting of lower alkyl and furyl; and

R_5 represents a radical selected from the group consisting of phenyl, (lower alkyl) phenyl, nitrophenyl, halophenyl, and pyridyl,

4-oxides of the said compounds and acid addition salts of the said compounds and of their 4-oxides with pharmaceutically acceptable acids.

9. A therapeutic composition comprising a tranquilizing, sedating or hypnosis-inducing amount of at least one compound according to claim 1 in admixture with a pharmacologically acceptable diluent.

4,060,609
BIPHENYLYL ETHERS AND METHOD OF USE

Erich Schacht; Werner Mehrhof; Rochus Jonas; Herbert Nowak, and Zdenek Simane, all of Darmstadt, Germany, assignors to Merch Patent Gesellschaft mit beschrankter Haftung, Darmstadt, Germany

Filed Oct. 29, 1974, Ser. No. 518,811

Claims priority, application Germany, Oct. 31, 1973, 2354444

Int. Cl.[2] C07D *295/08;* A61K *31/535*

U.S. Cl. 424—244 **21 Claims**

1. A biphenylyl ether of the formula R—O—CH_2—CH(OH)—CH_2Z wherein Z is piperidino and R is biphenyl-4 substituted in the 4'-position by F, Cl, Br, I, CF_3, NO_2 or piperidino; or a physiologically acceptable acid addition salt thereof.

21. A method of lowering abnormally high blood serum cholesterol levels which comprises administering systemically to the affected patient an amount of a compound of claim 1 effective to lower the abnormally high cholesterol level.

4,060,610
PHARMACEUTICAL COMPOSITIONS COMPRISING 7-ACYL-3-(SUBSTITUTED TRIAZOLYL THIOMETHYL)-CEPHALOSPORINS AND METHODS OF TREATING BACTERIAL INFECTIONS

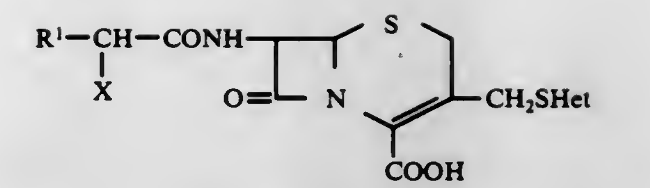
David A. Berges, Wayne, Pa., assignor to SmithKline Corporation, Phila., Pa.

Division of Ser. No. 536,759, Dec. 27, 1974, Pat. No. 3,989,694. This application Oct. 12, 1976, Ser. No. 731,401

Int. Cl.[2] A61K *31/545*

U.S. Cl. 424—246 **20 Claims**

11. A method of treating bacterial infections comprising administering internally either orally or by injection to an infected or susceptible warm-blooded animal an antibacterially effective but nontoxic dose of a compound of the formula:



in which:

R^1 is thienyl, phenyl or phenyl substituted with one or two groups selected from hydroxy, halo, nitro, hydroxymethyl, amino, lower alkylamino, di(lower)alkylamino, or carboxymethylamino, each alkyl having from one to four carbon atoms;

X is amino or hydroxy; and

Het is 1,2,4-triazolyl or 1,2,3-triazolyl each of which is substituted with —$(CHR^2)_nCOR^3$ where R^2 is hydrogen or lower alkyl or from one to four carbon atoms, *n* is zero to six and R^3 is hydroxy, lower alkoxy of from one to four carbon atoms, amino, lower alkylamino or di(lower) alkylamino, each alkyl having from one to four carbon atoms, or a non-toxic pharmaceutically acceptable salt thereof.

4,060,611
3-CARBAMYLBENZYL-7-(PHENYLGLYCYL)AMINO CEPHALOSPORIN DERIVATIVES

Brian George James, Cranleigh, England, assignor to Beecham Group Limited, Great Britain

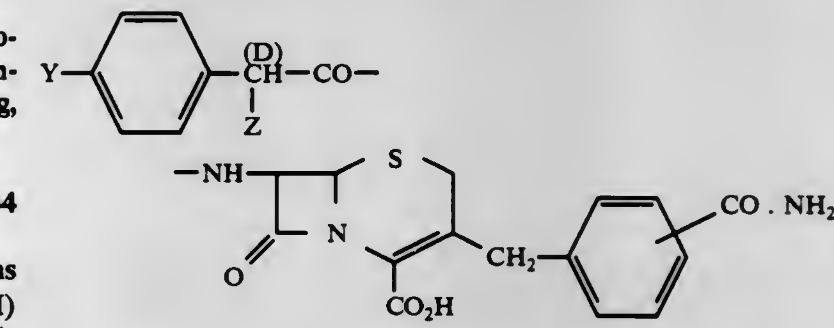
Filed July 26, 1976, Ser. No. 708,342

Claims priority, application United Kingdom, Aug. 15, 1975, 34008/75

Int. Cl.[2] A61K *31/545;* C07D *501/24*

U.S. Cl. 424—246 **15 Claims**

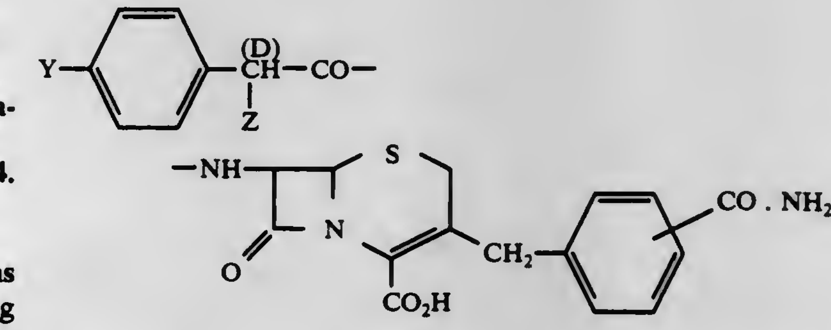
1. A compound of the formula:



pharmaceutically acceptable salt thereof wherein Y is H or OH and Z is NH_2 or OH.

6. An antibacterial pharmaceutical composition in a form for administration to humans comprising an antibacterially effective amount of a compound of claim 1 and a conventional physiologically acceptable carrier.

11. A method of treating bacterial infections in humans which comprises administering to a human in need thereof an antibacterially effective amount of a compound of the formula



or a pharmaceutically acceptable salt thereof wherein Y is H or OH and Z is NH_2 or OH.

4,060,612
PHARMACEUTICALLY ACTIVE 2-OMEGA-AMINOALKOXYDIPHENYL SULFIDES

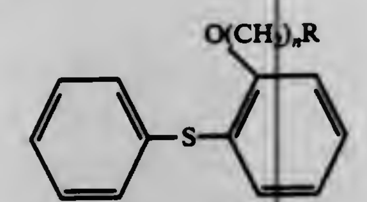
Ryoji Kikumoto, Machida; Akihiro Tobe, Kawasaki; Shinji Tonomura, Tokyo, and Hidenobu Ikoma, Kawasaki, all of Japan, assignors to Mitsubishi Chemical Industries Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 627,059, Oct. 30, 1975, abandoned. This application July 12, 1976, Ser. No. 704,493

Int. Cl.[2] A01N *9/22, 9/24;* C07C *93/06*

U.S. Cl. 424—248.52 12 Claims

1. A 2-omega-aminoalkoxydiphenyl sulfide compound having the formula:



wherein n 3–5 and when n = 3, R is C_1–C_5 alkylamino; when n = 4, R is amino, C_1–C_5 alkylamino, C_2–C_6 dialkylamino or morpholino; and when n = 5, R is C_2–C_6 dialkylamino or morpholino, and acid addition salts thereof.

12. An antidepressant composition which comprises an antidepressant effective amount of a compound of claim 1 and a pharmaceutically acceptable adjuvant.

4,060,613
3-ARYLOXY-2(4-LOWERALKYL-1-PIPERAZINYL)-PROPANOLS, THEIR ALKYLETHERS, AND USE THEREOF

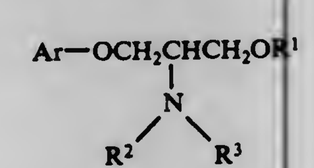
Jean-Marie Ferland, St. Laurent; Real Laliberte, Chomedey; Wilbur Lippmann, Montreal, and Thomas A. Pugsley, Kirkland, all of Canada, assignors to Ayerst McKenna and Harrison Ltd., Montreal, Canada

Filed May 19, 1976, Ser. No. 687,851

Int. Cl.[2] A61K *31/495;* C07D *241/04*

U.S. Cl. 424—250 5 Claims

1. A compound of formula 1



(1)

in which Ar is phenyl or 1-naphthyl; R^1 is hydrogen or lower alkyl having from one to six carbon atoms in a straight chain and three to four carbon atoms in a branched chain; and R^2 and R^3 together with the nitrogen atom to which they are joined form a heterocyclic amine radical consisting of 4-(lower alkyl)-1-piperazinyl; or a therapeutically acceptable acid addition salt thereof.

5. A method of alleviating symptoms of depression in a mammal comprising administering to said mammal an antidepressant effective amount of a compound of formula 1 of claim 1, or a therapeutically acceptable acid addition salt thereof.

4,060,614
6-SUBSTITUTED 3-NITROIMIDAZO[1,2-b]PYRIDAZINE FOR THE CONTROL OF HEMORRHAGIC COLITIS IN SWINE

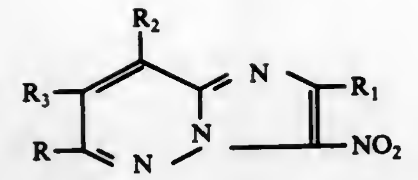
Alberto Ellert Adam, Wayne, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Filed July 22, 1976, Ser. No. 707,922

Int. Cl.[2] A61K *31/50, 31/54, 31/535*

U.S. Cl. 424—250 8 Claims

1. A method of treating hemorrhagic colitis in swine which comprises, administering to the animals a therapeutically effective amount of a compound having the formula:



wherein R is hydroxy, mercapto, alkoxy (C_1-C_8), alkylthio (C_1-C_8), phthalimidoloweralkoxy, phenylloweralkoxy, lower alkylaminoloweralkoxy, lower alkoxyloweralkoxy, hydroxyloweralkoxy, lower alkenyloxy, halobenzoylloweralkoxy, amino, alkyl (C_1-C_8) amino, dialkyl (C_1-C_8) amino, di(hydroxyloweralkyl)amino, hydroxyloweralkylamino, lower alkoxyloweralkylamino, lower alkenylamino, phenylloweralkylamino, pyridylloweralkylamino, cycloalkyl (C_3-C_6) amino, diloweralkylaminoloweralkylamino, 1-piperidinyl, 1-pyrrolidinyl, 4-loweralkyl-1-piperazinyl, 4-lower alkoxyphenyl-1-piperazinyl, morpholino, imidazolyl, 4-carboloweralkoxy-1-piperazinyl or 4-diloweraminoloweralkyl-1-piperazinyl, sulfanilamido, alkyl (C_1-C_4)-sulfanilamido; thiomorpholino-S,S-dioxide; p-chlorobenzoyl hydrazido; p-chlorobenzylidene hydrazino; nicotinylidene hydrazino loweralkylthioloweralkoxy and loweralkylsulfonyloweralkoxy or $-NR_4-CO-R_5$ where R_4 is hydrogen or alkyl C_1-C_4 and R_5 is alkyl C_1-C_{11}, phenyl, 3,4-dichlorophenyl, 4-chloro-3-nitrophenyl, benzyl, mono and dihaloalkyl C_1-C_4 or 2-phenoxypropionamide; R_1 is hydrogen or alkyl C_1-C_4; R_2 and R_3 are hydrogen or methyl; and the pharmaceutically acceptable acid addition salts thereof.

4,060,615
2-PIPERAZINYL-6,7-DIMETHOXYQUINAZOLINES

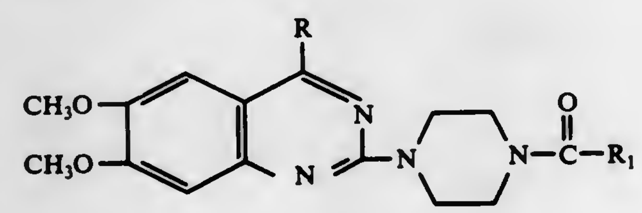
William Lesley Matier, and John David Catt, both of Evansville, Ind., assignors to Mead Johnson & Company, Evansville, Ind.

Filed Feb. 18, 1976, Ser. No. 659,059

Int. Cl.[2] A61K *31/505;* C07D *403/04*

U.S. Cl. 424—251 19 Claims

1. A compound having the formula

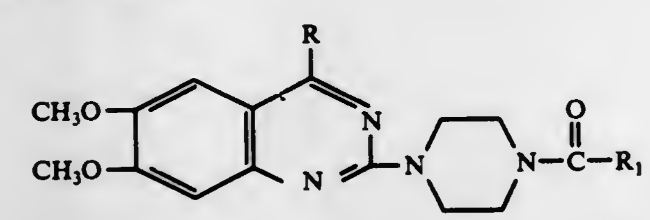


or a pharmaceutically acceptable salt thereof wherein

R is amino or hydrazino;

R_1 is cycloalkyl having 3 to 8 ring carbon atoms inclusive and cycloalkenyl having 4 to 8 ring carbon atoms inclusive.

13. A process for treating hypertension which comprises systemically administering to a mammal in need of said treatment an antihypertensive effective amount of a compound having the formula

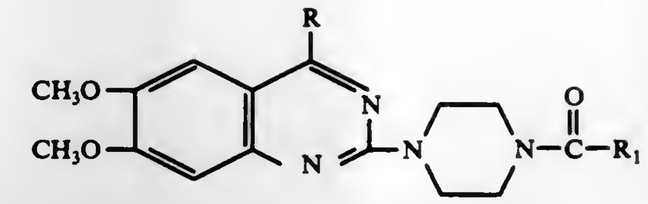


or a pharmaceutically acceptable salt thereof wherein

R is amino or hydrazino;

R_1 is cycloalkyl having 3 to 8 ring carbon atoms inclusive and cycloalkenyl having 4 to 8 ring carbon atoms inclusive.

16. A pharmaceutical composition in dosage unit form adapted for the systemic administration to a mammal comprising a dose of from 0.001 to 50 mg. per kilogram of body weight of said mammal of a compound having the formula



or a pharmaceutically acceptable salt thereof wherein

R is amino or hydrazino;

R_1 is cycloalkyl having 3 to 8 ring carbon atoms inclusive and cycloalkenyl having 4 to 8 ring carbon atoms inclusive.

4,060,616
PURINE DERIVATIVES WITH REPEATING UNIT

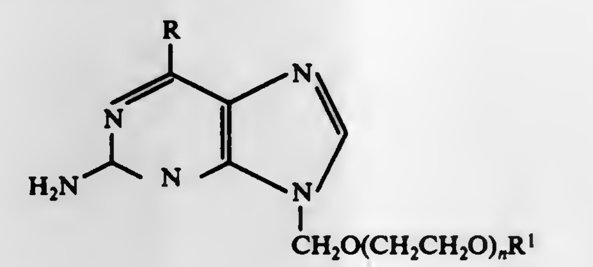
Howard John Schaeffer, Richmond, Va., assignor to Burroughs Wellcome Co., Research Triangle Park, N.C.

Filed Mar. 1, 1976, Ser. No. 662,899

Int. Cl.[2] A61K *31/52;* C07D *473/16, 473/18, 473/32*

U.S. Cl. 424—253 87 Claims

1. A compound of the formula I



(I)

where

n is an integer of 2 to 10

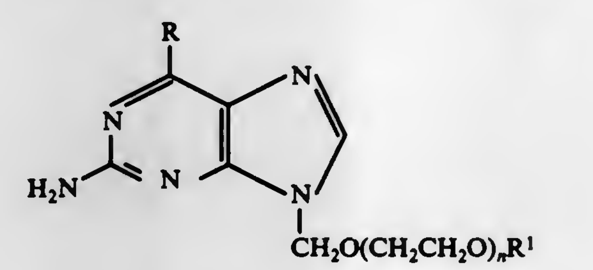
R is halogen, hydroxy or amino

R^1 is hydrogen or

$$\overset{\text{O}}{\overset{\parallel}{\text{C}}}R^2$$

where R^2 is hydrogen, alkyl of 1 to 8 carbons, phenyl or naphthyl or a pharmaceutically acceptable salt thereof.

18. A pharmaceutical composition comprising an effective non-toxic antiviral amount of a compound of the formula I



(I)

where

n is an integer of 2 to 10

R is halogen, hydroxy or amino

R^1 is hydrogen or

$$\overset{\text{O}}{\overset{\parallel}{\text{C}}}R^2$$

where R^2 is hydrogen, alkyl of 1 to 8 carbons, phenyl or naphthyl or a pharmaceutically acceptable salt thereof in association with a pharmaceutically acceptable carrier therefore.

4,060,617
ESTERS OF THE OPHYLLINYLACETIC ACID

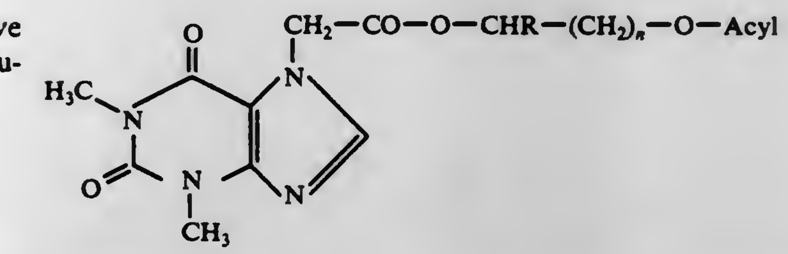
Karl Credner, Kaarst; Berthold Geisel, Gronau, Leine; Gunter Brenner, Grefrath, and Manfred Tauscher, Gronau, Leine, all of Germany, assignors to Johann A. Wulfing, Germany

Filed Apr. 1, 1976, Ser. No. 672,838

Int. Cl.[2] A61K *31/52;* C07D *473/08*

U.S. Cl. 424—253 48 Claims

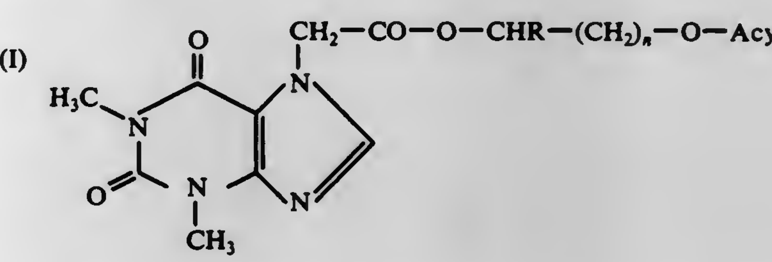
1. A compound of the formula (I):



(I)

wherein R is hydrogen or methyl; n is a number from 1 to 4 and 'Acyl' is nicotinoyl, 3-methylpyrazole-5-carboyl, 3-methylisoxazolyl-5-carboyl, 5-n-butylpyridin-2-carboyl, 2-(4-chlorophenoxy)-2-methyl-propionyl, 2-acetoxybenzoyl or theophyllinyl-7-acetyl.

15. A pharmaceutical composition in oral or parenteral administration form useful for treating adverse hyperlipidemic states in humans which comprises a therapeutically effective amount of a compound of the formula (I):



(I)

wherein R is hydrogen or methyl, n is a number from 1 to 4 and 'Acyl' is nicotinoyl, 3-methylpyrazole-5-carboyl, 3-methylisoxazolyl-5-carboyl, 5-n-butylpyridin-2-carboyl, 2-(4-chlorophenoxy)-2-methyl-propionyl, 2-acetoxybenzoyl or theophyllinyl-7-acetyl, in combination with a pharmaceutically acceptable carrier.

4,060,618
QUATERNARY XANTHINYLALKYL NORTROPINE

Karl H. Klingler, Langen; Rudolf Aurich, Karben, and Silke Habersang, Maintal, all of Germany, assignors to Deutsche Gold- und Silber-Scheideanstalt Vormals Roessler, Frankfurt, Germany

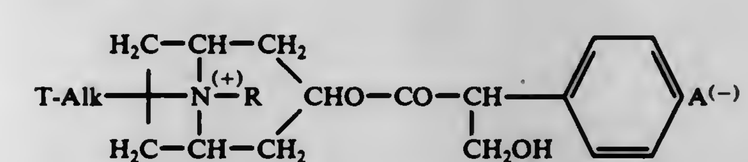
Filed Feb. 6, 1976, Ser. No. 656,085

Claims priority, application Austria, Feb. 21, 1975, 1355/75

Int. Cl.[2] A61K *31/52;* C07D *473/08*

U.S. Cl. 424—253 12 Claims

1. A quaternary xanthinylalkyl nortropine derivative of the formula



I

where T is a theophyllinyl-(7) group or a theobrominyl-(1) group, Alk is alkylene group with 2 to 10 carbon atoms or mono-hydroxy-alkylene group with 2 to 10 carbon atoms, the hydroxy group being attached to a carbon atom which is further bound exclusively to carbon and hydrogen, R is alkyl group of 1 to 4 carbon atoms and $A^{(-)}$ is an equivalent of an anion of a pharmaceutically acceptable acid.

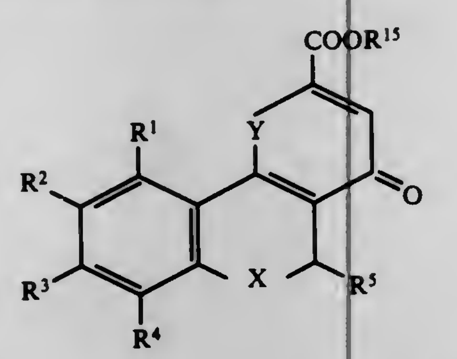
11. A composition comprising the compound of claim 1 together with a pharmaceutically acceptable carrier, said com-

pound being present in an amount sufficient to provide a spasmolytic effect.

4,060,619
1,4-DIHYDRO-4-OXO-BENZOTHIOPYRANO (4,3-b)PYRIDINE-2-CARBOXYLATES AND DERIVATIVES

Adolf H. Philipp, St. Laurent, and Ivo L. Jirkovsky, Montreal, both of Canada, assignors to Ayerst McKenna and Harrison Ltd., Montreal, Canada
Filed Jan. 14, 1976, Ser. No. 649,113
Int. $Cl.^2$ C07D *513/14;* **A61K** *31/435*
U.S. Cl. 424—256 **15 Claims**

1. A compound of formula I


(I)

in which R^1,R^2,R^3 and R^4 are the same or different selected from the group consisting of hydrogen, halogen and lower alkyl; R^5 is hydrogen or lower alkyl; R^{15} is hydrogen or lower alkyl, X is S, SO and SO_2; and Y is NR^{16} wherein R^{16} is hydrogen or lower alkyl, or a pharmaceutically acceptable salt thereof.

13. 9-(1-Methylpropyl)-1,4-dihydro-4-oxo-5H-[1]benzothiopyrano[4,3-b]pyridine-2-carboxylic acid ethyl ester, as claimed in claim 1.

4,060,620
INDUCTION OF LACTATION IN NONPREGNANT DAIRY ANIMALS

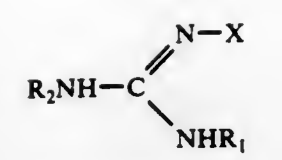
Dale E. Bauman, St. Joseph, Ill.; Robert J. Collier, East Lansing, Mich., and Ray L. Hays, Champaign, Ill., assignors to University of Illinois Foundation, Urbana, Ill.
Filed May 17, 1976, Ser. No. 687,205
Int. $Cl.^2$ A61K *31/475*
U.S. Cl. 424—262 **12 Claims**

1. Method for inducing copious milk production in an initially nonpregnant, nonlactating dairy animal which has been hormonally induced into lactation which comprises parenterally administering to said animal after the start of the hormone treatment an effective lactation-increasing amount of reserpine or a pharmaceutically acceptable salt thereof.

4,060,621
PYRIDYL ALKYLGUANIDINE COMPOUNDS

Graham John Durant, Welwyn Garden City; John Colin Emmett, Codicote, and Charon Robin Ganellin, Welwyn Garden City, all of England, assignors to Smith Kline & French Laboratories Limited, Welwyn Garden City, England
Division of Ser. No. 558,532, March 14, 1975, Pat. No. 3,971,786, which is a continuation-in-part of Ser. No. 384,992, Aug. 2, 1973, abandoned. This application Apr. 5, 1976, Ser. No. 673,516
Claims priority, application United Kingdom, Sept. 5, 1972, 41161/72
Int. $Cl.^2$ C07D *213/55;* **A61K** *31/34*
U.S. Cl. 424—263 **9 Claims**

1. A compound of the formula:



wherein R_1 is hydrogen or lower alkyl; R_2 is a grouping of the formula:

$$\text{Het} - (CH_2)_m Z (CH_2)_n -$$

wherein Het is a pyridyl ring which is optionally substituted by lower alkyl, trifluoromethyl, hydroxy, halogen or amino; Z is sulphur, oxygen, NH or a methylene group; *m* is 0, 1 or 2 and *n* is 2 or 3, the sum of *m* and *n* being from 2 to 4; X is COR_3, CSR_3, SO_2R_4 or nitro; R_3 is lower alkyl, lower alkoxy, or amino; and R_4 is lower alkyl, trifluoromethyl or amino or a pharmaceutically acceptable acid addition salt of said compound, provided that X is nitro only when Z is methylene and R_3 is amino only when Z is sulphur, oxygen or NH.

8. A method of inhibiting H-2 histamine receptors which comprises administering orally or parenterally to an animal in need thereof an effective amount to inhibit said receptors of a compound of claim 1.

4,060,622
(+) AND (−)
1-METHYL-4-(3-CYANO-5H-DIBENZO(a,d)-CYCLOHEPTEN-5-YLIDENE)PIPERIDINE CONTAINING COMPOSITIONS AND METHODS FOR USING SAME

David C. Remy, North Wales, Pa., assignor to Merck & Co., Inc., Rahway, N.J.
Continuation of Ser. No. 486,978, July 10, 1974, abandoned. This application Jan. 27, 1976, Ser. No. 652,674
Int. $Cl.^2$ A61K *31/445*
U.S. Cl. 424—267 **4 Claims**

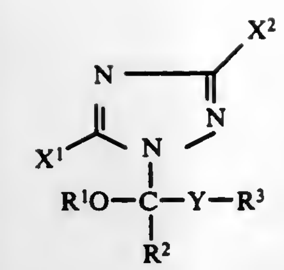
1. A method of producing a tranquilizing effect comprising administering to a patient in need of such treatment a therapeutically effective amount of (−) 1-methyl-4-(3-cyano-5H-dibenzo[a,d]-cyclohepten-5-ylidene)-piperidine substantially free of the corresponding dextrorotary isomer or a nontoxic pharmaceutically acceptable acid addition salt thereof.

2. A method of producing an anticholinergic effect comprising administering to a patient in need of such treatment a therapeutically effective amount of (+) 1-methyl-4-(3-cyano-5H-dibenzo[a,d]-cyclohepten-5-ylidene)-piperidine substantially free of the corresponding levorotary isomer or a nontoxic pharmaceutically acceptable acid addition salt thereof.

4,060,623
1,2,4-TRIAZOLE ANTIMYCOTIC COMPOSITIONS AND USE THEREOF

Werner Meiser, Wuppertal-Elberfeld; Wolfgang Kramer, Wuppertal-Barmen; Karl Heinz Buchel, and Manfred Plempel, both of Wuppertal-Elberfeld, all of Germany, assignors to Bayer Aktiengesellschaft, Germany
Division of Ser. No. 532,191, Dec. 12, 1974, Pat. No. 4,002,763, which is a division of Ser. No. 396,202, Sept. 11, 1973, Pat. No. 3,890,442. This application Jan. 2, 1976, Ser. No. 646,019
Claims priority, application Germany, Sept. 26, 1972, 2247186
Int. $Cl.^2$ A61K *31/41*
U.S. Cl. 424—269 **28 Claims**

14. A method for treating mycotic infections in humans and animals which comprises administering to a human or animal in need thereof an antimycotically effective amount of a 1,2,4-triazole of the formula:



wherein

X^1 is hydrogen or alkyl of 1 to 3 carbon atoms;
X^2 is hydrogen or alkyl of 1 to 3 carbon atoms;
R^1 is phenyl unsubstituted or substituted by one to five substituents selected from the group consisting of alkyl of 1 to 4 carbon atoms, the same or different halogen, the same or different haloalkyl of 1 to 2 carbon atoms and 2 to 5 halogen atoms, alkoxy of 1 or 2 carbon atoms, the same or different haloalkoxy of 1 or 2 atoms and 2 to 5 halogen atoms, and nitro, or by one substituent selected from the group consisting of phenyl, halophenyl or amino;
R^2 is hydrogen or alkyl of 1 to 6 carbon atoms;
R^3 is phenyl unsubstituted or substituted by one to five substituents selected from the group consisting of alkyl of 1 to 4 carbon atoms, the same or different halogen, the same or different haloalkyl of 1 or 2 carbon atoms and 2 to 5 halogen atoms, alkoxy of 1 or 2 carbon atoms, the same or different haloalkoxy of 1 or 2 carbon atoms and 2 to 5 halogen atoms, alkoxy of 1 or 2 carbon atoms, the same or different haloalkoxy of 1 or 2 carbon atoms and 2 to 5 halogen atoms, and nitro, or by one substitutent selected from the group consisting of phenyl, halophenyl or amino; and
Y is CO;

in combination with a pharmaceutically acceptable non-toxic, inert carrier.

4,060,624
CONTROLLING FUNGAL CROP DISEASES WITH MIXTURES OF METHYL 2-BENZIMIDAZOLECARBAMATE AND CERTAIN SPECIFIC FUNGICIDES

Hein Louis Klopping, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.
Continuation of Ser. No. 486,086, July 5, 1974, abandoned, which is a continuation-in-part of Ser. No. 434,556, Jan. 18, 1974, abandoned, which is a continuation-in-part of Ser. No. 260,196, June 6, 1972, abandoned, which is a continuation-in-part of Ser. No. 861,791, Sept. 29, 1969, abandoned, which is a continuation-in-part of Ser. No. 727,036, May 6, 1968, abandoned, which is a continuation-in-part of Ser. No. 629,914, April, 1967, abandoned. This application Apr. 12, 1976, Ser. No. 676,142
Int. $Cl.^2$ A01N *9/22, 9/12*
U.S. Cl. 424—273 R **5 Claims**

1. A fungicidal composition comprising a fungicidally effective amount of a mixture of methyl 2-benzimidazolecarbamate and an additive selected from the group consisting of tetramethylthiuramdisulfide, tetraethylthiuramdisulfide and zinc dimethyldithiocarbamate, the ratio of methyl 2-benzimidazolecarbamate to the additive being from 1:1 to 1:20.

4,060,625
MIXTURES OF METHYL 2-BENZIMIDAZOLECARBAMATE AND ETHYLENEBISDITHIO-CARBAMIC ACID SALTS AS FOLIAR FUNGICIDES

Hein Louis Klopping, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.
Continuation of Ser. No. 491,527, July 24, 1974, abandoned, which is a continuation-in-part of Ser. No. 324,826, Jan. 18, 1973, abandoned, which is a continuation-in-part of Ser. No. 260,196, June 6, 1972, abandoned, which is a continuation-in-part of Ser. No. 861,791, Sept. 29, 1969, abandoned, which is a continuation-in-part of Ser. No. 727,036, May 6, 1968, abandoned, which is a continuation-in-part of Ser. No. 629,914, April 11, 1967, abandoned. This application Apr. 12, 1976, Ser. No. 676,143
Int. $Cl.^2$ A01N *9/22, 9/12*
U.S. Cl. 424—273 R **6 Claims**

1. A fungicidal composition comprising a fungicidally effective amount of the mixture of methyl 2-benzimidazolecarbamate with the manganous or zinc salts of ethylenebisdithiocarbamic acid, the ratio of methyl 2-benzimidazolecarbamate to said manganous or zinc salts of ethylenebisdithiocarbamic acid being from 1:1 to 1:20.

4,060,626
INDOLE-CARBOXYLIC CARBON COMPOUNDS AND PHARMACEUTICAL COMPOSITIONS CONTAINING THEM

Vladimir Hrstka, Mannheim-Neuostheim; Manfred Hübner, Ludwigshafen; Manfred Kuhr, Mannheim-Sandhofen; Felix Helmut Schmidt, Mannheim-Seckenheim, and Walter Aumüller, Kelkheim-Munster, all of Germany, assignors to Boehringer Mannheim G.m.b.H., Mannheim, Germany
Continuation of Ser. No. 322,818, Jan. 11, 1973, abandoned. This application May 4, 1976, Ser. No. 683,110
Claims priority, application Germany, Jan. 26, 1972, 2203542
Int. $Cl.^2$ A61K *31/40;* **C07D** *209/18*
U.S. Cl. 424—274 **10 Claims**

1. A compound selected from
4-methoxy-5-methylindole-2-carboxylic acid,
5-methoxy-4-methylindole-2-carboxylic acid, and the pharmaceutically acceptable salts and lower alkyl esters thereof.

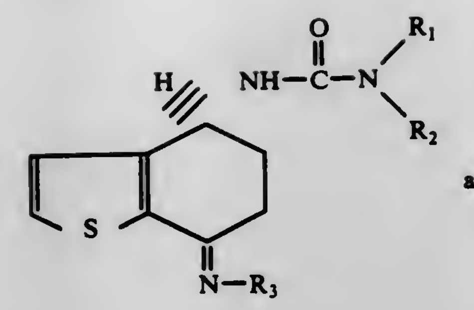
5. Method of depressing the blood sugar level in a subject which method comprises administrating to said subject an anti-diabetically effective amount of a compound selected from
4-methoxy-5-methylindole-2-carboxylic acid,
5-methoxy-4-methylindole-2-carboxylic acid, and the pharmaceutically acceptable salts and lower alkyl esters thereof.

9. Therapeutic composition having anti-diabetic properties comprising pharmaceutically acceptable carriers and, in anti-diabetically effective amount, a compound as claimed in claim 1.

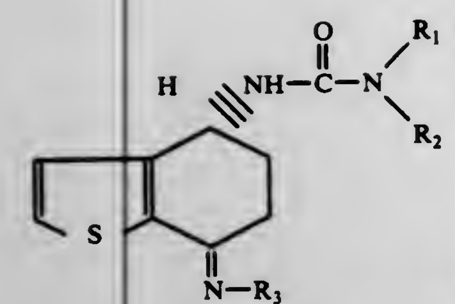
4,060,627
SUBSTITUTED TETRAHYDROIMINOBENZO(b)THIEN-4-YLUREAS AS NOVEL GROWTH PROMOTING COMPOUNDS FOR ANIMALS

Goro Asato, Titusville, and Terence James Bentley, Cranbury, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.
Filed Oct. 14, 1975, Ser. No. 622,298
Int. $Cl.^2$ A61K *31/38;* **C07D** *333/16*
U.S. Cl. 424—275 **23 Claims**

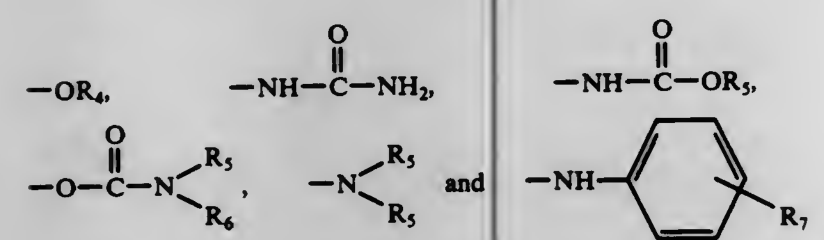
1. A racemate consisting of enantiomeric 4,5,6,7-tetrahydro-7-(substituted)benzo[b]thien-4-ylureas of the formulae:



and

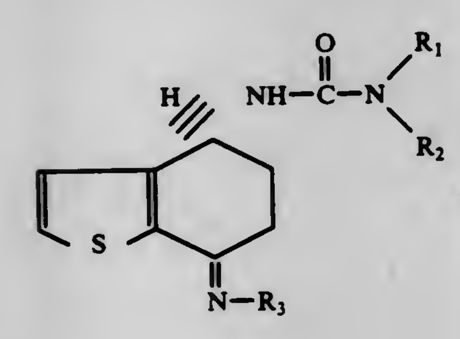


wherein R_1 is selected from the group consisting of hydrogen and alkyl C_1–C_4; R_2 is selected from the group consisting of hydrogen, hydroxy, alkyl C_1–C_4, allyl, 2-propynyl, alkoxy C_1–C_4 and benzyl; and R_3 is a moiety selected from the group consisting of those of the formulae:

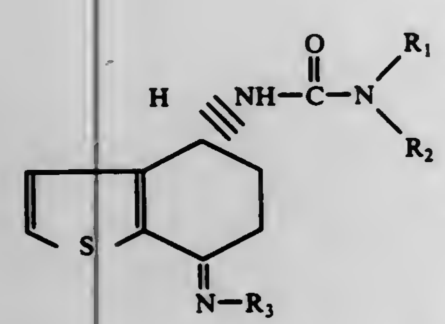


wherein R_4 is selected from the group consisting of hydrogen, alkyl C_1–C_4 and benzyl; R_5 is alkyl C_1–C_4; R_6 is selected from the group consisting of hydrogen and alkyl C_1–C_4; and R_7 is selected from the group consisting of hydrogen, chloro, methyl and methoxy.

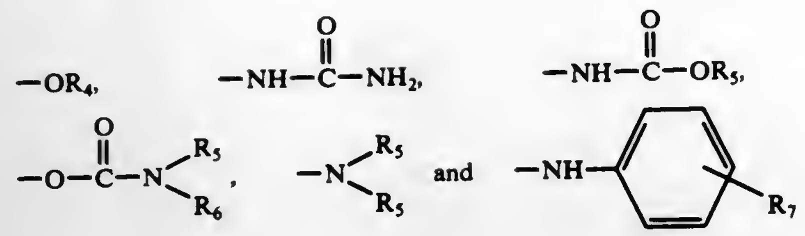
22. An animal feed composition for improving feed efficiency and enhancing the growth rate of poultry, fur-bearing animals, and farm animals comprising a nutritionally balanced animal feed containing from 0.0001% to 0.08% by weight of a racemate consisting of enantiomers of the formulae:



and



wherein R_1 is selected from the group consisting of hydrogen and alkyl C_1–C_4; R_2 is selected from the group consisting of hydrogen, hydroxy, alkyl C_1–C_4, allyl, 2-propynyl, alkoxy C_1–C_4 and benzyl; and R_3 is a moiety selected from the group consisting of those of the formulae:

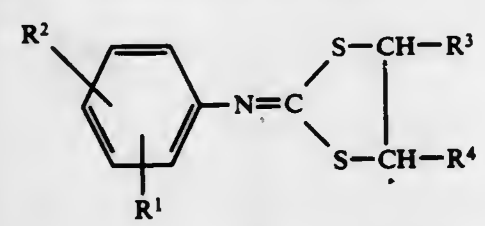


wherein R_4 is selected from the group consisting of hydrogen, alkyl C_1–C_4 and benzyl; R_5 is alkyl C_1–C_4; R_6 is selected from the group consisting of hydrogen and alkyl C_1–C_4; and R_7 is selected from the group consisting of hydrogen, chloro, methyl and methoxy.

4,060,628
2-(ALKYLHALOPHENYLIMINO)DITHIOLANES AND ECTOPARASITICIDAL COMPOSITION AND METHOD

Edgar Enders, Cologne, and Wilhelm Stendel, Wuppertal, both of Germany, assignors to Bayer Aktiengesellschaft, Germany
Filed Aug. 16, 1976, Ser. No. 714,401
Claims priority, application Germany, Aug. 22, 1975, 2537379
Int. Cl.² A01N *9/12;* **C07D** *339/06*
U.S. Cl. 424—277 10 Claims

1. A compound selected from the group consisting of a 2-phenylimino-1,3-dithiolane of the formula:



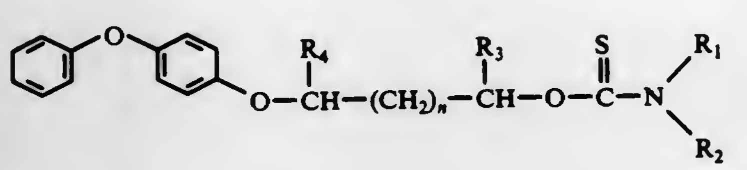
and the physiologically acceptable salts thereof wherein R^1 is alkyl of 1 to 6 carbon atoms;
R^2 is halo; and
each of R^3 and R^4 is hydrogen or alkyl of 1 to 6 carbon atoms.

10. A method of combatting ectoparasites on animals which comprises topically applying an effective amount of a compound according to claim 1.

4,060,629
PHENOXY-PHENOXY-ALKYL-THIONOCARBAMATE COMPOUNDS

Friedrich Karrer, Zofingen, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.
Filed Aug. 18, 1976, Ser. No. 715,592
Claims priority, application Switzerland, Aug. 22, 1975, 10901/75; July 15, 1976, 9085/76
Int. Cl.² A01N *9/12;* **C07C** *153/09, 153/11*
U.S. Cl. 424—300 11 Claims

1. A compound of the formula I



(I),

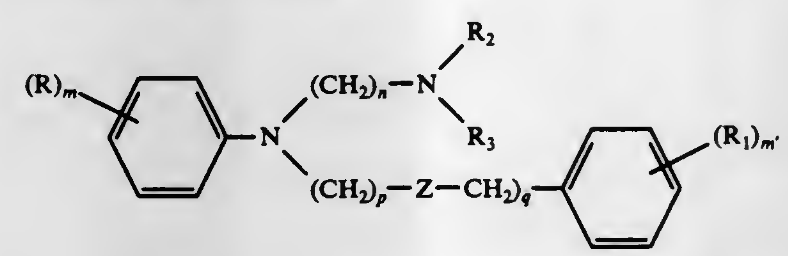
wherein
R_1 represents an alkyl group having 1 to 4 carbon atoms or an alkenyl group having 3 or 4 carbon atoms,
each of R_2 and R_3 represents a hydrogen atom or a methyl group,
R_4 represents a hydrogen atom or
R_3 and R_4, if n is 0, together with the carbon atoms to which they are attached form a cyclohexane ring, and
n is 0 or 1.

9. A method for combatting insects and acarids which comprises applying to the locus thereof an insecticidally and acaricidally effective amount of a compound according to claim 1.

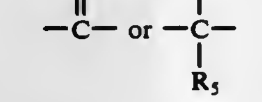
4,060,630
ETHYLENEDIAMINE DERIVATIVES USEFUL IN TREATING SICKLE CELL ANEMIA

Joseph E. Dolfini, and Robert D. MacKenzie, both of Cincinnati, Ohio, assignors to Richardson-Merrell Inc., Wilton, Conn.
Filed Dec. 22, 1975, Ser. No. 642,782
Int. Cl.² A61K *31/135, 31/535, 31/495, 31/445*
U.S. Cl. 424—300 17 Claims

1. A method of treating sickel cell anemia in a patient in need thereof which comprises administering to said patient in an amount effective to inhibit the sickling of red blood cells a compound of the formula



wherein each of R and R_1 is hydrogen, chlorine, fluorine, bromine, trifluoromethyl, hydroxy, a lower alkoxy group of from 1 to 4 carbon atoms or a straight or branched lower alkyl group of from 1 to 4 carbon atoms; R_2 is hydrogen or a straight or branched lower alkyl group of from 1 to 4 carbon atoms; R_3 is hydrogen or a straight or branched lower alkyl group of from 1 to 4 carbon atoms; Z is

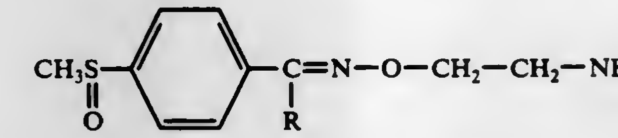


wherein R_4 is hydrogen or lower alkyl of from 1 to 4 carbon atoms, and R_5 is hydroxy or alkylcarbonyloxy wherein the alkyl moiety has from 1 to 4 carbon atoms; each of m and m' is the integer 1 or 2; n is an integer of from 2 to 6; p is an integer of from 1 to 3; and q is an integer of from zero to 2; or pharmaceutically acceptable acid addition salts thereof.

4,060,631
AMINOETHYL OXIME ETHERS HAVING ANTI-DEPRESSIVE ACTIVITY

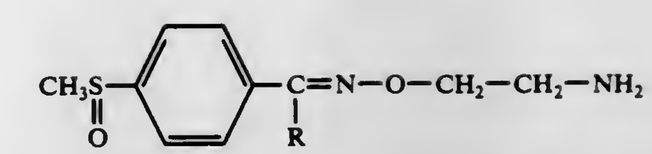
Hendricus Bernardus Antonius Welle, Utrecht, and Volkert Claassen, Weesp, both of Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.
Filed Mar. 19, 1976, Ser. No. 668,491
Claims priority, application Netherlands, Mar. 20, 1975, 7503308
Int. Cl.² A61K *31/15, 31/275;* **C07C** *131/00*
U.S. Cl. 424—304 12 Claims

1. An oxime ether compound of the formula



wherein R is a straight chain alkyl group having 4 to 6 C atoms, a benzyl group, a 4-ethoxybutyl group, a 5-methoxypentyl group, a 4-cyanobutyl group or a 5-cyano-pentyl group, and salts thereof with pharmaceutically acceptable acids.

12. Method of treating patients suffering from depression comprising administering to said patients an antidepressively effective quantity of a compound of the formula:

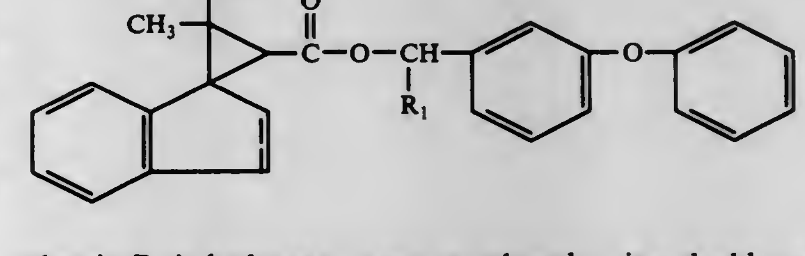


or a salt thereof with a pharmaceutically acceptable acid wherein R has the meaning as in claim 1.

4,060,632
METHOD FOR CONTROLLING ACARINA

Roger Williams Addor, Pennington, N.J., assignor to American Cyanamid Company, Stamford, Conn.
Continuation-in-part of Ser. No. 550,105, Feb. 13, 1975, Pat. No. 3,966,959. This application Jan. 28, 1976, Ser. No. 652,920
The portion of the term of this patent subsequent to June 29, 1993, has been disclaimed.
Int. Cl.² A01N *9/20, 9/24*
U.S. Cl. 424—304 7 Claims

1. A method for controlling ticks which comprises applying to adult ticks, a fecundity-suppressing amount of a spirocarboxylic acid compound having the formula

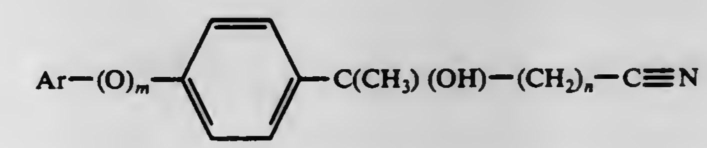


wherein R_1 is hydrogen, cyano or ethynyl, is a double or single bond and the steroisomers of the compounds.

4,060,633
PHENYLALKANOL NITRILES

Joachim Gante; Hans-Adolf Kurmeier; Dieter Orth; Erich Schacht, and Albrecht Wild, all of Darmstadt, Germany, assignors to Merck Patent Gesellschaft mit beschrankter Haftung, Darmstadt, Germany
Filed Apr. 28, 1976, Ser. No. 681,175
Claims priority, application Germany, May 2, 1975, 2519719
Int. Cl.² A61K *31/275;* **C07C** *121/75*
U.S. Cl. 424—304 19 Claims

1. A phenylalkanol of the formula



wherein Ar is phenyl or phenyl monosubstituted or disubstituted by F, Cl, Br or CH_3, m is 0 or 1 and n is 2 or 3.

4,060,634
RAPIDLY RESORBABLE GLIBENCLAMIDE

Werner Rothe, Hockenheim; Helmut Heinemann, Heidelberg; Felix Helmut Schmidt, Mannheim-Seckenheim, and Günter Betzien, Mannheim, all of Germany, assignors to Boehringer Mannheim G.m.b.H., Mannheim, Germany
Continuation-in-part of Ser. No. 508,001, Sept. 20, 1974, Pat. No. 3,979,520. This application May 20, 1976, Ser. No. 688,435
Claims priority, application Germany, Sept. 26, 1973, 2348334
The portion of the term of this patent subsequent to Sept. 7, 1993, has been disclaimed.
Int. Cl.² A01N *9/16*
U.S. Cl. 424—321 5 Claims

1. A blood sugar lowering composition comprising microfine particulate glibenclamide having a surface area of about 3

to 10 m^2/g in admixture with a pharmacologically acceptable non-ionic wetting agent present in about 2 to 20 times the weight of the glibenclamide.

4,060,635

AMIDINOUREAS FOR TREATING DIARRHEA

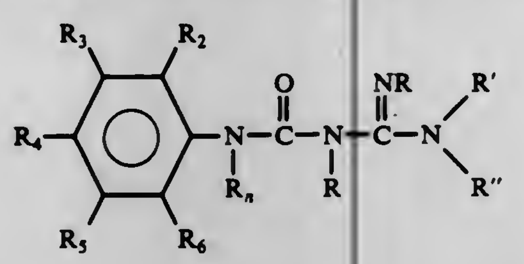
Julius Diamond, Morris Plains, N.J., and George H. Douglas, Paoli, Pa., assignors to William H. Rorer, Inc., Fort Washington, Pa.

Filed Mar. 31, 1975, Ser. No. 558,187

Int. Cl.^{2} A61K *31/17, 31/33, 31/40, 31/775*

U.S. Cl. 424—322 **22 Claims**

1. A method for the treatment of diarrhea in humans and mammals which comprises the administering thereto between 0.01 to 500 mg/kg per day of a compound of the formula:



where:

R_2, R_3, R_4, R_5 and R_6 may be the same or different and are:
hydrogen,
halo,
loweralkyl,
trifluoromethyl,
nitro,
methoxy, ethoxy
hydroxy,
benzyloxy
acetyloxy,
cyano,
trifluoromethoxy or
methylsulfonyl
R and R_n are hydrogen or loweralkyl;
R′ and R″ are hydrogen,
alkyl,
cyclopropyl, cyclobutyl, cyclopentyl, cyclohexyl,
benzyl or phenethyl; and
the non-toxic acid addition salts thereof.

4,060,636

ACETYL- AND CARBALKOXYTHIOUREIDOBENZOPHENONES AS ANTHELMINTIC AGENTS

Edward E. Kilbourn, Chalfont, and W. David Weir, Levittown, both of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Filed June 10, 1976, Ser. No. 694,746

Int. Cl.^{2} A01N *9/12, 9/20;* **A61K** *31/17, 31/27*

U.S. Cl. 424—322 **2 Claims**

2. A method for treating animals infested with helminths which comprises the administration to an animal in need of such treatment an anthelmintically effective amount of 3-(3-acetylthioureido)-4-aminobenzophenone.

4,060,637

MEDICAMENTS HAVING PSYCHOTROPIC PROPERTIES

M. Antoine Stenger; Henri Cousse, and M. Gilbert Mouzin, all of Castres, France, assignors to Pierre Fabre SA, Castres, France

Continuation of Ser. No. 264,501, June 20, 1972, abandoned. This application Nov. 21, 1974, Ser. No. 525,950

Claims priority, application France, June 21, 1971, 71.22575

Int. Cl.^{2} A61K *31/165*

U.S. Cl. 424—324 **8 Claims**

4. A method of reducing the occurrence of muscle spasms and for relaxing muscles in a host which comprises administering to the host an effective amount of a compound selected from the group consisting of a 5-bromo-N-(N′,N′-dialkylaminoalkyl)-ortho-cresotamide wherein each of the alkyl moieties in the N′,N′-dialkylamino moiety is methyl or ethyl, and the aminoalkyl is aminoethyl or aminopropyl, and a therapeutically acceptable salt thereof.

5. A compound selected from the group consisting of a 5-bromo-N-(N′, N′-dialkylaminoalkyl)-ortho-cresotamide wherein each of the alkyl moieties in the N′,N′-dialkylamino moiety is methyl or ethyl, and the aminoalkyl is aminoethyl or aminopropyl, and a therapeutically acceptable salt thereof.

4,060,638

ANTHRANILIC ACID AMIDES

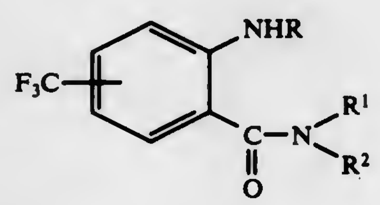
Paul L. Anderson, Dover, N.J., assignor to Sandoz, Inc., E. Hanover, N.J.

Filed May 27, 1975, Ser. No. 580,873

Int. Cl.^{2} C07C *103/76;* **A61K** *31/165*

U.S. Cl. 424—324 **17 Claims**

1. A compound which is a free base of the formula



in which

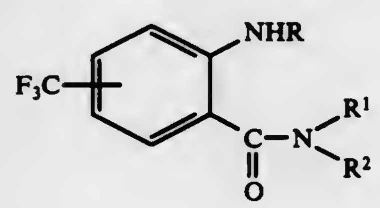
R is a hydrogen atom, or alkanoyl having from 2 to 4 carbon atoms;

R^1 is a hydrogen atom or alkyl having from 1 to 6 carbon atoms; and

R^2 is alkyl having from 1 to 6 carbon atoms or hydroxy-alkyl having from 1 to 6 carbon atoms, the hydroxy function being located at a carbon atom other than the carbon atom adjacent to the nitrogen atom; provided that when R is alkanoyl then R^2 is alkyl;

or a non toxic pharmaceutically acceptable acid addition salt thereof when R is a hydrogen atom.

14. A method of treating anxiety in a mammal in need of such treatment which comprises internally administering an amount of a compound which is a free base of the formula



in which

R is a hydrogen atom, or alkanoyl having from 2 to 4 carbon atoms;

R^1 is a hydrogen atom or alkyl having from 1 to 6 carbon atoms; and

R^2 is alkyl having from 1 to 6 carbon atoms or hydroxy-alkyl having from 1 to 6 carbon atoms, the hydroxy function being located at a carbon atom other than the carbon atom adjacent to the nitrogen atom; provided that when R is alkanoyl then R^2 is alkyl;

or a non-toxic pharmaceutically acceptable acid addition salt thereof when R is a hydrogen atom, effective in relieving anxiety in said mammal.

4,060,639

BROAD SPECTRUM ANTIBACTERIAL COMPOSITIONS CONTAINING TRIS-(HYDROXYMETHYL)-AMINOETHANE AND DICYCLOALIPHATIC-ALKYL POLYAMINES

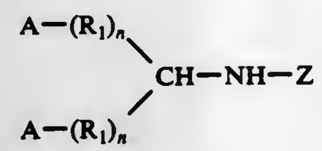
David P. Jacobus, Princeton; Eugene L. Dulaney, Summit, and Nathaniel Grier, Englewood, all of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Filed May 14, 1976, Ser. No. 686,428

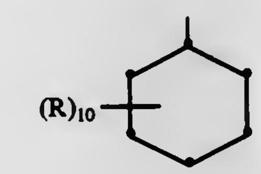
Int. Cl.^{2} A01N *9/02, 9/20, 9/22*

U.S. Cl. 424—325 **24 Claims**

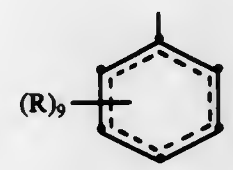
1. An antibacterial composition comprising an admixture of 1 to 500 parts by weight of tris(hydroxylamine)methylamine for each part by weight of a polyamine having the formula:



where A is alike or different cyclohexyl or cyclohexenyl of the formula:



or

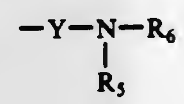


where

each R is either hydrogen or C_1 to C_6 alkyl, and the dished line indicates a single obefinic bond;

each *n* is alike or different and is the integer 0 or 1;

each R_1 is alike or different and is C_1 to C_4 alkylene; Z is

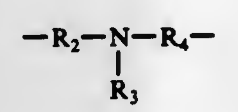


where

R_5 is hydrogen, aminoethyl, aminopropyl, C_1 to C_4 hydroxyalkyl, or C_2 to C_4 dihydroxyalkyl; and

R_6 is hydrogen, C_1 to C_4 hydroxyalkyl or C_2 to C_4 dihydroxyalkyl;

a. when Y is



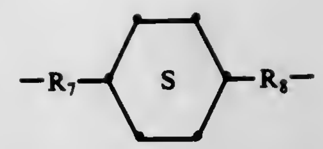
R_2 is 2-hydroxy-1,3-trimethylene, or R_1 as previously defined;

R_3 is hydrogen, C_1 to C_4 alkyl, C_2 to C_4 aminoalkyl, C_1 to C_4 hydroxyalkyl, or C_2 to C_4 dihydroxyalkyl;

R_4 is 2-hydroxy-1,3-trimethylene, or R_1 as previously defined;

or when R_3 and R_6 taken together are ethylene, R_4 is also ethylene, and R_5 is aminoethyl, aminopropyl, or aminohydroxypropyl; and

b. when Y is



R_7 is R_2, methylene, or a chemical bond between the cyclohexylene moiety and a first nitrogen; R_8 is R_4, methylene, or a chemical bond between the cyclohexylene moiety and a second nitrogen; and

c. when Y is —R_2—, then R_2, R_5 and R_6 are as previously defined, or acid addition salts thereof.

4,060,640

THERAPEUTIC AGENTS

Jiro K. Kodama, Herne Bay, England; George R. Haynes, and James R. Albert, both of Modesto, Calif., assignors to Shell Oil Company, Houston, Tex.

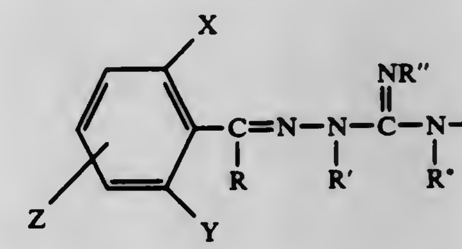
Continuation of Ser. No. 216,777, Jan. 10, 1972, abandoned, which is a division of Ser. No. 33,058, April 29, 1970, Pat. No. 3,658,993, which is a continuation-in-part of Ser. No. 674,753, Oct. 12, 1967, abandoned. This application June 8, 1976, Ser. No. 693,998

The portion of the term of this patent subsequent to Aug. 17, 1993, has been disclaimed.

Int. Cl.^{2} A61K *31/155, 31/33, 31/505, 31/415*

U.S. Cl. 424—326 **4 Claims**

1. A method of inducing a central nervous system depressant response in mammals to reduce hyperexcitability and induce sedation which comprises administering to a mammal an effective dosage for inducing a central nervous system depressant response of a compound of the formula



wherein X is halogen or trifluoromethyl, Y and Z may be the same or different and each is hydrogen, halogen, trifluoromethyl or alkyl of 1 to 4 carbon atoms, R, R′, R″ and R* each is hydrogen, alkyl of 1 to 4 carbon atoms, alkenyl of 2 to 4 carbon atoms or alkynyl of 2 to 4 carbon atoms with the proviso that R″ and R* may together form an ethylene or vinylene bridge, with the further proviso that one of Y and R must be hydrogen, or a pharmaceutically acceptable salt thereof.

4,060,641

PHARMACEUTICALLY ACTIVE 2-(3-ALKYLAMINOPROPOXY)DIPHENYLMETHANES

Ryoji Kikumoto, Machida; Akihiro Tobe, Kawasaki; Shinji Tonomura, Tokyo, and Hidenobu Ikoma, Kawasaki, all of Japan, assignors to Mitsubishi Chemical Industries Ltd., Tokyo, Japan

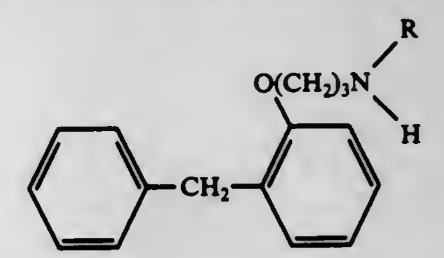
Division of Ser. No. 635,147, Nov. 25, 1975, Pat. No. 4,024,282. This application Oct. 21, 1976, Ser. No. 734,521

Int. Cl.^{2} A01N *9/20, 9/24;* **C07C** *93/06*

U.S. Cl. 424—330 **4 Claims**

1. A compound having the formula (I):

(I)



wherein R is C_1–C_5 alkyl.

4. An antidepressant composition which comprises an antidepressant effective amount of a compound of claim 1 and a pharmaceutically acceptable carrier.

4,060,642

CONCENTRATED PROTEINACEOUS FOOD MATERIAL FROM MARINE ANIMAL MEAT

Taneko Suzuki, Tokyo, Japan, assignor to Tokai Regional Fisheries Research Laboratory, Tokyo, Japan

Filed Dec. 3, 1975, Ser. No. 637,310

Claims priority, application Japan, Dec. 16, 1974, 49-144219; June 18, 1975, 50-74729

Int. Cl.² A23J *3/00;* **A23L** *1/325*

U.S. Cl. 426—104 **10 Claims**

1. A method for the manufacture of a concentrated proteinaceous food material suitable for the production of processed foodstuffs which, when reconstituted with water, assumes a textural structure wherein an amorphous aggregate of meat protein is dotted with muscle fibers, resembling that of livestock meat, which method comprises mixing minced marine animal meat with an edible salt to adjust the pH of said meat to a value in the range of from 6.5 to 7.7, said edible salt being selected from the group consisting of common salt, monosodium glutamate, pyrophosphates and polyphosphates then kneading the mixture and contacting the resultant meat with a hydrophilic organic solvent precooled to 0° to 5° C and in an amount sufficient to extract fats and water, and drying the extracted meat thereby producing the proteinaceous food material.

4,060,643

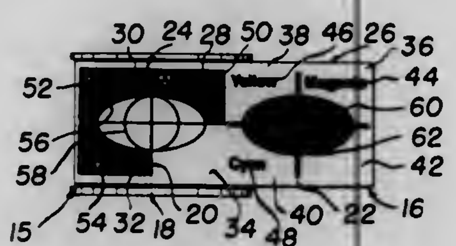
METHOD AND APPARATUS FOR IDENTIFYING COLOR SEPARATION FILM

William L. Blanks, 2343 N. Beckley Ave., Dallas, Tex. 75208

Division of Ser. No. 654,513, Feb. 2, 1976, Pat. No. 4,003,745. This application Aug. 13, 1976, Ser. No. 714,101

Int. Cl.² B32B *3/00*

U.S. Cl. 428—195 **7 Claims**



1. A color identifying tape for use in color separation photography comprising: a sheet of transparent material having first and second portions; an adhesive secured to one side of the transparent material; a black positive register mark on the first portion of the sheet; a negative register mark having a black outline in fixed spaced relation to the black positive register mark on the second portion of the sheet; colored backgrounds shaded in the three primary colors spaced in three quadrants about the black positive register mark, said backgrounds having negative indicia positioned therein to indicate the color of the background; and positive colored indicia shaded in primary colors and spaced in quadrants corresponding to the quadrants on the negative register mark corresponding to the quadrants on the colored backgrounds of the black positive register mark.

4,060,644

BLEACHING

John Edwin Braid, Warrington, England, assignor to Interox Chemicals Limited, London, England

Filed May 11, 1976, Ser. No. 685,188

Claims priority, application United Kingdom, Feb. 9, 1976, 5031/76

Int. Cl.² A23L *1/277, 1/325*

U.S. Cl. 426—261 **9 Claims**

1. A process for fish bleaching comprising the steps of contacting dark fish meat in the undissolved state with a dilute aqueous solution of hydrogen peroxide containing a polyphosphate at an initial pH of from 10.5 to 11 and at a temperature of from 10° to 30° C separating the fish from the solution when the fish meat has been bleached to a desired extent, removing any residual hydrogen peroxide from the fish, and adjusting the pH of the fish to below or approximately neutral.

4,060,645

DEHYDRATED FOOD PRODUCT

Pierre Risler, Montmorency; Jean Gireau, Montrouge; Pierre Rosé, Ennery, and Jean-Pierre Bisson, Boulogne-Billancourt, all of France, assignors to Societe d'Assistance Technique pour Produits Nestle S.A., Lausanne, Switzerland

Filed Nov. 24, 1975, Ser. No. 634,519

Claims priority, application France, Dec. 17, 1974, 74.41603

Int. Cl.² A23L *1/40, 1/226*

U.S. Cl. 426—302 **12 Claims**

1. A process for the production of a dehydrated food product selected from the group consisting of stocks, soups, consummes, soup bases, seasonings, condiments, sauces, extracts of meat, vegatable, fruit and spice supports based on dextrin which comprises extruding at a temperature in the range from 60° to 125° C. and under a pressure of from 1 to 15 bars a thermoplastic starting material selected from the group consisting essentially of edible powder and paste and containing up to 20% water into a chamber where a sub-atmospheric pressure from 0.01 to 0.3 bar prevails, and cutting the extruded product into fragments.

4,060,646

FOOD FAT

Naganathan Viswanath Bringi, Bombay, India, and Frederick Bolton Padley, Welwyn Garden City, England, assignors to Lever Brothers Company, New York, N.Y.

Filed Aug. 9, 1976, Ser. No. 712,669

Claims priority, application United Kingdom, Aug. 8, 1975, 33168/75

Int. Cl.² A23G *1/00;* **A23D** *5/00*

U.S. Cl. 426—607 **11 Claims**

1. A processed fat composition, containing; processed Mango kernel fat, wherein;

said processed Mango kernel fat,

a. is substantially free from glycerides containing at least two unsaturated fatty acid residues;
b. has an Iodine Value of less than 50; and
c. has melting characteristics suitable for confectionary purposes.

4,060,647

PULSED POWER APPLICATION SYSTEM

Peter N. Y. Pan, Country Club Hills, and Rafael J. Hernandez, Chicago, both of Ill., assignors to The Continental Group, Inc., New York, N.Y.

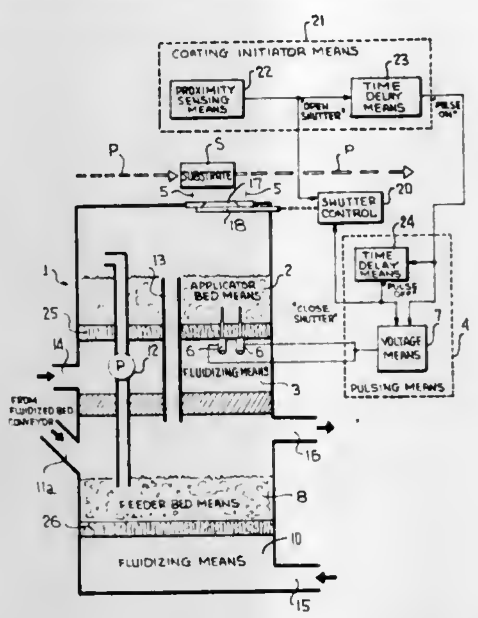
Division of Ser. No. 678,676, April 20, 1976, Pat. No. 4,027,607. This application Jan. 11, 1977, Ser. No. 758,444

Int. Cl.² B05D *1/06*

U.S. Cl. 427—21 **15 Claims**

1. A method of electrostatically powder-coating a substrate occupying a coating position adjacent thereto, comprising the steps of:

a. providing electrostatic powder particles in the vicinity of said coating position;
b. fluidizing said electrostatic powder to endow it with fluid-like characteristics;
c. pulsing said fluidized electrostatic powder by a high voltage pulse connected across a pair of electrodes disposed in the bed of the fluidized powder for a predetermined coat-



ing time so as to effect ionization of said electrostatic powder particles whereby to cause the establishment of an electric field attracting said electrostatic powder particles to said substrate; and

d. subsequently applying to said pair of electrodes a reverse electrical field attracting the excess of said ionized electrostatic powder particles away from said substrate.

4,060,648

SURFACE COATING PROCESS

Terence John Taylor-Brown, Ipswich; Paul Newton Calver, Great Bentley, both of England, and James Jack, deceased, late of Mistley, England (by Margaret Jack, administratrix), assignors to Union Carbide Corporation, New York, N.Y.

Filed Oct. 14, 1975, Ser. No. 622,368

Claims priority, application United Kingdom, Oct. 15, 1974, 44623/74

Int. Cl.² B05D *1/06, 7/04, 7/14*

U.S. Cl. 427—32 **23 Claims**

1. A process for coating a surface with electrically chargeable particles of material, which comprises passing the surface to be coated through or past an excited cloud of coating material having a surface resistivity of less than $10^{12}\Omega$ or a volume resistivity of less than $10^{11}\Omega$ cm., the excited cloud having been formed in an alternating electric field between two electrodes, one of which comprises a rotating drum which carries a metered supply of the particles of coating material.

4,060,649

PAINT CURTAIN MACHINE AND METHOD OF PAINTING

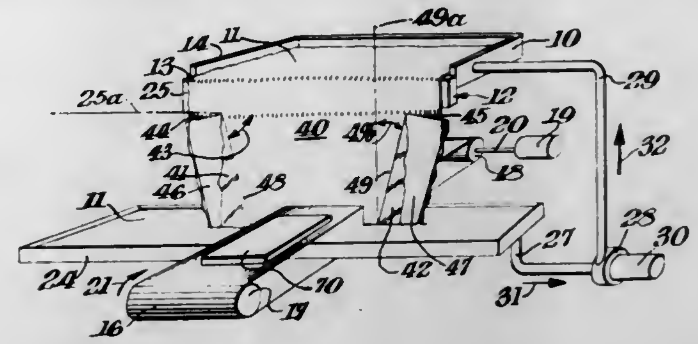
James H. Coleman, Wichita Falls, Tex., assignor to Sprague Electric Company, North Adams, Mass.

Filed Dec. 6, 1976, Ser. No. 748,075

Int. Cl.² B05C *5/00;* **B05D** *1/30;* **H01G** *13/00*

U.S. Cl. 427—79 **15 Claims**

9. In a method for coating a substrate with a fluid paint including providing a falling paint curtain by discharging a fluid paint from a line of discharge at a paint reservoir and moving said substrate through said falling paint curtain, the improvement comprising (a) fixedly mounting two members, each having a planar surface, with said two planar surfaces extending from two spaced points, respectively, within said line of discharge, said points being each spaced from an extremity of said line of discharge, said planar surfaces facing each other and extending from said line downwardly and sloping toward each other for guiding therebetween the portion of said discharged paint intercepted at said points; and (b)



diverting at said points the excess paint falling from said line of discharge.

4,060,650

METHOD FOR PREVENTING OR ELIMINATING WATER-ABSORPTION WHITENING OF A MOLDED ARTICLE CONTAINING AN ACRYLONITRILE POLYMER OR COPOLYMER

Masaki Ohya, and Mitsuru Hoshino, both of Iwaki, Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed June 24, 1976, Ser. No. 699,400

Claims priority, application Japan, June 24, 1975, 50-76528

Int. Cl.² B05B *5/00*

U.S. Cl. 427—161 **11 Claims**

1. A method for preventing or eliminating the water-absorption whitening of a molded article containing an acrylonitrile polymer or copolymer which comprises immersing said molded article into an aqueous medium containing one or more salts selected from the group consisting of halides excluding iodide, a nitrate and an acetate of one or more element included in Groups I, II, III and VIII, Periods 1 to 4 of the Periodic Table, excluding zinc, and having a solubility in water at the temperature of use of at least about 10% by weight, in an amount of from about 5% by weight to the saturation amount of said salt.

4,060,651

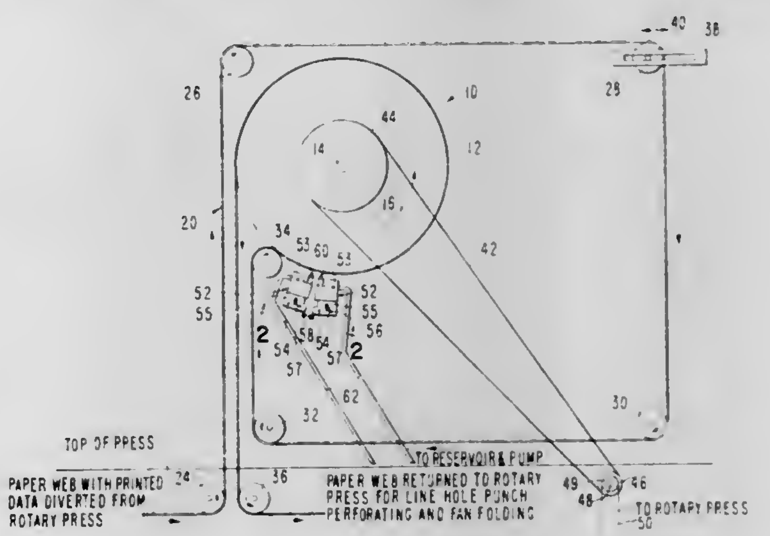
METHOD FOR APPLYING STIFFENER TO COMPUTER PAPER

Frederick A. DaMert, 31 Muir Ave., Piedmont, Calif. 94610

Continuation of Ser. No. 484,538, July 1, 1974, abandoned. This application Feb. 23, 1976, Ser. No. 660,592

Int. Cl.² B05D *5/00, 1/28*

U.S. Cl. 427—285 **6 Claims**



1. A method of applying a band of flowable stiffening material to one face of a flexible web of computer paper and moving said web about a major portion of a cylindrical surface, said stiffening material being applied to said moving web at a location near the point at which the web commences to move

about said cylindrical surface with the stiffening material being capable of setting to a solidified condition, said materials being cured when the web is on said cylindrical surface to cause the material to set to said solidified condition to develop a built-in bias in the web whereby a relatively lightweight web of computer paper can be stiffened sufficiently to perform as effectively in a computer printout system as a relatively heavier weight paper.

4,060,652
NONDEPOLARIZING MUSCLE RELAXANT
Nikolai Vasilievich Khromov-Borisov, ulitsa Nalichnaya, 36, korpus 9, kv. 214; Samuil Fedorovich Torf, ulitsa Kurchatova, 4, kv. 86; Valentina Pavlovna Cherepanova, Vasilievsky Ostrov, 4 linia, 19, kv. 5; Anatoly Fedorovich Danilov, Vasilievsky Ostrov, 9 linia, 54, kv. 36, and Larisa Alexandrovna Starshinova, Annikov prospekt, 13, kv. 64, all of Leningrad, U.S.S.R.
Filed May 26, 1976, Ser. No. 689,978
Int. Cl.² A61K *31/14*
U.S. Cl. 424—329 **5 Claims**

1. A nondepolarizing muscle relaxant composition containing as the active ingredient an effective amount of p,p''-bis-triethylammonio-p-terphenyl dibenzenesulphonate in a pharamaceutical carrier.

4,060,653
COMPOSITE WIRE
William R. O'Day, Jr., Concord; Norman D. Bensky, Lexington, and James D. LeBlanc, Winthrop, all of Mass., assignors to Kennecott Copper Corporation, New York, N.Y.
Division of Ser. No. 444,702, Feb. 22, 1974, Pat. No. 3,932,344. This application Sept. 9, 1975, Ser. No. 611,787
Int. Cl.² B05D *1/08*
U.S. Cl. 427—423 **5 Claims**

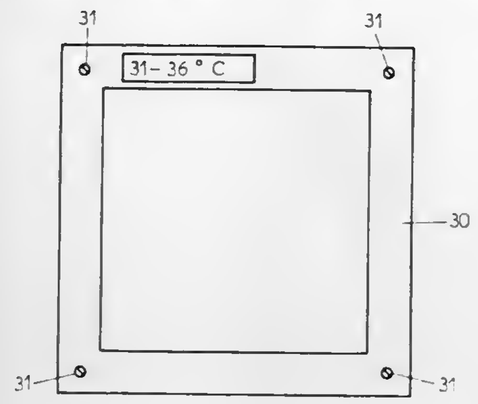
1. In a method of coating surfaces by flame spraying a material selected from the group consisting essentially of a particulate material selected from the group consisting of molybdenum, boron tanalum, tungsten, tungsten carbide, alumina, zirconia, oxides of chrome, titania, alloys of nickel and chromium with iron and mixtures of these, said material having a particle size smaller than 80 - mesh in an admixture with a mixture of a thermoplastic resin and a phenolic resin in a cured state wherein said material comprises from about 75 percent to about 97½ percent by weight of total composite with the balance being said phenolic resin and thermoplastic resin in a ratio to each other of 4:1 to 1:9 comprising

introducing said admixture in a wire form in a flame spraying zone; and

flame spraying said cured admixture onto a surface, whereby a coating of an improved hardness and adherence is obtained.

4,060,654
LAMELLAR PELLICLE FOR THERMOGRAPHY
Yves Quenneville, 2, rue d'Istanbul, Strasbourg (Bas-Rhin), France
Filed Aug. 16, 1976, Ser. No. 714,652
Int. Cl.² C09K *3/34*
U.S. Cl. 428—1 **7 Claims**

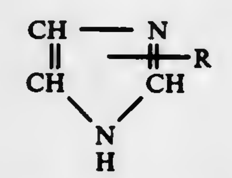
1. A temperature-responsive lamellar flexible pellicle for producing thermographic displays, comprising in combination a transparent inner sheet, a covering of liquid crystals which change color with temperature upon said inner sheet, an opaque inner backing sheet covering said crystals, an outer backing sheet covering said inner backing sheet, a transparent outer front sheet covering said transparent inner sheet, said outer backing sheet and said outer front sheet being of material having mechanical strength and being secured to each other by



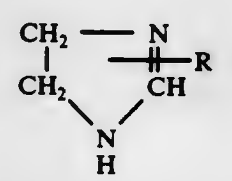
adhesive at their marginal zones, and a stiff rectangular frame in which said pellicle is mounted.

4,060,655
RESIN COATED METAL SUBSTRATES
Gerhard Johannes, Taunusstein; Erwin Gemmer, Falkenstein; Hans-Joachim Konig, Frankfurt am Main-Fechenheim, and Gunter Reinhard, Frankfurt am Main-Schwanheim, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt, Germany
Continuation-in-part of Ser. No. 544,316, Jan. 27, 1975, abandoned. This application July 26, 1976, Ser. No. 708,729
Claims priority, application Germany, Feb. 2, 1974, 2405111
Int. Cl.² F16L *9/14;* **B05D** *1/04, 3/02;* **B32B** *15/08*
U.S. Cl. 428—35 **12 Claims**

1. An article comprising a metal substrate in the form of a pipe having at least 100 mm internal diameter or a container, said substrate being coated with a single at least 100 micron thick coating of a hardened epoxy resin composition formed from a homogenized solid mixture of (A) a solid epoxy resin based on epichlorohydrin and a component selected from the group consisting of (a) 4,4'-diphenylolpropane, b) 4,4'-diphenylolmethane and (c) a combination of (a) and (b), (B) from 1 to 12% by weight based on the epoxy resin of at least one hardener for said epoxy resin selected from the group consisting of (a) compounds of formula

 (I)

wherein R is hydrogen or an alkyl group of 1 to 6 carbon atoms or an aromatic hydrocarbon residue with 6 to 10 carbon atoms, (b) compounds of formula

 (II)

wherein R is hydrogen or an alkyl group having 1 to 6 carbon atoms or an aromatic hydrocarbon residue with 6 to 10 carbon atoms and (c) an adduct of any one of the hardener compounds (a) and (b) to an epoxy resin with an epoxy equivalent weight of from 50 to 2000, (C) a flow improving amount of a flow agent of 0.1 up to 5% by weight based on the epoxy resin and (D) a thixotropic agent in an amount of 1 to 5% by weight of the total composition.

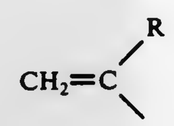
4,060,656
SUPPORT FOR PHOTOSENSITIVE RESIN
Kiyomi Naka, Hino, and Teruo Takahashi, Kunitachi, both of Japan, assignors to Teijin Limited, Osaka, Japan
Continuation-in-part of Ser. No. 455,679, March 28, 1974, abandoned. This application July 15, 1975, Ser. No. 596,189
Claims priority, application Japan, Apr. 2, 1973, 48-37546
Int. Cl.² G03F *7/02*
U.S. Cl. 428—355 **13 Claims**

1. A support for a photosensitive resin for use in making a printing plate using liquid photosensitive resin, said support comprising a flexible self-supporting base plate and an adhesive layer formed thereon for applying a layer of the photosensitive resin, wherein said adhesive layer is a three-dimensional cured product containing 1×10^{-4} to 1×10^{-2} mol/gr. of effectively photopolymerizable unsaturated carbon-to-carbon double bonds, which have been formed from a composition consisting of (A), (B) and (C) as shown below:

A. a compound which is a linear polycondensation product formed between epichlorohydrin and polyhydric phenolic compound, the polycondensation product having a molecular weight of up to 4,000 and containing 1,2-epoxy groups at both terminals, or a diepoxy ester compound selected from the group consisting of diglycidyl-2,6-naphthalenedicarboxylate, diglycidyl-2,7-naphthalenedicarboxylate, diglycidyl o-phthalate, diglycidyl isophthalate, diglycidyl terephthalate, diglycidyl methylisophthalate, and diglycidyl methylterephthalate;

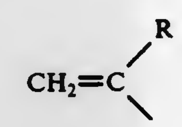
B. a compound selected from one of the group comprising

i. a compound containing an effectively photopolymerizable unsaturated carbon-to-carbon double bond moiety having the formula



wherein R is a hydrogen or an alkyl and a 1,2-epoxy group in the molecule and having a boiling point of at least 120° C., or

ii. a reaction product of the component (B) (i) with an amine curing agent selected from the group consisting of aliphatic amines, aromatic amines and amino-terminated polyamide resin obtained by the condensation of an aliphatic dicarboxylic acid with ethylene diamine and having a degree of polymerization of 5 to 20, the reaction product containing an effectively photopolymerizable unsaturated carbon-to-carbon double bond moiety having the formula



wherein R is hydrogen or an alkyl, and an amino group in the molecule and having a boiling point of at least 120° C.; and

C. an organic curing agent for epoxy resins containing at least two active hydrogen atoms but not containing an effectively photopolymerizable carbon-to-carbon double bond, or an organic compound convertible to said curing agent during the reaction, and selected from the group consisting of: aliphatic amines, aromatic amines, polycarboxylic acids, acid anhydrides, phenol resins, urea resins, polyester resins, polysulfide resins, melamine resins, and polyamide resins.

4,060,657
COATING COMPOSITIONS
Isamu Iwami, and Hideo Kinoshita, both of Kawasaki, Japan, assignors to Asahi-Dow Limited, Tokyo, Japan
Filed Mar. 30, 1976, Ser. No. 671,742
Claims priority, application Japan, Apr. 3, 1975, 50-39754; Feb. 4, 1976, 51-10276
Int. Cl.² D02G *3/36;* **B32B** *17/10*
U.S. Cl. 428—375 **36 Claims**

1. A water soluble coating composition comprising (a) a hydrophilic copolymer of 60 to 20% by mole of ethylene, 20 to 1% by mole of alpha,beta-ethylenically unsaturated carboxylic acid containing from three to nine carbon atoms and 20 to 79% by mole of polyvalent alcohol monoester of alpha,beta-ethylenically unsaturated carboxylic acid wherein the carboxylic acid moiety contains from three to nine carbon atoms, (b) a sufficient amount of a water-soluble base to at least partially neutralize said carboxylic acid, and (c) water.

32. A coating article obtained by coating a substrate with the coating composition as claimed in claim 1, and forming a water-insoluble film on the substrate.

4,060,658
GLASS FIBERS COATED WITH A POLYBUTADIENE HOMOPOLYMER LATEX-CONTAINING IMPREGNANT
Kingso C. Lin, and Donald J. Hammond, both of Newark, Ohio, assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio
Filed Sept. 19, 1975, Ser. No. 615,006
Int. Cl.² B32B *9/00;* **D02G** *3/00*
U.S. Cl. 428—378 **8 Claims**

1. Glass fibers in contact with the residue produced by removing water from a composition consisting essentially of a vinylpyridine-butadiene-styrene terpolymer, a polybutadiene homopolymer latex, a wax emulsion and a resorcinol-formaldehyde resin, with the polybutadiene homopolymer being present in an amount within the range from aboout 30 to about 80 weight percent.

4,060,659
ELECTRIC WIRES OR CABLES WITH STYRENE CONTAINING DIELECTRIC LAYER
Hironaga Matsubara, and Shousuke Yamanouchi, both of Osaka, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan
Filed Nov. 7, 1975, Ser. No. 629,827
Int. Cl.² B44D *1/42*
U.S. Cl. 428—379 **16 Claims**

1. Electric cables or wires having at least one dielectric layer consisting essentially of (1) of polyolefin and

2*a*. polystyrene, wherein for polymer composition (1)–(2a) the polystyrene is present in such an amount as to provide a 10 to 30% styrene content;

2*b*. a styrene copolymer, wherein for polymer composition (1)–(2*b*) the styrene copolymer is present in such an amount as to provide a 3 to 30% styrene content; or

2*c*. polystyrene and a styrene copolymer, wherein for polymer composition (1)–(2*c*) the polystyrene is present so as to provide a 10 to 30% styrene content and the styrene copolymer is present in such an amount so as to provide a 5 to 20% styrene content; all percentages being based on the entire polymer composition weight.

4,060,660

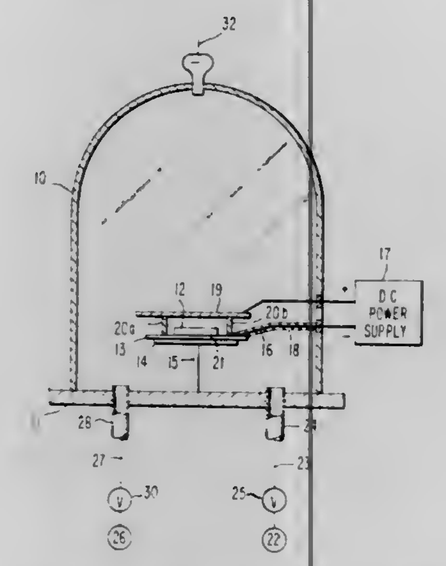
DEPOSITION OF TRANSPARENT AMORPHOUS CARBON FILMS

David Emil Carlson, Yardley, Pa., and Chester Edwin Tracy, Skillman, N.J., assignors to RCA Corporation, New York, N.Y.

Filed Jan. 15, 1976, Ser. No. 649,548

Int. Cl.² B05D *3/06*

U.S. Cl. 428—408 **8 Claims**



1. A method of depositing a transparent, resistive, amorphous carbon film on a glassy substrate which comprises:

a. heating said glassy substrate to a temperature in the range of from about 300° to 550° C. but below the softening temperature of the substrate in an evacuated chamber,

b. introducing a volatile hydrocarbon into said evacuated chamber,

c. applying a D.C. glow discharge between two electrodes situated in said chamber, the cathode of which is said glassy substrate, at a current density of from about 0.05 to about 1.0 mA/cm² for a period of about 15 seconds to about 3 minutes, so that said glassy substrate becomes coated with an amorphous carbon film.

7. A transparent amorphous carbon film having a room temperature surface resistance of from about 10^{12} ohm/sq. to about 10^{7} ohm/sq.

4,060,661

VOLTAGE-DEPENDENT RESISTOR

Akihiro Takami, Katano; Takayuki Kuroda, Nishinomiya; Katsuo Nagano, Chitose, and Michio Matsuoka, Ibaraki, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Aug. 4, 1976, Ser. No. 711,639

Claims priority, application Japan, Aug. 22, 1975, 50-102442; Aug. 22, 1975, 50-102444; Aug. 22, 1975, 50-102445; Aug. 22, 1975, 50-102446; Aug. 22, 1975, 50-102447; Aug. 22, 1975, 50-102448

Int. Cl.² H01B *1/02, 1/08*

U.S. Cl. 428—432 **16 Claims**

1. A voltage-dependent resistor comprising a bulk consisting mainly of zinc oxide as a major part and, as additives, 0.01 to 10 mol % of Bi_2O_3, CoO, MnO, TiO and NiO, respectively and electrodes on said bulk, said electrodes having been formed by baking a silver paste comprising silver powder and a glass frit on said bulk, said glass frit containing as its principal contents 80 to 95% by weight of Bi_2O_3 and correspondingly 20 to 5% by weight of SiO_2 said glass frit also containing 1 to 5 parts by weight of B_2O_3 per 100 parts of said principal contents.

4,060,662

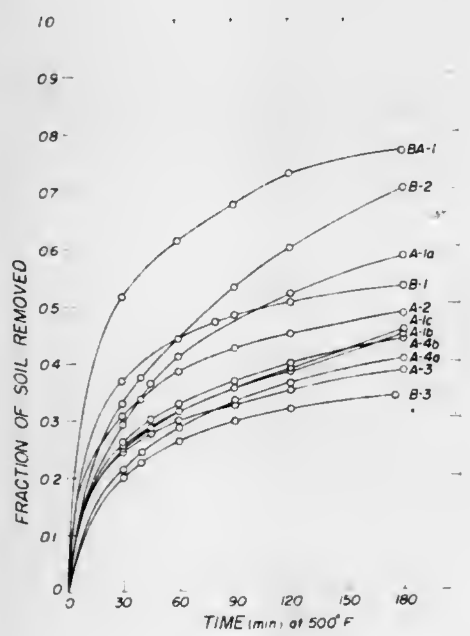
ARTICLE HAVING A SURFACE LAYER OF CATALYTIC ASH BY-PRODUCT OF COAL COMBUSTION

Clifton G. Bergeron, Urbana, and Lester W. Herron, St. Joseph, both of Ill., assignors to University of Illinois Foundation, Urbana, Ill.

Filed Aug. 25, 1975, Ser. No. 607,493

Int. Cl.² B32B *15/04, 15/18;* **A21B** *1/00*

U.S. Cl. 428—450 **14 Claims**



1. In an article of manufacture having a surface layer including means for catalytically enhancing the thermal oxidation of organic materials and a substrate for supporting the surface layer, the improvement wherein said surface layer comprises a finely divided ash by-product of the combustion of coal.

4. In an article of manufacture having a surface layer including means for catalytically enhancing the thermal oxidation of organic materials and a substrate for supporting the surface layer, wherein said surface layer comprises a composition consisting essentially of

	Wt. %
SiO_2	0 - 60
Al_2O_3	0 - 25
TiO_2	0.5 - 5
FeO	10 - 40
MgO	0.5 - 20
CaO	0 - 10
K_2O	0 - 10
MnO_2	0.1 - 5

9. In the process for thermal oxidation of organic materials wherein the materials are heated in the presence of a gaseous atmosphere including oxygen and contacted with a finely divided oxidation catalyst, the improvement wherein said oxidation catalyst is a finely divided ash product of the combustion of coal.

4,060,663

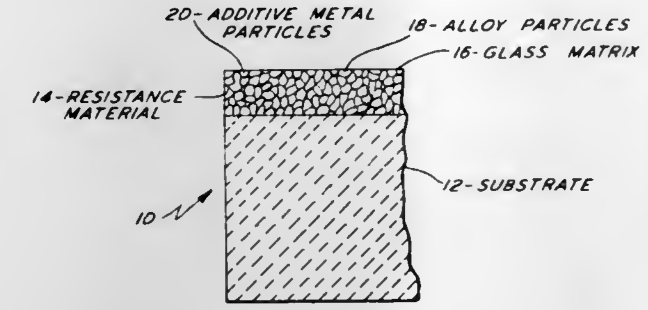
ELECTRICAL RESISTOR GLAZE COMPOSITION AND RESISTOR

Kenneth M. Merz, Gladwyne, and Howard E. Shapiro, Philadelphia, both of Pa., assignors to TRW Inc., Cleveland, Ohio

Continuation-in-part of Ser. No. 491,238, July 24, 1974, abandoned. This application Dec. 15, 1976, Ser. No. 750,661

Int. Cl.² B32B *5/16, 9/00;* **H01B** *1/00*

U.S. Cl. 428—428 **12 Claims**



7. An electrical resistor having a resistivity in the range of approximately 2 to 20 ohms per square, comprising a nonconductive ceramic body, a resistive film of glass on a surface of the body, and fine particles of an alloy containing approximately 75% to 80% by weight of nickel and approximately 20% by weight of chromium embedded within and dispersed throughout the glass film, the alloy being present in the resistive film in the amount of approximately 28% to 80% by weight.

4,060,664

BONDED COMPOSITE STRUCTURES

Thomas M. McGuire, Woodbury, and Kenneth Peacock, White Bear Lake, both of Minn., assignors to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.

Filed Dec. 8, 1975, Ser. No. 638,451

Int. Cl.² B32B *27/04*

U.S. Cl. 428—336 **12 Claims**

1. A bonded, composite structure comprising at least one polymeric substrate selected from the group consisting of polyester polymers and polyolefin polymers, said substrate having a solid material adhered thereto by an interposed bonding material which is a thin polymer zone having a thickness of up to about 500 Angstroms and consisting essentially of an organic polycarbodiimide polymer containing at least two carbodiimide groups, each linked directly to an aromatic nucleus through a carbodiimide nitrogen, said polycarbodiimide polymer containing about 1 to 35 weight percent carbodiimide groups.

4,060,665

ORNAMENTAL ASSEMBLY

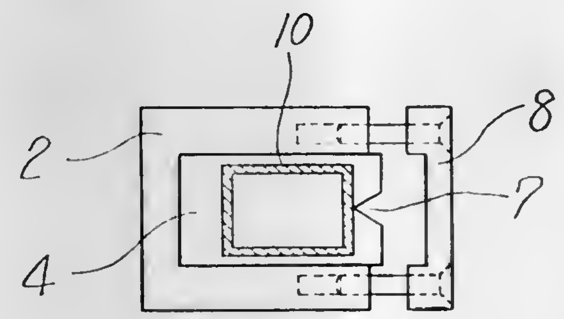
Chizuo Kato, No. 25-12, 2-chome,, Higashi-Ohi, Shinagawa, Tokyo, Japan

Filed Nov. 1, 1976, Ser. No. 737,568

Claims priority, application Japan, Aug. 16, 1976, 51-109535[U]

Int. Cl.² B32B *9/04*

U.S. Cl. 428—542 **2 Claims**



1. An ornamental assembly comprising

a. a holder or holders each formed with an axial, insert-receiving groove which is opened at one side of said holder,

b. ornamental members formed integral with said holder or holders,

c. an insert having a cross-sectional configuration so that the insert may be snugly fitted into said groove of said holder and an opening having a cross-sectional configuration adapted to be snugly fitted over a member to be decorated,

a V-shaped groove being cut through one side of said insert along the axial center line thereof, and

d. a cover adapted to be releasably joined to said holder for covering the opened side thereof,

whereby the ornamental assembly may be securely attached to the member to be decorated by fitting said insert over the member to be decorated and then fitting said holder over said insert and thereafter joining said cover to said holder.

4,060,666

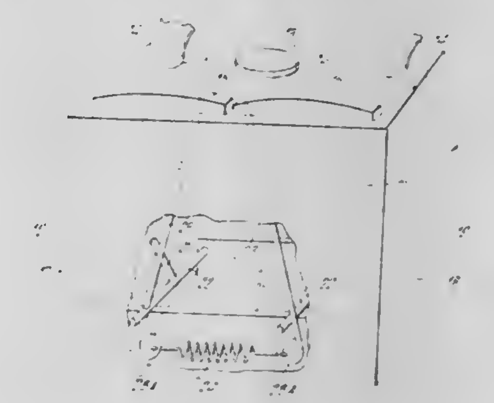
BATTERY CAPACITY INDICATOR FOR PRIMARY BATTERY

Lionel Anes, Califon, N.J., assignor to Compagnie Industrielle des Piles Electriques Cipel, Perret, France

Filed Feb. 23, 1976, Ser. No. 660,464

Int. Cl.² H01M *6/02*

U.S. Cl. 429—91 **5 Claims**



1. A battery exhaustion indicator for use with a primary battery having at least one electrode which is depleted with use, comprising; a fluid tight case, a scale carried by the case, at least one sensing arm, resiliently urged against a major face of the battery electrode which is depleted with use; said sensing arm comprises a means for contacting a large average space on the said electrode; a rotatable shaft secured to the sensing arm, a resilient means coupled to the rotatable shaft for urging the sensing arm against the electrode major face and an elongated pointer coupled to said arm and having a free movable end adjacent to the scale for indicating the thickness of the depleted electrode.

4,060,667

HIGH TEMPERATURE SECONDARY BATTERIES

Barry Anthony Askew, Broadstone; Ronald Holland, Wareham; Douglas Inman, and Yusuf Mohamed Faruq Marikar, both of London, all of England, assignors to National Research Development Corporation, London, England

Continuation of Ser. No. 616,820, Sept. 25, 1975. This application Mar. 1, 1977, Ser. No. 773,162

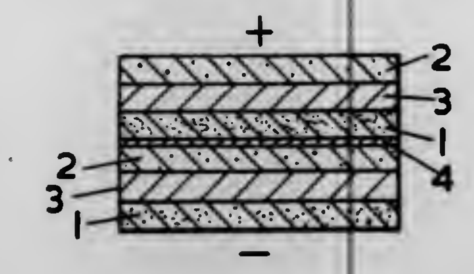
Claims priority, application United Kingdom, Aug. 22, 1975, 35044/75

Int. Cl.² H01M *4/36*

U.S. Cl. 429—103 **18 Claims**

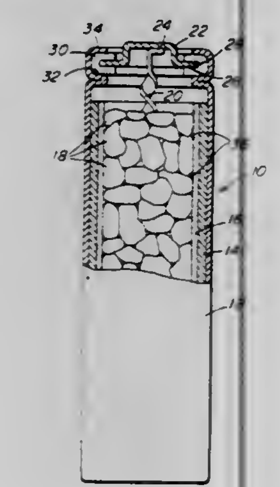
1. In a high temperature lithium-sulphur secondary battery comprising a stack of cells, each cell including a pellet of electrolyte suitable for said secondary battery and sandwiched between a negative electrode pellet composed at least partially of lithium and a positive electrode pellet, and an intercell metal sheet adapted to prevent direct chemical action between the electrode pellets of adjacent cells while maintaining electrical contact between them,

the improvement comprising using a positive electrode pellet composed substantially of titanium disulphide in



combination with the components of said lithium-sulphur secondary battery.

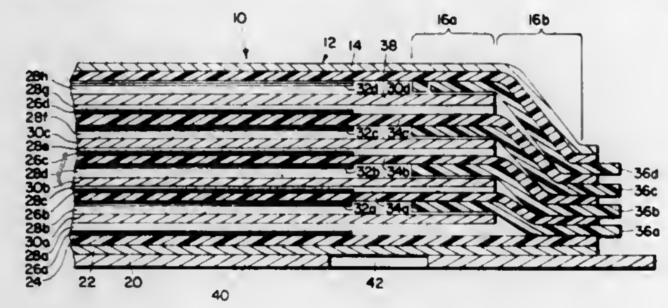
4,060,668
PRIMARY ELECTROCHEMICAL CELL
Franz Goebel, Ashland, Mass., assignor to GTE Laboratories Incorporated, Waltham, Mass.
Continuation-in-part of Ser. No. 539,749, Jan. 9, 1975, abandoned. This application Sept. 18, 1975, Ser. No. 614,467
The portion of the term of this patent subsequent to Apr. 25, 1994, has been disclaimed.
Int. Cl.² H01M *6/14*
U.S. Cl. 429—122 **11 Claims**



1. A cathode material for placement in a primary electrochemical cell containing an electrolyte comprising: an aggregate of porous semi-rigid globules having a composition of from about 40 to 99 weight percent of carbon black and at least 1 weight percent of a mechanical binder which is inert in the primary electrochemical cell, the remainder being graphite, a plurality of fluid-conducting channels being defined between boundaries of adjacent globules to insure diffusion of the electrolyte throughout the cathode material during the life of the cell.

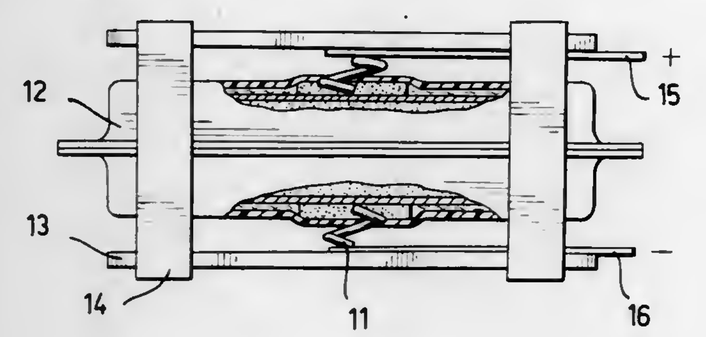
4. A primary electrochemical cell comprising:
an outer cell casing;
a first terminal on the exterior of the casing;
a primary electrochemical system including
an anode material connected to the first terminal,
a cathode material comprising an aggregate of semi-rigid globules for placement in the primary electrochemical cell and having a composition of from about 40 to 99 percent of carbon black and at least 1 weight percent of a mechanical binder which is inert in the primary electrochemical cell, the remainder being graphite, and
an electrolytic solution including a cathode depolarizer that can be electrochemically reduced on the surface of the carbon cathode,
a plurality of fluid conducting channels being defined between the boundaries of adjacent globules to enable diffusion of the electrolytic solution throughout the cathode material during the life of the cell;
a second terminal located on the exterior of the casing;
means for electrically insulating the second terminal from the first terminal; and
a cathode current collector connecting the cathode material to the second terminal.

4,060,669
FLAT BATTERY
Ralph D. Fanciullo, Waltham, Mass., assignor to Polaroid Corporation, Cambridge, Mass.
Filed Sept. 10, 1975, Ser. No. 612,210
Int. Cl.² H01M *6/46*
U.S. Cl. 429—152 **13 Claims**



1. A planar battery comprising: at least two discrete, sheet-type electrically conductive electrode supports substantially permeable to volatile effluvia generated internally of said battery;
separator means, electrode active material and electrolyte configured and arranged between said electrode supports to define at least one cell within said battery;
means defining a seal about the peripheral portion of said cell, said seal being formed inwardly of peripheries of said electrode supports to expose a portion thereof to the external environment of said battery in which said means defining said seal includes an electrically insulative frame having an opening defined by an inner border, an outer periphery and surface sealing portions intermediate said inner border and outer periphery, and in which said electrically insulative frame outer periphery extends outwardly beyond the periphery of said electrode supports.

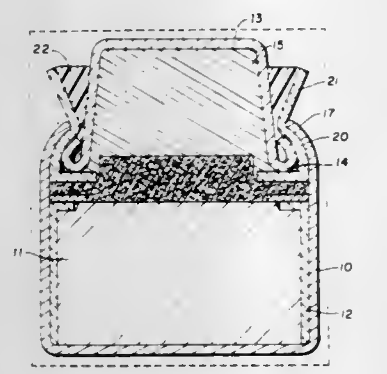
4,060,670
ALKALINE FLAT CELL BATTERY
Pentti Juuse Tamminen, Otsolahdentie 6, 02100 Tapiola, Finland
Filed Nov. 6, 1973, Ser. No. 413,288
Claims priority, application Finland, Nov. 10, 1972, 723151
Int. Cl.² H01M *2/30*
U.S. Cl. 429—154 **17 Claims**



1. An alkaline flat cell battery comprising:
a. terminal means
b. at least one flat cell arranged between said terminal means and being provided with a positive and a negative current collector;
c. battery contact elements in connection with said terminal means
d. contact areas of insulating material on both sides of each cell and corresponding to each other and being arranged in contact with the current collectors;

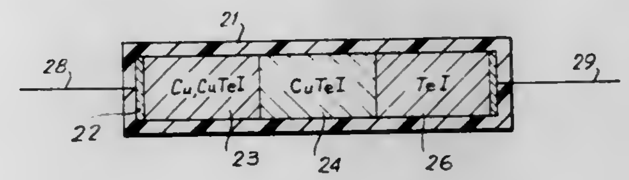
e. an envelope of plastics material, one for each of the cells, surrounding its respective cell to form a sealed unit; and
f. individual contact elements electrically interconnecting, on the one hand, adjacent cells and, on the other hand, the outermost cells and the battery contact elements, said individual contact elements being formed as metallic spring elements which are resiliently compressible in a direction substantially perpendicular to the contact area of the cell contacted thereby and have at least two point portions arranged to face in substantially opposite directions so as to pierce the envelope and the contact area of the cells to secure the electrical interconnecting of the battery when said terminal means are pressed against said flat cells.

4,060,671
BATTERY SEAL FOR ENCAPSULATABLE CELL
Richard J. VanderVelden, Wayzata, Minn., assignor to Medtronic, Inc., Minneapolis, Minn.
Filed Mar. 19, 1976, Ser. No. 668,595
Int. Cl.² H01M *2/08*
U.S. Cl. 429—174 **7 Claims**



1. An encapsulatable electrochemical power cell comprising:
a. a first cup-shaped metallic member, said cup including therein a first electrochemical reactant which together with said first member defines a first polarity electrode;
b. a cover member for said first member of a second cup-shaped metal member formed of an elastically resilient material, said cup member having a base portion and side walls of a substantial height, said cover member containing a second electrochemical reactant which together with said cover member defines an electrode of opposite polarity to said first electrode; said cover member having the open end thereof of a size to be inserted partially within the open end of a said first member to define an overlap region therebetween and to leave a major portion of said side walls exposed above said overlap region;
c. a grommet member of a substantially rigid material that is susceptible to cold flow positioned intermediate the first member and said cover member in the overlap region therebetween and constituting the sole material therebetween in said overlap region, said first member having the upper open end thereof formed inwardly to bear against said grommet member and thence to deform the open end of said cover member inwardly to less than its spring limit to produce an elastic spring bias of said cover member outwardly against said grommet member thereby providing a seal against loss of electrolyte from within said cell and which spring bias will follow the movement of said grommet should cold flow thereof occur to thereby maintain seal integrity; and,
d. a compressible and resilient layer of material having a thickness of at least 1/16 inch extending along and around the exposed sidewall of said cover member from said seal overlap region upwardly along the major portion of the sidewall of said cover member.

4,060,672
ELECTROCHEMICAL ENERGY CELL WITH SOLID ELECTROLYTE
Ulrich Von Alpen, Stuttgart; Jürgen Fenner, Ostfildern; Joachim Marcoll, Ludwigsburg, and Albrecht Rabenau, Stuttgart, all of Germany, assignors to Max-Planck-Gesellschaft zur Forderung der Wissenschaften e.V., Gottingen, Germany
Filed Apr. 29, 1976, Ser. No. 681,642
Claims priority, application Germany, Apr. 30, 1975, 2519351; Nov. 15, 1976, 2551346
Int. Cl.² H01M *6/18*
U.S. Cl. 429—191 **5 Claims**



1. Electrochemical energy cell, comprising first and second electrodes and at least one ionically-conductive solid electrolyte between said electrodes, said electrolyte comprising a chalcogen halide of the formula $Cu_xCg_yX_z$ where X is selected from the group consisting of chlorine, bromine or iodine, x is 1, y is at least equal to 1, Cg is a member of the group consisting of Te and Se, and $z = 1$.

4,060,673
ION EXCHANGE MEMBRANES AND ORGANIC ELECTROLYTE CELLS EMPLOYING SAME
Arabinda N. Dey, Needham, Mass., assignor to P. R. Mallory & Co. Inc., Indianapolis, Ind.
Continuation-in-part of Ser. No. 817,150, April 7, 1969, abandoned, which is a continuation-in-part of Ser. No. 313,300, Dec. 8, 1972, abandoned. This application Sept. 13, 1973, Ser. No. 396,924
Int. Cl.² H01M *6/18*
U.S. Cl. 429—192 **16 Claims**

1. In an organic electrolyte battery having a light metal anode, a cathode selected from the group consisting of metal halides and sulfur, and an organic electrolyte selected from the group consisting of gamma-butyrolactone, propylene carbonate, tetrahydrofuran, dimethylformamide, dimethylsulfoxide, dimethylcarbonate, acetonitrile, and the mixtures thereof, and containing an electrolyte salt dissolved therein, a microporous permselective barrier means therefor, separating said cathode and said electrolyte, and adapted to prevent diffusion of electrolytic anions, said barrier means comprising an ion-exchange membrane including a microporous substrate and a linear polyelectrolyte without cross-linking, said polyelectrolyte comprising a polymer insoluble in said organic solvent and having attached functional groups, said polyelectrolyte selected from the group consisting of Li, Na, and K polyacrylates.

4,060,674
ALKALI METAL ANODE-CONTAINING CELLS HAVING ELECTROLYTES OF ORGANOMETALLIC-ALKALI METAL SALTS AND ORGANIC SOLVENTS
Lawrence P. Klemann, Somerville, and Gerald H. Newman, Westfield, both of N.J., assignors to Exxon Research and Engineering Company, Linden, N.J.
Filed Dec. 14, 1976, Ser. No. 750,517
Int. Cl² H01M *6/14*
U.S. Cl. 429—194 **15 Claims**

1. In an electrochemical cell which contains an alkali metal anode, a cathode and a non-aqueous electrolyte, the improvement comprising;
using as said electrolyte one which consists essentially of:
a. an organic solvent selected from the group consisting of inertly substituted and unsubstituted ethers, sulfones, or-

ganic sulfates, organic sulfites, organic nitrates and organic nitrites; and

b. electrolytically active alkali metal salts including an electrolytically active amount of an organometallic alkali metal salt having the formula:

ZMR_n

wherein Z is an alkali metal, wherein M is a metal selected from the group consisting of Zn, Cd, B, Al, Ga, Sn (stannous), In, Tl, P and As, wherein R represents n number of radicals which may be the same or different and are inertly substituted or unsubstituted organic radicals selected from the group consisting of alkyl radicals having 1 to 8 carbon atoms, aryl radicals having 6 to 18 carbon atoms, and alkaryl and aralkyl radicals having 7 to 50 carbon atoms, subject to the proviso that at least one R is an alkyl radical, and wherein n is a numerical value equal to one plus the valence of the Metal M.

4,060,675

GALVANIC ELEMENT WITH A NEGATIVE ELECTRODE OF LIGHT METAL, A NON-AQUEOUS ELECTROLYTE AND A POSITIVE ELECTRODE

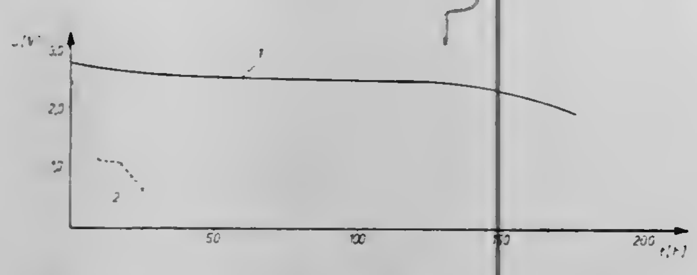
Helmut Lauck, Glashutten, Germany, assignor to Varta Batterie Aktiengesellschaft, Hannover, Germany

Filed Mar. 8, 1976, Ser. No. 664,544

Claims priority, application Germany, Apr. 16, 1975, 2516702

Int. Cl.² H01M *6/14*

U.S. Cl. 429—194 **9 Claims**



1. In a galvanic element with a negative electrode of a light metal, a non-aqueous electrolyte of a solution of a conducting salt in an organic solvent which does not set free H+-ions and a positive electrode containing a salt of a metal selected from the group consisting of silver, mercury, copper, lead and nickel, the improvement comprising said salt being an arsenite as the electrochemical reducible part of the positive electrode mass.

4,060,676

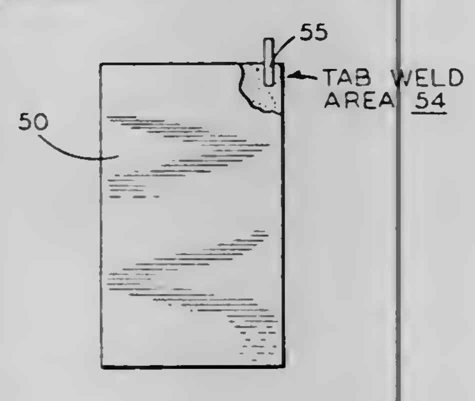
METAL PERIODATE ORGANIC ELECTROLYTE CELLS

Arabinda N. Dey, Needham, and Robert W. Holmes, Dedham, both of Mass., assignors to P. R. Mallory & Co. Inc., Indianapolis, Ind.

Division of Ser. No. 584,314, June 6, 1975, abandoned, which is a division of Ser. No. 245,510, April 19, 1972, Pat. No. 3,904,432. This application Aug. 27, 1976, Ser. No. 718,246

Int. Cl.² H01M *4/62*

U.S. Cl. 429—217 **5 Claims**



1. A solid cathodic electrode for a non-aqueous electrochemical cell wherein the cell comprises at least one positive electrode, at least one negative electrode, and an organic electrolyte with the electrodes disposed therein; the positive electrode, comprising the cathodic composition, including a periodate selected from the group consisting of silver, copper, iron, cobalt, nickel, mercury, thallium, lead, and bismuth and electrochemically inert conductive materials and binders wherein said periodate is substantially insoluble in said organic electrolyte.

4,060,677

PROCESS FOR MOLECULAR WEIGHT LOWERING OF VINYL HALIDE POLYMERS EMPLOYING SATURATED CARBON TO CARBON BONDED ALDEHYDES

Leigh E. Walker, Lewiston, N.Y., assignor to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.

Continuation-in-part of Ser. No. 552,826, Feb. 25, 1975, abandoned. This application May 6, 1976, Ser. No. 683,853

Int. Cl.² C08F *2/00, 14/06, 114/06, 214/06*

U.S. Cl. 526—88 **11 Claims**

1. In the process for preparation of a vinyl halide homopolymer, vinyl halide copolymer or vinyl halide graft polymer containing up to about 50% by weight of comonomer devoid of aldehyde substituents and/or a compatible back-bone polymer by bulk liquid phase polymerization which comprises:

1. polymerizing a vinyl halide monomer composition comprising 0% to about 50% by weight of said comonomer and/or said back-bone polymer at a temperature of about −60° C to about 90° C;
2. recovering the resulting vinyl halide polymer from said monomer or monomers, the improvement which comprises carrying out at least part of the polymerization in the presence of a small molecular weight-lowering amount of an aldehyde which is devoid of ethylenic and acetylenic unsaturation and which contains at least one carbon to carbon bond, whereby the molecular weight of the vinyl halide polymer product is substantially lowered without substantial lowering of the rate of conversion of vinyl halide to polymer, said amount of aldehyde being less than about 10 weight percent based on the weight of polymerization mixture.

4,060,678

CATIONIC HYDROGELS BASED ON HYDROXYALKYL ACRYLATES AND METHACRYLATES

Robert Steckler, San Diego, Calif., assignor to Plastomedical Sciences, Inc., Briarcliff Manor, N.Y.

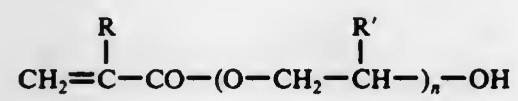
Filed Feb. 11, 1975, Ser. No. 549,096

Int. Cl.² C08F *220/06*

U.S. Cl. 526—260 **6 Claims**

1. The cationic, polymeric hydrogel produced by the process which comprises simultaneously polymerizing and crosslinking a mixture consisting essentially of the following monomers;

a. about 40 to about 95 weight percent, based on the total weight of monomers of an acrylic monomer selected from the group consisting of glyceryl monoacrylates and monomethacrylates and acrylic monomers having the formula:

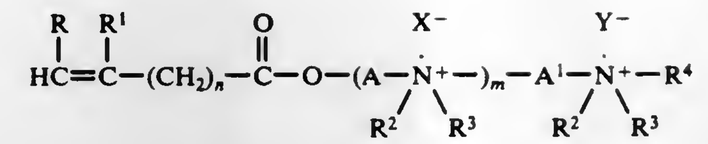


wherein:

R and R′ each represents hydrogen or lower alkyl of 1 to about 6 carbon atoms;

n represents an integer of from 1 to about 50;

b. about 50 to about 0.05 weight percent, based on the total weight of monomers, of a monoethylenically unsaturated cationic monomer, capable of copolymerizing with (a), and which is a quaternary ammonium compound having the formula:



wherein:

R represents hydrogen, methyl or aryl;

R¹ represents hydrogen or alkyl of 1 to about 18 carbons;

A and A¹, each of which may be the same or different, each represents an alkylene group of from about 2 to about 8 carbons or an arylene group;

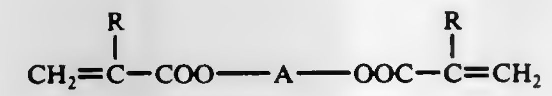
R², R³ and R⁴, each of which may be the same or different, each represents alkyl, aryl or alkaryl or the R² and R³ on the same nitrogen atom, taken together represent a divalent aliphatic group of 4 to 5 atoms which jointly with the amino nitrogen forms a 5 or 6 membered heterocyclic amino group;

X and Y, each of which may be the same or different, each represents an anion forming the anion portion of a quaternary ammonium group; and

n represents an integer, including 0, of from 0 to about 10; and

m represents an integer, including 0, of from 0 to about 5;

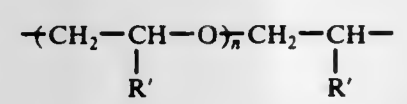
c. about 0.2 to about 12 weight percent, based on the total weight of monomers, of a polymerizable cross-linking agent capable of copolymerizing with (a) and (b); and having the formula:



wherein

R represents a member of the group consisting of hydrogen and alkyl of from 1 to about 4 carbon atoms;

A represents alkylene of from 2 to about 10 carbons or a polyglycol ether group of the formula:



in which

R′ represents a member of the group consisting of hydrogen and alkyl of 1 to 2 carbon atoms; and

n represents an integer of from 1 to about 20; and

(d) from 0 to about 50 weight percent, based on the total weight of monomers, of other monoethylenically unsaturated monomers capable of copolymerizing with (a), (b) and (c) and selected from the group consisting of: acrylamides, methacrylamides, alkyl acrylates, alkyl methacrylates, N-vinyl lactams, N-vinyl succinimide, N-vinyl diglycoylimide, N-vinyl glutarimide, N-vinyl-3-morpholinone, N-vinyl-5-methyl-3-morpholinone and N-vinyl imidazole;

provided that (a) ≧ (d) and (a) + (d) = about 40 to about 95 weight percent, and when an N-vinyl lactam, N-vinyl succinimide, N-vinyl diglycoylimide, N-vinyl glutarimide, N-vinyl-3-morpholinone, N-vinyl-5-methyl-3-morpholinone or N-vinyl imidazole is used it is present in an amount of less than 20 weight percent;

in the presence of a free radical polymerization catalyst in an amount of from about 0.05 to about 4 weight percent, based on the total weight of monomers; and at a temperature of from about 20° to about 125° C.

4,060,679

METHOD OF PREPARING A LOW MOLECULAR WEIGHT PAPER SIZE POLYMER BY CONTINUOUS POLYMERIZATION IN THE ABSENCE OF INITIATOR

Herbert Naarmann, Wattenheim; Fritz Reichel, Eppelheim, and Hermann Gausepohl, Mutterstadt, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Filed Apr. 9, 1976, Ser. No. 675,581

Claims priority, application Germany, May 2, 1975, 2519581

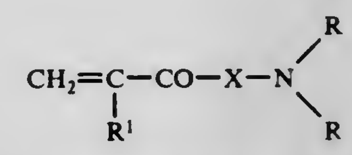
Int. Cl.² C08F *20/70, 22/58, 220/60, 226/00*

U.S. Cl. 526—304 **5 Claims**

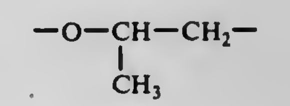
1. A process for the manufacture of a paper size by continuous polymerization of:

a. from 30 to 85 percent by weight of olefins of 2 to 12 carbon atoms having a terminal double bond selected from the group consisting of ethylene, propylene, butene-1 and 4-methylpentene-1, olefins containing aromatic group and having up to 12 carbon atoms selected from the group consisting of styrene and vinyl toluene, vinyl ethers selected from the group consisting of vinyl methyl ether, vinyl ethyl ether, vinyl n-propyl ether, vinyl isopropyl ether, vinyl n-butyl ether, vinyl sec.-butyl ether, vinyl tert.-butyl ether and vinyl dodecyl ether and mixtures thereof,

b. from 15 to 70 percent by weight of one or more basic acrylic and/or methacrylic compounds of the general formula



where R¹ is H or CH_3, R is alkyl of 1 to 4 carbon atoms, $—CH_2OH$ or $—CH_2—CH_2—OH$, X is $—O—CH_2—CH_2—$, $—O—CH_2—CH_2—CH_2—$,



or $—NH—(CH_2)_n—CH_2—$ and n is from 1 to 3, at from 130° to 320° C, in the absence of polymerization initiators said process taking place at a pressure of greater than 1 bar and with a residence time of from 3 to 60 minutes.

4,060,680

PRODUCTION OF ACRYLONITRILE COPOLYMERS

Brian Norman Hendy, Welwyn, England, assignor to Imperial Chemical Industries Limited, Great Britain

Filed Mar. 22, 1976, Ser. No. 668,816

Claims priority, application United Kingdom, Apr. 10, 1975, 14791/75; May 7, 1975, 19133/75

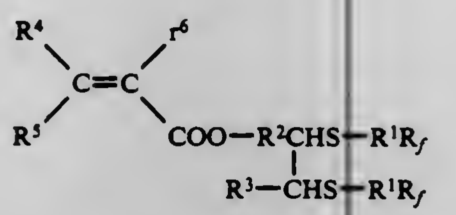
Int. Cl.² C08F *212/10*

U.S. Cl. 526—201 **9 Claims**

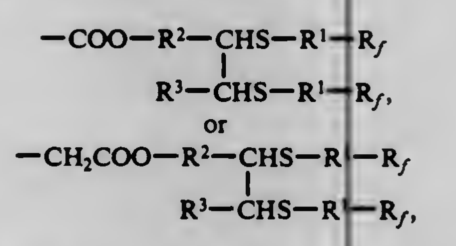
1. A granular polymerization process for producing a uniform copolymer consisting of 50–95% molar of acrylonitrile units, 5–45% molar of units of at least one faster-reacting aromatic olefin selected from the group consisting of styrene and α-methyl styrene and 0–10% of other ethylenically unsaturated monomers, said copolymer having a reduced viscosity of ≦ 0.75 determined as a 5% solution in dimethyl formamide at 25° C., said process comprising feeding a portion of at least the aromatic olefin to the reaction mixture during the polymerization so that the polymer molecules formed early in the polymerization reaction have substantially the same composition as those formed subsequently and conducting the polymerization in the presence of (a) at least one thiol as chain-transfer agent selected from the group consisting of alkane thiols containing up to 20 carbon atoms, isooctylthioglycolate, trimethylolypropane tri-(3-thiopropronate), thioethanol and α-thioglycerol, (b) a granulating agent and (c) a momomer soluble initiator, while maintaining the reaction medium at pH ≦ 4.5.

4,060,681
UNSATURATED ESTERS OF POLYFLUOROALKYLTHIOALCOHOLS
Eduard K. Kleiner, New York, and Robert Ernest Arthur Dear, Mount Kisco, both of N.Y., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.
Filed Feb. 11, 1976, Ser. No. 657,140
Int. Cl.² C07G *69/54*
U.S. Cl. 560—222 **14 Claims**

1. A compound of the structure



wherein
R^1, R^2 are each C_nH_{2n}, where n is 1 to 12 and may be straight chain or branched;
R^3 is hydrogen or C_nH_{2n+1}, where n is 1 to 12 and may be straight chain or branched;
R^4, R^5 and R^6 are hydrogen, methyl



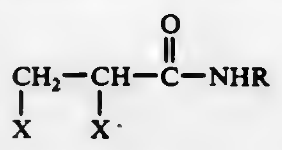
provided that at least one of R^4, R^5 and R^6 is hydrogen or methyl;
R_f is C_pF_{2p+1} or $C_pF_{2p+1}OC_qF_{2q}$, where p is 3 to 18, q is 2 to 8.

4,060,682
PROCESS FOR THE SYNTHETIC PRODUCTION OF 3-DEOXY DERIVATIVE OF AN AMINOGLYCOSIDIC ANTIBIOTIC
Hamao Umezawa; Sumio Umezawa, both of Tokyo; Osamu Tsuchiya, Yokohama; Eiichi Akita, Kamakura; Takeo Miyazawa, Tokyo; Yukio Horiuchi, Yokohama, and Shunzo Fukatsu, Tokyo, all of Japan, assignors to Meiji Seika Kaisha, Ltd., Tokyo, Japan
Filed July 23, 1975, Ser. No. 598,379
Claims priority, application Japan, Aug. 1, 1974, 49-87499
Int. Cl.² A61K *31/71;* **C07H** *15/22*
U.S. Cl. 536—10 **17 Claims**

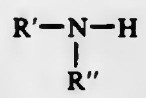
17. A compound which is selected from the group consisting of tetra-N-ethoxycarbonyl-5,6-O-cyclohexylidene-3′,4′-epoxy(α)-neamine; penta-N-ethoxycarbonyl-4″,6″-O-cyclohexylidene-3′,4′-epoxy(α)-kanamycin B; 3′,4′-epoxy(α) -kanamycin B; penta-N-ethoxycarbonyl-4″,6″-O-cyclohexylidene-3′,4′-epoxy(α)-6′-N-methylkanamycin B; 2″,3″-O-cyclohexylidene-tetra-N-ethoxycarbonyl-3′,4′-epoxy(α)-ribostamycin; and tri-N-ethoxycarbonyl-5,6-O-cyclohexylidene-3′,4′-epoxy(α)-paromamine.

4,060,683
PREPARATION OF CATIONIC STARCHES AND CATHIONIC STARCHES THUS PRODUCED
Martin M. Tessler, Edison, N.J., assignor to National Starch and Chemical Corporation, Bridgewater, N.J.
Filed Aug. 31, 1976, Ser. No. 719,266
Int. Cl.² C08B *31/08*
U.S. Cl. 536—50 **8 Claims**

1. A method for the preparation of modified starch products comprising the steps of
1. reacting a starch base with a modifying agent in an aqueous medium at a pH of 10.0 to 12.5 and a temperature of 10° to 60° C. for a period of 0.2 to 16 hours, said modifying agent comprising the reaction product of
a. a 2,3-dihalopropionamide of the formula:

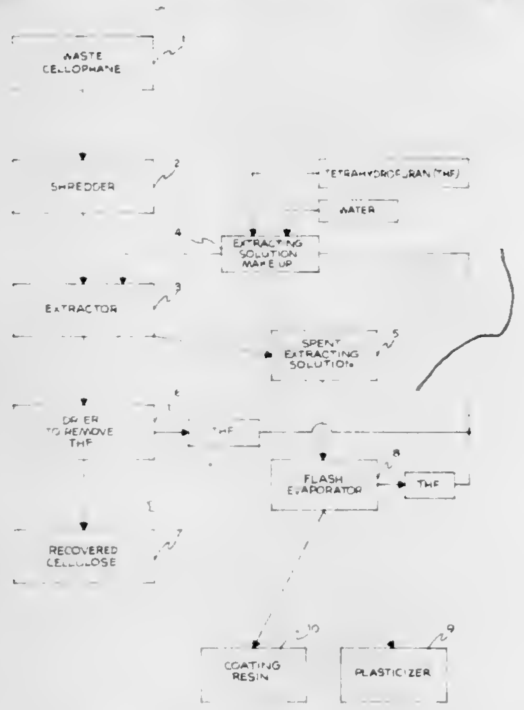


wherein X is a bromine or chlorine and R is hydrogen or C_1–C_8 alkyl with
b. a secondary amine of the formula



where R′ and R″ are, independently, alkyl, alkenyl, arylalkyl or ether substituted alkyl or alkenyl or wherein R′ and R″ are connected to form a cyclic amine and wherein the total number of carbon atoms in R′ and R″ combined is a maximum of 12, wherein the reaction to form said modifying agent is carried out at a temperature of 20° to 100° C, in an organic medium for a period of 10 minutes to 18 hours; and
2. isolating the resulting starch product.

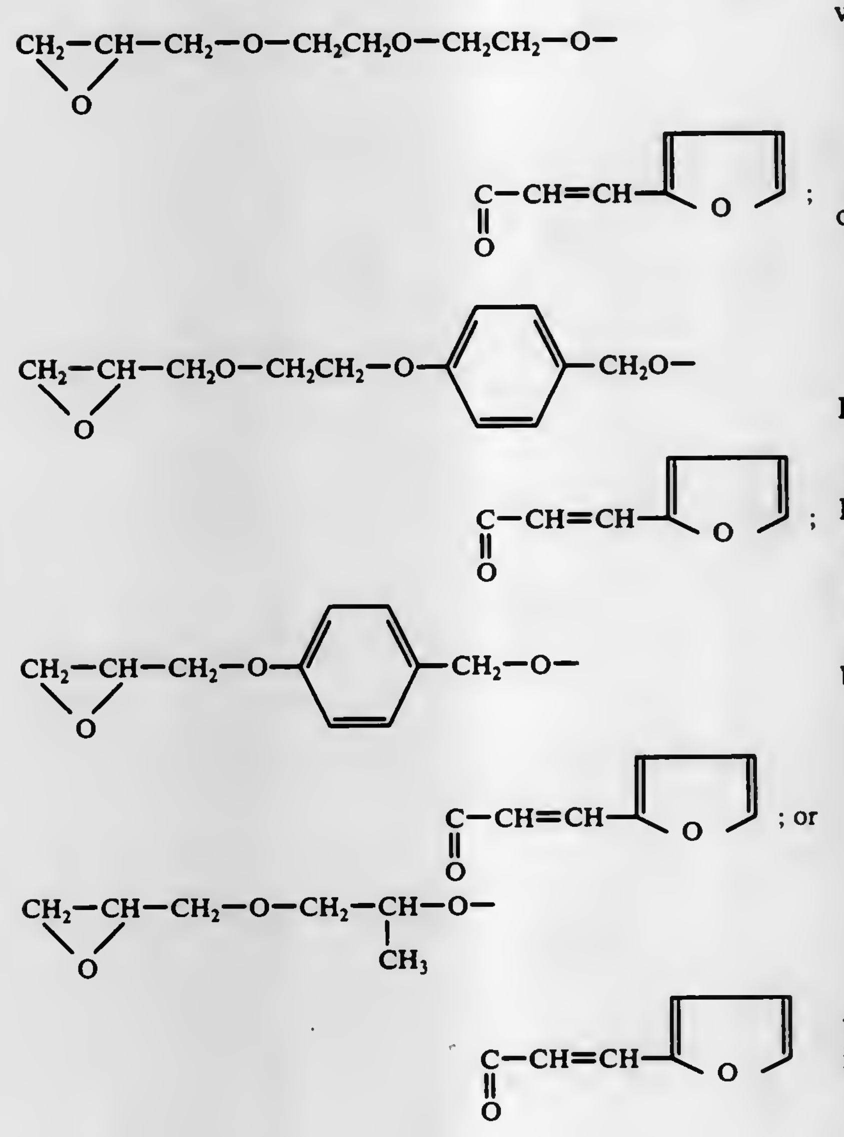
4,060,684
PROCESS FOR RECOVERING RAW MATERIALS FROM WASTE CELLOPHANE
Donald Wayne Monk, Brevard, N.C., assignor to Olin Corporation, Pisgah Forest, N.C.
Filed Sept. 1, 1976, Ser. No. 719,657
Int. Cl.² C08B *9/08*
U.S. Cl. 536—56 **8 Claims**



1. A process for recovering usable materials from scrap cellophane softened with a plasticizer and bearing a moisture-proof coating resin comprising:
a. shredding the cellophane to form a relatively fine flake;
b. extracting both plasticizer and coating resin by washing the cellophane flake with an aqueous solution of tetrahydrofuran containing from 2 to 15% by weight water;
c. removing the spent wash solution containing plasticizer, coating resin, tetrahydrofuran, and water and rapidly evaporating the tetrahydrofuran therefrom while concurrently allowing the coating resin to precipitate; and
d. drying the extracted cellophane flake to remove retained tetrahydrofuran and recovering the purified cellulose.

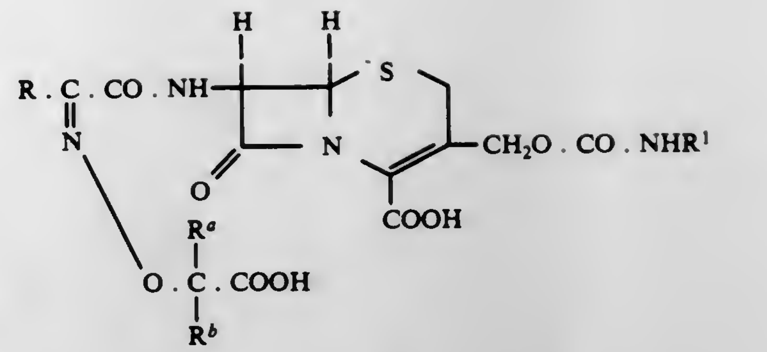
4,060,685
FURANACROYL ESTERS
Yukio Maekawa; Masato Satomura, and Akira Umehara, all of Asaka, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan
Division of Ser. No. 414,609, Nov. 8, 1973, Pat. No. 3,993,624. This application Apr. 28, 1976, Ser. No. 680,994
Claims priority, application Japan, Nov. 8, 1972, 47-111804; Feb. 17, 1973, 48-19544
Int. Cl.² C07D *407/06, 407/10, 407/12*
U.S. Cl. 542—413 **5 Claims**

1. A furanacroyl ester having the general formula



4,060,686
CEPHALOSPORINS HAVING A 7-(CARBOXY SUBSTITUTED α-ETHERIFIED OXIMINOARYLACETAMIDO) GROUP
Janice Bradshaw, 37 Hamilton Road, Harrow, Middlesex; Martin Christopher Cook, 18 Menlove Gardens South, Liverpool 18, and Gordon Ian Gregory, 18 The Paddock, Chalfont St. Peter, Buckinghamshire, all of England
Continuation-in-part of Ser. No. 533,451, Dec. 16, 1974, abandoned. This application Mar. 18, 1976, Ser. No. 668,246
Claims priority, application United Kingdom, Dec. 21, 1973, 59517/73
Int. Cl.² C07D *501/32, 501/34*
U.S. Cl. 544—22 **5 Claims**

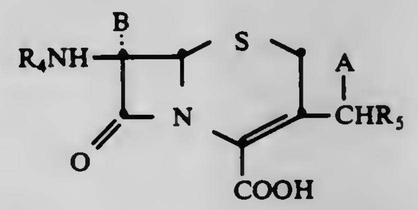
1. A cephalosporin antibiotic of the formula:



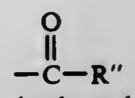
wherein
R is thienyl, furyl or phenyl;
R^a and R^b together with the carbon atom to which they are attached form a cyclobutylidene, cyclopentylidene or cyclohexylidene group; and
R^1 is hydrogen or methyl;
or a physiologically acceptable salt, ester, or 1-oxide thereof.

4,060,687
CEPHALOSPORINS HAVING A 3-α SUBSTITUTED ALKYL GROUPING
Burton G. Christensen, Metuchen, and Ronald W. Ratcliffe, Matawan, both of N.J., assignors to Merck & Co., Inc., Rahway, N.J.
Division of Ser. No. 392,159, Aug. 27, 1973, Pat. No. 3,947,413, which is a continuation-in-part of Ser. No. 314,485, Dec. 12, 1972, abandoned, and Ser. No. 306,064, Nov. 13, 1972, abandoned. This application Oct. 23, 1975, Ser. No. 625,280
Int. Cl.² C07D *501/16;* **A61K** *31/545*
U.S. Cl. 544—27 **3 Claims**

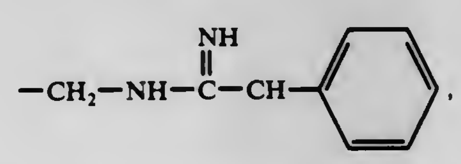
1. A compound having the structure:



wherein: R_4 is an acyl radical selected from the group consisting of:

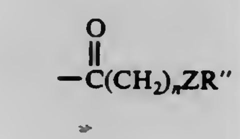


wherein: R″ is benzyl, p-hydroxybenzyl, 4-amino-4-carboxybutyl, methyl, cyanomethyl, 2-pentenyl, n-amyl, n-heptyl, ethyl, 3- or 4-nitrobenzyl, phenethyl, β,β-diphenylethyl, methyldiphenylmethyl, triphenylmethyl, 2-methoxyphenyl, 2,6-dimethoxyphenyl, 2,4,6-trimethoxyphenyl, 3,5-dimethyl-4-isoxazolyl, 3-butyl-5-methyl-4-isoxazolyl, 5-methyl-3-phenyl-4-isoxazolyl, 3-(2-chlorophenyl)-5-methyl-4-isoxazolyl, 3-(2,6-dichlorophenyl)-5-methyl-4-isoxazolyl, D-4-amino-4-carboxybutyl, D-4-N-benzoylamino-4-carboxy-n-butyl, p-aminobenzyl,

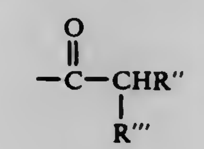


o-aminobenzyl, m-aminobenzyl, (3-pyridyl)methyl, 2-ethoxy-1-napthyl, 3-carboxy-2-quinoxalinyl, 3-(2,6-dichlorophenyl)-5-(2-furyl)-4-isoxazolyl, 3-phenyl-4-isoxazolyl, 5-methyl-3-(4-guanidinophenyl)-4-isoxazolyl, 4-guanidinomethylphenyl, 4-guanidinomethylbenzyl, 4-guanidinobenzyl, 4-guanidinophenyl, 2,6-dimethoxy-4-guanidinophenyl, o-sulfobenzyl, p-carboxymethylbenzyl, p-carbamoylmethylbenzyl, m-fluorobenzyl, m-bromobenzyl, p-chlorobenzyl, p-methoxybenzyl, 1-napthylmethyl, 3-isothiazolylmethyl, 4-isothiazolylmethyl, 5-

isothia-zolylmethyl, 4-pyridiylmethyl, 5-isoxazolylmethyl, 4-methoxy-5-isoxazolylmethyl, 4-methyl-5-isoxazolylmethyl, 1-imidazolylmethyl, 2-benzofuranylmethyl, 2-indolylmethyl, 2-phenylvinyl, 2-phenylethynyl, 2-(5-nitrofuranyl)vinyl, phenyl, o-methoxyphenyl, o-chlorophenyl, o-phenylphenyl, p-aminomethylbenzyl, 1-(5-cyanotriazolyl)methyl, difluoromethyl, dichloromethyl, dibromomethyl, 1-(3-methylimidazolyl)methyl, 2- or 3-(5-carboxymethylthienyl)-methyl, 2- or 3-(4-carbamoylthienyl)methyl, 2- or 3-(5-methylthienyl) methyl, 2- or 3-(5-methoxythienyl)methyl, 2- or 3-(4-chlorothienyl)methyl, 2- or 3-(5-sulfothienyl)methyl, 2- or 3-(5-carboxythienyl)methyl, 3-(1,2,5-thiadiazolyl) methyl, 3-(4-methoxy-1,2,5-thiadiazolyl)methyl, 2-furylmethyl, 2-(5-nitrofuryl)methyl, 3-furylmethyl, 2-thienylmethyl, 3-thienylmethyl, or tetrazolylmethyl; or the radical R_4 is represented by:



wherein n is 0–4, Z represents oxygen or sulfur, and R'' is defined above; or the radical R_4 is represented by:



wherein R'' is defined as above and R''' is a radical selected from the group consisting of: amino, hydroxy, azido, carbamoyl, guanidino, halo, sulfamino, tetrazolyl, sulfo, and carboxy; B is hydrogen or methoxyl; R^5 is a C_1–C_4 straight or branched chain alkyl; A is a heterocyclylthio radical selected from the group consisting of: isoxazolylthio, pyrolidenylthio, 1,3,4-thiadiazolylthio, 1-oxidopyridylthio, furazanylthio, tetrazolylthio, thienylthio, thiazolylthio, furylthio, pyranylthio, pyrrolylthio, imidazolylthio, pyrazolylthio, pyridylthio, pyrazinylthio, pyrimidinylthio, pyridazinylthio, isothiazolylthio, and 1-methyl-1,2,3,4-tetrazolyl-5-thio; and the non-toxic pharmaceutically acceptable salts and esters thereof.

4,060,688

CEPHALOSPORIN INTERMEDIATES

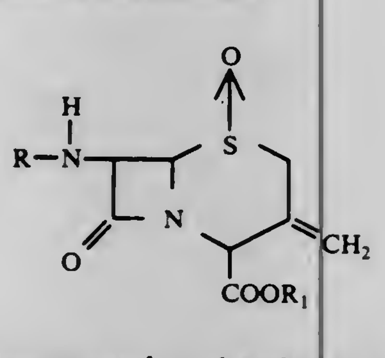
Robert R. Chauvette, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Continuation-in-part of Ser. No. 310,191, Nov. 28, 1972, Pat. No. 3,917,587. This application June 6, 1975, Ser. No. 584,548

Int. Cl.² C07D *501/22*

U.S. Cl. 544—30 **5 Claims**

1. The compound of the formula



wherein R is phenoxyacetyl or phenylacetyl and R_1 is hydrogen, p-nitrobenzyl, p-methoxybenzyl, benzhydryl, or 2,2,2-trichloroethyl.

4,060,689

VINYLBENZYL ESTERS OF N-BOC-AMINO ACIDS

Nicholas D. Harris, Norwich, N.Y., assignor to Morton-Norwich Products, Inc., Norwich, N.Y.

Division of Ser. No. 659,967, Feb. 20, 1976. This application Dec. 17, 1976, Ser. No. 751,721

Int. Cl.² C07C *125/06;* **A61K** *37/02*

U.S. Cl. 560—29 **1 Claim**

1. The vinylbenzyl ester of N-tertiarybutyloxy carbonyl-O-benzyl-L-threonine.

4,060,690

METHOD OF PREPARING ARYLACETIC ACID ALKYL ESTERS

Moustafa El Chahawi, Troisdorf, and Hermann Richtzenhain, Much-Schwellenbach, both of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Troisdorf, Germany

Division of Ser. No. 387,268, Aug. 10, 1973, Pat. No. 3,974,202. This application Mar. 29, 1976, Ser. No. 671,896

Claims priority, application Germany, Aug. 17, 1972, 2240399; Aug. 17, 1972, 2240398

Int. Cl.² C07C *67/36, 69/76*

U.S. Cl. 560—55 **6 Claims**

1. In a process of producing an alkyl ester of a substituted or unsubstituted arylacetic acid wherein a corresponding substituted or unsubstituted benzyl halide is reacted with carbon monoxide and an alcohol having an alkoxy group the same as that of said ester, the improvement which comprises carrying out said reaction in a basic reaction medium at a temperature of about 10°-100° C, and a carbon monoxide pressure of about 0.1-25 atmospheres in the presence as catalyst of at least one cobalt salt of the group cobalt halide, cobalt acetate, cobalt-acetylacetonate, cobalt nitrate, cobalthydroxide-carbonate and $Co_2(CO)_8$, at least one metal or metal alloy of the group manganese, iron, nickel and alloys thereof, and at least one water soluble sulfur compound of the group sodium dithionate, sulfoxylates, and sodium sulfide-sodium thiosulfate.

4,060,691

7-{3-HYDROXY-2-[4-HYDROXY-4-(LOWER ALKYL)-TRANS-1-OCTEN-1-YL]-5-OXOCYCLOPENT-1-YL}HEPTANOIC ACIDS AND ESTERS

Paul W. Collins, Deerfield, and Raphael Pappo, Skokie, both of Ill., assignors to G. D. Searle & Co., Chicago, Ill.

Continuation-in-part of Ser. No. 454,913, March 26, 1974, Pat. No. 3,965,143. This application Dec. 22, 1975, Ser. No. 642,830

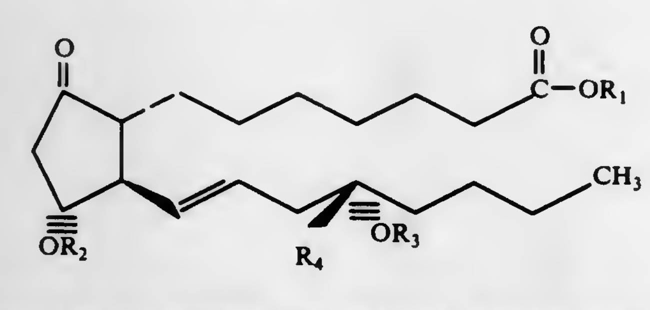
Claims priority, application South Africa, Mar. 6, 1975, 75/1391

The portion of the term of this patent subsequent to June 22, 1993, has been disclaimed.

Int. Cl.² C07C *177/00*

U.S. Cl. 560—121 **5 Claims**

1. A compound of the formula



wherein R_1 is hydrogen or lower alkyl; R_2 and R_3 are hydrogen or a lower alkanoyl, tetrahydropyran-2-yl, or tri(lower alkyl)-silyl radical; and R_4 is a lower alkyl radical.

ELECTRICAL

4,060,692

INDUCTION MELTING FURNACE

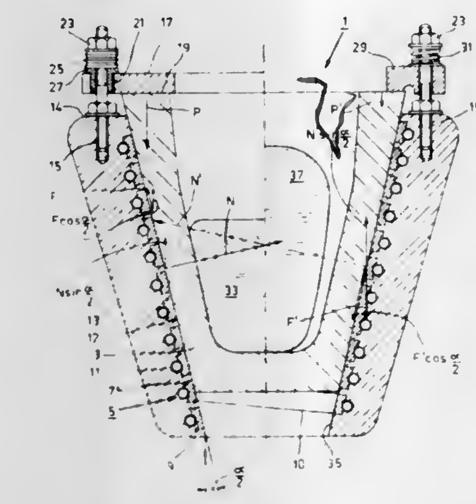
Pieter Aart Naastepad, and Jacob Willem de Ruiter, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed June 14, 1976, Ser. No. 695,773

Claims priority, application Netherlands, June 20, 1975, 7507358

Int. Cl.² H05B *5/00;* **F27D** *11/06*

U.S. Cl. 13—26 **13 Claims**



1. An induction melting furnace comprising a prefabricated conical crucible, a water-cooled induction coil and a supporting body having a conical inner circumference for supporting said conical crucible, and tensioning means arranged to subject the prefabricated crucible to an axial load during mounting to bring it under a radial compression stress and for maintaining said radial compression stress during the operation of the furnace.

4,060,693

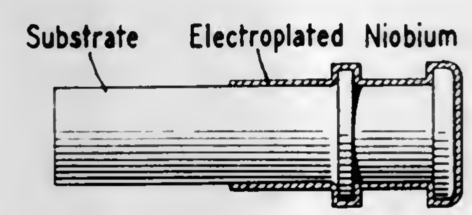
AC SUPERCONDUCTING ARTICLES

Robert Wagner Meyerhoff, Croton-on-Hudson, N.Y., assignor to Union Carbide Corporation, New York, N.Y.

Division of Ser. No. 359,377, May 11, 1973, Pat. No. 3,906,412, which is a continuation of Ser. No. 160,926, July 8, 1971, abandoned, which is a continuation of Ser. No. 701,594, Jan. 30, 1968, abandoned. This application Aug. 7, 1975, Ser. No. 596,839

Int. Cl.² H01B *12/00*

U.S. Cl. 174—126 S **6 Claims**



3. An AC superconducting transmission line for continuously transmitting AC power at power line frequencies with very low AC hysteretic losses which remain low even at high current density and/or high AC magnetic fields comprising: a multilayer tubular conductor wherein an outermost layer of said tubular conductor is niobium and wherein at least one other layer is of highly conductive material, said niobium layer containing oxygen in an amount less than about 50 parts per million, hydrogen in an amount less than about 1 part per million and nitrogen in an amount greater than about 1 part per million.

4,060,694

SPEECH RECOGNITION METHOD AND APPARATUS ADAPTED TO A PLURALITY OF DIFFERENT SPEAKERS

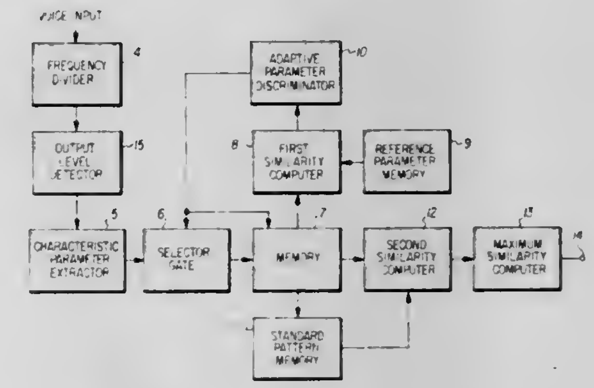
Matsumi Suzuki; Tetsuro Morino, and Shozo Yokota, all of Ebina, Japan, assignors to Fuji Xerox Co., Ltd., Tokyo, Japan

Filed May 27, 1975, Ser. No. 581,083

Claims priority, application Japan, June 4, 1974, 49-62526

Int. Cl.² G10L *1/02*

U.S. Cl. 179—1 SD **2 Claims**



1. Speech recognition method adapted to a plurality of speakers comprising the steps of

storing a plurality of reference parameters for a reference speaker where said reference parameters comprise a sentence of a predetermined vocabulary;

first extracting a characteristic parameter for each phoneme from said sentence when it is uttered by said reference speaker, and

storing a characteristic parameter corresponding to each said phoneme during said storing step where all of said characteristic parameters comprise said reference parameters and where each characteristic parameter x_i is extracted in accordance with the following equation

$$x_i = \sum_{j=1}^{n} \alpha_j F_j - \sum_{j=1}^{n} \beta_j F_j - \gamma_i$$

the foregoing equation being implemented by (a) dividing each phoneme into n frequency bands where F_j is the output of the j^{th} band, (b) respectively weighting each of the outputs the bands where the weight for the j^{th} band for x_i is α_j and the weight for a phoneme which can erroneously be recognized as x_i is β_j, (c) establishing a predetermined threshold γ_i and (d) subtracting the β_j weighted F_j outputs and γ_i from the α_j weighted F_j outputs to obtain x_i;

extracting the characteristic parameters from said sentence when uttered by an unknown speaker in accordance with the following equation

$$Y_m = \{y'_m(t) \mid x_{1k}(t_{ym}),\, x_{2k}(t_{ym}) \,.\,.\,.\,.\,.\, x_{ik}(t_{ym})\} \quad (9)$$

wherein $m = 1, 2, . . g$

where $k = 0, 1, 2, \ldots p-1$, the foregoing equation being implemented by said first extracting step and $p-1$ further extracting steps where each of said further extracting step comprises the same steps (a) through (d) comprising said first extracting step except for respective variations in the values of α_j and β_j where α_{jk} is the k^{th} variation of α_j and β_{jk} is the k^{th} variation of β_j whereby p characteristic parameters are extracted for each phoneme of said sentence;

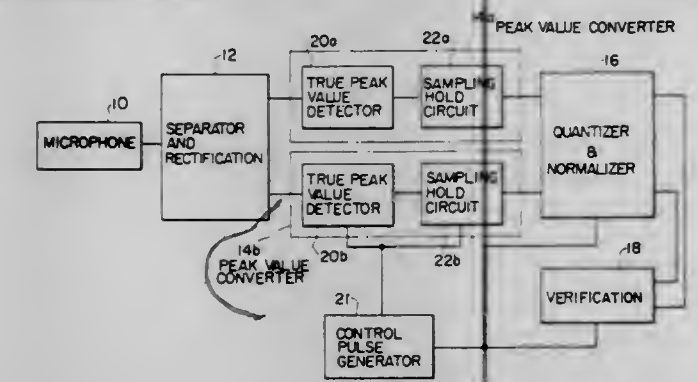
individually comparing said p characteristic parameters of each phoneme with the reference characteristic parameter extracted for said phoneme from said sentence uttered by said reference speaker;

selecting for each said phoneme the one characteristic parameter from said p characteristic parameters which most closely compares with said reference characteristic parameters,

in response to the selected characteristic parameter, selecting from the first extracting steps and said further extracting steps that extracting step which extracted the selected characteristic parameter for each phoneme whereby the selected extracting step is then employed for said unknown speaker; and

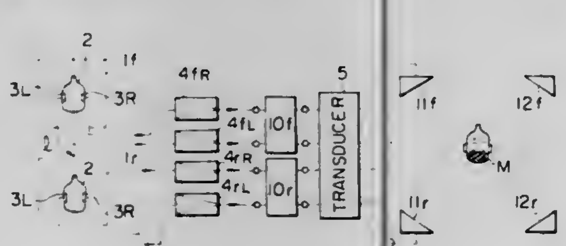
in response to the selected extracting step, utilizing the characteristic parameters of any sentence using said vocabulary uttered by said unknown speaker to effect recognition of said last-mentioned sentence.

4,060,695
SPEAKER IDENTIFICATION SYSTEM USING PEAK VALUE ENVELOP LINES OF VOCAL WAVEFORMS
Matsumi Suzuki; Hiroyuki Kataoka, and Keiichi Ueno, all of Kanagawa, Japan, assignors to Fuji Xerox Co., Ltd., Tokyo, Japan
Filed Aug. 9, 1976, Ser. No. 713,065
Claims priority, application Japan, Aug. 9, 1975, 50-97033
Int. Cl.² G10L *1/00*
U.S. Cl. 179—1 SB **3 Claims**



1. A voice recognition system for developing from an electrical voice signal a characteristic pattern for comparison with a stored characteristic pattern, said system comprising, means for separating said voice signal into its positive and negative polarity portions, peak follower circuit means for following the peaks of said positive and negative polarity portions, sampling means connected to said peak follower circuit means for sampling said peaks at predetermined intervals to develope positive and negative peak envelope waves, and quantizing and normalizing said positive and negative peak envelope waves, said quantized normalized positive and negative peak envelopes constituting said characteristic pattern.

4,060,696
BINAURAL FOUR-CHANNEL STEREOPHONY
Makoto Iwahara; Fumio Maruyama; Goro Fujiki; Toshinori Mori; Norio Hiyama, and Mitsuru Kikuchi, all of Yokohama, Japan, assignors to Victor Company of Japan, Limited, Japan
Filed June 17, 1976, Ser. No. 697,122
Claims priority, application Japan, June 20, 1975, 50-75209; June 24, 1975, 50-76934
Int. Cl.² H04R *5/00*
U.S. Cl. 179—1 GQ **11 Claims**



1. A four-channel stereophony using left and right front loudspeakers and left and right rear loudspeakers, comprising: first and second dummy heads each simulating the human head in shape and dimensions and provided with left and right microphones mounted in positions corresponding to the ears of the human head to generate front binaural signals Lfs and Rfs from the first dummy head and second binaural signals Lrs and Rrs from the second dummy head;

means comprising a first crosstalk cancellation circuit connected to the microphones of the first dummy head for converting the first binaural signals into third binaural signals $Lfsp$ and $Rfsp$ such that said third binaural signals have the following relations to the first binaural signals:

$$\begin{bmatrix} Lfsp \\ Rfsp \end{bmatrix} = T \begin{bmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{bmatrix}^{-1} \begin{bmatrix} Lfs \\ Rfs \end{bmatrix}$$

where, T is a delay time,

a_{11} and a_{12} are acoustic transmission characteristics over the path between the left front loudspeaker and the left and right ears, respectively, of a listener; and

a_{21} and a_{22} are acoustic transmission characteristics over the path between the right front loudspeaker and the left and right ears, respectively, of the listener;

means comprising a second crosstalk cancellation circuit connected to the microphones of the second dummy head for converting the second binaural signals into fourth binaural signals $Lrsp$ and $Rrsp$ such that said fourth binaural signals have the following relations to the second binaural signals:

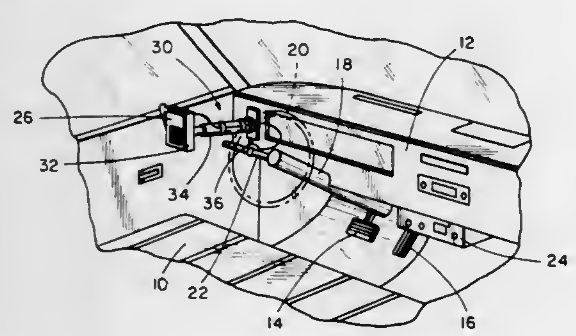
$$\begin{bmatrix} Lrsp \\ Rrsp \end{bmatrix} = T \begin{bmatrix} b_{11} & b_{12} \\ b_{21} & b_{22} \end{bmatrix}^{-1} \begin{bmatrix} Lrs \\ Rrs \end{bmatrix}$$

where, b_{11} and b_{21} are acoustic transmission characteristics over the path between the left rear loudspeaker and the left and right ears, respectively, of the listener; and

b_{12} and b_{22} are acoustic transmission characteristics over the path between the right rear loudspeaker and the left and right ears, respectively, of the listener; and

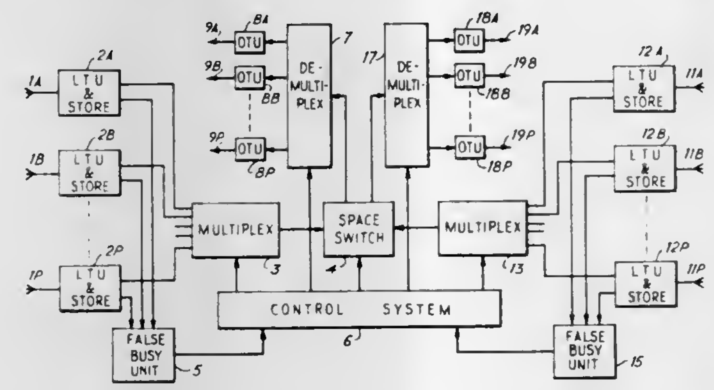
four-channel transducing means connected to the outputs from the first and second crosstalk cancellation circuit for translating the third and fourth binaural signals into reproduceable form; whereby said third and fourth binaural signal, when electroacoustically reproduced, will produce front and rear binaural effects, respectively, to said listener.

4,060,697
MICROPHONE MOUNTING AND CONTROL SYSTEM
Willie Neal, Chicago, Ill., assignor to Samuel R. Carter, Chicago, Ill., a part interest
Filed Mar. 8, 1976, Ser. No. 664,560
Int. Cl.² G05G *11/00;* **H04R** *5/02*
U.S. Cl. 179—1 VE **6 Claims**



1. Microphone mounting and control system for use in the driver's compartment of a vehicle especially adapted for operation by a handicapped person, said system being operable during operation of a vehicle and comprising a holder for a microphone, said holder having an opening in the side thereof through which a control button on a microphone positioned in said holder can extend, means for supporting said holder from a dashboard of a vehicle and at a location within the normal voice range of an operator of the vehicle, mechanical control means on said holder for engaging the control button of a microphone in said holder, trigger means for operating said mechanical control means to depress the control button, means for mounting said trigger means on an acceleration and brake control arm extending from a steering column for steering a vehicle and means connecting said trigger means to said mechanical control means.

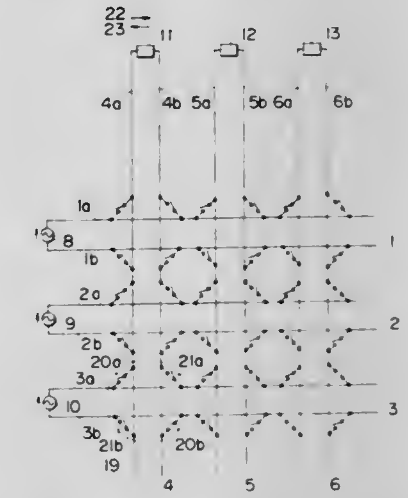
4,060,698
DIGITAL SWITCHING CENTER
Peter Alexander Birnie, Bromley, England, assignor to Post Office, London, England
Filed May 11, 1976, Ser. No. 685,323
Claims priority, application United Kingdom, May 19, 1975, 21180/75
Int. Cl.² H04J *3/00*
U.S. Cl. 179—15 AT **7 Claims**



1. A digital switching centre having a first set of signal stores connected to receive the signals of a set of pulse code modulation (P.C.M.) signal systems respectively, each signal store having a plurality of registers for storing signals of a respective plurality of channels of the particular PCM signal system, a control means and a switching means responsive to the control means and connected to derive signals from the signal stores of the first set at selected times so as to establish selected signal transfer paths from registers of the signal stores, wherein there is provided means responsive to signals from the particular PCM signal system for producing an indication of the time of occurrence of a selected channel of the system, the control means being responsive to the indication to prevent the establishment of a particular signal transfer path from the register for storing signals from the selected channel if that path would result in there being less than a predetermined interval of time between the reception of signals by and the derivation of signals from the register for storing signals from the selected channel.

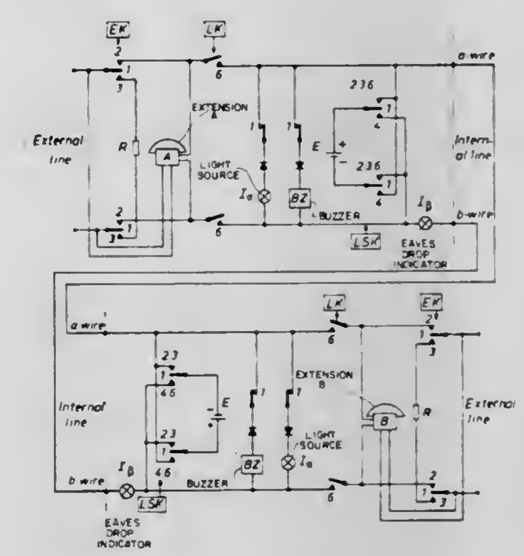
4,060,699
LINE CONNECTION REVERSING CIRCUITS
Hisashi Ataka; Shigeo Wako, and Shintaro Ushio, all of Tokyo, Japan, assignors to Oki Electric Industry Co., Ltd., Tokyo, Japan
Filed Sept. 2, 1976, Ser. No. 720,080
Claims priority, application Japan, Sept. 10, 1975, 50-109015
Int. Cl.² H04Q *3/52*
U.S. Cl. 179—18 GF **3 Claims**

1. A line connection reversing circuit comprising a first set of a plurality of paired transmission lines, a second set of a plurality of paired transmission lines crossing said first set of paired transmission lines to form a matrix, each one of said transmission lines including two conductors, first and second pairs of bidirectional semiconductor switching elements disposed at each cross-point of said matrix, one bidirectional semiconductor switching element of the first pair being connected between the first conductor of one paired transmission line of the first set and the first conductor of one paired transmission line of the second set, the other bidirectional semiconductor switching element of the first pair being connected between the second conductor of said paired transmission line of said first set and the second conductor of said paired transmission line of said second set, one bidirectional semiconductor switching element of the second pair being connected between said first conductor of said paired transmission line of said first set and said second conductor of said paired transmission line



of said second set and the other bidirectional semiconductor switching element of the second pair being connected between said second conductor of said paired transmission line of the first set and said first conductor of said paired transmission line of said second set, and means electrically coupled to said first and second pairs of semiconductor switching elements for oppositely controlling said first and second pairs of said semiconductor switching elements.

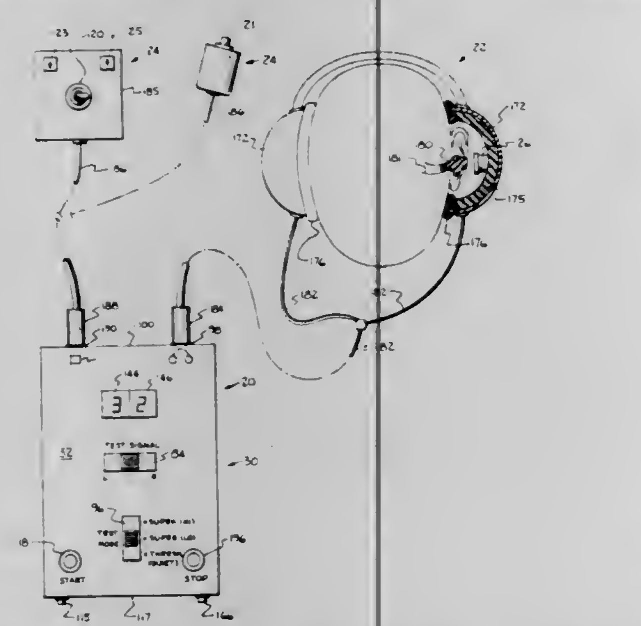
4,060,700
TWO-PARTY TELEPHONE SYSTEM
Sten Evert Magnusson, Tyreso, Sweden, assignor to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden
Filed May 26, 1976, Ser. No. 690,076
Claims priority, application Sweden, June 13, 1975, 7506831
Int. Cl.² H04M *1/72, 9/00*
U.S. Cl. 179—28 **5 Claims**



1. In a two-party telephone system utilizing a two-wire line, apparatus for enabling an external call to and from each of two telephone sets included in the system, an internal speech connection between said telephone sets and conference calls between the telephone sets and an external subscriber, said apparatus comprising, in order to achieve transmission of at least three different information conditions between said telephone sets in the system through a two-wire line, for each telephone set a control means, said control means comprising a first indicating means for busy marking connected between the conductors of said two-wire line, a voltage source, switching means for connecting said voltage source to said two-wire line

with a first and a second polarity respectively, second indicating means for receiving a calling signal connected to said two-wire line, said first indicating means being responsive to said first polarity on said line and said second indicating means being responsive to said second polarity on said line, means for connecting said voltage sources in series to said two-wire line so that an increased voltage occurs between the two conductors of said two-wire line if both telephone sets are connected to the external line, said control means furthermore comprising third indicating means responsive to said increased voltage.

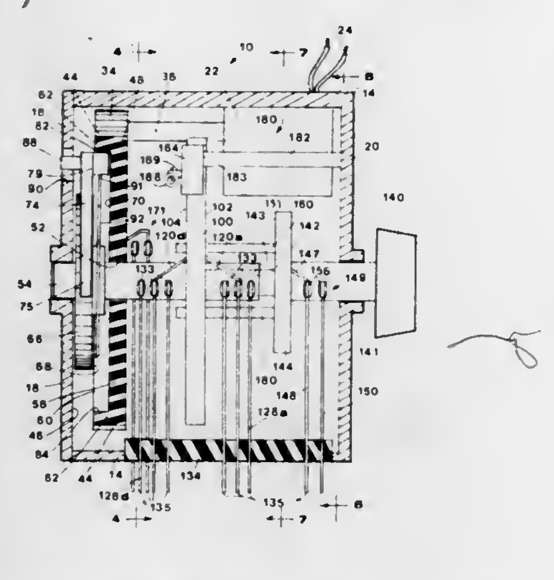
4,060,701
METHOD FOR TESTING ACOUSTICAL ATTENUATION OF HEARING PROTECTORS
John M. Epley, Portland, Oreg., assignor to Hearing Evaluation & Acoustic Research, Inc., Portland, Oreg.
Filed Sept. 15, 1975, Ser. No. 613,245
Int. Cl.² H04R *29/00*
U.S. Cl. 179—175 **5 Claims**



1. A method of measuring, in the presence of significant ambient noise, the acoustical attenuation effectiveness of a hearing protector worn in operative association with an ear by a subject individual, said method comprising the steps of:
a. generating a variable-amplitude audio signal and a separate audio signal of a constant amplitude sufficiently great to be audible to said individual over said ambient noise;
b. exposing said ear to one of said signals with said hearing protector worn in association with said ear, and without said hearing protector being so worn, respectively;
c. during the exposure of said ear to said signal, exposing the other ear of said individual to the other of said audio signals;
d. varying said variable signal both with and without said hearing protector being so worn until obtaining in each instance an indication from said individual that he perceives that said variable signal has a predetermined common relationship to said constant-amplitude signal; and
e. measuring the difference between the respective amplitudes of said variable signal which are indicated in each instance by said individual as having said predetermined relationship to said constant-amplitude signal.

4,060,702
TIMER SWITCH ASSEMBLY HAVING ESCAPEMENT MECHANISM
Wallace Leon Linn, 6705 Grosvenor Place, Indianapolis, Ind. 46220
Filed Jan. 9, 1976, Ser. No. 647,791
Int. Cl.² H01H *7/10, 43/00*
U.S. Cl. 200—35 R **9 Claims**

1. In combination, a timer comprising a program wheel and an escapement mechanism for driving said program wheel, said escapement mechanism comprising a drive wheel rotatable about its axis and having a portion radially inwardly from its outer periphery defining a housing with an outer, generally cylindrical wall extending generally coaxially with said drive wheel, a ratchet wheel disposed for rotation on an output shaft, said ratchet wheel being disposed concentrically within said housing, a pawl for engaging said ratchet wheel, said pawl being disposed within said housing, means for providing a camming surface, said camming surface means projecting peripherally and radially inwardly toward said axis from said housing wall, means for following said camming surface, and means for urging said following means into contact with said camming surface, said following means being coupled to said pawl to move said pawl a distance determined by said camming surface in a first direction and to allow said pawl to engage said ratchet wheel and to return the same distance in a second and opposite direction to advance said ratchet wheel



and output shaft a predetermined amount in response to rotation of said drive wheel, and said output shaft driving said program wheel.

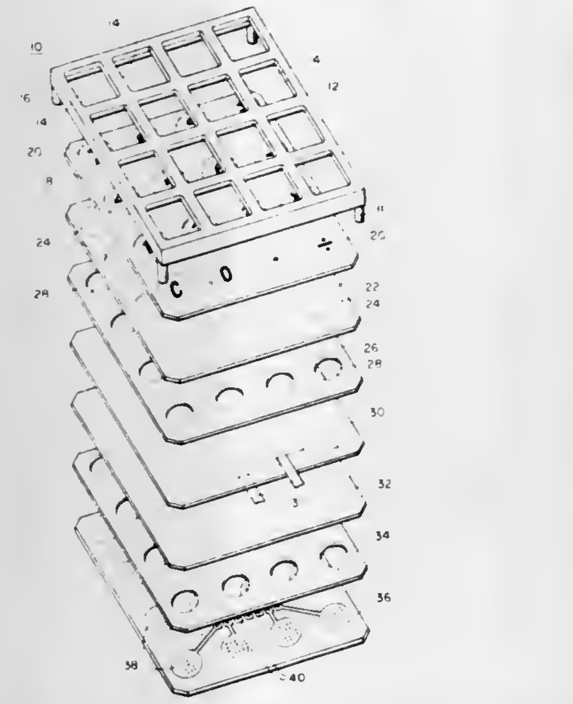
5. The invention of claim 1 wherein said program wheel is mounted upon said output shaft and comprises an axially narrow disc-shaped wheel having two opposite, axially facing surfaces, each of said surfaces having a plurality of program control surfaces disposed thereon concentric with the program wheel axis, and an array of switches associated with each of said opposite program wheel surfaces, each of said switches having an axially extending portion engaging one of said program control surfaces, each said axially extending portion extending a distance substantially equal to the axially narrow dimension of said program wheel, and said drive wheel housing extending axially a distance substantially equal to said axially narrow dimension, said combination thereby forming an axially narrow assembly.

4,060,703
KEYBOARD SWITCH ASSEMBLY WITH TACTILE FEEDBACK HAVING ILLUMINATED LAMINATED LAYERS INCLUDING OPAQUE OR TRANSPARENT CONDUCTIVE LAYER
Seth Leroy Everett, Jr., 196 Priscilla Drive, Lincroft, N.J. 07738
Filed Nov. 10, 1976, Ser. No. 740,567
Int. Cl.² H01H *13/70, 9/00*
U.S. Cl. 200—5 A **14 Claims**

1. A sandwich type computer keyboard comprising:
a bezel having parallel arranged apertures;
a first mylar sheet having a raised tactile bubbled surface, the bubbles being arranged and spaced to correspond to said apertures and dimensioned to pass through said apertures and extend beyond the upper bezel surface;
a flexible electroluminescent panel;
a flexible electrical conductive sheet adjacent said electroluminescent panel;

a first apertured insulator sheet intermediate said electroluminescent panel and said first mylar sheet;
a printed circuit board having respective conductors thereon arranged to be aligned and correspond with the tactile bubbled surface on said first mylar sheet; and
a second apertured insulator sheet intermediate said conductive sheet and said printed circuit board;
the apertures in said first and second insulator sheets being aligned with and corresponding to the tactile bubbled surface on said first mylar sheet.

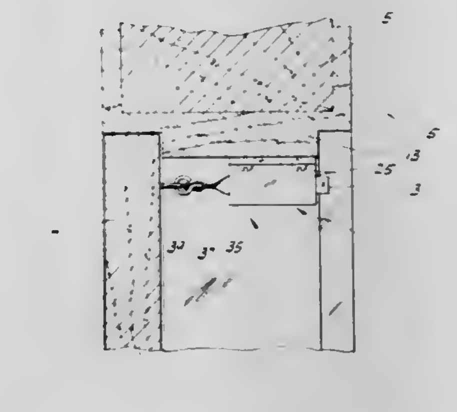
10. A sandwich type computer keyboard comprising:
a bezel having parallel arranged apertures;
a first mylar sheet having a raised tactile bubbled surface, the bubbles being arranged and spaced to correspond to said apertures and dimensioned to pass through said apertures and extend beyond the upper bezel surface;



a stiffener sheet having a tactile bubbled surface nestled within the concave surface of each of the bubbles on said first mylar sheet;
a transparent electrical conductive coating on the concave surfaces of the bubbles on said stiffener sheet;
a light transmissive printed circuit sheet having respective transparent conductors thereon arranged to correspond with the tactile bubbled surface on said first mylar sheet;
an apertured insulator spacer sheet intermediate said printed circuit sheet and said stiffener sheet;
the apertures in said insulator spacer sheet corresponding to the tactile bubbled surface of said first mylar sheet;
and an electroluminescent panel proximal said printed circuit sheet.

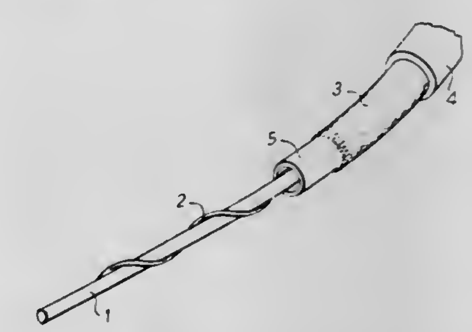
4,060,704
ALARM SWITCH HAVING RESILIENT GRIPPING STRUCTURE FOR SENSING UNAUTHORIZED MOVEMENT OF A DOOR
Donald G. Cole, Springfield, Mo., assignor to Silent Sentry, Inc., Springfield, Mo.
Filed Feb. 17, 1976, Ser. No. 658,240
Int. Cl.² H01H *3/16*
U.S. Cl. 200—61.62 **4 Claims**

1. An alarm switch mounted by means of a support for actuation by relative movement between the support and a member such as a door or window comprising:
switching means carried by the support;
an operating arm for the switching means extending from the support and carried thereby, said arm being adapted to be pulled a limited distance relative to the support for actuating the switching means to complete an alarm circuit; and
interengageable gripping members on the arm and said member for pulling the arm said limited distance relative to the support to actuate the switching means when there is relative movement between the member and the support, and said gripping members automatically disengaging to free the member from the arm when the relative movement between the member and the support is greater than said limited distance, said gripping members being selectively disengageable to permit relative movement between the support and said member without actuating the



alarm switch, said switching means comprising at least one switch having an operating member adapted to be pushed in to close the switch and to be pushed in again to open the switch, said arm being engageable with said operating member to push it in to close the switch when said member moves relative to the support, the gripping members then disengaging and the switch remaining closed.

4,060,705
PRESSURE ACTUATED CONTINUOUS SWITCH
Cyril John Peachey, Crawley, England, assignor to Cyril John Peachey and Gwendoline Nora Peachey, both of Crawley, England
Filed Apr. 7, 1976, Ser. No. 674,313
Claims priority, application United Kingdom, Apr. 9, 1975, 14639/75
Int. Cl.² H01H *3/14, 9/54*
U.S. Cl. 200—153 M **9 Claims**



1. A pressure actuated continuous switch comprising a central conductor, a filament of insulating material helically wound around the central conductor with empty spaces between the turns of said filament, a braided flexible tubular outer conductor coaxial with and surrounding the central conductor, and a flexible sheath of semiconductive material interposed between the insulating material and the outer conductor, whereby the conductors are normally insulated from one another by the helically wound filament of insulating material, and when pressure is applied to the assembly, the conductors are deformed into at least one of said empty spaces and are electrically connected through said flexible sheath.

4,060,706

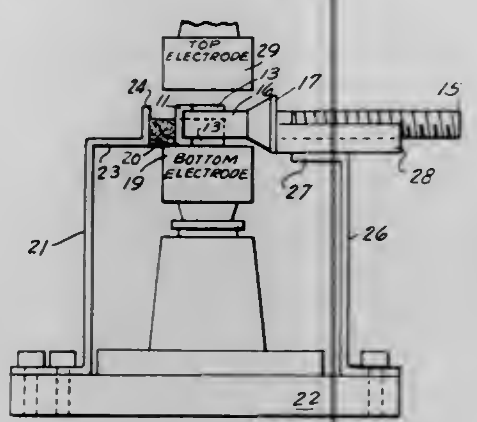
METHOD OF FORMING A HANDLE BY WELDING

Albert J. Karls, Greenville, Miss., assignor to Moeller Manufacturing Company, Inc., Greenville, Miss.

Filed Jan. 10, 1975, Ser. No. 540,174

Int. Cl.² B23K *11/02*

U.S. Cl. 219—107 **10 Claims**



1. A method of forming and mounting a handle comprising the steps of:

a. Providing a flat sheet of weldable metal with narrow, opposed imperforate flat lugs projecting from the midportions of the opposite side edges of the sheet;
b. Forming the sheet into a channel with said lugs extending coplanar with the channel sides parallel to each other;
c. Extending the end portion of a weldable cylindrical rod between said lugs perpendicularly to the channel to bring the end of the rod substantially into abutment with the web of the channel with diametrically opposite sides of the rod in tangential surface contact with the inside surfaces of the lugs; and
d. Fusing the rod to said inside surfaces to form rigid bonds therewith.

4,060,707

BALANCING DEVICE AND METHOD FOR A ROTATING BODY

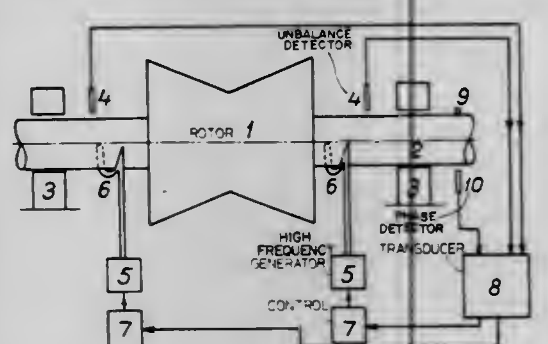
Karl Olof Olsson, and Jörgen Wildheim, both of Finspong, Sweden, assignors to Stal-Laval Turbin AB, Vasteras, Sweden

Filed Mar. 3, 1976, Ser. No. 663,588

Claims priority, application Sweden, Mar. 6, 1975, 7502480

Int. Cl.² B23K *27/00*

U.S. Cl. 219—121 LM **9 Claims**



6. A method for balancing a rotating body while in operation by local asymmetric heating and thus thermal deformation of its axis, comprising the steps of:

a. detecting phase and amount of an unbalance in said body,
b. converting said detected unbalance into a phase and amount responsive signal, and
c. asymmetrically heating predetermined parts of said rotating body in dependence on said signal, by local application of energy pulses without removing material from said body.

4,060,708

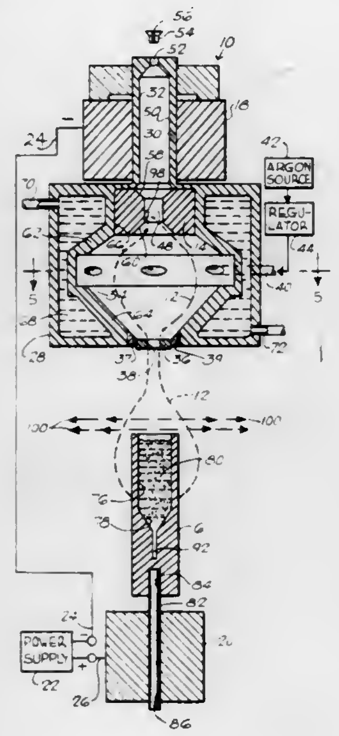
METASTABLE ARGON STABILIZED ARC DEVICES FOR SPECTROSCOPIC ANALYSIS

John P. Walters, Madison, Wis., assignor to Wisconsin Alumni Research Foundation, Madison, Wis.

Filed Sept. 17, 1975, Ser. No. 614,194

Int. Cl.² B23K *9/00*

U.S. Cl. 219—121 P **23 Claims**



1. A stabilized arc device to produce light for spectroscopic analysis,

said device comprising a housing having a chamber therein, a cathode within said chamber,
an anode electrode outside said housing,
direct current electrical power supply means having positive and negative terminals connected to said respective anode and cathode electrodes,
gas supply means for introducing a pressurized stabilizing gas into said chamber,
a nozzle electrode having a gas discharge orifice therein and disposed on said housing for discharging a stream of the stabilizing gas from said chamber to said anode electrode to stabilize an electrical arc between said cathode and anode electrodes,
said nozzle electrode being made of an electrically conductive material,
and electrically insulating means for insulating said nozzle electrode from said housing and also from said cathode and anode electrodes whereby said nozzle electrode can assume an intermediate electrical potential between the electrical potentials of said cathode and anode electrodes,
said anode electrode having receptacle means for holding a sample material to be vaporized by the arc to produce light for spectroscopic analysis.

4,060,709

POWER SUPPLY CONTROL

Charles G. Hanson, 10915 Beechwood Drive, Indianapolis, Ind. 46280

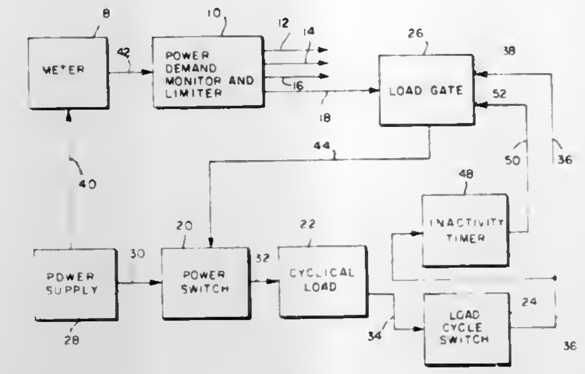
Filed Apr. 28, 1976, Ser. No. 681,125

Int. Cl.² B23K *9/10*

U.S. Cl. 219—131 R **10 Claims**

1. Apparatus for controlling the supply of power to a selected load of a number of cyclical, separately controllable loads, comprising a controllable switch for opening the power supply circuit to the selected load, first means for sensing the amount of power being consumed by the loads and for generating a first signal to indicate that the supply of power to the selected load is to be interrupted, second means for sensing the completion of an operating cycle of the selected load and for

generating a second signal in response thereto, and gate means for allowing the first sensing means to pass said first signal to cause said controllable switch to interrupt the power supply to



the selected load only after the second signal has been generated, the first and second means and controllable switch being coupled to the gate means.

4,060,710

RIGID ELECTRIC SURFACE HEATING ELEMENT

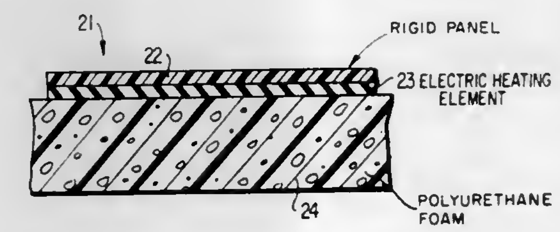
Franz Gottfried Reuter, Lemforde, and Tankred Walter Menzel, Bad Essen, both of Germany, assignors to Reuter Maschinen- and Werkzeugbau GmbH, Lemforde, Germany

Division of Ser. No. 292,321, Sept. 26, 1972, abandoned. This application Sept. 9, 1974, Ser. No. 504,192

Claims priority, application Germany, Sept. 27, 1971, 2148191; Oct. 16, 1971, 2151626; July 12, 1972, 2234216

Int. Cl.² H05B *3/22;* **H01B** *1/06;* **H01C** *1/012;* **F24D** *13/02*

U.S. Cl. 219—548 **7 Claims**



1. A rigid surface heating element heated by electricity and consisting of

a thin, rigid, heat-resistant, electrically insulating, air impervious layer for emitting heat, connected by means of an electrically conducting film provided with corresponding electrodes and electrical connectors to a thicker, rigid, air impervious electrically insulating polyurethane foam layer, said heating element being prepared by
mounting said electrodes on said thin, rigid, heat-resistant, electrically insulating, air impervious, heat emitting layer,
depositing an aqueous plastic dispersion consisting essentially of a synthetic resin, electrically conducting particles, and an alkai silicate selected from the group consisting of potassium silicate and sodium silicate in an amount sufficient to provide homogeneous voltage potential properties to form said electrically conducting film over said electrodes and heat emitting layer,
drying said film, and
depositing said thicker, air impervious, heat insulating, polyurethane resin foam layer over the entire surface of said film by bringing a foam-forming reaction mixture into direct contact with the previously deposited electrically conducting film, said silicates being present in said heating film in sufficient quantity to protect said heating film from attack by the starting reaction components of the polyurethane resin.

4,060,711

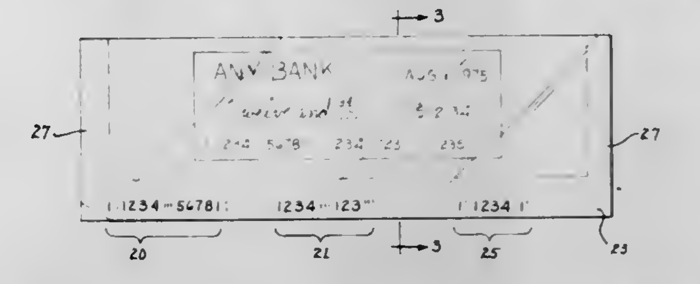
DOCUMENT CARRIER

Melvin S. Buros, Phoenix, Ariz., assignor to Micr-Shield Company, Phoenix, Ariz.

Filed Sept. 17, 1975, Ser. No. 614,332

Int. Cl.² G06K *19/00*

U.S. Cl. 235—488 **9 Claims**



1. A document carrier for enclosing a document to be machine-processed comprising:

a. a first single, flat substantially rectangular sheet of material having a layer of cohesive material on one surface thereof, said layer of cohesive material capable of adhering only to a similar layer of cohesive material;
b. a second single, flat substantially rectangular sheet of material having a layer of said cohesive material on one surface thereof;
c. said sheets having substantially the same length and width and being sufficiently translucent or transparent to permit optical recognition of the information on said document when it is placed between said sheets;
d. said cohesive layers surrounding said document and coming into contact with each other and with said document when said sheets are placed on opposite sides of said document to encase said document and to render said document immovable within said carrier, each of said sheets adhering only to each other and not to said document; and
e. one of said sheets having a magnetic ink-receiving surface along one edge thereof on the surface thereof opposite said cohesive material.

4,060,712

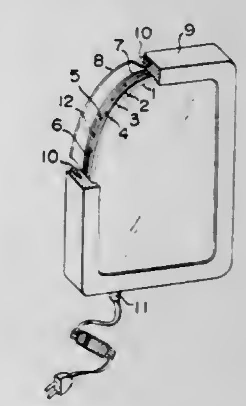
NON-CONDENSATION MIRROR

Yun-Te Chang, 47, Li Te 11 Road, Lin 8, Ta Te Li Tainan, China /Taiwan

Filed Dec. 23, 1976, Ser. No. 753,864

Int. Cl.² H05B *1/00*

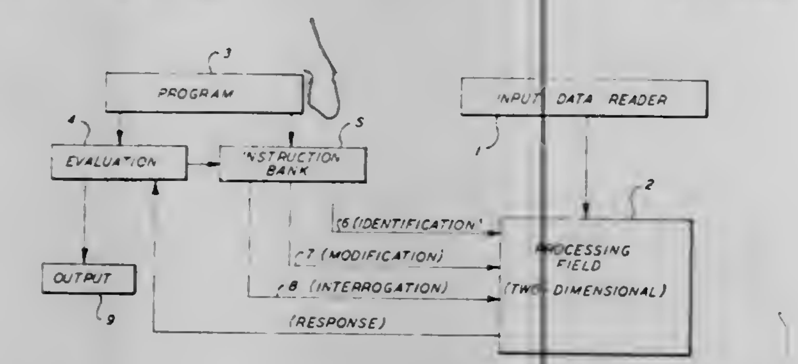
U.S. Cl. 219—219 **4 Claims**



1. A non-condensation mirror assembly adapted to be mounted generally vertically in a bathroom or like space wherein there is a relatively high concentration of water particles in the air, said assembly comprising a mirror consisting of a transparent glass plate having a light reflecting layer on its rear surface, and electrical heating means at said rear surface for heating the front surface of said mirror higher than the dew point of the air in said space, said heating means extending substantially coextensively with said mirror and being so constructed and arranged that more heat is imparted therefrom to

the bottom portion of the front surface of said glass plate than to the upper portion.

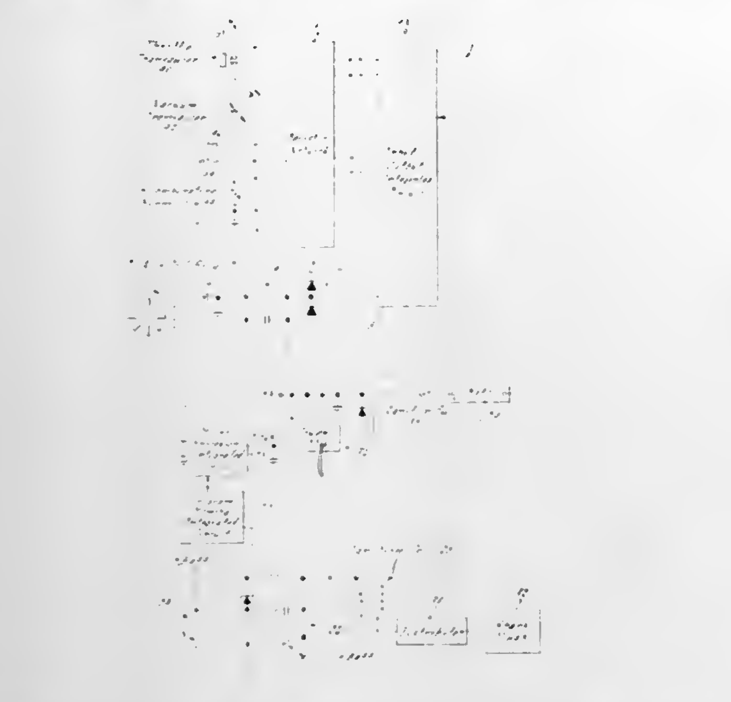
4,060,713
ANALYSIS OF IMAGES
Marcel J. E. Golay, Lutry, Switzerland, assignor to The Perkin-Elmer Corporation, Norwalk, Conn.
Continuation of Ser. No. 155,874, June 23, 1971, abandoned, which is a continuation-in-part of Ser. No. 803,004, Feb. 27, 1969, abandoned. This application July 14, 1975, Ser. No. 595,795
Int. Cl.² G06F *15/42*
U.S. Cl. 364—416 **16 Claims**



1. Apparatus for analyzing two dimensional image comprising:
a. means for converting the image to a binary image which is defined by a first field of image elements with each image element surrounded by six other elements;
b. means for storing representations of the binary image elements of said first field;
c. means for determining with respect to each element which is not at the edge of the field the pattern of the actual states of the six neighboring elements surrounding it;
d. means for comparing said pattern of states of said neighboring elements surrounding the respective element with at least one of the possible alternative patterns of states of said six neighboring elements;
e. means for fixing each element in said first field in a predetermined state when correspondence is found between the patterns of states of the neighboring elements surrounding its corresponding element in the first field of elements between the pattern of states of said neighboring elements and one of said possible patterns with which it is compared; and
f. means for providing an output representative of the state of the elements of said first field after fixing.

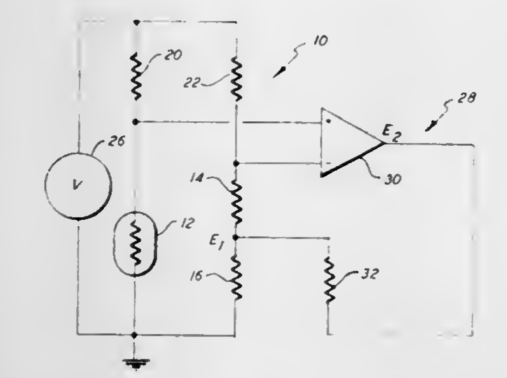
4,060,714
INPUT SENSOR CIRCUIT FOR A DIGITAL ENGINE CONTROLLER
John P. Lappington, Huntsville, and Leroy Shafer, Toney, both of Ala., assignors to Chrysler Corporation, Highland Park, Mich.
Filed May 20, 1976, Ser. No. 688,217
Int. Cl.² F02P *5/04;* **G06F** *15/20;* **G06G** *7/70*
U.S. Cl. 364—431 **26 Claims**

16. In an engine having an electronic control system which monitors a plurality of inputs and which in turns controls an event associated with operation of the engine, the improvement comprising:
a plurality of sensing circuits each of which is characterized by its own first order differential equation and exhibiting its own time constant which is representative of a corresponding input condition useful in controlling said event;
means for sampling the time constant of each of said sensing circuits by means of multiplexing;
a digital counter circuit;
means for causing said digital counter circuit to provide a binary word output representative of the time constant of each sensing circuit as it is sampled; and



utilization means for utilizing the binary word outputs in controlling said event.

4,060,715
LINEARIZED BRIDGE CIRCUITRY
Larkin B. Scott, Fort Worth, Tex., assignor to The Perkin-Elmer Corporation, Norwalk, Conn.
Filed July 16, 1976, Ser. No. 705,993
Int. Cl.² G01K *7/24;* **G06G** *7/16*
U.S. Cl. 364—557 **9 Claims**

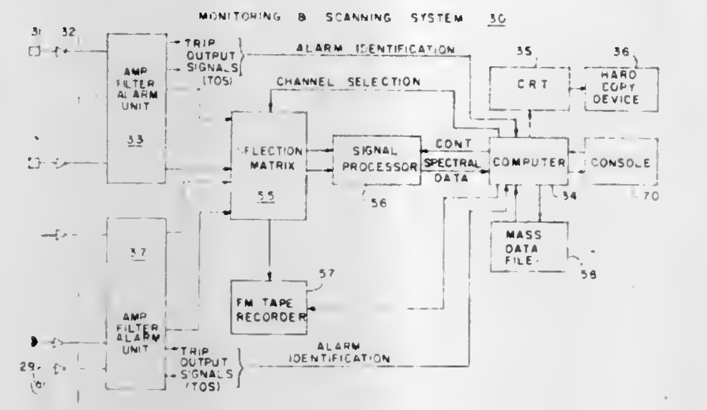


1. In a linearized bridge circuit of the type wherein a sensor presenting a resistance related to a parameter by a second order polynomial is disposed in the unknown leg and a voltage divider is disposed in the balance leg, the improvement comprising:
circuit means for continuously balancing the bridge circuit with feedback from across the conventional null measurement terminals thereof to a voltage divided point in the balance leg thereof, the voltage at said point divided by the current level of said feedback having substantially a linear relationship to the parameter of the sensor.

4,060,716
METHOD AND APPARATUS FOR AUTOMATIC ABNORMAL EVENTS MONITOR IN OPERATING PLANTS
Paul J. Pekrul, Canoga Park, and Alfred W. Thiele, Woodland Hills, both of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.
Filed May 19, 1975, Ser. No. 578,558
Int. Cl.² G21C *17/00*
U.S. Cl. 364—576 **20 Claims**

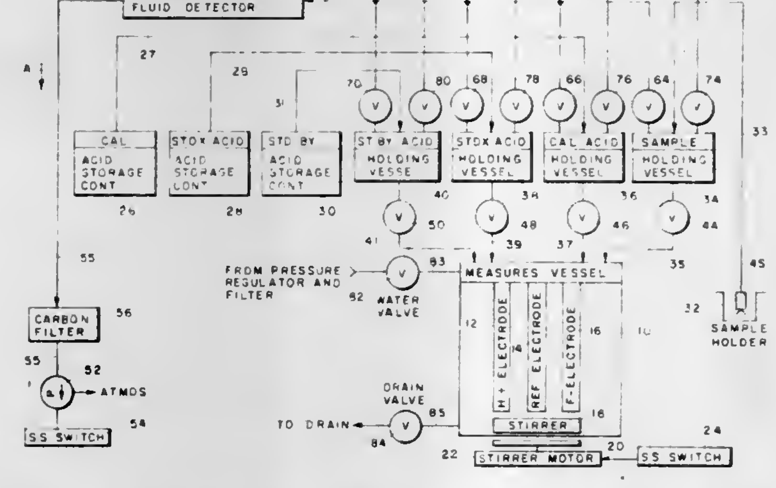
1. In an operating plant having significant background noise in time dependent fluctuating signals derived from sensors

placed at selected points for continually monitoring the operating conditions of system components, a method for scanning in real-time separate signal conditioning channels, one for each of said signals, to find potential malfunctions, draw conclusions as to their severity and indicating to an operator what action to take comprising the steps of:
selecting each channel in sequence for spectral analysis;
processing the signal of each channel selected to produce power spectral density data at predetermined frequencies over a predetermined frequency range as a simple Fourier transform;



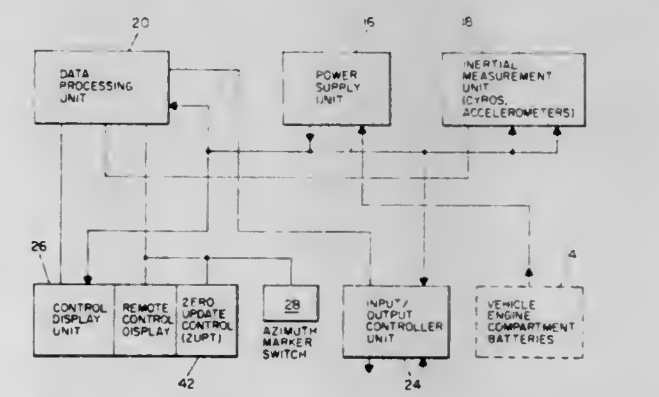
comparing said power spectral density data of each channel with predetermined sets of frequency dependent limits, each set consisting of at least two limits, one for a condition requiring caution, and another for an alarm condition requiring more direct action by the operator; and
indicating to the operator the condition of plant components associated with each channel and the action to be taken as a function of which set of limits and which limit of the set is exceeded by said power spectral data.

4,060,717
ACID TESTER
George J. Sitek, Stevensville, Mich., assignor to Leco Corporation, St. Joseph, Mich.
Filed Oct. 30, 1975, Ser. No. 627,194
Int. Cl.² G06F *15/20;* **G01N** *27/26*
U.S. Cl. 364—497 **21 Claims**



1. An acid testing instrument for use in combination with electrodes which are fluoride ion and hydrogen ion selective for determining the constituent acid concentrations in a bath including hydrofluoric and another acid having free hydrogen ions comprising:
circuit means coupled to said electrodes for providing digital output signals representative of the ion concentration detected by said electrodes;
a microprocessor and interface circuit means coupled to said microprocessor for handling input and output data and control signals to and from said microprocessor, said microprocessor coupled to said circuit means for receiving said digital output signals wherein said microprocessor includes a central processing unit (CPU) and storage means, a read-only memory and a switch multiplexer having operator actuated digital switches therein permitting the operator to select system parameters for controlling said CPU to correlate and process said digital output signals in a predetermined manner to provide display output signals representative of the concentration of acids being tested; and
display means coupled to said interface circuit means for receiving and displaying said display output signals as acid concentrations.

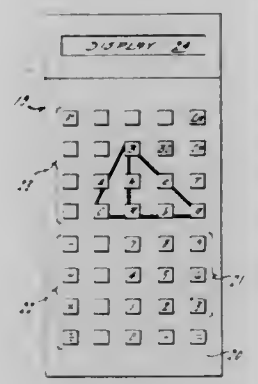
4,060,718
GEODETIC SURVEY METHOD
James R. Huddle, Chatsworth, Calif., assignor to Litton Systems, Inc., Woodland Hills, Calif.
Filed Dec. 10, 1976, Ser. No. 749,356
Int. Cl.² G01V *7/06;* **G06F** *15/50*
U.S. Cl. 364—421 **7 Claims**



1. A geodetic survey method using an inertial surveying system mounted in a vehicle which may be periodically stopped or brought to a substantially fixed position relative to the earth, comprising the steps of:
calibrating the system while the vehicle is in a fixed position including biasing the inertial system platform gyros and aligning the system accelerometers with the local coordinates;
at a first control point having a known location and a known deflection of the vertical, recording the surveying system indicated position, and recording the output from the inertial system sensing units, as required for determining the deflection of the vertical;
moving the vehicle along the terrain to be surveyed;
stopping the vehicle, at points which are to be surveyed, and at time intervals not to exceed the survey limit time interval, and eliminating accumulated errors from said system;
at all stops recording position including latitude, longitude, elevation, and the output from inertial system sensing units as required for determining the deflection of vertical, without releveling the inertial platform;
proceeding to a control point having a known location and known deflection of the vertical to take a second control point indication reading, and recording the inertial surveying system indicated position with regard to latitude, longitude elevation, and recording the output from the inertial system sensing units as required for determining the deflection of the vertical;
determining the position errors in latitude, longitude and elevation between the first and second control point indication readings;
recalculating the position of the intermediate survey points, utilizing the position errors between the two control point readings;
determining the error in the deflection of the vertical between the first and second control point indication readings; and
calculating the deflection of the vertical at the intermediate survey points, utilizing the error in the change in the

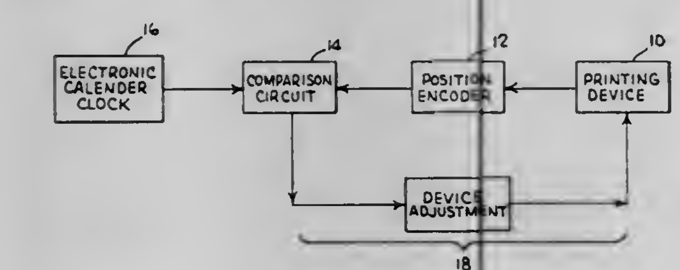
deflection of the vertical between the two control point readings.

4,060,719
COMPUTER FOR SOLVING UNKNOWN PARAMETERS OF GEOMETRICAL FIGURES
Alfred A. Dalinowski, 36244 English Drive, Sterling Heights, Mich. 48077
Filed July 23, 1976, Ser. No. 708,105
Int. Cl.² G06F *7/38*
U.S. Cl. 364—729 **10 Claims**



1. In a calculating device for determining an unknown dimension of a geometrical figure when necessary and sufficient known dimensions are available to enable calculation of said unknown dimension, the combination of means defining a geometrical design having parameters corresponding to parameters of said figure, a plurality of keys selectively operative for providing input signals representing said known dimensions and selected parameters of said design, programmed means responsive to said input signals for providing an output signal representing said unknown dimension, and display means responsive to said output signal for displaying said unknown dimension.

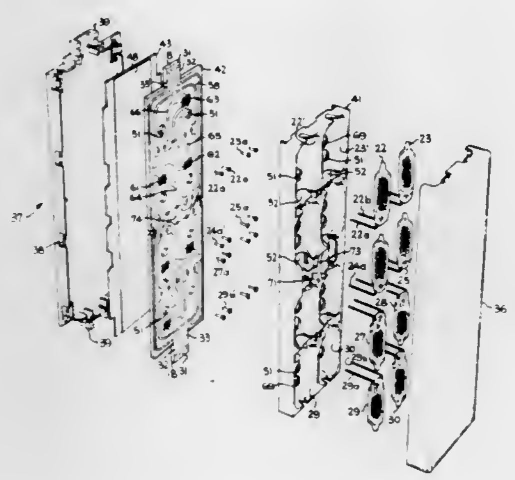
4,060,720
DATE PRINTING DEVICE WITH ELECTRONIC CALENDAR CLOCK
Frank Thomas Check, Jr., Orange, Conn., assignor to Pitney Bowes Inc., Stamford, Conn.
Filed Dec. 17, 1975, Ser. No. 641,488
Int. Cl.² G06F *11/00;* **G07C** *1/30*
U.S. Cl. 235—309 **10 Claims**



1. For use with a date printing device capable of printing symbols representing the days of the month, a date checking system comprising;

a. clock means for generating sets of electrical signals, each set representing a particular day of a calendar month;
b. an encoder associated with the date printing device for generating a set of electrical signals representing the current setting of the device;
c. means connected to said clock means and said encoder for comparing the clock-generated signals with the encoder-generated signals;
d. means responsive to the output of said comparing means for indicating a mismatch condition between the compared signals; and
e. means for coupling said comparing means to the date printing device, said coupling means being responsive to a mismatch signal to adjust the setting of the date printing device in increments until the mismatch condition has disappeared.

4,060,721
PHOTOFLASH LAMP ARRAY HAVING CONDUCTIVE REFLECTOR
James M. Hanson, Euclid, and Gerald W. Povall, Highland Heights, both of Ohio, assignors to General Electric Company, Schenectady, N.Y.
Filed Feb. 4, 1976, Ser. No. 655,055
Int. Cl.² G03B *15/02*
U.S. Cl. 362—13 **9 Claims**

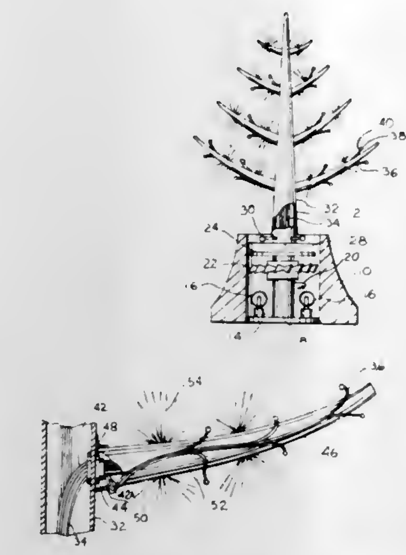


1. A multiple flash lamp array comprising a plurality of electrically fired flash lamps each having a pair of lead-in conductors, a circuit board containing thereon circuitry for sequentially firing said flash lamps, means electrically connecting said lead-in conductors of the flash lamps to said circuitry, a reflector unit positioned between said lamps and said circuit board and shaped to define individual concave reflectors on the front thereof for reflecting light from said lamps frontwardly of the array when flashed, said reflector unit comprising electrically insulating material having a coating of electrically conductive material on the front surface thereof, and an electrical ground conductive area carried on the front of said circuit board, wherein the improvement comprises a tab integral with said reflector unit and resiliently engaging against said electrical ground conductive area, said conductive coating on the reflector unit extending to the back of said tab thereby providing an electrical connection between said electrical ground conductive area and said conductive coating on the front of the reflector unit.

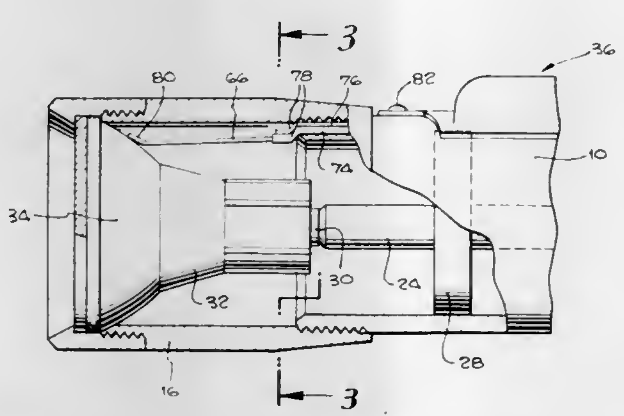
4,060,722
FIBRE OPTICS DISPLAY
Robert A. Foley, 75 Rollins Ave., Bellville, Ontario, Canada
Filed Sept. 8, 1976, Ser. No. 721,348
Int. Cl.² A47G *33/16;* **F21P** *1/02*
U.S. Cl. 362—32 **6 Claims**

1. In an artificial Christmas tree comprising a trunk portion, a plurality of branches hingably secured to the trunk portion, the trunk portion having a hollow passageway extending substantially along the length thereof, the improvement comprising:

a. a plurality of fibre optic filaments having first ends of each closely positioned one another to form a light receiving termination thereof, the termination being disposed within the passageway adjacent the base of the trunk portion, the plurality of filaments forming a quantity of sub-pluralities of filaments, one of the sub-plurality of filaments comprising a bundle passing through an orifice communicating to the passageway and being disposed located adjacent each root of each branch, means to clamp each bundle at each orifice, the other ends of the plurality of filaments being disposed distributed along the length of the plurality of branches; and
b. a tree trunk base supporting structure having a receptacle fixedly secured at the upper end thereof, the base of the trunk portion being removably secured within the receptacle, the receptacle disposing the trunk portion in substantially vertical alignment, the supporting structure comprising a housing, a lamp being disposed within the housing, the lamp being disposed producing rays of light communicating through a port in the housing to the light receiving termination of the plurality of filaments.



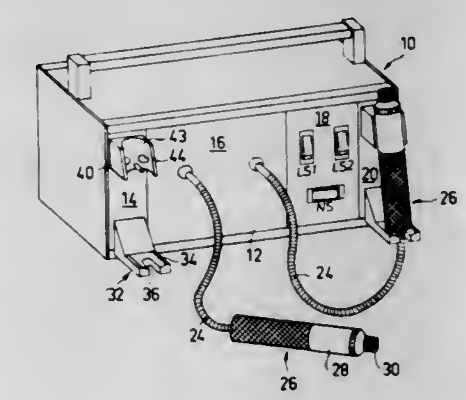
4,060,723
FLASHLIGHT ASSEMBLY
Norman C. Nelson, Barstow, Calif., assignor to Kel-Lite Industries, Inc., Barstow, Calif.
Filed Jan. 15, 1976, Ser. No. 649,404
Int. Cl.² H01H *3/40;* **F21V** *23/04*
U.S. Cl. 362—205 **1 Claim**



1. In an electric battery powered flashlight, a main body comprising an enclosure having a side wall with a battery compartment and a separated lamp compartment having a socket for a lamp,

said main body incorporating portions of an electric circuit of which battery means in the battery compartment, the lamp socket and a lamp therein are parts,
switch means in said circuit including contact means, one of which is movable relative to another to make and break said circuit,
a connection for establishing said circuit between said switch means and one of said lamp and socket, said contact means being carried by said main body outside said battery compartment, said connection between said switch means and one of said lamp and socket means also being carried by the main body outside said battery compartment and extending into said lamp compartment, the main body enclosure being tubular and having first and second separable cylindrical sections,
the first section having a male portion with threads and having a longitudinal relief through and deeper than the threads,
said connection for establishing said circuit between said switch means and said one of said lamp and socket being located in said relief below the bottoms of said threads,
and said second section having an opening with female threads therein and into which the male portion is threaded with said connection in the relief.

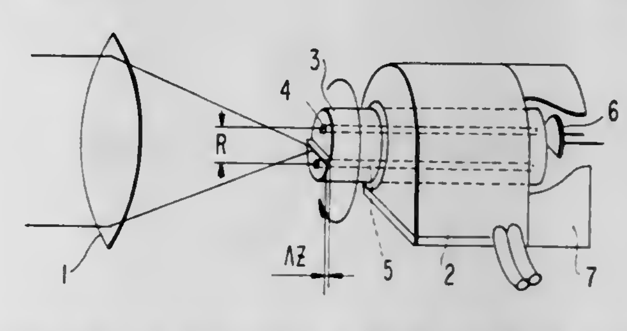
4,060,724
MOUNTING APPARATUS FOR OPTICAL EXAMINATION DEVICES CONNECTED TO A PROJECTOR THROUGH A LIGHT-CONDUCTING CABLE
Helmut A. Heine; Otto H. Schmidt, both of Herrsching, and Helmut W. Rosenbusch, Weilheim, all of Germany, assignors to Propper Manufacturing Company, Inc., Long Island City, N.Y. and Optotechnik Heine KG, Herrsching, Germany
Filed July 8, 1976, Ser. No. 703,365
Claims priority, application Germany, July 24, 1975, 2533145
Int. Cl.² F21L *15/16*
U.S. Cl. 362—32 **8 Claims**



1. A mounting apparatus for an optical examination instrument, said instrument being connected at the distal end of a light-conducting cable coupled to a source of light at its near end, said apparatus comprising:

a lower mount adapted to support said instrument at the lower end thereof, said lower mount having a slit therein for the passage of said light-conducting cable; and
an upper mount serving as a holding device for said instrument, the end of said instrument connected to said light-conducting cable being supported on said lower mount, and an upper portion of said instrument being held in said upper mount.

4,060,725
FOCAL PLANE DETECTING DEVICE
Shuji Hoshika, Wako, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan
Filed Mar. 16, 1976, Ser. No. 667,320
Claims priority, application Japan, Mar. 17, 1975, 50-32027
Int. Cl.² G02B *5/14;* **H01J** *5/16, 39/12*
U.S. Cl. 250—227 **10 Claims**



1. Apparatus for developing a signal indicative of the contrast of an image of scene, said apparatus comprising a motor having a rotary body having first and second ends and a means for imparting rotation to said rotary body about a rotary axis,

the first said end of said rotary body being adapted to have an image plane of a scene impinging thereon, optical fiber means positioned within said rotary body and extending generally in the direction of said rotary axis from said first end to said second end of said rotary body, the first and second ends of said optical fiber means being in light communication with the area just outside the first and second ends of said rotary body, whereby light in an image plane falling on said first end of said optical fiber is carried to the second end and directed outwardly of said second end of said optical fiber and said rotary body, the said first end of said optical fiber means being displaced from said axis of rotation to effect a circular scan of said image plane as said rotary body rotates, and photoconductor means positioned rearwardly of and stationary relative to said second end of said optical fiber means and said rotary body means for developing an electrical signal dependent upon the scene brightness in the image plane scanned circuit means separating and integrating said electrical signal for developing a further signal indicative of the contrast of said image, said optical fiber means comprising at least a first and a second optical fiber bundle, the first ends of both said optical fiber bundles being positioned symmetrically about said rotary axis, and the first end of said first optical fiber bundle being displaced axially a predetermined amount ΔZ relative to the first end of said second optical fiber bundle to effect scans of two image planes separated by ΔZ by said first and second optical fiber bundles, respectively.

4,060,726

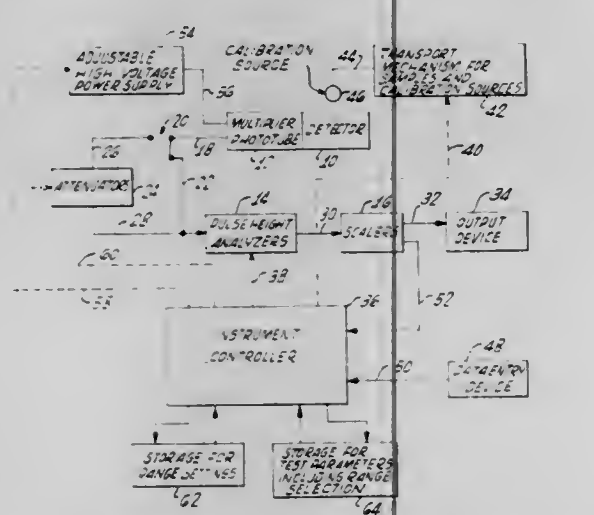
GAMMA COUNTER CALIBRATION SYSTEM

Samuel H. Luitwieler, La Mirada, and Donald L. Horrocks, Placentia, both of Calif., assignors to Beckman Instruments, Inc., Fullerton, Calif.

Filed Oct. 18, 1976, Ser. No. 733,605

Int. Cl.² G01D ***18/00***

U.S. Cl. 250—252 **10 Claims**



1. A method of calibration of a gamma counter having a detector and multiplier phototube means for the detection of gamma radiation, said method comprising the steps of:

placing a calibration source in an operative relationship with the detector, the calibration source being an emitter of gamma rays at a known energy level;

adjusting a setting of overall signal gain provided by the multiplier phototube means until pulses output therefrom have a pulse height which bears the same ratio to a maximum detectable pulse height as the known energy level bears to a desired maximum detectable energy level;

storing the setting obtained at the conclusion of said adjusting step; and

repeating said adjusting and storing steps for other desired maximum detectable energy levels, whereby each setting so obtained and stored may be retrieved and reapplied to select any of a plurality of desired detectable energy ranges.

4,060,727

METHOD AND APPARATUS FOR THE RADIOGRAPHIC INSPECTION OF TUBES

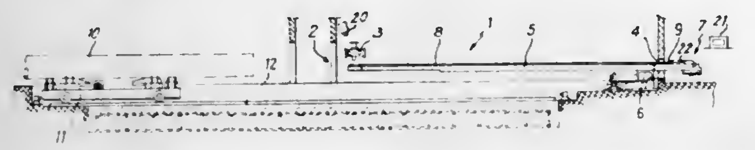
Jacques Verdickt, Dunkerque, France, assignor to Vallourec (Usines a Tubes de Lorraine-Escaut et Vallourec Reunies), Paris, France

Filed Apr. 5, 1976, Ser. No. 673,481

Claims priority, application France, Apr. 10, 1975, 75.11220

Int. Cl.² G01M ***21/00***

U.S. Cl. 250—358 P **7 Claims**



1. Device for the radiographic inspection of tubes which comprises:

an elongated chamber provided with an opening for the introduction of a tube to be inspected;

a rod projecting from a point outside said chamber into said chamber opposite said opening and extending substantially the full length of the chamber, said rod being provided with means for guiding a mobile film support along the rod;

a radiation emitter positioned inside the chamber;

tube-transporting means for bringing a tube to be inspected from outside the chamber through said opening so as to encircle the rod, said tube transporting means comprising at least one carriage movable on guide rails and carrying means for rotating the tube about its own axis;

control means for said tube-transporting means adapted to be actuated from outside the chamber to immobilize said tube transporting means when a selected zone of the tube is opposite the radiation emitter;

and control means for said film support adapted to be actuated from outside the chamber to move said support from a first position near the end of said rod outside the chamber and a second position opposite said emitter.

4,060,728

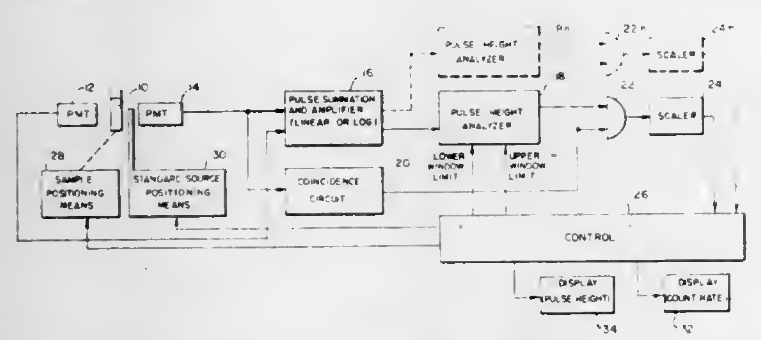
METHOD OF MEASURING THE DISINTEGRATION RATE OF BETA-EMITTING RADIONUCLIDE IN A LIQUID SAMPLE

Donald L. Horrocks, Placentia, Calif., assignor to Beckman Instruments, Inc., Fullerton, Calif.

Filed June 14, 1976, Ser. No. 696,003

Int. Cl.² G01T ***1/00***

U.S. Cl. 250—328 **8 Claims**



1. A method of measuring the disintegration rate (DPM) of a beta-emitting radionuclide in a liquid sample using a scintillation counting system, comprising the steps of:

a. exposing the sample to radiation from a standard source and generating a pulse height distribution spectrum for the sample in the presence of the standard source,

b. detecting a unique point on the spectrum and measuring the corresponding pulse height value (PH_1),

c. counting pulses produced by the radionuclide in the sample (CPM_1) in a window bounded on one side by a zero pulse height threshold detection limit for the counting system and bounded on the other side by a limit the value of which at least includes all the pulses produced by the radionuclide in the sample,

d. developing a quenched version of the sample,

e. exposing the quenched sample to radiation from the standard source and generating a pulse height distribution spectrum for the quenched sample in the presence of the standard source,

f. detecting the unique point on the latter spectrum and measuring the corresponding pulse height value (PH_2),

g. counting pulses produced only by the radionuclide in the quenched sample (CPM_2) in said window,

h. developing normalized values (R_1, R_2) for the measured pulse heights (PH_1, PH_2), and

i. correlating the normalized values (R_1, R_2) with corresponding pulse counts (CPM_1, CPM_2) to determine the value of the pulse count (CPM_0) for a normalized pulse height value of zero (R_0).

4,060,729

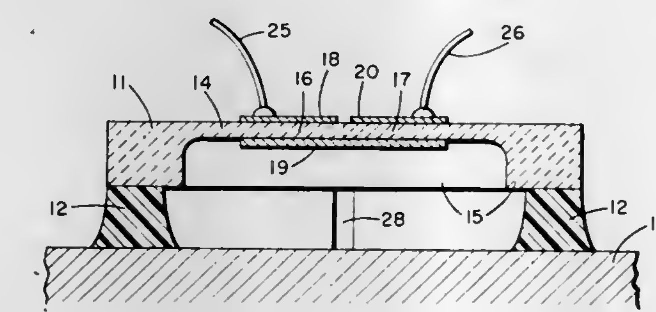
PYROELECTRIC DETECTOR WITH DECREASED SUSCEPTIBILITY TO VIBRATIONAL NOISE

Norman E. Byer, Columbia; Stanley E. Stokowski, Ellicott City, and John D. Venables, Baltimore, all of Md., assignors to Martin Marietta Corporation, Bethesda, Md.

Filed Dec. 10, 1976, Ser. No. 749,256

Int. Cl.² G01T ***1/16***

U.S. Cl. 250—338 **18 Claims**



1. A radiation detector comprising:

an integral wafer of pyroelectric material, said wafer comprising a relatively thin central region of substantially uniform thickness surrounded by a supporting rim having a thickness many times greater than said central region:

electrodes deposited on both surfaces of said central region defining between them at least one active detecting region;

external electrical connections to said electrodes being located on said rim on extensions of said electrodes beyond said active detecting region or regions; and

supporting means for said wafer attached only to said rim.

4,060,730

SCINTILLATION CAMERA FOR ESTABLISHING THE COORDINATES OF A RADIATION STIMULI PRODUCED BY A RADIATION FIELD

Jacob Zioni; Yitzhak Klein, and Dan Inbar, all of Haifa, Israel, assignors to Elscint, Ltd., Haifa, Israel

Continuation-in-part of Ser. No. 395,149, Sept. 7, 1973, abandoned. This application Sept. 6, 1974, Ser. No. 503,767

Int. Cl.² G01T ***1/20, 1/164***

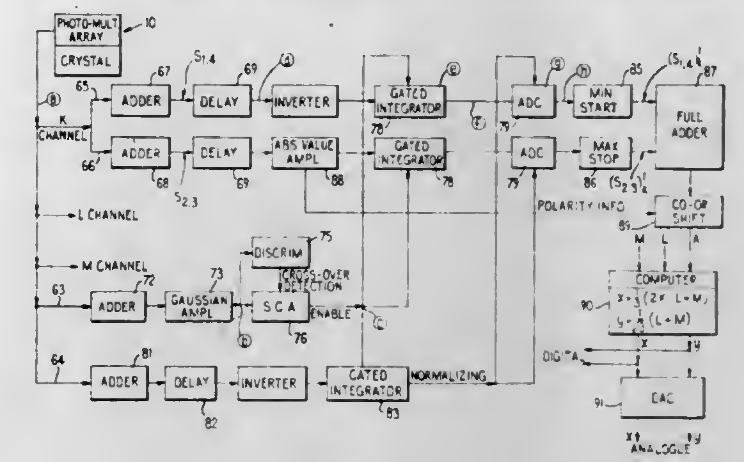
U.S. Cl. 250—369 **33 Claims**

1. A scintillation camera comprising:

a. a planar, unitary scintillating crystal responsive to radiation stimuli for producing light events at spatial locations corresponding to the spatial locations of the interactions of the stimuli with the crystal;

b. a plurality of photomultipliers positioned with their optical axes perpendicular to the plane of the crystal and having photocathodes for receiving light from the crystal, each photomultiplier producing an output in response to a light event in the crystal; and

c. computing circuitry coupled to said photomultipliers for computing the projection of a light event in the crystal on



a reference axis including means for forming an analytical function of the outputs of only those photomultipliers that are close to the light event in the crystal without attenuating such outputs.

4,060,731

DENTAL X-RAY APPARATUS

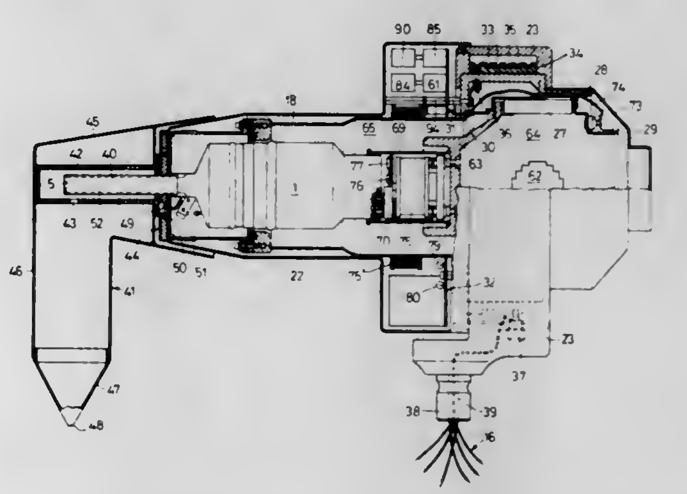
Walter Rissi, Lanzenhausern, Switzerland, assignor to Gesellschaft fur Elektronische Rohren Comet Bern, Bern, Switzerland

Filed Oct. 4, 1976, Ser. No. 729,514

Claims priority, application Switzerland, Oct. 6, 1975, 12956/75

Int. Cl.² H05G ***1/10***

U.S. Cl. 250—402 **6 Claims**



1. In apparatus for obtaining extra- and/or intra-oral dental X-ray photographs, of the type wherein high-voltage transformer and part of an X-ray tube are disposed in an inner casing contained within an outer housing, from an end face of which there projects an anode tube of said X-ray tube containing an anticathode and surrounded by an X-ray-permeable protective sleeve, the improvement comprising:

a plane anticathode target surface disposed within said anode tube and inclined with respect to the cathode-ray axis of said X-ray tube,

regulating means dependent upon the operating state of said apparatus for varying the cathode-ray current and/or the size of the focal spot,

an adapter designed to be fitted over said protective sleeve and secured to said end face of said outer housing for obtaining said intra-oral X-ray photographs,

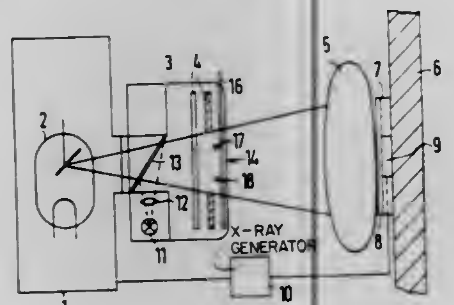
a change-over switch disposed within said outer housing near said end face thereof and actuatable by said adapter for influencing said regulating means, and

an X-ray-proof jacket forming part of said adapter and designed to fit over said protective sleeve coaxially therewith.

4,060,732
SEPARATING GASEOUS ISOTOPE MIXTURES
Dieter Rosenberger, Sauerlach, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany
Filed Dec. 18, 1975, Ser. No. 641,897
Claims priority, application Germany, Dec. 18, 1974, 2459989
Int. Cl.² H01J *39/34*
U.S. Cl. 250—432 R **5 Claims**

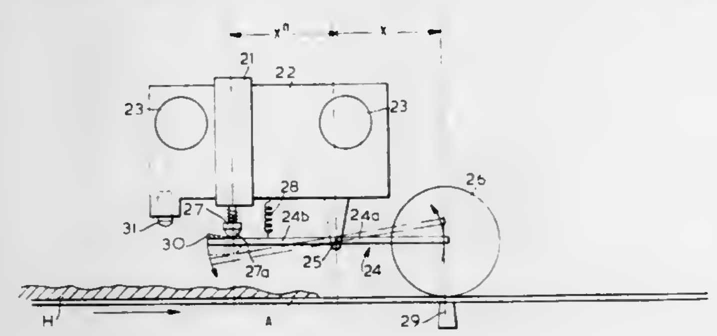
1. In an improved process for separating a gaseous isotope mixture having the general molecular composition $X_{n1}^{(1)}X_{n2}^{(2)}$ where a constituent $X^{(k)}$ can be replaced by an isotope, the improvement which comprises injecting laser light excitation irradiation into a location selected from the group consisting of the top and the bands of the fundamental and combination vibrations, and the vibration band edges of the electronic transitions associated with the isotopes comprising said mixture, said excitation irradiation being supplied by a laser source selected from the group consisting of a tunable laser and a pumping laser followed by a secondary tunable laser.

4,060,733
X-RAY DIAGNOSTIC APPARATUS WITH AN AUTOMATIC EXPOSURE TIMER
Kurt Franke, Erlangen, Germany, assignor to Siemens Aktiengesellschaft, 03, Berlin & Munich, Germany
Filed Oct. 16, 1975, Ser. No. 623,071
Claims priority, application Germany, Oct. 18, 1974, 2449708
Int. Cl.² G01N *23/02*
U.S. Cl. 250—491 **4 Claims**



1. An X-ray diagnostic installation comprising an X-ray tube housing having an X-ray tube mounted therewithin,
- an X-ray film cassette drawer disposed in spaced relation to said X-ray tube housing for receiving and holding a planar X-ray film cassette,
- a diaphragm housing disposed between said X-ray tube housing and said film cassette drawer and containing a primary X-ray focusing diaphragm and a light visor for illuminating a region of the body of a patient overlying said cassette drawer,
- an X-ray generator comprising an automatic X-ray exposure timer having a measuring probe adjustably positionable within said cassette drawer in parallel relation to the plane of the X-ray film cassette received therewithin,
- means operatively interconnecting said X-ray tube and said X-ray generator,
- said X-ray tube housing, said cassette drawer and said diaphragm housing being arranged in aligned relation with one another,
- shadow producing means adjustably positionable on said diaphragm housing in operative association with said light visor for producing an optically visual measuring area of selectively adjustable size and location on the body of the patient overlying said cassette drawer,
- first position determining means on said diaphragm housing for determining the position of said shadow producing means relative to said diaphragm housing, and second position determining means on said cassette drawer and on said measuring probe corresponding to said first position determining means for determining the position of said measuring probe relative to said cassette drawer and for positioning said measuring probe in alignment with the measuring area produced by said shadow producing means.

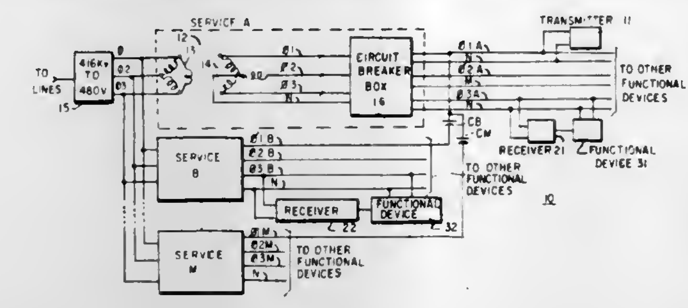
4,060,734
APPARATUS FOR MEASURING IRREGULAR AREAS AND THICKNESSES
Leslie Joseph Tilley, Edinburgh, and Bernard Dugdale, Roslin, both of Scotland, assignors to Forth Instruments Limited, Midlothian, Scotland
Filed Mar. 18, 1976, Ser. No. 667,934
Claims priority, application United Kingdom, Mar. 25, 1975, 12343/75
Int. Cl.² G01N *21/30*
U.S. Cl. 250—560 **10 Claims**



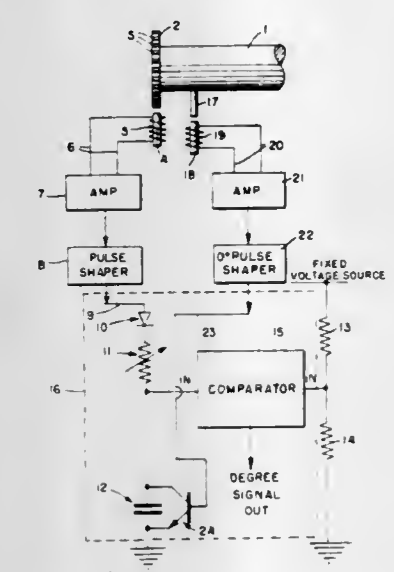
1. Apparatus for measuring the surface area and thickness of an irregular article, comprising a conveyor for the article, said conveyor having a substantially non-reflective surface, a series of photo-electric cells extending across and above said conveyor and spaced from each other by a predetermined distance, means for moving said conveyor at a predetermined speed relative to said photo-electric cells and in a direction normal to the line on which said series of cells are arranged, light means for illuminating an article on the conveyor from above and by reflection from the article engerizing as the article is moved under the series of photo-electric cells such of said cells as register with the article, means for sampling the output from said cells at predetermined intervals of time, electronic means for computing from the corresponding increments of movement of the article between successive samplings and the corresponding sum of the distances between photo-electric cells energized the area of the article, and means for measuring variations in the thickness of the article comprising at least one mechanical to electrical transducer positioned so as to bear against the article and be adjusted by the varying thickness thereof, point detection means for detecting a predetermined position relative to the leading edge of the pelt and measurement indicating means connected to said transducer responsive to the electrical output therefrom and to the point detection means and arranged to as to indicate the thickness at the predetermined position.

4,060,735
CONTROL SYSTEM EMPLOYING A PROGRAMMABLE MULTIPLE CHANNEL CONTROLLER FOR TRANSMITTING CONTROL SIGNALS OVER ELECTRICAL POWER LINES
Gregory A. Pascucci, Milwaukee; Ramesh Krishnaiyer, Hales Corners, and Donald Floyd Pridemore, Milwaukee, all of Wis., assignors to Johnson Controls, Inc., Milwaukee, Wis.
Filed July 12, 1976, Ser. No. 704,536
Int. Cl.² H02J *3/02*
U.S. Cl. 307—3 **40 Claims**

1. In a control system wherein functional devices are controlled in response to control signals transmitted over an electrical power distribution network of a building complex including power lines which conduct cyclical AC power signals, a control arrangement comprising transmitter means including timing means coupled to one of said power lines and responsive to a plurality of cycles of said power signals to define a like plurality of data channels which comprise a data frame, and signal means responsive to said timing means for providing control signals at a predetermined frequency which are coupled to said power line during selected ones of a plurality of said data channels for transmission over said power distribution network, and a plurality of receiver means each individually associated with a different one of said functional devices, each of said receiver means including input means coupled to one of said power lines for detecting said control signals, and enabling means for enabling the associated receiver means to respond to control signals in at least one of said data channels for controlling the associated functional device.

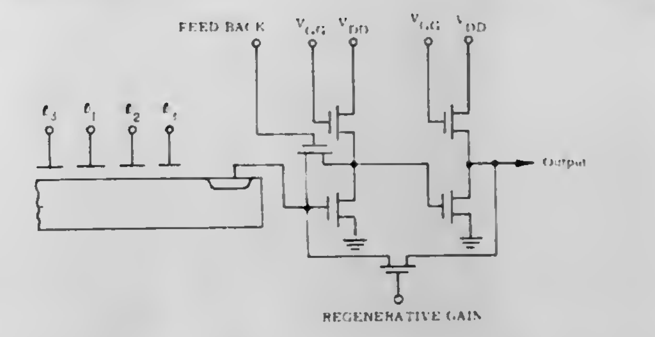


4,060,736
CONTROL SYSTEM FOR CYCLIC OPERATIONS
Robert Harvey Connors, Chicago, Ill., assignor to Triangle Package Machinery Co., Chicago, Ill.
Filed Mar. 11, 1976, Ser. No. 666,018
Int. Cl.² H01H *7/00*
U.S. Cl. 307—141 **25 Claims**



19. The method of controlling the timing of the occurrences of operations within a cycle of operations and of establishing the beginning of a cycle, comprising the steps of,
- a. detecting a preselected repeatable point of reference in a cycle,
- b. establishing first and second predetermined charge levels associated with each operation to be performed,
- c. changing the charge level from said first predetermined charge level to said second predetermined charge level at a rate of change proportional to the speed of each cycle each time the associated operation is to be performed,
- d. emitting a control signal for an operation to be controlled thereby when said second predetermined charge level is reached, and
- e. thereafter changing the charge level back to said first predetermined charge level after the emission of said control signal, whereby, at the time said point of reference is detected, said first charge level will have been reached.

4,060,737
CHARGE COUPLED DEVICE SHIFT REGISTERS HAVING AN IMPROVED REGENERATIVE CHARGE DETECTOR
William Milton Gosney, Richardson, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.
Division of Ser. No. 499,717, Aug. 22, 1974, Pat. No. 3,979,603. This application May 19, 1976, Ser. No. 687,726
Int. Cl.² H03K *5/18, 3/286, 3/353;* H01L *29/78*
U.S. Cl. 307—221 D **6 Claims**

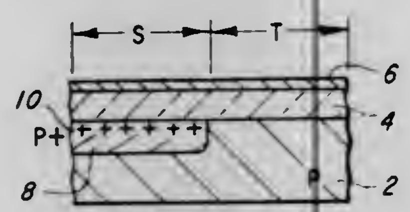


1. In a charge coupled device shift register including a plurality of stages, each including a plurality of transfer electrodes, means for applying multiphase clock signals to said electrodes to shift data signals along said shift register, data output means for said shift register adjacent a selected transfer electrode of one of said stages, said selected transfer electrode connected for application of a predetermined phase clock signal thereto; and regenerative charge detector means consisting of:
- first and second non-clocked inverter stages connected between respective voltage supply lines, means cross coupling input nodes and output nodes of said inverter stages, one of said cross coupling means including gating means connected for operation by said predetermined phase clock signal;
- said output means of said shift register connected to the input node of said first inverter stage;
- feedback means connected between the input and output nodes of said first inverter stage for precharging said nodes of said first inverter stage to a reference voltage set by a value $V_{out} = V_{in}$ on an output voltage (V_{out}) versus input voltage (V_{in}) transfer characteristic of said inverter stages;
- and means for applying subsequent to said precharge step, said predetermined phase signal to said selected transfer electrode and said shift register for causing regenerative imbalance between the voltages at the output nodes of said first and second inverter stages in a sense corresponding to the level of said transferred data signal compared with that of said reference voltage.

4,060,738
CHARGE COUPLED DEVICE RANDOM ACCESS MEMORY
Al F. Tasch, Jr, Richardson; Robert Charles Frye, Plano; Horng-Sen Fu, and Robert W. Brodersen, both of Dallas, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.
Continuation of Ser. No. 554,889, March 3, 1976. This application Nov. 8, 1976, Ser. No. 739,758
Int. Cl.² H03K *5/00;* H01L *29/78, 29/04;* G11C *11/24*
U.S. Cl. 307—238 **20 Claims**

1. A memory cell for a semiconductor memory device, comprising a gate conductor-insulator-semiconductor region, the semiconductor of said region having one conductivity type and including a storage portion and an adjacent transfer portion with at least part of the gate conductor of said region overlying and electrically coupled to both said storage and transfer portions for receiving clock pulses to create potential wells at said storage and transfer portions, the semiconductor of said region further including a sense portion adjacent said

transfer portion for receiving signal charge corresponding to logic 1 and logic 0 signal levels for writing into and read-out from said storage portion, and for receiving signal charge corresponding to logic 1 and logic 0 signal levels read-out from said storage portion, the conductor-insulator-semiconductor region at said storage and transfer portions having differing threshold voltage and semiconductor surface potential-gate voltage characteristics such that responsive to a selected first clock pulse level applied to said gate conductor, potential wells



of different depths are created at said storage and transfer portions with the potential well at said storage portion being deeper than that at said transfer portion for writing logic signal charge inputs from said sense portion into said storage portion, and responsive to a second selected clock pulse level potential wells having a lesser difference in depth are created at said storage and transfer portions with the potential well at said transfer portion being deeper than that at said storage portion for reading logic signal charge from said storage portion into said sense portion.

4,060,739

CIRCUIT ARRANGEMENT FOR AMPLIFYING PULSED SIGNALS

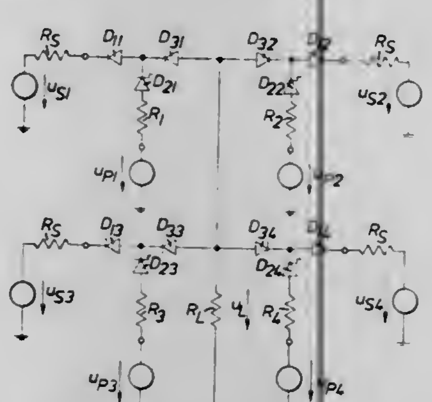
Peter Russer, and Johann Gruber, both of Ulm (Danube), Germany, assignors to Licentia Patent-Verwaltungs-G.m.b.H., Frankfurt am Main, Germany

Filed Dec. 12, 1975, Ser. No. 640,152

Claims priority, application Germany, Dec. 17, 1974, 2459496

Int. Cl.² H03K *3/33*

U.S. Cl. 307—319 **4 Claims**



1. A circuit arrangement for amplifying and multiplexing a plurality of electrical pulsed signals comprising: a plurality of step recovery diodes; a plurality of signal sources, one for each said diode, each providing a respective sequence of pulsed signals; a plurality of first switching diodes each connected between a respective step recovery diode and a respective signal source and poled to conduct current in the forward direction of its respective step recovery diode for conducting pulsed signals from its respective signal source to its respective step recovery diode in a manner to cause each such pulsed signal to charge said respective step recovery diode; a plurality of pump sources each producing a train of clock pulses and each connected to a respective one of said step recovery diodes for biasing its respective step recovery diode and said first switching diode connected thereto in the forward direction during the intervals between clock pulses and for causing each such clock pulse to produce a current flow in the reverse direction of its respective step recovery diode whenever said step recovery diode is in a charged state, each current flow produced by a clock pulse acting to discharge said respective step recovery diode; a plurality of second switching diodes each having one terminal connected to the point of connection between a respective step recovery diode and first switching diode, with the other terminal of all of said second switching diodes being connected to a common output point, and a common load resistor connected between said common output point and ground, each said second switching diode being poled to be biased in its reverse direction during the intervals between clock pulses and in its forward direction during a clock pulse whenever its respective step recovery diode is in a charged state, to cause each reverse current flow occurring in each said step recovery diode to flow through, and act upon, said common load resistor, wherein each said signal source is arranged to supply pulsed signals and each said pump source is arranged to supply clock pulses at a predetermined repetition rate which has the same value for all of said sources, the pulsed signals from different ones of said signal sources are offset in time from one another by an amount equal to the repetition rate period divided by the total number of said step recovery diodes, and the signal pulses produced by each said signal source occur in the intervals between the clock pulses produced by that pump source connected to the same step recovery diode, whereby said load resistor provides an output signal constituting an amplified and time multiplexed representation of all of said pulsed signals.

4,060,740

SENSING AMPLIFIER FOR CAPACITIVE MISFET MEMORY

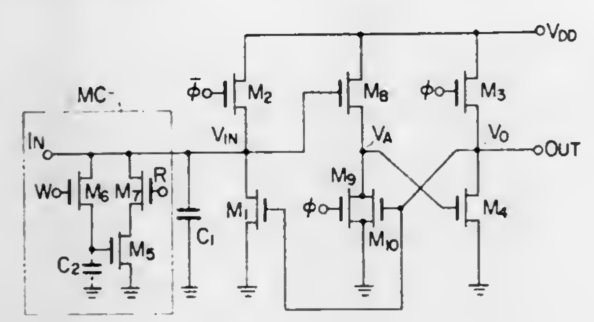
Kotaro Nishimura, Fuchu, Japan, assignor to Hitachi, Ltd., Japan

Filed May 12, 1976, Ser. No. 685,925

Claims priority, application Japan, May 28, 1975, 50-62900

Int. Cl.² H03K *5/18, 3/286, 3/353;* **G11C** *11/40*

U.S. Cl. 307—362 **14 Claims**



1. A sensing amplifier for sensing an output signal from a capacitive MISFET memory cell containing a memory capacitance, comprising:

an input terminal for receiving the output signal from said memory cell;

an output terminal;

first and second sensing MISFETs, the sources of said first and second sensing MISFETs being connected to a first reference potential, the drain of said first sensing MISFET being connected to the gate of said second sensing MISFET and to said output terminal, the drain of said second sensing MISFET being connected to said input terminal; and

a signal level shifting circuit connected to said input terminal at an input side thereof and to the gate of said first sensing MISFET at an output side thereof for shifting the level of the output signal from said memory cell, the level-shifted output signal being applied to the gate of said first sensing MISFET.

4,060,741

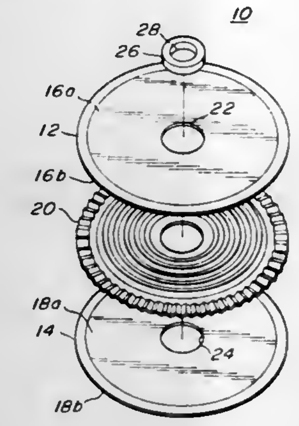
HIGH POWER PIEZOELECTRIC BENDER

Hugo Willy Schafft, Des Plaines, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Dec. 29, 1975, Ser. No. 644,665

Int. Cl.² H01L *41/04*

U.S. Cl. 310—332 **11 Claims**



1. A bimorph bender for driving a mechanical member comprising:

a pair of disc members, each disc member formed of a piezoelectric material and having first and second diametrically opposed surface portions, each disc further provided with a centrally located coupling hole defined by a disc coupling hole surface;

electrode members contiguous with a substantial portion of each disc member first and second surface portions;

a center vane member, provided with a centrally located coupling hole, for separating the discs in fixed spaced relationship and aligning the coupling holes to form a coupling cavity;

a coupling member comprised of an electrically insulating and mechanically stiff material, having a stiffness approximately equal to or greater than said piezoelectric material, and having a predetermined surface dimension for insertion in the coupling cavity, the coupler member further provided with a means adapted to rigidly affix the coupling member to the mechanical member; and

a means for affixing the coupling member within the coupling cavity such that the coupling member is stiffly attached to the coupling hole surface of each disc,

whereby the coupling member material and dimension maintains a high mechanical stress force across the bender surface to achieve a high electromechanical coupling factor thereof while providing a means adapted to mechanically affix and transmit movement of the bender to the mechanical member.

4,060,742

SUPERCONDUCTIVE DYNAMOELECTRIC MACHINE WITH IMPROVED CRYOGENIC SUPPORT ARRANGEMENT

Donald C. Litz, Monroeville, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 398,023, Sept. 17, 1973, now Defensive Publication No. T934,001. This application Dec. 31, 1975, Ser. No. 645,588

Int. Cl.² H02K *9/00*

U.S. Cl. 310—52 **12 Claims**

1. A superconducting dynamoelectric machine comprising:

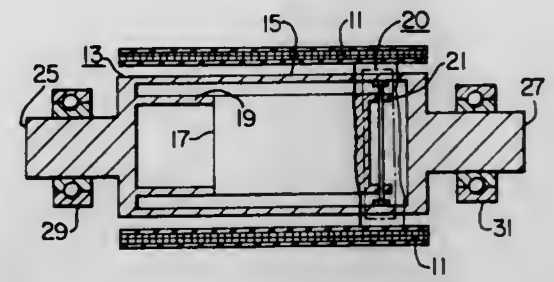
a generally cylindrical stator;

a generally cylindrical first rotor portion at ambient temperature concentric with said stator;

a generally cylindrical second rotor portion at cryogenic temperature concentric with said first rotor portion;

a generally cylindrical support ring associated with said second rotor portion, said support ring being constructed of a material having a first coefficient of thermal expansion; and

a plurality of generally radially extending support spokes interconnecting said first and second rotor portions, each of said spokes having one end connected to said first rotor portion and the other end connected to said support ring, said support spokes being constructed of a material having



a second coefficient of thermal expansion selected so that said support ring and said support spokes contract an equal amount in the radial direction when said second rotor portion is cooled to cryogenic temperature.

4,060,743

SUPERCONDUCTIVE EXCITER WINDING FOR THE ROTOR OF A TURBOGENERATOR AND METHOD OF PRODUCTION

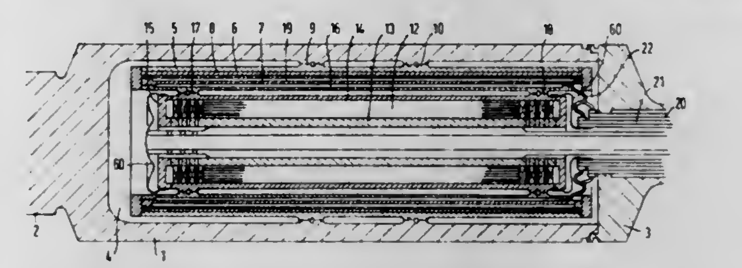
Erich Weghaupt, Mulheim (Ruhr), Germany, assignor to Kraftwerk Union Aktiengesellschaft, Mulheim (Ruhr), Germany

Filed June 2, 1975, Ser. No. 583,158

Claims priority, application Germany, Jan. 28, 1975, 2503428

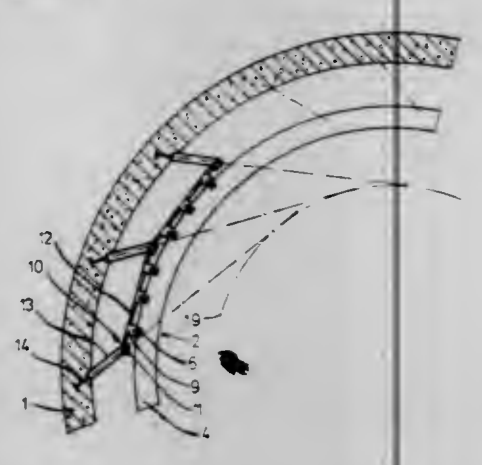
Int. Cl.² H02K *9/10*

U.S. Cl. 310—52 **9 Claims**



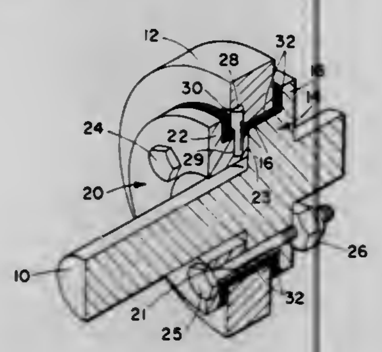
1. In a turbogenerator rotor having a hollow cylindrical body, the combination of winding support means disposed within the hollow cylindrical rotor body for supporting a superconductive winding, a plurality of intermediate cylinders comprising vibration damping and cold shielding cylinders disposed around said winding support means intermediate said winding support means and the cylindrical body of the rotor, said winding support means, being force-lockingly connected to the cylindrical rotor body through axially transposed articulating points on said intermediate cylinders yet being permitted resiliency thereat in radial direction, said winding support means comprising a support cylinder disposed within said intermediate cylinders and formed with axially extending slots uniformly distributed about the outer periphery thereof, said slots having respectively equal dimensions and having a content of respectively equal dimension and equal weight consisting of conductors formed at least partly of copper or superconductive material or both thereof, slot wedges covering said slots respectively at the outer peripheral surface of said support cylinder, and a bracing cylinder having a length equal to that of said support cylinder being coaxially disposed thereon in shrink fitting engagement therewith.

4,060,744
ROTARY ELECTRICAL MACHINE OR VERTICAL CONSTRUCTION
Mihailo Starčević, Mellingen, Switzerland, assignor to BBC Brown Boveri & Company Limited, Baden, Switzerland
Filed Nov. 11, 1975, Ser. No. 630,758
Claims priority, application Switzerland, Nov. 19, 1974, 15351/74
Int. Cl.^{2} H02K *5/00*
U.S. Cl. 310—91 **5 Claims**



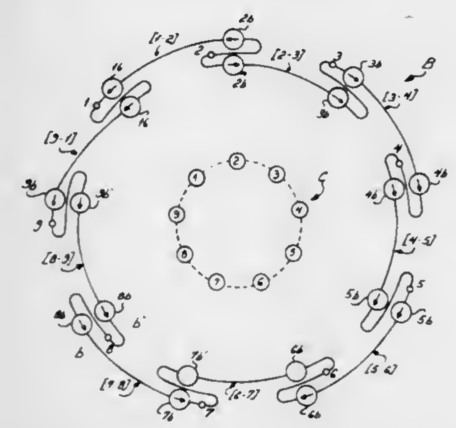
1. An electrical machine of vertical construction, the stator and surrounding foundation of which form concentric radially spaced inner and outer rings respectively, a system of circumferentially extending and uniformly distributed spoke-like arms located intermediate said inner and outer rings, and means joining the opposite ends of said arms to said inner and outer rings, the respective axes of said arms forming identical acute angles with radial lines extending respectively from the common center of said inner and outer rings through corresponding joints which interconnect the outer ends of said arms with said outer ring, and said arms being inflexible over their whole effective length in the longitudinal direction corresponding to the applied load, all of said arms being inclined in the same sense so as to accommodate torsional stresses imposed upon said inner ring caused by thermally induced expansion thereof.

4,060,745
STRUCTURE FOR ATTACHING A PERMANENT MAGNET TO A ROTATING SHAFT
Phillip S. Linscott, Jr., Rockford, Ill., assignor to Sundstrand Corporation, Rockford, Ill.
Filed Mar. 25, 1976, Ser. No. 670,139
Int. Cl.^{2} H02K *21/08*
U.S. Cl. 310—156 **9 Claims**



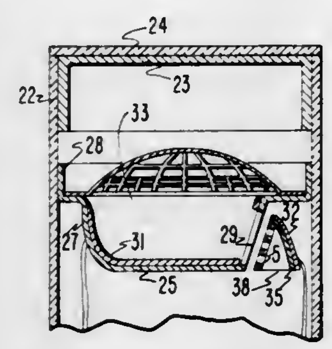
1. A rotatable structure comprising:
a shaft;
an annular magnet;
a generally circular support portion integral with the shaft having an outer supporting surface with a diameter less than the inside diameter of the permanent magnet and additionally including a shoulder portion effective to restrain axial movement of the permanent magnet in a first axial direction;
a shouldered ring having a shoulder effective to restrain axial movement of the permanent magnet in a second axial direction;
means for securing said shouldered ring to said support portion;
at least one securing member engaged with the permanent magnet to prevent the rotation of the magnet with respect to the shaft; and
a flexible material interposed between the said supporting surface and the magnet.

4,060,746
ELECTRIC DIRECT CURRENT ROTATING MACHINE
Marc Heyraud, Les Geneveye-sur-Coffrane, Switzerland, assignor to Portescap, La Chaux-de-Fonds, Switzerland
Filed Sept. 5, 1975, Ser. No. 610,861
Claims priority, application Switzerland, July 11, 1975, 9076/75
Int. Cl.^{2} H02K *23/00*
U.S. Cl. 310—177 **11 Claims**



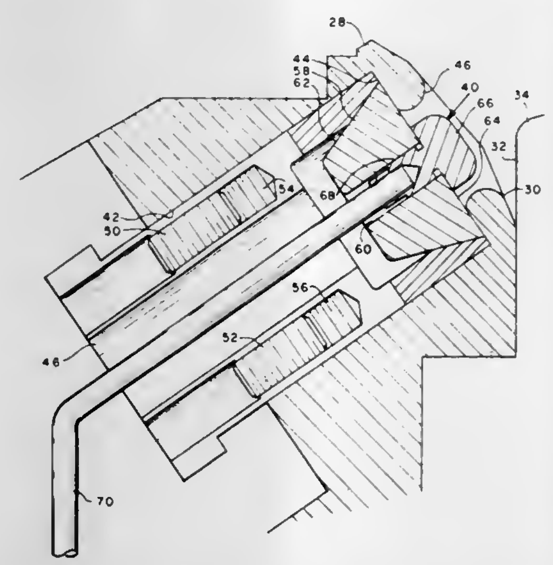
1. In an electric rotating machine having a stationary magnetic circuit and a rotor bearing at least one winding, said winding comprising a plurality of sections connected in series, each said section being formed of at least two series-connected coil elements; means for connecting the opposite ends of a section to adjacent segments of a commutator associated with said winding; the winding sections being arranged on the rotor such that at least one of said coil elements of one section and at least one of said coil elements of a different section are rotated to be disposed concurrently in the commutation zone so that currents flow through the respective coil elements of said different sections in opposite directions.

4,060,747
PHOTOTUBE HAVING DOMED MESH WITH NON-UNIFORM APERTURES
Richard Dale Faulkner, Lancaster, Pa., assignor to RCA Corporation, New York, N.Y.
Filed Feb. 4, 1976, Ser. No. 655,165
Int. Cl.^{2} H01J *39/00, 39/04*
U.S. Cl. 313—95 **9 Claims**



1. An electron discharge tube comprising an evacuated tube; a photocathode in said tube; a dynode having a covered input opening and an output opening in said tube; a dome-shaped radially symmetric mesh covering said input opening, said mesh having a plurality of spaced first elongated elements of electrically conducting material, and a plurality of spaced second elongated elements of electrically conducting material, said first elements and said second elements intersecting to form non-uniform apertures; said mesh further comprising a center and a periphery; said first elements being substantially radial elements; and said second elements being substantially circumferential elements; said apertures being progressively larger from the periphery to the center of said mesh whereby said central portion is more electron permeable than the peripheral portion.

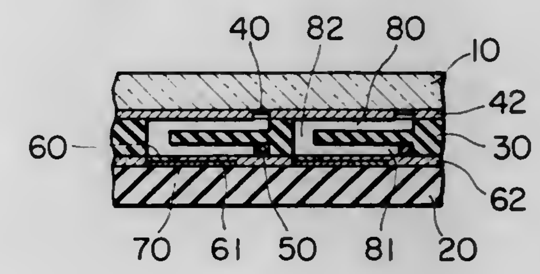
4,060,748
SURFACE BREAKDOWN IGNITER FOR MERCURY ARC DEVICES
John R. Bayless, Malibu, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.
Filed July 23, 1976, Ser. No. 707,976
Int. Cl.^{2} H01J *13/06, 13/34;* **H01T** *13/52*
U.S. Cl. 313—171 **8 Claims**



1. An igniter for a liquid metal plasma valve having an anode, a cathode and a condenser in an envelope so that a low pressure plasma arc discharge can operate between the cathode and anode and the atoms can be condensed out on the condenser;
said cathode having a pool-keeping wall for defining a liquid metal pool on which an arc runs to form the plasma discharge, an opening in said pool-keeping wall, said opening being defined by an igniter cathode wall which is continuous with said pool-keeping wall;
a block of semiconductor material having a front surface positioned in said opening with said front surface in engagement with said igniter cathode wall and below said pool-keeping wall; and
an igniter anode engaging said surface of said block of semiconductor material, said igniter anode being spaced from said igniter cathode so that upon application of voltage between said igniter anode and said igniter cathode a surface breakdown arc occurs across the front surface of said semiconductor material for igniting a plasma arc between said anode and said cathode of said liquid metal plasma valve.

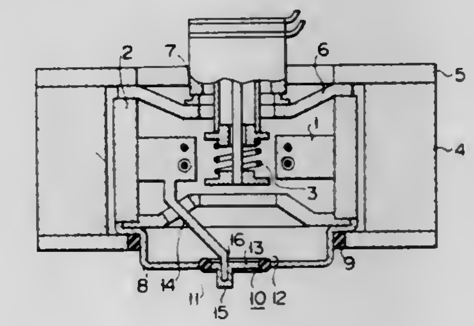
4,060,749
FLAT DISCHARGE DISPLAY PANEL HAVING POSITIVE COLUMN DISCHARGE AND AUXILIARY ANODE ELECTRODES
Shinichi Shinada, Kokubunji, and Shigeo Mikoshiba, Tokyo, both of Japan, assignors to Hitachi, Ltd., Japan
Filed Sept. 15, 1976, Ser. No. 723,608
Claims priority, application Japan, Sept. 17, 1975, 50-111625; May 24, 1976, 51-59120
Int. Cl.^{2} H01J *61/30, 61/42, 61/54, 61/56*
U.S. Cl. 313—484 **14 Claims**

1. In a flat discharge display panel of the type having a plurality of gas discharge cells arrayed in a matrix form, an improvement wherein each cell comprises:
a main anode electrode, and means for supporting said main anode electrode;
an auxiliary anode, and means for supporting said auxiliary anode;
a cathode electrode interposed between said main anode electrode and said auxiliary anode electrode and perpendicular to said main anode electrode, said auxiliary electrode being spaced apart from said main anode electrode and said cathode electrode by such a distance that a first positive column is produced between said main anode electrode and said cathode electrode and a second positive column is produced between said auxiliary anode electrode and said cathode electrode in parallel with said first positive column;
first means defining a main discharge space between said main anode electrode and said cathode electrode,



said first positive column being produced in said main discharge space;
second means defining an auxiliary discharge space between said auxiliary anode electrode and said cathode electrode, said auxiliary discharge space being in communication with said main discharge space through a passage, said second positive column being produced in said auxiliary discharge space; and
a resistor element connected to said cathode electrode, whereby when a DC voltage is applied between said anode electrode and said cathode electrode through said resistor element and between said auxiliary electrode and said cathode electrode through said resistor element and said DC voltage is varied, one of said first and second positive columns may be selectively produced and said first positive column thus produced may be used for display purposes.

4,060,750
COMPACT MAGNETRON WITH SMALL AXIAL LENGTH AND SLOT ANTENNA OUTPUT ATTACHED THERETO
Norio Tashiro, Yokohama, and Hirokazu Takahashi, Tokyo, both of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan
Filed May 13, 1976, Ser. No. 685,995
Claims priority, application Japan, May 13, 1975, 50-55456
Int. Cl.^{2} H01J *25/50*
U.S. Cl. 315—39.51 **23 Claims**



1. A vane-type magnetron comprising:
an anode having an anode cylinder and a plurality of vanes

extending from the inner surface of the anode cylinder toward the central axis of the anode cylinder to define resonance cavities within the anode cylinder,
a cathode disposed at the central axis of the anode cylinder,
magnetic means for applying a magnetic field to a space between the anode and the cathode,
a conductor member disposed at one end opening of the anode for electrical connection therewith,
a slot antenna comprising a bored slot in the conductor member for radiating microwaves generated in the resonance cavities,
a microwave-output conductor, one end of which is electrically connected to a vane and the other end of which is connected to a microwave-feeding point of the slot antenna, and
sealing means for maintaining the internal space of the anode hermetic.

4,060,751

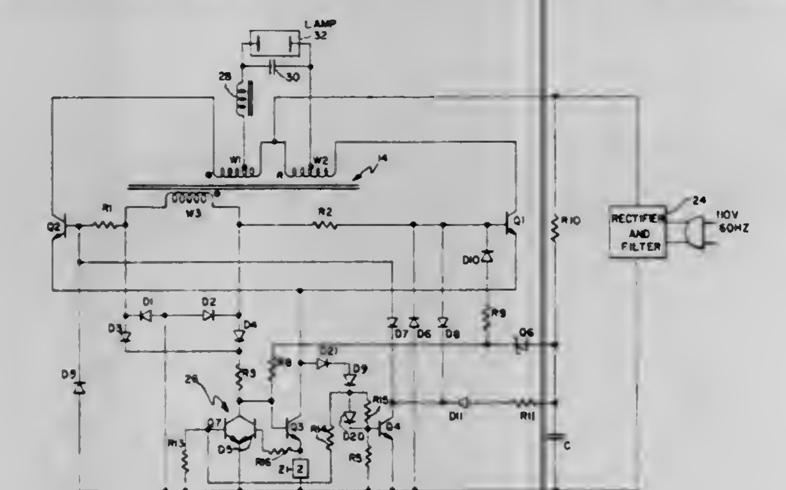
DUAL MODE SOLID STATE INVERTER CIRCUIT FOR STARTING AND BALLASTING GAS DISCHARGE LAMPS

Thomas E. Anderson, Normal, Ill., assignor to General Electric Company, Schenectady, N.Y.

Filed Mar. 1, 1976, Ser. No. 662,523

Int. Cl.² H05B *37/02, 39/04, 41/36*

U.S. Cl. 315—209 R **14 Claims**



1. A circuit for starting and ballasting a gas discharge lamp comprising:
inverter means for producing an alternating current output between a first output terminal and a second output terminal, including means for commutating the polarity of the voltage of said output at such times as the instantaneous value of said alternating current output equals a reference current level;
a capacitor and inductor connected in series between said first output terminal and said second output terminal to form a resonant circuit; and
a gas discharge lamp connected in parallel with said capacitor.

4,060,752

DISCHARGE LAMP AUXILIARY CIRCUIT WITH dI/dt SWITCHING CONTROL

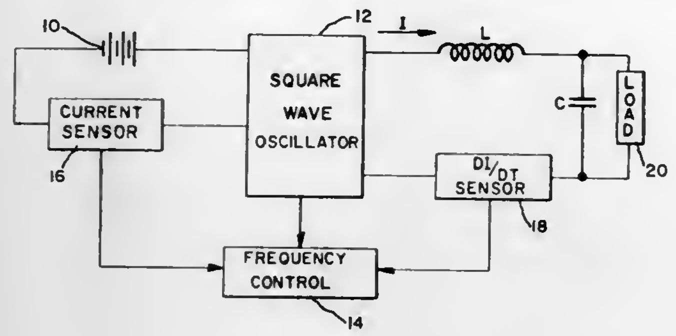
Loren H. Walker, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Mar. 1, 1976, Ser. No. 662,524

Int. Cl.² H05B *41/26, 41/36*

U.S. Cl. 315—244 **14 Claims**

1. A circuit for starting and operating a gas discharge lamp of the type including a capacitance operatively connected in parallel with a discharge lamp, an inductance operatively connected in series with said capacitance to form a series resonant matching network, a variable frequency alternating current source connected to couple power into said matching network, and means for automatically adjusting the frequency of said source to excite a resonance of said network; wherein, as an improvement, said means for automatically adjusting the frequency comprises:
first circuit means connected to commutate the polarity of the voltage across said matching network at such times as



the time derivative of current flow in said inductance is substantially equal to zero, whereby the frequency of said source is automatically maintained at or near a resonance of said matching network.

4,060,753

CONTROL SYSTEM FOR COMMUTATORLESS MOTOR

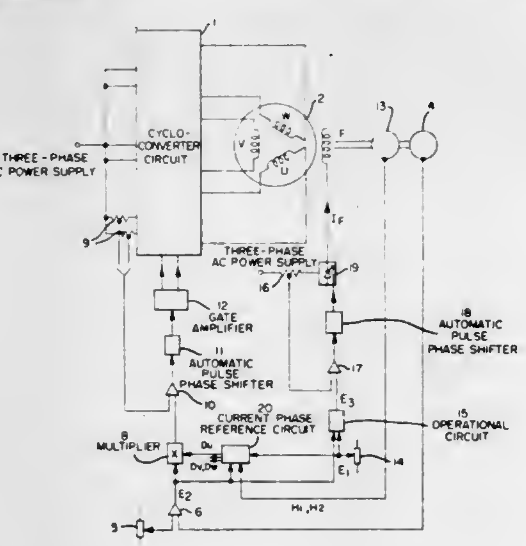
Toshiaki Okuyama, and Yuzuru Kubota, both of Ibaraki, Japan, assignors to Hitachi, Ltd., Japan

Filed July 6, 1976, Ser. No. 702,897

Claims priority, application Japan, July 4, 1975, 50-81799

Int. Cl.² H02K *29/00*

U.S. Cl. 318—175 **8 Claims**



1. A control system for commutatorless motor comprising:
a. a synchronous motor having polyphase armature winding and a field winding,
b. a frequency converter for supplying AC current of variable frequency to the armature winding of said synchronous motor,
c. a position senser for detecting the position signal based on the rotational position of said synchronous motor,
d. a voltage setup means for producing a constant exciting current reference determined in magnitude of the terminal voltage of said synchronous motor,
e. first operational means for obtaining the magnitude of a nominal induced electromotive force of the vector sum of the armature reaction drop and the terminal voltage of said synchronous motor based on the signal proportional to the armature current and said constant exciting current reference produced from said voltage setup means,
f. second operational means for obtaining the phase difference between the nominal induced electromotive force obtained by said first operational means and the terminal voltage of said synchronous motor,
g. field control means for controlling the field current supplied to the field winding of said synchronous motor responsive to the magnitude of the nominal induced electromotive force produced by said voltage setup means,
h. current phase reference means for producing a current phase reference leading the position signal of said position senser by the phase difference obtained by said second operational means, and
i. current control means for controlling the firing phase of said frequency converter based on the current phase reference and current reference.

4,060,754

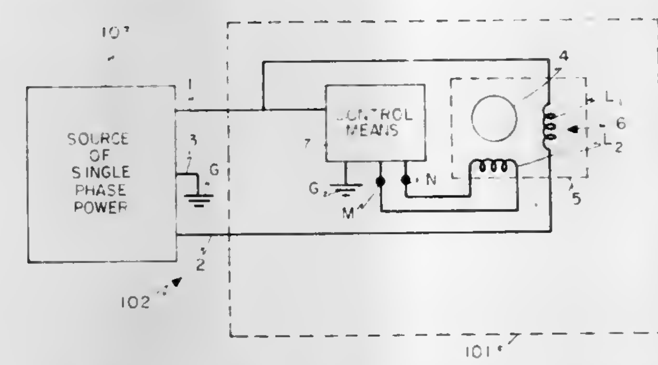
ELECTRONIC MOTOR THAT INCLUDES AN ELECTRONIC WAVEFORM SYNTHESIZER AND THE SYNTHESIZER PER SE

James L. Kirtley, Jr., Brookline, and Richard H. Baker, Bedford, both of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Filed May 14, 1976, Ser. No. 686,355

Int. Cl.² H02K *17/08*

U.S. Cl. 318—218 **19 Claims**



1. An electronic motor that comprises, in combination, a polyphase winding, at least one phase of the winding being adapted to connect directly across an incoming power line and at least one other phase of the winding being adapted to connect through control means to the power line, said control means comprising rectifier means, capacitance means, bilateral switch means, and logic means, the switch means serving to control the output of the rectifier means, and the logic means serving to control the bilateral switch means to establish a controllable phase shift between the power line voltage and the voltage applied to said at least one other phase.

4,060,755

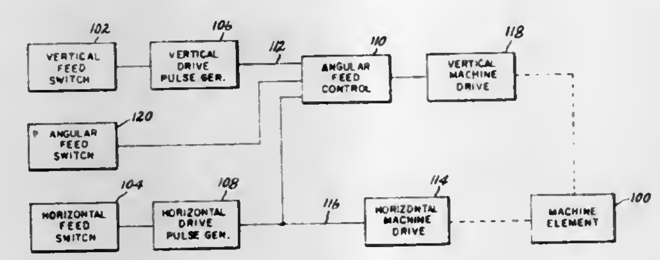
MULTIPLE AXIS PATH CONTROL FOR A MANUALLY CONTROLLED MACHINE

Edward George Robillard, Cherry Valley, Mass., assignor to Cincinnati Milacron, Inc., Cincinnati, Ohio

Filed Apr. 5, 1976, Ser. No. 673,467

Int. Cl.² G05B *19/24*

U.S. Cl. 318—571 **9 Claims**



1. An apparatus for producing first clock and direction signals for feeding a machine element along a first axis of motion in response to second clock and direction signals for feeding the machine element along a second orthogonal axis of motion, said first and second clock and direction signals being operative to move the machine element along a straight line path having a slope defined by a feed angle formed between the path and the second axis of motion, the apparatus comprising:
a. means for storing an input signal representing the tangent of the feed angle;
b. means responsive to each pulse in the second clock signal for producing timing signals;
c. a counter means responsive to the input signal and the timing signals for accumulating in response to each pulse in the second clock signal a number equal to the tangent of the feed angle, and said counter means producing a carry pulse in response to the counter accumulations exceeding the counter modulus whereby the carry pulse represents a pulse in the first clock signal.

4,060,756

AUTOMATIC IRIS CONTROL MEANS FOR VARIABLE FOCAL LENGTH LENS SYSTEM

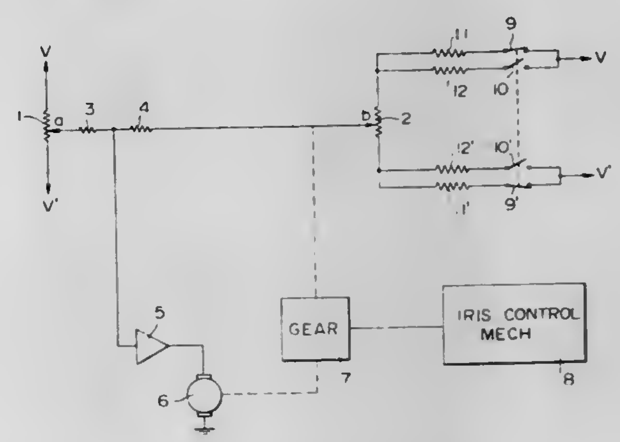
Naohei Watanabe, Kitamoto, and Tadaomi Inoue, Shobumachi, both of Japan, assignors to Fuji Photo Optical Co., Ltd., Omiya, Japan

Filed Oct. 16, 1974, Ser. No. 622,854

Claims priority, application Japan, Oct. 17, 1974, 49-118643

Int. Cl.² G05B *1/06*

U.S. Cl. 318—668 **4 Claims**



1. Means for controlling an iris of a variable focal length lens system comprising a servo-motor, a control potentiometer connected with the servo-motor for input of iris control signal, a position detecting potentiometer connected with the servo-motor to control the servo-motor by the balance made with reference to said control potentiometer, an iris control means connected with said servo-motor to control the diameter of an iris of the lens system, said iris control means being connected with said position detecting potentiometer so that the controlled position of the iris control means is detected by the detecting potentiometer, a plurality of change-over switches connected with said position detecting potentiometer, said switches being changed over in response to the change of the focal length of the lens system, and resistors having different resistance connected in series with said change-over switches, respectively.

4,060,757

INVERTERS HAVING A TRANSFORMER-COUPLED COMMUTATING CIRCUIT

William McMurray, Schenectady, N.Y., assignor to General Electric Co., Schenectady, N.Y.

Filed Sept. 17, 1976, Ser. No. 724,402

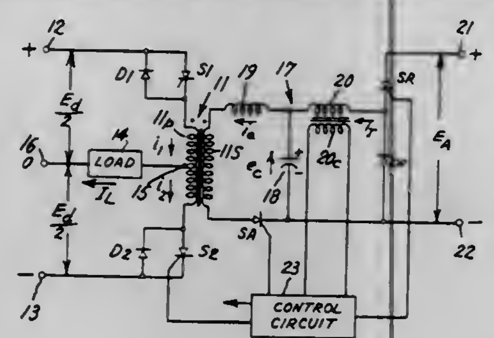
Int. Cl.² H02M *7/515*

U.S. Cl. 363—57 **28 Claims**

1. An inverter circuit comprising
at least one half-bridge inverter unit including first and second main thyristors connected in series between a pair of input unidirectional voltage supply terminals for alternate conduction of current selectively through the primary winding means of coupling transformer means to provide alternating-current output voltage at an output terminal, and feedback rectifier means in parallel with each main thyristor,
said coupling transformer means shaving inductively cou-

pled secondary winding means and functioning as a spanning reactor and to couple commutating current pulses to said main thyristors that are produced by a single commutating pulse generator,

said commutating pulse generator including a main commutating capacitor and at least one series-connected auxiliary thyristor for initiating discharge of said main commutating capacitor selectively through said secondary winding means, rebound circuit means comprising a rebound rectifier and rebound inductor in series across said main com-



mutating capacitor to recover trapped energy, and a recharge thyristor effectively connected in series with said main commutating capacitor and rebound inductor between a pair of auxiliary supply input terminals for independently recharging said main commutating capacitor to an initial voltage with the same polarity which, upon transformation into the primary winding means, is high enough to assure return of excess commutating pulse energy to the input terminals, and

control means for rendering said thyristors conductive in a prescribed sequence.

4,060,758

POWER SWITCHING CIRCUIT HAVING A DARLINGTON CONNECTED TRANSISTOR PAIR

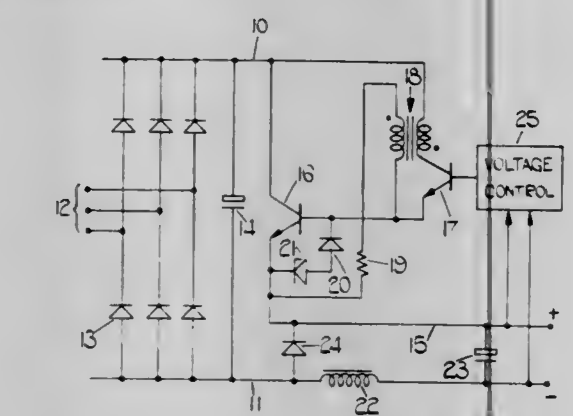
Owen Edgar Wright, Tring, England, assignor to Lucas Industries Limited, United Kingdom

Filed May 27, 1976, Ser. No. 690,618

Claims priority, application United Kingdom, June 4, 1975, 24066/75

Int. Cl.² G05F *1/56*

U.S. Cl. 323—17 **6 Claims**



1. A power switching circuit comprising a first supply conductor, a first output conductor, an output transistor having its collector connected to one conductor and its emitter connected to the other conductor, a drive transistor having its emitter connected to the base of the output transistor and its base connected to a control circuit and a transformer having one winding connecting the collector of the drive transistor to said one conductor and another winding connecting the emitter of the drive transistor to the emitter of the output transistor, the transformer being wound so that falling current in the collector of the drive transistor induces reverse bias current in the base-emitter junction of the output transistor.

4,060,759

TUBE-INSULATED SHELL-CORE CURRENT TRANSFORMER

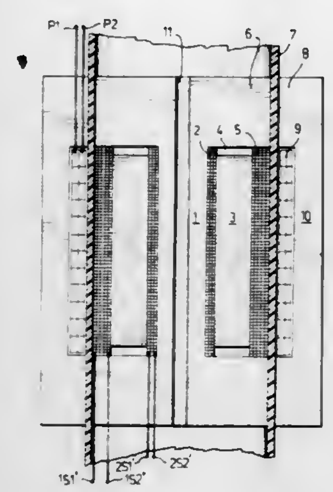
Kalevi Panu, Vaasa, Finland, assignor to Oy Stromberg AB, Vaasa, Finland

Filed Oct. 6, 1975, Ser. No. 620,114

Claims priority, application Finland, Oct. 18, 1974, 743148

Int. Cl.² H01F *40/06*

U.S. Cl. 323—60 **7 Claims**



1. A shell core current transformer comprising a tubular main insulator, a magnetic tubular measuring core having inner yokes and a magnetic tubular return core having outer yokes, said main insulator being arranged substantially coaxially between said measuring and return cores, a primary winding within said return core between said outer yokes, a secondary measuring winding within said measuring core between said inner yokes, a protecting core within said measuring core between said inner yokes and disposed coaxially with said main insulator, a protecting secondary winding within said measuring core between said inner yokes and between said protecting core and said main insulator, said secondary measuring winding being between said protecting core and said measuring core, said return core comprising a magnetic return circuit, whereby said primary winding serves both as a primary winding for said measuring core and as a primary winding for said protecting core.

4,060,760

EDDY CURRENT SENSOR FOR NON-DESTRUCTIVE TESTING THE QUALITY OF ELECTRICALLY CONDUCTIVE THROUGH-HOLE PLATING IN PRINTED CIRCUIT BOARDS

Viktor Igorevich Rogachev, Jurievsky pereulok, 22, korpus 2, kv. 55; Vasily Vasilievich Sukhorukov, 2 Vladimirskaya, 50, korpus 2, kv. 51, and Petr Nikolaevich Shkatov, Lefortovsky val, 7/6, korpus 4, kv. 69, all of Moscow, U.S.S.R.

Filed Feb. 6, 1976, Ser. No. 656,082

Claims priority, application U.S.S.R., Feb. 11, 1975, 2100851

Int. Cl.² G01R *33/12*

U.S. Cl. 324—2.9 **5 Claims**

1. An eddy current sensor for non-destructive testing of quality of electrically conductive through-hole plating in printed circuit boards comprising:

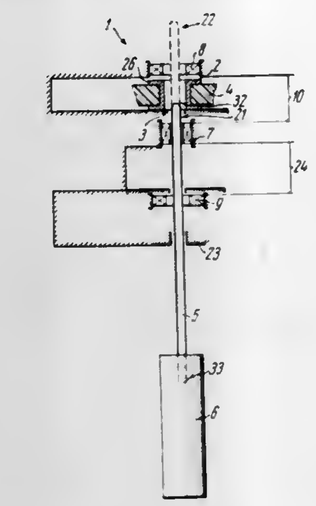
an elongated magnetic probe member having a first end and a second end, said probe member being movable and insertable into said through-plated hole of said printed circuit board when the latter is positioned in the path of movement;

means for moving said magnetic probe member for inserting said magnetic probe member into said hole of said printed circuit board;

a first winding coaxial with the probe's path of movement for inducing eddy currents in said electrically conductive plating of printed circuit boards holes when the latter are positioned adjacent thereto;

a second winding coaxial with the probe's path of movement and magnetically coupled with and rigidly fixed with respect to said first winding and positioned at a predetermined distance from said first winding for forming a gap to insert said tested printed circuit board;

a third winding coaxial with the probe's path of movement, connected in opposition to said second winding and magnetically coupled with the first winding, said third winding being rigidly fixed with respect to said first winding



and said second winding and being positioned at a predetermined distance from said first winding on the other side in relation to said second winding, said first winding comprising an exciting winding, said second and third windings comprising measuring windings located on opposite sides of said first winding, said measuring windings being rigidly fixed relative to said exciting winding and said probe, when moved, being positioned axially within said windings and said through holes.

4,060,761

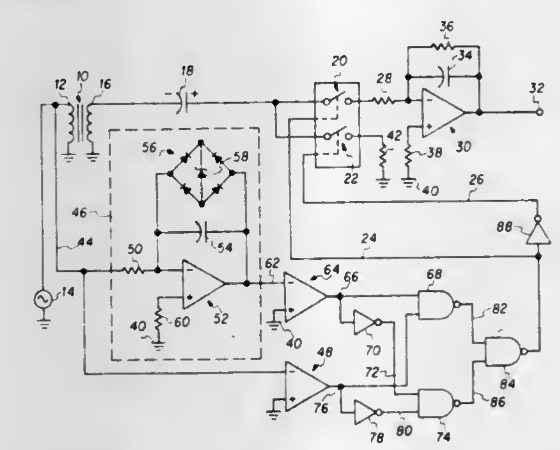
TUBULAR MAGNETIC FIELD SENSOR WITH MEANS TO RECTIFY THE SENSED SIGNAL

Melvin H. Rhodes, Cedar Rapids, Iowa, assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Nov. 11, 1976, Ser. No. 740,915

Int. Cl.² G01R *33/04*

U.S. Cl. 324—253 **1 Claim**



1. Magnetic sensing apparatus comprising, in combination:

a tubular length of magnetic material;

a first winding wound from inside to outside the tubular material;

a second winding wound around the circumference of the tubular material;

excitation means for applying an excitation signal to one of said windings;

a volt second integrator means, connected to said excitation means;

logic means, connected to the excitation means and to said volt second integrator means, for providing control signals,

rectifier means, including control input means, connected to the other of said windings; and

means connecting said control signals of said logic means to said control input means of said rectifier means for controlling the operation thereof to provide output sense signals indicative of magnetic field strength and direction in the vicinity of said magnetic material.

4,060,762

BIMODAL CAVITY RESONATOR BEAM POSITION MONITOR

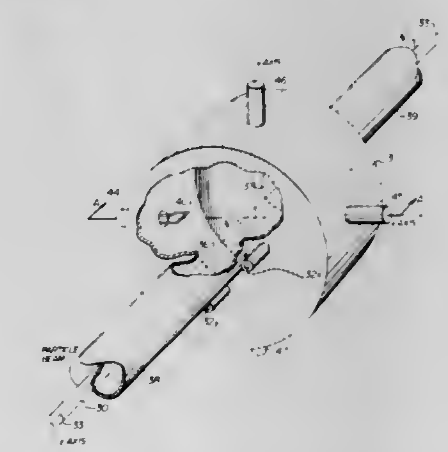
Joseph McKeown, Deep River, Canada, assignor to Atomic Energy of Canada Limited, Ottawa, Canada

Filed Nov. 30, 1976, Ser. No. 746,158

Claims priority, application Canada, May 17, 1976, 252671

Int. Cl.² G01N *27/00*

U.S. Cl. 324—71 EB **5 Claims**



1. A charged particle beam position monitor comprising:

resonant cavity means capable of being excited in a first mode about the *x*-axis of the cavity means and in a second mode orthogonal to the first mode about the *y*-axis of the cavity means, said cavity means having beam holes in opposite surfaces of said cavity means, said beam holes being concentric with a *z*-axis through the intersection of the *x*-axis and *y*-axis, to allow the particle beam to pass through said cavity means such said first mode is excited in the cavity when the centroid of the beam is displaced along the *x*-axis and said second mode is excited in the cavity when the centroid of the beam is displaced along the *y*-axis;

tuning means mounted on said cavity means for tuning the orthogonal modes to the same frequency;

first detector means coupled to said first mode in said cavity means to provide a signal as a function of beam displacement along the *x*-axis; and

second detector means coupled to said second mode in said cavity means to provide a signal as a function of beam displacement along the *y*-axis.

4,060,763

ARRANGEMENT FOR DETERMINING THE EFFECTIVE VALUE AND/OR THE POWER OF ELECTRICAL SIGNALS

Dieter Hassler, Erlangen, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Sept. 17, 1975, Ser. No. 614,333

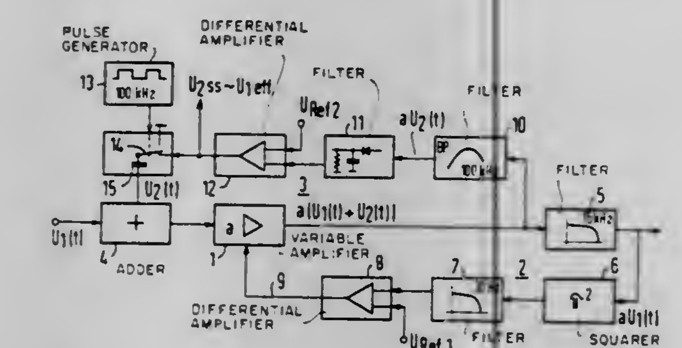
Claims priority, application Germany, Sept. 18, 1974, 2444626

Int. Cl.² G01R *1/30, 17/06*

U.S. Cl. 324—123 R **6 Claims**

1. In an arrangement for determining at least one of the effective value, power intensity or cross power of one or more input electrical signals, such as Doppler signals received in ultrasonic-Doppler blood flow measurement, comprising at least one variable amplifier having a controllable amplification control circuit for regulating the degree of amplification of said variable amplifier, so as to produce a constant amplifier output power, said variable amplifier being connected to said

control circuit, the arrangement further comprising a measuring circuit connected to said variable amplifier for determining the adjusted degree of amplification of the variable amplifier at said constant amplifier output power, said measuring circuit comprising: means for producing an auxiliary measuring signal; means for supplying said auxiliary measuring signal together with an input electrical signal into said variable amplifier, and means connected with the output of said variable amplifier for deriving an amplified auxiliary measuring signal from the amplified electrical signals at the output of said variable amplifier; and regulating means in said measuring circuit for regulating the amplitude of the auxiliary measuring signal

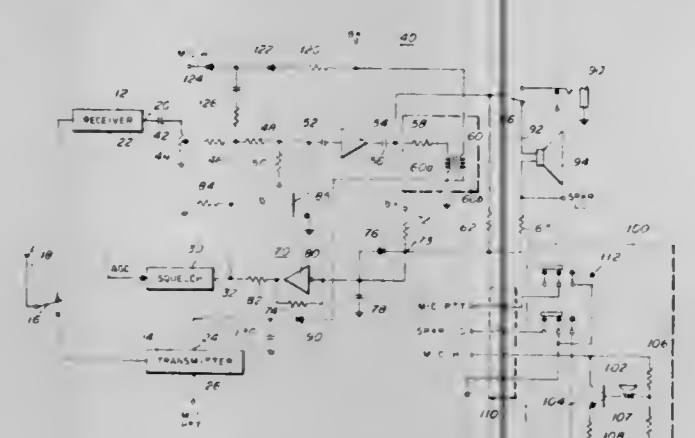


in an inverse proportionality to the degree of amplification of said variable amplifier, the producing means of the measuring circuit comprising: a chopper switch for generating said auxiliary measuring signal, said switch chopping the output signal of said regulating means into an amplitude-proportional direct current-free square-wave oscillation, said chopper switch being oscillated at a frequency outside the frequency band of the input electrical signal, and being substantially higher than the highest frequency occurring in the input electrical signal; and adding means having the higher-frequencied square-wave oscillation and lower-frequencied input electrical signal superimposed therein; and means for transmitting said superimposed signals to said variable amplifier.

4,060,764
TRANSCEIVER AUDIO SYSTEM

Charles William Bethards, and James Edward Andrews, both of Schaumburg, Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Mar. 25, 1976, Ser. No. 670,501
Int. Cl.[2] H04B *1/40*
U.S. Cl. 325—18 **11 Claims**

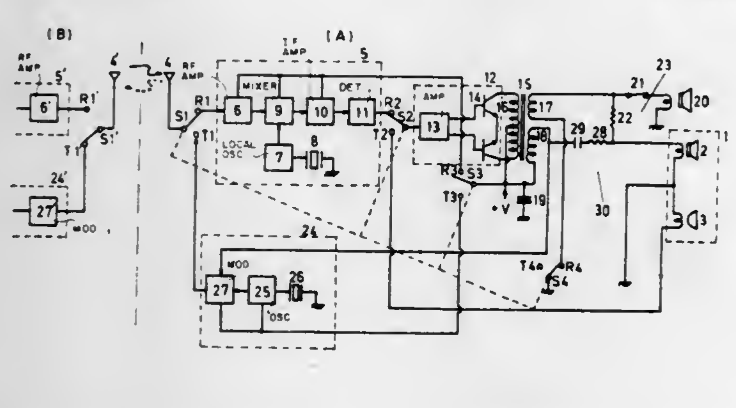


1. A radio frequency (RF) transceiver comprising:
a receiver portion for receiving and processing RF signals and producing an audio signal;
a transmitter for producing a modulated RF signal, the transmitter having a modulating signal input for receiving a modulating signal and modulating an RF carrier therewith,
the transmitter including a modulating transformer having primary and secondary windings, the primary winding adapted to receive the modulating signal and the secondary adapted for coupling to the modulating signal input of the transmitter;
an audio compressor means for receiving and predeterminedly compressing audio signals; and
switching means for switching the transceiver to either the transmit or the receive modes, the switching means comprising coupling means, operable in the transmit mode, to couple the modulating signal from the audio compressor to the primary of the modulating transformer,
the switching means operating in the receive mode to couple the receiver produced audio signal through the audio compressor means and further including decoupling means operable in the receive mode to effectively open circuit the secondary winding of the modulating transformer, such that the transformer primary assumes a high impedance,
whereby the audio compressor compresses both the modulating signal and the received audio signal.

4,060,765
PRESS-TO-TALK TRANSCEIVER

Kenji Sakamoto, Takaichi, and Osamu Kawasi, Tokyo, both of Japan, assignors to Sanyo Electric Co., Ltd. and A & A Japan, Ltd., both of Noriguchy, Japan

Filed Aug. 18, 1976, Ser. No. 715,621
Claims priority, application Japan, Aug. 20, 1975, 50-101827
Int. Cl.[2] H04B *1/44*
U.S. Cl. 325—21 **8 Claims**

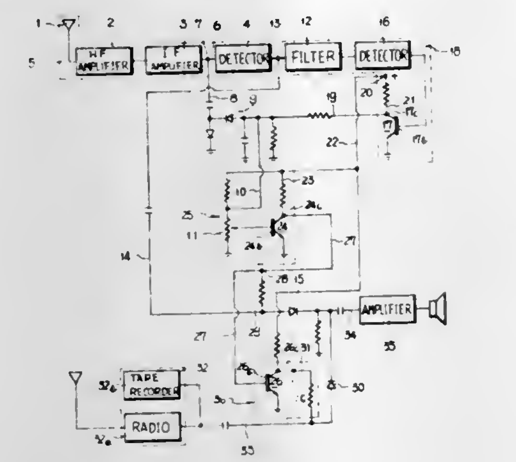


1. A press-to-talk transceiver comprising a handset having a receiver and a transmitter, antenna means for transmission and reception of a radio frequency signal, signal processing circuit means for producing an audio signal from a received radio frequency signal, audio amplifier means for amplifying the audio signal produced by said received signal processing circuit means and for amplifying an audio signal to be transmitted which is produced by said transmitter, output circuit means coupling the output of said audio amplifier means to said receiver of said handset for supplying the audio frequency signal amplified by said audio amplifier means to said receiver, transmission signal processing circuit means for producing a radio frequency signal to be transmitted modulated by the audio signal to be transmitted produced by said audio amplifier means, first press-to-talk switch means for selectively connecting said antenna means to said received signal processing circuit means during reception of a radio frequency signal and to said transmission signal processing circuit means during transmission of a radio frequency signal, second press-to-talk switch means for supplying the audio signal produced by said received signal processing circuit means to said audio amplifier means during reception of a radio frequency signal and for supplying the audio signal from said transmitter through to said audio amplifier means to said transmission signal processing circuit means during transmission, and side tone circuit means for supplying the audio signals to be transmitted as amplified by said audio amplifier means to said receiver of said handset.

4,060,766
AUTOMATIC SIGNAL SWITCHING APPARATUS FOR A COMBINED TRANSCEIVER AND RADIO OR TAPE RECORDER SET

Arai Kazuo, Kitamoto, Japan, assignor to Nissan Denshi Company Limited, Omiya, Japan

Filed May 7, 1976, Ser. No. 684,269
Int. Cl.[2] H04B *1/38*
U.S. Cl. 325—22 **8 Claims**

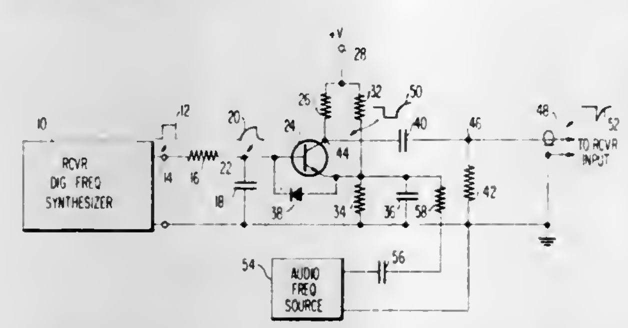


1. An improved automatic switching system in a combination transceiver set and radio or tape recorder set which contains an output amplifier circuit, a first source of audio signals and a first audio output circuit, and means associated with the transceiver set for receiving audio signals and for reproducing said received audio signals including a second audio output circuit, comprising:
a first switching transistor in the first audio output circuit;
a first diode between the first audio output circuit and the output amplifier circuit;
a noise squelching circuit in the transceiver;
a second switching transistor in the noise squelching circuit;
a second diode between the second audio output circuit and the output amplifier circuit; and
circuit means responsive to the second switching transistor upon the receipt of audio signals by the transceiver set, to cause the first switching transistor to bias the first diode to cut-off condition and to bias the second diode to conducting condition whereby to operatively connect only the second audio output circuit with the output amplifier circuit.

4,060,767
SELF TEST CIRCUIT FOR MULTICHANNEL RADIO RECEIVERS

Dieter Lohrmann, Lanham, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Nov. 10, 1976, Ser. No. 740,568
Int. Cl.[2] H04B *17/00*
U.S. Cl. 325—363 **12 Claims**

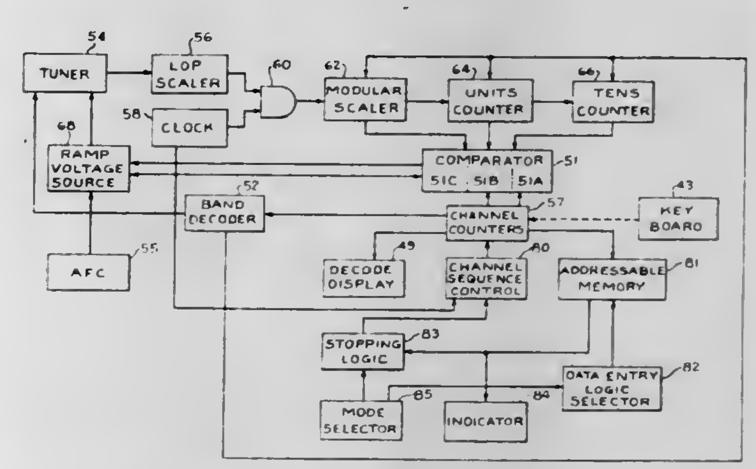


1. A self test circuit providing a simultaneously amplitude modulated and frequency modulated carrier signal for each frequency channel of a multichannel radio receiver having a substantially equal frequency separation between channels, comprising in combination:
circuit means providing a periodic signal having a predetermined sloping leading edge adapted to control the operating state of an electronic switch device and having a frequency equal to the frequency separation between channels;
an electronic switch device operable between first and second operating states coupled to said circuit means and being driven into one of said operating states by said periodic signal;
bias means coupled to said switch device for causing said switch device to switch to said one operating state at a selected point on said leading edge of said periodic signal intermediate the extremities thereof;
a modulation signal source coupled to said switch device for causing said switching to selectively vary about said selected point and thereby generate an intermediate output signal having a waveform including an abrupt changing leading edge which varies both in amplitude and phase; and
circuit means coupled to said switch device and being responsive to said intermediate output signal to pass the high frequency components of said waveform as an output signal to said receiver, said output signal having a harmonic frequency component at every channel which is both simultaneously amplitude modulated and frequency modulated.

4,060,768
MEMORY TUNING SYSTEM WITH DUAL SPEED PROGRAMMING

Akio Tanaka, Chicago, Ill., assignor to Zenith Radio Corporation, Glenview, Ill.

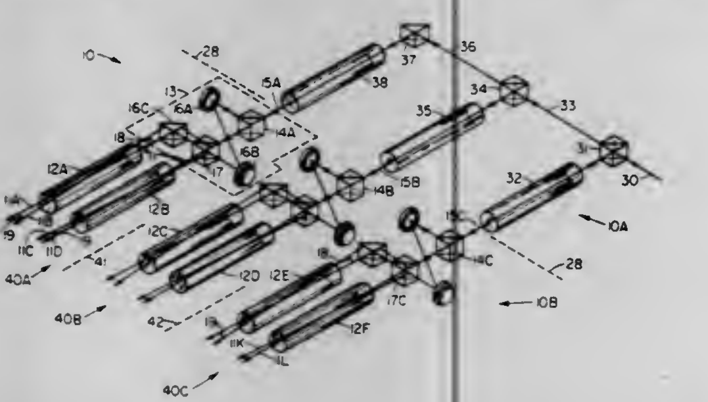
Filed Jan. 2, 1976, Ser. No. 646,116
Int. Cl.[2] H04B *1/16*
U.S. Cl. 325—464 **4 Claims**



1. A programmable television tuning system including:
counting means sequentially generating channel numbers for tuning all channels;
means communicating to the viewer the tens and units digits of channel numbers generated by said counting means;
read/write memory means coupled to said counting means having a plurality of addressable locations for storage and recall of signals related to selected channel numbers;
mode selection means for establishing a program mode for storage of said signals and an operate mode for recall from said memory means of said signals to cause tuning to selected channels;
clock means selectively coupled to said counting means and producing timing pulses at regular intervals; and
counting speed control means, coupled between said clock means and said counting means and operating in said program mode for changing the counting speed of said counting means to reduce the time required to sequentially generate any channel number, said counting speed control means including (1) a plurality of flip/flops interconnected for continuous binary counting, responsive to said clock means and producing at least two distinct pre-

determined rates of counting pulses, and (2) a selector switch for selecting between said two distinct rates of counting pulses, said distinct rates being predetermined to permit a viewer to perceive counting by tens for the faster rate and counting by units for the slower rate.

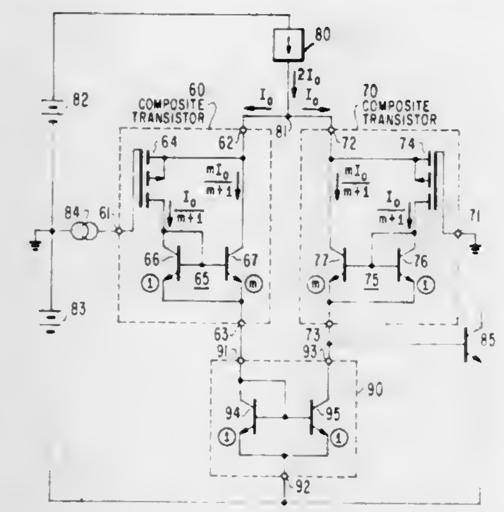
4,060,769
DIRECTING RADIATION
Philip J. Mallozzi; Harold M. Epstein; David C. Applebaum, all of Columbus; William J. Gallagher, Worthington, and Bernerd E. Campbell, Columbus, all of Ohio, assignors to Battelle Memorial Institute, Columbus, Ohio
Filed Sept. 20, 1974, Ser. No. 507,877
Int. Cl.² H01S *3/00;* **G02B** *27/14*
U.S. Cl. 330—4.3 **17 Claims**



1. A method of directing radiation pulses to a region wherein either a pulse or a substance in the region is adversely affected by the presence of more than a given power density therein, comprising
providing in rapid succession a plurality of pulses each having a power density of not more than the given power density,
controlling the path of each pulse in such manner as to cause each pulse to arrive at the region at an angle differing by at least its divergence angle from the arrival angle of every other such pulse, and
controlling the path length of each pulse in such manner as to cause it to arrive at the region at a time enough later than the arrival time of the preceding pulse that the total power density in the region at any instant is not more than the given power density,
so that the effective total power density of the radiation directed through the region may exceed the given power density without adversely affecting any pulse or substance in the region.

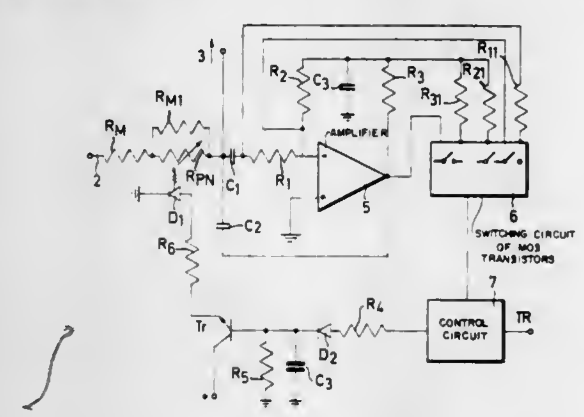
4,060,770
DIFFERENTIAL AMPLIFIER
Otto Heinrich Schade, Jr., North Caldwell, N.J., assignor to RCA Corporation, New York, N.Y.
Division of Ser. No. 644,821, Dec. 29, 1975. This application Nov. 23, 1976, Ser. No. 744,408
Claims priority, application United Kingdom, Feb. 24, 1975, 07659/75
Int. Cl.² H03F *3/45*
U.S. Cl. 330—253 **3 Claims**

1. A differential amplifier circuit comprising:
first and second terminals for receiving input signals;
third and fourth terminals for application of output signal to subsequent circuitry;
first and second field effect transistors of a first conductivity type, each having source and drain and gate electrodes, their respective gate electrodes being respectively connected to said first terminal and to said second terminal;
means for applying a bias current between said fourth terminal and an interconnection between the source electrodes of said first and said second field effect transistors;
first and second and third current mirror amplifiers, each of a type including a respective pair of bipolar mirroring transistors of a second conductivity type complementary to said first conductivity type and having respective input and output and common terminals, the input and output terminals of said first current mirror amplifier being connected to the drain and source electrodes respectively of said first field effect transistor, the input and output terminals of said second current mirror amplifier being connected to the drain and source electrodes respectively of



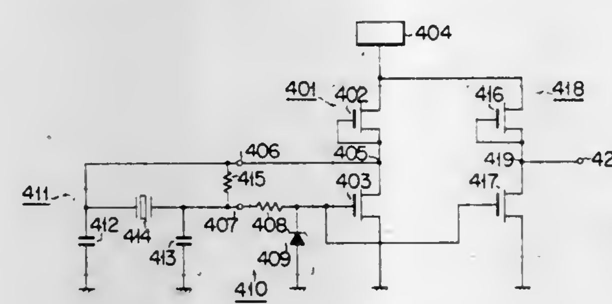
said second field effect transistor, the common terminal of said first current mirror amplifier being connected to the input terminal respectively of said third current mirror amplifier, the common terminal of said third current mirror amplifier being connected to said fourth terminal, and the output terminal of said third current mirror amplifier and the common terminal of said second current mirror amplifier being connected to said third terminal.

4,060,771
METHOD AND CIRCUIT ARRANGEMENT FOR CONDITIONING DIRECT CURRENT SIGNALS IN ELECTRIC MEASURAND TRANSMITTERS, PARTICULARLY ELECTROMECHANICAL PRECISION AND FINE BALANCES
Franz Josef Melcher, Ellierode, and Christian Oldendorf, Goettingen, both of Germany, assignors to Sartorius-Werke GmbH (und vorm. Gottinger Prazisions-Waagenfabrik GmbH), Goettingen, Germany
Filed Aug. 10, 1976, Ser. No. 713,285
Claims priority, application Germany, Aug. 22, 1975, 2537560
Int. Cl.² H03F *17/00*
U.S. Cl. 330—59 **8 Claims**



1. A electrical circuit for suppressing the effect of interfering alternating signals of various frequencies superimposed upon a direct current signal in measuring apparatus, such as in an electromechanical precision or fine balance, the circuit comprising a signal line for carrying the direct current signal and the interfering alternating signals; coupling-out means for capacitively coupling-out of interfering alternating signals of frequencies lower than a predetermined limit frequency from said signal line; amplifying and inverting means for amplifying and inverting 180° in phase the coupled-out signals; coupling-back means for capacitively coupling-back into said signal line the amplified and inverted coupled-out signals; wherein said coupling-out means, said amplifying and inverting means, and said coupling-back means form an active low-pass filter and said coupling-out means and said coupling-back means each include a respective capacitor means directly connected to said signal line; variable resistive circuit means in circuit with said capacitor of said coupling-out means, said resistive circuit means, with respective said capacitor means of said coupling-out means and said coupling-back means, determining the time constant of said active low-pass filter; wherein said coupling-out means includes a pair of resistors in parallel with one another, one of which is a variable resistor for altering said time constant of said active low-pass filter, said variable resistor being a photoresistor; a light emitting diode positioned opposite said photoresistor; a circuit for supplying current to said light emitting diode; a control circuit coupled to said circuit for supplying current to said light emitting diode via a time delay circuit for turning on said light emitting diode after a predetermined delay upon receipt of a control signal; a switching circuit coupled to said control circuit and responsive to an output therefrom; said variable resistive circuit means being coupled to said switching circuit and responsive thereto for changing the resistance value of said resistive circuit means to provide a lower time constant for said active low-pass filter upon receipt of an output from said switching circuit.

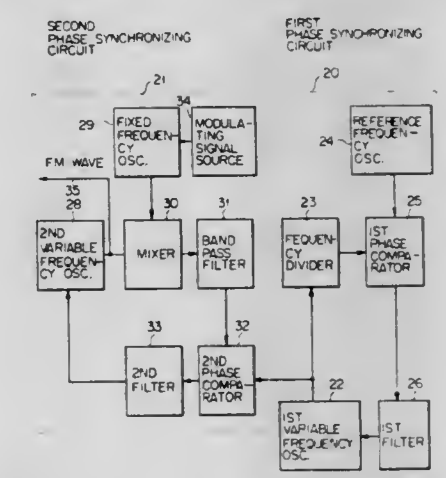
4,060,772
OSCILLATOR
Hisashi Yamada, Oiso, and Yoshinori Horiko, Yokohama, both of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Tokyo, Japan
Filed Feb. 3, 1976, Ser. No. 654,852
Claims priority, application Japan, Feb. 6, 1975, 50-14907
Int. Cl.² H03B *5/36*
U.S. Cl. 331—116 R **13 Claims**



1. An oscillator comprising a first inverter formed of insulated gate field effect transistors and acting as an oscillator; a feedback circuit formed of a passive circuit and designed to invert the phase of an output signal from the first inverter, amplify the output signal with a larger voltage gain than 1 and feed the output signal back to the input side of the first inverter; and means for drawing out the output signal of the feedback circuit from the input side of the first inverter and delivering said output signal to a succeeding second inverter acting as an amplifier.

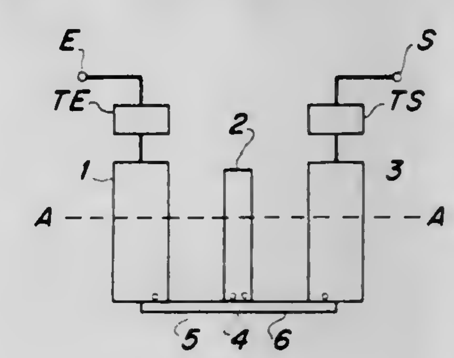
4,060,773
FREQUENCY MODULATION SYSTEM
Masaaki Hata, Hino, and Sotaro Wada, Hachioji, both of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan
Filed Jan. 24, 1977, Ser. No. 761,813
Claims priority, application Japan, Jan. 28, 1976, 51-7531
Int. Cl.² H03C *3/00*
U.S. Cl. 332—19 **5 Claims**

1. A frequency modulation system comprising:
first means including a first variable frequency oscillator, a frequency divider for frequency dividing the output frequency of said first variable frequency oscillator, a reference frequency oscillator, and a first feedback circuit in which the output frequency of said reference frequency oscillator is compared in phase with that of said frequency divider and the result of the phase comparing is fed back to said first variable frequency oscillator through a first filter for controlling the output frequency of said first variable frequency oscillator;
second means including a second variable frequency oscillator, a fixed frequency oscillator, means in which the output frequencies of said second variable frequency oscillator and of said fixed frequency oscillator are mixed in a mixer thereby to obtain a difference frequency between



said both frequencies, and a second feedback circuit in which said difference frequency is compared in phase with the output frequency of said first variable frequency oscillator and the result of the phase comparing is fed back to said second variable frequency oscillator through a second filter for controlling the output frequency of said second variable frequency oscillator; and
third means in which the output frequency of said fixed frequency oscillator is frequency-modulated by the frequency of a modulating signal thereby to obtain a frequency-modulated wave from said second variable frequency oscillator.

4,060,774
ELECTROMECHANICAL BAND-PASS FILTER FOR HIGH FREQUENCIES
Herbert Ernyei, Paris, France, assignor to Societe Lignes Telegraphiques et Telephoniques, Paris, France
Filed June 14, 1976, Ser. No. 695,920
Int. Cl.² H03H *9/04, 9/26*
U.S. Cl. 333—71 **4 Claims**



1. An electromechanical band pass filter comprising:
substantially cylindrical mechanical resonators operating in a longituinal mode arranged with their axes parallel and in the same plane;
wires operating in a bending mode coupling said resonators so that two adjacent resonators are coupled through a single quarter wave length wire connected at one of their terminal faces located in a same plane, and said resonators are divided into two sets, all the resonators of one set

having one first terminal face in a first plane and all the resonators of the other set having a second terminal face in a second plane, one resonator belonging to both sets and the couplers for each set being a single wire.

4,060,775

ELECTROMECHANICAL BAND-PASS FILTERS

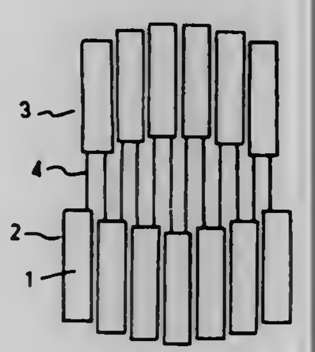
Philippe Marie Allemandou, Ablon, and Didier Marcel Beaudet, Saint-Maur-Des-Fosses, both of France, assignors to Societe Anonyme de Telecommunications, Paris, France

Filed July 21, 1976, Ser. No. 707,193

Claims priority, application France, Aug. 4, 1975, 75.24217

Int. Cl.² H03H *9/02, 9/26, 9/24*

U.S. Cl. 333—71 3 Claims



1. A band-pass electromechanical filter, comprising an input electromechanical transducer, an output electromechanical transducer and a mechanical filter disposed therebetween, said filter having *p* resonators and $(p-1)$ coupling pins, resonating all in the longitudinal mode, each coupling pin connecting two adjacent resonators, wherein the coupling pins have identical diameters and lengths varied according to their respective position within said mechanical filter, the length value being minimum at the end coupling pins and progressively increasing to a maximum at the half-way coupling pins.

4,060,776

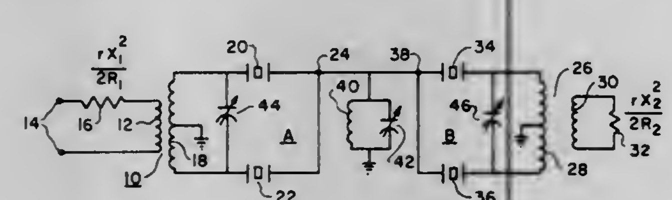
INTERMEDIATE-BAND CRYSTAL FILTER WITH LOW-TRANSIENT RESPONSE

Herman J. Blinchikoff, Baltimore, Md., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed May 17, 1976, Ser. No. 687,138

Int. Cl.² H03H *7/04, 7/08*

U.S. Cl. 333—72 4 Claims



1. An intermediate-band crystal filter comprising at least one pair of lattice filter sections, one of said sections including an input transformer winding and a first pair of crystals connected to each other and to opposite ends of the input transformer winding, the other of said sections including an output transformer winding and a second pair of crystals connected to each other and to opposite ends of the output transformer winding, said sections being directly connected together at the junctions between the crystals of each pair of crystals, and said junctions being connected by a parallel-connected inductor and capacitor to the midpoints of said input and output transformer windings, each of said filter sections comprising a semi-lattice equivalent to a lattice network derived from a prototype low-pass ladder network, and said inductor and capacitor being common to both filter sections.

4,060,777

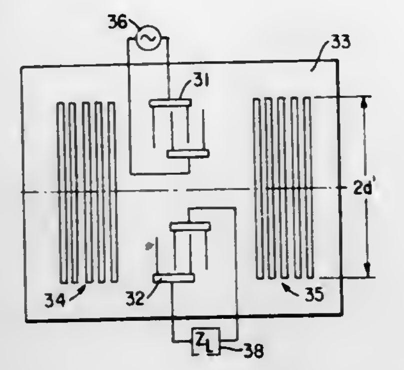
GUIDED ELASTIC SURFACE WAVE FILTER

Harry Frank Tiersten, Schenectady, N.Y., and Robert Chastain Smythe, Orlando, Fla., assignors to Piezo Technology Inc., Orlando, Fla.

Filed May 19, 1976, Ser. No. 687,901

Int. Cl.² H03H *9/02, 9/04, 9/26, 9/32*

U.S. Cl. 333—72 25 Claims



1. A surface wave resonator device comprising:
substrate means having at least a surface layer of piezoelectric material,
acoustic surface wave transducer means disposed on said piezoelectric surface of said substrate means operable in response to an input electrical signal to produce propagation of acoustic surface waves on said piezoelectric surface of said substrate means in a first direction,
means forming first and second arrays of elements on the piezoelectric surface of said substrate means on opposite sides of said acoustic surface wave transducer means and being multiply reflective to the acoustic surface waves propagated by the transducer means to produce by energy trapping at least one region on the piezoelectric surface of said substrate means wherein a first acoustic standing wave resonance occurs which is generally in said first direction and a second acoustic standing wave resonance occurs in a second direction which is generally transverse to said first direction, and
means for controlling at least one characteristic of the second acoustic standing wave.

4,060,778

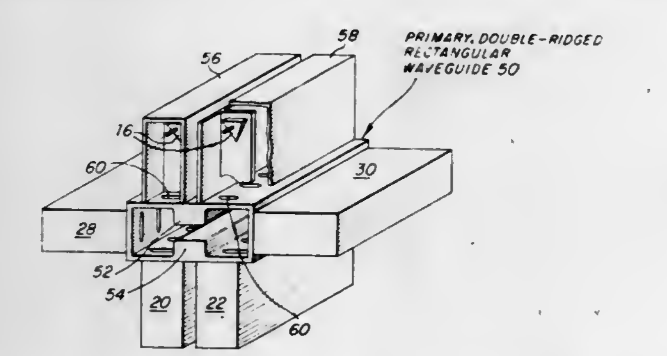
MICROWAVE HARMONIC ABSORPTION FILTER

Ibrahim El Hefni, North Andover; Kenneth A. Green, Andover, both of Mass., and Donald C. Cloutier, Newton, N.H., assignors to Microwave Research Corporation, North Andover, Mass.

Filed July 12, 1976, Ser. No. 704,211

Int. Cl.² H01P *1/20, 1/22, 1/16, 1/26*

U.S. Cl. 333—73 W 5 Claims



1. A microwave absorption filter, comprising:
a. a primary, rectangular waveguide having first and second elongated wall members and two side wall members and having a ridge substantially centered on the inner surface of a first elongated wall member thereof;
b. secondary waveguides positioned on both sides of said ridge on the outer surface of said first elongated wall member; and,
c. apertures extending through said first elongated wall member and connecting the primary, ridged, rectangular waveguide to said secondary waveguides, said apertures being positioned off-center on said first wall member.

4,060,779

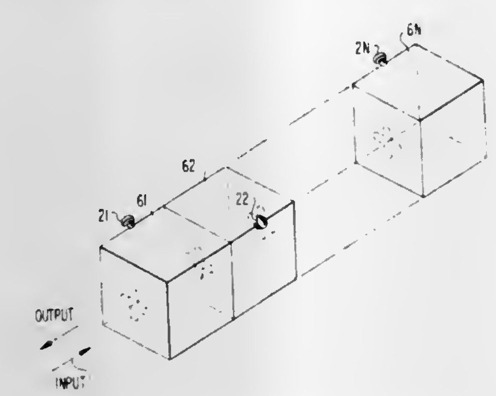
CANONICAL DUAL MODE FILTER

Ali Ezz Eldin Atia, Gaithersburg, and Albert Edward Williams, Bethesda, both of Md., assignors to Communications Satellite Corporation, Washington, D.C.

Filed Dec. 27, 1976, Ser. No. 754,804

Int. Cl.² H01P *1/16, 7/06, 1/20*

U.S. Cl. 333—73 W 10 Claims



1. In a plural cavity waveguide filter comprising a plurality of cascaded waveguide cavities each resonating at its resonant frequency in a first and a second independent orthogonal mode, first coupling means in each of said cavities for intra cavity coupling of said first mode to said second mode, and second coupling means connecting successive ones of said cavities for inter cavity coupling like oriented modes in said successive cavities, the improvement wherein a reflective plate is provided in one end cavity and both input and output ports are provided in the other end cavity of said plurality of cascaded waveguide cavities.

4,060,780

SIGNAL ATTENUATOR

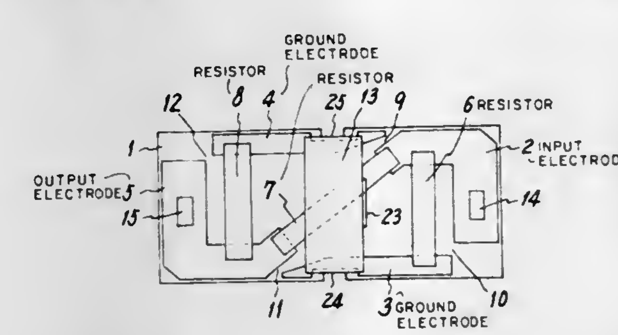
Kouji Nishida, Hirakata, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Continuation of Ser. No. 588,159, June 17, 1975, abandoned. This application Dec. 3, 1976, Ser. No. 747,385

Claims priority, application Japan, June 19, 1974, 49-70587

Int. Cl.² H01P *1/22*

U.S. Cl. 333—81 A 5 Claims



1. A signal attenuator capable of withstanding the effects of lightning applied thereto, said attenuator comprising:
an insulator substrate having on one surface thereof an input electrode, an output electrode, and a pair of elongated ground electrodes, said input electrode and said output electrode being arranged symmetrically with respect to a point on said substrate, each of said input and output electrodes formed with a pair of intersecting arms angularly disposed with respect to one another, said ground electrodes being arranged symmetrically with respect to said point, the first of said ground electrodes being arranged with its opposite ends spaced respectively from a free end of one arm of said input electrode and from a free end of one arm of said output electrode to form a first lightning discharging gap between the first ground electrode and said input electrode and a second lightning discharging gap between the first ground electrode and said output electrode, the second of said ground electrodes being arranged with its opposite ends spaced respectively from a free end of the other arm of said input electrode and from a free end of the other arm of said output electrode to form a third lightning discharging gap between said second ground electrode and the input electrode and a fourth lightning discharging gap between said second ground electrode and the output electrode,
a first flat-shaped resistor disposed on said insulator substrate and connected between the input electrode and said second ground electrode,
a second flat-shaped resistor disposed on said insulator substrate and connected between the output electrode and the first ground electrode, said first and said second resistor being of the same resistance and arranged symmetrically with respect to said point,
a third flat-shaped resistor connected between the free end of the one arm of the input electrode and the free end of said other arm of the output electrode, and
a shielding enclosure which encloses said attenuator.

4,060,781

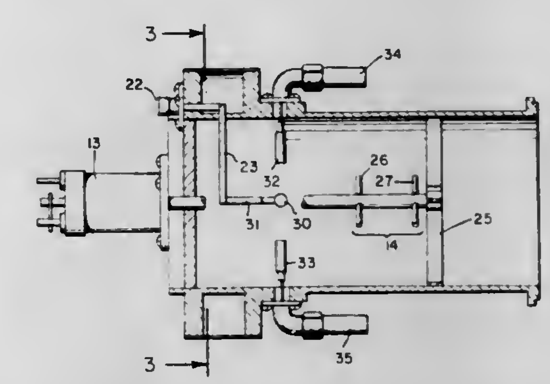
WAVEGUIDE SWITCH

Thomas Hudspeth, Malibu, and Harmon H. Keeling, Los Angeles, both of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Filed Sept. 16, 1976, Ser. No. 723,879

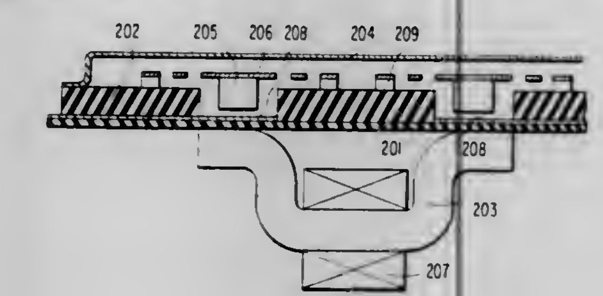
Int. Cl.² H01P *1/10, 1/16, 5/12, 1/17*

U.S. Cl. 333—98 S 7 Claims



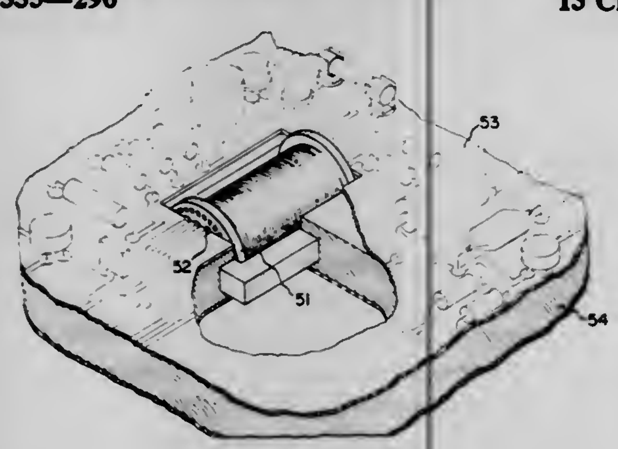
1. An improved microwave switch for generating circularly polarized waves in response to linear waves, comprising:
waveguide means being cylindrically shaped, having an aperture and having a closed end;
input probe means being radially mounted within said waveguide means and comprising first and second probes being disposed 180 degrees to each other for generating linear waves having a first polarity;
quarter-wave plate means rotatably disposed within said waveguide means between said input probe means and said aperture for generating selected right and left hand circular polarized waves in response to said linear waves; and
rotating means coupled to said quarter-wave plate means.

4,060,782
INTEGRATED TYPE SWITCHING DEVICE
Takashi Inagawa, and Sadayuki Mitsuhashi, both of Tokyo, Japan, assignors to Nippon Electric Company, Limited, Tokyo, Japan
Filed Feb. 19, 1976, Ser. No. 659,432
Claims priority, application Japan, Feb. 19, 1975, 50-19901
Int. Cl.² H01H *67/24*
U.S. Cl. 335—112 **9 Claims**



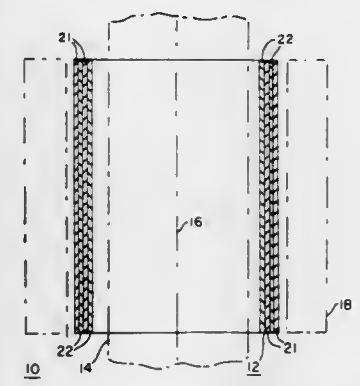
1. A switching device arranged in a matrix array comprising:
a first ceramic plate having a fixed contacts pattern of metalized layer arranged on one surface thereof;
second ceramic plate formed with through apertures in positions corresponding to said respective fixed contacts arranged on said first ceramic plate, said first and second ceramic plates being laid on each other in closely adhering relation to form an integral base plate for the switching device;
conductor means sandwiched between said first and second ceramic plates to connect to said fixed contacts with each other in each of the rows or columns of the matrix;
spring means carrying movable contacts made of a magnetic material and mounted on said base plate so that said movable contacts are positioned directly opposite to said respective fixed contacts for cooperation therewith;
a plurality of magnetic cores located adjacent said fixed contacts but on the opposite side of said first plate; and
a plurality of energizing windings encircling said cores, said magnetic cores and windings being operable to selectively drive said movable contacts in an axial direction of said through apertures into contact with the corresponding fixed contacts.

4,060,783
MAGNETIC CIRCUIT AND METHOD OF MAKING
John D. Harnden, Jr., Schenectady, N.Y., assignor to General Electric Co., Schenectady, N.Y.
Continuation-in-part of Ser. No. 412,341, Nov. 2, 1973, abandoned. This application Mar. 11, 1975, Ser. No. 557,386
Int. Cl.² H01F *1/08, 21/02*
U.S. Cl. 335—296 **13 Claims**



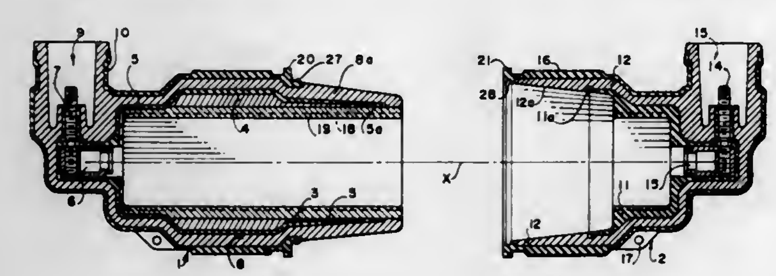
1. An electromagnetic circuit comprising:
a closed magnetic core having at least four substantially orthoganally interconnecting side members forming a generally rectangular structure of integral nonlaminar construction wherein at least one side of said core structure is of circular cross section;
a bobbin rotatably disposed about said circular side and in tight fitting engagement therewith, said bobbin comprising cylindrical complementary sections, said sections including flanges having drive means for forming a winding on said bobbin and interlocking means for locking said sections about said circular side; and
at least one conductive winding on said bobbin for providing highly efficient electromagnetic coupling between said core and said winding.

4,060,784
ELECTRICAL INDUCTIVE APPARATUS
Petter I. Fergestad, Konnerud, Norway, assignor to A/S National Industri, Drammen, Norway
Filed Nov. 22, 1976, Ser. No. 743,827
Claims priority, application Norway, Jan. 14, 1976, 760124
Int. Cl.² H01F *15/04, 27/28*
U.S. Cl. 336—84 R **14 Claims**



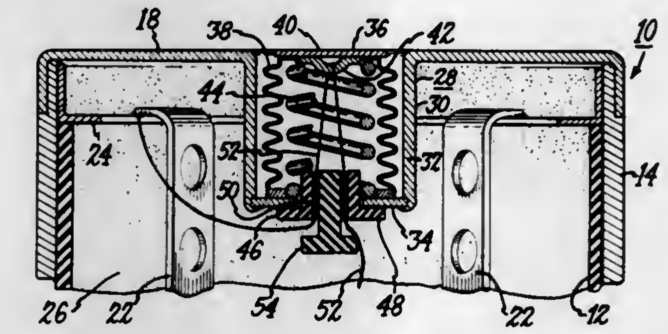
1. An electrical inductive apparatus comprising:
a magnetic core,
an electrical winding disposed in inductive relation around said core, said winding including a plurality of layers of non-magnetic, electrically conductive sheet material wound about a predetermined axis to provide a structure having first and second axial ends,
electrical terminals connected to said sheet material adapted for connection to a source of electrical potential,
a first magnetically conductive means disposed between at least certain of the layers of said conductive sheet material to provide a low reluctance path for magnetic flux in a direction parallel with said predetermined axis,
and a second magnetically conductive means, disposed between said first magnetically conductive means and said core, for providing a return path for said magnetic flux to said core.

4,060,785
ENCLOSING STRUCTURE FOR A HIGH VOLTAGE ELECTRIC FUSE
Kenneth Earl Hanke, Atlanta, and Ned Rees, Tucker, both of Ga., assignors to Kearney-National Inc., Atlanta, Ga.
Filed Sept. 13, 1976, Ser. No. 722,361
Int. Cl.² H01H *85/02*
U.S. Cl. 337—201 **15 Claims**



1. An enclosing structure for an electric fuse having a fusible element disposed within a tubular casing of insulating material and interconnected at its ends with terminals mounted on the casing ends, said enclosing structure comprising an elongated enclosure formed of insulating and semiconducting material and disposed about said tubular casing and with its inner surface in heat transferring surface contacting relation therewith, and a rigid metallic heat absorbing sleeve embedded in said elongated enclosure for absorbing heat therefrom and for imparting a degree of mechanical strength thereto.

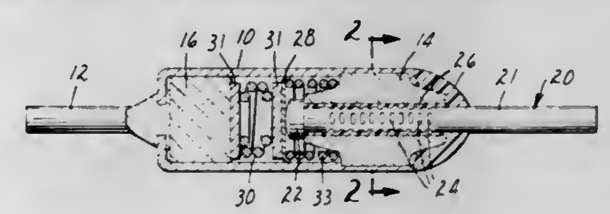
4,060,786
ELECTRIC FUSE WITH SEALED INDICATOR
Raymond Cuzzone, Pittsfield, Mass., assignor to General Electric Company, Philadelphia, Pa.
Filed Oct. 26, 1976, Ser. No. 735,184
Int. Cl.² H01H *85/30*
U.S. Cl. 337—244 **3 Claims**



1. An electric fuse of the type having an insulating housing, electrically conductive terminal caps at opposite ends of the housing, at least one main fusible element inside the housing connecting together electrically the terminal caps, and an indicating mechanism at one of said terminal caps for indicating fusing of the main element, wherein the improvement comprises said indicating mechanism comprising:
an electrically conductive support cup having its rim aligned with, and adjacent, an opening in one of said terminal caps and rigidly fastened in position to said cap in electrical connection thereto;
an apertured insulating bushing plug fitted into an opening in the bottom of said support cup;
a bellows telescopingly disposed inside said support cup, said bellows having a closed end remote from the bottom of said support cup and being sealed hermetically to the bottom of said support cup at the other end to function as a sealed indicator button;
biasing means for forcing the closed end of said button away from the bottom of said support cup, and
an electrical resistance restraining wire passing through said aperture in said bushing plut to the inside of said support cup and being secured to the bottom of said button, said wire being also secured under tension at said bushing plug, so that said button is held by said wire against the biasing force of said spring, the portion of said wire on the outside of said support cup passing through the interior of said insulating housing of said fuse and being electrically connected between said terminal caps.

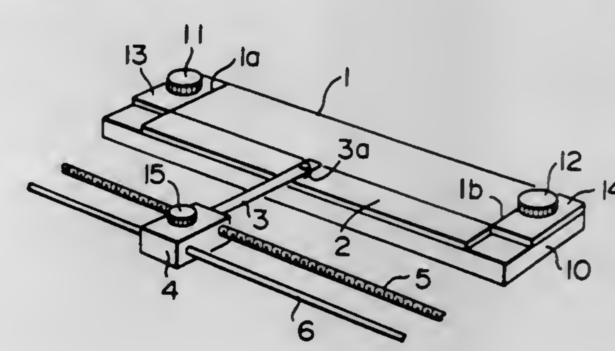
4,060,787
THERMAL SWITCH
Frederick Budnik, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.
Filed Nov. 12, 1976, Ser. No. 741,216
Int. Cl.² H01H *37/76*
U.S. Cl. 337—408 **5 Claims**

1. A thermal switch comprising:
a tubular, electrically and thermally conductive metal casing,
a first electrically conductive lead joined to and extending from one end of said metal casing to seal off said one end and make electrical connection to said casing,
an insulative ceramic bushing at the opposite end of said casing, said bushing sealing said opposite end of said casing and having its bore coaxial with said casing,
a normally solid, fusible pellet within said casing adjacent to said one end,
a second electrically conductive lead having a generally cylindrical body extending through the bore of said ceramic bushing and out of said casing to permit electrical connection thereto, and having a head abutting the end of said ceramic bushing within said casing, said body of said second lead being formed with at least one radially-extending relief lying within the bore of said ceramic bushing, said relief extending around less than the entire



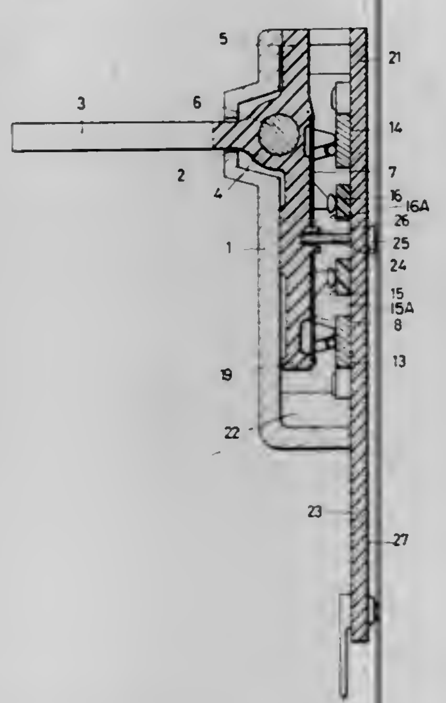
circumference of said body, said second lead being retained in said ceramic bushing by a sealing resin within the bore of said bushing around the body of said second lead,
an electrically conductive disk positioned within said casing between said fusible pellet and said head of said second lead coaxial with said casing, slidable axially within said casing and making electrical contact with the wall of said casing, and
resilient means urging said disk into electrical contact with the head of said second lead when said fusible pellet is solid and away therefrom upon melting of said fusible pellet.

4,060,788
POTENTIOMETER
Saburo Numata, and Shinichiro Fujino, both of Urawa, Japan, assignors to Fuji Photo Optical Co., Ltd., Omiya, Japan
Filed Aug. 3, 1976, Ser. No. 711,362
Claims priority, application Japan, Aug. 6, 1975, 50-95634
Int. Cl.² H01C *10/16*
U.S. Cl. 338—128 **6 Claims**



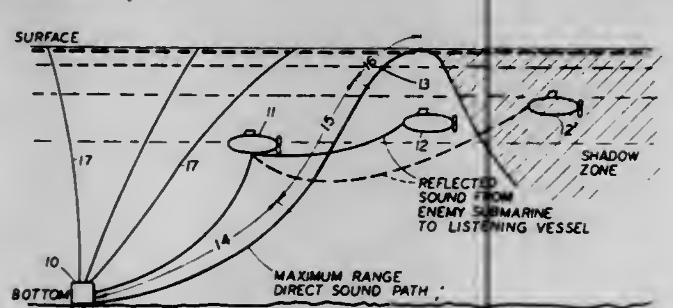
1. A potentiometer comprising a first resistor having input terminals at both ends thereof, said first resistor having a side edge extending between the input terminals, a second resistor extending along said side of the first resistor, said second resistor having a side which is in line contact with said side of the first resistor, the resistance of said first resistor being substantially lower than that of said second resistor, a movable contact slidable substantially parallel to said side of the first resistor in slidable contact with said second resistor to thereby establish a resistive path from said movable contact to the point on said first resistor nearest said movable contact, said movable contact having an output terminal fixed thereto and an amplifier connected to said output terminal of the movable contact, the input impedance of said amplifier being substantially greater than that of said resistive path.

4,060,789
MULTIPLE SLIDE RESISTOR
Walfried Achtmann, Bad Neustadt, Saale, and Gerhard Hochgesang, Lebenhan, both of Germany, assignors to Preh-Elektrofeinmechanische Werke - Jakob Preh Nachf, Bad Neustadt, Salle, Germany
Filed June 21, 1976, Ser. No. 698,022
Claims priority, application Germany, June 21, 1975, 7519719
Int. Cl.² H01C *10/44*
U.S. Cl. 338—183 **5 Claims**



1. In a multiple slide resistor having a base plate that forms a bottom closure of a resistor housing provided with a slide slot, resistor units each including a resistance element and a collector element associated with said resistance element being attached to said base plate, each resistor unit being separated electrically from the other by means of a shielding, and a movable slide element common to all the resistor units and upon which a number of pairs of brush springs corresponding to the number of resistor units is fastened to produce an electrical connection between the resistance element and the collector element of each resistor unit, the improvement comprising said base plate having a conductive coating on at least the side thereof upon which the resistance and collector elements are located, said coating being electrically connected with the shielding, said shielding projecting above the pairs of brush springs.

4,060,790
METHOD OF DETECTING THE PRESENCE OF AN ENEMY SUBMARINE
Samuel J. Raff, Chevy Chase, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.
Filed Dec. 30, 1963, Ser. No. 334,666
Int. Cl.² G01S *9/66*
U.S. Cl. 340—3 R **6 Claims**



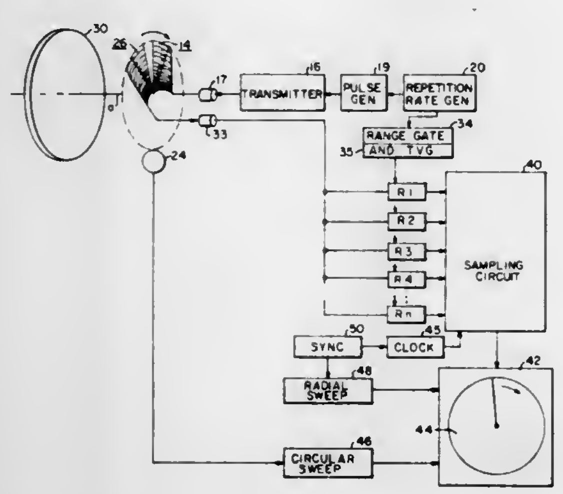
1. The method of detecting the presence of an enemy submarine within a given body of water without revealing the position of a listening vessel outside said body of water to said enemy submarine which comprises the steps of:

submerging a self-contained sound source on the floor of the ocean on the central vertical axis of said body of water, said sound source having a sufficient power output to enable sound waves to be transmitted to an enemy submarine within said body of water and be reflected therefrom to points outside said body of water,

propagating a high intensity, nondirectional sound signal from said sound source within said body of water,

positioning a listening vessel a predetermined distance outside said body of water, said predetermined distance being that required for said listening vessel to detect an echo of a sound signal originating at said sound source and reflected from said enemy submarine, while the sound from the source reflected from said listening vessel into said body of water will be of too low a level to be detected at said enemy submarine within said body of water, and detecting an echo of a sound signal originating at said sound source and reflected from said enemy submarine at said listening vessel.

4,060,791
IMAGING SYSTEM
Charles H. Jones, Murrysville, Pa., and Dale D. Skinner, Severna Park, Md., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.
Continuation of Ser. No. 570,695, April 23, 1975, abandoned. This application Oct. 28, 1976, Ser. No. 736,294
Int. Cl.² G01S *9/68, 7/62, 7/06*
U.S. Cl. 340—3 C **12 Claims**



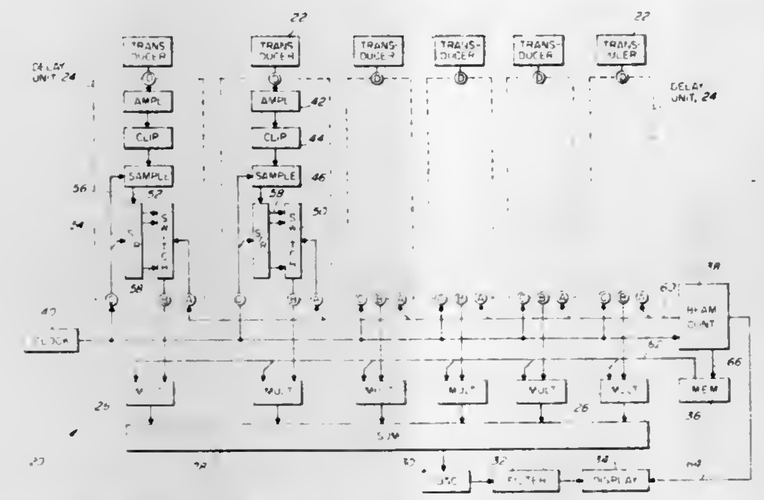
1. An imaging system comprising:
a. a plurality of receiving elements for receiving energy from a field of view;
b. said elements being operable to provide corresponding output signals upon receipt of said energy;
c. means for processing and displaying said signals as a picture of said field of view;
d. said elements being oriented relative to one another and said means for processing being operable to provide for relatively high resolution at the center of said field of view and reduced resolution away from said center.

4,060,792
HARD CLIPPED BEAM FORMER
Arent H. Kits van Heyningen, Newport, R.I., assignor to Raytheon Company, Lexington, Mass.
Filed June 17, 1976, Ser. No. 696,978
Int. Cl.² G01S *3/80*
U.S. Cl. 340—6 R **5 Claims**

1. A beam forming system coupled to individual elements of an array of radiating elements, the beam forming system comprising:

means coupled to individual ones of said radiating elements for clipping signals produced by said radiating elements in response to radiation incident thereupon;

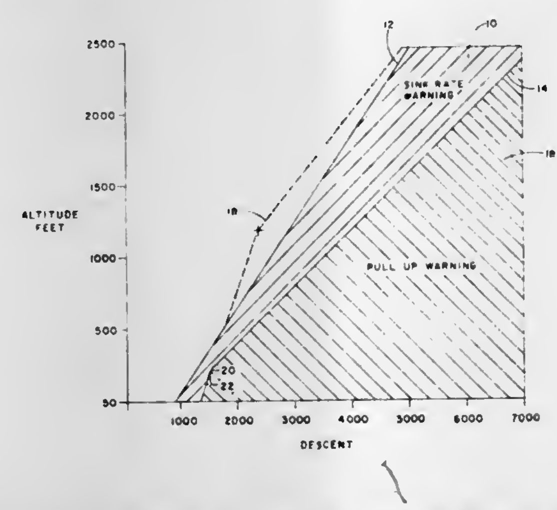
means for weighting said clipped signals, individual ones of said clipping signals from individual ones of said radiating elements being multiplied by individual weighting factors, the magnitude of a weighting factor being dependent on the position of the corresponding one of said radiating elements relative to the orientation of a beam to be formed by said beam forming system, said weighting being accomplished by affixing a sign to weighting factors of said weighting means, said sign depending on the relative phases of signals incident upon said radiating elements of said array;



means coupled to said weighting means for summing together the weighted values of said signals; and

means coupled to said summing means for filtering the sum of the weighted clipped signals, said filtering means including a low pass filter for providing a continuous analog waveform.

4,060,793
EXCESSIVE SINK RATE WARNING SYSTEM FOR AIRCRAFT
Charles Donald Bateman, Bellevue, Wash., assignor to Sundstrand Data Control, Inc., Redmond, Wash.
Filed July 19, 1976, Ser. No. 706,518
Int. Cl.² G01C *5/00*
U.S. Cl. 340—27 R **20 Claims**



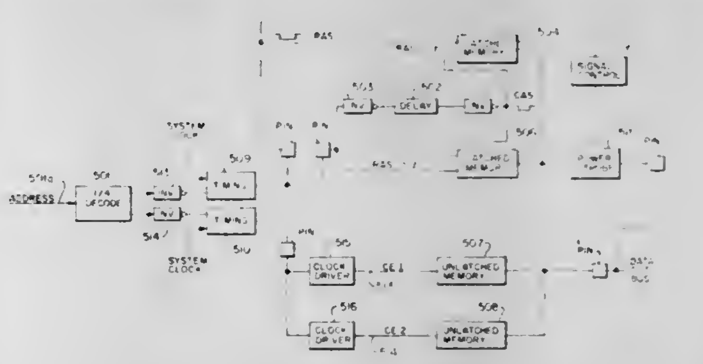
1. A warning system for use in aircraft having a source of signals representing the aircraft's barometric rate of descent and a source of signals representing the aircraft's altitude above terrain, comprising:

means for comparing the aircraft's barometric rate of descent with the aircraft's altitude above the terrain;

a first signal generating means, responsive to said comparing means, for generating a voice sink rate type of warning signal representing a condition wherein the aircraft is exceeding a descent rate according to a first predetermined, essentially linear, relationship between barometric descent rate and aircraft altitude above the terrain, wherein said first predetermined relationship has a slope of approximately 1,000 feet per minute for each 580 feet of altitude;

and a second signal generating means, responsive to said comparing means, for generating a voice pull-up type of warning signal representing a condition wherein the aircraft is exceeding a descent rate amounting to a second predetermined relationship between barometric descent rate and aircraft altitude above the terrain wherein said second predetermined relationship requires a lesser descent rate for a given altitude above the terrain than said first predetermined relationship.

4,060,794
APPARATUS AND METHOD FOR GENERATING TIMING SIGNALS FOR LATCHED TYPE MEMORIES
Paul S. Feldman, Newton; Robert B. Johnson, Billerica, and Chester M. Nibby, Jr., Peabody, all of Mass., assignors to Honeywell Information Systems Inc., Waltham, Mass.
Filed Mar. 31, 1976, Ser. No. 672,103
Int. Cl.² G06F *13/00*
U.S. Cl. 364—900 **9 Claims**



1. In a computer system having a power supply, a system clock, a data bus, a main memory of the latched type having first enabling means and responsive to said first enabling means wherein data out is latched to the data bus and remains latched to said data bus for a full memory cycle of said main memory, said main memory also having second enabling means for presenting a high impedance to said data bus when no electric signal is applied to said second enabling means from said power supply, an interface apparatus for generating an electronic pulse for causing the data out to be unlatched from said data bus prior to the end of the memory cycle, said interface apparatus comprising:

first means responsive to said system clock for generating a first timing signal;

second means responsive to said first means for delaying said first timing signal;

third means coupled to said first and second means for inverting said timing signal, whereby a second timing signal is generated; and,

fourth means coupled to said third means and second enabling means in said main memory and responsive to said second timing signal for removing electronic power from said second enabling means,

whereby a high impedance is presented to said data bus thus unlatching the data out from said data bus.

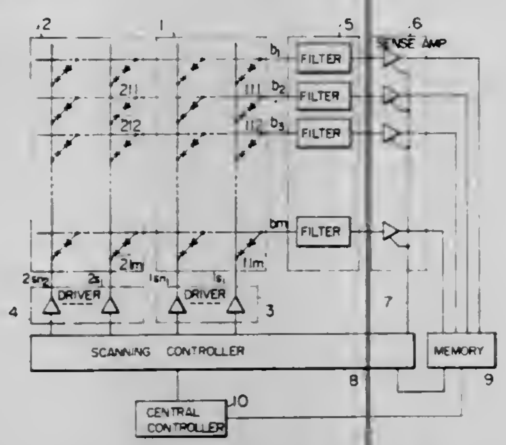
4,060,795
SCANNING SYSTEM
Akinori Harumiya, and Koki Toyosawa, both of Yokohama, Japan, assignors to Hitachi, Ltd., Japan
Continuation-in-part of Ser. No. 444,565, Feb. 21, 1974, abandoned. This application Aug. 17, 1976, Ser. No. 715,158
Claims priority, application Japan, Feb. 23, 1973, 48-21293
Int. Cl.² G11C *11/40*
U.S. Cl. 364—900 **2 Claims**

1. A scanning system comprising:
a. a scanning matrix including a multiplicity of columns and

rows and points to be scanned, each of said points being connected to each of the intersections of said columns and rows;

b. a plurality of scanning drive circuits connected to said columns of said scanning matrix, respectively:

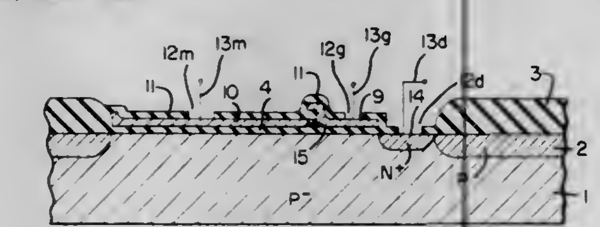
c. a plurality of read means connected to the rows of said scanning matrix;



d. a memory connected to said plurality of read means; and

e. a scanning controller for energizing said scanning drive circuits successively and storing in appropriate addresses of said memory signals produced from said plurality of read means, respectively.

4,060,796
SEMICONDUCTOR MEMORY DEVICE
Ryoiku Togei; Akira Takei; Yoshihiko Hika, and Kunihiko Wada, all of Kawasaki, Japan, assignors to Fujitsu Limited, Japan
Division of Ser. No. 675,196, April 8, 1976. This application Jan. 11, 1977, Ser. No. 758,447
Claims priority, application Japan, Apr. 11, 1975, 50-43388
Int. Cl.² G11C *11/40*
U.S. Cl. 365—183 8 Claims



1. A semiconductor memory device for reading and writing data in response to selected input signals, comprising in combination:

a semiconductor material substrate having a first conductivity and including, adjacent to a given surface thereof, a doped region of a second conductivity opposite to said first conductivity, and further including a gate region adjacent to said doped region, and a memory cell region adjacent to said gate region and remote from said doped region;

memory cell electrode means disposed above said given surface and above said memory cell region, and responsive to said selected input signals for respectively assuming one of a plurality of potentials;

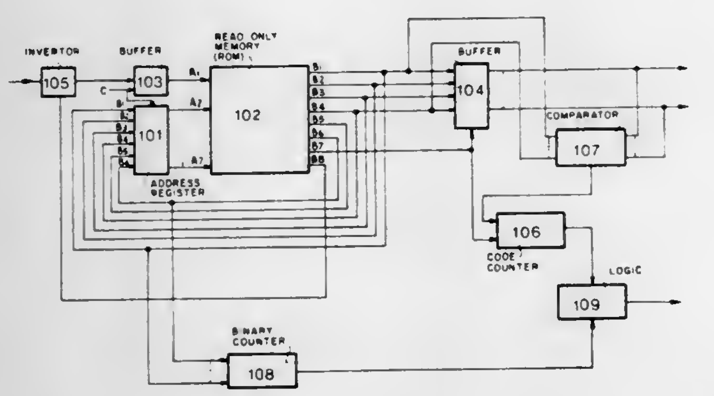
gate electrode means disposed above said given surface and above said gate region, and responsive to said selected input signals for respectively assuming one of said plurality of potentials; and

insulation means between said memory cell and gate electrode means, and said substrate, for electrically shielding the latter from the former;

said gate electrode means including, immediately adjacent to said memory cell electrode means, a resistive means for establishing a linear potential transition from the potential of said gate electrode means to that of said memory cell electrode means;

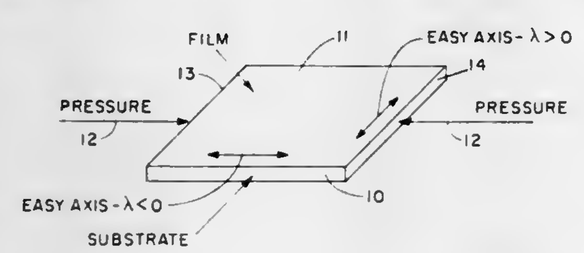
whereby, in response to said selected input signals, electrical charge is selectably transferred to and from said doped region, respectively, from and to said memory cell region, in a speedy manner.

4,060,797
SERIAL DIGITAL BIT STREAM CODE DETECTOR
Anthony Robert Maxwell, East Ringwood, and John Charles Platts, Doncaster, both of Australia, assignors to L. M. Ericsson Pty. Ltd., Australia
Continuation of Ser. No. 415,425, Nov. 13, 1973, abandoned. This application June 16, 1975, Ser. No. 587,210
Claims priority, application Australia, Nov. 13, 1972, 1198/72
Int. Cl.² H03K *13/256*
U.S. Cl. 340—347 DD 8 Claims



1. A code detector for detecting the presence or absence of particular sequences of data serial bits in a digital bit stream, comprising a memory adapted to sequentially receive said data bits, each location of said memory being programmed to contain one part of the address of two or more further locations in the memory, the other part of the address being provided by a bit in said serial digital bit stream to cause said memory to address successive locations dependent upon the data bit received, said memory being adapted to provide a first output signal representative of said one part of the address of two or more further locations, and a second output signal indicating when predetermined locations are reached, said output signifying the presence of a particular sequence, said first output signal being fed back to the input of said memory via an address register and being combined with the other part of the address which is fed to the input of said memory via a buffer store, said code detector further comprising clock means for timing the addressing of said successive address locations.

4,060,798
METHOD FOR INCREASING THE CRITICAL VELOCITY OF MAGNETIC BUBBLE PROPAGATION IN MAGNETIC MATERIALS
Ernst Fritz Rudolf August Schloemann, Weston, and Harry Jerrold Van Hook, Lexington, both of Mass., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.
Filed May 12, 1976, Ser. No. 685,877
Int. Cl.² G11C *19/08*
U.S. Cl. 365—25 2 Claims



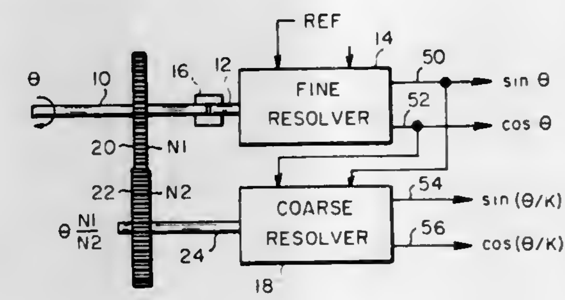
1. Apparatus for use in magnetic bubble devices so as to increase the frequency at which said bubble devices can operate, comprising in combination

a substrate;

a magnetic film formed on one surface of said substrate, the composition of said magnetic film being such that magnetic bubbles may be created and propagated therein; and

means for maintaining within said magnetic film a uniaxial strain-induced, in-plane, easy axis of magnetization.

4,060,799
TWO-SPEED RESOLVER EMPLOYING DIFFERENTIAL REDUCTION TECHNIQUES
Donald H. Jones, Pittsburgh, Pa., assignor to Control Systems Research, Inc., Pittsburgh, Pa.
Filed Sept. 5, 1974, Ser. No. 503,431
Int. Cl.² G08C *19/48*
U.S. Cl. 340—198 12 Claims



1. A two-speed resolver for indicating the exact position of a shaft rotatable through multiple revolutions comprising:

a first brushless resolver having a mechanical input connected to the shaft and an electrical output providing a signal indicating the position of the shaft;

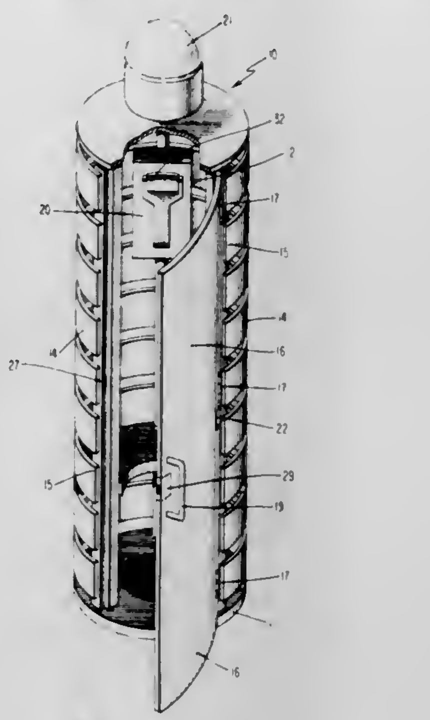
a second brushless resolver having a mechanical input, an electrical input, and an electrical output;

mechanical connecting means connecting the mechanical input of said first resolver to the mechanical input of said second resolver for moving the mechanical input of said second resolver at a different rate than the mechanical input of said first resolver as the shaft is rotated;

electrical connecting means for feeding the signals indicating the position of the shaft from the electrical output of said first resolver to the electrical input of said second resolver so that the electrical output of said second resolver provides a signal indicating the algebraic sum of the mechanical input to said second resolver and the position of the shaft as indicated by the output signal of said first resolver

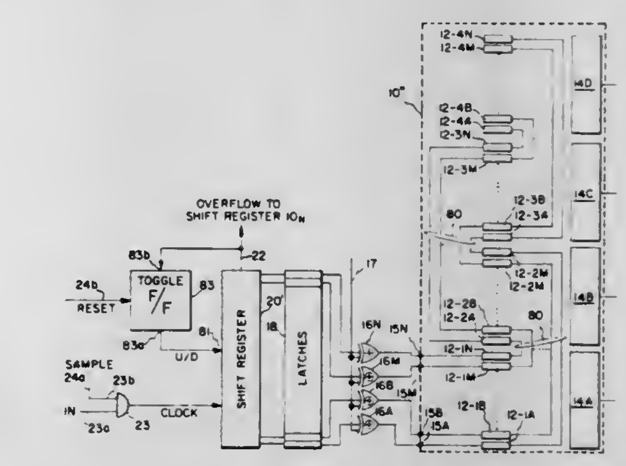
4,060,800
FIRE ALARM DEVICE
Philip Stern, 200 E. 27th St., New York, N.Y. 10016
Continuation of Ser. No. 136,093, April 21, 1971, abandoned. This application Aug. 7, 1975, Ser. No. 602,636
Int. Cl.² G08B *21/00*
U.S. Cl. 340—304 12 Claims

1. In a fire alarm system, the improvement which comprises a fire alarm device, and a mechanism for ensuring the presence of the one who has operated the alarm device at such device for a predetermined length of time, said mechanism comprising an enclosure in which the alarm device is mounted, said enclosure having an opening for the entry and exit of said operator of the fire alarm device, the alarm device being so disposed in the enclosure so that the operator must be within the enclosure before he can operate the alarm device, a door for selectively closing the opening, means responsive to at least the partial open position of the door for preventing operation of the fire alarm device unless the door is closed, and means actuated by the operation of the fire alarm device for locking the door and



maintaining the door locked for a predetermined length of time after operation of the fire alarm device.

4,060,801
METHOD AND APPARATUS FOR NON-SCAN MATRIX ADDRESSING OF BAR DISPLAYS
Charles R. Stein, Schenectady, N.Y., and William L. Carl, Montgomeryville, Pa., assignors to General Electric Company, Schenectady, N.Y.
Filed Aug. 13, 1976, Ser. No. 714,255
Int. Cl.² G06F *3/14*
U.S. Cl. 340—324 R 30 Claims



1. A method for the non-scanned matrix addressing of a display having a bar of variable length in a first light-transmissive condition continuously during all of a time interval between each change, responsive to only an external stimulus, of the length thereof, the display comprised of a plurality (Y) of common electrodes, a like plurality (Y) of groups each containing a plurality (N) of data segment electrodes associated with each common electrode, and a plurality (N Y) of consecutive portions of a display element with each portion being associated with one of the plurality of data segment electrodes and the common electrode associated therewith and actuateable between respective first and second light-transmissive conditions responsive to respective first and second magnitudes of a selected electrical parameter established between the associated data segment and common electrodes, comprising the steps of:

a. simultaneously driving selected ones of the data segment electrodes of each group only with a continuous data-true square-waveform of said electrical parameter, said data-

true waveform having a first amplitude and a substantially constant first frequency;

b. simultaneously driving the remaining ones of the data segment electrodes of each group only with a continuous data-false square-waveform of said electrical parameter of essentially the same substantially constant frequency and essentially the inversion of the amplitude of the data-true waveform;

c. simultaneously driving the common electrode associated with a transitional "top-of-the-bar" group of data segment electrodes only with a continuous first squarewaveform which is essentially the data-false waveform, to cause the selected parameter to continuously be of the first magnitude between said transitional common electrode and the associated data segment electrodes having the data-true waveform thereon and to continuously be of said second magnitude between said transitional common electrode and the associated data segment electrodes having the data-false waveform thereon;

d. simultaneously driving the common electrode associated with each subordinate "full-on" group of data segment electrodes below the "top-of-the-bar" common electrode only with a second continuous square-waveform of said electrical parameter having an amplitude differing from said first waveform and a frequency equal to one of an even-integer multiple and an even-integer submultiple of the frequency of the first waveform, to cause said electrical parameter to continuously be substantially of said first magnitude between each subordinate common electrode and the entire group of data segment electrodes associated therewith; and

e. simultaneously driving each common electrode associated with each "off" group of data segment electrodes above the "top-of-the-bar" common electrode only with a third continuous square-waveform of said selected electrical parameter having a frequency higher than a cut-off frequency of the display element to cause said electrical parameter to continuously be substantially of said second magnitude between each common electrode and the entire group of data segment electrodes associated therewith.

4,060,802

DRIVING CIRCUIT FOR A LIQUID CRYSTAL DISPLAY DEVICE

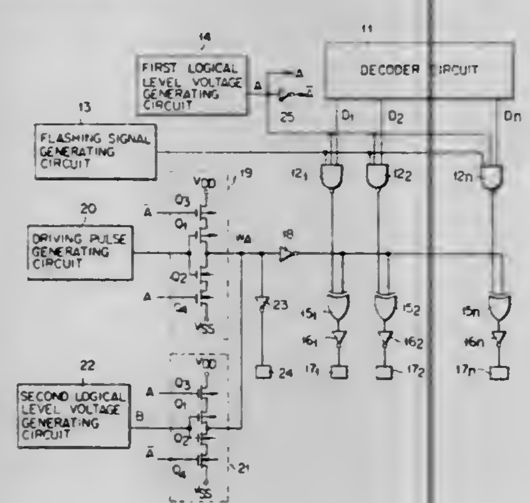
Koji Matsuki, Yokohama, Japan, assignor to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Filed June 23, 1976, Ser. No. 699,187

Claims priority, application Japan, June 24, 1975, 50-78051

Int. Cl.² G09F *9/32*

U.S. Cl. 340—324 M **5 Claims**



1. A driving circuit for a liquid crystal display device for causing the segment electrodes of a liquid crystal element to indicate prescribed data, which comprises a plurality of multi-input type NAND gates supplied with outputs from a decoder circuit for decoding coded data; a first logical level voltage-generating circuit for impressing prescribed logical level voltage in common to the NAND gates; a plurality of exclusive OR gates supplied with outputs from the NAND gates; a driving pulse-generating circuit for supplying liquid crystal-driving pulses to the exclusive OR gates; a second logical level voltage-generating circuit for sending forth an output to the exclusive OR gates, thereby producing prescribed logical level voltage; and switch circuit provided between the driving pulse-generating circuit or second logical level voltage-generating circuit and the exclusive OR gates, whereby the segment electrodes of a liquid crystal display element are selectively supplied with liquid crystal-driving pulses generated by the driving pulse-generating circuit or prescribed logical level voltage according to the combinations of logical level voltage outputs from the first and second logical level voltage-generating circuits.

4,060,803

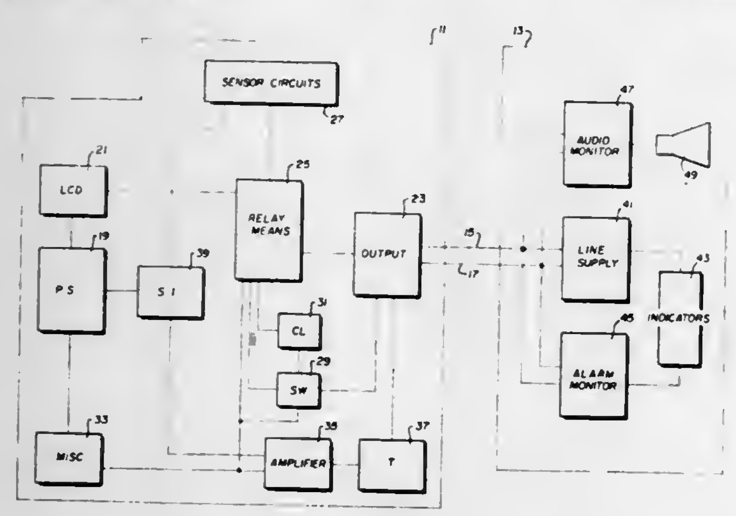
SECURITY ALARM SYSTEM WITH AUDIO MONITORING CAPABILITY

Charles S. Ashworth, Jr., Warren, Mich., assignor to Audio Alert, Inc., Farmington Hills, Mich.

Filed Feb. 9, 1976, Ser. No. 656,244

Int. Cl.² G08B *29/00*

U.S. Cl. 340—409 **12 Claims**



1. A security alarm system comprising, in combination, a remotely located station to be protected, a central monitoring station and electrical transmission lines coupled therebetween, said remote station including output means coupling said remote station to said transmission lines, means for generating a DC transmission signal having a first normal polarity, first relay responsive switching means normally coupling said generated DC signal of said first normal polarity to said output means, a line current detector including a photo-optical coupler having a photo diode coupled between said generating means and said first switching means, said photo diode being responsive to the normal passage of current therethrough for maintaining its phototransistor in a first conductive state and responsive to the absence of current therethrough to switch its phototransistor to a second conductive state, indicator means at said remote station responsive to said second conductive state for providing a visual indication of the failure to transmit said DC transmission signal, a plurality of alarm condition sensors normally maintaining a first normal condition but triggerable to a second alarm condition in response to the detection of said alarm condition, a normally de-energized relay responsive to said second alarm condition for energizing its coil to switch said first relay responsive switching means to reverse the normal polarity of the DC signal supplied to said output means, a manually operable multipositionable switch located at said remote station, said switch being positionable to at least an "on" and an "off" state, microphone detector means including a plurality of individual microphones located about said remote station for detecting audible sounds originating therein, each of said microphones having its own amplifying means and means for adjusting its individual sensitivity, said microphone detector means further including a high gain amplifier for further applying the AC outputs of said microphones, a transformer means for superimposing the amplifier AC audio signal onto the DC transmission signal at said output means, means responsive to said manually-operable switch being in the "on" position for supplying necessary power to said microphones, supplemental second relay responsive switching means responsive to the energization of said relay means in response to the detection of an alarm condition for supplying the necessary power to said microphones even if said manually-operable switch is in the "off" position, closed loop means activated when said manually-operable switch is in said "on" position, for maintaining a first closed circuit state so long as no part of the perimeter security loop is broken but responsive to a break in the security loop for switching to a second closed circuit state, said relay means being further responsive to said second closed circuit state for energizing the relay coil to reverse the polarity of the DC transmission signal supplied to said output means, said central monitoring station comprising a line supervision circuit including a full wave rectifier coupled to said transmission lines for providing a continuous DC signal to a photo-optical coupler for isolating said central station, said photo-optical coupler having a photo diode coupled in series with said full wave rectifier, said photo diode being normally responsive to the presence of DC current for maintaining its phototransistor in a first state but being responsive to the absence of DC current indicating an open circuit or short circuit fault for switching its phototransistor to a second state, means responsive to said second state for indicating the fault condition, an alarm condition monitor circuit including a diode coupled to one of said transmission lines and a photo-optical coupler in series with said diode for isolating said central station, said photo-optical coupler having a photo diode having its anode connected in series with the cathode of said diode such that said photo diode does not conduct when a DC signal of normal polarity is present on the lines so as to maintain its phototransistor in a first normal state indicating the absence of an alarm condition and such that said photo diode does conduct in response to a DC signal of reversed polarity on said lines so as to switch its phototransistor to a second alarm state indicating the presence of an alarm condition at said remote station, means including an SCR responsive to said second alarm state for switching said SCR to a conducting state, means responsive to said SCR being in said conducting state for indicating the existence of said alarm condition, and means for manually resetting said SCR to its non-conductive state after the alarm condition has been corrected at said remote station, and an audio monitoring circuit including a transformer for isolating the central station from the transmission lines, a DC blocking capacitor coupling a first transformer winding to said transmission lines, an audio amplifier having its inputs coupled to the second transformer winding, a threshold amplifier having its input coupled to one of the inputs of said audio amplifier for outputting a gating signal when the audio signal exceeds a predetermined threshold level, an audio gating means having its input coupled to the output of said audio amplifier and responsive to said gating signal from said threshold amplifier for passing the output from said audio amplifier and speaker means coupled to the output of said audio gating means for rendering the audio signals passed by said gating means audible to an operator at the central station so as to enable the operator to listen to the actual audio sounds originating in the protected remote location.

4,060,804

INK JET RECORDING METHOD AND APPARATUS

Takahiro Yamada, Hitachi, Japan, assignor to Hitachi, Ltd., Japan

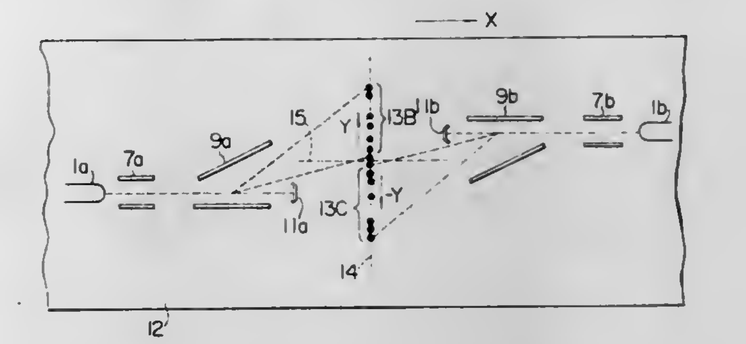
Filed Jan. 30, 1976, Ser. No. 653,928

Claims priority, application Japan, Feb. 3, 1975, 50-14505

Int. Cl.² G01D *15/18*

U.S. Cl. 346—1 **10 Claims**

1. An ink jet recording method for recording a continuous pattern by the synthesis of two record patterns split in a direction of deflection of ink droplets, wherein said two split record patterns are formed by deflecting first ejected ink droplets and second ejected ink droplets individually from each other and respectively in opposite senses of the ink droplet deflection



direction, and said two split record patterns are seamed together along their edges which are defined by the ink droplets deflected with a smaller angle.

4,060,805

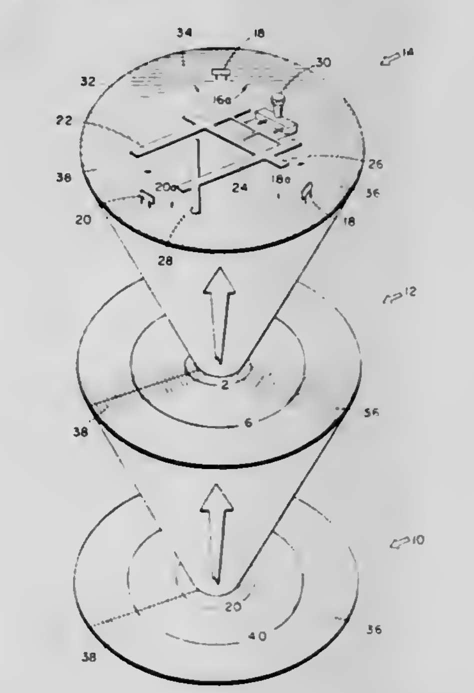
INTEGRATED TERMINAL AREA SURVEILLANCE SYSTEM

Arthur D. McComas, Cockeysville, Md., assignor to The Bendix Corporation, Southfield, Mich.

Filed June 28, 1976, Ser. No. 700,433

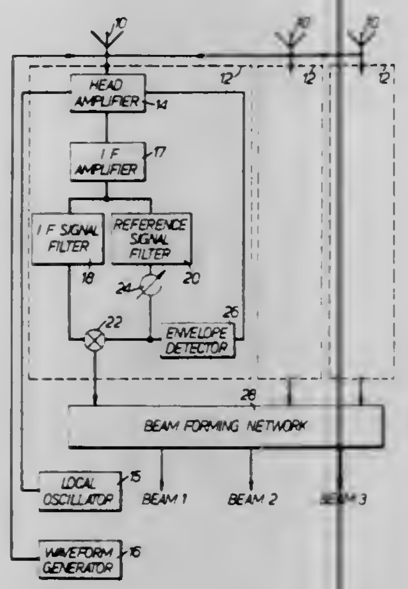
Int. Cl.² G01S *9/56*

U.S. Cl. 343—6.5 LC **7 Claims**



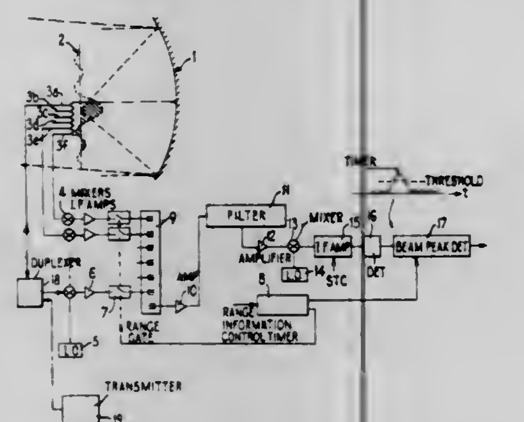
5. A surveillance system for an airport terminal control area including a plurality of spaced apart interrogating and receiving stations and wherein transponder equipped aircraft cooperate with said stations, said stations being able to direct an interrogation message into a selected portion of said terminal control area and determine, in response to a reply to said interrogation message, the location of a transponder equipped aircraft which replies to said interrogation message by any of a plurality of algorithms for determining location in response to a reply to an interrogation and additionally including means for recording the location of said transponder equipped aircraft which replies to said interrogation message; and, means responsive to the recorded location for selecting which of said plurality of algorithms is to be used for determining the location of said aircraft in response to a subsequent reply.

4,060,806
PHASED ARRAY RADARS
Eric Davies, deceased, late of Danbury, England (by Olivia Maude Davies, co-executor), and by Douglas Philip Marr, co-executor, Mevagissey, England, assignors to The Marconi Company Limited, England
Filed May 14, 1976, Ser. No. 686,574
Claims priority, application United Kingdom, May 14, 1975, 20243/75
Int. Cl.² G01S *7/40*
U.S. Cl. 343—17.7 **7 Claims**



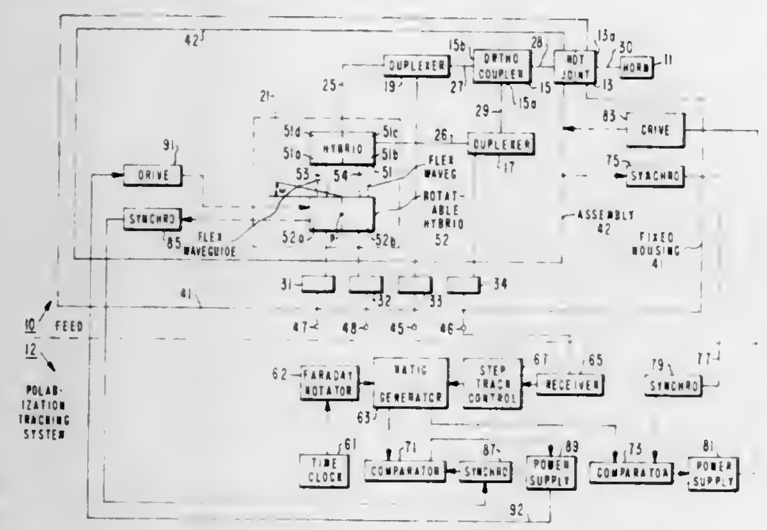
1. A radar having a plurality of antennae, a plurality of receiving channels each associated with a respective antennae and including an amplifier and a first frequency mixer/generator, means for providing a reference signal of known frequency which is different from the radar carrier frequency to the input of each receiving channel, filter means in each receiving channel for separating the I.F. frequency corresponding to the reference signal from that corresponding to the signal induced in the antennae and a second frequency mixer for mixing the signals at the outputs of the filter means to generate a second intermediate frequency for utilisation by a beam forming network.

4,060,807
LOW ANGLE RADAR
Paul Barton, Bishops Stortford, England, assignor to International Standard Electric Corporation, New York, N.Y.
Filed Feb. 22, 1977, Ser. No. 770,404
Claims priority, application United Kingdom, Feb. 24, 1976, 07210/76
Int. Cl.² G01S *7/28*
U.S. Cl. 343—17.1 R **7 Claims**



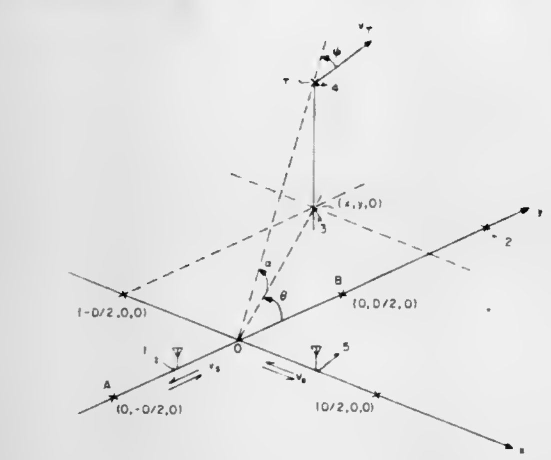
1. A receiving system for a pulse radar system comprising:
range gate controlled means for simultaneously sampling the return signal distribution across a predetermined portion of the receiving aperture;
means for combining in time distributed order, said combined samples producing a coherent signal waveform corresponding to a time scan of the received signal distribution across said predetermined aperture portion and having a signal spectrum which is representative of said aperture distribution;
and means for filtering said waveform such as to attenuate the edges of the signal spectrum.

4,060,808
ANTENNA SYSTEM WITH AUTOMATIC DEPOLARIZATION CORRECTION
Peter Foldes, Montreal, Canada, assignor to RCA Corporation, New York, N.Y.
Filed June 30, 1976, Ser. No. 701,422
Int. Cl.² H04B *7/00*
U.S. Cl. 343—100 PE **12 Claims**



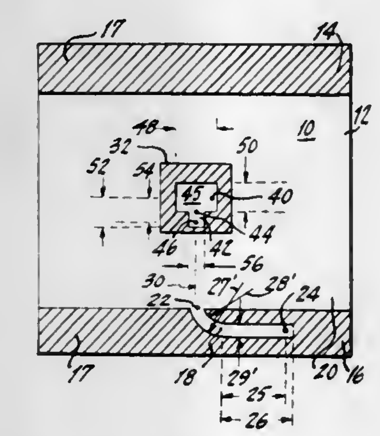
1. In an antenna system of the type including means for providing maximum coupling of radio frequency waves of a given polarization, the improvement therewith for automatically correcting for changes in the rotation of the polarization of waves when travelling through the ionosphere to maintain polarization alignment comprising:
means for locally generating a continuous control signal which represents the nominal amount of Faraday rotation that then exists for a radio frequency wave at a given frequency in the region of the antenna site, and
means responsive to said control signal for adjusting the polarization angle of the coupling means in accordance with said control signal to maintain alignment.

4,060,809
TRACKING AND POSITION DETERMINATION SYSTEM
Elie J. Baghdady, 21 Overlook Drive, Weston, Mass. 02193
Filed Apr. 9, 1975, Ser. No. 566,195
Int. Cl.² G01S *1/40, 3/54, 5/04;* **G08G** *5/00*
U.S. Cl. 343—112 R **43 Claims**



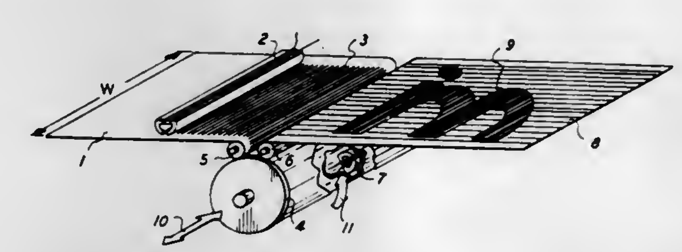
42. A method of determining the position of an object relative to known reference location, comprising the steps of:
radiating carrier waves from along two at least partially non-parallel lines at one of the object and the known reference location by varying the location of at least one radiating position to induce Doppler shift in the carrier waves;
receiving the carrier waves at at least two antennae spaced apart at the other of the object and the known location;
sensing the Doppler shift of the carrier waves received at each of the antennae; and,
calculating the position of the object from the sensed Doppler shifts, the separation of the two antennae and the coordinates of the known reference location.

4,060,810
LOADED MICROSTRIP ANTENNA
John L. Kerr, Neptune, and Michael J. Timochko, Lanoka Harbor, both of N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.
Filed Oct. 4, 1976, Ser. No. 729,513
Int. Cl.² H01Q *1/38*
U.S. Cl. 343—700 MS **10 Claims**



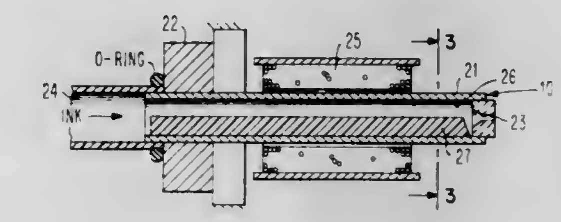
1. In a microstrip antenna, apparatus comprising:
a circuit board of dielectric material having a metallic ground plane on one side thereof; and
a radiating element in the form of a patch of metal etched on the opposite side of said board;
a microstrip transformer etched on said opposite side of said board continuous with said patch at the center of one side for coupling a transmission line and matching impedance to the patch; said patch being continuous thereacross except for the removal of a relatively large portion in the central region thereof, so that current flow across the patch is forced to deviate around the area of removal and therefore have a longer path, which lowers the resonant frequency of radiation.

4,060,811
MAGNETIC LATENT IMAGE CREATION
Eugene C. Faucz, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.
Filed Mar. 1, 1976, Ser. No. 662,628
Int. Cl.² G03G *19/00*
U.S. Cl. 346—74.1 **15 Claims**



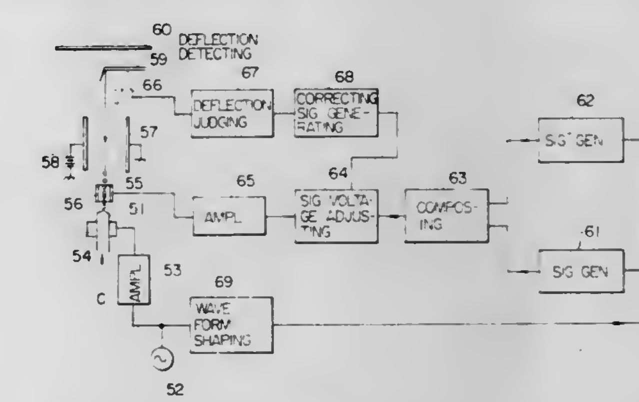
1. A method for creating a magnetic latent image capable of being rendered visible with magnetic toner without image deletion, comprising:
a. recording over an entire area of interest on a magnetizable member a first substantially uniform spatial pattern of magnetic transitions having a transition wavelength λ_1 capable of retaining said magnetic toner on said magnetizable member and effective to substantially completely cover said area of interest upon development with magnetic toner; and
b. recording in one of imagewise and background configuration within said area of interest a second spatial pattern of magnetic transitions having a wavelength λ_2 incapable of retaining said magnetic toner on said magnetizable member, wherein $\lambda_1 > \lambda_2$.

4,060,812
NOZZLE FOR AN INK JET PRINTER
John Mako, Endicott, and Walter Thornton Pimbley, Vestal, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.
Filed Nov. 15, 1976, Ser. No. 741,825
Int. Cl.² G01D *15/18*
U.S. Cl. 346—75 **10 Claims**



1. In an ink jet printer system wherein ink under pressure flows through a nozzle device and an electromechanical transducer is operated at a predetermined frequency for vibrating said nozzle device for applying perturbations to said ink as it flows through said nozzle and is emitted as a continuous stream to break into discrete drops as a result of said perturbations,
said vibration of said nozzle device by said transducer operation resulting in the production of soundwaves within the body of said ink in said nozzle, the improvement comprising
damper means within said nozzle device in contact with said body of ink contained within said nozzle device for absorbing energy from said soundwaves.

4,060,813
INK DROP WRITING APPARATUS
Takahiro Yamada, and Tetsuo Doi, both of Hitachi, Japan, assignors to Hitachi, Ltd., Japan
Filed Mar. 17, 1976, Ser. No. 667,588
Claims priority, application Japan, Mar. 17, 1975, 50-31212; Mar. 19, 1975, 50-32355
Int. Cl.² G01D *18/00*
U.S. Cl. 346—75 **13 Claims**

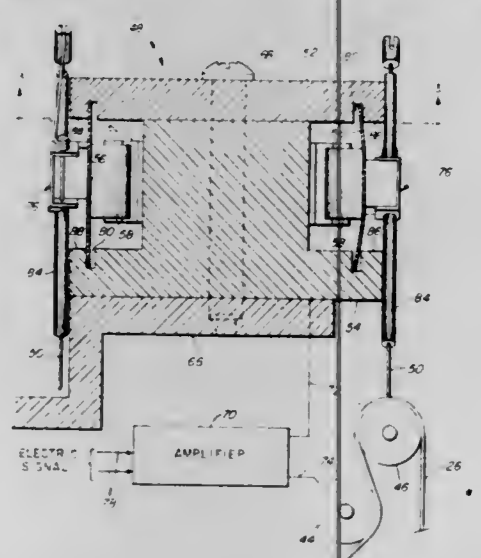


1. In an ink drop writing apparatus including a high frequency voltage source, nozzle means supplied with ink under pressure for generating an ink stream directed toward a recording medium, electro-mechanical converter means con-

nected to said high frequency voltage source for vibrating said nozzle means to cause the ink stream to break up into a stream of regularly spaced ink drops, means for generating recording signals, means for charging the drops in accordance with the charge therein, means responsive to the recording signals for applying a signal voltage to said charging means, and means for deflecting the drops in accordance with the charge thereon, the improvement comprising

a. calibrating means for controlling said charging means to apply a predetermined charge to selected drops;
b. means for detecting the amount of deflection of the selected drops and the deviation of the measured detection from a standard value; and
c. correcting means responsive to said detecting means for regulating said charging means to compensate the amount of charge applied to the selected drops to eliminate said deviation, said correcting means including signal voltage adjusting means for regulating the magnitude of said signal voltage.

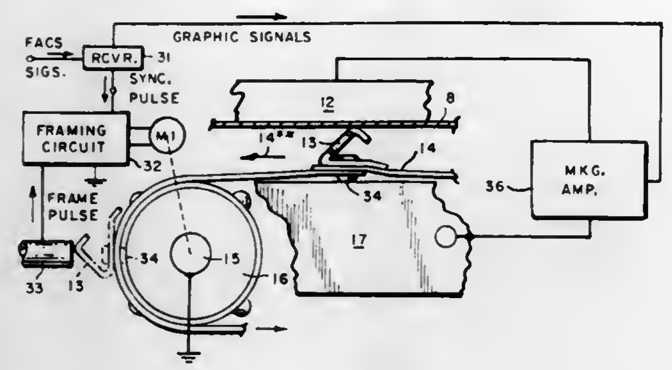
4,060,814
RECORDER WITH EDGE-GUIDED BELT
John P. Urciuoli, and Roger P. Icart, both of Portsmouth, R.I., assignors to Raytheon Company, Lexington, Mass.
Filed Nov. 25, 1975, Ser. No. 635,207
Int. Cl.^{2} G01D *15/16*
U.S. Cl. 346—139 A **13 Claims**



1. A recorder comprising:
a medium for inscribing a record;
a stylus for stimulating said medium; and
means for transporting said stylus along said medium, said transporting means including a belt having first and second edges thereof, a support having slots oriented transversely of said medium for slidably engaging said first and said second edges, and means for securing said stylus to said belt between said first and said second edges, said slots being configured to envelop only the edges of said belt, said securing means contacting said support, said securing means urging a mid-portion of said belt towards an edge of said support and providing a bowing of said belt to further stabilize said belt from longitudinal waves along said belt.

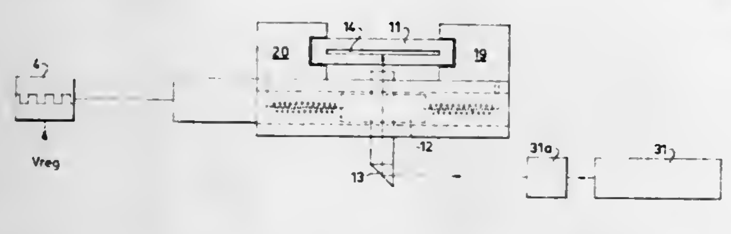
4,060,815
ELECTRICAL RECORDER AND BELT WITH STYLI THEREFOR
George C. Williams, South Easton, Mass., assignor to Alden Research Foundation, Westboro, Mass.
Filed Dec. 29, 1976, Ser. No. 755,211
Int. Cl.^{2} G01D *15/16*
U.S. Cl. 346—139 A **9 Claims**

1. In graphic recording of electric signals on a web fed through a recording zone, means for scanning the zone comprising:
a belt having a plurality of equally spaced feed elements between belt ends, and mutually registered coupling perforations at each end in predetermined relation to the equal feed element spacing,
a signal marking stylus having apertures registerable with the belt coupling perforations, and



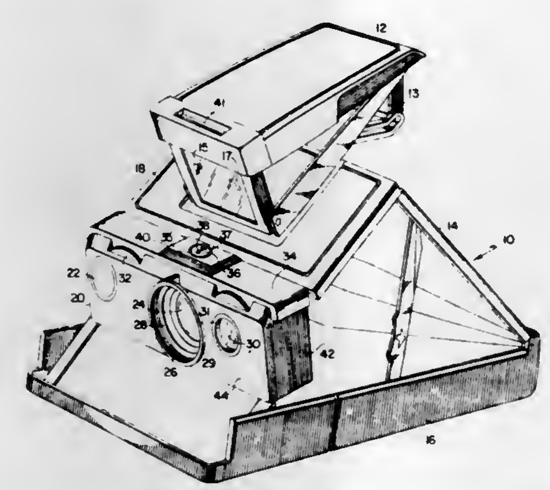
means extending through the stylus apertures and coupling perforations for fastening the stylus to the belt and also joining the belt ends with the feed elements of the joined ends at the aforesaid equal feed element spacing and in predetermined relation to the stylus.

4,060,816
SCANNING APPARATUS, FOR PRODUCING MASKS FOR MICRO CIRCUITS
Gerhard Westerberg, Hastskovagen 7A, 183 50 Taby, Sweden
Filed Feb. 9, 1976, Ser. No. 656,282
Claims priority, application Sweden, Feb. 13, 1975, 7501605
Int. Cl.^{2} G03B *27/00*
U.S. Cl. 354—4 **3 Claims**



1. In a device for mechanically scanning a surface (14) on which a mask pattern is adapted to be generated in the manufacture of micro circuits, having a source of radiation (31), a radiation sensitive medium on said surface, a first slide (11) carrying said surface, a drive device (23) for reciprocating the first slide in one direction, a second slide (12), means (13) carried by the second slide for transmitting radiation from said source to the radiation sensitive medium on said surface, and drive means connected to the second slide for reciprocation thereof in another direction to scan said surface, comprising means mounting the second slide for mechanical vibration at a natural frequency, pulsing means (9) operating at said natural frequency and elastically coupled continuously to the second slide for maintaining said reciprocation of the second slide at an adjusted amplitude, signal generator means (4) connected to the pulsing means for drive thereof at said natural frequency of the second slide, sensing means for measuring the period of reciprocation of the second slide, and feedback control means connecting the sensing means to the signal generator means for maintaining said reciprocation of the second slide at the adjusted amplitude.

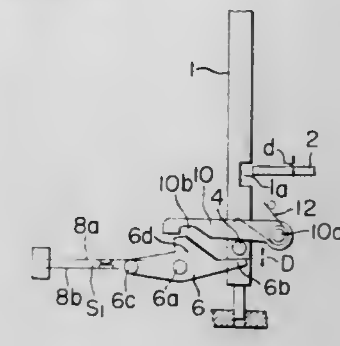
4,060,817
PHOTOGRAPHIC APPARATUS WITH LENS FOCUSING SCALE
Leonard J. Dionne, Westwood, Mass., assignor to Polaroid Corporation, Cambridge, Mass.
Filed Mar. 1, 1976, Ser. No. 662,352
Int. Cl.^{2} G03B *3/00, 13/02*
U.S. Cl. 354—198 **10 Claims**



1. A variable focusing photographic apparatus comprising:
a housing;
a lens assembly mounted substantially within said housing;
focusing means coupled to said lens assembly for moving said lens assembly between distant and nearmost foci so as to focus an image of a subject at a focal plane within said housing;
a viewing station formed within a surface of said housing;
an indicia-bearing strip of resilient material having a normally coiled unstressed configuration and first and second opposed ends; and
means for supporting said strip for movement across said viewing station, said supporting means including a rotatable member driveable coupled to said lens assembly or said focusing means, means for fixedly attaching said first end of said strip to said rotatable member and a fixed member around which said second end of said strip is unattachably coiled whereby said strip is coiled about said rotatable member and partially uncoiled from said fixed member when said focusing means is driven in a first direction, and said strip is automatically recoiled around said fixed member and partially uncoiled from said rotatable member when said focusing means is driven in a second direction opposite to said first direction.

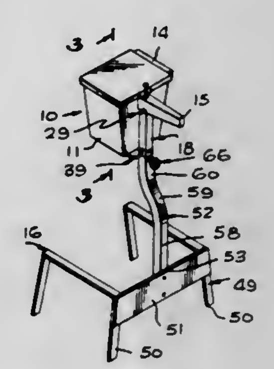
4,060,818
SWITCH OPERATING DEVICE OPERATIVELY ASSOCIATED WITH A RECIPROCALLY MOVABLE MEMBER
Koichi Furuta, Tokyo, Japan, assignor to Nippon Kogaku K.K., Tokyo, Japan
Filed Nov. 4, 1975, Ser. No. 628,653
Claims priority, application Japan, Nov. 14, 1974, 49-137060[U]
Int. Cl.^{2} G03B *17/38*
U.S. Cl. 354—266 **9 Claims**

1. In a photographic camera having a power-operated film advance mechanism energized when the camera shutter is in its closed position upon the closing of a control switch, the closure of the control switch being controlled by a reciprocally movable member that releases the shutter of the camera only after the reciprocally movable member has been moved in one direction from an initial position and substantially beyond a predetermined location, a device for operating the control switch comprising:
a. an actuating member operatively associated with the switch and having a first position in which the switch is maintained closed, but movable out of said first position for opening the switch;
b. operating means for moving the actuating member out of its first position only when said reciprocally movable member has moved in said one direction to said predetermined location; and



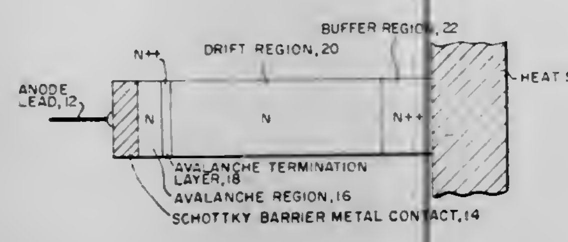
c. a holding member for holding the actuating member out of its first position until said reciprocally movable member returns in the opposite direction to substantially its initial position.

4,060,819
DETACHABLE CONNECTIONS FOR CAMERA OR THE LIKE
Gerhard I. W. Bahnsen, Box 1297, South Lake Tahoe, Calif. 95705
Division of Ser. No. 452,239, March 22, 1974, Pat. No. 3,945,738. This application May 5, 1975, Ser. No. 574,603
Int. Cl.^{2} G03B *17/00*
U.S. Cl. 354—293 **4 Claims**



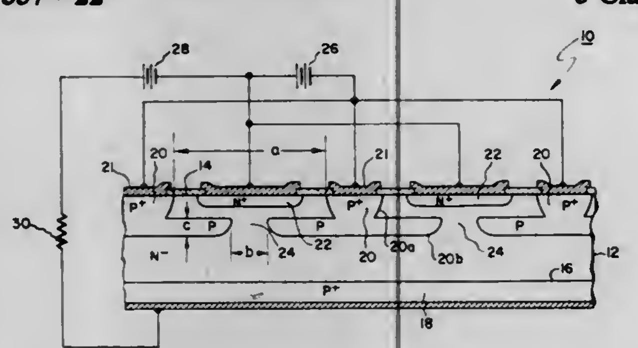
4. The combination comprising a camera having a shutter mechanism, a tubular adapter part, means for connecting said adapter part to said camera, a plurality of tubular support column parts connectible selectively to an end of said adapter part in general alignment therewith to form differently dimensioned extensions thereof, said tubular adapter part and said column parts having means at their ends forming telescopically interfitting connections between said end of said adapter part and coacting ends of said column parts, fastener means for locking said support column parts to said adapter part, and an elongated cable release unit manually actuable to operate said shutter mechanism and extending from an actuating end of the cable release unit into the interior of said tubular adapter part and then through a wall of said tubular adapter part to the exterior thereof and to a point of connection to the shutter mechanism, said adapter part having an upper end receivable upwardly within a downwardly opening socket recess in the camera, said first mentioned means including a fastener carried by a lower portion of said adapter part and slidably receivable within a slot formed in a lower portion of the camera upon upward movement of said adapter part into said socket recess.

4,060,820
LOW NOISE READ-TYPE DIODE
Robert A. Pucel, Needham, and Hermann Statz, Wayland, both of Mass., assignors to Raytheon Company, Lexington, Mass.
Filed Jan. 5, 1976, Ser. No. 646,101
Int. Cl.² H01L *29/90, 29/48*
U.S. Cl. 357—13 **20 Claims**



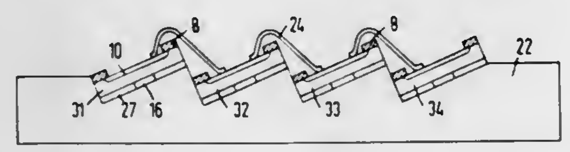
1. A Read-type diode comprising in combination:
a Schottky-barrier forming metal contact;
an avalanche region of semiconductor material adjacent said Schottky-barrier forming metal contact, said avalanche region having a doping density in the range of 5×10^{15} to 1×10^{17}/cm³;
an avalanche termination region of semiconductor material adjacent said avalanche region, said avalanche termination region having a doping density in the range of 2×10^{17} to 5×10^{17}/cm³, said avalanche termination region being of sufficient thickness to reduce the electric field within said avalanche termination region below the level sufficient for causing charge carrier multiplication;
a drift region of semiconductor material adjacent said avalanche termination region, said drift region having a doping density in the range of 3×10^{15} to 3×10^{16}/cm³, the length of said drift region being determined in accordance with a preferred operating frequency of said diode; and
means for determining the effective injection current of said diode such that the noise measure of said diode is less than 50 db.

4,060,821
FIELD CONTROLLED THYRISTOR WITH BURIED GRID
Douglas E. Houston, and Surinder Krishna, both of Ballston Lake, N.Y., assignors to General Electric Co., Schenectady, N.Y.
Filed June 21, 1976, Ser. No. 697,984
Int. Cl.² H01L *29/80*
U.S. Cl. 357—22 **5 Claims**



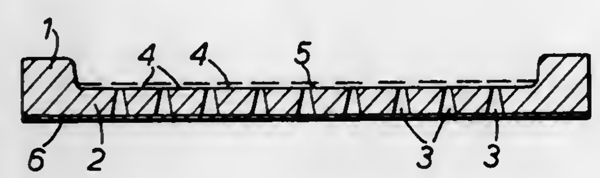
1. A field controlled thyristor comprising:
a semiconductor substrate of one type conductivity and having opposed major surfaces;
a uniform anode injecting region of opposite type conductivity in one of said major surfaces;
a current controlling grid structure comprising a plurality of surface-adjacent grid regions of opposite type conductivity in the other major surface and a like plurality of buried grid regions contacting said surface-adjacent grid regions, said surface-adjacent regions being of higher conductivity than said buried grid regions;
a plurality of surface-adjacent cathode regions of one type conductivity in said other major surface and within the interstices of said surface-adjacent grid regions, said surface-adjacent cathode regions having a larger surface area than said surface-adjacent grid regions and a higher conductivity than said substrate; and
wherein each of said buried grid regions are further characterized by having portions extending laterally under adjacent cathode regions and are spaced from the next adjacent buried grid region by a width, *b*, with each buried grid having a depth, *c*, the ratio of the depth to the width being in a range of 0.5 to 5.0 and substantially determining the magnitude of the grid-to-cathode voltage required to block substantial current flow from anode to cathode with a given anode-to-cathode voltage for a given substrate resistivity.

4,060,822
STRIP TYPE RADIATION DETECTOR AND METHOD OF MAKING SAME
Ottomar Jäntsch; Ingmar Feigt, both of Erlangen, and Wolf Rüdiger Willig, Erlangen-Bruck, all of Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany
Division of Ser. No. 374,019, June 27, 1973, Pat. No. 3,939,555. This application Feb. 24, 1976, Ser. No. 660,756
Int. Cl.² H01L *27/14*
U.S. Cl. 357—30 **9 Claims**



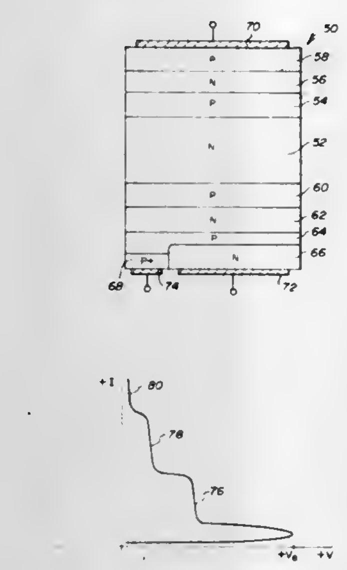
1. A detector for ionizing radiation comprising:
a. an N-conduction thin semi-conductor body having a resistivity of at least **100** ohm-cm and having two parallel flat sides;
b. a plurality of diffused P conduction electrodes on one side of said semi-conductor in the form of parallel strips;
c. an oxide layer covering the PN junctions on said one side; and
d. a plurality of parallel metal electrodes in ohmic contact with the other side of said semi-conductor at an angle to the P conduction electrodes on said one side.

4,060,823
ELECTRON-EMISSIVE SEMICONDUCTOR DEVICES
Jonathan Ross Howorth, Maldon; Alan Jerome Goss, Chelmsford, and Peter James Pool, Maldon, all of England, assignors to English Electric Valve Company Limited, England
Filed Apr. 9, 1976, Ser. No. 675,693
Claims priority, application United Kingdom, Apr. 11, 1975, 15094/75
Int. Cl.² H01L *27/14*
U.S. Cl. 357—30 **7 Claims**



1. An electron-emissive semiconductor device comprising first and second substantially parallel surfaces which are spaced apart from one another by intervening electron-emissive semiconductor material, the first surface of which is provided with a layer or coating of a material which provides a reduction in the surface work function of the semiconductor material so that electrons are emitted from said first surface when said second surface is subjected to an incident stimulus, the semiconductor material consisting of localized elemental regions which are separated from each other by barrier means which extend from said first to said second surface to isolate said regions from each other and inhibit current flow between the different elemental regions.

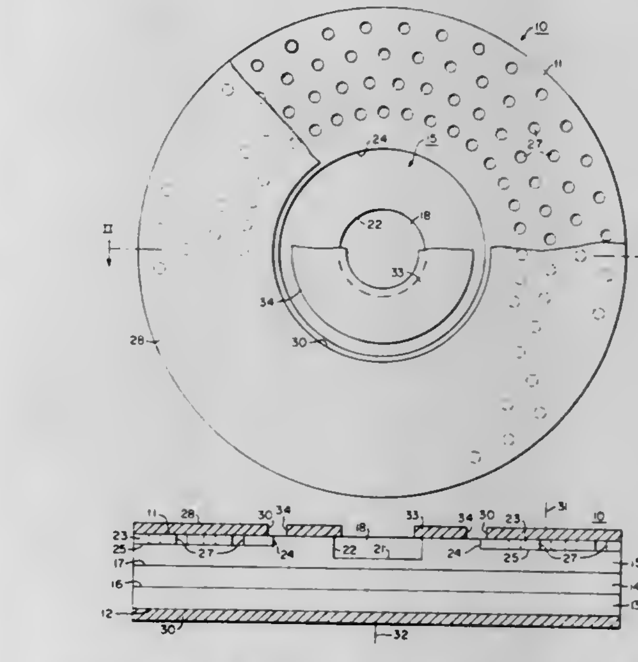
4,060,824
SLOW SPEED SEMICONDUCTOR SWITCHING DEVICE
Jearld L. Hutson, P.O. Box 34235, Dallas, Tex. 75234
Continuation-in-part of Ser. No. 488,789, July 15, 1974, abandoned. This application June 16, 1975, Ser. No. 587,536
Int. Cl.² H01L *29/00*
U.S. Cl. 357—37 **5 Claims**



1. A slow speed asymmetrical semiconductor switching device comprising:
a body of semiconductor material having at least six layers of alternating opposite types of conductivity to form a plurality of P-N junctions,
first and second electrodes attached to exterior ones of said layers having opposite conductivity types,
a gate electrode connected to one of said layers for receiving a gating signal having either of two levels, one of the levels of said gating signal being of a predetermined low value to cause more than one regenerative switching action within said body during switching of the device from a nonconductive state to a conductive state, said regenerative switching actions occurring primarily perpendicularly to said P-N junctions and the total switching time of said body being greater than one microsecond to inhibit the generation of rf current by said device, and
the second of the levels of said gating signal being of a predetermined high value to cause said device to switch from a nonconductive state to a conductive state within an interval on the order of one microsecond.

4,060,825
HIGH SPEED HIGH POWER TWO TERMINAL SOLID STATE SWITCH FIRED BY dV/dt
Earl S. Schlegel, Plum Borough, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.
Filed Feb. 9, 1976, Ser. No. 656,497
Int. Cl.² H01L *29/74*
U.S. Cl. 357—38 **4 Claims**

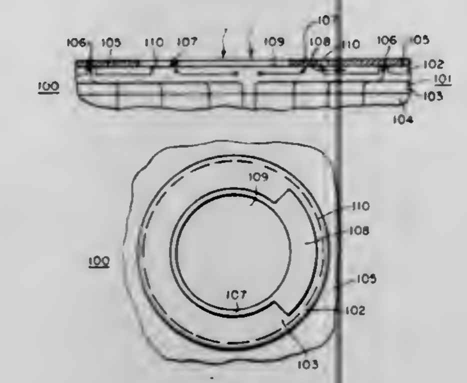
1. A two-terminal thyristor adapted to be fired by dV/dt comprising:
A. a body of semiconductor material having first and second outer surfaces, with at least four impurity regions of alternate type conductivity disposed through the body between the outer surfaces forming PN junctions between adjoining regions;
B. said regions being a cathode emitter region and a cathode base region adjoining parts of the first outer surface of the body, an anode base region, and an anode emitter region adjoining at least a portion of the second outer surface of the body;
C. said cathode emitter region including an auxiliary emitter region and a main emitter region, said auxiliary emitter region adjoining a portion of the first outer surface spaced centrally of the main emitter region
D. said cathode base region adjoining at least a portion of the first outer surface between the auxiliary emitter region and the main emitter region, and adjoining the first outer surface at predetermined locations bounded by the main emitter region to form cathode shunts;
E. said auxiliary emitter region being dimensioned such that $0.7 < CR\ dV/dt$, where C is the capacitance of a PN junction portion between the cathode base region and an anode base region within the confines of the outer boundary of the auxiliary emitter region, R is the effective radial resistance in the cathode base region under the auxiliary cathode emitter region, and dV/dt is the rate of application of a triggering voltage on the anode electrode hereinafter recited;
F. a metallic electrode in ohmic contact with the first outer surface and overlying at least a portion of the auxiliary region and a portion of the cathode base region outwardly from the auxiliary region;
G. a cathode electrode in ohmic contact with the main emitter region and with the cathode base region at said cathode shunts; and
H. an anode electrode in ohmic contact with the anode emitter region.



4,060,826
LIGHT ACTIVATED THYRISTOR CAPABLE OF ACTIVATION BY INTENSITY RADIATION
Peter Voss, Munich, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany
Filed Aug. 2, 1976, Ser. No. 710,972
Claims priority, application Germany, Aug. 29, 1975, 2538549
Int. Cl.² H01L *29/74*
U.S. Cl. 357—38 **7 Claims**

1. A light activated thyristor comprising:
a. a body of a semiconductor material; said body comprising an emitter zone of a first conductivity type adjacent to a major surface of said body, a base zone of a second conductivity type adjacent to said emitter zone and sharing a portion of said major surface with said emitter zone, a PN junction interfacing said base zone and said emitter zone and intersecting said major surface between emitter and base zones, said base zone having an area at said major surface for receiving low intensity radiation, said area being a source of carriers generated by said radiation; and,
b. means for providing a low resistance path for carriers in

said source area in said base zone to said PN junction without contacting an emitter zone, such that radiation-



generated carriers in said source area are concentrated in said path while flowing to said PN junction.

4,060,827

SEMICONDUCTOR DEVICE AND A METHOD OF MAKING THE SAME

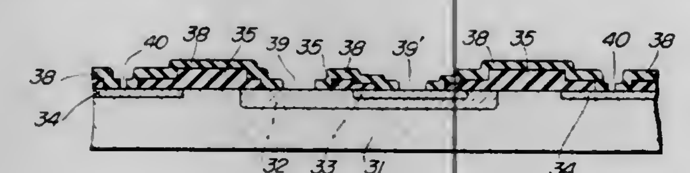
Minoru Ono, Kodaira, and Toshimitu Momoi, Tokyo, both of Japan, assignors to Hitachi, Ltd., Japan

Continuation of Ser. No. 219,470, Jan. 30, 1972, abandoned, which is a continuation of Ser. No. 701,988, Jan. 31, 1968, abandoned. This application Aug. 25, 1975, Ser. No. 607,697

Claims priority, application Japan, Feb. 3, 1967, 42-6608; Feb. 3, 1967, 42-6609

Int. Cl.[2] **H01L** *29/78, 27/02, 29/34*

U.S. Cl. 357—54 **4 Claims**



1. A field-effect semiconductor device comprising:

a semiconductor substrate having a major surface;

at least a pair of spaced semiconductor regions formed in said major surface of said substrate, having a conductivity type opposite to that of the adjacent semiconductor material and defining PN junctions terminating at the major surface with the adjacent semiconductor material;

an oxide film covering at least the portion of said major surface between said pair of said semiconductor regions;

an insulating film of silicon nitride which directly covers the entire exposed surface of said oxide film and the exposed surface of said major surface of the substrate to completely shield said oxide film from the surrounding atmosphere, said silicon nitride film being of substantially uniform thickness over its entire length and having further holes exposing surface portions of said semiconductor regions;

a gate electrode formed on at least a part of said insulating film covering said oxide film; and

a source and a drain electrode respectively formed on said exposed surface portions of said semiconductor regions in spaced relationship to said oxide film through said silicon nitride film.

4,060,828

SEMICONDUCTOR DEVICE HAVING MULTI-LAYER WIRING STRUCTURE WITH ADDITIONAL THROUGH-HOLE INTERCONNECTION

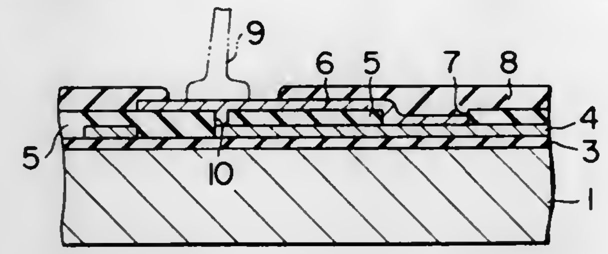
Koichiro Satonaka, Fuchu, Japan, assignor to Hitachi, Ltd., Japan

Filed Aug. 3, 1976, Ser. No. 711,301

Claims priority, application Japan, Aug. 22, 1975, 50-101245

Int. Cl.[2] **H01L** *23/48, 29/46, 29/54*

U.S. Cl. 357—71 **4 Claims**



1. A semiconductor device having a multi-layer wiring structure, comprising:

a. a first wiring layer formed on one main surface of a semiconductor substrate;

b. a first insulating layer formed on said first wiring layer;

c. a second wiring layer formed on said first insulating layer;

d. metal leads bonded to predetermined portions of said second wiring layer; and

e. a second insulating layer formed on the entire surface of said second wiring layer except said predetermined portions of said second wiring layer,

said first wiring layer being electrically connected with said second wiring layer through first through-holes cut in those portions of said first insulating layer which are just beneath said predetermined portions of said second wiring layer.

4,060,829

METHOD OF COLOR CORRECTION

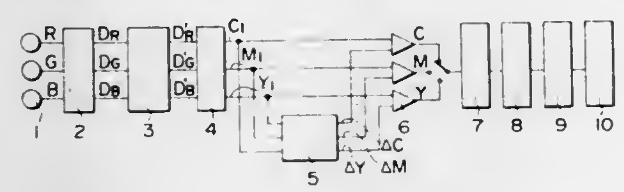
Takashi Sakamoto, Kyoto, Japan, assignor to Dainippon Screen Seizo Kabushiki-Kaisha, Kijamachi, Japan

Filed Aug. 16, 1976, Ser. No. 714,687

Claims priority, application Japan, Aug. 20, 1975, 50-100114

Int. Cl.[2] **G03F** *3/08*

U.S. Cl. 358—80 **2 Claims**



1. A method of color correction of the particular application to a color scanner which is adapted to produce color separation negatives of each color by utilizing color separation density signals obtained from the photoelectrical scanning of a color original and includes a color correction circuit, an analog-digital converter and a memory, said method of color correction comprising the steps of:

storing in said memory correction signals each adapted to correct a difference between a signal value digitally converted from each of said color separation density signals and a signal value corresponding to a color separation density which a finished print should have;

utilizing said color separation density signals, which have already been compressed to a color range reproducible by printing inks at said color correction circuit and converted to digital signals by said analog-digital converter, as addressing signals for reading out said correction signals from said memory; and

adding said read-out correction signals to said digital color separation density signals, thereby obtaining recording signals adapted to produce color separation negatives of each color.

4,060,830

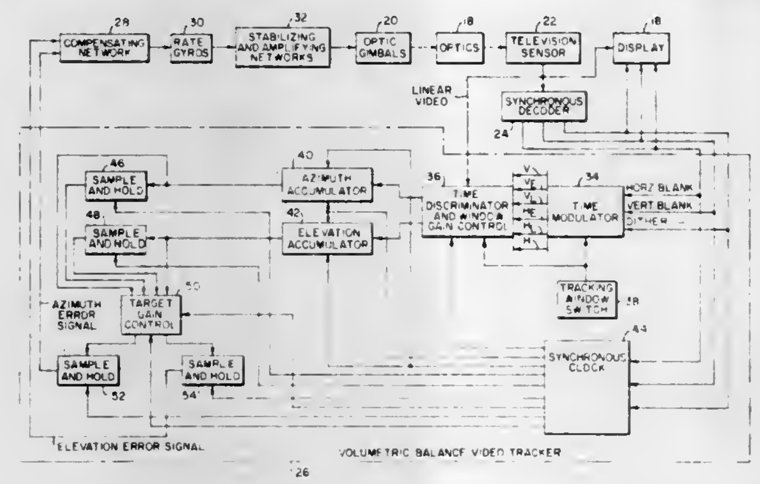
VOLUMETRIC BALANCE VIDEO TRACKER

Martin G. Woolfson, Baltimore, Md., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Oct. 22, 1976, Ser. No. 734,928

Int. Cl.[2] **H04N** *7/18*

U.S. Cl. 358—126 **15 Claims**



1. A video tracker for controlling the scanning of a sensor that provides video signals corresponding to its field-of-view, said tracker comprising:

a time modulator for providing early and late gate signals that define a tracking window within the field-of-view of said sensor;

a time discriminator that is responsive to the early and late gate signals for partially integrating the video signals that occur within the tracking windows defined by the early and late gate signals to generate partial tracking error signals; and

an accumulator that is responsive to said partial tracking error signals for adding the partial tracking error signals of the time discriminator to provide tracking error signals.

4,060,831

WIDEBAND ELECTROMECHANICAL RECORDING SYSTEM

Jerome Barth Halter, Indianapolis, Ind., assignor to RCA Corporation, New York, N.Y.

Filed Oct. 12, 1976, Ser. No. 731,204

Int. Cl.[2] **H04N** *5/76;* **G11B** *3/00*

U.S. Cl. 358—128 **8 Claims**

1. A system for electromechanically recording signals in a disc master; the frequency spectrum of said signals having a region of relatively high energy level; said system comprising:

A. a source for supplying said signals;

B. a cutterhead responsive to said signals for recording said signals in said disc master, when relative motion is established therebetween;

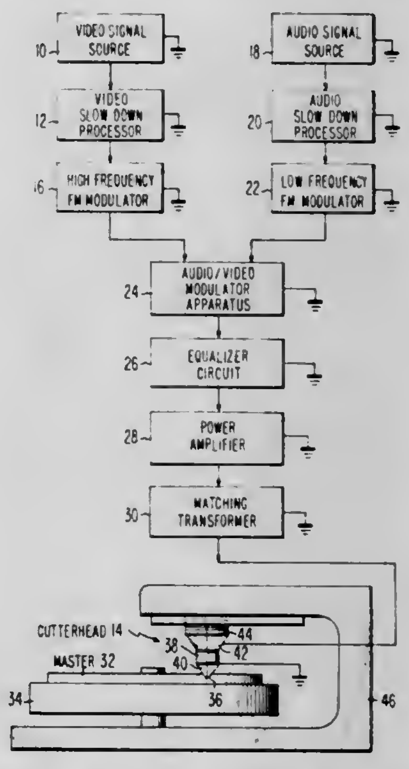
the frequency response characteristic of said cutterhead having a region of relatively increased sensitivity surrounding the resonant frequency of said cutterhead;

C. means for applying said signals to said cutterhead to cause said cutterhead to undergo vibrations in representation of said signals; and

D. means interposed between said signal source and said signal applying means for selectively modifying the energy level of said signals;

said energy level modifying means being constructed such that the shape of the frequency response characteristic of said energy level modifying means complements the shape of the frequency response characteristic of said cutterhead in said region of relatively increased sensitivity, so that the combined response of said energy level modifying means and said cutterhead is relatively uniform over said signal frequency spectrum;

said cutterhead being constructed such that the response of said cutterhead to said signal component frequencies in said region of relatively increased sensitivity varies with frequency in a manner substantially corresponding to the manner in which the energy level of said signal components varies over said region of relatively high energy level of said signal frequency spectrum; and



said energy level modifying means having a response characteristic that varies in a manner which is substantially the inverse of the manner in which the energy levels of said signal components vary over said region of relatively high energy level so as to substantially reduce the energy level of said high energy level signal components prior to their application to said cutterhead.

4,060,832

DIGIT RATE REDUCING METHOD IN VIDEO SIGNAL TRANSMISSION

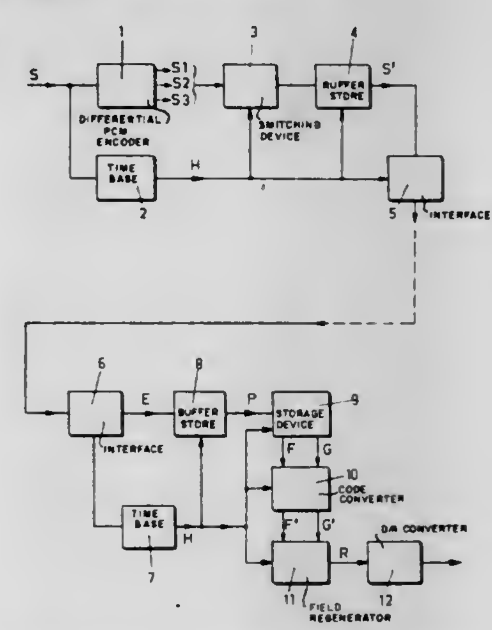
Daniel Pierre Yvon Devimeux, and François-Xavier Antoine Stouls, both of Perros Guirec, France, assignors to Societe Anonyme de Telecommunications, France

Filed June 23, 1976, Ser. No. 698,833

Claims priority, application France, July 3, 1975, 75.20864

Int. Cl.[2] **H04N** *7/12*

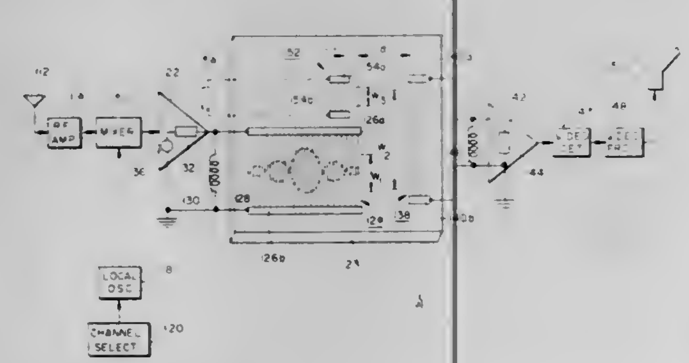
U.S. Cl. 358—133 **4 Claims**



1. A digit rate reducing method in the transmission of video-

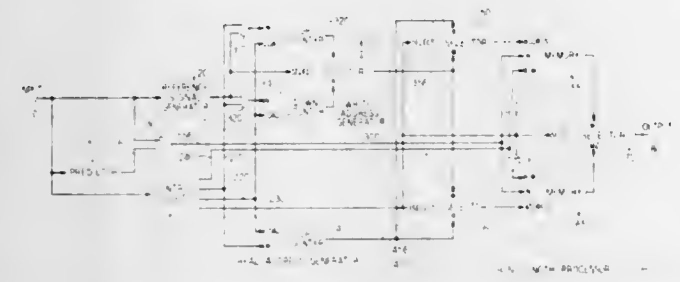
telephone signals, wherein each frame is scanned by means of two consecutive fields comprising each the lines of same parity, each frame dot being represented by a word of *n*, in particular 3, binary digits comprising transmitting a frame every three frames, storing a frame of each parity at the receiving equipment in a frame storage device, systematicaly freshening-up a stored frame by the next transmitted frame of same parity, and regenerating intermediate frames by interpolating between the stored frames, further comprising forming a pseudo-field I_n with opposite parity to a stored field T_n by interpolating between T_n and the stored field T_{n+3} or T_{-3}, and regenerating an intermediate field T_{n+1} or T_{n-1} from I_n and T_{n+3} or T_{n-3}, respectively.

4,060,833
TRANSDUCER ARRANGEMENT FOR A SURFACE ACOUSTIC WAVE DEVICE TO INHIBIT THE GENERATION OF MULTIPLE REFLECTION SIGNALS
Lubomyr Stephen Onyshkevych, Lawrenceville, N.J., assignor to RCA Corporation, New York, N.Y.
Filed Apr. 26, 1976, Ser. No. 680,073
Int. Cl.² H04N *5/48*
U.S. Cl. 358—188 **11 Claims**



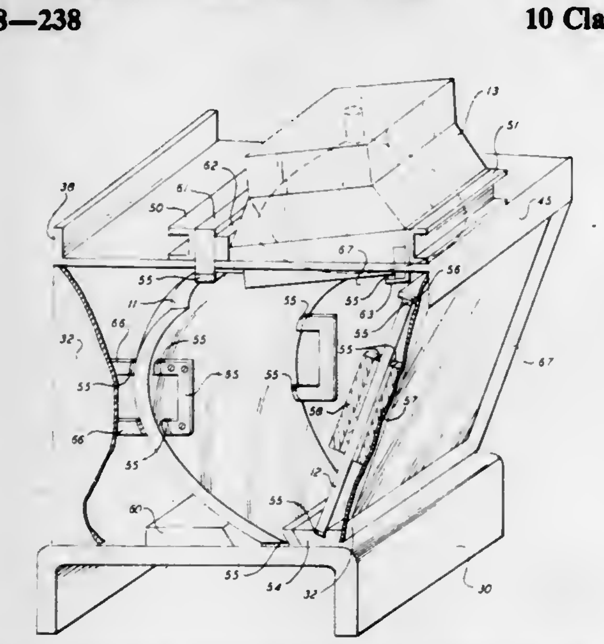
1. Apparatus comprising:
a piezoelectric substrate capable of supporting acoustic signals;
first, second and third transducers associated with one surface of said substrate, each of said transducers including at least one pair of interdigitized comb-shaped conductors, each of said transducers having a complex characteristic impedance associated therewith;
first and second electrical circuits respectively connected between said comb-shaped conductors of said first and second transducers, each of said circuits having a complex impedance associated therewith;
said first and second transducers being space apart a predetermined distance and aligned with respect to one another so that acoustic signals may be propagated between them;
said third transducer having no electrical connections thereto;
said third transducer being space apart from said second transducer by said predetermined distance modified by an incremental distance and aligned with respect to said second transducer so that acoustic signals may be propagated between them, said incremental distance being selected with respect to the phase shift provided by said complex characteristic impedance of said first transducer and said complex impedance of said first circuit so that the acoustic signals reflected from said third transducer are substantially out of phase with acoustic signals reflected from said first transducer at a predetermined frequency;
said third transducer having an aperture selected with respect to the aperture of said first transducer and the magnitudes of said complex characteristic impedance of said first transducer and said complex impedance of said first circuit so that the magnitude of acoustic signals reflected from said third transducer is substantially the same as the magnitude of acoustic signals reflected from said first transducer at said predetermined frequency; and
said second transducer receiving and substantially cancelling reflected acoustic waves from said first transducer and said third transducer.

4,060,834
PROCESSOR FOR INCREASING THE RUN-LENGTH OF DIGITAL SIGNALS
Frank William Mounts, Colts Neck, and Arun Narayan Netravali, Matawan, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.
Filed Oct. 21, 1976, Ser. No. 734,384
Int. Cl.² H04N *1/00*
U.S. Cl. 358—261 **6 Claims**



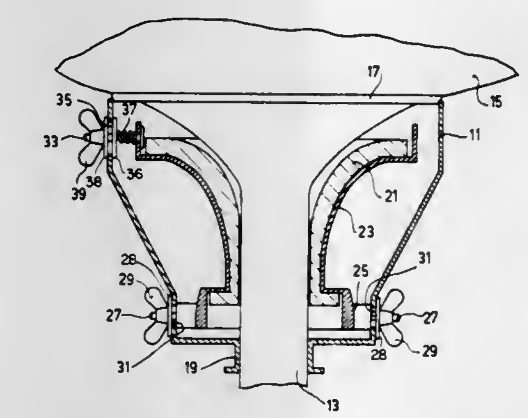
1. Apparatus for increasing the run-length of a digital signal comprising
an input terminal adapted to receive a first signal,
predicting means for providing a prediction of said first signal,
means responsive to said predicting means for supplying a reference signal,
means for comparing said first signal and said prediction to obtain a signal measure,
means responsive to said response signal for permuting said signal measure, and
means for extending said permuted signal measure to an output terminal.

4,060,835
VIEWING HEAD
David Paul Gdovin, Vestal, N.Y., assignor to The Singer Company, Binghamton, N.Y.
Filed Feb. 2, 1976, Ser. No. 654,106
Int. Cl.² H04N *5/74, 5/645*
U.S. Cl. 358—238 **10 Claims**



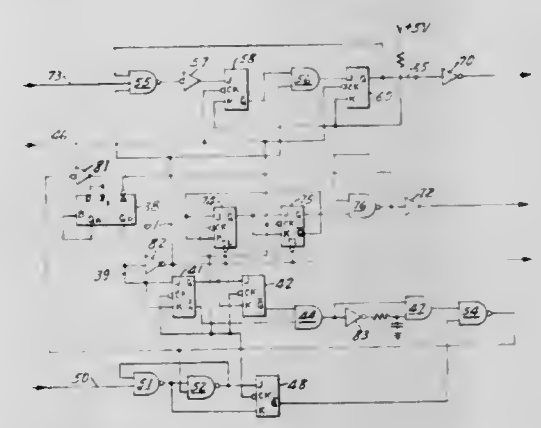
1. An improved display system and viewing head of the type which has a spherical mirror of radius r, a beamsplitter positioned between an observer and the center of said spherical mirror at approximately a 45° angle and an image projecting device located at a distance *r*/2 above said beamsplitter contained in a machined housing wherein the improvement comprises: a premachined base to accept a portion of said spherical mirror and said beamsplitter; means for mounting said spherical mirror to a predetermined location on said base; means for fastening said beamsplitter to a predetermined location on said base so that said beamsplitter will be positioned at approximately a 45° angle from the center of said spherical mirror; a first premachined side panel which is connected to said base; a second premachined side panel which is connected to said base; means for connecting the side edges of said spherical mirror to said first and second side panels; means for holding at predetermined locations the edges of said beamsplitter against said first and second panels; a premachined top panel having a hole, said top panel being able to accept a portion of said spherical mirror and said beamsplitter while being connected to said first and second side panels; means for attaching at predetermined locations said spherical mirror and said beamsplitter to said top panel and means for placing the screen of said device through said hole so that said device will be a distance of *r*/2 above said beamsplitter, whereby said beamsplitter, said spherical mirror and said image projecting device will be in optical alignment upon the assembly of said system, and an observer positioned in front of said beamsplitter will believe that the image appearing on the screen of said image projecting device is realistic and is coming from infinity.

4,060,836
TELEVISION DEFLECTION COIL UNIT
Peter H. J. Corbeij, and Tjitte Talsma, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.
Filed July 7, 1976, Ser. No. 703,220
Claims priority, application Netherlands, July 18, 1975, 7508613
Int. Cl.² H04N *3/16;* **H01F** *27/06*
U.S. Cl. 358—248 **3 Claims**



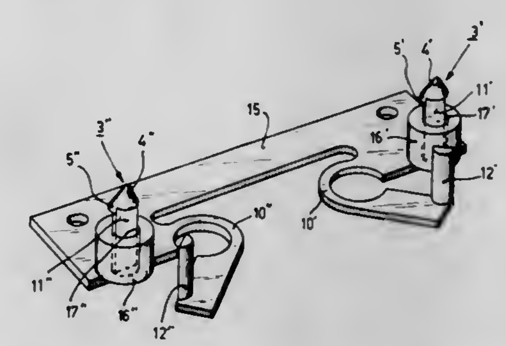
1. A deflection coil unit for a television display tube, said unit comprising a housing, a flared deflection yoke which is located within said housing, which housing is adapted to be secured to a display tube when the unit is mounted thereon, said yoke being capable of being displaced along its longitudinal axis which is adapted to substantially coincide with the longitudinal axis of a display tube, a ball joint means for mounting said yoke at its narrow end comprising first and second members each having a part spherical surface which cooperate to allow pivotal movement of said yoke about a plurality of axes, said first member being secured to said yoke, said second member being capable of being secured to said housing, and separate adjusting means for independently tilting said yoke about two mutually perpendicular transverse axes which extend perpendicular to the longitudinal axis of said yoke and which are situated at or adjacent the said narrow end of said yoke.

4,060,837
VARIABLE CELL WIDTH RECORDING
John L. Rynearson, Oakdale, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.
Filed Apr. 26, 1976, Ser. No. 680,055
Int. Cl.² G11B *5/02*
U.S. Cl. 360—44 **15 Claims**



1. Method of encoding binary numbers on a recording medium comprising the steps of:
1. generating alternate timing and data signals of first and second voltage levels, respectively, wherein each timing signal has a fixed time duration *t* and the data signals have variable time durations *x*, a first binary number is designated by $x = at$, a second binary number is designated by $x = abt$, and the absence of binary information is designated by $x > abct$, where *a* is a predetermined small number and each of *b* and *c* is a predetermined number appreciably exceeding one, and
2. serially recording the alternate timing and data signals along a track of the medium.

4,060,838
CENTERING PIN FOR CASSETTE APPARATUS
Jos Louis Hubert Meermans, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.
Filed Mar. 1, 1976, Ser. No. 662,454
Claims priority, application Netherlands, Mar. 14, 1975, 7503047
Int. Cl.² B65H *75/02*
U.S. Cl. 360—96 **5 Claims**



1. In a cassette-recording apparatus for use with a cassette having at least one centering opening having a centering edge and comprising a deck plate; at least one cassette-centering pin having a longitudinal axis disposed perpendicular to the plate, and having a base connected to the plate and a tip having a locally thickened portion; and resilient means for urging a portion of the pin and a centering edge of a cassette into engagement with one another, the improved centering pin consisting of a unitary molding wherein the pin is longitudinally split along at least part of its length such that the pin comprises a first part and a second part separated from each other by a longitudinal slit extending through the base of the pin, said first part being rigidly connected to said deck plate; and said resilient means comprises a resilient connection of the second part to the deck plate for pivotally urging said second part away

from said first part about an axis remote from and parallel to said longitudinal axis.

4,060,839

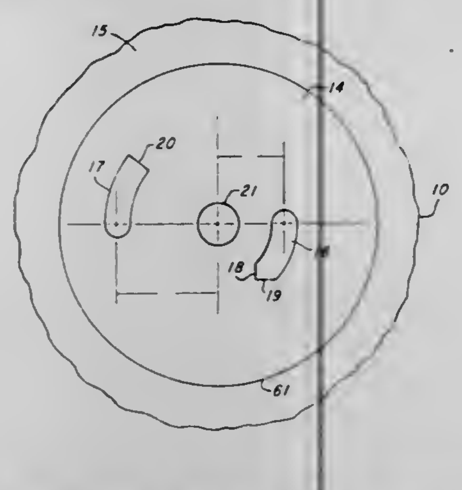
FLEXIBLE INFORMATION STORAGE DISC

Robert Alan Meadows, Richardson, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Jan. 7, 1976, Ser. No. 647,024

Int. Cl.² G11B *5/016, 5/82;* **G01D** *15/24;* **G11B** *3/60*

U.S. Cl. 360—99 **16 Claims**



1. A flexible information storage media comprising:

a sheet of flexible material including a central mounting portion extending radially outwardly from the approximate geometric center of said sheet,

and an outer body portion integral with the central mounting portion and concentric therewith, said outer body portion providing a surface area on which information may be recorded,

said central mounting portion being provided with at least first and second drive pin-receiving apertures disposed radially outwardly with respect to the approximate geometric center of said sheet and on opposite sides thereof,

said first and second apertures being respectively arcuately elongated in directions conforming to rotation of said sheet about its geometric center,

the leading end of said first arcuately elongated aperture being defined by a pair of straight edges angularly intersecting at an apex,

the leading end of said second arcuately elongated aperture being defined by a single straight edge,

the pair of intersecting straight edges of said central mounting portion bounding the leading end of said first aperture and the single straight edge of said central mounting portion bounding the leading end of said second aperture to provide three distinct drive pin abutment edges for a pair of drive pins with said edges being arranged in respectively different planes normal to the sheet.

4,060,840

RECORDING AND/OR REPRODUCING APPARATUS HAVING ADJUSTABLE TAPE GUIDE MECHANISM

Hiroyuki Umeda, Yokohama, Japan, assignor to Victor Company of Japan, Limited, Yokohama, Japan

Filed June 22, 1976, Ser. No. 698,497

Claims priority, application Japan, June 23, 1975, 50-84987[U]

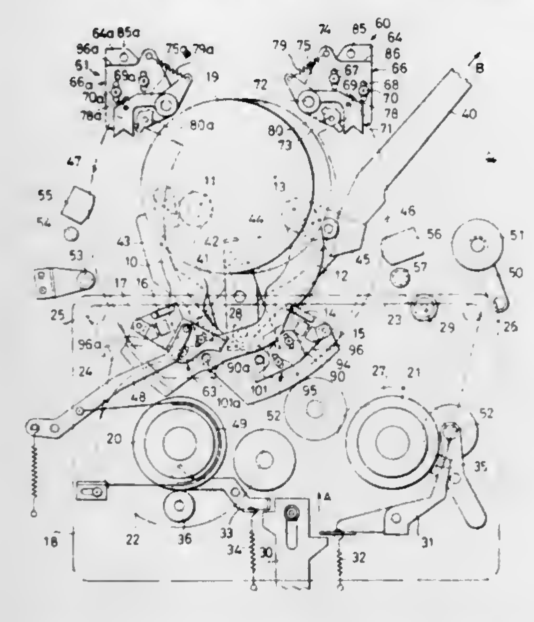
Int. Cl.² G11B *15/60, 15/66*

U.S. Cl. 360—130 **7 Claims**

1. In a recording and/or reproducing apparatus having a horizontal base plate, a guide drum including at least one head mounted to rotate in a plane within said drum, the cylindrical surface of said drum being inclined with respect to said base plate, recording tape disposed about a tape supply reel, the guide drum and a tape take-up reel in such a way that said tape defines a portion of a cylinder about said guide drum and the longitudinal center of said tape is disposed on substantially a single horizontal plane, and tape guide means for guiding the tape along a predetermined tape path, said tape guide means including a pair of height position guide means disposed respectively on the tape inlet side and on the tape outlet side of the cylindrical surface of said guide drum, a pair of guide poles disposed respectively between said height position guide means and said guide drum, each of said height position guide means having a pair of flanges for guiding the edges of said tape, each of said guide poles being inclined with respect to said base plate to convert between rectilinear and helical movements of said tape, the improvement in said tape guide means comprising:

first means for supporting one of said height position guide means;

first displacing means for causing the first support means and the supported height position guide means to be displaced horizontally and to change the distance between the guide drum and said one of the height position guide means, to



thereby adjust the height position of the tape on the guide drum;

first locking means for locking the first support means after the adjustment of said first displacing means;

a second means for supporting one of said guide poles between the guide drum and said one of the height position guide means;

second displacing means for causing the second supporting means and the supported guide pole to be rotatably displaced horizontally and to change the inclination of the pole with respect to the axis of said guide drum, to thereby adjust the uniformity of tape tension across the width of the tape on and in the vicinity of the guide drum; and

second locking means for locking the second supporting means after the adjustment of said second displacing means.

4,060,841

MOTOR PROTECTOR FOR THREE-PHASE MOTORS

Ernest Duane Allen, Box 426, Hudson, Colo. 80642

Filed Apr. 19, 1976, Ser. No. 678,398

Int. Cl.² H02H *7/09*

U.S. Cl. 361—33 **6 Claims**

1. A motor protector for a three-phase electric motor supplied electric power from a three-phase electric power supply through a motor control circuit, said motor protector comprising:

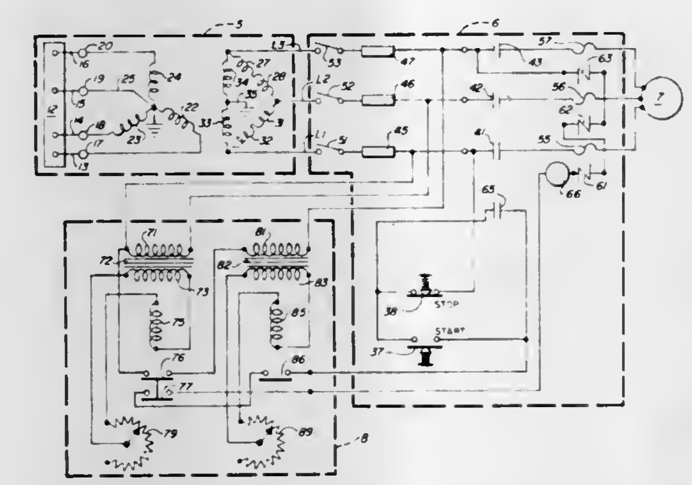
a first sensing step-down transformer having a first primary winding energized by the voltage across a first phase of said power supply and having a first secondary winding in which a first secondary voltage is induced from said first primary winding;

a first relay having a first AC coil in a first series circuit with a first variable resistor and said first secondary winding and having a first set of contacts and a second set of contacts;

a second sensing step-down transformer having a second

primary winding energized by the voltage across a second phase of said power supply through said first set of contacts and having a second secondary winding in which a second secondary voltage is induced from said second primary winding; and

a second relay having a second AC coil in a second series circuit with a second variable resistor and said second secondary winding electrically independent of said first series circuit and having a third set of contacts, said second and third sets of contacts arranged for controlling the power to said motor control circuit so that when there is a failure in the power supply that reduces the electric voltage across said first phase below a predetermined amount the electric power is disconnected from said second primary winding and removed from said motor and when there is a failure in the power supply that reduces the electric voltage across said second phase below a predetermined amount the electric power is removed from said motor,



each of said first and second AC coils having a threshold voltage a selected amount of voltage less than the normal sensed voltage in the associated secondary winding above which the power is maintained and below which the electric power is removed from said electric motor,

each said variable resistor having a maximum relay coil voltage setting, a threshold relay coil voltage setting and a range of intermediate relay coil voltage settings between said threshold and maximum settings, the maximum relay coil voltage setting requiring the greatest amount of sensed phase voltage decrease to actuate the associated relay with less sensed phase voltage decrease necessary as the associated relay coil voltage settings approach the threshold voltage setting so that a lesser reduction in sensed phase voltage is required to actuate the associated relay coil as the settings approach the threshold voltage setting, thereby increasing the sensitivity of the associated relay to decrease in associated phase voltages.

4,060,842

COMBINED MUTUAL DRAINAGE REACTOR AND GROUNDING RELAY

Gordon Y. R. Allen, 4 Ireland Court, Islington, Ontario, Canada

Filed Feb. 24, 1976, Ser. No. 661,005

Int. Cl.² H02H *3/22*

U.S. Cl. 361—56 **8 Claims**

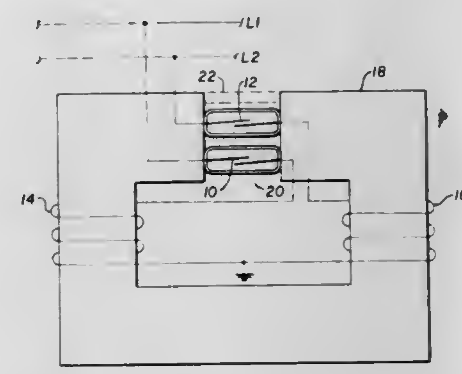
1. A combined mutual drainage reactor and grounding relay for overvoltage protection of a two-wire communication system, which comprises:

a magnetic core, at least a portion of which includes a uniform air gap;

a pair of coils inductively coupled by the magnetic core, each having the same number of turns; and

a pair of magnetically-operated, normally open, single-pole, single-throw, gas-filled reed switches, each having approximately the same voltage breakdown characteristics between its open contacts, and each switch requiring approximately the same minimum magnetic field strength for closure, both switches being disposed in said air gap of said magnetic core,

wherein each coil is connected in series with a correspond-



ing one of said switches across one of the two communication lines to ground, so that a voltage applied across one of said coils will induce an approximately equal voltage across the other of said coils.

4,060,843

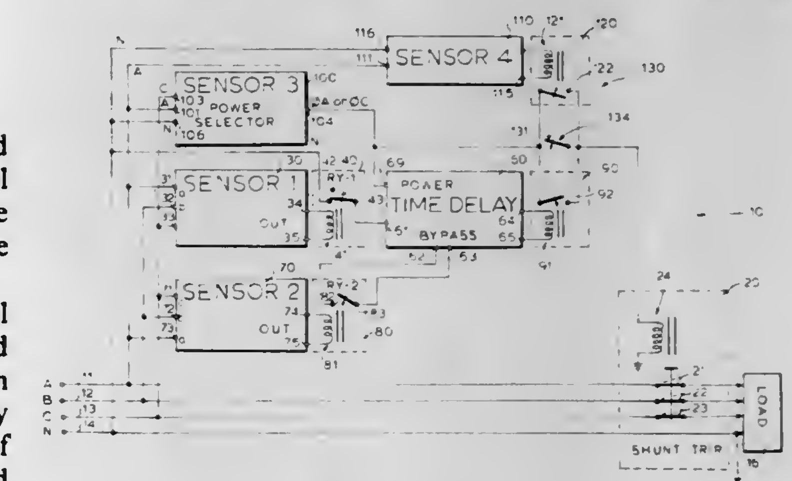
PROTECTION CIRCUIT FOR MULTIPLE PHASE POWER SYSTEMS

Charles H. Bost, Rte. 3, Box 43-A, Winter Haven, Fla. 33880

Continuation-in-part of Ser. No. 516,464, Oct. 21, 1974, abandoned. This application Mar. 25, 1976, Ser. No. 670,121

Int. Cl.² H02H *3/24*

U.S. Cl. 361—76 **10 Claims**



1. A protection circuit for use with circuit breaker means for electrical apparatus operated by multiple phase, alternating current power systems characterized by a plurality of electrical distribution lines for transmitting electrical energy, the electrical energy in said lines having a spaced phase relationship, wherein said protection circuit comprises:

first sensing means coupled to said lines for generating a first signal responsive to detecting an undesirable phase imbalance between two or more of said lines, and detecting a low voltage on one of said lines, and detecting a low voltage on more than one of said lines;

second sensing means coupled to said lines for detecting a phase reversal between two or more of said lines, said second sensing means initiating a second signal responsive thereto;

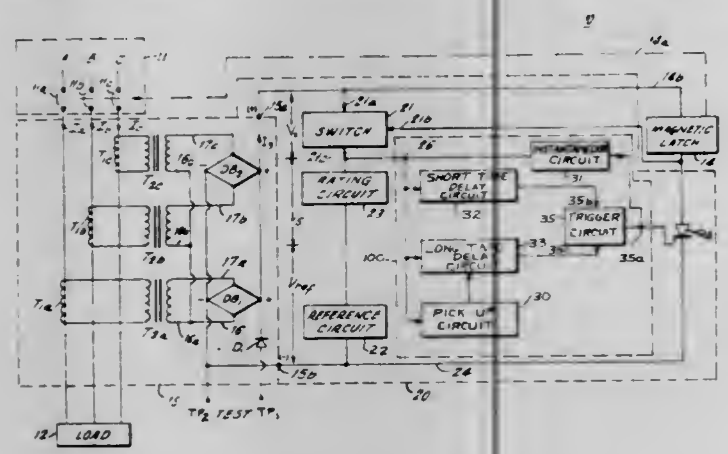
circuit breaker operating means coupled to said second sensing means for operating said circuit breaker means responsive to said second signal;

time delay means operably coupled between said first sensing means and said circuit breaker operating means, said time delay means for initiating said second signal responsive to said first signal being received for a predetermined period of time; and

power selector means coupled to at least two of said lines for supplying a power output from a priority one of said lines to said circuit breaker operating means, with said power

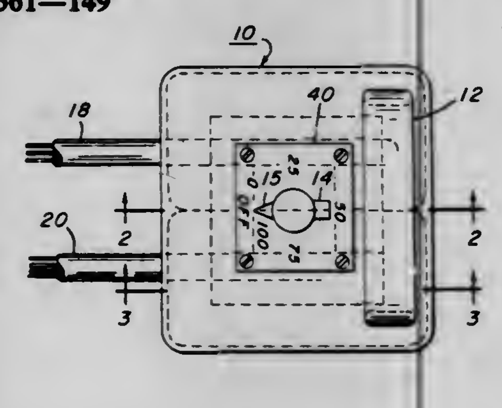
selector means selecting another one of said lines responsive to a loss of power on said priority line.

4,060,844
SOLID STATE TRIPPING CIRCUIT
Lee Davis, Audubon, N.J., and Peter Pang, Hong Kong, Hong Kong, assignors to I-T-E Imperial Corporation, Spring House, Pa.
Filed Feb. 17, 1976, Ser. No. 658,354
Int. Cl.² H02H *3/08*
U.S. Cl. 361—96 **12 Claims**



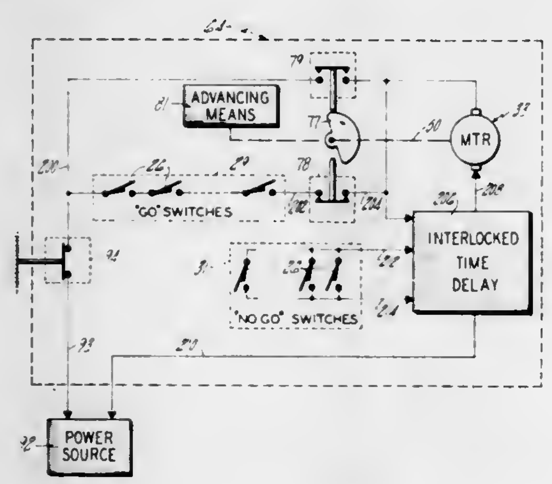
1. Apparatus for interrupting a current flowing in a circuit having a normal rated current, comprising:
means for interrupting the continuity of said circuit;
means coupled to said circuit for generating a signal current proportional to a peak of said circuit current;
timing circuit means responsive to said signal current for generating a trigger signal responsive to a predetermined relationship between the magnitude of said signal current and a time duration which said signal current is present;
actuating means responsive to said trigger signal for actuating said circuit continuity interrupting means to terminate current flow in said circuit; and
electronic switch means for applying at least a portion of said signal current to said timing circuit means prior to the generation of said trigger signal and for applying at least a portion of said signal current to said actuating means after the generation of said trigger signal whereby said timing circuit means is powered by said signal current prior to the generation of said trigger signal and said actuating means is powered by said signal current after the generation of said trigger signal.

4,060,845
PORTABLE DEMAGNETIZER
Paul E. Bowers, Marengo, and Mukund A. Phadke, Crystal Lake, both of Ill., assignors to The Arnold Engineering Company, Marengo, Ill.
Filed Mar. 25, 1976, Ser. No. 670,288
Int. Cl.² H01F *13/00*
U.S. Cl. 361—149 **10 Claims**



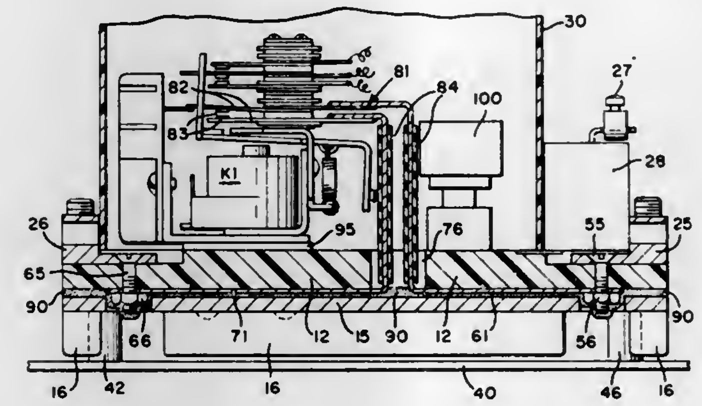
1. A portable demagnetizer comprising a housing, a demagnetizing head in said housing including at least one coil, means for supplying an alternating current potential to said coil, means for varying the magnitude of said alternating current potential from a maximum of the supplied potential to a predetermined minimum whereby to reduce the magnitude of the voltage potential applied to said demagnetization head and thereby reduce the magnitude of the magnetic field of said demagnetization head, and a control circuit for operating said varying means to apply a step-less alternating current power to aid demagnetization head for each variation of said varying means, said control circuit including a power control cord leading to said housing and means supported by said housing for operating said control circuit.

4,060,846
HIGH SECURITY LOCK
Michael L. Conn, San Jose, Calif., assignor to United Technologies Corporation, Hartford, Conn.
Filed July 20, 1976, Ser. No. 707,133
Int. Cl.² E05B *49/02*
U.S. Cl. 361—193 **4 Claims**



1. An improved electromagnetic locking apparatus of the type which includes a lock portion and a removable key portion, the key portion providing a determined unlocking combination signal, the lock portion having an electromotive device for providing a desired unlocking function in response to an unlock voltage signal presented through a switch contact arrangement provided by selective activation of a plurality of switches in response to the placement of the key portion on a determined surface location of the lock portion coincident with presentation of the determined unlocking combination signal, the plurality of switches including at least one switch for providing a signal manifestation in response to the proximate placement of the key portion within the determined surface location of the lock portion, wherein the improvement comprises:
time delay means, responsive to the unlock voltage signal and to the signal manifestation, for providing, at the end of a determined time interval following presentation of the unlock voltage signal, a gate signal in response to the simultaneous presence of the unlock voltage signal and the signal manifestation during the determined time interval; and
switch means, interconnected between the switch contact arrangement provided by the plurality of switches and the electromotive device, and selectively operable in a first state or a second state in response to the presence or absence of the gate signal from said timing means, said switch means presenting the unlock voltage signal to the electromotive device when operated in the first state in response to the presence of a gate signal, said switch means not presenting the unlock voltage signal to the electromotive device when operated in a second state in response to the absence of a gate signal.

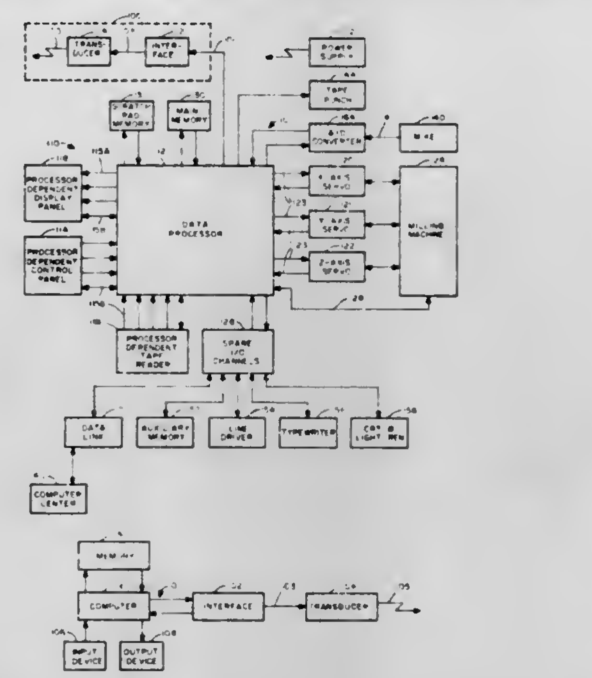
4,060,847
COOLING ARRANGEMENT FOR ELECTRICAL POWER CONTACTOR
John K. Penrod, Bellbrook, Ohio, assignor to Power Management Corporation, Dayton, Ohio
Filed Mar. 11, 1976, Ser. No. 666,164
Int. Cl.² H05K *7/20*
U.S. Cl. 361—387 **4 Claims**



1. Electrical apparatus including
a housing containing electrical components some of which produce heat during operation, said housing including a cover member and a base member having a top surface on which is mounted said cover member and a bottom surface;
electrical connection means mounted on said housing,
means forming at least one elongated recess in the bottom of said base member;
at least one electrically and thermally conducting element having a portion thereof extending into the interior of said housing where it is in electrical and thermal contact with said electrical components and another portion thereof extending from said housing through said recess to said electrical connection means; and
thermally conductive but electrically insulative means filling said recess between said element and the bottom surface of said base member whereby the bottom surface of said base member may be placed in contact with heat sink means and the heat carried by said element dissipated into said heat sink means without electrical contact therewith.

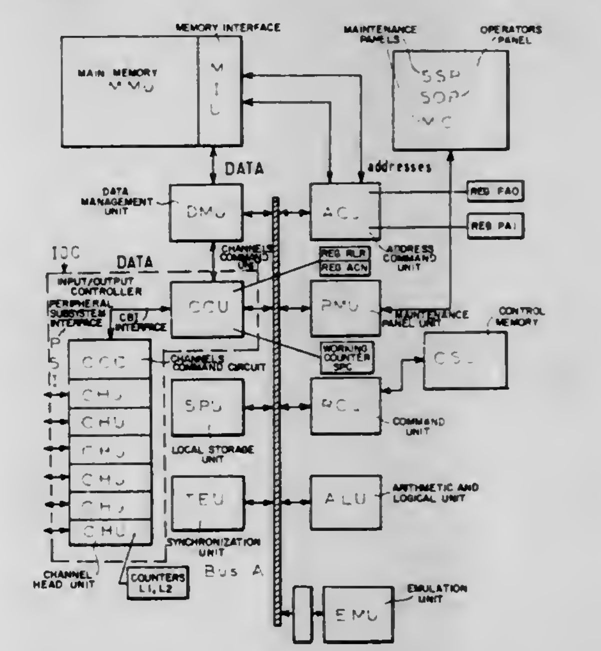
4,060,848
ELECTRONIC CALCULATOR SYSTEM HAVING AUDIO MESSAGES FOR OPERATOR INTERACTION
Gilbert Peter Hyatt, P.O. Box 4584, Anaheim, Calif. 92803
Continuation-in-part of Ser. No. 101,881, Dec. 28, 1970. This application Jan. 22, 1973, Ser. No. 325,941
Int. Cl.² G06F *3/16*
U.S. Cl. 364—200 **4 Claims**

1. A data processing system comprising:
operator actuable input means for generating at least one input signal;
stored program computer means for processing digital speech information under control of a stored program in response to the input signal; said computer means comprising memory means for storing digital information; said memory means comprising a first memory portion for storing the program wherein said stored program includes a plurality of computer instructions and said memory means further comprising a second memory portion for storing the digital speech information; and said computer means further comprising means for generating at least one output signal related to a speech message in response to the processing of the stored digital speech information; and
speech means for generating a speech message in response to the output signal; said speech means comprising signal conditioning means for generating a conditioned signal in response to the output signal and sound transducer means



for generating the speech message in response to the conditioned signal.

4,060,849
DATA INPUT AND OUTPUT CONTROLLER
Jacques Michel Jean Bienvenu, Paris; Jean-Claude Marcel Cassonnet, Conflans-Ste-Honorine, and Marc Michel Appell, Paris, all of France, assignors to Compagnie Internationale pour l'Informatique Cii-Honeywell Bull, Paris, France
Filed Oct. 28, 1975, Ser. No. 626,220
Int. Cl.² G06F *3/00*
U.S. Cl. 364—200 **7 Claims**



1. An input/output control system for an information processing system, comprising a main memory, a central processing unit having an input, a peripheral controller, and a plurality of peripheral units, each coupled to said central processing unit by said peripheral controller, said input/output control system comprising:
a. a plurality of physical channels disposed between said peripheral controller and said input to said central processing unit;
b. a plurality of logical channels for communicating information with said central processing unit, each of said logical channels being uniquely associated with one of said peripheral units and identified uniquely by a channel number;
c. said main memory comprising means for storing a first table including a number of physical channel entries con-

taining in formation relative to said plurality of physical channels and a second table including a number of logical channel entries each containing information relative to one of said plurality of peripheral units, the number of logic channel entries of said second table enabling access to the information contained therein, each physical channel entry corresponding to one of said logical channel tables; and

d. means for storing a channel control program comprising command words for data transfer, said input/output control system executing the channel control programs to selectively transfer data between said main memory and peripheral controller, by connecting said input/output control system to a logical channel entry and placing the identifying number of its logical channel in said means for storing to await execution.

4,060,850

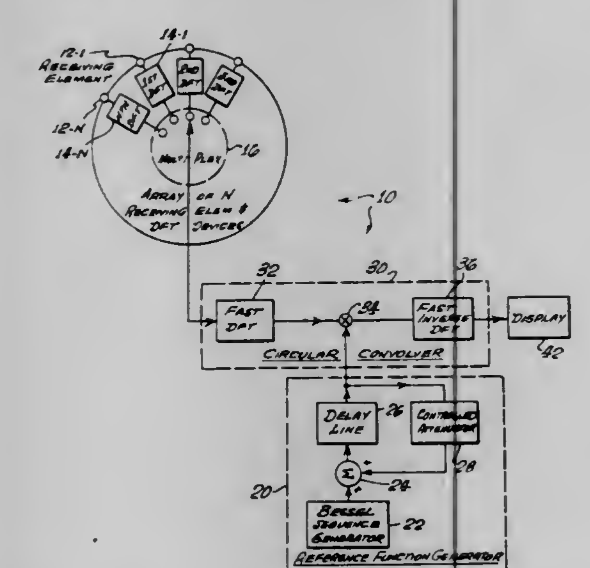
BEAM FORMER USING BESSEL SEQUENCES

Jeffrey M. Speiser, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 25, 1977, Ser. No. 791,132

Int. Cl.² G06G *7/19;* **G06F** *15/34*

U.S. Cl. 364—819 **12 Claims**



1. A beam former, to be used with a circular array of N signal receiving elements, N≧3, comprising:

an array of N discrete Fourier transform (DFT) devices, each one connected to one of the receiving elements, for taking a temporal discrete Fourier transform of the signals at each of the N receiving elements;

means connected to the array of DFT devices, for connecting sequentially to each of the N devices;

a reference function generator, which generates the sequence of terms

$$G_n = \sum_{p=-M}^{M} J_{n+pN}(x),\ n = 0, 1, \ldots, N-1,$$

where the argument x is equal to the number of wavelengths in the circumference of the circular array at the frequency being processed; and

means connected to the connecting means and to the reference function generator, for circularly convolving the signals received from the connecting means and the function generator.

4,060,851

CONTROL SYSTEM OF A NUMERICAL CONTROL UNIT

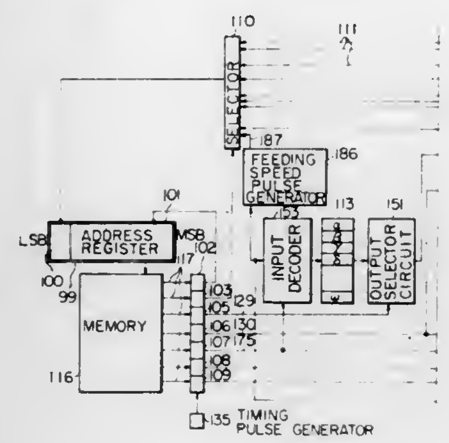
Kazuo Nakatsukasa; Kazuo Murata; Tetsuo Ohkubo; Masayoshi Yurugi, and Shinobu Takahashi, all of Tokyo, Japan, assignors to Oki Electric Industry Co., Ltd., Tokyo, Japan

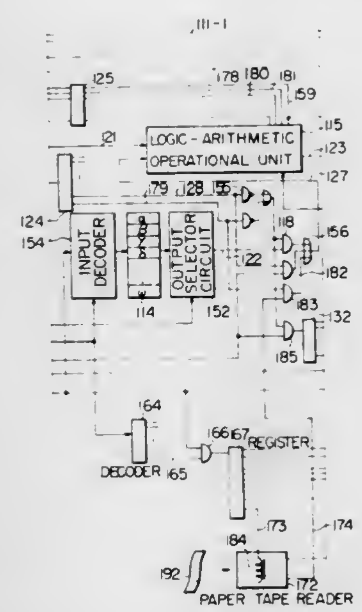
Filed July 10, 1975, Ser. No. 594,737

Claims priority, application Japan, July 15, 1974, 49-80238

Int. Cl.² G06F *9/20, 15/46*

U.S. Cl. 364—900 **3 Claims**





1. A control system of a numerical control unit for use in controlling a machine tool having a plurality of control switches associated thererwith, said control system comprising:

a digital memory for storing a control instructions program;

means for reading out for execution control instructions of said control instructions program, from said digital memory;

a plurality of memory registers responsive to said means for reading out for storing a plurality of said control instructions;

a plurality of register groups for storing sets of data for numerical control;

at least one selector circuit connected between particular memory registers and a particular register group for selectively transferring data to a said particular register group;

a logic arithmetic operational unit for selectively receiving data from particular portions of said register groups and for carrying out arithmetic operation in accordance with instructions in the memory registers;

servo mechanism means connected to the output of said logic arithmetic operational circuit and memory registers for controlling said machine tool in accordance with instructions in the memory registers;

an address register for providing address information to said memory;

and a selector means responsive to said arithmetic operational unit and being further responsive to the condition of signals and switches in said machine tool for determining in combination with the information stored in a particular one of said memory registers, the address of the control instructions to be next executed.

DESIGNS

NOVEMBER 29, 1977

246,486

FLUID FILLED INSOLE FOR FOOTWEAR

John Wesley Nickel, 18201 Impala Drive, Tustin, Calif. 92680

Filed Jan. 28, 1976, Ser. No. 653,221

Term of patent 14 years

Int. Cl. D2—*04*

U.S. Cl. D2—318

246,487

BELT PACK FOR A VETERINARIAN OR THE LIKE

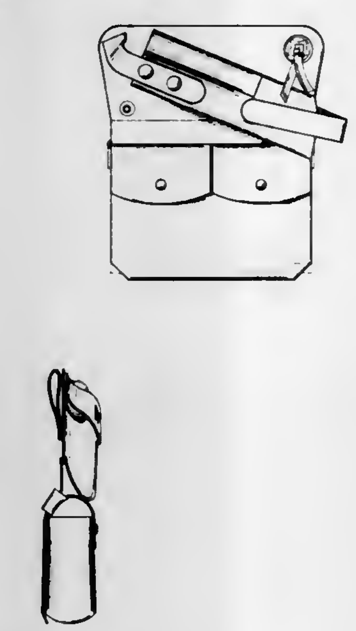
Robert Waters, R.R. 1, New Albin, Iowa 52160

Filed Mar. 8, 1976, Ser. No. 664,701

Term of patent 14 years

Int. Cl. D2—*07*

U.S. Cl. D2—400



246,488

BUCKLE

Jacques Zimmerman, Saint-Cloud, France, assignor to Les Must de Cartier-France, Paris, France

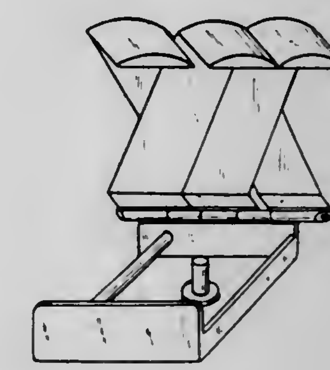
Filed Feb. 20, 1976, Ser. No. 659,635

Claims priority, application France, Aug. 22, 1975, 74.130

Term of patent 14 years

Int. Cl. D2—*07*

U.S. Cl. D2—427



246,489

COMBINED TOOTHBRUSH HOLDER AND PILL DISPENSER

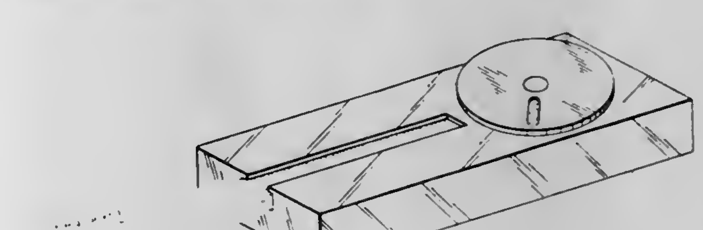
David Lynn Cunningham, 7502 W. 10th Ave., Apt. 2, Lakewood, Colo. 80215

Filed Dec. 4, 1975, Ser. No. 637,870

Term of patent 14 years

Int. Cl. D4—*02;* **D9—***03*

U.S. Cl. D4—18



246,490

COMBINED CHAIR AND COLLAPSIBLE TABLE UNIT

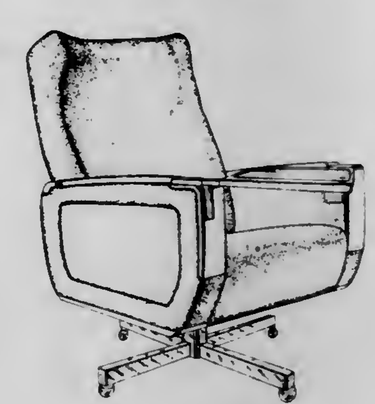
Clement P. DuFresne, Winston-Salem, N.C., assignor to Fairchild Industries, Inc., Germantown, Md.

Filed Aug. 15, 1975, Ser. No. 605,017

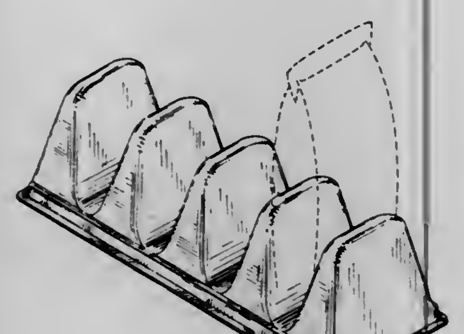
Term of patent 14 years

Int. Cl. D6—*05*

U.S. Cl. D6—31



246,491
TRAY FOR DISPLAY AND STORAGE OF FLEXIBLE BAGS
Herbert Fred D'Alo, Oakwood Hills-Cary, Ill., assignor to Abbott Laboratories, North Chicago, Ill.
Filed Jan. 12, 1976, Ser. No. 648,062
Term of patent 14 years
Int. Cl. D6—*04*; D20—*02*
U.S. Cl. D6—188

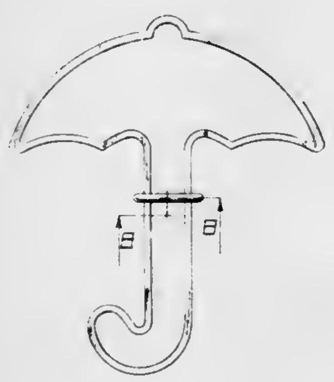


246,492
SEAT
Pierre Roset, Montagnieu, France, assignor to Roset S.A., Briord, France
Filed Aug. 6, 1976, Ser. No. 712,292
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—37

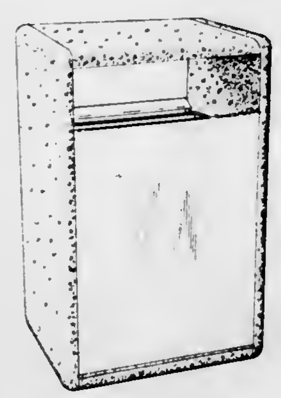
246,493
COUCH FRAME
Werner Blaser, Bottmingen, Switzerland, assignor to Dasu Anstalt, Vaduz, Liechtenstein
Filed Mar. 21, 1975, Ser. No. 560,633
Claims priority, application Hague, Sept. 25, 1974, 59491/70
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—191

246,494
CUP OR SIMILAR ARTICLE
George B. Jensen, Syracuse, N.Y., assignor to Syracuse China Corporation, Syracuse, N.Y.
Filed June 25, 1975, Ser. No. 590,142
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—9

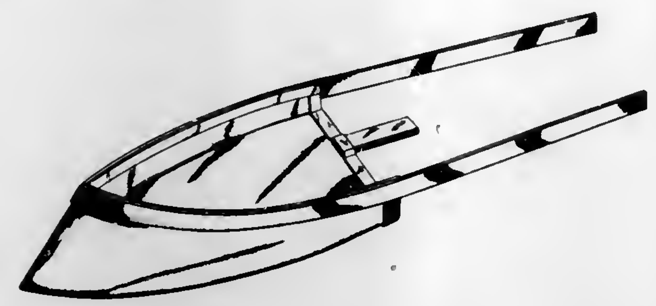
246,495
COOKIE CUTTER
Paula J. Montano, 56 Clark St., New Haven, Conn. 06511
Filed Mar. 26, 1976, Ser. No. 670,884
Term of patent 14 years
Int. Cl. D7—*04*
U.S. Cl. D7—43



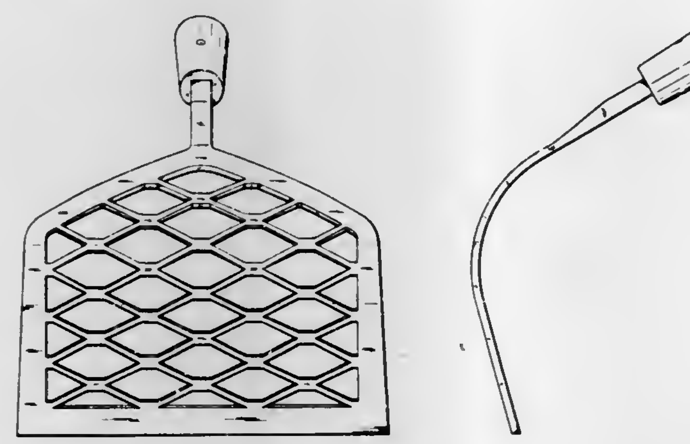
246,496
LITTER RECEPTACLE
Harald Weckwerth, 1775 NW. Mall St., Issaquah, Wash. 98027
Filed Feb. 17, 1976, Ser. No. 658,388
Term of patent 14 years
Int. Cl. D7—*05*
U.S. Cl. D7—189



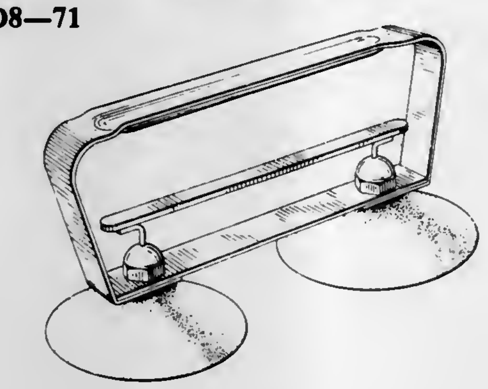
246,497
IRON COVER
Manabu Toyosawa, 2-2-4, Nakano, Nakano, Tokyo, Japan
Filed Jan. 30, 1976, Ser. No. 653,702
Term of patent 14 years
Int. Cl. D7—*05*
U.S. Cl. D7—205



246,498
BLADE FOR A MORTAR HOE
John Polc, 18 Hemlock St., Bairdford, Pa. 15006
Filed Jan. 23, 1976, Ser. No. 651,807
Term of patent 14 years
Int. Cl. D8—*01*
U.S. Cl. D8—11

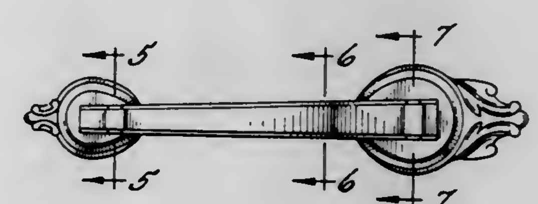


246,499
MATERIALS HANDLING DEVICE
Lance K. Poulsen; Richard D. Miller, both of Racine, Wis., and Robert D. Flinn, Highland Park, Ill., assignors to Rajo Motor & Manufacturing Company, Racine, Wis.
Filed Aug. 9, 1976, Ser. No. 712,731
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D8—71



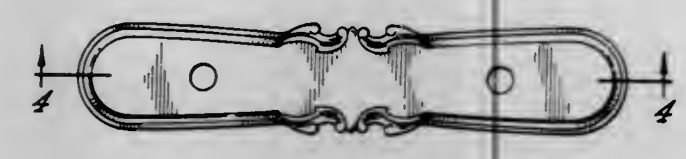
246,500
MATERIALS HANDLING DEVICE
Lance K. Poulsen; Richard D. Miller, both of Racine, Wis., and Robert D. Flinn, Highland Park, Ill., assignors to Rajo Motor & Manufacturing Company, Racine, Wis.
Filed Aug. 9, 1976, Ser. No. 712,732
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D8—71

246,501
PULL
LaVerne E. Clayton, Rockford, Ill., assignor to Amerock Corporation, Rockford, Ill.
Filed Dec. 1, 1976, Ser. No. 746,469
Term of patent 14 years
Int. Cl. D8—*06*
U.S. Cl. D8—320

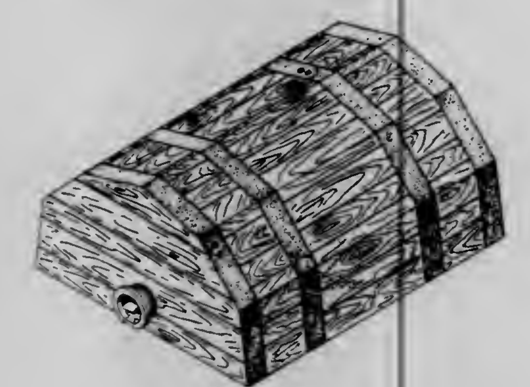


246,502
ESCUTCHEON FOR A KNOB
LaVerne E. Clayton, Rockford, Ill., assignor to Amerock Corporation, Rockford, Ill.
Filed Dec. 1, 1976, Ser. No. 746,470
Term of patent 14 years
Int. Cl. D8—*09*
U.S. Cl. D8—352

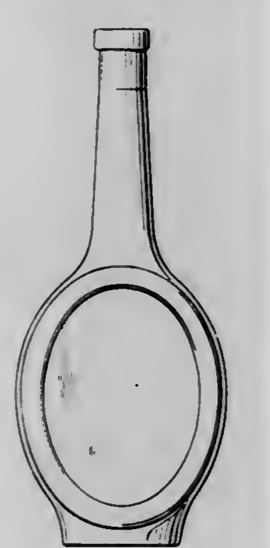
246,503
ESCUTCHEON
LaVerne E. Clayton, Rockford, Ill., assignor to Amerock Corporation, Rockford, Ill.
Filed Dec. 1, 1976, Ser. No. 746,522
Term of patent 14 years
Int. Cl. D8—*09*
U.S. Cl. D8—352



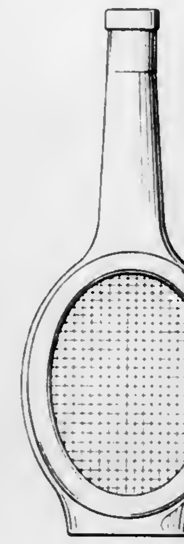
246,504
BEVERAGE CONTAINER
Gary F. Anger, 2050 Southwest Expr., San Jose, Calif. 95126, and Joseph C. Sesnak, 2309 Price Way, San Jose, Calif. 95124
Filed Mar. 22, 1976, Ser. No. 669,227
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—28



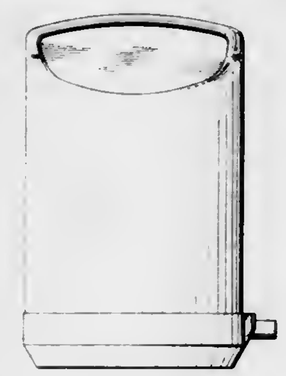
246,505
BOTTLE
John Paul Veasy, Alameda, Calif., assignor to Owens-Illinois, Inc.
Filed Dec. 18, 1975, Ser. No. 642,091
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—137



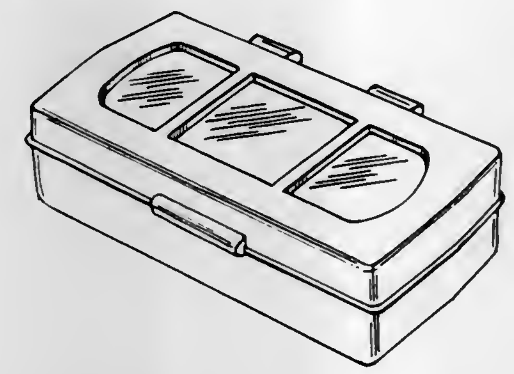
246,506
BOTTLE
John Paul Veasy, Alameda, Calif., assignor to Owens-Illinois, Inc.
Filed Dec. 18, 1975, Ser. No. 642,092
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—137



246,507
CONTAINER FOR LIQUIDS
David Charles Danielson, Rowayton, Conn., assignor to International Business Machines Corporation, Armonk, N.Y.
Filed Mar. 1, 1976, Ser. No. 662,661
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—175

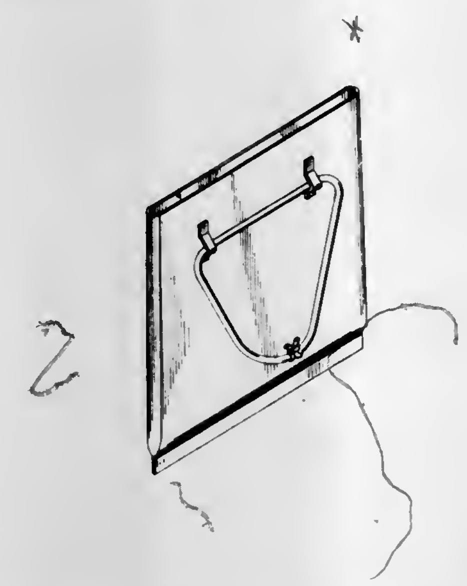


246,508
PILL BOX
Arthur A. Nudell, 3821 Sugar Loaf Lane, Skokie, Ill. 60076
Filed May 12, 1975, Ser. No. 576,569
The portion of the term of this patent subsequent to Aug. 27, 1988, has been disclaimed.
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—183

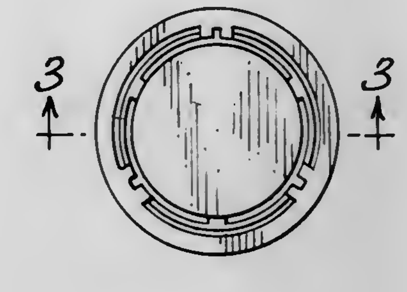


246,509
TOOTHPASTE TUBE
Sidney Hytken, 3210 Beals Branch Road, Louisville, Ky. 40206
Filed June 12, 1975, Ser. No. 586,499
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—194

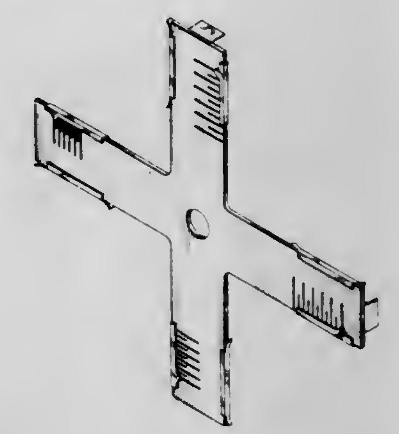
246,510
PLASTIC BAG
Spencer B. T. Lin, 3F, No. 5, Lane 4 Chin Chou St., Taipei, China /Taiwan
Filed Oct. 20, 1975, Ser. No. 623,611
Term of patent 14 years
Int. Cl. D9—*05*
U.S. Cl. D9—249



246,511
CONTAINER CLOSURE
Sidney M. Libit, 441 Lakeside Terrace, Glencoe, Ill. 60022
Filed June 2, 1975, Ser. No. 582,918
Term of patent 14 years
Int. Cl. D9—*07*
U.S. Cl. D9—267

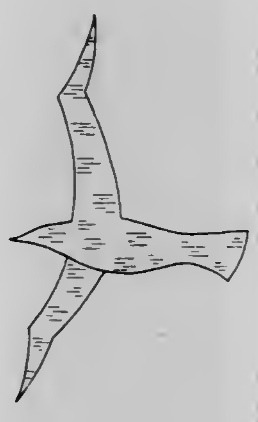


246,512
BRAKE LINING GAUGE
Frederick R. McFarland, and Walter L. Diffenderfer, both of Lancaster, Pa., assignors to K-D Manufacturing Company, Lancaster, Pa.
Filed Jan. 20, 1976, Ser. No. 650,704
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—64



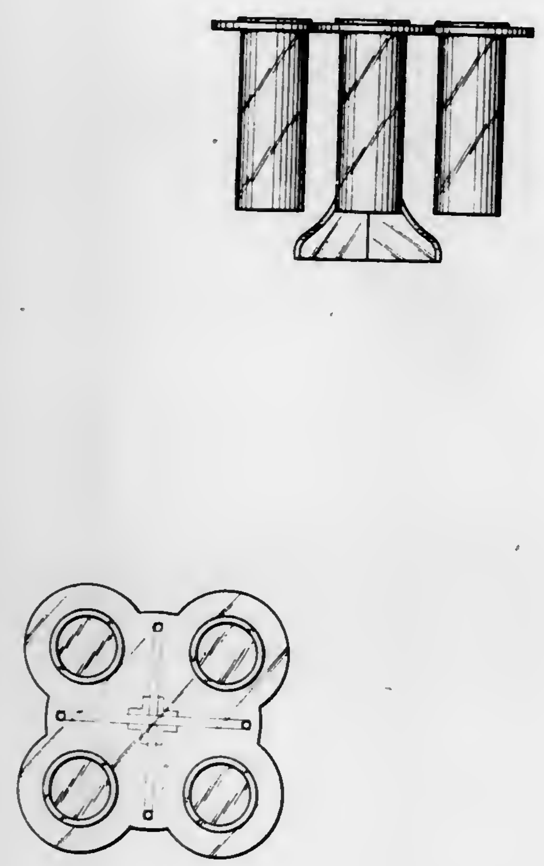
246,513
PERMANENT LAND SURVEY MARKER
Joseph Laureat Garneau, 1205 Ernest Lavigne St., Sillery, Quebec, Canada
Filed Aug. 23, 1973, Ser. No. 390,800
Term of patent 14 years
Int. Cl. D10—*99*
U.S. Cl. D10—66

246,514
HANDS FOR A TIMEPIECE
Barbara S. Honegger, 2340 Williams St., Palo Alto, Calif. 94306
Filed Mar. 15, 1976, Ser. No. 666,785
Term of patent 14 years
Int. Cl. D10—*07*
U.S. Cl. D10—127

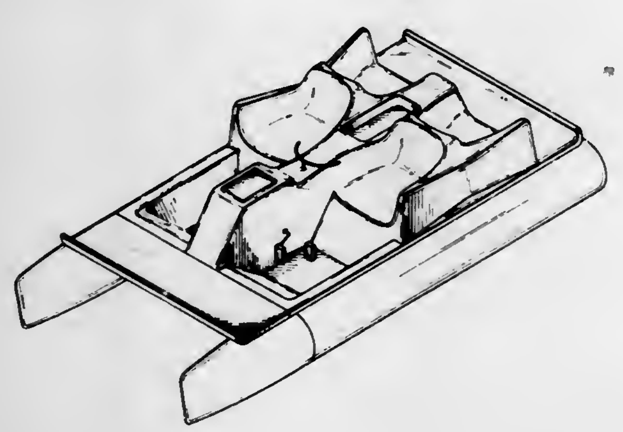


246,515
FINGER RING SETTING
Stanley M. Rosenfeld, 467 Kelton St., Los Angeles, Calif. 90024
Filed Nov. 29, 1976, Ser. No. 745,788
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D11—36

246,516
PLANTER
Edward A. Wagschal, 21 E. 62nd St., New York, N.Y. 10021
Filed May 24, 1976, Ser. No. 689,486
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D11—147



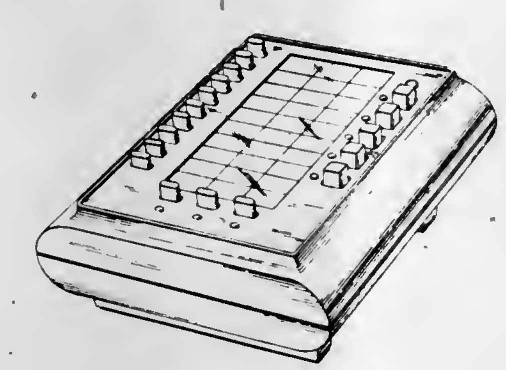
246,517
BOAT
Robert John Deputy, 4004 Forest Lane, Elkhart, Ind. 46514
Filed Aug. 19, 1976, Ser. No. 715,924
Term of patent 14 years
Int. Cl. D12—*06*
U.S. Cl. D12—68



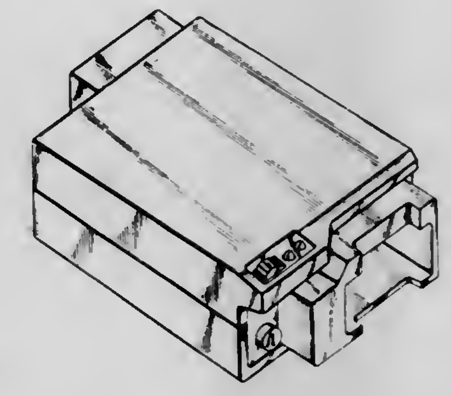
246,518
BABY CARRIAGE
Owen Finlay Maclaren, Barby, near Rugby, England, assignor to Gannet Holdings Limited, St. Peter Port, Guernsey (Channel Islands)
Filed Mar. 5, 1976, Ser. No. 664,310
Claims priority, application United Kingdom, Nov. 3, 1975, 973092/75
Term of patent 14 years
Int. Cl. D12—*12*
U.S. Cl. D12—128

246,519
HEAD PHONE
Ken Kato, Tokyo, Japan, assignor to Sansui Electric Co., Ltd., Tokyo, Japan
Filed Feb. 23, 1976, Ser. No. 660,561
Claims priority, application Japan, Aug. 22, 1975, 50-34320
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—36

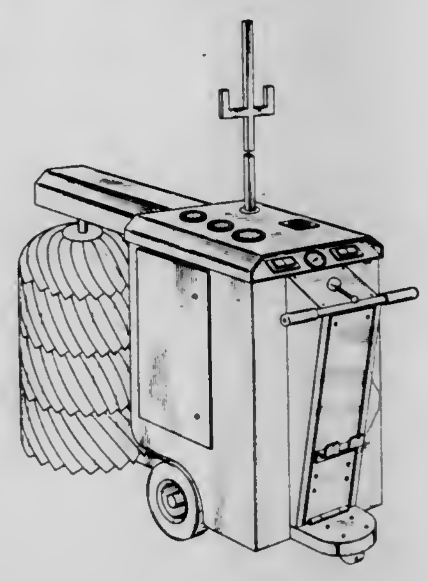
246,520
SUBSCRIBER TERMINAL CONSOLE
James Lee Fischer, Upper Arlington, Ohio, and George Payne, Bedford Hills, N.Y., assignors to Warner Cable Corporation, New York, N.Y.
Filed May 11, 1976, Ser. No. 685,289
Term of patent 14 years
Int. Cl. D14—*99*
U.S. Cl. D14—45



246,521
VEHICULAR COMMUNICATION CONVERTER APPARATUS OR SIMILAR ARTICLE
Donald Krumin, and Arnold Goldman, both of Fort Lauderdale, Fla., assignors to Motorola, Inc., Schaumburg, Ill.
Filed July 28, 1975, Ser. No. 599,902
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—68



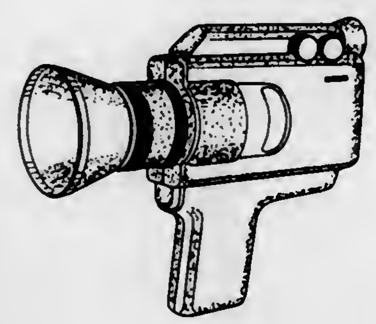
246,522
VEHICLE POLISHING APPARATUS
John H. Krimm, 7614 S. Gessner St., Apt. 145, Houston, Tex. 77036
Filed May 14, 1976, Ser. No. 686,558
Term of patent 14 years
Int. Cl. D15—*05*
U.S. Cl. D15—37



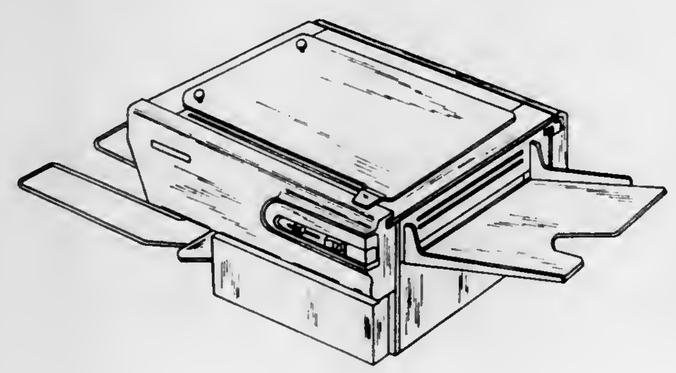
246,523
COMBINED CARPET CLEANING WAND AND HEAD THEREFOR
Robert N. Bartlett, Denver, Colo., Assignor to Windsor Industries, Inc., Denver, Colo.
Filed May 12, 1975, Ser. No. 576,563
Term of patent 14 years
Int. Cl. D15—*05*
U.S. Cl. D15—63

246,524
CUTTING TOOL
Olley C. Lauber, 604 N. Defiance St., Archbold, Ohio 43502
Filed Aug. 19, 1976, Ser. No. 715,671
Term of patent 14 years
Int. Cl. D15—*09*
U.S. Cl. D15—139

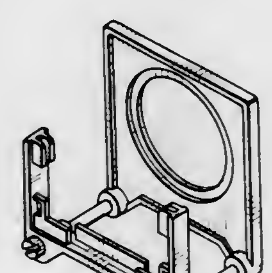
246,525
MOTION PICTURE CAMERA
Norbert Schlagheck, and Herbert Schultes, both of Furstenfeldbruck, Germany, assignors to AGFA-Gevaert AG, Leverkusen, Germany
Filed Apr. 14, 1976, Ser. No. 676,914
Claims priority, application Germany, Oct. 20, 1975, 5460106
Term of patent 14 years
Int. Cl. D16—*01*
U.S. Cl. D16—04



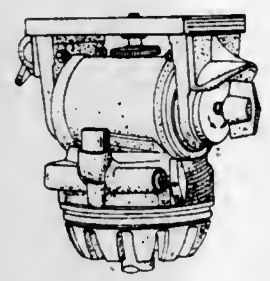
246,526
ELECTROPHOTOGRAPHICAL DUPLICATOR
Shigeru Kurozumi, Osaka, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan
Filed Apr. 22, 1976, Ser. No. 679,363
Claims priority, application Japan, Oct. 24, 1975, 50-42777
Term of patent 14 years
Int. Cl. D16—*03*
U.S. Cl. D16—31



246,527
VIGNETTING DEVICE
Irving S. Pfefer, 637 Anson St., Simi Valley, Calif. 93065
Filed Feb. 23, 1976, Ser. No. 660,474
Term of patent 14 years
Int. Cl. D16—*05*
U.S. Cl. D16—38

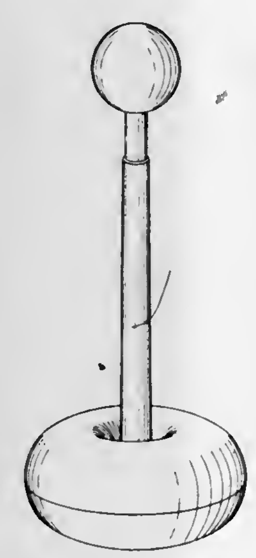


246,528
TRIPOD HEAD FOR CAMERAS OR OTHER INSTRUMENTS
Robert Eric Miller, Rose Bay, Australia, assignor to Miller-Universal (Aust.) Pty. Ltd., Rushcutters Bay, Australia
Filed Mar. 24, 1976, Ser. No. 670,005
Claims priority, application Australia, Oct. 3, 1975, 67876/75
Term of patent 14 years
Int. Cl. D16—*05*
U.S. Cl. D16—46

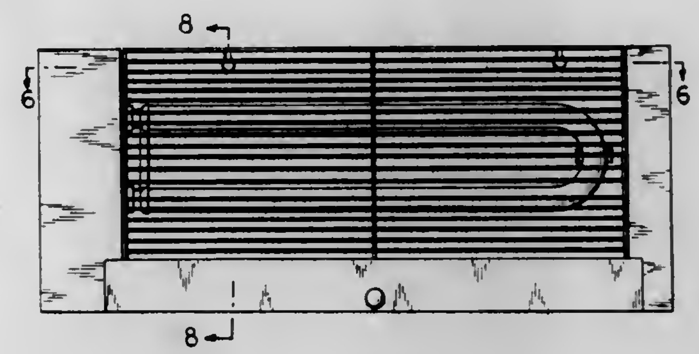


246,529
MONOCLE
Willard M. Thomas, 185 Preston Road, Columbus, Ohio 43209
Filed Mar. 22, 1976, Ser. No. 669,185
Term of patent 14 years
Int. Cl. D16—*06*; D2—*03*
U.S. Cl. D16—66

246,530
DESK SET
Walter Zeischegg, Neu-Ulm, Germany, assignor to Hans Friedrich Hefendehl, Kierspe, Germany
Filed Apr. 13, 1976, Ser. No. 676,555
Claims priority, application Germany, Oct. 15, 1975, 459
Term of patent 14 years
Int. Cl. D19—*06*
U.S. Cl. D19—75

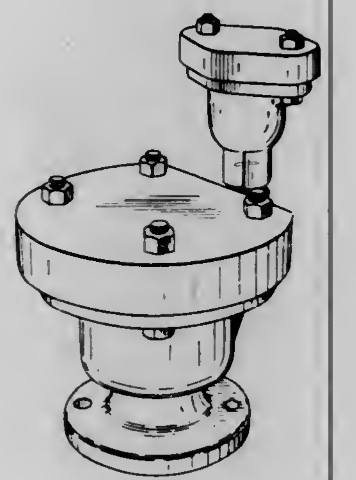


246,531
WALL-TYPE INSECT ELECTROCUTOR
Donald E. Gilbert, Box 2188, Jonesboro, Ark. 72401
Filed Apr. 13, 1977, Ser. No. 787,208
Term of patent 7 years
Int. Cl. D22—*06*
U.S. Cl. D22—19

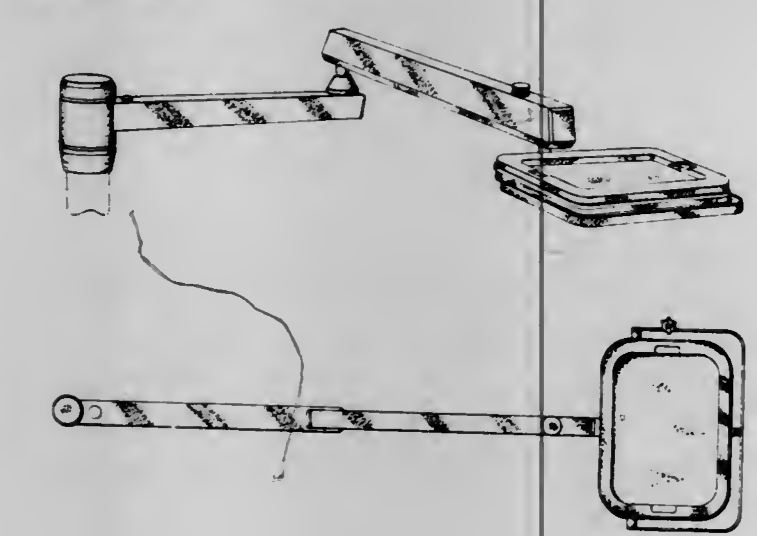


246,532
LURE TRANSFER ASSEMBLY
Orval Gene Ingram, Oklahoma City, Okla., assignor to James M. Brewer, Oklahoma City, Okla.
Filed Jan. 26, 1976, Ser. No. 652,551
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—30

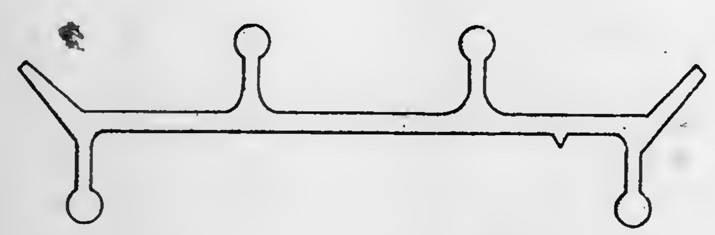
246,533
AIR VALVE FOR PIPELINES
William Henry Brockbank, Petaling Jaya, Malaysia, assignor to George Kent (Malaysia) Berhad, Malaysia
Filed Mar. 15, 1976, Ser. No. 666,953
Claims priority, application United Kingdom, Sept. 26, 1975, 972713/75
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—19



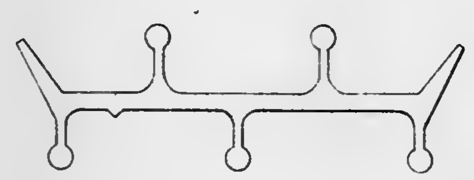
246,534
FLEXIBLE SUPPORT ARM FOR A DENTAL UNIT
George F. Buckley, 1550 Rollins Road, Burlingame, Calif. 94010
Filed Jan. 29, 1976, Ser. No. 653,968
Term of patent 14 years
Int. Cl. D24—*01*
U.S. Cl. D24—5



246,535
MICROBIOLOGICAL TEST STRIP
Michael William Dixon, Norley, England, assignor to Scientific Hospital Supplies Limited, Liverpool, England
Filed Oct. 18, 1976, Ser. No. 733,830
Term of patent 14 years
Int. Cl. D24—*02, 99*
U.S. Cl. D24—8

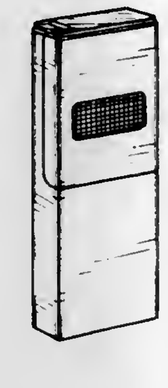


246,536
MICROBIOLOGICAL TEST STRIP
Michael William Dixon, Norley, England, assignor to Scientific Hospital Supplies Limited, Liverpool, England
Filed Oct. 18, 1976, Ser. No. 733,836
Term of patent 14 years
Int. Cl. D24—*02*; D24—*99*
U.S. Cl. D24—8

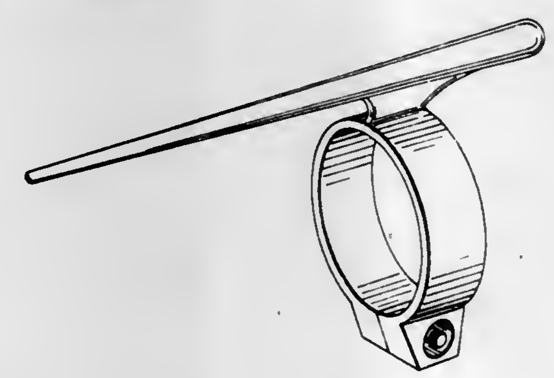


246,537
TOOTH POSITIONER MATERIAL
Woodford W. Gordon, 125 Miraloma Drive, San Francisco, Calif. 94127
Filed June 9, 1976, Ser. No. 694,335
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D24—10

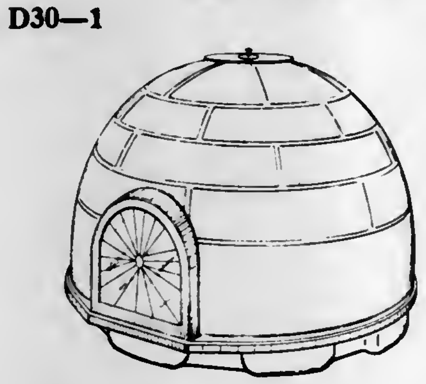
246,538
LIGHTER
Franz Alban Stuetzer, Muehlheim am Main, and Bernd Figur, Nieder-Roden, both of Germany, assignors to Rowenta-Werke, GmbH, Offenbach am Main, Germany
Filed Sept. 27, 1976, Ser. No. 727,093
Claims priority, application Germany, Apr. 2, 1976, 59941
Term of patent 14 years
Int. Cl. D27—*05*
U.S. Cl. D27—42



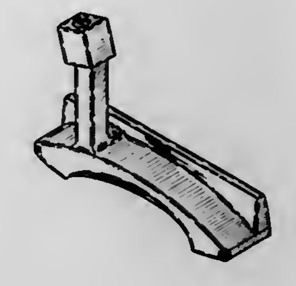
246,539
BLOW DRYER ATTACHMENT
Andre A. Nizetich, 2159 Rockinghorse Road, San Pedro, Calif. 90732
Filed Apr. 26, 1976, Ser. No. 680,489
Term of patent 3½ years
Int. Cl. D28—*03*
U.S. Cl. D28—18



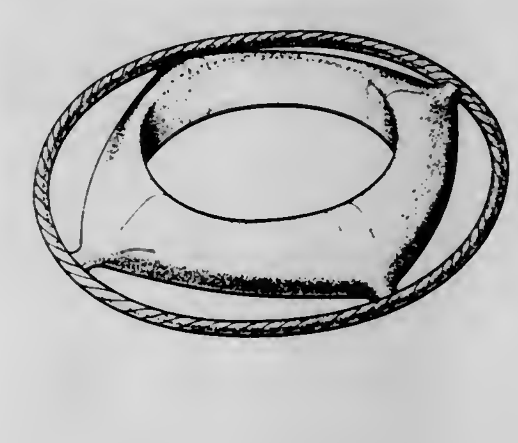
246,540
DOGHOUSE
Bill M. Burleson, P.O. Box 1123, Corsicana, Tex. 75110
Filed Nov. 10, 1975, Ser. No. 630,291
Term of patent 14 years
Int. Cl. D30—*02*
U.S. Cl. D30—1



246,541
GOLF CLUB HEAD
David W. Myers, 433 Westwood Drive North, Minneapolis, Minn. 55422
Filed Apr. 7, 1976, Ser. No. 674,633
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 GH

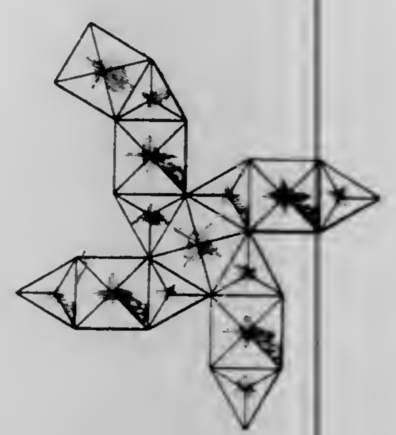


246,542
LIFE RING
Evan B. Hull, 49 Pleasant St., Northboro, Mass. 01532
Filed May 21, 1976, Ser. No. 688,736
Term of patent 14 years
Int. Cl. D29—*02*
U.S. Cl. D34—43



246,543
SKI
Rudolf Ferch, Salzburg, Austria, assignor to Kastle Gesellschaft m.b.H., Ried im Innkreis, Austria
Division of Ser. No. 539,843, Jan. 9, 1975. This application May 14, 1976, Ser. No. 686,551
Claims priority, application Austria, Nov. 19, 1974, 18324183/74
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—14 D

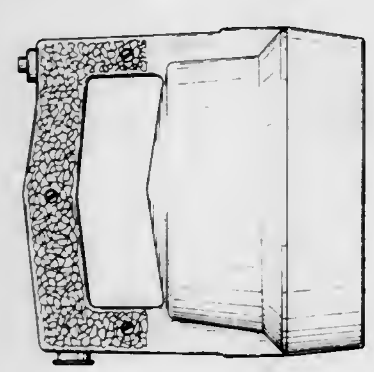
246,544
FOLDING PUZZLE
Mary Ann Paschal Brinkley, Rte. 9, Box 492, Johnson City, Tenn. 37601
Filed Apr. 10, 1975, Ser. No. 566,665
Term of patent 7 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 M



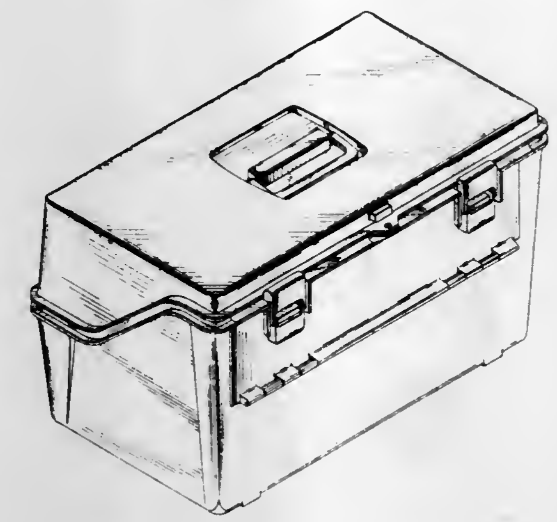
246,545
WHEELED ANIMAL FIGURE TOY
Luvenia C. Miller, 134 33rd St., NE., Washington, D.C. 20019
Filed May 18, 1976, Ser. No. 687,555
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 B

246,546
LAMP
David Kushner, 2300 Marcus Ave., New Hyde Park, N.Y. 11043
Filed Sept. 15, 1976, Ser. No. 723,561
Term of patent 14 years
Int. Cl. D26—*05, 01*
U.S. Cl. D48—20 R

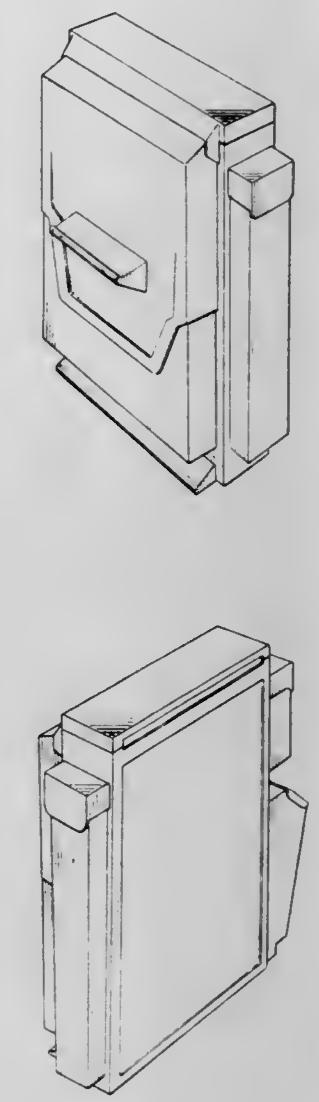
246,547
HAND HELD SPOT LIGHT
Duncan M. Payne, Tulsa, Okla., assignor to Optronics, Incorporated, Fort Gibson, Okla.
Filed Sept. 15, 1975, Ser. No. 613,262
Term of patent 14 years
Int. Cl. D26—*02*
U.S. Cl. D48—24 R



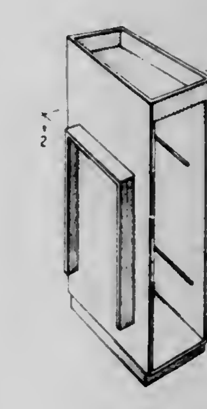
246,548
FISHING BOX
Tim M. Uyeda, S. San Gabriel, Calif., assignor to Ingersoll-Rand Company, Woodcliff Lake, N.J.
Filed July 10, 1975, Ser. No. 594,588
Term of patent 14 years
Int. Cl. D3—*02*
U.S. Cl. D87—1 R



246,549
CASE FOR CONTAINING ITEMS USED BY ENGINEERS, ARCHITECTS AND THE LIKE
Eugene H. Crane, 621 Washington St. NE., Warren, Ohio 44483
Filed Nov. 17, 1975, Ser. No. 632,500
Term of patent 14 years
Int. Cl. D3—*02*
U.S. Cl. D87—1 R



246,550
CASSETTE STORAGE UNIT
Charles Robert Herk, South Curl Curl, Australia, assignor to P.P. & D. Pty. Limited, Manly, Australia
Filed Mar. 3, 1976, Ser. No. 663,531
Claims priority, application Australia, Dec. 3, 1975, 68235/75
Term of patent 14 years
Int. Cl. D3—*02*
U.S. Cl. D87—1 D



LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 29TH DAY OF NOVEMBER, 1977

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A & A Japan, Ltd.: *See—*
Sakamoto, Kenji; and Kawaai, Osamu, 4,060,765, Cl. 325-21.000.
A. E. Staley Manufacturing Company: *See—*
Verbanac, Frank, 4,060,506, Cl. 260-17.4GC.
A/S National Industri: *See—*
Fergestad, Petter I., 4,060,784, Cl. 336-84.00R.
A Silag Inc.: *See—*
Divecha, Amarnath P., 4,060,412, Cl. 75-203.000.
A-T-O Inc.: *See—*
Carter, Sidney T., 4,060,229, Cl. 271-33.000.
Carter, Sidney T., 4,060,446, Cl. 156-475.000.
AAI Corporation: *See—*
Monson, Franklin A., 4,060,188, Cl. 227-9.000.
AB Carbox: *See—*
Trolle, Sten; and Jonson, Ake, 4,060,359, Cl. 425-78.000.
Abe, Eiichi, to Nissan Motor Company, Limited. Environmental noise pollution reduction device of running road vehicle. 4,060,142, Cl. 180-54.00A.
Abel, Stephen Carl; and Carlson, Jeffrey Allen, to International Business Machines Corporation. Device for and method of affixing the ends of a substantially plastic ladder chain to make a continuous ladder chain thereof. 4,060,006, Cl. 74-258.000.
Abramson, Joseph O. Battery cables and process for making same. 4,060,304, Cl. 339-224.000.
ACF Industries, Incorporated: *See—*
Baker, Forrest L.; and Behle, Gunter R., 4,060,000, Cl. 73-421.00B.
Acher, Heinz, to Kraftwerk Union Aktiengesellschaft. Positioning drive for absorber rods of a nuclear reactor. 4,060,452, Cl. 176-36.00R.
Achtmann, Walfried; and Hochgesang, Gerhard, to Preh-Elektrofeinmechanische Werke - Jakob Preh Nachf. Multiple slide resistor. 4,060,789, Cl. 338-183.000.
Adachi, Tadao: *See—*
Nishimura, Yoshiki; Sakiyama, Kazutaka; Adachi, Tadao; and Harada, Kenji, 4,060,389, Cl. 23-252.00A.
Adair, Gerald L. Method of making a small electric motor. 4,059,898, Cl. 29-598.000.
Adair, Harold Lee, to Raymond International Inc. Underwater gas discharge hammer with gas reservoir. 4,060,139, Cl. 173-137.000.
Adam, Alberto Eilert, to American Cyanamid Company. 6-Substituted 3-nitroimidazo[1,2-b]pyridazine for the control of hemorrhagic colitis in swine. 4,060,614, Cl. 424-250.000.
Adamis, Robert J. Handle for utensils. 4,059,867, Cl. 16-110.00A.
Adams, John M.: *See—*
Lin, Heh-Sen; and Adams, John M., 4,060,090, Cl. 128-419.0PG.
Addor, Roger Williams, to American Cyanamid Company. Method for controlling acarina. 4,060,632, Cl. 424-304.000.
AGA Aktiebolag: *See—*
Botos, Imre; and Hellquist, Ivan Aldine, 4,060,076, Cl. 128-142.00R.
AGFA-GEVAERT N.V.: *See—*
Van Royen, Freddy Ghisleen; Mertens, Ludovicus Maria; and Van Den Houte, Jozef Willy, 4,060,416, Cl. 96-48.00R.
Aimar, Michele, to ITW Fastex Italia, S.p.A. Adjustable molding end cap. 4,059,938, Cl. 52-716.000.
Akimoto, Minoru; and Tomizawa, Masaharu. Rotary pump for hot pitch, asphalt and like viscous solidifiable material. 4,060,353, Cl. 418-102.000.
Akita, Eiichi: *See—*
Umezawa, Hamao; Umezawa, Sumio; Tsuchiya, Osamu; Akita, Eiichi; Miyazawa, Takeo; Horiuchi, Yukio; and Fukatsu, Shunzo, 4,060,682, Cl. 536-10.000.
Akiyama, Taichiro. Plug for living body. 4,060,080, Cl. 128-152.000.
Aktiebolaget Electrolux: *See—*
Simonsson, Sven Bertil, 4,060,050, Cl. 116-114.0AD.
Aktiengesellschaft Adolph Saurer: *See—*
Grundler, Robert; and Jenny, Hubert, 4,060,103, Cl. 139-185.000.
Albert, James R.: *See—*
Kodama, Jiro K.; Haynes, George R.; and Albert, James R., 4,060,640, Cl. 424-326.000.
Alco Standard Corporation: *See—*
Bolt, James S., 4,060,380, Cl. 432-179.000.
Alden Research Foundation: *See—*
Williams, George C., 4,060,815, Cl. 346-139.00A.
Alessio, Lorenzo Ercole, to Black and Decker Manufacturing Company, The. Removable guard arrangement for a power tool having a rotating head for performing work on a workpiece. 4,059,930, Cl. 51-268.000.
Alewitz, Sam, to Perfection Corporation. Anode-fitting assembly. 4,060,472, Cl. 204-197.000.
Algeri, Harvey R.; and Stumphauzer, William C., to Nordson Corporation. Coating apparatus control including time dependent inhibitor circuit. 4,060,052, Cl. 118-2.000.
Allanson, John Trevor: *See—*
Austin, Eric Paul; and Allanson, John Trevor, 4,060,484, Cl. 210-80.000.
Allegheny Ludlum Industries, Inc.: *See—*
Choby, Edward G., Jr., 4,060,191, Cl. 228-207.000.
Allemandou, Philippe Marie; and Beaudet, Didier Marcel, to Societe Anonyme de Telecommunications. Electromechanical band-pass filters. 4,060,775, Cl. 333-71.000.
Allen, Ernest Duane. Motor protector for three-phase motors. 4,060,841, Cl. 361-33.000.
Allen, Gordon Y. R. Combined mutual drainage reactor and grounding relay. 4,060,842, Cl. 361-56.000.
Allied Chemical Corporation: *See—*
Kavesh, Sheldon, 4,060,430, Cl. 148-32.000.
Nemiroff, Michael; Yue, Hong Jun; and Schevey, William Russell, 4,060,448, Cl. 156-653.000.
Peterson, James Oliver; Sukornick, Bernard; Sweeney, Richard Francis; Nychka, Henry R.; Eibeck, Richard E.; and Berenbaum, Morris B., 4,060,555, Cl. 260-586.00R.
Pieters, Wim J. M.; Carlson, Emery J.; and Pez, Guido P., 4,060,499, Cl. 252-432.000.
Smalley, Edmund W.; Kurtz, Bruce Edward; and Bandyopadhyay, Bhaskar, 4,060,460, Cl. 203-29.000.
Sweeney, Richard F.; and Peterson, James O., 4,060,469, Cl. 204-163.00R.
Allis-Chalmers Corporation: *See—*
Mackie, Gordon E.; and Morris, Peter A., 4,059,979, Cl. 72-342.000.
Pollak, Robert J., 4,060,205, Cl. 241-211.000.
Allitt, Bernard Charles, to Dunlop Limited. Pneumatic tire manufacture. 4,060,357, Cl. 425-36.000.
Alpen, Ulrich Von; Fenner, Jurgen; Marcoll, Joachim; and Rabenau, Albrecht, to Max-Planck-Gesellschaft zur Forderung der Wissenschaften e.V. Electrochemical energy cell with solid electrolyte. 4,060,672, Cl. 429-191.000.
Alumax Mill Products, Inc.: *See—*
Papafingos, Pandelis N.; and Lance, Richard T., 4,060,118, Cl. 159-49.000.
Aluminum Company of America: *See—*
Kampert, William P., 4,060,462, Cl. 204-58.000.
Kuhn, John E., 4,060,408, Cl. 75-68.00R.
Alveru S. A.: *See—*
Schmidt, Achim D., 4,059,865, Cl. 15-161.000.
Alza Corporation: *See—*
Chandrasekaran, Santosh Kumar; Urquhart, John; and Shaw, Jane Elizabeth, 4,060,084, Cl. 128-260.000.
Amabili, Arnaldo. Container and closure cap. 4,060,172, Cl. 215-295.000.
Amcar Industries, Ltd.: *See—*
Finkelman, Morris, 4,059,870, Cl. 17-75.000.
Amemiya, Hidemitu: *See—*
Nakamoto, Hiromasa; Nakamoto, Shin-Ichi; Amemiya, Hidemitu; Miyamura, Souji; Shiba, Motoo; and Nakamura, Nobuko, 4,060,527, Cl. 260-279.00R.
American Cyanamid Company: *See—*
Adam, Alberto Eilert, 4,060,614, Cl. 424-250.000.
Addor, Roger Williams, 4,060,632, Cl. 424-304.000.
Asato, Goro; and Bentley, Terence James, 4,060,627, Cl. 424-275.000.
Bernady, Karel Francis; Floyd, Middleton Brawner, Jr.; Poletto, John Frank; Schaub, Robert Eugene; and Weiss, Martin Joseph, 4,060,540, Cl. 260-448.80R.
American Optical Corporation: *See—*
Swaminathan, Krishnaiyer, 4,060,306, Cl. 350-87.000.
American Seating Company: *See—*
Van Loo, William Rudolph, 4,060,280, Cl. 297-452.000.
American Solar Energy Corporation: *See—*
Johnson, Donald F., 4,060,072, Cl. 126-271.000.
Ammann, Paul R.; Crimes, Peter B.; and Kim, Jonathan J., to Kennecott Copper Corporation. Mechanically stirred furnace for pyrometallurgical operations and processes. 4,060,409, Cl. 75-93.00R.
Amort, Jurgen: *See—*
Seiler, Claus-Dietrich; Vahlensieck, Hans-Joachim; and Amort, Jurgen, 4,060,539, Cl. 260-448.80R.
AMP Incorporated: *See—*
Kunkle, James Raymond; and Olsson, Billy Erik, 4,060,296, Cl. 339-17.0CF.
Ampco Foods Inc.: *See—*
Shatila, Mounir A.; Veeneman, John L.; Lach, John H.; and Harmon, James F., 4,060,367, Cl. 425-311.000.
Amtel, Inc.: *See—*
Holloway, William Stuart; and Grunsky, Manfred, 4,060,335, Cl. 408-233.000.

Amyot, Claude, to Establissements Amyot S.A. Chuck with key tightening. 4,060,251, Cl. 279-62.000.

Anderson, Paul L., to Sandoz, Inc. Anthranilic acid amides. 4,060,638, Cl. 424-324.000.

Anderson, Thomas E., to General Electric Company. Dual mode solid state inverter circuit for starting and ballasting gas discharge lamps. 4,060,751, Cl. 315-209.00R.

Andrews, James Edward: *See—*

Bethards, Charles William; and Andrews, James Edward, 4,060,764, Cl. 325-18.000.

Anes, Lionel, to Compagnie Industrielle des Piles Electriques Cipel. Battery capacity indicator for primary battery. 4,060,666, Cl. 429-91.000.

Ankerfarm, S.p.A.: *See—*

Cotti, Gino, 4,060,605, Cl. 424-227.000.

Annino, Raymond; Prescott, Robert C.; Karas, Edwin L.; and Kalinoski, Richard W., to Foxboro Company, The. Pneumatic chromatograph. 4,059,994, Cl. 73-23.100.

Antisari, Ottavio Vittori: *See—*

Tirabassi, Tiziano; Giovanelli, Giorgio; Cesari, Giulio; Bonafe, Ubaldo; and Antisari, Ottavio Vittori, 4,060,326, Cl. 356-96.000.

Appell, Marc Michel: *See—*

Bienvenu, Jacques Michel Jean; Cassonnet, Jean-Claude Marcel; and Appell, Marc Michel, 4,060,849, Cl. 364-200.000.

Applebaum, David C.: *See—*

Mallozzi, Philip J.; Epstein, Harold M.; Applebaum, David C.; Gallagher, William J.; and Campbell, Bernerd E., 4,060,769, Cl. 330-4.300.

Arai, Shinji: *See—*

Maeda, Sachio; Saito, Nagoa; Arai, Shinji; and Haishi, Yuichiro, 4,060,467, Cl. 204-129.750.

Archerd, Paul H., to Phillips Petroleum Company. Sampling probe and method of use. 4,060,001, Cl. 73-421.50R.

Armour Pharmaceutical Company: *See—*

Liu, Robert Chung-Huan; and Hughes, John Lawrence, 4,060,554, Cl. 260-565.000.

Arnold Engineering Company, The: *See—*

Bowers, Paul E.; and Phadke, Mukund A., 4,060,845, Cl. 361-149.000.

Arnold, Friedrich: *See—*

Pfleiderer, Werner; Arnold, Friedrich; and Haussermann, Richard, 4,060,239, Cl. 272-73.000.

Arsenius, Torsten Henry; and Bildtsen, Sven Christian, to SKF Industrial Trading and Development Company B.V. Support in hydrostatic bearings. 4,060,288, Cl. 308-73.000.

ASA S.A.: *See—*

Derail, Yves C.; and Dupeuble, Jean-Claude, 4,059,948, Cl. 57-77.330.

Asahara, Yoshiyuki, to Hoya Corporation. Sealing glass for glass laser. 4,060,422, Cl. 106-47.00Q.

Asahi-Dow Limited: *See—*

Iwami, Isamu; and Kinoshita, Hideo, 4,060,657, Cl. 428-375.000.

Asahi Kogaku Kogyo Kabushiki Kaisha: *See—*

Hoshika, Shuji, 4,060,725, Cl. 250-227.000.

Nobusawa, Tsukumo, 4,060,325, Cl. 354-25.000.

Asari, Akira; and Tatsuno, Kenzou, to Kobe Steel, Ltd. Process for converting aluminum scrap into useful products. 4,059,896, Cl. 29-403.000.

Asato, Goro; and Bentley, Terence James, to American Cyanamid Company. Substituted tetrahydroiminobenzo(b)thien-4-ylureas as novel growth promoting compounds for animals. 4,060,627, Cl. 424-275.000.

Ashton, Shirley B., to Smith Company, The. Double wraparound brush assembly for vehicle washing apparatus. 4,059,862, Cl. 15-53.0AB.

Ashworth, Charles S., Jr., to Audio Alert, Inc. Security alarm system with audio monitoring capability. 4,060,803, Cl. 340-409.000.

Asinger, Friedrich; Offermanns, Heribert; and Ghyczy, Miklos, to Deutsche Gold- und Silber-Scheideanstalt Vormals Roessler. Process of making penicillamine. 4,060,548, Cl. 260-534.00S.

Askew, Barry Anthony; Holland, Ronald; Inman, Douglas; and Marikar, Yusuf Mohamed Faruq, to National Research Development Corporation. High temperature secondary batteries. 4,060,667, Cl. 429-103.000.

Ataka, Hisashi; Wako, Shigeo; and Ushio, Shintaro, to Oki Electric Industry Co., Ltd. Line connection reversing circuits. 4,060,699, Cl. 179-18.0GF.

Ateliers Breheret S.A.R.L.: *See—*

Breheret, Michel Francois; Wambergue, Andre Raphael; and Carpentier, Andre Jacques, 4,060,048, Cl. 114-266.000.

Athena Industries, Inc.: *See—*

Metcalf, Derek N. G., 4,060,214, Cl. 248-165.000.

Atia, Ali Ezz Eldin; and Williams, Albert Edward, to Communications Satellite Corporation. Canonical dual mode filter. 4,060,779, Cl. 333-73.00W.

Atlas Copco Aktiebolag: *See—*

Verner, Bo Lennart; and Fors, Lars Borje Staffan, 4,060,574, Cl. 261-77.000.

Atlas Powder Company: *See—*

Bowman, Arthur F.; and Camerini, Francis J., 4,060,034, Cl. 102-24.00R.

Postupack, Constantine; Borg, David G.; Junk, Norman M.; Oswald, Gerald L.; and Bowman, Arthur F., 4,060,033, Cl. 102-24.00R.

Audio Alert, Inc.: *See—*

Ashworth, Charles S., Jr., 4,060,803, Cl. 340-409.000.

Aumuller, Walter: *See—*

Hrstka, Vladimir; Hubner, Manfred; Kuhr, Manfred; Schmidt, Felix Helmut; and Aumuller, Walter, 4,060,626, Cl. 424-274.000.

Aurich, Rudolf: *See—*

Klingler, Karl H.; Aurich, Rudolf; and Habersang, Silke, 4,060,618, Cl. 424-253.000.

Austin, Eric Paul; and Allanson, John Trevor, to Simon-Hartley Limited. Filters. 4,060,484, Cl. 210-80.000.

Automation Equipment, Inc.: *See—*

Swoager, Jon R., 4,060,035, Cl. 105-177.000.

Automobiles Peugeot: *See—*

Bost, Jean Remy, 4,060,005, Cl. 74-745.000.

Croissant, Jean, 4,060,270, Cl. 296-37.200.

AVX Corporation: *See—*

Galvagni, John L., 4,059,887, Cl. 29-570.000.

Awalt, Thomas Y., Jr. Air conditioned shelter. 4,059,969, Cl. 62-238.000.

Ayerst McKenna and Harrison Ltd.: *See—*

Ferland, Jean-Marie; Laliberte, Real; Lippmann, Wilbur; and Pugsley, Thomas A., 4,060,613, Cl. 424-250.000.

Philipp, Adolf H.; and Jirkovsky, Ivo L., 4,060,619, Cl. 424-256.000.

B. F. Goodrich Company, The: *See—*

Kletecka, George, 4,060,552, Cl. 260-576.000.

B & J Manufacturing Company: *See—*

Jensen, Wayne E., 4,059,875, Cl. 29-78.000.

Baccile, Anthony, to Buchan Industries, Inc. Loose leaf binder locking device. 4,060,330, Cl. 402-47.000.

Backhaus, Hans-Gerd: *See—*

Scholz, Hansjurgen; Backhaus, Hans-Gerd; Brambilla, Luigi; and Gimbel, Jurgen, 4,060,004, Cl. 73-514.000.

Backlund, John R., to Honeywell Inc. Method of cutting lithium. 4,060,017, Cl. 83-23.000.

Bacsanyi, Thomas J.; and Harmon, Edward J., to Ransburg Corporation. Imbalance determining apparatus and method. 4,060,003, Cl. 73-483.000.

Bada Company, Inc.: *See—*

Gwaltney, Robert E.; and Mikovits, John L., 4,060,121, Cl. 164-262.000.

Baghdady, Elie J. Tracking and position determination system. 4,060,809, Cl. 343-112.00R.

Bahnsen, Gerhard I. W. Detachable connections for camera or the like. 4,060,819, Cl. 354-293.000.

Baker, Forrest L.; and Behle, Gunter R., to ACF Industries, Incorporated. Lading sampling device for a tank. 4,060,000, Cl. 73-421.00B.

Baker International Corporation: *See—*

Kenneday, John W.; Kinney, Charles W.; Scott, Floyd L., Jr.; and Schmuck, Phillip W., 4,060,131, Cl. 166-315.000.

Baker, Richard H.: *See—*

Kirtley, James L., Jr.; and Baker, Richard H., 4,060,754, Cl. 318-218.000.

Baldwin, John J., to Merck & Co., Inc. Certain lower-alkyl amino-2'-hydroxy-propoxy pyridines. 4,060,601, Cl. 424-263.000.

Balint, Peter: *See—*

Burns, Fredrick B.; and Balint, Peter, 4,060,215, Cl. 248-360.000.

Balla, Gyula, to Tetra Pak International AB. Device for the heat-sealing of thermoplastic material or paper material coated with thermoplastics. 4,060,443, Cl. 156-380.000.

Bandyopadhyay, Bhaskar: *See—*

Smalley, Edmund W.; Kurtz, Bruce Edward; and Bandyopadhyay, Bhaskar, 4,060,460, Cl. 203-29.000.

Baraldi, Enzo; and Longhi, Giuliano, to Fire Victor Holding S.A. Incinerator. 4,060,042, Cl. 110-14.000.

Barcellos, Eduardo Da Costa. Process for obtaining oil, gas, sulfur and other products from oil shale. 4,060,479, Cl. 208-11.00R.

Bares, James D.; and Burke, William P., Jr. Valve plate construction. 4,060,098, Cl. 137-594.000.

Barile, Conrad A.; Brill, Robert M.; Forneris, John L.; and Regh, Joseph, to International Business Machines Corporation. Method of forming an integrated circuit region through the combination of ion implantation and diffusion steps. 4,060,427, Cl. 148-1.500.

Barned, Philip Sydney: *See—*

Lanham, Albert Frank; Barned, Philip Sydney; and Potter, Sydney Ralph, 4,060,434, Cl. 149-2.000.

Barnoski, Michael K.; and Evtuhov, Viktor, to Hughes Aircraft Company. Angle selective coupler for optical fibers. 4,060,308, Cl. 350-96.00C.

Barrett, Norman C.: *See—*

Bryden, Kenneth; and Barrett, Norman C., 4,059,910, Cl. 36-103.000.

Barrington, Burchus Q., to Halliburton Company. Method and apparatus for preventing debris build-up in underwater oil wells. 4,060,140, Cl. 175-7.000.

Barron, James M.: *See—*

Rapp, Felix, Jr.; and Barron, James M., 4,060,195, Cl. 237-1.00A.

Bartles (Carn Brea) Limited: *See—*

Burt, Richard Owen, 4,060,482, Cl. 209-432.000.

Barton, Paul, to International Standard Electric Corporation. Low angle radar. 4,060,807, Cl. 343-17.10R.

Barzuza, Ytzhak. Method and apparatus for effecting the cleaning of a fluid filter. 4,060,483, Cl. 210-79.000.

BASF Aktiengesellschaft: *See—*

Jeserich, Wolfgang-Dieter; Cordes, Claus; Seydl, Wolfgang; and Weiss, Hans-Peter, 4,060,518, Cl. 260-78.00L.

Kindscher, Wolfgang; Fischer, Martin; Eicken, Karl; and Vitt, Guenter, 4,060,522, Cl. 260-293.850.

Mertes, Friedrich; Doerfel, Helmut; Heil, Eduard; and Cordes, Claus, 4,060,517, Cl. 260-78.00R.

Naarmann, Herbert; Reichel, Fritz; and Gausepohl, Hermann, 4,060,679, Cl. 526-304.000.

Treptow, Wolfram; and Wunsch, Gerd, 4,060,476, Cl. 204-290.00F.

Weitz, Hans-Martin; and Fischer, Rolf, 4,060,543, Cl. 260-464.000.

BASF Wyandotte Corporation: *See—*

Ciko, John D.; and Cramer, John J., 4,060,505, Cl. 252-8.800.

Bateman, Charles Donald, to Sundstrand Data Control, Inc. Excessive sink rate warning system for aircraft. 4,060,793, Cl. 340-27.00R.

Bates, Charles L., Jr. Controlled pressure drop valve. 4,060,099, Cl. 137-625.300.

Battelle Memorial Institute: *See—*

Mallozzi, Philip J.; Epstein, Harold M.; Applebaum, David C.; Gallagher, William J.; and Campbell, Bernerd E., 4,060,769, Cl. 330-4.300.

Batzer, Hans; Habermeier, Juergen; and Porret, Daniel, to Ciba-Geigy AG. Five- or six-membered heterocyclic mono -and dialcohols. 4,060,525, Cl. 260-260.000.

Bauer, Everhard. Diverter for distributing articles supplied in one line amongst a plurality of conveying tracks. 4,060,165, Cl. 198-442.000.

Bauer, James J.; and Sagaser, Thomas M., to Clark Equipment Company. Loader main frame for skid steer loader. 4,060,261, Cl. 280-756.000.

Bauman, Dale E.; Collier, Robert J.; and Hays, Ray L., to University of Illinois Foundation. Induction of lactation in nonpregnant dairy animals. 4,060,620, Cl. 424-262.000.

Baumann, Hans-Peter; and Karmann, Hans-Georg, to Sandoz Ltd. Aromatic carboxylic acid esters and amides as fixing agents. 4,060,387, Cl. 8-169.000.

Baumgartner, Hans Ulrich: *See—*

Engeler, Paul; Baumgartner, Hans Ulrich; Dubendorfer, Ulrich; and Sonderegger, Hans Conrad, 4,059,999, Cl. 73-419.000.

Bayer Aktiengesellschaft: *See—*

Enders, Edgar; and Stendel, Wilhelm, 4,060,628, Cl. 424-277.000.

Kapps, Manfred; Mitschke, Karl-Heinz; and Schliebs, Reinhard, 4,060,571, Cl. 260-970.000.

Maass, Gunther; Lucking, Hans Joachim; Buchner, Werner; and Degen, Bruno, 4,060,537, Cl. 260-448.20E.

Meiser, Werner; Kramer, Wolfgang; Buchel, Karl Heinz; and Plempel, Manfred, 4,060,623, Cl. 424-269.000.

Schmidt, Arthur H.; Lantzsch, Reinhard; Marhold, Albrecht; Lehment, Klaus-Friedrich; and Staffe, Adolf, 4,060,549, Cl. 260-543.00F.

Sundermann, Rudolf, 4,060,541, Cl. 260-453.0AR.

vor der Bruck, Dieter; Sommer, Richard; and Wolfrum, Gerhard, 4,060,521, Cl. 260-165.000.

Wedemeyer, Karlfried; Kiel, Wolfgang; and Evertz, Werner, 4,060,562, Cl. 260-623.00R.

Bayless, John R., to Hughes Aircraft Company. Surface breakdown igniter for mercury arc devices. 4,060,748, Cl. 313-171.000.

BBC Brown Boveri & Company Limited: *See—*

Starcevic, Mihailo, 4,060,744, Cl. 310-91.000.

Beach, Burt L.: *See—*

Tremain, David L.; Beach, Burt L.; and Hadley, James C., 4,060,341, Cl. 417-182.500.

Beam, Paul E., Jr.; and Meyers, Charles K., to General Motors Corporation. Turbine shaft balancing. 4,059,972, Cl. 64-1.00V.

Bean, Bruce L.: *See—*

Bean, Roland C.; and Bean, Bruce L., 4,059,911, Cl. 37-142.500.

Bean, Roland C.; and Bean, Bruce L. Track filler attachment for center pivot irrigation systems. 4,059,911, Cl. 37-142.500.

Beatty, Albert W. Electrical connector for transmission line insulators. 4,060,301, Cl. 339-95.00R.

Beaudet, Didier Marcel: *See—*

Allemandou, Philippe Marie; and Beaudet, Didier Marcel, 4,060,775, Cl. 333-71.000.

Beck, Walter; and Burk, Werner. Self-defense apparatus comprising flashcube light source. 4,060,372, Cl. 431-93.000.

Beckman Instruments, Inc.: *See—*

Horrocks, Donald L., 4,060,728, Cl. 250-328.000.

Luitwieler, Samuel H.; and Horrocks, Donald L., 4,060,726, Cl. 250-252.000.

Beecham Group Limited: *See—*

Howarth, Thomas Trefor; and Harbridge, John Barry, 4,060,530, Cl. 260-307.0FA.

James, Brian George, 4,060,611, Cl. 424-246.000.

Behle, Gunter R.: *See—*

Baker, Forrest L.; and Behle, Gunter R., 4,060,000, Cl. 73-421.00B.

Behme, Werner; and Berleth, Manfred, to R. Jung AG Fabrik fur Prazisionsapparate. Method of specimen preparation. 4,060,440, Cl. 156-154.000.

Bell, Albert H., III, to General Motors Corporation. Centrifugal compressor with a splitter shroud in flow path. 4,060,337, Cl. 416-186.00R.

Bell & Howell Company: *See—*

Linke, Walter R.; and Fleischman, Andor A., 4,060,312, Cl. 350-189.000.

Tress, Norwood E.; and Orsinger, Winston A., 4,060,228, Cl. 271-14.000.

Bell Telephone Laboratories, Incorporated: *See—*

Mounts, Frank William; and Netravali, Arun Narayan, 4,060,834, Cl. 358-261.000.

Bendix Corporation, The: *See—*

McComas, Arthur D., 4,060,805, Cl. 343-6.5LC.

Benner, Philip E. Apparatus for removing ions from an ionized liquid. 4,060,477, Cl. 204-300.00R.

Bensky, Norman D.: *See—*

O'Day, William R., Jr.; Bensky, Norman D.; and LeBlanc, James D., 4,060,653, Cl. 427-423.000.

Bentley, Terence James: *See—*

Asato, Goro; and Bentley, Terence James, 4,060,627, Cl. 424-275.000.

Benton, Richard E., to General Tire & Rubber Company, The. Sponge rubber rug underlay having improved load bearing capacity. 4,060,502, Cl. 260-2.50P.

Berenbaum, Morris B.: *See—*

Peterson, James Oliver; Sukornick, Bernard; Sweeney, Richard Francis; Nychka, Henry R.; Eibeck, Richard E.; and Berenbaum, Morris B., 4,060,555, Cl. 260-586.00R.

Bergeron, Clifton G.; and Herron, Lester W., to University of Illinois Foundation. Article having a surface layer of catalytic ash by-product of coal combustion. 4,060,662, Cl. 428-450.000.

Berges, David A., to SmithKline Corporation. Pharmaceutical compositions comprising 7-acyl-3-(substituted triazolyl thiomethyl)-cephalosporins and methods of treating bacterial infections. 4,060,610, Cl. 424-246.000.

Bergman, Roger E.: *See—*

Cunningham, Art, deceased, 4,060,225, Cl. 366-40.000.

Bergomi, Angelo: *See—*

Tazuma, James J.; and Bergomi, Angelo, 4,060,567, Cl. 260-681.50C.

Berkley & Company, Inc.: *See—*

Rumbaugh, James T., 4,060,049, Cl. 115-6.100.

Berleth, Manfred: *See—*

Behme, Werner; and Berleth, Manfred, 4,060,440, Cl. 156-154.000.

Berliner, Julius F. T., to Burnishine Products Inc. Stainless steel cleaner. 4,060,496, Cl. 252-171.000.

Bernady, Karel Francis; Floyd, Middleton Brawner, Jr.; Poletto, John Frank; Schaub, Robert Eugene; and Weiss, Martin Joseph, to American Cyanamid Company. Novel 3-triphenylmethoxy-1-alkynes, 3-triphenyl-methoxy-1-trans-alkenyl-dialkyl-alanes, and lithium 3-triphenylmethoxy-1-trans-alkenyl-dialkyl alanates. 4,060,540, Cl. 260-448.80R.

Bernard, George G., to Union Oil Company of California. Composition and method for enhanced oil recovery utilizing aqueous polyacrylamide solutions. 4,060,490, Cl. 252-8.55D.

Bernex, Firma: *See—*

Rohland, Bernhard, 4,059,866, Cl. 16-108.000.

Berthiez, Charles William, to Berthiez, Charles William. Circular indexing plate for a machine tool. 4,060,021, Cl. 90-58.00B.

Bertin & Cie: *See—*

Guienne, Paul; Herrouin, Guy; Lafont, Andre; Bertin, Jean, deceased; Bertin, Michel; Bertin, Laurent; Bertin, Philippe; Midy nee Bertin, Catherine; Gonzalez-Camino nee Bertin, Francoise; and Bertin nee Loustau, Genevieve, heirs, 4,060,147, Cl. 180-121.000.

Bertin, Jean, deceased: *See—*

Guienne, Paul; Herrouin, Guy; Lafont, Andre; Bertin, Jean, deceased; Bertin, Michel; Bertin, Laurent; Bertin, Philippe; Midy nee Bertin, Catherine; Gonzalez-Camino nee Bertin, Francoise; and Bertin nee Loustau, Genevieve, heirs, 4,060,147, Cl. 180-121.000.

Bertin, Laurent: *See—*

Guienne, Paul; Herrouin, Guy; Lafont, Andre; Bertin, Jean, deceased; Bertin, Michel; Bertin, Laurent; Bertin, Philippe; Midy nee Bertin, Catherine; Gonzalez-Camino nee Bertin, Francoise; and Bertin nee Loustau, Genevieve, heirs, 4,060,147, Cl. 180-121.000.

Bertin, Michel: *See—*

Guienne, Paul; Herrouin, Guy; Lafont, Andre; Bertin, Jean, deceased; Bertin, Michel; Bertin, Laurent; Bertin, Philippe; Midy nee Bertin, Catherine; Gonzalez-Camino nee Bertin, Francoise; and Bertin nee Loustau, Genevieve, heirs, 4,060,147, Cl. 180-121.000.

Bertin nee Loustau, Genevieve, heirs: *See—*

Guienne, Paul; Herrouin, Guy; Lafont, Andre; Bertin, Jean, deceased; Bertin, Michel; Bertin, Laurent; Bertin, Philippe; Midy nee Bertin, Catherine; Gonzalez-Camino nee Bertin, Francoise; and Bertin nee Loustau, Genevieve, heirs, 4,060,147, Cl. 180-121.000.

Bertin, Philippe: *See—*

Guienne, Paul; Herrouin, Guy; Lafont, Andre; Bertin, Jean, deceased; Bertin, Michel; Bertin, Laurent; Bertin, Philippe; Midy nee Bertin, Catherine; Gonzalez-Camino nee Bertin, Francoise; and Bertin nee Loustau, Genevieve, heirs, 4,060,147, Cl. 180-121.000.

Bethards, Charles William; and Andrews, James Edward, to Motorola, Inc. Transceiver audio system. 4,060,764, Cl. 325-18.000.

Bettencourt, Thomas S.; and Marshall, Lowell K., to University of California, The Regents of the. Method for mechanically harvesting tomatoes. 4,060,133, Cl. 171-1.000.

Betzien, Gunter: *See—*

Rothe, Werner; Heinemann, Helmut; Schmidt, Felix Helmut; and Betzien, Gunter, 4,060,634, Cl. 424-321.000.

Bickford, John H.; Ranheim, Donald H., Jr.; and Saxby, Willard A., to Raymond Engineering Inc. Torque wrench. 4,060,137, Cl. 173-12.000.

Bienert, Horst; Jardin, Hans; and Schatzler, Walter, to Webasto-Werk W. Baier GmbH & Co. Motor vehicle roof. 4,060,274, Cl. 296-137.00G.

Bienvenu, Jacques Michel Jean; Cassonnet, Jean-Claude Marcel; and Appell, Marc Michel, to Compagnie Internationale pour l'Informatique Cii-Honeywell Bull. Data input and output controller. 4,060,849, Cl. 364-200.000.
Bierlich, Johannes Harald. Operating mechanism for doors and windows. 4,059,924, Cl. 49-192.000.
Bildtsen, Sven Christian: *See—*
Arsenius, Torsten Henry; and Bildtsen, Sven Christian, 4,060,288, Cl. 308-73.000.
Biochemie Gesellschaft m.b.H.: *See—*
Riedl, Kurt, 4,060,542, Cl. 260-454.000.
Bioengineering Research S.A.: *See—*
Della Bianca, Luciano, 4,060,348, Cl. 417-475.000.
Bird, Forrest M. Ventilator and method. 4,060,078, Cl. 128-145.800.
Birnie, Peter Alexander, to Post Office. Digital switching center. 4,060,698, Cl. 179-15.0AT.
Bishop, David C., to Chemical-Ways Corporation. Precision metering system for the delivery of abrasive lapping and polishing slurries. 4,059,929, Cl. 51-263.000.
Bison-werke Bahre & Greten GmbH & Co. KG: *See—*
Pampel, Helmut, 4,060,580, Cl. 264-109.000.
Bisson, Jean-Pierre: *See—*
Risler, Pierre; Gireau, Jean; Rose, Pierre; and Bisson, Jean-Pierre, 4,060,645, Cl. 426-302.000.
Bjerklie, John W.: *See—*
LaHaye, Paul G.; Bjerklie, John W.; and Gallant, Gerald G., Jr., 4,060,379, Cl. 432-179.000.
Bjorling, Gotthard E.: *See—*
Fahlstrom, Per Anders Herman Henningsson; Mioen, Thomas Konrad; and Bjorling, Gotthard E., 4,060,464, Cl. 204-113.000.
Black and Decker Manufacturing Company, The: *See—*
Alessio, Lorenzo Ercole, 4,059,930, Cl. 51-268.000.
Blair, Bruce A. System for hog production in a controlled environment. 4,060,054, Cl. 119-16.000.
Blanks, William L. Method and apparatus for identifying color separation film. 4,060,643, Cl. 428-195.000.
Blaser, Bruno; Germscheid, Hans-Gunther; and Worms, Karl-Heinz, to Henkel Kommanditgesellschaft auf Aktien. Process for the manufacture of acylation products of phosphorous acid. 4,060,546, Cl. 260-502.40A.
Blaser Engine, Ltd.: *See—*
Blaser, Florencio, 4,060,059, Cl. 123-32.0ST.
Blaser, Florencio, to Blaser Engine, Ltd. Internal combustion engine. 4,060,059, Cl. 123-32.0ST.
Blenner, Henry E.: *See—*
Marshall, Bruce H.; and Blenner, Henry E., 4,060,297, Cl. 339-37.000.
Blinchikoff, Herman J., to Westinghouse Electric Corporation. Intermediate-band crystal filter with low-transient response. 4,060,776, Cl. 333-72.000.
Blomer, Alois; and Schulze, Hans. Splint and body-support device. 4,060,075, Cl. 128-90.000.
Blum, Albert. Submersible pump with guide means. 4,060,345, Cl. 417-360.000.
Bocanegra Marquina, Jesus. Handle for hand tools to be rotated during operation. 4,060,115, Cl. 145-61.00G.
Boehringer Mannheim G.m.b.H.: *See—*
Groppenbacher, Gregor; Rieckmann, Peter; and Rothe, Werner, 4,060,598, Cl. 424-33.000.
Hrstka, Vladimir; Hubner, Manfred; Kuhr, Manfred; Schmidt, Felix Helmut; and Aumuller, Walter, 4,060,626, Cl. 424-274.000.
Rothe, Werner; Heinemann, Helmut; Schmidt, Felix Helmut; and Betzien, Gunter, 4,060,634, Cl. 424-321.000.
Boey, Jozef Martin: *See—*
Janssen, Paul Adriaan Jan; Van Daele, Georges Henri Paul; and Boey, Jozef Martin, 4,060,528, Cl. 260-293.00R.
Bogenschutz, Thomas M.; Engle, Thomas H.; and McEathron, Eugene D., to General Signal Corporation. Rail car brake apparatus. 4,060,152, Cl. 188-52.000.
Boice, Elvin G., to Reynolds Metals Company. Wear resistant drill pipe collar and method of making same. 4,060,286, Cl. 308-4.00A.
Boliden Aktiebolag: *See—*
Fahlstrom, Per Anders Herman Henningsson; Mioen, Thomas Konrad; and Bjorling, Gotthard E., 4,060,464, Cl. 204-113.000.
Bolt, James S., to Alco Standard Corporation. Furnace having burners supplied with heated air. 4,060,380, Cl. 432-179.000.
Bolton, Dewayne P.: *See—*
Hoffman, Gerald F.; and Bolton, Dewayne P., 4,060,123, Cl. 165-11.000.
Bonafe, Ubaldo: *See—*
Tirabassi, Tiziano; Giovanelli, Giorgio; Cesari, Giulio; Bonafe, Ubaldo; and Antisari, Ottavio Vittori, 4,060,326, Cl. 356-96.000.
Bongartz, Paul; and Haag, Franz, to Motan Gesellschaft mit beschrankter Haftung. Device for mixing granular and/or pulverous substances. 4,060,223, Cl. 366-179.000.
Boning, Manfred: *See—*
Rieger, Werner; Boning, Manfred; Dalferth, Hans; and Smetz, Reinhard, 4,060,269, Cl. 294-78.00A.
Bonnet, Ludwig: *See—*
Hiltebrandt, Siegfried; and Bonnet, Ludwig, 4,060,087, Cl. 128-303.150.
Borden Products Limited: *See—*
Widmann, Marcel, 4,060,572, Cl. 261-18.00B.
Borg, David G.: *See—*
Postupack, Constantine; Borg, David G.; Junk, Norman M.; Oswald, Gerald L.; and Bowman, Arthur F., 4,060,033, Cl. 102-24.00R.
Borg-Warner Corporation: *See—*
Newton, Alwin B., 4,060,343, Cl. 417-309.000.
Bost, Charles H. Protection circuit for multiple phase power systems. 4,060,843, Cl. 361-76.000.
Bost, Jean Remy, to Automobiles Peugeot. Transmission assembly comprising a main gearbox in series with countershafting providing at least two gear ratios. 4,060,005, Cl. 74-745.000.
Botos, Imre; and Hellquist, Ivan Aldine, to AGA Aktiebolag. Breathing apparatus incorporating depth compensation. 4,060,076, Cl. 128-142.00R.
Bottcher, Dieter; Schulz, Heinz; and Stahlecker, Fritz, to Stahlecker, Fritz; and Stahlecker, Hans. Method and apparatus for start-spinning a thread on open-end spinning units. 4,059,946, Cl. 57-34.00R.
Bourgeois, Hugues: *See—*
Fournier, Daniel; and Bourgeois, Hugues, 4,060,475, Cl. 204-270.000.
Bower, Allen M., to Emco Wheaton Inc. Vapor recovery nozzle. 4,060,110, Cl. 141-207.000.
Bowers, Paul E.; and Phadke, Mukund A., to Arnold Engineering Company, The. Portable demagnetizer. 4,060,845, Cl. 361-149.000.
Bowman, Arthur F.; and Camerini, Francis J., to Atlas Powder Company. Delay booster assembly. 4,060,034, Cl. 102-24.00R.
Bowman, Arthur F.: *See—*
Postupack, Constantine; Borg, David G.; Junk, Norman M.; Oswald. Gerald L.; and Bowman, Arthur F., 4,060,033, Cl. 102-24.00R.
Bowman, Harry Frederick, to Massachusetts Institute of Technology. Apparatus for the measurement of thermal properties of biomaterials. 4,059,982, Cl. 73-15.00A.
Boyce, Richard M.: *See—*
Randolph, Arthur J.; and Boyce, Richard M., 4,059,889, Cl. 29-706.000.
Bradshaw, Janice; Cook, Martin Christopher; and Gregory, Gordon Ian. Cephalosporins having a 7-(carboxy substituted α-etherified oximinoarylacetamido) group. 4,060,686, Cl. 544-22.000.
Braid, John Edwin, to Interox Chemicals Limited. Bleaching. 4,060,644, Cl. 426-261.000.
Brambilla, Luigi: *See—*
Scholz, Hansjurgen; Backhaus, Hans-Gerd; Brambilla, Luigi; and Gimbel, Jurgen, 4,060,004, Cl. 73-514.000.
Brandenberger, Stanley G.: *See—*
McClure, James D.; and Brandenberger, Stanley G., 4,060,565, Cl. 260-671.00C.
Brandis, Helmut; Von Den Steinen, Albert; and Engineer, Serosh, to Thyssen Edelstahlwerke Aktiengesellschaft. Heat-treatable steel. 4,060,431, Cl. 148-36.000.
Branson, Charles D., to Robertshaw Controls Company. Fuel control system and method of operating the same and diverter valve therefor. 4,060,192, Cl. 236-46.00D.
Bratzler, Karl: *See—*
Eisenlohr, Karl-Heinz; and Bratzler, Karl, 4,060,595, Cl. 423-574.00R.
Brawley, Thomas Scott. Bearing component and method of making same. 4,060,290, Cl. 308-216.000.
Breheret, Michel Francois; Wambergue, Andre Raphael; and Carpentier, Andre Jacques, to Ateliers Breheret S.A.R.L. Mechanical couplings for pontoons and similar floatable units. 4,060,048, Cl. 114-266.000.
Brenner, Gunter: *See—*
Credner, Karl; Geisel, Berthold; Brenner, Gunter; and Tauscher, Manfred, 4,060,617, Cl. 424-253.000.
Bricon, Jean-Pierre Luc, to International Harvester Company. Hydraulic actuated grab bucket. 4,059,886, Cl. 29-426.000.
Bridger, Robert F.; and Schmitt, Kirk D., to Mobil Oil Corporation. Lubricant composition. 4,060,491, Cl. 252-50.000.
Bright, Gene Michael, to Pfizer Inc. 6-Acylamido-2,2-dimethyl-3-(pyrimidin-4,6-dione-2-yl)penams. 4,060,524, Cl. 260-256.50R.
Brill, Robert M.: *See—*
Barile, Conrad A.; Brill, Robert M.; Forneris, John L.; and Regh, Joseph, 4,060,427, Cl. 148-1.500.
Bringi, Naganathan Viswanath; and Padley, Frederick Bolton, to Lever Brothers Company. Food fat. 4,060,646, Cl. 426-607.000.
Brodersen, Robert W.: *See—*
Tasch, Al F., Jr; Frye, Robert Charles; Fu, Horng-Sen; and Brodersen, Robert W., 4,060,738, Cl. 307-238.000.
Brooks, Barry J.: *See—*
Stowe, Milton G.; and Brooks, Barry J., 4,060,249, Cl. 277-24.000.
Brown, Donald J., to Knox Manufacturing Co. Detachable modular drive unit for projection screen apparatus. 4,060,310, Cl. 350-117.000.
Brown & Sharpe Manufacturing Company: *See—*
Levesque, George N., 4,060,007, Cl. 74-457.000.
Bruins, Victor Leonard: *See—*
van Heel, Hubertus Johannes Gerardus; Bruins, Victor Leonard; and Smid, Joost, 4,060,391, Cl. 23-264.000.
Bruinsma, Bote: *See—*
Cowan, Wavell Frederick; and Bruinsma, Bote, 4,059,992, Cl. 73-95.000.
Brune, Gerhard; and Hans, Waldemar, to Robert Bosch G.m.b.H. Electromagnetic fuel injection valve. 4,060,199, Cl. 239-488.000.
Bryant and May: *See—*
Lanham, Albert Frank; Barned, Philip Sydney; and Potter, Sydney Ralph, 4,060,434, Cl. 149-2.000.

Bryden, Kenneth; and Barrett, Norman C. Footwear apparatus. 4,059,910, Cl. 36-103.000.
Buchan Industries, Inc.: *See—*
Baccile, Anthony, 4,060,330, Cl. 402-47.000.
Buchel, Karl Heinz: *See—*
Meiser, Werner; Kramer, Wolfgang; Buchel, Karl Heinz; and Plempel, Manfred, 4,060,623, Cl. 424-269.000.
Buchner, Werner: *See—*
Maass, Gunther; Lucking, Hans Joachim; Buchner, Werner; and Degen, Bruno, 4,060,537, Cl. 260-448.20E.
Budnik, Frederick, to Minnesota Mining and Manufacturing Company. Thermal switch. 4,060,787, Cl. 337-408.000.
Buiter, Pieter; van der Burgt, Maarten J.; and Van Helden, Henricus J. A., to Shell Internationale Research Maatschappij B.V. Two stage partial combustion process for solid carbonaceous fuels. 4,060,397, Cl. 48-197.00R.
Bulthius, Kornelis: *See—*
Lakerveld, Herman Gerard; van Rosmalen, Gerard Eduard; Bulthius, Kornelis; and Sinjou, Johannes Petrus, 4,060,248, Cl. 274-41.60R.
Bundy, Gordon L., to Upjohn Company, The. 9-Deoxy-9-methylene-PGF compounds. 4,060,534, Cl. 260-408.000.
Bunker Ramo Corporation: *See—*
Gearin, John M., 4,060,298, Cl. 339-48.000.
Burk, Charles B.: *See—*
Chmura, William J.; Slusarski, Ronald S.; and Burk, Charles B., 4,059,879, Cl. 29-148.40R.
Burk, Werner: *See—*
Beck, Walter; and Burk, Werner, 4,060,372, Cl. 431-93.000.
Burke, John F.: *See—*
Yannas, Ioannis V.; Burke, John F.; Gordon, Philip L.; and Huang, Chor, 4,060,081, Cl. 128-156.000.
Burke, William P., Jr.: *See—*
Bares, James D.; and Burke, William P., Jr., 4,060,098, Cl. 137-594.000.
Burks, Howard L., to Wingfield, Perino B., a part interest. Vending and dispensing bin. 4,060,111, Cl. 141-231.000.
Burnishine Products Inc.: *See—*
Berliner, Julius F. T., 4,060,496, Cl. 252-171.000.
Burns, Fredrick B.; and Balint, Peter, to E Z Painter Corporation. Slotted tool handle. 4,060,215, Cl. 248-360.000.
Buros, Melvin S., to Micr-Shield Company. Document carrier. 4,060,711, Cl. 235-488.000.
Burroughs Wellcome Co.: *See—*
Schaeffer, Howard John, 4,060,616, Cl. 424-253.000.
Burt, Richard Owen, to Bartles (Carn Brea) Limited. Method of and apparatus for separating fractions of different density contained in ores or other solid materials. 4,060,482, Cl. 209-432.000.
Burton, James V. Wafered fuel of compressed wood products. 4,060,396, Cl. 44-14.000.
Butement, William Alan Stewart. Electro-photographic element. 4,060,321, Cl. 355-8.000.
Byer, Norman E.; Stokowski, Stanley E.; and Venables, John D., to Martin Marietta Corporation. Pyroelectric detector with decreased susceptibility to vibrational noise. 4,060,729, Cl. 250-338.000.
Calver, Paul Newton: *See—*
Taylor-Brown, Terence John; Calver, Paul Newton; and Jack, James, deceased, 4,060,648, Cl. 427-32.000.
Camerini, Francis J.: *See—*
Bowman, Arthur F.; and Camerini, Francis J., 4,060,034, Cl. 102-24.00R.
Campana, Patsie Carmen. Coke oven door frame and jamb. 4,060,459, Cl. 202-248.000.
Campbell, Bernerd E.: *See—*
Mallozzi, Philip J.; Epstein, Harold M.; Applebaum, David C.; Gallagher, William J.; and Campbell, Bernerd E., 4,060,769, Cl. 330-4.300.
Canada, Atomic Energy of, Limited: *See—*
McKeown, Joseph, 4,060,762, Cl. 324-71.0EB.
Candor, James T. Electrostatic method and apparatus for making a patterned, non-woven sheet. 4,060,449, Cl. 162-109.000.
Canon Kabushiki Kaisha: *See—*
Hirayama, Kazuhiro; Sato, Yasushi; Tokiwa, Taisuke; Kawakubo, Kazuo; Iwatate, Fujio; and Nakatsui, Hisashi, 4,060,322, Cl. 355-60.000.
Hirayama, Kazuhiro; Sato, Yasushi; Tokiwa, Taisuke; Iwatate, Fujio; Kawakubo, Kazuo; and Nakatsui, Hisashi, 4,060,323, Cl. 355-60.000.
Cantwell, Alan David Cole: *See—*
Lee, Denis; and Cantwell, Alan David Cole, 4,060,463, Cl. 204-99.000.
Carl, William L.: *See—*
Stein, Charles R.; and Carl, William L., 4,060,801, Cl. 340-324.00R.
Carlin, Eunice A. Method of marking for garment pattern. 4,060,436, Cl. 156-63.000.
Carlson, David Emil; and Tracy, Chester Edwin, to RCA Corporation. Deposition of transparent amorphous carbon films. 4,060,660, Cl. 428-408.000.
Carlson, Emery J.: *See—*
Pieters, Wim J. M.; Carlson, Emery J.; and Pez, Guido P., 4,060,499, Cl. 252-432.000.
Carlson, Jeffrey Allen: *See—*
Abel, Stephen Carl; and Carlson, Jeffrey Allen, 4,060,006, Cl. 74-258.000.
Carpentier, Andre Jacques: *See—*
Breheret, Michel Francois; Wambergue, Andre Raphael; and Carpentier, Andre Jacques, 4,060,048, Cl. 114-266.000.
Carstedt, Howard B. Automatic sheet decurler. 4,060,236, Cl. 271-183.000.
Carter, Samuel R.: *See—*
Neal, Willie, 4,060,697, Cl. 179-1.0VE.
Carter, Sidney T., to A-T-O Inc. Rotary glue picker. 4,060,229, Cl. 271-33.000.
Carter, Sidney T., to A-T-O Inc. Apparatus embodying continuous conveyors for applying labels to containers. 4,060,446, Cl. 156-475.000.
Carteus, Marc Felix Maurice; De Bruyne, Yvrs Marie Grovgrs; Lemmens, Jean Pierre Gustaaf Rosa; and Stubbe, Elie Jozef, to Societe de Traction et D'Electricite S.A. Water supply pipe for a steam generator. 4,060,057, Cl. 122-451.00R.
Cassonnet, Jean-Claude Marcel: *See—*
Bienvenu, Jacques Michel Jean; Cassonnet, Jean-Claude Marcel; and Appell, Marc Michel, 4,060,849, Cl. 364-200.000.
Castagnos, Leonce F., Jr.; and Pratt, Roy E., to Texaco Inc. Fluidized cracking catalyst regeneration apparatus. 4,060,395, Cl. 23-288.00B.
Castner, Kenneth F., to Goodyear Tire & Rubber Company, The. Olefin metathesis process and catalyst therefor. 4,060,468, Cl. 204-158.00R.
Caterpillar Tractor Co.: *See—*
Gee, James Edgar; and Ohms, Edward Joseph, 4,060,289, Cl. 308-187.100.
Hendrickson, Vergil Philip; and Cole, Carroll Richard, 4,060,136, Cl. 172-795.000.
Catt, John David: *See—*
Matier, William Lesley; and Catt, John David, 4,060,615, Cl. 424-251.000.
Catterfeld, Fritz C., to Rockwell International Corporation. Self-propelled deep well turbine drill. 4,060,141, Cl. 175-94.000.
Cav Limited: *See—*
Jarret, Boaz Antony, 4,060,347, Cl. 417-392.000.
Cesari, Giulio: *See—*
Tirabassi, Tiziano; Giovanelli, Giorgio; Cesari, Giulio; Bonafe, Ubaldo; and Antisari, Ottavio Vittori, 4,060,326, Cl. 356-96.000.
Chabot, Daniel H.; Peterson, Robert S.; and Plumer, Roy D., to General Motors Corporation. Inertial ring lock. 4,060,117, Cl. 151-43.000.
Chandrasekaran, Santosh Kumar; Urquhart, John; and Shaw, Jane Elizabeth, to Alza Corporation. Method and therapeutic system for providing chemotherapy transdermally. 4,060,084, Cl. 128-260.000.
Chaney, Lynn Harold; and Smith, Glenn S., to Eaton Corporation. Hoist cooling system. 4,060,159, Cl. 192-113.00B.
Chang, Yun-Te. Non-condensation mirror. 4,060,712, Cl. 219-219.000.
Chauvette, Robert R., to Eli Lilly and Company. Cephalosporin intermediates. 4,060,688, Cl. 544-30.000.
Chayet, Emil L., to Solar Energy Dynamics Corporation. Solar collector for solar heating systems. 4,060,071, Cl. 126-271.000.
Chechenets, Akhmet Galievich: *See—*
Kaporovich, Vladimir Georgievich; Udovenko, Vitaly Kirillovich; Krasnorutsky, Viktor Petrovich; and Chechenets, Akhmet Galievich, 4,059,977, Cl. 72-69.000.
Check, Frank Thomas, Jr., to Pitney Bowes Inc. Date printing device with electronic calendar clock. 4,060,720, Cl. 235-309.000.
Chelin, Charles R.; and Hickman, Alan J., to Towmotor Corporation. Adjustable arbor wheel mounting arrangement. 4,060,151, Cl. 187-95.000.
Chemical-Ways Corporation: *See—*
Bishop, David C., 4,059,929, Cl. 51-263.000.
Chemie Linz Aktiengesellschaft: *See—*
Garber, Alfred; Stonner, Hans-Martin; Wiesner, Paul; Sinclair, Alan; and Schmidt, Alfred, 4,060,591, Cl. 423-352.000.
Cherepanova, Valentina Pavlovna: *See—*
Khromov-Borisov, Nikolai Vasilievich; Torf, Samuil Fedorovich; Cherepanova, Valentina Pavlovna; Danilov, Anatoly Fedorovich; and Starshinova, Larisa Alexandrovna, 4,060,652, Cl. 424-329.000.
Chesebrough-Pond's, Inc.: *See—*
Russo, Ronald D., 4,060,074, Cl. 128-2.080.
Chevron Research Company: *See—*
Gomaa, Ezzat E.; and Young, Roger E., 4,060,129, Cl. 166-252.000.
Reed, Marion G.; and Jaffe, Joseph, 4,060,480, Cl. 208-111.000.
Chiba, Kazukiyo: *See—*
Matsumoto, Takeshi; Chiba, Kazukiyo; Shioyama, Atsuo; and Yamaguchi, Yoshitake, 4,060,143, Cl. 180-64.00A.
Chiesa, Peter J., Jr., to Philadelphia Suburban Corporation. Fire fighting with thixotropic foam. 4,060,132, Cl. 169-47.000.
Chiesa, Peter J., Jr., to Philadelphia Suburban Corporation. Fire fighting with thixotropic foam. 4,060,489, Cl. 252-3.000.
Chmura, William J.; Slusarski, Ronald S.; and Burk, Charles B., to Textron Inc. Method for the controlled mechanical working of sintered porous powder metal shapes to effect surface and subsurface densification. 4,059,879, Cl. 29-148.40R.
Choby, Edward G., Jr., to Allegheny Ludlum Industries, Inc. Method of soldering with phosphoric acid soldering flux. 4,060,191, Cl. 228-207.000.
Chore-Time Equipment, Inc.: *See—*
Skinner, Mark, 4,060,055, Cl. 119-48.000.
Christ, Alfred; and Lehmann, Rolf, to Escher-Wyss Limited. Rolling mill. 4,059,976, Cl. 72-19.000.
Christensen, Burton G.; and Ratcliffe, Ronald W., to Merck & Co., Inc. Cephalosporins having a 3-α substituted alkyl grouping. 4,060,687, Cl. 544-27.000.

Chrysler Corporation: *See—*
Lappington, John P.; and Shafer, Leroy, 4,060,714, Cl. 364-431.000.
Chrysler United Kingdom Limited: *See—*
Jones, Clive, 4,060,011, Cl. 74-498.000.
Wyman, Howard John, 4,060,009, Cl. 74-573.00R.
Chunat, Gerald W.; and Maloney, James E., to Economics Laboratory, Inc. Foam phosphatizing method and composition. 4,060,433, Cl. 148-6.170.
Church, Wayne Edward; and Quist, Frederick Fenn, Jr., to International Business Machines Corporation. Embossing gate roller. 4,060,230, Cl. 271-63.000.
Ciba-Geigy AG: *See—*
Batzer, Hans; Habermeier, Juergen; and Porret, Daniel, 4,060,525, Cl. 260-260.000.
Ciba-Geigy Corporation: *See—*
Karrer, Friedrich, 4,060,629, Cl. 424-300.000.
Kleiner, Eduard K.; and Dear, Robert Ernest Arthur, 4,060,681, Cl. 560-222.000.
Cieciuch, Ronald F. W.; Luhowy, Roberta R.; Meneghini, Frank A.; and Rogers, Howard G., to Polaroid Corporation. Diffusion transfer elements comprising color-providing compounds capable of cleavage upon reaction with silver ions and silver ion barrier layers. 4,060,417, Cl. 96-3.000.
Ciko, John D.; and Cramer, John J., to BASF Wyandotte Corporation. Compositions for souring and softening laundered textile materials and stock solutions prepared therefrom. 4,060,505, Cl. 252-8.800.
Cincinnati Milacron-Heald Corporation: *See—*
Robillard, Edward G., 4,059,927, Cl. 51-165.770.
Cincinnati Milacron, Inc.: *See—*
Molt, Kenneth Richard, 4,060,513, Cl. 260-45.75N.
Robillard, Edward George, 4,060,755, Cl. 318-571.000.
Cinco, Salvatore A., to Tenneco Chemicals, Inc. Process for the production of metal salts of organic acids. 4,060,535, Cl. 260-414.000.
Citizen Watch Co., Ltd.: *See—*
Kuroda, Yoshiyuki, 4,060,185, Cl. 224-4.00F.
Claassen, Volkert: *See—*
Welle, Hendricus Bernardus Antonius; and Claassen, Volkert, 4,060,631, Cl. 424-304.000.
Clark Equipment Company: *See—*
Bauer, James J.; and Sagaser, Thomas M., 4,060,261, Cl. 280-756.000.
Clarke, Peter J. Sputtering apparatus and method. 4,060,470, Cl. 204-192.00R.
Clavenna, LeRoy R.; Longo, John M.; and Horowitz, Harold S., to Exxon Research and Engineering Company. Preparation of mixed metal oxides by decomposition of carbonate solid solutions having the calcite structure. 4,060,500, Cl. 252-471.000.
Cloup, Jean. Controlled inlet valves for metering pumps. 4,060,351, Cl. 417-520.000.
Cloutier, Donald C.: *See—*
Hefni, Ibrahim El; Green, Kenneth A.; and Cloutier, Donald C., 4,060,778, Cl. 333-73.00W.
Coaltek Associates: *See—*
Davis, Rufus F., Jr., 4,060,458, Cl. 201-40.000.
Coignet S.A.: *See—*
Fougea, Bernard, 4,060,358, Cl. 425-65.000.
Cole, Carroll Richard: *See—*
Hendrickson, Vergil Philip; and Cole, Carroll Richard, 4,060,136, Cl. 172-795.000.
Cole, Donald G., to Silent Sentry, Inc. Alarm switch having resilient gripping structure for sensing unauthorized movement of a door. 4,060,704, Cl. 200-61.620.
Coleman, James H., to Sprague Electric Company. Paint curtain machine and method of painting. 4,060,649, Cl. 427-79.000.
Colgate-Palmolive Company: *See—*
Cordon, Martin, 4,060,599, Cl. 424-49.000.
Karami, Hamzeh, 4,060,085, Cl. 128-287.000.
McGhie, Russell Park, 4,060,179, Cl. 222-92.000.
Collica, Carl; Epifano, Leonard; and Farella, Ralph, to Medi-Ray, Inc. Syringe shield. 4,060,073, Cl. 128-1.100.
Collier, Robert J.: *See—*
Bauman, Dale E.; Collier, Robert J.; and Hays, Ray L., 4,060,620, Cl. 424-262.000.
Collins, Cecil A., to Fisher, Robert C. Seat belt control system. 4,060,260, Cl. 280-747.000.
Collins, Paul W.; and Pappo, Raphael, to G. D. Searle & Co. 7-{3-Hydroxy-2-[4-hydroxy-4-(lower alkyl)-trans-1-octen-1-yl]-5-oxocyclopent-1-yl}heptanoic acids and esters. 4,060,691, Cl. 560-121.000.
Collins, Richard D., to Maryland Cup Corporation. Method for producing seamless foam plastic cups from expandable sidewall blanks. 4,060,577, Cl. 264-45.400.
Collombin, Andre Marcel; and Salomon, Georges Pierre Joseph, to Ets. Francois Salomon et Fils S.A. Device for connecting a skier's leg to a ski. 4,060,256, Cl. 280-613.000.
Communications Satellite Corporation: *See—*
Atia, Ali Ezz Eldin; and Williams, Albert Edward, 4,060,779, Cl. 333-73.00W.
Community Blood Council of Greater New York, Inc., The: *See—*
Rowe, Arthur W.; and Dayian, George, 4,059,967, Cl. 62-64.000.
Compagnie Industrielle des Piles Electriques Cipel: *See—*
Anes, Lionel, 4,060,666, Cl. 429-91.000.
Compagnie Internationale pour l'Informatique Cii-Honeywell Bull: *See—*
Bienvenu, Jacques Michel Jean; Cassonnet, Jean-Claude Marcel; and Appell, Marc Michel, 4,060,849, Cl. 364-200.000.
Compo Industries, Inc.: *See—*
Santos, John J., Jr.; and Tassone, Joseph V., 4,059,861, Cl. 12-145.000.
Conn, Michael L., to United Technologies Corporation. High security lock. 4,060,846, Cl. 361-193.000.
Connors, Robert Harvey, to Triangle Package Machinery Co. Control system for cyclic operations. 4,060,736, Cl. 307-141.000.
Consolidated Products Corporation: *See—*
Roe, Norman P., 4,059,951, Cl. 57-149.000.
Continental Group, Inc., The: *See—*
Pan, Peter N. Y.; and Hernandez, Rafael J., 4,060,647, Cl. 427-21.000.
Continental Oil Company: *See—*
Doerr, Richard E., 4,060,281, Cl. 302-14.000.
Leach, Bruce Eugene, 4,060,560, Cl. 260-621.00D.
Starks, Charles M., 4,060,561, Cl. 260-621.00F.
Control Systems Research, Inc.: *See—*
Jones, Donald H., 4,060,799, Cl. 340-198.000.
Cook, Martin Christopher: *See—*
Bradshaw, Janice; Cook, Martin Christopher; and Gregory, Gordon Ian, 4,060,686, Cl. 544-22.000.
Copal Company Limited: *See—*
Tachihara, Noribumi; Mizohata, Yukio; and Makita, Jun-ichi, 4,059,916, Cl. 40-130.00K.
Copley, Russell Dean: *See—*
Trimble, David Lee; Copley, Russell Dean; Jensen, James Keith; and Schlueter, Francis Edward, 4,059,942, Cl. 56-30.000.
Corbeij, Peter H. J.; and Talsma, Tjitte, to U.S. Philips Corporation. Television deflection coil unit. 4,060,836, Cl. 358-248.000.
Cordes, Charles P. Adjustable drum. 4,060,019, Cl. 84-411.00R.
Cordes, Claus: *See—*
Jeserich, Wolfgang-Dieter; Cordes, Claus; Seydl, Wolfgang; and Weiss, Hans-Peter, 4,060,518, Cl. 260-78.00L.
Mertes, Friedrich; Doerfel, Helmut; Heil, Eduard; and Cordes, Claus, 4,060,517, Cl. 260-78.00R.
Cordon, Martin, to Colgate-Palmolive Company. Dentifrices. 4,060,599, Cl. 424-49.000.
Cotti, Gino, to Ankerfarm, S.p.A. Water-soluble derivative of 6-deoxytetracyclines. 4,060,605, Cl. 424-227.000.
Cousse, Henri: *See—*
Stenger, M. Antoine; Cousse, Henri; and Mouzin, M. Gilbert, 4,060,637, Cl. 424-324.000.
Coutin, Pierre Fernand: *See—*
Hasquenoph, Jean H.; and Coutin, Pierre Fernand, 4,060,213, Cl. 244-137.00R.
Cowan, Wavell Frederick; and Bruinsma, Bote, to Pulmac Instruments Ltd. Apparatus for testing the tensile strength of sheet material. 4,059,992, Cl. 73-95.000.
Cox, William Edward; and Lee, Frank James, to Post Office. Vibratory tools. 4,060,138, Cl. 173-49.000.
Cramer, John J.: *See—*
Ciko, John D.; and Cramer, John J., 4,060,505, Cl. 252-8.800.
Crane, Stanley J. Inflatable suit for cyclists. 4,059,852, Cl. 2-2.000.
Crawford, Charles S. Quick disconnect coupler and safety check valve. 4,060,219, Cl. 251-149.600.
Credner, Karl; Geisel, Berthold; Brenner, Gunter; and Tauscher, Manfred, to Wulfing, Johann A. Esters of the ophyllinylacetic acid. 4,060,617, Cl. 424-253.000.
Cremeans, George E.: *See—*
Sinclair, Richard G.; and Cremeans, George E., 4,060,511, Cl. 260-34.200.
Crimes, Peter B.: *See—*
Ammann, Paul R.; Crimes, Peter B.; and Kim, Jonathan J., 4,060,409, Cl. 75-93.00R.
Croissant, Jean, to Automobiles Peugeot. Device for stowing away a spare-wheel on an automobile vehicle. 4,060,270, Cl. 296-37.200.
Crossbow, Inc.: *See—*
Trott, David H., 4,059,997, Cl. 73-352.000.
Crystal Thermoplastics, Inc.: *See—*
Dahl, Nils J., 4,060,173, Cl. 220-4.00B.
Cunningham, Art, deceased (by Cunningham, Velma Ruth, executrix), to Bergman, Roger E. Wheelbarrow with removable mixer. 4,060,225, Cl. 366-40.000.
Cunningham, Velma Ruth, executrix: *See—*
Cunningham, Art, deceased, 4,060,225, Cl. 366-40.000.
Cure, Omer Paul, to Electro-Nite Co. Molten metal sample cup containing blob for promoting carbide formation. 4,059,996, Cl. 73-354.000.
Curtiss-Wright Corporation: *See—*
Woodier, George H.; and Mount, Robert E., 4,060,352, Cl. 418-122.000.
Cuzzone, Raymond, to General Electric Company. Electric fuse with sealed indicator. 4,060,786, Cl. 337-244.000.
Daehne, Welf von; and Rasmussen, Poul Rodbroe, to Leo Pharmaceutical Products Ltd. A/S. 16-Ethers of fusidic acid derivatives. 4,060,606, Cl. 424-238.000.
Dahl, Nils J., to Crystal Thermoplastics, Inc. Container. 4,060,173, Cl. 220-4.00B.
Daicel Co., Ltd.: *See—*
Moriwaki, Takeshi, 4,059,921, Cl. 47-73.000.
Daimler-Benz Aktiengesellschaft: *See—*
Scholz, Hansjurgen; Backhaus, Hans-Gerd; Brambilla, Luigi; and Gimbel, Jurgen, 4,060,004, Cl. 73-514.000.
Steiner, Adolf, 4,060,284, Cl. 303-100.000.
Dainippon Screen Seizo Kabushiki-Kaisha: *See—*
Sakamoto, Takashi, 4,060,829, Cl. 358-80.000.
D'Alelio, Gaetano Francis, to University of Notre Dame du Lac.

Chain-extending nitrile end-capped polyimides. 4,060,515, Cl. 260-63.00R.
Dalferth, Hans: *See—*
Rieger, Werner; Boning, Manfred; Dalferth, Hans; and Smetz, Reinhard, 4,060,269, Cl. 294-78.00A.
Dalinowski, Alfred A. Computer for solving unknown parameters of geometrical figures. 4,060,719, Cl. 364-729.000.
DaMert, Frederick A. Method for applying stiffener to computer paper. 4,060,651, Cl. 427-285.000.
Damian J. Jenny AG: *See—*
Jenny, Damian Johann, 4,060,027, Cl. 99-450.100.
Dandine, Pierre. Trigger assembly for spring loaded weapons. 4,060,067, Cl. 124-31.000.
Danilov, Anatoly Fedorovich: *See—*
Khromov-Borisov, Nikolai Vasilievich; Torf, Samuil Fedorovich; Cherepanova, Valentina Pavlovna; Danilov, Anatoly Fedorovich; and Starshinova, Larisa Alexandrovna, 4,060,652, Cl. 424-329.000.
Darby, David L.; and Darby, James W. Method of making a composite burial vault. 4,060,581, Cl. 264-131.000.
Darby, James W.: *See—*
Darby, David L.; and Darby, James W., 4,060,581, Cl. 264-131.000.
Dauber, Howard. Electrical outlet and switchbox locator. 4,059,907, Cl. 33-174.00G.
Davern, John W.: *See—*
Vargo, Joseph, Jr.; and Davern, John W., 4,060,189, Cl. 227-53.000.
Davies, Eric, deceased (by Davies, Olivia Maude, co-executor); and by Marr, Douglas Philip, co-executor, to Marconi Company Limited, The. Phased array radars. 4,060,806, Cl. 343-17.700.
Davies, Olivia Maude, co-executor: *See—*
Davies, Eric, deceased; and Marr, Douglas Philip, co-executor, 4,060,806, Cl. 343-17.700.
Davis, Hugh M.; and Miller, Alan H., to De Laval Turbine Inc. Rotor seal element with heat resistant alloy coating. 4,060,250, Cl. 277-53.000.
Davis, Lee; and Pang, Peter, to I-T-E Imperial Corporation. Solid state tripping circuit. 4,060,844, Cl. 361-96.000.
Davis, Rufus F., Jr., to Coaltek Associates. Separation of gas from solids. 4,060,458, Cl. 201-40.000.
Davy-Loewy Limited: *See—*
Marshall, Robert, 4,060,029, Cl. 101-4.000.
Dayian, George: *See—*
Rowe, Arthur W.; and Dayian, George, 4,059,967, Cl. 62-64.000.
DDSA Pharmaceuticals: *See—*
Shenoy, Umakant Devdas, 4,060,608, Cl. 424-244.000.
de la Parra M., Rodolfo. Thermal motor of action and reaction forces. 4,059,961, Cl. 60-670.000.
De Laval Turbine Inc.: *See—*
Davis, Hugh M.; and Miller, Alan H., 4,060,250, Cl. 277-53.000.
Dean, Anthony Vincent; and Ennis, Philip James, to International Nickel Company, Inc., The. Manganese-nickel alloys. 4,060,429, Cl. 148-31.000.
Dear, Robert Ernest Arthur: *See—*
Kleiner, Eduard K.; and Dear, Robert Ernest Arthur, 4,060,681, Cl. 560-222.000.
De Bruyne, Yvrs Marie Grovgrs: *See—*
Carteus, Marc Felix Maurice; De Bruyne, Yvrs Marie Grovgrs; Lemmens, Jean Pierre Gustaaf Rosa; and Stubbe, Elie Jozef, 4,060,057, Cl. 122-451.00R.
Decca Limited: *See—*
Hansford, Reginald Frederick, 4,060,318, Cl. 353-42.000.
Deck, Arthur M., to Goodman Manufacturing Corporation. Damper assembly. 4,060,024, Cl. 98-40.0VM.
Deere & Company: *See—*
Trimble, David Lee; Copley, Russell Dean; Jensen, James Keith; and Schlueter, Francis Edward, 4,059,942, Cl. 56-30.000.
Degen, Bruno: *See—*
Maass, Gunther; Lucking, Hans Joachim; Buchner, Werner; and Degen, Bruno, 4,060,537, Cl. 260-448.20E.
Degen, Klaus; and Herrmann, Herbert, to Roland Offsetmaschinenfabrik Faber & Schleicher AG. Sheet positioning mechanism for feed table of a sheet-fed printing press. 4,060,237, Cl. 271-231.000.
Delesandri, Domenico. Hose clamp assembly. 4,059,872, Cl. 24-284.000.
Deli, Joseph; and Stevens, Henry C., to PPG Industries, Inc. Method of controlling weeds with N-(3-methyl-5-isothiazolyl)-2-methylpentanamide. 4,060,403, Cl. 71-90.000.
Della Bianca, Luciano, to Bioengineering Research S.A. Roller pump carrying out alternate pumping operations, particularly suited to extra-corporeal blood circulation. 4,060,348, Cl. 417-475.000.
Demaine, David George Anthony; and Norrie, David Gordon, to Rank Organisation Limited, The. Face plate graticule. 4,060,307, Cl. 350-96.00B.
Demido, Michael; and Shellhause, Ronald L., to General Motors Corporation. Brake actuating pressure proportioning system and proportioner modifying arm therefor. 4,060,283, Cl. 303-6.00C.
de Nora, Vittorio: *See—*
Giuffre, Luigi; de Nora, Vittorio; and Spaziante, Placido, 4,060,473, Cl. 204-253.000.
De Palacio, Raul Calderon. Level indicators for liquids. 4,059,995, Cl. 73-301.000.
Depew, Noel F.: *See—*
Nelson, Carl R.; Pierce, David R.; Depew, Noel F.; and Harp, Marlyn F., 4,060,161, Cl. 197-1.00R.
Derail, Yves C.; and Dupeuble, Jean-Claude, to ASA S.A.; and Societa Nazionale Industria Applicazioni Viscosa S.p.A. Automatic threading false-twist spindle. 4,059,948, Cl. 57-77.330.
de Ruiter, Jacob Willem: *See—*
Naastepad, Pieter Aart; and de Ruiter, Jacob Willem, 4,060,692, Cl. 13-26.000.
Dettling, Paul. Tube bending machine. 4,059,978, Cl. 72-156.000.
Deuchar, Robert C.; and Waitzman, Gene J. Combustion engine powered floor buffer. 4,059,863, Cl. 15-98.000.
Deutsche Gold- und Silber-Scheideanstalt Vormals Roessler: *See—*
Asinger, Friedrich; Offermanns, Heribert; and Ghyczy, Miklos, 4,060,548, Cl. 260-534.00S.
Klingler, Karl H.; Aurich, Rudolf; and Habersang, Silke, 4,060,618, Cl. 424-253.000.
Devimeux, Daniel Pierre Yvon; and Stouls, Francois-Xavier Antoine, to Societe Anonyme de Telecommunications. Digit rate reducing method in video signal transmission. 4,060,832, Cl. 358-133.000.
Devro, Inc.: *See—*
Ziolko, Francis Joseph, 4,060,361, Cl. 425-131.100.
Dey, Arabinda N., to P. R. Mallory & Co. Inc. Ion exchange membranes and organic electrolyte cells employing same. 4,060,673, Cl. 429-192.000.
Dey, Arabinda N.; and Holmes, Robert W., to P. R. Mallory & Co. Inc. Metal periodate organic electrolyte cells. 4,060,676, Cl. 429-217.000.
Diamond, Julius; and Douglas, George H., to William H. Rorer, Inc. Amidinoureas for treating diarrhea. 4,060,635, Cl. 424-322.000.
Dias, Francesco: *See—*
Luhleich, Hartmut; Nickel, Hubertus; and Dias, Francesco, 4,060,592, Cl. 423-448.000.
Diehl, Marcus I.: *See—*
Schweig, Eugene S., Jr.; and Diehl, Marcus I., 4,060,444, Cl. 156-391.000.
DiGiacinto, Joseph A. Sprayer hydroponic grower. 4,059,922, Cl. 47-82.000.
Dimitrov, Spas Petkov: *See—*
Stoev, Stoycho Mitrev; Metodiev, Metodi Stoyanov; Kuzev, Lyubomir Vladimirov; Vedrichkov, Petko Georgiev; Sapunarov, Ivan Mitrev; Vassilev, Vassil Vladimirov; Dimitrov, Spas Petkov; Gasharov, Vihar Assenov; Russev, Sheko Kolev; and Mitrev, Kostadin Georgiev, 4,060,481, Cl. 209-170.000.
Dionne, Leonard J., to Polaroid Corporation. Photographic apparatus with lens focusing scale. 4,060,817, Cl. 354-198.000.
Dirlam, John P., to Pfizer Inc. 1-Alkoxy-1-substituted phenyl-1,3-dehydrofuro[3,4-b]quinoxaline-4,9-dioxides. 4,060,523, Cl. 260-250.0QN.
Di Rosa, Gaetano, to FATA S.p.A. Low-pressure die casting machine. 4,060,122, Cl. 164-304.000.
Ditto, Edwin D., to General Motors Corporation. Method of alloying and forming a valve seat. 4,059,876, Cl. 29-156.70A.
Divecha, Amarnath P., to A Silag Inc. Method for preparing a fiber reinforced metal matrix using microscopic fibers. 4,060,412, Cl. 75-203.000.
DIY-Sol, Inc.: *See—*
Rapp, Felix, Jr.; and Barron, James M., 4,060,195, Cl. 237-1.00A.
Dobson, Charles Edward. Panel device. 4,059,914, Cl. 40-125.00F.
Dr. C. Otto & Comp. G.m.b.H.: *See—*
Oldengott, Hans, 4,059,885, Cl. 29-401.00F.
Doerfel, Helmut: *See—*
Mertes, Friedrich; Doerfel, Helmut; Heil, Eduard; and Cordes, Claus, 4,060,517, Cl. 260-78.00R.
Doerr, Richard E., to Continental Oil Company. Coal slurry feeder. 4,060,281, Cl. 302-14.000.
Doi, Tetsuo: *See—*
Yamada, Takahiro; and Doi, Tetsuo, 4,060,813, Cl. 346-75.000.
Doi, Yasuhiko; Tokura, Yukio; and Imaizumi, Koji, to Minolta Camera Kabushiki Kaisha. Transfer material separating device. 4,060,320, Cl. 355-3.00R.
Dolfini, Joseph E.; and MacKenzie, Robert D., to Richardson-Merrell Inc. Ethylenediamine derivatives useful in treating sickle cell anemia. 4,060,630, Cl. 424-300.000.
Dollond & Aitchison (Services) Limited: *See—*
Eadow-Allen, Stuart, 4,059,925, Cl. 51-100.00R.
Domer, Michel; and Hay, Jean-Yves, to Societe Paulstra. Spherical couplings for vehicle towing or kindred purposes. 4,060,331, Cl. 403-130.000.
Domergue, Annick Marthe Suzanne Simone; and Sureau, Robert Frederic Michel, to Produits Chimiques Ugine Kuhlmann. Coumarin derivatives. 4,060,531, Cl. 260-308.00R.
Doss, Richard C.; and Murtha, Timothy P., to Phillips Petroleum Company. Polythiol sealants. 4,060,519, Cl. 260-79.000.
Douglas, George H.: *See—*
Diamond, Julius; and Douglas, George H., 4,060,635, Cl. 424-322.000.
Douno, Syugo, to Glory Kogyo Kabushiki Kaisha. Coin stacker in automatic coin wrapping apparatus. 4,060,093, Cl. 133-1.00A.
Dow Chemical Company, The: *See—*
Olstowski, Franciszek, 4,060,509, Cl. 260-30.60R.
Dow Corning Corporation: *See—*
Schroeder, Fred, 4,060,435, Cl. 149-19.200.
Dowling, Donald J.; and Schoen, William, to Texaco Inc. Apparatus and method for measuring the water content of oil flowing in a pipe. 4,059,987, Cl. 73-61.10R.
Drechsel, Erhart Karl: *See—*
Sardisco, John B.; and Drechsel, Erhart Karl, 4,060,586, Cl. 423-167.000.
Dreibelbis, Richard C.; and Turner, Warren E., to Emerson Electric Co. (H&H Thermostats Div.). Dispensing head assembly for fluid dispensing system and a nozzle therefor made of plastic material. 4,060,198, Cl. 239-24.000.

Drouin, Claude, to Les Industries BFG Limitee. Window unit for use in oven doors. 4,060,069, Cl. 126-200.000.
Duarte, Manuel G.: *See—*
  Duarte, Ruben G.; and Duarte, Manuel G., 4,060,365, Cl. 425-214.000.
Duarte, Ruben G.; and Duarte, Manuel G. Dough press. 4,060,365, Cl. 425-214.000.
Dubendorfer, Ulrich: *See—*
  Engeler, Paul; Baumgartner, Hans Ulrich; Dubendorfer, Ulrich; and Sonderegger, Hans Conrad, 4,059,999, Cl. 73-419.000.
Duckett, William Arthur, to Jonas Woodhead Limited. Hydraulic shock absorber. 4,060,155, Cl. 188-282.000.
Dugdale, Bernard: *See—*
  Tilley, Leslie Joseph; and Dugdale, Bernard, 4,060,734, Cl. 250-560.000.
Dulaney, Eugene L.: *See—*
  Jacobus, David P.; Dulaney, Eugene L.; and Grier, Nathaniel, 4,060,639, Cl. 424-325.000.
Dunlop Limited: *See—*
  Allitt, Bernard Charles, 4,060,357, Cl. 425-36.000.
Dunstheimer, Mathias. Animal holder. 4,059,869, Cl. 17-44.000.
Dunston, Virgil M. Push pull exercising device. 4,060,240, Cl. 272-126.000.
Dupeuble, Jean-Claude: *See—*
  Derail, Yves C.; and Dupeuble, Jean-Claude, 4,059,948, Cl. 57-77.330.
Du Pont de Nemours, E. I., and Company: *See—*
  Evans, Arlyn Wayne, 4,060,404, Cl. 71-93.000.
  Hoover, Fred Wayne; and Iler, Ralph K., 4,060,488, Cl. 210-433.00M.
  Klopping, Hein Louis, 4,060,624, Cl. 424-273.00R.
  Klopping, Hein Louis, 4,060,625, Cl. 424-273.00R.
  Lee, Lin-Fa, 4,059,949, Cl. 57-140.0BY.
  Nelson, Thomas Larson, 4,059,873, Cl. 28-271.000.
  Welch, Aaron Waddington, 4,060,405, Cl. 71-93.000.
Durant, Graham John; Emmett, John Colin; and Ganellin, Charon Robin, to Smith Kline & French Laboratories Limited. Pyridyl alkylguanidine compounds. 4,060,621, Cl. 424-263.000.
Dyal, John P. Method for fitting dentures to various jaw positions. 4,059,899, Cl. 32-2.000.
Dybel, Frank R.: *See—*
  Dybel, William P.; and Dybel, Frank R., 4,059,991, Cl. 73-88.50R.
Dybel, William P.; and Dybel, Frank R. Modular constructed load sensing system. 4,059,991, Cl. 73-88.50R.
Dynamit Nobel Aktiengesellschaft: *See—*
  El Chahawi, Moustafa; and Richtzenhain, Hermann, 4,060,690, Cl. 560-55.000.
  Kotzsch, Hans-Joachim; and Vahlensieck, Hans-Joachim, 4,060,536, Cl. 260-448.20E.
  Kotzsch, Hans Joachim; Vahlensieck, Hans-Joachim; and Seiler, Claus-Dieter, 4,060,538, Cl. 260-448.80R.
  Seiler, Claus-Dietrich; Vahlensieck, Hans-Joachim; and Amort, Jurgen, 4,060,539, Cl. 260-448.80R.
E Z Painter Corporation: *See—*
  Burns, Fredrick B.; and Balint, Peter, 4,060,215, Cl. 248-360.000.
Eadow-Allen, Stuart, to Dollond & Aitchison (Services) Limited. Machine for forming a curved surface on a workpiece. 4,059,925, Cl. 51-100.00R.
Eastman Kodak Company: *See—*
  Merkel, Paul Barrett; and Ling, Hans Gway, 4,060,420, Cl. 96-114.100.
Eaton Corporation: *See—*
  Chaney, Lynn Harold; and Smith, Glenn S., 4,060,159, Cl. 192-113.00B.
  Frailly, Robert A., 4,060,116, Cl. 151-7.000.
  Goscenski, Edward J., Jr., 4,060,146, Cl. 180-161.000.
Eaton, Thomas, to I T L Technology, Inc. Dialysis apparatus. 4,060,485, Cl. 210-87.000.
Ebel, Fred H.: *See—*
  Landgraf, Glenn A.; and Ebel, Fred H., 4,060,227, Cl. 270-66.000.
Eckold, Gerd-Jurgen; and Maass, Hans. Hand tool. 4,060,046, Cl. 113-54.00R.
Economics Laboratory, Inc.: *See—*
  Chunat, Gerald W.; and Maloney, James E., 4,060,433, Cl. 148-6.170.
Edstrom, Richard C.: *See—*
  Feldeisen, Ronald F.; Minchak, John A.; Gerstman, Richard B.; Meyers, Herbert M.; and Edstrom, Richard C., 4,060,105, Cl. 141-1.000.
Edwards, Ronald Alexander Nixon; and Manrique, Jorge, to Unisearch Limited. Protein isolation. 4,060,203, Cl. 241-7.000.
Egorov, Boris Afanasievich; Grzhimalovsky, Alexandr Sergeevich; Judin, Alexandr Vladimirovich; Fishman, Konstantin Evgenievich; and Vernaya, Ljudmila Dmitrievna. Method of manufacturing polyoxymethylene filaments. 4,060,582, Cl. 264-210.00F.
Eibeck, Richard E.: *See—*
  Peterson, James Oliver; Sukornick, Bernard; Sweeney, Richard Francis; Nychka, Henry R.; Eibeck, Richard E.; and Berenbaum, Morris B., 4,060,555, Cl. 260-586.00R.
Eicken, Karl: *See—*
  Kindscher, Wolfgang; Fischer, Martin; Eicken, Karl; and Vitt, Guenter, 4,060,522, Cl. 260-293.850.
Eisenlohr, Karl-Heinz; and Bratzler, Karl, to Metallgesellschaft Aktiengesellschaft. Process for recovering elemental sulfur from gases having a high carbon dioxide content and containing sulfur compounds. 4,060,595, Cl. 423-574.00R.
El Chahawi, Moustafa; and Richtzenhain, Hermann, to Dynamit Nobel Aktiengesellschaft. Method of preparing arylacetic acid alkyl esters. 4,060,690, Cl. 560-55.000.
Electricite De France: *See—*
  Mascarello, Jean Marius; Godin, Paul; and Millet, Jacques Francois, 4,060,466, Cl. 204-129.000.
Electro-Nite Co.: *See—*
  Cure, Omer Paul, 4,059,996, Cl. 73-354.000.
Eli Lilly and Company: *See—*
  Chauvette, Robert R., 4,060,688, Cl. 544-30.000.
Elliott Enterprises of Monte Vista: *See—*
  Elliott, Lillard H., 4,059,939, Cl. 52-745.000.
Elliott, Lillard H., to Elliott Enterprises of Monte Vista. Prefabricated building unit. 4,059,939, Cl. 52-745.000.
Ellis, Delmar H., to General Electric Company. Method and apparatus for measuring deflection of rotating airfoils. 4,060,329, Cl. 356-167.000.
Elscint, Ltd.: *See—*
  Zioni, Jacob; Klein, Yitzhak; and Inbar, Dan, 4,060,730, Cl. 250-369.000.
Enico Wheaton Inc.: *See—*
  Bower, Allen M., 4,060,110, Cl. 141-207.000.
Emerson Electric Co.: *See—*
  Fleer, Thomas P., 4,060,370, Cl. 431-62.000.
Emerson Electric Co. (H&H Thermostats Div.): *See—*
  Dreibelbis, Richard C.; and Turner, Warren E., 4,060,198, Cl. 239-24.000.
Emmett, John Colin: *See—*
  Durant, Graham John; Emmett, John Colin; and Ganellin, Charon Robin, 4,060,621, Cl. 424-263.000.
Enders, Edgar; and Stendel, Wilhelm, to Bayer Aktiengesellschaft. 2-(Alkylhalophenylimino)dithiolanes and ectoparasiticidal composition and method. 4,060,628, Cl. 424-277.000.
Energiagazdalkodasi Intezet: *See—*
  Peredi, Karoly, 4,060,376, Cl. 432-24.000.
  Peredi, Karoly, 4,060,378, Cl. 432-96.000.
Energy Products of Idaho: *See—*
  Sowards, Norman K., 4,060,041, Cl. 110-8.00F.
Engeler, Paul; Baumgartner, Hans Ulrich; Dubendorfer, Ulrich; and Sonderegger, Hans Conrad, to Kistler Instrumente AG. Pressure transducers for plastic substances. 4,059,999, Cl. 73-419.000.
Engineer, Serosh: *See—*
  Brandis, Helmut; Von Den Steinen, Albert; and Engineer, Serosh, 4,060,431, Cl. 148-36.000.
Engle, Thomas H.: *See—*
  Bogenschutz, Thomas M.; Engle, Thomas H.; and McEathron, Eugene D., 4,060,152, Cl. 188-52.000.
English Electric Valve Company Limited: *See—*
  Howorth, Jonathan Ross; Goss, Alan Jerome; and Pool, Peter James, 4,060,823, Cl. 357-30.000.
English, Milton: *See—*
  Osborne, Ray L., 4,059,883, Cl. 29-259.000.
Ennis, Philip James: *See—*
  Dean, Anthony Vincent; and Ennis, Philip James, 4,060,429, Cl. 148-31.000.
Epifano, Leonard: *See—*
  Collica, Carl; Epifano, Leonard; and Farella, Ralph, 4,060,073, Cl. 128-1.100.
Epley, John M., to Hearing Evaluation & Acoustic Research, Inc. Method for testing acoustical attenuation of hearing protectors. 4,060,701, Cl. 179-175.000.
Epstein, Harold M.: *See—*
  Mallozzi, Philip J.; Epstein, Harold M.; Applebaum, David C.; Gallagher, William J.; and Campbell, Bernerd E., 4,060,769, Cl. 330-4.300.
Ernest, Robert P.: *See—*
  Hideg, Laszlo; and Ernest, Robert P., 4,060,058, Cl. 123-8.090.
Ernst, Arnold E. Implement re-alignment hitch. 4,060,254, Cl. 280-461.00A.
Ernst Leitz GmbH Wetzlar: *See—*
  Rapp, Wolfgang; Haas, Karl-Heinz; and Luessem, Heribert, 4,060,388, Cl. 23-230.00R.
Ernyei, Herbert, to Societe Lignes Telegraphiques et Telephoniques. Electromechanical band-pass filter for high frequencies. 4,060,774, Cl. 333-71.000.
Escher-Wyss Limited: *See—*
  Christ, Alfred; and Lehmann, Rolf, 4,059,976, Cl. 72-19.000.
Establissements Amyot S.A.: *See—*
  Amyot, Claude, 4,060,251, Cl. 279-62.000.
Etablissements Carpano & Pons: *See—*
  Saligny, Yves, 4,060,302, Cl. 339-97.00R.
Etablissements Nativelle S.A.: *See—*
  Jarreau, Francois-Xavier; and Sarfati, Roger Gerard, 4,060,607, Cl. 424-241.000.
Ets. Francois Salomon et Fils S.A.: *See—*
  Collombin, Andre Marcei; and Salomon, Georges Pierre Joseph, 4,060,256, Cl. 280-613.000.
Evans, Arlyn Wayne, to Du Pont de Nemours, E. I., and Company. Selective herbicide for sugarcane. 4,060,404, Cl. 71-93.000.
Evans, Charles P., to Laser Graphic Systems Corporation. Substrate for composite printing and relief plate. 4,060,032, Cl. 101-401.100.
Evenheat Kiln, Inc.: *See—*
  Watson, John C.; Watson, John D.; and Watson, Gerald K., 4,060,381, Cl. 432-247.000.
Everett, Seth Leroy, Jr. Keyboard switch assembly with tactile feedback having illuminated laminated layers including opaque or transparent conductive layer. 4,060,703, Cl. 200-5.00A.

Evertz, Werner: *See—*
  Wedemeyer, Karlfried; Kiel, Wolfgang; and Evertz, Werner, 4,060,562, Cl. 260-623.00R.
Evtuhov, Viktor: *See—*
  Barnoski, Michael K.; and Evtuhov, Viktor, 4,060,308, Cl. 350-96.00C.
Exxon Research and Engineering Company: *See—*
  Clavenna, LeRoy R.; Longo, John M.; and Horowitz, Harold S., 4,060,500, Cl. 252-471.000.
  Klemann, Lawrence P.; and Newman, Gerald H., 4,060,674, Cl. 429-194.000.
  Lang, Robert J., 4,060,478, Cl. 208-8.000.
F. Kuppersbusch & Sohne Aktiengesellschaft: *See—*
  Lohr, Alfred; and Tschek, Wolfgang, 4,060,026, Cl. 99-346.000.
Fabri-Tek Incorporated: *See—*
  Hoffman, Gerald F.; and Bolton, Dewayne P., 4,060,123, Cl. 165-11.000.
Fahlstrom, Per Anders Herman Henningsson; Mioen, Thomas Konrad; and Bjorling, Gotthard E., to Boliden Aktiebolag. Method for extracting and recovering iron and nickel in metallic form. 4,060,464, Cl. 204-113.000.
Faid, Robert W., to W. R. Grace & Co. Post-applied waterstop. 4,059,935, Cl. 52-396.000.
Fanciullo, Ralph D., to Polaroid Corporation. Flat battery. 4,060,669, Cl. 429-152.000.
Fanner Pty. Limited: *See—*
  Shaw, Alan Douglas, 4,059,988, Cl. 73-579.000.
Farella, Ralph: *See—*
  Collica, Carl; Epifano, Leonard; and Farella, Ralph, 4,060,073, Cl. 128-1.100.
Farris, Russell E.: *See—*
  Stanley, Lester N.; and Farris, Russell E., 4,060,544, Cl. 260-465.00D.
FATA S.p.A.: *See—*
  Di Rosa, Gaetano, 4,060,122, Cl. 164-304.000.
Faucz, Eugene C., to Xerox Corporation. Magnetic latent image creation. 4,060,811, Cl. 346-74.100.
Faulkner, Richard Dale, to RCA Corporation. Phototube having domed mesh with non-uniform apertures. 4,060,747, Cl. 313-95.000.
Federal-Mogul Corporation: *See—*
  Glover, Douglas; and Minter, Marvin J., 4,059,990, Cl. 73-81.000.
Feeney, George W.; and Habeck, Bruce W., to Goodyear Tire & Rubber Company, The. Adhesive composition. 4,060,503, Cl. 260-5.000.
Feigt, Ingmar: *See—*
  Jantsch, Ottomar; Feigt, Ingmar; and Willig, Wolf Rudiger, 4,060,822, Cl. 357-30.000.
Feldeisen, Ronald F.; Minchak, John A.; Gerstman, Richard B.; Meyers, Herbert M.; and Edstrom, Richard C., to Xerox Corporation. Toner loading apparatus with replenishing supply container. 4,060,105, Cl. 141-1.000.
Feldman, Paul S.; Johnson, Robert B.; and Nibby, Chester M., Jr., to Honeywell Information Systems Inc. Apparatus and method for generating timing signals for latched type memories. 4,060,794, Cl. 364-900.000.
Fenner, Jurgen: *See—*
  Alpen, Ulrich Von; Fenner, Jurgen; Marcoll, Joachim; and Rabenau, Albrecht, 4,060,672, Cl. 429-191.000.
Fenton, Donald M.; and Vaell, Raoul P., to Union Oil Company of California. Reducing the consumption of anthraquinone disulfonate in stretford solutions. 4,060,594, Cl. 423-573.00R.
Fergestad, Petter I., to A/S National Industri. Electrical inductive apparatus. 4,060,784, Cl. 336-84.00R.
Ferland, Jean-Marie; Laliberte, Real; Lippmann, Wilbur; and Pugsley, Thomas A., to Ayerst McKenna and Harrison Ltd. 3-Aryloxy-2(4-loweralkyl-1-piperazinyl)propanols, their alkylethers, and use thereof. 4,060,613, Cl. 424-250.000.
Fiberglass Specialty Co., Inc.: *See—*
  Rysgaard, John R., Sr., 4,060,175, Cl. 220-85.00B.
Fick, Paul A., to National Machinery Company, The. Apparatus for making shouldered tubular rivets. 4,059,860, Cl. 10-11.00R.
Filippov, Vladimir Jurievich: *See—*
  Savin, Nikolai Ivanovich; Ternikova, Tamara Alexandrovna; Filippov, Vladimir Jurievich; and Shiryaev, Vladimir Ivanovich, 4,060,127, Cl. 165-145.000.
Finkelman, Morris, to Amcar Industries, Ltd. Oyster board. 4,059,870, Cl. 17-75.000.
Fire Victor Holding S.A.: *See—*
  Baraldi, Enzo; and Longhi, Giuliano, 4,060,042, Cl. 110-14.000.
Fireplace Corporation of America: *See—*
  Lever, Paul H.; and Mohr, Clifford D., 4,060,068, Cl. 126-120.000.
Firestone Tire & Rubber Company, The: *See—*
  Lohr, Delmar Frederick, Jr.; and Wakefield, Lynn Burritt, 4,060,563, Cl. 260-624.00B.
Fischer, Josef, to Neumo Armaturenfabrik-Apparatebau-Metallgiesserei GmbH, Firma. Valve. 4,060,220, Cl. 251-306.000.
Fischer, Martin: *See—*
  Kindscher, Wolfgang; Fischer, Martin; Eicken, Karl; and Vitt, Guenter, 4,060,522, Cl. 260-293.850.
Fischer, Rolf: *See—*
  Weitz, Hans-Martin; and Fischer, Rolf, 4,060,543, Cl. 260-464.000.
Fisher, Robert C.: *See—*
  Collins, Cecil A., 4,060,260, Cl. 280-747.000.
Fishman, Konstantin Evgenievich: *See—*
  Egorov, Boris Afanasievich; Grzhimalovsky, Alexandr Sergeevich; Judin, Alexandr Vladimirovich; Fishman, Konstantin Evgenievich; and Vernaya, Ljudmila Dmitrievna, 4,060,582, Cl. 264-210.00F.
Flannery, John B.: *See—*
  Pollack, Joel M.; and Flannery, John B., 4,060,316, Cl. 353-20.000.
Fleer, Thomas P., to Emerson Electric Co. Manifold gas valve with stepped flow operation. 4,060,370, Cl. 431-62.000.
Fleischman, Andor A.: *See—*
  Linke, Walter R.; and Fleischman, Andor A., 4,060,312, Cl. 350-189.000.
Fleissner, Hans, to Vepa AG. Apparatus for the continuous treatment of endless material, especially the shrinking thereof. 4,059,974, Cl. 68-15.000.
Fleming-Potter Company, Inc.: *See—*
  Romagnoli, Robert A., 4,060,168, Cl. 206-216.000.
Floyd, Don E.; and Potente, Demetri, to General Mills Chemicals, Inc. Aminopolyamide-acrylamide-glyoxal resin. 4,060,507, Cl. 260-21.000.
Floyd, Middleton Brawner, Jr.: *See—*
  Bernady, Karel Francis; Floyd, Middleton Brawner, Jr.; Poletto, John Frank; Schaub, Robert Eugene; and Weiss, Martin Joseph, 4,060,540, Cl. 260-448.80R.
Flynt, William E., to Varo, Inc. System for measuring the modulation transfer function of an optical device. 4,060,328, Cl. 356-124.000.
Foldes, Peter, to RCA Corporation. Antenna system with automatic depolarization correction. 4,060,808, Cl. 343-100.0PE.
Foley, Robert A. Fibre optics display. 4,060,722, Cl. 362-32.000.
Foller, Werner, to Gestra-KSB Vertriebsgesellschaft mbH & Co. Kommanditgesellschaft. Thermally controlled valve. 4,060,193, Cl. 236-59.000.
Ford Motor Company: *See—*
  Hideg, Laszlo; and Ernest, Robert P., 4,060,058, Cl. 123-8.090.
  Kaufman, Sydney M., 4,060,414, Cl. 75-246.000.
  Macauley, William T., 4,060,338, Cl. 416-214.00R.
Forneris, John L.: *See—*
  Barile, Conrad A.; Brill, Robert M.; Forneris, John L.; and Regh, Joseph, 4,060,427, Cl. 148-1.500.
Fors, Lars Borje Staffan: *See—*
  Verner, Bo Lennart; and Fors, Lars Borje Staffan, 4,060,574, Cl. 261-77.000.
Forth Instruments Limited: *See—*
  Tilley, Leslie Joseph; and Dugdale, Bernard, 4,060,734, Cl. 250-560.000.
Foseco International Limited: *See—*
  Jones, Evan Thomas Richard, 4,060,406, Cl. 75-12.000.
Foster D. Snell, Inc.: *See—*
  Schoenhoiz, Daniel; and Petersen, Arthur W., 4,060,494, Cl. 252-105.000.
Foster Grant Co., Inc.: *See—*
  Smith, Stuart B., 4,060,354, Cl. 425-4.00R.
Fougea, Bernard, to Coignet S.A. Climbing scaffolding assemblies with associated shuttering. 4,060,358, Cl. 425-65.000.
Fournier, Daniel; and Bourgeois, Hugues, to Rhone-Poulenc Industries. Electrolytic cell suitable for producing alkali metal chlorates. 4,060,475, Cl. 204-270.000.
Foxboro Company, The: *See—*
  Annino, Raymond; Prescott, Robert C.; Karas, Edwin L.; and Kalinoski, Richard W., 4,059,994, Cl. 73-23.100.
Frailly, Robert A., to Eaton Corporation. Method for producing self-locking fasteners. 4,060,116, Cl. 151-7.000.
Frank, Willi: *See—*
  Menge, Gunter; Grieben, Karl-Heinz; Reitmeier, Lutz; and Frank, Willi, 4,059,940, Cl. 53-148.000.
Franke, Henry L.: *See—*
  Williams, David Roth, 4,060,400, Cl. 62-162.000.
Franke, Kurt, to Siements Aktiengesellschaft. X-ray diagnostic apparatus with an automatic exposure timer. 4,060,733, Cl. 250-491.000.
Frechette, Kenneth R., to Stamford, Xerox Corporation. Ribbon lift guide. 4,060,162, Cl. 197-53.000.
Friedman, Diana W.: *See—*
  Friedman, Irving, 4,060,077, Cl. 128-145.800.
Friedman, Irving, to Friedman, Diana W. Respirator. 4,060,077, Cl. 128-145.800.
Fritzsche, Christoph, to Lonza, Ltd. Process for the determination of the visco-elastic characteristics of polymers and arrangement to carry out the process. 4,059.983, Cl. 73-15.600.
Frye, Robert Charles: *See—*
  Tasch, Al F., Jr; Frye, Robert Charles; Fu, Horng-Sen; and Brodersen, Robert W., 4,060,738, Cl. 307-238.000.
Fu, Horng-Sen: *See—*
  Tasch, Al F., Jr; Frye, Robert Charles; Fu, Horng-Sen; and Brodersen, Robert W., 4,060,738, Cl. 307-238.000.
Fuji Chemical Industries, Ltd.: *See—*
  Nakamoto, Hiromasa; Nakamoto, Shin-Ichi; Amemiya, Hidemitu; Miyamura, Souji; Shiba, Motoo; and Nakamura, Nobuko, 4,060,527, Cl. 260-279.00R.
Fuji Photo Film Co., Ltd.: *See—*
  Kondo, Toshihiro, 4,060,313, Cl. 350-269.000.
  Maekawa, Yukio; Satomura, Masato; and Umehara, Akira, 4,060,685, Cl. 542-413.000.
Fuji Photo Optical Co., Ltd.: *See—*
  Numata, Saburo; and Fujino, Shinichiro, 4,060,788, Cl. 338-128.000.
  Watanabe, Naohei; and Inoue, Tadaomi, 4,060,756, Cl. 318-668.000.
Fuji Xerox Co., Ltd.: *See—*
  Suzuki, Matsumi; Morino, Tetsuro; and Yokota, Shozo, 4,060,694, Cl. 179-1.0SD.
  Suzuki, Matsumi; Kataoka, Hiroyuki; and Ueno, Keiichi, 4,060,695, Cl. 179-1.0SB.

Fujie, Kunio; Nakayama, Wataru; Kuwahara, Heikichi; and Kakizaki, Kimio, to Hitachi Cable, Ltd.; and Hitachi, Ltd. Heat transfer wall for boiling liquids. 4,060,125, Cl. 165-133.000.

Fujiki, Goro: *See—*
  Iwahara, Makoto; Maruyama, Fumio; Fujiki, Goro; Mori, Toshinori; Hiyama, Norio; and Kikuchi, Mitsuru, 4,060,696, Cl. 179-1.0GQ.

Fujino, Shinichiro: *See—*
  Numata, Saburo; and Fujino, Shinichiro, 4,060,788, Cl. 338-128.000.

Fujita, Makio: *See—*
  Shimizu, Kazufusa; Katsumori, Shigeo; Nishikawa, Tadaaki; Senoo, Keisaku; Sakamaki, Kenji; Fujita, Makio; Tano, Teruo; Takano, Hiroshi; and Komori, Hideo, 4,060,390, Cl. 23-259.100.

Fujitsu Limited: *See—*
  Togei, Ryoiku; Takei, Akira; Hika, Yoshihiko; and Wada, Kunihiko, 4,060,796, Cl. 365-183.000.

Fukatsu, Shunzo: *See—*
  Umezawa, Hamao; Umezawa, Sumio; Tsuchiya, Osamu; Akita, Eiichi; Miyazawa, Takeo; Horiuchi, Yukio; and Fukatsu, Shunzo, 4,060,682, Cl. 536-10.000.

Funk, Richard S.; Stewart, S. Alan; and Ruff, David L., to Grefco, Inc. Strip for fastening and sealing sheets of construction material. 4,059,933, Cl. 52-127.000.

Furuta, Koichi, to Nippon Kogaku K.K. Switch operating device operatively associated with a reciprocally movable member. 4,060,818, Cl. 354-266.000.

Futurecraft Corporation: *See—*
  Piet, Meyer; and Giles, Dean Gaylord, 4,059,903, Cl. 32-40.00R.

G. D. Searle & Co.: *See—*
  Collins, Paul W.; and Pappo, Raphael, 4,060,691, Cl. 560-121.000.

GAF Corporation: *See—*
  Stanley, Lester N.; and Farris, Russell E., 4,060,544, Cl. 260-465.00D.
  Waxman, Burton H.; and Mourning, Michael C., 4,060,418, Cl. 96-29.00D.

Gajajiva, Padej, to I-T-E Imperial Corporation Efcor Division. Swivel conduit coupling assembly. 4,060,264, Cl. 285-175.000.

Gallagher, William J.: *See—*
  Mallozzi, Philip J.; Epstein, Harold M.; Applebaum, David C.; Gallagher, William J.; and Campbell, Bernerd E., 4,060,769, Cl. 330-4.300.

Gallant, Gerald G., Jr.: *See—*
  LaHaye, Paul G.; Bjerklie, John W.; and Gallant, Gerald G., Jr., 4,060,379, Cl. 432-179.000.

Galvagni, John L., to AVX Corporation. Tantalum chip capacitor and method of manufacture. 4,059,887, Cl. 29-570.000.

Gamez Duch, Enrique. Soccer board game. 4,060,245, Cl. 273-85.00R.

Ganellin, Charon Robin: *See—*
  Durant, Graham John; Emmett, John Colin; and Ganellin, Charon Robin, 4,060,621, Cl. 424-263.000.

Gante, Joachim; Kurmeier, Hans-Adolf; Orth, Dieter; Schacht, Erich; and Wild, Albrecht, to Merck Patent Gesellschaft mit beschrankter Haftung. Phenylalkanol nitriles. 4,060,633, Cl. 424-304.000.

Garber, Alfred; Stonner, Hans-Martin; Wiesner, Paul; Sinclair, Alan; and Schmidt, Alfred, to Metallgesellschaft Aktiengesellschaft; and Chemie Linz Aktiengesellschaft. Continuous process for recovering pure, concentrated ammonia. 4,060,591, Cl. 423-352.000.

Garcia, Federico. Slide display. 4,059,913, Cl. 40-64.00A.

Gasharov, Vihar Assenov: *See—*
  Stoev, Stoycho Mitrev; Metodiev, Metodi Stoyanov; Kuzev, Lyubomir Vladimirov; Vedrichkov, Petko Georgiev; Sapunarov, Ivan Mitrev; Vassilev, Vassil Vladimirov; Dimitrov, Spas Petkov; Gasharov, Vihar Assenov; Russev, Sheko Kolev; and Mitrev, Kostadin Georgiev, 4,060,481, Cl. 209-170.000.

Gast, Gary. Liquor trunk. 4,060,156, Cl. 190-30.000.

Gausepohl, Hermann: *See—*
  Naarmann, Herbert; Reichel, Fritz; and Gausepohl, Hermann, 4,060,679, Cl. 526-304.000.

Gdovin, David Paul, to Singer Company, The. Viewing head. 4,060,835, Cl. 358-238.000.

Gearin, John M., to Bunker Ramo Corporation. Hermaphroditic connector assembly. 4,060,298, Cl. 339-48.000.

Gee, James Edgar; and Ohms, Edward Joseph, to Caterpillar Tractor Co. Bearing assembly for an auger scraper. 4,060,289, Cl. 308-187.100.

Geisel, Berthold: *See—*
  Credner, Karl; Geisel, Berthold; Brenner, Gunter; and Tauscher, Manfred, 4,060,617, Cl. 424-253.000.

Gemmer, Erwin: *See—*
  Johannes, Gerhard; Gemmer, Erwin; Konig, Hans-Joachim; and Reinhard, Gunter, 4,060,655, Cl. 428-35.000.

General Atomic Company: *See—*
  Miertschin, Gary N.; and Powell, Kenneth F., 4,060,454, Cl. 176-84.000.

General Electric Company: *See—*
  Anderson, Thomas E., 4,060,751, Cl. 315-209.00R.
  Cuzzone, Raymond, 4,060,786, Cl. 337-244.000.
  Ellis, Delmar H., 4,060,329, Cl. 356-167.000.
  Hall, Robert N., 4,060,432, Cl. 148-186.000.
  Hanson, James M.; and Povall, Gerald W., 4,060,721, Cl. 362-13.000.
  Harnden, John D., Jr., 4,060,783, Cl. 335-296.000.
  Houston, Douglas E.; and Krishna, Surinder, 4,060,821, Cl. 357-22.000.
  Loeb, Leopold, 4,059,970, Cl. 62-353.000.
  McMurray, William, 4,060,757, Cl. 363-57.000.
  Stein, Charles R.; and Carl, William L., 4,060,801, Cl. 340-324.00R.
  Thomas, George L., 4,060,423, Cl. 106-52.000.
  True, Howard D. F., Jr., 4,059,966, Cl. 62-414.000.
  Walker, Loren H., 4,060,752, Cl. 315-244.000.
  White, Dwain M., 4,060,514, Cl. 260-47.0ET.

General-Electro Mechanical Corporation: *See—*
  Vargo, Joseph, Jr.; and Davern, John W., 4,060,189, Cl. 227-53.000.

General Foods Corporation: *See—*
  Haas, Gerhard Julius; and Herman, Edwin Bernard, 4,060,602, Cl. 424-58.000.

General Mills Chemicals, Inc.: *See—*
  Floyd, Don E.; and Potente, Demetri, 4,060,507, Cl. 260-21.000.

General Motors Corporation: *See—*
  Beam, Paul E., Jr.; and Meyers, Charles K., 4,059,972, Cl. 64-1.00V.
  Bell, Albert H., III, 4,060,337, Cl. 416-186.00R.
  Chabot, Daniel H.; Peterson, Robert S.; and Plumer, Roy D., 4,060,117, Cl. 151-43.000.
  Demido, Michael; and Shellhause, Ronald L., 4,060,283, Cl. 303-6.00C.
  Ditto, Edwin D., 4,059,876, Cl. 29-156.70A.
  Jacobs, James W., 4,059,975, Cl. 68-23.700.

General Signal Corporation: *See—*
  Bogenschutz, Thomas M.; Engle, Thomas H.; and McEathron, Eugene D., 4,060,152, Cl. 188-52.000.

General Time Corporation: *See—*
  Morrison, David; and Rogers, Donald J., 4,059,953, Cl. 58-4.00R.

General Tire & Rubber Company, The: *See—*
  Benton, Richard E., 4,060,502, Cl. 260-2.50P.

Genjiro, Kakogawa: *See—*
  Kazuo, Yamaguchi; Genjiro, Kakogawa; Masayoshi, Hasuo; Goko, Nobuaki; and Maruyama, Yasuo, 4,060,593, Cl. 423-492.000.

Gentry, Charles B.; and Phillips, William A., to Granco Equipment, Inc. Liquid or gaseous fuel fired burner. 4,060,371, Cl. 431-75.000.

George Neville Truck Equipment Limited: *See—*
  Neville, George Edgar, 4,060,273, Cl. 296-100.000.

Gerber, Arthur M.; and Walworth, Vivian K., to Polaroid Corporation. Method of forming silver halide grains by electrolysis. 4,060,419, Cl. 96-94.00R.

Gerber Garment Technology, Inc.: *See—*
  Gerber, Heinz Joseph, 4,060,016, Cl. 83-451.000.

Gerber, Heinz Joseph, to Gerber Garment Technology, Inc. Method and apparatus for blanking out pattern pieces from a layup. 4,060,016, Cl. 83-451.000.

Gerhard, Helmut, to Westerwalder Eisenwerk Gerhard KG. Self-contained double-tubular transport container. 4,060,174, Cl. 220-23.400.

Germscheid, Hans-Gunther: *See—*
  Blaser, Bruno; Germscheid, Hans-Gunther; and Worms, Karl-Heinz, 4,060,546, Cl. 260-502.40A.

Gerstman, Richard B.: *See—*
  Feldeisen, Ronald F.; Minchak, John A.; Gerstman, Richard B.; Meyers, Herbert M.; and Edstrom, Richard C., 4,060,105, Cl. 141-1.000.

Gesellschaft fur Biotechnologische Forschung mbH, (GBF): *See—*
  Wagner, Fritz; Sahm, Hermann; and Keune, Walter Hartmut, 4,060,455, Cl. 195-29.000.

Gesellschaft fur Elektronische Rohren Comet Bern: *See—*
  Rissi, Walter, 4,060,731, Cl. 250-402.000.

Gestra-KSB Vertriebsgesellschaft mbH & Co. Kommanditgesellschaft: *See—*
  Foller, Werner, 4,060,193, Cl. 236-59.000.

Gewerkschaft Eisenhutte Westfalia: *See—*
  Stuckmann, Dieter, 4,059,965, Cl. 61-105.000.

Ghyczy, Miklos: *See—*
  Asinger, Friedrich; Offermanns, Heribert; and Ghyczy, Miklos, 4,060,548, Cl. 260-534.00S.

Giacosa, Dante, to Sira Societa' Industriale Richerche Automotoristiche. Stepless speed change gear for motor propulsion systems of motor vehicles. 4,060,012, Cl. 74-689.000.

Gibson, David Kent, to International Business Machines Corporation. Controlled slip paper separator. 4,060,232, Cl. 271-122.000.

Gibson, Michael H.: *See—*
  Hass, Robert H.; and Gibson, Michael H., 4,060,589, Cl. 423-244.000.

Gilbrech, Donald A. Banjo drumhead. 4,060,018, Cl. 84-269.000.

Giles, Dean Gaylord: *See—*
  Piet, Meyer; and Giles, Dean Gaylord, 4,059,903, Cl. 32-40.00R.

Gimbel, Jurgen: *See—*
  Scholz, Hansjurgen; Backhaus, Hans-Gerd; Brambilla, Luigi; and Gimbel, Jurgen, 4,060,004, Cl. 73-514.000.

Giovanelli, Giorgio: *See—*
  Tirabassi, Tiziano; Giovanelli, Giorgio; Cesari, Giulio; Bonafe, Ubaldo; and Antisari, Ottavio Vittori, 4,060,326, Cl. 356-96.000.

Girdler, George W., to Steinberg, Jack, a part interest. Tie clasp. 4,059,853, Cl. 2-152.00A.

Gireau, Jean: *See—*
  Risler, Pierre; Gireau, Jean; Rose, Pierre; and Bisson, Jean-Pierre, 4,060,645, Cl. 426-302.000.

Girling Limited: *See—*
  Smith, George Windsor, 4,060,154, Cl. 188-73.300.

Giuffre, Luigi; de Nora, Vittorio; and Spaziante, Placido, to Oronzio de Nora Impianti Elettrochimici S.p.A. Novel copolymers and diaphragms made therefrom. 4,060,473, Cl. 204-253.000.

Gleason, Thomas G. Scrubber-cooler tower. 4,060,399, Cl. 55-244.000.

Glory Kogyo Kabushiki Kaisha: *See—*
  Douno, Syugo, 4,060,093, Cl. 133-1.00A.

Glover, Douglas; and Minter, Marvin J., to Federal-Mogul Corporation. Materials hardness testing device. 4,059,990, Cl. 73-81.000.

Godin, Paul: *See—*
  Mascarello, Jean Marius; Godin, Paul; and Millet, Jacques Francois, 4,060,466, Cl. 204-129.000.

Goebel, Franz, to GTE Laboratories Incorporated. Primary electrochemical cell. 4,060,668, Cl. 429-122.000.

Goko, Nobuaki: *See—*
  Kazuo, Yamaguchi; Genjiro, Kakogawa; Masayoshi, Hasuo; Goko, Nobuaki; and Maruyama, Yasuo, 4,060,593, Cl. 423-492.000.

Golay, Marcel J. E., to Perkin-Elmer Corporation, The. Analysis of images. 4,060,713, Cl. 364-416.000.

Gold Lode, Inc.: *See—*
  Thompson, Arnold M., 4,060,013, Cl. 76-83.000.

Gold Thread Machinery Co.: *See—*
  Landgraf, Glenn A.; and Ebel, Fred H., 4,060,227, Cl. 270-66.000.

Goldmann, Wolf: *See—*
  Weber, Paul; Mollenkopf, Hans; Henning, Kurt; Heinemann, Otto; Schmits, Heinz-Herbert; Rother, Wolfgang; Ritzmann, Horst; Wurr, Jurgen; Krutzner, Karl, Jr.; Schossler, Werner; Goldmann, Wolf; and Schepers, Georg, 4,060,375, Cl. 432-14.000.

Goldsby, Claude W.; and Sandau, Roray J. Heat extractor for stoves. 4,060,196, Cl. 237-51.000.

Gomaa, Ezzat E.; and Young, Roger E., to Chevron Research Company. Method of improving a steam drive. 4,060,129, Cl. 166-252.000.

Gonzalez-Camino nee Bertin, Francoise: *See—*
  Guienne, Paul; Herrouin, Guy; Lafont, Andre; Bertin, Jean, deceased; Bertin, Michel; Bertin, Laurent; Bertin, Philippe; Midy nee Bertin, Catherine; Gonzalez-Camino nee Bertin, Francoise; and Bertin nee Loustau, Genevieve, heirs, 4,060,147, Cl. 180-121.000.

Goodman Manufacturing Corporation: *See—*
  Deck, Arthur M., 4,060,024, Cl. 98-40.0VM.

Goodyear Tire & Rubber Company, The: *See—*
  Castner, Kenneth F., 4,060,468, Cl. 204-158.00R.
  Feeney, George W.; and Habeck, Bruce W., 4,060,503, Cl. 260-5.000.
  Halsey, George H., 4,059,989, Cl. 73-598.000.
  Houck, Staley J.; and Smith, Michael W., 4,060,445, Cl. 156-414.000.
  Parker, Dane K., 4,060,556, Cl. 260-590.00R.
  Sinclair, Richard G.; and Cremeans, George E., 4,060,511, Cl. 260-34.200.
  Tazuma, James J.; and Bergomi, Angelo, 4,060,567, Cl. 260-681.50C.

Gordon, Philip L.: *See—*
  Yannas, Ioannis V.; Burke, John F.; Gordon, Philip L.; and Huang, Chor, 4,060,081, Cl. 128-156.000.

Goscenski, Edward J., Jr., to Eaton Corporation. Power steering mechanism. 4,060,146, Cl. 180-161.000.

Gosney, William Milton, to Texas Instruments Incorporated. Charge coupled device shift registers having an improved regenerative charge detector. 4,060,737, Cl. 307-221.00D.

Goss, Alan Jerome: *See—*
  Howorth, Jonathan Ross; Goss, Alan Jerome; and Pool, Peter James, 4,060,823, Cl. 357-30.000.

Goto, Hideo; Shibamoto, Nobuyori; and Tanaka, Shunsaku, to Sugai Chemical Industry Co., Ltd. Process for preparing O-phenylphenol. 4,060,559, Cl. 260-620.000.

Goto, Mituhiro; Hashimoto, Isao; Watanabe, Shugo; and Itabashi, Koji, to Mamiya Koki Kabushiki Kaisha. Precipitation-hardenable, nitrided aluminum alloys and nitrided mother alloys therefor. 4,060,411, Cl. 75-138.000.

Graham, Robert E. Retractable anchors for game bases. 4,060,244, Cl. 273-25.000.

Granco Equipment, Inc.: *See—*
  Gentry, Charles B.; and Phillips, William A., 4,060,371, Cl. 431-75.000.

Grant, Graham Cameron. Method and apparatus for vapor saturated gas delivery. 4,060,576, Cl. 261-130.000.

Granzow, Clarence E. Grinding mill. 4,060,206, Cl. 241-259.100.

Gras, Elie, to Societe Immobiliere et Financiere Suchet Alfort (S.I.F.-S.A.). Apparatus for fabricating molded articles using high-frequency heating. 4,060,364, Cl. 425-174.000.

Grasselli, Robert K.: *See—*
  Miller, Arthur F.; Zagata, Robert J.; and Grasselli, Robert K., 4,060,545, Cl. 560-208.000.

Grataloup, Xavier Roger, to Nodet-Gougis (Societe de droit francais). Method and apparatus for controlling the transfer of particulate material. 4,060,181, Cl. 222-193.000.

Graves, Toby R.: *See—*
  Woods, John Henry; and Graves, Toby R., 4,060,569, Cl. 260-683.15R.

Grebe, Herbert; Hartwig, Wolfgang; Kohler, Johann; Rothe, Rudolf; and Schroder, Karl-Friedrich, to HAG Aktiengesellschaft. Bottom closure for a chemical reactor. 4,060,394, Cl. 23-284.000.

Green, Joseph, to H. J. Heinz Company Limited. Heat treating particulate material. 4,059,919, Cl. 47-1.100.

Green, Kenneth A.: *See—*
  Hefni, Ibrahim El; Green, Kenneth A.; and Cloutier, Donald C., 4,060,778, Cl. 333-73.00W.

Green, Mino, to Imperial Chemical Industries Limited. Electrochromic device. 4,060,311, Cl. 350-160.00R.

Greene, Leonard M., to Safe Flight Instrument Corporation. System for monitoring water flow angle relative to a boat keel. 4,059,993, Cl. 73-178.00R.

Grefco, Inc.: *See—*
  Funk, Richard S.; Stewart, S. Alan; and Ruff, David L., 4,059,933, Cl. 52-127.000.

Gregory, Gordon Ian: *See—*
  Bradshaw, Janice; Cook, Martin Christopher; and Gregory, Gordon Ian, 4,060,686, Cl. 544-22.000.

Gresillon, Robert, to Prenihan AG. Circular knit lower body garment and method of manufacture. 4,059,973, Cl. 66-177.000.

Grieben, Karl-Heinz: *See—*
  Menge, Gunter; Grieben, Karl-Heinz; Reitmeier, Lutz; and Frank, Willi, 4,059,940, Cl. 53-148.000.

Grier, Nathaniel: *See—*
  Jacobus, David P.; Dulaney, Eugene L.; and Grier, Nathaniel, 4,060,639, Cl. 424-325.000.

Gritz, Robert W.: *See—*
  Poliak, John M.; Lopez, Juan M.; and Gritz, Robert W., 4,060,305, Cl. 339-269.000.

Grob, Jean, to J. Bobst & Fils, S.A. Process and apparatus for permanently controlling the movement of web of material continuously delivered to a machine processing the web. 4,060,187, Cl. 226-8.000.

Groppenbacher, Gregor; Rieckmann, Peter; and Rothe, Werner, to Boehringer Mannheim G.m.b.H. Tablets coated with aqueous resin dispersions. 4,060,598, Cl. 424-33.000.

Gros, Chajim. Apparatus and method for manufacturing resilient bands. 4,060,015, Cl. 83-19.000.

Gross, Dario R.: *See—*
  Yanik, LeRoy; and Gross, Dario R., 4,060,340, Cl. 417-28.000.

Grosse-Plankermann, Wilhelm, to Hauck GmbH. Laboratory clock. 4,059,954, Cl. 58-21.130.

Grotepass, Johann: *See—*
  Wilson, Norman A.; and Grotepass, Johann, 4,060,428, Cl. 148-12.00R.

Groves, James D.; and Loffredo, Stefano, to Minnesota Mining and Manufacturing Company. Electrically insulating composition. 4,060,583, Cl. 264-272.000.

Gruber, Johann: *See—*
  Russer, Peter; and Gruber, Johann, 4,060,739, Cl. 307-319.000.

Grundler, Robert; and Jenny, Hubert, to Aktiengesellschaft Adolph Saurer. Brakeshoe for shuttle brakes of looms. 4,060,103, Cl. 139-185.000.

Grunsky, Manfred: *See—*
  Holloway, William Stuart; and Grunsky, Manfred, 4,060,335, Cl. 408-233.000.

Grzhimalovsky, Alexandr Sergeevich: *See—*
  Egorov, Boris Afanasievich; Grzhimalovsky, Alexandr Sergeevich; Judin, Alexandr Vladimirovich; Fishman, Konstantin Evgenievich; and Vernaya, Ljudmila Dmitrievna, 4,060,582, Cl. 264-210.00F.

GTE Laboratories Incorporated: *See—*
  Goebel, Franz, 4,060,668, Cl. 429-122.000.

GTE Sylvania Incorporated: *See—*
  Jayne, Max L.; and Natale, Paul R., 4,060,300, Cl. 339-74.00R.

Guienne, Paul; Herrouin, Guy; Lafont, Andre; Bertin, Jean, deceased; by Bertin, Michel; by Bertin, Laurent; by Bertin, Philippe; by Midy nee Bertin, Catherine; by Gonzalez-Camino nee Bertin, Francoise; and by Bertin nee Loustau, Genevieve, heirs, to Bertin & Cie; and Societe d'Etudes et de Developpement des Aeroglisseurs Marins, Terrestres et Amphibies S.E.D.A.M. Vehicles riding on air cushions. 4,060,147, Cl. 180-121.000.

Guillaumont, Jacques: *See—*
  Masure, Daniel; Guillaumont, Jacques; and Pigeaud, Jean-Marie, 4,060,474, Cl. 204-270.000.

Gustafsson, Hans Hjalmar. Pallet. 4,060,037, Cl. 108-51.100.

Gwaltney, Robert E.; and Mikovits, John L., to Bada Company, Inc. Sprue removal mechanism for die casting apparatus. 4,060,121, Cl. 164-262.000.

H. A. Phillips & Co.: *See—*
  Ross, Robert R., 4,059,968, Cl. 62-174.000.

H. J. Heinz Company Limited: *See—*
  Green, Joseph, 4,059,919, Cl. 47-1.100.

Haag, Franz: *See—*
  Bongartz, Paul; and Haag, Franz, 4,060,223, Cl. 366-179.000.

Haas, Gerhard Julius; and Herman, Edwin Bernard, to General Foods Corporation. Oral preparations for preventing dental caries. 4,060,602, Cl. 424-58.000.

Haas, Karl-Heinz: *See—*
  Rapp, Wolfgang; Haas, Karl-Heinz; and Luessem, Heribert, 4,060,388, Cl. 23-230.00R.

Habeck, Bruce W.: *See—*
  Feeney, George W.; and Habeck, Bruce W., 4,060,503, Cl. 260-5.000.

Habermeier, Juergen: *See—*
  Batzer, Hans; Habermeier, Juergen; and Porret, Daniel, 4,060,525, Cl. 260-260.000.

Habersang, Silke: *See—*
  Klingler, Karl H.; Aurich, Rudolf; and Habersang, Silke, 4,060,618, Cl. 424-253.000.

Hadley, James C.: *See—*
  Tremain, David L.; Beach, Burt L.; and Hadley, James C., 4,060,341, Cl. 417-182.500.

HAG Aktiengesellschaft: *See—*
  Grebe, Herbert; Hartwig, Wolfgang; Kohler, Johann; Rothe, Rudolf; and Schroder, Karl-Friedrich, 4,060,394, Cl. 23-284.000.

Hague International: *See—*
  LaHaye, Paul G.; Bjerklie, John W.; and Gallant, Gerald G., Jr., 4,060,379, Cl. 432-179.000.

Hahn, Paul-Jurgen: *See—*
Walz, Alfred H.; and Hahn, Paul-Jurgen, 4,060,355, Cl. 425-7.000.

Haishi, Yuichiro: *See—*
Maeda, Sachio; Saito, Nagoa; Arai, Shinji; and Haishi, Yuichiro, 4,060,467, Cl. 204-129.750.

Hall, Robert N., to General Electric Co. Method for manufacturing nuclear radiation detector with deep diffused junction. 4,060,432, Cl. 148-186.000.

Haller, Fritz, to U. Scharer Sohne AG, (USM). Steel girder. 4,059,937, Cl. 52-693.000.

Halliburton Company: *See—*
Barrington, Burchus Q., 4,060,140, Cl. 175-7.000.

Halsey, George H., to Goodyear Tire & Rubber Company, The. Nondestructive examination of an article particularly a tire, with ultrasonic energy. 4,059,989, Cl. 73-598.000.

Halter, Jerome Barth, to RCA Corporation. Wideband electromechanical recording system. 4,060,831, Cl. 358-128.000.

Hamlin, Thomas J.: *See—*
Stange, Klaus K.; and Hamlin, Thomas J., 4,060,233, Cl. 271-160.000.

Hammond, Donald J.: *See—*
Lin, Kingso C.; and Hammond, Donald J., 4,060,658, Cl. 428-378.000.

Hanke, Kenneth Earl; and Rees, Ned, to Kearney-National Inc. Enclosing structure for a high voltage electric fuse. 4,060,785, Cl. 337-201.000.

Hannes Marker: *See—*
Jungkind, Roland; and Sedlmair, Gerhard, 4,060,257, Cl. 280-626.000.

Hans, Waldemar: *See—*
Brune, Gerhard; and Hans, Waldemar, 4,060,199, Cl. 239-488.000.

Hansen, M. James. Collapsible table. 4,060,275, Cl. 297-159.000.

Hansford, Reginald Frederick, to Decca Limited. Projection apparatus. 4,060,318, Cl. 353-42.000.

Hanson, Charles G. Power supply control. 4,060,709, Cl. 219-131.00R.

Hanson, James M.; and Povall, Gerald W., to General Electric Company. Photoflash lamp array having conductive reflector. 4,060,721, Cl. 362-13.000.

Hanson, Raymond L. Pill gun. 4,060,083, Cl. 128-223.000.

Harada, Kenji: *See—*
Nishimura, Yoshiki; Sakiyama, Kazutaka; Adachi, Tadao; and Harada, Kenji, 4,060,389, Cl. 23-252.00A.

Harada, Yutaka; Itai, Noriyuki; Ucikawa, Hiroshi; Kato, Hajime; Sato, Katutoshi; and Itoh, Akira, to Japanese National Railways; Onoda Cement Company Limited; and Nichireki Chemical Industry Company Limited. Super rapid hardening mixture. 4,060,425, Cl. 106-90.000.

Harbridge, John Barry: *See—*
Howarth, Thomas Trefor; and Harbridge, John Barry, 4,060,530, Cl. 260-307.0FA.

Harmon, Edward J.: *See—*
Bacsanyi, Thomas J.; and Harmon, Edward J., 4,060,003, Cl. 73-483.000.

Harmon, James F.: *See—*
Shatila, Mounir A.; Veeneman, John L.; Lach, John H.; and Harmon, James F., 4,060,367, Cl. 425-311.000.

Harnden, John D., Jr., to General Electric Co. Magnetic circuit and method of making. 4,060,783, Cl. 335-296.000.

Harp, Marlyn F.: *See—*
Nelson, Carl R.; Pierce, David R.; Depew, Noel F.; and Harp, Marlyn F., 4,060,161, Cl. 197-1.00R.

Harris, Frank W.: *See—*
Morrison, Charles F., Jr.; Harris, Frank W.; and Patzer, Michael D., 4,060,088, Cl. 128-303.170.

Harris, Nicholas D., to Morton-Norwich Products, Inc. Vinylbenzyl esters of n-boc-amino acids. 4,060,689, Cl. 560-29.000.

Hart, Joseph I., to Texaco Trinidad, Inc. Cleanout procedure for well with low bottom hole pressure. 4,060,130, Cl. 166-312.000.

Harter, Donald Gerton, to Solar Industries, Inc. Solar heating. 4,060,070, Cl. 126-271.000.

Hartig, Arnold: *See—*
Vahle, Erwin; and Hartig, Arnold, 4,060,045, Cl. 112-235.000.

Hartman, Milton D.: *See—*
Weston, Paul George; Jennemann, Glenn A.; and Hutchinson, Thomas Kemp, 4,060,108, Cl. 141-59.000.

Hartmann, Achim; Kulling, Achim; and Thumm, Hans, to Kronos Titan G.m.b.H. Process for recovery of iron oxide and chlorine from dust produced in chlorination of titaniferous ores. 4,060,584, Cl. 423-149.000.

Hartmann, Ludwig A., to ICI United States Inc. Halogenated dioxolane tranquilizers. 4,060,532, Cl. 260-340.90R.

Hartness, Robert G.: *See—*
Hartness, Thomas P.; and Hartness, Robert G., 4,060,166, Cl. 198-446.000.

Hartness, Thomas P.; and Hartness, Robert G. Container separator. 4,060,166, Cl. 198-446.000.

Hartwig, Wolfgang: *See—*
Grebe, Herbert; Hartwig, Wolfgang; Kohler, Johann; Rothe, Rudolf; and Schroder, Karl-Friedrich, 4,060,394, Cl. 23-284.000.

Harumiya, Akinori; and Toyosawa, Koki, to Hitachi, Ltd. Scanning system. 4,060,795, Cl. 364-900.000.

Hashimoto, Isao: *See—*
Goto, Mituhiro; Hashimoto, Isao; Watanabe, Shugo; and Itabashi, Koji, 4,060,411, Cl. 75-138.000.

Hashimoto, Junichiro: *See—*
Tsubuko, Kazuo; Kimura, Taro; Hashimoto, Junichiro; and Kurotori, Tsuneo, 4,060,493, Cl. 252-62.10L.

Hasquenoph, Jean H.; and Coutin, Pierre Fernand, to R. Alkan & Cie. Pressure control device. 4,060,213, Cl. 244-137.00R.

Hass, Robert H.; and Gibson, Michael H., to Union Oil Company of California. Process for reducing NO_x and/or SO_x in feed gas streams. 4,060,589, Cl. 423-244.000.

Hassler, Dieter, to Siemens Aktiengesellschaft. Arrangement for determining the effective value and/or the power of electrical signals. 4,060,763, Cl. 324-123.00R.

Hata, Masaaki; and Wada, Sotaro, to Tokyo Shibaura Electric Co., Ltd. Frequency modulation system. 4,060,773, Cl. 332-19.000.

Hata, Yoshitaka; Ikeura, Kenji; and Ozeki, Masaaki, to Nissan Motor Company, Limited. Exhaust gas recirculation system having means to estimate actual recirculation rate based on intake and exhaust gas temperatures. 4,060,065, Cl. 123-119.00A.

Hauck GmbH: *See—*
Grosse-Plankermann, Wilhelm, 4,059,954, Cl. 58-21.130.

Hauni-Werke Korber & Co. KG: *See—*
Menge, Gunter; Grieben, Karl-Heinz; Reitmeier, Lutz; and Frank, Willi, 4,059,940, Cl. 53-148.000.

Haussermann, Richard: *See—*
Pfleiderer, Werner; Arnold, Friedrich; and Haussermann, Richard, 4,060,239, Cl. 272-73.000.

Haworth Mfg., Inc.: *See—*
Haworth, Richard G.; Saylor, Charles J.; and Wilson, Harold R., 4,060,294, Cl. 339-4.000.

Haworth, Richard G.; Saylor, Charles J.; and Wilson, Harold R., to Haworth Mfg., Inc. Wall panel with prewired power system. 4,060,294, Cl. 339-4.000.

Hay, Jean-Yves: *See—*
Domer, Michel; and Hay, Jean-Yves, 4,060,331, Cl. 403-130.000.

Hayamizu, Seiji, to Senoh Kabushiki Kaisha. Arrangement for fastening an upstanding post to a floorboard. 4,059,934, Cl. 52-297.000.

Haynes, George R.: *See—*
Kodama, Jiro K.; Haynes, George R.; and Albert, James R., 4,060,640, Cl. 424-326.000.

Hays, Ray L.: *See—*
Bauman, Dale E.; Collier, Robert J.; and Hays, Ray L., 4,060,620, Cl. 424-262.000.

Hearing Evaluation & Acoustic Research, Inc.: *See—*
Epley, John M., 4,060,701, Cl. 179-175.000.

Heden, Bjorn Harald. Reduction gear, especially for camera lens motors. 4,060,010, Cl. 74-798.000.

Hefni, Ibrahim El; Green, Kenneth A.; and Cloutier, Donald C., to Microwave Research Corporation. Microwave harmonic absorption filter. 4,060,778, Cl. 333-73.00W.

Hegel, Edward. Friction type exercising device. 4,060,241, Cl. 272-132.000.

Heil, Eduard: *See—*
Mertes, Friedrich; Doerfel, Helmut; Heil, Eduard; and Cordes, Claus, 4,060,517, Cl. 260-78.00R.

Heine, Helmut A.; Schmidt, Otto H.; and Rosenbusch, Helmut W., to Propper Manufacturing Company, Inc.; and Optotechnik Heine KG. Mounting apparatus for optical examination devices connected to a projector through a light-conducting cable. 4,060,724, Cl. 362-32.000.

Heinemann, Helmut: *See—*
Rothe, Werner; Heinemann, Helmut; Schmidt, Felix Helmut; and Betzien, Gunter, 4,060,634, Cl. 424-321.000.

Heinemann, Otto: *See—*
Weber, Paul; Mollenkopf, Hans; Henning, Kurt; Heinemann, Otto; Schmits, Heinz-Herbert; Rother, Wolfgang; Ritzmann, Horst; Wurr, Jurgen; Krutzner, Karl, Jr.; Schossler, Werner; Goldmann, Wolf; and Schepers, Georg, 4,060,375, Cl. 432-14.000.

Heinz, Theodore A., to Rockwell International Corporation. Two axes remote mirror mount. 4,060,314, Cl. 350-285.000.

Heinz, Theodore A., to Rockwell International Corporation. Precision mirror mount. 4,060,315, Cl. 350-289.000.

Heklowski, Florian; and Nicholas, William, to Heklowski, Florian. Automotive engine exhaust — clean air system. 4,059,958, Cl. 60-614.000.

Hellquist, Ivan Aldine: *See—*
Botos, Imre; and Hellquist, Ivan Aldine, 4,060,076, Cl. 128-142.00R.

Hendrickson, Vergil Philip; and Cole, Carroll Richard, to Caterpillar Tractor Co. Motor grader blade mounting and tilt mechanism. 4,060,136, Cl. 172-795.000.

Hendy, Brian Norman, to Imperial Chemical Industries Limited. Production of acrylonitrile copolymers. 4,060,680, Cl. 526-201.000.

Henkel Kommanditgesellschaft auf Aktien: *See—*
Blaser, Bruno; Germscheid, Hans-Gunther; and Worms, Karl-Heinz, 4,060,546, Cl. 260-502.40A.

Henley, James C. Conveyer apparatus. 4,060,149, Cl. 182-133.000.

Henning, Kurt: *See—*
Weber, Paul; Mollenkopf, Hans; Henning, Kurt; Heinemann, Otto; Schmits, Heinz-Herbert; Rother, Wolfgang; Ritzmann, Horst; Wurr, Jurgen; Krutzner, Karl, Jr.; Schossler, Werner; Goldmann, Wolf; and Schepers, Georg, 4,060,375, Cl. 432-14.000.

Hentz, LeRoy Richard; Pavlovic, Gary Frank; Scarafino, Angelo James; and Seksinsky, John Joseph, to International Business Machines Corporation. Temperature monitoring furnace. 4,060,377, Cl. 432-50.000.

Herbst, Donald. Pipe construction. 4,060,265, Cl. 285-405.000.

Herman, Edwin Bernard: *See—*
Haas, Gerhard Julius; and Herman, Edwin Bernard, 4,060,602, Cl. 424-58.000.

Hernandez, Rafael J.: *See—*
Pan, Peter N. Y.; and Hernandez, Rafael J., 4,060,647, Cl. 427-21.000.

Herrmann, Herbert: *See—*
Degen, Klaus; and Herrmann, Herbert, 4,060,237, Cl. 271-231.000.

Herron, Lester W.: *See—*
Bergeron, Clifton G.; and Herron, Lester W., 4,060,662, Cl. 428-450.000.

Herrouin, Guy: *See—*
Guienne, Paul; Herrouin, Guy; Lafont, Andre; Bertin, Jean, deceased; Bertin, Michel; Bertin, Laurent; Bertin, Philippe; Midy nee Bertin, Catherine; Gonzalez-Camino nee Bertin, Francoise; and Bertin nee Loustau, Genevieve, heirs, 4,060,147, Cl. 180-121.000.

Hershman, Arnold: *See—*
Paulik, Frank E.; Hershman, Arnold; Knox, Walter R.; and Roth, James F., 4,060,547, Cl. 260-532.000.

Herzer, Heinz; and Zauhar, Helmut, to Wacker-Chemitronic Gesellshaft fur Elektronik Grundstoffe mbH. Device for the support of a crystalline rod. 4,060,392, Cl. 23-273.0SP.

Heyraud, Marc, to Portescap. Electric direct current rotating machine. 4,060,746, Cl. 310-177.000.

Hiab-Foco Aktiebolag: *See—*
Rilbe, Ulf Christer, 4,060,221, Cl. 254-93.00R.

Hickman, Alan J.: *See—*
Chelin, Charles R.; and Hickman, Alan J., 4,060,151, Cl. 187-95.000.

Hideg, Laszlo; and Ernest, Robert P., to Ford Motor Company. Internal combustion engine control system. 4,060,058, Cl. 123-8.090.

Higginbottom, Harold P., to Monsanto Company. Emulsifiable resoles having dispersed inert salts. 4,060,504, Cl. 260-7.000.

Hika, Yoshihiko: *See—*
Togei, Ryoiku; Takei, Akira; Hika, Yoshihiko; and Wada, Kunihiko, 4,060,796, Cl. 365-183.000.

Hildebrand, Larry R.; and Pausinger, Siegfried K., to Packaging Corporation of America. Foldable container. 4,060,169, Cl. 206-289.000.

Hillstrom, Thomas P., to International Harvester Company. Control mechanism. 4,060,157, Cl. 192-4.00A.

Hiltebrandt, Siegfried; and Bonnet, Ludwig, to Richard Wolf GmbH. Single or double-shank cutting loop device for resectoscopes. 4,060,087, Cl. 128-303.150.

Himes, Glenn R., to Shell Oil Company. Dry blending process. 4,060,510, Cl. 260-33.6AQ.

Hirasawa, Koichi, to Toyota Jidosha Kogyo Kabushiki Kaisha. Throttle positioner. 4,060,063, Cl. 123-97.00B.

Hirayama, Kazuhiro; Sato, Yasushi; Tokiwa, Taisuke; Kawakubo, Kazuo; Iwatate, Fujio; and Nakatsui, Hisashi, to Canon Kabushiki Kaisha. Image information handling device. 4,060,322, Cl. 355-60.000.

Hirayama, Kazuhiro; Sato, Yasushi; Tokiwa, Taisuke; Iwatate, Fujio; Kawakubo, Kazuo; and Nakatsui, Hisashi, to Canon Kabushiki Kaisha. Image information handling method and device. 4,060,323, Cl. 355-60.000.

Hirschkoff, Sidney, to McCulloch Corporation. Full position safety brake for portable chain saw. 4,059,895, Cl. 30-382.000.

Hitachi Cable, Ltd.: *See—*
Fujie, Kunio; Nakayama, Wataru; Kuwahara, Heikichi; and Kakizaki, Kimio, 4,060,125, Cl. 165-133.000.

Hitachi, Ltd.: *See—*
Fujie, Kunio; Nakayama, Wataru; Kuwahara, Heikichi; and Kakizaki, Kimio, 4,060,125, Cl. 165-133.000.
Harumiya, Akinori; and Toyosawa, Koki, 4,060,795, Cl. 364-900.000.
Kawagoshi, Hiroshi; Takeuchi, Masato; and Nakajima, Fumito, 4,060,498, Cl. 252-373.000.
Mori, Michitsugu; Ohfuji, Mitsuo; and Kuwahara, Akiyasu, 4,060,573, Cl. 261-23.00B.
Nishimura, Kotaro, 4,060,740, Cl. 307-362.000.
Okuyama, Toshiaki; and Kubota, Yuzuru, 4,060,753, Cl. 318-175.000.
Ono, Minoru; and Momoi, Toshimitu, 4,060,827, Cl. 357-54.000.
Satonaka, Koichiro, 4,060,828, Cl. 357-71.000.
Shinada, Shinichi; and Mikoshiba, Shigeo, 4,060,749, Cl. 313-484.000.
Yamada, Takahiro, 4,060,804, Cl. 346-1.000.
Yamada, Takahiro; and Doi, Tetsuo, 4,060,813, Cl. 346-75.000.

Hiyama, Norio: *See—*
Iwahara, Makoto; Maruyama, Fumio; Fujiki, Goro; Mori, Toshinori; Hiyama, Norio; and Kikuchi, Mitsuru, 4,060,696, Cl. 179-1.0GQ.

Hobart Corporation: *See—*
Meyers, Theodore F., 4,060,346, Cl. 417-360.000.

HOBEG Hochtemperaturreaktor-Brennelement GmbH: *See—*
Huschka, Hans; and Kadner, Martin, 4,060,497, Cl. 252-301.10S.

Hochgesang, Gerhard: *See—*
Achtmann, Walfried; and Hochgesang, Gerhard, 4,060,789, Cl. 338-183.000.

Hoechst Aktiengesellschaft: *See—*
Johannes, Gerhard; Gemmer, Erwin; Konig, Hans-Joachim; and Reinhard, Gunter, 4,060,655, Cl. 428-35.000.
Scheidl, Franz; and Sommer, Werner, 4,060,512, Cl. 260-45.80N.

Hoffman, Gerald F.; and Bolton, Dewayne P., to Fabri-Tek Incorporated. Energy saving temperature control apparatus. 4,060,123, Cl. 165-11.000.

Hofmann, Harriet E., to Norton Company. Low temperature setting refractory cements. 4,060,424, Cl. 106-55.000.

Holland, Ronald: *See—*
Askew, Barry Anthony; Holland, Ronald; Inman, Douglas; and Marikar, Yusuf Mohamed Faruq, 4,060,667, Cl. 429-103.000.

Holloway, David John, to USM Corporation. Blind riveting tools. 4,059,981, Cl. 72-391.000.

Holloway, William Stuart; and Grunsky, Manfred, to Amtel, Inc. Spade drill. 4,060,335, Cl. 408-233.000.

Holly, Harry H.: *See—*
Theis, James V., Jr.; McCord, John B.; and Holly, Harry H., 4,060,336, Cl. 415-80.000.

Hollymatic Corporation: *See—*
Theis, James V., Jr.; McCord, John B.; and Holly, Harry H., 4,060,336, Cl. 415-80.000.

Holmes, Robert W.: *See—*
Dey, Arabinda N; and Holmes, Robert W., 4,060,676, Cl. 429-217.000.

Home Curtain Corporation: *See—*
Johnson, Charles A., 4,060,438, Cl. 156-73.100.

Honda Giken Kogyo Kabushiki Kaisha: *See—*
Tsutsui, Katsuhiko; Miura, Heihachi; and Miyano, Yukio, 4,060,062, Cl. 123-75.00B.

Honeywell Inc.: *See—*
Backlund, John R., 4,060,017, Cl. 83-23.000.

Honeywell Information Systems Inc.: *See—*
Feldman, Paul S.; Johnson, Robert B.; and Nibby, Chester M., Jr., 4,060,794, Cl. 364-900.000.

Honma, Toyokuni: *See—*
Tomita, Kazuo; Murakami, Tadashi; Yamazaki, Yoshio; and Honma, Toyokuni, 4,060,402, Cl. 71-76.000.

Hooker Chemicals & Plastics Corporation: *See—*
Walker, Leigh E., 4,060,677, Cl. 526-88.000.

Hoover, Fred Wayne; and Iler, Ralph K., to Du Pont de Nemours, E. I., and Company. Particulate membrane ultrafiltration device. 4,060,488, Cl. 210-433.00M.

Horiko, Yoshinori: *See—*
Yamada, Hisashi; and Horiko, Yoshinori, 4,060,772, Cl. 331-116.00R.

Horiuchi, Yukio: *See—*
Umezawa, Hamao; Umezawa, Sumio; Tsuchiya, Osamu; Akita, Eiichi; Miyazawa, Takeo; Horiuchi, Yukio; and Fukatsu, Shunzo, 4,060,682, Cl. 536-10.000.

Horowitz, Harold S.: *See—*
Clavenna, LeRoy R.; Longo, John M.; and Horowitz, Harold S., 4,060,500, Cl. 252-471.000.

Horrocks, Donald L., to Beckman Instruments, Inc. Method of measuring the disintegration rate of beta-emitting radionuclide in a liquid sample. 4,060,728, Cl. 250-328.000.

Horrocks, Donald L.: *See—*
Luitwieler, Samuel H.; and Horrocks, Donald L., 4,060,726, Cl. 250-252.000.

Hoshika, Shuji, to Asahi Kogaku Kogyo Kabushiki Kaisha. Focal plane detecting device. 4,060,725, Cl. 250-227.000.

Hoshino, Mitsuru: *See—*
Ohya, Masaki; and Hoshino, Mitsuru, 4,060,650, Cl. 427-161.000.

Houck, Staley J.; and Smith, Michael W., to Goodyear Tire & Rubber Company, The. Building drum for tires and cylindrical articles having axially spaced beads. 4,060,445, Cl. 156-414.000.

Houdaille Industries, Inc.: *See—*
Tremain, David L.; Beach, Burt L.; and Hadley, James C., 4,060,341, Cl. 417-182.500.

Houle, Joseph Francois, to Houle, Leah Mary Louise, a part interest. Absorption process. 4,060,398, Cl. 55-73.000.

Houle, Leah Mary Louise: *See—*
Houle, Joseph Francois, 4,060,398, Cl. 55-73.000.

Houston, Douglas E.; and Krishna, Surinder, to General Electric Co. Field controlled thyristor with buried grid. 4,060,821, Cl. 357-22.000.

Howarth, Thomas Trefor; and Harbridge, John Barry, to Beecham Group Limited. Clavulanic acid amides. 4,060,530, Cl. 260-307.0FA.

Howorth, Jonathan Ross; Goss, Alan Jerome; and Pool, Peter James, to English Electric Valve Company Limited. Electron-emissive semiconductor devices. 4,060,823, Cl. 357-30.000.

Hoya Corporation: *See—*
Asahara, Yoshiyuki, 4,060,422, Cl. 106-47.00Q.

Hrstka, Vladimir; Hubner, Manfred; Kuhr, Manfred; Schmidt, Felix Helmut; and Aumuller, Walter, to Boehringer Mannheim G.m.b.H. Indole-carboxylic carbon compounds and pharmaceutical compositions containing them. 4,060,626, Cl. 424-274.000.

Huang, Chor: *See—*
Yannas, Ioannis V.; Burke, John F.; Gordon, Philip L.; and Huang, Chor, 4,060,081, Cl. 128-156.000.

Huang, Ling Ling: *See—*
Huang, Thomas L.; and Huang, Ling Ling, 4,060,242, Cl. 273-1.00E.

Huang, Thomas L.; and Huang, Ling Ling. Electronic game apparatus. 4,060,242, Cl. 273-1.00E.

Hubner, Manfred: *See—*
Hrstka, Vladimir; Hubner, Manfred; Kuhr, Manfred; Schmidt, Felix Helmut; and Aumuller, Walter, 4,060,626, Cl. 424-274.000.

Huddle, James R., to Litton Systems, Inc. Geodetic survey method. 4,060,718, Cl. 364-421.000.

Hudspeth, Thomas; and Keeling, Harmon H., to Hughes Aircraft Company. Waveguide switch. 4,060,781, Cl. 333-98.00S.

Hughes Aircraft Company: *See—*
Barnoski, Michael K.; and Evtuhov, Viktor, 4,060,308, Cl. 350-96.00C.
Bayless, John R., 4,060,748, Cl. 313-171.000.

Hudspeth, Thomas; and Keeling, Harmon H., 4,060,781, Cl. 333-98.00S.
Hughes, John Lawrence: *See—*
Liu, Robert Chung-Huan; and Hughes, John Lawrence, 4,060,554, Cl. 260-565.000.
Hughes, Peter. Ladder kit. 4,060,150, Cl. 182-151.000.
Hull, Evan B. Life ring. 4,059,859, Cl. 9-340.000.
Huschka, Hans; and Kadner, Martin, to HOBEG Hochtemperaturreaktor-Brennelement GmbH. Process for the production of spherical fuel and fertile particles. 4,060,497, Cl. 252-301.10S.
Hutchinson, Thomas Kemp: *See—*
Weston, Paul George; Jennemann, Glenn A.; and Hutchinson, Thomas Kemp, 4,060,108, Cl. 141-59.000.
Hutson, Jearld L. Slow speed semiconductor switching device. 4,060,824, Cl. 357-37.000.
Hyatt, Gilbert Peter. Electronic calculator system having audio messages for operator interaction. 4,060,848, Cl. 364-200.000.
Hydro-Plan Engineering Ltd.: *See—*
Mehoudar, Raphael, 4,060,200, Cl. 239-542.000.
I-T-E Imperial Corporation: *See—*
Davis, Lee; and Pang, Peter, 4,060,844, Cl. 361-96.000.
I-T-E Imperial Corporation Efcor Division: *See—*
Gajajiva, Padej, 4,060,264, Cl. 285-175.000.
I T L Technology, Inc.: *See—*
Eaton, Thomas, 4,060,485, Cl. 210-87.000.
Icart, Roger P.: *See—*
Urciuoli, John P.; and Icart, Roger P., 4,060,814, Cl. 346-139.00A.
ICI United States Inc.: *See—*
Hartmann, Ludwig A., 4,060,532, Cl. 260-340.90R.
Ignaz Vogel GmbH und Co. KG-Fahrzeugsitze: *See—*
Vogel, Ignaz, 4,060,279, Cl. 297-445.000.
Iizuka, Masahiko; Suzuki, Jiro; and Kobayashi, Sigeyasu, to Kojima, Ichiro. Apparatus for growing animal cells. 4,060,457, Cl. 195-127.000.
Ikeura, Kenji: *See—*
Hata, Yoshitaka; Ikeura, Kenji; and Ozeki, Masaaki, 4,060,065, Cl. 123-119.00A.
Ikoma, Hidenobu: *See—*
Kikumoto, Ryoji; Tobe, Akihiro; Tonomura, Shinji; and Ikoma, Hidenobu, 4,060,612, Cl. 424-248.520.
Kikumoto, Ryoji; Tobe, Akihiro; Tonomura, Shinji; and Ikoma, Hidenobu, 4,060,641, Cl. 424-330.000.
Iler, Ralph K.: *See—*
Hoover, Fred Wayne; and Iler, Ralph K., 4,060,488, Cl. 210-433.00M.
Imaizumi, Koji: *See—*
Doi, Yasuhiko; Tokura, Yukio; and Imaizumi, Koji, 4,060,320, Cl. 355-3.00R.
Imperial Chemical Industries Limited: *See—*
Green, Mino, 4,060,311, Cl. 350-160.00R.
Hendy, Brian Norman, 4,060,680, Cl. 526-201.000.
Lee, Denis; and Cantwell, Alan David Cole, 4,060,463, Cl. 204-99.000.
Ridyard, Denis Robert Annesley, 4,060,383, Cl. 8-41.00B.
Whittam, Thomas Vincent; and Youll, Barry, 4,060,590, Cl. 423-328.000.
Inaba, Shigeho: *See—*
Kimura, Michio; Inaba, Shigeho; and Yamamoto, Hisao, 4,060,550, Cl. 260-340.50R.
Inagawa, Takashi; and Mitsuhashi, Sadayuki, to Nippon Electric Company, Limited. Integrated type switching device. 4,060,782, Cl. 335-112.000.
Inbar, Dan: *See—*
Zioni, Jacob; Klein, Yitzhak; and Inbar, Dan, 4,060,730, Cl. 250-369.000.
Indra, Jaromir, to Vysoke uceni technicke. Cylinder head mounting arrangement for a diesel injection pump. 4,060,350, Cl. 417-490.000.
Inman, Douglas: *See—*
Askew, Barry Anthony; Holland, Ronald; Inman, Douglas; and Marikar, Yusuf Mohamed Faruq, 4,060,667, Cl. 429-103.000.
Inoue, Tadaomi: *See—*
Watanabe, Naohei; and Inoue, Tadaomi, 4,060,756, Cl. 318-668.000.
Insuldeck Corporation: *See—*
Lukens, Edward E., 4,059,936, Cl. 52-492.000.
International Business Machines Corporation: *See—*
Abel, Stephen Carl; and Carlson, Jeffrey Allen, 4,060,006, Cl. 74-258.000.
Barile, Conrad A.; Brill, Robert M.; Forneris, John L.; and Regh, Joseph, 4,060,427, Cl. 148-1.500.
Church, Wayne Edward; and Quist, Frederick Fenn, Jr., 4,060,230, Cl. 271-63.000.
Gibson, David Kent, 4,060,232, Cl. 271-122.000.
Hentz, LeRoy Richard; Pavlovic, Gary Frank; Scarafino, Angelo James; and Seksinsky, John Joseph, 4,060,377, Cl. 432-50.000.
Jacobowitz, Lawrence; Mathisen, Einar S.; and Thorp, Lawrence D., 4,060,327, Cl. 356-96.000.
Mako, John; and Pimbley, Walter Thornton, 4,060,812, Cl. 346-75.000.
Wilson, Charles Eugene, III, 4,060,362, Cl. 425-145.000.
International Harvester Company: *See—*
Bricon, Jean-Pierre Luc, 4,059,886, Cl. 29-426.000.
Hillstrom, Thomas P., 4,060,157, Cl. 192-4.00A.
International Nickel Company, Inc., The: *See—*
Dean, Anthony Vincent; and Ennis, Philip James, 4,060,429, Cl. 148-31.000.
International Standard Electric Corporation: *See—*
Barton, Paul, 4,060,807, Cl. 343-17.10R.
International Telephone and Telegraph Corporation: *See—*
Uhlarik, William J., 4,059,984, Cl. 73-40.50R.
Interox Chemicals Limited: *See—*
Braid, John Edwin, 4,060,644, Cl. 426-261.000.
Intersil, Inc.: *See—*
Prak, Jan Willem L., 4,059,955, Cl. 58-23.00R.
Irvin, Howard B., to Phillips Petroleum Company. Continuous reaction for preparation of arylene sulfide polymer. 4,060,520, Cl. 260-79.100.
Ishii, Norimichi: *See—*
Kanemaru, Muneaki; Kimura, Tetsuo; Ishii, Norimichi; and Kawashima, Hideo, 4,060,564, Cl. 260-641.000.
Itabashi, Koji: *See—*
Goto, Mituhiro; Hashimoto, Isao; Watanabe, Shugo; and Itabashi, Koji, 4,060,411, Cl. 75-138.000.
Itai, Noriyuki: *See—*
Harada, Yutaka; Itai, Noriyuki; Ucikawa, Hiroshi; Kato, Hajime; Sato, Katutoshi; and Itoh, Akira, 4,060,425, Cl. 106-90.000.
Itaya, Kenji: *See—*
Yokota, Noriyuki; Tokuda, Shingo; Ito, Yoshiro; and Itaya, Kenji, 4,060,465, Cl. 204-128.000.
Ito, Michio: *See—*
Takahashi, Shigeo; Ito, Michio; Nagasawa, Sakae; and Suzuki, Sigeo, 4,060,120, Cl. 164-35.000.
Ito, Shozo, to Mifuji Iron Works Co., Ltd. Apparatus for treating raw material with a treating gas. 4,060,393, Cl. 23-277.00R.
Ito, Yoshiro: *See—*
Yokota, Noriyuki; Tokuda, Shingo; Ito, Yoshiro; and Itaya, Kenji, 4,060,465, Cl. 204-128.000.
Itoh, Akira: *See—*
Harada, Yutaka; Itai, Noriyuki; Ucikawa, Hiroshi; Kato, Hajime; Sato, Katutoshi; and Itoh, Akira, 4,060,425, Cl. 106-90.000.
ITW Fastex Italia, S.p.A.: *See—*
Aimar, Michele, 4,059,938, Cl. 52-716.000.
Iwahara, Makoto; Maruyama, Fumio; Fujiki, Goro; Mori, Toshinori; Hiyama, Norio; and Kikuchi, Mitsuru, to Victor Company of Japan, Limited. Binaural four-channel stereophony. 4,060,696, Cl. 179-1.0GQ.
Iwami, Isamu; and Kinoshita, Hideo, to Asahi-Dow Limited. Coating compositions. 4,060,657, Cl. 428-375.000.
Iwatate, Fujio: *See—*
Hirayama, Kazuhiro; Sato, Yasushi; Tokiwa, Taisuke; Kawakubo, Kazuo; Iwatate, Fujio; and Nakatsui, Hisashi, 4,060,322, Cl. 355-60.000.
Hirayama, Kazuhiro; Sato, Yasushi; Tokiwa, Taisuke; Iwatate, Fujio; Kawakubo, Kazuo; and Nakatsui, Hisashi, 4,060,323, Cl. 355-60.000.
J. Bobst & Fils, S.A.: *See—*
Grob, Jean, 4,060,187, Cl. 226-8.000.
Jack, James, deceased: *See—*
Taylor-Brown, Terence John; Calver, Paul Newton; and Jack, James, deceased, 4,060,648, Cl. 427-32.000.
Jack, Margaret, administratrix: *See—*
Taylor-Brown, Terence John; Calver, Paul Newton; and Jack, James, deceased, 4,060,648, Cl. 427-32.000.
Jackman, Joseph R., to Reactive Metals & Alloys Corporation. Methods and apparatus for adding mischmetal to molten steel. 4,060,407, Cl. 75-58.000.
Jackson, Byron L.; and Wagner, Joseph P., to Robertshaw Controls Company. Method of making a condition responsive valve construction. 4,059,878, Cl. 29-157.10R.
Jacobowitz, Lawrence; Mathisen, Einar S.; and Thorp, Lawrence D., to International Business Machines Corporation. Wide band grating spectrometer. 4,060,327, Cl. 356-96.000.
Jacobs, James W., to General Motors Corporation. Belt-driven transfer arm clutch mechanism for agitator washer. 4,059,975, Cl. 68-23.700.
Jacobsen, Kim. Spline and groove connection. 4,060,332, Cl. 403-359.000.
Jacobus, David P.; Dulaney, Eugene L.; and Grier, Nathaniel, to Merck & Co., Inc. Broad spectrum antibacterial compositions containing tris-(hydroxymethyl)-aminoethane and dicycloaliphatic-alkyl polyamines. 4,060,639, Cl. 424-325.000.
Jaffe, Joseph: *See—*
Reed, Marion G.; and Jaffe, Joseph, 4,060,480, Cl. 208-111.000.
James, Brian George, to Beecham Group Limited. 3-Carbamylbenzyl-7-(phenylglycyl)amino cephalosporin derivatives. 4,060,611, Cl. 424-246.000.
Janssen, Paul Adriaan Jan; Van Daele, Georges Henri Paul; and Boey, Jozef Martin, to Janssen Pharmaceutica N.V. Aroyl-substituted phenylmalonic acid derivatives. 4,060,528, Cl. 260-295.00R.
Janssen Pharmaceutica N.V.: *See—*
Janssen, Paul Adriaan Jan; Van Daele, Georges Henri Paul; and Boey, Jozef Martin, 4,060,528, Cl. 260-295.00R.
Jantsch, Ottomar; Feigt, Ingmar; and Willig, Wolf Rudiger, to Siemens Aktiengesellschaft. Strip type radiation detector and method of making same. 4,060,822, Cl. 357-30.000.
Japan Crown Cork Co., Ltd.: *See—*
Ohmi, Hidehiko, 4,060,053, Cl. 118-215.000.
Japanese National Railways: *See—*
Harada, Yutaka; Itai, Noriyuki; Ucikawa, Hiroshi; Kato, Hajime; Sato, Katutoshi; and Itoh, Akira, 4,060,425, Cl. 106-90.000.
Jardin, Hans: *See—*
Bienert, Horst; Jardin, Hans; and Schatzler, Walter, 4,060,274, Cl. 296-137.00G.

Jarreau, Francois-Xavier; and Sarfati, Roger Gerard, to Etablissements Nativelle S.A. Cardenolide derivatives. 4,060,607, Cl. 424-241.000.
Jarret, Boaz Antony, to Cav Limited. Liquid fuel pumping apparatus. 4,060,347, Cl. 417-392.000.
Jayne, Max L.; and Natale, Paul R., to GTE Sylvania Incorporated. Longitudinally actuated zero force connector. 4,060,300, Cl. 339-74.00R.
Jennemann, Glenn A.: *See—*
Weston, Paul George; Jennemann, Glenn A.; and Hutchinson, Thomas Kemp, 4,060,108, Cl. 141-59.000.
Jenny, Damian Johann, to Damian J. Jenny AG. Apparatus for applying ingredients. 4,060,027, Cl. 99-450.100.
Jenny, Hubert: *See—*
Grundler, Robert; and Jenny, Hubert, 4,060,103, Cl. 139-185.000.
Jensen, James Keith: *See—*
Trimble, David Lee; Copley, Russell Dean; Jensen, James Keith; and Schlueter, Francis Edward, 4,059,942, Cl. 56-30.000.
Jensen, Wayne E., to B & J Manufacturing Company. Tire rasp blades with renewable cutting and buffing edges. 4,059,875, Cl. 29-78.000.
Jeserich, Wolfgang-Dieter; Cordes, Claus; Seydl, Wolfgang; and Weiss, Hans-Peter, to BASF Aktiengesellschaft. Manufacture of polyamide film-forming materials containing magnesium silicate. 4,060,518, Cl. 260-78.00L.
Jirkovsky, Ivo L.: *See—*
Philipp, Adolf H.; and Jirkovsky, Ivo L., 4,060,619, Cl. 424-256.000.
Johannes, Gerhard; Gemmer, Erwin; Konig, Hans-Joachim; and Reinhard, Gunter, to Hoechst Aktiengesellschaft. Resin coated metal substrates. 4,060,655, Cl. 428-35.000.
Johansson, Sven Olof G. Tube perforator. 4,060,366, Cl. 425-290.000.
Johnson, Charles A., to Home Curtain Corporation. Process for imparting color on a discrete basis to the thermally fused portion of quilted synthetic resinous materials. 4,060,438, Cl. 156-73.100.
Johnson Controls, Inc.: *See—*
Pascucci, Gregory A.; Krishnaiyer, Ramesh; and Pridemore, Donald Floyd, 4,060,735, Cl. 307-3.000.
Johnson, Donald F., to American Solar Energy Corporation. Solar heater apparatus. 4,060,072, Cl. 126-271.000.
Johnson, Robert B.: *See—*
Feldman, Paul S.; Johnson, Robert B.; and Nibby, Chester M., Jr., 4,060,794, Cl. 364-900.000.
Johnssen, Friedrich Karl. Antitheft system for sales areas. 4,060,040, Cl. 109-40.000.
Jonas, Rochus: *See—*
Schacht, Erich; Mehrhof, Werner; Jonas, Rochus; Nowak, Herbert; and Simane, Zdenek, 4,060,609, Cl. 424-244.000.
Jonas Woodhead Limited: *See—*
Duckett, William Arthur, 4,060,155, Cl. 188-282.000.
Jones, Charles H.; and Skinner, Dale D., to Westinghouse Electric Corporation. Imaging system. 4,060,791, Cl. 340-3.00C.
Jones, Clive, to Chrysler United Kingdom Limited. Engine mountings. 4,060,011, Cl. 74-498.000.
Jones, Donald H., to Control Systems Research, Inc. Two-speed resolver employing differential reduction techniques. 4,060,799, Cl. 340-198.000.
Jones, Evan Thomas Richard, to Foseco International Limited. Arc steelmaking. 4,060,406, Cl. 75-12.000.
Jones, James J., to Texas Instruments Incorporated. Brake control logic circuit for vehicle skid control brake system. 4,060,285, Cl. 303-106.000.
Jonson, Ake: *See—*
Trolle, Sten; and Jonson, Ake, 4,060,359, Cl. 425-78.000.
Joy Manufacturing Company: *See—*
Turner, John W., Jr., 4,060,014, Cl. 81-57.200.
Wayment, William Ross, 4,059,963, Cl. 61-35.000.
Judin, Alexandr Vladimirovich: *See—*
Egorov, Boris Afanasievich; Grzhimalovsky, Alexandr Sergeevich; Judin, Alexandr Vladimirovich; Fishman, Konstantin Evgenievich; and Vernaya, Ljudmila Dmitrievna, 4,060,582, Cl. 264-210.00F.
Jungkind, Roland; and Sedlmair, Gerhard, to Hannes Marker. Heel retainer for safety ski-bindings. 4,060,257, Cl. 280-626.000.
Junk, Norman M.: *See—*
Postupack, Constantine; Borg, David G.; Junk, Norman M.; Oswald, Gerald L.; and Bowman, Arthur F., 4,060,033, Cl. 102-24.00R.
Kabushiki Kaisha Komatsu Seisakusho: *See—*
Matsumoto, Takeshi; Chiba, Kazukiyo; Shioyama, Atsuo; and Yamaguchi, Yoshitake, 4,060,143, Cl. 180-64.00A.
Kabushiki Kaisha Ricoh: *See—*
Ohta, Wasaburo; and Watanabe, Tatsuya, 4,060,441, Cl. 156-234.000.
Kabushiki Kaisha Toyoda Jidoshokki Seisakusho: *See—*
Miyazaki, Tsutomu; Yoshida, Yoshiaki; Ueda, Shozo; Mitsuya, Kinpei; and Ogasawara, Takeshi, 4,060,207, Cl. 242-18.00R.
Kadner, Martin: *See—*
Huschka, Hans; and Kadner, Martin, 4,060,497, Cl. 252-301.10S.
Kaestner, Erwin. Bio-rhythm calculator. 4,059,952, Cl. 58-4.00R.
Kakizaki, Kimio: *See—*
Fujie, Kunio; Nakayama, Wataru; Kuwahara, Heikichi; and Kakizaki, Kimio, 4,060,125, Cl. 165-133.000.
Kalinoski, Richard W.: *See—*
Annino, Raymond; Prescott, Robert C.; Karas, Edwin L.; and Kalinoski, Richard W., 4,059,994, Cl. 73-23.100.
Kamatics Corporation: *See—*
Orkin, Stanley S., 4,060,287, Cl. 308-72.000.
Kamino, Hideo: *See—*
Minami, Hidehiro; and Kamino, Hideo, 4,060,064, Cl. 123-119.0EC.
Kampert, William P., to Aluminum Company of America. Color anodizing of aluminum. 4,060,462, Cl. 204-58.000.
Kanemaru, Muneaki; Kimura, Tetsuo; Ishii, Norimichi; and Kawashima, Hideo, to Mitsui Toatsu Chemicals, Incorporated. Process for preparing alcohols. 4,060,564, Cl. 260-641.000.
Kanojia, Ramesh M., to Ortho Pharmaceutical Corporation. Isolation of utero-evacuant substances from plant extracts. 4,060,604, Cl. 424-195.000.
Kansai Paint Company, Limited: *See—*
Sato, Hidetaka, 4,059,904, Cl. 33-126.70A.
Kaporovich, Vladimir Georgievich; Udovenko, Vitaly Kirillovich; Krasnorutsky, Viktor Petrovich; and Chechenets, Akhmet Galievich. Method of producing hermetically sealed end in a tubular workpiece. 4,059,977, Cl. 72-69.000.
Kapps, Manfred; Mitschke, Karl-Heinz; and Schliebs, Reinhard, to Bayer Aktiengesellschaft. Production of N,N-Bis-(2-hydroxyalkyl)-aminomethane phosphonic acid dialkyl esters. 4,060,571, Cl. 260-970.000.
Karami, Hamzeh, to Colgate-Palmolive Company. Diaper tape fastener. 4,060,085, Cl. 128-287.000.
Karas, Edwin L.: *See—*
Annino, Raymond; Prescott, Robert C.; Karas, Edwin L.; and Kalinoski, Richard W., 4,059,994, Cl. 73-23.100.
Karl Kroyer St. Anne's Limited: *See—*
Tapp, Frederick, 4,060,360, Cl. 425-83.000.
Karls, Albert J., to Moeller Manufacturing Company, Inc. Method of forming a handle by welding. 4,060,706, Cl. 219-107.000.
Karmann, Hans-Georg: *See—*
Baumann, Hans-Peter; and Karmann. Hans-Georg, 4,060,387, Cl. 8-169.000.
Karrer, Friedrich, to Ciba-Geigy Corporation. Phenoxy-phenoxy-alkylthionocarbamate compounds. 4,060,629, Cl. 424-300.000.
Kataoka, Hiroyuki: *See—*
Suzuki, Matsumi; Kataoka, Hiroyuki; and Ueno, Keiichi, 4,060,695, Cl. 179-1.0SB.
Kato, Chizuo. Ornamental assembly. 4,060,665, Cl. 428-542.000.
Kato, Hajime: *See—*
Harada, Yutaka; Itai, Noriyuki; Ucikawa, Hiroshi; Kato, Hajime; Sato, Katutoshi; and Itoh, Akira, 4,060,425, Cl. 106-90.000.
Katsumori, Shigeo: *See—*
Shimizu, Kazufusa; Katsumori, Shigeo; Nishikawa, Tadaaki; Senoo, Keisaku; Sakamaki, Kenji; Fujita, Makio; Tano, Teruo; Takano, Hiroshi; and Komori, Hideo, 4,060,390, Cl. 23-259.100.
Katz, Jerome. Method for hydrogen peroxide bleaching in acid or neutral solutions. 4,060,385, Cl. 8-111.000
Katz, Jerome. Alkaline hydrogen peroxide bleaching method. 4,060,386, Cl. 8-111.000.
Kaufman, Sydney M., to Ford Motor Company. Copper coated iron-carbon eutectic alloy powders. 4,060,414, Cl. 75-246.000.
Kaufmann, Frank H., to Steel Heddle Manufacturing Company. Heddle frames. 4,060,102, Cl. 139-91.000.
Kavesh, Sheldon, to Allied Chemical Corporation. Production of filaments of hexagonal close-packed metals and alloys thereof. 4,060,430, Cl. 148-32.000.
Kawaai, Osamu: *See—*
Sakamoto, Kenji; and Kawaai, Osamu, 4,060,765, Cl. 325-21.000.
Kawagoshi, Hiroshi; Takeuchi, Masato; and Nakajima, Fumito, to Hitachi, Ltd. Process for steam reforming of hydrocarbons. 4,060,498, Cl. 252-373.000.
Kawakubo, Kazuo: *See—*
Hirayama, Kazuhiro; Sato, Yasushi; Tokiwa, Taisuke; Kawakubo, Kazuo; Iwatate, Fujio; and Nakatsui, Hisashi, 4,060,322, Cl. 355-60.000.
Hirayama, Kazuhiro; Sato, Yasushi; Tokiwa, Taisuke; Iwatate, Fujio; Kawakubo, Kazuo; and Nakatsui, Hisashi, 4,060,323, Cl. 355-60.000.
Kawase, Shoji: *See—*
Kuratsuji, Takatoshi; Kawase, Shoji; and Shima, Takeo, 4,060,516, Cl. 260-75.00T.
Kawashima, Hideo: *See—*
Kanemaru, Muneaki; Kimura, Tetsuo; Ishii, Norimichi; and Kawashima, Hideo, 4,060,564, Cl. 260-641.000.
Kazuo, Arai, to Nissan Denshi Company Limited. Automatic signal switching apparatus for a combined transceiver and radio or tape recorder set. 4,060,766, Cl. 325-22.000.
Kazuo, Yamaguchi; Genjiro, Kakogawa; Masayoshi, Hasuo; Goko, Nobuaki; and Maruyama, Yasuo, to Mitsubishi Chemical Industries. Preparation of titanium trichloride. 4,060,593, Cl. 423-492.000.
Kearney-National Inc.: *See—*
Hanke, Kenneth Earl; and Rees, Ned, 4,060,785, Cl. 337-201.000.
Keeling, Harmon H.: *See—*
Hudspeth, Thomas; and Keeling, Harmon H., 4,060,781, Cl. 333-98.00S.
Kehr, Edwin A. Hydroseparator stacker. 4,060,282, Cl. 302-16.000.
Keiper Trainingsysteme GmbH & Co.: *See—*
Pfleiderer, Werner; Arnold, Friedrich; and Haussermann, Richard, 4,060,239, Cl. 272-73.000.
Kel-Lite Industries, Inc.: *See—*
Nelson, Norman C., 4,060,723, Cl. 362-205.000.
Keller Manufacturing Co., Inc.: *See—*
Keller, William A., 4,060,135, Cl. 172-380.000.
Keller, William A., to Keller Manufacturing Co., Inc. Sheet metal garden tool. 4,060,135, Cl. 172-380.000.

Kelley, William John: *See—*
  Sims, Larry Averett; and Kelley, William John, 4,059,917, Cl. 46-196.000.
Kelly, Buford L. Head gasket leak detector. 4,059,985, Cl. 73-46.000.
Kelp, Fritz: *See—*
  Tratz, Herbert; Kelp, Fritz; and Netsch, Erich, 4,060,124, Cl. 165-110.000.
Kennecott Copper Corporation: *See—*
  Ammann, Paul R.; Crimes, Peter B.; and Kim, Jonathan J., 4,060,409, Cl. 75-93.00R.
  O'Day, William R., Jr.; Bensky, Norman D.; and LeBlanc, James D., 4,060,653, Cl. 427-423.000.
Kenneday, John W.; Kinney, Charles W.; Scott, Floyd L., Jr.; and Schmuck, Phillip W., to Baker International Corporation. Mechanically set liner hanger and running tool. 4,060,131, Cl. 166-315.000.
Kernforschungsanlage Julich GmbH: *See—*
  Luhleich, Hartmut; Nickel, Hubertus; and Dias, Francesco, 4,060,592, Cl. 423-448.000.
Kerr, John L.; and Timochko, Michael J., to United States of America, Army. Loaded microstrip antenna. 4,060,810, Cl. 343-700.0MS.
Keune, Walter Hartmut: *See—*
  Wagner, Fritz; Sahm, Hermann; and Keune, Walter Hartmut, 4,060,455, Cl. 195-29.000.
Kewpie Kabushiki Kaisha: *See—*
  Sotoma, Koichi, 4,060,109, Cl. 141-83.000.
  Takasuga, Kenji, 4,060,106, Cl. 141-1.000.
Khromov-Borisov, Nikolai Vasilievich; Torf, Samuil Fedorovich; Cherepanova, Valentina Pavlovna; Danilov, Anatoly Fedorovich; and Starshinova, Larisa Alexandrovna. Nondepolarizing muscle relaxant. 4,060,652, Cl. 424-329.000.
Kiel, Wolfgang: *See—*
  Wedemeyer, Karlfried; Kiel, Wolfgang; and Evertz, Werner, 4,060,562, Cl. 260-623.00R.
Kikuchi, Mitsuru: *See—*
  Iwahara, Makoto; Maruyama, Fumio; Fujiki, Goro; Mori, Toshinori; Hiyama, Norio; and Kikuchi, Mitsuru, 4,060,696, Cl. 179-1.0GQ.
Kikuchi, Yasuhei, to Usui International Industry, Ltd. Cooling fan control mechanism. 4,060,158, Cl. 192-82.00T.
Kikuchi, Yoshito. Bottle with electrically-operated pump. 4,060,182, Cl. 222-333.000.
Kikumoto, Ryoji; Tobe, Akihiro; Tonomura, Shinji; and Ikoma, Hidenobu, to Mitsubishi Chemical Industries Ltd. Pharmaceutically active 2-omega-aminoalkoxydiphenyl sulfides. 4,060,612, Cl. 424-248.520.
Kikumoto, Ryoji; Tobe, Akihiro; Tonomura, Shinji; and Ikoma, Hidenobu, to Mitsubishi Chemical Industries Ltd. Pharmaceutically active 2-(3-alkylaminopropoxy)diphenylmethanes. 4,060,641, Cl. 424-330.000.
Kilbourn, Edward E.; and Weir, W. David, to Rohm and Haas Company. Acetyl- and carbalkoxythioureidobenzophenones as anthelmintic agents. 4,060,636, Cl. 424-322.000.
Kim, Jonathan J.: *See—*
  Ammann, Paul R.; Crimes, Peter B.; and Kim, Jonathan J., 4,060,409, Cl. 75-93.00R.
Kimura, Michio; Inaba, Shigeho; and Yamamoto, Hisao, to Sumitomo Chemical Company, Limited. Novel n'-acylated phenyl-hydrazine and -hydrazone derivatives. 4,060,550, Cl. 260-340.50R.
Kimura, Taro: *See—*
  Tsubuko, Kazuo; Kimura, Taro; Hashimoto, Junichiro; and Kurotori, Tsuneo, 4,060,493, Cl. 252-62.10L.
Kimura, Tetsuo: *See—*
  Kanemaru, Muneaki; Kimura, Tetsuo; Ishii, Norimichi; and Kawashima, Hideo, 4,060,564, Cl. 260-641.000.
Kindscher, Wolfgang; Fischer, Martin; Eicken, Karl; and Vitt, Guenter, to BASF Aktiengesellschaft. Sulfonamido containing carboxylic acids. 4,060,522, Cl. 260-293.850.
Kingman, Stephen A.; and Weaver, Leslie A., to LeBoeuf, Eugene A. Lift bed trailer suspension subframe. 4,060,145, Cl. 280-106.00T.
Kinney, Charles W.: *See—*
  Kenneday, John W.; Kinney, Charles W.; Scott, Floyd L., Jr.; and Schmuck, Phillip W., 4,060,131, Cl. 166-315.000.
Kinoshita, Hideo: *See—*
  Iwami, Isamu; and Kinoshita, Hideo, 4,060,657, Cl. 428-375.000.
Kirk, Donald. Concrete forms for building a concrete spillway. 4,060,217, Cl. 249-10.000.
Kirtley, James L., Jr.; and Baker, Richard H., to Massachusetts Institute of Technology. Electronic motor that includes an electronic waveform synthesizer and the synthesizer per se. 4,060,754, Cl. 318-218.000.
Kisbany, Frederick N. Method of foam-filling a tire carcass. 4,060,578, Cl. 264-46.600.
Kisteneich, Heinz: *See—*
  Schmitzer, Willi; Kisteneich, Heinz; and Proksa, Ferdinand, 4,060,579, Cl. 264-51.000.
Kistler Instrumente AG: *See—*
  Engeler, Paul; Baumgartner, Hans Ulrich; Dubendorfer, Ulrich; and Sonderegger, Hans Conrad, 4,059,999, Cl. 73-419.000.
Klein, Norman E., to Milliken Research Corporation. Method of making an apparatus for dyeing and printing of materials. 4,059,880, Cl. 29-157.00C.
Klein, Yitzhak: *See—*
  Zioni, Jacob; Klein, Yitzhak; and Inbar, Dan, 4,060,730, Cl. 250-369.000.
Kleiner, Eduard K.; and Dear, Robert Ernest Arthur, to Ciba-Geigy Corporation. Unsaturated esters of polyfluoroalkylthioalcohols. 4,060,681, Cl. 560-222.000.
Klemann, Lawrence P.; and Newman, Gerald H., to Exxon Research and Engineering Company. Alkali metal anode-containing cells having electrolytes of organometallic-alkali metal salts and organic solvents. 4,060,674, Cl. 429-194.000.
Kletecka, George, to B. F. Goodrich Company, The. Preparation of N,N'-di-2-naphthyl-p-phenylenediamine. 4,060,552, Cl. 260-576.000.
Klingler, Karl H.; Aurich, Rudolf; and Habersang, Silke, to Deutsche Gold- und Silber-Scheideanstalt Vormals Roessler. Quaternary xanthinylalkyl nortropine. 4,060,618, Cl. 424-253.000.
Klopping, Hein Louis, to Du Pont de Nemours, E. I., and Company. Controlling fungal crop diseases with mixtures of methyl 2-benzimidazolecarbamate and certain specific fungicides. 4,060,624, Cl. 424-273.00R.
Klopping, Hein Louis, to Du Pont de Nemours, E. I., and Company. Mixtures of methyl 2-benzimidazolecarbamate and ethylenebisdithiocarbamic acid salts as foliar fungicides. 4,060,625, Cl. 424-273.00R.
Knox Manufacturing Co.: *See—*
  Brown, Donald J., 4,060,310, Cl. 350-117.000.
Knox, Walter R.: *See—*
  Paulik, Frank E.; Hershman, Arnold; Knox, Walter R.; and Roth, James F., 4,060,547, Cl. 260-532.000.
Kobayashi, Sigeyasu: *See—*
  Iizuka, Masahiko; Suzuki, Jiro; and Kobayashi, Sigeyasu, 4,060,457, Cl. 195-127.000.
Kobe Steel, Ltd.: *See—*
  Asari, Akira; and Tatsuno, Kenzou, 4,059,896, Cl. 29-403.000.
Kobelt, Jacob. Self-balancing brake shoes for caliper brake. 4,060,153, Cl. 188-72.600.
Kobres, Robert E., Jr. Geometric puzzle. 4,060,247, Cl. 273-157.00R.
Kodama, Jiro K.; Haynes, George R.; and Albert, James R., to Shell Oil Company. Therapeutic agents. 4,060,640, Cl. 424-326.000.
Kohler, Johann: *See—*
  Grebe, Herbert; Hartwig, Wolfgang; Kohler, Johann; Rothe, Rudolf; and Schroder, Karl-Friedrich, 4,060,394, Cl. 23-284.000.
Kojima, Ichiro: *See—*
  Iizuka, Masahiko; Suzuki, Jiro; and Kobayashi, Sigeyasu, 4,060,457, Cl. 195-127.000.
Komori, Hideo: *See—*
  Shimizu, Kazufusa; Katsumori, Shigeo; Nishikawa, Tadaaki; Senoo, Keisaku; Sakamaki, Kenji; Fujita, Makio; Tano, Teruo; Takano, Hiroshi; and Komori, Hideo, 4,060,390, Cl. 23-259.100.
Kondo, Toshihiro, to Kondo, Toshihiro; and Fuji Photo Film Co., Ltd. Electromagnetically driven optical blade. 4,060,313, Cl. 350-269.000.
Konig, Hans-Joachim: *See—*
  Johannes, Gerhard; Gemmer, Erwin; Konig, Hans-Joachim; and Reinhard, Gunter, 4,060,655, Cl. 428-35.000.
Konort, Mark D.: *See—*
  Lamberti, Vincent; and Konort, Mark D., 4,060,495, Cl. 252-106.000.
Koransha Co., Ltd.: *See—*
  Kurita, Sumihiko, 4,060,095, Cl. 136-234.000.
Kotcharian, Michel, to Technigaz. Conduit for conveying a fluid, the temperature of which is different from the surrounding temperature. 4,060,263, Cl. 285-47.000.
Kotzsch, Hans-Joachim; and Vahlensieck, Hans-Joachim, to Dynamit Nobel Aktiengesellschaft. Method of preparing N,N'-bis-trimethylsilylurea. 4,060,536, Cl. 260-448.20E.
Kotzsch, Hans Joachim; Vahlensieck, Hans-Joachim; and Seiler, Claus-Dieter, to Dynamit Nobel Aktiengesellschaft. Process for the preparation of silane esters of tertiary alcohols. 4,060,538, Cl. 260-448.80R.
Kraftwerk Union Aktiengesellschaft: *See—*
  Acher, Heinz, 4,060,452, Cl. 176-36.00R.
  Schabert, Hans-Peter; and Laurer, Erwin, 4,060,453, Cl. 176-38.000.
  Tratz, Herbert; Kelp, Fritz; and Netsch, Erich, 4,060,124, Cl. 165-110.000.
  Weghaupt, Erich, 4,060,743, Cl. 310-52.000.
Kramer, Wolfgang: *See—*
  Meiser, Werner; Kramer, Wolfgang; Buchel, Karl Heinz; and Plempel, Manfred, 4,060,623, Cl. 424-269.000.
Krasnorutsky, Viktor Petrovich: *See—*
  Kaporovich, Vladimir Georgievich; Udovenko, Vitaly Kirillovich; Krasnorutsky, Viktor Petrovich; and Chechenets, Akhmet Galievich, 4,059,977, Cl. 72-69.000.
Krishna, Surinder: *See—*
  Houston, Douglas E.; and Krishna, Surinder, 4,060,821, Cl. 357-22.000.
Krishnaiyer, Ramesh: *See—*
  Pascucci, Gregory A.; Krishnaiyer, Ramesh; and Pridemore, Donald Floyd, 4,060,735, Cl. 307-3.000.
Kron, Gerald Joseph, to Singer Company, The. Neural receptor augmented G seat system. 4,059,909, Cl. 35-12.00E.
Kronos Titan G.m.b.H.: *See—*
  Hartmann, Achim; Kulling, Achim; and Thumm, Hans, 4,060,584, Cl. 423-149.000.
Krutzner, Karl, Jr.: *See—*
  Weber, Paul; Mollenkopf, Hans; Henning, Kurt; Heinemann, Otto; Schmits, Heinz-Herbert; Rother, Wolfgang; Ritzmann, Horst; Wurr, Jurgen; Krutzner, Karl, Jr.; Schossler, Werner; Goldmann, Wolf; and Schepers, Georg, 4,060,375, Cl. 432-14.000.
Kubik, Philip A. Hydraulic motor having positive locking means. 4,060,022, Cl. 91-40.000.

Kubota, Yuzuru: *See—*
  Okuyama, Toshiaki; and Kubota, Yuzuru, 4,060,753, Cl. 318-175.000.
Kudlacek, Donald S. Compound archery bow with eccentric cam elements. 4,060,066, Cl. 124-23.00R.
Kuhn, John E., to Aluminum Company of America. Melting process. 4,060,408, Cl. 75-68.00R.
Kuhn, S.A.: *See—*
  Reber, Walter, 4,059,944, Cl. 56-370.000.
Kuhr, Manfred: *See—*
  Hrstka, Vladimir; Hubner, Manfred; Kuhr, Manfred; Schmidt, Felix Helmut; and Aumuller, Walter, 4,060,626, Cl. 424-274.000.
Kulling, Achim: *See—*
  Hartmann, Achim; Kulling, Achim; and Thumm, Hans, 4,060,584, Cl. 423-149.000.
Kunkle, James Raymond; and Olsson, Billy Erik, to AMP Incorporated. Low profile DIP receptacle. 4,060,296, Cl. 339-17.0CF.
Kuntschik, Lawrence F.: *See—*
  Macaluso, Anthony, Sr.; and Kuntschik, Lawrence F., 4,060,557, Cl. 260-604.0HF.
Kuramochi, Shigeaki. Toy sewing machine. 4,060,044, Cl. 112-158.00R.
Kuratsuji, Takatoshi; Kawase, Shoji; and Shima, Takeo, to Teijin Limited. Naphthalate polyester filaments. 4,060,516, Cl. 260-75.00T.
Kureha Kagaku Kogyo Kabushiki Kaisha: *See—*
  Ohya, Masaki; and Hoshino, Mitsuru, 4,060,650, Cl. 427-161.000.
Kurita, Sumihiko, to Koransha Co., Ltd. Thermocouple protecting tube. 4,060,095, Cl. 136-234.000.
Kurmeier, Hans-Adolf: *See—*
  Gante, Joachim; Kurmeier, Hans-Adolf; Orth, Dieter; Schacht, Erich; and Wild, Albrecht, 4,060,633, Cl. 424-304.000.
Kuroda, Takayuki: *See—*
  Takami, Akihiro; Kuroda, Takayuki; Nagano, Katsuo; and Matsuoka, Michio, 4,060,661, Cl. 428-432.000.
Kuroda, Yoshiyuki, to Citizen Watch Co., Ltd.; and Sunarrow Koski, Co., Ltd. Band for wrist-watch. 4,060,185, Cl. 224-4.00F.
Kuroki, Masataka: *See—*
  Uchikuga, Saburo; and Kuroki, Masataka, 4,060,551, Cl. 260-561.00S.
Kurotori, Tsuneo: *See—*
  Tsubuko, Kazuo; Kimura, Taro; Hashimoto, Junichiro; and Kurotori, Tsuneo, 4,060,493, Cl. 252-62.10L.
Kurtz, Bruce Edward: *See—*
  Smalley, Edmund W.; Kurtz, Bruce Edward; and Bandyopadhyay, Bhaskar, 4,060,460, Cl. 203-29.000.
Kurtz, George W. Tie locating device. 4,059,906, Cl. 33-180.00R.
Kuwahara, Akiyasu: *See—*
  Mori, Michitsugu; Ohfuji, Mitsuo; and Kuwahara, Akiyasu, 4,060,573, Cl. 261-23.00B.
Kuwahara, Heikichi: *See—*
  Fujie, Kunio; Nakayama, Wataru; Kuwahara, Heikichi; and Kakizaki, Kimio, 4,060,125, Cl. 165-133.000.
Kuzev, Lyubomir Vladimirov: *See—*
  Stoev, Stoycho Mitrev; Metodiev, Metodi Stoyanov; Kuzev, Lyubomir Vladimirov; Vedrichkov, Petko Georgiev; Sapunarov, Ivan Mitrev; Vassilev, Vassil Vladimirov; Dimitrov, Spas Petkov; Gasharov, Vihar Assenov; Russev, Sheko Kolev; and Mitrev, Kostadin Georgiev, 4,060,481, Cl. 209-170.000.
Kwait, Benjamin F. Fuel saving system. 4,060,374, Cl. 431-190.000.
L. M. Ericsson Pty. Ltd.: *See—*
  Maxwell, Anthony Robert; and Platts, John Charles, 4,060,797, Cl. 340-347.0DD.
L. P. Machinery Ltd.: *See—*
  Piereder, Ludwig, 4,060,349, Cl. 417-482.000.
Lâch, John H.: *See—*
  Shatila, Mounir A.; Veeneman, John L.; Lach, John H.; and Harmon, James F., 4,060,367, Cl. 425-311.000.
Lafont, Andre: *See—*
  Guienne, Paul; Herrouin, Guy; Lafont, Andre; Bertin, Jean, deceased; Bertin, Michel; Bertin, Laurent; Bertin, Philippe; Midy nee Bertin, Catherine; Gonzalez-Camino nee Bertin, Francoise; and Bertin nee Loustau, Genevieve, heirs, 4,060,147, Cl. 180-121.000.
Lagarrigue, Serge. Security system. 4,060,039, Cl. 109-3.000.
LaHaye, Paul G.; Bjerklie, John W.; and Gallant, Gerald G., Jr., to Hague International. Energy conserving process furnace system and components thereof. 4,060,379, Cl. 432-179.000.
Lakerveld, Herman Gerard; van Rosmalen, Gerard Eduard; Bulthius, Kornelis; and Sinjou, Johannes Petrus, to U.S. Philips Corporation. Playing apparatus, in particular a video player for playing a record which is made of a transparent material and provided with a central hole. 4,060,248, Cl. 274-41.60R.
Laliberte, Real: *See—*
  Ferland, Jean-Marie; Laliberte, Real; Lippmann, Wilbur; and Pugsley, Thomas A., 4,060,613, Cl. 424-250.000.
Lambel, Reinhold; and Maynard, Steven. Drain cleaner providing sudden blast of gas. 4,059,858, Cl. 4-255.000.
Lamberti, Vincent; and Konort, Mark D., to Lever Brothers Company. Hydroxyaryldialkyl sulfonium halides. 4,060,495, Cl. 252-106.000.
Lance, Richard T.: *See—*
  Papafingos, Pandelis N.; and Lance, Richard T., 4,060,118, Cl. 159-49.000.
Landgraf, Glenn A.; and Ebel, Fred H., to Gold Thread Machinery Co. Folder. 4,060,227, Cl. 270-66.000.
Lang, Robert J., to Exxon Research and Engineering Company. Coal liquefaction bottoms conversion by coking and gasification. 4,060,478, Cl. 208-8.000.
Langan, John J. Combination chalk holder and cue slide. 4,060,243, Cl. 273-18.000.
Lanham, Albert Frank; Barned, Philip Sydney; and Potter, Sydney Ralph, to Bryant and May. Match-head compositions. 4,060,434, Cl. 149-2.000.
Lantzsch, Reinhard: *See—*
  Schmidt, Arthur H.; Lantzsch, Reinhard; Marhold, Albrecht; Lehment, Klaus-Friedrich; and Staffe, Adolf, 4,060,549, Cl. 260-543.00F.
Lappington, John P.; and Shafer, Leroy, to Chrysler Corporation. Input sensor circuit for a digital engine controller. 4,060,714, Cl. 364-431.000.
Laser Graphic Systems Corporation: *See—*
  Evans, Charles P., 4,060,032, Cl. 101-401.100.
Laszlo, Marcel. Process for removing heavy metals from fluid media. 4,060,410, Cl. 75-109.000.
Lauck, Helmut, to Varta Batterie Aktiengesellschaft. Galvanic element with a negative electrode of light metal, a non-aqueous electrolyte and a positive electrode. 4,060,675, Cl. 429-194.000.
Laure, George R., to Laure Prosthetics, Inc. Ribbed finger joint implant. 4,059,854, Cl. 3-1.910.
Laure Prosthetics, Inc.: *See—*
  Laure, George R., 4,059,854, Cl. 3-1.910.
Laurer, Erwin: *See—*
  Schabert, Hans-Peter; and Laurer, Erwin, 4,060,453, Cl. 176-38.000.
Leach, Bruce Eugene, to Continental Oil Company. Disproportionation of xylenols with phenol to form cresols. 4,060,560, Cl. 260-621.00D.
LeBlanc, James D.: *See—*
  O'Day, William R., Jr.; Bensky, Norman D.; and LeBlanc, James D., 4,060,653, Cl. 427-423.000.
LeBoeuf, Eugene A.: *See—*
  Kingman, Stephen A.; and Weaver, Leslie A., 4,060,145, Cl. 280-106.00T.
Leco Corporation: *See—*
  Sitek, George J., 4,060,717, Cl. 364-497.000.
Lee, Denis; and Cantwell, Alan David Cole, to Imperial Chemical Industries Limited. Operation of mercury-cathode cells. 4,060,463, Cl. 204-99.000.
Lee, Frank James: *See—*
  Cox, William Edward; and Lee, Frank James, 4,060,138, Cl. 173-49.000.
Lee, Lin-Fa, to Du Pont de Nemours, E. I., and Company. Sheath-core cospun heather yarns. 4,059,949, Cl. 57-140.0BY.
Leeper, William E., Jr. Multiple purpose woodworking apparatus. 4,060,112, Cl. 144-134.00R.
Leh, David T., to Sperry Rand Corporation. Method of making a pin actuator connector. 4,059,888, Cl. 29-629.000.
Lehmann, Rolf: *See—*
  Christ, Alfred; and Lehmann, Rolf, 4,059,976, Cl. 72-19.000.
Lehment, Klaus-Friedrich: *See—*
  Schmidt, Arthur H.; Lantzsch, Reinhard; Marhold, Albrecht; Lehment, Klaus-Friedrich; and Staffe, Adolf, 4,060,549, Cl. 260-543.00F.
Leib, Roger K. Modular furniture. 4,060,277, Cl. 297-248.000.
Leigh Products, Inc.: *See—*
  Wilkinson, Eric, 4,060,266, Cl. 292-148.000.
Lemmens, Jean Pierre Gustaaf Rosa: *See—*
  Carteus, Marc Felix Maurice; De Bruyne, Yvrs Marie Grovgrs; Lemmens, Jean Pierre Gustaaf Rosa; and Stubbe, Elie Jozef, 4,060,057, Cl. 122-451.00R.
Le Noane, Georges E.; and Mathern, Andre M. Adjustable connector assembly for laser effect diode, focussing lens and an optical fibre in optical fibre transmission system. 4,060,309, Cl. 350-96.00C.
Leo Pharmaceutical Products Ltd. A/S: *See—*
  Daehne, Welf von; and Rasmussen, Poul Rodbroe, 4,060,606, Cl. 424-238.000.
Les Industries BFG Limitee: *See—*
  Drouin, Claude, 4,060,069, Cl. 126-200.000.
Lever Brothers Company: *See—*
  Bringi, Naganathan Viswanath; and Padley, Frederick Bolton, 4,060,646, Cl. 426-607.000.
  Lamberti, Vincent; and Konort, Mark D., 4,060,495, Cl. 252-106.000.
Lever, Paul H.; and Mohr, Clifford D., to Fireplace Corporation of America. Air cooled freestanding fireplace. 4,060,068, Cl. 126-120.000.
Levesque, George N., to Brown & Sharpe Manufacturing Company. Clutch teeth. 4,060,007, Cl. 74-457.000.
Leviton Manufacturing Co., Inc.: *See—*
  Poliak, John M.; Lopez, Juan M.; and Gritz, Robert W., 4,060,305, Cl. 339-269.000.
  Poliak, John N., 4,060,020, Cl. 85-1.00L.
Lewis, Clifford J., to National Lime Association. Gaseous and liquid reactant treatment. 4,060,587, Cl. 423-210.000.
Licentia Patent-Verwaltungs-G.m.b.H.: *See—*
  Russer, Peter; and Gruber, Johann, 4,060,739, Cl. 307-319.000.
Lieber, Raymond Stanley. Safety guard for power operated machine. 4,060,160, Cl. 192-134.000.
Lin, Heh-Sen; and Adams, John M., to Medtronic, Inc. Variable P-R interval pacemaker. 4,060,090, Cl. 128-419.0PG.
Lin, Kingso C.; and Hammond, Donald J., to Owens-Corning Fiberglas Corporation. Glass fibers coated with a polybutadiene homopolymer latex-containing impregnant. 4,060,658, Cl. 428-378.000.
Lindberg, Richard M.; and Raghavachari, Srinivas T., to MPL, Inc. Dual-ingredient medication dispenser. 4,060,082, Cl. 128-218.00M.

Lindhuber, Hermann: *See—*

Uhlirsch, Kurt; and Lindhuber, Hermann, 4,060,575, Cl. 261-111.000.

Lindsay, Robert A. Cooling seat. 4,060,276, Cl. 297-180.000.

Ling, Hans Gway: *See—*

Merkel, Paul Barrett; and Ling, Hans Gway, 4,060,420, Cl. 96-114.100.

Linke, Walter R.; and Fleischman, Andor A., to Bell & Howell Company. Copier lens of reflex design. 4,060,312, Cl. 350-189.000.

Linn, Wallace Leon. Timer switch assembly having escapement mechanism. 4,060,702, Cl. 200-35.00R.

Linotype-Paul Limited: *See—*

Norris, John Henry, 4,060,210, Cl. 242-71.100.

Linscott, Phillip S., Jr., to Sundstrand Corporation. Structure for attaching a permanent magnet to a rotating shaft. 4,060,745, Cl. 310-156.000.

Lippmann, Wilbur: *See—*

Ferland, Jean-Marie; Laliberte, Real; Lippmann, Wilbur; and Pugsley, Thomas A., 4,060,613, Cl. 424-250.000.

Litton Systems, Inc.: *See—*

Huddle, James R., 4,060,718, Cl. 364-421.000.

Litz, Donald C., to Westinghouse Electric Corporation. Superconductive dynamoelectric machine with improved cryogenic support arrangement. 4,060,742, Cl. 310-52.000.

Liu, Robert Chung-Huan; and Hughes, John Lawrence, to Armour Pharmaceutical Company. Substituted 4-hydroxyphenyl guanidines. 4,060,554, Cl. 260-565.000.

Loeb, Leopold, to General Electric Company. Automatic icemaker including means for minimizing the supercooling effect. 4,059,970, Cl. 62-353.000.

Loffredo, Stefano: *See—*

Groves, James D.; and Loffredo, Stefano, 4,060,583, Cl. 264-272.000.

Lofgren, Stig-Gunnar, to Mo och Domsjo AB. Digging and planting machine. 4,060,043, Cl. 111-3.000.

Lohr, Alfred; and Tschek, Wolfgang, to F. Kuppersbusch & Sohne Aktiengesellschaft. Apparatus for adding salt or seasonings to food being cooked in steam cookers. 4,060,026, Cl. 99-346.000.

Lohr, Delmar Frederick, Jr.; and Wakefield, Lynn Burritt, to Firestone Tire & Rubber Company, The. Process for preparing 2-allyl phenol. 4,060,563, Cl. 260-624.00B.

Lohrmann, Dieter, to United States of America, Army. Self test circuit for multichannel radio receivers. 4,060,767, Cl. 325-363.000.

Long, Margaret E., to R. J. Reynolds Tobacco Company. Glucose isomerization process. 4,060,456, Cl. 195-31.00F.

Longhi, Giuliano: *See—*

Baraldi, Enzo; and Longhi, Giuliano, 4,060,042, Cl. 110-14.000.

Longo, John M.: *See—*

Clavenna, LeRoy R.; Longo, John M.; and Horowitz, Harold S., 4,060,500, Cl. 252-471.000.

Lonza, Ltd.: *See—*

Fritzsche, Christoph, 4,059,983, Cl. 73-15.600.

Lopez, Juan M.: *See—*

Poliak, John M.; Lopez, Juan M.; and Gritz, Robert W., 4,060,305, Cl. 339-269.000.

Lucas Industries Limited: *See—*

Wright, Owen Edgar, 4,060,758, Cl. 323-17.000.

Lucking, Hans Joachim: *See—*

Maass, Gunther; Lucking, Hans Joachim; Buchner, Werner; and Degen, Bruno, 4,060,537, Cl. 260-448.20E.

Ludwig, Duane H. Quick catch and release clamp for releaseably holding a spare tire of a vehicle. 4,060,171, Cl. 214-451.000.

Luessem, Heribert: *See—*

Rapp, Wolfgang; Haas, Karl-Heinz; and Luessem, Heribert, 4,060,388, Cl. 23-230.00R.

Luhleich, Hartmut; Nickel, Hubertus; and Dias, Francesco, to Kernforschungsanlage Julich GmbH. Method of making shaped carbonaceous bodies. 4,060,592, Cl. 423-448.000.

Luhowy, Roberta R.: *See—*

Cieciuch, Ronald F. W.; Luhowy, Roberta R.; Meneghini, Frank A.; and Rogers, Howard G., 4,060,417, Cl. 96-3.000.

Luitwieler, Samuel H.; and Horrocks, Donald L., to Beckman Instruments, Inc. Gamma counter calibration system. 4,060,726, Cl. 250-252.000.

Lukens, Edward E., to Insuldeck Corporation. Panel construction for roofs and the like. 4,059,936, Cl. 52-492.000.

Luscombe, Gene A. Stack forming vehicle. 4,060,028, Cl. 100-100.000.

Lutz, George H. Heating system and element therefor. 4,060,194, Cl. 237-1.0SL.

Maass, Gunther; Lucking, Hans Joachim; Buchner, Werner; and Degen, Bruno, to Bayer Aktiengesellschaft. Preparation of organosiloxanes. 4,060,537, Cl. 260-448.20E.

Maass, Hans: *See—*

Eckold, Gerd-Jurgen; and Maass, Hans, 4,060,046, Cl. 113-54.00R.

Macaluso, Anthony, Sr.; and Kuntschik, Lawrence F., to Texaco Inc. Hydroformylation. 4,060,557, Cl. 260-604.0HF.

Macauley, William T., to Ford Motor Company. Contoured sheet metal airfoil fans. 4,060,338, Cl. 416-214.00R.

MacKenzie, Robert D.: *See—*

Dolfini, Joseph E.; and MacKenzie, Robert D., 4,060,630, Cl. 424-300.000.

Mackie, Gordon E.; and Morris, Peter A., to Allis-Chalmers Corporation. Means for flaring openings in cylindrical bodies. 4,059,979, Cl. 72-342.000.

Maeda, Hidetoshi; and Sasaki, Takehiko, to Sharp Kabushiki Kaisha. Touch type contactless switch structure for electronic wristwatches having insulative member precluding establishment of shunt path by foreign matter. 4,059,956, Cl. 58-23.00R.

Maeda, Sachio; Saito, Nagoa; Arai, Shinji; and Haishi, Yuichiro, to Mitsubishi Denki Kabushiki Kaisha. Electrolytic machining system. 4,060,467, Cl. 204-129.750.

Maekawa, Yukio; Satomura, Masato; and Umehara, Akira, to Fuji Photo Film Co., Ltd. Furanacroyl esters. 4,060,685, Cl. 542-413.000.

Maeyerspeer, Bernhard, to Porsche Design, Firma. Energy absorbing member. 4,060,278, Cl. 297-386.000.

Magenheim, Bertram, to System Development Corporation. Deicing apparatus and method. 4,060,212, Cl. 244-134.00D.

Magnusson, Sten Evert, to Telefonaktiebolaget L M Ericsson. Two-party telephone system. 4,060,700, Cl. 179-28.000.

Maierson, Theodore, to Standard Register Company, The. Record material. 4,060,262, Cl. 282-27.500.

Maietta, Josephine. Animal harness. 4,060,056, Cl. 119-96.000.

Makita, Jun-ichi: *See—*

Tachihara, Noribumi; Mizohata, Yukio; and Makita, Jun-ichi, 4,059,916, Cl. 40-130.00K.

Mako, John; and Pimbley, Walter Thornton, to International Business Machines Corporation. Nozzle for an ink jet printer. 4,060,812, Cl. 346-75.000.

Mallozzi, Philip J.; Epstein, Harold M.; Applebaum, David C.; Gallagher, William J.; and Campbell, Bernerd E., to Battelle Memorial Institute. Directing radiation. 4,060,769, Cl. 330-4.300.

Maloney, James E.: *See—*

Chunat, Gerald W.; and Maloney, James E., 4,060,433, Cl. 148-6.170.

Mamiya Koki Kabushiki Kaisha: *See—*

Goto, Mituhiro; Hashimoto, Isao; Watanabe, Shugo; and Itabashi, Koji, 4,060,411, Cl. 75-138.000.

Mandelik, Bernard G., to Pullman Incorporated. Process for removing sulfur-containing gases from waste gases. 4,060,588, Cl. 423-242.000.

Mangold, Gregory L.: *See—*

Mefferd, Roy J.; and Mangold, Gregory L., 4,060,259, Cl. 280-656.000.

Manrique, Jorge: *See—*

Edwards, Ronald Alexander Nixon; and Manrique, Jorge, 4,060,203, Cl. 241-7.000.

Marchetti, Augusto. Machine for sealing parallelepipedal boxes having a variable height. 4,060,442, Cl. 156-358.000.

Marchitello, Raymond. Drill grinding attachment. 4,059,928, Cl. 51-241.00R.

Marcoll, Joachim: *See—*

Alpen, Ulrich Von; Fenner, Jurgen; Marcoll, Joachim; and Rabenau, Albrecht, 4,060,672, Cl. 429-191.000.

Marconi Company Limited, The: *See—*

Davies, Eric, deceased; and Marr, Douglas Philip, co-èxecutor, 4,060,806, Cl. 343-17.700.

Marhold, Albrecht: *See—*

Schmidt, Arthur H.; Lantzsch, Reinhard; Marhold, Albrecht; Lehment, Klaus-Friedrich; and Staffe, Adolf, 4,060,549, Cl. 260-543.00F.

Maries, Alan; and Rogers, Philip Sydney, to National Research Development Corporation. Method for making aligned fibrous crystals. 4,060,401, Cl. 65-33.000.

Marikar, Yusuf Mohamed Faruq: *See—*

Askew, Barry Anthony; Holland, Ronald; Inman, Douglas; and Marikar, Yusuf Mohamed Faruq, 4,060,667, Cl. 429-103.000.

Marquis, Edgar E., to Robertshaw Controls Company. Method of joining thin and thick switch members. 4,059,897, Cl. 29-432.100.

Marr, Douglas Philip, co-executor: *See—*

Davies, Eric, deceased; and Marr, Douglas Philip, co-executor, 4,060,806, Cl. 343-17.700.

Marshall, Bruce H.; and Blenner, Henry E. Plug cap. 4,060,297, Cl. 339-37.000.

Marshall, Lowell K.: *See—*

Bettencourt, Thomas S.; and Marshall, Lowell K., 4,060,133, Cl. 171-1.000.

Marshall, Robert, to Davy-Loewy Limited. Bounce-free object arresting system. 4,060,029, Cl. 101-4.000.

Martin Marietta Corporation: *See—*

Byer, Norman E.; Stokowski, Stanley E.; and Venables, John D., 4,060,729, Cl. 250-338.000.

Martinez, Robert. Rake cleaning attachment. 4,059,945, Cl. 56-400.100.

Maruyama, Fumio: *See—*

Iwahara, Makoto; Maruyama, Fumio; Fujiki, Goro; Mori, Toshinori; Hiyama, Norio; and Kikuchi, Mitsuru, 4,060,696, Cl. 179-1.0GQ.

Maruyama, Yasuo: *See—*

Kazuo, Yamaguchi; Genjiro, Kakogawa; Masayoshi, Hasuo; Goko, Nobuaki; and Maruyama, Yasuo, 4,060,593, Cl. 423-492.000.

Maryland Cup Corporation: *See—*

Collins, Richard D., 4,060,577, Cl. 264-45.400.

Masayoshi, Hasuo: *See—*

Kazuo, Yamaguchi; Genjiro, Kakogawa; Masayoshi, Hasuo; Goko, Nobuaki; and Maruyama, Yasuo, 4,060,593, Cl. 423-492.000.

Mascarello, Jean Marius; Godin, Paul; and Millet, Jacques Francois, to Electricite De France. Process for preparing hydrogen from water. 4,060,466, Cl. 204-129.000.

Maschinenfabrik Hennecke GmbH: *See—*

Schmitzer, Willi; Kisteneich, Heinz; and Proksa, Ferdinand, 4,060,579, Cl. 264-51.000.

Massachusetts Institute of Technology: *See—*

Bowman, Harry Frederick, 4,059,982, Cl. 73-15.00A.

Kirtley, James L., Jr.; and Baker, Richard H., 4,060,754, Cl. 318-218.000.

Yannas, Ioannis V.; Burke, John F.; Gordon, Philip L.; and Huang, Chor, 4,060,081, Cl. 128-156.000.

Masure, Daniel; Guillaumont, Jacques; and Pigeaud, Jean-Marie, to Rhone-Poulenc Industries. Electrolytic cell of the diaphragm type comprising a base made of an insulating material. 4,060,474, Cl. 204-270.000.

Mathern, Andre M.: *See—*

Le Noane, Georges E.; and Mathern, Andre M., 4,060,309, Cl. 350-96.00C.

Mathisen, Einar S.: *See—*

Jacobowitz, Lawrence; Mathisen, Einar S.; and Thorp, Lawrence D., 4,060,327, Cl. 356-96.000.

Matier, William Lesley; and Catt, John David, to Mead Johnson & Company. 2-Piperazinyl-6,7-dimethoxyquinazolines. 4,060,615, Cl. 424-251.000.

Matsubara, Hironaga; and Yamanouchi, Shousuke, to Sumitomo Electric Industries, Ltd. Electric wires or cables with styrene containing dielectric layer. 4,060,659, Cl. 428-379.000.

Matsuki, Koji, to Tokyo Shibaura Electric Co., Ltd. Driving circuit for a liquid crystal display device. 4,060,802, Cl. 340-324.00M.

Matsumoto Dental College: *See—*

Takahashi, Shigeo; Ito, Michio; Nagasawa, Sakae; and Suzuki, Sigeo, 4,060,120, Cl. 164-35.000.

Matsumoto, Takeshi; Chiba, Kazukiyo; Shioyama, Atsuo; and Yamaguchi, Yoshitake, to Kabushiki Kaisha Komatsu Seisakusho. Muffler mounting apparatus in construction machinery. 4,060,143, Cl. 180-64.00A.

Matsuoka, Michio: *See—*

Takami, Akihiro; Kuroda, Takayuki; Nagano, Katsuo; and Matsuoka, Michio, 4,060,661, Cl. 428-432.000.

Matsushima, Ryuzo. Tightening device for threaded screw part. 4,060,113, Cl. 145-50.00D.

Matsushima, Ryuzo. Tightening device for threaded screw part. 4,060,114, Cl. 145-50.00D.

Matsushiro, K. K.: *See—*

Matsushiro, Yukimitsu, 4,059,918, Cl. 46-209.000.

Matsushiro, Yukimitsu, to Matsushiro, K. K. Toy vehicle. 4,059,918, Cl. 46-209.000.

Matsushita Electric Industrial Co., Ltd.: *See—*

Nishida, Kouji, 4,060,780, Cl. 333-81.00A.

Takami, Akihiro; Kuroda, Takayuki; Nagano, Katsuo; and Matsuoka, Michio, 4,060,661, Cl. 428-432.000.

Matsuzawa, Shigetaka: *See—*

Sato, Yukio; Wada, Seijun; and Matsuzawa, Shigetaka, 4,060,597, Cl. 424-12.000.

Mattel, Inc.: *See—*

Sims, Larry Averett; and Kelley, William John, 4,059,917, Cl. 46-196.000.

Matthews, Hugh B., to Sperry Rand Corporation. Geothermal energy processing system with improved heat rejection. 4,059,959, Cl. 60-641.000.

Max-Planck-Gesellschaft zur Forderung der Wissenschaften e.V.: *See—*

Alpen, Ulrich Von; Fenner, Jurgen; Marcoll, Joachim; and Rabenau, Albrecht, 4,060,672, Cl. 429-191.000.

Maxwell, Anthony Robert; and Platts, John Charles, to L. M. Ericsson Pty. Ltd. Serial digital bit stream code detector. 4,060,797, Cl. 340-347.0DD.

Maynard, Steven: *See—*

Lambel, Reinhold; and Maynard, Steven, 4,059,858, Cl. 4-255.000.

Mazzei, Peter J.; and VanDrunen, Gerrit, to Westinghouse Canada Limited. Method of forming a composite structure. 4,060,413, Cl. 75-208.00R.

McAinsh, Kenneth G., to Smiths Industries Limited. Electrical-interconnection assemblies and methods of forming interconnections therein. 4,060,094, Cl. 136-230.000.

McCaskey, Harold O., Jr.: *See—*

Palazzolo, Salvatore E.; and McCaskey, Harold O., Jr., 4,060,450, Cl. 162-141.000.

McClure, James D.; and Brandenberger, Stanley G., to Shell Oil Company. Hydrocarbon conversion process using a supported perfluorinated polymer catalyst. 4,060,565, Cl. 260-671.00C.

McComas, Arthur D., to Bendix Corporation, The. Integrated terminal area surveillance system. 4,060,805, Cl. 343-6.5LC.

McCord, John B.: *See—*

Theis, James V., Jr.; McCord, John B.; and Holly, Harry H., 4,060,336, Cl. 415-80.000.

McCulloch Corporation: *See—*

Hirschkoff, Sidney, 4,059,895, Cl. 30-382.000.

McEathron, Eugene D.: *See—*

Bogenschutz, Thomas M.; Engle, Thomas H.; and McEathron, Eugene D., 4,060,152, Cl. 188-52.000.

McGhie, Russell Park, to Colgate-Palmolive Company. Collapsible tube structure. 4,060,179, Cl. 222-92.000.

McGuire, Thomas M.; and Peacock, Kenneth, to Minnesota Mining and Manufacturing Company. Bonded composite structures. 4,060,664, Cl. 428-336.000.

McKeown, Joseph, to Canada, Atomic Energy of, Limited. Bimodal cavity resonator beam position monitor. 4,060,762, Cl. 324-71.0EB.

McMurray, William, to General Electric Co. Inverters having a transformer-coupled commutating circuit. 4,060,757, Cl. 363-57.000.

Mead Johnson & Company: *See—*

Matier, William Lesley; and Catt, John David, 4,060,615, Cl. 424-251.000.

Meadows, Robert Alan, to Texas Instruments Incorporated. Flexible information storage disc. 4,060,839, Cl. 360-99.000.

Meaney, Daniel J., Jr. Coherent beam imaging apparatus and method. 4,060,319, Cl. 355-3.0DD.

Medi-Ray, Inc.: *See—*

Collica, Carl; Epifano, Leonard; and Farella, Ralph, 4,060,073, Cl. 128-1.100.

Medina, Carmen. Storage box. 4,060,292, Cl. 312-247.000.

Medtronic, Inc.: *See—*

Lin, Heh-Sen; and Adams, John M., 4,060,090, Cl. 128-419.0PG.

VanderVelden, Richard J., 4,060,671, Cl. 429-174.000.

Meermans, Jos Louis Hubert, to U.S. Philips Corporation. Centering pin for cassette apparatus. 4,060,838, Cl. 360-96.000.

Mefferd, Roy J.; and Mangold, Gregory L. Implement transporting device. 4,060,259, Cl. 280-656.000.

Mehoudar, Raphael, to Hydro-Plan Engineering Ltd. Drip level irrigation. 4,060,200, Cl. 239-542.000.

Mehrhof, Werner: *See—*

Schacht, Erich; Mehrhof, Werner; Jonas, Rochus; Nowak, Herbert; and Simane, Zdenek, 4,060,609, Cl. 424-244.000.

Meiji Seika Kaisha, Ltd.: *See—*

Umezawa, Hamao; Umezawa, Sumio; Tsuchiya, Osamu; Akita, Eiichi; Miyazawa, Takeo; Horiuchi, Yukio; and Fukatsu, Shunzo, 4,060,682, Cl. 536-10.000.

Meiser, Werner; Kramer, Wolfgang; Buchel, Karl Heinz; and Plempel, Manfred, to Bayer Aktiengesellschaft. 1,2,4-Triazole antimycotic compositions and use thereof. 4,060,623, Cl. 424-269.000.

Melcher, Franz Josef; and Oldendorf, Christian, to Sartorius-Werke GmbH (und vorm. Gottinger Prazisions-Waagenfabrik GmbH). Method and circuit arrangement for conditioning direct current signals in electric measurand transmitters, particularly electromechanical precision and fine balances. 4,060,771, Cl. 330-59.000.

Meneghini, Frank A.: *See—*

Cieciuch, Ronald F. W.; Luhowy, Roberta R.; Meneghini, Frank A.; and Rogers, Howard G., 4,060,417, Cl. 96-3.000.

Menge, Gunter; Grieben, Karl-Heinz; Reitmeier, Lutz; and Frank, Willi, to Hauni-Werke Korber & Co. KG. Apparatus for filling containers with cigarettes or the like. 4,059,940, Cl. 53-148.000.

Menzel, Tankred Walter: *See—*

Reuter, Franz Gottfried; and Menzel, Tankred Walter, 4,060,710, Cl. 219-548.000.

Merch Patent Gesellschaft mit beschrankter Haftung: *See—*

Schacht, Erich; Mehrhof, Werner; Jonas, Rochus; Nowak, Herbert; and Simane, Zdenek, 4,060,609, Cl. 424-244.000.

Merck & Co., Inc.: *See—*

Baldwin, John J., 4,060,601, Cl. 424-263.000.

Christensen, Burton G.; and Ratcliffe, Ronald W., 4,060,687, Cl. 544-27.000.

Jacobus, David P.; Dulaney, Eugene L.; and Grier, Nathaniel, 4,060,639, Cl. 424-325.000.

Remy, David C., 4,060,622, Cl. 424-267.000.

Merck Patent Gesellschaft mit beschrankter Haftung: *See—*

Gante, Joachim; Kurmeier, Hans-Adolf; Orth, Dieter; Schacht, Erich; and Wild, Albrecht, 4,060,633, Cl. 424-304.000.

Merkel, Paul Barrett; and Ling, Hans Gway, to Eastman Kodak Company. Sulfonylacetate activator-stabilizer precursor. 4,060,420, Cl. 96-114.100.

Mertens, Ludovicus Maria: *See—*

Van Royen, Freddy Ghisleen; Mertens, Ludovicus Maria; and Van Den Houte, Jozef Willy, 4,060,416, Cl. 96-48.00R.

Mertes, Friedrich; Doerfel, Helmut; Heil, Eduard; and Cordes, Claus, to BASF Aktiengesellschaft. Continuous manufacture of polyamides. 4,060,517, Cl. 260-78.00R.

Merz, Kenneth M.; and Shapiro, Howard E., to TRW Inc. Electrical resistor glaze composition and resistor. 4,060,663, Cl. 428-428.000.

Metallgesellschaft Aktiengesellschaft: *See—*

Eisenlohr, Karl-Heinz; and Bratzler, Karl, 4,060,595, Cl. 423-574.00R.

Garber, Alfred; Stonner, Hans-Martin; Wiesner, Paul; Sinclair, Alan; and Schmidt, Alfred, 4,060,591, Cl. 423-352.000.

Rohrborn, Hans-Joachim, 4,060,585, Cl. 423-164.000.

Metcalf, Derek N. G., to Athena Industries, Inc. Merchandise display stand. 4,060,214, Cl. 248-165.000.

Metodiev, Metodi Stoyanov: *See—*

Stoev, Stoycho Mitrev; Metodiev, Metodi Stoyanov; Kuzev, Lyubomir Vladimirov; Vedrichkov, Petko Georgiev; Sapunarov, Ivan Mitrev; Vassilev, Vassil Vladimirov; Dimitrov, Spas Petkov; Gasharov, Vihar Assenov; Russev, Sheko Kolev; and Mitrev, Kostadin Georgiev, 4,060,481, Cl. 209-170.000.

Meyerhoff, Robert Wagner, to Union Carbide Corporation. AC superconducting articles. 4,060,693, Cl. 174-126.00S.

Meyers, Charles K.: *See—*

Beam, Paul E., Jr.; and Meyers, Charles K., 4,059,972, Cl. 64-1.00V.

Meyers, Herbert M.: *See—*

Feldeisen, Ronald F.; Minchak, John A.; Gerstman, Richard B.; Meyers, Herbert M.; and Edstrom, Richard C., 4,060,105, Cl. 141-1.000.

Meyers, Theodore F., to Hobart Corporation. Dishwasher motor/-pump mounting means. 4,060,346, Cl. 417-360.000.

Meyn, Pieter. Apparatus for cutting open a fowl. 4,059,868, Cl. 17-11.000.

Micr-Shield Company: *See—*

Buros, Melvin S., 4,060,711, Cl. 235-488.000.

Microwave Research Corporation: *See—*

Hefni, Ibrahim El; Green, Kenneth A.; and Cloutier, Donald C., 4,060,778, Cl. 333-73.00W.

Midland-Ross Corporation: *See—*
Yanik, LeRoy; and Gross, Dario R., 4,060,340, Cl. 417-28.000.
Midy nee Bertin, Catherine: *See—*
Guienne, Paul; Herrouin, Guy; Lafont, Andre; Bertin, Jean, deceased; Bertin, Michel; Bertin, Laurent; Bertin, Philippe; Midy nee Bertin, Catherine; Gonzalez-Camino nee Bertin, Francoise; and Bertin nee Loustau, Genevieve, heirs, 4,060,147, Cl. 180-121.000.
Miertschin, Gary N.; and Powell, Kenneth F., to General Atomic Company. Nuclear fuel element and method for making same. 4,060,454, Cl. 176-84.000.
Mifuji Iron Works Co., Ltd.: *See—*
Ito, Shozo, 4,060,393, Cl. 23-277.00R.
Might, Willard C. Process and apparatus for improved I.C. engine composition. 4,060,061, Cl. 123-75.00B.
Mikoshiba, Shigeo: *See—*
Shinada, Shinichi; and Mikoshiba, Shigeo, 4,060,749, Cl. 313-484.000.
Mikovits, John L.: *See—*
Gwaltney, Robert E.; and Mikovits, John L., 4,060,121, Cl. 164-262.000.
Milgram, Jerome H. Floating skimming barrier assemblies. 4,059,962, Cl. 61-1.00F.
Miller, Alan H.: *See—*
Davis, Hugh M.; and Miller, Alan H., 4,060,250, Cl. 277-53.000.
Miller, Arthur F.; Zagata, Robert J.; and Grasselli, Robert K., to Standard Oil Company, The. Preparation of unsaturated carboxylic esters from propylene or isobutylene. 4,060,545, Cl. 560-208.000.
Miller, Gerald V.; and Zeh, David W. Closure for cylindrical pipe. 4,060,100, Cl. 138-89.000.
Miller, Herbert L., to Miller Mfg. Co. of Schiller Park, Inc. Metering pump. 4,060,178, Cl. 222-14.000.
Miller Mfg. Co. of Schiller Park, Inc.: *See—*
Miller, Herbert L., 4,060,178, Cl. 222-14.000.
Millet, Jacques Francois: *See—*
Mascarello, Jean Marius; Godin, Paul; and Millet, Jacques Francois, 4,060,466, Cl. 204-129.000.
Milliken Research Corporation: *See—*
Klein, Norman E., 4,059,880, Cl. 29-157.00C.
Million, Theodore L. Adjustable reading material supporter. 4,060,216, Cl. 248-460.000.
Minami, Hidehiro; and Kamino, Hideo, to Nissan Motor Company, Limited. Variable size venturi carburetor with an electronic air/fuel ratio control system. 4,060,064, Cl. 123-119.0EC.
Minchak, John A.: *See—*
Feldeisen, Ronald F.; Minchak, John A.; Gerstman, Richard B.; Meyers, Herbert M.; and Edstrom, Richard C., 4,060,105, Cl. 141-1.000.
Minnesota Mining and Manufacturing Company: *See—*
Budnik, Frederick, 4,060,787, Cl. 337-408.000.
Groves, James D.; and Loffredo, Stefano, 4,060,583, Cl. 264-272.000.
McGuire, Thomas M.; and Peacock, Kenneth, 4,060,664, Cl. 428-336.000.
Rynearson, John L., 4,060,837, Cl. 360-44.000.
Minolta Camera Kabushiki Kaisha: *See—*
Doi, Yasuhiko; Tokura, Yukio; and Imaizumi, Koji, 4,060,320, Cl. 355-3.00R.
Minter, Marvin J.: *See—*
Glover, Douglas; and Minter, Marvin J., 4,059,990, Cl. 73-81.000.
Mioen, Thomas Konrad: *See—*
Fahlstrom, Per Anders Herman Henningsson; Mioen, Thomas Konrad; and Bjorling, Gotthard E., 4,060,464, Cl. 204-113.000.
Mitrev, Kostadin Georgiev: *See—*
Stoev, Stoycho Mitrev; Metodiev, Metodi Stoyanov; Kuzev, Lyubomir Vladimirov; Vedrichkov, Petko Georgiev; Sapunarov, Ivan Mitrev; Vassilev, Vassil Vladimirov, Dimitrov, Spas Petkov; Gasharov, Vihar Assenov; Russev, Sheko Kolev; and Mitrev, Kostadin Georgiev, 4,060,481, Cl. 209-170.000.
Mitschke, Karl-Heinz: *See—*
Kapps, Manfred; Mitschke, Karl-Heinz; and Schliebs, Reinhard, 4,060,571, Cl. 260-970.000.
Mitsubishi Chemical Industries: *See—*
Kazuo, Yamaguchi; Genjiro, Kakogawa; Masayoshi, Hasuo; Goko, Nobuaki; and Maruyama, Yasuo, 4,060,593, Cl. 423-492.000.
Mitsubishi Chemical Industries Ltd.: *See—*
Kikumoto, Ryoji; Tobe, Akihiro; Tonomura, Shinji; and Ikoma, Hidenobu, 4,060,612, Cl. 424-248.520.
Kikumoto, Ryoji; Tobe, Akihiro; Tonomura, Shinji; and Ikoma, Hidenobu, 4,060,641, Cl. 424-330.000.
Mitsubishi Denki Kabushiki Kaisha: *See—*
Maeda, Sachio; Saito, Nagoa; Arai, Shinji; and Haishi, Yuichiro, 4,060,467, Cl. 204-129.750.
Mitsuhashi, Sadayuki: *See—*
Inagawa, Takashi; and Mitsuhashi, Sadayuki, 4,060,782, Cl. 335-112.000.
Mitsui Toatsu Chemicals, Incorporated: *See—*
Kanemaru, Muneaki; Kimura, Tetsuo; Ishii, Norimichi; and Kawashima, Hideo, 4,060,564, Cl. 260-641.000.
Mitsuya, Kinpei: *See—*
Miyazaki, Tsutomu; Yoshida, Yoshiaki; Ueda, Shozo; Mitsuya, Kinpei; and Ogasawara, Takeshi, 4,060,207, Cl. 242-18.00R.
Miura, Heihachi: *See—*
Tsutsui, Katsuhiko; Miura, Heihachi; and Miyano, Yukio, 4,060,062, Cl. 123-75.00B.
Miyamura, Souji: *See—*
Nakamoto, Hiromasa; Nakamoto, Shin-Ichi; Amemiya, Hidemitu; Miyamura, Souji; Shiba, Motoo; and Nakamura, Nobuko, 4,060,527, Cl. 260-279.00R.
Miyano, Yukio: *See—*
Tsutsui, Katsuhiko; Miura, Heihachi; and Miyano, Yukio, 4,060,062, Cl. 123-75.00B.
Miyazaki, Tsutomu; Yoshida, Yoshiaki; Ueda, Shozo; Mitsuya, Kinpei; and Ogasawara, Takeshi, to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho. Yarn winding mechanism in spinning machine. 4,060,207, Cl. 242-18.00R.
Miyazawa, Takeo: *See—*
Umezawa, Hamao; Umezawa, Sumio; Tsuchiya, Osamu; Akita, Eiichi; Miyazawa, Takeo; Horiuchi, Yukio; and Fukatsu, Shunzo, 4,060,682, Cl. 536-10.000.
Mizohata, Yukio: *See—*
Tachihara, Noribumi; Mizohata, Yukio; and Makita, Jun-ichi, 4,059,916, Cl. 40-130.00K.
Mizusawa Kagaku Kogyo Kabushiki Kaisha: *See—*
Sugahara, Yujiro; Noshi, Yoshibumi; Naito, Hiroyuki; and Nakamura, Seiichi, 4,060,508, Cl. 260-23.0XA.
Mo och Domsjo AB: *See—*
Lofgren, Stig-Gunnar, 4,060,043, Cl. 111-3.000.
Mobil Oil Corporation: *See—*
Bridger, Robert F.; and Schmitt, Kirk D., 4,060,491, Cl. 252-50.000.
Rodewald, Paul G., 4,060,568, Cl. 260-682.000.
Moeller Manufacturing Company, Inc.: *See—*
Karls, Albert J., 4,060,706, Cl. 219-107.000.
Mohr, Clifford D.: *See—*
Lever, Paul H.; and Mohr, Clifford D., 4,060,068, Cl. 126-120.000.
Molex Incorporated: *See—*
Tomkiewicz, Thaddeus K., 4,060,295, Cl. 339-17.0LC.
Mollenkopf, Hans: *See—*
Weber, Paul; Mollenkopf, Hans; Henning, Kurt; Heinemann, Otto; Schmits, Heinz-Herbert; Rother, Wolfgang; Ritzmann, Horst; Wurr, Jurgen; Krutzner, Karl, Jr.; Schossler, Werner; Goldmann, Wolf; and Schepers, Georg, 4.060,375, Cl. 432-14.000.
Molt, Kenneth Richard, to Cincinnati Milacron, Inc. Nickel organophosphate/benzophenone U.V. stabilizers. 4,060,513, Cl. 260-45.75N.
Momoi, Toshimitu: *See—*
Ono, Minoru; and Momoi, Toshimitu, 4,060,827, Cl. 357-54.000.
Monfardini, Paul. Adjustable door latch. 4,060,267, Cl. 292-173.000.
Mongan, William T. Building framing system for post-tensioned modular building structures. 4,059,931, Cl. 52-79.120.
Monk, Donald Wayne, to Olin Corporation. Process for recovering raw materials from waste cellophane. 4,060,684, Cl. 536-56.000.
Monnet, Ferjeux Jean Pierre, to S.B.B.M. Burdet S.A. Water-tight fitting of a glass in a watch case. 4,059,957, Cl. 58-90.00R.
Monsanto Company: *See—*
Higginbottom, Harold P., 4,060,504, Cl. 260-7.000.
Paulik, Frank E.; Hershman, Arnold; Knox, Walter R.; and Roth, James F., 4,060,547, Cl. 260-532.000.
Reilly, Joseph R., 4,060,164, Cl. 198-424.000.
Monson, Franklin A., to AAI Corporation. Impact nailing arrangement. 4,060,188, Cl. 227-9.000.
Morgan, Barry A.; and Schafer, Derek J., to Reckitt & Colman Products Limited. Histidine derivatives. 4,060,603, Cl. 424-177.000.
Morgan Construction Company: *See—*
Wilson, Norman A.; and Grotepass, Johann, 4,060,428, Cl. 148-12.00R.
Mori, Kenichi. Weatherstrip. 4,060,272, Cl. 296-93.000.
Mori, Michitsugu; Ohfuji, Mitsuo; and Kuwahara, Akiyasu, to Hitachi, Ltd. Carburetor assembly. 4,060,573, Cl. 261-23.00B.
Mori, Toshinori: *See—*
Iwahara, Makoto; Maruyama, Fumio; Fujiki, Goro; Mori, Toshinori; Hiyama, Norio; and Kikuchi, Mitsuru, 4,060,696, Cl. 179-1.0GQ.
Morino, Tetsuro: *See—*
Suzuki, Matsumi; Morino, Tetsuro; and Yokota, Shozo, 4,060,694, Cl. 179-1.0SD.
Moriwaki, Takeshi, to Daicel Co., Ltd. Plant pot for growing a plant. 4,059,921, Cl. 47-73.000.
Morris, Peter A.: *See—*
Mackie, Gordon E.; and Morris, Peter A., 4,059,979, Cl. 72-342.000.
Morrison, Charles F., Jr.; Harris, Frank W.; and Patzer, Michael D., to Valleylab, Inc. Electrosurgical method and apparatus for establishing an electrical discharge in an inert gas flow. 4,060,088, Cl. 128-303.170.
Morrison, David; and Rogers, Donald J., to General Time Corporation. Timepiece calendar indexing apparatus. 4,059,953, Cl. 58-4.00R.
Mortensen, Angel J. Apparatus for the determination of unbalance in rotating bodies. 4,060,002, Cl. 73-462.000.
Morton-Norwich Products, Inc.: *See—*
Harris, Nicholas D., 4,060,689, Cl. 560-29.000.
Moss, Herbert Irwin: *See—*
Pinch, Harry Louis; and Moss, Herbert Irwin, 4,060,471, Cl. 204-192.0SP.
Motan Gesellschaft mit beschrankter Haftung: *See—*
Bongartz, Paul; and Haag, Franz, 4,060,223, Cl. 366-179.000.
Motorola, Inc.: *See—*
Bethards, Charles William; and Andrews, James Edward, 4,060,764, Cl. 325-18.000.
Schafft, Hugo Willy, 4,060,741, Cl. 310-332.000.
Wilczynski, Mieczyslaw, 4,060,303, Cl. 339-147.00R.
Motoyama, Masamitsu, to Rank Xerox Ltd. Cartridge tray for use in a copying machine. 4,060,234, Cl. 271-164.000.

Mount, Robert E.: *See—*
Woodier, George H.; and Mount, Robert E., 4,060,352, Cl. 418-122.000.
Mounts, Frank William; and Netravali, Arun Narayan, to Bell Telephone Laboratories, Incorporated. Processor for increasing the run-length of digital signals. 4,060,834, Cl. 358-261.000.
Mourning, Michael C.: *See—*
Waxman, Burton H.; and Mourning, Michael C., 4,060,418, Cl. 96-29.00D.
Mouzin, M. Gilbert: *See—*
Stenger, M. Antoine; Cousse, Henri; and Mouzin, M. Gilbert, 4,060,637, Cl. 424-324.000.
Mowery, Geoffrey John. Ball type transfer apparatus. 4,060,252, Cl. 280-79.10R.
MPL, Inc.: *See—*
Lindberg, Richard M.; and Raghavachari, Srinivas T., 4,060,082, Cl. 128-218.00M.
Murakami, Tadashi: *See—*
Tomita, Kazuo; Murakami, Tadashi; Yamazaki, Yoshio; and Honma, Toyokuni, 4,060,402, Cl. 71-76.000.
Murata, Kazuo: *See—*
Nakatsukasa, Kazuo; Murata, Kazuo; Ohkubo, Tetsuo; Yurugi, Masayoshi; and Takahashi, Shinobu, 4,060,851, Cl. 364-900.000.
Murtha, Timothy P.: *See—*
Doss, Richard C.; and Murtha, Timothy P., 4,060,519, Cl. 260-79.000.
Naarmann, Herbert; Reichel, Fritz; and Gausepohl, Hermann, to BASF Aktiengesellschaft. Method of preparing a low molecular weight paper size polymer by continuous polymerization in the absence of initiator. 4,060,679, Cl. 526-304.000.
Naastepad, Pieter Aart; and de Ruiter, Jacob Willem, to U.S. Philips Corporation. Induction melting furnace. 4,060,692, Cl. 13-26.000.
Nabhan, George A., to National Steel Corporation. Metal strip handling apparatus and method. 4,060,186, Cl. 226-1.000.
Nadelson, Jeffrey, to Sandoz, Inc. Pyranone carboxamides. 4,060,533, Cl. 260-345.70R.
Naftulin, Henry. Method and apparatus for collecting fluids. 4,060,107, Cl. 141-7.000.
Nagano, Katsuo: *See—*
Takami, Akihiro; Kuroda, Takayuki; Nagano, Katsuo; and Matsuoka, Michio, 4,060,661, Cl. 428-432.000.
Nagasawa, Sakae: *See—*
Takahashi, Shigeo; Ito, Michio; Nagasawa, Sakae; and Suzuki, Sigeo, 4,060,120, Cl. 164-35.000.
Naito, Hiroyuki: *See—*
Sugahara, Yujiro; Noshi, Yoshibumi; Naito, Hiroyuki; and Nakamura, Seiichi, 4,060,508, Cl. 260-23.0XA.
Naka, Kiyomi; and Takahashi, Teruo, to Teijin Limited. Support for photosensitive resin. 4,060,656, Cl. 428-355.000.
Nakajima, Fumito: *See—*
Kawagoshi, Hiroshi; Takeuchi, Masato; and Nakajima, Fumito, 4,060,498, Cl. 252-373.000.
Nakamoto, Hiromasa; Nakamoto, Shin-Ichi; Amemiya, Hidemitu; Miyamura, Souji; Shiba, Motoo; and Nakamura, Nobuko, to Fuji Chemical Industries, Ltd. Pyrido[2,3-c]-acridine-1-hydroxy-2-carboxylic acid derivatives. 4,060,527, Cl. 260-279.00R.
Nakamoto, Shin-Ichi: *See—*
Nakamoto, Hiromasa; Nakamoto, Shin-Ichi; Amemiya, Hidemitu; Miyamura, Souji; Shiba, Motoo; and Nakamura, Nobuko, 4,060,527, Cl. 260-279.00R.
Nakamura, Nobuko: *See—*
Nakamoto, Hiromasa; Nakamoto, Shin-Ichi; Amemiya, Hidemitu; Miyamura, Souji; Shiba, Motoo; and Nakamura, Nobuko, 4,060,527, Cl. 260-279.00R.
Nakamura, Seiichi: *See—*
Sugahara, Yujiro; Noshi, Yoshibumi; Naito, Hiroyuki; and Nakamura, Seiichi, 4,060,508, Cl. 260-23.0XA.
Nakamura, Tokio, to Sony Corporation. Method of making goethite powder. 4,060,596, Cl. 423-633.000.
Nakatsui, Hisashi: *See—*
Hirayama, Kazuhiro; Sato, Yasushi; Tokiwa, Taisuke; Kawakubo, Kazuo; Iwatate, Fujio; and Nakatsui, Hisashi, 4,060,322, Cl. 355-60.000.
Hirayama, Kazuhiro; Sato, Yasushi; Tokiwa, Taisuke; Iwatate, Fujio; Kawakubo, Kazuo; and Nakatsui, Hisashi, 4,060,323, Cl. 355-60.000.
Nakatsukasa, Kazuo; Murata, Kazuo; Ohkubo, Tetsuo; Yurugi, Masayoshi; and Takahashi, Shinobu, to Oki Electric Industry Co., Ltd. Control system of a numerical control unit. 4,060,851, Cl. 364-900.000.
Nakayama, Wataru: *See—*
Fujie, Kunio; Nakayama, Wataru; Kuwahara, Heikichi; and Kakizaki, Kimio, 4,060,125, Cl. 165-133.000.
Nance, Frank B., to Olympic Fastening Systems, Inc. Method and means for installing blind fasteners. 4,059,980, Cl. 72-391.000.
Naphtachimie: *See—*
Paolini, Laurent, 4,060,190, Cl. 228-2.000.
Natale, Paul R.: *See—*
Jayne, Max L.; and Natale, Paul R., 4,060,300, Cl. 339-74.00R.
National Lime Association: *See—*
Lewis, Clifford J., 4,060,587, Cl. 423-210.000.
National Machinery Company, The: *See—*
Fick, Paul A., 4,059,860, Cl. 10-11.00R.
National Patent Development Corporation: *See—*
Vit, Jaroslav, 4,060,600, Cl. 424-53.000.
National Research Development Corporation: *See—*
Askew, Barry Anthony; Holland, Ronald; Inman, Douglas; and Marikar, Yusuf Mohamed Faruq, 4,060,667, Cl. 429-103.000.
Maries, Alan; and Rogers, Philip Sydney, 4,060,401, Cl. 65-33.000.
National Starch and Chemical Corporation: *See—*
Tessler, Martin M., 4,060,683, Cl. 536-50.000.
National Steel Corporation: *See—*
Nabhan, George A., 4,060,186, Cl. 226-1.000.
Nayagam, Kandiah Tharma. Pneumatically controlled rigid coreformer. 4,060,218, Cl. 249-65.000.
Naylor, Carter G.; and Yeakey, Ernest L., to Texaco Development Corporation. Novolak derivatives as defoamers. 4,060,501, Cl. 252-548.000.
NCR Corporation: *See—*
Nelson, Carl R.; Pierce, David R.; Depew, Noel F.; and Harp, Marlyn F., 4,060,161, Cl. 197-1.00R.
Neal, Willie, to Carter, Samuel R., a part interest. Microphone mounting and control system. 4,060,697, Cl. 179-1.0VE.
Negishi, Takao; and Tomiita, Kazuo, to Toray Industries, Inc. Multifilament yarn having novel configuration and a method for producing the same. 4,059,950, Cl. 57-140.00J.
Nelson, Carl R.; Pierce, David R.; Depew, Noel F.; and Harp, Marlyn F., to NCR Corporation. Vibration dampening means for printing mechanism. 4,060,161, Cl. 197-1.00R.
Nelson, Gerald B., to Papakube Corporation. Apparatus for making stable blocks formed of shredded paper-like material. 4,060,363, Cl. 425-147.000.
Nelson, Norman C., to Kel-Lite Industries, Inc. Flashlight assembly. 4,060,723, Cl. 362-205.000.
Nelson, Thomas Larson, to Du Pont de Nemours, E. I., and Company. Fluid process for making continuous filament heather yarn. 4,059,873, Cl. 28-271.000.
Nelson, Warren A., to Philip A. Hunt Chemical Corporation. Process for etching of metal. 4,060,447, Cl. 156-642.000.
Nemiroff, Michael; Yue, Hong Jun; and Schevey, William Russell, to Allied Chemical Corporation. Yttrium iron garnet disks on gadolinium gallium substrates for microwave applications. 4,060,448, Cl. 156-653.000.
Netravali, Arun Narayan: *See—*
Mounts, Frank William; and Netravali, Arun Narayan, 4,060,834, Cl. 358-261.000.
Netsch, Erich: *See—*
Tratz, Herbert; Kelp, Fritz; and Netsch, Erich, 4,060,124, Cl. 165-110.000.
Neumo Armaturenfabrik-Apparatebau-Metallgiesserei GmbH, Firma: *See—*
Fischer, Josef, 4,060,220, Cl. 251-306.000.
Neville, George Edgar, to George Neville Truck Equipment Limited. Vehicle body covering device. 4,060,273, Cl. 296-100.000.
Newman, Gerald H.: *See—*
Klemann, Lawrence P.; and Newman, Gerald H., 4,060,674, Cl. 429-194.000.
Newton, Alwin B., to Borg-Warner Corporation. Capacity control for rotary compressor. 4,060,343, Cl. 417-309.000.
Neyret, Guy, to Societe Anonyme dite: Etablissement Genoud & Cie. Valve for gas lighter. 4,060,202, Cl. 239-579.000.
Nibby, Chester M., Jr.: *See—*
Feldman, Paul S.; Johnson, Robert B.; and Nibby, Chester M., Jr., 4,060,794, Cl. 364-900.000.
Nichireki Chemical Industry Company Limited: *See—*
Harada, Yutaka; Itai, Noriyuki; Ucikawa, Hiroshi; Kato, Hajime; Sato, Katutoshi; and Itoh, Akira, 4,060,425, Cl. 106-90.000.
Nicholas, William: *See—*
Heklowski, Florian; and Nicholas, William, 4,059,958, Cl. 60-614.000.
Nickel, Hubertus: *See—*
Luhleich, Hartmut; Nickel, Hubertus; and Dias, Francesco, 4,060,592, Cl. 423-448.000.
Nihon Kinzoku Kogyo Kabushiki Kaisha: *Sec—*
Nishimura, Yoshiki; Sakiyama, Kazutaka; Adachi, Tadao; and Harada, Kenji, 4,060,389, Cl. 23-252.00A.
Niigata Engineering Co., Ltd.: *See—*
Shimizu, Kazufusa; Katsumori, Shigeo; Nishikawa, Tadaaki; Senoo, Keisaku; Sakamaki, Kenji; Fujita, Makio; Tano, Teruo; Takano, Hiroshi; and Komori, Hideo, 4,060,390, Cl. 23-259.100.
Nippon Electric Company, Limited: *See—*
Inagawa, Takashi; and Mitsuhashi, Sadayuki, 4,060,782, Cl. 335-112.000.
Nippon Kogaku K.K.: *See—*
Furuta, Koichi, 4,060,818, Cl. 354-266.000.
Nishida, Kouji, to Matsushita Electric Industrial Co., Ltd. Signal attenuator. 4,060,780, Cl. 333-81.00A.
Nishikawa, Tadaaki: *See—*
Shimizu, Kazufusa; Katsumori, Shigeo; Nishikawa, Tadaaki; Senoo, Keisaku; Sakamaki, Kenji; Fujita, Makio; Tano, Teruo; Takano, Hiroshi; and Komori, Hideo, 4,060,390, Cl. 23-259.100.
Nishimura, Kotaro, to Hitachi, Ltd. Sensing amplifier for capacitive MISFET memory. 4,060,740, Cl. 307-362.000.
Nishimura, Yoshiki; Sakiyama, Kazutaka; Adachi, Tadao; and Harada, Kenji, to Toyo Soda Manufacturing Co., Ltd.; and Nihon Kinzoku Kogyo Kabushiki Kaisha. Apparatus for use in the ammonia soda process or the ammonium chloride soda process. 4,060,389, Cl. 23-252.00A.
Nissan Denshi Company Limited: *See—*
Kazuo, Arai, 4,060,766, Cl. 325-22.000.

Nissan Motor Company, Limited: *See—*
Abe, Eiichi, 4,060,142, Cl. 180-54.00A.
Hata, Yoshitaka; Ikeura, Kenji; and Ozeki, Masaaki, 4,060,065, Cl. 123-119.00A.
Minami, Hidehiro; and Kamino, Hideo, 4,060,064, Cl. 123-119.0EC.
No Flame Process, Inc.: *See—*
Williford, Danny Franklin, 4,060,204, Cl. 241-74.000.
Noah, James D. Identification sticker. 4,059,912, Cl. 40-2.00R.
Nobusawa, Tsukumo, to Asahi Kogaku Kogyo Kabushiki Kaisha. Automatic focusing system employing two variable frequency oscillators. 4,060,325, Cl. 354-25.000.
Nodet-Gougis (Societe de droit francais): *See—*
Grataloup, Xavier Roger, 4,060,181, Cl. 222-193.000.
Nohmura, Ryotaro; Tazaki, Eiji; and Sato, Akio, to Taiyo Kogyo Company Limited. Shielding tent. 4,060,119, Cl. 160-266.000.
Noiles, Douglas G., to United States Surgical Corporation. Surgical fastening method and device therefor. 4,060,089, Cl. 128-325.000.
Nordson Corporation: *See—*
Algeri, Harvey R.; and Stumphauzer, William C., 4,060,052, Cl. 118-2.000.
Noro, Yoshihisa: *See—*
Yoshikawa, Ikuji; Noro, Yoshihisa; and Okaneya, Junji, 4,060,421, Cl. 106-38.50D.
Norrie, David Gordon: *See—*
Demaine, David George Anthony; and Norrie, David Gordon, 4,060,307, Cl. 350-96.00B.
Norris, John Henry, to Linotype-Paul Limited. Take-up spools. 4,060,210, Cl. 242-71.100.
Norton Company: *See—*
Hofmann, Harriet E., 4,060,424, Cl. 106-55.000.
Noschese, Fred J. Stencil sheet holder. 4,060,030, Cl. 101-127.100.
Noshi, Yoshibumi: *See—*
Sugahara, Yujiro; Noshi, Yoshibumi; Naito, Hiroyuki; and Nakamura, Seiichi, 4,060,508, Cl. 260-23.0XA.
Nowak, Herbert: *See—*
Schacht, Erich; Mehrhof, Werner; Jonas, Rochus; Nowak, Herbert; and Simane, Zdenek, 4,060,609, Cl. 424-244.000.
Numata, Saburo; and Fujino, Shinichiro, to Fuji Photo Optical Co., Ltd. Potentiometer. 4,060,788, Cl. 338-128.000.
N.V. Weefautomaten Picanol: *See—*
Steverlynck, Patrick A., 4,060,104, Cl. 139-188.00R.
Nychka, Henry R.: *See—*
Peterson, James Oliver; Sukornick, Bernard; Sweeney, Richard Francis; Nychka, Henry R.; Eibeck, Richard E.; and Berenbaum, Morris B., 4,060,555, Cl. 260-586.00R.
Oce-van der Grinten, N.V.: *See—*
van Nunen, Petrus J. M.; and van Barneveld, Willem, 4,060,415, Cl. 96-1.800.
O'Day, William R., Jr.; Bensky, Norman D.; and LeBlanc, James D., to Kennecott Copper Corporation. Composite wire. 4,060,653, Cl. 427-423.000.
Offermanns, Heribert: *See—*
Asinger, Friedrich; Offermanns, Heribert; and Ghyczy, Miklos, 4,060,548, Cl. 260-534.00S.
Ogasawara, Takeshi: *See—*
Miyazaki, Tsutomu; Yoshida, Yoshiaki; Ueda, Shozo; Mitsuya, Kinpei; and Ogasawara, Takeshi, 4,060,207, Cl. 242-18.00R.
Ohfuji, Mitsuo: *See—*
Mori, Michitsugu; Ohfuji, Mitsuo; and Kuwahara, Akiyasu, 4,060,573, Cl. 261-23.00B.
Ohkubo, Tetsuo: *See—*
Nakatsukasa, Kazuo; Murata, Kazuo; Ohkubo, Tetsuo; Yurugi, Masayoshi; and Takahashi, Shinobu, 4,060,851, Cl. 364-900.000.
Ohmi, Hidehiko, to Japan Crown Cork Co., Ltd. Apparatus for dispensing cap lining material. 4,060,053, Cl. 118-215.000.
Ohms, Edward Joseph: *See—*
Gee, James Edgar; and Ohms, Edward Joseph, 4,060,289, Cl. 308-187.100.
Ohta, Wasaburo; and Watanabe, Tatsuya, to Kabushiki Kaisha Ricoh. Method for forming a transparent protective coating on a photograph or the like. 4,060,441, Cl. 156-234.000.
Ohya, Masaki; and Hoshino, Mitsuru, to Kureha Kagaku Kogyo Kabushiki Kaisha. Method for preventing or eliminating water-absorption whitening of a molded article containing an acrylonitrile polymer or copolymer. 4,060,650, Cl. 427-161.000.
Okaneya, Junji: *See—*
Yoshikawa, Ikuji; Noro, Yoshihisa; and Okaneya, Junji, 4,060,421, Cl. 106-38.50D.
Oki Electric Industry Co., Ltd.: *See—*
Ataka, Hisashi; Wako, Shigeo; and Ushio, Shintaro, 4,060,699, Cl. 179-18.0GF.
Nakatsukasa, Kazuo; Murata, Kazuo; Ohkubo, Tetsuo; Yurugi, Masayoshi; and Takahashi, Shinobu, 4,060,851, Cl. 364-900.000.
Okuyama, Toshiaki; and Kubota, Yuzuru, to Hitachi, Ltd. Control system for commutatorless motor. 4,060,753, Cl. 318-175.000.
Oldendorf, Christian: *See—*
Melcher, Franz Josef; and Oldendorf, Christian, 4,060,771, Cl. 330-59.000.
Oldendorf, Eric W. Method and apparatus for skateboard suspension system. 4,060,253, Cl. 280-87.04A.
Oldengott, Hans, to Dr. C. Otto & Comp. G.m.b.H. Process for partial restoration of a coke oven battery. 4,059,885, Cl. 29-401.00F.
Olin Corporation: *See—*
Monk, Donald Wayne, 4,060,684, Cl. 536-56.000.
Olsson, Billy Erik: *See—*
Kunkle, James Raymond; and Olsson, Billy Erik, 4,060,296, Cl. 339-17.0CF.
Olsson, Karl Olof; and Wildheim, Jorgen, to Stal-Laval Turbin AB. Balancing device and method for a rotating body. 4,060,707, Cl. 219-121.0LM.
Olstowski, Franciszek, to Dow Chemical Company, The. Solid, rapid-setting, rigid polyurethanes. 4,060,509, Cl. 260-30.60R.
Olympic Fastening Systems, Inc.: *See—*
Nance, Frank B., 4,059,980, Cl. 72-391.000.
O'Neil, Thomas, Sr. Liquid dispensing container. 4,060,184, Cl. 222-501.000.
Ono, Minoru; and Momoi, Toshimitu, to Hitachi, Ltd. Semiconductor device and a method of making the same. 4,060,827, Cl. 357-54.000.
Onoda Cement Company Limited: *See—*
Harada, Yutaka; Itai, Noriyuki; Ucikawa, Hiroshi; Kato, Hajime; Sato, Katutoshi; and Itoh, Akira, 4,060,425, Cl. 106-90.000.
Onyshkevych, Lubomyr Stephen, to RCA Corporation. Transducer arrangement for a surface acoustic wave device to inhibit the generation of multiple reflection signals. 4,060,833, Cl. 358-188.000.
Ootsu, Fumio. Transducer for conversion of sea water-energy. 4,060,344, Cl. 417-330.000.
Optotechnik Heine KG: *See—*
Heine, Helmut A.; Schmidt, Otto H.; and Rosenbusch, Helmut W., 4,060,724, Cl. 362-32.000.
Orkin, Stanley S., to Kamatics Corporation. Bearing seal and method of forming same. 4,060,287, Cl. 308-72.000.
Oronzio de Nora Impianti Elettrochimici S.p.A.: *See—*
Giuffre, Luigi; de Nora, Vittorio; and Spaziante, Placido, 4,060,473, Cl. 204-253.000.
Orsinger, Winston A.: *See—*
Tress, Norwood E.; and Orsinger, Winston A., 4,060,228, Cl. 271-14.000.
Orth, Dieter: *See—*
Gante, Joachim; Kurmeier, Hans-Adolf; Orth, Dieter; Schacht, Erich; and Wild, Albrecht, 4,060,633, Cl. 424-304.000.
Ortho Pharmaceutical Corporation: *See—*
Kanojia, Ramesh M., 4,060,604, Cl. 424-195.000.
Orthwein, William C. Clip-on dental restoration and tools for removing same. 4,059,900, Cl. 32-5.000.
Osaka Soda Co. Ltd.: *See—*
Yokota, Noriyuki; Tokuda, Shingo; Ito, Yoshiro; and Itaya, Kenji, 4,060,465, Cl. 204-128.000.
Osborne, Ray L., to English, Milton. Apparatus for removing an ignition key cylinder. 4,059,883, Cl. 29-259.000.
Osborne, Robert L., to Westinghouse Electric Corporation. Method and apparatus for testing the movability of valve plugs. 4,059,960, Cl. 60-646.000.
Oskar Schleicher, Firma: *See—*
Seiler, Wolfgang, 4,060,101, Cl. 139-65.000.
Oswald, Gerald L.: *See—*
Postupack, Constantine; Borg, David G.; Junk, Norman M.; Oswald, Gerald L.; and Bowman, Arthur F., 4,060,033, Cl. 102-24.00R.
Outlaw, Benjamin T.: *See—*
Redmore, Derek; and Outlaw, Benjamin T., 4,060,553, Cl. 260-559.00A.
Ovutime, Inc.: *See—*
Schuster, Samuel R., 4,059,986, Cl. 73-54.000.
Owens-Corning Fiberglas Corporation: *See—*
Lin, Kingso C.; and Hammond, Donald J., 4,060,658, Cl. 428-378.000.
Owens, Frances R. Sign assembly. 4,059,915, Cl. 40-125.00H.
Oxford, Keith E. Automatic etching system. 4,060,097, Cl. 137-93.000.
Oy Stromberg AB: *See—*
Panu, Kalevi, 4,060,759, Cl. 323-60.000.
Oy W. Rosenlew AB: *See—*
Puurunen, Juhani, 4,060,183, Cl. 222-442.000.
Ozeki, Masaaki: *See—*
Hata, Yoshitaka; Ikeura, Kenji; and Ozeki, Masaaki, 4,060,065, Cl. 123-119.00A.
P. R. Mallory & Co. Inc.: *See—*
Dey, Arabinda N., 4,060,673, Cl. 429-192.000.
Dey, Arabinda N.; and Holmes, Robert W., 4,060,676, Cl. 429-217.000.
Packaging Corporation of America: *See—*
Hildebrand, Larry R.; and Pausinger, Siegfried K., 4,060,169, Cl. 206-289.000.
Padley, Frederick Bolton: *See—*
Bringi, Naganathan Viswanath; and Padley, Frederick Bolton, 4,060,646, Cl. 426-607.000.
Page, William H., Jr. Guard rail device. 4,060,268, Cl. 293-62.000.
Palazzolo, Salvatore E.; and McCaskey, Harold O., Jr., to Westinghouse Electric Corporation. High yield saturating paper. 4,060,450, Cl. 162-141.000.
Palms, Joseph X. Anchored transportation device. 4,060,036, Cl. 105-368.00T.
Pampel, Helmut, to Bison-werke Bahre & Greten GmbH & Co. KG. Process for the production of shaped components of wood material, especially boards, bound with a hydraulic binder, preferably cement. 4,060,580, Cl. 264-109.000.
Pan, Peter N. Y.; and Hernandez, Rafael J., to Continental Group, Inc., The. Pulsed power application system. 4,060,647, Cl. 427-21.000.
Panagiotoulis, Georgios. Blade and improved holder for it. 4,059,891, Cl. 30-50.000.

Pang, Peter: *See—*
Davis, Lee; and Pang, Peter, 4,060,844, Cl. 361-96.000.
Panu, Kalevi, to Oy Stromberg AB. Tube-insulated shell-core current transformer. 4,060,759, Cl. 323-60.000.
Paolini, Laurent, to Naphtachimie. Process for joining tubular members of great length. 4,060,190, Cl. 228-2.000.
Papafingos, Pandelis N.; and Lance, Richard T., to Alumax Mill Products, Inc. Recovering chloride flux salts for aluminum. 4,060,118, Cl. 159-49.000.
Papakube Corporation: *See—*
Nelson, Gerald B., 4,060,363, Cl. 425-147.000.
Pappas, James. Ashtray and extinguisher. 4,060,092, Cl. 131-236.000.
Pappo, Raphael: *See—*
Collins, Paul W.; and Pappo, Raphael, 4,060,691, Cl. 560-121.000.
Parker, Dane K., to Goodyear Tire & Rubber Company, The. Preparation of antioxidants. 4,060,556, Cl. 260-590.00R.
Paroty, Jean-Marie, to Societe Franco-Hispano-Americaine (FRANCISPAM). Gas lighter. 4,060,373, Cl. 431-135.000.
Pascucci, Gregory A.; Krishnaiyer, Ramesh; and Pridemore, Donald Floyd, to Johnson Controls, Inc. Control system employing a programmable multiple channel controller for transmitting control signals over electrical power lines. 4,060,735, Cl. 307-3.000.
Patterson, James A. Swimming pool gutter. 4,059,856, Cl. 4-172.170.
Patzer, Michael D.: *See—*
Morrison, Charles F., Jr.; Harris, Frank W.; and Patzer, Michael D., 4,060,088, Cl. 128-303.170.
Paul, Henry Neil, 3rd, to Thiokol Corporation. Curable liquid polysulfide polymer based sealants. 4,060,570, Cl. 260-889.000.
Paulik, Frank E.; Hershman, Arnold; Knox, Walter R.; and Roth, James F., to Monsanto Company. Production of dicarboxylic acids. 4,060,547, Cl. 260-532.000.
Pausinger, Siegfried K.: *See—*
Hildebrand, Larry R.; and Pausinger, Siegfried K., 4,060,169, Cl. 206-289.000.
Pavese, John R. Sheeting installation system. 4,059,964, Cl. 61-41.00A.
Pavlovic, Gary Frank: *See—*
Hentz, LeRoy Richard; Pavlovic, Gary Frank; Scarafino, Angelo James; and Seksinsky, John Joseph, 4,060,377, Cl. 432-50.000.
Peachey, Cyril John, to Peachey, Cyril John; and Peachey, Gwendoline Nora. Pressure actuated continuous switch. 4,060,705, Cl. 200-153.00M.
Peachey, Gwendoline Nora: *See—*
Peachey, Cyril John, 4,060,705, Cl. 200-153.00M.
Peacock, Kenneth: *See—*
McGuire, Thomas M.; and Peacock, Kenneth, 4,060,664, Cl. 428-336.000.
Peasley, Gerald J. Harvester apparatus. 4,059,943, Cl. 56-327.00A.
Pekrul, Paul J.; and Thiele, Alfred W., to Rockwell International Corporation. Method and apparatus for automatic abnormal events monitor in operating plants. 4,060,716, Cl. 364-576.000.
Pelosi, Michael H., Jr. Air distribution ceiling. 4,060,025, Cl. 98-40.0DL.
Pennwalt Corporation: *See—*
Shetty, Bola Vithal, 4,060,526, Cl. 260-268.0PH.
Pennzoil Company: *See—*
Sardisco, John B.; and Drechsel, Erhart Karl, 4,060,586, Cl. 423-167.000.
Penrod, John K., to Power Management Corporation. Cooling arrangement for electrical power contactor. 4,060,847, Cl. 361-387.000.
Peredi, Karoly, to Energiagazdalkodasi Intezet. Method of firing and furnace therefor. 4,060,376, Cl. 432-24.000.
Peredi, Karoly, to Energiagazdalkodasi Intezet. Method of firing and furnace therefor. 4,060,378, Cl. 432-96.000.
Perfection Corporation: *See—*
Alewitz, Sam, 4,060,472, Cl. 204-197.000.
Perkin-Elmer Corporation, The: *See—*
Golay, Marcel J. E., 4,060,713, Cl. 364-416.000.
Scott, Larkin B., 4,060,715, Cl. 364-557.000.
Personal Communications, Inc.: *See—*
Yevick, George Johannus, 4,060,317, Cl. 353-27.00R.
Petersen, Arthur W.: *See—*
Schoenholz, Daniel; and Petersen, Arthur W., 4,060,494, Cl. 252-105.000.
Peterson, James O.: *See—*
Sweeney, Richard F.; and Peterson, James O., 4,060,469, Cl. 204-163.00R.
Peterson, James Oliver; Sukornick, Bernard; Sweeney, Richard Francis; Nychka, Henry R.; Eibeck, Richard E.; and Berenbaum, Morris B., to Allied Chemical Corporation. Process for the production of chlorofluorinated aliphatic ketones. 4,060,555, Cl. 260-586.00R.
Peterson, Robert S.: *See—*
Chabot, Daniel H.; Peterson, Robert S.; and Plumer, Roy D., 4,060,117, Cl. 151-43.000.
Petrolite Corporation: *See—*
Redmore, Derek; and Outlaw, Benjamin T., 4,060,553, Cl. 260-559.00A.
Woods, John Henry; and Graves, Toby R., 4,060,569, Cl. 260-683.15R.
Pez, Guido P.: *See—*
Pieters, Wim J. M.; Carlson, Emery J.; and Pez, Guido P., 4,060,499, Cl. 252-432.000.
Pfizer Inc.: *See—*
Bright, Gene Michael, 4,060,524, Cl. 260-256.50R.
Dirlam, John P., 4,060,523, Cl. 260-250.0QN.
Pfleiderer, Werner; Arnold, Friedrich; and Haussermann, Richard, to Keiper Trainingsysteme GmbH & Co. Ergometer with automatic load control system. 4,060,239, Cl. 272-73.000.
Phadke, Mukund A.: *See—*
Bowers, Paul E.; and Phadke, Mukund A., 4,060,845, Cl. 361-149.000.
Philadelphia Suburban Corporation: *See—*
Chiesa, Peter J., Jr., 4,060,132, Cl. 169-47.000.
Chiesa, Peter J., Jr., 4,060,489, Cl. 252-3.000.
Philip A. Hunt Chemical Corporation: *See—*
Nelson, Warren A., 4,060,447, Cl. 156-642.000.
Philipp, Adolf H.; and Jirkovsky, Ivo L., to Ayerst McKenna and Harrison Ltd. 1,4-Dihydro-4-oxo-benzothiopyrano (4,3-b)pyridine-2-carboxylates and derivatives. 4,060,619, Cl. 424-256.000.
Philipp, Wilfried. Printing method and apparatus for performing the printing method. 4,060,031, Cl. 101-163.000.
Phillips Petroleum Company: *See—*
Archerd, Paul H., 4,060,001, Cl. 73-421.50R.
Doss, Richard C.; and Murtha, Timothy P., 4,060,519, Cl. 260-79.000.
Irvin, Howard B., 4,060,520, Cl. 260-79.100.
Phillips, William A.: *See—*
Gentry, Charles B.; and Phillips, William A., 4,060,371, Cl. 431-75.000.
Pierce, David R.: *See—*
Nelson, Carl R.; Pierce, David R.; Depew, Noel F.; and Harp, Marlyn F., 4,060,161, Cl. 197-1.00R.
Piereder, Ludwig, to L. P. Machinery Ltd. Continuous flow, oscillating piston meat pump. 4,060,349, Cl. 417-482.000.
Pierre Fabre SA: *See—*
Stenger, M. Antoine; Cousse, Henri; and Mouzin, M. Gilbert, 4,060,637, Cl. 424-324.000.
Piet, Meyer; and Giles, Dean Gaylord, to Futurecraft Corporation. Controlled environment work enclosure. 4,059,903, Cl. 32-40.00R.
Pieters, Wim J. M.; Carlson, Emery J.; and Pez, Guido P., to Allied Chemical Corporation. Copper chloride/boron nitride catalyst for substitution chlorination. 4,060,499, Cl. 252-432.000.
Piezo Technology Inc.: *See—*
Tiersten, Harry Frank; and Smythe, Robert Chastain, 4,060,777, Cl. 333-72.000.
Pigeaud, Jean-Marie: *See—*
Masure, Daniel; Guillaumont, Jacques; and Pigeaud, Jean-Marie, 4,060,474, Cl. 204-270.000.
Pigeon, Norbert G. Tow truck dolly. 4,060,258, Cl. 280-638.000.
Pimbley, Walter Thornton: *See—*
Mako, John; and Pimbley, Walter Thornton, 4,060,812, Cl. 346-75.000.
Pinch, Harry Louis; and Moss, Herbert Irwin, to RCA Corporation. Composite sputtering method. 4,060,471, Cl. 204-192.0SP.
Pisani, Luigi, to Rockwell-Rimoldi S.p.A. Fabric cutting machine for producing strips from tubular material. 4,059,874, Cl. 29-2.160.
Pitkin, Sheldon; Varcadipane, Richard; and Poppe, Walter H. Prefabricated fencing system. 4,060,222, Cl. 256-50.000.
Pitney Bowes Inc.: *See—*
Check, Frank Thomas, Jr., 4,060,720, Cl. 235-309.000.
Plastomedical Sciences, Inc.: *See—*
Steckler, Robert, 4,060,678, Cl. 526-260.000.
Platts, John Charles: *See—*
Maxwell, Anthony Robert; and Platts, John Charles, 4,060,797, Cl. 340-347.0DD.
Plempel, Manfred: *See—*
Meiser, Werner; Kramer, Wolfgang; Buchel, Karl Heinz; and Plempel, Manfred, 4,060,623, Cl. 424-269.000.
Plumer, Roy D.: *See—*
Chabot, Daniel H.; Peterson, Robert S.; and Plumer, Roy D., 4,060,117, Cl. 151-43.000.
Poister, Clarence E. Free standing toilet stool ventilating device. 4,059,857, Cl. 4-213.000.
Polaroid Corporation: *See—*
Cieciuch, Ronald F. W.; Luhowy, Roberta R.; Meneghini, Frank A.; and Rogers, Howard G., 4,060,417, Cl. 96-3.000.
Dionne, Leonard J., 4,060,817, Cl. 354-198.000.
Fanciullo, Ralph D., 4,060,669, Cl. 429-152.000.
Gerber, Arthur M.; and Walworth, Vivian K., 4,060,419, Cl. 96-94.00R.
Zinchuk, Michael, 4,060,426, Cl. 136-89.0NB.
Poletto, John Frank: *See—*
Bernady, Karel Francis; Floyd, Middleton Brawner, Jr.; Poletto, John Frank; Schaub, Robert Eugene; and Weiss, Martin Joseph, 4,060,540, Cl. 260-448.80R.
Poliak, John M.; Lopez, Juan M.; and Gritz, Robert W., to Leviton Manufacturing Co., Inc. Loop forming gauge and method of forming a loop. 4,060,305, Cl. 339-269.000.
Poliak, John N., to Leviton Manufacturing Co., Inc. Sheet metal screw. 4,060,020, Cl. 85-1.00L.
Pollack, Joel M.; and Flannery, John B., to Xerox Corporation. Imaging method. 4,060,316, Cl. 353-20.000.
Pollak, Robert J., to Allis-Chalmers Corporation. Hydraulic accumulator for use with gyratory crushers and combination of such accumulator with a gyratory crusher. 4,060,205, Cl. 241-211.000.
Polysius AG: *See—*
Weber, Paul; Mollenkopf, Hans; Henning, Kurt; Heinemann, Otto; Schmits, Heinz-Herbert; Rother, Wolfgang; Ritzmann, Horst; Wurr, Jurgen; Krutzner, Karl, Jr.; Schossler, Werner; Goldmann, Wolf; and Schepers, Georg, 4,060,375, Cl. 432-14.000.

Pool, Peter James: *See—*
Howorth, Jonathan Ross; Goss, Alan Jerome; and Pool, Peter James, 4,060,823, Cl. 357-30.000.
Poppe, Walter H.: *See—*
Pitkin, Sheldon; Varcadipane, Richard; and Poppe, Walter H., 4,060,222, Cl. 256-50.000.
Porret, Daniel: *See—*
Batzer, Hans; Habermeier, Juergen; and Porret, Daniel, 4,060,525, Cl. 260-260.000.
Porsche Design, Firma: *See—*
Maeyerspeer, Bernhard, 4,060,278, Cl. 297-386.000.
Portec, Inc.: *See—*
Qureshi, Khurshid Ahmed, 4,060,197, Cl. 238-338.000.
Portescap: *See—*
Heyraud, Marc, 4,060,746, Cl. 310-177.000.
Post Office: *See—*
Birnie, Peter Alexander, 4,060,698, Cl. 179-15.0AT.
Cox, William Edward; and Lee, Frank James, 4,060,138, Cl. 173-49.000.
Postupack, Constantine; Borg, David G.; Junk, Norman M.; Oswald, Gerald L.; and Bowman, Arthur F., to Atlas Powder Company. Delay booster assembly. 4,060,033, Cl. 102-24.00R.
Potente, Demetri: *See—*
Floyd, Don E.; and Potente, Demetri, 4,060,507, Cl. 260-21.000.
Potter, Sydney Ralph: *See—*
Lanham, Albert Frank; Barned, Philip Sydney; and Potter, Sydney Ralph, 4,060,434, Cl. 149-2.000.
Povall, Gerald W.: *See—*
Hanson, James M.; and Povall, Gerald W., 4,060,721, Cl. 362-13.000.
Powell, Kenneth F.: *See—*
Miertschin, Gary N.; and Powell, Kenneth F., 4,060,454, Cl. 176-84.000.
Power Management Corporation: *See—*
Penrod, John K., 4,060,847, Cl. 361-387.000.
Powers, John R., to Texaco Inc. Methods for forming bubble cap assemblies for a gas and liquid contact apparatus. 4,059,877, Cl. 29-157.00R.
PPG Industries, Inc.: *See—*
Deli, Joseph; and Stevens, Henry C., 4,060,403, Cl. 71-90.000.
Prak, Jan Willem L., to Intersil, Inc. One button digital watch and method of setting the display. 4,059,955, Cl. 58-23.00R.
Pratt, Roy E.: *See—*
Castagnos, Leonce F., Jr.; and Pratt, Roy E., 4,060,395, Cl. 23-288.00B.
Preh-Elektrofeinmechanische Werke - Jakob Preh Nachf: *See—*
Achtmann, Walfried; and Hochgesang, Gerhard, 4,060,789, Cl. 338-183.000.
Prenihan AG: *See—*
Gresillon, Robert, 4,059,973, Cl. 66-177.000.
Prescott, Robert C.: *See—*
Annino, Raymond; Prescott, Robert C.; Karas, Edwin L.; and Kalinoski, Richard W., 4,059,994, Cl. 73-23.100.
Pridemore, Donald Floyd: *See—*
Pascucci, Gregory A.; Krishnaiyer, Ramesh; and Pridemore, Donald Floyd, 4,060,735, Cl. 307-3.000.
Produits Chimiques Ugine Kuhlmann: *See—*
Domergue, Annick Marthe Suzanne Simone; and Sureau, Robert Frederic Michel, 4,060,531, Cl. 260-308.00R.
Proksa, Ferdinand: *See—*
Schmitzer, Willi; Kisteneich, Heinz; and Proksa, Ferdinand, 4,060,579, Cl. 264-51.000.
Propper Manufacturing Company, Inc.: *See—*
Heine, Helmut A.; Schmidt, Otto H.; and Rosenbusch, Helmut W., 4,060,724, Cl. 362-32.000.
Pucel, Robert A.; and Statz, Hermann, to Raytheon Company. Low noise read-type diode. 4,060,820, Cl. 357-13.000.
Pugsley, Thomas A.: *See—*
Ferland, Jean-Marie; Laliberte, Real; Lippmann, Wilbur; and Pugsley, Thomas A., 4,060,613, Cl. 424-250.000.
Pullman Incorporated: *See—*
Mandelik, Bernard G., 4,060,588, Cl. 423-242.000.
Pulmac Instruments Ltd.: *See—*
Cowan, Wavell Frederick; and Bruinsma, Bote, 4,059,992, Cl. 73-95.000.
Puurunen, Juhani, to Oy W. Rosenlew AB. Apparatus for portioning of a solid vegetable raw material. 4,060,183, Cl. 222-442.000.
Pyott-Boone Machinery Corporation: *See—*
Teti, John J., 4,060,144, Cl. 180-77.00R.
Quenneville, Yves. Lamellar pellicle for thermography. 4,060,654, Cl. 428-1.000.
Quist, Frederick Fenn, Jr.: *See—*
Church, Wayne Edward; and Quist, Frederick Fenn, Jr., 4,060,230, Cl. 271-63.000.
Qureshi, Khurshid Ahmed, to Portec, Inc. Rail fastener assembly. 4,060,197, Cl. 238-338.000.
R. Alkan & Cie: *See—*
Hasquenoph, Jean H.; and Coutin, Pierre Fernand, 4,060,213, Cl. 244-137.00R.
R. J. Reynolds Tobacco Company: *See—*
Long, Margaret E., 4,060,456, Cl. 195-31.00F.
R. Jung AG Fabrik fur Prazisionsapparate: *See—*
Behme, Werner; and Berleth, Manfred, 4,060,440, Cl. 156-154.000.
Raasch, Hans, to W. Schlafhorst & Co. Method and device for irregularizing or disturbing a winding pattern in a winding apparatus for cross-wound coils. 4,060,208, Cl. 242-18.100.

Rabenau, Albrecht: *See—*
Alpen, Ulrich Von; Fenner, Jurgen; Marcoll, Joachim; and Rabenau, Albrecht, 4,060,672, Cl. 429-191.000.
Raff, Frederick L.; and Szymanski, Edward, to United States Steel Corporation. Method and apparatus for controlling a gas-producing facility. 4,060,339, Cl. 417-2.000.
Raff, Samuel J., to United States of America, Navy. Method of detecting the presence of an enemy submarine. 4,060,790, Cl. 340-3.00R.
Raghavachari, Srinivas T.: *See—*
Lindberg, Richard M.; and Raghavachari, Srinivas T., 4,060,082, Cl. 128-218.00M.
Rampe, John F., to Rampe Research. Chain finishing system. 4,059,926, Cl. 51-163.100.
Rampe Research: *See—*
Rampe, John F., 4,059,926, Cl. 51-163.100.
Randolph, Arthur J.; and Boyce, Richard M., to Randolph, Arthur J. Quilting machine. 4,059,889, Cl. 29-706.000.
Ranheim, Donald H., Jr.: *See—*
Bickford, John H.; Ranheim, Donald H., Jr.; and Saxby, Willard A., 4,060,137, Cl. 173-12.000.
Rank Organisation Limited, The: *See—*
Demaine, David George Anthony; and Norrie, David Gordon, 4,060,307, Cl. 350-96.00B.
Rank Xerox Ltd.: *See—*
Motoyama, Masamitsu, 4,060,234, Cl. 271-164.000.
Wakatsuki, Susumu, 4,060,324, Cl. 355-60.000.
Ransburg Corporation: *See—*
Bacsanyi, Thomas J.; and Harmon, Edward J., 4,060,003, Cl. 73-483.000.
Rapoport, Henry; and Snyder, Clinton D., to University of California, The Regents of the. Process for preparing 3-alkyl-4-alkoxy-1-naphthols. 4,060,558, Cl. 260-613.00D.
Rapp, Felix, Jr.; and Barron, James M., to DIY-Sol, Inc. Solar heating control system. 4,060,195, Cl. 237-1.00A.
Rapp, Wolfgang; Haas, Karl-Heinz; and Luessem, Heribert, to Ernst Leitz GmbH Wetzlar. Specimen holding device and method of using same. 4,060,388, Cl. 23-230.00R.
Rasmussen, Poul Rodbroe: *See—*
Daehne, Welf von; and Rasmussen, Poul Rodbroe, 4,060,606, Cl. 424-238.000.
Ratcliffe, Ronald W.: *See—*
Christensen, Burton G.; and Ratcliffe, Ronald W., 4,060,687, Cl. 544-27.000.
Raychem Corporation: *See—*
Siden, Dennis, 4,059,892, Cl. 30-90.100.
Raymond Engineering Inc.: *See—*
Bickford, John H.; Ranheim, Donald H., Jr.; and Saxby, Willard A., 4,060,137, Cl. 173-12.000.
Raymond International Inc.: *See—*
Adair, Harold Lee, 4,060,139, Cl. 173-137.000.
Raytheon Company: *See—*
Pucel, Robert A.; and Statz, Hermann, 4,060,820, Cl. 357-13.000.
Urciuoli, John P.; and Icart, Roger P., 4,060,814, Cl. 346-139.00A.
van Heyningen, Arent H. Kits, 4,060,792, Cl. 340-6.00R.
RCA Corporation: *See—*
Carlson, David Emil; and Tracy, Chester Edwin, 4,060,660, Cl. 428-408.000.
Faulkner, Richard Dale, 4,060,747, Cl. 313-95.000.
Foldes, Peter, 4,060,808, Cl. 343-100.0PE.
Halter, Jerome Barth, 4,060,831, Cl. 358-128.000.
Onyshkevych, Lubomyr Stephen, 4,060,833, Cl. 358-188.000.
Pinch, Harry Louis; and Moss, Herbert Irwin, 4,060,471, Cl. 204-192.0SP.
Schade, Otto Heinrich, Jr., 4,060,770, Cl. 330-253.000.
Reactive Metals & Alloys Corporation: *See—*
Jackman, Joseph R., 4,060,407, Cl. 75-58.000.
Reber, Walter, to Kuhn, S.A. Haymaking machine for the tedding and windrowing of fodder. 4,059,944, Cl. 56-370.000.
Reckitt & Colman Products Limited: *See—*
Morgan, Barry A.; and Schafer, Derek J., 4,060,603, Cl. 424-177.000.
Redmore, Derek; and Outlaw, Benjamin T., to Petrolite Corporation. Hydroxyalkylaminoalkylamides and preparation and uses thereof. 4,060,553, Cl. 260-559.00A.
Reed, Marion G.; and Jaffe, Joseph, to Chevron Research Company. Hydrocarbon hydroconversion process employing hydroxy-aluminum stabilized catalysts supports. 4,060,480, Cl. 208-111.000.
Rees, Ned: *See—*
Hanke, Kenneth Earl; and Rees, Ned, 4,060,785, Cl. 337-201.000.
Regh, Joseph: *See—*
Barile, Conrad A.; Brill, Robert M.; Forneris, John L.; and Regh, Joseph, 4,060,427, Cl. 148-1.500.
Reichel, Fritz: *See—*
Naarmann, Herbert; Reichel, Fritz; and Gausepohl, Hermann, 4,060,679, Cl. 526-304.000.
Reilly, Joseph R., to Monsanto Company. Method and apparatus for loading blow molding machines. 4,060,164, Cl. 198-424.000.
Reinhard, Gunter: *See—*
Johannes, Gerhard; Gemmer, Erwin; Konig, Hans-Joachim; and Reinhard, Gunter, 4,060,655, Cl. 428-35.000.
Reinhold, Herbert E., Jr., to Survival Technology, Inc. Heart-lung resuscitator litter unit. 4,060,079, Cl. 128-145.800.
Reitmeier, Lutz: *See—*
Menge, Gunter; Grieben, Karl-Heinz; Reitmeier, Lutz; and Frank, Willi, 4,059,940, Cl. 53-148.000.

Remswerk Christian Foll und Sohne: *See—*
Wagner, Rudolf, 4,060,334, Cl. 408-126.000.
Remy, David C., to Merck & Co., Inc. (+) and (−) 1-Methyl-4-(3-cyano-5H-dibenzo(a,d)-cyclohepten-5-ylidene)piperidine containing compositions and methods for using same. 4,060,622, Cl. 424-267.000.
Resch, Ronald Dale. Self-supporting structural unit having a three-dimensional surface. 4,059,932, Cl. 52-81.000.
Reuter, Franz Gottfried; and Menzel, Tankred Walter, to Reuter Maschinen-and Werkzeugbau GmbH. Rigid electric surface heating element. 4,060,710, Cl. 219-548.000.
Reuter Maschinen-and Werkzeugbau GmbH: *See—*
Reuter, Franz Gottfried; and Menzel, Tankred Walter, 4,060,710, Cl. 219-548.000.
Reynolds Metals Company: *See—*
Boice, Elvin G., 4,060,286, Cl. 308-4.00A.
Rhodes, Melvin H., to Rockwell International Corporation. Tubular magnetic field sensor with means to rectify the sensed signal. 4,060,761, Cl. 324-253.000.
Rhone-Poulenc Industries: *See—*
Fournier, Daniel; and Bourgeois, Hugues, 4,060,475, Cl. 204-270.000.
Masure, Daniel; Guillaumont, Jacques; and Pigeaud, Jean-Marie, 4,060,474, Cl. 204-270.000.
Richard Wolf GmbH: *See—*
Hiltebrandt, Siegfried; and Bonnet, Ludwig, 4,060,087, Cl. 128-303.150.
Richardson-Merrell Inc.: *See—*
Dolfini, Joseph E.; and MacKenzie, Robert D., 4,060,630, Cl. 424-300.000.
Richtzenhain, Hermann: *See—*
El Chahawi, Moustafa; and Richtzenhain, Hermann, 4,060,690, Cl. 560-55.000.
Ricoh Co., Ltd.: *See—*
Tsubuko, Kazuo; Kimura, Taro; Hashimoto, Junichiro; and Kurotori, Tsuneo, 4,060,493, Cl. 252-62.10L.
Ridyard, Denis Robert Annesley, to Imperial Chemical Industries Limited. Monoazo dyestuffs. 4,060,383, Cl. 8-41.00B.
Rieckmann, Peter: *See—*
Groppenbacher, Gregor; Rieckmann, Peter; and Rothe, Werner, 4,060,598, Cl. 424-33.000.
Riedl, Kurt, to Biochemie Gesellschaft m.b.H. 14-Desoxy-14 thiocyanato-acetoxy-mutilin. 4,060,542, Cl. 260-454.000.
Rieger, Werner; Boning, Manfred; Dalferth, Hans; and Smetz, Reinhard. Equalizing head for chain slings. 4,060,269, Cl. 294-78.00A.
Riendeau, Carmel. Retractable cover for ground opening. 4,059,855, Cl. 4-172.140.
Riffe, Delmar R.; and Young, Robert R., to Westinghouse Electric Corporation. Vane assembly for rotary compressor. 4,060,342, Cl. 417-284.000.
Rilbe, Ulf Christer, to Hiab-Foco Aktiebolag. Double-acting hydraulic cylinder having two pistons arranged for coaxial movement relative thereto. 4,060,221, Cl. 254-93.00R.
Risler, Pierre; Gireau, Jean; Rose, Pierre; and Bisson, Jean-Pierre, to Societe d'Assistance Technique pour Produits Nestle S.A. Dehydrated food product. 4,060,645, Cl. 426-302.000.
Rissi, Walter, to Gesellschaft fur Elektronische Rohren Comet Bern. Dental X-ray apparatus. 4,060,731, Cl. 250-402.000.
Ritzmann, Horst: *See—*
Weber, Paul; Mollenkopf, Hans; Henning, Kurt; Heinemann, Otto; Schmits, Heinz-Herbert; Rother, Wolfgang; Ritzmann, Horst; Wurr, Jurgen; Krutzner, Karl, Jr.; Schossler, Werner; Goldmann. Wolf; and Schepers, Georg, 4,060,375, Cl. 432-14.000.
Robert Bosch G.m.b.H.: *See—*
Brune, Gerhard; and Hans, Waldemar, 4,060,199, Cl. 239-488.000.
Robertshaw Controls Company: *See—*
Branson, Charles D., 4,060,192, Cl. 236-46.00D.
Jackson, Byron L.; and Wagner, Joseph P., 4,059,878, Cl. 29-157.10R.
Marquis, Edgar E., 4,059,897, Cl. 29-432.100.
Sliger, Boyd P., 4,059,881, Cl. 29-157.10R.
Robillard, Edward G., to Cincinnati Milacron-Heald Corporation. Grinding machine. 4,059,927, Cl. 51-165.770.
Robillard, Edward George, to Cincinnati Milacron, Inc. Multiple axis path control for a manually controlled machine. 4,060,755, Cl. 318-571.000.
Rockwell International Corporation: *See—*
Catterfeld, Fritz C., 4,060,141, Cl. 175-94.000.
Heinz, Theodore A., 4,060,314, Cl. 350-285.000.
Heinz, Theodore A., 4,060,315, Cl. 350-289.000.
Pekrul, Paul J.; and Thiele, Alfred W., 4,060,716, Cl. 364-576.000.
Rhodes, Melvin H., 4,060,761, Cl. 324-253.000.
Rockwell-Rimoldi S.p.A.: *See—*
Pisani, Luigi, 4,059,874, Cl. 29-2.160.
Rodewald, Paul G., to Mobil Oil Corporation. Silica-modified zeolite catalyst and conversion therewith. 4,060,568, Cl. 260-682.000.
Roe, Norman P., to Consolidated Products Corporation. Composite strain member for use in electromechanical cable. 4,059,951, Cl. 57-149.000.
Rogachev, Viktor Igorevich; Sukhorukov, Vasily Vasilievich; and Shkatov, Petr Nikolaevich. Eddy current sensor for non-destructive testing the quality of electrically conductive through-hole plating in printed circuit boards. 4,060,760, Cl. 324-2.900.
Rogers, Donald J.: *See—*
Morrison, David; and Rogers, Donald J., 4,059,953, Cl. 58-4.00R.

Rogers, Howard G.: *See—*
Cieciuch, Ronald F. W.; Luhowy, Roberta R.; Meneghini, Frank A.; and Rogers, Howard G., 4,060,417, Cl. 96-3.000.
Rogers, Philip Sydney: *See—*
Maries, Alan; and Rogers, Philip Sydney, 4,060,401, Cl. 65-33.000.
Rohland, Bernhard, to Bernex, Firma. Swageable sleeve. 4,059,866, Cl. 16-108.000.
Rohm and Haas Company: *See—*
Kilbourn, Edward E.; and Weir, W. David, 4,060,636, Cl. 424-322.000.
Slejko, Frank L., 4,060,529, Cl. 260-307.0FA.
Rohrborn, Hans-Joachim, to Metallgesellschaft Aktiengesellschaft. Process for producing barium hydroxide. 4,060,585, Cl. 423-164.000.
Roland Offsetmaschinenfabrik Faber & Schleicher AG: *See—*
Degen, Klaus; and Herrmann, Herbert, 4,060,237, Cl. 271-231.000.
Simeth, Claus, 4,060,238, Cl. 271-276.000.
Romagnoli, Robert A., to Fleming-Potter Company, Inc. Label construction. 4,060,168, Cl. 206-216.000.
Rose, Charles Vincent: *See—*
Rosemund, Walter Richard; and Rose, Charles Vincent, 4,060,439, Cl. 156-78.000.
Rose, Pierre: *See—*
Risler, Pierre; Gireau, Jean; Rose, Pierre; and Bisson, Jean-Pierre, 4,060,645, Cl. 426-302.000.
Rosemund, Walter Richard; and Rose, Charles Vincent, to Union Carbide Corporation. Polyurethane foam composition and method of making same. 4,060,439, Cl. 156-78.000.
Rosenberger, Dieter, to Siemens Aktiengesellschaft. Separating gaseous isotope mixtures. 4,060,732, Cl. 250-432.00R.
Rosenbusch, Helmut W.: *See—*
Heine, Helmut A.; Schmidt, Otto H.; and Rosenbusch, Helmut W., 4,060,724, Cl. 362-32.000.
Ross, Robert R., to H. A. Phillips & Co. Refrigeration system. 4,059,968, Cl. 62-174.000.
Roth, James F.: *See—*
Paulik, Frank E.; Hershman, Arnold; Knox, Walter R.; and Roth, James F., 4,060,547, Cl. 260-532.000.
Rothe, Rudolf: *See—*
Grebe, Herbert; Hartwig, Wolfgang; Kohler, Johann; Rothe, Rudolf; and Schroder, Karl-Friedrich, 4,060,394, Cl. 23-284.000.
Rothe, Werner; Heinemann, Helmut; Schmidt, Felix Helmut; and Betzien, Gunter, to Boehringer Mannheim G.m.b.H. Rapidly resorbable glibenclamide. 4,060,634, Cl. 424-321.000.
Rothe, Werner: *See—*
Groppenbacher, Gregor; Rieckmann, Peter; and Rothe, Werner, 4,060,598, Cl. 424-33.000.
Rother, Wolfgang: *See—*
Weber, Paul; Mollenkopf, Hans; Henning, Kurt; Heinemann, Otto; Schmits, Heinz-Herbert; Rother, Wolfgang; Ritzmann, Horst; Wurr, Jurgen; Krutzner, Karl, Jr.; Schossler, Werner; Goldmann, Wolf; and Schepers, Georg, 4,060,375, Cl. 432-14.000.
Rowe, Arthur W.; and Dayian, George, to Community Blood Council of Greater New York, Inc., The. Process for freezing blood platelets. 4,059,967, Cl. 62-64.000.
Rowsell, David G.: *See—*
Watson, Hugh R.; Rowsell, David G.; and Spring, David John, 4,060,091, Cl. 131-9.000.
Ruff, David L.: *See—*
Funk, Richard S.; Stewart, S. Alan; and Ruff, David L., 4,059,933, Cl. 52-127.000.
Rumbaugh, James T., to Berkley & Company, Inc. Water ski rope handle. 4,060,049, Cl. 115-6.100.
Russer, Peter; and Gruber, Johann, to Licentia Patent-Verwaltungs-G.m.b.H. Circuit arrangement for amplifying pulsed signals. 4,060,739, Cl. 307-319.000.
Russev, Sheko Kolev: *See—*
Stoev, Stoycho Mitrev; Metodiev, Metodi Stoyanov; Kuzev, Lyubomir Vladimirov; Vedrichkov, Petko Georgiev; Sapunarov, Ivan Mitrev; Vassilev, Vassil Vladimirov; Dimitrov, Spas Petkov; Gasharov, Vihar Assenov; Russev, Sheko Kolev; and Mitrev, Kostadin Georgiev, 4,060,481, Cl. 209-170.000.
Russo, Ronald D., to Chesebrough-Pond's, Inc. Inhalation device. 4,060,074, Cl. 128-2.080.
Ruvolo, Sylvia. Rotating dining room table. 4,060,038, Cl. 108-94.000.
Rynearson, John L., to Minnesota Mining and Manufacturing Company. Variable cell width recording. 4,060,837, Cl. 360-44.000.
Rysgaard, John R., Sr., to Fiberglass Specialty Co., Inc. Diaphragm tank cover. 4,060,175, Cl. 220-85.00B.
S.B.B.M. Burdet S.A.: *See—*
Monnet, Ferjeux Jean Pierre, 4,059,957, Cl. 58-90.00R.
Sabella, Barney. Device for cleaning bottom of a boat. 4,060,047, Cl. 114-222.000.
Safe Flight Instrument Corporation: *See—*
Greene, Leonard M., 4,059,993, Cl. 73-178.00R.
Sagaser, Thomas M.: *See—*
Bauer, James J.; and Sagaser, Thomas M., 4,060,261, Cl. 280-756.000.
Sahm, Hermann: *See—*
Wagner, Fritz; Sahm, Hermann; and Keune, Walter Hartmut, 4,060,455, Cl. 195-29.000.
Saito, Nagoa: *See—*
Maeda, Sachio; Saito, Nagoa; Arai, Shinji; and Haishi, Yuichiro, 4,060,467, Cl. 204-129.750.

Sakamaki, Kenji: *See—*
Shimizu, **Kazufusa**; Katsumori, Shigeo; Nishikawa, Tadaaki; **Senoo, Keisaku**; Sakamaki, Kenji; Fujita, Makio; Tano, Teruo; **Takano, Hiroshi**; and Komori, Hideo, 4,060,390, Cl. 23-259.100.

Sakamoto, Kenji; and Kawaai, Osamu, to Sanyo Electric Co., Ltd.; and **A & A Japan**, Ltd. Press-to-talk transceiver. 4,060,765, Cl. 325-21.000.

Sakamoto, Takashi, to Dainippon Screen Seizo Kabushiki-Kaisha. Method of color correction. 4,060,829, Cl. 358-80.000.

Sakiyama, Kazutaka: *See—*
Nishimura, Yoshiki; Sakiyama, Kazutaka; Adachi, Tadao; and Harada, Kenji, 4,060,389, Cl. 23-252.00A.

Saligny, Yves, to Etablissements Carpano & Pons. Connector adapted to grip electric conductors. 4,060,302, Cl. 339-97.00R.

Salomon, Georges Pierre Joseph: *See—*
Collombin, Andre Marcel; and Salomon, Georges Pierre Joseph, 4,060,256, Cl. 280-613.000.

Samsel, Frank J. Apparatus for cleaning oil spills. 4,060,487, Cl. 210-242.00R.

Sandau, Roray J: *See—*
Goldsby, Claude W.; and Sandau, Roray J, 4,060,196, Cl. 237-51.000.

Sandoz, Inc.: *See—*
Anderson, Paul L., 4,060,638, Cl. 424-324.000.
Nadelson, Jeffrey, 4,060,533, Cl. 260-345.70R.

Sandoz Ltd.: *See—*
Baumann, Hans-Peter; and Karmann, Hans-Georg, 4,060,387, Cl. 8-169.000.

Sankyo Company Limited: *See—*
Tomita, Kazuo; Murakami, Tadashi; Yamazaki, Yoshio; and Honma, Toyokuni, 4,060,402, Cl. 71-76.000.

Santos, John J., Jr.; and Tassone, Joseph V., to Compo Industries, Inc. Wet latex lasting system. 4,059,861, Cl. 12-145.000.

Sanwa Seiki Kabushiki Kaisha: *See—*
Tomita, Tomiichi, 4,060,201, Cl. 239-553.000.

Sanyo Electric Co., Ltd.: *See—*
Sakamoto, Kenji; and Kawaai, Osamu, 4,060,765, Cl. 325-21.000.

Sapunarov, Ivan Mitrev: *See—*
Stoev, Stoycho Mitrev; Metodiev, Metodi Stoyanov; Kuzev, Lyubomir Vladimirov; Vedrichkov, Petko Georgiev; Sapunarov, Ivan Mitrev; Vassilev, Vassil Vladimirov; Dimitrov, Spas Petkov; Gasharov, Vihar Assenov; Russev, Sheko Kolev; and Mitrev, Kostadin Georgiev, 4,060,481, Cl. 209-170.000.

Sardisco, John B.; and Drechsel, Erhart Karl, to Pennzoil Company. Recovery of fluorides from gypsum. 4,060,586, Cl. 423-167.000.

Sarfati, Roger Gerard: *See—*
Jarreau, Francois-Xavier; and Sarfati, Roger Gerard, 4,060,607, Cl. 424-241.000.

Sarkes Tarzian, Inc.: *See—*
Valdettaro, Alarico A., 4,060,051, Cl. 116-124.10A.

Sartorius-Werke GmbH (und vorm. Gottinger Prazisions-Waagenfabrik GmbH): *See—*
Melcher, Franz Josef; and Oldendorf, Christian, 4,060,771, Cl. 330-59.000.

Sasaki, Takehiko: *See—*
Maeda, Hidetoshi; and Sasaki, Takehiko, 4,059,956, Cl. 58-23.00R.

Sato, Akio: *See—*
Nohmura, Ryotaro; Tazaki, Eiji; and Sato, Akio, 4,060,119, Cl. 160-266.000.

Sato, Hidetaka, to Kansai Paint Company, Limited. Preparation of coating composition of specified color. 4,059,904, Cl. 33-126.70A.

Sato, Hiroshi: *See—*
Yasui, Seimei; and Sato, Hiroshi, 4,060,492, Cl. 252-59.000.

Sato, Katutoshi: *See—*
Harada, Yutaka; Itai, Noriyuki; Ucikawa, Hiroshi; Kato, Hajime; Sato, Katutoshi; and Itoh, Akira, 4,060,425, Cl. 106-90.000.

Sato, Yasushi: *See—*
Hirayama, Kazuhiro; Sato, Yasushi; Tokiwa, Taisuke; Kawakubo, Kazuo; Iwatate, Fujio; and Nakatsui, Hisashi, 4,060,322, Cl. 355-60.000.
Hirayama, Kazuhiro; Sato, Yasushi; Tokiwa, Taisuke; Iwatate, Fujio; Kawakubo, Kazuo; and Nakatsui, Hisashi, 4,060,323, Cl. 355-60.000.

Sato, Yukio; Wada, Seijun; and Matsuzawa, Shigetaka, to Takeda Chemical Industries, Ltd. Serological reagent and preparation thereof. 4,060,597, Cl. 424-12.000.

Satomura, Masato: *See—*
Maekawa, Yukio; Satomura, Masato; and Umehara, Akira, 4,060,685, Cl. 542-413.000.

Satonaka, Koichiro, to Hitachi, Ltd. Semiconductor device having multi-layer wiring structure with additional through-hole interconnection. 4,060,828, Cl. 357-71.000.

Sauer, Abe. Security window guard. 4,059,923, Cl. 49-57.000.

Savin, Nikolai Ivanovich; Ternikova, Tamara Alexandrovna; Filippov, Vladimir Jurievich; and Shiryaev, Vladimir Ivanovich. Shell-and-tube heat exchanger. 4,060,127, Cl. 165-145.000.

Saxby, Willard A.: *See—*
Bickford, John H.; Ranheim, Donald H., Jr.; and Saxby, Willard A., 4,060,137, Cl. 173-12.000.

Saylor, Charles J.: *See—*
Haworth, Richard G.; Saylor, Charles J.; and Wilson, Harold R., 4,060,294, Cl. 339-4.000.

Scarafino, Angelo James: *See—*
Hentz, LeRoy Richard; Pavlovic, Gary Frank; Scarafino, Angelo James; and Seksinsky, John Joseph, 4,060,377, Cl. 432-50.000.

Schabert, Hans-Peter; and Laurer, Erwin, to Kraftwerk Union Aktiengesellschaft. Nuclear reactor installation. 4,060,453, Cl. 176-38.000.

Schacht, Erich; Mehrhof, Werner; Jonas, Rochus; Nowak, Herbert; and Simane, Zdenek, to Merch Patent Gesellschaft mit beschrankter Haftung. Biphenylyl ethers and method of use. 4,060,609, Cl. 424-244.000.

Schacht, Erich: *See—*
Gante, Joachim; Kurmeier, Hans-Adolf; Orth, Dieter; Schacht, Erich; and Wild, Albrecht, 4,060,633, Cl. 424-304.000.

Schade, Max Gunter. Ventilator valve. 4,060,096, Cl. 137-74.000.

Schade, Otto Heinrich, Jr., to RCA Corporation. Differential amplifier. 4,060,770, Cl. 330-253.000.

Schaeffer, Howard John, to Burroughs Wellcome Co. Purine derivatives with repeating unit. 4,060,616, Cl. 424-253.000.

Schafer, Derek J.: *See—*
Morgan, Barry A.; and Schafer, Derek J., 4,060,603, Cl. 424-177.000.

Schafft, Hugo Willy, to Motorola, Inc. High power piezoelectric bender. 4,060,741, Cl. 310-332.000.

Schatzler, Walter: *See—*
Bienert, Horst; Jardin, Hans; and Schatzler, Walter, 4,060,274, Cl. 296-137.00G.

Schaub, Robert Eugene: *See—*
Bernady, Karel Francis; Floyd, Middleton Brawner, Jr.; Poletto, John Frank; Schaub, Robert Eugene; and Weiss, Martin Joseph, 4,060,540, Cl. 260-448.80R.

Scheidl, Franz; and Sommer, Werner, to Hoechst Aktiengesellschaft. Physiologically unobjectionable stabilizer compositions for halogenated polyolefins. 4,060,512, Cl. 260-45.80N.

Schepers, Georg: *See—*
Weber, Paul; Mollenkopf, Hans; Henning, Kurt; Heinemann, Otto; Schmits, Heinz-Herbert; Rother, Wolfgang; Ritzmann, Horst; Wurr, Jurgen; Krutzner, Karl, Jr.; Schossler, Werner; Goldmann, Wolf; and Schepers, Georg, 4,060,375, Cl. 432-14.000.

Schevey, William Russell: *See—*
Nemiroff, Michael; Yue, Hong Jun; and Schevey, William Russell, 4,060,448, Cl. 156-653.000.

Schladitz, Hermann J. Heat transfer between solids and fluids utilizing polycrystalline metal whiskers. 4,060,126, Cl. 165-133.000.

Schlegel, Earl S., to Westinghouse Electric Corporation. High speed high power two terminal solid state switch fired by dV/dt. 4,060,825, Cl. 357-38.000.

Schliebs, Reinhard: *See—*
Kapps, Manfred; Mitschke, Karl-Heinz; and Schliebs, Reinhard, 4,060,571, Cl. 260-970.000.

Schloemann, Ernst Fritz Rudolf August; and Van Hook, Harry Jerrold, to United States of America, Navy. Method for increasing the critical velocity of magnetic bubble propagation in magnetic materials. 4,060,798, Cl. 365-25.000.

Schlueter, Francis Edward: *See—*
Trimble, David Lee; Copley, Russell Dean; Jensen, James Keith; and Schlueter, Francis Edward, 4,059,942, Cl. 56-30.000.

Schmidt, Achim D., to Alveru S. A. Shoe cleaning mat. 4,059,865, Cl. 15-161.000.

Schmidt, Alfred: *See—*
Garber, Alfred; Stonner, Hans-Martin; Wiesner, Paul; Sinclair, Alan; and Schmidt, Alfred, 4,060,591, Cl. 423-352.000.

Schmidt, Arthur H.; Lantzsch, Reinhard; Marhold, Albrecht; Lehment, Klaus-Friedrich; and Staffe, Adolf, to Bayer Aktiengesellschaft. Process for preparing sulfonic acid fluorides. 4,060,549, Cl. 260-543.00F.

Schmidt, Felix Helmut: *See—*
Hrstka, Vladimir; Hubner, Manfred; Kuhr, Manfred; Schmidt, Felix Helmut; and Aumuller, Walter, 4,060,626, Cl. 424-274.000.
Rothe, Werner; Heinemann, Helmut; Schmidt, Felix Helmut; and Betzien, Gunter, 4,060,634, Cl. 424-321.000.

Schmidt, Otto H.: *See—*
Heine, Helmut A.; Schmidt, Otto H.; and Rosenbusch, Helmut W., 4,060,724, Cl. 362-32.000.

Schmits, Heinz-Herbert: *See—*
Weber, Paul; Mollenkopf, Hans; Henning, Kurt; Heinemann, Otto; Schmits, Heinz-Herbert; Rother, Wolfgang; Ritzmann, Horst; Wurr, Jurgen; Krutzner, Karl, Jr.; Schossler, Werner; Goldmunn, Wolf; and Schepers, Georg, 4,060,375, Cl. 432-14.000.

Schmitt, Kirk D.: *See—*
Bridger, Robert F.; and Schmitt, Kirk D., 4,060,491, Cl. 252-50.000.

Schmitzer, Willi; Kisteneich, Heinz; and Proksa, Ferdinand, to Maschinenfabrik Hennecke GmbH. Method for the continuous forming of foam blocks. 4,060,579, Cl. 264-51.000.

Schmuck, Phillip W.: *See—*
Kenneday, John W.; Kinney, Charles W.; Scott, Floyd L., Jr.; and Schmuck, Phillip W., 4,060,131, Cl. 166-315.000.

Schoen, William: *See—*
Dowling, Donald J.; and Schoen, William, 4,059,987, Cl. 73-61.10R.

Schoenholz, Daniel; and Petersen, Arthur W., to Foster D. Snell, Inc. Non-caustic drain cleaner. 4,060,494, Cl. 252-105.000.

Scholz, Hansjurgen; Backhaus, Hans-Gerd; Brambilla, Luigi; and Gimbel, Jurgen, to Daimler-Benz Aktiengesellschaft. Sensor adapted to be triggered by deceleration forces. 4,060,004, Cl. 73-514.000.

Schossler, Werner: *See—*
Weber, Paul; Mollenkopf, Hans; Henning, Kurt; Heinemann, Otto; Schmits, Heinz-Herbert; Rother, Wolfgang; Ritzmann, Horst; Wurr, Jurgen; Krutzner, Karl, Jr.; Schossler, Werner; Goldmann, Wolf; and Schepers, Georg, 4,060,375, Cl. 432-14.000.

Schott, Charles W. Apparatus for making beads. 4,060,356, Cl. 425-8.000.

Schoute, Bernardus A.; and Verhoeven, Gerardus H. Th. M. Burner for the combustion of hydrocarbonates. 4,060,369, Cl. 431-9.000.

Schreiber, August. Waste water aeration device. 4,060,486, Cl. 210-220.000.

Schroder, Karl-Friedrich: *See—*
Grebe, Herbert; Hartwig, Wolfgang; Kohler, Johann; Rothe, Rudolf; and Schroder, Karl-Friedrich, 4,060,394, Cl. 23-284.000.

Schroeder, Fred, to Dow Corning Corporation. Floatable incendiary composition. 4,060,435, Cl. 149-19.200.

Schulz, Heinz: *See—*
Bottcher, Dieter; Schulz, Heinz; and Stahlecker, Fritz, 4,059,946, Cl. 57-34.00R.

Schulze, Hans: *See—*
Blomer, Alois; and Schulze, Hans, 4,060,075, Cl. 128-90.000.

Schuster, Samuel R., to Ovutime, Inc. Mucus testing processes and devices. 4,059,986, Cl. 73-54.000.

Schweig, Eugene S., Jr.; and Diehl, Marcus I. Tape applicator. 4,060,444, Cl. 156-391.000.

Schweller, John. Apparatus for injection molding. 4,060,226, Cl. 366-75.000.

Scott, Floyd L., Jr.: *See—*
Kenneday, John W.; Kinney, Charles W.; Scott, Floyd L., Jr.; and Schmuck, Phillip W., 4,060,131, Cl. 166-315.000.

Scott, Larkin B., to Perkin-Elmer Corporation, The. Linearized bridge circuitry. 4,060,715, Cl. 364-557.000.

Sedlmair, Gerhard: *See—*
Jungkind, Roland; and Sedlmair, Gerhard, 4,060,257, Cl. 280-626.000.

Seibu Chemical Industry Co., Ltd.: *See—*
Shimizu, Kazufusa; Katsumori, Shigeo; Nishikawa, Tadaaki; Senoo, Keisaku; Sakamaki, Kenji; Fujita, Makio; Tano, Teruo; Takano, Hiroshi; and Komori, Hideo, 4,060,390, Cl. 23-259.100.

Seiler, Claus-Dieter: *See—*
Kotzsch, Hans Joachim; Vahlensieck, Hans-Joachim; and Seiler, Claus-Dieter, 4,060,538, Cl. 260-448.80R.

Seiler, Claus-Dietrich; Vahlensieck, Hans-Joachim; and Amort, Jurgen, to Dynamit Nobel Aktiengesellschaft. Sulfurous organic silicon compounds, a process for their preparation, and their use as adhesivizing agents. 4,060,539, Cl. 260-448.80R.

Seiler, Wolfgang, to Oskar Schleicher, Firma. Double lift, open shed Jacquard loom. 4,060,101, Cl. 139-65.000.

Seksinsky, John Joseph: *See—*
Hentz, LeRoy Richard; Pavlovic, Gary Frank; Scarafino, Angelo James; and Seksinsky, John Joseph, 4,060,377, Cl. 432-50.000.

Senoh Kabushiki Kaisha: *See—*
Hayamizu, Seiji, 4,059,934, Cl. 52-297.000.

Senoo, Keisaku: *See—*
Shimizu, Kazufusa; Katsumori, Shigeo; Nishikawa, Tadaaki; Senoo, Keisaku; Sakamaki, Kenji; Fujita, Makio; Tano, Teruo; Takano, Hiroshi; and Komori, Hideo, 4,060,390, Cl. 23-259.100.

Seton Company: *See—*
Siegler, Marcel, 4,060,384, Cl. 8-94.270.

Seybold, Rolf. Friction bearing. 4,060,291, Cl. 308-241.000.

Seydl, Wolfgang: *See—*
Jeserich, Wolfgang-Dieter; Cordes, Claus; Seydl, Wolfgang; and Weiss, Hans-Peter, 4,060,518, Cl. 260-78.00L.

Seyl, Robert G. Method and apparatus for correcting error in corrosion rate measurements. 4,060,461, Cl. 204-1.00T.

Shafer, Leroy: *See—*
Lappington, John P.; and Shafer, Leroy, 4,060,714, Cl. 364-431.000.

Shapiro, Howard E.: *See—*
Merz, Kenneth M.; and Shapiro, Howard E., 4,060,663, Cl. 428-428.000.

Sharp Kabushiki Kaisha: *See—*
Maeda, Hidetoshi; and Sasaki, Takehiko, 4,059,956, Cl. 58-23.00R.

Shatila, Mounir A.; Veeneman, John L.; Lach, John H.; and Harmon, James F., to Ampco Foods Inc. Drive mechanism for dough shaping apparatus. 4,060,367, Cl. 425-311.000.

Shaw, Alan Douglas, to Fanner Pty. Limited, a part interest. Preliminary screening of wooden poles. 4,059,988, Cl. 73-579.000.

Shaw, Jane Elizabeth: *See—*
Chandrasekaran, Santosh Kumar; Urquhart, John; and Shaw, Jane Elizabeth, 4,060,084, Cl. 128-260.000.

Shell Internationale Research Maatschappij B.V.: *See—*
Buiter, Pieter; van der Burgt, Maarten J.; and Van Helden, Henricus J. A., 4,060,397, Cl. 48-197.00R.

Shell Oil Company: *See—*
Himes, Glenn R., 4,060,510, Cl. 260-33.6AQ.
Kodama, Jiro K.; Haynes, George R.; and Albert, James R., 4,060,640, Cl. 424-326.000.
McClure, James D.; and Brandenberger, Stanley G., 4,060,565, Cl. 260-671.00C.

Shellhause, Ronald L.: *See—*
Demido, Michael; and Shellhause, Ronald L., 4,060,283, Cl. 303-6.00C.

Shenoy, Umakant Devdas, to DDSA Pharmaceuticals. Substituted hydroxymethyl benzodiazepines. 4,060,608, Cl. 424-244.000.

Sherwood, Theodore R., to United States of America, Navy. Pin loading system. 4,059,890, Cl. 29-739.000.

Shetty, Bola Vithal, to Pennwalt Corporation. 1-Heterocyclic alkyl-1,2,3,4-tetrahydroquinazolinones and analgesic intermediates thereof. 4,060,526, Cl. 260-268.0PH.

Shiba, Motoo: *See—*
Nakamoto, Hiromasa; Nakamoto, Shin-Ichi; Amemiya, Hidemitu; Miyamura, Souji; Shiba, Motoo; and Nakamura, Nobuko, 4,060,527, Cl. 260-279.00R.

Shibamoto, Nobuyori: *See—*
Goto, Hideo; Shibamoto, Nobuyori; and Tanaka, Shunsaku, 4,060,559, Cl. 260-620.000.

Shima, Takeo: *See—*
Kuratsuji, Takatoshi; Kawase, Shoji; and Shima, Takeo, 4,060,516, Cl. 260-75.00T.

Shimizu, Kazufusa; Katsumori, Shigeo; Nishikawa, Tadaaki; Senoo, Keisaku; Sakamaki, Kenji; Fujita, Makio; Tano, Teruo; Takano, Hiroshi; and Komori, Hideo, to Niigata Engineering Co., Ltd.; and Seibu Chemical Industry Co., Ltd. Apparatus for producing composts. 4,060,390, Cl. 23-259.100.

Shinada, Shinichi; and Mikoshiba, Shigeo, to Hitachi, Ltd. Flat discharge display panel having positive column discharge and auxiliary anode electrodes. 4,060,749, Cl. 313-484.000.

Shiokawa, Yoichi. Tray for preparing a dentiform model used for an operation on a dental technic. 4,059,902, Cl. 32-11.000.

Shioyama, Atsuo: *See—*
Matsumoto, Takeshi; Chiba, Kazukiyo; Shioyama, Atsuo; and Yamaguchi, Yoshitake, 4,060,143, Cl. 180-64.00A.

Shiryaev, Vladimir Ivanovich: *See—*
Savin, Nikolai Ivanovich; Ternikova, Tamara Alexandrovna; Filippov, Vladimir Jurievich; and Shiryaev, Vladimir Ivanovich, 4,060,127, Cl. 165-145.000.

Shkatov, Petr Nikolaevich: *See—*
Rogachev, Viktor Igorevich; Sukhorukov, Vasily Vasilievich; and Shkatov, Petr Nikolaevich, 4,060,760, Cl. 324-2.900.

Shoji, Ota. Earring having magnetically secured displaceable ornament for facilitating telephoning. 4,059,971, Cl. 63-14.00R.

Siden, Dennis, to Raychem Corporation. Deformable wire stripper. 4,059,892, Cl. 30-90.100.

Sidney, James T. Portable collapsible scaffold structure. 4,060,148, Cl. 182-2.000.

Siegler, Marcel, to Seton Company. Manufacture of leather. 4,060,384, Cl. 8-94.270.

Siemens Aktiengesellschaft: *See—*
Hassler, Dieter, 4,060,763, Cl. 324-123.00R.
Jantsch, Ottomar; Feigt, Ingmar; and Willig, Wolf Rudiger, 4,060,822, Cl. 357-30.000.
Rosenberger, Dieter, 4,060,732, Cl. 250-432.00R.
Voss, Peter, 4,060,826, Cl. 357-38.000.

Siements Aktiengesellschaft: *See—*
Franke, Kurt, 4,060,733, Cl. 250-491.000.

Silent Sentry, Inc.: *See—*
Cole, Donald G., 4,060,704, Cl. 200-61.620.

Simane, Zdenek: *See—*
Schacht, Erich; Mehrhof, Werner; Jonas, Rochus; Nowak, Herbert; and Simane, Zdenek, 4,060,609, Cl. 424-244.000.

Simeth, Claus, to Roland Offsetmaschinenfabrik Faber & Schleicher AG. Device for the smooth and flutter-free feeding of sheets on sheet-fed machines, particularly offset printing presses. 4,060,238, Cl. 271-276.000.

Simon-Hartley Limited: *See—*
Austin, Eric Paul; and Allanson, John Trevor, 4,060,484, Cl. 210-80.000.

Simonsson, Sven Bertil, to Aktiebolaget Electrolux. Fill indicator for a vacuum cleaner dust collector. 4,060,050, Cl. 116-114.0AD.

Sims, Larry Averett; and Kelley, William John, to Mattel, Inc. Simulated firecracker. 4,059,917, Cl. 46-196.000.

Sinclair, Alan: *See—*
Garber, Alfred; Stonner, Hans-Martin; Wiesner, Paul; Sinclair, Alan; and Schmidt, Alfred, 4,060,591, Cl. 423-352.000.

Sinclair, Richard G.; and Cremeans, George E., to Goodyear Tire & Rubber Company, The. Pigmented, particulate powder coating composition. 4,060,511, Cl. 260-34.200.

Singer Company, The: *See—*
Gdovin, David Paul, 4,060,835, Cl. 358-238.000.
Kron, Gerald Joseph, 4,059,909, Cl. 35-12.00E.
Vahle, Erwin; and Hartig, Arnold, 4,060,045, Cl. 112-235.000.

Sinjou, Johannes Petrus: *See—*
Lakerveld, Herman Gerard; van Rosmalen, Gerard Eduard; Bulthius, Kornelis; and Sinjou, Johannes Petrus, 4,060,248, Cl. 274-41.60R.

Sira Societa' Industriale Richerche Automotoristiche: *See—*
Giacosa, Dante, 4,060,012, Cl. 74-689.000.

Sitek, George J., to Leco Corporation. Acid tester. 4,060,717, Cl. 364-497.000.

SKF Industrial Trading and Development Company B.V.: *See—*
Arsenius, Torsten Henry; and Bildtsen, Sven Christian, 4,060,288, Cl. 308-73.000.

Skinner, Dale D.: *See—*
Jones, Charles H.; and Skinner, Dale D., 4,060,791, Cl. 340-3.00C.

Skinner, Mark, to Chore-Time Equipment, Inc. Poultry cage structure. 4,060,055, Cl. 119-48.000.

Slejko, Frank L., to Rohm and Haas Company. Polymerization inhibitors for N-substituted aminoalkyl acrylic monomers. 4,060,529, Cl. 260-307.0FA.

Sliger, Boyd P., to Robertshaw Controls Company. Vent valve arrangement and method of making the same. 4,059,881, Cl. 29-157.10R.

Slusarski, Ronald S.: *See—*
Chmura, William J.; Slusarski, Ronald S.; and Burk, Charles B., 4,059,879, Cl. 29-148.40R.

Smalley, Edmund W.; Kurtz, Bruce Edward; and Bandyopadhyay, Bhaskar, to Allied Chemical Corporation. Removal of chloroprenes from ethylene-dichloride. 4,060,460, Cl. 203-29.000.
Smetz, Reinhard: *See—*
Rieger, Werner; Boning, Manfred; Dalferth, Hans; and Smetz, Reinhard, 4,060,269, Cl. 294-78.00A.
Smid, Joost: *See—*
van Heel, Hubertus Johannes Gerardus; Bruins, Victor Leonard; and Smid, Joost, 4,060,391, Cl. 23-264.000.
Smith Company, The: *See—*
Ashton, Shirley B., 4,059,862, Cl. 15-53.0AB.
Smith, George Edwin, to Union Carbide Corporation. Method for converting intermittent to constant refuse flow. 4,060,167, Cl. 198-622.000.
Smith, George Windsor, to Girling Limited. Disc brakes caliper and support structure. 4,060,154, Cl. 188-73.300.
Smith, Glenn S.: *See—*
Chaney, Lynn Harold; and Smith, Glenn S., 4,060,159, Cl. 192-113.00B.
Smith Kline & French Laboratories Limited: *See—*
Durant, Graham John; Emmett, John Colin; and Ganellin, Charon Robin, 4,060,621, Cl. 424-263.000.
Smith, Michael W.: *See—*
Houck, Staley J.; and Smith, Michael W., 4,060,445, Cl. 156-414.000.
Smith, Stuart B., to Foster Grant Co., Inc. Apparatus for pre-expanding and molding expandable thermoplastic polymer particles. 4,060,354, Cl. 425-4.00R.
Smith, Walton J. Method for improving the stability of seeds. 4,059,908, Cl. 34-15.000.
SmithKline Corporation: *See—*
Berges, David A., 4,060,610, Cl. 424-246.000.
Smiths Industries Limited: *See—*
McAinsh, Kenneth G., 4,060,094, Cl. 136-230.000.
Smythe, Robert Chastain: *See—*
Tiersten, Harry Frank; and Smythe, Robert Chastain, 4,060,777, Cl. 333-72.000.
Snyder, Clinton D.: *See—*
Rapoport, Henry; and Snyder, Clinton D., 4,060,558, Cl. 260-613.00D.
Societa Nazionale Industria Applicazioni Viscosa S.p.A.: *See—*
Derail, Yves C.; and Dupeuble, Jean-Claude, 4,059,948, Cl. 57-77.330.
Societe Anonyme de Telecommunications: *See—*
Allemandou, Philippe Marie; and Beaudet, Didier Marcel, 4,060,775, Cl. 333-71.000.
Devimeux, Daniel Pierre Yvon; and Stouls, Francois-Xavier Antoine, 4,060,832, Cl. 358-133.000.
Societe Anonyme dite: Etablissement Genoud & Cie: *See—*
Neyret, Guy, 4,060,202, Cl. 239-579.000.
Societe d'Assistance Technique pour Produits Nestle S.A.: *See—*
Risler, Pierre; Gireau, Jean; Rose, Pierre; and Bisson, Jean-Pierre, 4,060,645, Cl. 426-302.000.
Societe de Traction et D'Electricite S.A.: *See—*
Carteus, Marc Felix Maurice; De Bruyne, Yvrs Marie Grovgrs; Lemmens, Jean Pierre Gustaaf Rosa; and Stubbe, Elie Jozef, 4,060,057, Cl. 122-451.00R.
Societe d'Etudes et de Developpement des Aeroglisseurs Marins, Terrestres et Amphibies S.E.D.A.M.: *See—*
Guienne, Paul; Herrouin, Guy; Lafont, Andre; Bertin, Jean, deceased; Bertin, Michel; Bertin, Laurent; Bertin, Philippe; Midy nee Bertin, Catherine; Gonzalez-Camino nee Bertin, Francoise; and Bertin nee Loustau, Genevieve, heirs, 4,060,147, Cl. 180-121.000.
Societe Franco-Hispano-Americaine (FRANCISPAM): *See—*
Paroty, Jean-Marie, 4,060,373, Cl. 431-135.000.
Societe Immobiliere et Financiere Suchet Alfort (S.I.F.S.A.): *See—*
Gras, Elie, 4,060,364, Cl. 425-174.000.
Societe Lignes Telegraphiques et Telephoniques: *See—*
Ernyei, Herbert, 4,060,774, Cl. 333-71.000.
Societe Paulstra: *See—*
Domer, Michel; and Hay, Jean-Yves, 4,060,331, Cl. 403-130.000.
Sogo Pharmaceutical Company Limited: *See—*
Uchikuga, Saburo; and Kuroki, Masataka, 4,060,551, Cl. 260-561.00S.
Solar Energy Dynamics Corporation: *See—*
Chayet, Emil L., 4,060,071, Cl. 126-271.000.
Solar Industries, Inc.: *See—*
Harter, Donald Gerton, 4,060,070, Cl. 126-271.000.
Solury, Thomas F. Coaxial cable cutting tool. 4,059,893, Cl. 30-90.100.
Sommer, Richard: *See—*
vor der Bruck, Dieter; Sommer, Richard; and Wolfrum, Gerhard, 4,060,521, Cl. 260-165.000.
Sommer, Werner: *See—*
Scheidl, Franz; and Sommer, Werner, 4,060,512, Cl. 260-45.80N.
Sonderegger, Hans Conrad: *See—*
Engeler, Paul; Baumgartner, Hans Ulrich; Dubendorfer, Ulrich; and Sonderegger, Hans Conrad, 4,059,999, Cl. 73-419.000.
Sony Corporation: *See—*
Nakamura, Tokio, 4,060,596, Cl. 423-633.000.
Sotoma, Koichi, to Kewpie Kabushiki Kaisha; and Toyo Shokuhin Kikai Kabushiki Kaisha. Filling quantity regulating system in container filling apparatus. 4,060,109, Cl. 141-83.000.
Sowards, Norman K., to Energy Products of Idaho. Low pollution incineration of solid waste. 4,060,041, Cl. 110-8.00F.
Spalten, Robert. Porcelain fused to metal denture tooth retainer. 4,059,901, Cl. 32-8.000.
Spaziante, Placido: *See—*
Giuffre, Luigi; de Nora, Vittorio; and Spaziante, Placido, 4,060,473, Cl. 204-253.000.
Speiser, Jeffrey M., to United States of America, Navy. Beam former using bessel sequences. 4,060,850, Cl. 364-819.000.
Sperry Rand Corporation: *See—*
Leh, David T., 4,059,888, Cl. 29-629.000.
Matthews, Hugh B., 4,059,959, Cl. 60-641.000.
Sprague Electric Company: *See—*
Coleman, James H., 4,060,649, Cl. 427-79.000.
Spresny, Sharon. Oven cleaning implement. 4,059,864, Cl. 15-105.000.
Spring, David John: *See—*
Watson, Hugh R.; Rowsell, David G.; and Spring, David John, 4,060,091, Cl. 131-9.000.
Staffe, Adolf: *See—*
Schmidt, Arthur H.; Lantzsch, Reinhard; Marhold, Albrecht; Lehment, Klaus-Friedrich; and Staffe, Adolf, 4,060,549, Cl. 260-543.00F.
Stahlecker, Fritz: *See—*
Bottcher, Dieter; Schulz, Heinz; and Stahlecker, Fritz, 4,059,946, Cl. 57-34.00R.
Stahlecker, Gerd, 4,059,947, Cl. 57-58.890.
Stahlecker, Gerd, to Stahlecker, Fritz; and Stahlecker, Hans. Open-end spinning unit. 4,059,947, Cl. 57-58.890.
Stahlecker, Hans: *See—*
Bottcher, Dieter; Schulz, Heinz; and Stahlecker, Fritz, 4,059,946, Cl. 57-34.00R.
Stahlecker, Gerd, 4,059,947, Cl. 57-58.890.
Stal-Laval Turbin AB: *See—*
Olsson, Karl Olof; and Wildheim, Jorgen, 4,060,707, Cl. 219-121.0LM.
Stamford, Xerox Corporation: *See—*
Frechette, Kenneth R., 4,060,162, Cl. 197-53.000.
Standard Oil Company, The: *See—*
Miller, Arthur F.; Zagata, Robert J.; and Grasselli, Robert K., 4,060,545, Cl. 560-208.000.
Standard Oil Company (Indiana): *See—*
Yahnke, Robert L., 4,060,566, Cl. 260-677.00A.
Standard Register Company, The: *See—*
Maierson, Theodore, 4,060,262, Cl. 282-27.500.
Stange, Klaus K.; and Hamlin, Thomas J., to Xerox Corporation. Cassette loaded sheet feeder for reproduction machine. 4,060,233, Cl. 271-160.000.
Stanley, Lester N.; and Farris, Russell E., to GAF Corporation. N-2-[N-(keto-tert-alkyl carbamyl)alkyl]phenylamines. 4,060,544, Cl. 260-465.00D.
Starcevic, Mihailo, to BBC Brown Boveri & Company Limited. Rotary electrical machine or vertical construction. 4,060,744, Cl. 310-91.000.
Starks, Charles M., to Continental Oil Company. Method for the preparation of trimethylhydroquinone. 4,060,561, Cl. 260-621.00F.
Starshinova, Larisa Alexandrovna: *See—*
Khromov-Borisov, Nikolai Vasilievich; Torf, Samuil Fedorovich; Cherepanova, Valentina Pavlovna; Danilov, Anatoly Fedorovich; and Starshinova, Larisa Alexandrovna, 4,060,652, Cl. 424-329.000.
Statz, Hermann: *See—*
Pucel, Robert A.; and Statz, Hermann, 4,060,820, Cl. 357-13.000.
Steckler, Robert, to Plastomedical Sciences, Inc. Cationic hydrogels based on hydroxyalkyl acrylates and methacrylates. 4,060,678, Cl. 526-260.000.
Steel Heddle Manufacturing Company: *See—*
Kaufmann, Frank H., 4,060,102, Cl. 139-91.000.
Stein, Charles R.; and Carl, William L., to General Electric Company. Method and apparatus for non-scan matrix addressing of bar displays. 4,060,801, Cl. 340-324.00R.
Steinberg, Jack: *See—*
Girdler, George W., 4,059,853, Cl. 2-152.00A.
Steiner, Adolf, to Daimler-Benz Aktiengesellschaft. Installation for the control of the brake force at wheels of motor vehicles. 4,060,284, Cl. 303-100.000.
Stendel, Wilhelm: *See—*
Enders, Edgar; and Stendel, Wilhelm, 4,060,628, Cl. 424-277.000.
Stenger, M. Antoine; Cousse, Henri; and Mouzin, M. Gilbert, to Pierre Fabre SA. Medicaments having psychotropic properties. 4,060,637, Cl. 424-324.000.
Stern, Philip. Fire alarm device. 4,060,800, Cl. 340-304.000.
Stevens, Henry C.: *See—*
Deli, Joseph; and Stevens, Henry C., 4,060,403, Cl. 71-90.000.
Steverlynck, Patrick A., to N.V. Weefautomaten Picanol. Slay for weaving looms. 4,060,104, Cl. 139-188.00R.
Stewart, S. Alan: *See—*
Funk, Richard S.; Stewart, S. Alan; and Ruff, David L., 4,059,933, Cl. 52-127.000.
Stiko B.V.: *See—*
van der Kolk, Albertus; and Stiller, Johannes-Gerhardus, 4,059,998, Cl. 73-368.200.
Stiller, Johannes-Gerhardus: *See—*
van der Kolk, Albertus; and Stiller, Johannes-Gerhardus, 4,059,998, Cl. 73-368.200.
Stobb, Anton Rudolph; and Stobb, Walter John. Apparatus and method for stacking sheets. 4,060,231, Cl. 271-80.000.
Stobb, Walter John: *See—*
Stobb, Anton Rudolph; and Stobb, Walter John, 4,060,231, Cl. 271-80.000.

Stoev, Stoycho Mitrev; Metodiev, Metodi Stoyanov; Kuzev, Lyubomir Vladimirov; Vedrichkov, Petko Georgiev; Sapunarov, Ivan Mitrev; Vassilev, Vassil Vladimirov; Dimitrov, Spas Petkov; Gasharov, Vihar Assenov; Russev, Sheko Kolev; and Mitrev, Kostadin Georgiev, to Vish Minno-Geoloshki Institute - NIS. Material treating apparatus including pneumo-hydraulic vibrator. 4,060,481, Cl. 209-170.000.
Stokowski, Stanley E.: *See—*
Byer, Norman E.; Stokowski, Stanley E.; and Venables, John D., 4,060,729, Cl. 250-338.000.
Stonner, Hans-Martin: *See—*
Garber, Alfred; Stonner, Hans-Martin; Wiesner, Paul; Sinclair, Alan; and Schmidt, Alfred, 4,060,591, Cl. 423-352.000.
Stork Brabant B.V.: *See—*
Vertegaal, Jacobus Gerardus, 4,060,382, Cl. 8-2.50A.
Storz, Karl. Endoscope with an operating device. 4,060,086, Cl. 128-303.150.
Stouls, Francois-Xavier Antoine: *See—*
Devimeux, Daniel Pierre Yvon; and Stouls, Francois-Xavier Antoine, 4,060,832, Cl. 358-133.000.
Stowe, Milton G.; and Brooks, Barry J., to WPC, Inc. Rod packing. 4,060,249, Cl. 277-24.000.
Strout, Theodore M. Panelling method. 4,060,437, Cl. 156-71.000.
Stubbe, Elie Jozef: *See—*
Carteus, Marc Felix Maurice; De Bruyne, Yvrs Marie Grovgrs; Lemmens, Jean Pierre Gustaaf Rosa; and Stubbe, Elie Jozef, 4,060,057, Cl. 122-451.00R.
Stuckmann, Dieter, to Gewerkschaft Eisenhutte Westfalia. Apparatus for and a method of laying a pipe line. 4,059,965, Cl. 61-105.000.
Stumphauzer, William C.: *See—*
Algeri, Harvey R.; and Stumphauzer, William C., 4,060,052, Cl. 118-2.000.
Sugahara, Yujiro; Noshi, Yoshibumi; Naito, Hiroyuki; and Nakamura, Seiichi, to Mizusawa Kagaku Kogyo Kabushiki Kaisha. Stabilizer composition for chlorine-containing polymers. 4,060,508, Cl. 260-23.0XA.
Sugai Chemical Industry Co., Ltd.: *See—*
Goto, Hideo; Shibamoto, Nobuyori; and Tanaka, Shunsaku, 4,060,559, Cl. 260-620.000.
Sukhorukov, Vasily Vasilievich: *See—*
Rogachev, Viktor Igorevich; Sukhorukov, Vasily Vasilievich; and Shkatov, Petr Nikolaevich, 4,060,760, Cl. 324-2.900.
Sukornick, Bernard: *See—*
Peterson, James Oliver; Sukornick, Bernard; Sweeney, Richard Francis; Nychka, Henry R.; Eibeck, Richard E.; and Berenbaum, Morris B., 4,060,555, Cl. 260-586.00R.
Sumitomo Chemical Company, Limited: *See—*
Kimura, Michio; Inaba, Shigeho; and Yamamoto, Hisao, 4,060,550, Cl. 260-340.50R.
Takahashi, Shigeo; Ito, Michio; Nagasawa, Sakae; and Suzuki, Sigeo, 4,060,120, Cl. 164-35.000.
Yasui, Seimei; and Sato, Hiroshi, 4,060,492, Cl. 252-59.000.
Sumitomo Electric Industries, Ltd.: *See—*
Matsubara, Hironaga; and Yamanouchi, Shousuke, 4,060,659, Cl. 428-379.000.
Sunarrow Koski, Co., Ltd.: *See—*
Kuroda, Yoshiyuki, 4,060,185, Cl. 224-4.00F.
Sundermann, Rudolf, to Bayer Aktiengesellschaft. Aromatic cyanic acid esters. 4,060,541, Cl. 260-453.0AR.
Sundstrand Corporation: *See—*
Linscott, Phillip S., Jr., 4,060,745, Cl. 310-156.000.
Sundstrand Data Control, Inc.: *See—*
Bateman, Charles Donald, 4,060,793, Cl. 340-27.00R.
Surber, John L., Jr. Stamp dispensing apparatus. 4,060,177, Cl. 221-25.000.
Sureau, Robert Frederic Michel: *See—*
Domergue, Annick Marthe Suzanne Simone; and Sureau, Robert Frederic Michel, 4,060,531, Cl. 260-308.00R.
Survival Technology, Inc.: *See—*
Reinhold, Herbert E., Jr., 4,060,079, Cl. 128-145.800.
Suzuki, Jiro: *See—*
Iizuka, Masahiko; Suzuki, Jiro; and Kobayashi, Sigeyasu, 4,060,457, Cl. 195-127.000.
Suzuki, Matsumi; Morino, Tetsuro; and Yokota, Shozo, to Fuji Xerox Co., Ltd. Speech recognition method and apparatus adapted to a plurality of different speakers. 4,060,694, Cl. 179-1.0SD.
Suzuki, Matsumi; Kataoka, Hiroyuki; and Ueno, Keiichi, to Fuji Xerox Co., Ltd. Speaker identification system using peak value envelop lines of vocal waveforms. 4,060,695, Cl. 179-1.0SB.
Suzuki, Sigeo: *See—*
Takahashi, Shigeo; Ito, Michio; Nagasawa, Sakae; and Suzuki, Sigeo, 4,060,120, Cl. 164-35.000.
Suzuki, Taneko, to Tokai Regional Fisheries Research Laboratory. Concentrated proteinaceous food material from marine animal meat. 4,060,642, Cl. 426-104.000.
Swager, William E. Clamping device with locking trigger arm. 4,059,871, Cl. 24-134.00R.
Swaminathan, Krishnaiyer, to American Optical Corporation. Achromatic aplanatic condenser. 4,060,306, Cl. 350-87.000.
Sweeney, Richard F.; and Peterson, James O., to Allied Chemical Corporation. Preparation of 1,1,1-trifluoro-2,2-dichloroethane. 4,060,469, Cl. 204-163.00R.
Sweeney, Richard Francis: *See—*
Peterson, James Oliver; Sukornick, Bernard; Sweeney, Richard Francis; Nychka, Henry R.; Eibeck, Richard E.; and Berenbaum, Morris B., 4,060,555, Cl. 260-586.00R.
Swoager, Jon R., to Automation Equipment, Inc. Convertible rail-highway shuttle car. 4,060,035, Cl. 105-177.000.
System Development Corporation: *See—*
Magenheim, Bertram, 4,060,212, Cl. 244-134.00D.
Szymanski, Edward: *See—*
Raff, Frederick L.; and Szymanski, Edward, 4,060,339, Cl. 417-2.000.
Tachihara, Noribumi; Mizohata, Yukio; and Makita, Jun-ichi, to Copal Company Limited. Light diffusing device. 4,059,916, Cl. 40-130.00K.
Taiyo Kogyo Company Limited: *See—*
Nohmura, Ryotaro; Tazaki, Eiji; and Sato, Akio, 4,060,119, Cl. 160-266.000.
Takada, Juichiro, to Takata Kojyo Co., Ltd. Retraction locking safety belt retractor. 4,060,211, Cl. 242-107.700.
Takahashi, Hirokazu: *See—*
Tashiro, Norio; and Takahashi, Hirokazu, 4,060,750, Cl. 315-39.510.
Takahashi, Shigeo; Ito, Michio; Nagasawa, Sakae; and Suzuki, Sigeo, to Matsumoto Dental College; and Sumitomo Chemical Company, Limited. Investment casting process of chromium-cobalt and/or nickel alloys. 4,060,120, Cl. 164-35.000.
Takahashi, Shinobu: *See—*
Nakatsukasa, Kazuo; Murata, Kazuo; Ohkubo, Tetsuo; Yurugi, Masayoshi; and Takahashi, Shinobu, 4,060,851, Cl. 364-900.000.
Takahashi, Teruo: *See—*
Naka, Kiyomi; and Takahashi, Teruo, 4,060,656, Cl. 428-355.000.
Takami, Akihiro; Kuroda, Takayuki; Nagano, Katsuo; and Matsuoka, Michio, to Matsushita Electric Industrial Co., Ltd. Voltage-dependent resistor. 4,060,661, Cl. 428-432.000.
Takano, Hiroshi: *See—*
Shimizu, Kazufusa; Katsumori, Shigeo; Nishikawa, Tadaaki; Senoo, Keisaku; Sakamaki, Kenji; Fujita, Makio; Tano, Teruo; Takano, Hiroshi; and Komori, Hideo, 4,060,390, Cl. 23-259.100.
Takasuga, Kenji, to Kewpie Kabushiki Kaisha; and Toyo Shokuhin Kikai Kabushiki Kaisha. Method and system for preventing containerless discharging of filling material in container filling apparatus. 4,060,106, Cl. 141-1.000.
Takata Kojyo Co., Ltd.: *See—*
Takada, Juichiro, 4,060,211, Cl. 242-107.700.
Takeda Chemical Industries, Ltd.: *See—*
Sato, Yukio; Wada, Seijun; and Matsuzawa, Shigetaka, 4,060,597, Cl. 424-12.000.
Takei, Akira: *See—*
Togei, Ryoiku; Takei, Akira; Hika, Yoshihiko; and Wada, Kunihiko, 4,060,796, Cl. 365-183.000.
Takeuchi, Masato: *See—*
Kawagoshi, Hiroshi; Takeuchi, Masato; and Nakajima, Fumito, 4,060,498, Cl. 252-373.000.
Talsma, Tjitte: *See—*
Corbeij, Peter H. J.; and Talsma, Tjitte, 4,060,836, Cl. 358-248.000.
Tamminen, Pentti Juuse. Alkaline flat cell battery. 4,060,670, Cl. 429-154.000.
Tanaka, Akio, to Zenith Radio Corporation. Memory tuning system with dual speed programming. 4,060,768, Cl. 325-464.000.
Tanaka, Shunsaku: *See—*
Goto, Hideo; Shibamoto, Nobuyori; and Tanaka, Shunsaku, 4,060,559, Cl. 260-620.000.
Tano, Teruo: *See—*
Shimizu, Kazufusa; Katsumori, Shigeo; Nishikawa, Tadaaki; Senoo, Keisaku; Sakamaki, Kenji; Fujita, Makio; Tano, Teruo; Takano, Hiroshi; and Komori, Hideo, 4,060,390, Cl. 23-259.100.
Tapp, Frederick, to Karl Kroyer St. Anne's Limited. Apparatus for dry forming a layer of fiber. 4,060,360, Cl. 425-83.000.
Tasch, Al F., Jr; Frye, Robert Charles; Fu, Horng-Sen; and Brodersen, Robert W., to Texas Instruments Incorporated. Charge coupled device random access memory. 4,060,738, Cl. 307-238.000.
Tashiro, Norio; and Takahashi, Hirokazu, to Tokyo Shibaura Electric Co., Ltd. Compact magnetron with small axial length and slot antenna output attached thereto. 4,060,750, Cl. 315-39.510.
Tassone, Joseph V.: *See—*
Santos, John J., Jr.; and Tassone, Joseph V., 4,059,861, Cl. 12-145.000.
Tatsuno, Kenzou: *See—*
Asari, Akira; and Tatsuno, Kenzou, 4,059,896, Cl. 29-403.000.
Tauscher, Manfred: *See—*
Credner, Karl; Geisel, Berthold; Brenner, Gunter; and Tauscher, Manfred, 4,060,617, Cl. 424-253.000.
Taylor-Brown, Terence John; Calver, Paul Newton; and Jack, James, deceased (by Jack, Margaret, administratrix), to Union Carbide Corporation. Surface coating process. 4,060,648, Cl. 427-32.000.
Taylor, Oren M. Trailer hitch for a tobacco harvester. 4,059,941, Cl. 56-27.500.
Tazaki, Eiji: *See—*
Nohmura, Ryotaro; Tazaki, Eiji; and Sato, Akio, 4,060,119, Cl. 160-266.000.
Tazuma, James J.; and Bergomi, Angelo, to Goodyear Tire & Rubber Company, The. Method of reducing α-acetylene content of hydrocarbon. 4,060,567, Cl. 260-681.50C.
Technigaz: *See—*
Kotcharian, Michel, 4,060,263, Cl. 285-47.000.
Tecneco S.p.A.: *See—*
Tirabassi, Tiziano; Giovanelli, Giorgio; Cesari, Giulio; Bonafe, Ubaldo; and Antisari, Ottavio Vittori, 4,060,326, Cl. 356-96.000.
Teijin Limited: *See—*
Kuratsuji, Takatoshi; Kawase, Shoji; and Shima, Takeo, 4,060,516, Cl. 260-75.00T.
Naka, Kiyomi; and Takahashi, Teruo, 4,060,656, Cl. 428-355.000.

Uchiyama, Shuichi; Utsunomiya, Satoshi; and Watase, Hideo, 4,060,451, Cl. 162-157.00R.
Telefonaktiebolaget L M Ericsson: *See—*
Magnusson, Sten Evert, 4,060,700, Cl. 179-28.000.
Tenneco Chemicals, Inc.: *See—*
Cinco, Salvatore A., 4,060,535, Cl. 260-414.000.
Ternikova, Tamara Alexandrovna: *See—*
Savin, Nikolai Ivanovich; Ternikova, Tamara Alexandrovna; Filippov, Vladimir Jurievich; and Shiryaev, Vladimir Ivanovich, 4,060,127, Cl. 165-145.000.
Tessler, Martin M., to National Starch and Chemical Corporation. Preparation of cationic starches and cathionic starches thus produced. 4,060,683, Cl. 536-50.000.
Teti, John J., to Pyott-Boone Machinery Corporation. Combined accelerator and brake assembly. 4,060,144, Cl. 180-77.00R.
Tetra Pak International AB: *See—*
Balla, Gyula, 4,060,443, Cl. 156-380.000.
Texaco Development Corporation: *See—*
Naylor, Carter G.; and Yeakey, Ernest L., 4,060,501, Cl. 252-548.000.
Texaco Inc.: *See—*
Castagnos, Leonce F., Jr.; and Pratt, Roy E., 4,060,395, Cl. 23-288.00B.
Dowling, Donald J.; and Schoen, William, 4,059,987, Cl. 73-61.10R.
Macaluso, Anthony, Sr.; and Kuntschik, Lawrence F., 4,060,557, Cl. 260-604.0HF.
Powers, John R., 4,059,877, Cl. 29-157.00R.
Texaco Trinidad, Inc.: *See—*
Hart, Joseph I., 4,060,130, Cl. 166-312.000.
Texas Instruments Incorporated: *See—*
Gosney, William Milton, 4,060,737, Cl. 307-221.00D.
Jones, James J., 4,060,285, Cl. 303-106.000.
Meadows, Robert Alan, 4,060,839, Cl. 360-99.000.
Tasch, Al F., Jr; Frye, Robert Charles; Fu, Horng-Sen; and Brodersen, Robert W., 4,060,738, Cl. 307-238.000.
Textron Inc.: *See—*
Chmura, William J.; Slusarski, Ronald S.; and Burk, Charles B., 4,059,879, Cl. 29-148.40R.
Theis, James V., Jr.; McCord, John B.; and Holly, Harry H., to Hollymatic Corporation. Fluid engine. 4,060,336, Cl. 415-80.000.
Theysohn, Ernestine, administratrix: *See—*
Theysohn, Helmuth; and Theysohn, Ernestine, administratrix, 4,060,368, Cl. 425-376.00B.
Theysohn, Helmuth; and by Theysohn, Ernestine, administratrix. Flat-sheet injection head. 4,060,368, Cl. 425-376.00B.
Thiele, Alfred W.: *See—*
Pekrul, Paul J.; and Thiele, Alfred W., 4,060,716, Cl. 364-576.000.
Thiokol Corporation: *See—*
Paul, Henry Neil, 3rd, 4,060,570, Cl. 260-889.000.
Thomas, George L., to General Electric Company. High-temperature glass composition. 4,060,423, Cl. 106-52.000.
Thompson, Arnold M., to Gold Lode, Inc. Ski-renovating or conditioning tool. 4,060,013, Cl. 76-83.000.
Thorp, Lawrence D.: *See—*
Jacobowitz, Lawrence; Mathisen, Einar S.; and Thorp, Lawrence D., 4,060,327, Cl. 356-96.000.
Thumm, Hans: *See—*
Hartmann, Achim; Kulling, Achim; and Thumm, Hans, 4,060,584, Cl. 423-149.000.
Thyssen Edelstahlwerke Aktiengesellschaft: *See—*
Brandis, Helmut; Von Den Steinen, Albert; and Engineer, Serosh, 4,060,431, Cl. 148-36.000.
Tiersten, Harry Frank; and Smythe, Robert Chastain, to Piezo Technology Inc. Guided elastic surface wave filter. 4,060,777, Cl. 333-72.000.
Tilley, Leslie Joseph; and Dugdale, Bernard, to Forth Instruments Limited. Apparatus for measuring irregular areas and thicknesses. 4,060,734, Cl. 250-560.000.
Timochko, Michael J.: *See—*
Kerr, John L.; and Timochko, Michael J., 4,060,810, Cl. 343-700.0MS.
Tirabassi, Tiziano; Giovanelli, Giorgio; Cesari, Giulio; Bonafe, Ubaldo; and Antisari, Ottavio Vittori, to Tecneco S.p.A. Optical instrument for measuring concentrations of polluting gases on long and short geometrical paths. 4,060,326, Cl. 356-96.000.
Tobe, Akihiro: *See—*
Kikumoto, Ryoji; Tobe, Akihiro; Tonomura, Shinji; and Ikoma, Hidenobu, 4,060,612, Cl. 424-248.520.
Kikumoto, Ryoji; Tobe, Akihiro; Tonomura, Shinji; and Ikoma, Hidenobu, 4,060,641, Cl. 424-330.000.
Tobiasson, John R. Container lid-spoon combination. 4,060,176, Cl. 220-212.000.
Togei, Ryoiku; Takei, Akira; Hika, Yoshihiko; and Wada, Kunihiko, to Fujitsu Limited. Semiconductor memory device. 4,060,796, Cl. 365-183.000.
Tokai Regional Fisheries Research Laboratory: *See—*
Suzuki, Taneko, 4,060,642, Cl. 426-104.000.
Tokiwa, Taisuke: *See—*
Hirayama, Kazuhiro; Sato, Yasushi; Tokiwa, Taisuke; Kawakubo, Kazuo; Iwatate, Fujio; and Nakatsui, Hisashi, 4,060,322, Cl. 355-60.000.
Hirayama, Kazuhiro; Sato, Yasushi; Tokiwa, Taisuke; Iwatate, Fujio; Kawakubo, Kazuo; and Nakatsui, Hisashi, 4,060,323, Cl. 355-60.000.
Tokuda, Shingo: *See—*
Yokota, Noriyuki; Tokuda, Shingo; Ito, Yoshiro; and Itaya, Kenji, 4,060,465, Cl. 204-128.000.
Tokura, Yukio: *See—*
Doi, Yasuhiko; Tokura, Yukio; and Imaizumi, Koji, 4,060,320, Cl. 355-3.00R.
Tokyo Shibaura Electric Co., Ltd.: *See—*
Hata, Masaaki; and Wada, Sotaro, 4,060,773, Cl. 332-19.000.
Matsuki, Koji, 4,060,802, Cl. 340-324.00M.
Tashiro, Norio; and Takahashi, Hirokazu, 4,060,750, Cl. 315-39.510.
Yamada, Hisashi; and Horiko, Yoshinori, 4,060,772, Cl. 331-116.00R.
Tomiita, Kazuo: *See—*
Negishi, Takao; and Tomiita, Kazuo, 4,059,950, Cl. 57-140.00J.
Tomita, Kazuo; Murakami, Tadashi; Yamazaki, Yoshio; and Honma, Toyokuni, to Sankyo Company Limited. Isoxazolone derivatives, their preparation and their use as plant growth regulators. 4,060,402, Cl. 71-76.000.
Tomita, Tomiichi, to Sanwa Seiki Kabushiki Kaisha. Sprinkler head. 4,060,201, Cl. 239-553.000.
Tomizawa, Masaharu: *See—*
Akimoto, Minoru; and Tomizawa, Masaharu, 4,060,353, Cl. 418-102.000.
Tomkiewicz, Thaddeus K., to Molex Incorporated. Zero insertion force printed circuit board edge connector assembly. 4,060,295, Cl. 339-17.0LC.
Tonomura, Shinji: *See—*
Kikumoto, Ryoji; Tobe, Akihiro; Tonomura, Shinji; and Ikoma, Hidenobu, 4,060,612, Cl. 424-248.520.
Kikumoto, Ryoji; Tobe, Akihiro; Tonomura, Shinji; and Ikoma, Hidenobu, 4,060,641, Cl. 424-330.000.
Toray Industries, Inc.: *See—*
Negishi, Takao; and Tomiita, Kazuo, 4,059,950, Cl. 57-140.00J.
Torf, Samuil Fedorovich: *See—*
Khromov-Borisov, Nikolai Vasilievich; Torf, Samuil Fedorovich; Cherepanova, Valentina Pavlovna; Danilov, Anatoly Fedorovich; and Starshinova, Larisa Alexandrovna, 4,060,652, Cl. 424-329.000.
Towmotor Corporation: *See—*
Chelin, Charles R.; and Hickman, Alan J., 4,060,151, Cl. 187-95.000.
Toyo Shokuhin Kikai Kabushiki Kaisha: *See—*
Sotoma, Koichi, 4,060,109, Cl. 141-83.000.
Takasuga, Kenji, 4,060,106, Cl. 141-1.000.
Toyo Soda Manufacturing Co., Ltd.: *See—*
Nishimura, Yoshiki; Sakiyama, Kazutaka; Adachi, Tadao; and Harada, Kenji, 4,060,389, Cl. 23-252.00A.
Toyosawa, Koki: *See—*
Harumiya, Akinori; and Toyosawa, Koki, 4,060,795, Cl. 364-900.000.
Toyota Jidosha Kogyo Kabushiki Kaisha: *See—*
Hirasawa, Koichi, 4,060,063, Cl. 123-97.00B.
Tracy, Chester Edwin: *See—*
Carlson, David Emil; and Tracy, Chester Edwin, 4,060,660, Cl. 428-408.000.
Tratz, Herbert; Kelp, Fritz; and Netsch, Erich, to Kraftwerk Union Aktiengesellschaft. Feedwater preheater with two steam chambers. 4,060,124, Cl. 165-110.000.
Tremain, David L.; Beach, Burt L.; and Hadley, James C., to Houdaille Industries, Inc. Automatic auxiliary jet sump pump. 4,060,341, Cl. 417-182.500.
Treptow, Wolfram; and Wunsch, Gerd, to BASF Aktiengesellschaft. Anode for electrochemical processes. 4,060,476, Cl. 204-290.00F.
Tress, Norwood E.; and Orsinger, Winston A., to Bell & Howell Company. Pull-foot feed. 4,060,228, Cl. 271-14.000.
Triangle Package Machinery Co.: *See—*
Connors, Robert Harvey, 4,060,736, Cl. 307-141.000.
Trimble, David Lee; Copley, Russell Dean; Jensen, James Keith; and Schlueter, Francis Edward, to Deere & Company. Cotton harvester. 4,059,942, Cl. 56-30.000.
Trolle, Sten; and Jonson, Ake, to AB Carbox. Isostatic press. 4,060,359, Cl. 425-78.000.
Trott, David H., to Crossbow, Inc. Meat thermometer. 4,059,997, Cl. 73-352.000.
True, Howard D. F., Jr., to General Electric Company. Airflow distribution arrangement for a side-by-side refrigerator. 4,059,966, Cl. 62-414.000.
TRW Inc.: *See—*
Merz, Kenneth M.; and Shapiro, Howard E., 4,060,663, Cl. 428-428.000.
Wieland, Howard N., Jr., 4,060,180, Cl. 222-146.0HE.
Tschek, Wolfgang: *See—*
Lohr, Alfred; and Tschek, Wolfgang, 4,060,026, Cl. 99-346.000.
Tsubuko, Kazuo; Kimura, Taro; Hashimoto, Junichiro; and Kurotori, Tsuneo, to Ricoh Co., Ltd. Liquid electrostatic developer. 4,060,493, Cl. 252-62.10L.
Tsuchiya, Osamu: *See—*
Umezawa, Hamao; Umezawa, Sumio; Tsuchiya, Osamu; Akita, Eiichi; Miyazawa, Takeo; Horiuchi, Yukio; and Fukatsu, Shunzo, 4,060,682, Cl. 536-10.000.
Tsukamoto, Kotaro. Coil holding device. 4,060,209, Cl. 242-54.00R.
Tsutsui, Katsuhiko; Miura, Heihachi; and Miyano, Yukio, to Honda Giken Kogyo Kabushiki Kaisha. Carburetor choke valve control system apparatus. 4,060,062, Cl. 123-75.00B.
Turner, John W., Jr., to Joy Manufacturing Company. Power tong. 4,060,014, Cl. 81-57.200.

Turner Research, Inc.: *See—*
Turner, William F., 4,060,060, Cl. 123-43.00A.
Turner, Warren E.: *See—*
Dreibelbis, Richard C.; and Turner, Warren E., 4,060,198, Cl. 239-24.000.
Turner, William F., to Turner Research, Inc. Valving system for compressors, engines and the like. 4,060,060, Cl. 123-43.00A.
U. Scharer Sohne AG, (USM): *See—*
Haller, Fritz, 4,059,937, Cl. 52-693.000.
Uchikuga, Saburo; and Kuroki, Masataka, to Sogo Pharmaceutical Company Limited. Method of producing pantethine. 4,060,551, Cl. 260-561.00S.
Uchiyama, Shuichi; Utsunomiya, Satoshi; and Watase, Hideo, to Teijin Limited. Polyamide-imide and mica pulp particles and paper-like sheets made therefrom. 4,060,451, Cl. 162-157.00R.
Ucikawa, Hiroshi: *See—*
Harada, Yutaka; Itai, Noriyuki; Ucikawa, Hiroshi; Kato, Hajime; Sato, Katutoshi; and Itoh, Akira, 4,060,425, Cl. 106-90.000.
Udovenko, Vitaly Kirillovich: *See—*
Kaporovich, Vladimir Georgievich; Udovenko, Vitaly Kirillovich; Krasnorutsky, Viktor Petrovich; and Chechenets, Akhmet Galievich, 4,059,977, Cl. 72-69.000.
Ueda, Shozo: *See—*
Miyazaki, Tsutomu; Yoshida, Yoshiaki; Ueda, Shozo; Mitsuya, Kinpei; and Ogasawara, Takeshi, 4,060,207, Cl. 242-18.00R.
Ueno, Keiichi: *See—*
Suzuki, Matsumi; Kataoka, Hiroyuki; and Ueno, Keiichi, 4,060,695, Cl. 179-1.0SB.
Uhlarik, William J., to International Telephone and Telegraph Corporation. Fluid leak detector. 4,059,984, Cl. 73-40.50R.
Uhlirsch, Kurt; and Lindhuber, Hermann, to Vereinigte Metallwerke Ranshofen-Berndorf Aktiengesellschaft. Cooling tower and wall structure therefor. 4,060,575, Cl. 261-111.000.
Ultra-Centrifuge Nederland N.V.: *See—*
van Heel, Hubertus Johannes Gerardus; Bruins, Victor Leonard; and Smid, Joost, 4,060,391, Cl. 23-264.000.
Umeda, Hiroyuki, to Victor Company of Japan, Limited. Recording and/or reproducing apparatus having adjustable tape guide mechanism. 4,060,840, Cl. 360-130.000.
Umehara, Akira: *See—*
Maekawa, Yukio; Satomura, Masato; and Umehara, Akira, 4,060,685, Cl. 542-413.000.
Umezawa, Hamao; Umezawa, Sumio; Tsuchiya, Osamu; Akita, Eiichi; Miyazawa, Takeo; Horiuchi, Yukio; and Fukatsu, Shunzo, to Meiji Seika Kaisha, Ltd. Process for the synthetic production of 3-deoxy derivative of an aminoglycosidic antibiotic. 4,060,682, Cl. 536-10.000.
Umezawa, Sumio: *See—*
Umezawa, Hamao; Umezawa, Sumio; Tsuchiya, Osamu; Akita, Eiichi; Miyazawa, Takeo; Horiuchi, Yukio; and Fukatsu, Shunzo, 4,060,682, Cl. 536-10.000.
Union Carbide Corporation: *See—*
Meyerhoff, Robert Wagner, 4,060,693, Cl. 174-126.00S.
Rosemund, Walter Richard; and Rose, Charles Vincent, 4,060,439, Cl. 156-78.000.
Smith, George Edwin, 4,060,167, Cl. 198-622.000.
Taylor-Brown, Terence John; Calver, Paul Newton; and Jack, James, deceased, 4,060,648, Cl. 427-32.000.
Union Oil Company of California: *See—*
Bernard, George G., 4,060,490, Cl. 252-8.55D.
Fenton, Donald M.; and Vaell, Raoul P., 4,060,594, Cl. 423-573.00R.
Hass, Robert H.; and Gibson, Michael H., 4,060,589, Cl. 423-244.000.
Unisearch Limited: *See—*
Edwards, Ronald Alexander Nixon; and Manrique, Jorge, 4,060,203, Cl. 241-7.000.
United Aircraft Products, Inc.: *See—*
Wunder, John E., 4,059,882, Cl. 29-157.30A.
United States of America
Army: *See—*
Kerr, John L.; and Timochko, Michael J., 4,060,810, Cl. 343-700.0MS.
Lohrmann, Dieter, 4,060,767, Cl. 325-363.000.
Walters, David F., 4,060,170, Cl. 214-331.000.
Navy: *See—*
Raff, Samuel J., 4,060,790, Cl. 340-3.00R.
Schloemann, Ernst Fritz Rudolf August; and Van Hook, Harry Jerrold, 4,060,798, Cl. 365-25.000.
Sherwood, Theodore R., 4,059,890, Cl. 29-739.000.
Speiser, Jeffrey M., 4,060,850, Cl. 364-819.000.
U.S. Philips Corporation: *See—*
Corbeij, Peter H. J.; and Talsma, Tjitte, 4,060,836, Cl. 358-248.000.
Lakerveld, Herman Gerard; van Rosmalen, Gerard Eduard; Bulthius, Kornelis; and Sinjou, Johannes Petrus, 4,060,248, Cl. 274-41.60R.
Meermans, Jos Louis Hubert, 4,060,838, Cl. 360-96.000.
Naastepad, Pieter Aart; and de Ruiter, Jacob Willem, 4,060,692, Cl. 13-26.000.
Welle, Hendricus Bernardus Antonius; and Claassen, Volkert, 4,060,631, Cl. 424-304.000.
United States Steel Corporation: *See—*
Raff, Frederick L.; and Szymanski, Edward, 4,060,339, Cl. 417-2.000.
United States Surgical Corporation: *See—*
Noiles, Douglas G., 4,060,089, Cl. 128-325.000.
United Technologies Corporation: *See—*
Conn, Michael L., 4,060,846, Cl. 361-193.000.
University of California, The Regents of the: *See—*
Bettencourt, Thomas S.; and Marshall, Lowell K., 4,060,133, Cl. 171-1.000.
Rapoport, Henry; and Snyder, Clinton D., 4,060,558, Cl. 260-613.00D.
University of Illinois Foundation: *See—*
Bauman, Dale E.; Collier, Robert J.; and Hays, Ray L., 4,060,620, Cl. 424-262.000.
Bergeron, Clifton G.; and Herron, Lester W., 4,060,662, Cl. 428-450.000.
University of Notre Dame du Lac: *See—*
D'Alelio, Gaetano Francis, 4,060,515, Cl. 260-63.00R.
Upjohn Company, The: *See—*
Bundy, Gordon L., 4,060,534, Cl. 260-408.000.
Urciuoli, John P.; and Icart, Roger P., to Raytheon Company. Recorder with edge-guided belt. 4,060,814, Cl. 346-139.00A.
Urquhart, John: *See—*
Chandrasekaran, Santosh Kumar; Urquhart, John; and Shaw, Jane Elizabeth, 4,060,084, Cl. 128-260.000.
Ushio, Shintaro: *See—*
Ataka, Hisashi; Wako, Shigeo; and Ushio, Shintaro, 4,060,699, Cl. 179-18.0GF.
USM Corporation: *See—*
Holloway, David John, 4,059,981, Cl. 72-391.000.
Usui International Industry, Ltd.: *See—*
Kikuchi, Yasuhei, 4,060,158, Cl. 192-82.00T.
Utsunomiya, Satoshi: *See—*
Uchiyama, Shuichi; Utsunomiya, Satoshi; and Watase, Hideo, 4,060,451, Cl. 162-157.00R.
Vaell, Raoul P.: *See—*
Fenton, Donald M.; and Vaell, Raoul P., 4,060,594, Cl. 423-573.00R.
Vahle, Erwin; and Hartig, Arnold, to Singer Company, The. Presser bar pressure regulating module. 4,060,045, Cl. 112-235.000.
Vahlensieck, Hans-Joachim: *See—*
Kotzsch, Hans-Joachim; and Vahlensieck, Hans-Joachim, 4,060,536, Cl. 260-448.20E.
Kotzsch, Hans Joachim; Vahlensieck, Hans-Joachim; and Seiler, Claus-Dieter, 4,060,538, Cl. 260-448.80R.
Seiler, Claus-Dietrich; Vahlensieck, Hans-Joachim; and Amort, Jurgen, 4,060,539, Cl. 260-448.80R.
Valdettaro, Alarico A., to Sarkes Tarzian, Inc. Indicator simulating a seven-segment readout device. 4,060,051, Cl. 116-124.10A.
Valleylab, Inc.: *See—*
Morrison, Charles F., Jr.; Harris, Frank W.; and Patzer, Michael D., 4,060,088, Cl. 128-303.170.
Vallourec (Usines a Tubes de Lorraine-Escaut et Vallourec Reunies): *See—*
Verdickt, Jacques, 4,060,727, Cl. 250-358.00P.
van Barneveld, Willem: *See—*
van Nunen, Petrus J. M.; and van Barneveld, Willem, 4,060,415, Cl. 96-1.800.
Van Daele, Georges Henri Paul: *See—*
Janssen, Paul Adriaan Jan; Van Daele, Georges Henri Paul; and Boey, Jozef Martin, 4,060,528, Cl. 260-295.00R.
Van Den Houte, Jozef Willy: *See—*
Van Royen, Freddy Ghisleen; Mertens, Ludovicus Maria; and Van Den Houte, Jozef Willy, 4,060,416, Cl. 96-48.00R.
van der Burgt, Maarten J.: *See—*
Buiter, Pieter; van der Burgt, Maarten J.; and Van Helden, Henricus J. A., 4,060,397, Cl. 48-197.00R.
van der Kolk, Albertus; and Stiller, Johannes-Gerhardus, to Stiko B.V. Gas pressure thermometer, and apparatus for application in a gas pressure thermometer. 4,059,998, Cl. 73-368.200.
van der Lely, Cornelis. Soil cultivating implements. 4,060,134, Cl. 172-59.000.
VanderVelden, Richard J., to Medtronic, Inc. Battery seal for encapsulatable cell. 4,060,671, Cl. 429-174.000.
VanDrunen, Gerrit: *See—*
Mazzei, Peter J.; and VanDrunen, Gerrit, 4,060,413, Cl. 75-208.00R.
van Heel, Hubertus Johannes Gerardus; Bruins, Victor Leonard; and Smid, Joost, to Ultra-Centrifuge Nederland N.V. Apparatus for precipitating and separating a material in a solid form from a gaseous mixture. 4,060,391, Cl. 23-264.000.
Van Helden, Henricus J. A.: *See—*
Buiter, Pieter; van der Burgt, Maarten J.; and Van Helden, Henricus J. A., 4,060,397, Cl. 48-197.00R.
van Heyningen, Arent H. Kits, to Raytheon Company. Hard clipped beam former. 4,060,792, Cl. 340-6.00R.
Van Hook, Harry Jerrold: *See—*
Schloemann, Ernst Fritz Rudolf August; and Van Hook, Harry Jerrold, 4,060,798, Cl. 365-25.000.
Van Loo, William Rudolph, to American Seating Company. Flame-resistant cushion. 4,060,280, Cl. 297-452.000.
van Nunen, Petrus J. M.; and van Barneveld, Willem, to Oce-van der Grinten, N.V. Electrophotographic process. 4,060,415, Cl. 96-1.800.
van Rosmalen, Gerard Eduard: *See—*
Lakerveld, Herman Gerard; van Rosmalen, Gerard Eduard; Bulthius, Kornelis; and Sinjou, Johannes Petrus, 4,060,248, Cl. 274-41.60R.
Van Royen, Freddy Ghisleen; Mertens, Ludovicus Maria; and Van Den Houte, Jozef Willy, to AGFA-GEVAERT N.V. Stabilization of free-radical photosensitive materials. 4,060,416, Cl. 96-48.00R.

Varcadipane, Richard: *See—*
Pitkin, Sheldon; Varcadipane, Richard; and Poppe, Walter H., 4,060,222, Cl. 256-50.000.
Vargo, Joseph, Jr.; and Davern, John W., to General-Electro Mechanical Corporation. Slug riveting apparatus. 4,060,189, Cl. 227-53.000.
Varo, Inc.: *See—*
Flynt, William E., 4,060,328, Cl. 356-124.000.
Varta Batterie Aktiengesellschaft: *See—*
Lauck, Helmut, 4,060,675, Cl. 429-194.000.
Vassilev, Vassil Vladimirov: *See—*
Stoev, Stoycho Mitrev; Metodiev, Metodi Stoyanov; Kuzev, Lyubomir Vladimirov; Vedrichkov, Petko Georgiev; Sapunarov, Ivan Mitrev; Vassilev, Vassil Vladimirov; Dimitrov, Spas Petkov; Gasharov, Vihar Assenov; Russev, Sheko Kolev; and Mitrev, Kostadin Georgiev, 4,060,481, Cl. 209-170.000.
Vedrichkov, Petko Georgiev: *See—*
Stoev, Stoycho Mitrev; Metodiev, Metodi Stoyanov; Kuzev, Lyubomir Vladimirov; Vedrichkov, Petko Georgiev; Sapunarov, Ivan Mitrev; Vassilev, Vassil Vladimirov; Dimitrov, Spas Petkov; Gasharov, Vihar Assenov; Russev, Sheko Kolev; and Mitrev, Kostadin Georgiev, 4,060,481, Cl. 209-170.000.
Veeneman, John L.: *See—*
Shatila, Mounir A.; Veeneman, John L.; Lach, John H.; and Harmon, James F., 4,060,367, Cl. 425-311.000.
Vegella, George. Dual lip rod wiping seal. 4,060,023, Cl. 92-168.000.
Venables, John D.: *See—*
Byer, Norman E.; Stokowski, Stanley E.; and Venables, John D., 4,060,729, Cl. 250-338.000.
Vepa AG: *See—*
Fleissner, Hans, 4,059,974, Cl. 68-15.000.
Verbanac, Frank, to A. E. Staley Manufacturing Company. Starch acrylamides and the method for preparing the same. 4,060,506, Cl. 260-17.4GC.
Verdickt, Jacques, to Vallourec (Usines a Tubes de Lorraine-Escaut et Vallourec Reunies). Method and apparatus for the radiographic inspection of tubes. 4,060,727, Cl. 250-358.00P.
Vereinigte Metallwerke Ranshofen-Berndorf Aktiengesellschaft: *See—*
Uhlirsch, Kurt; and Lindhuber, Hermann, 4,060,575, Cl. 261-111.000.
Verhoeven, Gerardus H. Th. M.: *See—*
Schoute, Bernardus A.; and Verhoeven, Gerardus H. Th. M., 4,060,369, Cl. 431-9.000.
Vernaya, Ljudmila Dmitrievna: *See—*
Egorov, Boris Afanasievich; Grzhimalovsky, Alexandr Sergeevich; Judin, Alexandr Vladimirovich; Fishman, Konstantin Evgenievich; and Vernaya, Ljudmila Dmitrievna, 4,060,582, Cl. 264-210.00F.
Verner, Bo Lennart; and Fors, Lars Borje Staffan, to Atlas Copco Aktiebolag. Device for lake restoration by oxygen-enriching of the water. 4,060,574, Cl. 261-77.000.
Vertegaal, Jacobus Gerardus, to Stork Brabant B.V. Method and device for dye transfer printing. 4,060,382, Cl. 8-2.50A.
Victor Company of Japan, Limited: *See—*
Iwahara, Makoto; Maruyama, Fumio; Fujiki, Goro; Mori, Toshinori; Hiyama, Norio; and Kikuchi, Mitsuru, 4,060,696, Cl. 179-1.0GQ.
Umeda, Hiroyuki, 4,060,840, Cl. 360-130.000.
Vish Minno-Geoloshki Institute - NIS: *See—*
Stoev, Stoycho Mitrev; Metodiev, Metodi Stoyanov; Kuzev, Lyubomir Vladimirov; Vedrichkov, Petko Georgiev; Sapunarov, Ivan Mitrev; Vassilev, Vassil Vladimirov; Dimitrov, Spas Petkov; Gasharov, Vihar Assenov; Russev, Sheko Kolev; and Mitrev, Kostadin Georgiev, 4,060,481, Cl. 209-170.000.
Vit, Jaroslav, to National Patent Development Corporation. Treating teeth. 4,060,600, Cl. 424-53.000.
Vitt, Guenter: *See—*
Kindscher, Wolfgang; Fischer, Martin; Eicken, Karl; and Vitt, Guenter, 4,060,522, Cl. 260-293.850.
VKI-Rheinhold & Mahla AG, Firma: *See—*
Walz, Alfred H.; and Hahn, Paul-Jurgen, 4,060,355, Cl. 425-7.000.
Vogel, Ignaz, to Ignaz Vogel GmbH und Co. KG-Fahrzeugsitze. Passenger seat structure for vehicles. 4,060,279, Cl. 297-445.000.
Von Den Steinen, Albert: *See—*
Brandis, Helmut; Von Den Steinen, Albert; and Engineer, Serosh, 4,060,431, Cl. 148-36.000.
vor der Bruck, Dieter; Sommer, Richard; and Wolfrum, Gerhard, to Bayer Aktiengesellschaft. Benzene-azo-indole dyestuffs. 4,060,521, Cl. 260-165.000.
Voss, Peter, to Siemens Aktiengesellschaft. Light activated thyristor capable of activation by intensity radiation. 4,060,826, Cl. 357-38.000.
Vysoke uceni technicke: *See—*
Indra, Jaromir, 4,060,350, Cl. 417-490.000.
W. R. Grace & Co.: *See—*
Faid, Robert W., 4,059,935, Cl. 52-396.000.
W. Schlafhorst & Co.: *See—*
Raasch, Hans, 4,060,208, Cl. 242-18.100.
Wacker-Chemitronic Gesellshaft fur Elektronik Grundstoffe mbH: *See—*
Herzer, Heinz; and Zauhar, Helmut, 4,060,392, Cl. 23-273.0SP.
Wada, Kunihiko: *See—*
Togei, Ryoiku; Takei, Akira; Hika, Yoshihiko; and Wada, Kunihiko, 4,060,796, Cl. 365-183.000.
Wada, Seijun: *See—*
Sato, Yukio; Wada, Seijun; and Matsuzawa, Shigetaka, 4,060,597, Cl. 424-12.000.
Wada, Sotaro: *See—*
Hata, Masaaki; and Wada, Sotaro, 4,060,773, Cl. 332-19.000.
Wagner, Fritz; Sahm, Hermann; and Keune, Walter Hartmut, to Gesellschaft fur Biotechnologische Forschung mbH, (GBF). Process for the microbial production of L-serine using pseudomonas Sp. DSM 672. 4,060,455, Cl. 195-29.000.
Wagner, Joseph P.: *See—*
Jackson, Byron L.; and Wagner, Joseph P., 4,059,878, Cl. 29-157.10R.
Wagner, Rudolf, to Remswerk Christian Foll und Sohne. Machine for machining bars and tubes. 4,060,334, Cl. 408-126.000.
Waiters, Irene. Protective device. 4,060,293, Cl. 312-284.000.
Waitzman, Gene J.: *See—*
Deuchar, Robert C.; and Waitzman, Gene J., 4,059,863, Cl. 15-98.000.
Wakatsuki, Susumu, to Rank Xerox Ltd. Lens switching mechanism for use in copying machine. 4,060,324, Cl. 355-60.000.
Wakefield, Lynn Burritt: *See—*
Lohr, Delmar Frederick, Jr.; and Wakefield, Lynn Burritt, 4,060,563, Cl. 260-624.00B.
Wako, Shigeo: *See—*
Ataka, Hisashi; Wako, Shigeo; and Ushio, Shintaro, 4,060,699, Cl. 179-18.0GF.
Walker, Leigh E., to Hooker Chemicals & Plastics Corporation. Process for molecular weight lowering of vinyl halide polymers employing saturated carbon to carbon bonded aldehydes. 4,060,677, Cl. 526-88.000.
Walker, Loren H., to General Electric Company. Discharge lamp auxiliary circuit with dI/dt switching control. 4,060,752, Cl. 315-244.000.
Wallace, William J. Tertiary crude oil recovery process. 4,060,128 Cl. 166-249.
Walters, David F., to United States of America, Army. Tire mount-dismount mechanism. 4,060,170, Cl. 214-331.000.
Walters, John P., to Wisconsin Alumni Research Foundation. Metastable argon stabilized arc devices for spectroscopic analysis. 4,060,708, Cl. 219-121.00P.
Walworth, Vivian K.: *See—*
Gerber, Arthur M.; and Walworth, Vivian K., 4,060,419, Cl. 96-94.00R.
Walz, Alfred H.; and Hahn, Paul-Jurgen, to VKI-Rheinhold & Mahla AG, Firma. Device for the manufacture of fibers from fusible materials. 4,060,355, Cl. 425-7.000.
Wambergue, Andre Raphael: *See—*
Breheret, Michel Francois; Wambergue, Andre Raphael; and Carpentier, Andre Jacques, 4,060,048, Cl. 114-266.000.
Ward, Leslie J. Horse-race-simulating parlor or casino game of pure chance. 4,060,246, Cl. 273-135.0AA.
Watanabe, Naohei; and Inoue, Tadaomi, to Fuji Photo Optical Co., Ltd. Automatic iris control means for variable focal length lens system. 4,060,756, Cl. 318-668.000.
Watanabe, Shugo: *See—*
Goto, Mituhiro; Hashimoto, Isao; Watanabe, Shugo; and Itabashi, Koji, 4,060,411, Cl. 75-138.000.
Watanabe, Tatsuya: *See—*
Ohta, Wasaburo; and Watanabe, Tatsuya, 4,060,441, Cl. 156-234.000.
Watase, Hideo: *See—*
Uchiyama, Shuichi; Utsunomiya, Satoshi; and Watase, Hideo, 4,060,451, Cl. 162-157.00R.
Watson, Gerald K.: *See—*
Watson, John C.; Watson, John D.; and Watson, Gerald K., 4,060,381, Cl. 432-247.000.
Watson, Hugh R.; Rowsell, David G.; and Spring, David John, to Wilkinson Sword Limited. Tobacco and tobacco-containing manufactures containing an ingredient having physiological cooling activity. 4,060,091, Cl. 131-9.000.
Watson, John C.; Watson, John D.; and Watson, Gerald K., to Evenheat Kiln, Inc. Shield for pyrometric cones used in ceramic firing kilns. 4,060,381, Cl. 432-247.000.
Watson, John D.: *See—*
Watson, John C.; Watson, John D.; and Watson, Gerald K., 4,060,381, Cl. 432-247.000.
Waxman, Burton H.; and Mourning, Michael C., to GAF Corporation. Phenoxy carbonyl derivatives of a paraphenylenediamine color developer and their use in an image-receiving sheet for color diffusion transfer. 4,060,418, Cl. 96-29.00D.
Wayment, William Ross, to Joy Manufacturing Company. Method of mine backfilling and material therefor. 4,059,963, Cl. 61-35.000.
Weaver, Leslie A.: *See—*
Kingman, Stephen A.; and Weaver, Leslie A., 4,060,145, Cl. 280-106.00T.
Webasto-Werk W. Baier GmbH & Co.: *See—*
Bienert, Horst; Jardin, Hans; and Schatzler, Walter, 4,060,274, Cl. 296-137.00G.
Weber, Paul; Mollenkopf, Hans; Henning, Kurt; Heinemann, Otto; Schmits, Heinz-Herbert; Rother, Wolfgang; Ritzmann, Horst; Wurr, Jurgen; Krutzner, Karl, Jr.; Schossler, Werner; Goldmann, Wolf; and Schepers, Georg, to Polysius AG. Methods and apparatus for the heat treatment of fine-grained materials. 4,060,375, Cl. 432-14.000.
Wedemeyer, Karlfried; Kiel, Wolfgang; and Evertz, Werner, to Bayer Aktiengesellschaft. Process for preparing meta-substituted halophenols. 4,060,562, Cl. 260-623.00R.
Weghaupt, Erich, to Kraftwerk Union Aktiengesellschaft. Superconductive exciter winding for the rotor of a turbogenerator and method of production. 4,060,743, Cl. 310-52.000.
Weikel, Donald J., Jr., to Xerox Corporation. Self-lifting vacuum stripper. 4,060,235, Cl. 271-174.000.

Weill, Theodore C. Wear part. 4,059,884, Cl. 29-401.00E.
Weir, W. David: *See—*
Kilbourn, Edward E.; and Weir, W. David, 4,060,636, Cl. 424-322.000.
Weiss, Hans-Peter: *See—*
Jeserich, Wolfgang-Dieter; Cordes, Claus; Seydl, Wolfgang; and Weiss, Hans-Peter, 4,060,518, Cl. 260-78.00L.
Weiss, Martin Joseph: *See—*
Bernady, Karel Francis; Floyd, Middleton Brawner, Jr.; Poletto, John Frank; Schaub, Robert Eugene; and Weiss, Martin Joseph, 4,060,540, Cl. 260-448.80R.
Weitz, Hans-Martin; and Fischer, Rolf, to BASF Aktiengesellschaft. Manufacture of 5-cyanovaleric acid and its esters. 4,060,543, Cl. 260-464.000.
Welch, Aaron Waddington, to Du Pont de Nemours, E. I., and Company. Selective herbicide for evergreen seedlings. 4,060,405, Cl. 71-93.000.
Welle, Hendricus Bernardus Antonius; and Claassen, Volkert, to U.S. Philips Corporation. Aminoethyl oxime ethers having anti-depressive activity. 4,060,631, Cl. 424-304.000.
Westerberg, Gerhard. Scanning apparatus, for producing masks for micro circuits. 4,060,816, Cl. 354-4.000.
Westerwalder Eisenwerk Gerhard KG: *See—*
Gerhard, Helmut, 4,060,174, Cl. 220-23.400.
Westinghouse Canada Limited: *See—*
Mazzei, Peter J.; and VanDrunen, Gerrit, 4,060,413, Cl. 75-208.00R.
Westinghouse Electric Corporation: *See—*
Blinchikoff, Herman J., 4,060,776, Cl. 333-72.000.
Jones, Charles H.; and Skinner, Dale D., 4,060,791, Cl. 340-3.00C.
Litz, Donald C., 4,060,742, Cl. 310-52.000.
Osborne, Robert L., 4,059,960, Cl. 60-646.000.
Palazzolo, Salvatore E.; and McCaskey, Harold O., Jr., 4,060,450, Cl. 162-141.000.
Riffe, Delmar R.; and Young, Robert R., 4,060,342, Cl. 417-284.000.
Schlegel, Earl S., 4,060,825, Cl. 357-38.000.
Woolfson, Martin G., 4,060,830, Cl. 358-126.000.
Weston, Paul George; Jennemann, Glenn A.; and Hutchinson, Thomas Kemp, to Hartman, Milton D. Vapor control spout. 4,060,108, Cl. 141-59.000.
Wettstein, Dennis: *See—*
Zimmerman, Benjamin G., 4,060,255, Cl. 280-478.00R.
White, Dwain M., to General Electric Company. Process for the reduction of color in polyphenylene oxide resins. 4,060,514, Cl. 260-47.0ET.
White, John T. Apparatus for cutting disks from sheets. 4,060,333, Cl. 408-103.000.
Whittam, Thomas Vincent; and Youll, Barry, to Imperial Chemical Industries Limited. Zeolite Nu-1. 4,060,590, Cl. 423-328.000.
Widmann, Marcel, to Borden Products Limited. Foaming apparatus. 4,060,572, Cl. 261-18.00B.
Wieland, Howard N., Jr., to TRW Inc. Tool for applying adhesive material. 4,060,180, Cl. 222-146.0HE.
Wiesner, Paul: *See—*
Garber, Alfred; Stonner, Hans-Martin; Wiesner, Paul; Sinclair, Alan; and Schmidt, Alfred, 4,060,591, Cl. 423-352.000.
Wieting, James H. Apparatus for locating access openings for electrical outlet boxes in covering members. 4,059,905, Cl. 33-180.00R.
Wilczynski, Mieczyslaw, to Motorola, Inc. Fused in-line power connector arrangement. 4,060,303, Cl. 339-147.00R.
Wild, Albrecht: *See—*
Gante, Joachim; Kurmeier, Hans-Adolf; Orth, Dieter; Schacht, Erich; and Wild, Albrecht, 4,060,633, Cl. 424-304.000.
Wildheim, Jorgen: *See—*
Olsson, Karl Olof; and Wildheim, Jorgen, 4,060,707, Cl. 219-121.0LM.
Wilkinson, Eric, to Leigh Products, Inc. Surface bolt. 4,060,266, Cl. 292-148.000.
Wilkinson, Jerome L. Throttle control device. 4,060,008, Cl. 74-488.000.
Wilkinson Sword Limited: *See—*
Watson, Hugh R.; Rowsell, David G.; and Spring, David John, 4,060,091, Cl. 131-9.000.
William H. Rorer, Inc.: *See—*
Diamond, Julius; and Douglas, George H., 4,060,635, Cl. 424-322.000.
Williams, Albert Edward: *See—*
Atia, Ali Ezz Eldin; and Williams, Albert Edward, 4,060,779, Cl. 333-73.00W.
Williams, David Roth, to Franke, Henry L. Refrigerated semitrailer truck for long and local deliveries. 4,060,400, Cl. 62-162.000.
Williams, George C., to Alden Research Foundation. Electrical recorder and belt with styli therefor. 4,060,815, Cl. 346-139.00A.
Williams, Joseph J. Wheelchair hold down assembly. 4,060,271, Cl. 296-65.00R.
Williams, Robert A. Electrical connector. 4,060,299, Cl. 339-48.000.
Williford, Danny Franklin, to No Flame Process, Inc. Cremated remains processor. 4,060,204, Cl. 241-74.000.
Willig, Wolf Rudiger: *See—*
Jantsch, Ottomar; Feigt, Ingmar; and Willig, Wolf Rudiger, 4,060,822, Cl. 357-30.000.
Willingham, James S. Keyboard Guard. 4,060,163, Cl. 197-105.000.
Wilson, Charles Eugene, III, to International Business Machines Corporation. Injection molding same cycle control. 4,060,362, Cl. 425-145.000.
Wilson, Harold R.: *See—*
Haworth, Richard G.; Saylor, Charles J.; and Wilson, Harold R., 4,060,294, Cl. 339-4.000.
Wilson, Norman A.; and Grotepass, Johann, to Morgan Construction Company. Process for forming ferrous billets into finished product. 4,060,428, Cl. 148-12.00R.
Wilson, William. Mixing bar and system. 4,060,224, Cl. 366-169.000.
Wingfield, Perino B.: *See—*
Burks, Howard L., 4,060,111, Cl. 141-231.000.
Wisconsin Alumni Research Foundation: *See—*
Walters, John P., 4,060,708, Cl. 219-121.00P.
Wolfrum, Gerhard: *See—*
vor der Bruck, Dieter; Sommer, Richard; and Wolfrum, Gerhard, 4,060,521, Cl. 260-165.000.
Woodier, George H.; and Mount, Robert E., to Curtiss-Wright Corporation. Sealing grid system for rotary piston mechanism of the Wankel type. 4,060,352, Cl. 418-122.000.
Woods, John Henry; and Graves, Toby R., to Petrolite Corporation. Hydrocarbon polymers. 4,060,569, Cl. 260-683.15R.
Woolfson, Martin G., to Westinghouse Electric Corporation. Volumetric balance video tracker. 4,060,830, Cl. 358-126.000.
Worms, Karl-Heinz: *See—*
Blaser, Bruno; Germscheid, Hans-Gunther; and Worms, Karl-Heinz, 4,060,546, Cl. 260-502.40A.
Worrell, Paul O. Hanging flower pot arrangement. 4,059,920, Cl. 47-67.000.
WPC, Inc.: *See—*
Stowe, Milton G.; and Brooks, Barry J., 4,060,249, Cl. 277-24.000.
Wright, Owen Edgar, to Lucas Industries Limited. Power switching circuit having a Darlington connected transistor pair. 4,060,758, Cl. 323-17.000.
Wulfing, Johann A.: *See—*
Credner, Karl; Geisel, Berthold; Brenner, Gunter; and Tauscher, Manfred, 4,060,617, Cl. 424-253.000.
Wunder, John E., to United Aircraft Products, Inc. Method of making an annular tube-fin heat exchanger. 4,059,882, Cl. 29-157.30A.
Wunsch, Gerd: *See—*
Treptow, Wolfram; and Wunsch, Gerd, 4,060,476, Cl. 204-290.00F.
Wurr, Jurgen: *See—*
Weber, Paul; Mollenkopf, Hans; Henning, Kurt; Heinemann, Otto; Schmits, Heinz-Herbert; Rother, Wolfgang; Ritzmann, Horst; Wurr, Jurgen; Krutzner, Karl, Jr.; Schossler, Werner; Goldmann, Wolf; and Schepers, Georg, 4,060,375, Cl. 432-14.000.
Wyman, Howard John, to Chrysler United Kingdom Limited. Balancing rotors. 4,060,009, Cl. 74-573.00R.
Xerox Corporation: *See—*
Faucz, Eugene C., 4,060,811, Cl. 346-74.100.
Feldeisen, Ronald F.; Minchak, John A.; Gerstman, Richard B.; Meyers, Herbert M.; and Edstrom, Richard C., 4,060,105, Cl. 141-1.000.
Pollack, Joel M.; and Flannery, John B., 4,060,316, Cl. 353-20.000.
Stange, Klaus K.; and Hamlin, Thomas J., 4,060,233, Cl. 271-160.000.
Weikel, Donald J., Jr., 4,060,235, Cl. 271-174.000.
Yahnke, Robert L., to Standard Oil Company (Indiana). Membrane process for separating materials. 4,060,566, Cl. 260-677.00A.
Yamada, Hisashi; and Horiko, Yoshinori, to Tokyo Shibaura Electric Co., Ltd. Oscillator. 4,060,772, Cl. 331-116.00R.
Yamada, Takahiro, to Hitachi, Ltd. Ink jet recording method and apparatus. 4,060,804, Cl. 346-1.000.
Yamada, Takahiro; and Doi, Tetsuo, to Hitachi, Ltd. Ink drop writing apparatus. 4,060,813, Cl. 346-75.000.
Yamaguchi, Yoshitake: *See—*
Matsumoto, Takeshi; Chiba, Kazukiyo; Shioyama, Atsuo; and Yamaguchi, Yoshitake, 4,060,143, Cl. 180-64.00A.
Yamamoto, Hisao: *See—*
Kimura, Michio; Inaba, Shigeho; and Yamamoto, Hisao, 4,060,550, Cl. 260-340.50R.
Yamanouchi, Shousuke: *See—*
Matsubara, Hironaga; and Yamanouchi, Shousuke, 4,060,659, Cl. 428-379.000.
Yamazaki, Yoshio: *See—*
Tomita, Kazuo; Murakami, Tadashi; Yamazaki, Yoshio; and Honma, Toyokuni, 4,060,402, Cl. 71-76.000.
Yanik, LeRoy; and Gross, Dario R., to Midland-Ross Corporation. Air compressor with inlet diversion valve. 4,060,340, Cl. 417-28.000.
Yannas, Ioannis V.; Burke, John F.; Gordon, Philip L.; and Huang, Chor, to Massachusetts Institute of Technology. Multilayer membrane useful as synthetic skin. 4,060,081, Cl. 128-156.000.
Yasui, Seimei; and Sato, Hiroshi, to Sumitomo Chemical Company, Limited. Synthetic saturated oils, and their production and use. 4,060,492, Cl. 252-59.000.
Yavor, Stanley. Caulking gun cartridge opening tool. 4,059,894, Cl. 30-296.00A.
Yeakey, Ernest L.: *See—*
Naylor, Carter G.; and Yeakey, Ernest L., 4,060,501, Cl. 252-548.000.
Yevick, George Johannus, to Personal Communications, Inc. Compact folded mirror recorder and viewer of information. 4,060,317, Cl. 353-27.00R.
Yokota, Noriyuki; Tokuda, Shingo; Ito, Yoshiro; and Itaya, Kenji, to Osaka Soda Co. Ltd. Method of purifying the raw brine used in alkali salt electrolysis. 4,060,465, Cl. 204-128.000.
Yokota, Shozo: *See—*
Suzuki, Matsumi; Morino, Tetsuro; and Yokota, Shozo, 4,060,694, Cl. 179-1.0SD.

Yoshida, Yoshiaki: *See—*
Miyazaki, Tsutomu; Yoshida, Yoshiaki; Ueda, Shozo; Mitsuya, Kinpei; and Ogasawara, Takeshi, 4,060,207, Cl. 242-18.00R.
Yoshikawa, Ikuji; Noro, Yoshihisa; and Okaneya, Junji. Combined reversible aqueous colloidal dental impression material. 4,060,421, Cl. 106-38.50D.
Youll, Barry: *See—*
Whittam, Thomas Vincent; and Youll, Barry, 4,060,590, Cl. 423-328.000.
Young, Robert R.: *See—*
Riffe, Delmar R.; and Young, Robert R., 4,060,342, Cl. 417-284.000.
Young, Roger E.: *See—*
Gomaa, Ezzat E.; and Young, Roger E., 4,060,129, Cl. 166-252.000.
Yue, Hong Jun: *See—*
Nemiroff, Michael; Yue, Hong Jun; and Schevey, William Russell, 4,060,448, Cl. 156-653.000.
Yurugi, Masayoshi: *See—*
Nakatsukasa, Kazuo; Murata, Kazuo; Ohkubo, Tetsuo; Yurugi, Masayoshi; and Takahashi, Shinobu, 4,060,851, Cl. 364-900.000.
Zagata, Robert J.: *See—*
Miller, Arthur F.; Zagata, Robert J.; and Grasselli, Robert K., 4,060,545, Cl. 560-208.000.
Zauhar, Helmut: *See—*
Herzer, Heinz; and Zauhar, Helmut, 4,060,392, Cl. 23-273.0SP.
Zeh, David W.: *See—*
Miller, Gerald V.; and Zeh, David W., 4,060,100, Cl. 138-89.000.
Zenith Radio Corporation: *See—*
Tanaka, Akio, 4,060,768, Cl. 325-464.000.
Zimmerman, Benjamin G., to Wettstein, Dennis, a part interest. Wide range bumper mounted hitch. 4,060,255, Cl. 280-478.00R.
Zinchuk, Michael, to Polaroid Corporation. Tin indium oxide and polyvinylcarbazole layered polarized photovoltaic cell. 4,060,426, Cl. 136-89.0NB.
Ziolko, Francis Joseph, to Devro, Inc. Extruder apparatus for forming a tubular casing. 4,060,361, Cl. 425-131.100.
Zioni, Jacob; Klein, Yitzhak; and Inbar, Dan, to Elscint, Ltd. Scintillation camera for establishing the coordinates of a radiation stimuli produced by a radiation field. 4,060,730, Cl. 250-369.000.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 29TH DAY OF NOVEMBER, 1977

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Dual Manufacturing and Engineering, Incorporated: *See—*
Re, Frank Manuel, Re. 29,483, Cl. 297-88.000.
Fluid Devices, Ltd.: *See—*
Larner, Donald Alexander, Re. 29,481, Cl. 137-596.150.
Larner, Donald Alexander, to Fluid Devices, Ltd. Multi-way directional fluid flow control valve arrangement. Re. 29,481, Cl. 137-596.150.
Nippon Electric Company, Limited: *See—*
Utsumi, Kazuaki; Tsubouchi, Norio; and Ohno, Tomeji, Re. 29,484, Cl. 106-73.320.
Ohno, Tomeji: *See—*
Utsumi, Kazuaki; Tsubouchi, Norio; and Ohno, Tomeji, Re. 29,484, Cl. 106-73.320.
Park, Robert H. Method of effecting fast turbine valving for improvement of power system stability. Re. 29,485, Cl. 290-40.00R.
Re, Frank Manuel, to Dual Manufacturing and Engineering, Incorporated. Reclining chair. Re. 29,483, Cl. 297-88.000.
Rosen, Sidney. Container filling system. Re. 29,482, Cl. 141-160.000.
Tsubouchi, Norio: *See—*
Utsumi, Kazuaki; Tsubouchi, Norio; and Ohno, Tomeji, Re. 29,484, Cl. 106-73.320.
Utsumi, Kazuaki; Tsubouchi, Norio; and Ohno, Tomeji, to Nippon Electric Company, Limited. Barium titanate base ceramic composition having a high dielectric constant. Re. 29,484, Cl. 106-73.320.

LIST OF PLANT PATENTEES

Callahan, Claud: *See—*
Silvers, William E., 4,159, Cl. 35.000.
McCormick, Marjorie: *See—*
Silvers, William E., 4,159, Cl. 35.000.
Moore, Ralph S. Miniature rose plant. 4,158, 11-29-77, Cl. 9.000.
Ralph S. Moore. Miniature rose plant. 4,160, 11-29-77, Cl. 9.000.
Silvers, William E., to Callahan, Claud; and McCormick, Marjorie. Apple tree. 4,159, 11-29-77, Cl. 35.000.

LIST OF DESIGN PATENTEES

Abbott Laboratories: *See—*
D'Alo, Herbert Fred, 246,491, Cl. D6-188.000.
AGFA-Gevaert AG: *See—*
Schlagheck, Norbert; and Schultes, Herbert, 246,525, Cl. D16-04.000.
Amerock Corporation: *See—*
Clayton, LaVerne E., 246,501, Cl. D8-320.000.
Clayton, LaVerne E., 246,502, Cl. D8-352.000.
Clayton, LaVerne E., 246,503, Cl. D8-352.000.
Anger, Gary F.; and Sesnak, Joseph C. Beverage container. 246,504, 11-29-77, Cl. D9-28.000.
Bartlett, Robert N., to Windsor Industries, Inc. Combined carpet cleaning wand and head therefor. 246,523, 11-29-77, Cl. D15-63.000.
Blaser, Werner, to Dasu Anstalt. Couch frame. 246,493, 11-29-77, Cl. D6-191.000.
Brewer, James M.: *See—*
Ingram, Orval Gene, 246,532, Cl. D22-30.000.
Brinkley, Mary Ann Paschal. Folding puzzle. 246,544, 11-29-77, Cl. D34-15.00M.
Brockbank, William Henry, to George Kent (Malaysia) Berhad. Air valve for pipelines. 246,533, 11-29-77, Cl. D23-19.000.
Buckley, George F. Flexible support arm for a dental unit. 246,534, 11-29-77, Cl. D24-5.000.
Burleson, Bill M. Doghouse. 246,540, 11-29-77, Cl. D30-1.000.
Clayton, LaVerne E., to Amerock Corporation. Pull. 246,501, 11-29-77, Cl. D8-320.000.
Clayton, LaVerne E., to Amerock Corporation. Escutcheon for a knob. 246,502, 11-29-77, Cl. D8-352.000.
Clayton, LaVerne E., to Amerock Corporation. Escutcheon. 246,503, 11-29-77, Cl. D8-352.000.
Crane, Eugene H. Case for containing items used by engineers, architects and the like. 246,549, 11-29-77, Cl. D87-1.00R.
Cunningham, David Lynn. Combined toothbrush holder and pill dispenser. 246,489, 11-29-77, Cl. D4-18.000.
D'Alo, Herbert Fred, to Abbott Laboratories. Tray for display and storage of flexible bags. 246,491, 11-29-77, Cl. D6-188.000.
Danielson, David Charles, to International Business Machines Corporation. Container for liquids. 246,507, 11-29-77, Cl. D9-175.000.
Dasu Anstalt: *See—*
Blaser, Werner, 246,493, Cl. D6-191.000.
Deputy, Robert John. Boat. 246,517, 11-29-77, Cl. D12-68.000.
Diffenderfer, Walter L.: *See—*
McFarland, Frederick R.; and Diffenderfer, Walter L., 246,512, Cl. D10-64.000.
Dixon, Michael William, to Scientific Hospital Supplies Limited. Microbiological test strip. 246,535, 11-29-77, Cl. D24-8.000.
Dixon, Michael William, to Scientific Hospital Supplies Limited. Microbiological test strip. 246,536, 11-29-77, Cl. D24-8.000.
DuFresne, Clement P., to Fairchild Industries, Inc. Combined chair and collapsible table unit. 246,490, 11-29-77, Cl. D6-31.000.
Fairchild Industries, Inc.: *See—*
DuFresne, Clement P., 246,490, Cl. D6-31.000.
Ferch, Rudolf, to Kastle Gesellschaft m.b.H. Ski. 246,543, 11-29-77, Cl. D34-14.00D.
Figur, Bernd: *See—*
Stuetzer, Franz Alban; and Figur, Bernd, 246,538, Cl. D27-42.000.
Fischer, James Lee; and Payne, George, to Warner Cable Corporation. Subscriber terminal console. 246,520, 11-29-77, Cl. D14-45.000.
Flinn, Robert D.: *See—*
Poulsen, Lance K.; Miller, Richard D.; and Flinn, Robert D., 246,499, Cl. D8-71.000.
Poulsen, Lance K.; Miller, Richard D.; and Flinn, Robert D., 246,500, Cl. D8-71.000.
Gannet Holdings Limited: *See—*
Maclaren, Owen Finlay, 246,518, Cl. D12-128.000.
Garneau, Joseph Laureat. Permanent land survey marker. 246,513, 11-29-77, Cl. D10-66.000.
George Kent (Malaysia) Berhad: *See—*
Brockbank, William Henry, 246,533, Cl. D23-19.000.
Gilbert, Donald E. Wall-type insect electrocutor. 246,531, 11-29-77, Cl. D22-19.000.
Goldman, Arnold: *See—*
Krumin, Donald; and Goldman, Arnold, 246,521, Cl. D14-68.000.
Gordon, Woodford W. Tooth positioner material. 246,537, 11-29-77, Cl. D24-10.000.
Hefendehl, Hans Friedrich: *See—*
Zeischegg, Walter, 246,530, Cl. D19-75.000.
Herk, Charles Robert, to P.P. & D. Pty. Limited. Cassette storage unit. 246,550, 11-29-77, Cl. D87-1.00D.
Honegger, Barbara S. Hands for a timepiece. 246,514, 11-29-77, Cl. D10-127.000.
Hull, Evan B. Life ring. 246,542, 11-29-77, Cl. D34-43.000.
Hytken, Sidney. Toothpaste tube. 246,509, 11-29-77, Cl. D9-194.000.
Ingersoll-Rand Company: *See—*
Uyeda, Tim M., 246,548, Cl. D87-1.00R.
Ingram, Orval Gene, to Brewer, James M. Lure transfer assembly. 246,532, 11-29-77, Cl. D22-30.000.

International Business Machines Corporation: *See—*
  Danielson, David Charles, 246,507, Cl. D9-175.000.
Jensen, George B., to Syracuse China Corporation. Cup or similar article. 246,494, 11-29-77, Cl. D7-9.000.
K-D Manufacturing Company: *See—*
  McFarland, Frederick R.; and Diffenderfer, Walter L., 246,512, Cl. D10-64.000.
Kastle Gesellschaft m.b.H.: *See—*
  Ferch, Rudolf, 246,543, Cl. D34-14.00D.
Kato, Ken, to Sansui Electric Co., Ltd. Head phone. 246,519, 11-29-77, Cl. D14-36.000.
Krimm, John H. Vehicle polishing apparatus. 246,522, 11-29-77, Cl. D15-37.000.
Krumin, Donald; and Goldman, Arnold, to Motorola, Inc. Vehicular communication converter apparatus or similar article. 246,521, 11-29-77, Cl. D14-68.000.
Kurozumi, Shigeru, to Sharp Kabushiki Kaisha. Electrophotographical duplicator. 246,526, 11-29-77, Cl. D16-31.000.
Kushner, David. Lamp. 246,546, 11-29-77, Cl. D48-20.00R.
Lauber, Olley C. Cutting tool. 246,524, 11-29-77, Cl. D15-139.000.
Les Must de Cartier-France: *See—*
  Zimmerman, Jacques, 246,488, Cl. D2-427.000.
Libit, Sidney M. Container closure. 246,511, 11-29-77, Cl. D9-267.000.
Lin, Spencer B. T. Plastic bag. 246,510, 11-29-77, Cl. D9-249.000.
Maclaren, Owen Finlay, to Gannet Holdings Limited. Baby carriage. 246,518, 11-29-77, Cl. D12-128.000.
McFarland, Frederick R.; and Diffenderfer, Walter L., to K-D Manufacturing Company. Brake lining gauge. 246,512, 11-29-77, Cl. D10-64.000.
Miller, Luvenia C. Wheeled animal figure toy. 246,545, 11-29-77, Cl. D34-15.00B.
Miller, Richard D.: *See—*
  Poulsen, Lance K.; Miller, Richard D.; and Flinn, Robert D., 246,499, Cl. D8-71.000.
  Poulsen, Lance K.; Miller, Richard D.; and Flinn, Robert D., 246,500, Cl. D8-71.000.
Miller, Robert Eric, to Miller-Universal (Aust.) Pty. Ltd. Tripod head for cameras or other instruments. 246,528, 11-29-77, Cl. D16-46.000.
Miller-Universal (Aust.) Pty. Ltd.: *See—*
  Miller, Robert Eric, 246,528, Cl. D16-46.000.
Montano, Paula J. Cookie cutter. 246,495, 11-29-77, Cl. D7-43.000.
Motorola, Inc.: *See—*
  Krumin, Donald; and Goldman, Arnold, 246,521, Cl. D14-68.000.
Myers, David W. Golf club head. 246,541, 11-29-77, Cl. D34-5.0GH.
Nickel, John Wesley. Fluid filled insole for footwear. 246,486, 11-29-77, Cl. D2-318.000.
Nizetich, Andre A. Blow dryer attachment. 246,539, 11-29-77, Cl. D28-18.000.
Nudell, Arthur A. Pill Box. 246,508, 11-29-77, Cl. D9-183.000.
Optronics, Incorporated: *See—*
  Payne, Duncan M., 246,547, Cl. D48-24.00R.
Owens-Illinois, Inc.: *See—*
  Veasy, John Paul, 246,505, Cl. D9-137.000.
  Veasy, John Paul, 246,506, Cl. D9-137.000.
P.P. & D. Pty. Limited: *See—*
  Herk, Charles Robert, 246,550, Cl. D87-1.00D.
Payne, Duncan M., to Optronics, Incorporated. Hand held spot light. 246,547, 11-29-77, Cl. D48-24.00R.
Payne, George: *See—*
  Fischer, James Lee; and Payne, George, 246,520, Cl. D14-45.000.
Pfefer, Irving S. Vignetting device. 246,527, 11-29-77, Cl. D16-38.000.
Polc, John. Blade for a mortar hoe. 246,498, 11-29-77, Cl. D8-11.000.
Poulsen, Lance K.; Miller, Richard D.; and Flinn, Robert D., to Rajo Motor & Manufacturing Company. Materials handling device. 246,499, 11-29-77, Cl. D8-71.000.
Poulsen, Lance K.; Miller, Richard D.; and Flinn, Robert D., to Rajo Motor & Manufacturing Company. Materials handling device. 246,500, 11-29-77, Cl. D8-71.000.
Rajo Motor & Manufacturing Company: *See—*
  Poulsen, Lance K.; Miller, Richard D.; and Flinn, Robert D., 246,499, Cl. D8-71.000.
  Poulsen, Lance K.; Miller, Richard D.; and Flinn, Robert D., 246,500, Cl. D8-71.000.
Rosenfeld, Stanley M. Finger ring setting. 246,515, 11-29-77, Cl. D11-36.000.
Roset, Pierre, to Roset S.A. Seat. 246,492, 11-29-77, Cl. D6-37.000.
Roset S.A.: *See—*
  Roset, Pierre, 246,492, Cl. D6-37.000.
Rowenta-Werke, GmbH: *See—*
  Stuetzer, Franz Alban; and Figur, Bernd, 246,538, Cl. D27-42.000.
Sansui Electric Co., Ltd.: *See—*
  Kato, Ken, 246,519, Cl. D14-36.000.
Schlagheck, Norbert; and Schultes, Herbert, to AGFA-Gevaert AG. Motion picture camera. 246,525, 11-29-77, Cl. D16-04.000.
Schultes, Herbert: *See—*
  Schlagheck, Norbert; and Schultes, Herbert, 246,525, Cl. D16-04.000.
Scientific Hospital Supplies Limited: *See—*
  Dixon, Michael William, 246,535, Cl. D24-8.000.
  Dixon, Michael William, 246,536, Cl. D24-8.000.
Sesnak, Joseph C.: *See—*
  Anger, Gary F.; and Sesnak, Joseph C., 246,504, Cl. D9-28.000.
Sharp Kabushiki Kaisha: *See—*
  Kurozumi, Shigeru, 246,526, Cl. D16-31.000.
Stuetzer, Franz Alban; and Figur, Bernd, to Rowenta-Werke, GmbH. Lighter. 246,538, 11-29-77, Cl. D27-42.000.
Syracuse China Corporation: *See—*
  Jensen, George B., 246,494, Cl. D7-9.000.
Thomas, Willard M. Monocle. 246,529, 11-29-77, Cl. D16-66.000.
Toyosawa, Manabu. Iron cover. 246,497, 11-29-77, Cl. D7-205.000.
Uyeda, Tim M., to Ingersoll-Rand Company. Fishing box. 246,548, 11-29-77, Cl. D87-1.00R.
Veasy, John Paul, to Owens-Illinois, Inc. Bottle. 246,505, 11-29-77, Cl. D9-137.000.
Veasy, John Paul, to Owens-Illinois, Inc. Bottle. 246,506, 11-29-77, Cl. D9-137.000.
Wagschal, Edward A. Planter. 246,516, 11-29-77, Cl. D11-147.000.
Warner Cable Corporation: *See—*
  Fischer, James Lee; and Payne, George, 246,520, Cl. D14-45.000.
Waters, Robert. Belt pack for a veterinarian or the like. 246,487, 11-29-77, Cl. D2-400.000.
Weckwerth, Harald. Litter receptacle. 246,496, 11-29-77, Cl. D7-189.000.
Windsor Industries, Inc.: *See—*
  Bartlett, Robert N., 246,523, Cl. D15-63.000.
Zeischegg, Walter, to Hefendehl, Hans Friedrich. Desk set. 246,530, 11-29-77, Cl. D19-75.000.
Zimmerman, Jacques, to Les Must de Cartier-France. Buckle. 246,488, 11-29-77, Cl. D2-427.000.

CLASSIFICATION OF PATENTS

ISSUED NOVEMBER 29, 1977

NOTE.—First number, class; second number, subclass; third number, patent number

CLASS 2	
2	4,059,852
152 A	4,059,853
CLASS 3	
1.91	4,059,854
CLASS 4	
172.14	4,059,855
172.17	4,059,856
213	4,059,857
255	4,059,858
CLASS 8	
2.5 A	4,060,382
41 B	4,060,383
94.27	4,060,384
111	4,060,385
	4,060,386
169	4,060,387
CLASS 9	
340	4,059,859
CLASS 10	
11 R	4,059,860
CLASS 12	
145	4,059,861
CLASS 13	
26	4,060,692
CLASS 15	
53 AB	4,059,862
98	4,059,863
105	4,059,864
161	4,059,865
CLASS 16	
108	4,059,866
110 A	4,059,867
CLASS 17	
11	4,059,868
44	4,059,869
75	4,059,870
CLASS 23	
230 R	4,060,388
252 A	4,060,389
259.1	4,060,390
264	4,060,391
273 SP	4,060,392
277 R	4,060,393
284	4,060,394
288 B	4,060,395
CLASS 24	
134 R	4,059,871
284	4,059,872
CLASS 28	
271	4,059,873
CLASS 29	
2.16	4,059,874
78	4,059,875
148.4 R	4,059,879
156.7 A	4,059,876
157 C	4,059,880
157 R	4,059,877
157.1 R	4,059,878
	4,059,881
157.3 A	4,059,882
259	4,059,883
401 E	4,059,884
401 F	4,059,885
403	4,059,896
426	4,059,886
432.1	4,059,897
570	4,059,887
598	4,059,898
629	4,059,888
706	4,059,889
739	4,059,890
CLASS 30	
50	4,059,891
90.1	4,059,892
	4,059,893
296 A	4,059,894
382	4,059,895
CLASS 32	
2	4,059,899
5	4,059,900
8	4,059,901
11	4,059,902
40 R	4,059,903
CLASS 33	
126.7 A	4,059,904
174 G	4,059,907
180 R	4,059,905
	4,059,906
CLASS 34	
15	4,059,908
CLASS 35	
12 E	4,059,909
CLASS 36	
103	4,059,910
CLASS 37	
142.5	4,059,911
CLASS 40	
2 R	4,059,912
64 A	4,059,913
125 F	4,059,914
125 H	4,059,915
130 K	4,059,916
CLASS 44	
14	4,060,396
CLASS 46	
196	4,059,917
209	4,059,918
CLASS 47	
1.1	4,059,919
67	4,059,920
73	4,059,921
82	4,059,922
CLASS 48	
197 R	4,060,397
CLASS 49	
57	4,059,923
192	4,059,924
CLASS 51	
100 R	4,059,925
163.1	4,059,926
165.77	4,059,927
241 R	4,059,928
263	4,059,929
268	4,059,930
CLASS 52	
79.12	4,059,931
81	4,059,932
127	4,059,933
297	4,059,934
396	4,059,935
492	4,059,936
693	4,059,937
716	4,059,938
745	4,059,939
CLASS 53	
148	4,059,940
CLASS 55	
73	4,060,398
244	4,060,399
CLASS 56	
27.5	4,059,941
30	4,059,942
327 A	4,059,943
370	4,059,944
400.1	4,059,945
CLASS 57	
34 R	4,059,946
58.89	4,059,947
77.33	4,059,948
140 BY	4,059,949
140 J	4,059,950
149	4,059,951
CLASS 58	
4 R	4,059,952
	4,059,953
21.13	4,059,954
23 R	4,059,955
	4,059,956
90 R	4,059,957
CLASS 60	
614	4,059,958
641	4,059,959
646	4,059,960
670	4,059,961
CLASS 61	
1 F	4,059,962
35	4,059,963
41 A	4,059,964
105	4,059,965
CLASS 62	
64	4,059,967
162	4,060,400
174	4,059,968
238	4,059,969
353	4,059,970
414	4,059,966
CLASS 63	
14 R	4,059,971
CLASS 64	
1 V	4,059,972
CLASS 65	
33	4,060,401
CLASS 66	
177	4,059,973
CLASS 68	
15	4,059,974
23.7	4,059,975
CLASS 71	
76	4,060,402
90	4,060,403
93	4,060,404
	4,060,405
CLASS 72	
19	4,059,976
69	4,059,977
156	4,059,978
342	4,059,979
391	4,059,980
	4,059,981
CLASS 73	
15 A	4,059,982
15.6	4,059,983
23.1	4,059,994
40.5 R	4,059,984
46	4,059,985
54	4,059,986
61.1 R	4,059,987
81	4,059,990
88.5 R	4,059,991
95	4,059,992
178 R	4,059,993
301	4,059,995
352	4,059,997
354	4,059,996
368.2	4,059,998
419	4,059,999
421 B	4,060,000
421.5 R	4,060,001
462	4,060,002
483	4,060,003
514	4,060,004
579	4,059,988
598	4,059,989
CLASS 74	
258	4,060,006
457	4,060,007
488	4,060,008
498	4,060,011
573 R	4,060,009
689	4,060,012
745	4,060,005
798	4,060,010
CLASS 75	
12	4,060,406
58	4,060,407
68 R	4,060,408
93 R	4,060,409
109	4,060,410
138	4,060,411
203	4,060,412
208 R	4,060,413
246	4,060,414
CLASS 76	
83	4,060,013
CLASS 81	
57.2	4,060,014
CLASS 83	
19	4,060,015
23	4,060,017
451	4,060,016
CLASS 84	
269	4,060,018
411 R	4,060,019
CLASS 85	
1 L	4,060,020
CLASS 90	
58 B	4,060,021
CLASS 91	
40	4,060,022
CLASS 92	
168	4,060,023
CLASS 96	
1.8	4,060,415
3	4,060,417
29 D	4,060,418
48 R	4,060,416
94 R	4,060,419
114.1	4,060,420
CLASS 98	
40 DL	4,060,025
40 VM	4,060,024
CLASS 99	
346	4,060,026
450.1	4,060,027
CLASS 100	
100	4,060,028
CLASS 101	
4	4,060,029
127.1	4,060,030
163	4,060,031
401.1	4,060,032
CLASS 102	
24 R	4,060,033
	4,060,034
CLASS 105	
177	4,060,035
368 T	4,060,036
CLASS 106	
38.5 D	4,060,421
47 Q	4,060,422
52	4,060,423
55	4,060,424
73.32	Re.29,484
90	4,060,425
CLASS 108	
51.1	4,060,037
94	4,060,038
CLASS 109	
3	4,060,039
40	4,060,040
CLASS 110	
8 F	4,060,041
14	4,060,042
CLASS 111	
3	4,060,043
CLASS 112	
158 R	4,060,044
235	4,060,045
CLASS 113	
54 R	4,060,046
CLASS 114	
222	4,060,047
266	4,060,048
CLASS 115	
6.1	4,060,049
CLASS 116	
114 AD	4,060,050
124.1 A	4,060,051
CLASS 118	
2	4,060,052
215	4,060,053
CLASS 119	
16	4,060,054
48	4,060,055
96	4,060,056
CLASS 122	
451 R	4,060,057
CLASS 123	
8.09	4,060,058
32 ST	4,060,059
43 A	4,060,060
75 B	4,060,061
	4,060,062
97 B	4,060,063
119 A	4,060,065
119 EC	4,060,064
CLASS 124	
23 R	4,060,066
31	4,060,067
CLASS 126	
120	4,060,068
200	4,060,069
271	4,060,070
	4,060,071
	4,060,072
CLASS 128	
1.1	4,060,073
2.08	4,060,074
90	4,060,075
142 R	4,060,076
145.8	4,060,077
	4,060,078
	4,060,079
152	4,060,080
156	4,060,081
218 M	4,060,082
223	4,060,083
260	4,060,084
287	4,060,085
303.15	4,060,086
	4,060,087
303.17	4,060,088
325	4,060,089
419 PG	4,060,090
CLASS 131	
9	4,060,091
236	4,060,092
CLASS 133	
1 A	4,060,093
CLASS 136	
89 NB	4,060,426
230	4,060,094
234	4,060,095
CLASS 137	
74	4,060,096
93	4,060,097
594	4,060,098
596.15	Re.29,481
625.3	4,060,099
CLASS 138	
89	4,060,100
CLASS 139	
65	4,060,101
91	4,060,102
185	4,060,103
188 R	4,060,104
CLASS 141	
1	4,060,105
	4,060,106
7	4,060,107
59	4,060,108
83	4,060,109
160	Re.29,482
207	4,060,110
231	4,060,111
CLASS 144	
134 R	4,060,112
CLASS 145	
50 D	4,060,113
	4,060,114
61 G	4,060,115
CLASS 148	
1.5	4,060,427
6.17	4,060,433
12 R	4,060,428
31	4,060,429
32	4,060,430
36	4,060,431
186	4,060,432
CLASS 149	
2	4,060,434
19.2	4,060,435
CLASS 151	
7	4,060,116
43	4,060,117
CLASS 156	
63	4,060,436
71	4,060,437
73.1	4,060,438
78	4,060,439
154	4,060,440
234	4,060,441
358	4,060,442
380	4,060,443
391	4,060,444
414	4,060,445
475	4,060,446
642	4,060,447
653	4,060,448
CLASS 159	
49	4,060,118
CLASS 160	
266	4,060,119
CLASS 162	
109	4,060,449
141	4,060,450
157 R	4,060,451
CLASS 164	
35	4,060,120
262	4,060,121
304	4,060,122
CLASS 165	
11	4,060,123
110	4,060,124
133	4,060,125
	4,060,126
145	4,060,127
CLASS 166	
252	4,060,129
312	4,060,130
315	4,060,131
CLASS 169	
47	4,060,132
CLASS 171	
1	4,060,133
CLASS 172	
59	4,060,134
380	4,060,135
795	4,060,136
CLASS 173	
12	4,060,137
49	4,060,138
137	4,060,139
CLASS 174	
126 S	4,060,693

CLASS 175
7 4,060,140
94 4,060,141

CLASS 176
36 R 4,060,452
38 4,060,453
84 4,060,454

CLASS 179
1 GQ 4,060,696
1 SB 4,060,695
1 SD 4,060,694
1 VE 4,060,697
15 AT 4,060,698
18 GF 4,060,699
28 4,060,700
175 4,060,701

CLASS 180
54 A 4,060,142
64 A 4,060,143
77 R 4,060,144
121 4,060,147
161 4,060,146

CLASS 182
2 4,060,148
133 4,060,149
151 4,060,150

CLASS 187
95 4,060,151

CLASS 188
52 4,060,152
72.6 4,060,153
73.3 4,060,154
282 4,060,155

CLASS 190
30 4,060,156

CLASS 192
4 A 4,060,157
82 T 4,060,158
113 B 4,060,159
134 4,060,160

CLASS 195
29 4,060,455
31 F 4,060,456
127 4,060,457

CLASS 197
1 R 4,060,161
53 4,060,162
105 4,060,163

CLASS 198
424 4,060,164
442 4,060,165
446 4,060,166
622 4,060,167

CLASS 200
5 A 4,060,703
35 R 4,060,702
61.62 4,060,704
153 M 4,060,705

CLASS 201
40 4,060,458

CLASS 202
248 4,060,459

CLASS 203
29 4,060,460

CLASS 204
1 T 4,060,461
58 4,060,462
99 4,060,463
113 4,060,464
128 4,060,465
129 4,060,466
129.75 4,060,467
158 R 4,060,468
163 R 4,060,469
192 R 4,060,470
192 SP 4,060,471
197 4,060,472
253 4,060,473
270 4,060,474
4,060,475
290 F 4,060,476
300 R 4,060,477

CLASS 206
216 4,060,168
289 4,060,169

CLASS 208
8 4,060,478
11 R 4,060,479
111 4,060,480

CLASS 209
170 4,060,481
432 4,060,482

CLASS 210
79 4,060,483
80 4,060,484
87 4,060,485
220 4,060,486
242 R 4,060,487
433 M 4,060,488

CLASS 214
331 4,060,170
451 4,060,171

CLASS 215
295 4,060,172

CLASS 219
107 4,060,706
121 LM 4,060,707
121 P 4,060,708
131 R 4,060,709
219 4,060,712
548 4,060,710

CLASS 220
4 B 4,060,173
23.4 4,060,174
85 B 4,060,175
212 4,060,176

CLASS 221
25 4,060,177

CLASS 222
14 4,060,178
92 4,060,179
146 HE 4,060,180
193 4,060,181
333 4,060,182
442 4,060,183
501 4,060,184

CLASS 224
4 F 4,060,185

CLASS 226
1 4,060,186
8 4,060,187

CLASS 227
9 4,060,188
53 4,060,189

CLASS 228
2 4,060,190
207 4,060,191

CLASS 235
309 4,060,720
488 4,060,711

CLASS 236
46 D 4,060,192
59 4,060,193

CLASS 237
1 A 4,060,195
1 SL 4,060,194
51 4,060,196

CLASS 238
338 4,060,197

CLASS 239
24 4,060,198
488 4,060,199
542 4,060,200
553 4,060,201
579 4,060,202

CLASS 241
7 4,060,203
74 4,060,204
211 4,060,205
259.1 4,060,206

CLASS 242
18 R 4,060,207
18.1 4,060,208
54 R 4,060,209
71.1 4,060,210
107.7 4,060,211

CLASS 244
134 D 4,060,212
137 R 4,060,213

CLASS 248
165 4,060,214
360 4,060,215
460 4,060,216

CLASS 249
10 4,060,217
65 4,060,218

CLASS 250
227 4,060,725
252 4,060,726
328 4,060,728
338 4,060,729
358 P 4,060,727
369 4,060,730
402 4,060,731
432 R 4,060,732
491 4,060,733
560 4,060,734

CLASS 251
149.6 4,060,219
306 4,060,220

CLASS 252
3 4,060,489
8.55 D 4,060,490
8.8 4,060,505
50 4,060,491
59 4,060,492
62.1 L 4,060,493
105 4,060,494
106 4,060,495
171 4,060,496
301.1 S 4,060,497
373 4,060,498
432 4,060,499
471 4,060,500
548 4,060,501

CLASS 254
93 R 4,060,221

CLASS 256
50 4,060,222

CLASS 260
2.5 P 4,060,502
5 4,060,503
7 4,060,504
17.4 GC 4,060,506
21 4,060,507
23 XA 4,060,508
30.6 R 4,060,509
33.6 AQ 4,060,510
34.2 4,060,511
45.75 N 4,060,513
45.8 N 4,060,512
47 ET 4,060,514
63 R 4,060,515
75 T 4,060,516
78 L 4,060,518
78 R 4,060,517
79 4,060,519
79.1 4,060,520
165 4,060,521
250 QN 4,060,523
256.5 R 4,060,524
260 4,060,525
268 PH 4,060,526
279 R 4,060,527
293.85 4,060,522
295 R 4,060,528
307 FA 4,060,529
4,060,530
308 R 4,060,531
340.5 R 4,060,550
340.9 R 4,060,532
345.7 R 4,060,533
408 4,060,534
414 4,060,535
448.2 E 4,060,536
4,060,537
448.8 R 4,060,538
4,060,539
4,060,540
453 AR 4,060,541
454 4,060,542
464 4,060,543
465 D 4,060,544
502.4 A 4,060,546
532 4,060,547
534 S 4,060,548
543 F 4,060,549
559 A 4,060,553
561 S 4,060,551
565 4,060,554
576 4,060,552
586 R 4,060,555
590 R 4,060,556
604 HF 4,060,557
613 D 4,060,558
620 4,060,559
621 D 4,060,560
621 F 4,060,561
623 R 4,060,562
624 B 4,060,563
641 4,060,564
671 C 4,060,565
677 A 4,060,566
681.5 C 4,060,567
682 4,060,568
683.15 R 4,060,569
889 4,060,570
970 4,060,571

CLASS 261
18 B 4,060,572
23 B 4,060,573
77 4,060,574
111 4,060,575
130 4,060,576

CLASS 264
45.4 4,060,577
46.6 4,060,578
51 4,060,579
109 4,060,580
131 4,060,581
210 F 4,060,582
272 4,060,583

CLASS 270
66 4,060,227

CLASS 271
14 4,060,228
33 4,060,229
63 4,060,230
80 4,060,231
122 4,060,232
160 4,060,233
164 4,060,234
174 4,060,235
183 4,060,236
231 4,060,237
276 4,060,238

CLASS 272
73 4,060,239
126 4,060,240
132 4,060,241

CLASS 273
1 E 4,060,242
18 4,060,243
25 4,060,244
85 R 4,060,245
135 AA 4,060,246
157 R 4,060,247

CLASS 274
41.6 R 4,060,248

CLASS 277
24 4,060,249
53 4,060,250

CLASS 279
62 4,060,251

CLASS 280
79.1 R 4,060,252
87.04 A 4,060,253
106 T 4,060,145
461 A 4,060,254
478 R 4,060,255
613 4,060,256
626 4,060,257
638 4,060,258
656 4,060,259
747 4,060,260
756 4,060,261

CLASS 282
27.5 4,060,262

CLASS 285
47 4,060,263
175 4,060,264
405 4,060,265

CLASS 290
40 R Re.29,485

CLASS 292
148 4,060,266
173 4,060,267

CLASS 293
62 4,060,268

CLASS 294
78 A 4,060,269

CLASS 296
37.2 4,060,270
65 R 4,060,271
93 4,060,272
100 4,060,273
137 G 4,060,274

CLASS 297
88 Re.29,483
159 4,060,275
180 4,060,276
248 4,060,277
386 4,060,278
445 4,060,279
452 4,060,280

CLASS 302
14 4,060,281
16 4,060,282

CLASS 303
6 C 4,060,283
100 4,060,284
106 4,060,285

CLASS 307
3 4,060,735
141 4,060,736
221 D 4,060,737
238 4,060,738
319 4,060,739
362 4,060,740

CLASS 308
4 A 4,060,286
72 4,060,287
73 4,060,288
187.1 4,060,289
216 4,060,290
241 4,060,291

CLASS 310
52 4,060,742
4,060,743
91 4,060,744
156 4,060,745
177 4,060,746
332 4,060,741

CLASS 312
247 4,060,292
284 4,060,293

CLASS 313
95 4,060,747
171 4,060,748
484 4,060,749

CLASS 315
39.51 4,060,750
209 R 4,060,751
244 4,060,752

CLASS 318
175 4,060,753
218 4,060,754
571 4,060,755
668 4,060,756

CLASS 323
17 4,060,758
60 4,060,759

CLASS 324
2.9 4,060,760
71 EB 4,060,762
123 R 4,060,763
253 4,060,761

CLASS 325
18 4,060,764
21 4,060,765
22 4,060,766
363 4,060,767
464 4,060,768

CLASS 330
4.3 4,060,769
59 4,060,771
253 4,060,770

CLASS 331
116 R 4,060,772

CLASS 332
19 4,060,773

CLASS 333
71 4,060,774
4,060,775
72 4,060,776
4,060,777
73 W 4,060,778
4,060,779
81 A 4,060,780
98 S 4,060,781

CLASS 335
112 4,060,782
296 4,060,783

CLASS 336
84 R 4,060,784

CLASS 337
201 4,060,785
244 4,060,786
408 4,060,787

CLASS 338
128 4,060,788
183 4,060,789

CLASS 339
4 4,060,294
17 CF 4,060,296
17 LC 4,060,295
37 4,060,297
48 4,060,298
4,060,299
74 R 4,060,300
95 R 4,060,301
97 R 4,060,302
147 R 4,060,303
224 4,060,304
269 4,060,305

CLASS 340
3 C 4,060,791
3 R 4,060,790
6 R 4,060,792
27 R 4,060,793
198 4,060,799
304 4,060,800
324 M 4,060,802
324 R 4,060,801
347 DD 4,060,797
409 4,060,803

CLASS 343
6.5 LC 4,060,805
17.1 R 4,060,807
17.7 4,060,806
100 PE 4,060,808
112 R 4,060,809
700 MS 4,060,810

CLASS 346
1 4,060,804
74.1 4,060,811
75 4,060,812
4,060,813
139 A 4,060,814
4,060,815

CLASS 350
87 4,060,306
96 B 4,060,307
96 C 4,060,308
4,060,309
117 4,060,310
160 R 4,060,311
189 4,060,312
269 4,060,313
285 4,060,314
289 4,060,315

CLASS 353
20 4,060,316
27 R 4,060,317
42 4,060,318

CLASS 354
4 4,060,816
25 4,060,325
198 4,060,817
266 4,060,818
293 4,060,819

CLASS 355
3 DD 4,060,319
3 R 4,060,320
8 4,060,321
60 4,060,322
4,060,323
4,060,324

CLASS 356
96 4,060,326
4,060,327
124 4,060,328
167 4,060,329

CLASS 357
13 4,060,820
22 4,060,821
30 4,060,822
4,060,823
37 4,060,824
38 4,060,825
4,060,826
54 4,060,827
71 4,060,828

CLASS 358
80 4,060,829
126 4,060,830
128 4,060,831
133 4,060,832
188 4,060,833
238 4,060,835
248 4,060,836
261 4,060,834

CLASS 360
44 4,060,837
96 4,060,838
99 4,060,839
130 4,060,840

CLASS 361
33 4,060,841
56 4,060,842
76 4,060,843
96 4,060,844

149 4,060,845
193 4,060,846
387 4,060,847

CLASS 362
13 4,060,721
32 4,060,722
4,060,724
205 4,060,723

CLASS 363
57 4,060,757

CLASS 364
200 4,060,848
4,060,849
416 4,060,713
421 4,060,718
431 4,060,714
497 4,060,717
557 4,060,715
576 4,060,716
729 4,060,719
819 4,060,850
900 4,060,794
4,060,795
4,060,851

CLASS 365
25 4,060,798
183 4,060,796

CLASS 366
40 4,060,225
75 4,060,226
169 4,060,224
179 4,060,223

CLASS 402
47 4,060,330

CLASS 403
130 4,060,331
359 4,060,332

CLASS 408
103 4,060,333
126 4,060,334
233 4,060,335

CLASS 415
80 4,060,336

CLASS 416
186 R 4,060,337
214 R 4,060,338

CLASS 417
2 4,060,339
28 4,060,340
182.5 4,060,341
284 4,060,342
309 4,060,343
330 4,060,344
360 4,060,345
4,060,346
392 4,060,347
475 4,060,348
482 4,060,349
490 4,060,350
520 4,060,351

CLASS 418
102 4,060,353
122 4,060,352

CLASS 423
149 4,060,584
164 4,060,585
167 4,060,586
210 4,060,587
242 4,060,588
244 4,060,589
328 4,060,590
352 4,060,591
448 4,060,592
492 4,060,593
573 R 4,060,594
574 R 4,060,595
633 4,060,596

CLASS 424
12 4,060,597
33 4,060,598
49 4,060,599
53 4,060,600
58 4,060,602
177 4,060,603
195 4,060,604
227 4,060,605
238 4,060,606
241 4,060,607
244 4,060,608
4,060,609
246 4,060,610
4,060,611
248.52 4,060,612
250 4,060,613
4,060,614
251 4,060,615
253 4,060,616
4,060,617
4,060,618
256 4,060,619
262 4,060,620
263 4,060,601
4,060,621
267 4,060,622
269 4,060,623
273 R 4,060,624
4,060,625
274 4,060,626
275 4,060,627
277 4,060,628
300 4,060,629
4,060,630
304 4,060,631
4,060,632
4,060,633
321 4,060,634
322 4,060,635
4,060,636
324 4,060,637
4,060,638
325 4,060,639
326 4,060,640
329 4,060,652
330 4,060,641

CLASS 425
4 R 4,060,354
7 4,060,355
8 4,060,356
36 4,060,357
65 4,060,358
78 4,060,359
83 4,060,360
131.1 4,060,361
145 4,060,362
147 4,060,363
174 4,060,364
214 4,060,365
290 4,060,366
311 4,060,367
376 B 4,060,368

CLASS 426
104 4,060,642
261 4,060,644
302 4,060,645
607 4,060,646

CLASS 427
21 4,060,647
32 4,060,648
79 4,060,649
161 4,060,650
285 4,060,651
423 4,060,653

CLASS 428
1 4,060,654
35 4,060,655
195 4,060,643
336 4,060,664
355 4,060,656
375 4,060,657
378 4,060,658
379 4,060,659
408 4,060,660
428 4,060,663
432 4,060,661
450 4,060,662
542 4,060,665

CLASS 429
91 4,060,666
103 4,060,667
122 4,060,668
152 4,060,669
154 4,060,670
174 4,060,671
191 4,060,672
192 4,060,673
194 4,060,674
4,060,675
217 4,060,676

CLASS 431
9 4,060,369
62 4,060,370
75 4,060,371
93 4,060,372
135 4,060,373
190 4,060,374

CLASS 432
14 4,060,375
24 4,060,376
50 4,060,377
96 4,060,378
179 4,060,379
4,060,380
247 4,060,381

CLASS 526
88 4,060,677
201 4,060,680
260 4,060,678
304 4,060,679

CLASS 536
10 4,060,682
50 4,060,683
56 4,060,684

CLASS 542
413 4,060,685

CLASS 544
22 4,060,686
27 4,060,687
30 4,060,688

CLASS 560
29 4,060,689
55 4,060,690
121 4,060,691
208 4,060,545
222 4,060,681

CLASSIFICATION OF DESIGNS

D2— 318 246,486
400 246,487
427 246,488
D4— 18 246,489
D6— 31 246,490
37 246,492
188 246,491
191 246,493
D7— 9 246,494
43 246,495
189 246,496
205 246,497
D8— 11 246,498
71 246,499
246,500
320 246,501
352 246,502
246,503
D9— 28 246,504
137 246,505
246,506
175 246,507
183 246,508
194 246,509
249 246,510
267 246,511
D10— 64 246,512
66 246,513
127 246,514
D11— 36 246,515
147 246,516
D12— 68 246,517
128 246,518
D14— 36 246,519
45 246,520
68 246,521
D15— 37 246,522
63 246,523
139 246,524
D16— 04 246,525
31 246,526
38 246,527
46 246,528
66 246,529
D19— 75 246,530
D22— 19 246,531
30 246,532
D23— 19 246,533
D24— 5 246,534
8 246,535
246,536
10 246,537
D27— 42 246,538
D28— 18 246,539
D30— 1 246,540
D34— 5 GH 246,541
14 D 246,543
15 B 246,545
15 M 246,544
43 246,542
D48— 20 R 246,546
24 R 246,547
D87— 1 D 246,550
1 R 246,548
246,549

CLASSIFICATION OF PLANTS

P.— 9 4,158
4,160
35 4,159

GEOGRAPHICAL INDEX OF RESIDENCE OF INVENTORS

(U.S. States, Territories and Armed Forces, the Commonwealth of Puerto Rico, and the Canal Zone)

Alabama	1	Kentucky	21	Oregon	41
Alaska	2	Louisiana	22	Pennsylvania	42
American Samoa	3	Maine	23	Puerto Rico	43
Arizona	4	Maryland	24	Rhode Island	44
Arkansas	5	Massachusetts	25	South Carolina	45
California	6	Michigan	26	South Dakota	46
Canal Zone	7	Minnesota	27	Tennessee	47
Colorado	8	Mississippi	28	Texas	48
Connecticut	9	Missouri	29	Utah	49
Delaware	10	Montana	30	Vermont	50
District of Columbia	11	Nebraska	31	Virginia	51
Florida	12	Nevada	32	Virgin Islands	52
Georgia	13	New Hampshire	33	Washington	53
Guam	14	New Jersey	34	West Virginia	54
Hawaii	15	New Mexico	35	Wisconsin	55
Idaho	16	New York	36	Wyoming	56
Illinois	17	North Carolina	37	U.S. Air Force	57
Indiana	18	North Dakota	38	U.S. Army	58
Iowa	19	Ohio	39	U.S. Navy	59
Kansas	20	Oklahoma	40		

(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

PATENTS

1 :	4,059,906
	4,060,055
	4,060,333
	4,060,714
4 :	4,060,149
	4,060,206
	4,060,219
	4,060,711
5 :	4,060,018
	4,060,159
6 :	4,059,852
	4,059,863
	4,059,867
	4,059,889
	4,059,890
	4,059,892
	4,059,893
	4,059,895
	4,059,903
	4,059,917
	4,059,922
	4,059,933
	4,059,945
	4,059,951
	4,059,955
	4,059,980
	4,059,984
	4,060,047
	4,060,068
	4,060,078
	4,060,084
	4,060,097
	4,060,108
	4,060,117
	4,060,118
	4,060,129
	4,060,133
	4,060,141
	4,060,176
	4,060,216
	4,060,225
	4,060,253
	4,060,271
	4,060,277
	4,060,301
	4,060,308
	4,060,314
	4,060,315
	4,060,319
	4,060,363
	4,060,435
	4,060,448
	4,060,454
	4,060,470
	4,060,480
	4,060,485
	4,060,490
	4,060,558
	4,060,589
	4,060,594
	4,060,651
	4,060,716
	4,060,718
	4,060,723
	4,060,726
	4,060,728
	4,060,748
	4,060,781
	4,060,819
	4,060,846
	4,060,848
	4,060,850
8 :	4,059,939
	4,060,006
	4,060,088
	4,060,230
	4,060,232
	4,060,587
	4,060,841
9 :	4,059,879
	4,059,897
	4,059,967
	4,059,985
	4,060,016
	4,060,032
	4,060,074
	4,060,077
	4,060,089
	4,060,137
	4,060,164
	4,060,266
	4,060,287
	4,060,298
	4,060,437
	4,060,523
	4,060,524
	4,060,614
	4,060,720
10 :	4,059,873
	4,060,488
	4,060,532
	4,060,624
	4,060,625
12 :	4,059,853
	4,059,910
	4,059,913
	4,059,969
	4,060,071
	4,060,111
	4,060,204
	4,060,227
	4,060,276
	4,060,282
	4,060,303
	4,060,304
	4,060,336
	4,060,843
13 :	4,059,915
	4,059,953
	4,060,247
	4,060,785
16 :	4,059,911
	4,060,041
	4,060,367
17 :	4,059,858
	4,059,875
	4,059,898
	4,059,900
	4,059,929
	4,059,958
	4,059,968
	4,059,991
	4,060,013
	4,060,054
	4,060,082
	4,060,085
	4,060,100
	4,060,107
	4,060,136
	4,060,148
	4,060,151
	4,060,157
	4,060,178
	4,060,184
	4,060,197
	4,060,214
	4,060,255
	4,060,267
	4,060,268
	4,060,289
	4,060,295
	4,060,297
	4,060,310
	4,060,312
	4,060,335
	4,060,339
	4,060,341
	4,060,380
	4,060,403
	4,060,461
	4,060,496
	4,060,506
	4,060,554
	4,060,566
	4,060,581
	4,060,620
	4,060,647
	4,060,662
	4,060,691
	4,060,697
	4,060,736
	4,060,741
	4,060,745
	4,060,751
	4,060,764
	4,060,768
	4,060,845
18 :	4,059,871
	4,059,972
	4,060,051
	4,060,145
	4,060,186
	4,060,515
	4,060,615
	4,060,688
	4,060,702
	4,060,709
	4,060,831
19 :	4,059,942
	4,060,008
	4,060,028
	4,060,049
	4,060,171
	4,060,259
	4,060,761
20 :	4,059,857
	4,060,161
	4,060,217
21 :	4,059,966
	4,059,970
	4,060,458
22 :	4,060,586
23 :	4,060,379
24 :	Re.29,482
	4,060,079
	4,060,188
	4,060,212
	4,060,243
	4,060,526
	4,060,577
	4,060,678
	4,060,729
	4,060,767
	4,060,776
	4,060,779
	4,060,790
	4,060,805
	4,060,830
25 :	Re.29,483
	Re.29,485
	4,059,859
	4,059,861
	4,059,927
	4,059,935
	4,059,959
	4,059,962
	4,059,982
	4,059,986
	4,060,081
	4,060,195
	4,060,229
	4,060,354
	4,060,398
	4,060,409
	4,060,417
	4,060,419
	4,060,424
	4,060,426
	4,060,428
	4,060,446
	4,060,504
	4,060,653
	4,060,668
	4,060,669
	4,060,673
	4,060,676
	4,060,754
	4,060,755
	4,060,778
	4,060,786
	4,060,794
	4,060,798
	4,060,809
	4,060,815
	4,060,817
	4,060,820
26 :	4,059,854
	4,059,864
	4,059,876
	4,059,943
	4,059,990
	4,060,003
	4,060,022
	4,060,023
	4,060,036
	4,060,058
	4,060,146
	4,060,170
	4,060,260
	4,060,280
	4,060,294
	4,060,337
	4,060,338
	4,060,340
	4,060,371
	4,060,381
	4,060,414
	4,060,505
	4,060,534
	4,060,578
	4,060,717
	4,060,719
	4,060,803
27 :	4,060,083
	4,060,090
	4,060,123
	4,060,175
	4,060,236
	4,060,254
	4,060,362
	4,060,433
	4,060,436
	4,060,507
	4,060,664
	4,060,671
	4,060,787
	4,060,837
28 :	4,059,884
	4,059,979
	4,060,706
29 :	4,060,000
	4,060,135
	4,060,163
	4,060,370
	4,060,444
	4,060,553
	4,060,704
33 :	4,059,908
34 :	4,059,964
	4,060,019
	4,060,070
	4,060,198
	4,060,231
	4,060,246
	4,060,250
	4,060,317
	4,060,352
	4,060,361

	4,060,374
	4,060,384
	4,060,430
	4,060,439
	4,060,447
	4,060,471
	4,060,491
	4,060,494
	4,060,495
	4,060,499
	4,060,533
	4,060,535
	4,060,568
	4,060,599
	4,060,600
	4,060,602
	4,060,604
	4,060,627
	4,060,632
	4,060,635
	4,060,638
	4,060,639
	4,060,666
	4,060,674
	4,060,683
	4,060,687
	4,060,703
	4,060,770
	4,060,810
	4,060,833
	4,060,834
	4,060,844
35 :	4,060,160
36 :	4,059,887
	4,059,901
	4,059,907
	4,059,909
	4,059,928
	4,059,993
	4,059,994
	4,060,020
	4,060,030
	4,060,038
	4,060,056
	4,060,073
	4,060,105
	4,060,152
	4,060,167
	4,060,168
	4,060,179
	4,060,189
	4,060,194
	4,060,222
	4,060,233
	4,060,235
	4,060,241
	4,060,242
	4,060,264
	4,060,292
	4,060,293
	4,060,305
	4,060,306
	4,060,316
	4,060,327
	4,060,377
	4,060,385
	4,060,386
	4,060,399
	4,060,418
	4,060,420
	4,060,427
	4,060,432
	4,060,460
	4,060,469
	4,060,477
	4,060,514
	4,060,540
	4,060,544
	4,060,555
	4,060,677
	4,060,681
	4,060,689
	4,060,693
	4,060,752
	4,060,757
	4,060,777
	4,060,783
	4,060,800
	4,060,801
	4,060,811
	4,060,812
	4,060,821
	4,060,835
37 :	4,059,920
	4,059,941
	4,060,405
	4,060,438
	4,060,456
	4,060,684
38 :	4,060,261
39 :	4,059,856
	4,059,860
	4,059,882
	4,059,883
	4,059,926
	4,059,952
	4,059,975
	4,059,997
	4,060,052
	4,060,061
	4,060,098
	4,060,110
	4,060,116
	4,060,180
	4,060,226
	4,060,252
	4,060,262
	4,060,283
	4,060,329
	4,060,346
	4,060,423
	4,060,445
	4,060,449
	4,060,459
	4,060,468
	4,060,472
	4,060,487
	4,060,502
	4,060,503
	4,060,511
	4,060,513
	4,060,545
	4,060,552
	4,060,556
	4,060,563
	4,060,567
	4,060,630
	4,060,658
	4,060,721
	4,060,769
	4,060,847
40 :	4,060,001
	4,060,112
	4,060,140
	4,060,281
	4,060,519
	4,060,520
	4,060,560
	4,060,561
	4,060,569
41 :	4,060,196
	4,060,275
	4,060,701
42 :	4,059,888
	4,059,894
	4,059,931
	4,059,936
	4,059,960
	4,059,989
	4,060,017
	4,060,025
	4,060,033
	4,060,034
	4,060,035
	4,060,132
	4,060,169
	4,060,191
	4,060,192
	4,060,224
	4,060,228
	4,060,290
	4,060,296
	4,060,300
	4,060,330
	4,060,342
	4,060,343
	4,060,356
	4,060,407
	4,060,408
	4,060,462
	4,060,489
	4,060,529
	4,060,570
	4,060,601
	4,060,610
	4,060,622
	4,060,636
	4,060,660
	4,060,663
	4,060,742
	4,060,747
	4,060,791
	4,060,799
	4,060,825
44 :	4,060,007
	4,060,173
	4,060,792
	4,060,814
45 :	4,059,880
	4,060,102
	4,060,166
	4,060,450
46 :	4,060,072
47 :	4,059,862
	4,059,878
	4,059,881
	4,059,923
	4,059,949
	4,060,121
	4,060,244
	4,060,404
48 :	4,059,872
	4,059,877
	4,059,899
	4,059,905
	4,059,912
	4,059,987
	4,060,014
	4,060,024
	4,060,060
	4,060,131
	4,060,139
	4,060,162
	4,060,177
	4,060,249
	4,060,285
	4,060,299
	4,060,328
	4,060,365
	4,060,366
	4,060,395
	4,060,400
	4,060,478
	4,060,500
	4,060,501
	4,060,509
	4,060,510
	4,060,547
	4,060,557
	4,060,565
	4,060,588
	4,060,643
	4,060,649
	4,060,715
	4,060,737
	4,060,738
	4,060,824
	4,060,839
49 :	4,059,932
	4,060,099
51 :	4,060,059
	4,060,144
	4,060,286
	4,060,412
	4,060,616
53 :	4,060,066
	4,060,240
	4,060,793
55 :	4,060,156
	4,060,205
	4,060,215
	4,060,583
	4,060,708
	4,060,735
56 :	4,060,396

DESIGN PATENTS

5 :	246,531
6 :	246,486
	246,504
	246,505
	246,506
	246,514
	246,515
	246,527
	246,534
	246,537
	246,539
	246,548
8 :	246,523
9 :	246,495
	246,507
11 :	246,545
12 :	246,521
17 :	246,491
	246,499
	246,501
	246,502
	246,503
	246,508
	246,511
18 :	246,517
19 :	246,487
21 :	246,509
25 :	246,542
27 :	246,541
28 :	246,489
36 :	246,494
	246,516
	246,546
37 :	246,490
39 :	246,520
	246,524
	246,529
	246,549
40 :	246,532
	246,547
42 :	246,498
	246,512
47 :	246,544
48 :	246,522
	246,540
53 :	246,496
55 :	246,500

PLANT PATENTS

6 :	4,158
	4,160
53 :	4,159

U. S. GOVERNMENT PRINTING OFFICE : O - 1977

CHANGE OF ADDRESS FORM

NAME—FIRST, LAST

COMPANY NAME OR ADDITIONAL ADDRESS LINE

STREET ADDRESS

CITY | STATE | ZIP CODE

PLEASE PRINT OR TYPE | (or) COUNTRY

Mail this form to: NEW ADDRESS

Superintendent of Documents
Government Printing Office SSOM
Washington, D.C. 20402

Attach last subscription label here.

SUBSCRIPTION ORDER FORM

SUBSCRIPTION ORDER FORM

ENTER MY SUBSCRIPTION TO:

@ $ Domestic; @ $ Foreign.

NAME—FIRST, LAST

COMPANY NAME OR ADDITIONAL ADDRESS LINE

STREET ADDRESS

CITY | STATE | ZIP CODE

PLEASE PRINT OR TYPE | (or) COUNTRY

☐ Remittance Enclosed (Make checks payable to Superintendent of Documents)

☐ Charge to my Deposit Account No. . . . . . .

MAIL ORDER FORM TO:
Superintendent of Documents
Government Printing Office
Washington, D.C. 20402

U S OFFICIAL GAZETTE UNITED STATES PATENT OFFICE

VOL. 964

NOVEMBER

1977

END